Douglas Partners
Geotechnics / Environment / Groundwater

Integrated Practical Solutions

Report on
Detailed Site (Contamination) Investigation

Residential Redevelopment

Fernhill Estate
Eastern Precinct
Mulgoa Road, Mulgoa

Prepared for
Cubelic Holdings Pty Ltd

Project 71706.02
July 2014

Douglas Partners
Geotechnics / Environment / Groundwater

Document History

Document details

Project No.	71706.02	Document No.	1
Document title	Detailed Site (Contamination) Investigation		
Site address	Fernhill Estate (Eastern Precinct) Mulgoa Road, Mulgoa		
Report prepared for	Cubelic Holdings Pty Ltd		
File name	P:\71706.02 MULGOA, Fernhill Estate - Eastern Precinct - DSI PG\Docs\71706.02_Mulgoa		

Document status and review

Revision	Prepared by	Reviewed by	Date issued
0	Matthew West	Paul Gorman	30 July 2014

Distribution of copies

Revision	Electronic	Paper	Issued to
0	1	0	Paul Cubelic, Cubelic Holdings 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.

	Signature	Date
Author		30 July 2014
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Executive Summary

This report details the methodology and results of a detailed site investigation (DSI) undertaken by Douglas Partners Pty Ltd (DP) at parts of Lot 1 in DP 570484 and Lot 6 in DP 173159, being the Eastern Precinct of the Fernhill Estate, Mulgoa Road, Mulgoa, as shown on Drawing 1, Appendix A.

The DSI included a review of available site history information contained within the previous DP phase 1 contamination assessment conducted in 2013, a site inspection, development of a conceptual site model, drilling of four boreholes and excavation of fifty two test pits and collection of soil samples and analysis of the samples for various contaminants of concern. Details of the field work and chemical testing are given in the report.

The total proposed development area is approximately 8 ha, as shown on the proposed subdivision layout drawing in Appendix A. The site is currently a rural property that has an existing residence and accompanying outbuildings in the central eastern part of Lot 1. Surrounding the residence are fenced paddocks that contain a few horses and some cattle but are otherwise unused. There is evidence of a previous dwelling in the central eastern part of Lot 6, although this dwelling appears to have been demolished/burnt out, leaving behind remnant sheet metal and other building refuse within a small compound that is surrounded by a high chain wire fence, interviews with people on site suggest this may have been the old Mulgoa post office.

Review of the desktop information indicated from historical aerial photograph, the site appears to have been previously used for market gardening and subsequently for rural purposes. Based on the available historical information and site features, the potential for contamination was considered to be low, and included the following:

- The limited placement of fill to develop the site with material from unknown sources (i.e. dams) and potential localised filling not observed during the assessment;
- The possible general spraying of pesticides and application of fertilisers during past land use; and
- Asbestos containing material, which may be present around previous and existing structures and as a result of fly tipping (not observed during the current assessment) or within filling material.

No other major issues of environmental concern were identified in the desktop component of the investigation.

Limited sampling was also conducted as part of the DP (2013) investigation. The analytical results for the limited number of soil samples analysed show that the levels of contaminants within the analysed samples were all within the adopted Site Assessment Criteria (SAC) at the time.

The analytical data obtained was compared primarily against the health and ecological based investigation and screening levels for a residential and open space form of development as listed in Schedule B1, NEPC (2013) and the CRC CARE technical guidance.

The analytical results for the soil samples indicated that the concentrations of the selected analytes were within the laboratory's limit of reporting and/or within the adopted site assessment criteria (SAC).

Based on the field and analytical results no apparent soil contamination was present at the site at the sampling locations, with all analytical results being below the SAC. On the basis of the investigation

findings, it is considered that the site is suitable for the low density residential development. However, the following recommendations should be considered:

- The health based guidelines adopted for the assessment of the test results on soils are applicable for residential properties where home grown produce contributes less than 10% of the fruit and vegetable uptake, with no poultry. Should any of the proposed properties not comply with this restriction, further assessment of health risks needs to be undertaken;
- An unexpected finds protocol would be a useful inclusion in any civil works plan to provide guidance and methodology for addressing unexpected occurrences of contamination such as localised filling, fly tipping or asbestos fragments; and
- A fill importation protocol should be implemented to ensure that any imported materials during the subdivision works meet the legislative requirements regarding suitability. Such a protocol could be prepared by a suitability qualified environmental consultant.

Based on the field observations and laboratory results the topsoil and natural soils at the site are considered to be compatible with a VENM classification. The fill encountered at TP102 is preliminarily classified as General Solid Waste (non-putrescible) and is therefore suitable for off-site disposal in accordance with this classification. These waste classifications should be confirmed for any soils requiring off-site disposal as part of the proposed development.

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List of Abbreviations

AEC	area of environmental concern
AF	asbestos fines
AHD	Australian height datum
As	arsenic
B(a)P	benzo(a)pyrene
BaP TEQ	benzo(a)pyrene toxic equivalent
bgl	below ground level
BH	borehole
Bonded ACM	bonded asbestos-containing-material
BTEX	benzene, toluene, ethyl benzene, xylenes
BTEXN	benzene, toluene, ethyl benzene, xylenes, naphthalene
C10-C36	heavy fraction TPH molecules, 10 to 36 carbon atoms
C6-C9	volatile fraction TPH molecules, 6 to 9 carbon atoms
Cd	cadmium
CEC	cation exchange capacity
CLM Act	Contaminated Land Management Act
COC	chain of custody
Cr	chromium
Cr(III)	chromium with oxidation state III (stable in normal environments)
CRC Care	Co-operative Research Centre for Contamination Assessment and Remediation of the Environment
CSM	conceptual site model
Cu	copper
DECCW	NSW Department of Environment, Climate Change and Water (now superceded)
DP	Douglas Partners
D.P.	Deposited Plan
DQI	data quality indicator
DQO	data quality objective
DSI	detailed site (contamination) investigation
EIL	ecological investigation levels
ELS	Envirolab Services Pty Ltd
EPA	Environment Protection Authority
ESL	ecological screening level
F1	TPH fraction C6-C10
F2	TPH fraction >C10-C16
F3	TPH fraction >C16-C34
F4	TPH fraction >C34-C40
FA	friable asbestos
Hg	mercury
HIL	heath investigation level
HSL	health screening level
NATA	National Association of Testing Authorities
NEPC	National Environment Protection Council
NEPM	National Environmental Protection (Assessment of Site Contamination) Measure
Ni	nickel
OCP	organochlorine pesticides
OPP	organophosphate pesticides

PAH	polycyclic aromatic hydrocarbons
Pb	Lead
PCB	polychloride biphenyls
pH	unit measure of acidity/ alkalinity
PID	photoionisation detector
QA/QC	quality assurance/ quality control
SAC	site assessment criteria
TEQ	toxicity equivalency quotient
TPH	total petroleum hydrocarbons
VENM	virgin excavated natural material
VOC	volatile organic compounds
Zn	zinc

Report on Detailed Site (Contamination) Investigation
Residential Redevelopment
Fernhill Estate, Eastern Precinct, Mulgoa Road, Mulgoa

1. Introduction

This report details the methodology and results of a detailed site investigation (DSI) undertaken by Douglas Partners Pty Ltd (DP) at parts of Lot 1 in DP 570484 and Lot 6 in DP 173159, being the Eastern Precinct of the Fernhill Estate, Mulgoa Road, Mulgoa, as shown on Drawing 1, Appendix A. The DSI was commissioned by Cubelic Holdings Pty Ltd for the planned rezoning and redevelopment of the site.

It is understood that the proposed development will ultimately include a subdivision of into approximately 54 residential allotments with a typical allotment size of approximately 1000 m^2. The new lots will be serviced by several new roads that will provide access to the development from two entry points located on Mulgoa Road near to the northern and southern ends of the site. Viewing corridors will be retained in the central and south-eastern portions of the developed area. The proposed development layout at the time of preparing this report is shown on the subdivision plan, prepared by AE Design Partnership, included in Appendix A.

Presently, the development is at a concurrent rezoning and development application stage, with the current proposed development layout shown on Drawing 2, in Appendix A.

The objective of the DSI is to address recommendations made in the DP *Phase 1 Contamination Assessment* report, and assess the suitability of the developable sections (including areas of potential public access) of the Eastern Precinct for residential and open space use prior to the rezoning and redevelopment of the land.

The DSI was conducted and reported in accordance with the National Environment Protection Council (NEPC) *National Environment Protection (Assessment of Site Contamination) Measure 1999* (amended 2013) [NEPC, 2013] and included a review of available site history detailed in the DP *Phase 1 Contamination Assessment* report, a site inspection, development of a conceptual site model, collection of soil samples from bores and test pits, and analysis of the samples for various contaminants of concern outlined in Section 6.1.

2. Scope of Works

The scope of works for the DSI was as follows:

- A site inspection to identify current site features and visible areas of environmental concern (AEC);
- Review of published geological, soil and topographic maps to determine the likely soil and groundwater conditions at the site;
- Review of the previous contamination investigation report for the Eastern Precinct by DP in 2013. The report was titled "*Report on Phase 1 Contamination Assessment with Limited Sampling Fernhill Estate, Eastern Precinct* 71706.01, June 2013" (DP, 2013);

- Positioning of four (4) boreholes and fifty two (52) test pits across the site in a grid based pattern to provide maximum site coverage and target areas of current or former structures and identified AEC;
- Collection of soil samples from the filling (where encountered) and natural soil profiles in the bores and pits; soil samples were recovered directly from the auger or bucket at regular intervals and at changes in lithology and samples were submitted to a NATA-accredited laboratory for a general suite of contaminants comprising the following:-

- The priority heavy metals arsenic (As), cadmium (Cd), chromium (Cr), copper (Cu), lead (Pb), mercury (Hg), nickel (Ni) and zinc (Zn);
- Polycyclic aromatic hydrocarbon (PAH);
- Total recoverable hydrocarbon (TRH)
- Benzene, toluene, ethylbenzene and xylene (BTEX);
- Organochlorine/Organophosphorus pesticides (OCP/OPP);
- Polychlorinated biphenyl (PCB);
- Phenols;
- Asbestos;
- QA/QC samples.

- Provision of this DSI report, including a preliminary waste classification.

3. Site Identification and Description

3.1 Site Identification

The Fernhill Estate in whole occupies an area of about 27.5 hectares (ha) and comprises three registered allotments namely:

- Lot 100 in DP717549;
- Lot 1 in DP570484; and
- Lot 6 in DP173159.

The Eastern Precinct comprises Lot 1 in DP570484 and Lot 6 in DP173159. The proposed subdivision development footprint is the focus of this DSI and is referred to herein as “the site”. The total site area is approximately 8 ha (refer Drawing 1, Appendix A).

The site is within the southern region of the Penrith City Council local government area, in the Parish of Mulgoa and the County of Cumberland. The site has an irregular shape and comprises of rural land with a residential premises located off Mulgoa Road. A site plan and locality map is presented in Drawing 1.

3.2 Site Description

The site is currently a rural property that has an existing residence and accompanying outbuildings in the central eastern part of Lot 1. Surrounding the residence are fenced paddocks that contain a few horses and some cattle but are otherwise unused. An asphalt sealed driveway provides access to the existing residence from Mulgoa Road. There is evidence of a previous dwelling in the central eastern part of Lot 6, although this dwelling appears to have been demolished, leaving behind remnant sheet metal and other building refuse within a small compound that is surrounded by a high chain wire fence. DP interviews with people on site suggest this may have been the old Mulgoa post office.

Surrounding the site is vacant rural land that is covered with grass and scattered with dense natural tree growth. Although the site is mostly undeveloped and appears to follow the inferred natural land form, the proposed residential lot areas have been cleared of almost all substantial vegetation leaving a thick grass cover, with the exception of the south western portion of the site which contained some dense tree/scrub growth, which impeded access to some areas. Previous land uses are not directly evident from the site inspection, although it is likely that the site has been used for grazing or other rural land use, which is supported by the presence of existing rural dams, one of which is quite large and to the north-west of the site. Areas adjacent to the dams contained potentially intermittently water-logged ground that supported reedy grasses.

4. Regional Topography, Geology, Soils and Water

4.1 Topography and Surface Water

Topographical relief across the majority of the site is slight to moderate, with the overall landform being undulating and varying in elevation from reduced levels of RL 72 m relative to Australian height datum (AHD) in the south east portion of the site to RL 60 m at the water's edge of both dams in the centre of the site. A broad ridge line runs north to south through the central eastern part of the site between the dams and Mulgoa Road. A second broad ridge line runs in a north-east to south-west direction midway between the dams and the western property boundary. The crest of each ridge line is slightly undulating with ground surface slopes to either side of both ridges generally falling to the east and west, although irregular spurs extend from the main ridge line in varying directions thus ground slopes face many different directions. Ground slopes typically fall at angles of between 3 and 12 degrees within the proposed development area. Local ground slopes fall at up to 30 degrees near the northern boundary of the site and on the downstream side of the large dam embankment.

The nearest waterways to the site, apart from the dams located within the subject site, are the Nepean and Warragamba Rivers. The Nepean River is located broadly west of the site, with Warragamba River connecting to the south. Nepean River is located within approximately 3.7 km to the north-west, and 2.7 km to the south.

4.2 Geology

Reference to the Penrith 1:100,000 Geological Sheet indicates that the subject site is underlain by Bringelly Shale from the Wianamatta Group from the Middle Triassic Period, as well as s section of Minchinbury Sandstone also from the Wianamatta Group from the Middle Triassic Period, which generally runs thru the middle of the site. The lithology description of Bringelly Shale is that of shale,

carbonaceous claystone, claystone, laminate, fine to medium-grained lithic sandstone, rare coal and tuff. The lithology description of Minchinbury Sandstone is that of fine to medium-grained quartz-lithic sandstone.

Reference to the Penrith 1:100,000 Soils Landscape Sheet indicates that the site is situated within the Erosional Luddenham soil landscape, which is typified by undulating to rolling low hills on Wianamatta Group shales often associated with Minchinbury Sandstone, with narrow ridges, hillcrests and valleys. Moderately deep Yellow Podzoic Soils and Prairie Soils on lower sloped and drainage lines are expected, with shallow, dark Podzolic Soils or Massive Earth Clays on crests and moderately deep, red Podzolic Soils on upper slopes. Limitations of the soil type include a high soil erosion hazard, moderately reactive and localised impermeable highly plastic subsoil.

4.3 Acid Sulphate Soils

The site is located in an area outside of the Department of Land & Water Acid Sulphate Soil Risk Map Series 1:25 000, Edition II.

5. Previous Investigation

The previous contamination investigation undertaken by DP for the Eastern Precinct (DP, 2013) was carried out in conjunction with a geotechnical investigation by DP titled "*Report on Land Capability Assessment Fernhill Estate, Eastern Precinct* 71706.01, June 2013*".*

The phase 1 contamination assessment was conducted to assess the potential for broad scale contamination of the site based on past and present site usage, and, if contamination exists, the likely nature of this contamination. The scope of works for the assessment included a site history search and limited intrusive soil sampling with a view to obtaining data pertaining to the broad scale contamination status of the site.

From a review of historical aerial photographs, the site appears to have been previously used for market gardening and subsequently for rural purposes.

Based on the available historical information and site features, the potential for contamination was considered to be low, and included the following:

- The limited placement of fill to develop the site with material from unknown sources (i.e. dams) and potential localised filling not observed during the assessment;
- The possible general spraying of pesticides and application of fertilisers during past market gardening land use; and
- Asbestos containing material, which may be present around previous and existing structures and as a result of fly tipping (not observed during the current assessment) or within filling material.

The analytical results for the limited number of soil samples analysed show that the levels of contaminants within the analysed samples were all within the adopted Site Assessment Criteria (SAC) at the time.

Surface water samples from the dams were also taken and the analytical results showed that the levels of OCP and OPP were all below the laboratory practical quantitation limits (PQL). The heavy metals concentrations were reported at less than the adopted Surface Water Investigation Levels (SWIL) at the time.

Based on the results reported in DP (2013) it was considered that the Eastern Precinct, in general, has a low risk of contamination and is not likely to present an unacceptable risk of contamination with respect to rural residential land use. However, given the limited and generally broad nature of the assessment, it was recommended that further investigative studies be undertaken, which this current report addresses.

6. Preliminary Conceptual Site Model

A conceptual site model (CSM) is a representation of site-related information regarding contamination sources, receptors and exposure pathways between those sources and receptors. The CSM provides the framework for identifying how the site became contaminated and how potential receptors may be exposed to contamination either in the present or the future i.e. it enables an assessment of the potential source – pathway – receptor linkages. The preliminary CSM is used to inform the sampling and analysis plan as part of the DSI.

6.1 Potential Contamination Sources

Based on the current and previous site uses and DP's site observations the potential contamination sources (or areas of environmental concern) are summarised in Table 1 below.

Table 1: Areas of Environmental Concern (AEC)

Potential AEC	Description of Potential Contaminating Activity	Chemicals of Concern
Possible Imported Fill (S1)	Fill material may have been placed at site during past development, including dam and building construction. Some localised filling of depressions may have also taken place in the past. The source of fill material (if present) is likely to be unknown.	Heavy metals, TPH, BTEX, PAH, OCP, OPP, PCB, phenols and asbestos.
Use of Pesticides (S2)	From observations made in the aerial photos, the site appears to have been used for agricultural purposes including market gardens; therefore it is possible that pesticides and fertilisers may have been sprayed across the site in these areas in the past.	Heavy Metals, OCP and OPP
Hazardous building materials in soils (S3)	During the demolition of old buildings within the site, there is the potential of contamination from materials such as asbestos in fibro and lead paint to have impacted on surface soils in the vicinity of the old buildings.	Asbestos, Lead

AEC: Area of Environmental Concern

6.2 Potential Receptors

Human Health Receptors

R1 – Current site visitors (currently unoccupied).

R2 – Future construction and maintenance workers.

R3 – Future residents and visitors to the site once developed.

R4 – Land users in adjacent areas.

Environmental (Ecological) Receptors

R5 – Groundwater.

R6 – Surface waterbodies.

R7 – Ecology.

6.3 Potential Pathways

Potential pathways for contamination to impact on receptors include the following:

P1 – Direct contact with soil (ingestion and dermal).

P2 – Inhalation of dust and/or vapours.

P3 – Leaching of contaminants and vertical mitigation into groundwater.

P4 – Surface water run-off.

P5 – Lateral migration of groundwater providing baseflow to watercourses.

P6 – Direct contact of contaminated ground with ecological receptors.

The potential source – pathway – receptor linkages are presented in the following Table 2.

Table 2: Preliminary Conceptual Site Model

Source	Transport Pathway	Receptor	Risk Management / Investigation Action Recommended
S1: Imported filling. Potential contaminants include Heavy metals, TPH, BTEX, PAH, PCB, OCP/OPP, phenol, asbestos **S2**: Previous market garden/ agricultural uses Potential contaminants include heavy metals, OCP, OPP. **S3**: Hazardous building materials in soils Potential contaminants include lead and asbestos	**P1**: Direct contact with soil (ingestion and dermal)	**R1**: Current site visitors **R2**: Future construction and maintenance workers **R3**: Final end users	An intrusive investigation is required to quantify and characterise possible contamination including chemical testing of the soils.
	P2: Inhalation of dust and/or vapours	**R1**: Current site visitors **R2**: Future construction and maintenance workers **R3**: Final end users **R4**: Land users in adjacent areas	An intrusive investigation is required to quantify and characterise possible contamination including chemical testing of the soils. Vapour intrusion modelling / investigation may be required depending upon the outcome of the soils testing. Volatile vapours can also be generated from contaminated groundwater, however the potential for groundwater contamination at the site is low and no groundwater sampling and testing is proposed at this stage. .
	P3 – Leaching of contaminants and vertical migration into groundwater.	**R5**: Groundwater	An intrusive investigation is required to quantify and characterise possible contamination including chemical testing of the soils. The potential for leaching of contaminants should be assessed on the basis of the soil profile and contaminant concentrations in the soils.
	P4 – Surface water run-off.	**R6**: Surface water bodies **R7**: Ecology	An intrusive investigation is required to quantify and characterise possible contamination including chemical testing of the soils, particularly surface soils which can impact surface water runoff.

Source	Transport Pathway	Receptor	Risk Management / Investigation Action Recommended
	P5 – Lateral migration of groundwater providing baseflow to watercourses	**R6:** Surface water bodies	The potential for groundwater contamination at the site is low and no groundwater sampling and testing is proposed at this stage. A groundwater assessment will be recommended should significant soil contamination and/or permeable soils be encountered through the DSI.
	P6 – Direct contact with contaminated soil	**R7**: Ecology	An intrusive investigation is required to quantify and characterise possible contamination including chemical testing of the soils.

This preliminary CSM is updated in Section 11 of this report, following the discussion of field and analytical data obtained through this current DSI.

7. Fieldwork and Analysis

7.1 Data Quality Objectives and Project Quality Procedures

The DSI has been devised broadly in accordance with the seven step data quality objective (DQO) process which is provided in Appendix B, Schedule B2 of NEPC (2013). The DQO process is outlined as follows:

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

An evaluation of the DQO is presented in Appendix D.

7.2 Data Quality Indicators

The performance of the assessment in achieving the DQO was assessed through the application of Data Quality Indicators (DQI), defined as follows:

Precision:	A quantitative measure of the variability (or reproducibility) of data;
Accuracy:	A quantitative measure of the closeness of reported data to the “true” value;
Representativeness:	The confidence (expressed qualitatively) that data are representative of each media present on the site;
Completeness:	A measure of the amount of useable data from a data collection activity;
Comparability:	The confidence (expressed qualitatively) that data can be considered equivalent for each sampling and analytical event.

An evaluation of the DQI is presented in Appendix E.

7.3 Sampling Methods

A total of 52 test pits (TP1-TP50 and TP101-TP102) where excavated using a 3.5 tonne excavator with a 300mm bucket. The pits were excavated to depths of between 0.5 m and 1.2 m below ground level (bgl). Groundwater was not encountered in any of the test pits.

The drilling of four boreholes (BH1-BH4) was undertaken in the vicinity of the homestead using a hand auger to minimise disturbance to the gardens and lawn.

The bores/pits were completed between 27 and 28 May 2014. The bore and test pit locations are shown on Drawing 2, Appendix A.

7.4 Field Quality Assurance and Quality Control

The field QC procedures for sampling were as prescribed in Douglas Partners' *Field Procedures Manual*, and are outlined later in this section.

Field replicates were recovered and analysed for a limited suite of contaminants by means of intra-laboratory and inter-laboratory analysis. This is in accordance with standard industry practice and guidelines. The comparative results are outlined in Appendix F.

7.5 Laboratory QA/QC

The analytical laboratory, accredited by NATA, is 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.

The results of the DP assessment of laboratory QA/QC are shown in Appendix F, with the full laboratory certificates of analysis included in Appendix C.

7.6 Sample Location and Rationale

The combined development area within the Eastern Precinct is approximately 8ha. NEPC (2013) suggests the use of professional judgement in determining appropriate sample numbers. For information purposes, the NSW EPA *Sampling Design Guidelines* (1995) for contaminated site investigations recommends a minimum of 11 sampling points per hectare evenly spaced, therefore the development area would require 88 test pit locations to comply. However, given the results of a recent archaeological study which involved the excavation of 75 test pits, confirming relatively homogeneous natural soils across the site, and the relatively low risk of contamination resulting from the previous use of the site as market gardens, a total of fifty two (52) locations were spaced in an approximate grid across the site, but with several of the locations positioned within the vicinity and/or beneath former structures and existing structures yet to be removed to assess the potential for filling and/or the presence of hazardous materials as specified in DP (2013).

In additional, the four bores were positioned in the area of formed structures around the homestead, all now removed.

7.7 Soil Sampling Procedure

All sample locations were cleared for services and underground pipes by a services locator tracing all services entering the site and by review of dial-before-you-dig (DBYD) plans.

All sampling data was recorded on DP's field logs with essential information included in the chain-of-custody sheets. The general sampling procedure adopted for the collection of environmental samples is summarised below:

- collect soil samples directly from the auger tip or excavator bucket using disposable sampling equipment or;
- transfer samples into laboratory-prepared glass jars, filled to the top to minimise the headspace within the sample jar, and capping immediately to minimise loss of volatiles;
- label sample containers with individual and unique identification, including project number, sample location and sample depth; and
- place the glass jars, with Teflon lined lid, into an ice cooled, insulated and sealed container for transport to the laboratory.

Envirolab Services Pty Ltd (Envirolab) was used for the analysis of soil samples. The laboratory is required to carry out routine in-house QC procedures. The Inter-laboratory sample was sent to Eurofins Pty Ltd (NATA accreditation number: 1261).

7.8 Analytical Rationale

The analytical scheme was designed to obtain an indication of the potential presence and possible distribution of contaminants that may be attributable to past and present activities, and features within the site, as discussed in Section 6. As there were no identified "point" sources of contamination at the site (i.e. the identified contamination sources were more broad-scale), and no visual indicators of likely contamination in the bores / pits, soil samples were selected randomly from the bores / pits, however with a minimum of one sample per location, and from various depths between surface and 0.8 m bgl.

Laboratory analytical methods as stated by Envirolab Services and Eurofins Pty Ltd are provided in the laboratory certificates of analysis in Appendix C and are summarised in the QA/QC section in Appendix F.

8. Site Assessment Criteria

DP understands the site is proposed for low density residential and open space development. The Site Assessment Criteria (SAC) applied in the current investigation is informed by the CSM which identified *human and ecological* receptors to potential contamination on the site (refer to Section 6). Analytical results were assessed (as a Tier 1 assessment) against the SAC comprising the investigation and

screening levels of Schedule B1, NEPC (2013). The NEPC guidelines are endorsed by the NSW EPA under the CLM Act 1997. Petroleum based health screening levels for direct contact have been adopted from the *Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC CARE) Technical Report no.10 Health screening levels for petroleum hydrocarbons in soil and groundwater* (2011) as referenced by NEPC (2013).

The investigation and screening levels are applicable to generic land use settings and include consideration of, where relevant, the soil type and the depth of contamination. The investigation and screening levels are not intended to be used as clean up levels. Rather, they establish concentrations above which further appropriate investigation (e.g. Tier 2 assessment) should be undertaken. They are intentionally conservative and are based on a reasonable worst-case scenario.

The investigation and screening levels applied in the current investigation comprise levels adopted for a generic low density residential and recreational/open space land use.

8.1 Soils

8.1.1 Health Investigation Levels

The Health Investigation Levels (HIL) and Health Screening Levels (HSL) are scientifically-based, generic assessment criteria designed to be used in the first stage (Tier 1) of an assessment of potential human health risk from chronic exposure to contaminants.

HILs are applicable to assessing health risk arising *via* all relevant pathways of exposure for a range of metals and organic substances. The HIL are generic to all soil types and apply generally to a depth of 3 m below the surface for residential use. Site-specific conditions may determine the depth to which HILs apply for other land uses.

The generic HIL are considered to be appropriate for the assessment of contamination at the site. Given the proposed land use the adopted HIL are:

HIL A - Residential with garden/accessible soil; and

HIL C - Public open space such as parks, playgrounds, playing fields (e.g. ovals), secondary schools and footpaths.

The adopted soil HILs for the potential contaminants of concern are presented in Table 3.

Table 3: Health Investigation Levels (HIL) in mg/kg unless otherwise indicated

Contaminants		HIL-A Residential (Low density)	HIL-C Recreational/ Open Space
Metals	Arsenic	100	300
	Cadmium	20	90
	Chromium (VI)	100	300
	Copper	6,000	17,000
	Lead	300	600
	Mercury (inorganic)	40	80
	Nickel	1,200	1,200
	Zinc	7,400	30,000
PAH	Benzo(a)pyrene TEQ[1]	3	3
	Naphthalene	2,200	-
	Total PAH	300	300
Phenol	Pentachlorophenol (used as an initial screen)	100	120
OCP	Aldrin + Dieldrin	6	10
	Chlordane	50	70
	DDT+DDE+DDD	240	400
	Endosulfan	270	340
	Endrin	10	20
	Heptachlor	6	10
	HCB	10	10
	Methoxychlor	300	400
OPP	Chlorpyriphos	160	250
PCB [2]		1	1

Notes: .

1 *sum of carcinogenic PAH*

2 *non dioxin-like PCBs only.*

As an initial screen, all analyte concentrations were screened against HIL-A, being the most conservative of the two health investigation levels. If any reported analyte concentrations exceed HIL-A then the location of the exceedence will be further assessed against the development footprint and the applicability of using HIL-C.

8.1.2 Health Screening Levels

Health Screening Levels (HSLs) are used to assess selected petroleum compounds and fractions to assess the risk to human health via inhalation and direct contact with affected soils and groundwater.

The HSLs were developed by the *Co-operative Research Centre for Contamination Assessment and Remediation of the Environment* (CRC CARE) and were derived through the consideration of health effects only, with particular emphasis on the vapour exposure pathway. Other considerations such as ecological risk, aesthetics, the presence of free phase product and explosive / fire risk are not addressed by the HSLs. As such the HSLs should be used similarly to the HILs, i.e. as a screening tool.

The HSLs have been developed for a range of petroleum hydrocarbons, and for different land uses, media, pathways, soil types and depths to contamination. HSLs have also been derived by CRC CARE for direct contact with petroleum hydrocarbons for the four land use scenarios and intrusive maintenance workers.

The approach in the development of HSLs has sought to set a combination of assumptions and parameters that correspond to the reasonable exposure that can be expected for the range of scenarios. If the subject site does not fall within the range of assumed conditions the HSLs may not be protective and a more detailed consideration of the site specific situation should be carried out.

In order to determine the appropriate HSLs as tabulated in Schedule B1 of NEPC (2013) the following parameters were used:

Table 4: Inputs to the Derivation of HSLs

Variable	Input	Rationale
Potential exposure pathway	*Soil vapour intrusion (inhalation) / Direct contact **	
Soil Type	*Sand*	laboratory particle analysis showed clays in soils <2µm ranged from 14-55%; due to this variation sand HSLs have been adopted as an initial conservative screen; sand being the most conservative soil type.
Depth to contamination	*0 m to <1 m*	0 to <1 m for soil HSLs (most likely to be impacted by fill or pesticides between 0 m and 1 m).

**Developed by CRC CARE (2011)*

Given the proposed land use the adopted HSLs are:

- **HSL A -** Residential with garden/accessible soil;
- **HSL C -** Public open space such as parks, playgrounds, playing fields (e.g. ovals), secondary schools and footpaths; and
- Intrusive maintenance worker (used to assess potential impacts on construction workers).

Workers Engaged in Subsurface Works

- For work in shallow trenches the HSLs for vapour intrusion and direct contact for HSL A and intrusive maintenance worker (CRC CARE technical reports) have been adopted. No vapour intrusion values are listed for HSL C.
- Work in deep trenches (e.g. sewers) has not been included in the development of HSLs. These works usually require health and safety procedures to be followed for protection in confined spaces including use of personal protection equipment.

Other Considerations

- The HSLs have been compared to individual values as an initial conservative screen rather than using a statistical approach.
- Multiple sources of contamination are not considered to be present.
- Combined pathways exposure has not been assessed. For each land use the lowest HSLs for soil vapour intrusion and/or direct contact have been adopted as an initial conservative screen.
- Cumulative cancer risk has not been assessed as the chemicals which have been recorded near to or above the HSLs are limited to TRH (non-carcinogenic) only;
- Site specific adjustments for vapour biodegradation, soils organic carbon content, air exchange rate, soil moisture content, differing lithology or depth of contamination have not been considered in this assessment. These parameters tend to reduce the conservatism of the HSL and can be considered at a later stage.

The adopted soil HSLs for vapour intrusion, from Table 1A(3), Schedule B1 of NEPC (2013) and Table A3, Appendix B, CRC CARE Technical Report No. 10 (Intrusive Maintenance Worker) are shown on the following Table 5.

Table 5: Soil Health Screening Levels (HSLs) for Vapour Intrusion (mg/kg)

Analyte		HSL A	Intrusive Maintenance Worker	Comments
TRH	$C_6 – C_{10}$ (less BTEX) [F1]	110	NL	HSL A: Sand Profile
	$>C_{10}-C_{16}$ (less Naphthalene) [F2]	95	NL	Depth to Contamination 0 to <1 m
BTEX	Benzene	0.5	77	
	Toluene	160	NL	
	Ethyl Benzene	55	NL	Intrusive Maintenance Worker: Sand Profile
	Xylene	40	NL	
PAH	Naphthalene	NL	NL	Depth to Contamination 0 m to <2m

The adopted soil HSLs for direct contact, from Table B4, Appendix B, CRC CARE Technical Report No. 10 are shown on the following Table 6.

Table 6: Soil Health Screening Levels (HSLs) for Direct Contact (mg/kg)

Analyte		HSL-A Residential (Low density)	HSL-C Recreational/Open Space	Intrusive Maintenance Worker
TRH	$C_6 - C_{10}$	4,400	5,100	82,000
	$>C_{10}-C_{16}$	3,300	3,800	62,000
	$>C_{16}-C_{34}$	4,500	5,300	85,000
	$>C_{34}-C_{40}$	6,300	7,400	120,000
BTEX	Benzene	100	120	430
	Toluene	14,000	18,000	120,000
	Ethyl Benzene	4,500	5,300	85,000
	Xylene	12,000	15,000	130,000
PAH	Naphthalene	1,400	1,900	29,000

As an initial screen, all analyte concentrations were screened against HSL-A, being the most conservative of the health investigation levels. If any reported analyte concentrations exceed HSL-A then the location of the exceedence will be further assessed against the development footprint and the applicability of using HSL-C.

8.1.3 Management Limits – Petroleum Hydrocarbons

In addition to appropriate consideration and application of the HSL, there are additional considerations which reflect the nature and properties of petroleum hydrocarbons, including:

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

Management Limits to avoid or minimise these potential effects have been adopted in NEPC (2013) as interim Tier 1 guidance. Management Limits have been derived in NEPC (2013) for the same four petroleum fractions as the HSL (F1 to F4). The adopted Management Limits, from Table 1B(7), Schedule B1 of NEPC (2013) are shown in the following Table 7. The following site specific data and assumptions have been used to determine the Management Limits:

- the Management Limits will apply to any depth within the soil profile;
- the Management Limits for low density residential apply;
- A “coarse” soil texture has been adopted, to take a conservative approach.

Table 7: Management Limits in mg/kg

Analyte		Management Limit
TRH	$C_6 - C_{10}$ (F1) #	700
	$>C_{10}-C_{16}$ (F2) #	1,000
	$>C_{16}-C_{34}$ (F3)	2,500
	$>C_{34}-C_{40}$ (F4)	10,000

Separate management limits for BTEX and naphthalene are not available hence these have not been subtracted from the relevant fractions to obtain F1 and F2

8.1.4 Asbestos in Soil

Bonded asbestos-containing material (ACM) is the most common form of asbestos contamination across Australia, generally arising from:

- Inadequate removal and disposal practices during demolition of buildings containing asbestos products;
- Widespread dumping of asbestos products and asbestos containing fill on vacant land and development sites; and
- Commonly occurring in historical fill containing unsorted demolition materials.

Mining, manufacturing or distribution of asbestos products may result in sites being contaminated by friable asbestos including free fibres. Severe weathering or damage to bonded ACM may also result in the formation of friable asbestos comprising fibrous asbestos (FA) and/or asbestos fines (AF).

Asbestos only poses a risk to human health when asbestos fibres are made airborne and inhaled. If asbestos is bound in a matrix such as cement or resin, it is not readily made airborne except through substantial physical damage. Bonded ACM in sound condition represents a low human health risk, whilst both FA and AF materials have the potential to generate, or be associated with, free asbestos fibres. Consequently, FA and AF must be carefully managed to prevent the release of asbestos fibres into the air.

A detailed asbestos assessment as outlined in NEPC (2013) was not undertaken as part of the DSI as the potential for asbestos contamination was considered low. As such, asbestos was screened from jar samples taken for general analysis of contaminants. Therefore the presence or absence of asbestos at a limit of reporting of 0.1 g/kg has been adopted for this assessment as an initial screen. Should asbestos contamination be identified using this screening criteria, a recommendation would be made to undertake a detailed asbestos assessment as outlined in NEPC (2013).

8.1.5 Ecological Investigation Levels

Ecological Investigation Levels (EIL) have been derived for selected metals and organic compounds and are applicable for assessing risk to terrestrial ecosystems (NEPC, 2013). EIL depend on specific soil physiochemical properties and land use scenarios and generally apply to the top 2 m of soil, which corresponds to the root zone and habitation zone of many species. The EIL is determined for a contaminant based on the sum of the ambient background concentration (ABC) and an added contaminant limit (ACL). The ABC of a contaminant is the soil concentration in a specific locality that

is the sum of naturally occurring background levels and the contaminants levels that have been introduced from diffuse or non-point sources (e.g. motor vehicle emissions). The ACL is the added concentration (above the ABC) of a contaminant above which further appropriate investigation and evaluation of the impact on ecological values is required.

The EIL is calculated using the following formula:

EIL = ABC + ACL,

The ABC is determined through direct measurement at an appropriate reference site (preferred) or through the use of methods defined by Olszowy et al *Trace element concentrations in soils from rural and urban areas of Australia*, Contaminated Sites monograph no. 4, South Australian Health Commission, Adelaide, Australia 1995 (Olszowy, 1995) or Hamon et al, *Geochemical indices allow estimation of heavy metal background concentrations in soils*, Global Biogeochemical Cycles, vol. 18, GB1014, (Hamon, 2004). ACL is based on the soil characteristics of pH, CEC and clay content.

EIL (and ACLs where appropriate) have been derived in NEPC (2013) for only a short list of contaminants comprising As, Cu, Cr (III), DDT, naphthalene, Ni, Pb and Zn. An *Interactive (Excel) Calculation Spreadsheet* was used for calculating site-specific EIL for these contaminants.

Table 8: Ecological Investigation Levels (EIL) in mg/kg

Analyte		EIL	Comments
Metals	Arsenic	100	EILs are site specific and based on the averaged parameters of samples collected across the site; the adopted parameters are as follows: pH 5.33 CEC 8.71 Clay content 38.6%
	Copper	130	
	Nickel	130	
	Chromium III	630	
	Lead	1100	
	Zinc	310	
PAH	Naphthalene	170	
OCP	DDT	180	

8.1.6 Ecological Screening Levels – Petroleum Hydrocarbons

Ecological Screening Levels (ESL) is used to assess the risk of selected petroleum hydrocarbon compounds, BTEX and benzo(a)pyrene to terrestrial ecosystems. ESL applies to the top 2 m of the soil profile as for EIL.

ESL has been derived in NEPC (2013) for petroleum fractions F1 to F4 as well as BTEX and Benzo(a)pyrene. Site specific data and assumptions as summarised in Table 9 have been used to determine the ESL. The adopted ESL, from Table 1B(6), Schedule B1 of NEPC (2013) are shown in Table 10.

Table 9: Inputs to the derivation of ESL

Variable	Input	Rationale
Depth of ESL application	Top 2 m of the soil profile	The top 2 m depth below ground level corresponds to the root zone and habitation zone of many species.
Land use	Urban residential and public open space	
Soil Texture	Coarse	The most conservative values

Table 10: Ecological Screening Levels (ESL) in mg/kg

Analyte		ESL	Comments
TRH	C6 – C10 (less BTEX) [F1]	180*	All ESLs are low reliability apart from those marked with * which are moderate reliability
	>C10-C16 (less Naphthalene) [F2]	120*	
	>C16-C34 [F3]	300	
	>C34-C40 [F4]	2800	
BTEX	Benzene	50	
	Toluene	85	
	Ethylbenzene	70	
	Xylenes	105	
PAH	Benzo(a)pyrene	0.7	

8.2 Waste Classification Criteria

The preliminary waste classification was generally conducted in accordance with NSW DECCW *Waste Classification Guidelines* 2008 (Revision July 2009) [DECCW, 2009]. The material was assessed against the threshold concentrations provided in Tables 1 and 2 of the above mentioned guidelines as shown in Table 11, Section 10.

9. Fieldwork Results

9.1 Field Observations

The subsurface conditions encountered in the boreholes and test pits are summarised below:

Filling: Light grey and light brown silty clay and gravel filling was observed in all four hand augured boreholes surrounding the homestead, which appeared to have been placed there to provide a level surface for the house and surrounding yards.

Only one test pit (TP102) encountered filling, the test pit was positioned directly adjacent to what appeared to be the footprint of an old structure (see photographs 1 and 2, Appendix B) just north of the current homestead and comprised a layer of silty clay and brick fragments and whole pavers to 0.5m bgl.

Topsoil: Brown to light brown silty/sandy clay was encountered at most test locations with the expectation of some that were positioned at the peaks of hills where topsoil had eroded and gravelly silty clay could be seen on the surface.

Natural Clays: Firm, stiff and very stiff clay, silty clay, sandy clay and clay with some ironstone gravel was observed in all test locations underlying the topsoil or filling.

Groundwater was not encountered in any of the test pits or bores. During the investigation there was no visible evidence of hydrocarbon staining on the surface, and no visual signs or odours were observed in any of the bores or pits. Photographs 3 – 6, in Appendix B show some examples of what the test pits encountered across the site.

9.2 Field Testing Results

Replicate soil samples collected in plastic bags were allowed to equilibrate under ambient temperatures before screening for Total Photoionisable Compounds (TOPIC) using a calibrated photo-ionisation detector (PID). The PID readings were between <2 ppm indicating a low potential for volatile contaminants in the samples.

10. Laboratory Testing

The results of the laboratory analysis undertaken are presented in the following Table 11. The full laboratory reports together with the chain of custody and sample receipt information are presented in Appendix C.

Table 11: Summary of Laboratory Results - All Samples

Sample ID		Sampled Date	Fill/ Natural	Applicable Soil Type [b]	Metals (total)									TRH						BTEX				PAH								
					Arsenic	Cadmium	Chromium	Copper	Lead	TCLP Lead	Mercury	Nickel	Zinc	C6-C10 less BTEX (F1)	>C10-C16-NAPHTHALENE (F2)	C6-C10	$>C_{10}-C_{16}$	>C16-C34	>C34-C40	Benzene	Toluene	Ethylbenzene	Xylene Total	naphthalene	B(a)P	B(a)P TEQ	Total +ve PAH [c]	Total Phenolics	OCP [c]	OPP [c]	PCB	Asbestos
Bore/Pit	Depth				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	-
Laboratory Results																																
Samples from the homestead																																
BH1	0.0-0.1	27/05/14	Fill	Sand	10	<0.4	41	16	20	-	<0.1	4	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
BH2	0.0-0.1	27/05/14	Fill	Sand	10	<0.4	39	14	21	-	<0.1	4	20	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.1	<0.05	<0.5	<0.1	<5	<0.1	<0.1	<0.1	NAD
BH3	0.0-0.1	28/05/14	Fill	Sand	9	<0.4	30	17	25	-	<0.1	6	48	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
BH4	0.0-0.1	28/05/14	Fill	Sand	10	<0.4	44	13	23	-	0.1	5	36	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.1	<0.05	<0.5	<0.1	<5	<0.1	<0.1	<0.1	NAD
Samples from near former buildings																																
TP101	0.0-0.3	27/05/14	Topsoil	Sand	7	<0.4	28	10	16	-	<0.1	6	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP102	0.2-0.5	27/05/14	Fill	Sand	10	<0.4	41	220*	29	-	<0.1	4	48	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.1	<0.05	<0.5	<0.1	<5	<0.1	<0.1	<0.1	NAD
General site samples																																
TP1	0.0-0.3	28/05/14	Topsoil	Sand	<4	<0.4	18	5	11	-	0.2	1	4	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.1	<0.05	<0.5	<0.1	<5	<0.1	<0.1	<0.1	NAD
TP2	0.0-0.3	27/05/14	Topsoil	Sand	9	<0.4	26	8	20	-	0.1	4	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP3	0.0-0.3	28/05/14	Topsoil	Sand	6	<0.4	19	6	20	-	<0.1	2	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP4	0.0-0.3	27/05/14	Topsoil	Sand	9	<0.4	44	46	110	<0.03	0.5	5	180	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.1	<0.05	<0.5	<0.1	<5	<0.1	<0.1	<0.1	NAD
TP5	0.4-0.5	27/05/14	Natural	Sand	10	<0.4	36	10	19	-	<0.1	2	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP6	0.0-0.3	28/05/14	Topsoil	Sand	10	<0.4	51	24	23	-	<0.1	6	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP7	0.5-0.6	28/05/14	Natural	Sand	9	<0.4	17	9	13	-	<0.1	2	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP8	0.0-0.3	28/05/14	Topsoil	Sand	10	<0.4	36	18	23	-	<0.1	4	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP9	0.0-0.3	27/05/14	Topsoil	Sand	9	<0.4	30	17	41	-	0.1	5	85	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP10	0.0-0.3	27/05/14	Topsoil	Sand	9	<0.4	37	24	27	-	<0.1	5	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP11	0.4-0.5	27/05/14	Natural	Sand	<4	<0.4	6	7	7	-	<0.1	<1	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP12	0.0-0.2	27/05/14	Topsoil	Sand	10	<0.4	35	18	27	-	<0.1	3	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP13	0.0-0.3	27/05/14	Topsoil	Sand	9	<0.4	44	11	38	-	<0.1	4	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP14	0.0-0.3	27/05/14	Topsoil	Sand	7	<0.4	30	9	29	-	<0.1	6	64	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP15	0.4-0.5	27/05/14	Natural	Sand	6	<0.4	22	8	11	-	0.1	2	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP16	0.0-0.3	27/05/14	Topsoil	Sand	10	<0.4	32	18	36	-	0.1	6	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP17	0.0-0.3	27/05/14	Topsoil	Sand	8	<0.4	23	7	16	-	<0.1	3	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP18	0.0-0.2	27/05/14	Topsoil	Sand	8	<0.4	17	13	14	-	<0.1	2	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP19	0.0-0.3	28/05/14	Topsoil	Sand	7	<0.4	24	5	16	-	<0.1	2	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP20	0.0-0.3	27/05/14	Topsoil	Sand	8	<0.4	33	6	27	-	<0.1	3	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP21	0.0-0.3	27/05/14	Topsoil	Sand	7	<0.4	31	5	19	-	<0.1	3	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP22	0.0-0.3	27/05/14	Topsoil	Sand	7	<0.4	44	5	17	-	<0.1	3	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP23	0.0-0.3	27/05/14	Topsoil	Sand	9	<0.4	36	19	20	-	<0.1	5	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP24	0.0-0.2	27/05/14	Topsoil	Sand	10	<0.4	31	14	19	-	<0.1	9	21	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.1	<0.05	<0.5	<0.1	<5	<0.1	<0.1	<0.1	NAD
TP25	0.0-0.3	27/05/14	Topsoil	Sand	10	<0.4	23	20	19	-	<0.1	5	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP26	0.0-0.3	27/05/14	Topsoil	Sand	10	<0.4	26	17	24	-	<0.1	6	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP27	0.3-0.5	27/05/14	Natural	Sand	<4	<0.4	4	5	5	-	<0.1	<1	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP28	0.0-0.2	27/05/14	Topsoil	Sand	<4	<0.4	10	9	11	-	<0.1	2	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP29	0.0-0.2	28/05/14	Topsoil	Sand	5	<0.4	21	4	9	-	<0.1	2	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP30	0.6-0.8	28/05/14	Natural	Sand	6	<0.4	25	5	11	-	0.2	2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP31	0.0-0.3	28/05/14	Topsoil	Sand	6	<0.4	19	7	10	-	0.1	1	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP32	0.0-0.2	28/05/14	Topsoil	Sand	10	<0.4	29	40	16	-	<0.1	5	17	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.1	<0.05	<0.5	<0.1	<5	<0.1	<0.1	<0.1	NAD
TP33	0.0-0.2	27/05/14	Topsoil	Sand	9	<0.4	30	21	16	-	<0.1	4	10	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.1	<0.05	<0.5	<0.1	<5	<0.1	<0.1	<0.1	NAD
TP34	0.0-0.3	27/05/14	Topsoil	Sand	7	<0.4	27	18	18	-	<0.1	6	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP35	0.0-0.3	27/05/14	Topsoil	Sand	9	<0.4	23	19	19	-	<0.1	7	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP36	0.0-0.3	27/05/14	Topsoil	Sand	9	<0.4	26	22	21	-	<0.1	7	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP37	0.0-0.3	27/05/14	Topsoil	Sand	6	<0.4	16	19	15	-	<0.1	5	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP38	0.0-0.3	28/05/14	Topsoil	Sand	8	<0.4	25	6	12	-	<0.1	2	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP39	0.0-0.3	28/05/14	Topsoil	Sand	7	<0.4	29	10	18	-	<0.1	9	16	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.1	<0.05	<0.5	<0.1	<5	<0.1	<0.1	<0.1	NAD
TP40	0.4-0.6	28/05/14	Natural	Sand	10	<0.4	31	11	15	-	<0.1	3	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP41	0.0-0.3	28/05/14	Topsoil	Sand	9	<0.4	27	5	16	-	<0.1	3	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP42	0.0-0.3	27/05/14	Topsoil	Sand	9	<0.4	31	8	18	-	<0.1	4	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP43	0.0-0.3	27/05/14	Topsoil	Sand	10	<0.4	31	17	19	-	0.1	5	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP44	0.6-0.8	27/05/14	Natural	Sand	10	<0.4	29	18	16	-	<0.1	15	46	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP45	0.0-0.3	28/05/14	Topsoil	Sand	10	<0.4	22	18	19	-	0.1	5	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP46	0.0-0.3	28/05/14	Topsoil	Sand	10	<0.4	27	15	17	-	<0.1	7	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP47	0.0-0.3	28/05/14	Topsoil	Sand	8	<0.4	24	9	16	-	<0.1	7	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP48	0.0-0.3	28/05/14	Topsoil	Sand	9	<0.4	24	11	24	-	<0.1	6	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP49	0.0-0.3	28/05/14	Topsoil	Sand	7	<0.4	24	8	21	-	<0.1	5	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-
TP50	0.0-0.3	27/05/14	Topsoil	Sand	8	<0.4	20	12	19	-	<0.1	9	24	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.1	<0.05	<0.5	<0.1	<5	<0.1	<0.1	<0.1	NAD
BD1A/27514	0.0-0.2	27/05/14	Topsoil	Sand	10	<0.4	48	17	23	-	<0.1	5	14	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.1	<0.05	<0.5	<0.1	<5	<0.1	<0.1	<0.1	-
BD1B/27514	0.0-0.2	27/05/14	Topsoil	Sand	8.2	0.6	34	17	17	-	<0.05	<5	9.5	<20	<50	<25	<50	<100	<100	<0.2	<0.5	<0.1	<0.4	<0.5	<0.05	<0.5	<0.1	<5	<0.1	<0.1	<0.1	-
BD1A/28514	0.0-0.2	28/05/14	Topsoil	Sand	9.8	0.6	32	16	17	-	<0.05	6.1	11	<20	<50	<25	<50	<100	<100	<0.2	<0.5	<0.1	<0.4	<0.5	<0.05	<0.5	<0.1	<5	<0.1	<0.1	<0.1	-
BD1B/28514	0.0-0.2	28/05/14	Topsoil	Sand	20	<0.4	41	14	20	-	<0.1	7	15	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.1	<0.05	<0.5	<0.1	<5	<0.1	<0.1	<0.1	-
TS	-	27/05/14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	99%	101%	103%	103-104%	-	-	-	-	-	-	-	-	-
TB	-	27/05/14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-	-	-
TS	-	28/05/14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	106%	107%	105%	105%	-	-	-	-	-	-	-	-	-
TB	-	28/05/14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-	-	-
Guideline Criteria																																
Site Assessment Criteria & Reference Levels																																
HIL A [a]			-		100	20	100	6,000	300	-	40	1,200	7,400	-	-	-	-	-	-	-	-	-	-	2,200	-	3	300	100	- [e]	- [e]	1	-
HIL C [a]			-		300	90	300	17,000	600	-	80	1,200	30,000	-	-	-	-	-	-	-	-	-	-	-	-	3	300	120	- [e]	- [e]	1	-
HSL A, 0 to <1m [d]			Sand		-	-	-	-	-	-	-	-	-	110	95	-	-	-	-	0.5	160	55	40	NL	-	-	-	-	-	-	-	-
HSL Intrusive Maintenance Worker, 0 to <1m [f]			Sand		-	-	-	-	-	-	-	-	-	NL	NL	-	-	-	-	77	NL	NL	NL	NL	-	-	-	-	-	-	-	-
HSL A for direct contact [f]			-		-	-	-	-	-	-	-	-	-	-	-	4,400	3,300	4,500	6,300	100	14,000	4,500	12,000	1400	-	-	-	-	-	-	-	-
HSL C for direct contact [f]			-		-	-	-	-	-	-	-	-	-	-	-	5,100	3,800	5,300	7,400	120	18,000	5,300	15,000	1900	-	-	-	-	-	-	-	-
HSL Intrusive Maintenance Worker for direct contact [f]			-		-	-	-	-	-	-	-	-	-	-	-	82,000	62,000	85,000	120,000	1,100	120,000	85,000	130,000	29,000	-	-	-	-	-	-	-	-
Management Limit [g]			Coarse		-	-	-	-	-	-	-	-	-	700	1000	-	-	2,500	10,000	-	-	-	-	-	-	-	-	-	-	-	-	-
EIL [h]			-		100	-	190	60	1100	-	-	30	70	-	-	-	-	-	-	-	-	-	-	180	-	-	-	-	180	-	-	-

Table 11: Summary of Laboratory Results - All Samples

Sample ID	Sampled Date	Fill/ Natural	Applicable Soil Type [b]	Metals (total)									TRH						BTEX				PAH									
				Arsenic	Cadmium	Chromium	Copper	Lead	TCLP Lead	Mercury	Nickel	Zinc	C6-C10 less BTEX (F1)	>C10-C16-NAPHTHALENE (F2)	C6-C10	$>C_{10}-C_{16}$	>C16-C34	>C34-C40	Benzene	Toluene	Ethylbenzene	Xylene Total	naphthalene	B(a)P	B(a)P TEQ	Total +ve PAH [c]	Total Phenolics	OCP [c]	OPP [c]	PCB	Asbestos
Bore/Pit / Depth				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	-
Laboratory Results																															
ESL, 0 to < 2m [i]		Coarse	-	-	-	-	-	-	-	-	-	180	120	-	-	300	2800	50	85	70	105	-	-	-	-	-	-	-	-	-
General Solid Waste CT1 (mg/kg) [j]		-	100	20	100	N/A	100	-	4.0	40	N/A	-	-	650	-			10	288	600	1000	-	0.8	-	-	-	<50	<50	<50	NAD
Restricted Solid Waste CT2(mg/kg) [j]		-	400	80	400	N/A	400	-	16.0	160	N/A	-	-	2600	10000			40	1152	2400	4000	-	3.2	-	-	-	<50	<50	<50	NAD
General Solid Waste SCC1 (mg/kg) & TCLP1 (mg/L) [j]		-	500	100	1900	N/A	1500	5	50	1050	N/A	-	-	N/A	40000			18	518	1080	1800	-	10	-	-	-	N/A	N/A	N/A	NAD
Restricted Solid Waste SCC2 (mg/kg) & TCLP2 (mg/L) [j]		-	2000	400	7600	N/A	6000	20	200	4200	N/A	-	-	N/A	N/A			72	2073	4320	7200	-	23	-	-	-	N/A	N/A	N/A	NAD

Notes

a *National Environment Protection (Assessment of Site Contamination) Measure 2013* (as amended). Health investigation levels for Residential with garden/accessible soil (HIL A) and residential, parkland and public open space (HIL C).
b Overlying material applying for HSL and management limit. Coarse soil type adopted on conservative basis
c Sum of detectable, or where none detected, less than the PQL of the majority of compounds
d *National Environment Protection (Assessment of Site Contamination) Measure 2013* (as amended). Health screening levels for vapour intrusion Residential with garden/accessible soil (HSL A)
e Various available, not listed as not detected above PQL
f Co-operative Research Centre (CRC) for Contamination Assessment and Remediation of the Environment (CARE), Technical Report Series No. 10, *Health screening levels for petroleum hydrocarbons in soil and groundwater health screening level, vapour intrusion.* September 2011 (CRC CARE Series 10).
g *National Environment Protection (Assessment of Site Contamination) Measure 2013 (as amended)* . Table 1 B(7) Management Limits for TPH fractions F1-F4 in soil for coarse soil texture and residential, parkland and public open space.
h *National Environment Protection (Assessment of Site Contamination) Measure 2013 (as amended)* . Ecological investigation Levels Tables 1B(1) to 1B(5) residential, parkland and public open space.
i *National Environment Protection (Assessment of Site Contamination) Measure 2013 (as amended)* . Ecological Screening Levels Table 1B(6), Schedule B1 residential, parkland and public open space.
j NSW DECC (2008) Waste Classification Guidelines, revised July 2009
- Not defined/ not analysed/ not applicable
* Results statically analysed and discussed in section 11.2 of this report
General Solid Waste CT1 (mg/kg)
Exceeds the EIL

Acronyms

RP	Result pending
B(a)P	Benzo(a)pyrene
B(a)P TEQ	Benzo(a)pyrene toxic equivalent
BTEX	Benzene, toluene, ethyl benzene, total xylenes
CT	Contaminant threshold value
ENM	Excavated natural material
HIL	Health investigation level
HSL	Health screening level
NAD	No asbestos detected at the limit of reporting (0.1g/kg)
N/A	Not applicable
NL	"Not limiting" to human health for the proposed land use for vapour intrusion from petroleum hydrocarbons
OCP	Organochlorine pesticides
OPP	Organophosphorus pesticides
PAH	Polycyclic aromatic hydrocarbons
PCB	Polychlorinated biphenyls
TCLP	Specific contaminant concentration
SCC	Toxicity characteristic leaching procedure
PQL	Practical quantitation limit
TRH	Total recoverable hydrocarbons, including total petroleum hydrocarbons (TPH)

11. Discussion of Results

11.1 Desktop Study

Review of the desktop information contained in DP (2013) indicates that the site has previously used for market gardening and subsequently for rural purposes.

Based on the available historical information and site features, the potential for contamination was considered to be low, and included the following:

- The limited placement of fill to develop the site with material from unknown sources (i.e. dams) and potential localised filling not observed during the assessment;
- The possible general spraying of pesticides and application of fertilisers during past land use; and
- Asbestos containing material, which may be present around previous and existing structures and as a result of fly tipping (not observed during the current assessment) or within filling material.

No other major issues of environmental concern were identified in the desktop component of the investigation, or from the current site inspection.

The analytical results for the limited number of soil samples analysed as part of the DP (2013) assessment showed that the levels of contaminants within the analysed samples were all within the adopted Site Assessment Criteria (SAC) at the time.

11.2 Contaminants in Soil

The analytical results for the soil samples indicated that the concentrations of PAH, TRH, BTEX, PCB, OCP, OPP and phenols in all soil samples analysed were below the laboratory's limit of reporting and within the adopted SAC.

Low, generally background concentrations of heavy metals were recorded, which were all within the SAC.

Asbestos was not observed and was not detected at the reporting limit in any samples analysed for asbestos. No building rubble or demolition waste was observed in the fill in any of the test locations.

The EIL relate only to a limited number of contaminants (As, Cu, Cr (III), DDT, naphthalene, Ni, Pb and Zn). The analyte concentrations were within the EILs. Only a single minor Cu exceedance was detected across the site at TP102. The computer program, ProUCL version 5.0, was used to run statistical analysis on all Cu concentrations across the site. The statistical analysis revealed that:

- the standard deviation is 28.76 mg/kg which is less than 50% of the of the EIL (130 mg/kg);
- the 95% Chebyshev upper confidence limit (UCL) is 33.82 mg/kg which is less than the EIL and;
- the mean is 17.07 mg/kg which is less than the EIL.

Based on these results (and given that the concentration of Cu did not exceed 250% of the EIL), the concentration of Cu in the filling at TP 102 is not considered significant, and thus, further assessment of Cu in soil is not considered warranted.

The TRH, BTEX and B(a)P concentrations in all soil samples analysed were below the laboratory's limit of reporting and within the adopted ESL limits.

11.3 Waste Classification

The preliminary waste classification of the material encountered in the test pits and bores was conducted in accordance with the six step process as set out in DECCW (2009) and summarised in Table 12 below.

Table 12: Six Step Classification

Step	Classification	Rationale
1. Is it special waste?	No	asbestos not detected
2. Is it liquid waste?	No	The spoil comprised of soil matrix (i.e. no liquids)
3. Is the waste "pre-classified"?	No	Waste not observed to contain coal tar, batteries, lead paint or dangerous goods containers.
4. Does the waste have hazardous waste characteristics?	No	Waste not observed to/ or considered at risk to contain explosives, gases, flammable solids, oxidising agents, organic peroxides, toxic substances or corrosive substances.
5. Chemical Assessment	Undertaken	Soil matrix with unknown chemical characteristics.
6. Is the waste putrescible?	No	All observed components of material composed of materials pre-classified as non-putrescible (i.e. soil-based materials). Organic content is assessed to be minor.

The analytical results for total heavy metals recorded concentrations of arsenic, cadmium, chromium, copper, mercury, nickel and zinc within the screening threshold criteria for General Solid Waste (i.e. CT1).

The analytical results recorded concentrations of TRH C_6-C_9, TRH C_{10}-C_{36}, benzene, toluene, ethylbenzene, total xylene, total PAH, PCB, phenols and OCP/OPP either below the limit of reporting and/or within the threshold criteria for General Solid Waste (i.e. CT1 or SCC1, as applicable).

Total lead was detected above the screening CT1 threshold but within the General Solid Waste threshold criteria (SCC1), which can be used in conjunction with TCLP testing. The sample with the lead exceedance was selected for TCLP extraction and lead analysis. TCLP testing determined the concentrations of leachable lead were within the TCLP threshold criteria for General Solid Waste (TCLP1). On this basis lead is within the General Solid Waste thresholds taking into account both total and leachable concentrations.

Based on the field observation and laboratory results the filling described is preliminarily classified as General Solid Waste (non-putrescible) and is therefore suitable for off-site disposal in accordance with this classification.

If any signs of concern not recorded in this report are observed in the materials (e.g. odours, staining) the current classification will not apply to the impacted materials and further assessment will be required. No warranties can be given that asbestos is not present. If asbestos-based materials are found to be present during bulk excavation then the waste classification will be Special Waste (Asbestos) and should be disposed of in accordance with the Regulations for this type of waste.

On the basis of the site history, field and analytical results, it is also considered that the natural topsoil and underlying natural soils can be classified as virgin excavated natural material (VENM) for the purpose of off-site disposal.

11.4 Updated Conceptual Site Model

On the basis of the field and analytical data, the preliminary CSM presented in Section 6 has been reassessed and updated with new information as discussed in Table 13.

Table 13: Updated CSM

Item	Discussion
S1: Imported filling	Filling was only encountered at one test pit location, and no contaminants were identified in the fill at this location. There remains a low potential for localised filling to be present between sampled locations.
S2: Market gardening	Sufficient data has been obtained to remove this as a potential source at the site.
S3: Hazardous building materials in soil	No indicators of remnant hazardous building materials were encountered in the soils at the sampled locations, and no associated contaminants were detected. There remains a low potential for localised impacts with asbestos or lead between sampled locations.
Groundwater	No contaminants were identified in soils at concentrations considered to pose a risk of leaching to groundwater, and the relatively impermeable soil profile provides a further barrier to vertical migration of contaminants from soil to groundwater. Based on this and the history of the site the potential for groundwater contamination at the site is considered to be low.
Source-pathway-receptor linkage	As there was no soil contaminants found at the site, at the sampled locations, there are no complete source-pathway-receptor linkages identified.
Risk Management Recommendations	The recommendations for the management of the low potential for contamination mentioned above are outlined in Section 12.

12. Conclusion and Recommendations

Based on the field and analytical results no apparent soil contamination was present at the site at the sampling locations, with all analytical results being below the investigation and screening levels adopted from NEPC (2013) and CRC CARE. On the basis of the investigation findings, it is considered that the site is suitable for the low density residential development. However, the following recommendations should be considered:

- The health based guidelines adopted for the assessment of the test results on soils are applicable for residential properties where home grown produce contributes less than 10% of the fruit and vegetable uptake, with no poultry. Should any of the proposed properties not comply with this restriction, further assessment of health risks needs to be undertaken;
- An unexpected finds protocol would be a useful inclusion in any civil works plan to provide guidance and methodology for addressing unexpected occurrences of contamination such as localised filling, fly tipping or asbestos fragments; and
- A fill importation protocol should be implemented to ensure that any imported materials during the subdivision works meet the legislative requirements regarding suitability. Such a protocol could be prepared by a suitability qualified environmental consultant.

Based on the field observations and laboratory results the topsoil and natural soils at the site are considered to be compatible with a VENM classification. The fill encountered at TP102 is preliminarily classified as General Solid Waste (non-putrescible) and is therefore suitable for off-site disposal in accordance with this classification. These waste classifications should be confirmed for any soils requiring off-site disposal as part of the proposed development.

13. Limitations

Douglas Partners (DP) has prepared this report for this project at Eastern Precinct of the Fernhill Estate, Mulgoa in accordance with DP's proposal SYD140310-Rev-2 dated 16 May 2014. The work was carried out under DP's Conditions of Engagement. This report is provided for the use of Cubelic Holdings 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 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 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 notes 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 a 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 Comments 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 geotechnical 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

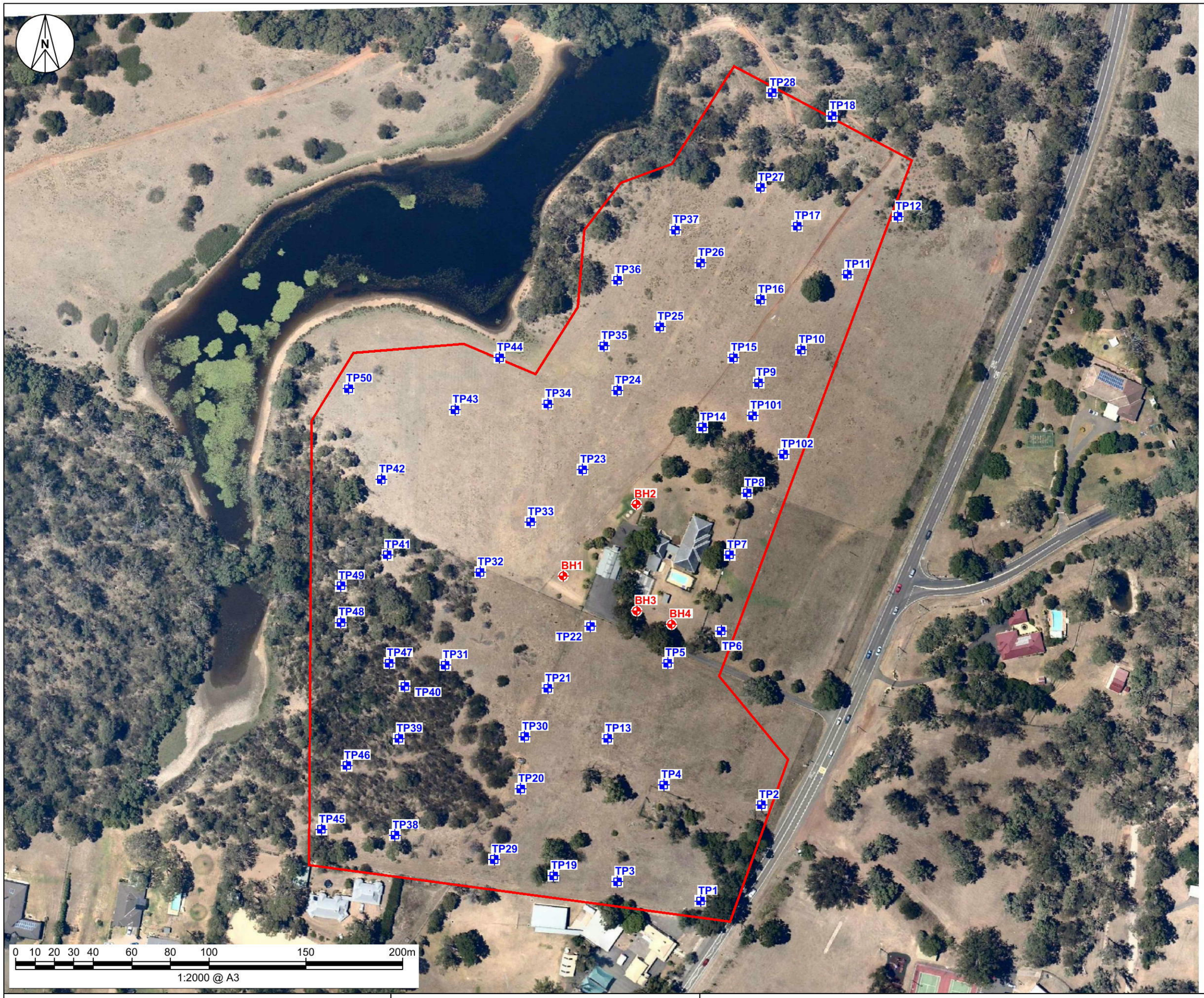
Drawings 1 and 2, Subdivision Drawing

Location Plan

Legend

Site boundary

Douglas Partners Geotechnics / Environment / Groundwater	CLIENT: Cubelic Holdings Pty Ltd		TITLE: **Lot and Site Boundaries** **Detailed Site Investigation (DSI)** **Fernhill Estate (Eastern Precinct) Mulgoa Road, Mulgoa**	PROJECT No:	71706.02
	OFFICE: Sydney	DRAWN BY: MW		DRAWING No:	1
	SCALE: NTS	DATE: 18 June 2014		REVISION:	0



Location Plan

Legend

- Borehole Location
- Test Pit Location
- Site Boundary

Douglas Partners *Geotechnics / Environment / Groundwater*	CLIENT: Cubelic Holdings Pty Ltd	TITLE: **Test Location Plan**	PROJECT No: 71706.02
	OFFICE: Sydney / DRAWN BY: JCP	**Detailed Site Investigation (DSI)**	DRAWING No: 2
	SCALE: As shown / DATE: 13.06.2014	**Fernhill Estate (Eastern Precinct) Mulgoa Road, Mulgoa**	REVISION: 0

50mm on Original

File Name: P:\71706.02 MULGOA, Fernhill Estate - Eastern Precinct - DSI PG\Drawings\71706.02_DWG02.dwg Date printed: 18 Jun 2014 - 12:17PM

54 Lots

Mulgoa Road, Fernhill - Eastern Precinct

1:2000 @ A3

0 20 50 100 200m

Key Notes

- Fire Trail
- 100m Mulgoa Rd Setback
- Ridge Line
- 1m Contours
- Road Reserve (extended)
- Fernhill

Min Lot Size	750m²
Min Width	15.5m
Total Lots	54

ae design partnership
architecture urban design planning

Date 12/05/2014

Issue A

About this Report

Douglas Partners

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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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.

Appendix B

Site Photographs

Photo 1 - Former building footprint near TP102

Photo 2 - Fill material from TP102

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs** **Detailed Site Investigation** **Fernhill Estate (Eastern Precinct)** **Mulgoa Road, Mulgoa**	PROJECT: 71706.02 PLATE No: 1 REV: A
	CLIENT: Cubelic Holdings Pty Ltd	DATE: 13-Jun-14

Photo 3 - Example of materials encountered on site

Photo 4 - Example of materials encountered on site

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs** **Detailed Site Investigation** **Fernhill Estate (Eastern Precinct)** **Mulgoa Road, Mulgoa**	PROJECT: 71706.02 PLATE No: 2 REV: A
	CLIENT: Cubelic Holdings Pty Ltd	DATE: 13-Jun-14

Photo 5 - Example of materials encountered on site.

Photo 6 - Example of materials encountered on site

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs** **Detailed Site Investigation** **Fernhill Estate (Eastern Precinct)** **Mulgoa Road, Mulgoa**	PROJECT: 71706.02 PLATE No: 3 REV: A
	CLIENT: Cubelic Holdings Pty Ltd	DATE: 13-Jun-14

Appendix C

Laboratory Certificates

and Chain of Custody Documentation

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

CERTIFICATE OF ANALYSIS 110679

Client:
Douglas Partners Pty Ltd
96 Hermitage Rd
West Ryde
NSW 2114

Attention: Matt West

Sample log in details:

Your Reference:	**71706.02, Mulgoa**		
No. of samples:	62 soils		
Date samples received / completed instructions received	29/05/14	/	29/05/14

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:	5/06/14	/	5/06/14
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:

Jacinta Hurst
Laboratory Manager

ACCREDITED FOR TECHNICAL COMPETENCE

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	110679-1	110679-4	110679-24	110679-32	110679-33
Your Reference	----------	TP1	TP4	TP24	TP32	TP33
Depth	----------	0-0.3	0-0.3	0-0.2	0-0.2	0-0.2
Date Sampled		28/05/2014	27/05/2014	27/05/2014	28/05/2014	27/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	01/06/2014	01/06/2014	01/06/2014	01/06/2014	01/06/2014
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	%	67	70	72	70	67

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	110679-39	110679-50	110679-52	110679-54	110679-56
Your Reference	----------	TP39	TP50	TP102	BH2	BH4
Depth	----------	0-0.3	0-0.3	0.2-0.5	0-0.1	0-0.1
Date Sampled		28/05/2014	27/05/2014	27/05/2014	27/05/2014	28/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	01/06/2014	01/06/2014	01/06/2014	01/06/2014	01/06/2014
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	%	71	67	72	65	72

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	110679-57	110679-58	110679-59	110679-60	110679-61
Your Reference	----------	TS	TB	TS	TB	BD1A/27514
Depth	----------	-	-	-	-	-
Date Sampled		27/05/2014	27/05/2014	28/05/2014	28/05/2014	27/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	01/06/2014	01/06/2014	01/06/2014	01/06/2014	01/06/2014
TRH C_6 - C_9	mg/kg	[NA]	[NA]	[NA]	[NA]	<25
TRH C_6 - C_{10}	mg/kg	[NA]	[NA]	[NA]	[NA]	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	[NA]	[NA]	[NA]	[NA]	<25
Benzene	mg/kg	99%	<0.2	106%	<0.2	<0.2
Toluene	mg/kg	101%	<0.5	107%	<0.5	<0.5
Ethylbenzene	mg/kg	103%	<1	105%	<1	<1
m+p-xylene	mg/kg	103%	<2	105%	<2	<2
o-Xylene	mg/kg	104%	<1	105%	<1	<1
naphthalene	mg/kg	[NA]	[NA]	[NA]	[NA]	<1
Surrogate aaa-Trifluorotoluene	%	99	73	105	74	68

svTRH(C10-C40)in Soil						
Our Reference:	UNITS	110679-1	110679-4	110679-24	110679-32	110679-33
Your Reference	----------	TP1	TP4	TP24	TP32	TP33
Depth	----------	0-0.3	0-0.3	0-0.2	0-0.2	0-0.2
Date Sampled		28/05/2014	27/05/2014	27/05/2014	28/05/2014	27/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
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	%	105	105	106	101	96

svTRH(C10-C40)in Soil						
Our Reference:	UNITS	110679-39	110679-50	110679-52	110679-54	110679-56
Your Reference	----------	TP39	TP50	TP102	BH2	BH4
Depth	----------	0-0.3	0-0.3	0.2-0.5	0-0.1	0-0.1
Date Sampled		28/05/2014	27/05/2014	27/05/2014	27/05/2014	28/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
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	%	102	103	101	100	98

svTRH (C10-C40) in Soil		
Our Reference:	UNITS	110679-61
Your Reference	----------	BD1A/27514
Depth	----------	-
Date Sampled		27/05/2014
Type of sample		Soil
Date extracted	-	30/05/2014
Date analysed	-	30/05/2014
TRH C_{10} - C_{14}	mg/kg	<50
TRH C_{15} - C_{28}	mg/kg	<100
TRH C_{29} - C_{36}	mg/kg	<100
TRH >C_{10}-C_{16}	mg/kg	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50
TRH >C_{16}-C_{34}	mg/kg	<100
TRH >C_{34}-C_{40}	mg/kg	<100
Surrogate o-Terphenyl	%	101

PAHs in Soil						
Our Reference:	UNITS	110679-1	110679-4	110679-24	110679-32	110679-33
Your Reference	----------	TP1	TP4	TP24	TP32	TP33
Depth	----------	0-0.3	0-0.3	0-0.2	0-0.2	0-0.2
Date Sampled		28/05/2014	27/05/2014	27/05/2014	28/05/2014	27/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	31/05/2014	31/05/2014	31/05/2014	31/05/2014	31/05/2014
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ NEPM B1	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	mg/kg	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	89	88	95	91	89

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- ----------	110679-39 TP39 0-0.3 28/05/2014 Soil	110679-50 TP50 0-0.3 27/05/2014 Soil	110679-52 TP102 0.2-0.5 27/05/2014 Soil	110679-54 BH2 0-0.1 27/05/2014 Soil	110679-56 BH4 0-0.1 28/05/2014 Soil
Date extracted	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	31/05/2014	31/05/2014	31/05/2014	31/05/2014	31/05/2014
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ NEPM B1	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	mg/kg	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	89	91	96	94	91

PAHs in Soil		
Our Reference:	UNITS	110679-61
Your Reference	----------	BD1A/27514
Depth	----------	-
Date Sampled		27/05/2014
Type of sample		Soil
Date extracted	-	30/05/2014
Date analysed	-	31/05/2014
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 NEPM B1	mg/kg	<0.5
Total +ve PAH's	mg/kg	NIL (+)VE
Surrogate p-Terphenyl-d14	%	93

Total Phenolics in Soil						
Our Reference:	UNITS	110679-1	110679-4	110679-24	110679-32	110679-33
Your Reference	----------	TP1	TP4	TP24	TP32	TP33
Depth	----------	0-0.3	0-0.3	0-0.2	0-0.2	0-0.2
Date Sampled		28/05/2014	27/05/2014	27/05/2014	28/05/2014	27/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Total Phenolics in Soil						
Our Reference:	UNITS	110679-39	110679-50	110679-52	110679-54	110679-56
Your Reference	----------	TP39	TP50	TP102	BH2	BH4
Depth	----------	0-0.3	0-0.3	0.2-0.5	0-0.1	0-0.1
Date Sampled		28/05/2014	27/05/2014	27/05/2014	27/05/2014	28/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Total Phenolics in Soil			
Our Reference:	UNITS	110679-61	
Your Reference	----------	BD1A/27514	
Depth	----------	-	
Date Sampled		27/05/2014	
Type of sample		Soil	
Date extracted	-	30/05/2014	
Date analysed	-	30/05/2014	
Total Phenolics (as Phenol)	mg/kg	<5	

Organochlorine Pesticides in soil						
Our Reference:	UNITS	110679-1	110679-2	110679-3	110679-4	110679-5
Your Reference	----------	TP1	TP2	TP3	TP4	TP5
Depth	----------	0-0.3	0-0.3	0-0.3	0-0.3	0.4-0.5
Date Sampled		28/05/2014	27/05/2014	28/05/2014	27/05/2014	27/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
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	%	85	79	86	87	86

Organochlorine Pesticides in soil						
Our Reference:	UNITS	110679-6	110679-7	110679-8	110679-9	110679-10
Your Reference	----------	TP6	TP7	TP8	TP9	TP10
Depth	----------	0-0.3	0.5-0.6	0-0.3	0-0.3	0-0.3
Date Sampled		28/05/2014	28/05/2014	28/05/2014	27/05/2014	27/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
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	%	84	84	83	88	84

Organochlorine Pesticides in soil						
Our Reference:	UNITS	110679-11	110679-12	110679-13	110679-14	110679-15
Your Reference	----------	TP11	TP12	TP13	TP14	TP15
Depth	----------	0.4-0.5	0-0.2	0-0.3	0-0.3	0.4-0.5
Date Sampled		27/05/2014	27/05/2014	27/05/2014	27/05/2014	27/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
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	%	82	85	85	83	84

Organochlorine Pesticides in soil						
Our Reference:	UNITS	110679-16	110679-17	110679-18	110679-19	110679-20
Your Reference	----------	TP16	TP17	TP18	TP19	TP20
Depth	----------	0-0.3	0-0.3	0-0.2	0-0.3	0-0.3
Date Sampled		27/05/2014	27/05/2014	27/05/2014	28/05/2014	27/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
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	%	85	85	81	82	86

Organochlorine Pesticides in soil						
Our Reference:	UNITS	110679-21	110679-22	110679-23	110679-24	110679-25
Your Reference	----------	TP21	TP22	TP23	TP24	TP25
Depth	----------	0-0.3	0-0.3	0-0.3	0-0.2	0-0.3
Date Sampled		27/05/2014	27/05/2014	27/05/2014	27/05/2014	27/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
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	%	81	79	81	84	80

Organochlorine Pesticides in soil						
Our Reference:	UNITS	110679-26	110679-27	110679-28	110679-29	110679-30
Your Reference	----------	TP26	TP27	TP28	TP29	TP30
Depth	----------	0-0.3	0.3-0.5	0-0.2	0-0.2	0.6-0.8
Date Sampled		27/05/2014	27/05/2014	27/05/2014	28/05/2014	28/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
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	0.7	<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	%	80	77	80	79	81

Organochlorine Pesticides in soil						
Our Reference:	UNITS	110679-31	110679-32	110679-33	110679-34	110679-35
Your Reference	----------	TP31	TP32	TP33	TP34	TP35
Depth	----------	0-0.3	0-0.2	0-0.2	0-0.3	0-0.3
Date Sampled		28/05/2014	28/05/2014	27/05/2014	27/05/2014	27/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
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	%	81	79	75	84	77

Organochlorine Pesticides in soil						
Our Reference:	UNITS	110679-36	110679-37	110679-38	110679-39	110679-40
Your Reference	----------	TP36	TP37	TP38	TP39	TP40
Depth	----------	0-0.3	0-0.3	0-0.3	0-0.3	0.4-0.6
Date Sampled		27/05/2014	27/05/2014	28/05/2014	28/05/2014	28/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
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	%	79	80	80	79	79

Organochlorine Pesticides in soil						
Our Reference:	UNITS	110679-41	110679-42	110679-43	110679-44	110679-45
Your Reference	----------	TP41	TP42	TP43	TP44	TP45
Depth	----------	0-0.3	0-0.3	0-0.3	0.6-0.8	0-0.3
Date Sampled		28/05/2014	27/05/2014	27/05/2014	27/05/2014	28/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
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	%	80	77	80	80	80

Organochlorine Pesticides in soil						
Our Reference:	UNITS	110679-46	110679-47	110679-48	110679-49	110679-50
Your Reference	----------	TP46	TP47	TP48	TP49	TP50
Depth	----------	0-0.3	0-0.3	0-0.3	0-0.3	0-0.3
Date Sampled		28/05/2014	28/05/2014	28/05/2014	28/05/2014	27/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
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	%	81	81	79	78	84

Organochlorine Pesticides in soil						
Our Reference:	UNITS	110679-51	110679-52	110679-53	110679-54	110679-55
Your Reference	----------	TP101	TP102	BH1	BH2	BH3
Depth	----------	0-0.3	0.2-0.5	0-0.1	0-0.1	0-0.1
Date Sampled		27/05/2014	27/05/2014	27/05/2014	27/05/2014	28/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
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	%	80	81	79	81	81

Organochlorine Pesticides in soil				
Our Reference:	UNITS	110679-56	110679-61	110679-62
Your Reference	----------	BH4	BD1A/27514	BD1B/28514
Depth	----------	0-0.1	-	-
Date Sampled		28/05/2014	27/05/2014	28/05/2014
Type of sample		Soil	Soil	Soil
Date extracted	-	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014
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	%	76	81	79

Organophosphorus Pesticides						
Our Reference:	UNITS	110679-1	110679-2	110679-3	110679-4	110679-5
Your Reference	----------	TP1	TP2	TP3	TP4	TP5
Depth	----------	0-0.3	0-0.3	0-0.3	0-0.3	0.4-0.5
Date Sampled		28/05/2014	27/05/2014	28/05/2014	27/05/2014	27/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	85	79	86	87	86

Organophosphorus Pesticides						
Our Reference:	UNITS	110679-6	110679-7	110679-8	110679-9	110679-10
Your Reference	----------	TP6	TP7	TP8	TP9	TP10
Depth	----------	0-0.3	0.5-0.6	0-0.3	0-0.3	0-0.3
Date Sampled		28/05/2014	28/05/2014	28/05/2014	27/05/2014	27/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	84	84	83	88	84

Organophosphorus Pesticides						
Our Reference:	UNITS	110679-11	110679-12	110679-13	110679-14	110679-15
Your Reference	----------	TP11	TP12	TP13	TP14	TP15
Depth	----------	0.4-0.5	0-0.2	0-0.3	0-0.3	0.4-0.5
Date Sampled		27/05/2014	27/05/2014	27/05/2014	27/05/2014	27/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	82	85	85	83	84

Organophosphorus Pesticides						
Our Reference:	UNITS	110679-16	110679-17	110679-18	110679-19	110679-20
Your Reference	----------	TP16	TP17	TP18	TP19	TP20
Depth	----------	0-0.3	0-0.3	0-0.2	0-0.3	0-0.3
Date Sampled		27/05/2014	27/05/2014	27/05/2014	28/05/2014	27/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	85	85	81	82	86

Organophosphorus Pesticides						
Our Reference:	UNITS	110679-21	110679-22	110679-23	110679-24	110679-25
Your Reference	----------	TP21	TP22	TP23	TP24	TP25
Depth	----------	0-0.3	0-0.3	0-0.3	0-0.2	0-0.3
Date Sampled		27/05/2014	27/05/2014	27/05/2014	27/05/2014	27/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	81	79	81	84	80

Organophosphorus Pesticides						
Our Reference:	UNITS	110679-26	110679-27	110679-28	110679-29	110679-30
Your Reference	----------	TP26	TP27	TP28	TP29	TP30
Depth	----------	0-0.3	0.3-0.5	0-0.2	0-0.2	0.6-0.8
Date Sampled		27/05/2014	27/05/2014	27/05/2014	28/05/2014	28/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	80	77	80	79	81

Organophosphorus Pesticides						
Our Reference:	UNITS	110679-31	110679-32	110679-33	110679-34	110679-35
Your Reference	----------	TP31	TP32	TP33	TP34	TP35
Depth	----------	0-0.3	0-0.2	0-0.2	0-0.3	0-0.3
Date Sampled		28/05/2014	28/05/2014	27/05/2014	27/05/2014	27/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	81	79	75	84	77

Organophosphorus Pesticides						
Our Reference:	UNITS	110679-36	110679-37	110679-38	110679-39	110679-40
Your Reference	----------	TP36	TP37	TP38	TP39	TP40
Depth	----------	0-0.3	0-0.3	0-0.3	0-0.3	0.4-0.6
Date Sampled		27/05/2014	27/05/2014	28/05/2014	28/05/2014	28/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	79	80	80	79	79

Organophosphorus Pesticides						
Our Reference:	UNITS	110679-41	110679-42	110679-43	110679-44	110679-45
Your Reference	----------	TP41	TP42	TP43	TP44	TP45
Depth	----------	0-0.3	0-0.3	0-0.3	0.6-0.8	0-0.3
Date Sampled		28/05/2014	27/05/2014	27/05/2014	27/05/2014	28/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	80	77	80	80	80

Organophosphorus Pesticides						
Our Reference:	UNITS	110679-46	110679-47	110679-48	110679-49	110679-50
Your Reference	----------	TP46	TP47	TP48	TP49	TP50
Depth	----------	0-0.3	0-0.3	0-0.3	0-0.3	0-0.3
Date Sampled		28/05/2014	28/05/2014	28/05/2014	28/05/2014	27/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	81	81	79	78	84

Organophosphorus Pesticides						
Our Reference:	UNITS	110679-51	110679-52	110679-53	110679-54	110679-55
Your Reference	----------	TP101	TP102	BH1	BH2	BH3
Depth	----------	0-0.3	0.2-0.5	0-0.1	0-0.1	0-0.1
Date Sampled		27/05/2014	27/05/2014	27/05/2014	27/05/2014	28/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	80	81	79	81	81

Organophosphorus Pesticides				
Our Reference:	UNITS	110679-56	110679-61	110679-62
Your Reference	----------	BH4	BD1A/27514	BD1B/28514
Depth	----------	0-0.1	-	-
Date Sampled		28/05/2014	27/05/2014	28/05/2014
Type of sample		Soil	Soil	Soil
Date extracted	-	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014
Diazinon	mg/kg	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	76	81	79

PCBs in Soil						
Our Reference:	UNITS	110679-1	110679-4	110679-24	110679-32	110679-33
Your Reference	----------	TP1	TP4	TP24	TP32	TP33
Depth	----------	0-0.3	0-0.3	0-0.2	0-0.2	0-0.2
Date Sampled		28/05/2014	27/05/2014	27/05/2014	28/05/2014	27/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
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	%	85	87	84	79	84

PCBs in Soil						
Our Reference:	UNITS	110679-39	110679-50	110679-52	110679-54	110679-56
Your Reference	----------	TP39	TP50	TP102	BH2	BH4
Depth	----------	0-0.3	0-0.3	0.2-0.5	0-0.1	0-0.1
Date Sampled		28/05/2014	27/05/2014	27/05/2014	27/05/2014	28/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
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	%	79	84	81	81	76

PCBs in Soil		
Our Reference:	UNITS	110679-61
Your Reference	----------	BD1A/27514
Depth	----------	-
Date Sampled		27/05/2014
Type of sample		Soil
Date extracted	-	30/05/2014
Date analysed	-	30/05/2014
Arochlor 1016	mg/kg	<0.1
Arochlor 1221	mg/kg	<0.1
Arochlor 1232	mg/kg	<0.1
Arochlor 1242	mg/kg	<0.1
Arochlor 1248	mg/kg	<0.1
Arochlor 1254	mg/kg	<0.1
Arochlor 1260	mg/kg	<0.1
Surrogate TCLMX	%	79

Acid Extractable metals in soil						
Our Reference:	UNITS	110679-1	110679-2	110679-3	110679-4	110679-5
Your Reference	----------	TP1	TP2	TP3	TP4	TP5
Depth	----------	0-0.3	0-0.3	0-0.3	0-0.3	0.4-0.5
Date Sampled		28/05/2014	27/05/2014	28/05/2014	27/05/2014	27/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Arsenic	mg/kg	<4	9	6	9	10
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	18	26	19	44	36
Copper	mg/kg	5	8	6	46	10
Lead	mg/kg	11	20	20	110	19
Mercury	mg/kg	0.2	0.1	<0.1	0.5	<0.1
Nickel	mg/kg	1	4	2	5	2
Zinc	mg/kg	4	14	28	180	7
Iron	mg/kg	[NA]	[NA]	[NA]	[NA]	61,000

Acid Extractable metals in soil						
Our Reference:	UNITS	110679-6	110679-7	110679-8	110679-9	110679-10
Your Reference	----------	TP6	TP7	TP8	TP9	TP10
Depth	----------	0-0.3	0.5-0.6	0-0.3	0-0.3	0-0.3
Date Sampled		28/05/2014	28/05/2014	28/05/2014	27/05/2014	27/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Arsenic	mg/kg	10	9	10	9	9
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	51	17	36	30	37
Copper	mg/kg	24	9	18	17	24
Lead	mg/kg	23	13	23	41	27
Mercury	mg/kg	<0.1	<0.1	<0.1	0.1	<0.1
Nickel	mg/kg	6	2	4	5	5
Zinc	mg/kg	17	7	20	85	34
Iron	mg/kg	[NA]	34,000	[NA]	[NA]	[NA]

Acid Extractable metals in soil						
Our Reference:	UNITS	110679-11	110679-12	110679-13	110679-14	110679-15
Your Reference	----------	TP11	TP12	TP13	TP14	TP15
Depth	----------	0.4-0.5	0-0.2	0-0.3	0-0.3	0.4-0.5
Date Sampled		27/05/2014	27/05/2014	27/05/2014	27/05/2014	27/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Arsenic	mg/kg	<4	10	9	7	6
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	6	35	44	30	22
Copper	mg/kg	7	18	11	9	8
Lead	mg/kg	7	27	38	29	11
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	0.1
Nickel	mg/kg	<1	3	4	6	2
Zinc	mg/kg	5	17	63	64	8
Iron	mg/kg	15,000	[NA]	[NA]	[NA]	40,000

Acid Extractable metals in soil						
Our Reference:	UNITS	110679-16	110679-17	110679-18	110679-19	110679-20
Your Reference	----------	TP16	TP17	TP18	TP19	TP20
Depth	----------	0-0.3	0-0.3	0-0.2	0-0.3	0-0.3
Date Sampled		27/05/2014	27/05/2014	27/05/2014	28/05/2014	27/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Arsenic	mg/kg	10	8	8	7	8
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	32	23	17	24	33
Copper	mg/kg	18	7	13	5	6
Lead	mg/kg	36	16	14	16	27
Mercury	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	6	3	2	2	3
Zinc	mg/kg	29	37	10	32	39

Acid Extractable metals in soil						
Our Reference:	UNITS	110679-21	110679-22	110679-23	110679-24	110679-25
Your Reference	----------	TP21	TP22	TP23	TP24	TP25
Depth	----------	0-0.3	0-0.3	0-0.3	0-0.2	0-0.3
Date Sampled		27/05/2014	27/05/2014	27/05/2014	27/05/2014	27/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Arsenic	mg/kg	7	7	9	10	10
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	31	44	36	31	23
Copper	mg/kg	5	5	19	14	20
Lead	mg/kg	19	17	20	19	19
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	3	3	5	9	5
Zinc	mg/kg	10	9	14	21	21
Iron	mg/kg	[NA]	49,000	[NA]	[NA]	[NA]

Acid Extractable metals in soil						
Our Reference:	UNITS	110679-26	110679-27	110679-28	110679-29	110679-30
Your Reference	----------	TP26	TP27	TP28	TP29	TP30
Depth	----------	0-0.3	0.3-0.5	0-0.2	0-0.2	0.6-0.8
Date Sampled		27/05/2014	27/05/2014	27/05/2014	28/05/2014	28/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Arsenic	mg/kg	10	<4	<4	5	6
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	26	4	10	21	25
Copper	mg/kg	17	5	9	4	5
Lead	mg/kg	24	5	11	9	11
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	0.2
Nickel	mg/kg	6	<1	2	2	2
Zinc	mg/kg	25	4	24	5	6
Iron	mg/kg	[NA]	[NA]	25,000	[NA]	[NA]

Acid Extractable metals in soil						
Our Reference:	UNITS	110679-31	110679-32	110679-33	110679-34	110679-35
Your Reference	----------	TP31	TP32	TP33	TP34	TP35
Depth	----------	0-0.3	0-0.2	0-0.2	0-0.3	0-0.3
Date Sampled		28/05/2014	28/05/2014	27/05/2014	27/05/2014	27/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Arsenic	mg/kg	6	10	9	7	9
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	19	29	30	27	23
Copper	mg/kg	7	40	21	18	19
Lead	mg/kg	10	16	16	18	19
Mercury	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	1	5	4	6	7
Zinc	mg/kg	5	17	10	10	21
Iron	mg/kg	[NA]	[NA]	[NA]	[NA]	67,000

Acid Extractable metals in soil						
Our Reference:	UNITS	110679-36	110679-37	110679-38	110679-39	110679-40
Your Reference	----------	TP36	TP37	TP38	TP39	TP40
Depth	----------	0-0.3	0-0.3	0-0.3	0-0.3	0.4-0.6
Date Sampled		27/05/2014	27/05/2014	28/05/2014	28/05/2014	28/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Arsenic	mg/kg	9	6	8	7	10
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	26	16	25	29	31
Copper	mg/kg	22	19	6	10	11
Lead	mg/kg	21	15	12	18	15
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	7	5	2	9	3
Zinc	mg/kg	24	19	5	16	11
Iron	mg/kg	[NA]	[NA]	[NA]	[NA]	51,000

Acid Extractable metals in soil						
Our Reference:	UNITS	110679-41	110679-42	110679-43	110679-44	110679-45
Your Reference	----------	TP41	TP42	TP43	TP44	TP45
Depth	----------	0-0.3	0-0.3	0-0.3	0.6-0.8	0-0.3
Date Sampled		28/05/2014	27/05/2014	27/05/2014	27/05/2014	28/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Arsenic	mg/kg	9	9	10	10	10
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	27	31	31	29	22
Copper	mg/kg	5	8	17	18	18
Lead	mg/kg	16	18	19	16	19
Mercury	mg/kg	<0.1	<0.1	0.1	<0.1	0.1
Nickel	mg/kg	3	4	5	15	5
Zinc	mg/kg	8	12	18	46	18
Iron	mg/kg	[NA]	[NA]	[NA]	64,000	[NA]

Acid Extractable metals in soil						
Our Reference:	UNITS	110679-46	110679-47	110679-48	110679-49	110679-50
Your Reference	----------	TP46	TP47	TP48	TP49	TP50
Depth	----------	0-0.3	0-0.3	0-0.3	0-0.3	0-0.3
Date Sampled		28/05/2014	28/05/2014	28/05/2014	28/05/2014	27/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Arsenic	mg/kg	10	8	9	7	8
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	27	24	24	24	20
Copper	mg/kg	15	9	11	8	12
Lead	mg/kg	17	16	24	21	19
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	7	7	6	5	9
Zinc	mg/kg	15	13	23	14	24
Iron	mg/kg	[NA]	[NA]	[NA]	63,000	[NA]

Acid Extractable metals in soil						
Our Reference:	UNITS	110679-51	110679-52	110679-53	110679-54	110679-55
Your Reference	----------	TP101	TP102	BH1	BH2	BH3
Depth	----------	0-0.3	0.2-0.5	0-0.1	0-0.1	0-0.1
Date Sampled		27/05/2014	27/05/2014	27/05/2014	27/05/2014	28/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Arsenic	mg/kg	7	10	10	10	9
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	28	41	41	39	30
Copper	mg/kg	10	220	16	14	17
Lead	mg/kg	16	29	20	21	25
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	6	4	4	4	6
Zinc	mg/kg	13	48	19	20	48

Acid Extractable metals in soil						
Our Reference:	UNITS	110679-56	110679-61	110679-62	110679-63	110679-64
Your Reference	----------	BH4	BD1A/27514	BD1B/28514	TP1-TRIPLICATE	TP101-TRIPLICATE
Depth	----------	0-0.1	-	-	0-0.3	0-0.3
Date Sampled		28/05/2014	27/05/2014	28/05/2014	28/05/2014	27/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Arsenic	mg/kg	10	10	20	8	7
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	44	48	41	28	34
Copper	mg/kg	13	17	14	6	11
Lead	mg/kg	23	23	20	17	18
Mercury	mg/kg	0.1	<0.1	<0.1	0.2	<0.1
Nickel	mg/kg	5	5	7	3	7
Zinc	mg/kg	36	14	15	9	21

Moisture						
Our Reference:	UNITS	110679-1	110679-2	110679-3	110679-4	110679-5
Your Reference	----------	TP1	TP2	TP3	TP4	TP5
Depth	----------	0-0.3	0-0.3	0-0.3	0-0.3	0.4-0.5
Date Sampled		28/05/2014	27/05/2014	28/05/2014	27/05/2014	27/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	02/06/2014	02/06/2014	02/06/2014	02/06/2014	02/06/2014
Moisture	%	15	10	9.6	12	22

Moisture						
Our Reference:	UNITS	110679-6	110679-7	110679-8	110679-9	110679-10
Your Reference	----------	TP6	TP7	TP8	TP9	TP10
Depth	----------	0-0.3	0.5-0.6	0-0.3	0-0.3	0-0.3
Date Sampled		28/05/2014	28/05/2014	28/05/2014	27/05/2014	27/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	02/06/2014	02/06/2014	02/06/2014	02/06/2014	02/06/2014
Moisture	%	9.1	18	16	9.2	10

Moisture						
Our Reference:	UNITS	110679-11	110679-12	110679-13	110679-14	110679-15
Your Reference	----------	TP11	TP12	TP13	TP14	TP15
Depth	----------	0.4-0.5	0-0.2	0-0.3	0-0.3	0.4-0.5
Date Sampled		27/05/2014	27/05/2014	27/05/2014	27/05/2014	27/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	02/06/2014	02/06/2014	02/06/2014	02/06/2014	02/06/2014
Moisture	%	19	16	12	7.4	19

Moisture						
Our Reference:	UNITS	110679-16	110679-17	110679-18	110679-19	110679-20
Your Reference	----------	TP16	TP17	TP18	TP19	TP20
Depth	----------	0-0.3	0-0.3	0-0.2	0-0.3	0-0.3
Date Sampled		27/05/2014	27/05/2014	27/05/2014	28/05/2014	27/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	02/06/2014	02/06/2014	02/06/2014	02/06/2014	02/06/2014
Moisture	%	10	8.3	7.6	8.2	11

Moisture						
Our Reference:	UNITS	110679-21	110679-22	110679-23	110679-24	110679-25
Your Reference	----------	TP21	TP22	TP23	TP24	TP25
Depth	----------	0-0.3	0-0.3	0-0.3	0-0.2	0-0.3
Date Sampled		27/05/2014	27/05/2014	27/05/2014	27/05/2014	27/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	02/06/2014	02/06/2014	02/06/2014	02/06/2014	02/06/2014
Moisture	%	9.6	12	11	11	11

Moisture						
Our Reference:	UNITS	110679-26	110679-27	110679-28	110679-29	110679-30
Your Reference	----------	TP26	TP27	TP28	TP29	TP30
Depth	----------	0-0.3	0.3-0.5	0-0.2	0-0.2	0.6-0.8
Date Sampled		27/05/2014	27/05/2014	27/05/2014	28/05/2014	28/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	02/06/2014	02/06/2014	02/06/2014	02/06/2014	02/06/2014
Moisture	%	9.2	13	11	8.9	22

Moisture						
Our Reference:	UNITS	110679-31	110679-32	110679-33	110679-34	110679-35
Your Reference	----------	TP31	TP32	TP33	TP34	TP35
Depth	----------	0-0.3	0-0.2	0-0.2	0-0.3	0-0.3
Date Sampled		28/05/2014	28/05/2014	27/05/2014	27/05/2014	27/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	02/06/2014	02/06/2014	02/06/2014	02/06/2014	02/06/2014
Moisture	%	5.4	12	8.6	13	11

Moisture						
Our Reference:	UNITS	110679-36	110679-37	110679-38	110679-39	110679-40
Your Reference	----------	TP36	TP37	TP38	TP39	TP40
Depth	----------	0-0.3	0-0.3	0-0.3	0-0.3	0.4-0.6
Date Sampled		27/05/2014	27/05/2014	28/05/2014	28/05/2014	28/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	30/05/2014	30/05/2014	30/05/2014	5/02/1900 2:38:24 AM	30/05/2014
Date analysed	-	02/06/2014	02/06/2014	02/06/2014	02/06/2014	02/06/2014
Moisture	%	8.9	8.9	8.9	9.7	13

Moisture						
Our Reference:	UNITS	110679-41	110679-42	110679-43	110679-44	110679-45
Your Reference	----------	TP41	TP42	TP43	TP44	TP45
Depth	----------	0-0.3	0-0.3	0-0.3	0.6-0.8	0-0.3
Date Sampled		28/05/2014	27/05/2014	27/05/2014	27/05/2014	28/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	02/06/2014	02/06/2014	02/06/2014	02/06/2014	02/06/2014
Moisture	%	7.4	4.7	11	20	14

Moisture						
Our Reference:	UNITS	110679-46	110679-47	110679-48	110679-49	110679-50
Your Reference	----------	TP46	TP47	TP48	TP49	TP50
Depth	----------	0-0.3	0-0.3	0-0.3	0-0.3	0-0.3
Date Sampled		28/05/2014	28/05/2014	28/05/2014	28/05/2014	27/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	02/06/2014	02/06/2014	02/06/2014	02/06/2014	02/06/2014
Moisture	%	9.1	8.6	7.2	5.4	11

Moisture Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- ----------	110679-51 TP101 0-0.3 27/05/2014 Soil	110679-53 BH1 0-0.1 27/05/2014 Soil	110679-54 BH2 0-0.1 27/05/2014 Soil	110679-55 BH3 0-0.1 28/05/2014 Soil	110679-56 BH4 0-0.1 28/05/2014 Soil
Date prepared	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	02/06/2014	02/06/2014	02/06/2014	02/06/2014	02/06/2014
Moisture	%	9.3	17	14	7.3	7.4

Moisture Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- ----------	110679-61 BD1A/27514 - 27/05/2014 Soil	110679-62 BD1B/28514 - 28/05/2014 Soil
Date prepared	-	30/05/2014	30/05/2014
Date analysed	-	02/06/2014	02/06/2014
Moisture	%	9.2	12

Asbestos ID - soils						
Our Reference:	UNITS	110679-1	110679-4	110679-24	110679-32	110679-33
Your Reference	----------	TP1	TP4	TP24	TP32	TP33
Depth	----------	0-0.3	0-0.3	0-0.2	0-0.2	0-0.2
Date Sampled		28/05/2014	27/05/2014	27/05/2014	28/05/2014	27/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	3/06/2014	3/06/2014	3/06/2014	3/06/2014	3/06/2014
Sample mass tested	g	Approx 35g	Approx 35g	Approx 35g	Approx 35g	Approx 35g
Sample Description	-	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown 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	110679-39	110679-50	110679-52	110679-54	110679-56
Your Reference	----------	TP39	TP50	TP102	BH2	BH4
Depth	----------	0-0.3	0-0.3	0.2-0.5	0-0.1	0-0.1
Date Sampled		28/05/2014	27/05/2014	27/05/2014	27/05/2014	28/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	3/06/2014	3/06/2014	3/06/2014	3/06/2014	3/06/2014
Sample mass tested	g	Approx 35g	Approx 35g	Approx 35g	Approx 35g	Approx 35g
Sample Description	-	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown 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

ESP/CEC						
Our Reference:	UNITS	110679-5	110679-7	110679-11	110679-15	110679-22
Your Reference	----------	TP5	TP7	TP11	TP15	TP22
Depth	----------	0.4-0.5	0.5-0.6	0.4-0.5	0.4-0.5	0-0.3
Date Sampled		27/05/2014	28/05/2014	27/05/2014	27/05/2014	27/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Exchangeable Ca	meq/100g	0.9	1.2	0.2	4.0	2.5
Exchangeable K	meq/100g	0.1	0.2	0.3	0.2	0.1
Exchangeable Mg	meq/100g	8.3	9.2	14	6.7	1.5
Exchangeable Na	meq/100g	1.1	0.91	2.7	0.41	0.16
Cation Exchange Capacity	meq/100g	10	11	17	11	4.2

ESP/CEC						
Our Reference:	UNITS	110679-28	110679-35	110679-40	110679-44	110679-49
Your Reference	----------	TP28	TP35	TP40	TP44	TP49
Depth	----------	0-0.2	0-0.3	0.4-0.6	0.6-0.8	0-0.3
Date Sampled		27/05/2014	27/05/2014	28/05/2014	27/05/2014	28/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Date analysed	-	30/05/2014	30/05/2014	30/05/2014	30/05/2014	30/05/2014
Exchangeable Ca	meq/100g	4.3	5.4	<0.1	4.5	2.6
Exchangeable K	meq/100g	0.2	0.1	<0.1	0.2	0.5
Exchangeable Mg	meq/100g	4.6	1.2	4.4	12	1.2
Exchangeable Na	meq/100g	0.39	<0.1	0.60	1.3	<0.1
Cation Exchange Capacity	meq/100g	9.5	6.9	5.1	18	4.4

Miscellaneous Inorg - soil						
Our Reference:	UNITS	110679-5	110679-7	110679-11	110679-15	110679-22
Your Reference	----------	TP5	TP7	TP11	TP15	TP22
Depth	----------	0.4-0.5	0.5-0.6	0.4-0.5	0.4-0.5	0-0.3
Date Sampled		27/05/2014	28/05/2014	27/05/2014	27/05/2014	27/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	02/06/2014	02/06/2014	02/06/2014	02/06/2014	02/06/2014
Date analysed	-	04/06/2014	04/06/2014	04/06/2014	04/06/2014	04/06/2014
pH 1:5 soil:water	pH Units	5.2	4.9	5.0	4.8	5.7
Clay in soils <2um	% (w/w)	55	53	49	54	16

Miscellaneous Inorg - soil						
Our Reference:	UNITS	110679-28	110679-35	110679-40	110679-44	110679-49
Your Reference	----------	TP28	TP35	TP40	TP44	TP49
Depth	----------	0-0.2	0-0.3	0.4-0.6	0.6-0.8	0-0.3
Date Sampled		27/05/2014	27/05/2014	28/05/2014	27/05/2014	28/05/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	02/06/2014	02/06/2014	02/06/2014	02/06/2014	02/06/2014
Date analysed	-	04/06/2014	04/06/2014	04/06/2014	04/06/2014	04/06/2014
pH 1:5 soil:water	pH Units	5.3	6.1	5.5	5.8	5.0
Clay in soils <2um	% (w/w)	38	17	36	54	14

Method ID	Methodology Summary
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
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 - 2013.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-008	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.
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 12 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.
Metals-009	Determination of exchangeable cations and cation exchange capacity in soil based on Rayment and Lyons 2011.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA 22nd ED, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
AS1289.3.6.3	Determination Particle Size Analysis using AS1289.3.6.3 and AS1289.3.6.1 and in house method INORG-107. Clay fraction at <2um reported.

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base || Duplicate || %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			30/05/2014	110679-1	30/05/2014 || 30/05/2014	LCS-3	30/05/2014
Date analysed	-			01/06/2014	110679-1	01/06/2014 || 01/06/2014	LCS-3	01/06/2014
TRHC$_{6}$ - C$_{9}$	mg/kg	25	Org-016	<25	110679-1	<25 || <25	LCS-3	74%
TRHC$_{6}$ - C$_{10}$	mg/kg	25	Org-016	<25	110679-1	<25 || <25	LCS-3	74%
Benzene	mg/kg	0.2	Org-016	<0.2	110679-1	<0.2 || <0.2	LCS-3	67%
Toluene	mg/kg	0.5	Org-016	<0.5	110679-1	<0.5 || <0.5	LCS-3	73%
Ethylbenzene	mg/kg	1	Org-016	<1	110679-1	<1 || <1	LCS-3	76%
m+p-xylene	mg/kg	2	Org-016	<2	110679-1	<2 || <2	LCS-3	75%
o-Xylene	mg/kg	1	Org-016	<1	110679-1	<1 || <1	LCS-3	79%
naphthalene	mg/kg	1	Org-014	<1	110679-1	<1 || <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%		Org-016	72	110679-1	67 || 68 || RPD: 1	LCS-3	74%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base || Duplicate || %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			30/05/2014	110679-1	30/05/2014 || 30/05/2014	LCS-3	30/05/2014
Date analysed	-			30/05/2014	110679-1	30/05/2014 || 30/05/2014	LCS-3	30/05/2014
TRHC$_{10}$ - C$_{14}$	mg/kg	50	Org-003	<50	110679-1	<50 || <50	LCS-3	90%
TRHC$_{15}$ - C$_{28}$	mg/kg	100	Org-003	<100	110679-1	<100 || <100	LCS-3	90%
TRHC$_{29}$ - C$_{36}$	mg/kg	100	Org-003	<100	110679-1	<100 || <100	LCS-3	83%
TRH>C$_{10}$-C$_{16}$	mg/kg	50	Org-003	<50	110679-1	<50 || <50	LCS-3	90%
TRH>C$_{16}$-C$_{34}$	mg/kg	100	Org-003	<100	110679-1	<100 || <100	LCS-3	90%
TRH>C$_{34}$-C$_{40}$	mg/kg	100	Org-003	<100	110679-1	<100 || <100	LCS-3	83%
Surrogate o-Terphenyl	%		Org-003	88	110679-1	105 || 100 || RPD: 5	LCS-3	90%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base || Duplicate || %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			30/05/2014	110679-1	30/05/2014 || 30/05/2014	LCS-3	30/05/2014
Date analysed	-			31/05/2014	110679-1	31/05/2014 || 31/05/2014	LCS-3	31/05/2014
Naphthalene	mg/kg	0.1	Org-012 subset	<0.1	110679-1	<0.1 || <0.1	LCS-3	105%
Acenaphthylene	mg/kg	0.1	Org-012 subset	<0.1	110679-1	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012 subset	<0.1	110679-1	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012 subset	<0.1	110679-1	<0.1 || <0.1	LCS-3	105%
Phenanthrene	mg/kg	0.1	Org-012 subset	<0.1	110679-1	<0.1 || <0.1	LCS-3	101%
Anthracene	mg/kg	0.1	Org-012 subset	<0.1	110679-1	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012 subset	<0.1	110679-1	<0.1 || <0.1	LCS-3	99%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base || Duplicate || %RPD	Spike Sm#	Spike % Recovery
Pyrene	mg/kg	0.1	Org-012 subset	<0.1	110679-1	<0.1 || <0.1	LCS-3	102%
Benzo(a)anthracene	mg/kg	0.1	Org-012 subset	<0.1	110679-1	<0.1 || <0.1	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012 subset	<0.1	110679-1	<0.1 || <0.1	LCS-3	96%
Benzo(b+k)fluoranthene	mg/kg	0.2	Org-012 subset	<0.2	110679-1	<0.2 || <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	0.05	Org-012 subset	<0.05	110679-1	<0.05 || <0.05	LCS-3	105%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012 subset	<0.1	110679-1	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012 subset	<0.1	110679-1	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012 subset	<0.1	110679-1	<0.1 || <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012 subset	95	110679-1	89 || 96 || RPD: 8	LCS-3	88%
QUALITY CONTROL Total Phenolics in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base || Duplicate || %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			[NT]	110679-1	30/05/2014 || 30/05/2014	LCS-1	03/06/2014
Date analysed	-			[NT]	110679-1	30/05/2014 || 30/05/2014	LCS-1	03/06/2014
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	110679-1	<5 || <5	LCS-1	102%
QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base || Duplicate || %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			30/05/2014	110679-1	30/05/2014 || 30/05/2014	LCS-3	30/05/2014
Date analysed	-			30/05/2014	110679-1	30/05/2014 || 30/05/2014	LCS-3	30/05/2014
HCB	mg/kg	0.1	Org-005	<0.1	110679-1	<0.1 || <0.1	[NR]	[NR]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	110679-1	<0.1 || <0.1	LCS-3	90%
gamma-BHC	mg/kg	0.1	Org-005	<0.1	110679-1	<0.1 || <0.1	[NR]	[NR]
beta-BHC	mg/kg	0.1	Org-005	<0.1	110679-1	<0.1 || <0.1	LCS-3	80%
Heptachlor	mg/kg	0.1	Org-005	<0.1	110679-1	<0.1 || <0.1	LCS-3	103%
delta-BHC	mg/kg	0.1	Org-005	<0.1	110679-1	<0.1 || <0.1	[NR]	[NR]
Aldrin	mg/kg	0.1	Org-005	<0.1	110679-1	<0.1 || <0.1	LCS-3	104%
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	110679-1	<0.1 || <0.1	LCS-3	132%
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	110679-1	<0.1 || <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	110679-1	<0.1 || <0.1	[NR]	[NR]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	110679-1	<0.1 || <0.1	[NR]	[NR]
pp-DDE	mg/kg	0.1	Org-005	<0.1	110679-1	<0.1 || <0.1	LCS-3	103%
Dieldrin	mg/kg	0.1	Org-005	<0.1	110679-1	<0.1 || <0.1	LCS-3	100%
Endrin	mg/kg	0.1	Org-005	<0.1	110679-1	<0.1 || <0.1	LCS-3	95%
pp-DDD	mg/kg	0.1	Org-005	<0.1	110679-1	<0.1 || <0.1	LCS-3	114%
Endosulfan II	mg/kg	0.1	Org-005	<0.1	110679-1	<0.1 || <0.1	[NR]	[NR]

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
pp-DDT	mg/kg	0.1	Org-005	<0.1	110679-1	<0.1 || <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	110679-1	<0.1 || <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	110679-1	<0.1 || <0.1	LCS-3	106%
Methoxychlor	mg/kg	0.1	Org-005	<0.1	110679-1	<0.1 || <0.1	[NR]	[NR]
Surrogate TCMX	%		Org-005	78	110679-1	85 || 83 || RPD: 2	LCS-3	75%
QUALITY CONTROL Organophosphorus Pesticides	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			30/05/2014	110679-1	30/05/2014 || 30/05/2014	LCS-3	30/05/2014
Date analysed	-			30/05/2014	110679-1	30/05/2014 || 30/05/2014	LCS-3	30/05/2014
Diazinon	mg/kg	0.1	Org-008	<0.1	110679-1	<0.1 || <0.1	[NR]	[NR]
Dimethoate	mg/kg	0.1	Org-008	<0.1	110679-1	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos-methyl	mg/kg	0.1	Org-008	<0.1	110679-1	<0.1 || <0.1	[NR]	[NR]
Ronnel	mg/kg	0.1	Org-008	<0.1	110679-1	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos	mg/kg	0.1	Org-008	<0.1	110679-1	<0.1 || <0.1	LCS-3	102%
Fenitrothion	mg/kg	0.1	Org-008	<0.1	110679-1	<0.1 || <0.1	LCS-3	88%
Bromophos-ethyl	mg/kg	0.1	Org-008	<0.1	110679-1	<0.1 || <0.1	[NR]	[NR]
Ethion	mg/kg	0.1	Org-008	<0.1	110679-1	<0.1 || <0.1	LCS-3	87%
Surrogate TCMX	%		Org-008	78	110679-1	85 || 83 || RPD: 2	LCS-3	77%
QUALITY CONTROL PCBs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			30/05/2014	110679-1	30/05/2014 || 30/05/2014	LCS-3	30/05/2014
Date analysed	-			30/05/2014	110679-1	30/05/2014 || 30/05/2014	LCS-3	30/05/2014
Arochlor 1016	mg/kg	0.1	Org-006	<0.1	110679-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1221	mg/kg	0.1	Org-006	<0.1	110679-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1232	mg/kg	0.1	Org-006	<0.1	110679-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1242	mg/kg	0.1	Org-006	<0.1	110679-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1248	mg/kg	0.1	Org-006	<0.1	110679-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1254	mg/kg	0.1	Org-006	<0.1	110679-1	<0.1 || <0.1	LCS-3	105%
Arochlor 1260	mg/kg	0.1	Org-006	<0.1	110679-1	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%		Org-006	78	110679-1	85 || 83 || RPD: 2	LCS-3	88%

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	-			30/05/2014	110679-1	30/05/2014 || 30/05/2014	LCS-4	30/05/2014
Date analysed	-			30/05/2014	110679-1	30/05/2014 || 30/05/2014	LCS-4	30/05/2014
Arsenic	mg/kg	4	Metals-020 ICP-AES	<4	110679-1	<4 || 8	LCS-4	102%
Cadmium	mg/kg	0.4	Metals-020 ICP-AES	<0.4	110679-1	<0.4 || <0.4	LCS-4	111%
Chromium	mg/kg	1	Metals-020 ICP-AES	<1	110679-1	18 || 31 || RPD: 53	LCS-4	104%
Copper	mg/kg	1	Metals-020 ICP-AES	<1	110679-1	5 || 5 || RPD: 0	LCS-4	104%
Lead	mg/kg	1	Metals-020 ICP-AES	<1	110679-1	11 || 22 || RPD: 67	LCS-4	107%
Mercury	mg/kg	0.1	Metals-021 CV-AAS	<0.1	110679-1	0.2 || 0.2 || RPD: 0	LCS-4	99%
Nickel	mg/kg	1	Metals-020 ICP-AES	<1	110679-1	1 || 2 || RPD: 67	LCS-4	105%
Zinc	mg/kg	1	Metals-020 ICP-AES	<1	110679-1	4 || 12 || RPD: 100	LCS-4	105%
Iron	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-4	110%

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 ESP/CEC	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date digested	-			30/05/2014	110679-5	30/05/2014 || 30/05/2014	LCS-1	30/05/2014
Date analysed	-			30/05/2014	110679-5	30/05/2014 || 30/05/2014	LCS-1	30/05/2014
Exchangeable Ca	meq/100g	0.1	Metals-009	<0.1	110679-5	0.9 || 0.9 || RPD: 0	LCS-1	110%
Exchangeable K	meq/100g	0.1	Metals-009	<0.1	110679-5	0.1 || 0.1 || RPD: 0	LCS-1	107%
Exchangeable Mg	meq/100g	0.1	Metals-009	<0.1	110679-5	8.3 || 8.8 || RPD: 6	LCS-1	109%
Exchangeable Na	meq/100g	0.1	Metals-009	<0.1	110679-5	1.1 || 1.1 || RPD: 0	LCS-1	107%
Cation Exchange Capacity	meq/100g	1	Metals-009	<1.0	110679-5	10 || 11 || RPD: 10	[NR]	[NR]

QUALITY CONTROL Miscellaneous Inorg - soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			[NT]	[NT]	[NT]	LCS-1	02/06/2014
Date analysed	-			[NT]	[NT]	[NT]	LCS-1	02/06/2014
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	[NT]	[NT]	LCS-1	102%
Clay in soils <2um	% (w/w)		AS1289.3.6.3	[NT]	[NT]	[NT]	[NR]	[NR]

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	110679-61	30/05/2014 || 30/05/2014	110679-4	30/05/2014
Date analysed	-	110679-61	01/06/2014 || 01/06/2014	110679-4	01/06/2014
TRH C_6 - C_9	mg/kg	110679-61	<25 || <25	110679-4	64%
TRH C_6 - C_{10}	mg/kg	110679-61	<25 || <25	110679-4	64%
Benzene	mg/kg	110679-61	<0.2 || <0.2	110679-4	60%
Toluene	mg/kg	110679-61	<0.5 || <0.5	110679-4	63%
Ethylbenzene	mg/kg	110679-61	<1 || <1	110679-4	65%
m+p-xylene	mg/kg	110679-61	<2 || <2	110679-4	64%
o-Xylene	mg/kg	110679-61	<1 || <1	110679-4	68%
naphthalene	mg/kg	110679-61	<1 || <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%	110679-61	68 || 69 || RPD: 1	110679-4	68%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	110679-61	30/05/2014 || 30/05/2014	110679-4	30/05/2014
Date analysed	-	110679-61	30/05/2014 || 30/05/2014	110679-4	30/05/2014
TRH C_{10} - C_{14}	mg/kg	110679-61	<50 || <50	110679-4	118%
TRH C_{15} - C_{28}	mg/kg	110679-61	<100 || <100	110679-4	140%
TRH C_{29} - C_{36}	mg/kg	110679-61	<100 || <100	110679-4	120%
TRH >C_{10}-C_{16}	mg/kg	110679-61	<50 || <50	110679-4	118%
TRH >C_{16}-C_{34}	mg/kg	110679-61	<100 || <100	110679-4	140%
TRH >C_{34}-C_{40}	mg/kg	110679-61	<100 || <100	110679-4	120%
Surrogate o-Terphenyl	%	110679-61	101 || 93 || RPD: 8	110679-4	115%

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	110679-61	30/05/2014 || 30/05/2014	110679-4	30/05/2014
Date analysed	-	110679-61	31/05/2014 || 31/05/2014	110679-4	31/05/2014
Naphthalene	mg/kg	110679-61	<0.1 || <0.1	110679-4	85%
Acenaphthylene	mg/kg	110679-61	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	110679-61	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	110679-61	<0.1 || <0.1	110679-4	96%
Phenanthrene	mg/kg	110679-61	<0.1 || <0.1	110679-4	94%
Anthracene	mg/kg	110679-61	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	110679-61	<0.1 || <0.1	110679-4	92%

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Pyrene	mg/kg	110679-61	<0.1 || <0.1	110679-4	94%
Benzo(a)anthracene	mg/kg	110679-61	<0.1 || <0.1	[NR]	[NR]
Chrysene	mg/kg	110679-61	<0.1 || <0.1	110679-4	89%
Benzo(b+k)fluoranthene	mg/kg	110679-61	<0.2 || <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	110679-61	<0.05 || <0.05	110679-4	94%
Indeno(1,2,3-c,d)pyrene	mg/kg	110679-61	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	110679-61	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	110679-61	<0.1 || <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d14	%	110679-61	93 || 91 || RPD: 2	110679-4	89%
QUALITY CONTROL Total Phenolics in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	110679-61	30/05/2014 || 30/05/2014	110679-4	03/06/2014
Date analysed	-	110679-61	30/05/2014 || 30/05/2014	110679-4	03/06/2014
Total Phenolics (as Phenol)	mg/kg	110679-61	<5 || <5	110679-4	103%
QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	110679-11	30/05/2014 || 30/05/2014	LCS-4	30/05/2014
Date analysed	-	110679-11	30/05/2014 || 30/05/2014	LCS-4	30/05/2014
HCB	mg/kg	110679-11	<0.1 || <0.1	[NR]	[NR]
alpha-BHC	mg/kg	110679-11	<0.1 || <0.1	LCS-4	102%
gamma-BHC	mg/kg	110679-11	<0.1 || <0.1	[NR]	[NR]
beta-BHC	mg/kg	110679-11	<0.1 || <0.1	LCS-4	103%
Heptachlor	mg/kg	110679-11	<0.1 || <0.1	LCS-4	102%
delta-BHC	mg/kg	110679-11	<0.1 || <0.1	[NR]	[NR]
Aldrin	mg/kg	110679-11	<0.1 || <0.1	LCS-4	101%
Heptachlor Epoxide	mg/kg	110679-11	<0.1 || <0.1	LCS-4	104%
gamma-Chlordane	mg/kg	110679-11	<0.1 || <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	110679-11	<0.1 || <0.1	[NR]	[NR]
Endosulfan I	mg/kg	110679-11	<0.1 || <0.1	[NR]	[NR]
pp-DDE	mg/kg	110679-11	<0.1 || <0.1	LCS-4	103%
Dieldrin	mg/kg	110679-11	<0.1 || <0.1	LCS-4	103%
Endrin	mg/kg	110679-11	<0.1 || <0.1	LCS-4	103%
pp-DDD	mg/kg	110679-11	<0.1 || <0.1	LCS-4	120%
Endosulfan II	mg/kg	110679-11	<0.1 || <0.1	[NR]	[NR]
pp-DDT	mg/kg	110679-11	<0.1 || <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	110679-11	<0.1 || <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	110679-11	<0.1 || <0.1	LCS-4	104%
Methoxychlor	mg/kg	110679-11	<0.1 || <0.1	[NR]	[NR]
Surrogate TCMX	%	110679-11	82 || 86 || RPD: 5	LCS-4	72%

QUALITY CONTROL Organophosphorus Pesticides	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	110679-11	30/05/2014 || 30/05/2014	LCS-4	30/05/2014
Date analysed	-	110679-11	30/05/2014 || 30/05/2014	LCS-4	30/05/2014
Diazinon	mg/kg	110679-11	<0.1 || <0.1	[NR]	[NR]
Dimethoate	mg/kg	110679-11	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos-methyl	mg/kg	110679-11	<0.1 || <0.1	[NR]	[NR]
Ronnel	mg/kg	110679-11	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos	mg/kg	110679-11	<0.1 || <0.1	LCS-4	73%
Fenitrothion	mg/kg	110679-11	<0.1 || <0.1	LCS-4	69%
Bromophos-ethyl	mg/kg	110679-11	<0.1 || <0.1	[NR]	[NR]
Ethion	mg/kg	110679-11	<0.1 || <0.1	LCS-4	90%
Surrogate TCMX	%	110679-11	82 || 86 || RPD: 5	LCS-4	76%
QUALITY CONTROL PCBs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	110679-61	30/05/2014 || 30/05/2014	110679-4	30/05/2014
Date analysed	-	110679-61	30/05/2014 || 30/05/2014	110679-4	30/05/2014
Arochlor 1016	mg/kg	110679-61	<0.1 || <0.1	[NR]	[NR]
Arochlor 1221	mg/kg	110679-61	<0.1 || <0.1	[NR]	[NR]
Arochlor 1232	mg/kg	110679-61	<0.1 || <0.1	[NR]	[NR]
Arochlor 1242	mg/kg	110679-61	<0.1 || <0.1	[NR]	[NR]
Arochlor 1248	mg/kg	110679-61	<0.1 || <0.1	[NR]	[NR]
Arochlor 1254	mg/kg	110679-61	<0.1 || <0.1	110679-4	97%
Arochlor 1260	mg/kg	110679-61	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%	110679-61	79 || 80 || RPD: 1	110679-4	91%
QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	110679-11	30/05/2014 || 30/05/2014	LCS-5	30/05/2014
Date analysed	-	110679-11	30/05/2014 || 30/05/2014	LCS-5	30/05/2014
Arsenic	mg/kg	110679-11	<4 || <4	LCS-5	104%
Cadmium	mg/kg	110679-11	<0.4 || <0.4	LCS-5	109%
Chromium	mg/kg	110679-11	6 || 5 || RPD: 18	LCS-5	108%
Copper	mg/kg	110679-11	7 || 6 || RPD: 15	LCS-5	106%
Lead	mg/kg	110679-11	7 || 6 || RPD: 15	LCS-5	106%
Mercury	mg/kg	110679-11	<0.1 || <0.1	LCS-5	83%
Nickel	mg/kg	110679-11	<1 || <1	LCS-5	108%
Zinc	mg/kg	110679-11	5 || 4 || RPD: 22	LCS-5	108%
Iron	mg/kg	110679-11	15000 || 12000 || RPD: 22	[NR]	[NR]

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	110679-21	30/05/2014 || 30/05/2014	LCS-5	30/05/2014
Date analysed	-	110679-21	30/05/2014 || 30/05/2014	LCS-5	30/05/2014
HCB	mg/kg	110679-21	<0.1 || <0.1	[NR]	[NR]
alpha-BHC	mg/kg	110679-21	<0.1 || <0.1	LCS-5	97%
gamma-BHC	mg/kg	110679-21	<0.1 || <0.1	[NR]	[NR]
beta-BHC	mg/kg	110679-21	<0.1 || <0.1	LCS-5	69%
Heptachlor	mg/kg	110679-21	<0.1 || <0.1	LCS-5	96%
delta-BHC	mg/kg	110679-21	<0.1 || <0.1	[NR]	[NR]
Aldrin	mg/kg	110679-21	<0.1 || <0.1	LCS-5	95%
Heptachlor Epoxide	mg/kg	110679-21	<0.1 || <0.1	LCS-5	98%
gamma-Chlordane	mg/kg	110679-21	<0.1 || <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	110679-21	<0.1 || <0.1	[NR]	[NR]
Endosulfan I	mg/kg	110679-21	<0.1 || <0.1	[NR]	[NR]
pp-DDE	mg/kg	110679-21	<0.1 || <0.1	LCS-5	60%
Dieldrin	mg/kg	110679-21	<0.1 || <0.1	LCS-5	97%
Endrin	mg/kg	110679-21	<0.1 || <0.1	LCS-5	96%
pp-DDD	mg/kg	110679-21	<0.1 || <0.1	LCS-5	68%
Endosulfan II	mg/kg	110679-21	<0.1 || <0.1	[NR]	[NR]
pp-DDT	mg/kg	110679-21	<0.1 || <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	110679-21	<0.1 || <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	110679-21	<0.1 || <0.1	LCS-5	97%
Methoxychlor	mg/kg	110679-21	<0.1 || <0.1	[NR]	[NR]
Surrogate TCMX	%	110679-21	81 || 78 || RPD: 4	LCS-5	72%

QUALITY CONTROL Organophosphorus Pesticides	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	110679-21	30/05/2014 || 30/05/2014	LCS-5	30/05/2014
Date analysed	-	110679-21	30/05/2014 || 30/05/2014	LCS-5	30/05/2014
Diazinon	mg/kg	110679-21	<0.1 || <0.1	[NR]	[NR]
Dimethoate	mg/kg	110679-21	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos-methyl	mg/kg	110679-21	<0.1 || <0.1	[NR]	[NR]
Ronnel	mg/kg	110679-21	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos	mg/kg	110679-21	<0.1 || <0.1	LCS-5	74%
Fenitrothion	mg/kg	110679-21	<0.1 || <0.1	LCS-5	70%
Bromophos-ethyl	mg/kg	110679-21	<0.1 || <0.1	[NR]	[NR]
Ethion	mg/kg	110679-21	<0.1 || <0.1	LCS-5	60%
Surrogate TCMX	%	110679-21	81 || 78 || RPD: 4	LCS-5	70%
QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	110679-21	30/05/2014 || 30/05/2014	LCS-6	30/05/2014
Date analysed	-	110679-21	30/05/2014 || 30/05/2014	LCS-6	30/05/2014
Arsenic	mg/kg	110679-21	7 || 7 || RPD: 0	LCS-6	101%
Cadmium	mg/kg	110679-21	<0.4 || <0.4	LCS-6	108%
Chromium	mg/kg	110679-21	31 || 29 || RPD: 7	LCS-6	106%
Copper	mg/kg	110679-21	5 || 4 || RPD: 22	LCS-6	105%
Lead	mg/kg	110679-21	19 || 17 || RPD: 11	LCS-6	05%
Mercury	mg/kg	110679-21	<0.1 || <0.1	LCS-6	92%
Nickel	mg/kg	110679-21	3 || 3 || RPD: 0	LCS-6	106%
Zinc	mg/kg	110679-21	10 || 9 || RPD: 11	LCS-6	106%
Iron	mg/kg	[NT]	[NT]	[NR]	[NR]
QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	110679-31	30/05/2014 || 30/05/2014	110679-4	30/05/2014
Date analysed	-	110679-31	30/05/2014 || 30/05/2014	110679-4	30/05/2014
HCB	mg/kg	110679-31	<0.1 || <0.1	[NR]	[NR]
alpha-BHC	mg/kg	110679-31	<0.1 || <0.1	110679-4	96%
gamma-BHC	mg/kg	110679-31	<0.1 || <0.1	[NR]	[NR]
beta-BHC	mg/kg	110679-31	<0.1 || <0.1	110679-4	85%
Heptachlor	mg/kg	110679-31	<0.1 || <0.1	110679-4	110%
delta-BHC	mg/kg	110679-31	<0.1 || <0.1	[NR]	[NR]
Aldrin	mg/kg	110679-31	<0.1 || <0.1	110679-4	112%
Heptachlor Epoxide	mg/kg	110679-31	<0.1 || <0.1	110679-4	130%
gamma-Chlordane	mg/kg	110679-31	<0.1 || <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	110679-31	<0.1 || <0.1	[NR]	[NR]
Endosulfan I	mg/kg	110679-31	<0.1 || <0.1	[NR]	[NR]
pp-DDE	mg/kg	110679-31	<0.1 || <0.1	110679-4	111%

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Dieldrin	mg/kg	110679-31	<0.1 || <0.1	110679-4	106%
Endrin	mg/kg	110679-31	<0.1 || <0.1	110679-4	97%
pp-DDD	mg/kg	110679-31	<0.1 || <0.1	110679-4	122%
Endosulfan II	mg/kg	110679-31	<0.1 || <0.1	[NR]	[NR]
pp-DDT	mg/kg	110679-31	<0.1 || <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	110679-31	<0.1 || <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	110679-31	<0.1 || <0.1	110679-4	113%
Methoxychlor	mg/kg	110679-31	<0.1 || <0.1	[NR]	[NR]
Surrogate TCMX	%	110679-31	81 || 79 || RPD: 2	110679-4	82%
QUALITY CONTROL Organophosphorus Pesticides	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	110679-31	30/05/2014 || 30/05/2014	110679-4	30/05/2014
Date analysed	-	110679-31	30/05/2014 || 30/05/2014	110679-4	30/05/2014
Diazinon	mg/kg	110679-31	<0.1 || <0.1	[NR]	[NR]
Dimethoate	mg/kg	110679-31	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos-methyl	mg/kg	110679-31	<0.1 || <0.1	[NR]	[NR]
Ronnel	mg/kg	110679-31	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos	mg/kg	110679-31	<0.1 || <0.1	110679-4	101%
Fenitrothion	mg/kg	110679-31	<0.1 || <0.1	110679-4	83%
Bromophos-ethyl	mg/kg	110679-31	<0.1 || <0.1	[NR]	[NR]
Ethion	mg/kg	110679-31	<0.1 || <0.1	110679-4	83%
Surrogate TCMX	%	110679-31	81 || 79 || RPD: 2	110679-4	81%
QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	110679-31	30/05/2014 || 30/05/2014	LCS-7	30/05/2014
Date analysed	-	110679-31	30/05/2014 || 30/05/2014	LCS-7	30/05/2014
Arsenic	mg/kg	110679-31	6 || 6 || RPD: 0	LCS-7	104%
Cadmium	mg/kg	110679-31	<0.4 || <0.4	LCS-7	108%
Chromium	mg/kg	110679-31	19 || 18 || RPD: 5	LCS-7	106%
Copper	mg/kg	110679-31	7 || 7 || RPD: 0	LCS-7	104%
Lead	mg/kg	110679-31	10 || 12 || RPD: 18	LCS-7	105%
Mercury	mg/kg	110679-31	0.1 || <0.1	LCS-7	106%
Nickel	mg/kg	110679-31	1 || 2 || RPD: 67	LCS-7	106%
Zinc	mg/kg	110679-31	5 || 6 || RPD: 18	LCS-7	107%
Iron	mg/kg	[NT]	[NT]	[NR]	[NR]

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	110679-41	30/05/2014 || 30/05/2014	110679-22	30/05/2014
Date analysed	-	110679-41	30/05/2014 || 30/05/2014	110679-22	30/05/2014
HCB	mg/kg	110679-41	<0.1 || <0.1	[NR]	[NR]
alpha-BHC	mg/kg	110679-41	<0.1 || <0.1	110679-22	104%
gamma-BHC	mg/kg	110679-41	<0.1 || <0.1	[NR]	[NR]
beta-BHC	mg/kg	110679-41	<0.1 || <0.1	110679-22	74%
Heptachlor	mg/kg	110679-41	<0.1 || <0.1	110679-22	101%
delta-BHC	mg/kg	110679-41	<0.1 || <0.1	[NR]	[NR]
Aldrin	mg/kg	110679-41	<0.1 || <0.1	110679-22	101%
Heptachlor Epoxide	mg/kg	110679-41	<0.1 || <0.1	110679-22	102%
gamma-Chlordane	mg/kg	110679-41	<0.1 || <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	110679-41	<0.1 || <0.1	[NR]	[NR]
Endosulfan I	mg/kg	110679-41	<0.1 || <0.1	[NR]	[NR]
pp-DDE	mg/kg	110679-41	<0.1 || <0.1	110679-22	63%
Dieldrin	mg/kg	110679-41	<0.1 || <0.1	110679-22	101%
Endrin	mg/kg	110679-41	<0.1 || <0.1	110679-22	100%
pp-DDD	mg/kg	110679-41	<0.1 || <0.1	110679-22	71%
Endosulfan II	mg/kg	110679-41	<0.1 || <0.1	[NR]	[NR]
pp-DDT	mg/kg	110679-41	<0.1 || <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	110679-41	<0.1 || <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	110679-41	<0.1 || <0.1	110679-22	100%
Methoxychlor	mg/kg	110679-41	<0.1 || <0.1	[NR]	[NR]
Surrogate TCMX	%	110679-41	80 || 81 || RPD: 1	110679-22	77%

QUALITY CONTROL Organophosphorus Pesticides	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	110679-41	30/05/2014 || 30/05/2014	110679-22	30/05/2014
Date analysed	-	110679-41	30/05/2014 || 30/05/2014	110679-22	30/05/2014
Diazinon	mg/kg	110679-41	<0.1 || <0.1	[NR]	[NR]
Dimethoate	mg/kg	110679-41	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos-methyl	mg/kg	110679-41	<0.1 || <0.1	[NR]	[NR]
Ronnel	mg/kg	110679-41	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos	mg/kg	110679-41	<0.1 || <0.1	110679-22	78%
Fenitrothion	mg/kg	110679-41	<0.1 || <0.1	110679-22	71%
Bromophos-ethyl	mg/kg	110679-41	<0.1 || <0.1	[NR]	[NR]
Ethion	mg/kg	110679-41	<0.1 || <0.1	110679-22	62%
Surrogate TCMX	%	110679-41	80 || 81 || RPD: 1	110679-22	82%
QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	110679-41	30/05/2014 || 30/05/2014	110679-22	30/05/2014
Date analysed	-	110679-41	30/05/2014 || 30/05/2014	110679-22	30/05/2014
Arsenic	mg/kg	110679-41	9 || 8 || RPD: 12	110679-22	85%
Cadmium	mg/kg	110679-41	<0.4 || <0.4	110679-22	86%
Chromium	mg/kg	110679-41	27 || 32 || RPD: 17	110679-22	78%
Copper	mg/kg	110679-41	5 || 5 || RPD: 0	110679-22	99%
Lead	mg/kg	110679-41	16 || 17 || RPD: 6	110679-22	83%
Mercury	mg/kg	110679-41	<0.1 || <0.1	110679-22	81%
Nickel	mg/kg	110679-41	3 || 3 || RPD: 0	110679-22	86%
Zinc	mg/kg	110679-41	8 || 9 || RPD: 12	110679-22	82%
Iron	mg/kg	[NT]	[NT]	110679-22	#
QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	110679-51	30/05/2014 || 30/05/2014	110679-42	30/05/2014
Date analysed	-	110679-51	30/05/2014 || 30/05/2014	110679-42	30/05/2014
HCB	mg/kg	110679-51	<0.1 || <0.1	[NR]	[NR]
alpha-BHC	mg/kg	110679-51	<0.1 || <0.1	110679-42	100%
gamma-BHC	mg/kg	110679-51	<0.1 || <0.1	[NR]	[NR]
beta-BHC	mg/kg	110679-51	<0.1 || <0.1	110679-42	72%
Heptachlor	mg/kg	110679-51	<0.1 || <0.1	110679-42	97%
delta-BHC	mg/kg	110679-51	<0.1 || <0.1	[NR]	[NR]
Aldrin	mg/kg	110679-51	<0.1 || <0.1	110679-42	97%
Heptachlor Epoxide	mg/kg	110679-51	<0.1 || <0.1	110679-42	99%
gamma-Chlordane	mg/kg	110679-51	<0.1 || <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	110679-51	<0.1 || <0.1	[NR]	[NR]
Endosulfan I	mg/kg	110679-51	<0.1 || <0.1	[NR]	[NR]
pp-DDE	mg/kg	110679-51	<0.1 || <0.1	110679-42	61%

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Dieldrin	mg/kg	110679-51	<0.1 || <0.1	110679-42	97%
Endrin	mg/kg	110679-51	<0.1 || <0.1	110679-42	96%
pp-DDD	mg/kg	110679-51	<0.1 || <0.1	110679-42	69%
Endosulfan II	mg/kg	110679-51	<0.1 || <0.1	[NR]	[NR]
pp-DDT	mg/kg	110679-51	<0.1 || <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	110679-51	<0.1 || <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	110679-51	<0.1 || <0.1	110679-42	97%
Methoxychlor	mg/kg	110679-51	<0.1 || <0.1	[NR]	[NR]
Surrogate TCMX	%	110679-51	80 || 80 || RPD: 0	110679-42	79%
QUALITY CONTROL Organophosphorus Pesticides	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	110679-51	30/05/2014 || 30/05/2014	110679-42	30/05/2014
Date analysed	-	110679-51	30/05/2014 || 30/05/2014	110679-42	30/05/2014
Diazinon	mg/kg	110679-51	<0.1 || <0.1	[NR]	[NR]
Dimethoate	mg/kg	110679-51	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos-methyl	mg/kg	110679-51	<0.1 || <0.1	[NR]	[NR]
Ronnel	mg/kg	110679-51	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos	mg/kg	110679-51	<0.1 || <0.1	110679-42	75%
Fenitrothion	mg/kg	110679-51	<0.1 || <0.1	110679-42	67%
Bromophos-ethyl	mg/kg	110679-51	<0.1 || <0.1	[NR]	[NR]
Ethion	mg/kg	110679-51	<0.1 || <0.1	110679-42	84%
Surrogate TCMX	%	110679-51	80 || 80 || RPD: 0	110679-42	79%
QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	110679-51	30/05/2014 || 30/05/2014	110679-42	30/05/2014
Date analysed	-	110679-51	30/05/2014 || 30/05/2014	110679-42	30/05/2014
Arsenic	mg/kg	110679-51	7 || 7 || RPD: 0	110679-42	91%
Cadmium	mg/kg	110679-51	<0.4 || <0.4	110679-42	89%
Chromium	mg/kg	110679-51	28 || 34 || RPD: 19	110679-42	91%
Copper	mg/kg	110679-51	10 || 11 || RPD: 10	110679-42	104%
Lead	mg/kg	110679-51	16 || 20 || RPD: 22	110679-42	89%
Mercury	mg/kg	110679-51	<0.1 || <0.1	110679-42	107%
Nickel	mg/kg	110679-51	6 || 7 || RPD: 15	110679-42	90%
Zinc	mg/kg	110679-51	13 || 22 || RPD: 51	110679-42	89%
Iron	mg/kg	[NT]	[NT]	[NR]	[NR]

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date extracted	-	110679-61	30/05/2014 || 30/05/2014
Date analysed	-	110679-61	30/05/2014 || 30/05/2014
HCB	mg/kg	110679-61	<0.1 || <0.1
alpha-BHC	mg/kg	110679-61	<0.1 || <0.1
gamma-BHC	mg/kg	110679-61	<0.1 || <0.1
beta-BHC	mg/kg	110679-61	<0.1 || <0.1
Heptachlor	mg/kg	110679-61	<0.1 || <0.1
delta-BHC	mg/kg	110679-61	<0.1 || <0.1
Aldrin	mg/kg	110679-61	<0.1 || <0.1
Heptachlor Epoxide	mg/kg	110679-61	<0.1 || <0.1
gamma-Chlordane	mg/kg	110679-61	<0.1 || <0.1
alpha-chlordane	mg/kg	110679-61	<0.1 || <0.1
Endosulfan I	mg/kg	110679-61	<0.1 || <0.1
pp-DDE	mg/kg	110679-61	<0.1 || <0.1
Dieldrin	mg/kg	110679-61	<0.1 || <0.1
Endrin	mg/kg	110679-61	<0.1 || <0.1
pp-DDD	mg/kg	110679-61	<0.1 || <0.1
Endosulfan II	mg/kg	110679-61	<0.1 || <0.1
pp-DDT	mg/kg	110679-61	<0.1 || <0.1
Endrin Aldehyde	mg/kg	110679-61	<0.1 || <0.1
Endosulfan Sulphate	mg/kg	110679-61	<0.1 || <0.1
Methoxychlor	mg/kg	110679-61	<0.1 || <0.1
Surrogate TCMX	%	110679-61	81 || 80 || RPD: 1

QUALITY CONTROL Organophosphorus Pesticides	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date extracted	-	110679-61	30/05/2014 || 30/05/2014
Date analysed	-	110679-61	30/05/2014 || 30/05/2014
Diazinon	mg/kg	110679-61	<0.1 || <0.1
Dimethoate	mg/kg	110679-61	<0.1 || <0.1
Chlorpyriphos-methyl	mg/kg	110679-61	<0.1 || <0.1
Ronnel	mg/kg	110679-61	<0.1 || <0.1
Chlorpyriphos	mg/kg	110679-61	<0.1 || <0.1
Fenitrothion	mg/kg	110679-61	<0.1 || <0.1
Bromophos-ethyl	mg/kg	110679-61	<0.1 || <0.1
Ethion	mg/kg	110679-61	<0.1 || <0.1
Surrogate TCMX	%	110679-61	81 || 80 || RPD: 1

QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	110679-61	30/05/2014 || 30/05/2014	110679-4	30/05/2014
Date analysed	-	110679-61	30/05/2014 || 30/05/2014	110679-4	30/05/2014
Arsenic	mg/kg	110679-61	10 || 10 || RPD: 0	110679-4	91%
Cadmium	mg/kg	110679-61	<0.4 || <0.4	110679-4	85%
Chromium	mg/kg	110679-61	48 || 40 || RPD: 18	110679-4	90%
Copper	mg/kg	110679-61	17 || 17 || RPD: 0	110679-4	98%
Lead	mg/kg	110679-61	23 || 22 || RPD: 4	110679-4	94%
Mercury	mg/kg	110679-61	<0.1 || <0.1	110679-4	84%
Nickel	mg/kg	110679-61	5 || 5 || RPD: 0	110679-4	82%
Zinc	mg/kg	110679-61	14 || 13 || RPD: 7	110679-4	92%
Iron	mg/kg	[NT]	[NT]	[NR]	[NR]

QUALITY CONTROL Total Phenolics in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date extracted	-	110679-1	30/05/2014 || 30/05/2014
Date analysed	-	110679-1	30/05/2014 || 30/05/2014
Total Phenolics (as Phenol)	mg/kg	110679-1	<5 || <5

QUALITY CONTROL Total Phenolics in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date extracted	-	110679-61	30/05/2014 || 30/05/2014
Date analysed	-	110679-61	30/05/2014 || 30/05/2014
Total Phenolics (as Phenol)	mg/kg	110679-61	<5 || <5

Report Comments:

Acid Extractable Metals in Soil: The laboratory RPD acceptance criteriae has been exceeded for 110679-1 for Cr, Pb, Zn. Therefore a triplicate result has been issued as laboratory sample number 110679-63.

Acid Extractable Metals in Soil: The laboratory RPD acceptance criteriae has been exceeded for 110679-51 for Zn. Therefore a triplicate result has been issued as laboratory sample number 110679-64.

Acid Extractable Metals in Soil:# 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.

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.

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

INS: Insufficient sample for this test
NA: Test not required
<: Less than

PQL: Practical Quantitation Limit
RPD: Relative Percent Difference
>: Greater than

NT: Not tested
NA: Test not required
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.

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

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

Douglas Partners
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CHAIN OF CUSTODY

Project Name: MULGOA.....
Project No: 71706.02..... Sampler: ...M.West .....
Project Mgr: PG..... Mob. Phone: 0412 985 938 .....
Email: Matt.West@douglaspartners.com.au
Date Required: STD; ESdat Format Lab Quote No. .....

To: Envirolab Services
12 Ashley St Chatswood 2067
Attn: Tania Notaras
Phone: (02) 9910 6200 Fax: (02) 9910 6201
Email: tnotaras@envirolabservices.com.au

Sample ID	Lab ID	Sampling Date	Sample Type (S - soil, W – water)	Container type (G – glass, P - plastic)	Analytes: Combo 8a	Heavy Metals	OPP/OCP	pH, iron and cation exchange capacity (CEC) and clay content	Combo 8	BTEX				Notes/preservation
TP1 0-0.3	1	28/5/14	S	G	X									
TP2 0-0.3	2	27/5/14	S	G		X	X							Combo
TP3 0-0.3	3	28/5/14	S	G		X	X							Combo
TP4 0-0.3	4	27/5/14	S	G	X									Combo
TP5 0.4-0.5	5	27/5/14	S	G		X	X	X						Combo
TP6 0-0.3	6	28/5/14	S	G		X	X							Combo
TP7 0.5-0.6	7	28/5/14	S	G		X	X	X						Combo
TP8 0-0.3	8	27/5/14	S	G		X	X							Combo
TP9 0-0.3	9	27/5/14	S	G		X	X							Combo
TP10 0-0.3	10	27/5/14	S	G		X	X							Combo

ENVIROLAB
Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200
Job No: 110679
Date Received: 29.5.14
Time Received: 15:30
Received by: D.F
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Lab Report No. .....
Send Results to: Douglas Partners Address: 96 Hermitage Road West Ryde NSW 2114 Phone: (02) 4271 1836 Fax: (02) 4271 1897
Relinquished by: M.West Signed: Date & Time: 29/5/14
Received By: D FORD Date & Time: 29.5.14 15:30 Transported to laboratory by: Hunter Express

Form COC

Douglas Partners
Geotechnics · Environment · Groundwater

CHAIN OF CUSTODY

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Project Mgr: PG.....
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Attn: Tania Notaras
Phone: (02) 9910 6200 Fax: (02) 9910 6201
Email: tnotaras@envirolabservices.com.au

Sample ID	Lab ID	Sampling Date	Sample Type (S - soil W – water)	Container type (G – glass P - plastic)	Analytes: Combo 8a	Heavy Metals	OPP/OCP	pH, iron and cation exchange capacity (CEC) and clay content	Combo 8	BTEX					Notes/preservation
TP11 0.4-0.5	11	27/5/14	S	G		X	X	X							
TP12 0-0.2	12	27/5/14	S	G		X	X								Combo
TP13 0-0.3	13	27/5/14	S	G		X	X								Combo
TP14 0-0.3	14	27/5/14	S	G		X	X								Combo
TP15 0.4-0.5	15	27/5/14	S	G		X	X	X							Combo
TP16 0-0.3	16	27/5/14	S	G		X	X								Combo
TP17 0-0.3	17	27/5/14	S	G		X	X								Combo
TP18 0-0.2	18	27/5/14	S	G		X	X								Combo
TP19 0-0.2	19	28/5/14	S	G		X	X								Combo
TP20 0-0.3	20	27/5/14	S	G		X	X								Combo

(BH)

Lab Report No. .....
Send Results to: Douglas Partners Address: 96 Hermitage Road West Ryde NSW 2114
Phone: (02) 4271 1836
Fax: (02) 4271 1897

Relinquished by: M.West Signed: M.W Date & Time: 29/5/14 Transported to laboratory by: Hunter Express
Received By: D.FORD Date & Time: 29.5.14 15:30

Form COC

Douglas Partners
Geotechnics · Environment · Groundwater

CHAIN OF CUSTODY

Project Name: MULGOA.....
Project No: 71706.02..... Sampler: ...M.West .....
Project Mgr: PG..... Mob. Phone: 0412 985 938 .....
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Attn: Tania Notaras
Phone: (02) 9910 6200 Fax: (02) 9910 6201
Email: tnotaras@envirolabservices.com.au

Sample ID	Lab ID	Sampling Date	Sample Type (S - soil, W – water)	Container type (G – glass, P - plastic)	Analytes: Combo 8a	Heavy Metals	OPP/OCP	pH, iron and cation exchange capacity (CEC) and clay content	Combo 8	BTEX					Notes/preservation
TP21 0-0.3	21	27/5/14	S	G		X	X								Combo
TP22 0-0.3	22	27/5/14	S	G		X	X	X							Combo
TP23 0-0.3	23	27/5/14	S	G		X	X								Combo
TP24 0-0.2	24	27/5/14	S	G	X										Combo
TP25 0-0.3	25	27/5/14	S	G		X	X								Combo
TP26 0-0.3	26	27/5/14	S	G		X	X								Combo
TP27 0.3-0.5	27	27/5/14	S	G		X	X								Combo
TP28 0-0.2	28	27/5/14	S	G		X	X	X							Combo
TP29 0-0.2	29	28/5/14	S	G		X	X								Combo
TP30 0.6-0.8	30	28/5/14	S	G		X	X								Combo

Lab Report No. .....
Send Results to: Douglas Partners Address: 96 Hermitage Road West Ryde NSW 2114 Phone: (02) 4271 1836 Fax: (02) 4271 1897

Relinquished by: M.West Signed: Date & Time: 29/5/14 Transported to laboratory by: Hunter Express
Received By: D.FORD Date & Time: 29.5.14 15:30

Douglas Partners
Geotechnics · Environment · Groundwater

CHAIN OF CUSTODY

Project Name: MULGOA
Project No: 71706.02 Sampler: M.West
Project Mgr: PG Mob. Phone: 0412 985 938
Email: Matt.West@douglaspartners.com.au
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12 Ashley St Chatswood 2067
Attn: Tania Notaras
Phone: (02) 9910 6200 Fax: (02) 9910 6201
Email: tnotaras@envirolabservices.com.au

Sample ID	Lab ID	Sampling Date	Sample Type (S - soil W – water)	Container type (G – glass P - plastic)	Analytes: Combo 8a	Heavy Metals	OPP/OCP	pH, iron and cation exchange capacity (CEC) and clay content	Combo 8	BTEX					Notes/preservation
TP31 0-0.3	31	28/5/14	S	G		X	X								
TP32 0-0.2	32	28/5/14	S	G	X										Combo
TP33 0-0.2	33	27/5/14	S	G	X										Combo
TP34 0-0.3	34	27/5/14	S	G		X	X								Combo
TP35 0-0.3	35	27/5/14	S	G		X	X	X							Combo
TP36 0-0.3	36	27/5/14	S	G		X	X								Combo
TP37 0-0.3	37	27/5/14	S	G		X	X								Combo
TP38 0-0.3	38	28/5/14	S	G		X	X								Combo
TP39 0-0.3	39	28/5/14	S	G	X										Combo
TP40 0.4-0.6	40	28/5/14	S	G		X	X	X							Combo

Lab Report No.
Send Results to: Douglas Partners Address: 96 Hermitage Road West Ryde NSW 2114
Phone: (02) 4271 1836
Fax: (02) 4271 1897

Relinquished by: M.West Signed: Date & Time: 29/5/14
Received By: D.FORD Date & Time: 29.5.14 15:30
Transported to laboratory by: Hunter Express

Form COC

Douglas Partners
Geotechnics · Environment · Groundwater

CHAIN OF CUSTODY

Project Name: MULGOA.....
Project No: 71706.02..... Sampler: ...M.West .....
Project Mgr: PG..... Mob. Phone: 0412 985 938 .....
Email: Matt.West@douglaspartners.com.au
Date Required: STD; ESdat Format Lab Quote No. .....

To: Envirolab Services
12 Ashley St Chatswood 2067
Attn: Tania Notaras
Phone: (02) 9910 6200 Fax: (02) 9910 6201
Email: tnotaras@envirolabservices.com.au

Sample ID	Lab ID	Sampling Date	Sample Type (S - soil, W – water)	Container type (G – glass, P - plastic)	Analytes: Combo 8a	Heavy Metals	OPP/OCP	pH, iron and cation exchange capacity (CEC) and clay content	Combo 8	BTEX					Notes/preservation
TP41 0-0.3	41	28/5/14	S	G		X	X								
TP42 0-0.3	42	27/5/14	S	G		X	X								Combo
TP43 0-0.3	43	27/5/14	S	G		X	X								Combo
TP44 ~~0.6-0.8~~ 44		27/5/14	S	G		X	X	X							Combo
TP45 0-0.3	45	28/5/14	S	G		X	X								Combo
TP46 0-0.3	46	28/5/14	S	G		X	X								Combo
TP47 0-0.3	47	28/5/14	S	G		X	X								Combo
TP48 0-0.3	48	28/5/14	S	G		X	X								Combo
TP49 0-0.3	49	28/5/14	S	G		X	X	X							Combo
TP50 0-0.3	50	27/5/14	S	G	X										Combo
															Combo

Lab Report No. .....
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Sample ID	Lab ID	Sampling Date	Sample Type (S - soil, W – water)	Container type (G – glass, P - plastic)	Analytes: Combo 8a	Heavy Metals	OPP/OCP	pH, iron and cation exchange capacity (CEC) and clay content	Combo 8	BTEX					Notes/preservation
TP101 0-0.3	S1	27 28/5/14	S	G		X	X								Combo
TP102 0.2-0.5	S2	27 28/5/14	S	G	X										Combo
BH1 0-0.1	S3	27/5/14	S	G		X	X								Combo
BH2 0-0.1	S4	27/5/14	S	G	X										Combo
BH3 0-01	S5	28/5/14	S	G		X	X								Combo
BH4 0-0.1	S6	28/5/14	S	G	X										Combo
TS	S7	27/5/14	S	G						X					Combo
TB	S8	27/5/14	S	G						X					Combo
TS	S9	28/5/14	S	G						X					Combo
TB	S10	28/5/14	S	G						X					Combo

On bottles all dated 27.5.14 - none or 28.5.14

Lab Report No. .....
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Sample ID	Lab ID	Sampling Date	Sample Type (S - soil W – water)	Container type (G – glass P - plastic)	Analytes: Combo 8a	Heavy Metals	OPP/OCP	pH, iron and cation exchange capacity (CEC) and clay content	Combo 8	BTEX					Notes/preservation
BD1A/27514	61	27/5/14	S	G					X						Combo
BD1B/27514	*	27/5/14	S	G					X	forward to Eurofins					Combo
BD1A/28514	62	28/5/14	S	G		X	X								Combo
BD1B/28514	*	28/5/14	S	G					X	forward to Eurofins					Combo
															Combo
															Combo
															Combo
															Combo
															Combo
															Combo
															Combo

Lab Report No. .....
Send Results to: Douglas Partners Address: 96 Hermitage Road West Ryde NSW 2114
Phone: (02) 4271 1836
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Relinquished by: M.West Signed: Date & Time: 29/5/14
Received By: D.FORD Date & Time: 29.5.14 15:30
Transported to laboratory by: Hunter Express

Form COC

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 110679-A

Client:
Douglas Partners Pty Ltd
96 Hermitage Rd
West Ryde
NSW 2114

Attention: Matt West

Sample log in details:

Your Reference:	**71706.02, Mulgoa**
No. of samples:	Additional Testing on 1 Soil
Date samples received / completed instructions received	29/05/14 / 16/06/14

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:	17/06/14 / 17/06/14
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:

Jacinta Hurst
Laboratory Manager

ACCREDITED FOR TECHNICAL COMPETENCE

Metals in TCLP USEPA1311		
Our Reference:	UNITS	110679-A-4
Your Reference	----------	TP4
Depth	----------	0-0.3
Date Sampled		27/05/2014
Type of sample		Soil
Date extracted	-	17/06/2014
Date analysed	-	17/06/2014
pH of soil for fluid# determ.	pH units	7.5
pH of soil for fluid # determ. (acid)	pH units	1.6
Extraction fluid used	-	1
pH of final Leachate	pH units	5.1
Lead in TCLP	mg/L	<0.03

Method ID	Methodology Summary
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using AS 4439 and USEPA 1311 and in house method INORG-004.
EXTRACT.7	Toxicity Characteristic Leaching Procedure (TCLP).
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA 22nd ED, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
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 II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			17/06/2014	[NT]	[NT]	LCS-W1	17/06/2014
Date analysed	-			17/06/2014	[NT]	[NT]	LCS-W1	17/06/2014
Lead in TCLP	mg/L	0.03	Metals-020 ICP-AES	<0.03	[NT]	[NT]	LCS-W1	99%

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.

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

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

Document Set ID: 6093951
Version: 1, Version Date: 14/08/2014

Envirolab Ref: 110679 A.
Due: 17/6/14

Aileen Hie

24hr T/A.

From: Matt West [Matt.West@douglaspartners.com.au]
Sent: Monday, 16 June 2014 9:40 AM
To: Aileen Hie
Subject: RE: TCLP

Sorry for that Aileen,

Could I please have TCLP analysis for lead conducted on sample 110679-4 on a 24hr turnaround.

Thank you.

Matt West | Environmental Scientist
Douglas Partners Pty Ltd | ABN 75 053 980 117 | www.douglaspartners.com.au
96 Hermitage Road West Ryde NSW 2114 | PO Box 472 West Ryde NSW 1685
P: 02 9809 0666 | F: 02 9809 4095 | M: 0412 985 938 | E: Matt.West@douglaspartners.com.au

From: Aileen Hie [mailto:AHie@envirolab.com.au]
Sent: Friday, 13 June 2014 4:47 PM
To: Matt West
Subject: RE: TCLP

Hi Matt

This has already been requested and reported to you yesterday.

Regards,

Aileen Hie | Sample Receipt Supervisor | Envirolab Services Pty Ltd

Great Chemistry, Great Service.

12 Ashley Street Chatswood NSW 2067
T 612 9910 6200 **F** 612 9910 6201
ahie@envirolab.com.au | www.envirolab.com.au

Latest Links Below:

NEW information on QA/QC requirements and Temperature Recording of Samples on receipt at the laboratory

Our "RECOMMENDED PRESERVATION & HOLDING TIMES (RHT)" chart that includes minimal sample volumes required

Please note that all samples submitted to the Envirolab Group laboratories will be analysed under the Envirolab Group Terms and Conditions. The Terms and Conditions are accessible by clicking this link

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From: Matt West [mailto:Matt.West@douglaspartners.com.au]
Sent: Friday, 13 June 2014 11:04 AM
To: Aileen Hie
Subject: TCLP

Hi Aileen,

Could I please have TCLP analysis for lead conducted on sample 110459-19 on a 48hr turnaround.

Thanks,

Matt West | Environmental Scientist
Douglas Partners Pty Ltd | ABN 75 053 980 117 | www.douglaspartners.com.au
96 Hermitage Road West Ryde NSW 2114 | PO Box 472 West Ryde NSW 1685
P: 02 9809 0666 | F: 02 9809 4095 | M: 0412 985 938 | E: Matt.West@douglaspartners.com.au

eurofins | mgt

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: **Matt West**

Report **420193-S**
Client Reference MULGOA 71706.02
Received Date May 30, 2014

Client Sample ID			**BD1B/270514**	**BD1B/280514**
Sample Matrix			**Soil**	**Soil**
Eurofins | mgt Sample No.			**S14-My27389**	**S14-My27390**
Date Sampled			**May 27, 2014**	**May 28, 2014**
Test/Reference	LOR	Unit		
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				
TRH C6-C9	20	mg/kg	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50
TRH C29-C36	50	mg/kg	< 50	< 50
TRH C10-36 (Total)	50	mg/kg	< 50	< 50
BTEX				
Benzene	0.1	mg/kg	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	86	101
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100
Polycyclic Aromatic Hydrocarbons				
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	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5
Benzo(k)fluoranthene	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	< 0.5
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

Client Sample ID			BD1B/270514	BD1B/280514
Sample Matrix			Soil	Soil
Eurofins | mgt Sample No.			S14-My27389	S14-My27390
Date Sampled			May 27, 2014	May 28, 2014
Test/Reference	LOR	Unit		
Polycyclic Aromatic Hydrocarbons				
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5
Total PAH	0.5	mg/kg	< 0.5	< 0.5
Benzo(a)pyrene TEQ (lower bound)*	0.5	mg/kg	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound)*	0.5	mg/kg	0.6	0.6
Benzo(a)pyrene TEQ (upper bound)*	0.5	mg/kg	1.2	1.2
2-Fluorobiphenyl (surr.)	1	%	96	97
p-Terphenyl-d14 (surr.)	1	%	108	107
Organochlorine Pesticides				
Chlordanes - Total	0.1	mg/kg	< 0.1	< 0.1
4.4'-DDD	0.05	mg/kg	< 0.05	< 0.05
4.4'-DDE	0.05	mg/kg	< 0.05	< 0.05
4.4'-DDT	0.05	mg/kg	< 0.05	< 0.05
a-BHC	0.05	mg/kg	< 0.05	< 0.05
Aldrin	0.05	mg/kg	< 0.05	< 0.05
b-BHC	0.05	mg/kg	< 0.05	< 0.05
d-BHC	0.05	mg/kg	< 0.05	< 0.05
Dieldrin	0.05	mg/kg	< 0.05	< 0.05
Endosulfan I	0.05	mg/kg	< 0.05	< 0.05
Endosulfan II	0.05	mg/kg	< 0.05	< 0.05
Endosulfan sulphate	0.05	mg/kg	< 0.05	< 0.05
Endrin	0.05	mg/kg	< 0.05	< 0.05
Endrin aldehyde	0.05	mg/kg	< 0.05	< 0.05
Endrin ketone	0.05	mg/kg	< 0.05	< 0.05
g-BHC (Lindane)	0.05	mg/kg	< 0.05	< 0.05
Heptachlor	0.05	mg/kg	< 0.05	< 0.05
Heptachlor epoxide	0.05	mg/kg	< 0.05	< 0.05
Hexachlorobenzene	0.05	mg/kg	< 0.05	< 0.05
Methoxychlor	0.2	mg/kg	< 0.2	< 0.2
Toxaphene	1	mg/kg	< 1	< 1
Dibutylchlorendate (surr.)	1	%	98	114
Tetrachloro-m-xylene (surr.)	1	%	97	119
Polychlorinated Biphenyls (PCB)				
Aroclor-1016	0.5	mg/kg	< 0.5	< 0.5
Aroclor-1232	0.5	mg/kg	< 0.5	< 0.5
Aroclor-1242	0.5	mg/kg	< 0.5	< 0.5
Aroclor-1248	0.5	mg/kg	< 0.5	< 0.5
Aroclor-1254	0.5	mg/kg	< 0.5	< 0.5
Aroclor-1260	0.5	mg/kg	< 0.5	< 0.5
Total PCB	0.5	mg/kg	< 0.5	< 0.5
Dibutylchlorendate (surr.)	1	%	98	114
Speciated Phenols				
2.4-Dichlorophenol	0.5	mg/kg	< 0.5	< 0.5
2.4-Dimethylphenol	0.5	mg/kg	< 0.5	< 0.5
2.4.5-Trichlorophenol	0.5	mg/kg	< 0.5	< 0.5
2.4.6-Trichlorophenol	0.5	mg/kg	< 0.5	< 0.5
Phenol	0.5	mg/kg	< 0.5	< 0.5
2-Methylphenol (o-Cresol)	0.5	mg/kg	< 0.5	< 0.5
3&4-Methylphenol (m&p-Cresol)	1	mg/kg	< 1	< 1

Client Sample ID			BD1B/270514	BD1B/280514
Sample Matrix			Soil	Soil
Eurofins | mgt Sample No.			S14-My27389	S14-My27390
Date Sampled			May 27, 2014	May 28, 2014
Test/Reference	LOR	Unit		
Speciated Phenols				
2-Chlorophenol	0.5	mg/kg	< 0.5	< 0.5
2-Nitrophenol	0.5	mg/kg	< 0.5	< 0.5
4-Chloro-3-methylphenol	0.5	mg/kg	< 0.5	< 0.5
Pentachlorophenol	1	mg/kg	< 1	< 1
Phenol-d5 (surr.)	1	%	91	93
Organophosphorus Pesticides (OP)				
Chlorpyrifos	0.5	mg/kg	< 0.5	< 0.5
Coumaphos	0.5	mg/kg	< 0.5	< 0.5
Demeton (total)	1	mg/kg	< 1	< 1
Diazinon	0.5	mg/kg	< 0.5	< 0.5
Dichlorvos	0.5	mg/kg	< 0.5	< 0.5
Dimethoate	0.5	mg/kg	< 0.5	< 0.5
Disulfoton	0.5	mg/kg	< 0.5	< 0.5
Ethoprop	0.5	mg/kg	< 0.5	< 0.5
Fenitrothion	0.5	mg/kg	< 0.5	< 0.5
Fensulfothion	0.5	mg/kg	< 0.5	< 0.5
Fenthion	0.5	mg/kg	< 0.5	< 0.5
Methyl azinphos	0.5	mg/kg	< 0.5	< 0.5
Malathion	0.5	mg/kg	< 0.5	< 0.5
Methyl parathion	0.5	mg/kg	< 0.5	< 0.5
Mevinphos	0.5	mg/kg	< 0.5	< 0.5
Monocrotophos	10	mg/kg	< 10	< 10
Parathion	0.5	mg/kg	< 0.5	< 0.5
Phorate	0.5	mg/kg	< 0.5	< 0.5
Profenofos	0.5	mg/kg	< 0.5	< 0.5
Prothiofos	0.5	mg/kg	< 0.5	< 0.5
Ronnel	0.5	mg/kg	< 0.5	< 0.5
Stirophos	0.5	mg/kg	< 0.5	< 0.5
Trichloronate	0.5	mg/kg	< 0.5	< 0.5
Triphenylphosphate (surr.)	1	%	101	70
Heavy Metals				
Arsenic	2	mg/kg	8.2	9.8
Cadmium	0.4	mg/kg	0.6	0.6
Chromium	5	mg/kg	34	32
Copper	5	mg/kg	17	16
Lead	5	mg/kg	17	17
Mercury	0.05	mg/kg	< 0.05	< 0.05
Nickel	5	mg/kg	< 5	6.1
Zinc	5	mg/kg	9.5	11
% Moisture	0.1	%	8.5	13

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).

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Sydney	Jun 04, 2014	14 Day
- Method: E004 Petroleum Hydrocarbons (TPH)			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Jun 04, 2014	14 Day
- Method: LM-LTM-ORG2010			
BTEX	Sydney	Jun 04, 2014	14 Day
- Method: E029/E016 BTEX			
Polycyclic Aromatic Hydrocarbons	Sydney	Jun 04, 2014	14 Day
- Method: E007 Polyaromatic Hydrocarbons (PAH)			
Organochlorine Pesticides	Sydney	Jun 04, 2014	14 Day
- Method: E013 Organochlorine Pesticides (OC)			
Polychlorinated Biphenyls (PCB)	Sydney	Jun 04, 2014	28 Day
- Method: E013 Polychlorinated Biphenyls (PCB)			
Speciated Phenols	Sydney	Jun 04, 2014	14 Day
- Method: E008 Speciated Phenols			
Organophosphorus Pesticides (OP)	Sydney	Jun 04, 2014	14 Day
- Method: E014 Organophosphorus Pesticides (OP)			
Metals M8	Sydney	Jun 04, 2014	28 Day
- Method: LTM-MET-3040_R0 TOTAL AND DISSOLVED METALS AND MERCURY IN WATERS BY ICP-MS			
% Moisture	Sydney	Jun 04, 2014	28 Day
- Method: E005 Moisture Content			

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NATA # 1261 Site # 18217

Brisbane
1/21 Smallwood Place
Murarrie QLD 4172
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NATA # 1261 Site # 20794

Company Name:	Douglas Partners (Syd)	**Order No.:**		**Received:**	May 30, 2014 2:30 PM
Address:	96 Hermitage Road West Ryde NSW 2114	**Report #:** **Phone:** **Fax:**	420193 02 9809 0666	**Due:** **Priority:** **Contact Name:**	Jun 6, 2014 5 Day Matt West
Client Job No.:	MULGOA 71706.02				

Eurofins | mgt Client Manager: Jean Heng

Sample Detail					% Moisture	Polycyclic Aromatic Hydrocarbons	Organochlorine Pesticides	Metals M8	BTEX	Polychlorinated Biphenyls (PCB)	Speciated Phenols	Organophosphorus Pesticides (OP)	Total Recoverable Hydrocarbons
Laboratory where analysis is conducted													
Melbourne Laboratory - NATA Site # 1254 & 14271													
Sydney Laboratory - NATA Site # 18217					X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794													
External Laboratory													
Sample ID	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**									
BD1B/270514	May 27, 2014		Soil	S14-My27389	X	X	X	X	X	X	X	X	X
BD1B/280514	May 28, 2014		Soil	S14-My27390	X	X	X	X	X	X	X	X	X

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

mg/l: milligrams per litre

ug/l: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100ml: Organisms per 100 millilitres

NTU: Units

MPN/100mL: Most Probable Number of organisms per 100 millilitres

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 Environmental Protection Agency
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
TEQ	Toxic Equivalency Quotient

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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Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	mg/kg	< 20			20	Pass	
TRH C10-C14	mg/kg	< 20			20	Pass	
TRH C15-C28	mg/kg	< 50			50	Pass	
TRH C29-C36	mg/kg	< 50			50	Pass	
Method Blank							
BTEX							
Benzene	mg/kg	< 0.1			0.1	Pass	
Toluene	mg/kg	< 0.1			0.1	Pass	
Ethylbenzene	mg/kg	< 0.1			0.1	Pass	
m&p-Xylenes	mg/kg	< 0.2			0.2	Pass	
o-Xylene	mg/kg	< 0.1			0.1	Pass	
Xylenes - Total	mg/kg	< 0.3			0.3	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/kg	< 0.5			0.5	Pass	
TRH C6-C10	mg/kg	< 20			20	Pass	
TRH C6-C10 less BTEX (F1)	mg/kg	< 20			20	Pass	
TRH >C10-C16	mg/kg	< 50			50	Pass	
TRH >C16-C34	mg/kg	< 100			100	Pass	
TRH >C34-C40	mg/kg	< 100			100	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
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&j)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Benzo(g.h.i)perylene	mg/kg	< 0.5			0.5	Pass	
Benzo(k)fluoranthene	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							
Organochlorine Pesticides							
Chlordanes - Total	mg/kg	< 0.1			0.1	Pass	
4.4'-DDD	mg/kg	< 0.05			0.05	Pass	
4.4'-DDE	mg/kg	< 0.05			0.05	Pass	
4.4'-DDT	mg/kg	< 0.05			0.05	Pass	
a-BHC	mg/kg	< 0.05			0.05	Pass	
Aldrin	mg/kg	< 0.05			0.05	Pass	
b-BHC	mg/kg	< 0.05			0.05	Pass	
d-BHC	mg/kg	< 0.05			0.05	Pass	
Dieldrin	mg/kg	< 0.05			0.05	Pass	
Endosulfan I	mg/kg	< 0.05			0.05	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Endosulfan II	mg/kg	< 0.05			0.05	Pass	
Endosulfan sulphate	mg/kg	< 0.05			0.05	Pass	
Endrin	mg/kg	< 0.05			0.05	Pass	
Endrin aldehyde	mg/kg	< 0.05			0.05	Pass	
Endrin ketone	mg/kg	< 0.05			0.05	Pass	
g-BHC (Lindane)	mg/kg	< 0.05			0.05	Pass	
Heptachlor	mg/kg	< 0.05			0.05	Pass	
Heptachlor epoxide	mg/kg	< 0.05			0.05	Pass	
Hexachlorobenzene	mg/kg	< 0.05			0.05	Pass	
Methoxychlor	mg/kg	< 0.2			0.2	Pass	
Toxaphene	mg/kg	< 1			1	Pass	
Method Blank							
Polychlorinated Biphenyls (PCB)							
Aroclor-1016	mg/kg	< 0.5			0.5	Pass	
Aroclor-1232	mg/kg	< 0.5			0.5	Pass	
Aroclor-1242	mg/kg	< 0.5			0.5	Pass	
Aroclor-1248	mg/kg	< 0.5			0.5	Pass	
Aroclor-1254	mg/kg	< 0.5			0.5	Pass	
Aroclor-1260	mg/kg	< 0.5			0.5	Pass	
Total PCB	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Speciated Phenols							
2.4-Dichlorophenol	mg/kg	< 0.5			0.5	Pass	
2.4-Dimethylphenol	mg/kg	< 0.5			0.5	Pass	
2.4.5-Trichlorophenol	mg/kg	< 0.5			0.5	Pass	
2.4.6-Trichlorophenol	mg/kg	< 0.5			0.5	Pass	
Phenol	mg/kg	< 0.5			0.5	Pass	
2-Methylphenol (o-Cresol)	mg/kg	< 0.5			0.5	Pass	
3&4-Methylphenol (m&p-Cresol)	mg/kg	< 1			1	Pass	
2-Chlorophenol	mg/kg	< 0.5			0.5	Pass	
2-Nitrophenol	mg/kg	< 0.5			0.5	Pass	
4-Chloro-3-methylphenol	mg/kg	< 0.5			0.5	Pass	
Pentachlorophenol	mg/kg	< 1			1	Pass	
Method Blank							
Organophosphorus Pesticides (OP)							
Chlorpyrifos	mg/kg	< 0.5			0.5	Pass	
Coumaphos	mg/kg	< 0.5			0.5	Pass	
Demeton (total)	mg/kg	< 1			1	Pass	
Diazinon	mg/kg	< 0.5			0.5	Pass	
Dichlorvos	mg/kg	< 0.5			0.5	Pass	
Dimethoate	mg/kg	< 0.5			0.5	Pass	
Disulfoton	mg/kg	< 0.5			0.5	Pass	
Ethoprop	mg/kg	< 0.5			0.5	Pass	
Fenitrothion	mg/kg	< 0.5			0.5	Pass	
Fensulfothion	mg/kg	< 0.5			0.5	Pass	
Fenthion	mg/kg	< 0.5			0.5	Pass	
Methyl azinphos	mg/kg	< 0.5			0.5	Pass	
Malathion	mg/kg	< 0.5			0.5	Pass	
Methyl parathion	mg/kg	< 0.5			0.5	Pass	
Mevinphos	mg/kg	< 0.5			0.5	Pass	
Monocrotophos	mg/kg	< 10			10	Pass	
Parathion	mg/kg	< 0.5			0.5	Pass	
Phorate	mg/kg	< 0.5			0.5	Pass	
Profenofos	mg/kg	< 0.5			0.5	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Prothiofos	mg/kg	< 0.5			0.5	Pass	
Ronnel	mg/kg	< 0.5			0.5	Pass	
Stirophos	mg/kg	< 0.5			0.5	Pass	
Trichloronate	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Heavy Metals							
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							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	77			70-130	Pass	
TRH C10-C14	%	77			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	117			70-130	Pass	
Toluene	%	94			70-130	Pass	
Ethylbenzene	%	89			70-130	Pass	
m&p-Xylenes	%	106			70-130	Pass	
o-Xylene	%	103			70-130	Pass	
Xylenes - Total	%	105			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	118			70-130	Pass	
TRH C6-C10	%	93			70-130	Pass	
TRH >C10-C16	%	81			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	98			70-130	Pass	
Acenaphthylene	%	97			70-130	Pass	
Anthracene	%	99			70-130	Pass	
Benz(a)anthracene	%	95			70-130	Pass	
Benzo(a)pyrene	%	97			70-130	Pass	
Benzo(b&j)fluoranthene	%	121			70-130	Pass	
Benzo(g.h.i)perylene	%	94			70-130	Pass	
Benzo(k)fluoranthene	%	107			70-130	Pass	
Chrysene	%	101			70-130	Pass	
Dibenz(a.h)anthracene	%	95			70-130	Pass	
Fluoranthene	%	98			70-130	Pass	
Fluorene	%	97			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	95			70-130	Pass	
Naphthalene	%	97			70-130	Pass	
Phenanthrene	%	94			70-130	Pass	
Pyrene	%	95			70-130	Pass	
LCS - % Recovery							
Organochlorine Pesticides							
Chlordanes - Total	%	95			70-130	Pass	
4.4'-DDD	%	99			70-130	Pass	
4.4'-DDE	%	92			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
4.4'-DDT	%	88			70-130	Pass	
a-BHC	%	100			70-130	Pass	
Aldrin	%	98			70-130	Pass	
b-BHC	%	95			70-130	Pass	
d-BHC	%	94			70-130	Pass	
Dieldrin	%	96			70-130	Pass	
Endosulfan I	%	96			70-130	Pass	
Endosulfan II	%	97			70-130	Pass	
Endosulfan sulphate	%	98			70-130	Pass	
Endrin	%	91			70-130	Pass	
Endrin aldehyde	%	99			70-130	Pass	
Endrin ketone	%	93			70-130	Pass	
g-BHC (Lindane)	%	93			70-130	Pass	
Heptachlor	%	86			70-130	Pass	
Heptachlor epoxide	%	98			70-130	Pass	
Hexachlorobenzene	%	128			70-130	Pass	
Methoxychlor	%	91			70-130	Pass	
LCS - % Recovery							
Polychlorinated Biphenyls (PCB)							
Aroclor-1260	%	82			70-130	Pass	
LCS - % Recovery							
Speciated Phenols							
2.4-Dichlorophenol	%	101			30-130	Pass	
2.4-Dimethylphenol	%	100			30-130	Pass	
2.4.5-Trichlorophenol	%	100			30-130	Pass	
2.4.6-Trichlorophenol	%	97			30-130	Pass	
Phenol	%	104			30-130	Pass	
2-Methylphenol (o-Cresol)	%	101			30-130	Pass	
3&4-Methylphenol (m&p-Cresol)	%	96			30-130	Pass	
2-Chlorophenol	%	99			30-130	Pass	
2-Nitrophenol	%	101			30-130	Pass	
4-Chloro-3-methylphenol	%	101			30-130	Pass	
Pentachlorophenol	%	130			30-130	Pass	
LCS - % Recovery							
Organophosphorus Pesticides (OP)							
Chlorpyrifos	%	82			70-130	Pass	
Diazinon	%	82			70-130	Pass	
Dichlorvos	%	111			70-130	Pass	
Dimethoate	%	72			70-130	Pass	
Disulfoton	%	96			70-130	Pass	
Ethoprop	%	82			70-130	Pass	
Fenitrothion	%	77			70-130	Pass	
Fenthion	%	81			70-130	Pass	
Malathion	%	78			70-130	Pass	
Methyl parathion	%	76			70-130	Pass	
Mevinphos	%	83			70-130	Pass	
Parathion	%	90			70-130	Pass	
Phorate	%	87			70-130	Pass	
Profenofos	%	72			70-130	Pass	
Prothiofos	%	81			70-130	Pass	
Ronnel	%	83			70-130	Pass	
Stirophos	%	73			70-130	Pass	
Trichloronate	%	124			70-130	Pass	
LCS - % Recovery							

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Heavy Metals									
Arsenic			%	93			70-130	Pass	
Cadmium			%	93			70-130	Pass	
Chromium			%	103			70-130	Pass	
Copper			%	125			70-130	Pass	
Lead			%	88			70-130	Pass	
Mercury			%	97			70-130	Pass	
Nickel			%	99			70-130	Pass	
Zinc			%	104			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	S14-My27389	CP	%	70			70-130	Pass	
TRH C10-C14	S14-Jn03134	NCP	%	77			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	S14-My27389	CP	%	115			70-130	Pass	
Toluene	S14-My27389	CP	%	86			70-130	Pass	
Ethylbenzene	S14-My27389	CP	%	78			70-130	Pass	
m&p-Xylenes	S14-My27389	CP	%	90			70-130	Pass	
o-Xylene	S14-My27389	CP	%	88			70-130	Pass	
Xylenes - Total	S14-My27389	CP	%	89			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	S14-My27389	CP	%	73			70-130	Pass	
TRH C6-C10	S14-My27389	CP	%	70			70-130	Pass	
TRH >C10-C16	S14-Jn03134	NCP	%	82			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	S14-My27389	CP	%	93			70-130	Pass	
Acenaphthylene	S14-My27389	CP	%	94			70-130	Pass	
Anthracene	S14-My27389	CP	%	99			70-130	Pass	
Benz(a)anthracene	S14-My27389	CP	%	94			70-130	Pass	
Benzo(a)pyrene	S14-My27389	CP	%	96			70-130	Pass	
Benzo(b&j)fluoranthene	S14-My27389	CP	%	77			70-130	Pass	
Benzo(g.h.i)perylene	S14-My27389	CP	%	89			70-130	Pass	
Benzo(k)fluoranthene	S14-My27389	CP	%	91			70-130	Pass	
Chrysene	S14-My27389	CP	%	101			70-130	Pass	
Dibenz(a.h)anthracene	S14-My27389	CP	%	92			70-130	Pass	
Fluoranthene	S14-My27389	CP	%	92			70-130	Pass	
Fluorene	S14-My27389	CP	%	93			70-130	Pass	
Indeno(1.2.3-cd)pyrene	S14-My27389	CP	%	91			70-130	Pass	
Naphthalene	S14-My27389	CP	%	94			70-130	Pass	
Phenanthrene	S14-My27389	CP	%	92			70-130	Pass	
Pyrene	S14-My27389	CP	%	96			70-130	Pass	
Spike - % Recovery									
Organochlorine Pesticides				Result 1					
Chlordanes - Total	S14-My27389	CP	%	94			70-130	Pass	
4.4'-DDD	S14-My27389	CP	%	103			70-130	Pass	
4.4'-DDE	S14-My27389	CP	%	103			70-130	Pass	
4.4'-DDT	S14-My27389	CP	%	85			70-130	Pass	
a-BHC	S14-My27389	CP	%	97			70-130	Pass	
Aldrin	S14-My27389	CP	%	100			70-130	Pass	
b-BHC	S14-My27389	CP	%	92			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
d-BHC	S14-My27389	CP	%	94			70-130	Pass	
Dieldrin	S14-My27389	CP	%	97			70-130	Pass	
Endosulfan I	S14-My27389	CP	%	95			70-130	Pass	
Endosulfan II	S14-My27389	CP	%	97			70-130	Pass	
Endosulfan sulphate	S14-My27389	CP	%	93			70-130	Pass	
Endrin	S14-My27389	CP	%	90			70-130	Pass	
Endrin aldehyde	S14-My27389	CP	%	103			70-130	Pass	
Endrin ketone	S14-My27389	CP	%	94			70-130	Pass	
g-BHC (Lindane)	S14-My27389	CP	%	91			70-130	Pass	
Heptachlor	S14-My27389	CP	%	84			70-130	Pass	
Heptachlor epoxide	S14-My27389	CP	%	99			70-130	Pass	
Hexachlorobenzene	S14-My27389	CP	%	127			70-130	Pass	
Methoxychlor	S14-My27389	CP	%	95			70-130	Pass	
Spike - % Recovery									
Polychlorinated Biphenyls (PCB)				Result 1					
Aroclor-1260	S14-My27389	CP	%	86			70-130	Pass	
Spike - % Recovery									
Speciated Phenols				Result 1					
2.4-Dichlorophenol	S14-My27389	CP	%	94			30-130	Pass	
2.4-Dimethylphenol	S14-My27389	CP	%	67			30-130	Pass	
2.4.5-Trichlorophenol	S14-My27389	CP	%	101			30-130	Pass	
2.4.6-Trichlorophenol	S14-My27389	CP	%	91			30-130	Pass	
Phenol	S14-My27389	CP	%	101			30-130	Pass	
2-Methylphenol (o-Cresol)	S14-My27389	CP	%	89			30-130	Pass	
3&4-Methylphenol (m&p-Cresol)	S14-My27389	CP	%	92			30-130	Pass	
2-Chlorophenol	S14-My27389	CP	%	91			30-130	Pass	
2-Nitrophenol	S14-My27389	CP	%	90			30-130	Pass	
4-Chloro-3-methylphenol	S14-My27389	CP	%	70			30-130	Pass	
Pentachlorophenol	S14-My27389	CP	%	114			30-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S14-My26625	NCP	%	99			70-130	Pass	
Cadmium	S14-My26625	NCP	%	101			70-130	Pass	
Chromium	S14-My26625	NCP	%	115			70-130	Pass	
Copper	S14-Jn01950	NCP	%	94			70-130	Pass	
Lead	S14-My26625	NCP	%	85			70-130	Pass	
Mercury	S14-Jn01950	NCP	%	88			70-130	Pass	
Nickel	S14-My26625	NCP	%	92			70-130	Pass	
Zinc	S14-My26625	NCP	%	100			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	S14-My27390	CP	%	95			70-130	Pass	
Acenaphthylene	S14-My27390	CP	%	93			70-130	Pass	
Anthracene	S14-My27390	CP	%	94			70-130	Pass	
Benz(a)anthracene	S14-My27390	CP	%	95			70-130	Pass	
Benzo(a)pyrene	S14-My27390	CP	%	98			70-130	Pass	
Benzo(b&j)fluoranthene	S14-My27390	CP	%	93			70-130	Pass	
Benzo(g.h.i)perylene	S14-My27390	CP	%	94			70-130	Pass	
Benzo(k)fluoranthene	S14-My27390	CP	%	96			70-130	Pass	
Chrysene	S14-My27390	CP	%	99			70-130	Pass	
Dibenz(a.h)anthracene	S14-My27390	CP	%	92			70-130	Pass	
Fluoranthene	S14-My27390	CP	%	95			70-130	Pass	
Fluorene	S14-My27390	CP	%	96			70-130	Pass	
Indeno(1.2.3-cd)pyrene	S14-My27390	CP	%	93			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Naphthalene	S14-My27390	CP	%	96			70-130	Pass	
Phenanthrene	S14-My27390	CP	%	94			70-130	Pass	
Pyrene	S14-My27390	CP	%	94			70-130	Pass	
Spike - % Recovery									
Speciated Phenols				Result 1					
2.4-Dichlorophenol	S14-My27390	CP	%	98			30-130	Pass	
2.4-Dimethylphenol	S14-My27390	CP	%	84			30-130	Pass	
2.4.5-Trichlorophenol	S14-My27390	CP	%	99			30-130	Pass	
2.4.6-Trichlorophenol	S14-My27390	CP	%	98			30-130	Pass	
Phenol	S14-My27390	CP	%	101			30-130	Pass	
2-Methylphenol (o-Cresol)	S14-My27390	CP	%	98			30-130	Pass	
3&4-Methylphenol (m&p-Cresol)	S14-My27390	CP	%	80			30-130	Pass	
2-Chlorophenol	S14-My27390	CP	%	93			30-130	Pass	
2-Nitrophenol	S14-My27390	CP	%	93			30-130	Pass	
4-Chloro-3-methylphenol	S14-My27390	CP	%	82			30-130	Pass	
Pentachlorophenol	S14-My27390	CP	%	87			30-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	S14-My27389	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C10-C14	S14-Jn03134	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	S14-Jn03134	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	S14-Jn03134	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S14-My27389	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	S14-My27389	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	S14-My27389	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	S14-My27389	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	S14-My27389	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total	S14-My27389	CP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	S14-My27389	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C6-C10 less BTEX (F1)	S14-My27389	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH >C10-C16	S14-Jn03134	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	S14-Jn03134	NCP	mg/kg	< 100	< 100	<1	30%	Pass	
TRH >C34-C40	S14-Jn03134	NCP	mg/kg	< 100	< 100	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	

Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Naphthalene	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Organochlorine Pesticides				Result 1	Result 2	RPD			
Chlordanes - Total	S14-My27389	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
4.4'-DDD	S14-My27389	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDE	S14-My27389	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDT	S14-My27389	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
a-BHC	S14-My27389	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Aldrin	S14-My27389	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
b-BHC	S14-My27389	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
d-BHC	S14-My27389	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Dieldrin	S14-My27389	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan I	S14-My27389	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan II	S14-My27389	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan sulphate	S14-My27389	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin	S14-My27389	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin aldehyde	S14-My27389	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin ketone	S14-My27389	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
g-BHC (Lindane)	S14-My27389	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor	S14-My27389	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor epoxide	S14-My27389	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Hexachlorobenzene	S14-My27389	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Methoxychlor	S14-My27389	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Toxaphene	S14-My27389	CP	mg/kg	< 1	< 1	<1	30%	Pass	
Duplicate									
Polychlorinated Biphenyls (PCB)				Result 1	Result 2	RPD			
Aroclor-1016	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Aroclor-1232	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Aroclor-1242	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Aroclor-1248	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Aroclor-1254	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Aroclor-1260	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Speciated Phenols				Result 1	Result 2	RPD			
2.4-Dichlorophenol	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2.4-Dimethylphenol	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2.4.5-Trichlorophenol	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2.4.6-Trichlorophenol	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenol	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2-Methylphenol (o-Cresol)	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
3&4-Methylphenol (m&p-Cresol)	S14-My27389	CP	mg/kg	< 1	< 1	<1	30%	Pass	
2-Chlorophenol	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2-Nitrophenol	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
4-Chloro-3-methylphenol	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pentachlorophenol	S14-My27389	CP	mg/kg	< 1	< 1	<1	30%	Pass	
Duplicate									
Organophosphorus Pesticides (OP)				Result 1	Result 2	RPD			
Chlorpyrifos	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Coumaphos	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Diazinon	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dichlorvos	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dimethoate	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	

Duplicate									
Organophosphorus Pesticides (OP)				Result 1	Result 2	RPD			
Disulfoton	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Ethoprop	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fenitrothion	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fensulfothion	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fenthion	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Methyl azinphos	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Malathion	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Methyl parathion	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Mevinphos	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Monocrotophos	S14-My27389	CP	mg/kg	< 10	< 10	<1	30%	Pass	
Parathion	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phorate	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Profenofos	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Prothiofos	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Ronnel	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Stirophos	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Trichloronate	S14-My27389	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S14-My26625	NCP	mg/kg	3.3	5.1	45	30%	Fail	Q15
Cadmium	S14-My26625	NCP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	S14-My26625	NCP	mg/kg	27	27	1.0	30%	Pass	
Copper	S14-My26625	NCP	mg/kg	11	7.6	7.0	30%	Pass	
Lead	S14-My26625	NCP	mg/kg	< 5	< 5	<1	30%	Pass	
Mercury	S14-Jn00113	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Nickel	S14-My26625	NCP	mg/kg	5.6	5.8	2.0	30%	Pass	
Zinc	S14-My26625	NCP	mg/kg	33	32	3.0	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
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
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
James Norford	Senior Analyst-Metal (NSW)
Ryan Hamilton	Senior Analyst-Organic (NSW)
Ryan Hamilton	Senior Analyst-Volatile (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

420193

Douglas Partners
Geotechnics · Environment · Groundwater

CHAIN OF CUSTODY

Project Name: MULGOA.....
Project No: 71706.02..... Sampler: ...M.West .....
Project Mgr: PG..... Mob. Phone: 0412 985 938 .....
Email: Matt.West@douglaspartners.com.au
Date Required: STD; ESdat Format Lab Quote No. .....

To: Envirolab Services
12 Ashley St Chatswood 2067
Attn: Tania Notaras
Phone: (02) 9910 6200 Fax: (02) 9910 6201
Email: tnotaras@envirolabservices.com.au

Sample ID	Lab ID	Sampling Date	Sample Type (S - soil W – water)	Container type (G – glass P - plastic)	Analytes: Combo 8a	Heavy Metals	OPP/OCP	pH, iron and cation exchange capacity (CEC) and clay content	Combo 8	BTEX					Notes/preservation
BD1A/27514	61	27/5/14	S	G					X						Combo
BD1B/27514	*	27/5/14	S	G					X	(Forward to Eurofins)					Combo 8= TPH, BTEX
BD1A/28514	62	28/5/14	S	G		X	X								Combo PAH, OC, OP,
BD1B/28514	*	28/5/14	S	G					X	(Forward to Eurofins)					Combo PCB, 8 metals
															Combo phenols
															Combo
															Combo
															Combo
															Combo
															Combo
															Combo

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30 MAY 2014
BY: 10m 1430

Lab Report No. .....
Send Results to: Douglas Partners Address: 96 Hermitage Road West Ryde NSW 2114 Phone: (02) 4271 1836 Fax: (02) 4271 1897

Relinquished by: M.West Signed: Date & Time: 29/5/14 Transported to laboratory by: Hunter Express

Received By: D.FOTO Date & Time: 29.5.14 15:30

Rel by: JHi (ELS) 30/5/14 12:15

Form COC

Appendix D

Data Quality Objectives

Data Quality Objectives (DQOs)

The *Detailed Site (Contamination) Investigation* has been devised broadly in accordance with the seven step data quality objective (DQO) process which is provided in Appendix B, Schedule B2 of the *National Environment Protection (Assessment of Site Contamination) Measure* 1999 as amended 2013 (NEPC 2013). The DQO process is outlined as follows:

(1) State the Problem

The "problem" to be addressed is the potential for contamination of the site, to be assessed prior to a residential redevelopment. It is understood that the proposed development will ultimately include the subdivision of the site into approximately 54 residential allotments with a typical allotment size of approximately 1000 m^2. The new lots will be serviced by several new roads that will provide access to the site from two entry points located on Mulgoa Road near to the northern and southern ends of the site. Viewing corridors will be retained as shown on the proposed subdivision drawing in Appendix A.

The previous phase 1 contamination assessment undertaken by Douglas Partners Pty Ltd (DP 2013) identified potential sources of contamination including imported filling, former market gardening (i.e. pesticide and fertiliser application) and the demolition of former buildings potential containing asbestos or lead based paint.

DP's project team included Paul Gorman (Senior Associate/Project Manager) and Matthew West (Environmental Scientist).

(2) Identify the Decision/Goal of the Study

Based on DP (2013) it is considered that the contaminants of potential concern (COPC) are heavy metals, TRH, BTEX, PAH, OCP, OPP, PCB, phenols, and asbestos. As such, the analysis focused on these potential contaminants.

The analytical data was compared primarily against the Health-based investigation levels (HIL), Health-based Screening Levels (HSL), and Ecological Investigation and Screening Levels (EIL/ESL) for a residential and open space land use as per Schedule B1, NEPC (2013) and CRC CARE technical reports.

The following specific decisions were to be made, as appropriate:

- What is the conceptual site model (i.e. sources, receptors, migration pathways, exposure)?
- Do the existing fill materials and/or natural soils pose a potential risk to identified receptors?
- Does the existing groundwater beneath the site pose a potential risk to identified receptors?
- Is the data sufficient to make a decision regarding the abovementioned risks, the compatibility of the site for the proposed development or are additional investigations required?
- Does contamination at the site, if encountered, trigger the Duty to Report requirements under the CLM Act 1997?
- Are there any off-site migration issues that need to be considered?
- Is the data sufficient to enable the preparation of a Remediation Action Plan (RAP) and/or Environmental Management Plan (EMP) should the data suggest these are required?

(3) Identify Information Inputs

Inputs into the decisions were as follows:

- Collection and review of site history information including information regarding previous and current activities undertaken on the site and the surrounding areas;
- Regional geology, topography, hydrogeology, ASS mapping and groundwater bore search;
- Soil samples collected on a systematic approach on a grid based pattern across the site to a maximum depth of 0.5 m in natural material, and analysed for the COPC;
- The lithology of the site as described in the field observations and bore / test pit logs;
- If site conditions suggest additional COPC i.e. condition of subsurface material encountered during test bores/pits (odours, staining etc.), further analysis will be undertaken;
- Field and laboratory QA/QC data to assess the suitability of the environmental data for the assessment;
- All analysis undertaken at NATA accredited laboratories; and
- The results will be compared with the NEPC (2013) criteria.

(4) Define the Study Boundaries

The Eastern Precinct of Fernhill Estate comprises Lot 1 in DP570484 and Lot 6 in DP173159. The proposed subdivision development footprint is the focus of this detailed site investigation (DSI) and is referred to herein as “the site”. The total site area is approximately 8 ha (refer Drawing 1, Appendix A).

The vertical extent of the DSI is the maximum extent of bore and test pit construction, being 1.2 m below ground level (bgl).

(5) Develop the Analytical Approach (or decision rule)

The field and analytical information obtained during the DSI was used to characterise the site in terms of contamination issues and risk to human health and/or the environment. The decision rules used in characterising the site were as follows:

- Laboratory test results for soil samples were assessed both individually and as a data set through statistics;
- The adopted SAC were the NSW Environment Protection Authority (EPA) endorsed criteria adopted from NEPC (2013) and relevant CRC CARE technical reports;

Field and laboratory test results were considered useable for the assessment after evaluation against the following data quality indicators (DQIs):

- Precision – a measure of variability or reproducibility of data;
- Accuracy – a measure of closeness of the data to the ‘true’ value;
- Representativeness – the confidence (qualitative) of data representativeness of media present on site;
- Completeness – a measure of the amount of usable data from a data collection activity; and

- Comparability – the confidence (qualitative) that data may be considered to be equivalent for each sampling and analytical event.

The specific limits (their acceptable range, where applicable) are outlined in the data QA/QC procedures and results (Appendix F).

(6) Specify the Performance or Acceptable Criteria

Decision errors for the respective COPC for fill/soil at the target locations are:

1. Deciding that the fill/soil concentrations exceed the SAC when they truly do not; and
2. Deciding that the fill/soil concentrations are within the SAC when they are truly not.

Decision errors were minimised and measured by the following:

- Sample collection and handling techniques were in accordance with DP's Field Procedures Manual;
- Samples were prepared and analysed by a NATA-accredited laboratory with the acceptance limits for laboratory QA/QC parameters based on the laboratory reported acceptance limits and those stated in NEPC (2013);
- The analyte selection was based on the available site history, past site activities, site features and the findings of the PSI reported in DP (2013). The potential for contaminants other than those proposed to be analysed is considered to be low;
- The SAC were adopted from established and NSW EPA endorsed guidelines. The SAC have risk probabilities already incorporated; and
- Only NATA accredited laboratories using NATA endorsed methods were used to perform laboratory analysis. Where NATA endorsed methods are not used, the reasons are stated. The effect of using non-NATA methods on the decision making process are explained.

(7) Optimise the design for obtaining data

Sampling design and procedures that were implemented to optimise data collection for achieving the DQOs included the following:

- Only NATA accredited laboratories using NATA endorsed methods were used to perform laboratory analysis*;*
- Systematic soil sampling was adopted, in a grid based pattern spaced across the site. The spread is considered to provide reasonable representation of the site conditions;
- To optimise the selection of soil samples for chemical analysis, all samples collected were screened using a calibrated photo-ionisation detector (PID) allowing for site assessment and sample selection. In addition, additional soil samples were collected but kept 'on hold' pending details of initial analysis and will be analysed if further delineation is required and;
- An adequately experienced environmental scientist was chosen to conduct field work and sample analysis interpretation.

Appendix E

Data Quality Indicators

Data Quality Indicators (DQIs)

Field and laboratory procedures were assessed against the following data quality indicators (DQIs):

- Completeness – a measure of the amount of usable data from a data collection activity;
- Comparability – the confidence (qualitative) that data may be considered to be equivalent for each sampling and analytical event;
- Representativeness – the confidence (qualitative) of data representativeness of media present on-site;
- Precision – a measure of variability or reproducibility of data; and
- Accuracy – a measure of closeness of the data to the 'true' value.

The DQIs were assessed as outlined in the following table.

DQI	Considerations as specified in NEPM Schedule B2	Comment
Completeness		
Field Considerations	All critical locations sampled	No significant point source contamination identified by the desktop study and site inspection. Sampling was therefore systematic across accessible areas of the site. Some sampling locations targeted the general area of former site structures.
	All samples collected (from grid and at depth)	Grid based soil sampling has been used to provide coverage of the site.
	Standard operating practices (SOPs) appropriate and complied with.	Field staff followed SOPs as defined in the DP *Field Procedures Manual.*
	Experienced sampler	DP Environmental Scientist with > *2.5* years experience led the field team and carried out the sampling.
	Documentation correct	Field staff followed SOPs as defined in the DP *Field Procedures Manual.* Documentation reviewed and signed off by project *Senior Associate.*
Laboratory Considerations	All critical samples analysed according to the proposal and AEC identified in the desktop study sampled.	The AEC identified by DP's previous phase 1 assessment included filling and surface soils, samples of which were selected for analysis.

DQI	Considerations as specified in NEPM Schedule B2	Comment
	All analytes analysed according to the proposal and AEC identified in the desktop study sampled.	All analytes analysed according to the proposal and AEC identified in DPs previous desktop study sampled. Any variation has been recorded in the report.
	Appropriate methods and PQLs/LOR	NATA approved methods have been adopted. Limits of reporting (LORs) and practical quantitation limits (PQLs) in accordance with the method have been used by the contract laboratories. The implications of any raised LOR or PQL have been discussed in the QA/QC in Appendix F of the report.
	Sample Documentation complete	Chain-of-custody (CoC) maintained and appended to the Certificates of Analysis(s). All Certificates of Analysis are complete and appended to the report.
	Sample holding times complied with	Sample holding times complied with the NATA accredited laboratories.
Comparability		
Field Considerations	Same SOPs used on each occasion	Field staff followed SOPs for each day of sampling as defined in the DP *Field procedures Manual*
	Experienced sampler	DP environmental scientist with > *2.5 years'* experience led the field team
	Climatic conditions *(temperature, rainfall, wind…)*	Climatic conditions on both days of sampling were similar and samples were collect from the subsurface.
	Same types of samples collected *(filtered, size fractions...)*	Field staff followed SOPs as defined in the *DP Field Procedures Manual* and sampling regime defined in the proposal.
Laboratory Considerations	Sample analytical methods used	Laboratories used are accredited by NATA for the analyses undertaken. Laboratory methods are as stated on the Certificates of Analysis

DQI	Considerations as specified in NEPM Schedule B2	Comment
	Sample PQLs / LORs	PQL or LOR set by the laboratories are below the adopted site criteria or indicate across-the-board lack of detection. Where this is not achieved the implications of this are explained in the report in the QA/QC Appendix F.
	Same laboratories	Envirolab Services Pty Ltd was used for primary sample analysis. Eurofins Pty Ltd was used for inter-laboratory duplicate sample analysis.
	Same units	All laboratory results are expressed in consistent units for each media type.
Representativeness		
Field Considerations	Appropriate media sampled according to the proposal and AEC identified in the desktop study	Appropriate media were sampled in accordance with the proposal and AEC identified in DPs previous desktop study.
	All media identified in *proposal and AEC* identified in the desktop study sampled	All media identified in proposal and AEC identified in in DPs previous desktop study.
Laboratory Considerations	All samples analysed according to SAQP	All samples analysed according to the proposal and AEC identified in DPs previous desktop study.
Precision		
Field Considerations	SOPs appropriate and complied with	Field staff followed SOPs as defined in the DP *Field procedures Manual*.
Laboratory Considerations	Analysis of: 1) laboratory and inter-laboratory duplicates 2) field duplicates	Envirolab Services and Eurofins Pty Ltd Laboratory acceptance limits are: 1) Average relative percentage difference (RPD) result <10 times PQL/LOR, no limit; results >10 times PQL/LOR, 0% -50% 2) Average relative percentage difference (RPD) result <10 times PQL/LOR, no limit; results >10 times PQL/LOR, 0% -50%

DQI	Considerations as specified in NEPM Schedule B2	Comment
	3) laboratory-prepared volatile trip spikes	3) Recovery of 70-130%
Accuracy (bias)		
Field Considerations	SOPs Appropriate and complied with	Field staff followed SOPs as defined in the DP *Field procedures Manual.*
Laboratory Considerations	Analysis of: 1) field blanks 2) rinsate blank 3) reagent blank/method blank 4) matrix spike 5) surrogate spike 6) reference material 7) laboratory control sample 8) laboratory-prepared spikes	Envirolab Services Laboratory and Eurofins Pty Ltd acceptance limits are: 1) Concentrations of analytes *are <PQL/LOR* 2) Concentrations of analytes *are <PQL/LOR* 3) Results are within acceptance limits as specified by the laboratory (*recovery usually within 60-140%)*. 4) Results are within acceptance limits as specified by the laboratory (*recovery within 70-130% for inorganics and 60-140% for organics)*. 5) Results are within acceptance limits as specified by the laboratory (*recovery within 70-130% for inorganics and 60-140% for organics)*. 6) Analysis within the acceptable limits of the Certificate of Analysis for the reference material. These results are generally not contained in the Certificate of Analysis. 7) Results are within acceptance limits as specified by the laboratory (*recovery within 70-130% for inorganics and 60-140% for organics)*. 8) Results are within acceptance limits as

DQI	Considerations as specified in NEPM Schedule B2	Comment
		specified by the laboratory (*recovery within 60-140%*). Discussions of the results outside the targets are included in Appendix F of the report.

Appendix F

Quality Assurance and Quality Control Procedures

QA/QC PROCEDURES AND RESULTS

Q1. 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.

Q1.1 Sampling Team

Field sampling was undertaken by DP Environmental Scientist Matthew West. Site works were undertaken between 27 and 28 May 2014. Sampling was typically undertaken during fine weather conditions. All members of the team were instructed by the Project Manager regarding the sampling processes to be adopted.

Q1.2 Sample Collection

Soil samples obtained from bores were collected from auger returns from a hand auger, samples from test pits were obtain directly from the excavator bucket. Further details of the drilling and sampling methodology is presented in Sections 7.3 and 7.7 of the report. The QA/QC samples collected during the course of soil sampling comprised the following:

- Collection of a minimum of one inter-laboratory replicate and one intra-laboratory replicate everyday of sampling for QA/QC purposes;
- Collection of a minimum one trip spike and one trip blank per day of sampling.

Q1.3 Logs and Field Sheets

Details 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, replicate locations, replicate type, site observations. Analysis to be performed on each sample and the dispatch courier were recorded on the COC, Appendix C.

Q1.4 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 certificates of analysis.

Q1.5 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 split to prevent the loss of volatiles from the soil but not homogenised in a bowl. Replicate samples were labelled with a DP identification number, recorded on DP's field logs, so as to conceal their relationship to their primary sample from the analytical laboratory.

Q1.6 Replicate Frequency

Field sampling included collection of replicate samples (including inter- and intra-laboratory replicates) for QA/QC purposes.

Q1.7 Field Blank

A field blank is a sample taken as an indication to demonstrate correct field handling. Field blank samples were collected at least once per day during soil sampling.

Q1.8 Trip Spike

In accordance with the *NSW EPA Guidelines for Consultants Reporting on Contaminated Sites (2011)*, laboratory prepared trip spike results for volatile analytes are included in this report. The purpose of a trip spike is to assess the potential loss of volatile analytes that may have occurred between the time of collection and transfer of the sample to the laboratory. For the current investigation, a trip spike was taken into the field on each day of sampling with BTEX being the volatile assessed.

For soils, laboratory preparation of the trip spike involved putting 1mL of BTEX (using a 1500ppm BTEX trip spike standard) into two jars which are cross referenced and labelled 'trip spike' and 'control'. Both jars were sealed with electrical tape. The trip spike was taken onto site and subject to the same jar storage and transfer as the field samples. The control stayed refrigerated in the laboratory. Following receipt of the trip spike and field samples, the trip spike and corresponding control are both analysed with results of the trip spike being expressed as the % difference from the control sample.

The acceptance limit for trip spikes is 60-140% in difference compared to the control or standard.

A trip spike was taken into the field on every soil sampling day and dispatched with the batch sampling run.

Q1.9 Relative Percentage Difference

A measure of the consistency of results for field samples is derived by the calculation of relative percentage differences (RPDs) for replicate 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 five times the PQL. High RPDs (if applicable) are shown in **bold and shaded** on the relevant tables below.

Replicate samples were collected at a rate of approximately one replicate sample for every 14 original samples collected. A total of 56 primary soil samples were analysed to 2 intra-laboratory soil samples (~3.6%) and 2 inter-laboratory replicate sample (~3.6%). Therefore a ~7.2% replicate sampling density was achieve, which is deemed appropriate due to the high volume of sampling and observed consistency of the material across the site.

Q1.9.1 Intra-Laboratory Analysis

Intra-laboratory replicates were analysed as an internal check of the reproducibility within the primary laboratory (Envirolab Pty Ltd) and as a measure of consistency of sampling techniques.

The comparative results of analysis between original and replicate samples are summarised in Table Q1.

Table Q1: Intra-laboratory Results – Soils (mg/kg)

Analyte	BH33 0.0-0.2	BD1A/27514	Difference	RPD
arsenic (As)	9	10	1	11
cadmium (Cd)	<0.4	<0.4	0	0
chromium (Cr)	30	38	8	24
copper (Cu)	21	17	4	21
lead (Pb)	16	23	7	**36**
mercury (Hg)	<0.1	<0.1	0	0
nickel (Ni)	4	5	1	22
zinc (Zn)	10	14	4	**33**
BTEX	<PQL	<PQL	0	0
TRH	<PQL	<PQL	0	0
Analyte	**TP32 0.0-0.2**	**BD1A/28514**	**Difference**	**RPD**
arsenic (As)	10	20	10	**67**
cadmium (Cd)	<0.4	<0.4	0	0
chromium (Cr)	29	41	12	**34**
copper (Cu)	40	14	26	**96**
lead (Pb)	16	20	4	22
mercury (Hg)	<0.1	<0.1	0	0
nickel (Ni)	5	7	2	**33**
zinc (Zn)	17	15	2	13
BTEX	<PQL	<PQL	0	0
TRH	<PQL	<PQL	0	0

The calculated RPD values were within the acceptable range of ± 30 for inorganic analytes and± 50% for organics with the exception of those shaded and in bold. However, this is not considered to be significant because:

- The typically low actual differences in the concentrations of the replicate pairs where some RPD exceedances occurred, particularly for groundwater;
- A number of replicate pairs being collected from topsoils which by its nature is heterogeneous;
- Replicates, rather than homogenised replicates were used to avoid volatile loss, hence greater variability can be expected;
- The majority of RPDs within a replicate pair being within the acceptable limits; and
- All other QA/QC parameters met the DQIs.

Q1.9.2 Inter-Laboratory Analysis

Inter-laboratory replicates were conducted as a check of the reproducibility of results between the primary laboratory Envirolab Service Pty Ltd and the secondary laboratory Eurofins Pty Ltd and as a measure of consistency of sampling techniques.

The comparative results of analysis between original and inter-laboratory replicate samples are summarised in Table Q2.

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.

Table Q2: Inter-laboratory Results – Soils (mg/kg)

Analyte	BH33 0.0-0.2	BD1B/27514	Difference	RPD
arsenic (As)	9	8.2	0.8	9
cadmium (Cd)	<0.4	0.6	0	0
chromium (Cr)	30	34	4	13
copper (Cu)	21	17	4	21
lead (Pb)	16	17	1	6
mercury (Hg)	<0.1	<0.05	0	0
nickel (Ni)	4	<5	0	0
zinc (Zn)	10	9.5	0.5	5
BTEX	<PQL	<PQL	0	0
TRH	<PQL	<PQL	0	0
Analyte	**TP32 0.0-0.2**	**BD1B/28514**	**Difference**	**RPD**
arsenic (As)	10	9.8	0.2	2
cadmium (Cd)	<0.4	0.6	0	0
chromium (Cr)	29	32	4	10
copper (Cu)	40	16	24	**86**
lead (Pb)	16	17	1	6
mercury (Hg)	<0.1	<0.05	0	0
nickel (Ni)	5	6.1	1.1	20
zinc (Zn)	17	11	6	**43**
BTEX	<PQL	<PQL	0	0
TRH	<PQL	<PQL	0	0

The calculated RPD values were within the acceptable range of ± 30 for inorganic analytes (± 50% for organic) with the exception of those shaded and in bold. However, this is not considered to be significant because:

- 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 topsoils soils which by its nature is heterogeneous;
- Replicates, rather than homogenised replicates 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 DQIs.

Q1.10 Field Blanks

Laboratory prepared soil and groundwater field blanks were taken out to the field unopened on each day of sampling, subjected to the same preservation methods as the field samples, then analysed for the purposes of determining whether transfer of contaminants into the blank sample had occurred prior to reaching the laboratory. If this is confirmed then there is also a potential for other samples in the batch to have been impacted. The result of the laboratory analysis for the field blanks is shown in Table Q3. A total of two soil blank were analysed over the course of the investigation.

Table Q3: Trip Blank Results - Soils (mg/kg)

Sample ID	Benzene	Toluene	Ethylbenzene	M + P Xylene	O Xylene
TB/27514	<0.2	<0.5	<1	<3	<0.2
TB/28514	<0.2	<0.5	<1	<3	<0.2

Levels of analytes were all below detection limits indicating that the potential that significant cross contamination had not occurred during the course of the round trip from the site to the laboratory.

Q1.11 Trip Spikes

A trip spike was taken into the field on each day of sampling and dispatched with the batch sampling run. Results Table Q4 indicate that the percentage loss for BTEX during the trip was minimal and therefore appropriate preservation techniques were employed. The results of the laboratory analysis for the trip spikes are shown in Tables Q4. A total of two soil spikes were analysed over the course of the investigation.

Table Q4: Trip Spike Results – Soils (% Recovery)

Sample ID	Benzene	Toluene	Ethylbenzene	M + P Xylene	O Xylene
TS/27514	99%	101%	103%	103%	104%
TS/28514	106%	107%	105%	105%	105%

Results indicate that the percentage loss for BTEX during the trip was minimal and therefore appropriate preservation techniques were employed.

Q2. LABORATORY QUALITY ASSURANCE AND QUALITY CONTROL

Q2.1 Chain of Custody

Chain-of-custody procedures are discussed in Section Q1.5.

Q2.2 Holding Times

A review of the laboratory certificates of analysis and chain-of-custody documentation indicated that holding times were met, as summarised in Table Q5.

Table Q5: Holding Times

Matrix	Analyte	Recommended maximum holding time	Holding time met
Soil	Heavy Metals: As, Cd, Cr, Cu, Pb, Hg, Ni, Zn	6 months	Yes
	TRH C_6-C_9	14 days	Yes
	TRH C_{10}-C_{36}	14 days	Yes
	BTEX	14 days	Yes
	PAH	14 days	Yes
	OCP	14 days	Yes
	PCB	14 days	Yes
	Phenols	14 days	Yes
	pH	7 days	Yes
	Asbestos	Nil	Yes

Q2.3 Analytical Laboratories

Samples were submitted to the following laboratories for analysis:

- Primary Laboratory: Envirolab Services Pty Ltd;
- Secondary Laboratory: Eurofins Pty Ltd; and

The laboratories are all NATA accredited for the analysis undertaken. Envirolab Services Pty Ltd is accredited for compliance with ISO/IEC 17025. Envirolab Services Pty Ltd tests comply with NATA and NEPC (2013). In-house procedures are employed by Envirolab Services Pty Ltd in the absence of documented standards.

Eurofins Pty Ltd is NATA accredited and is accredited for compliance with ISO/IEC 17025. Eurofins Pty Ltd in-house laboratory methods are referenced from NEPC, ASTM, modified USEPA/ APHA documents.

It is noted, however, that some of the test methods adopted are not NATA accredited where no NATA accredited method exists, however, the best international practice was adopted in the analytical methods and standard international analytical methods adopted. It is not considered that this will affect the validity of the results for this assessment.

Q2.4 Analytical Methods

The laboratory analytical methods are provided on the laboratory certificates of analysis in Appendix C and summarised below in Table Q6.

Table Q6: Soil Analysis

Analyte	Limit of Reporting (mg/kg)	Limit of Reporting (mg/kg)	Envirolab Services Reference Method	Eurofins Pty Ltd Reference Method
Heavy Metals Cd, Cr, Cu, Pb, Ni, Zn	0.4-4.0	0.4-5	Metals.20 ICP-AES	E022 Acid Extractable metals in Soils
Arsenic (As)	4.0	2	Metals.20 ICP-AES	E022 Acid Extractable metals in Soils
Mercury (Hg)	0.10	0.05	Metals.21 ICP-AAS	E026 Mercury
TPH C_6-C_9	25	20	GC.16	LM-LTM-ORG2010 (2013 NEPM Fractions) E004 Petroleum Hydrocarbons (TPH) (1999 NEPM Fractions)

Analyte	Limit of Reporting (mg/kg)	Limit of Reporting (mg/kg)	Envirolab Services Reference Method	Eurofins Pty Ltd Reference Method
TPH C_{10}-C_{36}	250	50	GC.3	LM-LTM-ORG2010 (2013 NEPM Fractions) E004 Petroleum Hydrocarbons (TPH) (1999 NEPM Fractions)
BTEX	0.5-2	0.1-0.3	GC.14	E029/E016 BTEX
OCP	0.1	-	GC-5	-
PCB	0.1	-	GC-6	-
PAH	0.05-0.1	-	GC.12 subset	-
Phenols	5	-	GC.12	-
Asbestos	qualitative identification	-	NA	-

Q2.5 Results of Laboratory QA/QC Procedures

The following QA/QC procedures were conducted by the laboratories. The results are included in the laboratory certificates of analysis in Appendix C.

Q2.5.1 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 by Envirolab Services Pty Ltd, 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.

The laboratory QC for surrogate spikes was within the acceptance standards.

Q2.5.2 Practical Quantitation Limits - PQLs

The PQL is the lowest quantity of an analyte which can be measured with a high degree of confidence that the analyte is present at or above that concentration. PQLs at different analytical laboratories can differ based on the analytical techniques.

Q2.5.3 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.

The laboratory QC for LCS was within the acceptance standards.

Q2.5.4 Laboratory Replicate 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 replicate samples is: in cases where the level is <5xPQL – any RPD is acceptable; and in cases where the level is >5xPQL – 0-50% RPD is acceptable.

The laboratory QC for laboratory replicate results was within the acceptance standards.

Q2.5.5 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.

The laboratory QC for method blanks was within the acceptance standards.

Q2.5.6 Matrix Spike

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

The laboratory QC for matrix spikes were within the acceptance standards.

Q2.6 Laboratory Comments

The laboratory QC for surrogate spikes, LCS, laboratory replicate results, method blanks and matrix spikes were within the acceptance standards. There were, however a few comments made in the laboratory certificates of analysis which are summarised in Table Q7 below. The results of the review of the laboratory QC by DP is also presented on the table.

Table Q7: Laboratory QA Comments

Laboratory Certificate of Analysis	Laboratory	Laboratory Comment	DP Comment
110679	Envirolab Services Pty Ltd.	Acid Extractable Metals in Soil: The laboratory RPD acceptance criteriae has been exceeded for 110679-1 for Cr, Pb, Zn. Therefore a triplicate result has been issued as laboratory sample number 110679-63.	Likely to be due to the heterogeneous nature of the nature. The triplicate results are similar to the primary results.
110679	Envirolab Services Pty Ltd.	Acid Extractable Metals in Soil: The laboratory RPD acceptance criteria has been exceeded for 110679-51 for Zn. Therefore a triplicate result has been issued as laboratory sample number 110679-64	Likely to be due to the heterogeneous nature of the nature. The triplicate results are similar to the primary results.
110679	Envirolab Services Pty Ltd.	Acid Extractable Metals in Soil: 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.	Likely to be due to the heterogeneous nature of the nature. 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 Q7. 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 replicate 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.