

REPORT TO **ERILYAN**

ON

DETAILED (STAGE 2) SITE INVESTIGATION

FOR

PROPOSED COMMERCIAL DEVELOPMENT (GENESIS CARE)

AT

CORNER KELLICAR AND CAMDEN ROADS, CAMPBELLTOWN, NSW

Date: 24 February 2021 Ref: E33438PLrpt2

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Executive Summary

Erilyan ('the client') commissioned JK Environments (JKE) to undertake a Detailed (Stage 2) Site Investigation (DSI) for the proposed commercial development at the corner of Kellicar and Camden Roads, Campbelltown, NSW ('the site'). The purpose of the investigation is to characterise the soil contamination conditions. The site location is shown on Figure 1 and the investigation was confined to the site boundaries as shown on Figure 2. This report has been prepared to support the lodgement of a Development Application (DA) for the proposed development.

JKE have previously undertaken a *Preliminary (Stage 1) Site Investigation – Contamination Assessment and Waste Classification* (PSI) at the site. A summary of this information has been included in Section 2.

The proposed development includes construction of a medical facility containing radiation/oncology, medical imaging and consultations rooms. The building will be constructed in the south-eastern portion of the site and does not include any basement levels. The remaining areas of the site will include a car park and landscaping. The site may also be subdivided.

The objectives were to:

- Assess the current site conditions and use(s) via a site walkover inspection;
- Characterise the soils contamination conditions via implementation of a sampling and analysis program;
- Update the existing conceptual site model (CSM);
- Assess the potential risks posed by contamination to the receptors identified in the CSM (Tier 1 assessment);
- Provide a waste classification for off-site disposal of soil;
- Assess whether the site is suitable or can be made suitable for the proposed development (from a contamination viewpoint); and
- Assess whether further intrusive investigation and/or remediation is required.

The scope of work included the following:

- Review of site information, including background and site history information from various sources outlined in the report;
- 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.

Soil samples were obtained from 26 test pit locations across the site. The test pits generally encountered fill material (i.e. historically imported soil) to depths of between approximately 0.3m below ground level (BGL) to 0.8mBGL, underlain by natural (alluvial) silty clay. The fill contained inclusions of igneous, siltstone and sandstone gravel, siltstone cobbles, plastic, glass, fibre cement fragments (FCF), tile fragments, concrete fragments, brick fragments, steel, sand, ash, slag and root fibres.

FCF/asbestos containing material (ACM) was encountered at two locations during the PSI and at 10 locations during the DSI. The occurrence of ACM in the fill was widespread across the site and there was no clear delineation between fill/areas where ACM was and was not observed. Asbestos concentrations exceeded the SAC in three of the test pits. Elevated concentrations of the remaining contaminants were not encountered above the adopted SAC.

Based on the Tier 1 risk assessment, the contamination identified in soil was assessed to pose a potential risk in the current site configuration and in the context of the proposed development. Interim management of asbestos is recommended and a Remediation Action Plan (RAP) is also required to document the procedure for remediating the site.

JKE are of the opinion that the site can be made suitable for the proposed development via appropriate remediation/validation and management. Based on the primary contaminant of concern (asbestos), any associated site remediation for this contaminant is expected to be technically achievable and relatively straight forward to implement using common and robust remedial and management approaches.





We recommend the following:

- 1. Preparation of an interim Asbestos Management Plan (AMP) (for asbestos in/on soil) to manage the site until the proposed development (and associated remediation) commences;
- 2. Preparation and implementation of a RAP;
- 3. Remediation and validation of the site in accordance with the RAP; and
- 4. Preparation of a validation report on completion of remediation.

The notification triggers to report site contamination to the NSW EPA under the NSW EPA Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997 (2015) have not been met. This is to be further evaluated throughout remediation.

JKE consider that the report objectives outlined in Section 1.2 have been addressed.

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



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Appendix B: Laboratory Results Summary Tables

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Appendix E: Report Explanatory Notes Appendix F: Data (QA/QC) Evaluation Appendix G: UCL Calculation Sheets

Appendix H: Field Records / Asbestos Weights
Appendix I: Guidelines and Reference Documents



Abbreviations

Asbestos Fines/Fibrous Asbestos	AF/FA
Ambient Background Concentrations	ABC
Added Contaminant Limits	ACL
Asbestos Containing Material	ACM
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	ВОМ
Benzene, Toluene, Ethylbenzene, Xylene	ВТЕХ
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
Fibre Cement Fragment(s)	FCF
Health Investigation Level	HILs
Health Screening Level	HSL
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	РАН
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	ТВ
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	μS/cm
Micrograms per Litre	μg/L
Milligrams per Kilogram	mg/kg
Milligrams per Litre	mg/L
Parts Per Million	ppm
Percentage	%



1 INTRODUCTION

Erilyan ('the client') commissioned JK Environments (JKE) to undertake a Detailed (Stage 2) Site Investigation (DSI) for the proposed commercial development at the corner of Kellicar and Camden Roads, Campbelltown, NSW ('the site'). The purpose of the investigation is to characterise the soil contamination conditions. The site location is shown on Figure 1 and the investigation was confined to the site boundaries as shown on Figure 2.

This report has been prepared to support the lodgement of a Development Application (DA) for the proposed development.

JKE have previously undertaken a *Preliminary (Stage 1) Site Investigation – Contamination Assessment and Waste Classification*¹ at the site. A summary of this information has been included in Section 2.

1.1 Proposed Development Details

The proposed development includes construction of a medical facility containing radiation/oncology, medical imaging and consultations rooms. The building will be constructed in the south-eastern portion of the site and does not include any basement levels. The remaining areas of the site will include a car park and landscaping. The site may also be sub-divided.

1.2 Aims and Objectives

The primary aims of the investigation were to characterise the soil contamination conditions and to comment on site suitability (from a contamination viewpoint) for the proposed development. The objectives were to:

- Assess the current site conditions and use(s) via a site walkover inspection;
- Characterise the soils contamination conditions via implementation of a sampling and analysis program;
- Update the existing conceptual site model (CSM);
- Assess the potential risks posed by contamination to the receptors identified in the CSM (Tier 1 assessment);
- Provide a waste classification for off-site disposal of soil;
- Assess whether the site is suitable or can be made suitable for the proposed development (from a contamination viewpoint); and
- Assess whether further intrusive investigation and/or remediation is required.

1.3 Scope of Work

The investigation was undertaken generally in accordance with a JKE proposal (Ref: EP52719PL) of 23 September 2020 and written acceptance from the client of 10 December 2020. The scope of work included the following:

¹ JKE, (2020). Report to Erilyan on *Preliminary (Stage 1) Site Investigation – Contamination Assessment and Waste Classification for Proposed Commercial Development at Corner Kellicar and Camden Roads, Campbelltown, NSW (dated 30 September 2020, Report ref: E33438PLrpt).* (Referred to as PSI)





- Review of site information, including background and site history information from various sources outlined in the report;
- 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)², other guidelines made under or with regards to the Contaminated Land Management Act (1997)³ and State Environmental Planning Policy No.55 – Remediation of Land (1998)⁴. A list of reference documents/guidelines is included in the appendices.

⁴ State Environmental Planning Policy No. 55 – Remediation of Land 1998 (NSW) (referred to as SEPP55)



² National Environment Protection Council (NEPC), (2013). *National Environmental Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013).* (referred to as NEPM 2013)

³ Contaminated Land Management Act 1997 (NSW) (referred to as CLM Act 1997)



2 SITE INFORMATION

2.1 PSI (JKE, 2020)

The PSI included a review of historical information and sampling from eight borehole locations (BH1 to BH8 – as shown on Figure 2). The primary aims of the PSI were to make a preliminary assessment of site contamination and provide a preliminary waste classification for soil waste that may be generated during the proposed development works.

The investigation identified bonded asbestos containing material (ACM) within the fill (i.e. historically imported/disturbed soil) from BH2 in the eastern area of the site. Asbestos was also identified in fill/soil from BH7 (0.1-0.2m) in the western area of the site. Based on the Tier 1 risk assessment, the contamination identified at the site was considered to potentially pose a risk to human-health if not managed properly during the construction phase of the proposed development. The asbestos-related risks in the context of the current land use were assessed to be low due to the most likely form of asbestos being ACM (i.e. non-friable) and there being consistent grass coverage across the majority of the site.

JKE were of the opinion that the site could be made suitable for the proposed development. However, a DSI was recommended to address the identified data gaps and to facilitate preparation of a remediation action plan (RAP) and/or asbestos management plan (AMP). The report concluded that the DSI was to include the following:

- Additional soil sampling from 26 locations for asbestos quantification of asbestos/ACM in fill (recommended to be grid-based sampling across the site using an excavator); and
- Additional soil sampling and analysis of the fill and natural soil from at least eight of these locations to confirm the waste classification and provide additional characterisation for the identified CoPC.

It is noted that the investigation applied Health Investigation Levels (HILs) for a 'public open space; secondary schools; and footpaths' exposure scenario (HIL-C), in accordance with the general philosophy of the NEPM (2013) in relation to hospitals and medical land uses where there is a potential for children to visit the site from time to time. This land use exposure scenario has been reviewed for the purpose of this DSI, as outlined in Section 6.

2.2 Site Identification

Table 2-1: Site Identification

Current Site Owner (certificate of title):	Campbelltown City Council
Site Address:	Cnr Kellicar and Camden Roads, Campbelltown, NSW
Lot & Deposited Plan:	Lot 1 in DP883417
Current Land Use:	Public Open Space
Proposed Land Use:	Commercial Development (Genesis Care Medical Facility)
Local Government Authority:	Campbelltown City Council



Current Zoning:	B4: Mixed Use
Site Area (m²) (approx.):	4,744m ²
RL (AHD in m) (approx.):	66-68
Geographical Location (decimal degrees) (approx.):	Latitude: -34.071297 Longitude: 150.80588
Site Location Plan:	Figure 1
Sample Location Plan:	Figure 2

2.3 Site Location and Regional Setting

The site is located in a predominantly commercial and residential area of Campbelltown and is bound by Kellicar Road to the south-east and Camden Road to the south-west. The site is located approximately 70m west of Birunji Creek and approximately 90m south of Bow Bowing Creek.

2.4 Topography

The regional topography is an alluvial floodplain and is characterised by a hillside that falls gently toward the south-west. The site itself is located mid-slope of the hillside and falls gently to the south-west, towards Buirunji Creek at approximately 3°.

2.5 Site Description/Inspection

A walkover inspection of the site was undertaken by JKE on 16 December 2020. The site was generally similar to the inspection undertaken as part of the PSI, with observations summarised below:

- The site was vacant grassed land and used as a public reserve and there were no visible indicators of former land use;
- The site was fenced along the western boundary by a steel mesh fence. The remaining boundaries were open with no fencing. The site predominantly consisted of grass cover with minimal exposed soil at the surface. No signs of soil erosion were identified;
- No evidence was identified of chemicals or waste being stored at the site;
- Where bare soil was exposed at the surface, the material visually appeared to be fill/disturbed soil. No
 odours, visible staining or visible ACM was identified at the time of the inspection;
- An open stormwater drain was located parallel to the northern site boundary which discharged directly into Birunji Creek. Surface water runoff was assumed to follow the general slope of the site towards the south-west;
- Birunji Creek was located approximately 70m south-west of the site. This creek feeds into a man-made duck pond and wetland area approximately 150m south-west of the site; and
- The site was predominantly grassed with minor areas of exposed soil at the surface. Large exotic and native trees and shrubs were located along the western boundary and towards the northern corner of the site. No visible signs of plant stress or dieback was identified.





2.6 Surrounding Land Use

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

- North Camden Road and Railway Line;
- South Junction of Narellan and Kellicar Roads and Campbelltown Catholic Club beyond
- East Camden Road and Campbelltown Library; and
- West Narellan Road and Birunji Creek.

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

2.7 Summary of Site History Information

The PSI included a review of various site history documentation sources. Based on a review of this information and additional observations/findings made by JKE during the DSI, a time line summary of the historical land uses and activities is presented in the following table. The information presented in the table is based on a weight of evidence assessment of the site history documentation and observations made by JKE.

Table 2-2: Summary of Historical Land Uses / Activities

Year(s)	Potential Land Use / Activities
1911-1980	The site was likely used for agricultural (grazing) purposes at various times during this period. The aerial photographs indicated various small-scale construction and demolition activities took place at the site, most likely associated with residential land uses. The surrounds were mostly used for agricultural and residential purposes.
1980-1991	The site was gradually bought by Campbelltown City Council. It was around this time the aerial photographs indicated the residential and ancillary buildings were demolished and the site became a public recreation area.
	The surrounds continued to be utilised for residential and agricultural land purposes with other construction activities/uses taking place.
1980-present day	The site was maintained as a public recreation area with grass and other vegetation. The surrounds continued to be developed.



3 SUMMARY OF GEOLOGY AND HYDROGEOLOGY

3.1 Regional Geology

Regional geological information reviewed as part of the PSI indicated that the site is underlain by Quaternary alluvium, then Ashfield Shale of the Wianamatta Group.

3.2 Acid Sulfate Soil (ASS) Risk and Planning

ASS information reviewed as part of the PSI indicated that the site is not mapped as being in an ASS risk area.

3.3 Hydrogeology

Hydrogeological information reviewed as part of the PSI indicated that there were no registered bores within 500m of the site. There were approximately 11 groundwater bores within 1,000m of the site. In summary:

- The nearest registered bore was located approximately 650m from the site. This was utilised for monitoring purposes;
- The majority of the bores were registered for monitoring purposes;
- There were no nearby bores (i.e. within 500m) registered for domestic or irrigation uses; and
- The drillers log information from the closest registered bores typically identified fill and/or clay soil to depths of 1.6-2.7m, underlain by shale (siltstone) bedrock. Standing water levels (SWLs) in the bores ranged from 3.0m below ground level (BGL) to 6.2mBGL.

The information reviewed for the PSI indicated that the subsurface conditions at the site are likely to consist of alluvial soils overlying relatively deep bedrock. Abstraction and use of groundwater at the site or in the immediate surrounds may be viable under these conditions, however the use of groundwater is not proposed as part of the development and there were no nearby registered groundwater users. There is a reticulated water supply in the area and consumption of groundwater is not expected to occur.

Considering the local topography and surrounding land features, JKE would generally expect groundwater to flow towards the south-west.

Based on the potential sources of contamination identified and the soil analysis results of the PSI, there was considered to be a low potential for groundwater contamination to pose a risk to receptors and an investigation of groundwater was not recommended.

3.4 Receiving Water Bodies

The site location and regional topography indicates that excess surface water flows have the potential to enter Birunji Creek located south-west of the site. This water body is a potential receptor.



4 CONCEPTUAL SITE MODEL

4.1 Potential Contamination Sources/AEC and CoPC

The conceptual site model has been reviewed after consideration of the data collected for the PSI.

Table 4-1: Potential (and/or known) Contamination Sources/AEC and Contaminants of Potential Concern

Source / AEC	CoPC
Fill material – Portions of the site appear to have been historically filled to achieve a level base for construction of previous buildings. The fill may have been imported from various sources and could be contaminated. The boreholes drilled for the PSI encountered fill ranging in depth from approximately 0.2m to 0.5mBGL. Asbestos was found in fill at two locations (BH1 and BH7). Although not above the SAC, variable lead concentrations were also identified in fill/soil.	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.
Historical agricultural use – The site appears to have been used for grazing and farming purposes. This could have resulted in contamination across the site via use of machinery, application of pesticides and building/demolition of various structures. Underground pipework containing asbestos may have also been utilised.	Heavy metals, TRH, PAHs, OCPs, PCBs and asbestos JKE note that OCPs only became commercially available in the 1940s. Prior to this time pesticides were predominantly heavy metal compounds.
Hazardous Building Material – Hazardous building materials may be present as a result of former building and demolition activities. Site history information indicated that various demolition activities have taken place in the northern and southern portions of the site. The PSI identified asbestos in soil and variable lead concentrations.	Asbestos, lead and PCBs

4.2 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 4-2: 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 has been identified as the potentially affected medium. Groundwater impacts were addressed during the PSI and groundwater does not warrant further consideration unless mobile soil contamination is identified during the DSI.



Receptor identification	Human receptors include site users (primarily adults in a commercial/industrial scenario, or adults and children infrequently utilising medical-related services), construction workers and intrusive maintenance workers. Off-site human receptors include adjacent land users. Ecological receptors include terrestrial organisms and plants within unpaved areas.
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 primary/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 the future commercial building.
Potential exposure mechanisms	 The following have been identified as potential exposure mechanisms for site contamination: Vapour intrusion into the proposed building from volatilisation of soil contamination; and Contact (dermal, ingestion or inhalation) with exposed soils during construction works or in unpaved areas.
Presence of preferential pathways for contaminant movement	None identified.



5 SAMPLING, ANALYSIS AND QUALITY PLAN

5.1 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 1.2. 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)⁵. 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 7.1 and the detailed evaluation is provided in the appendices.

5.1.1 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 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.

5.1.2 Step 2 - Identify the Decisions of the Study

The objectives of the investigation are outlined in Section 1.2. 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 remediation required?
- Is the site suitable for the proposed development, or can the site be made suitable subject to further characterisation and/or remediation?

5.1.3 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 the PSI;
- Site information, including site observations and site history documentation;
- Sampling of soil;
- Observations of sub-surface variables such as soil type, photo-ionisation detector (PID) concentrations, odours and staining;

⁵ NSW EPA (2017). Guidelines for the NSW Site Auditor Scheme, 3rd ed. (referred to as Site Auditor Guidelines 2017)





- Laboratory analysis of soils and fibre cement for the CoPC identified in the CSM; and
- Field and laboratory QA/QC data.

5.1.4 Step 4 - Define the Study Boundary

The sampling will be confined to the site boundaries as shown in Figure 2 and will be limited vertically to a depth of 1.1m (spatial boundary). The DSI sampling was completed between 16 and 17 December 2020 (temporal boundary). The assessment of potential risk to adjacent land users has been made based on data collected within the site boundary.

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

5.1.5.1 Tier 1 Screening Criteria

The laboratory data will be assessed against relevant Tier 1 screening criteria (referred to as SAC), as outlined in Section 6. 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 human health and ecological SAC.

Statistical evaluation of the heavy metal dataset via calculation of mean values and/or 95% upper confidence limit (UCL) values has been undertaken for waste classification purposes only and only for contaminants found to exceed the Contaminant Threshold (CT) criteria.

5.1.5.2 Field and Laboratory QA/QC

Field QA/QC included analysis of inter-laboratory duplicates, intra-laboratory duplicates, trip spike and trip blank 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).



5.1.5.3 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.

5.1.6 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.

5.1.7 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 PSI findings and 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.

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

5.2 Soil Sampling Plan and Methodology

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

Table 5-1: Soil Sampling Plan and Methodology

Aspect	Input					
Sampling	The sampling density for asbestos in soil included sampling at twice the minimum sampling density					
Density	(26 locations) recommended in the Guidelines for the Assessment, Remediation and Management					
	of Asbestos-Contaminated Sites in Western Australia (2009) ⁶ (endorsed in NEPM 2013). This					
	density met the investigation regime outlined in Table 1 of the WA DoH (2009) guidelines based on					
	a 'known' likelihood of asbestos which was established during the PSI.					
	Samples for other contaminants were obtained from 13 locations as shown on the attached Figure					
	2. Based on the site area (4,744m²), this number of locations corresponded to a sampling density					
	of approximately one sample per 365m ² . The sampling plan was designed to meet the minimum					

⁶ 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)





Aspect	Input					
	sampling density for hotspot identification, as outlined in the NSW EPA Contaminated Sites Sampling Design Guidelines (1995) ⁷ .					
Sampling Plan	The sampling locations were placed on a systematic plan with a grid spacing of approximately 13.5m between sampling location. A systematic plan was considered suitable to identify hotspots to a 95% confidence level and calculate UCLs for specific data populations (UCLs were only applied were appropriate and in accordance with the DQOs).					
Set-out and Sampling Equipment	Sampling locations were set out using a hand-held GPS unit (with an accuracy of ±5m). In-situ sampling locations were checked for underground services by an external contractor prior to sampling.					
	Samples were collected using a backhoe. Samples were obtained from the test pit walls or directly from the bucket by hand. Where sampling occurred from the bucket, JKE collected samples from the central portion of large soil clods, or from material that was unlikely to have come into contact with the bucket.					
Sample Collection and Field QA/QC	Soil samples were obtained between 16 and 17 December 2020 in accordance with our 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 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.					
	 The field screening for asbestos quantification included the following: A representative bulk (10L) sample was collected from fill at 1m intervals, or from each distinct fill profile. The quantity of material for each sample varied based on whatever return could be achieved. The bulk sample intervals are shown on the attached test pit logs; Each sample was weighed using an electronic scale; Each bulk sample was passed through a sieve with a 7.1mm aperture and inspected for the presence of fibre cement; 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 ziplock bag and assigned a unique identifier. Calculations for asbestos content were undertaken based on the requirements outlined in Schedule B1 of NEPM (2013), as summarised in Section 6.1. 					

⁷ NSW EPA, (1995), *Contaminated Sites Sampling Design Guidelines*. (referred to as EPA Sampling Design Guidelines 1995)





Aspect	Input			
	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 JKE. 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.			
Decontami- nation 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. 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			
Make Good	analysis under standard chain of custody (COC) procedures. On completion of each test pit, the test pit was backfilled and the grass was replaced to the extent practicable. Any exposed soil surfaces at the test pit locations were visually checked for the			
	occurrence of FCF/ACM and any visible material was picked from the surface and was disposed of appropriately by JKE.			

5.2.1 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 5-2: Laboratory Details

Samples	Laboratory	Report Reference	
All primary samples and field QA/QC samples including (intra-laboratory duplicates, trip blanks and trip spikes samples)	Envirolab Services Pty Ltd NSW, NATA Accreditation Number – 2901 (ISO/IEC 17025 compliance)	258622 and 258622-A	
Inter-laboratory duplicates	Envirolab Services Pty Ltd VIC, NATA Accreditation Number – 2901 (ISO/IEC 17025 compliance)	23908	

The analysis largely included asbestos and lead as these were considered to be the primary CoPC based on the PSI findings. A limited selection of samples were analysed for the broader suite of CoPC, primarily for waste classification purposes, to increase the sample density and improve the spatial distribution of analysis across the site.



6 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.

It is noted that the PSI adopted a land use type C scenario (for risk assessment purposes) which applies to recreational open space land uses and can also be applied for more sensitive commercial uses such as hospitals. JKE has reviewed the exposure scenario that is likely to be applicable to the proposed development described in Section 1.1 and we are of the opinion that land use type D (commercial/industrial) is more appropriate. This is based on the following:

- The primary human receptors will be adults in an occupational exposure setting (i.e. workers within the medical facility) who are expected to work typical hours, and adult visitors who infrequently attend site for treatment;
- Although children are also expected to frequent the site for treatment, the exposure frequency and duration for children is expected to be very limited and below the assumptions used to derive the more conservative land use type C criteria; and
- The majority of the site will be covered by a building or sealed as a paved car park area and there will be no readily accessible soils where regular or prolonged exposure is expected to occur.

6.1 Human Health

- Health Investigation Levels (HILs) for a 'commercial/industrial' land-use exposure scenario (HIL-D);
- Health Screening Levels (HSLs) for a 'commercial/industrial' land use exposure scenario (HSL-D). 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)⁸; and
- Asbestos was assessed against the HSL-D criteria. A summary of the asbestos criteria is provided in the table below:

Table 6-1: Details for Asbestos SAC

Guideline	Applicability				
Asbestos in Soil	The HSL-D 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; <0.05% 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): 				
	% w/w asbestos in soil = % asbestos content x bonded ACM (kg) Soil volume (L) x soil density (kg/L)				

⁸ 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





Guideline	Applicability			
	However, we are of the opinion that the actual soil volume in a 10L bucket varies considerably due to the presence of voids, particularly when assessing cohesive soils. Therefore, each bucket sample was weighed using electronic scales and the above equation was adjusted as follows (we note that the units have also converted to grams):			
	% w/w asbestos in soil = % asbestos content x bonded ACM (g) Soil weight (g)			

6.2 Environment (Ecological – terrestrial ecosystems)

- Ecological Investigation Levels (EILs) and Ecological Screening Levels (ESLs) for a 'commercial/industrial' land-use 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 Guidelines⁹;
- ESLs were adopted based on the soil type; and
- EILs for selected metals were calculated based on the most conservative added contaminant limit (ACL) values presented in Schedule B(1) of NEPM (2013) and published ambient background concentration (ABC) values presented in the document titled Trace Element Concentrations in Soils from Rural and Urban Areas of Australia (1995)¹⁰. This method is considered to be adequate for the Tier 1 screening.

6.3 Management Limits for Petroleum Hydrocarbons

Management limits for petroleum hydrocarbons (as presented in Schedule B1 of NEPM 2013) were considered (if required).

6.4 Waste Classification

Data for the waste classification assessment were assessed in accordance with the Waste Classification Guidelines, Part 1: Classifying Waste (2014)¹¹ as outlined in the following table:

Table 6-2: Waste Categories

Category	Description
General Solid Waste (non-putrescible)	 If Specific Contaminant Concentration (SCC) ≤ Contaminant Threshold (CT1) then Toxicity Characteristics Leaching Procedure (TCLP) not needed to classify the soil as general solid waste; and If TCLP ≤ TCLP1 and SCC ≤ SCC1 then treat as general solid waste.
Restricted Solid Waste (non-putrescible)	 If SCC ≤ CT2 then TCLP not needed to classify the soil as restricted solid waste; and If TCLP ≤ TCLP2 and SCC ≤ 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.

⁹ 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)

¹¹ NSW EPA, (2014). Waste Classification Guidelines, Part 1: Classifying Waste. (referred to as Waste Classification Guidelines 2014)



¹⁰ 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



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. 			



7 RESULTS

7.1 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.

7.2 Subsurface Conditions

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

Table 7-1: Summary of Subsurface Conditions

Profile	Description
Fill	Fill was encountered at the surface in all test pits and extended to depths of approximately 0.3mBGL to 0.8mBGL. The fill typically comprised silty clay, sandy gravel, gravelly sand, silty sandy gravel and silty sandy clay with inclusions of igneous, siltstone and sandstone gravel, siltstone cobbles, plastic, glass, fibre cement fragments (FCF), tile fragments, concrete fragments, brick fragments, steel, sand, ash, slag and root fibres.
	Neither staining nor odours were observed in the fill material during the field work. FCF/ACM was encountered in 10 fill profiles during the fieldwork: TP101 (0.0-0.8m), TP109 (0.0-0.4m), TP112 (0.0-0.4m), TP116 (0.0-0.6m), TP118 (0.0-0.4m), TP120 (0.2-0.7m), TP121 (0.0-0.5m), TP122 (0.0-0.4m), TP123 (0.0-0.6m) and TP125 (0.0-0.4m). FCF/ACM was encountered in the top 10cm (wall of test pit) in TP112 only.
Natural Soil	Natural (alluvial) silty clay soil was encountered beneath the fill material in all test pits and extended to the maximum termination depth of the test pits at approximately 1.1mBGL. Neither staining nor odours were encountered in the natural soils during the fieldwork.
Groundwater	Groundwater seepage was not encountered in the test pits during excavation. All test pits remained dry on completion of and a short time after.

7.3 Field Screening

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

Table 7-2: 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 0ppm to 0.5ppm equivalent isobutylene. These results indicate a lack of significant PID detectable VOCs.
Bulk Screening for Asbestos	The bulk field screening results are summarised in Table S5. A representative FCF was analysed from nine of the 10 fill profiles where FCF was encountered, and all nine tested positive for asbestos (i.e. all FCF were ACM). The ACM concentrations in TP112 (0.0-0.4m), TP118 (0.0-0.4m), and TP123 (0.0-0.6m) exceeded the SAC of 0.05%w/w. All other results were below the SAC.



7.4 Soil Laboratory Results

The soil laboratory results were assessed against the SAC presented in Section 6.1. Individual SAC are shown in the report tables attached in the appendices. A summary of the results is presented below:

7.4.1 Human Health and Environmental (Ecological) Assessment

Table 7-3: Summary of Soil Laboratory Results – Human Health and Environmental (Ecological)

Analyte	N	Max. (mg/kg)	N> Human Health SAC	N> Ecological SAC	Comments
Arsenic	5	7	0	NSL	-
Cadmium	5	<pql< td=""><td>0</td><td>NSL</td><td>-</td></pql<>	0	NSL	-
Chromium (total)	5	17	0	0	-
Copper	5	44	0	0	-
Lead	19	250	0	0	-
Mercury	5	0.4	0	NSL	-
Nickel	5	11	0	0	-
Zinc	5	190	0	0	-
Total PAHs	5	0.05	0	NSL	-
Benzo(a)pyrene	5	0.05	NSL	0	-
Carcinogenic PAHs (as BaP TEQ)	5	<pql< td=""><td>0</td><td>NSL</td><td>-</td></pql<>	0	NSL	-
Naphthalene	5	<pql< td=""><td>0</td><td>NSL</td><td>-</td></pql<>	0	NSL	-
DDT+DDE+DDD	5	<pql< td=""><td>0</td><td>NSL</td><td>-</td></pql<>	0	NSL	-
DDT	5	<pql< td=""><td>NSL</td><td>0</td><td>-</td></pql<>	NSL	0	-
Aldrin and dieldrin	5	<pql< td=""><td>0</td><td>NSL</td><td>-</td></pql<>	0	NSL	-
Chlordane	5	<pql< td=""><td>0</td><td>NSL</td><td>-</td></pql<>	0	NSL	-
Heptachlor	5	<pql< td=""><td>0</td><td>NSL</td><td>-</td></pql<>	0	NSL	-
PCBs	5	<pql< td=""><td>0</td><td>NSL</td><td>-</td></pql<>	0	NSL	-
TRH F1	5	<pql< td=""><td>0</td><td>0</td><td>-</td></pql<>	0	0	-
TRH F2	5	<pql< td=""><td>0</td><td>0</td><td>-</td></pql<>	0	0	-



Analyte	N	Max. (mg/kg)	N> Human Health SAC	N> Ecological SAC	Comments
TRH F3	5	<pql< td=""><td>0</td><td>0</td><td>-</td></pql<>	0	0	-
TRH F4	5	<pql< td=""><td>0</td><td>0</td><td>-</td></pql<>	0	0	-
Benzene	5	<pql< td=""><td>0</td><td>0</td><td>-</td></pql<>	0	0	-
Toluene	5	<pql< td=""><td>0</td><td>0</td><td>-</td></pql<>	0	0	-
Ethylbenzene	5	<pql< td=""><td>0</td><td>0</td><td>-</td></pql<>	0	0	-
Xylenes	5	<pql< td=""><td>0</td><td>0</td><td>-</td></pql<>	0	0	-
Asbestos (in soil)	8	ACM >7mm, 0.0659% w/w AF/FA, <0.001%w/w	1	NA	The ACM >7mm concentration in the fill sample obtained and analysed from TP123 (0.0-0.2m) exceeded the SAC.
Asbestos in fibre cement	9	Detected	-	NSL	Asbestos was detected in all nine FCF analysed.

Notes:

N: Total number (primary samples)

NSL: No set limit NL: Not limiting

PQL: Practical quantitation limit

7.4.2 Waste Classification Assessment

The laboratory results were assessed against the criteria presented in Section 6.4. The results are presented in the report tables attached in the appendices. A summary of the results is presented in the following table:

Table 7-4: Summary of Soil Laboratory Results Compared to CT and SCC Criteria

Analyte	N	N > CT Criteria	N > SCC Criteria	Comments
Arsenic	5	0	0	-
Cadmium	5	0	0	-
Chromium	5	0	0	-
Copper	5	NSL	NSL	-
Lead	19	5	0	Lead concentrations exceeded the CT1 criterion in TP107 (0.0-0.2m), TP110 (0.0-0.2m), TP122 (0.0-0.2m), and TP123 (0.0-0.2m).
Mercury	5	0	0	-
Nickel	5	0	0	-



Analyte	N	N > CT Criteria	N > SCC Criteria	Comments
Zinc	5	NSL	NSL	-
TRH (C ₆ -C ₉)	5	0	0	-
TRH (C ₁₀ -C ₃₆)	5	0	0	-
BTEX	5	0	0	-
Total PAHs	5	0	0	-
Benzo(a)pyrene	5	0	0	-
OCPs & OPPs	5	0	0	-
PCBs	5	0	0	-
Asbestos (in soil)	8	-	-	Asbestos was detected in one soil sample analysed (within ACM).
Asbestos in fibre cement	9	-	-	Asbestos was detected in the nine FCF analysed.

N: Total number (primary samples)

NSL: No set limit

Table 7-5: Summary of Soil Laboratory Results Compared to TCLP Criteria

Analyte	N	N > TCLP Criteria	Comments
Lead	5	0	-

N: Total number (primary samples)

7.4.3 Statistical Analysis

Statistical calculations undertaken on the lead results for waste classification using ProUCL (Version 5.1) are attached in the appendices. In summary: the 95% UCL was calculated using the entire lead data set from the fill soil samples for both the PSI and DSI. The 95% UCL for lead was 108.2mg/kg which was greater than the CT1 criterion of 100mg/kg.



8 WASTE CLASSIFICATION ASSESSMENT

8.1 Waste Classification of Fill

Based on the results of the waste classification assessment, and at the time of reporting, the fill material is classified as **General Solid Waste (non-putrescible) containing Special Waste (asbestos)**. Surplus fill should be disposed of to a facility that is appropriately licensed to receive this waste stream. The facility should be contacted to obtain the required approvals prior to commencement of excavation.

The extent of excavation and waste quantities are not yet known as the remedial strategy is yet to be confirmed. However, in a hypothetical scenario where all fill is excavated and removed from the site as waste, we guestimate that there may be in the order of 2,400m³ of waste fill/soil. This is based on a fill depth of 0.5m on average allowing for some churn/over-excavation, and a site area of 4,744m². Using an approximate conversion factor of 1.6 tonnes of fill per 1m³, this volume would equate to approximately 3,850 tonnes of General Solid Waste (non-putrescible) containing Special Waste (asbestos).

8.2 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. This VENM classification should be confirmed after removal of the overlying fill and prior to off-site disposal and/or re-use of VENM.



9 DISCUSSION

9.1 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.

ACM was encountered in the bulk screening samples obtained from the fill profiles in 10 of the 26 test pits. The occurrence of ACM in the fill was widespread across the site and there was no clear delineation between fill/areas where ACM was not observed. In three of the test pits (TP112, TP118 and TP123), the ACM concentrations in the bulk screening samples were above the SAC. The ACM concentration in the laboratory sample was also above the SAC in TP123. JKE note that TP112, TP118 and TP123 are located beneath the proposed building footprint.

All ACM encountered could not be broken or pulverised/crushed to a powder by hand pressure, therefore the material is considered to be in the bonded (i.e. non-friable) form. The source of the ACM at the site is considered to be associated with former demolition activities at the site and/or the importation of asbestos-impacted fill material. The potential to generate airborne asbestos fibres from the disturbance of soil containing bonded ACM is relatively low compared to disturbing soils impacted by friable-types of asbestos.

As ACM was identified in fill profiles extending from the surface, there is a potential for a complete SPR linkage to exist, particularly where soil disturbance occurs. Due to the existing land use and as a duty of care, an interim AMP (for asbestos in/on soil) should be prepared and implemented to manage the site until development occurs. This interim AMP must outline measures to limit site access/activities, maintain grass cover, complete surface picks/clearances and outline contingency procedures for intrusive works where such works cannot be avoided.

Remediation of ACM will be required as part of the proposed development to address risks posed by asbestos in soil.

Elevated concentrations of the other CoPC were not encountered above the adopted SAC in the soil samples analysed. Therefore, the CoPC (excluding asbestos) were not present in soil at concentrations that were assessed to pose a risk to the receptors.



9.2 Decision Statements

The decision statements are addressed below:

Are any results above the SAC?

Yes. Refer to Section 9.1.

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

Yes, potential human health risks exist relating to exposure to asbestos. The risks relate to the potential inhalation of asbestos fibres following disturbance of asbestos-impacted soil containing ACM.

Is remediation required?

Yes.

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 that the site can be made suitable for the proposed development via appropriate remediation/validation and management. Based on the primary contaminant of concern (asbestos), any associated site remediation for this contaminant is expected to be technically achievable and relatively straight forward to implement using common and robust remedial and management approaches.



10 CONCLUSIONS AND RECOMMENDATIONS

The DSI included a review of the PSI findings, a site inspection and soil sampling from 26 test pit locations across the site. The test pits generally encountered fill material (i.e. historically imported soil) to depths of between approximately 0.3mBGL to 0.8mBGL, underlain by natural (alluvial) silty clay. The fill contained inclusions of igneous, siltstone and sandstone gravel, siltstone cobbles, plastic, glass, fibre cement fragments (FCF), tile fragments, concrete fragments, brick fragments, steel, sand, ash, slag and root fibres.

FCF/ACM was encountered at two locations during the PSI and at 10 locations during the DSI. The occurrence of ACM in the fill was widespread across the site and there was no clear delineation between fill/areas where ACM was and was not observed. Asbestos concentrations exceeded the SAC in three of the test pits. Elevated concentrations of the remaining CoPC were not encountered above the adopted SAC.

Based on the Tier 1 risk assessment, the contamination identified in soil was assessed to pose a potential risk in the current site configuration and in the context of the proposed development. Interim management of asbestos is recommended and a RAP is also required to document the procedure for remediating the site.

JKE are of the opinion that the site can be made suitable for the proposed development via appropriate remediation/validation and management. Based on the primary contaminant of concern (asbestos), any associated site remediation for this contaminant is expected to be technically achievable and relatively straight forward to implement using common and robust remedial and management approaches.

We recommend the following:

- 1. Preparation of an interim AMP (for asbestos in/on soil) to manage the site until the proposed development (and associated remediation) commences;
- 2. Preparation and implementation of a RAP;
- 3. Remediation and validation of the site in accordance with the RAP; and
- 4. Preparation of a validation report on completion of remediation.

The notification triggers to report site contamination to the NSW EPA under the NSW EPA Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997 (2015) have not been met. This is to be further evaluated throughout remediation.

JKE consider that the report objectives outlined in Section 1.2 have been addressed.



11 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



AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

Title:

SITE LOCATION PLAN

Location:

CNR OF KELLICAR AND CAMDEN ROAD,
CAMPBELLTOWN, NSW

Report No:

E33438PLrpt2

Figure No:

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

Title:

SITE LOCATION PLAN

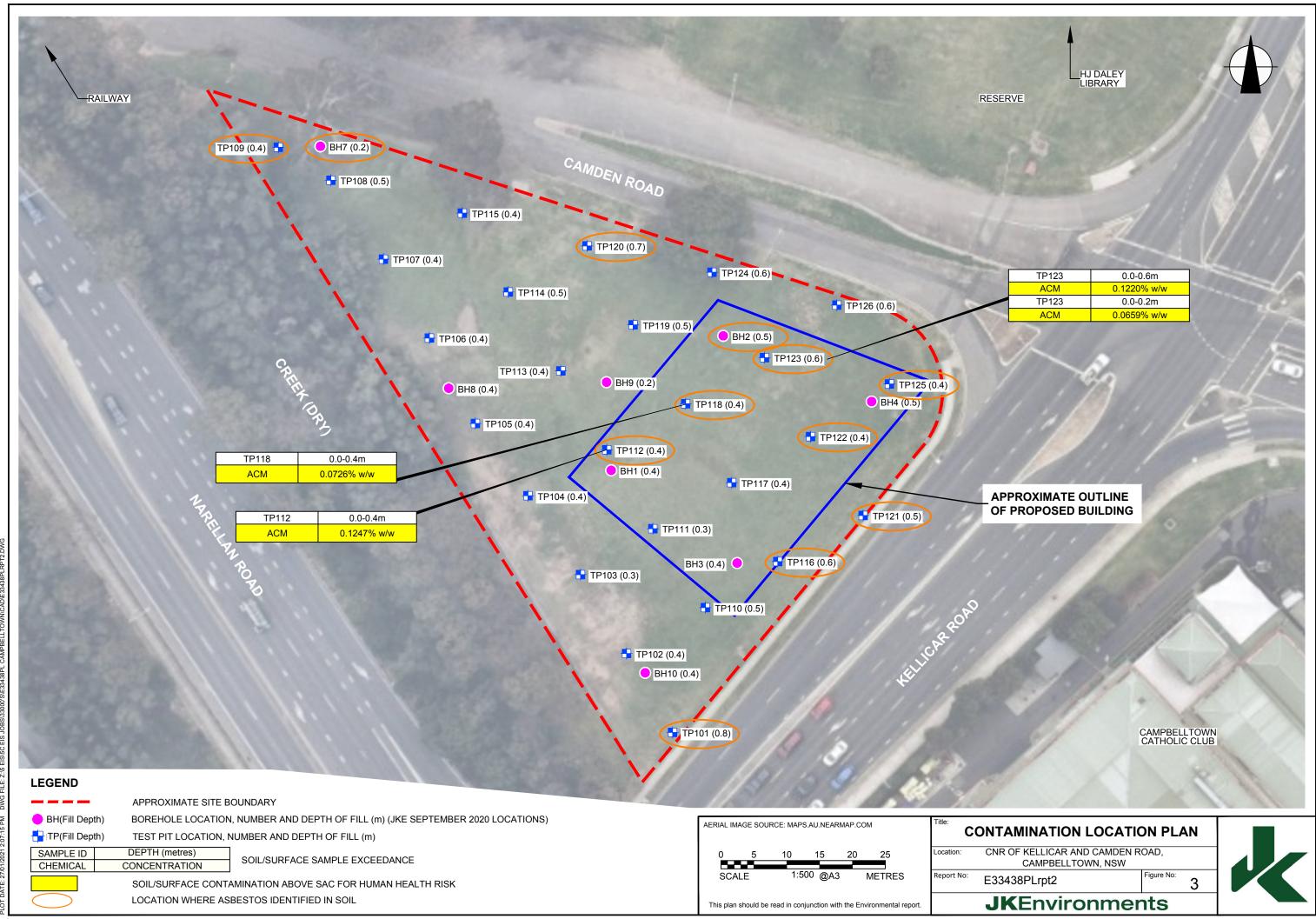
Location:
CNR OF KELLICAR AND CAMDEN ROAD,
CAMPBELLTOWN, NSW

Figure No:

1

K







Appendix B: Laboratory Results Summary Tables

HSL-SSA: Health Screening Level-SiteSpecific Assessment



ABBREVIATIONS AND EXPLANATIONS

Abbreviations used in the Tables:

ABC: Ambient Background Concentration PCBs: Polychlorinated Biphenyls

ACM: PCE: Perchloroethylene (Tetrachloroethylene or Teterachloroethene) **Asbestos Containing Material**

pH_{KCL}: pH of filtered 1:20, 1M KCL extract, shaken overnight ADWG: Australian Drinking Water Guidelines

AF: Asbestos Fines pH of filtered 1:20 1M KCl after peroxide digestion

ANZG Practical Quantitation Limit Australian and New Zealand Guidelines POL:

B(a)P: Benzo(a)pyrene RS: Rinsate Sample

CEC: Cation Exchange Capacity RSL: **Regional Screening Levels** CRC: RSW: **Restricted Solid Waste** Cooperative Research Centre CT: Contaminant Threshold SAC: Site Assessment Criteria

SCC: Specific Contaminant Concentration EILs: **Ecological Investigation Levels**

ESLs: **Ecological Screening Levels** Chromium reducible sulfur S_{cr}: FA: Peroxide oxidisable Sulfur Fibrous Asbestos S_{POS}: Site Specific Assessment GIL: **Groundwater Investigation Levels** SSA:

GSW: SSHSLs: Site Specific Health Screening Levels General Solid Waste

Total Actual Acidity in 1M KCL extract titrated to pH6.5 HILs: **Health Investigation Levels** TAA:

1,1,1 Trichloroethane (methyl chloroform)

HSLs: **Health Screening Levels** TB: Trip Blank TCA:

kg/L kilograms per litre TCE: Trichloroethylene (Trichloroethene) NA: Not Analysed TCLP: **Toxicity Characteristics Leaching Procedure**

NC: Not Calculated TPA: Total Potential Acidity, 1M KCL peroxide digest NEPM: National Environmental Protection Measure TS: Trip Spike

NHMRC: National Health and Medical Research Council TRH: **Total Recoverable Hydrocarbons**

NL: **Not Limiting** TSA: Total Sulfide Acidity (TPA-TAA)

NSL: No Set Limit UCL: Upper Level Confidence Limit on Mean Value OCP: **Organochlorine Pesticides USEPA** United States Environmental Protection Agency OPP: Organophosphorus Pesticides **VOCC:** Volatile Organic Chlorinated Compounds

PAHs: Polycyclic Aromatic Hydrocarbons WHO: World Health Organisation weight per weight

Table Specific Explanations:

Parts per million

%w/w: ppm:

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 refered 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:

ABC Values for selected metals have been adopted from the published background concentrations presented in Olszowy et. al., (1995), Trace Element Concentrations in Soils from Rural and Urban New South Wales (the 25th percentile values for old suburbs with high traffic have been quoted).

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-D: 'Commercial/Industrial'

			Ī			HEAVY I	METALS					PAHs			ORGANOCHL	ORINE PESTI	CIDES (OCPs)			OD DESTICIDES (ODDs)		
All data in mg/kg unless	stated otherwis	ρ				IIEAVI I	VIETALS						LICD	Endosulfon			1 ,	DDT DDD	Hontochlor	OP PESTICIDES (OPPs)	TOTAL PCBs	ASBESTOS FIBRES
An data in mg/ kg dilless	stated otherwis		Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Total PAHs	Carcinogenic PAHs	НСВ	Endosultan	Methoxychlor	Aldrin & Dieldrin	Chlordane	DDT, DDD & DDE	Heptachlor	Chlorpyrifos	TOTALTEDS	ASBESTOSTIBRES
PQL - Envirolab Services	i		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)		3000	900	3600	240000	1500	730	6000	400000	4000	40	80	2000	2500	45	530	3600	50	2000	7	Detected/Not Detected
Sample Reference	Sample Depth	Sample Description																				
TP101	0-0.2	F: Silty clay	NA	NA	NA	NA	16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
TP101	0.5-0.8	F: Silty clay	NA	NA	NA	NA	34	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP103	0-0.2	F: Silty clay	6	<0.4	14	18	58	<0.1	6	130	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
TP103 - [LAB_DUP]	0-0.2	F: Silty clay	6	<0.4	14	17	54	<0.1	6	120	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
TP105	0-0.2	F: Silty clay	NA	NA	NA	NA	30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP106	0-0.1	F: Sandy gravel	NA	NA	NA	NA	8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP107	0-0.2	F: Silty clay	NA	NA	NA	NA	250	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP108	0-0.2	F: Silty clay	7	<0.4	16	36	100	0.1	11	190	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
TP109	0-0.2	F: Silty clay	NA	NA	NA	NA	86	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
TP110	0-0.2	F: Silty clay	NA	NA	NA	NA	130	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP112	0-0.2	F: Silty clay	NA	NA	NA	NA	52	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
TP114	0-0.1	F: Sandy gravel	NA	NA	NA	NA	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP116	0-0.2	F: Silty clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
TP118	0-0.2	F: Silty clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
TP119	0-0.2	F: Silty clay	4	<0.4	11	14	43	<0.1	6	27	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
TP121	0-0.2	F: Silty sandy clay	NA	NA	NA	NA	89	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
TP122	0-0.2	F: Silty sandy clay	7	<0.4	16	38	190	0.4	9	140	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
TP122 - [LAB_DUP]	0-0.2	F: Silty sandy clay	7	<0.4	17	44	200	0.4	10	150	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
TP122	0.4-0.6	Silty clay	NA	NA	NA	NA	19	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP123	0-0.2	F: Silty clay	NA	NA	NA	NA	190	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Detected
TP125	0-0.2	F: Silty clay	NA	NA	NA	NA	120	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
DUP104	-	Fill	5	<0.4	14	20	55	0.1	9	120	0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
DUP106	-	Fill	7	<0.4	15	41	160	0.3	8	130	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
TP101 FCF1	0-0.8	Material	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Detected
TP109 FCF1	0-0.4	Material	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Detected
TP112 FCF1	0-0.4	Material	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Detected
TP116 FCF1	0-0.6	Material	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Detected
TP118 FCF1	0-0.4	Material	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Detected
TP121 FCF1	0-0.5	Material	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Detected
TP122 FCF1	0-0.4	Material	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Detected
TP123 FCF1	0-0.6	Material	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Detected
TP125 FCF1	0-0.4	Material	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Detected
Total Number of Samp	ples		8	8	8	8	21	8	8	8	8	8	8	8	8	8	8	8	8	8	8	18
Maximum Value			7	<pql< td=""><td>17</td><td>44</td><td>250</td><td>0.4</td><td>11</td><td>190</td><td>0.05</td><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	17	44	250	0.4	11	190	0.05	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<>	<pql< td=""><td>Detected</td></pql<>	Detected

Concentration above the SAC Concentration above the PQL

VALUE Bold



TABLE S2

SOIL LABORATORY RESULTS COMPARED TO HSLs

All data in mg/kg unless stated otherwise

					C ₆ -C ₁₀ (F1)	>C ₁₀ -C ₁₆ (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	Field PID Measurement
PQL - Envirolab Services					25	50	0.2	0.5	1	1	1	ppm
NEPM 2013 HSL Land Use Co	tegory						HSL-D: (COMMERCIAL/IND	DUSTRIAL			
Sample Reference	Sample Depth	Sample Description	Depth Category	Soil Category								
TP103	0-0.2	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP103 - [LAB_DUP]	0-0.2	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP108	0-0.2	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP119	0-0.2	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP122	0-0.2	F: Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP122 - [LAB_DUP]	0-0.2	F: Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
DUP104	-	Fill	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
DUP106	-	Fill	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
DUP107	-	Fill	0m to <1m	Sand	<25	NA	<0.2	<0.5	<1	<3	<1	0
Total Number of Samples					9	8	9	9	9	9	9	9
Maximum Value					<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""></pql<></td></pql<>	<pql< td=""></pql<>

Concentration above the SAC

VALUE Bold

Concentration above the PQL

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 ₁₆ (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene
TP103	0-0.2	F: Silty clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP103 - [LAB_DUP]	0-0.2	F: Silty clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP108	0-0.2	F: Silty clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP119	0-0.2	F: Silty clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP122	0-0.2	F: Silty sandy clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP122 - [LAB_DUP]	0-0.2	F: Silty sandy clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
DUP104	-	Fill	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
DUP106	-	Fill	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
DUP107	-	Fill	0m to <1m	Sand	260	NA	3	NL	NL	230	NL



TABLE S3 SOIL LABORATORY RESULTS COMPARED TO MANAGEMENT LIMITS All data in mg/kg unless stated otherwise

			C ₆ -C ₁₀ (F1) plus	>C ₁₀ -C ₁₆ (F2) plus	>C ₁₆ -C ₃₄ (F3)	>C ₃₄ -C ₄₀ (F4)
			BTEX	napthalene	2C ₁₆ -C ₃₄ (13)	>C ₃₄ -C ₄₀ (14)
PQL - Envirolab Services	;		25	50	100	100
NEPM 2013 Land Use Ca	ategory			COMMERCIAL	/INDUSTRIAL	
Sample Reference	Sample Depth	Soil Texture				
TP103	0-0.2	Fine	<25	<50	<100	<100
TP103 - [LAB_DUP]	0-0.2	Fine	<25	<50	<100	<100
TP108	0-0.2	Fine	<25	<50	<100	<100
TP119	0-0.2	Fine	<25	<50	<100	<100
TP122	0-0.2	Fine	<25	<50	<100	<100
TP122 - [LAB_DUP]	0-0.2	Fine	<25	<50	<100	<100
DUP104	-	Fine	<25	<50	<100	<100
DUP106	-	Fine	<25	<50	<100	<100
DUP107	-	Fine	<25	NA	NA	NA
Total Number of Sampl	es		9	8	8	8
Maximum Value			<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""></pql<></td></pql<>	<pql< td=""></pql<>

Concentration above the SAC Concentration above the PQL

VALUE Bold

MANAGEMENT LIMIT ASSESSMENT CRITERIA

Sample Reference	Sample Depth	Soil Texture	C ₆ -C ₁₀ (F1) plus BTEX	>C ₁₀ -C ₁₆ (F2) plus napthalene	>C ₁₆ -C ₃₄ (F3)	>C ₃₄ -C ₄₀ (F4)
TP103	0-0.2	Fine	800	1000	5000	10000
TP103 - [LAB_DUP]	0-0.2	Fine	800	1000	5000	10000
TP108	0-0.2	Fine	800	1000	5000	10000
TP119	0-0.2	Fine	800	1000	5000	10000
TP122	0-0.2	Fine	800	1000	5000	10000
TP122 - [LAB_DUP]	0-0.2	Fine	800	1000	5000	10000
DUP104	-	Fine	800	1000	5000	10000
DUP106	-	Fine	800	1000	5000	10000
DUP107	-	Fine	800	NA	NA	NA



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 contac	t Criteria	82,000	62,000	85,000	120,000	1,100	120,000	85,000	130,000	29,000	
Site Use				Intro	usive Maintena	nce Worker - DI	RECT SOIL CON	TACT			
Sample Reference	Sample Depth										
TP103	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
TP103 - [LAB_DUP]	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
TP108	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
TP119	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
TP122	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
TP122 - [LAB_DUP]	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
DUP104	-	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
DUP106	-	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
DUP107	-	<25	NA	NA	NA	<0.2	<0.5	<1	<3	<1	0
Total Number of Sampl	es	9	8	8	8	9	9	9	9	9	9
Maximum Value		<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""></pql<></td></pql<>	<pql< td=""></pql<>

Concentration above the SAC Concentration above the PQL

VALUE Bold



TABLE SS
ASBESTOS QUANTIFICATION - FIELD OBSERVATIONS AND LABORATORY RESULTS
HSL-D:Commercial/industrial

							FIE	LD DATA											LABORATOR	RY 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 Asbestos in FA (g)	[Asbestos from FA in soil] (%w/w)	Lab Report Number	Sample refeference	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 A Estimation %(w/w)
SAC			No					0.05			0.001			0.001											0.05	0.001
16/12/2020	TP101	0.0-0.8	No	10	19,500	59.5	8.922	0.0458	No ACM <7mm observed			No FA observed														
16/12/2020	TP102	0.0-0.4	No	10	18,600	No ACM observed		-	No ACM <7mm observed			No FA observed	-						-	-		-				
16/12/2020	TP103	0.0-0.3	No	10	18,200	No ACM observed			No ACM <7mm observed			No FA observed							-							
16/12/2020	TP104	0.0-0.4	No	10	17,300	No ACM observed		-	No ACM <7mm observed			No FA observed	-						-	-		-				
16/12/2020	TP105	0.0-0.4	No	10	16,900	No ACM observed		-	No ACM <7mm observed			No FA observed	-						-	-		-				
16/12/2020	TP106	0.0-0.1	No	-	3,300	No ACM observed		-	No ACM <7mm observed			No FA observed	-						-	-		-				
16/12/2020	TP106	0.1-0.4	NA	10	16,700	No ACM observed			No ACM <7mm observed			No FA observed							-							
16/12/2020	TP107	0.0-0.4	No	10	16,200	No ACM observed			No ACM <7mm observed			No FA observed							-							
16/12/2020	TP108	0.0-0.5	No	10	16,300	No ACM observed			No ACM <7mm observed			No FA observed							-							
16/12/2020	TP109	0.0-0.4	No	10	18,800	12.3	1.842	0.0098	No ACM <7mm observed			No FA observed			258622	TP109	0-0.2	584.38	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
16/12/2020	TP110	0.0-0.5	No	10	14,900	No ACM observed			No ACM <7mm observed			No FA observed							-							
16/12/2020	TP111	0.0-0.3	No	10	19,800	No ACM observed			No ACM <7mm observed			No FA observed							-							
16/12/2020	TP112	0.0-0.4	Yes	10	17,700	147.2	22.08	0.1247	No ACM <7mm observed			No FA observed			258662	TP112	0-0.2	731.62	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
16/12/2020	TP113	0.0-0.4	No	10	20,200	No ACM observed			No ACM <7mm observed			No FA observed							-							
16/12/2020	TP114	0.0-0.1	No	10	13,300	No ACM observed			No ACM <7mm observed			No FA observed							-							
16/12/2020	TP114	0.2-0.5	NA	10	16,700	No ACM observed			No ACM <7mm observed			No FA observed							-							
16/12/2020	TP115	0.0-0.4	No	10	15,700	No ACM observed			No ACM <7mm observed			No FA observed							-							
17/12/2020	TP116	0.0-0.6	No	10	19,200	37.2	5.58	0.0291	No ACM <7mm observed			No FA observed			258662	TP116	0-0.2	656.43	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
17/12/2020	TP117	0.0-0.4	No	10	17,500	No ACM observed			No ACM <7mm observed			No FA observed							-							
17/12/2020	TP118	0.0-0.4	No	10	17,400	84.2	12.63	0.0726	No ACM <7mm observed			No FA observed			258662	TP118	0-0.2	573.36	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
17/12/2020	TP119	0.0-0.5	No	10	15,700	No ACM observed		-	No ACM <7mm observed			No FA observed							-	-		-				
17/12/2020	TP120	0.0-0.2	No	-	3,100	No ACM observed			No ACM <7mm observed			No FA observed							-							
17/12/2020	TP120	0.2-0.7	NA	10	17,500	30.6	4.59	0.0262	No ACM <7mm observed			No FA observed							-	-		-				
17/12/2020	TP121	0.0-0.5	No	10	17,900	30.6	4.59	0.0256	No ACM <7mm observed		-	No FA observed			258662	TP121	0-0.2	628.25	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
17/12/2020	TP122	0.0-0.4	No	10	17,300	4.6	0.693	0.0040	No ACM <7mm observed		-	No FA observed			258662	TP122	0-0.2	592.33	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
17/12/2020	TP123	0.0-0.6	No	10	18,400	149.7	22.455	0.1220	No ACM <7mm observed		-	No FA observed			258662	TP123	0-0.2	642.28	Chrysotile asbestos detected: Organic fibres detected	No asbestos detected	0.659	See previous	0.4233	-	0.0659	<0.001
17/12/2020	TP124	0.0-0.6	No	10	17,400	No ACM observed		-	No ACM <7mm observed			No FA observed							-							
17/12/2020	TP125	0.0-0.4	No	10	16,900	3.9	0.579	0.0034	No ACM <7mm observed			No FA observed			258662	TP125	0-0.2	675.7	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
17/12/2020	TP126	0.0-0.6	No	10	16,400	No ACM observed			No ACM <7mm observed			No FA observed														

Concentration above the SAC

VALUE



SOIL LABORATORY RESULTS COMPARED TO NEPM 2013 EILS AND ESLS

All data in mg/kg unless stated otherwise

and Use Category												COM	MERCIAL/INDUS	TRIAL									
									AGED HEAV	Y METALS-EILs			EII	LS					ESLs				
				рН	CEC (cmolc/kg)	Clay Content (% clay)	Arsenic	Chromium	Copper	Lead	Nickel	Zinc	Naphthalene	DDT	C ₆ -C ₁₀ (F1)	>C ₁₀ -C ₁₆ (F2) plus napthalene	>C ₁₆ -C ₃₄ (F3)	>C ₃₄ -C ₄₀ (F4)	Benzene	Toluene	Ethylbenzene	Total Xylenes	B(a)P
QL - Envirolab Services				-	1	-	4	1	1	1	1	1	1	0.1	25	50	100	100	0.2	0.5	1	1	0.05
Ambient Background Conce	entration (ABC)			-	-	-	NSL	13	28	163	5	122	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL
Sample Reference	Sample Depth	Sample Description	Soil Texture																				
TP101	0-0.2	F: Silty clay	Fine	NA	NA	NA	NA	NA	NA	16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP101	0.5-0.8	F: Silty clay	Fine	NA	NA	NA	NA	NA	NA	34	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP103	0-0.2	F: Silty clay	Fine	NA	NA	NA	6	14	18	58	6	130	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
TP103 - [LAB_DUP]	0-0.2	F: Silty clay	Fine	NA	NA	NA	6	14	17	54	6	120	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
TP105	0-0.2	F: Silty clay	Fine	NA	NA	NA	NA	NA	NA	30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP106	0-0.1	F: Sandy gravel	Coarse	NA	NA	NA	NA	NA	NA	8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP107	0-0.2	F: Silty clay	Fine	NA	NA	NA	NA	NA	NA	250	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP108	0-0.2	F: Silty clay	Fine	NA	NA	NA	7	16	36	100	11	190	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
TP109	0-0.2	F: Silty clay	Fine	NA	NA	NA	NA	NA	NA	86	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP110	0-0.2	F: Silty clay	Fine	NA	NA	NA	NA	NA	NA	130	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP112	0-0.2	F: Silty clay	Fine	NA	NA	NA	NA	NA	NA	52	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP114	0-0.1	F: Sandy gravel	Coarse	NA	NA	NA	NA	NA	NA	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP119	0-0.2	F: Silty clay	Fine	NA	NA	NA	4	11	14	43	6	27	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
TP121	0-0.2	F: Silty sandy clay	Fine	NA	NA	NA	NA	NA	NA	89	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP122	0-0.2	F: Silty sandy clay	Fine	NA	NA	NA	7	16	38	190	9	140	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
TP122 - [LAB_DUP]	0-0.2	F: Silty sandy clay	Fine	NA	NA	NA	7	17	44	200	10	150	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
TP122	0.4-0.6	Silty clay	Fine	NA	NA	NA	NA	NA	NA	19	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP123	0-0.2	F: Silty clay	Fine	NA	NA	NA	NA	NA	NA	190	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP125	0-0.2	F: Silty clay	Fine	NA	NA	NA	NA	NA	NA	120	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP104	-	Fill	Fine	NA	NA	NA	5	14	20	55	9	120	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	0.05
DUP106	-	Fill	Fine	NA	NA	NA	7	15	41	160	8	130	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
DUP107	-	Fill	Fine	NA	NA	NA	NA	NA	NA	NA	NA	NA	<1	NA	<25	NA	NA	NA	<0.2	<0.5	<1	<3	NA
otal Number of Samples				0	0	0	8	8	8	21	8	8	9	8	9	8	8	8	9	9	9	9	8
Maximum Value				NA.	NA NA	NA NA	7	17	44	250	11	190	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>0.05</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>0.05</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>0.05</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>0.05</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>0.05</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>0.05</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>0.05</td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td>0.05</td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td>0.05</td></pql<></td></pql<>	<pql< td=""><td>0.05</td></pql<>	0.05

Concentration above the SAC

Concentration above the PQL

The guideline corresponding to the elevated value is highlighted in grey in the EIL and ESL Assessment Criteria Table below

EIL AND ESL ASSESSMENT CRITERIA

Sample Reference	Sample Depth	Sample Description	Soil Texture	рН	CEC (cmolc/kg)	Clay Content (% clay)	Arsenic	Chromium	Copper	Lead	Nickel	Zinc	Naphthalene	DDT	C ₆ -C ₁₀ (F1)	>C ₁₀ -C ₁₆ (F2) plus napthalene	>C ₁₆ -C ₃₄ (F3)	>C ₃₄ -C ₄₀ (F4)	Benzene	Toluene	Ethylbenzene	Total Xylenes	B(a)P
TP101	0-0.2	F: Silty clay	Fine	NA	NA	NA				2000													
TP101	0.5-0.8	F: Silty clay	Fine	NA	NA	NA				2000													
TP103	0-0.2	F: Silty clay	Fine	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	2500	6600	95	135	185	95	72
TP103 - [LAB_DUP]	0-0.2	F: Silty clay	Fine	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	2500	6600	95	135	185	95	72
TP105	0-0.2	F: Silty clay	Fine	NA	NA	NA				2000													
TP106	0-0.1	F: Sandy gravel	Coarse	NA	NA	NA				2000													
TP107	0-0.2	F: Silty clay	Fine	NA	NA	NA				2000													
TP108	0-0.2	F: Silty clay	Fine	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	2500	6600	95	135	185	95	72
TP109	0-0.2	F: Silty clay	Fine	NA	NA	NA				2000													
TP110	0-0.2	F: Silty clay	Fine	NA	NA	NA				2000													
TP112	0-0.2	F: Silty clay	Fine	NA	NA	NA				2000													
TP114	0-0.1	F: Sandy gravel	Coarse	NA	NA	NA				2000													-
TP119	0-0.2	F: Silty clay	Fine	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	2500	6600	95	135	185	95	72
TP121	0-0.2	F: Silty sandy clay	Fine	NA	NA	NA				2000													
TP122	0-0.2	F: Silty sandy clay	Fine	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	2500	6600	95	135	185	95	72
TP122 - [LAB_DUP]	0-0.2	F: Silty sandy clay	Fine	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	2500	6600	95	135	185	95	72
TP122	0.4-0.6	Silty clay	Fine	NA	NA	NA				2000													
TP123	0-0.2	F: Silty clay	Fine	NA	NA	NA				2000													
TP125	0-0.2	F: Silty clay	Fine	NA	NA	NA				2000													
DUP104	-	Fill	Fine	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	2500	6600	95	135	185	95	72
DUP106	-	Fill	Fine	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	2500	6600	95	135	185	95	72
DUP107	-	Fill	Fine	NA	NA	NA							370		215				95	135	185	95	



TABLE S7

SOIL LABORATORY RESULTS COMPARED TO WASTE CLASSIFICATION GUIDELINES

All data in mg/kg unless stated otherwise

						HEAVY	METALS				P/	AHs		OC/OF	PESTICIDES		Total			TRH				BTEX COI	MPOUNDS		
			Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Total PAHs	B(a)P	Total Endosulfans	Chloropyrifos	Total Moderately Harmful	Total Scheduled	PCBs	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	ASBESTOS FIBRES
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	າ		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	2000	400	7000	NSL	0000	200	4200	NJL	800	23	432	30	1000	30	30	2000	1	NSL		40,000	72	2,073	4,320	7,200	<u> </u>
TP101	0-0.2	F: Silty clay	NA	NA	NA	NA	16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
TP101	0.5-0.8	F: Silty clay	NA	NA	NA	NA	34	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP103	0-0.2	F: Silty clay	6	<0.4	14	18	58	<0.1	6	130	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA
TP103 - [LAB_DUP]	0-0.2	F: Silty clay	6	<0.4	14	17	54	<0.1	6	120	< 0.05	<0.05	<0.1	<0.1	<0.1	0.2	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA
TP105	0-0.2	F: Silty clay	NA	NA	NA	NA	30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP106	0-0.1	F: Sandy gravel	NA	NA	NA	NA	8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP107	0-0.2	F: Silty clay	NA	NA	NA	NA	250	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP108	0-0.2	F: Silty clay	7	<0.4	16	36	100	0.1	11	190	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA
TP109	0-0.2	F: Silty clay	NA	NA	NA	NA	86	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
TP110	0-0.2	F: Silty clay	NA	NA	NA	NA	130	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP112	0-0.2	F: Silty clay	NA	NA	NA	NA	52	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
TP114	0-0.1	F: Sandy gravel	NA	NA	NA	NA	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP116	0-0.2	F: Silty clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
TP118	0-0.2	F: Silty clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
TP119	0-0.2	F: Silty clay	4	<0.4	11	14	43	<0.1	6	27	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA
TP121	0-0.2	F: Silty sandy clay	NA	NA	NA	NA	89	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
TP122	0-0.2	F: Silty sandy clay	7	<0.4	16	38	190	0.4	9	140	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	Not Detected
TP122 - [LAB_DUP]	0-0.2	F: Silty sandy clay	7	<0.4	17	44	200	0.4	10	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	<3	NA NA
TP122	0.4-0.6	Silty clay	NA NA	NA NA	NA	NA	19	NA	NA	NA	NA NA	NA	NA NA	NA NA	NA NA	NA	NA NA	NA NA	NA	NA	NA	NA	NA NA	NA	NA	NA NA	NA Datastad
TP123	0-0.2	F: Silty clay	NA NA	NA NA	NA	NA	190	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA	NA NA	NA	NA NA	NA NA	NA NA	NA	NA NA	Detected Not Detected
TP125 DUP104	0-0.2	F: Silty clay Fill	NA 5	NA <0.4	NA 14	NA 20	120 55		NA 9	NA 120	0.05	0.05	NA <0.1	NA <0.1	<0.1	NA <0.1	<0.1	NA <25	NA <50	<100	NA <100	NA <50	<0.2	NA <0.5	NA <1	NA <3	Not Detected NA
DUP104	-	Fill	7	<0.4	15	41	160	0.1	8	130	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA NA
DUP107		Fill	NA NA	NA	NA	NA	NA	NA	NA NA	NA	NA	NA	NA	NA	NA	NA	NA	<25	NA	NA NA	NA NA	NA	<0.2	<0.5	<1	<3	NA NA
TP101 FCF1	0-0.8	Material	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA	NA NA	NA NA	NA NA	NA NA	NA	NA	NA NA	NA NA	Detected
TP101 FCF1	0-0.8	Material	NA NA	NA NA	NA NA	NA NA	NA	NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	Detected
TP112 FCF1	0-0.4	Material	NA NA	NA NA	NA NA	NA NA	NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	Detected
TP116 FCF1	0-0.4	Material	NA NA	NA NA	NA	NA	NA	NA	NA NA	NA	NA NA	NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA	NA	NA	NA NA	NA	NA	NA NA	Detected
TP118 FCF1	0-0.4	Material	NA	NA NA	NA	NA	NA	NA	NA NA	NA	NA NA	NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA	NA	NA	NA	NA NA	NA	NA	NA NA	Detected
TP121 FCF1	0-0.5	Material	NA NA	NA	NA	NA	NA	NA	NA	NA	NA NA	NA	NA NA	NA NA	NA NA	NA NA	NA	NA NA	NA	NA	NA	NA	NA NA	NA	NA	NA NA	Detected
TP122 FCF1	0-0.4	Material	NA.	NA NA	NA	NA	NA	NA	NA NA	NA	NA.	NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA	NA NA	NA	NA	NA NA	NA	NA NA	NA NA	Detected
TP123 FCF1	0-0.6	Material	NA	NA	NA	NA	NA	NA	NA NA	NA	NA NA	NA	NA NA	NA	NA NA	NA NA	NA	NA NA	NA	NA	NA	NA	NA NA	NA	NA	NA NA	Detected
TP125 FCF1	0-0.4	Material	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Detected
Total Number of Samples	3		8	8	8	8	21	8	8	8	8	8	8	8	8	8	8	9	8	8	8	8	9	9	9	9	18
Maximum Value			7	<pql< td=""><td>17</td><td>44</td><td>250</td><td>0.4</td><td>11</td><td>190</td><td>0.05</td><td>0.05</td><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>0.2</td><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	17	44	250	0.4	11	190	0.05	0.05	<pql< td=""><td><pql< td=""><td><pql< td=""><td>0.2</td><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td>0.2</td><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td>0.2</td><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	0.2	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<>	<pql< td=""><td>Detected</td></pql<>	Detected
Statistical Analysis on Fill Sa	amples															1		I					1				
Number of Fill Samples *	p		NC	NC	NC	NC	22	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Mean Value			NC	NC	NC	NC	85.27	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Standard Deviation			NC	NC	NC	NC	62.43	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
% UCL			NC	NC	NC	NC	95	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
UCL Value			NC	NC	NC	NC	108.2	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC

Concentration above the CT1 Concentration above SCC1 Concentration above the SCC2 Concentration above PQL VALUE
VALUE
Bold

 $[\]boldsymbol{\ast}$ Statistical analysis number of fill samples includes samples from the PSI and DSI dataset



TABLE S8			
SOIL LABORATORY TCLP R	ESULTS		
All data in mg/L unless sta	ated otherwise		
			1
			Lead
PQL - Envirolab Services			0.03
TCLP1 - General Solid Waste			5
TCLP2 - Restricted Solid Was	ste		20
TCLP3 - Hazardous Waste			>20
Sample Reference	Sample Depth	Sample Description	
TP107	0-0.2	F: Silty clay	<0.03
TP107 - [LAB_DUP]	0-0.2	F: Silty clay	<0.03
TP110	0-0.2	F: Silty clay	<0.03
TP122	0-0.2	F: Silty sandy clay	<0.03
TP123	0-0.2	F: Silty clay	<0.03
TP125	0-0.2	F: Silty clay	<0.03
Total Number of samples			6
Maximum Value			<pql< td=""></pql<>
General Solid Waste			VALUE
Restricted Solid Waste			VALUE
Hazardous Waste			VALUE
Concentration above PQL			Bold

Detailed (Stage 2) Site Investigation Corner Kellicar and Camden Roads, Campbelltown, NSW E33438PL



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Result outside of QA/QC acceptance criteria





Appendix C: Test pit Logs



Environmental logs are not to be used for geotechnical purposes

Client: ERILYAN

Project: PROPOSED GENESISCARE CAMPBELLTOWN

Location: CNR KELLICAR & CAMDEN ROADS, CAMPBELLTOWN, NSW

Job No.: E33438PL Method: TEST PIT R.L. Surface: N/A

1			-			64. 1281111				11// (
Date: 1								D	atum:	N/A
Plant Ty	ype:	BACKH	HOE		Logg	ged/Checked by: C.R./B.P.				
	ASB SAMPLES SAL DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE- TION			0			FILL: Silty clay, low to medium plasticity, brown, trace of igneous gravel, plastic, glass and root fibres, fibre cement fragments.	w <pl< td=""><td></td><td></td><td>GRASS COVER SCREEN: (19.5kg) 0-0.8m FCF 1 FCF 2</td></pl<>			GRASS COVER SCREEN: (19.5kg) 0-0.8m FCF 1 FCF 2
			-		CI-CH	Silty CLAY: medium to high plasticity, red brown mottled orange, trace of ironstone gravel, ash and root fibres.	w <pl< td=""><td></td><td></td><td>ALLUVIAL -</td></pl<>			ALLUVIAL -
			1.5			END OF TEST PIT AT 1.0m				



Environmental logs are not to be used for geotechnical purposes

Client: ERILYAN

Project: PROPOSED GENESISCARE CAMPBELLTOWN

Location: CNR KELLICAR & CAMDEN ROADS, CAMPBELLTOWN, NSW

Job No.: E33438PL Method: TEST PIT R.L. Surface: N/A

Data: 40/40/0000									. L . G a	Surface. N/A	
Date:	16	5/12	/2020						D	atum:	N/A
Plant	Ty	pe:	BACKH	HOE		Logg	ged/Checked by: C.R./B.P.				
Groundwater Record	-1-1		Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
ORY ON OMPLE- TION				- - -			FILL: Silty clay, low to medium plasticity, brown, trace of siltstone gravel and cobbles, sandstone gravel, ash, slag and root fibres.	w <pl< td=""><td></td><td></td><td>SCREEN: (18.6kg) - 0-0.4m NO FCF</td></pl<>			SCREEN: (18.6kg) - 0-0.4m NO FCF
				0.5 -		CI-CH	Silty CLAY: medium to high plasticity, orange brown mottled yellow, trace of root fibres.	w <pl< td=""><td></td><td></td><td>ALLUVIAL - -</td></pl<>			ALLUVIAL - -
		Ħ			<i>Y </i>		END OF TEST PIT AT 0.7m				
				1			END OF TEST FIT AT 0.7III				-
				2.5 - - - - - 3 - -							- - - - - -
	Plant Record Record	Plant Type Coundwater Several Plant	Plant Type: Plant Type: Record ASS SAMPLES ASS OBA DBA DBA DBA DBA DBA DBA DBA DBA DBA D	Date: 16/12/2020 Plant Type: BACKH	Plant Type: BACKHOE Salama Salama	Plant Type: BACKHOE Standard (m) Hadel (m) Plant Type: BACKHOE Standard (m) Plant Type: BACKHOE Standard (m) Plant Type: BACKHOE Standard (m) Plant Type: BACKHOE Object (m) Plant Type: BACKHOE Standard (m	Date: 16/12/2020 Plant Type: BACKHOE Logg Way Plant Type: BACKHOE Logg Groundwater A Standard Circh Logg Groundwater A Standard Circh Logg Groundwater A Standard Circh Logg A Standard Circh Logg A Standard Circh A Standard Circh	Plant Type: BACKHOE Logged/Checked by: C.R./B.P. Logged/Checked by: C.R./B.P. DESCRIPTION DE	Plant Type: BACKHOE Logged/Checked by: C.R./B.P. DESCRIPTION Page 19 19 19 19 19 19 19 19 19 19 19 19 19	Plant Type: BACKHOE Logged/Checked by: C.R./B.P. DESCRIPTION Strong and root fibres. DESCRIPTION Strong and root fibres. END OF TEST PIT AT 0.7m Description of the control of the	Datum: Plant Type: BACKHOE Logged/Checked by: C.R./B.P.



Environmental logs are not to be used for geotechnical purposes

Client: ERILYAN

Project: PROPOSED GENESISCARE CAMPBELLTOWN

Location: CNR KELLICAR & CAMDEN ROADS, CAMPBELLTOWN, NSW

Job No.: E33438PL Method: TEST PIT R.L. Surface: N/A

Job N	lo.: E3	33438PL	-		Method: TEST PIT			R.L. Surface: N/A		
Date:	16/12	/2020						D	atum:	N/A
Plant	Type:	BACKH	HOE		Logg	ged/Checked by: C.R./B.P.				
Groundwater Record	Record Record ASS AAS AAS AAS BAMPLES BAM Field Tests Field Tests Graphic Log					DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE- TION			0		Unified Classification	FILL: Silty clay, medium to high plasticity, brown, trace of tile fragments and root fibres.	w <pl< td=""><td></td><td></td><td>SCREEN: (18.2kg) - 0-0.3m NO FCF -</td></pl<>			SCREEN: (18.2kg) - 0-0.3m NO FCF -
			0.5 -		CL-CI	Silty CLAY: low to medium plasticity, orange brown, trace of root fibres.	w <pl< td=""><td></td><td></td><td>ALLUVIAL - - - -</td></pl<>			ALLUVIAL - - - -
						END OF TEST PIT AT 0.8m				
			1 -							_
										-
			-							-
			-							-
			1.5 -							_
			1.0	_						-
			-	_						_
										_
										_
			2 -							_
										-
										-
				-						-
			2.5 -							_
				-						-
										-
				-						-
			3 -							_
				-						-
[-						-
				-						-
. — —			3.5	J			l .			



Environmental logs are not to be used for geotechnical purposes

Client: ERILYAN

Project: PROPOSED GENESISCARE CAMPBELLTOWN

Location: CNR KELLICAR & CAMDEN ROADS, CAMPBELLTOWN, NSW

Job No.: E33438PL Method: TEST PIT R.L. Surface: N/A

J	Date: 16/12/2020					Method: TEST PIT R.L. Surface: N/A					
	Date:	16/12	/2020						D	atum:	N/A
	Plant	Туре:	BACKH	HOE		Logg	ged/Checked by: C.R./B.P.				
		ASS ASB ASB SAL DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	DRY ON COMPLE- TION			-			FILL: Silty clay, medium to high plasticity, brown, trace of glass, tile and concrete fragments and root fibres.	w <pl< td=""><td></td><td></td><td>GRASS COVER - SCREEN: (17.3kg) 0-0.4m NO FCF</td></pl<>			GRASS COVER - SCREEN: (17.3kg) 0-0.4m NO FCF
				0.5 — -		CL-CI	Silty CLAY: low to medium plasticity, orange brown and red brown, trace of ironstone gravel.	w <pl< td=""><td></td><td></td><td>ALLUVIAL - -</td></pl<>			ALLUVIAL - -
ı				_			END OF TEST PIT AT 0.8m				
				1							- - - - -
				2 - - - 2.5							
והפואולוטי				- 3 - - - - - 3.5							- - - -



Environmental logs are not to be used for geotechnical purposes

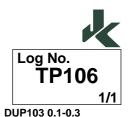
Client: ERILYAN

Project: PROPOSED GENESISCARE CAMPBELLTOWN

Location: CNR KELLICAR & CAMDEN ROADS, CAMPBELLTOWN, NSW

Job No.: E33438PL Method: TEST PIT R.L. Surface: N/A

Job I	No.: E	33438PL	-		Method: TEST PIT			R.L. Surface: N/A		
Date	: 16/12	2/2020						D	atum:	N/A
Plant	t Type:	BACKH	HOE		Logg	ged/Checked by: C.R./B.P.				
Groundwater Record	ASS ASB SAL SAL SAL	DB Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE- TION			-			FILL: Silty clay, medium to high plasticity, brown, trace of igneous gravel, ash, glass and tile fragments and root fibres.	w <pl< td=""><td></td><td></td><td>GRASS COVER - SCREEN: (16.9kg) - 0-0.4m NO FCF</td></pl<>			GRASS COVER - SCREEN: (16.9kg) - 0-0.4m NO FCF
			0.5 -		CL-CI	Silty CLAY: low to medium plasticity, brown and orange brown, trace of ironstone gravel, ash and root fibres.	w <pl< td=""><td></td><td></td><td>ALLUVIAL - -</td></pl<>			ALLUVIAL - -
			-			END OF TEST PIT AT 0.7m				-
			-	_						-
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			- -							-
			1.5 –							-
			-	-						-
			2 -							-
			-							- -
			2.5 - -							-
			3-							-
			- -							-
			3.5 _							-



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Client: ERILYAN

Project: PROPOSED GENESISCARE CAMPBELLTOWN

Location: CNR KELLICAR & CAMDEN ROADS, CAMPBELLTOWN, NSW

Job No.: E33438PL Method: TEST PIT R.L. Surface: N/A

Job I	No.: E3	33438PL	•		Method: TEST PIT			R.L. Surface: N/A		
Date	: 16/12	/2020						D	atum:	N/A
Plan	t Type:	BACKH	ЮE		Logg	ged/Checked by: C.R./B.P.				
Groundwater Record	ES ASS ASB SAL DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE TION			0		CL-CI	FILL: Sandy gravel, fine to coarse grained, sub-angular, yellow brown, sandstone, fine to medium grained sand. FILL: Silty clay, low to medium plasticity, brown, trace of siltstone gravel, ash, glass, plastic and root fibres. Silty CLAY: low to medium plasticity,	D w <pl w<pl< td=""><td></td><td></td><td>GRASS COVER SCREEN 3.3kg (0-0.1m) NO FCF SCREEN 16.7kg (0.1-0.4m) NO FCF ALLUVIAL</td></pl<></pl 			GRASS COVER SCREEN 3.3kg (0-0.1m) NO FCF SCREEN 16.7kg (0.1-0.4m) NO FCF ALLUVIAL
			-			brown and orange brown, trace of ash and root fibres. END OF TEST PIT AT 0.8m				-
			- 1 – - -			END OF TEST FIT AT 0.0III				- - -
			- 1.5 — - -							- - - -
			2 - - -							- - -
			2.5 — - - -							- - -
: 5			3 - - - - 3.5							 - -



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Client: ERILYAN

Project: PROPOSED GENESISCARE CAMPBELLTOWN

Location: CNR KELLICAR & CAMDEN ROADS, CAMPBELLTOWN, NSW

Job No.: E33438PL Method: TEST PIT R.L. Surface: N/A

Job No. : E33438PL	Method: TEST PIT	R.L. Surface: N/A
Date: 16/12/2020		Datum: N/A
Plant Type: BACKHOE	Logged/Checked by: C.R./B.P.	
Groundwater Record Record ASS ASS SAL DB Field Tests Craphic Log	Unified Classification Moisture Moisture	Condition/ Weathering Strength/ Rel. Density Hand Penetrometer Readings (kPa.)
DRY ON COMPLE-TION	FILL: Silty clay, medium to high plasticity, brown, trace of ironstone gravel, ash, tile, ceramic, glass and brick fragments.	GRASS COVER - SCREEN: (16.2kg) 0-0.4m NO FCF
0.5 -	CL-CI Silty CLAY: low to medium plasticity, brown and orange brown, trace of ash and root fibres.	PL ALLUVIAL
	END OF TEST PIT AT 0.7m	
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3.5		



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Client: ERILYAN

Project: PROPOSED GENESISCARE CAMPBELLTOWN

Location: CNR KELLICAR & CAMDEN ROADS, CAMPBELLTOWN, NSW

Job No.: E33438PL Method: TEST PIT R.L. Surface: N/A

TION III.e, glass, concrete, plastic and root fibres. 0-0.5m NO FCF 1.5 CL-CI Sitty CLAY: low to medium plasticity, w <pl 0.7m="" 1.5<="" at="" end="" of="" pit="" test="" th=""><th>J</th><th colspan="6">JOD NO.: E33438PL</th><th colspan="5">Method: 1EST PIT R.L. Surface: N/A</th></pl>	J	JOD NO.: E33438PL						Method: 1EST PIT R.L. Surface: N/A				
DESCRIPTION A plant A		Date:	16/12	/2020						D	atum:	N/A
DRY ON COMPLETION 1.5 - 1.5 - 2.5 - 2.5 - 3.5		Plant	Type:	BACK	HOE		Logg	ged/Checked by: C.R./B.P.				
DRY ON COMPLE TION FILL: Sitly clay, medium to high plasticity, brown, trace of ash, brick, tile, glass, concrete, plastic and root fibres. O.5 CL-CI Sitly CLAY: low to medium plasticity, red brown and orange brown. END OF TEST PIT AT 0.7m 1- 1.5- 2- 2.5- 3- 3- - 3- - 3- - - - - -		Groundwater Record		Field Tests		Graphic Log	Unified Classification		Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	
2		DRY ON			- - -			plasticity, brown, trace of ash, brick, tile, glass, concrete, plastic and root fibres.	w <pl< th=""><th></th><th></th><th>- SCREEN: (16.3kg) 0-0.5m NO FCF</th></pl<>			- SCREEN: (16.3kg) 0-0.5m NO FCF
2					-		CL-CI	red brown and orange brown.	w <pl< th=""><th></th><th></th><th>ALLUVIAL -</th></pl<>			ALLUVIAL -
					1.5 - 1.5 - 2 - 2 - 3 - 3 - 3 - 3 - 3 - 3 - 3 - 3			END OF TEST PIT AT 0.7m				



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Client: ERILYAN

Project: PROPOSED GENESISCARE CAMPBELLTOWN

Location: CNR KELLICAR & CAMDEN ROADS, CAMPBELLTOWN, NSW

Job No.: E33438PL Method: TEST PIT R.L. Surface: N/A

Job No.: E33438PL	Meth	Method: TEST PIT			ace: N/A
Date: 16/12/2020				Datum: N	√A
Plant Type: BACKHC	DE Log	ged/Checked by: C.R./B.P.			
Groundwater Record ES ASB SAMPLES SAL DB Field Tests	Depth (m) Graphic Log Unified Classification	DESCRIPTION	Moisture Condition/ Weathering Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE- TION		FILL: Silty clay, low to medium plasticity, brown, trace of ash, ironstone gravel, tile, fibre cement fragments and root fibres.	w <pl< td=""><td>-</td><td>GRASS COVER NO FCF 0-0.1m SCREEN: (18.8kg) 0-0.4m FCF1</td></pl<>	-	GRASS COVER NO FCF 0-0.1m SCREEN: (18.8kg) 0-0.4m FCF1
	0.5	Silty CLAY: low to medium plasticity, red brown, trace of ironstone gravel and ash.	w <pl< td=""><td>_</td><td>ALLUVIAL</td></pl<>	_	ALLUVIAL
		END OF TEST PIT AT 0.7m		-	
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	1.5 —			-	
				-	
	2-			-	
	2.5 –			-	
	3-			-	
				-	
	3.5			-	
	U.U	1			



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Client: ERILYAN

Project: PROPOSED GENESISCARE CAMPBELLTOWN

Location: CNR KELLICAR & CAMDEN ROADS, CAMPBELLTOWN, NSW

Job No.: E33438PL Method: TEST PIT R.L. Surface: N/A

Date: 17/12/2020						Metriod. 1231 FII R.L. Surface. N/A				ace. N/A	
Date	: 17/	12/	2020						D	atum:	N/A
Plan	t Typ	e:	BACKH	HOE		Logg	ged/Checked by: C.R./B.P.				
	ASS SAMPLES	-	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE TION	<u>:</u>			-			FILL: Silty clay, medium to high plasticity, brown, trace sandstone gravel, igneous gravel, tile, glass and plastic.	w <pl< td=""><td></td><td></td><td>GRASS COVER - SCREEN: (14.9kg) - 0-0.5m NO FCF</td></pl<>			GRASS COVER - SCREEN: (14.9kg) - 0-0.5m NO FCF
				0.5 -		CI-CH	Silty CLAY: medium to high plasticity, orange brown and brown.	w <pl< td=""><td></td><td></td><td>ALLUVIAL -</td></pl<>			ALLUVIAL -
							END OF TEST PIT AT 0.7m				
				1							
				- - - 3.5	-						-



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Client: ERILYAN

Project: PROPOSED GENESISCARE CAMPBELLTOWN

Location: CNR KELLICAR & CAMDEN ROADS, CAMPBELLTOWN, NSW

Job No.: E33438PL Method: TEST PIT R.L. Surface: N/A

Job No. : E33438PL	Metho	Method: TEST PIT			R.L. Surface: N/A		
Date: 17/12/2020				D	atum:	N/A	
Plant Type: BACKHOE	Logg	ed/Checked by: C.R./B.P.					
Groundwater Record ES ASS ASS SAL DEPT Field Tests Depth (m)	Graphic Log Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks	
DRY ON COMPLE-TION		FILL: Silty clay, medium to high plasticity, brown, trace of igneous gravel, ash, tile and glass.	w <pl< td=""><td></td><td></td><td>GRASS COVER - SCREEN: (19.8kg) 0-0.3m NO FCF</td></pl<>			GRASS COVER - SCREEN: (19.8kg) 0-0.3m NO FCF	
	CL-CI	Silty CLAY: low to medium plasticity, orange brown, trace of ash.	w <pl< td=""><td></td><td></td><td>ALLUVIAL -</td></pl<>			ALLUVIAL -	
0.5		END OF TEST PIT AT 0.5m				_	
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1.5						_	
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2.5 —						_	
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						-	
3.5							
3.5							



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Client: **ERILYAN**

Project: PROPOSED GENESISCARE CAMPBELLTOWN

Location: CNR KELLICAR & CAMDEN ROADS, CAMPBELLTOWN, NSW

E22420DI

Job No.: E33438PL				Method: TEST PIT			R.L. Surface: N/A		
Date: 17/12	2/2020						D	atum:	N/A
Plant Type:	BACKH	ЮE		Logo	ged/Checked by: C.R./B.P.				
Groundwater Record ES ASS ASB SAMPLES	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE- TION		0 - -			FILL: Silty clay, medium to high plasticity, brown, trace of igneous gravel, ash, glass, tile and fibre cement fragments.	w <pl< td=""><td></td><td></td><td>GRASS COVER - SCREEN: (17.7kg) - 0-0.4m FCF1-FCF6 0 0.7m FCF VISIBLE IN - WALL</td></pl<>			GRASS COVER - SCREEN: (17.7kg) - 0-0.4m FCF1-FCF6 0 0.7m FCF VISIBLE IN - WALL
				CL-CI	Silty CLAY: low to medium plasticity, orange brown, trace of ironstone gravel and ash. END OF TEST PIT AT 0.5m	w <pl< td=""><td></td><td></td><td>ALLUVIAL - -</td></pl<>			ALLUVIAL - -
		1 - -							- - -
		- 1.5 — -							- - -
		- 2 - -							-
		- - 2.5 —							-
		3-							-
		- - 3.5_							-



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Client: ERILYAN

Project: PROPOSED GENESISCARE CAMPBELLTOWN

Location: CNR KELLICAR & CAMDEN ROADS, CAMPBELLTOWN, NSW

	lo.: E3	33438PL		Method: TEST PIT R.L. Surface: N/A Datum: N/A					
		/2020 BACKHC	Œ	Log	ged/Checked by: C.R./B.P.		ט	atum:	IN/A
ndwater rd	ES ASS ASB SAL SAL OR	Tests	Depth (m) Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE- TION					FILL: Silty clay, medium to high plasticity, brown, trace of igneous and sandstone gravel, ash, glass, tile brick, glass and root fibres.	w <pl< td=""><td></td><td></td><td>GRASS COVER - SCREEN: (20.2kg) 0-0.4m NO FCF</td></pl<>			GRASS COVER - SCREEN: (20.2kg) 0-0.4m NO FCF
			1.5 -	CI-CH	Silty CLAY: medium to high plasticity, orange brown, trace of ironstone gravel. END OF TEST PIT AT 0.5m	w <pl< td=""><td></td><td></td><td>ALLUVIAL </td></pl<>			ALLUVIAL
			2.5						-



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Client: **ERILYAN**

Project: PROPOSED GENESISCARE CAMPBELLTOWN

Location: CNR KELLICAR & CAMDEN ROADS, CAMPBELLTOWN, NSW

E22420DI

Job No.: E33438PL		Method: TEST PIT		R.L. Surface: N/A					
Date: 16/12/2020						D	atum:	N/A	
Plant Type:	BACKH	HOE		Logg	ged/Checked by: C.R./B.P.				
Groundwater Record ES ASS ASS SAMPLES	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION		0.5 - 0.5 - 1.5 - 2 - 3 - 3 - 3 - 3 - 3 -		СІ-СН	FILL: Sandy gravel, fine to coarse grained, grey, sub-angular, igneous gravel, fine to medium grained sand, (cemented), trace of ash, brick and tile. FILL: Silty clay, low to medium plasticity, brown and grey brown, trace of igneous gravel, ash, tile and root fibres. Silty CLAY: medium to high plasticity, orange brown and grey brown. END OF TEST PIT AT 0.6m	D w <pl< td=""><td></td><td></td><td>GRASS COVER SCREEN 13.3kg (0-0.1m) NO FCF SCREEN 16.7kg (0.2-0.5m) NO FCF ALLUVIAL</td></pl<>			GRASS COVER SCREEN 13.3kg (0-0.1m) NO FCF SCREEN 16.7kg (0.2-0.5m) NO FCF ALLUVIAL
		3.5 _							_



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Client: ERILYAN

Project: PROPOSED GENESISCARE CAMPBELLTOWN

Location: CNR KELLICAR & CAMDEN ROADS, CAMPBELLTOWN, NSW

Job No.: E33438PL Method: TEST PIT R.L. Surface: N/A

Job No. : E33438PL	Method: TEST PIT	R.L. Surface: N/A
Date: 16/12/2020		Datum: N/A
Plant Type: BACKHOE	Logged/Checked by: C.R./B.P.	
Groundwater Record ES ASS ASS ASS ASS ASS ASS ASS ASS ASS	Graphic Log Unified Classification NOILAINDSSA	Moisture Condition/ Weathering Strength/ Rel. Density Hand Penetrometer Readings (kPa.)
DRY ON COMPLE-TION	FILL: Silty clay, medium to high plasticity, dark brown, trace of ash, tile, plastic, glass, concrete and brick fragments.	w <pl (15.7kg)="" -="" 0-0.4m="" cover="" fcf<="" grass="" no="" screen:="" td=""></pl>
0.5	CI-CH Silty CLAY: medium to high plasticity, brown, trace of ironstone gravel, ash and root fibres.	w <pl -<="" alluvial="" td=""></pl>
	END OF TEST PIT AT 0.7m	
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Client: **ERILYAN**

Project: PROPOSED GENESISCARE CAMPBELLTOWN

Location: CNR KELLICAR & CAMDEN ROADS, CAMPBELLTOWN, NSW

E22420DI

Job I	Job No.: E33438PL		Method: TEST PIT		R.L. Surface: N/A					
Date: 17/12/2020				Datum: N/A			N/A			
Plan	t Type:	BACKH	HOE		Logg	ged/Checked by: C.R./B.P.				
	ASS ASB SAL DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE TION			0			FILL: Silty clay, medium to high plasticity, brown, trace of igneous, ironstone gravel, ash, root fibres, tile, steel, plastic and fibre cement fragments.	w <pl< td=""><td></td><td></td><td>GRASS COVER - SCREEN: (19.2kg) _ 0-0.6m FCF1 - FCF4 -</td></pl<>			GRASS COVER - SCREEN: (19.2kg) _ 0-0.6m FCF1 - FCF4 -
					CI-CH	Silty CLAY: medium to high plasticity, orange brown, trace of ash.	w <pl< td=""><td></td><td></td><td>ALLUVIAL - -</td></pl<>			ALLUVIAL - -
			1			END OF TEST PIT AT 0.9m				
			3.5							-



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Client: **ERILYAN**

Project: PROPOSED GENESISCARE CAMPBELLTOWN

Location: CNR KELLICAR & CAMDEN ROADS, CAMPBELLTOWN, NSW

E22420DI

Job I	Job No.: E33438PL		Method: TEST PIT		R.L. Surface: N/A					
Date	Date : 17/12/2020				Datum: N/A			N/A		
Plant	t Type:	BACKH	HOE		Logg	ged/Checked by: C.R./B.P.				
	ES ASS ASB SAL DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE- TION			-			FILL: Silty clay, medium to high plasticity, brown, trace of ash, ironstone, igneous gravel and root fibres.	w <pl< td=""><td></td><td></td><td>SCREEN: (17.5kg) - 0-0.4m NO FCF -</td></pl<>			SCREEN: (17.5kg) - 0-0.4m NO FCF -
			0.5 -		CI-CH	Silty CLAY: medium to high plasticity, brown and orange brown, trace of ironstone gravel and ash. END OF TEST PIT AT 0.6m	w <pl< td=""><td></td><td></td><td>ALLUVIAL -</td></pl<>			ALLUVIAL -
			-							-
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			1.5 -	_						-
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			2 -							
			-							
			2.5 -							_
			-							-
			3-							-
			3.5							-



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Project: PROPOSED GENESISCARE CAMPBELLTOWN

Location: CNR KELLICAR & CAMDEN ROADS, CAMPBELLTOWN, NSW

Job No.: E33438PL Method: TEST PIT R.L. Surface: N/A

Job No.: E33438PL	Method: TEST PIT	R.L. Surface: N/A
Date: 17/12/2020		Datum: N/A
Plant Type: BACKHOE	Logged/Checked by: C.R./B.P.	
Groundwater Record ES ASB ASB SAMPLES SAL Depth (m) Graphic Log	Unified Classification NOITHINGSAD Moisture	Condition/ Weathering Strength/ Rel. Density Hand Penetrometer Readings (kPa.)
DRY ON COMPLE-TION	FILL: Silty clay, medium to high plasticity, brown, trace of concrete, tile, fibre cement fragments and root fibres.	J <pl (17.4kg)<br="" screen:="">- 0-0.4m FCF1-FCF5</pl>
0.5	CI-CH Silty CLAY: medium to high plasticity, worange brown, trace of ironstone gravel.	r <pl -<="" alluvial="" td=""></pl>
	END OF TEST PIT AT 0.7m	_
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1.5		
2-		-
2.5 —		
3-		
3.5		



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Client: ERILYAN

Project: PROPOSED GENESISCARE CAMPBELLTOWN

Location: CNR KELLICAR & CAMDEN ROADS, CAMPBELLTOWN, NSW

Job No.: E33438PL Method: TEST PIT R.L. Surface: N/A

Job No.: E33438PL Method: TEST PIT	R.L. Surface: N/A
Date: 17/12/2020	Datum: N/A
Plant Type: BACKHOE Logged/Checked by: C.R./B.f	Р.
Groundwater Record ES ASB ASB SAMPLES SAMPLES SAMPLES Classification Classification Notified Classification Notified Not	Moisture Condition/ Weathering Strength/ Rel. Density Hand Penetrometer Readings (kPa.)
DRY ON COMPLE-TION TION FILL: Silty clay, medium to high plasticity, brown, trace of igneous sandstone, siltstone gravel, tile, a and root fibres.	w <pl (15.7kg)<br="" screen:="">s, - 0-0.5m NO FCF</pl>
0.5 CI-CH Silty CLAY: medium to high plasti orange brown and red brown, track ironstone gravel.	icity, w <pl -<="" alluvial="" td=""></pl>
END OF TEST PIT AT 0.8m	
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3,5	



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Client: ERILYAN

Project: PROPOSED GENESISCARE CAMPBELLTOWN

Location: CNR KELLICAR & CAMDEN ROADS, CAMPBELLTOWN, NSW

Job No.: E33438PL Method: TEST PIT R.L. Surface: N/A

Plant Type: BACKHOE Logged/Checked by: C.R./B.P. DESCRIPTION DESCRI	Date: 17/12/2020 Datum: N/A				
DRY ON COMPLE TION O	Plant Type: BACKHOE	Logged/Checked by: C.R./B.P.			
DRY ON COMPLE TION FILL: Gravelly sand, fine to coarse grained, yellow brown, fine to medium grained sandstone gravel. FILL: Sitty sandy clay, tow to medium plasticity, orange brown, trace of ironstone gravel. CI-CH Sitty CLAY: medium to high plasticity, orange brown, trace of ironstone gravel. END OF TEST PIT AT 0.9m 1.5- 1.5- 2.5- 3.4- 2.5-	Groundwater Record ES ASS ASS SAMPLES SAMPLES Field Tests Graphic Log	Unified Classification DESCRIPTION NOITH	Moisture Condition/ Weathering Strength/ Rel. Density Hand	Penetrometer Readings (kPa.) sylvemen	
orange brown, trace of ironstone gravel. END OF TEST PIT AT 0.9m 1.5 – 2 – 2.5 – 3 – 3 – 4 – 4 – 4 – 4 – 4 – 4	DRY ON COMPLETION	FILL: Gravelly sand, fine to coarse grained, yellow brown, fine to medium grained sandstone gravel. FILL: Silty sandy clay, low to medium plasticity, brown, fine to medium grained sand, trace of sandstone gravel, ash and root fibres.	D w <pl< td=""><td>GRASS COVER - SCREEN 3.1kg (0-0.2m) NO FCF SCREEN 17.5kg - (0.2-0.7m) NO FCF -</td></pl<>	GRASS COVER - SCREEN 3.1kg (0-0.2m) NO FCF SCREEN 17.5kg - (0.2-0.7m) NO FCF -	
		orange brown, trace of ironstone gravel.	w <pl< td=""><td>ALLUVIAL</td></pl<>	ALLUVIAL	
	1.5 - 2 - 2.5 - 3 -	END OF TEST PIT AT 0.9m			
	3.5			-	



Environmental logs are not to be used for geotechnical purposes

Client: **ERILYAN**

Project: PROPOSED GENESISCARE CAMPBELLTOWN

Location: CNR KELLICAR & CAMDEN ROADS, CAMPBELLTOWN, NSW

E22420DI

Job No.: E3	3438PL	Meth	od: TEST PIT		R.L. Surf	ace: N/A
Date: 17/12/	2020				Datum:	N/A
Plant Type:	BACKHOE	Logg	ged/Checked by: C.R./B.P.			
Groundwater Record ES ASS SAMPLES SAL DB	Field Tests Depth (m)	Graphic Log Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Rel. Density Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE- TION	0		FILL: Silty clay, medium to high plasticity, brown, trace of igneous and ironstone gravel, brick, tile, fibre cement fragments and root fibres.	w <pl< td=""><td></td><td>GRASS COVER - SCREEN: (17.9kg) - 0-0.5m FCF1,FCF2</td></pl<>		GRASS COVER - SCREEN: (17.9kg) - 0-0.5m FCF1,FCF2
	0.5 -	CL-CI	Silty CLAY: low to medium plasticity, red brown mottled orange, trace of ironstone gravel.	w <pl< td=""><td></td><td>ALLUVIAL -</td></pl<>		ALLUVIAL -
	1.5 - 2.5 - 3.5		END OF TEST PIT AT 0.7m			



Environmental logs are not to be used for geotechnical purposes

Client: ERILYAN

Project: PROPOSED GENESISCARE CAMPBELLTOWN

Location: CNR KELLICAR & CAMDEN ROADS, CAMPBELLTOWN, NSW

Job No.: E33438PL Method: TEST PIT R.L. Surface: N/A

ı	300 NO.: E33430FE				IVICLI	ou. ILSI FII		11	.L. Juii	ace. N/A	
ı	Date:	17/12	2/2020						D	atum:	N/A
	Plant	Type:	BACK	HOE		Logg	ged/Checked by: C.R./B.P.				
	Groundwater Record	ASS ASB SAL SAL DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	DRY ON COMPLE- TION			-			FILL: Silty sandy clay, medium to high plasticity, brown, fine to medium grained sand, trace of igneous and ironstone gravel, tile, brick, glass and fibre cement fragments.	w <pl< th=""><th></th><th></th><th>GRASS COVER - SCREEN: (17.3kg) 0-0.4m FCF1</th></pl<>			GRASS COVER - SCREEN: (17.3kg) 0-0.4m FCF1
				0.5 -		CL-CI	Silty CLAY: low to medium plasticity, red brown mottled orange, trace of ash and ironstone gravel.	w <pl< td=""><td></td><td></td><td>ALLUVIAL _</td></pl<>			ALLUVIAL _
				-			END OF TEST PIT AT 0.6m				-
				1 -							-
				-	-						-
				1.5 -							-
				-							_
				2 -	-						-
				-							-
				2.5 -							-
				-	_						-
				3 -							-
5				3.5							-
											<u> </u>



Environmental logs are not to be used for geotechnical purposes

Client: **ERILYAN**

Project: PROPOSED GENESISCARE CAMPBELLTOWN

Location: CNR KELLICAR & CAMDEN ROADS, CAMPBELLTOWN, NSW

E22420DI

Job No	o.: E3	3438PL	-		Meth	od: TEST PIT		R	.L. Surf	face: N/A
Date:	17/12	/2020						D	atum:	N/A
Plant ⁻	Туре:	BACKH	HOE		Logg	ged/Checked by: C.R./B.P.				
	ASS ASB SAL DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE- TION			0 -			FILL: Silty clay, low to medium plasticity, brown, with brick, trace of ironstone gravel, tile, glass and fibre cement fragments.	w <pl< td=""><td></td><td></td><td>GRASS COVER - SCREEN: (18.4kg) 0-0.6m FCF1 - FCF8</td></pl<>			GRASS COVER - SCREEN: (18.4kg) 0-0.6m FCF1 - FCF8
			-		CL-CI	Silty CLAY: low to medium plasticity, orange brown, trace of ash and ironstone gravel.	w <pl< td=""><td></td><td></td><td>ALLUVIAL -</td></pl<>			ALLUVIAL -
			-	_		END OF TEST PIT AT 0.8m				_
			1 -	_						_
			-							-
			1.5 -							-
			-							-
			2 -	-						-
			-							-
			2.5 -							_
			-							-
			3 -							_
			-							-
			3.5							



Environmental logs are not to be used for geotechnical purposes

Client: ERILYAN

Project: PROPOSED GENESISCARE CAMPBELLTOWN

Location: CNR KELLICAR & CAMDEN ROADS, CAMPBELLTOWN, NSW

Job No.: E33438PL Method: TEST PIT R.L. Surface: N/A

Job N	lo.: E3	3438PL	-		Meth	od: TEST PIT		R	.L. Surf	face: N/A
Date:	17/12	/2020						D	atum:	N/A
Plant	Type:	BACKH	HOE		Logg	ged/Checked by: C.R./B.P.				
	ASS ASS ASB SAL OB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE- TION			0			FILL: Silty sandy clay, medium to high plasticity, brown, fine to medium grained sand, trace of ash, glass, sandstone gravel, and root fibres.	w <pl< td=""><td></td><td></td><td>GRASS COVER - SCREEN: (17.4kg) - 0-0.6m NO FCF</td></pl<>			GRASS COVER - SCREEN: (17.4kg) - 0-0.6m NO FCF
			-		CI-CH	Silty CLAY: medium to high plasticity, orange brown, trace of ironstone gravel.	w <pl< td=""><td></td><td></td><td>ALLUVIAL - - -</td></pl<>			ALLUVIAL - - -
			- - -	-		END OF TEST PIT AT 1.0m				-
			1.5 – - -	-						- - -
			2 - -							- - -
			2.5 –							
			- - - 3 -							-
			- - 3.5	-						- -



Environmental logs are not to be used for geotechnical purposes

Client: ERILYAN

Project: PROPOSED GENESISCARE CAMPBELLTOWN

Location: CNR KELLICAR & CAMDEN ROADS, CAMPBELLTOWN, NSW

Job No.: E33438PL Method: TEST PIT R.L. Surface: N/A

Job No. : E33438PL		Meth	Method: TEST PIT			R.L. Surface: N/A		
Date: 17/12/2020)		Datum: N/A				N/A	
Plant Type: BAC	KHOE	Log	Logged/Checked by: C.R./B.P.					
Groundwater Record ES ASS ASS SAL DB Field Tests	Depth (m) Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks	
DRY ON COMPLE- TION	0	×	FILL: Silty clay, medium to high plasticity, brown, trace of ironstone igneous gravel, ash, glass, tile, fibre cement fragments, and root fibres.	w <pl< td=""><td></td><td></td><td>GRASS COVER - SCREEN: (16.9kg) 0-0.4m FCF1</td></pl<>			GRASS COVER - SCREEN: (16.9kg) 0-0.4m FCF1	
	0.5	CI-CH	Silty CLAY: medium to high plasticity, brown and orange brown, trace of ash and ironstone gravel.	w <pl< td=""><td></td><td></td><td>ALLUVIAL -</td></pl<>			ALLUVIAL -	
	1.5 -		END OF TEST PIT AT 0.6m					



Environmental logs are not to be used for geotechnical purposes

Client: ERILYAN

Project: PROPOSED GENESISCARE CAMPBELLTOWN

Location: CNR KELLICAR & CAMDEN ROADS, CAMPBELLTOWN, NSW

Job No.: E33438PL Method: TEST PIT R.L. Surface: N/A

			method: TEST PIT R.L. Surface:			ace: N/A					
	Date:	17/12	/2020						D	atum:	N/A
	Plant	Type:	BACK	HOE		Logg	ged/Checked by: C.R./B.P.				
	Groundwater Record	ASS ASB ASB SAL DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
С	DRY ON OMPLE- TION			0			FILL: Silty clay, medium to high plasticity, brown, trace of ash, ironstone and igneous gravel, plastic, roots and root fibres.	w <pl< td=""><td></td><td></td><td>GRASS COVER - SCREEN: (16.4kg) - 0-0.6m NO FCF</td></pl<>			GRASS COVER - SCREEN: (16.4kg) - 0-0.6m NO FCF
				- - 1 -		CI-CH	Silty CLAY: medium to high plasticity, brown and orange brown, trace of ironstone gravel, roots and root fibres. END OF TEST PIT AT 1.1m	w <pl< td=""><td></td><td></td><td>ALLUVIAL - - -</td></pl<>			ALLUVIAL - - -
				- - 1.5 –			END OF TEST FIT AT 1.1111				- - -
				- - - 2 -							- - -
				2.5 -							- - - -
				3-							- - -
יטריאן איניין				3.5							-



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

1

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

LOGS

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

The 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

3

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 ROCK FILL CONGLOMERATE TOPSOIL SANDSTONE CLAY (CL, CI, CH) SHALE/MUDSTONE SILT (ML, MH) SILTSTONE SAND (SP, SW) CLAYSTONE GRAVEL (GP, GW) COAL SANDY CLAY (CL, CI, CH) LAMINITE SILTY CLAY (CL, CI, CH) LIMESTONE CLAYEY SAND (SC) PHYLLITE, SCHIST SILTY SAND (SM) TUFF GRAVELLY CLAY (CL, CI, CH) GRANITE, GABBRO CLAYEY GRAVEL (GC) DOLERITE, DIORITE SANDY SILT (ML, MH) BASALT, ANDESITE 77 77 77 7 77 77 77 77 77 QUARTZITE PEAT AND HIGHLY ORGANIC SOILS (Pt)

OTHER MATERIALS





ASPHALTIC CONCRETE



CLASSIFICATION OF COARSE AND FINE GRAINED SOILS

М	ajor Divisions	Group Symbol	Typical Names	Field Classification of Sand and Gravel	Laboratory Cl	Laboratory Classification		
ionis	GRAVEL (more than half	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 < $C_c < 3$		
rsizefract	of coarse fraction is larger than 2.36mm	. GP Gravel and gravel-sand mixtu little or no fines, uniform grav		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		
uding ove	avo su pr		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
ofsailexdu		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		
rethan 65%c greaterthan	SAND (more than half	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 < $C_c < 3$		
oil (more:	of coarse fraction is smaller than	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		
Carse grained soil (more than 65% of soil excluding oversize fraction is greater than 0,075mm)	2.36mm)			'Dirty' materials with excess of non-plastic fines, zero to medium dry strength	≥ 12% fines, fines are silty			
Coarse		SC	Sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength	≥ 12% fines, fines are clayey	N/A		

						Laboratory Classification	
Majo	or Divisions	Group Symbol	Typical Names	Dry Strength	Dilatancy	Toughness	% < 0.075mm
Supr	SILT and CLAY (low to medium	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
ainedsoils (more than 35% of soil excl. oversize fraction is less than 0.075mm)	for the design of the design o		Inorganic clay of low to medium plasticity, gravelly clay, sandy clay	Medium to high	None to slow	Medium	Above A line
an 35%. se than		OL	Organic silt	Low to medium	Slow Low		Below A line
onisle	SILT and CLAY	МН	Inorganic silt	Low to medium	None to slow	Low to medium	Below A line
xoils (m e fracti	(high plasticity)	СН	Inorganic clay of high plasticity	High to very high	None	High	Above A line
inegrainedsoils (more than oversize fraction is les		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	-	-	-	-

5

Laboratory Classification Criteria

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

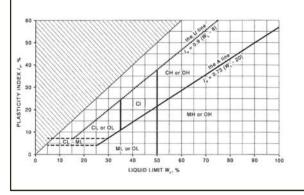
$$C_U = \frac{D_{60}}{D_{10}}$$
 and $C_C = \frac{(D_{30})^2}{D_{10} D_{60}}$

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

- 1 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.
- 3 Clay soils with liquid limits > 35% and ≤ 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.

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





LOG SYMBOLS

Log Column	Symbol	De	finition				
Groundwater Record		— Sta	anding water level.	Time delay following compl	etion of drilling/excavation may be shown.		
	—с	Ext	ent of borehole/te	est pit collapse shortly after o	drilling/excavation.		
	—	— Gr	oundwater seepag	e into borehole or test pit no	oted during drilling or excavation.		
Samples	ES U50 DB DS ASB ASS SAL	Un Bu Sm So So	Sample taken over depth indicated, for environmental analysis. Undisturbed 50mm diameter tube sample taken over depth indicated. Bulk disturbed sample taken over depth indicated. Small disturbed bag sample taken over depth indicated. Soil sample taken over depth indicated, for asbestos analysis. Soil sample taken over depth indicated, for acid sulfate soil analysis. Soil sample taken over depth indicated, for salinity analysis.				
Field Tests	N = 17 4, 7, 10	fig	ures show blows pe		tween depths indicated by lines. Individual usal' refers to apparent hammer refusal within		
	N _c = 5 7 3R		Solid Cone Penetration Test (SCPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration for 60° solid cone driven by SPT hammer. 'R' refers to apparent hammer refusal within the corresponding 150mm depth increment.				
	VNS = 25 PID = 100		Vane shear reading in kPa of undrained shear strength. Photoionisation detector reading in ppm (soil sample headspace test).				
Moisture Condition (Fine Grained Soils) (Coarse Grained Soils)	w > PL w ≈ PL w < PL w ≈ LL w > LL	Mo Mo Mo	Moisture content estimated to be greater than plastic limit. Moisture content estimated to be approximately equal to plastic limit. Moisture content estimated to be less than plastic limit. Moisture content estimated to be near liquid limit. Moisture content estimated to be wet of liquid limit. DRY – runs freely through fingers.				
	M W		MOIST – does not run freely but no free water visible on soil surface.WET – free water visible on soil surface.				
Strength (Consistency) Cohesive Soils	VS S F St VSt Hd Fr ()	SO FIR STI VE HA FR Bra	FT – und RM – und FF – und RY STIFF – und RD – und IABLE – stre	confined compressive streng confined compressive streng confined compressive streng confined compressive streng confined compressive streng confined compressive streng ength not attainable, soil cru dicates estimated consiste	ath > 25kPa and \leq 50kPa. th > 50kPa and \leq 100kPa. th > 100kPa and \leq 200kPa. th > 200kPa and \leq 400kPa. th > 400kPa.		
Density Index/ Relative Density				Density Index (I _D) Range (%)	SPT 'N' Value Range (Blows/300mm)		
(Cohesionless Soils)	VL L		RY LOOSE	≤15	0-4		
	MD		ose Edium dense	> 15 and ≤ 35 > 35 and ≤ 65	4 – 10 10 – 30		
	D		NSE	> 65 and ≤ 85	30 – 50		
	VD		RY DENSE	> 85	> 50 > 50		
	()				sed on ease of drilling or other assessment.		
Hand Penetrometer Readings	300 250	Me	easures reading in l		ive strength. Numbers indicate individual		



Log Column	Symbol	Definition	
Remarks	'V' bit	Hardened steel "	V' shaped bit.
	'TC' bit	Twin pronged tu	ngsten carbide bit.
	T ₆₀	Penetration of au without rotation	uger string in mm under static load of rig applied by drill head hydraulics of augers.
	Soil Origin	The geological or	rigin 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	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	(Note 1)	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		W	Rock is partially discoloured with staining or bleaching along joints but shows little or no change of strength from fresh rock.			
Fresh		F	R	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

				Guide to Strength
Term	Abbreviation	Uniaxial Compressive Strength (MPa)	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	М	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	н	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



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CERTIFICATE OF ANALYSIS 258622

Client Details	
Client	JK Environments
Attention	Brendan Page
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details	
Your Reference	E33438PL, Campbelltown
Number of Samples	79 soil
Date samples received	18/12/2020
Date completed instructions received	18/12/2020

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.

Please refer to the last page of this report for any comments relating to the results.

Report Details	
Date results requested by	24/12/2020
Date of Issue	24/12/2020
NATA Accreditation Number 2901. This of	document shall not be reproduced except in full.
Accredited for compliance with ISO/IEC	17025 - Testing. Tests not covered by NATA are denoted with *

TECHNICAL COMPETENCE

Asbestos Approved By

Analysed by Asbestos Approved Identifier: Panika Wongchanda Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By

Dragana Tomas, Senior Chemist Jaimie Loa-Kum-Cheung, Metals Supervisor Lucy Zhu, Asbestos Supervisor Manju Dewendrage, Chemist **Authorised By**

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		258622-6	258622-14	258622-28	258622-35	258622-76
Your Reference	UNITS	TP103	TP108	TP119	TP122	DUP106
Depth		0-0.2	0-0.2	0-0.2	0-0.2	-
Date Sampled		16.12.20	16.12.20	17.12.20	17.12.20	17.12.20
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	21/12/2020	21/12/2020	21/12/2020	21/12/2020	21/12/2020
Date analysed	-	21/12/2020	21/12/2020	21/12/2020	21/12/2020	21/12/2020
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	%	90	87	88	93	100

vTRH(C6-C10)/BTEXN in Soil				
Our Reference		258622-77	258622-78	258622-79
Your Reference	UNITS	DUP107	TS-S1	TB-S1
Depth		-	-	-
Date Sampled		17.12.20	16.12.20	16.12.20
Type of sample		soil	soil	soil
Date extracted	-	21/12/2020	21/12/2020	21/12/2020
Date analysed	-	21/12/2020	21/12/2020	21/12/2020
TRH C ₆ - C ₉	mg/kg	<25	[NA]	<25
TRH C ₆ - C ₁₀	mg/kg	<25	[NA]	<25
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	[NA]	<25
Benzene	mg/kg	<0.2	114%	<0.2
Toluene	mg/kg	<0.5	116%	<0.5
Ethylbenzene	mg/kg	<1	106%	<1
m+p-xylene	mg/kg	<2	122%	<2
o-Xylene	mg/kg	<1	100%	<1
naphthalene	mg/kg	<1	[NA]	<1
Total +ve Xylenes	mg/kg	<3	[NA]	<3
Surrogate aaa-Trifluorotoluene	%	82	85	103

svTRH (C10-C40) in Soil						
Our Reference		258622-6	258622-14	258622-28	258622-35	258622-76
Your Reference	UNITS	TP103	TP108	TP119	TP122	DUP106
Depth		0-0.2	0-0.2	0-0.2	0-0.2	-
Date Sampled		16.12.20	16.12.20	17.12.20	17.12.20	17.12.20
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	21/12/2020	21/12/2020	21/12/2020	21/12/2020	21/12/2020
Date analysed	-	22/12/2020	22/12/2020	22/12/2020	22/12/2020	22/12/2020
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	<100	<100	<100	<100	<100
TRH >C10 -C16	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	%	94	82	90	84	100

PAHs in Soil						
Our Reference		258622-6	258622-14	258622-28	258622-35	258622-76
Your Reference	UNITS	TP103	TP108	TP119	TP122	DUP106
Depth		0-0.2	0-0.2	0-0.2	0-0.2	-
Date Sampled		16.12.20	16.12.20	17.12.20	17.12.20	17.12.20
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	21/12/2020	21/12/2020	21/12/2020	21/12/2020	18/12/2020
Date analysed	-	21/12/2020	21/12/2020	21/12/2020	21/12/2020	18/12/2020
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	%	108	99	99	96	97

Envirolab Reference: 258622

Organochlorine Pesticides in soil						
Our Reference		258622-6	258622-14	258622-28	258622-35	258622-76
Your Reference	UNITS	TP103	TP108	TP119	TP122	DUP106
Depth		0-0.2	0-0.2	0-0.2	0-0.2	-
Date Sampled		16.12.20	16.12.20	17.12.20	17.12.20	17.12.20
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	21/12/2020	21/12/2020	21/12/2020	21/12/2020	18/12/2020
Date analysed	-	21/12/2020	21/12/2020	21/12/2020	21/12/2020	18/12/2020
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
нсв	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	%	109	102	101	99	100

Organophosphorus Pesticides in Soil						
Our Reference		258622-6	258622-14	258622-28	258622-35	258622-76
Your Reference	UNITS	TP103	TP108	TP119	TP122	DUP106
Depth		0-0.2	0-0.2	0-0.2	0-0.2	-
Date Sampled		16.12.20	16.12.20	17.12.20	17.12.20	17.12.20
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	21/12/2020	21/12/2020	21/12/2020	21/12/2020	18/12/2020
Date analysed	-	21/12/2020	21/12/2020	21/12/2020	21/12/2020	18/12/2020
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
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
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
Chlorpyriphos	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	%	109	102	101	99	100

Envirolab Reference: 258622

PCBs in Soil						
Our Reference		258622-6	258622-14	258622-28	258622-35	258622-76
Your Reference	UNITS	TP103	TP108	TP119	TP122	DUP106
Depth		0-0.2	0-0.2	0-0.2	0-0.2	-
Date Sampled		16.12.20	16.12.20	17.12.20	17.12.20	17.12.20
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	21/12/2020	21/12/2020	21/12/2020	21/12/2020	18/12/2020
Date analysed	-	21/12/2020	21/12/2020	21/12/2020	21/12/2020	18/12/2020
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	%	109	102	101	99	100

Acid Extractable metals in soil						
Our Reference		258622-1	258622-2	258622-6	258622-8	258622-10
Your Reference	UNITS	TP101	TP101	TP103	TP105	TP106
Depth		0-0.2	0.5-0.8	0-0.2	0-0.2	0-0.1
Date Sampled		16/12/2020	16.12.20	16.12.20	16.12.20	16.12.20
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	22/12/2020	22/12/2020	22/12/2020	22/12/2020	22/12/2020
Date analysed	-	22/12/2020	22/12/2020	22/12/2020	22/12/2020	22/12/2020
Arsenic	mg/kg	[NA]	[NA]	6	[NA]	[NA]
Cadmium	mg/kg	[NA]	[NA]	<0.4	[NA]	[NA]
Chromium	mg/kg	[NA]	[NA]	14	[NA]	[NA]
Copper	mg/kg	[NA]	[NA]	18	[NA]	[NA]
Lead	mg/kg	16	34	58	30	8
Mercury	mg/kg	[NA]	[NA]	<0.1	[NA]	[NA]
Nickel	mg/kg	[NA]	[NA]	6	[NA]	[NA]
Zinc	mg/kg	[NA]	[NA]	130	[NA]	[NA]

Acid Extractable metals in soil						
Our Reference		258622-13	258622-14	258622-16	258622-17	258622-19
Your Reference	UNITS	TP107	TP108	TP109	TP110	TP112
Depth		0-0.2	0-0.2	0-0.2	0-0.2	0-0.2
Date Sampled		16.12.20	16.12.20	16.12.20	17.12.20	17.12.20
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	22/12/2020	22/12/2020	22/12/2020	22/12/2020	22/12/2020
Date analysed	-	22/12/2020	22/12/2020	22/12/2020	22/12/2020	22/12/2020
Arsenic	mg/kg	[NA]	7	[NA]		[NA]
Cadmium	mg/kg	[NA]	<0.4	[NA]		[NA]
Chromium	mg/kg	[NA]	16	[NA]		[NA]
Copper	mg/kg	[NA]	36	[NA]		[NA]
Lead	mg/kg	250	100	86	130	52
Mercury	mg/kg	[NA]	0.1	[NA]		[NA]
Nickel	mg/kg	[NA]	11	[NA]		[NA]
Zinc	mg/kg	[NA]	190	[NA]	[NA]	[NA]

Acid Extractable metals in soil						
Our Reference		258622-22	258622-28	258622-33	258622-35	258622-37
Your Reference	UNITS	TP114	TP119	TP121	TP122	TP123
Depth		0-0.1	0-0.2	0-0.2	0-0.2	0-0.2
Date Sampled		16.12.20	17.12.20	17.12.20	17.12.20	17.12.20
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	22/12/2020	22/12/2020	22/12/2020	22/12/2020	22/12/2020
Date analysed	-	22/12/2020	22/12/2020	22/12/2020	22/12/2020	22/12/2020
Arsenic	mg/kg	[NA]	4	[NA]	7	[NA]
Cadmium	mg/kg	[NA]	<0.4	[NA]	<0.4	[NA]
Chromium	mg/kg	[NA]	11	[NA]	16	[NA]
Copper	mg/kg	[NA]	14	[NA]	38	[NA]
Lead	mg/kg	90	43	89	190	190
Mercury	mg/kg	[NA]	<0.1	[NA]	0.4	[NA]
Nickel	mg/kg	[NA]	6	[NA]	9	[NA]
Zinc	mg/kg	[NA]	27	[NA]	140	[NA]

Acid Extractable metals in soil			
Our Reference		258622-39	258622-76
Your Reference	UNITS	TP125	DUP106
Depth		0-0.2	-
Date Sampled		17.12.20	17.12.20
Type of sample		soil	soil
Date prepared	-	22/12/2020	22/12/2020
Date analysed	-	22/12/2020	22/12/2020
Arsenic	mg/kg	[NA]	7
Cadmium	mg/kg	[NA]	<0.4
Chromium	mg/kg	[NA]	15
Copper	mg/kg	[NA]	41
Lead	mg/kg	120	160
Mercury	mg/kg	[NA]	0.3
Nickel	mg/kg	[NA]	8
Zinc	mg/kg	[NA]	130

Moisture						
Our Reference		258622-1	258622-2	258622-6	258622-8	258622-10
Your Reference	UNITS	TP101	TP101	TP103	TP105	TP106
Depth		0-0.2	0.5-0.8	0-0.2	0-0.2	0-0.1
Date Sampled		16/12/2020	16.12.20	16.12.20	16.12.20	16.12.20
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	21/12/2020	21/12/2020	21/12/2020	21/12/2020	21/12/2020
Date analysed	-	22/12/2020	22/12/2020	22/12/2020	22/12/2020	22/12/2020
Moisture	%	6.1	25	9.9	9.7	2.0

Moisture						
Our Reference		258622-13	258622-14	258622-16	258622-17	258622-19
Your Reference	UNITS	TP107	TP108	TP109	TP110	TP112
Depth		0-0.2	0-0.2	0-0.2	0-0.2	0-0.2
Date Sampled		16.12.20	16.12.20	16.12.20	17.12.20	17.12.20
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	21/12/2020	21/12/2020	21/12/2020	21/12/2020	21/12/2020
Date analysed	-	22/12/2020	22/12/2020	22/12/2020	22/12/2020	22/12/2020
Moisture	%	26	20	12	7.3	19

Moisture						
Our Reference		258622-22	258622-28	258622-33	258622-35	258622-37
Your Reference	UNITS	TP114	TP119	TP121	TP122	TP123
Depth		0-0.1	0-0.2	0-0.2	0-0.2	0-0.2
Date Sampled		16.12.20	17.12.20	17.12.20	17.12.20	17.12.20
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	21/12/2020	21/12/2020	21/12/2020	21/12/2020	21/12/2020
Date analysed	-	22/12/2020	22/12/2020	22/12/2020	22/12/2020	22/12/2020
Moisture	%	5.9	7.0	10	18	17

Moisture			
Our Reference		258622-39	258622-76
Your Reference	UNITS	TP125	DUP106
Depth		0-0.2	-
Date Sampled		17.12.20	17.12.20
Type of sample		soil	soil
Date prepared	-	21/12/2020	21/12/2020
Date analysed	-	22/12/2020	22/12/2020
Moisture	%	11	9.4

Asbestos ID - soils NEPM - ASB-001						
Our Reference		258622-1	258622-16	258622-19	258622-25	258622-27
Your Reference	UNITS	TP101	TP109	TP112	TP116	TP118
Depth		0-0.2	0-0.2	0-0.2	0-0.2	0-0.2
Date Sampled		16/12/2020	16.12.20	17.12.20	17.12.20	17.12.20
Type of sample		soil	soil	soil	soil	soil
Date analysed	-	21-22/12/2020	21-22/12/2020	21-22/12/2020	21-22/12/2020	21-22/12/2020
Sample mass tested	g	754.01	584.38	731.62	656.43	573.36
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	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*	-	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

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Asbestos ID - soils NEPM - ASB-001					
Our Reference		258622-33	258622-35	258622-37	258622-39
Your Reference	UNITS	TP121	TP122	TP123	TP125
Depth		0-0.2	0-0.2	0-0.2	0-0.2
Date Sampled		17.12.20	17.12.20	17.12.20	17.12.20
Type of sample		soil	soil	soil	soil
Date analysed	-	21-22/12/2020	21-22/12/2020	21-22/12/2020	21-22/12/2020
Sample mass tested	g	628.25	592.33	642.28	675.7
Sample Description	-	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	Chrysotile asbestos detected Organic fibres	No asbestos detected at reporting limit of 0.1g/kg
		Organic fibres detected	Organic fibres detected	detected	Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos ^{#1}	g/kg	<0.1	<0.1	0.6590	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	See Above	No visible asbestos detected
ACM >7mm Estimation*	g	_	_	0.4233	_
FA and AF Estimation*	g	_	_	-	_
ACM >7mm Estimation*	%(w/w)	<0.01	<0.01	0.0659	<0.01
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001

Asbestos ID - materials						
Our Reference		258622-42	258622-44	258622-45	258622-51	258622-55
Your Reference	UNITS	TP101 FCF1	TP109 FCF1	TP112 FCF1	TP116 FCF1	TP118 FCF1
Depth		0-0.8	0-0.4	0-0.4	0-0.6	0-0.4
Date Sampled		16.12.20	16.12.20	17.12.20	17/12/2020	17.12.20
Type of sample		soil	soil	soil	soil	soil
Date analysed	-	22/12/2020	22/12/2020	22/12/2020	22/12/2020	22/12/2020
Mass / Dimension of Sample	-	102x60x5mm	45x35x5mm	121x20x5mm	45x25x5mm	75x40x5mm
Sample Description	-	Grey fibre cement material	Grey fibre cement material	Grey fibre cement material	Grey fibre cement material	Grey fibre cement material
Asbestos ID in materials	-	Chrysotile asbestos detected	Chrysotile asbestos detected	Chrysotile asbestos detected	Chrysotile asbestos detected	Chrysotile asbestos detected
		Amosite asbestos detected			Amosite asbestos detected	Amosite asbestos detected
Trace Analysis	-	[NT]	[NT]	[NT]	[NT]	[NT]

Asbestos ID - materials					
Our Reference		258622-60	258622-62	258622-63	258622-71
Your Reference	UNITS	TP121 FCF1	TP122 FCF1	TP123 FCF1	TP125 FCF1
Depth		0-0.5	0-0.4	0-0.6	0-0.4
Date Sampled		17.12.20	17.12.20	17.12.20	17.12.20
Type of sample		soil	soil	soil	soil
Date analysed	-	22/12/2020	22/12/2020	22/12/2020	22/12/2020
Mass / Dimension of Sample	-	60x50x5mm	35x15x5mm	80x60x5mm	35x15x5mm
Sample Description	-	Grey fibre cement material			
Asbestos ID in materials	-	Chrysotile asbestos detected	Chrysotile asbestos detected	Chrysotile asbestos detected	Chrysotile asbestos detected
				Amosite asbestos detected	Amosite asbestos detected
					Crocidolite asbestos detected
Trace Analysis	-	[NT]	[NT]	[NT]	[NT]

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.

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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 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 "total="" 'eq="" +ve="" 2.="" 3.="" <pql="" a="" above.="" actually="" all="" and="" approach="" approaches="" are="" as="" assuming="" at="" be="" below="" between="" but="" calculation="" can="" conservative="" contribute="" contributing="" false="" give="" given="" half="" hence="" individual="" is="" least="" lowest="" may="" mid-point="" more="" most="" negative="" not="" note,="" of="" pahs="" pahs"="" pahs.<="" positive="" pql="" pql'values="" pql.="" present="" present.="" reflective="" reported="" simply="" stipulated="" sum="" susceptible="" td="" teq="" teqs="" that="" the="" therefore="" this="" to="" total="" when="" zero'values="" zero.=""></pql>
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.
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.

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QUALITY CONT	QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil								Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-9	258622-14	
Date extracted	-			21/12/2020	6	21/12/2020	21/12/2020		21/12/2020	21/12/2020	
Date analysed	-			21/12/2020	6	21/12/2020	21/12/2020		21/12/2020	21/12/2020	
TRH C ₆ - C ₉	mg/kg	25	Org-023	<25	6	<25	<25	0	90	79	
TRH C ₆ - C ₁₀	mg/kg	25	Org-023	<25	6	<25	<25	0	90	79	
Benzene	mg/kg	0.2	Org-023	<0.2	6	<0.2	<0.2	0	92	91	
Toluene	mg/kg	0.5	Org-023	<0.5	6	<0.5	<0.5	0	87	84	
Ethylbenzene	mg/kg	1	Org-023	<1	6	<1	<1	0	93	76	
m+p-xylene	mg/kg	2	Org-023	<2	6	<2	<2	0	90	73	
o-Xylene	mg/kg	1	Org-023	<1	6	<1	<1	0	87	70	
naphthalene	mg/kg	1	Org-023	<1	6	<1	<1	0	[NT]	[NT]	
Surrogate aaa-Trifluorotoluene	%		Org-023	97	6	90	83	8	92	93	

QUALITY CONT	ROL: vTRH	(C6-C10)	/BTEXN in Soil			Du	plicate		Spike Re	covery %
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	35	21/12/2020	21/12/2020			[NT]
Date analysed	-			[NT]	35	21/12/2020	21/12/2020			[NT]
TRH C ₆ - C ₉	mg/kg	25	Org-023	[NT]	35	<25	<25	0		[NT]
TRH C ₆ - C ₁₀	mg/kg	25	Org-023	[NT]	35	<25	<25	0		[NT]
Benzene	mg/kg	0.2	Org-023	[NT]	35	<0.2	<0.2	0		[NT]
Toluene	mg/kg	0.5	Org-023	[NT]	35	<0.5	<0.5	0		[NT]
Ethylbenzene	mg/kg	1	Org-023	[NT]	35	<1	<1	0		[NT]
m+p-xylene	mg/kg	2	Org-023	[NT]	35	<2	<2	0		[NT]
o-Xylene	mg/kg	1	Org-023	[NT]	35	<1	<1	0		[NT]
naphthalene	mg/kg	1	Org-023	[NT]	35	<1	<1	0		[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	35	93	83	11		[NT]

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QUALITY CO	NTROL: svT	RH (C10	-C40) in Soil			Du	plicate		Spike Re	covery %
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-9	258622-14
Date extracted	-			22/12/2020	6	21/12/2020	21/12/2020		21/12/2020	21/12/2020
Date analysed	-			22/12/2020	6	22/12/2020	22/12/2020		22/12/2020	22/12/2020
TRH C ₁₀ - C ₁₄	mg/kg	50	Org-020	<50	6	<50	<50	0	114	106
TRH C ₁₅ - C ₂₈	mg/kg	100	Org-020	<100	6	<100	<100	0	106	105
TRH C ₂₉ - C ₃₆	mg/kg	100	Org-020	<100	6	<100	<100	0	92	87
TRH >C ₁₀ -C ₁₆	mg/kg	50	Org-020	<50	6	<50	<50	0	114	106
TRH >C ₁₆ -C ₃₄	mg/kg	100	Org-020	<100	6	<100	<100	0	106	105
TRH >C ₃₄ -C ₄₀	mg/kg	100	Org-020	<100	6	<100	<100	0	92	87
Surrogate o-Terphenyl	%		Org-020	73	6	94	71	28	106	104

QUALITY CO	NTROL: svT	RH (C10	-C40) in Soil			Du	plicate		Spike Re	covery %
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	35	21/12/2020	21/12/2020			
Date analysed	-			[NT]	35	22/12/2020	22/12/2020			
TRH C ₁₀ - C ₁₄	mg/kg	50	Org-020	[NT]	35	<50	<50	0		
TRH C ₁₅ - C ₂₈	mg/kg	100	Org-020	[NT]	35	<100	<100	0		
TRH C ₂₉ - C ₃₆	mg/kg	100	Org-020	[NT]	35	<100	<100	0		
TRH >C ₁₀ -C ₁₆	mg/kg	50	Org-020	[NT]	35	<50	<50	0		
TRH >C ₁₆ -C ₃₄	mg/kg	100	Org-020	[NT]	35	<100	<100	0		
TRH >C ₃₄ -C ₄₀	mg/kg	100	Org-020	[NT]	35	<100	<100	0		
Surrogate o-Terphenyl	%		Org-020	[NT]	35	84	90	7		

QUALIT	Y CONTRO	L: PAHs	in Soil			Du	plicate		Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-9	258622-14	
Date extracted	-			21/12/2020	6	21/12/2020	21/12/2020		21/12/2020	21/12/2020	
Date analysed	-			21/12/2020	6	21/12/2020	21/12/2020		21/12/2020	21/12/2020	
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	90	83	
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]	
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	91	84	
Fluorene	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	102	95	
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	99	90	
Anthracene	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]	
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	96	92	
Pyrene	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	98	90	
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]	
Chrysene	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	118	119	
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	6	<0.2	<0.2	0	[NT]	[NT]	
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	6	<0.05	<0.05	0	108	102	
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]	
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]	
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]	
Surrogate p-Terphenyl-d14	%		Org-022/025	105	6	108	101	7	103	101	

QUALI	TY CONTRO	L: PAHs	in Soil			Du	plicate		Spike Re	covery %
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	35	21/12/2020	21/12/2020			[NT]
Date analysed	-			[NT]	35	21/12/2020	21/12/2020			[NT]
Naphthalene	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]
Fluorene	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]
Anthracene	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]
Pyrene	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]
Chrysene	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	[NT]	35	<0.2	<0.2	0		[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	[NT]	35	<0.05	<0.05	0		[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	35	96	101	5		[NT]

QUALITY C	QUALITY CONTROL: Organochlorine Pesticides in soil						plicate		Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-9	258622-14	
Date extracted	-			21/12/2020	6	21/12/2020	21/12/2020		21/12/2020	21/12/2020	
Date analysed	-			21/12/2020	6	21/12/2020	21/12/2020		21/12/2020	21/12/2020	
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	97	90	
НСВ	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]	
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	98	91	
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]	
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	97	91	
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]	
Aldrin	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	103	95	
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	103	95	
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]	
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]	
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]	
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	0.2	67	106	97	
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	99	95	
Endrin	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	102	96	
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]	
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	101	92	
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]	
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]	
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	88	74	
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]	
Surrogate TCMX	%		Org-022/025	105	6	109	103	6	106	102	

QUALITY C	ONTROL: Organo	chlorine F	Pesticides in soil			Du	plicate	Spike Recovery %			
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]	
Date extracted	-			[NT]	35	21/12/2020	21/12/2020			[NT]	
Date analysed	-			[NT]	35	21/12/2020	21/12/2020			[NT]	
alpha-BHC	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]	
НСВ	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]	
beta-BHC	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]	
gamma-BHC	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]	
Heptachlor	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]	
delta-BHC	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]	
Aldrin	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]	
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]	
gamma-Chlordane	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]	
alpha-chlordane	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]	
Endosulfan I	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]	
pp-DDE	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]	
Dieldrin	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]	
Endrin	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]	
Endosulfan II	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]	
pp-DDD	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]	
Endrin Aldehyde	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]	
pp-DDT	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]	
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]	
Methoxychlor	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]	
Surrogate TCMX	%		Org-022/025	[NT]	35	99	102	3		[NT]	

QUALITY CONTRO	Duplicate S _l						Spike Recovery %			
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-9	258622-14
Date extracted	-			21/12/2020	6	21/12/2020	21/12/2020		21/12/2020	21/12/2020
Date analysed	-			21/12/2020	6	21/12/2020	21/12/2020		21/12/2020	21/12/2020
Dichlorvos	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	96	73
Dimethoate	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	100	91
Fenitrothion	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	101	93
Malathion	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	124	106
Chlorpyriphos	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	101	93
Parathion	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	108	106
Bromophos-ethyl	mg/kg	0.1	Org-022	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	129	123
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	105	6	109	103	6	106	102

QUALITY CONTRO	L: Organoph	osphorus	s Pesticides in Soil			Du		Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	35	21/12/2020	21/12/2020			[NT]
Date analysed	-			[NT]	35	21/12/2020	21/12/2020			[NT]
Dichlorvos	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]
Dimethoate	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]
Diazinon	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]
Ronnel	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]
Fenitrothion	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]
Malathion	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]
Chlorpyriphos	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]
Parathion	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]
Bromophos-ethyl	mg/kg	0.1	Org-022	[NT]	35	<0.1	<0.1	0		[NT]
Ethion	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0		[NT]
Surrogate TCMX	%		Org-022/025	[NT]	35	99	102	3		[NT]

QUALIT	QUALITY CONTROL: PCBs in Soil								Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-9	258622-14
Date extracted	-			21/12/2020	6	21/12/2020	21/12/2020		21/12/2020	21/12/2020
Date analysed	-			21/12/2020	6	21/12/2020	21/12/2020		21/12/2020	21/12/2020
Aroclor 1016	mg/kg	0.1	Org-021	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	<0.1	6	<0.1	<0.1	0	100	80
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	105	6	109	103	6	106	102

QUALI	TY CONTRO	L: PCBs	in Soil		Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	35	21/12/2020	21/12/2020			[NT]
Date analysed	-			[NT]	35	21/12/2020	21/12/2020			[NT]
Aroclor 1016	mg/kg	0.1	Org-021	[NT]	35	<0.1	<0.1	0		[NT]
Aroclor 1221	mg/kg	0.1	Org-021	[NT]	35	<0.1	<0.1	0		[NT]
Aroclor 1232	mg/kg	0.1	Org-021	[NT]	35	<0.1	<0.1	0		[NT]
Aroclor 1242	mg/kg	0.1	Org-021	[NT]	35	<0.1	<0.1	0		[NT]
Aroclor 1248	mg/kg	0.1	Org-021	[NT]	35	<0.1	<0.1	0		[NT]
Aroclor 1254	mg/kg	0.1	Org-021	[NT]	35	<0.1	<0.1	0		[NT]
Aroclor 1260	mg/kg	0.1	Org-021	[NT]	35	<0.1	<0.1	0		[NT]
Surrogate TCMX	%		Org-021	[NT]	35	99	102	3		[NT]

QUALITY CONT	ROL: Acid E	xtractabl	e metals in soil			Du		Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-9	258622-14
Date prepared	-			22/12/2020	6	22/12/2020	22/12/2020		22/12/2020	22/12/2020
Date analysed	-			22/12/2020	6	22/12/2020	22/12/2020		22/12/2020	22/12/2020
Arsenic	mg/kg	4	Metals-020	<4	6	6	6	0	100	92
Cadmium	mg/kg	0.4	Metals-020	<0.4	6	<0.4	<0.4	0	100	81
Chromium	mg/kg	1	Metals-020	<1	6	14	14	0	98	94
Copper	mg/kg	1	Metals-020	<1	6	18	17	6	97	111
Lead	mg/kg	1	Metals-020	<1	6	58	54	7	97	109
Mercury	mg/kg	0.1	Metals-021	<0.1	6	<0.1	<0.1	0	115	76
Nickel	mg/kg	1	Metals-020	<1	6	6	6	0	97	89
Zinc	mg/kg	1	Metals-020	<1	6	130	120	8	100	#

QUALITY CONT	ROL: Acid E	xtractabl	e metals in soil			Du	Spike Recovery %			
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	35	22/12/2020	22/12/2020			[NT]
Date analysed	-			[NT]	35	22/12/2020	22/12/2020			[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	35	7	7	0		[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	35	<0.4	<0.4	0		[NT]
Chromium	mg/kg	1	Metals-020	[NT]	35	16	17	6		[NT]
Copper	mg/kg	1	Metals-020	[NT]	35	38	44	15		[NT]
Lead	mg/kg	1	Metals-020	[NT]	35	190	200	5		[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	35	0.4	0.4	0		[NT]
Nickel	mg/kg	1	Metals-020	[NT]	35	9	10	11		[NT]
Zinc	mg/kg	1	Metals-020	[NT]	35	140	150	7		[NT]

Result Definiti	ons
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	ol 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

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.

8 metals in soil - # Percent recovery is not possible to report due to the inhomogeneous nature of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

Envirolab Reference: 258622 Page | 27 of 27 R00



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SAMPLE RECEIPT ADVICE

Client Details	
Client	JK Environments
Attention	Brendan Page

Sample Login Details	
Your reference	E33438PL, Campbelltown
Envirolab Reference	258622
Date Sample Received	18/12/2020
Date Instructions Received	18/12/2020
Date Results Expected to be Reported	24/12/2020

Sample Condition	
Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	79 soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	18.2
Cooling Method	Ice
Sampling Date Provided	YES

Comments	
Nil	

Please direct any queries to:

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

Analysis Underway, details on the following page:



Envirolab Services Pty Ltd

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

Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBsin Soil	Acid Extractable metalsin soil	Asbestos ID - soils NEPM - ASB- 001	Asbestos ID - materials	On Hold
TP101-0-0.2							✓	✓		
TP101-0.5-0.8							✓			
TP101-0.8-1.0										✓
TP102-0-0.2										✓
TP102-0.4-0.6										✓
TP103-0-0.2	✓	✓	✓	✓	✓	✓	✓			
TP104-0-0.2										✓
TP105-0-0.2							✓			
TP105-0.5-0.7										✓
TP106-0-0.1							✓			
TP106-0.1-0.2										✓
TP106-0.4-0.6										✓
TP107-0-0.2							✓			
TP108-0-0.2	✓	✓	✓	✓	✓	✓	✓			
TP108-0.5-0.7										✓
TP109-0-0.2							✓	✓		
TP110-0-0.2							✓			
TP111-0-0.2										✓
TP112-0-0.2							✓	✓		
TP112-0.4-0.5										✓
TP113-0-0.2										✓
TP114-0-0.1							✓			
TP114-0.2-0.4										✓
TP115-0-0.2										✓
TP116-0-0.2								✓		
TP117-0-0.2										✓
TP118-0-0.2								✓		
TP119-0-0.2	✓	✓	✓	✓	✓	✓	✓			
TP119-0.5-0.7										✓
TP120-0-0.2										✓
TP120-0.2-0.4										✓
TP120-0.7-0.9										✓



Envirolab Services Pty Ltd

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Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBsin Soil	Acid Extractable metalsin soil	Asbestos ID - soils NEPM - ASB- 001	Asbestos ID - materials	On Hold
TP121-0-0.2							✓	✓		
TP121-0.5-0.7										✓
TP122-0-0.2	✓	✓	✓	✓	✓	✓	✓	✓		
TP122-0.4-0.6										✓
TP123-0-0.2							✓	✓		
TP124-0-0.2										✓
TP125-0-0.2							✓	✓		
TP126-0-0.2										✓
TP126-0.8-1.0										✓
TP101 FCF1-0-0.8									✓	
TP101 FCF2-0-0.8										✓
TP109 FCF1-0-0.4									✓	
TP112 FCF1-0-0.4									✓	
TP112 FCF2-0-0.4										✓
TP112 FCF3-0-0.4										✓
TP112 FCF4-0-0.4										✓
TP112 FCF5-0-0.4										✓
TP112 FCF6-0-0.4										✓
TP116 FCF1-0-0.6									✓	
TP116 FCF2-0-0.6										✓
TP116 FCF3-0-0.6										✓
TP116 FCF4-0-0.6										✓
TP118 FCF1-0-0.4									✓	
TP118 FCF2-0-0.4										✓
TP118 FCF3-0-0.4										✓
TP118 FCF4-0-0.4										✓
TP118 FCF5-0-0.4										✓
TP121 FCF1-0-0.5									✓	
TP121 FCF2-0-0.5										✓
TP122 FCF1-0-0.4									✓	
TP123 FCF1-0-0.6									✓	
TP123 FCF2-0-0.6										✓



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

Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBsin Soil	Acid Extractable metalsin soil	Asbestos ID - soils NEPM - ASB- 001	Asbestos ID - materials	On Hold
TP123 FCF3-0-0.6										✓
TP123 FCF4-0-0.6										✓
TP123 FCF5-0-0.6										✓
TP123 FCF6-0-0.6										✓
TP123 FCF7-0-0.6										✓
TP123 FCF8-0-0.6										✓
TP125 FCF1-0-0.4									✓	
DUP101										✓
DUP102										✓
DUP103										✓
DUP105										✓
DUP106	✓	✓	✓	✓	✓	✓	✓			
DUP107	✓									
TS-S1	✓									
TB-S1	✓									

The '\sqrt{'} 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.



<u>TO:</u> ENVIROLAB S	ERVICE	S PTY LTD		JKE Job		E33438PL					FRON	<u>1:</u>		•						
12 ASHLEY ST				Number:								_ I	KE	'nV		or	m	۱۵r	nts	ŀ
CHATSWOOD		2067		Data Baa		CTANDADD					DEAD						** *	ıCı	ILS	
P: (02) 99106 F: (02) 99106				Date Res Required		STANDARD	'					OF 11 QUARI			- 1					
(02, 55200.					•							9888		,		02-98		5001		
Attention: Ail	een			Page:		1 of 4					Atten	tion:				Brend				
													BPage	•				s.con	<u>ı.au</u>	\dashv
Location:	Campl	elltown				<u> </u>				5	ample	Prese			yp	n Ice				
Sampler:	CR	1	Γ	1		T			····	1		Test	s Req	uired	\perp					\dashv
Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 2	Combo 3a	Combo 6	Combo 6a	8 Metals	SHAA	ткн/втех	втех	Asbestos	(detection)	Asbestos	(NEPM 2013)	Lead	
16.12.20	1	TP101	0-0.2	G, A	0	Fill: Silty Clay				· If-							x	,	x	
16.12.20	٦	TP101	0.5-0.8	G, A	0	Fill: Silty Clay													х	
16.12.20	3	TP101	0.8-1.0	G	0	Silty Clay														
16.12.20	4	TP102	0-0.2	G, A	0 .4	Fill: Silty Clay														
16.12.20	5	TP102 -	05-0.7	G	/o	Silty Clay									П					
16.12.20	6	TP103	0-0.2	G, A	0	Fill: Silty Clay			x	6		l .	Ëerli	40100	Š	wice inty	Š			
16.12.20	7	TP104	0-0.2	G, A	0	Fill: Silty Clay			<u> </u>	EIV		©n	átswa Min: (och ji		1200 1200 1621	<u>ሃ</u> 77 ሴ			
16.12.20	8	TP105	0-0.2	G, A	Q	Fill: Silty Clay				Joh	No:		58			702			X	
16.12.20	9	TP105	0.5-0.7	G	0	Silty Clay				Dat	e Rec	eived			П	W2	<u>~</u>		-	П
16.12.20	10	TP106	0-0.1	G, A	0	Fill: Sandy Gravel		-		Tim	e Rec	eivec	k _	160	þ¢	>			X	
16.12.20	11	TP106	0.1-0.2	G, A	0	Fill: Silty Clay						BY:			П	18	٠2			
16.12.20	12	TP106	0.4-0.6	G	.0	Silty Clay				Cod	ling:	Ce K	epaci	D	D					
16.12.20	13	TP107	0-0.2	G, A	0	Fill: Silty Clay				Sec	urity:	· Current	y is rot	en/N	Dn	B			x	\Box
16.12.20	14	TP108	0-0.2	G, A	0	Fill: Silty Clay			x										_	
16.12.20	5	TP108	0.5-0.7	G	0	Silty Clay														
16.12.20	مال	TP109	0-0.2	G, A	0	Fill: Silty Clay											Х		x	
17.12.20	17	TP110	0-0.2	G, A	0	Fill: Silty Clay													x	
17.12.20	18	TP111	0-0.2	G, A	0	Fill: Silty Clay											7			
17.12.20	19	TP112	0-0.2	G, A	Ö	Fill: Silty Clay										Ļ	x	¥ 7	<u>Ŕ</u>	, 1
17.12.20	ක	TP112	0.4-0.5	G	0	Silty Clay														
16.12.20	4	TP113	0-0.2	G, A	0	Fill: Silty Clay												_		
16.12.20	27	TP114	0-0.1	G, A	0	Fill: Sandy Gravel									ļ.				X	
16,12.20		TP114	0.2-0.4	G, A	0	Fill: Silty Clay														
16.12.20	24	TP115	0-0.2	G, A	0	Fill: Silty Clay	L_			ļ						Ш		_ :		
17.12.20	25	TP116	0-0.2	G, A	0	Fill: Silty Clay					<u></u>						х			
Remarks (con			mits required):			G - 25	0mg plock												
Relinquished (By	otter		Date:	/n/.)OVO	Time	: 5:{<	ے ص			ived B	•	 پ			Date		2.2	0 č

TO: ENVIROLAB S 12 ASHLEY ST CHATSWOOD P: (02) 99106 F: (02) 99106 Attention: Ail			JKE Job Number: Date Res Required Page:	E33438PL STANDARD					REAR OF 115 WICKS RO MACQUARIE PARK, NSV P: 02-9888 5000 Attention:					W 2113 F: 02-9888 5001 Brendan Page nyironments.com.au					
Location:	Campl	elltown								S	ample				yon	lce			
Sampler:	CR	T .	ı					· · · · ·	_	Tests Required				uired	-	-т			
Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 2	Сотро За	Combo 6	Combo 6a	8 Metals	PAHs	TRH/BTEX	втех	Asbestos	(detection)	Asbestos (NEPM 2013)	Lead	
17.12.20	26	TP117	0-0.2	G, A	0	Fill: Silty Clay													
17.12.20	27	TP118	0-0.2	G, A	0	Fill: Silty Clay											x		
17.12.20	28	TP119	0-0.2	G	0	Fill: Silty Clay			х										
17.12,20	29	TP119	0.5-0.7	G	0	Silty Clay													
17.12.20	30	TP120	0-0.2	G, A	0	Fill: Gravelly Sand													
17.12.20	31	TP120	0.2-0.4	G, A	0	Fill: Silty Sandy Clay	-												
17.12.20	32	TP120	0.7-0.9	G	0	Silty Clay													
17.12.20	33	TP121	0-0.2	G, A	0	Fill: Silty Sandy Clay											X	х	
17.12.20	34	TP121	0.5-0.7	G	0	Silty Clay			•										
17.12.20	35	TP122	0-0.2	G, A	0	Fill: Silty Sandy Clay			х								x		
17.12.20	36	TP122	0.4-0.6	G	0	Silty Clay					-								
17.12.20	37	TP123	0-0.2	G, A	0	Fill: Silty Clay											x	х	
17.12.20	38	TP124	0-0.2	- G, A	0	Fill: Silty Sandy Clay	٠,												
17.12.20	39	TP125	0-0.2	G, A	0	Fill: Silty Clay											x ,	x	
17.12.20	40	TP126	0-0.2	` G, A	0	Fill: Silty Clay								-					
17.12.20	41	TP126	0.8-1.0	G, A	0.5	Silty Clay										7			
16.12.20	42	TP101 FCF1	0-0.8	А	-	Fragment									x				
16.12.20	43	TP101 FCF2	0-0.8	А	-	Fragment											-		
16.12.20	44	TP109 FCF1	0-0.4	Α	-	Fragment									х				
17.12.20	45	TP112 FCF1	0-0.4	Α	-	Fragment									x	1			
17.12.20	16	TP112 FCF2	0-0.4	А	-	Fragment										1			
17.12.20	42	TP112 FCF3	0-0.4	Α	- '	Fragment													
17.12.20	48	TP112 FCF4	0-0.4	Α	-	Fragment										1			
17.12.20	49	TP112 FCF5	0-0.4	А	-	Fragment										1			
17.12.20		TP112 FCF6	0-0.4	Α	-	Fragment	:												
Remarks (cor		detection li	mits required): Date:			G - 25 A - Zi	50mg plock astic I	ntaine Glass Asbes Bag	Jar				g Glas		2ح	2-2 Date:		· · · · · · · · · · · · · · · · · · ·
l l	,-			2000			l	(C O	0	Received By: Date: 18/12/18				12/10	>				

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TO: ENVIROLAB S 12 ASHLEY ST CHATSWOOD	REET			JKE Job Number:			E33438PL					JKEnvironi			nm	er	nts				
P: (02) 991062 F: (02) 991062	200			Date Resi Required		1	STANDARD					MAC	QUAR	IS WIC		w	2113				
Attention: Ail	een			Page:			3 of 4					ı	9888 tion:	BPage		-	02-98 Brend	lan P	age		
Location:	Campb	elitown			-			i			5	ample	Pres			_			COII	<u>ı.au</u>	
Sampler:	CR						- 1.						Test	s Req	uired						
Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	P	ID	Sample Description	Combo 2	Combo 3a	Combo 6	Combo 6a	8 Metals	PAHs	ткн/втех	втех	Achaetme	(detection)	Asbestos	(NEPM 2013)	Lead	
17.12.20	51	TP116 FCF1	0-0.6	А		-	Fragment									x					
17.12.20	52	TP116 FCF2	0-0.6	А		<u></u>	Fragment														
17.12.20	53	TP116 FCF3	0-0.6	Α		_	Fragment														
17.12.20	54	TP116 FCF4	0-0.6	А		-	Fragment														
17.12.20	55	TP118 FCF1	0-0.4	А		<u> </u>	Fragment									x					
17.12.20	57.	TP118 FCF2	0-0.4	А		Ī	Fragment		-							П					
17.12.20	57	TP118 FCF3	0-0.4	Α			Fragment														
17.12.20	58	TP118 FCF4	0-0.4	Α		<u> </u> 	Fragment														
17.12.20	59	TP118 FCF5	0-0.4	А			Fragment														
17.12.20	60	TP121 FCF1	0-0.5	Α			Fragment									x					
17.12.20	61	TP121 FCF2	0-0.5	А			Fragment									Г					
17.12.20	62	TP122 FCF1	0-0.4	А			Fragment									x					
17.12.20	63	TP123 FCF1	0-0.6	Α			Fragment									х					ı,
17.12.20	64	TP123 FCF2	0-0.6	А		1	Fragment														
17.12.20	65	TP123 FCF3	0-0.6	Α		-	Fragment														
17.12.20	66	TP123 FCF4	0-0.6	А		-	Fragment														
17.12.20	ř	TP123 FCF5	0-0.6	Α		-	Fragment														
17.12.20	7.	TP123 FCF6	0-0.6	А		-	Fragment														
17.12.20	69	TP123 FCF7	0-0.6	А		-	Fragment														
17.12.20	70	TP123 FCF8	0-0.6	Α			Fragment	_													
17.12.20	71	TP125 FCF1	0-0.4	Α			Fragment									x					
16.12.20	72	DUP101	-	G		-	Duplicate								:						
16.12.20	73	DUP102	-	G		-	Duplicate	^	، نمز												
16.12.20	79	DUP103 -	-	G		-	Duplicate										\prod				
16.12.20		DUP104	-	G		-	Duplicate			х	VIC					Γ			$\neg \uparrow$		
Remarks (con #### Send to	Envirol			s				G - 25 A - Zi P - Pl	astic E	Glass Asbes	Jar	os Bag 258622									
Relinquished	Ву:			Date:				Time	16	00		l	ved B	y: (201	не			Date	10	. 12 · 1	20

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TO: ENVIROLAB S 12 ASHLEY ST CHATSWOOD P: (02) 99106 F: (02) 99106	REET NSW 2 200 201			JKE Job Number: Date Res Required	ults	E33438PL STANDARD					JKEnvironm REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5					888 5001	Ĺ	
Attention: Ail	een			Page:		4 of 4	!		_		Atten	tion:	BPage		Bren	dan Page nents.cor		;
Location:	Campl	elltown								S	ample	Pres	erved	in Esk	on ice)		
Sampler:	CR	Γ	1									Test	s Req	uired				
Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 2	Combo 3a	Combo 6	Combo 6a	8 Metals	PAHS	ткн/втех	втех	Asbestos (detection)	Asbestos (NEPM 2013)	Lead	
17.12.20	75	DUP105	-	G	-	Duplicate												
17.12.20	76	DUP106	j	G	-	Duplicate			х									
17.12.20	77	DUP107	-	G	-	Duplicate								х				
16.12.20	78	TS-S1	-	V		Trip Spike	,							x		,		
16.12.20	79	TB-S1	-	G1		Trip Blank								x				
Remarks (con	nments	/detection lin	mits required):			G - 25	0mg	ntaine	lar		G1 -	150m	g Glas	s Jar			
Relinquished	Ву:			Date:			A - Zi; P - Pl; Time:	plock astic E	Asbes Bag		os Bag 258622 Received By: Date:							
							, ct	160	00	K-hore 18/12/			12/2	0				



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CERTIFICATE OF ANALYSIS 258622-A

Client Details	
Client	JK Environments
Attention	Brendan Page
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details	
Your Reference	E33438PL, Campbelltown
Number of Samples	79 soil
Date samples received	18/12/2020
Date completed instructions received	18/12/2020

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	08/01/2021
Date of Issue	07/01/2021
NATA Accreditation Number 2901. The	nis document shall not be reproduced except in full.
Accredited for compliance with ISO/IE	EC 17025 - Testing. Tests not covered by NATA are denoted with *

Asbestos Approved By

Analysed by Asbestos Approved Identifier: Panika Wongchanda Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By

Hannah Nguyen, Senior Chemist Loren Bardwell, Senior Chemist **Authorised By**

Nancy Zhang, Laboratory Manager

Acid Extractable metals in soil		
Our Reference		258622-A-36
Your Reference	UNITS	TP122
Depth		0.4-0.6
Date Sampled		17.12.20
Type of sample		soil
Date prepared	-	29/12/2020
Date analysed	-	29/12/2020
Lead	mg/kg	23

Envirolab Reference: 258622-A

Moisture		
Our Reference		258622-A-36
Your Reference	UNITS	TP122
Depth		0.4-0.6
Date Sampled		17.12.20
Type of sample		soil
Date prepared	-	29/12/2020
Date analysed	-	30/12/2020
Moisture	%	19

Envirolab Reference: 258622-A

Metals in TCLP USEPA1311						
Our Reference		258622-A-13	258622-A-17	258622-A-35	258622-A-37	258622-A-39
Your Reference	UNITS	TP107	TP110	TP122	TP123	TP125
Depth		0-0.2	0-0.2	0-0.2	0-0.2	0-0.2
Date Sampled		16.12.20	17.12.20	17.12.20	17.12.20	17.12.20
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	05/01/2021	05/01/2021	05/01/2021	05/01/2021	05/01/2021
Date analysed	-	05/01/2021	05/01/2021	05/01/2021	05/01/2021	05/01/2021
pH of soil for fluid# determ.	pH units	6.2	6.4	6.1	6.0	6.2
pH of soil TCLP (after HCl)	pH units	1.4	1.4	1.4	1.4	1.3
Extraction fluid used	-	[NT]	[NT]	[NT]	[NT]	[NT]
pH of final Leachate	pH units	5.0	5.0	5.0	5.0	4.9
Lead in TCLP	mg/L	<0.03	<0.03	<0.03	<0.03	<0.03

Envirolab Reference: 258622-A

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.
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-020 ICP-AES	Determination of various metals by ICP-AES.

Envirolab Reference: 258622-A Page | 5 of 9

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			29/12/2020	[NT]		[NT]	[NT]	29/12/2020	
Date analysed	-			29/12/2020	[NT]		[NT]	[NT]	29/12/2020	
Lead	mg/kg	1	Metals-020	<1	[NT]		[NT]	[NT]	104	

Envirolab Reference: 258622-A

QUALITY CONTROL: Metals in TCLP USEPA1311					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			05/01/2021	13	05/01/2021	05/01/2021		05/01/2021	[NT]
Date analysed	-			05/01/2021	13	05/01/2021	05/01/2021		05/01/2021	[NT]
Lead in TCLP	mg/L	0.03	Metals-020 ICP- AES	<0.03	13	<0.03	<0.03	0	86	[NT]

Envirolab Reference: 258622-A

Result Definiti	ons
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

Envirolab Reference: 258622-A

Quality Control	ol 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.

Envirolab Reference: 258622-A Page | 9 of 9



Envirolab Services Pty Ltd
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12 Ashley St Chatswood NSW 2067
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SAMPLE RECEIPT ADVICE

Client Details	
Client	JK Environments
Attention	Brendan Page

Sample Login Details	
Your reference	E33438PL, Campbelltown
Envirolab Reference	258622-A
Date Sample Received	18/12/2020
Date Instructions Received	18/12/2020
Date Results Expected to be Reported	08/01/2021

Sample Condition	
Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	79 soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	18.2
Cooling Method	Ice
Sampling Date Provided	YES

Comments	
Nil	

Please direct any queries to:

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

Analysis Underway, details on the following page:

ENVIROLAB GROUP ENVIROLAB GROUP LABTEC

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

Sample ID	Acid Extractable metalsin soil	pH of soil for fluid#determ.	pH of soil TCLP (after HCI)	Extraction fluid used	pH of final Leachate	Lead in TCLP	On Hold
TP101-0-0.2							✓
TP101-0.5-0.8							✓
TP101-0.8-1.0							✓
TP102-0-0.2							✓ ✓ ✓
TP102-0.4-0.6							✓
TP103-0-0.2							✓
TP104-0-0.2							✓
TP105-0-0.2							✓
TP105-0.5-0.7							✓
TP106-0-0.1							✓
TP106-0.1-0.2							✓
TP106-0.4-0.6							✓
TP107-0-0.2		✓	✓	✓	✓	✓	
TP108-0-0.2							✓
TP108-0.5-0.7							✓
TP109-0-0.2							✓
TP110-0-0.2		✓	✓	✓	✓	✓	
TP111-0-0.2							✓
TP112-0-0.2							✓
TP112-0.4-0.5							✓
TP113-0-0.2							✓
TP114-0-0.1							✓
TP114-0.2-0.4							✓
TP115-0-0.2							✓
TP116-0-0.2							✓
TP117-0-0.2							✓
TP118-0-0.2							✓
TP119-0-0.2							✓
TP119-0.5-0.7							✓
TP120-0-0.2							✓
TP120-0.2-0.4							✓
TP120-0.7-0.9							✓

ENVIROLAB EMPL ALABTEC

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

Sample ID	Acid Extractable metalsin soil	pH of soil for fluid#determ.	pH of soil TCLP (after HCI)	Extraction fluid used	pH of final Leachate	Lead in TCLP	On Hold
TP121-0-0.2							✓
TP121-0.5-0.7							✓
TP122-0-0.2		✓	✓	✓	✓	✓	
TP122-0.4-0.6	✓						
TP123-0-0.2		✓	✓	✓	✓	✓	
TP124-0-0.2							✓
TP125-0-0.2		✓	✓	✓	✓	✓	
TP126-0-0.2							✓
TP126-0.8-1.0							✓
TP101 FCF1-0-0.8							✓
TP101 FCF2-0-0.8							✓
TP109 FCF1-0-0.4							✓
TP112 FCF1-0-0.4							✓ ✓ ✓
TP112 FCF2-0-0.4							✓
TP112 FCF3-0-0.4							✓
TP112 FCF4-0-0.4							✓ ✓ ✓
TP112 FCF5-0-0.4							✓
TP112 FCF6-0-0.4							
TP116 FCF1-0-0.6							✓
TP116 FCF2-0-0.6							✓
TP116 FCF3-0-0.6							✓
TP116 FCF4-0-0.6							✓
TP118 FCF1-0-0.4							✓
TP118 FCF2-0-0.4							✓
TP118 FCF3-0-0.4							✓
TP118 FCF4-0-0.4							✓
TP118 FCF5-0-0.4							✓
TP121 FCF1-0-0.5							✓
TP121 FCF2-0-0.5							✓
TP122 FCF1-0-0.4							✓
TP123 FCF1-0-0.6							✓
TP123 FCF2-0-0.6							✓



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

Sample ID	Acid Extractable metalsin soil	pH of soil for fluid#determ.	pH of soil TCLP (after HCI)	Extraction fluid used	pH of final Leachate	Lead in TCLP	On Hold
TP123 FCF3-0-0.6							✓
TP123 FCF4-0-0.6							√
TP123 FCF5-0-0.6							
TP123 FCF6-0-0.6							✓
TP123 FCF7-0-0.6							✓
TP123 FCF8-0-0.6							✓
TP125 FCF1-0-0.4							✓
DUP101							✓
DUP102							✓
DUP103							✓
DUP105							✓
DUP106							✓
DUP107							✓
TS-S1							✓
TB-S1							$ \checkmark $

The 'V' 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.

Jessica Hie

From:

Brendan Page <BPage@jkenvironments.com.au>

Sent:

Thursday, 24 December 2020 10:59 AM

To:

Samplereceipt

Subject:

Additional Analysis for Registration 258622 E33438PL, Campbelltown

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,

Could we please order the following additional analyses on these samples (standard TAT):

- TP107 0-0.2, TCLP lead ー いる
- TP110 0-0.2, TCLP lead □
- TP122 0-0.2, TCLP lead -35
- TP123 0-0.2, TCLP lead ~ 37.
- TP125 0-0.2, TCLP lead 39.

• TP122 0.4-0.6, lead only (no TCLP) - 36

258622-A

Due 8/1/21

Sta TAT.

Thank you. Have a great Christmas!

Regards

Brendan Page

Principal Associate | Environmental Scientist

CEnvP (Site Contamination Specialist)

We would like to take this opportunity to wish all our clients and suppliers Seasons Greetings. Thank you all for contributing to yet another great year for the JK Group. Our office will be closed from 5pm on Thursday 24th December 2020 and will reopen on Monday 4th January 2021.

JK Group are now predominantly working from our office. Please contact us by mobile phone rather than landline as some staff are still working from home.



T: +612 9888 5000

PO Box 976

D: 0424 193 922

NORTH RYDE BC NSW 1670

E: BPage@jkenvironments.com.au

115 Wicks Road

www.jkenvironments.com.au

MACQUARIE PARK NSW 2113

JKEnvironments

This email and any attachments are confidential and may be privileged in which case neither is intended to be waived. If you have received this message in error, please notify us and remove it from your system. It is your responsibility to check any attachments for viruses and defects before opening or sending them on. At the Company's discretion we may send a paper copy for confirmation. In the event of any discrepancy between paper and electronic versions the paper version is to take precedence.

From: Nancy Zhang <NZhang@envirolab.com.au>
Sent: Thursday, 24 December 2020 10:09 AM

To: Brendan Page <BPage@jkenvironments.com.au>

Subject: Results for Registration 258622 E33438PL, Campbelltown

Please refer to attached for: a copy of the Certificate of Analysis



Envirolab Services Pty Ltd

ABN 37 112 535 645 - 002 25 Research Drive Croydon South VIC 3136 ph 03 9763 2500 fax 03 9763 2633 melbourne@envirolab.com.au www.envirolab.com.au

CERTIFICATE OF ANALYSIS 23908

Client Details	
Client	JK Environments
Attention	Brendan Page
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details	
Your Reference	E33438PL - Campbelltown
Number of Samples	1 Soil
Date samples received	22/12/2020
Date completed instructions received	22/12/2020

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	31/12/2020
Date of Issue	30/12/2020
NATA Accreditation Number 2901. Thi	s document shall not be reproduced except in full.
Accredited for compliance with ISO/IE	C 17025 - Testing. Tests not covered by NATA are denoted with *

TECHNICAL COMPETENCE

Results Approved By

Chris De Luca, Operations Manager

Authorised By

Pamela Adams, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil		
Our Reference		23908-1
Your Reference	UNITS	DUP104
Date Sampled		16/12/2020
Type of sample		Soil
Date extracted	-	23/12/2020
Date analysed	-	23/12/2020
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	%	97

TRH Soil C10-C40 NEPM		
Our Reference		23908-1
Your Reference	UNITS	DUP104
Date Sampled		16/12/2020
Type of sample		Soil
Date extracted	-	23/12/2020
Date analysed	-	24/12/2020
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 >C10 -C16	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	%	81

PAHs in Soil		
Our Reference		23908-1
Your Reference	UNITS	DUP104
Date Sampled		16/12/2020
Type of sample		Soil
Date extracted	-	23/12/2020
Date analysed	-	25/12/2020
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	<0.1
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	<0.5
Benzo(a)pyrene TEQ calc (Half)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc (PQL)	mg/kg	<0.5
Surrogate p-Terphenyl-d ₁₄	%	112

OCP in Soil		
Our Reference		23908-1
Your Reference	UNITS	DUP104
Date Sampled		16/12/2020
Type of sample		Soil
Date extracted	-	23/12/2020
Date analysed	-	25/12/2020
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	%	90

OP in Soil		
Our Reference		23908-1
Your Reference	UNITS	DUP104
Date Sampled		16/12/2020
Type of sample		Soil
Date extracted	-	23/12/2020
Date analysed	-	25/12/2020
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	%	90

PCBs in Soil		
Our Reference		23908-1
Your Reference	UNITS	DUP104
Date Sampled		16/12/2020
Type of sample		Soil
Date extracted	-	23/12/2020
Date analysed	-	25/12/2020
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	%	112

Acid Extractable metals in soil		
Our Reference		23908-1
Your Reference	UNITS	DUP104
Date Sampled		16/12/2020
Type of sample		Soil
Date digested	-	24/12/2020
Date analysed	-	24/12/2020
Arsenic	mg/kg	5
Cadmium	mg/kg	<0.4
Chromium	mg/kg	14
Copper	mg/kg	20
Lead	mg/kg	55
Mercury	mg/kg	0.1
Nickel	mg/kg	9
Zinc	mg/kg	120

Moisture		
Our Reference		23908-1
Your Reference	UNITS	DUP104
Date Sampled		16/12/2020
Type of sample		Soil
Date prepared	-	23/12/2020
Date analysed	-	24/12/2020
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-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 'eq="" +ve="" 2.="" 3.="" <pql="" a="" above.="" actually="" all="" and="" approach="" approaches="" are="" as="" assuming="" at="" be="" below="" between="" but="" calculation="" can="" conservative="" contribute="" contributing="" false="" give="" given="" half="" hence="" individual="" is="" least="" lowest="" may="" mid-point="" more="" most="" negative="" not="" note,="" of="" pahs="" pahs"="" pahs.<="" positive="" pql="" pql'values="" pql.="" present="" present.="" reflective="" reported="" simply="" stipulated="" sum="" susceptible="" td="" teq="" teqs="" that="" the="" therefore"="" this="" to="" total="" when="" zero'values="" zero.=""></pql>
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 CONT	ROL: vTRH	(C6-C10)	/BTEXN in Soil		Duplicate				Spike Re	Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]	
Date extracted	-			23/12/2020	[NT]		[NT]	[NT]	23/12/2020		
Date analysed	-			23/12/2020	[NT]		[NT]	[NT]	23/12/2020		
vTRH C ₆ - C ₉	mg/kg	25	Org-023	<25	[NT]		[NT]	[NT]	99		
vTRH C ₆ - C ₁₀	mg/kg	25	Org-023	<25	[NT]		[NT]	[NT]	99		
Benzene	mg/kg	0.2	Org-023	<0.2	[NT]		[NT]	[NT]	92		
Toluene	mg/kg	0.5	Org-023	<0.5	[NT]		[NT]	[NT]	97		
Ethylbenzene	mg/kg	1	Org-023	<1	[NT]		[NT]	[NT]	99		
m+p-xylene	mg/kg	2	Org-023	<2	[NT]		[NT]	[NT]	103		
o-Xylene	mg/kg	1	Org-023	<1	[NT]		[NT]	[NT]	100		
Naphthalene	mg/kg	1	Org-023	<1	[NT]		[NT]	[NT]	[NT]		
Surrogate aaa-Trifluorotoluene	%		Org-023	103	[NT]		[NT]	[NT]	102		

QUALITY COM	NTROL: TRI	Soil C10	C40 NEPM			Du		Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			23/12/2020	1	23/12/2020	23/12/2020		23/12/2020	
Date analysed	-			24/12/2020	1	24/12/2020	24/12/2020		24/12/2020	
TRH C ₁₀ - C ₁₄	mg/kg	50	Org-020	<50	1	<50	<50	0	67	
TRH C ₁₅ - C ₂₈	mg/kg	100	Org-020	<100	1	<100	<100	0	75	
TRH C ₂₉ - C ₃₆	mg/kg	100	Org-020	<100	1	<100	<100	0	80	
TRH >C ₁₀ -C ₁₆	mg/kg	50	Org-020	<50	1	<50	<50	0	67	
TRH >C ₁₆ -C ₃₄	mg/kg	100	Org-020	<100	1	<100	<100	0	75	
TRH >C ₃₄ -C ₄₀	mg/kg	100	Org-020	<100	1	<100	<100	0	80	
Surrogate o-Terphenyl	%		Org-020	83	1	81	81	0	80	

QUA	LITY CONTRO	L: PAHs	in Soil			Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]	
Date extracted	-			23/12/2020	[NT]		[NT]	[NT]	23/12/2020		
Date analysed	-			25/12/2020	[NT]		[NT]	[NT]	25/12/2020		
Naphthalene	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	100		
Acenaphthylene	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	106		
Acenaphthene	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	[NT]		
Fluorene	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	102		
Phenanthrene	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	106		
Anthracene	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	[NT]		
Fluoranthene	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	102		
Pyrene	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	106		
Benzo(a)anthracene	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	[NT]		
Chrysene	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	100		
Benzo(b,j&k)fluoranthene	mg/kg	0.2	Org-022	<0.2	[NT]		[NT]	[NT]	[NT]		
Benzo(a)pyrene	mg/kg	0.05	Org-022	<0.05	[NT]		[NT]	[NT]	102		
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	[NT]		
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	[NT]		
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	[NT]		
Surrogate p-Terphenyl-d ₁₄	%		Org-022	128	[NT]		[NT]	[NT]	106		

QUA	LITY CONTRO	DL: OCP i	n Soil			Du	plicate		Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]	
Date extracted	-			23/12/2020	[NT]		[NT]	[NT]	23/12/2020		
Date analysed	-			25/12/2020	[NT]		[NT]	[NT]	25/12/2020		
alpha-BHC	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	100		
Hexachlorobenzene	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	[NT]		
beta-BHC	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	96		
gamma-BHC	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	[NT]		
Heptachlor	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	88		
delta-BHC	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	[NT]		
Aldrin	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	104		
Heptachlor Epoxide	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	96		
gamma-Chlordane	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	98		
alpha-chlordane	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	[NT]		
Endosulfan I	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	[NT]		
pp-DDE	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	104		
Dieldrin	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	102		
Endrin	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	[NT]		
Endosulfan II	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	[NT]		
pp-DDD	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	138		
Endrin Aldehyde	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	[NT]		
pp-DDT	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	[NT]		
Endosulfan Sulphate	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	106		
Methoxychlor	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	[NT]		
Surrogate 2-chlorophenol-d4	%		Org-022	98	[NT]		[NT]	[NT]	92		

QUA	LITY CONTR	OL: OP ir	Soil			Du	plicate	Spike Recovery %			
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	23908-1	
Date extracted	-			23/12/2020	1	23/12/2020	23/12/2020		23/12/2020	23/12/2020	
Date analysed	-			25/12/2020	1	25/12/2020	25/12/2020		25/12/2020	25/12/2020	
Azinphos-methyl	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]	
Bromophos-ethyl	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]	
Chlorpyrifos	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	100	109	
Chlorpyrifos-methyl	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]	
Diazinon	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]	
Dichlorovos	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]	
Dimethoate	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]	
Ethion	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	128	139	
Fenitrothion	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	128	127	
Malathion	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]	
Parathion	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]	
Ronnel	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]	
Surrogate 2-chlorophenol-d4	%		Org-022	98	1	90	94	4	92	86	

QUALIT	Y CONTRO	L: PCBs	in Soil		Duplicate Sp					covery %
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			23/12/2020	[NT]		[NT]	[NT]	23/12/2020	
Date analysed	-			25/12/2020	[NT]		[NT]	[NT]	25/12/2020	
Aroclor 1016	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	[NT]	
Aroclor 1221	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	[NT]	
Aroclor 1232	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	[NT]	
Aroclor 1242	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	[NT]	
Aroclor 1248	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	[NT]	
Aroclor 1254	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	90	
Aroclor 1260	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	[NT]	
Surrogate 2-fluorobiphenyl	%		Org-022	114	[NT]	[NT]	[NT]	[NT]	104	[NT]

QUALITY CONT	ROL: Acid E	xtractabl	e metals in soil		Duplicate					covery %
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date digested	-			24/12/2020	[NT]		[NT]	[NT]	24/12/2020	
Date analysed	-			24/12/2020	[NT]		[NT]	[NT]	24/12/2020	
Arsenic	mg/kg	4	Metals-020 ICP- AES	<4	[NT]		[NT]	[NT]	98	
Cadmium	mg/kg	0.4	Metals-020 ICP- AES	<0.4	[NT]		[NT]	[NT]	97	
Chromium	mg/kg	1	Metals-020 ICP- AES	<1	[NT]		[NT]	[NT]	96	
Copper	mg/kg	1	Metals-020 ICP- AES	<1	[NT]		[NT]	[NT]	99	
Lead	mg/kg	1	Metals-020 ICP- AES	<1	[NT]		[NT]	[NT]	97	
Mercury	mg/kg	0.1	Metals-021 CV-AAS	<0.1	[NT]		[NT]	[NT]	104	
Nickel	mg/kg	1	Metals-020 ICP- AES	<1	[NT]		[NT]	[NT]	95	
Zinc	mg/kg	1	Metals-020 ICP- AES	<1	[NT]		[NT]	[NT]	96	

Result Definiti	ons
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 Contro	ol 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.

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Envirolab Services Pty Ltd

ABN 37 112 535 645 - 002 25 Research Drive Croydon South VIC 3136 ph 03 9763 2500 fax 03 9763 2633 melbourne@envirolab.com.au www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details	
Client	JK Environments
Attention	Brendan Page

Sample Login Details								
Your reference	E33438PL - Campbelltown							
Envirolab Reference	23908							
Date Sample Received	22/12/2020							
Date Instructions Received	22/12/2020							
Date Results Expected to be Reported	31/12/2020							

Sample Condition	
Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	1 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	15.3
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments	
Nil	

Please direct any queries to:

Pamela Adams	Chris De Luca
Phone: 03 9763 2500	Phone: 03 9763 2500
Fax: 03 9763 2633	Fax: 03 9763 2633
Email: padams@envirolab.com.au	Email: cdeluca@envirolab.com.au

Analysis Underway, details on the following page:



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Sample ID	vTRH(C6-C10)/BTEXN in Soil	TRH Soil C10-C40 NEPM	PAHs in Soil	OCP in Soil	OP in Soil	PCBsin Soil	Acid Extractable metalsin soil
DUP104	✓	✓	✓	✓	✓	✓	✓

The '\sqrt{'} 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 FROM: E33438PL ENVIROLAB SERVICES PTY LTD JKE Job Number-12 ASHLEY STREET **JK**Environments CHATSWOOD NSW 2067 STANDARD REAR OF 115 WICKS ROAD P: (02) 99106200 Date Results MACQUARIE PARK, NSW 2113 F: (02) 99106201 Required: P: 02-9888 5000 F: 02-9888 5001 3 of 4 Brendan Page

BPage@ikenvironments.com.au Attention: Aileen Page: Attention: Sample Preserved in Esky on ice Location: Campbelitown Tests Required Sampler: CR Asbestos (NEPM 2013) Sample Description Compo 2 (detection) Combo 3a Сотро ба TRH/BTEX Sample Container 8 Metals Сошро (PAHS Sample Date Lab BTEX ead Depth (m) PID Sampled Ref: Number Fragment 17.12.20 TP116 FCF1 0-0.6 52 TP116 FCF2 Α _ Fragment 0-0.6 17.12.20 Α *5*3 Fragment TP116 FCF3 17.12.20 0-0.6 Α _ Fragment TP116 FCF4 17.12.20 A -Fraement 17.12.20 TP118 FCF1 0-0.4 Fragment 57. Α TP118 FCF2 17.12.20 Α 57 _ **Fragment** TP118 FCF3 0-0.4 17.12.20 58 Α Fragment TP118 FCF4 0-0.4 17.12.20 59 Α _ Fragment TP118 FCF5 17,12.20 Α _ Fragment 17.12.20 TP121 FCF1 0-0.5 -<u>-</u> Α Fragment 61 17.12.20 TP121 FCF2 Α Fragment 62 TP122 FCF1 0-0.4 17.12.20 TP123 FCF1 Fragment 63 17.12.20 ⁻ 0.0.6 Α _ Fragment TP123 FCF2 0-0.6 17.12.20 65 Α Fragment TP123 FCF3 0-0.6 17.12.20 Α Fragment 17.12.20 66 TP123 FCF4 Α 6ス | TP123 FCF5 -Fragment 17.12.20 Α 68 Fragment TP123 FCF6 0-0.6 17.12.20 Α _ Fragment TP123 FCF7 17.12.20 Α Fragment 70 TP123 FCF8 17.12.20 0-0.6 71 Α _ Fragment TP125 FCF1 17.12.20 72 ; G Duplicate DUP101 16.12.20 73 G Duplicate DUP102 16,12,20 74 G Duplicate DUP103 -16.12.20 G Duplicate 16.12.20 : #### DUP104 vic Remarks (comments/detection limits required): Sample Containers: G - 250mg Glass Jar G1 - 150mg Glass Jar #### Send to Envirolab VIC for Interlab Analysis A - Zipłock Asbestos Bag P - Plastic Bag Received By: Relinquished By: 12.20 C-MUlenze K-LIPE ELS SHU 1600 1800 EŃVĨŘOLÀB 25 Research Drive Croydon South VIC 3136 Ph: (03) 9763 2500 Job No: 23908

Date Received: 22/12/10
Time Received: 2 PW
Received By: G 5
Temp: Cool/Ambient
Cooling: Ice/Icepack

Security: Intect/Broken/None



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)¹² methods and those described in *Environmental Sampling and Analysis, A Practical Guide*, (1991)¹³. 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. <u>Precision</u>

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 handing 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;



¹² US EPA, (1994). SW-846: Test Methods for Evaluating Solid Waste, Physical/Chemical Methods. (US EPA SW-846)

¹³ 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. <u>Comparability</u>

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%.

(Spike Sample Result – Sample Result) x 100 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. <u>Duplicates</u>

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 5.1 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.

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:

Sample Type	Sample Identification	Frequency (of Sample Type)	Analysis Performed
Intra-laboratory duplicate (soil)	DUP106 (primary sample TP122 0-0.2m)	Approximately 25% of primary samples	Heavy metals, TRH/BTEX, PAHs, OCPs, OPPs and PCBs
Intra-laboratory duplicate (soil)	DUP107 (primary sample TP125 0-0.2m)	As above	Lead/BTEX (scheduling error)
Inter-laboratory duplicate (soil)	DUP104 (primary sample TP108 0-0.2m)	Approximately 25% of primary samples	Heavy metals, TRH/BTEX, PAHs, OCPs, OPPs and PCBs
Trip spike (soil)	TS-S1 (16 December 2020)	One for the investigation to demonstrate adequacy of preservation, storage and transport methods	ВТЕХ
Trip blank (soil)	TB-S1 (16 December 2020)	One for the investigation to demonstrate adequacy of storage and transport methods	BTEX

The results for the field QA/QC samples are detailed in the laboratory summary Table Q1 attached to the investigation report and are discussed in the subsequent sections of this Data (QA/QC) Evaluation report.

It is noted that a scheduling error caused DUP107 to be scheduled and analysed for BTEX instead of lead. RPD results for this analysis have not been tabulated. It is noted that all BTEX results reported for DUP107 were below the laboratory PQL.





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

Acceptable targets for field blank 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. <u>Sample Collection, Storage, Transport and Analysis</u>

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 generally specified holding times in accordance with Schedule B(3) of NEPM (2013) and the laboratory NATA accredited methodologies. 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.

JKE note that the temperature on receipt of soil samples was reported to be up to 18.2°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 100% to 122%.

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.

2. <u>Laboratory PQLs</u>

Appropriate PQLs were adopted for the analysis and all PQLs were below the SAC.

3. Field QA/QC Sample Results

Field Duplicates

The results indicated that field precision was acceptable. RPD non-conformances were reported for benzo(a)pyrene, arsenic, copper, lead and zinc in DUP104/TP108 (0-0.2m). Values outside the acceptable limits have been attributed to sample heterogeneity and the difficulties associated with obtaining homogenous duplicate samples of heterogeneous matrices. 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.

Field/Trip Blanks

During the investigation, one soil trip blank was placed in the esky during sampling and transported back to the laboratory. The results were all less than the PQLs, therefore cross contamination between samples that may have significance for data validity did not occur.





Trip Spikes

The results ranged from 100% to 122% and indicated that field preservation methods were appropriate.

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-conformance in Envirolab report 258622:

• The percent recovery was not possible to report due to the inhomogeneous nature of the element/s in the sample/s. However, an acceptable recovery was obtained for the laboratory control sample.

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.



Appendix G: UCL Calculation Sheets



TABLE ST1 LEAD SOIL LABORATORY RESULTS FOR STATISTICAL ANALYSIS All data in mg/kg unless stated otherwise

			Lead
PQL - Envirolab Serv		1	
Sample Reference	Sample Depth	Sample Description	
BH2	0-0.2	Fill: Silty clay	93
BH3	0-0.2	Fill: Silty clay	60
BH4	0.1-0.2	Fill: Silty clay	120
BH8	0-0.2	Fill: Silty clay	37
ВН9	0-0.2	Fill: Silty clay	61
TP101	0-0.2	F: Silty clay	16
TP101	0.5-0.8	F: Silty clay	34
TP103	0-0.2	F: Silty clay	58
TP105	0-0.2	F: Silty clay	30
TP106	0-0.1	F: Sandy gravel	8
TP107	0-0.2	F: Silty clay	250
TP108	0-0.2	F: Silty clay	100
TP109	0-0.2	F: Silty clay	86
TP110	0-0.2	F: Silty clay	130
TP112	0-0.2	F: Silty clay	52
TP114	0-0.1	F: Sandy gravel	90
TP119	0-0.2	F: Silty clay	43
TP121	0-0.2	F: Silty sandy clay	89
TP122	0-0.2	F: Silty sandy clay	190
TP122	0.4-0.6	Silty clay	19
TP123	0-0.2	F: Silty clay	190
TP125	0-0.2	F: Silty clay	120
Total Number of Sa	mples		22
Maximum Value			250

	Α	В	С	D	E UCL Statis	F	G ensored Full	H Data Sate	I	J	K	L
1					OCL Statis	sucs for Office	ensored Full	Data Sets				
2	User Selected Options											
3	D:	Date/Time of Computation ProUCL 5.122/01/2021 1:51:05 PM										
4	From File WorkSheet.xls											
5		Fu	Il Precision	OFF	AIS .							
6		Confidence		95%								
7	Number	of Bootstrap		2000								
8	Turribor	Ог Воогонар	Орогацопо	2000								
9	Lead											
10												
11 12						General	Statistics					
13	Total Number of Observations 22 Number of Distinct Observations 20											
14									Numbe	r of Missing (Observations	0
15					Minimum	8					Mean	85.27
16					Maximum	250					Median	73.5
17					SD	62.43				Std. E	rror of Mean	13.31
18				Coefficient	of Variation	0.732					Skewness	1.137
19						<u>I</u>	<u> </u>					
20						Normal (GOF Test					
21	Shapiro Wilk Test Statistic 0.903 Shapiro Wilk GOF Test											
22		5% Shapiro Wilk Critical Value							=	5% Significa		
23	Lilliefors Test Statistic					0.151			Lilliefors	GOF Test		
24			5	5% Lilliefors C	ritical Value	0.184		Data appe	ar Normal a	nt 5% Signific	ance Level	
25	Data appear Approximate Normal at 5% Significance Level											
26												
27					As	suming Norr	nal Distributi	ion				
28			95% N	ormal UCL				95%	UCLs (Adju	sted for Ske	wness)	
29				95% Stud	dent's-t UCL	108.2		(95% Adjuste	ed-CLT UCL	(Chen-1995)	110.6
30									95% Modifi	ed-t UCL (Jo	hnson-1978)	108.7
31												
32						Gamma (GOF Test					
33				A-D T	est Statistic	0.152		Ander	son-Darling	Gamma GC	F Test	
34				5% A-D C	ritical Value	0.757	Detected	d data appea	r Gamma D	istributed at	5% Significand	e Level
35				K-S T	est Statistic	0.102	Kolmogorov-Smirnov Gamma GOF Test					-
36				5% K-S C	ritical Value	0.188	Detected data appear Gamma Distributed at 5% Significance Level					
37				Detected	data appea	r Gamma Dis	stributed at 5	5% Significar	nce Level			
38												
39						Gamma	Statistics					
40					k hat (MLE)	1.853			k	star (bias co	rrected MLE)	1.63
41				Thet	ta hat (MLE)	46.02			Theta	star (bias co	rrected MLE)	52.3
42				n	u hat (MLE)	81.52				nu star (bia	as corrected)	71.74
43			М	LE Mean (bia	s corrected)	85.27				MLE Sd (bia	as corrected)	66.78
44						I.		,	Approximate	e Chi Square	Value (0.05)	53.24
45			Adju	sted Level of	Significance	0.0386			A	djusted Chi S	Square Value	52.05
46						L	L				I	
47					Ass	suming Gam	ma Distribut	tion				
48		95% Approxir	mate Gamma	a UCL (use wl	hen n>=50))	114.9		95% Adj	usted Gam	ma UCL (use	when n<50)	117.5
49												
50						Lognorma	GOF Test					
51			S	Shapiro Wilk T	est Statistic	0.964		Shap	iro Wilk Lo	gnormal GOI	- Test	
52			5% S	hapiro Wilk C	ritical Value	0.911		Data appear	Lognormal	at 5% Signif	icance Level	
53				Lilliefors T	est Statistic	0.138		Lill	iefors Logn	ormal GOF	Гest	
54	5% Lilliefors Critical Value 0.184 Data appear Lognormal at 5% Significance Level											
55					Data appear	Lognormal	at 5% Signifi	icance Level				

	Α	E	В	С		D		E		F	G		Н		I		J		K	L	
56																					
57	Lognormal Statistics																				
58	Minimum of Logged Data 2.079 Mean of logged Data Maximum of Logged Data 5.521 SD of logged Data									4.152											
59					M	aximun	m of L	ogged	Data	5.521							SD o	f logg	jed Data	0.856	
60																					
61		Assuming Lognormal Distribution 95% H-UCL 143.3 90% Chebyshev (MVUE) UCL 1																			
62								95% H		143.3							•	•	,	143.7	
63						-	•	MVUE)		168.2					97.5%	Cheb	yshev	(MVL	JE) UCL	202.1	
64				9	19% C	hebysl	hev (I	MVUE)	UCL	268.8											
65																					
66								•		tric Distribu											İ
67						Data a _l	ppea	r to foll	ow a L	Discernible	Distribut	tion a	t 5% Sigi	nifica	ince Leve	 					İ
68												_									
69									-	ametric Dis	tribution	ree	UCLS							1000	
70								% CLT		107.2									nife UCL	108.2	
71								otstrap		106.2									ap-t UCL	113.2	
72								otstrap		113.2					95%	Perce	entile B	ootstr	rap UCL	106.5	
73								otstrap		110.3											
74							•	an, Sd)		125.2									Sd) UCL	143.3	
75				97.5%	6 Ch€	byshe	v(Mea	an, Sd)	UCL	168.4					99% CI	nebys	shev(Me	ean, S	Sd) UCL	217.7	
76																					
77										Suggested	UCL to	Use								,	
78						95%	6 Stud	dent's-t	UCL	108.2											
79																					
80										mate (e.g., ı	,			_							
81		When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL																			
82																					
83		Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.																			
84										ed upon dat											İ
85								•		ts of the sim									. ,		
86	Н	wever,	, simul	ations re	esults	will no	ot cov	er all R	Real W	orld data se	ts; for ac	ddition	nal insigh	t the	user may	want	to cons	sult a	statistici	an.	
87																					



Appendix H: Field Records / Asbestos Weights



PO Box 976, North Ryde BC NSW 1670 115 Wicks Rd, Macquarie Park NSW 2113 Tel: 02 9888 5000 Fax: 02 9888 5001 www.jkenvironments.com.au

PURPOSE:	ASBESTOS (FCF) WEIGHTS	JKE JOB No: E33438PL
LOCATION:	CAMPBALTOWN	DATE: 18/12/2020
GIVEN TO:	B. PAGE	PAGE: OF
OF:	JKE	INSP BY: C. RIDLEY

INSPECTION REPORT No _____

TPIOI FCF 1 = FCF 2 =	17.149	TPR3 FCF1 = FCF3 =	- 0. 60 9
TP109 FCF1 =	12.289	FCF3 =	8.46 g
TP112 FCF 1 = PCF 2 = FCF 3 =	45.66g	FCF 7 =	8.46 8 8.60 9 26.40 9 7.74 9 27.22 9 21.58 9
FCF 4 = FCF 6 =	45.66 g 12.72 g 13.40 g 31.40 g 10.44 g 33.62 g	TP125 FCF1	
		CALIBRATION CLA MOISSWEIGHT	ECK WEIGHTS
FCF2 = FCF3 =	6.589 8.549 8.503 13.589	1009	100,129
TPIS FOF1 =	20.024	50g	50.08g
FCF2= FCF3= FCF4= FCF5=	7789	200.	20.0 g-
		109.	10.02-g
TP121 FCF1 = 5	23.14g 7.50g	50) 20	2.020
TP122 FCF1 =	4.629.	29.	2.00g.
		19.	0.989.

Given by:	Received by:
Time Arrive:	Time Depart:



Appendix I: Guidelines and Reference Documents



Acid Sulfate Soils Management Advisory Committee (ASSMAC), (1998). Acid Sulfate Soils Manual

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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)

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

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NSW EPA, (2020). Consultants Reporting on Contaminated Land, Contaminated Land Guidelines

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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)

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