Douglas Partners
Geotechnics / Environment / Groundwater

Report on
Phase 2 Contamination Assessment

Proposed Stage 2 Warringah Mall Redevelopment
Corner Condamine Street & Old Pittwater Road
Brookvale

Prepared for
Scentre Design and Construction Pty Ltd

Project 71015.18
August 2018

Integrated Practical Solutions

Douglas Partners
Geotechnics | Environment | Groundwater

Document History

Document details

Project No.	71015.18	Document No.	R.003.Rev1
Document title	Phase 2 Contamination Assessment, Proposed Stage2 Warringah Mall Redevelopment		
Site address	Corner Condamine Street and Old Pittwater Road, Brookvale		
Report prepared for	Westfield Design and Construction Pty Ltd		
File name	71015.18.R.003.Rev1		

Document status and review

Revision	Prepared by	Reviewed by	Date issued
Revision 0	D Walker	L Rockett	December 2013
Revision 1	D. Walker	P. Gorman	16 August 2018

Distribution of copies

Revision	Electronic	Paper	Issued to
Revision 0	1	0	Westfield Design and Construction Pty Ltd
Revision 1	1	0	Boris Manzewski – Scentre Design & Construction Pty Ltd

The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

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bsi. ISO 9001 Quality Management
FS 604853

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Executive Summary

This report details the methodology and results of a Phase 2 Contamination Assessment associated with Stage 2 of the proposed redevelopment at Warringah Mall, corner of Condamine Street and Old Pittwater Road, Brookvale. In addition, this report provides a preliminary waste classification of soil for off-site disposal during construction. A summary of results of a preliminary acid sulphate soils (ASS) assessment, undertaken for the culvert realignment within the Stage 2 area (now completed), has also been included.

Stage 2 covers an irregularly shaped area of approximately 2.2 ha at Warringah Mall and includes: the Red car park (previously the Sand Castle) and Purple car park (previously the Crab car parks); and southern portions of Dale Street and Green Street as well as adjacent vehicle access car parks and a loading dock.

Based on the current and previous site uses, a review of documented information and site observations, a number of areas of potential sources of contamination have been identified. These included: previous commercial or industrial activities, imported filling to form/level the site; demolition of previous buildings; market gardens or agriculture; two former service stations; a dry cleaning operation up-gradient of the site; surrounding industrial uses; and hazardous materials currently used at the site.

Fieldwork comprised the drilling of 31 test bores for environmental soil sampling within the Stage 2 area as part of a wider investigation scope of 68 test bores at Warringah Mall. Two of the test bores were converted to monitoring wells. Three test bores were also used for collection of soil samples for acid sulphate soil testing.

Concentrations of all eight heavy metals in soil were within the health investigation levels (HIL) for all samples analysed. Results for polycyclic aromatic hydrocarbons (PAH) and benzo(a)pyrene toxicity equivalent were within the HIL for all analysed soil samples. Concentrations of total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene, xylenes, and naphthalene were within the respective health screening levels (HSL) and management limits for all soil samples. Concentrations of organochlorine pesticides (OCP) and phenols in soil were within the HIL.

PCB was only detected in the filling sample from Test Bore 763, depth 1.4 - 1.5 m. The detected PCB was more than 2.5 times the HSL. This is considered to be a hot-spot concentration. The source of the PCB is not known although is probably associated with the filling even though no obvious signs of contamination were observed in the filling at this location.

Asbestos was detected in one filling sample and one fibre cement material sample. The asbestos in the filling sample from Test Bore 761, depth 0.9 - 1.0 m, was identified in a fragment of fibre cement. Although fibre cement was not observed at the time of sampling, traces of brick were observed in the filling at a similar depth. Asbestos contamination may be associated with building rubble in filling. The fibre cement material sample (A1) was collected from filling at Test Bore 760, depth 1.4 m. The filling was not observed to contain building rubble. This test bore was drilled behind a retaining wall where filling is anticipated to be prevalent. Given that the parts of the site in the vicinity of Test Bores 760 and 761 are covered in asphalt, it is considered that there is not an immediate risk associated with the buried asbestos contamination.

Results of preliminary waste classification testing indicate that concentrations of chemical contaminants (i.e. excluding asbestos) are within guideline values for General Solid Waste except for the sample from Test Bore 740, depth 0.9 - 1 m. The concentration of leachable lead in this sample is above the guideline value for General Solid Waste but within the guideline value for Restricted Waste. Asbestos has been identified and is classified as Special Waste (Asbestos). Further assessment for acid sulphate soils of filling materials close to the water table will need to be undertaken to determine if treatment will be required prior to off-site disposal.

Given that some natural soils have been identified as impacted with contaminants, it is recommended that any excavated natural soil designated for off-site disposal is assessed *ex situ* in order to determine if it can disposed of as Virgin Excavated Natural Material (VENM). Note that acid sulphate soils have also been identified in the natural soil. Natural, potential acid sulphate soils (PASS) that are not contaminated can be disposed of below the water table at an appropriately licensed landfill. Where PASS cannot be classified as VENM or a suitable underwater disposal site at a landfill is not available, the soil must be treated by neutralising techniques prior to disposal to a licensed landfill in accordance with an Acid Sulphate Soil Management Plan and otherwise disposed of in accordance with its waste classification.

Field screening results and laboratory test results has indicated that potential acid sulphate soils (PASS) are present at the site. It has been assessed that:

- PASS is present below the water table within the site;
- Some natural soils above the water table could be PASS, although not to the same degree as that identified below the water table; and
- Near surface filling such as ripped/crushed sandstone is not considered to be PASS, although may have acidic properties. It is noted, however, that Warringah Mall is within an area of highly disturbed terrain and that pockets of filling may have been sourced locally from areas of acid sulphate soils. Therefore, filling, other than near-surface filling materials such as crushed sandstone and roadbase, are considered to be possible PASS, particularly filling close to the groundwater table.

An Acid Sulphate Soil Management Plan will need to be prepared if the construction approach will disturb PASS or lower the groundwater table (by dewatering). The plan will also need to account for treatment of acid sulphate soils designated for off-site disposal.

Concentrations of cadmium, chromium, lead, mercury, arsenic, copper and nickel were within the respective groundwater investigation levels (GIL). Zinc was detected in all analysed samples and was slightly in excess of the GIL in one sample. Based on DP's experience, detectable concentrations of zinc in groundwater are common in the Sydney region and the concentrations are considered to be representative of the background zinc concentration rather than contamination.

PAH, TRH, BTEX, and other VOC were not detected in any of the analysed groundwater samples. PCB, OCP and phenols were also not detected in any of the analysed groundwater samples.

Although not considered to be a contaminant, concentrations of iron indicate that, if dewatering is undertaken, treatment will be required to reduce the iron concentration to an acceptable concentration for stormwater discharge. Results of pH testing indicate slightly acidic conditions. If water is to be discharged as result of dewatering, some treatment is likely to be required to neutralise the slightly acidic conditions.

Based on the results of the investigation, the following are recommended:

- Prepare an Acid Sulphate Soil Management Plan if it is determined that the construction approach for the Stage 2 development will disturb PASS or lower the groundwater table by dewatering;
- Conduct further assessment at Test Bore 740 to better define the extent of the leachable lead for waste classification purposes; and
- Conduct further assessment of the PCB soil contamination at Test Bore 763 to better define the extent of the contamination for remediation purposes.

Further assessment to attempt to define the extent of the PCB contamination and leachable lead should involve 'step-out' sampling from Test Bores 763 and 740 respectively. It is noted that step-out investigations at these two Bores may be limited due to the presence of the stormwater culvert and other underground services. Given the presence of PCB contamination and leachable lead, a Remediation Action Plan (RAP) will be required. The extent of leachable lead, currently classified as Restricted Solid Waste, will also be confirmed by additional sampling. It is likely that the remedial approach will involve excavation and off-site disposal of the contaminated filling.

A RAP would also provide procedures for managing asbestos contamination and general dewatering procedures.

It is anticipated that some excavated soil will have hydrocarbon odours and elevated concentrations of petroleum hydrocarbons may be found between sample points especially at the former service station sites. The RAP will need to incorporate procedures for managing soil odours and an Unexpected Finds Protocol (UFP) for managing potentially contaminated soil and possible underground storage tanks identified detected during construction. Further assessment by an environmental consultant should be undertaken if exposed soils are noted to have strong hydrocarbon odours, oil/ fuel staining or oil sheens. As a precautionary measure, final placement of excavated soil with signs of fuel/ hydrocarbon contamination should not be placed below the groundwater table (or close to the groundwater table) so that the any adverse impacts on groundwater can be avoided.

In conclusion, the site can be rendered suitable for the proposed development following the successful implementation of the above recommendations.

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Glossary of Terms

ANZECC	Australian and New Zealand Conservation Council and Agriculture
ARMCANZ	Agriculture, and Resource Management Council of Australia and New Zealand
ASC NEPM	National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013
ASS	Acid sulphate soils
bgl	below ground level
BTEX	Benzene, Toluene, Ethyl Benzene, Xylenes
CLM	Contaminated Land Management
DA	Development Application
DCE	Dichloroethane
DEC	Department of Environment and Conservation
DECC	Department of Environment and Climate Change
DECCW	Department of Environment, Climate Change and Water
DP	Douglas Partners Pty Ltd
DQI	Data Quality Indicators
DQO	Data Quality Objective
DBYD	Dial-before-you-dig
EIL	Ecological Investigation Level
EPA	Environment Protection Authority
EMP	Environmental Management Plan
ESL	Environmental Screening Level
GIL	Groundwater Investigation Level
GPR	Ground Penetrating Radar
HHRA	Human health risk assessment
HIL	Heath Investigation Level
LCS	Laboratory Control Sample
LNAPL	Light non-Aqueous phase liquids
m	metres
mg/kg	milligrams per kilogram
mg/L	milligrams per litre
MNA	Monitored natural attenuation
NAA	Noel Arnold & Associates Pty Ltd
NATA	National Association of Testing Authorities, Australia
NEPM 1999	National Environment Protection (Assessment of Site Contamination) Measure 1999
NHMRC	National Health and Medical Research Council
NRMMC	National Resource Management Ministerial Council, Australia
NSW	New South Wales
µg/L	micrograms per litre

OCP	Organochlorine pesticides
OPP	Organophosphate pesticides (Organophosphorus pesticides)
OEH	Office of Environment and Heritage
OH&S	Occupational Health and Safety
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated biphenyls
PCE	Tetrachloroethene (Perchlorethylene)
PQL	Practical Quantitation Limit
pH_F	Field pH
pH_{FOX}	Field oxidised pH
PASS	Potential Acid Sulphate Soil
PPE	Personal protective equipment
PID	Photo-ionisation detector
POEO	Protection of the Environment Operations
ppm	parts per million
QA	Quality Assurance
QC	Quality Control
RAP	Remediation Action Plan
RPD	Relative Percentage Difference
SAC	Site Assessment Criteria
SOC	Substances of concern
SPOCAS	Suspension peroxide oxidation combined acidity and sulfate
TCE	Trichloroethene
TCLP	Toxicity characteristic leaching procedure
TCM	Trichloromethane
TEQ	Toxicity equivalent quotient
TMB	Trimethylbenzene
TOPIC	Total photoionisable compounds
TPH	Total petroleum hydrocarbons
TRH	Total recoverable hydrocarbons
UCL	Upper Confidence Limit
VC	Vinyl chloride
VOC	Volatile organic compounds

Report on Phase 2 Contamination Assessment
Proposed Stage 2 Warringah Mall Redevelopment
Corner Condamine Street and Old Pittwater Road, Brookvale

1. Introduction

This report details the methodology and results of a Phase 2 Contamination Assessment associated with Stage 2 of the proposed redevelopment at Warringah Mall, corner of Condamine Street and Old Pittwater Road, Brookvale. The investigation was originally commissioned by Westfield Design and Construction Pty Ltd (Westfield), in accordance with Douglas Partners' proposal dated 19 March 2013 under a Westfield Consultant Services Contract D11754, dated 8 April 2013. This report was commissioned by Scentre Design & Construction Pty Ltd.

It was understood at the time of the investigation (2013) that the proposed redevelopment of Warringah Mall involved three distinct elements:

- Stage 1: including demolition of some structures in the western and north-western parts of Warringah Mall, followed by the construction of a new mall extension and multi-storey car park (now complete);
- Stage 2: extending, redeveloping and refurbishing the existing multi-storey shopping complex within the Stage 2 area (at the east of part of Warringah Mall), including extension of existing multi-storey car park up to Level 1M.; and
- Stormwater works: comprising the realignment of the existing Brookvale Creek culverts and construction of a new replacement stormwater culvert from the Green car park (previously known as the Palm Tree car park) at the north of the site, to Condamine Street at the east (now complete).

This report provides for assessment of a selected area which is proposed to be subject to significant redevelopment works (at ground level) within the proposed Stage 2 redevelopment area. Assessment of areas for the proposed Stage 1 redevelopment and proposed stormwater works were reported separately. [Note that part of the (completed) stormwater works area overlaps with the Stage 2 area]. For the purposes of this report, the 'site' comprises much of the Red car park (previously known as the Sand Castle car park) and Purple car park (previously the Crab car park) and extends to the southern end of Green Street. Internal areas of the existing shops where there is not a change of use have not been assessed. Drawing 1, Appendix A, shows the location of the culvert alignment, Stage 1 and Stage 2 investigation areas.

The aim of the Phase 2 Contamination Assessment was to:

- Assess the potential for contamination at the site (via a review of previous assessments and investigations, as well as soil and groundwater sampling and testing);
- Provide data on the contamination status of the subsoils and groundwater present at the site; and
- Make recommendations for further investigations and/or remediation required to render the site suitable for the proposed redevelopment works.

In addition, this report provides a preliminary waste classification of soil for off-site disposal during construction. A summary of results of a preliminary acid sulphate soils (ASS) assessment, undertaken for the culvert realignment (stormwater works) within the Stage 2 area, have also been included.
The data obtained from the investigation will be used for design and construction purposes. This assessment is not subject to an audit by an accredited contaminated land auditor.

Environmental investigations at the site were undertaken concurrently with geotechnical investigations. The results of the geotechnical investigations are reported separately.

2. Scope of Works

The scope of works undertaken for the Phase 2 contamination investigation is described below:

- Conduct a Dial-Before-You-Dig (DBYD) search and underground service location prior to drilling, to locate detectable services as a precautionary measure;
- Drill 31 test bores across the site for soil sampling. The bores were drilled at least 0.5 m into natural soil or prior refusal;
- Collection of soil samples from the test bores at broadly regular intervals and based on field observations;
- Extension of two of the test bores to a depth of up to 6 m bgl and installation of a groundwater monitoring well at these two locations;
- Develop the two new wells plus four selected existing wells;
- Sample five groundwater wells using low flow techniques following stabilisation of field parameters (where possible);
- Screening of all soil samples to assess the presence of volatile organic compounds using a calibrated photo-ionisation detector (PID);
- Despatch selected primary soil samples to a National Association of Testing Authorities, Australia (NATA), accredited laboratory for quantitative analysis for the following potential contaminants:
  - Heavy metals: arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc – 47 samples;
  - Polycyclic aromatic hydrocarbons (PAH) – 47 samples;
  - Total recoverable hydrocarbons (TRH) – 47 samples;
  - Benzene, toluene, ethylbenzene and xylene (BTEX) – 47 samples;
  - Organochlorine pesticides (OCP) – 31 samples;
  - Total phenols – 31 samples;
  - Polychlorinated biphenyls (PCB) – 31 samples;
  - Volatile organic compounds (VOC) – 3 samples; and
  - Asbestos – 33 samples including 1 material sample.
- Analysis of the following soil samples for QA/QC purposes:
  - Four intra-laboratory replicates for heavy metals and PAH;

  - Two inter-laboratory replicates for heavy metals and PAH; and
  - One trip blank and trip spike for BTEX for each day of soil sampling.
- Following a review of initial soil results, extraction of nine samples using the toxicity characteristic leaching procedure (TCLP) and selective analysis of the extract for waste classification purposes;
- Despatch of primary groundwater samples to a NATA accredited laboratory for quantitative analysis for the following contaminants of potential concern and discharge parameters:
  - Heavy metals – arsenic, cadmium, chromium, copper, lead, mercury, nickel, zinc – 4 samples;
  - Iron (dissolved) – 4 samples;
  - PAH (low level analysis) – 4 samples;
  - TPH / BTEX – 4 samples;
  - Oil & grease – 4 samples;
  - OCP / PCB (trace level analysis) – 5 samples;
  - VOC – 4 samples;
  - Total phenols (and speciated phenols for one groundwater sample) – 4 samples;
  - pH – 4 samples; and
  - Hardness – 4 samples.
- Analysis of the following water samples for QA/QC purposes:
  - One intra-laboratory replicate for heavy metals and PAH; and
  - One trip spike and trip blank for BTEX.
- Provision of this contamination assessment report with reference to relevant guidelines and detailing the fieldwork methodology, analytical results and discussion of results. Results of the waste classification assessment and water discharge parameters are also discussed. In addition, reference to results of preliminary acid sulphate soil testing, undertaken as part of the assessment for the proposed culvert, has been included.

It is noted that the above scope has minor variations to the proposed scope of works (19 March 2013). These minor variations were based on drilling and observed soil and groundwater conditions.

3. Previous Investigations and Other Reports

Since 1960, numerous geotechnical reports for the Warringah Mall site have been prepared by DP. Numerous contamination assessment-related reports have also been prepared for the Warringah Mall site by DP since 2009. A list of contamination assessment reports issued prior to conducting field work (in 2013) for this assessment which are relevant to the Stage 2 assessment include:

- *Report on Phase 1 Contamination Assessment, Proposed Redevelopment Works, Warringah Mall, Pittwater Road, Brookvale*, reference 71015, prepared for Westfield Design and Construction Pty Ltd and AMP Capital Investors, April 2009 [DP, 2009a];

- *Report on Targeted Phase 2 Contamination Assessment, Stormwater Augmentation, Warringah Mall, Brookvale*, reference 71015.01, prepared for Westfield Management Ltd and Warringah Mall Pty Ltd, November 2009 [DP, 2009b];
- *Report on Human Health Risk Assessment, Warringah Mall, Old Pittwater Road, Brookvale, reference 71015.07-1, prepared for AMP Warringah Mall Pty Ltd and Westfield Management Ltd, June 2011* [DP, 2011a];
- *Report on Detailed Groundwater and Targeted Soil Assessment, Warringah Mall, Brookvale, reference 71015.06-2, prepared for AMP Capital Investors Ltd on behalf of AMP Warringah Mall Pty Ltd and Westfield Management Ltd, June 2011 [DP, 2011b];*
- *Report on Environmental Management Plan, Warringah Mall, Old Pittwater Road, Brookvale, reference 71015.10-1 Rev 1, prepared for AMP Warringah Mall Pty Ltd and Westfield Management Ltd, November 2011 [DP, 2011c]; and*
- *Groundwater Remediation Strategy, Warringah Mall, 145 Pittwater Road, Brookvale, reference 71015.11, prepared for AMP Capital Investors Pty Ltd*, 22 December 2011 [DP, 2011d].

The following reports were issued by DP after completion of field work (in 2013):

- *Report on Annual Groundwater Monitoring of May 2013, Warringah Mall, Old Pittwater Road, Brookvale, reference 71015.16, prepared for Westfield Design and Construction*, July 2013 [DP, 2013a];
- *Bi-annual Round of Groundwater Monitoring – November 2013, Warringah Mall, 145 Old Pittwater Road, Brookvale, reference 71015.23, prepared for Westfield Design and Construction,* 20 December 2013 [DP, 2013b]; and
- *Report on Annual Groundwater Monitoring of July 2014, Warringah Mall, Old Pittwater Road, Brookvale, reference 71015.29, prepared for Westfield Design and Construction,* October 2014 [DP, 2014].

It is noted that only (DP) reports relevant to the subject site have been listed above and the list does not include reference to all investigations or assessments undertaken at Warringah Mall and neighbouring properties.

The following reports were provided to DP for review (and were prepared subsequent to field work in 2013):

- Noel Arnold & Associates Pty Ltd, *Warringah Mall Data Gap Analysis – addendum, Corner Condamine Street and Old Pittwater Road*, *reference C108107:J123106, prepared for Westfield Design and Construction,* December 2013 [NAA, 2013];
- Noel Arnold & Associates Pty Ltd, *Warringah Mall PCE Plume Investigation, Corner Condamine Street and Old Pittwater Road*, *reference C108107:J124232*, *prepared for Westfield Design and Construction, 5 March 2014* [NAA, 2014]; and
- Environ Australia Pty Ltd, *Site Audit Report – Warringah Mall Chlorinated Hydrocarbon Assessment, reference AS121657, prepared for Westfield Design and Construction Pty Ltd,* June 2015 [Environ, 2015].

3.1 Phase 1 Contamination Assessment [DP, 2009a]

The objective of DP (2009a) was to assess the potential for contamination based on past and present site usage and to comment on the need for further investigations. This involved a review of site history and identification of the contaminants of concern based on the site history. The assessment was required for a Development Application (DA) submission for proposed redevelopment works to Warringah Council.

A review of historical information for Warringah Mall was undertaken including a review of historical aerial photographs, historical title deeds, a WorkCover NSW Dangerous Goods database search, a search of the local historical section of Warringah Library, a search of regulatory Notices [issued under Contaminated Land Management (CLM) Act 1997 and Protection of the Environment Operations (POEO) Act 1997], a review of Council's Section 149(2) certificate and a groundwater bore search. Reported site history information relevant to the subject site has been summarised in Section 6 of this report.

A site walkover inspection and site interview was also conducted to identify potential contaminating activities at Warringah Mall and surrounding properties. Potential sources of contamination identified from the site walkover inspection and site history relevant to the subject site has been summarised in Section 7 of this report.

The Phase 1 report identified market gardens, former service stations at the site and two adjacent land uses as potentially contaminating activities or site uses. The identified, potentially contaminating sites adjacent to Warringah Mall included Harrison Manufacturing (storage and manufacture of petroleum products) and a dry cleaning operation (as shown on Drawing 1, Appendix A). These historical and current land uses were considered to have the potential to impact the proposed redevelopment works and further detailed investigation of sub-surface conditions was recommended.

3.2 Targeted Phase 2 Contamination Assessment, Stormwater Augmentation [DP, 2009b]

DP (2009b) was undertaken at locations identified as areas of potential environmental concern in regard to proposed redevelopment at Warringah Mall. The site for the investigation was identified as an area described as 'Stormwater Augmentation Works' which corresponds closely with the culvert realignment as shown on Drawing 1, Appendix A.

The scope of work for the field investigation included the drilling of seven test bores (numbered 1 – 7) for soil sampling and the installation of three groundwater monitoring wells at Test Bores 1, 5 and 7. Test Bores 4, 5, 6, and 7 were located within the subject site. Results from these four test bores have been included as part of the current assessment (see Section 12) and the test bore logs are provided in Appendix B. All analytical results for soil samples were found to be low or below the practical quantitation limit (PQL). It was recommended that future excavation in the vicinity of Test Bore 3 should be checked for odours and/or staining during the work and, if encountered, the soil should be assessed by an environmental consultant. Groundwater testing along the alignment recorded low concentrations of chlorinated pesticides and PCB at Test Bore 5. Whilst the concentrations were considered suitable for use of the site for commercial purposes, further testing at the time of construction was recommended to be undertaken to confirm the suitability for off-site discharge should this be required for construction purposes.

A ground penetrating radar (GPR) survey was undertaken in two areas of Warringah Mall believed to be the former service stations (identified in DP [2009a]) in order to assess whether there were any residual underground storage tanks following the decommissioning of the service stations. The results of the GPR survey showed that there was no evidence of underground storage tanks remaining in either area, including the former service station area within the Stage 2 investigation area.

3.3 Human Health Risk Assessment [DP, 2011a]

DP (2011a) details the methodology and results of a Human Health Risk Assessment (HHRA) at Warringah Mall. The objectives was to characterise the nature and magnitude of human health risks associated with groundwater contamination found at the Warringah Mall site and to identify the need for any risk management strategies to reduce, if not eliminate, any unacceptable human health risk.

Based on the results of previous assessments and the recent soil vapour survey, the following substances of concern (SOC) were identified: 1,1-Dichloroethene (1,1-DCE); 1,2,4-trimethylbenzene (1,2,4-TMB); 1,3,5-trimethylbenzene (1,3,5-TMB); *Cis*-1,2-dichloroethene (*cis*-1,2-DCE); *Trans*-1,2-dichloroethene (*trans*-1,2-DCE); benzene; tetrachloroethene (PCE); toluene; trichloroethene (TCE); trichloromethane (TCM); vinyl chloride (VC); and xylenes.

Based on the source-pathway-receptor linkages the following were identified as the key issues that required quantitative assessment:

- Inhalation of SOC by adult/child shoppers in shops, offices, car parks, and in outdoor areas within the Mall;
- Inhalation of SOC by the occupants of the Child Care Centre;
- Inhalation of SOC by the Mall/shop employees; and
- Inhalation of SOC by utility/maintenance workers working in an existing utility trench within the site.

To assess the potential vapour risk, a vapour intrusion model provided in the Risk-Integrated Software for Clean-Ups (Version 4) was undertaken based on the assumption that the maximum concentration soil vapour is located under the site. The predicted air concentrations were found to be greater than the ambient air monitoring conducted at Warringah Mall which indicated that the predicted air concentrations were conservatively estimated.

It was considered that there was no unacceptable human health risk presented by the SOC at the Warringah Mall site assuming continued commercial use. It was considered, however, that if the conditions of the site change (e.g. construction of basement car park, removal of slab, etc), a review of the applicability of the assessment and/or further assessment will be required.

3.4 Detailed Groundwater and Targeted Soil Assessment [DP, 2011b]

DP (2011b) details the methodology and results of a Detailed Groundwater and Targeted Soil Assessment undertaken at Warringah Mall. The report provides information on the potential for off-site impacts, the lateral and vertical extent of groundwater contamination and the potential for natural attenuation as a remediation strategy. The report was to be submitted to the NSW Office of Environment and Heritage (OEH) to enable the OEH to determine whether the site will need to be regulated as significantly contaminated land under the CLM Act, 1997.

The objectives of the investigation were to:

- Provide evidence to determine whether PCE, TCE, DCE or VC contaminated groundwater is migrating off the Warringah Mall site towards the potential sensitive ecological receptor, Brookvale Creek;
- Assess and further delineate the lateral extent of the groundwater plume;
- Determine if the groundwater plume is naturally attenuating; and
- Assess the suspected source of the contamination (i.e. Littles Dry Cleaning) including a visual survey of the sewer system that drains Littles Dry Cleaning and traverses Warringah Mall.

Prior to fieldwork, the section of the sewer draining Littles Dry Cleaning and passing through the Aqua car park (previously the Ships Wheel car park) and Warringah Mall Child Care Centre car park was assessed using an in-pipe video camera to locate any displaced sewer joints and breaks. The sewer was found to be in good condition with the exception of some minor defects at Littles Dry Cleaning. The sewer/sewer trench was considered to be a potential source of PCE at the Mall. The highest PCE concentrations had been detected in the Child Care Centre car park near the sewer alignment.

A network with a total of 32 groundwater wells across the western part of Warringah Mall was sampled in the investigation. The wells were located in the Centre Court, shopping centre (near Target),Aqua car park (previously Ships Wheel car park), Blue car park (previously Starfish car park), Purple car park (previously Crab car park) and Warringah Mall Child Care Centre car parks. MNA parameters were analysed in addition to the contaminants of concern. Results relevant to the subject site are included in Section 12 of this report. Bore logs from wells relevant to the subject site are included in Appendix B.

It was considered that there was a strong evidence to suggest natural attenuation of PCE in groundwater is occurring. This was shown by the presence of degradation daughter products whereby the PCE concentration is reducing and is shown to be degrading to TCE which is then reducing and degrading to, and replaced by, cis-DCE and, following this trend down-gradient, VC, in very small concentrations was found below the Centre Court of the Mall. Supporting secondary lines of evidence included the results of the MNA indicator parameters and the presence of high levels of carbon dioxide and ethene in the sub-slab vapour samples conducted for the human health risk assessment. Ethene and carbon dioxide are the end points of the dechlorination chain.

Given that there is a contaminated groundwater plume beneath the site and given the timeframe for the recommended groundwater monitoring programme (see Section 3.6 of this report), a HHRA was carried out to assess the risks posed to occupants and users of the site. The report concluded that there is no unacceptable human health risk presented by the SOC at the site assuming continued commercial (land) use.

On the basis that there is no risk to human health or the nearest environmental receptor, recommendations for additional work were made to include further monitoring of the plume and Brookvale Creek; as well as prepare a suitable EMP and occupational health and safety (OH&S) plan to manage the ongoing operation of the shopping mall with respect to the underlying contaminated groundwater plume.

3.5 Environmental Management Plan [DP, 2011c]

The purpose of DP (2011c) was to provide advice and guidance to the managers of Warringah Mall to facilitate the management of groundwater and soil contamination that has been identified within Warringah Mall's boundaries. The EMP described the nature and extent of known contamination; the health implications associated with the contaminants of concern; investigations undertaken; and procedures to be adopted and implemented by management to address health and safety and environmental issues during maintenance and construction activities undertaken at the Mall from time to time.

The EMP makes reference to results of previous soil testing, groundwater monitoring and indoor air monitoring as well as the human health risk assessment. The EMP also makes provides a description of proposed groundwater monitoring and indoor air monitoring.

Requirements for the excavation and disposal of soil as well as dewatering are provided. It is noted that some projects may require pumping or dewatering and, in this event, groundwater cannot be discharged to the surface water drainage system. The options for the disposal of large volumes of water, such as that generated by spear points, will need to be assessed on a case by case basis. Small volumes of water may be able to be captured and stored in tanks or skip bins prior to disposal by a licensed liquid waste contractor. The stored water will need to be characterised (sampled and analysed) and classified before the liquid waste contractor will tanker the water from the site.

The EMP also provides information in regards environmental management procedures for works to be undertaken at Warringah Mall including: management of odorous soils or groundwater, dust control and an unexpected finds protocol. A requirement of the EMP was that, in the event that future construction or expansion of Warringah Mall takes place within the footprint of the contaminated groundwater plume which requires the removal of the existing floor slabs or pavements and the construction of new slabs and pavements, consideration needs to be given to the construction of a sub-slab vapour barrier. The objective of a sub-slab vapour barrier is to inhibit the migration of soil vapour into the air space above the slab or pavement. Such consideration will be made when the proposed works are being designed and a decision on the need to incorporate a vapour barrier will be made after consideration of groundwater contaminant concentrations and contaminant trends based on the groundwater monitoring programme. Advice will be sought from a qualified environmental consultant with experience in health risk assessments.

3.6 Groundwater Remediation Strategy [DP, 2011d]

DP (2011d) presents the strategy for the remediation of groundwater contamination at Warringah Mall. It is noted that a contaminated land auditor, Mr Graeme Nyland, reviewed the groundwater and soil assessment report [DP, 2011b] as well as other documentation.

The strategy focuses on a MNA approach as the most efficient and cost effective way to achieve the remediation of groundwater contamination. The contaminants of concern are listed as PCE and associated daughter products TCE, 1,1-DCE, trans-DCE, VC and ethene. Contingencies are also provided in the event that the data that is collected does not eventually support MNA.

Key elements of the strategy included:

- Completion of quarterly monitoring in February 2012;
- Commencement of biannual monitoring in August 2012 and completion in February 2014, with subsequent reporting;
- Extending the monitoring programme if the initial programme cannot confirm that the plume is attenuating;
- If the plume is expanding, identification and activity of microbes within the substrate (Microcosm Study);
- If PCE concentrations are increasing in the Aqua car park (previously Ships Wheel car park), initiate a detailed investigation of the sewer alignment as a source of PCE. If PCE is confirmed as present, remediate area of concern;
- If PCE concentrations continue to are increase in the Aqua car park (previously Ships Wheel car park) after remediation of the sewer trench or no contamination near the sewer has been identified, remediate the Littles Dry Cleaning site; and
- If PCE concentrations continue to increase in the Aqua car park (previously Ships Wheel car park), conduct a biostimulation pilot trial. If successful, conduct a full scale biostimulation programme.

3.7 Annual Groundwater Monitoring of May 2013 [DP, 2013a]

The report presents the results of the annual groundwater monitoring event (GME) of May 2013 in general compliance with DP (2011c). Fieldwork included sampling groundwater from 25 groundwater wells across Warringah Mall. Samples were analysed for volatile organic compounds (VOC) and natural attenuation indicators (Total organic carbon (TOC), nitrate, nitrite, chloride, sulphate, sulphide, ammonia, dissolved iron, iron (Fe^{2+}), iron (Fe^{3+}), manganese, methane, ethane and ethene and total alkalinity).

Non-aqueous phase liquids (NAPL) were not observed in any of the monitoring wells. Analytical results for VOC and iron for the subject site are included in Table 15. It is noted that VOC were not detected above the practical quantitation limits in samples from groundwater wells at the subject site.

It was concluded that remediation by natural attenuation was occurring and remained viable as a remedial approach to the identified chlorinated ethenes in groundwater at Warringah Mall.

3.8 Bi-annual Round of Groundwater Monitoring [DP, 2013b]

The letter report presents the results of the Bi-Annual groundwater monitoring round undertaken in November 2013 at Warringah Mall. Field work included the collection of samples from 25 groundwater wells across Warringah Mall. Groundwater samples were analysed for VOC.

Analytical results for VOC and iron for the subject site are included in Table 15. It is noted that VOC were not detected above the practical quantitation limits in samples from groundwater wells at the subject site.

It was concluded that the results appeared to confirm that there was continued biodegradation and reducing concentrations of the substances of concern (i.e. PCE and degradation by-products).

3.9 Data Gap Analysis [NAA, 2013]

The report presents the findings of data gap analysis which included a review of reports from DP and detailed design drawings for the redevelopment of Warringah Mall.

A Ground Penetrating Radar (GPR) scan of the area where the (former) Golden Fleece Service Station (see Section 4) was thought to be located, however, no underground structures indicative of tanks and associated infrastructure were detected, NAA assumed that the service station was decommissioned at some point after 1978 and the tanks were removed (based on the lack of information from the GPR scan). It was recommended that the area is managed under an unexpected finds protocol incorporated into the project Construction Environmental Management Plan (CEMP).

A WorkCover database search indicated that several locations within and surrounding Warringah Mall had licences for the storage of chemicals. With regard to the subject site, the building known as the Dulux Trade Centre (present in the 1960s to 1990s) at 463 Pittwater Road had a licence for a 2000 L underground storage tank for the storage of turpentine as well as a roofed store for flammable liquids. The underground storage tank was indicated to be adjacent to the western side of the Dulux Trade Centre building. The approximate location of the Dulux Trade Centre is shown on Drawing 2, Appendix A. In December 1994, it was the intention of the tenant to fill the tank with an inert solid. Apart from this, there is no documentation for decommissioning of the tank.

It was recommended that further work be undertaken to gain a better understanding of how the PCE groundwater plume will travel at the site once the hardstand and/or buildings are removed for the construction phase of the Warringah Mall development.

3.10 PCE Plume Investigation [NAA, 2014]

The objective of the investigation was to gain a greater understanding of how groundwater contamination (comprising of PCE and its breakdown products) may migrate at the site once hardstand and/or buildings are removed for construction works at Warringah Mall. The investigation included groundwater level gauging, slug testing (hydraulic conductivity testing), permeability testing and a review of previous groundwater monitoring results.

It was considered by NAA that the results of the investigation indicated that there is unlikely to be a high risk of the groundwater plume being impacted by development. Despite this, it was recommended that controls are put in place during redevelopment of the mall including at least one stormwater retention pond/retention tank in areas where hardstand will be removed; continued monitoring of contaminant concentrations within the creek and the groundwater; and general management protocols should be highlighted in the CEMP (Construction Environment Management Plan) specifically for works with soil and water impacted by the PCE plume.

3.11 Annual Groundwater Monitoring [DP, 2014]

The report presents the results of the annual groundwater monitoring event of July 2014 in general compliance with DP (2011c). Field work included sampling groundwater from 25 groundwater wells across Warringah Mall. Samples were analysed for volatile organic compounds (VOC) and natural attenuation indicators.

Analytical results for VOC and iron for the subject site are included in Table 15. It is noted that VOC were not detected above the practical quantitation limits in samples from groundwater wells at the subject site.

Based on the results of the three year monitoring programme, the following was recommended:

- Given that the groundwater plume appears to be attenuating naturally and is either decreasing in concentration and size or is static, on-going groundwater is not necessary;
- A Construction Environment Management Plan should be prepared for all future site redevelopment works to ensure that redevelopment works do not adversely affect the plume geometry and characteristics;
- Following completion of any site redevelopment works which involve significant ground disturbance and in particular any dewatering, a round of groundwater monitoring should be conducted to determine if the redevelopment works have significantly impacted the plume geometry and in particular if the dewatering activities have advanced the plume front. This may require the installation of additional groundwater wells if the redevelopment works result in the destruction of the groundwater wells;
- If future redevelopment works will result in the destruction of any of the existing groundwater wells, then prior to destruction of the wells they must be properly decommissioned (grouted) to eliminate a potential preferential pathway for cross contamination of the aquifer in the alluvial sediments and aquifer in the fractured sandstone bedrock; and
- The environmental management plan (DP 2011) for the site should be updated to reflect the results of the three-year monitoring programme and the cessation of the monitoring programme.

3.12 Site Audit Report [Environ, 2015]

The report provides the results of a Site Audit by Graeme Nyland (NSW EPA accredited Site Auditor) in regards to the volatile chlorinated hydrocarbons (VCHs) groundwater plume at Warringah Mall.

It was concluded by the Auditor that, based on the information presented in DP reports and observations made on site, the nature and extend of the VCH contamination on the site had been adequately assessed. There was considered to be no evidence of and a low potential for offsite migration of contaminated groundwater. An assessment of risks to users of the site from vapour inhalation concluded that there was unlikely to be significant inhalation health risks. Risks from dermal contact and ingestion during intrusive or maintenance works were to be managed by an environmental management plan (DP, 2011c).

The Auditor also concluded that any future development on the site would be required to adhere with the requirements in the EMP and consent conditions, which may require preparation of a remedial action plan or construction environmental management plan; and groundwater should not be extracted for beneficial use.

4. Site Description

Warringah Mall is a large shopping mall complex at Brookvale, NSW, with significant frontages to Old Pittwater Road, Cross Street and Condamine Street (becoming Pittwater Road), to the south, north and east of the mall respectively. Drawing 1, Appendix A shows a locality plan for the Mall. The subject site, primarily located within Lot 100 of Deposited Plan 1015283, covers an irregularly shaped area of approximately 2.2 ha. At the time of field work (2013) the subject site and included:

- A southern portion of Green Street, part of which is within a road reserve. The southern end of Green Street has a roundabout, part of which is within the subject site. The site could be accessed via Green Street;
- A southern portion of Dale Street. The southern end of Dale Street has a roundabout which is within the subject site. The site could be accessed via Dale Street;
- A road section and small car park between Green Street and Dale Street. The small car park was for a retail outlet (Bing Lee);
- The Sand Castle car park (now Red car park) and part of an adjacent car park to the north for a hardware store (Bunnings). The site could be exited at the northern end of the Sand Castle car park;
- A vehicle entrance road from Pittwater Road to access the Sand Caste car park (now Red car park)and Crab car park (now Purple car park);
- A loading dock area adjacent to the west of the Sand Castle car park (now Red car park);
- Most of the Crab car park (now Purple car park), which could be accessed from the north or south; and
- A two-storey commercial building (partly occupied by HCF and partly disused) near the junction of Pittwater Road and Condamine Street with adjacent parking area to the south. [The building has since been demolished].

Car parks and road surfaces within the Stage 2 investigation area were mostly asphalt. Some minor landscaping existed at the roundabouts and as strip gardens in and around parking areas. Much of the site is relatively level, with gentle slopes generally down towards the existing stormwater culvert or old alignment of Brookvale Creek. A retaining wall for a parking area wass located at the southern side of the two-storey commercial building (now demolished). Concrete ramps were also present to access car-parks on the upper levels of the Mall, beyond the investigation area.

The land to the west of the subject site comprises the Mall shops and parking areas as well as a loading dock and covered bus stop. The land to the south and east of Condamine Street and Pittwater Road comprises commercial and residential properties as well as a golf course. The land to the north of the investigation area comprises parking areas and commercial buildings including offices, shops, a hardware store and a supermarket.

Drawings 1 and 2, Appendix A, show the Stage 2 investigation area.

5 Geology, Hydrogeology and Soil Landscape

Reference to the Sydney 1:100 000 Geological Series Sheet indicates that the subject site is underlain by stream alluvium and estuarine deposits comprising silty to peaty quartz sands, silt and clay with ferruginous and humic cementation in places and common sea shells.

The Sydney 1:100 000 Soil Landscape Sheet shows that the majority of the subject site is within a soil landscape of disturbed terrain. The landscape is described as level plain to hummocky terrain, extensively disturbed by human activity, including complete disturbance, removal or burial of soil with land fill including soil, rock, building and waste materials. The soil is described as turfed fill areas commonly capped with up to 40 cm of sandy loam or up to 60 cm of compacted clay over fill or waste materials. The southern end of the subject site (Purple / Crab car park) is within the Warriewood soil landscape which is considered to be formed as a swamp. The landscape is described as level to gently undulating swales, depressions and infilled lagoons on Quaternary sands. The soil is described as deep (>150 cm), well sorted, sandy humus podzols and dark, mottled siliceous sands, overlying acid peats in depressions; and deep (>200 cm) podzols and pale siliceous sands on sandy rises.

Acid sulphate soils (ASS) are commonly used to label soils and sediments that contain iron sulphides, which, when oxidised by draining or exposure to air, form sulphuric acid. When ASS are disturbed, oxidation occurs and results in release and export of acid, aluminium, iron and other heavy metals. The acid breaks down the soil structure as it moves through the soil, eventually resulting in a skeletal collapsible formation, which settles appreciably under load but does not rebound when the load is removed. The acid strips the metal from the soil so that, following rainfall, they are transported into surrounding waterways. There are many consequential impacts including biological impacts such as fish kills and engineering impacts such as increased corrosion to structures. According to the NSW Acid Sulphate Soil Risk mapping data (1994-1998) supplied from NSW Department of Environment and Climate Change, much of the Stage 2 investigation area including the northern end of the subject site and parts of the Red car park (Sand Castle car park) and Purple car park (Crab car park); are within an area of low probability of occurrence of acid sulphate soils. The depth to acid sulphate soils is given to be greater than 3 m below the ground surface. The environmental risk is given to be generally not expected to contain acid sulphate soil materials, although highly localised occurrences may occur especially near boundaries with environments with a high probability of acid sulphate soil occurrence. The site is not considered to be close to any areas of high probability of acid sulphate soil occurrence. The Blue car park (Starfish car park) is approximately 50 m to the west of the mapped area of low probability of occurrence of acid sulphate soils. Figure 1 shows the area of low probability of occurrence of acid sulphate soil in relation to Warringah Mall.

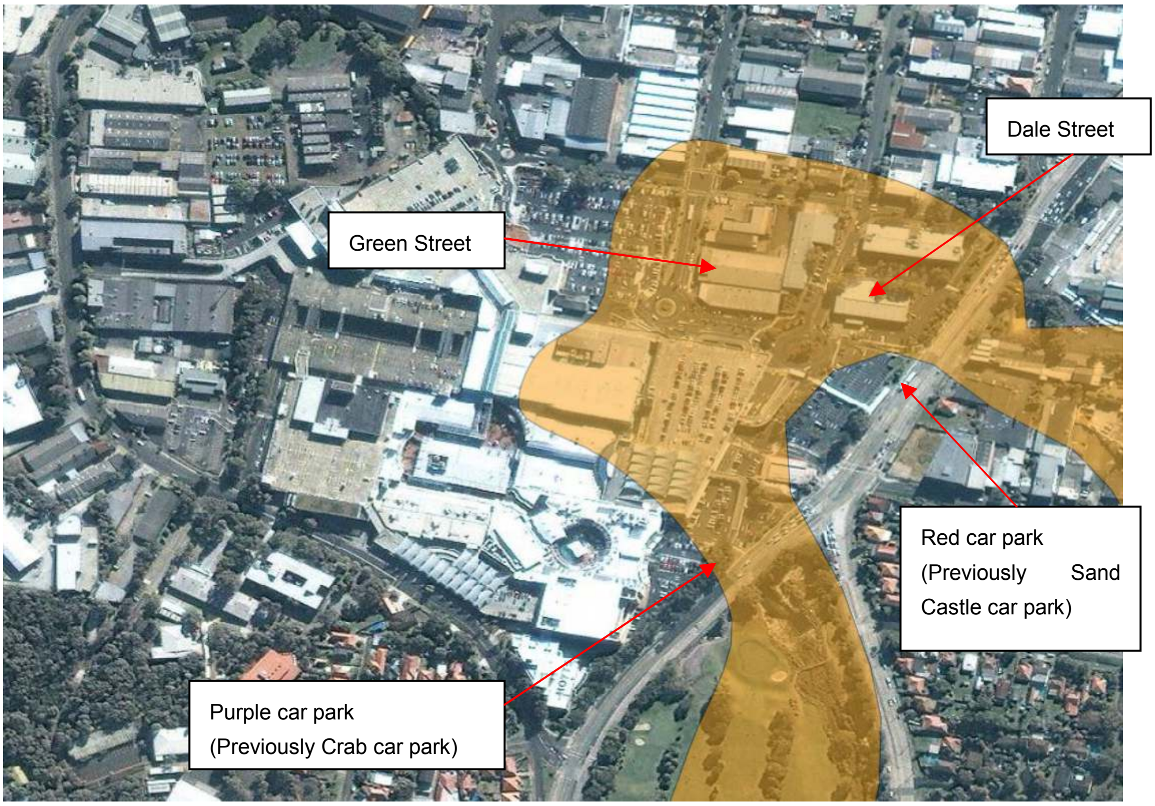


Figure 1: Area in highlighted in orange indicates a low probability of occurrence of ASS (ASS mapping: NSW DECC 1994-1998; Aerial image: Yahoo! maps)

Brookvale Creek enters the Warringah Mall site at its north-western corner, and is then culverted to the eastern side of the Mall and under Condamine Street, to return to open channel at Warringah Golf Course. The approximate alignment of the culvert is shown in Drawing 1, Appendix A and is shown to cross the Stage 2 investigation area. The historic alignment of Brookvale creek (sourced from 1943 aerial photography, www.maps.six.nsw.gov.au, NSW government land and property information, accessed 8 May 2013, imagery data by SKM), is also indicated on the drawing and is shown to cross the subject site.

Slopes at Warringah Mall are gentle and are generally down towards the existing (old) stormwater culvert or historical alignment of Brookvale Creek, for example, slopes are generally down to the west at the Red car park (Sand Castle car park) and to the east at the southern end of the Purple car park (Crab car park).

6. Site History

A site history review for Warringah Mall was conducted during the Phase 1 Contamination Assessment, DP (2009a). The key findings of the site history review relevant to the subject site are summarised below.

The Warringah Mall site was used primarily for market gardening and agricultural purposes and remained vacant up until the early 1960s when the shopping centre and commercial/ industrial properties were constructed. Extensions to the shopping centre and car park have occurred over the past fifty years.

A search of Warringah library records showed that there was a ‘Golden Fleece’ service station previously located adjacent to the subject site, on the western side of Green Street (as shown on Drawing 2, Appendix A). H. C. Sleigh Limited was the former owner of Golden Fleece (Golden Fleece later became part of Ampol Ltd). It was not known whether the Golden Fleece site was remediated upon closure (reference to such a report had not been sighted). It is also understood that some other historical properties within Warringah Mall were also previously owned by H.C. Sleigh Limited and subsequently owned by industrial companies Mynor Pty Ltd (cordial factory) and Morgan Engineering Pty Ltd. Some of these historical lots are within, or close to, the subject site (as shown on Drawing 2, Appendix A). It is possible that some sort of petroleum storage infrastructure may have also been located on this part of Warringah Mall. Title deeds records also indicated the possible location of another service station, with a historical Lot owned by Caltex Oil Pty Ltd (to the junction of Pittwater Road and Condamine Street) which is located within the subject site (as shown on Drawing 2, Appendix A).

Bulk soil disturbance during construction was indicated from photographs from the library search. Mass soil disturbance also would have occurred with the installation of the current stormwater system. Due to the extent of this disturbance it was considered that possible tanks or underground structures associated with petroleum storage would have been removed. It was also considered that this disturbance would also mitigate the potential for residual contamination associated with market gardens as the topsoil which would have been impacted with pesticide sprays would probably have been excavated and taken off site as it is an unsuitable medium for construction purposes.

A search of the NSW WorkCover dangerous goods database indicated that there were no registered dangerous goods storage depots at the subject site.

7. Potential for Contamination

Based on the current and previous site uses, DP’s review of documented information and site observations, a number of areas of potential sources of contamination have been identified. The potential sources contamination as well as the associated potential contaminants and risk are summarised in Table 1.

Table 1: Potential Sources of Contamination

Potential Source of Contamination	Description of Potential Contaminating Activity	Potential Contaminants	Potential Risk Rating
Previous commercial or industrial activities	Historical aerial photographs (DP, 2009a) showed that commercial or industrial buildings occupied the subject site since the 1960s. The previous Dulux Trade Centre had an underground storage tank for turpentine storage.	Various (TPH, PAH, VOC, phenols, heavy metals)	Low to moderate
Imported filling to form/level the site	Imported contaminated filling could have been used in site formation processes and used to level the site, particularly in areas in and around the old creek alignment. The site is within an area mapped as terrain disturbed by human activity (see Section 5).	Various (TPH, PAH, VOC, heavy metals, phenols and asbestos)	Low to moderate
Demolition of previous buildings	Given that the site has undergone significant redevelopment since the early 1960s (DP, 2009a), buildings that have previously been demolished are likely to have contained hazardous building materials such as asbestos cement sheeting, lead based paint and fluorescent light capacitors containing PCB.	Lead, asbestos and PCB	Low to moderate
Market gardens or agricultural use	Much of the site was used for market gardens prior to commercial development [DP, 2009a]. Pesticides may have been used in surficial soils, although the surficial topsoil may have been removed to accommodate construction of the mall as the material would have been unsuitable as a foundation for civil works.	OCP, heavy metals (OPP not considered to be potential contaminant given that it does not persist in the environment)	Low
Former service stations	Site history (DP, 2009a) indicated that a possible service station was located within the subject site. In addition, a 'Golden Fleece' service station was present adjacent and up-gradient to the subject site and fuel storage may have been present on neighbouring properties to this service station based on previous land ownership. It is not known if either service station was remediated once decommissioned.	TPH, PAH, VOC, phenols and lead	Moderate

Potential Source of Contamination	Description of Potential Contaminating Activity	Potential Contaminants	Potential Risk Rating
	Leaks from underground fuel tanks and associated pipes and bowsers may have contaminated soil and groundwater. Migration of contamination onto the subject site from the Golden Fleece site may occur.		
Dry cleaning operation up-gradient of site.	Dry cleaners use of chlorinated solvents. Littles Dry Cleaners is located approximately 375 m up-gradient of the Purple car park (Crab car park) (subject site). Contaminated groundwater, sourced from the dry cleaners site, is known to be present near the centre of the Mall site but has not yet been identified at the subject site from ongoing groundwater monitoring.	PCE and breakdown products (VOC)	Moderate Significant contamination has not previously been identified within the subject site.
Surrounding industrial land uses	Contamination has the potential to migrate from up-gradient contaminating industrial properties (in addition to the dry cleaner), to the subject site.	Various (TPH, PAH, VOC, PCB, heavy metals, phenols)	Low
Hazardous materials currently used at the site	Any spills of chemicals or fuels currently used at Warringah Mall may be contaminating.	TPH and VOC	Low

8. Fieldwork and Analysis

Prior to the commencement of drilling, all test locations were checked for underground services using an electronic scanner and a review of available plans. Drilling of bores for environmental sampling within the Stage 2 area commenced on the 24 April 2013 and was completed on 2 May 2013. Where possible, a differential GPS was used to determine the coordinates of each test bore. The test bore coordinates are provided in the bore logs in Appendix B.

Fieldwork comprised the drilling of 31 test bores (Test Bores 738 – 768) for environmental soil sampling within the Stage 2 area as part of a wider investigation scope of 68 test bores using a Bobcat-mounted drilling rig (as shown in Drawing 1, Appendix A). Two of the test bores (740 and 752) within the Stage 2 area were converted to monitoring wells.

Three test bores (740, 752, and 763) within the Stage 2 area were also used for collection of soil samples for acid sulphate soil testing as part of the Phase 2 contamination assessment for the proposed culvert alignment. The fieldwork methods and analytical scope for the acid sulphate soil assessment is discussed in greater detail in the Phase 2 Contamination Assessment report for the proposed culvert alignment.

8.1 Sampling Locations

The Stage 2 investigation area covers approximately 2.2 ha. The NSW EPA *Sampling Design Guidelines 1995* recommends that 32 sampling locations be adopted for a site of this size. In addition to the 31 test bores drilled for the current investigation, soil sampling data from four test bores previously drilled in 2009 (as part of previous investigations, see Section 3) have been used to supplement that of the current investigation. In this regard, soil sampling data from a total of 35 test bores means that the recommended sampling density from the guidelines has effectively been exceeded for this assessment.

The soil sample locations were designed to provide for site coverage within accessible areas of the site. Restrictions on the final design of test bore locations included:

- The location of known underground services, in particular, the stormwater culverts;
- Building structures, such as vehicle ramps and the two storey commercial building at the eastern part of the site; and
- Vehicle and pedestrian traffic movements. Sample locations were designed to not significantly impact upon the busy operations of the shopping mall as well as not to impede traffic, particularly, at Green Street and Dale Street.

Test Bores 740 and 752 were designated for the installation of groundwater monitoring wells for the following reasons:

- Groundwater sampling from these two locations can provide relevant data for the proposed culvert alignment in addition to the Stage 2 area; and
- The two new well locations complement the locations of previously installed groundwater monitoring wells (at Test Bores 5, 7, 510, 511B, and 513) in terms of providing site coverage and determining groundwater flow directions.

Drawings 1 and 2, Appendix A show the test locations.

8.2 Soil Sampling Procedures

Soil sampling was undertaken using a Bobcat-mounted drilling rig with solid flight auger attachment. Soil samples were collected at intervals based on field observations, including changes in strata and signs of contamination.

All soil sampling was performed according to standard operating procedures outlined in the DP *Field Procedures Manual* (internal manual). All sampling data was recorded on DP chain-of-custody sheets. The general soil sampling procedure comprised:

- Collect soil samples directly from the auger attachment using disposable sampling equipment;
- Transfer of samples into laboratory-prepared glass jars, and capping immediately with Teflon lined lids;

- Label sample containers with individual and unique identification, including project number, sample location and sample depth;
- Replicate samples of every sample were placed in sealed plastic bags for volatiles screening using a photo-ionisation detector (PID);
- Collection of 10% replicate samples (5% inter-laboratory replicates and 5% intra-laboratory replicates) for QA/QC purposes; and
- Placement of the sample jars into a cooled (with ice; topped up as required), insulated and sealed container for transport to the laboratory (Envirolab Services).

8.3 Soil Samples Analytical Scope and Rationale

The soil analytical scope is summarised in Table 2. The analytical scope was determined prior to the release of the National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (ASC NEPM), and was thus based around guidelines endorsed by EPA at the time of undertaking the investigation (see Section 10 for further explanation).

Table 2: Analytical Scheme for Soil Samples

Sample Location	Depth (m)	Soil Type	Heavy Metals	BTEX	TRH	PAH	OCP	PCB	Phenols	VOCs	Asbestos
738	0.4-0.5	Filling	✓	✓	✓	✓	✓	✓	✓		✓
738	0.9-1	Filling	✓	✓	✓	✓					
739	0.4-0.5	Filling	✓	✓	✓	✓					
739	0.9-1	Filling	✓	✓	✓	✓	✓	✓	✓		✓
BD2-240413		Filling	✓			✓					
740	0.4-0.5	Filling	✓	✓	✓	✓					
740	0.9-1	Filling	✓	✓	✓	✓	✓	✓	✓		✓
741	0.4-0.5	Filling	✓	✓	✓	✓	✓	✓	✓		✓
741	2.9-3	Natural		✓						✓	
742	0.4-0.5	Filling	✓	✓	✓	✓	✓	✓	✓		✓
743	0.9-1	Filling	✓	✓	✓	✓	✓	✓	✓		✓
744	0.9-1	Filling	✓	✓	✓	✓	✓	✓	✓		✓
745	0.4-0.5	Filling	✓	✓	✓	✓	✓	✓	✓		✓
746	0.9-1	Filling	✓	✓	✓	✓	✓	✓	✓		✓
746	1.4-1.5	Filling	✓	✓	✓	✓					
746	1.7-2	Natural		✓						✓	
747	0.4-0.5	Filling	✓	✓	✓	✓	✓	✓	✓		✓
BD2-290413		Filling	✓			✓					
747	0.9-1	Filling	✓	✓	✓	✓					
748	0.4-0.5	Filling	✓	✓	✓	✓	✓	✓	✓		✓
BD2-020513		Filling	✓			✓					
749	0.4-0.5	Filling	✓	✓	✓	✓	✓	✓	✓		✓

Sample Location	Depth (m)	Soil Type	Heavy Metals	BTEX	TRH	PAH	OCP	PCB	Phenols	VOCs	Asbestos
749	1-1.1	Filling	✓	✓	✓	✓					
750	1-1.2	Natural	✓	✓	✓	✓	✓	✓	✓		✓
750	2.9-3	Natural	✓	✓	✓	✓				✓	
751	0.9-1	Filling	✓	✓	✓	✓	✓	✓	✓		✓
BD1-290413		Filling	✓			✓					
752	0.6-0.7	Filling	✓	✓	✓	✓	✓	✓	✓		✓
753	0.4-0.5	Filling	✓	✓	✓	✓	✓	✓	✓		✓
754	0.4-0.5	Filling	✓	✓	✓	✓	✓	✓	✓		✓
755	0.9-1	Filling	✓	✓	✓	✓	✓	✓	✓		✓
756	0.4-0.5	Filling	✓	✓	✓	✓	✓	✓	✓		✓
756	0.9-1	Filling	✓	✓	✓	✓					
757	0.5-0.7	Filling	✓	✓	✓	✓	✓	✓	✓		✓
758	0.7-0.8	Filling	✓	✓	✓	✓	✓	✓	✓		✓
BD2-300413		Filling	✓			✓					
758	2.4-2.5	Filling	✓	✓	✓	✓					
759	1.4-1.5	Filling	✓	✓	✓	✓	✓	✓	✓		✓
759	2.9-3	Filling	✓	✓	✓	✓					
759	3.5-3.8	Filling									✓
760	0.9-1	Filling	✓	✓	✓	✓					
A1	1.4	Material									✓
760	1.4-1.5	Filling	✓	✓	✓	✓	✓	✓	✓		
761	0.9-1	Filling	✓	✓	✓	✓	✓	✓	✓		✓
761	1.9-2	Filling	✓	✓	✓	✓					
762	0.4-0.5	Filling	✓	✓	✓	✓	✓	✓	✓		✓
762	1.4-1.5	Filling	✓	✓	✓	✓					
763	1.4-1.5	Filling	✓	✓	✓	✓	✓	✓	✓		✓
764	1.4-1.5	Filling	✓	✓	✓	✓					
764	2.9-3	Filling	✓	✓	✓	✓	✓	✓	✓		✓
765	0.9-1	Filling	✓	✓	✓	✓	✓	✓	✓		✓
765	1.9-2	Filling	✓	✓	✓	✓					
766	0.9-1	Filling	✓	✓	✓	✓	✓	✓	✓		✓
BD3-010513		Filling	✓			✓					
767	0.9-1	Filling	✓	✓	✓	✓	✓	✓	✓		✓
768	0.4-0.5	Filling	✓	✓	✓	✓					
768	1.4-1.5	Filling	✓	✓	✓	✓	✓	✓	✓		✓

Notes: BD2-240413 is blind replicate of 739, 0.9-1 m
BD2-290413 is blind replicate of 747, 0.4-0.5 m
BD2-020513 is blind replicate of 748, 0.4-0.5 m
BD1-290413 is blind replicate of 751, 0.9-1 m
BD2-300413 is blind replicate of 758, 0.7-0.8 m
BD3-010513 is blind replicate of 766, 0.9-1 m

The general rationale behind the selection of soil samples and analytes was as follows:

- One sample from each test bore was selected for analysis for a large suite of potential contaminants (heavy metals, TRH, BTEX, PAH, OCP, PCB, phenols, and asbestos). These were primarily filling samples. A smaller set of (primarily filling) samples were selected for analysis of a smaller suite of more commonly encountered chemical contaminants (TRH, BTEX, PAH and heavy metals);
- Filling from Test Bore 740, depth 0.9 - 1.0 m, was analysed for asbestos as brick, terracotta and glass (building rubble materials) was observed in the filling at this location and depth and asbestos containing materials can sometimes be associated with building rubble;
- Natural soil from Test Bore 741, depth 2.9 – 3.0 m, was analysed for VOC as slight hydrocarbon odour was identified at this location and depth;
- Filling from Test Bore 744, depth 0.9 - 1.0 m, was analysed for TRH, BTEX and PAH as slight hydrocarbon odour was noted in the filling at this location and depth;
- Filling from Test Bore 746, depth 0.9 - 1.0 m, was analysed for asbestos as brick was noted in this filling;
- Natural soil from Test Bore 746, depth 1.7 - 2.0 m, was analysed for VOC as a very slight hydrocarbon odour was noted in this soil;
- Natural soil from Test Bore 750, depth 2.9 – 3.0 m, was analysed for TRH, BTEX, PAH and VOC as a slight hydrocarbon odour was identified in the natural soil at this depth;
- Filling from Test Bore 759, depth 1.4 - 1.5 m, was analysed for PAH and heavy metals as slag was identified in this filling. The filling sample from depth 3.5 – 3.8 m at this location was analysed for asbestos and PAH as tile and charcoal was identified in this filling;
- A piece of fibre cement from Test Bore 760, depth 1.4 m, was analysed for asbestos. The filling from a depth of 1.4 – 1.5 m at this test bore was also analysed for asbestos;
- Filling from Test Bore 761, depth 0.9 - 1.0 m, was analysed for asbestos as brick was identified in the filling at a depth of 1m;
- Filling from Test Bore 764, depth 2.9 - 3.0 m was analysed for asbestos as tile and other anthropogenic materials were identified in this filling; and
- Filling from Test Bore 765, depth 0.9 - 1.0 m, was analysed for asbestos as some terracotta pieces was identified in this filling.

In addition to the sample analytical scheme shown in Table 2, nine filling samples were selected for TCLP analysis for waste classification purposes. TCLP analysis for PAH was conducted on four samples with elevated total concentrations of benzo(a)pyrene. TCLP analysis for nickel was undertaken on three samples with elevated total concentrations of nickel. Similarly, TCLP analysis for lead was undertaken on seven samples with elevated total concentrations of lead.

8.4 Well Installation and Groundwater Sampling Technique

Test Bores 740 and 752 were converted into groundwater monitoring wells (piezometers). Well construction details are provided on the borehole logs in Appendix B. The piezometers were constructed of 50 mm diameter acid washed class 18 PVC casing and machine slotted well screen intervals. Joints were screw threaded, thereby avoiding the use of glues and solvents which may contaminate the groundwater. The wells were completed with a gravel pack extending above the well screen and then a bentonite plug. The wells were finished flush with the ground surface by means of a Gatic cover and concrete.

The water levels in piezometers (5, 7, 510, 513, 740 and 752) were recorded prior to development. Using an electronic interface probe which can detect the presence of separate phase liquid in the water column [such as light non-aqueous phase liquids (LNAPL) including petroleum hydrocarbons]. The water levels in the piezometers (5, 510, 513, 740 and 752) were also measured prior to sampling. Groundwater from Test Bore 7 was not sampled due to the minimal amount of water observed in the piezometer during well development. Groundwater sampling of the selected wells (5, 510, 513, and 740) was undertaken on 21 May 2013 using a low-flow geo-pump (peristaltic pump) and disposable tubing, following stabilisation of field parameters, except at Test Bore 752 which was sampled using a disposable bailer. Field parameters were obtained using a calibrated YSI Quatro Pro Plus multiparameter instrument, with probes placed inside a flow-through cell. The field parameters included temperature, dissolved oxygen (DO), electrical conductivity (EC), pH and oxidation reduction potential (redox). Field parameters were not obtained for the sample from Test bore 752 due to the minimal amount of water collected.

The pumps and all non-disposable sampling equipment was decontaminated between samples via a “triple rinse” procedure i.e. a rinse of all particulates in tap water followed a decontamination using a 3% Decon 90 solution and a final rinse in deionised water.

Samples were collected in laboratory prepared bottles and vials. The groundwater samples collected for heavy metal testing were filtered in the field through a 45 µm membrane filter into nitric acid preserved bottles.

Collection of groundwater samples was carried out in accordance with the methodology prescribed in the DP *Field Procedures Manual*. Sample handling and transport was as set out below:-

- Sample containers (supplied by the laboratory) were labelled with individual and unique identification, including project number and sample number;
- Collection of an intra-laboratory replicate sample for QA/QC purposes;
- 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.

Samples designated for analysis were dispatched to Envirolab Services, a NATA accredited laboratory.

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

The field QC procedures for sampling as prescribed in Douglas Partners' *Field Procedures Manual* were followed during the assessment. Field sampling comprised intra- and inter-laboratory replicate sampling at a rate of approximately one replicate sample for every 10-20 samples. QA/QC also consisted of the use of trip spikes and trip blanks. The comparative QA/QC results are summarised in Appendix D.

8.6 Laboratory QA/QC

The analytical laboratories that were used are NATA accredited and are required to conduct in-house QA/QC procedures. These are normally incorporated into every analytical run and include reagent blanks, spike recovery, surrogate recovery and duplicate samples. These results are included in the laboratory reports in Appendix C and are evaluated in the QA/QC report in Appendix D.

9. Data Quality Objectives

The Phase 2 Contamination Assessment has been devised broadly in accordance with the seven step data quality objective (DQO) process which is provided in Department of Environment and Conservation NSW, *Guidelines for the NSW Site Auditor Scheme* (2nd Edition), 2006. The DQO process has also been adopted in Appendix B, Schedule 2 of National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013. The seven step DQO process is as follows:

1) State the Problem;
2) Identify the Decision;
3) Identify Inputs to the Decision;
4) Define the Boundary of the Assessment;
5) Develop a Decision Rule;
6) Specify Acceptable Limits on Decision Errors; and
7) Optimise the Design for Obtaining Data.

The DQO process includes a number of data quality indicators (DQI) to confirm the quality of the data. The DQI include precision, accuracy, comparability, representativeness and completeness. The DQO and DQI are discussed in more detail in the QA/QC report in Appendix D. The DQI are undertaken to ensure that the data is reliable and that adequate sampling and analytical precision had been achieved. The DQI indicate (as discussed in Appendix D) that a satisfactory level of sampling and analytical precision was achieved to meet the objectives of the assessment.

10. Site Assessment Criteria

The National Environment Protection (Assessment of Site Contamination) Measure was originally made in 1999 (NEPM 1999) and has been recognised by stakeholders as the primary national guidance document for the assessment of site contamination in Australia. An amendment to NEPM 1999 took effect on 16 May 2013, the day after it was registered on the Federal Register of Legislative Instruments (FRLI). The amendment included the repealing of all original schedules to the NEPM 1999 and the substitution of new schedules. The NSW EPA added the amended NEPM (ASC NEPM) to the list of Guidelines approved by the EPA in June 2013 under Section 105 of the *Contaminated Land Management Act* 1997. A twelve month transition period was adopted by NSW EPA as they expected that all site contamination assessment reports dated from 16 May 2014 would be consistent with the ASC NEPM unless alternative arrangements had been agreed with the EPA.

At the time of commencement of this assessment (8 April 2013) ASC NEPM had not been approved by the NSW EPA and therefore the scope of assessment and investigation was based on the original NEPM 1999 and guidelines made or approved by NSW EPA at that time. However, given the timeframe for the proposed redevelopment (more than 12 months), it wass considered that ASC NEPM should be used as the primary source for site assessment criteria as far as practicable as this approach will better determine the requirements for potential site remediation in the future.

10.1 Soils

Table 3 shows the health investigation levels (HIL) that have been adopted as site assessment criteria for assessing the human health risk from a contaminant via all relevant pathways of exposure. The HIL have been attained from Column D (Commercial/Industrial) of Table 1A(1) of Schedule B 1 – Guideline on Investigation Levels for Soil and Groundwater, ASC NEPM. Table 3 only includes contaminants tested in this assessment (and previous site assessments) and does not include the full list provided in ASC NEPM.

Table 3: Health Investigation Levels for Soil Contaminants

Contaminant	HIL D Commercial/Industrial (mg/kg)
Metals and Inorganics	
Arsenic	3 000
Cadmium	900
Copper	240 000
Chromium (screening value based on Cr (VI))	3 600
Lead	1 500
Mercury (inorganic)	730
Nickel	6 000
Zinc	400 000
PAH	
Carcinogenic PAH (as Benzo(a)pyrene TEQ)	40
Total PAH	4 000
OCP	
DDT+DDE+DDD	3 600
Aldrin + Dieldrin	45
Chlordane	530
Endosulfan (total)	2 000
Endrin	100
Heptachlor	50
HCB	80
Methoxychlor	2 500
Phenols	
Total Phenolics (screening value based on pentachlorophenol)	660 mg/kg
Other Pesticides	
Chlorpyrifos	2 000
Other Organics	
PCB	7

It is noted that ASC NEPM, does not provide a HIL for total chromium, but does provide a HIL for chromium (VI) of 3 600 mg/kg. Similarly, ASC NEPM does not provide a HIL for total phenolics, but does provide a HIL for phenol of 240 000 mg/kg, pentachlorophenol of 660 mg/kg and cresols of 25 000 mg/kg. Therefore analytical testing undertaken for total chromium and total phenolics are considered to be screening tests. The HIL for chromium (VI) and pentachlorophenol (the lowest HIL from the listed phenols in ASC NEPM) have been adopted as the screening values. Further (speciated) analysis and assessment should be undertaken if concentrations are encountered in excess of the screening values. It is also noted that ASC NEPM does not provide HIL for the complete list of pesticide contaminants tested in this assessment.

Table 4 shows the health screening levels (HSL) for petroleum hydrocarbon compounds adopted for the assessment and are based on the exposure to petroleum hydrocarbons through the dominant vapour inhalation exposure pathway only (i.e. not direct contact to soils). The HSL have been obtained from Column HSL D (Commercials / Industrial) of Table 1A(3) of Schedule B 1, Guideline on Investigation Levels for Soil and Groundwater, ASC NEPM. Direct contact HSL have not been included as site assessment criteria as long term direct contact exposure is not considered relevant for the proposed commercial development and (as stated in Section 2.4.11 of ASC NEPM) values for direct contact are significantly higher than most other soil screening levels (and are unlikely to become drivers for further investigation or site management).

Table 4: Soil Health Screening Levels for Vapour Intrusion

Contaminant	Soil Type	HSL D Commercial/ Industrial (mg/kg)			
		depth 0 m to <1 m	depth 1 m to <2 m	depth 2 m to 4 m	depth 4 m+
Toluene	Sand	NL	NL	NL	NL
Ethylbenzene		NL	NL	NL	NL
Xylenes		230	NL	NL	NL
Naphthalene		NL	NL	NL	NL
Benzene		3	3	3	3
TPH C_6-C_{10} less BTEX		260	370	630	NL
TPH >C_{10}-C_{16} less Napthalene		NL	NL	NL	NL
Toluene	Silt	NL	NL	NL	NL
Ethylbenzene		NL	NL	NL	NL
Xylenes		NL	NL	NL	NL
Naphthalene		NL	NL	NL	NL
Benzene		4	4	6	10
TPH C_6-C_{10} less BTEX		250	360	590	NL
TPH >C_{10}-C_{16} less Napthalene		NL	NL	NL	NL
Toluene	Clay	NL	NL	NL	NL
Ethylbenzene		NL	NL	NL	NL
Xylenes		NL	NL	NL	NL
Naphthalene		NL	NL	NL	NL
Benzene		4	6	9	20
TPH C_6-C_{10} less BTEX		310	480	NL	NL
TPH >C_{10}-C_{16} less Napthalene		NL	NL	NL	NL

Note: NL Not limiting

It is noted that ASC NEPM does not provide HSL for a complete list of VOC tested for this assessment.

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

- The concentration of the contaminant is more than 2.5 times the investigation or screening level. Any location more than 2.5 times the SAC is classified as a 'hotspot', requiring further assessment/ management;
- The calculated 95% Upper Confidence Limit (95% UCL) of average concentrations (excluding any 'hotspot' concentrations) exceeds the screening or investigation level; and
- The standard deviation of the results is greater than 50% of the screening or investigation levels.

Table 5 shows the health screening levels for asbestos contamination in soil that has been attained from Column D, Table 7 (Commercial/Industrial), Schedule B 1 – Guideline on Investigation Levels for Soil and Groundwater, ASC NEPM. As the investigation was limited to collection of soil samples from test bores and a detailed characterisation of asbestos contamination in soil has not been undertaken at this stage, the presence of any detectable asbestos will be considered significant for the purpose of this assessment.

Table 5: Health Screening Levels for Asbestos Contamination in Soil

Form of asbestos	Health screening level (w/w)
Bonded asbestos-cement-material (bonded ACM)	0.05%
Fibrous asbestos (FA) and asbestos fibres (AF)	0.001%
All forms of asbestos	No visible asbestos for surface soil

In the absence of health screening levels from Australian sources, Regional Screening Levels for Industrial Soil from USA EPA *Pacific Southwest, Region 9,* November 2012, have been adopted as site assessment criteria for selected VOC. Table 6 shows the health screening levels for VOC that have been positively detected in soil during the assessment.

Table 6: Health Screening Levels for Selected VOC

VOC contaminant	Health screening level (mg/kg)
1,2,4-trimethylbenzene	260
1,3,5-trimethylbenzene	10 000
n-butylbenzene	51 000
n-propylbenzene	21 000

Note: USA EPA, November 2012 regional screening level not provided for sec-butylbenzene

According to DEC *Guidelines for the NSW Site Auditor Scheme* (2nd edition), 2006, the phytotoxicity of contaminants in soil did not require consideration for industrial and commercial sites, and, thus, the scope of the investigation did not allow for an ecological or phytotoxicity assessment of the soil. ASC NEPM, however, provides ecological investigation levels (EILs) and ecological screening levels (ESLs) for some contaminants in soil for industrial and commercial sites. The EILs have been developed for selected metals and organic substances and are applicable for assessing risk to terrestrial ecosystems and generally apply to the top 2 m of soil. ESLs have been developed for selected petroleum hydrocarbon compounds and total petroleum hydrocarbon (TPH) fractions and are also applicable for assessing risk to terrestrial ecosystems and also generally apply to the top 2 m of soil. In addition, Section 3.4.2 of ASC NEPM, states that: the relevance and scope of ecological assessment should be considered early in the development of the conceptual site model and data quality objectives; and commercial and industrial sites may have large building structures and extensive areas covered with concrete, other pavement or hardstand materials and may have limited environmental values requiring consideration while in operational use. Schedule B5a of the ASC NEPM also states, *inter alia*, *Commercial and industrial land, particularly in long-established industrial areas, is often heavily contaminated by past activities or fill materials used to level the area. In these cases, jurisdictions may determine that HILs are the most appropriate soil quality criteria and that EILs are not applicable.* Given all of the foregoing and given that the proposed development will be covered by concrete slabs or other hardstand materials, DP considers that ecological values will not apply to the site.

A section of the eastern boundary of the Stage 2 area may contain (limited) strip landscaping as part of the final development. DP considers it likely that soil to be used for landscaping is more likely to be imported than the use of site sourced soil particularly as much of the excavation will be potential acid sulphate soil (PASS). Given that strip landscaping is a minor part of the proposed development it is considered that an ecological assessment of soil designated for landscaped areas can be undertaken at a later stage.

The land immediately surrounding the Stage 2 investigation areas is used for road traffic, commercial and residential purposes as well as recreational purposes (golf course). Brookvale Creek runs through the Warringah Mall site via a concrete culvert.The concrete culvert is considered to be a barrier between the soil and creek water at the site and hence it is considered that the ecological impact of soil to the creek within the Stage 2 area does not need to be assessed. Brookvale Creek exits the culvert on the eastern side of Condamine Street, approximately 30 m from the Stage 2 investigation area. There is the potential that contaminated soil within the Stage 2 area may impact groundwater migrating towards the open creek channel, which is considered to be the closest significant ecological receptor. It is therefore considered that the ecological assessment of soil, at this stage, can be limited to the potential impact of soil contamination on groundwater, particularly as the groundwater table is not deep (i.e. less than 4 m below the surface) across a significant proportion of the site. Groundwater investigation levels are provided in Section 10.2.

ASC NEPM provides 'management limits' for TPH fractions, which are applied after consideration of relevant ESL and HSL. Management limits have been included to avoid or minimise the following potential effects of petroleum hydrocarbons:

- Formation of light non-aqueous phase liquids (LNAPL);
- Fire and explosive hazards; and
- Effects on buried infrastructure e.g. penetration of, or damage to, in-ground services by hydrocarbons.

The presence of TPH contamination at the levels of the management limits does not imply that there is no need for administrative notification or controls in accordance with jurisdictional requirements. Management limits for commercial and industrial sites are shown in Table 7 and have been adopted as site assessment criteria, secondary to criteria for health and ecological assessment.

Table 7: Management Limits for TPH Fractions in Soil

TPH Fraction	Soil Texture	Management Limit (mg/kg)
C_6-C_9	Coarse	700
	Fine	800
>C_{10}–C_{16}	Coarse	1000
	Fine	1000
>C_{16}-C_{34}	Coarse	3500
	Fine	5000
>C_{34}-C_{40}	Coarse	10 000
	Fine	10 000

10.2 Groundwater

For assessing groundwater quality, the potential uses of groundwater at, or down-gradient of, the site have been considered. Potential uses at, or down-gradient of, the site may include:

- Groundwater discharge to water bodies sustaining aquatic ecosystems. Brookvale Creek is the most likely receptor of groundwater from the site. It is noted that the creek section within Warringah Mall is enclosed within concrete box culverts and does not become an open, unlined channel until it passes under Condamine Street approximately 200 m from the subject site;
- Extraction for irrigation of gardens (considered unlikely); and
- Potential potable use (considered extremely unlikely).

It is noted that there did not appear to be any registered groundwater wells for domestic or irrigation purposes between the subject site and the open, unlined creek. It is anticipated that abstraction of groundwater for potable use between the site and Brookvale Creek will not occur in the future. It is therefore considered that any contamination encountered in groundwater at the site does not require assessment for the protection of drinking water resources.

Given that Brookvale Creek is a freshwater creek and is considered to be an ecological receptor of groundwater migrating from the site, the groundwater investigation levels (GILs) adopted for the assessment are sourced from the Australian and New Zealand Conservation Council (ANZECC), and Agriculture, and Resource Management Council of Australia and New Zealand (ARMCANZ) *Australian Water Quality Guidelines 2000* values for the protection of, as a minimum, 95% of freshwater aquatic species. Selected moderate to high reliability trigger values from the guidelines are also listed in Table 1C, Schedule B1 of ASC NEPM. Exceedance of the criteria does not necessarily mean that a substance will cause ecological harm, but prompts further investigations involving an evaluation of risk to assess whether harmful effects may occur as a result of the exceedance.

The adopted GILs for analytes and the corresponding source documents are shown in Table 8. Note that the table does not provide GILs for all chemicals tested for this assessment, but does provide applicable GILs for all chemicals detected in laboratory analysis, excluding TRH.

ANZECC & ARMCANZ, 2000 provides trigger values for individual (speciated) phenols, but not for total phenols. The detection limit for total phenols has been used as a screening criterion and is listed in Table 8 as a GIL. Similarly, ANZECC & ARMCANZ, 2000, does not provide trigger values for 1,2-dichloroethene. The National Health and Medical Research Council (NHMRC) and National Resource Management Ministerial Council, Australia (NRMMC) *National water quality management strategy, Australian drinking water guidelines*, 2011, has been sourced for a GIL for 1,2-dichloroethene as shown in Table 8.

Table 8: Groundwater Investigation Levels

Contaminant	GIL [µg/L]	Source of GIL
Volatile Organic Compounds		
Benzene	950	ANZECC & ARMCANZ (2000) low to moderate reliability trigger values, Australian Water Quality Guidelines for the protection of 95% of fresh water species
Toluene	180	
Ethylbenzene	80	
o-xylene	350	
p-xylene	200	
m-xylene	75	
Trichloroethene	330	
Vinyl Chloride (Chloroethene)	100	
1,1-dichlorothene	700	
Tetrachloroethene (PCE)	70	
1,2-dichloroethene	60	NHMRC & NRMMC (2011) drinking water value
Polycyclic Aromatic Hydrocarbons		
Naphthalene	16	ANZECC & ARMCANZ (2000) low to moderate reliability trigger values, Australian Water Quality Guidelines for the protection of 95% of fresh water species.
Benzo(a)pyrene	0.1	ANZECC & ARMCANZ (2000) low reliability trigger value, Australian Water Quality Guidelines for the protection of 99% of fresh water species.
Phenols		
Total Phenolics	50	Detection limit used as screening criterion in absence of guideline value.

Contaminant	GIL [µg/L]	Source of GIL
Metals		ANZECC & ARMCANZ (2000) low to high reliabilty trigger values, Australian Water Quality Guidelines for the protection of 95% of fresh water species. Trigger values have been adjusted for hardness where applicable: S – Soft, M – Moderate, H – Hard, VH – Very hard, EH – Extremely hard.
Arsenic (III)	24	
Arsenic (V)	13	
Cadmium	0.2(S), 0.5(M), 0.8(H), 1.1(VH), 2(EH)	
Chromium (III)	3.3(S), 8.3(M), 12(H), 16(VH), 28(EH)	
Chromium (VI)	1.0	
Copper	1.4(S), 3.5(M), 5.5(H), 7.3(VH),	
Lead	12.6(EH)	
Nickel	3.4(S), 14(M), 26(H), 40(VH), 91(EH)	
Zinc	11(S), 28(M), 43(H), 57(VH), 99(EH)	
	8(S), 20(M), 31(H), 41(VH), 72(EH)	
Mercury (inorganic)	0.06	ANZECC & ARMCANZ (2000) Australian Water Quality Guidelines for the protection of 99% of fresh water species.
Organochlorine Pesticides		ANZECC & ARMCANZ (2000) Australian Water Quality Guidelines for the protection of 99% of fresh water species.
Chlordane	0.03	
DDT	0.006	
Hetptachlor	0.01	
Polychlorinated Biphenyls		ANZECC & ARMCANZ (2000) Australian Water Quality Guidelines for the protection of 99% of fresh water species
Aroclor 1242	0.3	
Aroclor 1254	0.01	
Organophosphate Pesticides		ANZECC & ARMCANZ (2000) Australian Water Quality Guidelines for the protection of 95% of fresh water species
Diazinon	0.01	
Dimethoate	0.15	
Chloropyrifos	0.01	
Malathion	0.05	
Azinophos methyl	0.02	
Fenitrothion	0.2	
Parathion (ethyl)	0.004	

Table 9 shows the HSL for petroleum hydrocarbon compounds adopted for the assessment and are based on the exposure to petroleum hydrocarbons through the dominant vapour inhalation exposure pathway. The HSL have been obtained from Column HSL D (Commercials / Industrial) of Table 1A(4) of Schedule B 1, Guideline on Investigation Levels for Soil and Groundwater, ASC NEPM

Table 9: Groundwater Health Screening Levels for vapour intrusion

Contaminant	Soil Type	HSL D Commercial/ Industrial (µg/L)		
		depth 2 m to <4 m	depth 4 m to <8 m	depth 8 m+
Toluene	Sand	NL	NL	NL
Ethylbenzene		NL	NL	NL
Xylenes		NL	NL	NL
Naphthalene		NL	NL	NL
Benzene		5000	5000	5000
TPH C_6-C_{10} less BTEX		6000	6000	7000
TPH >C_{10}-C_{16} less Napthalene		NL	NL	NL
Toluene	Silt	NL	NL	NL
Ethylbenzene		NL	NL	NL
Xylenes		NL	NL	NL
Naphthalene		NL	NL	NL
Benzene		30000	30000	30000
TPH C_6-C_{10} less BTEX		NL	NL	NL
TPH >C_{10}-C_{16} less Napthalene		NL	NL	NL
Toluene	Clay	NL	NL	NL
Ethylbenzene		NL	NL	NL
Xylenes		NL	NL	NL
Naphthalene		NL	NL	NL
Benzene		30000	30000	35000
TPH C_6-C_{10} less BTEX		NL	NL	NL
TPH >C_{10}-C_{16} less Napthalene		NL	NL	NL

Note: NL Not limiting

It is noted that ASC NEPM does not provide HSLs for a complete list of VOC tested for this assessment.

11. Fieldwork Results

11.1 Soil Observations

Most test bores were drilled through a surface layer of asphalt which was underlain by a layer of roadbase, observed to be up to 1m thick. Various filling materials were observed to underlay the roadbase including sand, clayey sand, clay, ripped/crushed sandstone and sandy gravel. Test Bores 742, 745, and 756 were not drilled through an asphalt surface as these bore were located within garden areas. Filling at these bores was observed to be predominantly sand or silty sand. Observed filling depths were variable and ranged from 0.5 m to 3.8 m. The deepest filling was observed close to the old creek alignment and at the southern end of the investigation area. Auger refusal on concrete in filling occurred at Test Bore 742 at depth 0.5 m. Test Bore 753 was abandoned in filling at 0.7 m due to a possible underground service. Test bore logs are provided in Appendix B and should be referenced for detailed filling descriptions.

Natural soils underlying filling were observed to include silty clay, sand, clayey sand, sandy clay and clay. Sandstone was encountered at Test Bore 756, at a depth of 1.65 – 1.7 m; and Test Bore 758, at a depth of 3.2 – 3.5 m. Auger refusal on sandstone was encountered at these two bore holes. Test bore logs are provided in Appendix B and should be referenced for detailed soil descriptions.

Anthropogenic materials and signs of potential contamination observed whilst drilling are as follows:

- Filling at Test Bore 740, depth 0.6 – 1.0 m, included brick, terracotta and glass;
- A very slight hydrocarbon odour was associated with the groundwater in Test Bore 740 whilst drilling;
- A slight hydrocarbon odour at Test Bore 741 was identified in the natural soil at depth 2.0 – 3.0 m;
- A very slight hydrocarbon odour at Test Bore 744 was identified at a depth of 0.6 - 1.0 m in the filling;
- Trace nails and brick was observed at Test Bore 746, depth 0.8 m;
- A very slight hydrocarbon odour was identified in the natural soil at Test Bore 746, depth 1.5 – 2.7 m;
- A slight hydrocarbon odour was identified in the natural soil at Test bore 750, depth 2.9 – 3.0 m;
- Pieces of steel and plastic was noted in the filling at a depth of 0.5 m;
- Terracotta and brick pieces were identified in the filling at Test Bore 758, depth 0.6 – 0.9 m;
- Slag was identified in the filling at Test Bore 759, depth 1.0 – 2.6 m. Charcoal was identified in the filling at this location at depth 2.6 – 3.8 m. Trace tile was also identified at a depth of 3.5 – 3.8 m;
- A piece of fibre cement was observed at Test Bore 760, depth 1.4 m;
- Traces of brick were observed at 1.0 - 1.1 m in the filling at Test Bore 761;
- Pieces of glass, wire and tile, and a nail were observed in the filling between a depth of 0.5 m and 3.2 m at Test Bore 764;
- Terracotta pieces were observed at a depth of 0.7 – 1.0 m in the filling at Test Bore 765; and
- Trace pieces of metal was observed in the filling at a depth of 1.4 – 1.9 m at Test Bore 768.

11.2 Field Screening Results

Replicate soil samples collected from the bores in plastic bags were allowed to equilibrate under ambient temperatures before screening for total photoionisable compounds (TOPIC) using a calibrated PID. Readings from the PID are recorded on the test bore logs, Appendix B. Most readings were less than 1 ppm (with some readings at 2 - 3 ppm) indicating a low potential for volatile contaminants to be present in soil.

PID readings ranging from 4 ppm and 10 ppm were recorded at Test Bore 746, between depths of 1.7 m and 3.0 m. A PID reading of 10 ppm at Test Bore 750, depth 2.9 – 3.0 m was also recorded. Although these readings are relatively high compared to other PID results, these readings are considered to indicate a low potential for volatile contaminants to be present in soil at elevated concentrations.

Results of field screening for acid sulphate soils are included in Section 12 and discussed in Section 13.3.

11.3 Groundwater Field Measurements

Free groundwater, or water seepage, was observed in some test bores whilst drilling. Groundwater levels, from selected monitoring wells, were measured immediately prior to undertaking well development and immediately prior to undertaking groundwater sampling. Table 10 shows the measured groundwater levels and the volume of water removed for well development. Water sampled from each of the wells appeared to be clear except for some slightly turbid water from Test Bore 752. No obvious signs of contamination (such as separated phase hydrocarbons or odours) were noted in the samples.

Table 10: Groundwater Levels

Well	Ground Surface Level (m AHD)	Well development (16 May 2013)			Well sampling (21 May 2013)	
		Depth to Water (m)	Water Level (m AHD)	Approximate Volume of Water Removed (L)	Depth to Water (m)	Water Level (m AHD)
5	9.68	2.64	7.04	50	2.67	7.01
7	9.63	3.90	5.73	0.2 (to dry)	-	-
510	8.62	3.11	5.51	80	3.12	5.50
513	9.90	3.55	6.35	130	3.55	6.35
740	9.07	1.79	7.28	40 (to dry)	1.86	7.21
752	9.68	2.57	7.11	1 (to dry)	2.64	7.04

Groundwater levels indicate that the groundwater flow is generally toward the old alignment of Brookvale Creek and the current culvert alignment. Groundwater is inferred to flow:

- To the south or south-east at the north-western part of the site;
- To the west or south-west at the Red car park (previously Sand Castle car park); and
- To the north or north-east at the southern end of the site.

Drawing 3, Appendix A shows the inferred groundwater flow directions.

The groundwater sampling depth and stabilised field parameters, collected prior to groundwater sampling, are presented in Table 11.

Table 11: Stabilised Field Parameters

Well	Approximate Sample Depth (m)	pH	DO (mg/L)	Redox (mV)	Temp (°C)	EC (µS/cm)
5	3.5	6.3	0.4	-90	22.2	630
510	4.5	5.9	0.7	-80	20.3	485
513	6	5.9	0.3	-85	20	250
740	4	6.8	3.5	-40	22.7	1040
752	3	Insufficient water to take stabilization parameters (very slow water recharge in well)				

The pH values in Table 11 indicate slightly acidic conditions. Redox values indicate generally reducing conditions.

12. Laboratory Testing

The results of laboratory analysis are summarised in the following tables:

- Table 12 :Summary Results of Soil Analysis for Contamination Assessment;
- Table 13: Summary Results of Soil Analysis for Waste Classification;
- Table 14: Summary of Results of Acid Sulphate Soils Testing; and
- Table 15: Summary of Results of Water Analysis.

The full laboratory reports together with the chain of custody and sample receipt information are presented in Appendix C.

Drawing 3, in Appendix A, shows the location of soil and groundwater exceedances.

Table 12: Summary Results of Soil Analysis for Contamination Assessment (All results in mg/kg unless otherwise stated)

Sample Identification			Heavy Metals								PAHs		Petroleum Hydrocarbons													Organochlorine Pesticides (OCP)								Other Organics			Other Pesticides	
Sample Location	Sample Depth Range (m)	Soil Type	Arsenic	Cadmium	Chromium (III + VI)	Copper	Lead	Mercury	Nickel	Zinc	Benzo(a)pyrene TEQ	Total PAHs	TRH C6-C10 less BTEX	TRH >C10-C16 less Naphthalene	TRH C6-C10	TRH >C10-C16	TRH >C16-C34	TRH >C34-C40	TRH C6 - C9	TRH +C10 - C36 (Sum of total)	Naphthalene	Benzene	Toluene	Ethylbenzene	Total Xylene	DDT+DDE+DDD	Aldrin + Dieldrin	Chlordane	Endosulfan (total)	Endrin	Heptachlor	HCB	Methoxychlor	PCBs (total)	Phenols	Other VOC	Chlorpyrifos	Asbestos (fibres)
Current Investigation Results																																						
738	0.4-0.5	Filling	<4	<0.4	10	8	17	<0.1	10	24	<0.5	0.17	<25	<50	<25	<50	<100	<100	<25	<250	<0.1	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.7	<5	-	-	NAD
738	0.9-1	Filling	<4	<0.4	20	11	30	<0.1	6	27	<0.5	1.28	<25	<50	<25	<50	<100	<100	<25	<250	<0.1	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-	-	-	-	-	-	-
739	0.4-0.5	Filling	<4	<0.4	70	29	7	<0.1	66	38	<0.5	0.3	<25	<50	<25	<50	100	120	<25	205	<0.1	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-	-	-	-	-	-	-
739	0.9-1	Filling	<4	<0.4	26	14	130	<0.1	16	150	<0.5	2.59	<25	<50	<25	<50	120	<100	<25	195	<0.1	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.7	<5	-	-	NAD
BD2-240413		Filling	<4	<0.4	19	7	190	<0.1	5	190	1	4.73	-	-	-	-	-	-	-	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
740	0.4-0.5	Filling	6	<0.4	76	7	12	<0.1	9	6	<0.5	<1.55	<25	<50	<25	<50	<100	<100	<25	<250	<0.1	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-	-	-	-	-	-	-
740	0.9-1	Filling	<4	0.4	5	5	690	<0.1	2	170	<0.5	<1.55	<25	<50	<25	<50	<100	<100	<25	<250	<0.1	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.7	<5	-	-	NAD
741	0.4-0.5	Filling	<4	<0.4	61	8	34	0.2	7	16	<0.5	2.26	<25	<50	<25	<50	<100	<100	<25	<250	<0.1	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.7	<5	-	-	NAD
741	2.9-3	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-	-	-	-	ND	-	-
742	0.4-0.5	Filling	<4	<0.4	47	41	14	<0.1	49	50	<0.5	0.1	<25	<50	<25	<50	<100	<100	<25	<250	<0.1	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.7	<5	-	-	NAD
743	0.9-1	Filling	<4	<0.4	10	3	8	<0.1	3	4	<0.5	<1.55	<25	<50	<25	<50	<100	<100	<25	<250	<0.1	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.7	<5	-	-	NAD
744	0.9-1	Filling	<4	<0.4	15	6	6	<0.1	4	7	<0.5	1.7	<25	920	<25	920	670	<100	<25	1690	0.5	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.7	<5	-	-	NAD
745	0.4-0.5	Filling	<4	<0.4	13	9	14	<0.1	4	19	<0.5	<1.55	<25	<50	<25	<50	<100	<100	<25	<250	<0.1	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.7	<5	-	-	NAD
746	0.9-1	Filling	<4	<0.4	23	21	11	<0.1	20	47	<0.5	<1.55	<25	<50	<25	<50	110	<100	<25	<250	<0.1	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.7	<5	-	-	NAD
746	1.4-1.5	Filling	<4	<0.4	13	12	11	<0.1	10	19	<0.5	0.88	<25	<50	<25	<50	310	320	<25	435	<0.1	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-	-	-	-	-	-	-
746	1.7-2	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-	-	-	-	ND	-	-
747	0.4-0.5	Filling	<4	<0.4	50	<1	5	<0.1	4	6	<0.5	<1.55	<25	<50	<25	<50	<100	<100	<25	<250	<0.1	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.7	<5	-	-	NAD
BD2-290413		Filling	<4	<0.4	66	3	8	<0.1	11	9	<0.5	<1.55	-	-	-	-	-	-	-	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
747	0.9-1	Filling	5	<0.4	23	7	15	<0.1	1	6	<0.5	<1.55	<25	<50	<25	<50	<100	<100	<25	<250	<0.1	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-	-	-	-	-	-	-
748	0.4-0.5	Filling	<4	<0.4	12	15	18	<0.1	9	23	1	9.65	<25	<50	<25	<50	140	170	<25	215	<0.1	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.7	<5	-	-	NAD
BD2-020513		Filling	<4	<0.4	7	6	5	<0.1	2	7	<0.5	1.7	-	-	-	-	-	-	-	-	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
749	0.4-0.5	Filling	5	<0.4	9	8	12	<0.1	2	25	<0.5	1.79	<25	<50	<25	<50	<100	<100	<25	<250	<0.1	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.7	<5	-	-	NAD
749	1-1.1	Filling	<4	<0.4	57	13	8	0.2	33	24	<0.5	1.15	<25	<50	<25	<50	<100	150	<25	185	<0.1	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-	-	-	-	-	-	-
750	1-1.2	Filling	<4	<0.4	17	18	27	<0.1	12	42	<0.5	0.15	<25	<50	<25	<50	890	1100	<25	1225	<0.1	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.7	<5	-	-	NAD
750	2.9-3	Natural	<4	<0.4	11	<1	7	<0.1	3	<1	<0.5	<1.55	<25	<50	<25	<50	<100	<100	<25	<250	<0.1	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-	-	-	-	ND	-	-
751	0.9-1	Filling	<4	<0.4	21	<1	10	<0.1	3	3	<0.5	<1.55	<25	<50	<25	<50	<100	<100	<25	<250	<0.1	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.7	<5	-	-	NAD
BD1-290413		Filling	<4	<0.4	17	<1	9	<0.1	3	4	<0.5	<1.55	-	-	-	-	-	-	-	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
752	0.6-0.7	Filling	<4	<0.4	17	3	4	<0.1	4	5	<0.5	<1.55	<25	<50	<25	<50	<100	<100	<25	<250	<0.1	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.7	<5	-	-	NAD
753	0.4-0.5	Filling	<4	<0.4	14	13	14	<0.1	9	40	<0.5	<1.55	<25	<50	<25	<50	<100	<100	<25	<250	<0.1	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.7	<5	-	-	NAD
754	0.4-0.5	Filling	<4	<0.4	37	2	8	<0.1	4	7	<0.5	3.3	<25	<50	<25	<50	<100	<100	<25	<250	<0.1	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.7	<5	-	-	NAD
755	0.9-1	Filling	6	<0.4	6	6	3	<0.1	2	7	<0.5	<1.55	<25	<50	<25	<50	<100	<100	<25	<250	<0.1	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.7	<5	-	-	NAD
756	0.4-0.5	Filling	5	0.8	23	120	220	0.3	12	260	10	50.1	<25	<50	<25	<50	460	200	<25	575	<0.1	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<3.5	<5	-	-	NAD
756	0.9-1	Filling	<4	5.5	10	58	240	0.3	6	250	2	10	<25	<50	<25	<50	220	110	<25	255	<0.1	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-	-	-	-	-	-	-
757	0.5-0.7	Filling	<4	<0.4	20	15	13	<0.1	6	17	<0.5	0.06	<25	<50	<25	<50	<100	<100	<25	<250	<0.1	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.7	<5	-	-	NAD
758	0.7-0.8	Filling	<4	<0.4	9	31	13	<0.1	14	68	<0.5	<1.55	<25	<50	<25	<50	<100	<100	<25	<250	<0.1	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.7	<5	-	-	NAD
BD2-300413		Filling	<2	<0.4	<5	23	13	<0.05	9.9	72	<2	<1	-	-	-	-	-	-	-	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
758	2.4-2.5	Filling	8	<0.4	5	4	4	<0.1	2	10	<0.5	<1.55	<25	<50	<25	<50	<100	<100	<25	<250	<0.1	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-	-	-	-	-	-	-
759	1.4-1.5	Filling	<4	<0.4	42	36	280	0.2	4	310	1	5.04	<25	<50	<25	<50	<100	<100	<25	<250	<0.1	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.7	<5	-	-	NAD
759	2.9-3	Filling	<4	<0.4	9	6	15	0.1	2	18	<0.5	<1.55	<25	<50	<25	<50	<100	<100	<25	<250	<0.1	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-	-	-	-	-	-	-
759	3.5-3.8	Filling	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD
760	0.9-1	Filling	<4	<0.4	7	7	14	<0.1	5	23	<0.5	0.26	<25	<50	<25	<50	<100	<100	<25	<250	<0.1	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-	-	-	-	-	-	-
A1	1.4	Material	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**AD**
760	1.4-1.5	Filling	<4	0.9	14	36	53	0.2	9	140	<0.5	0.95	<25	<50	<25	<50	130	<100	<25	185	<0.1	<0.2	<0.5	<1	<3	<0.3	1.25	1.25	<0.3	<0.1	<0.1	<0.1	<0.1	<0.7	<5	-	-	NAD
761	0.9-1	Filling	<4	<0.4	83	41	6	<0.1	82	45	<0.5	0.3	<25	<50	<25	<50	<100	110	<25	<250	0.1	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.7	<5	-	-	**AD**
761	1.9-2	Filling	<4	<0.4	11	21	26	<0.1	3	22	<0.5	2.96	<25	<50	<25	<50	160	120	<25	225	<0.1	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-	-	-	-	-	-	-
762	0.4-0.5	Filling	<4	<0.4	66	4	11	<0.1	7	9	<0.5	<1.55	<25	<50	<25	<50	<100	<100	<25	<250	<0.1	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.7	<5	-	-	NAD
762	1.4-1.5	Filling	<4	<0.4	16	8	25	<0.1	11	29	<0.5	2.69	<25	<50	<25	<50	<100	<100	<25	<250	<0.1	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-	-	-	-	-	-	-
763	1.4-1.5	Filling	<4	<0.4	14	21	50	<0.1	8	74	<0.5	0.67	<25	<50	<25	<50	<100	<100	<25	<250	<0.1	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	**21**	<5	-	-	NAD
764	1.4-1.5	Filling	5	<0.4	8	14	130	0.2	2	120	2	16.2	<25	<50	<25	<50	120	<100	<25	<250	<0.1	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-	-	-	-	-	-	-
764	2.9-3	Filling	<4	<0.4	10	10	13	<0.1	3	47	<0.5	0.28	<25	<50	<25	<50	<100	<100	<25	<250	<0.1	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.7	<5	-	-	NAD
765	0.9-1	Filling	7	<0.4	21	38	140	<0.1	7	69	3	21.7	<25	<50	<25	<50	150	<100	<25	<250	<0.1	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.7	<5	-	-	NAD
765	1.9-2	Filling	5	<0.4	12	14	16	<0.1	4	110	<0.5	1.71	<25	<50	<25	<50	<100	<100	<25	<250	0.1	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-	-	-	-	-	-	-
766	0.9-1	Filling	<4	<0.4	8	11	34	<0.1	2	57	1	3.64	<25	<50	<25	<50	<100	<100	<25	<250	<0.1	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.7	<5	-	-	NAD
BD3-010513		Filling	5.8	<0.4	5.8	12	49	0.06	5.3	68	0.6	2.2	-	-	-	-	-	-	-	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
767	0.9-1	Filling	<4	<0.4	13	10	18	<0.1	9	27	<0.5	0.49	<25	<50	<25	<50	<100	<100	<25	<250	<0.1	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.7	<5	-	-	NAD
768	0.4-0.5	Filling	<4	<0.4	8	13	9	<0.1	13	36	<0.5	0.05	<25	<50	<25	<50	<100	<100	<25	<250	<0.1	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-	-	-	-	-	-	-
768	1.4-1.5	Filling	<4	<0.4	9	2	12	<0.1	<1	10	<0.5	<1.55	<25	<50	<25	<50	<100	<100	<25	<250	<0.1	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.7	<5	-	-	NAD
Previous Investigation Results																																						
4	0.3-0.5	Filling	<4	<0.5	30	16	9	<0.1	23	20	<0.5	<1.55	-	-	-	-	-	-	<25	<250	<0.1	<0.5	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.6	<5	-	<0.1	NAD
5	0.8-1	Filling	<4	<0.5	64	<1	11	<0.1	4	2	<0.5	<1.55	-	-	-	-	-	-	<25	<250	<0.1	<0.5	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.6	<5	-	<0.1	NAD
5	1.1-1.5	Filling	<4	<0.5	17	16	28	<0.1	5	30	0.9	5.2	-	-	-	-	-	-	<25	185	<0.1	<0.5	<0.5	<1	<3	-	-	-	-	-	-	-	-	-	-	-	-	-
6	0.8-1	Filling	<4	<0.5	16	3	5	<0.1	4	4	<1.55	<1.55	-	-	-	-	-	-	<25	<250	<0.1	<0.5	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.6	<5	-	<0.1	NAD
7	0.8-1	Filling	<4	<0.5	8	5	19	<0.1	4	28	0.05	0.25	-	-	-	-	-	-	<25	<250	<0.1	<0.5	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.6	<5	-	<0.1	NAD
7	1.3-1.5	Filling	<4	<0.5	19	14	20	<0.1	11	38	0.06	0.36	-	-	-	-	-	-	<25	<250	<0.1	<0.5	<0.5	<1	<3	-	-	-	-	-	-	-	-	-	-	-	-	-
Site Assessment Criteria																																						
HIL or HSL			3000	900	-	240000	1500	730	6000	400000	40	4000	250*	NL	-	-	-	-	-	-	NL	3*	NL	NL	230*	3600	45	530	2000	100	50	80	2500	7	-	-	2000	NAD
Management Limit			-	-	-	-	-	-	-	-	-	-	-	-	700**	1000	3500**	10000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes
BD2-240413 is blind replicate of 739, 0.9-1 m
BD2-290413 is blind replicate of 747, 0.9-1 m
BD2-020513 is blind replicate of 748, 0.4-0.5 m
BD1-290413 is blind replicate of 751, 0.9-1 m
BD2-300413 is blind replicate of 758, 0.7-0.8m
A1 is fibre cement sample from 760
BD3-010513 is blind replicate 766, 0.9-1 m

ND Not Detected
NL Not Limiting
NAD No Asbestos Detected
AD Asbestos Detected
Exceedence of Site Assessment Criteria (yellow)
* Only lowest HSL for vapour intrusion shown (HSL may be raised depending on soil type and soil depth)
** Only lowest management limit shown (management limit may be raised depending on soil type)

Table 13: Summary Results of Soil Analysis for Waste Classification (All results in mg/kg unless otherwise stated)

Sample Identification			Heavy Metals							PAHs			Petroleum Hydrocarbons						Organochlorine Pesticides (OCP)		Polychlorinated Byphenyls (PCB)	Organophosphorus Pesticides (OPP)		Chlorinated Volatile Organic Compounds (VOC)	Asbestos (fibres)
Sample Location	Sample Depth Range (m)	Soil Type	Arsenic	Cadmium	Lead	TCLP Lead (mg/L)	Mercury	Nickel	TCLP Nickel (mg/L)	Benzo(a)pyrene	TCLP Benzo(a)pyrene (mg/L)	Total PAHs	TRH C6 - C9	TRH +C10 - C36 (Sum of total)	Benzene	Toluene	Ethylbenzene	Total Xylene	Endosulfan (total)	Total OCP	Total PCB	Chloripyrifos	Total OPP		
Current Investigation Results																									
737	0.4-0.5	Filling	<4	<0.4	9	-	<0.1	1	-	<0.05	-	<1.55	<25	<250	<0.2	<0.5	<1	<3	<0.3	<2	<0.7	-	-	-	NAD
737	1.4-1.5	Natural	<4	<0.4	15	-	<0.1	2	-	<0.05	-	<1.55	<25	<250	<0.2	<0.5	<1	<3	<0.3	-	-	-	-	-	-
738	0.4-0.5	Filling	<4	<0.4	17	-	<0.1	10	-	0.07	-	0.17	<25	<250	<0.2	<0.5	<1	<3	<0.3	<2	<0.7	-	-	-	NAD
738	0.9-1	Filling	<4	<0.4	30	-	<0.1	6	-	0.18	-	1.28	<25	<250	<0.2	<0.5	<1	<3	<0.3	-					
739	0.4-0.5	Filling	<4	<0.4	7	-	<0.1	66	0.05	<0.05	-	0.3	<25	205	<0.2	<0.5	<1	<3	<0.3	-	-	-	-	-	-
739	0.9-1	Filling	<4	<0.4	130	-	<0.1	16	-	0.39	-	2.59	<25	195	<0.2	<0.5	<1	<3	<0.3	<2	<0.7	-	-	-	NAD
BD2-240413		Filling	<4	<0.4	190	0.4	<0.1	5	-	0.53	-	4.73	-	-	-	-	-	-	-	-	-	-	-	-	-
740	0.4-0.5	Filling	6	<0.4	12	-	<0.1	9	-	<0.05	-	<1.55	<25	<250	<0.2	<0.5	<1	<3	<0.3	-	-	-	-	-	-
740	0.9-1	Filling	<4	0.4	**690**	**9.2**	<0.1	2	-	<0.05	-	<1.55	<25	<250	<0.2	<0.5	<1	<3	<0.3	<2	<0.7	-	-	-	NAD
741	0.4-0.5	Filling	<4	<0.4	34	-	0.2	7	-	0.16	-	2.26	<25	<250	<0.2	<0.5	<1	<3	<0.3	<2	<0.7	-	-	-	NAD
741	2.9-3	Natural	-	-	-	-	-	-	-	-	-	-	-	-	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-
742	0.4-0.5	Filling	<4	<0.4	14	-	<0.1	49	<0.02	<0.05	-	0.1	<25	<250	<0.2	<0.5	<1	<3	<0.3	<2	<0.7	-	-	-	NAD
743	0.9-1	Filling	<4	<0.4	8	-	<0.1	3	-	<0.05	-	<1.55	<25	<250	<0.2	<0.5	<1	<3	<0.3	<2	<0.7	-	-	-	NAD
744	0.9-1	Filling	<4	<0.4	6	-	<0.1	4	-	<0.05	-	1.7	<25	1690	<0.2	<0.5	<1	<3	<0.3	<2	<0.7	-	-	-	NAD
745	0.4-0.5	Filling	<4	<0.4	14	-	<0.1	4	-	<0.05	-	<1.55	<25	<250	<0.2	<0.5	<1	<3	<0.3	<2	<0.7	-	-	-	NAD
746	0.9-1	Filling	<4	<0.4	11	-	<0.1	20	-	<0.05	-	<1.55	<25	<250	<0.2	<0.5	<1	<3	<0.3	<2	<0.7	-	-	-	NAD
746	1.4-1.5	Filling	<4	<0.4	11	-	<0.1	10	-	0.08	-	0.88	<25	435	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-
746	1.7-2	Natural	-	-	-	-	-	-	-	-	-	-	-	-	<0.2	<0.5	<1	<3	-	-	-	-	-	ND	-
747	0.4-0.5	Filling	<4	<0.4	5	-	<0.1	4	-	<0.05	-	<1.55	<25	<250	<0.2	<0.5	<1	<3	<0.3	<2	<0.7	-	-	-	NAD
BD2-290413		Filling	<4	<0.4	8	-	<0.1	11	-	<0.05	-	<1.55	-	-	-	-	-	-	-	-	-	-	-	-	-
747	0.9-1	Filling	5	<0.4	15	-	<0.1	1	-	<0.05	-	<1.55	<25	<250	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-
748	0.4-0.5	Filling	<4	<0.4	18	-	<0.1	9	-	0.65	-	9.65	<25	215	<0.2	<0.5	<1	<3	<0.3	<2	<0.7	-	-	-	NAD
BD2-020513		Filling	<4	<0.4	5	-	<0.1	2	-	<0.05	-	1.7	-	-	-	-	-	-	-	-	-	-	-	-	-
749	0.4-0.5	Filling	5	<0.4	12	-	<0.1	2	-	0.19	-	1.79	<25	<250	<0.2	<0.5	<1	<3	<0.3	<2	<0.7	-	-	-	NAD
749	1-1.1	Filling	<4	<0.4	8	-	0.2	33	-	0.15	-	1.15	<25	185	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-
750	1-1.2	Filling	<4	<0.4	27	-	<0.1	12	-	0.05	-	0.15	<25	1225	<0.2	<0.5	<1	<3	<0.3	<2	<0.7	-	-	-	NAD
750	2.9-3	Natural	<4	<0.4	7	-	<0.1	3	-	<0.05	-	<1.55	<25	<250	<0.2	<0.5	<1	<3	-	-	-	-	-	ND	-
751	0.9-1	Natural	<4	<0.4	10	-	<0.1	3	-	<0.05	-	<1.55	<25	<250	<0.2	<0.5	<1	<3	<0.3	<2	<0.7	-	-	-	NAD
BD1-290413		Filling	<4	<0.4	9	-	<0.1	3	-	<0.05	-	<1.55	-	-	-	-	-	-	-	-	-	-	-	-	-
752	0.6-0.7	Filling	<4	<0.4	4	-	<0.1	4	-	<0.05	-	<1.55	<25	<250	<0.2	<0.5	<1	<3	<0.3	<2	<0.7	-	-	-	NAD
753	0.4-0.5	Filling	<4	<0.4	14	-	<0.1	9	-	<0.05	-	<1.55	<25	<250	<0.2	<0.5	<1	<3	<0.3	<2	<0.7	-	-	-	NAD
754	0.4-0.5	Filling	<4	<0.4	8	-	<0.1	4	-	0.3	-	3.3	<25	<250	<0.2	<0.5	<1	<3	<0.3	<2	<0.7	-	-	-	NAD
755	0.9-1	Filling	6	<0.4	3	-	<0.1	2	-	<0.05	-	<1.55	<25	<250	<0.2	<0.5	<1	<3	<0.3	<2	<0.7	-	-	-	NAD
756	0.4-0.5	Filling	5	0.8	220	0.03	0.3	12	-	6.3	<0.001	50.1	<25	575	<0.2	<0.5	<1	<3	<0.3	<2	<3.5	-	-	-	NAD
756	0.9-1	Filling	<4	5.5	240	0.2	0.3	6	-	1.3	<0.001	10	<25	255	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-
757	0.5-0.7	Filling	<4	<0.4	13	-	<0.1	6	-	0.06	-	0.06	<25	<250	<0.2	<0.5	<1	<3	<0.3	<2	<0.7	-	-	-	NAD
758	0.7-0.8	Filling	<4	<0.4	13	-	<0.1	14	-	<0.05	-	<1.55	<25	<250	<0.2	<0.5	<1	<3	<0.3	<2	<0.7	-	-	-	NAD
BD2-300413		Filling	<2	<0.4	13	-	<0.05	9.9	-	<0.5	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-
758	2.4-2.5	Filling	8	<0.4	4	-	<0.1	2	-	<0.05	-	<1.55	<25	<250	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-
759	1.4-1.5	Filling	<4	<0.4	280	0.7	0.2	4	-	0.64	-	5.04	<25	<250	<0.2	<0.5	<1	<3	<0.3	<2	<0.7	-	-	-	NAD
759	2.9-3	Filling	<4	<0.4	15	-	0.1	2	-	<0.05	-	<1.55	<25	<250	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-
759	3.5-3.8	Filling	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD
760	0.9-1	Filling	<4	<0.4	14	-	<0.1	5	-	0.06	-	0.26	<25	<250	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-
A1	1.4	Material	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**AD**
760	1.4-1.5	Filling	<4	0.9	53	-	0.2	9	-	0.15	-	0.95	<25	185	<0.2	<0.5	<1	<3	<0.3	2.5	<0.7	-	-	-	NAD
761	0.9-1	Filling	<4	<0.4	6	-	<0.1	82	0.06	<0.05	-	0.3	<25	<250	<0.2	<0.5	<1	<3	<0.3	<2	<0.7	-	-	-	**AD**
761	1.9-2	Filling	<4	<0.4	26	-	<0.1	3	-	0.36	-	2.96	<25	225	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-
762	0.4-0.5	Filling	<4	<0.4	11	-	<0.1	7	-	<0.05	-	<1.55	<25	<250	<0.2	<0.5	<1	<3	<0.3	<2	<0.7	-	-	-	NAD
762	1.4-1.5	Filling	<4	<0.4	25	-	<0.1	11	-	0.39	-	2.69	<25	<250	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-
763	1.4-1.5	Filling	<4	<0.4	50	-	<0.1	8	-	0.17	-	0.67	<25	<250	<0.2	<0.5	<1	<3	<0.3	<2	21	-	-	-	NAD
764	1.4-1.5	Filling	5	<0.4	130	0.3	0.2	2	-	1.7	<0.001	16.2	<25	<250	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-
764	2.9-3	Filling	<4	<0.4	13	-	<0.1	3	-	0.08	-	0.28	<25	<250	<0.2	<0.5	<1	<3	<0.3	<2	<0.7	-	-	-	NAD
765	0.9-1	Filling	7	<0.4	140	0.4	<0.1	7	-	2	<0.001	21.7	<25	<250	<0.2	<0.5	<1	<3	<0.3	<2	<0.7	-	-	-	NAD
765	1.9-2	Filling	5	<0.4	16	-	<0.1	4	-	0.11	-	1.71	<25	<250	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-
766	0.9-1	Filling	<4	<0.4	34	-	<0.1	2	-	0.44	-	3.64	<25	<250	<0.2	<0.5	<1	<3	<0.3	<2	<0.7	-	-	-	NAD
BD3-010513		Filling	5.8	<0.4	49	-	0.06	5.3	-	0.6	-	2.2	-	-	-	-	-	-	-	-	-	-	-	-	-
767	0.9-1	Filling	<4	<0.4	18	-	<0.1	9	-	0.09	-	0.49	<25	<250	<0.2	<0.5	<1	<3	<0.3	<2	<0.7	-	-	-	NAD
768	0.4-0.5	Filling	<4	<0.4	9	-	<0.1	13	-	0.05	-	0.05	<25	<250	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-
768	1.4-1.5	Filling	<4	<0.4	12	-	<0.1	<1	-	<0.05	-	<1.55	<25	<250	<0.2	<0.5	<1	<3	<0.3	<2	<0.7	-	-	-	NAD
Previous Investigation Results																									
4	0.3-0.5	Filling	<4	<0.5	9	-	<0.1	23	-	<0.05	-	<1.55	<25	<250	<0.5	<0.5	<1	<3	<0.3	<2	<0.6	<0.1	<0.8	-	NAD
5	0.8-1	Filling	<4	<0.5	11	-	<0.1	4	-	<0.05	-	<1.55	<25	<250	<0.5	<0.5	<1	<3	<0.3	<2	<0.6	<0.1	<0.8	-	NAD
5	1.1-1.5	Filling	<4	<0.5	28	-	<0.1	5	-	0.7	-	5.2	<25	110	<0.5	<0.5	<1	<3	-	-	-	-	-	-	-
6	0.8-1	Filling	<4	<0.5	5	-	<0.1	4	-	<0.05	-	<1.55	<25	<250	<0.5	<0.5	<1	<3	<0.3	<2	<0.6	<0.1	<0.8	-	NAD
7	0.8-1	Filling	<4	<0.5	19	-	<0.1	4	-	0.05	-	0.25	<25	<250	<0.5	<0.5	<1	<3	<0.3	<2	<0.6	<0.1	<0.8	-	NAD
7	1.3-1.5	Filling	<4	<0.5	20	-	<0.1	11	-	0.06	-	0.36	<25	<250	<0.5	<0.5	<1	<3	-	-	-	-	-	-	-
Maximum values of Specific Contaminant Concentration for classification without TCLP																									
General Solid Waste (CT1)			100	20	100	-	4	40	-	0.8	-	200	650	10000	10	288	600	1000	60	<50*	<50	4	250**	- ***	NAD
Maximum values for Specific Contaminant Concentration and Leachable Concentration (with TCLP) when used together																									
General Solid Waste (SCC1 & TCLP1)			500	100	1500	5	50	1050	2	10	0.04	200	650	10000	18	518	1080	1800	108	<50*	<50	7.5	250**	- ***	NAD
Restricted Solid Waste (SCC2 & TCLP2)			2000	400	6000	20	200	4200	8	23	0.16	800	2600	40000	72	2073	4320	7200	432	<50*	<50	30	1000**	- ***	NAD

Notes
BD2-240413 is blind replicate of 739, 0.9-1m
BD2-290413 is blind replicate of 747, 0.4-0.5m
BD2-020513 is blind replciate of 748, 0,4-0.5m
BD1-290413 is blind replicate of 751 ,0.9-1m
BD2-300413 is blind replciate of 758, 0.7-0.8m
BD3-010513 is blind replicate of 767, 0.9-1m
ND Not detected
NAD No Asbestos Detected
Bold Exceedence of General Solid Waste Criteria
AD Asbestos Detected
* Value for scheduled chemicals
** Value for moderately harmful pesticides

Table 14: Summary of Results for Acid Sulphate Soils Testing

Sample Location	Depth (m)	Soil Description (see logs for full description)	Screening Tests			sPOCAS Laboratory Results										
			pH_F	pH_{FOX}	Strength of Reaction (1,2,3,4; F)*	pH_{KCl}	pH_{Ox}	TAA (moles H^+/t)	TSA (moles H^+/t)	TPA (moles H^+/t)	$a\text{-}S_{NAS}$ (moles H^+/t)	$a\text{-}ANC_E$ (moles H^+/t)	a-Net Acidity (moles H^+/t)	S_{KCl} (%w/w S)	S_{POS} (%w/w S)	S_P (%w/w S)
740	0.4-0.5	Clay filling, trace silt, sand & gravel	7.1	4.6	1	-	-	-	-	-	-	-	-	-	-	-
	0.9-1.0	Sand filling, some gravel, trace brick, terracotta, glass	6.5	4.3	1	-	-	-	-	-	-	-	-	-	-	-
	1.4-1.5	Sand and clay filling (possibly reworked natural)	6.4	4.0	1	-	-	-	-	-	-	-	-	-	-	-
	1.9-2.0	Clayey sand, moist	10.7	10.7	2-3F	-	-	-	-	-	-	-	-	-	-	-
	2.4-2.5		11.2	10.3	2-3F	-	-	-	-	-	-	-	-	-	-	-
	2.9-3.0		10.0	7.0	2-3F	-	-	-	-	-	-	-	-	-	-	-
	3.4-3.5		9.4	5.4	1	-	-	-	-	-	-	-	-	-	-	-
	3.9-4.0		9.2	6.8	1	-	-	-	-	-	-	-	-	-	-	-
	4.4-4.5	Clayey sand, saturated	8.8	3.8	2-3F	-	-	-	-	-	-	-	-	-	-	-
	4.9-5.0	Clayey sand, saturated, very slight hydrocarbon odour	8.4	2.9	1	3.9	4.3	25	<5	17	<5	<0.05	**25**	0.02	<0.005	0.02
	5.4-5.5		7.9	3.1	2-3F	-	-	-	-	-	-	-	-	-	-	-
	5.9-6.0		7.8	3.0	2-3F	-	-	-	-	-	-	-	-	-	-	-
752	0.4-0.5	Sandy gravel filling (roadbase)	7.2	2.4	2-3F	-	-	-	-	-	-	-	-	-	-	-
	0.6-0.7	Clayey sand filling, trace rock fragments (ripped sandstone)	7.4	3.0	2-3F	-	-	-	-	-	-	-	-	-	-	-
	0.9-1.0	Clayey sand, moist	7.2	3.0	2-3F	-	-	-	-	-	-	-	-	-	-	-
	1.4-1.5	Sandy clay, moist	7.0	3.2	2-3F	4.1	4.5	5	32	37	6	<5	**19**	0.02	0.01	0.03
	1.9-2.0	Clayey sand , moist	6.6	6.9	1	-	-	-	-	-	-	-	-	-	-	-
	2.4-2.5		8.3	7.4	1	-	-	-	-	-	-	-	-	-	-	-
	2.9-3.0	Sandstone	8.1	6.2	1	-	-	-	-	-	-	-	-	-	-	-
763	0.4-0.5	Sandy gravel filling (roadbase)	6.7	4.2	1	-	-	-	-	-	-	-	-	-	-	-
	0.9-1.0		6.5	3.4	1-2	-	-	-	-	-	-	-	-	-	-	-
	1.4-1.5	Sand filling, trace clay and sandstone fragments	5.1	3.5	3-4	-	-	-	-	-	-	-	-	-	-	-
	1.9-2.0		5.4	3.6	3-4	-	-	-	-	-	-	-	-	-	-	-
	2.1-2.3	Sand filling, trace rock fragments	5.3	3.6	3-4	-	-	-	-	-	-	-	-	-	-	-
	2.4-2.5	Sand, trace silt (possible filling)	5.1	3.5	3	-	-	-	-	-	-	-	-	-	-	-
	2.9-3.0		5.2	3.6	1	-	-	-	-	-	-	-	-	-	-	-
	3.4-3.5	Sand, trace silt & clay, moist to wet	5.1	3.0	1	5.8	3.5	10	12	22	NT	<5	**27**	<0.005	0.03	0.03
	3.9-4.0		5.1	3.5	1	-	-	-	-	-	-	-	-	-	-	-
	4.4-4.5	Sand, some silt & clay, wet to saturated	10.0	9.0	3-4F	5.6	2.5	<5	590	600	NT	<5	**250**	0.01	0.4	0.41
	4.9-5.0	Sandy clay (probably with some peat), saturated	8.8	7.1	1	-	-	-	-	-	-	-	-	-	-	-
	5.4-5.5		8.6	5.5	1	-	-	-	-	-	-	-	-	-	-	-
	5.9-6.0		8.2	4.5	1	-	-	-	-	-	-	-	-	-	-	-

Notes:

pH_F	Field pH (pH of soil and deionised water solution)
pH_{FOX}	Field pH (pH of soil and hydrogen peroxide solution)
pH_{Ox}	pH of soil and hydrogen peroxide solution
pH_{KCl}	pH of solution of soil and KCl
*(1,2,3,4; F)	1 - denotes no or slight effervescence
	2 - denotes moderate effervescence
	3 - denotes vigorous effervescence
	4 - denotes very vigorous effervescence with gas evolution and heat
	F - denotes "frothy" reaction, indicative of organics
TAA	Total Actual Acidity
TSA	Total Sulphidic Acidity (TPA - TAA)
TPA	Total Potential Acidity
$a\text{-}S_{NAS}$	Retained Acidity
$a\text{-}ANC_E$	Acid Neutralising Capacity
S_{KCl}	KCl extractable sulfur
S_{POS}	Peroxide oxidisable sulfur
S_P	Peroxide oxidation sulfur
NT	Not tested
-	Not analysed / not applicable
BOLD	Exceedance of *Action Criteria* (a-Net Acidity of 18 moles H^+/tonne) for the disturbance of more than 1000 tonnes of material for all soil textures (ASSMAC)

Table 15: Summary Results of Groundwater Analysis (All results in μg/L unless otherwise stated)

		Heavy Metals (dissolved)									Polycyclic Aromatic Hydrocarbons (PAH)			Total Recoverable Hydrocarbons (TRH)								VOCs (including BTEX)												PCB			Organochlorine Pesticides						Organophosphate Pesticides											
Sample Location	Sample date	Arsenic	Cadmium	Chromium (III + VI)	Copper	Lead	Mercury	Nickel	Zinc	Iron	Naphthalene	Benzo(a)pyrene	All other PAH	TRH C6-C10 less BTEX	TRH >C10-C16 less Naphthalene	TRH C6-C10	TRH >C10-C16	TRH >C16-C34	TRH >C34-C40	TRH C6 - C9	TRH +C10 - C36 (Sum of total)	Benzene	Toulene	Ethylbenzene	o-xylene	m+p-xylene	Vinyl Chloride	1,1-Dichloroethene	Trans-1,2-dichloroethene	Cis-1,2-dichloroethene	Trichloroethene	Tetrachloroethene	All other VOCS	Arochlor 1242	Arochlor 1254	All other PCB	Heptachlor	Chlordane	DDT	Endrin	Endosulfan	All other OCP	Diazinon	Dimethoate	Chloropyrifos	Malathion	Azinophos methyl	Fenitrothion	Parathion (ethyl)	All Other OPP	Total Phenolics	pH (pH units)	Oil & Grease	Hardness (mgCaCO3/L)
Phase 2 Investigation Results																																																						
740	21-May-13	2	<0.1	<1	<1	<1	<0.05	4	18	44000	<0.1	<0.1	ND	<10	<50	<10	<50	<100	<100	<10	<250	<1	<1	<1	<1	<2	<10	<1	<1	<1	1	<1	ND	<0.01	<0.01	ND	<0.001	<0.002	<0.001	<0.001	<0.002	ND	-	-	-	-	-	-	-	-	<50	6.2	<5000	310 (EH)
BD2/21/5/13	21-May-13	2	<0.1	<1	<1	<1	<0.05	5	24	34000	<0.1	<0.1	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
752	21-May-13	<1	<0.1	<1	3	<1	<0.05	2	16	140	<0.1	<0.1	ND	<10	<50	<10	<50	<100	<100	<10	<250	<1	<1	<1	<1	<2	<10	<1	<1	<1	<1	<1	ND	<0.01	<0.01	ND	<0.001	<0.002	<0.001	<0.001	<0.002	ND	-	-	-	-	-	-	-	-	<50	5	<5000	140 (H)
5	21-May-13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01	<0.01	ND	<0.001	<0.002	<0.001	<0.001	<0.002	ND	-	-	-	-	-	-	-	-	-	-	-	-
510	21-May-13	<1	<0.1	<1	<1	<1	<0.05	<1	10	3100	<0.1	<0.1	ND	<10	<50	<10	<50	<100	<100	<10	<250	<1	<1	<1	<1	<2	<10	<1	<1	<1	<1	<1	ND	<0.01	<0.01	ND	<0.001	<0.002	<0.001	<0.001	<0.002	ND	-	-	-	-	-	-	-	-	<50	6	<5000	130 (H)
513	21-May-13	<1	<0.1	<1	<1	<1	<0.05	<1	**9**	3600	<0.1	<0.1	ND	<10	<50	<10	<50	<100	<100	<10	<250	<1	<1	<1	<1	<2	<10	<1	<1	<1	<1	<1	ND	<0.01	<0.01	ND	<0.001	<0.002	<0.001	<0.001	<0.002	ND	-	-	-	-	-	-	-	-	<50	5.7	<5000	28 (S)
Results from Other Investigations																																																						
5	11-Aug-09	<1	<0.1	<1	1	<0.1	<0.5	<0.1	8	-	<1	<1	ND	-	-	-	-	-	-	<10	<250	<1	<1	<1	<1	<2	<10	<1	<1	<1	<1	<1	ND	0.025	<0.01	ND	<0.001	0.0051	<0.001	<0.001	<0.002	ND	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	ND	<50	6.3	-	300 (EH)
BD1/110809	11-Aug-09	<1	<0.1	<1	2	<0.1	<0.5	<1	11	-	<1	<1	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	20-Sep-10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1	<1	<2	<10	<1	<1	<1	<1	<1	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
510	20-Sep-10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1	<1	<2	<10	<1	<1	<1	1	<1	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
510	22-Aug-11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1	<1	<2	2.5	0.5	0.5	0.5	0.5	<1	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
510	3-Feb-12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1	<1	<2	<5	<1	<1	<1	<1	<1	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
510	7-Sep-12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1	<1	<2	<10	<1	<1	<1	<1	<1	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
510	28-May-13	-	-	-	-	-	-	-	-	4300	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1	<1	<2	<5	<1	<1	<1	<1	<1	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
510	28-Nov-13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1	<1	<2	<5	<1	<1	<1	<1	<1	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
510	10-Jul-14	-	-	-	-	-	-	-	-	3700	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1	<1	<2	<10	<1	<1	<1	<1	<1	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
511B	20-Sep-10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1	<1	<2	<10	<1	<1	<1	<1	<1	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
511B	22-Aug-11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1	<1	<2	2.5	0.5	0.5	0.5	0.5	<1	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
511B	3-Feb-12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1	<1	<2	<5	<1	<1	<1	<1	4	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
511B	7-Sep-12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1	<1	<2	<10	<1	<1	<1	<1	<1	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
511B	29-May-13	-	-	-	-	-	-	-	-	53000	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1	<1	<2	<5	<1	<1	<1	<1	<1	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
511B	28-Nov-13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1	<1	<2	<5	<1	<1	<1	<1	<1	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
511B	10-Jul-14	-	-	-	-	-	-	-	-	6300	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1	<1	<2	<10	<1	<1	<1	<1	<1	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
513	21-Aug-11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1	<1	<2	<5	<1	<1	<1	<1	<1	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
513	3-Feb-12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1	<1	<2	<5	<1	<1	<1	<1	5	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
513	7-Sep-12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1	<1	<2	<10	<1	<1	<1	<1	<1	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
513	28-May-13	-	-	-	-	-	-	-	-	6600	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1	<1	<2	<5	<1	<1	<1	<1	<1	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
513	28-Nov-13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1	<1	<2	<5	<1	<1	<1	<1	<1	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
513	10-Jul-14	-	-	-	-	-	-	-	-	4200	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1	<1	<2	<10	<1	<1	<1	<1	<1	ND																					
Assessment Criteria																																																						
Groundwater Investigation Levels (GIL)		24as As(III) 13 as As(V)	0.2 (S) 0.5 (M) 0.8 (H) 1.1 (VH) 2 (EH)	3.3 (S) 8.3 (M) 12 (H) 16 (VH) 28 (EH) as Cr(III) 1 as Cr(VI)	1.4 (S) 3.5 (M) 5.5 (H) 7.3 (VH) 12.6 (EH)	3.4 (S) 14 (M) 26 (H) 40 (VH) 91 (EH)	0.06	11 (S) 28 (M) 43 (H) 57 (VH) 99 (EH)	8 (S) 20 (M) 31 (H) 41 (VH) 72 (EH)	-	16	0.1	-	-	-	-	-	-	-	-	-	950	180	80	350	75+200	100	30	60		330	50	-	0.3	0.01	-	0.01	0.03	0.006	0.01	0.03	-	0.01	0.15	0.01	0.05	0.02	0.2	0.004	-	50	-	-	-
HSLs for vapour intrusion		-	-	-	-	-	-	-	-	-	-	-	-	6000	NL	-	-	-	-	-	-	5000	NL	NL	NL		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-

Notes:
BD2/21/5/13 is blind replicate of the sample from test bore 740
BD1/110809 is a blind replicate of the sample from test bore 5, 11 August 2009

ND Not detected
\- not defined/ not analysed/ not applicable
Bold Exceeds GIL
S Soft water
M Moderate water hardness
H Hard water
VH Very hard water
EH Extremely hard water

13. Discussion

13.1 Contaminants in Soil

The majority of concentrations of arsenic, cadmium and mercury in soil were below detection limits, and detectable concentrations of these three metals were all relatively low. Concentrations of chromium, copper, nickel, zinc and lead in soil were generally low. Concentrations of all eight heavy metals in soil were within the HIL for all samples analysed.

Concentrations of PAH were generally low and all concentrations of total PAH were within the HIL. Results for Benzo(a)pyrene toxicity equivalent (TEQ) were within the HIL for all samples analysed.

Concentrations of BTEX and TRH C_6-C_{10} were below detection limits in all analysed samples. Naphthalene was detected at low concentrations in a small number of samples, and all concentrations of naphthalene were within the HSL. Other VOC were not detected in the three samples analysed. Concentrations of TRH >C_{10} were detected in numerous samples, generally at low levels. Relatively more elevated concentrations of TRH >C_{10} were identified at Test Bores 744 and 750 and are summarised as follows:

- TRH >C_{10}-C_{16} (920 kg/kg) and TRH >C_{16}-C_{34} (670 mg/kg) was detected in the filling sample from Test Bore 744, depth 0.9 – 1.0 m. This filling was identified with a hydrocarbon odour. These TRH concentrations are within HSL and management limits. Review of the TRH chromatogram for this reveals that this TRH concentration may be attributable to diesel fuel; and

- TRH >C_{16}-C_{34} (890 mg/kg) and TRH >C_{34}-C_{40} (1100 mg/kg) was detected in the filling sample from Test Bore 750, depth 1 – 1.2 m. This filling was not identified to have signs of contamination. Review of the TRH chromatogram for this sample reveals that this TRH concentration has a similar response to asphalt, as opposed to fuel or oil. Although road /pavement materials were not observed in this filling, materials such as roadbase or asphalt in the filling may be attributable to the TRH detection. The TRH concentrations were within the management limits.

OCP was only detected in one sample (from Test Bore 760 / 1.4-1.5 m) with concentrations of detectable OCP well within the HIL.

PCB was only detected in the filling sample from Test Bore 763, depth 1.4-1.5m. The detected PCB (21 mg/kg of Arochlor 1254) was more than 2.5 times the HSL of 7 mg/kg. This is considered to be a hot-spot concentration. The source of the PCB is not known although is probably associated with the filling even though no obvious signs of contamination were observed in the filling at this location.

Phenols were not detected in any analysed samples.

Asbestos was detected in one filling sample and one material sample. The asbestos in the filling sample from Test Bore 761, depth 0.9 -1.0 m, was identified as chrysotile, amosite, and crocidolite asbestos identified in a fragment of fibre cement. Although fibre cement was not observed at the time of sampling, traces of brick were observed in the filling at a similar depth. Asbestos contamination may be associated with building rubble (such as brick) in filling.

The asbestos in the material sample (A1) was identified as chrysotile, amosite and crocidolite asbestos in fibre cement. The sample was collected from filling at test Bore 760, depth 1.4. The filling was not observed to contain building rubble. This test bore was drilled behind a retaining wall (on the high side) where filling was anticipated to be prevalent.

Given that the parts of the site in the vicinity of Test Bores 760 and 761 are covered in asphalt, it is considered that there is not an immediate risk associated with the buried asbestos contamination.

13.2 Preliminary Waste Classification Results

Results shown in Table 13 have been compared to criteria sourced from the) NSW EPA *Waste Classification Guidelines,* 2014. Results of preliminary waste classification testing indicate that concentrations of chemical contaminants (i.e. excluding asbestos) are within guideline values for General Solid Waste except for the sample from Test Bore 740, depth 0.9 - 1 m. The concentration of leachable lead (9.2 mg/L) in this sample is above the guideline value for General Solid Waste (5 mg/L) but within the guideline value for Restricted Waste (20 mg/L). Asbestos has been identified in the filling at Test Bores 760 and 761. Asbestos is classified as Special Waste (Asbestos).

The red-brown, sand filling at Test Bore 740, depth 0.6 – 1.1 m, was noted to contain brick, terracotta and glass (building rubble materials). Although the source of the elevated lead concentrations at this location is not confirmed, the source is probably associated with the filling containing building rubble (and possibly other waste materials). This sand filling has a preliminary waste classification of Restricted Solid Waste. Some ‘step-out’ sampling is recommended to attempt to delineate the lead impacted soil, although investigations at this part of the site are likely to be limited by the presence of underground services. This is further discussed in Section 13.5.

Given that asbestos has been identified in filling containing building rubble or fibre cement, it is considered that filling at the subject site not containing building rubble or fibre cement has a preliminary waste classification of General Solid Waste (non-putrescible) other than the lead impacted filling in the vicinity of Test Bore 740, discussed above. Soils observed to contain building rubble or suspected asbestos-containing materials will require further assessment for final waste classification. Soils containing asbestos have a minimum waste classification of Special Waste (Asbestos). Note that filling soils close to the water table may be acid sulphate soils (see Section 13.3). Further assessment for acid sulphate soils of filling materials close to the water table will need to be undertaken to determine if treatment will be required prior to off-site disposal.

It is noted that some natural soils have been identified to show signs of contamination; in particular, hydrocarbon odours have been noted in the natural soil at Test Bores 740, 741, 746, and 750. Natural soils impacted with contaminants cannot be classified as Virgin Excavated Natural Material (VENM). Given that some natural soils have been identified as impacted with contaminants, it is recommended that any excavated natural soil designated for off-site disposal is assessed *ex situ* in order to determine if it can disposed of as VENM. Note that acid sulphate soils have also been identified in the natural soil (see Section 13.3). Natural, potential acid sulphate soils (PASS) that are not contaminated can be disposed of below the water table at an appropriately licensed landfill, according to the *Waste Classification Guidelines*. The PASS must be disposed of within 8 hours of their receipt at a landfill and kept wet at all times until their burial below the water table. Where PASS cannot be classified as VENM or a suitable underwater disposal site at a landfill is not available, the soil must be treated by neutralising techniques prior to disposal to a licensed landfill in accordance with an Acid Sulphate Soil Management Plan and otherwise disposed of in accordance with its waste classification.

13.3 Acid Sulphate Soils

Field screening results (pH_F and pH_{FOX}) and laboratory test results (SPOCAS) undertaken for the assessment of acid sulphate soils along the proposed culvert alignment has indicated that potential acid sulphate soils (PASS) are present at the site. The report for the Phase 2 contamination assessment for the proposed culvert alignment should be referenced for further details regarding the methods and assessment of results of acid sulphate soils testing. The action criterion 18 mol H^+ /tonne for net acidity has been adopted from Dear SE, Moore NG, Dobod SK, Watling KM, and Ahern CR, *Soil Management Guidelines*, in *Queensland Acid Sulfate Soil Technical Manual*, Department of Natural Resources and Mines, Indooroopilly, Queensland, 2002. The action criterion is based on the presumption that more than 1000 tonnes of soil material will be disturbed and is relatively conservative. The a-Net acidity result for the sample from Test Bore 763, depth 4.4 – 4.5, is well in excess of the action criterion. The a-Net acidity results for the other three samples (from Test Bore 740, depth 4.9 - 5.0; Test Bore 752, depth 1.4 - 1.5 m and Test Bore 763; depth 3.4 – 3.5 m) shown in Table 13 are slightly above the action criterion.

In summary, it has been assessed that:

- PASS is present below the water table within the site;
- Some natural soils above the water table could be PASS, although not to the same degree as that identified below the water table; and
- Near surface filling such as ripped/crushed sandstone (generally within 1 m of the surface) is not considered to be PASS, although may have acidic properties. It is noted, however, that Warringah Mall is within an area of highly disturbed terrain and that pockets of filling may have been sourced locally from areas of acid sulphate soils. Therefore, filling, other than near-surface filling materials such as crushed sandstone and roadbase, are considered to be possible PASS, particularly filling close to the groundwater table.

In regards to Stage 2 redevelopment works, an Acid Sulphate Soil Management Plan will need to be prepared if the construction approach will disturb PASS or lower the groundwater table (by dewatering). The plan will also need to account for treatment of acid sulphate soils designated for off-site disposal.

13.4 Contaminants in Groundwater

Hardness results indicate that the groundwater is extremely hard at Bore 740, hard at Bores 752 and 510, and soft at Bore 513. Table 15 provides adjusted GILs for hardness for heavy metals, where applicable.

Concentrations of cadmium, chromium, lead, and mercury were below detection limits, and within the GILs for all groundwater samples. Detectable concentrations of arsenic, copper and nickel were within the GIL. Zinc was detected in all analysed samples and was slightly in excess of the GIL (8 µg/L) for the sample collected from Bore 513 (9 µg/L). Based on DP's experience, detectable concentrations of zinc in groundwater are common in the Sydney region and the concentrations at Test Bore 513 are considered to be representative of the background zinc concentration rather than contamination. Given this, it is considered that the detectable concentration of zinc at Bore 513 does not warrant further assessment.

PAH, TRH, BTEX, and other VOC were not detected in any of the analysed samples. It is noted that VOC previously detected at Test Bores 510 (August 2011) and 513 (February 2012) were not detected in the current round of sampling. Oil and grease was not detected in any analysed sample.

PCB and OCP were not detected in any of the analysed samples. It is noted that OCP and PCB previously detected at Bore 5 (August 2009) was not detected in the current round of sampling.

Total phenol was not detected in any analysed groundwater sample.

Dissolved iron concentrations ranged from 140 µg/L to 44,000 µg/L. Although not considered to be a contaminant, concentrations of iron at these levels indicate that, if dewatering is undertaken, treatment will be required to reduce the iron concentration to an acceptable concentration for stormwater discharge. The ANZECC & ARMCANZ, 2000, *Australian Water Quality Guidelines for Recreational Purposes* provides for a guideline value of 300 µg/L although accepted discharge limits for iron may be determined by local authorities. The reason for consideration of iron during dewatering is that the iron precipitates out when it becomes oxidised and forms an unsightly brown sludge.

Results of pH testing indicate slightly acidic conditions with the highest pH value of 6.2. If water is to be discharged as result of dewatering, some treatment is likely to be required to neutralise the slightly acidic conditions.

13.5 Recommendations for Remediation and Further Assessment

Based on the results of the investigation, the following are recommended:

- Prepare an Acid Sulphate Soil Management Plan if it is determined that the construction approach for the Stage 2 development will disturb PASS or lower the groundwater table by dewatering;
- Conduct further assessment at Test Bore 740 to better define the extent of the leachable lead for waste classification purposes; and
- Conduct further assessment of the PCB soil contamination at Test Bore 763 to better define the extent of the contamination for remediation purposes.

Further assessment to attempt to define the extent of the PCB contamination and leachable lead should involve ‘step-out’ sampling from Test Bores 763 and 740 respectively. It is noted that step-out investigations at these two Bores may be limited due to the presence of the stormwater culvert and other underground services. Given the presence of PCB contamination and leachable lead, a Remediation Action Plan (RAP) will be required.. The results indicate that the PCB impacted filling is within General Solid Waste criteria at the identified concentration. The extent of leachable lead, currently classified as Restricted Solid Waste, will also be confirmed by additional sampling. It is likely that the remedial approach will involve excavation and off-site disposal of the contaminated filling.

A RAP would also provide procedures for managing asbestos contamination and general dewatering procedures.

Delineation of the identified asbestos contaminated soil at Test Bores 760 and 761 is not recommended at this stage as these parts of the site are currently being used as an operational car park. Test bores could be used in an attempt to delineate the asbestos contamination, however, the reliability of the findings would be relatively low (compared to using test pits and trenches), because only a very small portion of the subsurface profile is observed in drilling returns. Even using test pits and trenches will not necessarily define the extent of asbestos impacted soil as asbestos-containing material can be dispersed infrequently within the soil matrix. Delineation of the asbestos contamination may, therefore, be appropriate during construction, when the site can be more easily subject to inspection.

Typical approaches for remediating asbestos contamination can include complete removal of the asbestos contamination to a licensed landfill; or burial of the asbestos at the site underneath a capping layer that is managed by procedures provided in an environmental management plan. It is noted that the asbestos contamination at Test Bore 760 was located behind a retaining wall which will probably be removed during redevelopment. The appropriate remediation approach, in this case, may be complete removal of the asbestos contamination to landfill. The remediation approach can be incorporated into an Unexpected Finds Protocol (UFP) incorporated into a RAP. Excavation and removal of asbestos contaminated soil would need to be undertaken by an appropriately licensed (AS1) contractor. A qualified occupational hygienist would inspect and validate the completion of the works and prepare a certificate stating the work was undertaken in a satisfactory manner and that the resultant health risk associated with the asbestos contamination has been reduced to an insignificant level.

It is anticipated that some excavated soil will have hydrocarbon odours and elevated concentrations of petroleum hydrocarbons may be found between sample points especially at the former service station sites. The RAP will need to incorporate procedures for managing soil odours and a UFP for managing potentially contaminated soil and possible underground storage tanks identified during construction. Further assessment by an environmental consultant should be undertaken if exposed soils are noted to have strong hydrocarbon odours, oil/ fuel staining or oil sheens. As a precautionary measure, final placement of excavated soil with signs of fuel/ hydrocarbon contamination should not be placed below the groundwater table (or close to the groundwater table) so that the any adverse impacts on groundwater can be avoided.

Whether imported or re-used from elsewhere on site, soils designated to be used for any (minor) landscaped areas should be further assessed from ecological and human health perspectives. Given that concentrations of zinc, copper, chromium, nickel and lead, arsenic, DDT, naphthalene, BTEX, benzo(a)pyrene and TRH fractions were low or undetected in most soil samples, it is anticipated that soil (from selected areas) within the site would be suitable to be used within landscaped areas from an ecological perspective. Additional laboratory analysis of soil samples (for example, pH testing, cation exchange capacity and clay content) will need to be undertaken in order to make this assessment.

Although significant groundwater contamination has not been identified at the subject site, there is a reasonable likelihood that groundwater will need to be monitored during redevelopment, therefore, and it may be necessary to have groundwater wells reinstated or reconstructed during the construction phase to allow for continued groundwater monitoring.

14. Conclusions

This Phase 2 Contamination Assessment for the Stage 2 investigation area did not uncover evidence of widespread or substantial soil or groundwater contamination. However, step-out sampling at Test Bores 740 and 763 is recommended to define the extent and nature of identified PCB contamination and leachable lead. A RAP will be need for be prepared for remediation of the PCB contamination and Restricted Solid Waste. The RAP would also provide procedures for managing asbestos contamination and general dewatering procedures. An UFP is required to manage sporadic asbestos and any unexpected chemical contamination.

Filling at Test Bore 740 has a preliminary waste classification of Restricted Waste. Other filling materials designated for off-site disposal have a preliminary waste classification of General Solid Waste (non-putrescible) or Special Waste (Asbestos). It is recommended that any excavated natural soil designated for off-site disposal be assessed *ex situ* in order to determine if it can disposed as VENM. Treated PASS will need to be disposed in accordance with an Acid Sulphate Soil Management Plan and otherwise disposed of in accordance with its waste classification.

The site can be rendered suitable for the proposed development following the successful implementation of the above recommendations.

15. Limitations

Douglas Partners (DP) has prepared this report for this project at Warringah Mall, Brookvale in accordance with DP's revised proposal dated 19 March 2013; and Westfield Consultant Services Contract: *Westfield Warringah Stage 2 -11754* dated 8 April 2013 prepared by Mr Glen Pigeon of Westfield Design and Construction Pty Ltd. This report is provided for the exclusive use of Scentre Design & Construction Pty Ltd for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

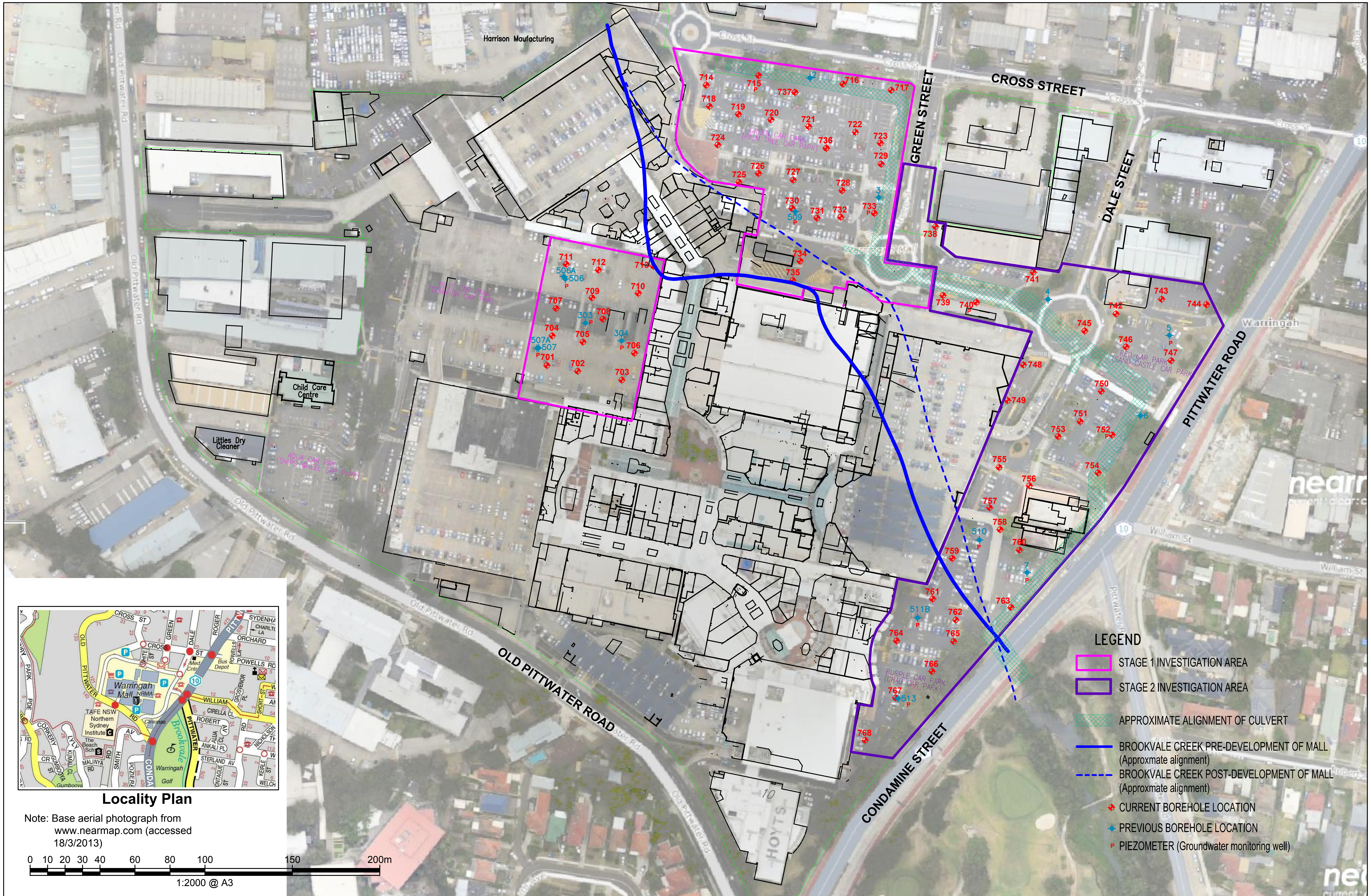
This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

The contents of this report do not constitute formal design components such as are required, by the Health and Safety Legislation and Regulations, to be included in a Safety Report specifying the hazards likely to be encountered during construction and the controls required to mitigate risk. This design process requires risk assessment to be undertaken, with such assessment being dependent upon factors relating to likelihood of occurrence and consequences of damage to property and to life. This, in turn, requires project data and analysis presently beyond the knowledge and project role respectively of DP. DP may be able, however, to assist the client in carrying out a risk assessment of potential hazards contained in the discussions section of this report, as an extension to the current scope of works, if so requested, and provided that suitable additional information is made available to DP. Any such risk assessment would, however, be necessarily restricted to the environmental components set out in this report and to their application by the project designers to project design, construction, maintenance and demolition.

Douglas Partners Pty Ltd

Appendix A

Drawings

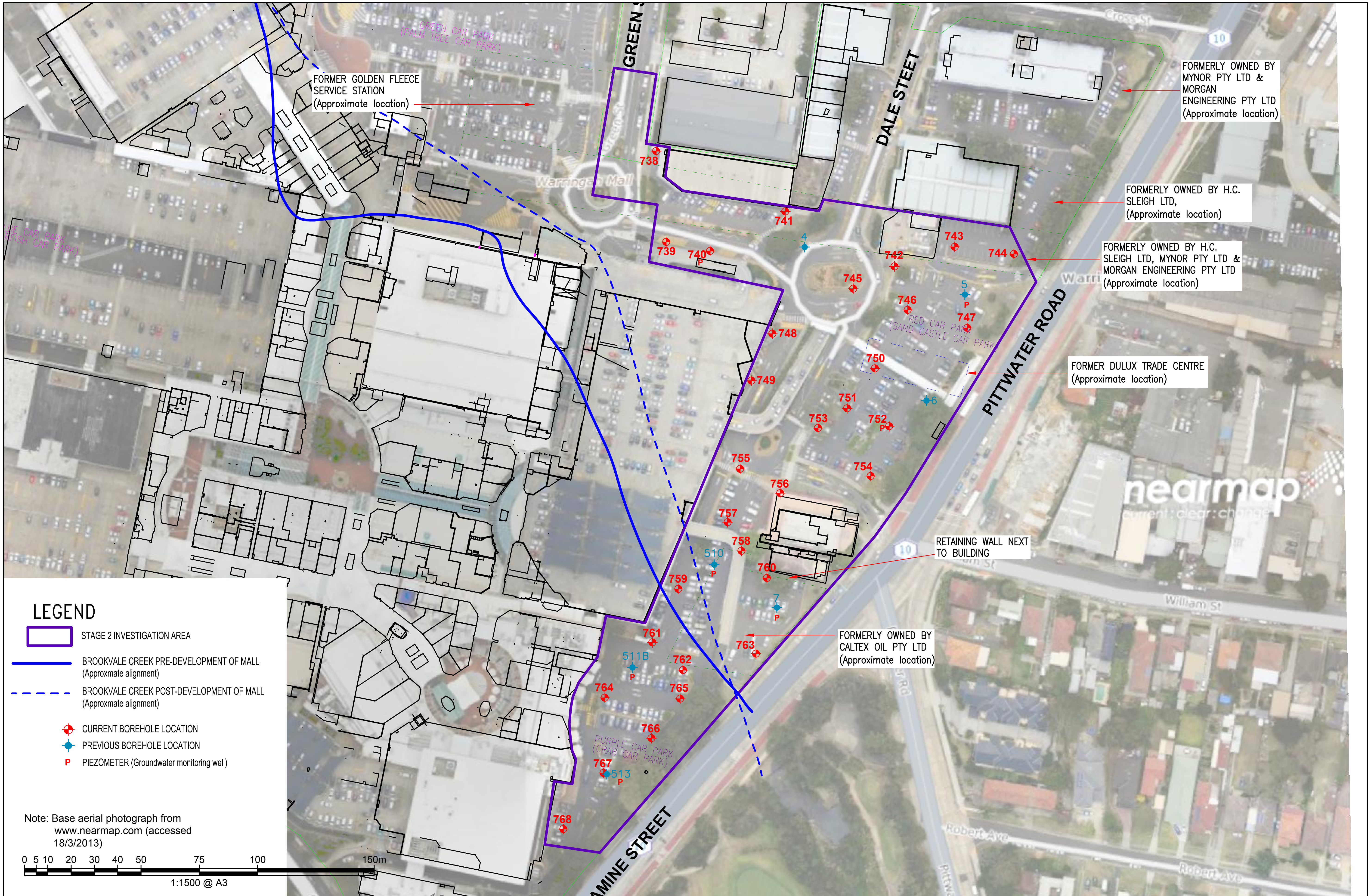


Douglas Partners Geotechnics / Environment / Groundwater	CLIENT: Scentre Design and Construction Pty Ltd	
	OFFICE: Sydney	DRAWN BY: PSCH
	SCALE: 1:2000	DATE: 15.8.2018

TITLE: **Investigation Areas, Phase 2 Contamination Assessment**
Proposed Stage 2 Warringah Mall Redevelopment
Cnr. Condamine Street and Old Pittwater Road, Brookvale

MGA

PROJECT No:	71015.18
DRAWING No:	1
REVISION:	B

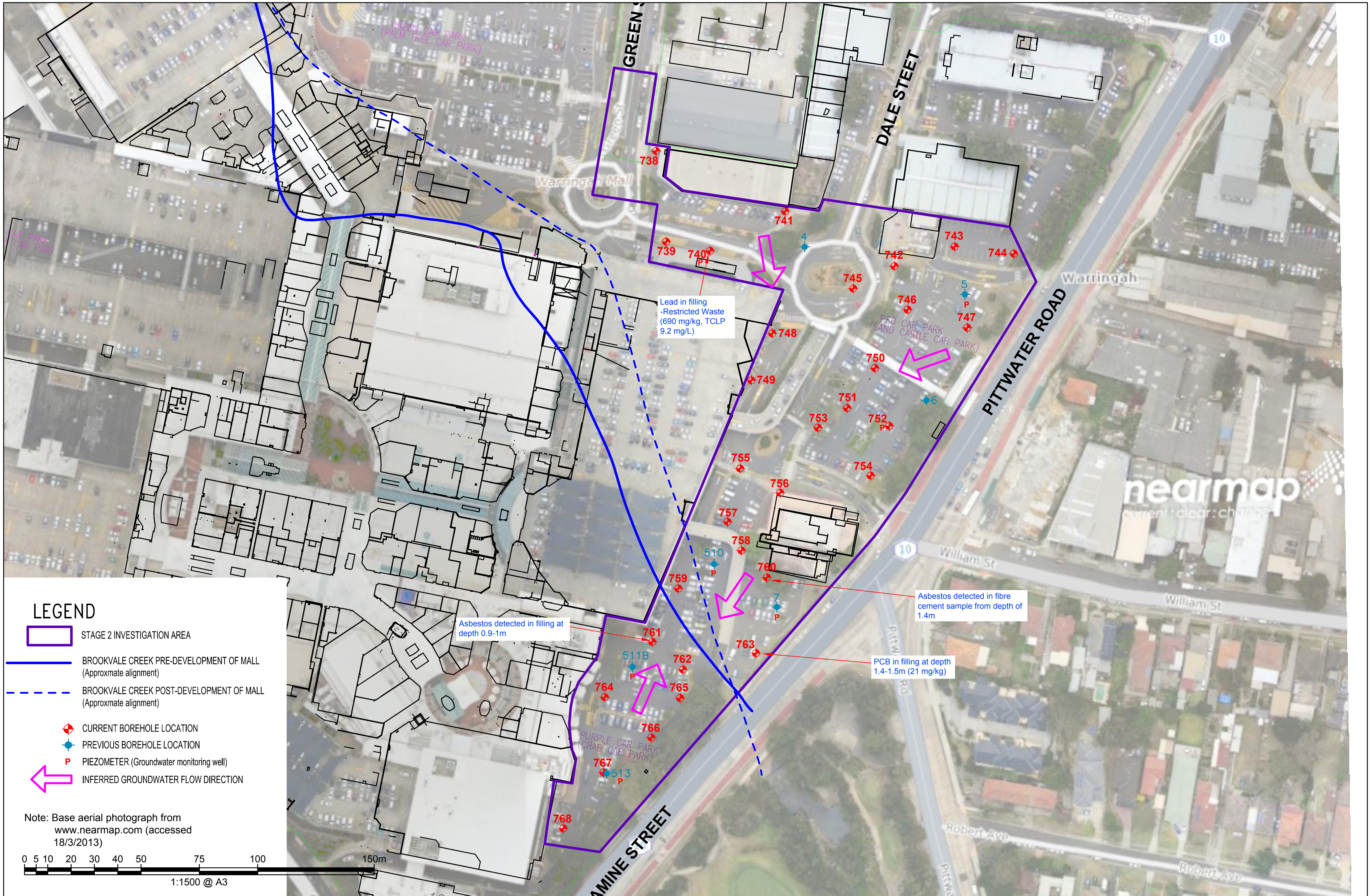


Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT: Scentre Design and Construction Pty Ltd		TITLE:	**Test Bore Locations and Site Features, Phase 2 Contamination Assessment**
OFFICE: Sydney	DRAWN BY: PSCH		**Proposed Stage 2 Warringah Mall Redevelopment**
SCALE: 1:1500	DATE: 15.8.2018		**Cnr. Condamine Street and Old Pittwater Road, Brookvale**

MGA

PROJECT No:	71015.18
DRAWING No:	2
REVISION:	B



Douglas Partners Geotechnics / Environment / Groundwater	CLIENT: Scentre Design and Construction Pty Ltd	TITLE: **Exceedances of Site Assessment Criteria**	PROJECT No: 71015.18
	OFFICE: Sydney — DRAWN BY: PSCH	**Proposed Stage 2 Warringah Mall Redevelopment**	DRAWING No: 3
	SCALE: 1:1500 — DATE: 15.8.2018	**Cnr. Condamine Street and Old Pittwater Road, Brookvale**	REVISION: B

N MGA

Appendix B

Test Bore Logs

Notes About this Report

Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations 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.

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This report is the property of Douglas Partners Pty Ltd. The report may only be used for the purpose for which it was commissioned and in accordance with the Conditions of Engagement for the commission supplied at the time of proposal. Unauthorised use of this report in any form whatsoever is prohibited.

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report 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 or excavation. 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 and test pits 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 or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole 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; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements 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.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP 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 conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

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

About this Report

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, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report 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. DP 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 and environmental 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.

Sampling

Sampling is carried out during drilling or test pitting 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 it to obtain 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.

Test Pits

Test pits are usually excavated with a backhoe or an excavator, allowing close examination of the in-situ soil if it is safe to enter into the pit. The depth of excavation is limited to about 3 m for a backhoe and up to 6 m for a large excavator. A potential disadvantage of this investigation method is the larger area of disturbance to the site.

Large Diameter Augers

Boreholes can be drilled using a rotating plate or short spiral auger, generally 300 mm or larger in diameter commonly mounted on a standard piling rig. The cuttings are returned to the surface at intervals (generally 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 samples.

Continuous Spiral Flight Augers

The borehole 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 sands above the water table. Samples are returned to the surface, or may be collected after withdrawal of the auger flights, but they are disturbed and may be mixed with soils from the sides of the hole. Information from the drilling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively low reliability, due to the remoulding, possible mixing or softening of samples by groundwater.

Non-core Rotary Drilling

The borehole is advanced using a rotary bit, with water or drilling mud 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 the rate of penetration. Where drilling mud is used this can mask the cuttings and reliable identification is only possible from separate sampling such as SPTs.

Continuous Core Drilling

A continuous core sample can be obtained using a diamond tipped core barrel, usually with a 50 mm internal diameter. Provided full core recovery is achieved (which is not always possible in weak rocks and granular soils), this technique provides a very reliable method of investigation.

Standard Penetration Tests

Standard penetration tests (SPT) are used as a means of estimating the density or strength of soils 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 before the full penetration depth, 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 SPT tests can be related empirically to the engineering properties of the soils.

Dynamic Cone Penetrometer Tests / Perth Sand Penetrometer Tests

Dynamic penetrometer tests (DCP or PSP) are carried out by driving a steel rod into the ground using a standard weight of hammer falling a specified distance. As the rod penetrates the soil the number of blows required to penetrate each successive 150 mm depth are recorded. 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 types of penetrometer are commonly used.

- Perth sand penetrometer - a 16 mm diameter flat ended rod is driven using a 9 kg hammer dropping 600 mm (AS 1289, Test 6.3.3). This test was developed for testing the density of sands and is mainly used in granular soils and filling.
- Cone penetrometer - a 16 mm diameter rod with a 20 mm diameter cone end is driven using a 9 kg hammer dropping 510 mm (AS 1289, Test 6.3.2). This test was developed initially for pavement subgrade investigations, and correlations of the test results with California Bearing Ratio have been published by various road authorities.

Soil Descriptions

Douglas Partners

Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are based on Australian Standard AS 1726-1993, Geotechnical Site Investigations Code. In general, the descriptions include strength or density, colour, structure, soil or rock type and inclusions.

Soil Types

Soil types are described according to the predominant particle size, qualified by the grading of other particles present:

Type	Particle size (mm)
Boulder	>200
Cobble	63 - 200
Gravel	2.36 - 63
Sand	0.075 - 2.36
Silt	0.002 - 0.075
Clay	<0.002

The sand and gravel sizes can be further subdivided as follows:

Type	Particle size (mm)
Coarse gravel	20 - 63
Medium gravel	6 - 20
Fine gravel	2.36 - 6
Coarse sand	0.6 - 2.36
Medium sand	0.2 - 0.6
Fine sand	0.075 - 0.2

The proportions of secondary constituents of soils are described as:

Term	Proportion	Example
And	Specify	Clay (60%) and Sand (40%)
Adjective	20 - 35%	Sandy Clay
Slightly	12 - 20%	Slightly Sandy Clay
With some	5 - 12%	Clay with some sand
With a trace of	0 - 5%	Clay with a trace of sand

Definitions of grading terms used are:

- Well graded - a good representation of all particle sizes
- Poorly graded - an excess or deficiency of particular sizes within the specified range
- Uniformly graded - an excess of a particular particle size
- Gap graded - a deficiency of a particular particle size with the range

Cohesive Soils

Cohesive soils, such as clays, are classified on the basis of undrained shear strength. The strength may be measured by laboratory testing, or estimated by field tests or engineering examination. The strength terms are defined as follows:

Description	Abbreviation	Undrained shear strength (kPa)
Very soft	vs	<12
Soft	s	12 - 25
Firm	f	25 - 50
Stiff	st	50 - 100
Very stiff	vst	100 - 200
Hard	h	>200

Cohesionless Soils

Cohesionless soils, such as clean sands, are classified on the basis of relative density, generally from the results of standard penetration tests (SPT), cone penetration tests (CPT) or dynamic penetrometers (PSP). The relative density terms are given below:

Relative Density	Abbreviation	SPT N value	CPT qc value (MPa)
Very loose	vl	<4	<2
Loose	l	4 - 10	2 -5
Medium dense	md	10 - 30	5 - 15
Dense	d	30 - 50	15 - 25
Very dense	vd	>50	>25

Soil Descriptions

Soil Origin
It is often difficult to accurately determine the origin of a soil. Soils can generally be classified as:

- Residual soil - derived from in-situ weathering of the underlying rock;
- Transported soils - formed somewhere else and transported by nature to the site; or
- Filling - moved by man.

Transported soils may be further subdivided into:

- Alluvium - river deposits
- Lacustrine - lake deposits
- Aeolian - wind deposits
- Littoral - beach deposits
- Estuarine - tidal river deposits
- Talus - scree or coarse colluvium
- Slopewash or Colluvium - transported downslope by gravity assisted by water. Often includes angular rock fragments and boulders.

Rock Descriptions

Douglas Partners

Rock Strength

Rock strength is defined by the Point Load Strength Index ($Is_{(50)}$) and refers to the strength of the rock substance and not the strength of the overall rock mass, which may be considerably weaker due to defects. The test procedure is described by Australian Standard 4133.4.1 - 2007. The terms used to describe rock strength are as follows:

Term	Abbreviation	Point Load Index $Is_{(50)}$ MPa	Approximate Unconfined Compressive Strength MPa*
Extremely low	EL	<0.03	<0.6
Very low	VL	0.03 - 0.1	0.6 - 2
Low	L	0.1 - 0.3	2 - 6
Medium	M	0.3 - 1.0	6 - 20
High	H	1 - 3	20 - 60
Very high	VH	3 - 10	60 - 200
Extremely high	EH	>10	>200

* Assumes a ratio of 20:1 for UCS to $Is_{(50)}$. It should be noted that the UCS to $Is_{(50)}$ ratio varies significantly for different rock types and specific ratios should be determined for each site.

Degree of Weathering

The degree of weathering of rock is classified as follows:

Term	Abbreviation	Description
Extremely weathered	EW	Rock substance has soil properties, i.e. it can be remoulded and classified as a soil but the texture of the original rock is still evident.
Highly weathered	HW	Limonite staining or bleaching affects whole of rock substance and other signs of decomposition are evident. Porosity and strength may be altered as a result of iron leaching or deposition. Colour and strength of original fresh rock is not recognisable
Moderately weathered	MW	Staining and discolouration of rock substance has taken place
Slightly weathered	SW	Rock substance is slightly discoloured but shows little or no change of strength from fresh rock
Fresh stained	Fs	Rock substance unaffected by weathering but staining visible along defects
Fresh	Fr	No signs of decomposition or staining

Degree of Fracturing

The following classification applies to the spacing of natural fractures in diamond drill cores. It includes bedding plane partings, joints and other defects, but excludes drilling breaks.

Term	Description
Fragmented	Fragments of <20 mm
Highly Fractured	Core lengths of 20-40 mm with some fragments
Fractured	Core lengths of 40-200 mm with some shorter and longer sections
Slightly Fractured	Core lengths of 200-1000 mm with some shorter and longer sections
Unbroken	Core lengths mostly > 1000 mm

Rock Descriptions

Rock Quality Designation

The quality of the cored rock can be measured using the Rock Quality Designation (RQD) index, defined as:

$$\text{RQD \%} = \frac{\text{cumulative length of 'sound' core sections} \geq 100 \text{ mm long}}{\text{total drilled length of section being assessed}}$$

where 'sound' rock is assessed to be rock of low strength or better. The RQD applies only to natural fractures. If the core is broken by drilling or handling (i.e. drilling breaks) then the broken pieces are fitted back together and are not included in the calculation of RQD.

Stratification Spacing

For sedimentary rocks the following terms may be used to describe the spacing of bedding partings:

Term	Separation of Stratification Planes
Thinly laminated	< 6 mm
Laminated	6 mm to 20 mm
Very thinly bedded	20 mm to 60 mm
Thinly bedded	60 mm to 0.2 m
Medium bedded	0.2 m to 0.6 m
Thickly bedded	0.6 m to 2 m
Very thickly bedded	> 2 m

Symbols & Abbreviations

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Introduction

These notes summarise abbreviations commonly used on borehole logs and test pit reports.

Drilling or Excavation Methods

C	Core drilling
R	Rotary drilling
SFA	Spiral flight augers
NMLC	Diamond core - 52 mm dia
NQ	Diamond core - 47 mm dia
HQ	Diamond core - 63 mm dia
PQ	Diamond core - 81 mm dia

Water

▷	Water seep
▽	Water level

Sampling and Testing

A	Auger sample
B	Bulk sample
D	Disturbed sample
E	Environmental sample
U_{50}	Undisturbed tube sample (50mm)
W	Water sample
pp	Pocket penetrometer (kPa)
PID	Photo ionisation detector
PL	Point load strength Is(50) MPa
S	Standard Penetration Test
V	Shear vane (kPa)

Description of Defects in Rock

The abbreviated descriptions of the defects should be in the following order: Depth, Type, Orientation, Coating, Shape, Roughness and Other. Drilling and handling breaks are not usually included on the logs.

Defect Type

B	Bedding plane
Cs	Clay seam
Cv	Cleavage
Cz	Crushed zone
Ds	Decomposed seam
F	Fault
J	Joint
Lam	Lamination
Pt	Parting
Sz	Sheared Zone
V	Vein

Orientation

The inclination of defects is always measured from the perpendicular to the core axis.

h	horizontal
v	vertical
sh	sub-horizontal
sv	sub-vertical

Coating or Infilling Term

cln	clean
co	coating
he	healed
inf	infilled
stn	stained
ti	tight
vn	veneer

Coating Descriptor

ca	calcite
cbs	carbonaceous
cly	clay
fe	iron oxide
mn	manganese
slt	silty

Shape

cu	curved
ir	irregular
pl	planar
st	stepped
un	undulating

Roughness

po	polished
ro	rough
sl	slickensided
sm	smooth
vr	very rough

Other

fg	fragmented
bnd	band
qtz	quartz

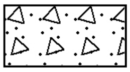
Symbols & Abbreviations

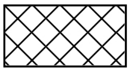
Graphic Symbols for Soil and Rock

General

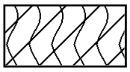
 Asphalt

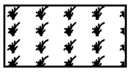
 Road base

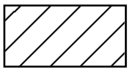
 Concrete

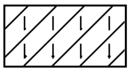
 Filling

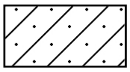
Soils

 Topsoil

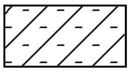
 Peat

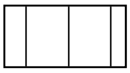
 Clay

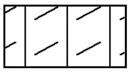
 Silty clay

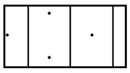
 Sandy clay

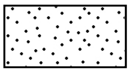
 Gravelly clay

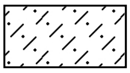
 Shaly clay

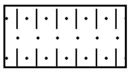
 Silt

 Clayey silt

 Sandy silt

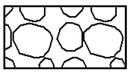
 Sand

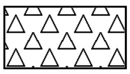
 Clayey sand

 Silty sand

 Gravel

 Sandy gravel

 Cobbles, boulders

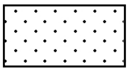
 Talus

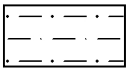
Sedimentary Rocks

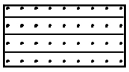
 Boulder conglomerate

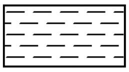
 Conglomerate

 Conglomeratic sandstone

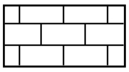
 Sandstone

 Siltstone

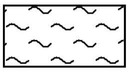
 Laminite

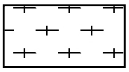
 Mudstone, claystone, shale

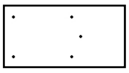
 Coal

 Limestone

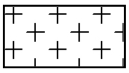
Metamorphic Rocks

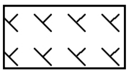
 Slate, phyllite, schist

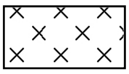
 Gneiss

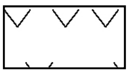
 Quartzite

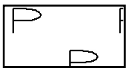
Igneous Rocks

 Granite

 Dolerite, basalt, andesite

 Dacite, epidote

 Tuff, breccia

 Porphyry

BOREHOLE LOG

CLIENT: Westfield Design and Construction Pty Ltd
PROJECT: Contamination Assessment
LOCATION: Warringah Mall, Brookvale

SURFACE LEVEL: 9.34 AHD
EASTING: 339512.11
NORTHING: 6262386.11
DIP/AZIMUTH: 90°/--

BORE No: 738
PROJECT No: 71015.18
DATE: 24/4/2013
SHEET 1 OF 1

Depth (m)	Description of Strata	Sampling Type	Sampling Depth	Results & Comments	Water
0.2	ASPHALT				
0.3	FILLING - grey, sandy gravel filling (roadbase)				
0.6	FILLING - dark grey, sand filling with some gravel and trace clay	E	0.4–0.5	PID<1	
1.1	FILLING - dark grey, clayey sand filling (possibly reworked natural)	E	0.9–1.0	PID<1	
2.0	SILTY CLAY - soft to firm, dark grey, silty clay and trace sand, moist to wet - saturated at 1.7m	E	1.4–1.5	PID<1	Water level at 1.7m
		E	1.9–2.0	PID<1	
	Bore discontinued at 2.0m - target depth reached				

RIG: Bobcat **DRILLER:** S. Gregor **LOGGED:** DW **CASING:** Uncased
TYPE OF BORING: 100mm diameter solid flight auger
WATER OBSERVATIONS: Free groundwater observed at 1.7m whilst drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Westfield Design and Construction Pty Ltd
PROJECT: Contamination Assessment
LOCATION: Warringah Mall, Brookvale

SURFACE LEVEL: 9.30 AHD
EASTING: 339516.05
NORTHING: 6262346.77
DIP/AZIMUTH: 90°/--

BORE No: 739
PROJECT No: 71015.18
DATE: 24/4/2013
SHEET 1 OF 1

Depth (m)	Description of Strata	Type	Depth	Results & Comments
0.03	ASPHALT			
	FILLING - brown, gravelly sand filling (roadbase)	E	0.4–0.5	PID<1
0.5	FILLING - brown, clayey sand filling with trace gravel	*E	0.9–1.0	PID<1
1.1	SILTY CLAY - soft, brown, silty clay with trace sand, moist	E	1.1–1.2	PID<1
1.2	SAND - grey, medium grained sand, moist	E	1.4–1.5	PID<1
		E	1.9–2.0	PID<1
2.0	Bore discontinued at 2.0m - target depth reached			

RIG: Bobcat **DRILLER:** S. Gregor **LOGGED:** DW **CASING:** Uncased
TYPE OF BORING: 100mm diameter solid flight auger
WATER OBSERVATIONS: No free groundwater observed whilst drilling
REMARKS: *BD2-240413 is blind replicate of 739/0.9-1.0

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Westfield Design and Construction Pty Ltd
PROJECT: Contamination Assessment
LOCATION: Warringah Mall, Brookvale

SURFACE LEVEL: 9.07 AHD
EASTING: 339535.08
NORTHING: 6262342.84
DIP/AZIMUTH: 90°/--

BORE No: 740
PROJECT No: 71015.18
DATE: 24/4/2013
SHEET 1 OF 1

Depth (m)	Description of Strata	Type	Depth	Results & Comments	Well Construction Details
0.05	ASPHALT				Gatic cover and concrete
0.25	FILLING - grey, gravelly sand filling (roadbase)	E	0.4–0.5	PID<1	Bentonite 0.25-0.75m
0.6	FILLING - red-brown clay filling with trace silt, sand and gravel				Blank PVC pipe
1.1	FILLING - red-brown, sand filling with some gravel and trace brick, terracotta and glass	E	0.9–1.0	PID<1	
1.6	FILLING - grey, sand and clay filling (possibly reworked natural)	E	1.4–1.5	PID<1	
	CLAYEY SAND - grey, mottled yellow-brown, fine to medium grained clayey sand, moist	E	1.9–2.0	PID<1	
		A	2.4–2.5		
		E	2.9–3.0	PID<1	Gravel 0.75-5.8m
		A	3.4–3.5		Machine slotted PVC screen 1.3-5.8m
	- saturated from 4.0m	A	3.9–4.0		
	- very slight hydrocarbon odour at 4.5m (associated with water)	A	4.4–4.5		
		A	4.9–5.0		
		A	5.4–5.5		End Cap
6.0		A	5.9–6.0		
	Bore discontinued at 6.0m - target depth reached				

Water: 21-05-13 (water level at approx. 1.9m)

RIG: Bobcat **DRILLER:** S. Gregor **LOGGED:** DW **CASING:** Uncased
TYPE OF BORING: 100mm diameter solid flight auger
WATER OBSERVATIONS: Free groundwater observed at 4.0m whilst drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Westfield Design and Construction Pty Ltd
PROJECT: Contamination Assessment
LOCATION: Warringah Mall, Brookvale

SURFACE LEVEL: 9.45 AHD
EASTING: 339567.93
NORTHING: 6262359.7
DIP/AZIMUTH: 90°/--

BORE No: 741
PROJECT No: 71015.18
DATE: 24/4/2013
SHEET 1 OF 1

Depth (m)	Description of Strata	Sampling Type	Sampling Depth	Sample	Results & Comments	Water	Well Construction Details
0.02	ASPHALT						
0.15	FILLING - grey, gravelly sand filling (roadbase)						
	FILLING - brown, sand filling with some clay and gravel	*E	0.4 - 0.5		PID<1		
0.6	CLAYEY SAND - yellow-brown, mottled grey and red-brown, fine to medium grained, clayey sand, moist	E	0.9 - 1.0		PID<1		
1.3	SANDY CLAY - stiff, grey, fine grained sandy clay, damp	E	1.4 - 1.5		PID<1		
1.6	SAND - grey, medium grained sand, moist - mottled brown from 2.0m - slight hydrocarbon odour at 2.0-3.0m	E	1.9 - 2.0		PID<1		
		E	2.9 - 3.0		PID=2		
3.0	Bore discontinued at 3.0m - target depth reached						

RIG: Bobcat **DRILLER:** S. Gregor **LOGGED:** DW **CASING:** Uncased
TYPE OF BORING: 100mm diameter solid flight auger
WATER OBSERVATIONS: No free groundwater observed whilst drilling
REMARKS: *BD3-240413 is blind replicate of 741/0.4-0.5

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Westfield Design and Construction Pty Ltd
PROJECT: Contamination Assessment
LOCATION: Warringah Mall, Brookvale

SURFACE LEVEL: 9.62 AHD
EASTING: 339615.23
NORTHING: 6262336.29
DIP/AZIMUTH: 90°/--

BORE No: 742
PROJECT No: 71015.18
DATE: 24/4/2013
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
	0.05	FILLING - brown, sand filling with trace gravel, silt and rootlets		E	0.0 0.05		PID<1		
	0.5	FILLING - brown, sand filling with some gravel filling		E	0.4 0.5		PID<1		
		Bore discontinued at 0.5m- refusal on concrete							

RIG: Bobcat **DRILLER:** S. Gregor **LOGGED:** DW **CASING:** Uncased
TYPE OF BORING: 100mm diameter solid flight auger
WATER OBSERVATIONS: No free groundwater observed whilst drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Westfield Design and Construction Pty Ltd
PROJECT: Contamination Assessment
LOCATION: Warringah Mall, Brookvale

SURFACE LEVEL: 10.04 AHD
EASTING: 339641.34
NORTHING: 6262344.42
DIP/AZIMUTH: 90°/--

BORE No: 743
PROJECT No: 71015.18
DATE: 2/5/2013
SHEET 1 OF 1

Depth (m)	Description of Strata	Sampling Type	Sampling Depth	Results & Comments
0.05	ASPHALT			
0.25	FILLING - grey, sandy gravel filling (roadbase)			
0.5	FILLING - red-brown, sandstone boulder filling	E	0.4–0.5	PID<1 ppm
	FILLING - red-brown and grey sand filling with some rock fragments (ripped sandstone filling)	E	0.9–1.0	PID<1 ppm
1.4	SAND - grey mottled brown, fine to medium grained sand with trace clay, moist	E	1.4–1.5	PID<1 ppm
1.7	SAND - grey, fine to medium grained sand, moist	E	1.9–2.0	PID<1 ppm
2.1	CLAY - very stiff, grey mottled red-brown, clay with trace silt and sand	E	2.7–2.8	PID<1 ppm
2.8	Bore discontinued at 2.8m - target depth reached			

RIG: Bobcat **DRILLER:** S. Gregor **LOGGED:** DW **CASING:** Uncased
TYPE OF BORING: 100mm diameter solid flight auger
WATER OBSERVATIONS: No free groundwater observed whilst drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Westfield Design and Construction Pty Ltd
PROJECT: Contamination Assessment
LOCATION: Warringah Mall, Brookvale

SURFACE LEVEL: 10.33 AHD
EASTING: 339666.71
NORTHING: 6262341.66
DIP/AZIMUTH: 90°/--

BORE No: 744
PROJECT No: 71015.18
DATE: 2/5/2013
SHEET 1 OF 1

Depth (m)	Description of Strata	Sampling Type	Sampling Depth	Results & Comments
0.05	ASPHALT			
0.4	FILLING - grey, sandy gravel filling (roadbase)			
1.3	FILLING - brown, sandy filling with some rock fragments and roadbase gravel - very slight hydrocarbon odour at 0.6m - 1.0m - sandstone cobble at 1.1m to 1.3m	E	0.4–0.5	PID=3 ppm
		*E	0.9–1.0	PID=3 ppm
1.6	CLAYEY SAND - soft, dark brown, clayey sand with trace roots, moist	E	1.4–1.5	PID=3 ppm
3.0	SAND - grey, fine to medium grained sand with trace clay, moist to wet	E	1.9–2.0	PID<1 ppm
		E	2.9–3.0	PID<1 ppm
	Bore discontinued at 3.0m - target depth reached			

RIG: Bobcat **DRILLER:** S. Gregor **LOGGED:** DW **CASING:** Uncased

TYPE OF BORING: 100mm diameter solid flight auger

WATER OBSERVATIONS: No free groundwater observed whilst drilling

REMARKS: *BD2-020513 is blind replicate of 744/0.9-1.0

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Westfield Design and Construction Pty Ltd
PROJECT: Contamination Assessment
LOCATION: Warringah Mall, Brookvale

SURFACE LEVEL: 9.89 AHD
EASTING: 339597.38
NORTHING: 6262326.43
DIP/AZIMUTH: 90°/--

BORE No: 745
PROJECT No: 71015.18
DATE: 24/4/2013
SHEET 1 OF 1

Depth (m)	Description of Strata	Type	Depth	Results & Comments
0.05	FILLING - woodchips	E	0.05–0.1	PID<1
0.1	FILLING - dark brown, sand filling with trace silt, clay and rootlets	E	0.4–0.5	PID<1
	FILLING - brown, sand filling with trace clay and gravel			
0.8	FILLING - brown, sandy gravel filling with trace clay (roadbase)	E	0.9–1.0	PID<1
1.2	SAND - grey, fine to medium grained, sand with trace clay, moist	E	1.4–1.5	PID<1
2.0	CLAY - very stiff, grey clay with some fine grained sand and silt	E	2.9–3.0	PID<1
3.0	Bore discontinued at 3.0m - target depth reached			

RIG: Bobcat **DRILLER:** S. Gregor **LOGGED:** DW **CASING:** Uncased
TYPE OF BORING: 100mm diameter solid flight auger
WATER OBSERVATIONS: No free groundwater observed whilst drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Westfield Design and Construction Pty Ltd
PROJECT: Contamination Assessment
LOCATION: Warringah Mall, Brookvale

SURFACE LEVEL: 8.96 AHD
EASTING: 339620.99
NORTHING: 6262317.3
DIP/AZIMUTH: 90°/--

BORE No: 746
PROJECT No: 71015.18
DATE: 29/4/2013
SHEET 1 OF 1

Depth (m)	Description of Strata
0.05	ASPHALT
1.1	FILLING - grey-brown, sandy gravel filling (roadbase) - trace nail and brick at 0.8m
1.5	FILLING - grey, sand filling with some sandstone fragments
2.7	CLAYEY SAND - brown, fine to medium grained clayey sand, with trace gravel and silt, moist to wet. Very slight hydrocarbon odour.
3.0	CLAYEY SAND - dark brown, fine to medium grained, clayey sand, saturated
	Bore discontinued at 3.0m - target depth reached

Type	Depth	Sample	Results & Comments
E	0.4 0.5		PID<1 ppm
E	0.9 1.0		PID<1 ppm
E	1.4 1.5		PID<1 ppm
E	1.7 2.0		PID=10 ppm
E	2.4 2.5		PID=8 ppm
E	2.9 3.0		PID=4 ppm

Water: ▼ (2.7 m)

RIG: Bobcat **DRILLER:** S. Gregor **LOGGED:** DW **CASING:** Uncased
TYPE OF BORING: 100mm diameter solid flight auger
WATER OBSERVATIONS: Free groundwater observed at 2.7m whilst drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Westfield Design and Construction Pty Ltd
PROJECT: Contamination Assessment
LOCATION: Warringah Mall, Brookvale

SURFACE LEVEL: 9.79 AHD
EASTING: 339646.73
NORTHING: 6262309.63
DIP/AZIMUTH: 90°/--

BORE No: 747
PROJECT No: 71015.18
DATE: 29/4/2013
SHEET 1 OF 1

Depth (m)	Description of Strata	Sampling Type	Sampling Depth	Results & Comments
0.05	ASPHALT			
0.25	FILLING - grey, sandy gravel filling (roadbase)	*E	0.4–0.5	PID<1 ppm
0.6	FILLING - brown mottled red, clay filling with trace ironstone gravel			
1.0	FILLING - yellow-brown, clay filling with trace silt - some gravel at 1.0m	E	0.9–1.0	PID<1 ppm
	SAND - grey, medium grained sand with trace clay, damp (possibly filling)	E	1.4–1.5	PID<1 ppm
1.9	CLAY - very stiff, red mottled grey, clay with trace ironstone gravel and silt, damp	E	1.9–2.0	PID<1 ppm
		E	2.9–3.0	PID<1 ppm
3.0	Bore discontinued at 3.0m - target depth reached			

RIG: Bobcat **DRILLER:** S. Gregor **LOGGED:** DW **CASING:** Uncased
TYPE OF BORING: 100mm diameter solid flight auger
WATER OBSERVATIONS: No free groundwater observed whilst drilling
REMARKS: *BD2-290413 is blind replicate of 747/0.4-0.5

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Westfield Design and Construction Pty Ltd
PROJECT: Contamination Assessment
LOCATION: Warringah Mall, Brookvale

SURFACE LEVEL: 8.95 AHD
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: 748
PROJECT No: 71015.18
DATE: 2/5/2013
SHEET 1 OF 1

Depth (m)	Description of Strata	Sample Type	Sample Depth	Results & Comments	Water
0.03	ASPHALT				
0.07	FILLING - grey, gravelly sand filling (roadbase)				
0.5	FILLING - brown, sand filling with trace clay and rock fragments	*E	0.4–0.5	PID<1 ppm	
0.9	FILLING - brown, sandy gravel filling with trace clay (roadbase)	E	0.8–0.9	PID<1 ppm	
1.6	CLAYEY SAND - soft, dark brown, fine grained clayey sand, moist - possibly reworked from 0.9m to 1.1m	E E	1.2–1.3 1.4–1.5	PID<1 ppm PID<1 ppm	
3.0	SAND - grey, fine to medium grained sand, damp to wet - saturated from 2.5m	E E	1.9–2.0 2.9–3.0	PID<1 ppm PID<1 ppm	▼ (2.5m)
	Bore discontinued at 3.0m - target depth reached				

RIG: Bobcat **DRILLER:** S. Gregor **LOGGED:** DW **CASING:** Uncased
TYPE OF BORING: 100mm diameter solid flight auger
WATER OBSERVATIONS: Free groundwater observed at 2.5m whilst drilling
REMARKS: *BD1-020513 is blind replicate of 748/0.4-0.5

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Westfield Design and Construction Pty Ltd
PROJECT: Contamination Assessment
LOCATION: Warringah Mall, Brookvale

SURFACE LEVEL: 8.94 AHD
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: 749
PROJECT No: 71015.18
DATE: 2/5/2013
SHEET 1 OF 1

Depth (m)	Description of Strata	Type	Sample Depth	Results & Comments
0.02	ASPHALT			
0.07	FILLING - grey, sandy gravel filling (roadbase)			
0.09	FILLING - brown, clayey sand filling with trace rock fragments	E	0.4–0.5	PID<1 ppm
	FILLING - grey, sand filling with some gravel	E	0.9–1.0	PID<1 ppm
1.0	FILLING - brown, sand filling with some clay and rock fragments	E	1.1	PID<1 ppm
1.1		E	1.2	PID<1 ppm
1.3	SAND - dark brown, fine to medium grained sand with trace clay, damp to moist	E	1.3–1.4	PID<1 ppm
1.6	SAND - brown mottled grey, fine to medium grained sand, damp to moist		1.5	
	SAND - grey, fine to medium grained sand with trace clay, moist to wet - some clay at 1.9m - 2.1m	E	1.9–2.0	PID<1 ppm
		E	2.9–3.0	PID<1 ppm
3.0	Bore discontinued at 3.0m - target depth reached			

RIG: Bobcat **DRILLER:** S. Gregor **LOGGED:** DW **CASING:** Uncased
TYPE OF BORING: 100mm diameter solid flight auger
WATER OBSERVATIONS: No free groundwater observed whilst drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Westfield Design and Construction Pty Ltd
PROJECT: Contamination Assessment
LOCATION: Warringah Mall, Brookvale

SURFACE LEVEL: 9.16 AHD
EASTING: 339606.77
NORTHING: 6262291.89
DIP/AZIMUTH: 90°/--

BORE No: 750
PROJECT No: 71015.18
DATE: 29/4/2013
SHEET 1 OF 1

Depth (m)	Description of Strata	Type	Depth	Results & Comments
0.05	ASPHALT			
	FILLING - brown, sandy gravel filling (roadbase)	E	0.4–0.5	PID<1 ppm
1.0	FILLING - brown, sand filling with some clay and rock fragments	E	1.0–1.2	PID<1 ppm
1.2	CLAY - very stiff, grey mottled brown, clay with trace silt, damp	E	1.4–1.5	PID<1 ppm
		E	1.9–2.0	PID=3 ppm
2.5	SAND - grey, medium grained sand with trace clay, moist. Slight hydrocarbon odour.	E	2.9–3.0	PID=10 ppm
3.0	Bore discontinued at 3.0m - target depth reached			

RIG: Bobcat **DRILLER:** S. Gregor **LOGGED:** DW **CASING:** Uncased
TYPE OF BORING: 100mm diameter solid flight auger
WATER OBSERVATIONS: No free groundwater observed whilst drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Westfield Design and Construction Pty Ltd
PROJECT: Contamination Assessment
LOCATION: Warringah Mall, Brookvale

SURFACE LEVEL: 9.08 AHD
EASTING: 339594.8
NORTHING: 6262274.73
DIP/AZIMUTH: 90°/--

BORE No: 751
PROJECT No: 71015.18
DATE: 29/4/2013
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
9	0.07	ASPHALT							
	0.5	FILLING - grey, gravelly sand filling (roadbase)		E	0.4 0.5		PID<1 ppm		
8	1.2	FILLING - brown, clay filling with some silt and trace sand and rootlets		*E	0.9 1.0		PID<1 ppm		
7		CLAYEY SAND - grey mottled brown, medium grained clayey sand, moist		E	1.4 1.5		PID<1 ppm		
				E	1.9 2.0		PID<1 ppm		
6	3.0	- some rock fragments at 2.5m to 3.0m		E	2.9 3.0		PID<1 ppm		
		Bore discontinued at 3.0m on sandstone bedrock - target depth reached							

RIG: Bobcat **DRILLER:** S. Gregor **LOGGED:** DW **CASING:** Uncased
TYPE OF BORING: 100mm diameter solid flight auger
WATER OBSERVATIONS: No free groundwater observed whilst drilling
REMARKS: *BD1-290413 is blind replicate of 751/0.9-1.0

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Westfield Design and Construction Pty Ltd
PROJECT: Contamination Assessment
LOCATION: Warringah Mall, Brookvale

SURFACE LEVEL: 9.68 AHD
EASTING: 339613.05
NORTHING: 6262266.98
DIP/AZIMUTH: 90°/--

BORE No: 752
PROJECT No: 71015.18
DATE: 29/4/2013
SHEET 1 OF 1

Depth (m)	Description of Strata	Sampling Type	Sampling Depth	Results & Comments	Water	Well Construction Details
0.07	ASPHALT					Flush gatic cover and concrete
0.5	FILLING - brown, sandy gravel filling (roadbase)	E	0.4 0.5	PID<1 ppm		
0.8	FILLING - yellow-brown, clayey sand filling with trace rock fragments (ripped sandstone)	E	0.6 0.7	PID<1 ppm		Bentonite 0.4-1.0m
1.1	CLAYEY SAND - grey and brown, fine to medium grained clayey sand, moist	E	0.9 1.0	PID<1 ppm		
1.6	SANDY CLAY - stiff, brown and grey, fine to medium grained sandy clay, moist	E	1.4 1.5	PID<1 ppm		Blank PVC pipe
2.7	CLAYEY SAND - grey, medium grained clayey sand, moist	E	1.9 2.0	PID<1 ppm		Gravel 1.0-3.1m
		E	2.4 2.5	PID<1 ppm	21-05-13	Machine slotted PVC screen 1.6m-3.1m
3.15	SANDSTONE - very low strength, yellow-white, fine to medium grained sandstone	E	2.9 3.0	PID<1 ppm		End Cap
	Bore discontinued at 3.15m - refusal on sandstone					

RIG: Bobcat **DRILLER:** S. Gregor **LOGGED:** DW **CASING:** Uncased
TYPE OF BORING: 100mm diameter solid flight auger
WATER OBSERVATIONS: Water seepage observed at 2.6m whilst drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Westfield Design and Construction Pty Ltd
PROJECT: Contamination Assessment
LOCATION: Warringah Mall, Brookvale

SURFACE LEVEL: 8.89 AHD
EASTING: 339582.22
NORTHING: 6262266.18
DIP/AZIMUTH: 90°/--

BORE No: 753
PROJECT No: 71015.18
DATE: 30/4/2013
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.05	ASPHALT							
	0.6	FILLING - brown, sandy gravel filling (roadbase)		E	0.4 0.5		PID<1 ppm		
	0.7	FILLING - grey, sand filling							
8	1	Bore discontinued at 0.7m - wire observed as possible service. Test bore abandoned.							1
7	2								2
6	3								3
5	4								4
4	5								5
3	6								6
2	7								7
1	8								8
0	9								9
-1									

RIG: Bobcat **DRILLER:** S. Gregor **LOGGED:** DW **CASING:** Uncased
TYPE OF BORING: 100mm diameter solid flight auger
WATER OBSERVATIONS: Water seepage observed at 0.6m whilst drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Westfield Design and Construction Pty Ltd
PROJECT: Contamination Assessment
LOCATION: Warringah Mall, Brookvale

SURFACE LEVEL: 10.19 AHD
EASTING: 339604.71
NORTHING: 6262245.57
DIP/AZIMUTH: 90°/--

BORE No: 754
PROJECT No: 71015.18
DATE: 29/4/2013
SHEET 1 OF 1

Depth (m)	Description of Strata	Type	Sample Depth	Results & Comments
0.02	ASPHALT			
0.4	FILLING - brown, gravelly sand filling (roadbase)	E	0.4–0.5	PID<1 ppm
0.6	FILLING - brown, clayey sand filling with trace rock fragments			
1.3	SANDY CLAY - stiff, yellow-brown, sandy clay with trace ironstone gravel and tree roots, damp	*E	0.9–1.0	PID<1 ppm
2.0	CLAYEY SAND - light yellow-brown, medium grained clayey sand, damp to moist (extremely low strength sandstone)	E	1.4–1.5	PID<1 ppm
		E	1.9–2.0	PID<1 ppm
	Bore discontinued at 2.0m on sandstone bedrock - target depth reached			

RIG: Bobcat **DRILLER:** S. Gregor **LOGGED:** DW **CASING:** Uncased
TYPE OF BORING: 100mm diameter solid flight auger
WATER OBSERVATIONS: No free groundwater observed whilst drilling
REMARKS: *BD3-290413 is blind replicate of 754/0.9-1.0

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Westfield Design and Construction Pty Ltd
PROJECT: Contamination Assessment
LOCATION: Warringah Mall, Brookvale

SURFACE LEVEL: 8.74 AHD
EASTING: 339548.41
NORTHING: 6262248.54
DIP/AZIMUTH: 90°/--

BORE No: 755
PROJECT No: 71015.18
DATE: 30/4/2013
SHEET 1 OF 1

Depth (m)	Description of Strata	Type	Depth	Sample	Results & Comments	Water
0.05	ASPHALT					
	FILLING - brown, sandy gravel filling (roadbase)	E	0.4–0.5		PID<1 ppm	
0.5	FILLING - grey, sand filling with trace roots	E	0.9–1.0		PID<1 ppm	
		E	1.4–1.5		PID<1 ppm	
1.7	CLAY - soft, dark brown, clay with trace silt, moist	E	1.9–2.0		PID<1 ppm	
2.2	SAND - brown and grey, medium grained sand with trace clay, moist to wet - saturated from 2.7m	E	2.9–3.0		PID<1 ppm	▼ (2.7m)
3.0	Bore discontinued at 3.0m - target depth reached					

RIG: Bobcat **DRILLER:** S. Gregor **LOGGED:** DW **CASING:** Uncased
TYPE OF BORING: 100mm diameter solid flight auger
WATER OBSERVATIONS: Free groundwater observed at 2.7m whilst drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Westfield Design and Construction Pty Ltd
PROJECT: Contamination Assessment
LOCATION: Warringah Mall, Brookvale

SURFACE LEVEL: 8.53 AHD
EASTING: 339565.62
NORTHING: 6262237.7
DIP/AZIMUTH: 90°/--

BORE No: 756
PROJECT No: 71015.18
DATE: 30/4/2013
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
		FILLING - brown, silty sand filling with trace clay - some rootlets at 0-0.1m - pieces of steel and plastic at 0.5m		*E	0.4 0.5		PID<1 ppm		
	0.8	FILLING - grey, sand filling		E	0.9 1.0		PID<1 ppm		
	1.2	SAND - yellow-brown, fine to medium grained sand with some clay, moist to wet		E	1.4 1.5		PID<1 ppm		
	1.65 1.7	SANDSTONE - low strength, medium grained sandstone Bore discontinued at 1.7m - refusal on sandstone		A	1.65 1.7		PID<1 ppm		

RIG: Bobcat **DRILLER:** S. Gregor **LOGGED:** DW **CASING:** Uncased
TYPE OF BORING: 100mm diameter solid flight auger
WATER OBSERVATIONS: No free groundwater observed whilst drilling
REMARKS: *BD1-300413 is blind replicate of 756/0.4-0.5

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Westfield Design and Construction Pty Ltd
PROJECT: Contamination Assessment
LOCATION: Warringah Mall, Brookvale

SURFACE LEVEL: 8.59 AHD
EASTING: 339542.89
NORTHING: 6262225.44
DIP/AZIMUTH: 90°/--

BORE No: 757
PROJECT No: 71015.18
DATE: 30/4/2013
SHEET 1 OF 1

Depth (m)	Description of Strata	Sampling Type	Sampling Depth	Results & Comments
0.07	ASPHALT			
0.5	FILLING - brown, gravelly sand filling (roadbase)	E	0.4–0.5	PID<1 ppm
0.7	FILLING - light brown, sand filling with some sandstone fragments (ripped sandstone)	E	0.5–0.7	PID<1 ppm
1.2	SAND - dark brown, fine to medium grained sand with trace clay, humid	E	0.9–1.0	PID<1 ppm
1.6	CLAYEY SAND - brown, fine to medium grained clayey sand, damp	E	1.4–1.5	PID<1 ppm
2.3	CLAY - soft, brown clay with trace sand, moist	E	1.9–2.0	PID<1 ppm
3.0	SAND - brown, medium grained sand, damp	E	2.9–3.0	PID<1 ppm
	Bore discontinued at 3.0m - target depth reached			

RIG: Bobcat **DRILLER:** S. Gregor **LOGGED:** DW **CASING:** Uncased
TYPE OF BORING: 100mm diameter solid flight auger
WATER OBSERVATIONS: No free groundwater observed whilst drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Westfield Design and Construction Pty Ltd
PROJECT: Contamination Assessment
LOCATION: Warringah Mall, Brookvale

SURFACE LEVEL: 8.25 AHD
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: 758
PROJECT No: 71015.18
DATE: 30/4/2013
SHEET 1 OF 1

Depth (m)	Description of Strata	Type	Depth	Results & Comments	Water
0.05	ASPHALT				
0.6	FILLING - some gravelly sand filling (roadbase)	E	0.4–0.5	PID<1 ppm	
0.9	FILLING - grey, sand filling with some gravel, terracotta and brick pieces	*E	0.7–0.8	PID<1 ppm	
1.5	FILLING - dark brown, clayey sand filling with trace roots	E	1.4–1.5	PID<1 ppm	
2.8	FILLING - yellow, sand filling with trace oyster shells and ironstone gravel	E	1.9–2.0	PID<1 ppm	
		E	2.4–2.5	PID<1 ppm	
3.2	SAND - grey, medium grained sand, moist to wet - saturated from 3.0m	E	2.9–3.0	PID<1 ppm	▼ (3.0)
3.5	SANDSTONE - very low strength, light grey sandstone	E	3.4–3.5	PID<1 ppm	
	Bore discontinued at 3.5m - refusal on sandstone				

RIG: Bobcat **DRILLER:** S. Gregor **LOGGED:** DW **CASING:** Uncased
TYPE OF BORING: 100mm diameter solid flight auger
WATER OBSERVATIONS: Free groundwater observed at 3.0m whilst drilling
REMARKS: *BD2-300413 is blind replicate of 758/0.7-0.8

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Westfield Design and Construction Pty Ltd
PROJECT: Contamination Assessment
LOCATION: Warringah Mall, Brookvale

SURFACE LEVEL: 9.40 AHD
EASTING: 339521.61
NORTHING: 6262196.6
DIP/AZIMUTH: 90°/--

BORE No: 759
PROJECT No: 71015.18
DATE: 1/5/2013
SHEET 1 OF 1

Depth (m)	Description of Strata	Type	Depth	Results & Comments	Water
0.07	ASPHALT				
0.2	FILLING - grey, sandy gravel filling (roadbase)	*E	0.4 0.5	PID<1 ppm	
0.6	FILLING - red-brown, clayey sand filling with some rock fragments				
1.0	FILLING - grey and brown, sand filling with some roadbase gravel and trace clay and rock fragments	E	0.9 1.0	PID<1 ppm	
	FILLING - brown, clay filling with trace clay, sand, slag and roots	E	1.4 1.5	PID<1 ppm	
		E	1.9 2.0	PID<1 ppm	
		E	2.4 2.5	PID<1 ppm	
2.6	FILLING - brown-grey, sand filling with some clay and trace gravel, roots and charcoal	E	2.9 3.0	PID<1 ppm	
	- trace tile at 3.5m to 3.8m	E	3.5 3.8	PID<1 ppm	
3.8	SAND - light brown and grey, medium grained sand, damp	E	3.9 4.0		▼ (4.3)
4.3	SANDY CLAY - soft, dark brown, fine grained sandy clay, saturated	E	4.4 4.5		
4.5	Bore discontinued at 4.5m - target depth reached				

RIG: Bobcat **DRILLER:** S. Gregor **LOGGED:** DW **CASING:** Uncased
TYPE OF BORING: 100mm diameter solid flight auger
WATER OBSERVATIONS: Free groundwater observed at 4.3m whilst drilling
REMARKS: *BD1-010513 is blind replicate of 759/0.4-0.5

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Westfield Design and Construction Pty Ltd
PROJECT: Contamination Assessment
LOCATION: Warringah Mall, Brookvale

SURFACE LEVEL: 9.61 AHD
EASTING: 339559.87
NORTHING: 6262201.06
DIP/AZIMUTH: 90°/--

BORE No: 760
PROJECT No: 71015.18
DATE: 30/4/2013
SHEET 1 OF 1

Depth (m)	Description of Strata	Type	Depth	Results & Comments	Water
0.05	ASPHALT				
0.5	FILLING - brown, gravelly sand filling (roadbase) with trace roots	E	0.4–0.5	PID<1 ppm	
1.1	FILLING - brown and yellow-brown, sand filling with some rock fragments and trace roots (ripped sandstone)	*E	0.9–1.0	PID<1 ppm	
2.0	FILLING - dark brown, sand filling with some gravel and trace silt, clay and gravel - piece of fibre cement at 1.4m	E	1.4–1.5	PID<1 ppm A1-sample of fibre cement at 1.4m	
		E	1.9–2.0	PID<1 ppm	
2.7	SAND - brown, fine to medium grained sand with trace clay, humid to damp	E	2.4–2.5	PID<1 ppm	
3.2	SAND - light brown, fine to medium grained sand, humid	E	2.9–3.0	PID<1 ppm	
4.0	SANDY CLAY - soft, grey mottled brown, fine to medium grained, sandy clay, wet to saturated	E	3.9–4.0	PID<1 ppm	▼ (3.6m)
	Bore discontinued at 4.0m - target depth reached				

RIG: Bobcat **DRILLER:** S. Gregor **LOGGED:** DW **CASING:** Uncased
TYPE OF BORING: 100mm diameter solid flight auger
WATER OBSERVATIONS: Water seepage observed at 3.6m whilst drilling
REMARKS: *BD3-300413 is blind replicate of 760/0.9-1.0

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Westfield Design and Construction Pty Ltd
PROJECT: Contamination Assessment
LOCATION: Warringah Mall, Brookvale

SURFACE LEVEL: 9.36 AHD
EASTING: 339510.5
NORTHING: 6262173.04
DIP/AZIMUTH: 90°/--

BORE No: 761
PROJECT No: 71015.18
DATE: 1/5/2013
SHEET 1 OF 1

Depth (m)	Description of Strata	Sampling Type	Sampling Depth	Sample	Results & Comments	Water
0.07	ASPHALT					
	FILLING - grey, sandy gravel filling (roadbase) - brown from 0.5-1.1m - trace brick at 1.0 to 1.1m	E	0.4–0.5		PID<1 ppm	
		E	0.9–1.0		PID<1 ppm	
1.1	FILLING - yellow-brown, clay filling with trace sand and gravel	E	1.4–1.5		PID<1 ppm	
1.8	FILLING - grey, sand filling with trace wood	E	1.9–2.0		PID<1 ppm	
2.1	FILLING - brown, clay and sand filling with trace rock fragments	E	2.4–2.5		PID<1 ppm	
2.5	FILLING - brown, clay filling with trace shale fragments and silt	E	2.5–2.7		PID<1 ppm	
2.7	FILLING - dark brown, clay filling	E	2.9–3.0		PID<1 ppm	
3.1	CLAYEY SAND - dark brown, fine to medium grained clayey sand, wet to saturated	E	3.4–3.5		PID<1 ppm	▼
3.6	SAND - brown, fine to medium grained, sand with some clay	E	4.4–4.5		PID<1 ppm	
4.5	Bore discontinued at 4.5m - target depth reached					

RIG: Bobcat **DRILLER:** S. Gregor **LOGGED:** DW **CASING:** Uncased
TYPE OF BORING: 100mm diameter solid flight auger
WATER OBSERVATIONS: Free groundwater observed at 3.5m whilst drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Westfield Design and Construction Pty Ltd
PROJECT: Contamination Assessment
LOCATION: Warringah Mall, Brookvale

SURFACE LEVEL: 8.95 AHD
EASTING: 339523.6
NORTHING: 6262161.18

PIT No: 762
PROJECT No: 71015.18
DATE: 30/4/2013
SHEET 1 OF 1

Depth (m)	Description of Strata	Type	Depth	Sample	Results & Comments	Water
0.05	ASPHALT					
0.25	FILLING - grey, sandy gravel filling (roadbase)	E	0.4 0.5		PID<1 ppm	
0.5	FILLING - orange-brown, clay filling with trace silt and gravel	E	0.8 0.9		PID<1 ppm	
0.9	FILLING - brown and grey, sand filling with trace clay and sandstone fragments					
	FILLING - grey, sand filling with trace sandstone fragments and clay	E	1.4 1.5		PID<1 ppm	
		E	1.9 2.0		PID<1 ppm	
2.1	SAND - brown and grey, medium grained sand with trace clay, humid	E	2.4 2.5		PID<1 ppm	
2.5	SANDY CLAY - soft, brown, fine to medium grained sandy clay, wet	E	2.9 3.0		PID<1 ppm	
3.0	Pit discontinued at 3.0m - target depth reached					

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20 (no results recorded)

RIG: Bobcat **LOGGED:** DW **SURVEY DATUM:** MGA94

WATER OBSERVATIONS: No free groundwater observed whilst drilling

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Westfield Design and Construction Pty Ltd
PROJECT: Contamination Assessment
LOCATION: Warringah Mall, Brookvale

SURFACE LEVEL: 9.58 AHD
EASTING: 339555.15
NORTHING: 6262168.49
DIP/AZIMUTH: 90°/--

BORE No: 763
PROJECT No: 71015.18
DATE: 29/4/2013
SHEET 1 OF 1

Depth (m)	Description of Strata	Sampling Type	Sampling Depth	Results & Comments	Water
0.03	ASPHALT				
	FILLING - brown, sandy gravel filling (roadbase)	E	0.4–0.5	PID<1 ppm	
		E	0.9–1.0	PID<1 ppm	
1.0	FILLING - dark grey and brown, sand filling with trace clay and sandstone fragments	E	1.4–1.5	PID<1 ppm	
		E	1.9–2.0	PID<1 ppm	
2.1	FILLING - light brown, sand filling with trace rock fragments	E	2.1–2.3	PID<1 ppm	
2.3	SAND - brown, fine to medium grained sand with trace silt, damp (possible filling)	E	2.4–2.5	PID<1 ppm	
		E	2.9–3.0	PID<1 ppm	
3.0	SAND - grey, medium grained sand with trace silt and clay, moist to wet	A	3.4–3.5		
		A	3.9–4.0		
4.0	SAND - dark brown, fine to medium grained sand with some silt and clay, wet to saturated	A	4.4–4.5		▼ (4.3)
4.6	SANDY CLAY - soft, dark brown, fine to medium grained sandy clay (probably with some peat), saturated	A	4.9–5.0		
		A	5.4–5.5		
		A	5.9–6.0		
6.0	Bore discontinued at 6.0m - target depth reached				

RIG: Bobcat **DRILLER:** S. Gregor **LOGGED:** DW **CASING:** Uncased
TYPE OF BORING: 100mm diameter solid flight auger
WATER OBSERVATIONS: Free groundwater observed at 4.3m whilst drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Westfield Design and Construction Pty Ltd
PROJECT: Contamination Assessment
LOCATION: Warringah Mall, Brookvale

SURFACE LEVEL: 9.44 AHD
EASTING: 339489.51
NORTHING: 6262149.32
DIP/AZIMUTH: 90°/--

BORE No: 764
PROJECT No: 71015.18
DATE: 1/5/2013
SHEET 1 OF 1

Depth (m)	Description of Strata	Type	Depth	Sample	Results & Comments	Water	Well Construction Details
0.05	ASPHALT						
	FILLING - brown, sandy gravel filling (roadbase)	E	0.4 0.5		PID<1 ppm		
0.5	FILLING - brown, sand filling with some rock fragments and clay	E	0.9 1.0		PID<1 ppm		
	- pieces of glass at 1.4m	E	1.4 1.5		PID<1 ppm		
	- yellow sandstone boulder at 1.8m to 2.4m	E	1.9 2.0		PID<1 ppm		
		E	2.4 2.5		PID<1 ppm		
	- pieces of wire at 2.5m to 3.0m						
	- piece of tile at 2.8m - nail at 3.0m	E	2.9 3.0		PID<1 ppm		
3.2	CLAY - soft, dark brown, clay with trace sand and rootlets, wet	E	3.9 4.0		PID<1 ppm		
4.0	Bore discontinued at 4.0m - target depth reached						

RIG: Bobcat **DRILLER:** S. Gregor **LOGGED:** DW **CASING:** Uncased
TYPE OF BORING: 100mm diameter solid flight auger
WATER OBSERVATIONS: No free groundwater observed whilst drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Westfield Design and Construction Pty Ltd
PROJECT: Contamination Assessment
LOCATION: Warringah Mall, Brookvale

SURFACE LEVEL: 8.90 AHD
EASTING: 339522.29
NORTHING: 6262149.15
DIP/AZIMUTH: 90°/--

BORE No: 765
PROJECT No: 71015.18
DATE: 1/5/2013
SHEET 1 OF 1

Depth (m)	Description of Strata	Sampling Type	Sampling Depth	Results & Comments
0.07	ASPHALT			
0.35	FILLING - brown, sandy gravel filling (roadbase)	*E	0.4 0.5	PID<1 ppm
0.6	FILLING - grey, sand filling with trace clay and sandstone fragments			
1.3	FILLING - brown, sand filling with trace gravel and clay - some terracotta pieces at 0.7m to1.0m	E	0.9 1.0	PID<1 ppm
1.6	FILLING - brown and grey, clay filling with some sand and trace rock fragments and rootlets	E	1.4 1.5	PID<1 ppm
2.0	FILLING - brown, sand filling with some rock fragments and trace clay	E	1.9 2.0	PID<1 ppm
2.8	SAND - grey, find to medium grained sand with trace clay and rootlets, humid	E	2.4 2.5	PID<1 ppm
3.0	CLAYEY SAND - brown, fine to medium grained clayey sand, damp to moist	E	2.9 3.0	PID<1 ppm
	Bore discontinued at 3.0m - target depth reached			

RIG: Bobcat **DRILLER:** S. Gregor **LOGGED:** DW **CASING:** Uncased
TYPE OF BORING: 100mm diameter solid flight auger
WATER OBSERVATIONS: No free groundwater observed whilst drilling
REMARKS: *BD2-010513 is blind replicate of 765/0.4-0.5

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Westfield Design and Construction Pty Ltd
PROJECT: Contamination Assessment
LOCATION: Warringah Mall, Brookvale

SURFACE LEVEL: 8.87 AHD
EASTING: 339509.99
NORTHING: 6262132.05
DIP/AZIMUTH: 90°/--

BORE No: 766
PROJECT No: 71015.18
DATE: 1/5/2013
SHEET 1 OF 1

Depth (m)	Description of Strata	Graphic Log	Sampling Type	Sampling Depth	Sample	Results & Comments	Water	Well Construction Details
0.05	ASPHALT							
	FILLING - grey, gravelly sand filling (roadbase)		E	0.4–0.5		PID<1 ppm		
0.6	FILLING - brown, sand filling with trace silt, clay and tree roots (probably reworked natural)		*E	0.9–1.0		PID<1 ppm		
1.3	CLAYEY SAND - brown, fine to medium grained clayey sand with trace roots, humid to damp		E	1.4–1.5		PID<1 ppm		
1.6	SAND - brown, fine to medium grained sand with trace clay and roots, damp to moist		E	2.4–2.5		PID<1 ppm		
	- wet at 2.8m		E	2.9–3.0		PID<1 ppm		
3.0	Bore discontinued at 3.0m - target depth reached							

RIG: Bobcat **DRILLER:** S. Gregor **LOGGED:** DW **CASING:** Uncased
TYPE OF BORING: 100mm diameter solid flight auger
WATER OBSERVATIONS: No free groundwater observed whilst drilling
REMARKS: *BD3-010513 is blind replicate of 766/0.9-1.0

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Westfield Design and Construction Pty Ltd
PROJECT: Contamination Assessment
LOCATION: Warringah Mall, Brookvale

SURFACE LEVEL: 9.20 AHD
EASTING: 339489.12
NORTHING: 6262116.84
DIP/AZIMUTH: 90°/--

BORE No: 767
PROJECT No: 71015.18
DATE: 1/5/2013
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.05	ASPHALT							
		FILLING - grey, sandy gravel filling (roadbase)		E	0.4 0.5		PID<1 ppm		
	0.6	FILLING - brown and yellow, sand filling with some sandstone fragments - sandstone boulder at 0.8m		*E	0.9 1.0		PID<1 ppm		
	1.3	FILLING - dark and light brown, clayey sand filling with trace rock fragments		E	1.4 1.5		PID<1 ppm		
	1.7	FILLING - brown, sand filling with trace clay and roots (possibly reworked natural)		E	1.9 2.0		PID<1 ppm		
				E	2.4 2.5		PID<1 ppm		
	2.5	SAND - grey mottled light grey, medium grained sand, damp		E	2.9 3.0		PID<1 ppm		
	3.0	Bore discontinued at 3.0m - target depth reached							

RIG: Bobcat **DRILLER:** S. Gregor **LOGGED:** DW **CASING:** Uncased
TYPE OF BORING: 100mm diameter solid flight auger
WATER OBSERVATIONS: No free groundwater observed whilst drilling
REMARKS: *BD4-010513 is blind replicate of 767/0.9-1.0

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Westfield Design and Construction Pty Ltd
PROJECT: Contamination Assessment
LOCATION: Warringah Mall, Brookvale

SURFACE LEVEL: 8.81 AHD
EASTING: 339472.05
NORTHING: 6262092.51
DIP/AZIMUTH: 90°/--

BORE No: 768
PROJECT No: 71015.18
DATE: 1/5/2013
SHEET 1 OF 1

Depth (m)	Description of Strata	Sampling Type	Sampling Depth	Sample	Results & Comments	Water	Well Construction Details
0.05	ASPHALT						
0.25	FILLING - grey, sandy gravel filling (roadbase)						
0.6	FILLING - brown, sand filling with some sandstone fragments (ripped sandstone filling)	E	0.4 0.5		PID<1 ppm		
1.2	FILLING - yellow-brown sand filling	E	0.9 1.0		PID<1 ppm		
1.9	FILLING - brown, clayey sand filling with trace pieces of metal	E	1.4 1.5		PID<1 ppm		
2.2	FILLING - brown, sand filling with some oyster shells	E	1.9 2.0		PID<1 ppm		
3.0	SAND - yellow mottled grey and orange, medium grained sand, damp	E	2.4 2.5		PID<1 ppm		
		E	2.9 3.0		PID<1 ppm		
	Bore discontinued at 3.0m - target depth reached						

RIG: Bobcat **DRILLER:** S. Gregor **LOGGED:** DW **CASING:** Uncased
TYPE OF BORING: 100mm diameter solid flight auger
WATER OBSERVATIONS: No free groundwater observed whilst drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Westfield Design & Construction Pty Ltd
PROJECT: Phase 2 Contamination Assessment
LOCATION: Stormwater Augmentation Works

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

BORE No: 4
PROJECT No: 71015.01
DATE: 28 Jul 09
SHEET 1 **OF** 1

RL	Depth (m)	Description of Strata	Graphic Log	Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.1	FILLING - dark brown, silty sand filling with trace rootlets (topsoil)							
	0.6	FILLING - dark brown, silty clay filling with some sand and concrete fragments		A	0.3 0.5		PID<10ppm		
	1.1	CLAY - light brown, silty clay with some sand, small band of dark brown silty sand/clay		A	0.7 1.0		PID<10ppm		
	1.5	SILTY CLAY - red brown, silty clay		A	1.2 1.5		PID<10ppm		
	1.6	SILTY CLAY - mottled grey and red brown, silty clay with some sand		A	1.6 2.0		PID<10ppm		
	2.1	SILTY CLAY - very stiff, light grey, silty clay							
		SAND - light grey, medium grained sand, wet to moist		A	2.3 2.5		PID<10ppm		
	3.0	- slight odour, wet		A	2.8 3.0		PID<10ppm		
		Bore discontinued at 3.0m - target depth reached							

RIG: DT 100 **DRILLER:** G Cooper **LOGGED:** ZS **CASING:** Uncased
TYPE OF BORING: Solid flight auger
WATER OBSERVATIONS:
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:
Date:

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BOREHOLE LOG

CLIENT: Westfield Design & Construction Pty Ltd		SURFACE LEVEL: --	BORE No: 5
PROJECT: Phase 2 Contamination Assessment		EASTING:	PROJECT No: 71015.01
LOCATION: Stormwater Augmentation Works		NORTHING:	DATE: 28 Jul 09
		DIP/AZIMUTH: 90°/--	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
	0.05	BITUMINOUS CONCRETE							Gatic end cap
	0.2	ROADBASE - some concrete and silty, fine grained sand		A	0.2–0.5		PID<10ppm		Gravel backfill
	0.5	FILLING - ripped sandstone filling							
	0.8	FILLING - dark brown/yellow, silty clay filling with some sand		A	0.8–1.0		PID<10ppm		
	1.1	FILLING - stiff, red brown, silty clay filling with trace ironstone gravel		A	1.1–1.5		PID<10ppm		Bentonite
		FILLING - dark grey, sandy clay filling, slightly moist, slight hydrocarbon odour, trace glass fragments (peat?), with some medium brown, silty clay, moist		A	1.8–2.0		PID<10ppm		Backfilled with gravel
	2.1	SANDY CLAY - grey brown, sandy clay, moist		A	2.3–2.5		PID<10ppm	▼	Machine slotted PVC Screen; End cap
	5.0	Bore discontinued at 5.0m - target depth reached							

RIG: DT 100 DRILLER: G Cooper LOGGED: ZS CASING: Uncased

TYPE OF BORING: Solid flight auger

WATER OBSERVATIONS: Free groundwater observed at 2.3m whilst augering

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:

Date:

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BOREHOLE LOG

CLIENT: Westfield Design & Construction Pty Ltd
PROJECT: Phase 2 Contamination Assessment
LOCATION: Stormwater Augmentation Works

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

BORE No: 6
PROJECT No: 71015.01
DATE: 28 Jul 09
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
	0.05	BITUMINOUS CONCRETE							
	0.2	ROADBASE		A	0.2 / 0.4		PID<10ppm		
	0.4	RIPPED SANDSTONE							
		FILLING - yellow brown, sandy clay filling		A	0.8 / 1.0		PID<10ppm		
	1.2	SANDY CLAY - yellow brown, sandy clay		A	1.2 / 1.5		PID<10ppm		
	1.6	SANDY CLAY - grey sandy clay		A	1.8 / 2.0		PID<10ppm		
	2.2	SANDY CLAY - grey, sandy clay with some fine rock fragments (low strength sandstone)		A	2.3 / 2.5		PID<10ppm		
	3.0	Bore discontinued at 3.0m - target depth reached							

RIG: DT 100 DRILLER: G Cooper LOGGED: ZS CASING: Uncased
TYPE OF BORING: Solid flight auger
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:
Date:

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BOREHOLE LOG

CLIENT: Westfield Design & Construction Pty Ltd
PROJECT: Phase 2 Contamination Assessment
LOCATION: Stormwater Augmentation Works

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

BORE No: 7
PROJECT No: 71015.01
DATE: 28 Jul 09
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
	0.05	BITUMINOUS CONCRETE							Gatic end cap
	0.2	ROADBASE - gravel with silty sand		A	0.3 / 0.55				Gravel backfill
	0.5	FILLING - dark brown, sandy clay filling with some gravel and concrete fragments							
		FILLING - dark sandy clay filling with gravel		A	0.8 / 1.0				Bentonite
1	1.0	FILLING - black brown, sandy clay filling with gravel		A	1.3				
2	2.1	SILTY SAND - dark grey, fine grained, silty sand, trace gravel (possibly filling)		A	2.3 / 2.5				Backfilled with gravel
	2.6	SANDY CLAY - dark grey/black, fine grained, sandy clay with some organic matter		A	3.0 / 3.5				Machine slotted PVC Screen
3	3.6	SAND - yellow grey, medium grained sand, moist (alluvial)		A	3.7 / 4.0				
4	4.3	Bore discontinued at 4.3m - refusal on white/grey sandstone							End cap

RIG: DT 100 DRILLER: G Cooper LOGGED: ZS CASING: Uncased
TYPE OF BORING: Solid flight auger
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:
Date:

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BOREHOLE LOG

CLIENT: AMP Capital Investors Pty Ltd
PROJECT: Supplementary Contamination Assessment
LOCATION: Warringah Mall

SURFACE LEVEL: 8.62 AHD
EASTING: 339537.01
NORTHING: 6262207.11
DIP/AZIMUTH: 90°/--

BORE No: 510
PROJECT No: 71015.06
DATE: 18/8/2010
SHEET 1 OF 1

Depth (m)	Description of Strata	Sampling Type	Sampling Depth	Sample	Results & Comments	Water	Well Construction Details
0.05	BITUMEN/ASPHALT						Gatic cover
0.2	ROADBASE						Sand & cement mix
0.5	FILLING - black silty sand filling with some gravel						Bentonite
	SILTY CLAY - black organic clay, with decomposed wood and rootlets, slightly moist	A	0.8 – 1.0				Sand & cement mix
2.0	PEATY SAND - black organic peaty sand, moist						
2.2	SILTY CLAY - black organic clay with trace sand and brown timber fragments, moist	A	2.2 – 2.5				Bentonite
3.0	CLAY - black organic clay, wet, odorous - hard band (timber section at 4.5m) - soft clay as above	A	3.3 – 3.6			▼ (3.2)	Backfilled with gravel
5.1	CLAYEY SAND - yellow/grey, medium grained clayey sand						Machine slotted PVC screen
6.0	Bore discontinued at 6.0m - target depth reached						End cap

RIG: Scout 2 **DRILLER:** JS **LOGGED:** ZM **CASING:** Uncased **SURVEY DATUM:**
TYPE OF BORING: Solid flight auger to 6.0m
WATER OBSERVATIONS: Free groundwater observed at 3.2m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: AMP Capital Investors Pty Ltd
PROJECT: Supplementary Contamination Assessment
LOCATION: Warringah Mall

SURFACE LEVEL: 9.45 AHD
EASTING: 339501.81
NORTHING: 6262162.61
DIP/AZIMUTH: 90°/--

BORE No: 511B
PROJECT No: 71015.06
DATE: 17/8/2010
SHEET 1 OF 3

Depth (m)	Description of Strata	Water	Well Construction Details
0.15	BITUMEN/ASPHALT		Gatic cover
0.5	ROADBASE		
1.5	FILLING - black clayey sand filling with quartz, sandstone fragments and metal pieces		Bentonite
2.2	SAND - yellow red, medium grained sand with some sandstone and ironstone gravel		Backfilled with gravel
4.0	ORGANIC CLAY - black organic clay with trace sand and decomposed roots and wood with a sulphurous odour	▼ (3.8)	Bentonite
5.25	CLAYEY SAND - yellow grey, medium grained clayey sand, wet		
5.5	SAND - grey, medium grained sand with some clay		Backfilled with gravel
8.0	SAND - yellow brown, medium grained sand with some clay		Machine slotted PVC screen; End cap (8.0)
	SAND - very loose		

Sampling & In Situ Testing: Type | Depth | Sample | Results & Comments

RIG: **DRILLER:** **LOGGED:** ZM **CASING:** Uncased

TYPE OF BORING: Solid flight auger to 8.0m

WATER OBSERVATIONS: Free groundwater observed at 3.8m

REMARKS: Adjacent to location 511A (approximately 1.0m to the north)

SURVEY DATUM:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: AMP Capital Investors Pty Ltd
PROJECT: Supplementary Contamination Assessment
LOCATION: Warringah Mall

SURFACE LEVEL: 9.45 AHD
EASTING: 339501.81
NORTHING: 6262162.61
DIP/AZIMUTH: 90°/--

BORE No: 511B
PROJECT No: 71015.06
DATE: 17/8/2010
SHEET 2 OF 3

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
-1 to -2	11	SAND - very loose *(continued)*							
-3 to -9	12.0	SAND - loose to mediumd ense							
-10	18.8	CLAYEY SAND - dense							

Depth scale: 11, 12, 13, 14, 15, 16, 17, 18, 19. RL scale: -1, -2, -3, -4, -5, -6, -7, -8, -9, -10.

RIG: **DRILLER:** **LOGGED:** ZM **CASING:** Uncased
TYPE OF BORING: Solid flight auger to 8.0m
WATER OBSERVATIONS: Free groundwater observed at 3.8m
REMARKS: Adjacent to location 511A (approximately 1.0m to the north)

SURVEY DATUM:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: AMP Capital Investors Pty Ltd
PROJECT: Supplementary Contamination Assessment
LOCATION: Warringah Mall

SURFACE LEVEL: 9.45 AHD
EASTING: 339501.81
NORTHING: 6262162.61
DIP/AZIMUTH: 90°/--

BORE No: 511B
PROJECT No: 71015.06
DATE: 17/8/2010
SHEET 3 OF 3

RL	Depth (m)	Description of Strata	Graphic Log	Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		CLAYEY SAND - dense *(continued)*							
-11	20.5	WEATHERED ROCK							
	20.9	Bore discontinued at 20.9m - target depth reached							
	21								21
-12									
	22								22
-13									
	23								23
-14									
	24								24
-15									
	25								25
-16									
	26								26
-17									
	27								27
-18									
	28								28
-19									
	29								29
-20									

RIG: **DRILLER:** **LOGGED:** ZM **CASING:** Uncased
TYPE OF BORING: Solid flight auger to 8.0m
WATER OBSERVATIONS: Free groundwater observed at 3.8m
REMARKS: Adjacent to location 511A (approximately 1.0m to the north)

SURVEY DATUM:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: AMP Capital Investors Ltd
PROJECT: Groundwater Monitoring
LOCATION: Crab Car Park, Warringah Mall, Brookvale

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

BORE No: BH513
PROJECT No: 71015.09
DATE: 2/8/2011
SHEET 1 **OF** 1

RL	Depth (m)	Description of Strata	Graphic Log	Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.15	ASPHALTIC CONCRETE							Gatic cover
		FILLING - black clayey sand filling with quartz sandstone fragments							
	1	- timber and metal sheet at 1.0m							
	1.8	SAND - light grey, medium grained sand							
	2.0	ORGANIC CLAY - black, organic clay with trace sand and decomposed roots and timber with a sulphurous odour							
	3.0	SAND - dark grey, medium grained sand							
		- wet at 3.5m							Cement/bentonite grout
	5								Blank casing
									Gravel Machine slotted PVC screen
	10.0								End cap

Bore discontinued at 10.0m - target depth reached

RIG: Bobcat **DRILLER:** S Younan **LOGGED:** RA **CASING:** HW
TYPE OF BORING: Solid flight auger to 5.0m; Rotary to 10.0m
WATER OBSERVATIONS: Free groundwater observed at 3.5m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U,	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Appendix C

Laboratory Reports and Chain of Custody Information

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 89690

Client:
Douglas Partners
96 Hermitage Rd
West Ryde
NSW 2114

Attention: Lindsay Rockett

Sample log in details:

Your Reference:	**71015.18, Brookvale**
No. of samples:	45 Soils
Date samples received / completed instructions received	26/04/2013 / 26/04/2013

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

Report Details:

Date results requested by: / Issue Date:	3/05/13 / 3/05/13
Date of Preliminary Report:	Not issued

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

Results Approved By:

Nancy Zhang
Chemist

Rhian Morgan
Reporting Supervisor

Lulu Guo
Approved Signatory

ACCREDITED FOR TECHNICAL COMPETENCE

VOCs in soil						
Our Reference:	UNITS	89690-18	89690-19	89690-20	89690-22	89690-34
Your Reference	-------------	732	732	732	733	741
Depth	------------	0.9-1.0	1.4-1.5	2.9-3.0	2.9-3.0	2.9-3.0
Date Sampled		23/04/2013	23/04/2013	23/04/2013	23/04/2013	24/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Date analysed	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Dichlorodifluoromethane	mg/kg	<1	<1	<1	<1	<1
Chloromethane	mg/kg	<1	<1	<1	<1	<1
Vinyl Chloride	mg/kg	<1	<1	<1	<1	<1
Bromomethane	mg/kg	<1	<1	<1	<1	<1
Chloroethane	mg/kg	<1	<1	<1	<1	<1
Trichlorofluoromethane	mg/kg	<1	<1	<1	<1	<1
1,1-Dichloroethene	mg/kg	<1	<1	<1	<1	<1
trans-1,2-dichloroethene	mg/kg	<1	<1	<1	<1	<1
1,1-dichloroethane	mg/kg	<1	<1	<1	<1	<1
cis-1,2-dichloroethene	mg/kg	<1	<1	<1	<1	<1
bromochloromethane	mg/kg	<1	<1	<1	<1	<1
chloroform	mg/kg	<1	<1	<1	<1	<1
2,2-dichloropropane	mg/kg	<1	<1	<1	<1	<1
1,2-dichloroethane	mg/kg	<1	<1	<1	<1	<1
1,1,1-trichloroethane	mg/kg	<1	<1	<1	<1	<1
1,1-dichloropropene	mg/kg	<1	<1	<1	<1	<1
Cyclohexane	mg/kg	<1	<1	<1	<1	<1
carbon tetrachloride	mg/kg	<1	<1	<1	<1	<1
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
dibromomethane	mg/kg	<1	<1	<1	<1	<1
1,2-dichloropropane	mg/kg	<1	<1	<1	<1	<1
trichloroethene	mg/kg	<1	<1	<1	<1	<1
bromodichloromethane	mg/kg	<1	<1	<1	<1	<1
trans-1,3-dichloropropene	mg/kg	<1	<1	<1	<1	<1
cis-1,3-dichloropropene	mg/kg	<1	<1	<1	<1	<1
1,1,2-trichloroethane	mg/kg	<1	<1	<1	<1	<1
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-dichloropropane	mg/kg	<1	<1	<1	<1	<1
dibromochloromethane	mg/kg	<1	<1	<1	<1	<1
1,2-dibromoethane	mg/kg	<1	<1	<1	<1	<1
tetrachloroethene	mg/kg	<1	<1	<1	<1	<1
1,1,1,2-tetrachloroethane	mg/kg	<1	<1	<1	<1	<1
chlorobenzene	mg/kg	<1	<1	<1	<1	<1
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
bromoform	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
styrene	mg/kg	<1	<1	<1	<1	<1
1,1,2,2-tetrachloroethane	mg/kg	<1	<1	<1	<1	<1
o-Xylene	mg/kg	<1	<1	<1	<1	<1

VOCs in soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ------------- ------------	89690-18 732 0.9-1.0 23/04/2013 Soil	89690-19 732 1.4-1.5 23/04/2013 Soil	89690-20 732 2.9-3.0 23/04/2013 Soil	89690-22 733 2.9-3.0 23/04/2013 Soil	89690-34 741 2.9-3.0 24/04/2013 Soil
1,2,3-trichloropropane	mg/kg	<1	<1	<1	<1	<1
isopropylbenzene	mg/kg	<1	<1	<1	<1	<1
bromobenzene	mg/kg	<1	<1	<1	<1	<1
n-propyl benzene	mg/kg	3	<1	<1	<1	<1
2-chlorotoluene	mg/kg	<1	<1	<1	<1	<1
4-chlorotoluene	mg/kg	<1	<1	<1	<1	<1
1,3,5-trimethyl benzene	mg/kg	<1	1	<1	<1	<1
tert-butyl benzene	mg/kg	<1	<1	<1	<1	<1
1,2,4-trimethyl benzene	mg/kg	<1	3	2	<1	<1
1,3-dichlorobenzene	mg/kg	<1	<1	<1	<1	<1
sec-butyl benzene	mg/kg	2	<1	<1	<1	<1
1,4-dichlorobenzene	mg/kg	<1	<1	<1	<1	<1
4-isopropyl toluene	mg/kg	<1	<1	<1	<1	<1
1,2-dichlorobenzene	mg/kg	<1	<1	<1	<1	<1
n-butyl benzene	mg/kg	6	1	<1	<1	<1
1,2-dibromo-3-chloropropane	mg/kg	<1	<1	<1	<1	<1
1,2,4-trichlorobenzene	mg/kg	<1	<1	<1	<1	<1
hexachlorobutadiene	mg/kg	<1	<1	<1	<1	<1
1,2,3-trichlorobenzene	mg/kg	<1	<1	<1	<1	<1
Surrogate Dibromofluorometha	%	101	81	79	80	81
Surrogate aaa-Trifluorotoluene	%	95	88	85	84	89
Surrogate Toluene-d8	%	102	96	95	95	93
Surrogate 4-Bromofluorobenzene	%	138	106	99	87	87

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	89690-1	89690-2	89690-3	89690-4	89690-5
Your Reference	-------------	717	717	721	722	722
Depth	------------	0.4-0.5	0.9-1.0	0.3-0.4	0.4-0.5	0.9-1.0
Date Sampled		22/04/2013	22/04/2013	22/04/2013	22/04/2013	22/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Date analysed	-	30/04/2013	30/04/2013	30/04/2013	30/04/2013	30/04/2013
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	94	95	93	96	92

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	89690-6	89690-7	89690-8	89690-9	89690-10
Your Reference	-------------	723	723	724	725	726
Depth	------------	0.4-0.5	0.9-1.0	0.4-0.5	0.4-0.5	0.4-0.5
Date Sampled		22/04/2013	22/04/2013	22/04/2013	22/04/2013	22/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Date analysed	-	30/04/2013	30/04/2013	30/04/2013	30/04/2013	30/04/2013
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	95	91	97	95	84

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	89690-11	89690-12	89690-13	89690-14	89690-15
Your Reference	-------------	726	727	728	729	729
Depth	------------	0.7-0.8	0.4-0.5	0.4-0.5	0.4-0.5	0.9-1.0
Date Sampled		22/04/2013	23/04/2013	23/04/2013	22/04/2013	22/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Date analysed	-	30/04/2013	30/04/2013	30/04/2013	30/04/2013	30/04/2013
TRHC$_6$ - C$_9$	mg/kg	<25	<25	<25	<25	<25
TRHC$_6$ - C$_{10}$	mg/kg	<25	<25	<25	<25	<25
vTPH C$_6$ - C$_{10}$ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	90	91	90	107	106

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	89690-16	89690-17	89690-18	89690-19	89690-20
Your Reference	-------------	730	731	732	732	732
Depth	------------	0.4-0.5	0.4-0.5	0.9-1.0	1.4-1.5	2.9-3.0
Date Sampled		23/04/2013	23/04/2013	23/04/2013	23/04/2013	23/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Date analysed	-	30/04/2013	30/04/2013	30/04/2013	30/04/2013	30/04/2013
TRHC$_6$ - C$_9$	mg/kg	<25	<25	<25	<25	<25
TRHC$_6$ - C$_{10}$	mg/kg	<25	<25	37	72	<25
vTPH C$_6$ - C$_{10}$ less BTEX (F1)	mg/kg	<25	<25	37	72	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	6	3	<1
Surrogate aaa-Trifluorotoluene	%	106	105	95	88	85

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	89690-21	89690-22	89690-23	89690-24	89690-25
Your Reference	-------------	733	733	734	734	735
Depth	------------	0.9-1.0	2.9-3.0	0.4-0.5	0.9-1.0	0.4-0.5
Date Sampled		23/04/2013	23/04/2013	24/04/2013	24/04/2013	24/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Date analysed	-	30/04/2013	30/04/2013	30/04/2013	30/04/2013	30/04/2013
TRHC $_6$ - C $_9$	mg/kg	<25	<25	<25	<25	<25
TRHC $_6$ - C $_{10}$	mg/kg	<25	<25	<25	<25	<25
vTPH C $_6$ - C $_{10}$ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	108	84	103	102	105

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	89690-26	89690-27	89690-28	89690-29	89690-30
Your Reference	-------------	736	738	738	739	739
Depth	------------	0.3-0.4	0.4-0.5	0.9-1.0	0.4-0.5	0.9-1.0
Date Sampled		22/04/2013	24/04/2013	24/04/2013	24/04/2013	24/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Date analysed	-	30/04/2013	30/04/2013	30/04/2013	30/04/2013	30/04/2013
TRHC $_6$ - C $_9$	mg/kg	<25	<25	<25	<25	<25
TRHC $_6$ - C $_{10}$	mg/kg	<25	<25	<25	<25	<25
vTPH C $_6$ - C $_{10}$ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	108	103	101	109	101

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	89690-31	89690-32	89690-33	89690-35	89690-36
Your Reference	-------------	740	740	741	742	745
Depth	------------	0.4-0.5	0.9-1.0	0.4-0.5	0.4-0.5	0.4-0.5
Date Sampled		24/04/2013	24/04/2013	24/04/2013	24/04/2013	24/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Date analysed	-	30/04/2013	30/04/2013	30/04/2013	30/04/2013	30/04/2013
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	102	98	104	96	104

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	89690-40	89690-41	89690-42	89690-43	89690-44
Your Reference	-------------	Trip Blank	Trip Spike	Trip Blank	Trip Spike	Trip Blank
Depth	------------	-	-	-	-	-
Date Sampled		22/04/2013	22/04/2013	23/04/2013	23/04/2013	24/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Date analysed	-	30/04/2013	30/04/2013	30/04/2013	30/04/2013	30/04/2013
Benzene	mg/kg	<0.2	99%	<0.2	68%	<0.2
Toluene	mg/kg	<0.5	97%	<0.5	69%	<0.5
Ethylbenzene	mg/kg	<1	96%	<1	66%	<1
m+p-xylene	mg/kg	<2	97%	<2	69%	<2
o-Xylene	mg/kg	<1	97%	<1	67%	<1
Surrogate aaa-Trifluorotoluene	%	109	96	110	95	108

vTRH(C6-C10)/BTEXN in Soil		
Our Reference:	UNITS	89690-45
Your Reference	-------------	Trip Spike
Depth	------------	-
Date Sampled		24/04/2013
Type of sample		Soil
Date extracted	-	29/04/2013
Date analysed	-	30/04/2013
Benzene	mg/kg	101%
Toluene	mg/kg	101%
Ethylbenzene	mg/kg	103%
m+p-xylene	mg/kg	102%
o-Xylene	mg/kg	102%
Surrogate aaa-Trifluorotoluene	%	102

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	89690-1	89690-2	89690-3	89690-4	89690-5
Your Reference	-------------	717	717	721	722	722
Depth	------------	0.4-0.5	0.9-1.0	0.3-0.4	0.4-0.5	0.9-1.0
Date Sampled		22/04/2013	22/04/2013	22/04/2013	22/04/2013	22/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Date analysed	-	01/05/2013	01/05/2013	01/05/2013	01/05/2013	01/05/2013
TRHC $_{10}$ - C $_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC $_{15}$ - C $_{28}$	mg/kg	150	<100	<100	<100	<100
TRHC $_{29}$ - C $_{36}$	mg/kg	310	<100	<100	<100	<100
TRH>C $_{10}$-C $_{16}$	mg/kg	<50	<50	<50	<50	<50
TRH>C $_{10}$ - C $_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C $_{16}$-C $_{34}$	mg/kg	360	<100	<100	<100	<100
TRH>C $_{34}$-C $_{40}$	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	96	97	105	98	94

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	89690-6	89690-7	89690-8	89690-9	89690-10
Your Reference	-------------	723	723	724	725	726
Depth	------------	0.4-0.5	0.9-1.0	0.4-0.5	0.4-0.5	0.4-0.5
Date Sampled		22/04/2013	22/04/2013	22/04/2013	22/04/2013	22/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Date analysed	-	01/05/2013	01/05/2013	01/05/2013	01/05/2013	01/05/2013
TRHC $_{10}$ - C $_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC $_{15}$ - C $_{28}$	mg/kg	<100	<100	<100	<100	<100
TRHC $_{29}$ - C $_{36}$	mg/kg	<100	<100	<100	<100	<100
TRH>C $_{10}$-C $_{16}$	mg/kg	<50	<50	<50	<50	<50
TRH>C $_{10}$ - C $_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C $_{16}$-C $_{34}$	mg/kg	<100	<100	<100	<100	<100
TRH>C $_{34}$-C $_{40}$	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	96	95	101	99	99

svTRH (C10-C40) in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ------------- ------------	89690-11 726 0.7-0.8 22/04/2013 Soil	89690-12 727 0.4-0.5 23/04/2013 Soil	89690-13 728 0.4-0.5 23/04/2013 Soil	89690-14 729 0.4-0.5 22/04/2013 Soil	89690-15 729 0.9-1.0 22/04/2013 Soil
Date extracted	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Date analysed	-	01/05/2013	01/05/2013	01/05/2013	01/05/2013	01/05/2013
TRHC $_{10}$ - C $_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC $_{15}$ - C $_{28}$	mg/kg	<100	<100	<100	<100	<100
TRHC $_{29}$ - C $_{36}$	mg/kg	<100	<100	<100	<100	<100
TRH>C $_{10}$-C $_{16}$	mg/kg	<50	<50	<50	<50	<50
TRH>C $_{10}$ - C $_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C $_{16}$-C $_{34}$	mg/kg	<100	<100	<100	<100	<100
TRH>C $_{34}$-C $_{40}$	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	97	97	98	101	100

svTRH (C10-C40) in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ------------- ------------	89690-16 730 0.4-0.5 23/04/2013 Soil	89690-17 731 0.4-0.5 23/04/2013 Soil	89690-18 732 0.9-1.0 23/04/2013 Soil	89690-19 732 1.4-1.5 23/04/2013 Soil	89690-20 732 2.9-3.0 23/04/2013 Soil
Date extracted	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Date analysed	-	01/05/2013	01/05/2013	01/05/2013	01/05/2013	01/05/2013
TRHC $_{10}$ - C $_{14}$	mg/kg	<50	<50	770	260	230
TRHC $_{15}$ - C $_{28}$	mg/kg	<100	<100	260	<100	<100
TRHC $_{29}$ - C $_{36}$	mg/kg	<100	<100	300	<100	<100
TRH>C $_{10}$-C $_{16}$	mg/kg	<50	<50	770	230	210
TRH>C $_{10}$ - C $_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	760	230	210
TRH>C $_{16}$-C $_{34}$	mg/kg	<100	<100	400	<100	110
TRH>C $_{34}$-C $_{40}$	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	94	96	100	101	96

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	89690-21	89690-22	89690-23	89690-24	89690-25
Your Reference	-------------	733	733	734	734	735
Depth	------------	0.9-1.0	2.9-3.0	0.4-0.5	0.9-1.0	0.4-0.5
Date Sampled		23/04/2013	23/04/2013	24/04/2013	24/04/2013	24/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Date analysed	-	01/05/2013	01/05/2013	01/05/2013	01/05/2013	01/05/2013
TRHC $_{10}$ - C $_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC $_{15}$ - C $_{28}$	mg/kg	<100	<100	<100	<100	<100
TRHC $_{29}$ - C $_{36}$	mg/kg	<100	<100	<100	<100	<100
TRH>C $_{10}$-C $_{16}$	mg/kg	<50	<50	<50	<50	<50
TRH>C $_{10}$ - C $_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C $_{16}$-C $_{34}$	mg/kg	<100	<100	<100	<100	<100
TRH>C $_{34}$-C $_{40}$	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	96	95	96	96	96

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	89690-26	89690-27	89690-28	89690-29	89690-30
Your Reference	-------------	736	738	738	739	739
Depth	------------	0.3-0.4	0.4-0.5	0.9-1.0	0.4-0.5	0.9-1.0
Date Sampled		22/04/2013	24/04/2013	24/04/2013	24/04/2013	24/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Date analysed	-	01/05/2013	01/05/2013	01/05/2013	01/05/2013	01/05/2013
TRHC $_{10}$ - C $_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC $_{15}$ - C $_{28}$	mg/kg	<100	<100	<100	<100	<100
TRHC $_{29}$ - C $_{36}$	mg/kg	<100	<100	<100	130	120
TRH>C $_{10}$-C $_{16}$	mg/kg	<50	<50	<50	<50	<50
TRH>C $_{10}$ - C $_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C $_{16}$-C $_{34}$	mg/kg	<100	<100	<100	100	120
TRH>C $_{34}$-C $_{40}$	mg/kg	<100	<100	<100	120	<100
Surrogate o-Terphenyl	%	96	95	98	90	99

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	89690-31	89690-32	89690-33	89690-35	89690-36
Your Reference	-------------	740	740	741	742	745
Depth	------------	0.4-0.5	0.9-1.0	0.4-0.5	0.4-0.5	0.4-0.5
Date Sampled		24/04/2013	24/04/2013	24/04/2013	24/04/2013	24/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Date analysed	-	01/05/2013	01/05/2013	01/05/2013	01/05/2013	01/05/2013
TRHC $_{10}$ - C $_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC $_{15}$ - C $_{28}$	mg/kg	<100	<100	<100	<100	<100
TRHC $_{29}$ - C $_{36}$	mg/kg	<100	<100	<100	<100	<100
TRH>C $_{10}$-C $_{16}$	mg/kg	<50	<50	<50	<50	<50
TRH>C $_{10}$ - C $_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C $_{16}$-C $_{34}$	mg/kg	<100	<100	<100	<100	<100
TRH>C $_{34}$-C $_{40}$	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	96	94	97	97	98

PAHs in Soil						
Our Reference:	UNITS	89690-1	89690-2	89690-3	89690-4	89690-5
Your Reference	-------------	717	717	721	722	722
Depth	------------	0.4-0.5	0.9-1.0	0.3-0.4	0.4-0.5	0.9-1.0
Date Sampled		22/04/2013	22/04/2013	22/04/2013	22/04/2013	22/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Date analysed	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
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	0.3	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	0.3	<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	0.2	<0.1
Benzo(b+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	0.3	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	0.21	<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
Benzo(a)pyrene TEQ	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	119	107	102	119	108

PAHs in Soil						
Our Reference:	UNITS	89690-6	89690-7	89690-8	89690-9	89690-10
Your Reference	-------------	723	723	724	725	726
Depth	------------	0.4-0.5	0.9-1.0	0.4-0.5	0.4-0.5	0.4-0.5
Date Sampled		22/04/2013	22/04/2013	22/04/2013	22/04/2013	22/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Date analysed	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Naphthalene	mg/kg	<0.1	<0.1	0.2	<0.1	0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	0.2	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	0.2	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	1.7	0.2	0.3
Anthracene	mg/kg	<0.1	<0.1	0.4	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	1.0	<0.1	0.2
Pyrene	mg/kg	<0.1	<0.1	1	0.1	0.2
Benzo(a)anthracene	mg/kg	<0.1	<0.1	0.4	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	0.4	0.1	0.1
Benzo(b+k)fluoranthene	mg/kg	<0.2	<0.2	0.6	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	0.36	0.07	0.07
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	0.2	<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	0.2	<0.1	<0.1
Benzo(a)pyrene TEQ	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	109	103	106	106	106

PAHs in Soil						
Our Reference:	UNITS	89690-11	89690-12	89690-13	89690-14	89690-15
Your Reference	-------------	726	727	728	729	729
Depth	------------	0.7-0.8	0.4-0.5	0.4-0.5	0.4-0.5	0.9-1.0
Date Sampled		22/04/2013	23/04/2013	23/04/2013	22/04/2013	22/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Date analysed	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
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	0.2	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	0.3	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	0.3	<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	0.2	<0.1
Benzo(b+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	0.3	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	0.20	<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
Benzo(a)pyrene TEQ	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	105	108	107	107	110

PAHs in Soil						
Our Reference:	UNITS	89690-16	89690-17	89690-18	89690-19	89690-20
Your Reference	-------------	730	731	732	732	732
Depth	------------	0.4-0.5	0.4-0.5	0.9-1.0	1.4-1.5	2.9-3.0
Date Sampled		23/04/2013	23/04/2013	23/04/2013	23/04/2013	23/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Date analysed	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Naphthalene	mg/kg	<0.1	<0.1	5.5	1.5	<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
Benzo(a)pyrene TEQ	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	109	107	107	107	108

PAHs in Soil						
Our Reference:	UNITS	89690-21	89690-22	89690-23	89690-24	89690-25
Your Reference	-------------	733	733	734	734	735
Depth	------------	0.9-1.0	2.9-3.0	0.4-0.5	0.9-1.0	0.4-0.5
Date Sampled		23/04/2013	23/04/2013	24/04/2013	24/04/2013	24/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Date analysed	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Naphthalene	mg/kg	<0.1	0.2	<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
Benzo(a)pyrene TEQ	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	111	103	116	118	111

PAHs in Soil						
Our Reference:	UNITS	89690-26	89690-27	89690-28	89690-29	89690-30
Your Reference	-------------	736	738	738	739	739
Depth	------------	0.3-0.4	0.4-0.5	0.9-1.0	0.4-0.5	0.9-1.0
Date Sampled		22/04/2013	24/04/2013	24/04/2013	24/04/2013	24/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Date analysed	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
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	0.3	0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	0.2	<0.1	0.3
Pyrene	mg/kg	<0.1	0.1	0.2	<0.1	0.4
Benzo(a)anthracene	mg/kg	<0.1	<0.1	0.1	<0.1	0.2
Chrysene	mg/kg	<0.1	<0.1	0.1	<0.1	0.2
Benzo(b+k)fluoranthene	mg/kg	<0.2	<0.2	0.3	<0.2	0.5
Benzo(a)pyrene	mg/kg	<0.05	0.07	0.18	<0.05	0.39
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	0.1	<0.1	0.2
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	0.3
Benzo(a)pyrene TEQ	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	112	115	113	103	109

PAHs in Soil						
Our Reference:	UNITS	89690-31	89690-32	89690-33	89690-35	89690-36
Your Reference	-------------	740	740	741	742	745
Depth	------------	0.4-0.5	0.9-1.0	0.4-0.5	0.4-0.5	0.4-0.5
Date Sampled		24/04/2013	24/04/2013	24/04/2013	24/04/2013	24/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Date analysed	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
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	0.4	0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	0.4	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	0.4	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	0.2	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	0.2	<0.1	<0.1
Benzo(b+k)fluoranthene	mg/kg	<0.2	<0.2	0.3	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	0.16	<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
Benzo(a)pyrene TEQ	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	117	119	111	118	116

PAHs in Soil				
Our Reference:	UNITS	89690-37	89690-38	89690-39
Your Reference	-------------	BD1-220413	BD2-220413	BD2-240413
Depth	------------	-	-	-
Date Sampled		22/04/2013	22/04/2013	24/04/2013
Type of sample		Soil	Soil	Soil
Date extracted	-	29/04/2013	29/04/2013	29/04/2013
Date analysed	-	29/04/2013	29/04/2013	29/04/2013
Naphthalene	mg/kg	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	0.2
Anthracene	mg/kg	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	0.5
Pyrene	mg/kg	<0.1	<0.1	0.5
Benzo(a)anthracene	mg/kg	<0.1	<0.1	0.3
Chrysene	mg/kg	<0.1	<0.1	0.3
Benzo(b+k)fluoranthene	mg/kg	<0.2	<0.2	0.7
Benzo(a)pyrene	mg/kg	<0.05	<0.05	0.53
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	0.3
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	0.4
Benzo(a)pyrene TEQ	mg/kg	<0.5	<0.5	1
Surrogate p-Terphenyl-d14	%	113	115	109

Organochlorine Pesticides in soil						
Our Reference:	UNITS	89690-1	89690-3	89690-5	89690-6	89690-8
Your Reference	-------------	717	721	722	723	724
Depth	------------	0.4-0.5	0.3-0.4	0.9-1.0	0.4-0.5	0.4-0.5
Date Sampled		22/04/2013	22/04/2013	22/04/2013	22/04/2013	22/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Date analysed	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
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 TCMX	%	98	101	101	99	100

Organochlorine Pesticides in soil						
Our Reference:	UNITS	89690-9	89690-11	89690-12	89690-13	89690-15
Your Reference	-------------	725	726	727	728	729
Depth	------------	0.4-0.5	0.7-0.8	0.4-0.5	0.4-0.5	0.9-1.0
Date Sampled		22/04/2013	22/04/2013	23/04/2013	23/04/2013	22/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Date analysed	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
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 TCMX	%	99	101	106	101	99

Organochlorine Pesticides in soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ------------- ------------	89690-16 730 0.4-0.5 23/04/2013 Soil	89690-17 731 0.4-0.5 23/04/2013 Soil	89690-18 732 0.9-1.0 23/04/2013 Soil	89690-21 733 0.9-1.0 23/04/2013 Soil	89690-23 734 0.4-0.5 24/04/2013 Soil
Date extracted	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Date analysed	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
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 TCMX	%	99	96	97	100	100

Organochlorine Pesticides in soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ------------- ------------	89690-25 735 0.4-0.5 24/04/2013 Soil	89690-26 736 0.3-0.4 22/04/2013 Soil	89690-27 738 0.4-0.5 24/04/2013 Soil	89690-30 739 0.9-1.0 24/04/2013 Soil	89690-32 740 0.9-1.0 24/04/2013 Soil
Date extracted	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Date analysed	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
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 TCMX	%	98	100	102	97	99

Organochlorine Pesticides in soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ------------- ------------	89690-33 741 0.4-0.5 24/04/2013 Soil	89690-35 742 0.4-0.5 24/04/2013 Soil	89690-36 745 0.4-0.5 24/04/2013 Soil
Date extracted	-	29/04/2013	29/04/2013	29/04/2013
Date analysed	-	29/04/2013	29/04/2013	29/04/2013
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 TCMX	%	99	99	102

PCBs in Soil						
Our Reference:	UNITS	89690-1	89690-3	89690-5	89690-6	89690-8
Your Reference	------------	717	721	722	723	724
Depth	------------	0.4-0.5	0.3-0.4	0.9-1.0	0.4-0.5	0.4-0.5
Date Sampled		22/04/2013	22/04/2013	22/04/2013	22/04/2013	22/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Date analysed	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1221	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	%	98	101	101	99	100

PCBs in Soil						
Our Reference:	UNITS	89690-9	89690-11	89690-12	89690-13	89690-15
Your Reference	------------	725	726	727	728	729
Depth	------------	0.4-0.5	0.7-0.8	0.4-0.5	0.4-0.5	0.9-1.0
Date Sampled		22/04/2013	22/04/2013	23/04/2013	23/04/2013	22/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Date analysed	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1221	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	%	99	101	106	101	99

PCBs in Soil						
Our Reference:	UNITS	89690-16	89690-17	89690-18	89690-21	89690-23
Your Reference	------------	730	731	732	733	734
Depth	------------	0.4-0.5	0.4-0.5	0.9-1.0	0.9-1.0	0.4-0.5
Date Sampled		23/04/2013	23/04/2013	23/04/2013	23/04/2013	24/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Date analysed	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1221	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	%	99	96	99	100	100

PCBs in Soil						
Our Reference:	UNITS	89690-25	89690-26	89690-27	89690-30	89690-32
Your Reference	-------------	735	736	738	739	740
Depth	------------	0.4-0.5	0.3-0.4	0.4-0.5	0.9-1.0	0.9-1.0
Date Sampled		24/04/2013	22/04/2013	24/04/2013	24/04/2013	24/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Date analysed	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1221	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	%	98	100	102	97	99

PCBs in Soil				
Our Reference:	UNITS	89690-33	89690-35	89690-36
Your Reference	-------------	741	742	745
Depth	------------	0.4-0.5	0.4-0.5	0.4-0.5
Date Sampled		24/04/2013	24/04/2013	24/04/2013
Type of sample		Soil	Soil	Soil
Date extracted	-	29/04/2013	29/04/2013	29/04/2013
Date analysed	-	29/04/2013	29/04/2013	29/04/2013
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1
Arochlor 1221	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	%	99	99	102

Total Phenolics in Soil						
Our Reference:	UNITS	89690-1	89690-3	89690-5	89690-6	89690-8
Your Reference	-------------	717	721	722	723	724
Depth	------------	0.4-0.5	0.3-0.4	0.9-1.0	0.4-0.5	0.4-0.5
Date Sampled		22/04/2013	22/04/2013	22/04/2013	22/04/2013	22/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/04/2013	30/04/2013	30/04/2013	30/04/2013	30/04/2013
Date analysed	-	30/04/2013	30/04/2013	30/04/2013	30/04/2013	30/04/2013
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Total Phenolics in Soil						
Our Reference:	UNITS	89690-9	89690-11	89690-12	89690-13	89690-15
Your Reference	-------------	725	726	727	728	729
Depth	------------	0.4-0.5	0.7-0.8	0.4-0.5	0.4-0.5	0.9-1.0
Date Sampled		22/04/2013	22/04/2013	23/04/2013	23/04/2013	22/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/04/2013	30/04/2013	30/04/2013	30/04/2013	30/04/2013
Date analysed	-	30/04/2013	30/04/2013	30/04/2013	30/04/2013	30/04/2013
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Total Phenolics in Soil						
Our Reference:	UNITS	89690-16	89690-17	89690-18	89690-21	89690-23
Your Reference	-------------	730	731	732	733	734
Depth	------------	0.4-0.5	0.4-0.5	0.9-1.0	0.9-1.0	0.4-0.5
Date Sampled		23/04/2013	23/04/2013	23/04/2013	23/04/2013	24/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/04/2013	30/04/2013	30/04/2013	30/04/2013	30/04/2013
Date analysed	-	30/04/2013	30/04/2013	30/04/2013	30/04/2013	30/04/2013
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Total Phenolics in Soil						
Our Reference:	UNITS	89690-25	89690-26	89690-27	89690-30	89690-32
Your Reference	-------------	735	736	738	739	740
Depth	------------	0.4-0.5	0.3-0.4	0.4-0.5	0.9-1.0	0.9-1.0
Date Sampled		24/04/2013	22/04/2013	24/04/2013	24/04/2013	24/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/04/2013	30/04/2013	30/04/2013	30/04/2013	30/04/2013
Date analysed	-	30/04/2013	30/04/2013	30/04/2013	30/04/2013	30/04/2013
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Total Phenolics in Soil				
Our Reference:	UNITS	89690-33	89690-35	89690-36
Your Reference	-------------	741	742	745
Depth	------------	0.4-0.5	0.4-0.5	0.4-0.5
Date Sampled		24/04/2013	24/04/2013	24/04/2013
Type of sample		Soil	Soil	Soil
Date extracted	-	30/04/2013	30/04/2013	30/04/2013
Date analysed	-	30/04/2013	30/04/2013	30/04/2013
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5

Acid Extractable metals in soil						
Our Reference:	UNITS	89690-1	89690-2	89690-3	89690-4	89690-5
Your Reference	-------------	717	717	721	722	722
Depth	------------	0.4-0.5	0.9-1.0	0.3-0.4	0.4-0.5	0.9-1.0
Date Sampled		22/04/2013	22/04/2013	22/04/2013	22/04/2013	22/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Date analysed	-	30/04/2013	30/04/2013	30/04/2013	30/04/2013	30/04/2013
Arsenic	mg/kg	<4	<4	<4	4	<4
Cadmium	mg/kg	<0.4	<0.4	0.8	<0.4	<0.4
Chromium	mg/kg	25	14	12	19	7
Copper	mg/kg	14	4	49	17	8
Lead	mg/kg	17	22	25	9	12
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	18	3	11	14	2
Zinc	mg/kg	30	12	110	24	19

Acid Extractable metals in soil						
Our Reference:	UNITS	89690-6	89690-7	89690-8	89690-9	89690-10
Your Reference	-------------	723	723	724	725	726
Depth	------------	0.4-0.5	0.9-1.0	0.4-0.5	0.4-0.5	0.4-0.5
Date Sampled		22/04/2013	22/04/2013	22/04/2013	22/04/2013	22/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Date analysed	-	30/04/2013	30/04/2013	30/04/2013	30/04/2013	30/04/2013
Arsenic	mg/kg	5	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	11	7	57	62	70
Copper	mg/kg	16	4	33	33	33
Lead	mg/kg	12	9	33	13	14
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	6	9	61	76	75
Zinc	mg/kg	18	7	48	40	47

Acid Extractable metals in soil						
Our Reference:	UNITS	89690-11	89690-12	89690-13	89690-14	89690-15
Your Reference	-------------	726	727	728	729	729
Depth	------------	0.7-0.8	0.4-0.5	0.4-0.5	0.4-0.5	0.9-1.0
Date Sampled		22/04/2013	23/04/2013	23/04/2013	22/04/2013	22/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Date analysed	-	30/04/2013	30/04/2013	30/04/2013	30/04/2013	30/04/2013
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	11	28	55	19	12
Copper	mg/kg	2	10	24	30	13
Lead	mg/kg	11	10	7	39	25
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	5	25	62	14	7
Zinc	mg/kg	9	21	36	54	27

Acid Extractable metals in soil						
Our Reference:	UNITS	89690-16	89690-17	89690-18	89690-19	89690-20
Your Reference	------------	730	731	732	732	732
Depth	------------	0.4-0.5	0.4-0.5	0.9-1.0	1.4-1.5	2.9-3.0
Date Sampled		23/04/2013	23/04/2013	23/04/2013	23/04/2013	23/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Date analysed	-	30/04/2013	30/04/2013	30/04/2013	30/04/2013	30/04/2013
Arsenic	mg/kg	6	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	18	34	12	12	7
Copper	mg/kg	5	5	7	6	2
Lead	mg/kg	10	10	14	12	10
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	7	4	3	5	2
Zinc	mg/kg	11	13	7	8	9

Acid Extractable metals in soil						
Our Reference:	UNITS	89690-21	89690-22	89690-23	89690-24	89690-25
Your Reference	------------	733	733	734	734	735
Depth	------------	0.9-1.0	2.9-3.0	0.4-0.5	0.9-1.0	0.4-0.5
Date Sampled		23/04/2013	23/04/2013	24/04/2013	24/04/2013	24/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Date analysed	-	30/04/2013	30/04/2013	30/04/2013	30/04/2013	30/04/2013
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	11	11	61	12	71
Copper	mg/kg	4	5	<1	4	21
Lead	mg/kg	11	10	6	17	4
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	7	6	2	2	82
Zinc	mg/kg	9	22	2	22	37

Acid Extractable metals in soil						
Our Reference:	UNITS	89690-26	89690-27	89690-28	89690-29	89690-30
Your Reference	------------	736	738	738	739	739
Depth	------------	0.3-0.4	0.4-0.5	0.9-1.0	0.4-0.5	0.9-1.0
Date Sampled		22/04/2013	24/04/2013	24/04/2013	24/04/2013	24/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Date analysed	-	30/04/2013	30/04/2013	30/04/2013	30/04/2013	30/04/2013
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	21	10	20	70	26
Copper	mg/kg	55	8	11	29	14
Lead	mg/kg	7	17	30	7	130
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	49	10	6	66	16
Zinc	mg/kg	39	24	27	38	150

Acid Extractable metals in soil						
Our Reference:	UNITS	89690-31	89690-32	89690-33	89690-35	89690-36
Your Reference	-------------	740	740	741	742	745
Depth	------------	0.4-0.5	0.9-1.0	0.4-0.5	0.4-0.5	0.4-0.5
Date Sampled		24/04/2013	24/04/2013	24/04/2013	24/04/2013	24/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Date analysed	-	30/04/2013	30/04/2013	30/04/2013	30/04/2013	30/04/2013
Arsenic	mg/kg	6	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	76	5	61	47	13
Copper	mg/kg	7	5	8	41	9
Lead	mg/kg	12	690	34	14	14
Mercury	mg/kg	<0.1	<0.1	0.2	<0.1	<0.1
Nickel	mg/kg	9	2	7	49	4
Zinc	mg/kg	6	170	16	50	19

Acid Extractable metals in soil						
Our Reference:	UNITS	89690-37	89690-38	89690-39	89690-46	89690-47
Your Reference	-------------	BD1-220413	BD2-220413	BD2-240413	717 - Triplicate	732 - Triplicate
Depth	------------	-	-	-	0.4-0.5	2.9-3.0
Date Sampled		22/04/2013	22/04/2013	24/04/2013	22/04/2013	23/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	29/04/2013	29/04/2013	29/04/2013	29/04/2013	29/04/2013
Date analysed	-	30/04/2013	30/04/2013	30/04/2013	30/04/2013	30/04/2013
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	9	8	19	12	7
Copper	mg/kg	3	9	7	11	2
Lead	mg/kg	14	14	190	10	9
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	3	3	5	4	2
Zinc	mg/kg	13	22	190	15	8

Moisture						
Our Reference:	UNITS	89690-1	89690-2	89690-3	89690-4	89690-5
Your Reference	-------------	717	717	721	722	722
Depth	------------	0.4-0.5	0.9-1.0	0.3-0.4	0.4-0.5	0.9-1.0
Date Sampled		22/04/2013	22/04/2013	22/04/2013	22/04/2013	22/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	29/04/13	29/04/13	29/04/13	29/04/13	29/04/13
Date analysed	-	30/04/13	30/04/13	30/04/13	30/04/13	30/04/13
Moisture	%	14	11	13	7.2	17

Moisture						
Our Reference:	UNITS	89690-6	89690-7	89690-8	89690-9	89690-10
Your Reference	-------------	723	723	724	725	726
Depth	------------	0.4-0.5	0.9-1.0	0.4-0.5	0.4-0.5	0.4-0.5
Date Sampled		22/04/2013	22/04/2013	22/04/2013	22/04/2013	22/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	29/04/13	29/04/13	29/04/13	29/04/13	29/04/13
Date analysed	-	30/04/13	30/04/13	30/04/13	30/04/13	30/04/13
Moisture	%	11	15	8.7	8.7	8.7

Moisture						
Our Reference:	UNITS	89690-11	89690-12	89690-13	89690-14	89690-15
Your Reference	-------------	726	727	728	729	729
Depth	------------	0.7-0.8	0.4-0.5	0.4-0.5	0.4-0.5	0.9-1.0
Date Sampled		22/04/2013	23/04/2013	23/04/2013	22/04/2013	22/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	29/04/13	29/04/13	29/04/13	29/04/13	29/04/13
Date analysed	-	30/04/13	30/04/13	30/04/13	30/04/13	30/04/13
Moisture	%	14	12	4.3	10	15

Moisture						
Our Reference:	UNITS	89690-16	89690-17	89690-18	89690-19	89690-20
Your Reference	-------------	730	731	732	732	732
Depth	------------	0.4-0.5	0.4-0.5	0.9-1.0	1.4-1.5	2.9-3.0
Date Sampled		23/04/2013	23/04/2013	23/04/2013	23/04/2013	23/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	29/04/13	29/04/13	29/04/13	29/04/13	29/04/13
Date analysed	-	30/04/13	30/04/13	30/04/13	30/04/13	30/04/13
Moisture	%	10	13	17	18	25

Moisture						
Our Reference:	UNITS	89690-21	89690-22	89690-23	89690-24	89690-25
Your Reference	-------------	733	733	734	734	735
Depth	------------	0.9-1.0	2.9-3.0	0.4-0.5	0.9-1.0	0.4-0.5
Date Sampled		23/04/2013	23/04/2013	24/04/2013	24/04/2013	24/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	29/04/13	29/04/13	29/04/13	29/04/13	29/04/13
Date analysed	-	30/04/13	30/04/13	30/04/13	30/04/13	30/04/13
Moisture	%	8.2	19	16	13	8.5

Moisture Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ------------- ------------	89690-26 736 0.3-0.4 22/04/2013 Soil	89690-27 738 0.4-0.5 24/04/2013 Soil	89690-28 738 0.9-1.0 24/04/2013 Soil	89690-29 739 0.4-0.5 24/04/2013 Soil	89690-30 739 0.9-1.0 24/04/2013 Soil
Date prepared	-	29/04/13	29/04/13	29/04/13	29/04/13	29/04/13
Date analysed	-	30/04/13	30/04/13	30/04/13	30/04/13	30/04/13
Moisture	%	6.9	14	29	10	15

Moisture Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ------------- ------------	89690-31 740 0.4-0.5 24/04/2013 Soil	89690-32 740 0.9-1.0 24/04/2013 Soil	89690-33 741 0.4-0.5 24/04/2013 Soil	89690-34 741 2.9-3.0 24/04/2013 Soil	89690-35 742 0.4-0.5 24/04/2013 Soil
Date prepared	-	29/04/13	29/04/13	29/04/13	29/04/13	29/04/13
Date analysed	-	30/04/13	30/04/13	30/04/13	30/04/13	30/04/13
Moisture	%	14	14	16	14	8.4

Moisture Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ------------- ------------	89690-36 745 0.4-0.5 24/04/2013 Soil	89690-37 BD1-220413 - 22/04/2013 Soil	89690-38 BD2-220413 - 22/04/2013 Soil	89690-39 BD2-240413 - 24/04/2013 Soil	89690-40 Trip Blank - 22/04/2013 Soil
Date prepared	-	29/04/13	29/04/13	29/04/13	29/04/13	29/04/13
Date analysed	-	30/04/13	30/04/13	30/04/13	30/04/13	30/04/13
Moisture	%	14	14	13	14	<0.1

Moisture Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ------------- ------------	89690-42 Trip Blank - 23/04/2013 Soil	89690-44 Trip Blank - 24/04/2013 Soil
Date prepared	-	29/04/13	29/04/13
Date analysed	-	30/04/13	30/04/13
Moisture	%	<0.1	0.1

Asbestos ID - soils						
Our Reference:	UNITS	89690-1	89690-3	89690-5	89690-6	89690-8
Your Reference	-------------	717	721	722	723	724
Depth	------------	0.4-0.5	0.3-0.4	0.9-1.0	0.4-0.5	0.4-0.5
Date Sampled		22/04/2013	22/04/2013	22/04/2013	22/04/2013	22/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	2/05/2013	2/05/2013	2/05/2013	2/05/2013	2/05/2013
Sample mass tested	g	Approx 40g	Approx 40g	Approx 40g	Approx 40g	Approx 40g
Sample Description	-	Brown coarse-grained soil	Brown coarse-grained soil	Brown coarse-grained soil	Brown coarse-grained soil & rocks	Grey coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg
Trace Analysis	-	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected

Asbestos ID - soils						
Our Reference:	UNITS	89690-9	89690-11	89690-12	89690-13	89690-15
Your Reference	-------------	725	726	727	728	729
Depth	------------	0.4-0.5	0.7-0.8	0.4-0.5	0.4-0.5	0.9-1.0
Date Sampled		22/04/2013	22/04/2013	23/04/2013	23/04/2013	22/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	2/05/2013	2/05/2013	2/05/2013	2/05/2013	2/05/2013
Sample mass tested	g	Approx 40g	Approx 40g	Approx 40g	Approx 40g	Approx 40g
Sample Description	-	Grey coarse-grained soil & rocks	Brown fine-grained soil & rocks	Grey fine-grained soil & rocks	Grey fine-grained soil & rocks	Brown fine-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg
Trace Analysis	-	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected

Asbestos ID - soils						
Our Reference:	UNITS	89690-16	89690-17	89690-18	89690-21	89690-23
Your Reference	-------------	730	731	732	733	734
Depth	------------	0.4-0.5	0.4-0.5	0.9-1.0	0.9-1.0	0.4-0.5
Date Sampled		23/04/2013	23/04/2013	23/04/2013	23/04/2013	24/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	2/05/2013	2/05/2013	2/05/2013	2/05/2013	2/05/2013
Sample mass tested	g	Approx 40g	Approx 40g	Approx 40g	Approx 40g	Approx 40g
Sample Description	-	Brown fine-grained soil & rocks	Brown fine-grained clayey soil	Brown fine-grained soil & rocks	Beige coarse-grained soil & rocks	Orange fine-grained clayey soil
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg
Trace Analysis	-	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected

Asbestos ID - soils						
Our Reference:	UNITS	89690-25	89690-26	89690-27	89690-30	89690-32
Your Reference	-------------	735	736	738	739	740
Depth	------------	0.4-0.5	0.3-0.4	0.4-0.5	0.9-1.0	0.9-1.0
Date Sampled		24/04/2013	22/04/2013	24/04/2013	24/04/2013	24/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	2/05/2013	2/05/2013	2/05/2013	2/05/2013	2/05/2013
Sample mass tested	g	Approx 40g	Approx 40g	Approx 40g	Approx 40g	Approx 40g
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Grey coarse-grained soil	Brown fine-grained soil & rocks	Pink fine-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg
Trace Analysis	-	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected

Asbestos ID - soils				
Our Reference:	UNITS	89690-33	89690-35	89690-36
Your Reference	-------------	741	742	745
Depth	------------	0.4-0.5	0.4-0.5	0.4-0.5
Date Sampled		24/04/2013	24/04/2013	24/04/2013
Type of sample		Soil	Soil	Soil
Date analysed	-	2/05/2013	2/05/2013	2/05/2013
Sample mass tested	g	Approx 40g	Approx 40g	Approx 40g
Sample Description	-	Brown fine-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg
Trace Analysis	-	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected

Method ID	Methodology Summary
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 draft Guideline on Investigation Levels for Soil and Groundwater.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 draft Guideline on Investigation Levels for Soil and Groundwater.
Org-012 subset	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM draft B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Inorg-030	Total Phenolics - determined colorimetrically following disitillation, based upon APHA 22nd ED 5530 D.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Inorg-008	Moisture content determined by heating at 105+/-5 deg C for a minimum of 4 hours.
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.

QUALITY CONTROL VOCs in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			29/04/2013	89690-20	29/04/2013 || 29/04/2013	LCS-5	29/04/2013
Date analysed	-			29/04/2013	89690-20	29/04/2013 || 29/04/2013	LCS-5	29/04/2013
Dichlorodifluoromethane	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
Chloromethane	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
Vinyl Chloride	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
Bromomethane	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
Chloroethane	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
Trichlorofluoromethane	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
1,1-Dichloroethene	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
trans-1,2-dichloroethene	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
1,1-dichloroethane	mg/kg	1	Org-014	<1	89690-20	<1 || <1	LCS-5	82%
cis-1,2-dichloroethene	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
bromochloromethane	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
chloroform	mg/kg	1	Org-014	<1	89690-20	<1 || <1	LCS-5	96%
2,2-dichloropropane	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
1,2-dichloroethane	mg/kg	1	Org-014	<1	89690-20	<1 || <1	LCS-5	89%
1,1,1-trichloroethane	mg/kg	1	Org-014	<1	89690-20	<1 || <1	LCS-5	83%
1,1-dichloropropene	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
Cyclohexane	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
carbon tetrachloride	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
Benzene	mg/kg	0.2	Org-014	<0.2	89690-20	<0.2 || <0.2	[NR]	[NR]
dibromomethane	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
1,2-dichloropropane	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
trichloroethene	mg/kg	1	Org-014	<1	89690-20	<1 || <1	LCS-5	80%
bromodichloromethane	mg/kg	1	Org-014	<1	89690-20	<1 || <1	LCS-5	102%
trans-1,3-dichloropropene	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
cis-1,3-dichloropropene	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
1,1,2-trichloroethane	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
Toluene	mg/kg	0.5	Org-014	<0.5	89690-20	<0.5 || <0.5	[NR]	[NR]
1,3-dichloropropane	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
dibromochloromethane	mg/kg	1	Org-014	<1	89690-20	<1 || <1	LCS-5	104%
1,2-dibromoethane	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
tetrachloroethene	mg/kg	1	Org-014	<1	89690-20	<1 || <1	LCS-5	90%
1,1,1,2-tetrachloroethane	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
chlorobenzene	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
Ethylbenzene	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
bromoform	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
m+p-xylene	mg/kg	2	Org-014	<2	89690-20	<2 || <2	[NR]	[NR]
styrene	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
1,1,2,2-tetrachloroethane	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
o-Xylene	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
1,2,3-trichloropropane	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]

QUALITY CONTROL VOCs in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
isopropylbenzene	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
bromobenzene	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
n-propyl benzene	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
2-chlorotoluene	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
4-chlorotoluene	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
1,3,5-trimethyl benzene	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
tert-butyl benzene	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
1,2,4-trimethyl benzene	mg/kg	1	Org-014	<1	89690-20	2 || <1	[NR]	[NR]
1,3-dichlorobenzene	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
sec-butyl benzene	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
1,4-dichlorobenzene	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
4-isopropyl toluene	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
1,2-dichlorobenzene	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
n-butyl benzene	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
1,2-dibromo-3-chloropropane	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
1,2,4-trichlorobenzene	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
hexachlorobutadiene	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
1,2,3-trichlorobenzene	mg/kg	1	Org-014	<1	89690-20	<1 || <1	[NR]	[NR]
Surrogate Dibromofluorometha	%		Org-014	93	89690-20	79 || 80 || RPD: 1	LCS-5	92%
Surrogate aaa-Trifluorotoluene	%		Org-014	97	89690-20	85 || 84 || RPD: 1	LCS-5	96%
Surrogate Toluene-d_8	%		Org-014	96	89690-20	95 || 94 || RPD: 1	LCS-5	96%
Surrogate 4-Bromofluorobenzene	%		Org-014	82	89690-20	99 || 95 || RPD: 4	LCS-5	83%

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			29/04/2013	89690-1	29/04/2013 || 29/04/2013	LCS-5	29/04/2013
Date analysed	-			30/04/2013	89690-1	30/04/2013 || 30/04/2013	LCS-5	30/04/2013
TRHC$_6$ - C$_9$	mg/kg	25	Org-016	<25	89690-1	<25 || <25	LCS-5	113%
TRHC$_6$ - C$_{10}$	mg/kg	25	Org-016	<25	89690-1	<25 || <25	LCS-5	113%
vTPH C$_6$ - C$_{10}$ less BTEX (F1)	mg/kg	25	Org-016	[NT]	89690-1	<25 || <25	[NR]	[NR]
Benzene	mg/kg	0.2	Org-016	<0.2	89690-1	<0.2 || <0.2	LCS-5	120%
Toluene	mg/kg	0.5	Org-016	<0.5	89690-1	<0.5 || <0.5	LCS-5	110%
Ethylbenzene	mg/kg	1	Org-016	<1	89690-1	<1 || <1	LCS-5	109%
m+p-xylene	mg/kg	2	Org-016	<2	89690-1	<2 || <2	LCS-5	113%
o-Xylene	mg/kg	1	Org-016	<1	89690-1	<1 || <1	LCS-5	115%
naphthalene	mg/kg	1	Org-014	<1	89690-1	<1 || <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%		Org-016	88	89690-1	94 || 93 || RPD: 1	LCS-5	95%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			29/04/2013	89690-1	29/04/2013 || 29/04/2013	LCS-5	29/04/2013
Date analysed	-			01/05/2013	89690-1	01/05/2013 || 01/05/2013	LCS-5	01/05/2013
TRHC$_{10}$ - C$_{14}$	mg/kg	50	Org-003	<50	89690-1	<50 || <50	LCS-5	123%
TRHC$_{15}$ - C$_{28}$	mg/kg	100	Org-003	<100	89690-1	150 || <100	LCS-5	132%
TRHC$_{29}$ - C$_{36}$	mg/kg	100	Org-003	<100	89690-1	310 || 150 || RPD: 70	LCS-5	126%
TRH>C$_{10}$-C$_{16}$	mg/kg	50	Org-003	<50	89690-1	<50 || <50	LCS-5	123%
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	50	Org-003	[NT]	89690-1	<50 || <50	[NR]	[NR]
TRH>C$_{16}$-C$_{34}$	mg/kg	100	Org-003	<100	89690-1	360 || 120 || RPD: 100	LCS-5	132%
TRH>C$_{34}$-C$_{40}$	mg/kg	100	Org-003	<100	89690-1	<100 || <100	LCS-5	126%
Surrogate o-Terphenyl	%		Org-003	129	89690-1	96 || 99 || RPD: 3	LCS-5	122%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			29/04/2013	89690-1	29/04/2013 || 29/04/2013	LCS-5	29/04/2013
Date analysed	-			29/04/2013	89690-1	29/04/2013 || 29/04/2013	LCS-5	29/04/2013
Naphthalene	mg/kg	0.1	Org-012 subset	<0.1	89690-1	<0.1 || <0.1	LCS-5	108%
Acenaphthylene	mg/kg	0.1	Org-012 subset	<0.1	89690-1	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012 subset	<0.1	89690-1	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012 subset	<0.1	89690-1	<0.1 || <0.1	LCS-5	99%
Phenanthrene	mg/kg	0.1	Org-012 subset	<0.1	89690-1	<0.1 || <0.1	LCS-5	108%
Anthracene	mg/kg	0.1	Org-012 subset	<0.1	89690-1	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012 subset	<0.1	89690-1	<0.1 || <0.1	LCS-5	92%
Pyrene	mg/kg	0.1	Org-012 subset	<0.1	89690-1	<0.1 || <0.1	LCS-5	68%
Benzo(a)anthracene	mg/kg	0.1	Org-012 subset	<0.1	89690-1	<0.1 || <0.1	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012 subset	<0.1	89690-1	<0.1 || <0.1	LCS-5	109%
Benzo(b+k)fluoranthene	mg/kg	0.2	Org-012 subset	<0.2	89690-1	<0.2 || <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	0.05	Org-012 subset	<0.05	89690-1	<0.05 || <0.05	LCS-5	122%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012 subset	<0.1	89690-1	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012 subset	<0.1	89690-1	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012 subset	<0.1	89690-1	<0.1 || <0.1	[NR]	[NR]
Benzo(a)pyrene TEQ	mg/kg	0.5	Org-012 subset	[NT]	89690-1	<0.5 || <0.5	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012 subset	130	89690-1	119 || 109 || RPD: 9	LCS-5	129%

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			29/04/2013	89690-1	29/04/2013 || 29/04/2013	LCS-5	29/04/2013
Date analysed	-			29/04/2013	89690-1	29/04/2013 || 29/04/2013	LCS-5	29/04/2013
HCB	mg/kg	0.1	Org-005	<0.1	89690-1	<0.1 || <0.1	[NR]	[NR]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	89690-1	<0.1 || <0.1	LCS-5	95%
gamma-BHC	mg/kg	0.1	Org-005	<0.1	89690-1	<0.1 || <0.1	[NR]	[NR]
beta-BHC	mg/kg	0.1	Org-005	<0.1	89690-1	<0.1 || <0.1	LCS-5	100%
Heptachlor	mg/kg	0.1	Org-005	<0.1	89690-1	<0.1 || <0.1	LCS-5	96%
delta-BHC	mg/kg	0.1	Org-005	<0.1	89690-1	<0.1 || <0.1	[NR]	[NR]
Aldrin	mg/kg	0.1	Org-005	<0.1	89690-1	<0.1 || <0.1	LCS-5	89%
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	89690-1	<0.1 || <0.1	LCS-5	101%
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	89690-1	<0.1 || <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	89690-1	<0.1 || <0.1	[NR]	[NR]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	89690-1	<0.1 || <0.1	[NR]	[NR]
pp-DDE	mg/kg	0.1	Org-005	<0.1	89690-1	<0.1 || <0.1	LCS-5	93%
Dieldrin	mg/kg	0.1	Org-005	<0.1	89690-1	<0.1 || <0.1	LCS-5	100%
Endrin	mg/kg	0.1	Org-005	<0.1	89690-1	<0.1 || <0.1	LCS-5	85%
pp-DDD	mg/kg	0.1	Org-005	<0.1	89690-1	<0.1 || <0.1	LCS-5	98%
Endosulfan II	mg/kg	0.1	Org-005	<0.1	89690-1	<0.1 || <0.1	[NR]	[NR]
pp-DDT	mg/kg	0.1	Org-005	<0.1	89690-1	<0.1 || <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	89690-1	<0.1 || <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	89690-1	<0.1 || <0.1	LCS-5	99%
Methoxychlor	mg/kg	0.1	Org-005	<0.1	89690-1	<0.1 || <0.1	[NR]	[NR]
Surrogate TCMX	%		Org-005	108	89690-1	98 || 100 || RPD: 2	LCS-5	102%

QUALITY CONTROL PCBs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			29/04/2013	89690-1	29/04/2013 || 29/04/2013	LCS-5	29/04/2013
Date analysed	-			29/04/2013	89690-1	29/04/2013 || 29/04/2013	LCS-5	29/04/2013
Arochlor 1016	mg/kg	0.1	Org-006	<0.1	89690-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1221	mg/kg	0.1	Org-006	<0.1	89690-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1232	mg/kg	0.1	Org-006	<0.1	89690-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1242	mg/kg	0.1	Org-006	<0.1	89690-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1248	mg/kg	0.1	Org-006	<0.1	89690-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1254	mg/kg	0.1	Org-006	<0.1	89690-1	<0.1 || <0.1	LCS-5	102%
Arochlor 1260	mg/kg	0.1	Org-006	<0.1	89690-1	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%		Org-006	108	89690-1	98 || 100 || RPD: 2	LCS-5	93%

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	-			30/04/2013	89690-1	30/04/2013 || 30/04/2013	LCS-1	30/04/2013
Date analysed	-			30/04/2013	89690-1	30/04/2013 || 30/04/2013	LCS-1	30/04/2013
Total Phenolics (as Phenol)	mg/kg	5	Inorg-030	<5	89690-1	<5 || <5	LCS-1	80%

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	-			30/04/2013	89690-1	29/04/2013 || 29/04/2013	LCS-1	29/04/2013
Date analysed	-			30/04/2013	89690-1	30/04/2013 || 30/04/2013	LCS-1	30/04/2013
Arsenic	mg/kg	4	Metals-020 ICP-AES	<4	89690-1	<4 || <4	LCS-1	100%
Cadmium	mg/kg	0.4	Metals-020 ICP-AES	<0.4	89690-1	<0.4 || <0.4	LCS-1	105%
Chromium	mg/kg	1	Metals-020 ICP-AES	<1	89690-1	25 || 12 || RPD: 70	LCS-1	104%
Copper	mg/kg	1	Metals-020 ICP-AES	<1	89690-1	14 || 6 || RPD: 80	LCS-1	103%
Lead	mg/kg	1	Metals-020 ICP-AES	<1	89690-1	17 || 11 || RPD: 43	LCS-1	100%
Mercury	mg/kg	0.1	Metals-021 CV-AAS	<0.1	89690-1	<0.1 || <0.1	LCS-1	92%
Nickel	mg/kg	1	Metals-020 ICP-AES	<1	89690-1	18 || 4 || RPD: 127	LCS-1	103%
Zinc	mg/kg	1	Metals-020 ICP-AES	<1	89690-1	30 || 13 || RPD: 79	LCS-1	101%

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

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

QUALITY CONTROL VOCs in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	89690-18	29/04/2013
Date analysed	-	[NT]	[NT]	89690-18	29/04/2013
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]	89690-18	78%
cis-1,2-dichloroethene	mg/kg	[NT]	[NT]	[NR]	[NR]
bromochloromethane	mg/kg	[NT]	[NT]	[NR]	[NR]
chloroform	mg/kg	[NT]	[NT]	89690-18	91%
2,2-dichloropropane	mg/kg	[NT]	[NT]	[NR]	[NR]
1,2-dichloroethane	mg/kg	[NT]	[NT]	89690-18	82%
1,1,1-trichloroethane	mg/kg	[NT]	[NT]	89690-18	78%
1,1-dichloropropene	mg/kg	[NT]	[NT]	[NR]	[NR]
Cyclohexane	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]	89690-18	77%
bromodichloromethane	mg/kg	[NT]	[NT]	89690-18	95%
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]	89690-18	97%
1,2-dibromoethane	mg/kg	[NT]	[NT]	[NR]	[NR]
tetrachloroethene	mg/kg	[NT]	[NT]	89690-18	86%
1,1,1,2-tetrachloroethane	mg/kg	[NT]	[NT]	[NR]	[NR]

QUALITY CONTROL VOCs in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
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]
hexachlorobutadiene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,2,3-trichlorobenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
Surrogate Dibromofluorometha	%	[NT]	[NT]	89690-18	87%
Surrogate aaa-Trifluorotoluene	%	[NT]	[NT]	89690-18	94%
Surrogate Toluene-d_8	%	[NT]	[NT]	89690-18	104%
Surrogate 4-Bromofluorobenzene	%	[NT]	[NT]	89690-18	#

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	89690-11	29/04/2013 || 29/04/2013	LCS-6	29/04/2013
Date analysed	-	89690-11	30/04/2013 || 30/04/2013	LCS-6	30/04/2013
TRH C_6 - C_9	mg/kg	89690-11	<25 || <25	LCS-6	121%
TRH C_6 - C_{10}	mg/kg	89690-11	<25 || <25	LCS-6	121%
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	89690-11	<25 || <25	[NR]	[NR]
Benzene	mg/kg	89690-11	<0.2 || <0.2	LCS-6	133%
Toluene	mg/kg	89690-11	<0.5 || <0.5	LCS-6	117%
Ethylbenzene	mg/kg	89690-11	<1 || <1	LCS-6	112%
m+p-xylene	mg/kg	89690-11	<2 || <2	LCS-6	121%
o-Xylene	mg/kg	89690-11	<1 || <1	LCS-6	126%
naphthalene	mg/kg	89690-11	<1 || <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%	89690-11	90 || 91 || RPD: 1	LCS-6	112%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	89690-11	29/04/2013 || 29/04/2013	LCS-6	30/04/2013
Date analysed	-	89690-11	01/05/2013 || 01/05/2013	LCS-6	01/05/2013
TRH C_{10} - C_{14}	mg/kg	89690-11	<50 || <50	LCS-6	132%
TRH C_{15} - C_{28}	mg/kg	89690-11	<100 || <100	LCS-6	125%
TRH C_{29} - C_{36}	mg/kg	89690-11	<100 || <100	LCS-6	107%
TRH >C_{10}-C_{16}	mg/kg	89690-11	<50 || <50	LCS-6	132%
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	89690-11	<50 || <50	[NR]	[NR]
TRH >C_{16}-C_{34}	mg/kg	89690-11	<100 || <100	LCS-6	125%
TRH >C_{34}-C_{40}	mg/kg	89690-11	<100 || <100	LCS-6	107%
Surrogate o-Terphenyl	%	89690-11	97 || 93 || RPD: 4	LCS-6	127%

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	89690-11	29/04/2013 || 29/04/2013	LCS-6	29/04/2013
Date analysed	-	89690-11	29/04/2013 || 29/04/2013	LCS-6	29/04/2013
Naphthalene	mg/kg	89690-11	<0.1 || <0.1	LCS-6	106%
Acenaphthylene	mg/kg	89690-11	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	89690-11	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	89690-11	<0.1 || <0.1	LCS-6	100%
Phenanthrene	mg/kg	89690-11	<0.1 || <0.1	LCS-6	110%
Anthracene	mg/kg	89690-11	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	89690-11	<0.1 || <0.1	LCS-6	108%
Pyrene	mg/kg	89690-11	<0.1 || <0.1	LCS-6	112%
Benzo(a)anthracene	mg/kg	89690-11	<0.1 || <0.1	[NR]	[NR]
Chrysene	mg/kg	89690-11	<0.1 || <0.1	LCS-6	110%
Benzo(b+k)fluoranthene	mg/kg	89690-11	<0.2 || <0.2	[NR]	[NR]

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Benzo(a)pyrene	mg/kg	89690-11	<0.05 || <0.05	LCS-6	123%
Indeno(1,2,3-c,d)pyrene	mg/kg	89690-11	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	89690-11	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	89690-11	<0.1 || <0.1	[NR]	[NR]
Benzo(a)pyrene TEQ	mg/kg	89690-11	<0.5 || <0.5	[NR]	[NR]
Surrogate p-Terphenyl-d14	%	89690-11	105 || 107 || RPD: 2	LCS-6	105%

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	89690-11	29/04/2013 || 29/04/2013	LCS-6	29/04/2013
Date analysed	-	89690-11	29/04/2013 || 29/04/2013	LCS-6	29/04/2013
HCB	mg/kg	89690-11	<0.1 || <0.1	[NR]	[NR]
alpha-BHC	mg/kg	89690-11	<0.1 || <0.1	LCS-6	101%
gamma-BHC	mg/kg	89690-11	<0.1 || <0.1	[NR]	[NR]
beta-BHC	mg/kg	89690-11	<0.1 || <0.1	LCS-6	106%
Heptachlor	mg/kg	89690-11	<0.1 || <0.1	LCS-6	98%
delta-BHC	mg/kg	89690-11	<0.1 || <0.1	[NR]	[NR]
Aldrin	mg/kg	89690-11	<0.1 || <0.1	LCS-6	95%
Heptachlor Epoxide	mg/kg	89690-11	<0.1 || <0.1	LCS-6	108%
gamma-Chlordane	mg/kg	89690-11	<0.1 || <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	89690-11	<0.1 || <0.1	[NR]	[NR]
Endosulfan I	mg/kg	89690-11	<0.1 || <0.1	[NR]	[NR]
pp-DDE	mg/kg	89690-11	<0.1 || <0.1	LCS-6	99%
Dieldrin	mg/kg	89690-11	<0.1 || <0.1	LCS-6	106%
Endrin	mg/kg	89690-11	<0.1 || <0.1	LCS-6	90%
pp-DDD	mg/kg	89690-11	<0.1 || <0.1	LCS-6	104%
Endosulfan II	mg/kg	89690-11	<0.1 || <0.1	[NR]	[NR]
pp-DDT	mg/kg	89690-11	<0.1 || <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	89690-11	<0.1 || <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	89690-11	<0.1 || <0.1	LCS-6	101%
Methoxychlor	mg/kg	89690-11	<0.1 || <0.1	[NR]	[NR]
Surrogate TCMX	%	89690-11	101 || 101 || RPD: 0	LCS-6	105%

QUALITY CONTROL PCBs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	89690-11	29/04/2013 || 29/04/2013	LCS-6	29/04/2013
Date analysed	-	89690-11	29/04/2013 || 29/04/2013	LCS-6	29/04/2013
Arochlor 1016	mg/kg	89690-11	<0.1 || <0.1	[NR]	[NR]
Arochlor 1221	mg/kg	89690-11	<0.1 || <0.1	[NR]	[NR]
Arochlor 1232	mg/kg	89690-11	<0.1 || <0.1	[NR]	[NR]
Arochlor 1242	mg/kg	89690-11	<0.1 || <0.1	[NR]	[NR]
Arochlor 1248	mg/kg	89690-11	<0.1 || <0.1	[NR]	[NR]
Arochlor 1254	mg/kg	89690-11	<0.1 || <0.1	LCS-6	101%
Arochlor 1260	mg/kg	89690-11	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%	89690-11	101 || 101 || RPD: 0	LCS-6	91%

QUALITY CONTROL Total Phenolics in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	89690-16	30/04/2013 || 30/04/2013	LCS-2	30/04/2013
Date analysed	-	89690-16	30/04/2013 || 30/04/2013	LCS-2	30/04/2013
Total Phenolics (as Phenol)	mg/kg	89690-16	<5 || <5	LCS-2	87%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	89690-11	29/04/2013 || 29/04/2013	LCS-2	30/04/2013
Date analysed	-	89690-11	30/04/2013 || 30/04/2013	LCS-2	30/04/2013
Arsenic	mg/kg	89690-11	<4 || <4	LCS-2	102%
Cadmium	mg/kg	89690-11	<0.4 || <0.4	LCS-2	108%
Chromium	mg/kg	89690-11	11 || 11 || RPD: 0	LCS-2	106%
Copper	mg/kg	89690-11	2 || 3 || RPD: 40	LCS-2	105%
Lead	mg/kg	89690-11	11 || 14 || RPD: 24	LCS-2	101%
Mercury	mg/kg	89690-11	<0.1 || <0.1	LCS-2	95%
Nickel	mg/kg	89690-11	5 || 6 || RPD: 18	LCS-2	106%
Zinc	mg/kg	89690-11	9 || 8 || RPD: 12	LCS-2	103%

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	89690-20	29/04/2013 || 29/04/2013	89690-3	29/04/2013
Date analysed	-	89690-20	30/04/2013 || 30/04/2013	89690-3	30/04/2013
TRH C_6 - C_9	mg/kg	89690-20	<25 || <25	89690-3	110%
TRH C_6 - C_{10}	mg/kg	89690-20	<25 || <25	89690-3	110%
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	89690-20	<25 || <25	[NR]	[NR]
Benzene	mg/kg	89690-20	<0.2 || <0.2	89690-3	117%
Toluene	mg/kg	89690-20	<0.5 || <0.5	89690-3	108%
Ethylbenzene	mg/kg	89690-20	<1 || <1	89690-3	107%
m+p-xylene	mg/kg	89690-20	<2 || <2	89690-3	110%
o-Xylene	mg/kg	89690-20	<1 || <1	89690-3	113%
naphthalene	mg/kg	89690-20	<1 || <1	[NR]	[NR]

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Surrogate aaa-Trifluorotoluene	%	89690-20	85 || 84 || RPD: 1	89690-3	95%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	89690-20	29/04/2013 || 29/04/2013	89690-3	29/04/2013
Date analysed	-	89690-20	01/05/2013 || 01/05/2013	89690-3	01/05/2013
TRH C_{10} - C_{14}	mg/kg	89690-20	230 || 94 || RPD: 84	89690-3	104%
TRH C_{15} - C_{28}	mg/kg	89690-20	<100 || <100	89690-3	106%
TRH C_{29} - C_{36}	mg/kg	89690-20	<100 || <100	89690-3	107%
TRH >C_{10}-C_{16}	mg/kg	89690-20	210 || 79 || RPD: 91	89690-3	104%
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	89690-20	210 || 79 || RPD: 91	[NR]	[NR]
TRH >C_{16}-C_{34}	mg/kg	89690-20	110 || <100	89690-3	106%
TRH >C_{34}-C_{40}	mg/kg	89690-20	<100 || <100	89690-3	107%
Surrogate o-Terphenyl	%	89690-20	96 || 95 || RPD: 1	89690-3	102%

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	89690-20	29/04/2013 || 29/04/2013	89690-3	29/04/2013
Date analysed	-	89690-20	29/04/2013 || 29/04/2013	89690-3	29/04/2013
Naphthalene	mg/kg	89690-20	<0.1 || <0.1	89690-3	104%
Acenaphthylene	mg/kg	89690-20	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	89690-20	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	89690-20	<0.1 || <0.1	89690-3	98%
Phenanthrene	mg/kg	89690-20	<0.1 || <0.1	89690-3	107%
Anthracene	mg/kg	89690-20	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	89690-20	<0.1 || <0.1	89690-3	107%
Pyrene	mg/kg	89690-20	<0.1 || <0.1	89690-3	111%
Benzo(a)anthracene	mg/kg	89690-20	<0.1 || <0.1	[NR]	[NR]
Chrysene	mg/kg	89690-20	<0.1 || <0.1	89690-3	106%
Benzo(b+k)fluoranthene	mg/kg	89690-20	<0.2 || <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	89690-20	<0.05 || <0.05	89690-3	121%
Indeno(1,2,3-c,d)pyrene	mg/kg	89690-20	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	89690-20	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	89690-20	<0.1 || <0.1	[NR]	[NR]
Benzo(a)pyrene TEQ	mg/kg	89690-20	<0.5 || <0.5	[NR]	[NR]
Surrogate p-Terphenyl-d14	%	89690-20	108 || 109 || RPD: 1	89690-3	100%

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	89690-32	29/04/2013 || 29/04/2013	89690-3	29/04/2013
Date analysed	-	89690-32	29/04/2013 || 29/04/2013	89690-3	29/04/2013
HCB	mg/kg	89690-32	<0.1 || <0.1	[NR]	[NR]
alpha-BHC	mg/kg	89690-32	<0.1 || <0.1	89690-3	91%
gamma-BHC	mg/kg	89690-32	<0.1 || <0.1	[NR]	[NR]
beta-BHC	mg/kg	89690-32	<0.1 || <0.1	89690-3	101%
Heptachlor	mg/kg	89690-32	<0.1 || <0.1	89690-3	99%
delta-BHC	mg/kg	89690-32	<0.1 || <0.1	[NR]	[NR]
Aldrin	mg/kg	89690-32	<0.1 || <0.1	89690-3	92%
Heptachlor Epoxide	mg/kg	89690-32	<0.1 || <0.1	89690-3	102%
gamma-Chlordane	mg/kg	89690-32	<0.1 || <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	89690-32	<0.1 || <0.1	[NR]	[NR]
Endosulfan I	mg/kg	89690-32	<0.1 || <0.1	[NR]	[NR]
pp-DDE	mg/kg	89690-32	<0.1 || <0.1	89690-3	94%
Dieldrin	mg/kg	89690-32	<0.1 || <0.1	89690-3	101%
Endrin	mg/kg	89690-32	<0.1 || <0.1	89690-3	85%
pp-DDD	mg/kg	89690-32	<0.1 || <0.1	89690-3	100%
Endosulfan II	mg/kg	89690-32	<0.1 || <0.1	[NR]	[NR]
pp-DDT	mg/kg	89690-32	<0.1 || <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	89690-32	<0.1 || <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	89690-32	<0.1 || <0.1	89690-3	100%
Methoxychlor	mg/kg	89690-32	<0.1 || <0.1	[NR]	[NR]
Surrogate TCMX	%	89690-32	99 || 92 || RPD: 7	89690-3	100%

QUALITY CONTROL PCBs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	89690-32	29/04/2013 || 29/04/2013	89690-3	29/04/2013
Date analysed	-	89690-32	29/04/2013 || 29/04/2013	89690-3	29/04/2013
Arochlor 1016	mg/kg	89690-32	<0.1 || <0.1	[NR]	[NR]
Arochlor 1221	mg/kg	89690-32	<0.1 || <0.1	[NR]	[NR]
Arochlor 1232	mg/kg	89690-32	<0.1 || <0.1	[NR]	[NR]
Arochlor 1242	mg/kg	89690-32	<0.1 || <0.1	[NR]	[NR]
Arochlor 1248	mg/kg	89690-32	<0.1 || <0.1	[NR]	[NR]
Arochlor 1254	mg/kg	89690-32	<0.1 || <0.1	89690-3	101%
Arochlor 1260	mg/kg	89690-32	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%	89690-32	99 || 92 || RPD: 7	89690-3	92%

QUALITY CONTROL Total Phenolics in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	89690-33	30/04/2013 || 30/04/2013	89690-3	30/04/2013
Date analysed	-	89690-33	30/04/2013 || 30/04/2013	89690-3	30/04/2013
Total Phenolics (as Phenol)	mg/kg	89690-33	<5 || <5	89690-3	75%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	89690-20	29/04/2013 || 29/04/2013	89690-3	29/04/22013
Date analysed	-	89690-20	30/04/2013 || 30/04/2013	89690-3	30/04/2013
Arsenic	mg/kg	89690-20	<4 || <4	89690-3	100%
Cadmium	mg/kg	89690-20	<0.4 || <0.4	89690-3	104%
Chromium	mg/kg	89690-20	7 || 4 || RPD: 55	89690-3	105%
Copper	mg/kg	89690-20	2 || 1 || RPD: 67	89690-3	98%
Lead	mg/kg	89690-20	10 || 6 || RPD: 50	89690-3	114%
Mercury	mg/kg	89690-20	<0.1 || <0.1	89690-3	98%
Nickel	mg/kg	89690-20	2 || 1 || RPD: 67	89690-3	94%
Zinc	mg/kg	89690-20	9 || 4 || RPD: 77	89690-3	128%

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	89690-32	29/04/2013 || 29/04/2013	89690-18	29/04/2013
Date analysed	-	89690-32	30/04/2013 || 30/04/2013	89690-18	30/04/2013
TRH C_6 - C_9	mg/kg	89690-32	<25 || <25	89690-18	116%
TRH C_6 - C_{10}	mg/kg	89690-32	<25 || <25	89690-18	116%
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	89690-32	<25 || <25	[NR]	[NR]
Benzene	mg/kg	89690-32	<0.2 || <0.2	89690-18	128%
Toluene	mg/kg	89690-32	<0.5 || <0.5	89690-18	112%
Ethylbenzene	mg/kg	89690-32	<1 || <1	89690-18	118%
m+p-xylene	mg/kg	89690-32	<2 || <2	89690-18	111%
o-Xylene	mg/kg	89690-32	<1 || <1	89690-18	114%
naphthalene	mg/kg	89690-32	<1 || <1	[NR]	[NR]

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Surrogate aaa-Trifluorotoluene	%	89690-32	98 || 106 || RPD: 8	89690-18	101%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	89690-32	29/04/2013 || 29/04/2013	89690-18	29/04/2013
Date analysed	-	89690-32	01/05/2013 || 01/05/2013	89690-18	01/05/2013
TRHC $_{10}$ - C $_{14}$	mg/kg	89690-32	<50 || <50	89690-18	#
TRHC $_{15}$ - C $_{28}$	mg/kg	89690-32	<100 || <100	89690-18	#
TRHC $_{29}$ - C $_{36}$	mg/kg	89690-32	<100 || <100	89690-18	#
TRH>C $_{10}$-C $_{16}$	mg/kg	89690-32	<50 || <50	89690-18	#
TRH>C $_{10}$ - C $_{16}$ less Naphthalene (F2)	mg/kg	89690-32	<50 || <50	[NR]	[NR]
TRH>C $_{16}$-C $_{34}$	mg/kg	89690-32	<100 || <100	89690-18	#
TRH>C $_{34}$-C $_{40}$	mg/kg	89690-32	<100 || <100	89690-18	#
Surrogate o-Terphenyl	%	89690-32	94 || 92 || RPD: 2	89690-18	123%

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	89690-32	29/04/2013 || 29/04/2013	89690-18	29/04/2013
Date analysed	-	89690-32	29/04/2013 || 29/04/2013	89690-18	29/04/2013
Naphthalene	mg/kg	89690-32	<0.1 || <0.1	89690-18	#
Acenaphthylene	mg/kg	89690-32	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	89690-32	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	89690-32	<0.1 || <0.1	89690-18	100%
Phenanthrene	mg/kg	89690-32	<0.1 || <0.1	89690-18	112%
Anthracene	mg/kg	89690-32	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	89690-32	<0.1 || <0.1	89690-18	108%
Pyrene	mg/kg	89690-32	<0.1 || <0.1	89690-18	112%
Benzo(a)anthracene	mg/kg	89690-32	<0.1 || <0.1	[NR]	[NR]
Chrysene	mg/kg	89690-32	<0.1 || <0.1	89690-18	107%
Benzo(b+k)fluoranthene	mg/kg	89690-32	<0.2 || <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	89690-32	<0.05 || <0.05	89690-18	120%
Indeno(1,2,3-c,d)pyrene	mg/kg	89690-32	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	89690-32	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	89690-32	<0.1 || <0.1	[NR]	[NR]
Benzo(a)pyrene TEQ	mg/kg	89690-32	<0.5 || <0.5	[NR]	[NR]
Surrogate *p*-Terphenyl-d14	%	89690-32	119 || 115 || RPD: 3	89690-18	100%

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	89690-18	29/04/2013
Date analysed	-	[NT]	[NT]	89690-18	29/04/2013
HCB	mg/kg	[NT]	[NT]	[NR]	[NR]
alpha-BHC	mg/kg	[NT]	[NT]	89690-18	85%
gamma-BHC	mg/kg	[NT]	[NT]	[NR]	[NR]
beta-BHC	mg/kg	[NT]	[NT]	89690-18	92%
Heptachlor	mg/kg	[NT]	[NT]	89690-18	87%
delta-BHC	mg/kg	[NT]	[NT]	[NR]	[NR]
Aldrin	mg/kg	[NT]	[NT]	89690-18	83%
Heptachlor Epoxide	mg/kg	[NT]	[NT]	89690-18	95%
gamma-Chlordane	mg/kg	[NT]	[NT]	[NR]	[NR]
alpha-chlordane	mg/kg	[NT]	[NT]	[NR]	[NR]
Endosulfan I	mg/kg	[NT]	[NT]	[NR]	[NR]
pp-DDE	mg/kg	[NT]	[NT]	89690-18	86%
Dieldrin	mg/kg	[NT]	[NT]	89690-18	94%
Endrin	mg/kg	[NT]	[NT]	89690-18	80%
pp-DDD	mg/kg	[NT]	[NT]	89690-18	92%
Endosulfan II	mg/kg	[NT]	[NT]	[NR]	[NR]
pp-DDT	mg/kg	[NT]	[NT]	[NR]	[NR]
Endrin Aldehyde	mg/kg	[NT]	[NT]	[NR]	[NR]
Endosulfan Sulphate	mg/kg	[NT]	[NT]	89690-18	92%
Methoxychlor	mg/kg	[NT]	[NT]	[NR]	[NR]
Surrogate TCMX	%	[NT]	[NT]	89690-18	94%

QUALITY CONTROL PCBs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	89690-18	29/04/2013
Date analysed	-	[NT]	[NT]	89690-18	29/04/2013
Arochlor 1016	mg/kg	[NT]	[NT]	[NR]	[NR]
Arochlor 1221	mg/kg	[NT]	[NT]	[NR]	[NR]
Arochlor 1232	mg/kg	[NT]	[NT]	[NR]	[NR]
Arochlor 1242	mg/kg	[NT]	[NT]	[NR]	[NR]
Arochlor 1248	mg/kg	[NT]	[NT]	[NR]	[NR]
Arochlor 1254	mg/kg	[NT]	[NT]	89690-18	102%
Arochlor 1260	mg/kg	[NT]	[NT]	[NR]	[NR]
Surrogate TCLMX	%	[NT]	[NT]	89690-18	94%

QUALITY CONTROL Total Phenolics in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	89690-35	30/04/2013
Date analysed	-	[NT]	[NT]	89690-35	30/04/2013
Total Phenolics (as Phenol)	mg/kg	[NT]	[NT]	89690-35	96%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	89690-32	29/04/2013 || 29/04/2013	89690-18	30/04/2013
Date analysed	-	89690-32	30/04/2013 || 30/04/2013	89690-18	30/04/2013
Arsenic	mg/kg	89690-32	<4 || <4	89690-18	88%
Cadmium	mg/kg	89690-32	0.4 || <0.4	89690-18	91%
Chromium	mg/kg	89690-32	5 || 4 || RPD: 22	89690-18	95%
Copper	mg/kg	89690-32	5 || 4 || RPD: 22	89690-18	93%
Lead	mg/kg	89690-32	690 || 560 || RPD: 21	89690-18	85%
Mercury	mg/kg	89690-32	<0.1 || <0.1	89690-18	96%
Nickel	mg/kg	89690-32	2 || 2 || RPD: 0	89690-18	85%
Zinc	mg/kg	89690-32	170 || 150 || RPD: 12	89690-18	85%

Report Comments:

PAH(in soil)# Percent recovery is not possible to report as the high concentration of analytes in the sample/s have caused interference.

PAH's in soil:# Percent recovery is not possible to report as the high concentration of analytes in the sample/s have caused interference.

VOC in soil: # Percent recovery is not possible to report as the high concentration of analytes in the sample/s have caused interference.

Acid Extractable Metals in Soil: The laboratory RPD acceptance criteriae has been exceeded for 89690-1 for Cr, Cu, Ni, Zn. Therefore a triplicate result has been issued as laboratory sample number 89690-46.

Acid Extractable Metals in Soil: The laboratory RPD acceptance criteriae has been exceeded for 89690-20 for Cr, Pb, Zn. Therefore a triplicate result has been issued as laboratory sample number 89690-47.

Asbestos: A portion of the supplied sample was sub-sampled for asbestos analysis according to Envirolab procedures. We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying . 40-50g of sample in its own container.

Total Recoverable Hydrocarbons in soil: (NEPM) # Percent recovery is not possible to report as the high concentration of analytes

Asbestos ID was analysed by Approved Identifier:	Paul Ching
Asbestos ID was authorised by Approved Signatory:	Lulu Guo

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

Quality Control Definitions

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

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

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

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

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

Laboratory Acceptance Criteria

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

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics and 10-140% for SVOC and speciated phenols is acceptable.

Douglas Partners
Geotechnics · Environment · Groundwater

CHAIN OF CUSTODY

Project Name: Brookvale
Project No: 71015-18 Sampler: D. Walker
Project Mgr: L.R Mob. Phone:
Email: lindsay.rackett@douglaspartners.com.au
Date Required: Standard T/A Lab Quote No.

To: Envirolab Services
12 Ashley Street, Chatswood NSW 2068
Attn: Tania Notaras
Phone: 02 9910 6200 Fax: 02 9910 6201
Email: tnotaras@envirolabservices.com.au

Sample ID	Sample Depth	Lab ID	Sampling Date	Sample Type (S - soil, W - water)	Container type	Analytes: Heavy Metals	BTEX/ TPH	OCPs/ PCBs	PAH	Phenols	Asbestos							Other	Notes
717	0.4-0.5	1	22/4/13	S	Jar	✓	✓	✓	✓	✓	✓								COMBO 7A
717	0.9-1.0	2	↓	↓	↓	✓	✓		✓										3
721	0.3-0.4	3				✓	✓	✓	✓	✓	✓								7A
722	0.4-0.5	4				✓	✓		✓										3
722	0.9-1.0	5				✓	✓	✓	✓	✓	✓								7A
723	0.4-0.5	6				✓	✓	✓	✓	✓	✓								7A
723	0.9-1.0	7				✓	✓		✓										3
724	0.4-0.5	8				✓	✓	✓	✓	✓	✓								7A
725	0.4-0.5	9				✓	✓	✓	✓	✓	✓								7A
726	0.4-0.5	10				✓	✓		✓										3
726	0.7-0.8	11	↓			✓	✓	✓	✓	✓	✓								7A
727	0.4-0.5	12	23/4/13	↓	↓	✓	✓	✓	✓	✓	✓								7A

Envirolab Services
12 Ashley St
Chatswood
Ph: (02) 9910 6200
Job No. 89690
Date Received: 26/4/13
Time Received: 14:45
Received by: PT
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: D. Walker Signed: D. Walker Date & Time: 26/4/13 9.50 am Received By: Peat Date & Time: 26/4/13 14:45
Relinquished by: Signed: Date & Time: Received By: Date & Time:

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CHAIN OF CUSTODY

Project Name: Brookvale
Project No: 71015-18 Sampler: D. Walker
Project Mgr: L.R. Mob. Phone:
Email: lindsay.rockett@douglaspartners.com.au
Date Required: Standard T/A Lab Quote No.

To: Envirolab Services
12 Ashley Street, Chatswood NSW 2068
Attn: Tania Notaras
Phone: 02 9910 6200 Fax: 02 9910 6201
Email: tnotaras@envirolabservices.com.au

Sample ID	Sample Depth	Lab ID	Sampling Date	Sample Type (S - soil, W – water)	Container type	Analytes: Heavy Metals	BTEX/ TPH	OCPs/ PCBs	PAH	Phenols	Asbestos	VOC						Other	Notes
728	0.4-0.5	13	23/4/13	S	Jar	✓	✓	✓	✓	✓	✓								combo 7A
729	0.4-0.5	14	22/4/13	S		✓	✓		✓										3
729	0.9-1.0	15	22/4/13	S		✓	✓	✓	✓	✓	✓								7A
730	0.4-0.5	16	23/4/13			✓	✓	✓	✓	✓	✓								7A
731	0.4-0.5	17				✓	✓	✓	✓	✓	✓								7A
732	0.9-1.0	18				✓	✓	✓	✓	✓	✓	✓							7A + VOC
732	1.4-1.5	19				✓	✓		✓			✓							3 + VOC
732	2.9-3.0	20				✓	✓		✓			✓							3 + VOC
733	0.9-1.0	21				✓	✓	✓	✓	✓	✓							89690	7A
733	2.9-3.0	22				✓	✓		✓			✓							3 + VOC
734	0.4-0.5	23	24/4/13			✓	✓	✓	✓	✓	✓								7A
734	0.9-1.0	24	24/4/13			✓	✓		✓										3

Lab Report No. .... Phone: (02) 9809 0666
Send Results to: Douglas Partners Address: 96 Hermitage Road, West Ryde 2114 Fax: (02) 9809 4095
Relinquished by: D. Walker Signed: D. Walker Date & Time: 26/4/13 9.50am Received By: Preet Date & Time: 26/4/13 14:45
Relinquished by: Signed: Date & Time: Received By: Date & Time:

Douglas Partners
Geotechnics · Environment · Groundwater

CHAIN OF CUSTODY

Project Name: Brookvale
Project No: 71015-18 Sampler: D. Walker
Project Mgr: L.R. Mob. Phone:
Email: lindsay.rockett@douglaspartners.com.au
Date Required: Standard T/A Lab Quote No.

To: Envirolab Services
12 Ashley Street, Chatswood NSW 2068
Attn: Tania Notaras
Phone: 02 9910 6200 Fax: 02 9910 6201
Email: tnotaras@envirolabservices.com.au

Sample ID	Sample Depth	Lab ID	Sampling Date	Sample Type (S - soil, W - water)	Container type	Analytes: Heavy Metals	BTEX/ TPH	OCPs/ PCBs	PAH	Phenols	Asbestos	VOC						Other	Notes
735	0.4-0.5	25	24/4/13	S	Jar	✓	✓	✓	✓	✓	✓								Combo 7A
736	0.3-0.4	26	22/4/13			✓	✓	✓	✓	✓	✓								7A
738	0.4-0.5	27	24/4/13			✓	✓	✓	✓	✓	✓								7A
738	0.9-1.0	28				✓	✓		✓										3
739	0.4-0.5	29				✓	✓		✓										3
739	0.9-1.0	30				✓	✓	✓	✓	✓	✓								7A
740	0.4-0.5	31				✓	✓		✓										3
740	0.9-1.0	32				✓	✓	✓	✓	✓	✓								7A
741	0.4-0.5	33				✓	✓	✓	✓	✓	✓							89690	7A
741	2.9-3.0	34										✓							
742	0.4-0.5	35				✓	✓	✓	✓	✓	✓								7A
745	0.4-0.5	36				✓	✓	✓	✓	✓	✓								7A

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: D. Walker Signed: D. Walker Date & Time: 26/4/13 9:[illegible] Received By: [illegible] Date & Time: 26/4/13 14:45

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

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Page ___ of ___

Douglas Partners
Geotechnics · Environment · Groundwater

CHAIN OF CUSTODY

Project Name: Brookvale
Project No: 71015.18 Sampler: D. Walker
Project Mgr: L.R Mob. Phone:
Email: lindsay.rackett@douglaspartners.com.au
Date Required: Standard T/A Lab Quote No.

To: Envirolab Services
12 Ashley Street, Chatswood NSW 2068
Attn: Tania Notaras
Phone: 02 9910 6200 Fax: 02 9910 6201
Email: tnotaras@envirolabservices.com.au

Sample ID	Sample Depth	Lab ID	Sampling Date	Sample Type S - soil W - water	Container type	Analytes: Heavy Metals	BTEX/ TPH	OCPs/ PCBs	PAH	Phenols	Asbestos	BTEX only						Other	Notes
BD1-220413		37		22/4/13		✓			✓										Send sample to Labmark for analysis
BD2-220413		38		22/4/13		✓			✓										
BD2-240413		39		24/4/13		✓			✓										
~~BD3~~-220413				22/4/13		✓			✓	✗									
Trip blank		40		22/4/13								✓							
Trip spike		41		22/4/13								✓							
Trip blank		42		23/4/13								✓							
Trip spike		43		23/4/13								✓							
Trip blank		44		24/4/13								✓							
Trip spike		45		24/4/13								✓							89690

Lab Report No. .... Phone: (02) 9809 0666
Send Results to: Douglas Partners Address: 96 Hermitage Road, West Ryde 2114 Fax: (02) 9809 4095
Relinquished by: D. Walker Signed: D. Walker Date & Time: 26/4/13 9:52am Received By: Pcaleithe Date & Time: 26/4/13 14:45
Relinquished by: Signed: Date & Time: Received By: Date & Time:

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

SAMPLE RECEIPT ADVICE

Client:

Douglas Partners	ph: 02 9809 0666
96 Hermitage Rd	Fax: 02 9809 4095
West Ryde NSW 2114	

Attention: Lindsay Rockett

Sample log in details:

Your reference:	**71015.18, Brookvale**
Envirolab Reference:	**89690**
Date received:	26/04/2013
Date results expected to be reported:	**3/05/13**

Samples received in appropriate condition for analysis:	YES
No. of samples provided	45 Soils
Turnaround time requested:	Standard
Temperature on receipt	Cool
Cooling Method:	Ice Pack
Sampling Date Provided:	YES

Comments:

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

Contact details:

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

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 89690-A

Client:
Douglas Partners
96 Hermitage Rd
West Ryde
NSW 2114

Attention: Lindsay Rockett

Sample log in details:

Your Reference:	**71015.18, Brookvale**
No. of samples:	Additional testing on soils
Date samples received / completed instructions received	26/04/2013 / 06/05/13

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

Report Details:

Date results requested by: / Issue Date:	13/05/13 / 10/05/13
Date of Preliminary Report:	Not issued

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

Results Approved By:

Giovanni Agosti
Technical Manager

Metals in TCLP USEPA1311						
Our Reference:	UNITS	89690-A-8	89690-A-9	89690-A-10	89690-A-13	89690-A-25
Your Reference	-------------	724	725	726	728	735
Depth	------------	0.4-0.5	0.4-0.5	0.4-0.5	0.4-0.5	0.4-0.5
Date Sampled		22/04/2013	22/04/2013	22/04/2013	23/04/2013	24/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/05/2013	07/05/2013	07/05/2013	07/05/2013	07/05/2013
Date analysed	-	10/05/2013	10/05/2013	10/05/2013	10/05/2013	10/05/2013
pH of soil for fluid# determ.	pH units	10.3	9.3	10.2	9.6	9.3
pH of soil for fluid # determ. (acid)	pH units	1.6	1.4	1.6	1.6	1.3
Extraction fluid used	-	1	1	1	1	1
pH of final Leachate	pH units	6.6	6.2	6.4	5.5	5.5
Nickel in TCLP	mg/L	0.03	0.02	0.03	0.08	0.1

Metals in TCLP USEPA1311						
Our Reference:	UNITS	89690-A-26	89690-A-29	89690-A-32	89690-A-35	89690-A-39
Your Reference	-------------	736	739	740	742	BD2-240413
Depth	------------	0.3-0.4	0.4-0.5	0.9-1.0	0.4-0.5	-
Date Sampled		22/04/2013	24/04/2013	24/04/2013	24/04/2013	24/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/05/2013	07/05/2013	07/05/2013	07/05/2013	07/05/2013
Date analysed	-	10/05/2013	10/05/2013	10/05/2013	10/05/2013	10/05/2013
pH of soil for fluid# determ.	pH units	9.3	8.9	9.6	9.4	9.2
pH of soil for fluid # determ. (acid)	pH units	1.6	1.6	1.5	1.6	1.6
Extraction fluid used	-	1	1	1	1	1
pH of final Leachate	pH units	5.3	5.5	5.4	5.7	5.3
Lead in TCLP	mg/L	[NA]	[NA]	9.2	[NA]	0.4
Nickel in TCLP	mg/L	0.09	0.05	[NA]	<0.02	[NA]

Method ID	Methodology Summary
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using AS 4439 and USEPA 1311.
EXTRACT.7	Toxicity Characteristic Leaching Procedure (TCLP).
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA 22nd ED, 4500-H+.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.

QUALITY CONTROL Metals in TCLP USEPA1311	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			07/05/2013	89690-A-8	07/05/2013 || 07/05/2013	LCS-W1	07/05/2013
Date analysed	-			10/05/2013	89690-A-8	10/05/2013 || 10/05/2013	LCS-W1	10/05/2013
Lead in TCLP	mg/L	0.03	Metals-020 ICP-AES	<0.03	[NT]	[NT]	LCS-W1	101%
Nickel in TCLP	mg/L	0.02	Metals-020 ICP-AES	<0.02	89690-A-8	0.03 || 0.03 || RPD: 0	LCS-W1	103%

QUALITY CONTROL Metals in TCLP USEPA1311	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date extracted	-	89690-A-39	07/05/2013 || 07/05/2013
Date analysed	-	89690-A-39	10/05/2013 || 10/05/2013
Lead in TCLP	mg/L	89690-A-39	0.4 || 0.6 || RPD: 40
Nickel in TCLP	mg/L	[NT]	[NT]

Report Comments:

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

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

Quality Control Definitions

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

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

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

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

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Laboratory Acceptance Criteria

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Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

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

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 89989

Client:
Douglas Partners
96 Hermitage Rd
West Ryde
NSW 2114

Attention: David Walker

Sample log in details:

Your Reference:	**71015.18, Waringah Mall**		
No. of samples:	5 soils		
Date samples received / completed instructions received	02/05/13	/	02/05/13

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

Report Details:

Date results requested by: / Issue Date:	10/05/13	/	9/05/13
Date of Preliminary Report:	Not Issued		

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Results Approved By:

M. Mansfield
Matt Mansfield
Approved Signatory

ACCREDITED FOR TECHNICAL COMPETENCE

sPOCAS					
Our Reference:	UNITS	89989-1	89989-2	89989-3	89989-4
Your Reference	-------------	740	752	763	763
Depth	------------	4.9-5.0	1.4-1.5	3.4-3.5	4.4-4.5
Date Sampled		24/04/2013	29/04/2013	29/04/2013	29/04/2013
Type of sample		soil	soil	soil	soil
Date prepared	-	07/05/2013	07/05/2013	07/05/2013	07/05/2013
Date analysed	-	07/05/2013	07/05/2013	07/05/2013	07/05/2013
pH_{kcl}	pH units	3.9	4.1	5.8	5.6
TAA pH 6.5	moles H^+/t	25	5	10	<5
s-TAA pH 6.5	%w/w S	0.04	<0.01	0.02	<0.01
pH_{Ox}	pH units	4.3	4.5	3.5	2.5
TPA pH 6.5	moles H^+/t	17	37	22	600
s-TPA pH 6.5	%w/w S	0.03	0.06	0.04	0.96
TSA pH 6.5	moles H^+/t	<5	32	12	590
s-TSA pH 6.5	%w/w S	<0.01	0.05	0.02	0.95
ANC_E	% $CaCO_3$	<0.05	<0.05	<0.05	<0.05
a-ANC_E	moles H^+/t	<5	<5	<5	<5
s-ANC_E	%w/w S	<0.05	<0.05	<0.05	<0.05
S_{KCl}	%w/w S	0.02	0.02	<0.005	0.01
S_P	%w/w	0.02	0.03	0.03	0.41
S_{POS}	%w/w	<0.005	0.01	0.03	0.40
a-S_{POS}	moles H^+/t	<5	8	17	250
Ca_{KCl}	%w/w	0.01	0.04	0.1	0.32
Ca_P	%w/w	0.01	0.06	0.10	0.40
Ca_A	%w/w	<0.005	0.015	0.005	0.082
Mg_{KCl}	%w/w	0.019	0.016	0.015	0.051
Mg_P	%w/w	0.015	0.018	0.012	0.058
Mg_A	%w/w	<0.005	<0.005	<0.005	0.007
S_{HCl}	%w/w S	0.015	0.032	[NT]	[NT]
S_{NAS}	%w/w S	<0.005	0.013	[NT]	[NT]
a-S_{NAS}	moles H^+/t	<5	6	[NT]	[NT]
s-S_{NAS}	%w/w S	<0.01	0.01	[NT]	[NT]
Fineness Factor	-	1.5	1.5	1.5	1.5
a-Net Acidity	moles H^+/t	25	19	27	250
Liming rate	kg $CaCO_3$/t	1.9	1.5	2.1	19
a-Net Acidity without ANCE	moles H^+/t	NA	NA	NA	NA
Liming rate without ANCE	kg $CaCO_3$/t	NA	NA	NA	NA

Method ID	Methodology Summary
Inorg-064	sPOCAS determined using titrimetric and ICP-AES techniques. Based on Acid Sulfate Soils Laboratory Methods Guidelines, Version 2.1 - June 2004.

QUALITY CONTROL sPOCAS	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			07/05/2013	89989-1	07/05/2013 || 07/05/2013	LCS-1	07/05/2013
Date analysed	-			07/05/2013	89989-1	07/05/2013 || 07/05/2013	LCS-1	07/05/2013
pH_{kcl}	pH units		Inorg-064	[NT]	89989-1	3.9 || 3.9 || RPD: 0	LCS-1	96%
TAA pH 6.5	moles H^+/t	5	Inorg-064	<5	89989-1	25 || 25 || RPD: 0	LCS-1	113%
s-TAA pH 6.5	%w/w S	0.01	Inorg-064	<0.01	89989-1	0.04 || 0.04 || RPD: 0	[NR]	[NR]
pH_{Ox}	pH units		Inorg-064	[NT]	89989-1	4.3 || 4.4 || RPD: 2	LCS-1	104%
TPA pH 6.5	moles H^+/t	5	Inorg-064	<5	89989-1	17 || 15 || RPD: 12	LCS-1	100%
s-TPA pH 6.5	%w/w S	0.01	Inorg-064	<0.01	89989-1	0.03 || 0.02 || RPD: 40	[NR]	[NR]
TSA pH 6.5	moles H^+/t	5	Inorg-064	<5	89989-1	<5 || <5	LCS-1	99%
s-TSA pH 6.5	%w/w S	0.01	Inorg-064	<0.01	89989-1	<0.01 || <0.01	[NR]	[NR]
ANC_E	% $CaCO_3$	0.05	Inorg-064	<0.05	89989-1	<0.05 || <0.05	[NR]	[NR]
a-ANC_E	moles H^+/t	5	Inorg-064	<5	89989-1	<5 || <5	[NR]	[NR]
s-ANC_E	%w/w S	0.05	Inorg-064	<0.05	89989-1	<0.05 || <0.05	[NR]	[NR]
S_{KCl}	%w/w S	0.005	Inorg-064	<0.005	89989-1	0.02 || 0.01 || RPD: 67	LCS-1	91%
S_P	%w/w	0.005	Inorg-064	<0.005	89989-1	0.02 || 0.02 || RPD: 0	LCS-1	91%
S_{POS}	%w/w	0.005	Inorg-064	<0.005	89989-1	<0.005 || 0.005	LCS-1	91%
a-S_{POS}	moles H^+/t	5	Inorg-064	<5	89989-1	<5 || <5	LCS-1	91%
Ca_{KCl}	%w/w	0.005	Inorg-064	<0.005	89989-1	0.01 || 0.01 || RPD: 0	LCS-1	90%
Ca_P	%w/w	0.005	Inorg-064	<0.005	89989-1	0.01 || 0.01 || RPD: 0	[NR]	[NR]
Ca_A	%w/w	0.005	Inorg-064	<0.005	89989-1	<0.005 || <0.005	[NR]	[NR]
Mg_{KCl}	%w/w	0.005	Inorg-064	<0.005	89989-1	0.019 || 0.017 || RPD: 11	LCS-1	96%
Mg_P	%w/w	0.005	Inorg-064	<0.005	89989-1	0.015 || 0.016 || RPD: 6	[NR]	[NR]
Mg_A	%w/w	0.005	Inorg-064	<0.005	89989-1	<0.005 || <0.005	[NR]	[NR]
S_{HCl}	%w/w S	0.005	Inorg-064	<0.005	89989-1	0.015 || 0.014 || RPD: 7	[NR]	[NR]
S_{NAS}	%w/w S	0.005	Inorg-064	<0.005	89989-1	<0.005 || <0.005	[NR]	[NR]
a-S_{NAS}	moles H^+/t	5	Inorg-064	<5	89989-1	<5 || <5	[NR]	[NR]
s-S_{NAS}	%w/w S	0.01	Inorg-064	<0.01	89989-1	<0.01 || <0.01	[NR]	[NR]
Fineness Factor	-	1.5	Inorg-064	<1.5	89989-1	1.5 || 1.5 || RPD: 0	[NR]	[NR]
a-Net Acidity	moles H^+/t	10	Inorg-064	<10	89989-1	25 || 28 || RPD: 11	LCS-1	92%
Liming rate	kg $CaCO_3$ /t	0.75	Inorg-064	<0.75	89989-1	1.9 || 2.1 || RPD: 10	LCS-1	92%

QUALITY CONTROL sPOCAS	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
a-Net Acidity without ANCE	moles H^+/t	10	Inorg-064	<10	89989-1	NA || NA	[NR]	[NR]
Liming rate without ANCE	kg $CaCO_3$/t	0.75	Inorg-064	<0.75	89989-1	NA || NA	[NR]	[NR]

Report Comments:

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

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

Quality Control Definitions

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

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

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

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

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

Laboratory Acceptance Criteria

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

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

Douglas Partners
Geotechnics · Environment · Groundwater

CHAIN OF CUSTODY

Project Name: Warringah Mall Contamination Assessment
Project No: 71015.18 Sampler: David Walker
Project Mgr: DW Mob. Phone 0407 540 537
Email: david.walker @douglaspartners.com.au
Date Required: STD Lab Quote No.

To: Envirolab Services
12 Ashley Street, Chatswood NSW 2068
Attn: Tania Notaras
Phone: 02 9910 6200 Fax: 02 9910 6201
Email: tnotaras@envirolabservices.com.au

Sample ID	Sample Depth	Lab ID	Sampling Date	Sample Type S - soil W – water	Container type			~~ASS Screening~~	SPOCAS											Other	Notes
740	4.9-5.0	1	24/4/13	S	P				✓												
752	1.4-1.5	2	29/04/13																		
763	3.4-3.5	3	29/04/13																		
763	4.4-4.5	4																			
752	0.9-1.0	5																			

ENVIROLAB
Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200
Job No: 89989
Date Received: 2/5/13
Time Received: 17:35
Received by: AW
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: WFM Signed: Date & Time: 02/05 & 10:05 Received By: A. Weir Date & Time: 2/5/13 17:35
Relinquished by: Signed: Date & Time: Received By: Date & Time:

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

SAMPLE RECEIPT ADVICE

Client:

Douglas Partners
96 Hermitage Rd
West Ryde NSW 2114

ph: 02 9809 0666
Fax: 02 9809 4095

Attention: David Walker

Sample log in details:

Your reference:	**71015.18, Waringah Mall**
Envirolab Reference:	**89989**
Date received:	02/05/13
Date results expected to be reported:	**10/05/13**

Samples received in appropriate condition for analysis:	YES
No. of samples provided	5 soils
Turnaround time requested:	Standard
Temperature on receipt	Cool
Cooling Method:	Ice
Sampling Date Provided:	YES

Comments:

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

Contact details:

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

Envirolab Services Pty Ltd
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12 Ashley St Chatswood NSW 2067
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CERTIFICATE OF ANALYSIS 90053

Client:
Douglas Partners
96 Hermitage Rd
West Ryde
NSW 2114

Attention: Lindsay Rockett

Sample log in details:

Your Reference:	**71015.18, Brookvale**
No. of samples:	50 Soils, 1 Material
Date samples received / completed instructions received	03/05/13 / 03/05/13

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

Report Details:

Date results requested by: / Issue Date:	10/05/13 / 10/05/13
Date of Preliminary Report:	Not issued

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

Results Approved By:

Nancy Zhang
Chemist

Rhian Morgan
Reporting Supervisor

Nick Sarlamis
Inorganics Supervisor

Lulu Guo
Approved Signatory

Jeremy Faircloth
Chemist

ACCREDITED FOR TECHNICAL COMPETENCE

VOCs in soil			
Our Reference:	UNITS	90053-5	90053-12
Your Reference	-------------	746	750
Depth	------------	1.7-2.0	2.9-3.0
Date Sampled		29/04/2013	29/04/2013
Type of sample		Soil	Soil
Date extracted	-	06/05/2013	06/05/2013
Date analysed	-	06/05/2013	06/05/2013
Dichlorodifluoromethane	mg/kg	<1	<1
Chloromethane	mg/kg	<1	<1
Vinyl Chloride	mg/kg	<1	<1
Bromomethane	mg/kg	<1	<1
Chloroethane	mg/kg	<1	<1
Trichlorofluoromethane	mg/kg	<1	<1
1,1-Dichloroethene	mg/kg	<1	<1
trans-1,2-dichloroethene	mg/kg	<1	<1
1,1-dichloroethane	mg/kg	<1	<1
cis-1,2-dichloroethene	mg/kg	<1	<1
bromochloromethane	mg/kg	<1	<1
chloroform	mg/kg	<1	<1
2,2-dichloropropane	mg/kg	<1	<1
1,2-dichloroethane	mg/kg	<1	<1
1,1,1-trichloroethane	mg/kg	<1	<1
1,1-dichloropropene	mg/kg	<1	<1
Cyclohexane	mg/kg	<1	<1
carbon tetrachloride	mg/kg	<1	<1
Benzene	mg/kg	<0.2	<0.2
dibromomethane	mg/kg	<1	<1
1,2-dichloropropane	mg/kg	<1	<1
trichloroethene	mg/kg	<1	<1
bromodichloromethane	mg/kg	<1	<1
trans-1,3-dichloropropene	mg/kg	<1	<1
cis-1,3-dichloropropene	mg/kg	<1	<1
1,1,2-trichloroethane	mg/kg	<1	<1
Toluene	mg/kg	<0.5	<0.5
1,3-dichloropropane	mg/kg	<1	<1
dibromochloromethane	mg/kg	<1	<1
1,2-dibromoethane	mg/kg	<1	<1
tetrachloroethene	mg/kg	<1	<1
1,1,1,2-tetrachloroethane	mg/kg	<1	<1
chlorobenzene	mg/kg	<1	<1
Ethylbenzene	mg/kg	<1	<1
bromoform	mg/kg	<1	<1
m+p-xylene	mg/kg	<2	<2
styrene	mg/kg	<1	<1
1,1,2,2-tetrachloroethane	mg/kg	<1	<1
o-Xylene	mg/kg	<1	<1

VOCs in soil			
Our Reference:	UNITS	90053-5	90053-12
Your Reference	-------------	746	750
Depth	------------	1.7-2.0	2.9-3.0
Date Sampled		29/04/2013	29/04/2013
Type of sample		Soil	Soil
1,2,3-trichloropropane	mg/kg	<1	<1
isopropylbenzene	mg/kg	<1	<1
bromobenzene	mg/kg	<1	<1
n-propyl benzene	mg/kg	<1	<1
2-chlorotoluene	mg/kg	<1	<1
4-chlorotoluene	mg/kg	<1	<1
1,3,5-trimethyl benzene	mg/kg	<1	<1
tert-butyl benzene	mg/kg	<1	<1
1,2,4-trimethyl benzene	mg/kg	<1	<1
1,3-dichlorobenzene	mg/kg	<1	<1
sec-butyl benzene	mg/kg	<1	<1
1,4-dichlorobenzene	mg/kg	<1	<1
4-isopropyl toluene	mg/kg	<1	<1
1,2-dichlorobenzene	mg/kg	<1	<1
n-butyl benzene	mg/kg	<1	<1
1,2-dibromo-3-chloropropane	mg/kg	<1	<1
1,2,4-trichlorobenzene	mg/kg	<1	<1
hexachlorobutadiene	mg/kg	<1	<1
1,2,3-trichlorobenzene	mg/kg	<1	<1
Surrogate Dibromofluorometha	%	93	94
Surrogate aaa-Trifluorotoluene	%	72	77
Surrogate Toluene-d_8	%	91	90
Surrogate 4-Bromofluorobenzene	%	97	97

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	90053-1	90053-2	90053-3	90053-4	90053-6
Your Reference	-------------	743	744	746	746	747
Depth	------------	0.9-1.0	0.9-1.0	0.9-1.0	1.4-1.5	0.4-0.5
Date Sampled		2/05/2013	2/05/2013	29/04/2013	29/04/2013	29/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	07/05/2013	07/05/2013	07/05/2013	07/05/2013	07/05/2013
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	88	91	91	89	82

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	90053-7	90053-8	90053-9	90053-10	90053-11
Your Reference	-------------	747	748	749	749	750
Depth	------------	0.9-1.0	0.4-0.5	0.4-0.5	1.0-1.1	1.0-1.2
Date Sampled		29/04/2013	2/05/2013	2/05/2013	2/05/2013	29/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	07/05/2013	07/05/2013	07/05/2013	07/05/2013	07/05/2013
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	88	87	88	91	92

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	90053-12	90053-13	90053-14	90053-15	90053-16
Your Reference	-------------	750	751	752	753	754
Depth	------------	2.9-3.0	0.9-1.0	0.6-0.7	0.4-0.5	0.4-0.5
Date Sampled		29/04/2013	29/04/2013	29/04/2013	30/04/2013	29/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	07/05/2013	07/05/2013	07/05/2013	07/05/2013	07/05/2013
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	77	88	92	88	87

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	90053-17	90053-18	90053-19	90053-20	90053-21
Your Reference	-------------	755	756	756	757	758
Depth	------------	0.9-1.0	0.4-0.5	0.9-1.0	0.5-0.7	0.7-0.8
Date Sampled		30/04/2013	30/04/2013	30/04/2013	30/04/2013	30/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	07/05/2013	07/05/2013	07/05/2013	07/05/2013	07/05/2013
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	86	87	87	88	91

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	90053-22	90053-23	90053-24	90053-25	90053-26
Your Reference	-------------	758	759	759	760	760
Depth	------------	2.4-2.5	1.4-1.5	2.9-3.0	0.9-1.0	1.4-1.5
Date Sampled		30/04/2013	1/05/2013	1/05/2013	30/04/2013	30/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	07/05/2013	07/05/2013	07/05/2013	07/05/2013	07/05/2013
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	89	90	87	88	91

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	90053-27	90053-28	90053-29	90053-30	90053-31
Your Reference	-------------	761	761	762	762	763
Depth	------------	0.9-1.0	1.9-2.0	0.4-0.5	1.4-1.5	1.4-1.5
Date Sampled		1/05/2013	1/05/2013	30/04/2013	30/04/2013	30/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	07/05/2013	07/05/2013	07/05/2013	07/05/2013	07/05/2013
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	90	90	87	81	88

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	90053-32	90053-33	90053-34	90053-35	90053-36
Your Reference	-------------	764	764	765	765	766
Depth	------------	1.4-1.5	2.9-3.0	0.9-1.0	1.9-2.0	0.9-1.0
Date Sampled		1/05/2013	1/05/2013	1/05/2013	1/05/2013	1/05/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	07/05/2013	07/05/2013	07/05/2013	07/05/2013	07/05/2013
TRH $C_6 - C_9$	mg/kg	<25	<25	<25	<25	<25
TRH $C_6 - C_{10}$	mg/kg	<25	<25	<25	<25	<25
vTPH $C_6 - C_{10}$ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	87	86	91	87	87

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	90053-37	90053-38	90053-39	90053-44	90053-45
Your Reference	-------------	767	768	768	Trip spike	Trip blank
Depth	------------	0.9-1.0	0.4-0.5	1.4-1.5	-	-
Date Sampled		1/05/2013	1/05/2013	1/05/2013	29/04/2013	29/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	07/05/2013	07/05/2013	07/05/2013	07/05/2013	07/05/2013
TRH $C_6 - C_9$	mg/kg	<25	<25	<25	[NA]	[NA]
TRH $C_6 - C_{10}$	mg/kg	<25	<25	<25	[NA]	[NA]
vTPH $C_6 - C_{10}$ less BTEX (F1)	mg/kg	<25	<25	<25	[NA]	[NA]
Benzene	mg/kg	<0.2	<0.2	<0.2	89%	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	88%	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	88%	<1
m+p-xylene	mg/kg	<2	<2	<2	92%	<2
o-Xylene	mg/kg	<1	<1	<1	91%	<1
naphthalene	mg/kg	<1	<1	<1	[NA]	[NA]
Surrogate aaa-Trifluorotoluene	%	88	89	89	88	93

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	90053-46	90053-47	90053-48	90053-49	90053-50
Your Reference	-------------	Trip spike	Trip blank	Trip spike	Trip blank	Trip spike
Depth	------------	-	-	-	-	-
Date Sampled		30/04/2013	30/04/2013	1/05/2013	1/05/2013	2/05/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	07/05/2013	07/05/2013	07/05/2013	07/05/2013	07/05/2013
Benzene	mg/kg	94%	<0.2	91%	<0.2	96%
Toluene	mg/kg	93%	<0.5	91%	<0.5	94%
Ethylbenzene	mg/kg	92%	<1	91%	<1	93%
m+p-xylene	mg/kg	92%	<2	89%	<2	92%
o-Xylene	mg/kg	93%	<1	90%	<1	92%
Surrogate aaa-Trifluorotoluene	%	90	96	96	93	89

vTRH(C6-C10)/BTEXN in Soil		
Our Reference:	UNITS	90053-51
Your Reference	-------------	Trip blank
Depth	------------	-
Date Sampled		2/05/2013
Type of sample		Soil
Date extracted	-	06/05/2013
Date analysed	-	07/05/2013
Benzene	mg/kg	<0.2
Toluene	mg/kg	<0.5
Ethylbenzene	mg/kg	<1
m+p-xylene	mg/kg	<2
o-Xylene	mg/kg	<1
Surrogate aaa-Trifluorotoluene	%	94

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	90053-1	90053-2	90053-3	90053-4	90053-6
Your Reference	-------------	743	744	746	746	747
Depth	------------	0.9-1.0	0.9-1.0	0.9-1.0	1.4-1.5	0.4-0.5
Date Sampled		2/05/2013	2/05/2013	29/04/2013	29/04/2013	29/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	07/05/2013	07/05/2013	07/05/2013	07/05/2013	07/05/2013
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	540	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	1,100	<100	100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100	<100	310	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	920	<50	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	920	<50	<50	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	<100	670	110	310	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100	<100	320	<100
Surrogate o-Terphenyl	%	90	#	95	93	88

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	90053-7	90053-8	90053-9	90053-10	90053-11
Your Reference	-------------	747	748	749	749	750
Depth	------------	0.9-1.0	0.4-0.5	0.4-0.5	1.0-1.1	1.0-1.2
Date Sampled		29/04/2013	2/05/2013	2/05/2013	2/05/2013	29/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	07/05/2013	07/05/2013	07/05/2013	07/05/2013	07/05/2013
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100	<100	<100	240
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	140	<100	110	960
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	<100	140	<100	<100	890
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	170	<100	150	1,100
Surrogate o-Terphenyl	%	84	92	88	89	99

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	90053-12	90053-13	90053-14	90053-15	90053-16
Your Reference	-------------	750	751	752	753	754
Depth	------------	2.9-3.0	0.9-1.0	0.6-0.7	0.4-0.5	0.4-0.5
Date Sampled		29/04/2013	29/04/2013	29/04/2013	30/04/2013	29/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	07/05/2013	07/05/2013	07/05/2013	07/05/2013	07/05/2013
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{10}-C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16}-C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34}-C_{40}	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	84	85	84	87	88

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	90053-17	90053-18	90053-19	90053-20	90053-21
Your Reference	-------------	755	756	756	757	758
Depth	------------	0.9-1.0	0.4-0.5	0.9-1.0	0.5-0.7	0.7-0.8
Date Sampled		30/04/2013	30/04/2013	30/04/2013	30/04/2013	30/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	07/05/2013	07/05/2013	07/05/2013	07/05/2013	07/05/2013
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	220	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	330	180	<100	<100
TRH >C_{10}-C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16}-C_{34}	mg/kg	<100	460	220	<100	<100
TRH >C_{34}-C_{40}	mg/kg	<100	200	110	<100	<100
Surrogate o-Terphenyl	%	84	95	86	87	87

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	90053-22	90053-23	90053-24	90053-25	90053-26
Your Reference	-------------	758	759	759	760	760
Depth	------------	2.4-2.5	1.4-1.5	2.9-3.0	0.9-1.0	1.4-1.5
Date Sampled		30/04/2013	1/05/2013	1/05/2013	30/04/2013	30/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	07/05/2013	07/05/2013	07/05/2013	07/05/2013	07/05/2013
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	110
TRH >C_{10}-C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16}-C_{34}	mg/kg	<100	<100	<100	<100	130
TRH >C_{34}-C_{40}	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	83	86	84	89	87

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	90053-27	90053-28	90053-29	90053-30	90053-31
Your Reference	-------------	761	761	762	762	763
Depth	------------	0.9-1.0	1.9-2.0	0.4-0.5	1.4-1.5	1.4-1.5
Date Sampled		1/05/2013	1/05/2013	30/04/2013	30/04/2013	30/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	07/05/2013	07/05/2013	07/05/2013	07/05/2013	07/05/2013
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	150	<100	<100	<100
TRH >C_{10}-C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16}-C_{34}	mg/kg	<100	160	<100	<100	<100
TRH >C_{34}-C_{40}	mg/kg	110	120	<100	<100	<100
Surrogate o-Terphenyl	%	90	91	89	88	87

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	90053-32	90053-33	90053-34	90053-35	90053-36
Your Reference	-------------	764	764	765	765	766
Depth	------------	1.4-1.5	2.9-3.0	0.9-1.0	1.9-2.0	0.9-1.0
Date Sampled		1/05/2013	1/05/2013	1/05/2013	1/05/2013	1/05/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	07/05/2013	07/05/2013	07/05/2013	07/05/2013	07/05/2013
TRHC_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRHC_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRHC_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH>C_{10}-C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH>C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C_{16}-C_{34}	mg/kg	120	<100	150	<100	<100
TRH>C_{34}-C_{40}	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	89	87	90	93	84

svTRH (C10-C40) in Soil				
Our Reference:	UNITS	90053-37	90053-38	90053-39
Your Reference	-------------	767	768	768
Depth	------------	0.9-1.0	0.4-0.5	1.4-1.5
Date Sampled		1/05/2013	1/05/2013	1/05/2013
Type of sample		Soil	Soil	Soil
Date extracted	-	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	07/05/2013	07/05/2013	07/05/2013
TRHC_{10} - C_{14}	mg/kg	<50	<50	<50
TRHC_{15} - C_{28}	mg/kg	<100	<100	<100
TRHC_{29} - C_{36}	mg/kg	<100	<100	<100
TRH>C_{10}-C_{16}	mg/kg	<50	<50	<50
TRH>C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50
TRH>C_{16}-C_{34}	mg/kg	<100	<100	<100
TRH>C_{34}-C_{40}	mg/kg	<100	<100	<100
Surrogate o-Terphenyl	%	86	87	87

PAHs in Soil						
Our Reference:	UNITS	90053-1	90053-2	90053-3	90053-4	90053-6
Your Reference	-------------	743	744	746	746	747
Depth	------------	0.9-1.0	0.9-1.0	0.9-1.0	1.4-1.5	0.4-0.5
Date Sampled		2/05/2013	2/05/2013	29/04/2013	29/04/2013	29/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	07/05/2013	07/05/2013	07/05/2013	07/05/2013	07/05/2013
Naphthalene	mg/kg	<0.1	0.5	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	0.2	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	0.4	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	0.6	<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	0.2	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	0.2	<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	0.08	<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
Benzo(a)pyrene TEQ	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	126	92	84	123	137

PAHs in Soil						
Our Reference:	UNITS	90053-7	90053-8	90053-9	90053-10	90053-11
Your Reference	-------------	747	748	749	749	750
Depth	------------	0.9-1.0	0.4-0.5	0.4-0.5	1.0-1.1	1.0-1.2
Date Sampled		29/04/2013	2/05/2013	2/05/2013	2/05/2013	29/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	07/05/2013	07/05/2013	07/05/2013	07/05/2013	07/05/2013
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	0.7	0.1	<0.1	0.1
Anthracene	mg/kg	<0.1	0.3	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	2.0	0.3	0.2	<0.1
Pyrene	mg/kg	<0.1	2.1	0.4	0.2	<0.1
Benzo(a)anthracene	mg/kg	<0.1	0.8	0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	0.6	0.1	0.1	<0.1
Benzo(b+k)fluoranthene	mg/kg	<0.2	1.8	0.6	0.5	<0.2
Benzo(a)pyrene	mg/kg	<0.05	0.65	0.19	0.15	0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	0.3	<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	0.3	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ	mg/kg	<0.5	1	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	139	139	120	127	114

PAHs in Soil						
Our Reference:	UNITS	90053-12	90053-13	90053-14	90053-15	90053-16
Your Reference	-------------	750	751	752	753	754
Depth	------------	2.9-3.0	0.9-1.0	0.6-0.7	0.4-0.5	0.4-0.5
Date Sampled		29/04/2013	29/04/2013	29/04/2013	30/04/2013	29/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	07/05/2013	07/05/2013	07/05/2013	07/05/2013	07/05/2013
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	0.6
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.8
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.3
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.3
Benzo(b+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	0.9
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	0.30
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
Benzo(a)pyrene TEQ	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	122	109	129	120	137

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ------------- ------------	90053-17 755 0.9-1.0 30/04/2013 Soil	90053-18 756 0.4-0.5 30/04/2013 Soil	90053-19 756 0.9-1.0 30/04/2013 Soil	90053-20 757 0.5-0.7 30/04/2013 Soil	90053-21 758 0.7-0.8 30/04/2013 Soil
Date extracted	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	07/05/2013	07/05/2013	07/05/2013	07/05/2013	07/05/2013
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	0.3	<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	1	0.6	<0.1	<0.1
Anthracene	mg/kg	<0.1	0.4	0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	6.1	1.2	<0.1	<0.1
Pyrene	mg/kg	<0.1	5.8	1.2	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	2.6	0.5	<0.1	<0.1
Chrysene	mg/kg	<0.1	4.2	0.9	<0.1	<0.1
Benzo(b+k)fluoranthene	mg/kg	<0.2	10	1.8	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	6.3	1.3	0.06	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	5.7	0.9	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	1.2	0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	6.8	1.4	<0.1	<0.1
Benzo(a)pyrene TEQ	mg/kg	<0.5	10	2	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	127	80	66	86	99

PAHs in Soil						
Our Reference:	UNITS	90053-22	90053-23	90053-24	90053-25	90053-26
Your Reference	-------------	758	759	759	760	760
Depth	------------	2.4-2.5	1.4-1.5	2.9-3.0	0.9-1.0	1.4-1.5
Date Sampled		30/04/2013	1/05/2013	1/05/2013	30/04/2013	30/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	07/05/2013	07/05/2013	07/05/2013	07/05/2013	07/05/2013
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	0.3	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	0.7	<0.1	0.1	0.1
Pyrene	mg/kg	<0.1	0.8	<0.1	0.1	0.1
Benzo(a)anthracene	mg/kg	<0.1	0.5	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	0.5	<0.1	<0.1	0.1
Benzo(b+k)fluoranthene	mg/kg	<0.2	0.9	<0.2	<0.2	0.2
Benzo(a)pyrene	mg/kg	<0.05	0.64	<0.05	0.06	0.15
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	0.3	<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	0.4	<0.1	<0.1	0.2
Benzo(a)pyrene TEQ	mg/kg	<0.5	1	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	71	101	90	103	66

PAHs in Soil						
Our Reference:	UNITS	90053-27	90053-28	90053-29	90053-30	90053-31
Your Reference	-------------	761	761	762	762	763
Depth	------------	0.9-1.0	1.9-2.0	0.4-0.5	1.4-1.5	1.4-1.5
Date Sampled		1/05/2013	1/05/2013	30/04/2013	30/04/2013	30/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	07/05/2013	07/05/2013	07/05/2013	07/05/2013	07/05/2013
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	0.2	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	0.5	<0.1	0.3	0.1
Pyrene	mg/kg	<0.1	0.5	<0.1	0.4	0.1
Benzo(a)anthracene	mg/kg	<0.1	0.4	<0.1	0.3	<0.1
Chrysene	mg/kg	<0.1	0.3	<0.1	0.3	<0.1
Benzo(b+k)fluoranthene	mg/kg	<0.2	0.5	<0.2	0.5	0.2
Benzo(a)pyrene	mg/kg	<0.05	0.36	<0.05	0.39	0.17
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	0.1	<0.1	0.2	<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	<0.1	0.3	0.1
Benzo(a)pyrene TEQ	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	114	107	92	101	104

PAHs in Soil						
Our Reference:	UNITS	90053-32	90053-33	90053-34	90053-35	90053-36
Your Reference	-------------	764	764	765	765	766
Depth	------------	1.4-1.5	2.9-3.0	0.9-1.0	1.9-2.0	0.9-1.0
Date Sampled		1/05/2013	1/05/2013	1/05/2013	1/05/2013	1/05/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	07/05/2013	07/05/2013	07/05/2013	07/05/2013	07/05/2013
Naphthalene	mg/kg	<0.1	<0.1	<0.1	0.1	<0.1
Acenaphthylene	mg/kg	0.2	<0.1	0.3	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	0.3	<0.1	<0.1
Phenanthrene	mg/kg	2.5	<0.1	2.5	0.3	0.2
Anthracene	mg/kg	0.5	<0.1	0.5	<0.1	<0.1
Fluoranthene	mg/kg	2.8	0.1	4.0	0.4	0.6
Pyrene	mg/kg	2.7	0.1	3.8	0.3	0.6
Benzo(a)anthracene	mg/kg	1	<0.1	1.7	0.1	0.2
Chrysene	mg/kg	1.3	<0.1	1.8	0.2	0.3
Benzo(b+k)fluoranthene	mg/kg	1.9	<0.2	2.8	0.2	0.7
Benzo(a)pyrene	mg/kg	1.7	0.08	2.0	0.11	0.44
Indeno(1,2,3-c,d)pyrene	mg/kg	0.7	<0.1	0.9	<0.1	0.3
Dibenzo(a,h)anthracene	mg/kg	0.1	<0.1	0.2	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	0.7	<0.1	0.9	<0.1	0.3
Benzo(a)pyrene TEQ	mg/kg	2	<0.5	3.0	<0.5	1
Surrogate p-Terphenyl-d14	%	85	91	93	91	90

PAHs in Soil						
Our Reference:	UNITS	90053-37	90053-38	90053-39	90053-41	90053-42
Your Reference	-------------	767	768	768	BD2-020513	BD2-290413
Depth	------------	0.9-1.0	0.4-0.5	1.4-1.5	-	-
Date Sampled		1/05/2013	1/05/2013	1/05/2013	2/05/2013	29/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	07/05/2013	07/05/2013	07/05/2013	07/05/2013	07/05/2013
Naphthalene	mg/kg	<0.1	<0.1	<0.1	0.4	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	0.2	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	0.4	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	0.6	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.2	<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	0.09	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
Benzo(a)pyrene TEQ	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	89	89	91	91	93

PAHs in Soil		
Our Reference:	UNITS	90053-43
Your Reference	-------------	BD1-290413
Depth	------------	-
Date Sampled		29/04/2013
Type of sample		Soil
Date extracted	-	06/05/2013
Date analysed	-	07/05/2013
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
Benzo(a)pyrene TEQ	mg/kg	<0.5
Surrogate p-Terphenyl-d14	%	92

Acid Extractable metals in soil						
Our Reference:	UNITS	90053-1	90053-2	90053-3	90053-4	90053-6
Your Reference	-------------	743	744	746	746	747
Depth	------------	0.9-1.0	0.9-1.0	0.9-1.0	1.4-1.5	0.4-0.5
Date Sampled		2/05/2013	2/05/2013	29/04/2013	29/04/2013	29/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	10	15	23	13	50
Copper	mg/kg	3	6	21	12	<1
Lead	mg/kg	8	6	11	11	5
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	3	4	20	10	4
Zinc	mg/kg	4	7	47	19	6

Acid Extractable metals in soil						
Our Reference:	UNITS	90053-7	90053-8	90053-9	90053-10	90053-11
Your Reference	-------------	747	748	749	749	750
Depth	------------	0.9-1.0	0.4-0.5	0.4-0.5	1.0-1.1	1.0-1.2
Date Sampled		29/04/2013	2/05/2013	2/05/2013	2/05/2013	29/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Arsenic	mg/kg	5	<4	5	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	23	12	9	57	17
Copper	mg/kg	7	15	8	13	18
Lead	mg/kg	15	18	12	8	27
Mercury	mg/kg	<0.1	<0.1	<0.1	0.2	<0.1
Nickel	mg/kg	1	9	2	33	12
Zinc	mg/kg	6	23	25	24	42

Acid Extractable metals in soil						
Our Reference:	UNITS	90053-12	90053-13	90053-14	90053-15	90053-16
Your Reference	-------------	750	751	752	753	754
Depth	------------	2.9-3.0	0.9-1.0	0.6-0.7	0.4-0.5	0.4-0.5
Date Sampled		29/04/2013	29/04/2013	29/04/2013	30/04/2013	29/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	11	21	17	14	37
Copper	mg/kg	<1	<1	3	13	2
Lead	mg/kg	7	10	4	14	8
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	3	3	4	9	4
Zinc	mg/kg	<1	3	5	40	7

Acid Extractable metals in soil						
Our Reference:	UNITS	90053-17	90053-18	90053-19	90053-20	90053-21
Your Reference	-------------	755	756	756	757	758
Depth	------------	0.9-1.0	0.4-0.5	0.9-1.0	0.5-0.7	0.7-0.8
Date Sampled		30/04/2013	30/04/2013	30/04/2013	30/04/2013	30/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Arsenic	mg/kg	6	5	<4	<4	<4
Cadmium	mg/kg	<0.4	0.8	5.5	<0.4	<0.4
Chromium	mg/kg	6	23	10	20	9
Copper	mg/kg	6	120	58	15	31
Lead	mg/kg	3	220	240	13	13
Mercury	mg/kg	<0.1	0.3	0.3	<0.1	<0.1
Nickel	mg/kg	2	12	6	6	14
Zinc	mg/kg	7	260	250	17	68

Acid Extractable metals in soil						
Our Reference:	UNITS	90053-22	90053-23	90053-24	90053-25	90053-26
Your Reference	-------------	758	759	759	760	760
Depth	------------	2.4-2.5	1.4-1.5	2.9-3.0	0.9-1.0	1.4-1.5
Date Sampled		30/04/2013	1/05/2013	1/05/2013	30/04/2013	30/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Arsenic	mg/kg	8	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	0.9
Chromium	mg/kg	5	42	9	7	14
Copper	mg/kg	4	36	6	7	36
Lead	mg/kg	4	280	15	14	53
Mercury	mg/kg	<0.1	0.2	0.1	<0.1	0.2
Nickel	mg/kg	2	4	2	5	9
Zinc	mg/kg	10	310	18	23	140

Acid Extractable metals in soil						
Our Reference:	UNITS	90053-27	90053-28	90053-29	90053-30	90053-31
Your Reference	-------------	761	761	762	762	763
Depth	------------	0.9-1.0	1.9-2.0	0.4-0.5	1.4-1.5	1.4-1.5
Date Sampled		1/05/2013	1/05/2013	30/04/2013	30/04/2013	30/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	83	11	66	16	14
Copper	mg/kg	41	21	4	8	21
Lead	mg/kg	6	26	11	25	50
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	82	3	7	11	8
Zinc	mg/kg	45	22	9	29	74

Acid Extractable metals in soil						
Our Reference:	UNITS	90053-32	90053-33	90053-34	90053-35	90053-36
Your Reference	-------------	764	764	765	765	766
Depth	------------	1.4-1.5	2.9-3.0	0.9-1.0	1.9-2.0	0.9-1.0
Date Sampled		1/05/2013	1/05/2013	1/05/2013	1/05/2013	1/05/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Arsenic	mg/kg	5	<4	7	5	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	8	10	21	12	8
Copper	mg/kg	14	10	38	14	11
Lead	mg/kg	130	13	140	16	34
Mercury	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	2	3	7	4	2
Zinc	mg/kg	120	47	69	110	57

Acid Extractable metals in soil						
Our Reference:	UNITS	90053-37	90053-38	90053-39	90053-41	90053-42
Your Reference	-------------	767	768	768	BD2-020513	BD2-290413
Depth	------------	0.9-1.0	0.4-0.5	1.4-1.5	-	-
Date Sampled		1/05/2013	1/05/2013	1/05/2013	2/05/2013	29/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	13	8	9	7	66
Copper	mg/kg	10	13	2	6	3
Lead	mg/kg	18	9	12	5	8
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	9	13	<1	2	11
Zinc	mg/kg	27	36	10	7	9

Acid Extractable metals in soil		
Our Reference:	UNITS	90053-43
Your Reference	-------------	BD1-290413
Depth	------------	-
Date Sampled		29/04/2013
Type of sample		Soil
Date digested	-	06/05/2013
Date analysed	-	06/05/2013
Arsenic	mg/kg	<4
Cadmium	mg/kg	<0.4
Chromium	mg/kg	17
Copper	mg/kg	<1
Lead	mg/kg	9
Mercury	mg/kg	<0.1
Nickel	mg/kg	3
Zinc	mg/kg	4

Moisture						
Our Reference:	UNITS	90053-1	90053-2	90053-3	90053-4	90053-5
Your Reference	-------------	743	744	746	746	746
Depth	------------	0.9-1.0	0.9-1.0	0.9-1.0	1.4-1.5	1.7-2.0
Date Sampled		2/05/2013	2/05/2013	29/04/2013	29/04/2013	29/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	06/05/13	06/05/13	06/05/13	06/05/13	06/05/13
Date analysed	-	07/05/13	07/05/13	07/05/13	07/05/13	07/05/13
Moisture	%	9.5	11	7.7	13	30

Moisture						
Our Reference:	UNITS	90053-6	90053-7	90053-8	90053-9	90053-10
Your Reference	-------------	747	747	748	749	749
Depth	------------	0.4-0.5	0.9-1.0	0.4-0.5	0.4-0.5	1.0-1.1
Date Sampled		29/04/2013	29/04/2013	2/05/2013	2/05/2013	2/05/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	06/05/13	06/05/13	06/05/13	06/05/13	06/05/13
Date analysed	-	07/05/13	07/05/13	07/05/13	07/05/13	07/05/13
Moisture	%	21	20	10	11	13

Moisture						
Our Reference:	UNITS	90053-11	90053-12	90053-13	90053-14	90053-15
Your Reference	-------------	750	750	751	752	753
Depth	------------	1.0-1.2	2.9-3.0	0.9-1.0	0.6-0.7	0.4-0.5
Date Sampled		29/04/2013	29/04/2013	29/04/2013	29/04/2013	30/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	06/05/13	06/05/13	06/05/13	06/05/13	06/05/13
Date analysed	-	07/05/13	07/05/13	07/05/13	07/05/13	07/05/13
Moisture	%	6.9	15	18	11	11

Moisture						
Our Reference:	UNITS	90053-16	90053-17	90053-18	90053-19	90053-20
Your Reference	-------------	754	755	756	756	757
Depth	------------	0.4-0.5	0.9-1.0	0.4-0.5	0.9-1.0	0.5-0.7
Date Sampled		29/04/2013	30/04/2013	30/04/2013	30/04/2013	30/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	06/05/13	06/05/13	06/05/13	06/05/13	06/05/13
Date analysed	-	07/05/13	07/05/13	07/05/13	07/05/13	07/05/13
Moisture	%	13	20	16	17	14

Moisture						
Our Reference:	UNITS	90053-21	90053-22	90053-23	90053-24	90053-25
Your Reference	-------------	758	758	759	759	760
Depth	------------	0.7-0.8	2.4-2.5	1.4-1.5	2.9-3.0	0.9-1.0
Date Sampled		30/04/2013	30/04/2013	1/05/2013	1/05/2013	30/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	06/05/13	06/05/13	06/05/13	06/05/13	06/05/13
Date analysed	-	07/05/13	07/05/13	07/05/13	07/05/13	07/05/13
Moisture	%	14	12	18	12	12

Moisture						
Our Reference:	UNITS	90053-26	90053-27	90053-28	90053-29	90053-30
Your Reference	-------------	760	761	761	762	762
Depth	------------	1.4-1.5	0.9-1.0	1.9-2.0	0.4-0.5	1.4-1.5
Date Sampled		30/04/2013	1/05/2013	1/05/2013	30/04/2013	30/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	06/05/13	06/05/13	06/05/13	06/05/13	06/05/13
Date analysed	-	07/05/13	07/05/13	07/05/13	07/05/13	07/05/13
Moisture	%	14	6.9	14	16	13

Moisture						
Our Reference:	UNITS	90053-31	90053-32	90053-33	90053-34	90053-35
Your Reference	-------------	763	764	764	765	765
Depth	------------	1.4-1.5	1.4-1.5	2.9-3.0	0.9-1.0	1.9-2.0
Date Sampled		30/04/2013	1/05/2013	1/05/2013	1/05/2013	1/05/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	06/05/13	06/05/13	06/05/13	06/05/13	06/05/13
Date analysed	-	07/05/13	07/05/13	07/05/13	07/05/13	07/05/13
Moisture	%	11	13	13	11	15

Moisture						
Our Reference:	UNITS	90053-36	90053-37	90053-38	90053-39	90053-41
Your Reference	-------------	766	767	768	768	BD2-020513
Depth	------------	0.9-1.0	0.9-1.0	0.4-0.5	1.4-1.5	-
Date Sampled		1/05/2013	1/05/2013	1/05/2013	1/05/2013	2/05/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	06/05/13	06/05/13	06/05/13	06/05/13	06/05/13
Date analysed	-	07/05/13	07/05/13	07/05/13	07/05/13	07/05/13
Moisture	%	15	7.4	9.4	18	11

Moisture			
Our Reference:	UNITS	90053-42	90053-43
Your Reference	-------------	BD2-290413	BD1-290413
Depth	------------	-	-
Date Sampled		29/04/2013	29/04/2013
Type of sample		Soil	Soil
Date prepared	-	06/05/13	06/05/13
Date analysed	-	07/05/13	07/05/13
Moisture	%	21	20

Organochlorine Pesticides in soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ------------- ------------	90053-1 743 0.9-1.0 2/05/2013 Soil	90053-2 744 0.9-1.0 2/05/2013 Soil	90053-3 746 0.9-1.0 29/04/2013 Soil	90053-6 747 0.4-0.5 29/04/2013 Soil	90053-8 748 0.4-0.5 2/05/2013 Soil
Date extracted	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	07/05/2013	07/05/2013	07/05/2013	07/05/2013	07/05/2013
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 TCMX	%	105	97	104	105	106

Organochlorine Pesticides in soil						
Our Reference:	UNITS	90053-9	90053-11	90053-13	90053-14	90053-15
Your Reference	-------------	749	750	751	752	753
Depth	------------	0.4-0.5	1.0-1.2	0.9-1.0	0.6-0.7	0.4-0.5
Date Sampled		2/05/2013	29/04/2013	29/04/2013	29/04/2013	30/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	07/05/2013	07/05/2013	07/05/2013	07/05/2013	07/05/2013
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 TCMX	%	102	107	117	105	107

Organochlorine Pesticides in soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ------------- ------------	90053-16 754 0.4-0.5 29/04/2013 Soil	90053-17 755 0.9-1.0 30/04/2013 Soil	90053-18 756 0.4-0.5 30/04/2013 Soil	90053-20 757 0.5-0.7 30/04/2013 Soil	90053-21 758 0.7-0.8 30/04/2013 Soil
Date extracted	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	07/05/2013	07/05/2013	07/05/2013	07/05/2013	07/05/2013
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 TCMX	%	106	106	108	111	108

Organochlorine Pesticides in soil						
Our Reference:	UNITS	90053-23	90053-26	90053-27	90053-29	90053-31
Your Reference	-------------	759	760	761	762	763
Depth	------------	1.4-1.5	1.4-1.5	0.9-1.0	0.4-0.5	1.4-1.5
Date Sampled		1/05/2013	30/04/2013	1/05/2013	30/04/2013	30/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	07/05/2013	07/05/2013	07/05/2013	07/05/2013	07/05/2013
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	1.2	<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 TCMX	%	107	107	112	110	108

Organochlorine Pesticides in soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ------------- ------------	90053-33 764 2.9-3.0 1/05/2013 Soil	90053-34 765 0.9-1.0 1/05/2013 Soil	90053-36 766 0.9-1.0 1/05/2013 Soil	90053-37 767 0.9-1.0 1/05/2013 Soil	90053-39 768 1.4-1.5 1/05/2013 Soil
Date extracted	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	07/05/2013	07/05/2013	07/05/2013	07/05/2013	07/05/2013
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 TCMX	%	111	96	97	89	89

PCBs in Soil						
Our Reference:	UNITS	90053-1	90053-2	90053-3	90053-6	90053-8
Your Reference	------------	743	744	746	747	748
Depth	------------	0.9-1.0	0.9-1.0	0.9-1.0	0.4-0.5	0.4-0.5
Date Sampled		2/05/2013	2/05/2013	29/04/2013	29/04/2013	2/05/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	07/05/2013	07/05/2013	07/05/2013	07/05/2013	07/05/2013
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1221	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	%	105	97	104	105	106

PCBs in Soil						
Our Reference:	UNITS	90053-9	90053-11	90053-13	90053-14	90053-15
Your Reference	------------	749	750	751	752	753
Depth	------------	0.4-0.5	1.0-1.2	0.9-1.0	0.6-0.7	0.4-0.5
Date Sampled		2/05/2013	29/04/2013	29/04/2013	29/04/2013	30/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	07/05/2013	07/05/2013	07/05/2013	07/05/2013	07/05/2013
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1221	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	%	102	107	115	105	107

PCBs in Soil						
Our Reference:	UNITS	90053-16	90053-17	90053-18	90053-20	90053-21
Your Reference	------------	754	755	756	757	758
Depth	------------	0.4-0.5	0.9-1.0	0.4-0.5	0.5-0.7	0.7-0.8
Date Sampled		29/04/2013	30/04/2013	30/04/2013	30/04/2013	30/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	07/05/2013	07/05/2013	07/05/2013	07/05/2013	07/05/2013
Arochlor 1016	mg/kg	<0.1	<0.1	<0.5	<0.1	<0.1
Arochlor 1221	mg/kg	<0.1	<0.1	<0.5	<0.1	<0.1
Arochlor 1232	mg/kg	<0.1	<0.1	<0.5	<0.1	<0.1
Arochlor 1242	mg/kg	<0.1	<0.1	<0.5	<0.1	<0.1
Arochlor 1248	mg/kg	<0.1	<0.1	<0.5	<0.1	<0.1
Arochlor 1254	mg/kg	<0.1	<0.1	<0.5	<0.1	<0.1
Arochlor 1260	mg/kg	<0.1	<0.1	<0.5	<0.1	<0.1
Surrogate TCLMX	%	106	106	108	111	108

PCBs in Soil						
Our Reference:	UNITS	90053-23	90053-26	90053-27	90053-29	90053-31
Your Reference	-------------	759	760	761	762	763
Depth	------------	1.4-1.5	1.4-1.5	0.9-1.0	0.4-0.5	1.4-1.5
Date Sampled		1/05/2013	30/04/2013	1/05/2013	30/04/2013	30/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	07/05/2013	07/05/2013	07/05/2013	07/05/2013	07/05/2013
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<2
Arochlor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<2
Arochlor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<2
Arochlor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<2
Arochlor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<2
Arochlor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	21
Arochlor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<2
Surrogate TCLMX	%	107	107	112	110	108

PCBs in Soil						
Our Reference:	UNITS	90053-33	90053-34	90053-36	90053-37	90053-39
Your Reference	-------------	764	765	766	767	768
Depth	------------	2.9-3.0	0.9-1.0	0.9-1.0	0.9-1.0	1.4-1.5
Date Sampled		1/05/2013	1/05/2013	1/05/2013	1/05/2013	1/05/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	07/05/2013	07/05/2013	07/05/2013	07/05/2013	07/05/2013
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1221	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	%	111	96	97	89	89

Total Phenolics in Soil						
Our Reference:	UNITS	90053-1	90053-2	90053-3	90053-6	90053-8
Your Reference	-------------	743	744	746	747	748
Depth	------------	0.9-1.0	0.9-1.0	0.9-1.0	0.4-0.5	0.4-0.5
Date Sampled		2/05/2013	2/05/2013	29/04/2013	29/04/2013	2/05/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	07/05/2013	07/05/2013	07/05/2013	07/05/2013	07/05/2013
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Total Phenolics in Soil						
Our Reference:	UNITS	90053-9	90053-11	90053-13	90053-14	90053-15
Your Reference	-------------	749	750	751	752	753
Depth	------------	0.4-0.5	1.0-1.2	0.9-1.0	0.6-0.7	0.4-0.5
Date Sampled		2/05/2013	29/04/2013	29/04/2013	29/04/2013	30/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	07/05/2013	07/05/2013	07/05/2013	07/05/2013	07/05/2013
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Total Phenolics in Soil						
Our Reference:	UNITS	90053-16	90053-17	90053-18	90053-20	90053-21
Your Reference	-------------	754	755	756	757	758
Depth	------------	0.4-0.5	0.9-1.0	0.4-0.5	0.5-0.7	0.7-0.8
Date Sampled		29/04/2013	30/04/2013	30/04/2013	30/04/2013	30/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	07/05/2013	07/05/2013	07/05/2013	07/05/2013	07/05/2013
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Total Phenolics in Soil						
Our Reference:	UNITS	90053-23	90053-26	90053-27	90053-29	90053-31
Your Reference	-------------	759	760	761	762	763
Depth	------------	1.4-1.5	1.4-1.5	0.9-1.0	0.4-0.5	1.4-1.5
Date Sampled		1/05/2013	30/04/2013	1/05/2013	30/04/2013	30/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	07/05/2013	07/05/2013	07/05/2013	07/05/2013	07/05/2013
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Total Phenolics in Soil						
Our Reference:	UNITS	90053-33	90053-34	90053-36	90053-37	90053-39
Your Reference	-------------	764	765	766	767	768
Depth	------------	2.9-3.0	0.9-1.0	0.9-1.0	0.9-1.0	1.4-1.5
Date Sampled		1/05/2013	1/05/2013	1/05/2013	1/05/2013	1/05/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/05/2013	06/05/2013	06/05/2013	06/05/2013	06/05/2013
Date analysed	-	07/05/2013	07/05/2013	07/05/2013	07/05/2013	07/05/2013
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Asbestos ID - soils						
Our Reference:	UNITS	90053-1	90053-2	90053-3	90053-6	90053-8
Your Reference	-------------	743	744	746	747	748
Depth	------------	0.9-1.0	0.9-1.0	0.9-1.0	0.4-0.5	0.4-0.5
Date Sampled		2/05/2013	2/05/2013	29/04/2013	29/04/2013	2/05/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	8/05/2013	8/05/2013	8/05/2013	8/05/2013	8/05/2013
Sample mass tested	g	Approx 45g	Approx 45g	Approx 45g	Approx 45g	Approx 45g
Sample Description	-	Purple-brown fine-grained clayey soil	Brown coarse-grained soil	Grey coarse-grained soil & rocks	Peach fine-grained clayey soil	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg
Trace Analysis	-	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected

Asbestos ID - soils						
Our Reference:	UNITS	90053-9	90053-11	90053-13	90053-14	90053-15
Your Reference	-------------	749	750	751	752	753
Depth	------------	0.4-0.5	1.0-1.2	0.9-1.0	0.6-0.7	0.4-0.5
Date Sampled		2/05/2013	29/04/2013	29/04/2013	29/04/2013	30/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	8/05/2013	8/05/2013	8/05/2013	8/05/2013	8/05/2013
Sample mass tested	g	Approx 45g	Approx 45g	Approx 45g	Approx 45g	Approx 45g
Sample Description	-	Brown coarse-grained soil & rocks	Grey coarse-grained soil	Grey fine-grained clayey soil	Mustard fine-grained soil	Grey coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg
Trace Analysis	-	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected

Asbestos ID - soils						
Our Reference:	UNITS	90053-16	90053-17	90053-18	90053-20	90053-21
Your Reference	-------------	754	755	756	757	758
Depth	------------	0.4-0.5	0.9-1.0	0.4-0.5	0.5-0.7	0.7-0.8
Date Sampled		29/04/2013	30/04/2013	30/04/2013	30/04/2013	30/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	8/05/2013	8/05/2013	8/05/2013	8/05/2013	8/05/2013
Sample mass tested	g	Approx 45g	Approx 45g	Approx 45g	Approx 45g	Approx 45g
Sample Description	-	Copper fine-grained clayey soil & rocks	Grey fine-grained soil	Brown fine-grained soil & rocks	Grey coarse-grained clayey soil	Grey fine-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg
Trace Analysis	-	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected

Asbestos ID - soils						
Our Reference:	UNITS	90053-23	90053-26	90053-27	90053-29	90053-31
Your Reference	-------------	759	760	761	762	763
Depth	------------	1.4-1.5	1.4-1.5	0.9-1.0	0.4-0.5	1.4-1.5
Date Sampled		1/05/2013	30/04/2013	1/05/2013	30/04/2013	30/04/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	8/05/2013	8/05/2013	8/05/2013	8/05/2013	8/05/2013
Sample mass tested	g	Approx 45g	Approx 45g	45.83g	Approx 45g	Approx 45g
Sample Description	-	Brown fine-grained clayey soil	Grey fine-grained soil & rocks	Grey coarse-grained soil & rocks	Orange fine-grained clayey soil	Dark grey coarse-grained soil
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	Chrysotile asbestos detected Amosite asbestos detected Crocidolite asbestos detected	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg
Trace Analysis	-	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected

Asbestos ID - soils						
Our Reference:	UNITS	90053-33	90053-34	90053-36	90053-37	90053-39
Your Reference	-------------	764	765	766	767	768
Depth	------------	2.9-3.0	0.9-1.0	0.9-1.0	0.9-1.0	1.4-1.5
Date Sampled		1/05/2013	1/05/2013	1/05/2013	1/05/2013	1/05/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	8/05/2013	8/05/2013	8/05/2013	8/05/2013	8/05/2013
Sample mass tested	g	Approx 45g	Approx 45g	Approx 45g	Approx 45g	Approx 45g
Sample Description	-	Grey coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Dark grey fine-grained soil	Beige coarse-grained soil	Brown fine-grained soil
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg
Trace Analysis	-	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected

Asbestos ID - materials		
Our Reference:	UNITS	90053-40
Your Reference	-------------	A1
Depth	------------	-
Date Sampled		30/04/2013
Type of sample		Material
Date analysed	-	9/05/2013
Mass / Dimension of Sample	-	32x20x8mm
Sample Description	-	Brown compressed fibre cement material
Asbestos ID in materials	-	Chrysotile asbestos detected Amosite asbestos detected Crocidolite asbestos detected

Method ID	Methodology Summary
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 draft Guideline on Investigation Levels for Soil and Groundwater.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 draft Guideline on Investigation Levels for Soil and Groundwater.
Org-012 subset	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM draft B1 Guideline on Investigation Levels for Soil and Groundwater.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Inorg-008	Moisture content determined by heating at 105+/-5 deg C for a minimum of 4 hours.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Inorg-030	Total Phenolics - determined colorimetrically following disitillation, based upon APHA 22nd ED 5530 D.
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.

QUALITY CONTROL VOCs in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			06/05/2013	[NT]	[NT]	LCS-5	06/05/2013
Date analysed	-			06/05/2013	[NT]	[NT]	LCS-5	06/05/2013
Dichlorodifluoromethane	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
Chloromethane	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
Vinyl Chloride	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
Bromomethane	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
Chloroethane	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
Trichlorofluoromethane	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
1,1-Dichloroethene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
trans-1,2-dichloroethene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
1,1-dichloroethane	mg/kg	1	Org-014	<1	[NT]	[NT]	LCS-5	68%
cis-1,2-dichloroethene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
bromochloromethane	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
chloroform	mg/kg	1	Org-014	<1	[NT]	[NT]	LCS-5	85%
2,2-dichloropropane	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
1,2-dichloroethane	mg/kg	1	Org-014	<1	[NT]	[NT]	LCS-5	77%
1,1,1-trichloroethane	mg/kg	1	Org-014	<1	[NT]	[NT]	LCS-5	74%
1,1-dichloropropene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
Cyclohexane	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
carbon tetrachloride	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
Benzene	mg/kg	0.2	Org-014	<0.2	[NT]	[NT]	[NR]	[NR]
dibromomethane	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
1,2-dichloropropane	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
trichloroethene	mg/kg	1	Org-014	<1	[NT]	[NT]	LCS-5	74%
bromodichloromethane	mg/kg	1	Org-014	<1	[NT]	[NT]	LCS-5	95%
trans-1,3-dichloropropene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
cis-1,3-dichloropropene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
1,1,2-trichloroethane	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
Toluene	mg/kg	0.5	Org-014	<0.5	[NT]	[NT]	[NR]	[NR]
1,3-dichloropropane	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
dibromochloromethane	mg/kg	1	Org-014	<1	[NT]	[NT]	LCS-5	100%
1,2-dibromoethane	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
tetrachloroethene	mg/kg	1	Org-014	<1	[NT]	[NT]	LCS-5	82%
1,1,1,2-tetrachloroethane	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
chlorobenzene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
Ethylbenzene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
bromoform	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
m+p-xylene	mg/kg	2	Org-014	<2	[NT]	[NT]	[NR]	[NR]
styrene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
1,1,2,2-tetrachloroethane	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
o-Xylene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
1,2,3-trichloropropane	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]

QUALITY CONTROL VOCs in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
isopropylbenzene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
bromobenzene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
n-propyl benzene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
2-chlorotoluene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
4-chlorotoluene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
1,3,5-trimethyl benzene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
tert-butyl benzene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
1,2,4-trimethyl benzene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
1,3-dichlorobenzene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
sec-butyl benzene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
1,4-dichlorobenzene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
4-isopropyl toluene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
1,2-dichlorobenzene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
n-butyl benzene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
1,2-dibromo-3-chloropropane	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
1,2,4-trichlorobenzene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
hexachlorobutadiene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
1,2,3-trichlorobenzene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
Surrogate Dibromofluorometha	%		Org-014	94	[NT]	[NT]	LCS-5	94%
Surrogate aaa-Trifluorotoluene	%		Org-014	82	[NT]	[NT]	LCS-5	84%
Surrogate Toluene-d_8	%		Org-014	90	[NT]	[NT]	LCS-5	91%
Surrogate 4-Bromofluorobenzene	%		Org-014	98	[NT]	[NT]	LCS-5	97%

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			06/05/2013	90053-1	06/05/2013 || 06/05/2013	LCS-5	06/05/2013
Date analysed	-			07/05/2013	90053-1	07/05/2013 || 07/05/2013	LCS-5	07/05/2013
TRH C_6 - C_9	mg/kg	25	Org-016	<25	90053-1	<25 || <25	LCS-5	99%
TRH C_6 - C_{10}	mg/kg	25	Org-016	<25	90053-1	<25 || <25	LCS-5	99%
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	25	Org-016	[NT]	90053-1	<25 || <25	[NR]	[NR]
Benzene	mg/kg	0.2	Org-016	[NT]	90053-1	<0.2 || <0.2	LCS-5	95%
Toluene	mg/kg	0.5	Org-016	<0.5	90053-1	<0.5 || <0.5	LCS-5	89%
Ethylbenzene	mg/kg	1	Org-016	<1	90053-1	<1 || <1	LCS-5	101%
m+p-xylene	mg/kg	2	Org-016	<2	90053-1	<2 || <2	LCS-5	104%
o-Xylene	mg/kg	1	Org-016	<1	90053-1	<1 || <1	LCS-5	107%
naphthalene	mg/kg	1	Org-014	<1	90053-1	<1 || <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%		Org-016	82	90053-1	88 || 90 || RPD: 2	LCS-5	91%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			06/05/2013	90053-1	06/05/2013 || 06/05/2013	LCS-5	06/05/2013
Date analysed	-			07/05/2013	90053-1	07/05/2013 || 07/05/2013	LCS-5	07/05/2013
TRH C_{10} - C_{14}	mg/kg	50	Org-003	<50	90053-1	<50 || <50	LCS-5	139%
TRH C_{15} - C_{28}	mg/kg	100	Org-003	<100	90053-1	<100 || <100	LCS-5	102%
TRH C_{29} - C_{36}	mg/kg	100	Org-003	<100	90053-1	<100 || <100	LCS-5	95%
TRH >C_{10}-C_{16}	mg/kg	50	Org-003	<50	90053-1	<50 || <50	LCS-5	139%
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	50	Org-003	[NT]	90053-1	<50 || <50	[NR]	[NR]
TRH >C_{16}-C_{34}	mg/kg	100	Org-003	<100	90053-1	<100 || <100	LCS-5	102%
TRH >C_{34}-C_{40}	mg/kg	100	Org-003	<100	90053-1	<100 || <100	LCS-5	95%
Surrogate o-Terphenyl	%		Org-003	91	90053-1	90 || 86 || RPD: 5	LCS-5	117%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			06/05/2013	90053-1	06/05/2013 || 06/05/2013	LCS-6	06/05/2013
Date analysed	-			07/05/2013	90053-1	07/05/2013 || 07/05/2013	LCS-6	07/05/2013
Naphthalene	mg/kg	0.1	Org-012 subset	<0.1	90053-1	<0.1 || <0.1	LCS-6	103%
Acenaphthylene	mg/kg	0.1	Org-012 subset	<0.1	90053-1	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012 subset	<0.1	90053-1	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012 subset	<0.1	90053-1	<0.1 || <0.1	LCS-6	117%
Phenanthrene	mg/kg	0.1	Org-012 subset	<0.1	90053-1	<0.1 || <0.1	LCS-6	109%
Anthracene	mg/kg	0.1	Org-012 subset	<0.1	90053-1	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012 subset	<0.1	90053-1	<0.1 || <0.1	LCS-6	120%
Pyrene	mg/kg	0.1	Org-012 subset	<0.1	90053-1	<0.1 || <0.1	LCS-6	130%
Benzo(a)anthracene	mg/kg	0.1	Org-012 subset	<0.1	90053-1	<0.1 || <0.1	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012 subset	<0.1	90053-1	<0.1 || <0.1	LCS-6	92%
Benzo(b+k)fluoranthene	mg/kg	0.2	Org-012 subset	<0.2	90053-1	<0.2 || <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	0.05	Org-012 subset	<0.05	90053-1	<0.05 || <0.05	LCS-6	108%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012 subset	<0.1	90053-1	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012 subset	<0.1	90053-1	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012 subset	<0.1	90053-1	<0.1 || <0.1	[NR]	[NR]
Benzo(a)pyrene TEQ	mg/kg	0.5	Org-012 subset	[NT]	90053-1	<0.5 || <0.5	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012 subset	85	90053-1	126 || 118 || RPD: 7	LCS-6	122%

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	-			06/05/2013	90053-1	06/05/2013 || 06/05/2013	LCS-1	06/05/2013
Date analysed	-			06/05/2013	90053-1	06/05/2013 || 06/05/2013	LCS-1	06/05/2013
Arsenic	mg/kg	4	Metals-020 ICP-AES	<4	90053-1	<4 || <4	LCS-1	109%
Cadmium	mg/kg	0.4	Metals-020 ICP-AES	<0.4	90053-1	<0.4 || <0.4	LCS-1	110%
Chromium	mg/kg	1	Metals-020 ICP-AES	<1	90053-1	10 || 11 || RPD: 10	LCS-1	112%
Copper	mg/kg	1	Metals-020 ICP-AES	<1	90053-1	3 || 5 || RPD: 50	LCS-1	115%
Lead	mg/kg	1	Metals-020 ICP-AES	<1	90053-1	8 || 7 || RPD: 13	LCS-1	107%
Mercury	mg/kg	0.1	Metals-021 CV-AAS	<0.1	90053-1	<0.1 || <0.1	LCS-1	98%
Nickel	mg/kg	1	Metals-020 ICP-AES	<1	90053-1	3 || 3 || RPD: 0	LCS-1	112%
Zinc	mg/kg	1	Metals-020 ICP-AES	<1	90053-1	4 || 4 || RPD: 0	LCS-1	110%

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

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	-			06/05/2013	90053-1	06/05/2013 || 06/05/2013	LCS-5	06/05/2013
Date analysed	-			06/05/2013	90053-1	07/05/2013 || 07/05/2013	LCS-5	06/05/2013
HCB	mg/kg	0.1	Org-005	<0.1	90053-1	<0.1 || <0.1	[NR]	[NR]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	90053-1	<0.1 || <0.1	LCS-5	99%
gamma-BHC	mg/kg	0.1	Org-005	<0.1	90053-1	<0.1 || <0.1	[NR]	[NR]
beta-BHC	mg/kg	0.1	Org-005	<0.1	90053-1	<0.1 || <0.1	LCS-5	91%
Heptachlor	mg/kg	0.1	Org-005	<0.1	90053-1	<0.1 || <0.1	LCS-5	89%
delta-BHC	mg/kg	0.1	Org-005	<0.1	90053-1	<0.1 || <0.1	[NR]	[NR]
Aldrin	mg/kg	0.1	Org-005	<0.1	90053-1	<0.1 || <0.1	LCS-5	104%
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	90053-1	<0.1 || <0.1	LCS-5	101%
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	90053-1	<0.1 || <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	90053-1	<0.1 || <0.1	[NR]	[NR]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	90053-1	<0.1 || <0.1	[NR]	[NR]
pp-DDE	mg/kg	0.1	Org-005	<0.1	90053-1	<0.1 || <0.1	LCS-5	91%
Dieldrin	mg/kg	0.1	Org-005	<0.1	90053-1	<0.1 || <0.1	LCS-5	99%
Endrin	mg/kg	0.1	Org-005	<0.1	90053-1	<0.1 || <0.1	LCS-5	71%
pp-DDD	mg/kg	0.1	Org-005	<0.1	90053-1	<0.1 || <0.1	LCS-5	98%

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Endosulfan II	mg/kg	0.1	Org-005	<0.1	90053-1	<0.1 || <0.1	[NR]	[NR]
pp-DDT	mg/kg	0.1	Org-005	<0.1	90053-1	<0.1 || <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	90053-1	<0.1 || <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	90053-1	<0.1 || <0.1	LCS-5	100%
Methoxychlor	mg/kg	0.1	Org-005	<0.1	90053-1	<0.1 || <0.1	[NR]	[NR]
Surrogate TCMX	%		Org-005	95	90053-1	105 || 103 || RPD: 2	LCS-5	100%

QUALITY CONTROL PCBs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			06/05/2013	90053-1	06/05/2013 || 06/05/2013	LCS-5	06/05/2013
Date analysed	-			06/05/2013	90053-1	07/05/2013 || 07/05/2013	LCS-5	06/05/2013
Arochlor 1016	mg/kg	0.1	Org-006	<0.1	90053-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1221	mg/kg	0.1	Org-006	<0.1	90053-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1232	mg/kg	0.1	Org-006	<0.1	90053-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1242	mg/kg	0.1	Org-006	<0.1	90053-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1248	mg/kg	0.1	Org-006	<0.1	90053-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1254	mg/kg	0.1	Org-006	<0.1	90053-1	<0.1 || <0.1	LCS-5	100%
Arochlor 1260	mg/kg	0.1	Org-006	<0.1	90053-1	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%		Org-006	95	90053-1	105 || 103 || RPD: 2	LCS-5	90%

QUALITY CONTROL Total Phenolics in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			06/05/2013	90053-1	06/05/2013 || 06/05/2013	LCS-1	06/05/2013
Date analysed	-			07/05/2013	90053-1	07/05/2013 || 07/05/2013	LCS-1	07/05/2013
Total Phenolics (as Phenol)	mg/kg	5	Inorg-030	<5	90053-1	<5 || <5	LCS-1	73%

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

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

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	90053-10	06/05/2013 || 06/05/2013	LCS-6	06/05/2013
Date analysed	-	90053-10	07/05/2013 || 07/05/2013	LCS-6	07/05/2013
TRH C_6 - C_9	mg/kg	90053-10	<25 || <25	LCS-6	96%
TRH C_6 - C_{10}	mg/kg	90053-10	<25 || <25	LCS-6	96%
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	90053-10	<25 || <25	[NR]	[NR]
Benzene	mg/kg	90053-10	<0.2 || <0.2	LCS-6	94%

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Toluene	mg/kg	90053-10	<0.5 || <0.5	LCS-6	88%
Ethylbenzene	mg/kg	90053-10	<1 || <1	LCS-6	97%
m+p-xylene	mg/kg	90053-10	<2 || <2	LCS-6	101%
o-Xylene	mg/kg	90053-10	<1 || <1	LCS-6	103%
naphthalene	mg/kg	90053-10	<1 || <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%	90053-10	91 || 84 || RPD: 8	LCS-6	93%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	90053-10	06/05/2013 || 06/05/2013	LCS-6	06/05/2013
Date analysed	-	90053-10	07/05/2013 || 07/05/2013	LCS-6	07/05/2013
TRHC_{10} - C_{14}	mg/kg	90053-10	<50 || <50	LCS-6	129%
TRHC_{15} - C_{28}	mg/kg	90053-10	<100 || <100	LCS-6	97%
TRHC_{29} - C_{36}	mg/kg	90053-10	110 || 130 || RPD: 17	LCS-6	99%
TRH>C_{10}-C_{16}	mg/kg	90053-10	<50 || <50	LCS-6	129%
TRH>C_{10} - C_{16} less Naphthalene (F2)	mg/kg	90053-10	<50 || <50	[NR]	[NR]
TRH>C_{16}-C_{34}	mg/kg	90053-10	<100 || <100	LCS-6	97%
TRH>C_{34}-C_{40}	mg/kg	90053-10	150 || 170 || RPD: 12	LCS-6	99%
Surrogate o-Terphenyl	%	90053-10	89 || 85 || RPD: 5	LCS-6	115%

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	90053-10	06/05/2013 || 06/05/2013	LCS-7	06/05/2013
Date analysed	-	90053-10	07/05/2013 || 07/05/2013	LCS-7	07/05/2013
Naphthalene	mg/kg	90053-10	<0.1 || <0.1	LCS-7	109%
Acenaphthylene	mg/kg	90053-10	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	90053-10	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	90053-10	<0.1 || <0.1	LCS-7	104%
Phenanthrene	mg/kg	90053-10	<0.1 || <0.1	LCS-7	91%
Anthracene	mg/kg	90053-10	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	90053-10	0.2 || 0.2 || RPD: 0	LCS-7	93%
Pyrene	mg/kg	90053-10	0.2 || 0.2 || RPD: 0	LCS-7	101%
Benzo(a)anthracene	mg/kg	90053-10	<0.1 || 0.1	[NR]	[NR]
Chrysene	mg/kg	90053-10	0.1 || 0.1 || RPD: 0	LCS-7	92%
Benzo(b+k)fluoranthene	mg/kg	90053-10	0.5 || 0.6 || RPD: 18	[NR]	[NR]
Benzo(a)pyrene	mg/kg	90053-10	0.15 || 0.19 || RPD: 24	LCS-7	109%
Indeno(1,2,3-c,d)pyrene	mg/kg	90053-10	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	90053-10	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	90053-10	<0.1 || 0.1	[NR]	[NR]
Benzo(a)pyrene TEQ	mg/kg	90053-10	<0.5 || <0.5	[NR]	[NR]
Surrogate p-Terphenyl-d14	%	90053-10	127 || 85 || RPD: 40	LCS-7	103%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	90053-10	06/05/2013 || 06/05/2013	LCS-2	06/05/2013
Date analysed	-	90053-10	06/05/2013 || 06/05/2013	LCS-2	06/05/2013
Arsenic	mg/kg	90053-10	<4 || <4	LCS-2	104%
Cadmium	mg/kg	90053-10	<0.4 || <0.4	LCS-2	104%
Chromium	mg/kg	90053-10	57 || 42 || RPD: 30	LCS-2	109%
Copper	mg/kg	90053-10	13 || 11 || RPD: 17	LCS-2	110%
Lead	mg/kg	90053-10	8 || 11 || RPD: 32	LCS-2	104%
Mercury	mg/kg	90053-10	0.2 || <0.1	LCS-2	99%
Nickel	mg/kg	90053-10	33 || 24 || RPD: 32	LCS-2	108%
Zinc	mg/kg	90053-10	24 || 34 || RPD: 34	LCS-2	107%

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	90053-21	06/05/2013 || 06/05/2013	LCS-6	06/05/2013
Date analysed	-	90053-21	07/05/2013 || 07/05/2013	LCS-6	06/05/2013
HCB	mg/kg	90053-21	<0.1 || <0.1	[NR]	[NR]
alpha-BHC	mg/kg	90053-21	<0.1 || <0.1	LCS-6	76%
gamma-BHC	mg/kg	90053-21	<0.1 || <0.1	[NR]	[NR]
beta-BHC	mg/kg	90053-21	<0.1 || <0.1	LCS-6	85%
Heptachlor	mg/kg	90053-21	<0.1 || <0.1	LCS-6	81%
delta-BHC	mg/kg	90053-21	<0.1 || <0.1	[NR]	[NR]
Aldrin	mg/kg	90053-21	<0.1 || <0.1	LCS-6	75%
Heptachlor Epoxide	mg/kg	90053-21	<0.1 || <0.1	LCS-6	84%
gamma-Chlordane	mg/kg	90053-21	<0.1 || <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	90053-21	<0.1 || <0.1	[NR]	[NR]
Endosulfan I	mg/kg	90053-21	<0.1 || <0.1	[NR]	[NR]
pp-DDE	mg/kg	90053-21	<0.1 || <0.1	LCS-6	77%
Dieldrin	mg/kg	90053-21	<0.1 || <0.1	LCS-6	83%
Endrin	mg/kg	90053-21	<0.1 || <0.1	LCS-6	71%
pp-DDD	mg/kg	90053-21	<0.1 || <0.1	LCS-6	81%
Endosulfan II	mg/kg	90053-21	<0.1 || <0.1	[NR]	[NR]
pp-DDT	mg/kg	90053-21	<0.1 || <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	90053-21	<0.1 || <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	90053-21	<0.1 || <0.1	LCS-6	82%
Methoxychlor	mg/kg	90053-21	<0.1 || <0.1	[NR]	[NR]
Surrogate TCMX	%	90053-21	108 || 104 || RPD: 4	LCS-6	85%

QUALITY CONTROL PCBs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	90053-21	06/05/2013 || 06/05/2013	LCS-6	06/05/2013
Date analysed	-	90053-21	07/05/2013 || 07/05/2013	LCS-6	06/05/2013
Arochlor 1016	mg/kg	90053-21	<0.1 || <0.1	[NR]	[NR]
Arochlor 1221	mg/kg	90053-21	<0.1 || <0.1	[NR]	[NR]
Arochlor 1232	mg/kg	90053-21	<0.1 || <0.1	[NR]	[NR]
Arochlor 1242	mg/kg	90053-21	<0.1 || <0.1	[NR]	[NR]
Arochlor 1248	mg/kg	90053-21	<0.1 || <0.1	[NR]	[NR]
Arochlor 1254	mg/kg	90053-21	<0.1 || <0.1	LCS-6	101%
Arochlor 1260	mg/kg	90053-21	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%	90053-21	108 || 104 || RPD: 4	LCS-6	94%

QUALITY CONTROL Total Phenolics in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	90053-16	06/05/2013 || 06/05/2013	LCS-2	06/05/2013
Date analysed	-	90053-16	07/05/2013 || 07/05/2013	LCS-2	07/05/2013
Total Phenolics (as Phenol)	mg/kg	90053-16	<5 || <5	LCS-2	74%

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	90053-21	06/05/2013 || 06/05/2013	LCS-7	06/05/2013
Date analysed	-	90053-21	07/05/2013 || 07/05/2013	LCS-7	07/05/2013
TRH C_6 - C_9	mg/kg	90053-21	<25 || <25	LCS-7	107%
TRH C_6 - C_{10}	mg/kg	90053-21	<25 || <25	LCS-7	107%
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	90053-21	<25 || <25	[NR]	[NR]
Benzene	mg/kg	90053-21	<0.2 || <0.2	LCS-7	109%
Toluene	mg/kg	90053-21	<0.5 || <0.5	LCS-7	105%
Ethylbenzene	mg/kg	90053-21	<1 || <1	LCS-7	104%
m+p-xylene	mg/kg	90053-21	<2 || <2	LCS-7	109%
o-Xylene	mg/kg	90053-21	<1 || <1	LCS-7	111%
naphthalene	mg/kg	90053-21	<1 || <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%	90053-21	91 || 88 || RPD: 3	LCS-7	104%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	90053-21	06/05/2013 || 06/05/2013	90053-2	06/05/2013
Date analysed	-	90053-21	07/05/2013 || 07/05/2013	90053-2	07/05/2013
TRHC $_{10}$ - C $_{14}$	mg/kg	90053-21	<50 || <50	90053-2	#
TRHC $_{15}$ - C $_{28}$	mg/kg	90053-21	<100 || <100	90053-2	#
TRHC $_{29}$ - C $_{36}$	mg/kg	90053-21	<100 || <100	90053-2	#
TRH>C $_{10}$-C $_{16}$	mg/kg	90053-21	<50 || <50	90053-2	#
TRH>C $_{10}$ - C $_{16}$ less Naphthalene (F2)	mg/kg	90053-21	<50 || <50	[NR]	[NR]
TRH>C $_{16}$-C $_{34}$	mg/kg	90053-21	<100 || <100	90053-2	#
TRH>C $_{34}$-C $_{40}$	mg/kg	90053-21	<100 || <100	90053-2	#
Surrogate o-Terphenyl	%	90053-21	87 || 83 || RPD: 5	90053-2	#

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	90053-21	06/05/2013 || 06/05/2013	90053-2	06/05/2013
Date analysed	-	90053-21	07/05/2013 || 07/05/2013	90053-2	07/05/2013
Naphthalene	mg/kg	90053-21	<0.1 || <0.1	90053-2	111%
Acenaphthylene	mg/kg	90053-21	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	90053-21	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	90053-21	<0.1 || <0.1	90053-2	109%
Phenanthrene	mg/kg	90053-21	<0.1 || <0.1	90053-2	120%
Anthracene	mg/kg	90053-21	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	90053-21	<0.1 || <0.1	90053-2	115%
Pyrene	mg/kg	90053-21	<0.1 || <0.1	90053-2	121%
Benzo(a)anthracene	mg/kg	90053-21	<0.1 || <0.1	[NR]	[NR]
Chrysene	mg/kg	90053-21	<0.1 || <0.1	90053-2	92%
Benzo(b+k)fluoranthene	mg/kg	90053-21	<0.2 || <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	90053-21	<0.05 || <0.05	90053-2	101%
Indeno(1,2,3-c,d)pyrene	mg/kg	90053-21	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	90053-21	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	90053-21	<0.1 || <0.1	[NR]	[NR]
Benzo(a)pyrene TEQ	mg/kg	90053-21	<0.5 || <0.5	[NR]	[NR]
Surrogate p-Terphenyl-d14	%	90053-21	99 || 101 || RPD: 2	90053-2	119%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	90053-21	06/05/2013 || 06/05/2013	LCS-3	06/05/2013
Date analysed	-	90053-21	06/05/2013 || 06/05/2013	LCS-3	06/05/2013
Arsenic	mg/kg	90053-21	<4 || <4	LCS-3	102%
Cadmium	mg/kg	90053-21	<0.4 || <0.4	LCS-3	102%
Chromium	mg/kg	90053-21	9 || 9 || RPD: 0	LCS-3	106%
Copper	mg/kg	90053-21	31 || 38 || RPD: 20	LCS-3	108%
Lead	mg/kg	90053-21	13 || 14 || RPD: 7	LCS-3	101%
Mercury	mg/kg	90053-21	<0.1 || 0.1	LCS-3	97%
Nickel	mg/kg	90053-21	14 || 16 || RPD: 13	LCS-3	105%
Zinc	mg/kg	90053-21	68 || 70 || RPD: 3	LCS-3	104%

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	90053-39	06/05/2013 || 06/05/2013	90053-2	06/05/2013
Date analysed	-	90053-39	07/05/2013 || 07/05/2013	90053-2	06/05/2013
HCB	mg/kg	90053-39	<0.1 || <0.1	[NR]	[NR]
alpha-BHC	mg/kg	90053-39	<0.1 || <0.1	90053-2	99%
gamma-BHC	mg/kg	90053-39	<0.1 || <0.1	[NR]	[NR]
beta-BHC	mg/kg	90053-39	<0.1 || <0.1	90053-2	91%
Heptachlor	mg/kg	90053-39	<0.1 || <0.1	90053-2	81%
delta-BHC	mg/kg	90053-39	<0.1 || <0.1	[NR]	[NR]
Aldrin	mg/kg	90053-39	<0.1 || <0.1	90053-2	106%
Heptachlor Epoxide	mg/kg	90053-39	<0.1 || <0.1	90053-2	106%
gamma-Chlordane	mg/kg	90053-39	<0.1 || <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	90053-39	<0.1 || <0.1	[NR]	[NR]
Endosulfan I	mg/kg	90053-39	<0.1 || <0.1	[NR]	[NR]
pp-DDE	mg/kg	90053-39	<0.1 || <0.1	90053-2	97%
Dieldrin	mg/kg	90053-39	<0.1 || <0.1	90053-2	105%
Endrin	mg/kg	90053-39	<0.1 || <0.1	90053-2	61%
pp-DDD	mg/kg	90053-39	<0.1 || <0.1	90053-2	107%
Endosulfan II	mg/kg	90053-39	<0.1 || <0.1	[NR]	[NR]
pp-DDT	mg/kg	90053-39	<0.1 || <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	90053-39	<0.1 || <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	90053-39	<0.1 || <0.1	90053-2	105%
Methoxychlor	mg/kg	90053-39	<0.1 || <0.1	[NR]	[NR]
Surrogate TCMX	%	90053-39	89 || 84 || RPD: 6	90053-2	99%

QUALITY CONTROL PCBs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	90053-39	06/05/2013 || 06/05/2013	90053-2	06/05/2013
Date analysed	-	90053-39	07/05/2013 || 07/05/2013	90053-2	06/05/2013
Arochlor 1016	mg/kg	90053-39	<0.1 || <0.1	[NR]	[NR]
Arochlor 1221	mg/kg	90053-39	<0.1 || <0.1	[NR]	[NR]
Arochlor 1232	mg/kg	90053-39	<0.1 || <0.1	[NR]	[NR]
Arochlor 1242	mg/kg	90053-39	<0.1 || <0.1	[NR]	[NR]
Arochlor 1248	mg/kg	90053-39	<0.1 || <0.1	[NR]	[NR]
Arochlor 1254	mg/kg	90053-39	<0.1 || <0.1	90053-2	100%
Arochlor 1260	mg/kg	90053-39	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%	90053-39	89 || 84 || RPD: 6	90053-2	83%

QUALITY CONTROL Total Phenolics in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	90053-33	06/05/2013 || 06/05/2013	90053-2	06/05/2013
Date analysed	-	90053-33	07/05/2013 || 07/05/2013	90053-2	07/05/2013
Total Phenolics (as Phenol)	mg/kg	90053-33	<5 || <5	90053-2	84%

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	90053-30	06/05/2013 || 06/05/2013	90053-2	06/05/2013
Date analysed	-	90053-30	07/05/2013 || 07/05/2013	90053-2	07/05/2013
TRH C_6 - C_9	mg/kg	90053-30	<25 || <25	90053-2	85%
TRH C_6 - C_{10}	mg/kg	90053-30	<25 || <25	90053-2	85%
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	90053-30	<25 || <25	[NR]	[NR]
Benzene	mg/kg	90053-30	<0.2 || <0.2	90053-2	82%
Toluene	mg/kg	90053-30	<0.5 || <0.5	90053-2	77%
Ethylbenzene	mg/kg	90053-30	<1 || <1	90053-2	87%
m+p-xylene	mg/kg	90053-30	<2 || <2	90053-2	89%
o-Xylene	mg/kg	90053-30	<1 || <1	90053-2	92%
naphthalene	mg/kg	90053-30	<1 || <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%	90053-30	81 || 87 || RPD: 7	90053-2	89%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	90053-30	06/05/2013 || 06/05/2013	90053-22	06/05/2013
Date analysed	-	90053-30	07/05/2013 || 07/05/2013	90053-22	07/05/2013
TRHC $_{10}$ - C $_{14}$	mg/kg	90053-30	<50 || <50	90053-22	117%
TRHC $_{15}$ - C $_{28}$	mg/kg	90053-30	<100 || <100	90053-22	88%
TRHC $_{29}$ - C $_{36}$	mg/kg	90053-30	<100 || <100	90053-22	91%
TRH>C $_{10}$-C $_{16}$	mg/kg	90053-30	<50 || <50	90053-22	117%
TRH>C $_{10}$ - C $_{16}$ less Naphthalene (F2)	mg/kg	90053-30	<50 || <50	[NR]	[NR]
TRH>C $_{16}$-C $_{34}$	mg/kg	90053-30	<100 || <100	90053-22	88%
TRH>C $_{34}$-C $_{40}$	mg/kg	90053-30	<100 || <100	90053-22	91%
Surrogate o-Terphenyl	%	90053-30	88 || 84 || RPD: 5	90053-22	122%

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	90053-30	06/05/2013 || 06/05/2013	90053-22	06/05/2013
Date analysed	-	90053-30	07/05/2013 || 07/05/2013	90053-22	07/05/2013
Naphthalene	mg/kg	90053-30	<0.1 || <0.1	90053-22	104%
Acenaphthylene	mg/kg	90053-30	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	90053-30	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	90053-30	<0.1 || <0.1	90053-22	109%
Phenanthrene	mg/kg	90053-30	<0.1 || <0.1	90053-22	90%
Anthracene	mg/kg	90053-30	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	90053-30	0.3 || 0.2 || RPD: 40	90053-22	84%
Pyrene	mg/kg	90053-30	0.4 || 0.2 || RPD: 67	90053-22	95%
Benzo(a)anthracene	mg/kg	90053-30	0.3 || 0.1 || RPD: 100	[NR]	[NR]
Chrysene	mg/kg	90053-30	0.3 || 0.1 || RPD: 100	90053-22	89%
Benzo(b+k)fluoranthene	mg/kg	90053-30	0.5 || 0.2 || RPD: 86	[NR]	[NR]
Benzo(a)pyrene	mg/kg	90053-30	0.39 || 0.15 || RPD: 89	90053-22	108%
Indeno(1,2,3-c,d)pyrene	mg/kg	90053-30	0.2 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	90053-30	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	90053-30	0.3 || 0.1 || RPD: 100	[NR]	[NR]
Benzo(a)pyrene TEQ	mg/kg	90053-30	<0.5 || <0.5	[NR]	[NR]
Surrogate p-Terphenyl-d14	%	90053-30	101 || 100 || RPD: 1	90053-22	95%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	90053-30	06/05/2013 || 06/05/2013	90053-2	06/05/2013
Date analysed	-	90053-30	06/05/2013 || 06/05/2013	90053-2	06/05/2013
Arsenic	mg/kg	90053-30	<4 || <4	90053-2	99%
Cadmium	mg/kg	90053-30	<0.4 || <0.4	90053-2	98%
Chromium	mg/kg	90053-30	16 || 15 || RPD: 6	90053-2	93%
Copper	mg/kg	90053-30	8 || 8 || RPD: 0	90053-2	110%
Lead	mg/kg	90053-30	25 || 25 || RPD: 0	90053-2	98%
Mercury	mg/kg	90053-30	<0.1 || <0.1	90053-2	99%
Nickel	mg/kg	90053-30	11 || 9 || RPD: 20	90053-2	99%
Zinc	mg/kg	90053-30	29 || 28 || RPD: 4	90053-2	103%

QUALITY CONTROL Total Phenolics in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	90053-34	06/05/2013
Date analysed	-	[NT]	[NT]	90053-34	07/05/2013
Total Phenolics (as Phenol)	mg/kg	[NT]	[NT]	90053-34	80%

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	90053-39	06/05/2013 || 06/05/2013	90053-22	06/05/2013
Date analysed	-	90053-39	07/05/2013 || 07/05/2013	90053-22	07/05/2013
TRH C_6 - C_9	mg/kg	90053-39	<25 || <25	90053-22	99%
TRH C_6 - C_{10}	mg/kg	90053-39	<25 || <25	90053-22	99%
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	90053-39	<25 || <25	[NR]	[NR]
Benzene	mg/kg	90053-39	<0.2 || <0.2	90053-22	96%
Toluene	mg/kg	90053-39	<0.5 || <0.5	90053-22	90%
Ethylbenzene	mg/kg	90053-39	<1 || <1	90053-22	101%
m+p-xylene	mg/kg	90053-39	<2 || <2	90053-22	104%
o-Xylene	mg/kg	90053-39	<1 || <1	90053-22	107%
naphthalene	mg/kg	90053-39	<1 || <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%	90053-39	89 || 90 || RPD: 1	90053-22	88%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date extracted	-	90053-39	06/05/2013 || 06/05/2013
Date analysed	-	90053-39	07/05/2013 || 07/05/2013
TRHC $_{10}$ - C $_{14}$	mg/kg	90053-39	<50 || <50
TRHC $_{15}$ - C $_{28}$	mg/kg	90053-39	<100 || <100
TRHC $_{29}$ - C $_{36}$	mg/kg	90053-39	<100 || <100
TRH>C $_{10}$-C $_{16}$	mg/kg	90053-39	<50 || <50
TRH>C $_{10}$ - C $_{16}$ less Naphthalene (F2)	mg/kg	90053-39	<50 || <50
TRH>C $_{16}$-C $_{34}$	mg/kg	90053-39	<100 || <100
TRH>C $_{34}$-C $_{40}$	mg/kg	90053-39	<100 || <100
Surrogate o-Terphenyl	%	90053-39	87 || 84 || RPD: 4

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date extracted	-	90053-39	06/05/2013 || 06/05/2013
Date analysed	-	90053-39	07/05/2013 || 07/05/2013
Naphthalene	mg/kg	90053-39	<0.1 || <0.1
Acenaphthylene	mg/kg	90053-39	<0.1 || <0.1
Acenaphthene	mg/kg	90053-39	<0.1 || <0.1
Fluorene	mg/kg	90053-39	<0.1 || <0.1
Phenanthrene	mg/kg	90053-39	<0.1 || <0.1
Anthracene	mg/kg	90053-39	<0.1 || <0.1
Fluoranthene	mg/kg	90053-39	<0.1 || <0.1
Pyrene	mg/kg	90053-39	<0.1 || <0.1
Benzo(a)anthracene	mg/kg	90053-39	<0.1 || <0.1
Chrysene	mg/kg	90053-39	<0.1 || <0.1
Benzo(b+k)fluoranthene	mg/kg	90053-39	<0.2 || <0.2
Benzo(a)pyrene	mg/kg	90053-39	<0.05 || <0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	90053-39	<0.1 || <0.1
Dibenzo(a,h)anthracene	mg/kg	90053-39	<0.1 || <0.1
Benzo(g,h,i)perylene	mg/kg	90053-39	<0.1 || <0.1
Benzo(a)pyrene TEQ	mg/kg	90053-39	<0.5 || <0.5
Surrogate p-Terphenyl-d14	%	90053-39	91 || 90 || RPD: 1

QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	90053-39	06/05/2013 || 06/05/2013	90053-22	06/05/2013
Date analysed	-	90053-39	06/05/2013 || 06/05/2013	90053-22	06/05/2013
Arsenic	mg/kg	90053-39	<4 || 6	90053-22	112%
Cadmium	mg/kg	90053-39	<0.4 || <0.4	90053-22	95%
Chromium	mg/kg	90053-39	9 || 11 || RPD: 20	90053-22	104%
Copper	mg/kg	90053-39	2 || 2 || RPD: 0	90053-22	115%
Lead	mg/kg	90053-39	12 || 14 || RPD: 15	90053-22	95%
Mercury	mg/kg	90053-39	<0.1 || <0.1	90053-22	95%
Nickel	mg/kg	90053-39	<1 || 1	90053-22	99%
Zinc	mg/kg	90053-39	10 || 16 || RPD: 46	90053-22	93%

Report Comments:

Total Recoverable Hydrocarbons in soil (NEPM):# Percent recovery is not possible to report as the high concentration of analytes in the sample/s have caused interference.

Asbestos in soil:
A portion of the supplied sample was sub-sampled for asbestos analysis according to Envirolab procedures. We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying 40-50g of sample in its own container.

Sample 90053-27; Chrysotile, amosite and crocidolite asbestos identified embedded in a fragment of fibre cement (total weight 0.8165g). It is estimated that the fibre cement contains up to 30% asbestos fibres by weight. This calculates to 0.2450g of asbestos fibres, which in 45.83g of soil is 5.34g/kg (i.e. > reporting limit for the method of 0.1g/kg).

PCB in soil: #18 PQL has been raised due to interference from analytes(other than those being tested) in the sample/s and
#31 PQL has been raised due to the high concentration of analytes in the sample/s, resulting in the sample/s requiring dilution.

Asbestos ID was analysed by Approved Identifier:	Lulu Guo, Paul Ching
Asbestos ID was authorised by Approved Signatory:	Lulu Guo

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

Quality Control Definitions

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

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

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

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

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

Laboratory Acceptance Criteria

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

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

Douglas Partners
Geotechnics - Environment - Groundwater

CHAIN OF CUSTODY

Project Name: Brookvale
Project No: 71015.18 Sampler: D.Walker
Project Mgr: L.R Mob. Phone:
Email: lindsay.rockett@douglaspartners.com.au
Date Required: Standard T/A Lab Quote No.

[ESDAT format please]

To: Envirolab Services
12 Ashley Street, Chatswood NSW 2068
Attn: Tania Notaras
Phone: 02 9910 6200 Fax: 02 9910 6201
Email: tnotaras@envirolabservices.com.au

Sample ID	Sample Depth	Lab ID	Sampling Date	Sample Type S - soil W – water	Container type	Heavy Metals	BTEX/ TPH	OCPs/ PCBs	PAH	Phenols	Asbestos	VOC						Other	Notes
743	0.9-1.0	1	2/5/13	S	Jar	✓	✓	✓	✓	✓	✓								combo 7A
744	0.9-1.0	2	2/5/13	↓	↓	✓	✓	✓	✓	✓	✓								7A
746	0.9-1.0	3	29/4/13			✓	✓	✓	✓	✓	✓								7A
746	1.4-1.5	4				✓	✓		✓										3
746	1.7-2.0	5	↓									✓							
747	0.4-0.5	6				✓	✓	✓	✓	✓	✓								7A
747	0.9-1.0	7	↓			✓	✓		✓										3
748	0.4-0.5	8	2/5/13			✓	✓	✓	✓	✓	✓								7A
749	0.4-0.5	9				✓	✓	✓	✓	✓	✓								7A
749	1.0-1.1	10	↓			✓	✓		✓										3
750	1.0-1.2	11	29/4/13			✓	✓	✓	✓	✓	✓								7A
750	2.9-3.0	12	↓	↓	↓	✓	✓		✓			✓							3 + VOC

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200
Job No: 90053
Date Received: 3/5/13
Time Received: 15:00
Received by: PT
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: D.Walker Signed: [signature] Date & Time: 3/5/13 Received By: Preet Date & Time: 3/5/13 15:00
Relinquished by: Signed: Date & Time: Received By: Date & Time:

Douglas Partners
Geotechnics - Environment - Groundwater

CHAIN OF CUSTODY

Project Name: Brookvale
Project No: 71015.18 Sampler: D. Walker
Project Mgr: L. R Mob. Phone:
Email: lindsay.rockett@douglaspartners.com.au
Date Required: Standard T/A Lab Quote No.

To: Envirolab Services
12 Ashley Street, Chatswood NSW 2068
Attn: Tania Notaras
Phone: 02 9910 6200 Fax: 02 9910 6201
Email: tnotaras@envirolabservices.com.au

Sample ID	Sample Depth	Lab ID	Sampling Date	Sample Type S - soil W - water	Container type	Analytes: Heavy Metals	BTEX/ TPH	OCPs/ PCBs	PAH	Phenols	Asbestos							Other	Notes
751	0.9-1.0	13	29/4/13	S	Jar	✓	✓	✓	✓	✓	✓								combo 7A
752	0.6-0.7	14				✓	✓	✓	✓	✓	✓								7A
753	0.4-0.5	15	30/4/13			✓	✓	✓	✓	✓	✓								7A
754	0.4-0.5	16	29/4/13			✓	✓	✓	✓	✓	✓								7A
755	0.9-1.0	17	30/4/13			✓	✓	✓	✓	✓	✓								7A
756	0.4-0.5	18				✓	✓	✓	✓	✓	✓								7A
756	0.9-1.0	19				✓	✓		✓										3
757	0.5-0.7	20				✓	✓	✓	✓	✓	✓								7A
758	0.7-0.8	21				✓	✓	✓	✓	✓	✓								7A
758	2.4-2.5	22				✓	✓		✓										3
759	1.4-1.5	23	5/1/13			✓	✓	✓	✓	✓	✓								7A
759	2.9-3.0	24	5/1/13			✓	✓		✓										3

Lab Report No. Phone: (02) 9809 0666
Send Results to: Douglas Partners Address: 96 Hermitage Road, West Ryde 2114 Fax: (02) 9809 4095
Relinquished by: D. Walker Signed: [signature] Date & Time: 3/5/13 Received By: Pkab Date & Time: 3/5/13 15:00
Relinquished by: Signed: Date & Time: Received By: Date & Time:

90053

Douglas Partners
Geotechnics · Environment · Groundwater

CHAIN OF CUSTODY

Project Name: Brookvale
Project No: 71015.18 Sampler: D. Walke
Project Mgr: L. R Mob. Phone:
Email: lindsay.rockett@douglaspartners.com.au
Date Required: Standard T/A Lab Quote No.

To: Envirolab Services
12 Ashley Street, Chatswood NSW 2068
Attn: Tania Notaras
Phone: 02 9910 6200 Fax: 02 9910 6201
Email: tnotaras@envirolabservices.com.au

Sample ID	Sample Depth	Lab ID	Sampling Date	Sample Type S - soil W – water	Container type	Heavy Metals	BTEX/ TPH	OCPs/ PCBs	PAH	Phenols	Asbestos							Other	Notes
760	0.9-1.0	25	30/4/13	S	Jw	✓	✓		✓										Combo 3
760	1.4-1.5	26	↓			✓	✓	✓	✓	✓	✓								7A
761	0.9-1.0	27	1/5/13			✓	✓	✓	✓	✓	✓								7A
761	1.9-2.0	28	↓			✓	✓		✓										3
762	0.4-0.5	29	30/4/13			✓	✓	✓	✓	✓	✓								7A
762	1.4-1.5	30				✓	✓		✓										3
763	1.4-1.5	31	↓			✓	✓	✓	✓	✓	✓								7A
764	1.4-1.5	32	1/5/13			✓	✓		✓										3
764	2.9-3.0	33				✓	✓	✓	✓	✓	✓								7A
765	0.9-1.0	34				✓	✓	✓	✓	✓	✓								7A
765	1.9-2.0	35				✓	✓		✓										3
766	0.9-1.0	36	↓	↓	↓	✓	✓	✓	✓	✓	✓								7A

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: D. Walker Signed: D Wlk Date & Time: 3/5/13 Received By: Katisthu Date & Time: 3/5/13 15:00

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

Douglas Partners
Geotechnics · Environment · Groundwater

CHAIN OF CUSTODY

Project Name: Brookvale
Project No: 71015.18 Sampler: D. Walker
Project Mgr: L.R. Mob. Phone:
Email: lindsay.rockett@douglaspartners.com.au
Date Required: Standard T/A Lab Quote No.

To: Envirolab Services
12 Ashley Street, Chatswood NSW 2068
Attn: Tania Notaras
Phone: 02 9910 6200 Fax: 02 9910 6201
Email: tnotaras@envirolabservices.com.au

Sample ID	Sample Depth	Lab ID	Sampling Date	Sample Type S - soil W – water	Container type	Heavy Metals	BTEX/ TPH	OCPs/ PCBs	PAH	Phenols	Asbestos	BTEX only						Other	Notes
767	0.9-1.0	37	1/5/13	S	Jar	✓	✓	✓	✓	✓	✓								combo 7A
768	0.4-0.5	38	1/5/13	↓	↓	✓	✓		✓										3
768	1.4-1.5	39	1/5/13	↓	↓	✓	✓	✓	✓	✓	✓								7A
A1		40	30/4/13	material	bag						✓								
BD2-020513		41	2/5/13	S	Jar	✓			✓										Send samples to
BD2-290413		42	29/4/13			✓			✓										Labmark for analysis
BD1-290413		43	↓			✓			✓										
BD2-300413			30/4/13			✓			✓	*									
BD3-010513			5/1/13			✓			✓	*									
Trip spike		44	29/4/13									✓							
Trip blank		45	29/4/13									✓							
trip spike		46	30/4/13	↓	↓							✓							

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: D. Walker Signed: Date & Time: 3/5/13 Received By: Pralutta Date & Time: 3/5/13 15:00
Relinquished by: Signed: Date & Time: Received By: Date & Time:

Douglas Partners
Geotechnics · Environment · Groundwater

CHAIN OF CUSTODY

Project Name: Brookvale
Project No: 71015.18 Sampler: D. Walker
Project Mgr: L.R Mob. Phone:
Email: lindsay.rockett@douglaspartners.com.au
Date Required: Standard T/A Lab Quote No.

To: Envirolab Services
12 Ashley Street, Chatswood NSW 2068
Attn: Tania Notaras
Phone: 02 9910 6200 Fax: 02 9910 6201
Email: tnotaras@envirolabservices.com.au

Sample ID	Sample Depth	Lab ID	Sampling Date	Sample Type S - soil W - water	Container type	Analytes: Heavy Metals	BTEX/ TPH	OCPs/ PCBs	PAH	Phenols	Asbestos	BTEX only					Other	Notes
trip blank		47	30/4/13	S	Jar							✓						
trip spike		48	1/5/13	↓	↓							✓						
trip blank		49	1/5/13									✓						
trip spike		50	2/5/13	↓								✓						
trip blank		51	2/5/13	S	↓							✓						

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: D.Walker Signed: [signature] Date & Time: 3/5/13 Received By: Prakrithi Date & Time: 3/5/13 15:00
Relinquished by: Signed: Date & Time: Received By: Date & Time:

90053

Form COC Rev0/November 2006

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

SAMPLE RECEIPT ADVICE

Client:

Douglas Partners	ph: 02 9809 0666
96 Hermitage Rd	Fax: 02 9809 4095
West Ryde NSW 2114	

Attention: Lindsay Rockett

Sample log in details:

Your reference:	**71015.18, Brookvale**
Envirolab Reference:	**90053**
Date received:	03/05/13
Date results expected to be reported:	**10/05/13**

Samples received in appropriate condition for analysis:	YES
No. of samples provided	50 Soils, 1 Material
Turnaround time requested:	Standard
Temperature on receipt	Cool
Cooling Method:	Ice Pack
Sampling Date Provided:	YES

Comments:

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

Contact details:

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

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 **90053-A**

Client:
Douglas Partners
96 Hermitage Rd
West Ryde
NSW 2114

Attention: Lindsay Rockett

Sample log in details:

Your Reference:	**71015.18, Brookvale**
No. of samples:	Additional testing on 6 soils
Date samples received / completed instructions received	03/05/13 / 10/05/13

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

Report Details:

Date results requested by: / Issue Date:	17/05/13 / 15/05/13
Date of Preliminary Report:	Not issued

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

Results Approved By:

Rhian Morgan
Reporting Supervisor

Jeremy Faircloth
Chemist

ACCREDITED FOR TECHNICAL COMPETENCE

Metals in TCLP USEPA1311 Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ------------ ------------	90053-A-18 756 0.4-0.5 30/04/2013 Soil	90053-A-19 756 0.9-1.0 30/04/2013 Soil	90053-A-23 759 1.4-1.5 1/05/2013 Soil	90053-A-27 761 0.9-1.0 1/05/2013 Soil	90053-A-32 764 1.4-1.5 1/05/2013 Soil
Date extracted	-	13/05/2013	13/05/2013	13/05/2013	13/05/2013	13/05/2013
Date analysed	-	13/05/2013	13/05/2013	13/05/2013	13/05/2013	13/05/2013
pH of soil for fluid# determ.	pH units	8.3	8.1	8.1	9.6	9.0
pH of soil for fluid # determ. (acid)	pH units	1.7	1.7	1.5	1.5	1.5
Extraction fluid used	-	1	1	1	1	1
pH of final Leachate	pH units	5.1	5.1	5.5	5.2	5.1
Lead in TCLP	mg/L	0.03	0.2	0.7	[NA]	0.3
Nickel in TCLP	mg/L	[NA]	[NA]	[NA]	0.06	[NA]

Metals in TCLP USEPA1311 Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ------------ ------------	90053-A-34 765 0.9-1.0 1/05/2013 Soil
Date extracted	-	13/05/2013
Date analysed	-	13/05/2013
pH of soil for fluid# determ.	pH units	8.9
pH of soil for fluid # determ. (acid)	pH units	1.7
Extraction fluid used	-	1
pH of final Leachate	pH units	5.1
Lead in TCLP	mg/L	0.4

PAHs in TCLP (USEPA 1311) Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ------------- ------------	90053-A-18 756 0.4-0.5 30/04/2013 Soil	90053-A-19 756 0.9-1.0 30/04/2013 Soil	90053-A-32 764 1.4-1.5 1/05/2013 Soil	90053-A-34 765 0.9-1.0 1/05/2013 Soil
Date extracted	-	13/05/2013	13/05/2013	13/05/2013	13/05/2013
Date analysed	-	13/05/2013	13/05/2013	13/05/2013	13/05/2013
Naphthalene in TCLP	mg/L	0.002	<0.001	<0.001	<0.001
Acenaphthylene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Acenaphthene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Fluorene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Phenanthrene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Anthracene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Fluoranthene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Pyrene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Benzo(a)anthracene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Chrysene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Benzo(b+k)fluoranthene in TCLP	mg/L	<0.002	<0.002	<0.002	<0.002
Benzo(a)pyrene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Dibenzo(a,h)anthracene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Benzo(g,h,i)perylene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Surrogate p-Terphenyl-d14	%	87	89	85	97

Method ID	Methodology Summary
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using AS 4439 and USEPA 1311.
EXTRACT.7	Toxicity Characteristic Leaching Procedure (TCLP).
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA 22nd ED, 4500-H+.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Org-012 subset	Leachates are extracted with Dichloromethane and analysed by GC-MS.
Org-012 subset	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM draft B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.

QUALITY CONTROL Metals in TCLP USEPA1311	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			14/05/2013	90053-A-23	13/05/2013 || 13/05/2013	LCS-W1	14/05/2013
Date analysed	-			14/05/2013	90053-A-23	13/05/2013 || 13/05/2013	LCS-W1	14/05/2013
Lead in TCLP	mg/L	0.03	Metals-020 ICP-AES	<0.03	90053-A-23	0.7 || 0.7 || RPD: 0	LCS-W1	96%
Nickel in TCLP	mg/L	0.02	Metals-020 ICP-AES	<0.02	[NT]	[NT]	LCS-W1	99%

QUALITY CONTROL PAHs in TCLP (USEPA 1311)	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			13/05/2013	[NT]	[NT]	LCS-W1	13/05/2013
Date analysed	-			13/05/2013	[NT]	[NT]	LCS-W1	13/05/2013
Naphthalene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	109%
Acenaphthylene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Acenaphthene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Fluorene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	107%
Phenanthrene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	98%
Anthracene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Fluoranthene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	97%
Pyrene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	105%
Benzo(a)anthracene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Chrysene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	93%
Benzo(b+k)fluoranthene in TCLP	mg/L	0.002	Org-012 subset	<0.002	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	113%
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012	98	[NT]	[NT]	LCS-W1	96%

Report Comments:

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

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

Quality Control Definitions

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

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

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

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

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

Laboratory Acceptance Criteria

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

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

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 90583

Client:
Douglas Partners
96 Hermitage Rd
West Ryde
NSW 2114

Attention: David Walker

Sample log in details:

Your Reference:	**71015.18, Brookvale**	
No. of samples:	1 Soil	
Date samples received / completed instructions received	14/05/13	/ 14/05/13

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

Report Details:

Date results requested by: / Issue Date:	21/05/13	/ 21/05/13
Date of Preliminary Report:	Not issued	

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Results Approved By:

Jacinta Hurst
Laboratory Manager

NATA
ACCREDITED FOR TECHNICAL COMPETENCE

Asbestos ID - soils		
Our Reference:	UNITS	90583-1
Your Reference	-------------	759
Depth	------------	3.5-3.8
Date Sampled		01/05/2013
Type of sample		Soil
Date analysed	-	16/05/2013
Sample mass tested	g	Approx 40g
Sample Description	-	Dark grey fine-grained soil
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg
Trace Analysis	-	No respirable fibres detected

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.

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

Report Comments:

Asbestos ID was analysed by Approved Identifier: Alex Tam
Asbestos ID was authorised by Approved Signatory: Lulu Guo

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

Quality Control Definitions

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

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

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

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

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

Laboratory Acceptance Criteria

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

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

Douglas Partners
Geotechnics · Environment · Groundwater

CHAIN OF CUSTODY

Project Name: Brookvale
Project No: 7015-18 Sampler: D. Walke
Project Mgr: LR Mob. Phone:
Email: david.walker@douglaspartners.com.au
Date Required: Standard Lab Quote No.

To: Envirolab Services
12 Ashley Street, Chatswood NSW 2068
Attn: Tania Notaras
Phone: 02 9910 6200 Fax: 02 9910 6201
Email: tnotaras@envirolabservices.com.au

Sample ID	Sample Depth (m)	Lab ID	Sampling Date	Sample Type S - soil W – water	Container type	Analytes: Asbestos												Other	Notes
759	3.5-3.8	1	1/5/13	S	bag	✓													

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200
Job No: 90583
Date Received: 14/5/13
Time Received: 15:15
Received by: AW
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: David Walker Signed: [signature] Date & Time: 14/5/13 Received By: A. Weir Date & Time: 14/5/13 15:15
Relinquished by: Signed: Date & Time: Received By: Date & Time:

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

SAMPLE RECEIPT ADVICE

Client:

Douglas Partners	ph: 02 9809 0666
96 Hermitage Rd	Fax: 02 9809 4095
West Ryde NSW 2114	

Attention: David Walker

Sample log in details:

Your reference:	**71015.18, Brookvale**
Envirolab Reference:	**90583**
Date received:	14/05/13
Date results expected to be reported:	**21/05/13**

Samples received in appropriate condition for analysis:	YES
No. of samples provided	1 Soil
Turnaround time requested:	Standard
Temperature on receipt	Ambient
Cooling Method:	None
Sampling Date Provided:	YES

Comments:

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

Contact details:

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

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 91105

Client:
Douglas Partners
96 Hermitage Rd
West Ryde
NSW 2114

Attention: David Walker

Sample log in details:

Your Reference:	**71015.18, Brookvale**	
No. of samples:	17 Waters	
Date samples received / completed instructions received	22/05/13	/ 22/05/13

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

Report Details:

Date results requested by: / Issue Date:	29/05/13	/ 3/06/13
Date of Preliminary Report:	Not Issued	

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Results Approved By:

Jacinta Hurst
Laboratory Manager

VOCs in water Our Reference: Your Reference Date Sampled Type of sample	UNITS ------------- ------------	91105-1 715 21/05/2013 Water	91105-2 733 21/05/2013 Water	91105-3 740 21/05/2013 Water	91105-4 752 21/05/2013 Water	91105-5 509 21/05/2013 Water
Date extracted	-	23/05/2013	23/05/2013	23/05/2013	23/05/2013	23/05/2013
Date analysed	-	24/05/2013	24/05/2013	24/05/2013	24/05/2013	24/05/2013
Dichlorodifluoromethane	µg/L	<10	<10	<10	<10	<10
Chloromethane	µg/L	<10	<10	<10	<10	<10
Vinyl Chloride	µg/L	<10	<10	<10	<10	<10
Bromomethane	µg/L	<10	<10	<10	<10	<10
Chloroethane	µg/L	<10	<10	<10	<10	<10
Trichlorofluoromethane	µg/L	<10	<10	<10	<10	<10
1,1-Dichloroethene	µg/L	<1	<1	<1	<1	<1
Trans-1,2-dichloroethene	µg/L	<1	<1	<1	<1	<1
1,1-dichloroethane	µg/L	<1	<1	<1	<1	<1
Cis-1,2-dichloroethene	µg/L	<1	<1	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1	<1	<1
Chloroform	µg/L	<1	<1	<1	<1	<1
2,2-dichloropropane	µg/L	<1	<1	<1	<1	<1
1,2-dichloroethane	µg/L	<1	<1	<1	<1	<1
1,1,1-trichloroethane	µg/L	<1	<1	<1	<1	<1
1,1-dichloropropene	µg/L	<1	<1	<1	<1	<1
Cyclohexane	µg/L	<1	<1	<1	<1	<1
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1
Benzene	µg/L	<1	<1	<1	<1	<1
Dibromomethane	µg/L	<1	<1	<1	<1	<1
1,2-dichloropropane	µg/L	<1	<1	<1	<1	<1
Trichloroethene	µg/L	<1	<1	1	<1	<1
Bromodichloromethane	µg/L	<1	<1	<1	<1	<1
trans-1,3-dichloropropene	µg/L	<1	<1	<1	<1	<1
cis-1,3-dichloropropene	µg/L	<1	<1	<1	<1	<1
1,1,2-trichloroethane	µg/L	<1	<1	<1	<1	<1
Toluene	µg/L	<1	<1	<1	<1	<1
1,3-dichloropropane	µg/L	<1	<1	<1	<1	<1
Dibromochloromethane	µg/L	<1	<1	<1	<1	<1
1,2-dibromoethane	µg/L	<1	<1	<1	<1	<1
Tetrachloroethene	µg/L	<1	<1	<1	<1	<1
1,1,1,2-tetrachloroethane	µg/L	<1	<1	<1	<1	<1
Chlorobenzene	µg/L	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1	<1
Bromoform	µg/L	<1	<1	<1	<1	<1
m+p-xylene	µg/L	<2	<2	<2	<2	<2
Styrene	µg/L	<1	<1	<1	<1	<1
1,1,2,2-tetrachloroethane	µg/L	<1	<1	<1	<1	<1
o-xylene	µg/L	<1	<1	<1	<1	<1
1,2,3-trichloropropane	µg/L	<1	<1	<1	<1	<1

VOCs in water Our Reference: Your Reference Date Sampled Type of sample	UNITS ------------- ------------	91105-1 715 21/05/2013 Water	91105-2 733 21/05/2013 Water	91105-3 740 21/05/2013 Water	91105-4 752 21/05/2013 Water	91105-5 509 21/05/2013 Water
Isopropylbenzene	µg/L	<1	<1	<1	<1	<1
Bromobenzene	µg/L	<1	<1	<1	<1	<1
n-propyl benzene	µg/L	<1	<1	<1	<1	<1
2-chlorotoluene	µg/L	<1	<1	<1	<1	<1
4-chlorotoluene	µg/L	<1	<1	<1	<1	<1
1,3,5-trimethyl benzene	µg/L	<1	<1	<1	<1	<1
Tert-butyl benzene	µg/L	<1	<1	<1	<1	<1
1,2,4-trimethyl benzene	µg/L	<1	<1	<1	<1	<1
1,3-dichlorobenzene	µg/L	<1	<1	<1	<1	<1
Sec-butyl benzene	µg/L	<1	<1	<1	<1	<1
1,4-dichlorobenzene	µg/L	<1	<1	<1	<1	<1
4-isopropyl toluene	µg/L	<1	<1	<1	<1	<1
1,2-dichlorobenzene	µg/L	<1	<1	<1	<1	<1
n-butyl benzene	µg/L	<1	<1	<1	<1	<1
1,2-dibromo-3-chloropropane	µg/L	<1	<1	<1	<1	<1
1,2,4-trichlorobenzene	µg/L	<1	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	<1	<1	<1	<1	<1
1,2,3-trichlorobenzene	µg/L	<1	<1	<1	<1	<1
Surrogate Dibromofluoromethane	%	128	128	130	131	130
Surrogate toluene-d8	%	99	101	100	100	99
Surrogate 4-BFB	%	95	102	97	97	96

VOCs in water	UNITS	91105-11	91105-12	91105-13	91105-14	91105-15
Our Reference:	UNITS	91105-11	91105-12	91105-13	91105-14	91105-15
Your Reference	-------------	506	510	513	304	507A
Date Sampled	------------	22/05/2013	21/05/2013	21/05/2013	22/05/2013	22/05/2013
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	23/05/2013	23/05/2013	23/05/2013	23/05/2013	23/05/2013
Date analysed	-	24/05/2013	24/05/2013	24/05/2013	24/05/2013	24/05/2013
Dichlorodifluoromethane	µg/L	<10	<10	<10	<10	<10
Chloromethane	µg/L	<10	<10	<10	<10	<10
Vinyl Chloride	µg/L	<10	<10	<10	<10	<10
Bromomethane	µg/L	<10	<10	<10	<10	<10
Chloroethane	µg/L	<10	<10	<10	<10	<10
Trichlorofluoromethane	µg/L	<10	<10	<10	<10	<10
1,1-Dichloroethene	µg/L	<1	<1	<1	<1	1
Trans-1,2-dichloroethene	µg/L	<1	<1	<1	<1	<1
1,1-dichloroethane	µg/L	<1	<1	<1	<1	<1
Cis-1,2-dichloroethene	µg/L	180	<1	<1	1,400	160
Bromochloromethane	µg/L	<1	<1	<1	<1	<1
Chloroform	µg/L	<1	<1	<1	<1	<1
2,2-dichloropropane	µg/L	<1	<1	<1	<1	<1
1,2-dichloroethane	µg/L	<1	<1	<1	<1	<1
1,1,1-trichloroethane	µg/L	<1	<1	<1	<1	<1
1,1-dichloropropene	µg/L	<1	<1	<1	<1	<1
Cyclohexane	µg/L	<1	<1	<1	<1	<1
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1
Benzene	µg/L	<1	<1	<1	<1	<1
Dibromomethane	µg/L	<1	<1	<1	<1	<1
1,2-dichloropropane	µg/L	<1	<1	<1	<1	<1
Trichloroethene	µg/L	6	<1	<1	7	36
Bromodichloromethane	µg/L	<1	<1	<1	<1	<1
trans-1,3-dichloropropene	µg/L	<1	<1	<1	<1	<1
cis-1,3-dichloropropene	µg/L	<1	<1	<1	<1	<1
1,1,2-trichloroethane	µg/L	<1	<1	<1	<1	<1
Toluene	µg/L	<1	<1	<1	<1	<1
1,3-dichloropropane	µg/L	<1	<1	<1	<1	<1
Dibromochloromethane	µg/L	<1	<1	<1	<1	<1
1,2-dibromoethane	µg/L	<1	<1	<1	<1	<1
Tetrachloroethene	µg/L	<1	<1	<1	<1	<1
1,1,1,2-tetrachloroethane	µg/L	<1	<1	<1	<1	<1
Chlorobenzene	µg/L	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1	<1
Bromoform	µg/L	<1	<1	<1	<1	<1
m+p-xylene	µg/L	<2	<2	<2	<2	<2
Styrene	µg/L	<1	<1	<1	<1	<1
1,1,2,2-tetrachloroethane	µg/L	<1	<1	<1	<1	<1
o-xylene	µg/L	<1	<1	<1	<1	<1
1,2,3-trichloropropane	µg/L	<1	<1	<1	<1	<1
Isopropylbenzene	µg/L	<1	<1	<1	<1	<1

VOCs in water						
Our Reference:	UNITS	91105-11	91105-12	91105-13	91105-14	91105-15
Your Reference	-------------	506	510	513	304	507A
Date Sampled	------------	22/05/2013	21/05/2013	21/05/2013	22/05/2013	22/05/2013
Type of sample		Water	Water	Water	Water	Water
Bromobenzene	µg/L	<1	<1	<1	<1	<1
n-propyl benzene	µg/L	<1	<1	<1	<1	<1
2-chlorotoluene	µg/L	<1	<1	<1	<1	<1
4-chlorotoluene	µg/L	<1	<1	<1	<1	<1
1,3,5-trimethyl benzene	µg/L	<1	<1	<1	<1	<1
Tert-butyl benzene	µg/L	<1	<1	<1	<1	<1
1,2,4-trimethyl benzene	µg/L	<1	<1	<1	<1	<1
1,3-dichlorobenzene	µg/L	<1	<1	<1	<1	<1
Sec-butyl benzene	µg/L	<1	<1	<1	<1	<1
1,4-dichlorobenzene	µg/L	<1	<1	<1	<1	<1
4-isopropyl toluene	µg/L	<1	<1	<1	<1	<1
1,2-dichlorobenzene	µg/L	<1	<1	<1	<1	<1
n-butyl benzene	µg/L	<1	<1	<1	<1	<1
1,2-dibromo-3-chloropropane	µg/L	<1	<1	<1	<1	<1
1,2,4-trichlorobenzene	µg/L	<1	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	<1	<1	<1	<1	<1
1,2,3-trichlorobenzene	µg/L	<1	<1	<1	<1	<1
Surrogate Dibromofluoromethane	%	108	132	108	100	120
Surrogate toluene-d8	%	98	99	97	97	101
Surrogate 4-BFB	%	103	97	104	100	103

BTEX in Water					
Our Reference:	UNITS	91105-9	91105-10	91105-16	91105-17
Your Reference	-------------	Trip Spike	Trip Blank	Trip Spike	Trip Blank
Date Sampled	------------	21/05/2013	21/05/2013	22/05/2013	22/05/2013
Type of sample		Water	Water	Water	Water
Date extracted	-	24/05/2013	24/05/2013	24/05/2013	24/05/2013
Date analysed	-	24/05/2013	24/05/2013	24/05/2013	24/05/2013
Benzene	µg/L	103%	<1	96%	<1
Toluene	µg/L	100%	<1	107%	<1
Ethylbenzene	µg/L	100%	<1	113%	<1
m+p-xylene	µg/L	98%	<2	113%	<2
o-xylene	µg/L	99%	<1	114%	<1
Surrogate Dibromofluoromethane	%	103	112	116	103
Surrogate toluene-d8	%	101	97	101	97
Surrogate 4-BFB	%	95	99	96	98

vTRH in Water (C6-C9) NEPM						
Our Reference:	UNITS	91105-1	91105-2	91105-3	91105-4	91105-5
Your Reference	-------------	715	733	740	752	509
Date Sampled	------------	21/05/2013	21/05/2013	21/05/2013	21/05/2013	21/05/2013
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	23/05/2013	23/05/2013	23/05/2013	23/05/2013	23/05/2013
Date analysed	-	24/05/2013	24/05/2013	24/05/2013	24/05/2013	24/05/2013
TRH C_6 - C_9	µg/L	<10	<10	<10	<10	<10
TRH C_6 - C_{10}	µg/L	<10	10	<10	<10	<10
Surrogate Dibromofluoromethane	%	128	128	130	131	130
Surrogate toluene-d8	%	99	101	100	100	99
Surrogate 4-BFB	%	95	102	98	97	96

vTRH in Water (C6-C9) NEPM						
Our Reference:	UNITS	91105-11	91105-12	91105-13	91105-14	91105-15
Your Reference	-------------	506	510	513	304	507A
Date Sampled	------------	22/05/2013	21/05/2013	21/05/2013	22/05/2013	22/05/2013
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	23/05/2013	23/05/2013	23/05/2013	23/05/2013	23/05/2013
Date analysed	-	24/05/2013	24/05/2013	24/05/2013	24/05/2013	24/05/2013
TRH C_6 - C_9	µg/L	100	<10	<10	680	130
TRH C_6 - C_{10}	µg/L	100	<10	<10	680	130
Surrogate Dibromofluoromethane	%	122	132	108	115	91
Surrogate toluene-d8	%	99	99	97	100	97
Surrogate 4-BFB	%	91	97	104	97	96

svTRH (C10-C40) in Water						
Our Reference:	UNITS	91105-1	91105-2	91105-3	91105-4	91105-5
Your Reference	-------------	715	733	740	752	509
Date Sampled	------------	21/05/2013	21/05/2013	21/05/2013	21/05/2013	21/05/2013
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	30/05/2013	30/05/2013	30/05/2013	30/05/2013	30/05/2013
Date analysed	-	30/05/2013	30/05/2013	30/05/2013	30/05/2013	30/05/2013
TRHC $_{10}$ - C $_{14}$	µg/L	<50	<50	<50	<50	<50
TRHC $_{15}$ - C $_{28}$	µg/L	<100	<100	<100	<100	<100
TRHC $_{29}$ - C $_{36}$	µg/L	<100	<100	<100	<100	<100
TRH>C $_{10}$ - C $_{16}$	µg/L	<50	<50	<50	<50	<50
TRH>C $_{16}$ - C $_{34}$	µg/L	<100	<100	<100	<100	<100
TRH>C $_{34}$ - C $_{40}$	µg/L	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	77	82	60	102	86

svTRH (C10-C40) in Water						
Our Reference:	UNITS	91105-11	91105-12	91105-13	91105-14	91105-15
Your Reference	-------------	506	510	513	304	507A
Date Sampled	------------	22/05/2013	21/05/2013	21/05/2013	22/05/2013	22/05/2013
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	30/05/2013	30/05/2013	30/05/2013	30/05/2013	30/05/2013
Date analysed	-	30/05/2013	30/05/2013	30/05/2013	30/05/2013	30/05/2013
TRHC $_{10}$ - C $_{14}$	µg/L	<50	<50	<50	<50	<50
TRHC $_{15}$ - C $_{28}$	µg/L	<100	<100	<100	<100	<100
TRHC $_{29}$ - C $_{36}$	µg/L	<100	<100	<100	<100	<100
TRH>C $_{10}$ - C $_{16}$	µg/L	<50	<50	<50	<50	<50
TRH>C $_{16}$ - C $_{34}$	µg/L	<100	<100	<100	<100	<100
TRH>C $_{34}$ - C $_{40}$	µg/L	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	74	74	83	86	86

PAHs in Water - Low Level						
Our Reference:	UNITS	91105-1	91105-2	91105-3	91105-4	91105-5
Your Reference	-------------	715	733	740	752	509
Date Sampled	------------	21/05/2013	21/05/2013	21/05/2013	21/05/2013	21/05/2013
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	23/05/2013	23/05/2013	23/05/2013	23/05/2013	23/05/2013
Date analysed	-	24/05/2013	24/05/2013	24/05/2013	24/05/2013	24/05/2013
Naphthalene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b+k)fluoranthene	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	73	65	61	101	74

PAHs in Water - Low Level						
Our Reference:	UNITS	91105-7	91105-8	91105-11	91105-12	91105-13
Your Reference	-------------	BD1/21/5/13	BD2/21/5/13	506	510	513
Date Sampled	------------	21/05/2013	21/05/2013	22/05/2013	21/05/2013	21/05/2013
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	23/05/2013	23/05/2013	23/05/2013	23/05/2013	23/05/2013
Date analysed	-	24/05/2013	24/05/2013	24/05/2013	24/05/2013	24/05/2013
Naphthalene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b+k)fluoranthene	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	75	101	86	84	105

PAHs in Water - Low Level Our Reference: Your Reference Date Sampled Type of sample	UNITS ------------- ------------	91105-14 304 22/05/2013 Water	91105-15 507A 22/05/2013 Water
Date extracted	-	23/05/2013	23/05/2013
Date analysed	-	24/05/2013	24/05/2013
Naphthalene	µg/L	<0.1	<0.1
Acenaphthylene	µg/L	<0.1	<0.1
Acenaphthene	µg/L	<0.1	<0.1
Fluorene	µg/L	<0.1	<0.1
Phenanthrene	µg/L	<0.1	<0.1
Anthracene	µg/L	<0.1	<0.1
Fluoranthene	µg/L	<0.1	<0.1
Pyrene	µg/L	<0.1	<0.1
Benzo(a)anthracene	µg/L	<0.1	<0.1
Chrysene	µg/L	<0.1	<0.1
Benzo(b+k)fluoranthene	µg/L	<0.2	<0.2
Benzo(a)pyrene	µg/L	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	<0.1	<0.1
Dibenzo(a,h)anthracene	µg/L	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1	<0.1
Benzo(a)pyrene TEQ	µg/L	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	103	116

OCP in water - trace level Our Reference: Your Reference Date Sampled Type of sample	UNITS ------------- ------------	91105-1 715 21/05/2013 Water	91105-2 733 21/05/2013 Water	91105-3 740 21/05/2013 Water	91105-4 752 21/05/2013 Water	91105-5 509 21/05/2013 Water
Date extracted	-	31/05/2013	31/05/2013	31/05/2013	31/05/2013	31/05/2013
Date analysed	-	31/05/2013	31/05/2013	31/05/2013	31/05/2013	31/05/2013
HCB	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Heptachlor	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Heptachlor Epoxide	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Aldrin	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
gamma-BHC (Lindane)	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
alpha-BHC	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
beta-BHC	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
delta-BHC	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
trans-Chlordane	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
cis-Chlordane	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Oxychlordane	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Dieldrin	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
p,p-DDE	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
p,p-DDD	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
p,p-DDT	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Endrin	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Endrin Aldehyde	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Endrin Ketone	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
alpha-Endosulfan	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
beta-Endosulfan	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Endosulfan Sulfate	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Methoxychlor	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Surrogate OC Recovery	%	106	77	99	105	116

OCP in water - trace level Our Reference: Your Reference Date Sampled Type of sample	UNITS ------------- ------------	91105-6 5 21/05/2013 Water	91105-11 506 22/05/2013 Water	91105-12 510 21/05/2013 Water	91105-13 513 21/05/2013 Water	91105-14 304 22/05/2013 Water
Date extracted	-	31/05/2013	31/05/2013	31/05/2013	31/05/2013	31/05/2013
Date analysed	-	31/05/2013	31/05/2013	31/05/2013	31/05/2013	31/05/2013
HCB	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Heptachlor	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Heptachlor Epoxide	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Aldrin	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
gamma-BHC (Lindane)	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
alpha-BHC	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
beta-BHC	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
delta-BHC	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
trans-Chlordane	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
cis-Chlordane	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Oxychlordane	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Dieldrin	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
p,p-DDE	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
p,p-DDD	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
p,p-DDT	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Endrin	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Endrin Aldehyde	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Endrin Ketone	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
alpha-Endosulfan	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
beta-Endosulfan	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Endosulfan Sulfate	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Methoxychlor	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Surrogate OC Recovery	%	109	116	79	110	99

OCP in water - trace level		
Our Reference:	UNITS	91105-15
Your Reference	-------------	507A
Date Sampled	------------	22/05/2013
Type of sample		Water
Date extracted	-	31/05/2013
Date analysed	-	31/05/2013
HCB	µg/L	<0.001
Heptachlor	µg/L	<0.001
Heptachlor Epoxide	µg/L	<0.001
Aldrin	µg/L	<0.001
gamma-BHC (Lindane)	µg/L	<0.001
alpha-BHC	µg/L	<0.001
beta-BHC	µg/L	<0.001
delta-BHC	µg/L	<0.001
trans-Chlordane	µg/L	<0.001
cis-Chlordane	µg/L	<0.001
Oxychlordane	µg/L	<0.001
Dieldrin	µg/L	<0.001
p,p-DDE	µg/L	<0.001
p,p-DDD	µg/L	<0.001
p,p-DDT	µg/L	<0.001
Endrin	µg/L	<0.001
Endrin Aldehyde	µg/L	<0.001
Endrin Ketone	µg/L	<0.001
alpha-Endosulfan	µg/L	<0.001
beta-Endosulfan	µg/L	<0.001
Endosulfan Sulfate	µg/L	<0.001
Methoxychlor	µg/L	<0.001
Surrogate OC Recovery	%	80

PCB in water - trace level						
Our Reference:	UNITS	91105-1	91105-2	91105-3	91105-4	91105-5
Your Reference	-------------	715	733	740	752	509
Date Sampled	------------	21/05/2013	21/05/2013	21/05/2013	21/05/2013	21/05/2013
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	31/05/2013	31/05/2013	31/05/2013	31/05/2013	31/05/2013
Date analysed	-	31/05/2013	31/05/2013	31/05/2013	31/05/2013	31/05/2013
Aroclor 1016	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Aroclor 1221	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Aroclor 1232	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Aroclor 1242	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Aroclor 1248	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Aroclor 1254	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Aroclor 1260	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Total PCB's (as above)	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01

PCB in water - trace level						
Our Reference:	UNITS	91105-6	91105-11	91105-12	91105-13	91105-14
Your Reference	-------------	5	506	510	513	304
Date Sampled	------------	21/05/2013	22/05/2013	21/05/2013	21/05/2013	22/05/2013
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	31/05/2013	31/05/2013	31/05/2013	31/05/2013	31/05/2013
Date analysed	-	31/05/2013	31/05/2013	31/05/2013	31/05/2013	31/05/2013
Aroclor 1016	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Aroclor 1221	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Aroclor 1232	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Aroclor 1242	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Aroclor 1248	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Aroclor 1254	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Aroclor 1260	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Total PCB's (as above)	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01

PCB in water - trace level		
Our Reference:	UNITS	91105-15
Your Reference	-------------	507A
Date Sampled	------------	22/05/2013
Type of sample		Water
Date extracted	-	31/05/2013
Date analysed	-	31/05/2013
Aroclor 1016	µg/L	<0.01
Aroclor 1221	µg/L	<0.01
Aroclor 1232	µg/L	<0.01
Aroclor 1242	µg/L	<0.01
Aroclor 1248	µg/L	<0.01
Aroclor 1254	µg/L	<0.01
Aroclor 1260	µg/L	<0.01
Total PCB's (as above)	µg/L	<0.01

Total Phenolics in Water Our Reference: Your Reference Date Sampled Type of sample	UNITS ------------- ------------	91105-1 715 21/05/2013 Water	91105-2 733 21/05/2013 Water	91105-3 740 21/05/2013 Water	91105-4 752 21/05/2013 Water	91105-5 509 21/05/2013 Water
Date extracted	-	23/05/2013	23/05/2013	23/05/2013	23/05/2013	23/05/2013
Date analysed	-	23/05/2013	23/05/2013	23/05/2013	23/05/2013	23/05/2013
Total Phenolics (as Phenol)	mg/L	0.2	<0.05	<0.05	<0.05	<0.05

Total Phenolics in Water Our Reference: Your Reference Date Sampled Type of sample	UNITS ------------- ------------	91105-11 506 22/05/2013 Water	91105-12 510 21/05/2013 Water	91105-13 513 21/05/2013 Water	91105-14 304 22/05/2013 Water	91105-15 507A 22/05/2013 Water
Date extracted	-	23/05/2013	23/05/2013	23/05/2013	23/05/2013	23/05/2013
Date analysed	-	23/05/2013	23/05/2013	23/05/2013	23/05/2013	23/05/2013
Total Phenolics (as Phenol)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05

HM in water - dissolved						
Our Reference:	UNITS	91105-1	91105-2	91105-3	91105-4	91105-5
Your Reference	-------------	715	733	740	752	509
Date Sampled	------------	21/05/2013	21/05/2013	21/05/2013	21/05/2013	21/05/2013
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	23/05/2013	23/05/2013	23/05/2013	23/05/2013	23/05/2013
Date analysed	-	23/05/2013	23/05/2013	23/05/2013	23/05/2013	23/05/2013
Arsenic-Dissolved	µg/L	1	<1	2	<1	<1
Cadmium-Dissolved	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium-Dissolved	µg/L	1	<1	<1	<1	<1
Copper-Dissolved	µg/L	<1	<1	<1	3	<1
Lead-Dissolved	µg/L	<1	<1	<1	<1	<1
Mercury-Dissolved	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel-Dissolved	µg/L	1	<1	4	2	<1
Zinc-Dissolved	µg/L	4	8	18	16	7
Iron-Dissolved	µg/L	2,700	3,500	44,000	140	8,800

HM in water - dissolved						
Our Reference:	UNITS	91105-7	91105-8	91105-11	91105-12	91105-13
Your Reference	-------------	BD1/21/5/13	BD2/21/5/13	506	510	513
Date Sampled	------------	21/05/2013	21/05/2013	22/05/2013	21/05/2013	21/05/2013
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	23/05/2013	23/05/2013	23/05/2013	23/05/2013	23/05/2013
Date analysed	-	23/05/2013	23/05/2013	23/05/2013	23/05/2013	23/05/2013
Arsenic-Dissolved	µg/L	1	2	2	<1	<1
Cadmium-Dissolved	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium-Dissolved	µg/L	2	<1	<1	<1	<1
Copper-Dissolved	µg/L	<1	<1	<1	<1	<1
Lead-Dissolved	µg/L	2	<1	<1	<1	<1
Mercury-Dissolved	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel-Dissolved	µg/L	1	5	2	<1	<1
Zinc-Dissolved	µg/L	13	24	7	10	9
Iron-Dissolved	µg/L	2,700	34,000	3,000	3,100	3,600

HM in water - dissolved Our Reference: Your Reference Date Sampled Type of sample	UNITS ------------- ------------	91105-14 304 22/05/2013 Water	91105-15 507A 22/05/2013 Water
Date prepared	-	23/05/2013	23/05/2013
Date analysed	-	23/05/2013	23/05/2013
Arsenic-Dissolved	µg/L	2	<1
Cadmium-Dissolved	µg/L	<0.1	<0.1
Chromium-Dissolved	µg/L	<1	<1
Copper-Dissolved	µg/L	<1	2
Lead-Dissolved	µg/L	<1	<1
Mercury-Dissolved	µg/L	<0.05	<0.05
Nickel-Dissolved	µg/L	<1	<1
Zinc-Dissolved	µg/L	6	6
Iron-Dissolved	µg/L	2,600	1,100

Miscellaneous Inorganics Our Reference: Your Reference Date Sampled Type of sample	UNITS ------------- ------------	91105-1 715 21/05/2013 Water	91105-2 733 21/05/2013 Water	91105-3 740 21/05/2013 Water	91105-4 752 21/05/2013 Water	91105-5 509 21/05/2013 Water
Date prepared	-	22/5/2013	22/5/2013	22/5/2013	22/5/2013	22/5/2013
Date analysed	-	23/5/2013	23/5/2013	23/5/2013	23/5/2013	23/5/2013
Oil & Grease (LLE)	mg/L	<5	<5	<5	<5	<5
pH	pH Units	5.4	6.6	6.2	5.0	5.6
Calcium - Dissolved	mg/L	2.8	59	68	29	1.7
Magnesium - Dissolved	mg/L	2.6	6.9	34	16	3.9
Hardness	mgCaCO3 /L	18	180	310	140	20

Miscellaneous Inorganics Our Reference: Your Reference Date Sampled Type of sample	UNITS ------------- ------------	91105-11 506 22/05/2013 Water	91105-12 510 21/05/2013 Water	91105-13 513 21/05/2013 Water	91105-14 304 22/05/2013 Water	91105-15 507A 22/05/2013 Water
Date prepared	-	22/5/2013	22/5/2013	22/5/2013	22/5/2013	22/5/2013
Date analysed	-	23/5/2013	23/5/2013	23/5/2013	23/5/2013	23/5/2013
Oil & Grease (LLE)	mg/L	<5	<5	<5	<5	<5
pH	pH Units	5.7	6.0	5.7	5.2	5.3
Calcium - Dissolved	mg/L	4.4	16	5.5	4.1	2.6
Magnesium - Dissolved	mg/L	6.7	23	3.5	6.7	3.1
Hardness	mgCaCO3 /L	39	130	28	38	19

Method ID	Methodology Summary
Org-013	Water samples are analysed directly by purge and trap GC-MS.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-012 subset	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Ext-020	Analysis subcontracted to Australian Government - National Measurement Institute. NATA Accreditation No: 198
Inorg-030	Total Phenolics - determined colorimetrically following disitillation, based upon APHA 22nd ED 5530 D.
Metals-022 ICP-MS	Determination of various metals by ICP-MS.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Inorg-003	Oil & Grease - determine gravimetrically following extraction with Hexane, in accordance with APHA 22nd ED, 5220-B.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA 22nd ED, 4500-H+.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.

QUALITY CONTROL VOCs in water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			23/05/2013	[NT]	[NT]	LCS-W1	23/05/2013
Date analysed	-			24/05/2013	[NT]	[NT]	LCS-W1	24/05/2013
Dichlorodifluoromethane	µg/L	10	Org-013	<10	[NT]	[NT]	[NR]	[NR]
Chloromethane	µg/L	10	Org-013	<10	[NT]	[NT]	[NR]	[NR]
Vinyl Chloride	µg/L	10	Org-013	<10	[NT]	[NT]	[NR]	[NR]
Bromomethane	µg/L	10	Org-013	<10	[NT]	[NT]	[NR]	[NR]
Chloroethane	µg/L	10	Org-013	<10	[NT]	[NT]	[NR]	[NR]
Trichlorofluoromethane	µg/L	10	Org-013	<10	[NT]	[NT]	[NR]	[NR]
1,1-Dichloroethene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Trans-1,2-dichloroethene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,1-dichloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	LCS-W1	124%
Cis-1,2-dichloroethene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Bromochloromethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Chloroform	µg/L	1	Org-013	<1	[NT]	[NT]	LCS-W1	120%
2,2-dichloropropane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,2-dichloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	LCS-W1	118%
1,1,1-trichloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	LCS-W1	116%
1,1-dichloropropene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Cyclohexane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Carbon tetrachloride	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Benzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Dibromomethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,2-dichloropropane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Trichloroethene	µg/L	1	Org-013	<1	[NT]	[NT]	LCS-W1	135%
Bromodichloromethane	µg/L	1	Org-013	<1	[NT]	[NT]	LCS-W1	115%
trans-1,3-dichloropropene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
cis-1,3-dichloropropene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,1,2-trichloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Toluene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,3-dichloropropane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Dibromochloromethane	µg/L	1	Org-013	<1	[NT]	[NT]	LCS-W1	110%
1,2-dibromoethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Tetrachloroethene	µg/L	1	Org-013	<1	[NT]	[NT]	LCS-W1	106%
1,1,1,2-tetrachloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Chlorobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Ethylbenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Bromoform	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
m+p-xylene	µg/L	2	Org-013	<2	[NT]	[NT]	[NR]	[NR]
Styrene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,1,2,2-tetrachloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
o-xylene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]

QUALITY CONTROL VOCs in water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
1,2,3-trichloropropane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Isopropylbenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Bromobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
n-propyl benzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
2-chlorotoluene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
4-chlorotoluene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,3,5-trimethyl benzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Tert-butyl benzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,2,4-trimethyl benzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,3-dichlorobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Sec-butyl benzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,4-dichlorobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
4-isopropyl toluene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,2-dichlorobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
n-butyl benzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,2-dibromo-3-chloropropane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,2,4-trichlorobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Hexachlorobutadiene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,2,3-trichlorobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Surrogate Dibromofluoromethane	%		Org-013	119	[NT]	[NT]	LCS-W1	105%
Surrogate toluene-d8	%		Org-013	108	[NT]	[NT]	LCS-W1	101%
Surrogate 4-BFB	%		Org-013	102	[NT]	[NT]	LCS-W1	103%

QUALITY CONTROL BTEX in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			24/05/2013	[NT]	[NT]	LCS-W1	24/05/2013
Date analysed	-			24/05/2013	[NT]	[NT]	LCS-W1	24/05/2013
Benzene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W1	123%
Toluene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W1	122%
Ethylbenzene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W1	124%
m+p-xylene	µg/L	2	Org-016	<2	[NT]	[NT]	LCS-W1	126%
o-xylene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W1	125%
Surrogate Dibromofluoromethane	%		Org-016	119	[NT]	[NT]	LCS-W1	125%
Surrogate toluene-d8	%		Org-016	108	[NT]	[NT]	LCS-W1	104%
Surrogate 4-BFB	%		Org-016	102	[NT]	[NT]	LCS-W1	93%

QUALITY CONTROL vTRH in Water (C6-C9) NEPM	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			23/05/2013	[NT]	[NT]	LCS-W1	23/05/2013
Date analysed	-			24/05/2013	[NT]	[NT]	LCS-W1	24/05/2013
TRHC_6 - C_9	µg/L	10	Org-016	<10	[NT]	[NT]	LCS-W1	124%
TRHC_6 - C_{10}	µg/L	10	Org-016	<10	[NT]	[NT]	LCS-W1	124%
Surrogate Dibromofluoromethane	%		Org-013	108	[NT]	[NT]	LCS-W1	125%
Surrogate toluene-d8	%		Org-013	100	[NT]	[NT]	LCS-W1	104%
Surrogate 4-BFB	%		Org-013	103	[NT]	[NT]	LCS-W1	93%

QUALITY CONTROL svTRH (C10-C40) in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			30/05/2013	[NT]	[NT]	LCS-W1	30/05/2013
Date analysed	-			30/05/2013	[NT]	[NT]	LCS-W1	30/05/2013
TRHC_{10} - C_{14}	µg/L	50	Org-003	<50	[NT]	[NT]	LCS-W1	94%
TRHC_{15} - C_{28}	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W1	93%
TRHC_{29} - C_{36}	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W1	97%
TRH>C_{10} - C_{16}	µg/L	50	Org-003	<50	[NT]	[NT]	LCS-W1	94%
TRH>C_{16} - C_{34}	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W1	93%
TRH>C_{34} - C_{40}	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W1	97%
Surrogate o-Terphenyl	%		Org-003	84	[NT]	[NT]	LCS-W1	95%

QUALITY CONTROL PAHs in Water - Low Level	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			23/05/2013	[NT]	[NT]	LCS-W1	23/05/2013
Date analysed	-			24/05/2013	[NT]	[NT]	LCS-W1	24/05/2013
Naphthalene	µg/L	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-W1	78%
Acenaphthylene	µg/L	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Acenaphthene	µg/L	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Fluorene	µg/L	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-W1	77%
Phenanthrene	µg/L	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-W1	70%
Anthracene	µg/L	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Fluoranthene	µg/L	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-W1	68%
Pyrene	µg/L	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-W1	73%
Benzo(a)anthracene	µg/L	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Chrysene	µg/L	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-W1	66%
Benzo(b+k)fluoranthene	µg/L	0.2	Org-012 subset	<0.2	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene	µg/L	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-W1	84%
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene	µg/L	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	µg/L	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene TEQ	µg/L	0.5	Org-012 subset	[NT]	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012 subset	86	[NT]	[NT]	LCS-W1	80%

QUALITY CONTROL OCP in water - trace level	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			31/05/2013	[NT]	[NT]	LCS-W1	31/05/2013
Date analysed	-			31/05/2013	[NT]	[NT]	LCS-W1	31/05/2013
HCB	µg/L	0.001	Ext-020	<0.001	[NT]	[NT]	[NR]	[NR]
Heptachlor	µg/L	0.001	Ext-020	<0.001	[NT]	[NT]	LCS-W1	114%
Heptachlor Epoxide	µg/L	0.001	Ext-020	<0.001	[NT]	[NT]	[NR]	[NR]
Aldrin	µg/L	0.001	Ext-020	<0.001	[NT]	[NT]	LCS-W1	113%
gamma-BHC (Lindane)	µg/L	0.001	Ext-020	<0.001	[NT]	[NT]	LCS-W1	122%
alpha-BHC	µg/L	0.001	Ext-020	<0.001	[NT]	[NT]	[NR]	[NR]
beta-BHC	µg/L	0.001	Ext-020	<0.001	[NT]	[NT]	[NR]	[NR]
delta-BHC	µg/L	0.001	Ext-020	<0.001	[NT]	[NT]	[NR]	[NR]
trans-Chlordane	µg/L	0.001	Ext-020	<0.001	[NT]	[NT]	[NR]	[NR]
cis-Chlordane	µg/L	0.001	Ext-020	<0.001	[NT]	[NT]	[NR]	[NR]
Oxychlordane	µg/L	0.001	Ext-020	<0.001	[NT]	[NT]	[NR]	[NR]
Dieldrin	µg/L	0.001	Ext-020	<0.001	[NT]	[NT]	LCS-W1	66%
p,p-DDE	µg/L	0.001	Ext-020	<0.001	[NT]	[NT]	[NR]	[NR]
p,p-DDD	µg/L	0.001	Ext-020	<0.001	[NT]	[NT]	[NR]	[NR]
p,p-DDT	µg/L	0.001	Ext-020	<0.001	[NT]	[NT]	LCS-W1	62%
Endrin	µg/L	0.001	Ext-020	<0.001	[NT]	[NT]	LCS-W1	69%
Endrin Aldehyde	µg/L	0.001	Ext-020	<0.001	[NT]	[NT]	[NR]	[NR]
Endrin Ketone	µg/L	0.001	Ext-020	<0.001	[NT]	[NT]	[NR]	[NR]
alpha-Endosulfan	µg/L	0.001	Ext-020	<0.001	[NT]	[NT]	[NR]	[NR]
beta-Endosulfan	µg/L	0.001	Ext-020	<0.001	[NT]	[NT]	[NR]	[NR]
Endosulfan Sulfate	µg/L	0.001	Ext-020	<0.001	[NT]	[NT]	[NR]	[NR]
Methoxychlor	µg/L	0.001	Ext-020	<0.001	[NT]	[NT]	[NR]	[NR]
Surrogate OC Recovery	%		Ext-020	[NT]	[NT]	[NT]	LCS-W1	81%

QUALITY CONTROL PCB in water - trace level	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			31/05/2013	[NT]	[NT]	LCS-W1	31/05/2013
Date analysed	-			31/05/2013	[NT]	[NT]	LCS-W1	31/05/2013
Aroclor 1016	µg/L	0.01	Ext-020	<0.01	[NT]	[NT]	[NR]	[NR]
Aroclor 1221	µg/L	0.01	Ext-020	<0.01	[NT]	[NT]	[NR]	[NR]
Aroclor 1232	µg/L	0.01	Ext-020	<0.01	[NT]	[NT]	[NR]	[NR]
Aroclor 1242	µg/L	0.01	Ext-020	<0.01	[NT]	[NT]	[NR]	[NR]
Aroclor 1248	µg/L	0.01	Ext-020	<0.01	[NT]	[NT]	[NR]	[NR]
Aroclor 1254	µg/L	0.01	Ext-020	<0.01	[NT]	[NT]	[NR]	[NR]
Aroclor 1260	µg/L	0.01	Ext-020	<0.01	[NT]	[NT]	[NR]	[NR]
Total PCB's (as above)	µg/L	0.010	Ext-020	<0.01	[NT]	[NT]	LCS-W1	103%

QUALITY CONTROL Total Phenolics in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			23/05/2013	91105-1	23/05/2013 || 23/05/2013	LCS-W1	23/05/2013
Date analysed	-			23/05/2013	91105-1	23/05/2013 || 23/05/2013	LCS-W1	23/05/2013
Total Phenolics (as Phenol)	mg/L	0.05	Inorg-030	<0.05	91105-1	0.2 || 0.2 || RPD: 0	LCS-W1	98%

QUALITY CONTROL HM in water - dissolved	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			24/05/2013	91105-8	23/05/2013 || 23/05/2013	LCS-W3	23/05/2013
Date analysed	-			24/05/2013	91105-8	23/05/2013 || 23/05/2013	LCS-W3	23/05/2013
Arsenic-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	91105-8	2 || 2 || RPD: 0	LCS-W3	98%
Cadmium-Dissolved	µg/L	0.1	Metals-022 ICP-MS	<0.1	91105-8	<0.1 || <0.1	LCS-W3	100%
Chromium-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	91105-8	<1 || <1	LCS-W3	93%
Copper-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	91105-8	<1 || <1	LCS-W3	93%
Lead-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	91105-8	<1 || <1	LCS-W3	97%
Mercury-Dissolved	µg/L	0.05	Metals-021 CV-AAS	<0.05	91105-8	<0.05 || <0.05	LCS-W3	96%
Nickel-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	91105-8	5 || 5 || RPD: 0	LCS-W3	95%
Zinc-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	91105-8	24 || 24 || RPD: 0	LCS-W3	93%
Iron-Dissolved	µg/L	10	Metals-022 ICP-MS	<10	91105-8	34000 || 35000 || RPD: 3	LCS-W3	84%

QUALITY CONTROL Miscellaneous Inorganics	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			22/05/2013	91105-1	22/5/2013 || 22/5/2013	LCS-W4	22/05/2013
Date analysed	-			22/05/2013	91105-1	23/5/2013 || 23/5/2013	LCS-W4	23/05/2013
Oil & Grease (LLE)	mg/L	5	Inorg-003	<5	91105-1	<5 || [N/T]	LCS-W4	82%
pH	pH Units		Inorg-001	[NT]	91105-1	5.4 || 5.3 || RPD: 2	LCS-W4	102%
Calcium - Dissolved	mg/L	0.5	Metals-020 ICP-AES	<0.5	91105-1	2.8 || [N/T]	LCS-W4	105%
Magnesium - Dissolved	mg/L	0.5	Metals-020 ICP-AES	<0.5	91105-1	2.6 || [N/T]	LCS-W4	102%
Hardness	mgCaCO3/L	3		[NT]	91105-1	18 || [N/T]	[NR]	[NR]

QUALITY CONTROL Total Phenolics in Water	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	91105-2	23/05/2013
Date analysed	-	[NT]	[NT]	91105-2	23/05/2013
Total Phenolics (as Phenol)	mg/L	[NT]	[NT]	91105-2	92%

QUALITY CONTROL HM in water - dissolved	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	91105-1	23/05/2013 || 23/05/2013	91105-2	23/05/2013
Date analysed	-	91105-1	23/05/2013 || 23/05/2013	91105-2	23/05/2013
Mercury-Dissolved	µg/L	91105-1	<0.05 || <0.05	91105-2	104%

QUALITY CONTROL Miscellaneous Inorganics	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	91105-11	22/5/2013 || 22/5/2013	91105-12	22/05/2013
Date analysed	-	91105-11	23/5/2013 || 23/5/2013	91105-12	22/05/2013
Calcium - Dissolved	mg/L	91105-11	4.4 || 4.3 || RPD: 2	91105-12	#
Magnesium - Dissolved	mg/L	91105-11	6.7 || 6.7 || RPD: 0	91105-12	#
Hardness	mgCaCO3/L	91105-11	39 || 38 || RPD: 3	[NR]	[NR]

QUALITY CONTROL HM in water - dissolved	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date prepared	-	91105-14	23/05/2013 || 23/05/2013
Date analysed	-	91105-14	23/05/2013 || 23/05/2013
Arsenic-Dissolved	µg/L	91105-14	2 || [N/T]
Cadmium-Dissolved	µg/L	91105-14	<0.1 || [N/T]
Chromium-Dissolved	µg/L	91105-14	<1 || [N/T]
Copper-Dissolved	µg/L	91105-14	<1 || [N/T]
Lead-Dissolved	µg/L	91105-14	<1 || [N/T]
Mercury-Dissolved	µg/L	91105-14	<0.05 || <0.05
Nickel-Dissolved	µg/L	91105-14	<1 || [N/T]
Zinc-Dissolved	µg/L	91105-14	6 || [N/T]
Iron-Dissolved	µg/L	91105-14	2600 || [N/T]

Report Comments:

MISC_INORG: # Percent recovery is not possible to report due to the high concentration of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

OC/PCB's in soil analysed by NMI. Report No.RN0974584.

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

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

Quality Control Definitions

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

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

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

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

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

Laboratory Acceptance Criteria

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

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

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CHAIN OF CUSTODY

Project Name: Brookvale
Project No: 71015.18 Sampler: Richard Lamont
Project Mgr: L.R. Mob. Phone:
Email: david.welke@douglaspartners.com.au
Date Required: Standard Lab Quote No.

To: Envirolab Services
12 Ashley Street, Chatswood NSW 2068
Attn: Tania Notaras
Phone: 02 9910 6200 Fax: 02 9910 6201
Email: tnotaras@envirolabservices.com.au

Esdat format please.

Sample ID	Sample Depth	Lab ID	Sampling Date	Sample Type S - soil W - water	Container type	Heavy Metals (8)	Iron (dissolved)	PAH (low level)	Oil + grease	OCP/PCB (trace level)	VOC	phenols (total)	pH + hardness	BTEX only				Other	Notes
715		1	21/5/13	W	bottles/vials	✓	✓	✓	✓	✓	✓	✓	✓						
733		2	21/5/13																
740		3	21/5/13																
752	~~21/5/13~~	4	21/5/13																
509		5	21/5/13																Envirolab Services 12 Ashley St Chatswood NSW 2067 Ph: (02) 9910 6200
5		6	21/5/13							✓									Job No: 91105
BD1/21/5/13		7	21/5/13			✓		✓											Date Received: 22/05
BD2/21/5/13		8	21/5/13			✓		✓											Time Received: 13:30
Trip Spike		9	21/5/13		vial									✓					Received by: SR
Trip Blank		10	21/5/13	W	vial									✓					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: David Welke Signed: D. Welke Date & Time: 22/5/13 11.20 am Received By: Sophie Date & Time: 22/05
Relinquished by: Signed: Date & Time: Received By: Date & Time:

Douglas Partners
Geotechnics · Environment · Groundwater

CHAIN OF CUSTODY

Project Name: Brookvale
Project No: 71015.18 Sampler: Richard Lamont
Project Mgr: L.R Mob. Phone:
Email: david.walker@douglaspartners.com.au
Date Required: Standard Lab Quote No.

To: Envirolab Services
12 Ashley Street, Chatswood NSW 2068
Attn: Tania Notaras
Phone: 02 9910 6200 Fax: 02 9910 6201
Email: tnotaras@envirolabservices.com.au

Esdat format please

Sample ID	Sample Depth	Lab ID	Sampling Date	Sample Type S - soil W – water	Container type	Heavy Metals (8)	Iron (dissolved)	PAH (low level)	Oil + grease	OCP/PCB (trace level)	VOC	Phenols (total)	pH + hardness	BTEX only				Other	Notes
506		11	22/5/13	W	bottles/vials	✓	✓	✓	✓	✓	✓	✓	✓						
510		12	21/5/13	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓						
513		13	21/5/13	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓						
304		14	22/5/13	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓						
507A		15	22/5/13	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓						
Trip Spike		16	22/5/13	↓	vial									✓					
Trip Blank		17	22/5/13	↓	vial									✓					

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: David Walker Signed: Date & Time: 22/5/13 11.20 am Received By: Date & Time:
Relinquished by: Signed: Date & Time: Received By: Sophie Date & Time: 22/05

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

SAMPLE RECEIPT ADVICE

Client:

Douglas Partners	ph: 02 9809 0666
96 Hermitage Rd	Fax: 02 9809 4095
West Ryde NSW 2114	

Attention: David Walker

Sample log in details:

Your reference:	**71015.18, Brookvale**
Envirolab Reference:	**91105**
Date received:	22/05/13
Date results expected to be reported:	**29/05/13**

Samples received in appropriate condition for analysis:	YES
No. of samples provided	17 Waters
Turnaround time requested:	Standard
Temperature on receipt	Cool
Cooling Method:	Ice Pack
Sampling Date Provided:	YES

Comments:

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

Contact details:

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

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Certificate of Analysis

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Douglas Partners (Syd)
96 Hermitage Road
West Ryde
NSW 2114

Attention: **Lindsay Rockett**

Report **378011-S**
Client Reference BROOKVALE 71015.18
Received Date May 06, 2013

Client Sample ID			**BD2-300413**	**BD3-010513**
Sample Matrix			**Soil**	**Soil**
Eurofins | mgt Sample No.			**S13-My04821**	**S13-My04822**
Date Sampled			**Apr 30, 2013**	**May 01, 2013**
Test/Reference	LOR	Unit		
Polyaromatic Hydrocarbons (PAH)				
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	0.6
Benzo(b)fluoranthene & Benzo(k)fluoranthene	1	mg/kg	< 1	< 1
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	0.8
Fluorene	0.5	mg/kg	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	0.8
Total PAH	1	mg/kg	< 1	2.2
2-Fluorobiphenyl (surr.)	1	%	93	99
p-Terphenyl-d14 (surr.)	1	%	72	71
Heavy Metals				
Arsenic	2	mg/kg	< 2	5.8
Cadmium	0.4	mg/kg	< 0.4	< 0.4
Chromium	5	mg/kg	< 5	5.8
Copper	5	mg/kg	23	12
Lead	5	mg/kg	13	49
Mercury	0.05	mg/kg	< 0.05	0.06
Nickel	5	mg/kg	9.9	5.3
Zinc	5	mg/kg	72	68
% Moisture	0.1	%	16	16

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

Description	Testing Site	Extracted	Holding Time
Polyaromatic Hydrocarbons (PAH)	Sydney	May 08, 2013	14 Day
- Method: E007 Polyaromatic Hydrocarbons (PAH)			
Metals M8	Sydney	May 07, 2013	28 Day
- Method: E022 Acid Extractable metals in Soils & E026 Mercury			
% Moisture	Sydney	May 07, 2013	28 Day
- Method: E005 Moisture Content			

Company Name:	Douglas Partners (Syd)	**Order No.:**		**Received:**	May 6, 2013 1:35 PM
Address:	96 Hermitage Road West Ryde NSW 2114	**Report #:**	378011	**Due:**	May 13, 2013
		Phone:	02 9809 0666	**Priority:**	5 Day
		Fax:		**Contact Name:**	Lindsay Rockett
Client Job No.:	BROOKVALE 71015.18				

Eurofins | mgt Client Manager: Jean Heng

Sample Detail					% Moisture	Metals M8	Polyaromatic Hydrocarbons (PAH)
Laboratory where analysis is conducted							
Melbourne Laboratory - NATA Site # 1254 & 14271							
Sydney Laboratory - NATA Site # 18217					X	X	X
Brisbane Laboratory - NATA Site # 20794							
External Laboratory							
Sample ID	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**			
BD2-300413	Apr 30, 2013		Soil	S13-My04821	X	X	X
BD3-010513	May 01, 2013		Soil	S13-My04822	X	X	X

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Eurofins | mgt Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Actual PQLs are matrix dependant. Quoted PQLs may be raised where sample extracts are diluted due to interferences.
4. Results are uncorrected for matrix spikes or surrogate recoveries.
5. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
6. Samples were analysed on an 'as received' basis. 7. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Acknowledgment.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

****NOTE:** pH duplicates are reported as a range NOT as RPD

UNITS

mg/kg: milligrams per Kilogram

ug/l: micrograms per litre

ppb: Parts per billion

org/100ml: Organisms per 100 millilitres

MPN/100mL: Most Probable Number of organisms per 100 millilitres

mg/l: milligrams per litre

ppm: Parts per million

%: Percentage

NTU: Units

TERMS

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery
CRM	Certified Reference Material - reported as percent recovery
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands. In the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
Batch Duplicate	A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis.
Batch SPIKE	Spike recovery reported on a sample from outside of the clients batch of samples but run within the laboratory batch of analysis.
USEPA	United States Environment Protection Authority
APHA	American Public Health Association
ASLP	Australian Standard Leaching Procedure (AS4439.3)
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within

QC - ACCEPTANCE CRITERIA

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries : Recoveries must lie between 50-150% - Phenols 20-130%.

QC DATA GENERAL COMMENTS

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxophene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxophene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Arochlor 1260 in Matrix Spikes and LCS's.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPD's are calculated from raw analytical data thus it is possible to have two sets of data.

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Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Polyaromatic Hydrocarbons (PAH) E007 Polyaromatic Hydrocarbons (PAH)							
Acenaphthene	mg/kg	< 0.5			0.5	Pass	
Acenaphthylene	mg/kg	< 0.5			0.5	Pass	
Anthracene	mg/kg	< 0.5			0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5			0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Benzo(b)fluoranthene & Benzo(k)fluoranthene	mg/kg	< 1			1	Pass	
Benzo(g.h.i)perylene	mg/kg	< 0.5			0.5	Pass	
Chrysene	mg/kg	< 0.5			0.5	Pass	
Dibenz(a.h)anthracene	mg/kg	< 0.5			0.5	Pass	
Fluoranthene	mg/kg	< 0.5			0.5	Pass	
Fluorene	mg/kg	< 0.5			0.5	Pass	
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.5			0.5	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Phenanthrene	mg/kg	< 0.5			0.5	Pass	
Pyrene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Metals M8 E022 Acid Extractable metals in Soils & E026 Mercury							
Arsenic	mg/kg	< 2			2	Pass	
Cadmium	mg/kg	< 0.4			0.4	Pass	
Chromium	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 5			5	Pass	
Lead	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.05			0.05	Pass	
Nickel	mg/kg	< 5			5	Pass	
Zinc	mg/kg	< 5			5	Pass	
LCS - % Recovery							
Polyaromatic Hydrocarbons (PAH) E007 Polyaromatic Hydrocarbons (PAH)							
Acenaphthene	%	105			70-130	Pass	
Acenaphthylene	%	100			70-130	Pass	
Anthracene	%	112			70-130	Pass	
Benz(a)anthracene	%	91			70-130	Pass	
Benzo(a)pyrene	%	129			70-130	Pass	
Benzo(b)fluoranthene & Benzo(k)fluoranthene	%	125			70-130	Pass	
Benzo(g.h.i)perylene	%	102			70-130	Pass	
Chrysene	%	102			70-130	Pass	
Dibenz(a.h)anthracene	%	103			70-130	Pass	
Fluoranthene	%	92			70-130	Pass	
Fluorene	%	96			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	101			70-130	Pass	
Naphthalene	%	106			70-130	Pass	
Phenanthrene	%	110			70-130	Pass	
Pyrene	%	90			70-130	Pass	
LCS - % Recovery							
Metals M8 E022 Acid Extractable metals in Soils & E026 Mercury							
Arsenic	%	87			70-130	Pass	
Cadmium	%	84			70-130	Pass	
Chromium	%	94			70-130	Pass	
Copper	%	110			70-130	Pass	
Lead	%	95			70-130	Pass	
Mercury	%	99			70-130	Pass	

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Nickel			%	96			70-130	Pass	
Zinc			%	97			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Polyaromatic Hydrocarbons (PAH)				Result 1					
Acenaphthene	S13-My01353	NCP	%	110			70-130	Pass	
Acenaphthylene	S13-My01353	NCP	%	107			70-130	Pass	
Anthracene	S13-My01353	NCP	%	114			70-130	Pass	
Benz(a)anthracene	S13-My01353	NCP	%	104			70-130	Pass	
Benzo(a)pyrene	S13-My01353	NCP	%	123			70-130	Pass	
Benzo(b)fluoranthene & Benzo(k)fluoranthene	S13-My01353	NCP	%	124			70-130	Pass	
Benzo(g.h.i)perylene	S13-My01353	NCP	%	98			70-130	Pass	
Chrysene	S13-My01353	NCP	%	107			70-130	Pass	
Dibenz(a.h)anthracene	S13-My01353	NCP	%	111			70-130	Pass	
Fluoranthene	S13-My01353	NCP	%	100			70-130	Pass	
Fluorene	S13-My01353	NCP	%	102			70-130	Pass	
Indeno(1.2.3-cd)pyrene	S13-My01353	NCP	%	123			70-130	Pass	
Naphthalene	S13-My01353	NCP	%	113			70-130	Pass	
Phenanthrene	S13-My01353	NCP	%	110			70-130	Pass	
Pyrene	S13-My01353	NCP	%	99			70-130	Pass	
Spike - % Recovery									
Metals M8				Result 1					
Arsenic	S13-My04835	NCP	%	113			70-130	Pass	
Cadmium	S13-My04835	NCP	%	89			70-130	Pass	
Chromium	S13-My04835	NCP	%	99			70-130	Pass	
Copper	S13-My04835	NCP	%	97			70-130	Pass	
Lead	S13-My05826	NCP	%	101			70-130	Pass	
Mercury	S13-My04835	NCP	%	95			70-130	Pass	
Nickel	S13-My04835	NCP	%	112			70-130	Pass	
Zinc	S13-My05826	NCP	%	102			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Polyaromatic Hydrocarbons (PAH)				Result 1	Result 2	RPD			
Acenaphthene	S13-My01353	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	S13-My01353	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	S13-My01353	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	S13-My01353	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	S13-My01353	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b)fluoranthene & Benzo(k)fluoranthene	S13-My01353	NCP	mg/kg	< 1	< 1	<1	30%	Pass	
Benzo(g.h.i)perylene	S13-My01353	NCP	mg/kg	0.70	< 0.5	30	30%	Pass	
Chrysene	S13-My01353	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	S13-My01353	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	S13-My01353	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	S13-My01353	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	S13-My01353	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	S13-My01353	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	S13-My01353	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	S13-My01353	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Metals M8				Result 1	Result 2	RPD			
Arsenic	S13-My05826	NCP	mg/kg	2.0	3.6	56	30%	Fail	Q15
Cadmium	S13-My05826	NCP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	

Duplicate									
Metals M8				Result 1	Result 2	RPD			
Chromium	S13-My05826	NCP	mg/kg	24	6.2	54	30%	Fail	Q15
Copper	S13-My05826	NCP	mg/kg	27	24	11	30%	Pass	
Lead	S13-My05826	NCP	mg/kg	18	15	19	30%	Pass	
Mercury	S13-My04835	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Nickel	S13-My05826	NCP	mg/kg	7.6	8.2	7.0	30%	Pass	
Zinc	S13-My05826	NCP	mg/kg	42	56	30	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Organic samples had Teflon liners	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
Q15	The RPD reported passes Eurofins | mgt's Acceptance Criteria as stipulated in SOP 05. Refer to Glossary Page of this report for further details

Authorised By

Jean Heng	Client Services
Ryan Hamilton	Senior Analyst-Organic (NSW)
James Norford	Senior Analyst-Metal (NSW)

Dr. Bob Symons
Laboratory Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Uncertainty data is available on request

Douglas Partners
Geotechnics · Environment · Groundwater

CHAIN OF CUSTODY

Project Name: Brookvale
Project No: 71015 18 Sampler: D. Walker
Project Mgr: L.R. Mob. Phone:
Email: lindsay.rockett@douglaspartners.com.au
Date Required: Standard T/A Lab Quote No.

To: Envirolab Services
12 Ashley Street, Chatswood NSW 2068
Attn: Tania Notaras
Phone: 02 9910 6200 Fax: 02 9910 6201
Email: tnotaras@envirolabservices.com.au

Sample ID	Sample Depth	Lab ID	Sampling Date	Sample Type S - soil W - water	Container type	Heavy Metals	BTEX/ TPH	OCPs/ PCBs	PAH	Phenols	Asbestos	BTEX only						Other	Notes #378011
767	0.5-1.0	37	1/5/13	S	Jar	✓	✓	✓	✓	✓	✓								Combo 7A
768	0.4-0.5	38	1/5/13	↓		✓	✓		✓										3
768	1.4-1.5	39	1/5/13	↓	↓	✓	✓	✓	✓	✓	✓								7A
A1		40	30/4/13	material	bag						✓								
BD2-02 0513		41	2/5/13	S	Jar	✓			✓										Send samples to Labmark for analysis
BD2-290413		42	29/4/13			✓			✓										
BD1-290413		43	↓			✓			✓										
BD2-300413			30/4/13			✓			✓	*									
BD3-010513			1/5/13			✓			✓	*									
Trip spike		44	29/4/13									✓							
Trip blank		45	29/4/13									✓							
trip spike		46	30/4/13	↓	↓							✓							

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: D. Walker Signed: Date & Time: 3/5/13 Received By: Prabuttla Date & Time: 3/5/13 15:00
Relinquished by: Sophie Signed: Date & Time: 06/05 Received By: C. ALIMANE Date & Time: 6/5/13 1335 RC.

90053

Sample Receipt Advice

Company name:	**Douglas Partners (Syd)**
Contact name:	Lindsay Rockett
Client job number:	BROOKVALE 71015.18
COC number:	Not provided
Turn around time:	5 Day
Date/Time received:	May 6, 2013 1:35 PM
Eurofins | mgt reference:	**378011**

Sample information

☑ A detailed list of analytes logged into our LIMS, is included in the attached summary table.

☑ All samples have been received as described on the above COC.

☑ COC has been completed correctly.

☑ Attempt to chill was evident.

☑ Appropriately preserved sample containers have been used.

☑ All samples were received in good condition.

☑ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.

☑ Organic samples had Teflon liners.

☒ Some samples have been subcontracted.

N/A Custody Seals intact (if used).

Contact notes

If you have any questions with respect to these samples please contact:

Jean Heng on Phone : (+61) (2) 9900 8400 or by e.mail: jean.heng@mgtlabmark.com.au

Results will be delivered electronically via e.mail to Lindsay Rockett - rockettl@douglaspartners.com.au.

Eurofins | mgt Sample Receipt

Appendix D

QA/QC Procedures

QA/QC PROCEDURES AND RESULTS

Q1. Data Quality Objectives

The Phase 2 Contamination Assessment has been devised broadly in accordance with the seven step data quality objective (DQO) process which is provided in Department of Environment and Conservation NSW, *Guidelines for the NSW Site Auditor Scheme* (2nd Edition), 2006. The DQO process has also been adopted in Appendix B, Schedule 2 of National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013. The DQO process is outlined as follows:

(1) State the Problem

The site is proposed to be redeveloped as part of the Warringah Mall redevelopment. Previous investigations at Warringah Mall have identified potential sources of contamination as well as groundwater contamination associated with a neighboring dry cleaning operation. The “problem” to be addressed is to characterize the nature and extent of contamination, if any, at the site, and to make recommendations for further investigations and/or remediation to render the site suitable for the proposed redevelopment works.

(2) Identify the Decision

Environmental data, including soil and groundwater characteristics, is required as part of the contamination assessment process to enable an assessment of the contamination status of the site, and the requirement for further assessment and/or remediation. The following specific decisions are required to be made:

- Do the existing fill materials and natural soils pose a potential risk to human health of potential future users of the site, including construction workers, site workers, and visitors?
- Do the existing fill materials and natural soils pose a potential risk to ecological receptors, either current receptors or potential future receptors?
- Does the existing groundwater beneath the site pose a potential risk to human health (on-site or off-site) or ecological receptors, either current receptors or potential future receptors?
- Is the data sufficient to make a decision regarding the abovementioned risks, or are additional investigations required?
- Is the data sufficient to enable preparation of a Remediation Action Plan (RAP) and/or Environmental Management Plan (EMP) should the data suggest these are required?

(3) Identify Inputs to the Decision

Inputs into the decision are as follows:

- Available site information regarding previous and current activities undertaken on the site and the surrounding area (presented in previous reports, in particular, the Phase 1 Contamination Assessment);
- Results of previous investigations undertaken;
- Screening results;
- The local geology, topography and hydrology;
- Soil data collected from the site, included analytical results for the contaminants of concern;
- Groundwater data collected from the site, including analytical results and the contaminants of concern;
- Relevant Site Assessment Criteria (SAC) and Groundwater Investigation Levels (GIL); and
- Field and laboratory QA/QC data to assess the suitability of the environmental data for the assessment.

(4) Define the Boundary of the Assessment

Warringah Mall is a large shopping mall complex at Brookvale, NSW, with significant frontages to Old Pittwater Road, Cross Street and Condamine Street (becoming Pittwater Road), to the south, north and east of the mall respectively. Drawing 1, Appendix A shows a locality plan for the Mall. The subject site, primarily located within Lot 100 of Deposited Plan 1015283, covers an irregularly shaped area of approximately 2.2 ha and included:

- A southern portion of Green Street, part of which is within a road reserve. The southern end of Green Street has a roundabout, part of which is within the subject site. The site can be accessed via Green Street;
- A southern portion of Dale Street. The southern end of Dale street has a roundabout which is within the subject site. The site can be accessed via Dale Street;
- A road section and small car park between Green Street and Dale Street. The small car park is for a retail outlet (Bing Lee);
- The Sand Castle car park (now the Red car park) and part of an adjacent car park to the north for a hardware store (Bunnings). The site could be exited at the northern end of the Sand Castle car park;
- A vehicle entrance road from Pittwater Road to access the Sand Caste car park (now the Red car park) and Crab car park (now the Purple car park);
- A loading dock area adjacent to the west of the Sand Castle car park (now the Red car park;
- Most of the Crab car park (now the Purple car park), which can be accessed from the north or south; and

- A two-storey commercial building (partly occupied by HCF and partly disused) near the junction of Pittwater Road and Condamine Street with adjacent parking area to the south. This building has been demolished since the field work was undertaken.

(5) Develop a Decision Rule

The information obtained during the assessment was used to characterise the site in terms of contamination issues and risk to human health and/or the environment. The decision rule in characterising the site was as follows:

- Laboratory test results for systematic soil samples (i.e. non-targeted soil samples) can be analysed statistically, if considered appropriate, to ascertain the 95% upper confidence level (UCL) of the mean concentration for each analyte or analyte group (of like materials);
- Laboratory test results for targeted locations (and identified "hot spots") was assessed individually;
- The SAC and GIL will be the NSW Environment Protection Authority (EPA) endorsed criteria. Where such criteria are not available, other recognised national or international standards was used;
- A contaminant concentration in soil/filling material is considered to be significant if:
  - The concentration of the contaminant is more than 2.5 times the investigation or screening level. Any location more than 2.5 times the SAC is classified as a 'hotspot', requiring further assessment/ management;
  - the calculated 95% Upper Confidence Limit (95% UCL) of average concentrations (excluding any 'hotspot' concentrations) exceeds the screening or investigation level;
  - the standard deviation of the results is greater than 50% of the screening or investigation levels;
- The groundwater was considered not significantly impacted by a particular contaminant if there is no notable or significant increase in analyte concentrations in the groundwater between well locations and/or there are no analyte concentrations in the groundwater samples significantly exceeding the adopted GIL; and
- Further investigation, remediation and/or management are to be recommended if the site is found to be contaminated or containing contamination "hot spots".

Laboratory test results will only be accepted and considered useable for the assessment under the following conditions:

- All laboratories used are accredited by NATA for the analyses undertaken. DP used Envirolab Services as the primary laboratory and Eurofins mgt as the secondary laboratory;
- All practical quantitation limits (PQL) set by the laboratories fall below the SAC and GIL adopted, or indicate across the board lack of detection (i.e. it is noted that some of the water assessment criteria are difficult to achieve at PQL);
- The differences between the reported concentrations of analytes in the intra-laboratory and inter-laboratory replicate samples and the corresponding original samples are within adopted acceptance limits; and

- The quality assurance / quality control (QA/QC) protocols and results reported by the laboratories comply with the requirements of NEPM, 1999 amended 2013.

(6) Specify Acceptable Limits on Decision Errors

Limits on decision errors for the proposed assessment were as follows:

- Systematic soil sample numbers comply (where possible) with those recommended in the NSW EPA Sampling Design Guidelines (1995), which have risk probabilities already incorporated;
- The analyte selection based on the available site history, past site activities, site features and the findings of the Phase 1 Contamination Assessment. The potential for contaminants other than those proposed to be analysed is considered to be low;
- The SAC and GIL were adopted from established and NSW EPA endorsed guidelines. Where not available, recognised national and international guidelines were used. The SAC and GIL have risk probabilities already incorporated; and
- The acceptance limits for laboratory QA/QC parameters are based on the laboratory reported acceptance limits and those stated in NEPM, 1999 amended 2013.

(7) Optimise the Design for Obtaining Data

Sampling locations were located to provide site coverage where accessible to a drilling rig. Procedures for the collection of environmental samples, were developed prior to undertaking the assessment phase of works.

To optimise the selection of samples for chemical analysis, all samples collected were screened using a calibrated photo-ionisation detector (PID). The interpretation of PID values allowed for better assessment of the investigation samples to determine the analytical programme and the need, if any, for further investigation. Further, DP employed NATA accredited analytical laboratories to conduct sample analysis.

Q2. 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 assessment.

Q2.1 Sampling Team

Soil sampling was by David Walker, a DP Environmental Engineer. Groundwater sampling was undertaken by Richard Lamont, a DP Environmental Scientist.

Q2.2 Sample Collection and Weather Conditions

Sample collection procedures and dispatch are reported in Section 8. Soil and groundwater sampling was undertaken during mainly sunny and mild conditions.

Q2.3 Logs

Logs for each soil sampling location were recorded in the field. The individual samples were recorded on the field logs along with the sample identity, location, depth, initials of sampler, duplicate locations, duplicate type, site observations. Logs are presented in Appendix B.

Field Logs of groundwater sampling and development were maintained including records of micro-purging and field parameters.

Q2.4 Chain of Custody

Chain of custody information was recorded on the Chain of Custody (COC) sheets and accompanied samples to the analytical laboratory. Signed copies of COCs are presented in Appendix C, following the laboratory reports.

Q2.5 Sample Splitting Techniques

Replicate samples were collected in the field as a measure of accuracy, precision and repeatability of the results. Field replicate samples for soil were collected from the same location and an identical depth to the primary sample. Equal portions of the primary sample were placed into the sampling jars and sealed. The sample was not homogenised in a bowl to prevent the loss of volatiles from the soil. Replicate samples were labelled with a DP identification number, recorded on DP bore logs, so as to conceal their relationship to their primary sample from the analysing laboratory.

Groundwater replicate samples were collected by decanting equal portions of groundwater into separately and uniquely labelled groundwater bottles. Sample bottles were filled directly from the pump outlet to minimise disturbance.

Q2.6 Replicate Frequency

Field sampling comprised inter-laboratory and intra-laboratory replicate sampling, at a rate of at least one replicate sample for every ten original samples for intra-laboratory and inter-laboratory analysis, with a minimum of one replicate sample per sampling day.

Q2.7 Trip Spikes

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 volatile contaminants (BTEX in this case), for the purposes of assessing any potential losses in volatile organics incurred prior to reaching the laboratory.

Discussions with the laboratory indicated that trip spikes are generally prepared as aqueous solutions. The laboratory prepared soil trip spikes which were preserved in the standard manner and taken into the field unopened. The volatile organic recovery rates are shown in the table below. At this stage, the laboratory has no standard acceptance limits in recovery rates as results from in-house laboratory controls often vary.

A trip spike was taken into the field on every soil sample day and every groundwater sampling day and dispatched with the batch sampling run. Results (Table Q1) indicate that the percentage loss for BTEX during the trip was minimal and therefore appropriate preservation techniques were employed.

Table Q1: Trip Spike Results (% Recovery)

Sampling Date	Benzene	Toluene	Ethylbenzene	m + p Xylene	o Xylene
Soil Spikes					
24 April 2013	101	101	103	102	102
29 April 2013	89	88	88	92	91
30 April 2013	94	93	92	92	93
1 May 2013	91	91	91	89	90
2 May 2013	96	94	93	92	92
Water Spikes					
21 May 2013	103	100	100	98	99

Q2.8 Trip Blanks

Laboratory prepared soil trip blanks and water trip blanks were taken out to the field unopened, subjected to the same preservation methods as the field samples, then analysed for the purposes of determining the transfer of contaminants into the blank sample incurred prior to reaching the laboratory. The result of the laboratory analysis for the trip blanks is shown in Table Q2.

Table Q2: Trip Blank Results

Sampling Date	Benzene	Toluene	Ethylbenzene	m+p Xylene	0- Xylene
Soil Blanks (mg/kg)					
24 April 2013	<0.2	<0.5	<1	<2	<1
29 April 2013	<0.2	<0.5	<1	<2	<1
30 April 2013	<0.2	<0.5	<1	<2	<1
1 May 2013	<0.2	<0.5	<1	<2	<1

Sampling Date	Benzene	Toluene	Ethylbenzene	m+p Xylene	0- Xylene
2 May 2013	<0.2	<0.5	<1	<2	<1
Water Blanks (µg/L)					
21 May 2013	<1	<1	<1	<2	<1

Levels of analytes were all below detection limits and indicate transfer of BTEX contaminants into the blank has not occurred.

Q2.9 Relative Percentage Difference

A measure of the consistency of results for field samples is derived by the calculation of relative percentage differences (RPDs) for duplicate samples. A RPD of 30% is generally considered typically acceptable for inorganic analytes by NSW EPA, although in general a wider RPD range (50%) may be acceptable for organic analytes. RPDs have only been considered where a concentration is greater than 5 times the practical quantitation limit (PQL). High RPDs are shown in **bold** on the relevant tables below.

Q2.9.1 Intra-Laboratory Analysis

Intra-laboratory replicates were conducted as an internal check of the reproducibility within the primary laboratory (Envirolab Pty Ltd) and as a measure of consistency of sampling techniques. Replicate samples were collected at a rate of approximately one replicate sample for every ten original samples collected and also analysed at a rate of 10% of primary samples analysed. Generally at least one replicate sample was recovered and analysed for each day of sampling.

The comparative results of analysis between original and replicate samples are summarised in the Tables Q3 and Q4.

Table Q3: RPD results for Intra-laboratory soil samples

	739 / 0.9-1	BD2-240413	RPD	747 / 0.4-0.5	BD2-290413	RPD	748 / 0.4-0.5	BD2-020513	RPD	751 / 0.9-1	BD1-290413	RPD
Arsenic	<4	<4	0	<4.0	<4.0	0	<4.0	<4.0	0	<4.0	<4.0	0
Cadmium	<0.4	<0.4	0	<0.4	<0.4	0	<0.4	<0.4	0	<0.4	<0.4	0
Chromium (III+VI)	26	19	**31**	50.0	66.0	28	12.0	7.0	**53**	21.0	17.0	21
Copper	14	7	**67**	<1.0	3.0	**100**	15.0	6.0	**86**	<1.0	<1.0	0
Lead	130	190	**38**	5.0	8.0	46	18.0	5.0	**113**	10.0	9.0	11
Mercury	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0
Nickel	16	5	**104**	4.0	11.0	**93**	9.0	2.0	**127**	3.0	3.0	0
Zinc	150	190	24	6.0	9.0	**40**	23.0	7.0	**107**	3.0	4.0	29
Acenaphthene	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	0.2	**67**	<0.1	<0.1	0
Acenaphthylene	<0.1	<0.1	0	<0.1	<0.1	0	0.1	<0.1	0	<0.1	<0.1	0
Anthracene	<0.1	<0.1	0	<0.1	<0.1	0	0.3	<0.1	**100**	<0.1	<0.1	0
Benzo(a)anthracene	0.2	0.3	40	<0.1	<0.1	0	0.8	<0.1	**156**	<0.1	<0.1	0
Benzo(a) pyrene	0.39	0.53	30	<0.05	<0.05	0	0.65	<0.05	**171**	<0.05	<0.05	0
Benzo(b)&(k)fluoranthene	0.5	0.7	33	<0.2	<0.2	0	1.8	<0.2	**160**	<0.2	<0.2	0
Benzo(g,h,i)perylene	0.3	0.4	29	<0.1	<0.1	0	0.3	<0.1	**100**	<0.1	<0.1	0
Chrysene	0.2	0.3	40	<0.1	<0.1	0	0.6	0.1	**143**	<0.1	<0.1	0
Dibenz(a,h)anthracene	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0
Fluoranthene	0.3	0.5	50	<0.1	<0.1	0	2.0	<0.1	**181**	<0.1	<0.1	0
Fluorene	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	0.4	**120**	<0.1	<0.1	0
Indeno(1,2,3-c,d)pyrene	0.2	0.3	40	<0.1	<0.1	0	0.3	<0.1	**100**	<0.1	<0.1	0
Naphthalene	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	0.4	**120**	<0.1	<0.1	0
Phenanthrene	0.1	0.3	**100**	<0.1	<0.1	0	0.7	0.6	15	<0.1	<0.1	0
Pyrene	0.4	0.5	22	<0.1	<0.1	0	2.1	<0.1	**182**	<0.1	<0.1	0

Table Q4: RPD results for Intra-laboratory Groundwater Sample

	740	BD2/21/5/13	**RPD**
Arsenic	2	2	0
Cadmium	<0.1	<0.1	0
Chromium (III+VI)	<1	<1	0
Copper	<1	<1	0
Lead	<1	<1	0
Mercury	<0.05	<0.05	0
Nickel	4	5	22
Zinc	18	24	27
Iron	44000	34000	27
Acenaphthene	<0.1	<0.1	0
Acenaphthylene	<0.1	<0.1	0
Anthracene	<0.1	<0.1	0
Benzo(a)anthracene	<0.1	<0.1	0
Benzo(a) pyrene	<0.1	<0.1	0
Benzo(b)&(k)fluoranthene	<0.2	<0.2	0
Benzo(g,h,i)perylene	<0.1	<0.1	0
Chrysene	<0.1	<0.1	0
Dibenz(a,h)anthracene	<0.1	<0.1	0
Fluoranthene	<0.1	<0.1	0
Fluorene	<0.1	<0.1	0
Indeno(1,2,3-c,d)pyrene	<0.1	<0.1	0
Naphthalene	<0.1	<0.1	0
Phenanthrene	<0.1	<0.1	0
Pyrene	<0.1	<0.1	0

The greater majority of calculated RPD values were within the acceptable range of 30% for inorganic analytes and 50% for organic analytes with the exception of those in bold. However, this is not considered to be significant due to:

- The typically low actual differences in the concentrations of the replicate pairs where some RPD exceedances occurred;
- A number of replicate pairs being collected from fill soils which by its nature is heterogeneous;
- Replicates, rather than homogenised duplicates were used to avoid volatile loss, hence greater variability can be expected;
- Most of the recorded concentrations being at/ close to the practical quantitation limit;
- The majority of RPDs within a replicate pair being within the acceptable limits; and
- All other QA/QC parameters met the DQI's.

Therefore the overall intra-laboratory comparisons indicate that the sampling technique was consistent and repeatable and therefore the results are useable and representative of the conditions encountered.

Q2.9.2 Inter-Laboratory Analysis

Inter-laboratory duplicates were conducted as a check of the reproducibility of results between the primary laboratory (Envirolab Pty Ltd) and a secondary laboratory (Eurofins mgt) and as a measure of consistency of sampling techniques. Inter-laboratory replicates were collected at a rate at least one replicate sample for every 10 original samples collected and also analysed at a rate of 10% of primary samples analysed.

The comparative results of analysis between original and inter-laboratory replicates are summarised in Table Q5. Note that where the laboratory PQL are different and both samples are below PQL (or one sample is below PQL and other has a recorded detection below the other lab PQL) the difference and RPD has been given as zero (0).

Table Q5: Inter-laboratory Results - Soils

	758 / 0.7-0.8	BD2-300413	RPD	766 / 0.9-1	BD3-010513	RPD
Arsenic	<4.0	<2.0	0	<4.0	5.8	**37**
Cadmium	<0.4	<0.4	0	<0.4	<0.4	0
Chromium (III+VI)	9.0	<5.0	**57**	8.0	5.8	**32**
Copper	31.0	23.0	30	11.0	12.0	9
Lead	13.0	13.0	0	**34.0**	**49.0**	**36**
Mercury	<0.1	<0.05	0	<0.1	0.06	0
Nickel	14.0	9.9	**34**	**2.0**	**5.3**	**90**
Zinc	68.0	72.0	6	57.0	68.0	18
Acenaphthene	<0.1	<0.5	0	<0.1	<0.5	0
Acenaphthylene	<0.1	<0.5	0	<0.1	<0.5	0
Anthracene	<0.1	<0.5	0	<0.1	<0.5	0
Benz(a)anthracene	<0.1	<0.5	0	0.2	<0.5	0
Benzo(a) pyrene	<0.05	<0.5	0	0.44	0.6	31
Benzo(b)&(k)fluoranthene	<0.2	<1.0	0	0.7	<1.0	0
Benzo(g,h,i)perylene	<0.1	<0.5	0	0.3	<0.5	0
Chrysene	<0.1	<0.5	0	0.3	<0.5	0
Dibenz(a,h)anthracene	<0.1	<0.5	0	<0.1	<0.5	0
Fluoranthene	<0.1	<0.5	0	0.6	0.8	29
Fluorene	<0.1	<0.5	0	<0.1	<0.5	0
Indeno(1,2,3-c,d)pyrene	<0.1	<0.5	0	0.3	<0.5	0
Naphthalene	<0.1	<0.5	0	<0.1	<0.5	0
Phenanthrene	<0.1	<0.5	0	0.2	<0.5	0
Pyrene	<0.1	<0.5	0	0.6	0.8	29

The greater majority of calculated RPD values were within the acceptable range of 30% for inorganic analytes and 50% for organic analysts with the exception of those in bold. However, this is not considered to be of concern due to:

- The typically low actual differences in the concentrations of the replicate pairs where some RPD exceedances occurred;
- A number of replicate pairs being collected from fill soils which by its nature is heterogeneous;

- Replicates, rather than homogenised duplicates were used to avoid volatile loss, hence greater variability can be expected;
- Most of the recorded concentrations being at/ close to the practical quantitation limit;
- The majority of RPDs within a replicate pair being within the acceptable limits; and
- All other QA/QC parameters met the DQI's.

Therefore the overall inter-laboratory comparisons indicate that the sampling technique was consistent and repeatable and therefore the results are useable and representative of the conditions encountered.

Q3. LABORATORY QUALITY ASSURANCE AND QUALITY CONTROL

Envirolab Services was used as the primary laboratory. Eurofins mgt was used as the secondary laboratory.

Q3.1 Surrogate Spike

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. These results are within acceptance limits as specified in Envirolab Services, indicating that the extraction technique was effective.

The laboratory acceptance criteria for surrogate samples is generally 60-140% for organics; and 10-140% for SVOC and speciated phenols.

Q3.2 Reference and Daily Check Sample Results – Laboratory Control Sample (LCS)

This sample comprises spiking either a standard reference material or a control matrix (such as a blank of sand or water) with a known concentration of specific analytes. The LCS is then analysed and results compared against each other to determine how the laboratory has performed with regard to sample preparation and analytical procedure. LCSs are analysed at a frequency of 1 in 20, with a minimum of one analysed per batch.

The laboratory acceptance criteria for LCS samples is generally 70-130% for inorganic/ metals; and 60-140% for organics; and 10-140% for SVOC and speciated phenols.

Q3.3 Laboratory Duplicate Results

These are additional portions of a sample which are analysed in exactly the same manner as all other samples. The laboratory acceptance criteria for duplicate samples are: in cases where the level is <5xPQL – any RPD is acceptable; and in cases where the level is >5xPQL – 0-50% RPD is acceptable.

Q3.4 Laboratory Blank Results

The laboratory blank, sometimes referred to as the method blank or reagent blank is the sample prepared and analysed at the beginning of every analytical run, following calibration of the analytical apparatus. This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, it can be determined by processing solvents and reagents in exactly the same manner as for samples. Laboratory blanks are analysed at a frequency of 1 in 20, with a minimum of one per batch.

Q3.5 Matrix Spike

This is a sample duplicate 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. The laboratory acceptance criteria for matrix spike samples is generally 70-130% for inorganic/metals; and 60-140% for organics; and 10-140% for SVOC and speciated phenols.

Q3.6 Results of Laboratory QC

The laboratory QC for surrogate spikes, LCS, laboratory duplicate results, method blanks and matrix spikes were generally within the acceptance standards. There were, however a few comments made in some of the laboratory reports which are summarised in Table Q6 below.

Table Q6: Laboratory QA Comments

Report No.	Laboratory	Laboratory Comment
89690	Envirolab	For PAH, TRH and VOC analysis, percent recovery is not possible in duplicate and spike samples have caused interference. The laboratory RPD acceptance criteria has been exceeded for 89690-1 for Cr, Cu, Ni, Zn. Therefore a triplicate result has been issued as laboratory sample number 89690-46. The laboratory RPD acceptance criteria has been exceeded for 89690-20 for Cr, Pb, Zn. Therefore a triplicate result has been issued as laboratory sample number 89690-47.
90053 R01	Envirolab	For TRH in soil, percent recovery is not possible to report as the high concentrations of analytes in the samples have caused interference. The PQL for PCB in soil has been raised due to sample interference from analytes (other than those being tested) in sample 90053-18 The PQL for PCB in soil has been raised due to the high concentrations of analytes in the sample, resulting in the sample 90053-31 requiring dilution.
91105	Envirolab	For inorganics analysis, percent recovery is not possible to report due to the high concentration of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

The majority of the laboratory quality control samples were within the laboratory acceptance criteria, with the exception of those identified in Table Q6. The QC failures, where they occurred, are not considered to have significantly impacted the quality of the results overall as the number of failures were minor compared to the overall QC data. It is considered that an acceptable level of laboratory precision and consistency was achieved and that surrogate spikes, LCS, laboratory duplicate results, method blanks and matrix spike results were of an acceptable level overall. On the basis of this assessment, the laboratory data sets are considered to be reliable and useable for this assessment.

Q4. QA/QC DATA EVALUATION

The following Table Q7 provides a list of the data quality indicators adopted for the Phase 2 contamination assessment and the methods adopted in ensuring that the data quality indicators were met. Reference should be made to all previous sections and referenced Appendices for specific details.

Table Q7: QA/QC Data Evaluation

Data Quality Indicator	Method(s) of Achievement
Data Precision and Accuracy	Use of trained, qualified and inducted field staff; Adequate field QA/QC samples prepared and/or recovered, including field replicates, trip spike and trip blank; Use of analytical laboratories experienced in the analyses undertaken, with appropriate NATA certification; Appropriate and validated laboratory test methods used; Adequate laboratory performance based on overall results of the blank samples, matrix spike samples, control samples, duplicates and surrogate spike samples; Acceptable RPD overall for replicate comparison; Acceptable concentrations (less than PQL) in trip blank samples; Acceptable recoveries in trip spike samples.
Data Representativeness	Sampling location numbers comply with the NSW EPA sampling design guidelines; Representative coverage of potential contaminant sources, based on site history, site activities and site features; Representative coverage of potential contaminants, Adequate replicate sample numbers prepared and analysed, complying with NEPM; Batch and daily trip spike, trip blank and rinsate samples analysed; and

Data Quality Indicator	Method(s) of Achievement
	Adequate laboratory internal quality control and quality assurance methods overall, complying with the NEPM.
Documentation Completeness	Preparation of borehole logs, groundwater sampling records, sample location plan and chain of custody records; Laboratory sample receipt information received confirming receipt of samples intact and appropriateness of the chain of custody; and NATA registered laboratory results certificates provided by all laboratories used.
Data Completeness	Sample location numbers comply with EPA guidelines; Analysis for all potential contaminants of concern; and Field replicate sample, trip spike, trip blank and rinsate numbers complying with NEPM.
Data Comparability	Using appropriate techniques for sample recovery; Experienced samplers used throughout; Using appropriate sample storage and transportation methods; Using the same sampling, storage and transportation methods for each day of sampling; Use of NATA registered laboratories; Test methods consistent for each sample; Acceptable RPD between original samples and field replicates; and Adequate laboratory internal quality control and quality assurance results, generally complying with the NEPM and laboratory internal standards.

Based on the above, it is considered that the quality assurance and quality control data quality indicators have been generally complied with. Overall, it is concluded that the field and laboratory test data obtained are reliable and useable for this assessment.