Detailed Contamination Assessment

Lot 152 DP 1202468 Raven Street, Kooragang NSW.

NEW20P-0171-AD 10 March 2021



GEOTECHNICAL I LABORATORY I EARTHWORKS I QUARRY I CONSTRUCTION MATERIAL TESTING

Document control record

Document prepared for:

EJE Architecture Pty Ltd 412 King Street NEWCASTLE NSW 2300

Document prepared by:

Qualtest Laboratory (NSW) Pty Ltd ABN 98 153 268 89 8 Ironbark Close Warabrook, NSW 2304 T 02 4968 4468

W www.qualtest.com.au

Document Control							
Report Title		Detailed Contamination	Detailed Contamination Assessment				
Document ID		NEW20P-0171-AD					
Project		Detailed Contamination Assessment Lot 152 DP1202468 Raven Street, Kooragang NSW					
Rev	Date	Revision details/statusPrepared by ReviewAuthorReview					
0	10 March 2021	Original	Qualtest	L.Betz	L.Fox		

Executive Summary

Qualtest Laboratory NSW Pty Ltd (Qualtest) has carried out a Detailed Contamination Assessment (DCA) for EJE Architecture Pty Ltd (EJE) for a site located at 70 Raven Street (Lot 152 DP1202468), Kooragang, NSW (the site).

The site is owned by Port of Newcastle (PoN), who engaged EJE to lodge a Development Application (DA) for an industrial development. The site is about 1.05ha, and information provided by EJE indicates the proposed development area on the site is about 5,800m², located in the eastern portion of the site.

Qualtest completed a Preliminary Contamination Assessment (PCA)) on the site in February 2021 (ref: NEW20P-0171-AA dated 8 February 2021. The PCA identified two Areas of Environmental Concern (AECs) for the site. The AECs related to; importation of fill; and the potential impact from surrounding industrial land uses. The PCA recommended additional assessment, comprising intrusive investigations in the proposed development area.

The objectives of the DCA were to:

- Assess the presence of soil contamination within the Areas of Environmental Concern (AECs) previously identified at the site by Qualtest (2021) within the proposed development area;
- Update the Conceptual Site Model (CSM) for the site based on the findings of the assessment; and
- Provide recommendations for further assessments, remediation and/or management, as required.

In order to achieve the above objectives, Qualtest carried out the following scope:

- Collection of soil samples from 11 borehole locations;
- Collection of water samples from two existing on-site groundwater monitoring wells;
- Laboratory analysis of soil and groundwater samples for identified contaminants of concern; and,
- Data assessment and preparation of this Detailed Contamination Assessment Report.

Based on the results of the Detailed Contamination Assessment and results of field and laboratory investigations, it is considered that the site is suitable for the proposed development. As a precaution it is recommended that an Unexpected Finds Procedure be included in the Construction Environmental Management Plan, and implemented during earthworks.

Based on the insitu assessment, if the surface/fill material is proposed to be disposed offsite to a licenced waste facility, the material classifies as **General Solid Waste** in accordance with the NSW EPA (2014) Waste Classification Guidelines, Part 1 – Classifying Waste. Qualtest previously completed an Acid Sulfate Soil Assessment on the site. Based on the field observations, and the laboratory results, the estuarine/alluvial sands and clays below fill material (from about 1.5m bgs) were assessed to comprise Acid Sulfate Soils and a management plan was developed for the site, refer to NEW20P-0171-AC, dated 8 February 2021. This ASSMP should be implemented during redevelopment of the site.

If conditions other than those encountered during this assessment are uncovered, further assessment by an environmental consultant may be necessary.

This report was prepared in general accordance with the relevant sections of the NSW EPA (2020) Guidelines for Consultants Reporting on Contaminated Land and the National Environment Protection (Assessment of Site Contamination) Measure 1999 (April 2013), NEPC 2013, Canberra (referred to as ASC NEPM 2013).

Table of Contents:

1.0		Introduction	
	1.1	Objectives	3
	1.2	Scope of Works	3
2.0		Site Description	3
	2.1	Site Identification	3
	2.2	Topography and Drainage	4
	2.3	Regional Geology	4
	2.4	Hydrogeology	5
	2.5	Acid Sulfate Soils	6
3.0		Previous Reports	6
4.0		Site Observations	7
5.0		Preliminary Conceptual Site Model	7
6.0		Data Quality Objectives	9
	6.1	Step 1 – State the Problem	9
	6.2	Step 2 – Identify the Decisions	9
	6.3	Step 3 – Identify the Inputs to the Decisions	9
	6.4	Step 4 – Define the Study Boundaries	10
	6.5	Step 5 – Develop a Decision Rule	10
	6.6	Step 6 – Specify Acceptable Limits on Decision Errors	10
	6.7	Step 7 – Optimise the Design for Obtaining Data	10
7.0		Field and Laboratory Investigations	
	7.1	Sampling Plan	11
	5.2	Soil Sampling	11
	7.3	Groundwater Sampling	11
	7.4	Laboratory analysis	12
8.0		Investigation Criteria	12
	8.1	Health and Ecological Levels (Soil)	12
	8.2	Management Limits	13
	8.3	Asbestos Materials in Soil	
	8.4	Waste Classification	15
	8.5	Groundwater Investigation Levels	15
	8.5.1	Assessment of Environmental Values	15

	8.5.2	Protection of Aquatic Ecosystems	16
	8.5.3	Protection of Human Health Via Vapour Intrusion	16
9.0		Quality Assurance/Quality Control	17
10.0		Results	17
	10.1	Subsurface Conditions	17
	10.2	Groundwater Gauging and Field Water Quality	18
	10.3	Laboratory Results	19
11.0		Conceptual Site Model	20
12.0		Conclusions and Recommendations	22
13.0		Limitations	22
14.0		References	22

Attachments:

Appendix A -	Figures: Figure 1 - Site Location Plan
	Figure 2 – Lot Layout Plan
	Figure 3 – Sampling Plan
Appendix B:	Tables: Table 1 – Soil Analytical Results
	Table 2 – Waste Classification Analytical Results
	Table 3 – QA/QC Results
	Table 4 – Groundwater Gauging
	Table 5 – Field Water Quality parameters
	Table 6 – Groundwater Analytical Results
Appendix C:	Groundwater Bore Search
Appendix D:	Borehole Logs
Appendix E:	Data Validation Report
Appendix F:	Laboratory Documentation

1.0 Introduction

Qualtest Laboratory NSW Pty Ltd (Qualtest) has carried out a Detailed Contamination Assessment for EJE Architecture Pty Ltd (EJE) for a site located at 70 Raven Street (Lot 152 DP1202468), Kooragang, NSW (the site). Figure 1, Appendix A, shows the site location.

The site is owned by Port of Newcastle (PoN), who engaged EJE to lodge a Development Application (DA) for an industrial development. The site is about 1.05ha, and information provided by EJE indicates the proposed development area on the site is about 5,800m², located in the eastern portion of the site. Figure 2, Appendix A, shows the location of the proposed development area.

Qualtest completed a Preliminary Contamination Assessment (PCA)) on the site in February 2021 (ref: NEW20P-0171-AA dated 8 February 2021. The PCA identified two Areas of Environmental Concern (AECs) for the site. The AECs related to; importation of fill; and potential impact from surrounding industrial land uses. The PCA recommended additional assessment, comprising intrusive investigations in the proposed development area.

This report was prepared in general accordance with the relevant sections of the NSW EPA (2020) Guidelines for Consultants Reporting on Contaminated Land and the National Environment Protection (Assessment of Site Contamination) Measure 1999 (April 2013), NEPC 2013, Canberra (referred to as ASC NEPM 2013).

1.1 Objectives

The objectives of the assessment were to:

- Assess the presence of soil contamination within the Areas of Environmental Concern (AECs) previously identified at the site by Qualtest (2021) within the proposed development area;
- Update the Conceptual Site Model (CSM) for the site based on the findings of the assessment; and
- Provide recommendations for further assessments, remediation and/or management, as required.

1.2 Scope of Works

In order to achieve the above objectives, Qualtest carried out the following scope:

- Collection of soil samples from 11 borehole locations;
- Collection of water samples from two existing on-site groundwater monitoring wells installed by others;
- Laboratory analysis of soil and groundwater samples for identified contaminants of potential concern; and,
- Data assessment and preparation of this Detailed Contamination Assessment Report.

2.0 Site Description

2.1 Site Identification

General site information is provided below in Table 2.1. The site location is shown in Figure 1, Appendix A.

Site Address:	70 Raven Street, Kooragang NSW
Approximate site area and dimensions:	Approx. 1.05 ha. Proposed development area 0.58 ha. Approx. 150m long by 60m wide at its widest and longest points within the proposed development area.
Title Identification Details:	Lot 152 DP1202468, within the Newcastle local government area, Parish of Newcastle, County of Northumberland.
Current Zoning	SP1 Special activities
Current Ownership:	Port of Newcastle Lessor Pty Ltd
Current Occupier:	Vacant land used as a carpark, and access from Raven Street to Port Waratah Coal Services to the north.
Previous and Current Landuse:	Vacant land used as a carpark, and access from Raven Street to Port Waratah Coal Services to the north.
Proposed Landuse:	Industrial Development
Adjoining Site Uses:	 Heavy industry to the north, east, south and west: Port Waratah Coal Services to the north and east; J Steel to the west; and, Cargills (oil seed processing plant) to the south.
Site Coordinates for approx. centre of site:	32°52'46.96 S 151°46'15.02 E

Table 2.1: Summary of Site Details

2.2 Topography and Drainage

Reference to the NSW Land and Property Information Spatial Information Exchange website (<u>https://six.nsw.gov.au/wps/portal/</u>) indicated the elevation of the site was below 10m AHD.

During the site investigation the site was observed to be relatively level, with a very slight slope towards the south. The ground surface consisted of gravel hardstand with some asphalt pavement.

Rain falling on the site would be expected to infiltrate into the site surface. Excess surface water is expected to follow the site topography, and flow to the south towards Raven Street and subsequently into municipal stormwater drains. It is expected that the municipal stormwater system discharges to South Channel of the Hunter River located approximately 840m south of the site.

2.3 Regional Geology

Reference to the 1:100,000 Newcastle-Hunter Coastal Quaternary Geology map indicates that the site is underlain by "modern fill on Quaternary deposits".

2.4 Hydrogeology

Groundwater beneath the site is anticipated to be present in an unconfined aquifer within fill or alluvial/estuarine deposits. Groundwater is expected to be less than 3m below ground surface (bgs). Groundwater flow direction is anticipated to follow the surface topography and flow to the south south-east and discharge into the Hunter River located approximately 820m south to south-east of the site.

It should be noted that groundwater conditions can vary due to rainfall and other influences including regional groundwater flow, temperature, permeability, recharge areas, surface condition, and subsoil drainage.

A search of the NSW Department of Primary Industries (Office of Water) registered groundwater bores located within a 500m radius of the site was undertaken. The search revealed that there were fifty bores within this radius. A summary of the information available for the bores is provided in Table 2.2 below. A copy of the search is provided in Appendix C. Thirty-four bores were found to the north of the site within the Port Waratah Coal Services land. None of these 34 bores had information available, and so have not been included in Table 2.4 below.

Bore ID	Installation Date	Purpose	Approx. Distance and Gradient from Site	Water Bearing Zones (mbgs)
GW202649	13/05/2009	Monitoring bore	Approx. 350m E	4.45
GW202650	13/05/2009	Monitoring bore	Approx. 350m E	4.20
GW202654	20/08/2009	Monitoring bore	Approx. 475m E	6.60
GW202657	19/07/1996	Monitoring bore	Approx. 160m NW	2.60
				8.20
GW202658	19/07/1996	Monitoring bore	Approx. 160m NW	2.20
GW202795	29/10/2012	Monitoring bore	Approx. 400m SE	2.80-7.00
GW202982	19/08/2014	Monitoring bore	Approx. 305 SW	2.00-6.20
GW202983	13/09/2014	Monitoring bore	Approx. 250m S	2.00-8.00
GW202984	13/09/2014	Monitoring bore	Approx. 265m S	2.00-8.00
GW202988	13/08/2012	Monitoring bore	Approx. 350m E	5.95
GW202989	13/08/2012	Monitoring bore	Approx. 350m E	6.50
GW202990	14/08/2020	Monitoring bore	Approx. 350m E	5.65
GW202991	14/08/2012	Monitoring bore	Approx. 350m E	5.95
GW202992	14/08/2012	Monitoring bore	Approx. 350m E	5.95

Table 2.4 – Summary of Registered Groundwater Bore Information

Bore ID	Installation Date	Purpose	Approx. Distance and Gradient from Site	Water Bearing Zones (mbgs)
GW202993	14/08/2012	Monitoring bore	Approx. 350m E	6.45
GW202994	14/08/2012	Monitoring bore	Approx. 350m E	6.00
GW203212	12/09/2014	Monitoring bore	Approx. 242m S	2.00-4.00

Note: NK - not known; N - North, E - East, S - South, W - West

2.5 Acid Sulfate Soils

Reference to the Acid Sulfate Soil Risk Mapping for Lower Hunter Catchment (1:25,000 scale, 2008 Edition 3) indicates that the site is located within an area of "disturbed terrain".

Qualtest completed an Acid Sulfate Soil Assessment in conjunction with the PCA assessment. Based on the field observations, and the laboratory results, the estuarine/alluvial sands and clays below fill material (from about 1.5m bgs) were assessed to comprise Acid Sulfate Soils and a management plan was developed for the site, refer to NEW20P-0171-AC, dated 8 February 2021.

3.0 Previous Reports

Qualtest carried out a Preliminary Contamination Assessment (PCA) for the site in February 2021, ref NEW20P-0171-AA dated 8 February 2021. Relevant information available from the PCA (Qualtest, 2021) is summarised below.

The objectives of the PCA were to:

- Provide an assessment of potential sources of contamination and associated chemicals of concern;
- Provide a preliminary assessment of the location and extent of potential soil contamination on the site; and
- Provide recommendations on the need for further assessment, management and/or remediation.

In order to achieve the above objectives, Qualtest carried out the following scope:

- Desktop study and site history review;
- Site walkover;
- Collection of soil samples from 4 locations;
- Laboratory analysis of soil samples from a suite of common contaminants; and,
- Data assessment and preparation of a Preliminary Contamination Assessment Report.

The site history review showed the site had been undeveloped, potentially stock grazing land until the 1950s to 1960s. In the 1960s and 1980s the site was subjected to filling, likely with dredged material from the Hunter River. From the 1990s the site had been used for vehicle traffic from Raven Street (south) to Port Waratah Coal Services (north), with asphalt paved roads and gravel hardstand being constructed. The site was surrounded by industrial properties on each side. Two Areas of Environmental Concern (AECs) were identified for the site relating to:

1. Imported Fill - Potential use of contaminated imported fill.

2. Surrounding industrial land uses and potential off-site impacts - Potential for contaminated groundwater to migrate onto the site; and Potential for contaminated dust, particularly coal, to migrate onto the site

To provide a preliminary assessment, soil sampling from four locations (BH01 to BH04) was carried out across the site. The laboratory results reported concentrations of contaminants below the adopted criteria. Due to the limited sampling carried out, the site was not considered to have been characterised in accordance with NSW EPA (1994) Sampling Design Guidelines. The borehole logs for BH01 to BH04 are included in Appendix D of this report. The results of the sampling and analysis for these locations are included in Table 1 and Table 2, Appendix B of this report.

The Preliminary Conceptual Site Model (CSM) (in Section 4 below) indicated that if soil, sediment, surface water and/or groundwater contamination existed on the site, then a potential exposure pathway could exist to current and future site users and the environment. Further assessment was required to assess if exposure pathways were complete or incomplete.

Based on the site history and observations during field investigations, it was recommended that an additional assessment, comprising additional intrusive investigations in the AECs identified be carried out, in accordance with NSW EPA guidelines.

4.0 Site Observations

During the PCA (Qualtest, 2021) a Qualtest Environmental Scientist carried out a site walkover to assess site features. During the site walkover the site was observed to contain an asphalt paved road in the western portion of the site running approximately north-south, and an asphalt paved crossing in the northern portion of the site running approximately east-west. The remainder of the site was covered with varying thicknesses of road base gravel material. Grass was present along the eastern boundary, and in small areas not frequently traversed by vehicles. Slopes on the site were observed to be relatively flat, with a very slight slope down to the south. Refer to Qualtest PCA (Qualtest, 2021) for further details.

Based on information provided by PON two groundwater wells were identified on the site. The groundwater wells were constructed with flush mounted gatic covers and covered with gravel and grass. The location of the groundwater wells are shown on Figure 3, Appendix A.

5.0 Preliminary Conceptual Site Model

Based on the results of the PCA, a Preliminary Conceptual Site Model (CSM) was developed, and is shown below in Table 5.1

Table 5.1 – Preliminary Conceptual Site Model

AEC	COPC	Likelihood of Contamination	Mechanism of Contamination	Potentially Affected Media	Human & Ecological Receptors	Potential mechanisms of exposure	Potential & Complete Exposure Pathways	Comments
 Imported Fill: Potential use of contaminated imported fill. 	TRH, BTEX, PAH, Metals, Asbestos	Low to medium	 Top-down and to depth of fill Leaching of contaminants from fill into underlying soils Leaching of soil contaminants to groundwater 	 Fill soils Underlying soils Surface water Groundwater 	 Current site visitors Future construction workers & site users Offsite groundwater discharge point – Hunter River located approximately 820m to the south to south- east of the site. 	 Direct dermal contact with contaminated soil and/or groundwater Ingestion of contaminated soil and/or groundwater Inhalation of asbestos fibres, or contaminated soil (as dust) Inhalation of petroleum hydrocarbon vapours Leaching of soil contaminants to groundwater Groundwater discharge from onsite to offsite Hunter River. Direct dermal contact with contaminated soil and/or surface water 	 Complete exposure pathway for current site visitors, future construction workers and site users (if contaminated and not remediated/ managed). Potentially incomplete exposure pathway for offsite surface water, due to groundwater discharging to surface water greater than 800m from the site. Complete exposure pathway for groundwater, due to sandy soils and shallow depth of groundwater (if contaminated and not remediated/managed). 	Exposure pathway currently potentially incomplete for soil as preliminary soil sampling results were reported below adopted guidelines. Additional sampling and analysis to sufficiently characterise the fill would be required to confirm the exposure pathway is incomplete.
 2. Surrounding industrial land uses: Potential for contaminated groundwater to migrate onto the site; Potential for contaminated dust, particularly coal, to migrate onto the site. 	TRH, BTEX, PAH, Metals	Low	 Top-down settlement of dust on site surface. Migration of contaminated groundwater onto site. 	 Surface soils Surface water Groundwater Dust 	 Current site visitors Future construction workers & site users Offsite groundwater discharge point – Hunter River located approximately 820m to the south to south- east of the site. 	 Direct dermal contact with contaminated soil and/or groundwater Ingestion of contaminated soil and/or groundwater Inhalation of contaminated soil (as dust) Inhalation of petroleum hydrocarbon vapours Leaching of soil contaminants to groundwater Groundwater discharge from onsite to offsite Hunter River. 	 Complete exposure pathway for current site visitors, future construction workers and site users (if contaminated and not remediated/ managed). Potentially incomplete exposure pathway for offsite surface water, due to groundwater discharging to surface water greater than 800m from the site. Complete exposure pathway for groundwater, due to sandy soils and shallow depth of groundwater (if contaminated and not remediated/managed). 	Exposure pathways would be incomplete if soils and groundwater are found to not be contaminated via sampling & analysis.

6.0 Data Quality Objectives

6.1 Step 1 – State the Problem

There is a potential for soil, surface water and/or groundwater contamination to exist from past filling, past landuse and surrounding industrial land. Should contamination exist the site many not be suitable for the intended use without remediation and or management.

Two AECs have been identified for the site and require assessment:

- 1. Imported Fill across site Potential use of contaminated imported fill.
- 2. Surrounding industrial land uses Potential for contaminated groundwater to migrate onto the site; and Potential for contaminated dust, particularly coal, to migrate onto the site

6.2 Step 2 – Identify the Decisions

The decisions to be made based on the Preliminary Contamination Assessment (site history review, site observations and limited sampling & analysis) are:

- Are the concentrations of COPCs above the adopted landuse criteria; and
- Will the site require remediation, and if so, what level and type of remediation will be required to make the site suitable for the proposed land use, from a contamination perspective?

6.3 Step 3 – Identify the Inputs to the Decisions

Inputs into the decision are:

- Have samples been collected in the required areas of the site (the identified AECs)?
- Have samples been collected at the required frequencies and adequately represent the conditions on site?
- Is the data set adequate to perform statistical analysis, if required (i.e. calculate 95% UCL)?
- Have the samples been analysed for the COPCs identified?
- Have concentrations exceeding the adopted criteria been reported in the samples?
- If concentrations exceeding adopted criteria have been reported, will these areas require remediation and/or management?

The informational inputs into the decision are:

- Field observations and field screening results (PID);
- Laboratory results (concentrations of contaminants in soil);
- QA/QC documentation and data;
- Adopted assessment criteria (see Section 6); and,
- Relevant NSW EPA endorsed Guidelines.

The media to be sampled and analysed is:

- Soil; and
- Groundwater.

6.4 Step 4 – Define the Study Boundaries

The study boundary is defined laterally as the site boundary, Lot 152 DP1202468, within the Newcastle local government area, Parish of Newcastle, County of Northumberland. The site is located at 70 Raven Street, Kooragang, NSW, the proposed development area on the site is about 5,800m², located in the eastern portion of the site (refer to Figure 1 and Figure 2, Appendix A). Vertically, the study boundary will be defined by the depth of soil contamination and/or depth to groundwater. It is anticipated the vertical boundary would be a maximum of 5m bgs.

6.5 Step 5 – Develop a Decision Rule

Chemicals of Potential Concern (COPCs) are identified in Section 3.11, above. The COPCs and the associated assessment criteria are listed in Section 8 below.

The decision rules can be defined as: -

- If the laboratory quality assurance/ quality control data are within the acceptable ranges, the data will be considered suitable for use;
- If the COPCs are reported above the adopted criteria and/or at elevated levels (where no criteria are available) then it will be considered whether further assessment, remediation and/or management measures are required; and
- Where concentrations are below the assessment criteria, then no further assessment, remediation and/or management of that contaminant, in that area, in that media, is required. This is provided samples have been collected at the required frequencies (as per NSW EPA guidelines) and adequately represent the conditions on site, if not, additional sampling may be required.

6.6 Step 6 – Specify Acceptable Limits on Decision Errors

There are two types of errors:

- Type 1 finding that the site is contaminated, when it is not;
- Type 2 finding that the site is uncontaminated, when it is.

To reduce the potential for errors, the following will be applied:

- Appropriate field sampling methodologies and collection of field data (including sampling frequency);
- Robust QA/QC assessment of field procedures and laboratory data;
- Appropriate sampling and analytical density;
- Use of statistics (i.e. 95% UCL) to assess arithmetic average of COPCs. Use of statistics will also take into account:
 - No sample should report a concentration more than 250% of the adopted criteria; and,
 - The standard deviation of a sample population should not exceed 50% of the adopted criteria.

6.7 Step 7 – Optimise the Design for Obtaining Data

The methodologies presented in this report are designed to meet the nominated DQOs (for a preliminary assessment). Optimisation of the data collection process will be achieved by:

- Working closely with the analytical laboratories and sampling equipment suppliers so that appropriate procedures and processes are developed and implemented prior to and during the field work and that sampling, handling, and transport to, and processing by, the analytical laboratories is appropriate.
- Conduct sampling in accordance with industry best practice and Standard Operating Procedures (SOPs) for the type of sampling being conducted.

7.0 Field and Laboratory Investigations

7.1 Sampling Plan

The site is about 1.05ha and the available building area on the site is about 0.58ha. The NSW EPA (1995) Sampling Design Guidelines recommend a minimum of 15 sample locations to characterise a site of 0.58ha.

During the PCA, four sampling locations were carried out in the eastern portion of the site (within the proposed building area). For the current DCA an additional 11 boreholes were drilled in the eastern portion of the site.

Two existing groundwater wells were also sampled on the site.

The sampling locations are shown on Figure 3, Appendix A.

5.2 Soil Sampling

The fifteen boreholes (BH01 to BH15) were drilled across the site using a truck mounted drill rig fitted push tubes. The boreholes were drilled to approximate maximum depths of between 2.1m and 4.1m bgs.

Soil samples were collected from the boreholes in the fill materials and underlying natural materials. Samples from BH01 to BH04 were collected using a split spoon sampler (SPT) and samples collected from BH05 to BH15 were collected using push tubes. All samples were collected using a clean pair of nitrile gloves per sample.

The soil samples were placed into 250mL laboratory supplied glass jars and zip locked bags for laboratory analysis. Each soil sample was placed directly into an ice-chilled esky and remained chilled during fieldwork and transportation to the laboratory.

7.3 Groundwater Sampling

Two existing groundwater monitoring wells KIBMW1 and KIBMW2 were identified by PON on the site and sampled by Qualtest on the 23 February 2021. The locations of the groundwater monitoring wells are shown on Figure 3, Appendix B.

The monitoring well installation and construction details were not provided to Qualtest.

Groundwater sampling was undertaken on 23 February 2021. The wells were gauged for depth to product (if present), depth to water and total depth using an interface probe (IP). The wells were then purged using a micropurge pump until they were purged of three well volumes. Water quality parameters (pH, temperature, and redox potential) were measured using a portable water quality meter (WQM) during purging. It is noted that water quality parameters for Electrical conductivity (EC) and dissolved oxygen (DO) could not obtained due to a WQM malfunction. Samples were collected in laboratory supplied and preserved sample bottles and placed directly into an ice-chilled esky during field work and during transportation to the laboratory.

7.4 Laboratory analysis

The samples were dispatched to the NATA-accredited Eurofins MGT laboratory under chain of custody conditions.

Nine soil samples were selected for analysis as part of the PCA (Qualtest, 2021). A further twelve soil sampled were selected for analysis as part of this DCA based on field observations. The soil samples were analysed for the following:

- Total Recoverable Hydrocarbons (TRH) 7 primary samples;
- Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) 7 primary samples;
- Polycyclic Aromatic Hydrocarbons (PAHs) 12 primary samples;
- Metals (arsenic, cadmium, chromium, copper, lead, nickel, zinc and mercury) 12 primary samples;
- Asbestos (presence/absence) 7 primary soil samples; and,

One duplicate sample was also analysed for heavy metals and PAHs for quality control purposes.

Two water samples were also selected for analysis as part of this DCA. The water samples were analysed for the following:

- Total Recoverable Hydrocarbons (TRH) 2 primary samples;
- Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) 2 primary samples;
- Polycyclic Aromatic Hydrocarbons (PAHs) 2 primary samples; and
- Metals (filtered) (arsenic, cadmium, chromium, copper, lead, nickel, zinc and mercury) 2 primary samples.

8.0 Investigation Criteria

8.1 Health and Ecological Levels (Soil)

The health and ecological investigation levels for soil, presented in the National Environment Protection (Assessment of Site Contamination) Measure 1999 (April 2013), NEPC 2013, Canberra (referred to as ASC NEPM 2013) are generally used in NSW when selecting investigation levels for chemical contaminants in soil.

The purpose of the ASC NEPM (2013) is to 'establish a nationally consistent approach to the assessment of site contamination to ensure sound environmental management practices by the community which includes regulators, site assessors, environmental auditors, landowners, developers and industry'.

ASC NEPM (2013) provides health and ecological investigation and screening levels for different exposure scenarios based on a proposed land use. Health and ecological investigation and screening levels are applicable to the first stage (Tier 1) of site assessment and are used to assist in the iterative development of a Conceptual Site Model (CSM). They are adopted as concentrations of a contaminant above which either further appropriate investigation and/or evaluation will be required, or development of an appropriate management strategy (including remediation).

Health Investigation Levels (HILs) and Health Screening levels (HSLs) are applicable for assessing human health risk via relevant exposure pathways.

The HILs were developed for a broad range of metals and organic substances. These are generic to all soil types.

The HSLs have been developed for selected petroleum compounds and fractions and are applicable to assessing human health risk via inhalation and direct contact with soil and groundwater. The HSLs depend on specific soil physicochemical properties, building configurations, land use scenarios and the depth that groundwater is encountered.

Ecological Investigation Levels (EILs) and Ecological Screening Levels (ESLs) are applicable for assessing risk to terrestrial ecosystems under residential, open space and commercial/industrial land use scenarios. They apply to the top 2m of soil, which corresponds to the root zone and habitation zone of many species.

The EILs are associated with selected metals and organic compounds. The EILs are site specific and are determined by calculating an Ambient Background Concentration (ABC) and an Added Contaminant Limit (ACL) for the site, which are added together to get the EIL. In the absence of ambient background concentration data, a generic ACL, based on the soils pH, Cation Exchange Capacity (CEC) and clay content, has been adopted.

The ESLs are associated with petroleum compounds and fractions and are dependent on specific soil physical properties (i.e. coarse and fine-grained soil).

Based on the proposed site use the investigation and screening levels for commercial/industrial land use have been adopted, and are shown in Table 1, Appendix B.

8.2 Management Limits

The ASC NEPM (2013) provides management limits for petroleum hydrocarbons. The purpose of the Management Limits is to 'avoid or minimise' potential effects of petroleum hydrocarbons. ASC NEPM (1999, amended 2013) Schedule B(1) provides these as effects as:

- Formation of observable Light Non-Aqueous Phase Liquid (LNAPL);
- Fire and explosive hazards; and,
- Effects on buried infrastructure e.g. penetration of, or damage to, in-ground services by hydrocarbons.

Management limits were derived by Canada-Wide Standard for Petroleum Hydrocarbons (CWS-PHC) in Soil (2008) where the lowest limiting value for each effect became the Recommended Management Limit. Based on site specific information, the applicability of management limits as soil investigation levels for the site was reviewed, and is discussed further in Table 6.1 below.

Table 6.1 discusses the derivation of the revised management limits. These management limits will be applied to soils. As described in the ASC NEPM (2013) the magnitude of an exceedance will be considered in the context of whether the exposure pathways are plausible and whether exposure will result in harm. Depending on the level of the exceedance further qualitative or quantitative risk assessment may be required.

TRH Fraction	Basis of Recommended Management Limits (coarse soils)	Appropriateness of Recommended Management Limits for Adopted Criteria
F1 (C6-C10)	Formation of free phase NAPL 700mg/kg Effects on Workers in Trenches	The limiting value of 700mg/kg for formation of free phase NAPL is considered appropriate.
	1,000mg/kg Fire/Explosion Risk 1,400mg/kg	The value for effects on workers is not considered relevant as HSLs have been derived for Australian conditions and considered to be more appropriate.
F2 (C10-C16)	Effects on Workers in Trenches 1,000mg/kg Formation of free-phase Total F1 to F3 10,000mg/kg Fire/Explosion Risk 5,200mg/kg	'Effects on Workers in Trenches' is not appropriate for adoption as a criteria. These values are based on occupational exposure limits for gasoline and jet fuel, as there is no relevant acute toxicity endpoints available. CRC Care (2011) has established HSLs for 'Intrusive Maintenance Worker' for both vapour intrusion and direct contact of 'Not Limiting' and 20,000mg/kg respectively. HSLs are considered more appropriate for Australian conditions and the robustness in which they are derived.
		The limiting value of 5,200mg/kg for explosion risk to intrusive maintenance workers is considered appropriate.
F3 (C16-C34)	Effectiveness of bioremediation 3,500mg/kg Formation of free phase NAPL Total F1 to F3 10,000mg/kg	'Effectiveness of bioremediation' is not appropriate as a validation criteria, rather more of a guide for assessing whether bioremediation may be a viable option. It should be noted that this criterion was developed based on Canadian conditions, where bioremediation may not be as accelerated compared to the generally warmer Australian climate.
		The limiting value of 10,000mg/kg for formation of free phase NAPL is considered appropriate.
F4 (C34-C40)	Formation of free phase NAPL 10,000mg/kg	The limiting value of 10,000mg/kg for formation of free phase NAPL is considered appropriate.

The adopted management limits are shown in Table 1, Appendix B.

8.3 Asbestos Materials in Soil

The assessment of known and suspected asbestos contamination in soil is based on:

- National Environment Protection (Assessment of Site Contamination) Measure 1999 (April 2013), NEPC 2013, Canberra; and
- WA DoH 2009 Guidelines of the assessment and management of asbestos contaminated sites in Western Australia, WA Department of Health and Department of Environment and Conservation.

Schedule B1, Section 4 NEPM (2013) provides guidance on the assessment of both friable and non-friable forms of asbestos in soil. This guidance is based on the WA DoH (2009) Guidelines that presented risk-based screening levels for asbestos in soil under various land use scenarios.

For the purpose of assessing asbestos impacts in soil, three groups are recognised:

- Asbestos Containing Material (ACM) which is in sound condition although possibly broken or fragmented and the asbestos is bound in a matrix. This is restricted to material that cannot pass through a 7mm x 7mm sieve;
- Fibrous asbestos (FA) friable asbestos material, such as severely weathered ACM, and asbestos in the form of loose fibrous material such as insulation products;
- Asbestos fines (AF) includes free fibres of asbestos, small fibre bundles and also ACM fragments that pass through a 7mm x 7mm sieve.

The adopted health screening levels for asbestos in soil under various land use scenarios, are shown in Table 6.2.

It is noted that Qualtest have carried out asbestos sampling and analysis on a "present/absent" basis, and therefore the guidelines above are not practical to apply. Therefore, a guideline of "detected" has been adopted.

	Health Screening Level	
	<u>HIL A</u>	
Bonded ACM (%)	0.01	
FA and AF (%)	0.001	
All forms of Asbestos	No visible asbestos for surface soil (top 10cm)	

Table 6.2 Health Screening Levels for Asbestos contamination in soil (NEPM 2013)

8.4 Waste Classification

In order to provide a waste classification, the laboratory results were compared to the Contaminant Threshold (CT) and Specific Contaminant Concentration (SCC) values for General and Restricted Solid Waste in the NSW EPA (2014) Waste Classification Guidelines.

8.5 Groundwater Investigation Levels

8.5.1 Assessment of Environmental Values

The NSW EPA Guidelines for the Assessment and Management of Groundwater Contamination (NSW DEC, 2007) describes the process to identify environmental values which must be considered in groundwater investigations at contaminated sites. Based on these guidelines, assessment of relevant environmental values requires that the consultant:

• Determines whether the aquifer beneath the site is included in the NSW Office of Water list of major aquifers of drinking water quality;

- Assesses the identified uses of groundwater from the aquifer; and
- Uses groundwater indicators to assess whether the aquifer is suitable for use as a drinking water source. The NSW EPA has stated that, 'Groundwater with total dissolved solids (TDS) concentrations below 2,000 mg/L is suitable for potential drinking water supply, and hence should be afforded this level of protection from contamination unless other site-specific factors, such as low yield, render such use unlikely.' (NSW DEC, 2007).

Based on these steps, it is identified that:

- The listed Water Sharing Plans do not include the area of the site. The site is not listed as situated in an Unincorporated Area Groundwater Management Area (GMU). This GMU is not considered to be part of the NSW Office of Water list of protected aquifers as an actual or potential drinking water supply (NSW DEC, 2007).
- The closest potential exposure point to groundwater contamination is considered to be the Hunter River located approximately 840m south of the site.
- The Hunter River is considered to be tidal at Kooragang. Due to a WQM malfunction, no electrical conductivity (TDS) values were calculated during sampling.
- Due to the industrial nature of the site and the presence of reticulated water in the area it is considered unlikely that groundwater beneath the site and/or the Hunter River (around Kooragang) would be used for drinking water, livestock or agricultural irrigation purposes.

Based on the above, it is considered that the principal receptors from contaminated groundwater (if present) is the Hunter Rivers groundwater discharge zone. Consequently, environmental values for groundwater quality are for protection of fresh and marine water aquatic species (based on potential groundwater uses, discharge zones, and tidal nature of the water).

8.5.2 Protection of Aquatic Ecosystems

The trigger values for marine water species presented in the ANZECC (2018) (<u>http://www.waterquality.gov.au/anz-guidelines</u>) are considered applicable for the protection of aquatic ecosystems of the receiving waters.

The guidelines present 'Default Guideline Values' which are defined as concentrations of key performance parameters below which there is a low risk that adverse biological effects will occur. It is important to note that these are not threshold values at which an environmental problem is likely to occur if exceeded. Rather, if the trigger values are exceeded, then further action is required which may include either, further site-specific investigations to assess whether or not there is an actual problem, or the implementation of management / remedial actions.

Default Guideline Values are provided for the protection of 80-99% of species in fresh and marine waters, with the DGV depending on the health of the receiving waters.

It is considered that the fresh and marine water trigger values for protection of 95% of species (99% for bio-accumulative compounds) are applicable for investigating chemical concentrations in groundwater, based on the conductivity measured (brackish to saline) and the potential discharge zones (potentially fresh water).

8.5.3 Protection of Human Health Via Vapour Intrusion

Based on NEPM Schedule B1, Guideline on the Investigation Levels for Soil and Groundwater, the following criteria were adopted:

• Groundwater HSLs for vapour intrusion for Commercial/Industrial Land Use (HSL D), Sand, 2m to <4m.

9.0 Quality Assurance/Quality Control

Sampling activities were undertaken in accordance with normal, industry accepted practices and standards. The assessment of field and laboratory quality assurance / quality control (QA / QC) procedures is provided below, and a data validation report is presented in Appendix E.

In order to assess field quality assurance / quality control (QA/QC) procedures, the following quality control samples were collected and analysed:

QC Sample	Туре	Lab	Analysis
D.12.01.21	Duplicate of BH01 0.0-0.1	Eurofins mgt	TRH, BTEX, PAH, Metals
D.22.2.21	Duplicate of BH05 0.5-0.8	Eurofins mgt	PAH, Metals

Primary and intra lab duplicate samples were analysed by the NATA-accredited Eurofins mgt laboratory.

Table 3, Appendix B, presents the relative percentage differences (RPDs) between the primary and duplicate samples. A review of the Qualtest QA / QC results indicates that RPDs were within the acceptable range. It is noted that low concentrations can exaggerate the percentage differences with respect to small total concentrations, therefore where results for primary and duplicate sample were less than 10 time the LOR, the RPDs have been disregarded.

The laboratory internal QA/QC reports indicated that the appropriate laboratory QA / QC procedures and rates were undertaken for contamination studies, and that:

- Laboratory blank samples were free of contamination;
- Matrix spike recoveries were within the control limits;
- Laboratory duplicate RPDs were recorded within the control limits;
- Surrogates and laboratory control samples were within the laboratories acceptable range.

Based on the above, and the data validation report in Appendix E, it is considered that the field and laboratory methods for soil sampling are appropriate and that the data obtained is usable and considered to reasonably represent the concentrations at the sampling points at the time of sampling.

10.0 Results

10.1 Subsurface Conditions

The soils observed during drilling are summarised below in Table 10.1. The borehole logs are presented in Appendix D.

Unit	Soil Type	Description	Depth Range (m bgs)
1A	ASPHALT (BH03 only)	Asphalt	0.0 to 0.25
1B	FILL	Sandy GRAVEL- fine to medium grained sub-rounded to sub-angular, pale grey to brown, fine to medium grained sand, trace fines of low plasticity. SILT – low to medium plasticity, white to pale grey, with some crystalline material, possibly gypsum. SAND – fine to medium grained, pale brown to yellow/brown, brown, grey to dark grey, with shells, trace glass. Clayey Sandy GRAVEL – fine to medium grained, brown to grey/brown, fine to coarse grained sand, fines of low to medium plasticity. Gravelly SAND – fine to medium grains, brown fine grained gravel. CLAY – medium to high plasticity brown to dark brown.	0.0 to 2.0
2	Estuarine Soils	Sandy CLAY – medium to high plasticity, grey to dark grey. Silty Sandy CLAY – medium to high plasticity, grey to dark grey, fine to medium grained sand. Clayey SAND – fine to medium grained, grey to dark grey, fines of low plasticity. CLAY – medium to high plasticity, grey to dark grey with some brown and red-brown.	1.4 to EOH*
3	Alluvial Soils	SAND – fine to medium grained, dark grey to grey, grey-brown and dark brown to brown, pale brown with some pale brown to white, with shells.	1.6 to EOH*

Table 10.1 – Summary of Geotechnical Units and Soil Types

* End of hole

Anthropogenic materials (glass) were observed within fill material at BH01. A white crystalline material, assumed to be gypsum was also observed in fill at BH02, BH03, BH06 to BH11 and BH13 to BH14. Trace coal was observed in BH11.

Groundwater inflows were observed between 2.1 and 3.0m bgs during drilling and soil sampling.

No odours were observed during sampling.

10.2 Groundwater Gauging and Field Water Quality

The gauging and water quality parameters are shown in Table 5 and Table 6, Appendix B, and are summarised in Table 10.2 below.

Item	Item Description							
Depth to Groundwater	Gauged depths to groundwater ran MW1) and 2.347m btoc (KIB MW2) o	ged between 2.144m btoc (KIB n 23 February 2021.						
Non-Aqueous Phase Hydrocarbons (NAPL)	NAPL was not detected in the groun	dwater wells.						
Groundwater Flow	As no survey data was available for contours were developed. It is antici- to the south south-east and discharg located approximately 820m south t	the wells no groundwater ipated that groundwater flows ges into the Hunter River to south-east of the site.						
Groundwater Quality	Parameter	Range						
Parameters	Redox potential	3 mV to 10 mV						
	Dissolved Oxygen	No results, machine malfunction						
	Electrical conductivity (EC)	No results, machine malfunction						
	рН	6.85 to 6.98						
	Temperature	24.0°C to 24.9°C						

Table 10.2 – Summary of Gauging Data and Water Quality Parameters

Notes: btoc = below top of casing.

10.3 Laboratory Results

Soil

Soil analytical results for the contamination assessment are summarised in Table 1, Appendix B. The laboratory analytical reports are also included in Appendix F.

The soil laboratory results were compared to the investigation levels described in Sections 6.

The analytical results indicated that concentrations of contaminants were reported below the adopted commercial industrial landuse criteria, and asbestos was not detected.

Groundwater

Groundwater analytical results for the contamination assessment are summarised in Table 6, Appendix B. The laboratory analytical reports are also included in Appendix F.

The groundwater laboratory results were compared to the investigation levels described in Section 8. The analytical results indicated that concentrations of contaminants were reported below the adopted criteria, with the exception of:

- Concentrations of chromium above the aquatic ecosystem DGV (0.001mg/L) in samples KIB MW1 (0.003mg/L) and KIB MW2 (0.009mg/L);
- Concentrations of copper above the aquatic ecosystem DGV (0.0014mg/L) in samples KIB MW1 (0.009mg/L) and KIB MW2 (0.013mg/L); and
- Concentrations of zinc above the aquatic ecosystem DGV (0.008mg/L) in samples KIB MW1(0.099mg/L) and KIB MW2(0.038mg/L).

It is considered unlikely that the metals concentrations exceedences were due to site activities due to the top down nature of potential contamination and due to low metal concentrations in the fill material. Therefore, the metal concentrations are considered to be indicative of regional background water quality, and do not warrant further investigation or remediation.

Preliminary waste Classification

Qualtest followed the six step process described in Part 1 of the guidelines for assessing the classification of the in-situ soil on the site. According to the waste classification procedure:

- Step 1 Is the waste special waste?: The material is not classified as a 'special waste'.
- Step 2 Is the waste liquid waste?: The material assessed is not to be a 'liquid waste' in its current form. The material requiring offsite disposal was soil and capable of being picked up by a spade or shovel.
- Step 3 Is the waste pre-classified?: The material assessed is not 'pre-classified'.
- Step 4 Does the waste possess hazardous characteristics?: The material assessed does not appear to possess hazardous characteristics from the onsite observations made.
- Step 5 Determining a waste's classification using chemical assessment: The material has been assessed by chemical analyses. Soil analytical results are presented in Table 3 (attached). Laboratory certificates and chain of custody records are also attached. The results show concentrations below the general solid waste criteria (CT1/SCC1/TCLP1).
- Step 6 Is the waste putrescible or non-putrescible?: The material is composed predominantly of soil. NSW EPA (2014) notes that materials that are generally not classified as putrescible include soils, timber, garden trimmings, agricultural, forestry and crop materials, and natural fibrous organic and vegetative materials. Based on observations by Qualtest, the material is considered to be non-putrescible.

Based on the above, the fill material on the site classifies as General Solid Waste in accordance with the NSW (2014) Waste Classification Guidelines.

11.0 Conceptual Site Model

Based on the results of the detailed contamination assessment, including sampling and analysis results, carried out on the site, the Conceptual Site Model (CSM) has been updated.

|--|

AEC	COPC	Likelihood of Contamination	Mechanism of Contamination	Potentially Affected Media	Human & Ecological Receptors	Potential mechanisms of exposure	Sampling Completed	Potential & Complete Exposure Pathways
 Imported Fill: Potential use of contaminated imported fill. 	TRH, BTEX, PAH, Metals, Asbestos	Low to medium	 Top-down and to base of fill Leaching of contaminants from fill into underlying soils Leaching of soil contaminants to groundwater 	 Fill soils Underlying soils Surface water Groundwater 	 Current site visitors Future construction workers & site users Offsite groundwater discharge point – Hunter River located approximately 820m to the south to southe ast of the site. 	 Direct dermal contact with contaminated soil and/or groundwater Ingestion of contaminated soil and/or groundwater Inhalation of asbestos fibres, or contaminated soil (as dust) Inhalation of petroleum hydrocarbon vapours Leaching of soil contaminants to groundwater Groundwater discharge from onsite to offsite Hunter River. Direct dermal contact with contaminated soil and/or surface water 	 BH01 to BH15 Groundwater wells - KIBMW1 and KIBMW2 	 No contamination was identified in the fill soils, therefore there is an incomplete exposure pathway for current site visitors, future construction workers, site users, soil biota, surface water and groundwater.
 2. Surrounding industrial land uses: Potential for contaminated groundwater to migrate onto the site; Potential for contaminated dust, particularly coal, to migrate onto the site. 	TRH, BTEX, PAH, Metals	Low	 Top-down settlement of dust on site surface. Migration of contaminated groundwater onto site. 	 Surface soils Surface water Groundwater Dust 	 Current site visitors Future construction workers & site users Offsite groundwater discharge point – Hunter River located approximately 820m to the south to southeast of the site. 	 Direct dermal contact with contaminated soil and/or groundwater Ingestion of contaminated soil and/or groundwater Inhalation of contaminated soil (as dust) Inhalation of petroleum hydrocarbon vapours Leaching of soil contaminants to groundwater Groundwater discharge from onsite to offsite Hunter River. 	 BH01 to BH15 Groundwater wells - KIBMW1 and KIBMW2 	 No contamination was identified therefore there is an incomplete exposure pathway for current site visitors, future construction workers, site users, soil biota, surface water and groundwater.

12.0 Conclusions and Recommendations

Based on the results of the Detailed Contamination Assessment and results of field and laboratory investigations, it is considered that the site is suitable for the proposed development.

As a precaution it is recommended that an Unexpected Finds Procedure be included in the Construction Environmental Management Plan, and implemented during earthworks.

Based on the insitu assessment, if the surface/fill material is proposed to be disposed offsite to a licenced waste facility, the material classifies as **General Solid Waste** in accordance with the NSW EPA (2014) Waste Classification Guidelines, Part 1 – Classifying Waste.

Qualtest previously completed an Acid Sulfate Soil Assessment on the site. Based on the field observations, and the laboratory results, the estuarine/alluvial sands and clays below fill material (from about 1.5m bgs) were assessed to comprise Acid Sulfate Soils and a management plan was developed for the site, refer to NEW20P-0171-AC, dated 8 February 2021. This ASSMP should be implemented during redevelopment of the site.

If conditions other than those encountered during this assessment are uncovered, further assessment by an environmental consultant may be necessary.

This report was prepared in general accordance with the relevant sections of the NSW EPA (2020) Guidelines for Consultants Reporting on Contaminated Land and the National Environment Protection (Assessment of Site Contamination) Measure 1999 (April 2013), NEPC 2013, Canberra (referred to as ASC NEPM 2013).

13.0 Limitations

The findings presented in the report and used as the basis for recommendations presented herein were obtained using normal, industry accepted practices and standards. To our knowledge, they represent a reasonable interpretation of the general site history of the site relevant to potential contamination.

Data and opinions contained within the report may not be used in other contexts or for any other purposes without prior review and agreement by Qualtest. If this report is reproduced, it must be in full.

14.0 References

NSW Department of Primary Industries (Office of Water) Registered Groundwater Bore Map, accessed from <u>http://allwaterdata.water.nsw.gov.au/water.stm</u>, accessed on 28 October 2020.

NSW Land and Property Information, Spatial Information eXchange (SIX) Maps - Topographic Map, accessed from <u>https://maps.six.nsw.gov.au/</u>, accessed on 28 October 2020.

Department of Environment and Climate Change (2008) Acid Sulfate Soil Risk Mapping for Part of the Lower Hunter River Catchment, 1:25,000 scale (Edition 3).

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

NEPC (2013) National Environment Protection (Assessment of Site Contamination) Measure 1999 (April 2013), Canberra (ASC NEPM 2013).

Troedson A. L. & Deyssing L. (2016) Newcastle-Hunter Area 1:25,000 Coastal Quaternary Geology Map Series, Geological Survey of NSW

APPENDIX A:

Figures



Image obtained from Sixmaps (<u>https://maps.six.nsw.gov.au/</u>) 11 Janaury 2021

LABORATORY (NSW) PTY

. 🚺	Client:	EJE ARCHITECTURE PTY LTD	Drawing No:	FIGURE 1
	Project:	PRELIMINARY CONTAMINATION ASSESSMENT	Project No:	NEW20P-0171-AD
	Location:	70 RAVEN STREET (LOT 152 DP1202468)	Scale:	N.T.S.
ABORATORY (NSW) PTY LTD	Title:	SITE LOCATION PLAN	Date:	4/3/2021



Image obtained from Sixmaps (<u>https://maps.six.nsw.gov.au/</u>) 25 September 2020



Client:	EJE ARCHITECTURE PTY LTD	Drawing No:	FIGURE 2
Project:	PRELIMINARY CONTAMINATION ASSESSMENT	Project No:	NEW20P-0171-AD
ocation:	70 RAVEN STREET (LOT 152 DP1202468)	Scale:	N.T.S.
ïtle:	LOT LAYOUT AND PROPOSED DEVELOPMENT AREA	Date:	4/03/2021



Image obtained from Sixmaps (https://maps.six.nsw.gov.au/) 11 Janaury 2021

LABORATO

	Client:	EJE ARCHITECTURE PTY LTD	Drawing No:	FIGURE 3
Itaet 1	Project:	DETAILED CONTAMINATION ASSESSMENT	Project No:	NEW20P-0171-AD
	Location:	70 RAVEN STREET (LOT 152 DP1202468)	Scale:	N.T.S.
RY (NSW) PTY LTD	Title:	SAMPLING LOCATIONS	Date:	4/03/2021

APPENDIX B:

Tables

							Field ID	BH01 0.0-0.1	BH01 1.0-1.1	BH01 2.0-2.1	BH02 0.0-0.1	BH02 1.0-1.1	BH03 0.25-0.35	BH03 1.5-1.6	BH04 0.0-0.1	BH04 0.5-0.6	BH05 0.5-0.8	BH06 0.0-0.3
							Date	12/01/2021	12/01/2021	12/01/2021	12/01/2021	12/01/2021	12/01/2021	12/01/2021	12/01/2021	12/01/2021	2/02/2021	2/02/2021
Analytes		Units	LOR		HSL D ²	EIL/ESL D ³	Mgmt Limits ⁴											
	Arsenic	mg/kg	2	3000		160		2.4	2.2	7.2	3.4	4.7	< 2	< 2	2.4	< 2	2.5	3
	Cadmium	mg/kg	0.4	900				0.6	< 0.5	< 0.5	5.3	4.1	7.4	< 0.5	0.6	< 0.5	< 0.4	< 0.4
	Chromium	mg/kg	5	3600		320*		53	< 5	49	10	16	51	14	6.5	< 5	< 5	8.3
Motals	Copper	mg/kg	5	240000		110*		5.9	< 5	35	6.7	10	< 5	21	< 5	< 5	< 5	5.6
IVIELAIS	Lead	mg/kg	5	1500		1800		7.9	< 5	30	14	51	10	44	7.6	5.3	< 5	14
	Mercury	mg/kg	5	730				0.2	< 0.1	0.1	1.7	0.2	0.3	< 0.1	0.1	< 0.1	< 0.1	< 0.1
	Nickel	mg/kg	5	6000		60*		< 5	< 5	48	< 5	10	5.7	< 5	< 5	< 5	< 5	6
	Zinc	mg/kg	5	400000		230*		58	16	320	56	180	21	67	28	20	28	56
	Acenaphthene	mg/kg	0.5					< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Acenaphthylene	mg/kg	0.5					< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Anthracene	mg/kg	0.5					< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Benz(a)anthracene	mg/kg	0.5					< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Benzo(a)pyrene	mg/kg	0.5			1.4		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Benzo(a)pyrene TEQ (medium bound)	mg/kg	0.6	40				0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Benzo(b&j)fluoranthene	mg/kg	0.5					< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
PAHs	Benzo(g.h.i)perylene	mg/kg	0.5					< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Benzo(k)fluoranthene	mg/kg	0.5					< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Chrysene	mg/kg	0.5					< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Dibenz(a.h)anthracene	mg/kg	0.5					< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Fluoranthene	mg/kg	0.5					< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Fluorene	mg/kg	0.5					< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Indeno(1.2.3-cd)pyrene	mg/kg	0.5					< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Naphthalene	mg/kg	0.5					< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Phenanthrene	mg/kg	0.5					< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Pyrene	mg/kg	0.5					< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Total PAH	mg/kg	0.5	4000				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Benzene	mg/kg	0.1		3	75		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-
BTEX	Toluene	mg/kg	0.1		NL	135		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-
DILA	Ethylbenzene	mg/kg	0.1		NL	165		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-
	Xylenes - Total	mg/kg	0.3		230	180		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	-
	Naphthalene	mg/kg	0.5			370		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	-
	TRH C6-C10	mg/kg	20			215	700	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	-
трн	TRH C6-C10 less BTEX (F1)	mg/kg	20		260			< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	-
	TRH >C10-C16	mg/kg	50			170	5200	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	-
	TRH >C10-C16 less Naphthalene (F2)	mg/kg	50		NL			< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	-
	TRH >C16-C34	mg/kg	100			1700	10000	110	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	-
	TRH >C34-C40	mg/kg	100			3300	10000	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	-
Asbestos	Asbestos	-	-	Detect				ND	-	-	ND	-	ND	-	ND	-	ND	-

Notes

Clay content 1%, and using Ambient *

Background Concentration obtained from

ND Not detected

NL Not limiting

Result Concentration exceeds adopted health investigation level (Commercial/Industrial)

Result Concentration exceeds adopted health screening level, vapour intrusion (Commercial/Industrial, Sand, 0-1m)

Result Concentration exceeds the adopted ecological investigation/screening levels

Result Concentration exceeds adopted Management Limits

¹ NEPC (2013) National Environmental Protection (Assessment of Site

2 NEPC (2013) Soil Health Screening Levels for Vapour Intrusion, Commercial/Industrial, Sand Om to <1m

3 NEPC (2013) Soil Ecological Investigation & Screening Levels, commercial/industrial

4 NEPC (2013) Management Limits for TPH Fractions F1-F4 in Soil, adjusted as described in report



					1										
						BH07 0.0-0.25	BH08 0.0-0.25	BH09 0.0-0.2	BH09 0.95-1.3	BH10 0.0-0.25	BH11 0.0-0.45	BH12 0.0-0.15	BH13 0.3-0.75	BH14 0.0-0.2	BH15 1.1-1.4
						2/02/2021	2/02/2021	2/02/2021	2/02/2021	2/02/2021	2/02/2021	2/02/2021	2/02/2021	2/02/2021	2/02/2021
Analytes		Units	LOR	HIL D ¹	HSL D ²										
	Arsenic	mg/kg	2	3000		3.9	4.5	4.9	< 2	6.7	4.3	5.4	< 2	4.3	2.3
	Cadmium	mg/kg	0.4	900		4.2	1	< 0.4	< 0.4	1.8	< 0.4	< 0.4	19	1.7	< 0.4
	Chromium	mg/kg	5	3600		23	10	11	< 5	290	10	17	9.9	150	7.2
Matala	Copper	mg/kg	5	240000		8.1	7.4	< 5	< 5	18	< 5	< 5	< 5	140	< 5
wetais	Lead	mg/kg	5	1500		20	14	16	6.9	35	11	13	< 5	22	< 5
	Mercury	mg/kg	5	730		1	0.2	< 0.1	0.1	0.4	< 0.1	< 0.1	3	0.2	< 0.1
	Nickel	mg/kg	5	6000		5.2	6.2	5.5	< 5	16	5	< 5	< 5	8.1	< 5
	Zinc	mg/kg	5	400000		72	51	43	21	73	43	44	22	61	25
	Acenaphthene	mg/kg	0.5			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Acenaphthylene	mg/kg	0.5			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Anthracene	mg/kg	0.5			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Benz(a)anthracene	mg/kg	0.5			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Benzo(a)pyrene	mg/kg	0.5			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Benzo(a)pyrene TEQ (medium bound)	mg/kg	0.6	40		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Benzo(b&j)fluoranthene	mg/kg	0.5			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Benzo(g.h.i)perylene	mg/kg	0.5			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Benzo(k)fluoranthene	mg/kg	0.5			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
PARS	Chrysene	mg/kg	0.5			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
PAHs	Dibenz(a.h)anthracene	mg/kg	0.5			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Fluoranthene	mg/kg	0.5			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Fluorene	mg/kg	0.5			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Indeno(1.2.3-cd)pyrene	mg/kg	0.5			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Naphthalene	mg/kg	0.5			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Phenanthrene	mg/kg	0.5			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Pyrene	mg/kg	0.5			< 0.5	< 0.5	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Total PAH	mg/kg	0.5	4000		< 0.5	< 0.5	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Benzene	mg/kg	0.1		3	< 0.1	-	< 0.1	< 0.1	-	< 0.1	< 0.1	-	-	< 0.1
DTEV	Toluene	mg/kg	0.1		NL	< 0.1	-	< 0.1	< 0.1	-	< 0.1	< 0.1	-	-	< 0.1
DIEA	Ethylbenzene	mg/kg	0.1		NL	< 0.1	-	< 0.1	< 0.1	-	< 0.1	< 0.1	-	-	< 0.1
	Xylenes - Total	mg/kg	0.3		230	< 0.3	-	< 0.3	< 0.3	-	< 0.3	< 0.3	-	-	< 0.3
	Naphthalene	mg/kg	0.5			< 0.5	-	< 0.5	< 0.5	-	< 0.5	< 0.5	-	-	< 0.5
	TRH C6-C10	mg/kg	20			< 20	-	< 20	< 20	-	< 20	< 20	-	-	< 20
трц	TRH C6-C10 less BTEX (F1)	mg/kg	20		260	< 20	-	< 20	< 20	-	< 20	< 20	-	-	< 20
IЛП	TRH >C10-C16	mg/kg	50			< 50	-	< 50	< 50	-	< 50	< 50	-	-	< 50
	TRH >C10-C16 less Naphthalene (F2)	mg/kg	50		NL	< 50	-	< 50	< 50	-	< 50	< 50	-	-	< 50
	TRH >C16-C34 mg/		100			< 100	-	< 100	< 100	-	< 100	< 100	-	-	< 100
	TRH >C34-C40 mg/kg					< 100	-	< 100	< 100	-	< 100	< 100	-	-	< 100
Asbestos	Asbestos	-	-	Detect		ND	-	ND	ND	-	ND	ND	-	-	ND

Notes

Clay content 1%, and using Ambient *

Background Concentration obtained from

ND Not detected

NL Not limiting

Result Concentration exceeds adopted health investigation level (Commercial/Industrial)

Result Concentration exceeds adopted health screening level, vapour intrusion (Commercial/Industrial, San

Result Concentration exceeds the adopted ecological investigation/screening levels

Result Concentration exceeds adopted Management Limits

¹ NEPC (2013) National Environmental Protection (Assessment of Site

2 NEPC (2013) Soil Health Screening Levels for Vapour Intrusion, Commercial/Industrial, Sand Om to <1

3 NEPC (2013) Soil Ecological Investigation & Screening Levels, commercial/industrial

4 NEPC (2013) Management Limits for TPH Fractions F1-F4 in Soil, adjusted as described in report



Raven Street, Kooragang

Field ID							BH01 0.0-0.1	BH01 1.0-1.1	BH01 2.0-2.1	BH02 0.0-0.1	BH02 1.0-1.1	BH03 0.25-0.35	BH03 1.5-1.6	BH04 0.0-0.1	BH04 0.5-0.6	BH05 0.5-0.8	BH06 0.0-0.3	BH07 0.0-0.25
						Date	12/01/2021	12/01/2021	12/01/2021	12/01/2021	12/01/2021	12/01/2021	12/01/2021	12/01/2021	12/01/2021	2/02/2021	2/02/2021	2/02/2021
				General Solid Waste	Conoral Calid V													
	Analytes	Units	LOR	without TCLP	General Solid V	vaste with TCLP												
				CT1	SCC1	TCLP1												
	Arsenic	mg/kg	2	100	500		2.4	2.2	7.2	3.4	4.7	< 2	< 2	2.4	< 2	2.5	3	3.9
	Cadmium	mg/kg	0.4	20			0.6	< 0.5	< 0.5	5.3	4.1	7.4	< 0.5	0.6	< 0.5	< 0.4	< 0.4	4.2
	Chromium	mg/kg	5	100	1900		53	< 5	49	10	16	51	14	6.5	< 5	< 5	8.3	23
	chromium	mg/L	0.01			5	-	-	-	-	-	-	-	-	-	-	-	-
Motals	Copper	mg/kg	5				5.9	< 5	35	6.7	10	< 5	21	< 5	< 5	< 5	5.6	8.1
Ivietais	Lead	mg/kg	5	100	1500		7.9	< 5	30	14	51	10	44	7.6	5.3	< 5	14	20
	Mercury	mg/kg	5	4			0.2	< 0.1	0.1	1.7	0.2	0.3	< 0.1	0.1	< 0.1	< 0.1	< 0.1	1
	Nickel	mg/kg	5	40	1050		< 5	< 5	48	< 5	10	5.7	< 5	< 5	< 5	< 5	6	5.2
	Nickel TCLP	mg/L	0.01			2	-	-	0.06	-	-	-	-	-	-	-	-	-
	Zinc	mg/kg	5				58	16	320	56	180	21	67	28	20	28	56	72
	Acenaphthene	mg/kg	0.5				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Acenaphthylene	mg/kg	0.5				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Anthracene	mg/kg	0.5				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Benz(a)anthracene	mg/kg	0.5				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Benzo(a)pyrene	mg/kg	0.5	0.8			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Benzo(a)pyrene TEQ	mg/kg	0.6				0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Benzo(b&j)fluoranthene	mg/kg	0.5				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Benzo(g.h.i)perylene	mg/kg	0.5				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
РАН	Benzo(k)fluoranthene	mg/kg	0.5				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Chrysene	mg/kg	0.5				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Dibenz(a.h)anthracene	mg/kg	0.5				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Fluoranthene	mg/kg	0.5				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Fluorene	mg/kg	0.5				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Indeno(1.2.3-cd)pyrene	mg/kg	0.5				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Naphthalene	mg/kg	0.5				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Phenanthrene	mg/kg	0.5				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Pyrene	mg/kg	0.5	200			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Total PAH*	mg/kg	0.5	200			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Benzene	mg/kg	0.1	10			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-	< 0.1
втех	Ethylbenzene	mg/kg	0.1	600			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-	< 0.1
	Toluene	mg/kg	0.1	288			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-	< 0.1
	Xylenes - Total	mg/kg	0.3	1000			< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	-	< 0.3
TRH	TRH C6-C9	mg/kg	20	650			< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	-	< 20
	TRH C10-C14	mg/kg	20				< 20	< 20	< 20	< 20	21	< 20	< 20	< 20	< 20	< 20	-	< 20
	TRH C15-C28	mg/kg	50				< 50	65	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	-	< 50
	TRH C29-C36	mg/kg	50	10000			< 50	60	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	-	< 50
	TRH C10-36 (Total)	mg/kg	50	10000			< 50	125	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	-	< 50
Asbestos Detect					Detect		ND	-	-	ND	-	ND	-	ND	-	ND	-	ND

Notes:

Value Result exceeds criteria for General Solid Waste without TCLP (CT1)

Result exceeds criteria for General Solid Waste with TCLP (SCC1/TCLP1) Value

Asbestos Detected Value

Not detected ND

Criteria from NSW EPA (2014) Waste Classification Guidelines, Tables\ 1 and 2



Raven S	treet, Ko	ooraga
---------	-----------	--------

					Field ID	BH08 0.0-0.25	BH09 0.0-0.2	BH09 0.95-1.3	BH10 0.0-0.25	BH11 0.0-0.45	BH12 0.0-0.15	BH13 0.3-0.75	BH14 0.0-0.2	BH15 1.1-1.4
					Date	2/02/2021	2/02/2021	2/02/2021	2/02/2021	2/02/2021	44229	44229	44229	44229
			General Solid Waste	General Solid V	Vaste with TCLP									
	Analytes	Units LOR			701.04	_								
	I			SCC1	ICLP1			_						
	Arsenic	mg/kg 2	100	500		4.5	4.9	< 2	6.7	4.3	5.4	< 2	4.3	2.3
	Cadmium	mg/kg 0.4	20			1	< 0.4	< 0.4	1.8	< 0.4	< 0.4	19	1.7	< 0.4
	Chromium	mg/kg 5	100	1900		10	11	< 5	290	10	17	9.9	150	7.2
	chromium	mg/L 0.01			5	-	-	-	<0.05	-	-	-	-	-
Metals	Copper	mg/kg 5				7.4	< 5	< 5	18	< 5	< 5	< 5	140	< 5
	Lead	mg/kg 5	100	1500		14	16	6.9	35	11	13	< 5	22	< 5
	Mercury	mg/kg 5	4			0.2	< 0.1	0.1	0.4	< 0.1	< 0.1	3	0.2	< 0.1
	Nickel	mg/kg 5	40	1050		6.2	5.5	< 5	16	5	< 5	< 5	8.1	< 5
	Nickel TCLP	mg/L 0.01			2	-	-	-	-	-	-	-	-	-
	Zinc	mg/kg 5				51	43	21	73	43	44	22	61	25
	Acenaphthene	mg/kg 0.5				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Acenaphthylene	mg/kg 0.5				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Anthracene	mg/kg 0.5				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Benz(a)anthracene	mg/kg 0.5				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Benzo(a)pyrene	mg/kg 0.5	0.8			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Benzo(a)pyrene TEQ	mg/kg 0.6				0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Benzo(b&j)fluoranthene	mg/kg 0.5				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Benzo(g.h.i)perylene	mg/kg 0.5				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Benzo(k)fluoranthene	mg/kg 0.5				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
гап	Chrysene	mg/kg 0.5				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Dibenz(a.h)anthracene	mg/kg 0.5				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Fluoranthene	mg/kg 0.5				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Fluorene	mg/kg 0.5				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Indeno(1.2.3-cd)pyrene	mg/kg 0.5				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Naphthalene	mg/kg 0.5				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Phenanthrene	mg/kg 0.5				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Pyrene	mg/kg 0.5				< 0.5	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Total PAH*	mg/kg 0.5	200			< 0.5	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Benzene	mg/kg 0.1	10			-	< 0.1	< 0.1	-	< 0.1	< 0.1	-	-	< 0.1
DTCV	Ethylbenzene	mg/kg 0.1	600			-	< 0.1	< 0.1	-	< 0.1	< 0.1	-	-	< 0.1
BIEX	Toluene	mg/kg 0.1	288			-	< 0.1	< 0.1	-	< 0.1	< 0.1	-	-	< 0.1
	Xylenes - Total	mg/kg 0.3	1000			-	< 0.3	< 0.3	-	< 0.3	< 0.3	-	-	< 0.3
TRH	TRH C6-C9	mg/kg 20	650			-	< 20	< 20	-	< 20	< 20	-	-	< 20
	TRH C10-C14	mg/kg 20				-	< 20	< 20	-	< 20	< 20	-	-	< 20
	TRH C15-C28	mg/kg 50				-	< 50	< 50	-	69	< 50	-	-	< 50
	TRH C29-C36	mg/kg 50				-	< 50	< 50	-	54	< 50	-	-	< 50
	TRH C10-36 (Total)	mg/kg 50	10000			-	< 50	< 50	-	123	< 50	-	-	< 50
	Asbestos			Detect		-	ND	ND	-	ND	ND	-	-	ND

Notes:

Value Result exceeds criteria for General Solid Waste without TCLP (CT1)

Result exceeds criteria for General Solid Waste with TCLP (SCC1/TCLP1) Value

Asbestos Detected Value

Not detected ND

Criteria from NSW EPA (2014) Waste Classification Guidelines, Tables\ 1 and 2

gang



				BH01 0.0-0.1	D.12.1.21		BH05 0.5-0.8	D.22.2.21	
				12/01/2021	12/01/2021	RPD %	2/02/2021	2/02/2021	RPD %
Analytes		Units	LOR						
-	Arsenic	mg/kg	2	2.4	2.8	15	2.5	2.4	4
Metals	Cadmium	mg/kg	0.4	0.6	0.6	0	< 0.4	< 0.4	0
	Chromium	mg/kg	5	53	50	6	< 5	< 5	0
	Copper	mg/kg	5	5.9	6.2	5	< 5	< 5	0
	Lead	mg/kg	5	7.9	8.4	6	< 5	5.9	17
	Mercury	mg/kg	5	0.2	0.2	0	< 0.1	< 0.1	0
	Nickel	mg/kg	5	< 5	< 5	0	< 5	< 5	0
	Zinc	mg/kg	5	58	45	25	28	30	7
	Acenaphthene	mg/kg	0.5	< 0.5	< 0.5	0	< 0.5	< 0.5	0
	Acenaphthylene	mg/kg	0.5	< 0.5	< 0.5	0	< 0.5	< 0.5	0
	Anthracene	mg/kg	0.5	< 0.5	< 0.5	0	< 0.5	< 0.5	0
	Benz(a)anthracene	mg/kg	0.5	< 0.5	< 0.5	0	< 0.5	< 0.5	0
	Benzo(a)pyrene	mg/kg	0.5	< 0.5	< 0.5	0	< 0.5	< 0.5	0
	Benzo(b&j)fluoranthene	mg/kg	0.5	< 0.5	< 0.5	0	< 0.5	< 0.5	0
	Benzo(g.h.i)perylene	mg/kg	0.5	< 0.5	< 0.5	0	< 0.5	< 0.5	0
	Benzo(k)fluoranthene	mg/kg	0.5	< 0.5	< 0.5	0	< 0.5	< 0.5	0
PAHs	Chrysene	mg/kg	0.5	< 0.5	< 0.5	0	< 0.5	< 0.5	0
	Dibenz(a.h)anthracene	mg/kg	0.5	< 0.5	< 0.5	0	< 0.5	< 0.5	0
	Fluoranthene	mg/kg	0.5	< 0.5	< 0.5	0	< 0.5	< 0.5	0
	Fluorene	mg/kg	0.5	< 0.5	< 0.5	0	< 0.5	< 0.5	0
	Indeno(1.2.3-cd)pyrene	mg/kg	0.5	< 0.5	< 0.5	0	< 0.5	< 0.5	0
	Naphthalene	mg/kg	0.5	< 0.5	< 0.5	0	< 0.5	< 0.5	0
	Phenanthrene	mg/kg	0.5	< 0.5	< 0.5	0	< 0.5	< 0.5	0
	Pyrene	mg/kg	0.5	< 0.5	< 0.5	0	< 0.5	< 0.5	0
	Total PAH	mg/kg	0.5	< 0.5	< 0.5	0	< 0.5	< 0.5	0
	Benzene	mg/kg	0.1	< 0.1	< 0.1	0	< 0.1	-	0
BTEX	Toluene	mg/kg	0.1	< 0.1	< 0.1	0	< 0.1	-	0
	Ethylbenzene	mg/kg	0.1	< 0.1	< 0.1	0	< 0.1	-	0
	Xylenes - Total	mg/kg	0.3	< 0.3	< 0.3	0	< 0.3	-	0
TRH	Naphthalene	mg/kg	0.5	< 0.5	< 0.5	0	< 0.5	-	0
	TRH C6-C10	mg/kg	20	< 20	< 20	0	< 20	-	0
	TRH C6-C10 less BTEX (F1)	mg/kg	20	< 20	< 20	0	< 20	-	0
	TRH >C10-C16	mg/kg	50	< 50	< 50	0	< 50	-	0
	TRH >C10-C16 less Naphthalene (F2)	mg/kg	50	< 50	< 50	0	< 50	-	0
	TRH >C16-C34	mg/kg	100	110	200	58	< 100	-	0
	TRH >C34-C40	mg/kg	100	< 100	< 100	0	< 100	-	0

*RPDs have only been considered where a concentration is greater than 10 times the EQL.

**High RPDs are in bold (Acceptable RPD range is 30% (>10 x EQL))





Sample ID	Date	Time	Event	Top of Well Casing Elevation (m AHD)	Depth to Water (m)	Total Well Depth (m BTOC)	Water Elevation (m AHD)	Comments	
KIB MW1	23.02.21	8:15	Pre-purge	*	2.144	4.005	*	Cloudy, brown, no obvious odour	
KIB MW2	23.02.21	9:30	Pre-purge	*	2.347	3.940	*	Greeny-brown, slight organic odour	

<u>Notes</u>

ID = identification

mAHD = metres above Australia Height Datum

m = metres

* No survey data available


Sample ID	Date	Event	Dissolved Oxygen (mg/L)	Electrical Conductivity (µ\$/cm)	рН	Redox Potential (mV)	Temperature (oC)	Comments (Clarity, Odour, Colour, Sediments, Sheens etc)
KIB MW1	23.02.21	post-purge	*	*	6.85	10.0	24.0	Cloudy, brown, no obvious odour
KIB MW2	23.02.21	post-purge	*	*	6.98	3.0	24.9	Greeny-brown, slight organic odour

<u>Notes</u>

ID = identification

* WQM Malfunction

Table 6: Groundwater Analytical Results - TR, BTEX, PAH, Metals Raven Street, Kooragang

						Field ID	KIB MW1	KIB MW2
_						Date	23/02/2021	23/02/2021
	Applytos	Unite		Aquatic E	Ecosystem ¹	$\mu c \nu p^2$		
	Analytes	Units	LUK	Freshwater	Marine	HSL D		
	Arsenic	mg/L	0.001	0.013			0.002	0.004
	Cadmium	mg/L	0.0002	0.0002	0.0007		< 0.0002	< 0.0002
	Chromium	mg/L	0.001	0.001	0.0044		0.003	0.009
Metals	Copper	mg/L	0.001	0.0014	0.0013		0.009	0.013
Wietais	Lead	mg/L	0.001	0.0034	0.0044		0.002	< 0.001
	Mercury	mg/L	0.0001	0.00006	0.0001		< 0.0001	< 0.0001
	Nickel	mg/L	0.001	0.011	0.07		0.005	0.008
	Zinc	mg/L	0.005	0.008	0.015		0.099	0.038
	Benzene	mg/L	0.001		0.95	5	< 0.001	< 0.001
DTEV	Tolune	mg/L	0.001		0.18	NL	< 0.001	< 0.001
DIEA	Ethylbenzene	mg/L	0.001		0.08	NL	< 0.001	< 0.001
	Xylenes	mg/L	0.003		0.075	NL	< 0.003	< 0.003
	Naphthalene		0.01			NL	< 0.01	< 0.01
	TRH C6-C10		0.02			-	< 0.02	< 0.02
	TRH C6-C10 less BTEX (F1)	mg/L	0.02			6	< 0.02	< 0.02
TRH	TRH >C10-C16	mg/L	0.05				< 0.05	< 0.05
	TRH >C10-C16 less Naphthalene (F2)	mg/L	0.05			NL	< 0.05	< 0.05
	TRH >C16-C34	mg/L	0.1				< 0.1	< 0.1
	IRH >C34-C40	mg/L	0.1				< 0.1	< 0.1
	Acenaphthene	mg/L	0.001				< 0.001	< 0.001
	Acenaphthylene	mg/L	0.001	0.00001	0.00004		< 0.001	< 0.001
	Anthracene	mg/L	0.001	0.00001	0.00001		< 0.001	< 0.001
	Benz(a)anthracene	mg/L	0.001	0.0004	0.0004		< 0.001	< 0.001
	Benzo(a)pyrene	mg/L	0.001	0.0001	0.0001		< 0.001	< 0.001
	Benzo(b&j)fluoranthene	mg/L	0.001				< 0.001	< 0.001
	Benzo(g.n.i)perviene	mg/L	0.001				< 0.001	< 0.001
DALL	Chrysene	mg/L	0.001				< 0.001	< 0.001
PAHS	Dibonz(a b)anthracana	mg/L	0.001				< 0.001	< 0.001
		mg/L	0.001				< 0.001	< 0.001
	Fluoropo	mg/L	0.001				< 0.001	< 0.001
	Indono(1.2.2.cd)pyrono	mg/L	0.001				< 0.001	< 0.001
	Naphthalong	mg/L	0.001	0.016	0.016		< 0.001	< 0.001
	Phonanthrono	mg/L	0.001	0.010	0.010		< 0.001	< 0.001
	Durono	mg/L	0.001				< 0.001	< 0.001
		mg/L	0.001				< 0.001	< 0.001
		11/8/L	0.001				< 0.001	< 0.001

Notes: Result

Concentration exceeds the Protection of 95-99% of species in Marine water trigger values

Result Concentration exceeds the Protection of 95-99% of species in Fresh water trigger values

Result Concentration exceeds Health Screening Levels

Italics

LOR exceeds adopted criteria

1 ANZECC (2018) Australian and New Zealand Guidelines for Fresh and Marine Water Quality

2 NEPC (2013) National Environmental Protection (Assessment of Site Contamination) Measure (NEPM 2013) - Health

Screening Levels, Commercial/Industrial, Clay 2m to <4m



APPENDIX C:

Groundwater Bore Search

Groundwater Bores

- Groundwater works
- Telemetered bores
- Logged bores
- Manual bores

Monitoring Bore Types

Coastal Sands Fractured Rock Porous Rock Great Artesian Basin Discontinued



60201465

00.4155

GM72,0,51,53

GW204672_

GW204669

GW204676

GW204671

GW202649

Licence:	20BL173444	Licence Status:	ACTIVE
	Α	uthorised Purpose(s): Intended Purpose(s):	MONITORING BORE MONITORING BORE
Work Type:	Bore		
Work Status:	Equipped		
Construct.Method:	Auger - Hollow		
Owner Type:	Mines		
Commenced Date: Completion Date:	13/05/2009	Final Depth: Drilled Depth:	4.45 m 4.45 m
Contractor Name:	BR & M ATKINS		
Driller:	Brian Richard Atkins		
Assistant Driller:			
Property: GWMA: GW Zone:	N A Off Cormorant Rd KOORAGANG ISLAND 2304 NSW - -	Standing Water Level (m): Salinity Description: Yield (L/s):	1.900

Site Details

Site Chosen By:

		County Form A: NORTHUMBERLAND Licensed: NORTHUMBERLAND	Parish NEWCA NEWCASTLE	Cadastre 1//775775 Whole Lot 1//775775
Region:	20 - Hunter	CMA Map: 9232-3N		
River Basin: Area/District:	210 - HUNTER RIVER	Grid Zone:	Scale:	
Elevation: Elevation Source:	0.00 m (A.H.D.) Unknown	Northing: 6361292.000 Easting: 385361.000	Latitude: Longitude:	32°52'49.9"S 151°46'28.2"E
GS Map:	-	MGA Zone: 56	Coordinate Source:	GPS - Global

GS Map: -

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Туре	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	4.45	150			Auger - Hollow Flight
1		Annulus	Cement	0.00	0.20	150	58		PL:Poured/Shovelled
1		Annulus	Bentonite	0.20	0.60	150	58		PL:Poured/Shovelled
1		Annulus	Waterworn/Rounded	0.60	4.00	150	58		Graded, PL:Poured/Shovelled
1	1	Casing	Pvc Class 18	0.00	1.00	58	50		Seated on Bottom, Screwed
1	1	Opening	Slots - Horizontal	1.00	4.00	58		0	Mechanically Slotted, PVC Class 18,
L]							Screwed, SL: 30.0mm, A: 0.50mm

Water Bearing Zones

	From (m)	To (m)	Thickness (m)	WBZ Туре	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
Γ	0.00	4.45	4.45	Unknown	1.90					

From	То	Thickness	Drillers Description	Geological Material	Comments
(m)	(m)	(m)			
0.00	0.15	0.15	Topsoil/Fill; generally brown fien to medium	Topsoil	
1	I				

https://realtimedata.waternsw.com.au/wgen/users/955fa8f693b347108cc14db5a87fa8cf/gw202649.agagpf org.wsr.htm?16038410...

			slightly silty sand, with abundant rootlets 0.1m		
0.15	0.75	0.60	Fill; brown fine to medium sand, with trace to some silt, damp	Fill	
0.75	1.60	0.85	Fill; light brown, fine to medium sand, with trace shells, damp to moist	Fill	
1.60	1.90	0.30	Fill; as abov, from about 1.6m wet	Fill	
1.90	2.30	0.40	Fill; as above, from 1.9m saturated	Fill	
2.30	4.45	2.15	Fill; as above, from 2.3m, trace to some fine to medium subangular gravel & shells	Fill	

Remarks

13/05/2009: Form A Remarks:

Nat Carling, 15-Feb-2013; All details were provided by client/consultant retrospectively.

*** End of GW202649 ***

GW202650

Licence:		Licence Status:	
		Authorised Purpose(s): Intended Purpose(s):	MONITORING BORE
Work Type:	Bore		
Work Status:	Equipped		
Construct.Method:	Auger - Hollow		
Owner Type:	Mines		
Commenced Date: Completion Date:	13/05/2009	Final Depth: Drilled Depth:	4.20 m 4.20 m
Contractor Name:	BR & M ATKINS		
Driller:	Brian Richard Atkins		
Assistant Driller:			
Property:		Standing Water Level (m):	2.000
GWMA: GW Zone:		Salinity Description Yield (L/s):	
Site Details			

Site Chosen By:

		Cou Form A: NO Licensed:	u nty RTHUMBERLAND	Parish NEWCA	Cadastre 1//775775	
Region:	20 - Hunter	CMA Map: 923	2-3N			
River Basin: Area/District:	210 - HUNTER RIVER	Grid Zone:		Scale:		
Elevation: Elevation Source:	0.00 m (A.H.D.) Unknown	Northing: 636 Easting: 385	1293.000 350.000	Latitude: Longitude:	32°52'49.9"S 151°46'27.8"E	
GS Map:	-	MGA Zone: 56		Coordinate Source:	GPS - Global	

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Туре	From	To	Outside	Inside	Interval	Details
				(m)	(m)	(mm)	(mm)		
1		Hole	Hole	0.00	4.20	150			Auger - Hollow Flight
1		Annulus	Cement	0.00	0.25	150	58		PL:Poured/Shovelled
1		Annulus	Bentonite	0.25	0.60	150	58		PL:Poured/Shovelled
1		Annulus	Waterworn/Rounded	0.60	4.00	150	58		Graded, PL:Poured/Shovelled
1	1	Casing	Pvc Class 18	0.00	1.00	58	50		Seated on Bottom, Screwed
1	1	Opening	Slots - Horizontal	1.00	4.00	58		0	Mechanically Slotted, PVC Class 18,
		ļ							Screwed, SL: 30.0mm, A: 0.50mm

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Туре	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
0.00	4.20	4.20	Unknown	2.00					

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	0.15	0.15	Topsoil/Fill; brown fine to medium grained,	Topsoil	

https://realtimedata.waternsw.com.au/wgen/users/955fa8f693b347108cc14db5a87fa8cf/gw202650.agagpf org.wsr.htm?16038408...

			slightly silty sand, with abundant rootlets to 0.10m		
0.15	0.80	0.65	Fill; generally brown fine to medium sand, with trace to some silt, damp	Fill	
0.80	1.60	0.80	Fill; generally dense light brown fine to medium sand, with trace fine to mediumg rained (up to 15mm) & trace shells, da	Fill	
1.60	2.00	0.40	Fill; as above, from 1.8m, moist to wet	Fill	
2.00	4.20	2.20	Fill; as above, from approx 2m, saturated	Fill	

Remarks

13/05/2009: Form A Remarks:

Nat Carling, 15-Feb-2013; All details were provided by client/consultant retrospectively.

*** End of GW202650 ***

GW202654

Licence:		Licence Status:	
		Authorised Purpose(s): Intended Purpose(s):	MONITORING BORE
Work Type:	Bore		
Work Status:	Equipped		
Construct.Method:	Auger - Hollow		
Owner Type:	Mines		
Commenced Date: Completion Date:	20/08/2009	Final Depth: Drilled Depth:	6.60 m 7.45 m
Contractor Name:	BR & M ATKINS		
Driller:	Brian Richard Atkins		
Assistant Driller:			
Property:		Standing Water Level (m):	4.500
GWMA: GW Zone:		Salinity Description: Yield (L/s):	
Site Details			

Site Chosen By:

		County Form A: NORTHUMBER Licensed:	Parish LAND NEWCA	Cadastre 1//775775
Region:	20 - Hunter	CMA Map: 9232-2S		
River Basin: Area/District:	210 - HUNTER RIVER	Grid Zone:	s	Scale:
Elevation: Elevation Source:	0.00 m (A.H.D.) Unknown	Northing: 6361172.000 Easting: 385476.000	Lati Longi	itude: 32°52'53.8"S itude: 151°46'32.6"E
GS Map:	-	MGA Zone: 56	Coordinate So	ource: GPS - Global

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Туре	From (m)	To (m)	Outside Inside Diameter Diameter (mm) (mm)		Interval	Details
1		Hole	Hole	0.00	7.45	140			Auger - Hollow Flight
1		Annulus	Bentonite	0.00	2.50	140	58		PL:Poured/Shovelled
1		Annulus	Waterworn/Rounded	2.50	6.50	140	58		Graded, PL:Poured/Shovelled
1	1	Casing	Pvc Class 18	0.00	3.50	58	50		Seated on Bottom, Screwed
1	1	Opening	Slots - Horizontal	3.50	6.50	58		0	Mechanically Slotted, PVC Class 18,
									Screwed, SL: 30.0mm, A: 0.50mm

Water Bearing Zones

	From (m)	To (m)	Thickness (m)	WBZ Туре	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
I	0.00	6.60	6.60	Unknown	4.50					

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	0.34	0.34	Fill; brown fine to mediumg rained sand, with trace shell fragments & trace rootlets	Fill	

 $https://realtimedata.waternsw.com.au/wgen/users/955fa8f693b347108cc14db5a87fa8cf/gw202654.agagpf_org.wsr.htm?16038418\ldots$

			to 0.03m, dry		
0.34	4.25	3.91	Fill; as above, from 3.4m, moist to wet	Fill	
4.25	4.50	0.25	Fill; as above, from 4.25m, light to dark	Fill	
			grey		
4.50	6.60	2.10	Fill; as above, from 4.5m, saturated	Fill	
6.60	7.45	0.85	Clay; soft, dark grey	Clay	

Remarks

20/08/2009: Form A Remarks:

Nat Carling, 18-Feb-2013; All details were provided by client/consultant retrospectively.

*** End of GW202654 ***

GW202795

Licence:		Licence Status:	
		Authorised Purpose(s): Intended Purpose(s):	MONITORING BORE
Work Type:	Bore		
Work Status:	Equipped		
Construct.Method:	Auger - Solid		
Owner Type:	Private		
Commenced Date: Completion Date:	29/10/2012	Final Depth: Drilled Depth:	5.50 m 7.45 m
Contractor Name:	FICO		
Driller:	Daniel James Dudley		
Assistant Driller:	Shaun Currie		
Property:		Standing Water Level	
GWMA: GW Zone:		(iii). Salinity Description: Yield (L/s):	
Site Details			
Site Chosen By:			

		Form A: Licensed:	County NORTHUMBERLAND	Parish NEWCA	Cadastre RD ADJ 14//1144748
Region:	20 - Hunter	CMA Map:	9232-2S		
River Basin: Area/District:	210 - HUNTER RIVER	Grid Zone:		Scale:	
Elevation: Elevation Source:	0.00 m (A.H.D.) Unknown	Northing: Easting:	6360901.000 385108.000	Latitude: Longitude:	32°53'02.5"S 151°46'18.3"E
GS Map:	-	MGA Zone:	56	Coordinate Source:	GPS - Global

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Туре	From (m)	To (m)	Outside Diameter	Inside Diameter	Interval	Details
				Ľ,	Ľ,	(mm)	(mm)		
1		Hole	Hole	0.00	7.00	110			Auger - Solid Flight
1		Annulus	Bentonite/Grout	0.00	2.10	110	58		PL:Poured/Shovelled
1		Annulus	Waterworn/Rounded	2.10	5.50	110	58		Graded, PL:Poured/Shovelled
1	1	Casing	Pvc Class 18	0.00	2.50	58	50		Seated on Bottom, Screwed
1	1	Opening	Slots - Horizontal	2.50	5.50	58		0	Mechanically Slotted, PVC Class 18,
									Screwed, SL: 30.0mm, A: 0.50mm

Water Bearing Zones

ľ	From (m)	To (m)	Thickness (m)	WBZ Туре	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
Γ	2.80	7.00	4.20	Unknown						

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	1.80	1.80	Fill	Fill	
1.80	2.70	0.90	Clay, silty sandy	Clay	

10/28/2020	https://realtimedata.watern	sw.com.au/wgen/users/955fa8f693b347108cc14db5a87fa8	cf/gw202795.agagpf_org.wsr.htm?16038417
2.70 7.45	4.75 Sand	Sand	

Remarks

29/10/2012: Form A Remarks: Nat Carling, 5-Mar-2014; GPS provided by the drillers.

*** End of GW202795 ***

GW202657

Licence:		Licence Status:	
		Authorised Purpose(s): Intended Purpose(s): M	ONITORING BORE
Work Type:	Bore		
Work Status:	Equipped		
Construct.Method:	Auger - Solid		
Owner Type:	Mines		
Commenced Date: Completion Date:	19/07/1996	Final Depth: 8.7 Drilled Depth: 8.7	20 m 20 m
Contractor Name:	McDermott Drilling		
Driller:	Unkown Unknown		
Assistant Driller:	Lance		
Property:		Standing Water Level 1.4 (m):	400
GWMA:		Salinity Description:	
GW Zone:		Yield (L/s):	
Site Details			

Site Chosen By:

		Form A: Licensed:	County NORTHUMBERLAND	Parish NEWCA	Cadastre 1//775775
Region:	20 - Hunter	CMA Map:	9232-2S		
River Basin: Area/District:	210 - HUNTER RIVER	Grid Zone:		Scale:	
Elevation: Elevation Source:	0.00 m (A.H.D.) Unknown	Northing: Easting:	6361582.000 384871.000	Latitude: Longitude:	32°52'40.3"S 151°46'09.5"E
GS Map:	-	MGA Zone:	56	Coordinate Source:	GPS - Global

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Туре	From	То	Outside	Inside	Interval	Details
				(m)	(m)	Diameter (mm)	Diameter (mm)		
1		Hole	Hole	0.00	3.10	150			Auger - Solid Flight
1		Hole	Hole	3.10	8.20	150			Rot. Rev. Circ Mud
1		Annulus	Waterworn/Rounded	0.00	2.20	150	58		Graded, PL:Poured/Shovelled
1		Annulus	Bentonite	2.20	5.00	150	58		PL:Poured/Shovelled
1		Annulus	Waterworn/Rounded	5.00	8.20	150	58		Graded, PL:Poured/Shovelled
1	1	Casing	Pvc Class 18	0.00	5.20	58	50		Seated on Bottom, Screwed
1	1	Opening	Slots - Horizontal	5.20	8.20	58		0	Mechanically Slotted, PVC Class 18, Screwed, SL: 30.0mm, A: 0.50mm

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Туре	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
0.00	2.60	2.60	Unknown	1.40					
4.00	8.20	4.20	Unknown						

	From	То	Thickness	Drillers Description	Geological Material	Comments	
http	s://real	timedat	a.waternsw.c	om.au/wgen/users/955fa8f693b347108cc14d	b5a87fa8cf/gw202657.agagp	f_org.wsr.htm?1603840550490&16038…	1/2

 $https://realtimedata.waternsw.com.au/wgen/users/955 fa8f 693 b347 108 cc 14 db 5a87 fa8 cf/gw 2026 57.ag ag pf_org.wsr.htm? 16038405 \ldots provide the second state of t$

(m)	(m)	(m)			
0.00	0.20	0.20	Sand; moist, brown, loose, silty (topsoil)	Sand	
0.20	0.50	0.30	Gravel; moist, grey, dense, coarse, & Cobbles (blast furnace slag fill)	Gravel	
0.50	2.20	1.70	Sand; moist, light brown, medium grained, dense (dredged fill), wet @ 1.5m	Sand	
2.20	2.60	0.40	Clay; wet, black, loose/soft, sandy/clayey sand (alluvium)	Clay	
2.60	4.00	1.40	Clay; wet, black, fine to stiff, with a trace of sand (alluvium)	Clay	
4.00	5.20	1.20	Sand; wet, black, loose, with clay (alluvium)	Sand	
5.20	8.20	3.00	Sand; wet, light grey, fine grey, fine grained, medium dense (Alluvium)	Sand	

Remarks

19/07/1996: Form A Remarks:

Nat Carling, 18-Feb-2013; All details were provided by client/consultant retrospectively.

*** End of GW202657 ***

GW202982

Licence:	20BL173112	Licence Status:	ACTIVE
		Authorised Purpose(s): Intended Purpose(s):	MONITORING BORE MONITORING BORE
Work Type:	Bore		
Work Status:	Filled,Backfilled		
Construct.Method:	Jetted - Water		
Owner Type:	Private		
Commenced Date: Completion Date:	19/08/2014	Final Depth: Drilled Depth:	6.00 m 6.20 m
Contractor Name:	CARGILL AUSTRALIA		
Driller:	Andrew Forbes		
Assistant Driller:	Gareth Fitzgerald		
Property: GWMA: GW Zone:	N A 51 Raven St KOORAGANG 2304 NSW - -	Standing Water Level (m): Salinity Description: Yield (L/s):	

Site Details

Site Chosen By:

	Form A: Licensed:	County NORTHUMBERLAND NORTHUMBERLAND	Parish NEWCA NEWCASTLE	Cadastre 2//858206 Whole Lot 2//858206		
Region: 20 - Hunter	CMA Map:	9232-2S				
River Basin: 210 - HUNTER RIVER Area/District:	Grid Zone:		Scale:			
Elevation: 0.00 m (A.H.D.) Elevation Source: Unknown	Northing: Easting:	6361014.000 384793.000	Latitude: Longitude:	32°52'58.7"S 151°46'06.2"E		

Coordinate Source: GIS - Geogra

GS Map: -

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

MGA Zone: 56

Hole	Pipe	Component	Туре	From	То	Outside	utside Inside Interval Details		Details
				(m)	(m)	Diameter (mm)	Diameter (mm)		
1		Hole	Hole	0.00	6.00	150			Jetted - Water
1		Backfill	Clay	0.00	6.00	150			
1	1	Casing	Pvc Class 9	0.00	6.00	50	46		Seated, Other
1	1	Opening	Slots - Horizontal	0.00	6.00	50		0	Mechanically Slotted, PVC Class 18, Other,
									SL: 50.0mm, A: 0.50mm

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Туре	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
2.00	6.20	4.20	Unknown						

From (m)	rom To Thickness n) (m) (m)		Drillers Description	Geological Material	Comments
0.00	0.60	0.60	Fill; roadbase	Fill	
0.60	1.00	0.40	(Unknown); Geo Fabric, shell grit	(Unknown)	
1.00	2.40	1.40	Mud; med to dark	Mud	

https://realtimedata.waternsw.com.au/wgen/users/955fa8f693b347108cc14db5a87fa8cf/gw202982.agagpf org.wsr.htm?16038416...

L	2.40	3.40	1.00	Silt, Sandy	Silt	
Γ	3.40	5.90	2.50	Mud/Clay; silty, dark	Mud	
	5.90	6.20	0.30	Silty	Silt	

Remarks

19/08/2014: Form A Remarks:

Nat Carling, 5-May-2015; Coordinates based on location map provided with the Form-A.

*** End of GW202982 ***

GW202658

Licence:		Licence Status:	
		Authorised Purpose(s): Intended Purpose(s):	MONITORING BORE
Work Type:	Bore		
Work Status:	Equipped		
Construct.Method:	Auger - Solid		
Owner Type:	Mines		
Commenced Date: Completion Date:	19/07/1996	Final Depth: Drilled Depth:	2.20 m 2.20 m
Contractor Name:	McDermott Drilling		
Driller:	Unkown Unknown		
Assistant Driller:	Jamie		
Property:		Standing Water Level (m):	
GWMA: GW Zone:		Salinity Description: Yield (L/s):	
Site Details			

Site Chosen By:

		County Form A: NORTHUMBERLAND Licensed:	ParishCadastreNEWCA1//775775
Region:	20 - Hunter	CMA Map: 9232-2S	
River Basin: Area/District:	210 - HUNTER RIVER	Grid Zone:	Scale:
Elevation: Elevation Source:	0.00 m (A.H.D.) Unknown	Northing: 6361582.000 Easting: 384877.000	Latitude: 32°52'40.3"S Longitude: 151°46'09.7"E
GS Map:	-	MGA Zone: 56	Coordinate Source: GPS - Global

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Туре	From (m)	To (m)	Outside Diameter	Dutside Inside I Diameter Diameter		Details
				(,	(,	(mm)	(mm)		
1		Hole	Hole	0.00	2.20	140			Auger - Solid Flight
1		Annulus	Crushed Aggregate	0.00	2.20	140	58		Ungraded, PL:Poured/Shovelled
1	1	Casing	Pvc Class 18	0.00	0.70	58	50		Seated on Bottom, Screwed
1	1	Opening	Slots - Horizontal	0.70	2.20	58		0	Mechanically Slotted, PVC Class 18, Screwed, SL: 30.0mm, A: 0.50mm

Water Bearing Zones

	From (m)	To (m)	Thickness (m)	WBZ Туре	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
I	0.00	2.20	2.20	Unknown						

Ī	From	То	Thickness	Drillers Description	Geological Material	Comments
	(m)	(m)	(m)			
I	0.00	0.20	0.20	Sand; moist, brown, loose, silty (topsoil)	Sand	
Ī	0.20	0.40	0.20	Gravel; moist, grey, dense, coarse grained,	Gravel	
1						

https://realtimedata.waternsw.com.au/wgen/users/955fa8f693b347108cc14db5a87fa8cf/gw202658.agagpf_org.wsr.htm?16038402...

			with some sand & cobbles (slag fill)		
0.40	2.20	1.80	Sand; moist, light brown, medium grained, dense (dredged fill), varying to wet ~1.4m	Sand	

Remarks

19/07/1996: Form A Remarks: Nat Carling, 18-Feb-2013; All details were provided by client/consultant retrospectively.

*** End of GW202658 ***

GW202983

Licence:		Licence Status:	
		Authorised Purpose(s): Intended Purpose(s):	MONITORING BORE
Work Type:	Bore		
Work Status:	Equipped		
Construct.Method:	Jetted - Water		
Owner Type:	Private		
Commenced Date: Completion Date:	13/09/2014	Final Depth: Drilled Depth:	8.00 m 8.00 m
Contractor Name:	CARGILL AUSTRALIA		
Driller:	Andrew Forbes		
Assistant Driller:	Gareth Fitzgerald		
Property:		Standing Water Level (m):	
GWMA: GW Zone:		Salinity Description: Yield (L/s):	15.000
e Details			
te Chosen By:			

County

Darich

Cadastro

		Form A: Licensed:	NORTHUMBERLAND	NEWCA	2//858206
Region:	20 - Hunter	CMA Map:	9232-2S		
River Basin: Area/District:	210 - HUNTER RIVER	Grid Zone:		Scale	
Elevation: Elevation Source:	0.00 m (A.H.D.) Unknown	Northing: Easting:	6360995.000 384864.000	Latitude: Longitude:	32°52'59.4"S 151°46'08.9"E
GS Map:	-	MGA Zone:	56	Coordinate Source:	GPS - Global

Construction

Site

Site

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Туре	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details	
1		Hole	Hole	0.00	8.00	250	ĺ		Jetted - Water	
1		Annulus	Cement	0.00	0.50	250	100			
1		Annulus	Waterworn/Rounded	0.50	8.00	250	100		Graded, Q:0.500m3	
1	1	Casing	Pvc Class 12	0.00	6.00	100	94		Seated, Other	
1	1	Opening	Slots - Horizontal	5.00	6.00	100		0	Mechanically Slotted, PVC Class 12,	
									Other, SL: 500.0mm, A: 1.00mm	

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Туре	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
2.00	8.00	6.00	Unknown			15.00			

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	0.40	0.40	Fill; Cement	Fill	
0.40	1.40	1.00	Silt, Sandy	Silt	

https://realtimedata.waternsw.com.au/wgen/users/955fa8f693b347108cc14db5a87fa8cf/gw202983.agagpf_org.wsr.htm?16038416...

1.40	3.90	2.50 Mud; silty, Clay, dark	Mud	
3.90	4.20	0.30 Clay, silty; grey	Clay	
4.20	8.00	3.80 Mud, silty; Clay dark	Mud	

Remarks

13/09/2014: Form A Remarks: Nat Carling, 5-May-2015; GPS provided on the Form-A.

*** End of GW202983 ***

GW202984

Site

Site

Licence:		Licence Status:	
		Authorised Purpose(s): Intended Purpose(s):	MONITORING BORE
Work Type:	Bore		
Work Status:	Equipped		
Construct.Method:	Jetted - Water		
Owner Type:	Private		
Commenced Date: Completion Date:	13/09/2014	Final Depth: Drilled Depth:	8.00 m 8.00 m
Contractor Name:	CARGILL AUSTRALIA		
Driller:	Andrew Forbes		
Assistant Driller:	Gareth Fitzgerald		
Property:		Standing Water Level (m):	
GWMA: GW Zone:		Salinity Description: Yield (L/s):	0.500
e Details			
te Chosen By:			

		Co Form A: NO Licensed:		Parish NEWCA	Cadastre 2//858206
Region:	20 - Hunter	CMA Map:	9232-2S		
River Basin: Area/District:	210 - HUNTER RIVER	Grid Zone:		Scale:	
Elevation: Elevation Source:	0.00 m (A.H.D.) Unknown	Northing: Easting:	6360988.000 384928.000	Latitude: Longitude:	32°52'59.6"S 151°46'11.4"E
GS Map:	-	MGA Zone:	56	Coordinate Source:	GPS - Global

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Туре	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details	
1		Hole	Hole	0.00	8.00	250			Jetted - Water	
1		Annulus	Cement	0.00	0.50	250	100		PL:Poured/Shovelled	
1		Annulus	Waterworn/Rounded	0.50	8.00	250	100		Graded, Q:0.500m3, PL:Poured/Shovelled	
1	1	Casing	Pvc Class 12	0.00	6.00	100	94		Seated, Other	
1	1	Opening	Slots - Horizontal	3.00	6.00	100		0	Mechanically Slotted, PVC Class 12, Other	
									SL: 500.0mm, A: 0.50mm	

Water Bearing Zones

Frc (m)	om)	To (m)	Thickness (m)	WBZ Туре	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
	2.00	8.00	6.00	Unknown			0.50			

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	0.40	0.40	Fill; Cement	Fill	
0.40	1.40	1.00	Silt, Sandy	Silt	

 $https://realtimedata.waternsw.com.au/wgen/users/955 fa8f 693b 347108 cc 14d b5a87 fa8c f/gw 202984.agagp f_org.wsr.htm ?16038415 \ldots for the second state of the secon$

1.40	3.90	2.50 Mud, silty/Clay, dark	Mud	
3.90	4.20	0.30 Clay, silty; grey	Clay	
4.20	8.00	3.80 Mud, silty/Clay, dark	Mud	

Remarks

13/09/2014: Form A Remarks: Nat Carling, 5-May-2015; GPS provided on the Form-A.

*** End of GW202984 ***

GW202988

Licence:		Licence Status:	
		Authorised Purpose(s): Intended Purpose(s):	MONITORING BORE
Work Type:	Bore		
Work Status:	Equipped		
Construct.Method:	Auger - Solid		
Owner Type:	Private		
Commenced Date: Completion Date:	13/08/2012	Final Depth: Drilled Depth:	5.50 m 5.95 m
Contractor Name:	FICO Group		
Driller:	Daniel James Dudley		
Assistant Driller:	Shaun Currie		
Property:		Standing Water Level (m):	3.800
GWMA: GW Zone:		Salinity Description: Yield (L/s):	
Site Details			

Site Chosen By:

		Form A: Licensed:	County NORTHUMBERLAND	Parish NEWCA	Cadastre 1//775775
Region:	20 - Hunter	CMA Map:	9232-2S		
River Basin: Area/District:	210 - HUNTER RIVER	Grid Zone:		Scale:	
Elevation: Elevation Source:	0.00 m (A.H.D.) Unknown	Northing: Easting:	6361290.000 385374.000	Latitude: Longitude:	32°52'50.0"S 151°46'28.7"E
GS Map:	-	MGA Zone:	56	Coordinate Source:	GIS - Geogra

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Туре	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	5.95	150	, , , , , , , , , , , , , , , , , , ,		Auger - Solid Flight
1		Annulus	Bentonite	0.00	0.60	150	58		PL:Poured/Shovelled
1		Annulus	Waterworn/Rounded	0.60	5.50	150	58		Graded, PL:Poured/Shovelled
1		Backfill	Drilled Cutting	5.50	5.95	150			
1	1	Casing	Pvc Class 18	0.00	0.90	58	50		Seated on Bottom, Screwed
1	1	Opening	Slots - Horizontal	0.90	5.50	58		0	Mechanically Slotted, PVC Class 18, Screwed, SL: 30.0mm, A: 0.50mm

Water Bearing Zones

	From (m)	To (m)	Thickness (m)	WBZ Туре	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
ſ	0.00	5.95	5.95	Unknown	3.80					

	From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
	0.00	0.25	0.25	Fill; Asphalt	Fill	
- 1						

https://realtimedata.waternsw.com.au/wgen/users/955fa8f693b347108cc14db5a87fa8cf/gw202988.agagpf_org.wsr.htm?16038412...

0.25	3.50	3.25	Fill; generally light brown, medium grained sandy, trace shell inclusions, moist	Fill	
3.50	3.80	0.30	Fill; as above, increasing moisture	Fill	
3.80	5.35	1.55	Fill; as above, grey brown sand, trace to some shells, moist to wet	Fill	
5.35	5.95	0.60	Clay, Silty; soft, dark grey with trace sand	Clay	

Remarks

13/08/2012: Form A Remarks:

Nat Carling, 5-May-2015; GPS provided on Form-A was in wrong projection, coordinates based on location map provided with the Form-A. Backfill & lithology details were taken from sketch provided on consultants log.

*** End of GW202988 ***

GW202989

Licence:		Licence Status:	
		Authorised Purpose(s): Intended Purpose(s):	MONITORING BORE
Work Type:	Bore		
Work Status:	Equipped		
Construct.Method:	Auger - Solid		
Owner Type:	Private		
Commenced Date: Completion Date:	13/08/2012	Final Depth: Drilled Depth:	6.50 m 6.50 m
Contractor Name:	FICO Group		
Driller:	Daniel James Dudley		
Assistant Driller:	Shaun Currie		
Property:		Standing Water Level (m):	4.800
GWMA: GW Zone:		Salinity Description Yield (L/s):	
Site Details			

Site Chosen By:

		Form A: Licensed:	County NORTHUMBERLAND	Parish NEWCA	Cadastre 1//775775
Region:	20 - Hunter	CMA Map:	9232-2S		
River Basin: Area/District:	210 - HUNTER RIVER	Grid Zone:		Scale:	
Elevation: Elevation Source:	0.00 m (A.H.D.) Unknown	Northing: Easting:	6361274.000 385368.000	Latitude: Longitude:	32°52'50.5"S 151°46'28.5"E
GS Map:	-	MGA Zone:	56	Coordinate Source:	GIS - Geogra

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Туре	From (m)	To (m)	Outside Diameter	Inside Diameter	Interval	Details
						(mm)	(mm)		
1		Hole	Hole	0.00	6.50	150			Auger - Solid Flight
1		Annulus	Bentonite	0.00	0.40	150	58		PL:Poured/Shovelled
1		Annulus	Waterworn/Rounded	0.40	6.50	150	58		Graded, PL:Poured/Shovelled
1	1	Casing	Pvc Class 18	0.00	0.50	58	50		Seated on Bottom, Screwed
1	1	Opening	Slots - Horizontal	0.50	6.50	58		0	Mechanically Slotted, PVC Class 18,
									Screwed, SL: 30.0mm, A: 0.50mm

Water Bearing Zones

	From (m)	To (m)	Thickness (m)	WBZ Туре	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
I	0.00	6.50	6.50	Unknown	4.80					

From (m)	m To Thickness (m) (m)		Drillers Description	Geological Material	Comments
0.00	0.17	0.17	Fill; Concrete	Fill	
0.17	2.10	1.93	Fill; generally light brown, medium grained	Fill	

https://realtimedata.waternsw.com.au/wgen/users/955fa8f693b347108cc14db5a87fa8cf/gw202989.agagpf org.wsr.htm?16038414...

			sand, with trace gravel & shell inclusions, trace coal to approx 2.1m, moist		
2.10	4.00	1.90	Fill; as above, some gravel, cobbles & coal	Fill	
			reject		
4.00	4.60	0.60	Fill; as above, grey/brown, sand filling	Fill	
4.60	4.80	0.20	Fill; as above, trace rubber	Fill	
4.80	5.50	0.70	Fill; as above, wet	Fill	
5.50	6.10	0.60	Fill; as above, loose sand	Fill	
6.10	6.40	0.30	Clay, Silty Sandy; soft, grey	Clay	
6.40	6.50	0.10	Clay, Silty; stiff, grey	Clay	

Remarks

13/08/2012: Form A Remarks:

Nat Carling, 5-May-2015; GPS provided on Form-A was in wrong projection, coordinates based on location map provided with the Form-A. Lithology details were taken from sketch provided on consultants log.

*** End of GW202989 ***

GW202990

Licence:		Licence Status:	
		Authorised Purpose(s): Intended Purpose(s):	MONITORING BORE
Work Type:	Bore		
Work Status:	Equipped		
Construct.Method:	Auger - Solid		
Owner Type:	Private		
Commenced Date:	14/00/0010	Final Depth:	5.65 m
Completion Date:	14/06/2012	Drilled Depth:	5.05 11
Contractor Name:	FICO Group		
Driller:	Daniel James Dudley		
Assistant Driller:	Shaun Currie		
Dronortu		Standing Water Level	4 000
Property:		Standing water Level (m):	4.000
GWMA:		Salinity Description:	
Gw zone:		field (L/S):	
Site Details			

Site Chosen By:

		Form A: Licensed:	County NORTHUMBERLAND	Parish NEWCA	Cadastre 1//775775
Region:	20 - Hunter	CMA Map:	9232-2S		
River Basin: Area/District:	210 - HUNTER RIVER	Grid Zone:		Scale	:
Elevation: Elevation Source:	0.00 m (A.H.D.) Unknown	Northing: Easting:	6361287.000 385369.000	Latitude: Longitude:	: 32°52'50.1"S : 151°46'28.5"E
GS Map:	-	MGA Zone:	56	Coordinate Source:	: GIS - Geogra

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Туре	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	5.65	150			Auger - Solid Flight
1		Annulus	Bentonite	0.00	0.40	150	58		PL:Poured/Shovelled
1		Annulus	Waterworn/Rounded	0.40	5.65	150	58		Graded, PL:Poured/Shovelled
1	1	Casing	Pvc Class 18	0.00	0.50	58	50		Seated on Bottom, Screwed
1	1	Opening	Slots - Horizontal	0.50	5.65	58		0	Mechanically Slotted, PVC Class 18,
									Screwed, SL: 30.0mm, A: 0.50mm

Water Bearing Zones

	From (m)	To (m)	Thickness (m)	WBZ Туре	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
I	0.00	5.65	5.65	Unknown	4.00					

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	0.25	0.25	Fill; Asphalt	Fill	
0.25	2.50	2.25	Fill; generally light brown, medium grained	Fill	

https://realtimedata.waternsw.com.au/wgen/users/955fa8f693b347108cc14db5a87fa8cf/gw202990.agagpf org.wsr.htm?16038411...

			sandy, with trace shell inclusions, moist		
2.50	4.00	1.50	Fill; as above, from 2.5m, sand filling	Fill	
4.00	5.40	1.40	Fill; as above, from 4.0m wet grey/brown	Fill	
			sand filling		
5.40	5.65	0.25	Clay, Silty Sandy; dark grey	Clay	

Remarks

14/08/2012: Form A Remarks: Nat Carling, 5-May-2015; GPS provided on Form-A was in wrong projection, coordinates based on location map provided with the Form-A. Lithology details were taken from sketch provided on consultants log.

*** End of GW202990 ***

GW202991

Licence:		Licence Status:	
		Authorised Purpose(s): Intended Purpose(s):	MONITORING BORE
Work Type:	Bore		
Work Status:	Equipped		
Construct.Method:	Auger - Solid		
Owner Type:	Private		
Commenced Date: Completion Date:	14/08/2012	Final Depth: Drilled Depth:	5.60 m 5.95 m
Contractor Name:	FICO Group		
Driller:	Daniel James Dudley		
Assistant Driller:	Shaun Currie		
Property:		Standing Water Level (m):	4.000
GWMA:		Salinity Description:	
Gw zone:		field (L/S):	
Site Details			

Site Chosen By:

		County Form A: NORTHUMBERLAND Licensed:	ParishCadastreNEWCA1//775775
Region:	20 - Hunter	CMA Map: 9232-2S	
River Basin: Area/District:	210 - HUNTER RIVER	Grid Zone:	Scale:
Elevation: Elevation Source:	0.00 m (A.H.D.) Unknown	Northing: 6361296.000 Easting: 385359.000	Latitude: 32°52'49.8"S Longitude: 151°46'28.1"E
GS Map:	-	MGA Zone: 56	Coordinate Source: GIS - Geogra

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Туре	From (m)	To (m)	Outside Diameter	Inside Diameter	Interval	Details	
				(,	(,	(mm)	(mm)			
1		Hole	Hole	0.00	5.95	150			Auger - Solid Flight	
1		Annulus	Bentonite	0.00	0.40	150	58		PL:Poured/Shovelled	
1		Annulus	Waterworn/Rounded	0.40	5.60	150	58		Graded, PL:Poured/Shovelled	
1		Backfill	Drilled Cutting	5.60	5.95	150				
1	1	Casing	Pvc Class 18	0.00	0.60	58	50		Seated on Bottom, Screwed	
1	1	Opening	Slots - Horizontal	0.60	5.60	58		0	Mechanically Slotted, PVC Class 18,	
									Screwed, SL: 30.0mm, A: 0.50mm	

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Туре	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
0.0	5.95	5.95	Unknown	4.00					

From	To (m)	Thickness Drillers Description		Geological Material	Comments
0.00	0.15	0.15	Fill; generally brown, medium grained silty	Fill	

https://realtimedata.waternsw.com.au/wgen/users/955fa8f693b347108cc14db5a87fa8cf/gw202991.agagpf_org.wsr.htm?16038409...

			sandy topoil with some rootlets & organics, moist		
0.15	1.10	0.95	Fill; generally light brown, medium grained sandy filling with trace shell inclusions, moist	Fill	
1.10	4.00	2.90	Fill; as above, from 1.1m to 1.15m, gravel/cobbles	Fill	
4.00	5.50	1.50	Fill; as above, from 4m grey/brown sand filling with trace shells, wet	Fill	
5.50	5.60	0.10	Clay, Silty; dark grey with trace sand	Clay	
5.60	5.95	0.35	Clay, Silty; as above, from 5.6m no sand	Clay	

Remarks

14/08/2012: Form A Remarks:

Nat Carling, 5-May-2015; GPS provided on Form-A was in wrong projection, coordinates based on location map provided with the Form-A. Lithology & backfill details were taken from sketch provided on consultants log.

*** End of GW202991 ***

GW202992

Licence:		Licence Status:	
		Authorised Purpose(s): Intended Purpose(s):	MONITORING BORE
Work Type:	Bore		
Work Status:	Equipped		
Construct.Method:	Auger - Solid		
Owner Type:	Private		
Commenced Date: Completion Date:	14/08/2012	Final Depth: Drilled Depth:	5.60 m 5.95 m
Contractor Name:	FICO Group		
Driller:	Daniel James Dudley		
Assistant Driller:	Shaun Currie		
Property:		Standing Water Level (m):	4.000
GWMA: GW Zone:		Salinity Description: Yield (L/s):	
Site Details			

Site Chosen By:

		Form A: Licensed:	County NORTHUMBERLAND	Parish NEWCA	Cadastre 1//775775
Region:	20 - Hunter	CMA Map:	9232-2S		
River Basin: Area/District:	210 - HUNTER RIVER	Grid Zone:		Scale:	
Elevation: Elevation Source:	0.00 m (A.H.D.) Unknown	Northing: Easting:	6361300.000 385363.000	Latitude: Longitude:	32°52'49.6"S 151°46'28.3"E
GS Map:	-	MGA Zone:	56	Coordinate Source:	GIS - Geogra

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Туре	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	5.95	150			Auger - Solid Flight
1		Annulus	Bentonite	0.00	0.40	150	58		PL:Poured/Shovelled
1		Annulus	Waterworn/Rounded	0.40	5.60	150	58		Graded, PL:Poured/Shovelled
1		Backfill	Drilled Cutting	5.60	5.95	150			
1	1	Casing	Pvc Class 18	0.00	0.60	58	50		Seated on Bottom, Screwed
1	1	Opening	Slots - Horizontal	0.60	5.60	58		0	Mechanically Slotted, PVC Class 18, Screwed, SL: 30.0mm, A: 0.50mm

Water Bearing Zones

	From (m)	To (m)	Thickness (m)	WBZ Туре	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
Γ	0.00	5.95	5.95	Unknown	4.00					

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	0.15	0.15	Fill; generally brown, medium grained silty	Fill	

https://realtimedata.waternsw.com.au/wgen/users/955fa8f693b347108cc14db5a87fa8cf/gw202992.agagpf_org.wsr.htm?16038409...

			sandy topsoil filling, moist		
0.15	2.50	2.35	Fill; generally light brown, medium grained sandy filling with trace shell inclusions, moist	Fill	
2.50	4.00	1.50	Fill; as above, from 2.5 to 2.56m, trace coal ash	Fill	
4.00	5.40	1.40	Fill; as above, from 4m grey/brown sand filling, wet, @ 4.1m, some yellow concrete & shells found	Fill	
5.40	5.95	0.55	Clay, Silty; soft to firm, dark grey	Clay	

Remarks

14/08/2012: Form A Remarks:

Nat Carling, 5-May-2015; GPS provided on Form-A was in wrong projection, coordinates based on location map provided with the Form-A. Lithology & backfill details were taken from sketch provided on consultants log.

*** End of GW202992 ***

GW202993

Licence:		Licence Status:	
		Authorised Purpose(s): Intended Purpose(s):	MONITORING BORE
Work Type:	Bore		
Work Status:	Equipped		
Construct.Method:	Auger - Solid		
Owner Type:	Private		
Commenced Date: Completion Date:	14/08/2012	Final Depth: Drilled Depth:	6.20 m 6.45 m
Contractor Name:	FICO Group		
Driller:	Daniel James Dudley		
Assistant Driller:	Shaun Currie		
Property:		Standing Water Level (m):	4.600
GWMA: GW Zone:		Salinity Description: Yield (L/s):	
Site Details			

Site Chosen By:

		Form A: Licensed:	County NORTHUMBERLAND	Parish NEWCA	Cadastre 1//775775
Region:	20 - Hunter	CMA Map:	9232-2S		
River Basin: Area/District:	210 - HUNTER RIVER	Grid Zone:		Scale:	
Elevation: Elevation Source:	0.00 m (A.H.D.) Unknown	Northing: Easting:	6361275.000 385349.000	Latitude: Longitude:	32°52'50.4"S 151°46'27.7"E
GS Map:	-	MGA Zone:	56	Coordinate Source:	GIS - Geogra

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Туре	From	To (m)	Outside	Inside Diameter	Interval	Details
				(11)	(11)	(mm)	(mm)		
1		Hole	Hole	0.00	6.45	150			Auger - Solid Flight
1		Annulus	Bentonite	0.00	0.60	150	58		PL:Poured/Shovelled
1		Annulus	Waterworn/Rounded	0.60	6.20	150	58		Graded, PL:Poured/Shovelled
1		Backfill	Drilled Cutting	6.20	6.45	150			
1	1	Casing	Pvc Class 18	0.00	1.00	58	50		Seated on Bottom, Screwed
1	1	Opening	Slots - Horizontal	1.00	6.20	58		0	Mechanically Slotted, PVC Class 18,
									Screwed, SL: 30.0mm, A: 0.50mm

Water Bearing Zones

	From (m)	To (m)	Thickness (m)	WBZ Туре	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
I	0.00	6.45	6.45	Unknown	4.60					

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	0.05	0.05	Fill; generally brown silty sandy topsoil,	Fill	

https://realtimedata.waternsw.com.au/wgen/users/955fa8f693b347108cc14db5a87fa8cf/gw202993.agagpf_org.wsr.htm?16038408...

			abundant organics, moist		
0.05	1.00	0.95	Fill; generally light brown, medium grained sandy filling with trace shell inclusions, moist	Fill	
1.00	2.50	1.50	Fill; as above, from 1 to 1.05m, light green & blue slag cobbles	Fill	
2.50	3.50	1.00	Fill; as above, form 2.5m, dense sand filling, at approx 2.5m, light green slag cobble	Fill	
3.50	4.60	1.10	Fill; as above, from 3.5m, slight increase in moisture	Fill	
4.60	5.50	0.90	Fill; as above, from 4.6m, wet	Fill	
5.50	6.00	0.50	Fill; as above, from 5.5m, grey/brown sand filling	Fill	
6.00	6.45	0.45	Clay, Silty; soft, dark grey, with trace shells	Clay	

Remarks

14/08/2012: Form A Remarks:

Nat Carling, 5-May-2015; GPS provided on Form-A was in wrong projection, coordinates based on location map provided with the Form-A. Lithology & backfill details were taken from sketch provided on consultants log.

*** End of GW202993 ***

GW202994

Licence:		Licence Status:	
		Authorised Purpose(s): Intended Purpose(s):	MONITORING BORE
Work Type:	Bore		
Work Status:	Equipped		
Construct.Method:	Auger - Solid		
Owner Type:	Private		
Commenced Date: Completion Date:	14/08/2012	Final Depth: Drilled Depth:	6.00 m 6.00 m
Contractor Name:	FICO Group		
Driller:	Daniel James Dudley		
Assistant Driller:	Shaun Currie		
Property:		Standing Water Level (m):	4.500
GWMA: GW Zone:		Salinity Description: Yield (L/s):	
Site Details			

Site Chosen By:

		Form A: Licensed:	County NORTHUMBERLAND	Parish NEWCA	Cadastre 1//775775
Region:	20 - Hunter	CMA Map:	9232-2S		
River Basin: Area/District:	210 - HUNTER RIVER	Grid Zone:		Scale	:
Elevation: Elevation Source:	0.00 m (A.H.D.) Unknown	Northing: Easting:	6361275.000 385358.000	Latitude: Longitude:	: 32°52'50.5"S : 151°46'28.1"E
GS Map:	-	MGA Zone:	56	Coordinate Source:	: GIS - Geogra

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Туре	From (m)	To (m)	Outside Diameter	Inside Diameter	Interval	Details
						(mm)	(mm)		
1		Hole	Hole	0.00	6.00	150			Auger - Solid Flight
1		Annulus	Bentonite	0.00	0.60	150	58		PL:Poured/Shovelled
1		Annulus	Waterworn/Rounded	0.60	6.00	150	58		Graded, PL:Poured/Shovelled
1	1	Casing	Pvc Class 18	0.00	1.00	58	50		Seated on Bottom, Screwed
1	1	Opening	Slots - Horizontal	1.00	6.00	58		0	Mechanically Slotted, PVC Class 18,
									Screwed, SL: 30.0mm, A: 0.50mm

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Туре	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
0.00	6.00	6.00	Unknown	4.50					

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	0.17	0.17	Fill; concrete	Fill	
0.17	0.20	0.03	Fill; generally light brown, medium grained	Fill	

https://realtimedata.waternsw.com.au/wgen/users/955fa8f693b347108cc14db5a87fa8cf/gw202994.agagpf org.wsr.htm?16038411...

			sandy filling with trace shells & gravel inclusions, moist		
0.20	4.00	3.80	Fill; as above, from 0.2m to 0.4m, abundant gravel & cobbles, max diameter 0.05mm	Fill	
4.00	5.80	1.80	Fill; as above, from 4m, blue/black slag, refusal on SPT	Fill	
5.80	6.00	0.20	Clay, Silty; dark grey	Clay	

Remarks

14/08/2012: Form A Remarks:

Nat Carling, 5-May-2015; GPS provided on Form-A was in wrong projection, coordinates based on location map provided with the Form-A. Lithology details were taken from sketch provided on consultants log.

*** End of GW202994 ***
WaterNSW Work Summary

GW203212

Licence:		Licence Status:	
		Authorised Purpose(s): Intended Purpose(s):	DEWATERING (GROU
Work Type:	Bore		
Work Status:	Abandoned,Backfilled		
Construct.Method:	Jetted - Water		
Owner Type:	Private		
Commenced Date: Completion Date:	12/09/2014	Final Depth: Drilled Depth:	6.00 m 6.00 m
Contractor Name:	CARGILL AUSTRALIA		
Driller:	Andrew Forbes		
Assistant Driller:	Gareth Fitzgerald		
Property:		Standing Water Level	
GWMA: GW Zone:		Salinity Description: Yield (L/s):	
e Details			

Site Chosen By:

Site

		Form A: Licensed:	County NORTHUMBERLAND	Parish NEWCA	Cadastre 2//858206
Region:	20 - Hunter	CMA Map:	9232-2S		
River Basin: Area/District:	210 - HUNTER RIVER	Grid Zone:		Scale:	
Elevation: Elevation Source:	0.00 m (A.H.D.) Unknown	Northing: Easting:	6361018.000 384873.000	Latitude: Longitude:	32°52'58.6"S 151°46'09.3"E
GS Map:	-	MGA Zone:	56	Coordinate Source:	Unknown

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Туре	From	To (m)	Outside	Inside Diamotor	Interval	Details
					(11)	(mm)	(mm)		
1		Hole	Hole	0.00	6.00	250			Jetted - Water
1		Backfill	Concrete	0.00	0.40	250			
1		Backfill	Sand	0.40	6.00	250			
1		Annulus	Waterworn/Rounded	0.50	6.00	250	100		Graded, Q:0.500m3, PL:Poured/Shovelled
1	1	Casing	Pvc Class 12	0.00	6.00	100	94		Seated, Other
1	1	Opening	Slots - Horizontal	5.00	6.00	100		0	Mechanically Slotted, PVC Class 12, Other,
									SL: 500.0mm, A: 0.50mm

Water Bearing Zones

	From (m)	To (m)	Thickness (m)	WBZ Туре	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
ſ	2.00	6.00	4.00	Unknown						

Drillers Log

(m) (n	(m)	(m)	-	-	
0.00	0.40	0.40	Mud, mid to dark	Mud	

10/28/2020

https://realtimedata.waternsw.com.au/wgen/users/955fa8f693b347108cc14db5a87fa8cf/gw203212.agagpf org.wsr.htm?16038413...

0.40	1.40	1.00	Silt, sandy	Silt	
1.40	3.90	2.50	Mud/Clay, silty, dark	Mud	
3.90	4.20	0.30	Mud, silty	Mud	
4.20	6.00	1.80	Mud/Clay, silty, dark	Mud	

Remarks

12/09/2014: Form A Remarks:

Nat Carling, 27-May-2015; Coordinates based on location map provided with the Form-A.

*** End of GW203212 ***

Warning To Clients: This raw data has been supplied to the WaterNSW by drillers, licensees and other sources. WaterNSW does not verify the accuracy of this data. The data is presented for use by you at your own risk. You should consider verifying this data before relying on it. Professional hydrogeological advice should be sought in interpreting and using this data.

APPENDIX D:

Borehole Logs



LOCATION: LOT 152, RAVEN STREET, KOORAGANG

CLIENT:

NORTHROP CONSULTING ENGINEERS

PROJECT: PROPOSED INDUSTRIAL WAREHOUSE FACILITY JOB NO:

BOREHOLE NO:

BH01 1 OF 1

NEW20P-0171

LOGGED BY:

PAGE:

DATE:

12/1/21

BS

DR	DRILL TYPE: TRACK MOUNTED DRILL RIG SU BOREHOLE DIAMETER: 100 mm												
	Drill					111	DATC	JIVI:	F	ΠD	Field	t Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticit characteristics,colour,minor component	y/particle ts	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
		E 0.10m		-		GP	FILL: Sandy GRAVEL - fine to medium gra sub-angular to angular, pale grey to brown, ^{0.20m} medium grained sand trace fines of low play	ined, , fine to	D				FILL
		0.50m SPT 11, 17, 21 N* = 38 0.95m 1.00m E 1.10m		- 0.5 - - - - 1.0 - - - - - - - - - - - - - - - - - - -		SP	FILL: SAND - fine to medium grained, brow shells.	<u>asucuty.</u> /n, with	D - M				
AD/T		1.50m SPT 3, 3, 4 N* = 7 <u>1.95m</u> <u>2.00m</u> E 2.10m		1. <u>5</u> - - 2.0_ -		сн	Silty CLAY - medium to high plasticity, grey grey.		M > W _P	F/St	HP	100	ESTUARINE DEPOSITS
	•	2.50m SPT 7, 9, 11 N* = 20		- 2.5_ -		— — - СН	2.50m Silty Sandy CLAY - medium to high plastici dark grey, fine to medium grained sand. Clayey SAND - fine to medium grained, gre	 ty, grey to ey to dark	-		HP	55 65	
		2.95m 3.00m E 3.10m		3.0		SC	grey, fines of low to medium plasticity.						
.D.				3. <u>5</u> - -		SP	SAND - fine to medium grained, grey, with	shells.	W				ALLUVIUM
		4.00m E 4.10m		4.0			4.10m Hole Terminated at 4.10 m						
LEG	GEND:			Notes, Sa	mples a	nd Tes	Borehole Collapse	Consister	ncy			CS (kPa	a) Moisture Condition
	<u>ter</u> (Dat - Wat € Wat	ter Level te and time sh ter Inflow ter Outflow <u>anges</u>	nown)	U₅₀ CBR E ASS B Field Test	50mm Bulk s Enviro (Glass Acid S (Plast Bulk S	n Diame sample f onmenta s jar, se Sulfate S ic bag, a Sample	ter tube sample or CBR testing al sample aled and chilled on site) Soil Sample air expelled, chilled)	VS V S S F F St S VSt V H H Fb F	Yery Soft Fort Stiff Yery Stiff Iard Triable		<2 25 50 10 20 >4	25 5 - 50 0 - 100 00 - 200 00 - 400 00 - 400	D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit Density Index <15%
	G tra D st	radational or ansitional stra efinitive or dis trata change	ita stict	PID DCP(x-y) HP	Photo Dynar Hand	ionisatio nic pen Penetro	on detector reading (ppm) etrometer test (test depth interval shown) meter test (UCS kPa)	Density	L ME D VD	D D	ery LC pose ledium ense ery De	n Dense ense	Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 65 - 100%



CLIENT: NORTHROP CONSULTING ENGINEERS

LOCATION: LOT 152, RAVEN STREET, KOORAGANG

PROJECT: PROPOSED INDUSTRIAL WAREHOUSE FACILITY JOB NO:

BOREHOLE NO:

BH02 1 OF 1

NEW20P-0171

LOGGED BY:

PAGE:

DATE:

BS 12/1/21

D	RILL 1	L TYPE: TRACK MOUNTED DRILL RIG EHOLE DIAMETER: 100 mm							SURFACE RL: DATUM: AHD					
F	Dril	ling and San	nolina				Material description and profile information		<i></i>		Field	d Test		
			iping			N				≻	TICK			
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATIC SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity characteristics,colour,minor component	//particle s	MOISTURE CONDITION	CONSISTENC DENSITY	Test Type	Result	Structure and additional observations	
		E 0.10m 0.50m SPT 2, 1, 1 N* = 2		- - - 0.5_ -		GC	FILL: Clayey Sandy GRAVEL - fine to medi grained, sub angular to angular, brown to grey-brown, fine to coarse grained sand, fin to medium plasticity.	um ies of low	М				FILL	
		N = 2		-		ML	FILL: SILT - low plasticity, white to pale grey some crystalline material, possibly gypsum.	y, with	M < w					
		0.95m 1.00m SPT		1. <u>0</u>		SP	FILL: SAND - fine to medium grained, brow	n.						
AD/		3, 4, 6 N* = 10		-		СН	FILL: CLAY - medium to high plasticity, brov brown.	wn to dark	_ D - IVI	VSt	HP HP	270 330		
		1.45m		1.5		SP	FILL: SAND - fine to medium grained, grey grey, with some black, with trace glass.	to dark	M - M		ΗP	250		
_		E 1.60m 2.00m E 2.10m			××××	SP	SAND - fine to medium grained, brown. Becoming brown to pale brown.		W				ALLUVIUM7 POSSIBLE FILE	
				-			Hole Terminated at 2.20 m Borehole Collapse							
	GGEND: ater ⊆ War (Da — War	ter Level te and time sh ter Inflow ter Outflow	nown)	2.5 2.5 3.0 3.0 - - - - - - - - - - - - - - - - - - -	mples a 50mm Bulk s Envirc (Glass Acid S (Plasti	nd Tes Diame ample t jar, se ulfate \$ c bag, 1	Set to the sample or CBR testing I sample aled and chilled on site) to il Sample air expelled, chilled)	Consister VSVV SSS FFS StSVSVV H F	ncy fery Soft Soft firm fery Stiff fard		U <22 500 10 20 24	CS (kPa 55 5- 50 0 - 200 00 - 2000 00 - 2000	 Moisture Condition D Dry M Moist W Wet Wp, Plastic Limit W_L Liquid Limit 	
: <u>St</u>	trata Changes B Bulk Sample Gradational or transitional strata Field Tests PID Photoionisation detector reading (ppm)			Fb F Density	riable V L	Ve	ery Lo oose	ose	Density Index <15% Density Index 15 - 35%					
	transitional strata Definitive or distict DCP(x-y) Dynamic penetrometer test (test depth interval shown) strata change HP Hand Penetrometer test (UCS kPa)				MC D VD) M De Ve	ediun ense ery De	n Dense ense	 Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100% 					



ENGINEERING LOG - BOREHOLE

CLIENT: NORTHROP CONSULTING ENGINEERS

LOCATION: LOT 152, RAVEN STREET, KOORAGANG

PROJECT: PROPOSED INDUSTRIAL WAREHOUSE FACILITY JOB NO:

BOREHOLE NO:

BH03

1 OF 1 NEW20P-0171

BS

LOGGED BY:

PAGE:

DATE:

									DA	TE:	12/1/21		
DR BO	ILL 1 REH	YPE: Ole diam	TR/	ACK MO :	SURFACE RL: 100 mm DATUM:								
	Dril	ling and Sam	npling				Material description and profile information				Field	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity characteristics,colour,minor component	y/particle ts	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
				-			Asphalt.		D				ASPHALT
		0.25m E 0.35m 0.50m		- - 0.5_		 ML	0.25m FILL: SILT - low plasticity, white to pale grey some crystalline material, possibly gypsum	y, with	M < W				 FILL
		12, 20, 25 N* = 45		-		 SP	FILL: SAND - fine to medium grained, pale yellow-brown.	brown to	D				
		0.95m		1.0		SP	FILL: SAND - fine to medium grained, grey grey-brown, trace fine grained angular grav	 to el, with	D - M				
		1.50m SPT				SP	FILL: SAND - fine to medium grained, brow FILL: SAND - fine to medium grained, brow brown with some grey-brown, trace fine gra sub-rounded to sub-angular gravel, with sh	n to dark ined, ells.	D				
AD/T		8, 10, 10 N* = 20 <u>1.95m</u> <u>2.00m</u> E 2.10m		- - 2. <u>0</u> -			1.60m SAND - fine to medium grained, grey to dar grey-brown.	_ — — — —	M				ALLUVIAL — — — — — — — — — — — — — — — — — — —
		2.50m SPT 3, 5, 6 N* = 11		2. <u>5</u> -		SP	Becoming brown to pale brown.		M - M				
	•	2.95m 3.00m (3.10m (3.50m E (3.60m)		3. <u>0</u> - - - - - - - - - - - - - - - - - - -			Becoming brown to grey-brown.		w				
		4.00m E		- 4.0_		 SP	3.80m SAND - fine to coarse grained, grey with so grey-brown.		_				
		4.10m		-	-		Hole Terminated at 4.10 m Borehole Collapse						
	Eer Wat (Da Wat Wat Wat Mata Ch Ch Ch Ch Ch Ch Ch Ch Ch Ch Ch Ch Ch C	ter Level te and time sh ter Inflow ter Outflow anges radational or ansitional stra efinitive or dis	nown) ata stict	I Notes, Sa U ₅₀ CBR E ASS B Field Tes: PID DCP(x-y) HP	mples a 50mm Bulk s Envirc (Glass Acid S (Plasti Bulk S Bulk S ts Photo Dynar Hand	nd Tes Diame ample f onmenta s jar, se sulfate \$ c bag, a c bag, a	ter tube sample for CBR testing al sample aled and chilled on site) Soil Sample air expelled, chilled) on detector reading (ppm) etrometer test (test depth interval shown) meter test (UCS kPa)	Consiste VS VS F F St S VSt V Fb F Density	/ ency /ery Soft Soft Firm Stiff /ery Stiff Hard Friable V L ME	V Lu D M	<u>U(</u> <2 25 50 10 20 >4 ery Lo cose ledium	25 5 - 50 6 - 100 10 - 200 10 - 200 10 - 400 100 100 100 100 100 100 100	 Moisture Condition D Dry



BOREHOLE DIAMETER:

DRILL TYPE:

ENGINEERING LOG - BOREHOLE

CLIENT:

TRACK MOUNTED DRILL RIG

NORTHROP CONSULTING ENGINEERS

BOREHOLE NO:

BH04 1 OF 1

PROJECT: PROPOSED INDUSTRIAL WAREHOUSE FACILITY JOB NO: NEW20P-0171 LOCATION: LOT 152, RAVEN STREET, KOORAGANG LOGGED BY: BS DATE: 12/1/21 OUNTED DRILL RIG SURFACE RL: DATUM: AHD Material description and profile information Field Test attractions Structure and additional observations Material description and profile information Field Test attractions BS Structure and additional observations Material description and profile information Field Test Structure and additional observations Structure and additional observations Material description and profile information Field Test Structure and additional observations Material description and profile information Field Test Structure and additional observations Material description and profile information Field Test Structure and additional observations Output Structure and additional observations De-M De-M Field Test Structure and additional observations De-M De-M Field Test Field Test Sp Fill Structure and additional observations De-M De-M Field Test	С	LIENT	: 1	NORTHRO	OP CONSULTING ENG	SINEERS	PA	GE:			1 OF 1			
LOCATION: LOT 152, RAVEN STREET, KOORAGANG DATE: BS DATE: 12/1/21 OUNTED DRILL RIG 100 mm DATUM: AHD Material description and profile information TH U U U U U U U U U U U U U	Ρ	ROJE	CT:	PROPOSE	ED INDUSTRIAL WARE	EHOUSE FACILITY	′ JO	B NO:	:		NEW20P-0171			
DATE: 12/1/21 OUNTED DRILL RIG 100 mm SURFACE RL: DATUM: AHD Material description and profile information Field Test Material description and profile information Batterial associations Material description and profile information Field Test Material description and profile information Field Test Batterial description and profile information Batterial associations Material description and profile information Field Test Batterial description and profile information Batterial associations Batterial description and profile information Batterial associations Batterial description and profile information Batterial associations Batterial description Batterial description Batterial descri	L	OCATI	ON: 1	LOT 152, I	RAVEN STREET, KOO	RAGANG	LO	GGED	ЭBY	:	BS			
OUNTED DRILL RIG 100 mm SURFACE RL: DATUM: AHD Material description and profile information Field Test Material description and profile information BATUM: Material description BATUM: Material description Material description GP FILL: Sandy GRAVEL - fine to medium grained, sub-angular to angular, grey-brown to brown, fine to medium grained, angular to angular gravel. M SP FILL: Gravelly SAND - fine to medium grained, angular gravel. M SP FILL: SAND - fine to medium grained, brown and pale brown, with shells. M							DA	TE:			12/1/21			
100 mm DATUM: AHD Image: transmission of the transmission of the transmission of transmissin of transmission of	0	UNTEI	D DR	ILL RIG		SURFACE RL:								
Image: Material description and profile information Field Test Image: Material description and profile information Image: Material description and posterial strange information Image: Material description and posterial strangerial strangerial strangerial strangerial s		100 m	m			DATUM:	A	HD						
H OFFOR MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components NOL GROUP Structure and additional observations H OFFOR GP FILL: Sandy GRAVEL - fine to medium grained, sub-angular to angular, grey-brown to brown, fine to medium grained, sub-angular to angular, grey-brown to brown, fine to medium grained, sub-angular to sub-angular gravel. D - M M FILL: SAND - fine to medium grained, angular to sub-angular gravel. M 5 FILL: SAND - fine to medium grained, pale brown, with shells. FILL: SAND - fine to medium grained, brown and pale brown, with shells. M Image: Sand Sand Sand Sand Sand Sand Sand Sand				Materi	al description and profile inf	ormation			Fiel	d Test				
GP FILL: Sandy GRAVEL - fine to medium grained, sub-angular to angular, grey-brown to brown, fine to medium grained sand, trace fines of low plasticity. D - M SP FILL: Gravelly SAND - fine to medium grained, angular to sub-angular gravel. M 5 FILL: SAND - fine to medium grained, brown and pale brown, with shells. M	H	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATER	IAL DESCRIPTION: Soil typ characteristics,colour,minor o	e, plasticity/particle components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations			
			GP 	FILL sub-: 	: Sandy GRAVEL - fine to m angular to angular, grey-bro um grained sand, trace fine : Gravelly SAND - fine to me n, fine grained, angular to s : SAND - fine to medium gra brown, with shells.	iedium grained, wn to brown, fine to <u>s of low plasticity.</u> edium grained, ub-angular gravel. ained, brown and	D - M M				FILL			

		Drill	ing and San	npling				Material description and profile information				Field Test		
-	METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity characteristics,colour,minor component	y/particle ts	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
-			E (0.10m SPT 8, 10, 12 N* = 22		- - - - - - - -		GP SP	FILL: Sandy GRAVEL - fine to medium grai sub-angular to angular, grey-brown to brow medium grained sand, trace fines of low pla FILL: Gravelly SAND - fine to medium grain 0.40m brown, fine grained, angular to sub-angular FILL: SAND - fine to medium grained, brow pale brown, with shells.	ined, m, fine to asticity. ed, gravel. n and	D - M M				FILL
			0.95m 1.00m SPT 2, 5, 5 N* = 10 <u>1.45m</u> E 1.60m		- 1. <u>0</u> - - - 1. <u>5</u> - - - - - - - - - - -		SP			М				
0.0.000 Datgel Lab and In Situ Tool	AD/T		2.00m E 2.10m 2.50m SPT 2, 3, 9 N* = 12		2.0_ - - - - - - - - - - - - - - - - - - -		сн	2.00m CLAY - medium to high plasticity, grey and	dark grey.	M > Wp	F / St	HP HP HP HP	120 110 170 150 100	ESTUARINE DEPOSITS
3PJ < <drawingfile>> 15/02/2021 16:24 1</drawingfile>		•	<u>5:00m</u> E (<u>3.10m</u>) <u>3.50m</u> E (<u>3.60m</u>)		3. <u>0</u> - - 3. <u>5</u>		SP	SAND - fine to medium grained, grey, trace low plasticity, trace fine grained, sub-rounde Becoming brown and pale brown.	fines of ed gravel.	M - M				ALLUVIAL
TEST PIT NEW20P-0171 LOGS.0			4.00m E (4.10m /		4.0			4.10m Hole Terminated at 4.10 m Borehole Collapse						
Log NON-CORED BOREHOLE - 1	LEG <u>Wat</u>	END: er (Dat Wat Wat Wat	er Level te and time sl er Inflow er Outflow anges radational or	hown)	Notes, Sa U₅ CBR E ASS B Field Tes	mples a 50mm Bulk s Envirc (Glass Acid S (Plasti Bulk S ts	nd Tesi Diame ample f onmenta s jar, se sulfate s c bag, a c bag, a c bag, a	ter tube sample ter tube sample for CBR testing al sample aled and chilled on site) Soil Sample air expelled, chilled)	Consister VS V S S F F St S VSt V H H Fb F Density	hcy ery Soft oft irm tiff ery Stiff ard riable V	Vi	U 2 2 50 10 20 20	CS (kPa 25 5 - 50 0 - 100 00 - 200 00 - 400 400	Moisture Condition D Dry M Moist W Wet W _ρ Plastic Limit W _L Liquid Limit Density Index <15%
QT LIB 1.1.GLB		tra Do St	ansitional stra efinitive or dis rata change	ata stict	PID DCP(x-y) HP	Photo Dynar Hand	ionisatio nic pen Penetro	on detector reading (ppm) etrometer test (test depth interval shown) ometer test (UCS kPa)		L ME D VD	La D M D D V	ediun ediun ense ery D	n Dense	Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%



CLIENT: NORTHROP CONSULTING ENGINEERS

LOCATION: LOT 152, RAVEN STREET, KOORAGANG

PROJECT: PROPOSED INDUSTRIAL WAREHOUSE FACILITY **JOB NO:**

BOREHOLE NO:

BH05 1 OF 1

NEW20P-0171

LOGGED BY:

PAGE:

DATE:

BS	
22/2/21	

D	RILL T OREH	YPE: OLE DIAM	TR ETEF	АСК МО २:	UNTE 100 m	D DR m	ILL RIG S	URFACE RL: ATUM:	A	AHD.			
	Dril	ling and Sam	pling				Material description and profile informat	ion			Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, pla characteristics,colour,minor comp	sticity/particle onents	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
РТ		E 0.20m E 0.80m 1.50m E 1.75m		0.5 - - - - - - - - - - - - - - - - - - -		GP SP	FILL: Sandy GRAVEL - fine to medium sub-rounded to sub-angular, brown, fin grained sand. FILL: SAND - fine to medium grained, brown with shells.	brown to pale	D - M				FILL
		E 2.00m		2.0		CH	<u>2.00m</u> <u>SAND</u> fine to medium grained, gray		- M - M				
	GGEND: GGEND: Water Water Water Water Water Water Water Water Market Water Market	ter Level te and time sh ter Inflow ter Outflow anges	nown)	2.5 2.5 3.0 3.0 3.5 3.5 - - - - - - - - - - - - - - - - - - -	mples a 50mm Bulk s Enviro (Glass Acid S (Plast Bulk S	nd Tes maple Diame ample Sulfate : ic bag, Sample	2.10m SAND - time to medium grained, grey, Hole Terminated at 2.10 m Limit Of Required Investigation Limit Of Required Investigation Solution ts terminated at 2.10 m ts terminated at 2.10 m	VS VS V S S St S VS V H H Fb Doosity	mcy /ery Soft Soft /ery Stiff /ery Stiff -frable		<u>U</u> <2 5 5 10 20 20 20	CS (kP# 25 5 - 50 0 - 2000 0 - 2000 100	a) <u>Moisture Condition</u> D Dry M Moist W Wet W _L Liquid Limit Density Index <15%
	rata Changes B Gradational or Field T transitional strata PID Definitive or distict DCP(x. strata change HP			PID DCP(x-y) HP	Photo Dynar Hand	ionisati nic pen Penetro	on detector reading (ppm) etrometer test (test depth interval shown) ometer test (UCS kPa)		L D VD	La D M D D	bose lediun ense <u>ery</u> D	n Dense ense	Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%



ENGINEERING LOG - BOREHOLE

CLIENT: NORTHROP CONSULTING ENGINEERS

LOCATION: LOT 152, RAVEN STREET, KOORAGANG

PROJECT: PROPOSED INDUSTRIAL WAREHOUSE FACILITY JOB NO:

BOREHOLE NO:

BH06 1 OF 1

NEW20P-0171

LOGGED BY:

PAGE:

DATE:

DF	DRILL TYPE: TRA BOREHOLE DIAMETER: Drilling and Sampling				UNTE	D DRI	ILL RIG SUR	FACE RL:	Δ	нп		
	Drill	ing and San					Material description and profile information	J IVI.	~		Field Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plastici characteristics,colour,minor componer	ty/particle ts	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type Result	Structure and additional observations
awingFile>> 02003/2021 10:27 10:01:00 10 Datget Lab and in Situ Tool PT PT PT ME THO	WATEF	SAMPLES E 0.30m 0.50m E 0.75m E 0.90m 1.00m E 1.30m 1.60m E 2.10m	RL (m)	DEPTH (m) 		CLASSFICA Sb SVMB01 SVMB01 SVMB01	MATERIAL DESCRIPTION: Soil type, plastici characteristics, colour, minor componer sub-rounded to sub-angular, brown, fine to grained sand. 	ty/particle ts ained, p medium yn, with vn, with rown to wn to dark <u></u> wn with	$M > w_{p} \left \overline{A} M < w_{p} \right = \mathbf{Z} \qquad M \leq w_{p} \qquad \mathbf{Z} \qquad M \leq w_{p} \qquad \mathbf{Z} \qquad \mathbf{M} \leq w_{p} \qquad \mathbf{Z} \qquad \mathbf{W} \leq w_{p} \qquad \mathbf{W} \qquad $	CONSISTEI	Test Type Result	FILL ESTUARINE DEPOSITS
OTLIB 11.1.GLB Log NON-CORED BOREHOLE - TEST PIT NEW20P-0171 LOGS.GPJ < <dr< th=""><th>GEND: ter ? Wat (Dat - Wat ata Cha ata Cha tra tra tra tra tra tra tra tra tra tr</th><th>er Level e and time sl er Inflow er Outflow anges radational or ansitional stra efinitive or dis rata change</th><th>nown) ata</th><th></th><th>mples a 50mm Bulk s Envirse (Glasti Bulk S (Plasti Bulk S ts Photoi Dynan Hand</th><th>nd Tes Diame ample f onmenta i jar, se c bag, a iample ionisatir nic pen- Penetro</th><th>ts ter tube sample for CBR testing al sample alade and chilled on site) Soil Sample air expelled, chilled) on detector reading (ppm) etrometer test (test depth interval shown) ometer test (UCS kPa)</th><th>Consiste VS S S St St St VSt VSt H H Fb Fb Density</th><th>Pincy /erry Soft Firm Soft /erry Stiff -lard Friable V L MD D V D V D</th><th>Vé Lo D</th><th>UCS (kPa <25 25 - 50 50 - 100 100 - 200 200 - 400 >400 Pary Loose pose edium Densa ense ary Dense</th><th>a) <u>Moisture Condition</u> D Dry M Moist W Wet W_p Plastic Limit W_L Liquid Limit Density Index <15% Density Index 15 - 35% a Density Index 35 - 65% Density Index 85 - 85% Density Index 85 - 100%</th></dr<>	GEND: ter ? Wat (Dat - Wat ata Cha ata Cha tra tra tra tra tra tra tra tra tra tr	er Level e and time sl er Inflow er Outflow anges radational or ansitional stra efinitive or dis rata change	nown) ata		mples a 50mm Bulk s Envirse (Glasti Bulk S (Plasti Bulk S ts Photoi Dynan Hand	nd Tes Diame ample f onmenta i jar, se c bag, a iample ionisatir nic pen- Penetro	ts ter tube sample for CBR testing al sample alade and chilled on site) Soil Sample air expelled, chilled) on detector reading (ppm) etrometer test (test depth interval shown) ometer test (UCS kPa)	Consiste VS S S St St St VSt VSt H H Fb Fb Density	Pincy /erry Soft Firm Soft /erry Stiff -lard Friable V L MD D V D V D	Vé Lo D	UCS (kPa <25 25 - 50 50 - 100 100 - 200 200 - 400 >400 Pary Loose pose edium Densa ense ary Dense	a) <u>Moisture Condition</u> D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit Density Index <15% Density Index 15 - 35% a Density Index 35 - 65% Density Index 85 - 85% Density Index 85 - 100%



CLIENT: NORTHROP CONSULTING ENGINEERS

LOCATION: LOT 152, RAVEN STREET, KOORAGANG

PROJECT: PROPOSED INDUSTRIAL WAREHOUSE FACILITY JOB NO:

BOREHOLE NO:

BH07 1 OF 1

NEW20P-0171

LOGGED BY:

PAGE:

DATE:

D	RILL 1	YPE:	TR/	ACK MO	UNTEI	D DRI	LL RIG SURF	ACE RL:	۵	ЧП			
	Dril	ling and San	nplina		100 111		Material description and profile information	111.	~		Field	Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity characteristics,colour,minor component	//particle s	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
T PIT NEW20P-0171 LOGS GPJ < <drawingfile>> 0203/2021 10:27 10.01.00.01 Dage! Lab and in Situ Tool PT PT</drawingfile>		E 0.25m 0.40m E 0.70m 1.40m E 1.70m 1.80m 1.80m E 1.95m				GP ML SP CH SCH SP	FILL: Sandy GRAVEL - fine to medium grained sand. 0.25m FILL: Silt - low to medium plasticity, pale brown FILL: SAND - fine to medium grained, brown Pale brown.	ned, medium	D - M M > W M				FILL / AEOLIAN DEPOSITS
	GEND: GEND: GEND: GEND: (Da' (ter Level te and time sl ter Inflow ter Outflow anges radational or ansitional stra efinitive or dis	nown) tta stict	Notes, Sar U ₅₀ CBR E ASS B Field Test PID DCP(x-y) HP	mples ar 50mm Bulk s: Enviro (Glass Acid S (Plasti Bulk S s Photoi Dynan Hand I	nd Test Diame ample f nmenta jar, se ulfate S c bag, a ample onisationic pen-	ter tube sample for CBR testing al sample aled and chilled on site) Soil Sample air expelled, chilled) on detector reading (ppm) etrometer test (test depth interval shown) ometer test (UCS kPa)	Consister VS V S S F F St S VSt V H H Fb F Density	ncy Very Soft irm itiff very Stiff lard v L ME D	Ve Lc D Mi	UC <2 25 50 10 20 >4 ery Lo pose edium ense	CS (kPa) 5 - 50 - 100 0 - 200 0 - 400 00 ose	Moisture Condition D Dry M Moist W Wet Wp, Plastic Limit W_L Liquid Limit Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85%



NORTHROP CONSULTING ENGINEERS

LOCATION: LOT 152, RAVEN STREET, KOORAGANG

PROJECT: PROPOSED INDUSTRIAL WAREHOUSE FACILITY **JOB NO:**

BOREHOLE NO:

BH08 1 OF 1

NEW20P-0171

LOGGED BY:

PAGE:

DATE:

D	RILL 1		TR		UNTE	D DR	ILL RIG	SURF	ACE RL:					
B	JREH		IETE	R:	100 m	m		DATU	M:	A	HD			
	Dril	ling and Sar	npling		<u> </u>	T	Material description	and profile information				Field	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIF characteristics	PTION: Soil type, plasticity s,colour,minor component	/particle s	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
		E 0.25m				ĞP	FILL: Sandy GRA sub-rounded to su grained sand.	VEL - fine to medium graii ıb-angular, brown, fine to ı	ned, medium	м				FILL
		E 0.55m		0.5		, ML	0.35m FILL: Silt - low to n white.		own to	M < W				
		E 0.85m 0.90m		-		SP	FILL: SAND - fine brown, with shells.	to medium grained, brown	n to pale	D - M				
Ы		E 1.20m		1. <u>0</u>		СН	CLAY - medium to with some red-bro	high plasticity, dark grey- wn.	 -brown	M > Wp				ESTUARINE DEPOSITS
			- - 1. <u>5</u> -			SAND - fine to me brown. Pale grey.	dium grained, dark grey t	o dark					ALLUVIAL	
				- - 2.0_			Grey.			D - M				
				-	-	1	Hole Terminated a	at 2.10 m Investigation						
				2.5	- - -									
				3. <u>0</u>	-									
Þ				3.5	-									
				4.0	-									
				-										
LE	GEND:	:	L]	Notes, Sa	imples a	Ind Tes	its		Consiste	ency	I	U	CS (kPa	Moisture Condition
Wa	ater				50mm Bulk e	1 Diame	er tube sample		VS V	Very Soft Soft		<2 25	25 5 - 50	D Dry M Moist
	Wat	ter Level	hown	E	Enviro	onment	al sample		FI	Firm		50) - 100	W Wet
	(⊔a — Wa	ter Inflow	now(1)	ASS	(Glass Acid S	s jar, se Sulfate ∶	aled and chilled on site) Soil Sample		St St St St	Stiff Verv Stiff		10 20)0 - 200)0 - 400	W _p Plastic Limit
-	◀ Wa	ter Outflow			(Plast	ic bag,	air expelled, chilled)		н	Hard		>4	100	
<u>St</u>	Strata Changes B			B Field Tes	Bulk S ts	3ample			Fb F Densitv	Friable V	Ve	ervic	ose	Density Index <15%
—	— —- Gradational or transitional strata			PID	Photo	ionisati	on detector reading (ppm)			L	Lc	pose		Density Index 15 - 35%
_	D sí	efinitive or dis trata change	stict	DCP(x-y) HP	Dynar Hand	nic pen Penetro	etrometer test (test depth in ometer test (UCS kPa)	terval shown)		ME D) M De	ediun ense	n Dense	e Density Index 35 - 65% Density Index 65 - 85%
5	51									VD	Ve	ery De	ense	Density Index 85 - 100%



CLIENT: NORTHROP CONSULTING ENGINEERS

LOCATION: LOT 152, RAVEN STREET, KOORAGANG

PROJECT: PROPOSED INDUSTRIAL WAREHOUSE FACILITY JOB NO:

BOREHOLE NO:

BH09

1 OF 1 NEW20P-0171

LOGGED BY:

PAGE:

DATE:

D	RILL I	TYPE:	TR.		UNTE	D DR	ILL RIG SURF.	ACE RL:	۵	п		
	Dri	lling and San	nplina				Material description and profile information		<i></i>		Field Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity characteristics, colour, minor components	/particle s	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type Result	Structure and additional observations
		E 0.20m 0.30m E 0.70m 0.95m		0.5		GP ML	FILL: Sandy GRAVEL - fine to medium grain sub-rounded to sub-angular, brown, fine to r grained sand. 0.30m FILL: Silt - low to medium plasticity, pale brow white. FILL: SAND - fine to medium grained, pale t pale grey-white, with shells. Becoming brown to grey-brown.	ned, medium /wn to // / prown to	D - M v E D - M			FILL / AEOLIAN DEPOSITS
PT		E 1.30m 1.60m E 1.90m		1. <u>5</u> - - - - - - - - - - - - - - - - - - -		SP	Becoming dark grey to dark brown. Becoming pale grey to white.		М			
	GEND: ater ⊆ Wa (Da – Wa ◀ Wa	ter Level te and time si ter Inflow ter Outflow	hown)	2.5 2.5 3.0 3.0 - - - - - - - - - - - - - - - - - - -	mples a 50mm Bulk s Enviro (Glass Acid S (Plast	nd Tes Diame ample siar, se ic bag,	Hole Terminated at 2.10 m Limit Of Required Investigation	Consister VS V S S F F St S VSt V H H	ncy ery Soft oft ery Stiff ery Stiff		UCS (kPa <25 25 - 50 50 - 100 100 - 200 200 - 400 >400	 Moisture Condition D Dry M Moist W Wet W_P Plastic Limit W_L Liquid Limit
				PID PID DCP(x-y) HP	Photo Dynar Hand	ionisati nic pen Penetro	on detector reading (ppm) etrometer test (test depth interval shown) ometer test (UCS kPa)	<u>Density</u>	V L MC D VD	Vi La D D Vi	ery Loose bose edium Dense ense ery <u>D</u> ense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%



CLIENT: NORTHROP CONSULTING ENGINEERS

LOCATION: LOT 152, RAVEN STREET, KOORAGANG

PROJECT: PROPOSED INDUSTRIAL WAREHOUSE FACILITY **JOB NO:**

BOREHOLE NO:

BH10 1 OF 1

NEW20P-0171

LOGGED BY:

PAGE:

DATE:

DF			TR	АСК МО		D DR	LL RIG SURI	ACE RL:				
ВС				C.	100 m	m	Material description and profile information	JWI:	A	HD	Field Test	
-		ing and San	npiing			z	Material description and prolife information					-
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATIOI SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticit characteristics,colour,minor componer	y/particle ts	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type Result	Structure and additional observations
Ы		E 0.25m E 0.80m 1.15m E 1.45m E 1.60m				GP ML SP CH	FILL: Sandy GRAVEL - fine grained, sub-rounded gravel, brown, fine to coarse sand. 0.32m Dark brown. FILL: Silt - low to medium plasticity, pale brownite. FILL: SAND - fine to medium grained, grey with shells. Pale grey to pale brown. Brown with some dark brown. Dark brown. 1.45m CLAY - medium to high plasticity, dark brown. SAND - fine to medium grained, white to provide the plant of	ngular to grained / own to/ -brown,/ -brown,/ ale brown.	D - M M D - M M			FILL - ROADBASE
_							2.10m Hole Terminated at 2.10 m					
				2.5 			Limit Of Required Investigation					
	GEND: ter (Dat - Wat ■ Wat ata Cha tra 5 5	er Level e and time sl er Inflow er Outflow anges radational or ansitional stra efinitive or dis rata change	hown) ata stict	Notes, Sa U ₅₀ CBR E ASS B Field Test PID DCP(x-y) HP	50mm Bulk s Envirc (Glass Acid S (Plasti Bulk S Bulk S S Photo Dynar Hand	nd Tes Diame ample onmenta jar, se Sulfate S c bag, c bag,	IS ter tube sample or CBR testing il sample aled and chilled on site) soil Sample air expelled, chilled) on detector reading (ppm) etrometer test (test depth interval shown) meter test (UCS kPa)	Consiste VS F St VSt H Fb Fb Density	very Soft Soft Firm Stiff Hard Friable V L D VD	Vi Lc D M Vi	UCS (kP <25 25 - 50 50 - 100 100 - 20 200 - 40 >400 ery Loose edium Dens ense ery Dense	a) Moisture Condition D Dry M Moist W Wet) W _p Plastic Limit) W _L Liquid Limit Density Index <15% Density Index 35 - 65% Density Index 85 - 85% Density Index 85 - 100%



CLIENT: NORTHROP CONSULTING ENGINEERS

LOCATION: LOT 152, RAVEN STREET, KOORAGANG

PROJECT: PROPOSED INDUSTRIAL WAREHOUSE FACILITY JOB NO:

BOREHOLE NO:

BH11 1 OF 1

22/2/21

BS

NEW20P-0171

LOGGED BY:

PAGE:

DATE:

D	RILL 1		TR/	ACK MO		D DRI	LL RIG SURF	ACE RL:	•				
В	JREH			•	100 m	m	DATU		Α	HD			
	Dril	ling and Sar	npling			_	Material description and profile information				Field	Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity characteristics,colour,minor component	y/particle is	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
		E 0.45m				GP	FILL: Sandy GRAVEL - sub-rounded to sub fine to medium grained, dark grey with trace fine to coarse grained sand, trace coal. Brown.	o-angular, e black,	D				FILL
		E 0.90m		-		ML	FILL: Silt - low to medium plasticity, pale brownite.	own to	M < w _p				
		1.00m		1. <u>0</u>		SP _	1.00m FILL: SAND - fine to medium grained, brown brown, with some orange-brown CLAY - medium to high plasticity, dark brow	n to pale / n with	D A				ESTUARINE DEPOSITS
		E 1.35m		-		Сн	some grey and red-brown.		Š				
ΡŢ				- 1. <u>5</u> -			SAND - fine to medium grained, dark grey- with some coarse grained sand.	brown,					ALLUVIUM
lool				2.0			Grey.						
Datgel Lab and In Situ				- 2. <u>5</u> -		SP	Pale grey.		W				
21 10:27 10.01.00.01				- - 3.0_			With some fines of low plasticity. Grey to dark grey.						
< <drawingfile>> 02/03/20</drawingfile>				- - 3. <u>5</u> -			Limit Of Required Investigation						
VEW20P-0171 LOGS.GPJ				- 4.0									
TEST PIT 1				-									
	GEND: ater (Da – Wa d Wa rata Ch	ter Level te and time s ter Inflow ter Outflow <u>anges</u>	hown)	Notes, Sa U ₅₀ CBR E ASS B <u>Field Test</u>	mples a 50mm Bulk s Enviro (Glass Acid S (Plasti Bulk S	nd Test Diame ample f onmenta jar, se jar, se culfate S c bag, a cample	s ter tube sample or CBR testing Il sample aled and chilled on site) Soil Sample air expelled, chilled)	ConsisterVSVSSFFStSVStVHHFbFDensity	rery Soft oft irm tiff ery Stiff ard riable V	Ve	25 25 50 100 200 >40	5 5 - 50 - 100 0 - 200 0 - 400 00	Moisture Condition D Dry M Moist W Wet Wp Plastic Limit WL Liquid Limit
QT LIB 1.1.GLB	tr D si	ansitional stra efinitive or dis trata change	ata stict	PID DCP(x-y) HP	Photoi Dynan Hand	ionisatio nic pene Penetro	on detector reading (ppm) etrometer test (test depth interval shown) meter test (UCS kPa)		L MC D VD	Lo M De Ve	oose edium ense ery De	Dense	Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%



ENGINEERING LOG - BOREHOLE

CLIENT: NORTHROP CONSULTING ENGINEERS

LOCATION: LOT 152, RAVEN STREET, KOORAGANG

PROJECT: PROPOSED INDUSTRIAL WAREHOUSE FACILITY JOB NO:

BOREHOLE NO:

BH12 1 OF 1

NEW20P-0171

LOGGED BY:

PAGE:

DATE:

	DR BO	ILL T RFH	ΥΡΕ: ΟΙ Ε ΠΙΔΝ	TR/	ACK MO	UNTEI	D DRI m	ILL RIG	SURFACE RL:	Δ	ЛНП			
┢		Drill	ing and San	nplina	-			Material description and profile info	rmation	~		Fiel	d Test	
-	METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type characteristics,colour,minor co	e, plasticity/particle omponents	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
r Pfr NEW20P-0171 LOGS GPJ < <chrakingfile>> 02003/2021 10:27 10:0100.01 Bagel Lab and in Situ Tool</chrakingfile>	PT		E 0.30m E 0.80m 0.90m E 1.25m 1.32m E 1.60m				GP SP CH	FILL: Sandy GRAVEL - fine grain sub-rounded gravel, brown, fine to sand. FILL: SAND - fine to medium grai brown with shells. Brown, trace fine grained, sub-rou gravel. 1.25m CLAY - medium to high plasticity, some grey and red-brown. SAND - fine to medium grained, g Pale brown to white. 2.10m Hole Terminated at 2.10 m Limit Of Required Investigation	ed, sub-angular to o coarse grained ned, brown to pale anded to rounded dark brown with rey-brown.	D - M				FILL - ROADBASE FILL FILL ESTUARINE DEPOSITS ALLUVIUM
B Log NON-CORED BOREHOLE - TE	LEG Wat	END: er (Dat ∀Vat Wat Wat Wat G	er Level e and time sl er Inflow er Outflow anges radational or	hown)	Notes, Sa U ₅₀ CBR E ASS B Field Test	mples an 50mm Bulk s Enviro (Glass Acid S (Plasti Bulk S	nd Test Diame ample f nmenta jar, se ulfate S c bag, a ample	ts ter tube sample for CBR testing al sample aled and chilled on site) Soil Sample air expelled, chilled)	Consist VS S F St VSt H Fb Density	Very Soft Soft Firm Stiff Very Stiff Hard Friable V	 Ve	U 25 50 10 20 >4	CS (kPa 25 5 - 50 0 - 100 00 - 200 00 - 200 00 - 400 400) Moisture Condition D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit Density Index <15%
at LIB 1.1.GLE		tra Do	ansitional stra efinitive or dis rata change	ata stict	PID DCP(x-y) HP	Photoi Dynan Hand I	onisatio nic pene Penetro	on detector reading (ppm) etrometer test (test depth interval shown) ometer test (UCS kPa)		L ME D VD	Lo M De Ve	oose ediun ense ery D	n Dense ense	Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%



CLIENT: NORTHROP CONSULTING ENGINEERS

LOCATION: LOT 152, RAVEN STREET, KOORAGANG

PROJECT: PROPOSED INDUSTRIAL WAREHOUSE FACILITY JOB NO:

BOREHOLE NO:

BH13 1 OF 1

BS

NEW20P-0171

LOGGED BY:

PAGE:

DATE:

22/2/21

I	drii Bof	LL T REH(YPE: OLE DIAM	TRA IETER	CK MO	UNTEI 100 m	D DRI m	ILL RIG SURF/ DATU	ACE RL: M:	Д	HD		
		Drill	ing and San	npling				Material description and profile information				Field Test	
	MEIHOU	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity characteristics,colour,minor components	/particle	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type Result	Structure and additional observations
			E 0.15m		-		GP	FILL: Sandy GRAVEL - fine grained, sub-an sub-rounded gravel, brown, fine to coarse gi sand.	gular to rained	D - M			FILL - ROADBASE
			0.30m E 0.75m		- 0.5_ -			FILL: Silt - low to medium plasticity, pale bro white.	wn to	M < w _P			FILL
ł	۲ ۲		1.15m		- 1.0		SP	FILL: SAND - fine to medium grained, browr shells.	n, trace	м			
			E <u>1.45m</u>		- - 1. <u>5</u> - -		СН	CLAY - medium to high plasticity, dark brown some grey and red-brown.	n with	M > w _P			ESTUARINE DEPOSITS
					2.0		 SP	2.00m		м			
tu Tool					-			Hole Terminated at 2.10 m Limit Of Required Investigation					
og NON-CORED BOREHOLE - TEST PIT NEW20P-0171 LOGS.GPJ ≪DrawingFile>> 02/03/2021 10:27 10:01:00:01 Datgel Lab and In 9		END: Watt Watt Watt a Cha	er Level e and time sh er Inflow er Outflow anges	nown)	2.5_ 2.5_ - 3.0 - 3.0 - - - - - 4.0 - - - - - - - - - - - - - - - - - - -	mples ar 50mm Bulk s Enviro (Glass Acid S (Plasti Bulk S	nd Tesi Diame ample f nmenta jar, sea ulfate S c bag, a ample	ts ter tube sample for CBR testing al sample aled and chilled on site) Soil Sample air expelled, chilled)	Consister VS V S S F F St S VSt V H H Fb F	ncy /ery Soft iirm iirm fery Stiff łard rirable		UCS (kPa <25 25 - 50 50 - 100 100 - 200 200 - 400 >400	 Moisture Condition D Dry M Moist W Wet W, Plastic Limit W Liquid Limit
QT LIB 1.1.GLB L	Strata Changes Gradational or transitional strata Definitive or distict strata change			ta stict	Field Test PID DCP(x-y) HP	s Photoi Dynan Hand I	onisatio nic pene Penetro	on detector reading (ppm) etrometer test (test depth interval shown) ometer test (UCS kPa)	<u>Density</u>	V L MD D VD	Ve Lo Di Ve	ery Loose pose edium Dense ense ery Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%



CLIENT: NORTHROP CONSULTING ENGINEERS

LOCATION: LOT 152, RAVEN STREET, KOORAGANG

PROJECT: PROPOSED INDUSTRIAL WAREHOUSE FACILITY JOB NO:

BOREHOLE NO:

BH14 1 OF 1

NEW20P-0171

LOGGED BY:

PAGE:

DATE:

22/2/21

BS

DR	ILL T	YPE:	TR	АСК МО	UNTE	D DR	RILL RIG SURF	ACE RL:				
BO	REH		IETEF	R:	100 m	m	DATU	IM:	A	HD		
	Drill	ing and San	npling				Material description and profile information				Field Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticit characteristics,colour,minor componen	y/particle Is	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type Result	Structure and additional observations
Ы		E 0.30m E 0.80m 0.95m E 1.35m 2.00m E 2.30m		0.5 0.5 		GP ML GP SP	2.00m FILL: Sandy GRAVEL - fine grained, sub-a 0.15m sub-rounded gravel, brown, fine to coarse grand. FILL: Silt - low to medium plasticity, pale brown wite. Fill FILL: Sandy GRAVEL - fine grained, sub-a sub-rounded gravel, brown, fine to coarse grand. FILL: Sandy GRAVEL - fine grained, sub-a sub-rounded gravel, brown, fine to coarse grand. FILL: SAND - fine to medium grained, brow Dark brown with shells. Dark brown with shells. Dark brown with shells. 205m CLAY - medium to high plasticity, dark brow SAND - fine to medium grained, dark grey. Grey-brown. Grey. Grey.	ngular to grained // /i pwn to // /i ngular to // grained / // m.	D - M			FILL - ROADBASE FILL - ROADBASE / FILL / FILL / FILL / ESTUARINE DEPOSITS / / ALLUVIUM //
	END: er (Dat Wat Wat ta Cha	er Level e and time sł er Inflow er Outflow anges	nown)		mples a 50mm Bulk s Envirc (Glass Acid S (Plast Bulk S	nd Tes Diam ample inment i jar, sa ulfate c bag, ample	Hole Terminated at 3.10 m Limit Of Required Investigation sts eter tube sample for CBR testing tal sample ealed and chilled on site) Soil Sample air expelled, chilled)	Consister VS V S S F F St S VS V H H Fb F	ncy ery Soft oft irm tiff ery Stiff iard riable		UCS (kPa <25 25 - 50 50 - 100 100 - 200 200 - 400 >400	Moisture Condition D Dry M Moist W Wet Wp Plastic Limit WL Liquid Limit
	rata Changes B Gradational or transitional strata Field T Definitive or distict strata change DCP(x- HP				<u>ts</u> Photo Dynar Hand	ionisati nic per Penetr	ion detector reading (ppm) netrometer test (test depth interval shown) rometer test (UCS kPa)	<u>Density</u>	V L MD D VD	Ve Lo Me De Ve	ry Loose ose dium Dense nse ry Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%



CLIENT: NORTHROP CONSULTING ENGINEERS

LOCATION: LOT 152, RAVEN STREET, KOORAGANG

PROJECT: PROPOSED INDUSTRIAL WAREHOUSE FACILITY JOB NO:

BOREHOLE NO:

BH15 1 OF 1

NEW20P-0171

LOGGED BY:

PAGE:

DATE:

	DR	ILL T	YPE:	TR	ACK MC	DUNTE	D DR	ILL RIG SURF	ACE RL:				
	BO	REH		IETEI	R:	100 m	ım	DATU	M:	A	HD		
		Drill	ing and San	npling			_	Material description and profile information				Field Test	
	METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity characteristics,colour,minor component	ı/particle s	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type Result	Structure and additional observations
			E 0.20m				GP	FILL: Sandy GRAVEL - fine to medium graii sub-angular to sub-rounded gravel, grey-bro 0.20m to medium grained sand.	ned, own, fine	D			FILL - ROADBASE
					0.5		SP	FILL: SAND - fine to medium grained, brow	n.	D - M			FILL
			<u>0.55m</u> E		-		<u>SP</u>	^{0.55m} FILL: SAND (cemented) - fine to medium gr brown. FILL: SAND - fine to medium grained, grey-	rained, / brown.				
	Ţ		0.90m		1.0		×	Pale grey.					
ľ			E				SP	Pale grey to pale brown.		м			
			<u>1.40m</u>		1.5		×	Brown. Brown to pale brown.					
			1.75m E		2.0		сн	1.75m CLAY - medium to high plasticity, dark grey brown with some red-brown.	 and dark	> Wp			ESTUARINE DEPOSITS
			2.10m		-			2.10m		2			
					2.5 3.0 3.5 4.0			Limit Of Required Investigation					
		END: er (Dat (Dat Wat Wat	er Level e and time sl er Inflow er Outflow	hown)	I Notes, S U₅₀ CBR E ASS B	amples a 50mn Bulk s Enviro (Glas Acid s (Plast Bulk s	n Diame ample sample onmenta s jar, se Sulfate s ic bag, Sample	ts ter tube sample for CBR testing al sample aled and chilled on site) Soil Sample air expelled, chilled)	Consister VS V S S F F St S VSt V H H Fh F	Lery Soft oft irm tiff ery Stiff ard riable	I	UCS (kPa <25 25 - 50 50 - 100 100 - 200 200 - 400 >400	a) <u>Moisture Condition</u> D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit
	<u>ətra</u>	Water Outliow B Field T Gradational or transitional strata Definitive or distict strata change HP				Photo Dynai Hand	ionisati nic pen Penetro	on detector reading (ppm) etrometer test (test depth interval shown) ometer test (UCS kPa)	<u>Density</u>	V L ME D VD	V La D M	ery Loose cose ledium Dense ense ery Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 65 - 80%

APPENDIX E:

Data Validation Report

QA/QC DATA VALIDATION REPORT Job No: NEW20P-0171AD - VALIDATION

Eurofins report: 776003-AID, 776003-S_report, 775980-W

1. SAMPLE HANDLING

Item	Yes/No	Comments
Were the sample holding times met?	Yes	
Were the samples in proper custody between collection in the field and reaching the laboratory?	Yes	
Were the samples properly and adequately preserved?	Yes	
Were the samples received by the laboratory in good condition?	Yes	

Sampling Handling was:

Satisfactory :	\checkmark	Partially Satisfactory:	Unsatisfactory:

2. PRECISION AND ACCURACY ASSESSMENT

Item	Yes/No	Comment
Was a NATA registered laboratory used?	Yes	-
Did the laboratory perform the requested tests?	Yes	-
Were the laboratory methods adopted NATA endorsed?	Yes	-
Were the appropriate test procedures followed?	Yes	-
Were the reporting limits satisfactory?	Yes	-
Was the NATA seal on the reports?	Yes	-
Were the reports signed by an authorised person?	Yes	-

Laboratory Precision and Accuracy was:

Satisfactory : \checkmark	Partially Satisfactory:	Unsatisfactory:

3. FIELD QA/QC

Soil and Sediment Samples

	Soil
No. Samples Analysed	15
No. of Duplicates	1
No. of Triplicates	0
No. of Wash Blanks	0
No. of Trip Blanks	0
No. of Trip Spikes	0

No. Days Sampling

ltem	Soil
Number of Days Sampling	2
Number of Sampling Events	2

Field Duplicates

Item	Yes/No	Comments
Were an adequate number of field	Voc	Intra duplicates collected at a rate of
duplicates collected?	res	1 per 15 samples.
Were RPDs within control limits?		
No Limit for 5-10 x EQL and 30% for >10 x	Yes	
EQL		

Trip Blanks/Trip Spikes

Item	Yes/No	Comments
Were an adequate number of trip blanks and trip spikes collected?	No	Trip blanks and trip spikes were not collected. Taking into account field observations (odours, PID readings), the lack of trip blank/spike samples is not considered to affect the outcome of the assessment.
Were the trip blanks free of contaminants? (If no, comment whether the contaminants present are also detected in the samples and whether they are common laboratory chemicals).	N/A	
Were the trip spikes within recovery limits (between 80% and 120%)	N/A	

Rinsate Samples

ltem	Yes/No	Comments
Were an adequate number of rinsate samples used? (1 per day of using reusable sampling equipment – trowel, hand auger etc)	N/A	No re-useable sampling equipment was used, therefore wash black sample was not required.
Were the rinsate samples free of contaminants? (If no, comment whether the contaminants present are also detected in the samples and whether they are common laboratory chemicals).	N/A	

4. LABORATORY INTERNAL QUALITY CONTROL PROCEDURES

A) Type of QA/QC Sample	Yes/No	Comments
Laboratory Blanks/Reagent Blanks (at least 1 per batch)	Yes	
Laboratory Duplicates (at least 1 per batch or 1 per 10 samples)	Yes	
Matrix Spikes, Matrix Spike Duplicates (1 for each soil type)	Yes	
Laboratory Control Spike	Yes	
Surrogate (where appropriate)	Yes	

Item	Yes/No	Comments
B) Were the laboratory blanks and/or reagent blanks free of contamination?	Yes	
C) Were the spike recoveries within control limits? I: Organics/inorganics/metals (50% to 150%) II: Phenols (20% to 130%)	Yes	
D) Were the RPDs of the laboratory duplicates within control limits?	No	Laboratory duplicates in batch 776003 for Arsenic (36%) and Chromium (98%) and duplicate in batch 775980 for Nickel (43%). The lab code Q15 was quoted: "The RPD reported passes Eurofins mgt's QC – Acceptance Criteria as defined in the internal Quality Control Review and Glossary page of this report";
E) Were the surrogate recoveries within control limits?	Yes	

Laboratory Internal QA/QC was:

· · · · · · · · · · · · · · · · · · ·	Satisfactory : √	Partially Satisfactory:	Unsatisfactory:
---------------------------------------	------------------	-------------------------	-----------------

5. DATA USABILITY

ltem	Yes/No	Comments
Was the data directly usable?	Yes	
Was the data usable with the following corrections/modifications? (see comments)	NA	
Was the data not usable?	NA	

APPENDIX F:

Laboratory Documents

Q\$3009_RT0

Madified by:	Eurofin		-	Metho		10	æ		÷.	an a	-sin	4	3	N	-	7			S						
Dr. R Symons Approved by: G.	is Environment Testing	commenty over only	orstony lies Oak	od of Shipment													Quote ID Ne	Purchase Order	pecial Directions	Phone Ng	2	Contact Name	Address	company	
Jockson Approved on: 8 August 2019	Australia Pty Ltd	Received By	Received By	Courier (#		BH06 1.85-2.1	BH06 1.6-1.8	BH06 1.0-1.3	BH06 0.75-0.90	BH06 0.5-0.75	BH06 0.0-0.3	BH05 1.75-2.0	BH05 1.5-1.75	BH05 0.5-0.8	BH05 0.0 - 0.2	Client Sample ID	180622QUAN-1					Libby Batz	8 Ironbark Close Warabrook	Qualtest	CHAIN OF CUSTO Eurotine Environment Testing /
			SUL) 🛛 Han	Total C	22/2/21	22/2/21	22/2/21	22/2/21	22/2/21	22/2/21	22/2/21	22/2/21	22/2/21	22/02/21	Sampled Date/Time dd enifyyth.orm							(NSW 2304		DY RECORD
				d Delivered	ounts	SOIL	SOIL.	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	Matrix Solid (S) Water (W)	Where	metals are rea	Analys prested, please	es e specify "	Total" o	"Filtered"	Proj	P	
		SYD BN	SYD BN		2						×			×				PAHs	. Metals	dinact of	JARE DIR	ang	ect Name	oject N₂	Unit F3 02 990
	-		HE MEL	Post	4								T.	×			Asl	bestos (pres	ence/absen	ce)			g	N	y Laborat Bid.F 16 M 0 8400 Er
	۵. ۱.	PER AD	PER	<u>8</u>	4					- 2				×				Suite B1 T	RH, BTEX				E, KOOR	W20P-01	ory ars Road La wiroSample
	ibmission of	5 (NI-	Nam																			IGANG	7	ne Cove We NSW@eurol
	samples to t		DRW																						st NSW 206 fins.com
	Signatu he laborator	2	Sionatu	5/0		-																			
, 110 an 110	re v will be dee		3	5	-								-												Brisbar Unit 1 21 07 3902
an and an	hined as ann		1	é -				1					1							-			EDD ESdal	Projec	19 Laborat 1 Smallwood 4600 Env
abratice of the		4	-																				Format EQUIS etc	t Manage	ory Piace Mura iroSampleQ
Laonara EN		Ż	2	Signatu								_											Exce	Lipp	rrie QLD 417 LD@eurofin
vaconment T		2	200	5	4									-									-	y Batz	72 s.com
sting Stand	Date	Date	10m	6	-																				П
ard Terms a	-	N	- {	>_	_						_														Perth La Unit 2 91 08 9251 9
nd Condition	1 1	12/2/			-																-				boratory Leach Highv 600 Envir
s unless ag	-	21				-4																			ray Kewdale oSampleWA
and otherw	Time	Time	Date													51	00mL Plas	stic			Email	Email	Hande	Sa	WA 6105 @eurofins.c
GC A CODA		1							-							12	25mL Plas	itic		c	or Result	for Invoid	ad over b	npler(s)	8
k available		er.	23													40	mL VOA v	vial	a type of so	ontainers	ت ه	in and a second	У		
N and a second		307	いい	N		-	-	-		ь ,				_	-	500m	nL PFAS B	Bottle	Ze II A ces	S	bybetz@	ICCOUR		Silly Sno	
V #		Cuc	-	0				-	• •	•	•				-	Other (Asbesto	olass of H is AS4964, V	NA Guideline	(8)	n@quaire	qualtest	nts@q		W	Melbourn Monterey
	Report	Tempera	Tim			Ľ				1						/ Dang			2	Req	.com.au e	ualtes			Road Danc
Int	No.	sture	0													Sample erous Go	lays. Stan	me day	Default well	u pillysno. uired Tur	mmacolei	t.com.a		NAIduteco	ory tenong Sou
7		9.8	1:30pt													e Comments pods Hazard Wa	ndard)	 I daya 	be 5 days if not took •Surcharge w	w@qualtest.com rnaround Time	man@qualtest.co	au		c@eurotins.com	uth VIC 3175
			1				-									rning	•	1 1	fil apply	,au (TAT)	un.au				

urofins Environment Testin	fills and finance.	Laboratory Use Only	Method of Shipment		10	••	•	1	G	cn	•	ω	2	-	2	Quote ID Nº	Purchase Order	Special Directions		Dhome No	Contact Name	Address		Company	
g Australia Pty Ltd	Received By	Received By	Courier (#		BH09 0.3-0.7	BH09 0.0-0.2	BH08 0.9-1.2	BH08 0.55-0.85	BH08 0.25-0.55	BH08 0.0-0.25	BH07 1.8-1.95	BH07 1.4-1.7	BH07 0.4-0.7	BH07 0.0-0.25	Client Sample ID	180622QUAN-1					Libby Betz	8 Ironbark Close Warabrook		Qualtest	HAIN OF CUSTO
			_	Tot	22/2/24	22/2/21	22/2/21	22/2/21	22/2/21	22/2/21	22/2/21	22/2/21	22/2/21	22/02/21	Sampled Date/Time dd irmlyy fhann							NSW 2304			DY RECORD
	NS	NS	Hand Delivered	al Counts	SOIL	soil	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	Matrix Solid (S) Water (W)	Whare	metals are SUITE cor	Anal e requested, ple se must be used	yses ase specify I to attract (r "Total" SUITE or	or "Filterer icing:			Project	S 5 9
	BNE I	I BNE I		N		×				^				×			PA	Hs, Metals						15	dney Labo It F3 Bld.F 10 9900 8400
		MEL PER	Postal	N		×								×		As	bestos (p	presence/abs	ence)			EUE, NO		NEW20P	6 Mars Road EnviroSan
Submis	ANY	ADL				~								~			Suite B	IT IRH, BTE	X			2 PORODAIN		-0171	I Lane Cove npleNSW@e
sion of samp		NTL DRW	Name													_									West NSW purofins.com
les to the lat	2	S	8:1										_												2066
gnature boratory will		gnature	~								-														Unit 07.3
be deemed at			205														_					ES4	ŋ <u>1</u>	D	bane Labor 1 21 Smallwo 902 4600 E
s acceptance			٢																			at. EOulS etc	ect Inanag ID Format	orf Manna	atory od Place Mur inviroSample
of Eurofins			Signa																			Exo		Ē	arrie QLD 41 QLD@eurofi
Environmen			iture							5												<u>e</u>	y Betz		72 18.com
Dat		Dat	5																						П
3 Indend Term	1		Ž																						Perth La Unit 2 911 08 9251 9
a and Consi			r																						Iboratory Leach High 600 Envir
Ninne Imilae													-												way Kewdal oSampteW/
		_	-								-				51	DomL Pla	astic		- _?	Ema	Ēma	Han	50		e WA 610
ime	5	ima)ate									-			12	25mL Pla	istic		ange con	il for Re	il for In	ded ov	ampler		
	-														200m	L Ambe	r Glass	6.15	Cont: tainer typ	sults	voice	er by	(s)		
			2	-				-			-				40	mL VOA	vial		ainers é & size	step	ac ac		8		
		j	N	10	-	<u>44</u>	-	-	-	-	-	-	-	-	500n Jar (1	nL PFAS Glass or	Bottle		f hecess	hcullen	COUN		y Snov	ę	
			2-	CN	-			-	-		1	4	-		Other (Asbesto	a AS4964	WA Gui	delines)	NÝ	Qqualt	ts@q			0004 00	elbourn Monteray
Report Ne	armeraduse r	Tama	Time												Sample (/ Dangerous Good	5 days (Standa Other	2 days	Overnight (rep	Required Turna Default will be 5	est.com.au billysnow@	ualtest.com.au			2007 Envirosampievic@e	10 Laboratory
		1	1:30												Comments ds Hazard Warning	ard)	□ 1 day♦	 Surcharge will apply orting by 9am) 	around Time (TAT) 5 days if not ticked	n@qualtest.com.au }qualtest.com.au				surotians.com	/IC 3175

	Laboratory Use On	lethod of Shipment		10	9	8	7	6	5	•	4	N	-	Ŧ	Quote ID Nº	Purchase Order	Special Directions	Phone Nº	Contact Name		Address	Company	
Received By	Received By	Courier (#		BH12 0.0-0.15	BH11 1.0 - 1.35	BH11 0,45-0.9	BH11 0.0-0.45	BH10 1.45-1.6	BH10 1.15-1.45	BH10 0.5-0.8	BH10 0.0 - 0.25	BH09 1.6-1.9	BH09 0.95-1.3	Client Sample ID	180622QUAN-1				Libby Betz		8 Ironbark Close Warabrook N	Qualtest	and a state of the second state of the state
		-	Tol	22/2/21	22/2/21	22/2/21	22/2/21	22/2/21	22/2/21	22/2/21	22/2/21	22/2/21	22/02/21	Sampled Date/Time d4.tem/yy bt.nem							SW 2304		1 TO POST AND AN
		Hand Delivered	al Counts	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	Matrix Solid (S) Water (W)	Where	e metals ar SUITE ce	Analy e requested plea de must be used	' SeS lise specify to attract S	"Total" or UITE prici	Filtered*	Project	Proje	ľ
SYD BN	SYD BN		*	×			×				×		×			P/	AHs, Metals				Name	ct Ng	UZ 2300 04
E MEL	E MEL	Post	u	×			×						×		As	ibestos (presence/abse	ence)			EJE, I	NEW	
PERA	PERIA	8	1.1	×			×						×			Suite (31 TRH. BTEX	(KOORAG	20P-0171	osampievo
di nti	DL NTL	Nai																			ANG		wwwwwww
DRW	DRW	Πe									3.5												1S.CORI
Sigr	Sigr	1:B																	_				
lature	hature	5	57																arr U alea, any				07 390
		35	11.2																		52 E	Proj	2 4600
		S														- 1					DD Format tat. EQuis ei	ect Manaç	InviroSample
		Sig												100000							, m	yer L	QLD@eurc
ļ		inature														* **********					cel	oby Betz	fins.com
		6																					
Date	Date	3						+					_										08.9
-		r																					251 9600
		1								-				1.16									EnviroSan
-															innel P	lastia		-					pleWA@e
Tim	Tim	Dat								-					250mL P	lastic		Change	Email fo	Email fo	Handed	Sam	urofins.con
	u		_	_					_	_	_			1	25mL P	lastic		Containe	Result	r Invoic	over by	oler(s)	-
		2												4	OmL VO	er Glass A vial		ntainer r type & s	o,	•			
		2	-											500	mL PFA	S Bottle		ize if neus	bbybetz lephculi	locon		3illy Sn	
		2-	0	-	-	-	-	-	-	-	-	-		Jar Other (Achor	(Glass o	r HDPE)	(delle se)	vrezer	@qualte en@qua	nts@		WC	03 8564
	Te															-, WA GU		_	Itest.com.	qualt			5000 E
Report No	antereduce	Time											1	Sample angerous Goo	5 days (Stand Other(2 days◆	Overnight (re	Required Turn Default will be	au emmacolemı π.au billysnow(est.com.a			inviroSampleVic@
		1:300-												Comments bds Hazard Warn	dard)	□ 3 days◆	 Surcharge will a porting by 9am) 1 dave 	around Time (TA 5 days if not licked	an@qualtest.com.z @qualtest.com.au				eurofins.com

Eurofins Environment Testi		Laboratory Use Only	Method of Shipment		10	9	a	7	9	5	*	3	N	+	Ŧ	Quote ID Nº	Purchase Order	Special Directions	Phone №	Contact Name		Address	Company	\$÷
ng Australia Pty Ltd	Received By	Received By	Counier (#		BH14 2.0-2.30	BH14 0.95-1.35	BH14 0.3-0.8	BH14 0.0-0.2	BH13 1.15-1.45	BH13 0.3-0.75	BH13 0.0-0.15	BH12 1.32-1.60	BH12 0.9-1.25	BH12 0.3-0.8	Client Sample ID	180622QUAN-1				Libby Betz		8 fronbark Close Warabrook N	Qualtest	HAIN OF CUSTOD
			-	Tot	22/2/21	22/2/21	22/2/21	22/2/21	22/2/21	22/2/21	22/2/21	22/2/21	22/2/21	22/02/21	Sampled Date/Time dd meŵy hh.mm							SW 2304		Y RECORD
	50	60	Hand Delivered	al Counts	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	Matrix Solid (S) Water (W)	Where	m⊨tals ar SUITE co	Analy: e regrested, plea: de must be used t	Ses se specify " c altract St	Total" or JITE orici	"Filtered". 19	Project N	Project	
	YD BNE	YD BNE	m	2				×		×	1994					1.15	P/	AHs. Metals				lame	No	ydney Lab nil F3 Bld.F 2 9900 8400
	MEL PE	MEL PE	Postal													As	ibestos (presence/abse 	nce)			EJE, KO	NEW20P	oratory 16 Mans Roa EnviroSar
Submi	R ADL	R ADL						-							Ser 13		Suite I	31 TRH, BTEX				ORAGAN	-0171	d Lane Cove mp/eNSW@
ission of sam	NTL DRI	NTL DR	Name							_												G		West NSW Burofins.com
ples to the l	N I	×	6				110							-						_				2066
aboratory wi	signature	gnature	5 11				1.1.6																	Unit 07.3
il be deeme			05							- 1								المرجعات		-			Pro	sbane Lab 1 21 Smallv 1902 4600
d as accepta)																			EDD Form Stiat, EQuis	oject Mana	orstory wood Place M EnviroSamp
nce of Euro			<u>60</u>							_												e e	ager L	Aurarrie QLD pleQLD@eu
Ins Enviror			gnature				TT															Xcel	lbby Betz	0fins.com
ument Teattr			è		1										<u></u>									
ng Standard	Date	Date	3																					Unit 2 08 92
Terms and	1		5								-			-										h Laborati 2 91 Leach 1 251 9600
Conditions			l												10.00						ET			ory Highway Ke EnviroSamp
uniess agre																500mL P	lastic			m	m			wdale WA 6 NeWA@euro
ed otherws	Time	Time	Date													250mL P	lastic		Change c	mail for I	mail for	fanded o	Sampi	5105 ofins.com
se. A copy															20	125mL P OmL Amb	lastic er Glass	228.42	Con container by	Results	Invoice	wer by	er(s)	
is availabl			23													40mL VO	A vial		tainers pe & size	stei qqii	ac		8	
la on requ			N N	10	-	+	-	-	-	-	-	-	-	-	50 Ja	omL PFA	S Bottle		if necessi	ybetz@c ohcullen	count		y Snow	0 8 9 5
9\$t			-	(U))		-	-			-			-	-	Other (Asbe	stos AS496	4, WA Gu	idelines)	Ý	qualtest.	p@s			Stourne Monterey F 8564 500
	Report Nz	Temperature	Time 1						i i						Sample Comme / Dangerous Goods Haz	 5 days (Standard) Other(2 days	Overnight (reporting t Same dave	Required Turnaround Default will be 5 stays if a	com.au emmacoleman@quat st.com.au biliysnow@quattes	ualtest.com.au			Laboratory toad Dandenong South VIC 3175 D EnviroSampleVic@eurofins.cr
		-	2002												ents ard Warning		3 days◆	thange will apply by 9am)♦	Time (TAT) not toked	Itest.com.au st.com.au				Ē

7 of S

	Laborator	Method of S		10	ur A		~	7	Ø	en	*	u.	19		ş	Quote	Purchas	Special D	Phor	Contao		Add	Corr	
	y Use Only	nipment														ID №	e Order	irections	e N₂	r name		(ess	pany	
Received By	Received By	Courier (#								D.22.2.21	BH15 1.75-2.1	BH15 1.1-1.4	BH15 0.55-0.9	BH15 0.0-0.2	Client Sample ID	180622QUAN-1				стралу ветх		8 Ironbark Close Warabroo	Qualtest	Rifter memory
		-	Tota							22/2/21	22/2/21	22/2/21	22/2/21	22/02/25	Sampled Date/Time dd mrufyy hh sno							k NSW 2304		176 000 CM NO NON
		Hand Delivered	al Counts							SOIL	SOIL	SOIL	SOIL	SOIL	Matrix Selid (S) Water (W)	Where	metals ar SUITE co	Analy e requested, pies de must be used	/Ses ase specify ¹ to attract S	Tetal" or JITE prici	"Filtered". ng	Projec	Proj	ľ
SYD BN	SYD BA		N							×		×					P/	AHs, Metals				t Name	ect №	O PUGE ZA
E MEL	IE MEL	Posta	-									×				As	bestos (presence/abse	ance)			ELE, F	NEW2	
PER AD	PER AD	-	-									×					Suite E	11 TRH, BTEX	((OORAG/	0P-0171	ACMERGINEC
L NTL DRW	L NTL DRW	Name														-						ANG		v@euronns.com
Sig	Sig	D			-	-	-												_					ŀ
nature	nature	5																						07 390
		500 4									-											EDD Forn ESdat EQui	Project Mar	2 4600 EnviroSan
		Signa			-																	nat Svic Exci	nager Libb	npleQLD@eurofir
		ture												5.									y Betz	S.COM
Date	Date	Ø																						
-		5																						08 9251 96
		5															-							300 EnviroSa
-																500ml D	natia							mpleWA@e
Time	Time	Date														250mL Pl	astic		Change	Email for	Email for	Handed	Samp	Jrafins.com
-															20	125mL Pl	astic sr Glass		Cont container ty	Results	Invoice	over by	ler(s)	
		10				-			-							40mL VO	A vial		lainers pe & size il	Hbby step!	ac		Billy	
		2.21	9							-	-	-	-		Ja	Ir (Glass of	HDPE)		urssanau.	betz@qu)cullen@	ounts		Snow	03 85
			2	5.								-	-		Other (Asbe	Histos AS496	4, WA Gui	idelines)		altest.cor. qualtest.c	@qua			¥64 5000
Panort No	Temperature	Time													Sample Dangerous Go	 ✓ 5 days (Stan ☐ Other(2 days	Overnight (r	Required Ture Default will be	m.au emmacoler. :om.au billysnow	ltest.com.a			EnviroSampleVic@
		1:300													e Comments ods Hazard Wa	idard)	3 days	•Surcharge w eporting by 9am	naround Time (e 5 days if not ticke	tan@qualtest.co. /@qualtest.com.a	Ē			geurofins.com

P- 047

-

#AU04_Enviro_Sample_NSW

Subject: Attachments: FW: 2 DAY TAT ADDITIONAL LEACHATES: FW: 776003 - TCLP 776003-S_report.pdf; 776003_COC.pdf

Importance: High

From: Libby Betz <<u>LibbyBetz@qualtest.com.au</u>> Sent: Thursday, 4 March 2021 2:00 PM To: Andrew Black <<u>AndrewBlack@eurofins.com</u>> Subject: 776003 - TCLP

EXTERNAL EMAIL*

Hi Andrew,

Can I please have the additional TCLP analysis carried out:

Nickel – BH1 2.0-2.0

Chromium - BH10 0.0-0.25

2 day TAT.

Thanks,

Libby

Libby Betz Senior Environmental Scientist



 Mob: +61 432189418

 Tel: +61 2 4968 4468

 Fax: +61 2 4960 9775

 Web: www.qualtest.com.au

 8 Ironbark Close, Warabrook, NSW, 2304

 Libbybetz@qualtest.com.au

Click here to report this email as spam.

ScannedByWebsenseForEurofins

* WARNING - EXTERNAL: This email originated from outside of Eurofins. Do not click any links or open any attachments unless you trust the sender and know that the content is safe!



Environment Testing

ABN: 50 005 085 521

www.eurofins.com.au

EnviroSales@eurofins.com

New Zealand

Australia

Melbourne 6 Monterey Road
 Dandenong South VIC 3175
 16 Mars Road

 Phone : +61 3 8564 5000
 Lane Cove We

 NATA # 1261
 Phone : +61 2 9
 Site # 1254 & 14271

Sydney Unit F3, Building F Brisbane
 Muraris Road
 Muraris QLD 4172

 Lane Cove West NSW 2066
 Phone : +61 7 3902 4600

 Phone : +61 2 9900 8400
 NATA # 1261 Site # 10017
 NATA # 1261 Site # 18217

1/21 Smallwood Place NATA # 1261 Site # 20794

Perth 2/91 Leach Highway Kewdale WA 6105 Phone : +61 8 9251 9600 NATA # 1261 Site # 23736

Newcastle 4/52 Industrial Drive Mayfield East NSW 2304 PO Box 60 Wickham 2293 Phone : +61 2 4968 8448

Auckland 35 O'Rorke Road Penrose, Auckland 1061 Phone : +64 9 526 45 51 IANZ # 1327

Christchurch 43 Detroit Drive Rolleston, Christchurch 7675 Phone : 0800 856 450 IANZ # 1290

Sample Receipt Advice

Company name:	Qualtest
Contact name:	Emma Coleman
Project name:	EJE KOORAGANG
Project ID:	NEW20P-0171
Turnaround time:	5 Day
Date/Time received	Feb 23, 2021 2:30 PM
Eurofins reference	776003

Sample Information

- 1 A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- All samples have been received as described on the above COC.
- COC has been completed correctly.
- Attempt to chill was evident.
- Appropriately preserved sample containers have been used.
- All samples were received in good condition.
- Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- Appropriate sample containers have been used.
- Sample containers for volatile analysis received with zero headspace. ./
- X Split sample sent to requested external lab.
- X Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

Notes

Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

Andrew Black on phone : (+61) 2 9900 8490 or by email: AndrewBlack@eurofins.com

Results will be delivered electronically via email to Emma Coleman - emmacoleman@qualtest.com.au.



	eurofi	ns			Australia								New Zealand	
	0.005.085.521. web:	En			Melbourne 6 Monterey Road Dandenong South VIC 3 Phone : +61 3 8564 500 NATA # 1261 Site # 1254 & 14271	8175 1 0 L F	Sydney Jnit F3, 6 Mars ane Co Phone :	Building Road ve Wes +61 2 9	g F t NSW 2 900 8400	Brisbane 1/21 Smallwood Place Murarrie QLD 4172 66 Phone : +61 7 3902 4600 NATA # 1261 Site # 20794 7	Perth 2/91 Leach Highway Kewdale WA 6105 Phone : +61 8 9251 9600 NATA # 1261 Site # 23736	Newcastle 4/52 Industrial Drive Mayfield East NSW 2304 PO Box 60 Wickham 2293 Phone : +61 2 4968 8448	Auckland 35 O'Rorke Road Penrose, Auckland 1061 Phone : +64 9 526 45 51 IANZ # 1327	Christchurch 43 Detroit Drive Rolleston, Christchurch 767 Phone : 0800 856 450 IANZ # 1290
ADN. 3	0 003 083 521 web.	www.euronns.com	au email. EnviroSai	les@euronns.com	Sile # 1254 & 1427 1	, in	NATA #	1201 31	102	1	Sile # 23730			
Coi Ade	mpany Name: dress:	Qualtest 8 Ironbark Warabrool NSW 2304	Close <				O R P F	rder l eport hone: ax:	No.: : #: :	778179 02 4968 4468 02 4960 9775		Received: Due: Priority: Contact Name:	Mar 4, 2021 2:00 F Mar 8, 2021 2 Day Emma Coleman	M
Pro Pro	oject Name: oject ID:	ADDITION NEW20P-	IAL EJE KOOR 0171	AGANG								Eurofins Analytical S	Services Manager : Ar	ndrew Black
			Sample Detail			Chromium	Nickel	USA Leaching Procedure	USA Leaching Procedure					
Melb	ourne Laborato	ory - NATA Si	te # 1254 & 14	271										
Sydr	ey Laboratory	- NATA Site #	18217			X			X					
Brisk	bane Laborator	y - NATA Site	# 20794				X	X						
May	Laboratory - N	NATA Site # 2	3/30			-	-							
Fyto	rnal Laboratory	, ,				-	+							
No	Sample ID	Sample Dat	e Sampling	Matrix	LAB ID			1						
1	BH1 2.0-2.1	Feb 22, 2021	Time	US Leachate	S21-Ma09667		x	x						
2	BH10 0.0-0.25	Feb 22, 2021		US Leachate	S21-Ma09668	X			X					
Test	Counts					1	1	2	2					

	eurofi	ns			Australia										New Zealand	
		Env	ironment	Testing	Melbourne 6 Monterey Road Dandenong South VIC 3 Phone : +61 3 8564 5000 NATA # 1261	175 1 0 L P	ydney Init F3, E 6 Mars F ane Cov hone : +	Building Road re West 61 2 99	F NSW 2 000 8400	Bi 1/ 066 Pi 0 N/	risban (21 Sm lurarrie hone : ATA #	e allwood Place 9 QLD 4172 +61 7 3902 4600 1261 Site # 20794	Perth 2/91 Leach Highway Kewdale WA 6105 Phone : +61 8 9251 9600 NATA # 1261	Newcastle 4/52 Industrial Drive Mayfield East NSW 2304 PO Box 60 Wickham 2293 Phone : +61 2 4968 8448	Auckland 35 O'Rorke Road Penrose, Auckland 1061 Phone : +64 9 526 45 51 IANZ # 1327	Christchurch 43 Detroit Drive Rolleston, Christchurch 7675 Phone : 0800 856 450 IANZ # 1290
ABN: 5	0 005 085 521 web:	www.eurofins.com.au	i email: EnviroSale	es@eurofins.com	Site # 1254 & 14271	N	ATA # 1	261 Sit	e # 182	17			Site # 23736			
Co	mpany Name:	Qualtest					O	der N	lo.:					Received:	Feb 23, 2021 2:30	PM
Ad	dress:	8 Ironbark C	lose				Re	eport	#:	7	7600	03		Due:	Mar 2, 2021	
		Warabrook					Pł	none:		0)2 49	68 4468		Priority:	5 Day	
		NSVV 2304					Га	IX:		Ľ	JZ 49	00 9775		Contact Name:	Emma Coleman	
Pro	oject Name:															
FIC	Ject ID.		71											Eurofins Analytical S	ervices Manager : Ar	ndrew Black
Malli		Sa	mple Detail	774		Asbestos - AS4964		Polycyclic Aromatic Hydrocarbons	Metals M8	Moisture Set	Eurofins Suite B1					
Syde	nev Laboratory	- NATA Site # 1	# 1204 0 142	271		x	×	x	x	x	x	-				
Bris	bane Laborator	v - NATA Site #	20794					~		~		-				
Pert	h Laboratory - N	NATA Site # 23	736									-				
May	field Laboratory	1														
Exte	rnal Laboratory	1														
No	Sample ID	Sample Date	Sampling	Matrix	LAB ID											
1	BH05 0.5-0.8	Feb 22, 2021		Soil	S21-Fe46455	Х		х	х	х	х	1				
2	BH06 0.0-0.3	Feb 22, 2021		Soil	S21-Fe46456			х	х	х	1	7				
3	BH07 0.0-0.25	Feb 22, 2021		Soil	S21-Fe46457	Х		Х	х	Х	Х	7				
4	BH08 0.0-0.25	Feb 22, 2021		Soil	S21-Fe46458			Х	Х	Х						
5	BH09 0.0-0.2	Feb 22, 2021		Soil	S21-Fe46459	Х		Х	Х	Х	Х					
6	BH09 0.95-1.3	Feb 22, 2021		Soil	S21-Fe46460	Х		Х	х	Х	Х					
7	BH10 0.0-0.25	Feb 22, 2021		Soil	S21-Fe46461			Х	Х	Х						
8	BH11 0.0-0.45	Feb 22, 2021		Soil	S21-Fe46462	Х		х	х	х	Х					
9	BH12 0.0-0.15	Feb 22, 2021		Soil	S21-Fe46463	Х		Х	х	Х	х					

	eurofi	ns		Australia										New Zealand	
ABN: 50	005 085 521 web:	www.eurofins.com	vironment Testin	Melbourne 6 Monterey Road Dandenong South VIC 3 Phone : +61 3 8564 500 NATA # 1261 s.com Site # 1254 & 14271	S U 3175 1 10 L P N	Sydney Init F3, I 6 Mars ane Cov Phone : - IATA # ²	Building Road ve West +61 2 99 1261 Sit	F t NSW 2 900 840 te # 182	8 1/ 2066 Pi 0 N 17	risban /21 Sm lurarrie hone : ATA #	e allwood Place QLD 4172 +61 7 3902 4600 1261 Site # 20794	Perth 2/91 Leach Highway Kewdale WA 6105 Phone : +61 8 9251 9600 NATA # 1261 Site # 23736	Newcastle 4/52 Industrial Drive Mayfield East NSW 2304 PO Box 60 Wickham 2293 Phone : +61 2 4968 8448	Auckland 35 O'Rorke Road Penrose, Auckland 1061 Phone : +64 9 526 45 51 IANZ # 1327	Christchurch 43 Detroit Drive Rolleston, Christchurch 7675 Phone : 0800 856 450 IANZ # 1290
Con Add	npany Name: Iress:	Qualtest 8 Ironbark Warabrook NSW 2304	Close			O R Pl Fa	rder N eport hone: ax:	No.: #:	7	77600 02 49 02 49	3 68 4468 60 9775		Received: Due: Priority: Contact Name:	Feb 23, 2021 2:30 Mar 2, 2021 5 Day Emma Coleman	PM
Proj Proj	ject Name: ject ID:	EJE KOOF NEW20P-0	RAGANG 0171										Eurofins Analytical S	ervices Manager : Aı	ndrew Black
		S	Sample Detail		Asbestos - AS4964	HOLD	Polycyclic Aromatic Hydrocarbons	Metals M8	Moisture Set	Eurofins Suite B1					
Melbo	ourne Laborato	ory - NATA Si	te # 1254 & 14271												
Sydne	ey Laboratory	- NATA Site #	18217		Х	X	Х	Х	Х	Х					
Brisba	ane Laborator	y - NATA Site	# 20794							ļ	_				
Perth	Laboratory - N	ATA Site # 2	3736								_				
Mayfi	eld Laboratory	,									_				
Exteri	nal Laboratory	1	1		ļ						_				
10 I	BH13 0.3-0.75	Feb 22, 2021	Soil	S21-Fe46464			X	X	X		_				
	BH14 0.0-0.2	Feb 22, 2021	Soil	S21-Fe46465			X	X	X		4				
12 I	BH15 1.1-1.4	Feb 22, 2021	Soil	S21-Fe46466	X		X	X	X	X	4				
13 I	D.22.2.21	Feb 22, 2021	Soil	S21-Fe46467			X	X	X		4				
14	BH05 0.0-0.2	Feb 22, 2021	Soil	S21-Fe46468							4				
15	BH05 1.5-1.75	Feb 22, 2021	Soil	S21-Fe46469							4				
16 I	BH05 1.75-2.0	Feb 22, 2021	Soil	S21-Fe46470		X					4				
17 E	BH06 0.5-0.75	Feb 22, 2021	Soil	S21-Fe46471		X				<u> </u>	4				
18 (BH06 0.75- 0.90	Feb 22, 2021	Soil	S21-Fe46472		X					4				
19 I	BH06 1.0-1.3	Feb 22, 2021	Soil	S21-Fe46473		X									

	eurofi	ns			Australia										New Zealand	
ABN: 50	0 005 085 521 web:	www.eurofins.c	Environment 7	Testing ©eurofins.com	Melbourne 6 Monterey Road Dandenong South VIC 3 Phone : +61 3 8564 5000 NATA # 1261 Site # 1254 & 14271	S U 175 1) L P N	Sydney Init F3, E 6 Mars I ane Cov Phone : 4 IATA # 7	Building Road ve West +61 2 99 1261 Sit	F NSW 2 900 840 te # 182	8 1/ 066 P 0 N 17	risban /21 Sm lurarrie hone : ATA #	e allwood Place QLD 4172 +61 7 3902 4600 1261 Site # 20794	Perth 2/91 Leach Highway Kewdale WA 6105 Phone : +61 8 9251 9600 NATA # 1261 Site # 23736	Newcastle 4/52 Industrial Drive Mayfield East NSW 2304 PO Box 60 Wickham 2293 Phone : +61 2 4968 8448	Auckland 35 O'Rorke Road Penrose, Auckland 1061 Phone: +64 9 526 45 51 IANZ # 1327	Christchurch 43 Detroit Drive Rolleston, Christchurch 767: Phone : 0800 856 450 IANZ # 1290
Con Ado	mpany Name: dress:	Qualtes 8 Ironba Warabro NSW 23	t ark Close ook 304				O Re Pl Fa	rder N eport hone: ax:	No.: #:		7760()2 49)2 49)3 68 4468 60 9775		Received: Due: Priority: Contact Name:	Feb 23, 2021 2:30 Mar 2, 2021 5 Day Emma Coleman	PM
Pro Pro	oject Name: oject ID:	EJE KO NEW20	ORAGANG P-0171											Eurofins Analytical S	ervices Manager : A	ndrew Black
			Sample Detail			Asbestos - AS4964	HOLD	Polycyclic Aromatic Hydrocarbons	Metals M8	Moisture Set	Eurofins Suite B1					
Melbo	ourne Laborate	ory - NATA	Site # 1254 & 1427	71												
Sydn	ey Laboratory	- NATA Sit	e # 18217			Х	X	Х	X	Х	Х					
Brisb	bane Laborator	y - NATA S	ite # 20794							<u> </u>		4				
Perth	Laboratory - N	NATA Site #	# 23736									4				
Mayfi	leid Laboratory	y										-				
20	BHOG 1 6-1 9	Feb 22 20	121	Soil	S21-E0/6/7/		×					-				
20	BH06 1 85-2 1	Feb 22, 20)21	Soil	S21-Fe46474		x					-				
22	BH07 0.4-0.7	Feb 22, 20	021	Soil	S21-Fe46476		x					1				
23	BH07 1.4-1.7	Feb 22, 20)21	Soil	S21-Fe46477		X					1				
24	BH07 1.8-1.95	Feb 22, 20)21	Soil	S21-Fe46478		X									
25	BH08 0.25- 0.55	Feb 22, 20)21	Soil	S21-Fe46479		x									
26	BH08 0.55- 0.85	Feb 22, 20)21	Soil	S21-Fe46480		x					_				
27	BH08 0.9-1.2	Feb 22, 20	021	Soil	S21-Fe46481		X					4				
28	BH09 0.3-0.7	Feb 22, 20)21	Soil	S21-Fe46482		X	1	1							
	eurofi	ns			Australia										New Zealand	
-------------	------------------------------------	--	-------------------------	---------------	--	------------------------	--	---	-----------------------	-------------------------	--	--	--	---	---	---
~ ••	curon	En	vironment 1	Testing	Melbourne 6 Monterey Road Dandenong South VIC 3 Phone : +61 3 8564 500 NATA # 1261	S 175 1 0 L P	ydney Init F3, E 6 Mars I ane Cov hone : +	Building Road /e West -61 2 99	F NSW 2 200 840	8 1/ 066 P 0 N	Prisbar /21 Sn /urarrie Phone : IATA #	ne nallwood Place e QLD 4172 +61 7 3902 4600 t 1261 Site # 20794	Perth 2/91 Leach Highway Kewdale WA 6105 Phone : +61 8 9251 9600 NATA # 1261	Newcastle 4/52 Industrial Drive Mayfield East NSW 2304 PO Box 60 Wickham 2293 Phone : +61 2 4968 8448	Auckland 35 O'Rorke Road Penrose, Auckland 1061 Phone : +64 9 526 45 51 IANZ # 1327	Christchurch 43 Detroit Drive Rolleston, Christchurch 7675 Phone : 0800 856 450 IANZ # 1290
ABN:	50 005 085 521 web:	www.eurofins.com	n.au email: EnviroSales	@eurofins.com	Site # 1254 & 14271	N	IATA # 1	1261 Sit	e # 182	17			Site # 23736			
Cc Ac	ompany Name: Idress:	Qualtest 8 Ironbark Warabroo NSW 2304	Close k 4				O Re Pi Fa	rder N eport hone: ax:	No.: #:	- ((7760 02 49 02 49	03 968 4468 960 9775		Received: Due: Priority: Contact Name:	Feb 23, 2021 2:30 Mar 2, 2021 5 Day Emma Coleman	PM
Pr Pr	oject Name: oject ID:	EJE KOO NEW20P-			Eurofins Analytical \$								Services Manager : Ar	ndrew Black		
					Asbestos - AS4964	HOLD	Polycyclic Aromatic Hydrocarbons	Metals M8	Moisture Set	Eurofins Suite B1						
Mell	bourne Laborate	ory - NATA Si	ite # 1254 & 1427	71												
Syd	ney Laboratory	- NATA Site	# 18217			X	X	Х	X	Х	Х	_				
Bris	bane Laborator	y - NATA Site	e # 20794									_				
Pert	h Laboratory - N	NATA Site # 2	23736									4				
Мау	field Laboratory	1				<u> </u>						4				
Exte	ernal Laboratory			0 - 'l	004 5-40400						-	-				
29	BHU9 1.6-1.9	Feb 22, 202	1	5011 Soil	S21-F646483						+					
31	BH10 0.5-0.8 BH10 1.15- 1.45	Feb 22, 202 Feb 22, 202	1	Soil	S21-Fe46485		x					_				
32	BH10 1.45-1.6	Feb 22, 202 ²	1	Soil	S21-Fe46486		X					-				
33	BH11 0.45-0.9	Feb 22, 202	1	Soil	S21-Fe46487	1	х					7				
34	BH11 1.0-1.35	Feb 22, 202	1	Soil	S21-Fe46488		X									
35	BH12 0.3-0.8	Feb 22, 202	1	Soil	S21-Fe46489		Х									
36	BH12 0.9-1.25	Feb 22, 2027	1	Soil	S21-Fe46490		Х									
37	BH12 1.32- 1.60	Feb 22, 202 ⁻	1	Soil	S21-Fe46491		х									

	eurofi	ns			Australia										New Zealand	
ABN: 50 (005 085 521 web:	www.eurofins.com.a	vironment T au email: EnviroSales@	esting @eurofins.com	Melbourne 6 Monterey Road Dandenong South VIC 3 Phone : +61 3 8564 500 NATA # 1261 Site # 1254 & 14271	S 175 1 0 L P N	Sydney Init F3, E 6 Mars I ane Cov Phone : + IATA # 1	Building Road ve West 61 2 99 1261 Sit	F NSW 2 900 840 te # 182	8 1/ 066 P 0 N 17	risbane 21 Sma lurarrie hone : - ATA # ⁻	e allwood Place QLD 4172 +61 7 3902 4600 1261 Site # 20794	Perth 2/91 Leach Highway Kewdale WA 6105 Phone : +61 8 9251 9600 NATA # 1261 Site # 23736	Newcastle 4/52 Industrial Drive Mayfield East NSW 2304 PO Box 60 Wickham 2293 Phone : +61 2 4968 8448	Auckland 35 O'Rorke Road Penrose, Auckland 1061 Phone : +64 9 526 45 51 IANZ # 1327	Christchurch 43 Detroit Drive Rolleston, Christchurch 767 Phone: 0800 856 450 IANZ # 1290
Com Addr	ipany Name: ress:	Qualtest 8 Ironbark Warabrook NSW 2304	Close				O Re Pl Fa	rder N eport hone: ax:	No.: #:		7600)2 496)2 496	13 68 4468 60 9775		Received: Due: Priority: Contact Name:	Feb 23, 2021 2:30 Mar 2, 2021 5 Day Emma Coleman	PM
Proje Proje	ect Name: ect ID:	EJE KOOR NEW20P-0			Eurofins Analytical							ervices Manager : A	ndrew Black			
		s		Asbestos - AS4964	HOLD	Polycyclic Aromatic Hydrocarbons	Metals M8	Moisture Set	Eurofins Suite B1							
Melbo	urne Laborato	ory - NATA Sit	e # 1254 & 1427	1								_				
Sydne	ey Laboratory	- NATA Site #	18217			X	X	Х	Х	Х	Х	4				
Brisba	ane Laborator	y - NATA Site	# 20794									4				
Perth	Laboratory - N	NATA Site # 23	3736									4				
Maytie	eld Laboratory										<u> </u>	-				
38 F	141 Laboratory	Feb 22 2021		Soil	S21-Fe46492		×					-				
39 E	3H13 0.15- 1.45	Feb 22, 2021	5	Soil	S21-Fe46493		x					1				
40 E	3H14 0.3-0.8	Feb 22, 2021		Soil	S21-Fe46494		Х									
41 E 1	3H14 0.95- 1.35	Feb 22, 2021	S	Soil	S21-Fe46495		х									
42 E	3H14 2.0-2.30	Feb 22, 2021	s	Soil	S21-Fe46496		X									
43 E	BH15 0.0-0.2	Feb 22, 2021	s	Soil	S21-Fe46497		X					_				
44 E	BH15 0.55-0.9	Feb 22, 2021	s	Soil	S21-Fe46498		X									
45 E	BH15 1.75-2.1	Feb 22, 2021		Soil	S21-Fe46499		Х									
Test C	Counts					7	32	13	13	13	7					



Certificate of Analysis

Environment Testing

Qualtest 8 Ironbark Close Warabrook NSW 2304



NATA Accredited Accreditation Number 1261 Site Number 18217

Accredited for compliance with ISO/IEC 17025–Testing The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Emma Coleman
776003-AID
EJE KOORAGANG
NEW20P-0171
Feb 23, 2021
Mar 02, 2021
Conducted in accordance with the Australian Standard AS 4964 – 2004: Method for the Qualitative Identification of Asbestos in Bulk Samples and in-house Method LTM-ASB-8020 by polarised light microscopy (PLM) and dispersion staining (DS) techniques. NOTE: Positive Trace Analysis results indicate the sample contains detectable respirable fibres.
Mineral fibres of unknown type, as determined by PLM with DS, may require another analytical technique, such as Electron Microscopy, to confirm unequivocal identity. NOTE: While Actinolite, Anthophyllite and Tremolite asbestos may be detected by PLM with DS, due to variability in the optical properties of these materials, AS4964 requires that these are reported as UMF unless confirmed by an independent technique.
The whole sample submitted is first dried and then passed through a 10mm sieve followed by a 2mm sieve. All fibrous matter greater than 10mm, greater than 2mm as well as the material passing through the 2mm sieve are retained and analysed for the presence of asbestos. If the sub 2mm fraction is greater than approximately 30 to 60g then a sub-sampling routine based on ISO 3082:2009(E) is employed. NOTE: Depending on the nature and size of the soil sample, the sub-2 mm residue material may need to be sub-sampled for trace analysis, in accordance with AS 4964-2004.
The material is first examined and any fibres isolated for identification by PLM and DS. Where required, interfering matrices may be removed by disintegration using a range of heat, chemical or physical treatments, possibly in combination. The resultant material is then further examined in accordance with AS 4964 - 2004. NOTE: Even after disintegration it may be difficult to detect the presence of asbestos in some asbestos-containing bulk materials using PLM and DS. This is due to the low grade or small length or diameter of the asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials. Vinyl/asbestos floor tiles, some asbestos-containing sealants and mastics, asbestos-containing epoxy resins and some ore samples are examples of these types of material, which are difficult to analyse.
The performance limitation of the AS 4964 (2004) method for non-homogeneous samples is around 0.1 g/kg (equivalent to 0.01% (w/w)). Where no asbestos is found by PLM and DS, including Trace Analysis, this is considered to be at the nominal reporting limit of 0.01% (w/w). The NEPM screening level of 0.001% (w/w) is intended as an on-site determination, not a laboratory Limit of Reporting (LOR), per se. Examination of a large sample size (e.g. 500 mL) may improve the likelihood of detecting asbestos, particularly AF, to aid assessment against the NEPM criteria. Gravimetric determinations to this level of accuracy are outside of AS 4964 and hence NATA Accreditation does not cover the performance of this service (non-NATA results shown with an asterisk). NOTE: NATA News March 2014, p.7, states in relation to AS 4964: "This is a qualitative method with a nominal reporting limit of 0.01% " and that currently in Australia "there is no validated method available for the quantification of asbestos". This report is consistent with the analytical procedures and reporting recommendations in the NEPM and the WA DoH.





Accredited for compliance with ISO/IEC 17025–Testing The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Project Name	EJE KOORAGANG
Project ID	NEW20P-0171
Date Sampled	Feb 22, 2021
Report	776003-AID

Client Sample ID	Eurofins Sample No.	Date Sampled	Sample Description	Result
BH05 0.5-0.8	21-Fe46455	Feb 22, 2021	Approximate Sample 64g Sample consisted of: Brown coarse-grained sandy soil and shell	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
BH07 0.0-0.25	21-Fe46457	Feb 22, 2021	Approximate Sample 57g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
BH09 0.0-0.2	21-Fe46459	Feb 22, 2021	Approximate Sample 68g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
BH09 0.95-1.3	21-Fe46460	Feb 22, 2021	Approximate Sample 52g Sample consisted of: Brown coarse-grained sandy soil	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
BH11 0.0-0.45	21-Fe46462	Feb 22, 2021	Approximate Sample 64g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
BH12 0.0-0.15	21-Fe46463	Feb 22, 2021	Approximate Sample 57g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
BH15 1.1-1.4	21-Fe46466	Feb 22, 2021	Approximate Sample 63g Sample consisted of: Brown coarse-grained sandy soil and shell	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.



Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported. A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description

Asbestos - LTM-ASB-8020

Testing SiteExtractedHolding TimeSydneyFeb 24, 2021Indefinite

	eurofi	ns		Australia Melbourne Sydney B										New Zealand		
		Env		Testing	Melbourne Sydney Bri 6 Monterey Road Unit F3, Building F 1/2 Dandenong South VIC 3175 16 Mars Road Mu Phone : +61 3 8564 5000 Lane Cove West NSW 2066 Phone NATA # 1261 Phone : +61 2 9900 8400 NA fins.com Site # 1254 & 14271 NATA # 1261 Site # 18217			risbane 21 Sma lurarrie hone : - ATA #	e allwood Place QLD 4172 +61 7 3902 4600 1261 Site # 20794	Perth 2/91 Leach Highway Kewdale WA 6105 Phone : +61 8 9251 9600 NATA # 1261 Site # 23736	Newcastle 4/52 Industrial Drive Mayfield East NSW 2304 PO Box 60 Wickham 2293 Phone : +61 2 4968 8448	Auckland 35 O'Rorke Road Penrose, Auckland 1061 Phone : +64 9 526 45 51 IANZ # 1327	Christchurch 43 Detroit Drive Rolleston, Christchurch 7675 Phone : 0800 856 450 IANZ # 1290			
ABN: 5	0 005 085 521 Web:	www.eurofins.com.au	i email: EnviroSale	eurorins.com	Site # 1254 & 14271	N	IATA # 1	261 51	e # 182	17			Site # 23736			
Co Ad	mpany Name: dress:	Qualtest 8 Ironbark C Warabrook NSW 2304	lose			Oi Re Pi Fa	der N eport none: ix:	lo.: #:	7 0	77600)2 496)2 496	3 68 4468 60 9775		Received: Due: Priority: Contact Name:	Feb 23, 2021 2:30 Mar 2, 2021 5 Day Emma Coleman	РМ	
Pro Pro	oject Name: oject ID:	EJE KOORA NEW20P-01	AGANG 71			Eurofins Analytical									ervices Manager : Ar	drew Black
			Asbestos - AS4964	HOLD	Polycyclic Aromatic Hydrocarbons	Metals M8	Moisture Set	Eurofins Suite B1								
Melk	ourne Laborato	ory - NATA Site	# 1254 & 142	271								4				
Sydi	ney Laboratory	- NATA Site # 1	8217			X	X	X	X	X	X	-				
Bris	bane Laborator	y - NATA Site #	20794									-				
Pert	h Laboratory - N	NA I A Site # 237	36									4				
way	real Laboratory											4				
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID							-				
1	BH05 0.5-0.8	Feb 22, 2021		Soil	S21-Fe46455	Х		х	х	х	х					
2	BH06 0.0-0.3	Feb 22, 2021		Soil	S21-Fe46456			х	х	х]				
3	BH07 0.0-0.25	Feb 22, 2021		Soil	S21-Fe46457	Х		Х	Х	Х	Х]				
4	BH08 0.0-0.25	Feb 22, 2021		Soil	S21-Fe46458			Х	Х	Х						
5	BH09 0.0-0.2	Feb 22, 2021		Soil	S21-Fe46459	Х		Х	Х	х	Х					
6	BH09 0.95-1.3	Feb 22, 2021		Soil	S21-Fe46460	Х		Х	Х	Х	Х					
7	BH10 0.0-0.25	Feb 22, 2021		Soil	S21-Fe46461			Х	Х	Х						
8	BH11 0.0-0.45	Feb 22, 2021		Soil	S21-Fe46462	Х		Х	Х	х	х					
9	BH12 0.0-0.15	Feb 22, 2021		Soil	S21-Fe46463	Х		Х	Х	х	Х					

	eurofi	ns			Australia										New Zealand	
•••	curon	Env	vironment Tes	sting	Melbourne 6 Monterey Road Dandenong South VIC 3 Phone : +61 3 8564 500 NATA # 1261	5 175 1 0 L P	Sydney Init F3, I 6 Mars ane Cov Phone : -	Building Road ve West ⊧61 2 99	F NSW 2	8 1/ 066 P 0 N	risbane (21 Sma lurarrie (hone : + ATA # 1	llwood Place QLD 4172 61 7 3902 4600 261 Site # 20794	Perth 2/91 Leach Highway Kewdale WA 6105 Phone : +61 8 9251 9600 NATA # 1261	Newcastle 4/52 Industrial Drive Mayfield East NSW 2304 PO Box 60 Wickham 2293 Phone : +61 2 4968 8448	Auckland 35 O'Rorke Road Penrose, Auckland 1061 Phone : +64 9 526 45 51 IANZ # 1327	Christchurch 43 Detroit Drive Rolleston, Christchurch 7675 Phone : 0800 856 450 IANZ # 1290
ABN: 50	005 085 521 web:	www.eurofins.com.a	au email: EnviroSales@ei	urofins.com	Site # 1254 & 14271	N	IATA # [·]	1261 Sit	e # 182	17			Site # 23736			
Com Add	npany Name: Iress:	Qualtest 8 Ironbark Warabrook NSW 2304	Close				O Re Pl Fa	rder N eport hone: ax:	No.: #:	7	77600)2 496)2 496	3 68 4468 60 9775		Received: Due: Priority: Contact Name:	Feb 23, 2021 2:30 Mar 2, 2021 5 Day Emma Coleman	PM
Proj Proj	ject Name: ject ID:	EJE KOOR NEW20P-0	AGANG 171											Eurofins Analytical S	ervices Manager : Ar	ndrew Black
			Asbestos - AS4964	HOLD	Polycyclic Aromatic Hydrocarbons	Metals M8	Moisture Set	Eurofins Suite B1								
Melbo	ourne Laborato	ory - NATA Sit	e # 1254 & 14271									-				
Sydne	ey Laboratory	- NATA Site #	18217			X	X	X	X	Х	X					
Brisba	ane Laborator	y - NATA Site	# 20794									-				
Perth	Laboratory - N	ATA Site # 23	3736									-				
Mayfi	eld Laboratory	1										-				
Exteri	nal Laboratory		1 1			ļ						4				
10 I	BH13 0.3-0.75	Feb 22, 2021	Soi	il	S21-Fe46464			X	X	X		-				
	BH14 0.0-0.2	Feb 22, 2021	Soi	il	S21-Fe46465			X	X	X		-				
12 I	BH15 1.1-1.4	Feb 22, 2021	Soi	il	S21-Fe46466	X		X	X	X	X	-				
13 I	D.22.2.21	Feb 22, 2021	Soi	il 	S21-Fe46467			X	X	X		-				
14	BH05 0.0-0.2	Feb 22, 2021	Soi	il 	S21-Fe46468		X					-				
15 I	BH05 1.5-1.75	Feb 22, 2021	Soi	II	S21-Fe46469		X					-				
16 I	BH05 1.75-2.0	Feb 22, 2021	Soi	il 	S21-Fe46470		X					-				
17	BH06 0.5-0.75	Feb 22, 2021	Soi	il	S21-Fe46471		X					-				
18 I	BH06 0.75- 0.90	Feb 22, 2021	Soi	il 	S21-Fe46472		x									
19 I	BH06 1.0-1.3	Feb 22, 2021	Soi	il	S21-Fe46473		Х					J				

🔅 eurofi	ins			Australia										New Zealand		
ABN: 50 005 085 521 web	: www.eurofins.cc	nvironment	Testing s@eurofins.com	Melbourne 6 Monterey Road Dandenong South VIC 3 Phone : +61 3 8564 5000 NATA # 1261 Site # 1254 & 14271	S U 175 1 D L P N	bydney Init F3, E 6 Mars I ane Cov Phone : + IATA # 2	Building Road /e West -61 2 99	F NSW 2 900 840 te # 182	8 1 2066 P 10 N 217	V21 Sma /21 Sma /urarrie Phone : - IATA #	allwood Place QLD 4172 -61 7 3902 4600 1261 Site # 20794	Perth 2/91 Leach Highway Kewdale WA 6105 Phone : +61 8 9251 9600 NATA # 1261 Site # 23736	Newcastle 4/52 Industrial Drive Mayfield East NSW 2304 PO Box 60 Wickham 2293 Phone : +61 2 4968 8448	Auckland 35 O'Rorke Road Penrose, Auckland 1061 Phone : +64 9 526 45 51 IANZ # 1327	Christchurch 43 Detroit Drive Rolleston, Christchurch 767 Phone : 0800 856 450 IANZ # 1290	
Company Name: Address:	Company Name: Qualtest Address: 8 Ironbark Close Warabrook NSW 2304					O Re Pl Fa	rder N eport hone: ax:	No.: #:		77600 02 496 02 496	3 68 4468 60 9775		Received: Due: Priority: Contact Name:	Feb 23, 2021 2:30 Mar 2, 2021 5 Day Emma Coleman	РМ	
Project Name:EJE KOORAGANGProject ID:NEW20P-0171					Eurofins Analytical									Services Manager : Andrew Black		
		Sample Detail			Asbestos - AS4964	HOLD	Polycyclic Aromatic Hydrocarbons	Metals M8	Moisture Set	Eurofins Suite B1						
Melbourne Laborat	ory - NATA	Site # 1254 & 142	71													
Sydney Laboratory	- NATA Site	# 18217			Х	Х	Х	х	х	Х						
Brisbane Laborato	ry - NATA Si	te # 20794														
Perth Laboratory -	NATA Site #	23736														
Mayfield Laborator	у															
External Laborator	у										4					
20 BH06 1.6-1.8	Feb 22, 20	21	Soil	S21-Fe46474		X			<u> </u>		4					
21 BH06 1.85-2.1	Feb 22, 202	21	Soil	S21-Fe46475		X					4					
22 BH07 0.4-0.7	Feb 22, 202	21	Soil	S21-Fe46476		X					4					
23 BH07 1.4-1.7	Feb 22, 202	21	Soil	S21-Fe46477		X			-		4					
24 BH07 1.8-1.95	Feb 22, 20	21	Soil	S21-Fe46478		X					4					
25 BH08 0.25- 0.55	Feb 22, 20	21	Soil	S21-Fe46479		x					-					
20 BH08 0.55- 0.85	Feb 22, 202	21	Soil	S21-Fe46480		X					-					
	Teb 22, 202	21	Soil	S21-F040481							1					
28 BH09 0.3-0.7	TED 22, 202	21	2011	521-Fe46482		X										

🔅 eurofin:		ns			Australia										New Zealand	
ABN: 5	0.005.085.521 web:	E www.eurofins.co	nvironment	Resting	Melbourne 6 Monterey Road Dandenong South VIC 3 Phone : +61 3 8564 500 NATA # 1261 Site # 1254 & 14271	5 U 175 1 0 L P N	bydney Init F3, E 6 Mars I ane Cov Phone : + IATA # 1	Building Road re West 61 2 99 261 Sit	F NSW 2 900 840 e # 182	8 1/ 066 P 0 N 17	risbane 21 Sma lurarrie hone : + ATA # 1	allwood Place QLD 4172 -61 7 3902 4600 1261 Site # 20794	Perth 2/91 Leach Highway Kewdale WA 6105 Phone : +61 8 9251 9600 NATA # 1261 Site # 23736	Newcastle 4/52 Industrial Drive Mayfield East NSW 2304 PO Box 60 Wickham 2293 Phone : +61 2 4968 8448	Auckland 35 O'Rorke Road Penrose, Auckland 1061 Phone : +64 9 526 45 51 IANZ # 1327	Christchurch 43 Detroit Drive Rolleston, Christchurch 7675 Phone : 0800 856 450 IANZ # 1290
Cor	mpany Name: dress:	Qualtest 8 Ironbar Warabro NSW 230				O Re Pl	rder Meport	lo.: #:	7	7600)2 496)2 496	3 68 4468 60 9775		Received: Due: Priority: Contact Name:	Feb 23, 2021 2:30 Mar 2, 2021 5 Day Emma Coleman	PM	
Pro Pro	oject Name: oject ID:		Eurofins Analytical S										ervices Manager : Ai	ndrew Black		
Sample Detail						Asbestos - AS4964	HOLD	Polycyclic Aromatic Hydrocarbons	Metals M8	Moisture Set	Eurofins Suite B1					
Melb	ourne Laborato	ory - NATA S	Site # 1254 & 1427	71												
Sydr	ey Laboratory	- NATA Site	# 18217			X	X	Х	Х	Х	Х	4				
Brisk	bane Laborator	y - NATA Sit	te # 20794								<u> </u>	4				
Perth	h Laboratory - N	NATA Site #	23736									4				
Mayf	ield Laboratory	/										4				
Exte	rnal Laboratory			Coil	CO1 E- 40400					<u> </u>	<u> </u>	4				
29	BH09 1.6-1.9	Feb 22, 202	21	Soil	S21-F646483							-				
31	BH10 1.15- 1.45	Feb 22, 202 Feb 22, 202	21	Soil	S21-Fe46485		x					-				
32	BH10 1.45-1.6	Feb 22, 202	21	Soil	S21-Fe46486		X									
33	BH11 0.45-0.9	Feb 22, 202	21	Soil	S21-Fe46487		X					-				
34	BH11 1.0-1.35	Feb 22, 202	21	Soil	S21-Fe46488		X		<u> </u>			-				
35	BH12 0.3-0.8	Feb 22, 202	21	Soil	S21-Fe46489		X					-				
36 37	BH12 0.9-1.25 BH12 1.32-	Feb 22, 202 Feb 22, 202	21 21	Soil Soil	S21-Fe46490 S21-Fe46491		X X					-				

	eurofi	ns			Australia										New Zealand	
	curon	E	nvironment 1	Testing	Melbourne 6 Monterey Road Dandenong South VIC 3 Phone : +61 3 8564 5000 NATA # 1261	175 1 0 L P	ydney Init F3, I 6 Mars ane Cov hone : -	Building Road ve West +61 2 99	F NSW 2 900 840	8 1/ 066 P 0 N	risban /21 Sma lurarrie hone : - ATA #	e allwood Place QLD 4172 +61 7 3902 4600 1261 Site # 20794	Perth 2/91 Leach Highway Kewdale WA 6105 Phone : +61 8 9251 9600 NATA # 1261	Newcastle 4/52 Industrial Drive Mayfield East NSW 2304 PO Box 60 Wickham 2293 Phone : +61 2 4968 8448	Auckland 35 O'Rorke Road Penrose, Auckland 1061 Phone : +64 9 526 45 51 IANZ # 1327	Christchurch 43 Detroit Drive Rolleston, Christchurch 7675 Phone : 0800 856 450 IANZ # 1290
ABN: 5	0 005 085 521 web:	www.eurofins.coi	m.au email: EnviroSales	@eurofins.com	Site # 1254 & 14271	N	IATA # '	1261 Sit	te # 182	17			Site # 23736			
Co Ad	mpany Name: dress:	Qualtest 8 Ironbar Warabroo NSW 230				O Ri Pi Fa	rder N eport hone: ax:	No.: #:		77600)2 49()2 49(3 68 4468 60 9775		Received: Due: Priority: Contact Name:	Feb 23, 2021 2:30 Mar 2, 2021 5 Day Emma Coleman	PM	
Pro Pro	Project Name: EJE KOORAGANG Project ID: NEW20P-0171					Eurofins Analytical \$									ervices Manager : Aı	ndrew Black
Sample Detail						Asbestos - AS4964	HOLD	Polycyclic Aromatic Hydrocarbons	Metals M8	Moisture Set	Eurofins Suite B1					
Melb	ourne Laborate	ory - NATA S	Site # 1254 & 1427	71												
Sydr	ney Laboratory	- NATA Site	# 18217			X	X	Х	Х	Х	Х					
Brist	bane Laborator	y - NATA Sit	e # 20794													
Pert	h Laboratory - I	NATA Site #	23736									_				
Mayf	field Laboratory	/										-				
Exte	rnal Laboratory	/	1 1									-				
38	BH13 0.0-0.15	Feb 22, 202	21	Soil	S21-Fe46492		X					-				
39	BH13 0.15- 1.45	Feb 22, 202	21	Soil	S21-Fe46493		x									
40	BH14 0.3-0.8	Feb 22, 202	21	Soil	S21-Fe46494		Х									
41	BH14 0.95- 1.35	Feb 22, 202	21	Soil	S21-Fe46495		x									
42	BH14 2.0-2.30	Feb 22, 202	21	Soil	S21-Fe46496		х									
43	BH15 0.0-0.2	Feb 22, 202	21	Soil	S21-Fe46497		х									
44	BH15 0.55-0.9	Feb 22, 202	21	Soil	S21-Fe46498		Х									
45	BH15 1.75-2.1	Feb 22, 202	21	Soil	S21-Fe46499		Х									
Test	Counts					7	32	13	13	13	7					



Internal Quality Control Review and Glossary

General

1. QC data may be available on request.

- 2. All soil results are reported on a dry basis, unless otherwise stated.
- 3. Samples were analysed on an 'as received' basis.
- 4. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
- 5. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

Units

% w/w: weight for weight b	pasis	grams per kilogram
Filter loading:		fibres/100 graticule areas
Reported Concentration:		fibres/mL
Flowrate:		L/min
Terms		
Dry	Sample is dried by heating prior to analysis	
LOR	Limit of Reporting	
COC	Chain of Custody	
SRA	Sample Receipt Advice	
ISO	International Standards Organisation	
AS	Australian Standards	
WA DOH	Reference document for the NEPM. Government of Western Austr Sites in Western Australia (2009), including supporting document F	alia, Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Recommended Procedures for Laboratory Analysis of Asbestos in Soil (2011)
NEPM	National Environment Protection (Assessment of Site Contamination	on) Measure, 2013 (as amended)
ACM	Asbestos Containing Materials. Asbestos contained within a non-a: NEPM, ACM is generally restricted to those materials that do not p	sbestos matrix, typically presented in bonded and/or sound condition. For the purposes of the ass a 7mm x 7mm sieve.
AF	Asbestos Fines. Asbestos containing materials, including friable, w equivalent to "non-bonded / friable".	eathered and bonded materials, able to pass a 7mm x 7mm sieve. Considered under the NEPM as
FA	Fibrous Asbestos. Asbestos containing materials in a friable and/or materials that do not pass a 7mm x 7mm sieve.	r severely weathered condition. For the purposes of the NEPM, FA is generally restricted to those
Friable	Asbestos-containing materials of any size that may be broken or cr outside of the laboratory's remit to assess degree of friability.	rumbled by hand pressure. For the purposes of the NEPM, this includes both AF and FA. It is
Trace Analysis	Analytical procedure used to detect the presence of respirable fibre	as in the matrix.



Comments

The samples received were not collected in an approved asbestos bag and was therefore sub-sampled from the 250mL glass jar. Valid subsampling procedures were applied so as to ensure that the sub-samples to be analysed accurately represented the samples received.

Sample Integrity	
Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

CodeDescriptionN/ANot applicable

Asbestos Counter/Identifier:

Sayeed Abu

Senior Analyst-Asbestos (NSW)

Authorised by:

Chamath JHM Annakkage

e Senior Analyst-Asbestos (NSW)

Glenn Jackson General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.



Qualtest 8 Ironbark Close Warabrook NSW 2304

Attention:

Emma Coleman

Report Project name Project ID Received Date **776003-S** EJE KOORAGANG NEW20P-0171 Feb 23, 2021

Client Sample ID			BH05 0.5-0.8	BH06 0.0-0.3	BH07 0.0-0.25	BH08 0.0-0.25
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S21-Fe46455	S21-Fe46456	S21-Fe46457	S21-Fe46458
Date Sampled			Feb 22, 2021	Feb 22, 2021	Feb 22, 2021	Feb 22, 2021
Test/Reference	LOR	Unit				
BTEX						
Benzene	0.1	mg/kg	< 0.1	-	< 0.1	-
Toluene	0.1	mg/kg	< 0.1	-	< 0.1	-
Ethylbenzene	0.1	mg/kg	< 0.1	-	< 0.1	-
m&p-Xylenes	0.2	mg/kg	< 0.2	-	< 0.2	-
o-Xylene	0.1	mg/kg	< 0.1	-	< 0.1	-
Xylenes - Total*	0.3	mg/kg	< 0.3	-	< 0.3	-
4-Bromofluorobenzene (surr.)	1	%	132	-	77	-
Total Recoverable Hydrocarbons - 2013 NEPM Fract	ions					
Naphthalene ^{N02}	0.5	mg/kg	< 0.5	-	< 0.5	-
TRH C6-C10	20	mg/kg	< 20	-	< 20	-
TRH C6-C10 less BTEX (F1) ^{N04}	20	mg/kg	< 20	-	< 20	-
TRH >C10-C16	50	mg/kg	< 50	-	< 50	-
TRH >C10-C16 less Naphthalene (F2) ^{N01}	50	mg/kg	< 50	-	< 50	-
TRH >C16-C34	100	mg/kg	< 100	-	< 100	-
TRH >C34-C40	100	mg/kg	< 100	-	< 100	-
TRH >C10-C40 (total)*	100	mg/kg	< 100	-	< 100	-
Total Recoverable Hydrocarbons						
TRH C6-C9	20	mg/kg	< 20	-	< 20	-
Total Recoverable Hydrocarbons - 1999 NEPM Fract	ions					
TRH C10-C14	20	mg/kg	< 20	-	< 20	-
TRH C15-C28	50	mg/kg	< 50	-	< 50	-
TRH C29-C36	50	mg/kg	< 50	-	< 50	-
TRH C10-C36 (Total)	50	mg/kg	< 50	-	< 50	-
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene ^{N07}	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5





Accredited for compliance with ISO/IEC 17025 – Testing The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.



Client Sample ID Sample Matrix			BH05 0.5-0.8 Soil	BH06 0.0-0.3 Soil	BH07 0.0-0.25 Soil	BH08 0.0-0.25 Soil
Eurofins Sample No.			S21-Fe46455	S21-Fe46456	S21-Fe46457	S21-Fe46458
Date Sampled			Feb 22, 2021	Feb 22, 2021	Feb 22, 2021	Feb 22, 2021
Test/Reference	LOR	Unit		,	,	,
Polycyclic Aromatic Hydrocarbons	LOIN	Onit				
Chrvsene	0.5	ma/ka	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	63	68	61	56
p-Terphenyl-d14 (surr.)	1	%	96	82	92	86
Heavy Metals						
Arsenic	2	mg/kg	2.5	3.0	3.9	4.5
Cadmium	0.4	mg/kg	< 0.4	< 0.4	4.2	1.0
Chromium	5	mg/kg	< 5	8.3	23	10
Copper	5	mg/kg	< 5	5.6	8.1	7.4
Lead	5	mg/kg	< 5	14	20	14
Mercury	0.1	mg/kg	< 0.1	< 0.1	1.0	0.2
Nickel	5	mg/kg	< 5	6.0	5.2	6.2
Zinc	5	mg/kg	28	56	72	51
% Moisture	1	%	6.3	9.2	7.4	12

Client Sample ID			BH09 0.0-0.2	BH09 0.95-1.3	BH10 0.0-0.25	BH11 0.0-0.45
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S21-Fe46459	S21-Fe46460	S21-Fe46461	S21-Fe46462
Date Sampled			Feb 22, 2021	Feb 22, 2021	Feb 22, 2021	Feb 22, 2021
Test/Reference	LOR	Unit				
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	-	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	-	< 0.3
4-Bromofluorobenzene (surr.)	1	%	80	72	-	71
Total Recoverable Hydrocarbons - 2013 NEPM Fract	ions					
Naphthalene ^{N02}	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	-	< 20
TRH C6-C10 less BTEX (F1) ^{N04}	20	mg/kg	< 20	< 20	-	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	-	< 50
TRH >C10-C16 less Naphthalene (F2) ^{N01}	50	mg/kg	< 50	< 50	-	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	-	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	-	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100	-	< 100
Total Recoverable Hydrocarbons						
TRH C6-C9	20	mg/kg	< 20	< 20	-	< 20



Client Sample ID			BH09 0.0-0.2	BH09 0.95-1.3	BH10 0.0-0.25	BH11 0.0-0.45
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S21-Fe46459	S21-Fe46460	S21-Fe46461	S21-Fe46462
Date Sampled			Feb 22, 2021	Feb 22, 2021	Feb 22, 2021	Feb 22, 2021
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fract	ions	1				
TRH C10-C14	20	mg/kg	< 20	< 20	-	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	-	69
TRH C29-C36	50	mg/kg	< 50	< 50	-	54
TRH C10-C36 (Total)	50	mg/kg	< 50	< 50	-	123
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene ^{N07}	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	0.5	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	0.5	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	62	68	60	61
p-Terphenyl-d14 (surr.)	1	%	89	104	88	89
Heavy Metals						
Arsenic	2	mg/kg	4.9	< 2	6.7	4.3
Cadmium	0.4	mg/kg	< 0.4	< 0.4	1.8	< 0.4
Chromium	5	mg/kg	11	< 5	290	10
Copper	5	mg/kg	< 5	< 5	18	< 5
Lead	5	mg/kg	16	6.9	35	11
Mercury	0.1	mg/kg	< 0.1	0.1	0.4	< 0.1
Nickel	5	mg/kg	5.5	< 5	16	5.0
Zinc	5	mg/kg	43	21	73	43
		1				
% Moisture	1	%	5.7	3.4	6.9	6.6



Client Sample ID			BH12 0.0-0.15	BH13 0.3-0.75	BH14 0.0-0.2	BH15 1.1-1.4
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S21-Fe46463	S21-Fe46464	S21-Fe46465	S21-Fe46466
Date Sampled			Feb 22, 2021	Feb 22, 2021	Feb 22, 2021	Feb 22, 2021
Test/Reference	LOR	Unit	, i		, i	
BTEX		0				
Benzene	0.1	ma/ka	< 0.1	_	-	< 0.1
Toluene	0.1	ma/ka	< 0.1	_	-	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	-	-	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	-	-	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	-	-	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	-	-	< 0.3
4-Bromofluorobenzene (surr.)	1	%	82	-	-	80
Total Recoverable Hydrocarbons - 2013 NEPM Fract	ions					
Naphthalene ^{N02}	0.5	mg/kg	< 0.5	-	-	< 0.5
TRH C6-C10	20	mg/kg	< 20	-	-	< 20
TRH C6-C10 less BTEX (F1) ^{N04}	20	mg/kg	< 20	-	-	< 20
TRH >C10-C16	50	mg/kg	< 50	-	-	< 50
TRH >C10-C16 less Naphthalene (F2) ^{N01}	50	mg/kg	< 50	-	-	< 50
TRH >C16-C34	100	mg/kg	< 100	-	-	< 100
TRH >C34-C40	100	mg/kg	< 100	-	-	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	-	-	< 100
Total Recoverable Hydrocarbons						
TRH C6-C9	20	mg/kg	< 20	-	-	< 20
Total Recoverable Hydrocarbons - 1999 NEPM Fract	ions					
TRH C10-C14	20	mg/kg	< 20	-	-	< 20
TRH C15-C28	50	mg/kg	< 50	-	-	< 50
TRH C29-C36	50	mg/kg	< 50	-	-	< 50
TRH C10-C36 (Total)	50	mg/kg	< 50	-	-	< 50
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene ^{N07}	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	77	70	67	70
p-Terphenyl-d14 (surr.)	1	%	85	97	84	99



Client Sample ID Sample Matrix Eurofins Sample No.			BH12 0.0-0.15 Soil S21-Fe46463	BH13 0.3-0.75 Soil S21-Fe46464	BH14 0.0-0.2 Soil S21-Fe46465	BH15 1.1-1.4 Soil S21-Fe46466
		1.1	Feb 22, 2021	Feb 22, 2021	Feb 22, 2021	Feb 22, 2021
Heavy Metals	LUR	Unit				
Arsenic	2	mg/kg	5.4	< 2	4.3	2.3
Cadmium	0.4	mg/kg	< 0.4	19	1.7	< 0.4
Chromium	5	mg/kg	17	9.9	150	7.2
Copper	5	mg/kg	< 5	< 5	140	< 5
Lead	5	mg/kg	13	< 5	22	< 5
Mercury	0.1	mg/kg	< 0.1	3.0	0.2	< 0.1
Nickel	5	mg/kg	< 5	< 5	8.1	< 5
Zinc	5	mg/kg	44	22	61	25
% Moisture	1	%	4.3	33	5.4	13

Client Sample ID			D.22.2.21
Sample Matrix			Soil
Eurofins Sample No.			S21-Fe46467
Date Sampled			Feb 22, 2021
Test/Reference	LOR	Unit	
Polycyclic Aromatic Hydrocarbons			
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2
Acenaphthene	0.5	mg/kg	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5
Anthracene	0.5	mg/kg	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5
Benzo(b&j)fluoranthene ^{N07}	0.5	mg/kg	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5
Chrysene	0.5	mg/kg	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5
Fluorene	0.5	mg/kg	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5
Naphthalene	0.5	mg/kg	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5
Pyrene	0.5	mg/kg	< 0.5
Total PAH*	0.5	mg/kg	< 0.5
2-Fluorobiphenyl (surr.)	1	%	67
p-Terphenyl-d14 (surr.)	1	%	105
Heavy Metals			
Arsenic	2	mg/kg	2.4
Cadmium	0.4	mg/kg	< 0.4
Chromium	5	mg/kg	< 5
Copper	5	mg/kg	< 5
Lead	5	mg/kg	5.9
Mercury	0.1	mg/kg	< 0.1
Nickel	5	mg/kg	< 5
Zinc	5	mg/kg	30



Client Sample ID Sample Matrix Eurofins Sample No. Date Sampled Test/Reference	LOR	Unit	D.22.2.21 Soil S21-Fe46467 Feb 22, 2021
	LUR	Unit	
% Moisture	1	%	6.9



Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported. A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Eurofins Suite B1	-		-
BTEX	Sydney	Feb 26, 2021	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Feb 26, 2021	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Feb 26, 2021	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons	Sydney	Feb 26, 2021	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Sydney	Feb 26, 2021	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Polycyclic Aromatic Hydrocarbons	Sydney	Feb 26, 2021	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Metals M8	Sydney	Feb 26, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
% Moisture	Sydney	Feb 24, 2021	14 Days
- Method: LTM-GEN-7080 Moisture			

	eurofi	ns			Australia										New Zealand	
	Curon	Env	vironment	Testing	Melbourne 6 Monterey Road Dandenong South VIC 3 Phone : +61 3 8564 5000 NATA # 1261	8 U 175 1 D L P	bydney Init F3, E 6 Mars F ane Cov Phone : +	Building Road ve West 61 2 99	F NSW 2	8 1/ M 066 PI 0 N	risbane (21 Sma lurarrie hone : - ATA #	e allwood Place QLD 4172 +61 7 3902 4600 1261 Site # 20794	Perth 2/91 Leach Highway Kewdale WA 6105 Phone : +61 8 9251 9600 NATA # 1261	Newcastle 4/52 Industrial Drive Mayfield East NSW 2304 PO Box 60 Wickham 2293 Phone : +61 2 4968 8448	Auckland 35 O'Rorke Road Penrose, Auckland 1061 Phone : +64 9 526 45 51 IANZ # 1327	Christchurch 43 Detroit Drive Rolleston, Christchurch 7675 Phone : 0800 856 450 IANZ # 1290
ABN: 5	50 005 085 521 web:	www.eurofins.com.	au email: EnviroSale	es@eurofins.com	Site # 1254 & 14271	N	IATA # 1	261 Sit	e # 182	17			Site # 23736			
Co Ad	ompany Name: Idress:	Qualtest 8 Ironbark Warabrook NSW 2304	Close				Or Re Pr Fa	rder N eport none: ax:	lo.: #:	7 0 0	77600)2 490)2 490	3 58 4468 60 9775		Received: Due: Priority: Contact Name:	Feb 23, 2021 2:30 Mar 2, 2021 5 Day Emma Coleman	РМ
Pro Pro	oject Name: oject ID:	EJE KOOR NEW20P-0	AGANG)171											Eurofins Analytical S	ervices Manager : Ar	drew Black
		s	Sample Detail			Asbestos - AS4964	HOLD	Polycyclic Aromatic Hydrocarbons	Metals M8	Moisture Set	Eurofins Suite B1					
Melk	bourne Laborato	ory - NATA Sit	e # 1254 & 142	271								4				
Syd	ney Laboratory	- NATA Site #	18217			Х	X	Х	X	Х	Х	4				
Bris	bane Laborator	y - NATA Site	# 20794									4				
Pert	n Laboratory - N	IATA Site # 2	3736						<u> </u>			4				
way	meia Laboratory						+					4				
No	Sample ID	Sample Date	e Sampling Time	Matrix	LAB ID							-				
1	BH05 0.5-0.8	Feb 22, 2021		Soil	S21-Fe46455	Х		х	х	х	Х	1				
2	BH06 0.0-0.3	Feb 22, 2021		Soil	S21-Fe46456			Х	Х	Х]				
3	BH07 0.0-0.25	Feb 22, 2021		Soil	S21-Fe46457	Х		х	Х	Х	Х					
4	BH08 0.0-0.25	Feb 22, 2021		Soil	S21-Fe46458			х	х	Х						
5	BH09 0.0-0.2	Feb 22, 2021		Soil	S21-Fe46459	Х		х	Х	х	Х					
6	BH09 0.95-1.3	Feb 22, 2021		Soil	S21-Fe46460	Х		х	Х	Х	Х					
7	BH10 0.0-0.25	Feb 22, 2021		Soil	S21-Fe46461			Х	Х	Х						
8	BH11 0.0-0.45	Feb 22, 2021		Soil	S21-Fe46462	Х		Х	Х	Х	Х					
9	BH12 0.0-0.15	Feb 22, 2021		Soil	S21-Fe46463	Х		Х	Х	Х	Х					

Company Name: Balance Testing Below Testing Byte Testing Below T	
Company Name: Qualitiest Received: Feb 23, 2021 2:30 P Address: B forbahk Close Warabnook Project Name: EJE KOORAGANG Project Name: EJE KOORAGANG Project Name: EJE KOORAGANG Project D: NEW20P-0171 Eurofins Analytical Services Manager : And Sample Detail Image: State # 1254 & 14271 X X X Subscript: T X X X X X Melbourne Laboratory - NATA Site # 1254 & 14271 X X X Sydney Laboratory - NATA Site # 1254 & 14271 X X X Sydney Laboratory - NATA Site # 1254 & 14271 X X X Sydney Laboratory - NATA Site # 1254 & 14271 X X X Sydney Laboratory - NATA Site # 1254 & 14271 X X X Sydney Laboratory - NATA Site # 1254 & 14271 X X X Sydney Laboratory - NATA Site # 1254 & 14271 X X X Sydney Laboratory - NATA Site # 1254 & 14271 X X X Sydney Laboratory - NATA Site # 1254 & 14271 X X X Sydney Laboratory - NATA Site # 1254 & 14271 X X X Sydney Laboratory - NATA Site # 1254 & 14271 X X X </th <th>Christchurch 43 Detroit Drive Rolleston, Christchurch 76: Phone : 0800 856 450 IANZ # 1290</th>	Christchurch 43 Detroit Drive Rolleston, Christchurch 76: Phone : 0800 856 450 IANZ # 1290
Company Name: Qualtest Prior Report #: Trons Report #: Received: Feb 23, 2021 2:30 P Address: Warabrook Warabrook NSW 2304 NSW 2304 Due: Mar 2, 2021 Project Name: ELE KOORAGANG Fax: 02 4960 9775 Contact Name: Emma Coleman Project ID: NEW20P-0171 NEW20P-0171 Eurofins Analytical Services Manager : And Eurofins Analytical Services Manager : And Sample Detail Methourne Laboratory - NATA Site # 1254 & 14271 X <th></th>	
Project Name: EJE KOORAGANG NEW20P-0171 Eurofins Analytical Services Manager : And Build Laboratory - NATA Site # 1254 & 14271 No	4
Sample Detail Age of the second s	rew Black
Melbourne Laboratory - NATA Site # 1254 & 14271Image: Nata Site # 18217Nata Site # 18217Nata Site # 18217Sydner Laboratory - NATA Site # 18217Nata Site # 20794Nata Site # 20794Nata Site # 20794Perth Laboratory - NATA Site # 20794Image: Nata Site # 20794Image: Nata Site # 20794Perth Laboratory - NATA Site # 20794Image: Nata Site # 20794Image: Nata Site # 20794Nata Site # 20794Image: Nata Site # 20794Image: Nata Site # 20794Perth Laboratory - NATA Site # 20794Image: Nata Site # 20794Nata Site # 20794Image: Nata Site # 20794Nata Site # 20794Nata Site # 20794Nata Site # 20794Nata Site # 20794Image: Nata Site # 20794Nata Site # 20794SoliS21-Fe46466Nata Site # 20794SoliS21-Fe46466Nata Site # 20794SoliS21-Fe46466Nata Site # 20794SoliS21-Fe46466Nata Site # 20794SoliSoliS21-Fe46466Nata Site # 20794SoliSoli<th colspan="4</th> <th></th>	
Sydney Laboratory - NATA Site # 18217 X	
Brisbane Laboratory - NATA Site # 20794 Image: Site # 20794 Perth Laboratory - NATA Site # 23736 Image: Site # 23736 <	
Perth Laboratory - NATA Site # 23736 Image: NATA Site # 23736 Mayfield Laboratory Image: NATA Site # 23736 Image: National Site in the Site in t	
Mayfield Laboratory Image: Constraint of the system of	
External Laboratory Soil S21-Fe46464 X X X 10 BH13 0.3-0.75 Feb 22, 2021 Soil S21-Fe46464 X X X 11 BH14 0.0-0.2 Feb 22, 2021 Soil S21-Fe46465 X X X 12 BH15 1.1-1.4 Feb 22, 2021 Soil S21-Fe46466 X X X 13 D.22.2.21 Feb 22, 2021 Soil S21-Fe46467 X X X 14 BH05 0.0-0.2 Feb 22, 2021 Soil S21-Fe46468 X V X	
10 BH13 0.3-0.75 Feb 22, 2021 Soil S21-Fe46464 X X X X 11 BH14 0.0-0.2 Feb 22, 2021 Soil S21-Fe46465 X X X X 12 BH15 1.1-1.4 Feb 22, 2021 Soil S21-Fe46466 X X X X 13 D.22.2.21 Feb 22, 2021 Soil S21-Fe46467 X X X 14 BH05 0.0-0.2 Feb 22, 2021 Soil S21-Fe46468 X X X	
11 BH14 0.0-0.2 Feb 22, 2021 Soil S21-Fe46465 X X X X 12 BH15 1.1-1.4 Feb 22, 2021 Soil S21-Fe46466 X X X X 13 D.22.2.21 Feb 22, 2021 Soil S21-Fe46467 X X X 14 BH05 0.0-0.2 Feb 22, 2021 Soil S21-Fe46468 X V V	
12 BH15 1.1-1.4 Feb 22, 2021 Soil S21-Fe46466 X X X X X 13 D.22.2.21 Feb 22, 2021 Soil S21-Fe46467 X X X X 14 BH05 0.0-0.2 Feb 22, 2021 Soil S21-Fe46468 X Image: Control of the second seco	
13 D.22, 2.21 Feb 22, 2021 Soil S21-Fe4b4b7 X	
14 BRUS U.U-U.Z FED ZZ, ZUZ1 SOII SZ1-F646468 X	
15 BHU5 1.5-1./5 Feb 22, 2021 Soil S21-Fe46469 X 40 DU05 4.75 0.0 E=h 00, 0004 Doil D04 E=40470 V	
10 BHUS 1.75-2.0 Feb 22, 2021 Soli S21-Fe4b470 X 47 DU00 0 5 0 75 Esh 20, 2024 Doi:	
17 BH06 0.5-0.75 Feb 22, 2021 Soil S21-Fe46471 X 18 BH06 0.75- 0.90 Feb 22, 2021 Soil S21-Fe46472 X	
19 BH06 1.0-1.3 Feb 22, 2021 Soil S21-Fe46473 X	

🥵 eurofi	ns			Australia										New Zealand	
ABN: 50 005 085 521 web:	www.eurofins.com	Environment Testing		Melbourne 6 Monterey Road Dandenong South VIC 3175 Phone : +61 3 8564 5000 NATA # 1261 Site # 1254 8 14071		Sydney Unit F3, Building F 16 Mars Road Lane Cove West NSW 2066 Phone : +61 2 9900 8400 NATA # 1261 Site # 18217			8 1, 2066 P 10 N 217	Brisbane 1/21 Smallwood Place Murarrie QLD 4172 Phone : +61 7 3902 4600 NATA # 1261 Site # 20794		Perth 2/91 Leach Highway Kewdale WA 6105 Phone : +61 8 9251 9600 NATA # 1261 Site # 23736	Newcastle 4/52 Industrial Drive Mayfield East NSW 2304 PO Box 60 Wickham 2293 Phone : +61 2 4968 8448	Auckland 35 O'Rorke Road Penrose, Auckland 1061 Phone : +64 9 526 45 51 IANZ # 1327	Christchurch 43 Detroit Drive Rolleston, Christchurch 767 Phone : 0800 856 450 IANZ # 1290
Company Name: Address:	Company Name: Qualtest Address: 8 Ironbark Close Warabrook NSW 2304					O R Pi Fa	rder I eport hone: ax:	No.: #:		77600 02 496 02 496	3 68 4468 60 9775		Received: Due: Priority: Contact Name:	Feb 23, 2021 2:30 Mar 2, 2021 5 Day Emma Coleman	PM
Project Name: Project ID:	EJE KOO NEW20P-	RAGANG 0171											Eurofins Analytical S	Services Manager : A	ndrew Black
		Sample Detail			Asbestos - AS4964	HOLD	Polycyclic Aromatic Hydrocarbons	Metals M8	Moisture Set	Eurofins Suite B1					
Melbourne Laborat	ory - NATA Si	ite # 1254 & 14271													
Sydney Laboratory	- NATA Site	# 18217			Х	X	х	х	х	х	_				
Brisbane Laborator	ry - NATA Site	e # 20794				1	ļ				4				
Perth Laboratory -	NATA Site # 2	3736					 								
Mayfield Laborator	у										4				
External Laboratory	y				<u> </u>	1					_				
20 BH06 1.6-1.8	Feb 22, 202	1 Soil		S21-Fe46474		X					4				
21 BH06 1.85-2.1	Feb 22, 202	1 Soil		S21-Fe46475		X					-				
22 BH07 0.4-0.7	Feb 22, 202	I Soil		S21-Fe46476		X					4				
23 BH07 1.4-1.7	Feb 22, 202	I Soil		S21-Fe46477		X					4				
24 BH07 1.8-1.95	Feb 22, 202	I Soil		S21-Fe46478		X					-				
25 BH08 0.25- 0.55 26 BH08 0.55-	Feb 22, 202			S21-Fe46479		x					-				
0.85	1 00 22, 202			521-1640400		X					_				
27 BH08 0.9-1.2	Feb 22, 202	1 Soil		S21-Fe46481		X					_				
28 BH09 0.3-0.7	Feb 22, 202	1 Soil		S21-Fe46482		Х									

🔅 eurofir		Environment Testing			Australia										New Zealand	New Zealand		
				Melbourne 6 Monterey Road Dandenong South VIC 3 Phone : +61 3 8564 5000 NATA # 1261 Site # 1264 \$ 14274	S U 175 1) L P	bydney Init F3, I 6 Mars ane Cov Phone : -	Building Road /e West -61 2 99	F t NSW 2 900 840	8 1, 2066 P 0 N	Visban 21 Sm Aurarrie Phone : IATA #	e allwood Place QLD 4172 ⊧61 7 3902 4600 1261 Site # 20794	Perth 2/91 Leach Highway Kewdale WA 6105 Phone : +61 8 9251 9600 NATA # 1261 Site # 20726	Newcastle 4/52 Industrial Drive Mayfield East NSW 2304 PO Box 60 Wickham 2293 Phone : +61 2 4968 8448	Auckland 35 O'Rorke Road Penrose, Auckland 1061 Phone : +64 9 526 45 51 IANZ # 1327	Christchurch 43 Detroit Drive Rolleston, Christchurch 767 Phone : 0800 856 450 IANZ # 1290			
ABN: 50 0	105 085 521 Web:	www.euronns.	com.au ema	an: EnviroSales@euronns.com	Sile # 1254 & 14271	IN	IATA #	1201 51	.e # 182	.17			Sile # 23736					
Comp Addro	pany Name: ess:	Qualtes 8 Ironba Warabr NSW 2	st ark Close ook 304	3			Order No.: Report #: Phone: Fax:			(77600 02 49 02 49	93 68 4468 60 9775		Received: Due: Priority: Contact Name:	Feb 23, 2021 2:30 Mar 2, 2021 5 Day Emma Coleman	РМ		
Proje Proje	ect Name: ect ID:	EJE KO NEW20)ORAGA)P-0171	NG										Eurofins Analytical S	ervices Manager : A	ndrew Black		
			Samp	le Detail		Asbestos - AS4964	HOLD	Polycyclic Aromatic Hydrocarbons	Metals M8	Moisture Set	Eurofins Suite B1							
Melbou	urne Laborate	ory - NATA	Site # 1	254 & 14271								_						
Sydney	y Laboratory	- NATA Sit	te # 1821	7		Х	X	Х	X	X	Х	_						
Brisba	ne Laborator	y - NATA S	Site # 207	794					<u> </u>			_						
Perth L	Laboratory - I	NATA Site	# 23736									_						
Mayfie	Id Laboratory	/							<u> </u>			_						
Extern	al Laboratory		204									-						
29 B	HU9 1.6-1.9	Feb 22, 2	021	Soll	S21-Fe46483				+		-	-						
30 B 31 B 1.	H10 1.15-0.8 .45	Feb 22, 20	021	Soil	S21-Fe46485		x		+			-						
32 B	H10 1.45-1.6	Feb 22, 2	021	Soil	S21-Fe46486		X				L]						
33 B	H11 0.45-0.9	Feb 22, 2	021	Soil	S21-Fe46487		Х											
34 B	H11 1.0-1.35	Feb 22, 2	021	Soil	S21-Fe46488		х											
35 B	H12 0.3-0.8	Feb 22, 2	021	Soil	S21-Fe46489		х											
36 B	H12 0.9-1.25	Feb 22, 2	021	Soil	S21-Fe46490		x											
37 B 1.	H12 1.32- .60	Feb 22, 2	021	Soil	S21-Fe46491		х											

😫 eurofins 🗉				Australia										New Zealand	
ABN: 50 005 085 521 web:			Melbourne 6 Monterey Road Dandenong South VIC 3 Phone : +61 3 8564 5000 NATA # 1261 Site # 1254 & 14271	8 U 175 1 0 L P N	ydney Init F3, I 6 Mars ane Cov hone : - IATA #	Building Road /e West -61 2 99	F NSW 2 900 840 te # 182	8 1/ 2066 P 0 N 217	risbane /21 Sma lurarrie (hone : + ATA # 1	allwood Place QLD 4172 -61 7 3902 4600 1261 Site # 20794	Perth 2/91 Leach Highway Kewdale WA 6105 Phone : +61 8 9251 9600 NATA # 1261 Site # 23736	Newcastle 4/52 Industrial Drive Mayfield East NSW 2304 PO Box 60 Wickham 2293 Phone : +61 2 4968 8448	Auckland 35 O'Rorke Road Penrose, Auckland 1061 Phone : +64 9 526 45 51 IANZ # 1327	Christchurch 43 Detroit Drive Rolleston, Christchurch 76 Phone : 0800 856 450 IANZ # 1290	
Company Name: Qualtest Address: 8 Ironbark Close Warabrook NSW 2304					O Ri Pi Fa	rder N eport hone: ax:	No.: #:		77600 02 496 02 496	3 68 4468 60 9775		Received: Due: Priority: Contact Name:	Feb 23, 2021 2:30 Mar 2, 2021 5 Day Emma Coleman	PM	
Project Name: Project ID:	EJE KOOR NEW20P-0	AGANG 171											Eurofins Analytical S	Services Manager : A	ndrew Black
	S	ample Detail			Asbestos - AS4964	HOLD	Polycyclic Aromatic Hydrocarbons	Metals M8	Moisture Set	Eurofins Suite B1					
Melbourne Laborat	ory - NATA Site	e # 1254 & 14271													
Sydney Laboratory	- NATA Site #	18217			Х	X	Х	x	X	х	_				
Brisbane Laborator	y - NATA Site	# 20794									-				
Perth Laboratory -	NATA Site # 23	736									-				
Mayfield Laborator	/														
	Eab 22, 2024			S21 E046402							-				
39 BH13 0.15- 1.45	Feb 22, 2021 Feb 22, 2021	Soil		S21-Fe46492		x									
40 BH14 0.3-0.8	Feb 22, 2021	Soil		S21-Fe46494		х									
41 BH14 0.95- 1.35	Feb 22, 2021	Soil		S21-Fe46495		х									
42 BH14 2.0-2.30	Feb 22, 2021	Soil		S21-Fe46496		X					-				
43 BH15 0.0-0.2	Feb 22, 2021	Soil		S21-Fe46497		X					-				
44 BH15 0.55-0.9	Feb 22, 2021	Soil		S21-Fe46498		X					-				
45 BH15 1.75-2.1	Feb 22, 2021	Soil		S21-Fe46499		Х									
Test Counts					7	32	13	13	13	7					



Internal Quality Control Review and Glossary

General

- Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site 1. Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
- 2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
- 3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
- Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
- 5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds
- 6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
- 7. Samples were analysed on an 'as received' basis.
- 8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
- This report replaces any interim results previously issued. 9.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days. **NOTE: pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	ug/L: micrograms per litre
ppm: Parts per million	ppb: Parts per billion	%: Percentage
org/100mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms	
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
сос	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
СР	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

- 1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
- 2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
- 3. Organochlorine Pesticide analysis where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
- 4. Organochlorine Pesticide analysis where reporting Spike data, Toxaphene is not added to the Spike.
- Total Recoverable Hydrocarbons where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported 5. in the C10-C14 cell of the Report.
- 6. pH and Free Chlorine analysed in the laboratory Analysis on this test must begin within 30 minutes of sampling. Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
- 7. Recovery Data (Spikes & Surrogates) where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
- 8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
- 9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
- 10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.



Quality Control Results

Test	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
Method Blank		r	1	1		
ВТЕХ						
Benzene	mg/kg	< 0.1		0.1	Pass	
Toluene	mg/kg	< 0.1		0.1	Pass	
Ethylbenzene	mg/kg	< 0.1		0.1	Pass	
m&p-Xylenes	mg/kg	< 0.2		0.2	Pass	
o-Xylene	mg/kg	< 0.1		0.1	Pass	
Xylenes - Total*	mg/kg	< 0.3		0.3	Pass	
Method Blank		1				
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene	mg/kg	< 0.5		0.5	Pass	
TRH C6-C10	mg/kg	< 20		20	Pass	
TRH >C10-C16	mg/kg	< 50		50	Pass	
TRH >C16-C34	mg/kg	< 100		100	Pass	
TRH >C34-C40	mg/kg	< 100		100	Pass	
Method Blank		1				
Total Recoverable Hydrocarbons						
TRH C6-C9	mg/kg	< 20		20	Pass	
Method Blank		1				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C10-C14	mg/kg	< 20		20	Pass	
TRH C15-C28	mg/kg	< 50		50	Pass	
TRH C29-C36	mg/kg	< 50		50	Pass	
Method Blank						
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	mg/kg	< 0.5		0.5	Pass	
Acenaphthylene	mg/kg	< 0.5		0.5	Pass	
Anthracene	mg/kg	< 0.5		0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5		0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5		0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5		0.5	Pass	
Benzo(g.h.i)perylene	mg/kg	< 0.5		0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5		0.5	Pass	
Chrysene	mg/kg	< 0.5		0.5	Pass	
Dibenz(a.h)anthracene	mg/kg	< 0.5		0.5	Pass	
Fluoranthene	mg/kg	< 0.5		0.5	Pass	
Fluorene	mg/kg	< 0.5		0.5	Pass	
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.5		0.5	Pass	
Naphthalene	mg/kg	< 0.5		0.5	Pass	
Phenanthrene	mg/kg	< 0.5		0.5	Pass	
Pyrene	mg/kg	< 0.5		0.5	Pass	
Method Blank		1		1		
Heavy Metals						
Arsenic	mg/kg	< 2		2	Pass	
Cadmium	mg/kg	< 0.4		0.4	Pass	
Chromium	mg/kg	< 5		5	Pass	
Copper	mg/kg	< 5		5	Pass	
Lead	mg/kg	< 5		5	Pass	
Mercury	mg/kg	< 0.1		0.1	Pass	
Nickel	mg/kg	< 5		5	Pass	
Zinc	mg/kg	< 5		5	Pass	
LCS - % Pocovory						



Test			Units	Result 1	Acceptance Limits	Pass Limits	Qualifying Code
ВТЕХ							
Benzene			%	75	70-130	Pass	
Toluene			%	79	70-130	Pass	
Ethylbenzene			%	104	70-130	Pass	
m&p-Xylenes			%	104	70-130	Pass	
o-Xylene			%	105	70-130	Pass	
Xylenes - Total*			%	105	70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons -	2013 NEPM Fract	ions					
Naphthalene			%	110	70-130	Pass	
TRH C6-C10			%	90	70-130	Pass	
TRH >C10-C16			%	99	70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons							
TRH C6-C9			%	90	70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons -	1999 NEPM Fract	ions					
TRH C10-C14			%	101	70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons	i						
Acenaphthene			%	73	70-130	Pass	
Acenaphthylene			%	76	70-130	Pass	
Anthracene			%	77	70-130	Pass	
Benz(a)anthracene			%	79	70-130	Pass	
Benzo(a)pyrene			%	89	70-130	Pass	
Benzo(b&j)fluoranthene			%	71	70-130	Pass	
Benzo(g.h.i)perylene			%	82	70-130	Pass	
Benzo(k)fluoranthene			%	88	70-130	Pass	
Chrysene			%	73	70-130	Pass	
Dibenz(a.h)anthracene			%	78	70-130	Pass	
Fluoranthene			%	80	70-130	Pass	
Fluorene			%	76	70-130	Pass	
Indeno(1.2.3-cd)pyrene			%	88	70-130	Pass	
Naphthalene			%	77	70-130	Pass	
Phenanthrene			%	80	70-130	Pass	
Pyrene			%	81	70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic			%	98	80-120	Pass	
Cadmium			%	97	80-120	Pass	
Chromium			%	101	80-120	Pass	
Copper			%	99	80-120	Pass	
Lead			%	97	80-120	Pass	
Mercury			%	93	80-120	Pass	
Nickel			%	100	80-120	Pass	
Zinc			%	95	80-120	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1	Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery							
BTEX				Result 1			
Benzene	S21-Ma00295	NCP	%	80	70-130	Pass	
Toluene	S21-Fe45605	NCP	%	76	70-130	Pass	
Ethylbenzene	S21-Fe45605	NCP	%	79	70-130	Pass	
m&p-Xylenes	S21-Fe45605	NCP	%	80	70-130	Pass	
o-Xylene	S21-Fe45605	NCP	%	82	70-130	Pass	



Xytense - Total S21-Fe45605 NCP % 61 70-130 Pass Spike - % Recovery Total Recoverable Hytorcarbons - 2013 NEPM Fractions Result 1 70-130 Pass Naprhalene 521-Fe45605 NCP % 90 70-130 Pass TRH Co-C10 521-Fe45605 NCP % 71 70-130 Pass TRH Co-C10 521-Fe45605 NCP % 71 70-130 Pass TRH Co-C3 521-Fe45605 NCP % 72 70-130 Pass Spike - % Recovery Total Recoverable Hytorcarbons Result 1 TRH Co-C3 521-Fe45780 NCP % 95 70-130 Pass Spike - % Recovery Total Recoverable Hytorcarbons Result 1 TRH Co-C3 521-Fe52169 NCP % 80 70-130 Pass Aceraphthene 521-Fe52169 NCP % 80 70-130 Pass	Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery Contained by type of the second se	Xylenes - Total*	S21-Fe45605	NCP	%	81			70-130	Pass	
Total Recoverable hydrocarbons - 2013 NEPH Fractions Result 1 Image 1 Provide 1 </th <th>Spike - % Recovery</th> <th></th> <th></th> <th></th> <th>1 -</th> <th></th> <th></th> <th></th> <th></th> <th></th>	Spike - % Recovery				1 -					
Naphtalene S21-Fe45605 NCP % 90 70 70 70 985 TRH C6-C10 S21-Fe46626 NCP % 94 70-130 Pass Spike - % Recovers Total Recoverable Hydrocarbons - 1999 MEPM Fractions Result 1 70-130 Pass TRH C0-C3 S21-Fe46805 NCP % 72 70-130 Pass TRH C0-C4 S21-Fe46805 NCP % 95 70-130 Pass Spike - % Recovers Total Recoverable Hydrocarbons - 1999 MEPM Fractions Result 1 70-130 Pass Spike - % Recovers S21-Fe62169 NCP % 97 70-130 Pass Acenaphthene S21-Fe62169 NCP % 80 70-130 Pass Acenaphthene S21-Fe62169 NCP % 81 70-130 Pass Benzo(a)phronen S21-Fe62169 NCP % 81 70-130 Pass Benzo(a)phronen S21-Fe62169 NCP % 83 7	Total Recoverable Hydrocarbons -	2013 NEPM Fract	ions		Result 1					
TRH JC10-C10 S21-Fe45805 NCP % 71 71 70 70 70 Pass Spike - % Recoverals Test / C10-C16 S21-Fe45805 NCP % 94 70 70 Pass TRH C-C06 S21-Fe45805 NCP % 72 70 70 70 Pass Spike - % Recovers/ Test Result 1 Test 70 70 70 Pass Spike - % Recovers/ Test Result 1 Test 70 999 NEP Features Result 1 Test 70	Naphthalene	S21-Fe45605	NCP	%	90			70-130	Pass	
TRH 2-01-0216 S21-Fe45626 NCP % 94 70 70-130 Pass Spike - % Recovery Total Recoverable hydrocarbons NCP % 72 70-130 Pass TRH C0-C3 S21-Fe45605 NCP % 72 70-130 Pass TRH C10-C14 S21-Fe45605 NCP % 95 70-130 Pass Spike - % Recovery Total Recoverable hydrocarbons Result 1 1 1 1 Canaghthmen S21-Fe452169 NCP % 80 70-130 Pass Acenaphthyden S21-Fe452169 NCP % 73 70-130 Pass Benzo(a)purpmen S21-Fe452169 NCP % 81 70-130 Pass Benzo(b)funcanhne S21-Fe452169 NCP % 74 70-130 Pass Benzo(b)funcanhne S21-Fe452169 NCP % 78 70-130 Pass Benzo(b)funcanhne S21-Fe452169 NCP % <	TRH C6-C10	S21-Fe45605	NCP	%	71			70-130	Pass	
Spike - % Recovery Result 1 Total Recoverable Hydrocarbons Result 1 Total Recoverable Hydrocarbons - 1999 NEPM Fractions Result 1 Total Recoverable Hydrocarbons - 1999 NEPM Fractions Result 1 Total Recoverable Hydrocarbons - 1999 NEPM Fractions Result 1 Total Recoverable Hydrocarbons - 1999 NEPM Fractions Result 1 Total Recoverable Hydrocarbons Result 1 Total Recoverable Hydrocarbon How 10130 Pass R	TRH >C10-C16	S21-Fe45626	NCP	%	94			70-130	Pass	
Total Recoverable Hydrocarbons S21-Fe45605 NCP % 72 70-130 Pass Splke - %, Recovery Total Recoverable Hydrocarbons - 1999 NEPM Fractions Result 1	Spike - % Recovery				•					
TRH GC-G S21-Fe45605 NCP % 72 N 70-130 Pass Spike - % Recovery Tall Recoverable Hydrocarbons - 1999 NEPM Fractions Result 1 70-130 Pass Polycelic Aromatic Hydrocarbons Keevery Result 1 NCP % 95 70-130 Pass Accenaphthene S21-Fe52163 NCP % 80 70-130 Pass Accenaphthylene S21-Fe52163 NCP % 80 70-130 Pass Benzolajpyrene S21-Fe52168 NCP % 80 70-130 Pass Benzolajpyrene S21-Fe52169 NCP % 74 70-130 Pass Benzolajpyrene S21-Fe52169 NCP % 74 70-130 Pass Benzolajhurantene S21-Fe52169 NCP % 74 70-130 Pass Chrysene S21-Fe52169 NCP % 83 70-130 Pass Phoranthrene S21-Fe52169 NCP % 85 </td <td>Total Recoverable Hydrocarbons</td> <td></td> <td></td> <td></td> <td>Result 1</td> <td></td> <td></td> <td></td> <td></td> <td></td>	Total Recoverable Hydrocarbons				Result 1					
Spike - % Recovery Vert Vert </td <td>TRH C6-C9</td> <td>S21-Fe45605</td> <td>NCP</td> <td>%</td> <td>72</td> <td></td> <td></td> <td>70-130</td> <td>Pass</td> <td></td>	TRH C6-C9	S21-Fe45605	NCP	%	72			70-130	Pass	
Total Recoverable Hydrocarbons - 1999 NEPM Fractions Result 1 model model <thmodel< th=""> model model</thmodel<>	Spike - % Recovery				•			•		
TRH C10-C14 S21-Fe65268 NCP % 95 70-130 Pass Splke - % Racovery Result 1 Result 1 70-130 Pass Acenaphthene S21-Fe52169 NCP % 78 70-130 Pass Acenaphthylene S21-Fe52169 NCP % 80 70-130 Pass Anthracene S21-Fe52169 NCP % 80 70-130 Pass Benzo(a)privene S21-Fe52169 NCP % 76 70-130 Pass Benzo(b)fluoranthene S21-Fe52169 NCP % 81 70-130 Pass Benzo(k)fluoranthene S21-Fe52169 NCP % 83 70-130 Pass Benzo(k)fluoranthene S21-Fe52169 NCP % 85 70-130 Pass Fluoranthene S21-Fe52169 NCP % 85 70-130 Pass Inden0(1.2.3-odjyrane S21-Fe52169 NCP % 84 70-130 Pass	Total Recoverable Hydrocarbons -	1999 NEPM Fract	ions		Result 1					
Spike - % Recovery Result 1 Result 1 <td>TRH C10-C14</td> <td>S21-Fe45626</td> <td>NCP</td> <td>%</td> <td>95</td> <td></td> <td></td> <td>70-130</td> <td>Pass</td> <td></td>	TRH C10-C14	S21-Fe45626	NCP	%	95			70-130	Pass	
Polycyclic Aromatic Hydrocarbons Result 1 NCP Result 1 NCP Result 1 Acenaphthene \$21:Fe52169 NCP % 78 NCP 70:130 Pass Acenaphthene \$21:Fe52169 NCP % 80 NCP 70:130 Pass Benzolahtracene \$21:Fe52169 NCP % 80 NCP 70:130 Pass Benzolahytracene \$21:Fe52169 NCP % 81 70:130 Pass Benzolahytracene \$21:Fe52169 NCP % 81 70:130 Pass Benzolahytranthene \$21:Fe52169 NCP % 83 70:130 Pass Chrysene \$21:Fe52169 NCP % 83 70:130 Pass Fluoranthene \$21:Fe52169 NCP % 84 70:130 Pass Inden0112.3-cdbyrane \$21:Fe52169 NCP % 84 70:130 Pass Inden0112.3-cdbyrane \$21:Fe52169 NCP %	Spike - % Recovery									
Acenaphthene S21-Fe52169 NCP % 78 70.130 Pass Acenaphthylene S21-Fe52169 NCP % 80 70.130 Pass Anthracene S21-Fe52169 NCP % 80 70.130 Pass Benz(a)pyrene S21-Fe52169 NCP % 76 70.130 Pass Benz(a)filuranthene S21-Fe52169 NCP % 74 70.130 Pass Benz(a)filuranthene S21-Fe52169 NCP % 78 70.130 Pass Benz(a)filuranthene S21-Fe52169 NCP % 83 70.130 Pass Chrysene S21-Fe52169 NCP % 83 70.130 Pass Fluoranthene S21-Fe52169 NCP % 88 70.130 Pass Inden(1.2.3-cd)pyrene S21-Fe52169 NCP % 84 70.130 Pass Inden(1.2.3-cd)pyrene S21-Fe52169 NCP % 84 70.130 Pass	Polycyclic Aromatic Hydrocarbons	5			Result 1					
Acenaphthylene S21-Fe52169 NCP % 80 70-130 Pass Anthracene S21-Fe52169 NCP % 80 70-130 Pass Berz(a)anthracene S21-Fe52169 NCP % 76 70-130 Pass Berz(a)hjruranthene S21-Fe52169 NCP % 76 70-130 Pass Berza(a)hjruranthene S21-Fe52169 NCP % 81 70-130 Pass Berza(a)hjaprijene S21-Fe52169 NCP % 83 70-130 Pass Chrysene S21-Fe52169 NCP % 83 70-130 Pass Fluoranthene S21-Fe52169 NCP % 85 70-130 Pass Fluorene S21-Fe52169 NCP % 88 70-130 Pass Inden(1:2.3-cd)pyrane S21-Fe52169 NCP % 84 70-130 Pass Pyrane S21-Fe52169 NCP % 84 70-130 Pass <td>Acenaphthene</td> <td>S21-Fe52169</td> <td>NCP</td> <td>%</td> <td>78</td> <td></td> <td></td> <td>70-130</td> <td>Pass</td> <td></td>	Acenaphthene	S21-Fe52169	NCP	%	78			70-130	Pass	
Anthracene S21-F652169 NCP % 80 70-130 Pass Benzo(a)prime S21-F652169 NCP % 73 70-130 Pass Benzo(a)prime S21-F652169 NCP % 74 70-130 Pass Benzo(a)prime S21-F652169 NCP % 81 70-130 Pass Benzo(a)Li)perylene S21-F652169 NCP % 83 70-130 Pass Chrysene S21-F652169 NCP % 83 70-130 Pass Diberz(a,h)anthracene S21-F652169 NCP % 85 70-130 Pass Fluoranthene S21-F652169 NCP % 85 70-130 Pass Inden(1.2.3-cd)pyrene S21-F652169 NCP % 84 70-130 Pass Naphthalene S21-F652169 NCP % 84 70-130 Pass Pyrene S21-F652169 NCP % 84 70-130 Pass	Acenaphthylene	S21-Fe52169	NCP	%	80			70-130	Pass	
Benz(a)anthracene S21-Fe52169 NCP % 73 70-130 Pass Benzo(b)furoanthene S21-Fe52169 NCP % 76 70-130 Pass Benzo(b)furoanthene S21-Fe52169 NCP % 81 70-130 Pass Benzo(b)furoanthene S21-Fe52169 NCP % 83 70-130 Pass Chrysene S21-Fe52169 NCP % 83 70-130 Pass Dibenz(a,h)anthracene S21-Fe52169 NCP % 83 70-130 Pass Fluoranthene S21-Fe52169 NCP % 85 70-130 Pass Indeno(1.2.3-od)pyrene S21-Fe52169 NCP % 84 70-130 Pass Pationthrene S21-Fe52169 NCP % 84 70-130 Pass Pyrene S21-Fe52169 NCP % 84 70-130 Pass Spike - % Recovery Heavy Metals Result 1 Netsy No-130 Pass <td>Anthracene</td> <td>S21-Fe52169</td> <td>NCP</td> <td>%</td> <td>80</td> <td></td> <td></td> <td>70-130</td> <td>Pass</td> <td></td>	Anthracene	S21-Fe52169	NCP	%	80			70-130	Pass	
Benzo(a)pyrene S21-Fe52169 NCP % 76 76 70-130 Pass Benzo(b,i)fluoranthene S21-Fe52169 NCP % 81 70-130 Pass Benzo(b,i)fluoranthene S21-Fe52169 NCP % 83 70-130 Pass Benzo(b,i)fluoranthene S21-Fe52169 NCP % 83 70-130 Pass Chrysene S21-Fe52169 NCP % 83 70-130 Pass Fluoranthene S21-Fe52169 NCP % 85 70-130 Pass Fluorene S21-Fe52169 NCP % 85 70-130 Pass Inden(1.2.3-cd)pyrene S21-Fe52169 NCP % 84 70-130 Pass Naphthalene S21-Fe52169 NCP % 82 70-130 Pass Pyrene S21-Fe52169 NCP % 82 70-130 Pass Spike - % Recovery Result 1 75-125	Benz(a)anthracene	S21-Fe52169	NCP	%	73			70-130	Pass	
Benzo(bå)fluoranthene S21-Fe38649 NCP % 81 70-130 Pass Benzo(f)uper/ene S21-Fe52169 NCP % 74 70-130 Pass Benzo(f)uroranthene S21-Fe52169 NCP % 83 70-130 Pass Dibenz(a,h)anthracene S21-Fe52169 NCP % 83 70-130 Pass Fluoranthene S21-Fe52169 NCP % 83 70-130 Pass Fluoranthene S21-Fe52169 NCP % 85 70-130 Pass Indenc(1.2.3-cd)pyrene S21-Fe52169 NCP % 88 70-130 Pass Phenanthrene S21-Fe52169 NCP % 84 70-130 Pass Spite - % Recovery Result 1 70-130 Pass 70-130 Pass Spite - % Recovery Result 1 70-130 Pass 70-130 Pass Arsenic S21-Fe32169 NCP % 84 75-125	Benzo(a)pyrene	S21-Fe52169	NCP	%	76			70-130	Pass	
Benzo(g)h.i)perylene S21-Fe52169 NCP % 74 74 70-130 Pass Benzo(k)fluoranthene S21-Fe52169 NCP % 83 70-130 Pass Dibenz(a,h)anthracene S21-Fe52169 NCP % 83 70-130 Pass Dibenz(a,h)anthracene S21-Fe52169 NCP % 85 70-130 Pass Fluoranthene S21-Fe52169 NCP % 85 70-130 Pass Indeno(1.2.3-cd)pyrene S21-Fe52169 NCP % 84 70-130 Pass Phenanthrane S21-Fe52169 NCP % 84 70-130 Pass Spike S21-Fe52169 NCP % 84 70-130 Pass Pyrene S21-Fe52169 NCP % 84 70-130 Pass Spike % Recovery Resourt Resourt 70-130 Pass Spike % Recovery Resourt Resourt 75-125 Pass	Benzo(b&j)fluoranthene	S21-Fe38649	NCP	%	81			70-130	Pass	
Benzo(k)(Ilucranthene S21-Fe52169 NCP % 83 70-130 Pass Chrysne S21-Fe52169 NCP % 78 70-130 Pass Dibenz(a,h)anthracene S21-Fe52169 NCP % 83 70-130 Pass Fluoranthene S21-Fe52169 NCP % 85 70-130 Pass Fluoranthene S21-Fe52169 NCP % 88 70-130 Pass Indeno(1.2.3-cd)pyrene S21-Fe52169 NCP % 88 70-130 Pass Phenanthrene S21-Fe52169 NCP % 82 70-130 Pass Spike * Kecovery S21-Fe52169 NCP % 82 70-130 Pass Spike * Kecovery S21-Fe52169 NCP % 82 70-130 Pass Spike * Kecovery S21-Fe62169 NCP % 82 70-130 Pass Spike * Kecovery S21-Fe64646 CP % 98 75-125 P	Benzo(g.h.i)perylene	S21-Fe52169	NCP	%	74			70-130	Pass	
Chrysene S21-Fe52169 NCP % 78 70-130 Pass Diberg(a,h)anthracene S21-Fe3269 NCP % 83 70-130 Pass Fluoranthene S21-Fe32169 NCP % 85 70-130 Pass Fluorene S21-Fe32169 NCP % 85 70-130 Pass Indenc(1.2.3-cd)pyrene S21-Fe32169 NCP % 84 70-130 Pass Naphthalene S21-Fe32169 NCP % 84 70-130 Pass Phenanthrene S21-Fe32169 NCP % 82 70-130 Pass Spike - % Recovery Heavy Metals Result 1 Mercury S21-Fe46464 CP % 81 75-125 Pass Spike - % Recovery Heavy Metals Result 1 Arsenic S21-Fe46464 CP % 87 75-125 Pass Cadmium S21-Fe46464 <td>Benzo(k)fluoranthene</td> <td>S21-Fe52169</td> <td>NCP</td> <td>%</td> <td>83</td> <td></td> <td></td> <td>70-130</td> <td>Pass</td> <td></td>	Benzo(k)fluoranthene	S21-Fe52169	NCP	%	83			70-130	Pass	
Dibenz(a,h)anthracene S21-Fe38649 NCP % 83 70-130 Pass Fluoranthene S21-Fe52169 NCP % 85 70-130 Pass Fluoranthene S21-Fe52169 NCP % 85 70-130 Pass Indeno(1.2.3-cd)pyrene S21-Fe52169 NCP % 88 70-130 Pass Naphthalene S21-Fe52169 NCP % 84 70-130 Pass Phenanthrene S21-Fe52169 NCP % 84 70-130 Pass Spike -% Recovery Result 1 70-130 Pass 75-125 Pass Spike -% Recovery Result 1 75-125 Pass Cadmium S21-Fe46464 CP % 117 75-125 Pass Chromium S21-Fe46464 CP % 87 75-125 Pass Copper S21-Fe46464 CP % 88 75-125 Pass	Chrysene	S21-Fe52169	NCP	%	78			70-130	Pass	
Fluoranthene S21-Fe52169 NCP % 85 70-130 Pass Fluorene S21-Fe52169 NCP % 79 70-130 Pass Indeno(1.2.3-cd)pyrene S21-Fe52169 NCP % 88 70-130 Pass Maphthalene S21-Fe52169 NCP % 84 70-130 Pass Phenanthrene S21-Fe52169 NCP % 84 70-130 Pass Spike -% Recovery S21-Fe52169 NCP % 84 70-130 Pass Mercury S21-Fe50279 NCP % 84 75-125 Pass Spike -% Recovery Result 1 Heavy Metals S21-Fe46464 CP % 87 75-125 Pass Cadmium S21-Fe46464 CP % 87 75-125 Pass Cadmium S21-Fe46464 CP % 88 75-125 Pass Cop	Dibenz(a.h)anthracene	S21-Fe38649	NCP	%	83			70-130	Pass	
Fluorene S21-Fe52169 NCP % 79 70-130 Pass Indero(1.2.3-cd)pyrene S21-Fe52169 NCP % 88 70-130 Pass Naphthalene S21-Fe52169 NCP % 84 70-130 Pass Phenanthrene S21-Fe52169 NCP % 82 70-130 Pass Pyrene S21-Fe52169 NCP % 84 70-130 Pass Spike - % Recovery #eavy Metals 75-125 Pass Mercury S21-Fe64644 CP % 87 75-125 Pass Spike - % Recovery #eavy Metals Result 1 Arsenic S21-Fe46464 CP % 87 75-125 Pass Cadmium S21-Fe46464 CP % 88 75-125 Pass Lead S21-Fe46464 CP % 107 75-125 Pass	Fluoranthene	S21-Fe52169	NCP	%	85			70-130	Pass	
Indeno(1.2.3-cd)pyrene S21-Fe38649 NCP % 88 70-130 Pass Naphthalene S21-Fe52169 NCP % 84 70-130 Pass Phenanthrene S21-Fe52169 NCP % 84 70-130 Pass Spike -% Recovery S21-Fe52169 NCP % 84 70-130 Pass Heavy Metals Result 1 70-130 Pass Spike -% Recovery Result 1 Heavy Metals Result 1 Arsenic S21-Fe46464 CP % 87 75-125 Pass Cadmium S21-Fe46464 CP % 87 75-125 Pass Copper S21-Fe46464 CP % 96 75-125 Pass Lead S21-Fe46464 CP % 96 75-125 Pass Lead S21-Fe46464 CP % 107 <	Fluorene	S21-Fe52169	NCP	%	79			70-130	Pass	
Naphthalene S21-Fe52169 NCP % 84 70-130 Pass Phenanthrene S21-Fe52169 NCP % 82 70-130 Pass Pyrene S21-Fe52169 NCP % 82 70-130 Pass Spike - % Recovery Result 1 Mercury S21-Fe50279 NCP % 98 75-125 Pass Spike - % Recovery Result 1 Heavy Metals Result 1 <	Indeno(1.2.3-cd)pyrene	S21-Fe38649	NCP	%	88			70-130	Pass	
Phenanthrene S21-Fe52169 NCP % 82 70-130 Pass Pyrene S21-Fe52169 NCP % 84 70-130 Pass Spike - % Recovery Result 1 Mercury S21-Fe50279 NCP % 98 75-125 Pass Spike - % Recovery Result 1 Heavy Metals Result 1 Arsenic S21-Fe46464 CP % 11 Cadmium S21-Fe46464 CP % 87 75-125 Pass Copper S21-Fe46464 CP % 88 75-125 Pass Lead S21-Fe46464 CP % 103 75-125 Pass Zinc S21-Fe46464 CP % 103 75-125 Pass	Naphthalene	S21-Fe52169	NCP	%	84			70-130	Pass	
Pyrene S21-Fe52169 NCP % 84 70-130 Pass Spike - % Recovery Result 1	Phenanthrene	S21-Fe52169	NCP	%	82			70-130	Pass	
Spike - % Recovery Result 1 Colspan="6">Colspan="6">Colspan="6">Colspan="6"High Total Recoverable Hydrocarbons - 2013 NEPM Fractions Result 1 Result 1 Result 2 RPD Colspan="6"Colspan="6"Colspan="6"Colspan="6"Colspan="6"Colspan="6"Colspan="6"Colspan="6"Colspan="6"Colspan="6"Colspan="6"Colspan="6"Colspan="6"Colspan="6"Colspan="6"Colspan="6"Colspan="6"Co	Pyrene	S21-Fe52169	NCP	%	84			70-130	Pass	
Heavy Metals Result 1 Image: Constraint of the second se	Spike - % Recovery							•		
Mercury S21-Fe60279 NCP % 98 75-125 Pass Spike -% Recovery Heavy Metals Result 1 Arsenic S21-Fe46464 CP % 117 75-125 Pass Cadmium S21-Fe46464 CP % 87 75-125 Pass Chromium S21-Fe46464 CP % 87 75-125 Pass Copper S21-Fe46464 CP % 88 75-125 Pass Lead S21-Fe46464 CP % 107 75-125 Pass Nickel S21-Fe46464 CP % 103 75-125 Pass Zinc S21-Fe46464 CP % 92 75-125 Pass Zinc S21-Fe46464 CP % 92 75-125 Pass Duplicate Lab Sample ID QA Source Units Result 1 Receptance Limits Rode TRH >C10-C16	Heavy Metals				Result 1					
Spike - % Recovery Heavy Metals Result 1 Result 1 Colspan="6">Colspan="6">Colspan="6">Colspan="6">Colspan="6">Colspan="6">Colspan="6">Colspan="6">Colspan="6">Colspan="6">Colspan="6">Colspan="6">Colspan="6">Colspan="6"Co	Mercury	S21-Fe50279	NCP	%	98			75-125	Pass	
Heavy Metals Securit 1 Image: Constraint of the second o	Spike - % Recovery									
Arsenic S21-Fe46464 CP % 117 75-125 Pass Cadmium S21-Fe46464 CP % 87 75-125 Pass Chromium S21-Fe46464 CP % 96 75-125 Pass Copper S21-Fe46464 CP % 88 75-125 Pass Lead S21-Fe46464 CP % 107 75-125 Pass Nickel S21-Fe46464 CP % 103 75-125 Pass Zinc S21-Fe46464 CP % 92 75-125 Pass Test Lab Sample ID QA Source Units Result 1 Mcceptance Pass Qualifying TRH >C10-C16 S21-Fe46455 CP mg/kg <50	Heavy Metals				Result 1					
Cadmium S21-Fe46464 CP % 87 75-125 Pass Chromium S21-Fe46464 CP % 96 75-125 Pass Copper S21-Fe46464 CP % 88 75-125 Pass Lead S21-Fe46464 CP % 107 75-125 Pass Nickel S21-Fe46464 CP % 103 75-125 Pass Zinc S21-Fe46464 CP % 92 75-125 Pass Zinc S21-Fe46464 CP % 92 75-125 Pass Duplicate S21-Fe46464 CP % 92 75-125 Pass Test Lab Sample ID QA Source Units Result 1 Mcceptance Limits Pass Code Duplicate Total Recoverable Hydrocarbons - 2013 NEPM Fractions Result 1 Result 2 RPD TRH >C10-C16 S21-Fe46455 CP mg/kg <100	Arsenic	S21-Fe46464	CP	%	117			75-125	Pass	
Chromium S21-Fe46464 CP % 96 75-125 Pass Copper S21-Fe46464 CP % 88 75-125 Pass Lead S21-Fe46464 CP % 107 75-125 Pass Nickel S21-Fe46464 CP % 103 75-125 Pass Zinc S21-Fe46464 CP % 92 75-125 Pass Test Lab Sample ID QA Source Units Result 1 Result 2 RPD Qualifying Limits Qualifying Code Duplicate Total Recoverable Hydrocarbons - 2013 NEPM Fractions Result 1 Result 2 RPD V V TRH >C10-C16 S21-Fe46455 CP mg/kg < 50	Cadmium	S21-Fe46464	СР	%	87			75-125	Pass	
Copper S21-Fe46464 CP % 88 75-125 Pass Lead S21-Fe46464 CP % 107 75-125 Pass Nickel S21-Fe46464 CP % 103 75-125 Pass Zinc S21-Fe46464 CP % 92 75-125 Pass Test Lab Sample ID QA Source Units Result 1 Result 1 Acceptance Limits Pass Qualifying Code Duplicate	Chromium	S21-Fe46464	СР	%	96			75-125	Pass	
Lead S21-Fe46464 CP % 107 . 75-125 Pass Nickel S21-Fe46464 CP % 103 . 75-125 Pass Zinc S21-Fe46464 CP % 92 . 75-125 Pass Test Lab Sample ID QA Source Units Result 1 Result 1 Acceptance Limits Pass Limits Qualifying Code Duplicate . . S21-Fe46455 CP mg/kg <50	Copper	S21-Fe46464	CP	%	88			75-125	Pass	
Nickel S21-Fe46464 CP % 103 75-125 Pass Zinc S21-Fe46464 CP % 92 75-125 Pass Image: constraints of the state of th	Lead	S21-Fe46464	CP	%	107			75-125	Pass	
Zinc S21-Fe46464 CP % 92 75-125 Pass Test Lab Sample ID QA Source Units Result 1 Result 1 Acceptance Limits Pass Qualifying Code Duplicate Total Recoverable Hydrocarbons - 2013 NEPM Fractions Result 1 Result 1 Result 2 RPD TRH >C10-C16 S21-Fe46455 CP mg/kg < 50	Nickel	S21-Fe46464	CP	%	103			75-125	Pass	
TestLab Sample IDQA SourceUnitsResult 1Result 1Acceptance LimitsPass LimitsQualifying CodeDuplicateTotal Recoverable Hydrocarbons - 2013 NEPM FractionsTRH >C10-C16S21-Fe46455CPmg/kg< 50	Zinc	S21-Fe46464	СР	%	92			75-125	Pass	
Duplicate Source Result 1 Result 2 RPD Code Total Recoverable Hydrocarbons - 2013 NEPM Fractions Result 1 Result 2 RPD	Test	Lab Sample ID	QA	Units	Result 1			Acceptance	Pass	Qualifying
Total Recoverable Hydrocarbons - 2013 NEPM Fractions Result 1 Result 2 RPD Image: Colspan="6">CP mg/kg < 50	Duplicate		Cource					Linits	Linits	JULE
TRH >C10-C16 S21-Fe46455 CP mg/kg < 50 < 50 < 1 30% Pass TRH >C16-C34 S21-Fe46455 CP mg/kg < 100	Total Recoverable Hydrocarbons -	2013 NEPM Fract	ions		Result 1	Result 2	RPD			
TRH >C16-C34 S21-Fe46455 CP mg/kg < 100 < 1 30% Pass TRH >C34-C40 S21-Fe46455 CP mg/kg < 100	TRH >C10-C16	S21-Fe46455	CP	ma/ka	< 50	< 50	<1	30%	Pass	
TRH >C34-C40 S21-Fe46455 CP mg/kg < 100 < 1 30% Pass Duplicate Total Recoverable Hydrocarbons - 1999 NEPM Fractions Result 1 Result 2 RPD Image: Constraint of the	TRH >C16-C34	S21-Fe46455	CP	ma/ka	< 100	< 100	<1	30%	Pass	
Duplicate Result 1 Result 2 RPD Result 1 TRH C10-C14 S21-Fe46455 CP mg/kg < 20	TRH >C34-C40	S21-Fe46455	CP	ma/ka	< 100	< 100	<1	30%	Pass	
Total Recoverable Hydrocarbons - 1999 NEPM Fractions Result 1 Result 2 RPD Image: Constraint of the state of	Duplicate									
TRH C10-C14 S21-Fe46455 CP mg/kg < 20 < 20 < 1 30% Pass TRH C15-C28 S21-Fe46455 CP mg/kg < 50	Total Recoverable Hydrocarbons -	1999 NEPM Fract	ions		Result 1	Result 2	RPD			
TRH C15-C28 S21-Fe46455 CP mg/kg < 50 < 1 30% Pass TRH C29-C36 S21-Fe46455 CP mg/kg < 50	TRH C10-C14	S21-Fe46455	CP	ma/ka	< 20	< 20	<1	30%	Pass	
TRH C29-C36 S21-Fe46455 CP mg/kg < 50 < 50 < 1 30% Pass	TRH C15-C28	S21-Fe46455	CP	ma/ka	< 50	< 50	<1	30%	Pass	
	TRH C29-C36	S21-Fe46455	CP	ma/ka	< 50	< 50	<1	30%	Pass	



Duplicate									
Polycyclic Aromatic Hydrocarbons	5			Result 1	Result 2	RPD			
Acenaphthene	S21-Fe46455	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	S21-Fe46455	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	S21-Fe46455	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	S21-Fe46455	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	S21-Fe46455	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	S21-Fe46455	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	S21-Fe46455	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	S21-Fe46455	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	S21-Fe46455	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	S21-Fe46455	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	S21-Fe46455	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	S21-Fe46455	СР	ma/ka	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	S21-Fe46455	CP	ma/ka	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	S21-Fe46455	CP	ma/ka	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	S21-Fe46455	CP	ma/ka	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	S21-Fe46455	CP	ma/ka	< 0.5	< 0.5	<1	30%	Pass	
	0211010100	01	iiig/itg	4 0.0	x 0.0		0070	1 400	
BTEX				Result 1	Result 2	RPD			
Benzene	S21-Fe46459	CP	ma/ka	< 0.1	< 0.1	<1	30%	Pass	
Toluene	S21-Fe46459	CP	ma/ka	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	S21-Fe46459	CP	ma/ka	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	S21-Fe46459	CP	ma/ka	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	S21-Fe46459	CP	ma/ka	< 0.2	< 0.1	<1	30%	Pass	
Xylenes - Total*	S21-Fe46459	CP	ma/ka	< 0.1	< 0.1	<1	30%	Pass	
	0211040400	01	iiig/kg	< 0.0	< 0.0		0070	1 000	
Total Recoverable Hydrocarbons -	2013 NEPM Fract	ions		Result 1	Result 2	RPD			
Naphthalene	S21-Fe46459	CP	ma/ka	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	S21-Fe46459	CP	ma/ka	< 20	< 20	<1	30%	Pass	
Duplicate		-		-					
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD			
TRH C6-C9	S21-Fe46459	CP	ma/ka	< 20	< 20	<1	30%	Pass	
Duplicate		-		-					
BTEX				Result 1	Result 2	RPD			
Benzene	S21-Fe46460	CP	ma/ka	< 0.1	< 0.1	<1	30%	Pass	
Toluene	S21-Fe46460	CP	ma/ka	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	S21-Fe46460	CP	ma/ka	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	S21-Fe46460	CP	ma/ka	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	S21-Fe46460	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total*	S21-Fe46460	CP	ma/ka	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons -	2013 NEPM Fract	ions		Result 1	Result 2	RPD			
Naphthalene	S21-Fe46460	CP	ma/ka	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	S21-Fe46460	CP	ma/ka	< 20	< 20	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD			
TRH C6-C9	S21-Fe46460	CP	ma/ka	< 20	< 20	<1	30%	Pass	
Duplicate					. 20		0070		
Total Recoverable Hydrocarbons -	2013 NEPM Fract	ions		Result 1	Result 2	RPD			
TRH >C10-C16	S21-Fe46462	CP	ma/ka	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	S21-Fe46462	CP	ma/ka	< 100	< 100	<1	30%	Pass	
TRH >C34-C40	S21-Fo46462	CP	ma/ka	< 100	< 100	~1	30%	Pace	
	0211040402		iiig/itg		100		0070	1 433	



Duplicate				_	_		_		
Total Recoverable Hydrocarbons -	1999 NEPM Fract	ions		Result 1	Result 2	RPD			
TRH C10-C14	S21-Fe46462	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	S21-Fe46462	CP	mg/kg	69	64	8.0	30%	Pass	
TRH C29-C36	S21-Fe46462	CP	mg/kg	54	< 50	8.0	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons	5			Result 1	Result 2	RPD			
Acenaphthene	S21-Fe46462	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	S21-Fe46462	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	S21-Fe46462	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	S21-Fe46462	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	S21-Fe46462	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	S21-Fe46462	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	S21-Fe46462	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	S21-Fe46462	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	S21-Fe46462	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	S21-Fe46462	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	S21-Fe46462	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	S21-Fe46462	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	S21-Fe46462	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	S21-Fe46462	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	S21-Fe46462	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	S21-Fe46462	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S21-Fe46463	CP	mg/kg	5.4	3.8	36	30%	Fail	Q15
Cadmium	S21-Fe46463	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	S21-Fe46463	CP	mg/kg	17	51	98	30%	Fail	Q15
Copper	S21-Fe46463	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Lead	S21-Fe46463	CP	mg/kg	13	13	1.0	30%	Pass	
Mercury	S21-Fe46463	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	S21-Fe46463	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Zinc	S21-Fe46463	CP	mg/kg	44	42	4.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S21-Fe46463	CP	%	4.3	4.5	6.0	30%	Pass	



Comments

Sample Integrity	
Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code Description

N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised by:

Andrew Black Andrew Sullivan John Nguyen Analytical Services Manager Senior Analyst-Organic (NSW) Senior Analyst-Metal (NSW)

Glenn Jackson General Manager

Final Report - this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.



ABN: 50 005 085 521

www.eurofins.com.au

EnviroSales@eurofins.com

New Zealand

Australia

Melbourne 6 Monterey Road
 Dandenong South VIC 3175
 16 Mars Road

 Phone : +61 3 8564 5000
 Lane Cove We

 NATA # 1261
 Phone : +61 2 9
 Site # 1254 & 14271

Sydney Unit F3, Building F Brisbane
 Muraris Road
 Muraris QLD 4172

 Lane Cove West NSW 2066
 Phone : +61 7 3902 4600

 Phone : +61 2 9900 8400
 NATA # 1261 Site # 10017
 NATA # 1261 Site # 18217

1/21 Smallwood Place NATA # 1261 Site # 20794

Perth 2/91 Leach Highway Kewdale WA 6105 Phone : +61 8 9251 9600 NATA # 1261 Site # 23736

Newcastle 4/52 Industrial Drive Mayfield East NSW 2304 PO Box 60 Wickham 2293 Phone : +61 2 4968 8448

Auckland 35 O'Rorke Road Penrose, Auckland 1061 Phone : +64 9 526 45 51 IANZ # 1327

Christchurch 43 Detroit Drive Rolleston, Christchurch 7675 Phone : 0800 856 450 IANZ # 1290

Sample Receipt Advice

Company name:	Qualtest
Contact name:	Emma Coleman
Project name:	ADDITIONAL EJE KOORAGANG
Project ID:	NEW20P-0171
Turnaround time:	2 Day
Date/Time received	Mar 4, 2021 2:00 PM
Eurofins reference	778179

Sample Information

- 1 A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- All samples have been received as described on the above COC.
- COC has been completed correctly.
- Attempt to chill was evident.
- Appropriately preserved sample containers have been used.
- All samples were received in good condition.
- Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- Appropriate sample containers have been used.
- Sample containers for volatile analysis received with zero headspace. ./
- X Split sample sent to requested external lab.
- X Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

Notes

Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

Andrew Black on phone : (+61) 2 9900 8490 or by email: AndrewBlack@eurofins.com

Results will be delivered electronically via email to Emma Coleman - emmacoleman@qualtest.com.au.

Global Leader - Results you can trust



1111

ac=MRA

datas

NATA

WORLD RECOGNISED

Qualtest 8 Ironbark Close Warabrook NSW 2304

Emma Coleman

Report Project name Project ID Received Date

Attention:

778179-L ADDITIONAL EJE KOORAGANG NEW20P-0171 Mar 04, 2021

Client Sample ID Sample Matrix Eurofins Sample No. Date Sampled			BH1 2.0-2.1 US Leachate S21-Ma09667 Feb 22, 2021	BH10 0.0-0.25 US Leachate S21-Ma09668 Feb 22, 2021		
Test/Reference	LOR	Unit	, i			
Heavy Metals						
Chromium	0.05	mg/L	-	< 0.05		
Nickel	0.01	mg/L	0.06	-		
USA Leaching Procedure						
Leachate Fluid ^{C01}		comment	1.0	1.0		
pH (initial)	0.1	pH Units	5.1	7.8		
pH (Leachate fluid)	0.1	pH Units	5.1	5.0		
pH (off)	0.1	pH Units	5.3	6.5		
pH (USA HCI addition)	0.1	pH Units	1.0	1.6		

NATA Accredited Accreditation Number 1261 Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.



Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported. A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Heavy Metals	Brisbane	Mar 08, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
USA Leaching Procedure	Brisbane	Mar 08, 2021	14 Days
- Method: LTM-GEN-7010 Leaching Procedure for Soils & Solid Wastes			

Environment Testing		nc			Australia							New Zealand		
		Melbourne 6 Monterey Road Dandenong South VIC 317 Phone : +61 3 8564 5000 NATA # 1261		Sydney Unit F3, Building F 5 16 Mars Road Lane Cove West NSW 2066 Phone : +61 2 9900 8400		F NSW 2 900 840	Brisbane 1/21 Smallwood Place Murarrie QLD 4172 066 Phone : +61 7 3902 4600 NATA # 1261 Site # 20794	Perth 2/91 Leach Highway Kewdale WA 6105 Phone : +61 8 9251 9600 NATA # 1261	Newcastle 4/52 Industrial Drive Mayfield East NSW 2304 PO Box 60 Wickham 2293 Phone : +61 2 4968 8448	Auckland 35 O'Rorke Road Penrose, Auckland 1061 Phone : +64 9 526 45 51 IANZ # 1327	Christchurch 43 Detroit Drive Rolleston, Christchurch 7675 Phone : 0800 856 450 IANZ # 1290			
ABN: 5	0 005 085 521 Web:	www.eurofins.com.a	au emaii: EnviroSaie	es@eurofins.com	Site # 1254 & 14271	N	NATA # '	1261 51	te # 182	7	Site # 23736			
Company Name: Qualtest Address: 8 Ironbark Close Warabrook NSW 2304				Order No.: Report #: Phone: Fax:			No.: #:	778179 02 4968 4468 02 4960 9775		Received: Due: Priority: Contact Name:	Mar 4, 2021 2:00 P Mar 8, 2021 2 Day Emma Coleman	м		
Project Name:ADDITIONAL EJE KOORAGANGProject ID:NEW20P-0171										Eurofins Analytical S	ervices Manager : An	drew Black		
Sample Detail					hromium	ickel	SA Leaching Procedure	SA Leaching Procedure						
Melbourne Laboratory - NATA Site # 1254 & 14271														
Sydney Laboratory - NATA Site # 18217						X			X					
Brisbane Laboratory - NATA Site # 20794				X	X									
Perin Laboratory - NATA Site # 23736														
External Laboratory														
No	Sample ID	Sample Date	Sampling	Matrix	LAB ID									
1	BH1 2.0-2.1	Feb 22, 2021		US Leachate	S21-Ma09667		x	Х						
2	BH10 0.0-0.25	Feb 22, 2021		US Leachate	S21-Ma09668	Х			Х					
Test	Counts					1	1	2	2					



Internal Quality Control Review and Glossary

General

- Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site 1. Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
- 2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
- 3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
- Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
- 5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds
- 6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
- 7. Samples were analysed on an 'as received' basis.
- 8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
- This report replaces any interim results previously issued. 9.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days. **NOTE: pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	ug/L: micrograms per litre
ppm: Parts per million	ppb: Parts per billion	%: Percentage
org/100mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms	
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
сос	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
СР	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

- 1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
- 2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
- 3. Organochlorine Pesticide analysis where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
- 4. Organochlorine Pesticide analysis where reporting Spike data, Toxaphene is not added to the Spike.
- Total Recoverable Hydrocarbons where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported 5. in the C10-C14 cell of the Report.
- 6. pH and Free Chlorine analysed in the laboratory Analysis on this test must begin within 30 minutes of sampling. Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
- 7. Recovery Data (Spikes & Surrogates) where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
- 8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
- 9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
- 10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.


Environment Testing

Quality Control Results

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Chromium			mg/L	< 0.05			0.05	Pass	
Nickel			mg/L	< 0.01			0.01	Pass	
LCS - % Recovery									
Heavy Metals									
Chromium			%	97			80-120	Pass	
Nickel			%	88			80-120	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Heavy Metals				Result 1					
Nickel	S21-Ma09667	CP	%	90			75-125	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Chromium	S21-Ma10920	NCP	%	99			75-125	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Nickel	S21-Ma09667	CP	mg/L	0.06	0.06	1.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Chromium	S21-Ma09668	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
Nickel	S21-Ma09668	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass	



Environment Testing

Comments

Sample Integrity	
Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

 Code
 Description

 C01
 Leachate Fluid Key: 1 - pH 5.0; 2 - pH 2.9; 3 - pH 9.2; 4 - Reagent (DI) water; 5 - Client sample, 6 - other

Authorised by:

Andrew Black John Nguyen Steven Trout Analytical Services Manager Senior Analyst-Metal (NSW) Senior Analyst-Metal (QLD)

Glenn Jackson General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.