ENVIRONMENTAL INVESTIGATION SERVICES

2 February 2018
Ref: E30392KPlet3 Rev2

Coronation (28 Shepherd Street) Pty Ltd
C/- MN Builders
Level 2, 66 Wentworth Avenue
Surry Hills NSW 2010

Attention: Nicole Lasky, via email nicolel@coronation.com.au cc: al@coronation.com.au

RESPONSE TO LIVERPOOL CITY COUNCIL CLARIFICATION ON REMEDIATION – DA-82/2017
PROPOSED RESIDENTIAL DEVELOPMENT
26-28 SHEPHERD STREET, LIVERPOOL, NSW

MN Builders, acting on behalf of Coronation (28 Shepherd Street) Pty Ltd ('the client'), commissioned Environmental Investigation Services (EIS)[1] to provide validation consultant services associated with the remediation and proposed development of the above referenced site. It is understood that the proposed development and remediation initially commenced under DA-612/2015 for 28 Shepherd Street, however was subsequently extended to incorporate 26 Shepherd Street, resulting in the lodgement of a new development application (DA) DA-82/2017.

EIS were provided with a copy of the email from Liverpool City Council regarding the unauthorised works that commenced at 26 Shepherd Street which stated the following:

"The Stage 2-Detailed Site Investigation (Report E23125 AB_Rev 0, Revision 0) prepared by Environmental Investigations Australia Pty Ltd dated 22nd November 2016 indicated that Lot 23 DP 859055, 26 Shepherd Street, Liverpool NSW posed unacceptable risks to human health. Consequently, the Application was supported by a Remediation Action Plan titled 'Coronation (26 Shepherd St) Pty Ltd (EI Report No.: E23125 AC_Rev0) prepared by EI Australia dated 24th March 2017'. As a result, the site requires remediation and validation to confirm its suitability for the proposed land use.

The impact of the unauthorised works on the proposed remediation strategy is currently unknown. Due to this uncertainty, the Remediation Action Plan is to be reviewed by the contaminated land consultant to determine the validity of the remediation strategy. As the site requires validation sampling, the contaminated land consultant must confirm in writing that the proposed remediation strategy is still suitable given the unauthorised works on-site.

[1] Environmental consulting division of Jeffery & Katauskas Pty Ltd (J&K)

If remediation works were undertaken, a copy of the validation report prepared by a suitably qualified and experienced contaminated land consultant shall be submitted to Council for review."

In relation to the above, EIS note the following:

- The existing RAP for 28 Shepherd Street was initially reviewed by EIS at the commencement of our involvement on the project. EIS have also recently reviewed the RAP for 26 Shepherd Street as referenced above by Liverpool City Council. Notwithstanding some deficiencies that we have addressed (and will continue to address) progressively throughout the project, EIS are of the opinion that the RAPs are largely appropriate and applicable for both the 26 and 28 Shepherd Street portions of the site;
- EIS are of the opinion that the unauthorised works associated with the extension of the development into the 26 Shepherd Street portion of the site did not and should not have a significant impact on the proposed remediation strategy, or the outcome of the validation;
- The proposed remediation included removal and off-site disposal of underground tanks[2], and excavation and off-site disposal of contaminated fill soil (this was covered under the original RAPs for 26 and 28 Shepherd Street, prepared by EI Australia). EIS have collected and analysed validation samples from across the base of the basement excavation. The results of this analysis has demonstrated that the remediation in the basement/building footprint was successful and that this area of the site has been remediated so that there are no unacceptable risks to human health or the environment. These results are to be reported in the final site validation report on completion of all relevant works, to address Condition 146 of DA-612/2015. EIS believe that it would be appropriate for this condition to be reflected in DA-82/2017;
- Contaminated fill material remains in the eastern area of the site, between the eastern wall of the basement/building footprint and the river bank. EIS have prepared an addendum RAP (see attached) to address these residual impacts and we have been advised that remediation will occur at an appropriate point in the project timeline;
- EIS have been engaged to validate the remainder of the remedial works and provide a validation report to address Condition 146 of DA-612/2015. Subject to the implementation of the EIS addendum RAP and the existing RAPs prepared by EI Australia, EIS are of the opinion that successful validation can be achieved prior to issue of the Occupancy Certificate, as required under Condition 146 of DA-612/2015; and
- Overall, EIS are of the opinion that the previous RAPs prepared by EI Australia, together with the addendum RAP prepared by EIS, are suitable documents to facilitate remediation and validation of the site.

[2] The underground tanks were only relevant to the 28 Shepherd Street property and the associated RAP

EIS has used a degree of care, skill and diligence normally exercised by consulting engineers/scientists in similar circumstances and locality. No other warranty expressed or implied is made or intended. Subject to payment of all fees, the client alone shall have a licence to use this letter.

If you have any questions concerning the contents of this letter please do not hesitate to contact us.

Kind Regards

Brendan Page
Associate Environmental Scientist

Todd Hore
Associate Environmental Engineer

Attachments:
EIS Addendum RAP (Ref: E30392KPlet2, dated 9 August 2017)

ENVIRONMENTAL INVESTIGATION SERVICES

9/08/2017
Ref: E30392KPlet2

Coronation (28 Shepherd Street) Pty Ltd
C/- MN Builders
Level 2, 66 Wentworth Avenue
Surry Hills NSW 2010

Attention: Mr. John Saraf

ADDENDUM REMEDIATION/VALIDATION PLAN AND WASTE CLASSIFICATION
PROPOSED RESIDENTIAL DEVELOPMENT
26-28 SHEPHERD STREET, LIVERPOOL, NSW

1 INTRODUCTION

MN Builders, acting on behalf of Coronation (28 Shepherd Street) Pty Ltd ('the client'), commissioned Environmental Investigation Services (EIS)[1] to undertake a validation assessment for the proposed residential development at 26-28 Shepherd Street, Liverpool, NSW ('the site'). The site location is shown on the attached Figure 1. This letter has been prepared to document the waste classification of fill remaining at the site in the investigation area shown on Figure 2, and to document the supplementary remediation and validation requirements for this area.

This letter should be provided to the relevant consent authorities to advise of a minor variation to the approved Remediation Action Plan (RAP).

2 BACKGROUND

A RAP was prepared by Environmental Investigations Australia (EIA) for 28 Shepherd Street (Ref: E22480 AA, dated 15 April 2015). The RAP provided a methodology to remediate the number 28 Shepherd Street property via excavation and off-site disposal of contaminated soil. Since preparation of the RAP, EIS understand that the development site was expanded to include the number 26 Shepherd Street property. The RAP should be read in conjunction with this letter.

Following engagement as the validation consultant, EIS reviewed the RAP and advised MN Builders that further validation of the remnant fill in the eastern section of the site (i.e. the fill that would remain on-site following construction of the basement over the majority of the site footprint) would be

[1] Environmental consulting division of Jeffery & Katauskas Pty Ltd (J&K)

Postal Address: PO Box 976, North Ryde BC NSW 1670
Tel: 02 9888 5000 • Fax: 9888 5004
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required. EIS completed this validation in July 2017 and results of the validation identified contamination (asbestos, hydrocarbons and pesticides) above the human-health and ecological-based assessment criteria for residential land use. Due to constraints associated with the construction programme, the two available options for remediating the contamination included cap and contain, or excavation and off-site disposal.

Considering the above and the conditions of the development consent, MN Builders advised EIS that the preferred option for remediation of the remnant fill is excavation and off-site disposal. EIS subsequently prepared a summary advice letter (Ref: E30392KPlet, dated 25 July 2017) outlining the requirements for addressing the issues identified. The summary letter dated 25 July 2017 should be read in conjunction with this letter.

3 WASTE CLASSIFICATION

EIS have undertaken a waste classification assessment for the remnant fill in the investigation area shown on the attached Figure 2. The assessment was undertaken in general accordance with the NSW EPA Waste Classification Guidelines - Part 1: Classifying Waste (2014)[2]. Details for the waste classification are provided below:

3.1 Site Information

Table 3-1: Site Identification

Site Address:	26-28 Shepherd Street, Liverpool, NSW
Lot & Deposited Plan:	Lots 22 and 23 DP859055
Current Land Use:	Construction site
Historical Land Use(s):	Industrial, including a wool mill and metal reclamation (EIS, 2015)
Area Applicable to Waste Classification (m^2):	5,000
Geographical Location (approx.):	Latitude: -33.932929 Longitude: 150.92324

3.2 Site Description

EIS inspected the site on 13 July 2017. At the time of the inspection the majority of the site had been excavated for construction of the basement. The area applicable to this waste classification included

[2] NSW EPA, (2014). *Waste Classification Guidelines, Part 1: Classifying Waste.* (referred to as Waste Classification Guidelines 2014)

the land to the east of the basement (see Figure 2). This area was surfaced with exposed fill. Several fragments of fibre cement were observed at the ground surface.

3.3 Previous Investigations and Contaminants

The RAP indicated that the site was previously investigated by AER in 1996 and subsequently by Environmental Strategies in 2014. The Environmental Strategies investigation was limited to Lot 22 only.

EIS have not been provided with copies of the previous investigation reports and therefore cannot review the data. However, based on summary information presented in the RAP, the primary contaminants of concern that were assessed included heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), polycyclic aromatic hydrocarbons (PAHs), petroleum hydrocarbons including benzene, toluene, ethylbenzene and xylene (BTEX) and total petroleum/recoverable hydrocarbons (TRHs), pesticides and asbestos. Remediation was required in relation to asbestos, copper, lead, zinc and PAHs in fill, and for the removal of underground fuel storage tanks. The above contaminants have all been included as analytes for the purpose of this waste classification.

3.4 Waste Classification Assessment Criteria

Off-site disposal of fill, contaminated material, stockpiled soil, natural soil, rock excavated as part of the proposed development works is regulated by the Protection of the Environment Operations Act (1997)[3] and associated regulations and guidelines including the Part 1 of the Waste Classification Guidelines. Soils are classed into the following categories based on the chemical contaminant criteria outlined in the guidelines:

Table 3-2: Waste Categories

Category	Description
General Solid Waste (non-putrescible) (GSW)	• If Specific Contaminant Concentration (SCC) ≤ Contaminant Threshold (CT1) then Toxicity Characteristics Leaching Procedure (TCLP) not needed to classify the soil as GSW • If TCLP ≤ TCLP1 and SCC ≤ SCC1 then treat as GSW
Restricted Solid Waste (non-putrescible) (RSW)	• If SCC ≤ CT2 then TCLP not needed to classify the soil as RSW • If TCLP ≤ TCLP2 and SCC ≤ SCC2 then treat as RSW
Hazardous Waste (HW)	• If SCC > CT2 then TCLP not needed to classify the soil as HW • If TCLP > TCLP2 and/or SCC > SCC2 then treat as HW
Virgin Excavated Natural Material (VENM)	Natural material (such as clay, gravel, sand, soil or rock fines) that meet the following:

[3] NSW Government, (1997). *Protection of Environment Operations Act.* (POEO Act 1997)

Category	Description
	• That has been excavated or quarried from areas that are not contaminated with manufactured chemicals, or with process residues, as a result of industrial, commercial mining or agricultural activities; • That does not contain sulfidic ores or other waste; and • Includes excavated natural material that meets such criteria for virgin excavated natural material as may be approved from time to time by a notice published in the NSW Government Gazette.

3.5 Summary of Investigation Procedure

Field work for this investigation was undertaken on 13 July 2017. The waste classification data was collected as part of a broader investigation that aimed to quantify the presence of asbestos in fill in accordance with the relevant guidelines. The investigation plan was considered suitable to characterise the fill/waste in the investigation area, down to a maximum depth of 3m.

Soil samples were obtained from 16 test pits (TP1 to TP16 inclusive as shown on Figure 2). The investigation was limited to a maximum depth of 3m below ground level, however the sampling was targeted at the fill profiles and the majority of the test pits were terminated after reaching natural soil at depths shallower than 3m.

The sample locations were excavated using an excavator supplied by the client. Soil samples were obtained directly from the test pit walls and from the excavator bucket. Samples were typically obtained from each distinct fill profile. All samples were recorded on the test pit logs attached.

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. The samples were labelled with the job number, sampling location and sampling depth.

A portable Photoionisation Detector (PID) was used to screen the samples for the presence of VOCs and to assist with selection of samples for further analysis for petroleum hydrocarbons. PID screening for 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. All the PID measurements are quoted as parts per million (ppm) isobutylene equivalents and are documented on the Chain of Custody (COC) documents.

Soil samples were preserved by immediate storage in an insulated sample container with ice in accordance with AS4482.1-2005 and AS4482.2-1999[4]. On completion of the fieldwork, the samples

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

were delivered in the insulated sample container to a NATA registered laboratory for analysis under standard COC procedures.

3.6 Laboratory Analysis

Selected in-situ fill samples were analysed for the following:

- Heavy metals including: arsenic, cadmium, chromium (total), copper, lead, mercury, nickel and zinc (14 samples);
- Polycyclic Aromatic Hydrocarbons (PAHs) (14 samples);
- Total Recoverable Hydrocarbons (TRH) (14 samples);
- Monocyclic aromatic hydrocarbons including benzene, toluene, ethylbenzene and xylene (BTEX) (14 samples);
- Organochlorine pesticides (OCPs) (8 samples);
- Organophosphate pesticides (OPPs) (8 samples);
- Polychlorinated biphenyls (PCBs) (8 samples);
- Asbestos (20 samples); and
- TCLP leachate analysis for heavy metals where required.

Samples were analysed by Envirolab Services (NATA Accreditation Number – 2901) using the analytical methods detailed in the National Environmental Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013[5]). Reference should be made to the laboratory reports (Ref: 171390, 171390-A) attached for further information.

One natural soil sample and additional quality control samples were also analysed as part of the investigation. This data will be discussed as part of the overall site validation and does not affect the waste classification assessment.

3.7 Waste Classification Results

3.7.1 Sub-surface Conditions

The waste being classified comprised a mixture of silty clay soil, ash and building rubble (and various mixtures thereof). The fill extended to depths ranging from <1m to 2.6m. Fragments of fibre cement (containing asbestos) were identified in the waste.

Four locations (TP11, TP13, TP14 and TP15) were terminated due to obstructions in fill or due to other limitations. Reference should be made to the test pit logs attached for further details.

[5] National Environment Protection Council (NEPC), (2013). *National Environmental Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013).* (referred to as NEPM 2013)

A selection of photos of the waste are provided below:

Photos: test pits and test pit spoil 13.7.17

3.7.2 VOC Screening

PID soil sample headspace readings are presented in the COC documents attached in the appendices. All results were 0ppm equivalent isobutylene which indicates a lack of PID detectable VOCs.

3.7.3 Laboratory Results

The laboratory results were assessed against the criteria presented in Part 1 of the Waste Classification Guidelines, as summarised previously in this report. The results are presented in the attached report Table A and Table B. A summary of the results is presented below.

Table 3-3: Summary of Soil Laboratory Results Compared to CT and SCC Criteria

Analyte	No. of Fill Samples Analysed	No. of Results > CT Criteria	No. of Results > SCC Criteria	Comments
Heavy Metals	14	5	1	Lead exceeded CT1 in TP2 (0-0.2m), TP5 (0-0.5), TP11 (0-0.2m) and TP16 (0.5-0.7m). Mercury exceeded CT1 in TP11 (0-0.2m). Lead in TP11 (0-0.2m) also exceeded SCC1 (maximum concentration of 3,900mg/kg).
TRH/BTEX	14	0	0	-
Total PAHs	14	0	0	-

Analyte	No. of Fill Samples Analysed	No. of Results > CT Criteria	No. of Results > SCC Criteria	Comments
Benzo(a)pyrene	14	0	0	-
OCPs & OPPs	8	0	0	-
PCBs	8	0	0	-
Asbestos	20	-	-	Asbestos was detected in four samples.

Table 3-4: Summary of Soil Laboratory Results Compared to TCLP Criteria

Analyte	No. of Samples Analysed	No. of Results > TCLP Criteria	Comments
Lead	4	1	The TCLP lead concentration in TP11 (0-0.2m) was 140mg/L and exceeded the TCLP3 (HW) criterion of 20mg/L
Mercury	1	0	-

3.7.4 Statistical Analysis

The lead and mercury dataset was analysed statistically using ProUCL (version 5.0). A summary of the statistical data is presented in Table A and the statistical output from ProUCL is also attached. The 95% Upper Confidence Limit (UCL) values for lead and mercury were 3,069mg/kg and 2.5mg/kg respectively.

3.8 Classification of Fill

Based on the results of the assessment, the fill at TP11 is classified as 'hazardous waste (non-putrescible) containing asbestos (special waste)'. The remaining fill to a maximum depth of 3m is classified as 'general solid waste (non-putrescible) containing asbestos (special waste)'.

The anticipated horizontal extent of the hazardous waste stream is shown on the attached Figure 2. The extent should be confirmed via validation sampling prior to excavation of the general solid waste stream. A procedure for the excavation and validation is documented in the following sections of this letter.

4 REMEDIATION AND VALIDATION WORKS PLAN

A remediation and validation works plan is provided in the following sections of this letter to address the contaminated fill to the east of the basement footprint. This works plan forms an addendum to the existing RAP and the relevant controls and requirements outlined in the RAP should be implemented concurrently with this plan.

4.1 Approvals and Pre-commencement Requirements

Prior to the commencement of excavation works, the client/contractor should:

- Provide this addendum to the consent authorities and obtain approvals for the required works;
- Obtain geotechnical advice and develop a suitable methodology to facilitate the removal of fill from the investigation area shown on the attached Figure 2. Fill will need to be removed down to the natural soil level. In the unexpected event that fill in parts of the investigation area extends deeper than 3m below the proposed finished site level, the excavation does not need to extend beyond this depth (i.e. the maximum depth of fill excavation will be no more than 3m below the proposed finished site level);
- The excavation process should be designed to minimise the potential for cross contamination. EIS should be consulted in this regard;
- A Class A asbestos removal contractor should be engaged for the excavation work. An asbestos removal control plan should be developed, and notification of the works should be submitted to SafeWork NSW a minimum of five business days prior to commencement;
- The waste classification documentation contained within this report should be provided to the receiving waste facilities and authorisation for disposal should be provided; and
- Appropriate tracking of waste should be organised by the waste transporter.

4.2 Remediation

The excavation/remediation should subsequently be undertaken as follows:

- Mark out the area of hazardous waste at TP11 as shown on the attached Figure 2;
- Excavate all fill from this area down to the surface of the underlying natural soil. This portion of the excavation is expected to extend to a depth of approximately 0.9m to 1.1m based on the fill depths encountered in the EIS test pits;
- The hazardous waste should be loaded directly into trucks and transported to a suitably licensed facility under the waste classification provided in Section 3.8 of this letter;
- Following removal of the hazardous waste, validation samples should be obtained in accordance with Section 4.3. The primary aim of this validation is to confirm that the hazardous waste does not extend beyond the nominated area;
- Subject to appropriate validation (i.e. the results demonstrate that the material at the walls of the excavation falls into the general solid waste category with regards to lead), the remaining fill (i.e. general solid waste containing asbestos) can then be excavated, loaded directly into trucks and transported to a suitably licensed facility under the waste classification provided in Section 3.8 of this letter;

- Following removal of the general solid waste, validation samples should be obtained in accordance with Section 4.3. The primary aim of this validation is to confirm that residual contamination that could pose a risk to the receptors under the proposed land use scenario is not present;
- Subject to appropriate validation, the area can be backfilled with clean material in accordance with the project geotechnical requirements. Preferably, the backfill should be VENM. Any materials imported from off-site must have appropriate supporting documentation and be validated in accordance with the RAP.

4.3 Validation

A summary of the validation requirements is provided in the following table:

Table 4-1: Validation Requirements

Aspect	Sampling	Analysis	Observations and Documentation
Removal of Hazardous Waste			
Excavation walls	Two samples evenly spaced along each wall, obtained from a depth of 0-0.2m (eight samples total)	Lead and lead TCLP	A description of the material at each sample location is required. Photographs of the excavation walls and base should be obtained. Waste tracking documentation and landfill disposal dockets must be retained.
Removal of Remaining Fill / General Solid Waste			
Base of the excavation following removal of fill	One sample per 400m^2 (i.e. 20m grid)	Lead, OCPs, asbestos	Photographs of the excavation base (and any exposed walls) should be obtained. Waste tracking documentation and landfill disposal dockets must be retained.

Appropriate quality control sampling and analysis should also be undertaken in accordance with the RAP.

4.4 Validation Criteria

The validation data for the removal of hazardous waste should be compared to the criteria detailed in Part 1 of the Waste Classification Guidelines (2014). These results should fall into the general solid waste category. In the event of a validation failure, the excavation should be extended and revalidated under the guidance of EIS.

The validation data for the base of the excavation (i.e. following fill removal) should be assessed against the human-health criteria outlined in the RAP.

4.5 Fill Volume

Based on the existing data and the assumed extent of hazardous waste at TP11, EIS estimate that the volume of hazardous waste in this area may be in the order of 200m^3. On completion of excavation works, the weighbridge dockets from the landfill(s) should be reconciled to confirm the quantities of the various waste streams disposed off-site.

5 VALIDATION REPORT

An interim validation report should be prepared to document the results of the hazardous waste removal and confirm the classification of the remaining fill. The remaining validation results should be incorporated into the overall site validation report on completion of the project.

6 LIMITATIONS

The findings presented in this letter are based on site conditions that existed at the time of the assessment. The conclusions are based on the investigation of conditions at specific locations, chosen to be as representative as possible under the given circumstances.

This letter has been prepared for the particular project described and no responsibility is accepted for the use of any part of this letter in any other context or for any other purpose. Copyright in this letter is the property of EIS.

EIS has used a degree of care, skill and diligence normally exercised by consulting engineers/scientists in similar circumstances and locality. No other warranty expressed or implied is made or intended. Subject to payment of all fees, the client alone shall have a licence to use this letter.

If you have any questions concerning the contents of this letter please do not hesitate to contact us.

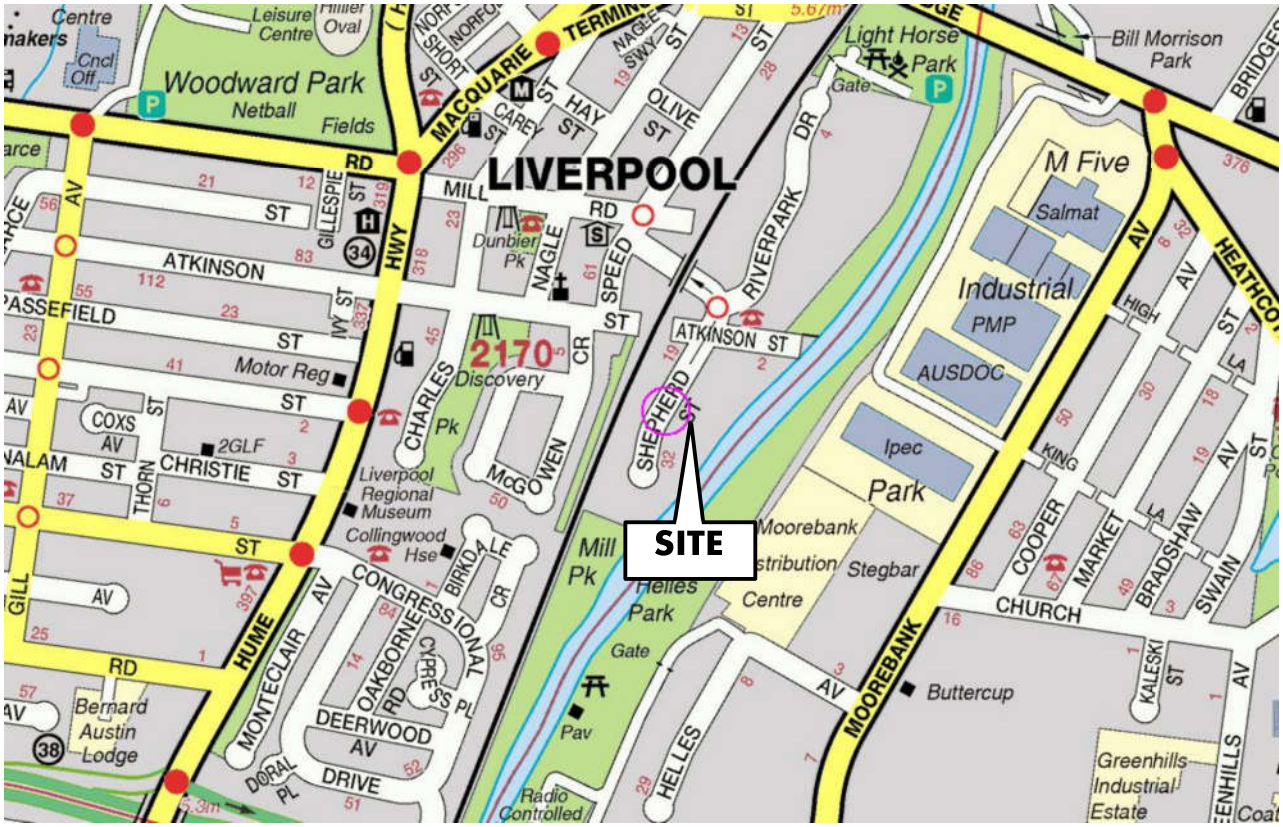
Kind Regards

Brendan Page
Associate Environmental Scientist

Adrian Kingswell
Principal

Attachments:
Figure 1

Figure 2
Results Summary Tables (Table A and Table B)
Test Pit Logs
Envirolab Reports 171390 and 171390-A
Statistical Analysis Summary



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NOTES:
Figure has been recreated from https://maps.six.nsw.gov.au/ and UBD on disc (version 7.1)

Figure is not to scale.

This plan should be read in conjunction with the EIS report

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SITE LOCATION PLAN

26-28 Shepherd Street, Liverpool

PROJECT ID: E30392KP

FIGURE 1

Shepherd Street

NOTE: LIFT CORES ARE TO FOUND ON 3500kPa SHALE & MAY NEED TO BE DUG DEEPER.

TP1 (0.9)
TP2 (1.1)
TP3 (0.9)
TP4 (0.9)
TP5 (2.6)
TP6 (1.0)
TP7 (1.9)
TP8 (0.9)
TP9 (1.6)
TP10 (0.9)
TP11 (>0.6)
TP12 (1.1)
TP13 (2.9)
TP14 (>1.0)
TP15 (>1.9)
TP16 (1.7)

Approximate location of temporary fence limiting access

Site North

LEGEND:

- Approximate site boundary
- Area applicable to waste classification
- TP2 (1.1) Test pit location, number and depth of fill (m)
- Assumed extent of hazardous waste

Note: this plan should be read in conjunction with the EIS report. Plan has been recreated from drawings supplied by the client.

APPROXIMATE SCALE (m): 0 4 8 12 16 20

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SAMPLE LOCATION PLAN

26-28 Shepherd Street, Liverpool

PROJECT ID: E30392KP

FIGURE 2

TABLE A
SOIL LABORATORY RESULTS COMPARED TO WASTE CLASSIFICATION GUIDELINES
All data in mg/kg unless stated otherwise

			HEAVY METALS								PAHs		OC/OP PESTICIDES				Total PCBs	TRH					BTEX COMPOUNDS				ASBESTOS FIBRES
			Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Total PAHs	B(a)P	Total Endosulfans	Chloropyrifos	Total Moderately Harmful [2]	Total Scheduled[3]		C_6-C_9	C_{10}-C_{14}	C_{15}-C_{28}	C_{29}-C_{36}	Total C_{10}-C_{36}	Benzene	Toluene	Ethyl benzene	Total Xylenes	
PQL - Envirolab Services			4	0.4	1	1	1	0.1	1	1	-	0.05	0.1	0.1	0.1	0.1	0.1	25	50	100	100	250	0.2	0.5	1	3	100
General Solid Waste CT1 [1]			100	20	100	NSL	100	4	40	NSL	200	0.8	60	4	250	<50	<50	650		NSL		10,000	10	288	600	1,000	-
General Solid Waste SCC1 [1]			500	100	1900	NSL	1500	50	1050	NSL	200	10	108	7.5	250	<50	<50	650		NSL		10,000	18	518	1,080	1,800	-
Restricted Solid Waste CT2 [1]			400	80	400	NSL	400	16	160	NSL	800	3.2	240	16	1000	<50	<50	2600		NSL		40,000	40	1,152	2,400	4,000	-
Restricted Solid Waste SCC2 [1]			2000	400	7600	NSL	6000	200	4200	NSL	800	23	432	30	1000	<50	<50	2600		NSL		40,000	72	2,073	4,320	7,200	-
Sample Reference	**Sample Depth**	**Sample Description**																									
TP1	0-0.2	Fill: silty clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
TP2	0-0.2	Fill: silty clay	6	LPQL	27	39	**110**	0.3	9	130	0.88	0.1	LPQL	LPQL	LPQL	9.5	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	Not Detected
TP3	0-0.2	Fill: silty clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
TP3	0-0.3	Fill: silty clay	LPQL	LPQL	27	51	74	0.1	13	870	0.51	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	NA
TP4	0-0.2	Fill: silty clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
TP5	0-0.05	Fill: gravelly clayey sand	LPQL	0.4	37	220	**200**	0.3	29	530	0.73	0.08	NA	NA	NA	NA	NA	LPQL	3800	LPQL	LPQL	3800	LPQL	LPQL	LPQL	LPQL	Not Detected
TP5	1-1.2	Fill: ash	6	LPQL	93	79	78	0.2	11	91	0.88	0.05	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	Not Detected
TP5	2.6-2.8	Fill: ash	LPQL	LPQL	14	8	21	LPQL	5	16	LPQL	LPQL	NA	NA	NA	NA	NA	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	NA
TP6	0.1-0.3	Fill: ash	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
TP7	0-0.1	Fill: gravelly clayey sand	LPQL	LPQL	34	120	85	0.4	27	230	0.82	0.1	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	Not Detected
TP7	0.15-0.35	Fill: ash	LPQL	LPQL	32	22	14	LPQL	11	27	1.1	0.06	NA	NA	NA	NA	NA	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	NA
TP7	1-1.2	Fill: ash	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
TP7	1.9-2.1	Clayey sand	LPQL	LPQL	17	15	27	LPQL	4	77	LPQL	LPQL	NA	NA	NA	NA	NA	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	NA
TP8	0-0.2	Fill: silty clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Asbestos Detected
TP9	0-0.1	Fill: silty clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
TP9	0.1-0.3	Fill: ash	4	LPQL	64	63	60	0.1	35	150	0.1	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	Not Detected
TP9	0.4-0.6	Fill: silty clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
TP10	0-0.1	Fill: silty clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Asbestos Detected
TP11	0-0.2	Fill: silty clay	22	1	16	1400	**3900**	**6.2**	10	2300	5.8	0.51	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	Asbestos Detected
TP12	0-0.2	Fill: silty clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
TP13	0-0.2	Fill: silty clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
TP13	0.5-0.6	Fill: silty clay	LPQL	LPQL	10	10	20	LPQL	5	230	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	NA
TP13	1.0-1.2	Fill: silty clay	LPQL	LPQL	10	6	17	LPQL	4	30	1.5	LPQL	NA	NA	NA	NA	NA	LPQL	LPQL	3900	370	4270	LPQL	LPQL	LPQL	LPQL	NA
TP13	2.7-2.9	Fill: clayey sand	LPQL	LPQL	14	12	22	LPQL	6	22	LPQL	LPQL	NA	NA	NA	NA	NA	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	NA
TP14	0-0.2	Fill: silty clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
TP15	0-0.2	Fill: building rubble	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Asbestos Detected
TP16	0-0.2	Fill: silty clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
TP16	0.5-0.7	Fill: ashy silty clay	5	LPQL	23	52	**150**	0.5	7	130	0.91	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	360	<100	360	LPQL	LPQL	LPQL	LPQL	NA
TP16	1.7-1.9	Fill: ashy silty clay	LPQL	LPQL	6	5	14	LPQL	3	13	LPQL	LPQL	NA	NA	NA	NA	NA	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	NA
Total Number of samples			15	15	15	15	15	15	15	15	15	15	8	8	8	8	8	15	15	15	14	15	15	15	15	15	20
Maximum Value			22	1	93	1400	3900	6.2	35	2300	5.8	0.51	LPQL	LPQL	LPQL	9.5	LPQL	LPQL	3800	3900	370	4270	LPQL	LPQL	LPQL	LPQL	NC
Statistical Analysis on Fill Samples																											
Number of Fill Samples [4]			NC	NC	NC	NC	14	14	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Mean Value [4]			NC	NC	NC	NC	340	0.62	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Standard Deviation [4]			NC	NC	NC	NC	1026	1.6	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
% UCL [4]			NC	NC	NC	NC	95	95	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
UCL Value [4]			NC	NC	NC	NC	3069	2.5	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC

Explanation:

[1] - NSW EPA Waste Classification Guidelines, Part 1: Classifying Waste (2014)

[2] - Assessment of Total Moderately Harmful pesticides includes: Dichlorovos, Dimethoate, Fenitrothion, Ethion, Malathion and Parathion

[3] - Assessment of Total Scheduled pesticides include: HBC, alpha-BHC, gamma-BHC, beta-BHC, Heptachlor, Aldrin, Heptachlor Epoxide, gamma-Chlordane, alpha-chlordane, pp-DDE, Dieldrin, Endrin, pp-DDD, pp-DDT, Endrin Aldehyde

[4] - Statistical calculation undertaken using ProUCL version 5.0 (USEPA). Statistical calculation has only been undertaken on fill samples

Concentration above the CT1 **VALUE**
Concentration above SCC1 **VALUE**
Concentration above the SCC2 **VALUE**

Abbreviations:

PAHs: Polycyclic Aromatic Hydrocarbons
B(a)P: Benzo(a)pyrene
PQL: Practical Quantitation Limit
LPQL: Less than PQL
PID: Photoionisation Detector
PCBs: Polychlorinated Biphenyls
UCL: Upper Level Confidence Limit on Mean Value
NA: Not Analysed
NC: Not Calculated
NSL: No Set Limit
SAC: Site Assessment Criteria
TRH: Total Recoverable Hydrocarbons
CT: Contaminant Threshold
SCC: Specific Contaminant Concentration
HILs: Health Investigation Levels
NEPM: National Environmental Protection Measure
BTEX: Monocyclic Aromatic Hydrocarbons

TABLE B
SOIL LABORATORY TCLP RESULTS
All data in mg/L unless stated otherwise

			Arsenic	Cadmium	Chromium	Lead	Mercury	Nickel	B(a)P
PQL - Envirolab Services			0.05	0.01	0.01	0.03	0.0005	0.02	0.001
TCLP1 - General Solid Waste [1]			5	1	5	5	0.2	2	0.04
TCLP2 - Restricted Solid Waste [1]			20	4	20	20	0.8	8	0.16
TCLP3 - Hazardous Waste [1]			>20	>4	>20	>20	>0.8	>8	>0.16
Sample Reference	**Sample Depth**	**Sample Description**							
TP2	0-0.2		NA	NA	NA	LPQL	NA	NA	NA
TP5	0-0.05		NA	NA	NA	0.04	NA	NA	NA
TP11	0-0.2		NA	NA	NA	140	LPQL	NA	NA
TP16	0.5-0.7		NA	NA	NA	0.2	NA	NA	NA
Total Number of samples			0	0	0	4	1	0	0
Maximum Value			LPQL	LPQL	LPQL	140	LPQL	LPQL	LPQL

Explanation:

1 - NSW EPA Waste Classification Guidelines, Part 1: Classifying Waste (2014)

General Solid Waste	**VALUE**
Restricted Solid Waste	**VALUE**
Hazardous Waste	**VALUE**

Abbreviations:

PQL: Practical Quantitation Limit
LPQL: Less than PQL
B(a)P: Benzo(a)pyrene
NC: Not Calculated
NA: Not Analysed
TCLP: Toxicity Characteristic Leaching Procedure

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Test Pit No. **1** **1/1**

Environmental logs are not to be used for geotechnical purposes

Client: CORONATION (28 SHEPHERD STREET) PTY LTD

Project: PROPOSED RESIDENTIAL DEVELOPMENT

Location: 26-28 SHEPHERD STREET, LIVERPOOL, NSW

Job No. E30392KP **Method:** EXCAVATOR **R.L. Surface:** N/A

Date: 13/7/17 **Datum:**

Logged/Checked by: A.S./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION			■		■		0			FILL: Silty clay, low to medium plasticity, orange brown, with ash and slag, building rubble, (terracotta pipes, bricks, plastic, metal).	MC≈PL			
							0.5							
							1		CL	SILTY CLAY: low to medium plasticity, orange brown, trace of ash.	MC≈PL			
										END OF TEST PIT AT 1.4m				
							1.5							
							2							
							2.5							
							3							
							3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Test Pit No. **2** **1/1**

Environmental logs are not to be used for geotechnical purposes

Client: CORONATION (28 SHEPHERD STREET) PTY LTD

Project: PROPOSED RESIDENTIAL DEVELOPMENT

Location: 26-28 SHEPHERD STREET, LIVERPOOL, NSW

Job No. E30392KP **Method:** EXCAVATOR **R.L. Surface:** N/A

Date: 13/7/17 **Datum:**

Logged/Checked by: A.S./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION							0			FILL: Silty clay, low to medium plasticity, dark grey, with ash, building rubble, (terracotta, bricks, plastic, metal).	MC<PL			
							0.5							
							1							
									CL	SILTY CLAY: low to medium plasticity, brown, trace of ash.	MC<PL			
							1.5			END OF TEST PIT AT 1.5m				
							2							
							2.5							
							3							
							3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Test Pit No. **3** **1/1**

Environmental logs are not to be used for geotechnical purposes

DUPASI 0-0.3

Client: CORONATION (28 SHEPHERD STREET) PTY LTD

Project: PROPOSED RESIDENTIAL DEVELOPMENT

Location: 26-28 SHEPHERD STREET, LIVERPOOL, NSW

Job No. E30392KP **Method:** EXCAVATOR **R.L. Surface:** N/A

Date: 13/7/17 **Datum:**

Logged/Checked by: A.S./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION							0			FILL: Silty clay, low to medium plasticity, dark brown, with ash and slag, and trace of terracotta pipe, metal and cloth, fine to coarse grained gravels.	MC<PL			
							0.5							
							1		CL	SILTY CLAY: medium plasticity, brown, trace of fine to medium grained ironstone gravel.	MC<PL			
							1.5			END OF TEST PIT AT 1.5m				
							2							
							2.5							
							3							
							3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Test Pit No. **4** **1/1**

Environmental logs are not to be used for geotechnical purposes

Client: CORONATION (28 SHEPHERD STREET) PTY LTD

Project: PROPOSED RESIDENTIAL DEVELOPMENT

Location: 26-28 SHEPHERD STREET, LIVERPOOL, NSW

Job No. E30392KP **Method:** EXCAVATOR **R.L. Surface:** N/A

Date: 13/7/17 **Datum:**

Logged/Checked by: A.S./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION			■		■		0			FILL: Silty clay, low to medium plasticity, dark brown, with ash and slag, and trace of terracotta pipe, metal and cloth, fine to coarse grained gravels.	MC<PL			
							0.5							
							1		SC	CLAYEY SAND: fine to medium grained, brown, trace of fine to medium grained ironstone gravel and ash.	M			
							1.5			END OF TEST PIT AT 1.5m				
							2							
							2.5							
							3							
							3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Test Pit No. **5** **1/1**

Environmental logs are not to be used for geotechnical purposes

Client: CORONATION (28 SHEPHERD STREET) PTY LTD

Project: PROPOSED RESIDENTIAL DEVELOPMENT

Location: 26-28 SHEPHERD STREET, LIVERPOOL, NSW

Job No. E30392KP **Method:** EXCAVATOR **R.L. Surface:** N/A

Date: 13/7/17 **Datum:**

Logged/Checked by: A.S./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION							0			FILL: Gravelly clayey sand, fine to coarse grained, brown, trace of glass, gravel, trace of ash, brick, cloth, metal.	D			
										FILL: Ash, grey, trace of metal and brick.				
							0.5							
							1							
							1.5							
							2							
							2.5							
									SC	CLAYEY SAND: fine to medium grained, brown, trace of fine to medium grained ironstone gravel.	D			
							3			END OF TEST PIT AT 3.0m				
							3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Test Pit No. **6** **1/1**

Environmental logs are not to be used for geotechnical purposes

Client: CORONATION (28 SHEPHERD STREET) PTY LTD

Project: PROPOSED RESIDENTIAL DEVELOPMENT

Location: 26-28 SHEPHERD STREET, LIVERPOOL, NSW

Job No. E30392KP **Method:** EXCAVATOR **R.L. Surface:** N/A

Date: 13/7/17 **Datum:**

Logged/Checked by: A.S./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION			■		■		0			FILL: Gravelly clayey sand, fine to coarse grained, brown, trace of glass, gravel, trace of ash, brick, cloth, metal.	D			
							0.5			FILL: Ash, grey, trace of brick, timber, plastic.				
							1		SC	CLAYEY SAND: fine to medium grained, brown, trace of fine to medium grained ironstone gravel and ash.	D			
							1.5							
										END OF TEST PIT AT 1.7m				
							2							
							2.5							
							3							
							3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Test Pit No. **7** **1/1**

Environmental logs are not to be used for geotechnical purposes

Client: CORONATION (28 SHEPHERD STREET) PTY LTD

Project: PROPOSED RESIDENTIAL DEVELOPMENT

Location: 26-28 SHEPHERD STREET, LIVERPOOL, NSW

Job No. E30392KP **Method:** EXCAVATOR **R.L. Surface:** N/A

Date: 13/7/17 **Datum:**

Logged/Checked by: A.S./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION							0			FILL: Gravelly clayey sand, fine to coarse grained, brown, trace of glass, gravel, trace of ash, brick, cloth, metal.	D			
											D			
							0.5			FILL: Ash, grey, trace of brick, timber, plastic.				
							1							
							1.5							
							2		SC	CLAYEY SAND: fine to medium grained, brown, trace of fine to medium grained ironstone gravel and ash.	D			
										END OF TEST PIT AT 2.3m				
							2.5							
							3							
							3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Test Pit No. **8** **1/1**

Environmental logs are not to be used for geotechnical purposes

Client: CORONATION (28 SHEPHERD STREET) PTY LTD

Project: PROPOSED RESIDENTIAL DEVELOPMENT

Location: 26-28 SHEPHERD STREET, LIVERPOOL, NSW

Job No. E30392KP **Method:** EXCAVATOR **R.L. Surface:** N/A

Date: 13/7/17 **Datum:**

Logged/Checked by: A.S./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION							0			FILL: Silty clay, low to medium plasticity, brown, trace of ash, brick, fine to medium grained gravel.	MC≤PL			TP8 F1 (0-0.2)
							0.5			FILL: Ash, dark grey, trace of bricks, terracotta, metal.	D			
							1		SC	CLAYEY SAND: fine to medium grained, orange brown.	M			
							1.5			END OF TEST PIT AT 1.5m				
							2							
							2.5							
							3							
							3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Test Pit No. **9** **1/1**

Environmental logs are not to be used for geotechnical purposes

Client: CORONATION (28 SHEPHERD STREET) PTY LTD

Project: PROPOSED RESIDENTIAL DEVELOPMENT

Location: 26-28 SHEPHERD STREET, LIVERPOOL, NSW

Job No. E30392KP **Method:** EXCAVATOR **R.L. Surface:** N/A

Date: 13/7/17 **Datum:**

Logged/Checked by: A.S./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION							0			FILL: Silty clay, low to medium plasticity, brown, trace of gravel.	MC<PL			
										FILL: Ash, dark grey, trace of metal, bricks.	D			
							0.5			FILL: Silty clay, low to medium plasticity, dark brown, with ash, trace of terracotta, brick.	MC≤PL			
							1							
							1.5							
									CL	SILTY CLAY: Low to medium plasticity, brown, trace of root fibres.	MC≈PL			
							2							
										END OF TEST PIT AT 2.1m				
							2.5							
							3							
							3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Test Pit No. **10** **1/1**

Environmental logs are not to be used for geotechnical purposes

Client: CORONATION (28 SHEPHERD STREET) PTY LTD

Project: PROPOSED RESIDENTIAL DEVELOPMENT

Location: 26-28 SHEPHERD STREET, LIVERPOOL, NSW

Job No. E30392KP **Method:** EXCAVATOR **R.L. Surface:** N/A

Date: 13/7/17 **Datum:**

Logged/Checked by: A.S./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION			■		■		0			FILL: Silty clay, low to medium plasticity, brown, trace of bricks, fine to medium grained gravel.	MC≤PL			
											D			
							0.5			FILL: Ash, dark grey, with bricks, terracotta.				
							1		CL	SILTY CLAY: low to medium plasticity, red brown, trace of ash, root fibres.	MC≈PL			
							1.5			END OF TEST PIT AT 1.4m				
							2							
							2.5							
							3							
							3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Test Pit No. **11** **1/1**

Environmental logs are not to be used for geotechnical purposes

Client: CORONATION (28 SHEPHERD STREET) PTY LTD

Project: PROPOSED RESIDENTIAL DEVELOPMENT

Location: 26-28 SHEPHERD STREET, LIVERPOOL, NSW

Job No. E30392KP **Method:** EXCAVATOR **R.L. Surface:** N/A

Date: 13/7/17 **Datum:**

Logged/Checked by: A.S./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION	■		■		■		0			FILL: Silty clay, low to medium plasticity, brown, with ash and bricks.	MC≤PL			
							0.5			END OF TEST PIT AT 0.6m				TEST PIT REFUSAL ON BRICK STRUCTURE
							1							
							1.5							
							2							
							2.5							
							3							
							3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Test Pit No. **12** **1/1**

Environmental logs are not to be used for geotechnical purposes

Client: CORONATION (28 SHEPHERD STREET) PTY LTD

Project: PROPOSED RESIDENTIAL DEVELOPMENT

Location: 26-28 SHEPHERD STREET, LIVERPOOL, NSW

Job No. E30392KP **Method:** EXCAVATOR **R.L. Surface:** N/A

Date: 13/7/17 **Datum:**

Logged/Checked by: A.S./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION			■		■		0			FILL: Silty clay, low to medium plasticity, brown, trace of ash, bricks, terracotta, metal.	MC≤PL			
			■		■		0.5			FILL: Silty clay, low to medium plasticity, brown, trace of ash, bricks.				LESS INCLUSIONS THAN TOP 0.5m
					■		1		CL	SILTY CLAY: Low to medium plasticity, red brown, trace of fine to medium grained sandstone gravel.	MC≈PL			POSSIBLY CEMENTED SAND
							1.5			END OF TEST PIT AT 1.5m				
							2							
							2.5							
							3							
							3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Test Pit No. **13** **1/1**

Environmental logs are not to be used for geotechnical purposes

Client: CORONATION (28 SHEPHERD STREET) PTY LTD

Project: PROPOSED RESIDENTIAL DEVELOPMENT

Location: 26-28 SHEPHERD STREET, LIVERPOOL, NSW

Job No. E30392KP **Method:** EXCAVATOR **R.L. Surface:** N/A

Date: 13/7/17 **Datum:**

Logged/Checked by: A.S./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION	■		■		■		0			FILL: Silty clay, low to medium plasticity, red brown, trace ash, slag, building rubble, fibre cement (one fragment).	MC≈PL			TP13 F1 (0-1.0)
							0.5							
	■		■		■		1			FILL: Silty clay, low to medium plasticity, grey, with fine to medium grained sand.	MC≥PL			STRONG HYDROCARBON ODOUR
							1.5							
	■		■		■		2			FILL: Clayey sand, fine to medium grained, red grey, trace of ash.	W			MILD TO STRONG HYDROCARBON ODOUR
							2.5							
	■				■									MILD HYDROCARBON ODOUR
							3			END OF TEST PIT AT 2.9m				EXCAVATOR AT REACH LIMIT
							3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Test Pit No. **14** **1/1**

Environmental logs are not to be used for geotechnical purposes

Client: CORONATION (28 SHEPHERD STREET) PTY LTD

Project: PROPOSED RESIDENTIAL DEVELOPMENT

Location: 26-28 SHEPHERD STREET, LIVERPOOL, NSW

Job No. E30392KP **Method:** EXCAVATOR **R.L. Surface:** N/A

Date: 13/7/17 **Datum:**

Logged/Checked by: A.S./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION							0			FILL: Silty clay, low to medium plasticity, orange brown, with bricks, trace of ash, root fibres, concrete, metal, fine to coarse grained igneous gravel.	MC<PL			
							0.5							
							1			END OF TEST PIT AT 1.0m				TEST PIT REFUSAL ON BRICK STRUCTURE
							1.5							
							2							
							2.5							
							3							
							3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Test Pit No. **15** **1/1**

Environmental logs are not to be used for geotechnical purposes

Client: CORONATION (28 SHEPHERD STREET) PTY LTD

Project: PROPOSED RESIDENTIAL DEVELOPMENT

Location: 26-28 SHEPHERD STREET, LIVERPOOL, NSW

Job No. E30392KP **Method:** EXCAVATOR **R.L. Surface:** N/A

Date: 13/7/17 **Datum:**

Logged/Checked by: A.S./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION							0			FILL: Building rubble, (bricks and concrete), with fine to medium grained sand, ash and coal.	D			
							0.5							
							1							
							1.5							
										END OF TEST PIT AT 1.9m				TEST PIT REFUSAL ON BRICK STRUCTURE
							2							
							2.5							
							3							
							3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Test Pit No. **16** **1/1**

Environmental logs are not to be used for geotechnical purposes

Client: CORONATION (28 SHEPHERD STREET) PTY LTD

Project: PROPOSED RESIDENTIAL DEVELOPMENT

Location: 26-28 SHEPHERD STREET, LIVERPOOL, NSW

Job No. E30392KP **Method:** EXCAVATOR **R.L. Surface:** N/A

Date: 13/7/17 **Datum:**

Logged/Checked by: A.S./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION	■		■		■		0			FILL: Silty clay, low to medium plasticity, brown, trace of bricks, fine to medium grained gravel.	D			
							0.5			FILL: Ashy silty clay, low to medium plasticity brown, trace of brick, slag.	MC<PL			
							1							
							1.5							
	■						2		CL	SANDY CLAY: low to medium plasticity, brown, fine to medium grained sand.	MC<PL			
							2.5			END OF TEST PIT AT 2.2m				
							3							
							3.5							

EXPLANATORY NOTES – ENVIRONMENTAL LOGS

INTRODUCTION

These notes have been provided to supplement the environmental report with regards to drilling and field logging. Not all notes are necessarily relevant to all reports. Where geotechnical borehole logs are utilised for environmental purpose, reference should also be made to the explanatory notes included in the geotechnical report. Environmental logs are not suitable for geotechnical purposes.

The ground is a product of continuing natural and manmade processes and therefore exhibits a variety of characteristics and properties which vary from place to place and can change with time. Environmental studies involve gathering and assimilating limited facts about these characteristics and properties in order to understand the ground on a particular site under certain conditions. These conditions 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 (e.g. sandy clay) as set out below (note that unless stated in the report, the soil classification is based on a qualitative field assessment, not laboratory testing):

Soil Classification	Particle Size
Clay	less than 0.002mm
Silt	0.002 to 0.075mm
Sand	0.075 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 shown in the following table:

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.

DRILLING OR EXCAVATION METHODS

The following is a brief summary of drilling and excavation methods currently adopted by the Company, and some comments on their use and application. All except test pits and hand auger drilling require the use of a mechanical drilling rig.

Test Pits: These are normally excavated with a backhoe or a tracked excavator, allowing close examination of the in-situ soils if it is safe to descend into the pit. The depth of penetration is limited to approximately 3m for a backhoe and up to 6m for an excavator. Limitations of test pits include problems associated with disturbance and difficulty of reinstatement; and the consequent effects on nearby structures. Care must be taken if construction is to be carried out near test pit locations to either properly re-compact 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 fill, 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 in-situ testing. This is a relatively economical means of drilling in clays and in sands above the water table. Samples are returned to the surface 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 (e.g. 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 locations 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, 30/40mm)

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 "Nc" on the borehole logs, together with the number of blows per 150mm penetration.

LOGS

The borehole or test pit logs presented herein are an 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; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must 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 (e.g. bricks, concrete, plastic, slag/ash, 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. 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 has not been undertaken to confirm the soil classifications and rocks strengths indicated on the environmental logs unless noted in the report.

SITE ANOMALIES

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, EIS should be notified immediately.

GRAPHIC LOG SYMBOLS FOR SOIL AND ROCKS

SOIL


FILL


TOPSOIL


CLAY (CL, CH)


SILT (ML, MH)


SAND (SP, SW)


GRAVEL (GP, GW)


SANDY CLAY (CL, CH)


SILTY CLAY (CL, CH)


CLAYEY SAND (SC)


SILTY SAND (SM)


GRAVELLY CLAY (CL, CH)


CLAYEY GRAVEL (GC)


SANDY SILT (ML)


PEAT AND ORGANIC SOILS

ROCK


CONGLOMERATE


SANDSTONE


SHALE


SILTSTONE, MUDSTONE, CLAYSTONE


LIMESTONE


PHYLLITE, SCHIST


TUFF


GRANITE, GABBRO


DOLERITE, DIORITE


BASALT, ANDESITE


QUARTZITE

DEFECTS AND INCLUSIONS


CLAY SEAM


SHEARED OR CRUSHED SEAM


BRECCIATED OR SHATTERED SEAM/ZONE


IRONSTONE GRAVEL


ORGANIC MATERIAL

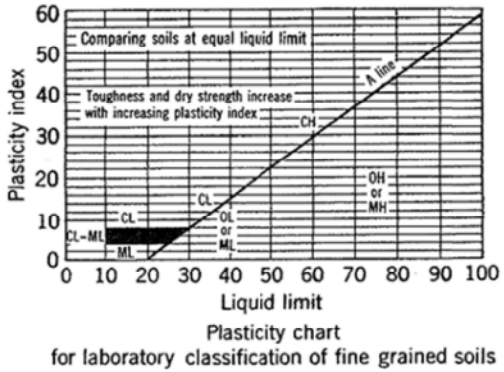
OTHER MATERIALS


CONCRETE


BITUMINOUS CONCRETE, COAL


COLLUVIUM

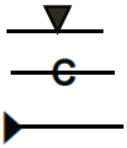
Field Identification Procedures (Excluding particles larger than 75 μm and basing fractions on estimated weights)						Group Symbols [a]	Typical Names	Information Required for Describing Soils	Laboratory Classification Criteria
Coarse-grained soils More than half of material is *larger* than 75 μm sieve size[b] (The 75 μm sieve size is about the smallest particle visible to naked eye)	Gravels More than half of coarse fraction is larger than 4 mm sieve size	Clean gravels (little or no fines)	Wide range in grain size and substantial amounts of all intermediate particle sizes			*GW*	Well graded gravels, gravel-sand mixtures, little or no fines	Give typical name; indicate approximate percentages of sand and gravel; maximum size; angularity, surface condition, and hardness of the coarse grains; local or geologic name and other pertinent descriptive information; and symbols in parentheses For undisturbed soils add information on stratification, degree of compactness, cementation, moisture conditions and drainage characteristics Example: *Silty sand*, gravelly; about 20% hard, angular gravel particles 12 mm maximum size; rounded and subangular sand grains coarse to fine, about 15% non-plastic fines with low dry strength; well compacted and moist in place; alluvial sand; (*SM*)	Use grain size curve in identifying the fractions as given under field identification Determine percentages of gravel and sand from grain size curve Depending on percentage of fines (fraction smaller than 75 μm sieve size) coarse grained soils are classified as follows: Less than 5% *GW, GP, SW, SP* More than 12% *GM, GC, SM, SC* 5% to 12% *Borderline* cases requiring use of dual symbols $C_U = \frac{D_{60}}{D_{10}}$ Greater than 4 $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3 Not meeting all gradation requirements for *GW* Atterberg limits below "A" line, or *PI* less than 4 — Above "A" line with *PI* between 4 and 7 are *borderline* cases requiring use of dual symbols Atterberg limits above "A" line, with *PI* greater than 7
			Predominantly one size or a range of sizes with some intermediate sizes missing			*GP*	Poorly graded gravels, gravel-sand mixtures, little or no fines		
		Gravels with fines (appreciable amount of fines)	Nonplastic fines (for identification procedures see *ML* below)			*GM*	Silty gravels, poorly graded gravel-sand-silt mixtures		
			Plastic fines (for identification procedures, see *CL* below)			*GC*	Clayey gravels, poorly graded gravel-sand-clay mixtures		
	Sands More than half of coarse fraction is smaller than 4 mm sieve size	Clean sands (little or no fines)	Wide range in grain sizes and substantial amounts of all intermediate particle sizes			*SW*	Well graded sands, gravelly sands, little or no fines		$C_U = \frac{D_{60}}{D_{10}}$ Greater than 6 $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3 Not meeting all gradation requirements for *SW* Atterberg limits below "A" line or *PI* less than 5 — Above "A" line with *PI* between 4 and 7 are *borderline* cases requiring use of dual symbols Atterberg limits below "A" line with *PI* greater than 7
			Predominantly one size or a range of sizes with some intermediate sizes missing			*SP*	Poorly graded sands, gravelly sands, little or no fines		
		Sands with fines (appreciable amount of fines)	Nonplastic fines (for identification procedures, see *ML* below)			*SM*	Silty sands, poorly graded sand-silt mixtures		
			Plastic fines (for identification procedures, see *CL* below)			*SC*	Clayey sands, poorly graded sand-clay mixtures		
Fine-grained soils More than half of material is *smaller* than 75 μm sieve size	Identification Procedures on Fraction Smaller than 380 μm Sieve Size		Dry Strength (crushing characteristics)	Dilatancy (reaction to shaking)	Toughness (consistency near plastic limit)				
	Silts and clays liquid limit less than 50		None to slight	Quick to slow	None	*ML*	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands with slight plasticity	Give typical name; indicate degree and character of plasticity, amount and maximum size of coarse grains; colour in wet condition, odour if any, local or geologic name, and other pertinent descriptive information, and symbol in parentheses For undisturbed soils add information on structure, stratification, consistency in undisturbed and remoulded states, moisture and drainage conditions Example: *Clayey silt*, brown; slightly plastic; small percentage of fine sand; numerous vertical root holes; firm and dry in place; loess; (*ML*)	
			Medium to high	None to very slow	Medium	*CL*	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays		
			Slight to medium	Slow	Slight	*OL*	Organic silts and organic silt-clays of low plasticity		
	Silts and clays liquid limit greater than 50		Slight to medium	Slow to none	Slight to medium	*MH*	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts		
			High to very high	None	High	*CH*	Inorganic clays of high plasticity, fat clays		
			Medium to high	None to very slow	Slight to medium	*OH*	Organic clays of medium to high plasticity		
Highly Organic Soils			Readily identified by colour, odour, spongy feel and frequently by fibrous texture			*Pt*	Peat and other highly organic soils		



Plasticity chart
for laboratory classification of fine grained soils

Note: 1 Soils possessing characteristics of two groups are designated by combinations of group symbols (eg. GW-GC, well graded gravel-sand mixture with clay fines).
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 U50 DB DS ASB ASS SAL	Soil sample taken over depth indicated, for environmental analysis. Undisturbed 50mm diameter tube sample taken over depth indicated. Bulk disturbed sample taken over depth indicated. Small disturbed bag sample taken over depth indicated. Soil sample taken over depth indicated, for asbestos screening. Soil sample taken over depth indicated, for acid sulfate soil analysis. 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 show blows per 150mm penetration. 'R' as noted below.
	N_c = 5 7 3 R	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 PID = 100	Vane shear reading in kPa of Undrained Shear Strength. Photoionisation detector reading in ppm (Soil sample heads pace test).
Moisture (Cohesive Soils) (Cohesionless)	MC > PL MC ≈ PL MC < PL D M W	Moisture content estimated to be greater than plastic limit. Moisture content estimated to be approximately equal to plastic limit. Moisture content estimated to be less than plastic limit. 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 S F St VSt H ( )	VERY SOFT – Unconfined compressive strength less than 25kPa SOFT – Unconfined compressive strength 25-5 0kPa FIRM – Unconfined compressive strength 50-1 00kPa STIFF – Unconfined compressive strength 100- 200kPa VERY STIFF – Unconfined compressive strength 200- 400kPa HARD – Unconfined compressive strength greater than 400kPa Bracketed symbol indicates estimated consistency based o n tactile examination or other tests.
Density Index/ Relative Density (Cohesionless Soils)	VL L MD D VD ( )	**Density Index (ID) Range (%)** / **SPT ' N' Value Range (Blows/300mm)** Very Loose <15 / 0-4 Loose 15-35 / 4-10 Medium Dense 35-65 / 10-30 Dense 65-85 / 30-50 Very Dense >85 / >50 Bracketed symbol indicates estimated density based on ease of drilling or other tests.
Hand Penetrometer Readings	300 250	Numbers indicate individual test results in kPa on representative undisturbed material unless noted otherwise
Remarks	'V' bit 'TC' bit T_{60}	Hardened steel 'V' shaped bit. Tungsten carbide wing bit. Penetration of auger string in mm under static load of rig applied by drill head hydraulics without rotation of augers.

LOG SYMBOLS CONTINUED

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 bedding. The test procedure is described by the International Journal of Rock Mechanics, Mining 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 150 mm 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 150 mm long x 50mm dia. can be broken by hand with difficulty. Readily scored with knife.
High:	H	3	A piece of core 150 mm 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 150 mm 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 150 mm long x 50mm dia. is very difficult to break with h and-held hammer . Rings when struck with a hammer.

ROCK STRENGTH

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

12 Ashley Street, Chatswood, NSW 2067
tel: +61 2 9910 6200

email: sydney@envirolab.com.au
envirolab.com.au

Envirolab Services Pty Ltd - Sydney | ABN 37 112 535 645

CERTIFICATE OF ANALYSIS 171390

Client:

Environmental Investigation Services
PO Box 976
North Ryde BC
NSW 1670

Attention: Brendan Page

Sample log in details:

Your Reference:	**E30392KP, Liverpool**
No. of samples:	44 soils, 2 materials
Date samples received / completed instructions received	14/07/17 / 14/07/17

Analysis Details:

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

Report Details:

Date results requested by: / Issue Date:	18/07/17 / 18/07/17
Date of Preliminary Report:	Not Issued

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

Results Approved By:

David Springer
General Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	171390-2	171390-5	171390-8	171390-10	171390-12
Your Reference	---------- -	TP2	TP3	TP5	TP5	TP5
Depth	----------	0-0.2	0-0.3	0-0.05	1-1.2	2.6-2.8
Date Sampled		13/07/2017	13/07/2017	13/07/2017	13/07/2017	13/07/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	17/07/2017	17/07/2017	17/07/2017	17/07/2017	17/07/2017
Date analysed	-	17/07/2017	17/07/2017	17/07/2017	17/07/2017	17/07/2017
TRHC$_6$ - C$_9$	mg/kg	<25	<25	<25	<25	<25
TRHC$_6$ - C$_{10}$	mg/kg	<25	<25	<25	<25	<25
vTPHC$_6$ - C$_{10}$ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	98	93	99	97	91

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	171390-14	171390-15	171390-17	171390-22	171390-28
Your Reference	---------- -	TP7	TP7	TP7	TP9	TP11
Depth	----------	0-0.1	0.15-0.35	1.9-2.1	0.1-0.3	0-0.2
Date Sampled		13/07/2017	13/07/2017	13/07/2017	13/07/2017	13/07/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	17/07/2017	17/07/2017	17/07/2017	17/07/2017	17/07/2017
Date analysed	-	17/07/2017	17/07/2017	17/07/2017	17/07/2017	17/07/2017
TRHC$_6$ - C$_9$	mg/kg	<25	<25	<25	<25	<25
TRHC$_6$ - C$_{10}$	mg/kg	<25	<25	<25	<25	<25
vTPHC$_6$ - C$_{10}$ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	102	91	91	104	92

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	171390-32	171390-33	171390-35	171390-41	171390-43
Your Reference	---------- -	TP13	TP13	TP13	TP16	TP16
Depth	----------	0.5-0.6	1.0-1.2	2.7-2.9	0.5-0.7	1.7-1.9
Date Sampled		13/07/2017	13/07/2017	13/07/2017	13/07/2017	13/07/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	17/07/2017	17/07/2017	17/07/2017	17/07/2017	17/07/2017
Date analysed	-	17/07/2017	17/07/2017	17/07/2017	17/07/2017	17/07/2017
TRHC6 - C9	mg/kg	<25	<25	<25	<25	<25
TRHC6 - C10	mg/kg	<25	<25	<25	<25	<25
vTPHC6 - C10 less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	97	92	109	100	96

vTRH(C6-C10)/BTEXN in Soil				
Our Reference:	UNITS	171390-44	171390-45	171390-46
Your Reference	---------- -	DUPAS1	TB	TS
Depth	----------	-	-	-
Date Sampled		13/07/2017	13/07/2017	13/07/2017
Type of sample		Soil	Soil	Soil
Date extracted	-	17/07/2017	17/07/2017	17/07/2017
Date analysed	-	17/07/2017	17/07/2017	17/07/2017
TRHC6 - C9	mg/kg	<25	[NA]	[NA]
TRHC6 - C10	mg/kg	<25	[NA]	[NA]
vTPHC6 - C10 less BTEX (F1)	mg/kg	<25	[NA]	[NA]
Benzene	mg/kg	<0.2	<0.2	108%
Toluene	mg/kg	<0.5	<0.5	107%
Ethylbenzene	mg/kg	<1	<1	109%
m+p-xylene	mg/kg	<2	<2	108%
o-Xylene	mg/kg	<1	<1	107%
Total +ve Xylenes	mg/kg	<1	<1	[NA]
naphthalene	mg/kg	<1	[NA]	[NA]
Surrogate aaa-Trifluorotoluene	%	94	132	109

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	171390-2	171390-5	171390-8	171390-10	171390-12
Your Reference	---------- -	TP2	TP3	TP5	TP5	TP5
Depth	----------	0-0.2	0-0.3	0-0.05	1-1.2	2.6-2.8
Date Sampled		13/07/2017	13/07/2017	13/07/2017	13/07/2017	13/07/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	17/07/2017	17/07/2017	17/07/2017	17/07/2017	17/07/2017
Date analysed	-	17/07/2017	17/07/2017	17/07/2017	17/07/2017	17/07/2017
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50	3,800	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100	<100	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100	<100	<100	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	<50	3,700	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	3,700	<50	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	<100	<100	120	<100	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	3,900	<50	<50
Surrogate o-Terphenyl	%	95	93	93	97	93

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	171390-14	171390-15	171390-17	171390-22	171390-28
Your Reference	---------- -	TP7	TP7	TP7	TP9	TP11
Depth	----------	0-0.1	0.15-0.35	1.9-2.1	0.1-0.3	0-0.2
Date Sampled		13/07/2017	13/07/2017	13/07/2017	13/07/2017	13/07/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	17/07/2017	17/07/2017	17/07/2017	17/07/2017	17/07/2017
Date analysed	-	17/07/2017	17/07/2017	17/07/2017	17/07/2017	17/07/2017
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100	<100	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100	<100	<100	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	<100	<100	<100	110	120
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	110	120
Surrogate o-Terphenyl	%	95	93	93	92	102

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	171390-32	171390-33	171390-35	171390-41	171390-43
Your Reference	---------- -	TP13	TP13	TP13	TP16	TP16
Depth	----------	0.5-0.6	1.0-1.2	2.7-2.9	0.5-0.7	1.7-1.9
Date Sampled		13/07/2017	13/07/2017	13/07/2017	13/07/2017	13/07/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	17/07/2017	17/07/2017	17/07/2017	17/07/2017	17/07/2017
Date analysed	-	17/07/2017	17/07/2017	17/07/2017	17/07/2017	17/07/2017
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	3,900	<100	360	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	370	<100	<100	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	76	<50	68	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	76	<50	68	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	<100	4,100	<100	370	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	4,200	<50	440	<50
Surrogate o-Terphenyl	%	93	#	92	134	90

svTRH (C10-C40) in Soil		
Our Reference:	UNITS	171390-44
Your Reference	---------- -	DUPAS1
Depth	----------	-
Date Sampled		13/07/2017
Type of sample		Soil
Date extracted	-	17/07/2017
Date analysed	-	17/07/2017
TRHC$_{10}$ - C$_{14}$	mg/kg	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	<100
Total +ve TRH (>C10-C40)	mg/kg	<50
Surrogate o-Terphenyl	%	91

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- - ---------- 	171390-2 TP2 0-0.2 13/07/2017 Soil	171390-5 TP3 0-0.3 13/07/2017 Soil	171390-8 TP5 0-0.05 13/07/2017 Soil	171390-10 TP5 1-1.2 13/07/2017 Soil	171390-12 TP5 2.6-2.8 13/07/2017 Soil
Date extracted	-	17/07/2017	17/07/2017	17/07/2017	17/07/2017	17/07/2017
Date analysed	-	18/07/2017	18/07/2017	18/07/2017	18/07/2017	18/07/2017
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.2	0.2	0.1	0.3	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.2	0.1	0.1	0.2	<0.1
Pyrene	mg/kg	0.2	0.1	0.2	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,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	0.1	<0.05	0.08	0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	mg/kg	0.88	0.51	0.73	0.88	<0.05
Surrogate p-Terphenyl-d14	%	105	103	105	106	104

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- - ---------- 	171390-14 TP7 0-0.1 13/07/2017 Soil	171390-15 TP7 0.15-0.35 13/07/2017 Soil	171390-17 TP7 1.9-2.1 13/07/2017 Soil	171390-22 TP9 0.1-0.3 13/07/2017 Soil	171390-28 TP11 0-0.2 13/07/2017 Soil
Date extracted	-	17/07/2017	17/07/2017	17/07/2017	17/07/2017	17/07/2017
Date analysed	-	18/07/2017	18/07/2017	18/07/2017	18/07/2017	18/07/2017
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	0.3	<0.1	0.1	0.4
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	0.2	<0.1	<0.1	0.8
Pyrene	mg/kg	0.2	0.2	<0.1	<0.1	1
Benzo(a)anthracene	mg/kg	0.1	0.1	<0.1	<0.1	0.7
Chrysene	mg/kg	0.1	0.2	<0.1	<0.1	0.6
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	1
Benzo(a)pyrene	mg/kg	0.1	0.06	<0.05	<0.05	0.51
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.3
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.4
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	0.8
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	0.8
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	0.8
Total +ve PAH's	mg/kg	0.82	1.1	<0.05	0.1	5.8
Surrogate p-Terphenyl-d14	%	105	110	99	105	116

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- - ---------- 	171390-32 TP13 0.5-0.6 13/07/2017 Soil	171390-33 TP13 1.0-1.2 13/07/2017 Soil	171390-35 TP13 2.7-2.9 13/07/2017 Soil	171390-41 TP16 0.5-0.7 13/07/2017 Soil	171390-43 TP16 1.7-1.9 13/07/2017 Soil
Date extracted	-	17/07/2017	17/07/2017	17/07/2017	17/07/2017	17/07/2017
Date analysed	-	18/07/2017	18/07/2017	18/07/2017	18/07/2017	18/07/2017
Naphthalene	mg/kg	<0.1	<0.1	<0.1	0.6	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	0.1	<0.1	0.3	<0.1
Anthracene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	0.5	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	0.3	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	0.4	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	mg/kg	<0.05	1.5	<0.05	0.91	<0.05
Surrogate p-Terphenyl-d14	%	111	108	112	100	101

PAHs in Soil		
Our Reference:	UNITS	171390-44
Your Reference	----------	DUPAS1
	-	
Depth	----------	-
Date Sampled		13/07/2017
Type of sample		Soil
Date extracted	-	17/07/2017
Date analysed	-	18/07/2017
Naphthalene	mg/kg	<0.1
Acenaphthylene	mg/kg	<0.1
Acenaphthene	mg/kg	<0.1
Fluorene	mg/kg	<0.1
Phenanthrene	mg/kg	0.2
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,j+k)fluoranthene	mg/kg	<0.2
Benzo(a)pyrene	mg/kg	0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5
Total +ve PAH's	mg/kg	0.59
Surrogate p-Terphenyl-d14	%	102

Organochlorine Pesticides in soil						
Our Reference:	UNITS	171390-2	171390-5	171390-10	171390-14	171390-22
Your Reference	----------	TP2	TP3	TP5	TP7	TP9
Depth	- ----------	0-0.2	0-0.3	1-1.2	0-0.1	0.1-0.3
Date Sampled		13/07/2017	13/07/2017	13/07/2017	13/07/2017	13/07/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	17/07/2017	17/07/2017	17/07/2017	17/07/2017	17/07/2017
Date analysed	-	17/07/2017	17/07/2017	17/07/2017	17/07/2017	17/07/2017
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	9.5	<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
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	90	90	93	94	88

Organochlorine Pesticides in soil				
Our Reference:	UNITS	171390-28	171390-32	171390-41
Your Reference	----------	TP11	TP13	TP16
	-			
Depth	----------	0-0.2	0.5-0.6	0.5-0.7
Date Sampled		13/07/2017	13/07/2017	13/07/2017
Type of sample		Soil	Soil	Soil
Date extracted	-	17/07/2017	17/07/2017	17/07/2017
Date analysed	-	17/07/2017	17/07/2017	17/07/2017
HCB	mg/kg	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	92	90	87

Organophosphorus Pesticides						
Our Reference:	UNITS	171390-2	171390-5	171390-10	171390-14	171390-22
Your Reference	----------	TP2	TP3	TP5	TP7	TP9
	-					
Depth	----------	0-0.2	0-0.3	1-1.2	0-0.1	0.1-0.3
Date Sampled		13/07/2017	13/07/2017	13/07/2017	13/07/2017	13/07/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	17/07/2017	17/07/2017	17/07/2017	17/07/2017	17/07/2017
Date analysed	-	17/07/2017	17/07/2017	17/07/2017	17/07/2017	17/07/2017
Azinphos-methyl (Guthion)	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
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorvos	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
Ethion	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
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	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
Surrogate TCMX	%	90	90	93	94	88

Organophosphorus Pesticides				
Our Reference:	UNITS	171390-28	171390-32	171390-41
Your Reference	----------	TP11	TP13	TP16
	-			
Depth	----------	0-0.2	0.5-0.6	0.5-0.7
Date Sampled		13/07/2017	13/07/2017	13/07/2017
Type of sample		Soil	Soil	Soil
Date extracted	-	17/07/2017	17/07/2017	17/07/2017
Date analysed	-	17/07/2017	17/07/2017	17/07/2017
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	92	90	87

PCBs in Soil						
Our Reference:	UNITS	171390-2	171390-5	171390-10	171390-14	171390-22
Your Reference	----------	TP2	TP3	TP5	TP7	TP9
	-					
Depth	----------	0-0.2	0-0.3	1-1.2	0-0.1	0.1-0.3
Date Sampled		13/07/2017	13/07/2017	13/07/2017	13/07/2017	13/07/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	17/07/2017	17/07/2017	17/07/2017	17/07/2017	17/07/2017
Date analysed	-	17/07/2017	17/07/2017	17/07/2017	17/07/2017	17/07/2017
Aroclor 1016	mg/kg	<0.2	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.2	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.2	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.2	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.2	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.2	<0.1	<0.1	0.1	<0.1
Aroclor 1260	mg/kg	<0.2	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.2	<0.1	<0.1	0.1	<0.1
Surrogate TCLMX	%	90	90	93	94	88

PCBs in Soil				
Our Reference:	UNITS	171390-28	171390-32	171390-41
Your Reference	----------	TP11	TP13	TP16
	-			
Depth	----------	0-0.2	0.5-0.6	0.5-0.7
Date Sampled		13/07/2017	13/07/2017	13/07/2017
Type of sample		Soil	Soil	Soil
Date extracted	-	17/07/2017	17/07/2017	17/07/2017
Date analysed	-	17/07/2017	17/07/2017	17/07/2017
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1
Surrogate TCLMX	%	92	90	87

Acid Extractable metals in soil						
Our Reference:	UNITS	171390-2	171390-5	171390-8	171390-10	171390-12
Your Reference	----------	TP2	TP3	TP5	TP5	TP5
	-					
Depth	----------	0-0.2	0-0.3	0-0.05	1-1.2	2.6-2.8
Date Sampled		13/07/2017	13/07/2017	13/07/2017	13/07/2017	13/07/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	17/07/2017	17/07/2017	17/07/2017	17/07/2017	17/07/2017
Date analysed	-	17/07/2017	17/07/2017	17/07/2017	17/07/2017	17/07/2017
Arsenic	mg/kg	6	<4	<4	6	<4
Cadmium	mg/kg	<0.4	<0.4	0.4	<0.4	<0.4
Chromium	mg/kg	27	27	37	93	14
Copper	mg/kg	39	51	220	79	8
Lead	mg/kg	110	74	200	78	21
Mercury	mg/kg	0.3	0.1	0.3	0.2	<0.1
Nickel	mg/kg	9	13	29	11	5
Zinc	mg/kg	130	870	530	91	16

Acid Extractable metals in soil						
Our Reference:	UNITS	171390-14	171390-15	171390-17	171390-22	171390-28
Your Reference	----------	TP7	TP7	TP7	TP9	TP11
	-					
Depth	----------	0-0.1	0.15-0.35	1.9-2.1	0.1-0.3	0-0.2
Date Sampled		13/07/2017	13/07/2017	13/07/2017	13/07/2017	13/07/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	17/07/2017	17/07/2017	17/07/2017	17/07/2017	17/07/2017
Date analysed	-	17/07/2017	17/07/2017	17/07/2017	17/07/2017	17/07/2017
Arsenic	mg/kg	<4	<4	<4	4	22
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	1
Chromium	mg/kg	34	32	17	64	16
Copper	mg/kg	120	22	15	63	1,400
Lead	mg/kg	85	14	27	60	3,900
Mercury	mg/kg	0.4	<0.1	<0.1	0.1	6.2
Nickel	mg/kg	27	11	4	35	10
Zinc	mg/kg	230	27	77	150	2,300

Acid Extractable metals in soil						
Our Reference:	UNITS	171390-32	171390-33	171390-35	171390-41	171390-43
Your Reference	---------- -	TP13	TP13	TP13	TP16	TP16
Depth	----------	0.5-0.6	1.0-1.2	2.7-2.9	0.5-0.7	1.7-1.9
Date Sampled		13/07/2017	13/07/2017	13/07/2017	13/07/2017	13/07/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	17/07/2017	17/07/2017	17/07/2017	17/07/2017	17/07/2017
Date analysed	-	17/07/2017	17/07/2017	17/07/2017	17/07/2017	17/07/2017
Arsenic	mg/kg	<4	<4	<4	5	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	10	10	14	23	6
Copper	mg/kg	10	6	12	52	5
Lead	mg/kg	20	17	22	150	14
Mercury	mg/kg	<0.1	<0.1	<0.1	0.5	<0.1
Nickel	mg/kg	5	4	6	7	3
Zinc	mg/kg	230	30	22	130	13

Acid Extractable metals in soil			
Our Reference:	UNITS	171390-44	171390-47
Your Reference	---------- -	DUPAS1	TP2 - [TRIPLICATE]
Depth	----------	-	0-0.2
Date Sampled		13/07/2017	13/07/2017
Type of sample		Soil	Soil
Date prepared	-	17/07/2017	17/07/2017
Date analysed	-	17/07/2017	17/07/2017
Arsenic	mg/kg	<4	7
Cadmium	mg/kg	<0.4	<0.4
Chromium	mg/kg	26	46
Copper	mg/kg	37	95
Lead	mg/kg	95	130
Mercury	mg/kg	0.3	0.3
Nickel	mg/kg	12	12
Zinc	mg/kg	350	120

Moisture						
Our Reference:	UNITS	171390-2	171390-5	171390-8	171390-10	171390-12
Your Reference	---------- -	TP2	TP3	TP5	TP5	TP5
Depth	----------	0-0.2	0-0.3	0-0.05	1-1.2	2.6-2.8
Date Sampled		13/07/2017	13/07/2017	13/07/2017	13/07/2017	13/07/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	17/07/2017	17/07/2017	17/07/2017	17/07/2017	17/07/2017
Date analysed	-	18/07/2017	18/07/2017	18/07/2017	18/07/2017	18/07/2017
Moisture	%	15	17	7.5	1.1	15

Moisture						
Our Reference:	UNITS	171390-14	171390-15	171390-17	171390-22	171390-28
Your Reference	---------- -	TP7	TP7	TP7	TP9	TP11
Depth	----------	0-0.1	0.15-0.35	1.9-2.1	0.1-0.3	0-0.2
Date Sampled		13/07/2017	13/07/2017	13/07/2017	13/07/2017	13/07/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	17/07/2017	17/07/2017	17/07/2017	17/07/2017	17/07/2017
Date analysed	-	18/07/2017	18/07/2017	18/07/2017	18/07/2017	18/07/2017
Moisture	%	3.1	20	18	22	23

Moisture						
Our Reference:	UNITS	171390-32	171390-33	171390-35	171390-41	171390-43
Your Reference	---------- -	TP13	TP13	TP13	TP16	TP16
Depth	----------	0.5-0.6	1.0-1.2	2.7-2.9	0.5-0.7	1.7-1.9
Date Sampled		13/07/2017	13/07/2017	13/07/2017	13/07/2017	13/07/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	17/07/2017	17/07/2017	17/07/2017	17/07/2017	17/07/2017
Date analysed	-	18/07/2017	18/07/2017	18/07/2017	18/07/2017	18/07/2017
Moisture	%	16	18	18	10	12

Moisture		
Our Reference:	UNITS	171390-44
Your Reference	---------- -	DUPAS1
Depth	----------	-
Date Sampled		13/07/2017
Type of sample		Soil
Date prepared	-	17/07/2017
Date analysed	-	18/07/2017
Moisture	%	16

Asbestos ID - soils			
Our Reference:	UNITS	171390-8	171390-14
Your Reference	----------	TP5	TP7
	-		
Depth	----------	0-0.05	0-0.1
Date Sampled		13/07/2017	13/07/2017
Type of sample		Soil	Soil
Date analysed	-	17/07/2017	17/07/2017
Sample mass tested	g	Approx. 35g	Approx. 35g
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected

Asbestos ID - soils NEPM - ASB-001						
Our Reference:	UNITS	171390-1	171390-2	171390-4	171390-7	171390-10
Your Reference	---------- -	TP1	TP2	TP3	TP4	TP5
Depth	----------	0-0.2	0-0.2	0-0.2	0-0.2	1-1.2
Date Sampled		13/07/2017	13/07/2017	13/07/2017	13/07/2017	13/07/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	17/07/2017	17/07/2017	17/07/2017	17/07/2017	17/07/2017
Sample mass tested	g	666.94	732.67	574.33	592.24	473.84
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–	–
FA and AF Estimation*	g	–	–	–	–	–
ACM >7mm Estimation*	%(w/w)	<0.01	<0.01	<0.01	<0.01	<0.01
FA and AF Estimation*[#2]	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Asbestos ID - soils NEPM - ASB-001						
Our Reference:	UNITS	171390-13	171390-16	171390-18	171390-21	171390-22
Your Reference	---------- -	TP6	TP7	TP8	TP9	TP9
Depth	----------	0.1-0.3	1-1.2	0-0.2	0-0.1	0.1-0.3
Date Sampled		13/07/2017	13/07/2017	13/07/2017	13/07/2017	13/07/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	17/07/2017	17/07/2017	17/07/2017	17/07/2017	17/07/2017
Sample mass tested	g	411.69	487.72	826.33	908.66	492.87
Sample Description	-	Grey coarse-grained soil & rocks	Grey coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Grey coarse-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected Synthetic mineral fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	See Above	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–	–
FA and AF Estimation*	g	–	–	0.0380	–	–
ACM >7mm Estimation*	%(w/w)	<0.01	<0.01	<0.01	<0.01	<0.01
FA and AF Estimation*[#2]	%(w/w)	<0.001	<0.001	0.0046	<0.001	<0.001

Asbestos ID - soils NEPM - ASB-001						
Our Reference:	UNITS	171390-23	171390-26	171390-28	171390-29	171390-31
Your Reference	---------- -	TP9	TP10	TP11	TP12	TP13
Depth	----------	0.4-0.6	0-0.1	0-0.2	0-0.2	0-0.2
Date Sampled		13/07/2017	13/07/2017	13/07/2017	13/07/2017	13/07/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	17/07/2017	17/07/2017	17/07/2017	17/07/2017	17/07/2017
Sample mass tested	g	637.7	807.32	586.77	616	513.85
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	See Above	See Above	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–	–
FA and AF Estimation*	g	–	0.0009	0.0094	–	–
ACM >7mm Estimation*	%(w/w)	<0.01	<0.01	<0.01	<0.01	<0.01
FA and AF Estimation*[#2]	%(w/w)	<0.001	<0.001	0.0016	<0.001	<0.001

Asbestos ID - soils NEPM - ASB-001				
Our Reference:	UNITS	171390-37	171390-38	171390-40
Your Reference	---------- -	TP14	TP15	TP16
Depth	----------	0-0.2	0-0.2	0-0.2
Date Sampled		13/07/2017	13/07/2017	13/07/2017
Type of sample		Soil	Soil	Soil
Date analysed	-	17/07/2017	17/07/2017	17/07/2017
Sample mass tested	g	625.35	775.55	668.99
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	See Above	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–
FA and AF Estimation*	g	–	0.0004	–
ACM >7mm Estimation*	%(w/w)	<0.01	<0.01	<0.01
FA and AF Estimation*[#2]	%(w/w)	<0.001	<0.001	<0.001

Asbestos ID - materials			
Our Reference:	UNITS	171390-20	171390-36
Your Reference	----------	TP8 F1	TP13 F1
	-		
Depth	----------	0.0-0.2	0-0.1
Date Sampled		13/07/2017	13/07/2017
Type of sample		Material	Material
Date analysed	-	18/07/2017	18/07/2017
Mass / Dimension of Sample	-	40x20x5mm (1.07g)	90x45x6mm (50.28g)
Sample Description	-	Beige fibrous rope material	Grey compressed fibre cement material
Asbestos ID in materials	-	Chrysotile asbestos detected	Chrysotile asbestos detected Amosite asbestos detected

Method ID	Methodology Summary
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'TEQ PQL' values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'TEQ zero' values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'TEQ half PQL' values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-008	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.

Method ID	Methodology Summary
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
ASB-001	Asbestos ID - Identification of asbestos in soil samples using Polarised Light Microscopy and Dispersion Staining Techniques. Minimum 500mL soil sample was analysed as recommended by "National Environment Protection (Assessment of site contamination) Measure, Schedule B1 and "The Guidelines from the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia - May 2009" with a reporting limit of 0.1g/kg (0.01% w/w) as per Australian Standard AS4964-2004. Results reported denoted with * are outside our scope of NATA accreditation. **NOTE** #1 Total Asbestos g/kg was analysed and reported as per Australian Standard AS4964 (This is the sum of ACM >7mm, <7mm and FA/AF) **NOTE** #2 The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres. Estimation = Estimated asbestos weight Results reported with "--" is equivalent to no visible asbestos identified using Polarised Light microscopy and Dispersion Staining Techniques.

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			17/07/2017	171390-2	17/07/2017 || 17/07/2017	LCS-1	17/07/2017
Date analysed	-			17/07/2017	171390-2	17/07/2017 || 17/07/2017	LCS-1	17/07/2017
TRHC$_6$ - C$_9$	mg/kg	25	Org-016	<25	171390-2	<25 || <25	LCS-1	100%
TRHC$_6$ - C$_{10}$	mg/kg	25	Org-016	<25	171390-2	<25 || <25	LCS-1	100%
Benzene	mg/kg	0.2	Org-016	<0.2	171390-2	<0.2 || <0.2	LCS-1	88%
Toluene	mg/kg	0.5	Org-016	<0.5	171390-2	<0.5 || <0.5	LCS-1	103%
Ethylbenzene	mg/kg	1	Org-016	<1	171390-2	<1 || <1	LCS-1	103%
m+p-xylene	mg/kg	2	Org-016	<2	171390-2	<2 || <2	LCS-1	104%
o-Xylene	mg/kg	1	Org-016	<1	171390-2	<1 || <1	LCS-1	104%
naphthalene	mg/kg	1	Org-014	<1	171390-2	<1 || <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%		Org-016	104	171390-2	98 || 91 || RPD: 7	LCS-1	105%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			17/07/2017	171390-2	17/07/2017 || 17/07/2017	LCS-1	17/07/2017
Date analysed	-			17/07/2017	171390-2	17/07/2017 || 17/07/2017	LCS-1	17/07/2017
TRHC$_{10}$ - C$_{14}$	mg/kg	50	Org-003	<50	171390-2	<50 || <50	LCS-1	97%
TRHC$_{15}$ - C$_{28}$	mg/kg	100	Org-003	<100	171390-2	<100 || <100	LCS-1	100%
TRHC$_{29}$ - C$_{36}$	mg/kg	100	Org-003	<100	171390-2	<100 || <100	LCS-1	91%
TRH>C$_{10}$-C$_{16}$	mg/kg	50	Org-003	<50	171390-2	<50 || <50	LCS-1	97%
TRH>C$_{16}$-C$_{34}$	mg/kg	100	Org-003	<100	171390-2	<100 || <100	LCS-1	100%
TRH>C$_{34}$-C$_{40}$	mg/kg	100	Org-003	<100	171390-2	<100 || <100	LCS-1	91%
Surrogate o-Terphenyl	%		Org-003	87	171390-2	95 || 97 || RPD: 2	LCS-1	96%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			17/07/2017	171390-2	17/07/2017 || 17/07/2017	LCS-1	17/07/2017
Date analysed	-			18/07/2017	171390-2	18/07/2017 || 18/07/2017	LCS-1	18/07/2017
Naphthalene	mg/kg	0.1	Org-012	<0.1	171390-2	<0.1 || <0.1	LCS-1	106%
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	171390-2	<0.1 || 0.1	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	171390-2	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012	<0.1	171390-2	<0.1 || <0.1	LCS-1	102%
Phenanthrene	mg/kg	0.1	Org-012	<0.1	171390-2	0.2 || 0.7 || RPD: 111	LCS-1	105%
Anthracene	mg/kg	0.1	Org-012	<0.1	171390-2	<0.1 || 0.2	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	171390-2	0.2 || 0.8 || RPD: 120	LCS-1	110%
Pyrene	mg/kg	0.1	Org-012	<0.1	171390-2	0.2 || 0.8 || RPD: 120	LCS-1	112%
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	171390-2	0.1 || 0.5 || RPD: 133	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012	<0.1	171390-2	0.1 || 0.5 || RPD: 133	LCS-1	119%
Benzo(b,j+k) fluoranthene	mg/kg	0.2	Org-012	<0.2	171390-2	<0.2 || 0.6	[NR]	[NR]

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	171390-2	0.1 || 0.3 || RPD: 100	LCS-1	88%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	171390-2	<0.1 || 0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	171390-2	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	171390-2	<0.1 || 0.2	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012	112	171390-2	105 || 107 || RPD: 2	LCS-1	103%
QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			17/07/2017	171390-2	17/07/2017 || 17/07/2017	LCS-2	17/07/2017
Date analysed	-			17/07/2017	171390-2	17/07/2017 || 17/07/2017	LCS-2	17/07/2017
HCB	mg/kg	0.1	Org-005	<0.1	171390-2	<0.1 || <0.1	[NR]	[NR]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	171390-2	<0.1 || <0.1	LCS-2	82%
gamma-BHC	mg/kg	0.1	Org-005	<0.1	171390-2	<0.1 || <0.1	[NR]	[NR]
beta-BHC	mg/kg	0.1	Org-005	<0.1	171390-2	<0.1 || <0.1	LCS-2	99%
Heptachlor	mg/kg	0.1	Org-005	<0.1	171390-2	<0.1 || <0.1	LCS-2	103%
delta-BHC	mg/kg	0.1	Org-005	<0.1	171390-2	<0.1 || <0.1	[NR]	[NR]
Aldrin	mg/kg	0.1	Org-005	<0.1	171390-2	<0.1 || <0.1	LCS-2	94%
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	171390-2	<0.1 || <0.1	LCS-2	97%
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	171390-2	<0.1 || <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	171390-2	<0.1 || <0.1	[NR]	[NR]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	171390-2	<0.1 || <0.1	[NR]	[NR]
pp-DDE	mg/kg	0.1	Org-005	<0.1	171390-2	<0.1 || <0.1	LCS-2	101%
Dieldrin	mg/kg	0.1	Org-005	<0.1	171390-2	9.5 || 2.3 || RPD: 122	LCS-2	106%
Endrin	mg/kg	0.1	Org-005	<0.1	171390-2	<0.1 || <0.1	LCS-2	101%
pp-DDD	mg/kg	0.1	Org-005	<0.1	171390-2	<0.1 || <0.1	LCS-2	110%
Endosulfan II	mg/kg	0.1	Org-005	<0.1	171390-2	<0.1 || <0.1	[NR]	[NR]
pp-DDT	mg/kg	0.1	Org-005	<0.1	171390-2	<0.1 || <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	171390-2	<0.1 || <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	171390-2	<0.1 || <0.1	LCS-2	88%
Methoxychlor	mg/kg	0.1	Org-005	<0.1	171390-2	<0.1 || <0.1	[NR]	[NR]
Surrogate TCMX	%		Org-005	88	171390-2	90 || 90 || RPD: 0	LCS-2	111%

QUALITY CONTROL Organophosphorus Pesticides	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			17/07/2017	171390-2	17/07/2017 || 17/07/2017	LCS-2	17/07/2017
Date analysed	-			17/07/2017	171390-2	17/07/2017 || 17/07/2017	LCS-2	17/07/2017
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	<0.1	171390-2	<0.1 || <0.1	[NR]	[NR]
Bromophos-ethyl	mg/kg	0.1	Org-008	<0.1	171390-2	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos	mg/kg	0.1	Org-008	<0.1	171390-2	<0.1 || <0.1	LCS-2	83%
Chlorpyriphos-methyl	mg/kg	0.1	Org-008	<0.1	171390-2	<0.1 || <0.1	[NR]	[NR]
Diazinon	mg/kg	0.1	Org-008	<0.1	171390-2	<0.1 || <0.1	[NR]	[NR]
Dichlorvos	mg/kg	0.1	Org-008	<0.1	171390-2	<0.1 || <0.1	LCS-2	77%
Dimethoate	mg/kg	0.1	Org-008	<0.1	171390-2	<0.1 || <0.1	[NR]	[NR]
Ethion	mg/kg	0.1	Org-008	<0.1	171390-2	<0.1 || <0.1	LCS-2	80%
Fenitrothion	mg/kg	0.1	Org-008	<0.1	171390-2	<0.1 || <0.1	LCS-2	97%
Malathion	mg/kg	0.1	Org-008	<0.1	171390-2	<0.1 || <0.1	LCS-2	72%
Parathion	mg/kg	0.1	Org-008	<0.1	171390-2	<0.1 || <0.1	LCS-2	110%
Ronnel	mg/kg	0.1	Org-008	<0.1	171390-2	<0.1 || <0.1	LCS-2	88%
Surrogate TCMX	%		Org-008	88	171390-2	90 || 90 || RPD: 0	LCS-2	88%

QUALITY CONTROL PCBs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			17/07/2017	171390-2	17/07/2017 || 17/07/2017	LCS-2	17/07/2017
Date analysed	-			17/07/2017	171390-2	17/07/2017 || 17/07/2017	LCS-2	17/07/2017
Aroclor 1016	mg/kg	0.1	Org-006	<0.1	171390-2	<0.2 || <0.2	[NR]	[NR]
Aroclor 1221	mg/kg	0.1	Org-006	<0.1	171390-2	<0.2 || <0.2	[NR]	[NR]
Aroclor 1232	mg/kg	0.1	Org-006	<0.1	171390-2	<0.2 || <0.2	[NR]	[NR]
Aroclor 1242	mg/kg	0.1	Org-006	<0.1	171390-2	<0.2 || <0.2	[NR]	[NR]
Aroclor 1248	mg/kg	0.1	Org-006	<0.1	171390-2	<0.2 || <0.2	[NR]	[NR]
Aroclor 1254	mg/kg	0.1	Org-006	<0.1	171390-2	<0.2 || <0.2	LCS-2	100%
Aroclor 1260	mg/kg	0.1	Org-006	<0.1	171390-2	<0.2 || <0.2	[NR]	[NR]
Surrogate TCLMX	%		Org-006	88	171390-2	90 || 90 || RPD: 0	LCS-2	88%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			17/07/2017	171390-2	17/07/2017 || 17/07/2017	LCS-1	17/07/2017
Date analysed	-			17/07/2017	171390-2	17/07/2017 || 17/07/2017	LCS-1	17/07/2017
Arsenic	mg/kg	4	Metals-020	<4	171390-2	6 || 8 || RPD: 29	LCS-1	97%
Cadmium	mg/kg	0.4	Metals-020	<0.4	171390-2	<0.4 || <0.4	LCS-1	95%
Chromium	mg/kg	1	Metals-020	<1	171390-2	27 || 43 || RPD: 46	LCS-1	100%
Copper	mg/kg	1	Metals-020	<1	171390-2	39 || 130 || RPD: 108	LCS-1	98%
Lead	mg/kg	1	Metals-020	<1	171390-2	110 || 150 || RPD: 31	LCS-1	92%
Mercury	mg/kg	0.1	Metals-021	<0.1	171390-2	0.3 || 0.5 || RPD: 50	LCS-1	110%
Nickel	mg/kg	1	Metals-020	<1	171390-2	9 || 12 || RPD: 29	LCS-1	93%
Zinc	mg/kg	1	Metals-020	<1	171390-2	130 || 190 || RPD: 38	LCS-1	94%

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	171390-14	17/07/2017 || 17/07/2017	171390-5	17/07/2017
Date analysed	-	171390-14	17/07/2017 || 17/07/2017	171390-5	17/07/2017
TRHC$_{6}$ - C$_{9}$	mg/kg	171390-14	<25 || <25	171390-5	95%
TRHC$_{6}$ - C$_{10}$	mg/kg	171390-14	<25 || <25	171390-5	95%
Benzene	mg/kg	171390-14	<0.2 || <0.2	171390-5	84%
Toluene	mg/kg	171390-14	<0.5 || <0.5	171390-5	98%
Ethylbenzene	mg/kg	171390-14	<1 || <1	171390-5	97%
m+p-xylene	mg/kg	171390-14	<2 || <2	171390-5	99%
o-Xylene	mg/kg	171390-14	<1 || <1	171390-5	97%
naphthalene	mg/kg	171390-14	<1 || <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%	171390-14	102 || 95 || RPD: 7	171390-5	98%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	171390-14	17/07/2017 || 17/07/2017	171390-5	17/07/2017
Date analysed	-	171390-14	17/07/2017 || 17/07/2017	171390-5	17/07/2017
TRHC$_{10}$ - C$_{14}$	mg/kg	171390-14	<50 || <50	171390-5	106%
TRHC$_{15}$ - C$_{28}$	mg/kg	171390-14	<100 || <100	171390-5	103%
TRHC$_{29}$ - C$_{36}$	mg/kg	171390-14	<100 || <100	171390-5	115%
TRH>C$_{10}$-C$_{16}$	mg/kg	171390-14	<50 || <50	171390-5	106%
TRH>C$_{16}$-C$_{34}$	mg/kg	171390-14	<100 || <100	171390-5	103%
TRH>C$_{34}$-C$_{40}$	mg/kg	171390-14	<100 || <100	171390-5	115%
Surrogate o-Terphenyl	%	171390-14	95 || 94 || RPD: 1	171390-5	93%

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	171390-14	17/07/2017 || 17/07/2017	171390-5	17/07/2017
Date analysed	-	171390-14	18/07/2017 || 18/07/2017	171390-5	18/07/2017
Naphthalene	mg/kg	171390-14	<0.1 || <0.1	171390-5	90%
Acenaphthylene	mg/kg	171390-14	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	171390-14	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	171390-14	<0.1 || <0.1	171390-5	87%
Phenanthrene	mg/kg	171390-14	0.1 || 0.1 || RPD: 0	171390-5	83%
Anthracene	mg/kg	171390-14	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	171390-14	0.1 || 0.1 || RPD: 0	171390-5	94%
Pyrene	mg/kg	171390-14	0.2 || 0.1 || RPD: 67	171390-5	101%
Benzo(a)anthracene	mg/kg	171390-14	0.1 || <0.1	[NR]	[NR]
Chrysene	mg/kg	171390-14	0.1 || <0.1	171390-5	100%
Benzo(b,j+k)fluoranthene	mg/kg	171390-14	<0.2 || <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	171390-14	0.1 || 0.05 || RPD: 67	171390-5	72%
Indeno(1,2,3-c,d)pyrene	mg/kg	171390-14	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	171390-14	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	171390-14	<0.1 || <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d14	%	171390-14	105 || 106 || RPD: 1	171390-5	97%

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date extracted	-	171390-14	17/07/2017 || 17/07/2017
Date analysed	-	171390-14	17/07/2017 || 17/07/2017
HCB	mg/kg	171390-14	<0.1 || <0.1
alpha-BHC	mg/kg	171390-14	<0.1 || <0.1
gamma-BHC	mg/kg	171390-14	<0.1 || <0.1
beta-BHC	mg/kg	171390-14	<0.1 || <0.1
Heptachlor	mg/kg	171390-14	<0.1 || <0.1
delta-BHC	mg/kg	171390-14	<0.1 || <0.1
Aldrin	mg/kg	171390-14	<0.1 || <0.1
Heptachlor Epoxide	mg/kg	171390-14	<0.1 || <0.1
gamma-Chlordane	mg/kg	171390-14	<0.1 || <0.1
alpha-chlordane	mg/kg	171390-14	<0.1 || <0.1
Endosulfan I	mg/kg	171390-14	<0.1 || <0.1
pp-DDE	mg/kg	171390-14	<0.1 || <0.1
Dieldrin	mg/kg	171390-14	<0.1 || <0.1
Endrin	mg/kg	171390-14	<0.1 || <0.1
pp-DDD	mg/kg	171390-14	<0.1 || <0.1
Endosulfan II	mg/kg	171390-14	<0.1 || <0.1
pp-DDT	mg/kg	171390-14	<0.1 || <0.1
Endrin Aldehyde	mg/kg	171390-14	<0.1 || <0.1
Endosulfan Sulphate	mg/kg	171390-14	<0.1 || <0.1

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Methoxychlor	mg/kg	171390-14	<0.1 || <0.1
Surrogate TCMX	%	171390-14	94 || 94 || RPD: 0
QUALITY CONTROL Organophosphorus Pesticides	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date extracted	-	171390-14	17/07/2017 || 17/07/2017
Date analysed	-	171390-14	17/07/2017 || 17/07/2017
Azinphos-methyl (Guthion)	mg/kg	171390-14	<0.1 || <0.1
Bromophos-ethyl	mg/kg	171390-14	<0.1 || <0.1
Chlorpyriphos	mg/kg	171390-14	<0.1 || <0.1
Chlorpyriphos-methyl	mg/kg	171390-14	<0.1 || <0.1
Diazinon	mg/kg	171390-14	<0.1 || <0.1
Dichlorvos	mg/kg	171390-14	<0.1 || <0.1
Dimethoate	mg/kg	171390-14	<0.1 || <0.1
Ethion	mg/kg	171390-14	<0.1 || <0.1
Fenitrothion	mg/kg	171390-14	<0.1 || <0.1
Malathion	mg/kg	171390-14	<0.1 || <0.1
Parathion	mg/kg	171390-14	<0.1 || <0.1
Ronnel	mg/kg	171390-14	<0.1 || <0.1
Surrogate TCMX	%	171390-14	94 || 94 || RPD: 0
QUALITY CONTROL PCBs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date extracted	-	171390-14	17/07/2017 || 17/07/2017
Date analysed	-	171390-14	17/07/2017 || 17/07/2017
Aroclor 1016	mg/kg	171390-14	<0.1 || <0.1
Aroclor 1221	mg/kg	171390-14	<0.1 || <0.1
Aroclor 1232	mg/kg	171390-14	<0.1 || <0.1
Aroclor 1242	mg/kg	171390-14	<0.1 || <0.1
Aroclor 1248	mg/kg	171390-14	<0.1 || <0.1
Aroclor 1254	mg/kg	171390-14	0.1 || 0.2 || RPD: 67
Aroclor 1260	mg/kg	171390-14	<0.1 || <0.1
Surrogate TCLMX	%	171390-14	94 || 94 || RPD: 0

QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	171390-14	17/07/2017 || 17/07/2017	171390-5	17/07/2017
Date analysed	-	171390-14	17/07/2017 || 17/07/2017	171390-5	17/07/2017
Arsenic	mg/kg	171390-14	<4 || <4	171390-5	88%
Cadmium	mg/kg	171390-14	<0.4 || <0.4	171390-5	91%
Chromium	mg/kg	171390-14	34 || 29 || RPD: 16	171390-5	96%
Copper	mg/kg	171390-14	120 || 120 || RPD: 0	171390-5	93%
Lead	mg/kg	171390-14	85 || 78 || RPD: 9	171390-5	103%
Mercury	mg/kg	171390-14	0.4 || 0.3 || RPD: 29	171390-5	109%
Nickel	mg/kg	171390-14	27 || 30 || RPD: 11	171390-5	88%
Zinc	mg/kg	171390-14	230 || 260 || RPD: 12	171390-5	#

Report Comments:

Asbestos-ID in soil: NEPM
This report is consistent with the reporting recommendations in the National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013.
This is reported outside our scope of NATA accreditation.

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

Acid Extractable Metals in Soil: The laboratory RPD acceptance criteria has been exceeded for 171390-2 for Cu. Therefore a triplicate result has been issued as laboratory sample number 171390-47.

Acid Extractable Metals in Soil:
Percent recovery is not possible to report due to the high concentration of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

PAH in soil:
The RPD for duplicate results is accepted due to the non homogenous nature of the sample/s.

PCB in soil:
PQL has been raised due to interference from analytes(other than those being tested) in the sample/s.

Asbestos ID was analysed by Approved Identifier:	Jessica Hie, Matt Tang, Lucy Zhu
Asbestos ID was authorised by Approved Signatory:	Lulu Scott

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

Quality Control Definitions

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

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

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

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

Laboratory Acceptance Criteria

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

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

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

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

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

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

SAMPLE RECEIPT ADVICE

Client Details	
Client	Environmental Investigation Services
Attention	Brendan Page

Sample Login Details	
Your Reference	E30392KP, Liverpool
Envirolab Reference	**171390**
Date Sample Received	14/07/2017
Date Instructions Received	14/07/2017
Date Results Expected to be Reported	**18/07/2017**

Sample Condition	
Samples received in appropriate condition for analysis	YES
No. of Samples Provided	44 soils, 2 materials
Turnaround Time Requested	2 days
Temperature on receipt (°C)	16.2
Cooling Method	Ice Pack
Sampling Date Provided	YES

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

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	Phone: 02 9910 6200
Fax: 02 9910 6201	Fax: 02 9910 6201
Email: ahie@envirolabservices.com.au	Email: jhurst@envirolabservices.com.au

Sample and Testing Details on following page

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
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Sample Id	*vTRH(C6-C10)/BTEXN in Soil*	*svTRH (C10-C40) in Soil*	*PAHs in Soil*	*Organochlorine Pesticides in soil*	*Organophosphorus Pesticides*	*PCBs in Soil*	*Acid Extractable metals in soil*	*Asbestos ID - soils NEPM - ASB-001*	*Asbestos ID - materials*	*On Hold*
TP1-0-0.2								✓		
TP2-0-0.2	✓	✓	✓	✓	✓	✓	✓	✓		
TP2-1.2-1.4										✓
TP3-0-0.2								✓		
TP3-0-0.3	✓	✓	✓	✓	✓	✓	✓			
TP3-1-1.2										✓
TP4-0-0.2								✓		
TP5-0-0.05	✓	✓	✓				✓	✓		
TP5-0.1-0.3										✓
TP5-1-1.2	✓	✓	✓	✓	✓	✓	✓	✓		
TP5-2-2.2										✓
TP5-2.6-2.8	✓	✓	✓				✓			
TP6-0.1-0.3								✓		
TP7-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓		
TP7-0.15-0.35	✓	✓	✓				✓			
TP7-1-1.2								✓		
TP7-1.9-2.1	✓	✓	✓				✓			
TP8-0-0.2								✓		
TP8-0.2-0.4										✓
TP8 F1-0.0-0.2									✓	
TP9-0-0.1								✓		
TP9-0.1-0.3	✓	✓	✓	✓	✓	✓	✓	✓		
TP9-0.4-0.6								✓		
TP9-1-1.2										✓
TP9-1.7-1.9										✓
TP10-0-0.1								✓		
TP10-0.1-0.3										✓
TP11-0-0.2	✓	✓	✓	✓	✓	✓	✓	✓		
TP12-0-0.2								✓		
TP12-0.5-0.7										✓
TP13-0-0.2								✓		
TP13-0.5-0.6	✓	✓	✓	✓	✓	✓	✓			
TP13-1.0-1.2	✓	✓	✓				✓			
TP13-2.0-2.2										✓
TP13-2.7-2.9	✓	✓	✓				✓			
TP13 F1-0-0.1									✓	
TP14-0-0.2								✓		
TP15-0-0.2								✓		

Envirolab Services Pty Ltd
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12 Ashley St Chatswood NSW 2067
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enquiries@envirolabservices.com.au
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Sample Id	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides	PCBs in Soil	Acid Extractable metals in soil	Asbestos ID - soils NEPM - ASB-001	Asbestos ID - materials	On Hold
TP15-1.0-1.2										✓
TP16-0-0.2								✓		
TP16-0.5-0.7	✓	✓	✓	✓	✓	✓	✓			
TP16-1.0-1.2										✓
TP16-1.7-1.9	✓	✓	✓				✓			
DUPAS1	✓	✓	✓				✓			
TB	✓									
TS	✓									

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD	EIS Job Number: E30392KP	ENVIRONMENTAL INVESTIGATION SERVICES
12 ASHLEY STREET		REAR OF 115 WICKS ROAD
CHATSWOOD NSW 2067		MACQUARIE PARK, NSW 2113
P: (02) 99106200	Date Results Required: ~~STANDARD~~ 48hr.	P: 02-9888 5000 F: 02-9888 5001
F: (02) 99106201		
Attention: Aileen	Page: 1 of 2	Attention: bpage@jkgroup.net.au

Location: Liverpool
Sampler: AS

Sample Preserved in Esky on Ice

Tests Required

Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 3a	Combo 6	Combo 6a	Asbestos in material	Asbestos WA 500ml	Combo 3			
13/07/2017	1	TP1	0-0.2	A	-	Fill Silty Clay					X				
	2	TP2	0-0.2	G,A	0	Fill Silty clay		X			X				
	3	TP2	1.2-1.4	G	0	Silty Clay									
	4	TP3	0-0.2	A	-	Fill Silty Clay					X				
	5	↓	0-0.3	G	0	↓		X							
	6	↓	1-1.2	G	0	Silty Clay									
	7	TP4	0-0.2	A	-	Fill Silty Clay					X				
	8	TP5	0-0.05	G	0	Fill Gravel Clay					X	X			
	9	↓	0.1-0.3	G,A	0	Fill Ash									
	10	↓	1-1.2	A	-	↓		X			X				
	11	↓	2-2.2	A	-	↓									
	12	↓	2.6-2.8	G	0	Clayey Sand						X			
	13	TP6	0.1-0.3	A	-	Fill Ash ~~Gravelly Clay~~					X				
	14	TP7	0-0.1	G	0	Fill Gravelly Sand		X			X				
	15	↓	0.15-0.35	G,A	0	Fill Ash						X			
	16	↓	1-1.2	A	-	Fill Ash					X				
	17	↓	1.9-2.1	G	0	Clayey Sand						X			
	18	TP8	0-0.2	A	-	Fill Silty Clay					X				
	19	↓	0.2-0.4	A	-	Fill Ash									
	20	TP8 F1	0-0.2	A	-	Fragment material				X					
	21	TP9	0-0.1	G,A	0	Fill Silty clay					X				
	22	↓	0.1-0.3	G,A	0	Fill Ash		X			X				
	23	↓	0.4-0.6	G,A	0	Fill Silty Clay					X				
	24	↓	1-1.2	G	0	↓									
↓	25	↓	1.7-1.9	G	0	Silty Clay									

ENVIROLAB GROUP

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 173390
Date Received: 14/7
Time Received: 1500
Received by: PH
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Remarks (comments/detection limits required): 0
* Please weigh + report weights for all material samples (asb).

Sample Containers:
G - 250mg Glass Jar
A - Ziplock Asbestos Bag (500ml)
P - Plastic Bag

Relinquished By:	Date:	Time:	Received By:	Date:
BP	14/7/17	1030am	ELS	14/7

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	EIS Job Number: E30392KP Date Results Required: ~~STANDARD~~ 48hr. Page: 2 of 2	EIS ENVIRONMENTAL INVESTIGATION SERVICES REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: bpage@jkgroup.net.au

Location: Liverpool

Sampler: AS

Sample Preserved in Esky on Ice

Tests Required

Date Sampled	Lab Ref:	Sample Number 171390	Depth (m)	Sample Container	PID	Sample Description	Combo 3a	Combo 6	Combo 6a	Asbestos in material	Asbestos WA 500ml	Combo 3	BTEX
13/07/2017	26	TP10	0-0.1	A	-	Fill Silty Clay					X		
↓	27	↓	0.1-0.3	A	-	Fill Ash							
↓	28	TP11	0-0.2	G,A	0	Fill Silty Clay		X			X		
↓	29	TP12	0-0.2	A	-	↓					X		
↓	30	↓	0.5-0.7	A	-	↓							
↓	31	TP13	0-0.2	G,A	0	↓					X		
↓	32	↓	0.5-0.6	G	0	↓		X					
↓	33	↓	1.0-1.2	G,A	0	↓						X	
↓	34	↓	2.0-2.2	A	-	Fill Clayey Sand							
↓	35	↓	2.7-2.9	G	0	↓						X	
↓	36	TP13 F1	0-1.0	A	-	Fragment				X			
↓	37	TP14	0-0.2	A	-	Fill Silty Clay					X		
↓	38	TP15	0-0.2	A	-	Fill Building Rubble					X		
↓	39	↓	1.0-1.2	A	-	↓							
↓	40	TP16	0-0.2	G,A	0	Fill Sandy ash					X		
↓	41	↓	0.5-0.7	G	0	Fill Ashy Silty clay		X					
↓	42	↓	1.0-1.2	A	-	↓							
↓	43	↓	1.7-1.9	G	0	Sandy Clay						X	
↓	44	DUPAS1	-	G	0	Soil						X	
↓	*	DUPAS2	-	G	0	↓						X	
↓	45	TB	-	Vial	-	Soil blank							X
↓	46	TS	-	Vial	-	Soil spike.							X

Remarks (comments/detection limits required): 0

* Send to Envirolab VIC for interlab analysis

Sample Containers:
G - 250mg Glass Jar
A - Ziplock Asbestos Bag (500ml)
P - Plastic Bag

Relinquished By:	Date:	Time:	Received By:	Date:
BP	14/7/17	1030am.	ELS	14/7

12 Ashley Street, Chatswood, NSW 2067
tel: +61 2 9910 6200

email: sydney@envirolab.com.au
envirolab.com.au

Envirolab Services Pty Ltd - Sydney | ABN 37 112 535 645

CERTIFICATE OF ANALYSIS 171390-A

Client:

Environmental Investigation Services
PO Box 976
North Ryde BC
NSW 1670

Attention: Brendan Page

Sample log in details:

Your Reference:	**E30392KP, Liverpool**
No. of samples:	Additional Testing on 4 Soils
Date samples received / completed instructions received	14/07/17 / 25/07/17

Analysis Details:

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

Report Details:

Date results requested by: / Issue Date:	28/07/17 / 27/07/17
Date of Preliminary Report:	Not Issued

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

Results Approved By:

David Springer
General Manager

ACCREDITED FOR TECHNICAL COMPETENCE

Metals in TCLP USEPA1311					
Our Reference:	UNITS	171390-A-2	171390-A-8	171390-A-28	171390-A-41
Your Reference	----------	TP2	TP5	TP11	TP16
	-				
Depth	----------	0-0.2	0-0.05	0-0.2	0.5-0.7
Date Sampled		13/07/2017	13/07/2017	13/07/2017	13/07/2017
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	26/07/2017	26/07/2017	26/07/2017	26/07/2017
Date analysed	-	26/07/2017	26/07/2017	26/07/2017	26/07/2017
pH of soil for fluid# determ.	pH units	9.3	9.2	9.1	9.5
pH of soil TCLP (after HCl)	pH units	1.2	1.2	1.2	1.3
Extraction fluid used	-	1	1	1	1
pH of final Leachate	pH units	5.0	5.0	5.0	5.2
Lead in TCLP	mg/L	<0.03	0.04	140	0.2
Mercury in TCLP	mg/L	[NA]	[NA]	<0.0005	[NA]

Method ID	Methodology Summary
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using in house method INORG-004.
EXTRACT.7	Toxicity Characteristic Leaching Procedure (TCLP) using Zero Headspace Extraction (zHE) using AS4439 and USEPA 1311.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.

QUALITY CONTROL Metals in TCLP USEPA1311	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			26/07/2017	[NT]	[NT]	LCS-W1	26/07/2017
Date analysed	-			26/07/2017	[NT]	[NT]	LCS-W1	26/07/2017
Lead in TCLP	mg/L	0.03	Metals-020 ICP-AES	<0.03	[NT]	[NT]	LCS-W1	106%
Mercury in TCLP	mg/L	0.0005	Metals-021 CV-AAS	<0.0005	[NT]	[NT]	LCS-W1	102%

Report Comments:

Asbestos ID was analysed by Approved Identifier:	Jessica Hie, Matt Tang, Lucy Zhu
Asbestos ID was authorised by Approved Signatory:	Lulu Scott

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

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Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
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Measurement Uncertainty estimates are available for most tests upon request.

Aileen Hie

From: Brendan Page <BPage@jkgroup.net.au>
Sent: Tuesday, 25 July 2017 10:14 AM
To: Aileen Hie
Subject: Additional Analysis Request for Registration 171390 E30392KP, Liverpool

Hi Aileen,

Could you please arrange for the following additional analysis to be undertaken on the soil samples in Envirolab's custody (**3 day TAT**):

2	TP2	0-0.2	TCLP lead
8	TP5	0-0.05	TCLP lead
28	TP11	0-0.2	TCLP lead and mercury
41	TP16	0.5-0.7	TCLP lead

Envirolab Ref: 171390 A
Due: 28/7/17
3 day TAT.

Thanks

Regards,

Brendan Page
Associate | Environmental Scientist
Certified Practitioner in Site Assessment and Management (SCPA)

T: +612 9888 5000
F: +612 9888 5001
BPage@jkgroup.net.au
www.jkgroup.net.au

ENVIRONMENTAL INVESTIGATION SERVICES
CONSULTING ENVIRONMENTAL ENGINEERS AND SCIENTISTS
PO Box 976, North Ryde BC NSW 1670
115 Wicks Rd, Macquarie Park NSW 2113

From: Ken Nguyen [mailto:KNguyen@envirolab.com.au]
Sent: Tuesday, 18 July 2017 7:12 PM
To: Brendan Page <BPage@jkgroup.net.au>
Subject: Results for Registration 171390 E30392KP, Liverpool

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

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	8/08/2017 3:39:08 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

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General Statistics

Total Number of Observations	14	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	14	Mean	340.4
Maximum	3900	Median	67
SD	1026	Std. Error of Mean	274.2
Coefficient of Variation	3.015	Skewness	3.722

Normal GOF Test

Shapiro Wilk Test Statistic	0.342	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.483	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.237	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	826	95% Adjusted-CLT UCL (Chen-1995)	1083
		95% Modified-t UCL (Johnson-1978)	871.5

Gamma GOF Test

A-D Test Statistic	2.2	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.815	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.332	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.245	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.387	k star (bias corrected MLE)	0.352
Theta hat (MLE)	878.5	Theta star (bias corrected MLE)	966.8
nu hat (MLE)	10.85	nu star (bias corrected)	9.857
MLE Mean (bias corrected)	340.4	MLE Sd (bias corrected)	573.6
		Approximate Chi Square Value (0.05)	3.852
Adjusted Level of Significance	0.0312	Adjusted Chi Square Value	3.369

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	870.8	95% Adjusted Gamma UCL (use when n<50)	995.7

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.833	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.182	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.237	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.639	Mean of logged Data	4.123
Maximum of Logged Data	8.269	SD of logged Data	1.505

Assuming Lognormal Distribution

95% H-UCL	897.9	90% Chebyshev (MVUE) UCL	391.4
95% Chebyshev (MVUE) UCL	493.5	97.5% Chebyshev (MVUE) UCL	635.4
99% Chebyshev (MVUE) UCL	913.9		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	791.4	95% Jackknife UCL	826
95% Standard Bootstrap UCL	772.3	95% Bootstrap-t UCL	7250
95% Hall's Bootstrap UCL	3559	95% Percentile Bootstrap UCL	882.7
95% BCA Bootstrap UCL	1164		
90% Chebyshev(Mean, Sd) UCL	1163	95% Chebyshev(Mean, Sd) UCL	1536
97.5% Chebyshev(Mean, Sd) UCL	2053	99% Chebyshev(Mean, Sd) UCL	3069

Suggested UCL to Use

99% Chebyshev (Mean, Sd) UCL	3069		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). However, simulations results will not cover all Real World data sets. For additional insight the user may want to consult a statistician.

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General Statistics

Total Number of Observations	14	Number of Distinct Observations	6
		Number of Missing Observations	0
Minimum	0.1	Mean	0.621
Maximum	6.2	Median	0.1
SD	1.611	Std. Error of Mean	0.431
Coefficient of Variation	2.593	Skewness	3.698

Normal GOF Test

Shapiro Wilk Test Statistic	0.358	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.459	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.237	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.384	95% Adjusted-CLT UCL (Chen-1995)	1.784
		95% Modified-t UCL (Johnson-1978)	1.455

Gamma GOF Test

A-D Test Statistic	2.689	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.788	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.312	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.241	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.561	k star (bias corrected MLE)	0.489
Theta hat (MLE)	1.107	Theta star (bias corrected MLE)	1.272
nu hat (MLE)	15.72	nu star (bias corrected)	13.68
MLE Mean (bias corrected)	0.621	MLE Sd (bias corrected)	0.889
		Approximate Chi Square Value (0.05)	6.355
Adjusted Level of Significance	0.0312	Adjusted Chi Square Value	5.705

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	1.338	95% Adjusted Gamma UCL (use when n<50)	1.491

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.68	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.304	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.237	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-2.303	Mean of logged Data	-1.587
Maximum of Logged Data	1.825	SD of logged Data	1.153

Assuming Lognormal Distribution

95% H-UCL	1.054	90% Chebyshev (MVUE) UCL	0.747
95% Chebyshev (MVUE) UCL	0.918	97.5% Chebyshev (MVUE) UCL	1.155
99% Chebyshev (MVUE) UCL	1.621		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	1.33	95% Jackknife UCL	1.384
95% Standard Bootstrap UCL	1.3	95% Bootstrap-t UCL	7.927
95% Hall's Bootstrap UCL	4.939	95% Percentile Bootstrap UCL	1.471
95% BCA Bootstrap UCL	1.907		
90% Chebyshev(Mean, Sd) UCL	1.913	95% Chebyshev(Mean, Sd) UCL	2.498
97.5% Chebyshev(Mean, Sd) UCL	3.31	99% Chebyshev(Mean, Sd) UCL	4.906

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL	2.498

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). However, simulations results will not cover all Real World data sets. For additional insight the user may want to consult a statistician.