



ENVIRONMENTAL INVESTIGATION SERVICES

REPORT
TO
MERITON APARTMENTS PTY LTD
ON
PRELIMINARY ENVIRONMENTAL SITE
ASSESSMENT
FOR
PROPOSED RESIDENTIAL DEVELOPMENT
AT
132-138 KILLEATON STREET, ST IVES

AUGUST 2010

REF: E23765KHrpt-rev1

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1 INTRODUCTION

Meriton Apartments Pty Ltd commissioned Environmental Investigation Services (EIS), a division of Jeffery & Katauskas Pty Ltd (J&K), to undertake an environmental site assessment to assess the likelihood of contamination of the subsurface soils and groundwater for a proposed residential development at 132-138 Killeaton Street, St Ives.

The site is identified as Lot 2 DP 748682 and at the time of this investigation was occupied by an abandoned monastery and grassed paddocks. The site location is shown on Figure 1 and the investigation was confined to the site boundaries as shown on Figure 2.

The screening was undertaken generally in accordance with an EIS proposal (Ref: EP4956KH) of 8 June 2010, a revised cost estimate of 9 June 2010 and written acceptance from Meriton Apartments Pty Ltd of 9 June 2010.

This report describes the investigation procedures and presents the results of the environmental site assessment, together with comments, discussion and recommendations.

A geotechnical investigation was undertaken previously to the environmental site screening by J&K and the results are presented in a separate report (Ref. 23765Vrpt, dated 16 March 2010).

1.1 Proposed Development Details

The proposed development includes construction of five apartment buildings approximately 5 storeys high and a basement carpark across the majority of the site. The carpark excludes an area around the existing monastery building. EIS understand the monastery is to be restored and used for residential purposes.

2 PREVIOUS ASSESSMENT

Three geotechnical assessments have been previously undertaken at the site (ref: 17065Vrpt (2002), 20607Vrpt (2006) and 23765Vrpt (2010)) that included drilling of fourteen boreholes across the site. The boreholes typically encountered shallow fill (less than 0.8m), overlying silty clay soil which in turn was underlain by shale bedrock. Groundwater was typically encountered at depths of approximately 3.4m to 6.5m.



Groundwater monitoring wells were installed at two locations and standing water levels were measured at approximately 2.6m and 3m 25 days after installation.

The borehole logs and site plan are attached in Appendix D.



3 OBJECTIVES AND SCOPE OF WORK

3.1 Objectives

The primary objectives of the investigation were to:

- Assess the potential risk of significant widespread contamination of the site;
- Assess the soil contamination conditions at the site in relation to the proposed residential land use;
- Undertake a waste classification assessment for off-site disposal of excavated soil associated with the proposed development works; and
- Prepare a report presenting the results of the assessment generally in accordance with the *NSW EPA (now DECCW) Guidelines for Consultants Reporting on Contaminated Sites (1997¹)* and *State Environmental Planning Policy No.55 – Remediation of Land (1998²)*.

3.2 Scope of Work

The scope of work undertaken to achieve the objective included:

1. Review of historical aerial photographs;
2. Review of historical land title records;
3. Search of the NSW DECCW notices for the site under Section 58 of the *Contaminated Land Management Act (1997³)*⁴;
4. Search of the NSW DECCW public register (POEO⁵) for licences, applications or notices for the site;
5. Search of WorkCover databases for licenses to store dangerous goods including underground fuel storage tanks (USTs);
6. Review of Kuring-gai Council historical development applications (DA) and building approvals (BA) records for the site;
7. Review of regional geology and groundwater conditions, including the location of registered groundwater bores and major underground services in the vicinity of the site;
8. Design and implementation of a field sampling program;
9. Laboratory analysis of selected soil samples; and

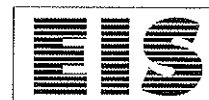
¹ *Guidelines for Consultants Reporting on Contaminated Sites*, NSW EPA (now DECCW), 1997 (Reporting Guidelines 1997)

² *State Environmental Planning Policy No. 55 – Remediation of Land*, NSW Government, 1998 (SEPP55)

³ *Contaminated Land Management Act*, NSW Government Legislation, 1997 (CLM Act 1997)

⁴ <http://www.environment.nsw.gov.au/prclmapp/searchregister.aspx> visited on 2 July 2010

⁵ <http://www.environment.nsw.gov.au/prpoeoapp/searchregister.aspx> visited on 2 July 2010



10. Preparation of a report presenting the results of the assessment together with recommendations and comments on the suitability of the site for the proposed development.

Field work for this investigation, including drilling and soil sampling, was undertaken on 28 June 2010.

4 SITE INFORMATION

4.1 Site Identification

The site identification details are summarised in the following table:

Site Owner:	Dasmin Pty Ltd
Site Address:	132-138 Killeaton Street, St Ives
Lot & Deposited Plan:	Lot 2 DP 748682
Current Land Use:	Rural/Residential
Proposed Land Use:	Residential
Local Government Authority:	Kuring-Gai Council
Site Area:	Approximately 22,500m ²
AHD:	Approximately 160m
Geographical Location (MGA):	N: 6266450 E: 330280 (approximately)
Site Locality Plan:	Refer to Figure 1
Borehole Location Plan:	Refer to Figure 2

4.2 Site Description

The site is located to the south of Killeaton Street, within an undulating regional topographic setting. The site is located approximately at the crest of a hill that falls away towards the east. The site is gently undulating and typically falls to the south-east at approximately 1°.

At the time of the investigation the majority of the site was vacant and grassed and used for livestock (horses) grazing and training. A two storey brick building was located in the east section of the site and appeared to have been abandoned. Windows and doors to the building had been boarded up. EIS understand that the building was formerly a monastery. A partially paved courtyard area was located immediately north of the monastery building. An unpaved driveway extended from the courtyard, along the east boundary of the site, to Killeaton Street. A metal clad stable/shed was located in the south-west corner of the site. The shed appeared to include horse stables and chicken coups. A large stockpile (approximately 15m



diameter, 3m high) was located immediately north-east of the shed and appeared to predominantly consist of demolition rubble, including brick, concrete and tile fragments.

Medium density residential areas that included single and double storey brick houses were located to the north and north-west of the site. Medium density residential premises were located to the east of the site that included apartments and houses. A school was located to the south-west and south of the site. School buildings were located to the south-west and sports facilities, including tennis courts and playing fields, were located to the south.

4.3 Regional Geology

The geological map of Sydney (1983⁶) indicates the site to be near the boundary of areas underlain by Ashfield Shale of the Wianamatta Group, which typically consists of black to dark grey shale and laminite and areas underlain by Hawkesbury Sandstone, which typically consists of medium to coarse grained quartz sandstone with minor shale and laminite lenses.

4.4 Hydrogeology

NSW Office of Water (formerly Department of Water and Energy⁷) records were researched for the investigation and indicated that four registered groundwater bores lie within 1km of the site. The groundwater works summaries and a map indicating the location of the bores in relation to the site are attached in Appendix C. The details are summarised in the following table:

Ref No	Approximate Distance from site (m)	Approximate Direction from site	Gradient from site	Depth (m)	Registered Purpose
GW022928	800	South-west	Up	50.2	Irrigation
GW103894	900	South-west	Up (over crest)	3.5	Monitoring Bore
GW032711	650	West	Up (over crest)	42.6	Irrigation
GW028301	300	North-east	Cross	68.5	Domestic

The stratigraphy of the site is expected to consist of residual clayey soils overlying relatively shallow bedrock. Based on these conditions and the results of the

⁶ 1:100,000 Geological Map of Sydney (Series 9130), Department of Mineral Resources (1983) [now Department of Primary Industries]

⁷ <http://www.waterinfo.nsw.gov.au/gw/> visited on 1 July 2010



groundwater bore search groundwater is not considered to be a significant resource in the immediate area of the site.



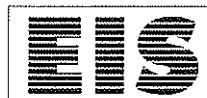
5 SITE HISTORY ASSESSMENT

5.1 Aerial Photographs

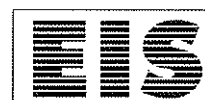
Aerial photographs of the site taken in 1930, 1951, 1961, 1970, 1978, 1986, 1994 and 2002 were obtained from the Department of Lands and were reviewed as part of the assessment of the site history. EIS has also reviewed the 1943 historical aerial photograph available for the site on the NSW Department of Lands SIX Viewer⁸. The information obtained from the photographs are summarised in the following table:

Year	Details
1930	The site appeared to be vacant and grassed except for a small shed in the south-west corner. The site appeared to be occupied by grazing or agricultural land. Killeaton Street was located to the north of the site and appeared unpaved. Vacant, grassed areas, similar to the site, were located to the east, west and south of the site. A narrow, unpaved track/drive was located to the east of the site and appeared to be Yarrabung Road. Bushland was located to the south-west of the site. Market gardens/orchards were located to the north of Killeaton Street and included some small rural buildings.
1943	A 'U' shaped building (open to the west) was located in the east section of the site. The north section of the building appeared similar to the existing (2010) monastery building. A small extension was located off the south-west corner of the building. A paved courtyard with oval shaped gardens was located immediately north of the building. A driveway extended along the east boundary of the site from Killeaton Street to south of the monastery building. Trees lined the west boundary along the extent of the driveway. A square, grassed area was located immediately north of the courtyard. Trees extended along all boundaries of the square area. A small building was located in the south section of the site. A small shed was located in the south-west corner of the site that appeared similar to the existing (2010) shed/stable. The immediate surrounds appeared similar to the 1930 photograph, except that Killeaton Street appeared paved and the market gardens located to the north of Killeaton Street had been replaced by vacant, grassed areas.
1951	The site appeared similar to the 1943 photograph, except for some trees located in the north-west section and a paved area located south of the monastery building adjacent to the east boundary.

⁸ <https://six.maps.nsw.gov.au/wps/portal/SIXViewer>



	Some development had been undertaken to the south-west of the site.
1961	The site appeared similar to the 1951 photograph, except that a driveway extended from south of the monastery to the shed in the south-west corner of the site. Long, narrow buildings were located to the south-west of the site. Medium density residential development had been undertaken to the north of Killeaton Street and east of Yarrabung Road.
1970	A medium sized building was located immediately west of the monastery building. Some small buildings/shed were located immediately south-west of the monastery building. A medium sized building was located to the south of the monastery building, immediately west of the paved area. The driveway to the shed/stable in the south-west corner had been removed/become overgrown. Trees lined the north and north-west boundaries of the site. College Crescent had been constructed to the east of the site. Medium density residential development had been undertaken to the east of College Crescent. Some medium density residential development had been undertaken to the north-west of the site. A vacant, grassed area was located to the south of the site.
1978	The site and immediate surrounding areas appeared similar to the 1970 photograph, except that some residential development had been undertaken to the east of the site and north of College Crescent and the vacant, grassed area to the south of the site was occupied by a playing field with cricket pitch.
1986	The site appeared similar to the 1978 photograph, except that the buildings at the south boundary had been demolished. Several medium sized buildings were located to the south-west of the site that appeared similar to the existing (2010) school buildings. Link Road had been constructed to the south-west of the site, beyond the school. Residential development had been undertaken to the east of the site that appeared similar to the existing (2010) residential area.
1994	The site appeared similar to the 1986 photograph. Additional buildings were located to the south-west of the site that appeared similar to the existing (2010) school buildings. Additional medium density residential development had been undertaken to the north-west of the site.
2002	The site and immediate surrounding areas appeared similar to the 1994 photograph, except that tennis courts were located immediately south of the site.
2005	The monastery building had been partially demolished. The east and south sections had been demolished and only the north section remained. All other buildings on the site had been demolished, except the shed/stable in the



	south-west corner. A disturbed area was located to the north-east of the shed/stable and was likely to have been the existing (2010) stockpile. Trees in the north-west section of the site had been cleared. The surrounds appeared similar to the 2002 photograph.
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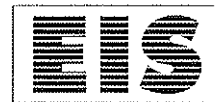
5.2 Land Title Search

A limited historical land title search was performed on our behalf by Advanced Legal Search Pty Ltd. Copies of the title records are presented in Appendix C and a summary of the relevant information is provided in the following table:

Registration Date	Proprietor
Part Portion 406 Parish Gordon	
1878 – 1902	Richard Nancarrow, stonemason
1902 – 1912	Maria Nancarrow, widow
1912 – 1927	Richard Edward Nancarrow, clerk
1927 – 1936	Perpetual Trustee Company (Limited)
1936 – 1944	Raymond Ouvrier Alphonus Foley, clerk in the holy orders Albert Spratt, clerk in the holy orders
1944 – 1965	Trustees of the Passionist Fathers
Lot 4 DP 225410	
1965 – 1966	Trustees of the Passionist Fathers
Lot 31 DP 230508	
1966 – 1968	Trustees of the Passionist Fathers
Lot 311 DP 235715	
1968 – 1969	Trustees of the Passionist Fathers
Lot 1 DP 535149	
1969 – 1972	Trustees of the Passionist Fathers
Lot 2 DP 551851	
1972 – 1980	Trustees of the Passionist Fathers
Lot 1 DP 609871	
1980 – 1987	Trustees of the Passionist Fathers
Lot 2 DP 748682	
1987 – 2003	Trustees of the Passionist Fathers
2003 – Todate	Dasmin Pty Limited

The land search has not indicated any particular land use that may be considered to have resulted in significant contamination of the soil and groundwater at the site.

The search indicated that the site is likely to have been occupied by the monastery and associated buildings and facilities since approximately 1936.



5.3 Council Records

A search of Development Application (DA) and Building Approval (BA) records held by Ku-Ring-Gai Council was undertaken by EIS. Copies of the documents are presented in Appendix C. The records included applications in 2001 to demolish existing buildings and applications in 2006-2010 to construct apartment buildings and re-use the former monastery building for 3 dwellings, a site office and gymnasium.

The council records search has not indicated any particular site use or development that may be considered to have resulted in significant contamination of the soil and groundwater at the site. The search indicated that the buildings at the site were demolished between 2001 and 2006.

5.4 WorkCover Database Records

A records search for licenses to store dangerous goods was undertaken on our behalf by WorkCover. The records did not indicate the existence of any licences, including underground storage tanks, at this site.

5.5 NSW DECCW Records

A search of the NSW DECCW (EPA) on-line database did not indicate the existence of any EPA notices for the site under section 58 of the CLM Act 1997. A search of the NSW DECCW public register (POEO) did not indicate the existence of any EPA notices, applications and licenses for the site.

5.6 Assessment of Historical Information Integrity

The site history assessment has generally been obtained from: government records including the NSW land titles office, local government historical archives, historical aerial photographs and NSW WorkCover records. The veracity of the information from these sources is considered to be high, however, given the age of the development, the gap of up to 13 years between aerial photographs and the lack of information available on activities prior to 1930's, a certain degree of information loss is to be expected.

Non verifiable anecdotal information has not been relied upon during assessment of historical site use. Therefore, there is considered to be a high level of integrity associated with information obtained with respect to historical use of the site.



5.7 Summary of Historical Site Use

The search of historical information has indicated the following:

- The site was vacant in 1930;
- The site was occupied by a monastery from approximately the mid 1930's until at least 2002;
- Buildings in the south section of the site were demolished between 1978 and 1986;
- Buildings to the south and west of the remaining section of the former monastery building were demolished between 2002 and 2005 (likely 2003, associated with change of ownership);
- The site has likely been used for livestock (horses) grazing and training since at least 2005;
- There are no recorded notices listed on the NSW DECCW CLM or POEO register; and
- WorkCover have no records of underground storage tank licenses issued for the site.



6 POTENTIAL CONTAMINATION SOURCES

6.1 Potential Site Specific Contamination

Potential contamination at the site would be anticipated to be associated with:

- Potentially contaminated, imported fill material;
- Potential asbestos contamination associated with demolition of the former site buildings/sheds; and
- Historical activities such as use of pesticides.

6.1.1 Site Specific Soil Contaminants of Concern

The compounds identified as soil contaminants of concern at the site include:

- Heavy metals: arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc;
- Total petroleum hydrocarbons (TPH);
- Monocyclic aromatic hydrocarbon compounds: benzene, toluene, ethyl benzene and xylenes (BTEX);
- Polycyclic aromatic hydrocarbons (PAHs) including benzo(a)pyrene;
- Organochlorine pesticides (OCPs) including Aldrin, dieldrin, chlordane, DDT, DDD, DDE and heptachlor;
- Organophosphorus pesticides (OPPs);
- Polychlorinated Biphenyls (PCBs); and
- Asbestos.

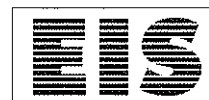
6.2 Potential Receptors

The main potential contamination receptors are considered to include:

- A tributary to Middle Harbour located approximately 750m to the east of the site;
- Site visitors, workers and adjacent property owners, who may come into contact with contaminated soil and/or be exposed to contaminated dust arising from construction activity; and
- Future site occupants.

6.3 Contaminant Laydown and Transport Mechanisms

At this site, mobile contaminants would be expected to move down to the rock surface and migrate laterally down-slope from the source. The movement of contaminants would be expected to be associated with groundwater flow and seepage at the top of the bedrock.



7 ASSESSMENT CRITERIA DEVELOPMENT

7.1 Regulatory Background

In 1997 the NSW Government introduced the CLM Act. This Act has recently been amended by the *Contaminated Land Management Amendment Act* (2008⁹).

The CLM Act 1997, associated regulations, SEPP55 and NSW DECCW (EPA) guidelines, were designed to provide uniform state-wide control of the management, investigation and remediation of contaminated land.

Prior to granting consent for any proposed rezoning or development, SEPP55 requires the consent authority to:

- Consider whether the land is contaminated;
- Consider whether the site is suitable, or if contaminated, can be made suitable by remediation, for the proposed land use; and
- Be satisfied that remediation works will be undertaken prior to use of the site for the proposed use.

Should the assessment indicate that the site poses a risk to human health or the environment, remediation of the site may be required prior to occupation of the proposed development. SEPP55 requires that the relevant local council be notified of all remediation works, whether or not development consent is required. Where development consent is not required, 30 days written notice of the proposed works must be provided to council. Details of validation of remediation work must also be submitted to Council within one month of completion of remediation works.

The consent authority may request that a site audit be undertaken during, or following the completion of the site assessment process. Under the terms of the CLM Act 1997 the NSW DECCW (EPA) Site Auditor Scheme was developed to provide a system of independent review for assessment reports. An accredited Contaminated Site Auditor is engaged to review reports prepared by suitably qualified consultants to ensure that the investigation has been undertaken in accordance with the guidelines and confirm that the sites are suitable for their intended use.

Section 59(2) of the CLM Act 1997 states that specific notation relating to contaminated land issues must be included on Section 149 (s149) planning certificates prepared by Council where the land to which the certificate relates is:

⁹ *Contaminated Land Management Amendment Act*, NSW Government Legislation, 2008 (CLM Amendment Act 2008)



- Within an investigation or remediation area;
- Subject to an investigation or remediation order by the DECCW (EPA);
- The subject of a voluntary investigation or remediation proposal; and/or
- The subject of a site audit statement.

Submission of contaminated site investigation and validation reports to council as part of rezoning or development application submissions may also result in notation of actual or potential site contamination on future s149 certificates prepared for the site.

Section 60 of the CLM Amendment Act 2008 sets out a positive duty on a land owner, or person whose activities have caused contamination, to notify the DECCW if they are or become aware that contamination exists on a site that generally poses "*an unacceptable risk to human health or the environment, given the site's current or approved use*". This duty to report is based on trigger values, above which notification is required.

Off-site disposal of fill, contaminated material and excess soil/rock excavated as part of the proposed development works is regulated by the provisions of the *Protection of the Environment Operations Act* (1997¹⁰) and associated regulations and guidelines including the *NSW DECC (now DECCW) Waste Classification Guidelines - Part 1: Classifying Waste* (2009¹¹). All materials should be classified in accordance with these guidelines prior to disposal.

Section 143 of the POEO Act 1997 states that if waste is transported to a place that cannot lawfully be used as a waste facility for that waste, then the transporter and owner of the waste are each guilty of an offence. The transporter and owner of the waste have a duty to ensure that the waste is disposed of in an appropriate manner.

7.2 Soil Contaminant Threshold Concentrations

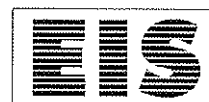
The soil investigation levels adopted for this investigation are derived from the NSW DEC (now DECCW) document *Guidelines for the NSW Site Auditor Scheme, 2nd Edition* (2006¹²) and the National Environmental Protection Council document *National Environmental Protection (Assessment of Site Contamination) Measure* (1999¹³). The contaminant thresholds listed below are levels at which further investigation and

¹⁰ *Protection of Environment Operations Act*, NSW Government, 1997 (POEO Act 1997)

¹¹ *Waste Classification Guidelines, Part 1: Classifying Waste*, NSW DECC, 2009 (Waste Classification Guidelines 2009)

¹² *Guidelines for the NSW Site Auditor Scheme, 2nd ed.*, NSW DEC, 2006 (Site Auditor Guidelines 2006)

¹³ *National Environmental Protection (Assessment of Site Contamination) Measure*, National Environment Protection Council (NEPC), 1999 (NEPM 1999)



evaluation is required to assess whether the site is considered suitable for the proposed urban land use.

To accommodate the range of human and ecological exposure settings, a number of generic settings are used on which the Health based Investigation Levels (HILs) can be based. Four categories of HILs are adopted for urban site assessments. Contaminant levels for a standard residential site with gardens and accessible soil (Column A in Table A-1) are based on protection of a young child resident at the site. The remaining categories (Columns D to F) present alternative exposure settings where there is reduced access to soil or reduced exposure time. These categories include residential land use with limited soil access, recreational and public open space and commercial/industrial use. Where the proposed land use will include more than one land use category (eg. mixed residential/commercial development) the exposure setting of the most "sensitive" land use is adopted for the site.

Threshold concentrations for petroleum hydrocarbon contaminants including total TPH and BTEX compounds have previously been established in the *NSW EPA (now DECCW) Contaminated Sites: Guidelines for Assessing Service Station Sites* (1994¹⁴) publication and this document is referenced in the Site Auditor Guidelines 2006. Heavy fraction petroleum hydrocarbon aliphatic/aromatic component threshold concentrations have also been introduced in NEPM 1999.

7.2.1 Provisional Phyto-toxicity Investigation Levels (PPILs)

The Provisional Phyto-toxicity Investigation Levels (PPILs) are generic values based on phytotoxicity data for plant response to specific contaminants in a sandy loam matrix and are included in the contaminated site assessment where the proposed land use includes gardens or accessible soils. The PPILs are listed in the Site Auditor Guidelines 2006. The PPILs are identical to the Ecological Investigation Levels (EILs) originally specified in NEPM 1999.

7.2.2 Asbestos

NEPM 1999 does not provide numeric guidelines for the assessment of asbestos in soil. NSW DECCW (EPA) advice (2006) has indicated that consultants should use their 'professional judgement' regarding determination of appropriate investigation and remediation levels for asbestos in soils; however the NSW DECCW (EPA) have not published numerical guidelines for the assessment of asbestos in subsurface soils.

¹⁴ *Guidelines for Assessing Service Station Sites*, NSW EPA, 1994 (Service Station Guidelines 1994)



The WorkCover publication *Working with Asbestos Guide* (2008¹⁵) states that, where buried asbestos is encountered, "A competent occupational hygienist should assess the site to determine:

- If asbestos material is bonded or friable
- The extent of asbestos contamination
- Safe work procedures for the remediation of the site"

"Any asbestos cement products that have been subjected to weathering, or damaged by hail, fire or water blasting are considered to be friable asbestos and an asbestos removal contractor with a WorkCover license for friable asbestos removal is required for its removal". Under the *NSW Occupational Health and Safety (OHS) Regulations 2001*¹⁶ and WorkCover requirements all necessary disturbance works associated with asbestos containing materials must be conducted by a licensed AS-1 Asbestos Removal Contractor.

7.2.3 Site Assessment Criteria for Soil Contaminants

The 'residential' (Column A) exposure setting has been adopted for this assessment and the appropriate soil criteria are listed in the following table:

¹⁵ *Working with Asbestos Guide*, NSW WorkCover, 2008 (WorkCover Working with Asbestos Guide 2008)

¹⁶ *Occupational Health and Safety Regulation*, NSW Government, 2001 (NSW OH&S Regulation 2001)



Soil Assessment Criteria (mg/kg)			
Contaminant	Health Investigation Levels (HILs) Column A	Guidelines for Assessing Service Station Sites (1994)	Phyto-toxicity Investigation Levels (PPILs)
Inorganics			
Arsenic (total)	100	-	20
Cadmium	20	-	3
Chromium (III)	12%	-	400
Copper	1000	-	100
Lead	300	-	600
Mercury (inorganic)	15	-	1
Nickel	600	-	60
Zinc	7000	-	200
Organic Contaminants			
TPH (C ₆ -C ₉)	-	65	-
TPH (C ₁₀ -C ₃₆)	-	1000	-
Benzene	-	1	-
Toluene	-	1.4	-
Ethylbenzene	-	3.1	-
Total Xylenes	-	14	-
Total PAHs	20	-	-
Benzo(a)pyrene	1	-	-
Aldrin + Dieldrin	10	-	-
Chlordane	50	-	-
DDT + DDD + DDE	200	-	-
Heptachlor	10	-	-
PCBs (Total)	10	-	-
Total OPPs	0.1 *	-	-
NOTE: * In the absence of local guidelines, the laboratory Practical Quantitation Limit (PQL) has been adopted.			

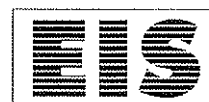
7.2.4 Assessment Criteria for Waste Classification

For the purpose of off-site disposal, the classification of soil into 'General Solid Waste (non-putrescible)', 'Restricted Solid Waste (non-putrescible)' and 'Hazardous Waste (non-putrescible)' categories is defined by chemical contaminant criteria outlined in the Waste Classification Guidelines 2009. The contaminant criteria are summarised in Table A-2.

7.3 Evaluation of Soil Analysis Data and Contaminant Threshold Concentrations

Assessment of the soil analytical data using the soil contaminant threshold concentrations has been undertaken in accordance with the methodology outlined in the NEPM 1999 Schedule 7(a).

The following criteria have been adopted for assessment of the analytical data:



- For a site to be considered suitable for the proposed land use each individual contaminant concentration should be less than the applicable contaminant threshold concentration; and
- Where the concentration of each contaminant is less than the applicable contaminant threshold concentration (site assessment criteria) in all samples, the suitability of the site for the proposed use may be assessed based solely on individual analytical results.

Where contamination results exceed the site criteria developed above a method of remediating the site is to physically and selectively remove the contamination hotspots from the site. This process should be continued until analysis of the data meets the above criteria. Validation of the remediated site is generally required to demonstrate that the site is suitable for the proposed land use.

8 ASSESSMENT PLAN

8.1 Soil Sampling Density

The *NSW EPA (now DECCW) Contaminated Sites Sampling Design Guidelines* (1995¹⁷) for contaminated site investigations state that samples should be obtained from a minimum of 33 evenly spaced sampling points for a site of this size (approximately 22,500m²).

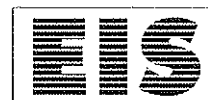
Samples were obtained from 17 sampling locations for this investigation. This density is approximately 52% of the minimum sampling density.

The boreholes were drilled on a systematic sampling plan with a spacing of up to 40m between sampling points. A systematic sampling plan was considered most appropriate for this investigation as:

- no specific potential contaminant sources were identified by the available site history; and
- the distribution of contamination is expected to be associated with imported potentially contaminated fill material and is therefore likely to be random.

Sampling was not undertaken beneath the existing monastery building and stable/shed at the site as access was not possible during the field investigation.

¹⁷ *Contaminated Sites Sampling Design Guidelines*, NSW EPA, 1995 (EPA Sampling Design Guidelines 1995)



8.2 Data Quality Objectives (DQOs)

The DQOs for the assessment were developed with reference to the US EPA document *Data Quality Objectives Process for Hazardous Waste Site Investigations* (2000¹⁸). The document includes seven steps as follows:

1. State the problem
2. Identify the decision
3. Identify inputs into the decision
4. Study Boundaries
5. Develop a Decision Rule
6. Specify Limits on Decision Errors
7. Optimise the Design for Obtaining data

Field investigations are undertaken generally in accordance with EIS sampling protocols outlined in Appendix E.

8.3 Data Quality Indicators (DQIs) and Quality Assurance

The validation, as part of the DQOs, involves the technical review of the data using defined Quality Assurance (QA) Assessment Criteria. The success of the DQIs is based on assessment of the data set as a whole and not on individual acceptance or exceedance within the data set.

Review of QA criteria was based on laboratory data including surrogate recovery, repeat analysis, duplicates, matrix spikes and method blanks.

Field QA/QC included collection and analysis of approximately 12% of field soil samples as intra-laboratory duplicates for the contaminants of concern.

Success of field DQIs is based on the following criteria:

- Relative percentage differences (RPDs) were calculated for the intra-laboratory duplicates. The RPD was calculated as the absolute value of the difference between the initial and repeat result divided by the average value, expressed as a percentage. The following acceptance criteria were used to assess the RPD results:
 - For results that were greater than 10 times the Practical Quantitation Limit (PQL) RPDs less than 50% were considered acceptable.
 - For results that were between 5 and 10 times PQL RPDs less than 75% were considered acceptable.

¹⁸ *Data Quality Objectives Process for Hazardous Waste Site Investigations*, US EPA, 2000 (US EPA 2000)



- For results that were less than 5 times the PQL RPDs less than 100% were considered acceptable.
- Acceptable concentrations in blank samples



9 INVESTIGATION PROCEDURE

9.1 Subsurface Investigation and Soil Sampling Methods

Subsurface investigation was undertaken using a four-wheel-drive (4wd) mounted hydraulically push tube rig. Soil samples were obtained from disposable polyethylene push tube samplers. Details of the decontamination procedure adopted during sampling are presented in Appendix E.

Soil samples were obtained at various depths, based on observations made during the field investigation. During sampling, soil at selected depths was split into initial and duplicate samples for QA/QC assessment.

All samples were placed in glass jars with plastic caps and teflon seals with minimal headspace. Samples for asbestos analysis were placed in zip-lock plastic bags. Sampling personnel used disposable nitrile gloves during sampling activities.

During the investigation, soil samples were preserved by immediate storage in an insulated sample container with ice in accordance with AS 4482.1-2005¹⁹ and AS 4482.2-1999²⁰ as summarised in the following table:

Analyte	Preservation	Storage
Heavy metals	Unpreserved glass jar with Teflon lined lid	Store at <4°, analysis within 28 days (mercury and Cr[VI]) and 180 days (other metals).
VOCs (TPH/BTEX)		Store at <4°, nil headspace, extract within 14 days, analysis within forty days
PAHs, OCP, OPP & PCBs		
Asbestos	Sealed plastic bag	None

The samples were labelled with the job number, sampling location, sampling depth and date. All samples were recorded on the borehole logs presented in Appendix A and on the laboratory chain of custody (COC) record presented in Appendix B.

On completion of the fieldwork, the samples were delivered in the insulated sample container to a NATA registered laboratory for analysis under standard COC procedures. Detailed EIS field sampling protocols are included in Appendix E.

¹⁹ *Guide to the Investigation and Sampling of sites with Potentially Contaminated Soil*, Standards Australia, 2005 (AS 2005)

²⁰ *Guide to the Sampling and Investigation of Potentially Contaminated Soil Part2: Volatile Substances*, Standards Australia, 1999 (AS 1999)



9.2 Photoionisation Detector (PID) Screening

A portable PID was used to screen the samples for the presence of volatile organic compounds (VOCs) and to assist with selection of samples for laboratory hydrocarbon (TPH/BTEX) analysis.

The sensitivity of the PID is dependent on the organic compound and varies for different mixtures of hydrocarbons. Some compounds give relatively high readings and some can be undetectable even though present in identical concentrations. The portable PID is best used semi-quantitatively to compare samples contaminated by the same hydrocarbon source.

The PID is calibrated before use by measurement of an isobutylene standard gas. All the PID measurements are quoted as parts per million (ppm) isobutylene equivalents.

PID screening of detectable volatile organic compounds (VOCs) was undertaken on soil samples using the soil sample headspace method. VOC data was obtained from partly filled zip-lock plastic bags following equilibration of the headspace gases. The PID headspace data is presented on the COC documents. PID calibration certificates are presented in Appendix F.

9.3 Laboratory Analysis - Soil Samples

Analysis of soil samples was undertaken by NATA registered laboratories using analytical methods detailed in the Schedule B(3) NEPM (1999) Guideline on Laboratory Analysis of Potentially Contaminated Soils.

Laboratory analysis was undertaken by Envirolab Services Pty Ltd (NATA Accreditation No. 2901).

For this investigation selected soil samples were analysed for contaminants using the following laboratory techniques:

- Heavy metals – Nitric acid digestion. Analysis by ICP/AES.
- Low level mercury – cold vapour AAS.
- OC and OP pesticides and PCBs – Extracted with dichloromethane/acetone. Analysis by GC/ECD.
- PAHs – Soil extracted with dichloromethane/acetone. Analysis by GC/MS.
- TPH (volatile) – Soil extracted with methanol. Analysis by P&T GC/MS.
- TPH – Soil extracted with dichloromethane/acetone. Analysis by GC/FID.
- BTEX – Soil extracted with methanol. Analysis by P&T GC/MS.



- Asbestos – Polarizing light microscopy.

10 RESULTS OF INVESTIGATION

10.1 Subsurface Conditions

Seventeen boreholes were drilled for this investigation. Site details and borehole locations are shown on Figure 2. For details of the subsurface soil profile reference should be made to the borehole logs in Appendix A. A summary of the subsurface conditions encountered by the boreholes is presented below:

Pavement

Concrete pavers, approximately 100mm thick, were encountered at the surface in BH308.

Fill

Silty clay fill material was encountered at the surface or beneath the pavement in all boreholes and extended to depths of approximately 0.1m to 0.6m. The fill contained inclusions of roots, root fibres, igneous gravel and ash. Traces of demolition rubble such as brick and concrete fragments were encountered in BH313 and BH316.

Natural Soils

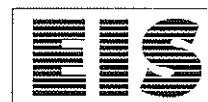
Silty clay was encountered beneath the fill in all boreholes and extended to the termination of all boreholes except BH303, BH304, BH309, BH313 and BH316 at a depth of approximately 1.5m. The silty clay extended to depths of approximately 1.1m to 1.3m in BH303, BH304, BH309, BH313 and BH316. The silty clay was typically grey or brown with red and/or orange mottling and contained traces of ironstone gravel.

Bedrock

Shale bedrock was encountered beneath the silty clay in BH303, BH304, BH309, BH313 and BH316 and extended to the termination of the boreholes at a maximum depth of approximately 1.5m. The shale was typically grey and included ironstone bands.

10.2 Laboratory Results - Soil

The laboratory analysis results for soil samples are summarised in Table B and analysis reports are presented in Appendix B. The site soil assessment criteria for this investigation are specified in Section 6.2.3. Statistical calculations have been



undertaken using ProUCL version 3.0 (USEPA) and the reports are presented in Appendix G. The results of the analyses are summarised below.

Heavy Metals

Seventeen fill, two stockpile and seven natural soil samples were analysed for heavy metals. The arsenic concentration of 250mg/kg in the BH308 (0.5-0.9m) sample exceeded the site assessment criterion of 100mg/kg. The remaining results of the analyses were below the site assessment criteria.

The 99% Upper Confidence Limit (UCL) on the mean value for arsenic was calculated to be 112mg/kg, which exceeds the site assessment criterion.

Dup 4 was a soil duplicate of the BH308 (0.5-0.9m) sample and was analysed for arsenic. The result of 350mg/kg exceeded the site assessment criterion.

The arsenic concentration of 250mg/kg in the BH308 (0.5-0.9m) sample exceeded the CT1 criterion outlined in the Waste Classification Guidelines 2009. The remaining results of the analyses were less than the CT1 criteria and all results were less than the SCC1 criteria outlined in the Waste Classification Guidelines 2009.

A TCLP leachate was prepared from the BH308 (0.5-0.9m) sample and analysed for arsenic. The result indicated arsenic was not leaching at detectable concentrations and was less than the TCLP1 criterion outlined in the Waste Classification Guidelines 2009.

Petroleum Hydrocarbons (TPH) and Monocyclic Aromatic Hydrocarbons (BTEX)

PID soil sample headspace readings were all zero ppm equivalent isobutylene. These results indicate a lack of PID detectable volatile organic contaminants.

Seventeen fill, two stockpile and seven natural soil samples were analysed for petroleum hydrocarbons and BTEX compounds. The results of the analyses were below the site assessment criteria.

The results of all analyses were less than the relevant CT1 and SCC1 criteria outlined in the Waste Classification Guidelines 2009.



Polycyclic Aromatic Hydrocarbons (PAHs)

Seventeen fill, two stockpile and seven natural soil samples were analysed for a range of PAHs including Benzo(a)pyrene. The results of the analyses were less than the site assessment criteria.

The results of all analyses were less than the relevant CT1 and SCC1 criteria outlined in the Waste Classification Guidelines 2009.

Organochlorine (OC) and Organophosphorus (OP) Pesticides and Polychlorinated Biphenyls (PCBs)

Seventeen fill, two stockpile and seven natural soil samples were analysed for a range of OC and OP pesticides and PCBs. The results of the analyses were below the laboratory practical quantitation limit and less than the site assessment criteria.

The results of all analyses were less than the SCC1 criteria outlined in the Waste Classification Guidelines 2009.

Asbestos

Seventeen fill, two stockpile and seven natural soil samples were screened for the presence of asbestos fibres. The results of the analyses indicated that asbestos fibres were not encountered within the samples and no respirable fibres were detected.

10.3 Assessment of Analytical QA/QC

The objective of the assessment of the laboratory QA/QC is to ensure that the sample data is reliable. All laboratory reports for project E23765KH have been checked and issued as final by Envirolab Services Pty Ltd, NATA Accreditation No. 2901, Report numbers: 42791, 42791A and 42791B.

Chain of custody documentation and sample receipt advice notices were signed and dated by Envirolab Services laboratories stating that all samples were received cool, in good order and in suitable containers. Compliance of holding times was met for all analyses undertaken by the above laboratory. EIS and laboratory QA/QC procedures for the site screening are summarised in the following table:



Analyte	QA/QC Procedure						
	Number of Samples	Intra-lab Duplicate	Repeat Analysis	Matrix Spike	LCS	Lab Blank	Surrogate Spike
Heavy metals	26	3	3	2	2	1	-
Arsenic	1	-	-	-	1	1	-
TPH	26	3	3	2	2	1	26
BTEX	26	3	3	2	2	1	26
PAH	26	-	3	2	2	1	26
OCP	26	-	3	2	2	1	26
OPP	26	-	3	2	2	1	26
PCB	26	-	3	2	2	1	26
TCLP Metals	1	-	-	-	1	1	-

Field QA/QC soil samples are specified below:

- Intra-laboratory duplicates
- Dup 1 is a duplicate of the BH301 (0.5-0.9m) sample
 - Dup 2 is a duplicate of the BH306 (0.5-0.9m) sample
 - Dup 3 is a duplicate of the BH303 (0.3-0.7m) sample
 - Dup 4 is a duplicate of the BH308 (0.5-0.9m) sample

The RPD results for the field QA/QC duplicate samples are summarised in Tables C, D and E. The following comments are an overall summary of the quality of the analytical component of the project:

1. Sample integrity and container requirements were documented as satisfactory.
2. All sample extraction analyses were performed within the required holding times.
3. Matrix spike, laboratory control sample (LCS) and surrogate recovery values indicated that the laboratory accuracy was very good, and that no outliers were reported.
4. Laboratory duplicate RPD results indicated that the sample precision was acceptable.
5. All method blanks were found to be free of analyte concentrations above the PQLs.
6. The intra -laboratory RPD values indicated that field precision was acceptable.

The QA/QC data reported by Envirolab Services laboratories for the documented soil samples were assessed to be of sufficient quality to be considered acceptable for the environmental assessment of EIS project E23765KH. The QA/QC data including the RPD results are considered to meet the Data Quality Objectives developed for this project.



11 CONCLUSION AND RECOMMENDATIONS

The environmental site assessment undertaken for the proposed residential development at 132-138 Killeaton Street, St Ives was designed to assess the suitability of the site for the proposed land use and classify soils for off-site disposal.

11.1 Summary of Soil Laboratory Results

Soil samples obtained for the investigation were analysed for the contaminants of concern identified in Section 5.1.1.

An elevated concentration of arsenic of 250mg/kg was encountered in the BH308 (0.5-0.9m) natural soil sample. Dup 4 (a duplicate of the BH308 sample) was subsequently analysed for arsenic and found to contain a concentration of 350mg/kg. EIS consider that the arsenic encountered is likely to be associated with historical use of pest control at the site and is, therefore, likely to be isolated to the former courtyard/garden area located immediately north of the former monastery building.

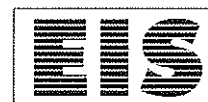
Elevated concentrations of contaminants were not encountered in the remaining soil samples analysed for the investigation. The remaining results were below the site assessment criteria

Based on the results of the assessment, EIS consider that the potential for significant, widespread soil contamination at the site is relatively low. However, further investigation should be undertaken to better assess the nature and extent of the arsenic contamination.

11.1.1 Provisional Phyto-toxicity Investigation Levels (PPILs)

The BH308 (0.5-0.9m) fill sample encountered an elevated concentration of arsenic above the PPIL. The PPIL criteria are principally concerned with phytotoxicity (i.e. adverse effects on plant growth in established and proposed areas of landscaping) and are described in NEPM 1999 as "*somewhat arbitrary*", as the effect of these compounds on plant growth will depend on the soil and plant type.

These elevations should be taken into consideration for this site as EIS understand that the proposed development includes landscaped areas and therefore elevated contaminant levels in these areas may influence plant growth. However, remediation of the arsenic impacted fill will remove the soil will concentrations of contaminants above the PPILs.



11.1.2 Asbestos Screening

Asbestos was not detected, above the reporting limit, in any of the samples analysed for the investigation.

The limited asbestos screening undertaken for the investigation does not meet NSW WorkCover requirements for a detailed Hazardous Materials Survey/Inspection. The scope of work undertaken was designed to assess the widespread asbestos contamination in soil. EIS adopts no responsibility for small scale or buried asbestos features at the site which may be encountered during earthworks or construction works at the site.

Prior to demolition or refurbishment of the existing site buildings, a suitably qualified consultant should undertake a hazardous building materials inspection. The demolition works should be undertaken in accordance with the recommendations made within the hazardous building materials report.

In the event that asbestos is encountered during the proposed excavation works, EIS should be contacted for advice. Reference should also be made to the WorkCover publication WorkCover Working with Asbestos Guide 2008.

11.2 Waste Classification

11.2.1 Fill Soils

Based on the results of the assessment, the fill material is classified as 'General Solid Waste (non-putrescible)' according to the criteria outlined in Waste Classification Guidelines 2009. The material should be disposed of to a suitably licensed NSW DECCW (EPA) landfill.

11.2.2 Natural Soil and Bedrock

The arsenic impacted natural silty clay soil should be classified as 'General Solid Waste (non-putrescible)'. Further investigation should be undertaken to better assess the extent of the impacted natural soil.

Following the additional investigation, the remaining natural silty clay and underlying shale bedrock at the site can be considered to be virgin excavated natural material (VENM). The material is considered suitable for re-use on-site, or alternatively, the information included in this report may be used to assess whether the material is suitable for beneficial reuse at another site as fill material. Where doubt exists about



the difference between fill and VENM material an environmental/geotechnical engineer should be contacted.

VENM must not be mixed with any fill material (including building rubble) as this will invalidate the VENM classification.

In the event the natural soils require disposal to a NSW DECCW (EPA) licensed landfill, the material can be disposed as 'General Solid Waste (non-putrescible)'.

11.3 Summary of Groundwater Conditions

Groundwater was not encountered in the boreholes drilled for this project (to a maximum depth of 1.5m). Groundwater is not considered to be a significant resource in the area and on this basis has not been considered in any further detail for this assessment.

Should disposal of groundwater be required during excavation at the site, an investigation will be required to assess potential disposal options.

11.4 Suitability of Site for Proposed Development

Based on the scope of work undertaken for this assessment EIS consider that the site can be made suitable for the proposed development provided that the following is undertaken:

- A Stage 2 site assessment to meet the minimum recommended sampling density;
- Additional investigation to better assess the nature and extent of the arsenic contamination encountered at BH308;
- Preparation of a remedial action plan (RAP) to outline measures to be implemented to render the site suitable for the proposed use; and
- A validation assessment to confirm that the arsenic impacted soil has been successfully removed.

An appropriate occupational health and safety plan should be prepared for the contaminants encountered at this site.



11.5 Regulatory Requirement

The requirement to report to the DECCW (EPA) under Section 60 and *Guidelines on the Duty to Report Contamination*²¹ under the CLM Amendment Act 2008 should be assessed once the results of the additional investigation works have been reviewed and a remedial strategy has been selected.

²¹ *Guidelines on the Duty to Report Contamination*, NSW Government Legislation, 2008 (Duty to Report Contamination 2008)



12 LIMITATIONS

The boreholes drilled for the investigation have enabled an assessment to be made of the existence of significant, large quantities of contaminated soils. The conclusions based on this investigation are that, while major widespread contamination of the site is not apparent, problems may be encountered with smaller scale features between boreholes. EIS adopts no responsibility whatsoever for any problems such as underground storage tanks, buried items or contaminated material that may be encountered between sampling locations at the site. The proposed construction activities at the site should be planned on this basis, and any unexpected problem areas that are encountered between boreholes should be immediately inspected by experienced environmental personnel. This should ensure that such problems are dealt with in an appropriate manner, with minimal disruption to the project timetable and budget.

The conclusions developed in this report are based on site conditions which existed at the time of the site assessment and the scope of work outlined previously in this report. They are based on investigation of conditions at specific locations, chosen to be as representative as possible under the given circumstances, and visual observations of the site and vicinity, together with the interpretation of available historical information and documents reviewed as described in this report.

The investigation for this assessment and preparation of this report have been undertaken in accordance with accepted practice for environmental consultants, with reference to applicable environmental regulatory authority and industry standards, guidelines and the assessment criteria outlined previously in this report.

Where information has been provided by third parties, EIS has not undertaken any verification process, except where specifically stated.

EIS has not undertaken any assessment of off-site areas that may be potential contamination sources or may have been impacted by site contamination.

Subsurface soil and rock conditions encountered between investigation locations may be found to be different from those expected. Groundwater conditions may also vary, especially after climatic changes.

Previous use of this site may have involved excavation for the foundations of buildings, services, and similar facilities. In addition, unrecorded excavation and burial of material may have occurred on the site. Backfilling of excavations could have been undertaken



with potentially contaminated material that may be discovered in discrete, isolated locations across the site during construction work.

EIS accept no responsibility for potentially asbestos containing materials that may exist at the site. These materials may be associated with demolition of pre-1990 constructed buildings or fill material at the site.

EIS have not and will not make any determination regarding finances associated with the site.

Changes in the proposed or current site use may result in remediation or further investigation being required at the site.

During construction at the site, soil, fill and any unsuspected materials that are encountered should be monitored by qualified environmental and geotechnical engineers to confirm assumptions made on the basis of the limited investigation data, and possible changes in site level and other conditions since the investigation. Soil materials considered to be suitable from a geotechnical point of view may be unsatisfactory from a soil contamination viewpoint, and vice versa.

This report has been prepared for the particular project described and no responsibility is accepted for the use of any part of this report in any other context or for any other purpose. Copyright in this report is the property of EIS. EIS has used a degree of care, skill and diligence normally exercised by consulting engineers in similar circumstances and locality. No other warranty expressed or implied is made or intended. Subject to payment of all fees due for the investigation, the client alone shall have a licence to use this report.

Should you require any further information regarding the above, please do not hesitate to contact us.

Yours faithfully

For and on behalf of

ENVIRONMENTAL INVESTIGATION SERVICES

A handwritten signature in black ink, appearing to read 'T Hore'.

Todd Hore
Senior Environmental Engineer

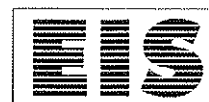
A handwritten signature in black ink, appearing to read 'A Kingswell'.

Adrian Kingswell
Senior Associate



ABBREVIATIONS

AAS	Atomic Absorption Spectrometry
AGST	Above Ground Storage Tank
AHD	Australian Height Datum
ANZECC	Australian and New Zealand Environment Conservation Council
ASS	Acid Sulfate Soil
B(a)P	Benzo(a)pyrene
BH	Borehole
BTEX	Benzene, Toluene, Ethyl benzene, Xylene
COC	Chain of Custody documentation
CLM	Contaminated Land Management
DECCW	Department of Environment, Climate Change and Water (formerly DECC, DEC and EPA)
DNR	NSW Department of Natural Resources (now split between DWE and DECCW)
DWE	NSW Department of Water and Energy
DP	Deposited Plan
DQO	Data Quality Objective
EC	Electrical Conductivity
EPA NSW	Environment Protection Authority, New South Wales (now part of DECCW)
GC-ECD	Gas Chromatograph-Electron Capture Detector
GC-FID	Gas Chromatograph-Flame Ionisation Detector
GC-MS	Gas Chromatograph-Mass Spectrometer
HIL	Health Based Investigation Level
HM	Heavy Metals
ICP-AES	Inductively Couple Plasma – Atomic Emission Spectra
NATA	National Association of Testing Authorities, Australia
NEPC	National Environmental Protection Council
NHMRC	National Health and Medical Research Council
OCPs	Organochlorine Pesticides
OHS (OH&S)	Occupational Health and Safety
PAH	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
PID	Photo-ionisation Detector
PPIL	Provisional Phyto-toxicity Investigation Levels
PQL	Practical Quantitation Limit
P&T	Purge & Trap
RAP	Remedial Action Plan
QA/QC	Quality Assurance and Quality Control
RPD	Relative Percentage Difference
SEPP	State Environmental Planning Policy
sPOCAS	suspension Peroxide Oxidation Combined Acidity and Sulfate
SPT	Standard Penetration Test
SWL	Standing Water Level
TCLP	Toxicity Characteristic Leaching Procedure
TP	Test Pit
TPH	Total Petroleum Hydrocarbons
USEPA	United States Environmental Protection Agency
UCL	Upper Confidence Limit
UST	Underground Storage Tank
VOC	Volatile Organic Compounds



IMPORTANT INFORMATION ABOUT THE SITE ASSESSMENT REPORT

These notes have been prepared by EIS to assist with the assessment and interpretation of this report.

An Environmental Assessment Report is Based on a Unique Set of Project Specific Factors:

This report has been prepared in response to specific project requirements as stated in the EIS proposal document which may have been limited by instructions from the client. This report should be reviewed, and if necessary, revised if any of the following occur:

- the proposed land use is altered;
- the defined subject site is increased or sub-divided;
- the proposed development details including size, configuration, location, orientation of the structures are modified;
- the proposed development levels are altered, eg addition of basement levels;
or
- ownership of the site changes.

EIS/J&K will not accept any responsibility whatsoever for situations where one or more of the above factors have changed since completion of the assessment. If the subject site is sold, ownership of the assessment report should be transferred by EIS to the new site owners who will be informed of the conditions and limitations under which the assessment was undertaken. No person should apply an assessment for any purpose other than that originally intended without first conferring with the consultant.

Changes in Subsurface Conditions

Subsurface conditions are influenced by natural geological and hydrogeological process and human activities. Groundwater conditions are likely to vary over time with changes in climatic conditions and human activities within the catchment (eg. water extraction for irrigation or industrial uses, subsurface waste water disposal, construction related dewatering). Soil and groundwater contaminant concentrations may also vary over time through contaminant migration, natural attenuation of organic contaminants, ongoing contaminating activities and placement or removal of fill material. The conclusions of an assessment report may have been affected by the above factors if a significant period of time has elapsed prior to commencement of the proposed development.



This Assessment is Based on Professional Interpretations of Factual Data

Site assessments identify actual subsurface conditions at the actual sampling locations at the time of the investigation. Data obtained from the sampling and subsequent laboratory analyses, available site history information and published regional information is interpreted by geologists, engineers or environmental scientists and opinions are drawn about the overall subsurface conditions, the nature and extent of contamination, the likely impact on the proposed development and appropriate remediation measures.

Actual conditions may differ from those inferred, because no professional, no matter how qualified, and no subsurface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than an assessment indicates. Actual conditions in areas not sampled may differ from predictions. Nothing can be done to prevent the unanticipated, but steps can be taken to help minimise the impact. For this reason, site owners should retain the services of their consultants throughout the development stage of the project, to identify variances, conduct additional tests which may be needed, and to recommend solutions to problems encountered on site.

Environmental Site Assessment Limitations

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

Misinterpretation of Environmental Site Assessments by Design Professionals

Costly problems can occur when other design professionals develop plans based on misinterpretation of an environmental assessment report. To minimise problems associated with misinterpretations, the environmental consultant should be retained to work with appropriate professionals to explain relevant findings and to review the adequacy of plans and specifications relevant to contamination issues.

Logs Should not be Separated from the Environmental Assessment Report

Borehole and test pit logs are prepared by environmental scientists, engineers or geologists based upon interpretation of field conditions and laboratory evaluation of field samples. Logs are normally provided in our reports and these should not be re-drawn for inclusion in site remediation or other design drawings, as subtle but



significant drafting errors or omissions may occur in the transfer process. Photographic reproduction can eliminate this problems, however contractors can still misinterpret the logs during bid preparation if separated from the text of the assessment. If this occurs, delays, disputes and unanticipated costs may result. In all cases it is necessary to refer to the text of the report to obtain a proper understanding of the assessment. Please note that logs with the 'Environmental Log' header are not suitable for geotechnical purposes as they have not been peer reviewed by a Senior Geotechnical Engineer.

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

Read Responsibility Clauses Closely

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

TABLE A-1
ENVIRONMENTAL AND HEALTH-BASED SOIL INVESTIGATION LEVELS (mg/kg)

Substances	Health Investigation Levels (HILs) ¹				Provisional Phyto-toxicity Investigation Levels (PPILs) ¹	NSW EPA Guidelines for Assessing Service Station Sites ²	Background Ranges ¹
	A	D	E	F			
	'Standard' residential with garden/accessible soil (home-grown produce contributing less than 10% of vegetable and fruit intake; no poultry); includes children's day-care centres, kindergartens, preschools and primary schools	Residential with minimal opportunities for soil access; includes dwellings with fully and permanently paved yard space such as high-rise apartments and flats	Parks, recreational open space and playing fields; includes secondary schools	Commercial/Industrial; includes premises such as shops and offices as well as factories and industrial sites			
METALS/METALLOIDS							
Arsenic (total)	100	400	200	500	20		1-50
Barium					300		100-3000
Beryllium	20	80	40	100			
Cadmium	20	80	40	100	3		1
Chromium(III)	12%	48%	24%	60%	400		
Chromium(VI)	100	400	200	500	1		
Chromium (total)							5-1000
Cobalt	100	400	200	500			1-40
Copper	1000	4000	2000	5000	100		2-100
Lead	300	1200	600	1500	600		2-200
Manganese	1500	6000	3000	7500	500		850
Methyl mercury	10	40	20	50			
Mercury (inorganic)	15	60	30	75	1		0.03
Nickel	600	2400	600	3000	60		5-500
Vanadium					50		20-500
Zinc	7000	28000	14000	35000	200		10-300
ORGANICS							
Aldrin + Dieldrin	10	40	20	50			
Chlordane	50	200	100	250			
DDT + DDD + DDE	200	800	400	1000			
Heptachlor	10	40	20	50			
Polycyclic aromatic hydrocarbons (PAHs)	20	80	40	100			
Benzo(a)pyrene	1	4	2	5			
Phenol	8500	34000	17000	42500			
PCBs (total)	10	40	20	50			
Petroleum Hydrocarbon Components (constituents):							
>C16 - C35 Aromatics	90	360	180	450			
>C16 - C35 Aliphatics	5600	22400	11200	28000			
>C35 Aliphatics	56000	224000	112000	280000			
C6-C9						65	
C10-C40						1000	
Benzene						1	
Toluene						1.4	
Ethyl Benzene						3.1	
Total Xylenes						14	
OTHER							
Boron	3000	12000	6000	15000			
Cyanides (complexed)	500	2000	1000	2500			
Cyanides (free)	250	1000	500	1250			
Phosphorus					2000		
Sulfur					600		
Sulfate					2000		

Reference should be made to the following guidelines for further details (as referenced in the above table):

1 National Environment Protection (Assessment of Site Contamination) Measure - 1999, National Environment Protection Council. Human exposure settings based on land use have been established for HILs and details are outlined in Taylor and Langley 1998.

2 NSW DECCW (formerly EPA) Guidelines for Assessing Service station Sites - 1994.

TABLE A - 2
CHEMICAL CONTAMINANT CRITERIA FOR WASTE CLASSIFICATION

Waste Classification Guidelines, Part 1: Classifying Waste DECC (now DECCW) NSW July 2009

GENERAL SOLID WASTE	RESTRICTED SOLID WASTE	HAZARDOUS WASTE
IF $SCC \leq CT1$, TCLP NOT NEEDED TO CLASSIFY AS GENERAL SOLID WASTE	IF $SCC \leq CT2$, TCLP NOT NEEDED TO CLASSIFY AS RESTRICTED SOLID WASTE	IF $SCC > SCC2$ TREAT AS HAZARDOUS WASTE
IF $TCLP \leq TCLP1$ AND $SCC \leq SCC1$ TREAT AS GENERAL SOLID WASTE	IF $TCLP \leq TCLP2$ AND $SCC \leq SCC2$ TREAT AS RESTRICTED SOLID WASTE	IF $> TCLP2$ TREAT AS HAZARDOUS WASTE

CONTAMINANT	GENERAL SOLID WASTE			RESTRICTED SOLID WASTE		
	CT1 (mg/kg)	TCLP1 (mg/L)	SCC1 (mg/kg)	CT2 (mg/kg)	TCLP2 (mg/L)	SCC2 (mg/kg)
Arsenic	100	5	500	400	20	2,000
Beryllium	20	1.0	100	80	4	400
Cadmium	20	1.0	100	80	4	400
Chromium VI	100	5	1,900	400	20	7,600
Cyanide (total)	320	16	5,900	1280	64	23,600
Cyanide (Amenable)	70	3.5	300	280	14	1,200
Fluoride	3,000	150	10,000	12,000	600	40,000
Lead	100	5	1,500	400	20	6,000
Mercury	4	0.2	50	16	0.8	200
Molybdenum	100	5	1,000	400	20	4,000
Nickel	40	2	1,050	160	8	4,200
Selenium	20	1	50	80	4	200
Silver	100	5.0	180	400	20	720
Benzene	10	0.5	18	40	2	72
Toluene	288	14.4	518	1,152	57.6	2,073
Ethylbenzene	600	30	1,080	2,400	120	4,320
Total xylenes	1,000	50	1,800	4,000	200	7,200
Total petroleum hydrocarbons (C6-C9)	-	-	650	-	-	2,600
Total petroleum hydrocarbons (C10-C36) (C10-C14, C15-C28, C29-C36)	-	-	10,000	-	-	40,000
Benzo(a)pyrene	0.8	0.04	10	3.2	0.16	23
Polycyclic aromatic hydrocarbons (Total)	-	-	200	-	-	800
Polychlorinated biphenyls	-	-	<50	-	-	<50
Phenol (nonhalogenated)	288	14.4	518	1,152	57.6	2,073
Scheduled chemicals	-	-	<50	-	-	<50



TABLE C
SOIL INTRA-LABORATORY DUPLICATE RESULTS
QA/QC - RELATIVE PERCENTAGE DIFFERENCES

SAMPLE	ANALYSIS	INITIAL (mg/kg)	REPEAT (mg/kg)	MEAN (mg/kg)	RPD %
Intra-laboratory Soil sample ID = BH301 (0.5-0.9m) Dup ID = Dup 1 Envirolab Report: 42791	Arsenic	13	8	10.5	48
	Cadmium	LPQL	LPQL	LPQL	NC
	Chromium	15	11	13	31
	Copper	2	2	2	0
	Lead	20	20	20	0
	Mercury	LPQL	LPQL	LPQL	NC
	Nickel	LPQL	LPQL	LPQL	NC
	Zinc	0.5	1	0.75	67
	C ₆ -C ₉ TPH	LPQL	LPQL	LPQL	NC
	C ₁₀ -C ₁₄ TPH	LPQL	LPQL	LPQL	NC
	C ₁₅ -C ₂₈ TPH	LPQL	LPQL	LPQL	NC
	C ₂₉ -C ₃₆ TPH	LPQL	LPQL	LPQL	NC
	Benzene	LPQL	LPQL	LPQL	NC
	Toluene	LPQL	LPQL	LPQL	NC
	Ethylbenzene	LPQL	LPQL	LPQL	NC
	Total Xylenes	LPQL	LPQL	LPQL	NC

ABBREVIATIONS:

PQL: Practical Quantitation Limit

LPQL: Less than PQL

NA: Not Analysed

NC: Not Calculated



TABLE D
SOIL INTRA-LABORATORY DUPLICATE RESULTS
QA/QC - RELATIVE PERCENTAGE DIFFERENCES

SAMPLE	ANALYSIS	INITIAL (mg/kg)	REPEAT (mg/kg)	MEAN (mg/kg)	RPD %
Intra-laboratory Soil sample ID = BH306 (0.5-0.9m) Dup ID = Dup 2 Envirolab Report: 42791	Arsenic	5	LPQL	3.5	86
	Cadmium	LPQL	LPQL	LPQL	NC
	Chromium	15	16	15.5	6
	Copper	10	12	11	18
	Lead	13	14	13.5	7
	Mercury	LPQL	0.1	0.075	67
	Nickel	2	3	2.5	40
	Zinc	6	7	6.5	15
	C ₆ -C ₉ TPH	LPQL	LPQL	LPQL	NC
	C ₁₀ -C ₁₄ TPH	LPQL	LPQL	LPQL	NC
	C ₁₅ -C ₂₈ TPH	LPQL	LPQL	LPQL	NC
	C ₂₉ -C ₃₆ TPH	LPQL	LPQL	LPQL	NC
	Benzene	LPQL	LPQL	LPQL	NC
	Toluene	LPQL	LPQL	LPQL	NC
	Ethylbenzene	LPQL	LPQL	LPQL	NC
	Total Xylenes	LPQL	LPQL	LPQL	NC

ABBREVIATIONS:

PQL: Practical Quantitation Limit

LPQL: Less than PQL

NA: Not Analysed

NC: Not Calculated



TABLE E
SOIL INTRA-LABORATORY DUPLICATE RESULTS
QA/QC - RELATIVE PERCENTAGE DIFFERENCES

SAMPLE	ANALYSIS	INITIAL (mg/kg)	REPEAT (mg/kg)	MEAN (mg/kg)	RPD %
Intra-laboratory Soil sample ID = BH303 (0.3-0.7m) Dup ID = Dup 3 Envirolab Report: 42791	Arsenic	6	6	6	0
	Cadmium	LPQL	LPQL	LPQL	NC
	Chromium	21	25	23	17
	Copper	8	13	10.5	48
	Lead	24	25	24.5	4
	Mercury	LPQL	LPQL	LPQL	NC
	Nickel	LPQL	1	0.75	67
	Zinc	1	2	1.5	67
	C ₆ -C ₉ TPH	LPQL	LPQL	LPQL	NC
	C ₁₀ -C ₁₄ TPH	LPQL	LPQL	LPQL	NC
	C ₁₅ -C ₂₈ TPH	LPQL	LPQL	LPQL	NC
	C ₂₉ -C ₃₆ TPH	LPQL	LPQL	LPQL	NC
	Benzene	LPQL	LPQL	LPQL	NC
	Toluene	LPQL	LPQL	LPQL	NC
	Ethylbenzene	LPQL	LPQL	LPQL	NC
	Total Xylenes	LPQL	LPQL	LPQL	NC

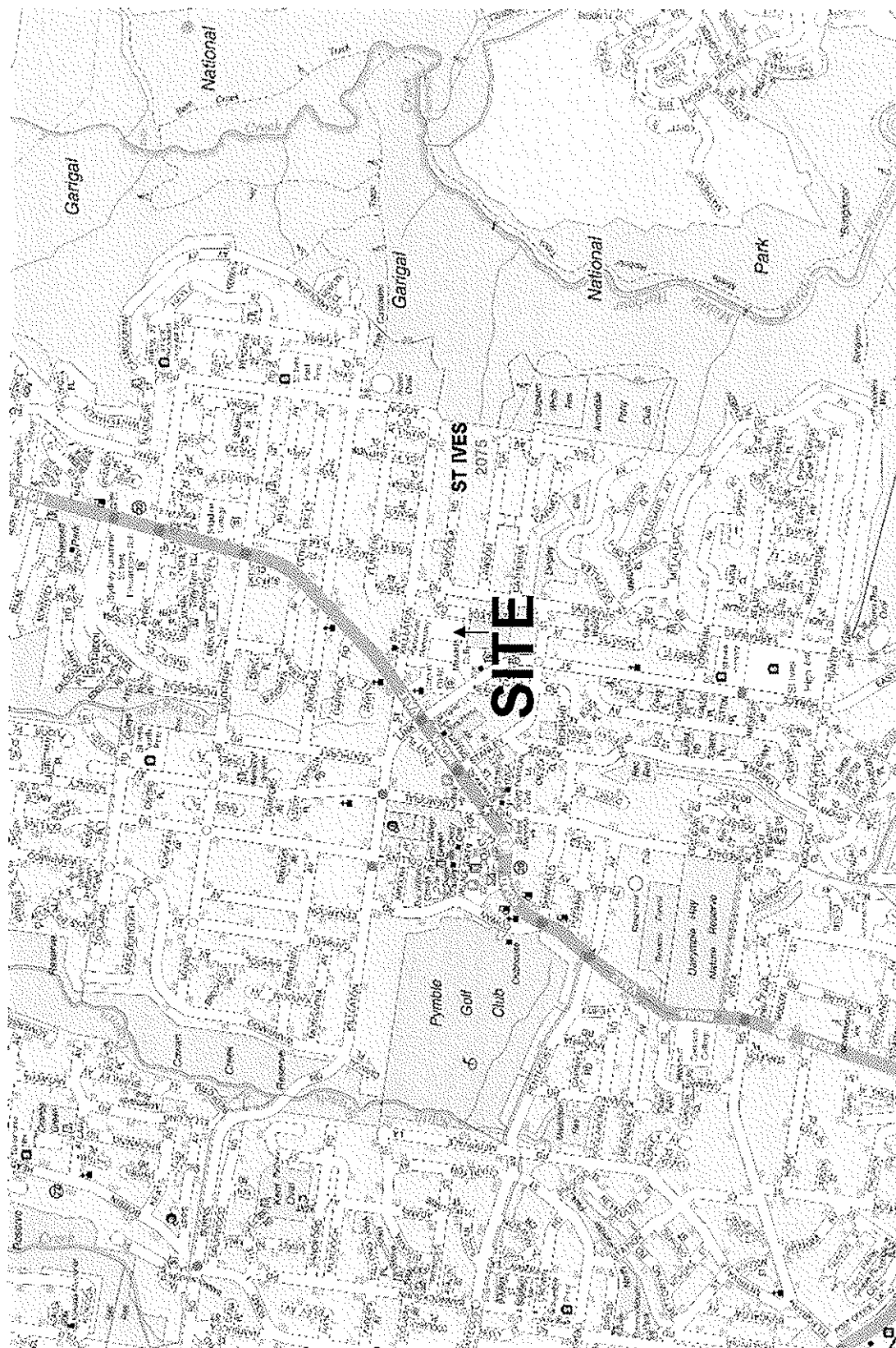
ABBREVIATIONS:

PQL: Practical Quantitation Limit

LPQL: Less than PQL

NA: Not Analysed

NC: Not Calculated



Reproduced from Sydney
UBD 2008
UBD Ref: 155 C11

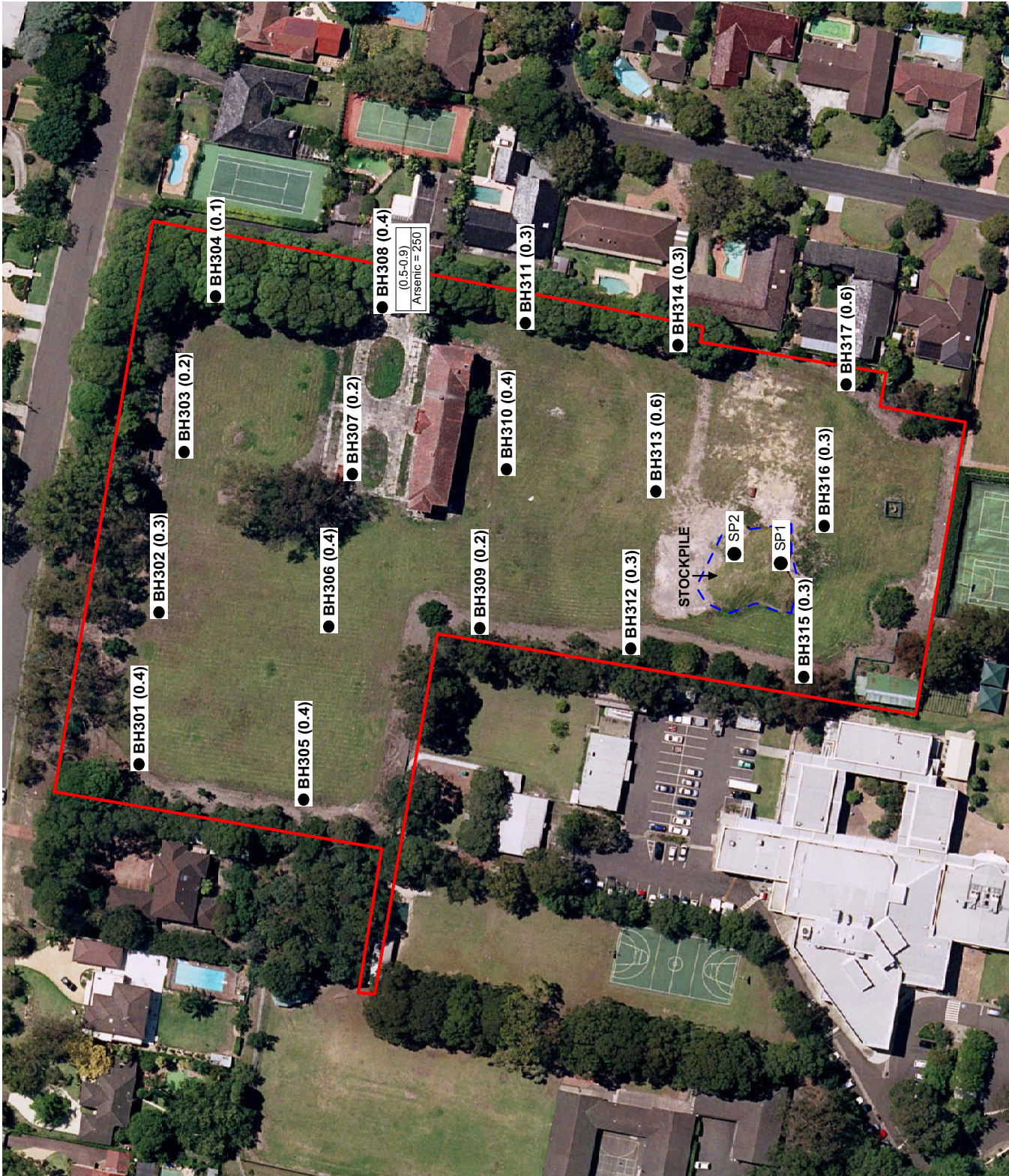
SITE LOCATION PLAN

132-138 KILLEATON STREET, ST IVES



ENVIRONMENTAL
INVESTIGATION
SERVICES

NOTE: Reference should be made to the
text for a full understanding of this plan.



Source: Google Earth Pro

NOTE: Reference should be made to the text for a full understanding of this plan.

LEGEND:

- BH301 (0.6)
- EIS Borehole location, number and depth of fill (m)
- Sample Depth Interval (metres)
- Contamination of Concern and Concentration in mg/kg

(0.5-0.9)
Arsenic = 250

BOREHOLE LOCATION PLAN

132-138 KILLEATON STREET, ST IVES



ENVIRONMENTAL
INVESTIGATION
SERVICES

Report No. E23765KHpt-rev1
Figure: 2



APPENDIX A

(Borehole Logs and Geotechnical Explanatory Notes)

ENVIRONMENTAL LOG

Borehole No.

301

1/1

Environmental logs are not to be used for geotechnical purposes

Client: MERITON APARTMENTS PTY LTD
Project: PROPOSED RESIDENTIAL DEVELOPMENT
Location: 132-138 KILLEATON STREET, ST IVES

Job No. E23765KH

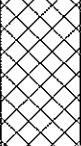
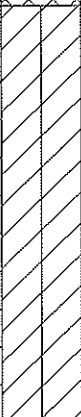
Method: EZI PROBE

R.L. Surface:

Date: 28-6-10

Datum:

Logged/Checked by: T.H./ *ASH*

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0			FILL: Silty clay, medium to high plasticity, brown with a trace of root fibres and igneous gravel.	MC≈PL			GRASS COVER
						0.5		CL-CH	SILTY CLAY: medium to high plasticity, light grey, mottled red.	MC≈PL	-	-	
						1							
						1.5			END OF BOREHOLE AT 1.5m				
						2							
						2.5							
						3							
						3.5							



Borehole No.

302

1/1

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Client: MERITON APARTMENTS PTY LTD													
Project: PROPOSED RESIDENTIAL DEVELOPMENT													
Location: 132-138 KILLEATON STREET, ST IVES													
Job No. E23765KH			Method: EZI PROBE				R.L. Surface:						
Date: 28-6-10			Datum:										
Logged/Checked by: T.H./ <i>TH</i>													
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLE -TION						0			FILL: Silty clay, medium to high plasticity, brown with a trace of roots and root fibres and ash.	MC≈PL			GRASS COVER
						0.5		CL-CH	SILTY CLAY: medium to high plasticity, light grey, mottled red.	MC<PL	-	-	
						1			as above, but with ironstone gravel bands.				
						1.5			END OF BOREHOLE AT 1.5m				
						2							
						2.5							
						3							
						3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS



ENVIRONMENTAL LOG

Borehole No.

303

1/1

Environmental logs are not to be used for geotechnical purposes

Client: MERITON APARTMENTS PTY LTD
Project: PROPOSED RESIDENTIAL DEVELOPMENT
Location: 132-138 KILLEATON STREET, ST IVES

Job No. E23765KH

Method: EZI PROBE

R.L. Surface:

Date: 28-6-10

Datum:

Logged/Checked by: T.H. / *T.H.*

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/Weathering	Strength/Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0			FILL: Silty clay, medium plasticity, brown with a trace of root fibres.	MC≈PL			GRASS COVER
						0.5		CL-CH	SILTY CLAY: medium to high plasticity, red brown mottled grey.	MC < PL	-	-	
						1			as above, but with a trace of ironstone gravel.				
						1.5		-	SHALE: light grey with ironstone bands.	XW	XL	-	
						1.5			END OF BOREHOLE AT 1.5m				
						2							
						2.5							
						3							
						3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS



ENVIRONMENTAL LOG

Borehole No.

304

1/1

Environmental logs are not to be used for geotechnical purposes

Client: MERITON APARTMENTS PTY LTD
Project: PROPOSED RESIDENTIAL DEVELOPMENT
Location: 132-138 KILLEATON STREET, ST IVES

Job No. E23765KH

Method: EZI PROBE

R.L. Surface:

Date: 28-6-10

Datum:

Logged/Checked by: T.H./ *TH*

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/Weathering	Strength/Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0		CL-CH	FILL/TOPSOIL: Silty clay, medium plasticity, brown with roots and root fibres. SILTY CLAY: medium to high plasticity, red brown mottled grey with a trace of ironstone gravel.	MC≈PL MC<PL	-	-	GRASS COVER
						0.5							
						1		-	SHALE: grey with ironstone bands.	XW	XL	-	
						1.5			END OF BOREHOLE AT 1.5m				
						2							
						2.5							
						3							
						3.5							



Borehole No.
305
1/1

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Client: MERITON APARTMENTS PTY LTD												
Project: PROPOSED RESIDENTIAL DEVELOPMENT												
Location: 132-138 KILLEATON STREET, ST IVES												
Job No. E23765KH			Method: EZI PROBE				R.L. Surface:					
Date: 28-6-10			Datum:									
Logged/Checked by: T.H./ <i>ASH</i>												
Groundwater Record	SAMPLES			Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	SAL									
DRY ON COMPLE -TION					0			FILL: Silty clay, medium plasticity, brown with root fibres.	MC≈PL			GRASS COVER
					0.5		CL-CH	SILTY CLAY: medium to high plasticity, grey mottled red and orange.	MC < PL	-	-	
					1							
					1.5			END OF BOREHOLE AT 1.5m				
					2							
					2.5							
					3							
					3.5							



ENVIRONMENTAL LOG

Borehole No.
306
1/1

Environmental logs are not to be used for geotechnical purposes

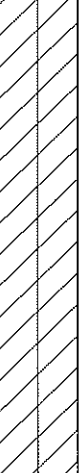
Client: MERITON APARTMENTS PTY LTD													
Project: PROPOSED RESIDENTIAL DEVELOPMENT													
Location: 132-138 KILLEATON STREET, ST IVES													
Job No. E23765KH			Method: EZI PROBE				R.L. Surface:						
Date: 28-6-10			Logged/Checked by: T.H./ASK										
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLE -TION	█	█	█	█		0			FILL: Silty clay, medium plasticity, brown with a trace of root fibres and igneous gravel.	MC≈PL			GRASS COVER
	█	█	█	█		0.5		CL-CH	SILTY CLAY: medium to high plasticity light grey, mottled red and orange.	MC < PL			
						1							
						1.5			END OF BOREHOLE AT 1.5m				
						2							
						2.5							
						3							
						3.5							



ENVIRONMENTAL LOG

Borehole No.
307
1/1

Environmental logs are not to be used for geotechnical purposes

Client: MERITON APARTMENTS PTY LTD												
Project: PROPOSED RESIDENTIAL DEVELOPMENT												
Location: 132-138 KILLEATON STREET, ST IVES												
Job No. E23765KH Method: EZI PROBE R.L. Surface:												
Date: 28-6-10 Logged/Checked by: T.H.  Datum:												
Groundwater Record	SAMPLES				Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL								
DRY ON COMPLE -TION					0			FILL: Silty clay, medium plasticity, brown with a trace of root fibres and ash.	MC≈PL			GRASS COVER
					0.5		CL-CH	SILTY CLAY: medium to high plasticity, light grey mottled orange.	MC < PL	-	-	
					1.5			END OF BOREHOLE AT 1.5m				
					2							
					2.5							
					3							
					3.5							



ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Client: MERITON APARTMENTS PTY LTD												
Project: PROPOSED RESIDENTIAL DEVELOPMENT												
Location: 132-138 KILLEATON STREET, ST IVES												
Job No. E23765KH			Method: EZI PROBE			R.L. Surface:						
Date: 28-6-10			Datum:									
Logged/Checked by: T.H.												
Groundwater Record	SAMPLES			Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	SAL									
DRY ON COMPLETION					0		-	CONCRETE: 100mm.t				
					0.5		CL-CH	FILL: Silty clay, medium plasticity, brown with a trace of roots, igneous gravel and ash.	MC≈PL	-	-	
					1			SILTY CLAY: medium to high plasticity, light grey mottled red.	MC < PL	-	-	
					1.5			END OF BOREHOLE AT 1.5m				
					2							
					2.5							
					3							
					3.5							

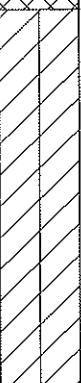
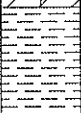


Borehole No.
309

1/1

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Client: MERITON APARTMENTS PTY LTD													
Project: PROPOSED RESIDENTIAL DEVELOPMENT													
Location: 132-138 KILLEATON STREET, ST IVES													
Job No. E23765KH Method: EZI PROBE R.L. Surface:													
Date: 28-6-10 Logged/Checked by: T.H.  Datum:													
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLE -TION						0			FILL: Silty clay, medium plasticity, brown with root fibres.	MC≈PL			GRASS COVER
						0.5		CL-CH	SILTY CLAY: medium to high plasticity, light grey mottled red and orange.	MC<PL	-	-	
						1		-	SHALE: grey.	XW	XL	-	
						1.5			END OF BOREHOLE AT 1.5m				
						2							
						2.5							
						3							
						3.5							

ENVIRONMENTAL LOG

Borehole No.
310
1/1

Environmental logs are not to be used for geotechnical purposes

Client: MERITON APARTMENTS PTY LTD												
Project: PROPOSED RESIDENTIAL DEVELOPMENT												
Location: 132-138 KILLEATON STREET, ST IVES												
Job No. E23765KH Method: EZI PROBE R.L. Surface:												
Date: 28-6-10 Logged/Checked by: T.H. /  Datum:												
Groundwater Record	SAMPLES				Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL								
DRY ON COMPLE -TION					0			FILL: Silty clay, medium to high plasticity, grey, with a trace of igneous gravel and ash.	MC < PL			GRASS COVER
					0.5		CL-CH	SILTY CLAY: medium to high plasticity, dark grey, with a trace of ash.	MC < PL	-	-	POSSIBLY FILL
							CH	SILTY CLAY: high plasticity, light grey.				
					1.5			END OF BOREHOLE AT 1.5m				
					2							
					2.5							
					3							
					3.5							

ENVIRONMENTAL LOG

Borehole No.

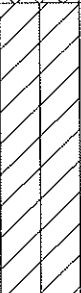
311

1/1

Environmental logs are not to be used for geotechnical purposes

Client: MERITON APARTMENTS PTY LTD
Project: PROPOSED RESIDENTIAL DEVELOPMENT
Location: 132-138 KILLEATON STREET, ST IVES

Job No. E23765KH**Method:** EZI PROBE**R.L. Surface:****Date:** 28-6-10**Datum:****Logged/Checked by:** T.H. / 

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLE- TION						0			FILL: Silty clay, medium plasticity, brown, with sandstone gravel and sand and a trace of root fibres and igneous gravel.	MC $\approx$ PL			GRASS COVER
						0.5		CL-CH	SILTY CLAY: medium to high plasticity, light brown mottled orange.	MC < PL	-	-	
						1			As above, but light grey, mottled red.				
						1.5			END OF BOREHOLE AT 1.5m				
						2							
						2.5							
						3							
						3.5							



Borehole No.
312
1/1

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Client: MERITON APARTMENTS PTY LTD													
Project: PROPOSED RESIDENTIAL DEVELOPMENT													
Location: 132-138 KILLEATON STREET, ST IVES													
Job No. E23765KH			Method: EZI PROBE				R.L. Surface:						
Date: 28-6-10			Datum:										
Logged/Checked by: T.H./													
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLE -TION						0			FILL: Silty clay, medium plasticity, brown with a trace of root fibres and ash.	MC≈PL			GRASS COVER
						0.5		CL-CH	SILTY CLAY: medium to high plasticity, light grey mottled orange.	MC<PL	-	-	
						1							
						1.5			END OF BOREHOLE AT 1.5m				
						2							
						2.5							
						3							
						3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS



ENVIRONMENTAL LOG

Borehole No.

313

1/1

Environmental logs are not to be used for geotechnical purposes

Client: MERITON APARTMENTS PTY LTD
Project: PROPOSED RESIDENTIAL DEVELOPMENT
Location: 132-138 KILLEATON STREET, ST IVES

Job No. E23765KH

Method: EZI PROBE

R.L. Surface:

Date: 28-6-10

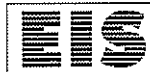
Datum:

Logged/Checked by: T.H./

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/Weathering	Strength/Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0			FILL: Silty clay, medium plasticity, brown with a trace of igneous gravel, brick fragments and ash.	MC _A PL			GRASS COVER
						0.5							
						1		CL-CH	SILTY CLAY: medium to high plasticity, light grey.	MC < PL	-	-	
						1.5		-	SHALE: light grey.	XW	XL	-	
						2			END OF BOREHOLE AT 1.5m				
						2.5							
						3							
						3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS



ENVIRONMENTAL LOG

Borehole No.

314

1/1

Environmental logs are not to be used for geotechnical purposes

Client: MERITON APARTMENTS PTY LTD
Project: PROPOSED RESIDENTIAL DEVELOPMENT
Location: 132-138 KILLEATON STREET, ST IVES

Job No. E23765KH

Method: EZI PROBE

R.L. Surface:

Date: 28-6-10

Datum:

Logged/Checked by: T.H./*SV*

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/Weathering	Strength/Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0			FILL: Silty clay, medium plasticity, brown with a trace of igneous gravel, and ash.	MC~PL			GRASS COVER
						0.5		CL-CH	SILTY CLAY: medium to high plasticity, grey mottled red, with a trace of ironstone gravel.	MC<PL	-	-	
						1			As above, but light grey.				
						1.5			END OF BOREHOLE AT 1.5m				
						2							
						2.5							
						3							
						3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS



ENVIRONMENTAL LOG

Borehole No.

315

1/1

Environmental logs are not to be used for geotechnical purposes

Client: MERITON APARTMENTS PTY LTD
Project: PROPOSED RESIDENTIAL DEVELOPMENT
Location: 132-138 KILLEATON STREET, ST IVES

Job No. E23765KH

Method: EZI PROBE

R.L. Surface:

Date: 28-6-10

Datum:

Logged/Checked by: T.H. /

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/Weathering	Strength/Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0			FILL: Silty clay, medium plasticity, brown with a trace of root fibres and ironstone gravel.	MC≈PL			GRASS COVER
						0.5		CL-CH	SILTY CLAY: medium to high plasticity, light brown, mottled orange.	MC<PL	-	-	
								CH	SILTY CLAY: high plasticity, light grey mottled orange.				
						1			As above, but with ironstone gravel.				
						1.5			END OF BOREHOLE AT 1.5m				
						2							
						2.5							
						3							
						3.5							



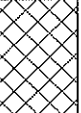
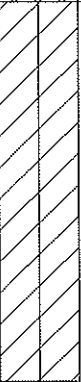
Borehole No.

316

1/1

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Client: MERITON APARTMENTS PTY LTD													
Project: PROPOSED RESIDENTIAL DEVELOPMENT													
Location: 132-138 KILLEATON STREET, ST IVES													
Job No. E23765KH		Method: EZI PROBE				R.L. Surface:							
Date: 28-6-10		Logged/Checked by: T.H. / 				Datum:							
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/Weathering	Strength/Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0			FILL: Silty clay, medium plasticity, brown and grey with a trace of igneous gravel, concrete fragments and root fibres.	MC ≈ PL			GRASS COVER
						0.5		CL-CH	SILTY CLAY: medium to high plasticity, light grey.	MC < PL	-	-	
						1		-	SHALE: light grey.	XW	XL	-	
						1.5			END OF BOREHOLE AT 1.5m				
						2							
						2.5							
						3							
						3.5							



ENVIRONMENTAL LOG

Borehole No.
317
1/1

Environmental logs are not to be used for geotechnical purposes

Client: MERITON APARTMENTS PTY LTD													
Project: PROPOSED RESIDENTIAL DEVELOPMENT													
Location: 132-138 KILLEATON STREET, ST IVES													
Job No. E23765KH			Method: EZI PROBE				R.L. Surface:						
Date: 28-6-10			Logged/Checked by: T.H./				Datum:						
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLE -TION						0			FILL: Silty clay, medium plasticity, brown with sandy clay bands and a trace of root fibres and ash.	MC < PL			
						0.5							
						1		CL-CH	SILTY CLAY: medium to high plasticity, light brown, mottled red. As above, but light grey, with a trace of ironstone gravel.	MC < PL	-	-	
						1.5			END OF BOREHOLE AT 1.5m	XW	XL	-	
						2							
						2.5							
						3							
						3.5							



REPORT EXPLANATION NOTES

INTRODUCTION

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

The ground is a product of continuing natural and man-made processes and therefore exhibits a variety of characteristics and properties which vary from place to place and can change with time. Geotechnical engineering involves gathering and assimilating limited facts about these characteristics and properties in order to understand or predict the behaviour of the ground on a particular site under certain conditions. This report may contain such facts obtained by inspection, excavation, probing, sampling, testing or other means of investigation. If so, they are directly relevant only to the ground at the place where and time when the investigation was carried out.

DESCRIPTION AND CLASSIFICATION METHODS

The methods of description and classification of soils and rocks used in this report are based on Australian Standard 1726, the SAA Site Investigation Code. In general, descriptions cover the following properties – soil or rock type, colour, structure, strength or density, and inclusions. Identification and classification of soil and rock involves judgement and the Company infers accuracy only to the extent that is common in current geotechnical practice.

Soil types are described according to the predominating particle size and behaviour as set out in the attached Unified Soil Classification Table qualified by the grading of other particles present (eg sandy clay) as set out below:

Soil Classification	Particle Size
Clay	less than 0.002mm
Silt	0.002 to 0.06mm
Sand	0.06 to 2mm
Gravel	2 to 60mm

Non-cohesive soils are classified on the basis of relative density, generally from the results of Standard Penetration Test (SPT) as below:

Relative Density	SPT 'N' Value (blows/300mm)
Very loose	less than 4
Loose	4 – 10
Medium dense	10 – 30
Dense	30 – 50
Very Dense	greater than 50

Cohesive soils are classified on the basis of strength (consistency) either by use of hand penetrometer, laboratory testing or engineering examination. The strength terms are defined as follows.

Classification	Unconfined Compressive Strength kPa
Very Soft	less than 25
Soft	25 – 50
Firm	50 – 100
Stiff	100 – 200
Very Stiff	200 – 400
Hard	Greater than 400
Friable	Strength not attainable – soil crumbles

Rock types are classified by their geological names, together with descriptive terms regarding weathering, strength, defects, etc. Where relevant, further information regarding rock classification is given in the text of the report. In the Sydney Basin, 'Shale' is used to describe thinly bedded to laminated siltstone.

SAMPLING

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

Disturbed samples taken during drilling provide information on plasticity, grain size, colour, moisture content, minor constituents and, depending upon the degree of disturbance, some information on strength and structure. Bulk samples are similar but of greater volume required for some test procedures.

Undisturbed samples are taken by pushing a thin-walled sample tube, usually 50mm diameter (known as a U50), into the soil and withdrawing it with a sample of the soil contained in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Details of the type and method of sampling used are given on the attached logs.

INVESTIGATION METHODS

The following is a brief summary of investigation methods currently adopted by the Company and some comments on their use and application. All except test pits, hand auger drilling and portable dynamic cone penetrometers require the use of a mechanical drilling rig which is commonly mounted on a truck chassis.



Test Pits: These are normally excavated with a backhoe or a tracked excavator, allowing close examination of the insitu soils if it is safe to descend into the pit. The depth of penetration is limited to about 3m for a backhoe and up to 6m for an excavator. Limitations of test pits are the problems associated with disturbance and difficulty of reinstatement and the consequent effects on close-by structures. Care must be taken if construction is to be carried out near test pit locations to either properly recompact the backfill during construction or to design and construct the structure so as not to be adversely affected by poorly compacted backfill at the test pit location.

Hand Auger Drilling: A borehole of 50mm to 100mm diameter is advanced by manually operated equipment. Premature refusal of the hand augers can occur on a variety of materials such as hard clay, gravel or ironstone, and does not necessarily indicate rock level.

Continuous Spiral Flight Augers: The borehole is advanced using 75mm to 115mm diameter continuous spiral flight augers, which are withdrawn at intervals to allow sampling and insitu testing. This is a relatively economical means of drilling in clays and in sands above the water table. Samples are returned to the surface by the flights or may be collected after withdrawal of the auger flights, but they can be very disturbed and layers may become mixed. Information from the auger sampling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively lower reliability due to mixing or softening of samples by groundwater, or uncertainties as to the original depth of the samples. Augering below the groundwater table is of even lesser reliability than augering above the water table.

Rock Augering: Use can be made of a Tungsten Carbide (TC) bit for auger drilling into rock to indicate rock quality and continuity by variation in drilling resistance and from examination of recovered rock fragments. This method of investigation is quick and relatively inexpensive but provides only an indication of the likely rock strength and predicted values may be in error by a strength order. Where rock strengths may have a significant impact on construction feasibility or costs, then further investigation by means of cored boreholes may be warranted.

Wash Boring: The borehole is usually advanced by a rotary bit, with water being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from "feel" and rate of penetration.

Mud Stabilised Drilling: Either Wash Boring or Continuous Core Drilling can use drilling mud as a circulating fluid to stabilise the borehole. The term 'mud' encompasses a range of products ranging from bentonite to polymers such as Revert or Biogel. The mud tends to mask the cuttings and reliable identification is only possible from intermittent intact sampling (eg from SPT and U50 samples) or from rock coring, etc.

Continuous Core Drilling: A continuous core sample is obtained using a diamond tipped core barrel. Provided full core recovery is achieved (which is not always possible in very low strength rocks and granular soils), this technique provides a very reliable (but relatively expensive) method of investigation. In rocks, an NMLC triple tube core barrel, which gives a core of about 50mm diameter, is usually used with water flush. The length of core recovered is compared to the length drilled and any length not recovered is shown as CORE LOSS. The location of losses are determined on site by the supervising engineer; where the location is uncertain, the loss is placed at the top end of the drill run.

Standard Penetration Tests: Standard Penetration Tests (SPT) are used mainly in non-cohesive soils, but can also be used in cohesive soils as a means of indicating density or strength and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, "Methods of Testing Soils for Engineering Purposes" – Test F3.1.

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

The test results are reported in the following form:

- In the case where full penetration is obtained with successive blow counts for each 150mm of, say, 4, 6 and 7 blows, as
$$N = 13$$
$$4, 6, 7$$
- In a case where the test is discontinued short of full penetration, say after 15 blows for the first 150mm and 30 blows for the next 40mm, as
$$N > 30$$
$$15, 30/40\text{mm}$$

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

Occasionally, the drop hammer is used to drive 50mm diameter thin walled sample tubes (U50) in clays. In such circumstances, the test results are shown on the borehole logs in brackets.

A modification to the SPT test is where the same driving system is used with a solid 60° tipped steel cone of the same diameter as the SPT hollow sampler. The solid cone can be continuously driven for some distance in soft clays or loose sands, or may be used where damage would otherwise occur to the SPT. The results of this Solid Cone Penetration Test (SCPT) are shown as "N_c" on the borehole logs, together with the number of blows per 150mm penetration.

Static Cone Penetrometer Testing and Interpretation: Cone penetrometer testing (sometimes referred to as a Dutch Cone) described in this report has been carried out using an Electronic Friction Cone Penetrometer (EFCP). The test is described in Australian Standard 1289, Test F5.1.

In the tests, a 35mm diameter rod with a conical tip is pushed continuously into the soil, the reaction being provided by a specially designed truck or rig which is fitted with an hydraulic ram system. Measurements are made of the end bearing resistance on the cone and the frictional resistance on a separate 134mm long sleeve, immediately behind the cone. Transducers in the tip of the assembly are electrically connected by wires passing through the centre of the push rods to an amplifier and recorder unit mounted on the control truck.

As penetration occurs (at a rate of approximately 20mm per second) the information is output as incremental digital records every 10mm. The results given in this report have been plotted from the digital data.

The information provided on the charts comprise:

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

The ratios of the sleeve resistance to cone resistance will vary with the type of soil encountered, with higher relative friction in clays than in sands. Friction ratios of 1% to 2% are commonly encountered in sands and occasionally very soft clays, rising to 4% to 10% in stiff clays and peats. Soil descriptions based on cone resistance and friction ratios are only inferred and must not be considered as exact.

Correlations between EFCP and SPT values can be developed for both sands and clays but may be site specific.

Interpretation of EFCP values can be made to empirically derive modulus or compressibility values to allow calculation of foundation settlements.

Stratification can be inferred from the cone and friction traces and from experience and information from nearby boreholes etc. Where shown, this information is presented for general guidance, but must be regarded as interpretive. The test method provides a continuous profile of engineering properties but, where precise information on soil classification is required, direct drilling and sampling may be preferable.

Portable Dynamic Cone Penetrometers: Portable Dynamic Cone Penetrometer (DCP) tests are carried out by driving a rod into the ground with a sliding hammer and counting the blows for successive 100mm increments of penetration.

Two relatively similar tests are used:

- Cone penetrometer (commonly known as the Scala Penetrometer) – a 16mm rod with a 20mm diameter cone end is driven with a 9kg hammer dropping 510mm (AS1289, Test F3.2). The test was developed initially for pavement subgrade investigations, and correlations of the test results with California Bearing Ratio have been published by various Road Authorities.
- Perth sand penetrometer – a 16mm diameter flat ended rod is driven with a 9kg hammer, dropping 600mm (AS1289, Test F3.3). This test was developed for testing the density of sands (originating in Perth) and is mainly used in granular soils and filling.

LOGS

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

The attached explanatory notes define the terms and symbols used in preparation of the logs.

Interpretation of the information shown on the logs, and its application to design and construction, should therefore take into account the spacing of boreholes or test pits, the method of drilling or excavation, the frequency of sampling and testing and the possibility of other than “straight line” variations between the boreholes or test pits. Subsurface conditions between boreholes or test pits may vary significantly from conditions encountered at the borehole or test pit locations.

GROUNDWATER

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

- Although groundwater may be present, in low permeability soils it may enter the hole slowly or perhaps not at all during the time it is left open.
- A localised perched water table may lead to an erroneous indication of the true water table.
- Water table levels will vary from time to time with seasons or recent weather changes and may not be the same at the time of construction.
- 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 be washed out of the hole or ‘reverted’ chemically if water observations are to be made.



More reliable measurements can be made by installing standpipes which are read after stabilising at intervals ranging from several days to 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 perched water tables or surface water.

FILL

The presence of fill materials can often be determined only by the inclusion of foreign objects (eg bricks, steel etc) or by distinctly unusual colour, texture or fabric. Identification of the extent of fill materials will also depend on investigation methods and frequency. Where natural soils similar to those at the site are used for fill, it may be difficult with limited testing and sampling to reliably determine the extent of the fill.

The presence of fill materials is usually regarded with caution as the possible variation in density, strength and material type is much greater than with natural soil deposits. Consequently, there is an increased risk of adverse engineering characteristics or behaviour. If the volume and quality of fill is of importance to a project, then frequent test pit excavations are preferable to boreholes.

LABORATORY TESTING

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

ENGINEERING REPORTS

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

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

- Unexpected variations in ground conditions – the potential for this will be partially dependent on borehole spacing and sampling frequency as well as investigation technique.
- Changes in policy or interpretation of policy by statutory authorities.
- The actions of persons or contractors responding to commercial pressures.

If these occur, the company will be pleased to assist with investigation or advice to resolve any problems occurring.

SITE ANOMALIES

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

REPRODUCTION OF INFORMATION FOR CONTRACTUAL PURPOSES

Attention is drawn to the document *'Guidelines for the Provision of Geotechnical Information in Tender Documents'*, published by the Institution of Engineers, Australia. Where information obtained from this investigation is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. The company would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Copyright in all documents (such as drawings, borehole or test pit logs, reports and specifications) provided by the Company shall remain the property of Jeffery and Katauskas Pty Ltd. Subject to the payment of all fees due, the Client alone shall have a licence to use the documents provided for the sole purpose of completing the project to which they relate. License to use the documents may be revoked without notice if the Client is in breach of any objection to make a payment to us.

REVIEW OF DESIGN

Where major civil or structural developments are proposed or where only a limited investigation has been completed or where the geotechnical conditions/ constraints are quite complex, it is prudent to have a joint design review which involves a senior geotechnical engineer.

SITE INSPECTION

The company will always be pleased to provide engineering inspection services for geotechnical aspects of work to which this report is related.

Requirements could range from:

- i) a site visit to confirm that conditions exposed are no worse than those interpreted, to
- ii) a visit to assist the contractor or other site personnel in identifying various soil/rock types such as appropriate footing or pier founding depths, or
- iii) full time engineering presence on site.

SOIL		ROCK		DEFECTS AND INCLUSIONS	
	FILL		CONGLOMERATE		CLAY SEAM
	TOPSOIL		SANDSTONE		SHEARED OR CRUSHED SEAM
	CLAY (CL, CH)		SHALE		BRECCIATED OR SHATTERED SEAM/ZONE
	SILT (ML, MH)		SILTSTONE, MUDSTONE, CLAYSTONE		IRONSTONE GRAVEL
	SAND (SP, SW)		LIMESTONE		ORGANIC MATERIAL
	GRAVEL (GP, GW)		PHYLLITE, SCHIST		
	SANDY CLAY (CL, CH)		TUFF		CONCRETE
	SILTY CLAY (CL, CH)		GRANITE, GABBRO		BITUMINOUS CONCRETE, COAL
	CLAYEY SAND (SC)		DOLERITE, DIORITE		COLLUVIUM
	SILTY SAND (SM)		BASALT, ANDESITE		
	GRAVELLY CLAY (CL, CH)		QUARTZITE		
	CLAYEY GRAVEL (GC)				
	SANDY SILT (ML)				
	PEAT AND ORGANIC SOILS				

UNIFIED SOIL CLASSIFICATION TABLE

[illegible]

2) Soils with liquid limits of the order of 35 to 50 may be visually classified as being of medium plasticity.



LOG SYMBOLS

LOG COLUMN	SYMBOL	DEFINITION
Groundwater Record		Standing water level. Time delay following completion of drilling may be shown.
		Extent of borehole collapse shortly after drilling.
		Groundwater seepage into borehole or excavation noted during drilling or excavation.
Samples	ES	Soil sample taken over depth indicated, for environmental analysis.
	U50	Undisturbed 50mm diameter tube sample taken over depth indicated.
	DB	Bulk disturbed sample taken over depth indicated.
	DS	Small disturbed bag sample taken over depth indicated.
	ASB	Soil sample taken over depth indicated, for asbestos screening.
	ASS	Soil sample taken over depth indicated, for acid sulfate soil analysis.
	SAL	Soil sample taken over depth indicated, for salinity analysis.
Field Tests	N = 17 4, 7, 10	Standard Penetration Test (SPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration. 'R' as noted below.
	N _c = 5 7 3R	Solid Cone Penetration Test (SCPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration for 60 degree solid cone driven by SPT hammer. 'R' refers to apparent hammer refusal within the corresponding 150mm depth increment.
	VNS = 25	Vane shear reading in kPa of Undrained Shear Strength.
	PID = 100	Photoionisation detector reading in ppm (Soil sample headspace test).
Moisture Condition (Cohesive Soils)	MC > PL	Moisture content estimated to be greater than plastic limit.
	MC ≈ PL	Moisture content estimated to be approximately equal to plastic limit.
	MC < PL	Moisture content estimated to be less than plastic limit.
	(Cohesionless Soils)	
	D M W	DRY - runs freely through fingers. MOIST - does not run freely but no free water visible on soil surface. WET - free water visible on soil surface.
Strength (Consistency) Cohesive Soils	VS	VERY SOFT - Unconfined compressive strength less than 25kPa
	S	SOFT - Unconfined compressive strength 25-50kPa
	F	FIRM - Unconfined compressive strength 50-100kPa
	St	STIFF - Unconfined compressive strength 100-200kPa
	VSt	VERY STIFF - Unconfined compressive strength 200-400kPa
	H	HARD - Unconfined compressive strength greater than 400kPa
	()	Bracketed symbol indicates estimated consistency based on tactile examination or other tests.
Density Index/ Relative Density (Cohesionless Soils)		Density Index (I_p) Range (%) SPT 'N' Value Range (Blows/300mm)
	VL	Very Loose < 15 0-4
	L	Loose 15-35 4-10
	MD	Medium Dense 35-65 10-30
	D	Dense 65-85 30-50
	VD	Very Dense > 85 > 50
	()	Bracketed symbol indicates estimated density based on ease of drilling or other tests.
Hand Penetrometer Readings	300	Numbers indicate individual test results in kPa on representative undisturbed material unless noted otherwise.
	250	
Remarks	'V' bit	Hardened steel 'V' shaped bit.
	'TC' bit	Tungsten carbide wing bit.
	T ₆₀	Penetration of auger string in mm under static load of rig applied by drill head hydraulics without rotation of augers.



LOG SYMBOLS

ROCK MATERIAL WEATHERING CLASSIFICATION

TERM	SYMBOL	DEFINITION
Residual Soil	RS	Soil developed on extremely weathered rock; the mass structure and substance fabric are no longer evident; there is a large change in volume but the soil has not been significantly transported.
Extremely weathered rock	XW	Rock is weathered to such an extent that it has "soil" properties, ie it either disintegrates or can be remoulded, in water.
Distinctly weathered rock	DW	Rock strength usually changed by weathering. The rock may be highly discoloured, usually by ironstaining. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
Slightly weathered rock	SW	Rock is slightly discoloured but shows little or no change of strength from fresh rock.
Fresh rock	FR	Rock shows no sign of decomposition or staining.

ROCK STRENGTH

Rock strength is defined by the Point Load Strength Index (Is 50) and refers to the strength of the rock substance in the direction normal to the bedding. The test procedure is described by the International Journal of Rock Mechanics, Mining, Science and Geomechanics. Abstract Volume 22, No 2, 1985.

TERM	SYMBOL	Is (50) MPa	FIELD GUIDE
Extremely Low:	EL	0.03	Easily remoulded by hand to a material with soil properties.
Very Low:	VL	0.1	May be crumbled in the hand. Sandstone is "sugary" and friable.
Low:	L	0.3	A piece of core 150mm long x 50mm dia. may be broken by hand and easily scored with a knife. Sharp edges of core may be friable and break during handling.
Medium Strength:	M	1	A piece of core 150mm long x 50mm dia. can be broken by hand with difficulty. Readily scored with knife.
High:	H	3	A piece of core 150mm long x 50mm dia. core cannot be broken by hand, can be slightly scratched or scored with knife; rock rings under hammer.
Very High:	VH	10	A piece of core 150mm long x 50mm dia. may be broken with hand-held pick after more than one blow. Cannot be scratched with pen knife; rock rings under hammer.
Extremely High:	EH		A piece of core 150mm long x 50mm dia. is very difficult to break with hand-held hammer. Rings when struck with a hammer.

ABBREVIATIONS USED IN DEFECT DESCRIPTION

ABBREVIATION	DESCRIPTION	NOTES
Be	Bedding Plane Parting	Defect orientations measured relative to the normal to the long core axis (ie relative to horizontal for vertical holes)
CS	Clay Seam	
J	Joint	
P	Planar	
Un	Undulating	
S	Smooth	
R	Rough	
IS	Ironstained	
XWS	Extremely Weathered Seam	
Cr	Crushed Seam	
60t	Thickness of defect in millimetres	



APPENDIX B

(Laboratory Reports and Chain of Custody Documents)



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 42791

Client:

Environmental Investigation Services
PO Box 976
North Ryde BC
NSW 1670

Attention: Todd Hore

Sample log in details:

Your Reference:	<u>E23765KH, St Ives</u>
No. of samples:	43 Soils
Date samples received:	29/06/10
Date completed instructions received:	29/06/10

Analysis Details:

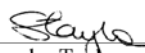
Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.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

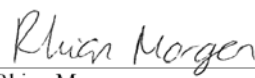
Report Details:

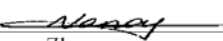
Date results requested by:	6/07/10
Date of Preliminary Report:	Not Issued
Issue Date:	5/07/10

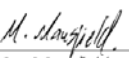
NATA accreditation number 2901. This document shall not be reproduced except in full.
This document is issued in accordance with NATA's accreditation requirements.
Accredited for compliance with ISO/IEC 17025.
Tests not covered by NATA are denoted with *.

Results Approved By:


Sandra Taylor
Senior Organic Chemist


Rhian Morgan
Metals Supervisor


Nancy Zhang
Chemist


Matt Mansfield
Approved Signatory

Envirolab Reference: 42791
Revision No: R 00



vTPH & BTEX in Soil	UNITS	42791-1	42791-2	42791-3	42791-5	42791-6
Our Reference:	-----	BH301	BH301	BH302	BH303	BH303
Your Reference	-----	0-0.4	0.5-0.9	0-0.3	0-0.2	0.3-0.4
Depth						
Date Sampled		28/06/2010	28/06/2010	28/06/2010	28/06/2010	28/06/2010
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010	30/6/2010
Date analysed	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010	30/6/2010
vTPH C ₆ - C ₉	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
m+p-xylene	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
o-Xylene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate aaa-Trifluorotoluene	%	97	114	101	110	107

vTPH & BTEX in Soil	UNITS	42791-7	42791-9	42791-11	42791-12	42791-13
Our Reference:	-----	BH304	BH305	BH306	BH306	BH307
Your Reference	-----	0-0.1	0-0.4	0-0.4	0.5-0.9	0-0.2
Depth						
Date Sampled		28/06/2010	28/06/2010	28/06/2010	28/06/2010	28/06/2010
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010	30/6/2010
Date analysed	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010	30/6/2010
vTPH C ₆ - C ₉	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
m+p-xylene	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
o-Xylene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate aaa-Trifluorotoluene	%	114	113	113	106	116

vTPH & BTEX in Soil	UNITS	42791-15	42791-16	42791-17	42791-19	42791-21
Our Reference:	-----	BH308	BH308	BH309	BH310	BH311
Your Reference	-----	0.1-0.4	0.5-0.9	0-0.2	0-0.4	0-0.3
Depth						
Date Sampled		28/06/2010	28/06/2010	28/06/2010	28/06/2010	28/06/2010
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010	30/6/2010
Date analysed	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010	30/6/2010
vTPH C ₆ - C ₉	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
m+p-xylene	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
o-Xylene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate aaa-Trifluorotoluene	%	114	122	113	110	114

vTPH & BTEX in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	42791-23 BH312 0-0.3 28/06/2010 Soil	42791-24 BH312 0.4-0.8 28/06/2010 Soil	42791-25 BH313 0-0.4 28/06/2010 Soil	42791-27 BH314 0-0.3 28/06/2010 Soil	42791-29 BH315 0-0.3 28/06/2010 Soil
Date extracted	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010	30/6/2010
Date analysed	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010	30/6/2010
vTPH C ₆ - C ₉	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
m+p-xylene	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
o-Xylene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate aaa-Trifluorotoluene	%	113	118	114	115	115

vTPH & BTEX in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	42791-30 BH315 0.3-0.5 28/06/2010 Soil	42791-32 BH316 0-0.3 28/06/2010 Soil	42791-33 BH316 0.4-0.8 28/06/2010 Soil	42791-34 BH317 0-0.4 28/06/2010 Soil	42791-36 Dup1 - 28/06/2010 Soil
Date extracted	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010	30/6/2010
Date analysed	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010	30/6/2010
vTPH C ₆ - C ₉	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
m+p-xylene	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
o-Xylene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate aaa-Trifluorotoluene	%	114	116	111	115	119

vTPH & BTEX in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	42791-37 Dup2 - 28/06/2010 Soil	42791-38 Dup3 - 28/06/2010 Soil	42791-42 SP1 - 28/06/2010 Soil	42791-43 SP2 - 28/06/2010 Soil
Date extracted	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010
Date analysed	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010
vTPH C ₆ - C ₉	mg/kg	<25	<25	<25	<25
Benzene	mg/kg	<0.5	<0.5	<0.5	<0.5
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1.0	<1.0	<1.0	<1.0
m+p-xylene	mg/kg	<2.0	<2.0	<2.0	<2.0
o-Xylene	mg/kg	<1.0	<1.0	<1.0	<1.0
Surrogate aaa-Trifluorotoluene	%	116	112	113	113

sTPH in Soil (C10-C36)						
Our Reference:	UNITS	42791-1	42791-2	42791-3	42791-5	42791-6
Your Reference	-----	BH301	BH301	BH302	BH303	BH303
Depth	-----	0-0.4	0.5-0.9	0-0.3	0-0.2	0.3-0.4
Date Sampled		28/06/2010	28/06/2010	28/06/2010	28/06/2010	28/06/2010
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010	30/6/2010
Date analysed	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010	30/6/2010
TPH C10 - C14	mg/kg	<50	<50	<50	<50	<50
TPH C15 - C28	mg/kg	<100	<100	<100	<100	<100
TPH C29 - C36	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	96	94	96	97	93

sTPH in Soil (C10-C36)						
Our Reference:	UNITS	42791-7	42791-9	42791-11	42791-12	42791-13
Your Reference	-----	BH304	BH305	BH306	BH306	BH307
Depth	-----	0-0.1	0-0.4	0-0.4	0.5-0.9	0-0.2
Date Sampled		28/06/2010	28/06/2010	28/06/2010	28/06/2010	28/06/2010
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010	30/6/2010
Date analysed	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010	30/6/2010
TPH C10 - C14	mg/kg	<50	<50	<50	<50	<50
TPH C15 - C28	mg/kg	<100	<100	<100	<100	<100
TPH C29 - C36	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	96	96	94	95	95

sTPH in Soil (C10-C36)						
Our Reference:	UNITS	42791-15	42791-16	42791-17	42791-19	42791-21
Your Reference	-----	BH308	BH308	BH309	BH310	BH311
Depth	-----	0.1-0.4	0.5-0.9	0-0.2	0-0.4	0-0.3
Date Sampled		28/06/2010	28/06/2010	28/06/2010	28/06/2010	28/06/2010
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010	30/6/2010
Date analysed	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010	30/6/2010
TPH C10 - C14	mg/kg	<50	<50	<50	<50	<50
TPH C15 - C28	mg/kg	<100	<100	<100	<100	<100
TPH C29 - C36	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	98	97	98	95	97

sTPH in Soil (C10-C36)						
Our Reference:	UNITS	42791-23	42791-24	42791-25	42791-27	42791-29
Your Reference	-----	BH312	BH312	BH313	BH314	BH315
Depth	-----	0-0.3	0.4-0.8	0-0.4	0-0.3	0-0.3
Date Sampled		28/06/2010	28/06/2010	28/06/2010	28/06/2010	28/06/2010
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010	30/6/2010
Date analysed	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010	30/6/2010
TPH C10 - C14	mg/kg	<50	<50	<50	<50	<50
TPH C15 - C28	mg/kg	<100	<100	<100	<100	<100
TPH C29 - C36	mg/kg	<100	<100	100	<100	<100
Surrogate o-Terphenyl	%	99	97	96	97	96

sTPH in Soil (C10-C36)						
Our Reference:	UNITS	42791-30	42791-32	42791-33	42791-34	42791-36
Your Reference	-----	BH315	BH316	BH316	BH317	Dup1
Depth	-----	0.3-0.5	0-0.3	0.4-0.8	0-0.4	-
Date Sampled		28/06/2010	28/06/2010	28/06/2010	28/06/2010	28/06/2010
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010	30/6/2010
Date analysed	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010	30/6/2010
TPH C10 - C14	mg/kg	<50	<50	<50	<50	<50
TPH C15 - C28	mg/kg	<100	<100	<100	<100	<100
TPH C29 - C36	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	96	98	96	96	95

sTPH in Soil (C10-C36)					
Our Reference:	UNITS	42791-37	42791-38	42791-42	42791-43
Your Reference	-----	Dup2	Dup3	SP1	SP2
Depth	-----	-	-	-	-
Date Sampled		28/06/2010	28/06/2010	28/06/2010	28/06/2010
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010
Date analysed	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010
TPH C10 - C14	mg/kg	<50	<50	<50	<50
TPH C15 - C28	mg/kg	<100	<100	<100	<100
TPH C29 - C36	mg/kg	<100	<100	<100	<100
Surrogate o-Terphenyl	%	95	94	98	98

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	42791-1 BH301 0-0.4 28/06/2010 Soil	42791-2 BH301 0.5-0.9 28/06/2010 Soil	42791-3 BH302 0-0.3 28/06/2010 Soil	42791-5 BH303 0-0.2 28/06/2010 Soil	42791-6 BH303 0.3-0.4 28/06/2010 Soil
Date extracted	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010	30/6/2010
Date analysed	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010	30/6/2010
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate p-Terphenyl-d ₁₄	%	104	103	107	107	103

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	42791-7 BH304 0-0.1 28/06/2010 Soil	42791-9 BH305 0-0.4 28/06/2010 Soil	42791-11 BH306 0-0.4 28/06/2010 Soil	42791-12 BH306 0.5-0.9 28/06/2010 Soil	42791-13 BH307 0-0.2 28/06/2010 Soil
Date extracted	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010	30/6/2010
Date analysed	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010	30/6/2010
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate p-Terphenyl-d ₁₄	%	108	107	105	104	104

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	42791-15 BH308 0.1-0.4 28/06/2010 Soil	42791-16 BH308 0.5-0.9 28/06/2010 Soil	42791-17 BH309 0-0.2 28/06/2010 Soil	42791-19 BH310 0-0.4 28/06/2010 Soil	42791-21 BH311 0-0.3 28/06/2010 Soil
Date extracted	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010	30/6/2010
Date analysed	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010	30/6/2010
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate p-Terphenyl-d ₁₄	%	102	108	108	106	106

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	42791-23 BH312 0-0.3 28/06/2010 Soil	42791-24 BH312 0.4-0.8 28/06/2010 Soil	42791-25 BH313 0-0.4 28/06/2010 Soil	42791-27 BH314 0-0.3 28/06/2010 Soil	42791-29 BH315 0-0.3 28/06/2010 Soil
Date extracted	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010	30/6/2010
Date analysed	-	30/6/2010	30/6/2010	30/6/2010	1/7/2010	1/7/2010
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	0.2
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	0.06
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate p-Terphenyl-d ₁₄	%	106	109	109	110	108

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	42791-30 BH315 0.3-0.5 28/06/2010 Soil	42791-32 BH316 0-0.3 28/06/2010 Soil	42791-33 BH316 0.4-0.8 28/06/2010 Soil	42791-34 BH317 0-0.4 28/06/2010 Soil	42791-42 SP1 - 28/06/2010 Soil
Date extracted	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010	30/6/2010
Date analysed	-	1/7/2010	1/7/2010	1/7/2010	1/7/2010	1/7/2010
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate p-Terphenyl-d ₁₄	%	106	106	113	107	112

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	42791-43 SP2 - 28/06/2010 Soil
Date extracted	-	30/6/2010
Date analysed	-	1/7/2010
Naphthalene	mg/kg	<0.1
Acenaphthylene	mg/kg	<0.1
Acenaphthene	mg/kg	<0.1
Fluorene	mg/kg	<0.1
Phenanthrene	mg/kg	<0.1
Anthracene	mg/kg	<0.1
Fluoranthene	mg/kg	<0.1
Pyrene	mg/kg	<0.1
Benzo(a)anthracene	mg/kg	<0.1
Chrysene	mg/kg	<0.1
Benzo(b+k)fluoranthene	mg/kg	<0.2
Benzo(a)pyrene	mg/kg	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1
Surrogate p-Terphenyl-d ₁₄	%	106

Organochlorine Pesticides in soil						
Our Reference:	UNITS	42791-1	42791-2	42791-3	42791-5	42791-6
Your Reference	-----	BH301	BH301	BH302	BH303	BH303
Depth	-----	0-0.4	0.5-0.9	0-0.3	0-0.2	0.3-0.4
Date Sampled		28/06/2010	28/06/2010	28/06/2010	28/06/2010	28/06/2010
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/06/2010	30/06/2010	30/06/2010	30/06/2010	30/06/2010
Date analysed	-	30/06/2010	30/06/2010	30/06/2010	30/06/2010	30/06/2010
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	101	102	105	102	102

Organochlorine Pesticides in soil						
Our Reference:	UNITS	42791-7	42791-9	42791-11	42791-12	42791-13
Your Reference	-----	BH304	BH305	BH306	BH306	BH307
Depth	-----	0-0.1	0-0.4	0-0.4	0.5-0.9	0-0.2
Date Sampled		28/06/2010	28/06/2010	28/06/2010	28/06/2010	28/06/2010
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/06/2010	30/06/2010	30/06/2010	30/06/2010	30/06/2010
Date analysed	-	30/06/2010	30/06/2010	30/06/2010	30/06/2010	30/06/2010
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	102	101	103	104	104

Organochlorine Pesticides in soil						
Our Reference:	UNITS	42791-15	42791-16	42791-17	42791-19	42791-21
Your Reference	-----	BH308	BH308	BH309	BH310	BH311
Depth	-----	0.1-0.4	0.5-0.9	0-0.2	0-0.4	0-0.3
Date Sampled		28/06/2010	28/06/2010	28/06/2010	28/06/2010	28/06/2010
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/06/2010	30/06/2010	30/06/2010	30/06/2010	30/06/2010
Date analysed	-	30/06/2010	30/06/2010	30/06/2010	30/06/2010	30/06/2010
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	105	105	104	102	105

Organochlorine Pesticides in soil						
Our Reference:	UNITS	42791-23	42791-24	42791-25	42791-27	42791-29
Your Reference	-----	BH312	BH312	BH313	BH314	BH315
Depth	-----	0-0.3	0.4-0.8	0-0.4	0-0.3	0-0.3
Date Sampled		28/06/2010	28/06/2010	28/06/2010	28/06/2010	28/06/2010
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/06/2010	30/06/2010	30/06/2010	30/06/2010	30/06/2010
Date analysed	-	30/06/2010	01/07/2010	01/07/2010	01/07/2010	01/07/2010
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	102	105	103	106	107

Organochlorine Pesticides in soil						
Our Reference:	UNITS	42791-30	42791-32	42791-33	42791-34	42791-42
Your Reference	-----	BH315	BH316	BH316	BH317	SP1
Depth	-----	0.3-0.5	0-0.3	0.4-0.8	0-0.4	-
Date Sampled		28/06/2010	28/06/2010	28/06/2010	28/06/2010	28/06/2010
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/06/2010	30/06/2010	30/06/2010	30/06/2010	30/06/2010
Date analysed	-	01/07/2010	01/07/2010	01/07/2010	01/07/2010	01/07/2010
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	106	107	102	100	103

Organochlorine Pesticides in soil		
Our Reference:	UNITS	42791-43
Your Reference	-----	SP2
Depth	-----	-
Date Sampled		28/06/2010
Type of sample		Soil
Date extracted	-	30/06/2010
Date analysed	-	01/07/2010
HCB	mg/kg	<0.1
alpha-BHC	mg/kg	<0.1
gamma-BHC	mg/kg	<0.1
beta-BHC	mg/kg	<0.1
Heptachlor	mg/kg	<0.1
delta-BHC	mg/kg	<0.1
Aldrin	mg/kg	<0.1
Heptachlor Epoxide	mg/kg	<0.1
gamma-Chlordane	mg/kg	<0.1
alpha-chlordane	mg/kg	<0.1
Endosulfan I	mg/kg	<0.1
pp-DDE	mg/kg	<0.1
Dieldrin	mg/kg	<0.1
Endrin	mg/kg	<0.1
pp-DDD	mg/kg	<0.1
Endosulfan II	mg/kg	<0.1
pp-DDT	mg/kg	<0.1
Endrin Aldehyde	mg/kg	<0.1
Endosulfan Sulphate	mg/kg	<0.1
Methoxychlor	mg/kg	<0.1
Surrogate TCLMX	%	104

Organophosphorus Pesticides						
Our Reference:	UNITS	42791-1	42791-2	42791-3	42791-5	42791-6
Your Reference	-----	BH301	BH301	BH302	BH303	BH303
Depth	-----	0-0.4	0.5-0.9	0-0.3	0-0.2	0.3-0.4
Date Sampled		28/06/2010	28/06/2010	28/06/2010	28/06/2010	28/06/2010
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/06/2010	30/06/2010	30/06/2010	30/06/2010	30/06/2010
Date analysed	-	30/06/2010	30/06/2010	30/06/2010	30/06/2010	30/06/2010
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
Chlorpyrifos-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
Chlorpyrifos	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 TCLMX	%	101	102	105	102	102

Organophosphorus Pesticides						
Our Reference:	UNITS	42791-7	42791-9	42791-11	42791-12	42791-13
Your Reference	-----	BH304	BH305	BH306	BH306	BH307
Depth	-----	0-0.1	0-0.4	0-0.4	0.5-0.9	0-0.2
Date Sampled		28/06/2010	28/06/2010	28/06/2010	28/06/2010	28/06/2010
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/06/2010	30/06/2010	30/06/2010	30/06/2010	30/06/2010
Date analysed	-	30/06/2010	30/06/2010	30/06/2010	30/06/2010	30/06/2010
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
Chlorpyrifos-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
Chlorpyrifos	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 TCLMX	%	102	101	103	104	104

Organophosphorus Pesticides						
Our Reference:	UNITS	42791-15	42791-16	42791-17	42791-19	42791-21
Your Reference	-----	BH308	BH308	BH309	BH310	BH311
Depth	-----	0.1-0.4	0.5-0.9	0-0.2	0-0.4	0-0.3
Date Sampled		28/06/2010	28/06/2010	28/06/2010	28/06/2010	28/06/2010
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/06/2010	30/06/2010	30/06/2010	30/06/2010	30/06/2010
Date analysed	-	30/06/2010	30/06/2010	30/06/2010	30/06/2010	30/06/2010
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
Chlorpyrifos-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
Chlorpyrifos	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 TCLMX	%	105	105	104	102	105

Organophosphorus Pesticides						
Our Reference:	UNITS	42791-23	42791-24	42791-25	42791-27	42791-29
Your Reference	-----	BH312	BH312	BH313	BH314	BH315
Depth	-----	0-0.3	0.4-0.8	0-0.4	0-0.3	0-0.3
Date Sampled		28/06/2010	28/06/2010	28/06/2010	28/06/2010	28/06/2010
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/06/2010	30/06/2010	30/06/2010	30/06/2010	30/06/2010
Date analysed	-	30/06/2010	01/07/2010	01/07/2010	01/07/2010	01/07/2010
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
Chlorpyrifos-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
Chlorpyrifos	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 TCLMX	%	102	105	103	106	107

Organophosphorus Pesticides	UNITS	42791-30	42791-32	42791-33	42791-34	42791-42
Our Reference:	-----	BH315	BH316	BH316	BH317	SP1
Your Reference	-----	0.3-0.5	0-0.3	0.4-0.8	0-0.4	-
Depth		28/06/2010	28/06/2010	28/06/2010	28/06/2010	28/06/2010
Date Sampled		Soil	Soil	Soil	Soil	Soil
Type of sample						
Date extracted	-	30/06/2010	30/06/2010	30/06/2010	30/06/2010	30/06/2010
Date analysed	-	01/07/2010	01/07/2010	01/07/2010	01/07/2010	01/07/2010
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
Chlorpyrifos-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
Chlorpyrifos	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 TCLMX	%	106	107	102	100	103

Organophosphorus Pesticides	UNITS	42791-43
Our Reference:	-----	SP2
Your Reference	-----	-
Depth		28/06/2010
Date Sampled		Soil
Type of sample		
Date extracted	-	30/06/2010
Date analysed	-	01/07/2010
Diazinon	mg/kg	<0.1
Dimethoate	mg/kg	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1
Ronnel	mg/kg	<0.1
Chlorpyrifos	mg/kg	<0.1
Fenitrothion	mg/kg	<0.1
Bromophos-ethyl	mg/kg	<0.1
Ethion	mg/kg	<0.1
Surrogate TCLMX	%	104

PCBs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	42791-1 BH301 0-0.4 28/06/2010 Soil	42791-2 BH301 0.5-0.9 28/06/2010 Soil	42791-3 BH302 0-0.3 28/06/2010 Soil	42791-5 BH303 0-0.2 28/06/2010 Soil	42791-6 BH303 0.3-0.4 28/06/2010 Soil
Date extracted	-	30/06/2010	30/06/2010	30/06/2010	30/06/2010	30/06/2010
Date analysed	-	30/06/2010	30/06/2010	30/06/2010	30/06/2010	30/06/2010
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	%	101	102	105	102	102

PCBs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	42791-7 BH304 0-0.1 28/06/2010 Soil	42791-9 BH305 0-0.4 28/06/2010 Soil	42791-11 BH306 0-0.4 28/06/2010 Soil	42791-12 BH306 0.5-0.9 28/06/2010 Soil	42791-13 BH307 0-0.2 28/06/2010 Soil
Date extracted	-	30/06/2010	30/06/2010	30/06/2010	30/06/2010	30/06/2010
Date analysed	-	30/06/2010	30/06/2010	30/06/2010	30/06/2010	30/06/2010
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1221*	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	102	101	103	104	104

PCBs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	42791-15 BH308 0.1-0.4 28/06/2010 Soil	42791-16 BH308 0.5-0.9 28/06/2010 Soil	42791-17 BH309 0-0.2 28/06/2010 Soil	42791-19 BH310 0-0.4 28/06/2010 Soil	42791-21 BH311 0-0.3 28/06/2010 Soil
Date extracted	-	30/06/2010	30/06/2010	30/06/2010	30/06/2010	30/06/2010
Date analysed	-	30/06/2010	30/06/2010	30/06/2010	30/06/2010	30/06/2010
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1221*	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	105	105	104	102	105

PCBs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	42791-23 BH312 0-0.3 28/06/2010 Soil	42791-24 BH312 0.4-0.8 28/06/2010 Soil	42791-25 BH313 0-0.4 28/06/2010 Soil	42791-27 BH314 0-0.3 28/06/2010 Soil	42791-29 BH315 0-0.3 28/06/2010 Soil
Date extracted	-	30/06/2010	30/06/2010	30/06/2010	30/06/2010	30/06/2010
Date analysed	-	30/06/2010	01/07/2010	01/07/2010	01/07/2010	01/07/2010
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1221*	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	102	105	103	106	107

PCBs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	42791-30 BH315 0.3-0.5 28/06/2010 Soil	42791-32 BH316 0-0.3 28/06/2010 Soil	42791-33 BH316 0.4-0.8 28/06/2010 Soil	42791-34 BH317 0-0.4 28/06/2010 Soil	42791-42 SP1 - 28/06/2010 Soil
Date extracted	-	30/06/2010	30/06/2010	30/06/2010	30/06/2010	30/06/2010
Date analysed	-	01/07/2010	01/07/2010	01/07/2010	01/07/2010	01/07/2010
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	%	106	107	102	102	103

PCBs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	42791-43 SP2 - 28/06/2010 Soil
Date extracted	-	30/06/2010
Date analysed	-	01/07/2010
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	%	104

Acid Extractable metals in soil						
Our Reference:	UNITS	42791-1	42791-2	42791-3	42791-5	42791-6
Your Reference	-----	BH301	BH301	BH302	BH303	BH303
Depth	-----	0-0.4	0.5-0.9	0-0.3	0-0.2	0.3-0.4
Date Sampled		28/06/2010	28/06/2010	28/06/2010	28/06/2010	28/06/2010
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	30/06/2010	30/06/2010	30/06/2010	30/06/2010	30/06/2010
Date analysed	-	30/06/2010	30/06/2010	30/06/2010	30/06/2010	30/06/2010
Arsenic	mg/kg	9	13	5	8	6
Cadmium	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	mg/kg	19	15	19	26	21
Copper	mg/kg	3	2	6	5	8
Lead	mg/kg	18	20	23	26	24
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	6	<1	3	4	<1
Zinc	mg/kg	5	<1	10	9	1

Acid Extractable metals in soil						
Our Reference:	UNITS	42791-7	42791-9	42791-11	42791-12	42791-13
Your Reference	-----	BH304	BH305	BH306	BH306	BH307
Depth	-----	0-0.1	0-0.4	0-0.4	0.5-0.9	0-0.2
Date Sampled		28/06/2010	28/06/2010	28/06/2010	28/06/2010	28/06/2010
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	30/06/2010	30/06/2010	30/06/2010	30/06/2010	30/06/2010
Date analysed	-	30/06/2010	30/06/2010	30/06/2010	30/06/2010	30/06/2010
Arsenic	mg/kg	5	10	4	5	<4
Cadmium	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	mg/kg	16	23	20	15	16
Copper	mg/kg	11	2	16	10	28
Lead	mg/kg	22	18	17	13	16
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	6	6	10	2	11
Zinc	mg/kg	34	6	12	6	11

Acid Extractable metals in soil	UNITS	42791-15	42791-16	42791-17	42791-19	42791-21
Our Reference:	-----	BH308	BH308	BH309	BH310	BH311
Your Reference	-----	0.1-0.4	0.5-0.9	0-0.2	0-0.4	0-0.3
Depth		28/06/2010	28/06/2010	28/06/2010	28/06/2010	28/06/2010
Date Sampled		Soil	Soil	Soil	Soil	Soil
Type of sample						
Date digested	-	30/06/2010	30/06/2010	30/06/2010	30/06/2010	30/06/2010
Date analysed	-	30/06/2010	30/06/2010	30/06/2010	30/06/2010	30/06/2010
Arsenic	mg/kg	7	250	<4	4	10
Cadmium	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	mg/kg	20	25	16	9	13
Copper	mg/kg	11	11	13	16	7
Lead	mg/kg	17	30	21	12	15
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	5	<1	8	1	5
Zinc	mg/kg	7	4	22	6	10

Acid Extractable metals in soil	UNITS	42791-23	42791-24	42791-25	42791-27	42791-29
Our Reference:	-----	BH312	BH312	BH313	BH314	BH315
Your Reference	-----	0-0.3	0.4-0.8	0-0.4	0-0.3	0-0.3
Depth		28/06/2010	28/06/2010	28/06/2010	28/06/2010	28/06/2010
Date Sampled		Soil	Soil	Soil	Soil	Soil
Type of sample						
Date digested	-	30/06/2010	30/06/2010	30/06/2010	30/06/2010	30/06/2010
Date analysed	-	30/06/2010	30/06/2010	30/06/2010	30/06/2010	30/06/2010
Arsenic	mg/kg	4	4	5	32	7
Cadmium	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	mg/kg	17	9	27	35	22
Copper	mg/kg	14	7	18	17	10
Lead	mg/kg	31	9	36	34	40
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	10	<1	18	27	8
Zinc	mg/kg	41	3	52	41	59

Acid Extractable metals in soil	UNITS	42791-30	42791-32	42791-33	42791-34	42791-36
Our Reference:	-----	BH315	BH316	BH316	BH317	Dup1
Your Reference	-----	0.3-0.5	0-0.3	0.4-0.8	0-0.4	-
Depth		28/06/2010	28/06/2010	28/06/2010	28/06/2010	28/06/2010
Date Sampled		Soil	Soil	Soil	Soil	Soil
Type of sample						
Date digested	-	30/06/2010	30/06/2010	30/06/2010	30/06/2010	30/06/2010
Date analysed	-	30/06/2010	30/06/2010	30/06/2010	30/06/2010	30/06/2010
Arsenic	mg/kg	11	<4	<4	46	8
Cadmium	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	mg/kg	33	11	10	14	11
Copper	mg/kg	4	4	3	5	2
Lead	mg/kg	21	13	16	15	20
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	4	2	<1	3	<1
Zinc	mg/kg	5	29	3	22	1

Acid Extractable metals in soil	UNITS	42791-37	42791-38	42791-42	42791-43
Our Reference:	-----	Dup2	Dup3	SP1	SP2
Your Reference	-----	-	-	-	-
Depth		28/06/2010	28/06/2010	28/06/2010	28/06/2010
Date Sampled		Soil	Soil	Soil	Soil
Type of sample					
Date digested	-	30/06/2010	30/06/2010	30/06/2010	30/06/2010
Date analysed	-	30/06/2010	30/06/2010	30/06/2010	30/06/2010
Arsenic	mg/kg	<4	6	<4	<4
Cadmium	mg/kg	<0.5	<0.5	<0.5	<0.5
Chromium	mg/kg	16	25	12	17
Copper	mg/kg	12	13	8	9
Lead	mg/kg	14	25	34	33
Mercury	mg/kg	0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	3	1	5	9
Zinc	mg/kg	7	2	23	35

Moisture						
Our Reference:	UNITS	42791-1	42791-2	42791-3	42791-5	42791-6
Your Reference	-----	BH301	BH301	BH302	BH303	BH303
Depth	-----	0-0.4	0.5-0.9	0-0.3	0-0.2	0.3-0.4
Date Sampled		28/06/2010	28/06/2010	28/06/2010	28/06/2010	28/06/2010
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010	30/6/2010
Date analysed	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010	30/6/2010
Moisture	%	26	21	26	23	22

Moisture						
Our Reference:	UNITS	42791-7	42791-9	42791-11	42791-12	42791-13
Your Reference	-----	BH304	BH305	BH306	BH306	BH307
Depth	-----	0-0.1	0-0.4	0-0.4	0.5-0.9	0-0.2
Date Sampled		28/06/2010	28/06/2010	28/06/2010	28/06/2010	28/06/2010
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010	30/6/2010
Date analysed	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010	30/6/2010
Moisture	%	30	30	28	21	25

Moisture						
Our Reference:	UNITS	42791-15	42791-16	42791-17	42791-19	42791-21
Your Reference	-----	BH308	BH308	BH309	BH310	BH311
Depth	-----	0.1-0.4	0.5-0.9	0-0.2	0-0.4	0-0.3
Date Sampled		28/06/2010	28/06/2010	28/06/2010	28/06/2010	28/06/2010
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010	30/6/2010
Date analysed	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010	30/6/2010
Moisture	%	23	22	23	18	15

Moisture						
Our Reference:	UNITS	42791-23	42791-24	42791-25	42791-27	42791-29
Your Reference	-----	BH312	BH312	BH313	BH314	BH315
Depth	-----	0-0.3	0.4-0.8	0-0.4	0-0.3	0-0.3
Date Sampled		28/06/2010	28/06/2010	28/06/2010	28/06/2010	28/06/2010
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010	30/6/2010
Date analysed	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010	30/6/2010
Moisture	%	24	18	19	18	24

Moisture						
Our Reference:	UNITS	42791-30	42791-32	42791-33	42791-34	42791-36
Your Reference	-----	BH315	BH316	BH316	BH317	Dup1
Depth	-----	0.3-0.5	0-0.3	0.4-0.8	0-0.4	-
Date Sampled		28/06/2010	28/06/2010	28/06/2010	28/06/2010	28/06/2010
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010	30/6/2010
Date analysed	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010	30/6/2010
Moisture	%	23	20	19	17	21

Moisture					
Our Reference:	UNITS	42791-37	42791-38	42791-42	42791-43
Your Reference	-----	Dup2	Dup3	SP1	SP2
Depth	-----	-	-	-	-
Date Sampled		28/06/2010	28/06/2010	28/06/2010	28/06/2010
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010
Date analysed	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010
Moisture	%	22	21	12	9.9

Asbestos ID - soils						
Our Reference:	UNITS	42791-1	42791-2	42791-3	42791-5	42791-6
Your Reference	-----	BH301	BH301	BH302	BH303	BH303
Depth	-----	0-0.4	0.5-0.9	0-0.3	0-0.2	0.3-0.4
Date Sampled		28/06/2010	28/06/2010	28/06/2010	28/06/2010	28/06/2010
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010	30/6/2010
Sample Description	-	Approx 35g Soil	Approx 35g Soil	Approx 35g Soil	Approx 35g Soil	Approx 35g Soil
Asbestos ID in soil	-	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg
Trace Analysis	-	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected

Asbestos ID - soils						
Our Reference:	UNITS	42791-7	42791-9	42791-11	42791-12	42791-13
Your Reference	-----	BH304	BH305	BH306	BH306	BH307
Depth	-----	0-0.1	0-0.4	0-0.4	0.5-0.9	0-0.2
Date Sampled		28/06/2010	28/06/2010	28/06/2010	28/06/2010	28/06/2010
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010	30/6/2010
Sample Description	-	Approx 35g Soil	Approx 35g Soil	Approx 35g Soil	Approx 35g Soil	Approx 35g Soil
Asbestos ID in soil	-	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg
Trace Analysis	-	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected

Asbestos ID - soils						
Our Reference:	UNITS	42791-15	42791-16	42791-17	42791-19	42791-21
Your Reference	-----	BH308	BH308	BH309	BH310	BH311
Depth	-----	0.1-0.4	0.5-0.9	0-0.2	0-0.4	0-0.3
Date Sampled		28/06/2010	28/06/2010	28/06/2010	28/06/2010	28/06/2010
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010	30/6/2010
Sample Description	-	Approx 35g Soil	Approx 35g Soil	Approx 35g Soil	Approx 35g Soil	Approx 35g Soil
Asbestos ID in soil	-	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg
Trace Analysis	-	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected

Asbestos ID - soils						
Our Reference:	UNITS	42791-23	42791-24	42791-25	42791-27	42791-29
Your Reference	-----	BH312	BH312	BH313	BH314	BH315
Depth	-----	0-0.3	0.4-0.8	0-0.4	0-0.3	0-0.3
Date Sampled		28/06/2010	28/06/2010	28/06/2010	28/06/2010	28/06/2010
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010	30/6/2010
Sample Description	-	Approx 35g Soil	Approx 35g Soil	Approx 35g Soil	Approx 35g Soil	Approx 35g Soil
Asbestos ID in soil	-	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg
Trace Analysis	-	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected

Asbestos ID - soils						
Our Reference:	UNITS	42791-30	42791-32	42791-33	42791-34	42791-42
Your Reference	-----	BH315	BH316	BH316	BH317	SP1
Depth	-----	0.3-0.5	0-0.3	0.4-0.8	0-0.4	-
Date Sampled		28/06/2010	28/06/2010	28/06/2010	28/06/2010	28/06/2010
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	30/6/2010	30/6/2010	30/6/2010	30/6/2010	30/6/2010
Sample Description	-	Approx 35g Soil	Approx 35g Soil	Approx 35g Soil	Approx 35g Soil	Approx 35g Soil
Asbestos ID in soil	-	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg
Trace Analysis	-	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected

Asbestos ID - soils		
Our Reference:	UNITS	42791-43
Your Reference	-----	SP2
Depth	-----	-
Date Sampled		28/06/2010
Type of sample		Soil
Date analysed	-	30/6/2010
Sample Description	-	Approx 35g Soil
Asbestos ID in soil	-	No asbestos found at reporting limit of 0.1g/kg
Trace Analysis	-	Respirable fibres not detected

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

QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
vTPH & BTEX in Soil						Base II Duplicate II %RPD		
Date extracted	-			30/6/2010	42791-1	30/6/2010 30/6/2010	LCS-1	30/6/2010
Date analysed	-			30/6/2010	42791-1	30/6/2010 30/6/2010	LCS-1	30/6/2010
vTPH C ₆ - C ₉	mg/kg	25	GC.16	<25	42791-1	<25 <25	LCS-1	97%
Benzene	mg/kg	0.5	GC.16	<0.5	42791-1	<0.5 <0.5	LCS-1	104%
Toluene	mg/kg	0.5	GC.16	<0.5	42791-1	<0.5 <0.5	LCS-1	101%
Ethylbenzene	mg/kg	1	GC.16	<1.0	42791-1	<1.0 <1.0	LCS-1	89%
m+p-xylene	mg/kg	2	GC.16	<2.0	42791-1	<2.0 <2.0	LCS-1	96%
o-Xylene	mg/kg	1	GC.16	<1.0	42791-1	<1.0 <1.0	LCS-1	93%
Surrogate aaa-Trifluorotoluene	%		GC.16	131	42791-1	97 107 RPD: 10	LCS-1	122%

QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
sTPH in Soil (C ₁₀ -C ₃₆)						Base II Duplicate II %RPD		
Date extracted	-			30/6/2010	42791-1	30/6/2010 30/6/2010	LCS-1	30/6/2010
Date analysed	-			30/6/2010	42791-1	30/6/2010 30/6/2010	LCS-1	30/6/2010
TPH C ₁₀ - C ₁₄	mg/kg	50	GC.3	<50	42791-1	<50 <50	LCS-1	89%
TPH C ₁₅ - C ₂₈	mg/kg	100	GC.3	<100	42791-1	<100 <100	LCS-1	101%
TPH C ₂₉ - C ₃₆	mg/kg	100	GC.3	<100	42791-1	<100 <100	LCS-1	102%
Surrogate o-Terphenyl	%		GC.3	96	42791-1	96 96 RPD: 0	LCS-1	84%

QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
PAHs in Soil						Base II Duplicate II %RPD		
Date extracted	-			30/6/2010	42791-1	30/6/2010 30/6/2010	LCS-1	30/6/2010
Date analysed	-			30/6/2010	42791-1	30/6/2010 30/6/2010	LCS-1	30/6/2010
Naphthalene	mg/kg	0.1	GC.12 subset	<0.1	42791-1	<0.1 <0.1	LCS-1	94%
Acenaphthylene	mg/kg	0.1	GC.12 subset	<0.1	42791-1	<0.1 <0.1	[NR]	[NR]
Acenaphthene	mg/kg	0.1	GC.12 subset	<0.1	42791-1	<0.1 <0.1	[NR]	[NR]
Fluorene	mg/kg	0.1	GC.12 subset	<0.1	42791-1	<0.1 <0.1	LCS-1	90%
Phenanthrene	mg/kg	0.1	GC.12 subset	<0.1	42791-1	<0.1 <0.1	LCS-1	98%
Anthracene	mg/kg	0.1	GC.12 subset	<0.1	42791-1	<0.1 <0.1	[NR]	[NR]
Fluoranthene	mg/kg	0.1	GC.12 subset	<0.1	42791-1	<0.1 <0.1	LCS-1	95%
Pyrene	mg/kg	0.1	GC.12 subset	<0.1	42791-1	<0.1 <0.1	LCS-1	102%

QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
PAHs in Soil						Base II Duplicate II %RPD		
Benzo(a)anthracene	mg/kg	0.1	GC.12 subset	<0.1	42791-1	<0.1 <0.1	[NR]	[NR]
Chrysene	mg/kg	0.1	GC.12 subset	<0.1	42791-1	<0.1 <0.1	LCS-1	105%
Benzo(b+k)fluoranthene	mg/kg	0.2	GC.12 subset	<0.2	42791-1	<0.2 <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	0.05	GC.12 subset	<0.05	42791-1	<0.05 <0.05	LCS-1	98%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	GC.12 subset	<0.1	42791-1	<0.1 <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	GC.12 subset	<0.1	42791-1	<0.1 <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	GC.12 subset	<0.1	42791-1	<0.1 <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		GC.12 subset	107	42791-1	104 107 RPD: 3	LCS-1	105%

QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
Organochlorine Pesticides in soil						Base II Duplicate II %RPD		
Date extracted	-			30/06/2010	42791-1	30/06/2010 30/06/2010	LCS-1	30/06/2010
Date analysed	-			30/06/2010	42791-1	30/06/2010 30/06/2010	LCS-1	30/06/2010
HCB	mg/kg	0.1	GC-5	<0.1	42791-1	<0.1 <0.1	[NR]	[NR]
alpha-BHC	mg/kg	0.1	GC-5	<0.1	42791-1	<0.1 <0.1	LCS-1	86%
gamma-BHC	mg/kg	0.1	GC-5	<0.1	42791-1	<0.1 <0.1	[NR]	[NR]
beta-BHC	mg/kg	0.1	GC-5	<0.1	42791-1	<0.1 <0.1	LCS-1	95%
Heptachlor	mg/kg	0.1	GC-5	<0.1	42791-1	<0.1 <0.1	LCS-1	88%
delta-BHC	mg/kg	0.1	GC-5	<0.1	42791-1	<0.1 <0.1	[NR]	[NR]
Aldrin	mg/kg	0.1	GC-5	<0.1	42791-1	<0.1 <0.1	LCS-1	84%
Heptachlor Epoxide	mg/kg	0.1	GC-5	<0.1	42791-1	<0.1 <0.1	LCS-1	97%
gamma-Chlordane	mg/kg	0.1	GC-5	<0.1	42791-1	<0.1 <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	0.1	GC-5	<0.1	42791-1	<0.1 <0.1	[NR]	[NR]
Endosulfan I	mg/kg	0.1	GC-5	<0.1	42791-1	<0.1 <0.1	[NR]	[NR]
pp-DDE	mg/kg	0.1	GC-5	<0.1	42791-1	<0.1 <0.1	LCS-1	101%
Dieldrin	mg/kg	0.1	GC-5	<0.1	42791-1	<0.1 <0.1	LCS-1	90%
Endrin	mg/kg	0.1	GC-5	<0.1	42791-1	<0.1 <0.1	LCS-1	92%
pp-DDD	mg/kg	0.1	GC-5	<0.1	42791-1	<0.1 <0.1	LCS-1	102%
Endosulfan II	mg/kg	0.1	GC-5	<0.1	42791-1	<0.1 <0.1	[NR]	[NR]
pp-DDT	mg/kg	0.1	GC-5	<0.1	42791-1	<0.1 <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	0.1	GC-5	<0.1	42791-1	<0.1 <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	0.1	GC-5	<0.1	42791-1	<0.1 <0.1	LCS-1	89%
Methoxychlor	mg/kg	0.1	GC-5	<0.1	42791-1	<0.1 <0.1	[NR]	[NR]
Surrogate TCLMX	%		GC-5	104	42791-1	101 107 RPD: 6	LCS-1	104%

QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
Organophosphorus Pesticides						Base II Duplicate II %RPD		
Date extracted	-			30/06/2010	42791-1	30/06/2010 30/06/2010	LCS-1	30/06/2010
Date analysed	-			30/06/2010	42791-1	30/06/2010 30/06/2010	LCS-1	30/06/2010
Diazinon	mg/kg	0.1	GC.8	<0.1	42791-1	<0.1 <0.1	[NR]	[NR]
Dimethoate	mg/kg	0.1	GC.8	<0.1	42791-1	<0.1 <0.1	[NR]	[NR]
Chlorpyrifos-methyl	mg/kg	0.1	GC.8	<0.1	42791-1	<0.1 <0.1	[NR]	[NR]
Ronnel	mg/kg	0.1	GC.8	<0.1	42791-1	<0.1 <0.1	[NR]	[NR]
Chlorpyrifos	mg/kg	0.1	GC.8	<0.1	42791-1	<0.1 <0.1	LCS-1	102%
Fenitrothion	mg/kg	0.1	GC.8	<0.1	42791-1	<0.1 <0.1	LCS-1	99%
Bromophos-ethyl	mg/kg	0.1	GC.8	<0.1	42791-1	<0.1 <0.1	[NR]	[NR]
Ethion	mg/kg	0.1	GC.8	<0.1	42791-1	<0.1 <0.1	LCS-1	109%
Surrogate TCLMX	%		GC.8	104	42791-1	101 107 RPD: 6	LCS-1	103%

QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
PCBs in Soil						Base II Duplicate II %RPD		
Date extracted	-			30/06/2010	42791-1	30/06/2010 30/06/2010	LCS-1	30/06/2010
Date analysed	-			30/06/2010	42791-1	30/06/2010 30/06/2010	LCS-1	30/06/2010
Arochlor 1016	mg/kg	0.1	GC-6	<0.1	42791-1	<0.1 <0.1	[NR]	[NR]
Arochlor 1221*	mg/kg	0.1	GC-6	<0.1	42791-1	<0.1 <0.1	[NR]	[NR]
Arochlor 1232	mg/kg	0.1	GC-6	<0.1	42791-1	<0.1 <0.1	[NR]	[NR]
Arochlor 1242	mg/kg	0.1	GC-6	<0.1	42791-1	<0.1 <0.1	[NR]	[NR]
Arochlor 1248	mg/kg	0.1	GC-6	<0.1	42791-1	<0.1 <0.1	[NR]	[NR]
Arochlor 1254	mg/kg	0.1	GC-6	<0.1	42791-1	<0.1 <0.1	LCS-1	111%
Arochlor 1260	mg/kg	0.1	GC-6	<0.1	42791-1	<0.1 <0.1	[NR]	[NR]
Surrogate TCLMX	%		GC-6	104	42791-1	101 107 RPD: 6	LCS-1	107%

QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
Acid Extractable metals in soil						Base II Duplicate II %RPD		
Date digested	-			30/06/2010	42791-1	30/06/2010 30/06/2010	LCS-1	30/06/2010
Date analysed	-			30/06/2010	42791-1	30/06/2010 30/06/2010	LCS-1	30/06/2010
Arsenic	mg/kg	4	Metals.20 ICP-AES	<4	42791-1	9 9 RPD: 0	LCS-1	101%
Cadmium	mg/kg	0.5	Metals.20 ICP-AES	<0.5	42791-1	<0.5 <0.5	LCS-1	103%
Chromium	mg/kg	1	Metals.20 ICP-AES	<1	42791-1	19 19 RPD: 0	LCS-1	104%
Copper	mg/kg	1	Metals.20 ICP-AES	<1	42791-1	3 4 RPD: 29	LCS-1	102%

Client Reference: E23765KH, St Ives

QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
Acid Extractable metals in soil						Base Duplicate %RPD		
Lead	mg/kg	1	Metals.20 ICP-AES	<1	42791-1	18 18 RPD: 0	LCS-1	101%
Mercury	mg/kg	0.1	Metals.21 CV-AAS	<0.1	42791-1	<0.1 <0.1	LCS-1	104%
Nickel	mg/kg	1	Metals.20 ICP-AES	<1	42791-1	6 6 RPD: 0	LCS-1	103%
Zinc	mg/kg	1	Metals.20 ICP-AES	<1	42791-1	5 5 RPD: 0	LCS-1	105%

QUALITY CONTROL	UNITS	PQL	METHOD	Blank
Moisture				
Date prepared	-			30/6/2010
Date analysed	-			30/6/2010
Moisture	%	0.1	LAB.8	<0.10

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

QUALITY CONTROL	UNITS	Dup. Sm#	Duplicate	Spike Sm#	Spike % Recovery
vTPH & BTEX in Soil			Base + Duplicate + %RPD		
Date extracted	-	42791-16	30/6/2010 30/6/2010	LCS-2	30/6/2010
Date analysed	-	42791-16	30/6/2010 30/6/2010	LCS-2	30/6/2010
vTPH C ₆ - C ₉	mg/kg	42791-16	<25 <25	LCS-2	110%
Benzene	mg/kg	42791-16	<0.5 <0.5	LCS-2	108%
Toluene	mg/kg	42791-16	<0.5 <0.5	LCS-2	108%
Ethylbenzene	mg/kg	42791-16	<1.0 <1.0	LCS-2	104%
m+p-xylene	mg/kg	42791-16	<2.0 <2.0	LCS-2	114%
o-Xylene	mg/kg	42791-16	<1.0 <1.0	LCS-2	107%
Surrogate aaa-Trifluorotoluene	%	42791-16	122 109 RPD: 11	LCS-2	119%

QUALITY CONTROL sTPH in Soil (C10-C36)	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	42791-16	30/6/2010 30/6/2010	LCS-2	30/6/2010
Date analysed	-	42791-16	30/6/2010 30/6/2010	LCS-2	30/6/2010
TPH C10 - C14	mg/kg	42791-16	<50 <50	LCS-2	84%
TPH C15 - C28	mg/kg	42791-16	<100 <100	LCS-2	99%
TPH C29 - C36	mg/kg	42791-16	<100 <100	LCS-2	100%
Surrogate o-Terphenyl	%	42791-16	97 97 RPD: 0	LCS-2	87%
QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	42791-16	30/6/2010 30/6/2010	LCS-2	30/6/2010
Date analysed	-	42791-16	30/6/2010 30/6/2010	LCS-2	1/7/2010
Naphthalene	mg/kg	42791-16	<0.1 <0.1	LCS-2	94%
Acenaphthylene	mg/kg	42791-16	<0.1 <0.1	[NR]	[NR]
Acenaphthene	mg/kg	42791-16	<0.1 <0.1	[NR]	[NR]
Fluorene	mg/kg	42791-16	<0.1 <0.1	LCS-2	99%
Phenanthrene	mg/kg	42791-16	<0.1 <0.1	LCS-2	99%
Anthracene	mg/kg	42791-16	<0.1 <0.1	[NR]	[NR]
Fluoranthene	mg/kg	42791-16	<0.1 <0.1	LCS-2	95%
Pyrene	mg/kg	42791-16	<0.1 <0.1	LCS-2	102%
Benzo(a)anthracene	mg/kg	42791-16	<0.1 <0.1	[NR]	[NR]
Chrysene	mg/kg	42791-16	<0.1 <0.1	LCS-2	100%
Benzo(b+k)fluoranthene	mg/kg	42791-16	<0.2 <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	42791-16	<0.05 <0.05	LCS-2	106%
Indeno(1,2,3-c,d)pyrene	mg/kg	42791-16	<0.1 <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	42791-16	<0.1 <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	42791-16	<0.1 <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d14	%	42791-16	108 104 RPD: 4	LCS-2	95%

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	42791-16	30/06/2010 30/06/2010	LCS-2	30/06/2010
Date analysed	-	42791-16	30/06/2010 30/06/2010	LCS-2	01/07/2010
HCB	mg/kg	42791-16	<0.1 <0.1	[NR]	[NR]
alpha-BHC	mg/kg	42791-16	<0.1 <0.1	LCS-2	88%
gamma-BHC	mg/kg	42791-16	<0.1 <0.1	[NR]	[NR]
beta-BHC	mg/kg	42791-16	<0.1 <0.1	LCS-2	98%
Heptachlor	mg/kg	42791-16	<0.1 <0.1	LCS-2	88%
delta-BHC	mg/kg	42791-16	<0.1 <0.1	[NR]	[NR]
Aldrin	mg/kg	42791-16	<0.1 <0.1	LCS-2	86%
Heptachlor Epoxide	mg/kg	42791-16	<0.1 <0.1	LCS-2	99%
gamma-Chlordane	mg/kg	42791-16	<0.1 <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	42791-16	<0.1 <0.1	[NR]	[NR]
Endosulfan I	mg/kg	42791-16	<0.1 <0.1	[NR]	[NR]
pp-DDE	mg/kg	42791-16	<0.1 <0.1	LCS-2	103%
Dieldrin	mg/kg	42791-16	<0.1 <0.1	LCS-2	92%
Endrin	mg/kg	42791-16	<0.1 <0.1	LCS-2	93%
pp-DDD	mg/kg	42791-16	<0.1 <0.1	LCS-2	103%
Endosulfan II	mg/kg	42791-16	<0.1 <0.1	[NR]	[NR]
pp-DDT	mg/kg	42791-16	<0.1 <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	42791-16	<0.1 <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	42791-16	<0.1 <0.1	LCS-2	90%
Methoxychlor	mg/kg	42791-16	<0.1 <0.1	[NR]	[NR]
Surrogate TCLMX	%	42791-16	105 107 RPD: 2	LCS-2	103%

QUALITY CONTROL Organophosphorus Pesticides	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	42791-16	30/06/2010 30/06/2010	LCS-2	30/06/2010
Date analysed	-	42791-16	30/06/2010 30/06/2010	LCS-2	01/07/2010
Diazinon	mg/kg	42791-16	<0.1 <0.1	[NR]	[NR]
Dimethoate	mg/kg	42791-16	<0.1 <0.1	[NR]	[NR]
Chlorpyrifos-methyl	mg/kg	42791-16	<0.1 <0.1	[NR]	[NR]
Ronnel	mg/kg	42791-16	<0.1 <0.1	[NR]	[NR]
Chlorpyrifos	mg/kg	42791-16	<0.1 <0.1	LCS-2	102%
Fenitrothion	mg/kg	42791-16	<0.1 <0.1	LCS-2	100%
Bromophos-ethyl	mg/kg	42791-16	<0.1 <0.1	[NR]	[NR]
Ethion	mg/kg	42791-16	<0.1 <0.1	LCS-2	110%
Surrogate TCLMX	%	42791-16	105 107 RPD: 2	LCS-2	104%
QUALITY CONTROL PCBs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	42791-16	30/06/2010 30/06/2010	LCS-2	30/06/2010
Date analysed	-	42791-16	30/06/2010 30/06/2010	LCS-2	01/07/2010
Arochlor 1016	mg/kg	42791-16	<0.1 <0.1	[NR]	[NR]
Arochlor 1221*	mg/kg	42791-16	<0.1 <0.1	[NR]	[NR]
Arochlor 1232	mg/kg	42791-16	<0.1 <0.1	[NR]	[NR]
Arochlor 1242	mg/kg	42791-16	<0.1 <0.1	[NR]	[NR]
Arochlor 1248	mg/kg	42791-16	<0.1 <0.1	[NR]	[NR]
Arochlor 1254	mg/kg	42791-16	<0.1 <0.1	LCS-2	111%
Arochlor 1260	mg/kg	42791-16	<0.1 <0.1	[NR]	[NR]
Surrogate TCLMX	%	42791-16	105 107 RPD: 2	LCS-2	108%
QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	42791-16	30/06/2010 30/06/2010	LCS-2	30/06/2010
Date analysed	-	42791-16	30/06/2010 30/06/2010	LCS-2	30/06/2010
Arsenic	mg/kg	42791-16	250 190 RPD: 27	LCS-2	101%
Cadmium	mg/kg	42791-16	<0.5 <0.5	LCS-2	103%
Chromium	mg/kg	42791-16	25 20 RPD: 22	LCS-2	103%
Copper	mg/kg	42791-16	11 10 RPD: 10	LCS-2	101%
Lead	mg/kg	42791-16	30 29 RPD: 3	LCS-2	101%
Mercury	mg/kg	42791-16	<0.1 <0.1	LCS-2	104%
Nickel	mg/kg	42791-16	<1 1	LCS-2	103%
Zinc	mg/kg	42791-16	4 4 RPD: 0	LCS-2	105%

QUALITY CONTROL vTPH & BTEX in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	42791-30	30/6/2010 30/6/2010	42791-2	30/6/2010
Date analysed	-	42791-30	30/6/2010 30/6/2010	42791-2	30/6/2010
vTPH C ₆ - C ₉	mg/kg	42791-30	<25 <25	42791-2	101%
Benzene	mg/kg	42791-30	<0.5 <0.5	42791-2	96%
Toluene	mg/kg	42791-30	<0.5 <0.5	42791-2	101%
Ethylbenzene	mg/kg	42791-30	<1.0 <1.0	42791-2	95%
m+p-xylene	mg/kg	42791-30	<2.0 <2.0	42791-2	106%
o-Xylene	mg/kg	42791-30	<1.0 <1.0	42791-2	103%
Surrogate aaa-Trifluorotoluene	%	42791-30	114 113 RPD: 1	42791-2	110%
QUALITY CONTROL sTPH in Soil (C10-C36)	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	42791-30	30/6/2010 30/6/2010	42791-2	30/6/2010
Date analysed	-	42791-30	30/6/2010 30/6/2010	42791-2	30/6/2010
TPH C ₁₀ - C ₁₄	mg/kg	42791-30	<50 <50	42791-2	85%
TPH C ₁₅ - C ₂₈	mg/kg	42791-30	<100 <100	42791-2	101%
TPH C ₂₉ - C ₃₆	mg/kg	42791-30	<100 <100	42791-2	100%
Surrogate o-Terphenyl	%	42791-30	96 97 RPD: 1	42791-2	92%
QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	42791-30	30/6/2010 30/6/2010	42791-2	30/6/2010
Date analysed	-	42791-30	1/7/2010 1/7/2010	42791-2	30/6/2010
Naphthalene	mg/kg	42791-30	<0.1 <0.1	42791-2	92%
Acenaphthylene	mg/kg	42791-30	<0.1 <0.1	[NR]	[NR]
Acenaphthene	mg/kg	42791-30	<0.1 <0.1	[NR]	[NR]
Fluorene	mg/kg	42791-30	<0.1 <0.1	42791-2	89%
Phenanthrene	mg/kg	42791-30	<0.1 <0.1	42791-2	95%
Anthracene	mg/kg	42791-30	<0.1 <0.1	[NR]	[NR]
Fluoranthene	mg/kg	42791-30	<0.1 <0.1	42791-2	92%
Pyrene	mg/kg	42791-30	<0.1 <0.1	42791-2	99%
Benzo(a)anthracene	mg/kg	42791-30	<0.1 <0.1	[NR]	[NR]
Chrysene	mg/kg	42791-30	<0.1 <0.1	42791-2	100%
Benzo(b+k)fluoranthene	mg/kg	42791-30	<0.2 <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	42791-30	<0.05 <0.05	42791-2	95%
Indeno(1,2,3-c,d)pyrene	mg/kg	42791-30	<0.1 <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	42791-30	<0.1 <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	42791-30	<0.1 <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d ₁₄	%	42791-30	106 108 RPD: 2	42791-2	103%

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	42791-30	30/06/2010 30/06/2010	42791-2	30/06/2010
Date analysed	-	42791-30	01/07/2010 01/07/2010	42791-2	30/06/2010
HCB	mg/kg	42791-30	<0.1 <0.1	[NR]	[NR]
alpha-BHC	mg/kg	42791-30	<0.1 <0.1	42791-2	90%
gamma-BHC	mg/kg	42791-30	<0.1 <0.1	[NR]	[NR]
beta-BHC	mg/kg	42791-30	<0.1 <0.1	42791-2	99%
Heptachlor	mg/kg	42791-30	<0.1 <0.1	42791-2	94%
delta-BHC	mg/kg	42791-30	<0.1 <0.1	[NR]	[NR]
Aldrin	mg/kg	42791-30	<0.1 <0.1	42791-2	89%
Heptachlor Epoxide	mg/kg	42791-30	<0.1 <0.1	[NR]	[NR]
gamma-Chlordane	mg/kg	42791-30	<0.1 <0.1	42791-2	103%
alpha-chlordane	mg/kg	42791-30	<0.1 <0.1	[NR]	[NR]
Endosulfan I	mg/kg	42791-30	<0.1 <0.1	[NR]	[NR]
pp-DDE	mg/kg	42791-30	<0.1 <0.1	42791-2	107%
Dieldrin	mg/kg	42791-30	<0.1 <0.1	42791-2	96%
Endrin	mg/kg	42791-30	<0.1 <0.1	42791-2	99%
pp-DDD	mg/kg	42791-30	<0.1 <0.1	42791-2	85%
Endosulfan II	mg/kg	42791-30	<0.1 <0.1	[NR]	[NR]
pp-DDT	mg/kg	42791-30	<0.1 <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	42791-30	<0.1 <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	42791-30	<0.1 <0.1	42791-2	96%
Methoxychlor	mg/kg	42791-30	<0.1 <0.1	[NR]	[NR]
Surrogate TCLMX	%	42791-30	106 103 RPD: 3	42791-2	107%

QUALITY CONTROL Organophosphorus Pesticides	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	42791-30	30/06/2010 30/06/2010	42791-2	30/06/2010
Date analysed	-	42791-30	01/07/2010 01/07/2010	42791-2	30/06/2010
Diazinon	mg/kg	42791-30	<0.1 <0.1	[NR]	[NR]
Dimethoate	mg/kg	42791-30	<0.1 <0.1	[NR]	[NR]
Chlorpyrifos-methyl	mg/kg	42791-30	<0.1 <0.1	[NR]	[NR]
Ronnel	mg/kg	42791-30	<0.1 <0.1	[NR]	[NR]
Chlorpyrifos	mg/kg	42791-30	<0.1 <0.1	42791-2	101%
Fenitrothion	mg/kg	42791-30	<0.1 <0.1	42791-2	100%
Bromophos-ethyl	mg/kg	42791-30	<0.1 <0.1	[NR]	[NR]
Ethion	mg/kg	42791-30	<0.1 <0.1	42791-2	114%
Surrogate TCLMX	%	42791-30	106 103 RPD: 3	42791-2	102%
QUALITY CONTROL PCBs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	42791-30	30/06/2010 30/06/2010	42791-2	30/06/2010
Date analysed	-	42791-30	01/07/2010 01/07/2010	42791-2	30/06/2010
Arochlor 1016	mg/kg	42791-30	<0.1 <0.1	[NR]	[NR]
Arochlor 1221*	mg/kg	42791-30	<0.1 <0.1	[NR]	[NR]
Arochlor 1232	mg/kg	42791-30	<0.1 <0.1	[NR]	[NR]
Arochlor 1242	mg/kg	42791-30	<0.1 <0.1	[NR]	[NR]
Arochlor 1248	mg/kg	42791-30	<0.1 <0.1	[NR]	[NR]
Arochlor 1254	mg/kg	42791-30	<0.1 <0.1	42791-2	113%
Arochlor 1260	mg/kg	42791-30	<0.1 <0.1	[NR]	[NR]
Surrogate TCLMX	%	42791-30	106 103 RPD: 3	42791-2	106%
QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	42791-30	30/06/2010 30/06/2010	42791-2	30/06/2010
Date analysed	-	42791-30	30/06/2010 30/06/2010	42791-2	30/06/2010
Arsenic	mg/kg	42791-30	11 11 RPD: 0	42791-2	93%
Cadmium	mg/kg	42791-30	<0.5 <0.5	42791-2	97%
Chromium	mg/kg	42791-30	33 34 RPD: 3	42791-2	97%
Copper	mg/kg	42791-30	4 4 RPD: 0	42791-2	102%
Lead	mg/kg	42791-30	21 21 RPD: 0	42791-2	96%
Mercury	mg/kg	42791-30	<0.1 <0.1	42791-2	102%
Nickel	mg/kg	42791-30	4 4 RPD: 0	42791-2	96%
Zinc	mg/kg	42791-30	5 5 RPD: 0	42791-2	98%

QUALITY CONTROL vTPH & BTEX in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	42791-32	30/6/2010
Date analysed	-	[NT]	[NT]	42791-32	30/6/2010
vTPH C ₆ - C ₉	mg/kg	[NT]	[NT]	42791-32	109%
Benzene	mg/kg	[NT]	[NT]	42791-32	104%
Toluene	mg/kg	[NT]	[NT]	42791-32	110%
Ethylbenzene	mg/kg	[NT]	[NT]	42791-32	102%
m+p-xylene	mg/kg	[NT]	[NT]	42791-32	114%
o-Xylene	mg/kg	[NT]	[NT]	42791-32	109%
Surrogate aaa-Trifluorotoluene	%	[NT]	[NT]	42791-32	111%
QUALITY CONTROL sTPH in Soil (C10-C36)	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	42791-32	30/6/2010
Date analysed	-	[NT]	[NT]	42791-32	30/6/2010
TPH C ₁₀ - C ₁₄	mg/kg	[NT]	[NT]	42791-32	87%
TPH C ₁₅ - C ₂₈	mg/kg	[NT]	[NT]	42791-32	103%
TPH C ₂₉ - C ₃₆	mg/kg	[NT]	[NT]	42791-32	102%
Surrogate o-Terphenyl	%	[NT]	[NT]	42791-32	93%
QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	42791-32	30/6/2010
Date analysed	-	[NT]	[NT]	42791-32	1/7/2010
Naphthalene	mg/kg	[NT]	[NT]	42791-32	67%
Acenaphthylene	mg/kg	[NT]	[NT]	[NR]	[NR]
Acenaphthene	mg/kg	[NT]	[NT]	[NR]	[NR]
Fluorene	mg/kg	[NT]	[NT]	42791-32	87%
Phenanthrene	mg/kg	[NT]	[NT]	42791-32	91%
Anthracene	mg/kg	[NT]	[NT]	[NR]	[NR]
Fluoranthene	mg/kg	[NT]	[NT]	42791-32	90%
Pyrene	mg/kg	[NT]	[NT]	42791-32	97%
Benzo(a)anthracene	mg/kg	[NT]	[NT]	[NR]	[NR]
Chrysene	mg/kg	[NT]	[NT]	42791-32	99%
Benzo(b+k)fluoranthene	mg/kg	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene	mg/kg	[NT]	[NT]	42791-32	96%
Indeno(1,2,3-c,d)pyrene	mg/kg	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d ₁₄	%	[NT]	[NT]	42791-32	104%

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	42791-32	30/06/2010
Date analysed	-	[NT]	[NT]	42791-32	01/07/2010
HCB	mg/kg	[NT]	[NT]	[NR]	[NR]
alpha-BHC	mg/kg	[NT]	[NT]	42791-32	86%
gamma-BHC	mg/kg	[NT]	[NT]	[NR]	[NR]
beta-BHC	mg/kg	[NT]	[NT]	42791-32	96%
Heptachlor	mg/kg	[NT]	[NT]	42791-32	89%
delta-BHC	mg/kg	[NT]	[NT]	[NR]	[NR]
Aldrin	mg/kg	[NT]	[NT]	42791-32	83%
Heptachlor Epoxide	mg/kg	[NT]	[NT]	42791-32	96%
gamma-Chlordane	mg/kg	[NT]	[NT]	[NR]	[NR]
alpha-chlordane	mg/kg	[NT]	[NT]	[NR]	[NR]
Endosulfan I	mg/kg	[NT]	[NT]	[NR]	[NR]
pp-DDE	mg/kg	[NT]	[NT]	42791-32	100%
Dieldrin	mg/kg	[NT]	[NT]	42791-32	89%
Endrin	mg/kg	[NT]	[NT]	42791-32	91%
pp-DDD	mg/kg	[NT]	[NT]	42791-32	63%
Endosulfan II	mg/kg	[NT]	[NT]	[NR]	[NR]
pp-DDT	mg/kg	[NT]	[NT]	[NR]	[NR]
Endrin Aldehyde	mg/kg	[NT]	[NT]	[NR]	[NR]
Endosulfan Sulphate	mg/kg	[NT]	[NT]	42791-32	90%
Methoxychlor	mg/kg	[NT]	[NT]	[NR]	[NR]
Surrogate TCLMX	%	[NT]	[NT]	42791-32	102%

QUALITY CONTROL Organophosphorus Pesticides	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	42791-32	30/06/2010
Date analysed	-	[NT]	[NT]	42791-32	01/07/2010
Diazinon	mg/kg	[NT]	[NT]	[NR]	[NR]
Dimethoate	mg/kg	[NT]	[NT]	[NR]	[NR]
Chlorpyrifos-methyl	mg/kg	[NT]	[NT]	[NR]	[NR]
Ronnel	mg/kg	[NT]	[NT]	[NR]	[NR]
Chlorpyrifos	mg/kg	[NT]	[NT]	42791-32	103%
Fenitrothion	mg/kg	[NT]	[NT]	42791-32	100%
Bromophos-ethyl	mg/kg	[NT]	[NT]	[NR]	[NR]
Ethion	mg/kg	[NT]	[NT]	42791-32	114%
Surrogate TCLMX	%	[NT]	[NT]	42791-32	100%
QUALITY CONTROL PCBs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	42791-32	30/06/2010
Date analysed	-	[NT]	[NT]	42791-32	01/07/2010
Arochlor 1016	mg/kg	[NT]	[NT]	[NR]	[NR]
Arochlor 1221*	mg/kg	[NT]	[NT]	[NR]	[NR]
Arochlor 1232	mg/kg	[NT]	[NT]	[NR]	[NR]
Arochlor 1242	mg/kg	[NT]	[NT]	[NR]	[NR]
Arochlor 1248	mg/kg	[NT]	[NT]	[NR]	[NR]
Arochlor 1254	mg/kg	[NT]	[NT]	42791-32	110%
Arochlor 1260	mg/kg	[NT]	[NT]	[NR]	[NR]
Surrogate TCLMX	%	[NT]	[NT]	42791-32	108%
QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	[NT]	[NT]	42791-32	30/06/2010
Date analysed	-	[NT]	[NT]	42791-32	30/06/2010
Arsenic	mg/kg	[NT]	[NT]	42791-32	99%
Cadmium	mg/kg	[NT]	[NT]	42791-32	99%
Chromium	mg/kg	[NT]	[NT]	42791-32	106%
Copper	mg/kg	[NT]	[NT]	42791-32	106%
Lead	mg/kg	[NT]	[NT]	42791-32	100%
Mercury	mg/kg	[NT]	[NT]	42791-32	105%
Nickel	mg/kg	[NT]	[NT]	42791-32	101%
Zinc	mg/kg	[NT]	[NT]	42791-32	116%

Report Comments:

Asbestos was analysed by Approved Identifier: Matt Mansfield

Asbestos was authorised by Approved Signatory: Matt Mansfield

INS: Insufficient sample for this test NT: Not tested PQL: Practical Quantitation Limit <: Less than >: Greater than

RPD: Relative Percent Difference NA: Test not required LCS: Laboratory Control Sample NR: Not requested

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 sample batch were within laboratory acceptance criteria.*

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

Matrix Spikes and LCS: Generally 70-130% for inorganics/metals; 60-140% for organics and 10-140% for

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



Envirolab Services Pty Ltd
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12 Ashley St Chatswood NSW 2067
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enquiries@envirolabservices.com.au
www.envirolabservices.com.au

SAMPLE RECEIPT ADVICE

Client:

Environmental Investigation Services
PO Box 976
North Ryde BC NSW 1670

ph: 02 9888 5000
Fax: 02 9888 5001

Attention: Todd Hore

Sample log in details:

Your reference:
Envirolab Reference:
Date received:
Date results expected to be reported:

E23765KH, St Ives
42791
29/06/10
6/07/10

Samples received in appropriate condition for analysis:	YES
No. of samples provided	43 Soils
Turnaround time requested:	Standard
Temperature on receipt	Cool
Cooling Method:	Ice Pack

Comments:

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

Contact details:

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

SAMPLE AND CHAIN OF CUSTODY FORM

TO: Envirolab Services Pty Ltd 12 Ashley Street Chatswood NSW 2067 Phone: (02) 99106200 Fax: (02) 99106201 Attention: Aileen						EIS Job Number: E23765KH Date Results Required: standard turnaround						FROM: Environmental Investigation Services Rear 115 Wicks Road Macquarie Park NSW 2113 Phone: (02) 9888 5000 Fax: (02) 9888 5004 Contact: Todd Hore						
Project: Proposed Residential Development Location: St Ives Sampler: TH						Tests Required						Sample Preservation: In esky on ice						
Date Sampled	Lab Ref:	Borehole/Sample Number	Depth (m)	Sample Container	PID	Sample Description	Heavy Metals (8)	TPH/BTEX	PAH	OC/OP/PCB	Asbestos	TCLP Prep + M6, PAH	Phenols	VOC	sVOC	sPOCAS		
28/06/2010	1	BH1	0-0.4	Glass jar + Asb Bag	0	Fill	X	X	X	X	X							
28/06/2010	2	BH1	0.5-0.9	Glass jar + Asb Bag	0	Natural	X	X	X	X	X							
28/06/2010	3	BH2	0-0.3	Glass jar + Asb Bag	0	Fill	X	X	X	X	X							
28/06/2010	4	BH2	0.4-0.8	Glass jar + Asb Bag	0	Natural												
28/06/2010	5	BH3	0-0.2	Glass jar + Asb Bag	0	Fill	X	X	X	X	X							
28/06/2010	6	BH3	0.3-0.4	Glass jar + Asb Bag	0	Natural	X	X	X	X	X							
28/06/2010	7	BH4	0-0.1	Glass jar + Asb Bag	0	Fill	X	X	X	X	X							
28/06/2010	8	BH4	0.2-0.6	Glass jar + Asb Bag	0	Natural												
28/06/2010	9	BH5	0-0.4	Glass jar + Asb Bag	0	Fill	X	X	X	X	X							
28/06/2010	10	BH5	0.5-0.9	Glass jar + Asb Bag	0	Natural												
28/06/2010	11	BH6	0-0.4	Glass jar + Asb Bag	0	Fill	X	X	X	X	X							
28/06/2010	12	BH6	0.5-0.9	Glass jar + Asb Bag	0	Natural	X	X	X	X	X							
28/06/2010	13	BH7	0-0.2	Glass jar + Asb Bag	0	Fill	X	X	X	X	X							
28/06/2010	14	BH7	0.3-0.7	Glass jar + Asb Bag	0	Natural												
28/06/2010	15	BH8	0.1-0.4	Glass jar + Asb Bag	0	Fill	X	X	X	X	X							
28/06/2010	16	BH8	0.5-0.9	Glass jar + Asb Bag	0	Natural	X	X	X	X	X							
28/06/2010	17	BH9	0-0.2	Glass jar + Asb Bag	0	Fill	X	X	X	X	X							
28/06/2010	18	BH9	0.3-0.7	Glass jar + Asb Bag	0	Natural												
28/06/2010	19	BH10	0-0.4	Glass jar + Asb Bag	0	Fill	X	X	X	X	X							
28/06/2010	20	BH10	0.2-0.6	Glass jar + Asb Bag	0	Natural												
28/06/2010	21	BH11	0-0.3	Glass jar + Asb Bag	0	Fill	X	X	X	X	X							
28/06/2010	22	BH11	0.4-0.8	Glass jar + Asb Bag	0	Natural												
28/06/2010	23	BH12	0-0.3	Glass jar + Asb Bag	0	Fill	X	X	X	X	X							
28/06/2010	24	BH12	0.4-0.8	Glass jar + Asb Bag	0	Natural	X	X	X	X	X							
28/06/2010	25	BH13	0-0.4	Glass jar + Asb Bag	0	Fill	X	X	X	X	X							
Remarks (comments/detection limits required):																		
Relinquished By: <i>[Signature]</i>		Date: 29/6/10 Time: 11am		Received By:		Relinquished By:		Date: 29/6/10 Time: 2pm		Received By:		Date: 29/6/10 Time: 2pm		Received By: Z L.				

SAMPLE AND CHAIN OF CUSTODY FORM

TO: EnviroLab Services Pty Ltd 12 Ashley Street Chatswood NSW 2067 Phone: (02) 99106200 Fax: (02) 99106201 Attention: Aileen	EIS Job Number: E23765KH Date Results Required: standard turnaround	FROM: Environmental Investigation Services Rear 115 Wicks Road Macquarie Park NSW 2113 Phone: (02) 9888 5000 Fax: (02) 9888 5004 Contact: Todd Hore
--	--	---

Sheet 2 /

Project: Proposed Residential Development Location: St Ives Sampler: TH	Tests Required	Sample Preservation: In esky on ice
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Date Sampled	Lab Ref:	Borehole/ Sample Number	Depth (m)	Sample Container	PID	Sample Description	Heavy Metals (8)	TPH/BTEX	PAH	OC/OP/ PCB	Asbestos	TCLP Prep + M6, PAH	Phenols	VOC	sVOC	sPOCAS		
28/06/2010	26	BH13	0.6-1	Glass jar + Asb Bag	0	Natural												
28/06/2010	27	BH14	0-0.3	Glass jar + Asb Bag	0	Fill	X	X	X	X	X							
28/06/2010	28	BH14	0.4-0.8	Glass jar + Asb Bag	0	Natural												
28/06/2010	29	BH15	0-0.3	Glass jar + Asb Bag	0	Fill	X	X	X	X	X							
28/06/2010	30	BH15	0.3-0.5	Glass jar + Asb Bag	0	Natural	X	X	X	X	X							
28/06/2010	31	BH15	0.5-0.9	Glass jar + Asb Bag	0	Natural												
28/06/2010	32	BH16	0-0.3	Glass jar + Asb Bag	0	Fill	X	X	X	X	X							
28/06/2010	33	BH16	0.4-0.8	Glass jar + Asb Bag	0	Natural	X	X	X	X	X							
28/06/2010	34	BH17	0-0.4	Glass jar + Asb Bag	0	Fill	X	X	X	X	X							
28/06/2010	35	BH17	0.6-1	Glass jar + Asb Bag	0	Natural												
28/06/2010	36	Dup 1		Glass jar + Asb Bag	0	Soil	X	X										
28/06/2010	37	Dup 2		Glass jar + Asb Bag	0	Soil	X	X										
28/06/2010	38	Dup 3		Glass jar + Asb Bag	0	Soil	X	X										
28/06/2010	39	Dup 4		Glass jar + Asb Bag	0	Soil												
28/06/2010	40	Dup 5		Glass jar + Asb Bag	0	Soil												
28/06/2010	41	Dup 6		Glass jar + Asb Bag	0	Soil												
28/06/2010		Dup 7 missing		Glass jar + Asb Bag	0	Soil												
28/06/2010	42	SP1		Glass jar + Asb Bag	0	Fill	X	X	X	X	X							
28/06/2010	43	SP2		Glass jar + Asb Bag	0	Fill	X	X	X	X	X							
28/06/2010				Glass jar + Asb Bag														
28/06/2010				Glass jar + Asb Bag														
28/06/2010				Glass jar + Asb Bag														
28/06/2010				Glass jar + Asb Bag														
28/06/2010				Glass jar + Asb Bag														
28/06/2010				Glass jar + Asb Bag														
28/06/2010				Glass jar + Asb Bag														

Remarks (comments/detection limits required):

Relinquished By:	Date: 29/6/10 Time: 11am	Received By:	Relinquished By:	Date:	Time:	Received By:
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12 Ashley St Chatswood NSW 2067
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CERTIFICATE OF ANALYSIS 42791-A

Client:

Environmental Investigation Services
PO Box 976
North Ryde BC
NSW 1670

Attention: Todd Hore

Sample log in details:

Your Reference:	<u>E23765KH, St Ives</u>
No. of samples:	Additional Testing on 1 Soil
Date samples received:	29/06/10
Date completed instructions received:	05/07/10

Analysis Details:

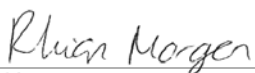
Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.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

Report Details:

Date results requested by:	9/07/10
Date of Preliminary Report:	Not Issued
Issue Date:	9/07/10

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

Results Approved By:


Rhian Morgan
Metals Supervisor

Envirolab Reference: 42791-A
Revision No: R 00



Metals in TCLP USEPA1311		
Our Reference:	UNITS	42791-A-16
Your Reference	-----	BH308
Depth	-----	0.5-0.9
Date Sampled		28/06/2010
Type of sample		Soil
Date extracted	-	05/07/2010
Date analysed	-	09/07/2010
pH of soil for fluid# determ.	pH units	8.30
pH of soil for fluid # determ. (acid)	pH units	1.50
Extraction fluid used	-	1
pH of final Leachate	pH units	4.90
Arsenic in TCLP	mg/L	<0.05

Method ID	Methodology Summary
LAB.4	Toxicity Characteristic Leaching Procedure (TCLP).
EXTRACT.7	Toxicity Characteristic Leaching Procedure (TCLP).
LAB.1	pH - Measured using pH meter and electrode in accordance with APHA 20th ED, 4500-H+.
Metals.20 ICP-AES	Determination of various metals by ICP-AES.

QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
Metals in TCLP USEPA1311						Base II Duplicate II %RPD		
Date extracted	-			05/07/2010	[NT]	[NT]	LCS-W1	05/07/2010
Date analysed	-			09/07/2010	[NT]	[NT]	LCS-W1	09/07/2010
Arsenic in TCLP	mg/L	0.05	Metals.20 ICP-AES	<0.05	[NT]	[NT]	LCS-W1	95%

Report Comments:

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

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

INS: Insufficient sample for this test NT: Not tested PQL: Practical Quantitation Limit <: Less than >: Greater than

RPD: Relative Percent Difference NA: Test not required LCS: Laboratory Control Sample NR: Not requested

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 sample batch were within laboratory acceptance criteria.*

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

Matrix Spikes and LCS: Generally 70-130% for inorganics/metals; 60-140% for organics and 10-140% for

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

Aileen Hie

From: Todd Hore [thore@jkgroup.net.au]
Sent: Monday, 5 July 2010 03:32 PM
To: Aileen Hie
Subject: 42791

EIS

ENVIRONMENTAL INVESTIGATION SERVICES

A division of Jeffery & Katauskas Pty Ltd
ABN 17 003 550 801

Aileen,
Could you please schedule the following TCLP for the project E23765KH, St Ives:

- 42791-16 – TCLP + arsenic

Please undertake the above on a 4 day turnaround or faster.

Regards,
For and on behalf of
ENVIRONMENTAL INVESTIGATION SERVICES

Todd Hore
Senior Environmental Engineer

115 Wicks Road, Macquarie Park, NSW, 2113
PO Box 976, North Ryde BC, NSW, 1670
Tel: 02 9888 5000
Fax: 02 9888 5004
email: thore@jkgroup.net.au
Web: www.jkgroup.net.au

*** IMPORTANT ***

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EnviroLab Ref: 42791A
Due: 9/7/10
Std T/A.

5/07/2010



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 42791-B

Client:

Environmental Investigation Services
PO Box 976
North Ryde BC
NSW 1670

Attention: Todd Hore

Sample log in details:

Your Reference:	<u>E23765KH, St Ives</u>
No. of samples:	Additional Testing on 1 Soil
Date samples received:	29/06/10
Date completed instructions received:	06/07/10

Analysis Details:

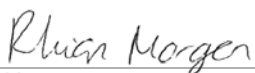
Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.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

Report Details:

Date results requested by:	9/07/10
Date of Preliminary Report:	Not Issued
Issue Date:	9/07/10

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Results Approved By:


Rhian Morgan
Metals Supervisor

Acid Extractable metals in soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	42791-B-39 Dup4 - 28/06/2010 Soil
Date digested	-	07/07/2010
Date analysed	-	07/07/2010
Arsenic	mg/kg	350

Moisture Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	42791-B-39 Dup4 - 28/06/2010 Soil
Date prepared	-	7/7/2010
Date analysed	-	7/7/2010
Moisture	%	11

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

QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
Acid Extractable metals in soil						Base II Duplicate II %RPD		
Date digested	-			07/07/2010	[NT]	[NT]	LCS-1	07/07/2010
Date analysed	-			07/07/2010	[NT]	[NT]	LCS-1	07/07/2010
Arsenic	mg/kg	4	Metals.20 ICP-AES	<4	[NT]	[NT]	LCS-1	101%

QUALITY CONTROL	UNITS	PQL	METHOD	Blank
Moisture				
Date prepared	-			7/7/2010
Date analysed	-			7/7/2010
Moisture	%	0.1	LAB.8	<0.10