



**REPORT TO
LORETO NORMANHURST SCHOOL**

**ON
DETAILED (STAGE 2) SITE INVESTIGATION**

**FOR
PROPOSED STAGE 1 WORKS AREA**

**AT
LORETO NORMANHURST GIRLS SCHOOL, 91-93
PENNANT HILLS ROAD, NORMANHURST, NSW**

Date: 15 December 2020

Ref: E31772PLrpt7

JKEnvironments
www.jkenvironments.com.au

T: +61 2 9888 5000

JK Environments Pty Ltd

ABN 90 633 911 403



Report prepared by:



Harry Leonard
Senior Environmental Scientist

Report reviewed by:



Brendan Page
Principal Associate | Environmental Scientist

For and on behalf of
JKE
PO BOX 976
NORTH RYDE BC NSW 1670

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Executive Summary

Loreto Normanhurst School ('the client') commissioned JK Environments (JKE) to undertake a Detailed (Stage 2) Site Investigation (DSI) for the proposed Stage 1 Works at Loreto Normanhurst Girls School, 91-93 Pennant Hills Road, Normanhurst, NSW. The site location is shown on Figure 1 and the investigation was confined to the site boundaries as shown on Figure 2.

The investigation was limited to the proposed Stage 1 Works development area only which occupies various portions of the north-eastern and western sections of the school property, as shown on Figure 2. For the purpose of this report, the investigation area has been referred to as 'the site', whilst the whole property has been referred to as 'the school'.

This report has been prepared to support the requirements outlined by the Department of Planning and Environment (DPE) as part of the Development Application (DA) lodgement.

From the information provided by the client, JKE understands the Stage 1 Works area will be developed in three stages as follows:

- Stage 1A – Includes the construction of a new boarding house located on the eastern boundary of the school. It is proposed that the new building will comprise four levels including one partial basement level. The building will be cut into the existing batters to the north and east elevations to create the two partial basement levels for car parking and common areas;
- Stage 1B – Includes the landscaping renovation of the Mary Ward Wing located in the centre of the northern section of the school. It is proposed that part of the existing building will be demolished and the area be developed as a landscape feature; and
- Stage 1C – Includes the garden plaza development located immediately to the east of the Mary Ward Wing. It is proposed that the area will be developed as a garden plaza with a combination of landscaped garden beds and paved footpaths.

The additional areas that are to be included in the Stage 1 Works area are the P3A car park, P4A car park, P1A car park, and the site through link.

JKE has carried out various preliminary and detailed site investigations at the site and have prepared a Remediation Action Plan (RAP) for parts of the Stage 1 Works area. Information from the previous investigations has been detailed in this report.

The primary aims of the investigation were to gather additional investigation data from the newly incorporated Stage 1 development areas in order to identify the potential for site contamination and further assess the soil and groundwater contamination conditions. The objectives were to:

- Assess the current site conditions and use(s) via a site walkover inspection;
- Outline the potential contamination sources/areas of environmental concern (AEC) and contaminants of potential concern (CoPC) based on a review of existing reports;
- Assess the soil and groundwater contamination conditions via implementation of a sampling and analysis program;
- Prepare a conceptual site model (CSM);
- Assess the potential risks posed by contamination to the receptors identified in the CSM (Tier 1 assessment);
- Provide a preliminary waste classification for off-site disposal of soil;
- Comment on site suitability for the proposed development; and
- Provide information to facilitate preparation of an updated RAP.

The scope of work included the following:

- Review of relevant site information and site history obtained for previous site investigations;
- Preparation of a CSM;
- Design and implementation of a sampling, analysis and quality plan (SAQP);
- Interpretation of the analytical results against the adopted Site Assessment Criteria (SAC);
- Data Quality Assessment; and
- Preparation of a report including a Tier 1 risk assessment.

The DSI included sampling of the soil and groundwater over several stages, then consolidation of the data into a single report for the site. Hydrocarbons (polycyclic aromatic hydrocarbons [PAHs] and total recoverable hydrocarbons [TRHs]) and asbestos were detected in fill (soil) at concentrations above the adopted human health-based SAC. TRHs and heavy metals were also encountered in fill (soil) at concentrations above the adopted ecological-based SAC. Minor elevations of some metals in groundwater were also identified above the ecological SAC, however these were considered to be consistent with regional/background groundwater conditions.

Based on the Tier 1 risk assessment, the PAHs, asbestos, TRHs and heavy metals were assessed to pose a low risk in the current site configuration. However, remediation will be required so that risks from PAHs and asbestos remain low and acceptable during construction and in the context of the proposed development. Additional soil sampling will be required for waste classification and validation purposes. These requirements will be documented in the RAP.

JKE are of the opinion that the site can be made suitable for the proposed development described in Section 1.2 via remediation. The RAP is to be updated to consider the findings of this DSI and the updated proposed development details. A site validation assessment will be required to document the remediation that occurs and the validation results.

The conclusions and recommendations should be read in conjunction with the limitations presented in the body of this report.



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Abbreviations

Asbestos Fines/Fibrous Asbestos	AF/FA
Ambient Background Concentrations	ABC
Added Contaminant Limits	ACL
Asbestos Containing Material	ACM
Australian Drinking Water Guidelines	ADWG
Area of Environmental Concern	AEC
Australian Height Datum	AHD
Acid Sulfate Soil	ASS
Above-Ground Storage Tank	AST
Below Ground Level	BGL
Benzo(a)pyrene Toxicity Equivalent Factor	BaP TEQ
Bureau of Meteorology	BOM
Benzene, Toluene, Ethylbenzene, Xylene	BTEX
Cation Exchange Capacity	CEC
Contaminated Land Management	CLM
Contaminant(s) of Potential Concern	CoPC
Chain of Custody	COC
Conceptual Site Model	CSM
Development Application	DA
Dial Before You Dig	DBYD
Data Quality Indicator	DQI
Data Quality Objective	DQO
Detailed Site Investigation	DSI
Ecological Investigation Level	EIL
Ecological Screening Level	ESL
Environmental Management Plan	EMP
Excavated Natural Material	ENM
Environment Protection Authority	EPA
Environmental Site Assessment	ESA
Ecological Screening Level	ESL
Fibre Cement Fragment(s)	FCF
General Approval of Immobilisation	GAI
Health Investigation Level	HILs
Health Screening Level	HSL
Health Screening Level-Site Specific Assessment	HSL-SSA
International Organisation of Standardisation	ISO
JK Environments	JKE
Lab Control Spike	LCS
Light Non-Aqueous Phase Liquid	LNAPL
Map Grid of Australia	MGA
National Association of Testing Authorities	NATA
National Environmental Protection Measure	NEPM
Organochlorine Pesticides	OCP
Organophosphate Pesticides	OPP
Polycyclic Aromatic Hydrocarbons	PAH
Potential ASS	PASS
Polychlorinated Biphenyls	PCBs
Per- and Polyfluoroalkyl Substances	PFAS
Photo-ionisation Detector	PID
Protection of the Environment Operations	POEO
Practical Quantitation Limit	PQL
Quality Assurance	QA
Quality Control	QC



Remediation Action Plan	RAP
Relative Percentage Difference	RPD
Site Assessment Criteria	SAC
Sampling, Analysis and Quality Plan	SAQP
Site Audit Statement	SAS
Site Audit Report	SAR
Site Specific Assessment	SSA
Source, Pathway, Receptor	SPR
Specific Contamination Concentration	SCC
Standard Penetration Test	SPT
Standing Water Level	SWL
Trip Blank	TB
Toxicity Characteristic Leaching Procedure	TCLP
Total Recoverable Hydrocarbons	TRH
Trip Spike	TS
Upper Confidence Limit	UCL
United States Environmental Protection Agency	USEPA
Underground Storage Tank	UST
Virgin Excavated Natural Material	VENM
Volatile Organic Compounds	VOC
World Health Organisation	WHO
Work Health and Safety	WHS

Units

Litres	L
Metres BGL	mBGL
Metres	m
Millivolts	mV
Millilitres	ml or mL
Milliequivalents	meq
micro Siemens per Centimetre	$\mu\text{S}/\text{cm}$
Micrograms per Litre	$\mu\text{g}/\text{L}$
Milligrams per Kilogram	mg/kg
Milligrams per Litre	mg/L
Parts Per Million	ppm
Percentage	%

1 INTRODUCTION

Loreto Normanhurst School ('the client') commissioned JK Environments (JKE) to undertake a Detailed (Stage 2) Site Investigation (DSI) for the proposed Stage 1 Works at Loreto Normanhurst Girls School, 91-93 Pennant Hills Road, Normanhurst, NSW. The site location is shown on Figure 1 and the investigation was confined to the site boundaries as shown on Figure 2.

The investigation was limited to the proposed Stage 1 Works development area only which occupies various portions of the north-eastern and western sections of the school property, as shown on Figure 2. For the purpose of this report, the investigation area has been referred to as 'the site', whilst the whole property has been referred to as 'the school'.

This report has been prepared to support the requirements outlined by the Department of Planning and Environment (DPE) as part of the Development Application (DA) lodgement.

A geotechnical investigation was undertaken in conjunction with this DSI by JK Geotechnics (JKG). The results of the geotechnical investigation are presented in a separate report (Ref: 31772Lrpt)¹. This report should be read in conjunction with the JKG report.

1.1 Previous investigations

JKE (formerly trading as Environmental Investigation Services – EIS) has previously undertaken a number of preliminary investigations/assessments at the site and the reports are referenced as follows:

- E31772KLrpt, dated 24 October 20182;
- E31772KLrpt2, dated 11 February 20193; and
- E31772KLrpt3, dated 30 April 20194.

The preliminary investigations/assessments were undertaken for targeted parts of the Stage 1 Works area as well as for the wider school property in order to address statutory planning considerations for both the Stage 1 development and the wider school Master Plan. A summary of this information has been included in Section 2.

JKE (as EIS) has also undertaken a DSI for the initial Stage 1 Works area (Ref: E31772PLrpt5, dated 24 May 2019)⁵. Since that time, the scope included in Stage 1 Works has been altered with the addition of the P3A car park, P4A car park, P1A car park, and site through link to the scope.

For the purposes of this investigation, all relevant data from the previous investigations has been included and the dataset as a whole will be considered in drawing conclusions for the Stage 1 Works development as

¹ JKG, (2020). *Report to Loreto Normanhurst School on Geotechnical Investigation*. (referred to as JKG report)

² EIS, (2018). *Report to TTW on Preliminary Site Investigation (PSI) for Proposed New School Buildings at Loreto Normanhurst Girls School, 91-93 Pennant Hills Road, Normanhurst* (referred to as EIS 2018 PSI)

³ EIS, (2019a). *Report to Allen Jack + Cottier Architects on Preliminary Stage 1 Environmental Site Assessment (ESA) for Loreto Normanhurst Girls School Master Plan at Loreto Normanhurst Girls School, 91-93 Pennant Hills Road, Normanhurst, NSW* (referred to as EIS 2019a ESA)

⁴ EIS, (2019b). *Report to Allen Jack + Cottier Architects on Preliminary Site Investigation (PSI) for Loreto Normanhurst Girls School Master Plan at Loreto Normanhurst Girls School, 91-93 Pennant Hills Road, Normanhurst, NSW* (referred to as EIS 2019b PSI)

⁵ EIS, (2019c). *Report to Allen Jack + Cottier on Detailed Site Investigation for Proposed Stage 1 Works Area at Loreto Normanhurst Girls School, 91-93 Pennant Hills Road, Normanhurst, NSW* (referred to as EIS 2019c DSI)

described in Section 1.2 below. The results and conclusions of this DSI therefore supersede those from the previous reports.

JKE (as EIS) also prepared a Remediation Action Plan (RAP) for the initial extent of the Stage 1 Works area (Ref: E31772KLrpt6, dated 29 May 2019)⁶. The EIS 2019d RAP will be updated based on the results of this DSI.

1.2 Proposed Development Details

From the SSDA Concept Proposal Plans (updated 8 December 2020) JKE understands the Stage 1 Works area will be developed as follows:

- Stage 1A – Includes the construction of a new boarding house located on the eastern boundary of the school. It is proposed that the new building will comprise four levels including one partial basement level. The building will be cut into the existing batters to the north and east elevations to create the partial basement level for car parking and common areas;
- Stage 1B – Includes the landscaping renovation of the Mary Ward Wing located in the centre of the northern section of the school. It is proposed that part of the existing building will be demolished and the area be developed as a landscape feature; and
- Stage 1C – Includes the garden plaza development located immediately to the east of the Mary Ward Wing. It is proposed that the area will be developed as a garden plaza with a combination of landscaped garden beds and paved footpaths.

The updated plans have included the following additional areas that are to be included in the Stage 1 Works area:

- P3A car park;
- P4A car park;
- P1A car park; and
- Site through link.

1.3 Aims and Objectives

The primary aims of the investigation were to gather additional investigation data from the newly incorporated Stage 1 development areas in order to identify the potential for site contamination and further assess the soil and groundwater contamination conditions. The objectives were to:

- Assess the current site conditions and use(s) via a site walkover inspection;
- Outline the potential contamination sources/areas of environmental concern (AEC) and contaminants of potential concern (CoPC) based on a review of existing reports;
- Assess the soil and groundwater contamination conditions via implementation of a sampling and analysis program;
- Prepare a conceptual site model (CSM);
- Assess the potential risks posed by contamination to the receptors identified in the CSM (Tier 1 assessment);
- Provide a preliminary waste classification for off-site disposal of soil;

⁶ EIS, (2019b). *Report to Loreto Normanhurst C/- Allen Jack + Cottier on Remediation Action Plan (RAP) for Proposed Stage 1 Works Area at Loreto Normanhurst Girls School, 91-93 Pennant Hills Road, Normanhurst, NSW* (referred to as EIS 2019d RAP)

- Comment on site suitability for the proposed development; and
- Provide information to facilitate preparation of an updated RAP.

1.4 Scope of Work

The investigation was undertaken generally in accordance with a JKE proposal (Ref: EP52766PL) of 30 September 2020 and written acceptance from the client of 23 October 2020. The scope of work included the following:

- Review of relevant site information and site history obtained for the 2018 PSI;
- Preparation of a CSM;
- Design and implementation of a sampling, analysis and quality plan (SAQP);
- Interpretation of the analytical results against the adopted Site Assessment Criteria (SAC);
- Data Quality Assessment; and
- Preparation of a report including a Tier 1 risk assessment.

The scope of work was undertaken with reference to the National Environmental Protection (Assessment of Site Contamination) Measure 1999 as amended (2013)⁷, other guidelines made under or with regards to the Contaminated Land Management Act (1997)⁸ and State Environmental Planning Policy No.55 – Remediation of Land (1998)⁹. A list of reference documents/guidelines is included in the appendices.

⁷ National Environment Protection Council (NEPC), (2013). *National Environmental Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013)*. (referred to as NEPM 2013)

⁸ Contaminated Land Management Act 1997 (NSW) (referred to as CLM Act 1997)

⁹ *State Environmental Planning Policy No. 55 – Remediation of Land 1998* (NSW) (referred to as SEPP55)

2 SITE INFORMATION

2.1 Background

2.1.1

A summary of the historical land uses and activities identified during the preliminary investigations/assessments (EIS 2018 PSI, EIS 2019a ESA, EIS 2019b PSI) is presented in the following table:

Table 2-1: Summary of Historical Land Uses

Year(s)	On-site - Potential Land Use / Activities	Off-site - Potential Land Use / Activities
Pre-1933	The majority of the school was vacant grassed land in the south section with residential properties in the northern section of the site. The site was owned by various individuals with professions unlikely to be associated with on-site activities.	The immediate surrounds have historically been used for agricultural and low-density residential purposes.
1933	The site was purchased by The Loreto Property Association.	
1933-2018	The site has been operational as Loreto Normanhurst School since 1933 with construction and various additions to the school buildings during this time.	

The site history assessments identified imported fill material, use of pesticides and hazardous building materials as potential contamination sources/AEC. The intrusive investigation undertaken for the EIS 2018 is summarised as follows:

- Soil sampling was undertaken from six locations within the Stage 1A boarding house area and extended to a maximum depth of 14.0m. Fill material (i.e. historically imported soil) was encountered at the surface or beneath the pavement in all boreholes and extended to depths of between 0.1m to 2.4m. The fill material typically consisted of silty sandy clay with inclusions of ironstone gravel, ash and roots;
- Natural silty clay was encountered in BH2 to BH6 and extended to depths of between 0.6m to 4.8m;
- Elevated concentrations of carcinogenic polycyclic aromatic hydrocarbons (PAHs), above the human-health based SAC, were encountered in the fill sample collected from BH2 (0.04-0.2m). These results are presented and discussed in further detail later in this report.

It is noted that data from BH7 to BH10 (inclusive) collected for the EIS 2018 PSI were for the proposed Early Learning Centre which no longer forms part of the site for the Stage 1 Works. Therefore, these results have been omitted from this DSI.

2.2 Site Identification

Table 2-2: Site Identification

Current Site Owner (certificate of title):	Trustees of the Loreto Property Association
Site Address:	91-93 Pennant Hills Road, Normanhurst, NSW
Lot & Deposited Plan:	Part of Lot 3 in DP1217496 Part of Lots 16, 20, 21 and 22 in DP6612 Part of Lot 1 in DP809066 Part of Lots 1, 2 and 3 in DP1218765
Current Land Use:	School
Proposed Land Use:	School
Local Government Authority:	Hornsby Shire Council
Current Zoning:	R2 – Low Density Residential
Site Area (m²) (approx.):	21,660m ²
RL (AHD in m) (approx.):	179m-193m
Geographical Location (decimal degrees) (approx.):	Latitude: -33.726726 Longitude: 151.098743
Site Location Plan:	Figure 1
Sample Location Plan:	Figure 2
Contamination Data Plan:	Figure 3

2.3 Site Location and Regional Setting

The site is located in a predominantly residential area of Normanhurst. The school is bound by Pennant Hills Road to the north, Mount Pleasant Avenue to the east and south and Osborn Road to the west.

2.4 Topography

The regional topography is characterised by an east facing hillside that falls towards Mount Pleasant Avenue. The school is located towards the mid-slope of the hillside and has a gentle slope towards the east and south-east at approximately 2° to 3°. Parts of the site have been levelled to account for the slope and accommodate the existing school development.

2.5 Site Inspection

A walkover inspection of the site was undertaken by JKE on 2 November 2020. The inspection was limited to accessible areas of the site and immediate surrounds. An internal inspection of buildings was not undertaken.

A summary of the inspection findings is outlined in the following subsections:

2.5.1 Current Site Use and/or Indicators of Former Site Use

At the time of the inspection, the majority of the site was occupied by school buildings, paved driveways and footpaths, landscaped areas and a tennis court. The surrounding areas within the school were occupied by school buildings including covered outdoor learning areas (COLAs). The southern section of the school was occupied by a recreational area that included car parking, playing fields and bushland. The boarding houses located in the north-east section of the school appeared to have been former residential buildings converted for school use.

2.5.2 Buildings, Structures and Roads

The north-eastern section of the school consisted of the main boarding house and the central section contained classrooms, amenities and administration offices. The buildings were mostly of brick construction with potential asbestos containing fibre cement sheeting noted on the external areas of the buildings. All buildings and structures appeared in good condition.

2.5.3 Boundary Conditions, Soil Stability and Erosion

The school was bounded by metal security fencing along most boundaries with the exception to the east of the boarding house which was bounded by a small brick retaining wall. There were no visible signs of erosion or soil instability along the school boundaries.

2.5.4 Presence of Drums/Chemical Storage and Waste

The maintenance yard located in the northern area of the school housed minor quantities of various chemicals and fuel for general maintenance of the school grounds. The yard appeared properly contained and the chemicals stored correctly with no direct pathway to reach bare soil or grass.

2.5.5 Evidence of Cut and Fill

The playing fields and tennis courts located centrally in the school ground appeared to have been historically cut and filled to achieve existing levels. Paved footpaths and landscaped garden beds within the site itself appeared to have been cut and filled in various locations to ensure a reasonably level platform for the footpaths. This is particularly evident towards the south-east section of the site, with a 1m-2m high retaining wall running adjacent the driveway leading down towards the playing fields.

2.5.6 Visible or Olfactory Indicators of Contamination (odours, spills etc)

During the 2019 works, a fibre cement fragment (FCF) was encountered on the ground surface within the site, adjacent the Loreto Community House (see Figures 2 and 3). The fragment was sampled and is identified as AMF1 in this report.

2.5.7 Drainage and Services

Stormwater pits were located across the low-level areas of the school and were assumed to be connected to the local stormwater system. The surface run-off was assumed to follow the general gradient of the site towards the south and east.

2.5.8 Sensitive Environments

Sensitive environments such as wetlands, ponds, creeks or extensive areas of natural vegetation were not identified within the site.

2.5.9 Landscaped Areas and Visible Signs of Plant Stress

Various raised garden beds, grassed areas and ground-level garden beds were identified across the school grounds. The vegetation present included large (>10m) native trees, exotic and native grasses and exotic shrubs. No visible signs of plant stress or dieback was noted during the site inspection.

2.6 Surrounding Land Use

During the site inspection, JKE observed the following land uses in the immediate surrounds:

- North – Cumberland Highway and Normanhurst Public School;
- South – Mount Pleasant Avenue and an aged care facility;
- East – Mount Pleasant Avenue and residential properties;
- West – Osborn Road and residential properties.

JKE did not observe any land uses in the immediate surrounds that were identified as potential contamination sources for the site.

2.7 Underground Services

The 'Dial Before You Dig' (DBYD) plans were reviewed for the investigation in order to establish whether any major underground services exist at the site or in the immediate vicinity that could act as a preferential pathway for contamination migration. Major services were not identified that would be expected to act as preferential pathways for contamination migration.

2.8 Summary of Geology and Hydrogeology

2.8.1 Geology and Acid Sulfate Soil (ASS)

Regional geological information presented in the EIS 2018 report indicated that the site is underlain by Ashfield Shale of the Wianamatta Group, which typically consists of black to dark grey shale and laminite.

A review of the acid sulfate soil (ASS) risk map prepared by Department of Land and Water Conservation (1997)¹⁰ indicated that the site is not located within a risk area. ASS information presented in the Lotsearch report (attached in the appendices) indicated that a Class 5 area is located directly to the south of the site. The proposed development will not lower the water table in nearby ASS risk areas and therefore the proposed works do not pose a risk in terms of ASS disturbance.

2.8.2 Hydrogeology

The information reviewed for the 2018 PSI indicated that there was a total of 10 registered bores within 2,000m of the site. The nearest registered bore was located approximately 235m from the site and was utilised for recreational purposes (probably irrigation of sports fields). The next closest bore was located 1,415m west of the site and was utilised for monitoring purposes. The information indicated that the subsurface conditions at the site are likely to consist of relatively low permeability residual soils overlying shallow bedrock. The potential for viable groundwater abstraction and use of shallow groundwater under these conditions is considered to be low. There is a reticulated water supply in the area and consumption of groundwater is not expected to occur at the site or in the vicinity. Use of groundwater is not proposed as part of the development.

Surface water bodies were not identified in the immediate vicinity of the site. The closest surface water body is Coups Creek located approximately 350m to the east of the site.

¹⁰ Department of Land and Water Conservation, (1997). *1:25,000 Acid Sulfate Soil Risk Map (Series 9130N3, Ed 2)*

3 CONCEPTUAL SITE MODEL

NEPM (2013) defines a CSM as a representation of site related information regarding contamination sources, receptors and exposure pathways between those sources and receptors. The CSM for the site is presented in the following sub-sections and is based on the site information (including the site inspection information) and the review of site history information. Reference should also be made to the figures attached in the appendices.

A review of the CSM in relation to source, pathway and receptor (SPR) linkages has been undertaken as part of the Tier 1 risk assessment process, as outlined in Section 8.

3.1 Potential Contamination Sources/AEC and CoPC

The potential contamination sources/AEC and CoPC are presented in the following table:

Table 3-1: Potential (and/or known) Contamination Sources/AEC and Contaminants of Potential Concern

Source / AEC	CoPC
<u>Fill material</u> – Based on data obtained from the EIS 2018 PSI, fill material is known to be present at the site within the proposed boarding house area. Elevated concentrations of PAHs were encountered within the fill material in this area. Other areas of the site appeared to have been historically filled to achieve existing levels.	Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), petroleum hydrocarbons (referred to as total recoverable hydrocarbons – TRHs), benzene, toluene, ethylbenzene and xylene (BTEX), polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides (OCPs), organophosphate pesticides (OPPs), polychlorinated biphenyls (PCBs) and asbestos.
<u>Use of pesticides</u> – Pesticides may have been used beneath the buildings and/or around the site.	Heavy metals and OCPs
<u>Hazardous Building Material</u> – Hazardous building materials may be present as a result of former building and demolition activities. Such activities may have impacted the surficial soils or been mixed in with fill used in earthworks. These materials may also be present in the existing buildings/ structures on site.	Asbestos, lead and PCBs

3.2 Mechanism for Contamination, Affected Media, Receptors and Exposure Pathways

The mechanisms for contamination, affected media, receptors and exposure pathways relevant to the potential contamination sources/AEC are outlined in the following CSM table:

Table 3-2: CSM

Potential mechanism for contamination	The potential mechanisms for contamination are most likely to include 'top-down' impacts and spills. There is a potential for sub-surface releases to have occurred if deep fill (or other buried industrial infrastructure) is present, although this is considered to be the least likely mechanism for contamination.
Affected media	Soil and groundwater have been identified as potentially affected media. The potential for groundwater impacts is considered to be relatively low based on the AEC. However, groundwater would require further investigation in the event

	that soil was found to be impacted by mobile contaminants that were assessed to pose a risk to groundwater.
Receptor identification	Human receptors include site occupants/users (including adults and children), construction workers and intrusive maintenance workers. Off-site human receptors include adjacent land users. Ecological receptors include terrestrial organisms and plants within unpaved areas (including the proposed landscaped areas), and freshwater ecology in down-gradient water bodies (e.g. Coups Creek).
Potential exposure pathways	Potential exposure pathways relevant to the human receptors include ingestion, dermal absorption and inhalation of dust (all contaminants) and vapours (volatile TRH, naphthalene and BTEX). The potential for exposure would typically be associated with the construction and excavation works, and future use of the site. Potential exposure pathways for ecological receptors include direct contact and ingestion. Exposure during future site use could occur via direct contact with soil in unpaved areas such as gardens, inhalation of airborne asbestos fibres during soil disturbance, or inhalation of vapours within enclosed spaces such as buildings and basements.
Potential exposure mechanisms	The following have been identified as potential exposure mechanisms for site contamination: • Vapour intrusion into the proposed basements and/or buildings (either from soil contamination or volatilisation of contaminants from groundwater); • Contact (dermal, ingestion or inhalation) with exposed soils in landscaped areas and/or unpaved areas; and • Migration of groundwater off-site into areas where groundwater is being utilised for recreational purposes (likely irrigation of sports fields) or into nearby water bodies that support freshwater ecosystems.

4 SAMPLING, ANALYSIS AND QUALITY PLAN

4.1 Data Quality Objectives (DQO)

Data Quality Objectives (DQOs) were developed to define the type and quality of data required to achieve the project objectives outlined in Section 1.3. The DQOs were prepared with reference to the process outlined in Schedule B2 of NEPM (2013) and the Guidelines for the NSW Site Auditor Scheme, 3rd Edition (2017)¹¹. The seven-step DQO approach for this project is outlined in the following sub-sections.

The DQO process is validated in part by the Data Quality Assurance/Quality Control (QA/QC) Evaluation. The Data (QA/QC) Evaluation is summarised in Section 6.1 and the detailed evaluation is provided in the appendices.

4.1.1 Step 1 - State the Problem

The CSM identified potential sources of contamination/AEC at the site that may pose a risk to human health and the environment. Investigation data is required to assess the contamination status of the site, assess the risks posed by the contaminants in the context of the proposed development/intended land use, and assess whether remediation is required. This information will be considered by the consent authority in exercising its planning functions in relation to the development proposal. A preliminary waste classification is required prior to off-site disposal of excavated soil/bedrock.

The DQOs were developed by the author of this report and checked by the reviewer. Both the author and reviewer were joint decision-makers in relation to Step 2 of the DQO process.

4.1.2 Step 2 - Identify the Decisions of the Study

The objectives of the investigation are outlined in Section 1.3. The decisions to be made reflect these objectives and are as follows:

- Are any results above the SAC?
- Do potential risks associated with contamination exist, and if so, what are they?
- Is the site suitable for the proposed development, or can the site be made suitable subject to further characterisation and/or remediation?

4.1.3 Step 3 - Identify Information Inputs

The primary information inputs required to address the decisions outlined in Step 2 include the following:

- Existing relevant environmental data from previous reports;
- Site information, including site observations and site history documentation;
- Sampling of potentially affected media, including soil and groundwater;
- Observations of sub-surface variables such as soil type, photo-ionisation detector (PID) concentrations, odours and staining, and groundwater physiochemical parameters;

¹¹ NSW EPA (2017). *Guidelines for the NSW Site Auditor Scheme, 3rd ed.* (referred to as Site Auditor Guidelines 2017)

- Laboratory analysis of soils, fibre cement and groundwater for the CoPC identified in the CSM. It is noted that the groundwater sample was also screened for a broader suite of volatile organic compounds (VOCs) as that formed part of the initial scope for that groundwater sampling; and
- Field and laboratory QA/QC data.

4.1.4 Step 4 - Define the Study Boundary

The sampling will generally be confined to the site boundaries as shown in Figure 2 (spatial boundary), however it is acknowledged that some samples fall marginally outside the site boundary due to access constraints and the changing scope of the project. The soil sampling was completed over multiple sampling events. Investigations commenced in September 2018 and were completed most recently on 2 November and 6 November 2020. Groundwater sampling occurred on 4 April 2019 (temporal boundary). The assessment of potential risk to adjacent land users has been made based on data collected within the site boundary.

4.1.5 Step 5 - Develop an Analytical Approach (or Decision Rule)

4.1.5.1 Tier 1 Screening Criteria

The laboratory data will be assessed against relevant Tier 1 screening criteria (referred to as SAC), as outlined in Section 5. Exceedances of the SAC do not necessarily indicate a requirement for remediation or a risk to human health and/or the environment. Exceedances are considered in the context of the CSM and valid SPR-linkages.

For this investigation, the individual results have been assessed as either above or below the SAC. Statistical evaluation of the dataset via calculation of mean values and/or 95% upper confidence limit (UCL) values has not been undertaken due to the non-probabilistic sample design.

4.1.5.2 Field and Laboratory QA/QC

Field QA/QC included analysis of inter-laboratory duplicates, intra-laboratory duplicates, trip spike, trip blank and rinsate samples. Further details regarding the sampling and analysis undertaken, and the acceptable limits adopted, is provided in the Data Quality (QA/QC) Evaluation in the appendices.

The suitability of the laboratory data is assessed against the laboratory QA/QC criteria which is outlined in the attached laboratory reports. These criteria were developed and implemented in accordance with the laboratory's National Association of Testing Authorities, Australia (NATA) accreditation and align with the acceptable limits for QA/QC samples as outlined in NEPM (2013) and other relevant guidelines.

In the event that acceptable limits are not met by the laboratory analysis, other lines of evidence are reviewed (e.g. field observations of samples, preservation, handling etc) and, where required, consultation with the laboratory is undertaken in an effort to establish the cause of the non-conformance. Where uncertainty exists, JKE typically adopt the most conservative concentration reported (or in some cases, consider the data from the affected sample as an estimate).

4.1.5.3 Appropriateness of Practical Quantitation Limits (PQLs)

The PQLs of the analytical methods are considered in relation to the SAC to confirm that the PQLs are less than the SAC. In cases where the PQLs are greater than the SAC, a discussion of this is provided.

4.1.6 Step 6 – Specify Limits on Decision Errors

To limit the potential for decision errors, a range of quality assurance processes are adopted. A quantitative assessment of the potential for false positives and false negatives in the analytical results is undertaken with reference to Schedule B(3) of NEPM (2013) using the data quality assurance information collected.

Decision errors can be controlled through the use of hypothesis testing. The test can be used to show either that the baseline condition is false or that there is insufficient evidence to indicate that the baseline condition is false. The null hypothesis is an assumption that is assumed to be true in the absence of contrary evidence. For this investigation, the null hypothesis has been adopted which is that, there is considered to be a complete SPR linkage for the CoPC identified in the CSM unless this linkage can be proven not to (or unlikely to) exist. The null hypothesis has been adopted for this investigation.

4.1.7 Step 7 - Optimise the Design for Obtaining Data

The most resource-effective design will be used in an optimum manner to achieve the investigation objectives. Adjustment of the investigation design can occur following consultation or feedback from project stakeholders. For this investigation, the design was optimised via consideration of the various lines of evidence used to select the sample locations, the media being sampled, and also by the way in which the data were collected concurrently with the geotechnical investigations.

The sampling plan and methodology are outlined in the following sub-sections.

4.2 Soil Sampling Plan and Methodology

The soil sampling plan and methodology adopted for this investigation is outlined in the table below:

Table 4-1: Soil Sampling Plan and Methodology

Aspect	Input
Sampling Density	The sampling density for asbestos in soil included sampling at the minimum sampling density for sites where asbestos was “possible” or “suspect” as recommended in the Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (2009)¹² (endorsed in NEPM 2013). This density was considered adequate in the absence of any previously identified sub-surface asbestos at the site. Samples were collected from a total of 39 locations as shown on the attached Figure 2. Based on the site area (21,660m²), this number of locations corresponded to a sampling density of approximately one sample per 555m². The sampling plan was not designed to meet the minimum sampling density for hotspot identification as outlined in the NSW EPA Contaminated Sites Sampling Design Guidelines (1995)¹³ as a probabilistic sampling plan was not implemented.

¹² Western Australian (WA) Department of Health (DoH), (2009). *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia*. (referred to as WA DoH 2009)

¹³ NSW EPA, (1995), *Contaminated Sites Sampling Design Guidelines*. (referred to as EPA Sampling Design Guidelines 1995)

Aspect	Input
	However, we note that the guidelines recommend 30 locations for areas up to 20,000m ² and 35 locations for areas up to 20,000m ² .
Sampling Plan	The sampling locations were placed on a judgemental sampling plan and were broadly positioned for site coverage, taking into consideration areas that were not easily accessible. This sampling plan was considered suitable to make an assessment of potential risks associated with the AEC and CoPC identified in the CSM, and assess whether further investigation is warranted. Additional sampling locations were placed in the vicinity of BH2, to target where elevated concentrations of PAHs were encountered during the EIS 2018 PSI. This was undertaken in an attempt to better characterise the extent of contamination in this area.
Set-out and Sampling Equipment	Sampling locations were set out using a tape measure. In-situ sampling locations were checked for underground services by an external contractor prior to sampling. Samples were collected using a drill rig equipped with spiral flight augers. Soil samples were obtained from a Standard Penetration Test (SPT) split-spoon sampler, or directly from the auger when conditions did not allow use of the SPT sampler. BH110 was drilled using a hand auger due to the presence of a potential service in the vicinity.
Sample Collection and Field QA/QC	Soil samples were obtained in accordance with standard field procedures. Soil samples were collected from the fill and natural profiles based on field observations. The sample depths are shown on the logs attached in the appendices. 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. During sampling, soil at selected depths was split into primary and duplicate samples for field QA/QC analysis. The field splitting procedure included splitting the soil by hand and alternately filling the sampling containers to obtain a representative split sample.
Field Screening	A portable Photoionisation Detector (PID) fitted with a 10.6mV lamp was used to screen the samples for the presence of volatile organic compounds (VOCs). 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. PID calibration records are maintained on file by JKE. Fill/spoil at the sampling locations was visually inspected during the works for the presence of fibre cement fragments. Additionally, field screening for asbestos quantification was undertaken from BH101 to BH117. The field screening included the following: • A representative bulk sample (10L volume where possible) sample was collected from fill at 1m intervals, or from each distinct fill profile. The bulk sample intervals are shown on the attached borehole logs; • Each sample was weighed using an electronic scale; • Due to the cohesive nature of the soils, each sample was subsequently placed on a contrasting support (blue tarpaulin) and inspected for the presence of fibre cement. Any soil clumps/nodules were disaggregated; • The condition of fibre cement or any other suspected asbestos materials was noted on the field records; and • If observed, any fragments of fibre cement in the bulk sample were collected, placed in a zip-lock bag and assigned a unique identifier. Calculations for asbestos content were undertaken

Aspect	Input
	based on the requirements outlined in Schedule B1 of NEPM (2013), as summarised in Section 5.1. A calibration/check of the accuracy of the scale used for weighing the fibre cement fragments was undertaken using a set of calibration weights. Calibration/check records are maintained on file by EIS. The scale used to weigh the bulk samples was not calibrated, however this is not considered significant as this method of providing a weight for the bulk sample is considered to be considerably more accurate than applying a nominal soil density conversion.
Decontamination and Sample Preservation	Sampling personnel used disposable nitrile gloves during sampling activities. Re-usable sampling equipment was decontaminated using Decon and potable water. Soil samples were preserved by immediate storage in an insulated sample container with ice or ice bricks. On completion of the fieldwork, the samples were stored temporarily in fridges in the JKE warehouse before being delivered in the insulated sample container to a NATA registered laboratory for analysis under standard chain of custody (COC) procedures.

4.3 Groundwater Sampling Plan and Methodology

The groundwater sampling plan and methodology is outlined in the table below:

Table 4-2: Groundwater Sampling Plan and Methodology

Aspect	Input
Sampling Plan	A groundwater monitoring well was installed in BH111 (MW111). The well was positioned to gain a snap-shot of the groundwater conditions. Considering the topography and the location of the nearest down-gradient water body, MW111 was considered to be in the up-gradient area of the site and would be expected to provide an indication of groundwater flowing onto (beneath) the site from the north.
Monitoring Well Installation Procedure	The monitoring well construction details are documented on the appropriate borehole log attached in the appendices. The monitoring well was installed to a depth of approximately 5.7mBGL. The well was generally constructed as follows: • 50mm diameter Class 18 PVC (machine slotted screen) was installed in the lower section of the well to intersect groundwater; • 50mm diameter Class 18 PVC casing was installed in the upper section of the well (screw fixed); • A 2mm sand filter pack was used around the screen section for groundwater infiltration; • A hydrated bentonite seal/plug was used on top of the sand pack to seal the well; and • A gatic cover was installed at the surface with a concrete plug to limit the inflow of surface water. The monitoring well installation, including the screen length, was considered suitable for assessment of general groundwater quality with regards to Table 5 in Schedule B2 of NEPM 2013.
Monitoring Well Development	The monitoring well was developed on 28 March 2019 using a submersible electrical pump. The monitoring well was effectively dry at the time of development. The field monitoring records and calibration data are attached in the appendices.
Groundwater Sampling	The monitoring well was allowed to recharge for approximately seven days after development. Groundwater samples were obtained on 4 April 2019.

Aspect	Input
	Prior to sampling, the monitoring wells were checked for the presence of Light Non-Aqueous Phase Liquids (LNAPLs) using an inter-phase probe electronic dip meter. The monitoring well head space was checked for VOCs using a calibrated PID unit. Due to the small volume of groundwater available, the samples were obtained using a disposable plastic bailer. During sampling, the following parameters were monitored using calibrated field instruments (see SSP): • SWL using an electronic dip meter; and • pH, temperature, electrical conductivity (EC), dissolved oxygen (DO) and redox potential (Eh) using a YSI Multi-probe water quality meter. Steady state conditions were not considered to have been achieved due to the slow infiltration rate of water into the well. Groundwater samples were obtained directly from the disposable bailer and placed in the sample containers. Duplicate samples were not obtained due to the small volume of groundwater encountered. Groundwater removed from the wells during development and sampling was transported to EIS in jerry cans and stored in holding drums prior to collection by a licensed waste water contractor for off-site disposal. The field monitoring record and calibration data are attached in the appendices.
Decontaminant and Sample Preservation	The decontamination procedure adopted during sampling is outlined in the SSP attached in the appendices. The samples were preserved with reference to the analytical requirements and placed in an insulated container with ice in accordance with the SSP. On completion of the fieldwork, the samples were temporarily stored in a fridge at the EIS office, before being delivered in the insulated sample container to a NATA registered laboratory for analysis under standard COC procedures.

4.3.1 Laboratory Analysis

Samples were analysed by an appropriate, NATA Accredited laboratory using the analytical methods detailed in Schedule B(3) of NEPM 2013. Reference should be made to the laboratory reports attached in the appendices for further details.

Table 4-3: Laboratory Details

Samples	Laboratory	Report Reference
All primary samples and field QA/QC samples including (intra-laboratory duplicates, trip blanks, trip spikes and field rinsate samples)	Envirolab Services Pty Ltd NSW, NATA Accreditation Number – 2901 (ISO/IEC 17025 compliance)	19989, 200697, 200697-A, 214605, 214605-A, 215092, 255370 & 255370-A
Inter-laboratory duplicates	Envirolab Services Pty Ltd VIC, NATA Accreditation Number – 2901 (ISO/IEC 17025 compliance)	14768, 16446 & 23339

5 SITE ASSESSMENT CRITERIA (SAC)

The SAC were derived from the NEPM 2013 and other guidelines as discussed in the following sub-sections. The guideline values for individual contaminants are presented in the attached report tables and further explanation of the various criteria adopted is provided in the appendices.

5.1 Soil

Soil data were compared to relevant Tier 1 screening criteria in accordance with NEPM (2013) as outlined below.

5.1.1 Human Health

- Health Investigation Levels (HILs) for a 'residential with accessible soils' exposure scenario (HIL-A), which are applicable for combined primary and secondary schools;
- Health Screening Levels (HSLs) for a 'low-high density residential' exposure scenario (HSL-A & HSL-B), which are also applicable for combined primary and secondary schools. HSLs were calculated based on conservative assumptions including a 'sand' type and a depth interval of 0m to 1m;
- HSLs for direct contact presented in the CRC Care Technical Report No. 10 – Health screening levels for hydrocarbons in soil and groundwater Part 1: Technical development document (2011)¹⁴; and
- For the DSI as a whole, asbestos was assessed on the basis of presence/absence and asbestos HSLs were not adopted as detailed asbestos quantification was not undertaken at all locations. However, where quantification was undertaken (BH101-BH117), these results were also assessed against the HSL-A criteria. A summary of the asbestos quantification criteria is provided in the table below:

Table 5-1: Details for Asbestos SAC

Guideline	Applicability
Asbestos in Soil	Where applicable, the HSL-A criteria were adopted for the assessment of asbestos in soil. The SAC adopted for asbestos were derived from the NEPM 2013 and are based on WA DoH (2009) guidance. The SAC include the following: • No visible asbestos at the surface/in the top 10cm of soil; • <0.01% w/w bonded asbestos containing material (ACM) in soil; and • <0.001% w/w asbestos fines/fibrous asbestos (AF/FA) in soil. Concentrations for bonded ACM concentrations in soil are based on the following equation which is presented in Schedule B1 of NEPM (2013): $\% \text{ w/w asbestos in soil} = \frac{\% \text{ asbestos content} \times \text{bonded ACM (kg)}}{\text{Soil volume (L)} \times \text{soil density (kg/L)}}$

¹⁴ Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC Care), (2011). Technical Report No. 10 - Health screening levels for hydrocarbons in soil and groundwater Part 1: Technical development document

5.1.2 Environment (Ecological – terrestrial ecosystems)

- Ecological Investigation Levels (EILs) and Ecological Screening Levels (ESLs) for an 'urban residential and public open space' (URPOS) exposure scenario. These have only been applied to the top 2m of soil as outlined in NEPM (2013). The criterion for benzo(a)pyrene has been increased from the value presented in NEPM (2013) based on the Canadian Soil Quality Guidelines¹⁵;
- ESLs were adopted based on the soil type (i.e. coarse or fine);
- EILs for selected metals were calculated for each soil type as follows:
 - Fine soils were calculated by averaging soil parameters from the laboratory data presented reports 214605 and 200697. The average parameters for pH (5.76), cation exchange capacity (CEC) (7.1) and clay content (35.3) were applied to each fine soil type: and
 - Coarse soils were calculated using site specific soil parameters for pH (9.2), CEC (26) and clay content (7) from one sampled analysed, as presented in lab report 200697.
- The above parameters were obtained from analysis of the two main soil types on site as clay and sand. The relevant data was averaged and applied to each soil type. These data were used to select the added contaminant limit (ACL) values presented in Schedule B(1) of NEPM (2013), and published ambient background concentration (ABC) presented in the document titled Trace Element Concentrations in Soils from Rural and Urban Areas of Australia (1995)¹⁶. This method is considered to be adequate for the Tier 1 screening.

5.1.3 Management Limits for Petroleum Hydrocarbons

Management limits for petroleum hydrocarbons (as presented in Schedule B1 of NEPM 2013) were considered following evaluation of human health and ecological risks, and risks to groundwater.

5.1.4 Waste Classification

Data for the waste classification assessment were assessed in accordance with the Waste Classification Guidelines, Part 1: Classifying Waste (2014)¹⁷ as outlined in the following table:

Table 5-2: Waste Categories

Category	Description
General Solid Waste (non-putrescible)	• If Specific Contaminant Concentration (SCC) $\leq$ Contaminant Threshold (CT1) then Toxicity Characteristics Leaching Procedure (TCLP) not needed to classify the soil as general solid waste; and • If TCLP $\leq$ TCLP1 and SCC $\leq$ SCC1 then treat as general solid waste.
Restricted Solid Waste (non-putrescible)	• If SCC $\leq$ CT2 then TCLP not needed to classify the soil as restricted solid waste; and • If TCLP $\leq$ TCLP2 and SCC $\leq$ SCC2 then treat as restricted solid waste.
Hazardous Waste	• If SCC $>$ CT2 then TCLP not needed to classify the soil as hazardous waste; and • If TCLP $>$ TCLP2 and/or SCC $>$ SCC2 then treat as hazardous waste.

¹⁵ Canadian Council of Ministers of the Environment, (1999). *Canadian soil quality guidelines for the protection of environmental and human health: Benzo(a)Pyrene (1997)* (referred to as the Canadian Soil Quality Guidelines)

¹⁶ Olszowy, H., Torr, P., and Imray, P., (1995), *Trace Element Concentrations in Soils from Rural and Urban Areas of Australia. Contaminated Sites Monograph Series No. 4*. Department of Human Services and Health, Environment Protection Agency, and South Australian Health Commission.

¹⁷ NSW EPA, (2014). *Waste Classification Guidelines, Part 1: Classifying Waste*. (referred to as Waste Classification Guidelines 2014)

Category	Description
Virgin Excavated Natural Material (VENM)	Natural material (such as clay, gravel, sand, soil or rock fines) that meet the following: • 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.

5.2 General Approvals of Immobilisation (GAI)

Waste classified as 'hazardous' in accordance with the Waste Classification Guidelines 2014 due to high levels of contaminants is generally not suitable for disposal to a landfill in NSW without treatment. However, if the contaminants are 'immobilised' so that they will not be released into the landfill leachate at levels of concern, then the EPA may grant an immobilisation approval to enable the waste to be landfilled. The immobilisation approvals are issued by the EPA under the Protection of the Environment Operations (Waste) Regulation 2014. A list of the GAI can be found on the NSW EPA website.

Significant amounts of waste ash and gravely slag were available in the late nineteenth and early twentieth centuries as a result of the use of coal for industrial and domestic heating purposes. Widespread use of ash waste (either as ash or mixed with other soil and waste materials) as fill material was common in the suburbs of Sydney at this time. To account for the presence of ash and slag, the NSW EPA has published the following:

Table 5-3: GAIs

Approval Number	Waste Stream	Contaminants	Waste Assessment Requirements
1999/05	Ash, Ash-contaminated natural excavated materials or coal-contaminated natural excavated material.	Polycyclic Aromatic Hydrocarbons (PAHs) including benzo(a)pyrene.	The SCC limits for PAHs and benzo(a)pyrene outlined in the Waste Classification Guidelines 2014 do not apply for the assessment of this waste stream. The material can be classified according to the leachable concentration (TCLP) value of benzo(a)pyrene alone. Disposal restrictions apply for material classified under this GAI.
2009/07	Metallurgical furnace slag or metallurgical furnace slag contaminated natural excavated materials.	Beryllium, Chromium (VI), lead, nickel, PAHs and benzo(a)pyrene.	The SCC limits for these contaminants outlined in the Waste Classification Guidelines 2014 do not apply for the assessment of this waste stream. The material can be classified according to their leachable concentrations (TCLP) values alone.

5.3 Groundwater

Groundwater data were compared to relevant Tier 1 screening criteria in accordance with NEPM (2013), following an assessment of environmental values in accordance with the Guidelines for the Assessment and Management of Groundwater Contamination (2007)¹⁸. Environmental values for this investigation include freshwater ecological environments, human uses (irrigation), and human-health risks in non-use scenarios (e.g. via volatilisation).

5.3.1 Human Health

- HSLs for a 'low-high density residential' exposure scenario (HSL-A/HSL-B). HSLs were calculated based on the soil type and the observed depth to groundwater;
- The NEPM (2013) HSLs were not applicable for some aspects of this project as the proposed basement will intersect groundwater. On this basis, JKE have undertaken a site-specific assessment (SSA) for the Tier 1 screening of human health risks posed by volatile contaminants in groundwater. The assessment included selection of alternative Tier 1 criteria that were considered suitably protective of human health. These criteria are based on drinking water guidelines and have been referred to as HSL-SSA. The criteria were based on the following (as shown in the attached report tables):
 - o Australian Drinking Water Guidelines 2011 (updated 2018)¹⁹ for BTEX compounds and selected VOCs;
 - o World Health Organisation (WHO) document titled Petroleum Products in Drinking-water, Background document for the development of WHO Guidelines for Drinking Water Quality (2008)²⁰ for petroleum hydrocarbons;
 - o USEPA Region 9 screening levels for naphthalene (threshold value for tap water); and
 - o The use of the laboratory PQLs for other contaminants where there were no Australian guidelines.
- The ADWG 2011 criteria were multiplied by a factor of 10 to assess potential risks associated with incidental/recreational-type exposure to groundwater (e.g. with bore water used for irrigation, or with seepage water in the basement). These have been deemed as 'recreational' SAC.

5.3.2 Environment (Ecological - aquatic ecosystems)

Groundwater Investigation Levels (GILs) for 95% protection of freshwater species were adopted based on the Default Guideline Values in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2018)²¹.

¹⁸ NSW Department of Environment and Conservation, (2007). *Guidelines for the Assessment and Management of Groundwater Contamination*.

¹⁹ National Health and Medical Research Council (NHMRC), (2018). *National Water Quality Management Strategy, Australian Drinking Water Guidelines 2011* (referred to as ADWG 2011)

²⁰ World Health Organisation (WHO), (2008). *Petroleum Products in Drinking-water, Background document for the development of WHO Guidelines for Drinking Water Quality* (referred to as WHO 2008)

²¹ Australian and New Zealand Governments (ANZG), (2018). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia (referred to as ANZG 2018)

6 RESULTS

6.1 Summary of Data (QA/QC) Evaluation

The data evaluation is presented in the appendices. In summary, JKE are of the opinion that the data are adequately precise, accurate, representative, comparable and complete to serve as a basis for interpretation to achieve the investigation objectives.

6.2 Subsurface Conditions

A summary of the subsurface conditions encountered during the investigation is presented in the following table. Reference should be made to the borehole logs attached in the appendices for further details.

Table 6-1: Summary of Subsurface Conditions

Profile	Description
Pavement	Asphaltic Concrete (AC)/Concrete pavement was encountered at the surface in BH2, BH104, BH105, BH106, BH108, BH109, BH111, BH114, BH115, BH116, BH117, BH201, BH206, BH207, BH209, BH210, and BH211 and extended to depths of between 0.015m to 0.16mBGL.
Fill	Fill was encountered at the surface or beneath the pavement in all boreholes and extended to depths of approximately 0.1mBGL to 2.8mBGL. The deepest fill was encountered in the south-most section of the site in the existing sports oval. The fill was generally much shallower (typically <0.5m deep) in other areas. BH105, BH106 and BH110 were terminated in the fill at a maximum depth of approximately 0.6mBGL. The fill typically comprised silty clay, silty sandy clay, gravelly sand, silty sandy clay, silty gravelly sand and sandy gravel with inclusions of ash, slag, ironstone gravels, igneous gravels, sandstone gravels and building rubble (concrete and AC).
Natural Soil	Natural silty clay was encountered beneath the fill in all boreholes, excluding boreholes BH103, BH105, BH106 and BH110, and extended to depths of between 0.7mBGL and 4.0mBGL.
Bedrock	Weathered siltstone bedrock was encountered beneath the natural soil or directly beneath the fill in boreholes BH102, BH103, BH104, BH109, BH111, BH116, BH202 and extended to the termination depths of between 1.0mBGL to 6.0mBGL.
Groundwater	Groundwater wells installed during the geotechnical investigation were measured at the completion of all field work on 6 November 2020. Groundwater was encountered in BH201, BH204 and BH211 at depths of between approximately 0.8mBGL and 2.3mBGL. Groundwater was not encountered during development in MW111. Only a small volume of groundwater was encountered during sampling seven days after installation at a depth of approximately 5.12mBGL.

6.3 Field Screening

A summary of the field screening results are presented in the following table:

Table 6-2: Summary of Field Screening

Aspect	Details
PID Screening of Soil Samples for VOCs	PID soil sample headspace readings are presented in attached report tables and the COC documents attached in the appendices. The results ranged from 0.1ppm to 122.6ppm equivalent isobutylene. These results indicate PID detectable VOCs were present in some samples. It is noted that the highest PID results did not correlate with any hydrocarbon-type odours or staining, or with elevated detections of TRH/BTEX.
Bulk Screening for Asbestos	The bulk field screening results are summarised in the attached report Table S5. FCF/ACM was not encountered in any of the samples. All bulk field screening results were below the SAC.
Groundwater Field Parameters	Due to the small volume of groundwater encountered, only one set of field measurements were recorded during sampling, these were as follows: - pH was recorded at 6.19; - EC was recorded at 2,234µS/cm; - Eh was recorded at 212.9mV; and - DO was recorded at 5.4ppm.
LNAPLs petroleum hydrocarbons	Phase separated product (i.e. LNAPL) were not detected using the interphase probe during groundwater sampling.

6.4 Soil Laboratory Results

The soil laboratory results were assessed against the SAC presented in Section 5.1. Individual SAC are shown in the report tables attached in the appendices and Elevations above the SAC are presented on Figure 3. A summary of the results is presented below:

6.4.1 Human Health and Environmental (Ecological) Assessment

Table 6-3: Summary of Soil Laboratory Results – Human Health and Environmental (Ecological)

Analyte	N	Max. (mg/kg)	N> Human Health SAC	N> Ecological SAC	Comments
Arsenic	52	20	0	NSL	
Cadmium	52	1	0	NSL	
Chromium (total)	52	150	1	0	One elevated concentration of chromium above the human-health SAC of 100mg/kg was encountered in the sample collected from the fill in BH209 (0-0.1m), with a concentration of 150mg/kg. However, we note that the result was for total chromium and the concentration was compared to the HIL-A SAC which is for hexavalent chromium.

Analyte	N	Max. (mg/kg)	N> Human Health SAC	N> Ecological SAC	Comments
Copper	52	110	0	0	
Lead	52	250	0	0	-
Mercury	52	0.5	0	NSL	-
Nickel	52	110	0	0	-
Zinc	52	590	0	1	One elevated concentration of zinc above the ecological criteria for clay of 390mg/kg was encountered in the sample collected from the fill in BH116 (0.7-0.95m), with a concentration of 590mg/kg.
Total PAHs	52	640	1	NSL	One elevated concentration of total PAHs above the human-health criteria of 300mg/kg was encountered in the sample collected from the fill in BH2 (0.04-0.2m), with a concentration of 640mg/kg.
Benzo(a)pyrene	52	50	NSL	1	One elevated concentration of benzo(a)pyrene above the ecological criteria for sands of 20mg/kg was encountered in the sample collected from the fill in BH2 (0.04-0.2m), with a concentration of 50mg/kg.
Carcinogenic PAHs (as BaP TEQ)	52	73	4	NSL	Elevated concentrations of carcinogenic PAHs above the human-health criteria of 3mg/kg were encountered in four samples collected from the fill in BH2 (0.04-0.2m), BH105 (0.2-0.4m), BH106 (0.03-0.15m) and DUPRK2/BH105 (0.2-0.4m), with a maximum concentration of 73mg/kg.
Naphthalene	52	<PQL	0	NSL	-
DDT+DDE+DDD	32	<PQL	0	NSL	-
DDT	32	<PQL	NSL	0	-
Aldrin and dieldrin	32	<PQL	0	NSL	-
Chlordane	32	<PQL	0	NSL	-
Heptachlor	32	<PQL	0	NSL	-
PCBs	32	<PQL	0	NSL	-

Analyte	N	Max. (mg/kg)	N> Human Health SAC	N> Ecological SAC	Comments
TRH F1	52	<PQL	0	0	-
TRH F2	52	120	1	0	The TRH F2 concentration of 120mg/kg in BH111 (0.6-0.95m) marginally exceeded the HSL of 110mg/kg.
TRH F3	52	1,700	0	5	Elevated concentrations of TRH F3 above the ecological criteria for sand of 300mg/kg were encountered in five samples collected from the fill in BH2 (0.04-0.2m), BH106 (0.03-0.15m), BH201 (0.1-0.2m) (Lab duplicate), BH207 (0.1-0.2m) and BH209 (0-0.1m) with a maximum concentration of 1,700mg/kg.
TRH F4	52	910	0	0	-
Benzene	52	<PQL	0	0	-
Toluene	52	0.6	0	0	-
Ethylbenzene	52	<PQL	0	0	-
Xylenes	52	<PQL	0	0	-
Asbestos (in soil)	35	Present	1	NA	Chrysotile asbestos in the form of fibre cement (>7mm) was identified in BH201 (0.1-0.2m). The concentration was less than the HSL-A criterion of 0.01%w/w.
Asbestos in fibre cement	1	Present	1	NSL	Chrysotile asbestos was identified in the fibre cement fragment AMF1.

Notes:

N: Total number (primary samples)

NSL: No set limit

NL: Not limiting

6.4.2 Waste Classification Assessment

The laboratory results were assessed against the criteria presented in Section 5.1.4. The results are presented in the report tables attached in the appendices. A summary of the results is presented in the following table:

Table 6-4: Summary of Soil Laboratory Results Compared to CT and SCC Criteria

Analyte	N	N > CT Criteria	N > SCC Criteria	Comments
Arsenic	52	3	0	Lead concentrations exceeded the CT1 criterion in three fill samples collected from BH107 (0-0.1m), BH115 (0.04-0.2m) and BH116 (0.7-0.95m). The maximum lead concentration was 250mg/kg.

Analyte	N	N > CT Criteria	N > SCC Criteria	Comments
Cadmium	52	0	0	
Chromium	52	0	0	Chromium concentrations exceeded the CT1 criterion in one fill sample collected from BH209 (0-0.1m) with a concentration 150mg/kg.
Copper	52	NSL	NSL	-
Lead	52	0	0	
Mercury	52	0	0	
Nickel	52	4	0	Nickel concentrations exceeded the CT1 criterion in four fill samples collected from BH3 (0-0.1), BH108 (0.05-0.2m), BH109 (0.05-0.15m) and BH109 (0-0.1m). The maximum nickel concentration was 110mg/kg.
Zinc	52	NSL	NSL	-
TRH (C ₆ -C ₉)	52	0	0	-
TRH (C ₁₀ -C ₃₆)	52	0	0	-
BTEX	52	0	0	-
Total PAHs	52	1	1	Total PAH concentrations exceeded the SCC1 criterion in one fill sample collected from BH2 (0.04-0.2m) with a concentration of 640mg/kg.
Benzo(a)pyrene	52	4	1	Benzo(a)pyrene concentrations exceeded the SCC2 criterion in one fill sample collected from BH2 (0.04-0.2) and the CT1 criterion in three fill samples collected from BH104 (0.4-0.6m), BH105 (0.2-0.4m) and BH106 (0.03-0.15m). The maximum benzo(a)pyrene concentration was 50mg/kg.
OCPs & OPPs	32	0	0	-
PCBs	32	0	0	-
Asbestos	36	-	-	Asbestos was not detected in the soil samples analysed.

N: Total number (primary samples)

NSL: No set limit

Table 6-5: Summary of Soil Laboratory Results Compared to TCLP Criteria

Analyte	N	N > TCLP Criteria	Comments
Arsenic	2	0	The BH3 (0-0.1m) and BH209 (0-0.1m) samples were analysed for TCLP heavy metals.
Cadmium	2	0	As above.

Analyte	N	N > TCLP Criteria	Comments
Chromium	2	0	As above.
Lead	2	0	As above.
Mercury	2	0	As above.
Nickel	2	0	As above.
Benzo(a)pyrene	1	0	The BH2 (0.04-0.2m) sample with the highest benzo(a)pyrene concentration was analysed for TCLP PAHs.

N: Total number (primary samples)

It is noted that a waste classification was outside the scope of several earlier investigation, therefore not all samples with CT exceedances were analysed for TCLPs.

6.5 Groundwater Laboratory Results

The soil laboratory results were assessed against the SAC presented in Section 0. Individual SAC are shown in the report tables attached in the appendices. A summary of the results is presented below:

Table 6-6: Summary of Groundwater Laboratory Results – Human Health and Environmental (Ecological)

Analyte	N ^	Max. (µg/L)	N> Human Health SAC	N> Ecological SAC	Comments
Arsenic	1	<PQL	0	0	-
Cadmium	1	<PQL	0	0	-
Chromium (total)	1	1	0	0	-
Copper	1	2	0	1	One elevated concentration of copper above the ecological criteria was encountered in MW111, at a concentration of 2µg/L.
Lead	1	<PQL	0	0	-
Mercury	1	<PQL	0	0	-
Nickel	1	9	0	0	-
Zinc	1	52	0	1	One elevated concentration of zinc above the ecological criteria was encountered in MW111 at a concentration of 52µg/L.
Benzo(a)pyrene	1	<PQL	0	0	-
TRH F1	1	<PQL	0	0	-
TRH F2	1	<PQL	0	0	-



Analyte	N ^	Max. (µg/L)	N> Human Health SAC	N> Ecological SAC	Comments
Benzene	1	<PQL	0	0	-
Toluene	1	<PQL	0	0	-
Ethylbenzene	1	<PQL	0	0	-
m+p-Xylene	1	<PQL	0	0	-
o-Xylene	1	<PQL	0	0	-
Total Xylenes	1	<PQL	0	0	-

Notes:

^: Primary samples

N: Total number

NSL: No set limit

NL: Not limiting

7 WASTE CLASSIFICATION ASSESSMENT

7.1 Preliminary Waste Classification of Fill

Based on the results of the assessment, and at the time of reporting, the fill material within the P3 car park and also in the vicinity of AMF1 is assigned a preliminary classification of **General Solid Waste (non-putrescible) containing Special Waste (asbestos)**. Further classification and delineation of this waste stream will be required prior to or during construction.

Based on the data collected, it is possible that the remaining fill could classify as **General Solid Waste (non-putrescible)**. However, as noted above, further classification and delineation of waste stream containing asbestos will be required to confirm this (prior to or during construction).

In relation to BH2, it is noted that the detections of PAHs resulting in exceedances of the SCC criteria are likely to be attributed to the overlying asphaltic concrete. Asphalt waste is pre-classified as **General Solid Waste (non-putrescible)**. It is also noted that the fill soil across the site was generally found to contain trace amounts of ash and/or slag. Fill material containing ash and slag with contaminant concentrations above SCC criteria can also be classified under the GAI 2009/07 and 1999/05 where relevant. Based on the current data, a classification of **General Solid Waste (non-putrescible)** or **General Solid Waste (non-putrescible) containing Special Waste (asbestos)** could likely be achieved subject to confirmation prior to or during construction.

7.2 Preliminary Classification of Natural Soil and Bedrock

Based on the scope of work undertaken for this assessment, and at the time of reporting, JKE are of the opinion that the natural soil and bedrock at the site is likely to meet the definition of **VENM** for off-site disposal or re-use purposes. Further assessment via sampling and/or inspection is required following the removal of the overlying fill (where applicable) to confirm this classification prior to off-site disposal of the waste. The anticipated waste quantities should also be confirmed at that time and documented in the report.

7.3 Recommendations

Once the excavation details/work methods and anticipated waste quantities are known, the requirements for further waste classification and delineation of waste streams should be assessed. JKE or a suitably qualified environmental consultant should be contacted to establish the requirements for any further inspections, analysis and/or reporting.

The anticipated waste quantities should also be confirmed at that time and documented in the final waste classification report.

8 DISCUSSION

8.1 Tier 1 Risk Assessment and Review of CSM

For a contaminant to represent a risk to a receptor, the following three conditions must be present:

1. Source – The presence of a contaminant;
2. Pathway – A mechanism or action by which a receptor can become exposed to the contaminant; and
3. Receptor – The human or ecological entity which may be adversely impacted following exposure to contamination.

If one of the above components is missing, the potential for adverse risks is relatively low.

8.1.1 Soil / Fill Material

8.1.1.1 Asbestos

ACM (AMF1) was found at the ground surface at one location. ACM (>7mm diameter) was also encountered in the soil sample from BH201 (0.1-0.2) based on the laboratory analysis results. The asbestos materials are considered non-friable. As the ACM found at the ground surface was removed, and given there was no other FCF/ACM observed on the ground surface during the inspections, the potential to generate airborne asbestos fibres and for there to be a complete SPR linkage under the current site configuration is considered to be low. Hence there is considered to be a low risk.

The potential for generating airborne asbestos fibres and a complete SPR linkage may increase during disturbance of soil containing ACM (i.e. during the proposed development works at the site). These risks will need to be managed during construction so they remain low and acceptable.

8.1.1.2 Hydrocarbons

PAHs were encountered above the human-health based SAC of 3mg/kg in several fill samples from BH2, BH105 and BH106 with concentrations. The maximum concentration was found in BH2. It is considered likely that the PAHs are associated with the asphaltic concrete pavement. However, ash and slag were also identified in fill throughout the site and it is possible that the PAHs are associated with the ash/slag.

As the elevated PAHs were found in soils beneath the pavements, there is not considered to be a complete SPR linkage under the current site configuration and therefore there is a low risk. The PAH impacted fill will need to be remediated so that risks remain low and acceptable in the context of the proposed development.

The TRH (C₁₀-C₁₆) (F2) concentration in BH111 was marginally above the human health-based SAC relating to exposure via the vapour inhalation pathway. The source of the TRH at this location is unknown, however we did not observe any odours or staining and it is considered unlikely that there is a significant source of petroleum contamination at this location. As the area in the vicinity of BH111 is currently and will remain landscaped under the proposed development scheme, there is no complete SPR linkage and hence there is a low risk.

TRH (C₁₆-C₃₄) (F3) was encountered above the ecological based SAC of 300mg/kg in numerous fill samples. The TRHs were considered likely to be associated with the inclusions of ash and slag encountered within the

fill material or interference from other organics within the fill. This is supported by the lack of visible staining or odours during sampling, indicating the TRH impact is not from petroleum. Furthermore, the laboratory results of the underlying natural soil samples from BH201 (1.7-1.8m) and BH209 (0.4-0.5m) did not encounter any detections of TRHs, therefore it is considered likely the TRHs are confined vertically to the fill material.

As the TRHs are not associated with petroleum, the exceedances of the ecological criteria are not significant and do not warrant remediation.

8.1.1.3 Heavy Metals

One elevation of chromium above the human-health based SAC of 100mg/kg was encountered in the fill material immediately beneath the pavement in BH209. As the elevated chromium was found in soils beneath the pavement, there is not considered to be a complete SPR linkage under the current site configuration. It is also noted that the SAC for chromium is based on health risks from hexavalent chromium (Cr VI), however the analysis includes total chromium. Given the age of the filling at the site, it is considered highly unlikely that the total chromium result report in BH209 includes a significant proportion of hexavalent chromium. On this basis, the fill is not considered to represent a source of chromium contamination and there is unlikely to be an unacceptable risk. This will need to be validated.

One elevated concentration of zinc above the ecological based SAC of 390mg/kg was encountered in the fill material in BH116. JKE consider the elevated concentrations of zinc do not pose a risk to existing ecological receptors in the current site configuration as this location is currently paved with asphaltic concrete at the surface, and consequently there is no potential for direct contact (i.e. there is no complete SPR linkage). In the context of the proposed development, this area is likely to be part of the proposed landscaped garden area near the Mary Ward Wing. Given the apparent localised nature of the zinc impact, the depth of occurrence, the apparent good health of surrounding vegetation, and the lack of elevated zinc concentrations in the surround fill, JKE consider the potential risk to ecological receptors to be low.

8.1.2 Groundwater

Elevated copper and zinc concentrations above the ecological SAC were encountered in the groundwater sample from MW111. The copper concentration was only marginally above the SAC. JKE consider the elevated results are likely to be indicative of regional groundwater background concentrations rather than on on-site contamination source and represents a low risk to ecological receptors.

All other CoPC in groundwater were low and consistent with expectations based on the absence of any suspected groundwater contamination sources at the site or in the surrounds.

8.2 Decision Statements

The decision statements are addressed below:

Are any results above the SAC?

Yes, as noted in Section 8.1.

Do potential risks associated with contamination exist, and if so, what are they?

Risks to site receptors under the current site configuration were assessed to be low. Remediation (and management) will be required so that risks remain low throughout construction and in the context of the proposed development.

Is the site suitable for the proposed development, or can the site be made suitable subject to further characterisation and/or remediation?

JKE are of the opinion the site can be made suitable for the proposed development via remediation.

8.3 Data Gaps

An assessment of data gaps is provided in the following table:

Table 8-1: Data Gap Assessment

Data Gap	Assessment
Asbestos soil sampling density below minimum WA Asbestos guideline density for sites where asbestos is “known” to be present. This triggers a need to sample at x2 the minimum EPA sampling density.	Asbestos has been identified at the site within the fill soil and at the surface. Soil sampling for asbestos sampling was limited to borehole sampling (i.e. a small representation of fill soil) which only disturbs small volumes of soil. Recommendations for additional soil sampling will be included in the RAP and will form part of the site validation requirements.

9 CONCLUSIONS AND RECOMMENDATIONS

The DSI included sampling of the soil and groundwater over several stages, then consolidation of the data into a single report for the site. Hydrocarbons (PAHs and TRHs) and asbestos were detected in fill (soil) at concentrations above the adopted human health-based SAC. TRHs and heavy metals were also encountered in fill (soil) at concentrations above the adopted ecological-based SAC. Minor elevations of some metals in groundwater were also identified above the ecological SAC, however these were considered to be consistent with regional/background groundwater conditions.

Based on the Tier 1 risk assessment, the PAHs, asbestos, TRHs and heavy metals were assessed to pose a low risk in the current site configuration. However, remediation will be required so that risks from PAHs and asbestos remain low and acceptable during construction and in the context of the proposed development. Additional soil sampling will be required for waste classification and validation purposes. These requirements will be documented in the RAP.

JKE are of the opinion that the site can be made suitable for the proposed development described in Section 1.2 via remediation. The RAP is to be updated to consider the findings of this DSI and the updated proposed development details. A site validation assessment will be required to document the remediation that occurs and the validation results.

JKE consider that the report objectives outlined in Section 1.3 have been addressed.

10 LIMITATIONS

The report limitations are outlined below:

- JKE accepts no responsibility for any unidentified contamination issues at the site. Any unexpected problems/subsurface features that may be encountered during development works should be inspected by an environmental consultant as soon as possible;
- Previous use of this site may have involved excavation for the foundations of buildings, services, and similar facilities. In addition, unrecorded excavation and burial of material may have occurred on the site. Backfilling of excavations could have been undertaken with potentially contaminated material that may be discovered in discrete, isolated locations across the site during construction work;
- This report has been prepared based on site conditions which existed at the time of the investigation; scope of work and limitation outlined in the JKE proposal; and terms of contract between JKE and the client (as applicable);
- The conclusions presented in this report are based on investigation of conditions at specific locations, chosen to be as representative as possible under the given circumstances, visual observations of the site and immediate surrounds and documents reviewed as described in the report;
- Subsurface soil and rock conditions encountered between investigation locations may be found to be different from those expected. Groundwater conditions may also vary, especially after climatic changes;
- The investigation and preparation of this report have been undertaken in accordance with accepted practice for environmental consultants, with reference to applicable environmental regulatory authority and industry standards, guidelines and the assessment criteria outlined in the report;
- Where information has been provided by third parties, JKE has not undertaken any verification process, except where specifically stated in the report;
- JKE has not undertaken any assessment of off-site areas that may be potential contamination sources or may have been impacted by site contamination, except where specifically stated in the report;
- JKE accept no responsibility for potentially asbestos containing materials that may exist at the site. These materials may be associated with demolition of pre-1990 constructed buildings or fill material at the site;
- JKE have not and will not make any determination regarding finances associated with the site;
- Additional investigation work may be required in the event of changes to the proposed development or landuse. JKE should be contacted immediately in such circumstances;
- Material considered to be suitable from a geotechnical point of view may be unsatisfactory from a soil contamination viewpoint, and vice versa; and
- This report has been prepared for the particular project described and no responsibility is accepted for the use of any part of this report in any other context or for any other purpose.

Important Information About This Report

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

The Report is based on a Unique Set of Project Specific Factors

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

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

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

Changes in Subsurface Conditions

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

This Report is based on Professional Interpretations of Factual Data

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

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

Investigation Limitations

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

Misinterpretation of Site Investigations by Design Professionals

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

Logs Should not be Separated from the Investigation Report

Borehole and test pit logs are prepared by environmental scientists, engineers or geologists based upon interpretation of field conditions and laboratory evaluation of field samples. Logs are normally provided in our reports and these should not be re-drawn for inclusion in site remediation or other design drawings, as subtle but significant drafting errors or omissions may occur in the transfer process. Photographic reproduction can eliminate this problem, however contractors can still misinterpret the logs during bid preparation if separated from the text of the investigation. If this occurs, delays, disputes and unanticipated costs may result. In all cases it is necessary to refer to the rest of the report to obtain a proper understanding of the investigation. Please note that logs with the 'Environmental Log' header are not suitable for geotechnical purposes as they have not been peer reviewed by a Senior Geotechnical Engineer.

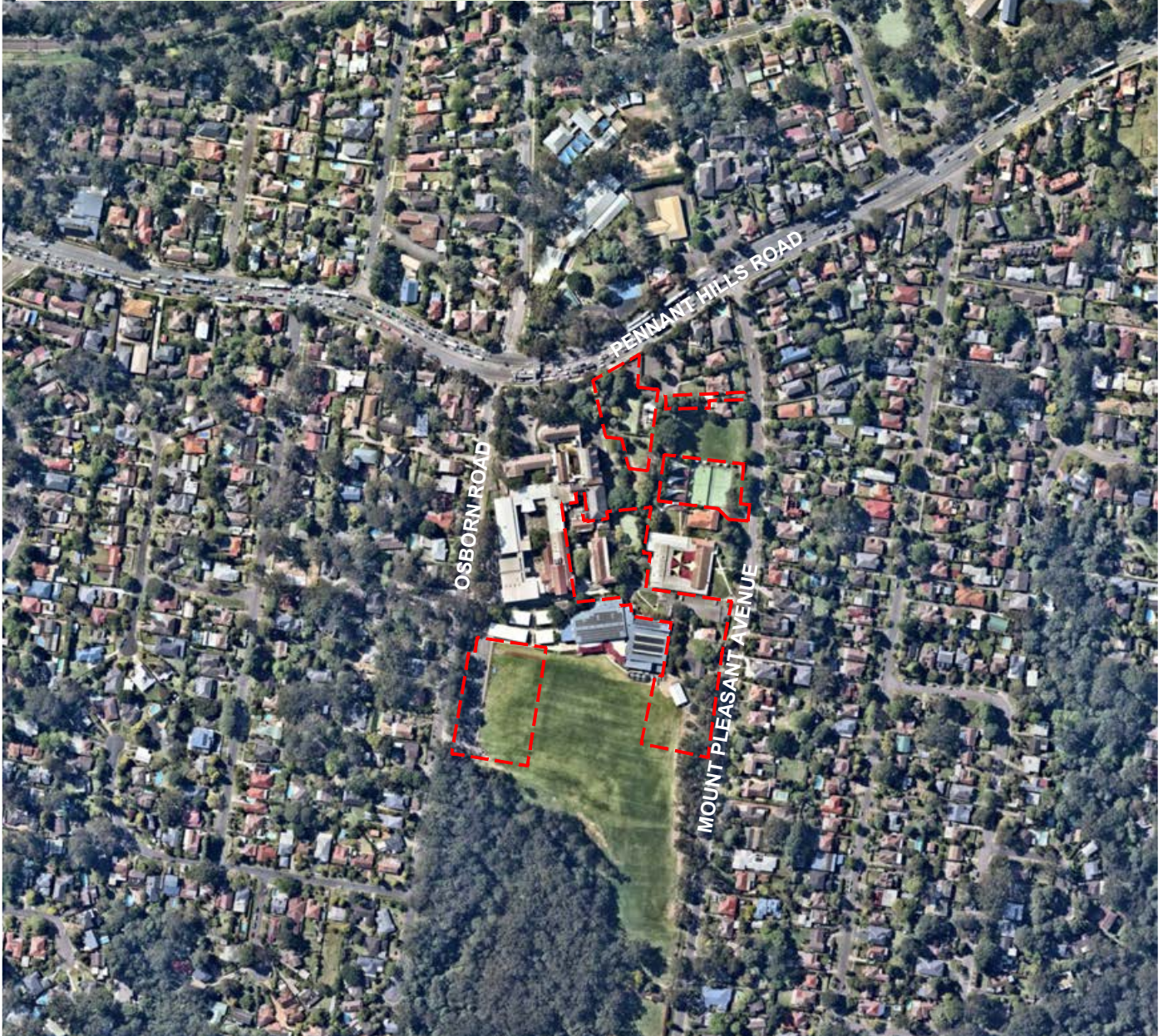
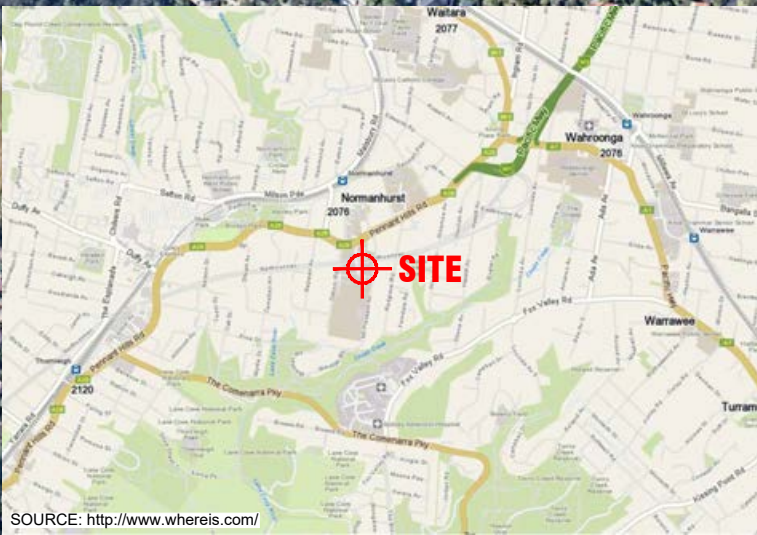
To reduce the likelihood of borehole and test pit log misinterpretation, the complete investigation should be available to persons or organisations involved in the project, such as contractors, for their use. Denial of such access and disclaiming responsibility for the accuracy of subsurface information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

Read Responsibility Clauses Closely

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



Appendix A: Report Figures



APPROXIMATE SITE BOUNDARIES

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

Title:

SITE LOCATION PLAN

Location:

LORETO NORMANHURST,
91-93 PENNANT HILLS ROAD, NORMANHURST, NSW

Project No:

E31772PL

Figure No:

1

This plan should be read in conjunction with the Environmental report.

JKEnvironments



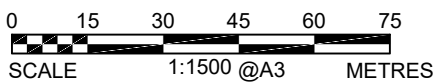
PLOT DATE: 15/12/2020 9:39:10 AM DWG FILE: Z:\6 EIS\6C EIS JOBS\31000\31E31772KL NORMANHURST\CAD\ES1772PL.DWG



LEGEND

- APPROXIMATE SITE BOUNDARY
- BH(Fill Depth) BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m)
- ⊕ BH/MW(Fill Depth) BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m)

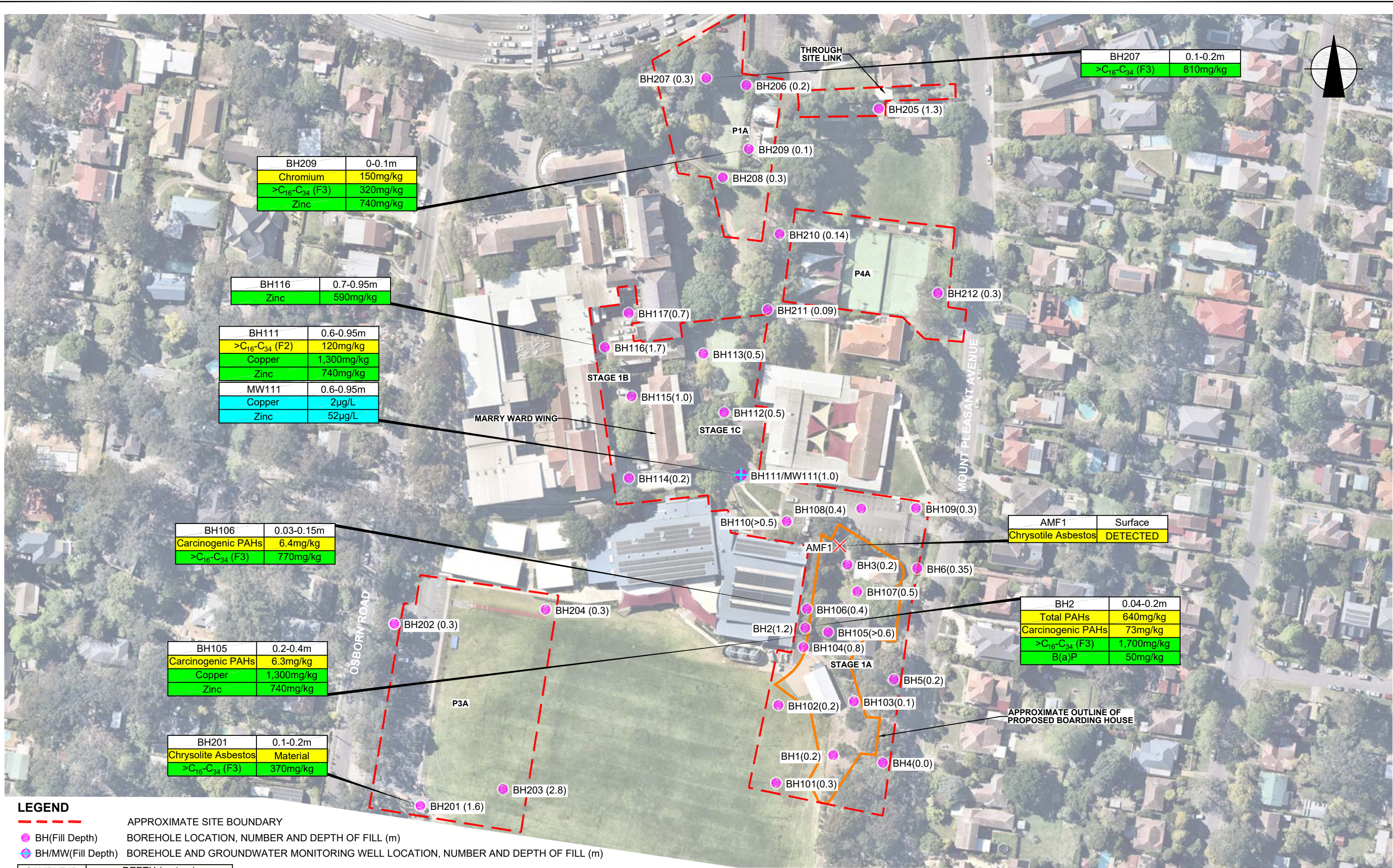
AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM



This plan should be read in conjunction with the Environmental report.

Title: SAMPLE LOCATION PLAN	
Location: LORETO NORMANHURST, 91-93 PENNANT HILLS ROAD, NORMANHURST, NSW	
Project No: E31772PL	Figure No: 2
JKEnvironments	





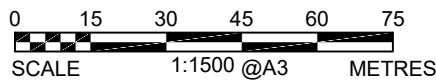
LEGEND

- APPROXIMATE SITE BOUNDARY
- BH(Fill Depth) BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m)
- BH/MW(Fill Depth) BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m)

SAMPLE ID	DEPTH (metres)
CHEMICAL	CONCENTRATION
SAMPLE ID	-
CHEMICAL	CONCENTRATION (µg/L)

- SOIL/SURFACE SAMPLE EXCEEDANCE
- GROUNDWATER SAMPLE EXCEEDANCE
- SOIL/SURFACE CONTAMINATION ABOVE SAC FOR HUMAN HEALTH RISK
- SOIL CONTAMINATION ABOVE SAC FOR ECOLOGICAL RISK
- GROUNDWATER CONTAMINATION ABOVE SAC

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM



This plan should be read in conjunction with the Environmental report.

CONTAMINATION LOCATION PLAN	
Location:	LORETO NORMANHURST, 91-93 PENNANT HILLS ROAD, NORMANHURST, NSW
Project No:	E31772PL
Figure No:	3
JKEnvironments	





Appendix B: Laboratory Results Summary Tables

ABBREVIATIONS AND EXPLANATIONS

Abbreviations used in the Tables:

ABC:	Ambient Background Concentration	PCBs:	Polychlorinated Biphenyls
ACM:	Asbestos Containing Material	PCE:	Perchloroethylene (Tetrachloroethylene or Tetrachloroethene)
ADWG:	Australian Drinking Water Guidelines	PQL:	Practical Quantitation Limit
AF:	Asbestos Fines	RS:	Rinsate Sample
ANZG:	Australian and New Zealand Guidelines	RSL:	Regional Screening Levels
B(a)P:	Benzo(a)pyrene	RSW:	Restricted Solid Waste
CEC:	Cation Exchange Capacity	SAC:	Site Assessment Criteria
CRC:	Cooperative Research Centre	SCC:	Specific Contaminant Concentration
CT:	Contaminant Threshold	SSA:	Site Specific Assessment
EILs:	Ecological Investigation Levels	SSHLs:	Site Specific Health Screening Levels
ESLs:	Ecological Screening Levels	TB:	Trip Blank
FA:	Fibrous Asbestos	TCLP:	Toxicity Characteristics Leaching Procedure
GIL:	Groundwater Investigation Levels	TS:	Trip Spike
GSW:	General Solid Waste	TRH:	Total Recoverable Hydrocarbons
HILs:	Health Investigation Levels	UCL:	Upper Level Confidence Limit on Mean Value
HSLs:	Health Screening Levels	USEPA:	United States Environmental Protection Agency
HSL-SSA:	Health Screening Level-Site Specific Assessment	VOCC:	Volatile Organic Chlorinated Compounds
kg/L	kilograms per litre	WHO:	World Health Organisation
NA:	Not Analysed		
NC:	Not Calculated		
NEPM:	National Environmental Protection Measure		
NHMRC:	National Health and Medical Research Council		
NL:	Not Limiting		
NSL:	No Set Limit		
OCP:	Organochlorine Pesticides		
OPP:	Organophosphorus Pesticides		
PAHs:	Polycyclic Aromatic Hydrocarbons		
%w/w:	weight per weight		
ppm:	Parts per million		

Table Specific Explanations:

HIL Tables:

- The chromium results are for Total Chromium which includes Chromium III and VI. For initial screening purposes, we have assumed that the samples contain only Chromium VI unless demonstrated otherwise by additional analysis.
- Carcinogenic PAHs is a toxicity weighted sum of analyte concentrations for a specific list of PAH compounds relative to B(a)P. It is also referred to as the B(a)P Toxic Equivalence Quotient (TEQ).
- Statistical calculations are undertaken using ProUCL (USEPA). Statistical calculation is usually undertaken using data from fill samples.

EIL/ESL Table:

- Site specific ABC values for specific metals have been adopted.

Waste Classification and TCLP Table:

- Data assessed using the NSW EPA Waste Classification Guidelines, Part 1: Classifying Waste (2014).
- The assessment of Total Moderately Harmful pesticides includes: Dichlorovos, Dimethoate, Fenitrothion, Ethion, Malathion and Parathion.
- 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.

QA/QC Table:

- Field blank, Inter and Intra laboratory duplicate results are reported in mg/kg.
- Trip spike results are reported as percentage recovery.
- Field rinsate results are reported in µg/L.

TABLE S1
SOIL LABORATORY RESULTS COMPARED TO NEPM 2013.
HIL-A: 'Residential with garden/accessible soils; children's day care centers; preschools; and primary schools'

All data in mg/kg unless stated otherwise			HEAVY METALS								PAHs		ORGANOCHLORINE PESTICIDES (OCPs)								OP PESTICIDES (OPPs)	TOTAL PCBs	ASBESTOS FIBRES
			Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Total PAHs	Carcinogenic PAHs	HCB	Endosulfan	Methoxychlor	Aldrin & Dieldrin	Chlordane	DDT, DDD & DDE	Heptachlor	Chlorpyrifos			
PQL - Envirolab Services			4	0.4	1	1	1	0.1	1	1	-	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	100	
Site Assessment Criteria (SAC)			100	20	100	6000	300	40	400	7400	300	3	10	270	300	6	50	240	6	160	1	Detected/Not Detected	
Sample Reference	Sample Depth	Sample Description																					
BH1	0.0-0.1	Fill: Silty clay	<4	<0.4	12	19	24	0.2	8	34	1.6	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH1	0.8-1.0	Siltstone	6	<0.4	8	28	33	0.1	5	22	0.06	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
BH2	0.04-0.2	Fill: Silty sand	<4	<0.4	18	53	21	<0.1	25	49	640	73	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH3	0.0-0.1	Fill: Silty sand	<4	<0.4	25	51	9	<0.1	110	55	0.2	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	Not Detected	
BH3	0.5-0.6	Silty clay	<4	<0.4	9	15	27	<0.1	1	3	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
BH4	0.0-0.1	Silty clay	5	<0.4	15	33	23	<0.1	6	26	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH5	0.0-0.1	Fill: Silty clay	6	<0.4	14	22	27	<0.1	6	24	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH5	0.5-0.6	Silty clay	6	<0.4	14	20	16	<0.1	3	18	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
BH6	0.0-0.1	Fill: Silty clay	7	<0.4	8	16	57	<0.1	4	54	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH101	0-0.1	Fill: Silty clay	4	<0.4	11	23	19	<0.1	8	100	5	0.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH101 [LAB_DUP]	0-0.1	Fill: Silty clay	6	<0.4	10	23	19	<0.1	7	40	2.1	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	
BH101	0.6-0.8	Silty clay	<4	<0.4	9	8	17	<0.1	<1	2	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
BH102	0-0.2	Fill: Silty clay	4	<0.4	9	15	15	<0.1	6	31	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH103	0-0.1	Fill: Gravelly sand	<4	<0.4	8	29	17	0.1	5	30	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH103	0.2-0.3	Siltstone	<4	<0.4	9	42	16	0.1	6	32	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
BH104	0.4-0.6	Fill: Silty sandy clay	<4	<0.4	7	30	19	<0.1	3	12	26	2.7	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH104	0.8-0.9	Silty clay	5	<0.4	4	21	28	<0.1	1	4	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
BH105	0.2-0.4	Fill: Gravelly sand	<4	<0.4	12	67	14	<0.1	12	60	60	6.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH106	0.03-0.15	Fill: Silty gravelly sand	<4	<0.4	38	86	14	<0.1	40	55	63	6.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH107	0-0.1	Fill: Silty clay	8	<0.4	17	29	150	<0.1	11	150	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH107	0.5-0.8	Silty clay	6	<0.4	14	10	15	<0.1	2	5	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
BH108	0.05-0.2	Fill: Silty clay	<4	<0.4	20	58	8	<0.1	82	41	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH108 [LAB_DUP]	0.05-0.2	Lab replicate	<4	<0.4	20	57	9	<0.1	79	41	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	
BH109	0.05-0.15	Fill: Sandy gravel	<4	<0.4	77	34	11	<0.1	69	47	4.2	0.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH109	0.5-0.7	Silty clay	4	<0.4	12	16	21	<0.1	1	5	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
BH110	0-0.1	Fill: Silty sandy clay	<4	<0.4	15	19	34	<0.1	10	33	0.2	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH111	0.6-0.95	Fill: Silty clay	20	<0.4	17	21	83	<0.1	6	66	1.7	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH111	1.5-1.95	Silty clay	5	<0.4	12	13	20	<0.1	<1	2	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
BH112	0-0.1	Fill: Silty clay	4	<0.4	19	32	41	<0.1	6	53	0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH113	0-0.1	Fill: Silty clay	7	<0.4	38	36	97	0.1	28	91	1.8	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH113	0.5-0.8	Silty clay	<4	<0.4	5	19	17	<0.1	<1	2	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
BH114	0.12-0.2	Fill: Sandy gravel	6	<0.4	17	28	75	<0.1	11	52	0.3	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH115	0.04-0.2	Fill: Silty clay	5	<0.4	8	28	120	<0.1	3	29	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH115	1.5-1.7	Silty clay	6	<0.4	16	17	26	<0.1	1	7	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
BH115 [LAB_DUP]	1.5-1.7	Lab replicate	5	<0.4	16	14	21	<0.1	<1	3	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
BH116	0.7-0.95	Fill: Silty clay	5	1	20	35	250	0.3	14	590	6.8	0.9	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH116	1.8-1.95	Siltstone	<4	<0.4	7	59	18	<0.1	12	42	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
BH117	0.2-0.4	Fill: Silty clay	<4	<0.4	12	20	22	<0.1	3	9	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH117	1.0-1.2	Silty clay	4	<0.4	5	20	26	<0.1	<1	5	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
DUPRK1	-	-	<4	<0.4	64	30	10	<0.1	55	46	7	0.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
DUPRK2	-	-	<4	<0.4	40	110	15	<0.1	41	42	80	8.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
AMF1	-	Material	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Detected	
BH201	0.1-0.2	Fill: Silty sand	<4	<0.4	6	12	8	<0.1	4	44	7.5	0.8	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Detected	
BH201 - [LAB_DUP]	0.1-0.2	Fill: Silty sand	<4	<0.4	3	9	5	<0.1	3	15	9.6	0.9	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	
BH201 - [TRIPLICATE]	0.1-0.2	Fill: Silty sand	<4	<0.4	2	5	3	<0.1	2	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
BH201	1.7-1.8	Silty clay	6	<0.4	6	16	14	<0.1	<1	3	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
BH202	0-0.2	Fill: Silty clay	<4	<0.4	8	11	17	<0.1	5	32	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH203	0-0.2	Fill: Silty clay	7	<0.4	8	18	14	<0.1	6	29	<0.05	<0.5	<0.1	&									

TABLE S2

SOIL LABORATORY RESULTS COMPARED TO HSLs

All data in mg/kg unless stated otherwise

					C ₆ -C ₁₀ (F1)	>C ₁₀ -C ₂₅ (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	Field PID Measurement
POL - EnviroLab Services					25	50	0.2	0.5	1	1	1	ppm
NEPM 2013 HSL Land Use Category					HSL-A/B: LOW/HIGH DENSITY RESIDENTIAL							
Sample Reference	Sample Depth	Sample Description	Depth Category	Soil Category								
BH1	0.0-0.1	Fill: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH1	0.8-1.0	Siltstone	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH2	0.04-0.2	Fill: Silty sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH3	0.0-0.1	Fill: Silty sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH3	0.5-0.6	Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH4	0.0-0.1	Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH5	0.0-0.1	Fill: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH5	0.5-0.6	Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH6	0.0-0.1	Fill: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH101	0-0.1	Fill: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH101 [LAB_DUP]	0-0.1	Fill: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH101	0.6-0.8	Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH102	0-0.2	Fill: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH103	0-0.1	Fill: Gravelly sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH103	0.2-0.3	Siltstone	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH104	0.4-0.6	Fill: Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH104	0.8-0.9	Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.1
BH105	0.2-0.4	Fill: Gravelly sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.1
BH106	0.03-0.15	Fill: Silty gravelly sand	0m to <1m	Sand	<25	60	<0.2	<0.5	<1	<1	<1	1.9
BH107	0-0.1	Fill: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	122.6
BH107	0.5-0.8	Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH108	0.05-0.2	Fill: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH108 [LAB_DUP]	0.05-0.2	Lab replicate	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.9
BH109	0.05-0.15	Fill: Sandy gravel	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.2
BH109	0.5-0.7	Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH110	0-0.1	Fill: Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	19.1
BH111	0.6-0.95	Fill: Silty clay	0m to <1m	Sand	<25	120	<0.2	<0.5	<1	<1	<1	0
BH111	1.5-1.95	Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH112	0-0.1	Fill: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH113	0-0.1	Fill: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	13.7
BH113	0.5-0.8	Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH114	0.12-0.2	Fill: Sandy gravel	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH115	0.04-0.2	Fill: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH115	1.5-1.7	Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH115 [LAB_DUP]	1.5-1.7	Lab replicate	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH116	0.7-0.95	Fill: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH116	1.8-1.95	Siltstone	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH117	0.2-0.4	Fill: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH117	1.0-1.2	Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	-
DUPR1	-	-	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	-
DUPR2	-	-	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	-
BH201	0.1-0.2	Fill: Silty sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH201 [LAB_DUP]	0.1-0.2	Fill: Silty sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	-
BH201	1.7-1.8	Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH202	0-0.2	Fill: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH203	0-0.2	Fill: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH204	0-0.2	Fill: Silty sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH205	0-0.2	Fill: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH205	1.5-1.6	Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH206	0-0.2	Fill: Asphalt gravel	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0.1
BH207	0.1-0.2	Fill: Asphalt gravel	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0.3
BH208	0-0.2	Fill: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH209	0-0.1	Fill: Asphalt gravel	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH209	0.4-0.5	Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH210	0.2-0.3	Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH210 [LAB_DUP]	0.2-0.3	Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	-
BH211	0.2-0.3	Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH212	0-0.2	Fill: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH212	0.6-0.7	Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
SDUP1	-	-	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	-
SDUP2	-	-	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	-
Total Number of Samples					69	69	69	69	69	69	69	60
Maximum Value					<PQL	120	<PQL	0.6	<PQL	<PQL	<PQL	122.6

Concentration above the SAC

VALUE

Concentration above the PQL

Bold

The guideline corresponding to the concentration above the SAC is highlighted in grey in the Site Assessment Criteria Table below

HSL SOIL ASSESSMENT CRITERIA

Sample Reference	Sample Depth	Sample Description	Depth Category	Soil Category	C ₆ -C ₁₀ (F1)	>C ₁₀ -C ₂₅ (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene
BH1	0.0-0.1	Fill: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH1	0.8-1.0	Siltstone	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH2	0.04-0.2	Fill: Silty sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH3	0.0-0.1	Fill: Silty sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH3	0.5-0.6	Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH4	0.0-0.1	Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH5	0.0-0.1	Fill: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH5	0.5-0.6	Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH6	0.0-0.1	Fill: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH7	0.0-0.1	Fill: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH8	0-0.1	Fill: Sandy silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH8	0.7-0.95	Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH9	0.5-0.95	Fill: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH9	3.10-3.15	Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH10	0-0.1	Fill: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
DUP1	-	-	0m to <1m	Sand	45	110	0.5	160	55	40	3
DUP2	-	-	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH101	0-0.1	Fill: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH101 [LAB_DUP]	0-0.1	Fill: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH101	0.6-0.8	Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH102	0-0.2	Fill: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH103	0-0.1	Fill: Gravelly sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH103	0.2-0.3	Siltstone	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH104	0.4-0.6	Fill: Silty-sandy clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH104	0.8-0.9	Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH105	0.2-0.4	Fill: Gravelly sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH106	0.03-0.15	Fill: Silty gravelly sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH107	0-0.1	Fill: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH107	0.5-0.8	Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH108	0.05-0.2	Fill: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH108 [LAB_DUP]	0.05-0.2	Lab replicate	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH109	0.05-0.15	Fill: Sandy gravel	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH109	0.5-0.7	Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH110	0-0.1	Fill: Silty sandy clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH111	0.6-0.95	Fill: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH111	1.5-1.95	Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH112	0-0.1	Fill: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH113	0-0.1	Fill: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH113	0.5-0.8	Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH114	0.12-0.2	Fill: Sandy gravel	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH115	0.04-0.2	Fill: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH115	1.5-1.7	Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH115 [LAB_DUP]	1.5-1.7	Lab replicate	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH116	0.7-0.95	Fill: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH116	1.8-1.95	Siltstone	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH117	0.2-0.4	Fill: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH117	1.0-1.2	Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
DUPRK1	-	-	0m to <1m	Sand	45	110	0.5	160	55	40	3
DUPRK2	-	-	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH201	0.1-0.2	Fill: Silty sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH201 [LAB_DUP]	0.1-0.2	Fill: Silty sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH201	1.7-1.8	Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH202	0-0.2	Fill: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH202	0-0.2	Fill: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH203	0-0.2	Fill: Silty sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH204	0-0.2	Fill: Silty sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH205	0-0.2	Fill: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH205	1.5-1.6	Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH206	0-0.2	Fill: Asphalt gravel	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH207	0.1-0.2	Fill: Asphalt gravel	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH208	0-0.2	Fill: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH209	0-0.1	Fill: Asphalt gravel	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH209	0.4-0.5	Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH210	0.2-0.3	Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH210 [LAB_DUP]	0.2-0.3	Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH211	0.2-0.3	Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH212	0-0.2	Fill: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH212	0.6-0.7	Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
SUP1	-	-	0m to <1m	Sand	45	110	0.5	160	55	40	3
SUP2	-	-	0m to <1m	Sand	45	110	0.5	160	55	40	3

TABLE 53 SOIL LABORATORY RESULTS COMPARED TO MANAGEMENT LIMITS All data in mg/kg unless stated otherwise					
		C_{100} - C_{100} (F1) plus BTEX	$>C_{100}$ - C_{100} (F2) plus naphthalene	$>C_{100}$ - C_{100} (F3)	$>C_{100}$ - C_{100} (F4)
PQL - Envirolabs Services		25	50	100	100
NEPM 2013 Land Use Category					
RESIDENTIAL, PARKLAND & PUBLIC OPEN SPACE					
Sample Reference	Sample Depth	Soil Texture			
BH1	0.0-0.1	Fine	<25	<50	<100
BH1	0.8-1.0	Fine	<25	<50	<100
BH2	0.04-0.2	Coarse	<25	<50	1700
BH3	0.0-0.1	Coarse	<25	<50	<100
BH3	0.5-0.6	Fine	<25	<50	<100
BH4	0.0-0.1	Fine	<25	<50	<100
BH5	0.0-0.1	Fine	<25	<50	<100
BH5	0.5-0.6	Fine	<25	<50	<100
BH6	0.0-0.1	Fine	<25	<50	<100
BH101	0-0.1	Fine	<25	<50	<100
BH101 [LAB_DUP]	0-0.1	Fine	<25	<50	<100
BH101	0.6-0.8	Fine	<25	<50	<100
BH102	0-0.2	Fine	<25	<50	<100
BH103	0-0.1	Coarse	<25	<50	<100
BH103	0.2-0.3	Fine	<25	<50	<100
BH104	0.4-0.6	Fine	<25	<50	<100
BH104	0.8-0.9	Fine	<25	<50	<100
BH105	0.2-0.4	Fine	<25	<50	410
BH106	0.03-0.15	Coarse	<25	60	770
BH107	0-0.1	Fine	<25	<50	<100
BH107	0.5-0.8	Fine	<25	<50	<100
BH108	0.05-0.2	Fine	<25	<50	<100
BH108 [LAB_DUP]	0.05-0.2	Fine	<25	<50	<100
BH109	0.05-0.15	Coarse	<25	<50	130
BH109	0.5-0.7	Fine	<25	<50	<100
BH110	0-0.1	Fine	<25	<50	<100
BH111	0.6-0.95	Fine	<25	120	<100
BH111	1.5-1.95	Fine	<25	<50	<100
BH112	0-0.1	Fine	<25	<50	<100
BH113	0-0.1	Fine	<25	<50	<100
BH113	0.5-0.8	Fine	<25	<50	<100
BH114	0.12-0.2	Coarse	<25	<50	<100
BH115	0.04-0.2	Fine	<25	<50	<100
BH115	1.5-1.7	Fine	<25	<50	<100
BH115 [LAB_DUP]	1.5-1.7	Fine	<25	<50	<100
BH116	0.7-0.95	Fine	<25	<50	<100
BH116	1.8-1.95	Fine	<25	<50	<100
BH117	0.2-0.4	Fine	<25	<50	<100
BH117	1.0-1.2	Fine	<25	<50	<100
DUPRK1	-	Fine	<25	<50	180
DUPRK2	-	Fine	<25	<50	350
BH201	0.1-0.2	Coarse	<25	<50	280
BH201 -	0.1-0.2	Coarse	<25	<50	370
BH201	1.7-1.8	Fine	<25	<50	<100
BH202	0-0.2	Fine	<25	<50	<100
BH203	0-0.2	Fine	<25	<50	<100
BH204	0-0.2	Coarse	<25	<50	<100
BH205	0-0.2	Fine	<25	<50	<100
BH205	1.5-1.6	Fine	<25	<50	<100
BH206	0-0.2	Coarse	<25	<50	<100
BH207	0.1-0.2	Coarse	<25	<50	810
BH208	0-0.2	Fine	<25	<50	<100
BH209	0-0.1	Coarse	<25	<50	310
BH209	0.4-0.5	Fine	<25	<50	<100
BH210	0.2-0.3	Fine	<25	<50	<100
BH210 -	0.2-0.3	Fine	<25	<50	<100
BH211	0.2-0.3	Fine	<25	<50	<100
BH212	0-0.2	Fine	<25	<50	200
BH212	0.6-0.7	Fine	<25	<50	<100
SDUP1	-	Fine	<25	<50	770
SDUP2	-	Fine	<25	<50	<100
Total Number of Samples			69	69	69
Maximum Value			<PQL	120	1700
Concentration above the SAC			VALUE		
Concentration above the PQL			Bold		

MANAGEMENT LIMIT ASSESSMENT CRITERIA

Sample Reference	Sample Depth	Soil Texture	C_{100} - C_{100} (F1) plus BTEX	$>C_{100}$ - C_{100} (F2) plus naphthalene	$>C_{100}$ - C_{100} (F3)	$>C_{100}$ - C_{100} (F4)
BH1	0.0-0.1	Fine	800	1000	3500	10000
BH1	0.8-1.0	Fine	800	1000	3500	10000
BH2	0.04-0.2	Coarse	700	1000	2500	10000
BH3	0.0-0.1	Coarse	700	1000	2500	10000
BH3	0.5-0.6	Fine	800	1000	3500	10000
BH4	0.0-0.1	Fine	800	1000	3500	10000
BH5	0.0-0.1	Fine	800	1000	3500	10000
BH5	0.5-0.6	Fine	800	1000	3500	10000
BH6	0.0-0.1	Fine	800	1000	3500	10000
BH7	0.0-0.1	Fine	800	1000	3500	10000
BH8	0-0.1	Fine	800	1000	3500	10000
BH8	0.7-0.95	Fine	800	1000	3500	10000
BH9	0.5-0.95	Fine	800	1000	3500	10000
BH9	3.10-3.15	Fine	800	1000	3500	10000
BH10	0-0.1	Fine	800	1000	3500	10000
DUP1	-	Fine	800	1000	3500	10000
DUP2	-	Fine	800	1000	3500	10000
BH101	0-0.1	Fine	800	1000	3500	10000
BH101 [LAB_DUP]	0-0.1	Fine	800	1000	3500	10000
BH101	0.6-0.8	Fine	800	1000	3500	10000
BH102	0-0.2	Fine	800	1000	3500	10000
BH103	0-0.1	Coarse	700	1000	2500	10000
BH103	0.2-0.3	Fine	800	1000	3500	10000
BH104	0.4-0.6	Fine	800	1000	3500	10000
BH104	0.8-0.9	Fine	800	1000	3500	10000
BH105	0.2-0.4	Fine	800	1000	3500	10000
BH106	0.03-0.15	Coarse	700	1000	2500	10000
BH107	0-0.1	Fine	800	1000	3500	10000
BH107	0.5-0.8	Fine	800	1000	3500	10000
BH108	0.05-0.2	Fine	800	1000	3500	10000
BH108 [LAB_DUP]	0.05-0.2	Fine	800	1000	3500	10000
BH109	0.05-0.15	Coarse	700	1000	2500	10000
BH109	0.5-0.7	Fine	800	1000	3500	10000
BH110	0-0.1	Fine	800	1000	3500	10000
BH111	0.6-0.95	Fine	800	1000	3500	10000
BH111	1.5-1.95	Fine	800	1000	3500	10000
BH112	0-0.1	Fine	800	1000	3500	10000
BH113	0-0.1	Fine	800	1000	3500	10000
BH113	0.5-0.8	Fine	800	1000	3500	10000
BH114	0.12-0.2	Coarse	700	1000	2500	10000
BH115	0.04-0.2	Fine	800	1000	3500	10000
BH115	1.5-1.7	Fine	800	1000	3500	10000
BH115 [LAB_DUP]	1.5-1.7	Fine	800	1000	3500	10000
BH116	0.7-0.95	Fine	800	1000	3500	10000
BH116	1.8-1.95	Fine	800	1000	3500	10000
BH117	0.2-0.4	Fine	800	1000	3500	10000
BH117	1.0-1.2	Fine	800	1000	3500	10000
DUPRK1	-	Fine	800	1000	3500	10000
DUPRK2	-	Fine	800	1000	3500	10000
BH201	0.1-0.2	Coarse	700	1000	2500	10000
BH201 -	0.1-0.2	Coarse	700	1000	2500	10000
BH202	0-0.2	Fine	800	1000	3500	10000
BH203	0-0.2	Fine	800	1000	3500	10000
BH204	0-0.2	Coarse	700	1000	2500	10000
BH205	0-0.2	Fine	800	1000	3500	10000
BH205	1.5-1.6	Fine	800	1000	3500	10000
BH206	0-0.2	Coarse	700	1000	2500	10000
BH207	0.1-0.2	Coarse	700	1000	2500	10000
BH208	0-0.2	Fine	800	1000	3500	10000
BH209	0-0.1	Coarse	700	1000	2500	10000
BH209	0.4-0.5	Fine	800	1000	3500	10000
BH210	0.2-0.3	Fine	800	1000	3500	10000
BH210 -	0.2-0.3	Fine	800	1000	3500	10000
BH211	0.2-0.3	Fine	800	1000	3500	10000
BH212	0-0.2	Fine	800	1000	3500	10000
BH212	0.6-0.7	Fine	800	1000	3500	10000
SDUP1	-	Fine	800	1000	3500	10000
SDUP2	-	Fine	800	1000	3500	10000

TABLE S4
SOIL LABORATORY RESULTS COMPARED TO DIRECT CONTACT CRITERIA
All data in mg/kg unless stated otherwise

Analyte		C ₆ -C ₁₀	>C ₁₀ -C ₁₆	>C ₁₆ -C ₃₄	>C ₃₄ -C ₄₀	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	PID
PQL - Envirolab Services		25	50	100	100	0.2	0.5	1	1	1	
CRC 2011 - Direct contact Criteria		4,400	3,300	4,500	6,300	100	14,000	4,500	12,000	1,400	
Site Use		RESIDENTIAL WITH ACCESSIBLE SOIL- DIRECT SOIL CONTACT									
Sample Reference	Sample Depth										
BH1	0.0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH1	0.8-1.0	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH2	0.04-0.2	<25	<50	1700	720	<0.2	<0.5	<1	<1	<1	0
BH3	0.0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH3	0.5-0.6	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH4	0.0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH5	0.0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH5	0.5-0.6	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH6	0.0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH101	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH101 [LAB_DUP]	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH101	0.6-0.8	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH102	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH103	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH103	0.2-0.3	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH104	0.4-0.6	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH104	0.8-0.9	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.1
BH105	0.2-0.4	<25	<50	410	300	<0.2	<0.5	<1	<1	<1	0.1
BH106	0.03-0.15	<25	60	770	710	<0.2	<0.5	<1	<1	<1	1.9
BH107	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	122.6
BH107	0.5-0.8	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH108	0.05-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH108 [LAB_DUP]	0.05-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.9
BH109	0.05-0.15	<25	<50	130	170	<0.2	<0.5	<1	<1	<1	0.2
BH109	0.5-0.7	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH110	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	19.1
BH111	0.6-0.95	<25	120	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH111	1.5-1.95	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH112	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH113	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	13.7
BH113	0.5-0.8	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH114	0.12-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH115	0.04-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH115	1.5-1.7	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH115 [LAB_DUP]	1.5-1.7	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH116	0.7-0.95	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH116	1.8-1.95	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH117	0.2-0.4	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH117	1.0-1.2	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	-
DUPRK1	-	<25	<50	180	200	<0.2	<0.5	<1	<1	<1	-
DUPRK2	-	<25	<50	350	420	<0.2	<0.5	<1	<1	<1	-
BH201	0.1-0.2	<25	<50	280	230	<0.2	<0.5	<1	<3	<1	0
BH201 - [LAB_DUP]	0.1-0.2	<25	<50	370	340	<0.2	<0.5	<1	<3	<1	-
BH201	1.7-1.8	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH202	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH203	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH204	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH205	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH205	1.5-1.6	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH206	0-0.2	<25	<50	<100	110	<0.2	<0.5	<1	<3	<1	0.1
BH207	0.1-0.2	<25	<50	810	910	<0.2	<0.5	<1	<3	<1	0.3
BH208	0-0.2	<25	<50	<100	120	<0.2	<0.5	<1	<3	<1	0
BH209	0-0.1	<25	<50	320	410	<0.2	<0.5	<1	<3	<1	0.1
BH209	0.4-0.5	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH210	0.2-0.3	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH210 - [LAB_DUP]	0.2-0.3	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	-
BH211	0.2-0.3	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH212	0-0.2	<25	<50	200	230	<0.2	<0.5	<1	<3	<1	0
BH212	0.6-0.7	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
SDUP1	-	<25	<50	770	790	<0.2	<0.5	<1	<3	<1	-
SDUP2	-	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	-
Total Number of Samples		69	69	69	69	69	69	69	69	69	60
Maximum Value		<PQL	120	1700	910	<PQL	0.6	<PQL	<PQL	<PQL	122.6
Concentration above the SAC											
Concentration above the PQL											

VALUE

Bold

TABLE 55 ASBESTOS QUANTIFICATION - FIELD OBSERVATIONS AND LABORATORY RESULTS HSL-A: Residential with garden/accessible soils; children's day care centers; preschools; and primary schools																													
FIELD DATA																LABORATORY DATA													
Date Sampled	Sample reference	Sample Depth	Visible ACM in top 100mm	Approx. Volume of Soil (L)	Soil Mass (g)	Mass ACM (g)	Mass Asbestos in ACM (g)	[Asbestos from ACM in soil] (%w/w)	Mass ACM <7mm (g)	Mass Asbestos in ACM <7mm (g)	[Asbestos from ACM <7mm in soil] (%w/w)	Mass FA (g)	Mass Asbestos in FA (g)	[Asbestos from FA in soil] (%w/w)	Lab Report Number	Sample reference	Sample Depth	Sample Mass (g)	Asbestos ID in soil (AS4964) >0.1g/kg	Trace Analysis	Total Asbestos (g/kg)	Asbestos ID in soil <0.1g/kg	ACM >7mm Estimation (g)	FA and AF Estimation (g)	ACM >7mm Estimation %(w/w)	FA and AF Estimation %(w/w)			
SAC			No	0.01						0.001						0.01												0.001	
27/03/2019	BH101	0-0.3	No	10	8,600	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	214605-A	BH101	0-0.3	534.47	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001			
27/03/2019	BH102	0-0.2	No	10	8,600	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	214605-A	BH102	0-0.2	453.94	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001			
27/03/2019	BH103	0-0.1	No	10	12,400	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	214605-A	BH103	0-0.1	758.54	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001			
27/03/2019	BH104	0.03-0.4	No	10	10,100	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	214605-A	BH104	0.03-0.4	763.45	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001			
27/03/2019	BH104	0.4-0.8	No	10	10,000	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	214605-A	BH104	0.4-0.8	509.28	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001			
27/03/2019	BH105	0.05-0.2	No	10	9,700	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	214605-A	BH105	0.05-0.2	726.94	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001			
27/03/2019	BH105	0.2-0.6	No	10	10,300	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	214605-A	BH105	0.2-0.6	600.84	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001			
27/03/2019	BH106	0.03-0.4	No	10	12,400	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	214605-A	BH106	0.03-0.4	780.67	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001			
27/03/2019	BH107	0-0.5	No	10	9,800	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	214605-A	BH107	0-0.5	429.63	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001			
27/03/2019	BH108	0.05-0.2	No	10	12,300	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	214605-A	BH108	0.05-0.2	784.28	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001			
27/03/2019	BH109	0.05-0.3	No	5	4,700	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	214605-A	BH109	0.05-0.3	684.56	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001			
27/03/2019	BH110	0-0.5	No	10	11,000	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	214605-A	BH110	0-0.5	639.32	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001			
27/03/2019	BH111	0.16-0.6	No	10	9,600	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	214605-A	BH111	0.16-0.6	711.12	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001			
27/03/2019	BH111	0.6-1.0	No	10	4,000	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	214605-A	BH111	0.6-1.0	329.33	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001			
27/03/2019	BH112	0-0.5	No	10	10,000	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	214605-A	BH112	0-0.5	503.23	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001			
27/03/2019	BH113	0-0.45	No	10	10,000	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	214605-A	BH113	0-0.45	460.24	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001			
27/03/2019	BH114	0.12-0.2	No	4	2,000	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	214605-A	BH114	0.12-0.2	480.4	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001			
27/03/2019	BH115	0.09-1.0	No	10	10,300	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	214605-A	BH115	0.09-1.0	561.15	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001			
27/03/2019	BH116	0.05-0.7	No	10	10,000	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	214605-A	BH116	0.05-0.7	906.93	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001			
27/03/2019	BH116	0.7-1.7	No	10	10,100	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	214605-A	BH116	0.7-1.7	630.74	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001			
27/03/2019	BH117	0.2-0.7	No	10	10,000	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	214605-A	BH117	0.2-0.7	552.09	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001			
2-6/11/2020	BH201	0.1-0.2	NA	NA	NA	NA	--	--	NA	--	--	NA	--	--	255370	BH201	0.1-0.2	906.41	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	Chrysotile	0.012	–	<0.01	<0.001			
2-6/11/2020	BH202	0-0.2	NA	NA	NA	NA	--	--	NA	--	--	NA	--	--	255370	BH202	0-0.2	529.44	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001			
2-6/11/2020	BH203	0-0.2	NA	NA	NA	NA	--	--	NA	--	--	NA	--	--	255370	BH203	0-0.2	244364	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001			
2-6/11/2020	BH204	0-0.2	NA	NA	NA	NA	--	--	NA	--	--	NA	--	--	255370	BH204	0-0.2	651.68	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001			
2-6/11/2020	BH205	0-0.2	NA	NA	NA	NA	--	--	NA	--	--	NA	--	--	255370	BH205	0-0.2	383.21	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001			
2-6/11/2020	BH206	0-0.2	NA	NA	NA	NA	--	--	NA	--	--	NA	--	--	255370	BH206	0-0.2	819.58	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001			
2-6/11/2020	BH207	0.1-0.2	NA	NA	NA	NA	--	--	NA	--	--	NA	--	--	255370	BH207	0.1-0.2	755.23	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001			
2-6/11/2020	BH208	0-0.2	NA	NA	NA	NA	--	--	NA	--	--	NA	--	--	255370	BH208	0-0.2	364.01	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001			
2-6/11/2020	BH209	0-0.1	NA	NA	NA	NA	--	--	NA	--	--	NA	--	--	255370	BH209	0-0.1	470.43	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001			
2-6/11/2020	BH210	0.2-0.3	NA	NA	NA	NA	--	--	NA	--	--	NA	--	--	255370	BH210	0.2-0.3	481.29	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001			
2-6/11/2020	BH211	0.2-0.3	NA	NA	NA	NA	--	--	NA	--	--	NA	--	--	255370	BH211	0.2-0.3	490.28	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001			
2-6/11/2020	BH212	0-0.2	NA	NA	NA	NA			NA			NA			255370	BH212	0-0.2	324.16	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001			
Concentration above the SAC			VALUE																										

TABLE 56
SOIL LABORATORY RESULTS COMPARED TO NEMH 2013 EILs AND ESLs
All data in mg/kg unless stated otherwise

Land Use Category				URBAN RESIDENTIAL AND PUBLIC OPEN SPACE																				
				AGED HEAVY METALS EILs								EILs												
				pH	CEC (cmol/kg)	Clay Content (% clay)	Arsenic	Chromium	Copper	Lead	Nickel	Zinc	Naphthalene	DOT	C ₁₀ -C ₁₈ (F1)	ΣC ₁₀ -C ₁₈ (F2) plus naphthalene	ΣC ₁₀ -C ₁₈ (F3)	ΣC ₁₀ -C ₁₈ (F4)	Benzene	Toluene	Ethylbenzene	Total Xylenes	B(a)P	
NGL - Envisalab Services				-	1	-	4	1	1	1	1	1	1	0.1	25	50	100	100	100	0.2	0.5	1	1	0.05
Ambient Background Concentration (ABC)				-	-	-	NGL	13	28	163	5	122	NGL	NGL	NGL	NGL	NGL	NGL	NGL	NGL	NGL	NGL	NGL	NGL
Sample Reference	Sample Depth	Sample Description	Soil Texture																					
BH1	0.0-0.1	Fil: Silty clay	Fine	5.76	7.1	35.3	<4	12	19	24	8	34	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.2
BH1	0.8-1.0	Siltstone	Fine	5.76	7.1	35.3	6	8	28	33	5	22	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.06
BH2	0.04-0.2	Fil: Silty sand	Coarse	9.2	26	7	<4	18	53	21	25	49	<1	<0.1	<25	<50	720	720	<0.2	<0.5	<1	<1	<1	0.56
BH3	0.0-0.1	Fil: Silty sand	Coarse	9.2	26	7	<4	25	51	9	110	55	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05
BH3	0.5-0.6	Silty clay	Fine	5.76	7.1	35.3	<4	9	15	27	1	3	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05
BH4	0.0-0.1	Silty clay	Fine	5.76	7.1	35.3	5	15	33	23	6	26	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05
BH5	0.0-0.1	Fil: Silty clay	Fine	5.76	7.1	35.3	6	14	22	27	6	24	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05
BH5	0.5-0.6	Silty clay	Fine	5.76	7.1	35.3	6	14	20	16	3	18	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05
BH6	0.0-0.1	Fil: Silty clay	Fine	5.76	7.1	35.3	7	8	16	57	4	54	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05
BH101	0-0.1	Fil: Silty clay	Fine	5.76	7.1	35.3	4	11	23	19	8	100	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.4
BH101 [LAB_DUP]	0-0.1	Fil: Silty clay	Fine	5.76	7.1	35.3	6	10	23	19	7	40	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.1
BH101	0.6-0.8	Silty clay	Fine	5.76	7.1	35.3	<4	9	8	17	<1	2	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05
BH102	0-0.2	Fil: Silty clay	Fine	5.76	7.1	35.3	4	9	15	15	6	31	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05
BH103	0-0.1	Fil: Gravelly sand	Coarse	9.2	26	7	<4	8	29	17	5	30	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05
BH103	0.2-0.3	Siltstone	Fine	5.76	7.1	35.3	<4	9	42	16	6	32	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05
BH104	0.4-0.6	Fil: Silty sandy clay	Fine	5.76	7.1	35.3	<4	7	20	19	3	12	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	1.7
BH104	0.8-0.9	Silty clay	Fine	5.76	7.1	35.3	5	4	21	28	1	4	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05
BH105	0.2-0.4	Fil: Gravelly sand	Fine	5.76	7.1	35.3	<4	12	67	14	12	60	<1	<0.1	<25	<50	410	300	<0.2	<0.5	<1	<1	<1	4.1
BH106	0.03-0.15	Fil: Silty gravelly sand	Coarse	9.2	26	7	<4	18	66	14	40	55	<1	<0.1	<25	<50	60	710	<0.2	<0.5	<1	<1	<1	4.2
BH107	0-0.1	Fil: Silty clay	Fine	5.76	7.1	35.3	8	17	29	150	11	150	<1	<0.1	<25	<50	8	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH107	0.5-0.8	Silty clay	Fine	5.76	7.1	35.3	6	14	10	15	2	5	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05
BH108	0.05-0.2	Fil: Silty clay	Fine	5.76	7.1	35.3	<4	20	58	8	82	41	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05
BH108 [LAB_DUP]	0.05-0.2	Lab replicate	Fine	5.76	7.1	35.3	<4	20	57	9	79	41	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05
BH109	0.05-0.15	Fil: Sandy gravel	Coarse	9.2	26	7	<4	77	34	11	69	47	<1	<0.1	<25	<50	130	170	<0.2	<0.5	<1	<1	<1	0.4
BH109	0.5-0.7	Silty clay	Fine	5.76	7.1	35.3	4	12	16	21	5	5	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05
BH110	0-0.1	Fil: Silty sandy clay	Fine	5.76	7.1	35.3	<4	15	19	34	10	33	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.6
BH111	0.6-0.95	Fil: Silty clay	Fine	5.76	7.1	35.3	20	17	21	83	6	66	<1	<0.1	<25	120	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05
BH111	1.5-1.95	Silty clay	Fine	5.76	7.1	35.3	5	12	13	20	<1	2	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05
BH112	0-0.1	Fil: Silty clay	Fine	5.76	7.1	35.3	4	19	32	41	6	53	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.5
BH113	0-0.1	Fil: Silty clay	Fine	5.76	7.1	35.3	7	18	36	97	28	91	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05
BH113	0.5-0.8	Silty clay	Fine	5.76	7.1	35.3	<4	5	19	17	<1	2	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05
BH114	0.12-0.2	Fil: Sandy gravel	Coarse	9.2	26	7	6	17	28	75	11	52	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.07
BH115	0.04-0.2	Fil: Silty clay	Fine	5.76	7.1	35.3	5	8	28	120	3	29	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05
BH115	1.5-1.7	Silty clay	Fine	5.76	7.1	35.3	6	16	17	1	7	7	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05
BH115 [LAB_DUP]	1.5-1.7	Lab replicate	Fine	5.76	7.1	35.3	5	16	14	21	<1	3	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05
BH116	0.7-0.95	Silty clay	Fine	5.76	7.1	35.3	5	20	35	250	14	42	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.82
BH116	1.8-1.95	Siltstone	Fine	5.76	7.1	35.3	<4	7	59	18	12	42	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05
BH117	0.2-0.4	Fil: Silty clay	Fine	5.76	7.1	35.3	<4	12	20	22	3	9	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05
BH117	1.0-1.2	Silty clay	Fine	5.76	7.1	35.3	<4	3	20	26	<1	4	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05
DUPR61	-	-	Fine	5.76	7.1	35.3	<4	64	36	10	55	46	<1	NA	<25	<50	180	200	<0.2	<0.5	<1	<1	<1	0.166
DUPR62	-	-	Fine	5.76	7.1	35.3	<4	60	110	15	41	42	<1	NA	<25	<50	350	420	<0.2	<0.5	<1	<1	<1	5.2
BH201	0.1-0.2	Fil: Silty sand	Coarse	9.2	26	7	<4	6	12	8	4	44	<1	<0.1	<25	<50	230	230	<0.2	<0.5	<1	<1	<1	0.5
BH201 [LAB_DUP]	0.1-0.2	Fil: Silty sand	Coarse	9.2	26	7	<4	3	5	3	15	<1	<0.1	<25	<50	<100	340	340	<0.2	<0.5	<1	<1	<1	0.61
BH201 [TRIPPLICATE]	0.1-0.2	Fil: Silty sand	Coarse	9.2	26	7	<4	2	5	3	2	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH201	1.7-1.8	Silty clay	Fine	5.76	7.1	35.3	<4	8	16	14	<1	3	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05
BH202	0-0.2	Fil: Silty clay	Fine	5.76	7.1	35.3	<4	8	11	17	5	32	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05
BH203	0-0.2	Fil: Silty clay	Fine	5.76	7.1	35.3	7	8	18	14	6	29	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05
BH204	0-0.2	Fil: Silty sand	Coarse	9.2	26	7	<4	7	13	26	31	12	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.07
BH205	0-0.2	Fil: Silty clay	Fine	5.76	7.1	35.3	<4	10	14	51	5	64	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05
BH205	1.5-1.6	Silty clay	Fine	5.76	7.1	35.3	<4	2	6	9	<1	1	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05
BH206	0-0.2	Fil: Asphalt gravel	Coarse	9.2	26	7	<4	32	9	10	17	14	<1	<0.1	<25	<50	110	110	<0.2	<0.5	<1	<1	<1	<0.05
BH207	0.1-0.2	Fil: Asphalt gravel	Coarse	9.2	26	7	<4	36	19	3	35	24	<1	<0.1	<25	<50	910	910	<0.2	<0.5	<1	<1	<1	0.06
BH208	0-0.2	Fil: Silty clay	Fine	5.76	7.1	35.3	<4	12	13	18	5	18	<1</											

TABLE S7																											
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		Total Scheduled	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	50	0.2	0.5	1	1	100
General Solid Waste CT1			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			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			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			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																									
BH1	0.0-0.1	Fill: Silty clay	<4	<0.4	12	19	24	0.2	8	34	1.6	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH1	0.8-1.0	Siltstone	6	<0.4	8	28	33	0.1	5	22	0.06	0.06	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH2	0.04-0.2	Fill: Silty sand	<4	<0.4	18	53	21	<0.1	25	49	640	50	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	940	920	1860	<0.2	<0.5	<1	<1	Not Detected
BH3	0.0-0.1	Fill: Silty sand	<4	<0.4	25	51	9	<0.1	110	55	0.2	<0.05	<0.1	<0.1	<0.1	<0.1	<0.5	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH3	0.5-0.6	Silty clay	<4	<0.4	9	15	27	<0.1	1	3	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH4	0.0-0.1	Silty clay	5	<0.4	15	33	23	<0.1	6	26	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH5	0.0-0.1	Fill: Silty clay	6	<0.4	14	22	27	<0.1	6	24	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH5	0.5-0.6	Silty clay	6	<0.4	14	20	16	<0.1	3	18	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH6	0.0-0.1	Fill: Silty clay	7	<0.4	8	16	57	<0.1	4	54	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH101	0-0.1	Fill: Silty clay	4	<0.4	11	23	19	<0.1	8	100	5	0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH101 [LAB_DUP]	0-0.1	Fill: Silty clay	6	<0.4	10	23	19	<0.1	7	40	2.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH101	0.6-0.8	Silty clay	<4	<0.4	9	8	17	<0.1	<1	2	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH102	0-0.2	Fill: Silty clay	4	<0.4	9	15	15	<0.1	6	31	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH103	0-0.1	Fill: Gravelly sand	<4	<0.4	8	29	17	0.1	5	30	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH103	0.2-0.3	Siltstone	<4	<0.4	9	42	16	0.1	6	32	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH104	0.4-0.6	Fill: Silty sandy clay	<4	<0.4	7	30	19	<0.1	3	12	26	1.7	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH104	0.8-0.9	Silty clay	5	<0.4	4	21	28	<0.1	1	4	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH105	0.2-0.4	Fill: Gravelly sand	<4	<0.4	12	67	14	<0.1	12	60	60	4.1	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	230	280	510	<0.2	<0.5	<1	<1	Not Detected
BH106	0.03-0.15	Fill: Silty gravelly sand	<4	<0.4	38	86	14	<0.1	40	55	63	4.2	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	400	610	1010	<0.2	<0.5	<1	<1	Not Detected
BH107	0-0.1	Fill: Silty clay	8	<0.4	17	29	150	<0.1	11	150	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH107	0.5-0.8	Silty clay	6	<0.4	14	10	15	<0.1	2	5	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH108	0.05-0.2	Fill: Silty clay	<4	<0.4	20	58	8	<0.1	82	41	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH108 [LAB_DUP]	0.05-0.2	Lab replicate	<4	<0.4	20	57	9	<0.1	79	41	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH109	0.05-0.15	Fill: Sandy gravel	<4	<0.4	77	34	11	<0.1	69	47	4.2	0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	130	130	<0.2	<0.5	<1	<1	Not Detected
BH109	0.5-0.7	Silty clay	4	<0.4	12	16	21	<0.1	1	5	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH110	0-0.1	Fill: Silty sandy clay	<4	<0.4	15	19	34	<0.1	10	33	0.2	0.06	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH111	0.6-0.95	Fill: Silty clay	20	<0.4	17	21	83	<0.1	6	66	1.7	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<25	140	<100	<100	140	<0.2	<0.5	<1	<1	Not Detected
BH111	1.5-1.95	Silty clay	5	<0.4	12	13	20	<0.1	<1	2	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH112	0-0.1	Fill: Silty clay	4	<0.4	19	32	41	<0.1	6	53	0.05	0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH113	0-0.1	Fill: Silty clay	7	<0.4	38	36	97	0.1	28	91	1.8	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH113	0.5-0.8	Silty clay	<4	<0.4	5	19	17	<0.1	<1	2	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5</			

TABLE S8

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			5	1	5	5	0.2	2	0.04
TCLP2 - Restricted Solid Waste			20	4	20	20	0.8	8	0.16
TCLP3 - Hazardous Waste			>20	>4	>20	>20	>0.8	>8	>0.16
Sample Reference	Sample Depth	Sample Description							
BH2	0.04-0.2	Fill: Silty sand	NA	NA	NA	NA	NA	NA	<0.001
BH3	0-0.1	Fill: Silty sand	<0.05	<0.01	<0.01	<0.03	<0.0005	0.03	NA
BH209	0-0.1	Fill: Asphalt gravel	<0.05	<0.01	<0.01	<0.03	<0.0005	0.04	NA
Total Number of samples			2	2	2	2	2	2	1
Maximum Value			<PQL	<PQL	<PQL	<PQL	<PQL	0.04	<PQL
General Solid Waste			VALUE						
Restricted Solid Waste			VALUE						
Hazardous Waste			VALUE						
Concentration above PQL			Bold						

[illegible]

ABBREVIATIONS AND EXPLANATIONS

Abbreviations used in the Tables:

ADWG:	Australian Drinking Water Guidelines	PCBs:	Polychlorinated Biphenyls
ANZG	Australian and New Zealand Guidelines	PCE:	Perchloroethylene (Tetrachloroethylene or Tetrachloroethene)
B(a)P:	Benzo(a)pyrene	PQL:	Practical Quantitation Limit
CRC:	Cooperative Research Centre	RS:	Rinsate Sample
ESLs:	Ecological Screening Levels	RSL:	Regional Screening Levels
GIL:	Groundwater Investigation Levels	SAC:	Site Assessment Criteria
HILs:	Health Investigation Levels	SSA:	Site Specific Assessment
HSLs:	Health Screening Levels	SSHSLs:	Site Specific Health Screening Levels
HSL-SSA:	Health Screening Level-Site Specific Assessment	TB:	Trip Blank
NA:	Not Analysed	TCA:	1,1,1 Trichloroethane (methyl chloroform)
NC:	Not Calculated	TCE:	Trichloroethylene (Trichloroethene)
NEPM:	National Environmental Protection Measure	TS:	Trip Spike
NHMRC:	National Health and Medical Research Council	TRH:	Total Recoverable Hydrocarbons
NL:	Not Limiting	UCL:	Upper Level Confidence Limit on Mean Value
NSL:	No Set Limit	USEPA	United States Environmental Protection Agency
OCP:	Organochlorine Pesticides	VOCC:	Volatile Organic Chlorinated Compounds
OPP:	Organophosphorus Pesticides	WHO:	World Health Organisation
PAHs:	Polycyclic Aromatic Hydrocarbons		
ppm:	Parts per million		

TABLE G1 SUMMARY OF GROUNDWATER LABORATORY RESULTS COMPARED TO ECOLOGICAL GILs SAC All results in µg/L unless stated otherwise.			
	PQL Envirolab Services	ANZG 2018 Fresh Waters	SAMPLES MW111
Inorganic Compounds and Parameters			
pH		6.5 - 8.5	NA
Electrical Conductivity (µS/cm)	1	NSL	NA
Turbidity (NTU)		NSL	NA
Metals and Metalloids			
Arsenic (As III)	1	24	<1
Cadmium	0.1	0.2	<0.1
Chromium (SAC for Cr III adopted)	1	3.3	1
Copper	1	1.4	2
Lead	1	3.4	<1
Total Mercury (inorganic)	0.05	0.06	<0.05
Nickel	1	11	9
Zinc	1	8	52
Monocyclic Aromatic Hydrocarbons (BTEX Compounds)			
Benzene	1	950	<1
Toluene	1	180	<1
Ethylbenzene	1	80	<1
m+p-xylene	2	75	<2
o-xylene	1	350	<1
Total xylenes	2	NSL	<2
Volatile Organic Compounds (VOCs), including chlorinated VOCs			
Dichlorodifluoromethane	10	NSL	<10
Chloromethane	10	NSL	<10
Vinyl Chloride	10	100	<10
Bromomethane	10	NSL	<10
Chloroethane	10	NSL	<10
Trichlorofluoromethane	10	NSL	<10
1,1-Dichloroethene	1	700	<1
Trans-1,2-dichloroethene	1	NSL	<1
1,1-dichloroethane	1	90	<1
Cis-1,2-dichloroethene	1	NSL	<1
Bromochloromethane	1	NSL	<1
Chloroform	1	370	<1
2,2-dichloropropane	1	NSL	<1
1,2-dichloroethane	1	1900	<1
1,1,1-trichloroethane	1	270	<1
1,1-dichloropropene	1	NSL	<1
Cyclohexane	1	NSL	<1
Carbon tetrachloride	1	240	<1
Benzene	1	950	<1
Dibromomethane	1	NSL	<1
1,2-dichloropropane	1	900	<1
Trichloroethene	1	330	<1
Bromodichloromethane	1	NSL	<1
trans-1,3-dichloropropene	1	NSL	<1
cis-1,3-dichloropropene	1	NSL	<1
1,1,2-trichloroethane	1	6500	<1
Toluene	1	180	<1
1,3-dichloropropane	1	1100	<1
Dibromochloromethane	1	NSL	<1
1,2-dibromoethane	1	NSL	<1
Tetrachloroethene	1	70	<1
1,1,1,2-tetrachloroethane	1	NSL	<1
Chlorobenzene	1	55	<1
Ethylbenzene	1	80	<1
Bromoform	1	NSL	<1
m+p-xylene	2	75	<2
Styrene	1	NSL	<1
1,1,2,2-tetrachloroethane	1	400	<1
o-xylene	1	350	<1
1,2,3-trichloropropane	1	NSL	<1
Isopropylbenzene	1	30	<1
Bromobenzene	1	NSL	<1
n-propyl benzene	1	NSL	<1
2-chlorotoluene	1	NSL	<1
4-chlorotoluene	1	NSL	<1
1,3,5-trimethyl benzene	1	NSL	<1
Tert-butyl benzene	1	NSL	<1
1,2,4-trimethyl benzene	1	NSL	<1
1,3-dichlorobenzene	1	260	<1
Sec-butyl benzene	1	NSL	<1
1,4-dichlorobenzene	1	60	<1
4-isopropyl toluene	1	NSL	<1
1,2-dichlorobenzene	1	160	<1
n-butyl benzene	1	NSL	<1
1,2-dibromo-3-chloropropane	1	NSL	<1
1,2,4-trichlorobenzene	1	85	<1
Hexachlorobutadiene	1	NSL	<1
1,2,3-trichlorobenzene	1	3	<1
Polycyclic Aromatic Hydrocarbons (PAHs)			
Naphthalene	0.2	16	<0.2
Acenaphthylene	0.1	NSL	<0.1
Acenaphthene	0.1	NSL	<0.1
Fluorene	0.1	NSL	<0.1
Phenanthrene	0.1	0.6	<0.1
Anthracene	0.1	0.01	<0.1
Fluoranthene	0.1	1	<0.1
Pyrene	0.1	NSL	<0.1
Benzo(a)anthracene	0.1	NSL	<0.1
Chrysene	0.1	NSL	<0.1
Benzo(b,j+k)fluoranthene	0.2	NSL	<0.2
Benzo(a)pyrene	0.1	0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	NSL	<0.1
Dibenzo(a,h)anthracene	0.1	NSL	<0.1
Benzo(g,h,i)perylene	0.1	NSL	<0.1
Concentration above the SAC	VALUE		
Concentration above the PQL	Bold		
GIL >PQL	Red		



TABLE G2 SUMMARY OF GROUNDWATER LABORATORY RESULTS COMPARED TO HUMAN CONTACT GILS All results in µg/L unless stated otherwise.			
	PQL Envirolab Services	Recreational (10 x NHMRC ADWG)	SAMPLES MW111
Inorganic Compounds and Parameters			
pH		6.5 - 8.5	NA
Electrical Conductivity (µS/cm)	1	NSL	NA
Turbidity (NTU)		NSL	NA
Metals and Metalloids			
Arsenic (As III)	1	100	<1
Cadmium	0.1	20	<0.1
Chromium (total)	1	500	1
Copper	1	20000	2
Lead	1	100	<1
Total Mercury (inorganic)	0.05	10	<0.05
Nickel	1	200	9
Zinc	1	30000	52
Monocyclic Aromatic Hydrocarbons (BTEX Compounds)			
Benzene	1	10	<1
Toluene	1	8000	<1
Ethylbenzene	1	3000	<1
m+p-xylene	2	NSL	<2
o-xylene	1	NSL	<1
Total xylenes	2	6000	<2
Volatile Organic Compounds (VOCs), including chlorinated VOCs			
Dichlorodifluoromethane	10	NSL	<10
Chloromethane	10	NSL	<10
Vinyl Chloride	10	3	<10
Bromomethane	10	NSL	<10
Chloroethane	10	NSL	<10
Trichlorofluoromethane	10	NSL	<10
1,1-Dichloroethene	1	300	<1
Trans-1,2-dichloroethene	1	600	<1
1,1-dichloroethane	1	NSL	<1
Cis-1,2-dichloroethene	1	600	<1
Bromochloromethane	1	2500	<1
Chloroform	1		<1
2,2-dichloropropane	1	NSL	<1
1,2-dichloroethane	1	30	<1
1,1,1-trichloroethane	1	NSL	<1
1,1-dichloropropene	1	NSL	<1
Cyclohexane	1	NSL	<1
Carbon tetrachloride	1	30	<1
Benzene	1	10	<1
Dibromomethane	1	NSL	<1
1,2-dichloropropane	1	NSL	<1
Trichloroethene	1	NSL	<1
Bromodichloromethane	1	NSL	<1
trans-1,3-dichloropropene	1	1000	<1
cis-1,3-dichloropropene	1	1000	<1
1,1,2-trichloroethane	1	NSL	<1
Toluene	1	8000	<1
1,3-dichloropropane	1	NSL	<1
Dibromochloromethane	1	NSL	<1
1,2-dibromoethane	1	NSL	<1
Tetrachloroethene	1	500	<1
1,1,1,2-tetrachloroethane	1	NSL	<1
Chlorobenzene	1	3000	<1
Ethylbenzene	1	3000	<1
Bromoform	1	NSL	<1
m+p-xylene	2	NSL	<2
Styrene	1	300	<1
1,1,2,2-tetrachloroethane	1	NSL	<1
o-xylene	1	NSL	<1
1,2,3-trichloropropane	1	NSL	<1
Isopropylbenzene	1	NSL	<1
Bromobenzene	1	NSL	<1
n-propyl benzene	1	NSL	<1
2-chlorotoluene	1	NSL	<1
4-chlorotoluene	1	NSL	<1
1,3,5-trimethyl benzene	1	NSL	<1
Tert-butyl benzene	1	NSL	<1
1,2,4-trimethyl benzene	1	NSL	<1
1,3-dichlorobenzene	1	200	<1
Sec-butyl benzene	1	NSL	<1
1,4-dichlorobenzene	1	400	<1
4-isopropyl toluene	1	NSL	<1
1,2-dichlorobenzene	1	15000	<1
n-butyl benzene	1	NSL	<1
1,2-dibromo-3-chloropropane	1	NSL	<1
1,2,4-trichlorobenzene	1	300	<1
1,2,3-trichlorobenzene	1		<1
Hexachlorobutadiene	1	7	<1
Polycyclic Aromatic Hydrocarbons (PAHs)			
Naphthalene	0.2	NSL	<0.2
Acenaphthylene	0.1	NSL	<0.1
Acenaphthene	0.1	NSL	<0.1
Fluorene	0.1	NSL	<0.1
Phenanthrene	0.1	NSL	<0.1
Anthracene	0.1	NSL	<0.1
Fluoranthene	0.1	NSL	<0.1
Pyrene	0.1	NSL	<0.1
Benzo(a)anthracene	0.1	NSL	<0.1
Chrysene	0.1	NSL	<0.1
Benzo(b,j+k)fluoranthene	0.2	NSL	<0.2
Benzo(a)pyrene	0.1	0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	NSL	<0.1
Dibenzo(a,h)anthracene	0.1	NSL	<0.1
Benzo(g,h,i)perylene	0.1	NSL	<0.1
Concentration above the SAC Concentration above the PQL GIL >PQL			
VALUE Bold Red			

TABLE G3 GROUNDWATER LABORATORY RESULTS COMPARED TO SITE SPECIFIC HSLs - RISK ASSESSMENT All results in µg/L unless stated otherwise.					
	PQL	NHMRC	WHO 2008	USEPA RSL	SAMPLES
	Envirolab	ADWG 2011		Tapwater	MW111
	Services	(v3.5 2018)		2017	
Total Recoverable Hydrocarbons (TRH)					
C ₆ -C ₉ Aliphatics (assessed using F1)	10	-	15000	-	<10
>C ₉ -C ₁₄ Aliphatics (assessed using F2)	50	-	100	-	<50
Monocyclic Aromatic Hydrocarbons (BTEX Compounds)					
Benzene	1	1	-	-	<1
Toluene	1	800	-	-	<1
Ethylbenzene	1	300	-	-	<1
Total xylenes	2	600	-	-	<2
Polycyclic Aromatic Hydrocarbons (PAHs)					
Naphthalene	1	-	-	6.1	<1
Volatile Organic Compounds (VOCs), including chlorinated VOCs					
Dichlorodifluoromethane	10	-	-	-	<10
Chloromethane	10	-	-	-	<10
Vinyl Chloride	10	0.3	-	-	<10
Bromomethane	10	-	-	-	<10
Chloroethane	10	-	-	-	<10
Trichlorofluoromethane	10	-	-	-	<10
1,1-Dichloroethene	1	30	-	-	<1
Trans-1,2-dichloroethene	1	60	-	-	<1
1,1-dichloroethane	1	-	-	-	<1
Cis-1,2-dichloroethene	1	60	-	-	<1
Bromochloromethane	1	250	-	-	<1
Chloroform	1		-	-	<1
2,2-dichloropropane	1	-	-	-	<1
1,2-dichloroethane	1	3	-	-	<1
1,1,1-trichloroethane	1	-	-	-	<1
1,1-dichloropropene	1	-	-	-	<1
Cyclohexane	1	-	-	-	<1
Carbon tetrachloride	1	3	-	-	<1
Benzene	1	1	-	-	<1
Dibromomethane	1	-	-	-	<1
1,2-dichloropropane	1	-	-	-	<1
Trichloroethene	1	-	-	-	<1
Bromodichloromethane	1	-	-	-	<1
trans-1,3-dichloropropene	1	100	-	-	<1
cis-1,3-dichloropropene	1	100	-	-	<1
1,1,2-trichloroethane	1	-	-	-	<1
Toluene	1	800	-	-	<1
1,3-dichloropropane	1	-	-	-	<1
Dibromochloromethane	1	-	-	-	<1
1,2-dibromoethane	1	-	-	-	<1
Tetrachloroethene	1	50	-	-	<1
1,1,1,2-tetrachloroethane	1	-	-	-	<1
Chlorobenzene	1	300	-	-	<1
Ethylbenzene	1	300	-	-	<1
Bromoform	1	-	-	-	<1
m+p-xylene	2	-	-	-	<2
Styrene	1	30	-	-	<1
1,1,2,2-tetrachloroethane	1	-	-	-	<1
o-xylene	1	-	-	-	<1
1,2,3-trichloropropane	1	-	-	-	<1
Isopropylbenzene	1	-	-	-	<1
Bromobenzene	1	-	-	-	<1
n-propyl benzene	1	-	-	-	<1
2-chlorotoluene	1	-	-	-	<1
4-chlorotoluene	1	-	-	-	<1
1,3,5-trimethyl benzene	1	-	-	-	<1
Tert-butyl benzene	1	-	-	-	<1
1,2,4-trimethyl benzene	1	-	-	-	<1
1,3-dichlorobenzene	1	20	-	-	<1
Sec-butyl benzene	1	-	-	-	<1
1,4-dichlorobenzene	1	40	-	-	<1
4-isopropyl toluene	1	-	-	-	<1
1,2-dichlorobenzene	1	1500	-	-	<1
n-butyl benzene	1	-	-	-	<1
1,2-dibromo-3-chloropropane	1	-	-	-	<1
1,2,4-trichlorobenzene	1	30	-	-	<1
1,2,3-trichlorobenzene	1		-	-	<1
Hexachlorobutadiene	1	7	-	-	<1
Concentration above the SAC					
		VALUE			
Concentration above the PQL		Bold			
GIL >PQL		Red			



TABLE Q2 GROUNDWATER QA/QC SUMMARY						
		Benzene	Toluene	Ethylbenzene	m+p-xylene	o-Xylene
PQL Envirolab SYD		1	1	1	2	1
PQL Envirolab VIC		1.0	1.0	1.0	2.0	1.0
Trip	TS1	100%	98%	101%	97%	102%
Spike	4/04/2019					
Result outside of QA/C		Value				



Appendix C: Borehole Logs



Borehole No.
1
1 / 2

BOREHOLE LOG

Client: TTW Project: PROPOSED NEW SCHOOL BUILDING Location: LORETO NORMANHURST GIRLS SCHOOL, NORMANHURST, NSW														
Job No.: 31772L Date: 5/9/18 Plant Type: JK308			Method: SPIRAL AUGER Logged/Checked By: A.B./L.S.			R.L. Surface: ~181.2 m Datum: AHD								
Groundwater Record	SAMPLES				Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
	ES	U50	DB	DS										
DRY ON COMPLETION OF AUGERING						181				FILL: Silty clay, low plasticity, dark brown, trace of roots.				GRASS COVER
										Extremely Weathered siltstone: silty CLAY, medium plasticity, light grey, with ironstone and dark grey low strength siltstone bands.	XW	(Hd)		ASHFIELD SHALE
							1							LOW TO MODERATE BANDS OF RESISTANCE
						180				REFER TO CORED BOREHOLE LOG				
							2							
						179								
							3							
						178								
							4							
						177								
							5							
						176								
							6							
						175								

Borehole No.

1

2 / 2

CORED BOREHOLE LOG

Client: TTW

Project: PROPOSED NEW SCHOOL BUILDING

Location: LORETO NORMANHURST GIRLS SCHOOL, NORMANHURST, NSW

Job No.: 31772L

Core Size: NMLC

R.L. Surface: ~181.2 m

Date: 5/9/18

Inclination: VERTICAL

Datum: AHD

Plant Type: JK308

Bearing: N/A

Logged/Checked By: A.B./L.S.

Water Loss/Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_p(50)$	SPACING (mm)	DEFECT DETAILS		Formation
										Specific	General	
		180			START CORING AT 1.20m							
					NO CORE 1.09m							
		179	2									
					SILTSTONE: dark grey and light grey, bedded subhorizontally.	XW - HW	Hd - VL					
		178	3		SILTSTONE: dark grey, bedded subhorizontally.	HW	VL - L	0.20			(2.92m) J, 90°, P, R, Fe Sn (3.13m) J, 90°, P, S, Cn (3.18m) J, 10°, P, S, Fe Sn (3.30m) J, 90°, P, R, Cn	Ashfield Shale
					NO CORE 0.18m							
					SILTSTONE: light grey and dark grey, with iron indurated and low strength bands.	XW	Hd					Ashfield Shale
		177	4		NO CORE 0.31m							
					SILTSTONE: dark grey, with iron indurated bands bedded subhorizontally.	HW	VL - L	0.20			(4.33m) J, 50°, P, S, Fe Sn (4.39m) J, 30 - 90°, P, S, Fe Sn (4.45m) XWS, 0°, 7 mm.t (4.57m) J, 30°, P, S, Fe Sn (4.65m) XWS, 0°, 60 mm.t (4.71m) J, 50°, P, S, Fe Sn (4.75m) XWS, 0°, 70 mm.t (4.84m) J, 60 - 90°, P, S, Fe Sn (4.91m) Be, 0°, P, R, Cn (5.04m) XWS, 0°, 70 mm.t (5.12m) J, 90°, P, R, Cn	Ashfield Shale
		176	5			XW	Hd					Ashfield Shale
					NO CORE 0.07m							
		175	6		SILTSTONE: orange brown and light grey, with clay seams.	XW	Hd	0.30			(5.71m) Be, 0°, P, S, Cn	Ashfield Shale
					SANDSTONE: fine to medium grained, orange brown.	SW	H	1.7				
					as above, but light grey with dark grey bands, bedded subhorizontally.	FR		1.3			(6.54m) J, 80°, P, R, Cn	Hawkesbury Sandstone
		174	7					1.1				
								1.7				

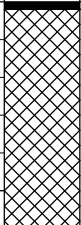
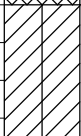
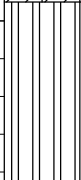


Borehole No.
2
1 / 2

BOREHOLE LOG

Client: TTW
Project: PROPOSED NEW SCHOOL BUILDING
Location: LORETO NORMANHURST GIRLS SCHOOL, NORMANHURST, NSW

Job No.: 31772L **Method:** SPIRAL AUGER **R.L. Surface:** ~183.8 m
Date: 5/9/18 **Datum:** AHD
Plant Type: JK308 **Logged/Checked By:** A.B./L.S.

Groundwater Record	SAMPLES				Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
	ES	U50	DB	DS										
DRY ON COMPLETION OF AUGERING						183	1		-	ASPHALTIC CONCRETE: 40mm.t FILL: Silty gravelly sand, fine to coarse grained, dark grey, fine to medium grained igneous gravel. FILL: Gravelly sand, fine to coarse grained, light brown, fine to coarse grained, grey igneous gravel.	M			APPEARS MODERATELY COMPACTED
					N=SPT 5/ 20mm REFUSAL	182	2		CH	Silty CLAY: high plasticity, light grey and grey, trace fine to medium grained ironstone gravel.	w>PL	Vst - Hd	460 400 360	
					N = 15 6,4,11	181	3		-	Extremely Weathered siltstone: silty CLAY, medium plasticity, grey with ironstone and low strength bands.	XW	Hd		ASHFIELD SHALE VERY LOW 'TC' BIT RESISTANCE
						180	4			REFER TO CORED BOREHOLE LOG				
						179	5							
						178	6							
						177								

JK 9.01.2.LIB.GLB Log JK AUGERHOLE - MASTER 31772L NORMANHURST.GPJ <<DrawingFile>> 25/10/2018 10:26 10.0.000 D:\gel\lib and in situ Tool - DGD (Lib JK 9.01.2 2018-04-02 Proj JK 9.01.0 2018-03-20)

Borehole No.

2

2 / 2

CORED BOREHOLE LOG

Client: TTW

Project: PROPOSED NEW SCHOOL BUILDING

Location: LORETO NORMANHURST GIRLS SCHOOL, NORMANHURST, NSW

Job No.: 31772L

Core Size: NMLC

R.L. Surface: ~183.8 m

Date: 5/9/18

Inclination: VERTICAL

Datum: AHD

Plant Type: JK308

Bearing: N/A

Logged/Checked By: A.B./L.S.

Water Loss/Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_p(50)$	SPACING (mm)	DEFECT DETAILS		Formation
										Specific	General	
					START CORING AT 3.26m							
					NO CORE 0.63m							
			180									
			179		SILTSTONE: dark grey, with iron indurated bands, bedded subhorizontally.	HW	VL	0.10				Ashfield Shale
			178		NO CORE 0.38m							
			177		SILTSTONE: dark grey, bedded subhorizontally.	MW	VL - L	0.050				Ashfield Shale
			176				L	0.10				
			175				M	0.50				
			174		NO CORE 0.14m							
					SILTSTONE: dark grey with light grey bands, bedded subhorizontally.	FR	H	0.40				Ashfield Shale
					as above, but bedded at 10°.			1.5				
								1.8				
								2.2				



Borehole No.
3
1 / 3

BOREHOLE LOG

Client: TTW
Project: PROPOSED NEW SCHOOL BUILDING
Location: LORETO NORMANHURST GIRLS SCHOOL, NORMANHURST, NSW

Job No.: 31772L **Method:** SPIRAL AUGER **R.L. Surface:** ~189.6 m
Date: 6/9/18 **Datum:** AHD
Plant Type: JK308 **Logged/Checked By:** A.B./L.S.

Groundwater Record	SAMPLES				Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
	ES	U50	DB	DS										
DRY ON COMPLETION OF AUGERING						189			CH	FILL: Silty sandy clay, low plasticity, dark brown, fine to medium grained, trace fine to medium grained igneous gravel. Silty CLAY; high plasticity, orange brown.	w<PL w>PL	VSt - Hd	440 320 470	GRASS COVER RESIDUAL
					N = 16 3,6,10		1		-	as above, but light grey with fine to coarse grained ironstone gravel, trace of fine to coarse grained very low strength siltstone gravel. Extremely Weathered siltstone: silty CLAY, medium plasticity, light grey, with ironstone and very low to low strength bands.	XW	Hd		ASHFIELD SHALE
						188	2				XW - DW	Hd - VL		VERY LOW TO LOW 'TC' BIT RESISTANCE
						187	3							
						186	4			SILTSTONE: grey brown and dark grey, with iron indurated bands and extremely weathered seams.	DW	VL - L		LOW RESISTANCE
						185	5			REFER TO CORED BOREHOLE LOG				Groundwater monitoring well installed to 12.67m. Class 18 machine slotted 50mm dia. PVC standpipe 6.67m to 12.67m. Casing 0.1m to 6.67m. 2mm sand filter pack 5.70m to 12.67m. Bentonite seal 1.25m to 5.70m. Completed with a concreted gatic cover
						184	6							
						183								

JK 9.01.2.LB.GLB Log JK AUGERHOLE - MASTER 31772L NORMANHURST.GPJ <<DrawingFile>> 25/10/2018 10:27 10.0.000 D:\proj\JK 9.01.2 2018-04-02 Proj JK 9.01.0 2018-03-20

Borehole No.

3

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CORED BOREHOLE LOG

Client: TTW

Project: PROPOSED NEW SCHOOL BUILDING

Location: LORETO NORMANHURST GIRLS SCHOOL, NORMANHURST, NSW

Job No.: 31772L

Core Size: NMLC

R.L. Surface: ~189.6 m

Date: 6/9/18

Inclination: VERTICAL

Datum: AHD

Plant Type: JK308

Bearing: N/A

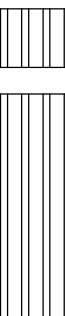
Logged/Checked By: A.B./L.S.

Water Loss/Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX I _s (50)	SPACING (mm)	DEFECT DETAILS		Formation
										DESCRIPTION Type, orientation, defect roughness and shape, defect coatings and seams, openness and thickness	Specific	
					START CORING AT 4.34m							
					NO CORE 0.52m							
		185										
			5		SILTSTONE: light grey.	XW	Hd					
					SILTSTONE: dark grey, with iron indurated bands, bedded subhorizontally.	MW	VL - L					
											(5.02m) J, 90°, P, S, Fe Sn	
											(5.16m) Be, 0°, P, S, Fe Sn	
											(5.23m) Be, 0°, P, S, Fe Sn	
											(5.38m) XWS, 0°, 12 mm.t	
											(5.45m) CS, 0°, 4 mm.t	
											(5.49m) Be, 0°, P, S, Fe Sn	
											(5.60m) J, 90°, P, S, Fe Sn	
											(5.68m) J, 60°, P, R, Fe Sn	
											(5.73m) J, 90°, P, R, Cn	
											(5.76m) CS, 0°, 3 mm.t	
											(5.78m) CS, 0°, 2 mm.t	
											(5.91m) J, 60°, P, S, Fe Sn	
											(6.02m) CS, 0°, 20 mm.t	
											(6.10m) Be, 0°, P, S, Fe Sn	
											(6.18m) XWS, 0°, 30 mm.t	
											(6.30m) J, 20°, P, R, Cn	
											(6.32m) CS, 0°, 5 mm.t	
											(6.36m) J, 90°, P, S, Cn	
											(6.41m) XWS, 0°, 30 mm.t	
											(6.58m) J, 90°, P, S, Fe Sn	
											(6.70m) J, 90°, P, S, Fe Sn	
											(6.90m) J, 90°, P, R, Cn	
											(7.02m) XWS, 0°, 30 mm.t	
											(7.07m) XWS, 0°, 10 mm.t	
					NO CORE 0.37m							
		182										
			8		SILTSTONE: dark grey with light grey bands, bedded subhorizontally.	MW	L - M					
											(7.51m) Be, 0°, P, S, Fe Sn	
											(7.60m) Healed J, 70-80°, P	
											(7.85m) J, 90°, P, S, Fe Sn	
											(8.03m) J, 90°, P, S, Fe Sn	
											(8.13m) J, 20°, P, S, Fe Sn	
											(8.24m) J, 60°, P, S, Fe Sn	
											(8.32m) J, 90°, P, R, Cn	
											(8.42m) J, 90°, P, R, Cn	
											(8.50m) J, 10°, P, S, Fe Sn	
											(8.67m) J, 60°, P, S, Cn	
											(8.73m) J, 10°, P, S, Cn	
											(8.76m) XWS, 0°, 4 mm.t	
											(8.83m) Healed J, 90°, P	
											(8.88m) XWS, 0°, 25 mm.t	
											(8.96m) XWS, 0°, 10 mm.t	
											(9.02m) J, 30°, P, S, Cn	
											(9.04m) Be, 0°, P, S, Cn	
											(9.12m) J, 90°, P, S, Cn	
											(9.30m) J, 90°, P, S, Cn	
											(9.38m) Healed J, 40°, P	
											(9.42m) J, 50°, P, R, Cn, XWS FILLED	
											(9.45m) Healed J, 40°, P	
											(9.57m) J, 90°, P, R, Cn	
											(9.86m) Healed J, 80°-90°, Un	
											(9.88m) J, 30°, P, R, Fe Sn	
											(9.99m) J, 30°, P, S, Fe Sn	
					NO CORE 0.16m							
					SILTSTONE: dark grey, bedded subhorizontally.	MW	L					
											(10.27m) J, 60°-90°, Un, R, Fe Sn	
											(10.37m) J, 30°, P, S, Fe Sn	
											(10.43m) CS, 0°, 2 mm.t	
											(10.46m) J, 90°, P, R, Cn	
											(10.52m) XWS, 0°, 50 mm.t	
											(10.57m) J, 10°, P, S, Cn	
											(10.81m) J, 90°, P, S, Fe Sn	
											(10.92m) J, 80°, P, R, Cn	
		179										

CORED BOREHOLE LOG

Client: TTW
Project: PROPOSED NEW SCHOOL BUILDING
Location: LORETO NORMANHURST GIRLS SCHOOL, NORMANHURST, NSW

Job No.: 31772L **Core Size:** NMLC **R.L. Surface:** ~189.6 m
Date: 6/9/18 **Inclination:** VERTICAL **Datum:** AHD
Plant Type: JK308 **Bearing:** N/A **Logged/Checked By:** A.B./L.S.

Water Loss/Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_p(50)$	SPACING (mm)	DEFECT DETAILS		Formation
										Specific	General	
100% RETURN		178	12		SILTSTONE: dark grey, bedded subhorizontally.	MW	L - M	0.20	600 200 60 20	(11.12m) XWS, 0°, 25 mm.t (11.20m) J, 80°, P, S, Cn (11.27m) XWS, 0°, 70 mm.t		Ashfield Shale
					NO CORE 0.14m							
					SILTSTONE: dark grey, bedded subhorizontally.	MW	L	0.20		(11.48m) J, 30°, P, S, Cn (11.55m) J, 90°, P, S, Cn (11.62m) J, 60 - 90°, Un, S, Cn		
						XW - HW	Hd - VL					
		177			SILTSTONE: dark grey with light grey bands, bedded at 20°.	SW	M	0.40		(11.98m) J, 20°, P, S, Cn (12.04m) XWS, 0°, 10 mm.t (12.17m) J, 20°, P, S, Cn (12.21m) J, 10°, P, S, Cn (12.25m) J, 20°, P, S, Cn (12.28m) J, 50°, P, S, Cn (12.39m) J, 30°, P, S, Cn (12.48m) J, 10°, P, S, Cn (12.56m) J, 80°, P, S, Cn		
					END OF BOREHOLE AT 12.67 m							
			13									
			176									
			14									
			175									
			15									
			174									
			16									
			173									
			17									
			172									



Borehole No.
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BOREHOLE LOG

Client: TTW
Project: PROPOSED NEW SCHOOL BUILDING
Location: LORETO NORMANHURST GIRLS SCHOOL, NORMANHURST, NSW

Job No.: 31772L **Method:** SPIRAL AUGER **R.L. Surface:** ~186.0 m
Date: 4/9/18 **Datum:** AHD
Plant Type: JK308 **Logged/Checked By:** A.B./L.S.

Groundwater Record	SAMPLES				Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
	ES	U50	DB	DS										
DRY ON COMPLETION OF AUGERING									CI-CH	Silty CLAY: medium to high plasticity, orange brown.	w<PL	Hd		RESIDUAL
									CH	Silty CLAY: high plasticity, light grey, trace fine to medium grained ironstone gravel.			>600 >600	
					N = 25 6,9,16	185	1		-	Extremely Weathered siltstone: silty CLAY, medium plasticity, light grey with ironstone bands and low strength bands.	XW	Hd		ASHFIELD SHALE VERY LOW 'TC' BIT RESISTANCE
						184	2							
						183	3			SILTSTONE: dark grey, with iron indurated bands.	DW	VL - L		LOW TO MODERATE RESISTANCE
						182	4			REFER TO CORED BOREHOLE LOG				
						181	5							
						180	6							

JK 9.01.2.LB.GLB Log JK AUGERHOLE - MASTER 31772L NORMANHURST.GPJ <<DrawingFile>> 25/10/2018 10:27 10.0.000 D:\gel\Lab and In Situ Tool - DGD (Lib JK 9.01.2 2018-04-02 Proj JK 9.01.0 2018-03-20)

Borehole No.

4

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CORED BOREHOLE LOG

Client: TTW

Project: PROPOSED NEW SCHOOL BUILDING

Location: LORETO NORMANHURST GIRLS SCHOOL, NORMANHURST, NSW

Job No.: 31772L

Core Size: NMLC

R.L. Surface: ~186.0 m

Date: 4/9/18

Inclination: VERTICAL

Datum: AHD

Plant Type: JK308

Bearing: N/A

Logged/Checked By: A.B./L.S.

Water Loss/Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_p(50)$	SPACING (mm)	DEFECT DETAILS		Formation
										Specific	General	
					START CORING AT 3.20m							
					NO CORE 0.20m							
					SILTSTONE: dark grey, with iron indurated bands, bedded subhorizontally.	HW	VL - L	0.070 0.10 0.20		(3.46m) Be, 0°, P, R, Fe Sn (3.50m) CS, 0°, 35 mm.t (3.55m) J, 90°, P, R, Cn (3.60m) XWS, 0°, 20 mm.t (3.75m) XWS, 0°, 130 mm.t (3.91m) XWS, 0°, 70 mm.t (4.03m) XWS, 0°, 100 mm.t (4.12m) Be, 0°, P, S, Cn		Ashfield Shale
					NO CORE 0.69m							
					SILTSTONE: dark grey, bedded subhorizontally.	HW	VL - L	0.40		(4.90m) XWS, 0°, 50 mm.t (4.97m) J, 20°, P, S, Fe Sn (5.05m) XWS, 0°, 15 mm.t (5.17m) FRAGMENTED ZONE, 0°, 200mm.t (5.31m) J, 90°, P, R, Cn		Ashfield Shale
						XW	Hd					
						HW	L	0.20		(5.70m) XWS, 0°, 20 mm.t (5.75m) J, 90°, P, R, Cn (5.82m) J, 80°, P, S, Fe Sn (5.92m) J, 90°, P, S, Fe Sn (5.97m) XWS, 0°, 20 mm.t (6.08m) XWS, 0°, 10 mm.t (6.13m) Be, 0°, P, R, Fe Sn (6.21m) J, 90°, P, R, Cn (6.32m) FRAGMENTED ZONE, 0°, 170mm.t (6.49m) CS, 0°, 150 mm.t		
					NO CORE 0.36m			0.30				
					SILTSTONE: dark grey, bedded subhorizontally.	HW	L	0.40 0.20		(7.05m) FRAGMENTED ZONE, 0°, 100mm.t (7.18m) Be, 0°, P, S, Fe Sn (7.24m) J, 90°, P, R, Cn (7.32m) CS, 0°, 20 mm.t (7.38m) XWS, 0°, 70 mm.t (7.43m) J, 30°, P, S, Fe Sn (7.48m) Be, 0°, P, S, Fe Sn (7.51m) XWS, 0°, 5 mm.t (7.69m) J, 90°, P, R, Clay FILLED (7.77m) J, 90°, P, R, Fe Sn (7.87m) J, 90°, P, S, XWS, Clay FILLED (7.96m) XWS, 0°, 70 mm.t (8.13m) J, 40°, P, R, Fe Sn (8.22m) XWS, 0°, 120 mm.t		Ashfield Shale
					NO CORE 0.23m							
					SILTSTONE: dark grey, bedded subhorizontally.	HW	M	0.60 0.70		(8.62m) J, 90°, P, R, Fe Sn, FRAGMENTING (8.81m) XWS, 0°, 15 mm.t (8.97m) J, 90°, P, R, Fe Sn, FRAGMENTING (9.03m) XWS, 0°, 3 mm.t (9.17m) CS, 0°, 3 mm.t (9.29m) Be, 0°, P, R, Fe, XWS, FILLED		Ashfield Shale
					SANDSTONE: fine grained, grey, bedded subhorizontally.	SW	M	0.50		(9.48m) XWS, 0°, 10 mm.t (9.51m) J, 90°, P, S, Cn (9.61m) Be, 0°, P, S, Fe Sn		
					as above, but fine to medium grained, light grey with dark grey bands, bedded subhorizontally.	FR	H	2.3				

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FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JK 9.01.2 LIB GLB Log JK CORED BOREHOLE - MASTER 31772L NORMANHURST.GPJ <<DrawingFile>> 25/10/2018 10:27 10.0.000 Dated Log and In Situ Tool - DGD | Lib JK 9.01.2 2018-04-02 Proj JK 9.01.0 2018-03-20



Borehole No.

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CORED BOREHOLE LOG

Client: TTW
Project: PROPOSED NEW SCHOOL BUILDING
Location: LORETO NORMANHURST GIRLS SCHOOL, NORMANHURST, NSW

Job No.: 31772L **Core Size:** NMLC **R.L. Surface:** ~186.0 m
Date: 4/9/18 **Inclination:** VERTICAL **Datum:** AHD
Plant Type: JK308 **Bearing:** N/A **Logged/Checked By:** A.B./L.S.

Water Loss/Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_p(50)$	DEFECT DETAILS		Formation
									SPACING (mm)	DESCRIPTION Type, orientation, defect roughness and shape, defect coatings and seams, openness and thickness	
								VL-0.1 L-0.3 M-1 H-3 VH-10 EH	600 200 60 20	Specific General	
50% RETURN		175	11		SANDSTONE: fine to medium grained, light grey with dark grey bands, bedded subhorizontally.	FR	H	1.8 1.0 1.2			Hawkesbury Sandstone
		174	12		END OF BOREHOLE AT 11.28 m						
		173	13								
		172	14								
		171	15								
		170	16								

JK 9.01.2 LIB.GLB Log JK CORED BOREHOLE - MASTER 31772L NORMANHURST.GPJ <<DrawingFile>> 25/10/2018 10:27 10.0.000 Dated Log and In Situ Tool - DGD | Lib JK 9.01.2 2018-04-02 Proj JK 9.01.0 2018-03-20



Borehole No.
5
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BOREHOLE LOG

Client: TTW
Project: PROPOSED NEW SCHOOL BUILDING
Location: LORETO NORMANHURST GIRLS SCHOOL, NORMANHURST, NSW

Job No.: 31772L **Method:** SPIRAL AUGER **R.L. Surface:** ~188.4 m
Date: 4/9/18 **Datum:** AHD
Plant Type: JK308 **Logged/Checked By:** A.B./L.S.

Groundwater Record	SAMPLES				Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
	ES	U50	DB	DS										
DRY ON COMPLETION OF AUGERING						188			CI-CH	TOPSOIL: Silty clay, low plasticity, brown, trace of root fibres.	w<PL			
										Silty CLAY: medium to high plasticity, orange brown, trace of fine to coarse grained ironstone gravel.	w<PL	Hd		RESIDUAL
					N > 16 8,16/ 150mm REFUSAL		1		-	Extremely Weathered siltstone: silty CLAY, medium plasticity, light grey with ironstone bands.	XW	Hd	>600 >600	ASHFIELD SHALE
										SILTSTONE: dark grey, with iron indurated bands and extremely weathered seams.	DW	VL - L		VERY LOW 'TC' BIT RESISTANCE
							2					L - M		MODERATE RESISTANCE
						186								
							3			REFER TO CORED BOREHOLE LOG				
						185								
							4							
						184								
							5							
						183								
							6							
						182								

JK 9.01.2 LIB.GLB Log JK AUGERHOLE - MASTER 31772L NORMANHURST.GPJ <<DrawingFile>> 25/10/2018 10:27 10.0.000 D:\gel\lib and in situ Tool - DGD (Lib JK 9.01.2 2018-04-02 Proj JK 9.01.0 2018-03-20)

CORED BOREHOLE LOG

Client: TTW
Project: PROPOSED NEW SCHOOL BUILDING
Location: LORETO NORMANHURST GIRLS SCHOOL, NORMANHURST, NSW

Job No.: 31772L **Core Size:** NMLC **R.L. Surface:** ~188.4 m
Date: 4/9/18 **Inclination:** VERTICAL **Datum:** AHD
Plant Type: JK308 **Bearing:** N/A **Logged/Checked By:** A.B./L.S.

Water Loss/Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_p(50)$	SPACING (mm)	DEFECT DETAILS		Formation
										Specific	General	
		186			START CORING AT 2.64m							
			3		SILTSTONE: dark grey with light grey orange brown bands, bedded subhorizontally.	MW	L - M	1.3		(2.73m) J, 90°, P, S, Fe Sn (2.97m) J, 80 - 90°, P, S, Fe Sn (3.12m) Be, 0°, P, R, FRAGMENTED FILLED (3.39m) Be, 0°, P, R, FRAGMENTED FILLED (3.44m) XWS, 0°, 3 mm.t (3.53m) J, 40°, P, R, Cn (3.61m) XWS, 0°, 2 mm.t (3.70m) Be, 0°, P, R, Fe Sn (3.82m) CS, 0°, 1 mm.t (3.85m) J, 80°, P, S, Fe Sn (3.92m) J, 10°, P, S, Clay FILLED		
			4					0.030		(4.32m) J, 15°, P, S, Clay FILLED (4.42m) J, 60 - 90°, Un, R, XW and FRAGMENTING (4.54m) CS, 0°, 1 mm.t (4.59m) J, 90°, P, S, Cn (4.75m) J, 20°, P, S, Fe Sn (4.82m) J, 20°, P, S, Fe Cn		
			5					1.2		(5.11m) J, 20°, P, S, Fe Cn (5.32m) J, 20°, P, S, Fe Cn (5.40m) Jx2, 30 - 60°, P, S, Fe Sn (5.45m) Be, 0°, P, S, Fe Sn (5.50m) J, 90°, P, S, Cn (5.57m) Jx2, 20°, P, S, Fe Sn (5.73m) J, 90°, P, R, Cn (5.84m) J, 60 - 90°, Un, S, Fe Sn (5.94m) J, 90°, P, S, Fe Sn		
			6					0.80		(6.18m) J, 10°, P, S, Fe Sn (6.33m) Be, 0°, P, S, Fe Sn (6.39m) CSx4, 5°, 1 mm.t, EACH (6.46m) J, 20 - 40°, Un, S, Fe Sn (6.54m) J, 10°, P, S, Cn (6.58m) J, 10°, P, S, Cn (6.62m) Be, 0°, P, R, Cn (6.67m) XWS, 0°, 2 mm.t (6.78m) J, 90°, P, S, Fe Sn (6.88m) J, 90°, P, S, Cn (7.00m) XWS, 0°, 3 mm.t (7.05m) HEALED J, 30°, P (7.10m) J, 90°, P, R, Cn (7.16m) J, 90°, P, R, Cn (7.23m) J, 20 - 60°, Un, S, Cn (7.29m) Be, 0°, P, S, Cn (7.39m) J, 60 - 90°, Un, S, Fe Sn		
			7					0.20		(7.71m) J, 70°, P, S, Fe Sn (7.81m) J, 30°, P, R, Fe Sn (7.84m) J, 30°, P, R, Fe Sn (7.86m) J, 90°, P, R, Cn (7.90m) J, 30°, P, S, Cn (7.96m) J, 20°, P, S, Fe Sn (8.17m) J, 20°, P, S, Cn (8.21m) J, 90°, P, S, Cn (8.27m) J, 20°, P, S, Cn (8.40m) J, 20°, P, S, Cn		
			8		SILTSTONE: dark grey, bedded subhorizontally.	FR	H	1.3		(8.53m) Be, 0°, P, S, Fe Sn (8.77m) J, 20°, P, S, Cn (8.86m) J, 30°, P, S, Cn (8.92m) J, 50°, P, S, Cn		

CORED BOREHOLE LOG

Client: TTW												
Project: PROPOSED NEW SCHOOL BUILDING												
Location: LORETO NORMANHURST GIRLS SCHOOL, NORMANHURST, NSW												
Job No.: 31772L				Core Size: NMLC				R.L. Surface: ~188.4 m				
Date: 4/9/18				Inclination: VERTICAL				Datum: AHD				
Plant Type: JK308				Bearing: N/A				Logged/Checked By: A.B./L.S.				
Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX I _s (50)	DEFECT DETAILS			Formation
									SPACING (mm)	DESCRIPTION Type, orientation, defect roughness and shape, defect coatings and seams, openness and thickness		
100% RETURN		179	10		SILTSTONE: dark grey, bedded subhorizontally. <i>(continued)</i>	FR	H					

BOREHOLE LOG

Client: TTW
Project: PROPOSED NEW SCHOOL BUILDING
Location: LORETO NORMANHURST GIRLS SCHOOL, NORMANHURST, NSW

Job No.: 31772L **Method:** SPIRAL AUGER **R.L. Surface:** ~191.0 m
Date: 7/9/18 **Datum:** AHD
Plant Type: JK308 **Logged/Checked By:** A.B./L.S.

Groundwater Record	SAMPLES				Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
	ES	U50	DB	DS										
DRY ON COMPLETION OF AUGERING					N = 27 5.9, 18					FILL: Silty clay, low plasticity, dark brown, trace fine to medium grained sand and root fibres.	w<PL			
									CH	Silty CLAY: high plasticity, orange brown, trace fine to coarse grained ironstone gravel.	w>PL	Hd		RESIDUAL
						190	1		-	SILTSTONE: light grey and dark grey, with ironstone bands.	XW - DW	Hd - VL	580 500	ASHFIELD SHALE
						189	2							
						188	3				DW	VL - L		VERY LOW 'TC' BIT RESISTANCE WITH MODERATE BANDS
						187	4					L		LOW TO MODERATE RESISTANCE
						186	5			REFER TO CORED BOREHOLE LOG				Groundwater monitoring well installed to 14.0m. Class 18 machine slotted 50mm dia. PVC standpipe 8.0m to 14.0m. Casing 0.15m to 8.0m. 2mm sand filter pack 7.5m to 14.0m. Bentonite seal 4.0m to 7.5m. Backfilled with sand to the surface. Completed with a concreted gatic cover
						185	6							

CORED BOREHOLE LOG

Client: TTW
Project: PROPOSED NEW SCHOOL BUILDING
Location: LORETO NORMANHURST GIRLS SCHOOL, NORMANHURST, NSW

Job No.: 31772L **Core Size:** NMLC **R.L. Surface:** ~191.0 m
Date: 7/9/18 **Inclination:** VERTICAL **Datum:** AHD
Plant Type: JK308 **Bearing:** N/A **Logged/Checked By:** A.B./L.S.

Water Loss/Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION	Weathering	Strength	POINT LOAD STRENGTH INDEX I _s (50)	DEFECT DETAILS		Formation	
									SPACING (mm)	DESCRIPTION		
					Specific	General						
					START CORING AT 4.34m							
100% RETURN	ON 9/10/18		186	5	SILTSTONE: dark grey, with iron indurated bands, bedded subhorizontally.	HW	L	0.10		(4.36m) XWS, 0°, 5 mm.t (4.40m) J, 90°, P, S, Fe Sn (4.44m) CSx2, 0°, 1 mm.t (4.46m) J, 90°, P, S, Cn (4.48m) CS, 0°, 20 mm.t (4.51m) J, 90°, P, S, Cn (4.56m) CS, 0°, 55 mm.t (4.62m) CS, 0°, 3 mm.t (4.65m) J, 90°, P, S, Fe Sn (4.68m) J, 60°, P, S, Fe Sn (4.70m) CS, 0°, 2 mm.t (4.78m) XWS, 0°, 12 mm.t (4.83m) Be, 0°, P, S, Fe Sn (5.04m) XWS, 0°, 10 mm.t (5.09m) J, 90°, P, R, Cn (5.16m) CS, 0°, 1 mm.t (5.39m) CS, 0°, 6 mm.t (5.43m) J, 90°, P, S, Fe Sn (5.50m) CS, 0°, 22 mm.t (5.61m) CS, 0°, 12 mm.t (5.64m) J, 20°, P, S, Fe Sn (5.72m) J, 20°, P, S, Fe Sn (5.82m) CS, 0°, 5 mm.t (5.86m) XWS, 0°, 30 mm.t (5.94m) XWS, 0°, 30 mm.t (5.99m) J, 90°, P, S, Cn (6.06m) J, 90°, P, S, Fe Sn (6.15m) Healed J, 90°, P (6.20m) Be, 0°, P, S, Fe Sn (6.34m) J, 90°, P, S, Cn (6.36m) CS, 0°, 7 mm.t (6.68m) J, 80°, P, R, Fe Sn (6.79m) J, 60 - 90°, Un, R, Fe Sn	Ashfield Shale	
					as above, but with light grey bands.	MW	M	0.50				
							0.40					
							0.40					
							0.90					
							0.90					
							0.30					
							1.1					
					NO CORE 0.22m							
100% RETURN	ON 9/10/18		183	8	SILTSTONE: dark grey with light grey bands, bedded at 20°.	SW	M - H H	0.40		(7.97m) J, 80°, P, S, Cn (8.20m) J, 80°, P, S, Cn (8.30m) J, 90°, P, S, Cn (8.65m) J, 70°, P, S, XW Infill (8.85m) J, 80°, P, S, Cn (9.07m) XWS, 20°, 10 mm.t	Ashfield Shale	
							2.2					
							1.4					
							1.2					
							2.1					
							4.2					
100% RETURN	ON 9/10/18		182	9								
100% RETURN	ON 9/10/18		181	10								

3 / 3

[illegible]

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH101
1/1

Environmental logs are not to be used for geotechnical purposes

Client: TTW

Project: PROPOSED NEW SCHOOL BUILDINGS

Location: LORETO NORMANHURST GIRLS SCHOOL, NORMANHURST, NSW

Job No.: E31772KL

Date: 27/3/19

Plant Type: JK300

Method: SPIRAL AUGER

Logged/Checked by: A.M./T.H.

R.L. Surface: N/A

Datum:

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/Weathering	Strength/Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
						0		-	FILL: Silty clay, low to medium plasticity, dark brown, trace of root fibres.	w>PL			GRASS COVER
						0.5		CH	Silty CLAY: high plasticity, red brown mottled grey, trace of ironstone gravel.				8.6kg BUCKET NO FCF
					N = 20 5,8,12	1			END OF BOREHOLE AT 1.0m				
						1.5							
						2							
						2.5							
						3							
						3.5							

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH102
1/1

Environmental logs are not to be used for geotechnical purposes

Client: TTW

Project: PROPOSED NEW SCHOOL BUILDINGS

Location: LORETO NORMANHURST GIRLS SCHOOL, NORMANHURST, NSW

Job No.: E31772KL

Date: 27/3/19

Plant Type: JK300

Method: SPIRAL AUGER

Logged/Checked by: A.M./T.H.

R.L. Surface: N/A

Datum:

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0		-	FILL: Silty clay, low to medium plasticity, dark brown, trace of root fibres.	w>PL			GRASS COVER 8.6kg BUCKET NO FCF
						0.5		CI-CH	Silty CLAY: medium to high plasticity, grey.	w<PL			
						N > 8 7,8/50mm REFUSAL			-	Extremely Weathered siltstone: silty CLAY, low to medium plasticity, light grey, with ironstone and siltstone bands.	XW		
						1			END OF BOREHOLE AT 1.0m				
						1.5							
						2							
						2.5							
						3							
						3.5							

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH103
1/1

Environmental logs are not to be used for geotechnical purposes

Client: TTW

Project: PROPOSED NEW SCHOOL BUILDINGS

Location: LORETO NORMANHURST GIRLS SCHOOL, NORMANHURST, NSW

Job No.: E31772KL

Method: SPIRAL AUGER

R.L. Surface: N/A

Date: 27/3/19

Datum:

Plant Type: JK300

Logged/Checked by: A.M./T.H.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0		-	FILL: Gravelly sand, fine to medium grained, brown, fine to medium grained ironstone, trace of ironstone gravel and siltstone fragments. Extremely Weathered siltstone: silty CLAY, low to medium plasticity, light grey, with ironstone and siltstone bands.	M			12.4kg BUCKET NO FCF ASHFIELD SHALE
						0.5		-		XW			
						1			END OF BOREHOLE AT 0.7m				
						1.5							
						2							
						2.5							
						3							
						3.5							

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH104
1/1

Environmental logs are not to be used for geotechnical purposes

Client:TTW

Project:PROPOSED NEW SCHOOL BUILDINGS

Location:LORETO NORMANHURST GIRLS SCHOOL, NORMANHURST, NSW

Job No.: E31772KL

Date: 27/3/19

Plant Type: JK300

Method: SPIRAL AUGER

Logged/Checked by: A.M./T.H.

R.L. Surface: N/A

Datum:

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0		-	ASPHALTIC CONCRETE: 30mm.t.	M			10.1kg BUCKET NO FCF
						0.5		-	FILL: Silty gravelly sand, fine to coarse grained, brown, fine to coarse grained grey igneous gravel.	w>PL			10kg BUCKET NO FCF
								CH	Silty CLAY: high plasticity, light grey, trace of ironstone gravel.	w>PL			RESIDUAL
						1		-	Extremely Weathered siltstone: silty CLAY, medium plasticity, grey, with ironstone bands.	XW			ASHFIELD SHALE
						1.5			END OF BOREHOLE AT 1.5m				
						2							
						2.5							
						3							
						3.5							

N > 16
4,8,8/
100mm

REFUSAL

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH105
1/1

Environmental logs are not to be used for geotechnical purposes

Client: TTW Project: PROPOSED NEW SCHOOL BUILDINGS Location: LORETO NORMANHURST GIRLS SCHOOL, NORMANHURST, NSW													
Job No.: E31772KL Date: 27/3/19 Plant Type: JK300			Method: SPIRAL AUGER Logged/Checked by: A.M./T.H.				R.L. Surface: N/A Datum:						
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/Weathering	Strength/Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION	ES	ASS	ASB	SAL	DB	0 0.5		-	ASPHALTIC CONCRETE: 50mm.t.				9.7kg BUCKET NO FCF 10.3kg BUCKET NO FCF
									FILL: Silty gravelly sand, fine to coarse grained, dark grey, fine to medium grained igneous gravel. FILL: Gravelly sand, fine to coarse grained, light brown, fine to coarse grained grey igneous gravel, trace of concrete, ironstone gravel and slag.				
						1			END OF BOREHOLE AT 0.6m				'TC' BIT REFUSAL ON OBSTRUCTION IN FILL
						1.5							
						2							
						2.5							
						3							
						3.5							

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH106
1/1

Environmental logs are not to be used for geotechnical purposes

Client: TTW

Project: PROPOSED NEW SCHOOL BUILDINGS

Location: LORETO NORMANHURST GIRLS SCHOOL, NORMANHURST, NSW

Job No.: E31772KL

Date: 27/3/19

Plant Type: JK300

Method: SPIRAL AUGER

Logged/Checked by: A.M./T.H.

R.L. Surface: N/A

Datum:

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL DB									
DRY ON COMPLETION						0		-	ASPHALTIC CONCRETE: 30mm.t. FILL: Silty gravelly sand, fine to coarse grained brown, fine to medium grained grey igneous gravel, trace of ironstone and siltstone gravel.	M			12.4kg BUCKET NO FCF
						0.5			END OF BOREHOLE AT 0.4m				'TC' BIT REFUSAL ON OBSTRUCTION IN FILL
						1							
						1.5							
						2							
						2.5							
						3							
						3.5							

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH107
1/1

Environmental logs are not to be used for geotechnical purposes

Client: TTW

Project: PROPOSED NEW SCHOOL BUILDINGS

Location: LORETO NORMANHURST GIRLS SCHOOL, NORMANHURST, NSW

Job No.: E31772KL

Date: 27/3/19

Plant Type: JK300

Method: SPIRAL AUGER

Logged/Checked by: A.M./T.H.

R.L. Surface: N/A

Datum:

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0		-	FILL: Silty sandy clay, low to medium plasticity, brown, trace of ironstone gravel, root fibres and ash.	w>PL			GRASS COVER 9.8kg BUCKET NO FCF
						0.5		CI-CH	Silty CLAY: medium to high plasticity, red brown mottled orange brown, trace of ironstone gravel and ash.	w>PL			RESIDUAL
					N = 7 2,4,3	1			END OF BOREHOLE AT 1.0m				
						1.5							
						2							
						2.5							
						3							
						3.5							

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH108
1/1

Environmental logs are not to be used for geotechnical purposes

Client: TTW

Project: PROPOSED NEW SCHOOL BUILDINGS

Location: LORETO NORMANHURST GIRLS SCHOOL, NORMANHURST, NSW

Job No.: E31772KL

Date: 28/3/19

Plant Type: JK350

Method: SPIRAL AUGER

Logged/Checked by: A.M./T.H.

R.L. Surface: N/A

Datum:

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/Weathering	Strength/Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0		-	ASPHALTIC CONCRETE: 50mm.t. FILL: Silty clay, low to medium plasticity, grey, with asphalt.	w<PL			12.3kg BUCKET NO FCF
						0.5		CI-CH	Silty CLAY: medium to high plasticity, red brown mottled orange brown, trace of ironstone gravel.	w>PL			RESIDUAL
						1			END OF BOREHOLE AT 1.0m				
						1.5							
						2							
						2.5							
						3							
						3.5							

N = 17
5,7,10

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH109
1/1

Environmental logs are not to be used for geotechnical purposes

Client: TTW

Project: PROPOSED NEW SCHOOL BUILDINGS

Location: LORETO NORMANHURST GIRLS SCHOOL, NORMANHURST, NSW

Job No.: E31772KL

Date: 27/3/19

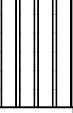
Plant Type: JK300

Method: SPIRAL AUGER

Logged/Checked by: A.M./T.H.

R.L. Surface: N/A

Datum:

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/Weathering	Strength/Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0		-	ASPHALTIC CONCRETE: 50mm.t.	M			4.7kg BUCKET NO FCF
						0.5		CL-CI	FILL: Sandy gravel, fine to medium grained, dark grey, igneous gravel, fine to medium grained, brown, trace of asphalt. Silty CLAY: low to medium plasticity, grey mottled red brown, trace of root fibres.	w>PL			RESIDUAL
						1		-	Extremely Weathered siltstone: silty CLAY, low to medium plasticity, with ironstone and siltstone bands.	w<PL			ASHFIELD SHALE
						1.5			END OF BOREHOLE AT 1.5m				
						2							
						2.5							
						3							
						3.5							

N = 7
2,3,4

Environmental logs are not to be used for geotechnical purposes

Client: TTW Project: PROPOSED NEW SCHOOL BUILDINGS Location: LORETO NORMANHURST GIRLS SCHOOL, NORMANHURST, NSW																
Job No.: E31772KL Method: HAND AUGER R.L. Surface: N/A																
Date: 28/3/19 Datum:																
Plant Type: N/A Logged/Checked by: A.M./T.H.																
Groundwater Record	ES	ASS	ASS	SAMPLES	ASS	SAL	DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/Weathering	Strength/Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
									0		-	FILL: Silty sandy clay, low to medium plasticity, brown, grey and orange brown, trace of igneous, ironstone and sandstone gravel and ash.	w≈PL			GRASS COVER 11kg BUCKET NO FCF
									0.5			END OF BOREHOLE AT 0.5m				HAND AUGER REFUSAL
									1							
									1.5							
									2							
									2.5							
									3							
									3.5							

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH111
1/2

Environmental logs are not to be used for geotechnical purposes

Client: TTW Project: PROPOSED NEW SCHOOL BUILDINGS Location: LORETO NORMANHURST GIRLS SCHOOL, NORMANHURST, NSW															
Job No.: E31772KL Date: 28/3/19 Plant Type: JK350			Method: SPIRAL AUGER Logged/Checked by: A.M./T.H.				R.L. Surface: N/A Datum:								
Groundwater Record	ES	ASS	ASB	SAL	DB	SAMPLES	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/Weathering	Strength/Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION								0		-	ASPHALTIC CONCRETE: 160mm.t.				
								0.5		-	FILL: Sandy gravel, fine to medium grained, grey, fine to coarse grained igneous gravel.	W			9.6kg BUCKET NO FCF
							N = 8 3,4,4				FILL: Silty clay, low to medium plasticity, brown, trace of ironstone gravel and ash.	w>PL			4kg BUCKET NO FCF
								1	CI-CH		Silty CLAY: medium to high plasticity, red brown mottled grey.	w<PL			RESIDUAL
							N = 10 3,5,5	1.5							
								2							
								2.5							
								3		-	Extremely Weathered siltstone: silty CLAY, low to medium plasticity, brown and grey	XW			ASHFIELD SHALE
								3.5							

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH111
2/2

Environmental logs are not to be used for geotechnical purposes

Client: TTW

Project: PROPOSED NEW SCHOOL BUILDINGS

Location: LORETO NORMANHURST GIRLS SCHOOL, NORMANHURST, NSW

Job No.: E31772KL

Date: 28/3/19

Plant Type: JK350

Method: SPIRAL AUGER

Logged/Checked by: A.M./T.H.

R.L. Surface: N/A

Datum:

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/Weathering	Strength/Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION									as above.	XW			
								END OF BOREHOLE AT 6.0m					GROUNDWATER MONITORING WELL INSTALLED TO 5.7m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 5.7m TO 2.7m. CASING 2.7m TO 0m SURFACE. 2mm SAND FILTER PACK 5.2m TO 2.1m. BENTONITE SEAL 2.1m TO 0.5m. BACKFILLED WITH SAND TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH112
1/1

Environmental logs are not to be used for geotechnical purposes

Client: TTW

Project: PROPOSED NEW SCHOOL BUILDINGS

Location: LORETO NORMANHURST GIRLS SCHOOL, NORMANHURST, NSW

Job No.: E31772KL

Date: 27/3/19

Plant Type: JK300

Method: SPIRAL AUGER

Logged/Checked by: A.M./T.H.

R.L. Surface: N/A

Datum:

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/Weathering	Strength/Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0		-	FILL: Silty clay, low to medium plasticity, brown, trace of ironstone and siltstone gravel and ash.	w>PL			GRASS COVER 10kg BUCKET NO FCF
						0.5		CI-CH	Silty CLAY: medium to high plasticity, red brown mottled grey, trace of ironstone gravel.	w>PL			RESIDUAL
					N = 9 3,4,5	1			END OF BOREHOLE AT 1.0m				
						1.5							
						2							
						2.5							
						3							
						3.5							

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH113
1/1

Environmental logs are not to be used for geotechnical purposes

Client: TTW

Project: PROPOSED NEW SCHOOL BUILDINGS

Location: LORETO NORMANHURST GIRLS SCHOOL, NORMANHURST, NSW

Job No.: E31772KL

Date: 27/3/19

Plant Type: JK300

Method: SPIRAL AUGER

Logged/Checked by: A.M./T.H.

R.L. Surface: N/A

Datum:

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/Weathering	Strength/Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0		-	FILL: Silty clay, low to medium plasticity, brown, trace of ironstone gavel, root fibres and ash.	w>PL			GRASS COVER 10kg BUCKET NO FCF
						0.5		CI-CH	Silty CLAY: medium to high plasticity, grey mottled orange brown, trace of root fibres.	w>PL			RESIDUAL
					N = 7 3,3,4	1			END OF BOREHOLE AT 1.0m				
						1.5							
						2							
						2.5							
						3							
						3.5							

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH114
1/1

Environmental logs are not to be used for geotechnical purposes

Client: TTW Project: PROPOSED NEW SCHOOL BUILDINGS Location: LORETO NORMANHURST GIRLS SCHOOL, NORMANHURST, NSW															
Job No.: E31772KL Date: 28/3/19 Plant Type: JK350			Method: SPIRAL AUGER Logged/Checked by: A.M./T.H.				R.L. Surface: N/A Datum:								
Groundwater Record	ES	ASS	ASB	SAL	DB	SAMPLES	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/Weathering	Strength/Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION							N = 6 2,3,3	0		-	CONCRETE: 120mm.t.	W w>PL			2kg BUCKET NO FCF RESIDUAL
								0.5		CI-CH	FILL: Sandy gravel, fine to coarse grained, dark grey, fine to medium grained igneous gravel. Silty CLAY: medium to high plasticity, red brown mottled grey.				
							N = 4 1,2,2	1			Silty CLAY: medium to high plasticity, grey, with siltstone banding.				
							1.5				END OF BOREHOLE AT 1.5m				
								2							
								2.5							
								3							
								3.5							

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH115
1/1

Environmental logs are not to be used for geotechnical purposes

Client: TTW

Project: PROPOSED NEW SCHOOL BUILDINGS

Location: LORETO NORMANHURST GIRLS SCHOOL, NORMANHURST, NSW

Job No.: E31772KL

Date: 28/3/19

Plant Type: JK350

Method: SPIRAL AUGER

Logged/Checked by: A.M./T.H.

R.L. Surface: N/A

Datum:

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0		-	CONCRETE: 90mm.t.	w<PL			10.3kg BUCKET NO FCF
						0.5		-	FILL: Silty clay, low to medium plasticity, brown, trace of igneous and ironstone gravel and ash.				
							1		CI-CH	Silty CLAY: medium to high plasticity, red brown mottled grey, trace of ironstone gravel.	w>PL		
						1.5			END OF BOREHOLE AT 1.5m				
						2							
						2.5							
						3							
						3.5							

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH116
1/1

Environmental logs are not to be used for geotechnical purposes

Client:TTW

Project:PROPOSED NEW SCHOOL BUILDINGS

Location:LORETO NORMANHURST GIRLS SCHOOL, NORMANHURST, NSW

Job No.: E31772KL

Date: 28/3/19

Plant Type: JK350

Method: SPIRAL AUGER

Logged/Checked by: A.M./T.H.

R.L. Surface: N/A

Datum:

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0		-	ASPHALTIC CONCRETE: 50mm.t.	D			10kg BUCKET NO FCF
						0.5		-	FILL: Gravelly sand, fine to medium grained, brown, fine to medium grained igneous gravel.				
						N = 3 2,1,2			FILL: Silty clay, low to medium plasticity, yellow brown, trace of ironstone gravel.	w<PL			10.1kg BUCKET NO FCF
						N = 8 1,1,7			Extremely Weathered siltstone: silty CLAY, low to medium plasticity, brown.	XW			ASHFIELD SHALE
						2.5			END OF BOREHOLE AT 2.5m				
						3							
						3.5							

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH117
1/1

Environmental logs are not to be used for geotechnical purposes

Client: TTW

Project: PROPOSED NEW SCHOOL BUILDINGS

Location: LORETO NORMANHURST GIRLS SCHOOL, NORMANHURST, NSW

Job No.: E31772KL

Date: 28/3/19

Plant Type: JK350

Method: SPIRAL AUGER

Logged/Checked by: A.M./T.H.

R.L. Surface: N/A

Datum:

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL DB									
DRY ON COMPLETION						0		-	CONCRETE: 130mm.t.				10kg BUCKET NO FCF
					N = 6 3,3,3	0.5		-	FILL: Gravelly sand, fine to coarse grained, brown, fine to medium grained, igneous gravel. FILL: Silty clay, low to medium plasticity, brown, trace of ironstone gravel and ash.	W w>PL			
					N = 20 5,6,14	1		CI-CH	Silty CLAY: medium to high plasticity, red brown mottled grey, trace of ironstone gravel.	w<PL			
						1.5			END OF BOREHOLE AT 1.5m				
						2							
						2.5							
						3							
						3.5							

BOREHOLE LOG

Client: LORETO NORMANHURST
Project: PROPOSED CARPARKS P3, P4A, P1A & THROUGH LINK
Location: LORETO NORMANHURST SCHOOL, NORMANHURST, NSW

Job No.: 31772L2 **Method:** SPIRAL AUGER **R.L. Surface:** ~179.6 m
Date: 4/11/20 **Datum:** AHD
Plant Type: JK305 **Logged/Checked By:** J.L./L.S.

Groundwater Record	SAMPLES				Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
	ES	U50	DB	DS										
DRY ON COMPLETION OF AUGERING										ASPHALTIC CONCRETE: 35mm.t	D			APPEARS WELL COMPACTED
					N = 11 5,5,6	179	1		-	FILL: Silty sand, fine grained, light brown, with fine to coarse grained igneous, ironstone gravel, trace of wood fragments and clay fines. FILL: Silty clay, medium to high plasticity, brown and grey, trace of fine to coarse grained ironstone and siltstone gravel.	w-PL		590 >600 >600	
					N = 13 5,5,8	178	2		CH	Silty CLAY: high plasticity, red brown and grey brown, trace of fine grained ironstone gravel.	w>PL	VSt - Hd	390 450 580	RESIDUAL
						177	3		-	SILTSTONE: grey and brown, with occasional ironstone bands.	DW	VL - L		ASHFIELD SHALE
						176	4					L		VERY LOW TO LOW 'TC' BIT RESISTANCE WITH MODERATE BANDS
						175	5			REFER TO CORED BOREHOLE LOG				GROUNDWATER MONITORING WELL INSTALLED TO 9.57m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 3.97m TO 9.57m. CASING 3.97m TO 0.08m. 2mm SAND FILTER PACK 3.2m TO 9.57m. BENTONITE SEAL 0.15m TO 3.2m. COMPLETED WITH A CONCRETED GATIC COVER.
						174	6							
						173								

CORED BOREHOLE LOG

Client: LORETO NORMANHURST
Project: PROPOSED CARPARKS P3, P4A, P1A & THROUGH LINK
Location: LORETO NORMANHURST SCHOOL, NORMANHURST, NSW

Job No.: 31772L2 **Core Size:** NMLC **R.L. Surface:** ~179.6 m
Date: 4/11/20 **Inclination:** VERTICAL **Datum:** AHD
Plant Type: JK305 **Bearing:** N/A **Logged/Checked By:** J.L./L.S.

Water Loss/Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_p(50)$	SPACING (mm)	DEFECT DETAILS		Formation
										Specific	General	
					START CORING AT 4.29m							
		175	5		SILTSTONE: grey, with light grey and orange brown laminae, bedded at 0-15°.	HW	VL - L	0.60		(4.38m) CS, 5°, 35 mm.t (4.47m) CS, 5°, 20 mm.t (4.59m) XWS, 5°, 15 mm.t (4.63m) XWS, 5°, 20 mm.t (4.76m) XWS, 0°, 55 mm.t (4.86m) CS, 5°, 40 mm.t (4.90m) J, 80°, P, R, Fe Sn (4.96m) CS, 5°, 20 mm.t (5.05m) XWS, 0°, 10 mm.t (5.18m) Be, 0°, P, R, Fe Sn		Ashfield Shale
		174	6			MW	M	0.10		(5.60m) XWS, 0 - 30°, 20 mm.t (5.63m) J, 30°, P, R, Fe Sn (5.87m) CS, 5°, 10 mm.t		
		173	7					0.70		(6.42m) XWS, 0°, 20 mm.t (6.62m) XWS, 0°, 60 mm.t		
		172	8					0.40		(6.89m) XWS, 0°, 40 mm.t (7.00m) XWS, 0°, 40 mm.t (7.12m) Cr, 5°, 35 mm.t (7.30m) J, 60°, Ir, R, Fe Sn (7.47m) Be, 5°, P, R, Fe Sn (7.51m) Be, 5°, P, R, Fe Sn (7.57m) XWS, 5°, 15 mm.t (7.65m) XWS, 5°, 10 mm.t		
		171	9			SW		0.80		(7.84m) Be, 5°, P, R, Fe Sn (7.92m) Be, 10°, P, R, Fe Sn (8.02m) XWS, 5°, 30 mm.t (8.06m) XWS, 10°, 15 mm.t (8.10m) Be, 10°, P, R, Fe Sn (8.28m) XWS, 5°, 10 mm.t		
		170	10				M - H	0.60		(8.87m) XWS, 5°, 15 mm.t (9.04m) CS, 60°, 2 mm.t (9.19m) Be, 0°, P, R, Fe Sn (9.26m) XWS, 5°, 10 mm.t		
		169			END OF BOREHOLE AT 9.62 m			1.2				
								0.90				
								1.5				

JK 9.02.4 LIB.GLB Log JK AUGERHOLE - MASTER 3177ZL2 NORMANHURST.GPJ <<DrawingFile>> 14/12/2020 14:09 10.01.00.01 Datagel Lab and In Situ Tool - DGD | Lib: JK 9.02.4 2019-05-31 Proj: JK 9.01.0 2018-03-20

CORED BOREHOLE LOG

Client: LORETO NORMANHURST
Project: PROPOSED CARPARKS P3, P4A, P1A & THROUGH LINK
Location: LORETO NORMANHURST SCHOOL, NORMANHURST, NSW

Job No.: 31772L2 **Core Size:** NMLC **R.L. Surface:** ~181.3 m
Date: 3/11/20 **Inclination:** VERTICAL **Datum:** AHD
Plant Type: JK305 **Bearing:** N/A **Logged/Checked By:** J.L./L.S.

Water Loss/Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX I _s (50)	SPACING (mm)			DEFECT DETAILS		Formation	
									600	200	60	20	DESCRIPTION		
													Specific		General
			179		START CORING AT 2.84m										
90% RETURN			178	3	NO CORE 0.86m										
			177	4	SILTSTONE: grey, with light brown and orange brown laminae, bedded at 0-20°.	HW	L - M	0.20				(3.75m) Fragmented, 0 - 5°, 40 mm.t (3.81m) Jh, 30°, C, Fe Sn (3.85m) Be, 20°, P, R, Fe Sn (3.88m) Fragmented, 0 - 10°, 25 mm.t (3.96m) J, 30°, P, R, Fe Sn (4.00m) Fragmented, 0 - 10°, 120 mm.t (4.20m) Fragmented, 0 - 20°, 130 mm.t (4.28m) J, 40°, C, R, Fe Sn (4.35m) Be, 10°, P, R, Fe Sn (4.37m) Be x 2, 20°, P, R, Fe Sn (4.42-4.71m) Fragmented, 0 - 20° (4.72m) Bex 2, 10°, P, R, Fe Sn		Ashfield Shale	
			176	5		SW	M	0.20				(4.87m) Fragmented, 0 - 5°, 50 mm.t, and J, 40°, P, Fe, Sn (5.00m) Cr, 0 - 10°, 50 mm.t (5.16m) CS, 5°, 100 mm.t (5.24m) Cr, 0 - 60°, 50 mm.t, and J, 60°, J, R, Fe, Sn (5.40m) J, 80 - 90°, P, R, Fe Sn (5.53m) J, 35 - 90°, P, R, Fe Sn (5.62m) J, 75°, P, R, Fe Sn (5.67m) Be, 10°, P, R, Fe Sn (5.69m) CS, 5°, 5 mm.t (5.74m) XWS, 10°, 15 mm.t (5.79m) XWS, 75°, 5 mm.t (5.82m) XWS, 15°, 10 mm.t (5.90m) XWS, 10°, 6 mm.t (5.92m) Be, 5°, P, R, Fe Sn (5.97m) Cr, 5°, 15 mm.t (6.01m) Be x 2, 10°, P, R, Fe Sn (6.11m) XWS, 10°, 5 mm.t (6.15m) Be, 5°, P, R, Fe Sn (6.20m) Be, 10°, P, R, Fe Sn (6.28m) Cr, 0 - 5°, 30 mm.t (6.30m) Be, 20°, C, R, Fe Sn (6.39m) Cr, 10°, 30 mm.t (6.53m) J, 30°, P, R, Fe Sn (6.55m) XWS, 10°, 15 mm.t (6.76m) XWS, 5°, 20 mm.t (6.79m) XWS, 10°, 3 mm.t (6.83m) XWS, 10°, 5 mm.t (6.89m) XWS, 20°, 5 mm.t (6.93m) XWS, 20°, 25 mm.t (6.97m) Cr, 10°, 15 mm.t (7.03m) Be, 20°, P, R, Fe Sn (7.06-7.52m) Fragmented, 6 - 10° (7.32m) J, 80°, P, R, Fe Sn (7.67m) Be, 10°, P, R, Fe Sn (7.73m) J, 30°, P, R, Fe Sn (7.89m) Cr, 0 - 5°, 50 mm.t (8.10m) Be, 10°, P, R, Fe Sn			
			175	6			0.50								
			174	7			0.70								
			173	8	SILTSTONE: grey and brown.			0.30							
								3.0							
								0.40							
						END OF BOREHOLE AT 8.65 m									

Borehole No.
203
1 / 2

Client: LORETO NORMANHURST														
Project: PROPOSED CARPARKS P3, P4A, P1A & THROUGH LINK														
Location: LORETO NORMANHURST SCHOOL, NORMANHURST, NSW														
Job No.: 31772L2			Method: SPIRAL AUGER			R.L. Surface: ~179.5 m								
Date: 3/11/20			Datum: AHD											
Plant Type: JK305			Logged/Checked By: J.L./L.S.											
Groundwater Record DRY ON COMPLETION OF AUGERING	SAMPLES				Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
	ES	U50	DB	DS										
				N = 9 7,5,4	179	1			FILL: Silty clay, low plasticity, dark brown and orange brown, trace of fine to coarse grained igneous and ironstone gravel, fine to medium grained sand, roots and root fibres.	w<PL			370 400 230	GRASS COVER APPEARS WELL COMPACTED
									FILL: Silty clay, medium to high plasticity, light grey, orange brown and red brown, trace of fine to medium grained igneous, ironstone and siltstone gravel.	w~PL				
				N = 9 3,5,4	178	2			FILL: Silty clay, high plasticity, grey brown, trace of fine to medium grained ironstone and ash.	w>PL		340 320 330	HP READING ON REMOULDED SAMPLE	
					177	3		CH	Silty CLAY: high plasticity, light grey mottled red brown.	w>PL	St	170 170 160	RESIDUAL	
				N = 11 4,5,6										
					176	4						160 180 190		
					175	5		-	SILTSTONE: brown and grey.	DW	VL - L		ASHFIELD SHALE VERY LOW 'TC' BIT RESISTANCE	
					174						L - M		LOW TO MODERATE RESISTANCE	
					173	6			REFER TO CORED BOREHOLE LOG					

CORED BOREHOLE LOG

Client: LORETO NORMANHURST
Project: PROPOSED CARPARKS P3, P4A, P1A & THROUGH LINK
Location: LORETO NORMANHURST SCHOOL, NORMANHURST, NSW

Job No.: 31772L2 **Core Size:** NMLC **R.L. Surface:** ~179.5 m
Date: 3/11/20 **Inclination:** VERTICAL **Datum:** AHD
Plant Type: JK305 **Bearing:** N/A **Logged/Checked By:** J.L./L.S.

Water Loss/Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_p(50)$	DEFECT DETAILS		Formation
									SPACING (mm)	DESCRIPTION Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness	
								VL-0.1 L-0.3 M-1 H-3 VH-10 EH	600 200 60 20	Specific General	
		174			START CORING AT 5.78m						
			6		NO CORE 0.57m						
		173	7		SILTSTONE: grey, with light grey and orange brown laminae, bedded at 0-20°.	MW	L - M	0.20		(6.40m) Cr, 0 - 5°, 50 mm.t (6.47m) Be, 0°, P, R, Fe Sn (6.54m) Cr, 0°, 40 mm.t (6.69m) CS, 5°, 15 mm.t (6.75m) Cr, 10°, 20 mm.t (6.84-6.93m) Be x 7, 0 - 10°, P, R, Fe Sn (6.95m) CS, 5°, 45 mm.t (7.06m) Cr, 0 - 5°, 100 mm.t (7.12-7.30m) Be x 6, 0 - 5°, P, R, Fe Sn (7.33m) XWS, 0°, 20 mm.t (7.45m) Cr, 0 - 5°, 120 mm.t	Ashfield Shale
		172	8					0.40		(7.75m) Cr, 0 - 5°, 85 mm.t (7.84m) CS, 5°, 8 mm.t (7.96m) Cr, 0 - 5°, 190 mm.t (8.10m) XWS, 0 - 5°, 60 mm.t	
		171	9					0.20		(8.36m) J, 90°, P, R, Fe Sn (8.48m) Cr, 0°, 150 mm.t (8.66m) XWS, 0°, 10 mm.t (8.77m) Cr, 0 - 5°, 110 mm.t (8.90m) CS, 5°, 60 mm.t	
		170	10					0.30		(9.13m) XWS, 10°, 5 mm.t (9.20m) CS, 0 - 10°, 50 mm.t (9.27m) Cr, 0 - 5°, 50 mm.t (9.33-9.41m) Be x 7, 0 - 10°, P, R, Fe Sn	
								0.80		(9.76m) Be, 20°, Ir, R, Fe Sn (9.83m) Be, 0°, P, R, Fe Sn (9.85m) Jh, 90°, P, Fe Sn (9.90m) Jh, 40°, C, Fe Sn (9.91m) Be, 5°, P, R, Fe Sn (9.92m) J, 30°, C, R, Fe Sn (10.07m) J, 40°, P, R, Fe Sn (10.12m) Be, 5°, P, R, Fe Sn	
					END OF BOREHOLE AT 10.26 m						
		169	11								
		168									

BOREHOLE LOG

Client: LORETO NORMANHURST
Project: PROPOSED CARPARKS P3, P4A, P1A & THROUGH LINK
Location: LORETO NORMANHURST SCHOOL, NORMANHURST, NSW

Job No.: 31772L2 **Method:** SPIRAL AUGER **R.L. Surface:** ~181.4 m
Date: 3/11/20 **Datum:** AHD
Plant Type: JK305 **Logged/Checked By:** J.L./L.S.

Groundwater Record	SAMPLES				Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
	ES	U50	DB	DS										
DRY ON COMPLETION OF AUGERING ON 10/12/20						181			CI-CH	FILL: Silty sand, fine to medium grained brown, trace of fine to coarse grained igneous gravel	M			GRASS COVER
					N = 21 7,8,13		1			Silty CLAY: medium to high plasticity, light grey, red brown and orange brown, trace of fine to medium grained ironstone gravel.	w>PL	Hd	530 >600 >600	RESIDUAL
					N = 42 10,18,24					as above. but with extremely weathered siltstone seams.	w~PL		580 >600 >600	
							2			SILTSTONE: grey and brown.	DW	L		ASHFIELD SHALE
						179						L - M		LOW 'TC' BIT RESISTANCE LOW RESISTANCE WITH MODERATE BANDS
						178	3			REFER TO CORED BOREHOLE LOG				GROUNDWATER MONITORING WELL INSTALLED TO 10.1m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 3.1m TO 10.1m. CASING 0.1m TO 3.1m. 2mm SAND FILTER PACK 2.5m TO 10.1m. BENTONITE SEAL 0.4m TO 2.5m. BACKFILLED WITH SAND TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.
							4							
						177								
						176	5							
						175	6							

CORED BOREHOLE LOG

Client: LORETO NORMANHURST
Project: PROPOSED CARPARKS P3, P4A, P1A & THROUGH LINK
Location: LORETO NORMANHURST SCHOOL, NORMANHURST, NSW

Job No.: 31772L2 **Core Size:** NMLC **R.L. Surface:** ~181.4 m
Date: 3/11/20 **Inclination:** VERTICAL **Datum:** AHD
Plant Type: JK305 **Bearing:** N/A **Logged/Checked By:** J.L./L.S.

Water Loss/Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX I_p (50)	SPACING (mm)	DEFECT DETAILS		Formation
										Specific	General	
		179			START CORING AT 2.86m							
		178	3		SILTSTONE: grey, with light grey and orange brown laminae, bedded at 0-10°.	HW	L	0.030		(2.88m) Be, 10°, P, R, Fe Sn (2.91m) Be, 10°, P, R, Fe Sn (3.01m) Cr, 0°, 20 (3.12m) Be, 0°, P, R, Fe Sn (3.19m) XWS, 10°, 6 mm.t (3.24m) Be, 5°, P, R, Fe Sn (3.35m) XWS, 5°, 10 mm.t (3.49m) Cr, 0°, 70 mm.t (3.64m) Bex 9, 0 - 5°, P, R, Fe Sn (3.57-3.82m) Be, 0°, P, R, Fe Sn		
		177	4					0.10		(3.95m) Be, 5°, P, R, Fe Sn (3.97m) XWS, 5°, 10 mm.t (4.00m) Be x 4, 0 - 5°, P, R, Fe Sn (4.09m) Jh, 30°, P, S Sn (4.00-4.24m) J, 30°, P, R, Fe Sn (4.17m) Cr, 0°, 30 mm.t (4.36m) CS, 0°, 5 mm.t (4.40m) Jh, 30°, C, Fe Sn (4.46m) Cr, 0°, 25 mm.t		
		176	5					0.20		(4.70m) Jh, 50°, P, Fe Sn (4.73m) Jh, 40°, P, C, Fe Sn (4.79m) CS, 10°, 5 mm.t (4.94m) J, 60°, C, R, Fe Sn (5.04m) Be, 0°, P, R, Fe Sn		
		175	6					0.30		(5.32m) Be, 10°, P, R, Fe Sn (5.36m) Be, 10°, P, R, Fe Sn (5.41m) Be, 0°, P, R, Fe Sn (5.60m) J, 30°, C, R, Fe Sn (5.61m) Be, 20°, Ir, R, Fe Sn (5.66m) Be, 20°, Ir, R, Fe Sn (5.73m) Cr, 5°, 60 mm.t (5.84m) Be, 5°, P, R, Fe Sn (5.86m) J, 30°, P, R, Cn (5.91m) CS, 5°, 8 mm.t (6.07m) Sheared Zone, 60°, 150 mm.t (6.17m) J, 70°, P, R, Fe Sn (6.24m) XWS, 10°, 10 mm.t (6.31m) Be, 10°, P, R, Fe Sn (6.40m) J, 70°, P, R, Fe Sn (6.47m) Be, 5°, P, R, Fe Sn		
		174	7			MW	M	0.40		(6.70m) XWS, 10°, 5 mm.t (6.75m) J, 70°, P, R, Fe Sn (6.82m) J, 70°, P, R, Fe Sn (6.89m) Jh, 60°, P, Fe Sn (7.03m) Cr, 20°, 40 mm.t (7.13m) J, 30°, P, R, Fe Sn (7.22m) XWS, 10°, 8 mm.t (7.24m) XWS, 10°, 8 mm.t (7.30m) J, 40°, C, R, Cn (7.31m) Be, 5°, P, R, Fe Sn (7.37m) J x 2, 40°, P, R, Fe Sn (7.40m) J, 40°, C, R, Fe Sn (7.44m) Be, 10°, P, R, Fe Sn (7.47m) Be, 10°, P, R, Fe Sn (7.70m) J, 50°, P, R, Clay FILLED, 1 mm.t (7.90m) J, 60°, C, R, Fe Sn (8.00m) J, 40°, P, R, XWS FILLED, 1 mm.t (8.08m) XWS, 5°, 3 mm.t (8.19m) CS, 15°, 4 mm.t (8.26m) J, 40°, Cn (8.30m) Be, 10°, P, R, XWS FILLED, 3 mm.t (8.32m) Be, 10°, P, R, XWS FILLED, 2 mm.t (8.47m) Be, 5°, P, R, Fe Sn		
		173	8					0.50		(8.67m) Be, 0°, P, R, Fe Sn (8.70-8.87m) Be x 6, 0 - 20°, P, R, Fe Sn		

CORED BOREHOLE LOG

Client: LORETO NORMANHURST
Project: PROPOSED CARPARKS P3, P4A, P1A & THROUGH LINK
Location: LORETO NORMANHURST SCHOOL, NORMANHURST, NSW

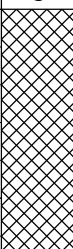
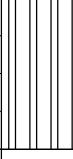
Job No.: 31772L2 **Core Size:** NMLC **R.L. Surface:** ~181.4 m
Date: 3/11/20 **Inclination:** VERTICAL **Datum:** AHD
Plant Type: JK305 **Bearing:** N/A **Logged/Checked By:** J.L./L.S.

Water Loss/Level		Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX I _p (50)	DEFECT DETAILS		Formation	
										SPACING (mm)	DESCRIPTION Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness		
90% RETURN		172	10			SILTSTONE: grey, with light grey and orange brown laminae, bedded at 0-10°. (continued)	MW	M	VL-0.1 L-0.3 M-1 H-3 VH-10 EH	600 200 60 20	Specific	General	
									0.40 0.60 1.2	600 200 60 20	(9.03m) CS, 0 - 20°, 75 mm.t (9.06-9.16m) J x 3, 30°, P, R, Fe Sn (9.28m) J, 40°, P, R, Cn (9.35m) CS, 0°, 20 mm.t (9.38m) CS, 0°, 5 mm.t (9.55m) CS, 0°, 70 mm.t (9.61m) XWS, 0°, 10 mm.t (9.69m) Cr, 0°, 35 mm.t (9.77m) CS, 5°, 10 mm.t (10.03m) Jh x 2, 35°, P, Fe Sn	Ashfield Shale	
		171				END OF BOREHOLE AT 10.23 m							
			11										
		170											
			12										
		169											
			13										
		168											
			14										
		167											
			15										
		166											

BOREHOLE LOG

Client: LORETO NORMANHURST
Project: PROPOSED CARPARKS P3, P4A, P1A & THROUGH LINK
Location: LORETO NORMANHURST SCHOOL, NORMANHURST, NSW

Job No.: 31772L2 **Method:** SPIRAL AUGER **R.L. Surface:** ~186.9 m
Date: 2/11/20 **Datum:** AHD
Plant Type: JK205 **Logged/Checked By:** J.L./L.S.

Groundwater Record	SAMPLES				Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
	ES	U50	DB	DS										
DRY ON COMPLETION					N = 2 1,1,1	186	1			FILL: Silty clay, low plasticity, dark brown, trace of fine to medium grained igneous and ironstone gravel, trace of roots and root fibres. FILL: Silty clay, medium plasticity, dark brown and orange brown, trace of fine to medium grained igneous and ironstone gravel, ash and earthenware fragments.	w-PL		190 190 200	GRASS COVER APPEARS POORLY COMPACTED
					N = 13 3,6,7	185	2		CH	Silty CLAY: high plasticity, light grey mottled red brown and orange brown, trace of fine to medium grained ironstone gravel.	w>PL	VSt - Hd	260 550 >600	RESIDUAL
						184	3		-	Extremely Weathered siltstone: silty CLAY, medium plasticity, light grey, with occasional ironstone bands.	XW	Hd		ASHFIELD SHALE VERY LOW 'TC' BIT RESISTANCE
										END OF BOREHOLE AT 3.00 m				
						183	4							
						182	5							
						181	6							
						180								

BOREHOLE LOG

Client: LORETO NORMANHURST
Project: PROPOSED CARPARKS P3, P4A, P1A & THROUGH LINK
Location: LORETO NORMANHURST SCHOOL, NORMANHURST, NSW

Job No.: 31772L2 **Method:** SPIRAL AUGER **R.L. Surface:** ~192.3 m
Date: 6/11/20 **Datum:** AHD
Plant Type: JK305 **Logged/Checked By:** J.L./L.S.

Groundwater Record	SAMPLES				Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
	ES	U50	DB	DS										
DRY ON COMPLETION OF AUGERING						192			CI-CH	ASPHALTIC CONCRETE and ROADBASE: 150mm.t Silty CLAY: medium to high plasticity, orange brown and light grey, trace of fine to medium grained ironstone gravel.	w>PL	VSt		RESIDUAL
					N = 10 4,5,5		1						300 300 270	
						191								
					N = 23 7,10,13		2		CI	as above, but medium plasticity, with occasional extremely weathered siltstone seams.	w~PL	Hd	>600 >600 >600	ASHFIELD SHALE VERY LOW 'TC' BIT RESISTANCE VERY LOW STRENGTH WITH LOW STRENGTH BANDS
						190			-	SILTSTONE: grey and brown, with occasional ironstone and clay bands.	DW	VL		
						189	3							
						188	4					VL - L		
						187	5							
						186	6			REFER TO CORED BOREHOLE LOG				

CORED BOREHOLE LOG

Client: LORETO NORMANHURST												
Project: PROPOSED CARPARKS P3, P4A, P1A & THROUGH LINK												
Location: LORETO NORMANHURST SCHOOL, NORMANHURST, NSW												
Job No.: 31772L2					Core Size: NMLC				R.L. Surface: ~192.3 m			
Date: 6/11/20					Inclination: VERTICAL				Datum: AHD			
Plant Type: JK305					Bearing: N/A				Logged/Checked By: J.L./L.S.			
Water Loss/Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX I _s (50)	SPACING (mm)	DEFECT DETAILS		Formation
										Specific	General	
		187										
					START CORING AT 5.85m							
90% RETURN		186	6		SILTSTONE: grey, with light grey and orange brown laminae, bedded at 0-10°.	HW	VL - L	0.20			(5.95m) Cr, 0 - 50°, Cn	Ashfield Shale
				0.30						(6.12m) Be, 0°, Cn		
										(6.26m) Be, 0°, Cn		
										(6.27m) XWS, 0°, Cn		
										(6.36m) XWS, 0°, Cn		
										(6.47m) XWS, 0°, Cn		
										(6.54m) XWS, 0°, Cn		
										(6.61m) XWS, 0°, Cn		
										(6.67m) XWS, 0°, Cn		
											0.080	
		185	7				0.080					
							0.050			(7.17m) XWS, 0°, Cn		
										(7.25m) XWS, 0°, Cn		
										(7.38m) XWS, 0°, Cn		
										(7.45m) Cr, 0°, Cn		
										(7.53m) Cr, 0°, Cn		
										(7.57m) J, 40°, Cn		
										(7.61m) J, 40°, Cn		
										(7.74m) Cr, 0 - 10°, Cn		
										(7.95m) J, 80°, Cn		
		184	8					0.080			(8.14m) XWS, 5°, Cn	
								0.090			(8.20m) Be x 2, 10°, Cn	
											(8.26m) XWS, 5°, Cn	
											(8.32m) CS, 5°, Cn	
											(8.38m) XWS, 5°, Cn	
											(8.45m) CS, 5°, Cn	
											(8.48m) CS, 5°, Cn	
											(8.49m) XWS, 5°, Cn	
											(8.55m) Be, 5°, Cn	
											(8.68m) Be, 0°, Cn	
								0.10				
		183			END OF BOREHOLE AT 9.07 m							
			10									
		182										
			11									
		181										

Borehole No.
207
1 / 3

Client: LORETO NORMANHURST														
Project: PROPOSED CARPARKS P3, P4A, P1A & THROUGH LINK														
Location: LORETO NORMANHURST SCHOOL, NORMANHURST, NSW														
Job No.: 31772L2					Method: SPIRAL AUGER					R.L. Surface: ~193.3 m				
Date: 6/11/20					Datum: AHD									
Plant Type: JK305					Logged/Checked By: J.L./L.S.									
Groundwater Record	SAMPLES				Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
	ES	U50	DB	DS										
					N = 31 6,12,19	193			CI-CH	ASPHALTIC CONCRETE: 150mm.t	w~PL	Hd		RESIDUAL
				1			Silty CLAY: medium to high plasticity, light grey and orange brown, with ironstone bands.						>600 >600 >600	
						192			-	SILTSTONE: grey and orange brown, with occasional clay bands.	DW	VL - L		ASHFIELD SHALE VERY LOW TO LOW 'TC' BIT RESISTANCE
				2										
						191								
									</					

CORED BOREHOLE LOG

Client: LORETO NORMANHURST
Project: PROPOSED CARPARKS P3, P4A, P1A & THROUGH LINK
Location: LORETO NORMANHURST SCHOOL, NORMANHURST, NSW

Job No.: 31772L2 **Core Size:** NMLC **R.L. Surface:** ~193.3 m
Date: 6/11/20 **Inclination:** VERTICAL **Datum:** AHD
Plant Type: JK305 **Bearing:** N/A **Logged/Checked By:** J.L./L.S.

Water Loss/Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX I _s (50) VL -0.1 L -0.3 M -1 H -3 VH -10 EH	DEFECT DETAILS				Formation	
									SPACING (mm) 600 200 50 20	DESCRIPTION Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness				
										Specific	General			
		191			START CORING AT 2.78m									
90% RETURN ON 10/12/20		190	3		SILTSTONE: grey and orange brown laminae, bedded at 0-20°.	HW	VL	0.10			(2.82m) Cr, 0°, 55 mm.t (2.86m) CS, 0°, 20 mm.t (2.89m) Be, 5°, P, R, Fe Sn (2.97m) CS, 0 - 5°, 120 mm.t (3.12m) CS, 0 - 20°, 45 mm.t (3.23m) CS, 0°, 10 mm.t (3.27m) CS, 0 - 10°, 45 mm.t (3.33m) CS, 0°, 15 mm.t (3.36m) CS, 20°, 10 mm.t (3.43m) Be, 20°, P, R, Fe Sn (3.49m) XWS, 20°, 20 mm.t (3.53m) CS, 20°, 15 mm.t (3.59m) Be, 10°, P, R, Fe Sn (3.65m) CS, 0 - 10°, 25 mm.t (3.73m) CS, 10°, 5 mm.t (3.80m) Jh, 60 - 80°, C, Fe Sn (3.87m) CS, 10°, 10 mm.t (3.97m) CS, 10°, 35 mm.t (4.05m) CS, 0°, 40 mm.t (4.11m) CS, 20°, 5 mm.t (4.17-4.56m) XWS, 0 - 10° (4.59m) Cr, 0 - 10°, 55 mm.t		Ashfield Shale	
		189	4					0.060						
		188	5		Silty CLAY: medium to high plasticity, grey and brown, with iron indurated seams.	RS	Hd				(4.78m) HP: 400, 480, >600 kPa (4.79m) Cr, 0 - 5°, 60 mm.t			
		187	6		SILTSTONE: grey and orange brown laminae.	HW	L				(5.44m) Cr, 0°, 40 mm.t (5.60-6.20m) Fragmented, 0 - 20°		Ashfield Shale	
				7		MW		0.20 0.20			(6.56m) Be, 5°, P, R, Fe Sn (6.66m) Be, 0°, P, R, Fe Sn (6.71m) XWS, 0°, 6 mm.t (6.81m) XWS, 5°, 8 mm.t (7.10m) Cr, 0°, Cn, 35 mm.t (7.20m) XWS, 0°, 8 mm.t (7.27m) Cr, 0°, 60 mm.t (7.40m) Jh, 80 - 90°, C, Fe Sn (7.62m) XWS, 5°, 15 mm.t (7.77m) XWS, 5°, 15 mm.t (7.90m) XWS, 5°, 25 mm.t (8.00m) XWS, 0°, 20 mm.t			
		186					L - M	0.10 0.30			(8.21m) Be, 0°, P, R, Fe Sn (8.26m) Be, 0°, P, R, Fe Sn (8.37m) XWS, 0°, 130 mm.t (8.47m) XWS, 0°, 10 mm.t (8.51m) XWS, 0°, 10 mm.t (8.74m) XWS, 0°, 10 mm.t (8.83m) Cr, 0°, 20 mm.t (8.93m) Cr, 0°, 30 mm.t			
		185	8					0.30 0.50 0.30						

CORED BOREHOLE LOG

Client: LORETO NORMANHURST

Project: PROPOSED CARPARKS P3, P4A, P1A & THROUGH LINK

Location: LORETO NORMANHURST SCHOOL, NORMANHURST, NSW

Job No.: 31772L2

Core Size: NMLC

R.L. Surface: ~193.3 m

Date: 6/11/20

Inclination: VERTICAL

Datum: AHD

Plant Type: JK305

Bearing: N/A

Logged/Checked By: J.L./L.S.

Water Loss/Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX I _p (50)	DEFECT DETAILS				Formation
									SPACING (mm)	DESCRIPTION Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness			
								VL 0.1 L 0.3 M 1 H 3 VH 10 EH	600 200 60 20	Specific	General		
		184			SILTSTONE: grey and orange brown laminae. <i>(continued)</i>	MW	L - M			 			
					END OF BOREHOLE AT 9.40 m								
			10										
		183											
			11										
		182											
			12										
		181							600 200 60 20				
			13										
		180											
			14										
		179											
			15										
		178											

BOREHOLE LOG

Client: LORETO NORMANHURST
Project: PROPOSED CARPARKS P3, P4A, P1A & THROUGH LINK
Location: LORETO NORMANHURST SCHOOL, NORMANHURST, NSW

Job No.: 31772L2 **Method:** SPIRAL AUGER **R.L. Surface:** ~193.6 m
Date: 5/11/20 **Datum:** AHD
Plant Type: JK305 **Logged/Checked By:** J.L./L.S.

Groundwater Record	SAMPLES				Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
	ES	U50	DB	DS										
DRY ON COMPLETION OF AUGERING										FILL: Silty clay, low plasticity, dark brown, trace of fine to medium grained ironstone and igneous gravel, roots and root fibres.	w<PL			GRASS COVER
					N = 8 3,4,4	193	1		CH	Silty CLAY: high plasticity, light grey and orange brown, trace of fine to medium grained ironstone gravel.	w>PL	VSt	340 330 300	RESIDUAL
					N = 24 8,9,15	192	2			as above, but with occasional ironstone bands.		Hd	490 520 >600	
						191	3		-	SILTSTONE: grey and brown, with occasional ironstone bands.	DW	VL - L		ASHFIELD SHALE VERY LOW TO LOW 'TC' BIT RESISTANCE
						189	5			REFER TO CORED BOREHOLE LOG				
						188	6							
						187								

CORED BOREHOLE LOG

Client: LORETO NORMANHURST
Project: PROPOSED CARPARKS P3, P4A, P1A & THROUGH LINK
Location: LORETO NORMANHURST SCHOOL, NORMANHURST, NSW

Job No.: 31772L2 **Core Size:** NMLC **R.L. Surface:** ~193.6 m
Date: 5/11/20 **Inclination:** VERTICAL **Datum:** AHD
Plant Type: JK305 **Bearing:** N/A **Logged/Checked By:** J.L./L.S.

Water Loss/Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_p(50)$	SPACING (mm)	DEFECT DETAILS		Formation
										Specific	General	
					START CORING AT 4.45m							
		189	5		SILTSTONE: grey, with orange brown laminae, bedded sub-horizontally. Silty CLAY: high plasticity, light grey, with iron indurated bands.	HW	VL				(4.58-5.23m) HP: 340, 340, 300, 470, 400 kPa	Ashfield Shale
							VSt - Hd				(5.24m) Be, 20°, P, R, Fe Sn	
											(5.44m) J, 60 - 90°, C, R, Fe Sn	
											(5.60m) Clayey band, 0 - 20°, 190 mm.t	
											(5.74m) Fragmented, 0 - 10°, 20 mm.t	
											(5.82m) Cr, 0 - 10°, 55 mm.t	
											(6.00m) J, 60°, Ir, R, Fe Sn, Cr, 230mm.t	
											(6.35m) J, 70°, Ir, R, Fe Sn	
											(6.46m) J, 75°, St, R, Fe Sn	
											(6.55m) Be, 20°, P, R, Fe Sn	
											(6.58m) CS, 5°, 30 mm.t	
											(6.66m) Cr, 5°, 90 mm.t	
											(6.84m) J, 70°, Ir, R, Fe Sn	
											(7.15m) XWS, 50°, 5 mm.t	
											(7.28m) XWS, 10°, 2 mm.t	
											(7.52m) Be, 5°, C, R, Fe Sn	
											(7.81m) Cr, 0 - 5°, 30 mm.t	
											(8.10m) Jh, 70°, P, Fe Sn	
											(8.14m) XWS, 5°, 5 mm.t	
											(8.21m) Jh, 70°, P, Fe Sn	
											(8.25m) XWS, 20°, 8 mm.t	
											(8.30m) Jh, 40 - 60°, P, Fe Sn	
											(8.64m) CS, 5°, 2 mm.t	
											(8.89m) Be, 0 - 10°, P, R, Fe Sn	
											(9.15m) Be, 0°, P, R, Fe Sn	
					END OF BOREHOLE AT 9.21 m							
		184	10									
		183										

BOREHOLE LOG

Client: LORETO NORMANHURST
Project: PROPOSED CARPARKS P3, P4A, P1A & THROUGH LINK
Location: LORETO NORMANHURST SCHOOL, NORMANHURST, NSW

Job No.: 31772L2 **Method:** SPIRAL AUGER **R.L. Surface:** ~192.2 m
Date: 5/11/20 **Datum:** AHD
Plant Type: JK305 **Logged/Checked By:** J.L./L.S.

Groundwater Record	SAMPLES				Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
	ES	U50	DB	DS										
DRY ON COMPLETION OF AUGERING ON 10/12/20						192			CH	ASPHALTIC CONCRETE: 85mm.t Silty CLAY: high plasticity, light grey and orange brown, trace of fine to medium grained ironstone gravel.	w<PL	VSt		RESIDUAL
					N = 8 3,3,5		1						260 260 200	
						191						Hd	>600 >600 >600	
					N = 28 8,11,17		2			as above, but with ironstone bands.	w~PL			
						190			-	SILTSTONE: grey and brown.	DW	VL		ASHFIELD SHALE VERY LOW 'TC' BIT RESISTANCE
						189						L		LOW RESISTANCE
						188								
						187								
						186				REFER TO CORED BOREHOLE LOG				

CORED BOREHOLE LOG

Client: LORETO NORMANHURST
Project: PROPOSED CARPARKS P3, P4A, P1A & THROUGH LINK
Location: LORETO NORMANHURST SCHOOL, NORMANHURST, NSW

Job No.: 31772L2 **Core Size:** NMLC **R.L. Surface:** ~192.2 m
Date: 5/11/20 **Inclination:** VERTICAL **Datum:** AHD
Plant Type: JK305 **Bearing:** N/A **Logged/Checked By:** J.L./L.S.

Water Loss/Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_p(50)$	SPACING (mm)	DEFECT DETAILS		Formation
										Specific	General	
ON 10/12/20		187			START CORING AT 5.90m							
100% RETURN		186	6		SILTSTONE: grey, with light grey and orange brown laminae, bedded at 0-10°.	MW	L - M	0.50		(5.95m) J, 50°, P, R, Fe Sn (6.09m) CS, 5°, 5 mm.t (6.10m) CS, 5°, 4 mm.t (6.23m) CS, 10°, 3 mm.t (6.26m) CS, 0°, 4 mm.t (6.34m) J, 70°, St, R, Fe Sn (6.45m) Be, 0°, P, R, Fe Sn (6.60m) XWS, 0°, 3 mm.t (6.65m) XWS, 0°, 15 mm.t (6.74m) Be, 0°, P, R, Fe Sn (6.82m) Cr, 0°, 10 mm.t (6.93m) XWS, 0°, 10 mm.t (7.01m) Cr, 0°, 10 mm.t (7.13m) Be, 0°, P, R, Cn (7.20m) Be, 0°, P, R, Fe Sn (7.30m) Be, 0°, P, R, Fe Sn (7.50m) Be, 0°, P, R, Fe Sn (7.53m) J, 30°, P, R, Fe Sn (7.60m) Be, 0°, P, R, Fe Sn (7.67m) J, 40 - 70°, C, R, Fe Sn (7.96m) CS, 0°, 6 mm.t (8.07m) XWS, 0°, 10 mm.t (8.13m) XWS, 0°, 6 mm.t (8.15m) Be, 0°, P, R, Fe Sn (8.19m) XWS, 0°, 3 mm.t (8.22m) XWS, 0°, 10 mm.t (8.26m) XWS, 0°, 2 mm.t (8.31m) XWS, 0°, 5 mm.t (8.36m) XWS, 0°, 8 mm.t (8.46m) XWS, 0°, 20 mm.t (8.56m) XWS, 0°, 8 mm.t (8.58m) XWS, 40°, 5 mm.t (8.64m) XWS, 0°, 3 mm.t		Ashfield Shale
		185	7				M	0.20				
		184	8					0.60				
		183	9		END OF BOREHOLE AT 9.00 m			1.0				
		182	10					0.80				
		181	11									

BOREHOLE LOG

Client: LORETO NORMANHURST
Project: PROPOSED CARPARKS P3, P4A, P1A & THROUGH LINK
Location: LORETO NORMANHURST SCHOOL, NORMANHURST, NSW

Job No.: 31772L2 **Method:** SPIRAL AUGER **R.L. Surface:** ~191.4 m
Date: 2/11/20 **Datum:** AHD
Plant Type: JK205 **Logged/Checked By:** J.L./L.S.

Groundwater Record	SAMPLES				Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
	ES	U50	DB	DS										
DRY ON COMPLETION OF AUGERING ON 10/12/20						191	1		CH	ASPHALTIC CONCRETE: 15mm.t and ROADBASE: 125mm.t Silty CLAY: high plasticity, orange brown and red brown mottled light grey, with occasional iron indurated bands.	w>PL	VSt - Hd	520 430 360	RESIDUAL
					N = 11 3,4,7				-	Extremely Weathered siltstone: silty CLAY, medium plasticity, grey mottled orange brown, with occasional ironstone bands.	XW	Hd	>600 >600 >600	ASHFIELD SHALE
					N = 50 7,20,30		2							
						189	3			SILTSTONE: grey and brown, with occasional ironstone bands and clay seams.	DW	VL - L		VERY LOW TO LOW 'TC' BIT RESISTANCE
						188	4							
						187	5							
						186								
						185	6			REFER TO CORED BOREHOLE LOG				GROUNDWATER MONITORING WELL INSTALLED TO 9.48m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 5.48m TO 9.48m. CASING 0.1m TO 5.48m. 2mm SAND FILTER PACK 4.4m TO 9.48m. BENTONITE SEAL 0.2m TO 4.4m. BACKFILLED WITH SAND TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.

CORED BOREHOLE LOG

Client: LORETO NORMANHURST
Project: PROPOSED CARPARKS P3, P4A, P1A & THROUGH LINK
Location: LORETO NORMANHURST SCHOOL, NORMANHURST, NSW

Job No.: 31772L2 **Core Size:** NMLC **R.L. Surface:** ~191.4 m
Date: 2/11/20 **Inclination:** VERTICAL **Datum:** AHD
Plant Type: JK205 **Bearing:** N/A **Logged/Checked By:** J.L./L.S.

Water Loss/Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_p(50)$	SPACING (mm)	DEFECT DETAILS		Formation
										Specific	General	
ON 10/12/20		186			START CORING AT 5.90m							
100% RETURN		185	6		SILTSTONE: grey and orange brown laminae, bedded at 0-20°.	HW	VL - L	0.10			(6.05m) Be, 20°, P, R, Fe Sn (6.06m) Jh, 80°, Fe Sn (6.11m) XWS, 20°, 60 mm.t (6.17m) Jh, 70°, Fe Sn (6.18m) Be, 20°, P, R, Fe Sn (6.27m) Be, 10°, P, R, Fe Sn (6.38m) CS, 20°, 1 mm.t (6.44m) CS, 20°, 40 mm.t (6.52m) Cr, 20°, 20 mm.t (6.59m) J, 75°, P, R, Fe Sn (6.73m) J, 80°, P, R, Fe Sn (6.78m) Be, 20°, P, R, Fe Sn (6.82m) CS, 20°, 10 mm.t (6.86m) Be, 20°, P, R, Fe Sn (7.10m) Cr, 0°, 40 mm.t (7.22m) Cr, 0 - 20°, 100 mm.t (7.33m) Be, 10°, P, R, Fe Sn (7.46m) Cr, 5°, 70 mm.t (7.58m) Cr, 5°, 100 mm.t (7.64-7.78m) Be x 5, 0 - 20°, P, R, Fe Sn (7.83m) Be, 5°, P, R, Fe Sn (7.93m) Be, 20°, P, R, Fe Sn (8.03m) CS, 20°, 5 mm.t	Ashfield Shale
		184	7					0.030				
		183	8					0.10				
		182	9					0.20				
		181	10									
		180	11									
					END OF BOREHOLE AT 9.00 m							

BOREHOLE LOG

Client: LORETO NORMANHURST
Project: PROPOSED CARPARKS P3, P4A, P1A & THROUGH LINK
Location: LORETO NORMANHURST SCHOOL, NORMANHURST, NSW

Job No.: 31772L2 **Method:** SPIRAL AUGER **R.L. Surface:** ~192.4 m
Date: 2/11/20 **Datum:** AHD
Plant Type: JK205 **Logged/Checked By:** J.L./L.S.

Groundwater Record	SAMPLES				Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
	ES	U50	DB	DS										
DRY ON COMPLETION OF AUGERING						192			CI-CH	ASPHALTIC CONCRETE: 20mm.t and ROADBASE: 90mm.t	D	Hd		RESIDUAL
					N = 10 4,4,6		1			Silty CLAY: medium to high plasticity, red brown and orange brown, trace of fine to medium grained ironstone gravel, and root fibres.	w>PL		460 540 420	
										as above, but mottled grey.				
						191			CH	Silty CLAY: high plasticity, light grey mottled red brown and orange brown.			>600 >600 >600	
					N = 28 5,11,17		2							
						190			-	Extremely Weathered siltstone: silty CLAY, medium plasticity, light grey and orange brown, with occasional ironstone bands.	XW	Hd		ASHFIELD SHALE
							3							VERY LOW 'TC' BIT RESISTANCE
						189								
							4							
						188								
							5			SILTSTONE: grey brown and red brown.	DW	VL - L		VERY LOW TO LOW RESISTANCE
						187								
							6			REFER TO CORED BOREHOLE LOG				
						186								

CORED BOREHOLE LOG

Client: LORETO NORMANHURST
Project: PROPOSED CARPARKS P3, P4A, P1A & THROUGH LINK
Location: LORETO NORMANHURST SCHOOL, NORMANHURST, NSW

Job No.: 31772L2 **Core Size:** NMLC **R.L. Surface:** ~192.4 m
Date: 2/11/20 **Inclination:** VERTICAL **Datum:** AHD
Plant Type: JK205 **Bearing:** N/A **Logged/Checked By:** J.L./L.S.

Water Loss/Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX I _s (50)	DEFECT DETAILS			Formation	
									SPACING (mm)		DESCRIPTION Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness		
												Specific	General
90% RETURN		187			START CORING AT 5.47m								
			6		SILTSTONE: grey, with light grey and orange brown laminae, bedded at 0-15°.	HW	VL - L					(5.49m) CS, 10°, 5 mm.t (5.52m) CS, 5°, 8 mm.t (5.54m) J, 30°, St, R, Fe Sn (5.59m) XWS, 0 - 20°, 40 mm.t (5.61m) CS, 10°, 5 mm.t (5.66m) CS, 5°, 5 mm.t (5.80m) J, 80°, P, R, Clay FILLED, 2 mm.t (5.94m) CS, 0°, 8 mm.t (6.02m) CS, 0°, 10 mm.t (6.05m) J, 50°, St, R, Fe Sn (6.11m) CS, 0°, 20 mm.t	Ashfield Shale
			7								(6.49m) J, 40°, P, Fe Sn (6.51m) Be, 5°, P, R, Fe Sn (6.61m) Cr, 0°, 110 mm.t (6.66m) CS, 5°, 10 mm.t (6.79m) Cr, 5°, 50 mm.t (7.03m) Cr, 0°, 20 mm.t (7.09m) CS, 0°, 30 mm.t		
			185			MW	M	+0.20		(7.33m) Cr, 5°, 30 mm.t (7.47m) Be, 5°, P, R, Fe Sn (7.55m) Be, 10°, P, R, Fe Sn (7.60m) Be, 5°, P, R, Fe Sn			
			8		NO CORE 0.19m			+0.40		(7.87m) Be, 0°, P, R, Fe Sn			
			184			MW	M	+0.60		(8.13m) CS, 0°, 20 mm.t (8.32m) Be, 5°, P, R, Fe Sn (8.36m) Cr, 0°, 20 mm.t (8.47m) Cr, 0°, 20 mm.t (8.64m) Cr, 0 - 10°, 100 mm.t			
			9					+0.90		(8.84m) Cr, 0°, 35 mm.t (8.90m) XWS, 5°, 15 mm.t (8.95m) XWS, 5°, 3 mm.t (9.06m) Be, 10°, P, R, Fe Sn (9.16m) Be, 5°, P, R, Fe Sn (9.25m) J, 30°, C, R, Fe Sn (9.29m) Be, 5°, P, R, Fe Sn (9.35m) Be, 15°, P, R, Fe Sn (9.48m) J, 60°, Ir, R, Fe Sn			
			183					+0.80					
					END OF BOREHOLE AT 9.54 m								
					10								
		182											
			11										
		181											

BOREHOLE LOG

Client: LORETO NORMANHURST
Project: PROPOSED CARPARKS P3, P4A, P1A & THROUGH LINK
Location: LORETO NORMANHURST SCHOOL, NORMANHURST, NSW

Job No.: 31772L2 **Method:** SPIRAL AUGER **R.L. Surface:** ~186.3 m
Date: 4/11/20 **Datum:** AHD
Plant Type: JK305 **Logged/Checked By:** J.L./L.S.

Groundwater Record	SAMPLES				Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
	ES	U50	DB	DS										
DRY ON COMPLETION OF AUGERING ON 10/12/20						186			CH	FILL: Silty clay, low plasticity, dark brown, trace of fine grained igneous, roots and root fibres.	w<PL			GRASS COVER
					N = 10 4,5,5		1			Silty CLAY: high plasticity, grey, light grey and orange brown, trace of fine to medium grained ironstone gravel.	w>PL	VSt	330 350 310	RESIDUAL
						185				Silty CLAY: high plasticity, light grey mottled orange brown.		Hd	460 >600 >600	
					N = 20 6,7,13		2							
						184								
					N = 26 7,10,16	183	3			as above, but with occasional extremely weathered siltstone seams.			>600 >600 >600	
						182	4		-	Extremely Weathered siltstone: silty CLAY, medium plasticity, light grey, with occasional ironstone bands.	XW	Hd		ASHFIELD SHALE VERY LOW 'TC' BIT RESISTANCE
						181	5			SILTSTONE: grey and brown.	DW	L		LOW RESISTANCE
						180	6			REFER TO CORED BOREHOLE LOG				GROUNDWATER MONITORING WELL INSTALLED TO 8.97m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 4.97m TO 8.97m. CASING 0.1m TO 4.97m. 2mm SAND FILTER PACK 4.2m TO 8.97m. BENTONITE SEAL 1.6m TO 4.2m. BACKFILLED WITH SAND TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.

CORED BOREHOLE LOG

Client: LORETO NORMANHURST
Project: PROPOSED CARPARKS P3, P4A, P1A & THROUGH LINK
Location: LORETO NORMANHURST SCHOOL, NORMANHURST, NSW

Job No.: 31772L2 **Core Size:** NMLC **R.L. Surface:** ~186.3 m
Date: 4/11/20 **Inclination:** VERTICAL **Datum:** AHD
Plant Type: JK305 **Bearing:** N/A **Logged/Checked By:** J.L./L.S.

Water Loss/Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_p(50)$	SPACING (mm)	DEFECT DETAILS		Formation
										DESCRIPTION Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness	General	
		181			START CORING AT 5.78m							
90% RETURN		180	6		SILTSTONE: grey, with light grey and orange brown laminae, bedded at 0-20°.	HW	M			(5.90m) XWS, 0°, 200 mm.t		
										(6.09m) XWS, 10°, 10 mm.t		
										(6.14m) CS, 10°, 15 mm.t		
										(6.20m) XWS, 5°, 15 mm.t		
										(6.40m) CS, 10°, 10 mm.t		
										(6.45m) XWS, 10°, 20 mm.t		
										(6.52m) XWS, 10°, 12 mm.t		
										(6.71m) J, 60 - 90°, C, R, Fe Sn		
										(6.82m) Be, 10°, P, R, Fe Sn		
										(7.09m) XWS, 30°, 20 mm.t		
		179	7			MW				(7.19m) CS, 5°, 15 mm.t		
										(7.20m) J, 40°, C, R, Fe Sn		
										(7.55m) Be, 5°, P, R, Fe Sn		
										(7.65m) CS, 10°		
										(7.90m) Be, 5°, P, R, Fe Sn		
										(8.00m) J, 90°, P, R, Fe Sn		
		178	8							(8.49m) Fractured, 0 - 5°, Ir, R, Fe Sn, 40 mm.t		
										(8.57m) J, 70°, Ir, R, Fe Sn		
										(8.73m) Highly Fractured, 0 - 5°, Cn, 40 mm.t		
										(8.87m) J, 35°, Ir, R, Fe Sn		
			9		END OF BOREHOLE AT 9.06 m					(8.90m) Be, 5°, Ir, R, Fe Sn		
										(8.95m) J, 40°, C, R, Fe Sn		
										(9.03m) Be, 20°, P, R, Fe Sn		
		177										
			10									
		176										
			11									
		175										

ENVIRONMENTAL LOGS EXPLANATION NOTES

INTRODUCTION

These notes have been provided to amplify the environmental report in regard to classification methods, field procedures and certain matters relating to the logging of soil and rock. 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 man-made processes and therefore exhibits a variety of characteristics and properties which vary from place to place and can change with time. Environmental studies include gathering and assimilating limited facts about these characteristics and properties in order to understand or predict the behaviour of the ground on a particular site under certain conditions. This report may contain such facts obtained by inspection, excavation, probing, sampling, testing or other means of investigation. If so, they are directly relevant only to the ground at the place where and time when the investigation was carried out.

DESCRIPTION AND CLASSIFICATION METHODS

The methods of description and classification of soils and rocks used in this report are based on Australian Standard 1726:2017 'Geotechnical Site Investigations'. 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 geoenvironmental practice.

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

Soil Classification	Particle Size
Clay	< 0.002mm
Silt	0.002 to 0.075mm
Sand	0.075 to 2.36mm
Gravel	2.36 to 63mm
Cobbles	63 to 200mm
Boulders	> 200mm

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 (VL)	< 4
Loose (L)	4 to 10
Medium dense (MD)	10 to 30
Dense (D)	30 to 50
Very Dense (VD)	> 50

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

Classification	Unconfined Compressive Strength (kPa)	Indicative Undrained Shear Strength (kPa)
Very Soft (VS)	≤ 25	≤ 12
Soft (S)	> 25 and ≤ 50	> 12 and ≤ 25
Firm (F)	> 50 and ≤ 100	> 25 and ≤ 50
Stiff (St)	> 100 and ≤ 200	> 50 and ≤ 100
Very Stiff (VSt)	> 200 and ≤ 400	> 100 and ≤ 200
Hard (Hd)	> 400	> 200
Friable (Fr)	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 fissile mudstone, with a weakness parallel to bedding. Rocks with alternating inter-laminations of different grain size (eg. siltstone/claystone and siltstone/fine grained sandstone) are referred to as 'laminite'.

INVESTIGATION METHODS

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

Test Pits: These are normally excavated with a backhoe or a tracked excavator, allowing close examination of the insitu soils and 'weaker' bedrock if it is safe to descend into the pit. The depth of penetration is limited to about 3m for a backhoe and up to 6m for a large excavator. Limitations of test pits are the problems associated with disturbance and difficulty of reinstatement and the consequent effects on close-by structures. Care must be taken if construction is to be carried out near test pit locations to either properly recompact the backfill during construction or to design and construct the

structure so as not to be adversely affected by poorly compacted backfill at the test pit location.

Hand Auger Drilling: A borehole of 50mm to 100mm diameter is advanced by manually operated equipment. Refusal of the hand auger can occur on a variety of materials such as obstructions within any fill, tree roots, hard clay, gravel or ironstone, cobbles and boulders, and does not necessarily indicate rock level.

Continuous Spiral Flight Augers: The borehole is advanced using 75mm to 115mm diameter continuous spiral flight augers, which are withdrawn at intervals to allow sampling and insitu testing. This is a relatively economical means of drilling in clays and in sands above the water table. Samples are returned to the surface by the flights or may be collected after withdrawal of the auger flights, but they can be very disturbed and layers may become mixed. Information from the auger sampling (as distinct from specific sampling by SPTs or undisturbed samples) is of limited 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 cuttings. 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 assessed 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. The mud tends to mask the cuttings and reliable identification is only possible from intermittent intact sampling (eg. from SPT and U50 samples) or from rock coring, etc.

Continuous Core Drilling: A continuous core sample is obtained using a diamond tipped core barrel. Provided full core recovery is achieved (which is not always possible in very low strength rocks and granular soils), this technique provides a very reliable (but relatively expensive) method of investigation. In rocks, NMLC or HQ triple tube core barrels, which give a core of about 50mm and 61mm diameter, respectively, 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 NO CORE. The location of NO CORE recovery is determined on site by the supervising engineer; where the location is uncertain, the loss is placed at the bottom 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 1289.6.3.1–2004 (R2016) ‘*Methods of Testing Soils for Engineering Purposes, Soil Strength and Consolidation Tests – Determination of the Penetration Resistance of a Soil – Standard Penetration Test (SPT)*’.

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 63.5kg 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.

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

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 terms and symbols used in preparation of the logs are defined in the following pages.

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

GROUNDWATER

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

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

More reliable measurements can be made by installing standpipes which are read after the groundwater level has stabilised at intervals ranging from several days to perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from perched water tables or surface water.

FILL

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

The presence of fill materials is usually regarded with caution as the possible variation in density and material type is much greater than with natural soil deposits. Consequently, there is an increased risk of adverse environmental characteristics or behaviour. If the volume and nature 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 classification and rock strengths indicated on the environmental logs unless noted in the report.

SYMBOL LEGENDS

SOIL



FILL



TOPSOIL



CLAY (CL, CI, CH)



SILT (ML, MH)



SAND (SP, SW)



GRAVEL (GP, GW)



SANDY CLAY (CL, CI, CH)



SILTY CLAY (CL, CI, CH)



CLAYEY SAND (SC)



SILTY SAND (SM)



GRAVELLY CLAY (CL, CI, CH)



CLAYEY GRAVEL (GC)



SANDY SILT (ML, MH)



PEAT AND HIGHLY ORGANIC SOILS (Pt)

ROCK



CONGLOMERATE



SANDSTONE



SHALE/MUDSTONE



SILTSTONE



CLAYSTONE



COAL



LAMINITE



LIMESTONE



PHYLLITE, SCHIST



TUFF



GRANITE, GABBRO



DOLERITE, DIORITE



BASALT, ANDESITE



QUARTZITE

OTHER MATERIALS



BRICKS OR PAVERS



CONCRETE



ASPHALTIC CONCRETE

CLASSIFICATION OF COARSE AND FINE GRAINED SOILS

Major Divisions		Group Symbol	Typical Names	Field Classification of Sand and Gravel	Laboratory Classification	
Coarse grained soil (more than 60% of soil excluding oversize fraction is greater than 0.075mm)	GRAVEL (more than half of coarse fraction is larger than 2.36mm)	GW	Gravel and gravel-sand mixtures, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	$C_u > 4$ $1 < C_c < 3$
		GP	Gravel and gravel-sand mixtures, little or no fines, uniform gravels	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	Fails to comply with above
		GM	Gravel-silt mixtures and gravel-sand-silt mixtures	'Dirty' materials with excess of non-plastic fines, zero to medium dry strength	≥ 12% fines, fines are silty	Fines behave as silt
		GC	Gravel-clay mixtures and gravel-sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength	≥ 12% fines, fines are clayey	Fines behave as clay
	SAND (more than half of coarse fraction is smaller than 2.36mm)	SW	Sand and gravel-sand mixtures, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	$C_u > 6$ $1 < C_c < 3$
		SP	Sand and gravel-sand mixtures, little or no fines	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	Fails to comply with above
		SM	Sand-silt mixtures	'Dirty' materials with excess of non-plastic fines, zero to medium dry strength	≥ 12% fines, fines are silty	N/A
		SC	Sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength	≥ 12% fines, fines are clayey	

Laboratory Classification Criteria

A well graded coarse grained soil is one for which the coefficient of uniformity $C_u > 4$ and the coefficient of curvature $1 < C_c < 3$. Otherwise, the soil is poorly graded. These coefficients are given by:

$$C_u = \frac{D_{60}}{D_{10}} \quad \text{and} \quad C_c = \frac{(D_{30})^2}{D_{10} D_{60}}$$

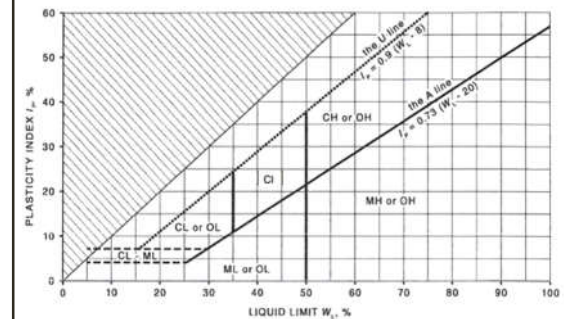
Where D_{10} , D_{30} and D_{60} are those grain sizes for which 10%, 30% and 60% of the soil grains, respectively, are smaller.

NOTES:

- For a coarse grained soil with a fines content between 5% and 12%, the soil is given a dual classification comprising the two group symbols separated by a dash; for example, for a poorly graded gravel with between 5% and 12% silt fines, the classification is GP-GM.
- Where the grading is determined from laboratory tests, it is defined by coefficients of curvature (C_c) and uniformity (C_u) derived from the particle size distribution curve.
- Clay soils with liquid limits $> 35\%$ and $\leq 50\%$ may be classified as being of medium plasticity.
- The U line on the Modified Casagrande Chart is an approximate upper bound for most natural soils.

Major Divisions		Group Symbol	Typical Names	Field Classification of Silt and Clay			Laboratory Classification
				Dry Strength	Dilatancy	Toughness	% < 0.075mm
fine grained soils (more than 35% of soil excluding oversize fraction is less than 0.075mm)	SILT and CLAY (low to medium plasticity)	ML	Inorganic silt and very fine sand, rock flour, silty or clayey fine sand or silt with low plasticity	None to low	Slow to rapid	Low	Below A line
		CL, CI	Inorganic clay of low to medium plasticity, gravelly clay, sandy clay	Medium to high	None to slow	Medium	Above A line
		OL	Organic silt	Low to medium	Slow	Low	Below A line
	SILT and CLAY (high plasticity)	MH	Inorganic silt	Low to medium	None to slow	Low to medium	Below A line
		CH	Inorganic clay of high plasticity	High to very high	None	High	Above A line
		OH	Organic clay of medium to high plasticity, organic silt	Medium to high	None to very slow	Low to medium	Below A line
	Highly organic soil	Pt	Peat, highly organic soil	—	—	—	—

Modified Casagrande Chart for Classifying Silts and Clays according to their Behaviour



LOG SYMBOLS

Log Column	Symbol	Definition
Groundwater Record	▼	Standing water level. Time delay following completion of drilling/excavation may be shown.
	—C—	Extent of borehole/test pit collapse shortly after drilling/excavation.
	▶	Groundwater seepage into borehole or test pit noted during drilling or excavation.
Samples	ES	Sample taken over depth indicated, for environmental analysis.
	U50	Undisturbed 50mm diameter tube sample taken over depth indicated.
	DB	Bulk disturbed sample taken over depth indicated.
	DS	Small disturbed bag sample taken over depth indicated.
	ASB	Soil sample taken over depth indicated, for asbestos analysis.
	ASS	Soil sample taken over depth indicated, for acid sulfate soil analysis.
	SAL	Soil sample taken over depth indicated, for salinity analysis.
Field Tests	N = 17 4, 7, 10	Standard Penetration Test (SPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration. 'Refusal' refers to apparent hammer refusal within the corresponding 150mm depth increment.
	N _c =	5 7 3R
	VNS = 25 PID = 100	Vane shear reading in kPa of undrained shear strength. Photoionisation detector reading in ppm (soil sample headspace test).
Moisture Condition (Fine Grained Soils)	w > PL	Moisture content estimated to be greater than plastic limit.
	w ≈ PL	Moisture content estimated to be approximately equal to plastic limit.
	w < PL	Moisture content estimated to be less than plastic limit.
	w ≈ LL	Moisture content estimated to be near liquid limit.
	w > LL	Moisture content estimated to be wet of liquid limit.
(Coarse Grained Soils)	D	DRY – runs freely through fingers.
	M	MOIST – does not run freely but no free water visible on soil surface.
	W	WET – free water visible on soil surface.
Strength (Consistency) Cohesive Soils	VS	VERY SOFT – unconfined compressive strength ≤ 25kPa.
	S	SOFT – unconfined compressive strength > 25kPa and ≤ 50kPa.
	F	FIRM – unconfined compressive strength > 50kPa and ≤ 100kPa.
	St	STIFF – unconfined compressive strength > 100kPa and ≤ 200kPa.
	VSt	VERY STIFF – unconfined compressive strength > 200kPa and ≤ 400kPa.
	Hd	HARD – unconfined compressive strength > 400kPa.
	Fr	FRIABLE – strength not attainable, soil crumbles.
	()	Bracketed symbol indicates estimated consistency based on tactile examination or other assessment.
Density Index/ Relative Density (Cohesionless Soils)	VL	VERY LOOSE
	L	LOOSE
	MD	MEDIUM DENSE
	D	DENSE
	VD	VERY DENSE
	()	Bracketed symbol indicates estimated density based on ease of drilling or other assessment.
Hand Penetrometer Readings	300	Measures reading in kPa of unconfined compressive strength. Numbers indicate individual test results on representative undisturbed material unless noted otherwise.
	250	



Log Column	Symbol	Definition
Remarks	'V' bit	Hardened steel 'V' shaped bit.
	'TC' bit	Twin pronged tungsten carbide bit.
	T ₆₀	Penetration of auger string in mm under static load of rig applied by drill head hydraulics without rotation of augers.
	Soil Origin	The geological origin of the soil can generally be described as:
	RESIDUAL	– soil formed directly from insitu weathering of the underlying rock. No visible structure or fabric of the parent rock.
	EXTREMELY WEATHERED	– soil formed directly from insitu weathering of the underlying rock. Material is of soil strength but retains the structure and/or fabric of the parent rock.
	ALLUVIAL	– soil deposited by creeks and rivers.
	ESTUARINE	– soil deposited in coastal estuaries, including sediments caused by inflowing creeks and rivers, and tidal currents.
	MARINE	– soil deposited in a marine environment.
	AEOLIAN	– soil carried and deposited by wind.
	COLLUVIAL	– soil and rock debris transported downslope by gravity, with or without the assistance of flowing water. Colluvium is usually a thick deposit formed from a landslide. The description 'slopewash' is used for thinner surficial deposits.
	LITTORAL	– beach deposited soil.

Classification of Material Weathering

Term		Abbreviation		Definition
Residual Soil		RS		Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are no longer visible, but the soil has not been significantly transported.
Extremely Weathered		XW		Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are still visible.
Highly Weathered	Distinctly Weathered (Note 1)	HW	DW	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable. Rock strength is significantly changed by weathering. Some primary minerals have weathered to clay minerals. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
Moderately Weathered		MW		The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable, but shows little or no change of strength from fresh rock.
Slightly Weathered		SW		Rock is partially discoloured with staining or bleaching along joints but shows little or no change of strength from fresh rock.
Fresh		FR		Rock shows no sign of decomposition of individual minerals or colour changes.

NOTE 1: The term 'Distinctly Weathered' is used where it is not practicable to distinguish between 'Highly Weathered' and 'Moderately Weathered' rock. 'Distinctly Weathered' is defined as follows: 'Rock strength usually changed by weathering. The rock may be highly discoloured, usually by iron staining. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores'. There is some change in rock strength.

Rock Material Strength Classification

Term	Abbreviation	Uniaxial Compressive Strength (MPa)	Guide to Strength	
			Point Load Strength Index $Is_{(50)}$ (MPa)	Field Assessment
Very Low Strength	VL	0.6 to 2	0.03 to 0.1	Material crumbles under firm blows with sharp end of pick; can be peeled with knife; too hard to cut a triaxial sample by hand. Pieces up to 30mm thick can be broken by finger pressure.
Low Strength	L	2 to 6	0.1 to 0.3	Easily scored with a knife; indentations 1mm to 3mm show in the specimen with firm blows of the pick point; has dull sound under hammer. A piece of core 150mm long by 50mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
Medium Strength	M	6 to 20	0.3 to 1	Scored with a knife; a piece of core 150mm long by 50mm diameter can be broken by hand with difficulty.
High Strength	H	20 to 60	1 to 3	A piece of core 150mm long by 50mm diameter cannot be broken by hand but can be broken by a pick with a single firm blow; rock rings under hammer.
Very High Strength	VH	60 to 200	3 to 10	Hand specimen breaks with pick after more than one blow; rock rings under hammer.
Extremely High Strength	EH	> 200	> 10	Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.



Appendix D: Laboratory Report(s) & COC Documents

CERTIFICATE OF ANALYSIS 200697

Client Details

Client	Environmental Investigation Services
Attention	Harry Leonard
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	<u>E31772KL, Normanhurst</u>
Number of Samples	17 Soil
Date samples received	13/09/2018
Date completed instructions received	13/09/2018

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	20/09/2018
Date of Issue	20/09/2018
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 *	

Asbestos Approved By

Analysed by Asbestos Approved Identifier: Jessica Hie
 Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By

Jeremy Faircloth, Organics Supervisor
 Long Pham, Team Leader, Metals
 Lucy Zhu, Asbestos Analyst
 Nancy Zhang, Assistant Lab Manager
 Nick Sarlamis, Inorganics Supervisor
 Priya Samarawickrama, Senior Chemist

Authorised By



Jacinta Hurst, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil

Our Reference		200697-1	200697-2	200697-3	200697-5	200697-6
Your Reference	UNITS	BH1	BH1	BH2	BH3	BH3
Depth		0.0-0.1	0.8-1.0	0.04-0.2	0.0-0.1	0.5-0.6
Date Sampled		05/09/2018	05/09/2018	05/09/2018	06/09/2018	06/09/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	14/09/2018	14/09/2018	14/09/2018	14/09/2018	14/09/2018
Date analysed	-	17/09/2018	17/09/2018	17/09/2018	17/09/2018	17/09/2018
TRH C ₆ - C ₉	mg/kg	<25	<25	<25	<25	<25
TRH C ₆ - C ₁₀	mg/kg	<25	<25	<25	<25	<25
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	102	105	102	98	97

vTRH(C6-C10)/BTEXN in Soil

Our Reference		200697-7	200697-8	200697-9	200697-10	200697-12
Your Reference	UNITS	BH4	BH5	BH5	BH6	BH7
Depth		0.0-0.1	0.0-0.1	0.5-0.6	0.0-0.1	0.0-0.1
Date Sampled		04/09/2018	04/09/2018	04/09/2018	07/09/2018	03/09/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	14/09/2018	14/09/2018	14/09/2018	14/09/2018	14/09/2018
Date analysed	-	17/09/2018	17/09/2018	17/09/2018	17/09/2018	17/09/2018
TRH C ₆ - C ₉	mg/kg	<25	<25	<25	<25	<25
TRH C ₆ - C ₁₀	mg/kg	<25	<25	<25	<25	<25
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	0.6
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	105	104	105	99	99

vTRH(C6-C10)/BTEXN in Soil			
Our Reference		200697-15	200697-17
Your Reference	UNITS	BH9	BH9
Depth		0.5-0.95	3.10-3.15
Date Sampled		03/09/2018	03/09/2018
Type of sample		Soil	Soil
Date extracted	-	14/09/2018	14/09/2018
Date analysed	-	17/09/2018	17/09/2018
TRH C ₆ - C ₉	mg/kg	<25	<25
TRH C ₆ - C ₁₀	mg/kg	<25	<25
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	<25
Benzene	mg/kg	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1
m+p-xylene	mg/kg	<2	<2
o-Xylene	mg/kg	<1	<1
naphthalene	mg/kg	<1	<1
Total +ve Xylenes	mg/kg	<1	<1
Surrogate aaa-Trifluorotoluene	%	106	99

svTRH (C10-C40) in Soil						
Our Reference	UNITS	200697-1	200697-2	200697-3	200697-5	200697-6
Your Reference		BH1	BH1	BH2	BH3	BH3
Depth		0.0-0.1	0.8-1.0	0.04-0.2	0.0-0.1	0.5-0.6
Date Sampled		05/09/2018	05/09/2018	05/09/2018	06/09/2018	06/09/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	14/09/2018	14/09/2018	14/09/2018	14/09/2018	14/09/2018
Date analysed	-	14/09/2018	14/09/2018	14/09/2018	14/09/2018	14/09/2018
TRH C ₁₀ - C ₁₄	mg/kg	<50	<50	<50	<50	<50
TRH C ₁₅ - C ₂₈	mg/kg	<100	<100	940	<100	<100
TRH C ₂₉ - C ₃₆	mg/kg	<100	<100	920	<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	1,700	<100	<100
TRH >C ₃₄ -C ₄₀	mg/kg	<100	<100	720	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	2,400	<50	<50
Surrogate o-Terphenyl	%	99	113	104	90	92

svTRH (C10-C40) in Soil						
Our Reference	UNITS	200697-7	200697-8	200697-9	200697-10	200697-12
Your Reference		BH4	BH5	BH5	BH6	BH7
Depth		0.0-0.1	0.0-0.1	0.5-0.6	0.0-0.1	0.0-0.1
Date Sampled		04/09/2018	04/09/2018	04/09/2018	07/09/2018	03/09/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	14/09/2018	14/09/2018	14/09/2018	14/09/2018	14/09/2018
Date analysed	-	14/09/2018	14/09/2018	14/09/2018	14/09/2018	15/09/2018
TRH C ₁₀ - C ₁₄	mg/kg	<50	<50	<50	<50	77
TRH C ₁₅ - C ₂₈	mg/kg	<100	<100	<100	<100	160
TRH C ₂₉ - C ₃₆	mg/kg	<100	<100	<100	<100	<100
TRH >C ₁₀ -C ₁₆	mg/kg	<50	<50	<50	<50	110
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	110
TRH >C ₁₆ -C ₃₄	mg/kg	<100	<100	<100	<100	170
TRH >C ₃₄ -C ₄₀	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	280
Surrogate o-Terphenyl	%	92	92	92	94	101

svTRH (C10-C40) in Soil

Our Reference		200697-15	200697-17
Your Reference	UNITS	BH9	BH9
Depth		0.5-0.95	3.10-3.15
Date Sampled		03/09/2018	03/09/2018
Type of sample		Soil	Soil
Date extracted	-	14/09/2018	14/09/2018
Date analysed	-	15/09/2018	15/09/2018
TRH C ₁₀ - C ₁₄	mg/kg	<50	<50
TRH C ₁₅ - C ₂₈	mg/kg	<100	<100
TRH C ₂₉ - C ₃₆	mg/kg	<100	<100
TRH >C ₁₀ -C ₁₆	mg/kg	<50	<50
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	<50	<50
TRH >C ₁₆ -C ₃₄	mg/kg	<100	<100
TRH >C ₃₄ -C ₄₀	mg/kg	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50
Surrogate o-Terphenyl	%	93	91

PAHs in Soil						
Our Reference		200697-1	200697-2	200697-3	200697-5	200697-6
Your Reference	UNITS	BH1	BH1	BH2	BH3	BH3
Depth		0.0-0.1	0.8-1.0	0.04-0.2	0.0-0.1	0.5-0.6
Date Sampled		05/09/2018	05/09/2018	05/09/2018	06/09/2018	06/09/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	14/09/2018	14/09/2018	14/09/2018	14/09/2018	14/09/2018
Date analysed	-	17/09/2018	17/09/2018	17/09/2018	17/09/2018	17/09/2018
Naphthalene	mg/kg	<0.1	<0.1	4.9	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	0.4	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	1.2	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	5.4	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	59	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	12	<0.1	<0.1
Fluoranthene	mg/kg	0.2	<0.1	140	0.1	<0.1
Pyrene	mg/kg	0.3	<0.1	120	0.1	<0.1
Benzo(a)anthracene	mg/kg	0.2	<0.1	49	<0.1	<0.1
Chrysene	mg/kg	0.2	<0.1	48	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	0.3	<0.2	82	<0.2	<0.2
Benzo(a)pyrene	mg/kg	0.2	0.06	50	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	<0.1	29	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	5.3	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	0.2	<0.1	36	<0.1	<0.1
Total +ve PAH's	mg/kg	1.6	0.06	640	0.2	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	73	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	73	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	73	<0.5	<0.5
Surrogate <i>p</i> -Terphenyl-d14	%	93	89	89	92	92

PAHs in Soil						
Our Reference		200697-7	200697-8	200697-9	200697-10	200697-12
Your Reference	UNITS	BH4	BH5	BH5	BH6	BH7
Depth		0.0-0.1	0.0-0.1	0.5-0.6	0.0-0.1	0.0-0.1
Date Sampled		04/09/2018	04/09/2018	04/09/2018	07/09/2018	03/09/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	14/09/2018	14/09/2018	14/09/2018	14/09/2018	14/09/2018
Date analysed	-	17/09/2018	17/09/2018	17/09/2018	17/09/2018	17/09/2018
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,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
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
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
Surrogate p-Terphenyl-d14	%	99	96	88	99	87

PAHs in Soil			
Our Reference		200697-15	200697-17
Your Reference	UNITS	BH9	BH9
Depth		0.5-0.95	3.10-3.15
Date Sampled		03/09/2018	03/09/2018
Type of sample		Soil	Soil
Date extracted	-	14/09/2018	14/09/2018
Date analysed	-	17/09/2018	17/09/2018
Naphthalene	mg/kg	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2
Benzo(a)pyrene	mg/kg	0.07	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1
Total +ve PAH's	mg/kg	0.07	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5
Surrogate <i>p</i> -Terphenyl-d14	%	86	86

Organochlorine Pesticides in soil						
Our Reference	UNITS	200697-1	200697-3	200697-5	200697-7	200697-8
Your Reference		BH1	BH2	BH3	BH4	BH5
Depth		0.0-0.1	0.04-0.2	0.0-0.1	0.0-0.1	0.0-0.1
Date Sampled		05/09/2018	05/09/2018	06/09/2018	04/09/2018	04/09/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	14/09/2018	14/09/2018	14/09/2018	14/09/2018	14/09/2018
Date analysed	-	17/09/2018	18/09/2018	17/09/2018	17/09/2018	17/09/2018
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	87	91	86	86	103

Organochlorine Pesticides in soil				
Our Reference		200697-10	200697-12	200697-15
Your Reference	UNITS	BH6	BH7	BH9
Depth		0.0-0.1	0.0-0.1	0.5-0.95
Date Sampled		07/09/2018	03/09/2018	03/09/2018
Type of sample		Soil	Soil	Soil
Date extracted	-	14/09/2018	14/09/2018	14/09/2018
Date analysed	-	17/09/2018	17/09/2018	17/09/2018
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	%	87	89	87

Organophosphorus Pesticides

Our Reference		200697-1	200697-3	200697-5	200697-7	200697-8
Your Reference	UNITS	BH1	BH2	BH3	BH4	BH5
Depth		0.0-0.1	0.04-0.2	0.0-0.1	0.0-0.1	0.0-0.1
Date Sampled		05/09/2018	05/09/2018	06/09/2018	04/09/2018	04/09/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	14/09/2018	14/09/2018	14/09/2018	14/09/2018	14/09/2018
Date analysed	-	17/09/2018	18/09/2018	17/09/2018	17/09/2018	17/09/2018
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
Chlorpyrifos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
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	%	87	91	86	86	103

Organophosphorus Pesticides

Our Reference		200697-10	200697-12	200697-15
Your Reference	UNITS	BH6	BH7	BH9
Depth		0.0-0.1	0.0-0.1	0.5-0.95
Date Sampled		07/09/2018	03/09/2018	03/09/2018
Type of sample		Soil	Soil	Soil
Date extracted	-	14/09/2018	14/09/2018	14/09/2018
Date analysed	-	17/09/2018	17/09/2018	17/09/2018
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1
Chlorpyrifos	mg/kg	<0.1	<0.1	<0.1
Chlorpyrifos-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	%	87	89	87

PCBs in Soil						
Our Reference	UNITS	200697-1	200697-3	200697-5	200697-7	200697-8
Your Reference		BH1	BH2	BH3	BH4	BH5
Depth		0.0-0.1	0.04-0.2	0.0-0.1	0.0-0.1	0.0-0.1
Date Sampled		05/09/2018	05/09/2018	06/09/2018	04/09/2018	04/09/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	14/09/2018	14/09/2018	14/09/2018	14/09/2018	14/09/2018
Date analysed	-	17/09/2018	18/09/2018	17/09/2018	17/09/2018	17/09/2018
Aroclor 1016	mg/kg	<0.1	<0.1	<0.5	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.5	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.5	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.5	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.5	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.5	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.5	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.5	<0.1	<0.1
Surrogate TCLMX	%	87	91	86	86	103

PCBs in Soil				
Our Reference	UNITS	200697-10	200697-12	200697-15
Your Reference		BH6	BH7	BH9
Depth		0.0-0.1	0.0-0.1	0.5-0.95
Date Sampled		07/09/2018	03/09/2018	03/09/2018
Type of sample		Soil	Soil	Soil
Date extracted	-	14/09/2018	14/09/2018	14/09/2018
Date analysed	-	17/09/2018	17/09/2018	17/09/2018
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	%	87	89	87

Acid Extractable metals in soil

Our Reference		200697-1	200697-2	200697-3	200697-5	200697-6
Your Reference	UNITS	BH1	BH1	BH2	BH3	BH3
Depth		0.0-0.1	0.8-1.0	0.04-0.2	0.0-0.1	0.5-0.6
Date Sampled		05/09/2018	05/09/2018	05/09/2018	06/09/2018	06/09/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	14/09/2018	14/09/2018	14/09/2018	14/09/2018	14/09/2018
Date analysed	-	14/09/2018	14/09/2018	14/09/2018	14/09/2018	14/09/2018
Arsenic	mg/kg	<4	6	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	12	8	18	25	9
Copper	mg/kg	19	28	53	51	15
Lead	mg/kg	24	33	21	9	27
Mercury	mg/kg	0.2	0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	8	5	25	110	1
Zinc	mg/kg	34	22	49	55	3

Acid Extractable metals in soil

Our Reference		200697-7	200697-8	200697-9	200697-10	200697-12
Your Reference	UNITS	BH4	BH5	BH5	BH6	BH7
Depth		0.0-0.1	0.0-0.1	0.5-0.6	0.0-0.1	0.0-0.1
Date Sampled		04/09/2018	04/09/2018	04/09/2018	07/09/2018	03/09/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	14/09/2018	14/09/2018	14/09/2018	14/09/2018	14/09/2018
Date analysed	-	14/09/2018	14/09/2018	14/09/2018	14/09/2018	14/09/2018
Arsenic	mg/kg	5	6	6	7	6
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	15	14	14	8	16
Copper	mg/kg	33	22	20	16	19
Lead	mg/kg	23	27	16	57	26
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	0.5
Nickel	mg/kg	6	6	3	4	4
Zinc	mg/kg	26	24	18	54	22

Acid Extractable metals in soil				
Our Reference		200697-15	200697-17	200697-18
Your Reference	UNITS	BH9	BH9	BH9 - [TRIPLICATE]
Depth		0.5-0.95	3.10-3.15	0.5-0.95
Date Sampled		03/09/2018	03/09/2018	03/09/2018
Type of sample		Soil	Soil	Soil
Date prepared	-	14/09/2018	14/09/2018	14/09/2018
Date analysed	-	14/09/2018	14/09/2018	14/09/2018
Arsenic	mg/kg	7	20	5
Cadmium	mg/kg	<0.4	<0.4	<0.4
Chromium	mg/kg	8	14	18
Copper	mg/kg	14	6	17
Lead	mg/kg	11	21	22
Mercury	mg/kg	0.1	<0.1	<0.1
Nickel	mg/kg	7	<1	4
Zinc	mg/kg	26	1	13

Moisture						
Our Reference	UNITS	200697-1	200697-2	200697-3	200697-5	200697-6
Your Reference		BH1	BH1	BH2	BH3	BH3
Depth		0.0-0.1	0.8-1.0	0.04-0.2	0.0-0.1	0.5-0.6
Date Sampled		05/09/2018	05/09/2018	05/09/2018	06/09/2018	06/09/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	14/09/2018	14/09/2018	14/09/2018	14/09/2018	14/09/2018
Date analysed	-	17/09/2018	17/09/2018	17/09/2018	17/09/2018	17/09/2018
Moisture	%	8.2	8.0	8.7	12	20

Moisture						
Our Reference	UNITS	200697-7	200697-8	200697-9	200697-10	200697-12
Your Reference		BH4	BH5	BH5	BH6	BH7
Depth		0.0-0.1	0.0-0.1	0.5-0.6	0.0-0.1	0.0-0.1
Date Sampled		04/09/2018	04/09/2018	04/09/2018	07/09/2018	03/09/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	14/09/2018	14/09/2018	14/09/2018	14/09/2018	14/09/2018
Date analysed	-	17/09/2018	17/09/2018	17/09/2018	17/09/2018	17/09/2018
Moisture	%	12	12	6.9	20	17

Moisture			
Our Reference	UNITS	200697-15	200697-17
Your Reference		BH9	BH9
Depth		0.5-0.95	3.10-3.15
Date Sampled		03/09/2018	03/09/2018
Type of sample		Soil	Soil
Date prepared	-	14/09/2018	14/09/2018
Date analysed	-	17/09/2018	17/09/2018
Moisture	%	15	20

Asbestos ID - soils						
Our Reference	UNITS	200697-1	200697-3	200697-5	200697-7	200697-8
Your Reference		BH1	BH2	BH3	BH4	BH5
Depth		0.0-0.1	0.04-0.2	0.0-0.1	0.0-0.1	0.0-0.1
Date Sampled		05/09/2018	05/09/2018	06/09/2018	04/09/2018	04/09/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	19/09/2018	19/09/2018	19/09/2018	19/09/2018	19/09/2018
Sample mass tested	g	Approx. 25g	Approx. 45g	Approx. 40g	Approx. 40g	Approx. 30g
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	-	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

Asbestos ID - soils				
Our Reference	UNITS	200697-10	200697-12	200697-15
Your Reference		BH6	BH7	BH9
Depth		0.0-0.1	0.0-0.1	0.5-0.95
Date Sampled		07/09/2018	03/09/2018	03/09/2018
Type of sample		Soil	Soil	Soil
Date analysed	-	19/09/2018	19/09/2018	19/09/2018
Sample mass tested	g	Approx. 10g	Approx. 25g	Approx. 40g
Sample Description	-	Brown coarse-grained soil & rocks	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	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected

Misc Inorg - Soil			
Our Reference		200697-3	200697-12
Your Reference	UNITS	BH2	BH7
Depth		0.04-0.2	0.0-0.1
Date Sampled		05/09/2018	03/09/2018
Type of sample		Soil	Soil
Date prepared	-	17/09/2018	17/09/2018
Date analysed	-	17/09/2018	17/09/2018
pH 1:5 soil:water	pH Units	9.2	5.6

CEC			
Our Reference		200697-3	200697-12
Your Reference	UNITS	BH2	BH7
Depth		0.04-0.2	0.0-0.1
Date Sampled		05/09/2018	03/09/2018
Type of sample		Soil	Soil
Date prepared	-	18/09/2018	18/09/2018
Date analysed	-	18/09/2018	18/09/2018
Exchangeable Ca	meq/100g	24	5.1
Exchangeable K	meq/100g	0.4	0.6
Exchangeable Mg	meq/100g	0.64	2.6
Exchangeable Na	meq/100g	0.20	0.22
Cation Exchange Capacity	meq/100g	26	8.5

Clay 50-120g			
Our Reference		200697-3	200697-12
Your Reference	UNITS	BH2	BH7
Depth		0.04-0.2	0.0-0.1
Date Sampled		05/09/2018	03/09/2018
Type of sample		Soil	Soil
Date prepared	-	20/09/2018	20/09/2018
Date analysed	-	20/09/2018	20/09/2018
Clay in soils <2µm	% (w/w)	7	35

Method ID	Methodology Summary
AS1289.3.6.3	Determination Particle Size Analysis using AS1289.3.6.3 and AS1289.3.6.1 and in house method INORG-107. Clay fraction at <2µm reported.
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.
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.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-009	Determination of exchangeable cations and cation exchange capacity in soils using 1M Ammonium Chloride exchange and ICP-AES analytical finish.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
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-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-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.
Org-008	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.

Method ID	Methodology Summary
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. 'EQ 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. 'EQ 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. 'EQ 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-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTX 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)-BTX 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.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	200697-3
Date extracted	-			14/09/2018	1	14/09/2018	14/09/2018		14/09/2018	14/09/2018
Date analysed	-			17/09/2018	1	17/09/2018	17/09/2018		17/09/2018	17/09/2018
TRH C ₆ - C ₉	mg/kg	25	Org-016	<25	1	<25	<25	0	115	98
TRH C ₆ - C ₁₀	mg/kg	25	Org-016	<25	1	<25	<25	0	115	98
Benzene	mg/kg	0.2	Org-016	<0.2	1	<0.2	<0.2	0	115	97
Toluene	mg/kg	0.5	Org-016	<0.5	1	<0.5	<0.5	0	115	98
Ethylbenzene	mg/kg	1	Org-016	<1	1	<1	<1	0	115	99
m+p-xylene	mg/kg	2	Org-016	<2	1	<2	<2	0	115	98
o-Xylene	mg/kg	1	Org-016	<1	1	<1	<1	0	115	98
naphthalene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	108	1	102	111	8	114	100

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	15	14/09/2018	14/09/2018		[NT]	[NT]
Date analysed	-			[NT]	15	17/09/2018	17/09/2018		[NT]	[NT]
TRH C ₆ - C ₉	mg/kg	25	Org-016	[NT]	15	<25	<25	0	[NT]	[NT]
TRH C ₆ - C ₁₀	mg/kg	25	Org-016	[NT]	15	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-016	[NT]	15	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-016	[NT]	15	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-016	[NT]	15	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-016	[NT]	15	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-016	[NT]	15	<1	<1	0	[NT]	[NT]
naphthalene	mg/kg	1	Org-014	[NT]	15	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	[NT]	15	106	100	6	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	200697-3
Date extracted	-			14/09/2018	1	14/09/2018	14/09/2018		14/09/2018	14/09/2018
Date analysed	-			14/09/2018	1	14/09/2018	14/09/2018		14/09/2018	14/09/2018
TRH C ₁₀ - C ₁₄	mg/kg	50	Org-003	<50	1	<50	<50	0	130	70
TRH C ₁₅ - C ₂₈	mg/kg	100	Org-003	<100	1	<100	<100	0	116	85
TRH C ₂₉ - C ₃₆	mg/kg	100	Org-003	<100	1	<100	<100	0	112	#
TRH >C ₁₀ -C ₁₆	mg/kg	50	Org-003	<50	1	<50	<50	0	130	70
TRH >C ₁₆ -C ₃₄	mg/kg	100	Org-003	<100	1	<100	<100	0	116	85
TRH >C ₃₄ -C ₄₀	mg/kg	100	Org-003	<100	1	<100	<100	0	112	#
Surrogate o-Terphenyl	%		Org-003	104	1	99	102	3	104	88

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	15	14/09/2018	14/09/2018		[NT]	[NT]
Date analysed	-			[NT]	15	15/09/2018	15/09/2018		[NT]	[NT]
TRH C ₁₀ - C ₁₄	mg/kg	50	Org-003	[NT]	15	<50	<50	0	[NT]	[NT]
TRH C ₁₅ - C ₂₈	mg/kg	100	Org-003	[NT]	15	<100	<100	0	[NT]	[NT]
TRH C ₂₉ - C ₃₆	mg/kg	100	Org-003	[NT]	15	<100	<100	0	[NT]	[NT]
TRH >C ₁₀ -C ₁₆	mg/kg	50	Org-003	[NT]	15	<50	<50	0	[NT]	[NT]
TRH >C ₁₆ -C ₃₄	mg/kg	100	Org-003	[NT]	15	<100	<100	0	[NT]	[NT]
TRH >C ₃₄ -C ₄₀	mg/kg	100	Org-003	[NT]	15	<100	<100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-003	[NT]	15	93	93	0	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	200697-3
Date extracted	-			14/09/2018	1	14/09/2018	14/09/2018		14/09/2018	14/09/2018
Date analysed	-			18/09/2018	1	17/09/2018	17/09/2018		17/09/2018	17/09/2018
Naphthalene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	104	88
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	106	84
Phenanthrene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	111	#
Anthracene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	1	0.2	0.1	67	112	69
Pyrene	mg/kg	0.1	Org-012	<0.1	1	0.3	0.2	40	102	68
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	1	0.2	<0.1	67	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012	<0.1	1	0.2	<0.1	67	104	#
Benzo(b,j,k)fluoranthene	mg/kg	0.2	Org-012	<0.2	1	0.3	<0.2	40	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	1	0.2	0.1	67	102	75
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	1	0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	1	0.2	<0.1	67	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	95	1	93	95	2	90	75

QUALITY CONTROL: PAHs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	15	14/09/2018	14/09/2018		[NT]	[NT]
Date analysed	-			[NT]	15	17/09/2018	17/09/2018		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-012	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-012	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-012	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-012	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-012	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-012	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Benzo(b,j,k)fluoranthene	mg/kg	0.2	Org-012	[NT]	15	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012	[NT]	15	0.07	<0.05	33	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	[NT]	15	86	92	7	[NT]	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	200697-3
Date extracted	-			14/09/2018	1	14/09/2018	14/09/2018		14/09/2018	14/09/2018
Date analysed	-			17/09/2018	1	17/09/2018	17/09/2018		17/09/2018	18/09/2018
HCB	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	88	104
gamma-BHC	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	75	86
Heptachlor	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	85	103
delta-BHC	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	86	93
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	86	97
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	86	96
Dieldrin	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	89	99
Endrin	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	98	112
pp-DDD	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	92	92
Endosulfan II	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	76	87
Methoxychlor	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-005	88	1	87	91	4	107	92

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	15	14/09/2018	14/09/2018		[NT]	[NT]
Date analysed	-			[NT]	15	17/09/2018	17/09/2018		[NT]	[NT]
HCB	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
gamma-BHC	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
delta-BHC	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
gamma-Chlordane	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Dieldrin	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Endrin	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Methoxychlor	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-005	[NT]	15	87	85	2	[NT]	[NT]

QUALITY CONTROL: Organophosphorus Pesticides					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	200697-3
Date extracted	-			14/09/2018	1	14/09/2018	14/09/2018		14/09/2018	14/09/2018
Date analysed	-			17/09/2018	1	17/09/2018	17/09/2018		17/09/2018	18/09/2018
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chlorpyrifos	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	76	111
Chlorpyrifos-methyl	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	120	117
Dimethoate	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	88	101
Fenitrothion	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	98	117
Malathion	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	68	97
Parathion	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	97	118
Ronnel	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	81	131
Surrogate TCMX	%		Org-008	88	1	87	91	4	87	89

QUALITY CONTROL: Organophosphorus Pesticides					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	15	14/09/2018	14/09/2018		[NT]	[NT]
Date analysed	-			[NT]	15	17/09/2018	17/09/2018		[NT]	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-008	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Chlorpyrifos	mg/kg	0.1	Org-008	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Chlorpyrifos-methyl	mg/kg	0.1	Org-008	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-008	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-008	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-008	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-008	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Fenitrothion	mg/kg	0.1	Org-008	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Malathion	mg/kg	0.1	Org-008	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Parathion	mg/kg	0.1	Org-008	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-008	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-008	[NT]	15	87	85	2	[NT]	[NT]

QUALITY CONTROL: PCBs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	200697-3
Date extracted	-			14/09/2018	1	14/09/2018	14/09/2018		14/09/2018	14/09/2018
Date analysed	-			17/09/2018	1	17/09/2018	17/09/2018		17/09/2018	18/09/2018
Aroclor 1016	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	106	114
Aroclor 1260	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCLMX	%		Org-006	88	1	87	91	4	87	89

QUALITY CONTROL: PCBs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	15	14/09/2018	14/09/2018		[NT]	[NT]
Date analysed	-			[NT]	15	17/09/2018	17/09/2018		[NT]	[NT]
Aroclor 1016	mg/kg	0.1	Org-006	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-006	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-006	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-006	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-006	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-006	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1260	mg/kg	0.1	Org-006	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCLMX	%		Org-006	[NT]	15	87	85	2	[NT]	[NT]

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	200697-3
Date prepared	-			14/09/2018	1	14/09/2018	14/09/2018		14/09/2018	14/09/2018
Date analysed	-			14/09/2018	1	14/09/2018	14/09/2018		14/09/2018	14/09/2018
Arsenic	mg/kg	4	Metals-020	<4	1	<4	<4	0	110	90
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	103	85
Chromium	mg/kg	1	Metals-020	<1	1	12	14	15	108	86
Copper	mg/kg	1	Metals-020	<1	1	19	21	10	112	123
Lead	mg/kg	1	Metals-020	<1	1	24	25	4	108	95
Mercury	mg/kg	0.1	Metals-021	<0.1	1	0.2	0.2	0	109	128
Nickel	mg/kg	1	Metals-020	<1	1	8	7	13	110	88
Zinc	mg/kg	1	Metals-020	<1	1	34	33	3	105	79

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	15	14/09/2018	14/09/2018		[NT]	[NT]
Date analysed	-			[NT]	15	14/09/2018	14/09/2018		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	15	7	5	33	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	15	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	15	8	20	86	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	15	14	20	35	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	15	11	26	81	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	15	0.1	<0.1	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	15	7	6	15	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	15	26	21	21	[NT]	[NT]

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QUALITY CONTROL: Misc Inorg - Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			17/09/2018	[NT]	[NT]	[NT]	[NT]	17/09/2018	[NT]
Date analysed	-			17/09/2018	[NT]	[NT]	[NT]	[NT]	17/09/2018	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	[NT]	[NT]	[NT]	[NT]	102	[NT]

QUALITY CONTROL: CEC					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			18/09/2018	[NT]	[NT]	[NT]	[NT]	18/09/2018	[NT]
Date analysed	-			18/09/2018	[NT]	[NT]	[NT]	[NT]	18/09/2018	[NT]
Exchangeable Ca	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Exchangeable K	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	[NT]	[NT]	106	[NT]
Exchangeable Mg	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Exchangeable Na	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.
Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.	

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: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

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.

Report Comments

TRH Soil C10-C40 NEPM -(3MS) # Percent recovery is not possible to report as the high concentration of analytes in the sample/s have caused interference.

PAHs in Soil - # Percent recovery is not possible to report due to interference from analytes (other than those being tested) in the sample 3ms.

PCBs in Soil - PQL has been raised due to interference from analytes(other than those being tested) in the sample/s.

Asbestos: Excessive sample volume was provided for asbestos analysis. A portion of the supplied sample was sub-sampled according to Envirolab procedures. We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying 40-50g (50mL) of sample in its own container as per AS4964-2004.

Note: Samples 200697-7,8 were sub-sampled from bags provided by the client.

Acid Extractable Metals in Soil: The laboratory RPD acceptance criteria has been exceeded for 200697-15 for Cr and Pb. Therefore a triplicate result has been issued as laboratory sample number 200697-18.

SAMPLE RECEIPT ADVICE

Client Details

Client	Environmental Investigation Services
Attention	Harry Leonard

Sample Login Details

Your reference	E31772KL, Normanhurst
Envirolab Reference	200697
Date Sample Received	13/09/2018
Date Instructions Received	13/09/2018
Date Results Expected to be Reported	20/09/2018

Sample Condition

Samples received in appropriate condition for analysis	YES
No. of Samples Provided	17 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	10.0
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie

Phone: 02 9910 6200
Fax: 02 9910 6201
Email: ahie@envirolab.com.au

Jacinta Hurst

Phone: 02 9910 6200
Fax: 02 9910 6201
Email: jhurst@envirolab.com.au

Analysis Underway, details on the following page:

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	Misc Inorg - Soil	CEC	Clay 5 0/20g	On Hold
BH1-0.0-0.1	✓	✓	✓	✓	✓	✓	✓	✓				
BH1-0.8 1.0	✓	✓	✓				✓					
BH2-0.04-0.2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
BH2-1.5 1.9												✓
BH3 0.0-0.1	✓	✓	✓	✓	✓	✓	✓	✓				
BH3 0.5 0.6	✓	✓	✓				✓					
BH4-0.0-0.1	✓	✓	✓	✓	✓	✓	✓	✓				
BH5 0.0-0.1	✓	✓	✓	✓	✓	✓	✓	✓				
BH5 0.5 0.6	✓	✓	✓				✓					
BH6-0.0-0.1	✓	✓	✓	✓	✓	✓	✓	✓				
BH6-0.6-0.95												✓
BH7 0.0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
BH7 0.5 0.95												✓
BH9-0.0-0.1												✓
BH9-0.5 0.95	✓	✓	✓	✓	✓	✓	✓	✓				
BH9-1.8 51.95												✓
BH9-3 .103 .15	✓	✓	✓				✓					

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.

Requests for longer term sample storage must be received in writing.

SAMPLE AND CHAIN OF CUSTODY FORM

TO: ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	EIS Job E31772KL Number: Date Results STANDARD Required: Page: 1 of 1	FROM: ENVIRONMENTAL INVESTIGATION SERVICES REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Harry Leonard



Location: Normanhurst							Sample Preserved In Esky on Ice												
Sampler: AB							Tests Required												
Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 6a	Combo 3	pH	CEC	Clay Content	PAHs	TRH/BTEX	BTEX	Asbestos				
5/9/18	1	BH1	0-0.1	G, A	0.0	clay F	X												
	2	BH1	0.8-1.0	G		siltstone		X											
	3	BH2	0.04-0.2	G, A		sand F	X		X	X	X								
	4	BH2	1.5-1.9	G		clay													
6/9/18	5	BH3	0-0.1	G, A		clay F	X												
	6	BH3	0.5-0.6	G		clay		X											
4/9/18	7	BH4	0-0.1	G, A		clay F	X												
	8	BH5	0-0.1	G, A		clay F	X												
	9	BH5	0.5-0.6	G		clay		X											
7/9/18	10	BH6	0-0.1	G, A		clay F	X												
	11	BH6	0.6-0.95	G		siltstone													
3/9/18	12	BH7	0-0.1	G, A		clay F	X		X	X	X								
	13	BH7	0.5-0.95	G		clay													
	14	BH9	0-0.1	G, A		clay F													
	15	BH9	0.5-0.95	G, A		clay F	X												
	16	BH9	1.85-1.95	G, A		clay F													
	17	BH9	3.10-3.15	G		clay		X											

Envirolab Services
 12 Ashley St
 Chatswood NSW 2067
 Ph: (02) 9910 6200
 Job No: 200697
 Date Received: 13/9/18
 Time Received: 12:10
 Received By: LN
 Temp: Cool/Ambient
 Cooling: Ice/Depac
 Security: Intact/Broken/None

Remarks (comments/detection limits required):		Sample Containers: G - 250mg Glass Jar A - Ziplock Asbestos Bag P - Plastic Bag	
Relinquished By:	Date: 13/9/2018	Received By:	Date: 13/9/18 12:10

CERTIFICATE OF ANALYSIS 200697-A

Client Details

Client	Environmental Investigation Services
Attention	Harry Leonard
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	<u>E31772KL, Normanhurst</u>
Number of Samples	17 Soil
Date samples received	13/09/2018
Date completed instructions received	10/10/2018

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	12/10/2018
Date of Issue	12/10/2018
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

Leon Ow, Chemist
Steven Luong, Senior Chemist

Authorised By



Jacinta Hurst, Laboratory Manager

Metals in TCLP USEPA1311			
Our Reference		200697-A-3	200697-A-5
Your Reference	UNITS	BH2	BH3
Depth		0.04-0.2	0.0-0.1
Date Sampled		05/09/2018	06/09/2018
Type of sample		Soil	Soil
Date extracted	-	12/10/2018	12/10/2018
Date analysed	-	12/10/2018	12/10/2018
pH of soil for fluid# determ.	pH units	9.9	8.1
pH of soil TCLP (after HCl)	pH units	1.7	1.7
Extraction fluid used	-	1	1
pH of final Leachate	pH units	5.7	5.0
Arsenic in TCLP	mg/L	[NA]	<0.05
Cadmium in TCLP	mg/L	[NA]	<0.01
Chromium in TCLP	mg/L	[NA]	<0.01
Copper in TCLP	mg/L	[NA]	<0.01
Lead in TCLP	mg/L	[NA]	<0.03
Mercury in TCLP	mg/L	[NA]	<0.0005
Nickel in TCLP	mg/L	[NA]	0.03
Zinc in TCLP	mg/L	[NA]	0.04

PAHs in TCLP (USEPA 1311)		
Our Reference		200697-A-3
Your Reference	UNITS	BH2
Depth		0.04-0.2
Date Sampled		05/09/2018
Type of sample		Soil
Date extracted	-	12/10/2018
Date analysed	-	12/10/2018
Naphthalene in TCLP	mg/L	<0.001
Acenaphthylene in TCLP	mg/L	<0.001
Acenaphthene in TCLP	mg/L	<0.001
Fluorene in TCLP	mg/L	<0.001
Phenanthrene in TCLP	mg/L	0.002
Anthracene in TCLP	mg/L	<0.001
Fluoranthene in TCLP	mg/L	0.001
Pyrene in TCLP	mg/L	<0.001
Benzo(a)anthracene in TCLP	mg/L	<0.001
Chrysene in TCLP	mg/L	<0.001
Benzo(b,k)fluoranthene in TCLP	mg/L	<0.002
Benzo(a)pyrene in TCLP	mg/L	<0.001
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	<0.001
Dibenzo(a,h)anthracene in TCLP	mg/L	<0.001
Benzo(g,h,i)perylene in TCLP	mg/L	<0.001
Total +ve PAH's	mg/L	0.0025
Surrogate <i>p</i> -Terphenyl-d14	%	95

Method ID	Methodology Summary
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.
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using in house method INORG-004.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
Org-012	Leachates are extracted with Dichloromethane and analysed by GC-MS.
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.

QUALITY CONTROL: Metals in TCLP USEPA1311					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			12/10/2018	[NT]	[NT]	[NT]	[NT]	12/10/2018	[NT]
Date analysed	-			12/10/2018	[NT]	[NT]	[NT]	[NT]	12/10/2018	[NT]
Arsenic in TCLP	mg/L	0.05	Metals-020 ICP-AES	<0.05	[NT]	[NT]	[NT]	[NT]	107	[NT]
Cadmium in TCLP	mg/L	0.01	Metals-020 ICP-AES	<0.01	[NT]	[NT]	[NT]	[NT]	104	[NT]
Chromium in TCLP	mg/L	0.01	Metals-020 ICP-AES	<0.01	[NT]	[NT]	[NT]	[NT]	102	[NT]
Copper in TCLP	mg/L	0.01	Metals-020 ICP-AES	<0.01	[NT]	[NT]	[NT]	[NT]	104	[NT]
Lead in TCLP	mg/L	0.03	Metals-020 ICP-AES	<0.03	[NT]	[NT]	[NT]	[NT]	100	[NT]
Mercury in TCLP	mg/L	0.0005	Metals-021 CV-AAS	<0.0005	[NT]	[NT]	[NT]	[NT]	107	[NT]
Nickel in TCLP	mg/L	0.02	Metals-020 ICP-AES	<0.02	[NT]	[NT]	[NT]	[NT]	100	[NT]
Zinc in TCLP	mg/L	0.02	Metals-020 ICP-AES	<0.02	[NT]	[NT]	[NT]	[NT]	103	[NT]

QUALITY CONTROL: PAHs in TCLP (USEPA 1311)					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			12/10/2018	[NT]	[NT]	[NT]	[NT]	12/10/2018	[NT]
Date analysed	-			12/10/2018	[NT]	[NT]	[NT]	[NT]	12/10/2018	[NT]
Naphthalene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	82	[NT]
Acenaphthylene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluorene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	85	[NT]
Phenanthrene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	88	[NT]
Anthracene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	83	[NT]
Pyrene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	74	[NT]
Benzo(a)anthracene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	81	[NT]
Benzo(bjk)fluoranthene in TCLP	mg/L	0.002	Org-012	<0.002	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	85	[NT]
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	92	[NT]	[NT]	[NT]	[NT]	100	[NT]

Result Definitions

NT	Not tested
NA	Test not required
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>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
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For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

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.

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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.

Report Comments

PAHs in TCLP USEPA 1311 was analysed outside of recommended holding time.

SAMPLE RECEIPT ADVICE

Client Details

Client	Environmental Investigation Services
Attention	Harry Leonard

Sample Login Details

Your reference	E31772KL, Normanhurst
Envirolab Reference	200697-A
Date Sample Received	13/09/2018
Date Instructions Received	10/10/2018
Date Results Expected to be Reported	12/10/2018

Sample Condition

Samples received in appropriate condition for analysis	YES
No. of Samples Provided	17 Soil
Turnaround Time Requested	2 days
Temperature on Receipt (°C)	10.0
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie

Phone: 02 9910 6200
Fax: 02 9910 6201
Email: ahie@envirolab.com.au

Jacinta Hurst

Phone: 02 9910 6200
Fax: 02 9910 6201
Email: jhurst@envirolab.com.au

Analysis Underway, details on the following page:

Sample ID	pH of soil for fluid# deorm.	pH of soil TCLP (after HCl)	Extraction fluid used	pH of final Leachate	Arsenic in TCLP	Cadmium in TCLP	Chromium in TCLP	Copper in TCLP	Lead in TCLP	Mercury in TCLP	Nick el in TCLP	Z inc in TCLP	Naphthalene in TCLP	Acenaphthylene in TCLP	Acenaphthene in TCLP	Fluorene in TCLP	Phenanthrene in TCLP	Anthracene in TCLP	Fluoranthene in TCLP	Pyrene in TCLP	Benz a)anthracene in TCLP	Chrysene in TCLP	Benz a)k fluoranthene in TCLP	Benz a)pyrene in TCLP	Indeno(1, 2, c3)pyrene - TCLP	Dibenz a, b)anthracene in TCLP	Benz a, b, h,p)ylene in TCLP	Total + vePAH' s	Surrogate p-Terphenyl-d14	On Hold
BH1-0.0-0.1																														✓
BH1-0.8 1.0																														✓
BH2-0.04-0.2	✓	✓	✓	✓									✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
BH2-1.5 1.9																														✓
BH3 0.0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓																		
BH3 0.5 0.6																														✓
BH4-0.0-0.1																														✓
BH5 0.0-0.1																														✓
BH5 0.5 0.6																														✓
BH6-0.0-0.1																														✓
BH6-0.6-0.95																														✓
BH7 0.0-0.1																														✓
BH7 0.5 0.95																														✓
BH9-0.0-0.1																														✓
BH9-0.5 0.95																														✓
BH9-1.8 51.95																														✓
BH9-3 .103 .15																														✓
BH9 - [TRIPLICATE]-0.5 0.95																														✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**



Envirolab Services Pty Ltd

ABN 37 112 535 645

12 Ashley St Chatswood NSW 2067

ph 02 9910 6200 fax 02 9910 6201

customerservice@envirolab.com.au

www.envirolab.com.au

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.

Requests for longer term sample storage must be received in writing.

Andrew Fitzsimons

From: Harry Leonard <HLeonard@jkgroup.net.au>
Sent: Wednesday, 10 October 2018 10:07 AM
To: Customer Service
Cc: Ken Nguyen
Subject: RE: Results for Registration 200697 E31772KL, Normanhurst

Hi,

Could I please order TCLP leachate analysis for the following samples:

- BH2 (0.04-0.2) for PAHs; and - 3
- BH3 (0-0.2) for heavy metals. - 5

Could I please have these on a 2 day turnaround.

Any issues, please let me know.

Regards,

Harry Leonard
Senior Environmental Scientist
NSW Licensed Asbestos Assessor

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

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

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From: Ken Nguyen [mailto:KNguyen@envirolab.com.au]
Sent: Thursday, 20 September 2018 5:31 PM
To: Harry Leonard <HLeonard@jkgroup.net.au>
Subject: Results for Registration 200697 E31772KL, Normanhurst

Please refer to attached for:
a copy of the Certificate of Analysis
a copy of the COC/paperwork received from you
an Excel or .csv file containing the results
Please note that a hard copy will not be posted.

We have a new reporting format and would welcome your feedback. Sydney@envirolab.com.au

ELS: 200697-A
TAT: 2 DAYS
DUE: 12/10/18
Ht2

CERTIFICATE OF ANALYSIS 147 68

Client Details

Client	Environmental Investigation Services
Attention	H. Wang
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	<u>E3 17 7 2K L</u>
Number of Samples	1 Soil
Date samples received	05/09/2018
Date completed instructions received	05/09/2018

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.

Report Details

Date results requested by	11/09/2018
Date of Issue	11/09/2018
NATA Accreditation Number 2901. This document shall not be reproduced except in full.	
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Results Approved By

Chris DeLuca, Senior Chemist

Authorised By

P. Adams

Pamela Adams, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil		
Our Reference		14768-1
Your Reference	UNITS	DUP2
Date Sampled		31/08/2018
Type of sample		Soil
Date extracted	-	06/09/2018
Date analysed	-	07/09/2018
vTRH C ₆ - C ₉	mg/kg	<25
vTRH C ₆ - C ₁₀	mg/kg	<25
TRH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25
Benzene	mg/kg	<0.2
Toluene	mg/kg	<0.5
Ethylbenzene	mg/kg	<1
m+p-xylene	mg/kg	<2
o-Xylene	mg/kg	<1
Naphthalene	mg/kg	<1
Total +ve Xylenes	mg/kg	<1
Surrogate aaa-Trifluorotoluene	%	118

TRH Soil C10-C40 NEPM		
Our Reference		14768-1
Your Reference	UNITS	DUP2
Date Sampled		31/08/2018
Type of sample		Soil
Date extracted	-	06/09/2018
Date analysed	-	07/09/2018
TRH C ₁₀ - C ₁₄	mg/kg	<50
TRH C ₁₅ - C ₂₈	mg/kg	<100
TRH C ₂₉ - C ₃₆	mg/kg	<100
Total +ve TRH (C10-C36)	mg/kg	<50
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	%	90

PAHs in Soil		
Our Reference		14768-1
Your Reference	UNITS	DUP2
Date Sampled		31/08/2018
Type of sample		Soil
Date extracted	-	06/09/2018
Date analysed	-	07/09/2018
Naphthalene	mg/kg	<0.1
Acenaphthylene	mg/kg	<0.1
Acenaphthene	mg/kg	<0.1
Fluorene	mg/kg	<0.1
Phenanthrene	mg/kg	<0.1
Anthracene	mg/kg	<0.1
Fluoranthene	mg/kg	<0.1
Pyrene	mg/kg	<0.1
Benzo(a)anthracene	mg/kg	<0.1
Chrysene	mg/kg	<0.1
Benzo(b,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
Total +ve PAH's	mg/kg	<0.05
Benzo(a)pyrene TEQ calc (Zero)	mg/kg	0
Benzo(a)pyrene TEQ calc (Half)	mg/kg	0.1
Benzo(a)pyrene TEQ calc (PQL)	mg/kg	0.2
Surrogate <i>p</i> -Terphenyl-d ₁₄	%	100

OCP in Soil		
Our Reference		14768-1
Your Reference	UNITS	DUP2
Date Sampled		31/08/2018
Type of sample		Soil
Date extracted	-	06/09/2018
Date analysed	-	07/09/2018
alpha-BHC	mg/kg	<0.1
Hexachlorobenzene	mg/kg	<0.1
beta-BHC	mg/kg	<0.1
gamma-BHC	mg/kg	<0.1
Heptachlor	mg/kg	<0.1
delta-BHC	mg/kg	<0.1
Aldrin	mg/kg	<0.1
Heptachlor Epoxide	mg/kg	<0.1
gamma-Chlordane	mg/kg	<0.1
alpha-chlordane	mg/kg	<0.1
Endosulfan I	mg/kg	<0.1
pp-DDE	mg/kg	<0.1
Dieldrin	mg/kg	<0.1
Endrin	mg/kg	<0.1
Endosulfan II	mg/kg	<0.1
pp-DDD	mg/kg	<0.1
Endrin Aldehyde	mg/kg	<0.1
pp-DDT	mg/kg	<0.1
Endosulfan Sulphate	mg/kg	<0.1
Methoxychlor	mg/kg	<0.1
Total +ve reported DDT+DDD+DDE	mg/kg	<0.1
Surrogate <i>p</i> -Terphenyl-d ₁₄	%	100

OP in Soil		
Our Reference		14768-1
Your Reference	UNITS	DUP2
Date Sampled		31/08/2018
Type of sample		Soil
Date extracted	-	06/09/2018
Date analysed	-	07/09/2018
Azinphos-methyl	mg/kg	<0.1
Bromophos-ethyl	mg/kg	<0.1
Chlorpyrifos	mg/kg	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1
Diazinon	mg/kg	<0.1
Dichlorovos	mg/kg	<0.1
Dimethoate	mg/kg	<0.1
Ethion	mg/kg	<0.1
Fenitrothion	mg/kg	<0.1
Malathion	mg/kg	<0.1
Parathion	mg/kg	<0.1
Ronnel	mg/kg	<0.1
Surrogate <i>p</i> -Terphenyl-d ₁₄	%	100

PCBs in Soil		
Our Reference		14768-1
Your Reference	UNITS	DUP2
Date Sampled		31/08/2018
Type of sample		Soil
Date extracted	-	06/09/2018
Date analysed	-	07/09/2018
Aroclor 1016	mg/kg	<0.1
Aroclor 1221	mg/kg	<0.1
Aroclor 1232	mg/kg	<0.1
Aroclor 1242	mg/kg	<0.1
Aroclor 1248	mg/kg	<0.1
Aroclor 1254	mg/kg	<0.1
Aroclor 1260	mg/kg	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1
Surrogate <i>p</i> -Terphenyl-d ₁₄	%	100

Acid Extractable metals in soil		
Our Reference		14768-1
Your Reference	UNITS	DUP2
Date Sampled		31/08/2018
Type of sample		Soil
Date digested	-	07/09/2018
Date analysed	-	07/09/2018
Arsenic	mg/kg	<4
Cadmium	mg/kg	<0.4
Chromium	mg/kg	45
Copper	mg/kg	16
Lead	mg/kg	17
Mercury	mg/kg	<0.1
Nickel	mg/kg	36
Zinc	mg/kg	38

Moisture		
Our Reference		14768-1
Your Reference	UNITS	DUP2
Date Sampled		31/08/2018
Type of sample		Soil
Date prepared	-	06/09/2018
Date analysed	-	07/09/2018
Moisture	%	13

Method ID	Methodology Summary
Inorg-008	Moisture content determined by heating at 105 deg C for a minimum of 12 hours.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
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.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Note, For OCs 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-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. 'EQ 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. 'EQ 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. 'EQ 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-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.

Method ID	Methodology Summary
Org-012	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD or GC-MS. 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.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 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.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			06/09/2018	[NT]	[NT]	[NT]	[NT]	06/09/2018	[NT]
Date analysed	-			07/09/2018	[NT]	[NT]	[NT]	[NT]	07/09/2018	[NT]
vTRH C ₆ - C ₉	mg/kg	25	Org-016	<25	[NT]	[NT]	[NT]	[NT]	86	[NT]
vTRH C ₆ - C ₁₀	mg/kg	25	Org-016	<25	[NT]	[NT]	[NT]	[NT]	86	[NT]
Benzene	mg/kg	0.2	Org-016	<0.2	[NT]	[NT]	[NT]	[NT]	89	[NT]
Toluene	mg/kg	0.5	Org-016	<0.5	[NT]	[NT]	[NT]	[NT]	90	[NT]
Ethylbenzene	mg/kg	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	84	[NT]
m+p-xylene	mg/kg	2	Org-016	<2	[NT]	[NT]	[NT]	[NT]	83	[NT]
o-Xylene	mg/kg	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	84	[NT]
Naphthalene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	119	[NT]	[NT]	[NT]	[NT]	111	[NT]

QUALITY CONTROL: TRH Soil C10-C40 NEPM					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			06/09/2018	[NT]	[NT]	[NT]	[NT]	06/09/2018	[NT]
Date analysed	-			06/09/2018	[NT]	[NT]	[NT]	[NT]	06/09/2018	[NT]
TRH C ₁₀ - C ₁₄	mg/kg	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	68	[NT]
TRH C ₁₅ - C ₂₈	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	73	[NT]
TRH C ₂₉ - C ₃₆	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	67	[NT]
TRH >C ₁₀ -C ₁₆	mg/kg	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	68	[NT]
TRH >C ₁₆ -C ₃₄	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	73	[NT]
TRH >C ₃₄ -C ₄₀	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	67	[NT]
Surrogate o-Terphenyl	%		Org-003	90	[NT]	[NT]	[NT]	[NT]	84	[NT]

QUALITY CONTROL: PAHs in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			06/09/2018	[NT]	[NT]	[NT]	[NT]	06/09/2018	[NT]
Date analysed	-			07/09/2018	[NT]	[NT]	[NT]	[NT]	07/09/2018	[NT]
Naphthalene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	76	[NT]
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	72	[NT]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	76	[NT]
Phenanthrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	68	[NT]
Anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	68	[NT]
Pyrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	68	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	72	[NT]
Benzo(b,j&k)fluoranthene	mg/kg	0.2	Org-012	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	[NT]	[NT]	[NT]	[NT]	68	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d ₁₄	%		Org-012	92	[NT]	[NT]	[NT]	[NT]	88	[NT]

QUALITY CONTROL: OCP in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			06/09/2018	[NT]	[NT]	[NT]	[NT]	06/09/2018	[NT]
Date analysed	-			07/09/2018	[NT]	[NT]	[NT]	[NT]	07/09/2018	[NT]
alpha-BHC	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	68	[NT]
Hexachlorobenzene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	64	[NT]
gamma-BHC	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	64	[NT]
delta-BHC	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	64	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	68	[NT]
gamma-Chlordane	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	68	[NT]
alpha-chlordane	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	68	[NT]
Dieldrin	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	68	[NT]
Endrin	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	68	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	68	[NT]
Methoxychlor	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate <i>p</i> -Terphenyl-d ₁₄	%		Org-012	92	[NT]	[NT]	[NT]	[NT]	88	[NT]

QUALITY CONTROL: OP in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			06/09/2018	[NT]	[NT]	[NT]	[NT]	06/09/2018	[NT]
Date analysed	-			07/09/2018	[NT]	[NT]	[NT]	[NT]	07/09/2018	[NT]
Azinphos-methyl	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chlorpyrifos	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	68	[NT]
Chlorpyrifos-methyl	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dichlorovos	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ethion	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	76	[NT]
Fenitrothion	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	68	[NT]
Malathion	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Parathion	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate <i>p</i> -Terphenyl-d ₁₄	%		Org-012	92	[NT]	[NT]	[NT]	[NT]	88	[NT]

QUALITY CONTROL: PCBs in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			06/09/2018	[NT]	[NT]	[NT]	[NT]	06/09/2018	[NT]
Date analysed	-			07/09/2018	[NT]	[NT]	[NT]	[NT]	07/09/2018	[NT]
Aroclor 1016	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Aroclor 1260	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate <i>p</i> -Terphenyl-d ₁₄	%		Org-012	92	[NT]	[NT]	[NT]	[NT]	88	[NT]

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date digested	-			06/09/2018	[NT]	[NT]	[NT]	[NT]	06/09/2018	[NT]
Date analysed	-			07/09/2018	[NT]	[NT]	[NT]	[NT]	07/09/2018	[NT]
Arsenic	mg/kg	4	Metals-020 ICP-AES	<4	[NT]	[NT]	[NT]	[NT]	101	[NT]
Cadmium	mg/kg	0.4	Metals-020 ICP-AES	<0.4	[NT]	[NT]	[NT]	[NT]	107	[NT]
Chromium	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Copper	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Lead	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Mercury	mg/kg	0.1	Metals-021 CV-AAS	<0.1	[NT]	[NT]	[NT]	[NT]	105	[NT]
Nickel	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	103	[NT]
Zinc	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	102	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.
Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.	

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: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

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.

SAMPLE RECEIPT ADVICE

Client Details

Client	Environmental Investigation Services
Attention	H. Wang

Sample Login Details

Your reference	E31772KL
Envirolab Reference	14768
Date Sample Received	05/09/2018
Date Instructions Received	05/09/2018
Date Results Expected to be Reported	11/09/2018

Sample Condition

Samples received in appropriate condition for analysis	YES
No. of Samples Provided	1 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	11
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Pamela Adams

Phone: 03 9763 2500

Fax: 03 9763 2633

Email: padams@envirolab.com.au

Analisa Mathrick

Phone: 03 9763 2500

Fax: 03 9763 2633

Email: amathrick @envirolab.com.au

Analysis Underway, details on the following page:

Sample ID	VTRH(C6-C10)/BTEXN in Soil	TRH Soil C10-C40 NEPM	PAHs in Soil	OCP in Soil	OP in Soil	PCBs in Soil	Acid Extractable metals in soil
DUP2	✓	✓	✓	✓	✓	✓	✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.

Requests for longer term sample storage must be received in writing.

THIS

[illegible]

Remarks (comments/detection limits required): Please send OVP2 as inter-lab duplicate to Victoria.		Sample Containers: G - 250mg Glass Jar A - Ziplock Asbestos Bag P - Plastic Bag	
Relinquished By: HW  Kevin	Date: 3/9/2018	Time:	Received By: J. C. M. B. L. E. N. 
			Date: 3/9/18

14:30

CERTIFICATE OF ANALYSIS 214605

Client Details

Client	Environmental Investigation Services
Attention	Harry Leonard
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	<u>E3 17 7 2K L, Normanhurst</u>
Number of Samples	63 soil, 1 material
Date samples received	29/03/2019
Date completed instructions received	29/03/2019

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	05/04/2019
Date of Issue	05/04/2019
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 *	

Asbestos Approved By

Analysed by Asbestos Approved Identifier: Matt Tang
 Authorised by Asbestos Approved Signatory: Matt Tang

Results Approved By

Giovanni Agosti, Group Technical Manager
 Jeremy Faircloth, Operations Manager, Sydney
 Ken Nguyen, Reporting Supervisor
 Matthew Tang, Asbestos Supervisor
 Nancy Zhang, Laboratory Manager, Sydney
 Nick Sarlamis, Inorganics Supervisor
 Steven Luong, Organics Supervisor

Authorised By



Jacinta Hux, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil

Our Reference		214605-1	214605-2	214605-3	214605-5	214605-6
Your Reference	UNITS	BH101	BH101	BH102	BH103	BH103
Depth		0-0.1	0.6-0.8	0-0.2	0-0.1	0.2-0.3
Date Sampled		27/03/2019	27/03/2019	27/03/2019	27/03/2019	27/03/2019
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Date analysed	-	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019
TRH C ₆ - C ₉	mg/kg	<25	<25	<25	<25	<25
TRH C ₆ - C ₁₀	mg/kg	<25	<25	<25	<25	<25
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	91	91	71	92	83

vTRH(C6-C10)/BTEXN in Soil

Our Reference		214605-8	214605-9	214605-11	214605-12	214605-13
Your Reference	UNITS	BH104	BH104	BH105	BH106	BH107
Depth		0.4-0.6	0.8-0.9	0.2-0.4	0.03-0.15	0-0.1
Date Sampled		27/03/2019	27/03/2019	27/03/2019	27/03/2019	27/03/2019
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Date analysed	-	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019
TRH C ₆ - C ₉	mg/kg	<25	<25	<25	<25	<25
TRH C ₆ - C ₁₀	mg/kg	<25	<25	<25	<25	<25
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	92	92	92	92	87

vTRH(C6-C10)/BTEXN in Soil

Our Reference		214605-14	214605-15	214605-17	214605-18	214605-19
Your Reference	UNITS	BH107	BH108	BH109	BH109	BH110
Depth		0.5-0.8	0.05-0.2	0.05-0.15	0.5-0.7	0-0.1
Date Sampled		27/03/2019	28/03/2019	27/03/2019	27/03/2019	28/03/2019
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Date analysed	-	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019
TRH C ₆ - C ₉	mg/kg	<25	<25	<25	<25	<25
TRH C ₆ - C ₁₀	mg/kg	<25	<25	<25	<25	<25
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	92	93	94	80	92

vTRH(C6-C10)/BTEXN in Soil

Our Reference		214605-21	214605-22	214605-23	214605-25	214605-26
Your Reference	UNITS	BH111	BH111	BH112	BH113	BH113
Depth		0.6-0.95	1.5-1.95	0-0.1	0-0.1	0.5-0.8
Date Sampled		28/03/2019	28/03/2019	27/03/2019	27/03/2019	27/03/2019
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Date analysed	-	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019
TRH C ₆ - C ₉	mg/kg	<25	<25	<25	<25	<25
TRH C ₆ - C ₁₀	mg/kg	<25	<25	<25	<25	<25
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	91	90	74	92	89

vTRH(C6-C10)/BTEXN in Soil

Our Reference		214605-27	214605-29	214605-30	214605-32	214605-34
Your Reference	UNITS	BH114	BH115	BH115	BH116	BH116
Depth		0.12-0.2	0.04-0.2	1.5-1.7	0.7-0.95	1.8-1.95
Date Sampled		27/03/2019	27/03/2019	27/03/2019	27/03/2019	27/03/2019
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Date analysed	-	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019
TRH C ₆ - C ₉	mg/kg	<25	<25	<25	<25	<25
TRH C ₆ - C ₁₀	mg/kg	<25	<25	<25	<25	<25
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	89	89	91	93	94

vTRH(C6-C10)/BTEXN in Soil

Our Reference		214605-36	214605-37	214605-38	214605-39
Your Reference	UNITS	BH117	BH117	TB1	DUPRK1
Depth		0.2-0.4	1.0-1.2	-	-
Date Sampled		27/03/2019	27/03/2019	27/03/2019	27/03/2019
Type of sample		soil	soil	soil	soil
Date extracted	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Date analysed	-	03/04/2019	03/04/2019	03/04/2019	03/04/2019
TRH C ₆ - C ₉	mg/kg	<25	<25	<25	<25
TRH C ₆ - C ₁₀	mg/kg	<25	<25	<25	<25
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	91	94	96	92

svTRH (C10-C40) in Soil						
Our Reference		214605-1	214605-2	214605-3	214605-5	214605-6
Your Reference	UNITS	BH101	BH101	BH102	BH103	BH103
Depth		0-0.1	0.6-0.8	0-0.2	0-0.1	0.2-0.3
Date Sampled		27/03/2019	27/03/2019	27/03/2019	27/03/2019	27/03/2019
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Date analysed	-	01/04/2019	01/04/2019	02/04/2019	02/04/2019	02/04/2019
TRH C ₁₀ - C ₁₄	mg/kg	<50	<50	<50	<50	<50
TRH C ₁₅ - C ₂₈	mg/kg	<100	<100	<100	<100	<100
TRH C ₂₉ - C ₃₆	mg/kg	<100	<100	<100	<100	<100
TRH >C ₁₀ -C ₁₆	mg/kg	<50	<50	<50	<50	<50
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C ₁₆ -C ₃₄	mg/kg	<100	<100	<100	<100	<100
TRH >C ₃₄ -C ₄₀	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	99	100	101	96	98

svTRH (C10-C40) in Soil						
Our Reference		214605-8	214605-9	214605-11	214605-12	214605-13
Your Reference	UNITS	BH104	BH104	BH105	BH106	BH107
Depth		0.4-0.6	0.8-0.9	0.2-0.4	0.03-0.15	0-0.1
Date Sampled		27/03/2019	27/03/2019	27/03/2019	27/03/2019	27/03/2019
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Date analysed	-	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019
TRH C ₁₀ - C ₁₄	mg/kg	<50	<50	<50	<50	<50
TRH C ₁₅ - C ₂₈	mg/kg	<100	<100	230	400	<100
TRH C ₂₉ - C ₃₆	mg/kg	<100	<100	280	610	<100
TRH >C ₁₀ -C ₁₆	mg/kg	<50	<50	<50	60	<50
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	<50	<50	<50	60	<50
TRH >C ₁₆ -C ₃₄	mg/kg	<100	<100	410	770	<100
TRH >C ₃₄ -C ₄₀	mg/kg	<100	<100	300	710	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	700	1,500	<50
Surrogate o-Terphenyl	%	93	96	99	107	100

svTRH (C10-C40) in Soil

Our Reference		214605-14	214605-15	214605-17	214605-18	214605-19
Your Reference	UNITS	BH107	BH108	BH109	BH109	BH110
Depth		0.5-0.8	0.05-0.2	0.05-0.15	0.5-0.7	0-0.1
Date Sampled		27/03/2019	28/03/2019	27/03/2019	27/03/2019	28/03/2019
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Date analysed	-	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019
TRH C ₁₀ - C ₁₄	mg/kg	<50	<50	<50	<50	<50
TRH C ₁₅ - C ₂₈	mg/kg	<100	<100	<100	<100	<100
TRH C ₂₉ - C ₃₆	mg/kg	<100	<100	130	<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	130	<100	<100
TRH >C ₃₄ -C ₄₀	mg/kg	<100	<100	170	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	300	<50	<50
Surrogate o-Terphenyl	%	112	94	93	94	93

svTRH (C10-C40) in Soil

Our Reference		214605-21	214605-22	214605-23	214605-25	214605-26
Your Reference	UNITS	BH111	BH111	BH112	BH113	BH113
Depth		0.6-0.95	1.5-1.95	0-0.1	0-0.1	0.5-0.8
Date Sampled		28/03/2019	28/03/2019	27/03/2019	27/03/2019	27/03/2019
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Date analysed	-	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019
TRH C ₁₀ - C ₁₄	mg/kg	140	<50	<50	<50	<50
TRH C ₁₅ - C ₂₈	mg/kg	<100	<100	<100	<100	<100
TRH C ₂₉ - C ₃₆	mg/kg	<100	<100	<100	<100	<100
TRH >C ₁₀ -C ₁₆	mg/kg	120	<50	<50	<50	<50
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	120	<50	<50	<50	<50
TRH >C ₁₆ -C ₃₄	mg/kg	<100	<100	<100	<100	<100
TRH >C ₃₄ -C ₄₀	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	120	<50	<50	<50	<50
Surrogate o-Terphenyl	%	97	94	98	100	106

svTRH (C10-C40) in Soil

Our Reference		214605-27	214605-29	214605-30	214605-32	214605-34
Your Reference	UNITS	BH114	BH115	BH115	BH116	BH116
Depth		0.12-0.2	0.04-0.2	1.5-1.7	0.7-0.95	1.8-1.95
Date Sampled		27/03/2019	27/03/2019	27/03/2019	27/03/2019	27/03/2019
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Date analysed	-	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019
TRH C ₁₀ - C ₁₄	mg/kg	<50	<50	<50	<50	<50
TRH C ₁₅ - C ₂₈	mg/kg	<100	<100	<100	<100	<100
TRH C ₂₉ - C ₃₆	mg/kg	<100	<100	<100	<100	<100
TRH >C ₁₀ -C ₁₆	mg/kg	<50	<50	<50	<50	<50
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C ₁₆ -C ₃₄	mg/kg	<100	<100	<100	<100	<100
TRH >C ₃₄ -C ₄₀	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	108	97	95	94	97

svTRH (C10-C40) in Soil

Our Reference		214605-36	214605-37	214605-39
Your Reference	UNITS	BH117	BH117	DUPRK1
Depth		0.2-0.4	1.0-1.2	-
Date Sampled		27/03/2019	27/03/2019	27/03/2019
Type of sample		soil	soil	soil
Date extracted	-	01/04/2019	01/04/2019	01/04/2019
Date analysed	-	02/04/2019	02/04/2019	02/04/2019
TRH C ₁₀ - C ₁₄	mg/kg	<50	<50	<50
TRH C ₁₅ - C ₂₈	mg/kg	<100	<100	<100
TRH C ₂₉ - C ₃₆	mg/kg	<100	<100	170
TRH >C ₁₀ -C ₁₆	mg/kg	<50	<50	<50
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	<50	<50	<50
TRH >C ₁₆ -C ₃₄	mg/kg	<100	<100	180
TRH >C ₃₄ -C ₄₀	mg/kg	<100	<100	200
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	380
Surrogate o-Terphenyl	%	94	93	94

PAHs in Soil						
Our Reference		214605-1	214605-2	214605-3	214605-5	214605-6
Your Reference	UNITS	BH101	BH101	BH102	BH103	BH103
Depth		0-0.1	0.6-0.8	0-0.2	0-0.1	0.2-0.3
Date Sampled		27/03/2019	27/03/2019	27/03/2019	27/03/2019	27/03/2019
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Date analysed	-	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019
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	0.4	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	1.2	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	1.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.4	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.4	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	0.7	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	0.4	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	0.2	<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	0.3	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	5.0	<0.05	<0.05	<0.05	<0.05
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	0.6	<0.5	<0.5	<0.5	<0.5
Surrogate <i>p</i> -Terphenyl-d14	%	135	110	104	102	113

PAHs in Soil						
Our Reference		214605-8	214605-9	214605-11	214605-12	214605-13
Your Reference	UNITS	BH104	BH104	BH105	BH106	BH107
Depth		0.4-0.6	0.8-0.9	0.2-0.4	0.03-0.15	0-0.1
Date Sampled		27/03/2019	27/03/2019	27/03/2019	27/03/2019	27/03/2019
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Date analysed	-	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019
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	0.2	0.4	<0.1
Fluorene	mg/kg	<0.1	<0.1	0.2	0.2	<0.1
Phenanthrene	mg/kg	1.8	<0.1	5.4	5.5	<0.1
Anthracene	mg/kg	0.4	<0.1	1.1	1.3	<0.1
Fluoranthene	mg/kg	5.5	<0.1	13	14	<0.1
Pyrene	mg/kg	5.0	<0.1	12	12	<0.1
Benzo(a)anthracene	mg/kg	1.8	<0.1	4.1	4.2	<0.1
Chrysene	mg/kg	2.5	<0.1	5.6	5.5	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	3.7	<0.2	8.0	8.0	<0.2
Benzo(a)pyrene	mg/kg	1.7	<0.05	4.1	4.2	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	1.3	<0.1	2.7	3.0	<0.1
Dibenzo(a,h)anthracene	mg/kg	0.3	<0.1	0.6	0.6	<0.1
Benzo(g,h,i)perylene	mg/kg	1.9	<0.1	3.7	3.9	<0.1
Total +ve PAH's	mg/kg	26	<0.05	60	63	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	2.7	<0.5	6.3	6.4	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	2.7	<0.5	6.3	6.4	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	2.7	<0.5	6.3	6.4	<0.5
Surrogate p-Terphenyl-d14	%	111	108	102	104	101

PAHs in Soil						
Our Reference		214605-14	214605-15	214605-17	214605-18	214605-19
Your Reference	UNITS	BH107	BH108	BH109	BH109	BH110
Depth		0.5-0.8	0.05-0.2	0.05-0.15	0.5-0.7	0-0.1
Date Sampled		27/03/2019	28/03/2019	27/03/2019	27/03/2019	28/03/2019
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Date analysed	-	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	0.3	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	0.6	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	0.8	<0.1	0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	0.3	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	0.4	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	0.7	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	0.4	<0.05	0.06
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	0.2	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	0.3	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	4.2	<0.05	0.2
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	0.6	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	0.6	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	100	99	108	97	110

PAHs in Soil						
Our Reference		214605-21	214605-22	214605-23	214605-25	214605-26
Your Reference	UNITS	BH111	BH111	BH112	BH113	BH113
Depth		0.6-0.95	1.5-1.95	0-0.1	0-0.1	0.5-0.8
Date Sampled		28/03/2019	28/03/2019	27/03/2019	27/03/2019	27/03/2019
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Date analysed	-	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.3	<0.1	<0.1	0.3	<0.1
Pyrene	mg/kg	0.3	<0.1	<0.1	0.3	<0.1
Benzo(a)anthracene	mg/kg	0.2	<0.1	<0.1	0.2	<0.1
Chrysene	mg/kg	0.3	<0.1	<0.1	0.2	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	0.4	<0.2	<0.2	0.4	<0.2
Benzo(a)pyrene	mg/kg	0.2	<0.05	0.05	0.2	<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
Total +ve PAH's	mg/kg	1.7	<0.05	0.05	1.8	<0.05
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
Surrogate p-Terphenyl-d14	%	116	105	115	105	111

PAHs in Soil						
Our Reference		214605-27	214605-29	214605-30	214605-32	214605-34
Your Reference	UNITS	BH114	BH115	BH115	BH116	BH116
Depth		0.12-0.2	0.04-0.2	1.5-1.7	0.7-0.95	1.8-1.95
Date Sampled		27/03/2019	27/03/2019	27/03/2019	27/03/2019	27/03/2019
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Date analysed	-	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	0.5	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	<0.1	1.3	<0.1
Pyrene	mg/kg	0.2	<0.1	<0.1	1.2	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	0.6	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	0.8	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	1	<0.2
Benzo(a)pyrene	mg/kg	0.07	<0.05	<0.05	0.62	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	0.4	<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	0.5	<0.1
Total +ve PAH's	mg/kg	0.3	<0.05	<0.05	6.8	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	0.8	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	0.9	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	0.9	<0.5
Surrogate p-Terphenyl-d14	%	95	113	104	109	118

PAHs in Soil				
Our Reference		214605-36	214605-37	214605-39
Your Reference	UNITS	BH117	BH117	DUPRK1
Depth		0.2-0.4	1.0-1.2	-
Date Sampled		27/03/2019	27/03/2019	27/03/2019
Type of sample		soil	soil	soil
Date extracted	-	01/04/2019	01/04/2019	01/04/2019
Date analysed	-	02/04/2019	02/04/2019	02/04/2019
Naphthalene	mg/kg	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	0.6
Anthracene	mg/kg	<0.1	<0.1	0.1
Fluoranthene	mg/kg	<0.1	<0.1	1.3
Pyrene	mg/kg	<0.1	<0.1	1.4
Benzo(a)anthracene	mg/kg	<0.1	<0.1	0.5
Chrysene	mg/kg	<0.1	<0.1	0.8
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	1
Benzo(a)pyrene	mg/kg	<0.05	<0.05	0.56
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	0.3
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	0.5
Total +ve PAH's	mg/kg	<0.05	<0.05	7.0
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	0.8
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	0.8
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	0.9
Surrogate <i>p</i> -Terphenyl-d14	%	115	97	103

Organochlorine Pesticides in soil						
Our Reference		214605-1	214605-3	214605-5	214605-8	214605-11
Your Reference	UNITS	BH101	BH102	BH103	BH104	BH105
Depth		0-0.1	0-0.2	0-0.1	0.4-0.6	0.2-0.4
Date Sampled		27/03/2019	27/03/2019	27/03/2019	27/03/2019	27/03/2019
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Date analysed	-	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	98	101	96	95	93

Organochlorine Pesticides in soil

Our Reference		214605-12	214605-13	214605-15	214605-17	214605-19
Your Reference	UNITS	BH106	BH107	BH108	BH109	BH110
Depth		0.03-0.15	0-0.1	0.05-0.2	0.05-0.15	0-0.1
Date Sampled		27/03/2019	27/03/2019	28/03/2019	27/03/2019	28/03/2019
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Date analysed	-	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	90	97	98	96	95

Organochlorine Pesticides in soil						
Our Reference		214605-21	214605-23	214605-25	214605-27	214605-29
Your Reference	UNITS	BH111	BH112	BH113	BH114	BH115
Depth		0.6-0.95	0-0.1	0-0.1	0.12-0.2	0.04-0.2
Date Sampled		28/03/2019	27/03/2019	27/03/2019	27/03/2019	27/03/2019
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Date analysed	-	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	98	97	98	95	96

Organochlorine Pesticides in soil			
Our Reference		214605-32	214605-36
Your Reference	UNITS	BH116	BH117
Depth		0.7-0.95	0.2-0.4
Date Sampled		27/03/2019	27/03/2019
Type of sample		soil	soil
Date extracted	-	01/04/2019	01/04/2019
Date analysed	-	03/04/2019	03/04/2019
HCB	mg/kg	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1
Surrogate TCMX	%	96	96

Organophosphorus Pesticides

Our Reference		214605-1	214605-3	214605-5	214605-8	214605-11
Your Reference	UNITS	BH101	BH102	BH103	BH104	BH105
Depth		0-0.1	0-0.2	0-0.1	0.4-0.6	0.2-0.4
Date Sampled		27/03/2019	27/03/2019	27/03/2019	27/03/2019	27/03/2019
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Date analysed	-	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019
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
Chlorpyrifos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
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	%	98	101	96	95	93

Organophosphorus Pesticides

Our Reference		214605-12	214605-13	214605-15	214605-17	214605-19
Your Reference	UNITS	BH106	BH107	BH108	BH109	BH110
Depth		0.03-0.15	0-0.1	0.05-0.2	0.05-0.15	0-0.1
Date Sampled		27/03/2019	27/03/2019	28/03/2019	27/03/2019	28/03/2019
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Date analysed	-	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019
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
Chlorpyrifos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
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	97	98	96	95

Organophosphorus Pesticides

Our Reference		214605-21	214605-23	214605-25	214605-27	214605-29
Your Reference	UNITS	BH111	BH112	BH113	BH114	BH115
Depth		0.6-0.95	0-0.1	0-0.1	0.12-0.2	0.04-0.2
Date Sampled		28/03/2019	27/03/2019	27/03/2019	27/03/2019	27/03/2019
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Date analysed	-	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019
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
Chlorpyrifos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
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	%	98	97	98	95	96

Organophosphorus Pesticides

Our Reference		214605-32	214605-36
Your Reference	UNITS	BH116	BH117
Depth		0.7-0.95	0.2-0.4
Date Sampled		27/03/2019	27/03/2019
Type of sample		soil	soil
Date extracted	-	01/04/2019	01/04/2019
Date analysed	-	03/04/2019	03/04/2019
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1
Chlorpyrifos	mg/kg	<0.1	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1
Surrogate TCMX	%	96	96

PCBs in Soil						
Our Reference	UNITS	214605-1	214605-3	214605-5	214605-8	214605-11
Your Reference		BH101	BH102	BH103	BH104	BH105
Depth		0-0.1	0-0.2	0-0.1	0.4-0.6	0.2-0.4
Date Sampled		27/03/2019	27/03/2019	27/03/2019	27/03/2019	27/03/2019
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Date analysed	-	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	98	101	96	95	93

PCBs in Soil						
Our Reference	UNITS	214605-12	214605-13	214605-15	214605-17	214605-19
Your Reference		BH106	BH107	BH108	BH109	BH110
Depth		0.03-0.15	0-0.1	0.05-0.2	0.05-0.15	0-0.1
Date Sampled		27/03/2019	27/03/2019	28/03/2019	27/03/2019	28/03/2019
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Date analysed	-	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	90	97	98	96	95

PCBs in Soil						
Our Reference		214605-21	214605-23	214605-25	214605-27	214605-29
Your Reference	UNITS	BH111	BH112	BH113	BH114	BH115
Depth		0.6-0.95	0-0.1	0-0.1	0.12-0.2	0.04-0.2
Date Sampled		28/03/2019	27/03/2019	27/03/2019	27/03/2019	27/03/2019
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Date analysed	-	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	98	97	98	95	96

PCBs in Soil			
Our Reference		214605-32	214605-36
Your Reference	UNITS	BH116	BH117
Depth		0.7-0.95	0.2-0.4
Date Sampled		27/03/2019	27/03/2019
Type of sample		soil	soil
Date extracted	-	01/04/2019	01/04/2019
Date analysed	-	03/04/2019	03/04/2019
Aroclor 1016	mg/kg	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1
Surrogate TCLMX	%	96	96

Acid Extractable metals in soil

Our Reference		214605-1	214605-2	214605-3	214605-5	214605-6
Your Reference	UNITS	BH101	BH101	BH102	BH103	BH103
Depth		0-0.1	0.6-0.8	0-0.2	0-0.1	0.2-0.3
Date Sampled		27/03/2019	27/03/2019	27/03/2019	27/03/2019	27/03/2019
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Date analysed	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Arsenic	mg/kg	4	<4	4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	11	9	9	8	9
Copper	mg/kg	23	8	15	29	42
Lead	mg/kg	19	17	15	17	16
Mercury	mg/kg	<0.1	<0.1	<0.1	0.1	0.1
Nickel	mg/kg	8	<1	6	5	6
Zinc	mg/kg	100	2	31	30	32

Acid Extractable metals in soil

Our Reference		214605-8	214605-9	214605-11	214605-12	214605-13
Your Reference	UNITS	BH104	BH104	BH105	BH106	BH107
Depth		0.4-0.6	0.8-0.9	0.2-0.4	0.03-0.15	0-0.1
Date Sampled		27/03/2019	27/03/2019	27/03/2019	27/03/2019	27/03/2019
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Date analysed	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Arsenic	mg/kg	<4	5	<4	<4	8
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	7	4	12	38	17
Copper	mg/kg	30	21	67	86	29
Lead	mg/kg	19	28	14	14	150
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	3	1	12	40	11
Zinc	mg/kg	12	4	60	55	150

Acid Extractable metals in soil

Our Reference		214605-14	214605-15	214605-17	214605-18	214605-19
Your Reference	UNITS	BH107	BH108	BH109	BH109	BH110
Depth		0.5-0.8	0.05-0.2	0.05-0.15	0.5-0.7	0-0.1
Date Sampled		27/03/2019	28/03/2019	27/03/2019	27/03/2019	28/03/2019
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Date analysed	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Arsenic	mg/kg	6	<4	<4	4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	14	20	77	12	15
Copper	mg/kg	10	58	34	16	19
Lead	mg/kg	15	8	11	21	34
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	2	82	69	1	10
Zinc	mg/kg	5	41	47	5	33

Acid Extractable metals in soil

Our Reference		214605-21	214605-22	214605-23	214605-25	214605-26
Your Reference	UNITS	BH111	BH111	BH112	BH113	BH113
Depth		0.6-0.95	1.5-1.95	0-0.1	0-0.1	0.5-0.8
Date Sampled		28/03/2019	28/03/2019	27/03/2019	27/03/2019	27/03/2019
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Date analysed	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Arsenic	mg/kg	20	5	4	7	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	17	12	19	38	5
Copper	mg/kg	21	13	32	36	19
Lead	mg/kg	83	20	41	97	17
Mercury	mg/kg	<0.1	<0.1	<0.1	0.1	<0.1
Nickel	mg/kg	6	<1	6	28	<1
Zinc	mg/kg	66	2	53	91	2

Acid Extractable metals in soil

Our Reference		214605-27	214605-29	214605-30	214605-32	214605-34
Your Reference	UNITS	BH114	BH115	BH115	BH116	BH116
Depth		0.12-0.2	0.04-0.2	1.5-1.7	0.7-0.95	1.8-1.95
Date Sampled		27/03/2019	27/03/2019	27/03/2019	27/03/2019	27/03/2019
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Date analysed	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Arsenic	mg/kg	6	5	6	5	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	1	<0.4
Chromium	mg/kg	17	8	16	20	7
Copper	mg/kg	28	28	17	35	59
Lead	mg/kg	75	120	26	250	18
Mercury	mg/kg	<0.1	<0.1	<0.1	0.3	<0.1
Nickel	mg/kg	11	3	1	14	12
Zinc	mg/kg	52	29	7	590	42

Acid Extractable metals in soil

Our Reference		214605-36	214605-37	214605-39	214605-64
Your Reference	UNITS	BH117	BH117	DUPRK1	BH101 - [TRIPLICATE]
Depth		0.2-0.4	1.0-1.2	-	0-0.1
Date Sampled		27/03/2019	27/03/2019	27/03/2019	27/03/2019
Type of sample		soil	soil	soil	soil
Date prepared	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Date analysed	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Arsenic	mg/kg	<4	4	<4	5
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	12	5	64	11
Copper	mg/kg	20	20	30	21
Lead	mg/kg	22	26	10	18
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	3	<1	55	8
Zinc	mg/kg	9	5	46	43

Moisture						
Our Reference	UNITS	214605-1	214605-2	214605-3	214605-5	214605-6
Your Reference		BH101	BH101	BH102	BH103	BH103
Depth		0-0.1	0.6-0.8	0-0.2	0-0.1	0.2-0.3
Date Sampled		27/03/2019	27/03/2019	27/03/2019	27/03/2019	27/03/2019
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Date analysed	-	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019
Moisture	%	28	18	23	10	6.2

Moisture						
Our Reference	UNITS	214605-8	214605-9	214605-11	214605-12	214605-13
Your Reference		BH104	BH104	BH105	BH106	BH107
Depth		0.4-0.6	0.8-0.9	0.2-0.4	0.03-0.15	0-0.1
Date Sampled		27/03/2019	27/03/2019	27/03/2019	27/03/2019	27/03/2019
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Date analysed	-	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019
Moisture	%	16	19	14	7.3	18

Moisture						
Our Reference	UNITS	214605-14	214605-15	214605-17	214605-18	214605-19
Your Reference		BH107	BH108	BH109	BH109	BH110
Depth		0.5-0.8	0.05-0.2	0.05-0.15	0.5-0.7	0-0.1
Date Sampled		27/03/2019	28/03/2019	27/03/2019	27/03/2019	28/03/2019
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Date analysed	-	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019
Moisture	%	21	5.5	12	21	15

Moisture						
Our Reference	UNITS	214605-21	214605-22	214605-23	214605-25	214605-26
Your Reference		BH111	BH111	BH112	BH113	BH113
Depth		0.6-0.95	1.5-1.95	0-0.1	0-0.1	0.5-0.8
Date Sampled		28/03/2019	28/03/2019	27/03/2019	27/03/2019	27/03/2019
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Date analysed	-	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019
Moisture	%	19	21	28	21	20

Moisture						
Our Reference	UNITS	214605-27	214605-29	214605-30	214605-32	214605-34
Your Reference		BH114	BH115	BH115	BH116	BH116
Depth		0.12-0.2	0.04-0.2	1.5-1.7	0.7-0.95	1.8-1.95
Date Sampled		27/03/2019	27/03/2019	27/03/2019	27/03/2019	27/03/2019
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Date analysed	-	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019
Moisture	%	22	17	16	16	9.2

Moisture				
Our Reference	UNITS	214605-36	214605-37	214605-39
Your Reference		BH117	BH117	DUPRK1
Depth		0.2-0.4	1.0-1.2	-
Date Sampled		27/03/2019	27/03/2019	27/03/2019
Type of sample		soil	soil	soil
Date prepared	-	01/04/2019	01/04/2019	01/04/2019
Date analysed	-	02/04/2019	02/04/2019	02/04/2019
Moisture	%	21	15	10

Asbestos ID - soils						
Our Reference	UNITS	214605-1	214605-3	214605-5	214605-8	214605-11
Your Reference		BH101	BH102	BH103	BH104	BH105
Depth		0-0.1	0-0.2	0-0.1	0.4-0.6	0.2-0.4
Date Sampled		27/03/2019	27/03/2019	27/03/2019	27/03/2019	27/03/2019
Type of sample		soil	soil	soil	soil	soil
Date analysed	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Sample mass tested	g	Approx. 20g	Approx. 25g	Approx. 35g	Approx. 70g	Approx. 30g
Sample Description	-	Brown sandy soil & rocks	Brown sandy soil & rocks	Brown sandy soil & rocks	Brown sandy soil & rocks	Brown sandy 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	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

Asbestos ID - soils

Our Reference		214605-12	214605-13	214605-15	214605-17	214605-19
Your Reference	UNITS	BH106	BH107	BH108	BH109	BH110
Depth		0.03-0.15	0-0.1	0.05-0.2	0.05-0.15	0-0.1
Date Sampled		27/03/2019	27/03/2019	28/03/2019	27/03/2019	28/03/2019
Type of sample		soil	soil	soil	soil	soil
Date analysed	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Sample mass tested	g	Approx. 50g	Approx. 20g	Approx. 30g	Approx. 40g	Approx. 25g
Sample Description	-	Brown sandy soil & rocks	Brown coarse-grained soil & rocks	Brown sandy soil & rocks	Brown sandy soil & rocks	Brown sandy 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	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

Asbestos ID - soils

Our Reference		214605-21	214605-23	214605-25	214605-27	214605-29
Your Reference	UNITS	BH111	BH112	BH113	BH114	BH115
Depth		0.6-0.95	0-0.1	0-0.1	0.12-0.2	0.04-0.2
Date Sampled		28/03/2019	27/03/2019	27/03/2019	27/03/2019	27/03/2019
Type of sample		soil	soil	soil	soil	soil
Date analysed	-	01/04/2019	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Sample mass tested	g	Approx. 30g	Approx. 30g	Approx. 20g	Approx. 40g	Approx. 25g
Sample Description	-	Brown sandy soil & rocks	Brown sandy soil & rocks	Brown sandy soil & rocks	Brown sandy soil & rocks	Brown sandy 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	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

Asbestos ID - soils			
Our Reference		214605-32	214605-36
Your Reference	UNITS	BH116	BH117
Depth		0.7-0.95	0.2-0.4
Date Sampled		27/03/2019	27/03/2019
Type of sample		soil	soil
Date analysed	-	01/04/2019	01/04/2019
Sample mass tested	g	Approx. 25g	Approx. 25g
Sample Description	-	Brown sandy soil & rocks	Brown sandy soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg
		Organic fibres detected	Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected

Misc Inorg - Soil			
Our Reference		214605-13	214605-37
Your Reference	UNITS	BH107	BH117
Depth		0-0.1	1.0-1.2
Date Sampled		27/03/2019	27/03/2019
Type of sample		soil	soil
Date prepared	-	02/04/2019	02/04/2019
Date analysed	-	02/04/2019	02/04/2019
pH 1:5 soil:water	pH Units	6.6	5.1

Clay 50-120g			
Our Reference	UNITS	214605-13	214605-37
Your Reference		BH107	BH117
Depth		0-0.1	1.0-1.2
Date Sampled		27/03/2019	27/03/2019
Type of sample		soil	soil
Date prepared	-	02/04/2019	02/04/2019
Date analysed	-	02/04/2019	02/04/2019
Clay in soils <2µm	% (w/w)	28	43

CEC			
Our Reference		214605-13	214605-37
Your Reference	UNITS	BH107	BH117
Depth		0-0.1	1.0-1.2
Date Sampled		27/03/2019	27/03/2019
Type of sample		soil	soil
Date prepared	-	03/04/2019	03/04/2019
Date analysed	-	03/04/2019	03/04/2019
Exchangeable Ca	meq/100g	8.7	0.5
Exchangeable K	meq/100g	0.8	0.2
Exchangeable Mg	meq/100g	1.9	0.89
Exchangeable Na	meq/100g	<0.1	0.18
Cation Exchange Capacity	meq/100g	11	1.8

BTEX in Water		
Our Reference		214605-42
Your Reference	UNITS	FRAM1
Depth		-
Date Sampled		27/03/2019
Type of sample		soil
Date extracted	-	01/04/2019
Date analysed	-	03/04/2019
Benzene	µg/L	<1
Toluene	µg/L	<1
Ethylbenzene	µg/L	<1
m+p-xylene	µg/L	<2
o-xylene	µg/L	<1
Surrogate Dibromofluoromethane	%	99
Surrogate toluene-d8	%	97
Surrogate 4-BFB	%	96

Asbestos ID - materials		
Our Reference	UNITS	214605-65
Your Reference		AMF1
Depth		-
Date Sampled		27/03/2019
Type of sample		material
Date analysed	-	03/04/2019
Mass / Dimension of Sample	-	72x27x5mm
Sample Description	-	Beige layered fibre cement material
Asbestos ID in materials	-	Chrysotile asbestos detected Organic fibres detected

Method ID	Methodology Summary
AS1289.3.6.3	Determination Particle Size Analysis using AS1289.3.6.3 and AS1289.3.6.1 and in house method INORG-107. Clay fraction at <2µm reported.
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.
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.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-009	Determination of exchangeable cations and cation exchange capacity in soils using 1M Ammonium Chloride exchange and ICP-AES analytical finish.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
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-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-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.
Org-008	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.

Method ID	Methodology Summary
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. 'EQ 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. 'EQ 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. 'EQ 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-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTX 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)-BTX 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.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	214605-3
Date extracted	-			01/04/2019	1	01/04/2019	01/04/2019		01/04/2019	01/04/2019
Date analysed	-			03/04/2019	1	03/04/2019	03/04/2019		03/04/2019	03/04/2019
TRH C ₆ - C ₉	mg/kg	25	Org-016	<25	1	<25	<25	0	88	94
TRH C ₆ - C ₁₀	mg/kg	25	Org-016	<25	1	<25	<25	0	88	94
Benzene	mg/kg	0.2	Org-016	<0.2	1	<0.2	<0.2	0	90	95
Toluene	mg/kg	0.5	Org-016	<0.5	1	<0.5	<0.5	0	93	94
Ethylbenzene	mg/kg	1	Org-016	<1	1	<1	<1	0	88	93
m+p-xylene	mg/kg	2	Org-016	<2	1	<2	<2	0	85	95
o-Xylene	mg/kg	1	Org-016	<1	1	<1	<1	0	89	96
naphthalene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	85	1	91	88	3	89	112

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	214605-32
Date extracted	-			[NT]	15	01/04/2019	01/04/2019		01/04/2019	01/04/2019
Date analysed	-			[NT]	15	03/04/2019	03/04/2019		03/04/2019	03/04/2019
TRH C ₆ - C ₉	mg/kg	25	Org-016	[NT]	15	<25	<25	0	97	91
TRH C ₆ - C ₁₀	mg/kg	25	Org-016	[NT]	15	<25	<25	0	97	91
Benzene	mg/kg	0.2	Org-016	[NT]	15	<0.2	<0.2	0	99	92
Toluene	mg/kg	0.5	Org-016	[NT]	15	<0.5	<0.5	0	104	96
Ethylbenzene	mg/kg	1	Org-016	[NT]	15	<1	<1	0	96	91
m+p-xylene	mg/kg	2	Org-016	[NT]	15	<2	<2	0	92	88
o-Xylene	mg/kg	1	Org-016	[NT]	15	<1	<1	0	97	91
naphthalene	mg/kg	1	Org-014	[NT]	15	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	[NT]	15	93	94	1	96	88

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	30	01/04/2019	01/04/2019		[NT]	[NT]
Date analysed	-			[NT]	30	03/04/2019	03/04/2019		[NT]	[NT]
TRH C ₆ - C ₉	mg/kg	25	Org-016	[NT]	30	<25	<25	0	[NT]	[NT]
TRH C ₆ - C ₁₀	mg/kg	25	Org-016	[NT]	30	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-016	[NT]	30	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-016	[NT]	30	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-016	[NT]	30	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-016	[NT]	30	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-016	[NT]	30	<1	<1	0	[NT]	[NT]
naphthalene	mg/kg	1	Org-014	[NT]	30	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	[NT]	30	91	86	6	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate		Spike Recovery %			
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	214605-3
Date extracted	-			01/04/2019	1	01/04/2019	01/04/2019		01/04/2019	01/04/2019
Date analysed	-			01/04/2019	1	01/04/2019	01/04/2019		01/04/2019	02/04/2019
TRH C ₁₀ - C ₁₄	mg/kg	50	Org-003	<50	1	<50	<50	0	124	106
TRH C ₁₅ - C ₂₈	mg/kg	100	Org-003	<100	1	<100	<100	0	121	98
TRH C ₂₉ - C ₃₆	mg/kg	100	Org-003	<100	1	<100	<100	0	129	79
TRH >C ₁₀ -C ₁₆	mg/kg	50	Org-003	<50	1	<50	<50	0	124	106
TRH >C ₁₆ -C ₃₄	mg/kg	100	Org-003	<100	1	<100	<100	0	121	98
TRH >C ₃₄ -C ₄₀	mg/kg	100	Org-003	<100	1	<100	<100	0	129	79
Surrogate o-Terphenyl	%		Org-003	94	1	99	107	8	108	101

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate		Spike Recovery %			
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	214605-32
Date extracted	-			[NT]	15	01/04/2019	01/04/2019		01/04/2019	01/04/2019
Date analysed	-			[NT]	15	02/04/2019	02/04/2019		02/04/2019	02/04/2019
TRH C ₁₀ - C ₁₄	mg/kg	50	Org-003	[NT]	15	<50	<50	0	102	88
TRH C ₁₅ - C ₂₈	mg/kg	100	Org-003	[NT]	15	<100	<100	0	94	84
TRH C ₂₉ - C ₃₆	mg/kg	100	Org-003	[NT]	15	<100	<100	0	100	81
TRH >C ₁₀ -C ₁₆	mg/kg	50	Org-003	[NT]	15	<50	<50	0	102	88
TRH >C ₁₆ -C ₃₄	mg/kg	100	Org-003	[NT]	15	<100	<100	0	94	84
TRH >C ₃₄ -C ₄₀	mg/kg	100	Org-003	[NT]	15	<100	<100	0	100	81
Surrogate o-Terphenyl	%		Org-003	[NT]	15	94	94	0	101	94

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate		Spike Recovery %			
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	30	01/04/2019	01/04/2019		[NT]	[NT]
Date analysed	-			[NT]	30	02/04/2019	02/04/2019		[NT]	[NT]
TRH C ₁₀ - C ₁₄	mg/kg	50	Org-003	[NT]	30	<50	<50	0	[NT]	[NT]
TRH C ₁₅ - C ₂₈	mg/kg	100	Org-003	[NT]	30	<100	<100	0	[NT]	[NT]
TRH C ₂₉ - C ₃₆	mg/kg	100	Org-003	[NT]	30	<100	<100	0	[NT]	[NT]
TRH >C ₁₀ -C ₁₆	mg/kg	50	Org-003	[NT]	30	<50	<50	0	[NT]	[NT]
TRH >C ₁₆ -C ₃₄	mg/kg	100	Org-003	[NT]	30	<100	<100	0	[NT]	[NT]
TRH >C ₃₄ -C ₄₀	mg/kg	100	Org-003	[NT]	30	<100	<100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-003	[NT]	30	95	96	1	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	214605-3
Date extracted	-			01/04/2019	1	01/04/2019	01/04/2019		01/04/2019	01/04/2019
Date analysed	-			02/04/2019	1	02/04/2019	02/04/2019		02/04/2019	02/04/2019
Naphthalene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	107	103
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	112	109
Phenanthrene	mg/kg	0.1	Org-012	<0.1	1	0.4	0.2	67	117	112
Anthracene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	1	1.2	0.5	82	109	105
Pyrene	mg/kg	0.1	Org-012	<0.1	1	1.1	0.5	75	109	105
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	1	0.4	0.2	67	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012	<0.1	1	0.4	0.2	67	110	109
Benzo(b,j,k)fluoranthene	mg/kg	0.2	Org-012	<0.2	1	0.7	0.3	80	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	1	0.4	0.1	120	107	97
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	1	0.2	<0.1	67	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	1	0.3	0.1	100	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	130	1	135	109	21	112	105

QUALITY CONTROL: PAHs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	214605-32
Date extracted	-			[NT]	15	01/04/2019	01/04/2019		01/04/2019	01/04/2019
Date analysed	-			[NT]	15	02/04/2019	02/04/2019		02/04/2019	02/04/2019
Naphthalene	mg/kg	0.1	Org-012	[NT]	15	<0.1	<0.1	0	107	102
Acenaphthylene	mg/kg	0.1	Org-012	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012	[NT]	15	<0.1	<0.1	0	115	108
Phenanthrene	mg/kg	0.1	Org-012	[NT]	15	<0.1	<0.1	0	116	112
Anthracene	mg/kg	0.1	Org-012	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012	[NT]	15	<0.1	<0.1	0	108	106
Pyrene	mg/kg	0.1	Org-012	[NT]	15	<0.1	<0.1	0	107	105
Benzo(a)anthracene	mg/kg	0.1	Org-012	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012	[NT]	15	<0.1	<0.1	0	109	107
Benzo(b,j,k)fluoranthene	mg/kg	0.2	Org-012	[NT]	15	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012	[NT]	15	<0.05	<0.05	0	94	97
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	[NT]	15	99	106	7	107	89

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	30	01/04/2019	01/04/2019		[NT]	[NT]
Date analysed	-			[NT]	30	02/04/2019	02/04/2019		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-012	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-012	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-012	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-012	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-012	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-012	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-012	[NT]	30	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012	[NT]	30	<0.05	<0.05	0	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	[NT]	30	104	115	10	[NT]	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	214605-3
Date extracted	-			01/04/2019	1	01/04/2019	01/04/2019		01/04/2019	01/04/2019
Date analysed	-			03/04/2019	1	03/04/2019	03/04/2019		03/04/2019	03/04/2019
HCB	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	82	75
gamma-BHC	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	82	73
Heptachlor	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	82	75
delta-BHC	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	83	78
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	92	83
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	90	82
Dieldrin	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	109	99
Endrin	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	97	90
pp-DDD	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	89	76
Endosulfan II	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	80	79
Methoxychlor	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-005	101	1	98	102	4	90	87

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	214605-32
Date extracted	-			[NT]	15	01/04/2019	01/04/2019		[NT]	01/04/2019
Date analysed	-			[NT]	15	03/04/2019	03/04/2019		[NT]	03/04/2019
HCB	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	68
gamma-BHC	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	67
Heptachlor	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	68
delta-BHC	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	68
Heptachlor Epoxide	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	76
gamma-Chlordane	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	73
Dieldrin	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	89
Endrin	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	82
pp-DDD	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	76
Endosulfan II	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	72
Methoxychlor	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-005	[NT]	15	98	99	1	[NT]	84

QUALITY CONTROL: Organophosphorus Pesticides					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	214605-3
Date extracted	-			01/04/2019	1	01/04/2019	01/04/2019		01/04/2019	01/04/2019
Date analysed	-			03/04/2019	1	03/04/2019	03/04/2019		03/04/2019	03/04/2019
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chlorpyrifos	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	99	100
Chlorpyrifos-methyl	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	95	97
Dimethoate	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	105	106
Fenitrothion	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	101	99
Malathion	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	83	75
Parathion	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	108	106
Ronnel	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	95	102
Surrogate TCMX	%		Org-008	101	1	98	102	4	99	97

QUALITY CONTROL: Organophosphorus Pesticides					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	214605-32
Date extracted	-			[NT]	15	01/04/2019	01/04/2019		[NT]	01/04/2019
Date analysed	-			[NT]	15	03/04/2019	03/04/2019		[NT]	03/04/2019
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-008	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Chlorpyrifos	mg/kg	0.1	Org-008	[NT]	15	<0.1	<0.1	0	[NT]	94
Chlorpyrifos-methyl	mg/kg	0.1	Org-008	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-008	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-008	[NT]	15	<0.1	<0.1	0	[NT]	93
Dimethoate	mg/kg	0.1	Org-008	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-008	[NT]	15	<0.1	<0.1	0	[NT]	102
Fenitrothion	mg/kg	0.1	Org-008	[NT]	15	<0.1	<0.1	0	[NT]	99
Malathion	mg/kg	0.1	Org-008	[NT]	15	<0.1	<0.1	0	[NT]	75
Parathion	mg/kg	0.1	Org-008	[NT]	15	<0.1	<0.1	0	[NT]	96
Ronnel	mg/kg	0.1	Org-008	[NT]	15	<0.1	<0.1	0	[NT]	91
Surrogate TCMX	%		Org-008	[NT]	15	98	99	1	[NT]	92

QUALITY CONTROL: PCBs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	214605-3
Date extracted	-			01/04/2019	1	01/04/2019	01/04/2019		01/04/2019	01/04/2019
Date analysed	-			03/04/2019	1	03/04/2019	03/04/2019		03/04/2019	03/04/2019
Aroclor 1016	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	104	101
Aroclor 1260	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCLMX	%		Org-006	101	1	98	102	4	99	97

QUALITY CONTROL: PCBs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	214605-32
Date extracted	-			[NT]	15	01/04/2019	01/04/2019		[NT]	01/04/2019
Date analysed	-			[NT]	15	03/04/2019	03/04/2019		[NT]	03/04/2019
Aroclor 1016	mg/kg	0.1	Org-006	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-006	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-006	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-006	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-006	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-006	[NT]	15	<0.1	<0.1	0	[NT]	100
Aroclor 1260	mg/kg	0.1	Org-006	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCLMX	%		Org-006	[NT]	15	98	99	1	[NT]	92

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	214605-3
Date prepared	-			01/04/2019	1	01/04/2019	01/04/2019		01/04/2019	01/04/2019
Date analysed	-			01/04/2019	1	01/04/2019	01/04/2019		01/04/2019	01/04/2019
Arsenic	mg/kg	4	Metals-020	<4	1	4	6	40	105	107
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	112	106
Chromium	mg/kg	1	Metals-020	<1	1	11	10	10	109	103
Copper	mg/kg	1	Metals-020	<1	1	23	23	0	109	111
Lead	mg/kg	1	Metals-020	<1	1	19	19	0	105	101
Mercury	mg/kg	0.1	Metals-021	<0.1	1	<0.1	<0.1	0	105	121
Nickel	mg/kg	1	Metals-020	<1	1	8	7	13	106	102
Zinc	mg/kg	1	Metals-020	<1	1	100	40	86	106	103

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	214605-32
Date prepared	-			[NT]	15	01/04/2019	01/04/2019		01/04/2019	01/04/2019
Date analysed	-			[NT]	15	01/04/2019	01/04/2019		01/04/2019	01/04/2019
Arsenic	mg/kg	4	Metals-020	[NT]	15	<4	<4	0	104	93
Cadmium	mg/kg	0.4	Metals-020	[NT]	15	<0.4	<0.4	0	109	87
Chromium	mg/kg	1	Metals-020	[NT]	15	20	20	0	107	105
Copper	mg/kg	1	Metals-020	[NT]	15	58	57	2	106	110
Lead	mg/kg	1	Metals-020	[NT]	15	8	9	12	105	#
Mercury	mg/kg	0.1	Metals-021	[NT]	15	<0.1	<0.1	0	106	126
Nickel	mg/kg	1	Metals-020	[NT]	15	82	79	4	104	94
Zinc	mg/kg	1	Metals-020	[NT]	15	41	41	0	104	#

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	30	01/04/2019	01/04/2019		[NT]	[NT]
Date analysed	-			[NT]	30	01/04/2019	01/04/2019		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	30	6	5	18	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	30	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	30	16	16	0	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	30	17	14	19	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	30	26	21	21	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	30	1	<1	0	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	30	7	3	80	[NT]	[NT]

Client Reference: E31772KL, Normanhurst

QUALITY CONTROL: Misc Inorg - Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date prepared	-			02/04/2019	[NT]	[NT]	[NT]	[NT]	02/04/2019	[NT]
Date analysed	-			02/04/2019	[NT]	[NT]	[NT]	[NT]	02/04/2019	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	[NT]	[NT]	[NT]	[NT]	102	[NT]

QUALITY CONTROL: CEC					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date prepared	-			03/04/2019	[NT]	[NT]	[NT]	[NT]	03/04/2019	[NT]
Date analysed	-			03/04/2019	[NT]	[NT]	[NT]	[NT]	03/04/2019	[NT]
Exchangeable Ca	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	[NT]	[NT]	91	[NT]
Exchangeable K	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Exchangeable Mg	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	[NT]	[NT]	93	[NT]
Exchangeable Na	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]

QUALITY CONTROL: BTEX in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date extracted	-			01/04/2019	[NT]	[NT]	[NT]	[NT]	01/04/2019	[NT]
Date analysed	-			03/04/2019	[NT]	[NT]	[NT]	[NT]	03/04/2019	[NT]
Benzene	µg/L	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Toluene	µg/L	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Ethylbenzene	µg/L	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	87	[NT]
m+p-xylene	µg/L	2	Org-016	<2	[NT]	[NT]	[NT]	[NT]	87	[NT]
o-xylene	µg/L	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	88	[NT]
Surrogate Dibromofluoromethane	%		Org-016	99	[NT]	[NT]	[NT]	[NT]	100	[NT]
Surrogate toluene-d8	%		Org-016	97	[NT]	[NT]	[NT]	[NT]	99	[NT]
Surrogate 4-BFB	%		Org-016	100	[NT]	[NT]	[NT]	[NT]	89	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.
Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.	

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: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

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.

Report Comments

METALS_S:

Acid Extractable Metals in Soil: The laboratory RPD acceptance criteria has been exceeded for 214605-1 for Zn. Therefore a triplicate result has been issued as laboratory sample number 214605-64.

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

Asbestos: Excessive sample volumes were provided for asbestos analysis. A portion of the supplied sample was sub-sampled according to Envirolab procedures. We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying 40-50g (50mL) of sample in its own container as per AS4964-2004.

Note: Samples requested for asbestos testing were sub-sampled from bags provided by the client.

PAHs in Soil - The RPD for duplicate results is accepted due to the non homogenous nature of sample 1.

SAMPLE RECEIPT ADVICE

Client Details

Client	Environmental Investigation Services
Attention	Harry Leonard

Sample Login Details

Your reference	E31772KL, Normanhurst
Envirolab Reference	214605
Date Sample Received	29/03/2019
Date Instructions Received	29/03/2019
Date Results Expected to be Reported	05/04/2019

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	63 soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	23.3
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie

Phone: 02 9910 6200
Fax: 02 9910 6201
Email: ahie@envirolab.com.au

Jacinta Hurst

Phone: 02 9910 6200
Fax: 02 9910 6201
Email: jhurst@envirolab.com.au

Analysis Underway, details on the following page:

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	Misc Inorg - Soil	Clay 5 0420g	CEC	BTEX in Water	On Hold
BH101-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓					
BH101-0.6-0.8	✓	✓	✓				✓						
BH102-0-0.2	✓	✓	✓	✓	✓	✓	✓	✓					
BH102-0.5 0.7													✓
BH103 0-0.1	✓	✓	✓	✓	✓	✓	✓	✓					
BH103 0.2-0.3	✓	✓	✓				✓						
BH104-0.03 0.15													✓
BH104-0.4-0.6	✓	✓	✓	✓	✓	✓	✓	✓					
BH104-0.8 0.9	✓	✓	✓				✓						
BH105 0.05 0.2													✓
BH105 0.2-0.4	✓	✓	✓	✓	✓	✓	✓	✓					
BH106-0.03 0.15	✓	✓	✓	✓	✓	✓	✓	✓					
BH107 0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
BH107 0.5 0.8	✓	✓	✓				✓						
BH108 0.05 0.2	✓	✓	✓	✓	✓	✓	✓	✓					
BH108 0.5 0.95													✓
BH109-0.05 0.15	✓	✓	✓	✓	✓	✓	✓	✓					
BH109-0.5 0.7	✓	✓	✓				✓						
BH110-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓					
BH111-0.16-0.3													✓
BH111-0.6-0.95	✓	✓	✓	✓	✓	✓	✓	✓					
BH111-1.5 1.95	✓	✓	✓				✓						
BH112-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓					
BH112-0.5 0.7													✓
BH113 0-0.1	✓	✓	✓	✓	✓	✓	✓	✓					
BH113 0.5 0.8	✓	✓	✓				✓						
BH114-0.12-0.2	✓	✓	✓	✓	✓	✓	✓	✓					
BH114-0.2-0.4													✓
BH115 0.04-0.2	✓	✓	✓	✓	✓	✓	✓	✓					
BH115 1.5 1.7	✓	✓	✓				✓						
BH116-0.05 0.2													✓
BH116-0.7 0.95	✓	✓	✓	✓	✓	✓	✓	✓					

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	Misc Inorg - Soil	Clay 5 0420g	CEC	BTEX in Water	On Hold
BH116-1.5 1.7													✓
BH116-1.8 1.95	✓	✓	✓				✓						
BH117 0.13 0.2													✓
BH117 0.2-0.4	✓	✓	✓	✓	✓	✓	✓	✓					
BH117 1.0-1.2	✓	✓	✓				✓		✓	✓	✓		
TB1	✓												
DUPRK 1	✓	✓	✓				✓						
DUPRK 3													✓
DUPRK 4													✓
FRAM1												✓	
BH101-0-0.3													✓
BH102-0-0.2													✓
BH103 0-0.1													✓
BH104-0.03 0.4													✓
BH104-0.4-0.8													✓
BH105 0.05 0.2													✓
BH105 0.2-0.6													✓
BH106-0.03 0.4													✓
BH107 0-0.5													✓
BH108 0.05 0.2													✓
BH109-0.05 0.3													✓
BH110-0-0.5													✓
BH111-0.16-0.6													✓
BH111-0.6-1.0													✓
BH112-0-0.5													✓
BH113 0-0.45													✓
BH114-0.12-0.2													✓
BH115 0.09-1.0													✓
BH116-0.05 0.7													✓
BH116-0.7 1.7													✓
BH117 0.2-0.7													✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**



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

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.

Requests for longer term sample storage must be received in writing.

SAMPLE AND CHAIN OF CUSTODY FORM

TO: ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	EIS Job E31772KL Number: Date Results STANDARD Required: Page: 15	FROM:  JK Environments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Harry Leonard

[illegible]

Remarks (comments/detection limits required):

DUPRIK2 - Inter-lab duplicate

EXPENSE - TRAVEL

Sample Containers:

G - 250mg Glass Jar

A - Ziplock Asbestos Bag

P - Plastic Bag

Relinquished By:

Date:

29/3/2017

Time:

Received By:

T. Nguyen

Date:

29/3/19

SAMPLE AND CHAIN OF CUSTODY FORM

TO: ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2057 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	EIS Job Number: E31772KL Date Results Required: STANDARD Page: 2/3	FROM: JK Environments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Harry Leonard

Locations:		Normanhurst					Sample Preserved In Esky on Ice												
Sampler:		AM					Tests Required												
Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 6a	Combo 3	Asbestos	WA Asbestos (500mL)	BTEX	pH/CEC	Clay content (%)						
27/3/19	26	BH113	0.5-0.28	G, A	13.7	Silty Clay		X											
28/3/19	27	BH114	0.12-0.2		0	Fill: Gravel	X												
	28	↓	0.2-0.4		0	Silty Clay													
	29	BH115	0.09-0.2		0	F. Silty Clay	X												
	30	↓	1.5-1.7		0	Silty Clay		X											
	31	BH116	0.05-0.2		0	Fill: Gravel													
	32	↓	0.7-0.95		0	F. Silty Clay	X												
	33	↓	1.5-1.7	↓	0	↓													
	34	↓	1.8-1.95	G	0	Siltstone		X											
	35	BH117	0.13-0.2	G, A	0	Fill: Gravel													
	36	↓	0.2-0.4	↓	0	F. Silty Clay	X												
✓	37	↓	1.0-1.2	↓	0	Silty Clay		X				X	X						
26/3/19	38	TB1	-	G	-	Trip blank					X								
27/3/19	39	DUPRK1	-		-	Dup Soil		X											
	-	DUPRK2	-		-	↓		X											
	A0	DUPRK3	-		-	↓													
	A1	DUPRK4	-	↓	-	↓													
	A2	FRAM1	-	V	-	Ringside Water					X								
	A3	BH101	0-0.3	A	-	F. Silty Clay													
	A4	BH102	0-0.2		-	↓													
	A5	BH103	0-0.1		-	F. Gravelly Sand													
	A6	BH104	0.03-0.4		-	F. Gravelly Sand													
	A7	↓	0.4-0.8		-	F. Silty Sand													
	A8	BH105	0.05-0.2		-	F. Silty Sand													
✓	A9	↓	0.2-0.6	↓	-	F. Gravelly Sand													

Remarks (comments/detection limits required): DUPRK2 - Interlab duplicate DUPRK1 - Initial duplicate		Sample Containers: G - 250mg Glass Jar A - Ziplock Asbestos Bag P - Plastic Bag	
Relinquished By:	Date: 29/3/2019	Received By: T. Nguyen	Date: 29/3/19

214605

SAMPLE AND CHAIN OF CUSTODY FORM

TO: ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen		EIS Job Number: E31772KL Date Results Required: STANDARD Page: 3/3		FROM:  JK Environments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Harry Leonard	

Location: Normanhurst							Sample Preserved in Esky on Ice									
Sampler: AM							Tests Required									
Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 6a	Combo 3	Asbestos	WA Asbestos (500ml)	BTEX	pH/CEC	Clay content (%)			
17/3/19	50	BH106	0.03-0.4	G, A	-	F: Silty Sand										
↓	51	BH107	0-0.5		-	F: Silty Clay										
28/3/19	52	BH108	0.05-0.2		-	F: Silty Sand										
27/3/19	53	BH109	0.05-0.3		-	F: Gravelly Sand										
28/3/19	54	BH110	0-0.5		-	F: Silty Sand										
↓	55	BH111	0.16-0.2		-	F: Gravelly Sand										
↓	56	↓	0.0-1.0		-	F: Silty Clay										
27/3/19	57	BH112	0-0.5		-	F: Silty Sand										
↓	58	BH113	0-0.5		-	↓										
28/3/19	59	BH114	0.12-0.2		-	F: Gravelly Sand										
	60	BH115	0.07-1.0		-	F: Silty Clay										
	61	BH116	0.05-0.7		-	F: Gravelly Sand										
	62	↓	0.7-1.7		-	F: Silty Clay										
	63	BH117	0.13-0.2		-	F: Gravelly Sand										
↓	64	↓	0.2-0.7		-	F: Silty Clay										
27/3/19	65	AME1	Surface	A	-	Fragment			X							

Remarks (comments/detection limits required): As page 1 duplicate. * Please hold 500mh samples. To be related.		Sample Containers: G - 250mg Glass Jar A - Ziplock Asbestos Bag P - Plastic Bag	
Relinquished By: <i>LL</i>	Date: 29/3/2019	Received By: <i>T. Nguyen</i>	Date: 29/3/19

CERTIFICATE OF ANALYSIS 214605-A

Client Details

Client	Environmental Investigation Services
Attention	Harry Leonard
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	<u>E31772KL, Normanhurst</u>
Number of Samples	63 soil, 1 material
Date samples received	29/03/2019
Date completed instructions received	16/05/2019

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	21/05/2019
Date of Issue	20/05/2019
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 *	

Asbestos Approved By

Analysed by Asbestos Approved Identifier: Matt Tang, Lucy Zhu
 Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By

Lucy Zhu, Senior Asbestos Analyst

Authorised By



Nancy Zhang, Laboratory Manager

Asbestos ID - soils NEPM - ASB-001

Our Reference		214605-A-43	214605-A-44	214605-A-45	214605-A-46	214605-A-47
Your Reference	UNITS	BH101	BH102	BH103	BH104	BH104
Depth		0-0.3	0-0.2	0-0.1	0.03-0.4	0.4-0.8
Date Sampled		27/03/2019	27/03/2019	27/03/2019	27/03/2019	27/03/2019
Type of sample		soil	soil	soil	soil	soil
Date analysed	-	20/05/2019	20/05/2019	20/05/2019	20/05/2019	20/05/2019
Sample mass tested	g	534.47	453.94	758.54	763.45	509.28
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		214605-A-48	214605-A-49	214605-A-50	214605-A-51	214605-A-52
Your Reference	UNITS	BH105	BH105	BH106	BH107	BH108
Depth		0.05-0.2	0.2-0.6	0.03-0.4	0-0.5	0.05-0.2
Date Sampled		27/03/2019	27/03/2019	27/03/2019	27/03/2019	27/03/2019
Type of sample		soil	soil	soil	soil	soil
Date analysed	-	20/05/2019	20/05/2019	20/05/2019	20/05/2019	20/05/2019
Sample mass tested	g	726.94	600.84	780.67	429.63	784.28
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown fine-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		214605-A-53	214605-A-54	214605-A-55	214605-A-56	214605-A-57
Your Reference	UNITS	BH109	BH110	BH111	BH111	BH112
Depth		0.05-0.3	0-0.5	0.16-0.6	0.6-1.0	0-0.5
Date Sampled		27/03/2019	27/03/2019	27/03/2019	27/03/2019	27/03/2019
Type of sample		soil	soil	soil	soil	soil
Date analysed	-	20/05/2019	20/05/2019	20/05/2019	20/05/2019	20/05/2019
Sample mass tested	g	684.56	639.32	711.12	329.33	503.23
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		214605-A-58	214605-A-59	214605-A-60	214605-A-61	214605-A-62
Your Reference	UNITS	BH113	BH114	BH115	BH116	BH116
Depth		0-0.45	0.12-0.2	0.09-1.0	0.05-0.7	0.7-1.7
Date Sampled		27/03/2019	27/03/2019	27/03/2019	27/03/2019	27/03/2019
Type of sample		soil	soil	soil	soil	soil
Date analysed	-	20/05/2019	20/05/2019	20/05/2019	20/05/2019	20/05/2019
Sample mass tested	g	460.24	480.4	561.15	906.93	630.74
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		214605-A-63
Your Reference	UNITS	BH117
Depth		0.2-0.7
Date Sampled		27/03/2019
Type of sample		soil
Date analysed	-	20/05/2019
Sample mass tested	g	552.09
Sample Description	-	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
Trace Analysis	-	No asbestos detected
Total Asbestos ^{#1}	g/kg	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected
ACM >7mm Estimation*	g	—
FA and AF Estimation*	g	—
ACM >7mm Estimation*	%(w/w)	<0.01
FA and AF Estimation*#2	%(w/w)	<0.001

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
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.

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

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.

Note: All samples analysed as received. However, samples 214605-A-44, 47, 51, 56, 58, 59 are below the minimum 500mL sample volume as per National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013.

SAMPLE RECEIPT ADVICE

Client Details

Client	Environmental Investigation Services
Attention	Harry Leonard

Sample Login Details

Your reference	E31772KL, Normanhurst
Envirolab Reference	214605-A
Date Sample Received	29/03/2019
Date Instructions Received	16/05/2019
Date Results Expected to be Reported	21/05/2019

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	63 soil, 1 material
Turnaround Time Requested	3 days
Temperature on Receipt (°C)	23.3
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie

Phone: 02 9910 6200
Fax: 02 9910 6201
Email: ahie@envirolab.com.au

Jacinta Hurst

Phone: 02 9910 6200
Fax: 02 9910 6201
Email: jhurst@envirolab.com.au

Analysis Underway, details on the following page:

Sample ID	Asbestos ID - soils NEPM - ASB-001	On Hold
BH101-0-0.1		✓
BH101-0.6-0.8		✓
BH102-0-0.2		✓
BH102-0.5 0.7		✓
BH103 0-0.1		✓
BH103 0.2-0.3		✓
BH104-0.03 0.15		✓
BH104-0.4-0.6		✓
BH104-0.8 0.9		✓
BH105 0.05 0.2		✓
BH105 0.2-0.4		✓
BH106-0.03 0.15		✓
BH107 0-0.1		✓
BH107 0.5 0.8		✓
BH108 0.05 0.2		✓
BH108 0.5 0.95		✓
BH109-0.05 0.15		✓
BH109-0.5 0.7		✓
BH110-0-0.1		✓
BH111-0.16-0.3		✓
BH111-0.6-0.95		✓
BH111-1.5 1.95		✓
BH112-0-0.1		✓
BH112-0.5 0.7		✓
BH113 0-0.1		✓
BH113 0.5 0.8		✓
BH114-0.12-0.2		✓
BH114-0.2-0.4		✓
BH115 0.04-0.2		✓
BH115 1.5 1.7		✓
BH116-0.05 0.2		✓
BH116-0.7 0.95		✓

Sample ID	Asbestos ID - soils NEPM - ASB-001	On Hold
BH116-1.5 1.7		✓
BH116-1.8 1.95		✓
BH117 0.13 0.2		✓
BH117 0.2-0.4		✓
BH117 1.0-1.2		✓
TB1		✓
DUPRK 1		✓
DUPRK 3		✓
DUPRK 4		✓
FRAM1		✓
BH101-0-0.3	✓	
BH102-0-0.2	✓	
BH103 0-0.1	✓	
BH104-0.03 0.4	✓	
BH104-0.4-0.8	✓	
BH105 0.05 0.2	✓	
BH105 0.2-0.6	✓	
BH106-0.03 0.4	✓	
BH107 0-0.5	✓	
BH108 0.05 0.2	✓	
BH109-0.05 0.3	✓	
BH110-0-0.5	✓	
BH111-0.16-0.6	✓	
BH111-0.6-1.0	✓	
BH112-0-0.5	✓	
BH113 0-0.45	✓	
BH114-0.12-0.2	✓	
BH115 0.09-1.0	✓	
BH116-0.05 0.7	✓	
BH116-0.7 1.7	✓	
BH117 0.2-0.7	✓	
BH101 - [TRIPLICATE]-0-0.1		✓

Sample ID	Asbestos ID - soils NEPM - ASB-001	On Hold
AMF1		✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.

Requests for longer term sample storage must be received in writing.

Andrew Fitzsimons

From: Harry Leonard <HLeonard@jkenvironments.com.au>
Sent: Thursday, 16 May 2019 7:40 AM
To: Nancy Zhang
Cc: Customer Service
Subject: RE: Results for Registration 214605 E31772KL, Normanhurst
Attachments: 2718_001.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Nancy,

43-63

Would you be able to schedule the samples highlighted in the attached COC for WA Asbestos analysis?

If we could get them on a 3 day turnaround that would be great.

Any issues or questions please let me know.

Ref: 214605-A

TAT: 3 days

Due: 21/5/19

fitz

Regards,

Harry Leonard
Senior Environmental Scientist
NSW Licensed Asbestos Assessor

T: +612 9888 5000
F: +612 9888 5001
HLeonard@jkenvironments.com.au
www.jkgroup.net.au

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

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Ref: 214605-A

Due: 21/5/19

fjb

SAMPLE AND CHAIN OF CUSTODY FORM

TO: ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 P: (02) 99106201 Attention: Aileen	EIS Job Number: 631772KL Date Results Required: STANDARD Page: 2/3	FROM:  JK Environments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Harry Leonard

Location: Normanhurst		Sample Preserved in Esky on Ice																	
Sampler: AM		Tests Required																	
Date Sampled	Lab Ref	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 6a	Combo 3	Asbestos	WLR Asbestos (500mL)	BTEX	pH/CEC	Clay content (%)						
27/3/19	26	BH113	0.5-0.2	G, A	13.7	Silty Clay		X											
28/3/19	27	BH114	0.12-0.2		0	Fill: Gravel	X												
	28	↓	0.2-0.4		0	Silty Clay													
	29	BH115	0.09-0.2		0	F. Silty Clay	X												
	30	↓	1.5-1.7		0	Silty Clay		X											
	31	BH116	0.05-0.2		0	Fill: Gravel													
	32	↓	0.7-0.95		0	F. Silty Clay	X												
	33	↓	1.5-1.7		0	↓													
	34	↓	1.8-1.95	G	0	Siltstone		X											
	35	BH117	0.13-0.2	G, A	0	Fill: Gravel													
	36	↓	0.2-0.4		0	F. Silty Clay	X												
	37	↓	1.0-1.2		0	Silty Clay		X						X	X				
26/3/19	38	TR1	-	G	-	trip blank soil						X							
27/3/19	39	DUPRK2	-		-	Dup Soil		X											
	-	DUPRK2	-		-	↓		X											
	40	DUPRK3	-		-	↓													
	41	DUPRK4	-		-	↓													
	42	FRAM1	-	U	-	Rinsate Water						X							
	43	BH101	0-0.3	A	-	F. Silty Clay													
	44	BH102	0-0.2		-	↓													
	45	BH103	0-0.1		-	F. Gravelly Sand													
	46	BH104	0.03-0.4		-	F. Gravelly Sand													
	47	↓	0.4-0.8		-	F. Silty Sand													
	48	BH105	0.05-0.2		-	F. Gravelly Sand													
	49	↓	0.2-0.6		-	F. Gravelly Sand													
Remarks (comments/detection limits required):							Sample Containers:												
DUPRK2 - Interlab duplicate							G - 250mg Glass Jar												
DUPRK3 - Interlab duplicate							A - Ziplock Asbestos Bag												
							P - Plastic Bag												
Relinquished By: H L							Date: 29/3/2019							Received By: T. Nguyen			Date: 29/3/19		

214605

Ref: 214605-A

Due: 21/5/19

A12

SAMPLE AND CHAIN OF CUSTODY FORM

TO: ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 1067 P: (02) 99106200 F: (02) 99106201 Attention: Alleen	EIS Job Number: E31772KL Date Results Required: STANDARD Page: 3/3	FROM:  JK Environments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Harry Leonard

Location: Normanhurst		Sample Preserved In Esky on Ice																
Sampler: AM		Tests Required																
Date Sampled	Lab Ref.	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 5a	Combo 3	Asbestos	WFA Asbestos (300mg)	BTEX	pH/CEC	Daylight (50)					
27/3/19	50	BH106	0.03-0.4	G.A	-	F: Silty Sand												
↓	51	BH107	0-0.5		-	F: Silty Clay												
28/3/19	52	BH108	0.05-0.2		-	F: Silty Sand												
27/3/19	53	BH109	0.05-0.3		-	F: Silty Sand												
28/3/19	54	BH110	0-0.5		-	F: Silty Sand												
↓	55	BH111	0.16-0.6		-	F: Silty Sand												
↓	56	↓	0.6-1.0		-	F: Silty Clay												
27/3/19	57	BH112	0-0.5		-	F: Silty Clay												
↓	58	BH113	0-0.45		-	↓												
28/3/19	59	BH114	0.12-0.2		-	F: Silty Sand												
↓	60	BH115	0.07-1.0		-	F: Silty Clay												
↓	61	BH116	0.05-0.7		-	F: Silty Sand												
↓	62	↓	0.7-1.7		-	F: Silty Clay												
↓	63	BH117	0.13-0.2		-	F: Silty Sand												
↓	64	↓	0.2-0.7		-	F: Silty Clay												
27/3/19	65	AME1	Surface	A	-	Fragment												
Remarks (comments/detection limits required): As page 1 duplicate. * Please hold 500ml sample. To be released later.							Sample Containers: G - 250mg Glass Jar A - Ziplock Asbestos Bag P - Plastic Bag											
Relinquished By: LLL		Date: 29/3/2019		Time:		Received By: T. Nguyen		Date: 29/3/19										

CERTIFICATE OF ANALYSIS 16446

Client Details

Client	Environmental Investigation Services
Attention	Harry Leonard
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	<u>E3 17 7 2K L</u>
Number of Samples	1 Soil
Date samples received	02/04/2019
Date completed instructions received	02/04/2019

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	08 /04/2019
Date of Issue	08 /04/2019
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

Chris DeLuca, Operations Manager

Authorised By

P. Adams

Pamela Adams, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil		
Our Reference		16446-1
Your Reference	UNITS	DUPRK2
Date Sampled		27/03/2019
Type of sample		Soil
Date extracted	-	03/04/2019
Date analysed	-	04/04/2019
vTRH C ₆ - C ₉	mg/kg	<25
vTRH C ₆ - C ₁₀	mg/kg	<25
TRH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25
Benzene	mg/kg	<0.2
Toluene	mg/kg	<0.5
Ethylbenzene	mg/kg	<1
m+p-xylene	mg/kg	<2
o-Xylene	mg/kg	<1
Naphthalene	mg/kg	<1
Total +ve Xylenes	mg/kg	<1
Surrogate aaa-Trifluorotoluene	%	101

TRH Soil C10-C40 NEPM		
Our Reference		16446-1
Your Reference	UNITS	DUPRK2
Date Sampled		27/03/2019
Type of sample		Soil
Date extracted	-	03/04/2019
Date analysed	-	04/04/2019
TRH C ₁₀ - C ₁₄	mg/kg	<50
TRH C ₁₅ - C ₂₈	mg/kg	140
TRH C ₂₉ - C ₃₆	mg/kg	340
Total +ve TRH (C10-C36)	mg/kg	480
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	350
TRH >C ₃₄ -C ₄₀	mg/kg	420
Total +ve TRH (>C10-C40)	mg/kg	770
Surrogate o-Terphenyl	%	77

PAHs in Soil		
Our Reference		16446-1
Your Reference	UNITS	DUPRK2
Date Sampled		27/03/2019
Type of sample		Soil
Date extracted	-	03/04/2019
Date analysed	-	06/04/2019
Naphthalene	mg/kg	<1
Acenaphthylene	mg/kg	<1
Acenaphthene	mg/kg	<1
Fluorene	mg/kg	<1
Phenanthrene	mg/kg	7.7
Anthracene	mg/kg	1.6
Fluoranthene	mg/kg	17
Pyrene	mg/kg	14
Benzo(a)anthracene	mg/kg	5.6
Chrysene	mg/kg	5.8
Benzo(b,j&k)fluoranthene	mg/kg	10
Benzo(a)pyrene	mg/kg	5.2
Indeno(1,2,3-c,d)pyrene	mg/kg	4.5
Dibenzo(a,h)anthracene	mg/kg	1.5
Benzo(g,h,i)perylene	mg/kg	5.8
Total +ve PAH's	mg/kg	80
Benzo(a)pyrene TEQ calc (Zero)	mg/kg	8.8
Benzo(a)pyrene TEQ calc (Half)	mg/kg	8.8
Benzo(a)pyrene TEQ calc (PQL)	mg/kg	8.8
Surrogate <i>p</i> -Terphenyl-d ₁₄	%	92

Acid Extractable metals in soil		
Our Reference		16446-1
Your Reference	UNITS	DUPRK2
Date Sampled		27/03/2019
Type of sample		Soil
Date digested	-	03/04/2019
Date analysed	-	03/04/2019
Arsenic	mg/kg	<4
Cadmium	mg/kg	<0.4
Chromium	mg/kg	40
Copper	mg/kg	110
Lead	mg/kg	15
Mercury	mg/kg	<0.1
Nickel	mg/kg	41
Zinc	mg/kg	42

Moisture		
Our Reference	UNITS	16446-1
Your Reference		DUPRK2
Date Sampled		27/03/2019
Type of sample		Soil
Date prepared	-	03/04/2019
Date analysed	-	04/04/2019
Moisture	%	7.6

Method ID	Methodology Summary
Inorg-008	Moisture content determined by heating at 105 deg C for a minimum of 12 hours.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
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. 'EQ 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. 'EQ 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. 'EQ 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-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTX 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.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			03/04/2019	[NT]	[NT]	[NT]	[NT]	03/04/2019	[NT]
Date analysed	-			04/04/2019	[NT]	[NT]	[NT]	[NT]	04/04/2019	[NT]
vTRH C ₆ - C ₉	mg/kg	25	Org-016	<25	[NT]	[NT]	[NT]	[NT]	92	[NT]
vTRH C ₆ - C ₁₀	mg/kg	25	Org-016	<25	[NT]	[NT]	[NT]	[NT]	92	[NT]
Benzene	mg/kg	0.2	Org-016	<0.2	[NT]	[NT]	[NT]	[NT]	85	[NT]
Toluene	mg/kg	0.5	Org-016	<0.5	[NT]	[NT]	[NT]	[NT]	96	[NT]
Ethylbenzene	mg/kg	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	92	[NT]
m+p-xylene	mg/kg	2	Org-016	<2	[NT]	[NT]	[NT]	[NT]	93	[NT]
o-Xylene	mg/kg	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Naphthalene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	98	[NT]	[NT]	[NT]	[NT]	97	[NT]

QUALITY CONTROL: TRH Soil C10-C40 NEPM					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			03/04/2019	[NT]	[NT]	[NT]	[NT]	03/04/2019	[NT]
Date analysed	-			04/04/2019	[NT]	[NT]	[NT]	[NT]	04/04/2019	[NT]
TRH C ₁₀ - C ₁₄	mg/kg	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	98	[NT]
TRH C ₁₅ - C ₂₈	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	90	[NT]
TRH C ₂₉ - C ₃₆	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	93	[NT]
TRH >C ₁₀ -C ₁₆	mg/kg	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	98	[NT]
TRH >C ₁₆ -C ₃₄	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	90	[NT]
TRH >C ₃₄ -C ₄₀	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	93	[NT]
Surrogate o-Terphenyl	%		Org-003	82	[NT]	[NT]	[NT]	[NT]	79	[NT]

QUALITY CONTROL: PAHs in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			03/04/2019	[NT]	[NT]	[NT]	[NT]	03/04/2019	[NT]
Date analysed	-			06/04/2019	[NT]	[NT]	[NT]	[NT]	06/04/2019	[NT]
Naphthalene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	110	[NT]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Phenanthrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	110	[NT]
Anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	110	[NT]
Pyrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	110	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Benzo(b,j&k)fluoranthene	mg/kg	0.2	Org-012	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	[NT]	[NT]	[NT]	[NT]	100	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate <i>p</i> -Terphenyl-d ₁₄	%		Org-012	104	[NT]	[NT]	[NT]	[NT]	104	[NT]

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date digested	-			03/04/2019	[NT]	[NT]	[NT]	[NT]	03/04/2019	[NT]
Date analysed	-			03/04/2019	[NT]	[NT]	[NT]	[NT]	03/04/2019	[NT]
Arsenic	mg/kg	4	Metals-020 ICP-AES	<4	[NT]	[NT]	[NT]	[NT]	98	[NT]
Cadmium	mg/kg	0.4	Metals-020 ICP-AES	<0.4	[NT]	[NT]	[NT]	[NT]	100	[NT]
Chromium	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Copper	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Lead	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Mercury	mg/kg	0.1	Metals-021 CV-AAS	<0.1	[NT]	[NT]	[NT]	[NT]	114	[NT]
Nickel	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Zinc	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	96	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.
Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.	

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: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

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.

Report Comments

PAH_S: PQL has been raised due to the high concentration of analytes in the sample/s, resulting in the sample/s requiring dilution.

SAMPLE RECEIPT ADVICE

Client Details

Client	Environmental Investigation Services
Attention	Harry Leonard

Sample Login Details

Your reference	E31772KL
Envirolab Reference	16446
Date Sample Received	02/04/2019
Date Instructions Received	02/04/2019
Date Results Expected to be Reported	09/04/2019

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	1 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	17.6
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Pamela Adams

Phone: 03 9763 2500

Fax: 03 9763 2633

Email: padams@envirolab.com.au

Analisa Mathrick

Phone: 03 9763 2500

Fax: 03 9763 2633

Email: amathrick @envirolab.com.au

Analysis Underway, details on the following page:

Sample ID	VTRH(C6-C10)/BTEXN in Soil	TRH Soil C10-C40 NEPM	PAHs in Soil	Acid Extractable metals in soil
DUPRK 2	✓	✓	✓	✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.

Requests for longer term sample storage must be received in writing.

SAMPLE AND CHAIN OF CUSTODY FORM

TO: ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen		EIS Job Number: E31772KL Date Results Required: STANDARD Page: 2/3		FROM:  JK Environments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Harry Leonard	

Location: Normanhurst							Sample Preserved in Esky on Ice									
Sampler: AM							Tests Required									
Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 6a	Combo 3	Asbestos	WA Asbestos (500mL)	BTEX	pH/CEC	Clay content (%)			
27/3/19	26	BH113	0.5-0.8	G, A	13.7	Silty Clay		X								
28/3/19	27	BH114	0.12-0.2		0	Fill: Gravel	X									
	28	↓	0.2-0.4		0	Silty Clay										
	29	BH115	0.09-0.2		0	F: Silty Clay	X									
	30	↓	1.5-1.7		0	Silty Clay		X								
	31	BH116	0.05-0.2		0	Fill: Gravel										
	32	↓	0.7-0.95		0	F: Silty Clay	X									
	33	↓	1.5-1.7	↓	0	↓										
	34	↓	1.8-1.95	G	0	Siltstone		X								
	35	BH117	6.73-0.2	G, A	0	Fill: Gravel										
	36	↓	0.2-0.4	↓	0	F: Silty Clay	X									
	37	↓	1.0-1.2	↓	0	Silty Clay		X				X	X			
26/3/19	38	TR1	-	G	-	Trip blank soil					X					
27/3/19	39	DUPRK1	-		-	Dup Soil		X								
	-	DUPRK2	-		-	↓		X								
	A0	DUPRK3	-		-	↓										
	A1	DUPRK4	-	↓	-	↓										
	A2	FRAM1	-	V	-	Ringside Water					X					
	A3	BH101	0-0.3	A	-	F: Silty Clay										
	A4	BH102	0-0.2		-	↓										
	A5	BH103	0-0.1		-	F: Gravelly Sand										
	A6	BH104	0.03-0.4		-	F: Gravelly Sand										
	A7	↓	0.4-0.8		-	F: Silty Sand										
	A8	BH105	0.05-0.2		-	F: Gravelly Sand										
	A9	↓	0.2-0.6	↓	-	F: Gravelly Sand										

Remarks (comments/detection limits required):

DUPRK2 - Inter-lab duplicate

DUPRK1 - Intra-lab duplicate

Sample Containers:

G - 250mg Glass Jar

A - Ziplock Asbestos Bag

P - Plastic Bag

Relinquished By:

LL

Date:

29/3/2019

Time:

Received By:

T. Nguyen

Date:

29/3/19

Relinquished: Tony Doherty
1/4/19 12:15
ELS

214605

17-6

CERTIFICATE OF ANALYSIS 215 092

Client Details

Client	Environmental Investigation Services
Attention	Harry Leonard
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	<u>E3 17 7 2K L, Normanhurst</u>
Number of Samples	3 WATER
Date samples received	05/04/2019
Date completed instructions received	05/04/2019

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	12/04/2019
Date of Issue	12/04/2019
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

Giovanni Agosti, Group Technical Manager
 Nancy Zhang, Laboratory Manager, Sydney
 Steven Luong, Organics Supervisor

Authorised By



Nancy Zhang, Laboratory Manager

VOCs in water		
Our Reference		215092-1
Your Reference	UNITS	MW111
Date Sampled		04/04/2019
Type of sample		WATER
Date extracted	-	07/04/2019
Date analysed	-	07/04/2019
Dichlorodifluoromethane	µg/L	<10
Chloromethane	µg/L	<10
Vinyl Chloride	µg/L	<10
Bromomethane	µg/L	<10
Chloroethane	µg/L	<10
Trichlorofluoromethane	µg/L	<10
1,1-Dichloroethene	µg/L	<1
Trans-1,2-dichloroethene	µg/L	<1
1,1-dichloroethane	µg/L	<1
Cis-1,2-dichloroethene	µg/L	<1
Bromochloromethane	µg/L	<1
Chloroform	µg/L	<1
2,2-dichloropropane	µg/L	<1
1,2-dichloroethane	µg/L	<1
1,1,1-trichloroethane	µg/L	<1
1,1-dichloropropene	µg/L	<1
Cyclohexane	µg/L	<1
Carbon tetrachloride	µg/L	<1
Benzene	µg/L	<1
Dibromomethane	µg/L	<1
1,2-dichloropropane	µg/L	<1
Trichloroethene	µg/L	<1
Bromodichloromethane	µg/L	<1
trans-1,3-dichloropropene	µg/L	<1
cis-1,3-dichloropropene	µg/L	<1
1,1,2-trichloroethane	µg/L	<1
Toluene	µg/L	<1
1,3-dichloropropane	µg/L	<1
Dibromochloromethane	µg/L	<1
1,2-dibromoethane	µg/L	<1
Tetrachloroethene	µg/L	<1
1,1,1,2-tetrachloroethane	µg/L	<1
Chlorobenzene	µg/L	<1
Ethylbenzene	µg/L	<1
Bromoform	µg/L	<1

VOCs in water		
Our Reference		215092-1
Your Reference	UNITS	MW111
Date Sampled		04/04/2019
Type of sample		WATER
m+p-xylene	µg/L	<2
Styrene	µg/L	<1
1,1,2,2-tetrachloroethane	µg/L	<1
o-xylene	µg/L	<1
1,2,3-trichloropropane	µg/L	<1
Isopropylbenzene	µg/L	<1
Bromobenzene	µg/L	<1
n-propyl benzene	µg/L	<1
2-chlorotoluene	µg/L	<1
4-chlorotoluene	µg/L	<1
1,3,5-trimethyl benzene	µg/L	<1
Tert-butyl benzene	µg/L	<1
1,2,4-trimethyl benzene	µg/L	<1
1,3-dichlorobenzene	µg/L	<1
Sec-butyl benzene	µg/L	<1
1,4-dichlorobenzene	µg/L	<1
4-isopropyl toluene	µg/L	<1
1,2-dichlorobenzene	µg/L	<1
n-butyl benzene	µg/L	<1
1,2-dibromo-3-chloropropane	µg/L	<1
1,2,4-trichlorobenzene	µg/L	<1
Hexachlorobutadiene	µg/L	<1
1,2,3-trichlorobenzene	µg/L	<1
Surrogate Dibromofluoromethane	%	101
Surrogate toluene-d8	%	100
Surrogate 4-BFB	%	106

vTRH(C6-C10)/BTEXN in Water			
Our Reference		215092-1	215092-3
Your Reference	UNITS	MW111	TS1
Date Sampled		04/04/2019	04/04/2019
Type of sample		WATER	WATER
Date extracted	-	07/04/2019	07/04/2019
Date analysed	-	07/04/2019	07/04/2019
TRH C ₆ - C ₉	µg/L	<10	[NA]
TRH C ₆ - C ₁₀	µg/L	<10	[NA]
TRH C ₆ - C ₁₀ less BTEX (F1)	µg/L	<10	[NA]
Benzene	µg/L	<1	100%
Toluene	µg/L	<1	98%
Ethylbenzene	µg/L	<1	101%
m+p-xylene	µg/L	<2	97%
o-xylene	µg/L	<1	102%
Naphthalene	µg/L	<1	[NA]
Surrogate Dibromofluoromethane	%	101	101
Surrogate toluene-d8	%	100	101
Surrogate 4-BFB	%	106	104

svTRH (C10-C40) in Water		
Our Reference		215092-1
Your Reference	UNITS	MW111
Date Sampled		04/04/2019
Type of sample		WATER
Date extracted	-	09/04/2019
Date analysed	-	09/04/2019
TRH C ₁₀ - C ₁₄	µg/L	<50
TRH C ₁₅ - C ₂₈	µg/L	190
TRH C ₂₉ - C ₃₆	µg/L	<100
TRH >C ₁₀ - C ₁₆	µg/L	<50
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	µg/L	<50
TRH >C ₁₆ - C ₃₄	µg/L	220
TRH >C ₃₄ - C ₄₀	µg/L	<100
Surrogate o-Terphenyl	%	75

PAHs in Water - Low Level		
Our Reference		215092-1
Your Reference	UNITS	MW111
Date Sampled		04/04/2019
Type of sample		WATER
Date extracted	-	09/04/2019
Date analysed	-	10/04/2019
Naphthalene	µg/L	<0.2
Acenaphthylene	µg/L	<0.1
Acenaphthene	µg/L	<0.1
Fluorene	µg/L	<0.1
Phenanthrene	µg/L	<0.1
Anthracene	µg/L	<0.1
Fluoranthene	µg/L	<0.1
Pyrene	µg/L	<0.1
Benzo(a)anthracene	µg/L	<0.1
Chrysene	µg/L	<0.1
Benzo(b,j+k)fluoranthene	µg/L	<0.2
Benzo(a)pyrene	µg/L	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	<0.1
Dibenzo(a,h)anthracene	µg/L	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1
Benzo(a)pyrene TEQ	µg/L	<0.5
Total +ve PAH's	µg/L	NIL (+)VE
Surrogate <i>p</i> -Terphenyl-d14	%	128

HM in water - dissolved		
Our Reference		215092-1
Your Reference	UNITS	MW111
Date Sampled		04/04/2019
Type of sample		WATER
Date prepared	-	09/04/2019
Date analysed	-	09/04/2019
Arsenic-Dissolved	µg/L	<1
Cadmium-Dissolved	µg/L	<0.1
Chromium-Dissolved	µg/L	1
Copper-Dissolved	µg/L	2
Lead-Dissolved	µg/L	<1
Mercury-Dissolved	µg/L	<0.05
Nickel-Dissolved	µg/L	9
Zinc-Dissolved	µg/L	52

Cations in water Dissolved		
Our Reference		215092-1
Your Reference	UNITS	MW111
Date Sampled		04/04/2019
Type of sample		WATER
Date digested	-	09/04/2019
Date analysed	-	09/04/2019
Calcium - Dissolved	mg/L	52
Magnesium - Dissolved	mg/L	20
Hardness	mgCaCO ₃ /L	210

Method ID	Methodology Summary
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-022	Determination of various metals by ICP-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-012	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.
Org-013	Water samples are analysed directly by purge and trap GC-MS.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.

QUALITY CONTROL: VOCs in water						Duplicate		Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			07/04/2019	[NT]	[NT]	[NT]	[NT]	07/04/2019	[NT]
Date analysed	-			07/04/2019	[NT]	[NT]	[NT]	[NT]	07/04/2019	[NT]
Dichlorodifluoromethane	µg/L	10	Org-013	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloromethane	µg/L	10	Org-013	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Vinyl Chloride	µg/L	10	Org-013	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromomethane	µg/L	10	Org-013	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloroethane	µg/L	10	Org-013	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trichlorofluoromethane	µg/L	10	Org-013	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1-Dichloroethene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trans-1,2-dichloroethene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1-dichloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Cis-1,2-dichloroethene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromochloromethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloroform	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	112	[NT]
2,2-dichloropropane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	111	[NT]
1,1,1-trichloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	107	[NT]
1,1-dichloropropene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Cyclohexane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Carbon tetrachloride	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibromomethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichloropropane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trichloroethene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	111	[NT]
Bromodichloromethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	109	[NT]
trans-1,3-dichloropropene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
cis-1,3-dichloropropene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1,2-trichloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Toluene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3-dichloropropane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibromochloromethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	111	[NT]
1,2-dibromoethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Tetrachloroethene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	116	[NT]
1,1,1,2-tetrachloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chlorobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ethylbenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromoform	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
m+p-xylene	µg/L	2	Org-013	<2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Styrene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1,2,2-tetrachloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
o-xylene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]

QUALITY CONTROL: VOCs in water						Duplicate		Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
1,2,3-trichloropropane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Isopropylbenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
n-propyl benzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
2-chlorotoluene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
4-chlorotoluene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3,5-trimethyl benzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Tert-butyl benzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,4-trimethyl benzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3-dichlorobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Sec-butyl benzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,4-dichlorobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
4-isopropyl toluene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichlorobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
n-butyl benzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dibromo-3-chloropropane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,4-trichlorobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Hexachlorobutadiene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,3-trichlorobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-013	99	[NT]	[NT]	[NT]	[NT]	100	[NT]
Surrogate toluene-d8	%		Org-013	100	[NT]	[NT]	[NT]	[NT]	101	[NT]
Surrogate 4-BFB	%		Org-013	102	[NT]	[NT]	[NT]	[NT]	102	[NT]

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water						Duplicate		Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			07/04/2019	[NT]	[NT]	[NT]	[NT]	07/04/2019	[NT]
Date analysed	-			07/04/2019	[NT]	[NT]	[NT]	[NT]	07/04/2019	[NT]
TRH C ₆ - C ₉	µg/L	10	Org-016	<10	[NT]	[NT]	[NT]	[NT]	109	[NT]
TRH C ₆ - C ₁₀	µg/L	10	Org-016	<10	[NT]	[NT]	[NT]	[NT]	109	[NT]
Benzene	µg/L	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Toluene	µg/L	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	110	[NT]
Ethylbenzene	µg/L	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	109	[NT]
m+p-xylene	µg/L	2	Org-016	<2	[NT]	[NT]	[NT]	[NT]	110	[NT]
o-xylene	µg/L	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	110	[NT]
Naphthalene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-016	99	[NT]	[NT]	[NT]	[NT]	100	[NT]
Surrogate toluene-d8	%		Org-016	100	[NT]	[NT]	[NT]	[NT]	101	[NT]
Surrogate 4-BFB	%		Org-016	102	[NT]	[NT]	[NT]	[NT]	102	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date extracted	-			09/04/2019	[NT]	[NT]	[NT]	[NT]	09/04/2019	[NT]
Date analysed	-			09/04/2019	[NT]	[NT]	[NT]	[NT]	09/04/2019	[NT]
TRH C ₁₀ - C ₁₄	µg/L	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	76	[NT]
TRH C ₁₅ - C ₂₈	µg/L	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	70	[NT]
TRH C ₂₉ - C ₃₆	µg/L	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	88	[NT]
TRH >C ₁₀ - C ₁₆	µg/L	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	76	[NT]
TRH >C ₁₆ - C ₃₄	µg/L	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	70	[NT]
TRH >C ₃₄ - C ₄₀	µg/L	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	88	[NT]
Surrogate o-Terphenyl	%		Org-003	95	[NT]	[NT]	[NT]	[NT]	110	[NT]

QUALITY CONTROL: PAHs in Water - Low Level					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date extracted	-			09/04/2019	[NT]	[NT]	[NT]	[NT]	09/04/2019	[NT]
Date analysed	-			10/04/2019	[NT]	[NT]	[NT]	[NT]	10/04/2019	[NT]
Naphthalene	µg/L	0.2	Org-012	<0.2	[NT]	[NT]	[NT]	[NT]	108	[NT]
Acenaphthylene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluorene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	106	[NT]
Phenanthrene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Anthracene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Pyrene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	114	[NT]
Benzo(a)anthracene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	132	[NT]
Benzo(b,j+k)fluoranthene	µg/L	0.2	Org-012	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	106	[NT]
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	130	[NT]	[NT]	[NT]	[NT]	130	[NT]

QUALITY CONTROL: HM in water - dissolved					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date prepared	-			09/04/2019	[NT]	[NT]	[NT]	[NT]	09/04/2019	[NT]
Date analysed	-			09/04/2019	[NT]	[NT]	[NT]	[NT]	09/04/2019	[NT]
Arsenic-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Chromium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Copper-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Lead-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	[NT]	[NT]	[NT]	[NT]	94	[NT]
Nickel-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Zinc-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	97	[NT]

QUALITY CONTROL: Cations in water Dissolved					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date digested	-			09/04/2019	[NT]	[NT]	[NT]	[NT]	09/04/2019	[NT]
Date analysed	-			09/04/2019	[NT]	[NT]	[NT]	[NT]	09/04/2019	[NT]
Calcium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]	[NT]	[NT]	[NT]	110	[NT]
Magnesium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]	[NT]	[NT]	[NT]	110	[NT]
Hardness	mgCaCO ₃ /L	3		<3	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.
Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.	

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: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

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.

Report Comments

For the determination of dissolved metals the unpreserved sample was filtered through 0.45um filter at the lab due to the appearance of colloids and/or sediment in the supplied HNO3 bottle.

SAMPLE RECEIPT ADVICE

Client Details

Client	Environmental Investigation Services
Attention	Harry Leonard

Sample Login Details

Your reference	E31772KL, Normanhurst
Envirolab Reference	215092
Date Sample Received	05/04/2019
Date Instructions Received	05/04/2019
Date Results Expected to be Reported	12/04/2019

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	3 WATER
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	11.2
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie

Phone: 02 9910 6200
Fax: 02 9910 6201
Email: ahie@envirolab.com.au

Jacinta Hurst

Phone: 02 9910 6200
Fax: 02 9910 6201
Email: jhurst@envirolab.com.au

Analysis Underway, details on the following page:

Sample ID	VOCs in water	VTRH(C6-C10)/BTEXN in Water	svTRH (C10-C40) in Water	PAHs in Water - Low Level	HM in water - dissolved	pH	Electrical Conductivity	Cations in water Dissolved
MW111	✓	✓	✓	✓	✓	✓	✓	✓
DUPAMW1					✓			
TS1		✓						

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.

Requests for longer term sample storage must be received in writing.

IBM

[illegible]

CERTIFICATE OF ANALYSIS 255370

Client Details

Client	Environmental Investigation Services
Attention	Harry Leonard
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	<u>E31772PL, Normanhurst</u>
Number of Samples	33 Soil, 2 Water
Date samples received	10/11/2020
Date completed instructions received	10/11/2020

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	17/11/2020
Date of Issue	16/11/2020
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 *	

Asbestos Approved By

Analysed by Asbestos Approved Identifier: Nyovan Moonean
 Authorised by Asbestos Approved Signatory: Lucy Z hu

Results Approved By

Dragana Tomas, Senior Chemist
 Jaimie Loa-Kum-Cheung, Metals Supervisor
 Josh Williams, Senior Chemist
 Loren Bardwell, Senior Chemist
 Lucy Z hu, Asbestos Supervisor
 Manj Dewendrage, Chemist

Authorised By



Nancy Z hang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil

Our Reference		255370-1	255370-3	255370-4	255370-7	255370-12
Your Reference	UNITS	BH201	BH201	BH202	BH203	BH204
Depth		0.1-0.2	1.7-1.8	0-0.2	0-0.2	0-0.2
Date Sampled		2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	11/11/2020	11/11/2020	11/11/2020	11/11/2020	11/11/2020
Date analysed	-	11/11/2020	11/11/2020	11/11/2020	11/11/2020	11/11/2020
TRH C ₆ - C ₉	mg/kg	<25	<25	<25	<25	<25
TRH C ₆ - C ₁₀	mg/kg	<25	<25	<25	<25	<25
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	118	111	106	116	110

vTRH(C6-C10)/BTEXN in Soil

Our Reference		255370-14	255370-16	255370-17	255370-19	255370-21
Your Reference	UNITS	BH205	BH205	BH206	BH207	BH208
Depth		0-0.2	1.5-1.6	0-0.2	0.1-0.2	0-0.2
Date Sampled		2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	11/11/2020	11/11/2020	11/11/2020	11/11/2020	11/11/2020
Date analysed	-	11/11/2020	11/11/2020	11/11/2020	11/11/2020	11/11/2020
TRH C ₆ - C ₉	mg/kg	<25	<25	<25	<25	<25
TRH C ₆ - C ₁₀	mg/kg	<25	<25	<25	<25	<25
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	99	112	120	105	111

vTRH(C6-C10)/BTEXN in Soil

Our Reference		255370-23	255370-24	255370-25	255370-27	255370-30
Your Reference	UNITS	BH209	BH209	BH210	BH211	BH212
Depth		0-0.1	0.4-0.5	0.2-0.3	0.2-0.3	0-0.2
Date Sampled		2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	11/11/2020	11/11/2020	11/11/2020	11/11/2020	11/11/2020
Date analysed	-	11/11/2020	11/11/2020	11/11/2020	11/11/2020	11/11/2020
TRH C ₆ - C ₉	mg/kg	<25	<25	<25	<25	<25
TRH C ₆ - C ₁₀	mg/kg	<25	<25	<25	<25	<25
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	113	102	114	112	108

vTRH(C6-C10)/BTEXN in Soil

Our Reference		255370-31	255370-32	255370-34
Your Reference	UNITS	BH212	SDUP1	TBS1
Depth		0.6-0.7	-	-
Date Sampled		2-6/11/2020	2-6/11/2020	2-6/11/2020
Type of sample		Soil	Soil	Soil
Date extracted	-	11/11/2020	11/11/2020	11/11/2020
Date analysed	-	11/11/2020	11/11/2020	11/11/2020
TRH C ₆ - C ₉	mg/kg	<25	<25	<25
TRH C ₆ - C ₁₀	mg/kg	<25	<25	<25
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	113	123	124

svTRH (C10-C40) in Soil

Our Reference		255370-1	255370-3	255370-4	255370-7	255370-12
Your Reference	UNITS	BH201	BH201	BH202	BH203	BH204
Depth		0.1-0.2	1.7-1.8	0-0.2	0-0.2	0-0.2
Date Sampled		2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	11/11/2020	11/11/2020	11/11/2020	11/11/2020	11/11/2020
Date analysed	-	12/11/2020	12/11/2020	12/11/2020	12/11/2020	12/11/2020
TRH C ₁₀ - C ₁₄	mg/kg	<50	<50	<50	<50	<50
TRH C ₁₅ - C ₂₈	mg/kg	150	<100	<100	<100	<100
TRH C ₂₉ - C ₃₆	mg/kg	200	<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	280	<100	<100	<100	<100
TRH >C ₃₄ -C ₄₀	mg/kg	230	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	520	<50	<50	<50	<50
Surrogate o-Terphenyl	%	100	87	89	92	93

svTRH (C10-C40) in Soil

Our Reference		255370-14	255370-16	255370-17	255370-19	255370-21
Your Reference	UNITS	BH205	BH205	BH206	BH207	BH208
Depth		0-0.2	1.5-1.6	0-0.2	0.1-0.2	0-0.2
Date Sampled		2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	11/11/2020	11/11/2020	11/11/2020	11/11/2020	11/11/2020
Date analysed	-	12/11/2020	12/11/2020	12/11/2020	12/11/2020	12/11/2020
TRH C ₁₀ - C ₁₄	mg/kg	<50	<50	<50	<50	<50
TRH C ₁₅ - C ₂₈	mg/kg	<100	<100	<100	240	<100
TRH C ₂₉ - C ₃₆	mg/kg	<100	<100	<100	830	<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	810	<100
TRH >C ₃₄ -C ₄₀	mg/kg	<100	<100	110	910	120
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	110	1,700	120
Surrogate o-Terphenyl	%	91	86	86	96	87

svTRH (C10-C40) in Soil

Our Reference		255370-23	255370-24	255370-25	255370-27	255370-30
Your Reference	UNITS	BH209	BH209	BH210	BH211	BH212
Depth		0-0.1	0.4-0.5	0.2-0.3	0.2-0.3	0-0.2
Date Sampled		2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	11/11/2020	11/11/2020	11/11/2020	11/11/2020	11/11/2020
Date analysed	-	12/11/2020	12/11/2020	12/11/2020	12/11/2020	12/11/2020
TRH C ₁₀ - C ₁₄	mg/kg	<50	<50	<50	<50	<50
TRH C ₁₅ - C ₂₈	mg/kg	<100	<100	<100	<100	100
TRH C ₂₉ - C ₃₆	mg/kg	360	<100	<100	<100	220
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	320	<100	<100	<100	200
TRH >C ₃₄ -C ₄₀	mg/kg	410	<100	<100	<100	230
Total +ve TRH (>C10-C40)	mg/kg	730	<50	<50	<50	420
Surrogate o-Terphenyl	%	86	86	90	84	104

svTRH (C10-C40) in Soil

Our Reference		255370-31	255370-32	255370-34
Your Reference	UNITS	BH212	SDUP1	TBS1
Depth		0.6-0.7	-	-
Date Sampled		2-6/11/2020	2-6/11/2020	2-6/11/2020
Type of sample		Soil	Soil	Soil
Date extracted	-	11/11/2020	11/11/2020	11/11/2020
Date analysed	-	12/11/2020	12/11/2020	12/11/2020
TRH C ₁₀ - C ₁₄	mg/kg	<50	<50	<50
TRH C ₁₅ - C ₂₈	mg/kg	<100	220	<100
TRH C ₂₉ - C ₃₆	mg/kg	<100	760	<100
TRH >C ₁₀ -C ₁₆	mg/kg	<50	<50	<50
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	<50	<50	<50
TRH >C ₁₆ -C ₃₄	mg/kg	<100	770	<100
TRH >C ₃₄ -C ₄₀	mg/kg	<100	790	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	1,600	<50
Surrogate o-Terphenyl	%	88	93	98

PAHs in Soil						
Our Reference		255370-1	255370-3	255370-4	255370-7	255370-12
Your Reference	UNITS	BH201	BH201	BH202	BH203	BH204
Depth		0.1-0.2	1.7-1.8	0-0.2	0-0.2	0-0.2
Date Sampled		2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	11/11/2020	11/11/2020	11/11/2020	11/11/2020	11/11/2020
Date analysed	-	12/11/2020	12/11/2020	12/11/2020	12/11/2020	12/11/2020
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	0.9	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	1.6	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	1.7	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.7	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.7	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	0.6	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	0.5	<0.05	<0.05	<0.05	0.07
Indeno(1,2,3-c,d)pyrene	mg/kg	0.3	<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	0.4	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	7.5	<0.05	<0.05	<0.05	0.07
Benzo(a)pyrene TEQ calc (zero)	mg/kg	0.7	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	0.7	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	0.8	<0.5	<0.5	<0.5	<0.5
Surrogate <i>p</i> -Terphenyl-d14	%	101	108	104	105	102

PAHs in Soil						
Our Reference		255370-14	255370-16	255370-17	255370-19	255370-21
Your Reference	UNITS	BH205	BH205	BH206	BH207	BH208
Depth		0-0.2	1.5-1.6	0-0.2	0.1-0.2	0-0.2
Date Sampled		2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	11/11/2020	11/11/2020	11/11/2020	11/11/2020	11/11/2020
Date analysed	-	12/11/2020	12/11/2020	12/11/2020	12/11/2020	12/11/2020
Naphthalene	mg/kg	<0.1	<0.1	0.2	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	0.2	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	0.2	<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	0.06	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	0.4	0.2	<0.05
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
Surrogate p-Terphenyl-d14	%	118	113	110	104	107

PAHs in Soil						
Our Reference		255370-23	255370-24	255370-25	255370-27	255370-30
Your Reference	UNITS	BH209	BH209	BH210	BH211	BH212
Depth		0-0.1	0.4-0.5	0.2-0.3	0.2-0.3	0-0.2
Date Sampled		2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	11/11/2020	11/11/2020	11/11/2020	11/11/2020	11/11/2020
Date analysed	-	12/11/2020	12/11/2020	12/11/2020	12/11/2020	12/11/2020
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,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
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
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
Surrogate p-Terphenyl-d14	%	99	95	111	109	111

PAHs in Soil				
Our Reference		255370-31	255370-32	255370-34
Your Reference	UNITS	BH212	SDUP1	TBS1
Depth		0.6-0.7	-	-
Date Sampled		2-6/11/2020	2-6/11/2020	2-6/11/2020
Type of sample		Soil	Soil	Soil
Date extracted	-	11/11/2020	11/11/2020	11/11/2020
Date analysed	-	12/11/2020	12/11/2020	12/11/2020
Naphthalene	mg/kg	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	0.2	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	0.3	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5
Surrogate <i>p</i> -Terphenyl-d14	%	100	103	110

Organochlorine Pesticides in soil						
Our Reference		255370-1	255370-4	255370-7	255370-12	255370-14
Your Reference	UNITS	BH201	BH202	BH203	BH204	BH205
Depth		0.1-0.2	0-0.2	0-0.2	0-0.2	0-0.2
Date Sampled		2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	11/11/2020	11/11/2020	11/11/2020	11/11/2020	11/11/2020
Date analysed	-	12/11/2020	12/11/2020	12/11/2020	12/11/2020	12/11/2020
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	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
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	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
Endrin Aldehyde	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
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	%	91	97	98	96	107

Organochlorine Pesticides in soil						
Our Reference		255370-17	255370-19	255370-21	255370-23	255370-25
Your Reference	UNITS	BH206	BH207	BH208	BH209	BH210
Depth		0-0.2	0.1-0.2	0-0.2	0-0.1	0.2-0.3
Date Sampled		2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	11/11/2020	11/11/2020	11/11/2020	11/11/2020	11/11/2020
Date analysed	-	12/11/2020	12/11/2020	12/11/2020	12/11/2020	12/11/2020
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	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
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	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
Endrin Aldehyde	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
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	%	101	92	102	100	99

Organochlorine Pesticides in soil				
Our Reference		255370-27	255370-30	255370-32
Your Reference	UNITS	BH211	BH212	SDUP1
Depth		0.2-0.3	0-0.2	-
Date Sampled		2-6/11/2020	2-6/11/2020	2-6/11/2020
Type of sample		Soil	Soil	Soil
Date extracted	-	11/11/2020	11/11/2020	11/11/2020
Date analysed	-	12/11/2020	12/11/2020	12/11/2020
alpha-BHC	mg/kg	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1
gamma-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
Endosulfan II	mg/kg	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1
pp-DDT	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	%	103	97	102

Organophosphorus Pesticides in Soil						
Our Reference		255370-1	255370-4	255370-7	255370-12	255370-14
Your Reference	UNITS	BH201	BH202	BH203	BH204	BH205
Depth		0.1-0.2	0-0.2	0-0.2	0-0.2	0-0.2
Date Sampled		2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	11/11/2020	11/11/2020	11/11/2020	11/11/2020	11/11/2020
Date analysed	-	12/11/2020	12/11/2020	12/11/2020	12/11/2020	12/11/2020
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
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
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
Chlorpyrifos	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
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	91	97	98	96	107

Organophosphorus Pesticides in Soil

Our Reference		255370-17	255370-19	255370-21	255370-23	255370-25
Your Reference	UNITS	BH206	BH207	BH208	BH209	BH210
Depth		0-0.2	0.1-0.2	0-0.2	0-0.1	0.2-0.3
Date Sampled		2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	11/11/2020	11/11/2020	11/11/2020	11/11/2020	11/11/2020
Date analysed	-	12/11/2020	12/11/2020	12/11/2020	12/11/2020	12/11/2020
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
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
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
Chlorpyrifos	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
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	101	92	102	100	99

Organophosphorus Pesticides in Soil				
Our Reference		255370-27	255370-30	255370-32
Your Reference	UNITS	BH211	BH212	SDUP1
Depth		0.2-0.3	0-0.2	-
Date Sampled		2-6/11/2020	2-6/11/2020	2-6/11/2020
Type of sample		Soil	Soil	Soil
Date extracted	-	11/11/2020	11/11/2020	11/11/2020
Date analysed	-	12/11/2020	12/11/2020	12/11/2020
Dichlorvos	mg/kg	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1	<0.1	<0.1
Ronnel	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
Chlorpyrifos	mg/kg	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	103	97	102

PCBs in Soil						
Our Reference	UNITS	255370-1	255370-4	255370-7	255370-12	255370-14
Your Reference		BH201	BH202	BH203	BH204	BH205
Depth		0.1-0.2	0-0.2	0-0.2	0-0.2	0-0.2
Date Sampled		2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	11/11/2020	11/11/2020	11/11/2020	11/11/2020	11/11/2020
Date analysed	-	12/11/2020	12/11/2020	12/11/2020	12/11/2020	12/11/2020
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	91	97	98	96	107

PCBs in Soil						
Our Reference	UNITS	255370-17	255370-19	255370-21	255370-23	255370-25
Your Reference		BH206	BH207	BH208	BH209	BH210
Depth		0-0.2	0.1-0.2	0-0.2	0-0.1	0.2-0.3
Date Sampled		2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	11/11/2020	11/11/2020	11/11/2020	11/11/2020	11/11/2020
Date analysed	-	12/11/2020	12/11/2020	12/11/2020	12/11/2020	12/11/2020
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	101	92	102	100	99

PCBs in Soil				
Our Reference		255370-27	255370-30	255370-32
Your Reference	UNITS	BH211	BH212	SDUP1
Depth		0.2-0.3	0-0.2	-
Date Sampled		2-6/11/2020	2-6/11/2020	2-6/11/2020
Type of sample		Soil	Soil	Soil
Date extracted	-	11/11/2020	11/11/2020	11/11/2020
Date analysed	-	12/11/2020	12/11/2020	12/11/2020
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 TCMX	%	103	97	102

Acid Extractable metals in soil

Our Reference		255370-1	255370-3	255370-4	255370-7	255370-12
Your Reference	UNITS	BH201	BH201	BH202	BH203	BH204
Depth		0.1-0.2	1.7-1.8	0-0.2	0-0.2	0-0.2
Date Sampled		2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	11/11/2020	11/11/2020	11/11/2020	11/11/2020	11/11/2020
Date analysed	-	11/11/2020	11/11/2020	11/11/2020	11/11/2020	11/11/2020
Arsenic	mg/kg	<4	6	<4	7	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	6	6	8	8	7
Copper	mg/kg	12	16	11	18	12
Lead	mg/kg	8	14	17	14	25
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	4	<1	5	6	5
Zinc	mg/kg	44	3	32	29	31

Acid Extractable metals in soil

Our Reference		255370-14	255370-16	255370-17	255370-19	255370-21
Your Reference	UNITS	BH205	BH205	BH206	BH207	BH208
Depth		0-0.2	1.5-1.6	0-0.2	0.1-0.2	0-0.2
Date Sampled		2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	11/11/2020	11/11/2020	11/11/2020	11/11/2020	11/11/2020
Date analysed	-	11/11/2020	11/11/2020	11/11/2020	11/11/2020	11/11/2020
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	10	2	32	36	12
Copper	mg/kg	14	6	9	19	13
Lead	mg/kg	51	9	1	3	18
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	5	<1	30	35	5
Zinc	mg/kg	64	1	17	24	18

Acid Extractable metals in soil

Our Reference		255370-23	255370-24	255370-25	255370-27	255370-30
Your Reference	UNITS	BH209	BH209	BH210	BH211	BH212
Depth		0-0.1	0.4-0.5	0.2-0.3	0.2-0.3	0-0.2
Date Sampled		2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	11/11/2020	11/11/2020	11/11/2020	11/11/2020	11/11/2020
Date analysed	-	11/11/2020	11/11/2020	11/11/2020	11/11/2020	11/11/2020
Arsenic	mg/kg	<4	4	6	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	150	8	19	18	11
Copper	mg/kg	26	9	14	12	18
Lead	mg/kg	4	9	17	11	40
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	68	<1	7	7	6
Zinc	mg/kg	66	2	8	6	86

Acid Extractable metals in soil

Our Reference		255370-31	255370-32	255370-34	255370-36	255370-37
Your Reference	UNITS	BH212	SDUP1	TBS1	BH201 - [TRIPLICATE]	BH210 - [TRIPLICATE]
Depth		0.6-0.7	-	-	0.1-0.2	0.2-0.3
Date Sampled		2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	11/11/2020	11/11/2020	11/11/2020	11/11/2020	11/11/2020
Date analysed	-	11/11/2020	11/11/2020	11/11/2020	11/11/2020	11/11/2020
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	8	41	2	2	9
Copper	mg/kg	10	25	<1	5	9
Lead	mg/kg	18	4	3	3	10
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	1	40	<1	2	2
Zinc	mg/kg	8	31	1	10	2

Moisture						
Our Reference	UNITS	255370-1	255370-3	255370-4	255370-7	255370-12
Your Reference		BH201	BH201	BH202	BH203	BH204
Depth		0.1-0.2	1.7-1.8	0-0.2	0-0.2	0-0.2
Date Sampled		2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	11/11/2020	11/11/2020	11/11/2020	11/11/2020	11/11/2020
Date analysed	-	12/11/2020	12/11/2020	12/11/2020	12/11/2020	12/11/2020
Moisture	%	7.5	20	18	13	15

Moisture						
Our Reference	UNITS	255370-14	255370-16	255370-17	255370-19	255370-21
Your Reference		BH205	BH205	BH206	BH207	BH208
Depth		0-0.2	1.5-1.6	0-0.2	0.1-0.2	0-0.2
Date Sampled		2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	11/11/2020	11/11/2020	11/11/2020	11/11/2020	11/11/2020
Date analysed	-	12/11/2020	12/11/2020	12/11/2020	12/11/2020	12/11/2020
Moisture	%	25	19	7.0	3.8	26

Moisture						
Our Reference	UNITS	255370-23	255370-24	255370-25	255370-27	255370-30
Your Reference		BH209	BH209	BH210	BH211	BH212
Depth		0-0.1	0.4-0.5	0.2-0.3	0.2-0.3	0-0.2
Date Sampled		2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	11/11/2020	11/11/2020	11/11/2020	11/11/2020	11/11/2020
Date analysed	-	12/11/2020	12/11/2020	12/11/2020	12/11/2020	12/11/2020
Moisture	%	9.2	22	21	22	27

Moisture				
Our Reference	UNITS	255370-31	255370-32	255370-34
Your Reference		BH212	SDUP1	TBS1
Depth		0.6-0.7	-	-
Date Sampled		2-6/11/2020	2-6/11/2020	2-6/11/2020
Type of sample		Soil	Soil	Soil
Date prepared	-	11/11/2020	11/11/2020	11/11/2020
Date analysed	-	12/11/2020	12/11/2020	12/11/2020
Moisture	%	21	4.3	1.1

Asbestos ID - soils NEPM - ASB-001

Our Reference		255370-1	255370-4	255370-7	255370-12	255370-14
Your Reference	UNITS	BH201	BH202	BH203	BH204	BH205
Depth		0.1-0.2	0-0.2	0-0.2	0-0.2	0-0.2
Date Sampled		2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	12,13/11/2020	12,13/11/2020	12,13/11/2020	12,13/11/2020	12,13/11/2020
Sample mass tested	g	906.41	529.44	244,364	651.68	383.21
Sample Description	-	Grey 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	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg
		Organic fibres detected	Organic fibres detected	Organic fibres detected	Organic fibres detected	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*	-	Chrysotile	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	0.0120	—	—	—	—
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		255370-17	255370-19	255370-21	255370-23	255370-25
Your Reference	UNITS	BH206	BH207	BH208	BH209	BH210
Depth		0-0.2	0.1-0.2	0-0.2	0-0.1	0.2-0.3
Date Sampled		2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020	2-6/11/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	12,13/11/2020	12,13/11/2020	12,13/11/2020	12,13/11/2020	12,13/11/2020
Sample mass tested	g	819.58	755.23	364.01	470.43	481.29
Sample Description	-	Grey coarse-grained soil & rocks	Brown fine-grained soil & rocks	Brown coarse-grained soil & rocks	Grey coarse-grained soil & rocks	Red 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		255370-27	255370-30
Your Reference	UNITS	BH211	BH212
Depth		0.2-0.3	0-0.2
Date Sampled		2-6/11/2020	2-6/11/2020
Type of sample		Soil	Soil
Date analysed	-	12,13/11/2020	12,13/11/2020
Sample mass tested	g	490.28	324.16
Sample Description	-	Red 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
Trace Analysis	-	No asbestos detected	No asbestos detected
Total Asbestos ^{#1}	g/kg	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	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
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001

vTRH(C6-C10)/BTEXN in Water			
Our Reference		255370-33	255370-35
Your Reference	UNITS	TS1	FR1
Depth		-	-
Date Sampled		2-6/11/2020	2-6/11/2020
Type of sample		Water	Water
Date extracted	-	10/11/2020	10/11/2020
Date analysed	-	10/11/2020	10/11/2020
TRH C ₆ - C ₉	µg/L	[NA]	33
TRH C ₆ - C ₁₀	µg/L	[NA]	38
TRH C ₆ - C ₁₀ less BTEX (F1)	µg/L	[NA]	38
Benzene	µg/L	82%	<1
Toluene	µg/L	98%	<1
Ethylbenzene	µg/L	108%	<1
m+p-xylene	µg/L	101%	<2
o-xylene	µg/L	109%	<1
Naphthalene	µg/L	[NT]	<1
Surrogate Dibromofluoromethane	%	87	86
Surrogate toluene-d8	%	99	99
Surrogate 4-BFB	%	103	100

svTRH (C10-C40) in Water		
Our Reference		255370-35
Your Reference	UNITS	FR1
Depth		-
Date Sampled		2-6/11/2020
Type of sample		Water
Date extracted	-	11/11/2020
Date analysed	-	11/11/2020
TRH C ₁₀ - C ₁₄	µg/L	<50
TRH C ₁₅ - C ₂₈	µg/L	<100
TRH C ₂₉ - C ₃₆	µg/L	<100
TRH >C ₁₀ - C ₁₆	µg/L	<50
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	µg/L	<50
TRH >C ₁₆ - C ₃₄	µg/L	<100
TRH >C ₃₄ - C ₄₀	µg/L	<100
Surrogate o-Terphenyl	%	65

PAHs in Water		
Our Reference		255370-35
Your Reference	UNITS	FR1
Depth		-
Date Sampled		2-6/11/2020
Type of sample		Water
Date extracted	-	11/11/2020
Date analysed	-	11/11/2020
Naphthalene	µg/L	<1
Acenaphthylene	µg/L	<1
Acenaphthene	µg/L	<1
Fluorene	µg/L	<1
Phenanthrene	µg/L	<1
Anthracene	µg/L	<1
Fluoranthene	µg/L	<1
Pyrene	µg/L	<1
Benzo(a)anthracene	µg/L	<1
Chrysene	µg/L	<1
Benzo(b,j+k)fluoranthene	µg/L	<2
Benzo(a)pyrene	µg/L	<1
Indeno(1,2,3-c,d)pyrene	µg/L	<1
Dibenzo(a,h)anthracene	µg/L	<1
Benzo(g,h,i)perylene	µg/L	<1
Benzo(a)pyrene TEQ	µg/L	<5
Total +ve PAH's	µg/L	NIL (+)VE
Surrogate <i>p</i> -Terphenyl-d14	%	101

Metals in Water - Dissolved		
Our Reference		255370-35
Your Reference	UNITS	FR1
Depth		-
Date Sampled		2-6/11/2020
Type of sample		Water
Date digested	-	11/11/2020
Date analysed	-	11/11/2020
Arsenic - Dissolved	mg/L	<0.05
Cadmium - Dissolved	mg/L	<0.01
Chromium - Dissolved	mg/L	<0.01
Copper - Dissolved	mg/L	0.6
Lead - Dissolved	mg/L	<0.03
Mercury - Dissolved	mg/L	<0.0005
Nickel - Dissolved	mg/L	<0.02
Zinc - Dissolved	mg/L	0.05

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
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.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-020	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-020	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-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.

Method ID	Methodology Summary
Org-021	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.
Org-022	Determination of VOCs sampled onto coconut shell charcoal sorbent tubes, that can be desorbed using carbon disulphide, and analysed by GC-MS.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-MS/GC-MSMS. 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-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ 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. 'EQ 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. 'EQ 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-023	Water samples are analysed directly by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	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)-BTX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-023	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)-BTX 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.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	255370-4
Date extracted	-			11/11/2020	1	11/11/2020	11/11/2020		11/11/2020	11/11/2020
Date analysed	-			11/11/2020	1	11/11/2020	11/11/2020		11/11/2020	11/11/2020
TRH C ₆ - C ₉	mg/kg	25	Org-023	<25	1	<25	<25	0	120	113
TRH C ₆ - C ₁₀	mg/kg	25	Org-023	<25	1	<25	<25	0	120	113
Benzene	mg/kg	0.2	Org-023	<0.2	1	<0.2	<0.2	0	119	110
Toluene	mg/kg	0.5	Org-023	<0.5	1	<0.5	<0.5	0	113	102
Ethylbenzene	mg/kg	1	Org-023	<1	1	<1	<1	0	115	109
m+p-xylene	mg/kg	2	Org-023	<2	1	<2	<2	0	126	121
o-Xylene	mg/kg	1	Org-023	<1	1	<1	<1	0	114	110
naphthalene	mg/kg	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	107	1	118	115	3	116	103

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	25	11/11/2020	11/11/2020		[NT]	[NT]
Date analysed	-			[NT]	25	11/11/2020	11/11/2020		[NT]	[NT]
TRH C ₆ - C ₉	mg/kg	25	Org-023	[NT]	25	<25	<25	0	[NT]	[NT]
TRH C ₆ - C ₁₀	mg/kg	25	Org-023	[NT]	25	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-023	[NT]	25	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-023	[NT]	25	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-023	[NT]	25	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-023	[NT]	25	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-023	[NT]	25	<1	<1	0	[NT]	[NT]
naphthalene	mg/kg	1	Org-023	[NT]	25	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	25	114	107	6	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	255370-4
Date extracted	-			11/11/2020	1	11/11/2020	11/11/2020		11/11/2020	11/11/2020
Date analysed	-			12/11/2020	1	12/11/2020	12/11/2020		12/11/2020	12/11/2020
TRH C ₁₀ - C ₁₄	mg/kg	50	Org-020	<50	1	<50	<50	0	103	98
TRH C ₁₅ - C ₂₈	mg/kg	100	Org-020	<100	1	150	200	29	84	87
TRH C ₂₉ - C ₃₆	mg/kg	100	Org-020	<100	1	200	270	30	98	83
TRH >C ₁₀ -C ₁₆	mg/kg	50	Org-020	<50	1	<50	<50	0	103	98
TRH >C ₁₆ -C ₃₄	mg/kg	100	Org-020	<100	1	280	370	28	84	87
TRH >C ₃₄ -C ₄₀	mg/kg	100	Org-020	<100	1	230	340	39	98	83
Surrogate o-Terphenyl	%		Org-020	95	1	100	101	1	70	90

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	25	11/11/2020	11/11/2020		[NT]	[NT]
Date analysed	-			[NT]	25	12/11/2020	12/11/2020		[NT]	[NT]
TRH C ₁₀ - C ₁₄	mg/kg	50	Org-020	[NT]	25	<50	<50	0	[NT]	[NT]
TRH C ₁₅ - C ₂₈	mg/kg	100	Org-020	[NT]	25	<100	<100	0	[NT]	[NT]
TRH C ₂₉ - C ₃₆	mg/kg	100	Org-020	[NT]	25	<100	<100	0	[NT]	[NT]
TRH >C ₁₀ -C ₁₆	mg/kg	50	Org-020	[NT]	25	<50	<50	0	[NT]	[NT]
TRH >C ₁₆ -C ₃₄	mg/kg	100	Org-020	[NT]	25	<100	<100	0	[NT]	[NT]
TRH >C ₃₄ -C ₄₀	mg/kg	100	Org-020	[NT]	25	<100	<100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-020	[NT]	25	90	85	6	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	255370-4
Date extracted	-			11/11/2020	1	11/11/2020	11/11/2020		11/11/2020	11/11/2020
Date analysed	-			12/11/2020	1	12/11/2020	12/11/2020		12/11/2020	12/11/2020
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	103	103
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	109	114
Fluorene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	112	111
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	1	0.9	1.3	36	93	97
Anthracene	mg/kg	0.1	Org-022/025	<0.1	1	0.2	0.2	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	1	1.6	2.2	32	84	90
Pyrene	mg/kg	0.1	Org-022/025	<0.1	1	1.7	2.1	21	107	110
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	0.7	0.8	13	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	1	0.7	0.8	13	114	113
Benzo(b,j,k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	1	0.6	0.6	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	1	0.5	0.61	20	105	98
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	1	0.3	0.3	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	1	0.4	0.5	22	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	104	1	101	98	3	105	109

QUALITY CONTROL: PAHs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	25	11/11/2020	11/11/2020		[NT]	[NT]
Date analysed	-			[NT]	25	12/11/2020	12/11/2020		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Benzo(b,j,k)fluoranthene	mg/kg	0.2	Org-022/025	[NT]	25	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	[NT]	25	<0.05	<0.05	0	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	25	111	106	5	[NT]	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	255370-4
Date extracted	-			11/11/2020	1	11/11/2020	11/11/2020		11/11/2020	11/11/2020
Date analysed	-			12/11/2020	1	12/11/2020	12/11/2020		12/11/2020	12/11/2020
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	101	101
HCB	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	94	100
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	93	85
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	76	79
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	78	86
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	136	132
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	107	113
Endrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	70	138
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	92	94
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	88	116
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	101	1	91	95	4	103	101

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	25	11/11/2020	11/11/2020		[NT]	[NT]
Date analysed	-			[NT]	25	12/11/2020	12/11/2020		[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
HCB	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
gamma-BHC	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
delta-BHC	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Dieldrin	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Endrin	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Methoxychlor	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	25	99	98	1	[NT]	[NT]

QUALITY CONTROL: Organophosphorus Pesticides in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	255370-4
Date extracted	-			11/11/2020	1	11/11/2020	11/11/2020		11/11/2020	11/11/2020
Date analysed	-			12/11/2020	1	12/11/2020	12/11/2020		12/11/2020	12/11/2020
Dichlorvos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	106	122
Dimethoate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chlorpyrifos-methyl	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	105	114
Fenitrothion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	79	91
Malathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	108	102
Chlorpyrifos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	123	126
Parathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	92	108
Bromophos-ethyl	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	93	119
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	101	1	91	95	4	103	101

QUALITY CONTROL: Organophosphorus Pesticides in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	25	11/11/2020	11/11/2020		[NT]	[NT]
Date analysed	-			[NT]	25	12/11/2020	12/11/2020		[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Chlorpyrifos-methyl	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Fenitrothion	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Malathion	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Chlorpyrifos	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Parathion	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-022	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	25	99	98	1	[NT]	[NT]

QUALITY CONTROL: PCBs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	255370-4
Date extracted	-			11/11/2020	1	11/11/2020	11/11/2020		11/11/2020	11/11/2020
Date analysed	-			12/11/2020	1	12/11/2020	12/11/2020		12/11/2020	12/11/2020
Aroclor 1016	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	120	120
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	101	1	91	95	4	103	101

QUALITY CONTROL: PCBs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	25	11/11/2020	11/11/2020		[NT]	[NT]
Date analysed	-			[NT]	25	12/11/2020	12/11/2020		[NT]	[NT]
Aroclor 1016	mg/kg	0.1	Org-021	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1260	mg/kg	0.1	Org-021	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	[NT]	25	99	98	1	[NT]	[NT]

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	255370-4
Date prepared	-			11/11/2020	1	11/11/2020	11/11/2020		11/11/2020	11/11/2020
Date analysed	-			11/11/2020	1	11/11/2020	11/11/2020		11/11/2020	11/11/2020
Arsenic	mg/kg	4	Metals-020	<4	1	<4	<4	0	95	88
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	90	85
Chromium	mg/kg	1	Metals-020	<1	1	6	3	67	99	87
Copper	mg/kg	1	Metals-020	<1	1	12	9	29	92	87
Lead	mg/kg	1	Metals-020	<1	1	8	5	46	100	88
Mercury	mg/kg	0.1	Metals-021	<0.1	1	<0.1	<0.1	0	90	75
Nickel	mg/kg	1	Metals-020	<1	1	4	3	29	101	89
Zinc	mg/kg	1	Metals-020	<1	1	44	15	98	92	87

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	25	11/11/2020	11/11/2020		[NT]	[NT]
Date analysed	-			[NT]	25	11/11/2020	11/11/2020		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	25	6	5	18	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	25	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	25	19	14	30	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	25	14	11	24	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	25	17	11	43	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	25	7	6	15	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	25	8	6	29	[NT]	[NT]

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			10/11/2020	[NT]	[NT]	[NT]	[NT]	10/11/2020	[NT]
Date analysed	-			10/11/2020	[NT]	[NT]	[NT]	[NT]	10/11/2020	[NT]
TRH C ₆ - C ₉	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	106	[NT]
TRH C ₆ - C ₁₀	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	106	[NT]
Benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	103	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	108	[NT]
m+p-xylene	µg/L	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	108	[NT]
o-xylene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Naphthalene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	86	[NT]	[NT]	[NT]	[NT]	79	[NT]
Surrogate toluene-d8	%		Org-023	100	[NT]	[NT]	[NT]	[NT]	100	[NT]
Surrogate 4-BFB	%		Org-023	99	[NT]	[NT]	[NT]	[NT]	103	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date extracted	-			11/11/2020	[NT]	[NT]	[NT]	[NT]	11/11/2020	[NT]
Date analysed	-			11/11/2020	[NT]	[NT]	[NT]	[NT]	11/11/2020	[NT]
TRH C ₁₀ - C ₁₄	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	81	[NT]
TRH C ₁₅ - C ₂₈	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	74	[NT]
TRH C ₂₉ - C ₃₆	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	118	[NT]
TRH >C ₁₀ - C ₁₆	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	81	[NT]
TRH >C ₁₆ - C ₃₄	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	74	[NT]
TRH >C ₃₄ - C ₄₀	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	118	[NT]
Surrogate o-Terphenyl	%		Org-020	73	[NT]	[NT]	[NT]	[NT]	120	[NT]

QUALITY CONTROL: PAHs in Water					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			11/11/2020	[NT]	[NT]	[NT]	[NT]	11/11/2020	[NT]
Date analysed	-			11/11/2020	[NT]	[NT]	[NT]	[NT]	11/11/2020	[NT]
Naphthalene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	82	[NT]
Acenaphthylene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	88	[NT]
Fluorene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Phenanthrene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Anthracene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	91	[NT]
Pyrene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	91	[NT]
Benzo(a)anthracene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Benzo(b,j+k)fluoranthene	µg/L	2	Org-022/025	<2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Indeno(1,2,3-c,d)pyrene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	108	[NT]	[NT]	[NT]	[NT]	96	[NT]

QUALITY CONTROL: Metals in Water - Dissolved					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date digested	-			11/11/2020	35	11/11/2020	11/11/2020		11/11/2020	[NT]
Date analysed	-			11/11/2020	35	11/11/2020	11/11/2020		11/11/2020	[NT]
Arsenic - Dissolved	mg/L	0.05	Metals-020	<0.05	35	<0.05	[NT]		108	[NT]
Cadmium - Dissolved	mg/L	0.01	Metals-020	<0.01	35	<0.01	[NT]		103	[NT]
Chromium - Dissolved	mg/L	0.01	Metals-020	<0.01	35	<0.01	[NT]		106	[NT]
Copper - Dissolved	mg/L	0.01	Metals-020	<0.01	35	0.6	[NT]		109	[NT]
Lead - Dissolved	mg/L	0.03	Metals-020	<0.03	35	<0.03	[NT]		106	[NT]
Mercury - Dissolved	mg/L	0.0005	Metals-021	<0.0005	35	<0.0005	<0.0005	0	105	[NT]
Nickel - Dissolved	mg/L	0.02	Metals-020	<0.02	35	<0.02	[NT]		111	[NT]
Zinc - Dissolved	mg/L	0.02	Metals-020	<0.02	35	0.05	[NT]		117	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.
Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.	
The recommended maximums for analytes in urine are taken from "2018 TLVs and BEIs", as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.	
Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2	

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: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-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.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

Acid Extractable Metals in Soil:

- The laboratory RPD acceptance criteria has been exceeded for 255370-1 for Zn. Therefore a triplicate result has been issued as laboratory sample number 255370-36.
- The laboratory RPD acceptance criteria has been exceeded for 255370-25 for Pb. Therefore a triplicate result has been issued as laboratory sample number 255370-37.

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.

Note: All samples analysed as received. However, samples 255370-7, 14, 21, 23, 25, 27, 30 are below the minimum 500mL sample volume as per National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013.

Factual description of asbestos identified in the soil samples: NEPM

Sample 255370-1; Chrysotile asbestos identified in 0.0801g of fibre cement material >7mm

SAMPLE RECEIPT ADVICE

Client Details

Client	Environmental Investigation Services
Attention	Harry Leonard

Sample Login Details

Your reference	E31772PL, Normanhurst
Envirolab Reference	255370
Date Sample Received	10/11/2020
Date Instructions Received	10/11/2020
Date Results Expected to be Reported	17/11/2020

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	33 Soil, 2 Water
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	14.9
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie

Phone: 02 9910 6200
Fax: 02 9910 6201
Email: ahie@envirolab.com.au

J acina Hurst

Phone: 02 9910 6200
Fax: 02 9910 6201
Email: j_hurst@envirolab.com.au

Analysis Underway, details on the following page:

Sample ID	VTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBs in Soil	Acid Extractable metals in soil	Asbestos ID - soils NEPM - ASB-001	VTRH(C6-C10)/BTEXN in Water	svTRH (C10-C40) in Water	PAHs in Water	Metals in Water - Dissolved	On Hold
BH201-0.1-0.2	✓	✓	✓	✓	✓	✓	✓	✓					
BH201-0.9-1.0													✓
BH201-1.7-1.8	✓	✓	✓				✓						
BH202-0-0.2	✓	✓	✓	✓	✓	✓	✓	✓					
BH202-0.5-0.6													✓
BH202-0.9-1.0													✓
BH203-0-0.2	✓	✓	✓	✓	✓	✓	✓	✓					
BH203-0.8 1.0													✓
BH203-1.5-1.6													✓
BH203-2.5-2.6													✓
BH203-3.0-3.1													✓
BH204-0-0.2	✓	✓	✓	✓	✓	✓	✓	✓					
BH204-0.4-0.5													✓
BH205-0-0.2	✓	✓	✓	✓	✓	✓	✓	✓					
BH205-0.9-1.0													✓
BH205-1.5-1.6	✓	✓	✓				✓						
BH206-0-0.2	✓	✓	✓	✓	✓	✓	✓	✓					
BH206-0.4-0.5													✓
BH207-0.1-0.2	✓	✓	✓	✓	✓	✓	✓	✓					
BH207-0.5-0.6													✓
BH208 0-0.2	✓	✓	✓	✓	✓	✓	✓	✓					
BH208 0.4-0.5													✓
BH209-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓					
BH209-0.4-0.5	✓	✓	✓				✓						
BH210-0.2-0.3	✓	✓	✓	✓	✓	✓	✓	✓					
BH210-0.7-0.8													✓
BH211-0.2-0.3	✓	✓	✓	✓	✓	✓	✓	✓					
BH211-0.5-0.6													✓
BH211-0.9-1.0													✓
BH212-0-0.2	✓	✓	✓	✓	✓	✓	✓	✓					
BH212-0.6-0.7	✓	✓	✓				✓						
SDUP1	✓	✓	✓	✓	✓	✓	✓						

Sample ID	VTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBs in Soil	Acid Extractable metals in soil	Asbestos ID - soils NEPM - ASB-001	VTRH(C6-C10)/BTEXN in Water	svTRH (C10-C40) in Water	PAHs in Water	Metals in Water - Dissolved	On Hold
TS1									✓				
TBS1	✓	✓	✓				✓						
FR1									✓	✓	✓	✓	

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.

Requests for longer term sample storage must be received in writing.

Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.

TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

SAMPLE AND CHAIN OF CUSTODY FORM

TO: ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen						EIS Job Number: E31772PL Date Results Required: STANDARD Page: 1 of 1						FROM:  JK Environments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Harry Leonard Hleonard@jkenvironments.com.au						
Location: Normanhurst						Sample Preserved in Esky on Ice												
Sampler: JL						Tests Required												
Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 5	Asbestos 500mL (WA)	BTX	Combo 3	Combo 3 (water)							
2-6-11-20	1	BH201	0.1-0.2	G, A	0	F: Silty sand	X	X										
2-6-11-20	2	BH201	0.9-1.0	G, A	0	F: Silty clay												
2-6-11-20	3	BH201	1.7-1.8	G, A	0	Silty clay				X								
2-6-11-20	4	BH202	0-0.2	G, A	0	F: Silty clay	X	X										
2-6-11-20	5	BH202	0.5-0.6	G, A	0	Silty clay/Siltstone												
2-6-11-20	6	BH202	0.9-1.0	G, A	0	Siltstone												
2-6-11-20	7	BH203	0-0.2	G, A	0	F: Silty clay	X	X										
2-6-11-20	8	BH203	0.8-1.0	G, A	0	F: Silty clay												
2-6-11-20	9	BH203	1.5-1.6	G, A	0	F: Silty clay												
2-6-11-20	10	BH203	2.5-2.6	G, A	0	F: Silty clay												
2-6-11-20	11	BH203	3.0-3.1	G, A	0	Silty clay												
2-6-11-20	12	BH204	0-0.2	G, A	0	F: Silty sand	X	X										
2-6-11-20	13	BH204	0.4-0.5	G, A	0	Silty clay												
2-6-11-20	14	BH205	0-0.2	G, A	0	F: Silty clay	X	X										
2-6-11-20	15	BH205	0.9-1.0	G, A	0	F: Silty clay												
2-6-11-20	16	BH205	1.5-1.6	G, A	0	Silty clay				X								
2-6-11-20	17	BH206	0-0.2	G, A	0.1	F: Gravelly sand	X	X										
2-6-11-20	18	BH206	0.4-0.5	G, A	0	Silty clay												
2-6-11-20	19	BH207	0.1-0.2	G, A	0.3	F: Gravelly sand	X	X										
2-6-11-20	20	BH207	0.5-0.6	G, A	0	Silty clay												
2-6-11-20	21	BH208	0-0.2	G, A	0	F: Silty clay	X	X										
2-6-11-20	22	BH208	0.4-0.5	G, A	0	Silty clay												
2-6-11-20	23	BH209	0-0.1	G, A	0.1	F: Gravelly sand	X	X										
2-6-11-20	24	BH209	0.4-0.5	G, A	0	Silty clay				X								
2-6-11-20	25	BH210	0.2-0.3	G, A	0	Silty clay	X	X										
2-6-11-20	26	BH210	0.7-0.8	G, A	0	Silty clay												
2-6-11-20	27	BH211	0.2-0.3	G, A	0	Silty clay	X	X										
2-6-11-20	28	BH211	0.5-0.6	G, A	0	Silty clay												
2-6-11-20	29	BH211	0.9-1.0	G, A	0	Silty clay												
Remarks (comments/detection limits required): SDUP1 - Intra-lab duplicate sample SDUP2 - Inter-lab duplicate sample Relinquished By: HL							Sample Containers: G - 250mg Glass Jar A - Ziplock Asbestos Bag P - Plastic Bag Date: 10/11/2020 Time: 1415 Received By: C. Mallem Date: 10/11/20											

EnviroLab Services
 12 Ashley St
 Chatswood NSW 2067
 Ph: (02) 9910 6200
 Job No: E31772PL
 Date Received: 10/11/20
 Time Received: 1415
 Received By: C. Mallem
 Temp: Cool/Dry
 Cooling: Ice/Refrigerator
 Security: Intact/Broken/None

15370

[illegible]

CERTIFICATE OF ANALYSIS 255370-A

Client Details

Client	JK Environments
Attention	Harry Leonard
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	<u>E31772PL, Normanhurst</u>
Number of Samples	33 Soil, 2 Water
Date samples received	10/11/2020
Date completed instructions received	07/12/2020

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.

Report Details

Date results requested by	09/12/2020
Date of Issue	08/12/2020
NATA Accreditation Number 2901. This document shall not be reproduced except in full.	
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Results Approved By

Jaimie Loa-Kum-Cheung, Metals Supervisor

Authorised By



Nancy Z hang, Laboratory Manager

Metals in TCLP USEPA1311		
Our Reference		255370-A-23
Your Reference	UNITS	BH209
Depth		0-0.1
Date Sampled		2-6/11/2020
Type of sample		Soil
Date extracted	-	08/12/2020
Date analysed	-	08/12/2020
pH of soil for fluid# determ.	pH units	9.2
pH of soil TCLP (after HCl)	pH units	1.8
Extraction fluid used	-	1
pH of final Leachate	pH units	5.0
Arsenic in TCLP	mg/L	<0.05
Cadmium in TCLP	mg/L	<0.01
Chromium in TCLP	mg/L	<0.01
Copper in TCLP	mg/L	0.01
Lead in TCLP	mg/L	<0.03
Mercury in TCLP	mg/L	<0.0005
Nickel in TCLP	mg/L	0.04
Zinc in TCLP	mg/L	0.3

Method ID	Methodology Summary
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.
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using in house method INORG-004. Please note that the mass used may be scaled down from the default based on sample mass available.
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					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			08/12/2020	[NT]	[NT]	[NT]	[NT]	08/12/2020	[NT]
Date analysed	-			08/12/2020	[NT]	[NT]	[NT]	[NT]	08/12/2020	[NT]
Arsenic in TCLP	mg/L	0.05	Metals-020 ICP-AES	<0.05	[NT]	[NT]	[NT]	[NT]	118	[NT]
Cadmium in TCLP	mg/L	0.01	Metals-020 ICP-AES	<0.01	[NT]	[NT]	[NT]	[NT]	100	[NT]
Chromium in TCLP	mg/L	0.01	Metals-020 ICP-AES	<0.01	[NT]	[NT]	[NT]	[NT]	104	[NT]
Copper in TCLP	mg/L	0.01	Metals-020 ICP-AES	<0.01	[NT]	[NT]	[NT]	[NT]	119	[NT]
Lead in TCLP	mg/L	0.03	Metals-020 ICP-AES	<0.03	[NT]	[NT]	[NT]	[NT]	101	[NT]
Mercury in TCLP	mg/L	0.0005	Metals-021 CV-AAS	<0.0005	[NT]	[NT]	[NT]	[NT]	81	[NT]
Nickel in TCLP	mg/L	0.02	Metals-020 ICP-AES	<0.02	[NT]	[NT]	[NT]	[NT]	99	[NT]
Zinc in TCLP	mg/L	0.02	Metals-020 ICP-AES	<0.02	[NT]	[NT]	[NT]	[NT]	101	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.
Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.	
The recommended maximums for analytes in urine are taken from "2018 TLVs and BEIs", as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.	
Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2	

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: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-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.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

SAMPLE RECEIPT ADVICE

Client Details

Client	JK Environments
Attention	Harry Leonard

Sample Login Details

Your reference	E31772PL, Normanhurst
Envirolab Reference	255370-A
Date Sample Received	10/11/2020
Date Instructions Received	07/12/2020
Date Results Expected to be Reported	09/12/2020

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	33 Soil, 2 Water
Turnaround Time Requested	2 days
Temperature on Receipt (°C)	14.9
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie

Phone: 02 9910 6200
Fax: 02 9910 6201
Email: ahie@envirolab.com.au

J acina Hurst

Phone: 02 9910 6200
Fax: 02 9910 6201
Email: j_hurst@envirolab.com.au

Analysis Underway, details on the following page:

Sample ID	pH of soil for fluid# de&rm.	pH of soil TCLP (after HCl)	Extraction fluid used	pH of final Leachate	Arsenic in TCLP	Cadmium in TCLP	Chromium in TCLP	Copper in TCLP	Lead in TCLP	Mercury in TCLP	Nick el in TCLP	Z inc in TCLP	On Hold
BH201-0.1-0.2													✓
BH201-0.9-1.0													✓
BH201-1.7-1.8													✓
BH202-0-0.2													✓
BH202-0.5-0.6													✓
BH202-0.9-1.0													✓
BH203-0-0.2													✓
BH203-0.8 1.0													✓
BH203-1.5-1.6													✓
BH203-2.5-2.6													✓
BH203-3.0-3.1													✓
BH204-0-0.2													✓
BH204-0.4-0.5													✓
BH205-0-0.2													✓
BH205-0.9-1.0													✓
BH205-1.5-1.6													✓
BH206-0-0.2													✓
BH206-0.4-0.5													✓
BH207-0.1-0.2													✓
BH207-0.5-0.6													✓

Sample ID	pH of soil for fluid# deerm.	pH of soil TCLP (after HCl)	Extraction fluid used	pH of final Leachate	Arsenic in TCLP	Cadmium in TCLP	Chromium in TCLP	Copper in TCLP	Lead in TCLP	Mercury in TCLP	Nick el in TCLP	Z inc in TCLP	On Hold
BH208 0-0.2													✓
BH208 0.4-0.5													✓
BH209-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
BH209-0.4-0.5													✓
BH210-0.2-0.3													✓
BH210-0.7-0.8													✓
BH211-0.2-0.3													✓
BH211-0.5-0.6													✓
BH211-0.9-1.0													✓
BH212-0-0.2													✓
BH212-0.6-0.7													✓
SDUP1													✓
TS1													✓
TBS1													✓
FR1													✓
BH201 - [TRIPLICATE]-0.1-0.2													✓
BH210 - [TRIPLICATE]-0.2-0.3													✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**



Envirolab Services Pty Ltd

ABN 37 112 535 645

12 Ashley St Chatswood NSW 2067

ph 02 9910 6200 fax 02 9910 6201

customerservice@envirolab.com.au

www.envirolab.com.au

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt. Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

Ming To

From: Simon Song
Sent: Monday, 7 December 2020 11:12 AM
To: Ming To
Subject: FW: Results for Registration 255370 E31772PL, Normanhurst

A job

Ref: 255370-A
TAT: 2 days
Due: 09/12/2020 MT

From: Harry Leonard <harryleonard85@gmail.com>
Sent: Monday, 7 December 2020 10:08 AM
To: Ken Nguyen <KNguyen@envirolab.com.au>; Customer Service <CustomerService@envirolab.com.au>
Subject: RE: Results for Registration 255370 E31772PL, Normanhurst

CAUTION: This email originated from outside of the organisation. Do not act on instructions, click links or open attachments unless you recognise the sender and know the content is authentic and safe.

Hi Ken,

Sorry our emails are down at work, so having to use my gmail account!

Could I please get TCLP analysis for heavy metals on sample BH209 (0-0.2) on a 2 day turnaround?

Let me know if there's any issues.

Thank you,
Harry Leonard (JKE)

From: Ken Nguyen <KNguyen@envirolab.com.au>
Sent: Monday, 16 November 2020 9:03 PM
To: Harry Leonard <HLeonard@jkenvironments.com.au>
Subject: Results for Registration 255370 E31772PL, Normanhurst

Please refer to attached for:
a copy of the Certificate of Analysis
a copy of the COC/paperwork received from you
an Excel or .csv file containing the results

Please note that a hard copy will not be posted.

Enquiries should be made directly to:
customerservice@envirolab.com.au

[How did we do? Send Feedback](#)

Kind Regards,

Ken Nguyen | Senior Customer Service | Envirolab Services

Celebrating 15 years of Great Science. Great Service.

12 Ashley Street Chatswood NSW 2087
T 612 9910 5200
E KNguyen@envirolab.com.au | W www.envirolab.com.au

CERTIFICATE OF ANALYSIS 23339

Client Details

Client	JK Environments
Attention	Harry Leonard
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	<u>E31772PL</u>
Number of Samples	1 SOIL
Date samples received	12/11/2020
Date completed instructions received	12/11/2020

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.

Report Details

Date results requested by	18/11/2020
Date of Issue	18/11/2020
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

Chris De Luca, Operations Manager

Authorised By



Pamela Adams, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil		
Our Reference		23339-1
Your Reference	UNITS	SDUP2
Date Sampled		04/11/2020
Type of sample		SOIL
Date extracted	-	13/11/2020
Date analysed	-	14/11/2020
vTRH C ₆ - C ₉	mg/kg	<25
vTRH C ₆ - C ₁₀	mg/kg	<25
TRH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25
Benzene	mg/kg	<0.2
Toluene	mg/kg	<0.5
Ethylbenzene	mg/kg	<1
m+p-xylene	mg/kg	<2
o-Xylene	mg/kg	<1
Naphthalene	mg/kg	<1
Total BTEX	mg/kg	<1
Total +ve Xylenes	mg/kg	<1
Surrogate aaa-Trifluorotoluene	%	89

TRH Soil C10-C40 NEPM		
Our Reference		23339-1
Your Reference	UNITS	SDUP2
Date Sampled		04/11/2020
Type of sample		SOIL
Date extracted	-	13/11/2020
Date analysed	-	14/11/2020
TRH C ₁₀ - C ₁₄	mg/kg	<50
TRH C ₁₅ - C ₂₈	mg/kg	<100
TRH C ₂₉ - C ₃₆	mg/kg	<100
Total +ve TRH (C10-C36)	mg/kg	<50
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	%	82

PAHs in Soil		
Our Reference		23339-1
Your Reference	UNITS	SDUP2
Date Sampled		04/11/2020
Type of sample		SOIL
Date extracted	-	13/11/2020
Date analysed	-	18/11/2020
Naphthalene	mg/kg	<0.1
Acenaphthylene	mg/kg	<0.1
Acenaphthene	mg/kg	<0.1
Fluorene	mg/kg	<0.1
Phenanthrene	mg/kg	<0.1
Anthracene	mg/kg	<0.1
Fluoranthene	mg/kg	0.2
Pyrene	mg/kg	0.2
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	0.13
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
Total +ve PAH's	mg/kg	1.2
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
Surrogate <i>p</i> -Terphenyl-d ₁₄	%	110

OCP in Soil		
Our Reference		23339-1
Your Reference	UNITS	SDUP2
Date Sampled		04/11/2020
Type of sample		SOIL
Date extracted	-	13/11/2020
Date analysed	-	18/11/2020
alpha-BHC	mg/kg	<0.1
Hexachlorobenzene	mg/kg	<0.1
beta-BHC	mg/kg	<0.1
gamma-BHC	mg/kg	<0.1
Heptachlor	mg/kg	<0.1
delta-BHC	mg/kg	<0.1
Aldrin	mg/kg	<0.1
Heptachlor Epoxide	mg/kg	<0.1
gamma-Chlordane	mg/kg	<0.1
alpha-chlordane	mg/kg	<0.1
Endosulfan I	mg/kg	<0.1
pp-DDE	mg/kg	<0.1
Dieldrin	mg/kg	<0.1
Endrin	mg/kg	<0.1
Endosulfan II	mg/kg	<0.1
pp-DDD	mg/kg	<0.1
Endrin Aldehyde	mg/kg	<0.1
pp-DDT	mg/kg	<0.1
Endosulfan Sulphate	mg/kg	<0.1
Methoxychlor	mg/kg	<0.1
Total +ve reported Aldrin + Dieldrin	mg/kg	<0.1
Total +ve reported DDT+DDD+DDE	mg/kg	<0.1
Surrogate 2-chlorophenol-d4	%	76

OP in Soil		
Our Reference		23339-1
Your Reference	UNITS	SDUP2
Date Sampled		04/11/2020
Type of sample		SOIL
Date extracted	-	13/11/2020
Date analysed	-	18/11/2020
Azinphos-methyl	mg/kg	<0.1
Bromophos-ethyl	mg/kg	<0.1
Chlorpyrifos	mg/kg	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1
Diazinon	mg/kg	<0.1
Dichlorovos	mg/kg	<0.1
Dimethoate	mg/kg	<0.1
Ethion	mg/kg	<0.1
Fenitrothion	mg/kg	<0.1
Malathion	mg/kg	<0.1
Parathion	mg/kg	<0.1
Ronnel	mg/kg	<0.1
Surrogate 2-chlorophenol-d4	%	76

PCBs in Soil		
Our Reference		23339-1
Your Reference	UNITS	SDUP2
Date Sampled		04/11/2020
Type of sample		SOIL
Date extracted	-	13/11/2020
Date analysed	-	18/11/2020
Aroclor 1016	mg/kg	<0.1
Aroclor 1221	mg/kg	<0.1
Aroclor 1232	mg/kg	<0.1
Aroclor 1242	mg/kg	<0.1
Aroclor 1248	mg/kg	<0.1
Aroclor 1254	mg/kg	<0.1
Aroclor 1260	mg/kg	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1
Surrogate 2-fluorobiphenyl	%	96

Acid Extractable metals in soil		
Our Reference		23339-1
Your Reference	UNITS	SDUP2
Date Sampled		04/11/2020
Type of sample		SOIL
Date digested	-	14/11/2020
Date analysed	-	14/11/2020
Arsenic	mg/kg	4
Cadmium	mg/kg	<0.4
Chromium	mg/kg	16
Copper	mg/kg	20
Lead	mg/kg	34
Mercury	mg/kg	<0.1
Nickel	mg/kg	5
Zinc	mg/kg	36

Moisture		
Our Reference	UNITS	23339-1
Your Reference		SDUP2
Date Sampled		04/11/2020
Type of sample		SOIL
Date prepared	-	13/11/2020
Date analysed	-	14/11/2020
Moisture	%	26

Method ID	Methodology Summary
Inorg-008	Moisture content determined by heating at 105 deg C for a minimum of 12 hours.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Org-020	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-021/022	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD or GC-MS. 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.
Org-022	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
Org-022	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Note, For OCs 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.

Method ID	Methodology Summary
Org-022	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. 'EQ 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. 'EQ 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. 'EQ 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-022	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	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.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate		Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			13/11/2020	[NT]	[NT]	[NT]	[NT]	13/11/2020	[NT]
Date analysed	-			14/11/2020	[NT]	[NT]	[NT]	[NT]	14/11/2020	[NT]
vTRH C ₆ - C ₉	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	94	[NT]
vTRH C ₆ - C ₁₀	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	94	[NT]
Benzene	mg/kg	0.2	Org-023	<0.2	[NT]	[NT]	[NT]	[NT]	86	[NT]
Toluene	mg/kg	0.5	Org-023	<0.5	[NT]	[NT]	[NT]	[NT]	92	[NT]
Ethylbenzene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	94	[NT]
m+p-xylene	mg/kg	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	100	[NT]
o-Xylene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Naphthalene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	99	[NT]	[NT]	[NT]	[NT]	98	[NT]

QUALITY CONTROL: TRH Soil C10-C40 NEPM					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			13/11/2020	[NT]	[NT]	[NT]	[NT]	13/11/2020	[NT]
Date analysed	-			14/11/2020	[NT]	[NT]	[NT]	[NT]	14/11/2020	[NT]
TRH C ₁₀ - C ₁₄	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	95	[NT]
TRH C ₁₅ - C ₂₈	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	91	[NT]
TRH C ₂₉ - C ₃₆	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	93	[NT]
TRH >C ₁₀ -C ₁₆	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	95	[NT]
TRH >C ₁₆ -C ₃₄	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	91	[NT]
TRH >C ₃₄ -C ₄₀	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	93	[NT]
Surrogate o-Terphenyl	%		Org-020	81	[NT]	[NT]	[NT]	[NT]	77	[NT]

QUALITY CONTROL: PAHs in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			13/11/2020	[NT]	[NT]	[NT]	[NT]	13/11/2020	[NT]
Date analysed	-			18/11/2020	[NT]	[NT]	[NT]	[NT]	18/11/2020	[NT]
Naphthalene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Acenaphthylene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Acenaphthene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Phenanthrene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Anthracene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Pyrene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Benzo(b,j&k)fluoranthene	mg/kg	0.2	Org-022	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022	<0.05	[NT]	[NT]	[NT]	[NT]	98	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d ₁₄	%		Org-022	106	[NT]	[NT]	[NT]	[NT]	98	[NT]

QUALITY CONTROL: OCP in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			13/11/2020	[NT]	[NT]	[NT]	[NT]	13/11/2020	[NT]
Date analysed	-			18/11/2020	[NT]	[NT]	[NT]	[NT]	18/11/2020	[NT]
alpha-BHC	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Hexachlorobenzene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	94	[NT]
gamma-BHC	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
delta-BHC	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	94	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	98	[NT]
alpha-chlordane	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Dieldrin	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Endrin	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Methoxychlor	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate 2-chlorophenol-d4	%		Org-022	74	[NT]	[NT]	[NT]	[NT]	86	[NT]

QUALITY CONTROL: OP in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			13/11/2020	[NT]	[NT]	[NT]	[NT]	13/11/2020	[NT]
Date analysed	-			18/11/2020	[NT]	[NT]	[NT]	[NT]	18/11/2020	[NT]
Azinphos-methyl	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chlorpyrifos	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Chlorpyrifos-methyl	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dichlorovos	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	112	[NT]
Fenitrothion	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Malathion	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Parathion	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate 2-chlorophenol-d4	%		Org-022	74	[NT]	[NT]	[NT]	[NT]	86	[NT]

QUALITY CONTROL: PCBs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			13/11/2020	[NT]	[NT]	[NT]	[NT]	13/11/2020	[NT]
Date analysed	-			18/11/2020	[NT]	[NT]	[NT]	[NT]	18/11/2020	[NT]
Aroclor 1016	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Aroclor 1260	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate 2-fluorobiphenyl	%		Org-022	92	[NT]	[NT]	[NT]	[NT]	96	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate		Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date digested	-			14/11/2020	[NT]	[NT]	[NT]	[NT]	14/11/2020	[NT]
Date analysed	-			14/11/2020	[NT]	[NT]	[NT]	[NT]	14/11/2020	[NT]
Arsenic	mg/kg	4	Metals-020 ICP-AES	<4	[NT]	[NT]	[NT]	[NT]	102	[NT]
Cadmium	mg/kg	0.4	Metals-020 ICP-AES	<0.4	[NT]	[NT]	[NT]	[NT]	101	[NT]
Chromium	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Copper	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Lead	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Mercury	mg/kg	0.1	Metals-021 CV-AAS	<0.1	[NT]	[NT]	[NT]	[NT]	112	[NT]
Nickel	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Zinc	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	100	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.
Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.	
The recommended maximums for analytes in urine are taken from "2018 TLVs and BEIs", as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.	
Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2	

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: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-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.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

SAMPLE RECEIPT ADVICE

Client Details

Client	JK Environments
Attention	Harry Leonard

Sample Login Details

Your reference	E31772PL
Envirolab Reference	23339
Date Sample Received	12/11/2020
Date Instructions Received	12/11/2020
Date Results Expected to be Reported	18/11/2020

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	1 SOIL
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	9.8
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Pamela Adams

Phone: 03 9763 2500
Fax: 03 9763 2633
Email: padams@envirolab.com.au

Chris De Luca

Phone: 03 9763 2500
Fax: 03 9763 2633
Email: cdeluca@envirolab.com.au

Analysis Underway, details on the following page:

Sample ID	VTRH(C6-C10)/BTEXN in Soil	TRH Soil C10-C40 NEPM	PAHs in Soil	OCP in Soil	OP in Soil	PCBs in Soil	Acid Extractable metals in soil
SDUP2	✓	✓	✓	✓	✓	✓	✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.

Requests for longer term sample storage must be received in writing.

Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.

SAMPLE AND CHAIN OF CUSTODY FORM

TO: ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen		EIS Job Number: E31772PL Date Results Required: STANDARD Page: 1 of 1		FROM:  JK Environments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Harry Leonard Hleonard@jkenvironments.com.au	

Location: Normanhurst							Sample Preserved in Esky on Ice									
Sampler: JL							Tests Required									
Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 5	Asbestos 500mL (WA)	BTX	Combo 3	Combo 3 (water)					
2-6-11-20	1	BH201	0.1-0.2	G, A	0	F: Silty sand	X	X								
2-6-11-20	2	BH201	0.9-1.0	G, A	0	F: Silty clay										
2-6-11-20	3	BH201	1.7-1.8	G, A	0	Silty clay				X						
2-6-11-20	4	BH202	0-0.2	G, A	0	F: Silty clay	X	X								
2-6-11-20	5	BH202	0.5-0.6	G, A	0	Silty clay/Siltstone										
2-6-11-20	6	BH202	0.9-1.0	G, A	0	Siltstone										
2-6-11-20	7	BH203	0-0.2	G, A	0	F: Silty clay	X	X								
2-6-11-20	8	BH203	0.8-1.0	G, A	0	F: Silty clay										
2-6-11-20	9	BH203	1.5-1.6	G, A	0	F: Silty clay										
2-6-11-20	10	BH203	2.5-2.6	G, A	0	F: Silty clay										
2-6-11-20	11	BH203	3.0-3.1	G, A	0	Silty clay										
2-6-11-20	12	BH204	0-0.2	G, A	0	F: Silty sand	X	X								
2-6-11-20	13	BH204	0.4-0.5	G, A	0	Silty clay										
2-6-11-20	14	BH205	0-0.2	G, A	0	F: Silty clay	X	X								
2-6-11-20	15	BH205	0.9-1.0	G, A	0	F: Silty clay										
2-6-11-20	16	BH205	1.5-1.6	G, A	0	Silty clay				X						
2-6-11-20	17	BH206	0-0.2	G, A	0.1	F: Gravelly sand	X	X								
2-6-11-20	18	BH206	0.4-0.5	G, A	0	Silty clay										
2-6-11-20	19	BH207	0.1-0.2	G, A	0.3	F: Gravelly sand	X	X								
2-6-11-20	20	BH207	0.5-0.6	G, A	0	Silty clay										
2-6-11-20	21	BH208	0-0.2	G, A	0	F: Silty clay	X	X								
2-6-11-20	22	BH208	0.4-0.5	G, A	0	Silty clay										
2-6-11-20	23	BH209	0-0.1	G, A	0.1	F: Gravelly sand	X	X								
2-6-11-20	24	BH209	0.4-0.5	G, A	0	Silty clay				X						
2-6-11-20	25	BH210	0.2-0.3	G, A	0	Silty clay	X	X								
2-6-11-20	26	BH210	0.7-0.8	G, A	0	Silty clay										
2-6-11-20	27	BH211	0.2-0.3	G, A	0	Silty clay	X	X								
2-6-11-20	28	BH211	0.5-0.6	G, A	0	Silty clay										
2-6-11-20	29	BH211	0.9-1.0	G, A	0	Silty clay										

Remarks (comments/detection limits required): SDUP1 - Intra-lab duplicate sample SDUP2 - Inter-lab duplicate sample Relinquished By: HL		Date: 10/11/2020		Sample Containers: G - 250mg Glass Jar A - Ziplock Asbestos Bag P - Plastic Bag		Time: 1415		Received By: C. Malton		Date: 10/11/20	

EnviroLab Services
 12 Ashley St
 Chatswood NSW 2067
 Ph: (02) 9910 6200
 Job No: E31772PL
 Date Received: 10/11/20
 Time Received: 1415
 Received By: C. Malton
 Temp: Cool/Dry
 Cooling: Ice/Refrigerator
 Security: Intact/Broken/None

15370

[illegible]



Appendix E: Report Explanatory Notes



QA/QC Definitions

The QA/QC terms used in this report are defined below. The definitions are in accordance with US EPA publication SW-846, entitled *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (1994)²² methods and those described in *Environmental Sampling and Analysis, A Practical Guide*, (1991)²³. The NEPM (2013) is consistent with these documents.

A. Practical Quantitation Limit (PQL), Limit of Reporting (LOR) & Estimated Quantitation Limit (EQL)

These terms all refer to the concentration above which results can be expressed with a minimum 95% confidence level. The laboratory reporting limits are generally set at ten times the standard deviation for the Method Detection Limit for each specific analyte. For the purposes of this report the LOR, PQL, and EQL are considered to be equivalent.

When assessing laboratory data it should be borne in mind that values at or near the PQL have two important limitations: *“The uncertainty of the measurement value can approach, and even equal, the reported value. Secondly, confirmation of the analytes reported is virtually impossible unless identification uses highly selective methods. These issues diminish when reliably measurable amounts of analytes are present. Accordingly, legal and regulatory actions should be limited to data at or above the reliable detection limit”* (Keith, 1991).

B. Precision

The degree to which data generated from repeated measurements differ from one another due to random errors. Precision is measured using the standard deviation or Relative Percent Difference (RPD).

C. Accuracy

Accuracy is a measure of the agreement between an experimental result and the true value of the parameter being measured (i.e. the proximity of an averaged result to the true value, where all random errors have been statistically removed). The assessment of accuracy for an analysis can be achieved through the analysis of known reference materials or assessed by the analysis of surrogates, field blanks, trip spikes and matrix spikes. Accuracy is typically reported as percent recovery.

D. Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is primarily dependent upon the design and implementation of the sampling program. Representativeness of the data is partially ensured by the avoidance of contamination, adherence to sample handling and analysis protocols and use of proper chain-of-custody and documentation procedures.

E. Completeness

Completeness is a measure of the number of valid measurements in a data set compared to the total number of measurements made and overall performance against DQIs. The following information is assessed for completeness:

- Chain-of-custody forms;
- Sample receipt form;
- All sample results reported;
- All blank data reported;

²² US EPA, (1994). *SW-846: Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*. (US EPA SW-846)

²³ Keith., H, (1991). *Environmental Sampling and Analysis, A Practical Guide*



- All laboratory duplicate and RPDs calculated;
- All surrogate spike data reported;
- All matrix spike and lab control spike (LCS) data reported and RPDs calculated;
- Spike recovery acceptable limits reported; and
- NATA stamp on reports.

F. Comparability

Comparability is the evaluation of the similarity of conditions (e.g. sample depth, sample homogeneity) under which separate sets of data are produced. Data comparability checks include a bias assessment that may arise from the following sources:

- Collection and analysis of samples by different personnel; Use of different techniques;
- Collection and analysis by the same personnel using the same methods but at different times; and
- Spatial and temporal changes (due to environmental dynamics).

G. Blanks

The purpose of laboratory and field blanks is to check for artefacts and interferences that may arise during sampling, transport and analysis.

H. Matrix Spikes

Samples are spiked with laboratory grade standards to detect interactive effects between the sample matrix and the analytes being measured. Matrix Spikes are reported as a percent recovery and are prepared for 1 in every 20 samples. Sample batches that contain less than 20 samples may be reported with a Matrix Spike from another batch. The percent recovery is calculated using the formula below. Acceptable recovery limits are 70% to 130%.

$$\frac{(\text{Spike Sample Result} - \text{Sample Result}) \times 100}{\text{Concentration of Spike Added}}$$

I. Surrogate Spikes

Samples are spiked with a known concentration of compounds that are chemically related to the analyte being investigated but unlikely to be detected in the environment. The purpose of the Surrogate Spikes is to check the accuracy of the analytical technique. Surrogate Spikes are reported as percent recovery.

J. Duplicates

Laboratory duplicates measure precision, expressed as Relative Percent Difference. Duplicates are prepared from a single field sample and analysed as two separate extraction procedures in the laboratory. The RPD is calculated using the formula where D1 is the sample concentration and D2 is the duplicate sample concentration:

$$\frac{(D1 - D2) \times 100}{\{(D1 + D2)/2\}}$$



Appendix F: Data (QA/QC) Evaluation

Data (QA/QC) Evaluation

A. INTRODUCTION

This Data (QA/QC) Evaluation forms part of the validation process for the DQOs documented in Section 4.1 of this report. Checks were made to assess the data in terms of precision, accuracy, representativeness, comparability and completeness. These 'PARCC' parameters are referred to collectively as DQIs and are defined in the Report Explanatory Notes attached in the report appendices.

JKE note that samples collected for the 2018 PSI included locations from within the Early Learning Centre which has since been removed from the Stage 1 Works area and therefore, this investigation. The samples and subsequent field duplicate samples from BH7, BH8, BH9 and BH10 still appear in the laboratory documentation in the appendices, however have not been reviewed as part of the investigation.

1. Field and Laboratory Considerations

The quality of the analytical data produced for this project has been considered in relation to the following:

- Sample collection, storage, transport and analysis;
- Laboratory PQLs;
- Field QA/QC results; and
- Laboratory QA/QC results.

2. Field QA/QC Samples and Analysis

A summary of the field QA/QC samples collected and analysed for this investigation is provided in the following table. It is noted that the investigation was undertaken over several separate stages and the data have been consolidated into a single dataset for the purpose of the DSI.

Sample Type	Sample Identification	Frequency (of Sample Type)	Analysis Performed
Intra-laboratory duplicate (soil)	DUPRK1 (primary sample BH109 0.05-0.15m)	Approximately 4% of primary samples	Heavy metals, TRH/BTEX, PAHs
Intra-laboratory duplicate (soil)	SDUP1 (primary sample BH203 0-0.2m)	As above	Heavy metals, TRH/BTEX, PAHs, OCPs, OPPs and PCBs
Inter-laboratory duplicate (soil)	DUPRK2 (primary sample BH105 0.2-0.4m)	Approximately 4% of primary samples	Heavy metals, TRH/BTEX, PAHs
Inter-laboratory duplicate (soil)	SDUP2 (primary sample BH207 0.1-0.2m)	As above	Heavy metals, TRH/BTEX, PAHs, OCPs, OPPs and PCBs
Trip blank (soil)	TB (31/08/2018)	One to demonstrate adequacy of storage and transport methods	BTEX
Trip blank (soil)	TB1 (27/03/2019)	One to demonstrate adequacy of storage and transport methods	BTEX



Sample Type	Sample Identification	Frequency (of Sample Type)	Analysis Performed
Trip blank (soil)	TBS1 (06/11/2020)	One to demonstrate adequacy of storage and transport methods	BTEX
Rinsate (soil)	FRAM1 (27/03/2019)	One to demonstrate adequacy of decontamination methods	BTEX
Rinsate (soil)	FR1 (06/11/2020)	One to demonstrate adequacy of decontamination methods	Heavy metals, TRH/BTEX and PAHS
Trip spike (soil)	TS1 (06/11/2020)	One to demonstrate adequacy of preservation, storage and transport methods	BTEX
Trip spike (water)	TS1 (04/04/2019)	One to demonstrate adequacy of preservation, storage and transport methods	BTEX

The results for the field QA/QC samples are detailed in the laboratory summary tables (Table Q1 and Table Q2) attached to the investigation report and are discussed in the subsequent sections of this Data (QA/QC) Evaluation report.

JKE note that during the groundwater sampling event, field duplicate samples were collected and submitted for analysis. However, due to the low volume of groundwater available adequate analysis on the duplicate samples was not possible and the analysis was therefore cancelled. The field duplicate samples appear on the chain of custody documentation but have not been analysed.

Overall, it is noted that the duplicate sampling frequency is marginally below the 10% required in NEPM 2013. Considering the data was collected over various stages, including for both preliminary and detailed investigations, this non-conformance is considered to be minor and does not compromise the overall data quality.

3. Data Assessment Criteria

JKE adopted the following criteria for assessing the field and laboratory QA/QC analytical results:

Field Duplicates

Acceptable targets for precision of field duplicates in this report will be 30% or less, consistent with NEPM (2013). RPD failures will be considered qualitatively on a case-by-case basis taking into account factors such as the concentrations used to calculate the RPD (i.e. RPD exceedance where concentrations are close to the PQL are typically not as significant as those where concentrations are reported at least five or 10 times the PQL), sample type, collection methods and the specific analyte where the RPD exceedance was reported.

Field/Trip Blanks and Rinsates

Acceptable targets for field blank and rinsate samples in this report will be less than the PQL for organic analytes. Metals will be considered on a case-by-case basis with regards to typical background concentrations in soils.

Trip Spikes

Acceptable targets for trip spike samples in this report will be 70% to 130%.

Laboratory QA/QC

The suitability of the laboratory data is assessed against the laboratory QA/QC criteria which is outlined in the laboratory reports. These criteria were developed and implemented in accordance with the laboratory's NATA accreditation and align with the acceptable limits for QA/QC samples as outlined in NEPM (2013) and other relevant guidelines.

A summary of the acceptable limits adopted by the primary laboratory (Envirolab) is provided below:

RPDs

- Results that are <5 times the PQL, any RPD is acceptable; and
- Results >5 times the PQL, RPDs between 0-50% are acceptable.

Laboratory Control Samples (LCS) and Matrix Spikes

- 70-130% recovery acceptable for metals and inorganics;
- 60-140% recovery acceptable for organics; and
- 10-140% recovery acceptable for VOCs.

Surrogate Spikes

- 60-140% recovery acceptable for general organics; and
- 10-140% recovery acceptable for VOCs.

Method Blanks

- All results less than PQL.

B. DATA EVALUATION

1. Sample Collection, Storage, Transport and Analysis

Samples were collected by trained field staff in accordance. Field sampling procedures were designed to be consistent with relevant guidelines, including NEPM (2013) and other guidelines made under the CLM Act 1997.

Appropriate sample preservation, handling and storage procedures were adopted. Laboratory analysis was undertaken within specified holding times generally in accordance with Schedule B(3) of NEPM (2013) and the laboratory NATA accredited methodologies.

JKE note that the temperature on receipt of soil samples was reported to be up to 23.3°C. JKE understand that the temperature is measured at the laboratory using an infrared temperature probe by scanning the

outside of the sample container (i.e. one sample jar/container at the time of registering the samples). This procedure is not considered to be robust as there is a potential for the outside of the jar to warm to ambient temperature, or at least to increase from that of the internal contents, relatively quickly. On this basis, JKE are of the opinion that the temperatures reported on the Sample Receipts are unlikely to be reliable or representative of the overall batch. This is further supported by the trip spike recovery results (discussed further below) which reported adequate recovery in the range of 85% to 107%.

EnviroLab noted that the asbestos results were reported to be consistent with the recommendations in NEPM (2013), however this level of reporting is outside the scope of their NATA accreditation. In the absence of other available analytical methods for asbestos, this was found to be acceptable for the purpose of this investigation.

Review of the project data also indicated that:

- COC documentation was adequately maintained;
- Sample receipt advice documentation was provided for all sample batches;
- All analytical results were reported; and
- Consistent units were used to report the analysis results.

It is noted that the PAH TCLP analysis in lab report 200697-A was undertaken outside of the recommended holding time. Considering that the PAH TCLP analysis was undertaken with a focus on benzo(a)pyrene which is a heavier molecular weight compound with a low vapour pressure (i.e. concentrations of this compound are not expected to be susceptible to degradation over the short term), the holding time exceedance is not considered to be of concern and does not compromise the data quality.

2. Laboratory PQLs

Appropriate PQLs were adopted for the analysis and all PQLs were below the SAC with the exception of the anthracene PQL for groundwater analysis which was 10 times greater than the ecological SAC. In light of the PAH concentrations reported for groundwater, JKE are of the opinion that this is not significant, and it does not affect the quality of the dataset as a whole or the outcome of the investigation.

3. Field QA/QC Sample Results

Field Duplicates

The results indicated that field precision was acceptable. RPD non-conformances were reported for some analytes as discussed below:

- Elevated RPDs were reported for several PAH compounds and TRH ($>C_{16}-C_{34}$) in DUPRK1/BH109 (0.05-0.15m). As both the primary and duplicate sample results were less than the SAC, the exceedances are not considered to have had an adverse impact on the data set as a whole;
- Elevated RPDs were reported for several PAH compounds, heavy metals and TRH ($>C_{34}-C_{40}$) in DUPRK2/BH105 (0.2-0.4m). These exceedances are considered associated with the heterogeneous nature of the fill; and
- Elevated RPDs were reported for several PAH compounds, TRH ($>C_{16}-C_{34}$), TRH ($>C_{34}-C_{40}$) and heavy metals in SDUP1/BH203 (0-0.2m). These exceedances are considered associated with the heterogeneous nature of the fill; and

- Elevated RPDs were reported for several PAH compounds, TRH ($>C_{16}-C_{34}$), TRH ($>C_{34}-C_{40}$) and heavy metals in SDUP2/BH207 (0.1-0.2m). These exceedances are considered associated with the heterogeneous nature of the fill on site.

Values outside the acceptable limits have been attributed to sample heterogeneity and the difficulties associated with obtaining homogenous duplicate samples of heterogeneous matrices. Where applicable, the higher duplicate value has been adopted as a conservative measure (see attached report tables). As all data was compared to the SAC, the heterogeneity of the fill was not considered to compromise the data quality or alter the conclusions of the report.

Field/Trip Blanks

During the investigation, a total of three soil trip blanks (one for each sampling event) were placed in the esky during sampling and transported back to the laboratory. The soil trip blank analysis results were all less than the PQLs with the exception of chromium, lead and zinc with reported concentrations of 2mg/kg, 3mg/kg and 1mg/kg respectively. Low level metals concentrations are typical in washed sand which is utilised as blank material. In JKE's experience, the concentrations reported were consistent with background concentrations in a sand matrix and were not indicative of cross-contamination. On this basis, cross contamination between samples that may have significance for data validity did not occur.

Rinsates

During the investigation, two field rinsates were collected. The rinsate analysis results were all within the acceptance criteria with the exception of zinc, copper and TRH $>C_6-C_{10}$. The detectable concentration of light fraction TRH is most likely attributed to trihalomethanes. These compounds are breakdown products from the chlorination process and are common in potable water at the concentration reported (the Australian drinking water guideline for total trihalomethanes is 250µg/L). The trace concentrations of zinc and copper are also attributable to the presence of low concentrations of metals in potable water which was used as rinsing water.

Considering the soil analysis results obtained during the investigation, there is considered to be a low potential for cross contamination to have occurred to an extent that may have significance for data validity.

Trip Spikes

The results ranged from 82% to 109% and indicated that field preservation methods were appropriate for both soil and groundwater sampling.

4. Laboratory QA/QC

The analytical methods implemented by the laboratory were performed in accordance with their NATA accreditation and were consistent with Schedule B(3) of NEPM (2013). The frequency of data reported for the laboratory QA/QC (i.e. duplicates, spikes, blanks, LCS) was considered to be acceptable for the purpose of this investigation.

A review of the laboratory QA/QC data identified the following minor non-conformances:

- The laboratory RPD acceptance criteria was exceeded for zinc in sample BH101 (0-0.1m). Therefore, a triplicate result was issued. Both the original and triplicate result has been reported and are both below the SAC. This is not considered to have an impact on the data quality;
- Samples BH102 (0-0.2m), BH104 (0.4-0.8m), BH107 (0-0.5m), BH111 (0.6-1.0m), BH113 (0-0.45m), BH114 (0.12-0.2m), BH203 (0-0.2m), BH205 (0-0.2m), BH209 (0-0.1m), BH210 (0.2-0.3m) and BH212 (0-0.2m) were below the minimum 500mL sample volume as per the NEPM 2013 guidance. As asbestos was not detected in these samples and all results were all below the SAC, this is not considered to have an impact on the data quality;
- The laboratory RPD acceptance criteria was exceeded for zinc in sample BH201 (0.1-0.2m). Therefore, a triplicate result was issued. Both the original and triplicate result has been reported and are both below the SAC. This is not considered to have an impact on the data quality; and
- The laboratory RPD acceptance criteria was exceeded for lead in sample BH210 (0.2-0.3m). Therefore, a triplicate result was issued. Both the original and triplicate result has been reported and are both below the SAC. This is not considered to have an impact on the data quality for this assessment.

C. DATA QUALITY SUMMARY

JKE are of the opinion that the data are adequately precise, accurate, representative, comparable and complete to serve as a basis for interpretation to achieve the investigation objectives.

Non-conformances were reported for some field QA/QC samples and laboratory QA/QC analysis. These non-conformances were considered to be sporadic and minor, and were not considered to be indicative of systematic sampling or analytical errors. On this basis, these non-conformances are not considered to materially impact the report findings.

There was only one groundwater monitoring event undertaken for the investigation. On this basis there is some uncertainty around the representativeness of the groundwater data, particularly during different climatic conditions and after wet/dry periods. However, given the low contaminant concentrations reported, the site history and the surrounding land uses, this is not considered to alter the conclusions of the investigation.



Appendix G: Field Work Documents

Client:	TTW	Job No.:	E31772KL
Project:	Proposed New School Buildings	Well No.:	MW11
Location:	LORETO NORMANHURST GIRLS SCHOOL, NORMANHURST, NSW	Depth (m):	6m

WELL FINISH DETAILS

	Gatic Cover ☒	Standpipe ☐	Other (describe) ☐

WELL DEVELOPMENT DETAILS

Method:	Development	SWL – Before (m):	—
Date:	28/03/19.	Time – Before:	1430pm
Undertaken By:	AM/RK	SWL – After (m):	—
Total Vol. Removed:	OL	Time – After:	—
PID Reading (ppm):	0 ppm		

Comments:

DEVELOPMENT MEASUREMENTS

[illegible]

Comments:Odours (YES / NO), NAPL/PSH (YES / NO), Sheen (YES / NO), Steady State Achieved (YES / NO)

YSI Used:

Tested By:	AM/RK	Remarks: - Steady state conditions - Difference in the pH less than 0.2 units, difference in the conductivity less than 10% and SWL stable/not in drawdown - Minimum 3 monitoring well volumes purged, unless well purged until it is effectively dry
Date Tested:	28/3/19	
Checked By:	HL	
Date:	28/3/19.	



Appendix H: Guidelines and Reference Documents



Acid Sulfate Soils Management Advisory Committee (ASSMAC), (1998). Acid Sulfate Soils Manual

Australian and New Zealand Environment Conservation Council (ANZECC), (2000). Australian and New Zealand Guidelines for Fresh and Marine Water Quality

Canadian Council of Ministers of the Environment, (1999). Canadian soil quality guidelines for the protection of environmental and human health: Benzo(a)Pyrene (1997)

CRC Care, (2011). Technical Report No. 10 – Health screening levels for hydrocarbons in soil and groundwater Part 1: Technical development document

Contaminated Land Management Act 1997 (NSW)

Department of Land and Water Conservation, (1997). 1:25,000 Acid Sulfate Soil Risk Map Series

Managing Land Contamination, Planning Guidelines SEPP55 – Remediation of Land (1998)

National Health and Medical Research Council (NHMRC), (2018). National Water Quality Management Strategy, Australian Drinking Water Guidelines 2011

NSW Department of Environment and Conservation, (2007). Guidelines for the Assessment and Management of Groundwater Contamination

NSW EPA, (1995). Contaminated Sites Sampling Design Guidelines

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

NSW EPA, (2015). Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997

NSW EPA, (2017). Guidelines for the NSW Site Auditor Scheme, 3rd Edition

NSW EPA, (2020). Consultants Reporting on Contaminated Land, Contaminated Land Guidelines

National Environment Protection Council (NEPC), (2013). National Environmental Protection (Assessment of Site Contamination) Measure 1999 as amended (2013)

Olszowy, H., Torr, P., and Imray, P., (1995). Trace Element Concentrations in Soils from Rural and Urban Areas of Australia. Contaminated Sites Monograph Series No. 4. Department of Human Services and Health, Environment Protection Agency, and South Australian Health Commission

Protection of the Environment Operations Act 1997 (NSW)

State Environmental Planning Policy No.55 – Remediation of Land 1998 (NSW)

World Health Organisation (WHO), (2008). Petroleum Products in Drinking-water, Background document for the development of WHO Guidelines for Drinking Water Quality

Western Australia Department of Health, (2009). Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia