REPORT TO

HEALTH INFRASTRUCTURE

ON

PRELIMINARY SITE INVESTIGATION (INTRUSIVE INVESTIGATION)

FOR

PROPOSED SOIL CONSERVATION WORKS

AT

LOT 2 DP1281576, PRINCES HIGHWAY, MORUYA, NSW

Date: 14 December 2022

Ref: E33942PL2rpt2Rev1

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Executive Summary

Health Infrastructure ('the client') care of Root Partnerships commissioned JK Environments (JKE) to undertake a Preliminary Site Investigation (PSI) for the proposed soil conservation works development at Lot 2 DP1281576 Princes Highway, Moruya, NSW ('the site'). This report presents the findings of the 'intrusive investigation' component of the PSI. The 'desktop contamination assessment' component of the PSI was reported previously under a separate cover (Ref: E33942PL2rptRev1, dated 14 December 2022)[1]. A summary of the Desktop PSI has been included in this report.

The site location is shown on Figure 1 and the revised site boundaries are shown on Figure 2 attached in the appendices. This revised report presents the findings of the PSI, while considering and the findings in the context of the revised site boundaries and the proposed soil conservation works. This report has been prepared with regards to State Environmental Planning Policy (Resilience and Hazards) 2021[2] (formerly known as SEPP55).

The primary aims of the investigation were to make a preliminary assessment of the soil contamination conditions based on sampling from the geotechnical boreholes. The objectives were to:

- Assess the soil contamination conditions via implementation of a preliminary sampling and analysis program;
- Review and update the conceptual site model (CSM);
- Assess the potential risks posed by contamination to the receptors identified in the CSM (Tier 1 assessment);
- Provide a preliminary waste classification for off-site disposal of soil;
- 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 the JKE Desktop PSI 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 PSI included a review of the information in the Desktop PSI and sampling from 38 borehole locations. The site has historically been used for grazing purposes since at least 1961 and it is presumed to have been of similar use before this time. Based on the site history review for the Desktop PSI, JKE identified the following potential contamination sources/areas of environmental concern (AEC):

- Sediment runoff from nearby stormwater drains; and
- Historical agricultural use.

The intrusive scope for the PSI was conducted via sampling of the soil on site to obtain preliminary data on the potential for soil contamination at the site. The soil laboratory results did not encounter any concentrations of contaminants above the human-health or ecological SAC.

Based on the potential contamination sources/AEC identified, and the potential for contamination, further investigation of the contamination conditions is considered to be required. We note that agricultural activities are listed in Table 1 of the SEPP55 Planning Guidelines as activities that may cause contamination. The SEPP55 Planning Guidelines state that "*A detailed investigation is only necessary when a preliminary investigation indicates that the land is contaminated or that it is, or was, formally used for an activity listed in Table 1 and a land use change is proposed that has the potential to increase the risk of exposure to contamination.*". A Detailed Site Investigation (DSI) is therefore required.

JKE are of the opinion that the historical land uses and potential sources of contamination identified would not preclude the proposed development described in Section 1.1. However, JKE recommend that a DSI be undertaken to address the

[1] JKE, (2022a). *Report to Health Infrastructure on Preliminary Site Investigation (Desktop Contamination Assessment) for Proposed Soil Conservation Works at Lot 2 DP1281576, Princes Highway, Moruya, NSW.* (Referred to as the Desktop PSI)

[2] *State Environmental Planning Policy (Resilience and Hazards) 2021* (NSW) (referred to as SEPP Resilience and Hazards 2021)

data gaps outlined in Section 8.3. It is recommended that the supplementary site history information be reviewed initially and the CSM is to be updated based on this information. Subsequently, a Sampling, Analysis and Quality Plan (SAQP), supported by the updated CSM, should be prepared.

We note that a small portion of the south-west corner of the site is within an acid sulfate soil (ASS) risk area, which encroaches into the proposed footprint of Sediment Basin 1. On this basis, JKE consider that either an intrusive ASS investigation should be undertaken or an ASS Management Plan (ASSMP) be implemented for the proposed soil conservation works as described in Section 1.2.

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

Table of Contents

1 INTRODUCTION 1

1.1 THE SITE 1
1.2 PROPOSED DEVELOPMENT DETAILS 2
1.3 AIMS AND OBJECTIVES 2
1.4 SCOPE OF WORK 3

2 SITE INFORMATION 4

2.1 JKE DESKTOP PSI 4
2.2 SITE IDENTIFICATION 4
2.3 SUMMARY OF SITE CONDITIONS 5
2.4 SUMMARY OF GEOLOGY AND HYDROGEOLOGY 6
2.5 SECTION 10.7 PLANNING CERTIFICATE 6
2.6 SUMMARY OF SITE HISTORY INFORMATION 7

3 CONCEPTUAL SITE MODEL 8

3.1 POTENTIAL CONTAMINATION SOURCES/AEC AND COPC 8
3.2 MECHANISM FOR CONTAMINATION, AFFECTED MEDIA, RECEPTORS AND EXPOSURE PATHWAYS 9

4 SAMPLING, ANALYSIS AND QUALITY PLAN 11

4.1 DATA QUALITY OBJECTIVES (DQO) 11
4.2 SOIL SAMPLING PLAN AND METHODOLOGY 13

5 SITE ASSESSMENT CRITERIA (SAC) 16

5.1 SOIL 16

6 RESULTS 19

6.1 SUMMARY OF DATA (QA/QC) EVALUATION 19
6.2 SUBSURFACE CONDITIONS 19
6.3 FIELD SCREENING 19
6.4 SOIL LABORATORY RESULTS 19

7 WASTE CLASSIFICATION ASSESSMENT 23

7.1 PRELIMINARY WASTE CLASSIFICATION OF TOPSOIL 23
7.2 PRELIMINARY CLASSIFICATION OF NATURAL SOIL AND BEDROCK 23

8 DISCUSSION 24

8.1 TIER 1 RISK ASSESSMENT AND REVIEW OF CSM 24
8.2 DECISION STATEMENTS 24
8.3 DATA GAPS 25

9 CONCLUSIONS AND RECOMMENDATIONS 26

9.1 CONCLUSIONS AND RECOMMENDATIONS 26

10 LIMITATIONS 27

List of Tables

Table 2-1: Site Identification	4
Table 3-1: Potential (and/or known) Contamination Sources/AEC and Contaminants of Potential Concern	8
Table 3-2: CSM	9
Table 4-1: Soil Sampling Plan and Methodology	13
Table 4-2: Laboratory Details	14
Table 5-1: Details for Asbestos SAC	16
Table 5-2: Waste Categories	17
Table 6-1: Summary of Subsurface Conditions	19
Table 6-2: Summary of Soil Laboratory Results – Human Health and Environmental (Ecological)	20
Table 6-3: Summary of Soil Laboratory Results Compared to CT and SCC Criteria	21
Table 8-1: Data Gap Assessment	25

Attachments

Appendix A: Report Figures
Appendix B: Site Information and Site History
Appendix C: Laboratory Results Summary Tables
Appendix D: Borehole Logs
Appendix E: Laboratory Report(s) & COC Documents
Appendix F: Report Explanatory Notes
Appendix G: Data (QA/QC) Evaluation
Appendix H: Guidelines and Reference Documents

Abbreviations

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

Quality Control	**QC**
Remediation Action Plan	**RAP**
Relative Percentage Difference	**RPD**
Review of Environmental Factors	**REF**
Site Assessment Criteria	**SAC**
Sampling, Analysis and Quality Plan	**SAQP**
Site Audit Statement	**SAS**
Site Audit Report	**SAR**
Secretary's Environmental Assessment Requirements	**SEARs**
Source, Pathway, Receptor	**SPR**
Specific Contamination Concentration	**SCC**
Standard Penetration Test	**SPT**
State Significant Development	**SSD**
Trip Blank	**TB**
Toxicity Characteristic Leaching Procedure	**TCLP**
Total Recoverable Hydrocarbons	**TRH**
Trip Spike	**TS**
Upper Confidence Limit	**UCL**
United States Environmental Protection Agency	**USEPA**
Underground Storage Tank	**UST**
Virgin Excavated Natural Material	**VENM**
Volatile Organic Compounds	**VOC**
World Health Organisation	**WHO**
Work Health and Safety	**WHS**

Units

Litres	**L**
Metres BGL	**mBGL**
Metres	**m**
Millivolts	**mV**
Millilitres	**ml or mL**
Milliequivalents	**meq**
micro Siemens per Centimetre	**µS/cm**
Micrograms per Litre	**µg/L**
Milligrams per Kilogram	**mg/kg**
Milligrams per Litre	**mg/L**
Parts Per Million	**ppm**
Percentage	**%**

1 INTRODUCTION

Health Infrastructure ('the client') care of Root Partnerships commissioned JK Environments (JKE) to undertake a Preliminary Site Investigation (PSI) for the proposed soil conservation works at Lot 2 DP1281576 Princes Highway, Moruya, NSW ('the site'). This report presents the findings of the 'intrusive investigation' component of the PSI. The 'desktop contamination assessment' component of the PSI was reported previously under a separate cover (Ref: E33942PL2rptRev1, dated 14 December2022)[3]. A summary of the Desktop PSI has been included in Section 2.

This report has been prepared with regards to State Environmental Planning Policy (Resilience and Hazards) 2021[4] (formerly known as SEPP55).

This report supports a Review of Environmental Factors (REF) prepared for Health Infrastructure NSW pursuant to part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for the undertaking of soil conservation works and the construction of a new road at Lot 2 DP 1281576, Princes Highway, Moruya.

Information used in preparation of this report was revised previously to account for an adjustment to the site boundary. The adjustment has resulted in the western site boundary being offset from the western cadastral boundary of the current Lot. The site location is shown on Figure 1 and the revised site boundaries are shown on Figure 2 attached in the appendices. This revised report presents the findings of the PSI, while considering and the findings in the context of the revised site boundaries.

Geotechnical investigations were undertaken in conjunction with this assessment by JK Geotechnics (JKG). The results of the JKG investigations are presented separate reports (Project Ref: 33942LT). This report should be read in conjunction with the JKG reports.

1.1 The Site

The site of the soil conservation works, and ancillary road works is located on the Princes Highway in the NSW south coast town of Moruya. The site is legally described as Lot 2 DP 1281576 and is a large vacant greenfield site. The soil conservation works will facilitate the ongoing management of the greenfield lot. To the west of the site is Moruya TAFE, and to the north is a small residential subdivision called Mynora Estate. An aerial figure of the site is shown on the following **Plate 1**.

[3] JKE, (2022a). *Report to Health Infrastructure on Preliminary Site Investigation (Desktop Contamination Assessment) for Proposed Soil Conservation Works at Lot 2 DP1281576, Princes Highway, Moruya, NSW.* (Referred to as the Desktop PSI)

[4] *State Environmental Planning Policy (Resilience and Hazards) 2021* (NSW) (referred to as SEPP Resilience and Hazards 2021)

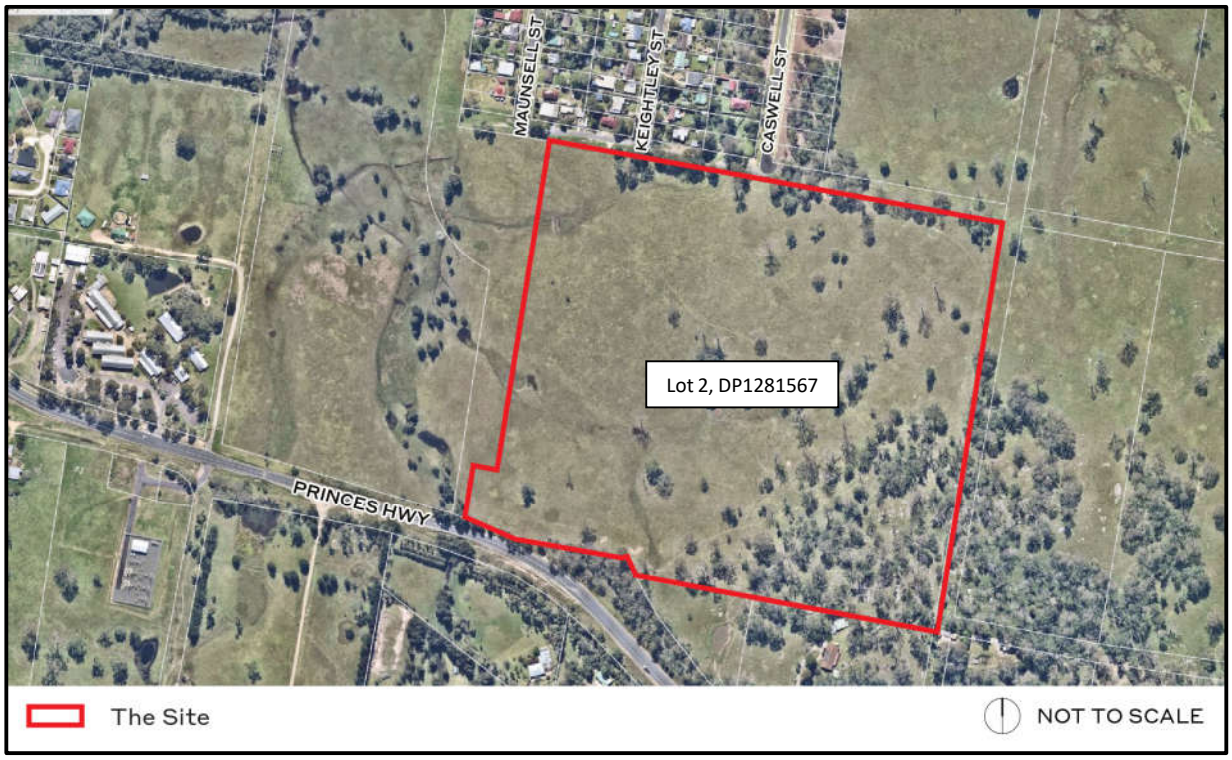


Plate 1: Proposed site location.

1.2 Proposed Development Details

The works proposed under the REF include the following:

- Construction of three erosion and sediment basins, ranging between 507m^2 and 990m^2 in area.
- Construction of an ancillary road into the site to facilitate construction access into the site.

JKE understand from the civil plans that excavation for the sediment basins will be required to a maximum depth of approximately 2.5m below the existing ground level. A further detailed description of the proposed works is contained in the REF report prepared by Ethos Urban.

Selected civil plans issued to JKE are attached in the appendices.

1.3 Aims and Objectives

The primary aims of the investigation were to make a preliminary assessment of the soil contamination conditions based on sampling from the geotechnical boreholes. The objectives were to:

- Assess the soil contamination conditions via implementation of a preliminary sampling and analysis program;
- Review and update the conceptual site model (CSM);
- Assess the potential risks posed by contamination to the receptors identified in the CSM (Tier 1 assessment);
- Provide a preliminary waste classification for off-site disposal of soil;
- 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.

1.4 Scope of Work

The investigation was undertaken generally in accordance with a JKE proposal (Ref: EP53393PL) of 1 February 2021 and written acceptance from the client via the Health Infrastructure Consultancy Agreement (Contract No.: HI21018) of 22 March 2021. The scope of work included the following:

- Review of the JKE Desktop PSI 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)[5], other guidelines made under or with regards to the Contaminated Land Management Act (1997)[6] and SEPP Resilience and Hazards 2021. A list of reference documents/guidelines is included in the appendices.

[5] National Environment Protection Council (NEPC), (2013). *National Environmental Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013).* (referred to as NEPM 2013)
[6] Contaminated Land Management Act 1997 (NSW) (referred to as CLM Act 1997)

2 SITE INFORMATION

2.1 JKE Desktop PSI

The Desktop PSI included a review of site information, including background and site history information and a site walkover inspection. Soil sampling was not undertaken.

Based on the information reviewed and a weight of evidence assessment of the site history documentation, and site observations made by JKE, it was considered that the site has been historically used for grazing purposes since at least 1961 and it was presumed to have been of similar use before this time. The immediate surrounds appeared to have been used for similar purposes, with the exception of the low-density residential properties to the north and south of the site. There were no historical structures on site and the site inspection and aerial photographs did not identify evidence of filling.

Based on the scope of work undertaken for this assessment, JKE identified the following potential contamination sources/areas of environmental concern (AEC):

- Sediment runoff from nearby stormwater drains; and
- Historical agricultural use.

The conclusions of the Desktop PSI were that based on the potential contamination sources/AEC identified, there is a potential for site contamination and further investigation of the contamination conditions was considered to be required. A preliminary intrusive investigation was recommended in the first instance to assess the potential for the contaminants of potential concern (CoPC) to occur in soil. The results from the preliminary intrusive investigation will inform the design of a Detailed Site Investigation (DSI).

2.2 Site Identification

Table 2-1: Site Identification

Current Site Owner (certificate of title):	Unknown (title records were not searched)
Site Address:	Princes Highway, Moruya, NSW
Lot & Deposited Plan:	Lot 2 in DP1281576
Current Land Use:	Vacant/Grazing
Proposed Land Use:	Soil Conservation Works (Ancillary Roads and Sediment Basins)
Local Government Authority:	Eurobodalla Shire Council
Current Zoning:	R2: Low Density Residential; and RU1: Primary Production
Site Area (m^2) (approx.):	22 hectares (220,000m^2)
RL (AHD in m) (approx.):	7-40

Geographical Location (MGA56) (approx. centre of site):	E: 237804.255 N: 6020784.595
Site Location Plan:	Figure 1
Sample Location Plan:	Figure 2

2.3 Summary of Site Conditions

The site is located in a predominantly residential and rural area of Moruya and is bound by Princes Highway to the south and partially by Albert Street to the north. Racecourse Creek is located approximately 550m to the north-west of the site.

The site is located within an area of undulating regional topography. The site itself comprises two hill peaks in the north-east and south-east corners of the site. The south-east hill slopes down towards the north and west at a gradient of between approximately 7° to 11°. The north-east hill slopes down towards the north, west and south at a gradient of between approximately 3° to 7°.

There are two tributaries (creek lines) that extend westward through the site (see Figure 2) and flow towards the low-lying, western areas of the site. These appeared to flow towards more significant tributaries of Racecourse Creek, beyond the western site boundary.

A walkover inspection of the site was undertaken by JKE on 25 March 2021 as part of the Desktop PSI. At the time of the inspection, the site was vacant and utilised for grazing of a small herd of cattle. The majority of the site was grassed, with some large native eucalypt trees across the eastern and southern portions of the site. Granite bedrock outcropping was visible at the highest points of the hills, with large boulders also visible at the surface mid-way down the hill slopes.

The site was fenced by a timber and wire fence that ran the entire perimeter of the property and appeared in good condition. The site appeared to follow that natural topography of the land and surrounds, with no evidence of cut or filling. There was no evidence of filling or other waste in the vicinity of the creek lines. The small dams appeared to have been formed by pushing up the native soils to form small embankments on the low side of the creek lines.

The surface water runoff is presumed to follow in sympathy with the varying slopes of the site, then generally tending towards the west along the creek lines. A stormwater drain located on Albert Street to the north of the site appeared to drain onto the site (see Figure 2) and meetup with the northern-most creek line. From the observation during the site walkover, the creek lines were found to support various forms of freshwater ecology such as fish, frogs and aquatic plants, as well as native plant life.

The surround areas of the site included: Braemar Drive and low density residential houses to the north; the Princes Highway and low density residential to the south; and vacant/grazing land to the east and west. JKE did not observe any land uses in the immediate surrounds that were identified as potential contamination sources for the site.

2.4 Summary of Geology and Hydrogeology

Regional geological information was reviewed for the Desktop PSI. The information indicated that the site is underlain by Moruya Tonalite of the Moruya Suite, which typically consists of tonalite, granodiorite, biotite, granite, adamellite, diorite and gabbro.

The Moruya 1:25,000 Quaternary Geology Sheet indicated that most of the site is underlain by bedrock of the Moruya Supersuite. However, along to the creek lines adjacent to the western site boundary, Quaternary aged alluvial and colluvial fan soils are mapped. These soils comprise *"fluvial sand, silt, gravel, clay"*.

A review of the acid sulfate soil (ASS) risk map prepared by Department of Land and Water Conservation (1997)[7] indicated that the site is partially located in an area classed as having 'low probability' of occurrence of ASS materials within 1 metre of the ground surface. The low probability risk area is predominantly located to the west of the site and only partially encroaches into the far western section of the site into the proposed location of Sediment Basin 1, as shown on the proposed civil plans in Appendix B.

ASS information presented in the Desktop PSI indicated that a Class 2 ASS risk area located to the west of the site, encroaches slightly onto the south-west corner of the site. Works in a Class 2 risk area that could pose an environmental risk in terms of ASS include all works below existing ground level and works by which the water table is likely to be lowered. This small area of Class 2 ASS risk is located on the low-lying area at the base of the western facing hillslope and the proposed Sediment Basin 1 is located on the boundary of the Class 2 risk area.

JKE note that intrusive sampling and analysis for ASS was not included in the scope of this investigation.

There was a total of 44 registered bores within the report buffer of 2,000m. The nearest registered bore was located approximately 418m from the site. This was utilised for domestic/stock purposes. The bores were generally registered for a mixture of monitoring, domestic and domestic stock purposes. The potential for viable groundwater abstraction and use of groundwater under these conditions was considered to be low. Use of groundwater is not proposed as part of the development. The majority of the registered bores are located in the low-lying land to the west of the site.

Several small dams were located along the creek lines and these appeared relatively full during the inspection due to the recent rain event. The upper sections of the creek lines on site were not expected to permanently hold water. The site location and regional topography indicates that water from the creek lines on site would flow towards the west, linking up with other tributaries of Racecourse Creek.

2.5 Section 10.7 Planning Certificate

The section 10.7 (2 and 5) planning certificates were reviewed for the PSI. Copies of the certificates are attached in the appendices. A summary of the relevant information is outlined below:

- Council has received no advice that the land is subject to any matter under the CLM Act 1997;
- Council considers that the land is below the 1:100 year flooding planning level and therefore the Moruya Floodplain Code does impose flood related development controls;

[7] Department of Land and Water Conservation, (1997). *1:25,000 Acid Sulfate Soil Risk Map (Series 8926S3,Moruya, Ed 2)*

- The land (or part) is identified on and acid sulfate soils map as class 1 or 2;
- The land is not within a conservation area; and
- An item of heritage is not situated on the land.

2.6 Summary of Site History Information

Based on the information reviewed and a weight of evidence assessment of the site history documentation (including that from the Desktop PSI), and site observations made by JKE, we consider that the site has been historically used for grazing purposes since at least 1961 and it is presumed to have been of similar use before this time. The immediate surrounds appeared to have been used for similar purposes, with the exception of the low-density residential properties to the north and south of the site.

There were no historical structures on site and the site inspection and aerial photographs did not identify evidence of filling.

3 CONCEPTUAL SITE MODEL

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

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

3.1 Potential Contamination Sources/AEC and CoPC

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

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

Source / AEC	CoPC
Sediment runoff from nearby stormwater drains – There is a potential for contaminant transport in sediment/runoff from nearby roadways. A stormwater pipe discharges in an area adjoining the central northern boundary of the site (see Figure 2). It is anticipated that the stormwater (and sediment loading within the stormwater) could eventuate in the northern-most creek line and flow westward to the low-lying area at the western end of the site. We note that the land use in these nearby, off-site areas are benign (i.e. residential, rather than heavy industry) and the potential for contamination to be associated with this AEC is relatively low.	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 low-intensity grazing purposes. This could have resulted in contamination across the site via use of machinery and potential (although unlikely) use of pesticides. There was no evidence of on-site irrigation pipework (e.g. pipework potentially containing asbestos) during the inspection, however, the presence of such pipework cannot be ruled out	Heavy metals, TRHs, PAHs, OCPs and asbestos JKE note that OCPs only became commercially available in the 1940s. Prior to this time pesticides were predominantly heavy metal compounds.

Based on the site inspection and historical assessment, JKE are of the opinion that there is a low potential for the site to have been used for activities associated with per- and polyfluoroalkyl substances (PFAS). We note that Appendix B2 of the PFAS National Environmental Management Plan (2020)[8] refers to 'agriculture' more broadly as an activity potentially associated with PFAS, however this relates to use of firefighting foams in the poultry industry, or with adjuvant or active ingredients in fertilisers and pesticides.

[8] Heads of EPA Australia and New Zealand, (2020). *PFAS National Environmental Management Plan Version 2.0* (referred to as PFAS NEMP)

Given the apparent low-intensity grazing activities at the site, use of pesticides is unlikely. It is also considered unlikely that stock feed (which is another potential source of OCPs) would have been imported. On this basis, we do not consider PFAS to be CoPC. This should be re-evaluated in the event that OCPs are identified in soil.

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

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

Table 3-2: CSM

Potential mechanism for contamination	The potential mechanisms for contamination are most likely to include 'top-down' impacts, spills and runoff from stormwater/sediment.
Affected media	Soil has been identified as the potentially affected medium. The potential for groundwater (or surface water) impacts is considered to be relatively low. However, this would need to be considered in the event mobile/leachable contamination was identified in soil. The potential for soil vapour impacts is also considered to be relatively low. Soil vapour would need to be considered in the event that volatile TRHs, BTEX and/or naphthalene (PAH compound) was identified in soil.
Receptor identification	The receptor identification and pathways/exposure assessment have considered a broader range of receptors that would apply in the context of the overall site development for a more sensitive land use, not only those receptors applicable in the context of the REF. Human receptors include site occupants/users (including adults and children), construction workers and intrusive maintenance workers. Off-site human receptors include adjacent land users in a residential setting. Ecological receptors include terrestrial organisms and plants within unpaved areas (including the proposed landscaped areas), and freshwater ecology in the dams and creeks.
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 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 contact and ingestion. Exposure during future site use could occur via direct contact with soil in unpaved areas, inhalation of airborne asbestos fibres during soil disturbance, or inhalation of vapours within future buildings and/or enclosed/semi-enclosed spaces during excavation.
Potential exposure mechanisms	The following have been identified as potential exposure mechanisms for site contamination: • Vapour intrusion trenches/excavation during excavation/construction (either from soil contamination or volatilisation of contaminants from groundwater); • Contact (dermal, ingestion or inhalation) with exposed soils during excavation and construction or in unpaved areas; • Migration of stormwater (and sediment) onto the site and into the creek lines/dams via overland flows; and

	• Migration of groundwater into nearby water bodies, including aquatic ecosystems.

4 SAMPLING, ANALYSIS AND QUALITY PLAN

4.1 Data Quality Objectives (DQO)

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

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

4.1.1 Step 1 - State the Problem

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

It is noted that the initial sampling plan/locations and analytical schedule were nominated in the client brief and was not designed by JKE based solely on the CSM prepared for the Desktop PSI.

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.

4.1.2 Step 2 - Identify the Decisions of the Study

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

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

4.1.3 Step 3 - Identify Information Inputs

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

- Existing relevant environmental data from previous reports;
- Site information, including site observations and site history documentation;
- Sampling of potentially affected media (soil);

- Observations of sub-surface variables such as soil type, photo-ionisation detector (PID) concentrations, odours and staining;
- Laboratory analysis of soils for the CoPC identified in the CSM. Phenols were also included in the client brief and were therefore also capture in the analytical schedule; and
- Field and laboratory QA/QC data.

4.1.4 Step 4 - Define the Study Boundary

The sampling will be confined to the site boundaries as shown in Figure 2 (spatial boundary). The sampling was completed between 13 and 22 April 2021 (temporal boundary). The assessment of potential risk to adjacent land users has been made based on data collected within the site boundary.

Sampling was limited to the specified locations as nominated by the client for the geotechnical investigation.

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

4.1.5.1 Tier 1 Screening Criteria

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

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

4.1.5.2 Field and Laboratory QA/QC

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

4.1.5.3 Appropriateness of Practical Quantitation Limits (PQLs)

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

4.1.6 Step 6 – Specify Limits on Decision Errors

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

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

Quantitative limits on decision errors were not established due to the non-probabilistic/preliminary sampling design.

4.1.7 Step 7 - Optimise the Design for Obtaining Data

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

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

4.2 Soil Sampling Plan and Methodology

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

Table 4-1: Soil Sampling Plan and Methodology

Aspect	Input
Sampling Density	Samples were collected from 38 locations as shown on the attached Figure 2. Based on the site area (220,000m^2), this number of locations corresponded to a sampling density of approximately one sample per 5,790m^2. The sampling plan was not designed to meet the minimum sampling density for hotspot identification, as outlined in the NSW EPA Contaminated Sites Sampling Design Guidelines (1995)[9] and we note the work occurred prior to the 2022 revision of these guidelines.
Sampling Plan	The sampling locations were placed on a judgemental sampling plan based on the nominated geotechnical borehole locations, taking into consideration areas that were not easily accessible. This sampling plan was considered suitable to make a preliminary assessment of potential risks

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

Aspect	Input
	associated with the AEC and CoPC identified in the CSM, and assess whether further investigation is warranted.
Set-out and Sampling Equipment	Sampling locations were set out using a Sokkia SHC5000 mobile GPS unit. In-situ sampling locations were checked for underground services by an external contractor prior to sampling. Samples were collected using a drill rig equipped with spiral flight augers. Soil samples were obtained from a Standard Penetration Test (SPT) split-spoon sampler, or directly from the auger when conditions did not allow use of the SPT sampler.
Sample Collection and Field QA/QC	Soil samples were obtained each day between 13 April and 22 April 2021 in accordance with standard field procedures. Soil samples were collected from the fill and natural profiles based on field observations. The sample depths are shown on the logs attached in the appendices. Samples were placed in glass jars with plastic caps and teflon seals with minimal headspace. Samples for asbestos analysis were placed in zip-lock plastic bags. During sampling, soil at selected depths was split into primary and duplicate samples for field QA/QC analysis. The field splitting procedure included splitting the soil by hand and alternately filling the sampling containers to obtain a representative split sample.
Field Screening	A portable Photoionisation Detector (PID) fitted with a 10.6mV lamp was used to screen the samples for the presence of volatile organic compounds (VOCs). PID screening for VOCs was undertaken on soil samples using the soil sample headspace method. VOC data was obtained from partly filled zip-lock plastic bags following equilibration of the headspace gases. PID calibration records are maintained on file by JKE. Fill/spoil at the sampling locations was visually inspected during the works for the presence of fibre cement fragments.
Decontami-nation and Sample Preservation	Sampling personnel used disposable nitrile gloves during sampling activities. Soil samples were preserved by immediate storage in an insulated sample container with ice or ice bricks. On completion of the fieldwork, the samples were stored temporarily in fridges in the JKE warehouse before being delivered in the insulated sample container to a NATA registered laboratory for analysis under standard chain of custody (COC) procedures. Due to the length of time required to complete the fieldwork, samples were scheduled in two separates batches to ensure they were within the laboratory holding times for accurate laboratory analysis.

4.2.1 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 4-2: Laboratory Details

Samples	Laboratory	Report Reference
All primary samples and field QA/QC samples including (intra-laboratory duplicates, trip blanks, rinsates and trip spikes)	Envirolab Services Pty Ltd NSW, NATA Accreditation Number – 2901 (ISO/IEC 17025 compliance)	266931 & 267510

Samples	Laboratory	Report Reference
Inter-laboratory duplicates	Envirolab Services Pty Ltd VIC, NATA Accreditation Number – 2901 (ISO/IEC 17025 compliance)	25549

Due to the consistency of the subsurface conditions, analysis was not undertaken on samples from every location. Analysis was scheduled to provide general site coverage.

5 SITE ASSESSMENT CRITERIA (SAC)

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

5.1 Soil

Soil data were compared to relevant Tier 1 screening criteria in accordance with NEPM (2013) as outlined below. Adoption of the land use type A exposure scenario is considered to be conservative, however, this approach aligns with the philosophy of the NEPM 2013 which promotes use of more conservative criteria to consider the most sensitive site receptors, which in this case is the potential for children and adults visiting/occupying the site following the completion of the soil conservation works.

5.1.1 Human Health

- Health Investigation Levels (HILs) for a 'residential with accessible soils' exposure scenario (HIL-A);
- Health Screening Levels (HSLs) for a 'low-high density residential' exposure scenario (HSL-A & HSL-B). 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)[10]; and
- For the PSI as a whole, asbestos was assessed on the basis of presence/absence and asbestos HSLs were not adopted as detailed asbestos quantification was not undertaken at all locations. However, where quantification analysis was undertaken at the laboratory, these results were also assessed against the HSL-A criteria. A summary of the asbestos quantification criteria is provided in the table below:

Table 5-1: Details for Asbestos SAC

Guideline	Applicability
Asbestos in Soil	The HSL-A criteria were adopted for the assessment of asbestos in soil. The SAC adopted for asbestos were derived from the NEPM 2013 and are based on Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (2021)[11]. The SAC include the following: • No visible asbestos at the surface/in the top 10cm of soil; • <0.01% w/w bonded asbestos containing material (ACM) in soil; and • <0.001% w/w asbestos fines/fibrous asbestos (AF/FA) in soil. Despite the above, given the preliminary nature of the investigation, decisions relating to the requirement for further investigation have been based around asbestos either being present or absent (i.e. if asbestos is found during the PSI, this will trigger a requirement for detailed investigation/characterisation).

[10] 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*

[11] Western Australian (WA) Department of Health (DoH), (2021). *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia*. (referred to as WA DoH 2021)

5.1.2 Environment (Ecological – terrestrial ecosystems)

- Ecological Investigation Levels (EILs) and Ecological Screening Levels (ESLs) for an 'urban residential and public open space' (URPOS) exposure scenario. These have only been applied to the top 2m of soil as outlined in NEPM (2013). The criterion for benzo(a)pyrene has been increased from the value presented in NEPM (2013) based on the Canadian Soil Quality Guidelines[12];
- ESLs were adopted based on the soil type;
- EILs for selected metals were calculated by averaging the physiochemical soil parameters from the laboratory data presented in report 266931. The average parameters for pH (5.9), cation exchange capacity (CEC) (3.05) and clay content (25) were applied; and
- The above parameters were obtained from analysis of two sample of the main soil type on site (clay). These data were used to select the added contaminant limit (ACL) values presented in Schedule B(1) of NEPM (2013), and published ambient background concentration (ABC) presented in the document titled Trace Element Concentrations in Soils from Rural and Urban Areas of Australia (1995)[13]. This method is considered to be adequate for the Tier 1 screening.

5.1.3 Management Limits for Petroleum Hydrocarbons

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

5.1.4 Waste Classification

Data for the waste classification assessment were assessed in accordance with the Waste Classification Guidelines, Part 1: Classifying Waste (2014)[14] as outlined in the following table:

Table 5-2: 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.
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

[12] 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)

[13] 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.

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

Category	Description
	• 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.

6 RESULTS

6.1 Summary of Data (QA/QC) Evaluation

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

6.2 Subsurface Conditions

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

Table 6-1: Summary of Subsurface Conditions

Profile	Description
Fill (topsoil)	Topsoil was encountered at the surface in all boreholes and extended to depths of approximately 0.1m to 0.3m below ground level (BGL). The topsoil typically comprised silty sandy clay with inclusions of roots and root fibres.
Natural Soil	Natural silty sandy clay and silty clay soils were encountered beneath the topsoil in all boreholes and extended to depths of approximately 0.3m to 1.4mBGL.
Bedrock	Granite bedrock was encountered beneath the natural clay in all boreholes and extended to the termination depth.
Groundwater	The boreholes were largely dry on completion of augering with the exception of BH2 and BH34. Groundwater seepage was encountered in BH2 at a depth of approximately 1.5mBGL, however the borehole was dry on completion of augering. Stand water was measured within BH34 at a depth of approximately 4.2mBGL upon completion of augering. Piezometer standpipes were installed for geotechnical purposes in BH1, BH18 and BH27, no groundwater was measured in these boreholes.

6.3 Field Screening

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 2ppm equivalent isobutylene which indicates a negligible level of PID detectable VOCs. The sample with a PID value of 2ppm did report detectable concentrations of TRHs as discussed later in this report.

6.4 Soil Laboratory Results

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

6.4.1 Human Health and Environmental (Ecological) Assessment

Table 6-2: Summary of Soil Laboratory Results – Human Health and Environmental (Ecological)

Analyte	N	Max. (mg/kg)	N> Human Health SAC	N> Ecological SAC	Comments
Arsenic	19	<PQL	0	0	-
Cadmium	19	<PQL	0	NSL	-
Chromium (total)	19	8	0	0	-
Copper	19	3	0	0	-
Lead	19	14	0	0	-
Mercury	19	<PQL	0	NSL	-
Nickel	19	5	0	0	-
Zinc	19	11	0	0	-
Total PAHs	19	<PQL	0	NSL	-
Benzo(a)pyrene	19	<PQL	NSL	0	-
Carcinogenic PAHs (as BaP TEQ)	19	<PQL	0	NSL	-
Naphthalene	19	<PQL	0	NSL	-
DDT+DDE+DDD	19	<PQL	0	NSL	-
DDT	19	<PQL	NSL	0	-
Aldrin and dieldrin	19	<PQL	0	NSL	-
Chlordane	19	<PQL	0	NSL	-
Heptachlor	19	<PQL	0	NSL	-
OCPs	19	<PQL	0	NSL	
PCBs	19	<PQL	0	NSL	-
TRH F1	19	<PQL	0	0	-
TRH F2	19	75	0	0	-
TRH F3	19	100	0	0	-
TRH F4	19	<PQL	0	0	-

Analyte	N	Max. (mg/kg)	N> Human Health SAC	N> Ecological SAC	Comments
Benzene	19	<PQL	0	0	-
Toluene	19	<PQL	0	0	-
Ethylbenzene	19	<PQL	0	0	-
Xylenes	19	<PQL	0	0	-
Phenols	19	<PQL	0	NSL	-
Asbestos (in soil) – 500ml Asbestos Containing Material (ACM) >7mm Asbestos Fines/Fibrous Asbestos (AF/FA)	17	 ACM <7mm <0.01%w/w AF/FA <0.001%w/w	 0 0	NA	-

Notes:

N: Total number (primary samples)

NSL: No set limit

NL: Not limiting

6.4.2 Waste Classification Assessment

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

Table 6-3: Summary of Soil Laboratory Results Compared to CT and SCC Criteria

Analyte	N	N > CT Criteria	N > SCC Criteria	Comments
Arsenic	19	0	0	-
Cadmium	19	0	0	-
Chromium	19	0	0	-
Copper	19	NSL	NSL	-
Lead	19	0	0	-
Mercury	19	0	0	-
Nickel	19	0	0	-
Zinc	19	NSL	NSL	-

Analyte	N	N > CT Criteria	N > SCC Criteria	Comments
TRH (C_6-C_9)	19	0	0	-
TRH (C_{10}-C_{36})	19	0	0	-
BTEX	19	0	0	-
Phenols	19	0	0	-
Total PAHs	19	0	0	-
Benzo(a)pyrene	19	0	0	-
OCPs & OPPs	19	0	0	-
PCBs	19	0	0	-
Asbestos	17	-	-	Asbestos was not detected in the samples analysed.

N: Total number (primary samples)

NSL: No set limit

7 WASTE CLASSIFICATION ASSESSMENT

7.1 Preliminary Waste Classification of Topsoil

Based on the results of the PSI, and at the time of reporting, the topsoil material is assigned a preliminary classification of **General Solid Waste (non-putrescible)**. However, given the apparent natural/undisturbed state of this material, with further assessment, the topsoil **may be classifiable as VENM**. Further sampling should be undertaken to confirm the waste classification prior to off-site disposal and a waste classification report must be prepared in accordance with the NSW EPA requirements.

7.2 Preliminary Classification of Natural Soil and Bedrock

Based on the scope of work undertaken for this PSI, and at the time of reporting, JKE are of the opinion that the natural soil and bedrock at the site will likely meet the definition of **VENM** for off-site disposal or re-use purposes. Further sampling should be undertaken to confirm the waste classification prior to off-site disposal and a waste classification report must be prepared in accordance with the NSW EPA requirements.

8 DISCUSSION

8.1 Tier 1 Risk Assessment and Review of CSM

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

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

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

8.1.1 Soil

Fill was not identified during the investigation. Based on multiple lines of evidence, including the borehole information and the site inspection, extensive areas of fill are not expected to occur at the site.

JKE note that detectable concentrations of TRH >C_{10}-C_{16} (F2) and TRH >C_{16}-C_{34} (F3) were encountered within the natural clay soil sample within BH26 (0.2-0.3) with concentrations of 75mg/kg and 100mg/kg respectively. These concentrations are well below the SAC and therefore are not considered to pose a risk to site receptors. However, considering there were no other detectable concentrations of TRH above the laboratory PQL from the samples analysed, and no potential source of TRH has been identified, this result appears to be an anomaly. Further investigation will be required within the vicinity of BH26 to properly rule out any widespread contamination issues.

All other CoPC were reported at low concentrations (all below the SAC) or at levels below the laboratory detection limits. On this basis, and considering the site history, the primary CoPC to be considered in further detail is TRH within the vicinity of BH26. The potential presence of the CoPC in areas of the site not investigated to date (e.g. the stormwater flow/wash zone) requires further consideration.

8.2 Decision Statements

The decision statements are addressed below:

Are any results above the SAC?

No.

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

The contamination status of the soils in the inferred overland flow/stormwater wash zone (see Figure 2) is largely unknown as sampling in this area was limited to one location (BH2). Nevertheless, elevated concentrations of contamination that may pose a risk to site receptors have not been identified at the site.

Is remediation required?

The PSI has not identified any triggers for site remediation.

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

JKE are of the opinion the site can be made suitable for the proposed development. A DSI is required to better characterise the CoPC at the site and any risk to site receptors.

8.3 Data Gaps

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

Table 8-1: Data Gap Assessment

Data Gap	Assessment
Historical land titles search	A land titles search was outside the scope of the desktop assessment. Although it is unlikely that information from the land titles records would alter the CSM, a search of these records should occur for completeness.
Council Records	The review of council records was limited to planning-related information within the section 10.7 certificates and/or within the Local Environmental Plan (as outlined in the Lotsearch report). Although it is unlikely that additional information from the local council would alter the CSM, a search of local records in relation to the property file and building/development records should occur for completeness.
SafeWork NSW	A search of SafeWork NSW records for licences to store dangerous goods was outside the scope of the desktop assessment. Although it is unlikely that SafeWork NSW records exist for the site, a search of these records should occur for completeness.
Limited sampling data	Soil sampling was limited to the borehole locations defined by the client for the geotechnical investigation. Sampling was not undertaken across the entirety of the site and no data was collected from the overland flow/potential stormwater wash zone in the north-west portion of the site. Recommendations to address this data gap have been included in this report.

9 CONCLUSIONS AND RECOMMENDATIONS

Based on the site history review for the Desktop PSI, JKE identified the following potential contamination sources/AEC:

- Sediment runoff from nearby stormwater drains; and
- Historical agricultural use.

The intrusive scope for the PSI was conducted via sampling of the soil on site to obtain preliminary data on the potential for soil contamination at the site. The soil laboratory results did not encounter any concentrations of contaminants above the human-health or ecological SAC.

Based on the potential contamination sources/AEC identified, and the potential for contamination, further investigation of the contamination conditions is considered to be required. We note that agricultural activities are listed in Table 1 of the SEPP55 Planning Guidelines as activities that may cause contamination. The SEPP55 Planning Guidelines state that "*A detailed investigation is only necessary when a preliminary investigation indicates that the land is contaminated or that it is, or was, formally used for an activity listed in Table 1 and a land use change is proposed that has the potential to increase the risk of exposure to contamination.*". A DSI is therefore required.

9.1 Conclusions and Recommendations

JKE are of the opinion that the historical land uses and potential sources of contamination identified would not preclude the proposed development described in Section 1.2. However, JKE recommend that a DSI be undertaken to address the data gaps outlined in Section 8.3. It is recommended that the supplementary site history information be reviewed initially and the CSM is to be updated based on this information. Subsequently, a Sampling, Analysis and Quality Plan (SAQP), supported by the updated CSM, should be prepared.

We note that a small portion of the south-west corner of the site is within an ASS risk area, which encroaches into the proposed footprint of Sediment Basin 1. On this basis, JKE consider that either an intrusive ASS investigation should be undertaken or an ASS Management Plan (ASSMP) be implemented for the proposed soil conservation works as described in Section 1.2.

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

10 LIMITATIONS

The report limitations are outlined below:

- JKE did not inspect the site between May and December 2022 in preparation of this report revision. It is unknown whether the site conditions changed during this period;
- 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;
- This report was produced based on information gathered as part of previous investigations associated with other proposed developments on the site;
- 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

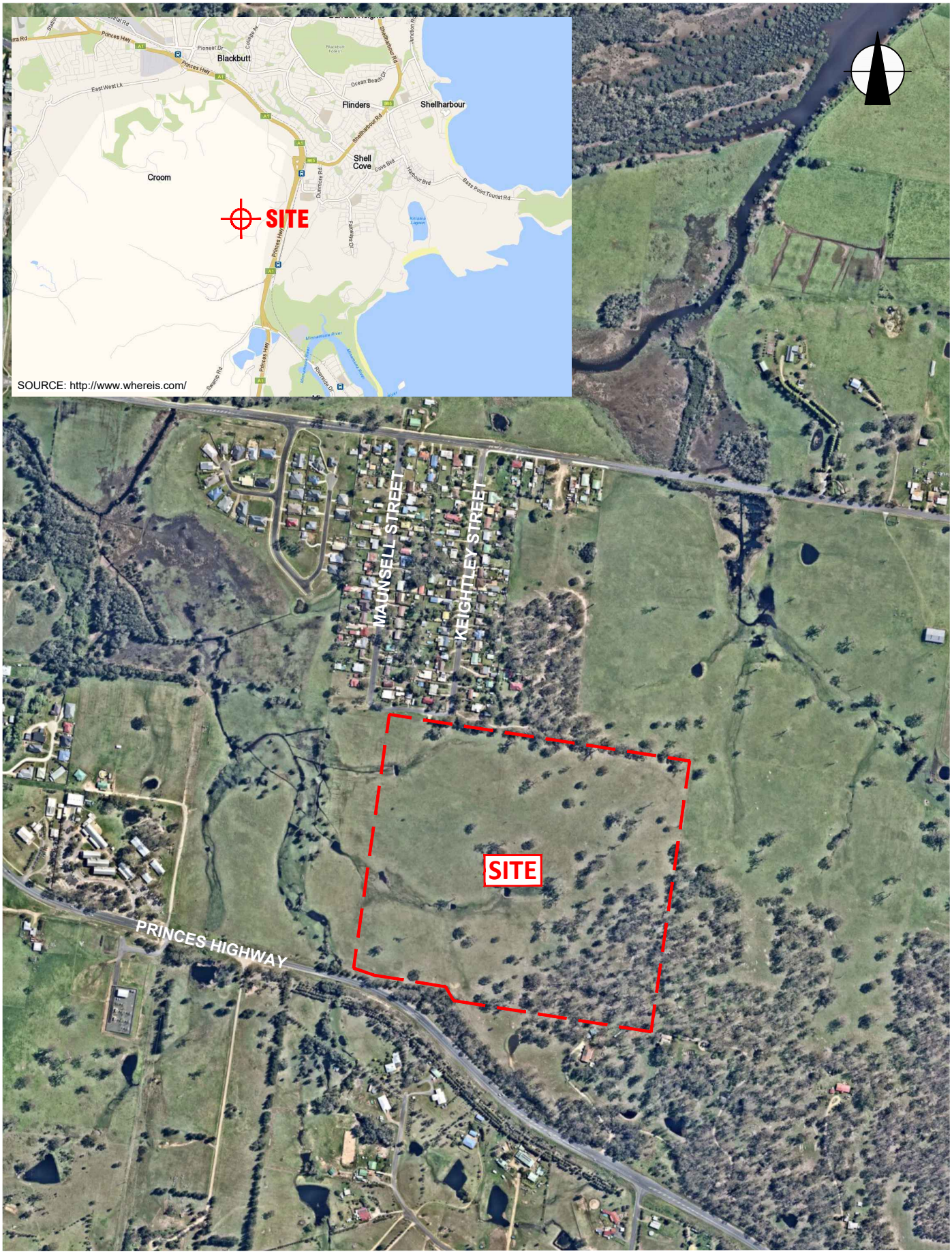
Borehole and test pit logs are prepared by environmental scientists, engineers or geologists based upon interpretation of field conditions and laboratory evaluation of field samples. Logs are normally provided in our reports and these should not be re-drawn for inclusion in site remediation or other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

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

Title: **SITE LOCATION PLAN**

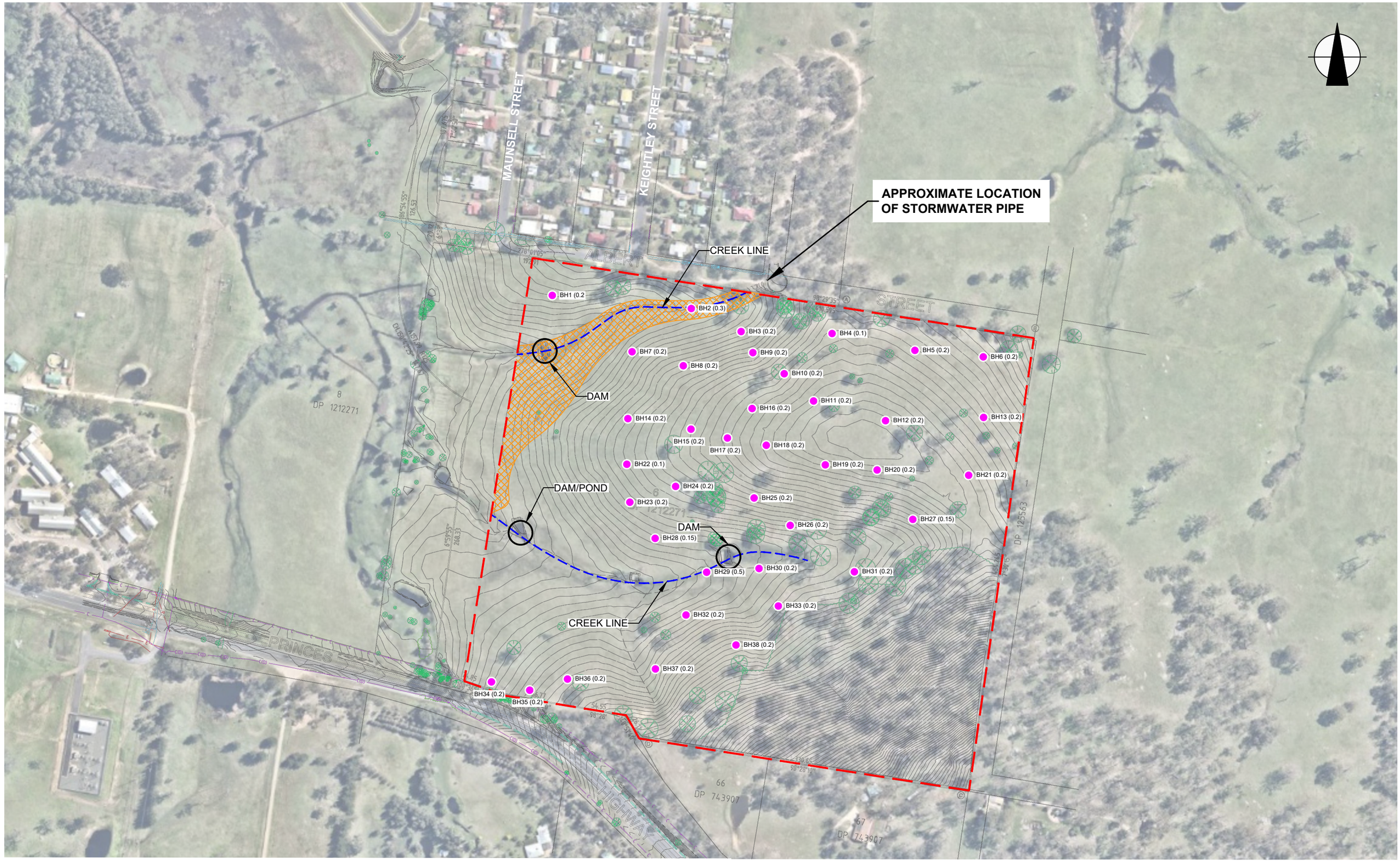
Location: LOT 2, DP1281576, PRINCES HIGHWAY, MORUYA, NSW

Project No: E33942PL

Figure No: 1

JKEnvironments

PLOT DATE: 8/12/2021 1:17:18 PM DWG FILE: S:\S ES\SC EIS JOBS\33000'S\E33942PL MORUYA\CAD\E33942PL.DWG



LEGEND

- APPROXIMATE SITE BOUNDARY
- BH(Fill Depth) — BOREHOLE LOCATION, NUMBER AND DEPTH OF TOPSOIL (m)
- INFERRED OVERLAND STORMWATER FLOW/WASH ZONE

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

0 35 70 105 140 175
SCALE 1:3500 @A3 METRES

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

Title: **SAMPLE LOCATION PLAN**

Location: LOT 2, DP1281576, PRINCES HIGHWAY, MORUYA, NSW

Project No: E33942PL

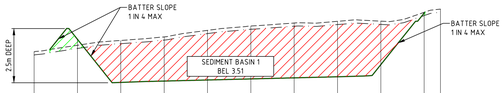
Figure No: 2a

JKEnvironments

PLOT DATE: 22/08/2022 10:43:42 AM DWG FILE: S:\5 EIS\5C EIS JOBS\33000\SIE33942PL MORUYA\CAD\E33942PL.DWG

Appendix B: Site Information and Site History

Proposed Civil Plans

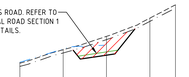


DATUM 1.5

SC01										
DESIGN SURFACE		5.511	3.523	3.595	3.634	3.683	3.733	3.782	4.345	6.723
BULK EARTHWORKS SURFACE		5.511	3.523	3.595	3.634	3.683	3.733	3.782	4.345	6.723
GRANITE SURFACE - XW (EXTREMELY WEATHERED)										
GRANITE SURFACE - DW (DISTINCTLY WEATHERED)										
STRIPPED 150mm SURFACE	4.785	5.988	5.310	5.475	5.774	5.976	6.114	6.192	6.300	6.607	6.755
EXISTING SURFACE	4.935	5.238	5.460	5.625	5.924	6.126	6.264	6.342	6.350	6.757	6.905
CHAINAGES	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	93.753

1 in 500 HORIZONTAL
1 in 100 VERTICAL

SC01 LONGITUDINAL SECTION



DATUM 9.4

SC02					
DESIGN SURFACE				12.693	
BULK EARTHWORKS SURFACE				11.743	
GRANITE SURFACE - XW (EXTREMELY WEATHERED)	11.693	12.275			
GRANITE SURFACE - DW (DISTINCTLY WEATHERED)					
STRIPPED 150mm SURFACE	11.423	12.043	12.660	13.501	14.175
EXISTING SURFACE	11.573	12.193	12.810	13.651	14.265
CHAINAGES	0.000	10.000	20.000	30.000	35.911

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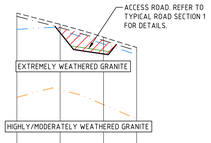
1 in 100 VERTICAL

SC02 LONGITUDINAL SECTION

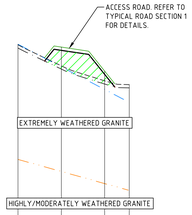


DATUM 14.4

SC03					
DESIGN SURFACE			20.543	19.564	
BULK EARTHWORKS SURFACE			20.393	19.414	
GRANITE SURFACE - XW (EXTREMELY WEATHERED)	20.560		20.527	19.879	19.385
GRANITE SURFACE - DW (DISTINCTLY WEATHERED)	17.433		17.761	17.076	16.414
STRIPPED 150mm SURFACE	21.152		20.630	20.039	19.566
EXISTING SURFACE	21.302		20.780	20.189	19.716
CHAINAGES	0.000		10.000	20.000	27.647

1 in 500 HORIZONTAL
1 in 100 VERTICAL

SC03 LONGITUDINAL SECTION



DATUM 1.5

SC04				
DESIGN SURFACE		10.156	9.467	
BULK EARTHWORKS SURFACE		10.006	8.897	
GRANITE SURFACE - XW (EXTREMELY WEATHERED)	10.283	9.243	8.199	
GRANITE SURFACE - DW (DISTINCTLY WEATHERED)	6.972	6.414	3.856	
STRIPPED 150mm SURFACE	10.193	9.141	8.452	8.275
EXISTING SURFACE	10.263	9.291	8.602	8.425
CHAINAGES	0.000	10.000	20.000	25.663

1 in 500 HORIZONTAL
1 in 100 VERTICAL

SC04 LONGITUDINAL SECTION

LEGEND

FILL FROM STRIPPED SURFACE TO UNDERSIDE OF BULK EARTHWORKS LEVELS

CUT FROM STRIPPED SURFACE TO UNDERSIDE OF BULK EARTHWORKS LEVELS

NOTES

1. EXISTING SURFACE LEVELS ARE INTERPOLATED FROM INFORMATION SUPPLIED BY 'LTS' PTY LTD REFERENCE 51266 001DT ISSUE 1 DATED 23/02/21
2. GRANITE SURFACE LEVELS INTERPOLATED FROM BOREHOLE LOGS SUPPLIED BY 'JKGEOTECHNICS' PTY LTD REF: 33942LTrpt2 DATED: 21ST MAY 2021

Rev	Description	Date	By	App
B	ISSUED FOR REF SUBMISSION	06.12.22	DH	SN
A	ISSUED FOR REF SUBMISSION	30.11.22	DH	SN

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www.meinhardt-bonacci.com
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Project Name: SOIL CONSERVATION WORKS
PRINCES HWY, MORUYA NSW 2537

Drawing Title: BULK EARTHWORKS SITE SECTIONS

REF SUBMISSION

Designed	AM	Approved	
Drawn	DH	Date	NOV. 2022
Scale	AS SHOWN	Project Ref	
Date	NOV. 2022	Drawing No	ERH-HI-CV-DWG-DD-01-PW-0521
Sheet	A1	Rev	B

North

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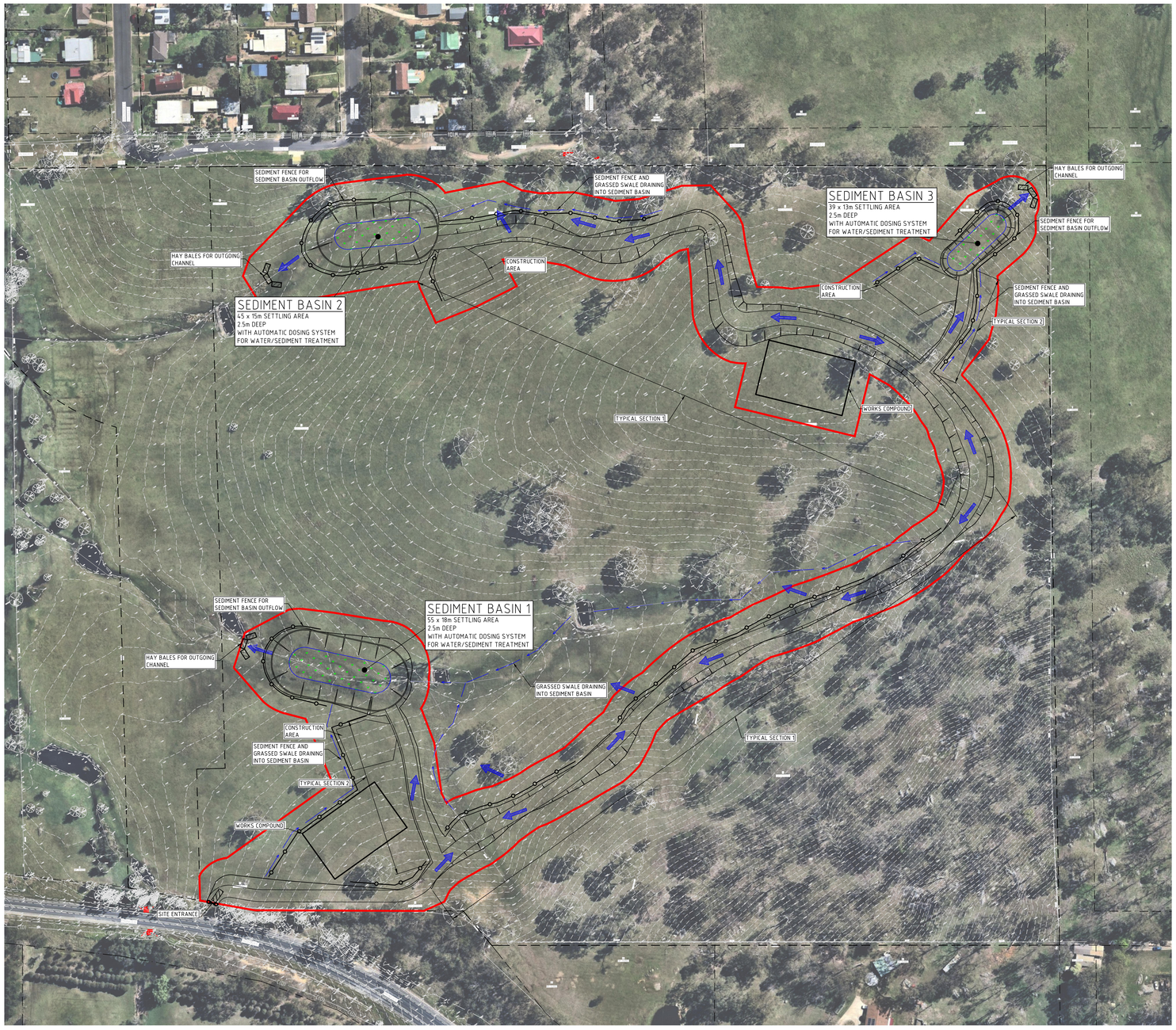
Plotted: 06.12.22 at 2:37 PM By: Dovsky Herrera



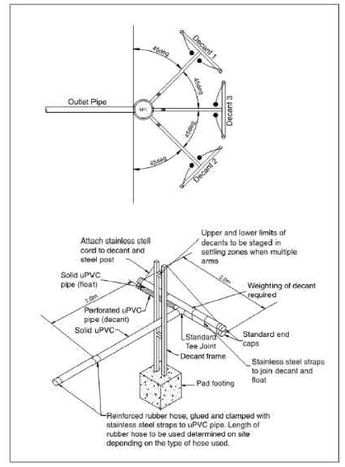


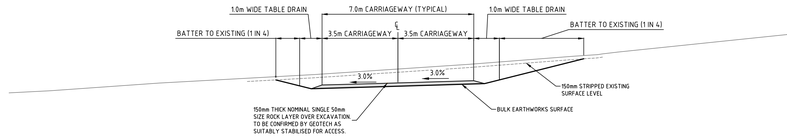
Figure B29 – Auckland-type floating decant system for Type A basins

DECANT SYSTEM TYPICAL DETAIL (EMPTYING FOR HIGH LEVEL)

N.T.S

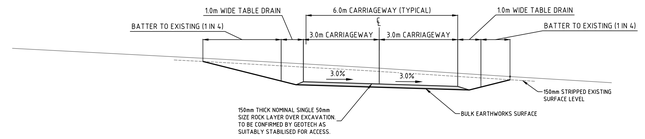
LEGEND

- EXISTING SURFACE CONTOUR
- EARLY WORKS DESIGN CONTOUR
- LOT BOUNDARY
- SEDIMENT BASIN SETTLING AREA
- BATTER
- TEMPORARY SHAKER RAMP FOR ENTRY/EXIT
- OVERLAND FLOW
- HAY BALES
- SEDIMENT FENCE
- SWALE DRAIN
- WORKS EXTENT (TOTAL AREA: 6.5Ha)
- WORKS COMPOUND



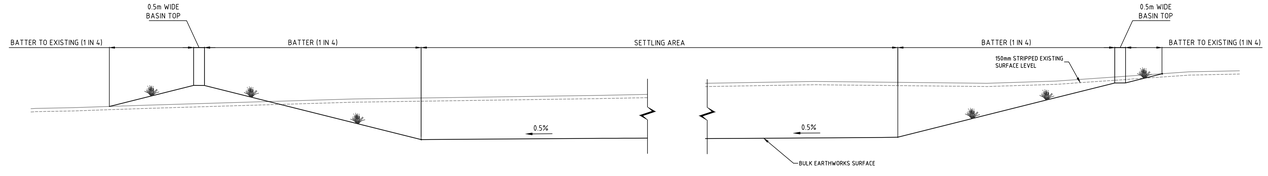
TYPICAL ROAD SECTION 1

N.T.S



TYPICAL ROAD SECTION 2

N.T.S



SEDIMENT BASIN TYPICAL SECTION

N.T.S

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Rev	Description	Date	By	App
B	ISSUED FOR REF SUBMISSION	06.12.22	DH	SN
A	ISSUED FOR REF SUBMISSION	30.11.22	DH	SN

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Project Name: SOIL CONSERVATION WORKS PRINCES HWY, MORUYA NSW 2537

Drawing Title: SITE WORKS PLAN

REF SUBMISSION

Designed	AM	Approved	North
Drawn	DH	SN	Date NOV. 2022
Scale	1:1000		
Date	NOV. 2022	Project Ref	Drawing No Rev
Sheet	A0	ERH-HI-CV-DWG-DD-01-PW-0530	B

Plotted: 06.12.22 at 4:06 PM By: Dunjay Herrera

Section 10.7 Certificates

Eurobodalla Shire Council
10.7 Planning Certificate

SECTION 10.7 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

Certificate No:	PL1802/21
Receipt No:	D000379242
Date of Issue:	30 March 2021
Reference:	E3394PL hl
Land ID:	36130

Applicant: Jk Environments Pty Ltd
mrichards@jkgroup.net.au

Property Description: Braemar Drive MORUYA NSW 2537
Lot 6 DP 1212271

Section A: Advice provided in accordance with Section 10.7(2).

Local Environmental Plans (LEP) Zoning and Draft LEPs (including Planning Proposals)

The following LEPs, Zones and Draft Plans apply to the land the subject of the Certificate:

Eurobodalla Local Environmental Plan 2012 - **R2 Low Density Residential**

Current version for 28 October 2020

1 Objectives of zone
- To provide for the housing needs of the community within a low density residential environment.
- To enable other land uses that provide facilities or services to meet the day to day needs of residents.
- To encourage residential development that is consistent with the character of the neighbourhood.

2 Permitted without consent
Environmental protection works; Home occupations

3 Permitted with consent
Bed and breakfast accommodation; Boarding houses; Building identification signs; Business identification signs; Centre-based child care facilities; Community facilities; Dual occupancies; Dwelling houses; Emergency services facilities; Environmental facilities; Exhibition homes; Exhibition villages; Group homes; Health consulting rooms; Home-based child care; Home businesses; Home industries; Hostels; Multi dwelling housing; Neighbourhood shops; Oyster aquaculture; Places of public worship; Pond-based aquaculture; Recreation areas; Respite day care centres; Roads; Secondary dwellings; Seniors housing; Sewerage systems; Shop top housing; Tank-based aquaculture; Water supply systems

4 Prohibited
Any development not specified in item 2 or 3

Eurobodalla Local Environmental Plan 2012 - **RU1 Primary Production**

Current version for 28 October 2020

1 Objectives of zone
- To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.
- To encourage diversity in primary industry enterprises and systems appropriate for the area.
- To minimise the fragmentation and alienation of resource lands.
- To minimise conflict between land uses within this zone and land uses within adjoining zones.
- To minimise the visual impact of development on the rural landscape.
- To provide for recreational and tourist activities that support the agricultural, environmental and conservation value of the land.

2 Permitted without consent
Environmental protection works; Extensive agriculture; Forestry; Home occupations

3 Permitted with consent
Agriculture; Animal boarding or training establishments; Aquaculture; Camping grounds; Cellar door premises; Dual occupancies; Dwelling houses; Eco-tourist facilities; Extractive industries; Farm buildings; Funeral homes; Home industries; Intensive livestock agriculture; Intensive plant agriculture; Landscaping material supplies; Open cut mining; Plant nurseries; Restaurants or cafes; Roads; Roadside stalls; Rural industries; Rural supplies; Secondary dwellings; Tourist and visitor accommodation; Any other development not specified in item 2 or 4

4 Prohibited

Advertising structures; Amusement centres; Business premises; Caravan parks; Centre-based child care facilities; Entertainment facilities; Heavy industrial storage establishments; Hotel or motel accommodation; Industrial retail outlets; Industries; Office premises; Residential accommodation; Restricted premises; Retail premises; Serviced apartments; Sex services premises; Vehicle body repair workshops; Vehicle repair stations

State Environmental Planning Policies (SEPP) and Deemed State Environmental Planning Policies

SEPP's that apply on a Shire wide basis:

State Environmental Planning Policy No.1 - Development Standards
State Environmental Planning Policy No.21 - Caravan Parks
State Environmental Planning Policy No.32 - Urban Consolidation (Redevelopment of Urban Land)
State Environmental Planning Policy No.33 - Hazardous and Offensive Development
State Environmental Planning Policy No.36 - Manufactured Home Estates
State Environmental Planning Policy No.50 - Canal Estates
State Environmental Planning Policy No.55 - Remediation of Land
State Environmental Planning Policy No.64 - Advertising and Signage
State Environmental Planning Policy No.65 - Design Quality of Residential Flat Development
State Environmental Planning Policy No.70 – Affordable Housing (Revised Schemes)
State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004
State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004
State Environmental Planning Policy (Major Development) 2005
State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007
State Environmental Planning Policy (Infrastructure) 2007
State Environmental Planning Policy (Rural Lands) 2008
State Environmental Planning Policy (Affordable Rental Housing) 2009
State Environmental Planning Policy (State and Regional Development) 2011
State Environmental Planning Policy (Educational Establishments and Child Care Facilities) 2017
State Environmental Planning Policy (Primary Production and Rural Development) 2019
State Environmental Planning Policy (Koala Habitat Protection) 2019

SEPPs that apply specifically to this land:

State Environment Planning Policy (Coastal Management) 2018 (Part Lot)

State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017 applies to all or part of the land.

State Environmental Planning Policy (Exempt and Complying Development Codes) 2008
- Housing Code
- Rural Housing Code
- Low Rise Housing Diversity Code
- Greenfield Housing Code
- Inland Code
- Housing Alterations Code
- General Development code
- Commercial and Industrial Alterations code
- Commercial and Industrial (New Buildings and Additions Code)
- Container Recycling Facilities Code
- Subdivisions Code
- Demolition Code
- Fire Safety Code

The above Codes may apply subject to the development meeting the specific standards and land requirements identified in the Codes. Further information about how these Codes apply to the subject land can be found in Section 5 of this Certificate.

Development Control Plans (DCP)

The following DCPs apply to the land the subject of the Certificate:

Residential Zones DCPEurobodalla Rural, R5 Large Lot Residential and E4 Environmental Living Zones Development Control Plan

Other Prescribed Information

1. Minimum Land Dimensions

There is no development standard applying to the land to fix minimum land dimensions for the erection of a dwelling house.

2. Critical Habitat

Council has received no advice that the land includes or comprises critical habitat.

3. Conservation Area

The land is not within a Conservation Area.

4. Heritage Listing

An item of environmental heritage is not situated on the land

5. Complying Development

Complying Development under State Environmental planning policy (Exempt and Complying Development Codes) 2008 may not be carried out on the land (or part of the land) because of the provisions set out under clause 1.17A (1) (c) to (e), (2), (3) and (4), 1.18 (1) (c3) and 1.19 of that Policy.

The land (or part) is identified on an Acid Sulfate Soils Map as class 1 or 2. Complying Development under State Environmental Planning Policy (Exempt & Complying Development Codes) 2008 (General Housing Code, Rural Housing Code and Commercial and Industrial New Buildings and Additions Code) may not be carried out on the land (or part of the land) because of the provisions of clause 1.19 of that Policy,as the land (or part of the land) is identified on an acid sulfate soils map as class 1 or 2.

Complying development under the above mentioned Codes may be carried out on any part of the land not so identified.

Complying development may be carried out on the land under Codes not mentioned above.

6. Annual Charges for Coastal Protection Services under Local Government Act 1993

No annual charges for coastal protection services that relate to the land apply.

7. Mine Subsidence

The land has not been proclaimed a mine subsidence district within the meaning of Section 15 of the Mine Subsidence Compensation Act 1961

8. Road Widening and Road Realignment

The land is not affected by a road widening or realignment under Division 2 of Part 3 of the Roads Act 1993, or any Environmental Planning Instrument or by any Resolution of the Council.

9. Council and Other Public Authority Policies on Hazard Risk Restrictions

The land is identified as Acid Sulfate Soils Class 1 or 2. Clause 6.3 of the Euobodalla Local Environmental Plan 2012 applies.

10. Flood Related Development Controls Information

Council considers that the land subject to this certificate is below 1:100 year flooding planning level and therefore the Moruya Floodplain Code (10 July 2012) does impose flood related development controls.

11. Land Reserved for Acquisition

There is no provision within the Eurobodalla Local Environmental Plans for the acquisition of the land by a public authority.

12. Contribution Plans

The following Contribution plans apply to the land:
(For further information please make separate enquires with Council)

1) Development Contributions Plan 2000-2005 Eurobodalla Shire Council
2) S94A Levy Contributions Plan 2007
3) Planning Agreements Policy 2006
4) Local Infrastructure Contributions Plan 2012

13. Biodiversity Certified Land

Council has received no advice that the land is Biodiversity Certified land under Part 8 of the Biodiversity Conservation Act 2016. Biodiversity certified land includes land certified under Part 7AA of the Threatened Species Conservation Act 1995.

13a. Biodiversity Stewardship Sites

Council has received no advice that the land is a biodiversity stewardship site under a biodiversity stewardship agreement under Part 5 of the Biodiversity Conservation Act 2016. Biodiversity stewardship agreements include biobanking agreements under Part 7A of the Threatened Species Conservation Act 1995.

13b. Native Vegetation clearing set asides

Council has received no advice that the land contains a set aside area under section 60ZC of the Local Land Services Act 2013.

14. Matters Arising under the Contaminated Land Management Act 1997

Council has received no advice that the land is subject to any matter under the Contaminated Land Management Act 1997

15. Bushfire Prone Land

The land is not bushfire prone land

16. Property Vegetation Plans

Council has received no advice that a Property Vegetation Plan under the Native Vegetation Act 2003 applies to the land.

17. Orders under Trees (Disputes Between Neighbours) Act 2006

Council has received no advice that the land is subject to an order.

18. Directions under Part 3A

Council has received no advice that the land is subject to an order or that a direction under Part 3A applies to the land.

19. Site Compatibility Certificates and Conditions for Seniors Housing

Council has received no advice that a site compatibility certificate under Clause 25 of State Environmental Planning Policy (Housing for seniors or People with a disability) 2004 applies to the land.

20. Site Compatibility Certificates for Infrastructure

Council has received no advice that a site compatibility certificate under Clause 19 of State Environmental Planning Policy (Infrastructure) 2007 applies to the land

21. Site Compatibility Certificates and Conditions for Affordable Rental Housing

Council has received no advice that a site compatibility certificate OR conditions for affordable rental housing have been imposed to a Development Application in respect of the land under clause 17(1) or 38(1) of State Environment Planning Policy (Affordable Rental Housing) 2009

22. Loose-Fill Asbestos Insulation

Council has received no advice that the land is identified on the Loose-Fill Asbestos Insulation Register.

Section B: Additional information provided under Section 10.7(5) of the Act.

This land upon development or subdivision, which requires the consent of Council, may become liable for contributions under the Development Servicing Plans for Water and/or Sewerage.
Council has received no advice that a Conservation Agreement under Division 3 of Part 5 of the Biodiversity Conservation Act 2016 applies to the land. This includes agreements entered into under section 68B of the National Parks and Wildlife Act 1974.

This land is identified on the vegetation and biodiversity corridors map in the Local Strategic Planning Statement. Development must take into consideration potential impacts to vegetation and/or biodiversity corridors which may require a biodiversity impact assessment, in accordance with Part 7 of the Biodiversity Conservation Act 2016.

Loose-Fill Asbestos - Advisory Note

Some residential homes located in the Eurobodalla Shire Council have been identified as containing loose-fill asbestos insulation, for example in the roof space. NSW Fair Trading maintains a Register of homes that are affected by loose-fill asbestos insulation.

You should make your own enquiries as to the age of the buildings on the land to which this certificate relates and, if it contains a building constructed prior to 1980, the council strongly recommends that any potential purchaser obtain advice from a licensed asbestos assessor to determine whether loose-fill asbestos is present in any building on the land and, if so, the health risks (id any) this may pose for the building's occupants.

Contact NSW Fair Trading for further information 137 788.

Description of any development consent concerning the land granted since 2000. Please note: not all historic records are available electronically and may not be displayed below. Conditions may apply to the consent or it may have lapsed. Purchasers should enquire further if they need to establish the status of approvals for this land.

Please Note:

This Council has made no inspection of the property for the purpose of this certificate.
Purchasers should satisfy themselves that there are no breaches of the Environmental Planning and Assessment Act 1979 in respect to the use or development of the property.

ADDITIONAL POLICIES AND OR CODES THAT MAY APPLY TO THE LAND

Eurobodalla Advertisement and Notification Code
Eurobodalla Footpath Trading Code
Eurobodalla Landscaping Code
Eurobodalla Parking and Access Code
Eurobodalla Safer by Design Code
Eurobodalla Signage Code
Eurobodalla Site Waste Minimisation and Management Code
Eurobodalla Soil and Water Management Code
Eurobodalla Tree Preservation Code
Design guidelines for rainwater tanks where an existing reticulated water supply exists
Moruya Floodplain Code
Interim Coastal Hazard Adaptation Code

Further information on these policies & strategies visit Council's website www.esc.nsw.gov.au or phone 4474 1000.

The National Parks and Wildlife Act 1974 provides protection to Aboriginal heritage objects and places on all land within New South Wales. Certain land within the Eurobodalla Shire may contain Aboriginal heritage that may have significance to the Aboriginal community. It may be advisable for potential purchasers of land to undertake appropriate searches to determine whether Aboriginal heritage objects or places have been previously recorded on that land.

The Office of Environment and Heritage, Climate Change and Water maintains a database of all previously recorded Aboriginal heritage objects and places called the Aboriginal Heritage Information Management System (AHIMS). You can check whether there are any previously recorded Aboriginal heritage object and places by contacting the AHIMS Registrar at Department of Environment Climate Change on 1300 305 695.

If you require further information on this certificate please contact Council's Duty Development Team on 4474 1231

Catherine Dale

Dr C Dale
General Manager

Appendix C: Laboratory Results Summary Tables

ABBREVIATIONS AND EXPLANATIONS

Abbreviations used in the Tables:

ABC:	Ambient Background Concentration
ACM:	Asbestos Containing Material
ADWG:	AustralianDrinking Water Guidelines
AF:	Asbestos Fines
ANZG	Australian and New Zealand Guidelines
B(a)P:	Benzo(a)pyrene
CEC:	Cation Exchange Capacity
CRC:	Cooperative Research Centre
CT:	Contaminant Threshold
EILs:	Ecological Investigation Levels
ESLs:	Ecological Screening Levels
FA:	Fibrous Asbestos
GIL:	Groundwater Investigation Levels
GSW:	General Solid Waste
HILs:	Health Investigation Levels
HSLs:	Health Screening Levels
HSL-SSA:	Health Screening Level-SiteSpecific Assessment
kg/L	kilograms per litre
NA:	Not Analysed
NC:	Not Calculated
NEPM:	National Environmental Protection Measure
NHMRC:	National Health and Medical Research Council
NL:	Not Limiting
NSL:	No Set Limit
OCP:	Organochlorine Pesticides
OPP:	Organophosphorus Pesticides
PAHs:	Polycyclic Aromatic Hydrocarbons
%w/w:	weight per weight
ppm:	Parts per million
PCBs:	Polychlorinated Biphenyls
PCE:	Perchloroethylene (Tetrachloroethylene or Teterachloroethene)
pH_{KCL} :	pH of filtered 1:20, 1M KCL extract, shaken overnight
pH_{ox} :	pH of filtered 1:20 1M KCl after peroxide digestion
PQL:	Practical Quantitation Limit
RS:	Rinsate Sample
RSL:	Regional Screening Levels
RSW:	Restricted Solid Waste
SAC:	Site Assessment Criteria
SCC:	Specific Contaminant Concentration
S_{Cr}:	Chromium reducible sulfur
S_{POS}:	Peroxide oxidisable Sulfur
SSA:	Site Specific Assessment
SSHSLs:	Site Specific Health Screening Levels
TAA:	Total Actual Acidity in 1M KCL extract titrated to pH6.5
TB:	Trip Blank
TCA:	1,1,1 Trichloroethane (methyl chloroform)
TCE:	Trichloroethylene (Trichloroethene)
TCLP:	Toxicity Characteristics Leaching Procedure
TPA:	Total Potential Acidity, 1M KCL peroxide digest
TS:	Trip Spike
TRH:	Total Recoverable Hydrocarbons
TSA:	Total Sulfide Acidity (TPA-TAA)
UCL:	Upper Level Confidence Limit on Mean Value
USEPA	United States Environmental Protection Agency
VOCC:	Volatile Organic Chlorinated Compounds
WHO:	World Health Organisation

Table Specific Explanations:

HIL Tables:

- The chromium results are for Total Chromium which includes Chromium III and VI. For initial screening purposes, we have assumed that the samples contain only Chromium VI unless demonstrated otherwise by additional analysis.
- Carcinogenic PAHs is a toxicity weighted sum of analyte concentrations for a specific list of PAH compounds relative to B(a)P. It is also 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:

Site specific ABC values for specific metals have been adopted.

Waste Classification and TCLP Table:

- Data assessed using the NSW EPA Waste Classification Guidelines, Part 1: Classifying Waste (2014).
- The assessment of Total Moderately Harmful pesticides includes: Dichlorovos, Dimethoate, Fenitrothion, Ethion, Malathion and Parathion.
- Assessment of Total Scheduled pesticides include: HBC, alpha-BHC, gamma-BHC, beta-BHC, Heptachlor, Aldrin, Heptachlor Epoxide, gamma-Chlordane, alpha-chlordane, pp-DDE, Dieldrin, Endrin, pp-DDD, pp-DDT, Endrin Aldehyde.

QA/QC Table:

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

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

All data in mg/kg unless stated otherwise			HEAVY METALS								PAHs		ORGANOCHLORINE PESTICIDES (OCPs)							OP PESTICIDES (OPPs)	TOTAL PCBs	TOTAL Phenols	ASBESTOS FIBRES
			Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Total PAHs	Carcinogenic PAHs	HCB	Endosulfan	Methoxychlor	Aldrin & Dieldrin	Chlordane	DDT, DDD & DDE	Heptachlor	Chlorpyrifos			
PQL - Envirolab Services			4	0.4	1	1	1	0.1	1	1	-	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	5	100
Site Assessment Criteria (SAC)			100	20	100	6000	300	40	400	7400	300	3	10	270	300	6	50	240	6	160	1	3000	Detected/Not Detected
Sample Reference	**Sample Depth**	**Sample Description**																					
BH1	0-0.1	Fill: Silty sandy clay	<4	<0.4	**1**	<1	**5**	<0.1	<1	**5**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	Not Detected
BH2	0-0.1	Fill: Silty sandy clay	<4	<0.4	**2**	<1	**5**	<0.1	**1**	**4**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	Not Detected
BH4	0-0.1	Fill: Silty sandy clay	<4	<0.4	**1**	<1	**3**	<0.1	<1	**4**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	Not Detected
BH4 - [LAB_DU	0-0.1	Fill: Silty sandy clay	<4	<0.4	**1**	<1	**3**	<0.1	<1	**5**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	NA
BH7	0-0.1	Fill: Silty sandy clay	<4	<0.4	**3**	**1**	**4**	<0.1	**1**	**11**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	Not Detected
BH11	0-0.1	Fill: Silty sandy clay	<4	<0.4	**1**	<1	**3**	<0.1	<1	**3**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	Not Detected
BH12	0-0.1	Fill: Silty sandy clay	<4	<0.4	**1**	<1	**3**	<0.1	<1	**5**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	Not Detected
BH13	0-0.1	Fill: Silty sandy clay	<4	<0.4	**1**	<1	**3**	<0.1	<1	**3**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	Not Detected
BH17	0-0.1	Fill: Silty sandy clay	<4	<0.4	**1**	**1**	**3**	<0.1	<1	**7**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	Not Detected
BH20	0-0.1	Fill: Silty sandy clay	<4	<0.4	**2**	<1	**3**	<0.1	<1	**7**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	Not Detected
BH22	0-0.1	Fill: Silty sandy clay	<4	<0.4	**1**	<1	**4**	<0.1	<1	**4**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	Not Detected
BH24	0-0.1	Fill: Silty sandy clay	<4	<0.4	**1**	<1	**3**	<0.1	<1	**5**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	Not Detected
BH26	0-0.1	Fill: Silty sandy clay	<4	<0.4	**2**	<1	**4**	<0.1	<1	**5**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	Not Detected
BH26	0.2-0.3	Silty sandy clay	<4	<0.4	**3**	<1	**3**	<0.1	**1**	**7**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	NA
BH27	0-0.1	Fill: Silty sandy clay	<4	<0.4	**2**	<1	**4**	<0.1	**1**	**7**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	Not Detected
BH28	0-0.1	Fill: Silty sandy clay	<4	<0.4	<1	<1	**3**	<0.1	<1	**3**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	Not Detected
BH29	0-0.1	Fill: Silty sandy clay	<4	<0.4	**7**	**3**	**11**	<0.1	**5**	**11**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	Not Detected
BH29	0.2-0.3	Fill: Silty sandy clay	<4	<0.4	**8**	**1**	**14**	<0.1	**5**	**11**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	NA
BH29 - [LAB_DU	0.2-0.3	Fill: Silty sandy clay	<4	<0.4	**7**	**1**	**13**	<0.1	**4**	**9**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	NA
BH33	0-0.1	Fill: Silty sandy clay	<4	<0.4	**3**	<1	**5**	<0.1	**1**	**4**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	Not Detected
BH35	0-0.1	Fill: Silty sandy clay	<4	<0.4	**2**	**1**	**5**	<0.1	<1	**5**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	Not Detected
SDUP1	-	Fill: Silty sandy clay	<4	<0.4	**2**	**2**	**4**	<0.1	**1**	**5**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	NA
SDUP2	-	Fill: Silty sandy clay	<4	<0.4	**2**	<1	**4**	<0.1	<1	**2**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	NA	NA
SDUP2 (lab rep	-	Fill: Silty sandy clay	NA	NA	NA	NA	NA	NA	NA	NA	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	<0.1	<0.3	NA	NA
Total Number of Samples			23	23	23	23	23	23	23	23	24	24	23	23	23	23	23	23	23	24	24	19	17
Maximum Value			<PQL	<PQL	8	3	14	<PQL	5	11	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	Not Detected

Concentration above the SAC **VALUE**
Concentration above the PQL **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 Category					**HSL-A/B: LOW/HIGH DENSITY RESIDENTIAL**							
Sample Reference	**Sample Depth**	**Sample Description**	**Depth Category**	**Soil Category**								
BH1	0-0.1	Fill: Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH2	0-0.1	Fill: Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH4	0-0.1	Fill: Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH4 - [LAB_DUP]	0-0.1	Fill: Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH7	0-0.1	Fill: Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH11	0-0.1	Fill: Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH12	0-0.1	Fill: Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH13	0-0.1	Fill: Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH17	0-0.1	Fill: Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH20	0-0.1	Fill: Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH22	0-0.1	Fill: Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH24	0-0.1	Fill: Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH26	0-0.1	Fill: Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH26	0.2-0.3	Silty sandy clay	0m to <1m	Sand	<25	**75**	<0.2	<0.5	<1	<3	<1	2
BH27	0-0.1	Fill: Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH28	0-0.1	Fill: Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH29	0-0.1	Fill: Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH29	0.2-0.3	Fill: Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH29 - [LAB_DUP]	0.2-0.3	Fill: Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH33	0-0.1	Fill: Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH35	0-0.1	Fill: Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
SDUP1	-	Fill: Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	-
SDUP2	-	Fill: Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	-
SDUP2 (lab replicate)	-	Fill: Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	-
Total Number of Samples					24	24	24	24	24	24	24	21
Maximum Value					<PQL	75	<PQL	<PQL	<PQL	<PQL	<PQL	2

Concentration above the SAC **VALUE**
Concentration above the PQL **Bold**
The guideline corresponding to the concentration above the SAC is highlighted in grey in the Site Assessment Criteria Table below

HSL SOIL ASSESSMENT CRITERIA

Sample Reference	**Sample Depth**	**Sample Description**	**Depth Category**	**Soil Category**	C_6-C_{10} (F1)	>C_{10}-C_{16} (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene
BH1	0-0.1	Fill: Silty sandy clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH2	0-0.1	Fill: Silty sandy clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH4	0-0.1	Fill: Silty sandy clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH4 - [LAB_DUP]	0-0.1	Fill: Silty sandy clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH7	0-0.1	Fill: Silty sandy clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH11	0-0.1	Fill: Silty sandy clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH12	0-0.1	Fill: Silty sandy clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH13	0-0.1	Fill: Silty sandy clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH17	0-0.1	Fill: Silty sandy clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH20	0-0.1	Fill: Silty sandy clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH22	0-0.1	Fill: Silty sandy clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH24	0-0.1	Fill: Silty sandy clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH26	0-0.1	Fill: Silty sandy clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH26	0.2-0.3	Silty sandy clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH27	0-0.1	Fill: Silty sandy clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH28	0-0.1	Fill: Silty sandy clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH29	0-0.1	Fill: Silty sandy clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH29	0.2-0.3	Fill: Silty sandy clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH29 - [LAB_DUP]	0.2-0.3	Fill: Silty sandy clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH33	0-0.1	Fill: Silty sandy clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH35	0-0.1	Fill: Silty sandy clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
SDUP1	-	Fill: Silty sandy clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
SDUP2	-	Fill: Silty sandy clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
SDUP2 (lab replicate)	-	Fill: Silty sandy clay	0m to <1m	Sand	45	110	0.5	160	55	40	3

JKEnvironments

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

			C_6-C_{10} (F1) plus BTEX	>C_{10}-C_{16} (F2) plus napthalene	>C_{16}-C_{34} (F3)	>C_{34}-C_{40} (F4)
PQL - Envirolab Services			25	50	100	100
NEPM 2013 Land Use Category			**RESIDENTIAL, PARKLAND & PUBLIC OPEN SPACE**			
Sample Reference	**Sample Depth**	**Soil Texture**				
BH1	0-0.1	Coarse	<25	<50	<100	<100
BH2	0-0.1	Coarse	<25	<50	<100	<100
BH4	0-0.1	Coarse	<25	<50	<100	<100
BH4 - [LAB_DUP]	0-0.1	Coarse	<25	<50	<100	<100
BH7	0-0.1	Coarse	<25	<50	<100	<100
BH11	0-0.1	Coarse	<25	<50	<100	<100
BH12	0-0.1	Coarse	<25	<50	<100	<100
BH13	0-0.1	Coarse	<25	<50	<100	<100
BH17	0-0.1	Coarse	<25	<50	<100	<100
BH20	0-0.1	Coarse	<25	<50	<100	<100
BH22	0-0.1	Coarse	<25	<50	<100	<100
BH24	0-0.1	Coarse	<25	<50	<100	<100
BH26	0-0.1	Coarse	<25	<50	<100	<100
BH26	0.2-0.3	Coarse	<25	**75**	**100**	<100
BH27	0-0.1	Coarse	<25	<50	<100	<100
BH28	0-0.1	Coarse	<25	<50	<100	<100
BH29	0-0.1	Coarse	<25	<50	<100	<100
BH29	0.2-0.3	Coarse	<25	<50	<100	<100
BH29 - [LAB_DUP]	0.2-0.3	Coarse	<25	<50	<100	<100
BH33	0-0.1	Coarse	<25	<50	<100	<100
BH35	0-0.1	Coarse	<25	<50	<100	<100
SDUP1	-	Coarse	<25	<50	<100	<100
SDUP2	-	Coarse	<25	<50	<100	<100
SDUP2 (lab replicate)	-	Coarse	<25	<50	<100	<100
Total Number of Samples			24	24	24	24
Maximum Value			<PQL	75	100	<PQL

Concentration above the SAC **VALUE**
Concentration above the PQL **Bold**

TABLE S4
SOIL LABORATORY RESULTS COMPARED T0 DIRECT CONTACT CRITERIA
All data in mg/kg unless stated otherwise

Analyte		C_6-C_{10}	>C_{10}-C_{16}	>C_{16}-C_{34}	>C_{34}-C_{40}	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	PID
PQL - Envirolab Services		25	50	100	100	0.2	0.5	1	1	1	
CRC 2011 -Direct contact Criteria		4,400	3,300	4,500	6,300	100	14,000	4,500	12,000	1,400	
Site Use		RESIDENTIAL WITH ACCESSIBLE SOIL- DIRECT SOIL CONTACT									
Sample Reference	**Sample Depth**										
BH1	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH2	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH4	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH4 - [LAB_DUP]	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH7	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH11	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH12	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH13	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH17	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH20	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH22	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH24	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH26	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH26	0.2-0.3	<25	**75**	**100**	<100	<0.2	<0.5	<1	<3	<1	**2**
BH27	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH28	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH29	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH29	0.2-0.3	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH29 - [LAB_DUP]	0.2-0.3	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH33	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH35	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
SDUP1	-	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	-
SDUP2	-	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	-
SDUP2 (lab replicate)	-	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	-
Total Number of Samples		24	24	24	24	24	24	24	24	24	21
Maximum Value		<PQL	75	100	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	2

Concentration above the SAC **VALUE**
Concentration above the PQL **Bold**

TABLE S5
ASBESTOS QUANTIFICATION - FIELD OBSERVATIONS AND LABORATORY RESULTS
HSL-A: Residential with garden/accessible soils; children's day care centers; preschools; and primary schools

LABORATORY DATA												
Date Sampled	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 AF Estimation %(w/w)
SAC											**0.01**	**0.001**
13/04/2021	266931	BH1	0-0.1	508.33	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
13/04/2021	266931	BH2	0-0.1	728.01	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
20/04/2021	267510	BH4	0-0.1	511.01	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
21/04/2021	267510	BH7	0-0.1	389.31	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
14/04/2021	266931	BH11	0-0.1	705.26	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
15/04/2021	267510	BH12	0-0.1	586.2	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
15/04/2021	266931	BH13	0-0.1	677.48	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
14/04/2021	266931	BH17	0-0.1	630.67	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
17/04/2021	267510	BH20	0-0.1	529.53	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
15/04/2021	266931	BH22	0-0.1	631.16	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
16/04/2021	267510	BH24	0-0.1	628.52	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
16/04/2021	267510	BH26	0-0.1	517.47	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
15/04/2021	267510	BH27	0-0.1	561.42	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
19/04/2021	267510	BH28	0-0.1	501.22	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
19/04/2021	267510	BH29	0-0.1	240.78	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected: Synthetic mineral fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
20/04/2021	267510	BH33	0-0.1	578.45	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
19/04/2021	267510	BH35	0-0.1	575.17	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001

Concentration above the SAC **VALUE**

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TABLE S6
SOIL LABORATORY RESULTS COMPARED TO NEPM 2013 EILs AND ESLs
All data in mg/kg unless stated otherwise

Land Use Category				URBAN RESIDENTIAL AND PUBLIC OPEN SPACE																	
							AGED HEAVY METALS-EILs						EILs		ESLs						
				pH	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
PQL - 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 Concentration (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**																				
BH1	0-0.1	Fill: Silty sandy clay	Coarse	**5.9**	**3.05**	**25**	<4	**1**	<1	**5**	<1	**5**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH2	0-0.1	Fill: Silty sandy clay	Coarse	**5.9**	**3.05**	**25**	<4	**2**	<1	**5**	**1**	**4**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH4	0-0.1	Fill: Silty sandy clay	Coarse	**5.9**	**3.05**	**25**	<4	**1**	<1	**3**	<1	**4**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH4 - [LAB_DUP]	0-0.1	Fill: Silty sandy clay	Coarse	**5.9**	**3.05**	**25**	<4	**1**	<1	**3**	<1	**5**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH7	0-0.1	Fill: Silty sandy clay	Coarse	**5.9**	**3.05**	**25**	<4	**3**	**1**	**4**	**1**	**11**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH11	0-0.1	Fill: Silty sandy clay	Coarse	**5.9**	**3.05**	**25**	<4	**1**	<1	**3**	<1	**3**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH12	0-0.1	Fill: Silty sandy clay	Coarse	**5.9**	**3.05**	**25**	<4	**1**	<1	**3**	<1	**5**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH13	0-0.1	Fill: Silty sandy clay	Coarse	**5.9**	**3.05**	**25**	<4	**1**	<1	**3**	<1	**3**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH17	0-0.1	Fill: Silty sandy clay	Coarse	**5.9**	**3.05**	**25**	<4	**1**	**1**	**3**	<1	**7**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH20	0-0.1	Fill: Silty sandy clay	Coarse	**5.9**	**3.05**	**25**	<4	**2**	<1	**3**	<1	**7**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH22	0-0.1	Fill: Silty sandy clay	Coarse	**5.9**	**3.05**	**25**	<4	**1**	<1	**4**	<1	**4**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH24	0-0.1	Fill: Silty sandy clay	Coarse	**5.9**	**3.05**	**25**	<4	**1**	<1	**3**	<1	**5**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH26	0-0.1	Fill: Silty sandy clay	Coarse	**5.9**	**3.05**	**25**	<4	**2**	<1	**4**	<1	**5**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH26	0.2-0.3	Silty sandy clay	Coarse	**5.9**	**3.05**	**25**	<4	**3**	<1	**3**	**1**	**7**	<1	<0.1	<25	**75**	**100**	<100	<0.2	<0.5	<1	<3	<0.05
BH27	0-0.1	Fill: Silty sandy clay	Coarse	**5.9**	**3.05**	**25**	<4	**2**	<1	**4**	**1**	**7**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH28	0-0.1	Fill: Silty sandy clay	Coarse	**5.9**	**3.05**	**25**	<4	<1	<1	**3**	<1	**3**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH29	0-0.1	Fill: Silty sandy clay	Coarse	**5.9**	**3.05**	**25**	<4	**7**	**3**	**11**	**5**	**11**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH29	0.2-0.3	Fill: Silty sandy clay	Coarse	**5.9**	**3.05**	**25**	<4	**8**	**1**	**14**	**5**	**11**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH29 - [LAB_DUP]	0.2-0.3	Fill: Silty sandy clay	Coarse	**5.9**	**3.05**	**25**	<4	**7**	**1**	**13**	**4**	**9**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH33	0-0.1	Fill: Silty sandy clay	Coarse	**5.9**	**3.05**	**25**	<4	**3**	<1	**5**	**1**	**4**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH35	0-0.1	Fill: Silty sandy clay	Coarse	**5.9**	**3.05**	**25**	<4	**2**	**1**	**5**	<1	**5**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
SDUP1	-	Fill: Silty sandy clay	Coarse	**5.9**	**3.05**	**25**	<4	**2**	**2**	**4**	**1**	**5**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
SDUP2	-	Fill: Silty sandy clay	Coarse	**5.9**	**3.05**	**25**	<4	**2**	<1	**4**	<1	**2**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
SDUP2 (lab replicate)	-	Fill: Silty sandy clay	Coarse	**5.9**	**3.05**	**25**	NA	NA	NA	NA	NA	NA	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
Total Number of Samples				24	24	24	23	23	23	23	23	23	24	23	24	24	24	24	24	24	24	24	24
Maximum Value				5.9	3.05	25	<PQL	8	3	14	5	11	<PQL	<PQL	<PQL	75	100	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL

Concentration above the SAC **VALUE**
Concentration above the PQL **Bold**
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	pH	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
BH1	0-0.1	Fill: Silty sandy clay	Coarse	5.9	3.05	25	100	410	120	1300	35	350	170	180	180	120	300	2800	50	85	70	105	20
BH2	0-0.1	Fill: Silty sandy clay	Coarse	5.9	3.05	25	100	410	120	1300	35	350	170	180	180	120	300	2800	50	85	70	105	20
BH4	0-0.1	Fill: Silty sandy clay	Coarse	5.9	3.05	25	100	410	120	1300	35	350	170	180	180	120	300	2800	50	85	70	105	20
BH4 - [LAB_DUP]	0-0.1	Fill: Silty sandy clay	Coarse	5.9	3.05	25	100	410	120	1300	35	350	170	180	180	120	300	2800	50	85	70	105	20
BH7	0-0.1	Fill: Silty sandy clay	Coarse	5.9	3.05	25	100	410	120	1300	35	350	170	180	180	120	300	2800	50	85	70	105	20
BH11	0-0.1	Fill: Silty sandy clay	Coarse	5.9	3.05	25	100	410	120	1300	35	350	170	180	180	120	300	2800	50	85	70	105	20
BH12	0-0.1	Fill: Silty sandy clay	Coarse	5.9	3.05	25	100	410	120	1300	35	350	170	180	180	120	300	2800	50	85	70	105	20
BH13	0-0.1	Fill: Silty sandy clay	Coarse	5.9	3.05	25	100	410	120	1300	35	350	170	180	180	120	300	2800	50	85	70	105	20
BH17	0-0.1	Fill: Silty sandy clay	Coarse	5.9	3.05	25	100	410	120	1300	35	350	170	180	180	120	300	2800	50	85	70	105	20
BH20	0-0.1	Fill: Silty sandy clay	Coarse	5.9	3.05	25	100	410	120	1300	35	350	170	180	180	120	300	2800	50	85	70	105	20
BH22	0-0.1	Fill: Silty sandy clay	Coarse	5.9	3.05	25	100	410	120	1300	35	350	170	180	180	120	300	2800	50	85	70	105	20
BH24	0-0.1	Fill: Silty sandy clay	Coarse	5.9	3.05	25	100	410	120	1300	35	350	170	180	180	120	300	2800	50	85	70	105	20
BH26	0-0.1	Fill: Silty sandy clay	Coarse	5.9	3.05	25	100	410	120	1300	35	350	170	180	180	120	300	2800	50	85	70	105	20
BH26	0.2-0.3	Silty sandy clay	Coarse	5.9	3.05	25	100	410	120	1300	35	350	170	180	180	120	300	2800	50	85	70	105	20
BH27	0-0.1	Fill: Silty sandy clay	Coarse	5.9	3.05	25	100	410	120	1300	35	350	170	180	180	120	300	2800	50	85	70	105	20
BH28	0-0.1	Fill: Silty sandy clay	Coarse	5.9	3.05	25	100	410	120	1300	35	350	170	180	180	120	300	2800	50	85	70	105	20
BH29	0-0.1	Fill: Silty sandy clay	Coarse	5.9	3.05	25	100	410	120	1300	35	350	170	180	180	120	300	2800	50	85	70	105	20
BH29	0.2-0.3	Fill: Silty sandy clay	Coarse	5.9	3.05	25	100	410	120	1300	35	350	170	180	180	120	300	2800	50	85	70	105	20
BH29 - [LAB_DUP]	0.2-0.3	Fill: Silty sandy clay	Coarse	5.9	3.05	25	100	410	120	1300	35	350	170	180	180	120	300	2800	50	85	70	105	20
BH33	0-0.1	Fill: Silty sandy clay	Coarse	5.9	3.05	25	100	410	120	1300	35	350	170	180	180	120	300	2800	50	85	70	105	20
BH35	0-0.1	Fill: Silty sandy clay	Coarse	5.9	3.05	25	100	410	120	1300	35	350	170	180	180	120	300	2800	50	85	70	105	20
SDUP1	-	Fill: Silty sandy clay	Coarse	5.9	3.05	25	100	410	120	1300	35	350	170	180	180	120	300	2800	50	85	70	105	20
SDUP2	-	Fill: Silty sandy clay	Coarse	5.9	3.05	25	100	410	120	1300	35	350	170	180	180	120	300	2800	50	85	70	105	20
SDUP2 (lab replicate)	-	Fill: Silty sandy clay	Coarse	5.9	3.05	25	--	--	--	--	--	--	170	--	180	120	300	2800	50	85	70	105	20

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TABLE S7
SOIL LABORATORY RESULTS COMPARED TO WASTE CLASSIFICATION GUIDELINES
All data in mg/kg unless stated otherwise

			HEAVY METALS								PAHs		OC/OP PESTICIDES				Total PCBs	TRH					BTEX COMPOUNDS					ASBESTOS FIBRES
			Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Total PAHs	B(a)P	Total Endosulfans	Chloropyrifos	Total Moderately Harmful	Total Scheduled		C_6-C_9	C_{10}-C_{14}	C_{15}-C_{28}	C_{29}-C_{36}	Total C_{10}-C_{36}	Benzene	Toluene	Ethyl benzene	Total Xylenes	Total Phenols	
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	5	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	288	-
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	518	-
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	1,152	-
Restricted Solid Waste SCC2			2000	400	7600	NSL	6000	200	4200	NSL	800	23	432	30	1000	50	50	2600		NSL		40,000	72	2,073	4,320	7,200	2,073	-
Sample Reference	**Sample Depth**	**Sample Description**																										
BH1	0-0.1	Fill: Silty sandy clay	<4	<0.4	**1**	<1	**5**	<0.1	<1	**5**	<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	<5	Not Detected
BH2	0-0.1	Fill: Silty sandy clay	<4	<0.4	**2**	<1	**5**	<0.1	**1**	**4**	<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	<5	Not Detected
BH4	0-0.1	Fill: Silty sandy clay	<4	<0.4	**1**	<1	**3**	<0.1	<1	**4**	<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	<5	Not Detected
BH4 - [LAB_DU	0-0.1	Fill: Silty sandy clay	<4	<0.4	**1**	<1	**3**	<0.1	<1	**5**	<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	<5	NA
BH7	0-0.1	Fill: Silty sandy clay	<4	<0.4	**3**	**1**	**4**	<0.1	**1**	**11**	<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	<5	Not Detected
BH11	0-0.1	Fill: Silty sandy clay	<4	<0.4	**1**	<1	**3**	<0.1	<1	**3**	<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	<5	Not Detected
BH12	0-0.1	Fill: Silty sandy clay	<4	<0.4	**1**	<1	**3**	<0.1	<1	**5**	<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	<5	Not Detected
BH13	0-0.1	Fill: Silty sandy clay	<4	<0.4	**1**	<1	**3**	<0.1	<1	**3**	<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	<5	Not Detected
BH17	0-0.1	Fill: Silty sandy clay	<4	<0.4	**1**	**1**	**3**	<0.1	<1	**7**	<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	<5	Not Detected
BH20	0-0.1	Fill: Silty sandy clay	<4	<0.4	**2**	<1	**3**	<0.1	<1	**7**	<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	<5	Not Detected
BH22	0-0.1	Fill: Silty sandy clay	<4	<0.4	**1**	<1	**4**	<0.1	<1	**4**	<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	<5	Not Detected
BH24	0-0.1	Fill: Silty sandy clay	<4	<0.4	**1**	<1	**3**	<0.1	<1	**5**	<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	<5	Not Detected
BH26	0-0.1	Fill: Silty sandy clay	<4	<0.4	**2**	<1	**4**	<0.1	<1	**5**	<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	<5	Not Detected
BH26	0.2-0.3	Silty sandy clay	<4	<0.4	**3**	<1	**3**	<0.1	**1**	**7**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	**110**	<100	**110**	<0.2	<0.5	<1	<3	<5	NA
BH27	0-0.1	Fill: Silty sandy clay	<4	<0.4	**2**	<1	**4**	<0.1	**1**	**7**	<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	<5	Not Detected
BH28	0-0.1	Fill: Silty sandy clay	<4	<0.4	**<1**	<1	**3**	<0.1	<1	**3**	<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	<5	Not Detected
BH29	0-0.1	Fill: Silty sandy clay	<4	<0.4	**7**	**3**	**11**	<0.1	**5**	**11**	<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	<5	Not Detected
BH29	0.2-0.3	Fill: Silty sandy clay	<4	<0.4	**8**	**1**	**14**	<0.1	**5**	**11**	<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	<5	NA
BH29 - [LAB_DU	0.2-0.3	Fill: Silty sandy clay	<4	<0.4	**7**	**1**	**13**	<0.1	**4**	**9**	<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	<5	NA
BH33	0-0.1	Fill: Silty sandy clay	<4	<0.4	**3**	<1	**5**	<0.1	**1**	**4**	<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	<5	Not Detected
BH35	0-0.1	Fill: Silty sandy clay	<4	<0.4	**2**	**1**	**5**	<0.1	<1	**5**	<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	<5	Not Detected
SDUP1	-	Fill: Silty sandy clay	<4	<0.4	**2**	**2**	**4**	<0.1	**1**	**5**	<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	<5	NA
SDUP2	-	Fill: Silty sandy clay	<4	<0.4	**2**	<1	**4**	<0.1	<1	**2**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA	NA
SDUP2 (lab rep	-	Fill: Silty sandy clay	NA	NA	NA	NA	NA	NA	NA	NA	<0.05	<0.05	NA	<0.1	<0.1	<0.1	<0.3	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA	NA
Total Number of Samples			23	23	23	23	23	23	23	23	24	24	23	24	24	24	24	24	24	24	24	24	24	24	24	24	19	17
Maximum Value			<PQL	<PQL	8	3	14	<PQL	5	11	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	110	<PQL	110	<PQL	<PQL	<PQL	<PQL	<PQL	Not Detected

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

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TABLE Q1
SOIL QA/QC SUMMARY

	Sample	Depth	TRH C6 - C10	TRH >C10-C16	TRH >C16-C34	TRH >C34-C40	Benzene	Toluene	Ethylbenzene	m+p-xylene	o-Xylene
	PQL Envirolab SYD		*25*	*50*	*100*	*100*	*0.2*	*0.5*	*1*	*2*	*1*
	PQL Envirolab VIC		*25*	*50*	*100*	*100*	*0.2*	*0.5*	*1.0*	*2.0*	*1.0*
Intra laboratory duplicate	BH12	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1
	SDUP1	-	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1
	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc
Inter laboratory duplicate	BH7	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1
	SDUP2	-	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1
	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc
Field Blank	TBS1 13/04/21	-	NA	NA	NA	NA	<0.2	<0.5	<1	<2	<1
Field Blank	TBS2 22/04/21	-	NA	NA	NA	NA	<0.2	<0.5	<1	<2	<1
Trip Spike	TSS1 13/04/21		-	-	-	-	83%	85%	106%	106%	106%
Trip Spike	TSS2 22/04/21		-	-	-	-	92%	91%	91%	91%	92%

	Sample	Depth	Naphthalene	Acenaphthylene	Acenaph-thene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b,j+k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-c,d)pyrene	Dibenzo(a,h)anthra-cene	Benzo(g,h,i)perylene
	PQL Envirolab SYD		*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.2*	*0.05*	*0.1*	*0.1*	*0.1*
	PQL Envirolab VIC		*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*
Intra laboratory duplicate	BH12	0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
	SDUP1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Inter laboratory duplicate	BH7	0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
	SDUP2	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Field Blank	TBS1 13/04/21	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Field Blank	TBS2 22/04/21	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trip Spike	TSS1 13/04/21		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trip Spike	TSS2 22/04/21		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

	Sample	Depth	HCB	alpha- BHC	gamma- BHC	beta- BHC	Heptachlor	delta- BHC	Aldrin	Heptachlor Epoxide	Gamma- Chlordane	alpha- chlordane	Endosulfan I	pp- DDE	Dieldrin	Endrin	pp- DDD	Endosulfan II	pp- DDT	Endrin Aldehyde	Endosulfan Sulphate	Methoxychlor
	PQL Envirolab SYD		*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*
	PQL Envirolab VIC		*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*
Intra laboratory duplicate	BH12	0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	SDUP1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Inter laboratory duplicate	BH7	0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	SDUP2	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Field Blank	TBS1 13/04/21	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Field Blank	TBS2 22/04/21	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trip Spike	TSS1 13/04/21		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trip Spike	TSS2 22/04/21		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

	Sample	Depth	Azinphos-methyl (Guthion	Bromophos-ethyl	Chlorpyriphos	Chlorpyriphos-methyl	Diazinon	Dichlorvos	Dimethoate	Ethion	Fenitrothion	Malathion	Parathion	Ronnel	Total PCBS	Total Phenols	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
	PQL Envirolab SYD		*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*5*	*4*	*0.4*	*1*	*1*	*1*	*0.1*	*1*	*1*
	PQL Envirolab VIC		*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*-*	*4.0*	*0.4*	*1.0*	*1.0*	*1.0*	*0.1*	*1.0*	*1.0*
Intra laboratory duplicate	BH12	0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	<4	<0.4	1	<1	3	<0.1	<1	5
	SDUP1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	<4	<0.4	2	2	4	<0.1	1	5
	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	1.5	1.25	3.5	nc	0.75	5
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	67%	120%	29%	nc	67%	0%
Inter laboratory duplicate	BH7	0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	<4	<0.4	3	1	4	<0.1	1	11
	SDUP2	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	-	<4	<0.4	2	<1	4	<0.1	<1	2
	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	2.5	0.75	4	nc	0.75	6.5
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	40%	67%	0%	nc	67%	138%
Field Blank	TBS1 13/04/21	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Field Blank	TBS2 22/04/21	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trip Spike	TSS1 13/04/21		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trip Spike	TSS2 22/04/21		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Result outside of QA/QC acceptance criteria (highlighted)

Appendix D: Borehole Logs

JKGeotechnics

BOREHOLE LOG

Borehole No.
BH1
1 / 1

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~7.7 m

Date: 13/4/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION									-	TOPSOIL: Silty sandy clay, low plasticity, brown, trace of root fibres.	w<PL			GRASS COVER
									CI	Silty sandy CLAY: medium plasticity, brown and orange brown, fine to medium grained sand, trace of fine grained quartz gravel and root fibres.	w~PL	St	120 110	RESIDUAL
					N = 43 9,20,23	7	1		-	Extremely Weathered granite: silty clayey SAND, fine to coarse grained, brown and light grey, trace of fine grained quartz gravel.	XW	D		HP ON DISTURBED WMP SAMPLE MORUYA TONALITE
					N=SPT 10/ 50mm REFUSAL	6	2							
						5	3							
					N=SPT 5/ 20mm REFUSAL	4	4							
						3	5							
						2	6			END OF BOREHOLE AT 6.00 m				GROUNDWATER MONITORING WELL INSTALLED TO 5.8m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 2.8m TO 5.8m. CASING 0.1m TO 2.8m. 2mm SAND BACKFILL 3m TO 5.8m. BENTONITE SEAL 2m TO 3m. BACKFILLED WITH CUTTINGS TO SURFACE COMPLETED WITH A CONCRETED GATIC COVER
						1								

JKGeotechnics

BOREHOLE LOG

Borehole No.
BH2
1 / 1

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~7.5 m

Date: 13/4/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION						7	0		-	TOPSOIL: Silty sandy clay, low plasticity, brown, fine to coarse grained sand, trace of root fibres.	w<PL			GRASS COVER
					N = 5 5,3,2		1		ML	Clayey sandy SILT low plasticity, brown and orange brown, fine to coarse grained sand, trace of fine grained quartz gravel and root fibres.	w<PL	VSt		RESIDUAL
▶					N=SPT 10/ 50mm REFUSAL	6	1		-	Extremely Weathered granite: silty clayey SAND, fine to coarse grained, brown and orange brown, trace of fine to coarse grained quartz gravel.	XW	D		MORUYA TONALITE
						5	2			as above, but light grey and brown.				
					N=SPT 15/ 100mm REFUSAL	4	3			GRANITE: medium to coarse grained, light grey and brown.	DW	VL - L		LOW 'TC' BIT RESISTANCE
					N > 7 15,7/ 50mm REFUSAL	3	4			GRANITE: medium to coarse grained, light grey and dark grey.		H - VH		VERY HIGH RESISTANCE
						2	5			END OF BOREHOLE AT 4.70 m				'TC' BIT REFUSAL
						1	6							

JK 9.02.4 LIB:GLB Log JK AUGERHOLE - MASTER 33942LT MORUYA.GPJ <<DrawingFile>> 21/05/2021 11:08 10.01.00.01 Datgel Lab and In Situ Tool - DGD | Lib: JK 9.02.4 2019-05-31 Prj: JK 9.01.0 2018-03-20

JKGeotechnics

BOREHOLE LOG

Borehole No.
BH3
1 / 3

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~10.8 m

Date: 21/4/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING									-	TOPSOIL: Silty sandy clay, low plasticity, brown, fine to coarse grained sand, trace of root fibres.	w>PL			GRASS COVER
									CI	Silty sandy CLAY: medium plasticity, brown and orange brown, fine to coarse grained sand, trace of fine grained quartz gravel and root fibres.	w<PL	VSt - Hd		RESIDUAL (0.75m) HP ON BASE OF U50 = 530kPa
					N > 27 2,7,20/ 50mm REFUSAL	10	1		-	Extremely Weathered granite: silty clayey SAND, fine to coarse grained, brown and orange brown, trace of fine grained quartz gravel.	XW	D	210 250	MORUYA TONALITE VERY LOW 'TC' BIT RESISTANCE
					N = 32 12,14,18	9	2							
					N=SPT 12/ 100mm REFUSAL	8	3							
					N=SPT 6/ 50mm REFUSAL	7	4							
					N=SPT 7/ 50mm REFUSAL	6	5							
						5	6							
						4								

JKGeotechnics

BOREHOLE LOG

Borehole No.
BH3
2 / 3

Client: HEALTH INFRASTRUCTURE
Project: PROPOSED EUROBODALLA HEALTH SERVICE
Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~10.8 m
Date: 21/4/21 **Datum:** AHD
Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
					N=SPT 5/ 0mm REFUSAL	3	8		-	Extremely Weathered granite: silty clayey SAND, fine to coarse grained, brown and orange brown, trace of fine grained quartz gravel. *(continued)*	XW	D		
						2	9			GRANITE: medium to coarse grained, light brown, light grey and dark grey.	DW	VL		LOW RESISTANCE
						1	10			REFER TO CORED BOREHOLE LOG				
						0	11							
						-1	12							
						-2	13							
						-3								

JKGeotechnics

CORED BOREHOLE LOG

Borehole No.
BH3
3 / 3

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Core Size:** NMLC **R.L. Surface:** ~10.8 m

Date: 21/4/21 **Inclination:** VERTICAL **Datum:** AHD

Plant Type: JK308 **Bearing:** N/A **Logged/Checked By:** W.S./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS SPACING (mm) DESCRIPTION Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness Specific / General	Formation
					START CORING AT 9.30m					
100% RETURN		1 0	10 11		NO CORE 0.35m					
					GRANITE: medium to coarse grained, light grey, dark grey and brown.	HW	L - M	0.10	(9.70m) XWS, 0°, 150 mm.t (9.87m) J x 2, 70°, P, R, Cn (9.95m) J, 65°, P, R, Cn (10.07m) J, 10°, P, R, Cn (10.18m) J, 25°, P, R, Cn	MORUYA TONALITE
					as above, but light grey and dark grey.	FR	VH	6.2	(10.47m) J, 20°, P, R, Cn (10.52m) J, 20°, P, R, Cn (10.65m) J, 30°, P, R, Cn	
					as above, but dark grey.			7.2		
					GRANITE: medium to coarse grained, light grey diorite and dark grey.			5.4		
		-1 -2 -3 -4 -5	12 13 14 15		END OF BOREHOLE AT 11.50 m					

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

BOREHOLE LOG

Borehole No.
BH4
1 / 5

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~17.2 m

Date: 20/4/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING						17			-	TOPSOIL: Silty sandy clay, low plasticity, brown, fine to coarse grained sands, trace of root fibres.	w<PL			GRASS COVER
									CI		w~PL			RESIDUAL
									-	Silty sandy CLAY: medium plasticity, brown and orange brown, fine to coarse grained sand, trace of fine grained quartz gravel and root fibres.	XW	D		MORUYA TONALITE VERY LOW 'TC' BIT RESISTANCE
					N=SPT 12/ 100mm REFUSAL		1			Extremely Weathered granite: clayey gravelly SAND, fine to coarse grained, brown and orange brown, fine grained quartz gravel.				
						16								
					N > 12 12,12/ 50mm REFUSAL		2							
						15								
					N=SPT 5/ 50mm REFUSAL		3							
						14								
							4							VERY LOW RESISTANCE WITH LOW BANDS
					N=SPT 10/ 50mm REFUSAL	13								(POSSIBLY LESS WEATHERED CORE STONES)
							5							
						12								
					N=SPT 8/ 50mm REFUSAL		6							
						11								

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BOREHOLE LOG

Borehole No.
BH4
2 / 5

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~17.2 m

Date: 20/4/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
					N=SPT 10/ 50mm REFUSAL	10			-	Extremely Weathered granite: clayey gravelly SAND, fine to coarse grained, brown and orange brown, fine grained quartz gravel. *(continued)*	XW	D		
					N=SPT 5/ 0mm REFUSAL	9	8							
					N=SPT 5/ 0mm REFUSAL	8	9							
						7	10							
						6	11							
						5	12							
						4	13							

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BOREHOLE LOG

Borehole No.
BH4
3 / 5

Client: HEALTH INFRASTRUCTURE
Project: PROPOSED EUROBODALLA HEALTH SERVICE
Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~17.2 m
Date: 20/4/21 **Datum:** AHD
Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
						3			-	Extremely Weathered granite: clayey gravelly SAND, fine to coarse grained, brown and orange brown, fine grained quartz gravel. *(continued)*	XW	D		
						2	15			REFER TO CORED BOREHOLE LOG				
						1	16							
						0	17							
						-1	18							
						-2	19							
						-3	20							

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CORED BOREHOLE LOG

Borehole No.
BH4
4 / 5

Client: HEALTH INFRASTRUCTURE
Project: PROPOSED EUROBODALLA HEALTH SERVICE
Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Core Size:** NMLC **R.L. Surface:** ~17.2 m
Date: 20/4/21 **Inclination:** VERTICAL **Datum:** AHD
Plant Type: JK308 **Bearing:** N/A **Logged/Checked By:** W.S./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$ VL 0.1 L 0.3 M 1 H 3 VH 10 EH	DEFECT DETAILS SPACING (mm) 600 200 60 20	DESCRIPTION Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness Specific / General	Formation
		3			START CORING AT 14.90m						
100% RETURN		2	15		NO CORE 5.25m						
		1	16								
		0	17								
		-1	18								
		-2	19								
		-3	20		GRANITE: medium to coarse grained quartz, brown and dark grey.	SW	M - H	•2.4		(20.27m) J, 60°, P, R, Cn (20.40m) J, 75°, P, R, Cn	MORUYA TONALITE
					GRANITE: as below	FR		•0.60			

JK 9.02.4 LIB.GLB Log JK CORED BOREHOLE - MASTER 33942LT MORUYA.GPJ <<DrawingFile>> 21/05/2021 11:08 10.01.00.01 Datgel Lab and In Situ Tool - DGD | Lib: JK 9.02.4 2019-05-31 Prj: JK 9.01.0 2018-03-20

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

CORED BOREHOLE LOG

Borehole No.
BH4
5 / 5

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Core Size:** NMLC **R.L. Surface:** ~17.2 m

Date: 20/4/21 **Inclination:** VERTICAL **Datum:** AHD

Plant Type: JK308 **Bearing:** N/A **Logged/Checked By:** W.S./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$ VL 0.1 L 0.3 M 1 H 3 VH 10 EH	DEFECT DETAILS SPACING (mm) 600 200 60 20	DEFECT DETAILS DESCRIPTION Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness Specific / General	Formation
		-4			GRANITE: medium to coarse grained quartz, light grey and dark grey.	FR	M - H			(21.20m) J, 70 - 90°, P, R, Cn	
		-5	22		END OF BOREHOLE AT 21.50 m						
		-6	23								
		-7	24								
		-8	25								
		-9	26								
		-10	27								

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

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BOREHOLE LOG

Borehole No.
BH5
1 / 1

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~16.5 m

Date: 15/4/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION									-	TOPSOIL: Silty sandy clay, low plasticity, brown, fine to coarse grained sand, trace of root fibres.	w~PL			GRASS COVER
									CH	Silty sandy CLAY: high plasticity, brown and grey, fine to coarse grained sand, with fine grained quartz gravel and root fibres.	w<PL	VSt - Hd		RESIDUAL
				■	N > 10 3,10/ 100mm REFUSAL	16			-	Extremely Weathered granite: clayey gravelly SAND, fine to coarse grained, fine grained quartz gravel, light grey, brown and orange brown.	XW	D	340 300 460	MORUYA TONALITE VERY LOW 'TC' BIT RESISTANCE
				■	N=SPT 13/ 100mm REFUSAL	15	1							
				■	N=SPT 11/ 100mm REFUSAL	14	2							
				■	N=SPT 6/ 50mm REFUSAL	13	3							
						12	4							
						11	5			GRANITE: medium to coarse grained, light grey, light brown and dark grey.	DW	VL		LOW RESISTANCE
						10	6			END OF BOREHOLE AT 6.00 m				

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BOREHOLE LOG

Borehole No.
BH6

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~14.3 m

Date: 20/4/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING									-	TOPSOIL: Silty sandy clay, low plasticity, brown, fine to coarse grained sand, trace of root fibres.	w~PL			GRASS COVER
						14			CH	Silty sandy CLAY: high plasticity, brown and grey, fine to coarse grained sand, with fine to coarse grained quartz gravel and root fibres.	w>PL	VSt - Hd	380 430	RESIDUAL
					N > 9 8,9/ 150mm REFUSAL				-	Extremely Weathered granite: clayey gravelly SAND, fine to coarse grained, fine grained quartz gravel, light grey, brown and orange brown.	XW	D		MORUYA TONALITE VERY LOW 'TC' BIT RESISTANCE
					N=SPT 10/ 100mm REFUSAL	13	1							
					N=SPT 5/ 50mm REFUSAL	12	2							
					N=SPT 7/ 50mm REFUSAL	11	3							
						10	4			GRANITE: medium to coarse grained, light grey, light brown and dark grey.	DW	VL		LOW RESISTANCE
						9	5							
						8	6			REFER TO CORED BOREHOLE LOG				LOW RESISTANCE WITH MODERATE BANDS SAMPLE OF RETURN CUTTINGS COLLECTED. GRAVELLY SAND FINE TO MEDIUM GRAINED, QUARTZ GRAVEL.

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CORED BOREHOLE LOG

Borehole No.
BH6
2 / 2

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Core Size:** NMLC **R.L. Surface:** ~14.3 m

Date: 20/4/21 **Inclination:** VERTICAL **Datum:** AHD

Plant Type: JK308 **Bearing:** N/A **Logged/Checked By:** W.S./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$ VL 0.1 L 0.3 M 1 H 3 VH 10 EH	DEFECT DETAILS SPACING (mm) 600 200 60 20	DESCRIPTION Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness Specific / General	Formation
		9			START CORING AT 5.60m						
100% RETURN		8	6		NO CORE 3.57m						
		7	7								
		6	8								
		5	9		GRANITE: medium to coarse grained, light grey, dark grey and light brown.	MW	L	0.090 0.10 0.10		(9.65m) J, 35°, P, R, Cn (9.72m) J, 35°, P, R, Cn (10.25m) J, 45°, P, R, Cn	MORUYA TONALITE
		4	10								
		3	11		as above, but light grey and dark grey.	FR	VH	5.0		(10.72m) XWS, 0°, 20 mm.t	
					END OF BOREHOLE AT 11.50 m						

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

BOREHOLE LOG

Borehole No.
BH7
1 / 2

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~9.1 m

Date: 21/4/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING						9			-	TOPSOIL: Silty sandy clay, low plasticity, brown, fine to coarse grained sand, trace of root fibres.	w~PL			GRASS COVER
									CH		w~PL	VSt		RESIDUAL
				■	N = 13 4,5,8					Silty sandy CLAY: high plasticity, brown and grey, fine to coarse grained sand, with fine grained quartz gravel and root fibres.			270 290	
						8	1							
									-	Extremely Weathered granite: clayey gravelly SAND, fine to coarse grained, fine grained quartz gravel, light grey, brown and orange brown.	XW	D		MORUYA TONALITE VERY LOW 'TC' BIT RESISTANCE
				■	N = 31 12,14,17	7	2							
					N=SPT 8/ 50mm REFUSAL	6	3							
							4							VERY LOW RESISTANCE WITH LOW BANDS (POSSIBLY LESS WEATHERED CORE STONES)
				■	N=SPT 6/ 50mm REFUSAL	5	5							
						4								
				■		3	6			GRANITE: medium to coarse grained sand and quartz gravel, light grey, dark grey and red brown.	DW	L - M		LOW RESISTANCE WITH MODERATE BANDS
										REFER TO CORED BOREHOLE LOG				

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CORED BOREHOLE LOG

Borehole No.
BH7
2 / 2

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Core Size:** NMLC **R.L. Surface:** ~9.1 m

Date: 21/4/21 **Inclination:** VERTICAL **Datum:** AHD

Plant Type: JK308 **Bearing:** N/A **Logged/Checked By:** W.S./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS SPACING (mm) DESCRIPTION Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness Specific / General	Formation
		3			START CORING AT 6.50m					
100% RETURN		2	7		GRANITE: medium to coarse grained, light grey, dark grey and light brown.	MW	M	0.60, 0.50, 0.50, 2.1	(7.20m) J, 65°, P, R, Cn	MORUYA TONALITE
		1	8		as above, but light grey and dark grey.	SW			(8.10m) Ji, 50 - 90°, Un	
		0	9			FR	VH	5.5, 5.5, 6.4	(8.60m) J, 0°, P, R, Fe Sn	
		-1	10		END OF BOREHOLE AT 9.10 m					
		-2	11							
		-3	12							

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

BOREHOLE LOG

Borehole No.
BH8
1 / 1

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~12.7 m

Date: 14/4/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION	■									TOPSOIL: Silty sandy clay, low plasticity, brown, fine to coarse grained sand, trace of root fibres.	w~PL			GRASS COVER
									CH		w<PL	VSt - Hd		RESIDUAL
				■	N > 22 3,12,10/ 50mm REFUSAL	12				Silty sandy CLAY: high plasticity, brown and orange brown, fine to coarse grained sand, trace of fine grained quartz gravel and root fibres.			350 360 440	
							1		-	Extremely Weathered granite: silty clayey SAND, fine to coarse grained, light grey, brown and orange brown,with fine grained quartz gravel.	XW	D		MORUYA TONALITE VERY LOW 'TC' BIT RESISTANCE
				■	N > 34 15,22,12/ 50mm REFUSAL	11	2							
				■	N=SPT 15/ 100mm REFUSAL	10	3							
						9	4							
				■	N=SPT 22/ 150mm REFUSAL	8	5			GRANITE: medium to coarse grained, light grey, brown and dark grey.	DW	VL		LOW RESISTANCE
					N=SPT 5/ 0mm REFUSAL	7	6							NO SPT SAMPLE RETURN
						6				END OF BOREHOLE AT 6.00 m				

JKGeotechnics

BOREHOLE LOG

Borehole No.
BH9
1 / 1

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~13.4 m

Date: 14/4/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION										TOPSOIL: Silty sandy clay, low plasticity, brown, fine to coarse grained sand, trace of root fibres.	w~PL			GRASS COVER
									CI	Silty sandy CLAY: medium plasticity, brown and grey, fine to coarse grained sand, trace of fine grained quartz gravel and root fibres.	w~PL	VSt	250 260 270	RESIDUAL
					N = 10 2,3,7	13				Silty sandy CLAY: medium plasticity, light brown, fine to coarse grained sand, with fine to medium grained quartz gravel.	w<PL			
						12	1							
					N = 17 7,8,9								350 350 360	
						11	2		-	Extremely Weathered granite: silty clayey SAND, fine to coarse grained, light grey brown and light grey, with fine to coarse grained quartz gravel.	XW	D		MORUYA TONALITE VERY LOW 'TC' BIT RESISTANCE
					N = 29 10,14,15									
						10	3							
							4							BANDS OF LOW RESISTANCE (POSSIBLY LESS WEATHERED CORE STONES)
					N=SPT 10/ 50mm REFUSAL	9								
							5			GRANITE: Fine to medium grained quartz and sand, white, grey and red brown.	DW	L - M		LOW TO MODERATE RESISTANCE
						8								
							6			END OF BOREHOLE AT 6.00 m				
						7								

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BOREHOLE LOG

Borehole No.
BH10
1 / 1

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~17.1 m

Date: 14/4/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION						17				TOPSOIL: Silty sandy clay, low plasticity, brown, fine to coarse grained sand, trace of root fibres.	w~PL			GRASS COVER
									CI	Silty sandy CLAY: medium plasticity, brown and grey, fine to coarse grained sand, trace of fine grained quartz gravel and root fibres.	w<PL	Hd		RESIDUAL
					N = 11 5,5,6								>600 >600	
						16	1		-	Extremely Weathered granite: silty clayey SAND, fine to coarse grained, light grey, brown and orange brown, with fine grained quartz gravel.	XW	D		MORUYA TONALITE VERY LOW 'TC' BIT RESISTANCE
					N=SPT 13/ 100mm REFUSAL	15	2							
										GRANITE: medium to coarse grained, light grey brown and dark grey.	DW	VL		LOW RESISTANCE
					N=SPT 6/ 50mm REFUSAL	14	3							
						13	4							LOW RESISTANCE WITH MODERATE BANDS (POSSIBLY LESS WEATHERED CORE STONES)
					N=SPT 5/ 0mm REFUSAL	12	5							
							6			GRANITE: medium to coarse grained, light grey and dark grey.		M		MODERATE RESISTANCE
						11				END OF BOREHOLE AT 6.00 m				

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BOREHOLE LOG

Borehole No.
BH11
1 / 1

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~19.4 m

Date: 14/4/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION										TOPSOIL: silty sandy clay, low plasticity, brown, fine to coarse grained sands, trace of root fibres.	w~PL			GRASS COVER
									CH	Silty sandy CLAY: high plasticity, brown and grey, fine to coarse grained sand, trace of fine grained quartz gravel and root fibres.	w<PL	VSt		RESIDUAL
					N=SPT 22/ 150mm REFUSAL	19			-	Extremely Weathered granite: silty clayey SAND, fine to coarse grained, light grey, brown and orange brown, with fine grained quartz gravel.	XW	D	350	MORUYA TONALITE
					N=SPT 12/ 150mm REFUSAL	18	1							VERY LOW 'TC' BIT RESISTANCE
					N=SPT 7/ 50mm REFUSAL	17	2							VERY LOW RESISTANCE WITH LOW BANDS (POSSIBLY LESS WEATHERED CORE STONES)
					N=SPT 5/ 0mm REFUSAL	16	3							
						15	4			GRANITE: medium to coarse grained, light grey, dark grey and brown.	DW	VL - L		LOW RESISTANCE WITH MODERATE BANDS
						14	5			GRANITE: medium to coarse grained, light grey and dark grey and brown.		L - M		MODERATE RESISTANCE
						13	6			END OF BOREHOLE AT 6.00 m				

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BOREHOLE LOG

Borehole No.
BH12
1 / 1

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~21.1 m

Date: 15/4/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION						21				TOPSOIL: Silty sandy clay, low plasticity, brown, fine to coarse grained sand, trace of root fibres.	w~PL			GRASS COVER
									CI		w>PL			RESIDUAL
					N = 37 13,23,14				-	Silty sandy CLAY: medium plasticity, brown and grey, fine to coarse grained sand, with fine grained quartz gravel and root fibres.	XW	D		MORUYA TONALITE VERY LOW 'TC' BIT RESISTANCE
						20	1			Extremely Weathered granite: clayey SAND, fine to coarse grained, light grey, brown and orange brown, with fine grained quartz gravel.				
					N=SPT 11/ 100mm REFUSAL	19	2							
					N=SPT 8/ 50mm REFUSAL	18	3			GRANITE: medium to coarse grained, light grey and dark grey.	DW	VH		VERY HIGH RESISTANCE
										END OF BOREHOLE AT 3.20 m				'TC' BIT REFUSAL
						17	4							
						16	5							
						15	6							

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BOREHOLE LOG

Borehole No. BH13 1 / 1

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~16.7 m

Date: 15/4/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION										TOPSOIL: silty sandy clay, low plasticity, brown, fine to coarse grained sand, trace of root fibres.	w~PL			GRASS COVER
									CH	Silty sandy CLAY: high plasticity, brown and grey, fine to coarse grained sand, with fine grained quartz gravel and root fibres.	w>PL	VSt		RESIDUAL
					N > 14 4,14/ 150mm REFUSAL	16					w~PL	Hd	290 600	MORUYA TONALITE
							1		-	Extremely Weathered granite: clayey gravelly SAND, fine grained, fine grained quartz gravel, light grey, brown and orange brown.	XW	D		VERY LOW 'TC' BIT RESISTANCE
					N > 10 10,10/ 50mm REFUSAL	15	2							
					N > 5 10,5/ 50mm REFUSAL	14								NO SPT SAMPLE RETURN
							3			END OF BOREHOLE AT 2.90 m				VERY HIGH RESISTANCE 'TC' BIT REFUSAL
						13	4							
						12	5							
						11	6							
						10								

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BOREHOLE LOG

Borehole No. BH14 1 / 1

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~12.0 m

Date: 15/4/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION	■									TOPSOIL: Silty sandy clay, low plasticity, brown, fine to coarse grained sand, trace of root fibres.	w~PL			GRASS COVER
									CH		w>PL	VSt		RESIDUAL
				■	N=SPT 12/ 100mm REFUSAL					Sandy silty CLAY: high plasticity, brown and grey, fine to coarse grained sand, with fine grained quartz gravel and root fibres.			250 230 200	
						11	1		-	Extremely Weathered granite: clayey gravelly SAND, fine grained, fine to coarse grained quartz gravel, light grey, brown and orange brown.	XW	D		MORUYA TONALITE VERY LOW 'TC' BIT RESISTANCE
				■	N = 46 12,22,24	10	2							
				■	N > 36 13,16,20/ 50mm REFUSAL	9	3							
					N=SPT 5/ 0mm REFUSAL	8	4							
						7	5			GRANITE: medium to coarse grained, dark and light grey.	DW	L - M		LOW RESISTANCE WITH MODERATE BANDS
						6	6			END OF BOREHOLE AT 6.00 m				

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BOREHOLE LOG

Borehole No.
BH15
1 / 1

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~15.5 m

Date: 14/4/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION										TOPSOIL: Silty sandy clay, low plasticity, brown, fine to coarse grained sand, trace of root fibres.	w~PL			GRASS COVER
									Cl		w>PL	Hd		RESIDUAL
					N = 16 3,6,10	15				Silty sandy CLAY: medium plasticity, brown and grey, fine to coarse grained sand and quartz gravel, trace of fine grained quartz gravel and root fibres.			400 550 >600	
							1							
					N > 29 8,18,11/ 50mm REFUSAL	14	2		-	Extremely Weathered granite: clayey sandy GRAVEL, fine to medium grained quartz, light grey, brown and orange brown, fine to coarse grained sand.	XW	D		MORUYA TONALITE VERY LOW 'TC' BIT RESISTANCE
					N=SPT 7/ 50mm REFUSAL	13	3							
						12	4							
					N=SPT 9/ 80mm REFUSAL	11	5							
						10	6			GRANITE: medium to coarse grained, light grey and dark grey.	DW	L - M		LOW TO MODERATE RESISTANCE
										END OF BOREHOLE AT 6.00 m				
						9								

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BOREHOLE LOG

Borehole No.
BH16
1 / 3

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~17.9 m

Date: 17/4/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING	■									TOPSOIL: Silty sandy clay, low plasticity, brown, fine to coarse grained sand, trace of root fibres.	w~PL			GRASS COVER
									CI		w>PL			RESIDUAL
				■	N=SPT 10/ 100mm REFUSAL				-	Silty sandy CLAY: medium plasticity, brown and grey, fine to coarse grained sand and quartz gravel, trace of fine grained quartz gravel and root fibres.	XW	D	>600	MORUYA TONALITE VERY LOW 'TC' BIT RESISTANCE
						17	1			Extremely Weathered granite: clayey gravelly SAND, fine to coarse grained, light grey, brown and orange brown, fine grained quartz gravel.				
				■	N=SPT 20/ 150mm REFUSAL	16	2							
				■	N > 13 13,13/ 100mm REFUSAL	15	3							
						14	4							
				■	N=SPT 8/ 50mm REFUSAL									
						13	5			Extremely Weathered granite: gravelly SAND, fine to coarse grained, light grey, brown and orange brown, fine to coarse grained quartz gravel, trace of fines.				VERY LOW RESISTANCE WITH LOW BANDS (POSSIBLY LESS WEATHERED CORE STONES)
					N=SPT 5/ 0mm REFUSAL	12	6							
						11								

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BOREHOLE LOG

Borehole No.
BH16
2 / 3

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~17.9 m

Date: 17/4/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
					N=SPT 10/ 50mm REFUSAL				-	Extremely Weathered granite: gravelly SAND, fine to coarse grained, light grey, brown and orange brown, fine to coarse grained quartz gravel, trace of fines.	XW	D		
										GRANITE: medium to coarse grained, dark grey and light grey.	DW	L - M		MODERATE RESISTANCE
						10	8			REFER TO CORED BOREHOLE LOG				
						9	9							
						8	10							
						7	11							
						6	12							
						5	13							
						4								

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CORED BOREHOLE LOG

Borehole No. BH16 3 / 3

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Core Size:** NMLC **R.L. Surface:** ~17.9 m

Date: 17/4/21 **Inclination:** VERTICAL **Datum:** AHD

Plant Type: JK308 **Bearing:** N/A **Logged/Checked By:** W.S./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS: SPACING (mm)	DEFECT DETAILS: DESCRIPTION (Specific / General)	Formation
					START CORING AT 7.80m						
100% RETURN		10 / 9 / 8	8 / 9 / 10		GRANITE: medium to coarse grained, red brown, dark grey and light grey.	MW	L	0.070; 0.40; 0.30; 0.020; 0.10; 0.20	600 200 60 20	(7.94m) J, 90°, P, S, Cn (8.21m) J, 15°, P, R, Cn (8.40m) J, 60 - 90°, Cu, R, Fe Sn, XW infill (8.74m) J, 45°, P, R, Cn (8.90m) J, 20°, P, R, Cn (9.13m) J, 0 - 20°, Cu, R, Cn (9.22m) J, 0 - 20°, Cu, R, Cn (9.50m) J, 40°, P, S, XW infill (9.55m) J, 40 - 90°, P, R, Cn (9.78m) J, 20°, P, R, Cn (9.90m) J, 70°, P, R, Fe Sn (10.30m) J, 75 - 90°, P, R, Fe Sn	MORUYA TONALITE
		7 / 6 / 5 / 4	11 / 12 / 13		END OF BOREHOLE AT 10.64 m						

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

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BOREHOLE LOG

Borehole No.
BH17
1 / 1

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~17.4 m

Date: 14/4/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION	■					17	0		-	TOPSOIL: Silty sandy clay, low plasticity, brown, fine to coarse grained sand, trace of root fibres.	w~PL			GRASS COVER
									CL		w<PL			RESIDUAL
				■	N = 35 8,13,22		1		-	Silty sandy CLAY: low plasticity, brown and grey, fine to coarse grained sand and quartz gravel, trace of fine grained quartz gravel and root fibres.	XW	D		MORUYA TONALITE VERY LOW 'TC' BIT RESISTANCE
						16				Extremely Weathered granite: clayey gravelly SAND, fine to coarse grained, light grey, brown and orange brown, fine grained quartz gravel.				
				■	N=SPT 15/ 150mm REFUSAL		2								
						15								
				■	N=SPT 14/ 100mm REFUSAL		3								
						14								
							4							LOW RESISTANCE WITH VERY LOW BANDS (POSSIBLY LESS WEATHERED CORE STONES)
				■	N=SPT 5/ 20mm REFUSAL	13								
							5							
						12								
							6			END OF BOREHOLE AT 6.00 m				
						11								

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BOREHOLE LOG

Borehole No.
BH18
1 / 1

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~19.3 m

Date: 14/4/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION									-	TOPSOIL: Silty sandy clay, low plasticity, brown, fine to coarse grained sands, trace of root fibres.	w~PL			GRASS COVER
						19			CL		w<PL			RESIDUAL
					N=SPT 20/ 100mm REFUSAL				-	Silty sandy CLAY: low plasticity, brown and grey, fine to coarse grained sand, trace of fine grained quartz gravel and root fibres.	XW	D		MORUYA TONALITE VERY LOW 'TC' BIT RESISTANCE
							1			Extremely Weathered GRANITE: Clayey gravelly SAND, fine to coarse grained, fine grained quartz gravel, light grey, brown and orange brown.				
						18								
					N > 15 12,15/ 150mm REFUSAL		2							
						17								
					N=SPT 5/ 20mm REFUSAL		3							
						16								GROUNDWATER MONITORING WELL INSTALLED TO 5.8m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 2.8m TO 5.8m. CASING 0.1m TO 2.8m. 2mm SAND BACKFILL 3m TO 5.8m. BENTONITE SEAL 2m TO 3m. BACKFILLED WITH CUTTINGS TO SURFACE COMPLETED WITH A CONCRETED GATIC COVER
							4							
					N=SPT 6/ 20mm REFUSAL	15								
							5							VERY LOW RESISTANCE WITH LOW BANDS (POSSIBLY LESS WEATHERED CORE STONES)
						14								
							6			GRANITE: medium to coarse grained quartz gravel and sand, orange brown, white grey and dark grey.	DW	M		MODERATE RESISTANCE
						13				END OF BOREHOLE AT 6.00 m				

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BOREHOLE LOG

Borehole No. BH19 1 / 1

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~20.0 m

Date: 17/4/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION	■									TOPSOIL: Silty sandy clay, medium plasticity, brown grey, fine to coarse grained sand, trace of root fibres.	w~PL			GRASS COVER
									CI	Silty sandy CLAY: medium plasticity, brown and grey, fine to coarse grained sand, trace of fine grained quartz gravel and root fibres.	w<PL	VSt - Hd		RESIDUAL
				■	N = 23 3,8,15				-	Extremely Weathered granite: Clayey gravelly SAND, fine to coarse grained, fine grained quartz gravel, light grey, brown and orange brown.	XW	D		MORUYA TONALITE VERY LOW 'TC' BIT RESISTANCE
				■	N=SPT 10/ 100mm REFUSAL	19	1			GRANITE: medium to coarse grained, orange brown, grey and dark grey.	DW			VERY LOW RESISTANCE WITH LOW BANDS
				■		18	2					M		MODERATE RESISTANCE
										END OF BOREHOLE AT 2.20 m				'TC' BIT REFUSAL
						17	3							
						16	4							
						15	5							
						14	6							

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BOREHOLE LOG

Borehole No.
BH20
1 / 2

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~20.6 m

Date: 17/4/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING	■									TOPSOIL: Silty sandy clay, medium plasticity, brown grey, fine to coarse grained sand, trace of root fibres.	w~PL			GRASS COVER
									CI	Sandy silty CLAY: medium plasticity, brown and grey, fine to coarse grained sand, trace of fine grained quartz gravel and root fibres.	w~PL	St		RESIDUAL
				■	N = 21 3,7,14	20			-	Extremely Weathered granite: Clayey gravelly SAND, fine to coarse grained, fine grained quartz gravel, light grey, brown and orange brown, trace of silt.	XW	D	170 / 200	MORUYA TONALITE VERY LOW 'TC' BIT RESISTANCE
				■	N=SPT 12/ 100mm REFUSAL	19	1							
				■	N=SPT 8/ 50mm REFUSAL	18	2			Extremely Weathered granite: gravelly SAND, fine to coarse grained, fine grained quartz gravel, light grey, brown and orange brown.				
				■	N=SPT 5/ 20mm REFUSAL	17	3							
						16	4							VERY LOW RESISTANCE WITH LOW BANDS (POSSIBLY LESS WEATHERED CORE STONES)
						15	5			GRANITE: medium to coarse grained, brown, light grey and dark grey.	DW	(L - M)		LOW RESISTANCE
										REFER TO CORED BOREHOLE LOG				
						14	6							

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CORED BOREHOLE LOG

Borehole No. BH20 **2 / 2**

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Core Size:** NMLC **R.L. Surface:** ~20.6 m

Date: 17/4/21 **Inclination:** VERTICAL **Datum:** AHD

Plant Type: JK308 **Bearing:** N/A **Logged/Checked By:** W.S./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS: SPACING (mm)	DEFECT DETAILS: DESCRIPTION (Specific / General)	Formation
		15			START CORING AT 5.70m						
			6		NO CORE 1.20m						
		14									
80% RETURN			7		GRANITE: medium to coarse grained, light brown, light grey and dark grey.	HW	VL	0.060		(7.35m) J, 40°, P, R, Cn	MORUYA TONALITE
		13						0.080		(7.80m) J, 80 - 90°, C, R, Fe Sn	
			8					0.050		(8.05m) J, 70°, P, R, Cn	
										(8.30m) J, 20°, P, R, Fe Sn	
										(8.43m) J, 28°, P, R, Fe Sn	
		12								(8.65m) XWS, 0°, 50 mm.t	
								0.070		(8.88m) J, 20°, P, R, Fe Sn	
			9			MW	L	0.30		(9.17m) J, 45°, P, R, Cn	
										(9.32m) J, 55°, P, R, Cn	
		11						0.20		(9.55m) J, 60°, P, R, Cn	
										(9.73m) XWS, 0°, 100 mm.t	
			10		END OF BOREHOLE AT 9.80 m						
		10									
			11								
		9									

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

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BOREHOLE LOG

Borehole No.
BH21
1 / 1

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~19.9 m

Date: 15/4/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION										TOPSOIL: Silty sandy clay, low plasticity, brown, fine to coarse grained sand, trace of root fibres.	w~PL			GRASS COVER
									CI	Silty sandy CLAY: medium plasticity, brown and grey, fine to coarse grained sand, with fine grained quartz gravel and root fibres.	w>PL	St - VSt		RESIDUAL HP ON BASE OF U50=200 kPa
					N > 14 12,14/ 100mm REFUSAL	19	1		-	Extremely Weathered granite: clayey gravelly SAND, fine to coarse grained, fine grained quartz gravel, light grey, brown and orange brown.	XW	D		MORUYA TONALITE VERY LOW 'TC' BIT RESISTANCE
					N > 13 12,13/ 80mm REFUSAL	18	2							
					N=SPT 7/ 20mm REFUSAL	17	3							
					N=SPT 5/ 0mm REFUSAL	16	4							
						15	5			GRANITE: medium to coarse grained, light grey, brown and dark grey.	DW	VL		LOW RESISTANCE
						14	6			END OF BOREHOLE AT 6.00 m				
						13								

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BOREHOLE LOG

Borehole No.
BH22
1 / 1

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~12.6 m

Date: 15/4/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION	■									TOPSOIL: Silty sandy clay, low plasticity, brown, fine to coarse grained sands, trace of root fibres.	w~PL			GRASS COVER
									CI		w>PL	VSt	250	RESIDUAL
				■	N=SPT 22/ 100mm REFUSAL	12			-	Silty sandy CLAY: medium plasticity, brown and grey, fine to coarse grained sand, with fine grained quartz gravel and root fibres.	XW	D		HP DISTURBED AUGER SAMPLE
							1			Extremely Weathered granite: clayey gravelly SAND, fine to coarse grained, fine grained quartz gravel, light grey, brown and orange brown.				MORUYA TONALITE VERY LOW 'TC' BIT RESISTANCE
				■	N > 18 16,18/ 100mm REFUSAL	11	2							
						10	3							
				■	N=SPT 18/ 150mm REFUSAL									
						9	4							VERY LOW RESISTANCE WITH LOW BANDS (POSSIBLY LESS WEATHERED CORE STONES)
				■	N=SPT 14/ 100mm REFUSAL	8	5							
						7	6			END OF BOREHOLE AT 6.00 m				
						6								

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BOREHOLE LOG

Borehole No.
BH23
1 / 1

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~11.2 m

Date: 17/4/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION						11				TOPSOIL: Silty sandy clay, low plasticity, brown, fine to coarse grained sand, trace of root fibres.	w~PL			GRASS COVER
									CI		w>PL			RESIDUAL
					N = 38 16,20,18				-	Sandy silty CLAY: medium plasticity, light brown and grey, fine to coarse grained sand, with fine grained quartz gravel and root fibres.	XW	D		MORUYA TONALITE VERY LOW 'TC' BIT RESISTANCE
						10	1			Extremely Weathered granite: clayey gravelly SAND, fine to coarse grained, fine grained quartz gravel, light grey, brown and orange brown.				
					N=SPT 19/ 100mm REFUSAL		2							
						9								
					N=SPT 10/ 100mm REFUSAL		3							VERY LOW RESISTANCE WITH LOW BANDS (POSSIBLY LESS WEATHERED CORE STONES)
						8								
							4							
					N=SPT 7/ 50mm REFUSAL	7								
							5			GRANITE: medium to coarse grained quartz, light and dark grey.	DW	M		MODERATE RESISTANCE
						6	6							
						5				END OF BOREHOLE AT 6.00 m				

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BOREHOLE LOG

Borehole No.
BH24
1 / 3

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~13.7 m

Date: 16/4/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION										TOPSOIL: Silty sandy clay, low plasticity, brown, fine to coarse grained sand, trace of root fibres.	w~PL			GRASS COVER
									CI		w>PL	St	100	RESIDUAL
					N=SPT 21/ 150mm REFUSAL	13	1		-	Silty sandy CLAY: medium plasticity, orange brown, grey and brown, fine to coarse grained sand, with fine grained quartz gravel, trace of root fibres.	XW	D		MORUYA TONALITE VERY LOW 'TC' BIT RESISTANCE
					N=SPT 17/ 100mm REFUSAL	12	2			Extremely Weathered granite: clayey gravelly SAND, fine to coarse grained, fine grained quartz gravel, light grey, brown and orange brown.				
					N=SPT 12/ 150mm REFUSAL	11	3							
					N=SPT 6/ 20mm REFUSAL	10	4							
						9	5			GRANITE: medium to coarse grained, dark grey and red brown.	DW	L - M		LOW RESISTANCE WITH MODERATE BANDS
						8	6							
						7								

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BOREHOLE LOG

Borehole No.
BH24
2 / 3

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~13.7 m

Date: 16/4/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
										GRANITE: as above REFER TO CORED BOREHOLE LOG				

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CORED BOREHOLE LOG

Borehole No.
BH24
3 / 3

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Core Size:** NMLC **R.L. Surface:** ~13.7 m

Date: 16/4/21 **Inclination:** VERTICAL **Datum:** AHD

Plant Type: JK308 **Bearing:** N/A **Logged/Checked By:** W.S./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS SPACING (mm)	DEFECT DETAILS DESCRIPTION Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness Specific / General	Formation
100% RETURN		6	8		GRANITE: medium to coarse grained, dark grey and red brown.	SW	M	0.40	600 200 60 20	(7.26m) Jh, 30°, P (7.40m) J, 45°, P, R, Fe Sn (7.50m) J, 0°, P, R, Cn (7.55m) J, 90°, P, R, Fe Sn (7.60m) J, 20°, P, R, Fe Sn (7.67m) J, 40°, P, R, Fe Sn (7.75m) J, 65°, P, R, Fe Sn	MORUYA TONALITE
					as above. but light grey and dark grey.					(8.00m) J, 80 - 90°, P, R, Fe Sn (8.25m) J, 70 - 80°, P, R, Fe Sn (8.40m) J, 30°, P, R, Fe Sn	
		5	9					0.10 0.20 0.70		(8.60m) J, 65°, P, R, Fe Sn (8.75m) J, 65°, P, R, Fe Sn (8.79m) J, 5°, P, R, Fe Sn (8.90m) J, 30°, P, S, Fe Sn (8.98m) J, 30°, P, S, Fe Sn	
		4	10		END OF BOREHOLE AT 9.45 m					(9.37m) J, 20°, P, R, Fe Sn (9.43m) J, 80 - 90°, P, R, Fe Sn	
		3	11								
		2	12								
		1	13								
		0									

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

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BOREHOLE LOG

Borehole No.
BH25
1 / 1

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~15.2 m

Date: 16/4/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION	■			■		15				TOPSOIL: Silty sandy clay, low plasticity, brown, fine to coarse grained sand, trace of root fibres.	w~PL			GRASS COVER
	■								CI		w>PL			RESIDUAL
				■	N > 12 9,12/ 50mm REFUSAL				-	Silty sandy CLAY: medium plasticity, orange brown, grey and brown, fine to coarse grained sand, with fine to coarse grained quartz gravel, trace of root fibres.	XW	D		MORUYA TONALITE
						14	1			Extremely Weathered granite: clayey gravelly SAND, fine to coarse grained, fine grained quartz gravel, light grey, brown and orange brown.				VERY LOW 'TC' BIT RESISTANCE
				■	N=SPT 10/ 50mm REFUSAL	13	2							
					N=SPT 5/ 0mm REFUSAL	12	3							NO SPT SAMPLE RETURN
						11	4			GRANITE: medium to coarse grained, dark grey and light grey.	DW	H		HIGH RESISTANCE
				■						END OF BOREHOLE AT 4.50 m				'TC' BIT REFUSAL
						10	5							
						9	6							

JK 9.02.4 LIB.GLB Log JK AUGERHOLE - MASTER 33942LT MORUYA.GPJ <<DrawingFile>> 21/05/2021 11:11 10.01.00.01 Datgel Lab and In Situ Tool - DGD | Lib: JK 9.02.4 2019-05-31 Prj: JK 9.01.0 2018-03-20

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BOREHOLE LOG

Borehole No.
BH26
1 / 1

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~13.0 m

Date: 16/4/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION										TOPSOIL: Silty sandy clay, low plasticity, brown, fine to coarse grained sand, trace of root fibres.	w~PL			GRASS COVER
									CL	Silty sandy CLAY: low plasticity, orange brown, grey and brown, fine to coarse grained sand, trace of fine grained quartz gravel, and root fibres.	w<PL	St - VSt		RESIDUAL
					N = 6 2,3,3	12	1						250 150	
									-	Extremely Weathered granite: clayey gravelly SAND, fine to coarse grained, fine grained quartz gravel, light grey, brown and orange brown.	XW	D		MORUYA TONALITE VERY LOW 'TC' BIT RESISTANCE
					N > 16 11,16/ 100mm REFUSAL					GRANITE: medium to coarse grained, dark grey and light grey.	DW	VH		VERY HIGH RESISTANCE
						11	2			END OF BOREHOLE AT 1.85 m				'TC' BIT REFUSAL
						10	3							
						9	4							
						8	5							
						7	6							

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BOREHOLE LOG

Borehole No.
BH27
1 / 1

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~17.3 m

Date: 15/4/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION										TOPSOIL: Silty sandy clay, low plasticity, brown, fine to coarse grained sand, trace of root fibres.	w~PL			GRASS COVER
						17			CI		w>PL			RESIDUAL
					N > 20 12,20/ 150mm REFUSAL				-	Silty sandy CLAY: medium plasticity, brown and grey, fine to coarse grained sand, with fine grained quartz gravel, trace of root fibres.	XW	D		MORUYA TONALITE
							1			Extremely Weathered granite: clayey SAND, fine to coarse grained, light grey, brown and orange brown, trace of fine grained quartz gravel.				VERY LOW 'TC' BIT RESISTANCE
					N = 44 13,21,23	16								
							2							
						15								
					N=SPT 11/ 100mm REFUSAL		3							
						14								
							4							
					N=SPT 5/ 50mm REFUSAL	13								
							5			GRANITE: medium to coarse grained, grey and red brown.	DW	L - M		LOW RESISTANCE WITH MODERATE BANDS
						12								
							6							GROUNDWATER MONITORING WELL INSTALLED TO 5.8m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 2.8m TO 5.8m. CASING 0.1m TO 2.8m. 2mm SAND BACKFILL 3m TO 5.8m. BENTONITE SEAL 2m TO 3m. BACKFILLED WITH CUTTINGS TO SURFACE COMPLETED WITH A CONCRETED GATIC COVER
										END OF BOREHOLE AT 6.00 m				
						11								

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BOREHOLE LOG

Borehole No.
BH28
1 / 1

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~9.8 m

Date: 19/4/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION										TOPSOIL: Silty sandy clay, low plasticity, brown, fine to coarse grained sand, trace of root fibres.	w~PL			GRASS COVER
									CI		w>PL			RESIDUAL
									-	Silty sandy CLAY: medium plasticity, brown and grey, fine to coarse grained sand, with fine grained quartz gravel and root fibres.	XW	Hd		MORUYA TONALITE
				■	N > 25 8,15,10/ 50mm REFUSAL	9	1						>600 >600	VERY LOW 'TC' BIT RESISTANCE
										Extremely Weathered granite: gravelly sandy CLAY, low plasticity, fine to coarse grained sand, light grey, brown and orange brown, trace of fine grained quartz gravel.				
				■	N > 35 13,18,17/ 50mm REFUSAL	8	2			Extremely Weathered granite: clayey gravelly SAND, fine to coarse grained sand, fine grained quartz gravel, light grey and brown.		D		
				■	N > 22 7,12,10/ 10mm REFUSAL	7	3							
						6	4							
				■	N=SPT 6/ 50mm REFUSAL	5	5							VERY LOW RESISTANCE WITH LOW BANDS (POSSIBLY LESS WEATHERED CORE STONES)
				■	N=SPT 6/ 50mm REFUSAL	4	6			END OF BOREHOLE AT 6.00 m				
						3								

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BOREHOLE LOG

Borehole No. BH29 1 / 1

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~8.9 m

Date: 19/4/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION	■			■		8.9	0			TOPSOIL: Silty clay, medium plasticity, dark brown, trace of root fibres.	w>PL			GRASS COVER
				■	N = 5 2,2,3	8.4	0.5		CI	Silty CLAY: medium plasticity, brown and grey, trace of fine to medium grained sand and root fibres.	w>PL	St	150 150	RESIDUAL
				■	N=SPT 13/ 150mm REFUSAL	7.9	1		-	Extremely Weathered granite: silty CLAY, medium plasticity, with fine to medium grained sand, trace of fine grained quartz gravel, grey, brown and orange brown.	XW	Hd		MORUYA TONALITE VERY LOW 'TC' BIT RESISTANCE
						7.4	1.5			Extremely Weathered granite: clayey gravelly SAND, fine to coarse grained sand, fine grained quartz gravel, light grey and brown.		D		
				■	N > 21 11,12,9/ 50mm REFUSAL	6.9	2							
				■	N = 19 9,9,10	5.9	3							VERY LOW RESISTANCE WITH LOW BANDS (POSSIBLY LESS WEATHERED CORE STONES)
				■	N=SPT 5/ 50mm REFUSAL	4.9	4							
						2.9	6			END OF BOREHOLE AT 6.00 m				

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BOREHOLE LOG

Borehole No.
BH30
1 / 3

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~10.5 m

Date: 16/4/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING										TOPSOIL: Silty sandy clay, low plasticity, brown, fine to coarse grained sand, trace of root fibres.	w~PL			GRASS COVER
									CL		w>PL	VSt		RESIDUAL
					N = 11 3,3,8	10				Silty sandy CLAY: low plasticity, grey and brown, fine to coarse grained sand, with fine grained quartz gravel, trace of root fibres.			250 350	
							1		-	Extremely Weathered granite: clayey gravelly SAND, fine to coarse grained, fine grained quartz gravel, light grey, brown and orange brown.	XW	D		MORUYA TONALITE VERY LOW 'TC' BIT RESISTANCE
					N=SPT 10/ 50mm REFUSAL	9	2							
						8	3							
					N=SPT 8/ 50mm REFUSAL	7	4			Extremely Weathered granite: gravelly clayey SAND, fine to coarse grained, fine grained quartz gravel, grey.				
					N=SPT 12/ 100mm REFUSAL	6	5							
						5				Extremely Weathered granite: clayey gravelly SAND, fine to coarse grained, fine grained quartz gravel, light grey, brown and orange brown.				
					N > 10 15,10/ 50mm REFUSAL	6	6							
						4								

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BOREHOLE LOG

Borehole No.
BH30
2 / 3

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~10.5 m

Date: 16/4/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
				■	N=SPT 10/ 100mm REFUSAL	3			-	Extremely Weathered granite: clayey gravelly SAND, fine to coarse grained, fine grained quartz gravel, light grey, brown and orange brown. *(continued)*	XW	D		LOW RESISTANCE WITH MODERATE BANDS (POSSIBLY LESS WEATHERED CORE STONES)
						2	8			REFER TO CORED BOREHOLE LOG				
						1	9							
						0	10							
						-1	11							
						-2	12							
						-3	13							

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CORED BOREHOLE LOG

Borehole No.
BH30
3 / 3

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Core Size:** NMLC **R.L. Surface:** ~10.5 m

Date: 16/4/21 **Inclination:** VERTICAL **Datum:** AHD

Plant Type: JK308 **Bearing:** N/A **Logged/Checked By:** W.S./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS SPACING (mm) DESCRIPTION Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness Specific / General	Formation
		3			START CORING AT 7.70m					
100% RETURN			8		NO CORE 0.30m					
		2			GRANITE: medium to coarse grained, light brown, dark grey and light grey .	MW	M	0.30 0.10	(8.20m) J, 45°, P, R, Cn (8.70m) J, 45°, P, S, Fe Sn (8.79m) J, 45°, P, S, Fe Sn (8.90m) J, 30°, P, R, Cn	MORUYA TONALITE
		1	9		GRANITE: medium to coarse grained, dark grey and light grey .	FR	VH	5.8 5.3 5.4	(9.43m) J, 15°, P, S, Fe Sn (9.52m) J, 10°, P, R, Fe Sn	
		0	10		END OF BOREHOLE AT 10.47 m					
		-1	11							
		-2	12							
		-3	13							

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

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BOREHOLE LOG

Borehole No. BH31 1 / 1

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~13.6 m

Date: 15/4/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION										TOPSOIL: Silty sandy clay, low plasticity, brown, fine to coarse grained sand, trace of root fibres.	w~PL			GRASS COVER
									CL-CI	Silty sandy CLAY: low to medium plasticity, orange brown and grey, fine to coarse grained sand, trace of fine grained quartz gravel, trace of root fibres.	w>PL	F - St		RESIDUAL
					N = 7 0,3,4	13	1					St - VSt	80 150 220	
					N > 18 10,18/ 100mm REFUSAL	12	2		-	Extremely Weathered granite: gravelly clayey SAND, fine to coarse grained, brown and orange brown.	XW	D		MORUYA TONALITE VERY LOW 'TC' BIT RESISTANCE
										Extremely Weathered granite: clayey gravelly SAND, fine to medium grained, light grey, brown and orange brown, fine grained quartz gravel.				
					N > 10 12,10/ 50mm REFUSAL	11	3							
						10	4							
					N=SPT 5/ 20mm REFUSAL	9	5							
										GRANITE: medium to coarse grained, light grey and dark grey.	DW	H		MODERATE TO HIGH RESISTANCE
						8	6			END OF BOREHOLE AT 5.30 m				'TC' BIT REFUSAL
						7								

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BOREHOLE LOG

Borehole No.
BH32
1 / 1

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~10.1 m

Date: 19/4/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION						10				TOPSOIL: Sandy silty clay, low plasticity, grey brown, trace of root fibres.	w>PL			GRASS COVER
									CL	Silty CLAY: low plasticity, orange brown and grey, trace of fine to medium grained sand and fine grained quartz gravel and root fibres.	w~PL	VSt	280 280	RESIDUAL
				■	N = 31 5,11,20				-	Extremely Weathered granite: clayey gravelly SAND, fine to coarse grained, brown and grey, fine grained quartz gravel.	XW	D		MORUYA TONALITE VERY LOW 'TC' BIT RESISTANCE
				■	N = 37 12,17,20	9	1							
				■	N=SPT 15/ 150mm REFUSAL	8	2							
						7	3							
					N=SPT 6/ 50mm REFUSAL	6	4							
				■		5	5			GRANITE: medium to coarse grained, dark grey and brown.	DW	L - M		LOW RESISTANCE WITH MODERATE BANDS
						4	6			END OF BOREHOLE AT 6.00 m				

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BOREHOLE LOG

Borehole No.
BH33
1 / 1

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~13.6 m

Date: 20/4/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION										TOPSOIL: Sandy silty clay, low plasticity, grey brown, trace of root fibres.	w~PL			GRASS COVER
									CL	Silty CLAY: low plasticity, grey brown and grey, trace of fine to medium grained sand and fine grained quartz gravel and root fibres.	w>PL	VSt - Hd		RESIDUAL
				■	N = 24 9,12,12	13	1						380 450	
				■	N > 12 12,12/ 100mm REFUSAL	12	2		-	Extremely Weathered granite: clayey gravelly SAND, fine to coarse grained, brown and grey, fine grained quartz gravel.	XW	D		MORUYA TONALITE VERY LOW 'TC' BIT RESISTANCE
					N=SPT 5/ 50mm REFUSAL	11	3							
						10	4							
				■	N=SPT 10/ 50mm REFUSAL	9	5							VERY LOW RESISTANCE WITH LOW BANDS (POSSIBLY LESS WEATHERED CORE STONES)
					N=SPT 6/ 20mm REFUSAL	8	6							NO SPT SAMPLE RETURN
						7				END OF BOREHOLE AT 6.00 m				

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BOREHOLE LOG

Borehole No.
BH34
1 / 1

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~7.8 m

Date: 22/4/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION										TOPSOIL: Sandy silty clay, low plasticity, grey brown, trace of root fibres.	w>PL			GRASS COVER
									CL	Silty sandy CLAY: low plasticity, dark grey, fine to coarse grained sand, trace of fine grained quartz gravel and root fibres.	w<PL	VSt		RESIDUAL
					N = 14 5,6,8	7	1			as above, but dark grey and orange brown.			250 280	
					N=SPT 7/ 50mm REFUSAL	6	2		-	Extremely Weathered granite: gravelly sandy CLAY, low plasticity, fine to medium grained sand, brown and light grey, fine grained quartz gravel.	XW	Hd		MORUYA TONALITE
					N > 12 9,12/ 50mm REFUSAL	5	3						>600 >600	
ON COMPLETION OF AUGERING						4	4			Extremely Weathered granite: clayey gravelly SAND, fine to coarse grained, orange brown and light grey, fine grained quartz gravel.		D		
					N = 29 9,13,16	3	5							
					N=SPT 15/ 100mm REFUSAL	2	6			GRANITE: medium to coarse grained, orange brown.	DW	L		LOW 'TC' BIT RESISTANCE
						1				END OF BOREHOLE AT 6.00 m				

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BOREHOLE LOG

Borehole No.
BH35
1 / 3

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~10.5 m

Date: 19/4/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING										TOPSOIL: Sandy silty clay, low plasticity, grey brown, trace of root fibres.	w>PL			GRASS COVER
									CI		w>PL			RESIDUAL
					N = 40 9,16,24	10			-	Silty gravelly CLAY: medium plasticity, orange brown and grey, fine grained quartz gravel, trace of sand and root fibres.	XW	D		MORUYA TONALITE VERY LOW 'TC' BIT RESISTANCE
							1			Extremely Weathered granite: clayey gravelly SAND, fine to coarse grained, brown and light grey, fine to coarse grained quartz gravel.				
					N = 39 10,16,23	9	2							
					N=SPT 10/ 100mm REFUSAL	8	3							
					N=SPT 10/ 50mm REFUSAL	7	4							
						6	5							
					N=SPT 12/ 100mm REFUSAL	5	6							VERY LOW RESISTANCE WITH LOW BANDS (POSSIBLY LESS WEATHERED CORE STONES)
						4								

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BOREHOLE LOG

Borehole No.
BH35
2 / 3

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~10.5 m

Date: 19/4/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
					N=SPT 6/ 50mm REFUSAL	3 2	8		-	Extremely Weathered granite: clayey gravelly SAND, fine to coarse grained, brown and light grey, fine to coarse grained quartz gravel. *(continued)*	XW	D		VERY LOW RESISTANCE WITH LOW BANDS (POSSIBLY LESS WEATHERED CORE STONES) LOW RESISTANCE WITH MODERATE BANDS
						1 0 -1 -2 -3	9 10 11 12 13			REFER TO CORED BOREHOLE LOG				

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CORED BOREHOLE LOG

Borehole No.
BH35
3 / 3

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Core Size:** NMLC **R.L. Surface:** ~10.5 m

Date: 19/4/21 **Inclination:** VERTICAL **Datum:** AHD

Plant Type: JK308 **Bearing:** N/A **Logged/Checked By:** W.S./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS SPACING (mm)	DEFECT DETAILS DESCRIPTION Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness Specific / General	Formation
		2			START CORING AT 8.70m						
			9		NO CORE 0.35m						
100% RETURN		1			GRANITE: medium to coarse grained, brown and dark grey.	HW	VL - L	0.020		(9.25m) J, 70°, P, R, Fe Sn (9.32m) J, 60°, P, R, Fe Sn (9.50m) J, 90°, P, R, Fe Sn, XW infill	MORUYA TONALITE
		0	10		as above, but light grey and dark grey.	SW	M	0.30 0.50		(9.76m) J, 30°, P, S, Cn (10.17m) J, 0 - 45°, Ir, R, Fe Sn (10.25m) J, 30°, P, R, Fe Sn (10.35m) J, 70°, P, R, Fe Sn	
		-1	11			FR	VH	5.1 5.1		(10.58m) J, 35°, P, R, Fe Sn (10.82m) J, 50°, P, R, Fe Sn (11.00m) J, 40°, P, S, Fe Sn, XW infill (11.22m) J, 55°, P, R, Fe Sn (11.48m) J, 25°, P, R, Fe Sn	
		-2	12		END OF BOREHOLE AT 11.60 m						
		-3	13								
		-4	14								

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

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BOREHOLE LOG

Borehole No.
BH36
1 / 1

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~12.0 m

Date: 22/4/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION	■									TOPSOIL: Sandy silty clay, low plasticity, grey brown, trace of root fibres.	w>PL			GRASS COVER
									CI		w~PL	Hd		RESIDUAL
				■	N = 21 8,8,13				CH	Silty gravelly CLAY: medium plasticity, orange brown and grey, fine grained quartz gravel, trace of sand and root fibres.				
						11	1			Gravelly sandy CLAY: high plasticity, grey and brown, fine to coarse graned sand, fine grained quartz gravel.				
				■	N > 24 9,10,14/ 100mm REFUSAL								570 >600	
						10	2		-	Extremely Weathered granite: clayey gravelly SAND, fine to coarse grained, brown and light grey, fine grained quartz gravel.	XW	D		MORUYA TONALITE VERY LOW 'TC' BIT RESISTANCE
				■	N=SPT 7/ 50mm REFUSAL	9	3							
						8	4							
				■	N=SPT 6/ 50mm REFUSAL									VERY LOW RESISTANCE WITH LOW BANDS (POSSIBLY LESS WEATHERED CORE STONES)
						7	5							
				■	N=SPT 5/ 0mm REFUSAL	6	6			END OF BOREHOLE AT 6.00 m				

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BOREHOLE LOG

Borehole No.
BH37
1 / 1

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~12.3 m

Date: 19/4/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION						12.3	0			TOPSOIL: Sandy silty clay, low plasticity, grey brown, trace of root fibres.	w>PL			GRASS COVER
						12			CI-CH	Silty sandy CLAY: medium to high plasticity, orange brown and grey, fine to coarse grained, trace of fine grained quartz gravel and root fibres.	w>PL	Hd		RESIDUAL
					N = 18 6,8,10		1						500 550	
						11			-	Extremely Weathered granite: clayey gravelly SAND, fine to coarse grained, brown and light grey, fine grained quartz gravel.	XW	D		MORUYA TONALITE VERY LOW 'TC' BIT RESISTANCE
					N = 23 10,11,12	10	2							
					N > 18 10,18/ 150mm REFUSAL		3							
						9								
					N=SPT 4/ 0mm REFUSAL	8	4							
						7	5							
					N=SPT 5/ 50mm REFUSAL		6							NO SPT SAMPLE RETURN
						6				END OF BOREHOLE AT 6.00 m				

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BOREHOLE LOG

Borehole No.
BH38
1 / 1

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED EUROBODALLA HEALTH SERVICE

Location: LOT 6 DP1212271, PRINCES HIGHWAY, MORUYA, NSW

Job No.: 33942LT **Method:** SPIRAL AUGER **R.L. Surface:** ~15.4 m

Date: 20/4/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** W.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION									-	TOPSOIL: sandy silty clay, low plasticity, grey brown, trace of root fibres.	w~PL			GRASS COVER
									CI	Silty CLAY: medium plasticity, orange brown and grey, trace of fine to medium grained sand and fine grained quartz gravel and root fibres.	w<PL			RESIDUAL
					N > 27 10,17,10/ 50mm REFUSAL	15			-	Extremely Weathered GRANITE: clayey gravelly SAND, fine to coarse grained, brown and grey, fine to coarse grained quartz gravel.	XW	D		MORUYA TONALITE VERY LOW 'TC' BIT RESISTANCE
					N=SPT 10/ 50mm REFUSAL	14	1							
					N=SPT 5/ 20mm REFUSAL	13	2							
					N=SPT 5/ 50mm REFUSAL	12	3							
					N=SPT 5/ 0mm REFUSAL	11	4							VERY LOW RESISTANCE WITH LOW BANDS (POSSIBLY LESS WEATHERED CORE STONES)
						10	5							
						9	6			END OF BOREHOLE AT 6.00 m				

ENVIRONMENTAL LOGS EXPLANATION NOTES

INTRODUCTION

These notes have been provided to amplify the environmental report in regard to classification methods, field procedures and certain matters relating to the logging of soil and rock. Not all notes are necessarily relevant to all reports.

Where geotechnical borehole logs are utilised for environmental purpose, reference should also be made to the explanatory notes included in the geotechnical report. Environmental logs are not suitable for geotechnical purposes.

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

DESCRIPTION AND CLASSIFICATION METHODS

The methods of description and classification of soils and rocks used in this report are based on Australian Standard 1726:2017 *'Geotechnical Site Investigations'*. In general, descriptions cover the following properties – soil or rock type, colour, structure, strength or density, and inclusions. Identification and classification of soil and rock involves judgement and the Company infers accuracy only to the extent that is common in current geoenvironmental practice.

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

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

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

Relative Density	SPT 'N' Value (blows/300mm)
Very loose (VL)	< 4
Loose (L)	4 to 10
Medium dense (MD)	10 to 30
Dense (D)	30 to 50
Very Dense (VD)	> 50

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

Classification	Unconfined Compressive Strength (kPa)	Indicative Undrained Shear Strength (kPa)
Very Soft (VS)	≤ 25	≤ 12
Soft (S)	> 25 and ≤ 50	> 12 and ≤ 25
Firm (F)	> 50 and ≤ 100	> 25 and ≤ 50
Stiff (St)	> 100 and ≤ 200	> 50 and ≤ 100
Very Stiff (VSt)	> 200 and ≤ 400	> 100 and ≤ 200
Hard (Hd)	> 400	> 200
Friable (Fr)	Strength not attainable – soil crumbles	

Rock types are classified by their geological names, together with descriptive terms regarding weathering, strength, defects, etc. Where relevant, further information regarding rock classification is given in the text of the report. In the Sydney Basin, 'shale' is used to describe fissile mudstone, with a weakness parallel to bedding. Rocks with alternating inter-laminations of different grain size (eg. siltstone/claystone and siltstone/fine grained sandstone) are referred to as 'laminite'.

INVESTIGATION METHODS

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

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

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

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

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

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

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

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

Continuous Core Drilling: A continuous core sample is obtained using a diamond tipped core barrel. Provided full core recovery is achieved (which is not always possible in very low strength rocks and granular soils), this technique provides a very reliable (but relatively expensive) method of investigation. In rocks, NMLC or HQ triple tube core barrels, which give a core of about 50mm and 61mm diameter, respectively, is usually used with water flush. The length of core recovered is compared to the length drilled and any length not recovered is shown as NO CORE. The location of NO CORE recovery is determined on site by the supervising engineer; where the location is uncertain, the loss is placed at the bottom of the drill run.

Standard Penetration Tests: Standard Penetration Tests (SPT) are used mainly in non-cohesive soils, but can also be used in cohesive soils, as a means of indicating density or strength and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289.6.3.1–2004 (R2016) *'Methods of Testing Soils for Engineering Purposes, Soil Strength and Consolidation Tests – Determination of the Penetration Resistance of a Soil – Standard Penetration Test (SPT)'*.

The test is carried out in a borehole by driving a 50mm diameter split sample tube with a tapered shoe, under the impact of a 63.5kg hammer with a free fall of 760mm. It is normal for the tube to be driven in three successive 150mm increments and the 'N' value is taken as the number of blows for the last 300mm. In dense sands, very hard clays or weak rock, the full 450mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form:

- In the case where full penetration is obtained with successive blow counts for each 150mm of, say, 4, 6 and 7 blows, as

  N = 13
  4, 6, 7

- In a case where the test is discontinued short of full penetration, say after 15 blows for the first 150mm and 30 blows for the next 40mm, as

  N > 30
  15, 30/40mm

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

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

LOGS

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

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

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

GROUNDWATER

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

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

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

FILL

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

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

LABORATORY TESTING

Laboratory testing has not been undertaken to confirm the soil classification and rock strengths indicated on the environmental logs unless noted in the report.

SYMBOL LEGENDS

SOIL


FILL


TOPSOIL


CLAY (CL, CI, CH)


SILT (ML, MH)


SAND (SP, SW)


GRAVEL (GP, GW)


SANDY CLAY (CL, CI, CH)


SILTY CLAY (CL, CI, CH)


CLAYEY SAND (SC)


SILTY SAND (SM)


GRAVELLY CLAY (CL, CI, CH)


CLAYEY GRAVEL (GC)


SANDY SILT (ML, MH)


PEAT AND HIGHLY ORGANIC SOILS (Pt)

ROCK


CONGLOMERATE


SANDSTONE


SHALE/MUDSTONE


SILTSTONE


CLAYSTONE


COAL


LAMINITE


LIMESTONE


PHYLLITE, SCHIST


TUFF


GRANITE, GABBRO


DOLERITE, DIORITE


BASALT, ANDESITE


QUARTZITE

OTHER MATERIALS


BRICKS OR PAVERS


CONCRETE


ASPHALTIC CONCRETE

CLASSIFICATION OF COARSE AND FINE GRAINED SOILS

Major Divisions		Group Symbol	Typical Names	Field Classification of Sand and Gravel	Laboratory Classification	
Coarse grained soil (more than 65% of soil excluding oversize fraction is greater than 0.075mm)	GRAVEL (more than half of coarse fraction is larger than 2.36mm	GW	Gravel and gravel-sand mixtures, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	$C_u > 4$ $1 < C_c < 3$
		GP	Gravel and gravel-sand mixtures, little or no fines, uniform gravels	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	Fails to comply with above
		GM	Gravel-silt mixtures and gravel-sand-silt mixtures	'Dirty' materials with excess of non-plastic fines, zero to medium dry strength	≥ 12% fines, fines are silty	Fines behave as silt
		GC	Gravel-clay mixtures and gravel-sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength	≥ 12% fines, fines are clayey	Fines behave as clay
	SAND (more than half of coarse fraction is smaller than 2.36mm)	SW	Sand and gravel-sand mixtures, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	$C_u > 6$ $1 < C_c < 3$
		SP	Sand and gravel-sand mixtures, little or no fines	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	Fails to comply with above
		SM	Sand-silt mixtures	'Dirty' materials with excess of non-plastic fines, zero to medium dry strength	≥ 12% fines, fines are silty	N/A
		SC	Sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength	≥ 12% fines, fines are clayey	

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

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:

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

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:

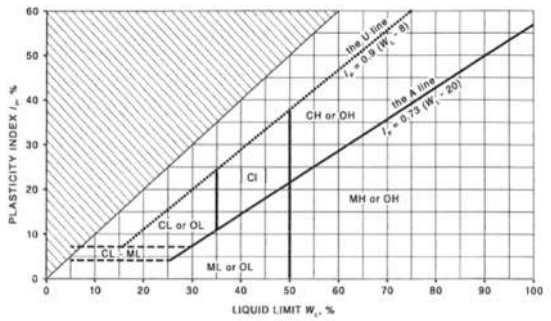
1 For a coarse grained soil with a fines content between 5% and 12%, the soil is given a dual classification comprising the two group symbols separated by a dash; for example, for a poorly graded gravel with between 5% and 12% silt fines, the classification is GP-GM.

2 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.

4 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	Definition
Groundwater Record		Standing water level. Time delay following completion of drilling/excavation may be shown.
		Extent of borehole/test pit collapse shortly after drilling/excavation.
		Groundwater seepage into borehole or test pit noted during drilling or excavation.
Samples	ES	Sample taken over depth indicated, for environmental analysis.
	U50	Undisturbed 50mm diameter tube sample taken over depth indicated.
	DB	Bulk disturbed sample taken over depth indicated.
	DS	Small disturbed bag sample taken over depth indicated.
	ASB	Soil sample taken over depth indicated, for asbestos analysis.
	ASS	Soil sample taken over depth indicated, for acid sulfate soil analysis.
	SAL	Soil sample taken over depth indicated, for salinity analysis.
	PFAS	Soil sample taken over depth indicated, for analysis of Per- and Polyfluoroalkyl Substances.
Field Tests	N = 17 4, 7, 10	Standard Penetration Test (SPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration. 'Refusal' refers to apparent hammer refusal within the corresponding 150mm depth increment.
	N_c = 5 7 3R	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)	w > PL $w \approx$ PL w < PL $w \approx$ LL w > LL	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.
(Coarse Grained Soils)	D M W	DRY – runs freely through fingers. MOIST – does not run freely but no free water visible on soil surface. WET – free water visible on soil surface.
Strength (Consistency) Cohesive Soils	VS S F St VSt Hd Fr ( )	VERY SOFT – unconfined compressive strength ≤ 25kPa. SOFT – unconfined compressive strength > 25kPa and ≤ 50kPa. FIRM – unconfined compressive strength > 50kPa and ≤ 100kPa. STIFF – unconfined compressive strength > 100kPa and ≤ 200kPa. VERY STIFF – unconfined compressive strength > 200kPa and ≤ 400kPa. HARD – unconfined compressive strength > 400kPa. FRIABLE – strength not attainable, soil crumbles. Bracketed symbol indicates estimated consistency based on tactile examination or other assessment.
Density Index/ Relative Density (Cohesionless Soils)	VL L MD D VD ( )	**Density Index (I_D) Range (%)** / **SPT 'N' Value Range (Blows/300mm)** VERY LOOSE ≤ 15 / 0 – 4 LOOSE > 15 and ≤ 35 / 4 – 10 MEDIUM DENSE > 35 and ≤ 65 / 10 – 30 DENSE > 65 and ≤ 85 / 30 – 50 VERY DENSE > 85 / > 50 Bracketed symbol indicates estimated density based on ease of drilling or other assessment.

Log Column	Symbol	Definition
Hand Penetrometer Readings	300 250	Measures reading in kPa of unconfined compressive strength. Numbers indicate individual test results on representative undisturbed material unless noted otherwise.
Remarks	'V' bit	Hardened steel 'V' shaped bit.
	'TC' bit	Twin pronged tungsten carbide bit.
	T_{60}	Penetration of auger string in mm under static load of rig applied by drill head hydraulics without rotation of augers.
	Soil Origin	The geological origin of the soil can generally be described as: RESIDUAL – soil formed directly from insitu weathering of the underlying rock. No visible structure or fabric of the parent rock. EXTREMELY WEATHERED – soil formed directly from insitu weathering of the underlying rock. Material is of soil strength but retains the structure and/or fabric of the parent rock. ALLUVIAL – soil deposited by creeks and rivers. ESTUARINE – soil deposited in coastal estuaries, including sediments caused by inflowing creeks and rivers, and tidal currents. MARINE – soil deposited in a marine environment. AEOLIAN – soil carried and deposited by wind. COLLUVIAL – soil and rock debris transported downslope by gravity, with or without the assistance of flowing water. Colluvium is usually a thick deposit formed from a landslide. The description 'slopewash' is used for thinner surficial deposits. LITTORAL – beach deposited soil.

Classification of Material Weathering

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

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

Rock Material Strength Classification

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

Appendix E: Laboratory Report(s) & COC Documents

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CERTIFICATE OF ANALYSIS 266931

Client Details

Client	JK Environments
Attention	Harry Leonard
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	**E33942PL, Moruya**
Number of Samples	30 Soil
Date samples received	16/04/2021
Date completed instructions received	16/04/2021

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	23/04/2021
Date of Issue	23/04/2021

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Asbestos Approved By
Analysed by Asbestos Approved Identifier: Lucy Zhu
Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By
Diego Bigolin, Team Leader, Inorganics
Dragana Tomas, Senior Chemist
Hannah Nguyen, Senior Chemist
Ken Nguyen, Senior Customer Service
Lucy Zhu, Asbestos Supervisor
Steven Luong, Organics Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		266931-1	266931-3	266931-13	266931-15	266931-21
Your Reference	UNITS	BH1	BH2	BH11	BH13	BH17
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		13.4.21	13.4.21	14.4.21	15.4.21	14.4.21
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	19/04/2021	19/04/2021	19/04/2021	19/04/2021	19/04/2021
Date analysed	-	20/04/2021	20/04/2021	20/04/2021	20/04/2021	20/04/2021
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	%	112	113	115	114	114

vTRH(C6-C10)/BTEXN in Soil				
Our Reference		266931-27	266931-29	266931-30
Your Reference	UNITS	BH22	TBS1	TSS1
Depth		0-0.1	-	-
Date Sampled		15.4.21	15.4.21	15.4.21
Type of sample		Soil	Soil	Soil
Date extracted	-	19/04/2021	19/04/2021	19/04/2021
Date analysed	-	20/04/2021	20/04/2021	20/04/2021
TRH C_6 - C_9	mg/kg	<25	[NA]	[NA]
TRH C_6 - C_{10}	mg/kg	<25	[NA]	[NA]
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	[NA]	[NA]
Benzene	mg/kg	<0.2	<0.2	83%
Toluene	mg/kg	<0.5	<0.5	85%
Ethylbenzene	mg/kg	<1	<1	106%
m+p-xylene	mg/kg	<2	<2	106%
o-Xylene	mg/kg	<1	<1	106%
naphthalene	mg/kg	<1	<1	[NA]
Total +ve Xylenes	mg/kg	<3	<3	[NA]
Surrogate aaa-Trifluorotoluene	%	117	117	106

svTRH (C10-C40) in Soil						
Our Reference		266931-1	266931-3	266931-13	266931-15	266931-21
Your Reference	UNITS	BH1	BH2	BH11	BH13	BH17
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		13.4.21	13.4.21	14.4.21	15.4.21	14.4.21
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	19/04/2021	19/04/2021	19/04/2021	19/04/2021	19/04/2021
Date analysed	-	20/04/2021	20/04/2021	20/04/2021	20/04/2021	20/04/2021
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	99	102	100	101	103

svTRH (C10-C40) in Soil		
Our Reference		266931-27
Your Reference	UNITS	BH22
Depth		0-0.1
Date Sampled		15.4.21
Type of sample		Soil
Date extracted	-	19/04/2021
Date analysed	-	20/04/2021
TRH C_{10} - C_{14}	mg/kg	<50
TRH C_{15} - C_{28}	mg/kg	<100
TRH C_{29} - C_{36}	mg/kg	<100
TRH >C_{10} -C_{16}	mg/kg	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50
TRH >C_{16} -C_{34}	mg/kg	<100
TRH >C_{34} -C_{40}	mg/kg	<100
Total +ve TRH (>C10-C40)	mg/kg	<50
Surrogate o-Terphenyl	%	99

PAHs in Soil						
Our Reference		266931-1	266931-3	266931-13	266931-15	266931-21
Your Reference	UNITS	BH1	BH2	BH11	BH13	BH17
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		13.4.21	13.4.21	14.4.21	15.4.21	14.4.21
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	19/04/2021	19/04/2021	19/04/2021	19/04/2021	19/04/2021
Date analysed	-	20/04/2021	20/04/2021	20/04/2021	20/04/2021	20/04/2021
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	%	109	111	109	106	108

PAHs in Soil		
Our Reference		266931-27
Your Reference	UNITS	BH22
Depth		0-0.1
Date Sampled		15.4.21
Type of sample		Soil
Date extracted	-	19/04/2021
Date analysed	-	20/04/2021
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-d14	%	109

Organochlorine Pesticides in soil						
Our Reference		266931-1	266931-3	266931-13	266931-15	266931-21
Your Reference	UNITS	BH1	BH2	BH11	BH13	BH17
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		13.4.21	13.4.21	14.4.21	15.4.21	14.4.21
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	19/04/2021	19/04/2021	19/04/2021	19/04/2021	19/04/2021
Date analysed	-	20/04/2021	20/04/2021	20/04/2021	20/04/2021	20/04/2021
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	100	104	102	101	101

Organochlorine Pesticides in soil		
Our Reference		266931-27
Your Reference	UNITS	BH22
Depth		0-0.1
Date Sampled		15.4.21
Type of sample		Soil
Date extracted	-	19/04/2021
Date analysed	-	20/04/2021
alpha-BHC	mg/kg	<0.1
HCB	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 DDT+DDD+DDE	mg/kg	<0.1
Surrogate TCMX	%	103

Organophosphorus Pesticides in Soil						
Our Reference		266931-1	266931-3	266931-13	266931-15	266931-21
Your Reference	UNITS	BH1	BH2	BH11	BH13	BH17
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		13.4.21	13.4.21	14.4.21	15.4.21	14.4.21
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	19/04/2021	19/04/2021	19/04/2021	19/04/2021	19/04/2021
Date analysed	-	20/04/2021	20/04/2021	20/04/2021	20/04/2021	20/04/2021
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	%	100	104	102	101	101

Organophosphorus Pesticides in Soil		
Our Reference		266931-27
Your Reference	UNITS	BH22
Depth		0-0.1
Date Sampled		15.4.21
Type of sample		Soil
Date extracted	-	19/04/2021
Date analysed	-	20/04/2021
Dichlorvos	mg/kg	<0.1
Dimethoate	mg/kg	<0.1
Diazinon	mg/kg	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1
Ronnel	mg/kg	<0.1
Fenitrothion	mg/kg	<0.1
Malathion	mg/kg	<0.1
Chlorpyriphos	mg/kg	<0.1
Parathion	mg/kg	<0.1
Bromophos-ethyl	mg/kg	<0.1
Ethion	mg/kg	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1
Surrogate TCMX	%	103

PCBs in Soil						
Our Reference		266931-1	266931-3	266931-13	266931-15	266931-21
Your Reference	UNITS	BH1	BH2	BH11	BH13	BH17
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		13.4.21	13.4.21	14.4.21	15.4.21	14.4.21
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	19/04/2021	19/04/2021	19/04/2021	19/04/2021	19/04/2021
Date analysed	-	20/04/2021	20/04/2021	20/04/2021	20/04/2021	20/04/2021
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	%	100	104	102	101	101

PCBs in Soil		
Our Reference		266931-27
Your Reference	UNITS	BH22
Depth		0-0.1
Date Sampled		15.4.21
Type of sample		Soil
Date extracted	-	19/04/2021
Date analysed	-	20/04/2021
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 TCMX	%	103

Acid Extractable metals in soil						
Our Reference		266931-1	266931-3	266931-13	266931-15	266931-21
Your Reference	UNITS	BH1	BH2	BH11	BH13	BH17
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		13.4.21	13.4.21	14.4.21	15.4.21	14.4.21
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	23/04/2021	23/04/2021	23/04/2021	23/04/2021	23/04/2021
Date analysed	-	23/04/2021	23/04/2021	23/04/2021	23/04/2021	23/04/2021
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	1	2	1	1	1
Copper	mg/kg	<1	<1	<1	<1	1
Lead	mg/kg	5	5	3	3	3
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	<1	1	<1	<1	<1
Zinc	mg/kg	5	4	3	3	7

Acid Extractable metals in soil		
Our Reference		266931-27
Your Reference	UNITS	BH22
Depth		0-0.1
Date Sampled		15.4.21
Type of sample		Soil
Date prepared	-	23/04/2021
Date analysed	-	23/04/2021
Arsenic	mg/kg	<4
Cadmium	mg/kg	<0.4
Chromium	mg/kg	1
Copper	mg/kg	<1
Lead	mg/kg	4
Mercury	mg/kg	<0.1
Nickel	mg/kg	<1
Zinc	mg/kg	4

Misc Soil - Inorg						
Our Reference		266931-1	266931-3	266931-13	266931-15	266931-21
Your Reference	UNITS	BH1	BH2	BH11	BH13	BH17
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		13.4.21	13.4.21	14.4.21	15.4.21	14.4.21
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	19/04/2021	19/04/2021	19/04/2021	19/04/2021	19/04/2021
Date analysed	-	19/04/2021	19/04/2021	19/04/2021	19/04/2021	19/04/2021
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Misc Soil - Inorg		
Our Reference		266931-27
Your Reference	UNITS	BH22
Depth		0-0.1
Date Sampled		15.4.21
Type of sample		Soil
Date prepared	-	19/04/2021
Date analysed	-	19/04/2021
Total Phenolics (as Phenol)	mg/kg	<5

Moisture						
Our Reference		266931-1	266931-3	266931-13	266931-15	266931-21
Your Reference	UNITS	BH1	BH2	BH11	BH13	BH17
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		13.4.21	13.4.21	14.4.21	15.4.21	14.4.21
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	19/04/2021	19/04/2021	19/04/2021	19/04/2021	19/04/2021
Date analysed	-	20/04/2021	20/04/2021	20/04/2021	20/04/2021	20/04/2021
Moisture	%	14	11	13	13	14

Moisture		
Our Reference		266931-27
Your Reference	UNITS	BH22
Depth		0-0.1
Date Sampled		15.4.21
Type of sample		Soil
Date prepared	-	19/04/2021
Date analysed	-	20/04/2021
Moisture	%	15

Asbestos ID - soils NEPM - ASB-001						
Our Reference		266931-1	266931-3	266931-13	266931-15	266931-21
Your Reference	UNITS	BH1	BH2	BH11	BH13	BH17
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		13.4.21	13.4.21	14.4.21	15.4.21	14.4.21
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	20/04/2021	20/04/2021	20/04/2021	20/04/2021	20/04/2021
Sample mass tested	g	508.33	728.01	705.26	677.48	630.67
Sample Description	-	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–	–
FA and AF Estimation*	g	–	–	–	–	–
ACM >7mm Estimation*	%(w/w)	<0.01	<0.01	<0.01	<0.01	<0.01
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Asbestos ID - soils NEPM - ASB-001		
Our Reference		266931-27
Your Reference	UNITS	BH22
Depth		0-0.1
Date Sampled		15.4.21
Type of sample		Soil
Date analysed	-	20/04/2021
Sample mass tested	g	631.16
Sample Description	-	Brown fine-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected
Total Asbestos#1	g/kg	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected
ACM >7mm Estimation*	g	–
FA and AF Estimation*	g	–
ACM >7mm Estimation*	%(w/w)	<0.01
FA and AF Estimation*#2	%(w/w)	<0.001

Misc Inorg - Soil			
Our Reference		266931-13	266931-14
Your Reference	UNITS	BH11	BH11
Depth		0-0.1	02-0.3
Date Sampled		14.4.21	14.4.21
Type of sample		Soil	Soil
Date prepared	-	21/04/2021	21/04/2021
Date analysed	-	21/04/2021	21/04/2021
pH 1:5 soil:water	pH Units	6.1	5.7

CEC			
Our Reference		266931-13	266931-14
Your Reference	UNITS	BH11	BH11
Depth		0-0.1	02-0.3
Date Sampled		14.4.21	14.4.21
Type of sample		Soil	Soil
Date prepared	-	23/04/2021	23/04/2021
Date analysed	-	23/04/2021	23/04/2021
Exchangeable Ca	meq/100g	1.1	0.3
Exchangeable K	meq/100g	0.1	<0.1
Exchangeable Mg	meq/100g	0.66	3.1
Exchangeable Na	meq/100g	<0.1	0.83
Cation Exchange Capacity	meq/100g	1.9	4.2

Clay 50-120g			
Our Reference		266931-13	266931-14
Your Reference	UNITS	BH11	BH11
Depth		0-0.1	02-0.3
Date Sampled		14.4.21	14.4.21
Type of sample		Soil	Soil
Date prepared	-	20/04/2021	20/04/2021
Date analysed	-	21/04/2021	21/04/2021
Clay in soils <2µm	% (w/w)	14	36

Method ID	Methodology Summary
AS1289.3.6.3	Determination Particle Size Analysis using AS1289.3.6.3 and AS1289.3.6.1 and in house method INORG-107. Clay fraction at <2µm reported.
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
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-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Metals-020	Determination of various metals by ICP-AES.
Metals-020	Determination of exchangeable cations and cation exchange capacity in soils using 1M Ammonium Chloride exchange and ICP-AES analytical finish.
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.

Method ID	Methodology Summary
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.
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 are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-023	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.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-7	[NT]
Date extracted	-			19/04/2021	[NT]	[NT]	[NT]	[NT]	19/04/2021	[NT]
Date analysed	-			20/04/2021	[NT]	[NT]	[NT]	[NT]	20/04/2021	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	108	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	108	[NT]
Benzene	mg/kg	0.2	Org-023	<0.2	[NT]	[NT]	[NT]	[NT]	127	[NT]
Toluene	mg/kg	0.5	Org-023	<0.5	[NT]	[NT]	[NT]	[NT]	116	[NT]
Ethylbenzene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	105	[NT]
m+p-xylene	mg/kg	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	97	[NT]
o-Xylene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	103	[NT]
naphthalene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	114	[NT]	[NT]	[NT]	[NT]	115	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-7	[NT]
Date extracted	-			19/04/2021	[NT]	[NT]	[NT]	[NT]	19/04/2021	[NT]
Date analysed	-			20/04/2021	[NT]	[NT]	[NT]	[NT]	20/04/2021	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	101	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	89	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	108	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	101	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	89	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	108	[NT]
Surrogate o-Terphenyl	%		Org-020	89	[NT]	[NT]	[NT]	[NT]	127	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-7	[NT]
Date extracted	-			19/04/2021	[NT]	[NT]	[NT]	[NT]	19/04/2021	[NT]
Date analysed	-			20/04/2021	[NT]	[NT]	[NT]	[NT]	20/04/2021	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	94	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	77	[NT]
Fluorene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	89	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	89	[NT]
Pyrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	84	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	78	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	81	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	112	[NT]	[NT]	[NT]	[NT]	103	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-7	[NT]
Date extracted	-			19/04/2021	[NT]	[NT]	[NT]	[NT]	19/04/2021	[NT]
Date analysed	-			20/04/2021	[NT]	[NT]	[NT]	[NT]	20/04/2021	[NT]
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	99	[NT]
HCB	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	106	[NT]
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	93	[NT]
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	99	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Endrin	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	91	[NT]
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	85	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	95	[NT]
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	105	[NT]	[NT]	[NT]	[NT]	100	[NT]

QUALITY CONTROL: Organophosphorus Pesticides in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-7	[NT]
Date extracted	-			19/04/2021	[NT]	[NT]	[NT]	[NT]	19/04/2021	[NT]
Date analysed	-			20/04/2021	[NT]	[NT]	[NT]	[NT]	20/04/2021	[NT]
Dichlorvos	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	71	[NT]
Dimethoate	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	89	[NT]
Fenitrothion	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	73	[NT]
Malathion	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Chlorpyriphos	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Parathion	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	78	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	77	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	105	[NT]	[NT]	[NT]	[NT]	100	[NT]

QUALITY CONTROL: PCBs in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-7	[NT]
Date extracted	-			19/04/2021	[NT]	[NT]	[NT]	[NT]	19/04/2021	[NT]
Date analysed	-			20/04/2021	[NT]	[NT]	[NT]	[NT]	20/04/2021	[NT]
Aroclor 1016	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	70	[NT]
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-021	105	[NT]	[NT]	[NT]	[NT]	100	[NT]

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-7	[NT]
Date prepared	-			23/04/2021	[NT]	[NT]	[NT]	[NT]	23/04/2021	[NT]
Date analysed	-			23/04/2021	[NT]	[NT]	[NT]	[NT]	23/04/2021	[NT]
Arsenic	mg/kg	4	Metals-020	<4	[NT]	[NT]	[NT]	[NT]	98	[NT]
Cadmium	mg/kg	0.4	Metals-020	<0.4	[NT]	[NT]	[NT]	[NT]	105	[NT]
Chromium	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Copper	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	103	[NT]
Lead	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	107	[NT]
Mercury	mg/kg	0.1	Metals-021	<0.1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Nickel	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	103	[NT]
Zinc	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	104	[NT]

QUALITY CONTROL: Misc Soil - Inorg					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			19/04/2021	[NT]	[NT]	[NT]	[NT]	19/04/2021	[NT]
Date analysed	-			19/04/2021	[NT]	[NT]	[NT]	[NT]	19/04/2021	[NT]
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	[NT]	[NT]	[NT]	[NT]	103	[NT]

QUALITY CONTROL: Misc Inorg - Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			21/04/2021	[NT]	[NT]	[NT]	[NT]	21/04/2021	[NT]
Date analysed	-			21/04/2021	[NT]	[NT]	[NT]	[NT]	21/04/2021	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	[NT]	[NT]	[NT]	[NT]	99	[NT]

QUALITY CONTROL: CEC						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			23/04/2021	[NT]	[NT]	[NT]	[NT]	23/04/2021	[NT]
Date analysed	-			23/04/2021	[NT]	[NT]	[NT]	[NT]	23/04/2021	[NT]
Exchangeable Ca	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	119	[NT]
Exchangeable K	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	128	[NT]
Exchangeable Mg	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	121	[NT]
Exchangeable Na	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	124	[NT]

Result Definitions

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

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

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

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

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.

Envirolab Services Pty Ltd
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SAMPLE RECEIPT ADVICE

Client Details

Client	JK Environments
Attention	Harry Leonard

Sample Login Details

Your reference	E33942PL, Moruya
Envirolab Reference	266931
Date Sample Received	16/04/2021
Date Instructions Received	16/04/2021
Date Results Expected to be Reported	23/04/2021

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	30 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	6
Cooling Method	Ice Pack
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:

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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	Misc Soil - Inorg	Asbestos ID - soils NEPM - ASB-001	Misc Inorg - Soil	CEC	Clay 50-120g	On Hold
BH1-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓				
BH1-0.2-0.3													✓
BH2-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓				
BH2-0.3-0.4													✓
BH5-0-0.1													✓
BH5-0.2-0.3													✓
BH8-0-0.1													✓
BH8-0.2-0.3													✓
BH9-0-0.1													✓
BH9-0.2-0.3													✓
BH10-0-0.1													✓
BH10-0.5-0.6													✓
BH11-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
BH11-02-0.3										✓	✓	✓	
BH13-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓				
BH13-0.2-0.3													✓
BH14-0-0.1													✓
BH14-0.2-0.3													✓
BH15-0-0.1													✓
BH15-0.2-0.3													✓
BH17-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓				
BH17-0.2-0.3													✓
BH18-0-0.1													✓
BH18-0.2-0.3													✓
BH21-0-0.1													✓
BH21-0.2-0.3													✓
BH22-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓				
BH22-0.2-0.3													✓
TBS1	✓												
TSS1	✓												

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

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Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	JKE Job Number: E33942PL Date Results Required: STANDARD Page: 1 of 2	JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Hleonard@jkenvironments.com.au

Location:	Moruya	Sample Preserved in Esky on Ice
Sampler:	WS	Tests Required

Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 8	Asbestos WA (500ml)	pH/CEC	Clay Content (%)	BTEX							
13.4.21	1	BH1	0-0.1	G, A	0	F: Silty sandy clay	X	X										
13.4.21	2	BH1	0.2-0.3	G	0	Silty sandy clay												
13.4.21	3	BH2	0-0.1	G, A	0	F: Silty sandy clay	X	X										
13.4.21	4	BH2	0.3-0.4	G	0	Silty sandy clay												
15.4.21	5	BH5	0-0.1	G, A	0	F: Silty sandy clay												
15.4.21	6	BH5	0.2-0.3	G	0	Silty sandy clay												
14.4.21	7	BH8	0-0.1	G, A	0	F: Silty sandy clay												
14.4.21	8	BH8	0.2-0.3	G	0	Silty sandy clay												
14.4.21	9	BH9	0-0.1	G, A	0	F: Silty sandy clay												
14.4.21	10	BH9	0.2-0.3	G	0	Silty sandy clay												
14.4.21	11	BH10	0-0.1	G, A	0	F: Silty sandy clay												
14.4.21	12	BH10	0.5-0.6	G	0	Silty sandy clay												
14.4.21	13	BH11	0-0.1	G, A	0	F: Silty sandy clay	X	X	X	X								
14.4.21	14	BH11	02-0.3	G	0	Silty sandy clay			X	X								
15.4.21	15	BH13	0-0.1	G, A	0	F: Silty sandy clay	X	X										
15.4.21	16	BH13	0.2-0.3	G	0	Silty sandy clay												
15.4.21	17	BH14	0-0.1	G, A	0	F: Silty sandy clay												
15.4.21	18	BH14	0.2-0.3	G	0	Silty sandy clay												
14.4.21	19	BH15	0-0.1	G, A	0	F: Silty sandy clay												
14.4.21	20	BH15	0.2-0.3	G	0	Silty sandy clay												
14.4.21	21	BH17	0-0.1	G, A	0	F: Silty sandy clay	X	X										
14.4.21	22	BH17	0.2-0.3	G	0	Silty sandy clay												
14.4.21	23	BH18	0-0.1	G, A	0	F: Silty sandy clay												
14.4.21	24	BH18	0.2-0.3	G	0	Silty sandy clay												
15.4.21	25	BH21	0-0.1	G, A	0	F: Silty sandy clay												

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200
Job No: 266931
Date Received: 16/4/21
Time Received: 1450
Received By: VV
Temp: Cooler / Ice brick
Cooling: Ice / Ice brick
Security: Intact / Broken / None

Remarks (comments/detection limits required):	Sample Containers: G - 250mg Glass Jar A - Ziplock Asbestos Bag P - Plastic Bag			
Relinquished By: HL	Date: 16 April 2021	Time: 1450	Received By: ELS - SYD VINA VEGA	Date: 16/4/21

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	JKE Job Number: E33942PL Date Results Required: STANDARD Page: 2 of 2	JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Hleonard@jkenvironments.com.au

Location:	Moruya	Sample Preserved in Esky on Ice
Sampler:	WS	Tests Required

Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 8	Asbestos WA (500ml)	pH/CEC	Clay Content (%)	BTEX							
15.4.21	26	BH21	0.2-0.3	G	0	Silty sandy clay												
15.4.21	27	BH22	0-0.1	G, A	0	F: Silty sandy clay	X	X										
15.4.21	28	BH22	0.2-0.3	G	0	Silty sandy clay												
	29	TBS1	-	G	-	Soil					X							
	30	TSS1	-	V	-	Soil					X							

Remarks (comments/detection limits required):	Sample Containers: G - 250mg Glass Jar A - Ziplock Asbestos Bag P - Plastic Bag	* 266931

Relinquished By: HL	Date: 16 April 2021	Time: 1450	Received By: ELS-SYD VINA VEGA	Date: 16/4/21

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

CERTIFICATE OF ANALYSIS 267510

Client Details

Client	JK Environments
Attention	Harry Leonard
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	**E33942PL, Moruya**
Number of Samples	53 Soil
Date samples received	23/04/2021
Date completed instructions received	23/04/2021

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	30/04/2021
Date of Issue	30/04/2021

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Asbestos Approved By
Analysed by Asbestos Approved Identifier: Nyovan Moonean
Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By
Diego Bigolin, Team Leader, Inorganics
Hannah Nguyen, Senior Chemist
Lucy Zhu, Asbestos Supervisor
Steven Luong, Organics Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		267510-3	267510-7	267510-9	267510-15	267510-19
Your Reference	UNITS	BH4	BH7	BH12	BH20	BH24
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		20.4.21	21.4.21	15.4.21	17.4.21	16.4.21
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	26/04/2021	29/04/2021	26/04/2021	26/04/2021	26/04/2021
Date analysed	-	26/04/2021	30/04/2021	26/04/2021	26/04/2021	26/04/2021
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	%	122	133	119	116	122

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		267510-23	267510-24	267510-25	267510-27	267510-29
Your Reference	UNITS	BH26	BH26	BH27	BH28	BH29
Depth		0-0.1	0.2-0.3	0-0.1	0-0.1	0-0.1
Date Sampled		16.4.21	16.4.21	15.4.21	19.4.21	19.4.21
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	26/04/2021	26/04/2021	26/04/2021	26/04/2021	26/04/2021
Date analysed	-	26/04/2021	26/04/2021	26/04/2021	26/04/2021	26/04/2021
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	%	121	122	120	120	114

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		267510-30	267510-38	267510-43	267510-50	267510-51
Your Reference	UNITS	BH29	BH33	BH35	TBS2	TSS2
Depth		0.2-0.3	0-0.1	0-0.1	-	-
Date Sampled		19.4.21	20.4.21	19.4.21	22.4.21	22.4.21
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	26/04/2021	26/04/2021	26/04/2021	26/04/2021	26/04/2021
Date analysed	-	26/04/2021	26/04/2021	26/04/2021	26/04/2021	26/04/2021
TRH C_6 - C_9	mg/kg	<25	<25	<25	[NA]	[NA]
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	[NA]	[NA]
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	[NA]	[NA]
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	92%
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	91%
Ethylbenzene	mg/kg	<1	<1	<1	<1	91%
m+p-xylene	mg/kg	<2	<2	<2	<2	91%
o-Xylene	mg/kg	<1	<1	<1	<1	92%
naphthalene	mg/kg	<1	<1	<1	<1	[NA]
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	[NA]
Surrogate aaa-Trifluorotoluene	%	119	123	121	127	80

vTRH(C6-C10)/BTEXN in Soil		
Our Reference		267510-52
Your Reference	UNITS	SDUP1
Depth		-
Date Sampled		15.4.21
Type of sample		Soil
Date extracted	-	26/04/2021
Date analysed	-	26/04/2021
TRH C_6 - C_9	mg/kg	<25
TRH C_6 - C_{10}	mg/kg	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25
Benzene	mg/kg	<0.2
Toluene	mg/kg	<0.5
Ethylbenzene	mg/kg	<1
m+p-xylene	mg/kg	<2
o-Xylene	mg/kg	<1
naphthalene	mg/kg	<1
Total +ve Xylenes	mg/kg	<3
Surrogate aaa-Trifluorotoluene	%	115

svTRH (C10-C40) in Soil						
Our Reference		267510-3	267510-7	267510-9	267510-15	267510-19
Your Reference	UNITS	BH4	BH7	BH12	BH20	BH24
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		20.4.21	21.4.21	15.4.21	17.4.21	16.4.21
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	26/04/2021	26/04/2021	26/04/2021	26/04/2021	26/04/2021
Date analysed	-	27/04/2021	30/04/2021	27/04/2021	27/04/2021	27/04/2021
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	103	109	103	104	102

svTRH (C10-C40) in Soil						
Our Reference		267510-23	267510-24	267510-25	267510-27	267510-29
Your Reference	UNITS	BH26	BH26	BH27	BH28	BH29
Depth		0-0.1	0.2-0.3	0-0.1	0-0.1	0-0.1
Date Sampled		16.4.21	16.4.21	15.4.21	19.4.21	19.4.21
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	26/04/2021	26/04/2021	26/04/2021	26/04/2021	26/04/2021
Date analysed	-	27/04/2021	28/04/2021	27/04/2021	27/04/2021	27/04/2021
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	110	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	75	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	75	<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	180	<50	<50	<50
Surrogate o-Terphenyl	%	101	107	108	101	107

svTRH (C10-C40) in Soil					
Our Reference		267510-30	267510-38	267510-43	267510-52
Your Reference	UNITS	BH29	BH33	BH35	SDUP1
Depth		0.2-0.3	0-0.1	0-0.1	-
Date Sampled		19.4.21	20.4.21	19.4.21	15.4.21
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	26/04/2021	26/04/2021	26/04/2021	26/04/2021
Date analysed	-	27/04/2021	27/04/2021	27/04/2021	27/04/2021
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50
Surrogate o-Terphenyl	%	104	95	104	104

PAHs in Soil						
Our Reference		267510-3	267510-7	267510-9	267510-15	267510-19
Your Reference	UNITS	BH4	BH7	BH12	BH20	BH24
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		20.4.21	21.4.21	15.4.21	17.4.21	16.4.21
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	26/04/2021	29/04/2021	26/04/2021	26/04/2021	26/04/2021
Date analysed	-	27/04/2021	29/04/2021	27/04/2021	27/04/2021	27/04/2021
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	%	117	108	116	114	116

PAHs in Soil						
Our Reference		267510-23	267510-24	267510-25	267510-27	267510-29
Your Reference	UNITS	BH26	BH26	BH27	BH28	BH29
Depth		0-0.1	0.2-0.3	0-0.1	0-0.1	0-0.1
Date Sampled		16.4.21	16.4.21	15.4.21	19.4.21	19.4.21
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	26/04/2021	26/04/2021	26/04/2021	26/04/2021	26/04/2021
Date analysed	-	27/04/2021	27/04/2021	27/04/2021	27/04/2021	27/04/2021
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	%	116	117	124	115	129

PAHs in Soil					
Our Reference		267510-30	267510-38	267510-43	267510-52
Your Reference	UNITS	BH29	BH33	BH35	SDUP1
Depth		0.2-0.3	0-0.1	0-0.1	-
Date Sampled		19.4.21	20.4.21	19.4.21	15.4.21
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	26/04/2021	26/04/2021	26/04/2021	26/04/2021
Date analysed	-	27/04/2021	27/04/2021	27/04/2021	27/04/2021
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<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
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	122	112	119	117

Organochlorine Pesticides in soil						
Our Reference		267510-3	267510-7	267510-9	267510-15	267510-19
Your Reference	UNITS	BH4	BH7	BH12	BH20	BH24
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		20.4.21	21.4.21	15.4.21	17.4.21	16.4.21
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	26/04/2021	29/04/2021	26/04/2021	26/04/2021	26/04/2021
Date analysed	-	27/04/2021	29/04/2021	27/04/2021	27/04/2021	27/04/2021
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	100	84	102	101	100

Organochlorine Pesticides in soil						
Our Reference		267510-23	267510-24	267510-25	267510-27	267510-29
Your Reference	UNITS	BH26	BH26	BH27	BH28	BH29
Depth		0-0.1	0.2-0.3	0-0.1	0-0.1	0-0.1
Date Sampled		16.4.21	16.4.21	15.4.21	19.4.21	19.4.21
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	26/04/2021	26/04/2021	26/04/2021	26/04/2021	26/04/2021
Date analysed	-	27/04/2021	27/04/2021	27/04/2021	27/04/2021	27/04/2021
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	104	101	102	100	109

Organochlorine Pesticides in soil					
Our Reference		267510-30	267510-38	267510-43	267510-52
Your Reference	UNITS	BH29	BH33	BH35	SDUP1
Depth		0.2-0.3	0-0.1	0-0.1	-
Date Sampled		19.4.21	20.4.21	19.4.21	15.4.21
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	26/04/2021	26/04/2021	26/04/2021	26/04/2021
Date analysed	-	27/04/2021	27/04/2021	27/04/2021	27/04/2021
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	105	99	100	102

Organophosphorus Pesticides in Soil						
Our Reference		267510-3	267510-7	267510-9	267510-15	267510-19
Your Reference	UNITS	BH4	BH7	BH12	BH20	BH24
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		20.4.21	21.4.21	15.4.21	17.4.21	16.4.21
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	26/04/2021	29/04/2021	26/04/2021	26/04/2021	26/04/2021
Date analysed	-	27/04/2021	29/04/2021	27/04/2021	27/04/2021	27/04/2021
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	%	100	84	102	101	100

Organophosphorus Pesticides in Soil						
Our Reference		267510-23	267510-24	267510-25	267510-27	267510-29
Your Reference	UNITS	BH26	BH26	BH27	BH28	BH29
Depth		0-0.1	0.2-0.3	0-0.1	0-0.1	0-0.1
Date Sampled		16.4.21	16.4.21	15.4.21	19.4.21	19.4.21
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	26/04/2021	26/04/2021	26/04/2021	26/04/2021	26/04/2021
Date analysed	-	27/04/2021	27/04/2021	27/04/2021	27/04/2021	27/04/2021
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	%	104	101	102	100	109

Organophosphorus Pesticides in Soil					
Our Reference		267510-30	267510-38	267510-43	267510-52
Your Reference	UNITS	BH29	BH33	BH35	SDUP1
Depth		0.2-0.3	0-0.1	0-0.1	-
Date Sampled		19.4.21	20.4.21	19.4.21	15.4.21
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	26/04/2021	26/04/2021	26/04/2021	26/04/2021
Date analysed	-	27/04/2021	27/04/2021	27/04/2021	27/04/2021
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	105	99	100	102

PCBs in Soil						
Our Reference		267510-3	267510-7	267510-9	267510-15	267510-19
Your Reference	UNITS	BH4	BH7	BH12	BH20	BH24
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		20.4.21	21.4.21	15.4.21	17.4.21	16.4.21
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	26/04/2021	29/04/2021	26/04/2021	26/04/2021	26/04/2021
Date analysed	-	27/04/2021	29/04/2021	27/04/2021	27/04/2021	27/04/2021
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	%	100	84	102	101	100

PCBs in Soil						
Our Reference		267510-23	267510-24	267510-25	267510-27	267510-29
Your Reference	UNITS	BH26	BH26	BH27	BH28	BH29
Depth		0-0.1	0.2-0.3	0-0.1	0-0.1	0-0.1
Date Sampled		16.4.21	16.4.21	15.4.21	19.4.21	19.4.21
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	26/04/2021	26/04/2021	26/04/2021	26/04/2021	26/04/2021
Date analysed	-	27/04/2021	27/04/2021	27/04/2021	27/04/2021	27/04/2021
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	%	104	101	102	100	109

PCBs in Soil					
Our Reference		267510-30	267510-38	267510-43	267510-52
Your Reference	UNITS	BH29	BH33	BH35	SDUP1
Depth		0.2-0.3	0-0.1	0-0.1	-
Date Sampled		19.4.21	20.4.21	19.4.21	15.4.21
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	26/04/2021	26/04/2021	26/04/2021	26/04/2021
Date analysed	-	27/04/2021	27/04/2021	27/04/2021	27/04/2021
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	105	99	100	102

Misc Soil - Inorg						
Our Reference		267510-3	267510-7	267510-9	267510-15	267510-19
Your Reference	UNITS	BH4	BH7	BH12	BH20	BH24
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		20.4.21	21.4.21	15.4.21	17.4.21	16.4.21
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	26/04/2021	26/04/2021	26/04/2021	26/04/2021	26/04/2021
Date analysed	-	26/04/2021	29/04/2021	26/04/2021	26/04/2021	26/04/2021
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Misc Soil - Inorg						
Our Reference		267510-23	267510-24	267510-25	267510-27	267510-29
Your Reference	UNITS	BH26	BH26	BH27	BH28	BH29
Depth		0-0.1	0.2-0.3	0-0.1	0-0.1	0-0.1
Date Sampled		16.4.21	16.4.21	15.4.21	19.4.21	19.4.21
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	26/04/2021	26/04/2021	26/04/2021	26/04/2021	26/04/2021
Date analysed	-	26/04/2021	26/04/2021	26/04/2021	26/04/2021	26/04/2021
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Misc Soil - Inorg					
Our Reference		267510-30	267510-38	267510-43	267510-52
Your Reference	UNITS	BH29	BH33	BH35	SDUP1
Depth		0.2-0.3	0-0.1	0-0.1	-
Date Sampled		19.4.21	20.4.21	19.4.21	15.4.21
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	26/04/2021	26/04/2021	26/04/2021	26/04/2021
Date analysed	-	26/04/2021	26/04/2021	26/04/2021	26/04/2021
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5

Acid Extractable metals in soil						
Our Reference		267510-3	267510-7	267510-9	267510-15	267510-19
Your Reference	UNITS	BH4	BH7	BH12	BH20	BH24
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		20.4.21	21.4.21	15.4.21	17.4.21	16.4.21
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	28/04/2021	30/04/2021	28/04/2021	28/04/2021	28/04/2021
Date analysed	-	28/04/2021	30/04/2021	28/04/2021	28/04/2021	28/04/2021
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	1	3	1	2	1
Copper	mg/kg	<1	1	<1	<1	<1
Lead	mg/kg	3	4	3	3	3
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	<1	1	<1	<1	<1
Zinc	mg/kg	4	11	5	7	5

Acid Extractable metals in soil						
Our Reference		267510-23	267510-24	267510-25	267510-27	267510-29
Your Reference	UNITS	BH26	BH26	BH27	BH28	BH29
Depth		0-0.1	0.2-0.3	0-0.1	0-0.1	0-0.1
Date Sampled		16.4.21	16.4.21	15.4.21	19.4.21	19.4.21
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	28/04/2021	28/04/2021	28/04/2021	28/04/2021	28/04/2021
Date analysed	-	28/04/2021	28/04/2021	28/04/2021	28/04/2021	28/04/2021
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	2	3	2	<1	7
Copper	mg/kg	<1	<1	<1	<1	3
Lead	mg/kg	4	3	4	3	11
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	<1	1	1	<1	5
Zinc	mg/kg	5	7	7	3	11

Acid Extractable metals in soil					
Our Reference		267510-30	267510-38	267510-43	267510-52
Your Reference	UNITS	BH29	BH33	BH35	SDUP1
Depth		0.2-0.3	0-0.1	0-0.1	-
Date Sampled		19.4.21	20.4.21	19.4.21	15.4.21
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	28/04/2021	28/04/2021	28/04/2021	28/04/2021
Date analysed	-	28/04/2021	28/04/2021	28/04/2021	28/04/2021
Arsenic	mg/kg	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	8	3	2	2
Copper	mg/kg	1	<1	1	2
Lead	mg/kg	14	5	5	4
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	5	1	<1	1
Zinc	mg/kg	11	4	5	5

Moisture						
Our Reference		267510-3	267510-7	267510-9	267510-15	267510-19
Your Reference	UNITS	BH4	BH7	BH12	BH20	BH24
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		20.4.21	21.4.21	15.4.21	17.4.21	16.4.21
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	26/04/2021	26/04/2021	26/04/2021	26/04/2021	26/04/2021
Date analysed	-	27/04/2021	27/04/2021	27/04/2021	27/04/2021	27/04/2021
Moisture	%	11	15	15	11	12

Moisture						
Our Reference		267510-23	267510-24	267510-25	267510-27	267510-29
Your Reference	UNITS	BH26	BH26	BH27	BH28	BH29
Depth		0-0.1	0.2-0.3	0-0.1	0-0.1	0-0.1
Date Sampled		16.4.21	16.4.21	15.4.21	19.4.21	19.4.21
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	26/04/2021	26/04/2021	26/04/2021	26/04/2021	26/04/2021
Date analysed	-	27/04/2021	27/04/2021	27/04/2021	27/04/2021	27/04/2021
Moisture	%	15	12	15	13	32

Moisture					
Our Reference		267510-30	267510-38	267510-43	267510-52
Your Reference	UNITS	BH29	BH33	BH35	SDUP1
Depth		0.2-0.3	0-0.1	0-0.1	-
Date Sampled		19.4.21	20.4.21	19.4.21	15.4.21
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	26/04/2021	26/04/2021	26/04/2021	26/04/2021
Date analysed	-	27/04/2021	27/04/2021	27/04/2021	27/04/2021
Moisture	%	24	12	13	17

Asbestos ID - soils NEPM - ASB-001						
Our Reference		267510-3	267510-7	267510-9	267510-15	267510-19
Your Reference	UNITS	BH4	BH7	BH12	BH20	BH24
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		20.4.21	21.4.21	15.4.21	17.4.21	16.4.21
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	29-30/04/2021	29-30/04/2021	29-30/04/2021	29-30/04/2021	29-30/04/2021
Sample mass tested	g	511.01	389.31	586.2	529.53	628.52
Sample Description	-	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–	–
FA and AF Estimation*	g	–	–	–	–	–
ACM >7mm Estimation*	%(w/w)	<0.01	<0.01	<0.01	<0.01	<0.01
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Asbestos ID - soils NEPM - ASB-001						
Our Reference		267510-23	267510-25	267510-27	267510-29	267510-38
Your Reference	UNITS	BH26	BH27	BH28	BH29	BH33
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		16.4.21	15.4.21	19.4.21	19.4.21	20.4.21
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	29-30/04/2021	29-30/04/2021	29-30/04/2021	29-30/04/2021	29-30/04/2021
Sample mass tested	g	517.47	561.42	501.22	240.78	578.45
Sample Description	-	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected Synthetic mineral fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–	–
FA and AF Estimation*	g	–	–	–	–	–
ACM >7mm Estimation*	%(w/w)	<0.01	<0.01	<0.01	<0.01	<0.01
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Asbestos ID - soils NEPM - ASB-001		
Our Reference		267510-43
Your Reference	UNITS	BH35
Depth		0-0.1
Date Sampled		19.4.21
Type of sample		Soil
Date analysed	-	29-30/04/2021
Sample mass tested	g	575.17
Sample Description	-	Brown fine-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected
Total Asbestos#1	g/kg	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected
ACM >7mm Estimation*	g	–
FA and AF Estimation*	g	–
ACM >7mm Estimation*	%(w/w)	<0.01
FA and AF Estimation*#2	%(w/w)	<0.001

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
ASB-001	Asbestos ID - Identification of asbestos in soil samples using Polarised Light Microscopy and Dispersion Staining Techniques. Minimum 500mL soil sample was analysed as recommended by "National Environment Protection (Assessment of site contamination) Measure, Schedule B1 and "The Guidelines from the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia - May 2009" with a reporting limit of 0.1g/kg (0.01% w/w) as per Australian Standard AS4964-2004. Results reported denoted with * are outside our scope of NATA accreditation. **NOTE** #1 Total Asbestos g/kg was analysed and reported as per Australian Standard AS4964 (This is the sum of ACM >7mm, <7mm and FA/AF) **NOTE** #2 The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres. Estimation = Estimated asbestos weight Results reported with "--" is equivalent to no visible asbestos identified using Polarised Light microscopy and Dispersion Staining Techniques.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
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.

Method ID	Methodology Summary
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.
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 are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-023	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.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	267510-9
Date extracted	-			29/04/2021	3	26/04/2021	26/04/2021		29/04/2021	26/04/2021
Date analysed	-			30/04/2021	3	26/04/2021	26/04/2021		30/04/2021	26/04/2021
TRH C_6 - C_9	mg/kg	25	Org-023	<25	3	<25	<25	0	112	82
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	3	<25	<25	0	112	82
Benzene	mg/kg	0.2	Org-023	<0.2	3	<0.2	<0.2	0	102	82
Toluene	mg/kg	0.5	Org-023	<0.5	3	<0.5	<0.5	0	105	77
Ethylbenzene	mg/kg	1	Org-023	<1	3	<1	<1	0	115	86
m+p-xylene	mg/kg	2	Org-023	<2	3	<2	<2	0	118	82
o-Xylene	mg/kg	1	Org-023	<1	3	<1	<1	0	117	91
naphthalene	mg/kg	1	Org-023	<1	3	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	119	3	122	126	3	112	118

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	30	26/04/2021	26/04/2021		[NT]	[NT]
Date analysed	-			[NT]	30	26/04/2021	26/04/2021		[NT]	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	[NT]	30	<25	<25	0	[NT]	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	[NT]	30	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-023	[NT]	30	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-023	[NT]	30	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-023	[NT]	30	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-023	[NT]	30	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-023	[NT]	30	<1	<1	0	[NT]	[NT]
naphthalene	mg/kg	1	Org-023	[NT]	30	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	30	119	119	0	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	267510-9
Date extracted	-			29/04/2021	3	26/04/2021	26/04/2021		26/04/2021	26/04/2021
Date analysed	-			29/04/2021	3	27/04/2021	27/04/2021		27/04/2021	27/04/2021
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	3	<50	<50	0	123	125
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	3	<100	<100	0	88	91
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	3	<100	<100	0	108	87
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	3	<50	<50	0	123	125
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	3	<100	<100	0	88	91
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	3	<100	<100	0	108	87
Surrogate o-Terphenyl	%		Org-020	108	3	103	101	2	120	103

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	30	26/04/2021	26/04/2021		[NT]	[NT]
Date analysed	-			[NT]	30	27/04/2021	27/04/2021		[NT]	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	[NT]	30	<50	<50	0	[NT]	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	[NT]	30	<100	<100	0	[NT]	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	[NT]	30	<100	<100	0	[NT]	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	[NT]	30	<50	<50	0	[NT]	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	[NT]	30	<100	<100	0	[NT]	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	[NT]	30	<100	<100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-020	[NT]	30	104	104	0	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	267510-9
Date extracted	-			29/04/2021	3	26/04/2021	26/04/2021		26/04/2021	26/04/2021
Date analysed	-			29/04/2021	3	27/04/2021	27/04/2021		27/04/2021	27/04/2021
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	92	92
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	79	77
Fluorene	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	89	86
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	99	95
Anthracene	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	86	82
Pyrene	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	88	84
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	84	82
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	3	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	3	<0.05	<0.05	0	98	92
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	123	3	117	115	2	121	113

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	30	26/04/2021	26/04/2021		[NT]	[NT]
Date analysed	-			[NT]	30	27/04/2021	27/04/2021		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	[NT]	30	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	[NT]	30	<0.05	<0.05	0	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	30	122	122	0	[NT]	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	267510-9
Date extracted	-			29/04/2021	3	26/04/2021	26/04/2021		26/04/2021	26/04/2021
Date analysed	-			29/04/2021	3	27/04/2021	27/04/2021		27/04/2021	27/04/2021
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	92	94
HCB	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	96	94
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	105	105
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	97	94
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	105	99
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	99	91
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	97	95
Endrin	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	96	96
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	105	103
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	118	112
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	92	3	100	101	1	103	100

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	30	26/04/2021	26/04/2021		[NT]	[NT]
Date analysed	-			[NT]	30	27/04/2021	27/04/2021		[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
HCB	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
gamma-BHC	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
delta-BHC	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Dieldrin	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Endrin	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Methoxychlor	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	30	105	103	2	[NT]	[NT]

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	267510-9
Date extracted	-			29/04/2021	3	26/04/2021	26/04/2021		26/04/2021	26/04/2021
Date analysed	-			29/04/2021	3	27/04/2021	27/04/2021		27/04/2021	27/04/2021
Dichlorvos	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	94	92
Dimethoate	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	100	93
Fenitrothion	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	119	121
Malathion	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	101	98
Chlorpyriphos	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	113	105
Parathion	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	114	114
Bromophos-ethyl	mg/kg	0.1	Org-022	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	109	103
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	92	3	100	101	1	103	100

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	30	26/04/2021	26/04/2021		[NT]	[NT]
Date analysed	-			[NT]	30	27/04/2021	27/04/2021		[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Fenitrothion	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Malathion	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Parathion	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-022	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	30	105	103	2	[NT]	[NT]

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	267510-9
Date extracted	-			29/04/2021	3	26/04/2021	26/04/2021		26/04/2021	26/04/2021
Date analysed	-			29/04/2021	3	27/04/2021	27/04/2021		27/04/2021	27/04/2021
Aroclor 1016	mg/kg	0.1	Org-021	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	<0.1	3	<0.1	<0.1	0	102	104
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	92	3	100	101	1	103	100

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	30	26/04/2021	26/04/2021		[NT]	[NT]
Date analysed	-			[NT]	30	27/04/2021	27/04/2021		[NT]	[NT]
Aroclor 1016	mg/kg	0.1	Org-021	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1260	mg/kg	0.1	Org-021	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	[NT]	30	105	103	2	[NT]	[NT]

QUALITY CONTROL: Misc Soil - Inorg						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	267510-9
Date prepared	-			26/04/2021	3	26/04/2021	26/04/2021		26/04/2021	26/04/2021
Date analysed	-			26/04/2021	3	26/04/2021	26/04/2021		26/04/2021	26/04/2021
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	3	<5	<5	0	104	105

QUALITY CONTROL: Misc Soil - Inorg						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	30	26/04/2021	26/04/2021		[NT]	[NT]
Date analysed	-			[NT]	30	26/04/2021	26/04/2021		[NT]	[NT]
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	[NT]	30	<5	<5	0	[NT]	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	267510-9
Date prepared	-			28/04/2021	3	28/04/2021	28/04/2021		28/04/2021	28/04/2021
Date analysed	-			28/04/2021	3	28/04/2021	28/04/2021		28/04/2021	28/04/2021
Arsenic	mg/kg	4	Metals-020	<4	3	<4	<4	0	99	96
Cadmium	mg/kg	0.4	Metals-020	<0.4	3	<0.4	<0.4	0	105	107
Chromium	mg/kg	1	Metals-020	<1	3	1	1	0	104	105
Copper	mg/kg	1	Metals-020	<1	3	<1	<1	0	102	104
Lead	mg/kg	1	Metals-020	<1	3	3	3	0	110	108
Mercury	mg/kg	0.1	Metals-021	<0.1	3	<0.1	<0.1	0	89	90
Nickel	mg/kg	1	Metals-020	<1	3	<1	<1	0	101	105
Zinc	mg/kg	1	Metals-020	<1	3	4	5	22	122	104

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	30	28/04/2021	28/04/2021		[NT]	[NT]
Date analysed	-			[NT]	30	28/04/2021	28/04/2021		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	30	<4	<4	0	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	30	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	30	8	7	13	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	30	1	1	0	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	30	14	13	7	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	30	<0.1	<0.1	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	30	5	4	22	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	30	11	9	20	[NT]	[NT]

Result Definitions

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

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

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.

Note: All samples analysed as received. However, samples 267510-7, 27, 29 are below the minimum 500mL sample volume as per National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013.

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SAMPLE RECEIPT ADVICE

Client Details

Client	JK Environments
Attention	Harry Leonard

Sample Login Details

Your reference	E33942PL, Moruya
Envirolab Reference	267510
Date Sample Received	23/04/2021
Date Instructions Received	23/04/2021
Date Results Expected to be Reported	30/04/2021

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	53 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	12
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

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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:

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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	Misc Soil - Inorg	Acid Extractable metalsin soil	Asbestos ID - soils NEPM - ASB-001	On Hold
BH3-0-0.1										✓
BH3-0.2-0.3										✓
BH4-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓	
BH4-0.2-0.3										✓
BH6-0-0.1										✓
BH6-0.2-0.3										✓
BH7-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓	
BH7-0.2-0.3										✓
BH12-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓	
BH12-0.2-0.3										✓
BH16-0-0.1										✓
BH16-0.2-0.3										✓
BH19-0-0.1										✓
BH19-02-0.3										✓
BH20-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓	
BH20-0.2-0.3										✓
BH23-0-0.1										✓
BH23-0.2-0.3										✓
BH24-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓	
BH24-0.2-0.3										✓
BH25-0-0.1										✓
BH25-0.2-0.3										✓
BH26-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓	
BH26-0.2-0.3	✓	✓	✓	✓	✓	✓	✓	✓		
BH27-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓	
BH27-0.15-0.25										✓
BH28-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓	
BH28-0.2-0.3										✓
BH29-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓	
BH29-0.2-0.3	✓	✓	✓	✓	✓	✓	✓	✓	✓	
BH29-0.5-0.6										✓
BH30-0-0.1										✓

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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	Misc Soil - Inorg	Acid Extractable metalsin soil	Asbestos ID - soils NEPM - ASB-001	On Hold
BH30-0.2-0.3										✓
BH31-0-0.1										✓
BH31-0.2-0.3										✓
BH32-0-0.1										✓
BH32-0.2-0.3										✓
BH33-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓	
BH33-0.2-0.3										✓
BH34-0-0.1										✓
BH34-0.2-0.3										✓
BH34-0.5-0.6										✓
BH35-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓	
BH35-0.2-0.3										✓
BH36-0-0.1										✓
BH36-0.2-0.3										✓
BH37-0-0.1										✓
BH37-0.2-0.3										✓
BH38-0-0.1										✓
TBS2	✓									
TSS2	✓									
SDUP1	✓	✓	✓	✓	✓	✓	✓	✓		
SDUP3										✓

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

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	JKE Job Number: E33942PL Date Results Required: STANDARD Page: 1 of 3	JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Hleonard@jkenvironments.com.au

Location: Moruya

Sampler: WS

Sample Preserved in Esky on Ice

Tests Required

Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 8	Asbestos WA (500ml)	pH/CEC	Clay Content (%)	BTEX							
21.4.21	1	BH3	0-0.1	G, A	0	F: Silty sandy clay												
21.4.21	2	BH3	0.2-0.3	G	0	Silty sandy clay												
20.4.21	3	BH4	0-0.1	G, A	0	F: Silty sandy clay	X	X										
20.4.21	4	BH4	0.2-0.3	G	0	Silty sandy clay												
20.4.21	5	BH6	0-0.1	G, A	0	F: Silty sandy clay												
20.4.21	6	BH6	0.2-0.3	G	0	Silty sandy clay												
21.4.21	7	BH7	0-0.1	A	0	F: Silty sandy clay	X	X										
21.4.21	8	BH7	0.2-0.3	G	0	Silty sandy clay												
15.4.21	9	BH12	0-0.1	G, A	0	F: Silty sandy clay	X	X										
15.4.21	10	BH12	0.2-0.3	G	0	Silty sandy clay												
17.4.21	11	BH16	0-0.1	G, A	0	F: Silty sandy clay												
17.4.21	12	BH16	0.2-0.3	G	0	Silty sandy clay												
17.4.21	13	BH19	0-0.1	G, A	0	F: Silty sandy clay												
17.4.21	14	BH19	02-0.3	G	0	Silty sandy clay												
17.4.21	15	BH20	0-0.1	G, A	0	F: Silty sandy clay	X	X										
17.4.21	16	BH20	0.2-0.3	G	0	Silty sandy clay												
17.4.21	17	BH23	0-0.1	G, A	0	F: Silty sandy clay												
17.4.21	18	BH23	0.2-0.3	G	0	Silty sandy clay												
16.4.21	19	BH24	0-0.1	G, A	0	F: Silty sandy clay	X	X										
16.4.21	20	BH24	0.2-0.3	G	0	Silty sandy clay												
16.4.21	21	BH25	0-0.1	G, A	0	F: Silty sandy clay												
16.4.21	22	BH25	0.2-0.3	G	0	Silty sandy clay												
16.4.21	23	BH26	0-0.1	G, A	0	F: Silty sandy clay	X	X										
16.4.21	24	BH26	0.2-0.3	G	2	Silty sandy clay	X											
15.4.21	25	BH27	0-0.1	G, A	0	F: Silty sandy clay	X	X										

Remarks (comments/detection limits required):

SDUP1 - Intra-lab duplicate sample

SDUP2 - Inter-lab duplicate (VIC)

Sample Containers:

G - 250mg Glass Jar

A - Ziplock Asbestos Bag

P - Plastic Bag

Relinquished By: HL	Date: 23/04/2021	Time: 1530	Received By:	Date: 23/4/2021

ENVIROLAB GROUP

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

Job No: 267510

Date Received: 23/4/2021

Time Received: 1530

Received By:

Temp: Cool/Ambient

Cooling: Ice/Icepack

Security: Intact/Broken/None

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	JKE Job Number: E33942PL Date Results Required: STANDARD Page: 2 of 3	JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Hleonard@jkenvironments.com.au

Location:	Moruya						Sample Preserved in Esky on Ice											
Sampler:	WS						Tests Required											
Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 8	Asbestos WA (500ml)	pH/CEC	Clay Content (%)	BTEX							
15.4.21	26	BH27	0.15-0.25	G	0	Silty sandy clay												
19.4.21	27	BH28	0-0.1	G, A	0	F: Silty sandy clay	X	X										
19.4.21	28	BH28	0.2-0.3	G	0	Silty sandy clay												
19.4.21	29	BH29	0-0.1	G, A	0	F: Silty clay	X	X										
19.4.21	30	BH29	0.2-0.3	G, A	0	F: Silty clay	X	X										
19.4.21	31	BH29	0.5-0.6	G	0	Silty clay												
16.4.21	32	BH30	0-0.1	G, A	0	F: Silty sandy clay												
16.4.21	33	BH30	0.2-0.3	G	0	Silty sandy clay												
15.4.21	34	BH31	0-0.1	G, A	0	F: Silty sandy clay												
15.4.21	35	BH31	0.2-0.3	G	0	Silty sandy clay												
19.4.21	36	BH32	0-0.1	G, A	0	F: Silty sandy clay												
19.4.21	37	BH32	0.2-0.3	G	0	Silty clay												
20.4.21	38	BH33	0-0.1	G, A	0	F: Silty sandy clay	X	X										
20.4.21	39	BH33	0.2-0.3	G	0	Silty clay												
22.4.21	40	BH34	0-0.1	G, A	0	F: Silty sandy clay												
22.4.21	41	BH34	0.2-0.3	G	0	Silty sandy clay												
22.4.21	42	BH34	0.5-0.6	G	0.5	Silty sandy clay												
19.4.21	43	BH35	0-0.1	G, A	0	F: Sandy silty clay	X	X										
19.4.21	44	BH35	0.2-0.3	G	0	Silty gravelly clay												
22.4.21	45	BH36	0-0.1	G, A	0	F: Sandy silty clay												
22.4.21	46	BH36	0.2-0.3	G	0	Silty gravelly clay												
19.4.21	47	BH37	0-0.1	G, A	0	F: Sandy silty clay												
19.4.21	48	BH37	0.2-0.3	G	0	Silty gravelly clay												
20.4.21	49	BH38	0-0.1	G, A	0	F: Sandy silty clay												

Remarks (comments/detection limits required):	Sample Containers:
SDUP1 - Intra-lab duplicate sample	G - 250mg Glass Jar
SDUP2 - Inter-lab duplicate (VIC)	A - Ziplock Asbestos Bag
	P - Plastic Bag

Relinquished By: HL	Date: 23/04/2021	Time: 1530	Received By: PL	Date: 23/4/2021

267510

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	JKE Job Number: E33942PL Date Results Required: STANDARD Page: 3 of 3	JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Hleonard@jkenvironments.com.au

Location:	Moruya	Sample Preserved in Esky on Ice
Sampler:	WS	Tests Required

Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 8	Asbestos WA (500ml)	pH/CEC	Clay Content (%)	BTEX							
22.4.21	50	TBS2	-	G	-	Soil					X							
22.4.21	51	TSS2	-	V	-	Soil					X							
15.4.21	52	SDUP1	-	G	-	DUP Soil	X											
22.4.21	—	SDUP2	-	G	-	DUP Soil	X											
17.4.21	53	SDUP3	-	G	-	DUP Soil												

Remarks (comments/detection limits required):	Sample Containers:
SDUP1 - Intra-lab duplicate sample	G - 250mg Glass Jar
SDUP2 - Inter-lab duplicate (VIC)	A - Ziplock Asbestos Bag
	P - Plastic Bag

Relinquished By: HL	Date: 23/04/2021	Time: 1530	Received By: Ray	Date: 23/4/2021

267510

Envirolab Services Pty Ltd
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25 Research Drive Croydon South VIC 3136
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melbourne@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 25549

Client Details

Client	JK Environments
Attention	Harry Leonard
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	**E33942PL**
Number of Samples	1 Soil
Date samples received	27/04/2021
Date completed instructions received	27/04/2021

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	04/05/2021
Date of Issue	04/05/2021

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

Results Approved By
Chris De Luca, Operations Manager

Authorised By

Pamela Adams, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil		
Our Reference		25549-1
Your Reference	UNITS	SDUP2
Date Sampled		22/04/2021
Type of sample		Soil
Date extracted	-	29/04/2021
Date analysed	-	30/04/2021
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	%	92

TRH Soil C10-C40 NEPM		
Our Reference		25549-1
Your Reference	UNITS	SDUP2
Date Sampled		22/04/2021
Type of sample		Soil
Date extracted	-	29/04/2021
Date analysed	-	01/05/2021
TRH C_{10} - C_{14}	mg/kg	<50
TRH C_{15} - C_{28}	mg/kg	<100
TRH C_{29} - C_{36}	mg/kg	<100
Total +ve TRH (C10-C36)	mg/kg	<50
TRH >C_{10} -C_{16}	mg/kg	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50
TRH >C_{16} -C_{34}	mg/kg	<100
TRH >C_{34} -C_{40}	mg/kg	<100
Total +ve TRH (>C10-C40)	mg/kg	<50
Surrogate o-Terphenyl	%	85

PAHs in Soil		
Our Reference		25549-1
Your Reference	UNITS	SDUP2
Date Sampled		22/04/2021
Type of sample		Soil
Date extracted	-	29/04/2021
Date analysed	-	02/05/2021
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}	%	118

Speciated Phenols in Soil		
Our Reference		25549-1
Your Reference	UNITS	SDUP2
Date Sampled		22/04/2021
Type of sample		Soil
Date extracted	-	29/04/2021
Date analysed	-	02/05/2021
Phenol	mg/kg	<0.2
2-Chlorophenol	mg/kg	<0.2
2-Methylphenol	mg/kg	<0.2
3/4-Methylphenol	mg/kg	<0.4
2-Nitrophenol	mg/kg	<0.2
2,4-Dimethylphenol	mg/kg	<0.2
2,4-Dichlorophenol	mg/kg	<0.2
2,6-Dichlorophenol	mg/kg	<0.2
2,4,5-Trichlorophenol	mg/kg	<0.2
2,4,6-Trichlorophenol	mg/kg	<0.2
2,4-Dinitrophenol	mg/kg	<2
4-Nitrophenol	mg/kg	<4
2,3,4,6-Tetrachlorophenol	mg/kg	<0.2
Pentachlorophenol	mg/kg	<1
4-Chloro-3-Methylphenol	mg/kg	<2
Total +ve Cresols	mg/kg	<0.2
Total +ve Phenols	mg/kg	<0.2
Surrogate Phenol-d_6	%	94
Surrogate 2-fluorophenol	%	94

OCP in Soil		
Our Reference		25549-1
Your Reference	UNITS	SDUP2
Date Sampled		22/04/2021
Type of sample		Soil
Date extracted	-	29/04/2021
Date analysed	-	02/05/2021
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	%	86

OP in Soil		
Our Reference		25549-1
Your Reference	UNITS	SDUP2
Date Sampled		22/04/2021
Type of sample		Soil
Date extracted	-	29/04/2021
Date analysed	-	02/05/2021
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	%	86

PCBs in Soil		
Our Reference		25549-1
Your Reference	UNITS	SDUP2
Date Sampled		22/04/2021
Type of sample		Soil
Date extracted	-	29/04/2021
Date analysed	-	02/05/2021
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	%	104

Acid Extractable metals in soil		
Our Reference		25549-1
Your Reference	UNITS	SDUP2
Date Sampled		22/04/2021
Type of sample		Soil
Date digested	-	30/04/2021
Date analysed	-	03/05/2021
Arsenic	mg/kg	<4
Cadmium	mg/kg	<0.4
Chromium	mg/kg	2
Copper	mg/kg	<1
Lead	mg/kg	4
Mercury	mg/kg	<0.1
Nickel	mg/kg	<1
Zinc	mg/kg	2

Moisture		
Our Reference		25549-1
Your Reference	UNITS	SDUP2
Date Sampled		22/04/2021
Type of sample		Soil
Date prepared	-	30/04/2021
Date analysed	-	3/05/2021
Moisture	%	7.5

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.
Org-022	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Note, the Total +ve Cresols or Phenols PQL is reflective of the lowest individual PQL and is therefore" Total +ve Cresols or Phenols" is simply a sum of the positive individual Cresols or Phenols.

Method ID	Methodology Summary
Org-022	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-022	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			29/04/2021	1	29/04/2021	29/04/2021		29/04/2021	[NT]
Date analysed	-			30/04/2021	1	30/04/2021	30/04/2021		30/04/2021	[NT]
vTRH C_6 - C_9	mg/kg	25	Org-023	<25	1	<25	<25	0	101	[NT]
vTRH C_6 - C_{10}	mg/kg	25	Org-023	<25	1	<25	<25	0	101	[NT]
Benzene	mg/kg	0.2	Org-023	<0.2	1	<0.2	<0.2	0	94	[NT]
Toluene	mg/kg	0.5	Org-023	<0.5	1	<0.5	<0.5	0	97	[NT]
Ethylbenzene	mg/kg	1	Org-023	<1	1	<1	<1	0	103	[NT]
m+p-xylene	mg/kg	2	Org-023	<2	1	<2	<2	0	106	[NT]
o-Xylene	mg/kg	1	Org-023	<1	1	<1	<1	0	105	[NT]
Naphthalene	mg/kg	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	99	1	92	95	3	97	[NT]

QUALITY CONTROL: TRH Soil C10-C40 NEPM					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			29/04/2021	1	29/04/2021	29/04/2021		29/04/2021	[NT]
Date analysed	-			01/05/2021	1	01/05/2021	01/05/2021		01/05/2021	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	1	<50	<50	0	95	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	1	<100	<100	0	101	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	1	<100	<100	0	120	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	1	<50	<50	0	95	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	1	<100	<100	0	101	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	1	<100	<100	0	120	[NT]
Surrogate o-Terphenyl	%		Org-020	87	1	85	84	1	92	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			29/04/2021	1	29/04/2021	29/04/2021		29/04/2021	[NT]
Date analysed	-			02/05/2021	1	02/05/2021	02/05/2021		02/05/2021	[NT]
Naphthalene	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	104	[NT]
Acenaphthylene	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	96	[NT]
Acenaphthene	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	130	[NT]
Phenanthrene	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	90	[NT]
Anthracene	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	94	[NT]
Pyrene	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	98	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	100	[NT]
Benzo(b,j&k)fluoranthene	mg/kg	0.2	Org-022	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022	<0.05	1	<0.05	<0.05	0	114	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d_{14}	%		Org-022	124	1	118	118	0	106	[NT]

QUALITY CONTROL: Speciated Phenols in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-		Org-022	29/04/2021	1	29/04/2021	29/04/2021		29/04/2021	[NT]
Date analysed	-		Org-022	02/05/2021	1	02/05/2021	02/05/2021		02/05/2021	[NT]
Phenol	mg/kg	0.2	Org-022	<0.2	1	<0.2	<0.2	0	102	[NT]
2-Chlorophenol	mg/kg	0.2	Org-022	<0.2	1	<0.2	<0.2	0	106	[NT]
2-Methylphenol	mg/kg	0.2	Org-022	<0.2	1	<0.2	<0.2	0	90	[NT]
3/4-Methylphenol	mg/kg	0.4	Org-022	<0.4	1	<0.4	<0.4	0	[NT]	[NT]
2-Nitrophenol	mg/kg	0.2	Org-022	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
2,4-Dimethylphenol	mg/kg	0.2	Org-022	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
2,4-Dichlorophenol	mg/kg	0.2	Org-022	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
2,6-Dichlorophenol	mg/kg	0.2	Org-022	<0.2	1	<0.2	<0.2	0	92	[NT]
2,4,5-Trichlorophenol	mg/kg	0.2	Org-022	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
2,4,6-Trichlorophenol	mg/kg	0.2	Org-022	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
2,4-Dinitrophenol	mg/kg	2	Org-022	<2	1	<2	<2	0	[NT]	[NT]
4-Nitrophenol	mg/kg	4	Org-022	<4	1	<4	<4	0	[NT]	[NT]
2,3,4,6-Tetrachlorophenol	mg/kg	0.2	Org-022	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Pentachlorophenol	mg/kg	1	Org-022	<1	1	<1	<1	0	92	[NT]
4-Chloro-3-Methylphenol	mg/kg	2	Org-022	<2	1	<2	<2	0	[NT]	[NT]
Surrogate Phenol-d_6	%		Org-022	108	1	94	104	10	110	[NT]
Surrogate 2-fluorophenol	%		Org-022	92	1	94	94	0	96	[NT]

QUALITY CONTROL: OCP in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	25549-1
Date extracted	-			29/04/2021	[NT]	[NT]	[NT]	[NT]	29/04/2021	29/04/2021
Date analysed	-			02/05/2021	[NT]	[NT]	[NT]	[NT]	02/05/2021	02/05/2021
alpha-BHC	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	130	102
Hexachlorobenzene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	108	95
gamma-BHC	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	78	100
delta-BHC	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	86	120
Heptachlor Epoxide	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	88	95
gamma-Chlordane	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	90	95
alpha-chlordane	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	96	100
Dieldrin	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	92	93
Endrin	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	136	127
Endrin Aldehyde	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	94	105
Methoxychlor	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate 2-chlorophenol-d4	%		Org-022	106	[NT]	[NT]	[NT]	[NT]	100	100

QUALITY CONTROL: OP in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			29/04/2021	1	29/04/2021	29/04/2021		29/04/2021	[NT]
Date analysed	-			02/05/2021	1	02/05/2021	02/05/2021		02/05/2021	[NT]
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	94	[NT]
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	134	[NT]
Fenitrothion	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	110	[NT]
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	106	1	86	92	7	100	[NT]

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			29/04/2021	1	29/04/2021	29/04/2021		29/04/2021	[NT]
Date analysed	-			02/05/2021	1	02/05/2021	02/05/2021		02/05/2021	[NT]
Aroclor 1016	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	130	[NT]
Aroclor 1260	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate 2-fluorobiphenyl	%		Org-022	116	1	104	92	12	108	[NT]

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date digested	-			30/04/2021	[NT]	[NT]	[NT]	[NT]	30/04/2021	[NT]
Date analysed	-			03/05/2021	[NT]	[NT]	[NT]	[NT]	03/05/2021	[NT]
Arsenic	mg/kg	4	Metals-020 ICP-AES	<4	[NT]	[NT]	[NT]	[NT]	87	[NT]
Cadmium	mg/kg	0.4	Metals-020 ICP-AES	<0.4	[NT]	[NT]	[NT]	[NT]	93	[NT]
Chromium	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Copper	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	93	[NT]
Lead	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Mercury	mg/kg	0.1	Metals-021 CV-AAS	<0.1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Nickel	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	94	[NT]
Zinc	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	92	[NT]

Result Definitions

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

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

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

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

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	Harry Leonard

Sample Login Details

Your reference	E33942PL
Envirolab Reference	25549
Date Sample Received	27/04/2021
Date Instructions Received	27/04/2021
Date Results Expected to be Reported	04/05/2021

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	1 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	13.4
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:

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 ID	vTRH(C6-C10)/BTEXN in Soil	TRH Soil C10-C40 NEPM	PAHs in Soil	Speciated Phenols in Soil	OCP in Soil	OP in Soil	PCBsin Soil	Acid Extractable metalsin soil
SDUP2	✓	✓	✓	✓	✓	✓	✓	✓

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

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	JKE Job Number: E33942PL Date Results Required: STANDARD Page: 3 of 3	JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Hleonard@jkenvironments.com.au

Location: Moruya

Sampler: WS

Sample Preserved in Esky on Ice

Tests Required

Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 8	Asbestos WA (500ml)	pH/CEC	Clay Content (%)	BTEX							
22.4.21	50	TBS2	-	G	-	Soil					X							
22.4.21	51	TSS2	-	V	-	Soil					X							
15.4.21	52	SDUP1	-	G	-	DUP Soil	X											
22.4.21	—	SDUP2	-	G	-	DUP Soil	X											
17.4.21	53	SDUP3	-	G	-	DUP Soil												

Remarks (comments/detection limits required):

SDUP1 - Intra-lab duplicate sample

SDUP2 - Inter-lab duplicate (VIC)

Sample Containers:

G - 250mg Glass Jar

A - Ziplock Asbestos Bag

P - Plastic Bag

Relinquished By:	Date:	Time:	Received By:	Date:
HL ELLSMU CMULLEAN	23/04/2021 26/4/21 1000.	1530	Ray	23/4/2021

Envirolab Services
25 Research Drive
Croydon South VIC 3136
Ph: (03) 9763 2500

267510

Job No: 25549

Date Received: 27/4

Time Received: 15:10 13/4

Received By: M

Temp: Cool/Ambient

Cooling: Ice/Icepack

Security: Intact/Broken/None

Appendix F: 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)[15] methods and those described in *Environmental Sampling and Analysis, A Practical Guide,* (1991)[16]. The NEPM (2013) is consistent with these documents.

A. Practical Quantitation Limit (PQL), Limit of Reporting (LOR) & Estimated Quantitation Limit (EQL)

These terms all refer to the concentration above which results can be expressed with a minimum 95% confidence level. The laboratory reporting limits are generally set at ten times the standard deviation for the Method Detection Limit for each specific analyte. For the purposes of this report the LOR, PQL, and EQL are considered to be equivalent.

When assessing laboratory data it should be borne in mind that values at or near the PQL have two important limitations: *"The uncertainty of the measurement value can approach, and even equal, the reported value. Secondly, confirmation of the analytes reported is virtually impossible unless identification uses highly selective methods. These issues diminish when reliably measurable amounts of analytes are present. Accordingly, legal and regulatory actions should be limited to data at or above the reliable detection limit*" (Keith, 1991).

B. Precision

The degree to which data generated from repeated measurements differ from one another due to random errors. Precision is measured using the standard deviation or Relative Percent Difference (RPD).

C. Accuracy

Accuracy is a measure of the agreement between an experimental result and the true value of the parameter being measured (i.e. the proximity of an averaged result to the true value, where all random errors have been statistically removed). The assessment of accuracy for an analysis can be achieved through the analysis of known reference materials or assessed by the analysis of surrogates, field blanks, trip spikes and matrix spikes. Accuracy is typically reported as percent recovery.

D. Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is primarily dependent upon the design and implementation of the sampling program. Representativeness of the data is partially ensured by the avoidance of contamination, adherence to sample 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;

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

[16] Keith., H, (1991). *Environmental Sampling and Analysis, A Practical Guide*

- All laboratory duplicate and RPDs calculated;
- All surrogate spike data reported;
- All matrix spike and lab control spike (LCS) data reported and RPDs calculated;
- Spike recovery acceptable limits reported; and
- NATA stamp on reports.

F. Comparability

Comparability is the evaluation of the similarity of conditions (e.g. sample depth, sample homogeneity) under which separate sets of data are produced. Data comparability checks include a bias assessment that may arise from the following sources:

- Collection and analysis of samples by different personnel; Use of different techniques;
- Collection and analysis by the same personnel using the same methods but at different times; and
- Spatial and temporal changes (due to environmental dynamics).

G. Blanks

The purpose of laboratory and field blanks is to check for artefacts and interferences that may arise during sampling, transport and analysis.

H. Matrix Spikes

Samples are spiked with laboratory grade standards to detect interactive effects between the sample matrix and the analytes being measured. Matrix Spikes are reported as a percent recovery and are prepared for 1 in every 20 samples. Sample batches that contain less than 20 samples may be reported with a Matrix Spike from another batch. The percent recovery is calculated using the formula below. Acceptable recovery limits are 70% to 130%.

$$\frac{\text{(Spike Sample Result – Sample Result) x 100}}{\text{Concentration of Spike Added}}$$

I. Surrogate Spikes

Samples are spiked with a known concentration of compounds that are chemically related to the analyte being investigated but unlikely to be detected in the environment. The purpose of the Surrogate Spikes is to check the accuracy of the analytical technique. Surrogate Spikes are reported as percent recovery.

J. Duplicates

Laboratory duplicates measure precision, expressed as Relative Percent Difference. Duplicates are prepared from a single field sample and analysed as two separate extraction procedures in the laboratory. The RPD is calculated using the formula where D1 is the sample concentration and D2 is the duplicate sample concentration:

$$\frac{(D1 - D2) \times 100}{\{(D1 + D2)/2\}}$$

Appendix G: Data (QA/QC) Evaluation

Data (QA/QC) Evaluation

A. INTRODUCTION

This Data (QA/QC) Evaluation forms part of the validation process for the DQOs documented in Section 4.1 of this report. Checks were made to assess the data in terms of precision, accuracy, representativeness, comparability and completeness. These 'PARCC' parameters are referred to collectively as DQIs and are defined in the Report Explanatory Notes attached in the report appendices.

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)	SDUP1 (primary sample BH12 0-0.1m)	Approximately 5% of primary samples	Heavy metals, TRH/BTEX, PAHs, OCPs, OPPs, PCBs and phenols
Intra-laboratory duplicate (soil)	SDUP2 (primary sample BH7 0-0.1m)	As above	Heavy metals, TRH/BTEX, PAHs, OCPs, OPPs and PCBs
Trip spike (soil)	TSS1 (13/04/2021)	One per batch of soil samples submitted for analysis	BTEX
Trip spike (soil)	TSS2 (22/04/2021)	One per batch of soil samples submitted for analysis	BTEX
Trip blank (soil)	TBS1 (13/04/2021)	One per batch of soil samples submitted for analysis	BTEX
Trip blank (soil)	TBS2 (22/04/2021)	One per batch of soil samples submitted for analysis	BTEX

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

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. Sample Collection, Storage, Transport and Analysis

Samples were collected by trained field staff in accordance. Field sampling procedures were designed to be consistent with relevant guidelines, including NEPM (2013) and other guidelines made under the CLM Act 1997.

Appropriate sample preservation, handling and storage procedures were adopted. Laboratory analysis was undertaken within specified holding times generally in accordance with Schedule B(3) of NEPM (2013) and the laboratory NATA accredited methodologies.

Envirolab noted that the asbestos results were reported to be consistent with the recommendations in NEPM (2013), however this level of reporting is outside the scope of their NATA accreditation. In the absence of other available analytical methods for asbestos, this was found to be acceptable for the purpose of this investigation.

Review of the project data also indicated that:

- COC documentation was adequately maintained;
- Sample receipt advice documentation was provided for all sample batches;
- All analytical results were reported; and
- Consistent units were used to report the analysis results.

2. Laboratory PQLs

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 some analytes as discussed below:

- Elevated RPDs were reported for chromium, copper and nickel in SDUP1/BH12 (0-0.1m); and
- Elevated RPDs were reported for chromium, copper, nickel and zinc in SDUP2/BH7 (0-0.1).

The RPD exceedances are considered to be associated with results that are close to the PQLs. 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, two soil trip blanks were 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 83% to 106% 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 did not identify any non-conformances that would impact the quality of the data.

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. 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 H: Guidelines and Reference Documents

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

Australian and New Zealand Environment Conservation Council (ANZECC), (2000). Australian and New Zealand Guidelines for Fresh and Marine Water Quality

Canadian Council of Ministers of the Environment, (1999). Canadian soil quality guidelines for the protection of environmental and human health: Benzo(a)Pyrene (1997)

CRC Care, (2011). Technical Report No. 10 – Health screening levels for hydrocarbons in soil and groundwater Part 1: Technical development document

Contaminated Land Management Act 1997 (NSW)

Department of Land and Water Conservation, (1997). 1:25,000 Acid Sulfate Soil Risk Map Series

Managing Land Contamination, Planning Guidelines SEPP55 – Remediation of Land (1998)

National Health and Medical Research Council (NHMRC), (2018). National Water Quality Management Strategy, Australian Drinking Water Guidelines 2011

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

NSW EPA, (1995). Contaminated Sites Sampling Design Guidelines

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

NSW EPA, (2015). Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997

NSW EPA, (2017). Guidelines for the NSW Site Auditor Scheme, 3rd Edition

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

National Environment Protection Council (NEPC), (2013). National Environmental Protection (Assessment of Site Contamination) Measure 1999 as amended (2013)

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

Protection of the Environment Operations Act 1997 (NSW)

State Environmental Planning Policy (Resilience and Hazards) 2021 (NSW)

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

Western Australia Department of Health, (2021). Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia