Appendix G
Geochemistry Assessment

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Oven Mountain Pumped Hydro Energy Storage Project

Geochemistry Assessment

Prepared for OMPS Pty Ltd

August 2024

Oven Mountain Pumped Hydro Energy Storage Project

Geochemistry Assessment

OMPS Pty Ltd

E230869C Submissions report - Geochemistry Assessment

August 2024

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Executive summary

ES1 Introduction

OMPS Pty Ltd (OMPS) is proposing to develop the Oven Mountain Pumped Hydro Energy Storage Project (the Project), an off-river pumped hydro energy storage system located approximately half-way between Kempsey and Armidale adjacent to the Macleay River in northern NSW. The Project is located within the New England Renewable Energy Zone (REZ) and the Armidale Regional Local Government Area (LGA), proximate to its border with Kempsey Shire LGA.

The Project involves building two 'off river' water containment structures to create an upper and a lower reservoir (referred to as 'the upper dam and reservoir' and 'the lower dam and reservoir' respectively), on an ephemeral tributary of the Macleay River. An underground hydro-electric power station complex will be connected to the reservoirs by infrastructure including a power waterway and tunnels. The power station complex will effectively have three operating modes: energy generating mode, pumping mode, and synchronous condenser, enabling the water to generate electricity as it passes through the underground power station while moving from the upper to the lower reservoir, from where it is pumped back up via the same waterway in a 'closed-loop circuit'. The pumped hydro system will be connected to the existing transmission network via new overhead high voltage transmission lines.

The Project is a scheme designed to provide utility-scale energy storage. It will provide up to around 900 MW of electricity generating capacity and at least eight hours of dispatchable energy to be stored and made available to the NEM through the New England REZ. The expected operational lifespan of the Project is in excess of 100 years.

ES2 Risk characterisation

Approximately 5,500,000 bank cubic metres of excavated material (spoil) will be generated through construction activities. Characterisation of the geochemistry within the Project area is essential to develop an understanding of risks associated with spoil stockpiling. Spoil stockpiling leads to oxidation of the minerals entrained in the geology which can result in acidic or neutral rock drainage. Typical key minerals include sulphides (potentially leading to acidic or neutral rock drainage) and leachable metals (potentially leading to metalliferous drainage).

This geochemistry assessment, supported by field investigative works, characterises the potential and, if present, the significance of these risks to the environment.

ES3 Assessment and findings

The geochemistry assessment has been informed through a combination of desktop review and field investigative works. The field investigation program relies on drill core return from the Geotechnical Investigation Program (SMEC 2022) and drill chip return from the Hydrogeological Investigation Program (EMM 2022). Data obtained from nine boreholes across the Project area and at varying depths below ground level (targeting Project relevant geological units) was assessed to understand the risk of acidic or neutral rock drainage and metalliferous drainage.

Based on the samples analysed:

- spoil is expected to meet the NSW waste classification guideline's definition of virgin excavated natural material
- concentrations of leachable metals within the spoil are considered low and are generally below pre-construction groundwater conditions onsite. The risk of increasing metal concentrations through leaching is considered low.

ES4 Mitigation and management

A monitoring program will be implemented as part of the water management plan to observe the response of the receiving environment to the placement of spoil. This is expected to confirm the low risk of spoil placement but monitoring will identify potential impacts and allow mitigation measures to be undertaken and an early stage.

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1 Introduction

1.1 The Project

OMPS Pty Ltd (OMPS) (the Proponent) is proposing to develop the Oven Mountain Pumped Hydro Energy Storage Project (the Project), an off-river pumped hydro energy storage system (referred to as the 'pumped hydro system') located approximately half-way between Kempsey and Armidale, adjacent to the Macleay River in northern NSW. The Project is located within the New England Renewable Energy Zone (REZ) and the Armidale Regional Local Government Area (LGA), proximate to its border with Kempsey Shire LGA.

Figure 1.1 and Figure 1.2 provide the regional and local context of the Project, respectively.

The Project involves building two 'off river' water containment structures to create an upper and a lower reservoir (referred to as 'the upper dam and reservoir' and 'the lower dam and reservoir' respectively), on an ephemeral tributary of the Macleay River. An underground hydro-electric power station complex will be connected to the reservoirs by infrastructure including a power waterway and tunnels. The power station complex will effectively have three operating modes: energy generating mode, pumping mode, and synchronous condenser, enabling the water to generate electricity as it passes through the underground power station while moving from the upper to the lower reservoir, from where it is pumped back up via the same waterway in a 'closed-loop circuit'. The pumped hydro system will be connected to the existing transmission network via new overhead high voltage transmission lines.

The Project is a scheme designed to provide utility-scale energy storage. It will provide up to around 900 MW of electricity generating capacity and at least eight hours of dispatchable energy to be stored and made available to the NEM through the New England REZ. The expected operational lifespan of the Project is in excess of 100 years.

1.2 Approval process

The Project has been declared State significant infrastructure (SSI) and critical State significant infrastructure (CSSI) in accordance with the provisions of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). The declaration of the Project as a CSSI project acknowledges that the Project is critical to the State for environmental, economic or social reasons.

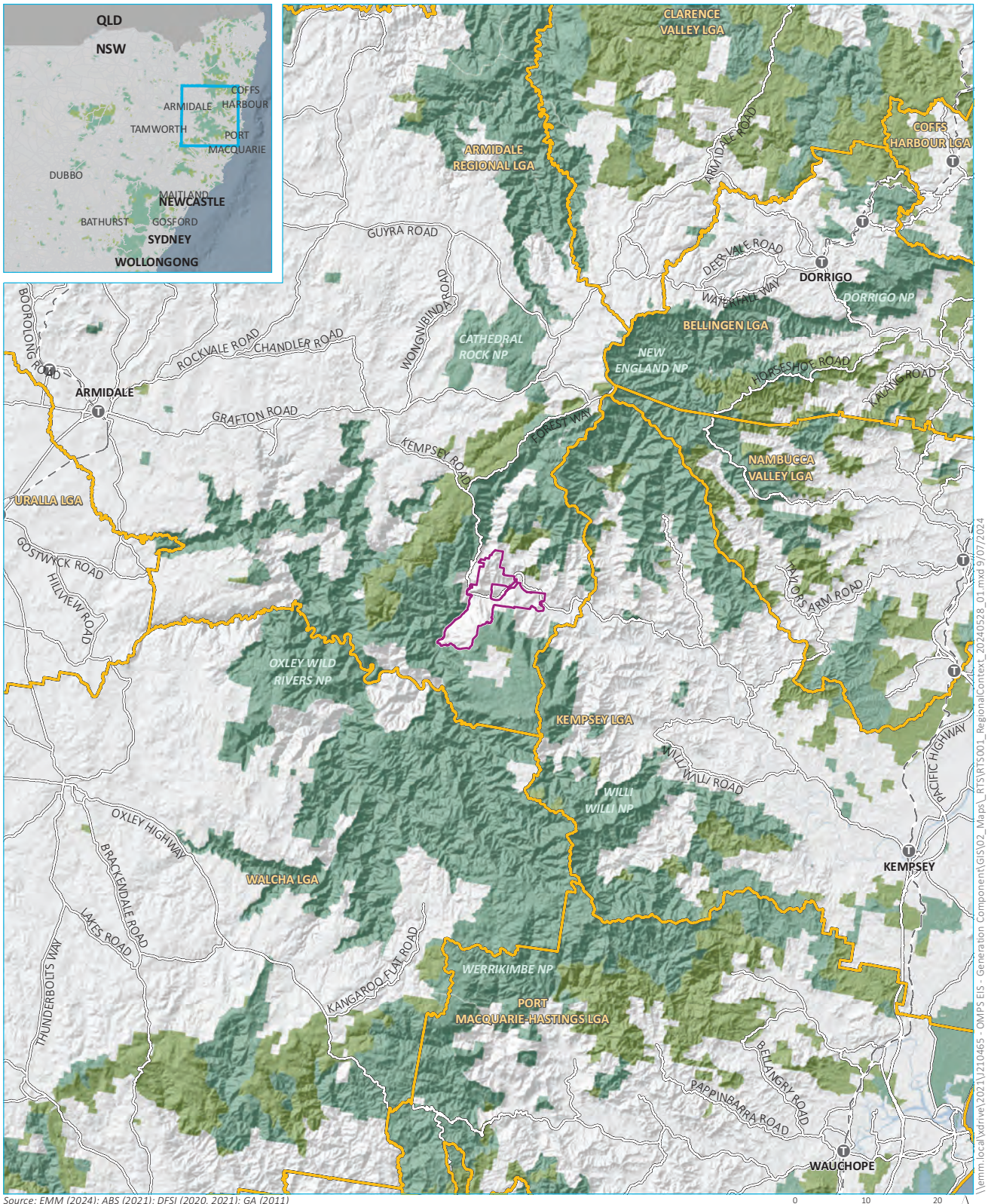
As a CSSI project, the Project is subject to Part 5, Division 5.2 of the EP&A Act which requires the preparation of an Environmental Impact Statement (EIS) in accordance with Secretary's Environmental Assessment Requirements (SEARs) and the approval of the NSW Minister for Planning and Public Spaces. In addition to requiring approval from the NSW Minister for Planning and Public Spaces, the Project has been deemed a controlled action under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and requires approval from the Commonwealth Minister for the Environment. The Minister for the Environment has accredited the NSW planning process for the assessment of the Project.

A single EIS was prepared to address the requirements set out by the NSW Department of Planning, Housing and Infrastructure (DPHI) and the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW). In accordance with the EP&A Act and *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation), the EIS was placed on public exhibition for a period of 32 days, between 19 September 2023 to 20 October 2023.

Submissions were received during the public exhibition period, including from state government agencies and councils, organisations and individual community members.

1.3 Purpose of report

Amendments and refinements to the design have been made since public exhibition of the EIS. This was done in response to feedback from stakeholders and to accommodate further development of the concept design, which aimed to optimise operation and minimise environmental impacts during construction where possible. This report addresses these changes in design and responds to the submissions raised on the EIS regarding geochemistry.



Source: EMM (2024); ABS (2021); DFSI (2020, 2021); GA (2011)

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KEY

- Project area
- Train station
- Rail line
- Major road
- Named waterbody
- Local government area
- NPWS reserve
- State forest

INSET KEY

- Major road
- NPWS reserve
- State forest

Regional setting

Oven Mountain Pumped Hydro Energy Storage Project
Geochemistry Assessment report
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Figure 1.1

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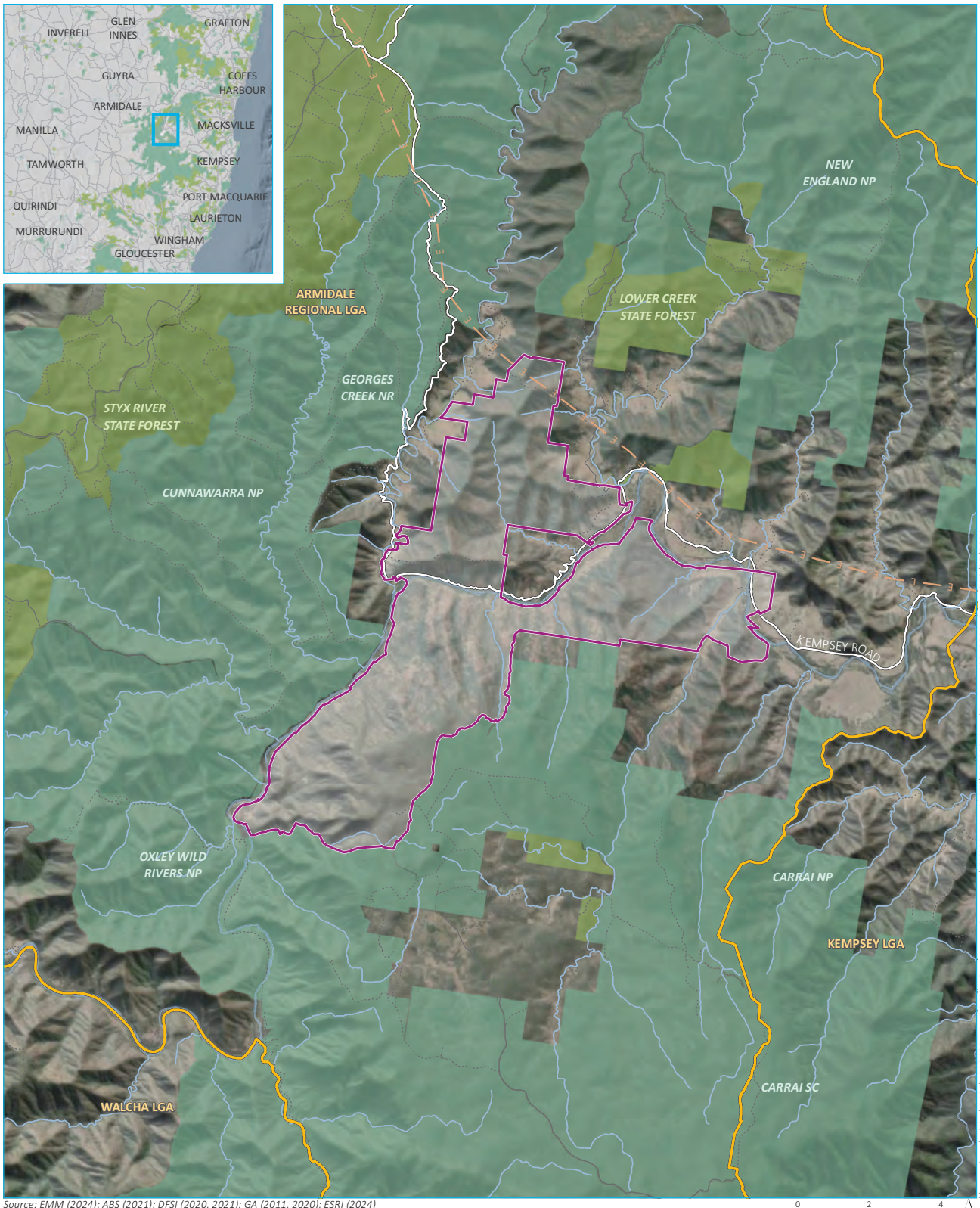

Source: EMM (2024); ABS (2021); DFSI (2020, 2021); GA (2011, 2020); ESRI (2024)

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KEY

- Project area
- Existing transmission line
- Major road
- Minor road
- Vehicular track
- Named watercourse
- Named waterbody
- Local government area
- NPWS reserve
- State forest

INSET KEY

- Major road
- NPWS reserve
- State forest

The Project area - local context

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Figure 1.2

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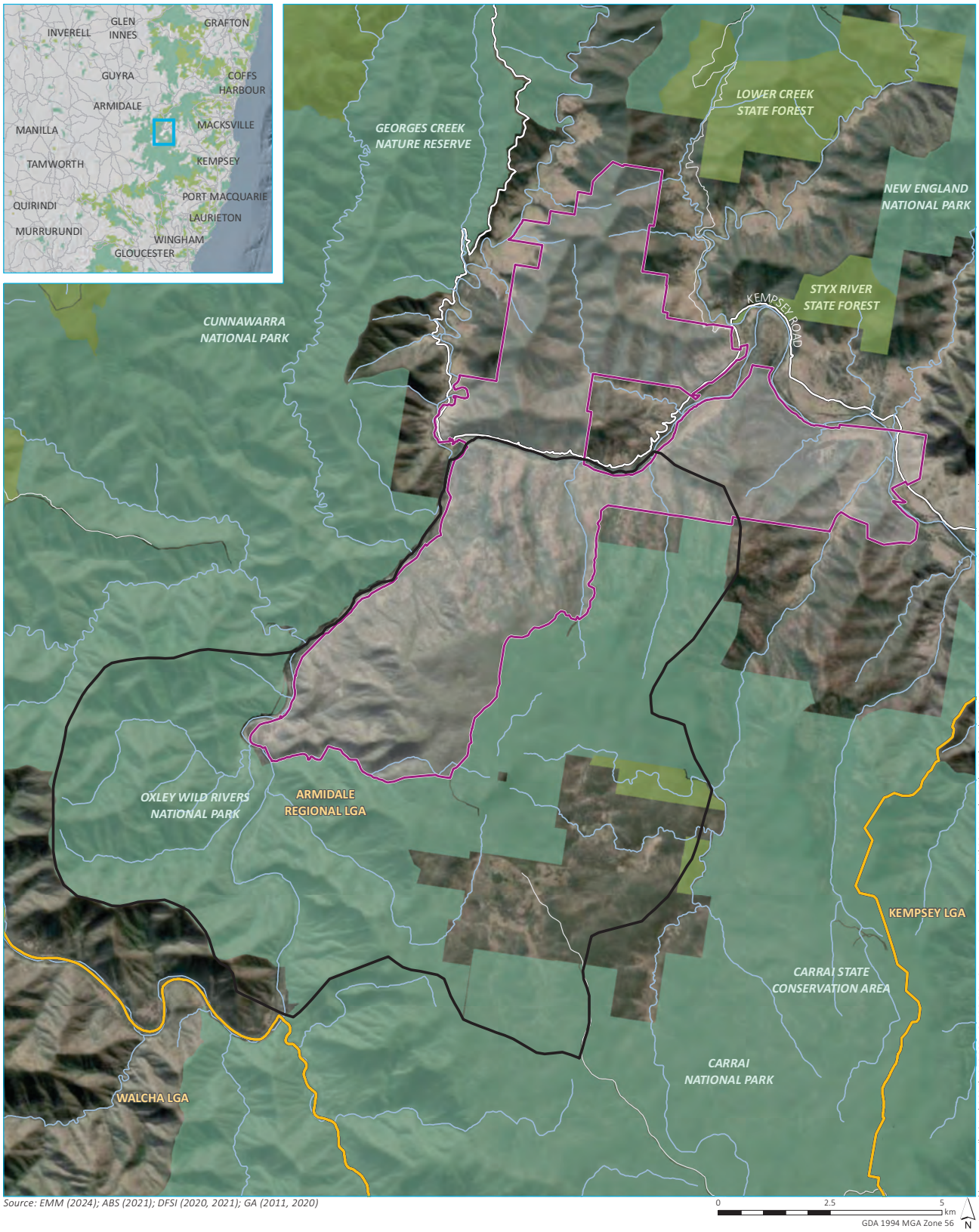

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Source: EMM (2024); ABS (2021); DFSI (2020, 2021); GA (2011, 2020)

0 2.5 5 km

GDA 1994 MGA Zone 56

N

KEY

- Project area
- Model domain

Existing environment

- Major road
- Minor road
- Named watercourse
- Local government area
- NPWS reserve
- State forest

INSET KEY

- Major road
- NPWS reserve
- State forest

Project area and study area

Oven Mountain Pumped Hydro Energy Storage Project
Geochemistry assessment
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Figure 1.3

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2 The Project description

2.1 Project overview

The Project involves building two 'off river' water containment structures to create an upper and a lower reservoir (referred to as 'the upper dam and reservoir' and 'the lower dam and reservoir'), on an ephemeral tributary of the Macleay River. An underground hydro-electric power station complex will be connected to the reservoirs by infrastructure including a power waterway and tunnels. During operation, the water will enable the generation of electricity as it passes through the underground power station while moving from the upper to the lower reservoir, from where it is pumped back up via the same waterway in a 'closed-loop circuit'. The pumped hydro system will be connected to the existing transmission network via new overhead high voltage transmission lines.

A detailed description of the Project and its strategic context is provided in the Project's EIS and Amendment Report which should be read in conjunction with this report.

An overview of the key components and elements are provided below.

2.2 Key Project design elements

Broadly, the Project has been categorised into three key components. These are further broken down into the Project's key elements and shown in Figure 2.1:

- pumped hydro-electric and generation works (PHGW), including:
  - new upper and lower water storage dams and reservoirs
  - a new underground pumped hydro-electric power station and transformer hall
  - water tunnels, access tunnels, portals and adits
  - tailrace
  - intake and outlet structures
  - associated gates, shafts and screens
- transmission connection works, including:
  - new electricity transmission lines to connect the PHGW to the existing electricity transmission network (Line 965)
  - new electricity transmission infrastructure
  - a new substation
- ancillary development, including but not limited to:
  - access roads, tracks and bridge
  - on-site quarries and related infrastructure
  - utilities and communications infrastructure
  - construction pads containing assets such as workshops, concrete batching plants (CBPs), and offices

- laydown and storage areas
- construction accommodation
- pumping infrastructure
- operational facilities such as offices, and camps for staff
- construction and operational power supply.

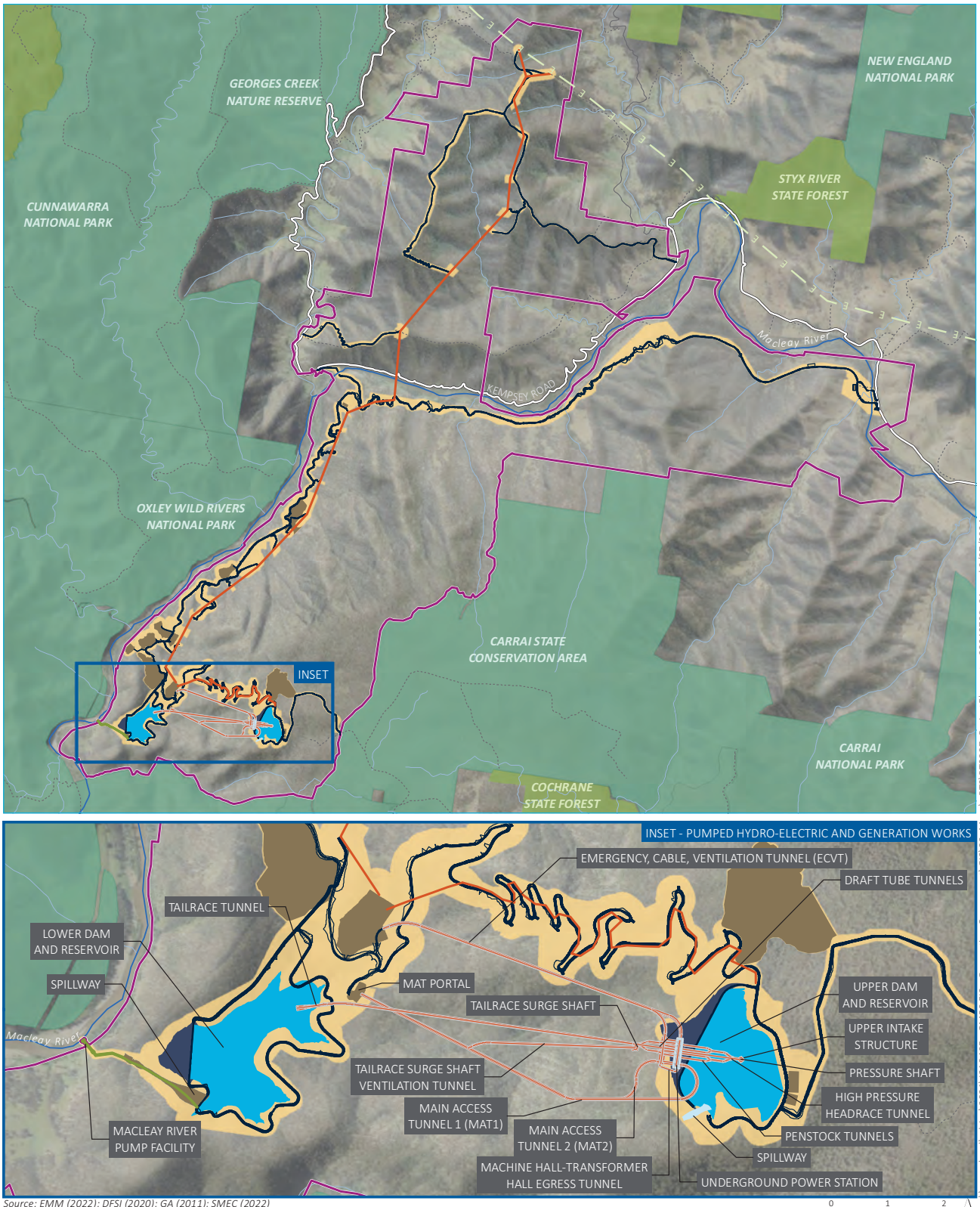
2.3 Amendments to design

Amendments to the project design have occurred following the delivery of the Environmental Impact Statement (EIS), exhibited on 19 September 2023. A detailed description of the Amended Project is provided in the Amendment Report. A summary of changes is presented in Table 2.1, with those relevant to this assessment shown in **bold text**.

Table 2.1 Overview of the project amendments in comparison to the project

Project Element	Description of change	Summary of the Project as exhibited in EIS	Summary of the amended Project
Internal roads			
Eastern Access Road (EAR) realignment	Realignment of the EAR to reduce need for earthworks, improve road safety and address drainage issues.	Approximately 11.4 km	Approximately 12.1 km
Temporary bridges	A temporary bridge will be utilised prior to the construction of the two permanent bridges (referred to as Eastern Access Temporary Bridge). A secondary, temporary access is proposed via the construction of a new, temporary bridge crossing of the Macleay River about 600 m upstream and north-west of Georges Junction (referred to as Western Access Temporary Bridge). This amendment is proposed to reduce the period of internal road construction and therefore overall construction period, and improve effectiveness of emergency response measures (access and egress).	One temporary bridge: Eastern Access Temporary Bridge. One permanent bridge.	Two temporary bridges: Eastern Access Temporary Bridge (EATB) and Western Access Temporary Bridge (WATB). One permanent bridge.
Upper Dam Access Road (UDAR) refinement	Realignment of the UDAR (including removal of a large north-south connecting section of road) in response to regulator feedback to avoid known habitat and potentially significant impacts to the threatened Brush-tailed Rock Wallaby.	Approximately 7.1 km	Approximately 6.4 km
Construction			
Temporary or fly camps	While fly camps were previously anticipated for the project, up to three fly camps are confirmed to be required and located near Smiths Bluff (Eastern fly camp), the intersection of the Main Access Road and the EAR (Western fly camp), and the upper reservoir (within spoil emplacement area) (Southern fly camp). The camps will each accommodate about 20 workers and up to 90 workers depending on the ultimate configuration, and would be established within the first year of construction. All services will be trucked in and out of the sites, with no permanent facilities or services proposed.	Temporary or fly camps may be required. The location and size will be documented during the detailed design phase.	Three temporary or fly camps will provide small scale temporary work accommodation for workers completing initial road works until the main accommodation camp is completed. Proposed locations in proximity of EATB, WATB, and Upper reservoir.
Blasting and rock crushing/processing	**Allowing blasting as a construction method for road works and other above-ground works. Rock processing/crushing facilities will be required in the lower reservoir (LR) and upper reservoir (UR) areas to process rock for use in dams.**	**Blasting required for tunnels and portals.**	**Blasting required for tunnels and portals, reservoirs and road works.**
Construction water requirements	Increasing the estimated water requirements for use in construction (e.g. dust suppression, concrete batching, etc).	Approximately 1 ML/day	Approximately 3 ML/day

Project Element	Description of change	Summary of the Project as exhibited in EIS	Summary of the amended Project
Construction envelope	Updates to the construction envelope to accommodate stakeholder feedback, design changes and refined construction requirements.	Approximately 780 ha	Approximately 768 ha
Disturbance footprint	Updates to the disturbance footprint to accommodate stakeholder feedback, design changes and refined construction requirements.	Approximately 330 ha	Approximately 367 ha
Spoil and materials			
Laydown/stockpile areas	**There will be four areas used for stockpiling and material laydown. One area is located along the main access road (between transmission towers 14–16), one area is located in proximity to the batching plant, one area is located near Georges Junction, and one is located near the Eastern Access Temporary Bridge on the eastern side of the Macleay River. The largest of the four areas has also been flagged as available for other ancillary uses, to provide further flexibility as the detailed design progresses.**	**There will be two areas used for stockpiling and material laydown, covering a total area of 114,000 m^2**	**There will be four areas used for stockpiling and material laydown, covering a total area of 119,600 m^2**
Spoil emplacement	**Revised spoil estimates were derived following changes to the underground arrangement and sizing. This, in addition to incorporating agency feedback, required changes to the conceptual landform design. The conceptual landform design presents reduced height and slopes, however, requires a greater disturbance area as a result.**	**Three permanent spoil emplacement locations to store around 2.9 Mm3 plus dead storage within the reservoirs with approximate capacity 300,000-400,000 m^3.**	**Two permanent spoil emplacement locations to store around 3.55 Mm^3.** **Use of dead storage in reservoir only if surplus material.**
Operational footprint	Updates to the operational footprint to accommodate design changes (including permanent spoil emplacement and transmission alignment along the UDAR).	Approximately 270 ha	Approximately 280 ha
Underground arrangement and sizing			
Underground arrangement and sizing for improved generation capacity	The Project will provide up to around 900 MW of electricity generating capacity and up to eight hours of energy storage at full generating capacity.	Up to 900 MW and between 8 and 12 hours of energy storage. Underground arrangement and tunnel sizes reflect lower energy storage capacity	Up to 900 MW and up to 8 hours of energy storage. Underground arrangement and tunnel sizes reflect greater energy storage capacity. Re-location of MAT portal to align with amended arrangement.



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Source: EMM (2022); DFSI (2020); GA (2011); SMEC (2022)

Key project elements

KEY

- Project area
- Construction envelope
- Surface works

Project operational elements

- Power station
- Pump station
- Tunnels, portals, intakes, shafts
- Transmission overhead lines
- Permanent road
- Dam wall
- Reservoir
- Spillway

Existing environment

- Macleay River
- Watercourse/drainage line
- Major road
- Minor road
- Vehicular track
- Existing transmission line
- NPWS reserve
- State forest

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Figure 2.1

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2.4 Project area terminology

Approval for the Project is being sought based on feasibility designs as is common for projects of this size and scale. To accommodate minor changes and amendments to the design as it progresses, a 'Project area', 'construction envelope', 'disturbance footprint' and 'operational footprint' approach is being adopted for the Project. This approach is aimed at ensuring environmental impacts are assessed as accurately as possible, whilst accounting for the current level of design and the likelihood of design refinements occurring as the Project progresses towards construction. This approach was adopted for the assessment of Snowy Hydro Limited's Snowy 2.0 Project.

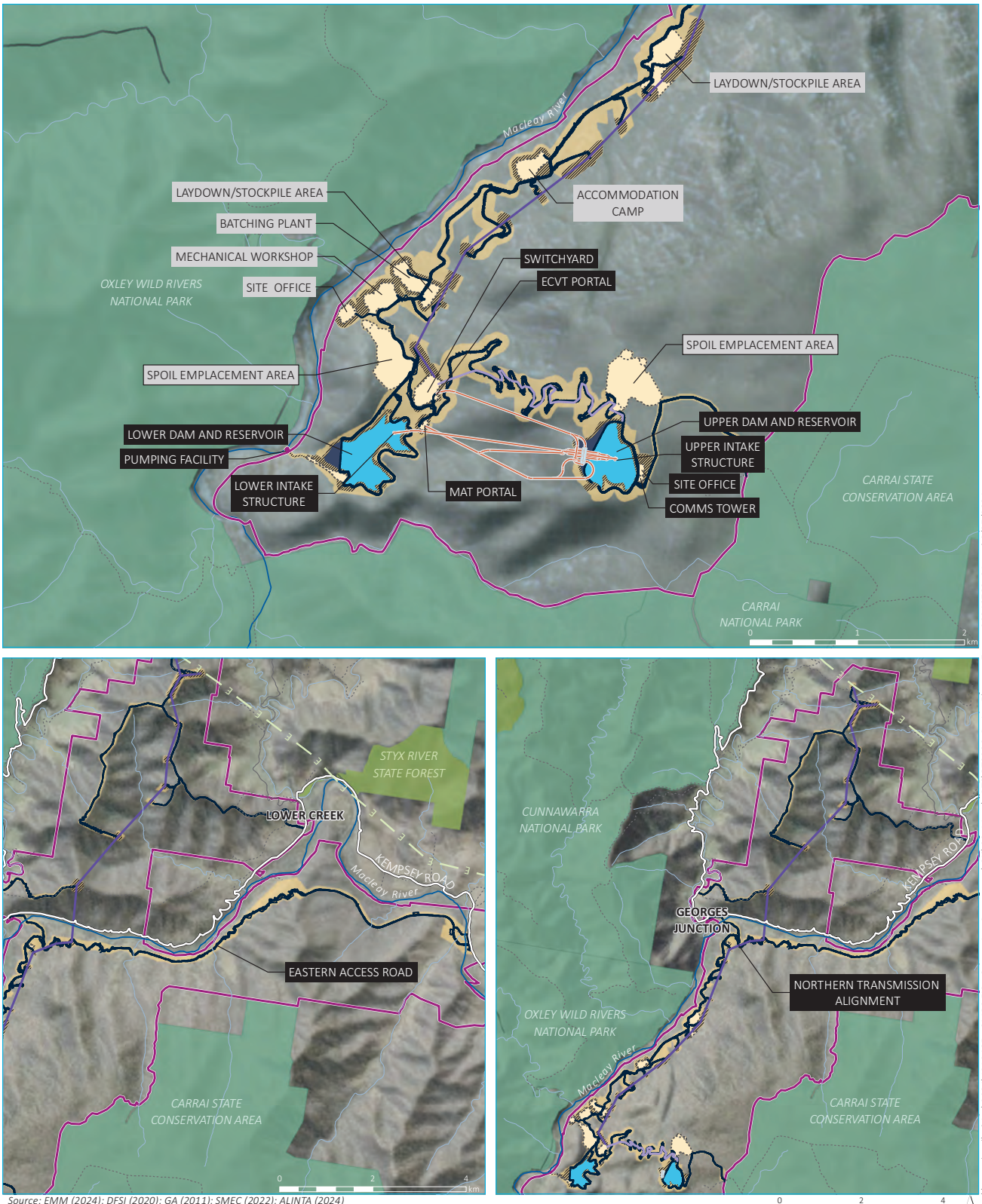
The *Project area* is the broader area within which the Project will be built and operated, and the extent within which direct impacts from the Project are anticipated. Importantly the Project area does not represent a footprint for the construction works, but rather indicates an area that was investigated during environmental assessments. The Project area has been further divided into different areas to facilitate the assessment of direct impacts from the Project.

The *construction envelope* represents the maximum extent of where disturbance may occur during the construction of the Project. In order to derive the construction envelope, buffers have been applied to key Project elements and infrastructure. The buffers used to derive the final construction envelope area reflect the confidence around the current siting of the asset or infrastructure, and the likelihood that some minor amendments may be required prior to commencing the construction works as a result of the detailed design. The construction envelope for the Project is around 768 ha.

Located entirely within the bounds of the construction envelope sits the *disturbance footprint*, a smaller area that has been derived directly from the current level of design. The disturbance footprint represents the physical disturbance that can be expected as part of the construction works. As the design is refined, the final siting of the disturbance footprint can move within the construction envelope, subject to the recommended environmental management measures, and provided it does not exceed any limits as defined by the construction envelope. It is proposed that most of the disturbance area will be rehabilitated and landformed at the completion of the project; however, other parts will be retained post construction. These components are necessary for the ongoing operation and maintenance of the new power station (operational footprint). The disturbance footprint for the Project is around 367 ha.

Progressively and at the end of construction, temporary components that are required to support the construction of the Project will be rehabilitated and returned to a state representing its previous use. The exception to this is the areas required for permanent operation of the Project, which would be retained (referred to as the *operational footprint*). The operational footprint of the Project is around 280 ha.

The Project area, construction envelope and disturbance footprint are shown in Figure 2.2.



Source: EMM (2024); DFSI (2020); GA (2011); SMEC (2022); ALINTA (2024)

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KEY

- Project area
- Disturbance footprint
- Construction envelope
- Surface works

Project operational elements

- Underground power station complex
- Power and communications lines
- Transmission overhead lines
- Tunnels, portals, intakes, shafts
- Permanent road
- Reservoir
- Dam wall

Existing environment

- Macleay River
- Watercourse/drainage line
- Kempsey-Armidale Road
- Vehicular track
- Existing transmission line
- NPWS reserve

Label format

- SURFACE PERMANENT INFRASTRUCTURE
- UNDERGROUND PERMANENT INFRASTRUCTURE
- TEMPORARY INFRASTRUCTURE
- PERMANENT SPOIL EMPLACEMENT

Project areas overview

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Figure 2.2

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3 Project setting

3.1 Land use

Land use within the Project area is predominantly agricultural, comprising agistment based cattle farming on privately owned land including sections of crown land and TSR. Based on the Geological Survey of NSW (GSNSW) mining tenements database (GSNSW 2022), Pickands Mather & Co International and BHP Minerals Limited have undertaken mineral exploratory works in 1971 and 1974 respectively. Exploratory works were generally concentrated within exploration lease EL9430 (formerly named EL664, refer Figure 3.1). Exploratory sampling and geological works were undertaken to assess the prospectivity for:

- arsenic (As)
- tin (Sn)
- molybdenum (Mo)
- copper (Cu)
- gold (Au)
- tungsten (W).

The extent of the exploration lease is provided in Figure 3.1.

3.2 Geology

The Project lies within the New England Orogen (NEO). The NEO extends approximately 2,000 km along the east coast of Australia from Townsville, QLD (north) to Newcastle, NSW (south), and is bordered by the Sydney-Gunnedah-Bowen Basin to the west (Jessop, Daczko and Piazolo 2019). Differing geodynamics in the early Permian to Triassic led to a series of linked pluton structures (known collectively as the New England Batholith) which intruded the sedimentary units of the Permian-aged Parrabel Beds and Carboniferous-aged Pee Dee Beds. The Triassic-aged Carrai Granodiorite; a plutonic structure outcropping over approximately 168 square kilometres (km^2), is the dominant geological unit occurring within the study area and a product of the New England Batholith.

A summary of the stratigraphy within the Project area is provided in Table 3.1. The distribution and extent of the relevant geological units to the study area are mapped and shown on Figure 3.1.

Table 3.1 Project area stratigraphy

Period	Formation	Typical description (Colquhoun, et al. 2022)
Quaternary	Undifferentiated alluvial, colluvial sediments	Well sorted, coarse grained and oversized fractions at the base of the incised valleys and adjacent to the Macleay River. Generally, comprises localised deposits of cobbles and boulders at the base of the incised valleys, becoming more prevalent and continuous within the lower escarpment. Sands to cobbles more frequently observed within the Macleay Valley floodplain.
Triassic	Carrai Granodiorite	Coarse grained, felsic, crystalline igneous rocks including granodiorite, monzogranite and leucogranite. Relatively shallow weathering profile (≤9 m depth) and strength typically increasing with depth. Dominant geology underlying the Project area.

Period	Formation	Typical description (Colquhoun, et al. 2022)
Permian	Parrabel Beds	Fine to coarse grained sedimentary rocks including diamictite, conglomerate, sandstone, mudstone, limestone and tuff. Highly metamorphosed within the Project area by the Carrai Granodiorite intrusion, forming an aureole contact of hornfels and meta-sediments. Underlies the western portion of the Project area.
Carboniferous	Pee Dee Beds	Fine to coarse grained sedimentary rocks including slaty siltstone, lithic sandstone and minor diamictite. Likely metamorphosed near the Project area by Carrai Granodiorite intrusion, forming an aureole contact of hornfels and meta-sediments. Underlies a relatively small portion of the Project area.

3.2.1 Geochemistry

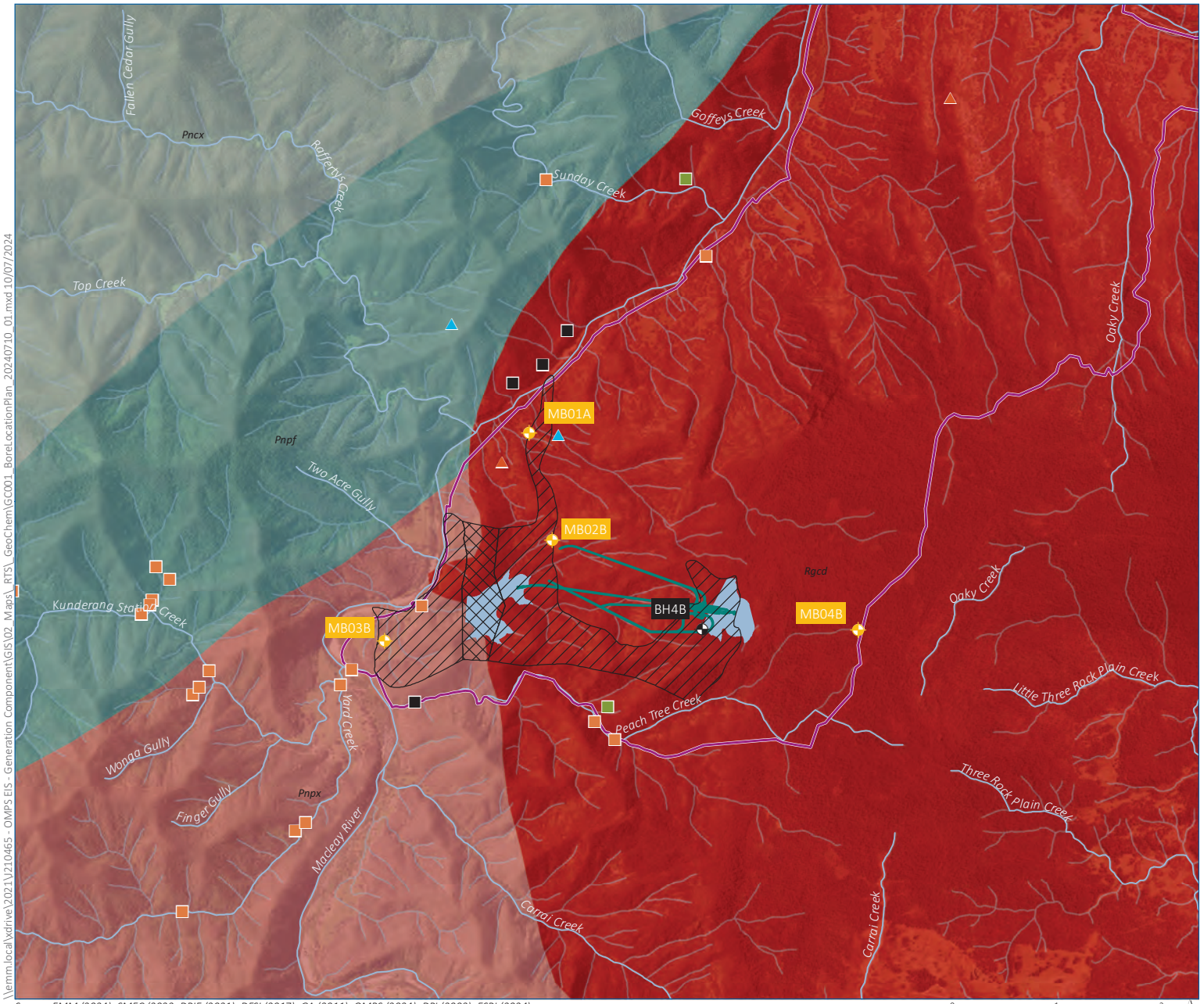
For the purpose of this geochemistry assessment, three geological groups are defined according to the likely geochemistry characteristics, as summarised below:

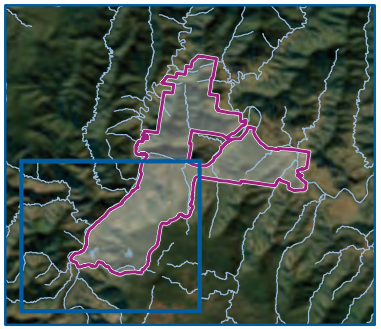
- Granodiorite (associated with the Triassic Carrai Granodiorite), underlying the majority of the Project area (refer to Figure 3.2) and intercepted by the majority of the subsurface infrastructure (tunnels, power cavern etc.) and a portion of the upper reservoir. This unit comprises an intrusive magmatic rock of predominantly quartz and felspar. It is unlikely to contain sulfidic minerals and is unlikely to be reactive or leach heavy metals or metalloids at elevated concentrations in the unaltered state. Alteration and increased quartz content was observed in bore MB01A (observed at 6–12 m and 16–28 m, refer Figure 3.1) which could be interpreted as granodiorite or greisen which comprises 60% or greater quartz, (Streckeiesen 1974). Greisen is often targeted for mineral exploration due to the enrichment of metal bearing minerals and is considered the highest risk of all identified geological features in the Project area for metal and metalloid leaching. The observed Greisen is located off the Project alignment.

- Hornfels (undifferentiated), forming a contact aureole with Carrai Granodiorite and adjacent sedimentary rocks, observed in the western extent of the Project area and contiguously across the Carrai Plateau (refer to Figure 3.1), intercepted by the shallower portion of the proposed pressure shaft and a portion of the upper and lower reservoirs. Hornfels consists of contact metamorphosed sedimentary rock such as sandstone, shale and diamictite. It is typically a very hard rock that consists of quartz, felspar and mica. Material from this unit is not believed to be reactive or to leach contaminants of potential concern (COPC).

- Metasediments (associated with contact metamorphism of the Permian Parrabel beds), underlying the western extent of the Project area, intercepted by the lower reservoir and minor components of the subsurface infrastructure. This unit consists of varying degrees of metamorphic rock (slate, phyllite, schist and hornfels) from sedimentary protoliths including sandstone, shale and diamictite. Material from this unit is not believed to be reactive or to leach COPCs.

Geological units were identified and presented in Figure 3.1 and Figure 3.2.





KEY

- Project area
- Hydrogeological borehole
- Geotechnical borehole
- Watercourse/drainage line
- Proposed subsurface infrastructure
- Proposed reservoir footprint

Geology (SMEC, 2022)

- Hornfels
- Meta-siltstone

Historical data - Commodity detected

- Antimony
- Arsenic

Historical data - Elevated metals

- Antimony
- Copper
- Zinc

Geology 250k period and formation

Permian

- Pnpx - Permian, Parrabel bed
- Rgcd - Permian, Carrai Granodiorite

Carboniferous

- Pncx - Carboniferous
- Pnpf - Carboniferous, Pee Dee bed

Desktop review and sample selection

Source: EMM (2024); SMEC (2022; DPIE (2021); DFSI (2017); GA (2011); OMPS (2024); DPI (2003); ESRI (2024)

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Oven Mountain Pumped Hdyro Energy Storage
Geochemistry Assessment report
OMPS Pty Ltd
Figure 3.1

EMM
creating opportunities

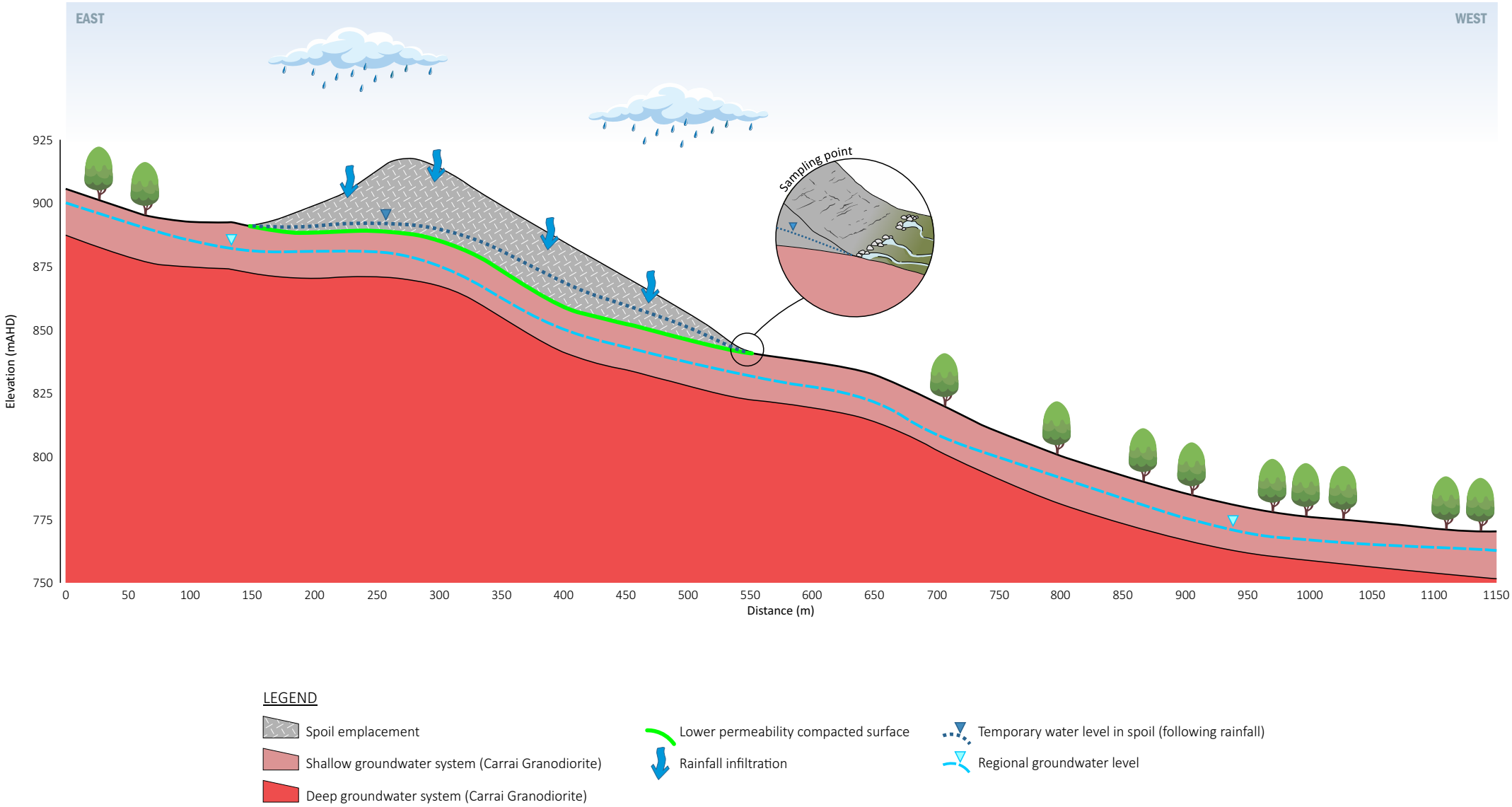


Figure 3.2 **Upper reservoir spoil emplacement conceptualisation**

EMM
creating opportunities

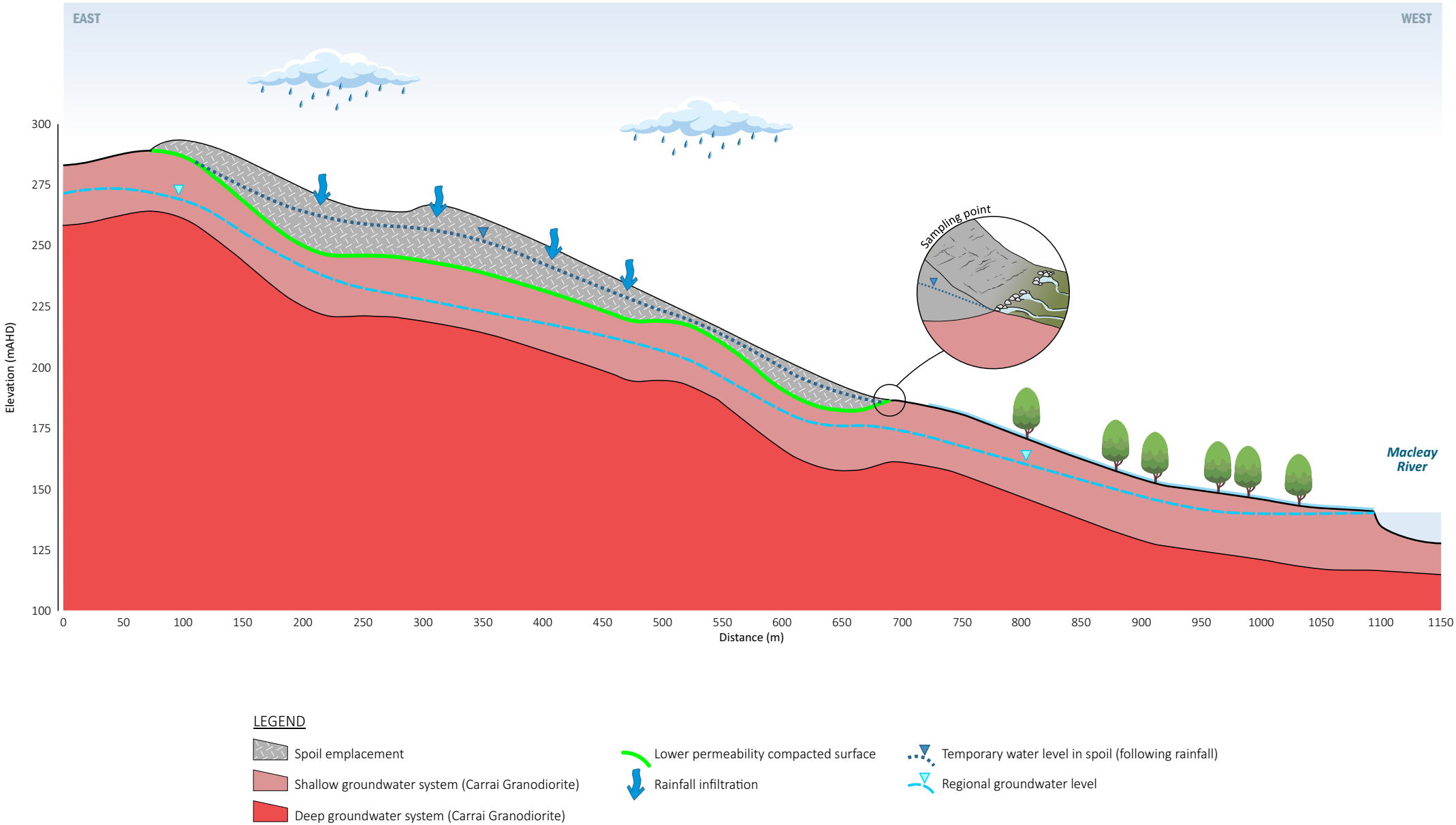


Figure 3.3 **Lower reservoir spoil emplacement conceptualisation**

4 Geochemistry assessment

4.1 Overview

Characterisation of the geochemistry within the Project area is essential to develop an understanding of risks associated with stockpiling excavated material (spoil). Stockpiling of spoil leads to oxidation of the minerals entrained in the geology which can result in:

- acidic or neutral rock drainage, typically caused by the oxidation of sulphides
- metalliferous drainage, typically caused by leaching of mobile metals and transport by rainfall.

The geochemistry assessment aims to inform risks associated with mobilising contaminants associated with disturbed materials.

4.2 Assessment methodology

4.2.1 Historical data review

A desktop review was undertaken to provide preliminary characterisation of geological units. The elemental composition of sediment samples collected by BHP Minerals Limited, Pickands Mather and Co International, and PlatSearch NL during prospecting studies (refer Section 3.1) were downloaded from MinView (GSNSW 2022).

It is understood that samples were collected from sieved stream sediments during mineral exploration in 1974, 1971 and 2010, respectively. The MinView database contained records of historical deposits (Diggers Creek Lode, Haydons Firetrail, Kempsey Armidale Road Prospect and unnamed) containing antimony and arsenic. Historical geochemistry sample locations are identified in Figure 3.1.

4.2.2 Sample collection and testing program

Two geotechnical bores were drilled by SMEC in October 2021 (BH4B) and July 2022 (BH4A) and samples were obtained where material was available. Geological core samples (core) were collected and stored. EMM completed a hydrogeological drilling program between October 2021 and March 2022, installing seven monitoring bores at the site. Geological chip samples (chips) were collected and stored in trays from each borehole.

Borelogs and photographs of the core and chips were reviewed to identify geological units and identify target samples for geochemical characterisation. Borehole locations and sample depths were selected to:

- capture spatial variability across the Project area
- target potentially geochemically reactive geological units, as identified from site investigations and the outcomes of the desktop review (refer Section 1)
- characterise all identified geological units where significant spoil will be excavated during construction of the Project.

A summary of borehole locations and selection criteria is provided in Table 4.1.

Table 4.1 Borehole location rationale

Borehole	Sampling rationale
BH04B	Geotechnical borehole drilled to 444 metres below ground level (m bgl) and near the proposed pressure shaft. The borehole intersected hornfels and granodiorite with samples collected from both units.
MB01A	Located regionally off the Project alignment and representing potentially altered granodiorite (greisen).
MB02B	Located regionally off the Project alignment and representing a similar depth within the Carrai Granodiorite to the maximum proposed depth of the Project infrastructure.
MB03B	Located within similar geology to the proposed excavation footprint for the lower reservoir.

Samples were selected from the core and chips for analysis, to assess:

- likely waste classification (in accordance with the Waste Classification Guidelines, (EPA 2014))
- the potential for leachability of contaminants (in accordance with the Waste Classification Guidelines, (EPA 2014))
- acid rock drainage (ARD) and neutral rock drainage (NRD) properties, referred to collectively as acid base accounting (ABA) analysis.

Seven samples were analysed for waste classification and seven samples for ABA and metal and metalloid leachability properties. All samples were collected from either the homogeneous core or chip samples and issued to ALS Environmental (Sydney) under chain of custody protocols for analysis.

Samples were analysed to determine their geochemical characteristics. The characteristics were interpreted with consideration of NSW guidelines for waste classification. Specifically, the geochemical characteristics were assessed conservatively against the full landfill suite, despite the negligible risk that spoil contains anthropogenic contaminants. This extended suite from the NSW waste classification guidelines also acts as a baseline, prior to any major construction works. The elemental composition of the sediment samples was also compared to NSW waste class criteria. This provided a background as to what contaminants of potential concern (COPCs) may be present within the spoil, and locations where such elements are elevated within the site area. The locations of the historical sediment samples are presented on Figure 3.1.

The waste classification analytical suite that the samples were subjected to includes the broad suite of analytes listed below. Analysis of total elemental concentrations was conducted to provide an indication of source contents and to identify potential elements of concern; these were further examined by deionised (DI) water leach testing (ASLP) to assess the potential mobility of metals and metalloids. This was further complemented by a series of kinetic humidity cell tests that were conducted to assess the longer-term reactivity and leachability of the spoil (Section 5.3). The waste classification suite included the following analytes:

- Metals and metalloids (arsenic, beryllium, chromium (hexavalent), cadmium, molybdenum, lead, mercury, nickel, selenium and silver).
- Inorganics – chloride, fluoride and sulphate.
- pH, electrical conductivity, alkalinity and moisture content.
- Total recoverable hydrocarbons (TRH).
- Total petroleum hydrocarbons (TPH).
- Chlorinated hydrocarbons.

- Benzene, ethylbenzene, toluene and xylenes (BTEX), semi volatile organic compounds (SVOC) and volatile organic compounds.
- Monocyclic aromatic hydrocarbons (MAHs).
- Organochlorine pesticides (OCPs), organophosphorus pesticides (OPPs) and herbicides.
- Polychlorinated Biphenyls (PCBs).
- Polycyclic aromatic hydrocarbons (PAH) and phenols.
- Cyanide.
- Halogenated benzenes and halogenated hydrocarbons.
- Nitroaromatics and phthalates.
- Solvents and explosives.
- Amino aliphatics, amino aromatics and anilines.
- ASLP DI water leachable metal concentrations of 26 metals (silver, aluminium, arsenic, boron, barium, cadmium, chromium, copper, iron, manganese, molybdenum, nickel, lead, antimony, selenium, strontium, tin, uranium, vanadium, thallium, titanium, cobalt, zinc, gallium, tungsten and thorium).

Acid Base Accounting (ABA) analysis included the analysis of the following:

- total sulphur (by LECO). Since the primary driver of most ARD is the oxidation of sulphide, total sulphur can provide an estimate of the potential acidity of a sample, which is expressed as the maximum potential acidity (MPA), defined as: MPA = 30.6 x total sulphur.
- Acid Neutralising Capacity (ANC). This provides a measure of the capacity of a given sample to buffer the acidity generated.
- Net Acid Generation (NAG). The MPA and ANC together may provide an indication of the likely acid-base characteristics of a sample. To provide additional detail, NAG testing is performed in which samples are subjected to oxidation and the net effect is measured and calculated. This has advantages where samples fall within the uncertain criteria of ABA.

To provide an indication of the longer-term leaching potential of the spoil, kinetic humidity cell testing was conducted, with analysis of the leachate on a complementary suite including:

- pH, EC
- Major cations and anions
- Dissolved metals and metalloids (aluminium, antimony, arsenic, barium, beryllium, bismuth, boron, cadmium, chromium, cobalt, copper, iron, lead, lithium, manganese, mercury, molybdenum, nickel, selenium, strontium, thallium, uranium and zinc).

A summary of samples selected for analysis is provided in Table 4.2.

Table 4.2 Samples selected for analysis

Borehole	Depth (m bgl)	Rationale	Analysis requested
BH4B	2.39–2.51	Hornfels with hydrothermal vein	Waste Classification
BH4B	6.40–6.52	Hornfels with alteration veins	ARD and NRD
BH4B	22.05–22.30	Hornfels – with different colouring	Waste Classification
BH4B	39.74–39.91	Hornfels	ARD and NRD
BH4B	71.00–71.20	Water strike – potential hydrothermal alteration	ARD and NRD
BH4B	126.27–126.37	Granodiorite	Waste Classification
BH4B	148.17–148.36	Granodiorite – potential hydrothermal alteration	ARD and NRD
BH4B	388.00–388.13	Granodiorite	Waste Classification
BH4B	419.00–419.14	Granodiorite	ARD and NRD
MB01A	26.00–36.50	Granodiorite, with minor hornblende	ARD and NRD
MB02B	0.00–9.00	Residual granodiorite – Sand and sandy gravel	Waste Classification
MB02B	178.00–187.00	Granodiorite – with ferruginous staining	Waste Classification
MB03B	7.00–20.00	Mixed metasediment (7–11 m slate, 11–18 m hornfels and 18–20 m slate)	Waste Classification
MB03B	21.00–29.00	Metasediment – slate	ARD and NRD
BH4B	71.2-71.4	Humidity cell – Shallow hornfels near upper reservoir and pressure shaft	Longer-term leaching
BH4B	420.0-420.3	Humidity cell – Granodiorite near pressure shaft excavation	Longer-term leaching
BH3001A	651.0-651.2	Humidity cell – Granodiorite near power station complex	Longer-term leaching
BH3001A	820.0-825.25	Humidity cell – Granodiorite near power station complex	Longer-term leaching

4.3 Screening guidelines

4.3.1 Waste classification

As per the NSW EPA Waste Classification guidelines (NSW EPA 2014), analytical results were screened against:

- *Contaminant Threshold criteria for General Solid Waste* (GSW) (CT1)
- *Specific Contaminant Concentration criteria for GSW* (SCC1)
- *Toxicity Characteristic Leaching Procedure Threshold criteria for GSW* (TCLP 1).

4.3.2 Acid and neutral rock drainage

Acid base accounting properties were assessed in accordance with the directions outlined in the AMIRA handbook (AMIRA 2002). Results are provided in Section 5.2.

Both the De-ionised water leachate (ASLP) and the leachate collected from the kinetic humidity cell tests were compared to the following guidelines and background water quality:

- 95% species protection level against toxicants in fresh water (ANZG 2018)
- *Australian Drinking Water Guidelines for protection of human health and aesthetic values* (NHMRC 2022)
- OMPS groundwater quality (median and 95th percentile).

It should be noted that direct comparison between the laboratory-scale leachate tests and the guideline values is not strictly appropriate due to various factors such as the conditions under which the data were derived (e.g. controlled laboratory conditions versus the guideline values that are often based on numerous case studies), differences in scale (e.g. gram to kilogram sample amounts in laboratory testing versus the larger quantities of spoil proposed), and different exposure and reaction pathways (e.g. high water to rock ratios and periodic wetting in laboratory testing versus climate variations in the receiving environment). Nevertheless, the comparisons have some merit in highlighting the potential variations and contaminants of potential concern in spoil leaching as material is exposed to site conditions. The results of this assessment should be interpreted with this in mind.

5 Results

5.1 Waste classification

- Laboratory results of samples analysed for the waste classification suite indicated that all reported results were below the contaminant threshold criteria for general solid waste (CT1).
- All reported results were below the specific contaminant concentration criteria for general solid waste (SCC1).
- All reported results were below the toxicity characteristic leaching procedure threshold criteria for general solid waste (TCLP 1).

5.2 Acid and neutral rock drainage

The seven samples tested for ARD and NRD properties were analysed for common acid base accounting (ABA) parameters and leachable metals and metalloids. The results of these analyses are tabulated in Table 5.1 and Table C and D (in Annexure B) attached and summarised in accordance with AMIRA (2002) guidance below. Table 5.1 presents the median and range (in brackets) of the results.

Table 5.1 Summary of acid base accounting results

Geology	Number of samples	Sulphur content (%)	Maximum Potential Acidity [MPA] (kg H2SO4/t)	Acid Neutralising Capacity [ANC] (kg H2SO4/t)	Minimum ANC/MPA ratio
Hornfels	3	0.05 (0.03–0.18)	1.5 (0.92–5.5)	14.8 (9.5–17.8)	2.7
Granodiorite	3	0.03 (0.005–0.91)	0.92 (0.15–27.8)	43.3 (7.2–59)	2.1
Parrabel Beds	1	0.16	4.9	18.7	3.8

The following summarises the results of the ABA testing:

- All samples were analysed for total percent sulphur (%S) with the maximum concentration reported at 0.91%.
- Acid neutralisation capacity (ANC) ranged from 7.2–59 kg H_2SO_4/t based on the laboratory reported total sulphur content.

A higher ANC/MPA ratio indicates a sample that is likely to be more acid consuming than producing, while a lower ratio indicates a sample that is likely more acid producing than consuming. An ANC/MPA ratio of 1.0 indicates that the maximum potential acidity equals the acid neutralisation capacity of the sample.

The ANC/MPA ratio was greater than two for all samples, indicating that all samples contain at least two times the acid neutralisation capacity compared to their maximum potential acid generation capacity. All samples are therefore considered to be non-acid forming (NAF). This is shown in Figure 5.1 and Figure 5.2.

- Net acid generation (NAG) testing includes reacting a soil or rock sample with peroxide to oxidise all sulphide minerals. At the end of the test, the pH of the solution is measured. If the oxidised pH is less than 4.5 the sample may generate acidity. The NAG pH for all samples was greater than pH 4.5 (range 4.6–10.6) and the maximum NAG (when back titrating the solution to a pH of 7.0) was reported to 3.5 kg H_2SO_4/t.

- Net acid production potential (NAPP) represents the difference between the amount of acid the sample may generate (MPA) and the sample's ability to neutralise acid (ANC). A positive NAPP value indicates that the sample may generate acidity and a negative NAPP value indicates that the sample's buffering capacity exceeds the acid generation potential. The calculated NAPP value was negative for all samples indicating that the samples are NAF.

Acid base accounting (ABA) classification is based on the calculated NAPP, NAGpH, ANC/APP and sulphur content. Samples are classified as acid consuming (AC), non-acid forming (NAF)-barren, NAF, uncertain (UNC) and potentially acid forming (PAF). The samples were classified according to the criteria presented in Table 5.2.

Table 5.2 Acid base accounting classification criteria

Classification	NAPP (kg H_2SO_4/t)	NAGpH	ANC/APP	%S
AC	<-20	pH >4.5	≥2	<0.1
NAF Barren	<0	pH >4.5	>1	<0.1
NAF	<0	pH >4.5	>1	<1.0
UNC	<0	pH >4.5	>1 and <2	>1.0
	>0	pH ≤4.5	<1	<0.1
	Samples that do not fit into other categories due to the discrepancies between factors			
PAF	>0	pH ≤4.5	<1	>1.0

Notes: Criteria developed with reference to the GARD Guide (INAP 2009) and the AMIRA International ARD Test Handbook (AMIRA, 2002). NAPP denotes net acid production potential, NAGpH denotes net acid generation, ANC denotes acid neutralisation capacity, APP denotes acid production potential, %S denotes total percent sulphur.

The results of the ABA testing are graphically presented in Figure 5.1 to Figure 5.4. The results indicate that all samples either do not generate significant acidity or contain sufficient acid buffering capacity to prevent acid generation. No samples are classified as PAF.

The distribution of the samples in relation to their NAPP and NAGpH is presented in Figure 5.3. NAGpH was also graphed against sulphur (%) in Figure 5.4.

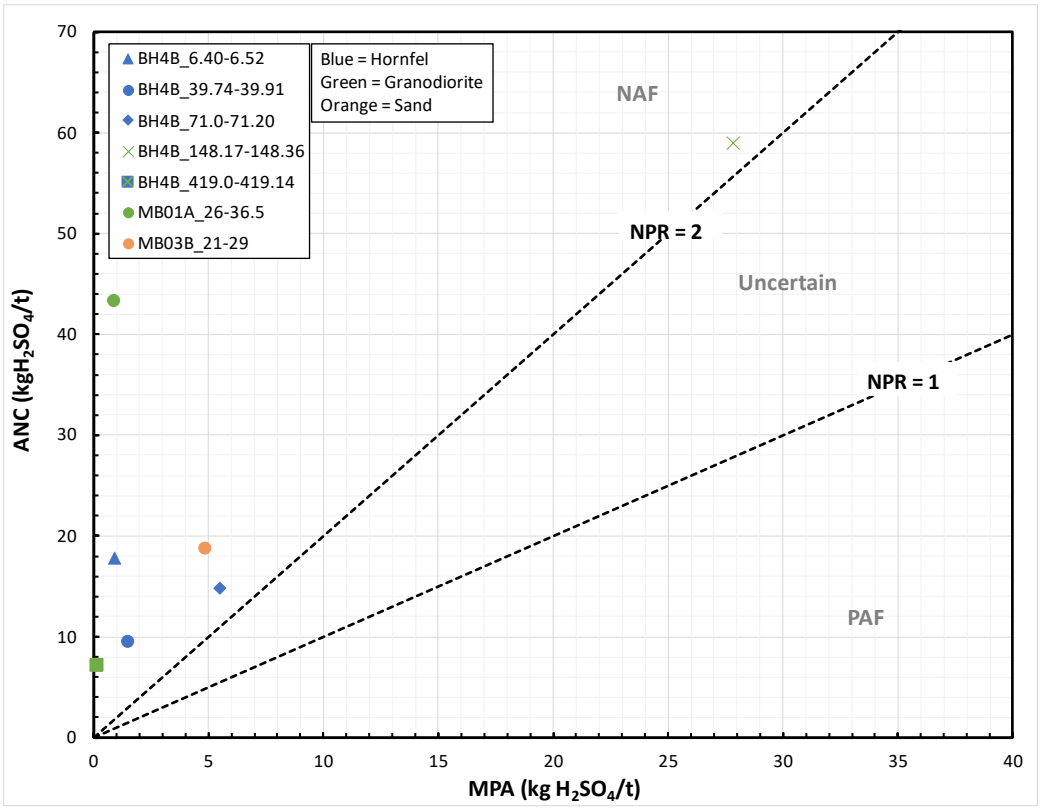


Figure 5.1 **Laboratory analysis of ANC and MPA**

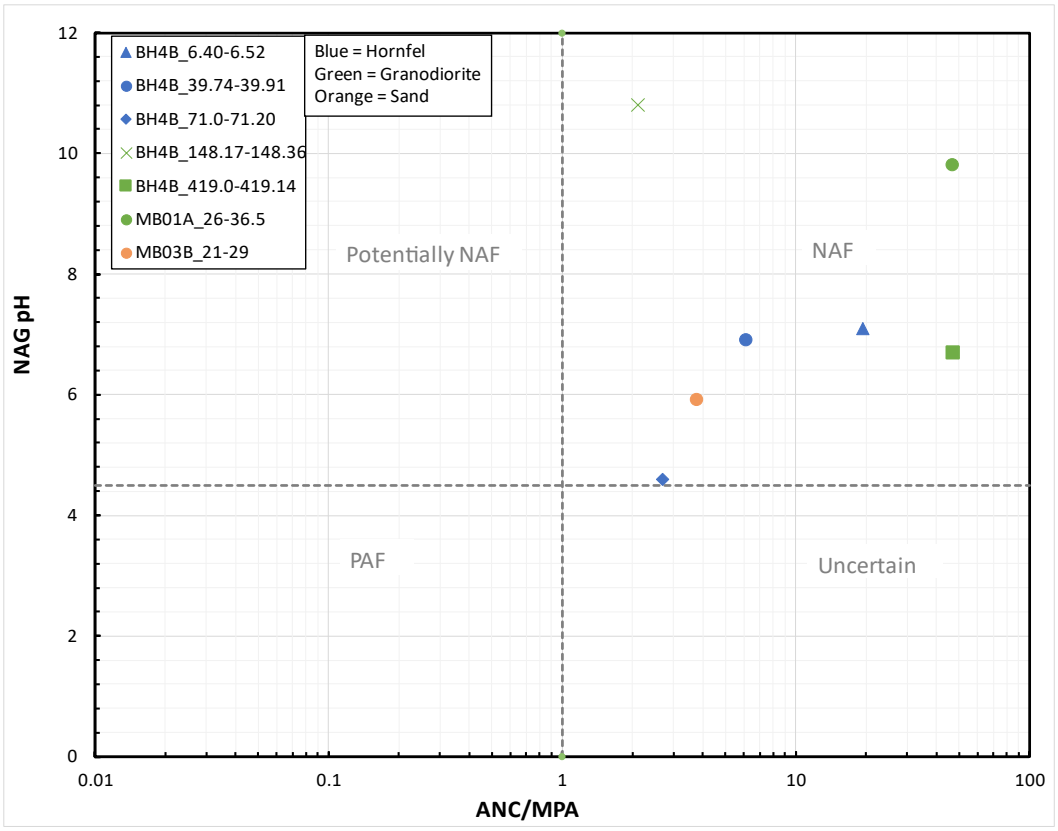


Figure 5.2 **Laboratory analysis of ANC/MPA vs NAG pH**

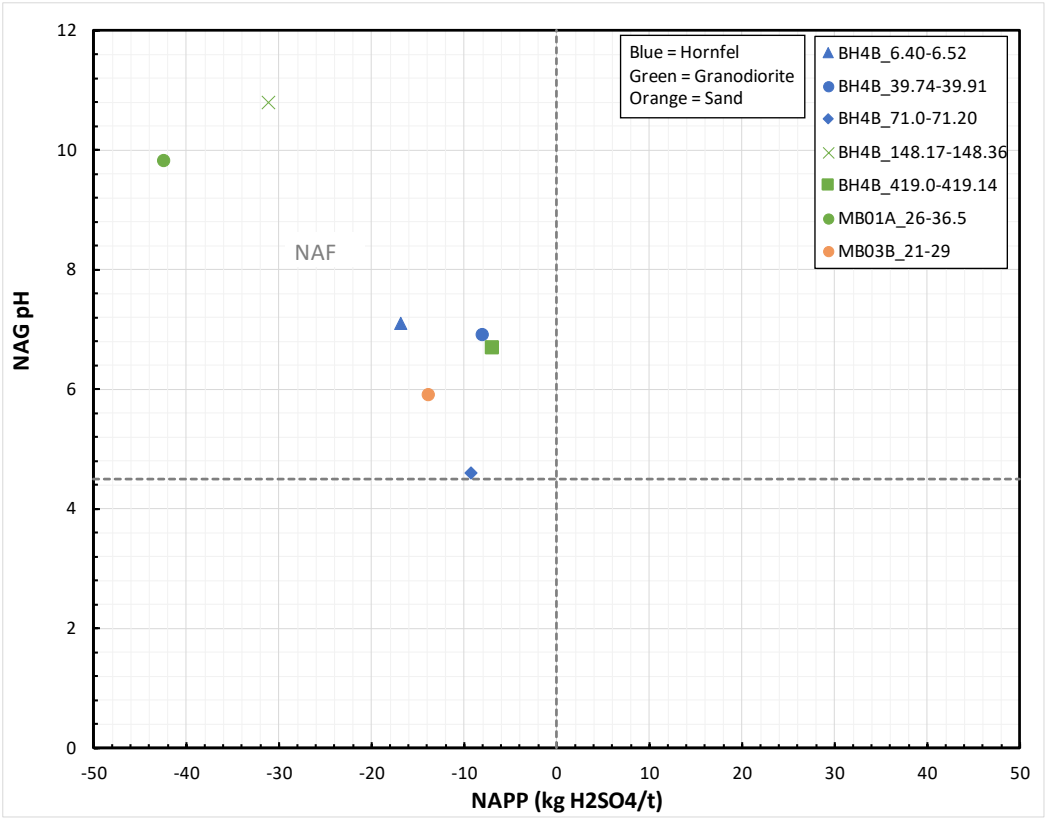


Figure 5.3 **Laboratory analysis of NAPP and NAG_{pH}**

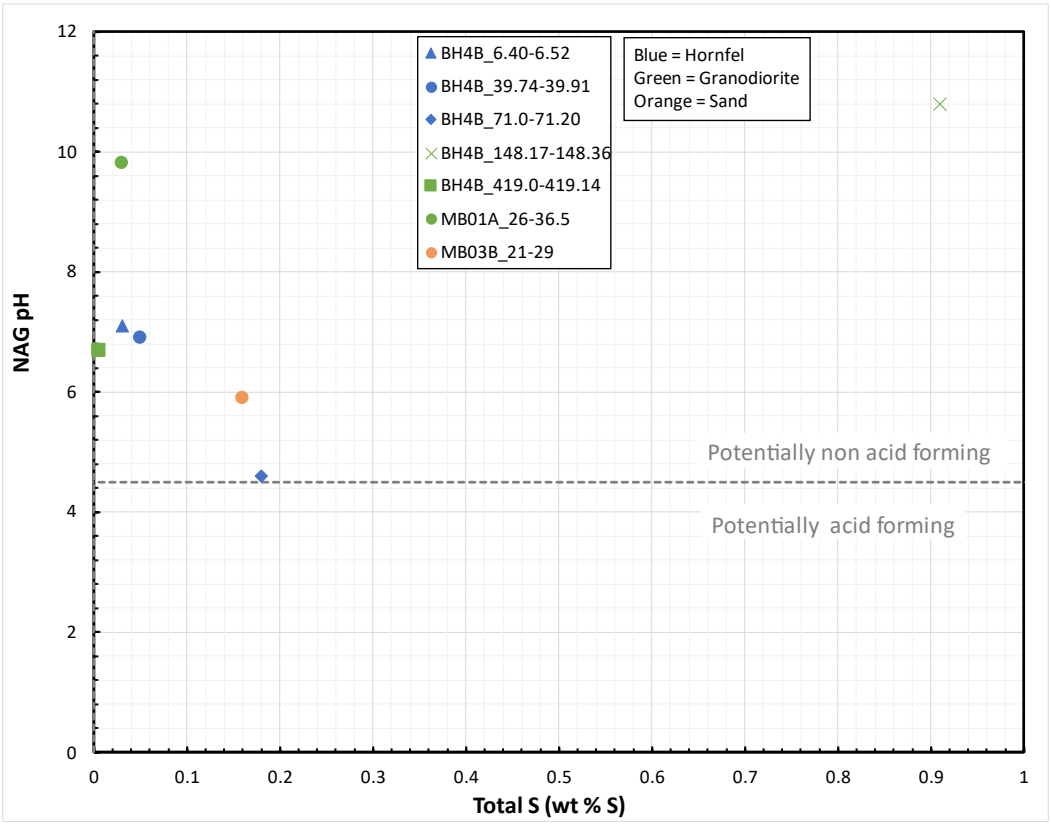


Figure 5.4 **Laboratory analysis of NAG_{pH} and sulphur**

5.3 Metalliferous rock drainage

Although the ABA results indicate that the spoil is unlikely to generate acidic drainage and that the low reactivity of the samples precludes saline drainage, there is the potential for neutral metalliferous drainage to be generated on exposure to ambient conditions. This was initially assessed by conducting the de-ionised water leach testing. Following review from the NSW EPA, a series of humidity cell tests was conducted over a number of months to assess the likely longer-term reactivity of the spoil following surface placement and exposure to weathering.

5.3.1 Leach testing

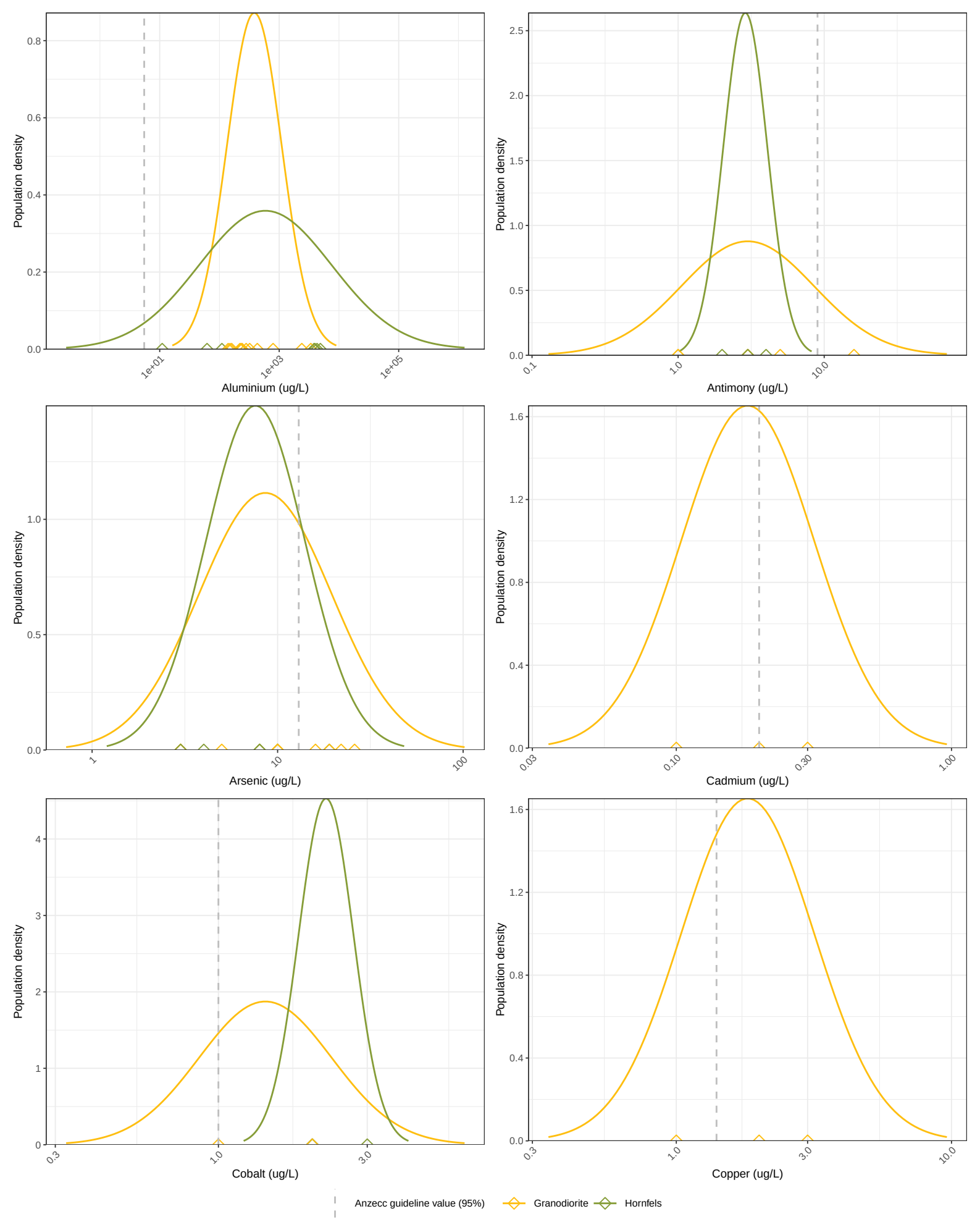
Leachable metal and metalloid concentrations for key parameters of concern are shown in Figure 5.5 and Figure 5.6, which also plot, for comparison, ANZG (2018) 95% species protection freshwater guidelines, where available. Leachate concentrations are summarized in Annexure B, Table D, along with 95% species protection freshwater guidelines, Australian Drinking Water Guidelines for protection of human health and aesthetic values, and OMPS groundwater quality data acquired prior to Project construction.

95% freshwater guidelines are particularly conservative and have been included only for comparison. In addition, due to the limitations of comparing the laboratory-controlled leach test results with natural systems described above, direct comparisons between the leach tests and guideline values are not in the strictest sense valid. Finally, for some analytes, the leachate LORs exceed the freshwater guidelines, therefore interpretation is being made within the limits of the analytical results and the comparison between laboratory-derived and receiving environment values. Nevertheless, leachate testing provides a useful indication of potential contaminants of concern (within the constraints of laboratory testing), and how concentrations may change, in this case under neutral drainage conditions.

Leachate samples exceeded groundwater 95th percentile concentrations for aluminium, iron and, in one sample, antimony (Figure 5.5 and Figure 5.6). Elevated aluminium is likely to be due to the type of rock being analysed and iron is not toxic and doesn't have associated freshwater, health or aesthetic guidelines. The antimony concentration is only marginally above the 95th percentile groundwater value (see below).

Pre-construction groundwater concentrations exceed the most conservative ANZG (2018) 95% species protection freshwater guidelines for almost all parameters compared (i.e. aluminium, arsenic, antimony, cadmium, chromium, copper, iron, lead, manganese, nickel and zinc; Annexure B, Table D). With the exception of aluminium in the hornfels samples, potential spoil leachate concentrations fall within the range of both background groundwater and surface water (Figure 5.6). This indicates that background groundwater (and surface water) concentrations are naturally elevated compared to guideline values and spoil leachate is unlikely to have an adverse impact.

Some samples exceeded the freshwater guidelines for aluminium, arsenic, thallium, uranium, antimony, cobalt, cadmium, lead, silver, selenium, vanadium and zinc; health guidelines for arsenic and antimony; and aesthetic guidelines for manganese. These guidelines are particularly conservative and as some pre-construction groundwater samples already exceed some of these guidelines, it is not expected that these leachable concentrations will create an added risk onsite. It should also be noted that no leachable metals results exceeded NSW TCLP 1 waste classifications guidelines.



Gaussian distributions of leachate testing results (set 1of 2)

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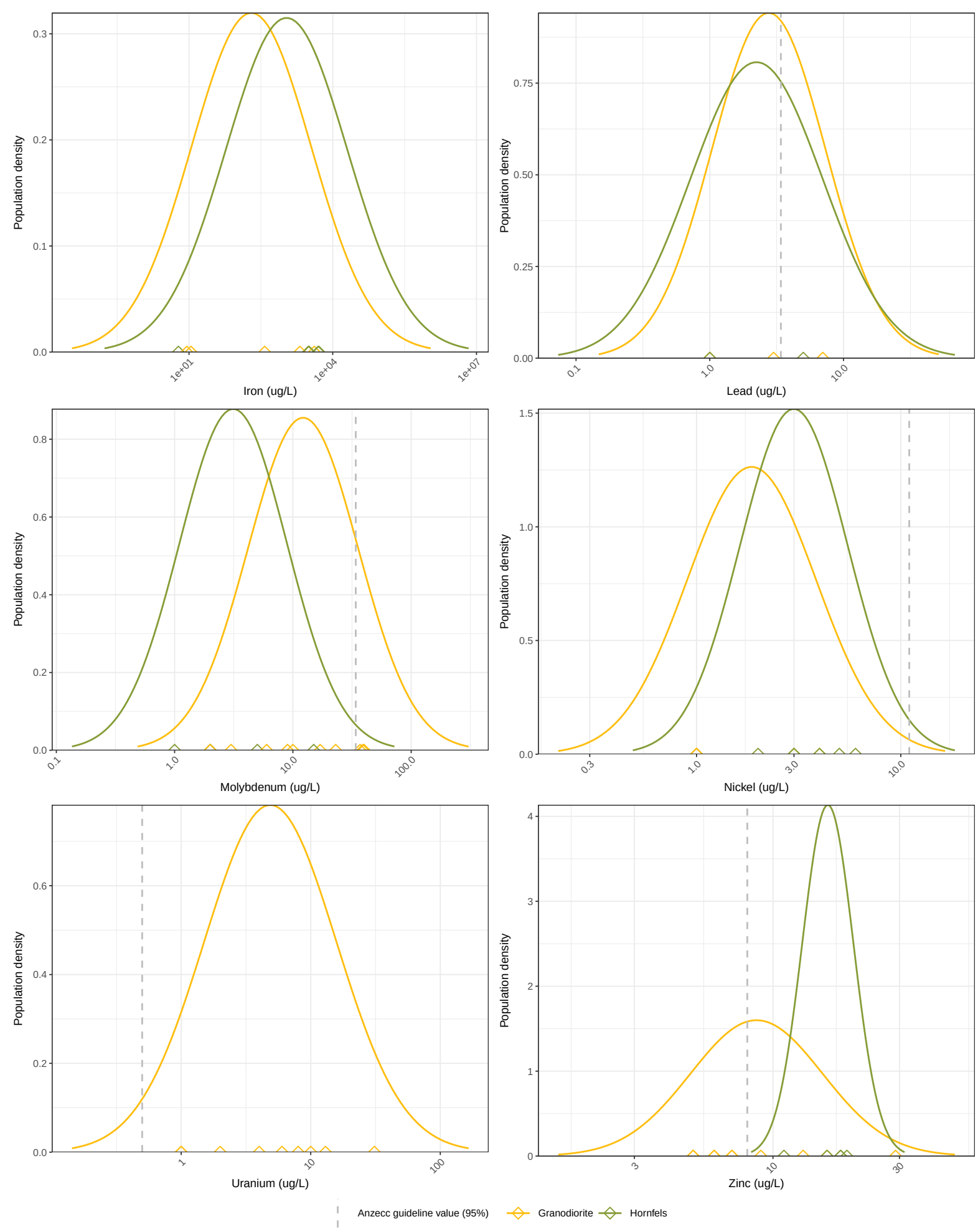
Geochemistry impact assessment

Figure 5.5

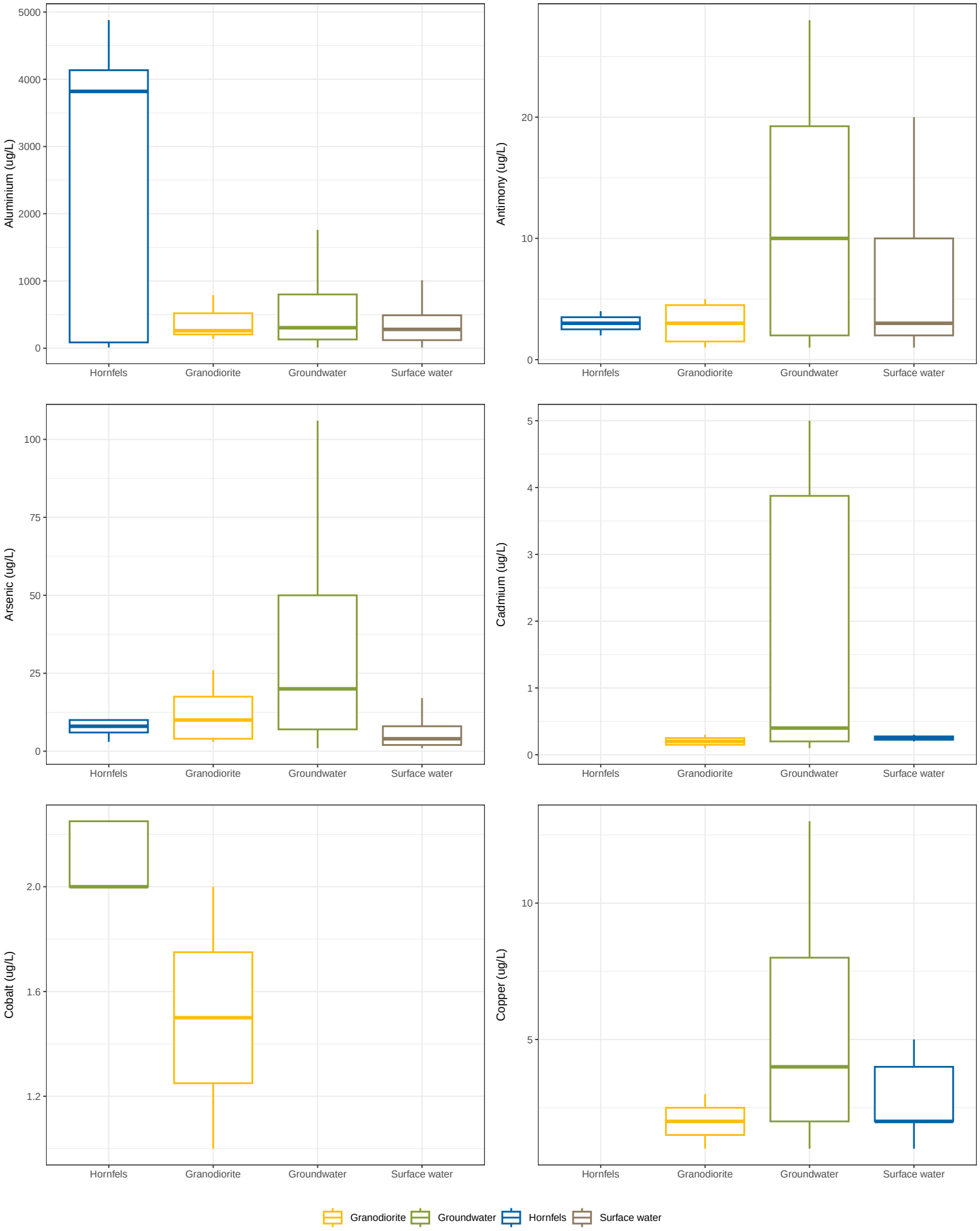


Gaussian distributions of leachate testing results (set 2of 2)

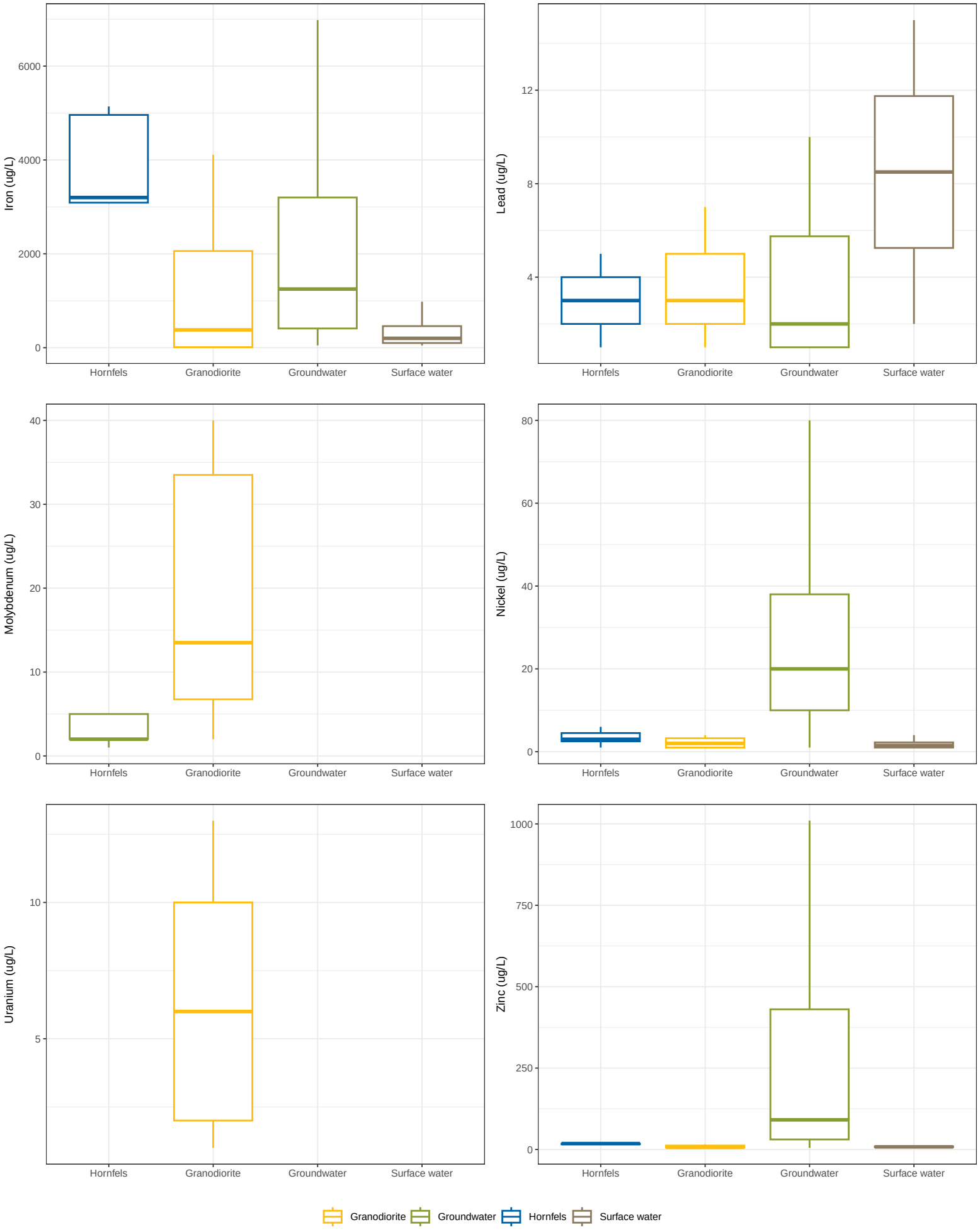
Oven Mountain Pumped Hydro Energy Storage

Geochemistry impact assessment

Figure 5.6



Box and whisker plots (set 1 of 2)
Oven Mountain Pumped Hydro Energy Storage
Geochemistry impact assessment
Figure 5.7

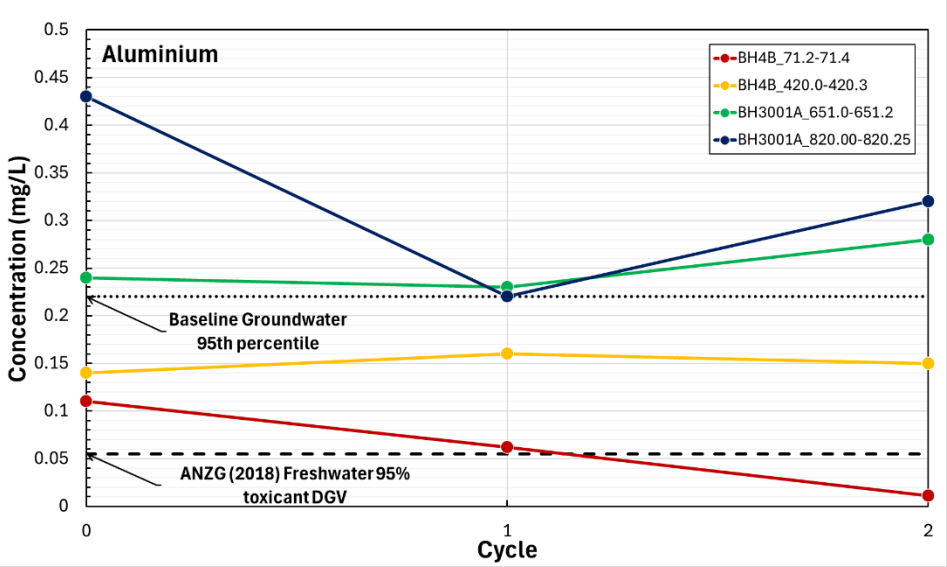


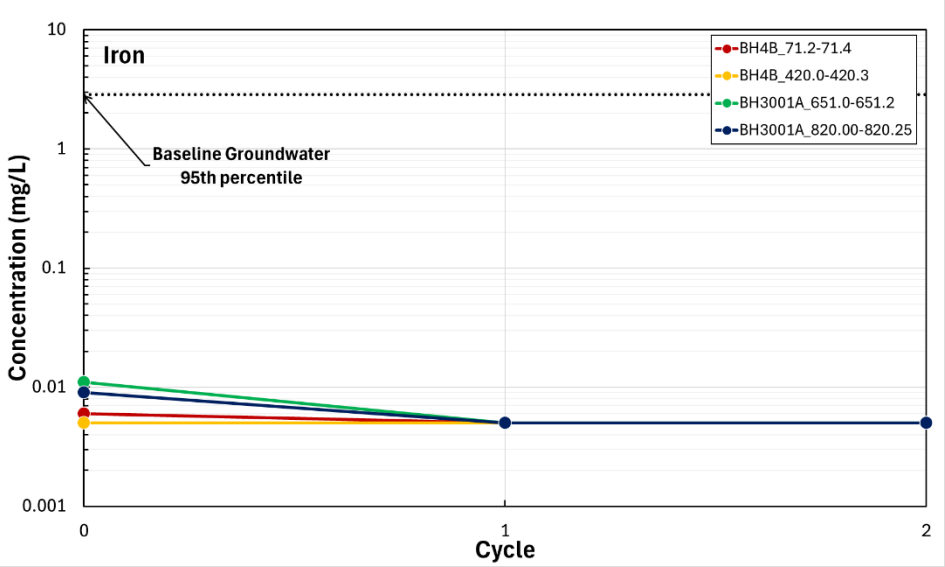
Box and whisker plots (set 2 of 2)
Oven Mountain Pumped Hydro Energy Storage
Geochemistry impact assessment
Figure 5.8

5.3.2 Humidity cell testing

Figure 5.9, Figure 5.10 and Figure 5.11 compare the results of the humidity cell testing, the ANZG (2018) 95% species protection guideline values and background groundwater values, where available.

As the results show (and with the same limitations in comparison to guideline and receiving environment values outlined above), although leachate concentrations exceed the guideline values for a number of parameters, with the exception of aluminium, concentrations are within the upper range of the pre-construction background water quality values. The low concentrations of and low variability of leachable metals and metalloids recorded during the test program indicate that the spoil samples are likely to be relatively unreactive and are unlikely to impact downstream groundwater quality.





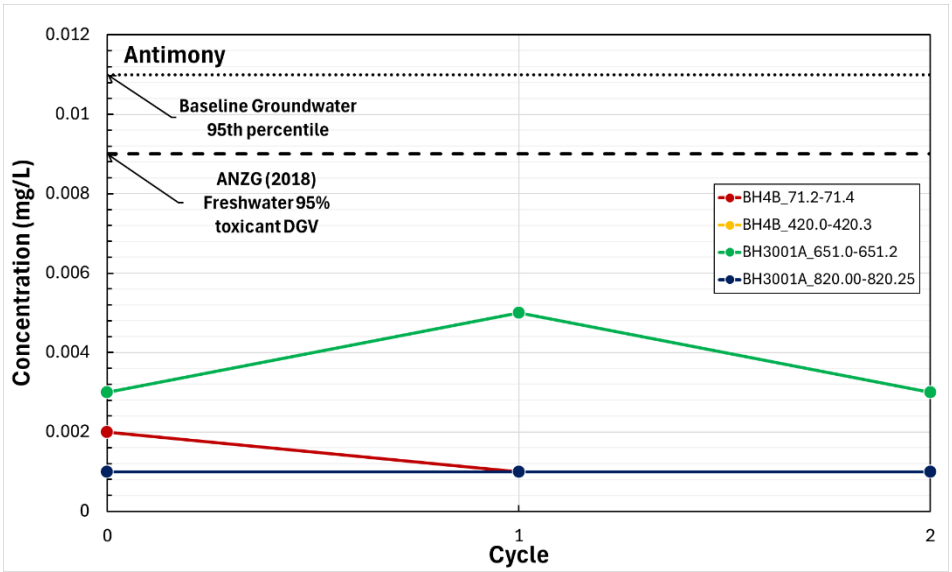
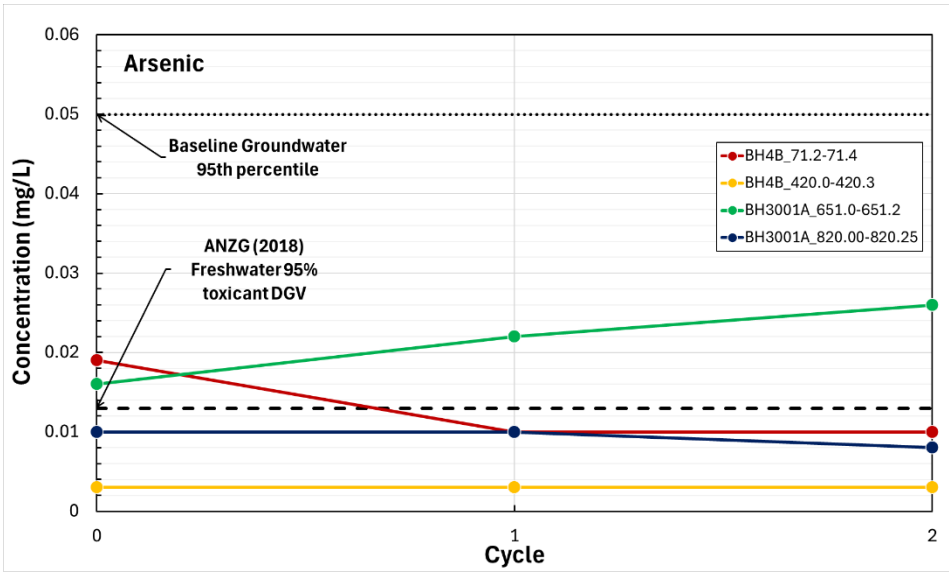
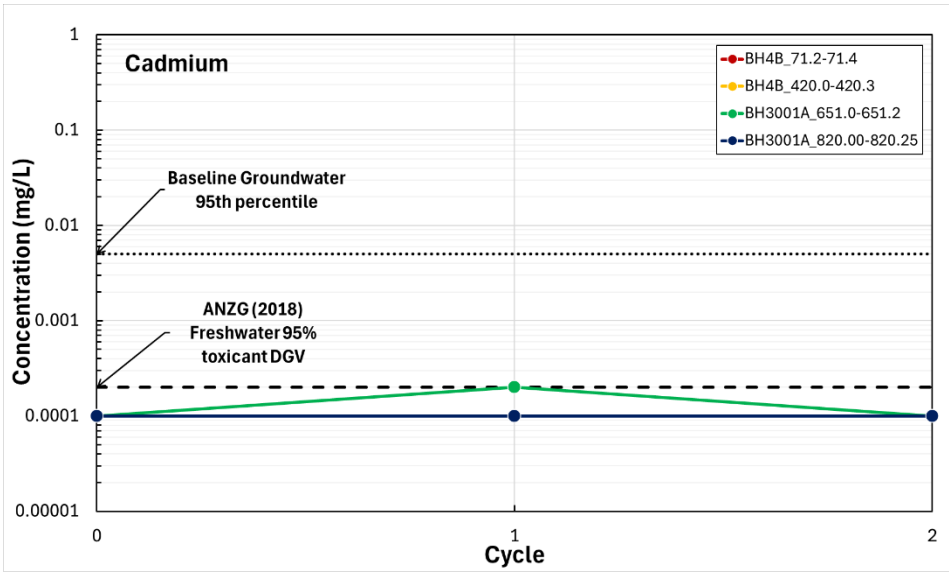


Figure 5.9 **Humidity cell leachate concentrations compared to groundwater and guideline values**





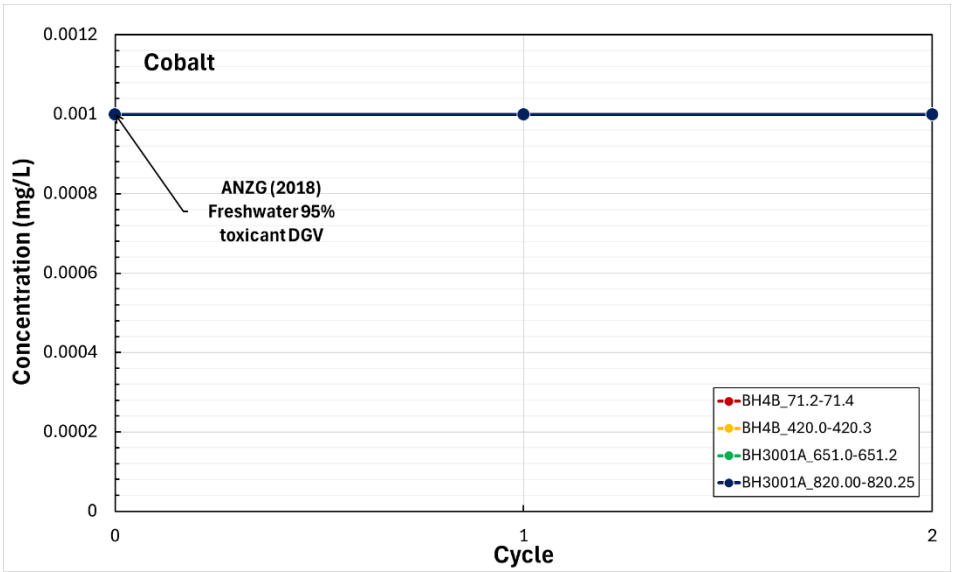
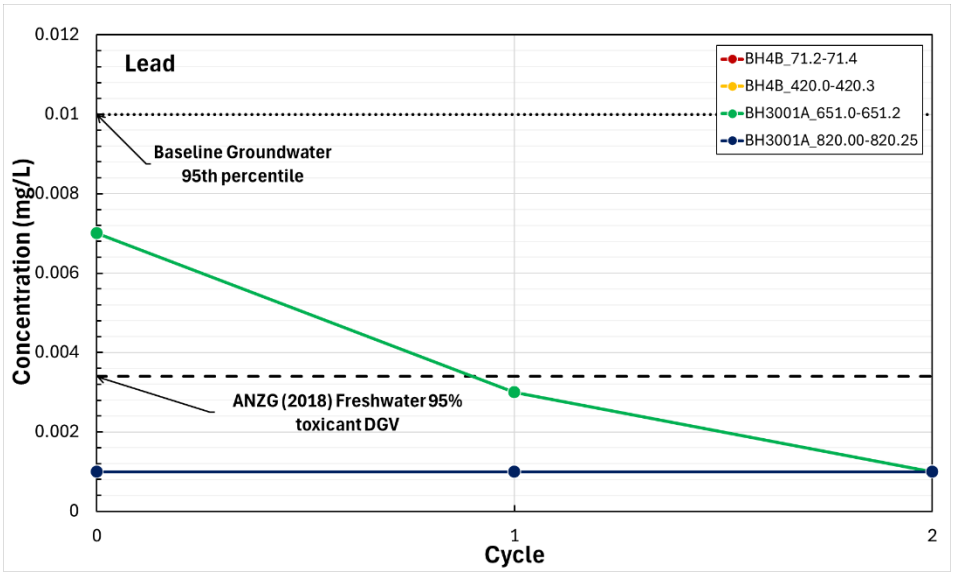
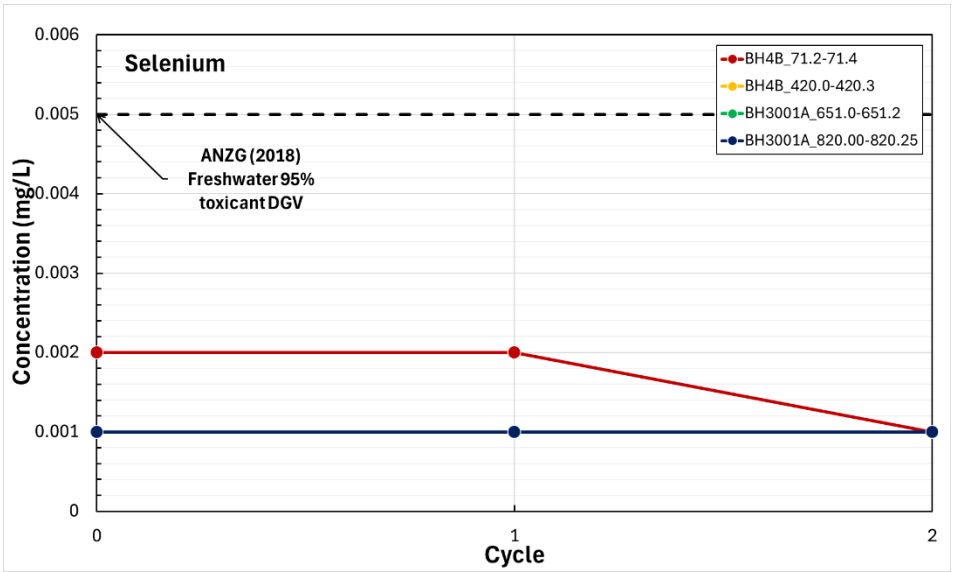


Figure 5.10 **Humidity cell leachate concentrations compared to groundwater and guideline values**





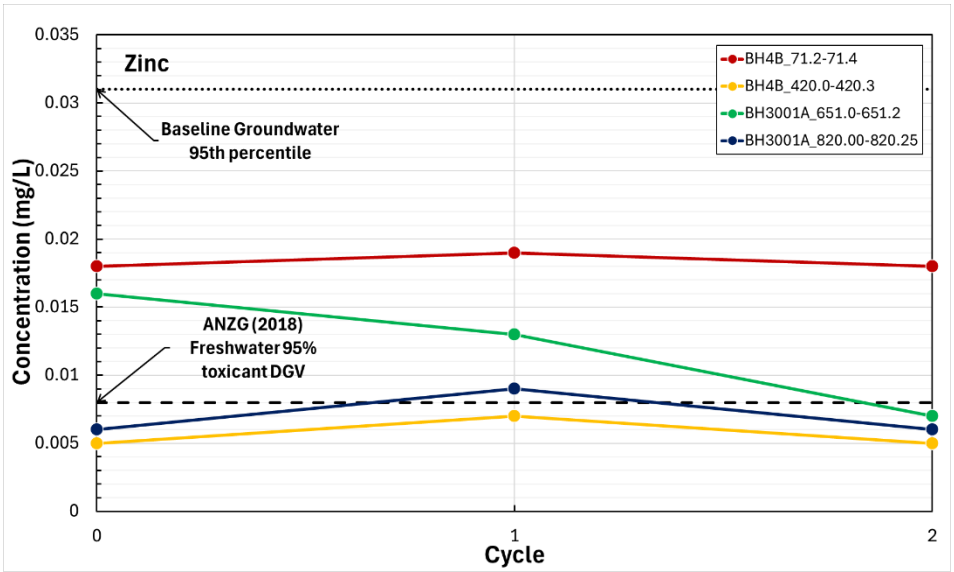


Figure 5.11 Humidity cell leachate concentrations compared to groundwater and guideline values

6 Summary and recommendations

6.1 Waste classification

Based on the field observations and analytical results evaluated herein, classification of spoil generated by the Project is provided in Table 6.1 below. The samples are considered to meet the NSW waste classification guideline's definition of virgin excavated natural material because the material does not consist of waste, and chemical testing indicates that the material does not leach metals or metalloids in excess of criteria for general solid waste.

Table 6.1 Waste classification

Steps	Category	Comment
Is the waste special waste?	Clinical and related waste present?	None observed
	Asbestos waste present?	None observed
	Waste tyres present?	None observed
Is the waste liquid waste?		No
Is the waste pre-classified waste?	Hazardous Waste	No
	General Solid Waste (putrescible)	No
	General Solid Waste (non-putrescible)	No
Does the waste possess hazardous characteristics?		None observed
Determining a waste's classification using chemical assessment:		Virgin excavated natural material
Is the waste putrescible or non-putrescible?		Non-putrescible
Overall waste classification:		**Virgin excavated natural material**
Estimated Volume		**5,500,000 m^3 ***

* Sample density was not selected based on the estimated excavation volume. Further sampling may be considered to confirm management strategies during construction phase.

6.2 Acid and neutral rock drainage

Based on the results presented in Section 5.2, all samples analysed for ABA properties were assessed as either acid consuming (one sample) or non-acid forming (six samples) with four of the samples containing less than 0.1% sulphur, indicating that those samples are barren of sulphur. These results indicate that there is a low risk that the spoil excavated will be acid generating.

A summary of the sample classifications is presented in Table 6.2.

Table 6.2 Core and chip classification

Borehole	Depth	Classification
BH4B	6.4–6.5	NAF Barren
BH4B	39.7–39.9	NAF Barren
BH4B	71.0–71.2	NAF
BH4B	148.2–148.4	NAF
BH4B	419.0–419.1	NAF Barren
MB01A	26.0–36.5	AC
MB03B	21.0–29.0	NAF Barren

Concentrations of leachable metals from rock samples are considered low and are generally below pre-construction groundwater conditions onsite. The risk of increasing metal concentrations through leaching is considered low.

Laboratory certificates of analysis are provided as Annexure C.

6.3 Closing

While the testing results are considered suitable for waste classification and for assessing geochemical risk of the bulk material expected to be encountered during construction of the Project, a monitoring program is recommended to be included in the water management plan to identify material that may contain concentrated metals (e.g. greisen). The number of samples analysed was not based on the volume of spoil that will be excavated during construction. It is estimated the spoil volume during construction to be approximately 3,551,000 cubic metres (WSP 2024) (SMEC 2022).

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Annexure A
Geological logs

EMM
creating opportunities

SMEC
Local People. Global Experience.
JOB NO: 30018018
BOREHOLE ID: BH4
DEPTH: 0 - 4.0 m
DATE: 19 / 10 / 21
OVEN MOUNTAIN
PROJECT: PUMPED HYDRO ENERGY STORAGE
CORE TRAY NO: 1
Chalk marks denote handling or drilling breaks
CORE FROM SURFACE
CORE LOSS 0.20m
1.20
1.50
1.76
3.10
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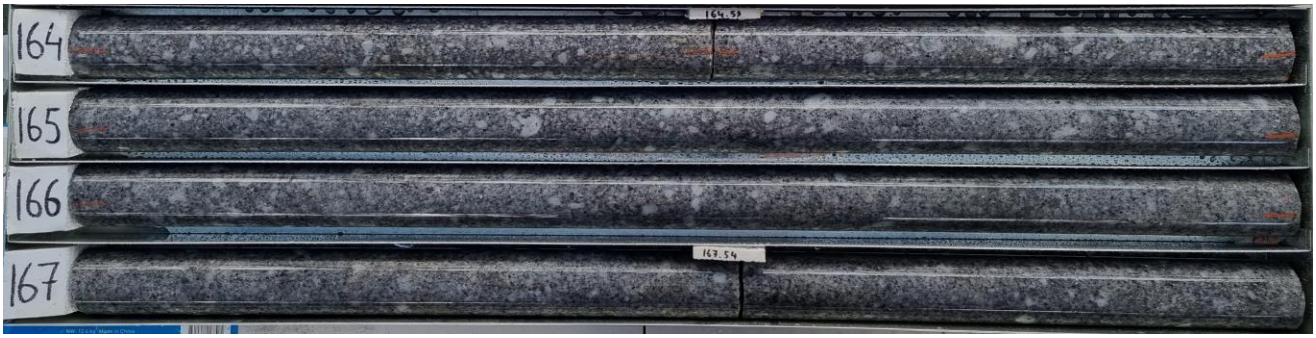
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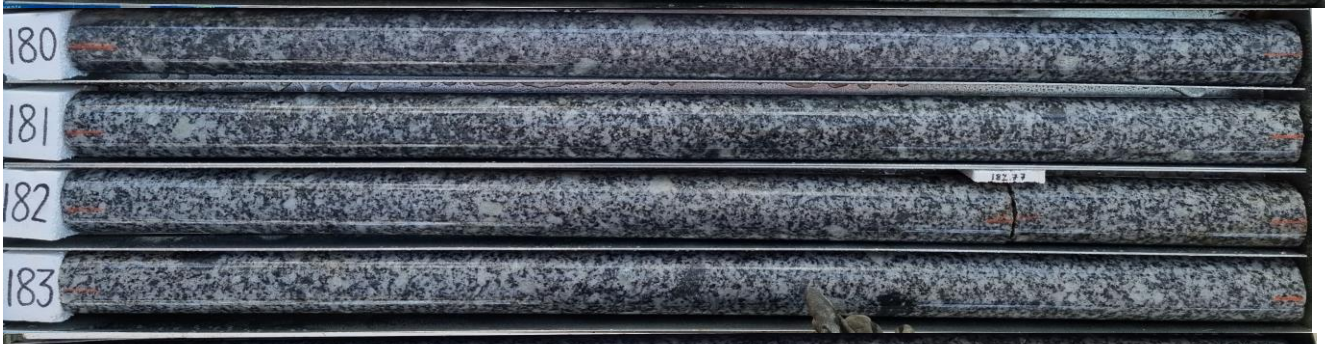
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength Point Load Is(50) ● - Axial ○ - Diametral	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3	Steel Casing - HW (114.3 mm)	0 % Loss	0.00				0.0 889.0			889.00	CORE LOSS 0.20m (0.00-0.20) CORE LOSS.													
										0.20														
					0.30m PP=250kPa		0.2 888.8			888.80	SILTY CLAY: brown with orange, fine to coarse grained sub-rounded to angular weathered hornfels gravel, very stiff to hard.	W<PL	VSt		RS								RESIDUAL SOIL	0.2
							0.4 888.6						H											0.4
					0.60m PP=550kPa		0.6 888.4			0.67														0.6
			R1 1.20m (83%) 8%							888.33	HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, weak lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Cream, green and orange staining on and proximal to defects. 0.70 m: Siltstone Protolith				SW	L - M					0.68: JT, 20° Cl VN, PL, SM, Sandy clay. 0.69: JT, 30° Cl VN, PL, SM 0.69: JT, 50° IT, PL, Discontinuous. 0.71: JT, 40° Cl VN, PL, SM 0.72: JT, 75° IT, PL, SM 0.78: JT, 45° Cl VN, UN, SM 0.86: JT, 45° Cl CT, UN, SM, 3 mm, Sandy clay. 0.87: JT, 70° IT, UN, Terminates on joint. 0.92: JT, 60° Cl CT, UN, SM, 2 mm, Sandy clay. 0.99: JT, 30° Cl VN, PL, SM 1.05: JT, Cl VN, ST, SM, 60 - 70°, smooth to slickensided.		PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM	0.8
							0.8 888.2									H								0.8
							1.0 888.0								HW	SS - VL				1.09-1.20: CS, Multiple angular rock fragments, with sandy clay, low to medium plasticity clay,fine sand, mulitple joints 60 to 70°, fragmented by drilling.		1.09-1.26: drilling induced core fragment due to multiple fractures	1.0
			1.20																					
		0 % Loss	R2 0.30m (100%) 87%				1.2 887.8								SW	H				1.23: JT, 60° Cl VN, PL, SM 1.26: JT, 70° IT, PL 1.30: JT, 25° IT, PL 1.31: JT, 70° IT, PL			1.2
			1.50				1.4 887.6													1.40: JT, 70° IT, PL 1.41: JT, 25° FeO SN, PL, SM 1.43: JT, 70° IT, PL 1.44: JT, 50° FeO SN, UN, SM			1.4
			R3 0.26m (100%) 58%				1.6 887.4													1.65: JT, 30° Cl VN, PL, SM 1.69: JT, 50° Cl VN, PL, SM			1.6
		0 % Loss	1.76																	1.75: JT, 10° Cl VN, PL, SM 1.75-1.76: DB, Drilling blocked off, crushed rocked fragment, sandy clay, fine sand, low to medium plasticity clay.			1.8
					1.90 m Is(50) ds(50) a=0.55 MPa		1.8 887.2													1.83: JT, 10° CN, PL, SM 1.93: JT, 70° IT, PL, SM			
							2.0																	

Draft

Observations and Comments

Notes

Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted.
Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
For Inclined Holes: Angles reported in defects are apparent dip from core horizontal unless as α or β.
Refer to explanatory notes for SMEC logs for details of abbreviations or basis of description.

Logged By	EM/LJ	Date	11/10/2021
Approved By		Date	
Status	1	Page	1 of 196

SMEC 2.10.10 UB.GLB Log _SMEC HYBRID BOREHOLE LANDSCAPE 30018018 OVEN MOUNTAIN.GPJ <<DrawingFile>> 28/01/2022 12:34 10.02.00.04 Datgel Tools | Lib: SMEC 2.10.9 2021-08-30 Prj: SMEC 2.10.9 2021-08-30

Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R4 1.34m (100%) 100%		3.00 m Is(50) d=2.52 3.05 m Is(50) a=3.22		2.0 / 887.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, weak lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Cream, green and orange staining on and proximal to defects. *(continued)*				SW *(cont)*	H *(cont)*	VL -0.1 L -0.3 M -1 H -3 VH -10 EH		0 2 20 200 2000		2.01: JT, 65° IT, PL		PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM	
							2.2 / 886.8														2.22: JT, 50° FeO SN, UN, Intact.			2.2
							2.4 / 886.6															2.13-2.72: Set A): Joint, 55°, Undulating, FeO, .1 mm tk, @ 10 - 30 mm sp.		2.4
																					2.49: JT, 40° FeO SN, UN, Intact.		2.50: Point Load >20KN – No Failure	
							2.6 / 886.4														2.59: JT, FeO SN, CR, SM, 10 - 20°. 2.64: JT, 85° FeO SN, UN, Terminates on joint, intact. 2.61-2.69: k, 50° FeO SN, UN, Intact.			2.6
							2.8 / 886.2														2.64-2.95: VE, FeO ID, UN, 3 - 15 mm ,60 - 80°, healed. 2.82: JT, 25° FeO SN, PL, SM	2.50-2.87: Set A): Joint, 50°, Irregular, @ 10 - 30 mm sp. Set B): Joint, 70°, Undulating, @ 5 - 50 mm sp. , discontinuous.		2.8
			3.10				3.0 / 886.0																	3.0
							3.2 / 885.8														3.09: JT, 3° FeO SN, UN, SM 3.05-3.17: Vugh, iron oxide, clay 20 to 50 mm x 5 to 20 mm dimension. 3.15: JT, 5° FeO SN, PL, Intact. 3.21: JT, 2° FeO SN, UN, Intact.			3.2
																					3.29: JT, FeO SN, IR, 40 - 80°, intact.			
		0 % Loss	R5 3.07m (100%) 97%				3.4 / 885.6														3.44: JT, 5° FeO SN, PL, SM			3.4
							3.6 / 885.4														3.58: JT, 65° FeO SN, PL, Terminates on joint, intact. 3.62: JT, 5° FeO SN, UN, Terminates on joint, intact. 3.65: JT, 40° FeO SN, PL, Intact. 3.69: JT, Qz CT, UN, 1 mm, 70 - 85°, healed.			3.6
							3.8 / 885.2														3.78: JT, 65° FeO SN, UN, SM			3.8
							4.0														3.90: JT, FeO SN, UN, SM, 0 - 80°. 3.99: JT, 45° FeO SN, UN, SM			

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Observations and Comments

Notes

Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted.
Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
For Inclined Holes: Angles reported in defects are apparent dip from core horizontal unless as α or β.
Refer to explanatory notes for SMEC logs for details of abbreviations or basis of description.

Logged By	EM/LJ	Date	11/10/2021
Approved By		Date	
Status	1	Page	2 of 196

Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● - Axial ○ - Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R5 3.07m (100%) 97%		4.40 m Is(50) d=6.05 5.50 m Is(50) d=2.86		4.0 / 885.0 4.2 / 884.8 4.4 / 884.6 4.6 / 884.4 4.8 / 884.2 5.0 / 884.0 5.2 / 883.8 5.4 / 883.6 5.6 / 883.4 5.8 / 883.2 6.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, weak lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Cream, green and orange staining on and proximal to defects. *(continued)* 4.05 m to 4.24 m: Quartz Vein, irregular 2 - 20 mm thickness, with iron staining, trace chlorite 4.90m: Diamictite Protolith, dark greybrown, in a silty to fine sand matrix supporting 5% fine to coarse angular gravel clasts up to 40 mm, minor lineation dipping at 60-70° and flattening of clasts, fine to coarse grained sub-rounded to sub-angular gravel up to 40 mm, in silt to fine grained sand matrix, randomly oriented				SW *(cont)*	H - VH				4.12: JT, 50° IT, UN 4.05-4.24: VE, Qz ID, IR, 40 - 80°, 3 - 20 mm, healed. 4.24: JT, 70° Qz VN, UN, Originates on adjacent joint, healed. 4.29: JT, 70° Qz VN, UN, Originates on adjacent joint, healed. 4.29-4.34: Shear, 45° Qz VN, PL, 1 to 2 mm displacement, healed. 4.33-4.41: Shear, 50° Qz VN, PL, 1 mm displacement. 4.38: JT, 45° HE, UN 4.34-4.44: VE, Qz CT, UN, 70°, 1 to 2 mm. 4.37-4.42: VE, 50° Qz CT, UN, 2 mm, Healed. 4.42: JT, 50° Qz VN, UN, Terminates on joint. 4.43: JT, Qz VN, IR, 10 - 30°, healed. 4.43: JT, 15° Qz CT, UN, 2 mm, Healed. 4.46: JT, 60° HE, PL 4.46: JT, 45° Qz VN, UN, Healed. 4.71: JT, 50° FeO SN, PL, SM, Intact, opened on handling. 4.84: JT, PL 4.84: JT, 10° FeO SN, PL, SM, Intact, opened on handling. 4.85: JT, 70° FeO SN, PL, SM, Intact, opened on handling. 4.86: JT, 60° IT, PL, Originates and terminates on joint. 4.90: JT, 15° Qz CT, UN, 1 mm, Healed. 4.97: JT, 15° Qz CT, PL, 2 mm, Healed. 5.25-5.34: Shear, 55° FeO SN, PL, SM, 8 mm displacement, intact, opened on handling. 5.30: JT, 20° Qz VN, PL 5.37: JT, 45° IT, PL 5.39: JT, 40° IT, PL 5.48: JT, 20° Qz VN, PL, Healed. 5.57: JT, 5° Qz VN, PL, SM, Intact, opened on handling. 5.70: JT, 15° Qz VN, PL, SM, Intact, opened on handling. 5.78: JT, 5° Qz VN, PL, Healed. 5.79: JT, 3° Qz CT, UN, 1 mm, Healed. 5.83: JT, Qz VN, ST, 5 - 40°, healed. 5.88: JT, 60° Qz VN, UN, Originates on joint. 5.88: JT, 85° Qz CT, PL, 1 mm, Healed.	4.07-4.27: Set A): Shear, 50°, Undulating, FeO, @ 20 -50 mm sp. Set B): Joint, 10 - 70°, Irregular, FeO, @ 5 - 20 mm sp. 4.47-4.62: Set A): Joint, 35°, Undulating, Quartz, 1-3 mm tk, @ 10 - 40 mm sp.	PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM	4.2 4.4 4.6 4.8 5.0 5.2 5.4 5.6 5.8

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Observations and Comments

Notes

Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted.
Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
For Inclined Holes: Angles reported in defects are apparent dip from core horizontal unless as α or β.
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
		0 % Loss	6.17		6.20 m Is(50) d=0.51		6.0 883.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, weak lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Cream, green and orange staining on and proximal to defects. *(continued)*				SW *(cont)*	H - VH *(cont)*	VL -0.1 L -0.3 M -1 H -3 VH -10 EH	0 2 20 200 2000			5.95: JT, 60° FeO SN, UN, Originates on joint. 5.97: JT, 75° FeO SN, UN, Originates on joint, discontinuous, intact. 6.08: JT, 45° Qz CT, ST, 1 mm, Healed. 6.13: JT, 70° Qz VN, UN, Originates and terminates on joint, healed. 6.14: JT, 15° FeO SN, UN, SM, Intact, opened on handling. 6.15: JT, 75° FeO SN, PL, Intact. 6.12-6.18: VE, Qz ID, IR, 1 mm, 20 - 60°, healed. 6.17-6.18: VE, Qz ID, IR, 1 mm, 10 - 30°, healed. 6.24: JT, 50 - 60° FeO SN, UN, Originates on contact, intact. 6.25: JT, 65° FeO SN, UN, Originates on adjacent joint, intact. 6.30: JT, 3° FeO SN, UN, SM, Intact, opened on handling. 6.30-6.40: VE, Qz ID, IR, 2 mm, 10 - 50°, healed. 6.52: JT, 5° FeO SN, UN, SM, Intact, opened on handling. 6.58: JT, 25° Qz CT, IR, 1 mm, Healed.		PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM	
							6.2 882.8				6.18 m to 6.30 m: Quartz Vein, white with pale grey, with orange and green staining on joint surfaces													6.2
							6.4 882.6				6.32m to 6.60m: Alteration Veins, light grey, green and orange brown, quartz, chlorite, iron staining			SA								6.30-6.60: cream grey and orange staining, irregular texture, moderately altered		6.4
							6.6 882.4																	6.6
							6.8 882.2													6.80: JT, 15° Py SN, UN, SM, Intact, opened on handling. 6.88: JT, 65° Qz VN, UN, Healed.				6.8
HQ3		0 % Loss	7.00		7.00 m Is(50) d=6.01		7.0 882.0													7.01: JT, 15° FeO SN, PL, SM, Intact, opened on handling.		7.05: Point Load >20KN – No Failure	7.0
							7.2 881.8													7.22: JT, 10° IT, PL 7.32: JT, 25° IT, PL 7.37: JT, IT, UN			7.2
							7.4 881.6															7.50: indistinct sub-horizontal bedding	7.4
							7.6 881.4													7.64: JT, 65° Qz VN, UN, Healed. 7.69: JT, FeO SN, CR, SM, 10 - 45°, intact, opened on handling.			7.6
							7.8 881.2													7.82: JT, 5° Qz CT, PL, 3 mm, Healed. 7.83: JT, 2° Qz VN, PL, Healed.			7.8
							8.0																	

R6 0.83m (100%) 100%

R7 2.56m (100%) 100%

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R7 2.56m (100%) 100%		9.40 m Is(50) d=4.42		8.0 / 881.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, weak lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Cream, green and orange staining on and proximal to defects. *(continued)*				SW *(cont)*	H - VH *(cont)*	VL -0.1, L -0.3, M -1, H -3, VH -10, EH	0, 2, 20, 200, 2000		8.09: JT, 25° FeO SN, UN, SM, Trace pyrite, intact, opened on handling. 8.16: JT, 5° Qz VN, UN, Healed. 8.23: JT, 40° Qz VN, UN, Healed. 8.40: JT, 70° Py VN, PL, SM, Intact, opened on handling. 8.41: JT, 35° Py VN, PL, SM, Intact, opened on handling. 8.52: JT, 25° IT, UN 8.70: JT, 10° FeO SN, PL, SM, Intact, opened on handling. 8.73: JT, 75° Py VN, UN, SM, Intact, opened on handling. 8.90-9.35: Shear, 80° Py VN, PL, SM, With yellow white clay veneer, 2 mm displacement, intact, opened on handling. 9.29: JT, 30° Qz VN, PL, Healed. 9.33: JT, 70° Qz VN, PL, Healed. 9.40: JT, 5° Qz VN, PL, Healed. 9.80: JT, 75° Qz VN, UN, Discontinuous, healed. 9.97: JT, 70° FeO SN, UN, SM, Discontinuous.		PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM 8.00: Point Load >20KN – No Failure	8.2, 8.4, 8.6, 8.8, 9.0, 9.2, 9.4, 9.6, 9.8
		0 % Loss	R8 1.34m (100%) 100%				8.2 / 880.8																
							8.4 / 880.6																
							8.6 / 880.4																
							8.8 / 880.2																
							9.0 / 880.0																
							9.2 / 879.8																
							9.4 / 879.6																
							9.6 / 879.4																
							9.8 / 879.2																
							10.0																

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Observations and Comments

Notes

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Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
For Inclined Holes: Angles reported in defects are apparent dip from core horizontal unless as α or β.
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
							10.0 879.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, weak lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Cream, green and orange staining on and proximal to defects. *(continued)*				SW *(cont)*	H - VH *(cont)*	VL -0.1 L -0.3 M -1 H -3 VH -10 EH	0 2 20 200 2000				PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM	
							10.2 878.8														10.22: JT, 75° FeO SN, PL, SM, Intact, opened on handling.			10.2
																					10.32: JT, 75° FeO SN, PL, SM, Intact, opened on handling.			
							10.4 878.6																	10.4
		0 % Loss	R8 1.34m (100%) 100%																		10.44-10.45: Shear, 10° IT, UN, 3 mm displacement. 10.50: JT, 5° IT, UN			
																					10.55: JT, 15° FeO SN, PL, SM, Intact, opened on handling.			
							10.6 878.4																	10.6
																					10.67: JT, IT, UN, 10 - 20°.			
																					10.72: JT, 20° Qz VN, PL, Healed.			
							10.8 878.2																	10.8
																					10.83-10.85: k, 25° IT, PL 10.87: JT, 0° IT, PL			
																					10.94-10.96: Shear, 15° IT, PL, 2 mm displacement.			
			10.90		10.90 m Is(50) d=3.65 10.94 m Is(50) a=6.12 11.00 m Is(50) d=4.98		11.0 878.0														11.01: JT, 10° FeO SN, PL, SM, Intact, opened on handling.		11.06: Point Load >20KN – No Failure	11.0
							11.2 877.8														11.26: JT, 10° Qz VN, PL, Healed.			11.2
																					11.39: JT, 10° Qz VN, PL, SM, Intact, opened on handling. 11.30-11.52: HB, 75° Qz VN, PL, Healed. 11.43-11.49: Shear, 45° FeO VN, UN, SL 11.49: JT, 5° IT, UN			
		0 % Loss	R9 1.82m (100%) 100%				11.4 877.6				11.46 m to 11.51 m: orange brown iron staining pervasive from defect surface													11.4
																					11.57: JT, 15° Py SN, UN, SM, Intact, opened on handling.			
							11.6 877.4														11.66-11.67: VE, 5° Qz CT, 7 mm, Healed.			11.6
							11.8 877.2														11.91: JT, 60° Cl VN, UN, SM, Trace pyrite.			11.8
							12.0																	

HQ3

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
							12.0 877.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, weak lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Cream, green and orange staining on and proximal to defects. *(continued)*				SW *(cont)*	H - VH *(cont)*	VL -0.1 L -0.3 M -1 H -3 VH -10 EH	0 2 20 200 2000			12.09: JT, 20° Qz VN, UN, Healed. 12.16: JT, 60° IT, UN, Terminates on joint. 12.18: JT, Py SN, UN, SM, 5 - 15°, intact, opened on handling.		PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM 12.00: indistinct sub-horizontal bedding 12.00: Point Load >20KN – No Failure 12.04: Point Load >20KN – No Failure	
							12.2 876.8														12.34: JT, 15° Qz VN, PL, Healed. 12.41: JT, 70° Qz VN, PL, Healed.			12.2
							12.4 876.6				12.34 m to 18.81 m: Sandstone Protolith brown grey, fine to coarse, indistinct sub-horizontal thin to medium bedding, slight lineation at 60 - 70° with trace fine to coarse sub-angular to sub-rounded gravel clasts up to 35 mm										12.51: JT, 75° Qz VN, PL, Healed.			12.4
							12.6 876.4														12.59: JT, Py VN, UN, SM 12.60: JT, 75° Qz VN, UN, Healed.			12.6
		0 % Loss	R9 1.82m (100%) 100%																		12.69: JT, 70° Qz VN, PL, Originates on adjacent joint, healed.			
			12.72				12.8 876.2														12.80: JT, 40° Qz VN, UN, Healed. 12.81: JT, 40° Qz VN, UN, Healed. 12.83: JT, 30° Qz VN, PL, Healed.			12.8
HQ3					13.00 m Is(50) a=3.38		13.0 876.0														12.99: JT, 75° Qz VN, PL, SM 13.03: JT, 75° IT, UN, Discontinuous. 13.07: JT, 75° IT, UN, Discontinuous. 13.10: JT, 75° IT, UN, Discontinuous. 13.18: JT, 70° IT, UN, Terminates on joint.		13.00: Point Load >20KN – No Failure	13.0
							13.2 875.8																	13.2
		0 % Loss	R10 2.96m (100%) 100%				13.4 875.6														13.32: JT, 40° IT, UN 13.37: JT, 25° FeO SN, UN, SM, Intact, opened on handling. 13.43: JT, 40° Py VN, UN, Healed.			13.4
							13.6 875.4														13.50-13.69: Shear, 70° Cl VN, UN, SL, Intact, opened on handling. 13.70: JT, 5° Qz CT, UN, 1 mm, Healed.			13.6
							13.8 875.2				13.81 m to 13.88 m: dark grey brown 13.88 m to 14.15 m: Igneous intrusion, dark grey brown, black with green, aphanitic irregular quartz veins, with green and orange staining dipping at 60-80°, moderately chlorite altered										13.80-13.99: Shear, 75° Cl CT, UN, SL, 1 mm, Iron staining, intact, opened on handling. 13.98: JT, Cl CT, UN, 1 mm, 65 -			13.8
							14.0																	

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
							14.0 / 875.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, weak lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Cream, green and orange staining on and proximal to defects. *(continued)* 14.15 m to 16.98 m: Diamictite Protolith, dark grey brown, very fine matrix supporting 5% fine to coarse angular gravel clasts up to 30 mm, minor lineation at 60 - 70°				SW *(cont)*	H - VH *(cont)*	VL -0.1 L -0.3 M -1 H -3 VH -10 EH	0 2 20 200 2000		80°, iron staining, intact, opened on handling. 14.05: JT, Cl CT, IR, 1 mm, 60 - 80°, intact.		PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM 14.00: green grey colour	
							14.2 / 874.8																14.2
																				14.26: JT, FeO SN, IR, 60 - 75°, originates on joint. 14.30: JT, 10° CN, UN, SM, Intact, opened on handling.			
							14.4 / 874.6																14.4
							14.6 / 874.4													14.59: JT, 0° FeO SN, PL, SM, Intact, opened on handling. 14.61: JT, 40° FeO SN, PL, SM, Intact, opened on handling. 14.64: JT, 80° IT, PL 14.65-14.68: Shear, IT, CR, 30 - 40°, 5 mm displacement. 14.70: JT, 65° FeO SN, UN, Healed, discontinuous. 14.78-14.79: Shear, 5° Qz VN, PL, 3 mm displacement, healed. 14.83: JT, 75° IT, PL, Originates on joint.			14.6
							14.8 / 874.2																14.8
					14.90 m Is(50) d=2.79		15.0 / 874.0													15.00: JT, 75° Qz VN, PL, Healed. 15.06: JT, 75° Qz VN, PL, Healed. 15.06: JT, 75° Qz VN, PL, Discontinuous, healed.				15.0
							15.2 / 873.8													15.26: JT, 75° Qz VN, PL, Healed. 15.28-15.32: Shear, 50° CN, UN, SL			15.2
							15.4 / 873.6																15.4
							15.6 / 873.4													15.56: JT, 70° Qz VN, PL, Healed. 15.62: JT, 25° Py VN, PL, SM, Intact, opened on handling. 15.68: JT, 70° Qz CT, UN, 1 mm, Healed.			15.6
							15.8 / 873.2													15.82: JT, 80° Qz VN, PL, Healed. 15.87-15.92: Shear, 35° Qz VN, PL, 3 mm displacement, healed. 15.91: JT, 20° Qz CT, PL, 2 mm, Intact, opened on handling.			15.8
	HQ3	0 % Loss	R10 2.96m (100%) 100%																				
		0 % Loss	15.68 R11 3.01m (100%) 100%		15.90 m Is(50) d=5.76		16.0																

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● - Axial ○ - Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
					16.05 m Is(50) d=5.61		16.0 / 873.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, weak lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Cream, green and orange staining on and proximal to defects. *(continued)*				SW *(cont)*	H - VH *(cont)*	○				15.92: JT, 80° Qz VN, PL, Healed. 15.97: JT, 80° Qz VN, PL, Healed. 16.09: JT, 80° Qz VN, PL, Healed. 16.14: JT, 20° CN, PL, SM, Intact, opened on handling.		PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM	
							16.2 / 872.8													16.23-16.37: Shear, 65° IT, PL, 2 mm displacemetn.			16.2
					16.40 m Is(50) d=3.62		16.4 / 872.6										○			16.40: JT, 20° CN, PL, SM, Intact, opened on handling.			16.4
							16.6 / 872.4																16.6
																				16.70: JT, 40° Py VN, UN, SM, Intact, opened on handling.			
	HQ3	0 % Loss	R11 3.01m (100%) 100%				16.8 / 872.2																16.8
					17.00 m Is(50) d=3.64		17.0 / 872.0				16.98 m to 17.27 m: Amorphous Silica, hydrothermal vein / intrusion, pale grey to blue, very fine grained. Irregular and sharp contacts and, with 5-10mm alteration halo dippingat 40 to 70°						○			16.98-17.17: CX, IT, IR, 60 - 80°, intrusion. 17.12: JT, CN, CR, SM, 40 - 50°, intact, opened on handling.		16.98: Protolith Igneous Intermediate Intrusion	17.0
							17.2 / 871.8													17.26: JT, 75° FeO SN, UN, SM, Trace pyrite, intact, opened on handling.			17.2
							17.4 / 871.6				17.36 m to 20.30 m: Diamictite Protolith, dark grey brown, very fine matrix supporting 5% fine to medium sub-rounded to angular gravel clasts									17.42-17.43: Shear, 10° IT, PL, 2 mm displacement.		17.36: Green, blue alteration mineral following lineation	17.4
							17.6 / 871.4																17.6
							17.8 / 871.2													17.78: JT, Py VN, UN, 40 - 60°. 17.82: JT, Py VN, UN, SM, 5 - 10°, intact, opened on handling. 17.85: JT, 45° Ch CD, UN, SM, 1 mm, Healed.			17.8
							18.0																

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
		0 % Loss	R11 3.01m (100%) 100%				18.0 871.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, weak lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Cream, green and orange staining on and proximal to defects. *(continued)*				SW *(cont)*	H - VH *(cont)*	VL –0.1 L –0.3 M –1 H –3 VH –10 EH	0 2 20 200 2000					PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM	
							18.2 870.8																	18.2
							18.4 870.6																	18.4
							18.6 870.4														18.50: JT, Py VN, IR, 40 - 55°, healed.			18.6
																					18.59: JT, 5° FeO SN, PL, SM		18.60: Point Load >20KN – No Failure	
			18.69																		18.70: JT, 55° IT, PL			
							18.8 870.2														18.79: JT, 30° FeO SN, UN, SM, Intact, opened on handling.			18.8
																					18.96: JT, 70° FeO SN, UN, SM, Intact, opened on handling.			
							19.0 870.0														19.06: JT, 65° FeO SN, UN, SM, Trace pyrite, intact, opened on handling.			19.0
																					19.16: JT, 80° Qz CT, PL, 1 mm, Healed.			
							19.2 869.8																	19.2
							19.4 869.6																	19.4
					19.62 m Is(50) a=6.09		19.6 869.4														19.65: JT, 10° Cl CT, UN, RO, 1 mm, Iron staining,.		19.62: Point Load >20KN – No Failure	19.6
							19.8 869.2														19.68-19.96: FO, 70° Cl VN, UN, SM, Trace pyrite.			19.8
							20.0																	
	HQ3	0 % Loss	R12 2.94m (100%) 100%																					

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
							20.0 869.0			869.00	HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, minor lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Occasional pyrite nodules and partial to thin veneer on joints.				F	VH	VL –0.1 L –0.3 M –1 H –3 VH –10 EH	0 2 20 200 2000			20.00: JT, 5° Ch VN, PL, Healed. 20.03: JT, 50° Cl VN, PL, SM, Intact, opened on handling.		PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM	
							20.2 868.8													20.21: JT, 50° Cl VN, PL, SM, Intact, opened on handling.			20.2
							20.4 868.6				20.38 m to 21.81 m: dark grey to brown grey, interbedded mudstone and siltstone protolith Interbedded Mudstone & Siltstone Protolith, dark grey to brown grey, indistinct sub-horizontal thin to medium bedding, minor lineation at 60 - 70°									20.39: JT, 20° Py VN, PL, SM, Intact, opened on handling.		20.38: Protolith Mudstone & Siltstone	20.4
																				20.54: JT, 20° Py VN, PL, SM, Intact, opened on handling.		20.50-22.00: indistinct sub-horizontal bedding	
							20.6 868.4													20.68: JT, Qz CT, UN, 2 mm, 40 - 50°, healed.			20.6
																							20.8
		0 % Loss	R12 2.94m (100%) 100%				20.8 868.2													20.93: JT, 20° CN, PL, SM, Intact, opened on handling.		20.90: Point Load >20KN – No Failure 20.94: Point Load >20KN – No Failure 21.00: Point Load >20KN – No Failure	
	HQ3						21.0 868.0																21.0
							21.2 867.8													21.13-21.18: Shear, 40° Cl VN, UN, SL, Trace pyrite, intact, opened on handling.			21.2
																				21.20-21.45: Shear, 72° Py VN, UN, SL, Intact, opened on handling.			
							21.4 867.6																21.4
													SA							21.49: JT, IT, IR, 85 - 90°, originates and terminates on joint.			
							21.6 867.4				21.58 m to 21.65 m: clay infilled, 12 to 22 mm aperture, cream grey with brown orange staining, slightly altered									21.58-21.65: FT, 70° Cl infilled, 12 - 22 mm, slightly altered 21.47-21.81: FT, 70° Cl ID, IR, 12 - 22 mm, healed. 21.69: JT, 80° Cl CT, UN, 1 mm, SA, Terminates on joint.			21.6
		0 % Loss	R13 3.07m (100%) 100%				21.8 867.2				21.79 m to 21.86 m: Quartz Veins Subvertical and sub-horizontal cross cutting each other, rock fabric lineation, and relic indistinct bedding 21.86 m to 22.60 m: Amorphous Silica, hydrothermal vein / intrusion, pale grey to blue, very fine grained. Irregular and sharp contacts and, with minor alteration halo dippingat 55° to 90°			HA						21.80: JT, 65° IT, UN, Terminates on joint. 21.80: JT, 5° IT, PL 21.84: JT, 40° Qz VN, UN, Healed. 21.85: JT, 30° Cl VN, UN, Healed. 21.85: JT, 20° Cl VN, UN,			21.8
							22.0																

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
					22.00 m Is(50) d=3.39		22.0 867.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, minor lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Occasional pyrite nodules and partial to thin veneer on joints. *(continued)*			HA *(cont)*	F *(cont)*	VH *(cont)*	VL L M H VH EH				Healed. 21.87: JT, 10° Cl VN, UN, Healed. 21.98: JT, 80° Cl VN, UN, Discontinuous. 22.00: JT, 40° Cl VN, UN, SM, Healed. 22.14: JT, 75° Cl VN, UN, Healed.		PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM 22.05: Point Load >20KN – No Failure	
							22.2 866.8														22.30: JT, 60° IT, PL, Discontinuous. 22.32: JT, 50° IT, PL 22.37: JT, 50° IT, UN 22.42: JT, 50° IT, PL			
							22.4 866.6																	
							22.6 866.4				22.59 m to 22.71 m: Quartz Vein, moderately altered, irregular, dipping at 40 - 60° cross-cutting and parallel to minor lineation in rock fabric										22.63: JT, Py VN, UN, SM, 80 - 85°,.. 22.59-22.71: VE, ID, IR, SA, 40 - 60°, 1 - 8 mm, trace pyrite, chlorite, healed.			
							22.8 866.2																	
							23.0 866.0														23.01: JT, 20° Py VN, PL, SM, Intact, opened on handling. 23.04-23.09: VE, 50° Qz ID, IR, 1 - 10 mm, trace pyrite, chlorite, healed. 23.09-23.11: Shear, 20° Ch HE, PL			
							23.2 865.8				23.23 m to 24.74 m: Mudstone Protolith, dark grey to brown grey, indistinct bedding sub-horizontal, thinly to thickly bedded													
							23.4 865.6														23.43: JT, 75° IT, UN, Discontinuous. 23.47: JT, 30° Py VN, PL, SM, Intact, opened on handling.		23.45: Point Load >20KN – No Failure	
							23.6 865.4														23.56: JT, 20° Py VN, PL, SM, Intact, opened on handling. 23.60: JT, 70° Qz VN, PL, Healed. 23.68: JT, 30° IT, PL			
							23.8 865.2														23.77: JT, 30° Py VN, UN, Healed. 23.82: JT, 50° IT, PL			
	HQ3	0 % Loss	R13 3.07m (100%) 100%				24.0														23.98: JT, 35° Py VN, PL, SM,			

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
		0 % Loss	R13 3.07m (100%) 100%		24.10 m Is(50) d=2.6		24.0 865.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, minor lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Occasional pyrite nodules and partial to thin veneer on joints. *(continued)*				F *(cont)*	VH *(cont)*	VL –0.1 L –0.3 M –1 H –3 VH –10 EH	0 2 20 200 2000			Intact, opened on handling.		PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM	
							24.2 864.8													24.14: JT, 20° IT, PL 24.16: JT, 5° Cl VN, PL, SM, Intact, opened on handling.		24.14: Point Load >20KN – No Failure	24.2
							24.4 864.6													24.37: JT, 40° Py VN, PL, SM, Intact, opened on handling. 24.44: JT, 60° IT, PL			24.4
							24.6 864.4													24.62: JT, 60° IT, PL, Healed.			24.6
			24.70								24.74 m to 26.73 m: foliated at 60 - 70°, multiple heat altered minerals, 1 to 10 mm, sub-rounded									24.73: JT, 70° Py VN, UN, Healed. 24.76: JT, 30° Py VN, PL, SM, Intact, opened on handling.			24.8
							24.8 864.2													24.92: JT, 25° Qz VN, PL, Healed. 24.97: JT, 60° Qz VN, UN, Healed. 25.03: Shear, 3° IT, UN, 2 mm displacement. 25.07: JT, 60° Qz VN, UN, Healed.			
							25.0 864.0													25.17: JT, 20° Py VN, UN, SM, Intact, opened on handling. 25.20: JT, 65° Qz VN, UN, Healed.		25.00: Point Load >20KN – No Failure	25.0
							25.2 863.8													25.33-25.35: Shear, 40° Py VN, PL, 3 mm displacement, intact.			25.2
		0 % Loss	R14 3.04m (100%) 100%				25.4 863.6													25.40: JT, 65° Ch VN, UN, Healed. 25.42: JT, 65° Py CT, UN, 2 mm, MA, Clay and chlorite, healed. 25.44: JT, 70° Py CT, UN, 2 mm, MA, Clay and chlorite, healed.			25.4
							25.6 863.4													25.63: JT, 60° Ch VN, UN, Healed. 25.68: JT, 80° IT, UN, Originates and terminates on joint.			25.6
							25.8 863.2													25.75-25.89: Shear, 65° IT, UN, 1 mm displacement. 25.79-25.86: Shear, IT, UN, 60 - 70°, 4 mm displacement. 25.84: JT, 70° IT, UN 25.93: JT, 25° Ch VN, PL, Healed.			25.8
							26.0																

HQ3

Draft

Observations and Comments

Notes

Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted.
Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
For Inclined Holes: Angles reported in defects are apparent dip from core horizontal unless as α or β.
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
					26.00 m Is(50) d=3.02 26.04 m Is(50) a=5.82		26.0 863.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, minor lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Occasional pyrite nodules and partial to thin veneer on joints. *(continued)*				F *(cont)*	VH *(cont)*	VL -0.1 L -0.3 M -1 H -3 VH -10 EH				25.96: JT, 60° IT, PL, Discontinuous.		PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM	
							26.2 862.8														26.12: JT, 60° Qz VN, UN, Terminates on joint. 26.18: JT, 35° Qz CT, UN, 1 - 3 mm, healed.			26.2
											26.31 m: Quarts Veinlets, discontinuous, dipping parallel to sub-horizontal indistinct bedding													
							26.4 862.6																	26.4
																					26.53: JT, 65° Qz VN, PL, Terminates on joint.			
							26.6 862.4														26.64: JT, 70° Qz VN, PL, Healed.			26.6
											26.68 m: Quarts Veinlets, discontinuous, dipping parallel to sub-horizontal indistinct bedding 26.72m: Sandstone Protolith beds increasing light brown grey, possibly tuffacious										26.69-26.75: Shear, 50° Cl VN, UN			
							26.8 862.2																	26.8
HQ3		0 % Loss	R14 3.04m (100%) 100%				27.0 862.0																27.00: Point Load >20KN – No Failure	27.0
							27.2 861.8														27.24: JT, 5° pyrie VN, PL, SM, Intact, opened on handling.			27.2
							27.4 861.6														27.35: JT, 40° IT, PL 26.70-28.00: FT, Qz ID, IR, 10 - 60°, 1 to 50 mm, with sub angular to angular quartz gravel greater than 50 mm, healed. 27.40: JT, 25° Qz VN, PL, SM, Healed. 27.40-27.50: Shear, Py VN, IR, 20 - 40°, healed. 27.52: JT, Qz CT, CR, 1 mm, 20 - 30°, healed.			27.4
							27.6 861.4																	27.6
		0 % Loss	27.74								27.68m: Quarts Vein, discontinuous, 10mm appature dipping parallel to sub-horizontal indistinct bedding													
							27.8 861.2														27.74-27.93: Shear, 70° IT, UN, Terminates on joint. 27.90: JT, 40° Py VN, UN, SM, Intact, opened on handling.			27.8
							28.0																	

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing	Support	Water	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● Axial ○ Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
						28.00 m Is(50) d=1.9		28.0 / 861.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, minor lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Occasional pyrite nodules and partial to thin veneer on joints. *(continued)*				F *(cont)*	VH *(cont)*	VL -0.1 L -0.3 M -1 H -3 VH -10 EH		0 2 20 200 2000				PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM 28.02-28.33: pale grey to dark grey with brown, white, green and blue
												28.09 m to 28.33 m: Fault Gouge, pale grey to dark grey with brown, white, green and blue, angular quartz fragments and quartz veins throughout up to 60 mm, silty and clay matrix, distinctly altered, low to medium strength, healed			DA		L - M				28.09-28.33: FT, HE, IR, 50 - 70°, angular quartz fragments up to 60 mm, silty and clay matrix, low to medium strength, fragmented by drilling.			
								28.2 / 860.8				28.33 m to 28.62 m: multiple quartz veins, with chlorite and trace pyrite, 2 to 50 mm thickness, sub-horizontal to sub-vertical dip, 40 to 240 mm spacing					VH				28.33-28.36: grey to dark grey brown with white and green		28.2
																					28.35-28.42: Shear, 55° Qz CT, UN, 3 mm, Healed.			
								28.4 / 860.6													28.45: JT, 5° Qz VN, PL, Healed.			28.4
																					28.55: JT, 15° Qz CT, UN, 1 mm, Healed.			
																					28.59-28.61: SI, Qz ID, UN, 0 - 5°, 5 - 10 mm.			
								28.6 / 860.4													28.66: JT, 40° IT, UN			28.6
																					28.67-28.77: VE, Qz ID, IR, 0 - 20°, 1 to 20 mm, healed.			
																					28.76: JT, 60° Py VN, UN, Healed.			
								28.8 / 860.2													28.79-28.83: VE, 35° Qz ID, UN, 3 mm, Healed.			28.8
																					28.86-28.92: VE, 40° Qz ID, UN, 3 mm, Healed.			
																					28.93-28.95: VE, Qz VN, CR, 5 - 20°, healed.			
								29.0 / 860.0													28.96-29.08: VE, Qz ID, UN, 5 - 10 mm, 30 - 50°.			29.0
								29.2 / 859.8																29.2
												29.36 m to 29.51 m: Quartz Vein, with chlorite and trace pyrite, irregular contact, sigma shearing dipping 5-30°									29.36-29.51: SI, Qz ID, IR, 150 mm, 5 - 30°, trace pyrite, chlorite, healed.			29.4
								29.4 / 859.6																
																					29.61-29.62: VE, 3° Qz, IR, 5 mm, Healed.			29.6
								29.6 / 859.4													29.74: JT, 5° Qz VN, PL, Healed. 29.76: JT, 5° Qz VN, PL, Healed.			
								29.8 / 859.2																29.8
						29.00 m Is(50) d=5.26 29.05 m Is(50) a=3.93																				
HQ3			0 % Loss	R15 3.01m (100%) 100%				30.0																

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Observations and Comments

Notes

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Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
							30.0 859.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, minor lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Occasional pyrite nodules and partial to thin veneer on joints. *(continued)*				F *(cont)*	VH - EH	VL -0.1 L -0.3 M -1 H -3 VH -10 EH	0 2 20 200 2000			30.02: JT, 2° Py VN, PL, Intact, opened on handling.		PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM 30.00: Point Load >20KN – No Failure	
							30.2 858.8														30.09: JT, 40° Ch VN, UN, Healed. 30.16: JT, Py VN, UN, 10 - 25°, healed. 30.20: JT, 15° IT, UN			30.2
							30.4 858.6														30.29: JT, 83° Ch VN, PL, Trace pyrite, healed. 30.39: JT, 30° Ch VN, UN, Healed. 30.44: JT, Py VN, ST, SM, 20 - 60°. 30.49: JT, 80° Py VN, UN, Healed.			30.4
		0 % Loss					30.6 858.4														30.56: JT, 20° Py VN, UN, SM, Intact, opened on handling.			30.6
							30.8 858.2														30.76: JT, 70° Ch VN, PL, Discontinuous, healed. 30.86: JT, 35° Ch VN, PL, Healed. 30.94: JT, 70° Ch VN, PL, Healed.			30.8
							31.0 858.0														31.05: JT, 70° Ch VN, UN, Healed.			31.0
							31.2 857.8														31.21: JT, 40° IT, PL 31.25: JT, 30° IT, UN			31.2
							31.4 857.6														31.42: JT, 80° Ch VN, PL			31.4
							31.6 857.4																31.51: Point Load >20KN – No Failure	31.6
							31.8 857.2														31.73-32.08: Shear, 72° Py VN, PL, SL, Intact, opened on handling.			31.8
	HQ3						32.0																	

30.75

R15 3.01m (100%) 100%

R16 2.96m (100%) 100%

31.56 m Is(50) a=2.42

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
							32.0 / 857.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, minor lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Occasional pyrite nodules and partial to thin veneer on joints. *(continued)*				F *(cont)*	VH - EH *(cont)*	VL -0.1 L -0.3 M -1 H -3 VH -10 EH						PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM	
							32.2 / 856.8													32.10: JT, 5° CN, PL, SM 31.90-32.32: VE, Qz CT, IR, 1 - 2 mm, 60 - 90°, healed.			32.2
							32.4 / 856.6													32.00-32.56: VE, Qz HE, IR, 1 mm, 60 - 90°. 32.39: JT, 45° Qz CT, UN, 1 mm, Healed. 32.40: JT, 25° CN, UN, SM			32.4
							32.6 / 856.4				32.63 m to 33.38 m: Amorphous Silica, hydrothermal vein / intrusion, pale grey to blue, very fine grained. Irregular contact with alteration halo dipping at 40-60°			MA						32.62: JT, 70° Py VN, UN, Terminates on joint. 32.66: JT, 10° Qz VN, PL, Healed. 32.72: JT, 10° IT, UN			32.6
							32.8 / 856.2													32.77: JT, 35° IT, PL 32.83: JT, 70° Py HE, UN, Originates on joint. 32.84: JT, 65° Py HE, PL			32.8
	HQ3	0 % Loss	R16 2.96m (100%) 100%		32.90 m Is(50) d=5.73		33.0 / 856.0													32.96: JT, 45° IT, PL 32.97: JT, 45° IT, PL 33.02: JT, IT, CR, 10 - 30°. 33.05: JT, 45° Qz CT, PL, 2 mm, Healed. 33.08: JT, 50° IT, PL 33.11: JT, 65° Py VN, UN, Originates on joint, healed. 33.15: JT, 75° Qz VN, UN, SM, Terminates on joint, healed. 33.19: JT, 70° Qz VN, UN, Originates and terminates on adjacent joint, healed. 33.23: JT, 50° Qz VN, UN, Healed. 33.28: JT, 30° Um VN, UN, Intac, opened on handling, yellowish white mineral soapy feel. 33.36: JT, intact, CR, 10 - 40°.			33.0
							33.2 / 855.8													33.50: JT, IT, UN, 70 - 80°, terminates on joint.			33.2
							33.4 / 855.6																33.4
							33.6 / 855.4				33.59 m to 34.55 m: Diamictite Protolith with very fine grained matrix, trace <5% matrix supported gravel sized clasts 5 to 45 mm sub-rounded									33.61: JT, 70° IT, PL, Discontinuous.			33.6
		33.71																					
		0 % Loss	R17 3.03m (100%) 100%		33.90 m Is(50) d=0.57		33.8 / 855.2													33.70: JT, Py VN, CR, SM, 15 - 30°, intact, opened on drilling break. 33.72: JT, 15° IT, UN 33.78: JT, 50° Qz CT, UN, 1 mm, Healed.			33.8
							34.0																

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
							34.0 855.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, minor lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Occasional pyrite nodules and partial to thin veneer on joints. *(continued)*				F *(cont)*	VH - EH *(cont)*	VL -0.1 L -0.3 M -1 H -3 VH -10 EH	0 2 20 200 2000			34.02: JT, 75° Py VN, UN, Healed. 34.02: JT, 15° Qz CT, UN, 1 - 4 mm. 34.07: JT, 15° Qz VN, PL, Healed. 34.08: JT, 75° Py VN, UN, Healed. 34.15: JT, 85° UN, Incipient.		PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM	
							34.2 854.8																	34.2
							34.4 854.6				34.45 m to 36.80 m: with 5 - 10% 0.5 to 10 mm sub-rounded to sub-angular gravel sized clasts										34.37: JT, 70° Qz VN, PL, Discontinuous, healed. 34.39: JT, 10° IT, PL 34.41: JT, IT, ST, 50 - 60°. 34.47: JT, 70° Qz VN, PL, Originates on joint, healed. 34.54: JT, 65° CN, UN, SM		34.47: indistinct sub-horizontal bedding	34.4
							34.6 854.4																	34.6
							34.8 854.2														34.68: JT, 40° Qz VN, UN, Healed. 34.78: JT, 70° Qz VN, ST, Healed. 34.74-34.83: Shear, Qz VN, ST, 40 - 60°, 6 mm displacement, healed. 34.90: JT, 85° Py VN, UN, SM, Originates on joint, with yellowish white soapy mineral. 34.91: JT, 20° CN, UN, SM, Intact, opened on handling.			34.8
HQ3		0 % Loss	R17 3.03m (100%) 100%		34.90 m Is(50) d=4.91		35.0 854.0														35.08: JT, 45° IT, PL			35.0
							35.2 853.8														35.22: JT, 20° CN, UN, SM		35.17: Point Load >20KN – No Failure	35.2
							35.4 853.6														35.30: JT, 30° Qz CT, PL, 1 mm, Healed. 35.34: JT, 70° Qz VN, PL, Healed. 35.41: JT, 10° IT, PL 35.43: JT, 70° intact, PL, Originates on joint. 35.44: JT, 40° Qz VN, ST, Originates on joint, healed. 35.53: JT, Qz VN, ST, 70 - 80, healed.			35.4
							35.6 853.4														35.58-35.65: Shear, 40° IT, UN, 8 mm displacement. 35.67: JT, 3° Qz VN, PL, Healed.			35.6
							35.8 853.2														35.74: JT, 80° Py VN, UN, Terminates on joint, intact. 35.80: JT, 70° Qz VN, PL, Healed. 35.88: JT, 45° Py VN, UN, SM, Intact, opened on handling. 35.91 35.95: JT, 80° Py VN, UN, SM, Intact.			35.8
							36.0																	

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
							36.0 853.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, minor lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Occasional pyrite nodules and partial to thin veneer on joints. *(continued)*				F *(cont)*	VH - EH *(cont)*	VL -0.1 L -0.3 M -1 H -3 VH -10 EH				35.99: JT, 30° Qz VN, PL, Healed.		PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM	
																				36.10: JT, 40° Qz VN, PL, Healed.			
																				36.11: JT, 25° Qz VN, PL, Healed.			
							36.2 852.8													36.15: JT, 50° Qz VN, PL, Healed.			36.2
																				36.18: JT, 70° CN, UN, SM			
																				36.19: JT, 70° Qz HE, PL, SM, Originates on joint.			
																				36.20: JT, 75° HE, UN			
																				36.24: JT, Py VN, UN, SM, 75 - 80°, healed.			
							36.4 852.6													36.24: JT, 65° Qz CT, UN, 1 mm, Discontinuous.			36.4
																				36.34: JT, Qz VN, IR, SM, 70 - 80°, healed.			
																				36.52: JT, 5° Qz VN, PL, Healed.			
																							36.6
		0 % Loss	R17 3.03m (100%) 100%				36.6 852.4				36.50 m: increasing Sandstone Protolith, with fine to medium grain size tuffacious and lithic clasts										36.39-36.90: Set A): Joint, 70°, Undulating, Quartz, @ 10 - 50 mm sp. discontinuous.		
																				36.71: JT, Py HE, UN			
																				36.79: JT, Qz VN, UN, 60 - 70°, healed.			36.8
							36.8 852.2													36.89: JT, 5° Qz VN, PL, Healed.			
																				36.91: JT, 5° Qz VN, PL, Healed.		36.90: Point Load >20KN – No Failure	
																				36.92: JT, 75° Qz VN, PL, Healed.			
																				36.97: JT, 35° Qz VN, UN, Healed.			
							37.0 852.0													37.00: JT, 70° Qz HE, PL, Originates and terminates on adjacent joint.			37.0
																				37.02: JT, 65° Qz VN, PL, Healed.			
																				37.02: JT, 78° Qz VN, PL, Healed.			
																				37.20: JT, 45° Py VN, UN, Healed.			
							37.2 851.8													37.27: JT, 75° Qz VN, UN, Healed.			37.2
																				37.37: JT, 55° Qz HE, UN			
																				37.43: JT, 50° Qz HE, PL			
							37.4 851.6													37.47: JT, 35° Qz HE, PL, Originates on joint.			37.4
																				37.50: JT, 75° Qz CT, UN, 1 - 3 mm, originates on joint.			
		0 % Loss	R18 3.00m (100%) 100%																	37.60: JT, 35° Py VN, UN, SM, Intact, opened on handling.			
																				37.62: JT, 30° Py VN, UN, Originates on joint, healed.			
							37.6 851.4													37.65: JT, 60° HE, UN, Originates on joint.			37.6
																				37.77: JT, 45° Qz HE, UN			
																				37.78: JT, 15° Qz VN, PL, Healed.			
																				37.83: JT, 75° Qz VN, UN, Originates on joint, healed.			
							37.8 851.2				37.70 m: increasing Diamictite Protolith 37.73 m to 38.86 m: increasing 5% gravel sized clasts, matrix supported, up to 20 mm, sub-rounded to sub-angular									37.91: JT, 70° Py VN, UN, Originates on joint.		37.90: Point Load >20KN – No Failure	37.8
							38.0																

HQ3

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Observations and Comments

Notes

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Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R18 3.00m (100%) 100%				38.0 851.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, minor lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Occasional pyrite nodules and partial to thin veneer on joints. *(continued)*				F *(cont)*	VH - EH *(cont)*	VL -0.1 L -0.3 M -1 H -3 VH -10 EH	0 2 20 200 2000			37.99-38.02: Shear, 25° Py VN, PL, SL		PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM	
							38.2 850.8														38.24: JT, 50° Qz CT, ST, 1 mm, Healed.			38.2
																					38.32: JT, 35° Qz CT, PL, 1 mm, Healed.			
							38.4 850.6														38.38: JT, 35° Qz VN, PL, Healed.			38.4
																					38.39: JT, 40° Qz VN, PL, Healed.			
																					38.47: JT, Py VN, UN, 40 - 85°, discontinuous, healed.			
																					38.48: JT, Qz CT, IR, 1 mm, 40 - 90°, originates on adjacent joint, healed.			
							38.6 850.4														38.63: JT, 55° Py VN, UN, Healed.			38.6
																					38.77: JT, 50° Py VN, PL, Healed.			
							38.8 850.2														38.85: JT, 5° Py VN, PL, Healed.			38.8
																					38.90: JT, 10° Py VN, PL, Healed.	38.01-39.80: Set A): Joint, 75°, Planar, @ 20 - 200 mm sp. discontinuous.	38.85: Point Load >20KN – No Failure	
																					38.95-38.98: Shear, 30° Py VN, PL, SL			
							39.0 850.0														39.09: JT, 15° VN, PL, SL, Intact, opened on handling, infill unknown, silvery mineral possibly mica with trace pyrite.			39.0
											39.15 m to 42.71 m: increasing 10 - 15% lithic grains, up to 5 mm, rounded to sub-angular										39.10: JT, Qz CT, IR, SM, 1 - 2 mm, 0 - 50°, healed.			
							39.2 849.8														39.12: JT, 70° Um VN, PL, SM, Yellowish white mineral, soapy feel possibly high magnesium content, dolomite.			39.2
																					39.15: JT, 5° Qz VN, UN, Healed.			
																					39.25: JT, Qz VN, UN, 70 - 90°, originates on joint, healed.			
							39.4 849.6														39.28: JT, 70° HE, UN, Terminates on joint.			39.4
																					39.29: JT, 20° Qz VN, PL, SM, Healed.			
																					39.46: JT, 20° HE, PL, SM			
							39.6 849.4														39.56: JT, 85° Py HE, UN, SM, Terminates on joint.			39.6
																					39.57: JT, 20° HE, PL, SM			
		39.74																					39.68: Point Load >20KN – No Failure	
		0 % Loss					39.8 849.2														39.73: JT, Qz VN, IR, 30 - 90°, healed.			39.8
																					39.83: JT, HE, UN, 10 - 20°.			
							40.0														39.94: JT, Py VN, IR, SM, 50 - 65°, healed.			

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing	Support	Water	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Sampling	Run (TCR) RQD	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
	HQ3		0 % Loss				R19 3.01m (100%) 100%	40.0 849.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, minor lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Occasional pyrite nodules and partial to thin veneer on joints. *(continued)*				F *(cont)*	VH - EH *(cont)*	VL -0.1 L -0.3 M -1 H -3 VH -10 EH		0 2 20 200 2000		39.98: JT, 60° Py VN, UN, SM, Intact, opened on handling.		PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM	
								40.2 848.8													40.10: JT, 45° Qz HE, UN 40.14: JT, 10° HE, UN 40.19: JT, HE, CR, 30 - 60°.			40.2
								40.4 848.6													40.26: JT, 60° Qz HE, UN, 1 mm 40.29: JT, 65° Qz HE, UN 40.30: JT, 20° Qz HE, PL, SM 40.31: JT, 25° HE, PL 40.32: JT, Qz HE, ST, 70 - 90°. 40.37: JT, 25° HE, PL, SM			40.4
								40.6 848.4													40.54: JT, 15° Qz CT, UN, SM, 1 - 2 mm, healed.			40.6
								40.8 848.2																40.8
								41.0 848.0													40.90-40.92: VE, Qz HE, IR, 4 mm, 20 - 40°, trace pyrite.		40.90: Point Load >20KN – No Failure	41.0
								41.2 847.8													41.05: JT, 35° Qz VN, UN, Healed. 41.09: JT, Qz VN, IR, 25 - 50°, healed. 41.16: JT, 40° (α 0°), Py VN, UN, SM, Intact, opened on handling. 41.17: JT, 45° Py VN, UN, Healed. 41.28: JT, 35° Qz VN, PL, Healed. 41.28: JT, 20° Qz VN, PL, Healed.			41.2
								41.4 847.6																41.4
								41.6 847.4													41.62: JT, 60° HE, UN, Discontinuous. 41.63: JT, 35° Py VN, PL, SM, Healed. 41.65: JT, Qz VN, IR, 60 - 85°, discontinuous, healed. 41.70: JT, 20° Py VN, PL, SM, Intact, opened on handling. 41.72: JT, 15° Py VN, UN, Healed. 41.76: JT, 70° Py VN, PL, 5 mm displacement, healed. 41.82: JT, 55° HE, PL 41.94: JT, 10° Py VN, PL, SM, Intact, opened on handling.			41.6
								41.8 847.2															41.83: Point Load >20KN – No Failure	41.8
								42.0																

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R19 3.01m (100%) 100%				42.0 847.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, minor lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Occasional pyrite nodules and partial to thin veneer on joints. *(continued)* 42.00 m: Diamictite Protolith				F *(cont)*	VH - EH *(cont)*	VL -0.1 L -0.3 M -1 H -3 VH -10 EH		0 2 20 200 2000		42.01: JT, 25° Qz VN, PL, Healed. 42.06: JT, 45° Qz VN, PL, Healed. 42.09: JT, Qz CT, IR, 1 mm, 10 - 50°, healed.		PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM	
							42.2 846.8														42.23: JT, 45° Py VN, UN, SM, Intact, opened on handling.			42.2
							42.4 846.6														42.47: JT, healed, ST, 40 - 50°, healed.			42.4
							42.6 846.4														42.65: JT, CR, SM, 20 - 40°, intact, opened on handling. 42.73: JT, 45° Qz CT, UN, 1 mm, Healed.			42.6
		42.75					42.8 846.2																42.90: Point Load >20KN – No Failure	42.8
																					42.95: JT, 80° Qz CT, ST, 1 mm, Discontinuous, healed.			
							43.0 846.0														43.03: JT, 50° Qz CT, UN, 1 mm, Trace pyrite, healed.			43.0
																					43.11: JT, 35° HE, PL 43.13: JT, 10° HE, PL, 3 - 5 mm displacement.			
							43.2 845.8														43.22-43.24: Shear, 20° Qz VN, UN, SL, Trace pyrite, intact, opened on handling.			43.2
																					43.33: JT, 25° Qz VN, PL, SM, Healed.			
		0 % Loss	R20 3.00m (100%) 100%				43.4 845.6																	43.4
							43.6 845.4														43.66: JT, 20° Py VN, PL, SM, Intact, opened on handling. 43.66-43.70: VE, 40° Qz ID, IR, 1 mm 43.71-43.75: VE, 30° Qz ID, IR, 2 - 12 mm. 43.78: JT, 30° Qz CT, UN, 1 mm, Healed.	43.40-44.00: Set A): Joint, 75 - 85°, Undulating, Unidentifed mineral, @ 20 - 40 mm sp.		43.6
							43.8 845.2																43.83: Point Load >20KN – No Failure	43.8
							44.0														43.92: JT, 20° Qz VN, UN, Healed.			

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R20 3.00m (100%) 100%				44.0 / 845.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, minor lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Occasional pyrite nodules and partial to thin veneer on joints. *(continued)* 44.13 m to 44.35 m: trace 5 - 10% lithic clasts up to 15 mm, sub-rounded to sub-angular				F *(cont)*	VH - EH *(cont)*	VL -0.1 L -0.3 M -1 H -3 VH -10 EH	0 2 20 200 2000				PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM	
							44.2 / 844.8														44.16: JT, 50° Py CT, UN, 1 mm, Healed. 44.17: JT, 30° Py VN, UN, SM, Intact, opened on handling.			44.2
							44.4 / 844.6														44.31: JT, 45° HE, PL 44.35: JT, 10° Py VN, PL, SM, Intact, opened on handling. 44.40: JT, Qz CT, IR, 2 mm, 30 - 60° healed. 44.43: JT, 60° Qz VN, UN, Healed. 44.47: JT, 45° Qz VN, UN, Healed. 44.48: JT, 60° Qz VN, UN, Healed. 44.56: JT, 10° Qz VN, CR, Healed. 44.64: JT, 50° Qz VN, UN, Healed. 44.66: JT, 60° Qz VN, PL, Healed.			44.4
							44.6 / 844.4																44.6
							44.8 / 844.2														44.81: JT, 25° Py VN, PL, SM, Intact, opened on handling.			44.8
							45.0 / 844.0														44.95: JT, 65° Qz VN, ST, Healed. 45.08: JT, 80° Py VN, UN, Healed.		44.89: Point Load >20KN – No Failure	45.0
							45.2 / 843.8														45.20: JT, 55° Qz VN, PL, Healed.			45.2
							45.4 / 843.6														45.33: JT, 75° Qz HE, UN, Discontinuous. 45.33: JT, 45° Qz VN, PL 45.45: JT, 35° Qz VN, PL, Healed.			45.4
		0 % Loss					45.6 / 843.4														45.54: JT, Qz VN, CR, SM, 10 - 20°, intact, opened on handling. 45.55: JT, 20° Qz VN, PL, SM, Intact, opened on handling. 45.62: JT, 50° Qz VN, PL, Healed.			45.6
			45.75				45.8 / 843.2														45.72: JT, 70° Py VN, PL, SM, Healed.			45.8
							46.0																45.90: Point Load >20KN – No Failure	

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R21 3.00m (100%) 100%		46.90 m Is(50) d=5.58		46.0 843.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, minor lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Occasional pyrite nodules and partial to thin veneer on joints. *(continued)*				F *(cont)*	VH - EH *(cont)*						PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM	
							46.2 842.8															46.2
							46.4 842.6				46.37 m to 46.52 m: Amorphous Silica, hydrothermal vein / intrusion pale grey to blue, very fine grained, sharp contact with alteration halo dipping at 40 to 65°											46.4
							46.6 842.4															46.6
							46.8 842.2															46.8
							47.0 842.0															47.0
							47.2 841.8															47.2
							47.4 841.6				47.53 m to 48.26 m: Amorphous Silica, hydrothermal vein / intrusion, pale grey to blue, very fine grained. Irregular upper contact (possible relic rip up clasts) and sharp lower contact with alteration halo dipping at 40°			DA								47.4
							47.6 841.4															47.6
							47.8 841.2															47.8
							48.0															

Fabric, Structure & Defect Description:
- 46.11: JT, 60° healed, UN
- 46.14: JT, 70° Py VN, UN, Terminates on joint, healed.
- 46.15: JT, 60° Py VN, UN, Healed.
- 46.15: JT, 55° Py VN, UN, Healed.
- 46.21: JT, 20° Qz VN, UN, Healed.
- 46.24: JT, 35° Qz VN, UN, Healed.
- 46.30: JT, 45° Qz VN, PL, Healed.
- 46.31: JT, 55° UN, SM, Intact, opened on handling.
- 46.44: JT, 75° HE, UN, Terminates on joint.
- 46.47: JT, 10° Py VN, UN, SM, Intact, opened on handling.
- 46.51: JT, 5° HE, UN
- 46.58: JT, 15° HE, UN
- 46.63: JT, 45° CN, UN, SM, Intact, opened on handling.
- 46.67: JT, 15° Qz VN, PL, Healed.
- 46.75: JT, 40° Py VN, PL, SM, Intact, opened on handling.
- 46.75: JT, 60° Py VN, UN, SM, Healed.
- 46.86: JT, 83° Qz VN, PL, Healed.
- 46.90: JT, Py VN, CR, SM, 20 - 30°, intact, opened on handling.
- 46.90: JT, 0° Qz VN, PL, Healed.
- 47.04: JT, 10° HE, PL
- 47.17: JT, 80° Qz VN, UN, Healed.
- 47.19-47.42: Shear, Qz VN, IR, 70 - 80°, 4 mm displacement, healed.
- 47.41: JT, 15° Py VN, PL, SM, Intact, opened on handling.
- 47.43: JT, 15° Qz VN, PL, Healed.
- 47.46: JT, HE, CR, 5 - 10°.
- 47.59: JT, 40° Qz CT, ST, 1 mm, Healed.
- 47.60: JT, IR, 75 - 85°, incipient.
- 47.66: JT, IR, 60 - °85°, incipient.
- 47.67: JT, 40° Py VN, UN, Healed.
- 47.69: JT, 10° HE, PL
- 47.88: JT, 70° HE, UN
- 47.93: JT, 40° HE, PL

Origin, Stratigraphic Unit & General Observations:
- 47.70: indistinct sub-horizontal bedding
- 47.90: Point Load >20KN – No Failure

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Observations and Comments

Notes
Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted.
Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
For Inclined Holes: Angles reported in defects are apparent dip from core horizontal unless as α or β.
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) *Elevation*	Graphic Log	Soil Code	*Depth* RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R21 3.00m (100%) 100%		48.75 m Is(50) a=5.95		48.0 *841.0*				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, minor lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Occasional pyrite nodules and partial to thin veneer on joints. *(continued)*			DA *(cont)*	F *(cont)*	VH - EH *(cont)*	VL –0.1 L –0.3 M –1 H –3 VH –10 EH	0 2 20 200 2000			48.02: JT, 40° HE, IR, SM		PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM 48.00: Point Load >20KN – No Failure	
							48.2 *840.8*													48.07: JT, 20° HE, PL, SM 48.08: JT, 20° HE, PL, SM 48.09: JT, 20° HE, PL, SM			48.2
																				48.20: JT, 30° HE, PL, SM 48.25: JT, 30° HE, PL, SM			
							48.4 *840.6*																48.4
																				48.49: JT, 85° Qz VN, PL, SM 48.51: JT, 45° Qz VN, PL, SM, Healed.			
							48.6 *840.4*																48.6
																				48.68: JT, 87° Py VN, PL, SM, Healed.			
							48.8 *840.2*																48.8
							49.0 *840.0*															49.00: Point Load >20KN – No Failure	49.0
							49.2 *839.8*													49.18: JT, 35° Qz VN, PL, SM, Healed. 49.21: JT, 2° Qz VN, PL, SM, Healed.			49.2
							49.4 *839.6*				49.40m - 50.19 m: Sandstone Protolith increasing matrix grain size, fine to medium, increasing lithic clasts									49.45: JT, 45° Qz VN, PL, SM, Healed.			49.4
																				49.53: JT, 75° Qz CT, PL, SM, 1mm, healed. 49.57: JT, 35° Qz VN, PL, SM			
							49.6 *839.4*													49.69: JT, 35° Qz VN, PL, SM			49.6
							49.8 *839.2*													49.80: JT, 30° Qz VN, PL, SM, Healed. 49.80: JT, 45° Qz VN, PL, SM, Healed.			49.8
		0 % Loss	R22 2.95m (100%) 100%				50.0																

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R22 2.95m (100%) 100%		50.62 m Is(50) d=4.98		50.0 / 839.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, minor lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Occasional pyrite nodules and partial to thin veneer on joints. *(continued)*				F *(cont)*	VH - EH *(cont)*	VL -0.1 L -0.3 M -1 H -3 VH -10 EH	0 2 20 200 2000		50.07: JT, 87° Qz VN, PL, SM		PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM	
							50.2 / 838.8													50.11: JT, 30° Qz VN, PL, SM, Healed.			50.2
							50.4 / 838.6				50.46 m - 50.48 m: Quartz Vein, 5 - 20 mm aperture, dipping at 10-25°, 5%									50.42: JT, 70° Qz CD, PL, SM, Trace pyrite, terminates on vein.			50.4
																				50.51: JT, Qz VN, PL, SM, Terminates on vein.			
							50.6 / 838.4													50.55-50.60: VO, 30° Qz CT, UN, SM, Chlorite, <10 mm.			50.6
																				50.69-50.71: Vugh, Qz ID, IR, SM, 10 - 20°, trace pyrite, chlorite.			
											50.75 m - 50.96 m: Quartz Veinletts, irregular sub-horizontal									50.73-50.84: VO, Qz CT, IR, SM, 5 mm, 10 - 50°, chlorite.			50.8
							50.8 / 838.2				50.86 m - 50.88 m: Quartz Vein, 10 mm aperture, dipping at 15°												
											50.90 m - 50.91 m: Quartz Vein, 10 mm aperture, dipping at 15°												
							51.0 / 838.0													51.01: JT, 45° Qz CT, PL, SM, 5 mm			51.0
																				51.06: JT, 35° Qz VN, PL, SM, Trace pyrite.			
							51.2 / 837.8																51.2
											51.31 m - 51.32 m: Quartz Vein, 30°									51.27: JT, Py VN, IR, SM, 45 - 75°, healed.			
																				51.32: JT, 75° Py VN, UN, RO			
							51.4 / 837.6																51.4
											51.51 m - 51.67 m: Quartz Vein, irregular contact, dipping at 15 - 80°									51.51: JT, 30° Qz VN, PL, SM, Healed.			
					51.60 m Is(50) d=5.49, a=5.65		51.6 / 837.4																51.6
		51.70																					
		0 % Loss	R23 3.00m (100%) 100%				51.8 / 837.2													51.71-51.73: VE, Qz CT, IR, SM, 5 mm, 10 - 30°.			
																				51.78-51.80: VE, 20° Qz CT, PL, SM, 5 mm			51.8
																				51.87: JT, 80° Qz VN, PL, SM, Healed.			
							52.0																

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing	Support	Water	Run (TCR)	RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● - Axial ○ - Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3			0 % Loss	R23 3.00m (100%) 100%					52.0 / 837.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, minor lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Occasional pyrite nodules and partial to thin veneer on joints. *(continued)*				F *(cont)*	VH - EH *(cont)*					52.01: JT, 45° Qz VN, PL, SM, Healed.		PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM	
									52.2 / 836.8												52.13: JT, 85° Qz VN, PL, SM, Healed. 52.18: JT, 70° Qz VN, PL, SM, Healed. 52.24: JT, 70° Qz VN, PL, SM, Healed. 52.26: JT, 30° Qz VN, PL, SM, Healed.			52.2
									52.4 / 836.6															52.4
									52.6 / 836.4				52.52 m - 52.69 m: Sandstone Protolith, fine to medium grained 20% lithic clasts								52.51: JT, 85° Qz VN, PL, SM, Trace pyrite, healed. 52.63: JT, 30° Qz VN, PL, SM, Healed. 52.73: JT, 45° Qz VN, PL, SM, Trace pyrite, healed.			52.6
									52.8 / 836.2															52.8
									53.0 / 836.0				53.11 m - 53.43 m: Ripup Clasts, tabular, 5-10 mm rtrfrdx								52.94: JT, Qz VN, IR, SM, 10 - 80°, healed. 52.94: JT, 45° Qz VN, PL, SM, Trace pyrite, healed. 52.97: JT, Qz VN, IR, SM, 10 - 80°, healed. 53.01: JT, 30° Qz CT, PL, SM, 1 mm, Healed.			53.0
									53.2 / 835.8												53.23-53.30: Shear, 45° X VN, PL, SM, Trace pyrite, healed.		53.32: Point Load >20KN – No Failure	53.2
									53.4 / 835.6				53.45 m: becoming Siltstone Protolith								53.49: JT, 10° Qz VN, PL, SM, Healed. 53.56: JT, 40° Qz CT, PL, SM, Healed.			53.4
									53.6 / 835.4				53.59 m - 56.25 m: Sandstone Protolith, fine to medium grained 20% lithic clasts											53.6
									53.8 / 835.2												53.70: JT, 40° Qz VN, PL, SM, Healed. 53.72: JT, 35° Qz VN, UN, SM, Healed. 53.75: JT, 3° Qz VN, PL, SM, Healed. 53.85: JT, 35° Qz VN, UN, SM, Healed.			53.8
									54.0															

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Observations and Comments

Notes

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Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
For Inclined Holes: Angles reported in defects are apparent dip from core horizontal unless as α or β.
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing	Support	Water	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● - Axial ○ - Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3			0 % Loss	R23 3.00m (100%) 100%				54.0 / 835.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, minor lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Occasional pyrite nodules and partial to thin veneer on joints. *(continued)*				F *(cont)*	VH - EH *(cont)*					54.08: JT, 35° Qz VN, PL, SM, Healed. 54.08: JT, 5° Qz VN, PL, SM, Healed.		PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM	
								54.2 / 834.8				54.19 m - 56.85 m: soft sediment deformation									54.19-54.26: Shear, 55° CN, UN, RO, Healed. 54.23-54.30: Shear, 55° CN, UN, RO, Healed. 54.29: JT, Check details. 54.36: JT, 80° Qz VN, PL, SM, Healed. 54.33-54.40: Shear, 55° CN, UN, RO, Healed. 54.40-54.43: Shear, 30° CN, UN, RO, Healed. 54.42-54.45: Shear, 30° CN, UN, RO, Healed. 54.43-54.45: Shear, 30° CN, UN, RO, Healed. 54.45: JT, 30° Qz VN, PL, SM, Trace pyrite, healed. 54.43-54.49: Shear, 55° CN, UN, RO, Healed. 54.45-54.51: Shear, 55° CN, UN, RO, Healed. 54.52-54.57: Shear, 55° CN, UN, RO, Healed. 54.56-54.60: Shear, 50° CN, UN, RO, Healed. 54.61-54.66: Shear, 50° CN, UN, RO, Healed. 54.68: JT, 70° Qz VN, PL, SM, Healed. 54.76: JT, 70° Qz VN, PL, SM, Healed, discontinuous. 54.90-54.92: Shear, 15° Py VN, PL, SM, Healed, 1mm displacement. 54.93: JT, 25° Qz VN, PL, SM, Healed. 54.97: JT, 25° Qz VN, PL, SM, Healed. 55.05-55.13: Shear, 60° CN, UN, RO, Healed, 2 mm displacement. 55.14-55.23: Shear, 60° CN, UN, RO, Healed, 2 mm displacement. 55.31: JT, Qz VN, CR, SM, 80 - 90°, healed. 55.37: JT, 60° Qz VN, PL, SM, Healed. 55.40: JT, 60° Qz VN, PL, SM, Healed.			54.2
								54.4 / 834.6																54.4
								54.6 / 834.4																54.6
				54.70				54.8 / 834.2																54.8
			0 % Loss	R24 3.05m (100%) 100%				55.0 / 834.0															55.0: Point Load >20KN – No Failure	55.0
								55.2 / 833.8																55.2
								55.4 / 833.6																55.4
								55.6 / 833.4													55.60: JT, 40° Qz VN, PL, SM, Healed.			55.6
								55.8 / 833.2													55.80-55.88: Shear, 60° CN, UN, RO, Healed, 2 mm displacement. 55.85-55.89: Shear, 45° CN, UN, RO, Healed.			55.8
								56.0																

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
							56.0 833.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, minor lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Occasional pyrite nodules and partial to thin veneer on joints. *(continued)*				F *(cont)*	VH - EH *(cont)*	VL -0.1 L -0.3 M -1 H -3 VH -10 EH		0 2 20 200 2000		56.02: JT, 40° Py VN, PL, SM, Healed. 56.06: JT, 50° Qz VN, PL, SM, Healed. 56.03-56.08: Shear, 40° CN, UN, RO, Healed, 3 to 10 mm displacement. 56.06-56.17: Shear, 60° CN, UN, RO, Healed, 3 - 10 mm displacement. 56.16: JT, 10° Qz VN, PL, SM, Healed. 56.24: JT, 10° Qz VN, PL, SM 56.34: JT, 65° Qz VN, PL, SM, Healed.		PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM	
							56.2 832.8			56.2														56.2
							56.4 832.6			56.4														56.4
							56.6 832.4			56.6	56.56 m - 56.69 m: Amorphous Silica, hydrothermal vein / intrusion pale grey to blue, very fine grained, sharp contact with alteration halo dipping at 40 to 60°			DA							56.50-56.61: BD, 70° Qz VN, PL, SM, Healed. 56.56: JT, 10° Qz VN, PL, SM 56.64-56.75: BD, 70° Qz VN, PL, SM, Healed.			56.6
							56.8 832.2			56.8	56.86 m - 57.06 m: Amorphous Silica, hydrothermal vein / intrusion pale grey to blue, very fine grained, sharp contact upper contact, irregular lower contact with alteration halo dipping at 40 to 60°			DA							56.83: JT, 65° Qz VN, PL, SM, Healed.		56.80: Point Load >20KN – No Failure	56.8
							57.0 832.0			57.0											56.90-57.13: BD, 80° Qz VN, PL, SM, Healed.			57.0
							57.2 831.8			57.2														57.2
							57.4 831.6			57.4											57.30: JT, 45° Qz VN, PL, SM, Healed. 57.31: JT, 45° Qz VN, PL, SM, Healed. 57.37: JT, 30° Qz VN, PL, SM, Healed.			57.4
							57.6 831.4			57.6											57.49: JT, 40° Qz VN, PL, SM, Healed. 57.50: JT, 50° Qz VN, PL, SM, Healed. 57.55: JT, 45° Qz VN, PL, SM, Healed. 57.55: JT, 40° Qz VN, PL, SM, Healed. 57.64: JT, 55° Py VN, PL, SM, Healed.			57.6
							57.8 831.2			57.8											57.76: JT, 25° CN, PL, SM, Healed.			57.8
							58.0														57.95: JT, 30° Qz VN, PL, SM, Healed.			

HQ3

0 % Loss

R24 3.05m (100%) 100%

57.75

0 % Loss

Draft

Observations and Comments

Notes

Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted.
Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
For Inclined Holes: Angles reported in defects are apparent dip from core horizontal unless as α or β.
Refer to explanatory notes for SMEC logs for details of abbreviations or basis of description.

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SMEC 2.10.10 LIB.GLB Log _SMEC HYBRID BOREHOLE LANDSCAPE 30018018 OVEN MOUNTAIN.GPJ <<DrawingFile>> 28/01/2022 12:34 10.02.00.04 Datgel Tools | Lib: SMEC 2.10.9 2021-08-30 Prj: SMEC 2.10.9 2021-08-30

Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing	Support	Water	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● - Axial ○ - Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3			0 % Loss	R25 3.02m (100%) 100%				58.0 / 831.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, minor lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Occasional pyrite nodules and partial to thin veneer on joints. *(continued)*				F *(cont)*	VH - EH *(cont)*					58.09: JT, 25° Qz CT, PL, SM, 1 mm, Healed. 58.12: JT, 70° Py VN, PL, SM, Healed.		PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM	
								58.2 / 830.8													58.29: JT, 35° Qz VN, PL, SM, Healed. 58.36: JT, 50° Py VN, PL, SM, Healed.			58.2
								58.4 / 830.6				58.42 m - 58.75 m: Amorphous Silica, hydrothermal vein / intrusion pale grey to blue, very fine grained, sharp contact with alteration halo 2mm upper contact, 25mm lower contact, dipping at 15 to 60°			DA						58.39: JT, 20° Py VN, PL, SM, Healed. 58.42: JT, 20° Py VN, PL, SM, Healed. 58.43: JT, 50° Py VN, PL, SM, Healed, discontinuous. 58.44: JT, 20° Py VN, PL, SM, Healed.			58.4
								58.6 / 830.4													58.48: JT, 40° Qz VN, PL, SM, Healed. 58.49: JT, 40° Qz VN, PL, SM, Healed. 58.54: JT, 50° Qz CT, PL, SM, 2 mm, Healed. 58.58: JT, 40° Qz VN, PL, SM, Healed.			58.6
								58.8 / 830.2													58.67: JT, 75° Qz VN, PL, SM, Healed. 58.75: JT, 70° Py VN, PL, SM, Healed. 58.85: JT, 50° Qz VN, PL, SM, Healed.			58.8
								59.0 / 830.0													59.00: JT, 70° Py VN, PL, SM, Healed.			59.0
								59.2 / 829.8													59.24: JT, 25° Qz CT, PL, SM, 2 mm, Healed. 59.28: JT, 60° Qz VN, PL, SM, Healed.			59.2
								59.4 / 829.6													59.40: JT, 70° Qz VN, PL, SM, Healed. 59.47: JT, 60° Qz VN, PL, SM, Healed.			59.4
								59.6 / 829.4				59.56 m - 59.58 m: Quartz Vein, 5 to 10mm aperture, dipping at 10° ,1mm hydrothermal alteration halo												59.6
								59.8 / 829.2				59.76m: Diamictite Protolith, with veryfine grained matrix, trace <5% matrix supported gravel sized 5 to 25 mm angular clasts, Minor lineation and flattening of clasts									59.73: JT, 30° Py VN, PL, SM, Healed.		59.72: Point Load >20KN – No Failure	59.8
								60.0													59.82: JT, 30° Qz VN, PL, SM, Healed. 59.83: JT, 80° Qz VN, PL, SM, Healed. 59.85: JT, 30° Qz VN, PL, SM, Healed. 59.92: JT, 30° Qz VN, PL, SM,			

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Observations and Comments

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Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R25 3.02m (100%) 100%				60.0 829.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, minor lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Occasional pyrite nodules and partial to thin veneer on joints. *(continued)* 60.07 m - 60.13 m: Quartz Vein, 50mm apature, dipping 10-20°, trace chlorite inclusions, 3mm alteration halo lower contact 60.23 m: Sandstone Protolith, fine to medium grained, lithic clasts, quartz porphroblasts up to 2mm, some flattening of grains				F *(cont)*	VH - EH *(cont)*	VL -0.1 L -0.3 M -1 H -3 VH -10 EH				Healed. 59.94: JT, 30° Qz VN, PL, SM, Healed.		PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM	
							60.2 828.8														60.14: JT, 70° Qz VN, IR, SM, Healed. 60.16: JT, 30° Qz VN, PL, SM, Healed. 60.22: JT, 30° Qz VN, PL, SM, Healed.			60.2
							60.4 828.6				60.38 m - 60.77m: 3 x Quartz Veins, 5-15mm aperture, 50mm to 300mm spaced 10-15° dip sub-parallel to bedding										60.38-60.40: VE, 15° Qz CT, PL, SM, Healed. 60.40: JT, 80° Qz VN, PL, SM, Healed. 60.44: JT, 60° Qz VN, PL, SM, Healed. 60.47: JT, 20° Qz CT, PL, SM, 1 mm, Healed. 60.56: JT, 5° Qz VN, PL, SM, Healed. 60.61: JT, 70° Qz VN, PL, SM, Healed, discontinuous.			60.4
							60.6 828.4														60.70-60.72: VE, 15° Qz CT, PL, SM, 10 mm, Healed.			60.6
		60.77					60.8 828.2														60.76-60.77: VE, 15° Qz CT, PL, SM, 10 mm, Healed.		60.77: Point Load >20KN – No Failure	60.8
		0 % Loss	R26 2.95m (100%) 100%				61.0 828.0				61.03 m - 61.08 m: Quartz Vein, 15-40mm aperture, dipping 10-45°, chlorite inclusions, alteration halo lower contact										61.10-61.12: VE, 15° Qz CT, PL, SM, 3 mm, Healed.			61.0
							61.2 827.8														61.26: VE, 0° Qz CT, PL, SM, 1 mm, Healed. 61.27: JT, 15° Qz VN, PL, SM, Healed. 61.28: VE, 0° Qz CT, PL, SM, 1 mm, Healed.			61.2
							61.4 827.6				61.49 m - 61.99 m: increasing lithic clasts, lineation fabric										61.35: JT, 30° Qz VN, PL, SM, Healed. 61.40: JT, 15° Qz VN, PL, SM, Healed. 61.41: JT, 60° Qz VN, PL, SM, Healed.			61.4
							61.6 827.4														61.61: JT, 65° Qz VN, PL, SM, Healed. 61.65: JT, 30° Qz VN, PL, SM, Healed.			61.6
							61.8 827.2														61.86: JT, 30° Qz VN, PL, SM, Healed.			61.8
							62.0																	

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Observations and Comments

Notes

Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted.
Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
							62.0 827.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, minor lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Occasional pyrite nodules and partial to thin veneer on joints. *(continued)*				F *(cont)*	VH - EH *(cont)*	VL –0.1 L –0.3 M –1 H –3 VH –10 EH	0 2 20 200 2000			62.00: JT, 70° Qz CT, PL, SM, 1 mm, Healed, slightly altered. 62.01: JT, 20° Qz VN, PL, SM, Healed. 62.08: JT, 20° Qz VN, PL, SM, Healed. 62.17: JT, 65° Qz CT, PL, SM, 1 mm, Healed.		PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM	
							62.2 826.8																	62.2
							62.4 826.6														62.43: JT, 30° Qz VN, PL, SM, Healed.			62.4
							62.6 826.4														62.56: JT, 30° Qz VN, PL, SM, Healed. 62.65: JT, 20° Qz VN, PL, SM, Healed. 62.70: JT, 30° Qz VN, PL, SM, Healed.			62.6
							62.8 826.2														62.78: JT, 30° Qz VN, PL, SM, Healed.			62.8
HQ3		0 % Loss	R26 2.95m (100%) 100%				63.0 826.0				63.01 m - 64.36 m: increasing lithic clasts up to 20%										63.01: JT, 30° Qz VN, PL, SM, Healed.			63.0
							63.2 825.8														63.29: JT, 30° Qz VN, PL, SM, Healed.			63.2
							63.4 825.6														63.37: JT, 45° Qz VN, ST, SM, Healed.			63.4
							63.6 825.4														63.52: JT, 30° Qz VN, PL, SM, Healed. 63.56: JT, 30° Qz VN, PL, SM, Healed. 63.59: JT, 30° Qz VN, PL, SM, Healed. 63.66: JT, 15° Qz CT, PL, SM, 1 mm, Healed.			63.6
		63.72 0 % Loss	R27 3.06m (100%) 100%				63.8 825.2														63.81: JT, 30° Qz VN, PL, SM, Healed.		63.80: Point Load >20KN – No Failure	63.8
							64.0																	

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Observations and Comments

Notes

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Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
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SMEC 2.10.10 LIB.GLB Log _SMEC HYBRID BOREHOLE LANDSCAPE 30018018 OVEN MOUNTAIN.GPJ <<DrawingFile>> 28/01/2022 12:34 10.02.00.04 Datgel Tools | Lib: SMEC 2.10.9 2021-08-30 Prj: SMEC 2.10.9 2021-08-30

Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing	Support	Water	(Gain/Loss)	Run (TCR)	RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength Point Load Is(50) ● - Axial ○ - Diametral	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
	HQ3			0 % Loss	R27 3.06m (100%) 100%					64.0 825.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, minor lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Occasional pyrite nodules and partial to thin veneer on joints. *(continued)*				F *(cont)*	VH - EH *(cont)*	VL -0.1 L -0.3 M -1 H -3 VH -10 EH		0 2 20 200 2000		64.02: JT, 15° Qz VN, PL, SM, Healed. 64.06: JT, 25° Qz VN, PL, SM, Healed. 64.08: JT, 20° Py VN, PL, SM, Healed. 64.15: JT, 20° Py VN, PL, SM, Healed. 64.18: JT, 20° Py VN, PL, SM, Healed. 64.21: JT, 30° Qz VN, PL, SM, Healed. 64.22: JT, 30° Qz VN, PL, SM, Healed. 64.24: JT, 30° Qz VN, PL, SM, Healed. 64.32: JT, 75° Qz VN, PL, SM, Healed.		PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM 64.00: Point Load >20KN – No Failure	
										64.2 824.8																64.2
										64.4 824.6																64.4
										64.6 824.4				64.57 m: Ripup Clasts												64.6
										64.8 824.2													64.80: JT, 85° Qz CT, PL, SM, 1 mm, Healed. 64.82: JT, 15° Qz VN, PL, SM, Healed. 64.94: JT, 20° Py VN, PL, SM, Healed.			64.8
										65.0 824.0													65.05: JT, 25° Py VN, PL, SM, Healed.			65.0
										65.2 823.8													65.15: JT, 65° Qz VN, PL, SM, Healed. 65.17: JT, 65° Qz VN, PL, SM, Healed. 65.22: JT, 40° Qz VN, PL, SM, Healed. 65.22: JT, 40° Qz VN, PL, SM, Healed. 65.28: JT, 80° Qz VN, PL, SM, Terminates on adjacent joint, healed.			65.2
										65.4 823.6				65.41 m - 65.92 m: Diamictite Protolith pale grey and grey sub-angular clasts, 2 -20 mm, matrix supported, minor lineation and flattening of grains											65.40: JT, 80° Qz CT, PL, SM, 1 mm, Terminates on adjacent joint, healed. 65.41: JT, 35° Qz VN, PL, SM, Healed. 65.51: JT, 80° Qz VN, PL, SM, Terminates on adjacent joint, healed.			65.4
										65.6 823.4																65.6
										65.8 823.2													65.77: JT, 80° Qz VN, PL, SM, Terminates on adjacent joint, healed. 65.93: JT, 45° Qz VN, PL, SM, Healed.			65.8
										66.0																

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Observations and Comments

Notes

Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted.
Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
For Inclined Holes: Angles reported in defects are apparent dip from core horizontal unless as α or β.
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R27 3.06m (100%) 100%				66.0 823.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, minor lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Occasional pyrite nodules and partial to thin veneer on joints. *(continued)*				F *(cont)*	VH - EH *(cont)*	VL -0.1 L -0.3 M -1 H -3 VH -10 EH		0 2 20 200 2000		66.04: JT, 80° Qz VN, PL, SM, Terminates on adjacent joint, healed.		PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM	
							66.2 822.8														66.28: JT, 80° Qz VN, PL, SM, Terminates on adjacent joint, healed. 66.31: JT, 80° Qz VN, PL, SM, Healed. 66.34: JT, 25° Qz VN, PL, SM, Healed.		66.36: Point Load >20KN – No Failure	66.2
							66.4 822.6																	66.4
							66.6 822.4														66.59: JT, 30° Qz VN, PL, SM, Healed. 66.62: JT, 15° Qz CT, PL, SM, 1 mm, Healed. 66.65: JT, 80° Py VN, PL, SM, Healed. 66.69: JT, 30° Qz VN, PL, SM, Healed. 66.77: JT, 70° Qz VN, PL, SM, Healed.			66.6
			66.78				66.8 822.2																	66.8
		5 % Loss	R28 2.95m (100%) 100%				67.0 822.0														66.89: JT, 25° Qz VN, PL, SM, Healed. 66.90: JT, 30° Qz VN, PL, SM, Healed. 66.98: JT, 25° Qz VN, PL, SM, Healed. 67.03: JT, 25° Qz VN, PL, SM, Healed. 67.04: JT, 20° Qz VN, PL, SM, Healed. 67.08: JT, 50° Qz VN, PL, SM, Healed.			67.0
							67.2 821.8														67.18: JT, 15° Qz VN, PL, SM, Healed. 67.22: JT, 80° Qz CT, PL, SM, 1 mm, Terminates on adjacent joint, healed. 67.23: JT, 80° Qz CT, PL, SM, 1 mm, Terminates on adjacent joint, healed. 67.25: JT, 15° Qz VN, PL, SM, Healed. 67.31: JT, 80° Qz CT, PL, SM, 1 mm, Terminates on adjacent joint, healed. 67.35: JT, 25° Qz CT, PL, SM, 1 - 3 mm, healed.			67.2
							67.4 821.6				67.48 m: Siltstone Protolithpale grey, elongated lenses parallel to lineation fabric at 45°													67.4
							67.6 821.4				67.54 m - 67.56 m: Alteration Lens grey to pale blue 67.65 m - 67.74 m: 3 x Quartz Veins / lenses irregular contacts, with chlorite, and trace pyrite veins, 1-30mm apature dipping 0 to 45° spaced 1 - 40mm apart										67.60: JT, 25° Qz CT, PL, SM, 1 mm, Healed. 67.63-67.67: Shear, 30° CN, PL, SM, 3 mm displacement. 67.69: JT, 10° Py VN, PL, SM, Healed.			67.6
							67.8 821.2				67.84 m - 68.07 m: Quartz Veins with chlorite, trace pyrite, irregular contacts, dipping 0 - 45°										67.78: JT, 40° Py VN, PL, SM, Healed. 67.79: JT, 40° Py VN, PL, SM, Healed. 67.80: JT, 40° Qz CT, PL, SM, 3 mm, Healed. 67.80: JT, 15° Qz VN, PL, SM, Healed. 67.81: JT, 25° Qz VN, PL, SM,			67.8
					67.85 m Is(50) d=4.49 Is(50) a=3.22 MPa		68.0																	

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Observations and Comments

Notes

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SMEC 2.10.10 LIB.GLB Log _SMEC HYBRID BOREHOLE LANDSCAPE 30018018 OVEN MOUNTAIN.GPJ <<DrawingFile>> 28/01/2022 12:34 10.02.00.04 Datgel Tools | Lib: SMEC 2.10.9 2021-08-30 Prj: SMEC 2.10.9 2021-08-30

Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition / Consistency / Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		5 % Loss	R28 2.95m (100%) 100%				68.0 821.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, minor lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Occasional pyrite nodules and partial to thin veneer on joints. *(continued)*			F *(cont)*	VH - EH *(cont)*	VL -0.1 L -0.3 M -1 H -3 VH -10 EH		0 2 20 200 2000		Healed.		PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM	
							68.2 820.8				68.25 m - 69.29 m: increasing lithic clasts 20% with quartz porphyorblasts up to 2mm									67.82: JT, 25° Qz VN, PL, SM, Healed. 67.84: JT, 25° Py VN, PL, SM, Healed. 68.02-68.04: BD, 20° CN, PL, SM, Healed. 68.11: JT, 40° Qz VN, PL, SM, Healed. 68.20: JT, 10° Qz CT, PL, SM, Healed. 68.20: JT, 40° Qz VN, PL, SM, Healed.			68.2
							68.4 820.6													68.50: JT, 25° Qz VN, PL, SM, Healed. 68.57: JT, 40° Qz VN, PL, SM, Healed.			68.4
							68.6 820.4															68.6
							68.8 820.2													68.85: JT, 35° Qz VN, IR, SM, Healed. 68.87: JT, 40° Qz VN, PL, SM, Healed.		68.90: Point Load >20KN – No Failure	68.8
							69.0 820.0				69.06 m - 69.14 m: Sandstone Protolith Bed									69.04: JT, 40° Qz VN, PL, SM, Healed. 69.05: JT, 70° Py VN, PL, SM, Healed. 69.10: JT, 70° Py VN, PL, SM, Healed.			69.0
							69.2 819.8															69.2
							69.4 819.6													69.40: JT, 5° Qz CT, PL, SM, 1 mm, Healed. 69.47: JT, 40° Qz VN, PL, SM, Healed.			69.4
							69.6 819.4															69.6
		5 % Loss	69.73 R29 3.02m (100%) 100%				69.8 819.2													69.61: JT, 5° Qz VN, PL, SM, Healed. 69.62: JT, 5° Qz VN, PL, SM, Healed. 69.64: JT, 5° Qz VN, PL, SM, Healed. 69.69: JT, 5° Qz VN, PL, SM, Healed. 69.69-69.74: SS, 50° CN, PL, RO, Healed.		69.90: Point Load >20KN – No Failure	69.8
							70.0															

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Observations and Comments

Notes

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SMEC 2.10.10 LIB.GLB Log _SMEC HYBRID BOREHOLE LANDSCAPE 30018018 OVEN MOUNTAIN.GPJ <<DrawingFile>> 28/01/2022 12:34 10.02.00.04 Datgel Tools | Lib: SMEC 2.10.9 2021-08-30 Prj: SMEC 2.10.9 2021-08-30

Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
							70.0 819.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, minor lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Occasional pyrite nodules and partial to thin veneer on joints. *(continued)* 70.06 m - 70.88 m: Diamictite Protolith, grey clasts up to < 30mm, matrix supported, flattened grains, minor lineation				F *(cont)*	VH - EH *(cont)*	VL –0.1 L –0.3 M –1 H –3 VH –10 EH				70.07: JT, 87° Qz CT, PL, SM, 2 mm, Healed. 70.07: JT, 85° Qz VN, PL, SM, Healed.		PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM	
							70.2 818.8			70.2											70.30: JT, Py VN, PL, SM, 30 - 40°, healed. 70.34: JT, 20° Qz VN, PL, SM, Healed. 70.36: JT, 20° Qz VN, PL, SM, Healed.			70.2
							70.4 818.6			70.4											70.44: JT, 30° Qz CT, PL, SM, 2 mm, Healed. 70.45: JT, 60° Py VN, PL, SM, Healed. 70.50: JT, 30° Qz VN, PL, SM, Healed.			70.4
							70.6 818.4			70.6											70.62: JT, 30° Qz VN, PL, SM, Healed.			70.6
							70.8 818.2			70.8											70.69: JT, 30° Qz VN, PL, SM, Healed. 70.75: JT, 30° Qz VN, PL, SM, Healed.			70.8
	HQ3	5 % Loss	R29 3.02m (100%) 100%				71.0 818.0			71.0	70.90 m: Siltstone Protolith													71.0
					71.20 m Is(50) d=2.12 71.25 m Is(50) a=2.97		71.2 817.8			71.2	71.09 m - 71.15 m: Fault Gouge, yellow green and light grey, clay infill, high hydrothermal alteration, soil strength infill			HA		VL VH - EH					71.03-71.19: SS, 70° Qz CT, PL, RO, 3 mm, Trace pyrite, healed. 71.12: JT, 20° Qz VN, PL, SM, Healed. 71.16-71.22: SS, 70° Qz CT, PL, RO, 5 mm, Trace pyrite, healed. 71.21: JT, 20° Qz VN, PL, SM, Healed. 71.26: JT, 10° Qz VN, PL, SM, Healed.			71.2
							71.4 817.6			71.4											71.38: JT, 60° Qz VN, PL, SM, Healed. 71.44: JT, 60° Qz VN, PL, SM, Healed.			71.4
							71.6 817.4			71.6	71.64 m: Sandstone thinly interbedded with Diamictite Protolith										71.54: JT, 30° Qz VN, PL, SM, Healed.			71.6
							71.8 817.2			71.8											71.73: JT, 70° Qz VN, PL, SM			71.8
							72.0														71.90: JT, 70° Qz VN, PL, SM			

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Observations and Comments

Notes

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SMEC 2.10.10 LIB.GLB Log _SMEC HYBRID BOREHOLE LANDSCAPE 30018018 OVEN MOUNTAIN.GPJ <<DrawingFile>> 28/01/2022 12:34 10.02.00.04 Datgel Tools | Lib: SMEC 2.10.9 2021-08-30 Prj: SMEC 2.10.9 2021-08-30

Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
							72.0 817.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, minor lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Occasional pyrite nodules and partial to thin veneer on joints. *(continued)*				F *(cont)*	VH - EH *(cont)*	VL -0.1 L -0.3 M -1 H -3 VH -10 EH	0 2 20 200 2000			72.07: JT, 35° Py VN, PL, SM, Healed.		PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM	
							72.2 816.8				72.19 m - 72.68 m: Increasing sand and sub-angular gravel sized lithic clasts, minor lineation, flattening of grains									72.27: JT, 40° Qz VN, PL, SM, Healed.			72.2
																				72.36: JT, 35° Py VN, PL, SM, Healed.			
							72.4 816.6																	72.4
		5 % Loss	R29 3.02m (100%) 100%				72.6 816.4													72.59: JT, 35° Qz VN, PL, SM, Healed. 72.62: JT, 75° Qz VN, PL, SM, Healed. 72.63: JT, 35° Qz VN, PL, SM, Healed. 72.67: JT, 35° Qz VN, PL, SM, Discontinuous, healed.			72.6
		72.75					72.8 816.2													72.75: JT, 10° Qz VN, PL, SM, Healed. 72.85: JT, 20° Qz VN, PL, SM, Healed. 72.87: JT, 25° Qz VN, PL, SM, Healed. 72.88: JT, 20° Qz CT, PL, SM, 1 mm, Healed.		72.74: Point Load >20KN – No Failure	72.8
HQ3							73.0 816.0													72.93: JT, 60° Py VN, PL, SM, Healed. 72.99: JT, 90° Py VN, PL, SM, Discontinuous, healed. 73.04: JT, 80° Qz VN, PL, SM, 1 mm, Discontinuous, healed.			73.0
							73.2 815.8				73.18 m - 73.42 m: increasing lithic sand sized clasts up to 20%									73.05: JT, 40° Qz VN, PL, SM, Healed. 73.07: JT, 65° Py VN, PL, SM, Discontinuous, healed. 73.09: JT, 40° Qz VN, PL, SM, Healed. 73.18: JT, 50° Qz VN, PL, SM, Healed.			73.2
		5 % Loss	R30 3.02m (100%) 100%				73.4 815.6													73.23: JT, 60° Qz VN, PL, SM, Healed. 73.28: JT, 88° Qz VN, PL, SM, Healed. 73.45: JT, 75° Qz VN, PL, SM, Healed.			73.4
							73.6 815.4													73.53: JT, 60° Qz VN, PL, SM, Healed. 73.58: JT, 50° Qz VN, PL, SM, Healed. 73.65: JT, 55° Qz VN, PL, SM, Healed.			73.6
					73.78 m Is(50) d=6.47 73.83 m Is(50) a=7.13		73.8 815.2													73.71: JT, 20° Qz CT, PL, SM, 1 mm, Healed. 73.77: JT, 10° Qz VN, PL, SM, Healed. 73.78-73.80: VE, 15° Qz CT, PL, SM, 2 mm, Healed. 73.83: JT, 10° Qz VN, PL, SM, Healed. 73.89: JT, 15° Qz VN, PL, SM, Healed.			73.8
							74.0													73.93: JT, 15° Qz VN, PL, SM,			

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● - Axial ○ - Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		5 % Loss	R30 3.02m (100%) 100%				74.0 815.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, minor lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Occasional pyrite nodules and partial to thin veneer on joints. *(continued)*				F *(cont)*	VH - EH *(cont)*					Healed. 74.04: JT, 15° Qz VN, PL, SM, Healed. 74.11: JT, 70° Py VN, PL, SM, Healed.		PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM	
							74.2 814.8				74.30 m - 74.67 m: increasing lithic sand sized clasts up to 20% with quartz porphyroblasts up to 2mm in size 30%									74.21: JT, 80° Qz CT, PL, SM, 1 mm, Discontinuous, healed. 74.23: JT, 65° Qz VN, PL, SM, Healed.			74.2
							74.4 814.6													74.37: JT, 20° Py VN, PL, SM, Discontinuous, healed. 74.41: JT, 89° Qz CT, PL, SM, 1 mm, Discontinuous, healed. 74.48: JT, 20° Py VN, PL, SM, Discontinuous, healed.			74.4
							74.6 814.4													74.56: JT, 75° Qz VN, PL, SM, Discontinuous, healed.			74.6
							74.8 814.2													74.72: JT, 40° Qz CT, PL, SM, 1 mm, Discontinuous, healed. 74.77: JT, 89° Py VN, PL, SM, Healed. 74.78: JT, 90° Py VN, PL, SM, Dscontinuous, healed. 74.83: JT, 70° Py VN, PL, SM, Healed.			74.8
							75.0 814.0				75.06 m - 75.65m: Diamictite Protolith, clasts up to 30mm, matrix supported, flattened grains, minor lineation									74.90: Point Load >20KN – No Failure 75.03-75.12: FO, 60° CN, PL, SM			75.0
							75.2 813.8													75.18: JT, 40° Py VN, PL, SM, Healed.			75.2
							75.4 813.6													75.46: JT, 70° Py VN, PL, SM, Healed. 75.48: JT, 30° Qz VN, PL, SM, Healed. 75.50: JT, 30° Qz VN, PL, SM, Healed.			75.4
							75.6 813.4				75.65 m: Siltstone Protolith									75.63: JT, 20° Qz VN, PL, SM, Healed. 75.65: JT, 15° Qz CT, PL, SM, 1 mm, Healed.			75.6
		0 % Loss	75.77		75.86 m Is(50) d=3.76		75.8 813.2				75.80 m - 75.94 m: Amorphous Silica, hydrothermal vein / intrusion pale grey to blue, very fine grained, irregular contact with alteration halo 2mm, dipping at 45 to 60°									75.78: JT, 65° Qz VN, PL, SM, Healed. 75.86: JT, 20° Py VN, PL, SM, Healed. 75.92: JT, 50° Py VN, PL, SM, Discontinuous, healed. 75.96: JT, 30° Py VN, PL, SM,			75.8
							76.0																

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing	Support	Water	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● - Axial ○ - Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3			0 % Loss	R31 3.01m (100%) 100%				76.0 / 813.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, minor lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Occasional pyrite nodules and partial to thin veneer on joints. *(continued)*				F *(cont)*	VH - EH *(cont)*					Healed. 75.99: JT, 50° Qz VN, PL, SM, Healed.		PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM	
								76.2 / 812.8				76.20 m: Sandstone interbedded with Diamictite Protolith 76.21 m - 76.64 m: increased lithic clasts and quartz porphyroblasts up to 2mm									76.19: JT, 15° Qz CT, PL, SM, 1 mm, Healed. 76.30: JT, 50° Qz CT, PL, SM, 1 mm, Healed.			76.2
								76.4 / 812.6													76.45: JT, 65° Py VN, PL, SM, Healed. 76.48: JT, 45° Py VN, PL, SM, Discontinuous. 76.51: JT, 45° Qz VN, PL, SM, Healed.			76.4
								76.6 / 812.4													76.57: JT, 10° Qz VN, PL, SM, Healed. 76.63: JT, 70° Qz VN, PL, SM, Discontinuous, healed. 76.65: JT, 75° Qz VN, PL, SM, Healed. 76.67: JT, 70° Qz CT, PL, SM, 1 mm, Healed.			76.6
								76.8 / 812.2				76.76 m - 77.41 m: increased lithic clasts and quartz porphyroblasts up to 2mm												76.8
								77.0 / 812.0													76.90: Point Load >20KN – No Failure 76.98: JT, 5° Qz VN, PL, SM, Healed. 77.04: JT, 10° Qz VN, PL, SM, Healed. 77.05: JT, 25° Qz VN, PL, SM, Healed. 77.06: JT, 30° Qz VN, PL, SM, Healed.			77.0
								77.2 / 811.8													77.06: JT, 80° Qz VN, PL, SM, Discontinuous, healed. 77.08: JT, 80° Qz VN, PL, SM, Discontinuous, healed. 77.09: JT, 85° Qz CT, PL, SM, 1 mm, Healed. 77.09: JT, 80° Qz VN, PL, SM, Discontinuous, healed.			77.2
								77.4 / 811.6													77.14: JT, 15° Qz VN, PL, SM, Discontinuous, healed. 77.19: JT, 60° Py VN, PL, SM, Healed. 77.34: JT, 40° Qz VN, PL, SM, Healed. 77.46: JT, 40° Qz CT, PL, SM, 1 mm, Healed.			77.4
								77.6 / 811.4													77.53: JT, 10° Qz CT, PL, SM, 1 mm, Healed.			77.6
								77.8 / 811.2																77.8
								78.0													77.90: JT, 85° Qz VN, PL, SM, Healed. 77.95: JT, 45° Qz VN, PL, SM, Healed.		77.90: Point Load >20KN – No Failure	

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Observations and Comments

Notes

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Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R31 3.01m (100%) 100%		78.00 m Is(50) a=5.48		78.0 811.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, minor lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Occasional pyrite nodules and partial to thin veneer on joints. *(continued)*				F *(cont)*	VH - EH *(cont)*	VL -0.1 L -0.3 M -1 H -3 VH -10 EH				77.98: JT, 30° Qz VN, PL, SM, Healed.		PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM	
							78.2 810.8														78.04: JT, 10° Py VN, PL, SM, Healed.			78.2
																					78.05: JT, 15° Qz VN, PL, SM, Healed.			
																					78.06: JT, 85° Qz VN, PL, SM, Healed.			
																					78.08: JT, 15° Qz VN, PL, SM, Healed.			
							78.4 810.6														78.09: JT, 50° Qz VN, PL, SM, Healed.			78.4
																					78.10: JT, 45° Qz VN, PL, SM, Healed.			
																					78.12: JT, 15° Qz VN, PL, SM, Healed.			
																					78.14: JT, 60° Qz VN, PL, SM, Discontinuous, healed.			
																					78.16: JT, 45° Py VN, PL, SM, Healed.			
							78.6 810.4														78.29: JT, 30° Qz VN, PL, SM, Healed.			78.6
																					78.35: JT, 45° Qz VN, PL, SM, Healed.			
																					78.56: JT, 75° Qz VN, PL, SM, Healed.			
			78.78																		78.75: JT, 30° Qz VN, PL, SM, Healed.			
							78.8 810.2														78.76: JT, 40° Qz VN, PL, SM, Healed.			78.8
											78.87 m: Increasing Sandstone Protolith bedding, brown grey, medium to coarse grained										78.81: JT, 60° Qz VN, PL, SM, Healed.			
																					78.89: JT, 25° Py VN, PL, SM			
																					78.92: JT, 30° Qz VN, PL, SM, Healed.			
							79.0 810.0														79.03: JT, 10° Qz CT, PL, SM, 1 mm, Discontinuous, healed.			79.0
																					79.10: JT, 45° Qz VN, PL, SM, Healed.			
																					79.15: JT, 60° Qz VN, PL, SM, Discontinuous, healed.			
							79.2 809.8														79.17: JT, 30° Qz VN, PL, SM, Healed.			79.2
																					79.21: JT, 5° Qz VN, PL, SM, Healed.		79.23: indistinct sub-horizontal bedding	
																					79.31: JT, 65° Qz VN, PL, SM, Healed.			
																					79.32: JT, 15° Qz VN, PL, SM, Healed.			
							79.4 809.6				79.36 m: lithic clasts concentrated in alternating beds, dark grey colour, indistinct sub-horizontal bedding										79.33: JT, 70° Py VN, PL, SM, Healed.			79.4
																					79.38: JT, 70° Py VN, PL, SM, Healed.			
																					79.47: JT, 55° Pl VN, PL, SM, Healed,.			
																					79.47: JT, 55° Qz VN, PL, SM, Trace pyrite, healed.			
							79.6 809.4														79.58: JT, 15° Qz VN, PL, SM, Healed.			79.6
																					79.73: JT, 45° Qz VN, PL, SM, Healed.			
																					79.70-79.78: FO, 55° PL, SM			
							79.8 809.2														79.79: JT, 80° Qz VN, PL, SM, Healed.			79.8
		0 % Loss	R32 2.94m (100%) 100%																				79.90: Point Load >20KN – No Failure	
							80.0																	

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● - Axial ○ - Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R32 2.94m (100%) 100%				80.0 809.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, minor lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Occasional pyrite nodules and partial to thin veneer on joints. *(continued)* 80.08 m: fine grained matrix				F *(cont)*	VH - EH *(cont)*				80.01: JT, 40° Qz VN, PL, SM, Healed. 80.00-80.10: Shear, 55° CN, PL, SM, Healed.		PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM	
							80.2 808.8												80.14: JT, 45° Qz VN, PL, SM, Healed. 80.16: JT, Qz VN, PL, SM, Healed. 80.17: JT, 5° Qz VN, PL, SM, Healed. 80.23: JT, 30° Qz VN, PL, SM, Healed. 80.27: JT, 40° Qz VN, PL, SM, Healed. 80.31: JT, 50° Qz VN, PL, SM, Healed. 80.43: JT, 85° Qz VN, PL, SM, Discontinuous, moderately altered, healed.			80.2
							80.4 808.6															80.4
							80.6 808.4				80.62 m - 81.07 m: Diamictite Protolith, increasing sub-angular clasts up to 30mm								80.68: JT, 30° Qz VN, PL, SM, Moderately altered, healed. 80.69: JT, 85° Qz VN, PL, SM, Moderately altered, healed. 80.70: JT, 30° Qz VN, PL, SM, Moderately altered, healed.			80.6
							80.8 808.2															80.8
							81.0 808.0														80.85: Point Load >20KN – No Failure	81.0
											81.07 m - 81.34 m: Amorphous Silica, hydrothermal vein / intrusion pale grey to blue, very fine grained, irregular contact with alteration halo 8mm on lower contact, dipping at 45 to 60°			DA					81.04: JT, 45° Py VN, PL, SM, Healed.			
							81.2 807.8												81.11: JT, 30° Qz VN, PL, SM, Healed. 81.13: JT, 35° Qz VN, PL, SM, Healed. 81.17: JT, 40° Qz VN, PL, SM, Healed. 81.19: JT, 25° Qz VN, PL, SM, Healed. 81.24: JT, 45° Qz VN, PL, SM, Healed. 81.27: JT, 40° Qz CT, PL, SM, 4 mm, Healed. 81.31: JT, 35° Qz VN, PL, SM, Healed. 81.35: JT, 40° Qz VN, PL, SM, Discontinuous, healed. 81.35: JT, 45° Qz VN, PL, SM, Healed. 81.38: JT, 25° Qz VN, PL, SM, Healed. 81.55: JT, 45° Qz VN, PL, SM, Healed. 81.60: JT, 15° Qz VN, PL, SM, Healed. 81.66: JT, 40° Qz CT, PL, SM, 1 mm, Healed. 81.72: JT, 10° Py VN, PL, SM, Healed. 81.81: JT, 45° Py VN, PL, SM, Healed. 81.84: JT, 45° Qz VN, PL, SM, Healed. 81.89: JT, 30° Qz VN, PL, SM, Healed.		81.14: Point Load >20KN – No Failure	81.2
							81.4 807.6															81.4
							81.6 807.4															81.6
		0 % Loss	81.72 R33 3.06m (100%) 100%				81.8 807.2														81.90: Point Load >20KN – No Failure	81.8
							82.0															

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
							82.0 807.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, minor lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Occasional pyrite nodules and partial to thin veneer on joints. *(continued)*				F *(cont)*	VH - EH *(cont)*	VL -0.1 L -0.3 M -1 H -3 VH -10 EH	0 2 20 200 2000			81.95: JT, 30° Qz VN, PL, SM, Healed. 81.97: JT, 50° Qz VN, PL, SM, Discontinuous, healed. 81.98: JT, 85° Qz VN, PL, SM, Discontinuous, healed. 82.03: JT, 25° Qz VN, PL, SM, Healed. 82.06: JT, 10° Qz VN, PL, SM, Healed. 82.08: JT, 10° Qz VN, PL, SM, Healed. 82.09: JT, 20° Qz VN, PL, SM, Healed. 82.12: JT, 10° Qz VN, PL, SM, Healed. 82.15: JT, 30° Qz VN, PL, SM, Terminates on joint, healed. 82.17: JT, 35° Qz VN, PL, SM, Terminates on joint, healed. 82.18: JT, 20° Qz VN, PL, SM, Terminates on joint, healed. 82.19: JT, 20° Qz VN, PL, SM, Terminates on joint, healed. 82.35: JT, 40° Qz CT, PL, SM, 2 mm, Healed. 82.39: JT, 30° Qz VN, PL, SM, Terminates on joint, healed. 82.40: JT, 30° Qz VN, PL, SM, Terminates on joint, healed. 82.47: JT, 50° Qz VN, PL, SM, Terminates on joint, healed. 82.52: JT, 30° Qz VN, PL, SM, Terminates on joint, healed. 82.54: JT, 25° Qz VN, PL, SM, Healed. 82.68: JT, 50° Qz VN, PL, SM, Healed. 82.95: JT, 80° Qz VN, PL, SM, Healed. 83.04: JT, 25° Py VN, PL, SM, Healed.		PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM 82.90: Point Load >20KN – No Failure	82.2 82.4 82.6 82.8 83.0
	HQ3	0 % Loss	R33 3.06m (100%) 100%				82.2 806.8																
							82.4 806.6																
							82.6 806.4																
							82.8 806.2																
							83.0 806.0																
							83.2 805.8				83.34 m - 83.60 m: increase in quartz porphyroblasts up to 2mm										83.34: JT, 85° Qz VN, PL, SM, Terminates on joint, healed. 83.45: JT, 50° Qz VN, PL, SM, Healed. 83.54: JT, 80° Qz VN, PL, SM, Healed. 83.54: JT, 40° Qz VN, PL, SM, Healed. 83.58: JT, 20° Qz VN, PL, SM, Healed. 83.62: JT, 80° Qz VN, PL, SM, Terminates on joint, healed. 83.68: JT, Qz VN, PL, SM, Healed. 83.80: JT, 5° Qz VN, PL, SM, Healed. 83.82: JT, 5° Qz VN, PL, SM, Healed. 83.83: JT, 5° Qz VN, PL, SM, Healed. 83.84: JT, 45° Qz VN, PL, SM, Healed.		83.90: Point Load >20KN – No Failure	83.4 83.6 83.8
							83.4 805.6																
							83.6 805.4																
							83.8 805.2																
							84.0																

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
							84.0 805.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, minor lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Occasional pyrite nodules and partial to thin veneer on joints. *(continued)*				F *(cont)*	VH - EH *(cont)*	VL -0.1 L -0.3 M -1 H -3 VH -10 EH	0 2 20 200 2000			83.88: JT, 45° Qz VN, PL, SM, Healed. 83.93: JT, 45° Qz VN, PL, SM, Healed. 83.94: JT, 45° Qz VN, PL, SM, Healed. 83.95: JT, 45° Qz VN, PL, SM, Healed. 83.99: JT, 20° Qz VN, PL, SM, Healed.		PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM	
							84.2 804.8																	84.2
							84.4 804.6																	84.4
							84.6 804.4																	84.6
							84.8 804.2																	84.8
							85.0 804.0				85.00 m - 85.51 m: sub-vertical alteration veins										84.91: JT, 85° Qz VN, PL, SM, Terminates on joint, healed.		85.00-91.00: Flasar bedding structures in protolith rocks producing textured surface on HQ core	85.0
							85.2 803.8				85.18 m - 90.86 m: thinly to thickly bedded Siltstone and Sandstone Protolith beds, spaced 10-600mm appart displaying flasar bedding structure										85.18: JT, 87° Qz VN, PL, SM, Terminates on joint, healed.			85.2
							85.4 803.6									H					85.30: JT, 85° Qz VN, PL, SM, Terminates on joint, healed. 85.32: JT, 85° Qz VN, PL, SM, Terminates on joint, healed. 85.36: JT, 85° Qz VN, PL, SM, Terminates on joint, healed.			85.4
							85.6 803.4																	85.6
							85.8 803.2														85.74: JT, 50° Qz VN, PL, SM, Healed.			85.8
							86.0									VH - EH							85.84: Point Load >20KN – No Failure	
HQ3		0 % Loss	R33 3.06m (100%) 100%																					
			84.78		84.78 m Is(50) d=0.8																			
		0 % Loss	R34 2.98m (100%) 100%																					

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● Axial ○ Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R34 2.98m (100%) 100%				86.0 803.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, minor lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Occasional pyrite nodules and partial to thin veneer on joints. *(continued)*				F *(cont)*	VH - EH *(cont)*	VL –0.1 L –0.3 M –1 H –3 VH –10 EH	0	2 20 200 2000		86.01: JT, 40° Qz VN, PL, SM, Healed.		PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM	
							86.2 802.8									H				86.14: JT, 30° Qz VN, PL, SM, Healed. 86.15: JT, 45° Qz VN, PL, SM, Healed.			86.2
							86.4 802.6													86.34: JT, Qz VN, PL, SM, Healed.			86.4
							86.6 802.4													86.43: JT, 80° Qz VN, PL, SM, Healed. 86.45: JT, 80° Qz VN, PL, SM, Healed.			86.6
							86.8 802.2															86.80: Point Load >20KN – No Failure	86.8
							87.0 802.0																87.0
							87.2 801.8													87.15: Point Load >20KN – No Failure 87.26: JT, 20° Py VN, PL, SM, Healed.			87.2
							87.4 801.6													87.42: JT, 15° Qz VN, PL, SM, Healed. 87.50: JT, 80° Qz VN, PL, SM, Healed.			87.4
							87.6 801.4																87.6
		0 % Loss	87.76				87.8 801.2									VH - EH				87.70: JT, 45° Qz VN, PL, SM, Healed.			87.8
							88.0													87.98: JT, 85° Qz VN, PL, SM,			

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
							88.0 801.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, minor lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Occasional pyrite nodules and partial to thin veneer on joints. *(continued)*				F *(cont)*	VH - EH *(cont)*	VL -0.1 L -0.3 M -1 H -3 VH -10 EH		0 2 20 200 2000		Healed.		PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM	
																					88.12: JT, 55° Qz VN, PL, SM, Healed. 88.15: JT, 55° Qz VN, PL, SM, Healed.			
							88.2 800.8																	88.2
							88.4 800.6																	88.4
											88.52 m - 88.81 m:Amorphous Silica, hydrothermal vein / intrusion pale grey to blue, very fine grained, irregular contact with alteration halo 4mm, dipping at 45 to 60°										88.39-88.59: BD, 65° Qz VN, PL, RO, Healed. 88.54: JT, 30° Qz VN, PL, SM, Healed.			
							88.6 800.4																	88.6
																					88.60-88.84: BD, 75° Qz VN, PL, SM, Healed. 88.62-88.86: BD, 75° Qz VN, PL, SM, Healed. 88.78: JT, 30° Qz VN, PL, SM, Healed.			
							88.8 800.2																88.80: Point Load >20KN – No Failure	88.8
											88.88 m - 89.96 m: irregular Alteration Veins, 2mm appature, sub-horizontal to sub-vertical													
							89.0 800.0														88.99: JT, 85° Qz CT, CR, SM, 1 mm, Healed.			89.0
																					89.12: JT, 50° Qz VN, PL, SM, Healed. 89.03-89.24: Shear, 75° HE, PL, RO, 2 mm displacement.			
							89.2 799.8																	89.2
							89.4 799.6																	89.4
																					89.49: JT, 15° Qz VN, PL, SM, Healed. 89.51: JT, 40° Qz VN, PL, SM, Healed. 89.55: JT, 80° Qz CT, IR, SM, 1 mm, Healed.			
							89.6 799.4																89.58: Point Load >20KN – No Failure	89.6
							89.8 799.2														89.79: JT, 87° Qz VN, PL, SM, Healed. 89.82: JT, 45° Qz VN, PL, SM, Healed. 89.81-89.85: Shear, 40° HE, PL, RO, 5 mm displacement. 89.84: JT, 45° Qz VN, PL, SM, Healed.			89.8
							90.0																	

HQ3

0 % Loss

R35 3.02m (100%) 100%

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● Axial ○ Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R35 3.02m (100%) 100%		90.58 m Is(50) d=3.79		90.0 / 799.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, minor lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Occasional pyrite nodules and partial to thin veneer on joints. *(continued)*				F *(cont)*	H					89.92: JT, 60° Qz VN, PL, SM, Healed. 89.78-90.20: Shear, 80° Qz VN, PL, RO, 2 mm displacement, healed. 90.05: JT, 87° Qz VN, PL, SM, Healed.		PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM	
							90.2 / 798.8									VH - EH					90.24: JT, 70° Py VN, PL, SM, Healed.			90.2
							90.4 / 798.6														90.32: JT, 45° Qz VN, PL, SM, Healed.			90.4
							90.6 / 798.4											O			90.56: JT, 20° Qz VN, PL, SM, Healed. 90.65: JT, 70° Qz VN, PL, SM, Healed.			90.6
			90.78				90.8 / 798.2				90.86m: Mudstone & Siltstone with Sandstone beds Protolith													90.8
							91.0 / 798.0														90.90: JT, 30° Py VN, PL, SM, Healed. 90.92: JT, 85° Qz VN, PL, SM, Healed. 90.96: JT, 35° Py VN, PL, SM, Healed. 91.06: JT, 40° Qz VN, PL, SM, Healed.			91.0
		0 % Loss	R36 2.99m (100%) 100%				91.2 / 797.8																	91.2
							91.4 / 797.6				91.38 m - 92.98 m: increased lithic clasts up to 20%										91.39: JT, 45° Qz VN, PL, SM, Healed. 91.50: JT, 10° Qz VN, PL, SM, Healed.			91.4
							91.6 / 797.4																91.69: Point Load >20KN – No Failure	91.6
							91.8 / 797.2														91.76: JT, 15° Qz VN, PL, SM, Healed.			91.8
							92.0														91.95: JT, 85° Qz VN, PL, SM, Healed.			

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R36 2.99m (100%) 100%				92.0 797.0				HORNFELS: grey to dark grey with brown colour. Indistinct sub-horizontal bedding, minor lineation at 60 - 70°. Heat affected contact metamorphism. Diamictite, Siltstone, Mudstone and tuffaceous Sandstone and Claystone protolith. Occasional pyrite nodules and partial to thin veneer on joints. *(continued)*				F *(cont)*	H	VL –0.1 L –0.3 M –1 H –3 VH –10 EH	0 2 20 200 2000		92.00: JT, 40° Qz CT, PL, SM, 1 mm, Healed.		PARRABEL BEDS - HEAT AFFECTED CONTACT METAMORPHISM	
							92.2 796.8													92.09: JT, 20° Py VN, PL, SM, Healed. 92.12: JT, 30° Qz CT, PL, SM, 1 mm, Healed.			92.2
							92.4 796.6				92.34 m: increasing thin Sandstone Protolith beds									92.36: JT, 30° Qz CT, PL, SM, 1 mm, Healed. 92.42: JT, 40° Qz CT, PL, SM, 1 mm, Terminates on joint, healed.			92.4
							92.6 796.4									VH - EH				92.56: JT, 30° Qz VN, PL, SM, Healed.			92.6
							92.8 796.2													92.81: JT, 30° Qz VN, PL, SM, Healed.			92.8
							93.0 796.0				93.07 m - 93.19 m: with Ripup Clasts up to 5 mm									92.91: JT, 10° Py VN, PL, SM, Healed.		92.90: Point Load >20KN – No Failure	93.0
							93.2 795.8													93.18: JT, 35° Qz VN, PL, SM, Healed. 93.19: JT, 35° Qz VN, PL, SM, Healed. 93.20-93.21: VE, 5° Qz CT, PL, SM, 6 mm, Healed. 93.32: JT, 35° Qz VN, PL, SM, Healed. 93.33: JT, 65° Py VN, PL, SM, Healed. 93.39: JT, 80° Qz VN, PL, SM, Discontinuous, healed. 93.41: JT, 5° Qz VN, PL, SM, Healed. 93.53: JT, 25° Qz VN, PL, SM, Healed.			93.2
							93.4 795.6																93.4
										93.54 795.46	GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. 93.54 m - 100.43 m: equiangular, with some feldspar crystals up to 8mm 93.64 m - 93.95 m: mafic layering											IGNEOUS ROCK - CARRAI ADAMELLITE 93.54: IGNEOUS CONTACT, sharp, planar, dipping 60°	93.6
							93.6 795.4																
							93.8 795.2															93.78: Point Load >20KN – No Failure 93.90: Point Load >20KN – No Failure	93.8
		100 % Loss	93.77				94.0																

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		100 % Loss	R37 2.85m (100%) 96%				94.0 / 795.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH - EH *(cont)*					94.05: JT, 50° Py VN, PL, RO		IGNEOUS ROCK - CARRAI ADAMELLITE	
											94.13 m - 94.28 m: mafic layering										94.15: JT, 55° Py VN, PL, RO			94.2
							94.2 / 794.8																	94.4
							94.4 / 794.6														94.52: JT, 85° Py VN, PL, RO			
							94.6 / 794.4																	94.6
							94.8 / 794.2																	94.8
							95.0 / 794.0																94.90: Point Load >20KN – No Failure	95.0
							95.2 / 793.8																	95.2
							95.4 / 793.6																	95.4
							95.6 / 793.4														95.72: JT, 80° CN, PL, RO			95.6
							95.8 / 793.2														95.82: JT, 80° CN, PL, RO			95.8
							96.0																	

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) *Elevation*	Graphic Log	Soil Code	*Depth* RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● Axial ○ Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		100 % Loss	R37 2.85m (100%) 96%				96.0 793.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH - EH *(cont)*	VL 0.1 L 0.3 M 1 H 3 VH 10 EH	0 2 20 200 2000				IGNEOUS ROCK - CARRAI ADAMELLITE	96.2
							96.2 792.8																	96.4
							96.4 792.6															96.40: Point Load >20KN – No Failure		
							96.6 792.4																	96.6
							96.8 792.2																	96.8
							97.0 792.0																	97.0
							97.2 791.8																	97.2
		100 % Loss	R38 3.07m (100%) 99%				97.4 791.6																	97.4
							97.6 791.4																	97.6
							97.8 791.2														97.85: JT, 20° CN, PL, RO 97.87: JT, 20° CN, PL, RO			97.8
							98.0																	

96.62

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Observations and Comments

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SMEC 2.10.10 LIB.GLB Log _SMEC HYBRID BOREHOLE LANDSCAPE 30018018 OVEN MOUNTAIN.GPJ <<DrawingFile>> 28/01/2022 12:34 10.02.00.04 Datgel Tools | Lib: SMEC 2.10.9 2021-08-30 Prj: SMEC 2.10.9 2021-08-30

Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● Axial ○ Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		100 % Loss	R38 3.07m (100%) 99%				98.0 791.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH - EH *(cont)*	VL -0.1 L -0.3 M -1 H -3 VH -10 EH		0 2 20 200 2000		98.11: JT, 88° CN, CR, RO		IGNEOUS ROCK - CARRAI ADAMELLITE	
							98.2 790.8																	98.2
							98.4 790.6																	98.4
							98.6 790.4																	98.6
							98.8 790.2																	98.8
							99.0 790.0				99.14 m - 99.27 m: grey to green, minor chlorite										99.19: JT, 10° Qz VN, PL, RO, Trace pyrite.			99.0
							99.2 789.8																	99.2
							99.4 789.6																	99.4
							99.6 789.4																	99.6
		0 % Loss	R39 2.89m (100%) 100%				99.8 789.2				99.88 m - 100.20 m: grey to green, minor chlorite										99.89: JT, 25° Qz VN, PL, RO, Healed. 99.89: JT, 20° Qz VN, PL, RO, Healed. 99.91: JT, Qz VN, CR, RO, 10 -		99.69: Borehole grouted to stop water loss 99.69: Point Load >20KN – No Failure	99.8
		99.69					100.0																	

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Observations and Comments

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SMEC 2.10.10 UB.GLB Log _SMEC HYBRID BOREHOLE LANDSCAPE 30018018 OVEN MOUNTAIN.GPJ <<DrawingFile>> 28/01/2022 12:34 10.02.00.04 Datgel Tools | Lib: SMEC 2.10.9 2021-08-30 Prj: SMEC 2.10.9 2021-08-30

Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R39 2.89m (100%) 100%				100.0 / 789.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH - EH *(cont)*					30°, healed, discontinuous.		IGNEOUS ROCK - CARRAI ADAMELLITE	
							100.2 / 788.8																	100.2
							100.4 / 788.6																	100.4
							100.6 / 788.4																	100.6
							100.8 / 788.2																	100.8
							101.0 / 788.0																	101.0
							101.2 / 787.8																	101.2
							101.4 / 787.6																	101.4
							101.6 / 787.4																	101.6
							101.8 / 787.2																	101.8
							102.0																	

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Observations and Comments

Notes

Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted.
Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
For Inclined Holes: Angles reported in defects are apparent dip from core horizontal unless as α or β.
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R39 2.89m (100%) 100%				102.0 787.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH - EH *(cont)*	VL -0.1 L -0.3 M -1 H -3 VH -10 EH	0 2 20 200 2000					IGNEOUS ROCK - CARRAI ADAMELLITE	
							102.2 786.8																	102.2
							102.4 786.6																	102.4
			102.58				102.6 786.4																102.58: Point Load >20KN – No Failure	102.6
							102.8 786.2														102.74: JT, 25° Qz VN, PL, RO, Healed. 102.74: JT, 20° Qz VN, PL, RO, Healed.			102.8
							103.0 786.0																	103.0
		0 % Loss	R40 3.07m (100%) 100%				103.2 785.8																	103.2
							103.4 785.6																	103.4
							103.6 785.4																	103.6
							103.8 785.2				103.92 m: slightly porphyritic feldspar crystals up to 30mm													103.8
							104.0																	

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) *Elevation*	Graphic Log	Soil Code	*Depth* RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
	HQ3	0 % Loss	R40 3.07m (100%) 100%				104.0 *785.0*				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH - EH *(cont)*	VL –0.1 L –0.3 M –1 H –3 VH –10 EH	0	0 2 20 200 2000				IGNEOUS ROCK - CARRAI ADAMELLITE	104.2
							104.2 *784.8*																	104.4
							104.4 *784.6*																	104.6
							104.6 *784.4*																	104.8
							104.8 *784.2*																	105.0
							105.0 *784.0*																	105.2
							105.2 *783.8*																	105.4
							105.4 *783.6*																	105.6
		105.65					105.6 *783.4*																105.65: Point Load >20KN – No Failure	
		0 % Loss	R41 3.04m (100%) 100%				105.8 *783.2*																	105.8
							106.0																	

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R41 3.04m (100%) 100%				106.0 783.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH - EH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
											106.12 m: increasing porphyritic texture, feldspar crystals up to 30mm												106.2
							106.2 782.8																106.4
							106.4 782.6																106.6
							106.6 782.4													106.65: JT, 0° HE, PL, RO			
																				106.72: JT, 0° HE, PL, RO			106.8
							106.8 782.2													106.88: JT, 10° VN, PL, RO, Mineral unknown, silver colour, soft <3 mohs.			
							107.0 782.0																107.0
							107.2 781.8																107.2
							107.4 781.6																107.4
							107.6 781.4													107.61: JT, 35° Qz CT, PL, RO, 1 mm 107.62: JT, 25° Py VN, PL, RO, Healed.		107.63: Point Load >20KN – No Failure	107.6
							107.8 781.2													107.88: JT, 45° HE, PL, RO			107.8
							108.0																

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● Axial ○ Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R41 3.04m (100%) 100%		108.30 m Is(50) d=4.81		108.0 781.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH - EH *(cont)*	VL -0.1 L -0.3 M -1 H -3 VH -10 EH	0 2 20 200 2000			108.12: JT, 25° Qz VN, PL, RO, Healed. 108.13: JT, 25° Qz VN, PL, RO, Healed.		IGNEOUS ROCK - CARRAI ADAMELLITE	
							108.2 780.8																	108.2
																				108.30: JT, 25° HE, PL, RO		108.30: Point Load >20KN – No Failure	
							108.4 780.6																108.43: horizontal fractures, discing of core, drill breaks due to worn bit	108.4
							108.6 780.4																	108.6
		108.69					108.8 780.2																	108.8
							109.0 780.0																109.00: Point Load >20KN – No Failure	109.0
		0 % Loss	R42 2.26m (100%) 100%				109.2 779.8																	109.2
							109.4 779.6																	109.4
							109.6 779.4																	109.6
							109.8 779.2				109.84 m - 111.23 m: thin mafic igneous layering, fine to medium grained, spaced 100-600mm, slight chlorite alteration													109.8
							110.0																	

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Observations and Comments

Notes

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For Inclined Holes: Angles reported in defects are apparent dip from core horizontal unless as α or β.
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● Axial ○ Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R42 2.26m (100%) 100%		110.03 m Is(50) d=4.19		110.0 / 779.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH - EH *(cont)*	VL -0.1, L -0.3, M -1, H -3, VH -10, EH; ○	0, 2, 20, 200, 2000		110.12: JT, 0° Qz VN, PL, RO, Healed. 110.13: JT, 0° Qz VN, PL, RO, Healed.		IGNEOUS ROCK - CARRAI ADAMELLITE 110.03: Point Load >20KN – No Failure	
							110.2 / 778.8																110.2
							110.4 / 778.6													110.33: JT, 0° Qz VN, PL, RO, Healed. 110.38: JT, 0° Qz VN, PL, RO, Healed. 110.40: JT, 0° Qz VN, PL, RO, Healed. 110.43: JT, 0° Qz VN, PL, RO, Healed. 110.46: JT, 0° Qz VN, PL, RO, Healed. 110.55: JT, 0° Qz VN, PL, RO, Healed. 110.57: JT, 0° Qz VN, PL, RO, Healed.			110.4
							110.6 / 778.4				110.56 m:becoming dark grey with green												110.6
							110.8 / 778.2													110.77: JT, 0° Qz VN, PL, RO, Healed. 110.80: JT, 0° Qz VN, PL, RO, Healed.				110.8
			110.95				111.0 / 778.0															111.00: Point Load >20KN – No Failure	111.0
		0 % Loss	R43 0.82m (100%) 100%				111.2 / 777.8				111.24 m: increasing porphyritic texture, feldspar crystals up to 20mm												111.2
							111.4 / 777.6																111.4
							111.6 / 777.4																111.6
		0 % Loss	111.77				111.8 / 777.2																111.8
							112.0																

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● Axial ○ Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R44 2.93m (100%) 100%				112.0 / 777.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH - EH *(cont)*	VL -0.1, L -0.3, M -1, H -3, VH -10, EH	0	2, 20, 200, 2000				IGNEOUS ROCK - CARRAI ADAMELLITE	
							112.2 / 776.8																112.2
							112.4 / 776.6																112.4
							112.6 / 776.4																112.6
							112.8 / 776.2																112.8
							113.0 / 776.0														113.09: JT, 89° HE, PL, RO		113.0
							113.2 / 775.8				113.25 m: Plagioclase feldspar crystal 40mm												113.2
							113.4 / 775.6																113.4
							113.6 / 775.4																113.6
							113.8 / 775.2																113.8
							114.0																

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing	Support	Water	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● - Axial ○ - Diametral	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
	HQ3		0 % Loss				114.0 / 775.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH - EH *(cont)*	VL –0.1, L –0.3, M –1, H –3, VH –10, EH	0	2, 20, 200, 2000				IGNEOUS ROCK - CARRAI ADAMELLITE	
							114.2 / 774.8																	114.2
							114.4 / 774.6																	114.4
							114.6 / 774.4																	114.6
							114.8 / 774.2																114.82: Point Load >20KN – No Failure	114.8
							115.0 / 774.0				115.00 m - 127.78 m: porphyritic with feldspar crystals up to 35mm													115.0
							115.2 / 773.8																	115.2
			5 % Loss				115.4 / 773.6																	115.4
							115.6 / 773.4																	115.6
							115.8 / 773.2																	115.8
							116.0																	

114.70

R44 2.93m (100%) 100%

R45 3.01m (100%) 100%

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		5 % Loss	R45 3.01m (100%) 100%				116.0 / 773.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH - EH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	116.2
							116.2 / 772.8																116.4
							116.4 / 772.6																116.6
							116.6 / 772.4																116.8
							116.8 / 772.2															116.90: Point Load >20KN – No Failure	
							117.0 / 772.0																117.0
							117.2 / 771.8																117.2
							117.4 / 771.6																117.4
							117.6 / 771.4																117.6
		0 % Loss	R46 3.00m (100%) 100%				117.71													117.92: JT, 89° HE, PL, RO		117.90: Point Load >20KN – No Failure	
							117.8 / 771.2																117.8
							118.0																

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Observations and Comments

Notes

Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted.
Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
For Inclined Holes: Angles reported in defects are apparent dip from core horizontal unless as α or β.
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● Axial ○ Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R46 3.00m (100%) 100%				118.0 / 771.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH - EH *(cont)*	VL –0.1, L –0.3, M –1, H –3, VH –10, EH	0	2, 20, 200, 2000		119.07: JT, 65° HE, PL, RO		IGNEOUS ROCK - CARRAI ADAMELLITE	
							118.2 / 770.8																118.2
							118.4 / 770.6																118.4
							118.6 / 770.4																118.6
							118.8 / 770.2																118.8
							119.0 / 770.0																119.0
							119.2 / 769.8																119.2
							119.4 / 769.6																119.4
							119.6 / 769.4																119.6
							119.8 / 769.2																119.8
							120.0																

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing	Support	Water	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3			0 % Loss	R46 3.00m (100%) 100%				120.0 / 769.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH - EH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
								120.2 / 768.8																120.2
																					120.34: JT, 45° HE, PL, RO			
								120.4 / 768.6																120.4
								120.6 / 768.4																120.6
				120.71																			120.71: Point Load >20KN – No Failure	
								120.8 / 768.2																120.8
								121.0 / 768.0																121.0
												121.20 m: increasing abundance of larger feldspar crystals up to 40mm in size												
								121.2 / 767.8																121.2
			0 % Loss	R47 3.00m (100%) 100%				121.4 / 767.6																121.4
																					121.57: JT, 30° HE, PL, RO			
								121.6 / 767.4																121.6
								121.8 / 767.2																121.8
								122.0																

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R47 3.00m (100%) 100%				122.0 / 767.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH - EH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
							122.2 / 766.8																122.2
							122.4 / 766.6																122.4
							122.6 / 766.4													122.55: JT, 85° HE, PL, RO, Discontinuous.			122.6
							122.8 / 766.2																122.8
							123.0 / 766.0																123.0
							123.2 / 765.8																123.2
							123.4 / 765.6																123.4
							123.6 / 765.4																123.6
		0 % Loss	R48 3.00m (100%) 100%				123.71															123.70: Point Load >20KN – No Failure	
							123.8 / 765.2																123.8
							124.0																

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Observations and Comments

Notes

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Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) *Elevation*	Graphic Log	Soil Code	*Depth* RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● Axial ○ Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
							124.0 765.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH - EH *(cont)*	VL -0.1 L -0.3 M -1 H -3 VH -10 EH	0	0 2 20 200 2000		125.55: JT, 20° HE, PL, RO 125.56: JT, 20° HE, PL, RO		IGNEOUS ROCK - CARRAI ADAMELLITE	
							124.2 764.8																	124.2
							124.4 764.6																	124.4
							124.6 764.4																	124.6
							124.8 764.2																	124.8
	HQ3	0 % Loss	R48 3.00m (100%) 100%				125.0 764.0																124.90: Point Load >20KN – No Failure	125.0
							125.2 763.8																	125.2
							125.4 763.6																	125.4
							125.6 763.4																	125.6
							125.8 763.2																	125.8
							126.0																125.90: Point Load >20KN – No Failure	

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition / Consistency / Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● Axial ○ Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R48 3.00m (100%) 100%				126.0 / 763.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*			F *(cont)*	VH - EH *(cont)*	VL -0.1, L -0.3, M -1, H -3, VH -10, EH	0, 2, 20, 200, 2000					IGNEOUS ROCK - CARRAI ADAMELLITE	
							126.2 / 762.8				126.00 m: increasing abundance of larger feldspar crystals up to 40mm												126.2
							126.4 / 762.6																126.4
							126.6 / 762.4													126.68: JT, 25° HE, PL, RO			126.6
		126.71																					
							126.8 / 762.2															126.90: Point Load >20KN – No Failure	126.8
							127.0 / 762.0																127.0
		0 % Loss	R49 2.98m (100%) 100%				127.2 / 761.8																127.2
							127.4 / 761.6													127.53: JT, 35° HE, PL, RO			127.4
							127.6 / 761.4																127.6
							127.8 / 761.2				127.79 m: upper contact of mafic igneous layer 127.79 m - 127.82 m: chill margin, dark grey, very fine grained mafic crystals									127.79: CX, HE, UN, RO, 0 - 10°, granodiorite and siltstone xenolith. 127.81: JT, 15° HE, PL, SM 127.83: CX, HE, UN, RO, 0 - 5°, granodiorite and siltstone xenolith. 127.84: JT, 15° Qz VN, PL, SM,		127.90: Point Load >20KN – No Failure	127.8
							128.0																

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Observations and Comments

Notes
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Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
							128.0 761.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)* 128.00 m- 128.48 m: becoming porporitic, feldspar crystals up to 15mm in a mafic groundmass				F *(cont)*	VH - EH *(cont)*	VL -0.1 L -0.3 M -1 H -3 VH -10 EH	0 2 20 200 2000			Healed. 127.87: JT, 15° Qz VN, PL, SM, Healed. 127.88: JT, 15° Qz VN, PL, SM, Healed. 127.93: JT, 15° Qz VN, PL, SM, Healed. 127.95: JT, 15° Qz VN, UN, SM, Healed. 128.01: JT, 15° HE, PL, RO 128.02: JT, 30° HE, PL, RO 128.07: JT, 15° HE, PL, RO 128.08: JT, 15° HE, PL, RO 128.11: JT, 30° HE, PL, RO 128.16: JT, 50° HE, PL, RO 128.17: JT, 30° HE, PL, RO, Terminates on joint. 128.19: JT, 50° HE, PL, RO 128.22: JT, 50° HE, PL, RO 128.22: JT, 15° HE, PL, RO 128.25: JT, 30° HE, PL, RO 128.30: JT, 45° HE, PL, RO, MA. 128.34: JT, 15° HE, PL, RO		IGNEOUS ROCK - CARRAI ADAMELLITE	
							128.2 760.8																	128.2
							128.4 760.6				128.49 - 128.77 m: chill margin, fine grained mafic groundmass with some feldspar crystals up to 10mm													128.4
							128.6 760.4																	128.6
							128.8 760.2														128.75: JT, 30° HE, PL, RO			128.8
	HQ3	0 % Loss	R49 2.98m (100%) 100%				129.0 760.0																128.88: Point Load >20KN – No Failure	129.0
							129.2 759.8				129.16 m: becoming darker grey, porphoritic with feldspar crystals up to 10mm and mafic crystals up to 20mm													129.2
							129.4 759.6																	129.4
							129.6 759.4																	129.6
		0 % Loss	R50 2.98m (100%) 100%				129.8 759.2																129.90: Point Load >20KN – No Failure	129.8
			129.69				130.0																	

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing	Support	Water	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● Axial ○ Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3			0 % Loss				130.0 / 759.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)* 130.00 m - 130.26 m: chill margin of mafic layering mafic groundmass with coarse grained, 2 to 25 mm, feldspar, quartz, hornblende, biotite up to 20mm				F *(cont)*	VH - EH *(cont)*	VL -0.1, L -0.3, M -1, H -3, VH -10, EH						IGNEOUS ROCK - CARRAI ADAMELLITE	
							130.2 / 758.8				130.26 m: basal contact of mafic layering 130.27 m: porphyritic texture, feldspar crystals up to 30mm													130.2
							130.4 / 758.6																	130.4
							130.6 / 758.4														130.53: JT, 45° HE, PL, RO			130.6
							130.8 / 758.2				130.70 m - 130.79 m: mafic igneous layering, dipping at 60°										130.69-130.83: VE, 40° CT, PL, SM, Unknown black mineral, healed. 130.83: JT, 35° Qz VN, PL, RO, Healed. 130.84: JT, 75° Qz VN, PL, RO, Discontinuous, healed. 130.88: JT, 25° HE, PL, RO 130.89: JT, 25° HE, PL, RO 130.89: JT, 30° CT, PL, RO, 1 mm, Unknown black mineral, healed.		130.90: Point Load >20KN – No Failure	130.8
							131.0 / 758.0														130.94: JT, 40° HE, PL, RO 130.94: JT, 15° CT, PL, RO, 2 mm, Unknown black mineral, healed.			131.0
							131.2 / 757.8														130.95: JT, 15° CT, PL, RO, 2 mm, Unknown black mineral, healed.			131.2
							131.4 / 757.6																	131.4
							131.6 / 757.4																	131.6
							131.8 / 757.2																	131.8
							132.0																131.90: Point Load >20KN – No Failure	

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Observations and Comments

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Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted.
Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R50 2.98m (100%) 100%				132.0 / 757.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH - EH *(cont)*					132.03: JT, 10° HE, PL, RO		IGNEOUS ROCK - CARRAI ADAMELLITE	
																					132.11: JT, 20° HE, PL, RO			
							132.2 / 756.8				132.20 m: mafic veins, irregular, subhorizontal										132.19-132.24: VE, 40° CT, PL, SM, Unknown black mineral, healed.			132.2
																					132.25: JT, 20° HE, PL, RO			
																					132.27-132.29: VE, 20° CT, PL, SM, Unknown black mineral, healed.			
							132.4 / 756.6																	132.4
		132.67																						
							132.6 / 756.4														132.66: JT, 25° Qz CT, PL, SM, 2 mm, Healed.			132.6
																					132.74: JT, 20° Qz VN, PL, RO, Healed.			
							132.8 / 756.2																	132.8
																VH					132.91: JT, 20° Qz VN, PL, RO, Healed.			
																					132.95: JT, 88° Qz VN, PL, RO, Discontinuous, healed.			
							133.0 / 756.0																	133.0
											133.22 m: mafic veins, irregular, subhorizontal to subvertical										133.15-133.19: VE, 30° HE, UN, SM			
																					133.18-133.24: VE, 40° HE, UN, SM			
							133.2 / 755.8														133.24-133.29: VE, 40° HE, UN, SM			133.2
		0 % Loss	R51 3.01m (100%) 100%																					
							133.4 / 755.6																	133.4
							133.6 / 755.4														133.73: JT, 30° HE, PL, RO			133.6
							133.8 / 755.2																	133.8
							134.0																	

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing	Support	Water	(Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
									134.0 755.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*	VL -0.1 L -0.3 M -1 H -3 VH -10 EH	0 2 20 200 2000					IGNEOUS ROCK - CARRAI ADAMELLITE	
																						134.19: JT, 50° HE, PL, RO			
									134.2 754.8																	134.2
																						134.24: JT, 50° HE, PL, RO 134.25: JT, 50° HE, PL, RO 134.28: JT, 0° HE, PL, RO 134.30-134.31: VE, 5° HE, UN, SM 134.34: JT, 50° HE, PL, RO, 50			
									134.4 754.6													134.39: JT, 35° Py HE, PL, RO			134.4
																								134.53: Point Load >20KN – No Failure	
									134.6 754.4													134.61: JT, 35° Py HE, PL, RO			134.6
																						134.68: JT, 15° HE, PL, RO 134.70: JT, 5° HE, PL, RO 134.74: JT, 25° HE, PL, RO 134.76: JT, 30° HE, PL, RO			
									134.8 754.2																	134.8
																						134.86: JT, 50° HE, PL, RO 134.88: JT, 50° HE, PL, RO 134.91: JT, 40° HE, PL, RO			
									135.0 754.0																	135.0
																						135.03: JT, 30° HE, PL, RO 135.04: JT, 30° HE, PL, RO			
									135.2 753.8													135.19: JT, 40° HE, PL, RO 135.21: JT, 40° HE, PL, RO, Terminates on joint. 135.23: JT, 10° HE, PL, RO, Terminates on joint. 135.23: JT, 5° HE, PL, RO 135.25: JT, 40° HE, PL, RO, Terminates on joint, x 8. 135.28: JT, 10° HE, PL, RO 135.29: JT, 25° HE, PL, RO, X 6. 135.34: JT, 25° HE, PL, RO 135.38: JT, 25° HE, PL, RO 135.40: JT, 20° Qz HE, PL, RO 135.46: JT, 20° Qz HE, PL, RO 135.49: JT, 20° Qz HE, PL, RO		135.30: Point Load >20KN – No Failure	135.2
									135.4 753.6				135.71 m to 135.74 m: mafic lenses, irregular, subhorizontal 135.75 m: becoming lighter grey and less mafic													135.4
									135.6 753.4													135.63: JT, 20° Qz HE, PL, RO 135.64: JT, 20° Qz HE, PL, RO 135.66: JT, 20° Qz HE, PL, RO 135.67: JT, 20° Qz HE, PL, RO 135.69: JT, 20° Qz HE, PL, RO 135.70: JT, 20° Qz HE, PL, RO 135.73: JT, 40° Um HE, PL, RO, 5 - 20 mm, x5. 135.80: JT, 15° Ca HE, PL, RO			135.6
									135.8 753.2																	135.8
																						135.91: JT, 40° Qz HE, PL, RO, 2 mm, Discontinuous. 135.94: JT, 10° Ca HE, PL, RO 135.95: JT, 10° Ca HE, PL, RO			
	HQ3			0 % Loss	R51 3.01m (100%) 100%																					
				100 % Loss	135.68 R52 1.02m (100%) 100%				136.0																	

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		100 % Loss	R52 1.02m (100%) 100%				136.0 / 753.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*					136.06: JT, 20° Qz HE, PL, RO, 2 mm 136.07-136.09: Shear, 15° Silt VN, PL, SL, 100% waterloss.		IGNEOUS ROCK - CARRAI ADAMELLITE 136.00: Point Load >20KN – No Failure 136.07-136.66: 100% water loss on joint. Borehole grouted	
							136.2 / 752.8																136.2
							136.4 / 752.6																136.4
							136.6 / 752.4														136.58: JT, 65° HE, PL, RO 136.59: JT, 65° Ca, PL, RO, Quartz, 100% waterloss.			136.6
		5 % Loss	R53 0.23m (100%) 100%	C			136.70 136.8 / 752.2																136.8
							136.93 137.0 / 752.0															137.00: Point Load >20KN – No Failure	137.0
		10 % Loss	R54 1.47m (100%) 100%	C			137.2 / 751.8				137.36 m - 137.59 m: increasing mafic groundmass igneous layering												137.2
							137.4 / 751.6																137.4
							137.6 / 751.4				137.59 m - 137.70 m: fine grained chill margin												137.6
							137.8 / 751.2																137.8
							138.0																

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss	R54 1.47m (100%) 100%	C			138.0 751.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)* 138.00 m: becoming less porphyritic with finer felsic phenocrysts				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
							138.2 750.8																138.2
							138.4 750.6																138.4
		10 % Loss	R55 2.76m (100%) 100%	C			138.6 750.4																138.6
							138.8 750.2																138.8
							139.0 750.0																139.0
							139.2 749.8																139.2
							139.4 749.6																139.4
							139.6 749.4																139.6
							139.8 749.2																139.8
							140.0																

138.40

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss	R55 2.76m (100%) 100%	C			140.0 749.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
							140.2 748.8				140.18 m: becoming equigranular												140.2
							140.4 748.6																140.4
							140.6 748.4																140.6
							140.8 748.2																140.8
							141.0 748.0															141.00: Point Load >20KN – No Failure	141.0
		141.16					141.2 747.8																141.2
							141.4 747.6																141.4
		10 % Loss	R56 3.09m (100%) 100%	C			141.6 747.4																141.6
							141.8 747.2																141.8
							142.0																

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) (Axial / Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss	R56 3.09m (100%) 100%	C			142.0 / 747.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*	VL 0.1, L 0.3, M 1, H 3, VH 10, EH	0, 2, 20, 200, 2000					IGNEOUS ROCK - CARRAI ADAMELLITE	
							142.2 / 746.8																	142.2
							142.4 / 746.6																	142.4
							142.6 / 746.4																	142.6
							142.8 / 746.2																	142.8
							143.0 / 746.0																142.89: Point Load >20KN – No Failure	143.0
							143.2 / 745.8																	143.2
							143.4 / 745.6				143.36 m - 143.62 m: mafic igneous layering, subhorizontal													143.4
							143.6 / 745.4																	143.6
							143.8 / 745.2				143.85 m: becoming less mafic													143.8
							144.0																	

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss	R57 1.88m (100%) 100%	C			144.0 / 745.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
		10 % Loss					144.2 / 744.8				144.19 m: mafic phenocryst												144.2
							144.25																
				C			144.4 / 744.6				144.30 m: mafic phenocryst												144.4
							144.6 / 744.4																144.6
							144.8 / 744.2																144.8
							145.0 / 744.0																145.0
				C			145.2 / 743.8																145.2
							145.4 / 743.6																145.4
							145.6 / 743.4																145.6
							145.8 / 743.2																145.8
							146.0																

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Observations and Comments

Notes

Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted.
Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
For Inclined Holes: Angles reported in defects are apparent dip from core horizontal unless as α or β.
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● - Axial ○ - Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss		C			146.0 / 743.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE 146.00: Point Load >20KN – No Failure	
																							146.2
							146.2 / 742.8				146.35 m - 146.47 m: 3 x thin mafic veins dipping at 30-40°												
							146.4 / 742.6																146.4
							146.6 / 742.4																146.6
		10 % Loss	R58 1.17m (100%) 100%	C																			
							146.8 / 742.2																146.8
							147.0 / 742.0																147.0
							147.2 / 741.8																147.2
											147.30 m - 148.60 m: Chlorite alteration			SA									
							147.4 / 741.6																147.4
		10 % Loss	R59 3.00m (100%) 100%	C			147.6 / 741.4																147.6
							147.8 / 741.2																147.8
							148.0																

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss	R59 3.00m (100%) 100%	C	148.17 m Is(50) d=0.98, a=0.96		148.0 / 741.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*			SA *(cont)*	F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
											148.15 m - 148.40 m: hydrothermal alteration			DA						148.17: JT, 2° HE, PL, RO		
							148.2 / 740.8													148.30: JT, HE, PL, RO			148.2
							148.4 / 740.6							SA									148.4
							148.6 / 740.4				148.60 m: becoming less mafic												148.6
							148.8 / 740.2																148.8
							149.0 / 740.0																149.0
							149.2 / 739.8																149.2
							149.4 / 739.6																149.4
							149.6 / 739.4																149.6
							149.8 / 739.2																149.8
							150.0																

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss	R59 3.00m (100%) 100%	C			150.0 / 739.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	150.2
							150.2 / 738.8				150.23 m: mafic phenocryst												150.4
		10 % Loss	150.30				150.4 / 738.6																150.6
							150.6 / 738.4																150.8
			R60 2.87m (100%) 100%	C			150.8 / 738.2																151.0
							151.0 / 738.0																151.2
							151.2 / 737.8																151.4
							151.4 / 737.6																151.6
							151.6 / 737.4																151.8
							151.8 / 737.2																
							152.0																

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock (0)	Defect Spacing (mm) (2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss	R60 2.87m (100%) 100%	C			152.0 737.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	152.2
							152.2 736.8																152.4
							152.4 736.6																152.6
							152.6 736.4																152.8
							152.8 736.2																153.0
							153.0 736.0															153.00: Point Load >20KN – No Failure	153.2
			153.17				153.2 735.8																153.4
		10 % Loss	R61 0.78m (100%) 100%	C			153.4 735.6																153.6
							153.6 735.4																153.8
			153.95				153.8 735.2																
				C			154.0															153.95: Point Load >20KN – No Failure	

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock (0)	Defect Spacing (mm) (2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss	R62 2.43m (100%) 100%	C			154.0 / 735.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
							154.2 / 734.8				154.26 m - 154.67 m: quartz vein, 1-2 mm thick dipping 80-90°												154.2
							154.4 / 734.6				154.44 m - 154.70 m: increasing mafic grains												154.4
							154.6 / 734.4																154.6
							154.8 / 734.2																154.8
							155.0 / 734.0				154.95 m - 155.38 m: becoming finer grained and less mafic												155.0
							155.2 / 733.8																155.2
							155.4 / 733.6				155.38 m: increasing mafic crystals												155.4
							155.6 / 733.4																155.6
							155.8 / 733.2																155.8
							156.0																

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● - Axial ○ - Diametral	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss	R62 2.43m (100%) 100%	C			156.0 733.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*	VL –0.1 L –0.3 M –1 H –3 VH –10 EH	0	2 20 200 2000				IGNEOUS ROCK - CARRAI ADAMELLITE	156.2
							156.2 732.8																	156.4
							156.4 732.6																	156.6
							156.6 732.4																	156.8
							156.8 732.2																156.83: Point Load >20KN – No Failure	
		10 % Loss	R63 2.11m (100%) 100%	C			157.0 732.0																	157.0
							157.2 731.8																	157.2
							157.4 731.6				157.53 m: becoming finer grained and less mafic													157.4
							157.6 731.4																	157.6
							157.8 731.2																	157.8
							158.0																	

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss	R63 2.11m (100%) 100%	C			158.0 / 731.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
							158.2 / 730.8																158.2
							158.4 / 730.6																158.4
		158.49																					
		10 % Loss	R64 3.01m (100%) 100%	C			158.6 / 730.4																158.6
							158.8 / 730.2																158.8
							159.0 / 730.0																159.0
							159.2 / 729.8																159.2
							159.4 / 729.6																159.4
							159.6 / 729.4																159.6
							159.8 / 729.2																159.8
							160.0																

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● - Axial ○ - Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss	R64 3.01m (100%) 100%	C			160.0 729.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
							160.2 728.8																160.2
							160.4 728.6				160.31 m: felsic phenocrysts up to 10 mm												160.4
							160.6 728.4																160.6
							160.8 728.2																160.8
							161.0 728.0																161.0
							161.2 727.8																161.2
							161.4 727.6																161.4
		161.50									161.52 m: Xenolith 161.55 m - 161.80 m: finer grained												
		10 % Loss	R65 3.03m (100%) 100%	C			161.6 727.4																161.6
							161.8 727.2																161.8
							162.0																

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss	R85 3.03m (100%) 100%	C			162.0 / 727.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)* 162.00 m: increasing abundance of felsic phenocrysts up to 10-20 mm				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
							162.2 / 726.8																162.2
							162.4 / 726.6																162.4
							162.6 / 726.4																162.6
							162.8 / 726.2																162.8
							163.0 / 726.0																163.0
							163.2 / 725.8																163.2
							163.4 / 725.6																163.4
							163.6 / 725.4																163.6
							163.8 / 725.2															163.89: Point Load >20KN – No Failure	163.8
							164.0																

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Observations and Comments

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Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
For Inclined Holes: Angles reported in defects are apparent dip from core horizontal unless as α or β.
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● Axial ○ Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss	R65 3.03m (100%) 100%	C			164.0 725.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*	VL –0.1 L –0.3 M –1 H –3 VH –10 EH	0	2 20 200 2000				IGNEOUS ROCK - CARRAI ADAMELLITE	164.2
							164.2 724.8																	
							164.4 724.6																	164.4
							164.53																	
		10 % Loss	R66 3.01m (100%) 100%	C			164.6 724.4																	164.6
							164.8 724.2																	164.8
							165.0 724.0																165.00: Point Load >20KN – No Failure	165.0
							165.2 723.8																	165.2
							165.4 723.6																	165.4
							165.6 723.4																	165.6
							165.8 723.2																	165.8
							166.0																	

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss	R66 3.01m (100%) 100%	C			166.0 / 723.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
							166.2 / 722.8																166.2
							166.4 / 722.6																166.4
							166.6 / 722.4																166.6
							166.8 / 722.2																166.8
							167.0 / 722.0																167.0
							167.2 / 721.8																167.2
							167.4 / 721.6																167.4
		167.54																					
		10 % Loss	R67 3.00m (100%) 100%	C			167.6 / 721.4																167.6
							167.8 / 721.2																167.8
							168.0																

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Observations and Comments

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Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss	R67 3.00m (100%) 100%	C			168.0 / 721.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
							168.2 / 720.8																168.2
							168.4 / 720.6																168.4
							168.6 / 720.4																168.6
							168.8 / 720.2																168.8
							169.0 / 720.0																169.0
							169.2 / 719.8																169.2
							169.4 / 719.6																169.4
							169.6 / 719.4																169.6
							169.8 / 719.2																169.8
							170.0																

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss	R67 3.00m (100%) 100%	C			170.0 / 719.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	170.2
							170.2 / 718.8																170.4
							170.4 / 718.6																
		10 % Loss	170.54				170.6 / 718.4															170.54: Point Load >20KN – No Failure	170.6
			R68 3.08m (100%) 100%	C			170.8 / 718.2																170.8
							171.0 / 718.0																171.0
							171.2 / 717.8																171.2
							171.4 / 717.6																171.4
							171.6 / 717.4																171.6
							171.8 / 717.2																171.8
							172.0																

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Observations and Comments

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Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) (● Axial, ○ Diametral) VL -0.1, L -0.3, M -1, H -3, VH -10, EH	Relative Strength Soil-Rock	Defect Spacing (mm) 0, 2, 20, 200, 2000	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss	R68 3.08m (100%) 100%	C			172.0 717.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
							172.2 716.8																172.2
							172.4 716.6																172.4
							172.6 716.4																172.6
							172.8 716.2																172.8
							173.0 716.0																173.0
							173.2 715.8																173.2
							173.4 715.6																173.4
		10 % Loss	173.62 R69 3.12m (100%) 100%	C			173.6 715.4															173.52: Point Load >20KN – No Failure	173.6
							173.8 715.2																173.8
							174.0																

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Observations and Comments

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Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
For Inclined Holes: Angles reported in defects are apparent dip from core horizontal unless as α or β.
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss	R69 3.12m (100%) 100%	C			174.0 / 715.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE 174.00: Point Load >20KN – No Failure	
							174.2 / 714.8																174.2
							174.4 / 714.6																174.4
							174.6 / 714.4																174.6
							174.8 / 714.2																174.8
							175.0 / 714.0																175.0
							175.2 / 713.8				175.70 m: felsic phenocrysts 10-30 mm												175.2
							175.4 / 713.6																175.4
							175.6 / 713.4																175.6
							175.8 / 713.2																175.8
							176.0																

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Observations and Comments

Notes

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For Inclined Holes: Angles reported in defects are apparent dip from core horizontal unless as α or β.
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL –0.1, L –0.3, M –1, H –3, VH –10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss	R69 3.12m (100%) 100%	C			176.0 / 713.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	176.2
							176.2 / 712.8																176.4
							176.4 / 712.6																176.6
							176.6 / 712.4																
		10 % Loss	176.74				176.8 / 712.2															176.74: Point Load >20KN – No Failure	176.8
			R70 2.91m (100%) 100%	C			177.0 / 712.0																177.0
							177.2 / 711.8																177.2
							177.4 / 711.6																177.4
							177.6 / 711.4																177.6
							177.8 / 711.2																177.8
							178.0																

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Observations and Comments

Notes

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For Inclined Holes: Angles reported in defects are apparent dip from core horizontal unless as α or β.
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss	R70 2.91m (100%) 100%	C			178.0 711.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	178.2
							178.2 710.8																178.4
							178.4 710.6																178.6
							178.6 710.4																178.8
							178.8 710.2																179.0
							179.0 710.0																179.2
							179.2 709.8																179.4
							179.4 709.6																179.6
							179.6 709.4																179.8
		10 % Loss	R71 3.12m (100%) 100%	C			179.8 709.2																
							180.0																

179.65

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock (0)	Defect Spacing (mm) (2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss	R71 3.12m (100%) 100%	C			180.0 / 709.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
							180.2 / 708.8																180.2
							180.4 / 708.6																180.4
							180.6 / 708.4																180.6
							180.8 / 708.2																180.8
							181.0 / 708.0																181.0
							181.2 / 707.8																181.2
							181.4 / 707.6																181.4
							181.6 / 707.4																181.6
							181.8 / 707.2																181.8
							182.0																

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Observations and Comments

Notes

Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted.
Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
For Inclined Holes: Angles reported in defects are apparent dip from core horizontal unless as α or β.
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL –0.1, L –0.3, M –1, H –3, VH –10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss	R71 3.12m (100%) 100%	C			182.0 707.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	182.2
							182.2 706.8																182.4
							182.4 706.6																182.6
							182.6 706.4															182.67: Point Load >20KN – No Failure	
			182.77				182.8 706.2																182.8
		5 % Loss	R72 3.12m (100%) 100%	C			183.0 706.0																183.0
							183.2 705.8																183.2
							183.4 705.6																183.4
							183.6 705.4																183.6
							183.8 705.2																183.8
							184.0																

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) *Elevation*	Graphic Log	Soil Code	*Depth* RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● Axial ○ Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
	HQ3	5 % Loss	R72 3.12m (100%) 100%	C			184.0 *705.0*				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*	VL 0.1 L 0.3 M 1 H 3 VH 10 EH	0	2 20 200 2000				IGNEOUS ROCK - CARRAI ADAMELLITE	
							184.2 *704.8*																	184.2
							184.4 *704.6*																	184.4
							184.6 *704.4*																	184.6
							184.8 *704.2*																	184.8
							185.0 *704.0*																	185.0
							185.2 *703.8*																	185.2
							185.4 *703.6*																	185.4
							185.6 *703.4*																	185.6
							185.8 *703.2*																	185.8
		5 % Loss		C			186.0																	
										185.89														

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock (0)	Defect Spacing (mm) (2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		5 % Loss	R73 2.87m (100%) 100%	C			186.0 / 703.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	186.2
							186.2 / 702.8																186.4
							186.4 / 702.6																186.6
							186.6 / 702.4																186.8
							186.8 / 702.2																187.0
							187.0 / 702.0																187.2
							187.2 / 701.8																187.4
							187.4 / 701.6																187.6
							187.6 / 701.4																187.8
							187.8 / 701.2																
							188.0																

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) *Elevation*	Graphic Log	Soil Code	*Depth* RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		5 % Loss	R73 2.87m (100%) 100%	C			188.0 *701.0*				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*	VL 0.1 L 0.3 M 1 H 3 VH 10 EH	0	2 20 200 2000				IGNEOUS ROCK - CARRAI ADAMELLITE	
							188.2 *700.8*																	188.2
							188.4 *700.6*																	188.4
							188.6 *700.4*																	188.6
							188.76																	
							188.8 *700.2*																	188.8
							189.0 *700.0*																189.00: Point Load >20KN – No Failure	189.0
							189.2 *699.8*																	189.2
		5 % Loss	R74 2.99m (100%) 100%	C			189.4 *699.6*																	189.4
							189.6 *699.4*																	189.6
							189.8 *699.2*																	189.8
							190.0																	

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Observations and Comments

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Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock (0)	Defect Spacing (mm) (2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		5 % Loss	R74 2.99m (100%) 100%	C			190.0 699.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)* 190.07 m - 190.17 m: fine grained felsic xenolith				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
							190.2 698.8																190.2
							190.4 698.6																190.4
							190.6 698.4																190.6
							190.8 698.2																190.8
							191.0 698.0																191.0
							191.2 697.8																191.2
							191.4 697.6																191.4
							191.6 697.4																191.6
		5 % Loss	191.75	C			191.8 697.2				191.84 m: gradational igneous contact, igneous layering 191.85 m - 192.18 m: very fine to fine grained chill margin											191.84: Igneous Contact 191.95: Point Load >20KN – No Failure	191.8
							192.0																

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Observations and Comments

Notes: Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted.
Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		5 % Loss	R75 3.04m (100%) 100%	C			192.0 / 697.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
							192.2 / 696.8				192.20 m: fine grained equigranular												192.2
							192.4 / 696.6																192.4
							192.6 / 696.4																192.6
							192.8 / 696.2																192.8
							193.0 / 696.0																193.0
							193.2 / 695.8																193.2
							193.4 / 695.6																193.4
							193.6 / 695.4																193.6
							193.8 / 695.2																193.8
							194.0																

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		5 % Loss	R75 3.04m (100%) 100%	C			194.0 695.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)* 194.00 m: becoming porphyritic, phenocrysts up to 5 mm				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE 194.00: Point Load >20KN – No Failure	194.2
							194.2 694.8																194.4
							194.4 694.6																194.6
							194.6 694.4																194.8
							194.8 694.2																195.0
							195.0 694.0																195.2
							195.2 693.8																195.4
							195.4 693.6																195.6
							195.6 693.4																195.8
							195.8 693.2																
							196.0																

194.79

R76 3.04m (100%) 100%

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		5 % Loss	R76 3.04m (100%) 100%	C			196.0 693.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
							196.2 692.8																196.2
							196.4 692.6																196.4
							196.6 692.4																196.6
							196.8 692.2																196.8
							197.0 692.0																197.0
							197.2 691.8																197.2
							197.4 691.6																197.4
							197.6 691.4																197.6
		5 % Loss	197.83	C			197.8 691.2															197.83: Point Load >20KN – No Failure	197.8
							198.0																

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		5 % Loss	R77 3.02m (100%) 100%	C			198.0 691.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	198.2
							198.2 690.8																198.4
							198.4 690.6																198.6
							198.6 690.4																198.8
							198.8 690.2																199.0
							199.0 690.0				199.13 m: gradational igneous contact fine grained chill margin											199.13: Igneous Contact	199.2
							199.2 689.8																199.4
							199.4 689.6																199.6
							199.6 689.4																199.8
							199.8 689.2																
							200.0																

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Observations and Comments

Notes

Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted.
Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
For Inclined Holes: Angles reported in defects are apparent dip from core horizontal unless as α or β.
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		5 % Loss	R77 3.02m (100%) 100%	C			200.0 / 689.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
							200.2 / 688.8																200.2
							200.4 / 688.6																200.4
							200.6 / 688.4																200.6
							200.8 / 688.2																200.8
		200.85					201.0 / 688.0															201.00: Point Load >20KN – No Failure	201.0
		5 % Loss	R78 3.02m (100%) 100%	C			201.2 / 687.8																201.2
							201.4 / 687.6																201.4
							201.6 / 687.4																201.6
							201.8 / 687.2																201.8
							202.0																

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL –0.1, L –0.3, M –1, H –3, VH –10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		5 % Loss	R78 3.02m (100%) 100%	C			202.0 687.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
							202.2 686.8															202.14-204.00: water loss on joints	202.2
							202.4 686.6				202.36 m: becoming coarser grained increasing mafic phenocrysts									202.48: JT, 85° HE, PL, RO			202.4
							202.6 686.4																202.6
							202.8 686.2				202.63 m - 202.95 m: minor chlorite alteration of mafic minerals and 6 x quartz veins spaced 2-30 mm, dipping 60-80°			SA									202.8
							203.0 686.0																203.0
							203.2 685.8																203.2
							203.4 685.6																203.4
							203.6 685.4				203.60 m: becoming fine grained												203.6
		100 % Loss	203.87	C			203.8 685.2																203.8
							204.0																

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL –0.1, L –0.3, M –1, H –3, VH –10, EH)	Relative Strength Soil-Rock (0, 2, 20, 200, 2000)	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		100 % Loss	R79 3.07m (100%) 100%	C			204.0 685.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*							IGNEOUS ROCK - CARRAI ADAMELLITE	
							204.2 684.8				204.00 m: fine grained equigranular												204.2
							204.4 684.6																204.4
							204.6 684.4																204.6
							204.8 684.2																204.8
							205.0 684.0															204.87: Point Load >20KN – No Failure	205.0
							205.2 683.8				205.27 m: mafic vein < 1 mm thick												205.2
							205.4 683.6				205.45 m: mafic vein < 1 mm thick 205.50 m: becoming coarser grained									205.46: JT, 45° HE, PL, RO			205.4
							205.6 683.4																205.6
							205.8 683.2																205.8
							206.0													205.99: JT, 40° HE, PL, RO			

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Observations and Comments

Notes

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For Inclined Holes: Angles reported in defects are apparent dip from core horizontal unless as α or β.
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		100 % Loss	R79 3.07m (100%) 100%	C			206.0 683.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	206.2
							206.2 682.8																
																				206.45: JT, 60° CN, PL, RO, 100% waterloss.		206.28-206.62: 100% water loss on joint	
							206.4 682.6																206.4
							206.6 682.4																206.6
		0 % Loss	206.94 R80 0.10m (100%) 100%	C			206.8 682.2															206.95: Point Load >20KN – No Failure	206.8
			207.04				207.0 682.0																207.0
		10 % Loss	R81 1.13m (100%) 100%	C			207.2 681.8				207.67 m - 207.78 m: mafic lenses												207.2
							207.4 681.6																207.4
							207.6 681.4																207.6
							207.8 681.2																207.8
							208.0																

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Observations and Comments

Notes

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For Inclined Holes: Angles reported in defects are apparent dip from core horizontal unless as α or β.
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss	R82 2.87m (100%) 100%	C			208.0 / 681.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
		10 % Loss					208.2 / 680.8																208.2
							208.4 / 680.6																208.4
							208.6 / 680.4																208.6
							208.8 / 680.2																208.8
							209.0 / 680.0																209.0
							209.2 / 679.8																209.2
							209.4 / 679.6																209.4
							209.6 / 679.4																209.6
							209.8 / 679.2														209.80: JT, 80° HE, PL, RO		209.8
							210.0																

208.17

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Observations and Comments

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Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
For Inclined Holes: Angles reported in defects are apparent dip from core horizontal unless as α or β.
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL –0.1, L –0.3, M –1, H –3, VH –10, EH)	Relative Strength Soil-Rock (0)	Defect Spacing (mm) (2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss	R82 2.87m (100%) 100%	C			210.0 679.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	210.2
							210.2 678.8																210.4
							210.4 678.6																210.6
							210.6 678.4																210.8
							210.8 678.2																211.0
							211.0 678.0															211.00: Point Load >20KN – No Failure 211.04: Point Load >20KN – No Failure	
							211.2 677.8																211.2
							211.4 677.6																211.4
		10 % Loss	R83 2.96m (100%) 100%	C			211.6 677.4																211.6
							211.8 677.2																211.8
							212.0																

211.04

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss	R83 2.96m (100%) 100%	C			212.0 677.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
							212.2 676.8																212.2
							212.4 676.6																212.4
							212.6 676.4													212.53: JT, 70° HE, PL, RO			212.6
							212.8 676.2																212.8
							213.0 676.0																213.0
							213.2 675.8																213.2
							213.4 675.6																213.4
							213.6 675.4																213.6
							213.8 675.2																213.8
		214.00					214.0																

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock (0)	Defect Spacing (mm) (2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		100 % Loss	R84 2.19m (100%) 100%	C			214.0 675.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*							IGNEOUS ROCK - CARRAI ADAMELLITE 214.00: Point Load >20KN – No Failure	
							214.2 674.8																214.2
																				214.30: JT, 3° HE, PL, RO			
							214.4 674.6																214.4
							214.6 674.4																214.6
							214.8 674.2				214.82 m: increasing larger mafic grains												214.8
							215.0 674.0																215.0
							215.2 673.8																215.2
							215.4 673.6																215.4
							215.6 673.4																215.6
							215.8 673.2																215.8
							216.0																

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Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
For Inclined Holes: Angles reported in defects are apparent dip from core horizontal unless as α or β.
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● Axial ○ Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		100 % Loss		C			216.0 / 673.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*	VL –0.1, L –0.3, M –1, H –3, VH –10, EH	0, 2, 20, 200, 2000				IGNEOUS ROCK - CARRAI ADAMELLITE	
							216.2 / 672.8				216.00 m: decreasing grainsize												216.2
							216.4 / 672.6																216.4
		5 % Loss	R85 1.05m (100%) 100%	C			216.6 / 672.4				216.63 m: decreasing abundance of larger mafic crystals												216.6
							216.8 / 672.2														216.87: JT, 80° HE, PL, RO		216.8
							217.0 / 672.0																217.0
							217.2 / 671.8														217.22: JT, 65° HE, PL, RO		217.2
							217.4 / 671.6																217.4
		5 % Loss	R86 1.87m (100%) 100%	C			217.6 / 671.4														217.63: JT, 0° HE, PL, RO		217.6
							217.8 / 671.2																217.8
							218.0																

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● Axial ○ Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		5 % Loss	R96 1.87m (100%) 100%	C			218.0 671.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*	VL –0.1 L –0.3 M –1 H –3 VH –10 EH	0	0 2 20 200 2000				IGNEOUS ROCK - CARRAI ADAMELLITE	
							218.2 670.8																	218.2
							218.4 670.6																	218.4
							218.6 670.4														218.64: JT, 5° HE, PL, RO			218.6
							218.8 670.2																	218.8
							219.0 670.0																219.00: Point Load >20KN – No Failure	219.0
		219.11					219.2 669.8																	219.2
		5 % Loss	R87 3.04m (100%) 100%	C			219.4 669.6																	219.4
							219.6 669.4																	219.6
							219.8 669.2																	219.8
							220.0																	

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition / Consistency / Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) (● Axial, ○ Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		5 % Loss	R87 3.04m (100%) 100%	C			220.0 669.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)* 220.00 m: becoming equigranular			F *(cont)*	VH *(cont)*	VL –0.1, L –0.3, M –1, H –3, VH –10, EH	0	2, 20, 200, 2000				IGNEOUS ROCK - CARRAI ADAMELLITE	220.2
							220.2 668.8															220.4
							220.4 668.6															220.6
							220.6 668.4															220.8
							220.8 668.2															221.0
							221.0 668.0													221.08: JT, 0° HE, PL, RO		221.07: Point Load >20KN – No Failure	
							221.2 667.8													221.27: JT, 40° HE, PL, RO			221.2
							221.4 667.6													221.38: JT, 10° HE, PL, RO			221.4
							221.6 667.4													221.61: JT, 45° HE, PL, RO			221.6
							221.8 667.2				221.75 m - 221.80 m: minor hydrothermal alteration		SA							221.71: JT, 20° HE, PL, RO			221.8
							222.0															

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● - Axial ○ - Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		5 % Loss	222.15	C			222.0 / 667.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*			SA	F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE 222.00: Point Load >20KN – No Failure	222.2
							222.2 / 666.8													222.27: JT, 80° HE, PL, RO			222.4
		50 % Loss	R88 3.07m (100%) 100%	C			222.4 / 666.6																222.6
							222.6 / 666.4																222.8
							222.8 / 666.2																223.0
							223.0 / 666.0																223.2
							223.2 / 665.8																223.4
							223.4 / 665.6																223.6
							223.6 / 665.4																223.8
							223.8 / 665.2																
							224.0																

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● Axial ○ Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
							224.0 / 665.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*	VL –0.1 L –0.3 M –1 H –3 VH –10 EH	0 2 20 200 2000				IGNEOUS ROCK - CARRAI ADAMELLITE	
							224.2 / 664.8													224.10: JT, 80° HE, PL, RO			224.2
							224.4 / 664.6																224.4
		50 % Loss	R88 3.07m (100%) 100%	C			224.6 / 664.4																224.6
							224.8 / 664.2																224.8
HQ3							225.0 / 664.0				225.05 m - 222.35 m: minor hydrothermal alteration												225.0
			225.22				225.2 / 663.8																225.2
		50 % Loss	R89 2.92m (100%) 100%	C	225.62 m Is(50) d=1.99		225.4 / 663.6													225.39: JT, 10° HE, PL, RO 225.43: JT, 10° HE, PL, RO			225.4
							225.6 / 663.4																225.6
							225.8 / 663.2				225.75 m: increasing grain size, becoming porphyritic with felsic phenocrysts up to 20 mm									225.72: JT, 10° HE, PL, RO			225.8
					Is(50) a=6.36 MPa		226.0													225.94: JT, 0° HE, PL, RO			

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock (0)	Defect Spacing (mm) (2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		50 % Loss	R89 2.92m (100%) 100%	C			226.0 / 663.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
							226.2 / 662.8																
							226.4 / 662.6																
							226.6 / 662.4																
							226.8 / 662.2																
							227.0 / 662.0																
							227.2 / 661.8																
							227.4 / 661.6																
							227.6 / 661.4																
							227.8 / 661.2																
							228.0																

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		50 % Loss	228.14	C			228.0 / 661.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE 228.00: Point Load >20KN – No Failure	228.2
		100 % Loss	R90 2.94m (100%) 100%	C			228.2 / 660.8																228.4
							228.4 / 660.6																228.6
							228.6 / 660.4																228.8
							228.8 / 660.2																229.0
							229.0 / 660.0																229.2
							229.2 / 659.8																229.4
							229.4 / 659.6																229.6
							229.6 / 659.4																229.8
							229.8 / 659.2																
							230.0																

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) (● Axial, ○ Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		100 % Loss	R90 2.94m (100%) 100%	C			230.0 659.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*	VL –0.1, L –0.3, M –1, H –3, VH –10, EH	0, 2, 20, 200, 2000				IGNEOUS ROCK - CARRAI ADAMELLITE	
							230.2 658.8																230.2
							230.4 658.6																230.4
							230.6 658.4																230.6
							230.8 658.2																230.8
							231.0 658.0																231.0
			R91 [illegible] (100%) 100%	C	231.08 m Is(50) a=7.16																		
							231.2 657.8				231.29 m: felsic phenocrysts up to 30 mm												231.2
		0 % Loss	R92 3.09m (100%) 100%	C			231.4 657.6																231.4
							231.6 657.4																231.6
							231.8 657.2																231.8
							232.0																

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock (0, 2, 20, 200, 2000)	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R92 3.09m (100%) 100%	C			232.0 / 657.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*					233.57: JT, 40° HE, PL, RO 233.59: JT, 40° HE, PL, RO 233.60: JT, 40° HE, PL, RO 233.91: JT, 30° HE, PL, RO		IGNEOUS ROCK - CARRAI ADAMELLITE	232.2 232.4 232.6 232.8 233.0 233.2 233.4 233.6 233.8
							232.2 / 656.8																
							232.4 / 656.6																
							232.6 / 656.4																
							232.8 / 656.2																
							233.0 / 656.0																
							233.2 / 655.8																
							233.4 / 655.6																
							233.6 / 655.4																
							233.8 / 655.2																
							234.0																

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) (● Axial, ○ Diametral) VL -0.1, L -0.3, M -1, H -3, VH -10, EH	Relative Strength Soil-Rock	Defect Spacing (mm) 0, 2, 20, 200, 2000	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss 5 % Loss	R93 2.94m (100%) 100%	C C			234.0 655.0 234.2 654.8 234.4 654.6 234.6 654.4 234.8 654.2 235.0 654.0 235.2 653.8 235.4 653.6 235.6 653.4 235.8 653.2 236.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)* VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	234.2 234.4 234.6 234.8 235.0 235.2 235.4 235.6 235.8

234.20

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL –0.1, L –0.3, M –1, H –3, VH –10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		5 % Loss	R93 2.94m (100%) 100%	C			236.0 653.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	236.2
							236.2 652.8																236.4
							236.4 652.6																236.6
							236.6 652.4																236.8
							236.8 652.2																237.0
							237.0 652.0															237.00: Point Load >20KN – No Failure	237.2
							237.2 651.8																237.4
							237.4 651.6																237.6
							237.6 651.4																237.8
							237.8 651.2																
		5 % Loss	R94 3.05m (100%) 100%	C			238.0																

237.14

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) *Elevation*	Graphic Log	Soil Code	*Depth* RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● Axial ○ Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		5 % Loss	R94 3.05m (100%) 100%	C			238.0 *651.0*				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*	VL 0.1 L 0.3 M 1 H 3 VH 10 EH	0	2 20 200 2000				IGNEOUS ROCK - CARRAI ADAMELLITE	
							238.2 *650.8*																	238.2
							238.4 *650.6*																	238.4
							238.6 *650.4*																	238.6
							238.8 *650.2*														238.88: JT, 20° HE, PL, RO			238.8
							239.0 *650.0*																	239.0
							239.2 *649.8*																	239.2
																					239.29: JT, 80° HE, PL, RO			
																					239.38: JT, 40° HE, PL, RO			239.4
							239.4 *649.6*																	
																					239.52: JT, 85° HE, PL, RO			
																					239.58: JT, 60° CN, PL, RO			
																					239.59: JT, 60° HE, PL, RO			
							239.6 *649.4*														239.61: JT, 60° HE, PL, RO			239.6
																					239.75: JT, 30° HE, PL, RO			
																					239.77: JT, 25° Ca VN, PL, RO			
							239.8 *649.2*																	239.8
																					239.86: JT, 45° HE, PL, RO			
							240.0																	

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		5 % Loss	R95 3.02m (100%) 94%	C			240.0 / 649.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE 240.00: Point Load >20KN – No Failure	
							240.2 / 648.8													240.14: JT, 40° HE, PL, RO			240.2
							240.4 / 648.6													240.39: JT, 50° HE, PL, RO 240.45: JT, 55° Ca HE, PL, RO 240.46: JT, 60° HE, PL, RO			240.4
							240.6 / 648.4																240.6
							240.8 / 648.2													240.88: JT, 10° HE, PL, RO 240.94: JT, 10° HE, PL, RO			240.8
		5 % Loss		C			241.0 / 648.0																241.0
							241.2 / 647.8																241.2
							241.4 / 647.6													241.43: JT, 75° Ca HE, PL, RO, I. 241.47: JT, 75° Ca HE, PL, RO			241.4
							241.6 / 647.4													241.59: JT, 50° Ca HE, PL, RO 241.67: JT, 40° Ca HE, PL, RO 241.74: JT, 40° Ca HE, PL, RO			241.6
							241.8 / 647.2													241.83: JT, 40° Ca HE, PL, RO 241.85: JT, 35° Ca HE, PL, RO 241.90: JT, 30° Ca HE, PL, RO 241.92: JT, 35° Ca HE, PL, RO			241.8
							242.0																

240.19

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Observations and Comments

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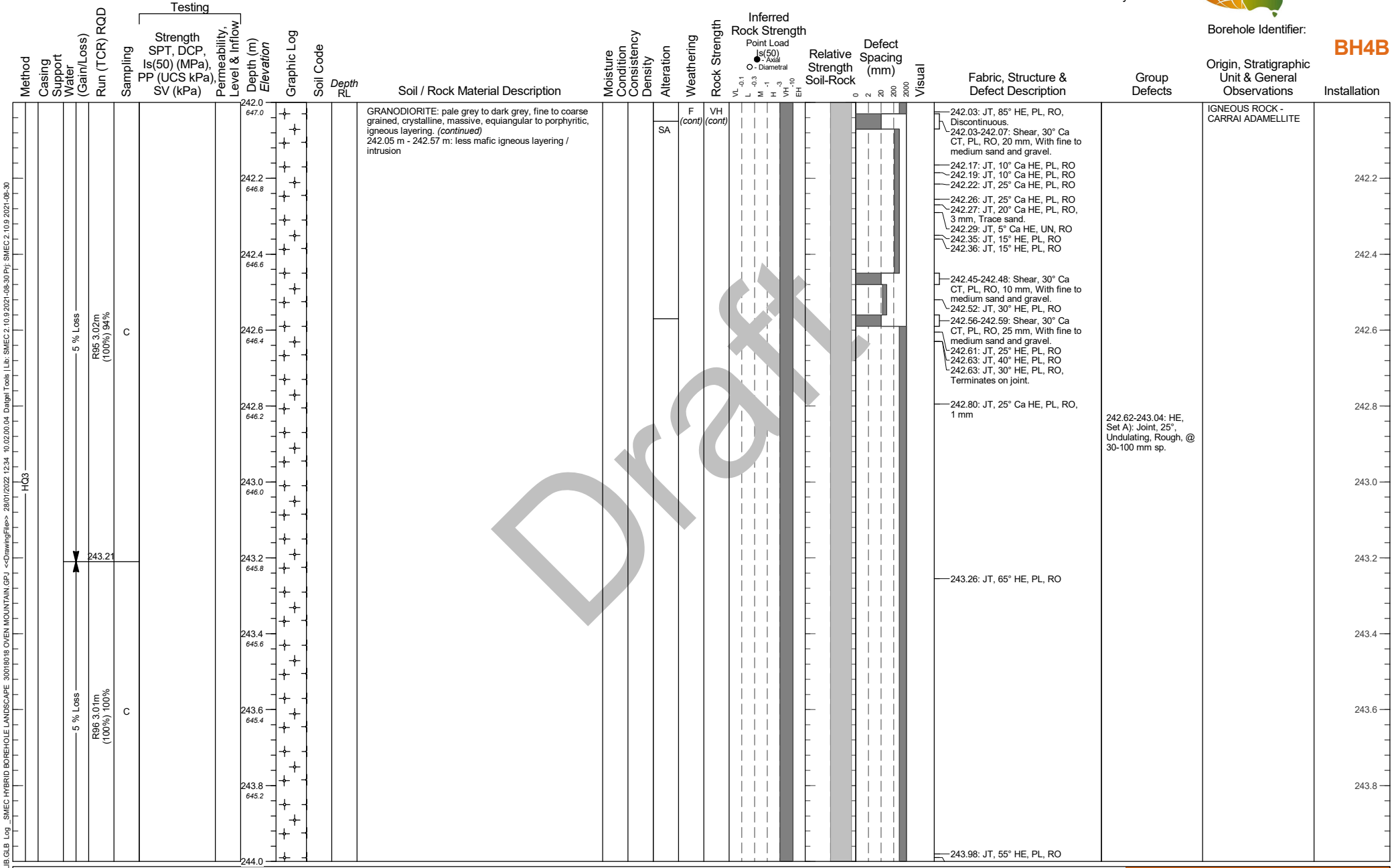
Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**



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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		5 % Loss	R96 3.01m (100%) 100%	C			244.0 / 645.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*				243.99: JT, 45° HE, PL, RO		IGNEOUS ROCK - CARRAI ADAMELLITE	
							244.2 / 644.8																244.2
							244.4 / 644.6																244.4
							244.6 / 644.4													244.58: JT, 65° HE, PL, RO			244.6
							244.8 / 644.2																244.8
							245.0 / 644.0																245.0
							245.2 / 643.8																245.2
							245.4 / 643.6																245.4
							245.6 / 643.4																245.6
							245.8 / 643.2																245.8
							246.0																

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		5 % Loss	R97 2.94m (100%) 100%	C			246.0 643.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE 246.00: Point Load >20KN – No Failure	
							246.2 642.8																246.2
							246.4 642.6																246.4
							246.6 642.4																246.6
							246.8 642.2																246.8
							247.0 642.0				247.15 m - 247.22 m: pale grey to grey, fine grained xenolith												247.0
				C			247.2 641.8																247.2
							247.4 641.6																247.4
							247.6 641.4																247.6
							247.8 641.2																247.8
							248.0																

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock (0)	Defect Spacing (mm) (2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		5 % Loss	R97 2.94m (100%) 100%	C			248.0 / 641.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
							248.2 / 640.8																248.2
							248.4 / 640.6																248.4
							248.6 / 640.4																248.6
							248.8 / 640.2																248.8
							249.0 / 640.0															249.00: Point Load >20KN – No Failure	249.0
		249.16					249.2 / 639.8				249.28 m - 253.33 m: occasional dark grey xenolith up to 20 mm												249.2
							249.4 / 639.6																249.4
		5 % Loss	R98 2.97m (100%) 100%	C			249.6 / 639.4																249.6
							249.8 / 639.2																249.8
							250.0																

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Observations and Comments

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Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
For Inclined Holes: Angles reported in defects are apparent dip from core horizontal unless as α or β.
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock (0)	Defect Spacing (mm) (2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		5 % Loss	R98 2.97m (100%) 100%	C			250.0 / 639.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
							250.2 / 638.8																250.2
							250.4 / 638.6																250.4
							250.6 / 638.4																250.6
							250.8 / 638.2																250.8
							251.0 / 638.0																251.0
							251.2 / 637.8																251.2
							251.4 / 637.6																251.4
							251.6 / 637.4																251.6
							251.8 / 637.2																251.8
							252.0																

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL –0.1, L –0.3, M –1, H –3, VH –10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		5 % Loss		C			252.0 / 637.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE 252.00: Point Load >20KN – No Failure	
			252.13				252.2 / 636.8													252.26: JT, 85° Ca HE, PL, RO, Discontinuous.			252.2
							252.4 / 636.6																252.4
							252.6 / 636.4																252.6
							252.8 / 636.2																252.8
		0 % Loss	R99 3.07m (100%) 100%	C			253.0 / 636.0				253.00 m: mafix xenolith up to 100 mm									253.01: JT, 85° HE, PL, RO, Discontinuous.			253.0
							253.2 / 635.8																253.2
							253.4 / 635.6																253.4
							253.6 / 635.4																253.6
							253.8 / 635.2																253.8
							254.0																

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● - Axial ○ - Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock (0)	Defect Spacing (mm) (2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R99 3.07m (100%) 100%	C			254.0 / 635.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
							254.2 / 634.8																254.2
							254.4 / 634.6																254.4
							254.6 / 634.4																254.6
							254.8 / 634.2																254.8
							255.0 / 634.0															255.00: Point Load >20KN – No Failure	255.0
							255.2 / 633.8																255.2
							255.4 / 633.6																255.4
		0 % Loss	R100 2.95m (100%) 100%	C			255.6 / 633.4																255.6
							255.8 / 633.2																255.8
							256.0														255.91-256.00: 85° Ca HE, PL, RO		

255.20

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R100 2.95m (100%) 100%	C			256.0 / 633.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
							256.2 / 632.8																256.2
							256.4 / 632.6																256.4
							256.6 / 632.4																256.6
							256.8 / 632.2																256.8
							257.0 / 632.0																257.0
							257.2 / 631.8																257.2
							257.4 / 631.6																257.4
							257.6 / 631.4																257.6
							257.8 / 631.2																257.8
							258.0																

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition / Consistency / Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss		C			258.0 631.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*			F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE 258.00: Point Load >20KN – No Failure	258.2 258.4 258.6 258.8 259.0 259.2 259.4 259.6 259.8
							258.2 630.8															
							258.4 630.6															
							258.6 630.4				258.67 m - 258.81 m: dark grey xenolith 30 to 50 mm											
							258.8 630.2															
							259.0 630.0															
							259.2 629.8															
							259.4 629.6															
							259.6 629.4															
							259.8 629.2															
							260.0															

			0 % Loss		C																	
				258.15																		
			0 % Loss	R101 3.03m (100%) 100%	C																	

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● Axial ○ Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R101 3.03m (100%) 100%	C			260.0 629.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*	VL 0.1 L 0.3 M 1 H 3 VH 10 EH	0	2 20 200 2000				IGNEOUS ROCK - CARRAI ADAMELLITE	
							260.2 628.8																	260.2
							260.4 628.6																	260.4
							260.6 628.4				260.55 m: felsic phenocrysts up to 40 mm													260.6
							260.8 628.2																	260.8
							261.0 628.0																261.00: Point Load >20KN – No Failure	261.0
							261.2 627.8																	261.2
							261.4 627.6																	261.4
		0 % Loss	R102 3.02m (100%) 100%	C			261.6 627.4																	261.6
							261.8 627.2																	261.8
							262.0																	

261.18

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Observations and Comments

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Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R102 3.02m (100%) 100%	C			262.0 / 627.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	262.2
							262.2 / 626.8																262.4
							262.4 / 626.6																262.6
							262.6 / 626.4																262.8
							262.8 / 626.2																263.0
							263.0 / 626.0																263.2
							263.2 / 625.8																263.4
							263.4 / 625.6																263.6
							263.6 / 625.4																263.8
							263.8 / 625.2																
							264.0																

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) (● Axial ○ Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R103 2.97m (100%) 100%	C			264.0 / 625.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*	VL 0.1 L 0.3 M 1 H 3 VH 10 EH	0	2 20 200 2000				IGNEOUS ROCK - CARRAI ADAMELLITE	
							264.2 / 624.8				264.00 m: felsic phenocrysts up to 20 mm													264.2
		0 % Loss					264.20																264.27: Point Load >20KN – No Failure	
							264.4 / 624.6																	264.4
																							264.42: Point Load >20KN – No Failure	
							264.6 / 624.4																	264.6
							264.8 / 624.2																	264.8
				C			265.0 / 624.0																	265.0
							265.2 / 623.8																	265.2
							265.4 / 623.6																	265.4
							265.6 / 623.4																	265.6
							265.8 / 623.2																	265.8
							266.0																	

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) *Elevation*	Graphic Log	Soil Code	*Depth* RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
	HQ3	0 % Loss	R103 2.97m (100%) 100%	C			266.0 *623.0*				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*	VL 0.1 L 0.3 M 1 H 3 VH 10 EH	0	2 20 200 2000				IGNEOUS ROCK - CARRAI ADAMELLITE	
							266.2 *622.8*																	266.2
							266.4 *622.6*																	266.4
							266.6 *622.4*																	266.6
							266.8 *622.2*																	266.8
							267.0 *622.0*				267.15 m - 271.34 m: occasional mafic xenolith 20 to 40 mm													267.0
		0 % Loss	R104 2.95m (100%) 100%	C			267.2 *621.8*																	267.2
							267.4 *621.6*																	267.4
							267.6 *621.4*																	267.6
							267.8 *621.2*																	267.8
							268.0																	

267.17

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Observations and Comments

Notes

Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted.
Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
For Inclined Holes: Angles reported in defects are apparent dip from core horizontal unless as α or β.
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock (0)	Defect Spacing (mm) (2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R104 2.95m (100%) 100%	C			268.0 621.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	268.2
							268.2 620.8																268.4
							268.4 620.6																268.6
							268.6 620.4																268.8
							268.8 620.2																269.0
							269.0 620.0																269.2
							269.2 619.8													269.23-269.25: VE, 5° Qz HE, PL, 20 mm			269.4
							269.4 619.6																269.6
							269.6 619.4																269.8
							269.8 619.2																
							270.0																

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	270.12	C			270.0 / 619.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE 270.00: Point Load >20KN – No Failure	270.2
		0 % Loss	R105 3.00m (100%) 100%	C			270.2 / 618.8																270.4
							270.4 / 618.6																270.6
							270.6 / 618.4																270.8
							270.8 / 618.2																271.0
							271.0 / 618.0																271.2
							271.2 / 617.8																271.4
							271.4 / 617.6																271.6
							271.6 / 617.4																271.8
							271.8 / 617.2																
							272.0																

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SMEC 2.10.10 LIB.GLB Log _SMEC HYBRID BOREHOLE LANDSCAPE 30018018 OVEN MOUNTAIN.GPJ <<DrawingFile>> 28/01/2022 12:34 10.02.00.04 Datgel Tools | Lib: SMEC 2.10.9 2021-08-30 Prj: SMEC 2.10.9 2021-08-30

Observations and Comments

Notes

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Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● Axial ○ Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R105 3.00m (100%) 100%	C	273.00 m Is(50) d=3.76		272.0 / 617.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*	VL -0.1, L -0.3, M -1, H -3, VH -10, EH; ○	0, 2, 20, 200, 2000				IGNEOUS ROCK - CARRAI ADAMELLITE	272.2
							272.2 / 616.8																272.4
							272.4 / 616.6																272.6
							272.6 / 616.4																272.8
							272.8 / 616.2																273.0
							273.0 / 616.0															273.00: Point Load >20KN – No Failure	273.2
							273.2 / 615.8																273.4
							273.4 / 615.6																273.6
		0 % Loss	R106 3.00m (100%) 100%	C			273.6 / 615.4				273.62 m - 273.76 m: mafic xenolith up to 140 mm										273.65: JT, 88° HE, PL, RO		273.8
							273.8 / 615.2																
							274.0																

273.12

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Observations and Comments

Notes

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Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R106 3.00m (100%) 100%	C			274.0 615.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
							274.2 614.8																274.2
							274.4 614.6				274.44 m - 281.01 m: occasional mafic xenolith 40 mm												274.4
							274.6 614.4																274.6
							274.8 614.2																274.8
							275.0 614.0																275.0
							275.2 613.8																275.2
							275.4 613.6													275.52: JT, 85° HE, PL, RO			275.4
							275.6 613.4																275.6
							275.8 613.2																275.8
							276.0																

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Observations and Comments

Notes

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Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) *Elevation*	Graphic Log	Soil Code	*Depth* RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● Axial ○ Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
	HQ3	0 % Loss	276.12	C			276.0 613.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*	VL 0.1 L 0.3 M 1 H 3 VH 10 EH	0	0 2 20 200 2000				IGNEOUS ROCK - CARRAI ADAMELLITE 276.00: Point Load >20KN – No Failure	276.2
							276.2 612.8																	276.4
							276.4 612.6																	276.6
							276.6 612.4																	276.8
		0 % Loss	R107 3.01m (100%) 100%	C			276.8 612.2																	277.0
							277.0 612.0																	277.2
							277.2 611.8																	277.4
							277.4 611.6																	277.6
							277.6 611.4																	277.8
							277.8 611.2																	
							278.0																	

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock (0)	Defect Spacing (mm) (2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R107 3.01m (100%) 100%	C			278.0 611.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	278.2
							278.2 610.8																278.4
							278.4 610.6																278.6
							278.6 610.4																278.8
							278.8 610.2																279.0
							279.0 610.0																279.2
							279.2 609.8																279.4
							279.4 609.6																279.6
							279.6 609.4																279.8
							279.8 609.2																
		0 % Loss	R108 2.97m (100%) 100%	C			280.0																

279.13

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R108 2.97m (100%) 100%	C			280.0 / 609.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)* 280.00 m: felsic phenocrysts up to 10 mm				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
							280.2 / 608.8																280.2
							280.4 / 608.6																280.4
							280.6 / 608.4																280.6
							280.8 / 608.2				280.90 m: mafic xenolith 200 mm												280.8
							281.0 / 608.0																281.0
							281.2 / 607.8																281.2
							281.4 / 607.6																281.4
							281.6 / 607.4																281.6
							281.8 / 607.2																281.8
							282.0																

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● Axial ○ Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R109 0.75m (100%) 100%	C			282.0 / 607.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*	VL –0.1 L –0.3 M –1 H –3 VH –10 EH	0	0 2 20 200 2000				IGNEOUS ROCK - CARRAI ADAMELLITE 282.00: Point Load >20KN – No Failure	
							282.10																
				C																			
							282.2 / 606.8																282.2
							282.4 / 606.6																282.4
		0 % Loss	R110 2.27m (100%) 100%	C			282.6 / 606.4																282.6
							282.8 / 606.2																282.8
							282.85																
							283.0 / 606.0																283.0
							283.2 / 605.8																283.2
							283.4 / 605.6																283.4
							283.6 / 605.4																283.6
							283.8 / 605.2																283.8
							284.0																

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Observations and Comments

Notes

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Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
For Inclined Holes: Angles reported in defects are apparent dip from core horizontal unless as α or β.
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R110 2.27m (100%) 100%	C			284.0 / 605.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
							284.2 / 604.8																284.2
							284.4 / 604.6																284.4
							284.6 / 604.4																284.6
							284.8 / 604.2																284.8
							285.0 / 604.0															285.00: Point Load >20KN – No Failure	285.0
							285.2 / 603.8																285.2
							285.4 / 603.6																285.4
		0 % Loss	R111 3.04m (100%) 100%	C			285.6 / 603.4																285.6
							285.8 / 603.2																285.8
							286.0																

285.12

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Observations and Comments

Notes

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Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R111 3.04m (100%) 100%	C			286.0 603.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	286.2
							286.2 602.8																286.4
							286.4 602.6																286.6
							286.6 602.4																286.8
							286.8 602.2																287.0
							287.0 602.0																287.2
							287.2 601.8				287.31 m: mafic xenolith 60 mm												287.4
							287.4 601.6																287.6
							287.6 601.4																287.8
							287.8 601.2																
							288.0																

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Observations and Comments

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Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) *Elevation*	Graphic Log	Soil Code	*Depth* RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R112 3.00m (100%) 100%	C			288.0 *601.0*				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*	VL –0.1 L –0.3 M –1 H –3 VH –10 EH	0	0 2 20 200 2000				IGNEOUS ROCK - CARRAI ADAMELLITE 288.00: Point Load >20KN – No Failure	
							288.2 *600.8*																	288.2
							288.4 *600.6*																	288.4
							288.6 *600.4*																	288.6
							288.8 *600.2*																	288.8
		0 % Loss		C			289.0 *600.0*																	289.0
							289.2 *599.8*																	289.2
							289.4 *599.6*														289.47: JT, 80° HE, PL, RO			289.4
							289.6 *599.4*																	289.6
							289.8 *599.2*				289.75 m - 290.52 m: quartz vein, irregular, 10-40 mm thick dipping at 80°, some mafic mineral assimilation			SA		H					289.48-290.03: Shear, 85° Ca HE, PL, RO			289.8
							290.0																	

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● Axial ○ Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R112 3.00m (100%) 100%	C			290.0 599.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*			SA *(cont)*	F *(cont)*	H *(cont)*	VH				290.12: JT, 80° HE, PL, RO, Discontinuous.		IGNEOUS ROCK - CARRAI ADAMELLITE	290.2
							290.2 598.8																290.4
							290.4 598.6														290.31-290.69: Shear, 80° Ca HE, PL			290.6
							290.6 598.4																290.8
							290.8 598.2																291.0
							291.0 598.0																291.2
		291.16					291.2 597.8																291.4
		0 % Loss	R113 2.98m (100%) 100%	C			291.4 597.6																291.6
							291.6 597.4																291.8
							291.8 597.2																
							292.0																

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock (0)	Defect Spacing (mm) (2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R113 2.98m (100%) 100%	C			292.0 / 597.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
							292.2 / 596.8																292.2
							292.4 / 596.6																292.4
							292.6 / 596.4																292.6
							292.8 / 596.2																292.8
							293.0 / 596.0				293.16 m: mafic xenolith 100 mm												293.0
							293.2 / 595.8																293.2
							293.4 / 595.6																293.4
							293.6 / 595.4																293.6
							293.8 / 595.2														293.86-293.88: VE, 10° Qz HE, PL, 20 mm		293.8
							294.0																

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Observations and Comments

Notes

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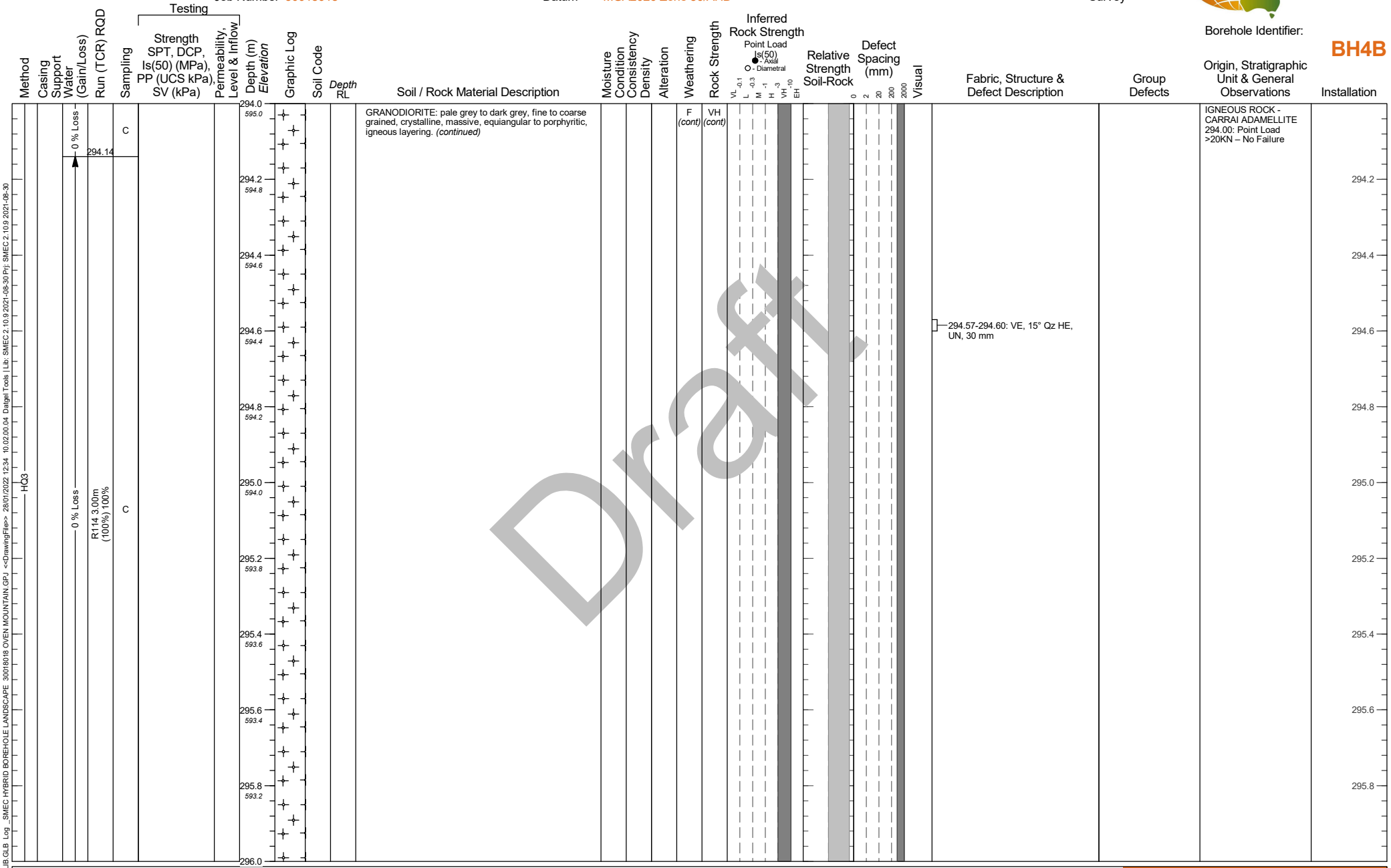
Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**



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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) (● - Axial, ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R114 3.00m (100%) 100%	C			296.0 / 593.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*	VL –0.1, L –0.3, M –1, H –3, VH –10, EH	0	2, 20, 200, 2000				IGNEOUS ROCK - CARRAI ADAMELLITE	
							296.2 / 592.8																296.2
							296.4 / 592.6																296.4
							296.6 / 592.4				296.70 m: becoming finer grained												296.6
							296.8 / 592.2																296.8
							297.0 / 592.0															297.00: Point Load >20KN – No Failure	297.0
		0 % Loss	R115 3.02m (100%) 100%	C			297.2 / 591.8				297.21 m - 297.62 m: increasing mafic groundmass with felsic phenocrysts up to 20 mm												297.2
							297.4 / 591.6																297.4
							297.6 / 591.4																297.6
							297.8 / 591.2																297.8
							298.0																

297.14

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R115 3.02m (100%) 100%	C			298.0 591.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*					298.98: JT, 75° Ca HE, PL, RO 299.00: JT, 75° Ca HE, PL, RO, SA. 299.33: JT, 75° Ca HE, PL, RO		IGNEOUS ROCK - CARRAI ADAMELLITE	298.2 298.4 298.6 298.8 299.0 299.2 299.4 299.6 299.8

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R116 2.99m (100%) 100%	C			300.0 589.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
		0 % Loss					300.2 588.8				300.16 m: increasing abundant of felsic phenocrysts up to 10 mm												
							300.4 588.6																
							300.6 588.4																
							300.8 588.2																
							301.0 588.0																
							301.2 587.8																
							301.4 587.6				301.64 m: becoming finer grained												
							301.6 587.4																
							301.8 587.2																
							302.0																

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R116 2.99m (100%) 100%	C			302.0 587.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	302.2
							302.2 586.8																
							302.4 586.6				302.32 m: becoming coarser grained and porphyritic with felsic phenocrysts up to 15 mm												302.4
							302.6 586.4																302.6
							302.8 586.2																302.8
							303.0 586.0															303.00: Point Load >20KN – No Failure	303.0
			303.15				303.2 585.8																303.2
		0 % Loss	R117 3.01m (100%) 100%	C			303.4 585.6																303.4
							303.6 585.4																303.6
							303.8 585.2																303.8
							304.0																

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Observations and Comments

Notes

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Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
For Inclined Holes: Angles reported in defects are apparent dip from core horizontal unless as α or β.
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R117 3.01m (100%) 100%	C			304.0 585.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	304.2
							304.2 584.8																304.4
							304.4 584.6																304.6
							304.6 584.4																304.8
							304.8 584.2																305.0
							305.0 584.0													305.19: JT, 70° Py HE, PL, RO, 1 mm			305.2
							305.2 583.8																305.4
							305.4 583.6																305.6
							305.6 583.4																305.8
							305.8 583.2																
							306.0																

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL –0.1, L –0.3, M –1, H –3, VH –10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss		C			306.0 583.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE 306.00: Point Load >20KN – No Failure	
							306.2 582.8																306.2
							306.4 582.6																306.4
							306.6 582.4																306.6
							306.8 582.2																306.8
							307.0 582.0																307.0
							307.2 581.8																307.2
							307.4 581.6																307.4
							307.6 581.4																307.6
							307.8 581.2																307.8
		306.16	R118 2.89m (100%) 100%	C			308.0																

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R118 2.89m (100%) 100%	C			308.0 581.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	308.2
							308.2 580.8																308.4
							308.4 580.6																308.6
							308.6 580.4																308.8
							308.8 580.2				308.90 m : becoming finer grained and equigranular												309.0
							309.0 580.0																309.2
							309.2 579.8																309.4
							309.4 579.6																309.6
		0 % Loss	R119 3.13m (100%) 100%	C			309.6 579.4																309.8
							309.8 579.2																
							310.0																

309.05

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● Axial ○ Diametral: VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm): 0, 2, 20, 200, 2000	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R119 3.13m (100%) 100%	C			310.0 / 579.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
							310.2 / 578.8				310.27 m: becoming coarser grained and porphyritic with felsic phenocrysts up to 15 mm												310.2
							310.4 / 578.6																310.4
							310.6 / 578.4																310.6
							310.8 / 578.2																310.8
							311.0 / 578.0															311.00: Point Load >20KN – No Failure	311.0
							311.2 / 577.8																311.2
							311.4 / 577.6																311.4
							311.6 / 577.4																311.6
							311.8 / 577.2																311.8
							312.0																

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss		C			312.0 / 577.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
		0 % Loss	R120 2.99m (100%) 100%	C			312.2 / 576.8																312.2
							312.4 / 576.6																312.4
							312.6 / 576.4																312.6
							312.8 / 576.2																312.8
							313.0 / 576.0																313.0
							313.2 / 575.8																313.2
							313.4 / 575.6																313.4
							313.6 / 575.4																313.6
							313.8 / 575.2																313.8
							314.0																

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R120 2.99m (100%) 100%	C			314.0 575.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*	VL –0.1 L –0.3 M –1 H –3 VH –10 EH	0	2 20 200 2000				IGNEOUS ROCK - CARRAI ADAMELLITE	314.2 314.4 314.6 314.8 315.0 315.2 315.4 315.6 315.8
							314.2 574.8																	
							314.4 574.6																	
							314.6 574.4																	
							314.8 574.2																	
			315.17				315.0 574.0																315.00: Point Load >20KN – No Failure	
							315.2 573.8																	
							315.4 573.6																	
		0 % Loss	R121 3.01m (100%) 100%	C			315.6 573.4																	
							315.8 573.2																	
							316.0																	

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Observations and Comments

Notes

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Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock (0)	Defect Spacing (mm) (2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R121 3.01m (100%) 100%	C			316.0 573.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	316.2
							316.2 572.8																316.4
							316.4 572.6																316.6
							316.6 572.4																316.8
							316.8 572.2																317.0
							317.0 572.0																317.2
							317.2 571.8																317.4
							317.4 571.6																317.6
							317.6 571.4																317.8
							317.8 571.2																
							318.0																

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) *Elevation*	Graphic Log	Soil Code	*Depth* RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● Axial ○ Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R122 2.98m (100%) 100%	C			318.0 *571.0*				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*	VL –0.1 L –0.3 M –1 H –3 VH –10 EH	0	0 2 20 200 2000				IGNEOUS ROCK - CARRAI ADAMELLITE 318.00: Point Load >20KN – No Failure	
							318.2 *570.8*																	318.2
							318.4 *570.6*																	318.4
							318.6 *570.4*																	318.6
							318.8 *570.2*																	318.8
							319.0 *570.0*																	319.0
							319.2 *569.8*																	319.2
							319.4 *569.6*																	319.4
							319.6 *569.4*																	319.6
							319.8 *569.2*																	319.8
							320.0																	

318.18

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock (0)	Defect Spacing (mm) (2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R122 2.98m (100%) 100%	C			320.0 569.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	320.2
							320.2 568.8																320.4
							320.4 568.6																320.6
							320.6 568.4													320.66: JT, 80° Qz HE, PL, RO, 1 mm, SA.			320.8
							320.8 568.2																321.0
							321.0 568.0															321.00: Point Load >20KN – No Failure	321.2
							321.2 567.8																321.4
		0 % Loss	R123 2.99m (100%) 100%	C			321.4 567.6																321.6
							321.6 567.4																321.8
							321.8 567.2																
							322.0																

321.16

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock (0)	Defect Spacing (mm) (2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R123 2.99m (100%) 100%	C			322.0 / 567.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
							322.2 / 566.8																322.2
							322.4 / 566.6																322.4
							322.6 / 566.4																322.6
							322.8 / 566.2																322.8
							323.0 / 566.0																323.0
							323.2 / 565.8																323.2
							323.4 / 565.6				323.42 m: mafic xenolith 75 mm												323.4
							323.6 / 565.4																323.6
							323.8 / 565.2																323.8
							324.0																

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● - Axial ○ - Diametral (VL –0.1, L –0.3, M –1, H –3, VH –10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss		C			324.0 / 565.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE 324.00: Point Load >20KN – No Failure	
							324.2 / 564.8																324.2
							324.4 / 564.6																324.4
							324.6 / 564.4																324.6
							324.8 / 564.2																324.8
		0 % Loss	R124 2.96m (100%) 100%	C			325.0 / 564.0																325.0
							325.2 / 563.8																325.2
							325.4 / 563.6																325.4
							325.6 / 563.4																325.6
							325.8 / 563.2																325.8
							326.0																

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R124 2.96m (100%) 100%	C			326.0 563.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	326.2
							326.2 562.8																326.4
							326.4 562.6																326.6
							326.6 562.4																326.8
							326.8 562.2																327.0
							327.0 562.0																327.2
							327.2 561.8																327.4
							327.4 561.6																327.6
							327.6 561.4																327.8
		0 % Loss	R125 3.05m (100%) 100%	C			327.8 561.2																
							328.0																

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R125 3.05m (100%) 100%	C			328.0 561.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	328.2
							328.2 560.8																328.4
							328.4 560.6																328.6
							328.6 560.4																328.8
							328.8 560.2																329.0
							329.0 560.0																329.2
							329.2 559.8																329.4
							329.4 559.6																329.6
							329.6 559.4																329.8
							329.8 559.2																
							330.0																

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
		0 % Loss		C			330.0 559.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*	VL –0.1 L –0.3 M –1 H –3 VH –10 EH	0 2 20 200 2000				IGNEOUS ROCK - CARRAI ADAMELLITE	
							330.2 558.8																330.2
							330.4 558.6																330.4
							330.6 558.4																330.6
							330.8 558.2																330.8
							331.0 558.0																331.0
							331.2 557.8																331.2
							331.4 557.6																331.4
							331.6 557.4																331.6
							331.8 557.2																331.8
							332.0																
HQ3		330.16																					
		0 % Loss	R126 2.98m (100%) 100%	C																			

331.90 m - 332.18 m: fine grained equigranular felsic layering / intrusion

331.90: Point Load >20KN – No Failure

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R126 2.98m (100%) 100%	C			332.0 557.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*	VL –0.1 L –0.3 M –1 H –3 VH –10 EH	0	2 20 200 2000				IGNEOUS ROCK - CARRAI ADAMELLITE	332.2
							332.2 556.8														332.29-332.31: VE, 10° HE, PL, RO			332.4
							332.4 556.6																	332.6
							332.6 556.4																	332.8
							332.8 556.2																	333.0
							333.0 556.0																333.00: Point Load >20KN – No Failure	
		0 % Loss	R127 3.00m (100%) 100%	C			333.14														333.20: JT, 5° HE, PL, RO			333.2
							333.2 555.8																	333.4
							333.4 555.6																	333.6
							333.6 555.4																	333.8
							333.8 555.2																	
							334.0																	

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Observations and Comments

Notes

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Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss	R127 3.00m (100%) 100%	C			334.0 555.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
							334.2 554.8																334.2
							334.4 554.6																334.4
							334.6 554.4																334.6
							334.8 554.2																334.8
							335.0 554.0																335.0
							335.2 553.8																335.2
							335.4 553.6																335.4
							335.6 553.4																335.6
							335.8 553.2																335.8
							336.0																

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● - Axial ○ - Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock (0)	Defect Spacing (mm) (2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		0 % Loss		C			336.0 / 553.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)* 336.00 m: occasional felsic phenocrysts up to 50 mm				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	336.2
							336.2 / 552.8																336.4
							336.4 / 552.6																336.6
		10 % Loss	R128 1.05m (100%) 100%	C			336.6 / 552.4																336.8
							336.8 / 552.2																337.0
							337.0 / 552.0															337.00: Point Load >20KN – No Failure	337.2
							337.2 / 551.8																337.4
							337.4 / 551.6																337.6
		10 % Loss	R129 2.00m (100%) 100%	C			337.6 / 551.4																337.8
							337.8 / 551.2																
							338.0																

336.14

337.19

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Observations and Comments

Notes

Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted.
Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● - Axial ○ - Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock (0)	Defect Spacing (mm) (2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss	R129 2.00m (100%) 100%	C			338.0 / 551.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
							338.2 / 550.8																338.2
							338.4 / 550.6																338.4
							338.6 / 550.4																338.6
							338.8 / 550.2																338.8
							339.0 / 550.0															339.03: Point Load >20KN – No Failure	339.0
							339.2 / 549.8																339.2
							339.4 / 549.6																339.4
							339.6 / 549.4																339.6
							339.8 / 549.2																339.8
		10 % Loss	R130 3.12m (100%) 100%	C			339.19																
							340.0																

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss	R130 3.12m (100%) 100%	C			340.0 549.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	340.2
							340.2 548.8																340.4
							340.4 548.6				340.47 m: dark grey xenolith > 70 mm												340.6
							340.6 548.4																340.8
							340.8 548.2																341.0
							341.0 548.0																341.2
							341.2 547.8																341.4
							341.4 547.6																341.6
							341.6 547.4																341.8
							341.8 547.2																
							342.0																

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) (● Axial, ○ Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss	R130 3.12m (100%) 100%	C			342.0 547.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*	VL –0.1, L –0.3, M –1, H –3, VH –10, EH	0	2, 20, 200, 2000				IGNEOUS ROCK - CARRAI ADAMELLITE	
							342.2 546.8																	342.2
							342.4 546.6																	342.4
							342.6 546.4																	342.6
							342.8 546.2																342.78: Point Load >20KN – No Failure	342.8
		10 % Loss	R131 2.86m (100%) 100%	C			343.0 546.0				343.17 m: dark grey xenolith 60 mm													343.0
							343.2 545.8																	343.2
							343.4 545.6																	343.4
							343.6 545.4																	343.6
							343.8 545.2																	343.8
							344.0																	

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● Axial ○ Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss	R131 2.86m (100%) 100%	C			344.0 / 545.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*	VL –0.1, L –0.3, M –1, H –3, VH –10, EH	0	2, 20, 200, 2000				IGNEOUS ROCK - CARRAI ADAMELLITE	344.2
							344.2 / 544.8																	344.4
							344.4 / 544.6																	344.6
							344.6 / 544.4																	344.8
							344.8 / 544.2																	345.0
							345.0 / 544.0														344.99: JT, 75° Qz HE, UN, 4 mm		345.00: Point Load >20KN – No Failure	345.2
							345.2 / 543.8																	345.4
		10 % Loss	R132 2.95m (100%) 100%	C			345.4 / 543.6														345.47-345.65: FT, 70° Qz HE			345.6
							345.6 / 543.4																	345.8
							345.8 / 543.2																	
							346.0																	

345.17

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Observations and Comments

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Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss	R132 2.95m (100%) 100%	C			346.0 543.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	346.2
							346.2 542.8																346.4
							346.4 542.6																346.6
							346.6 542.4																346.8
							346.8 542.2																347.0
							347.0 542.0																347.2
							347.2 541.8																347.4
							347.4 541.6																347.6
							347.6 541.4																347.8
							347.8 541.2																
							348.0																

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Observations and Comments

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Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
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SMEC 2.10.10 LIB.GLB Log _SMEC HYBRID BOREHOLE LANDSCAPE 30018018 OVEN MOUNTAIN.GPJ <<DrawingFile>> 28/01/2022 12:34 10.02.00.04 Datgel Tools | Lib: SMEC 2.10.9 2021-08-30 Prj: SMEC 2.10.9 2021-08-30

Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) (● Axial, ○ Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss		C			348.0 / 541.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*	VL –0.1, L –0.3, M –1, H –3, VH –10, EH	0	2, 20, 200, 2000				IGNEOUS ROCK - CARRAI ADAMELLITE 348.00: Point Load >20KN – No Failure	
							348.2 / 540.8																348.2
							348.4 / 540.6																348.4
							348.6 / 540.4																348.6
							348.8 / 540.2																348.8
							349.0 / 540.0														348.98: JT, 80° HE, UN, Trace pyrite.		349.0
							349.2 / 539.8				349.23 m - 350.05 m: fine grained more felsic igneous intrusion / layering												349.2
							349.4 / 539.6																349.4
							349.6 / 539.4																349.6
							349.8 / 539.2																349.8
		10 % Loss	R133 3.04m (100%) 100%	C			350.0																

348.12

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● - Axial ○ - Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock (0)	Defect Spacing (mm) (2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss	R133 3.04m (100%) 100%	C			350.0 / 539.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
							350.2 / 538.8																350.2
							350.4 / 538.6																350.4
							350.6 / 538.4				350.67 m - 350.75 m: fine grained felsic igneous intrusion / layering												350.6
							350.8 / 538.2																350.8
							351.0 / 538.0															351.00: Point Load >20KN – No Failure	351.0
		351.16					351.2 / 537.8				351.19 m - 351.26 m: fine grained felsic igneous intrusion / layering												351.2
							351.4 / 537.6				351.43 m - 351.51 m: fine grained felsic igneous intrusion / layering												351.4
		10 % Loss	R134 3.03m (100%) 100%	C			351.6 / 537.4																351.6
							351.8 / 537.2																351.8
							352.0																

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock (0)	Defect Spacing (mm) (2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss	R134 3.03m (100%) 100%	C			352.0 / 537.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	352.2
							352.2 / 536.8																352.4
							352.4 / 536.6																352.6
							352.6 / 536.4																352.8
							352.8 / 536.2																353.0
							353.0 / 536.0																353.2
							353.2 / 535.8																353.4
							353.4 / 535.6																353.6
							353.6 / 535.4																353.8
							353.8 / 535.2																
							354.0																

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss	R135 3.13m (100%) 100%	C			354.0 / 535.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE 354.00: Point Load >20KN – No Failure	
		10 % Loss					354.2 / 534.8																354.2
							354.4 / 534.6																354.4
							354.6 / 534.4																354.6
							354.8 / 534.2																354.8
				C			355.0 / 534.0															355.00: Point Load >20KN – No Failure	355.0
							355.2 / 533.8																355.2
							355.4 / 533.6																355.4
							355.6 / 533.4																355.6
							355.8 / 533.2																355.8
							356.0																

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Observations and Comments

Notes

Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted.
Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
For Inclined Holes: Angles reported in defects are apparent dip from core horizontal unless as α or β.
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● - Axial ○ - Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock (0)	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss	R135 3.13m (100%) 100%	C			356.0 / 533.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	356.2
							356.2 / 532.8																356.4
							356.4 / 532.6																356.6
							356.6 / 532.4																356.8
							356.8 / 532.2																357.0
							357.0 / 532.0															357.00: Point Load >20KN – No Failure	357.2
							357.2 / 531.8				357.21 m - 378.17 m: Core jammed in barrel unable to retrieve, will try next year												357.4
		357.32					357.4 / 531.6																357.6
		10 % Loss	R136 2.87m (100%) 100%	C			357.6 / 531.4				357.56 m - 357.67 m: fine to medium grained												357.8
							357.8 / 531.2																
							358.0																

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Observations and Comments

Notes

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Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss	R136 2.87m (100%) 100%	C			358.0 / 531.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
							358.2 / 530.8																358.2
							358.4 / 530.6																358.4
							358.6 / 530.4																358.6
							358.8 / 530.2																358.8
							359.0 / 530.0																359.0
							359.2 / 529.8																359.2
							359.4 / 529.6																359.4
							359.6 / 529.4																359.6
							359.8 / 529.2																359.8
							360.0																

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss	R137 3.07m (100%) 100%	C			360.0 529.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
		10 % Loss					360.19																360.2
							360.2 528.8																
							360.4 528.6																360.4
							360.6 528.4																360.6
							360.8 528.2																360.8
				C			361.0 528.0				361.04 m: fine grained												361.0
							361.2 527.8																361.2
							361.4 527.6																361.4
							361.6 527.4				361.64 m: fine grained												361.6
							361.8 527.2																361.8
							362.0																

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Observations and Comments

Notes

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Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● - Axial ○ - Diametral (VL –0.1, L –0.3, M –1, H –3, VH –10, EH)	Relative Strength Soil-Rock (0)	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss	R137 3.07m (100%) 100%	C			362.0 / 527.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	362.2
							362.2 / 526.8																362.4
							362.4 / 526.6																362.6
							362.6 / 526.4																362.8
							362.8 / 526.2																363.0
							363.0 / 526.0															363.00: Point Load >20KN – No Failure	
							363.2 / 525.8																363.2
							363.4 / 525.6																363.4
		10 % Loss	R138 2.91m (100%) 100%	C			363.6 / 525.4																363.6
							363.8 / 525.2																363.8
							364.0																

363.26

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Observations and Comments

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Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss	R138 2.91m (100%) 100%	C			364.0 / 525.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
							364.2 / 524.8																364.2
							364.4 / 524.6																364.4
							364.6 / 524.4																364.6
							364.8 / 524.2																364.8
							365.0 / 524.0																365.0
							365.2 / 523.8																365.2
							365.4 / 523.6																365.4
							365.6 / 523.4																365.6
							365.8 / 523.2																365.8
							366.0																

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Observations and Comments

Notes

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Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
For Inclined Holes: Angles reported in defects are apparent dip from core horizontal unless as α or β.
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss	R139 2.99m (100%) 100%	C			366.0 / 523.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE 366.00: Point Load >20KN – No Failure	366.2 366.4 366.6 366.8 367.0 367.2 367.4 367.6 367.8
							366.2 / 522.8																
							366.4 / 522.6																
							366.6 / 522.4																
							366.8 / 522.2																
							367.0 / 522.0																
							367.2 / 521.8																
							367.4 / 521.6																
							367.6 / 521.4																
							367.8 / 521.2																
							368.0																

10 % Loss at 366.17

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Observations and Comments

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) *Elevation*	Graphic Log	Soil Code	*Depth* RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss	R139 2.99m (100%) 100%	C			368.0 *521.0*				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*	VL 0.1 L 0.3 M 1 H 3 VH 10 EH	0	2 20 200 2000				IGNEOUS ROCK - CARRAI ADAMELLITE	
							368.2 *520.8*																	368.2
							368.4 *520.6*																	368.4
							368.6 *520.4*																	368.6
							368.8 *520.2*																	368.8
							369.0 *520.0*																369.00: Point Load >20KN – No Failure	369.0
							369.2 *519.8*																	369.2
							369.4 *519.6*																369.35: Point Load >20KN – No Failure	369.4
		10 % Loss	R140 3.04m (100%) 100%	C			369.6 *519.4*																	369.6
							369.8 *519.2*																	369.8
							370.0																	

369.16

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss	R140 3.04m (100%) 100%	C			370.0 519.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
							370.2 518.8																370.2
							370.4 518.6				370.39 m - 371.23 m: fine to medium grained												370.4
							370.6 518.4																370.6
							370.8 518.2																370.8
							371.0 518.0																371.0
							371.2 517.8																371.2
							371.4 517.6																371.4
							371.6 517.4																371.6
							371.8 517.2																371.8
							372.0																

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Observations and Comments

Notes

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For Inclined Holes: Angles reported in defects are apparent dip from core horizontal unless as α or β.
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss		C			372.0 517.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
		10 % Loss					372.20																
							372.2 516.8																372.2
							372.4 516.6																372.4
							372.6 516.4																372.6
							372.8 516.2																372.8
							373.0 516.0																373.0
							373.2 515.8																373.2
							373.4 515.6																373.4
							373.6 515.4																373.6
							373.8 515.2																373.8
							374.0																

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Observations and Comments

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Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted.
Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
For Inclined Holes: Angles reported in defects are apparent dip from core horizontal unless as α or β.
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		10 % Loss					374.0 / 515.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
							374.2 / 514.8																374.2
							374.4 / 514.6																374.4
							374.6 / 514.4																374.6
							374.8 / 514.2																374.8
							375.0 / 514.0																375.0
		375.21					375.2 / 513.8																375.2
							375.4 / 513.6																375.4
		50 % Loss	R141 2.96m (100%) 100%	C			375.6 / 513.4																375.6
							375.8 / 513.2																375.8
							376.0																

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		50 % Loss	R141 2.96m (100%) 100%	C			376.0 513.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
							376.2 512.8																376.2
							376.4 512.6																376.4
							376.6 512.4																376.6
							376.8 512.2																376.8
							377.0 512.0																377.0
							377.2 511.8																377.2
							377.4 511.6																377.4
							377.6 511.4																377.6
							377.8 511.2																377.8
							378.0																

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL –0.1, L –0.3, M –1, H –3, VH –10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		50 % Loss	378.17	C			378.0 511.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE 378.00: Point Load >20KN – No Failure	378.2 378.4 378.6 378.8 379.0 379.2 379.4 379.6 379.8
		50 % Loss	R142 3.00m (100%) 100%	C			378.2 510.8 378.4 510.6 378.6 510.4 378.8 510.2 379.0 510.0 379.2 509.8 379.4 509.6 379.6 509.4 379.8 509.2 380.0															

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) *Elevation*	Graphic Log	Soil Code	*Depth* RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
	HQ3	50 % Loss	R142 3.00m (100%) 100%	C			380.0 *509.0*				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*	VL –0.1 L –0.3 M –1 H –3 VH –10 EH	0	2 20 200 2000				IGNEOUS ROCK - CARRAI ADAMELLITE	
							380.2 *508.8*																	380.2
							380.4 *508.6*																	380.4
							380.6 *508.4*																	380.6
							380.8 *508.2*																	380.8
							381.0 *508.0*																381.00: Point Load >20KN – No Failure	381.0
		50 % Loss	R143 3.00m (100%) 100%	C			381.17																	
							381.2 *507.8*																	381.2
							381.4 *507.6*																	381.4
							381.6 *507.4*																	381.6
							381.8 *507.2*																	381.8
							382.0																	

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Observations and Comments

Notes

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Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
For Inclined Holes: Angles reported in defects are apparent dip from core horizontal unless as α or β.
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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL –0.1, L –0.3, M –1, H –3, VH –10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		50 % Loss	R143 3.00m (100%) 100%	C			382.0 / 507.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
							382.2 / 506.8																382.2
							382.4 / 506.6																382.4
							382.6 / 506.4																382.6
							382.8 / 506.2																382.8
							383.0 / 506.0																383.0
							383.2 / 505.8																383.2
							383.4 / 505.6																383.4
							383.6 / 505.4																383.6
							383.8 / 505.2																383.8
							384.0																

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) *Elevation*	Graphic Log	Soil Code	*Depth* RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● - Axial ○ - Diametral)	Relative Strength Soil-Rock	Defect Spacing (mm)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
		50 % Loss		C			384.0 *505.0*				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*	VL –0.1 L –0.3 M –1 H –3 VH –10 EH	0 2 20 200 2000				IGNEOUS ROCK - CARRAI ADAMELLITE 384.00: Point Load >20KN – No Failure	
							384.2 *504.8*																384.2
							384.4 *504.6*																384.4
							384.6 *504.4*																384.6
							384.8 *504.2*																384.8
	HQ3		R144 2.98m (100%) 100%				385.0 *504.0*																385.0
		50 % Loss		C			385.2 *503.8*																385.2
							385.4 *503.6*																385.4
							385.6 *503.4*																385.6
							385.8 *503.2*																385.8
							386.0																

384.17

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Testing: Permeability, Level & Inflow	Depth (m) Elevation	Graphic Log	Soil Code	Depth RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Relative Strength Soil-Rock (0)	Defect Spacing (mm) (2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		50 % Loss	R144 2.98m (100%) 100%	C			386.0 503.0				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	386.2
							386.2 502.8																386.4
							386.4 502.6																386.6
							386.6 502.4																386.8
							386.8 502.2																387.0
							387.0 502.0																387.2
							387.2 501.8																387.4
							387.4 501.6																387.6
							387.6 501.4																387.8
							387.8 501.2																
							388.0																
		90 % Loss	R145 2.87m (100%) 100%	C																			

387.15

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Observations and Comments

Notes

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Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520
Site	Site 8	Elevation	889.000 m			Mounting	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD			Inclination	90°
						Azimuth	
						North	
						Survey	

SMEC

Borehole Identifier: **BH4B**

Testing

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) *Elevation*	Graphic Log	Soil Code	*Depth* RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength (Point Load Is(50) ● Axial ○ Diametral: VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm): 0, 2, 20, 200, 2000	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
HQ3		90 % Loss	R145 2.87m (100%) 100%	C			388.0 *501.0*				GRANODIORITE: pale grey to dark grey, fine to coarse grained, crystalline, massive, equiangular to porphyritic, igneous layering. *(continued)*				F *(cont)*	VH *(cont)*						IGNEOUS ROCK - CARRAI ADAMELLITE	
							388.2 *500.8*																388.2
							388.4 *500.6*																388.4
							388.6 *500.4*																388.6
							388.8 *500.2*																388.8
							389.0 *500.0*															389.00: Point Load >20KN – No Failure	389.0
							389.2 *499.8*																389.2
							389.4 *499.6*																389.4
							389.6 *499.4*																389.6
							389.8 *499.2*																389.8
							390.0																

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Observations and Comments

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Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
For Inclined Holes: Angles reported in defects are apparent dip from core horizontal unless as α or β.
Refer to explanatory notes for SMEC logs for details of abbreviations or basis of description.

Logged By	EM/LJ	Date	11/10/2021
Approved By		Date	
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SMEC 2.10.10 LIB.GLB Log _SMEC HYBRID BOREHOLE LANDSCAPE 30018018 OVEN MOUNTAIN.GPJ <<DrawingFile>> 28/01/2022 12:34 10.02.00.04 Datgel Tools | Lib: SMEC 2.10.9 2021-08-30 Prj: SMEC 2.10.9 2021-08-30

Geological & Engineering Log

Project	Oven Mountain Pumped Hydro Energy Storage	East	421495.000 m	Start Date	11/10/2021	Contractor	Mulligan Geotechnical	Inclination	90°
Client	OMPS Pty Ltd	North	6591280.000 m	End Date	11/10/2021	Rig Type	Boart Longyear DB520	Azimuth	
Site	Site 8	Elevation	889.000 m			Mounting		North	
Job Number	30018018	Datum	MGA2020 Zone 56/AHD					Survey	

SMEC

Borehole Identifier: **BH4B**

Method	Casing Support	Water (Gain/Loss)	Run (TCR) RQD	Sampling	Testing: Strength SPT, DCP, Is(50) (MPa), PP (UCS kPa), SV (kPa)	Permeability, Level & Inflow	Depth (m) / Elevation	Graphic Log	Soil Code	Depth / RL	Soil / Rock Material Description	Moisture Condition	Consistency Density	Alteration	Weathering	Rock Strength	Inferred Rock Strength: Point Load Is(50) ● Axial ○ Diametral (VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	Relative Strength Soil-Rock	Defect Spacing (mm) (0, 2, 20, 200, 2000)	Visual	Fabric, Structure & Defect Description	Group Defects	Origin, Stratigraphic Unit & General Observations	Installation
			390.02				390.0 / 499.0			498.98	Hole Terminated at 390.02 m												
							390.2 / 498.8																390.2
							390.4 / 498.6																390.4
							390.6 / 498.4																390.6
							390.8 / 498.2																390.8
							391.0 / 498.0																391.0
							391.2 / 497.8																391.2
							391.4 / 497.6																391.4
							391.6 / 497.4																391.6
							391.8 / 497.2																391.8
							392.0																

Draft

Observations and Comments

Notes

Classifications compliant with AS1726-2017: Geotechnical Site Investigations unless otherwise noted.
Defect Log Abridged. Additional detail in digital dataset. Lugeon: BS5930:1999
For Inclined Holes: Angles reported in defects are apparent dip from core horizontal unless as α or β.
Refer to explanatory notes for SMEC logs for details of abbreviations or basis of description.

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SMEC 2.10.10 LIB.GLB Log _SMEC HYBRID BOREHOLE LANDSCAPE 30018018 OVEN MOUNTAIN.GPJ <<DrawingFile>> 28/01/2022 12:34 10.02.00.04 Datgel Tools | Lib: SMEC 2.10.9 2021-08-30 Prj: SMEC 2.10.9 2021-08-30

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Hydrogeological notes and symbols

In general accordance with AS1726-2017

Groundwater observations

Yield test | Water strike | Water dip | Water level

Soil

Components	Division	Size (mm)	Fraction
Boulder		>200	Oversize
Cobble		63-200	
Gravel	Coarse Medium Fine	19.00-63.00 6.70-19.00 2.36-6.70	Coarse grained
Sand	Coarse Medium Fine	0.60-2.36 0.21-0.60 0.075-0.21	

Components	Size (mm)	Fraction
Silt	0.002-0.075	Fine grained
Clay	<0.002	
Peat	Soil comprising >25% organic content	
Fill	Anthropogenic or collapsed material	

Rock

Sedimentary	Metamorphic	Igneous	Duricrust
Limestone	Gneiss	Gabbro	Ferricrete
Conglomerate	Schist	Dolerite	Gypcrete
Breccia	Phyllite	Basalt	Calcrete
Sandstone	Slate	Diorite	Silicrete
Siltstone	Marble	Microdiorite	
Claystone	Serpentinite	Andesite	
Coal	Hornfel	Granite	
Tuff	Quartzite	Microgranite	
Gypsum/Rocksalt etc.		Rhyolite	

Well construction

Bentonite	Gravel pack	Grout	Pipe	Screen
Mudex, TR30, 1/4" coated bentonite chips	Blue Circle specialised sand, 2 mm, washed	Cement based grout, approximately 1:1 mix	PVC, 50 mm diameter, class 18, threaded with O-ring	PVC, 50 mm diameter, class 18, horizontal slots, 0.4 mm aperture, threaded with O-ring

mbgl = metres below ground level

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Monitoring bore

ID: MB01A

Project:	OMPS-Stage 1 hydrogeological drilling
Project ID:	E210769
Client:	SMEC Australia Pty Limited
Site:	Oven Mountain, Carrai, NSW
Logged by:	HJN
Date:	17–21 October 2021

Easting:	419853.6
Northing:	6593143.5
Spatial reference:	MGA Zone 56
Elevation (collar):	183.9 mAHD
Elevation (ground):	182.8 mAHD
Nominal diameter:	125 mm

Screened lithology: Carrai Granodiorite **Drilling method/s:** Pneumatic hammer **Water level depth:** 9.93 mbgl

Screened depth: 28.5–34.5 mbgl **Total depth:** 36.5 mbgl **Level date; time:** 21 October 2021, 12:12

Depth (m)	Method	Penetration	Lithology: Graphic	Lithology: Formation	Lithology: Description (See AS1726-2017)	Water obs.	Additional notes	Bore design	RL (mAHD)
0	125 mm pneumatic hammer			Residual	SAND: Medium toCoarse, brown, angular with clay, brown, trace organics, roots ~1-3 mm, dry, residual.				
				Carrai Granodiorite	SAND: Extremely weathered monzogranite; Coarse grained, pale brown, 50% quartz, 50% mixed feldspar, dry.				180
					SYENOGRANITE: Coarse grained, pale pinkish brown, ~60% quartz, 30% biotite, 10% plagioclase, dry, moderately weathered.				
					SAND: Extremely weathered monzogranite; Coarse grained, pale brown, 50% quartz, 50% plagioclase, dry.				
					GRANODIORITE: Coarse grained, pale pinkish brown, ~60% quartz, 30% biotite, 10% plagioclase, dry, highly weathered.				
10						▼	9.93 m: Recovered water level		
					GRANODIORITE: Coarse grained, reddish brown, 5% quartz, 80% plagioclase, 15% horneblende, highly weathered, moist.	K	12.35 m: Very low yield, depleting		170
					GRANODIORITE: Coarse grained, pale greyish red, 40% quartz, 40% plagioclase, 15% biotite, 5% pyrite, fresh, dry.				
					GRANODIORITE: Coarse grained, white and dark grey, 60% quartz, 10% biotite, 10% plagioclase, 20% horneblende, fresh, dry.				

Company: Numac Drilling Services Pty Ltd **Water quality:** pH = 7.23; SPC = 647 µs/cm; Temp = 20.8°C; ORP = 95.1 mV

Driller: Justin Collyer **Termination details:** Borehole terminated at target depth of 36.5 m

File path: MB01A.ldat8

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Monitoring bore

ID: MB01A

Project:	OMPS-Stage 1 hydrogeological drilling
Project ID:	E210769
Client:	SMEC Australia Pty Limited
Site:	Oven Mountain, Carrai, NSW
Logged by:	HJN
Date:	17–21 October 2021

Easting:	419853.6
Northing:	6593143.5
Spatial reference:	MGA Zone 56
Elevation (collar):	183.9 mAHD
Elevation (ground):	182.8 mAHD
Nominal diameter:	125 mm

Screened lithology: Carrai Granodiorite **Drilling method/s:** Pneumatic hammer **Water level depth:** 9.93 mbgl

Screened depth: 28.5–34.5 mbgl **Total depth:** 36.5 mbgl **Level date; time:** 21 October 2021, 12:12

Depth (m)	Method	Penetration	Lithology: Graphic	Lithology: Formation	Lithology: Description (See AS1726-2017)	Water obs.	Additional notes	Bore design	RL (mAHD)
20	125 mm pneumatic hammer			Carrai Granodiorite		∅	21 m: 0.5 L/sec, pH 7.86, SPC 630 µS/cm, Temp 17.5°C, Eh 152.8 mV		160
					GRANODIORITE: As above, pale grey, pale green and dark grey, trace slightly weathered chips in return, likely aplite instrusions throughout granodiorite.				
					GRANODIORITE: As above, 50% quartz, 10% plagioclase, 20% horneblende, 10% biotite, 10% pyrite.				
30						⋈	32.8 m: 0.2 L/sec, pH 8.27, SPC 401 µS/cm, Temp 21.0°C, Eh 94.1 mV		150
						∅	34 m: 0.2 L/sec, pH 8.71, SPC 361 µS/cm, Temp 22.9°C, Eh 86.0 mV		

Company: Numac Drilling Services Pty Ltd **Water quality:** pH = 7.23; SPC = 647 µs/cm; Temp = 20.8°C; ORP = 95.1 mV

Driller: Justin Collyer **Termination details:** Borehole terminated at target depth of 36.5 m

File path: MB01A.ldat8

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Monitoring bore

ID: MB02A

Project:	OMPS-Stage 1 hydrogeological drilling
Project ID:	E210769
Client:	SMEC Australia Pty Limited
Site:	Oven Mountain, Carrai, NSW
Logged by:	HJN
Date:	10–11 December 2021

Easting:	420108.5
Northing:	6592190.8
Spatial reference:	MGA Zone 56
Elevation (collar):	303.5 mAHD
Elevation (ground):	302.4 mAHD
Nominal diameter:	150 mm

Screened lithology: Carrai Granodiorite **Drilling method/s:** Pneumatic hammer **Water level depth:** 19.27 mbgl

Screened depth: 25.6–31.6 mbgl **Total depth:** 34.5 m **Level date; time:** 25 January 2022, 09:44

Depth (m)	Method	Penetration	Lithology: Graphic	Lithology: Formation	Lithology: Description (See AS1726-2017)	Water obs.	Additional notes	Bore design	RL (mAHD)
0	150 mm pneaumatic hammer			Residual	Silty SAND: Medium grained, pale reddish brown, angular, moist, quartzose. Residual				
					Sandy GRAVEL: Fine grained, pale brown, angular, Sand is medium grained, angular, quartzose. With pyrite, moist. Residual				300
				Carrai Granodiorite	Sandy GRAVEL: Extremely weathered granodiorite, fine grained, pale brown, angular, sand is medium grained, angular, quartzose. Trace pyrite. Dry	⊻	4 m: Depleting, potential perched surface contact		
					GRANODIORITE: Coarse grained, pale yellowish red, moderately weathered, dry. 40% quartz, 10% biotite, 50% plagioclase		6.8–7 m: Highly weathered section		
10					GRANODIORITE: As above, pale grey, slightly weathered		11.2–12 m: Moderately weathered section		
					GRANODIORITE: As above, 40% quartz, 10% biotite, 20% horneblende, 30% plagioclase				290
					GRANODIORITE: As above, fresh				

Company: Numac Drilling Services Pty Ltd **Water quality:** pH = 6.96; SPC = 620 µs/cm; Temp = 21.6°C; ORP = 71.7 mV

Driller: Steffan Colls **Termination details:** Borehole terminated at target depth of 34.5 m.

File path: MB02A.ldat8

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Monitoring bore

ID: MB02A

Project:	OMPS-Stage 1 hydrogeological drilling
Project ID:	E210769
Client:	SMEC Australia Pty Limited
Site:	Oven Mountain, Carrai, NSW
Logged by:	HJN
Date:	10–11 December 2021

Easting:	420108.5
Northing:	6592190.8
Spatial reference:	MGA Zone 56
Elevation (collar):	303.5 mAHD
Elevation (ground):	302.4 mAHD
Nominal diameter:	150 mm

Screened lithology: Carrai Granodiorite
Screened depth: 25.6–31.6 mbgl
Drilling method/s: Pneumatic hammer
Total depth: 34.5 m
Water level depth: 19.27 mbgl
Level date; time: 25 January 2022, 09:44

Depth (m)	Method	Penetration	Lithology: Graphic	Lithology: Formation	Lithology: Description (See AS1726-2017)	Water obs.	Additional notes
	150 mm pneaumatic hammer			Carrai Granodiorite			17.9 m: No yield, colour change in rock and slightly damp
							19.27 m: Recovered water level
							28 m: <0.01L/sec
							29–34.5 m: Moderately weathered chip samples
							31 m: 0.02 L/sec, pH 8.30, SPC 1110 µS/cm, Temp 18.8°C, Eh 36.0 mV

Bore design

RL (mAHD): 280, 270

Company: Numac Drilling Services Pty Ltd
Driller: Steffan Colls
Water quality: pH = 6.96; SPC = 620 µs/cm; Temp = 21.6°C; ORP = 71.7 mV
Termination details: Borehole terminated at target depth of 34.5 m.

File path: MB02A.ldat8

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Monitoring bore

ID: MB02B

Project:	OMPS-Stage 1 hydrogeological drilling
Project ID:	E210769
Client:	SMEC Australia Pty Limited
Site:	Oven Mountain, Carrai, NSW
Logged by:	QB AB
Date:	15 January–9 February 2022

Easting:	420094
Northing:	6592175.2
Spatial reference:	MGA Zone 56
Elevation (collar):	301.5 mAHD
Elevation (ground):	300.6 mAHD
Nominal diameter:	200 mm

Screened lithology: Carrai Granodiorite **Drilling method/s:** Pneumatic hammer **Water level depth:** 19.05 mbgl

Screened depth: 173.5–185.5 mbgl **Total depth:** 187 mbgl **Level date; time:** 10 February 2022; 12:00

Depth (m)	Method	Penetration	Lithology: Graphic	Lithology: Formation	Lithology: Description (See AS1726-2017)	Water obs.	Additional notes
0	200 mm pneumatic hammer			Residual	SAND: Fine to coarse, brown orange with 20% quartz gravel 2-7 mm, micaceous		
					SAND: Fine to medium, pale brown, quartz and feldspar, with 5% mica		
					SANDY GRAVEL: Medium grained 2-7 mm, brown, quartz and 5% horneblende and mica		
10				Carrai Granodiorite	GRANODIORITE: Coarse grained, grey to white with some yellow oxidation, moderately weathered , 40% quartz ,40% plagioclase, 20% horneblende, trace mica.		
					GRANODIORITE: As above, trace green, slightly weathered	∅	13 m: <0.01 L/sec, pH 11.41, SPC 233 µS/cm, Temp 20.3°C, Eh 49.0 mV
						∅	16 m: <0.01 L/sec, pH 10.91, SPC 187 µS/cm, Temp 18.4°C, Eh 187.1 mV
20					GRANODIORITE: As above, fresh	∅	19 m: <0.01 L/sec, pH 10.27, SPC 343.7 µS/cm, Temp 22.3°C, Eh 50.7 mV
						▼	19.05 m: Recovered water level
						∅	22 m: <0.01 L/sec, pH 11.20, SPC 303.7 µS/cm, Temp 22.1°C, Eh 51.7 mV
					GRANODIORITE: As above, increasing quartz content. 50% quartz, 30% plagioclase, 20% horneblende	∅	25 m: <0.01 L/sec, pH 11.78, SPC 292.5 µS/cm, Temp 22.2°C, Eh 42.5 mV
30							

Bore design

RL (mAHD)
300
290
280
270

Company: Numac Drilling Services Pty Ltd **Water quality:** pH = 8.14; SPC = 495 µs/cm; Temp = 20.7°C; ORP = 82.9 mV

Driller: Steffan Colls **Termination details:** Borehole terminated at target depth of 187 m.

File path: MB02B.ldat8

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Monitoring bore

ID: MB02B

Project:	OMPS-Stage 1 hydrogeological drilling
Project ID:	E210769
Client:	SMEC Australia Pty Limited
Site:	Oven Mountain, Carrai, NSW
Logged by:	QB AB
Date:	15 January–9 February 2022

Easting:	420094
Northing:	6592175.2
Spatial reference:	MGA Zone 56
Elevation (collar):	301.5 mAHD
Elevation (ground):	300.6 mAHD
Nominal diameter:	200 mm

Screened lithology: Carrai Granodiorite **Drilling method/s:** Pneumatic hammer **Water level depth:** 19.05 mbgl

Screened depth: 173.5–185.5 mbgl **Total depth:** 187 mbgl **Level date; time:** 10 February 2022; 12:00

Depth (m)	Method	Penetration	Lithology: Graphic	Lithology: Formation	Lithology: Description (See AS1726-2017)	Water obs.	Additional notes	Bore design	RL (mAHD)
40	200 mm pneumatic hammer			Carrai Granodiorite	GRANODIORITE: As above, slightly weathered GRANODIORITE: As above, fresh	∅	34 m: <0.02 L/sec, pH 10.66, SPC 335.1 µS/cm, Temp 19.3°C, Eh 122.3 mV		260
						∅	37 m: <0.02 L/sec, pH 10.56, SPC 373.6 µS/cm, Temp 18.6°C, Eh 128.7 mV		
						∅	40 m: <0.02 L/sec, pH 5.50, SPC 381.8 µS/cm, Temp 19.8°C, Eh 120.1 mV		
50						∅	43 m: no WQ, too much foam		250
					GRANODIORITE: As above, slightly weathered GRANODIORITE: As above, fresh	∅	52 m: <0.02 L/sec, pH 11.3, SPC 325.9 µS/cm, Temp 21.4°C, Eh 105.2 mV		
						∅	55 m: <0.02 L/sec		
60						∅	58 m: <0.02 L/sec, pH 11.93, SPC 335.6 µS/cm, Temp 21.7°C, Eh 68.8 mV		240

Company: Numac Drilling Services Pty Ltd **Water quality:** pH = 8.14; SPC = 495 µs/cm; Temp = 20.7°C; ORP = 82.9 mV

Driller: Steffan Colls **Termination details:** Borehole terminated at target depth of 187 m.

File path: MB02B.ldat8

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Monitoring bore

ID: MB02B

Project:	OMPS-Stage 1 hydrogeological drilling
Project ID:	E210769
Client:	SMEC Australia Pty Limited
Site:	Oven Mountain, Carrai, NSW
Logged by:	QB AB
Date:	15 January–9 February 2022

Easting:	420094
Northing:	6592175.2
Spatial reference:	MGA Zone 56
Elevation (collar):	301.5 mAHD
Elevation (ground):	300.6 mAHD
Nominal diameter:	200 mm

Screened lithology: Carrai Granodiorite **Drilling method/s:** Pneumatic hammer **Water level depth:** 19.05 mbgl

Screened depth: 173.5–185.5 mbgl **Total depth:** 187 mbgl **Level date; time:** 10 February 2022; 12:00

Depth (m)	Method	Penetration	Lithology: Graphic	Lithology: Formation	Lithology: Description (See AS1726-2017)	Water obs.	Additional notes	Bore design	RL (mAHD)
	200 mm pneumatic hammer			Carrai Granodiorite	GRANODIORITE: As above , trace clay in return, potential weathered seam.		65.5 m: <1 L/sec, pH 11.83, SPC 543.0 µS/cm, Temp 21.4°C, Eh -21.4 mV		
					GRANODIORITE: As above, fresh				
70					GRANODIORITE: As above, trace low durability chips in return, slightly weathered		70 m: <1 L/sec, pH 11.80, SPC 532.6 µS/cm, Temp 20.9°C, Eh -24.9 mV		230
					GRANODIORITE: As above, 70% horneblende 30% quartz		76 m: <1 L/sec		
					GRANODIORITE: As above, fresh		79 m: <1 L/sec, pH 10.61, SPC 494.1 µS/cm, Temp 20.3°C, Eh 31.3 mV		
80									220
							82 m: <1 L/sec, pH 11.48, SPC 518.4 µS/cm, Temp 20.6°C, Eh 121.6 mV		
							85 m: <1 L/sec, pH 11.01, SPC 528.0 µS/cm, Temp 20.1°C, Eh 4.3 mV		
							88 m: <1 L/sec, pH 10.92, SPC 529.0 µS/cm, Temp 20.0°C, Eh 6.4 mV		
90									
							91 m: <1 L/sec, pH 10.60, SPC 536.0 µS/cm, Temp 20.0°C, Eh -0.3 mV		210

Company: Numac Drilling Services Pty Ltd **Water quality:** pH = 8.14; SPC = 495 µs/cm; Temp = 20.7°C; ORP = 82.9 mV

Driller: Steffan Colls **Termination details:** Borehole terminated at target depth of 187 m.

File path: MB02B.ldat8

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Monitoring bore

ID: MB02B

Project:	OMPS-Stage 1 hydrogeological drilling
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Client:	SMEC Australia Pty Limited
Site:	Oven Mountain, Carrai, NSW
Logged by:	QB AB
Date:	15 January–9 February 2022
Easting:	420094
Northing:	6592175.2
Spatial reference:	MGA Zone 56
Elevation (collar):	301.5 mAHD
Elevation (ground):	300.6 mAHD
Nominal diameter:	200 mm

Screened lithology: Carrai Granodiorite **Drilling method/s:** Pneumatic hammer **Water level depth:** 19.05 mbgl

Screened depth: 173.5–185.5 mbgl **Total depth:** 187 mbgl **Level date; time:** 10 February 2022; 12:00

Depth (m)	Method	Penetration	Lithology: Graphic	Lithology: Formation	Lithology: Description (See AS1726-2017)	Water obs.	Additional notes	Bore design	RL (mAHD)
100	200 mm pneumatic hammer			Carrai Granodiorite	GRANODIORITE: Coarse grained, pale grey and dark grey, fresh, dry, 60% quartz, 25% biotite	∅	94 m: <1 L/sec, pH 11.18, SPC 547.5 µS/cm, Temp 19.9°C, Eh -8.7 mV		200
						∅	97 m: <0.5 L/sec, pH 8.17, SPC 472.2 µS/cm, Temp 20.4°C, Eh 127.9 mV		
					GRANODIORITE: Grey, pale orange and dark grey, ferruginous colouring, moderately to slightly weathered		100.5m: Potential fracture		
							103 m: Minor Potential fracture		
						∅	103 m: <0.7 L/sec, pH 9.27, SPC 451 µS/cm, Temp 21.3°C, Eh 90.7 mV		
					GRANODIORITE: Pale grey, dark grey, fresh				
					GRANODIORITE: Grey and dark grey, minor ferruginous colouring, slightly weathered				
						∅	109 m: <0.5 L/sec, pH 8.17, SPC 492 µS/cm, Temp 20.1°C, Eh 121.3 mV		
110					GRANODIORITE: Increasing feldspar, 60% quartz, 25% biotite, 15% feldspar				190
					GRANODIORITE: Grey, pale orange, dark grey, ferruginous colouring, slight to moderately weathered		112–113 m: Potential fracture		
							115 m: Potential fracture		
					GRANODIORITE: Grey and dark grey, minor ferruginous colouring, slightly weathered	∅	115 m: <0.5 L/sec, pH 8.28, SPC 489.6 µS/cm, Temp 20.3°C		
						∅	118–123 m: Potential fracture		
120						∅	121 m: <0.5 L/sec, pH 8.36, SPC 503.3 µS/cm, Temp 21.7°C		180
					GRANODIORITE: Grey to pale orange and dark grey, ferruginous colouring observed, slightly to		124–127 m: Potential fracture		

Company: Numac Drilling Services Pty Ltd **Water quality:** pH = 8.14; SPC = 495 µs/cm; Temp = 20.7°C; ORP = 82.9 mV

Driller: Steffan Colls **Termination details:** Borehole terminated at target depth of 187 m.

File path: MB02B.ldat8

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Monitoring bore

ID: MB02B

Project:	OMPS-Stage 1 hydrogeological drilling
Project ID:	E210769
Client:	SMEC Australia Pty Limited
Site:	Oven Mountain, Carrai, NSW
Logged by:	QB AB
Date:	15 January–9 February 2022

Easting:	420094
Northing:	6592175.2
Spatial reference:	MGA Zone 56
Elevation (collar):	301.5 mAHD
Elevation (ground):	300.6 mAHD
Nominal diameter:	200 mm

Screened lithology: Carrai Granodiorite **Drilling method/s:** Pneumatic hammer **Water level depth:** 19.05 mbgl

Screened depth: 173.5–185.5 mbgl **Total depth:** 187 mbgl **Level date; time:** 10 February 2022; 12:00

Depth (m)	Method	Penetration	Lithology: Graphic	Lithology: Formation	Lithology: Description (See AS1726-2017)	Water obs.	Additional notes	Bore design	RL (mAHD)
	200 mm pneumatic hammer			Carrai Granodiorite	moderately weathered	∅	127 m: <0.6 L/sec, pH 8.32, SPC 498.2 µS/cm, Temp 21.8°C, Eh 108.9 mV		
130					GRANODIORITE: Pale grey and dark grey, very minor ferruginous staining, slightly weathered				170
					GRANODIORITE: Pale grey and dark grey, fresh	∅	133 m: <0.9 L/sec, pH 8.20, SPC 500.5 µS/cm, Temp 22.3°C, Eh 102.2 mV		
					GRANODIORITE: Grey, pale orange, and dark grey, slightly to moderately weathered		135 m: Potential fracture		
					GRANODIORITE: Grey and dark grey, minor ferruginous colouring, slightly weathered	∅	139 m: <0.7 L/sec, pH 8.38, SPC 502 µS/cm, Temp 22.1°C, Eh 67.0 mV		
140									160
					GRANODIORITE: Pale grey and dark grey, fresh	∅	145 m: <0.7 L/sec, pH 8.39, SPC 511.2 µS/cm, Temp 23.0°C, Eh 96.2 mV		
150									150
						∅	151 m: <0.7 L/sec, pH 8.47, SPC 526 µS/cm, Temp 23.0°C, Eh 68.5 mV		
					GRANODIORITE: Grey and dark grey, minor ferruginous colouring, slightly weathered				
					GRANODIORITE: Pale grey and dark grey, fresh				

Company: Numac Drilling Services Pty Ltd **Water quality:** pH = 8.14; SPC = 495 µs/cm; Temp = 20.7°C; ORP = 82.9 mV

Driller: Steffan Colls **Termination details:** Borehole terminated at target depth of 187 m.

File path: MB02B.ldat8

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Monitoring bore

ID: MB02B

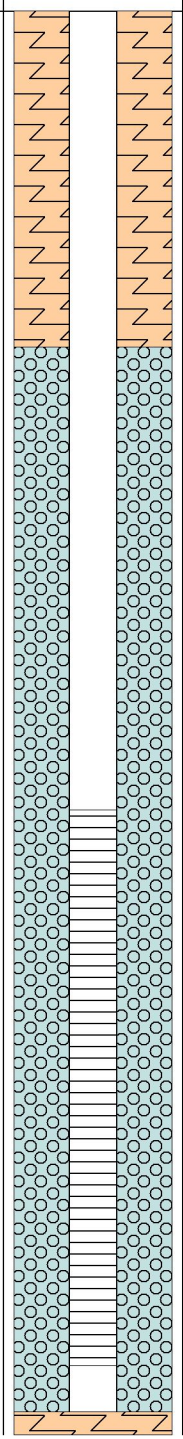
Project:	OMPS-Stage 1 hydrogeological drilling
Project ID:	E210769
Client:	SMEC Australia Pty Limited
Site:	Oven Mountain, Carrai, NSW
Logged by:	QB AB
Date:	15 January–9 February 2022

Easting:	420094
Northing:	6592175.2
Spatial reference:	MGA Zone 56
Elevation (collar):	301.5 mAHD
Elevation (ground):	300.6 mAHD
Nominal diameter:	200 mm

Screened lithology: Carrai Granodiorite **Drilling method/s:** Pneumatic hammer **Water level depth:** 19.05 mbgl

Screened depth: 173.5–185.5 mbgl **Total depth:** 187 mbgl **Level date; time:** 10 February 2022; 12:00

Depth (m)	Method	Penetration	Lithology: Graphic	Lithology: Formation	Lithology: Description (See AS1726-2017)	Water obs.	Additional notes
	200 mm pneumatic hammer			Carrai Granodiorite		∅	157 m: <0.6 L/sec, pH 8.40, SPC 520 µS/cm, Temp 22.3°C, Eh 97.5 mV
160						∅	163 m: <0.6 L/sec, pH 8.45, SPC 525 µS/cm, Temp 22.9°C, Eh 73.6 mV
					GRANODIORITE: Grey and dark grey, trace ferruginous colouring, slightly weathered	∅	169 m: <0.6 L/sec, pH 8.40, SPC 523 µS/cm, Temp 23.5°C, Eh 57.9 mV
170					GRANODIORITE: Pale grey and dark grey, fresh	∅	175 m: <0.7 L/sec, pH 8.32, SPC 528 µS/cm, Temp 23.3°C, Eh 102.2 mV
180					GRANODIORITE: Grey and dark grey, trace ferruginous colouring, slightly weathered	∅	181 m: <0.6 L/sec, pH 8.26, SPC 524 µS/cm, Temp 23.3°C, Eh 78.2 mV
					GRANODIORITE: Pale grey and dark grey, fresh		
					GRANODIORITE: Grey and dark grey, trace ferruginous colouring, slightly weathered		
					GRANODIORITE: Pale grey and dark grey, fresh	∅	187 m: <0.6 L/sec, pH 8.30, SPC 541 µS/cm, Temp 23.5°C, Eh 69.7 mV



RL (mAHD): 140, 130, 120

Company: Numac Drilling Services Pty Ltd **Water quality:** pH = 8.14; SPC = 495 µs/cm; Temp = 20.7°C; ORP = 82.9 mV

Driller: Steffan Colls **Termination details:** Borehole terminated at target depth of 187 m.

File path: MB02B.ldat8

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Monitoring bore

ID: MB03A

Project:	OMPS-Stage 1 hydrogeological drilling
Project ID:	E210769
Client:	SMEC Australia Pty Limited
Site:	Oven Mountain, Carrai, NSW
Logged by:	JdB
Date:	20–21 March 2022

Easting:	418650.9
Northing:	6591232.3
Spatial reference:	MGA Zone 56
Elevation (collar):	167.3 mAHD
Elevation (ground):	166.5 mAHD
Nominal diameter:	200 mm

Screened lithology: Parrabel beds
Screened depth: 15–21 mbgl
Drilling method/s: Pneumatic hammer
Total depth: 23 mbgl
Water level depth: 9.68 mbgl
Level date; time: 20/3/2022

Depth (m)	Method	Penetration	Lithology: Graphic	Lithology: Formation	Lithology: Description (See AS1726-2017)	Water obs.	Additional notes	Bore design	RL (mAHD)
0	200 mm pneumatic hammer			Residual	CLAY: High plasticity, brown, with silt, moisture at palstic limit. Residual				160
				Parrabel Beds	Gravelly CLAY: Extremely weathered hornfels, fine to medium, brown to dark grey. Clay is medium plasticity, brown. Moisture above plastic limit				
					SLATE: Fine grained, dark grey, defined celavage, distinct fabric with planes 0.1–0.3 m thick, high durability, slightly weathered				
10							9.68 m: Recovered water level		
					SLATE: As above, highly weathered, medium durability				
					HORNFELS: Fine grained, dark grey, non distinct cleavage or fabric, extremely high durability, fresh				150
20									

Company: Numac Drilling Services Pty Ltd
Driller: John Burns-Hind
Water quality: pH = 8.39; SPC = 1166 µs/cm; Temp = 24.2°C; ORP = 70.4 mV
Termination details: Borehole termianted at target depth of 23 mbgl

File path: MB03A.ldat8

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Monitoring bore

ID: MB03B

Project:	OMPS-Stage 1 hydrogeological drilling
Project ID:	E210769
Client:	SMEC Australia Pty Limited
Site:	Oven Mountain, Carrai, NSW
Logged by:	JdB
Date:	22 February–20 March 2022

Easting:	418645.8
Northing:	6591223.6
Spatial reference:	MGA Zone 56
Elevation (collar):	167.8 mAHD
Elevation (ground):	167 mAHD
Nominal diameter:	200 mm

Screened lithology: Carrai Granodiorite
Drilling method/s: Pneumatic hammer
Water level depth: 10.63 mbgl
Screened depth: 86–98 mbgl
Total depth: 100 mbgl
Level date; time: 19/3/2022: 09:30

Depth (m)	Method	Penetration	Lithology: Graphic	Lithology: Formation	Lithology: Description (See AS1726-2017)	Water obs.	Additional notes	Bore design	RL (mAHD)
0	200 mm pneumatic hammer			Parrabel Beds	CLAY: High plasticity, brown, with silt, moisture at palstic limit. Residual				
					Gravelly CLAY: Extremely weathered hornfels, fine to medium, brown to dark grey. Clay is medium plasticity, brown. Moisture above plastic limit				
					SLATE: Fine grained, dark grey, defined celavage, distinct fabric with planes 0.1–0.3 m thick, high durability, slightly weathered				
10					HORNFELS: Fine grained, dark grey, non distinct cleavage or fabric, extremely high durability, fresh	▼	10.63 m: Recovered water level		
							16–17 m: Potential quartz sill		
20					SLATE: Fine grained, dark grey, defined celavage, distinct fabric with planes 0.1–0.3 m thick, extremely high durability,fresh				
30					HORNFELS: Fine grained, dark grey, non distinct cleavage or fabric, extremely high durability, fresh		36–37 m: Aplitic intrusion, with pyrite, likely sill from nearby pluton		
40					SLATE: Fine grained, dark grey, defined celavage, distinct fabric with planes 0.1–0.3 m thick, extremely high durability,fresh				
50									

160 150 140 130 120

Company: Numac Drilling Services Pty Ltd
Water quality: pH = 8.43; SPC = 636 µs/cm; Temp = 22.1°C; ORP = 116.3 mV
Driller: John Burns-Hind
Termination details: Borehole terminated at target depth of 100 m

File path: MB03B.ldat8

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Monitoring bore

ID: MB03B

Project:	OMPS-Stage 1 hydrogeological drilling
Project ID:	E210769
Client:	SMEC Australia Pty Limited
Site:	Oven Mountain, Carrai, NSW
Logged by:	JdB
Date:	22 February–20 March 2022

Easting:	418645.8
Northing:	6591223.6
Spatial reference:	MGA Zone 56
Elevation (collar):	167.8 mAHD
Elevation (ground):	167 mAHD
Nominal diameter:	200 mm

Screened lithology: Carrai Granodiorite
Screened depth: 86–98 mbgl
Drilling method/s: Pneumatic hammer
Total depth: 100 mbgl
Water level depth: 10.63 mbgl
Level date; time: 19/3/2022: 09:30

Depth (m)	Method	Penetration	Lithology: Graphic	Lithology: Formation	Lithology: Description (See AS1726-2017)	Water obs.	Additional notes	Bore design	RL (mAHD)
60	200 mm pneumatic hammer			Parrabel Beds	PHYLLITE: Fine grained, pale grey, banded foliation ~0.3 mm thick, extremely high durability, fresh				110
					PHYLLITE: As above, brownish dark grey, moderately weathered				
					PHYLLITE: As above , pale grey				
70					PHYLLITE: As above, brownish dark grey, moderately weathered				100
					PHYLLITE: As above , pale grey				
					HORNFELS: Fine grained, dark grey, non distinct cleavage or fabric, extremely high durability, fresh		74–78 m: Potential quartz sill, with pyrite		
80							83–85 m: Potential quartz sill, with pyrite		90
					PHYLLITE: Fine grained, pale grey, banded foliation ~0.3 mm thick, extremely high durability, fresh				
					HORNFELS: Fine grained, dark grey, non distinct cleavage or fabric, extremely high durability, fresh		88–89m: Potential quartz sill, with pyrite		80
90							93–97 m: Aplitic intrusion, with pyrite, likely sill from nearby pluton		
100									70

Company: Numac Drilling Services Pty Ltd
Driller: John Burns-Hind
Water quality: pH = 8.43; SPC = 636 µs/cm; Temp = 22.1°C; ORP = 116.3 mV
Termination details: Borehole terminated at target depth of 100 m

File path: MB03B.ldat8

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Monitoring bore

ID: MB04A

Project:	OMPS-Stage 1 hydrogeological drilling
Project ID:	E210769
Client:	SMEC Australia Pty Limited
Site:	Oven Mountain, Carrai, NSW
Logged by:	HJN
Date:	29–31 January 2022

Easting:	423003.9
Northing:	6591263.9
Spatial reference:	MGA Zone 56
Elevation (collar):	972.7 mAHD
Elevation (ground):	972.1 mAHD
Nominal diameter:	125 mm

Screened lithology: Carrai Granodiorite **Drilling method/s:** Tri cone **Water level depth:** 0.25 mbgl

Screened depth: 6.35 - 9.35 mbgl **Total depth:** 10.5 m **Level date; time:** 31 January 2022; 17:21

Depth (m)	Method	Penetration	Lithology: Graphic	Lithology: Formation	Lithology: Description (See AS1726-2017)	Water obs.	Additional notes	Bore design	RL (mAHD)
0	Tri-cone with HWT string			Colluvium	SILTY SAND: Fine to medium grained, dark grey, subrounded, trace clay, wet. Colluvium		0.25 m: Recovered water level		
							1.4 m: 0.5 L/sec		970
				Residual	SAND: Medium to coarse grained, grey, angular, quartzose, with clay, pale grey, dry. Residual				
				Carrai Granodiorite	SAND: As above, wet				
	Shoe bit on PWT casing						6 m: 4 L/sec Casing method doesnt allow sampling		
10					SAND: Extremely weathered granodiorite; Sand, medium to coarse grained, pale grey, angular, 80% quartz, wet				

Company: Terratest Pty Ltd **Water quality:** pH = 5.93; SPC = 75.7 µs/cm; Temp = 21.6°C; ORP = 101.4 mV

Driller: Toby Osborne **Termination details:** Borehole terminated on competent rock at 10.5 m

File path: MB04A.ldat8

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Monitoring bore

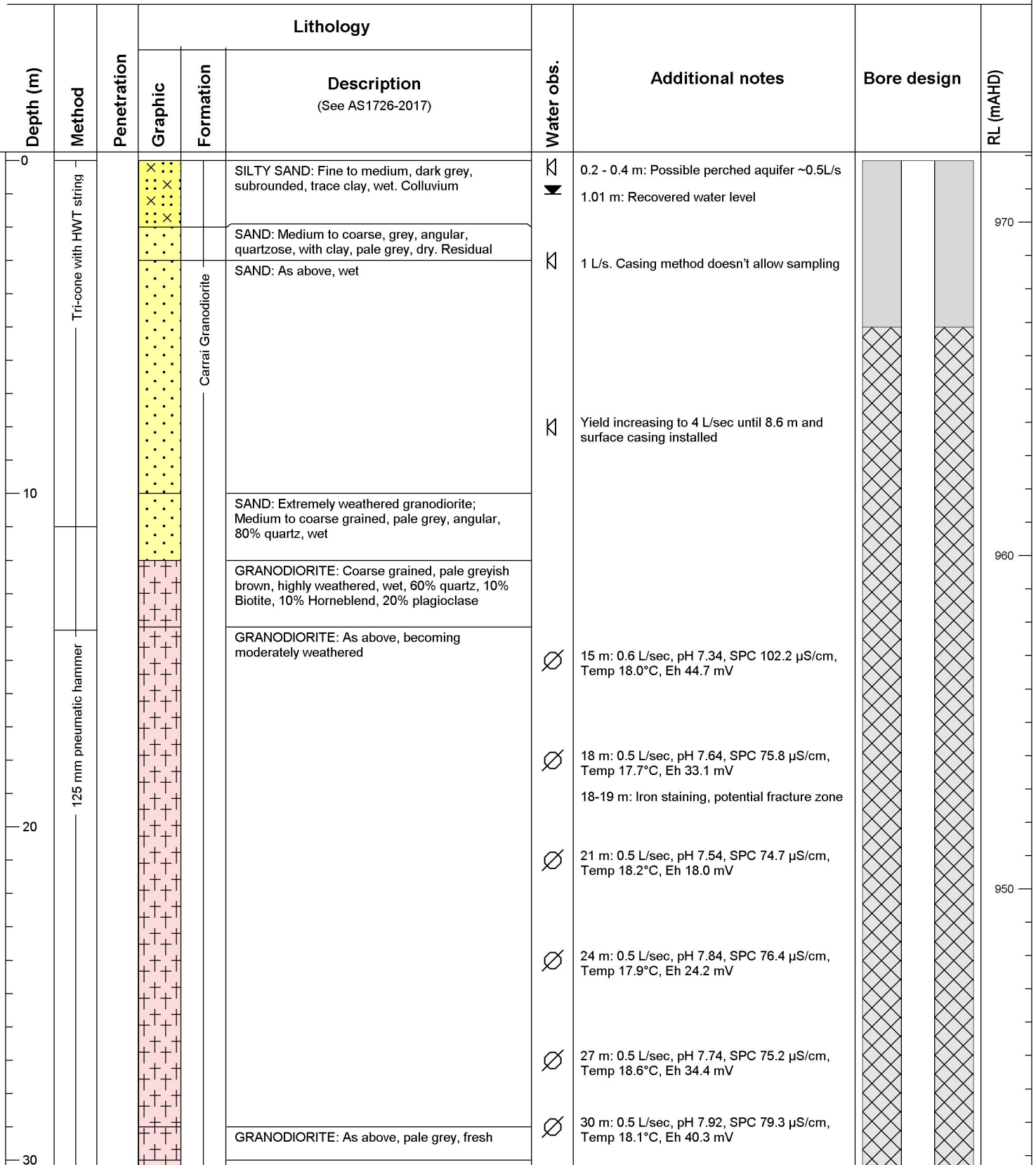
ID: MB04B

Project:	OMPS-Stage 1 hydrogeological drilling
Project ID:	E210769
Client:	SMEC Australia Pty Limited
Site:	Oven Mountain, Carrai, NSW
Logged by:	HJN
Date:	29–31 January 2022

Easting:	422999.7
Northing:	6591259
Spatial reference:	MGA Zone 56
Elevation (collar):	972.5 mAHD
Elevation (ground):	971.9 mAHD
Nominal diameter:	125 mm

Screened lithology: Carrai Granodiorite **Drilling method/s:** Pneumatic hammer **Water level depth:** 1.01 mbgl

Screened depth: 46.7–58.7 mbgl **Total depth:** 60.5 mbgl **Level date; time:** 31 January 2022



Company: Numac Drilling Services Pty Ltd **Water quality:** pH = 6.35; SPC = 171.2 µs/cm; Temp = 18.8°C; ORP = 17.2 mV

Driller: Toby Osborne **Termination details:** Borehole terminated at target depth of 60.5 m.

File path: MB04B.ldat8

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Monitoring bore

ID: MB04B

Project:	OMPS-Stage 1 hydrogeological drilling
Project ID:	E210769
Client:	SMEC Australia Pty Limited
Site:	Oven Mountain, Carrai, NSW
Logged by:	HJN
Date:	29–31 January 2022

Easting:	422999.7
Northing:	6591259
Spatial reference:	MGA Zone 56
Elevation (collar):	972.5 mAHD
Elevation (ground):	971.9 mAHD
Nominal diameter:	125 mm

Screened lithology: Carrai Granodiorite **Drilling method/s:** Pneumatic hammer **Water level depth:** 1.01 mbgl

Screened depth: 46.7–58.7 mbgl **Total depth:** 60.5 mbgl **Level date; time:** 31 January 2022

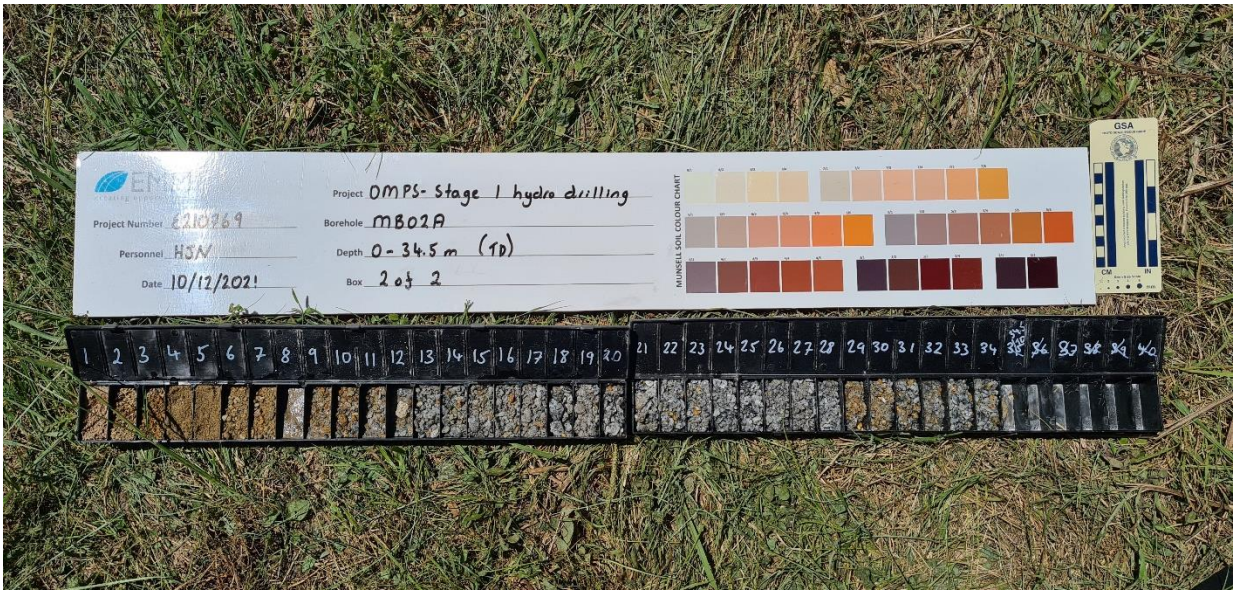
Depth (m)	Method	Penetration	Lithology: Graphic	Lithology: Formation	Lithology: Description (See AS1726-2017)	Water obs.	Additional notes	Bore design	RL (mAHD)
	125 mm pneumatic hammer			Carrai Granodiorite	GRANODIORITE: As above, slightly weathered	∅	33 m: 0.4 L/sec, pH 7.78, SPC 72.1 µS/cm, Temp 19.1°C, Eh 39.5 mV		940
						∅	36 m: 0.4 L/sec, pH 7.78, SPC 72.1 µS/cm, Temp 19.1°C, Eh 39.5 mV		
						∅	39 m: 2 L/sec, pH 7.46, SPC 110.8 µS/cm, Temp 18.8°C, Eh 44.4 mV		
40									
						∅	42 m: 0.04 L/sec, pH 8.73, SPC 177.0 µS/cm, Temp 22.9°C, Eh 70.0 mV		930
					GRANODIORITE: As above, fresh, pale green and pale grey		42 m: Likely extremely high strength rock		
						∅	45 m: 0.03 L/sec, pH 8.63, SPC 112.6 µS/cm, Temp 23.7°C, Eh 67.0 mV		
					GRANODIORITE: As above, slightly weathered, pale orangey grey		45-47 m: Iron staining, potential fracture zone		
						∅	48 m: 0.04 L/sec, pH 8.86, SPC 106.5 µS/cm, Temp 24.6°C, Eh 68.0 mV		
					GRANODIORITE: As above		49-50 m: Iron staining, potential fracture zone		
50									
						∅	51 m: 0.04 L/sec, pH 9.03, SPC 149.6 µS/cm, Temp 24.3°C, Eh 54.4 mV		920
							51-54 m: easier drlling, iron staining, potential fracture zone		
						∅	54 m: 0.05 L/sec, pH 8.73, SPC 148.6 µS/cm, Temp 25.5°C, Eh 31.5 mV		
						∅	57 m: 0.04 L/sec, pH 8.62, SPC 160.1 µS/cm, Temp 25.8°C, Eh 35.3 mV		
60									

Company: Numac Drilling Services Pty Ltd **Water quality:** pH = 6.35; SPC = 171.2 µs/cm; Temp = 18.8°C; ORP = 17.2 mV

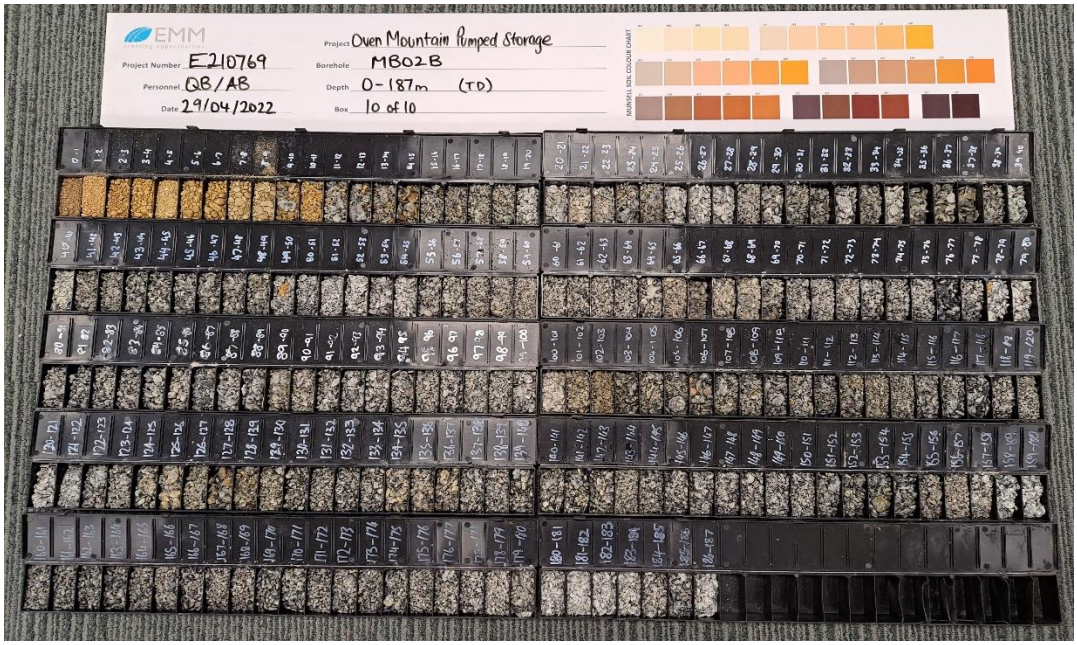
Driller: Toby Osborne **Termination details:** Borehole terminated at target depth of 60.5 m.

File path: MB04B.ldat8

MB01A chip trays from 0—36 m below ground level
21 October 2021
Oven Mountain Pumped Storage Project
Photograph B.1



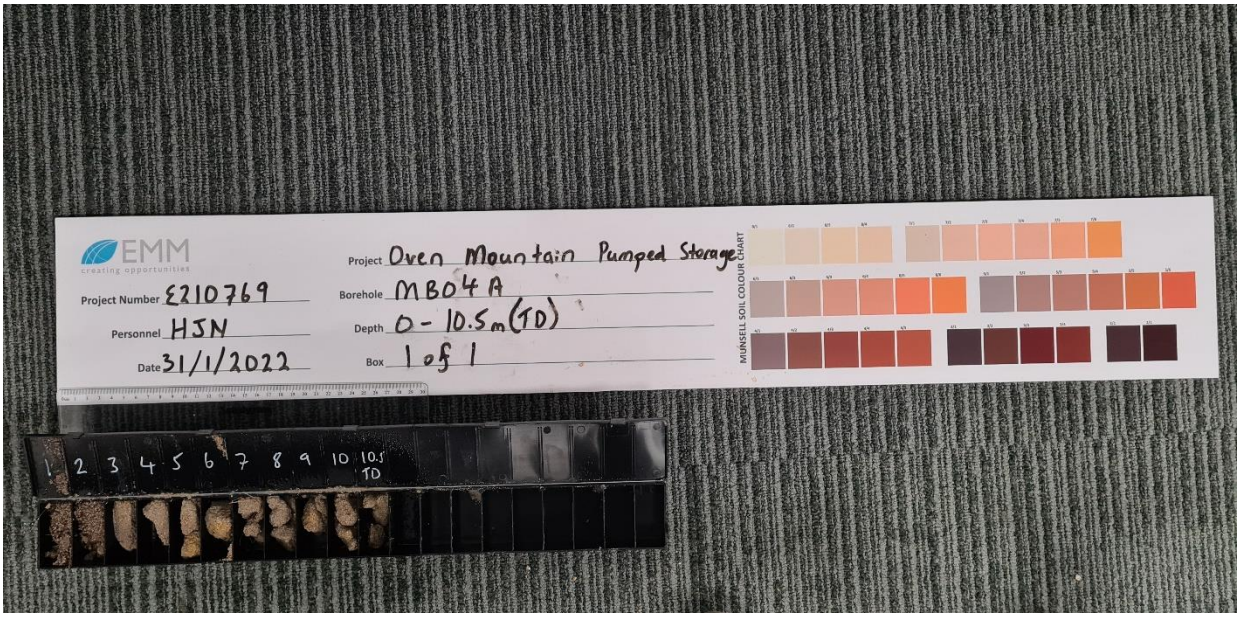
MB02A complete chip trays from 0—34 m below ground level
10 December 2021
Oven Mountain Pumped Storage Project
Photograph B.2



MB02B chip trays from 0—187 m below ground level
29 April 2022
Oven Mountain Pumped Storage Project
Photograph B.3

MB03A chip trays from 0—23 m below ground level
6 April 2022
Oven Mountain Pumped Storage Project
Photograph B.4

MB03B chip trays from 0—100 m below ground level
6 April 2022
Oven Mountain Pumped Storage Project
Photograph B.5



MB04A chip trays from 0—10 m below ground level
6 April 2022
Oven Mountain Pumped Storage Project
Photograph B.6

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MB04B chip trays from 0—60 m below ground level
6 April 2022
Oven Mountain Pumped Storage Project
Photograph B.7

Annexure B

Results and guideline comparisons

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Table A - Waste Classification (solids)

					Location	BH4B	BH4B	BH4B	BH4B	MB02B	MB02B	MB03B
					Field ID	BH4B_126.27-126.37	BH4B_2.39-2.51	BH4B_22.05-22.30	BH4B_388.0-388.13	MB02B_0-9	MB02B_178-187	MB03B_7-20
					Sample Depth	126.27-126.37	2.39-2.51	22.05-22.3	388-388.13	0-9	178-187	7-20
					Sample Date	25/08/2022	25/08/2022	25/08/2022	25/08/2022	12/09/2022		12/09/2022
					Lab Report Number	ES2230654	ES2230654	ES2230654	ES2230654	ES2233009	ES2233009	ES2233009
				NSW 2014 General Solid Waste CT1 (No Leaching)	NSW 2014 General Solid Waste SCC1 (with leached)							
Chemical Group	**Chemical Name**	**Units**	**LOR**									
Inorganics	Fluoride	mg/kg	40	*3000*	**10000**	490	500	770	360	320	250	330
	pH (Final)	-	0.1			9.4	8.9	9.6	9.3	7.2	8.8	7.4
	pH of Leaching Fluid	-	0.1			9.4	8.9	9.6	9.3	7.2	8.8	7.4
	Moisture Content	%	0.1			<1	<1	<1	<1	0.3	0.6	2
Metals	Arsenic	mg/kg	5	*100*	**500**	<5	6	<5	<5	<5	<5	<5
	Beryllium	mg/kg	1	*20*	**100**	<1	<1	<1	<1	<1	<1	<1
	Chromium (hexavalent)	mg/kg	0.5	*100*	**1900**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Cadmium	mg/kg	1	*20*	**100**	<1	<1	<1	<1	<1	<1	<1
	Molybdenum	mg/kg	2	*100*	**1000**	<2	<2	<2	<2	<2	<2	<2
	Lead	mg/kg	5	*100*	**1500**	<5	<5	19	<5	<5	<5	<5
	Mercury	mg/kg	0.1	*4*	**50**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Nickel	mg/kg	2	*40*	**1050**	<2	3	<2	2	3	3	4
	Selenium	mg/kg	5	*20*	**50**	<5	<5	<5	<5	<5	<5	<5
	Silver	mg/kg	2	*100*	**180**	<2	<2	<2	<2	<2	<2	<2
Cyanides	Cyanide (WAD)	mg/kg	1			<1	<1	<1	<1	<1	<1	<1
	Cyanide Total	mg/kg	1	*320*	**5900**	<1	<1	<1	<1	<1	<1	<1
SVOCs	Hexachlorophene	mg/kg	0.01			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
TRH	C6-C10	mg/kg	10			<10	<10	<10	<10	<10	<10	<10
TRH - (Silica Gel Cleanup)	>C10 - C40 Fraction (sum) (SG)	mg/kg	50			<50	<50	<50	<50	<50	<50	<50
	TRH >C10-C16 (after silica gel clean-up)	mg/kg	50			<50	<50	<50	<50	<50	<50	<50
	TRH >C16-C34 (after silica gel clean-up)	mg/kg	100			<100	<100	<100	<100	<100	<100	<100
	TRH >C34-C40 (after silica gel clean-up)	mg/kg	100			<100	<100	<100	<100	<100	<100	<100
	TRH C10-C36 (Total) (after silica gel clean-up)	mg/kg	50			<50	<50	<50	<50	<50	<50	<50
TPH	C6-C9	mg/kg	10	*650*	**650**	<10	<10	<10	<10	<10	<10	<10
TPH - (Silica Gel Cleanup)	TPH C10-C14 Fraction after Silica Cleanup	mg/kg	50			<50	<50	<50	<50	<50	<50	<50
	TPH C15-C28 Fraction after Silica Cleanup	mg/kg	100			<100	<100	<100	<100	<100	<100	<100
	TPH C29-C36 Fraction after Silica Cleanup	mg/kg	100			<100	<100	<100	<100	<100	<100	<100
BTEX	Benzene	mg/kg	0.2	*10*	**18**	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Ethylbenzene	mg/kg	0.5	*600*	**1080**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Toluene	mg/kg	0.5	*288*	**518**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Xylene (m & p)	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Xylene (o)	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PAH	Naphthalene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Acenaphthene	mg/kg	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
	Anthracene	mg/kg	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
	Benzo(a) pyrene	mg/kg	0.5	*0.8*	**10**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(b+j+k)fluoranthene	mg/kg	1			<1	<1	<1	<1	<1	<1	<1
	Benzo(g,h,i)perylene	mg/kg	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
	Dibenz(a,h)anthracene	mg/kg	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
	Fluorene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	PAHs (Sum of total)	mg/kg	0.5	*200*	**200**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	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
	Pyrene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorinated Hydrocarbons	Dichloromethane	mg/kg	0.5	*172*	**310**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	1,1,1,2-tetrachloroethane	mg/kg	0.5	*200*	**360**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	1,1,1-trichloroethane	mg/kg	0.5	*600*	**1080**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	1,1,2,2-tetrachloroethane	mg/kg	0.5	*26*	**46.8**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	1,1,2-trichloroethane	mg/kg	0.5	*24*	**43.2**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	1,1-dichloroethene	mg/kg	0.5	*14*	**25**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	1,2-dichloroethane	mg/kg	0.5	*10*	**18**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Carbon tetrachloride	mg/kg	0.5	*10*	**18**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Chloroform	mg/kg	0.5	*120*	**216**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Tetrachloroethene	mg/kg	0.5	*14*	**25.2**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Trichloroethene	mg/kg	0.5	*10*	**18**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Vinyl chloride	mg/kg	0.2	*4*	**7.2**	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
MAH	Styrene	mg/kg	0.5	*60*	**108**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Table A - Waste Classification (solids)

					Location	BH4B	BH4B	BH4B	BH4B	MB02B	MB02B	MB03B
					Field ID	BH4B_126.27-126.37	BH4B_2.39-2.51	BH4B_22.05-22.30	BH4B_388.0-388.13	MB02B_0-9	MB02B_178-187	MB03B_7-20
					Sample Depth	126.27-126.37	2.39-2.51	22.05-22.3	388-388.13	0-9	178-187	7-20
					Sample Date	25/08/2022	25/08/2022	25/08/2022	25/08/2022	12/09/2022		12/09/2022
					Lab Report Number	ES2230654	ES2230654	ES2230654	ES2230654	ES2233009	ES2233009	ES2233009
				NSW 2014 General Solid Waste CT1 (No Leaching)	NSW 2014 General Solid Waste SCC1 (with leached)							
Chemical Group	**Chemical Name**	**Units**	**LOR**									
Phenols	Picloram	mg/kg	0.02	*60*	**110**	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	2,4,5-Trichlorophenol	mg/kg	0.5	*8000*	**14400**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	2,4,6-Trichlorophenol	mg/kg	0.5	*40*	**72**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	2-Methylphenol	mg/kg	0.5	*4000*	**7200**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	3&4-Methylphenol (m&p-cresol)	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Pentachlorophenol	mg/kg	1			<1	<1	<1	<1	<1	<1	<1
	4-chloro-3-methylphenol	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Phenol	mg/kg	0.5		**518**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	2,3,4,6-Tetrachlorophenol	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Halogenated Benzenes	1,2,3,4-tetrachlorobenzene	mg/kg	0.5	*10*	**18**	<1.5[#1]	<1.5[#1]	<1.5[#1]	<1.5[#1]	<0.5	<0.5	<0.5
	1,2,4,5-tetrachlorobenzene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Hexachlorobenzene	mg/kg	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Pentachlorobenzene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	1,2,4-trichlorobenzene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	1,2-dichlorobenzene	mg/kg	0.5	*86*	**155**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	1,4-dichlorobenzene	mg/kg	0.5	*150*	**270**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Chlorobenzene	mg/kg	0.5	*2000*	**3600**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Herbicides	2,4,5-TP (Silvex)	mg/kg	0.02			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	2,4,5-Trichlorophenoxy Acetic Acid	mg/kg	0.02			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Fluroxypyr	mg/kg	0.02	*40*	**75**	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Hedonal	mg/kg	0.02	*200*	**10**	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Triclopyr	mg/kg	0.02	*40*	**75**	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Organochlorine Pesticides	a-BHC	mg/kg	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	4,4-DDE	mg/kg	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Aldrin	mg/kg	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	b-BHC	mg/kg	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Chlordane (cis)	mg/kg	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Chlordane (trans)	mg/kg	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	d-BHC	mg/kg	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	DDD	mg/kg	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	DDT	mg/kg	0.2			<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Dieldrin	mg/kg	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Endosulfan I	mg/kg	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Endosulfan II	mg/kg	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Endrin	mg/kg	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Endosulfan sulphate	mg/kg	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Endrin aldehyde	mg/kg	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	g-BHC (Lindane)	mg/kg	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Heptachlor	mg/kg	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Heptachlor epoxide	mg/kg	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	chlordane	mg/kg	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Sum of Endosulfans (inc. sulfate)	mg/kg	0.05		**108**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Organophosphorous Pesticides	Chlorpyrifos	mg/kg	0.05	*4*	**7.5**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
PCBs	PCBs (Sum of total)	mg/kg	0.1	*50*	**50**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pesticides	Isodrin	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nitroaromatics	Pentachloronitrobenzene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Phthalates	Bis(2-ethylhexyl) phthalate	mg/kg	5			<5	<5	<5	<5	<5	<5	<5
Solvents	Methyl Ethyl Ketone	mg/kg	5	*4000*	**7200**	<5	<5	<5	<5	<5	<5	<5
Explosives	2,4-Dinitrotoluene	mg/kg	1	*2.6*	**4.68**	<1	<1	<1	<1	<1	<1	<1
	Nitrobenzene	mg/kg	0.5	*40*	**72**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Di(2-ethylhexyl)adipate	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Other	Sum of plasticisers	mg/kg	0.5		**600**	<5[#1]	<5[#1]	<5[#1]	<5[#1]	<5[#1]	<5[#1]	<5[#1]
	Sum of Scheduled Chemicals	mg/kg	0.05		**50**	<10[#1]	<10[#1]	<10[#1]	<10[#1]	<10[#1]	<10[#1]	<10[#1]

Notes

#1 Reported Analyte LOR is higher than Requested Analyte LOR

				Location	BH4B	BH4B	BH4B	BH4B	MB02B	MB02B	MB03B
				Field ID	BH4B_126.27-126.37	BH4B_2.39-2.51	BH4B_22.05-22.30	BH4B_388.0-388.13	MB02B_0-9	MB02B_178-187	MB03B_7-20
				Sample Depth (mbgl)	126.27-126.37	2.39-2.51	22.05-22.3	388-388.13	0-9	178-187	7-20
				Sampled Date	25/08/2022	25/08/2022	25/08/2022	25/08/2022	12/09/2022	12/09/2022	12/09/2022
				Lab Report Number	ES2230654	ES2230654	ES2230654	ES2230654	ES2233009	ES2233009	ES2233009
				NSW 2014 General Solid Waste TCLP1 (leached)							
Chemical Group	**Chemical Name**	**Units**	**LOR**								
Cyanides	Cyanide (WAD)	mg/L	0.004		<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Analytical – general	pH (Lab)	-	0.01		7.53	7.21	7.62	7.62	6.73	7.03	6.52
	Electrical Conductivity (Lab)	µS/cm	1		31	19	37	27	19	27	25
Analytical – alkalinity	Alkalinity (Bicarbonate as $CaCO_3$)	mg/L	1		16	7	14	15	4	11	6
	Alkalinity (Carbonate as $CaCO_3$)	mg/L	1		<1	<1	<1	<1	<1	<1	<1
	Alkalinity (Hydroxide) as $CaCO_3$	mg/L	1		<1	<1	<1	<1	<1	<1	<1
	Alkalinity (total) as $CaCO_3$	mg/L	1		16	7	14	15	4	11	6
Inorganics	Cyanide Total	mg/L	0.004	**16**	<0.004	<0.004	<0.004	0.024	<0.004	<0.004	<0.004
	Chloride	mg/L	1		<1	<1	<1	<1	2	2	2
	Fluoride	mg/L	0.1	**150**	0.1	<0.1	0.1	<0.1	0.2	<0.1	0.1
	Sulfate as SO_4 - Turbidimetric	mg/L	1		<1	<1	<1	<1	<1	<1	4
Metals	Aluminium	mg/L	0.1		4	4.1	3.1	4.2	3.9	3	2.4
	Arsenic	mg/L	0.1	**5**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Beryllium	mg/L	0.05	**1**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Boron	mg/L	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Antimony	mg/L	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Chromium (hexavalent)	mg/L	0.01	**5**	<0.01	<0.1[#1]	<0.01	<0.01	<0.01	<0.01	<0.01
	Cadmium	mg/L	0.05	**1**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Molybdenum	mg/L	0.1	**5**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Chromium (III+VI)	mg/L	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Iron	mg/L	0.1		4.2	2.6	1	4.3	5.9	4.8	2.1
	Lead	mg/L	0.1	**5**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Manganese	mg/L	0.1		<0.1	0.1	0.1	<0.1	0.1	<0.1	<0.1
	Mercury	mg/L	0.001	**0.2**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Nickel	mg/L	0.1	**2**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Selenium	mg/L	0.05	**1**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Silver	mg/L	0.1	**5**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BTEX	Naphthalene (VOC)	µg/L	5		<5	<5	<5	<5	<5	<5	<5
	Benzene	µg/L	1	**500**	<1	<1	<1	<1	<1	<1	<1
	Ethylbenzene	µg/L	2	**30000**	<2	<2	<2	<2	<2	<2	<2
	Toluene	µg/L	2	**14400**	<2	<2	<2	<2	<2	<2	<2
	Xylene (m & p)	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	Xylene (o)	µg/L	2		<2	<2	<2	<2	<2	<2	<2
Phenols	2,4,5-Trichlorophenol	µg/L	2	**400000**	<2	<2	<2	<2	<2	<2	<2
	2,4,6-Trichlorophenol	µg/L	2	**2000**	<2	<2	<2	<2	<2	<2	<2
	2,4-Dichlorophenol	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	2,4-Dimethylphenol	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	2,6-Dichlorophenol	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	2-Chlorophenol	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	2-Nitrophenol	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	2-Methylphenol	µg/L	2	**200000**	<2	<2	<2	<2	<2	<2	<2
	3&4-Methylphenol (m&p-cresol)	µg/L	4		<4	<4	<4	<4	<4	<4	<4
	Pentachlorophenol	µg/L	4		<4	<4	<4	<4	<4	<4	<4
	4-chloro-3-methylphenol	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	Phenol	µg/L	2	**14400**	<2	<2	<2	<2	<2	<2	<2
	2,3,4,6-Tetrachlorophenol	µg/L	2		<2	<2	<2	<2	<2	<2	<2
Amino Aliphatics	N-nitrosodiethylamine	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	N-nitrosodi-n-butylamine	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	N-nitrosodi-n-propylamine	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	N-Nitrosomethylethylamine	µg/L	2		<2	<2	<2	<2	<2	<2	<2
Amino Aromatics	1-naphthylamine	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	N-Nitrosodiphenyl & Diphenylamine	µg/L	4		<4	<4	<4	<4	<4	<4	<4
Anilines	2-methyl-5-nitroaniline	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	2-nitroaniline	µg/L	4		<4	<4	<4	<4	<4	<4	<4
	3-nitroaniline	µg/L	4		<4	<4	<4	<4	<4	<4	<4
	4-chloroaniline	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	4-nitroaniline	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	Aniline	µg/L	2		<2	<2	<2	<2	<2	<2	<2
Chlorinated Hydrocarbons	Dichloromethane	µg/L	5	**8600**	<5	<5	<5	<5	<5	<5	<5
	Hexachlorocyclopentadiene	µg/L	10		<10	<10	<10	<10	<10	<10	<10
	Hexachloroethane	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	1,1,1,2-tetrachloroethane	µg/L	5	**10000**	<5	<5	<5	<5	<5	<5	<5
	1,1,1-trichloroethane	µg/L	5	**30000**	<5	<5	<5	<5	<5	<5	<5
	1,1,2,2-tetrachloroethane	µg/L	5	**1300**	<5	<5	<5	<5	<5	<5	<5
	1,1,2-trichloroethane	µg/L	5	**1200**	<5	<5	<5	<5	<5	<5	<5
	1,1-dichloroethane	µg/L	5		<5	<5	<5	<5	<5	<5	<5
	1,1-dichloroethene	µg/L	5	**700**	<5	<5	<5	<5	<5	<5	<5
	1,1-dichloropropene	µg/L	5		<5	<5	<5	<5	<5	<5	<5
	1,2,3-trichloropropane	µg/L	5		<5	<5	<5	<5	<5	<5	<5
	1,2-dibromo-3-chloropropane	µg/L	5		<5	<5	<5	<5	<5	<5	<5
	1,2-dichloroethane	µg/L	5	**500**	<5	<5	<5	<5	<5	<5	<5
	1,2-dichloropropane	µg/L	5		<5	<5	<5	<5	<5	<5	<5
	1,3-dichloropropane	µg/L	5		<5	<5	<5	<5	<5	<5	<5
	2,2-dichloropropane	µg/L	5		<5	<5	<5	<5	<5	<5	<5
	Bromodichloromethane	µg/L	5		<5	<5	<5	<5	<5	<5	<5
	Bromoform	µg/L	5		<5	<5	<5	<5	<5	<5	<5
	Carbon tetrachloride	µg/L	5	**500**	<5	<5	<5	<5	<5	<5	<5
	Chlorodibromomethane	µg/L	5		<5	<5	<5	<5	<5	<5	<5
	Chloroethane	µg/L	50		<50	<50	<50	<50	<50	<50	<50
	Chloroform	µg/L	5	**6000**	<5	<5	<5	<5	<5	<5	<5
	Chloromethane	µg/L	50		<50	<50	<50	<50	<50	<50	<50
	cis-1,2-dichloroethene	µg/L	5		<5	<5	<5	<5	<5	<5	<5
	cis-1,3-dichloropropene	µg/L	5		<5	<5	<5	<5	<5	<5	<5
	Dibromomethane	µg/L	5		<5	<5	<5	<5	<5	<5	<5
	Hexachlorobutadiene	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	Tetrachloroethene	µg/L	5	**700**	<5	<5	<5	<5	<5	<5	<5
	trans-1,2-dichloroethene	µg/L	5		<5	<5	<5	<5	<5	<5	<5
	trans-1,3-dichloropropene	µg/L	5		<5	<5	<5	<5	<5	<5	<5
	Trichloroethene	µg/L	5	**500**	<5	<5	<5	<5	<5	<5	<5
	Vinyl chloride	µg/L	50	**200**	<50	<50	<50	<50	<50	<50	<50
Explosives	1,3,5-Trinitrobenzene	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	2,4-Dinitrotoluene	µg/L	4	**130**	<4	<4	<4	<4	<4	<4	<4
	2,6-dinitrotoluene	µg/L	4		<4	<4	<4	<4	<4	<4	<4
	Nitrobenzene	µg/L	2	**2000**	<2	<2	<2	<2	<2	<2	<2
Halogenated Benzenes	1,2,4,5-tetrachlorobenzene	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	1,3,5-Trichlorobenzene	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	Hexachlorobenzene	µg/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Pentachlorobenzene	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	1,2,3-trichlorobenzene	µg/L	5		<5	<5	<5	<5	<5	<5	<5
	1,2,4-trichlorobenzene	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	1,2-dichlorobenzene	µg/L	2	**4300**	<2	<2	<2	<2	<2	<2	<2
	1,3-dichlorobenzene	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	1,4-dichlorobenzene	µg/L	2	**7500**	<2	<2	<2	<2	<2	<2	<2
	2-chlorotoluene	µg/L	5		<5	<5	<5	<5	<5	<5	<5
	4-chlorotoluene	µg/L	5		<5	<5	<5	<5	<5	<5	<5
	Bromobenzene	µg/L	5		<5	<5	<5	<5	<5	<5	<5
	Chlorobenzene	µg/L	5	**100000**	<5	<5	<5	<5	<5	<5	<5
Halogenated Hydrocarbons	1,2-dibromoethane	µg/L	5		<5	<5	<5	<5	<5	<5	<5
	Bromomethane	µg/L	50		<50	<50	<50	<50	<50	<50	<50
	Dichlorodifluoromethane	µg/L	50		<50	<50	<50	<50	<50	<50	<50
	Iodomethane	µg/L	5		<5	<5	<5	<5	<5	<5	<5
	Trichlorofluoromethane	µg/L	50		<50	<50	<50	<50	<50	<50	<50
Herbicides	Diallate	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	Atrazine	µg/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Simazine	µg/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Pronamide	µg/L	2		<2	<2	<2	<2	<2	<2	<2
MAH	1,2,4-trimethylbenzene	µg/L	5		<5	<5	<5	<5	<5	<5	<5
	1,3,5-trimethylbenzene	µg/L	5		<5	<5	<5	<5	<5	<5	<5

				Location	BH4B	BH4B	BH4B	BH4B	MB02B	MB02B	MB03B
				Field ID	BH4B_126.27-126.37	BH4B_2.39-2.51	BH4B_22.05-22.30	BH4B_388.0-388.13	MB02B_0-9	MB02B_178-187	MB03B_7-20
				Sample Depth (mbgl)	126.27-126.37	2.39-2.51	22.05-22.3	388-388.13	0-9	178-187	7-20
				Sampled Date	25/08/2022	25/08/2022	25/08/2022	25/08/2022	12/09/2022	12/09/2022	12/09/2022
				Lab Report Number	ES2230654	ES2230654	ES2230654	ES2230654	ES2233009	ES2233009	ES2233009
				NSW 2014 General Solid Waste TCLP1 (leached)							
Chemical Group	**Chemical Name**	**Units**	**LOR**								
MAH	Isopropylbenzene	µg/L	5		<5	<5	<5	<5	<5	<5	<5
	n-butylbenzene	µg/L	5		<5	<5	<5	<5	<5	<5	<5
	n-propylbenzene	µg/L	5		<5	<5	<5	<5	<5	<5	<5
	p-isopropyltoluene	µg/L	5		<5	<5	<5	<5	<5	<5	<5
	sec-butylbenzene	µg/L	5		<5	<5	<5	<5	<5	<5	<5
	Styrene	µg/L	5	**3000**	<5	<5	<5	<5	<5	<5	<5
	tert-butylbenzene	µg/L	5		<5	<5	<5	<5	<5	<5	<5
Nitroaromatics	2-Picoline	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	4-aminobiphenyl	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	Pentachloronitrobenzene	µg/L	2		<2	<2	<2	<2	<2	<2	<2
Organochlorine Pesticides	a-BHC	µg/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	4,4-DDE	µg/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Aldrin	µg/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	b-BHC	µg/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Chlordane (cis)	µg/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Chlordane (trans)	µg/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	d-BHC	µg/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	DDD	µg/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	DDT	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	DDT+DDE+DDD	µg/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Dieldrin	µg/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Endosulfan I	µg/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Endosulfan II	µg/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Endrin	µg/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Endosulfan sulphate	µg/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Endrin aldehyde	µg/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Endrin ketone	µg/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	g-BHC (Lindane)	µg/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Heptachlor	µg/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Heptachlor epoxide	µg/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Methoxychlor	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	Aldrin + Dieldrin	µg/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	chlordane	µg/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Organophosphorous Pesticides	Isosafrole (cis)	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	Isosafrole (trans)	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	Methyl methanesulfonate	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	Safrole	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	Azinophos methyl	µg/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Bromophos-ethyl	µg/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Chlorpyrifos	µg/L	0.5	**200**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Chlorpyrifos-methyl	µg/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Diazinon	µg/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Dichlorvos	µg/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Dimethoate	µg/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Ethion	µg/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Malathion	µg/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Carbophenothion	µg/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Chlorfenvinphos	µg/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fenthion	µg/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Methyl parathion	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	Monocrotophos	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	Prothiofos	µg/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Other	Acetophenone	µg/L	2		<2	<2	<2	<2	<2	<2	<2
PAH	Naphthalene	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	2-chloronaphthalene	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	3-methylcholanthrene	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	7,12-dimethylbenz(a)anthracene	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	2-methylnaphthalene	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	Acenaphthene	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	Acenaphthylene	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	Anthracene	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	Benz(a)anthracene	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	Benzo(a) pyrene	µg/L	2	**40**	<2	<2	<2	<2	<2	<2	<2
	Benzo(a)pyrene TEQ calc (Zero)	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	Benzo(b+j+k)fluoranthene	µg/L	4		<4	<4	<4	<4	<4	<4	<4
	Benzo(g,h,i)perylene	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	Chrysene	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	Dibenz(a,h)anthracene	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	Fluoranthene	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	Fluorene	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	PAHs (Sum of total)	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	Indeno(1,2,3-c,d)pyrene	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	Phenanthrene	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	Pyrene	µg/L	2		<2	<2	<2	<2	<2	<2	<2
Pesticides	Cypermethrins(total)	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	Methoprene	µg/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Carbazole	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	Chlorobenzilate	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	Parathion	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	Demeton-S-methyl	µg/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fenamiphos	µg/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Pirimphos-ethyl	µg/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Phthalates	Bis(2-ethylhexyl) phthalate	µg/L	10		<10	<10	<10	<10	<10	<10	<10
	Butyl benzyl phthalate	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	Diethylphthalate	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	Dimethyl phthalate	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	Di-n-butyl phthalate	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	Di-n-octyl phthalate	µg/L	2		<2	<2	<2	<2	<2	<2	<2
Solvents	Acetone	µg/L	50		<50	<50	<50	<50	<50	<50	<50
	Isophorone	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	2-hexanone (MBK)	µg/L	50		<50	<50	<50	<50	<50	<50	<50
	4-Methyl-2-pentanone	µg/L	50		<50	<50	<50	<50	<50	<50	<50
	Carbon disulfide	µg/L	5		<5	<5	<5	<5	<5	<5	<5
	Methyl Ethyl Ketone	µg/L	50	**200000**	<50	<50	<50	<50	<50	<50	<50
	Vinyl acetate	µg/L	50		<50	<50	<50	<50	<50	<50	<50
SVOCs	2-(acetylamino) fluorene	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	3,3-Dichlorobenzidine	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	4-(dimethylamino) azobenzene	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	4-bromophenyl phenyl ether	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	4-chlorophenyl phenyl ether	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	4-Nitroquinoline-N-oxide	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	Azobenzene	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	Bis(2-chloroethoxy) methane	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	Bis(2-chloroethyl)ether	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	Dibenzofuran	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	Hexachloropropene	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	Methapyrilene	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	N-nitrosomorpholine	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	N-nitrosopiperidine	µg/L	2		<2	<2	<2	<2	<2	<2	<2
	N-nitrosopyrrolidine	µg/L	4		<4	<4	<4	<4	<4	<4	<4
	Phenacetin	µg/L	2		<2	<2	<2	<2	<2	<2	<2
VOCs	cis-1,4-Dichloro-2-butene	µg/L	5		<5	<5	<5	<5	<5	<5	<5
	Pentachloroethane	µg/L	5		<5	<5	<5	<5	<5	<5	<5
	trans-1,4-Dichloro-2-butene	µg/L	5		<5	<5	<5	<5	<5	<5	<5

#1 Reported Analyte LOR is higher than Requested Analyte LOR

Table C - Acid Base Accounting Results

Location	BH4B	BH4B	BH4B	BH4B	BH4B	MB01A	MB03B
Field ID	BH4B_6.40-6.52	BH4B_39.74-39.91	BH4B_71.0-71.20	BH4B_148.17-148.36	BH4B_419.0-419.14	MB01A_26-36.5	MB03B_21-29
Sample Depth	6.4-6.52	39.74-39.91	71-71.2	148.17-148.36	419-419.14	26-36.5	21-29
Sample Date	25/08/2022	25/08/2022	25/08/2022	25/08/2022	25/08/2022	12/09/2022	12/09/2022
Lab Report Number	ES2230654	ES2230654	ES2230654	ES2230654	ES2230654	ES2233009	ES2233009

Chemical Group	Chemical Name	Units	LOR							
Field	pH (field)	pH	0.1	8.5	8.1	7	9.3	9.4	8.5	9.3
	Field pH of Peroxide extract	pH	0.1	4.9	3.4	2.9	3	5.3	6.2	5.7
Net Acid Generation	NAG (pH 4.5)	kg H2SO4/t	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	NAG (pH 7.0)	kg H2SO4/t	0.1	<0.1	0.5	3.5	<0.1	1.9	<0.1	1.2
	pH (Ox)	pH	0.1	7.1	6.9	4.6	10.8	6.7	9.8	5.9
Acid neutralising capacity	ANC as CaCO3	% CaCO3	0.1	1.8	1	1.5	6	0.7	4.4	1.9
	ANC as H2SO4	kg H2SO4 eq/t	0.5	17.8	9.5	14.8	59	7.2	43.3	18.7
	Maximum potential acidity[1]	kg H2SO4 eq/t		0.918	1.53	5.508	27.846	0.153	0.918	4.896
	Net Acid Production Potential[2]	kg H2SO4 eq/t		-16.882	-7.97	-9.292	-31.154	-7.047	-42.382	-13.804
	Fizz Rating	Fizz Unit	0	1	0	1	2	0	2	1
	Reaction Rate	Reaction unit	1	2	2	2	2	2	1	1
Sulfur and carbon	TOC	mg/kg	200	200	3800	600	<200	<200	<200	200
	TOC	%	0	0.02	0.38	0.06	<0.02	<0.02	<0.02	0.02
	Sulfur - Total as S (LECO)	mg/kg	100	300	500	1800	9100	<100	300	1600
	Sulfur - Total as S (LECO)	%	0	0.03	0.05	0.18	0.91	<0.01	0.03	0.16

Notes

[1] Maximum potential acidity calculated by Sulfur - Total as S * 30.6

[2] Net Acid Production Potential - Maximum potential acidity - Net Acid Production Potential

Table D - Rock leachable metals concentrations

								Location	BH4B	BH4B	BH4B	BH4B	BH4B	MB01A	MB03B
								Field ID	BH4B_148.17-148.36	BH4B_39.74-39.91	BH4B_419.0-419.14	BH4B_6.40-6.52	BH4B_71.0-71.20	MB01A_26-36.5	MB03B_7-20
								Sample Depth	148.17-148.36	39.74-39.91	419-419.14	6.4-6.52	71-71.2	26-36.5	7-20
								Sample Date	25-08-22	25-08-22	25-08-22	25-08-22	25-08-22	12-09-22	12-09-22
								Lab Report Number	ES2239415	ES2239415	ES2239415	ES2239415	ES2239415	ES2239415	ES2239415
				ANZG 2018 Freshwater 95% Toxicant DGV	ADWG 2011 Health	NSW 2014 General Solid Waste TCLP1 (leached)	ADWG 2011 Aesthetic	Baseline groundwater median concentration	Baseline groundwater 95th percentile							
Chemical Group	**Chemical Name**	**Units**	**LOR**													
Metals	Aluminium	mg/L	0.01	*0.055*			0.2	**0.1**	0.22	***0.79***	***3.82***	***3.38***	***4.88***	***4.3***	***2.39***	***3.97***
	Arsenic	mg/L	0.001	*0.013*	0.01	5		**0.01**	0.05	0.005	0.004	<0.001	0.008	0.008	***0.019***	0.003
	Barium	mg/L	0.001		2					0.002	0.026	0.033	0.032	0.025	0.015	0.024
	Boron	mg/L	0.05	*0.94*	4					<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Thallium	mg/L	0.001	*0.00003*						*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
	Uranium	mg/L	0.001	*0.0005*	0.02					***0.001***	*<0.001*	***0.002***	*<0.001*	*<0.001*	*<0.001*	*<0.001*
	Antimony	mg/L	0.001	*0.009*	0.003			**0.01**	0.011	<0.001	0.004	<0.001	<0.001	0.003	***0.016***	<0.001
	Tin	mg/L	0.001							<0.001	0.008	0.006	0.006	0.002	0.002	0.005
	Titanium	mg/L	0.01							<0.01	0.3	0.44	0.34	0.21	0.1	0.25
	Cadmium	mg/L	0.0001	*0.0002*	0.002	1		**0.005**	0.005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	*0.0003*	<0.0001
	Molybdenum	mg/L	0.001	*0.034*	0.05*	5				0.002	<0.001	<0.001	0.001	0.015	<0.001	<0.001
	Chromium (III+VI)	mg/L	0.001	*0.0033*	0.05			**0.01**	0.01	<0.001	<0.001	0.003	<0.001	<0.001	<0.001	<0.001
	Cobalt	mg/L	0.001	*0.001*						<0.001	*0.002*	*0.001*	*0.002*	*0.002*	*0.002*	*0.003*
	Copper	mg/L	0.001	*0.0014*	2		1	**0.01**	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Strontium	mg/L	0.001							0.021	0.008	0.005	0.015	0.025	0.016	0.028
	Iron	mg/L	0.05				0.3	**0.43**	2.864	0.38	**3.09**	**4.11**	**4.96**	**5.14**	**2.06**	**3.2**
	Lead	mg/L	0.001	*0.0034*	0.01	5		**0.01**	0.01	<0.001	<0.001	0.001	0.001	*0.005*	<0.001	<0.001
	Manganese	mg/L	0.001	*1.9*	0.5		0.1	**0.13**	1.9725	0.005	0.044	0.051	0.068	0.121	0.041	0.088
	Nickel	mg/L	0.001	*0.011*	0.02	2		**0.01**	0.01	<0.001	0.003	<0.001	0.004	0.005	0.001	0.006
	Selenium	mg/L	0.01	*0.005***	0.01	1				*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
	Silver	mg/L	0.001	*0.00005*	0.1	5				*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
	Vanadium	mg/L	0.01	*0.006*						*<0.01*	*<0.01*	*<0.01*	***0.01***	*<0.01*	*<0.01*	*<0.01*
	Zinc	mg/L	0.005	*0.008*			3	**0.01**	0.031	<0.005	<0.005	***0.011***	***0.016***	***0.029***	<0.005	***0.019***
	Gallium	mg/L	0.001							0.001	0.002	0.001	0.002	0.001	0.002	0.001
	Tungsten	mg/L	0.001							0.032	<0.001	0.002	<0.001	<0.001	<0.001	<0.001
	Thorium	mg/L	0.001							<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001

*Conservatively adopted speciated chromium (VI)
**Adopted the 99% criteria due to bioaccumulation

Annexure C

Laboratory certificates of analysis

EMM
creating opportunities

CHAIN OF CUSTODY

ALS Laboratory **please tick →**

CLIENT: EMM CONSULTING	**TURNAROUND REQUIREMENTS :** ☒ Standard TAT (List due date):		**FOR LABORATORY USE ONLY (Circle)**
OFFICE: 20 Chandos Street, St Leonards	(Standard TAT may be longer for some tests e.g. Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):		Custody Seal Intact? Yes No N/A
PROJECT: Oven Mountain Pumped Storage Project **PROJECT NO.:** J200698	**ALS QUOTE NO:** NA	**COC SEQUENCE NUMBER (Circle)**	Free ice / frozen ice bricks present upon receipt? Yes No N/A
PURCHASE ORDER: J200698	**COUNTRY OF ORIGIN:**	COC: ① 2 3 4 5 6 7	Random Sample Temperature on Receipt. °C
PROJECT MANAGER: Henry Noakes	**CONTACT PH:** 0448 772 835	OF: ① 2 3 4 5 6 7	Other comment:
SAMPLER: Henry Noakes	**SAMPLER MOBILE:** 0448 772 835	**RELINQUISHED BY:** HJN	**RECEIVED BY:** J GA
COC Emailed to ALS? (YES)	**EDD FORMAT (or default):** esdat		
Email Reports to: hnoakes@emmconsulting.com.au / ccassidy@emmconsulting.com.au / ebayer@emmconsulting.com.au / emmconsulting@esdat.net; rtruscott@emmconsulting.com.au; mskold@emmconsulting.com.au		DATE/TIME: 12/09/2022	DATE/TIME: 14/09/22 1515
Email Invoice to finance@emmconsulting.com.au / hnoakes@emmconsulting.com.au			

RELINQUISHED BY:	RECEIVED BY:
DATE/TIME	DATE/TIME

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS (MATRIX: Solid(S) Water(W))				CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB: Suite Codes must be listed to attract suite price) Where **Metals** are required, specify **Total** (unfiltered bottle required) or **Dissolved** (field filtered bottle required).									Additional Information
LAB ID	SAMPLE ID	DATE	TIME	MATRIX	TYPE & PRESERVATIVE *(refer to codes below)*	TOTAL CONATAINERS	HOLD									
1	MB01A_26-36.5	12/09/2022	15:00	Solids	Glass jar	1	1									
2	MB02B_0-9	12/09/2022	15:00	Solids	Glass jar	1	1									
3	MB02B_178-187	12/09/2022	15:00	Solids	Glass jar	1	1									
4	MB03B_7-20	12/09/2022	15:00	Solids	Glass jar	1	1									
5	MB03B_54-63	12/09/2022	15:00	Solids	Glass jar	1	1									
					TOTAL	5	5	0	0	0	0	0	0	0	0	

Water Container Codes: P = Unpreserved Plastic, N = Nitric Preserved Plastic, ORC = Nitric Preserved ORC, SH = Sodium Hydroxide/Cd Preserved, S = Sodium Hydroxide Preserved Plastic, AG = Amber Glass Unpreserved, AP = Airfreight Unpreserved Plastic, V = VOA Vial HCl Preserved, VB = VOA Vial Sodium Bisulphate Preserved, VS = VOA Vial Sulfuric Preserved, AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass, H = HCl preserved Plastic, HS = HCl preserved Speciation bottle, SP = Sulfuric Preserved Plastic, F = Formaldehyde Preserved Glass, Z = Zinc Acetate Preserved Bottle, E = EDTA Preserved Bottles, ST = Sterile Bottle, ASG = Plastic Bag for Acid Sulphate Soils, B = Unpreserved Bag, U = Lugols Iodine Preserved Bottles, STT = Sterile Sodium Thiosulfate Preserved Bottles

Environmental Division
Sydney
Work Order Reference
ES2233009

Telephone : - 61-2-8784 8555

ES2233009

CHAIN OF CUSTODY

ALS Laboratory: please tick →

ADELAIDE 21 Dursna Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com

BRISBANE 2 Byth Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com

GOLDSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com

MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com

MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com

MUDGEE 129 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgeemail@alsglobal.com

NEWCASTLE 0555 Maitland Road Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com

NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 02 4423 2063 E: nowra@alsglobal.com

PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com

SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com

TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com

WOLLONGONG 1/10-21 Ralph Black Dr, North Wollongong NSW 2500 Ph: 02 4225 3125 E: wollongong@alsglobal.com

CLIENT: EMM CONSULTING	TURNAROUND REQUIREMENTS: ☐ Standard TAT (List due date):		FOR LABORATORY USE ONLY (Circle)
OFFICE: 20 Chandos Street, St Leonards	(Standard TAT may be longer for some tests e.g. Ultra Trace Organics) X Non Standard or urgent TAT (List due date): FRIDAY - 16 December 2022		Custody Seal Intact? Yes No N/A
PROJECT: Oven Mountain Pumped Storage Project PROJECT NO.: J200506	ALS QUOTE NO: NA	COC SEQUENCE NUMBER (Circle)	Free ice / frozen ice bricks present upon receipt? Yes No N/A
PURCHASE ORDER: J200506	COUNTRY OF ORIGIN:	COC: ① 2 3 4 5 6 7	Random Sample Temperature on Receipt: °C
PROJECT MANAGER: Henry Nookes	CONTACT PH: 0448 772 935	OF: ① 2 3 4 5 6 7	Other comments:

SAMPLER: KG	SAMPLER MOBILE: 0401 881 447	RELINQUISHED BY: HJN	RECEIVED BY:	RELINQUISHED BY:
COC Emailed to ALS? (YES)	EDD FORMAT (or default): sadat			
Email Reports to: hnookes@emmconsulting.com.au / kmsady@emmconsulting.com.au / sbayer@emmconsulting.com.au / emmconsulting@seedat.net; ntrussell@emmconsulting.com.au; mskold@emmconsulting.com.au		DATE/TIME: 16/9/2022	DATE/TIME:	DATE/TIME:
Email Invoices to: finance@emmconsulting.com.au / hnookes@emmconsulting.com.au				RECEIVED BY: Helen DATE/TIME: 16/9/22 12pm

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)				CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required)								Additional Information
LAB ID	SAMPLE ID	DATE	TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL	Waste classification (Pr3 long)	Acid neutralising capacity	Total sulfur (S-IR08)	Metals and metalloids (ME M561m)	ASLP Suite (as per attached quote)	Rock analysis (as per attached quote)			
	BH4B_2.39-2.51	25/08/2022		Rock	BAG	1	1				1				
	BH4B_6.40-6.52	25/08/2022		Rock	BAG	1				1		1			
	BH4B_13.85-14.0	25/08/2022		Rock	BAG	1									
	BH4B_22.05-22.30	25/08/2022		Rock	BAG	1	1				1				
	BH4B_33.0-33.27	25/08/2022		Rock	BAG	1									
	BH4B_39.74-39.91	25/08/2022		Rock	BAG	1				1		1			
	BH4B_47.89-48.00	25/08/2022		Rock	BAG	1									
	BH4B_56.81-57.0	25/08/2022		Rock	BAG	1									
	BH4B_62.10-62.30	25/08/2022		Rock	BAG	1									
	BH4B_71.07-71.20	25/08/2022		Rock	BAG	1				1		1			
	BH4B_84.0-84.15	25/08/2022		Rock	BAG	1									
	BH4B_86.0-86.15	25/08/2022		Rock	BAG	1									
	BH4B_99.82-99.95	25/08/2022		Rock	BAG	1									
	BH4B_126.27-126.37	25/08/2022		Rock	BAG	1	1				1				
	BH4B_148.17-148.36	25/08/2022		Rock	BAG	1				1		1			
	BH4B_191.75-191.94	25/08/2022		Rock	BAG	1									
	BH4B_221.74-221.87	25/08/2022		Rock	BAG	1									
	BH4B_325.0-325.16	25/08/2022		Rock	BAG	1									
	BH4B_349.86-350.0	25/08/2022		Rock	BAG	1									
	BH4B_373.86-374.0	25/08/2022		Rock	BAG	1									
	BH4B_398.0-398.13	25/08/2022		Rock	BAG	1	1				1				
	BH4B_419.0-419.14	25/08/2022		Rock	BAG	1				1		1			
1	MB01A_26-36.5	12/09/2022	15:00	Solids	JAR	1				1		1			
2	MB02B_0-9	12/09/2022	15:00	Solids	JAR	1	1				1				
3	MB02B_178-187	12/09/2022	15:00	Solids	JAR	1	1				1				
4	MB03B_7-20	12/09/2022	15:00	Solids	JAR	1	1				1				

updated COC

Environmental Division
Sydney
Work Order Reference
ES2233009

Telephone : +61-2-8784 8555

5	MB03B_21-29	12/09/2022	15:00	Solids	JAR	1										
6	MB03B_54-63	12/09/2022	15:00	Solids	JAR	1				1		1				
					TOTAL	28	7	9	0	7	7	7	0	0	0	

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; HP = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass.
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottle; ST = Sterile Bottle; ASG = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag; LI = Lugols Iodine Preserved Bottles, STT = Sterile Sodium Thiosulfate Preserved Bottles

S4/284/22

UPDATED COC

Rec 2 @ 14/09/22 1550

	BH4B_373.86-374.0	25/08/2022		Rock	BAG	1											
	BH4B_388.0-388.13	25/08/2022		Rock	BAG	1											
	BH4B_419.0-419.14	25/08/2022		Rock	BAG	1				1	1	1					
1	MB01A_26-36.5	12/09/2022	15:00	Solids	JAR	1				1	1	1					
2	MB02B_0-9	12/09/2022	15:00	Solids	JAR	1	1				1						
3	MB02B_178-187	12/09/2022	15:00	Solids	JAR	1											
4	MB03B_7-20	12/09/2022	15:00	Solids	JAR	1	1			1	1	1					
5	MB03B_54-63	12/09/2022	15:00	Solids	JAR	1											
Extra 6	MB03B_21-29	12/9			TOTAL	27	5	0	0	7	11	7	0	0	0		

Waste classification (CP-713 long)

Metals & Metalloids (ME-MS61m)

ASLP suite (as per attached quote).

Leach analysis (as per attached quote). Table 3.

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic, ORC = Nitric Preserved ORC, SH = Sodium Hydroxide/Cd Preserved, S = Sodium Hydroxide Preserved Plastic, AG = Amber Glass Unpreserved, AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved, VB = VOA Vial Sodium Bisulphate Preserved, VS = VOA Vial Sulfuric Preserved, AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass, H = HCl preserved Plastic, HS = HCl preserved Speciation bottle, SP = Sulfuric Preserved Plastic, F = Formaldehyde Preserved Glass,
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles, ST = Sterile Bottle, ASS = Plastic Bag for Acid Sulphate Soils, B = Unpreserved Bag, LI = Lugols Iodine Preserved Bottles, STT = Sterile Sodium Thiosulfate Preserved Bottles.

TAT

Subcon / Forward Lab / (Split WO) From 8522 30654

Lab / Analysis:

Organised By / Date:

Relinquished By / Date:

Connote / Courier:

WO No:

Attached By PO / Internal Sheet:

Environmental Division
Sydney
Work Order Reference
ES2233009

Telephone : +61-2-8784 8555

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES2233009**	Page	: 1 of 21
Amendment	: **(Preliminary Report)**		
Client	: **EMM CONSULTING PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: HENRY NOAKES	Contact	: Cez Bautista
Address	: Ground Floor Suite 1 20 Chandos Street St Leonards NSW NSW 2065	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: J200096 Oven Mountain Pumped Storage Project	Date Samples Received	: 14-Sep-2022 15:15
Order number	: J200096	Date Analysis Commenced	: 16-Sep-2022
C-O-C number	: ----	Issue Date	: 11-Oct-2022 09:51
Sampler	: HENRY NOAKES		
Site	: ----		
Quote number	: SY/284/22		
No. of samples received	: 6		
No. of samples analysed	: 5		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Hez Weldermariam	Lab Technician	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Zoran Grozdanovski	Laboratory Operator	Newcastle - Inorganics, Mayfield West, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

This report contains preliminary authorised results. The report may contain semi-quantitative results. Any result presented in this preliminary report may be subject to change in the final report.

- EP202: Poor matrix spike recoveries for Clopyralid due to matrix effects.
- EG048G: Poor spike recovery for Hexavalent Chromium by Alkaline Digestion due to matrix interferences.
- EP075: Where reported, Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP068: Where reported, Total Chlordane (sum) is the sum of the reported concentrations of cis-Chlordane and trans-Chlordane at or above the LOR.
- EP068: Where reported, Total OCP is the sum of the reported concentrations of all Organochlorine Pesticides at or above LOR.
- NSW-WCG: Where reported, Total Chlorinated Hydrocarbons is the sum of the reported concentrations of all Chlorinated Hydrocarbons at or above the LOR.
- EP074: Where reported, Total Trihalomethanes is the sum of the reported concentrations of all Trihalomethanes at or above the LOR.
- EP074: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP074: Where reported, Sum of chlorinated hydrocarbons includes carbon tetrachloride, chlorobenzene, chloroform, 1,2-dichlorobenzene, 1,4-dichlorobenzene, 1,2-dichloroethane, 1,1-dichloroethene, cis-1,2-dichlorothene, trans-1,2-dichlorothene, 1,1,1,2-tetrachloroethane, 1,1,2,2-tetrachloroethane, 1,2,4-trichlorobenzene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, trichloroethene, vinyl chloride, hexachlorobutadiene and methylene chloride.
- EP074: Where reported, Total Trimethylbenzenes is the sum of the reported concentrations of 1.2.3-Trimethylbenzene, 1.2.4-Trimethylbenzene and 1.3.5-Trimethylbenzene at or above the LOR.
- EG048G: Poor spike recovery for Alkaline Hexavalent Chromium due to matrix interferences
- ASS: EA013 (ANC) Fizz Rating: 0- None; 1- Slight; 2- Moderate; 3- Strong; 4- Very Strong; 5- Lime.
- EP075: Where reported, 'Sum of PAH' is the sum of the USEPA 16 priority PAHs
- ASS: EA003 (NATA Field and F(ox) screening): pH F(ox) Reaction Rate: 1 - Slight; 2 - Moderate; 3 - Strong; 4 - Extreme
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.

- EP132: Where reported, Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.

Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)			Sample ID	MB02B_0-9	MB03B_7-20	MB02B_178-187	----	----
			Sampling date / time	12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00	----	----
Compound	CAS Number	LOR	Unit	ES2233009-002	ES2233009-004	ES2233009-007	--------	--------
				Result	Result	Result	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**6.73**	**6.52**	**7.03**	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**19**	**25**	**27**	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**4**	**6**	**11**	----	----
Total Alkalinity as CaCO3	----	1	mg/L	**4**	**6**	**11**	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	**4**	<1	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**2**	**2**	**2**	----	----
EG005(ED093)C: Leachable Metals by ICPAES								
Aluminium	7429-90-5	0.1	mg/L	**3.9**	**2.4**	**3.0**	----	----
Antimony	7440-36-0	0.1	mg/L	<0.1	<0.1	<0.1	----	----
Arsenic	7440-38-2	0.1	mg/L	<0.1	<0.1	<0.1	----	----
Beryllium	7440-41-7	0.05	mg/L	<0.05	<0.05	<0.05	----	----
Boron	7440-42-8	0.1	mg/L	<0.1	<0.1	<0.1	----	----
Cadmium	7440-43-9	0.05	mg/L	<0.05	<0.05	<0.05	----	----
Chromium	7440-47-3	0.1	mg/L	<0.1	<0.1	<0.1	----	----
Iron	7439-89-6	0.1	mg/L	**5.9**	**2.1**	**4.8**	----	----
Lead	7439-92-1	0.1	mg/L	<0.1	<0.1	<0.1	----	----
Manganese	7439-96-5	0.1	mg/L	**0.1**	<0.1	<0.1	----	----
Nickel	7440-02-0	0.1	mg/L	<0.1	<0.1	<0.1	----	----
Selenium	7782-49-2	0.05	mg/L	<0.05	<0.05	<0.05	----	----
Silver	7440-22-4	0.1	mg/L	<0.1	<0.1	<0.1	----	----
Molybdenum	7439-98-7	0.1	mg/L	<0.1	<0.1	<0.1	----	----
EG035C: Leachable Mercury by FIMS								
Mercury	7439-97-6	0.0010	mg/L	<0.0010	<0.0010	<0.0010	----	----
EG050G-W: Hexavalent Chromium - Water Leachable								
Hexavalent Chromium	18540-29-9	0.01	mg/L	<0.01	<0.01	<0.01	----	----
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	**0.2**	**0.1**	<0.1	----	----
EP068A: Organochlorine Pesticides (OC)								

Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)				Sample ID	MB02B_0-9	MB03B_7-20	MB02B_178-187	----	----
				Sampling date / time	12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00	----	----
Compound	CAS Number	LOR	Unit		ES2233009-002	ES2233009-004	ES2233009-007	--------	--------
					Result	Result	Result	----	----
EP068A: Organochlorine Pesticides (OC) - Continued									
alpha-BHC	319-84-6	0.5	µg/L		<0.5	<0.5	<0.5	----	----
Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L		<0.5	<0.5	<0.5	----	----
beta-BHC	319-85-7	0.5	µg/L		<0.5	<0.5	<0.5	----	----
gamma-BHC	58-89-9	0.5	µg/L		<0.5	<0.5	<0.5	----	----
delta-BHC	319-86-8	0.5	µg/L		<0.5	<0.5	<0.5	----	----
Heptachlor	76-44-8	0.5	µg/L		<0.5	<0.5	<0.5	----	----
Aldrin	309-00-2	0.5	µg/L		<0.5	<0.5	<0.5	----	----
Heptachlor epoxide	1024-57-3	0.5	µg/L		<0.5	<0.5	<0.5	----	----
trans-Chlordane	5103-74-2	0.5	µg/L		<0.5	<0.5	<0.5	----	----
alpha-Endosulfan	959-98-8	0.5	µg/L		<0.5	<0.5	<0.5	----	----
cis-Chlordane	5103-71-9	0.5	µg/L		<0.5	<0.5	<0.5	----	----
Dieldrin	60-57-1	0.5	µg/L		<0.5	<0.5	<0.5	----	----
4.4`-DDE	72-55-9	0.5	µg/L		<0.5	<0.5	<0.5	----	----
Endrin	72-20-8	0.5	µg/L		<0.5	<0.5	<0.5	----	----
beta-Endosulfan	33213-65-9	0.5	µg/L		<0.5	<0.5	<0.5	----	----
4.4`-DDD	72-54-8	0.5	µg/L		<0.5	<0.5	<0.5	----	----
Endrin aldehyde	7421-93-4	0.5	µg/L		<0.5	<0.5	<0.5	----	----
Endosulfan sulfate	1031-07-8	0.5	µg/L		<0.5	<0.5	<0.5	----	----
4.4`-DDT	50-29-3	2.0	µg/L		<2.0	<2.0	<2.0	----	----
Endrin ketone	53494-70-5	0.5	µg/L		<0.5	<0.5	<0.5	----	----
Methoxychlor	72-43-5	2.0	µg/L		<2.0	<2.0	<2.0	----	----
^ Total Chlordane (sum)	----	0.5	µg/L		<0.5	<0.5	<0.5	----	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.5	µg/L		<0.5	<0.5	<0.5	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.5	µg/L		<0.5	<0.5	<0.5	----	----
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.5	µg/L		<0.5	<0.5	<0.5	----	----
Demeton-S-methyl	919-86-8	0.5	µg/L		<0.5	<0.5	<0.5	----	----
Monocrotophos	6923-22-4	2.0	µg/L		<2.0	<2.0	<2.0	----	----
Dimethoate	60-51-5	0.5	µg/L		<0.5	<0.5	<0.5	----	----
Diazinon	333-41-5	0.5	µg/L		<0.5	<0.5	<0.5	----	----
Chlorpyrifos-methyl	5598-13-0	0.5	µg/L		<0.5	<0.5	<0.5	----	----
Parathion-methyl	298-00-0	2.0	µg/L		<2.0	<2.0	<2.0	----	----
Malathion	121-75-5	0.5	µg/L		<0.5	<0.5	<0.5	----	----
Fenthion	55-38-9	0.5	µg/L		<0.5	<0.5	<0.5	----	----

Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)			Sample ID	MB02B_0-9	MB03B_7-20	MB02B_178-187	----	----
			Sampling date / time	12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00	----	----
Compound	CAS Number	LOR	Unit	ES2233009-002	ES2233009-004	ES2233009-007	--------	--------
				Result	Result	Result	----	----
EP068B: Organophosphorus Pesticides (OP) - Continued								
Chlorpyrifos	2921-88-2	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Parathion	56-38-2	2.0	µg/L	<2.0	<2.0	<2.0	----	----
Pirimphos-ethyl	23505-41-1	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Chlorfenvinphos	470-90-6	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Bromophos-ethyl	4824-78-6	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Fenamiphos	22224-92-6	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Prothiofos	34643-46-4	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Ethion	563-12-2	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Carbophenothion	786-19-6	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Azinphos Methyl	86-50-0	0.5	µg/L	<0.5	<0.5	<0.5	----	----
EP068C: Triazines								
Atrazine	1912-24-9	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Simazine	122-34-9	0.5	µg/L	<0.5	<0.5	<0.5	----	----
EP068D: Cypermethrins								
Cypermethrins	----	2.0	µg/L	<2.0	<2.0	<2.0	----	----
EP068E: Other Pesticides								
Methoprene	40596-69-8	0.5	µg/L	<0.5	<0.5	<0.5	----	----
EP075A: Phenolic Compounds								
Phenol	108-95-2	2	µg/L	<2	<2	<2	----	----
2-Chlorophenol	95-57-8	2	µg/L	<2	<2	<2	----	----
2-Methylphenol	95-48-7	2	µg/L	<2	<2	<2	----	----
3- & 4-Methylphenol	1319-77-3	4	µg/L	<4	<4	<4	----	----
2-Nitrophenol	88-75-5	2	µg/L	<2	<2	<2	----	----
2.4-Dimethylphenol	105-67-9	2	µg/L	<2	<2	<2	----	----
2.4-Dichlorophenol	120-83-2	2	µg/L	<2	<2	<2	----	----
2.6-Dichlorophenol	87-65-0	2	µg/L	<2	<2	<2	----	----
4-Chloro-3-methylphenol	59-50-7	2	µg/L	<2	<2	<2	----	----
2.4.6-Trichlorophenol	88-06-2	2	µg/L	<2	<2	<2	----	----
2.4.5-Trichlorophenol	95-95-4	2	µg/L	<2	<2	<2	----	----
Pentachlorophenol	87-86-5	4	µg/L	<4	<4	<4	----	----
EP075B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	2	µg/L	<2	<2	<2	----	----
2-Methylnaphthalene	91-57-6	2	µg/L	<2	<2	<2	----	----
2-Chloronaphthalene	91-58-7	2	µg/L	<2	<2	<2	----	----

Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)				Sample ID	MB02B_0-9	MB03B_7-20	MB02B_178-187	----	----
				Sampling date / time	12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00	----	----
Compound	CAS Number	LOR	Unit		ES2233009-002	ES2233009-004	ES2233009-007	--------	--------
					Result	Result	Result	----	----
EP075B: Polynuclear Aromatic Hydrocarbons - Continued									
Acenaphthylene	208-96-8	2	µg/L		<2	<2	<2	----	----
Acenaphthene	83-32-9	2	µg/L		<2	<2	<2	----	----
Fluorene	86-73-7	2	µg/L		<2	<2	<2	----	----
Phenanthrene	85-01-8	2	µg/L		<2	<2	<2	----	----
Anthracene	120-12-7	2	µg/L		<2	<2	<2	----	----
Fluoranthene	206-44-0	2	µg/L		<2	<2	<2	----	----
Pyrene	129-00-0	2	µg/L		<2	<2	<2	----	----
N-2-Fluorenyl Acetamide	53-96-3	2	µg/L		<2	<2	<2	----	----
Benz(a)anthracene	56-55-3	2	µg/L		<2	<2	<2	----	----
Chrysene	218-01-9	2	µg/L		<2	<2	<2	----	----
Benzo(b+j) & Benzo(k)fluoranthene	205-99-2 207-08-9	4	µg/L		<4	<4	<4	----	----
7.12-Dimethylbenz(a)anthracene	57-97-6	2	µg/L		<2	<2	<2	----	----
Benzo(a)pyrene	50-32-8	2	µg/L		<2	<2	<2	----	----
3-Methylcholanthrene	56-49-5	2	µg/L		<2	<2	<2	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	2	µg/L		<2	<2	<2	----	----
Dibenz(a.h)anthracene	53-70-3	2	µg/L		<2	<2	<2	----	----
Benzo(g.h.i)perylene	191-24-2	2	µg/L		<2	<2	<2	----	----
^ Sum of PAHs	----	2	µg/L		<2	<2	<2	----	----
^ Benzo(a)pyrene TEQ (zero)	----	2	µg/L		<2	<2	<2	----	----
EP075C: Phthalate Esters									
Dimethyl phthalate	131-11-3	2	µg/L		<2	<2	<2	----	----
Diethyl phthalate	84-66-2	2	µg/L		<2	<2	<2	----	----
Di-n-butyl phthalate	84-74-2	2	µg/L		<2	<2	<2	----	----
Butyl benzyl phthalate	85-68-7	2	µg/L		<2	<2	<2	----	----
bis(2-ethylhexyl) phthalate	117-81-7	10	µg/L		<10	<10	<10	----	----
Di-n-octylphthalate	117-84-0	2	µg/L		<2	<2	<2	----	----
EP075D: Nitrosamines									
N-Nitrosomethylethylamine	10595-95-6	2	µg/L		<2	<2	<2	----	----
N-Nitrosodiethylamine	55-18-5	2	µg/L		<2	<2	<2	----	----
N-Nitrosopyrrolidine	930-55-2	4	µg/L		<4	<4	<4	----	----
N-Nitrosomorpholine	59-89-2	2	µg/L		<2	<2	<2	----	----
N-Nitrosodi-n-propylamine	621-64-7	2	µg/L		<2	<2	<2	----	----
N-Nitrosopiperidine	100-75-4	2	µg/L		<2	<2	<2	----	----
N-Nitrosodibutylamine	924-16-3	2	µg/L		<2	<2	<2	----	----

Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)			Sample ID	MB02B_0-9	MB03B_7-20	MB02B_178-187	----	----
			Sampling date / time	12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00	----	----
Compound	CAS Number	LOR	Unit	ES2233009-002	ES2233009-004	ES2233009-007	--------	--------
				Result	Result	Result	----	----
EP075D: Nitrosamines - Continued								
N-Nitrosodiphenyl & Diphenylamine	86-30-6 122-39-4	4	µg/L	<4	<4	<4	----	----
Methapyrilene	91-80-5	2	µg/L	<2	<2	<2	----	----
EP075E: Nitroaromatics and Ketones								
2-Picoline	109-06-8	2	µg/L	<2	<2	<2	----	----
Acetophenone	98-86-2	2	µg/L	<2	<2	<2	----	----
Nitrobenzene	98-95-3	2	µg/L	<2	<2	<2	----	----
Isophorone	78-59-1	2	µg/L	<2	<2	<2	----	----
2.6-Dinitrotoluene	606-20-2	4	µg/L	<4	<4	<4	----	----
2.4-Dinitrotoluene	121-14-2	4	µg/L	<4	<4	<4	----	----
1-Naphthylamine	134-32-7	2	µg/L	<2	<2	<2	----	----
4-Nitroquinoline-N-oxide	56-57-5	2	µg/L	<2	<2	<2	----	----
5-Nitro-o-toluidine	99-55-8	2	µg/L	<2	<2	<2	----	----
Azobenzene	103-33-3	2	µg/L	<2	<2	<2	----	----
1.3.5-Trinitrobenzene	99-35-4	2	µg/L	<2	<2	<2	----	----
Phenacetin	62-44-2	2	µg/L	<2	<2	<2	----	----
4-Aminobiphenyl	92-67-1	2	µg/L	<2	<2	<2	----	----
Pentachloronitrobenzene	82-68-8	2	µg/L	<2	<2	<2	----	----
Pronamide	23950-58-5	2	µg/L	<2	<2	<2	----	----
Dimethylaminoazobenzene	60-11-7	2	µg/L	<2	<2	<2	----	----
Chlorobenzilate	510-15-6	2	µg/L	<2	<2	<2	----	----
EP075F: Haloethers								
Bis(2-chloroethyl) ether	111-44-4	2	µg/L	<2	<2	<2	----	----
Bis(2-chloroethoxy) methane	111-91-1	2	µg/L	<2	<2	<2	----	----
4-Chlorophenyl phenyl ether	7005-72-3	2	µg/L	<2	<2	<2	----	----
4-Bromophenyl phenyl ether	101-55-3	2	µg/L	<2	<2	<2	----	----
EP075G: Chlorinated Hydrocarbons								
1.3-Dichlorobenzene	541-73-1	2	µg/L	<2	<2	<2	----	----
1.4-Dichlorobenzene	106-46-7	2	µg/L	<2	<2	<2	----	----
1.2-Dichlorobenzene	95-50-1	2	µg/L	<2	<2	<2	----	----
Hexachloroethane	67-72-1	2	µg/L	<2	<2	<2	----	----
1.2.4-Trichlorobenzene	120-82-1	2	µg/L	<2	<2	<2	----	----
Hexachloropropylene	1888-71-7	2	µg/L	<2	<2	<2	----	----
Hexachlorobutadiene	87-68-3	2	µg/L	<2	<2	<2	----	----

Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)			Sample ID	MB02B_0-9	MB03B_7-20	MB02B_178-187	----	----
			Sampling date / time	12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00	----	----
Compound	CAS Number	LOR	Unit	ES2233009-002	ES2233009-004	ES2233009-007	--------	--------
				Result	Result	Result	----	----
EP075G: Chlorinated Hydrocarbons - Continued								
Hexachlorocyclopentadiene	77-47-4	10	µg/L	<10	<10	<10	----	----
Pentachlorobenzene	608-93-5	2	µg/L	<2	<2	<2	----	----
Hexachlorobenzene (HCB)	118-74-1	4	µg/L	<4	<4	<4	----	----
EP075H: Anilines and Benzidines								
Aniline	62-53-3	2	µg/L	<2	<2	<2	----	----
4-Chloroaniline	106-47-8	2	µg/L	<2	<2	<2	----	----
2-Nitroaniline	88-74-4	4	µg/L	<4	<4	<4	----	----
3-Nitroaniline	99-09-2	4	µg/L	<4	<4	<4	----	----
Dibenzofuran	132-64-9	2	µg/L	<2	<2	<2	----	----
4-Nitroaniline	100-01-6	2	µg/L	<2	<2	<2	----	----
Carbazole	86-74-8	2	µg/L	<2	<2	<2	----	----
3.3`-Dichlorobenzidine	91-94-1	2	µg/L	<2	<2	<2	----	----
EP075I: Organochlorine Pesticides								
alpha-BHC	319-84-6	2	µg/L	<2	<2	<2	----	----
beta-BHC	319-85-7	2	µg/L	<2	<2	<2	----	----
gamma-BHC	58-89-9	2	µg/L	<2	<2	<2	----	----
delta-BHC	319-86-8	2	µg/L	<2	<2	<2	----	----
Heptachlor	76-44-8	2	µg/L	<2	<2	<2	----	----
Aldrin	309-00-2	2	µg/L	<2	<2	<2	----	----
Heptachlor epoxide	1024-57-3	2	µg/L	<2	<2	<2	----	----
alpha-Endosulfan	959-98-8	2	µg/L	<2	<2	<2	----	----
4.4`-DDE	72-55-9	2	µg/L	<2	<2	<2	----	----
Dieldrin	60-57-1	2	µg/L	<2	<2	<2	----	----
Endrin	72-20-8	2	µg/L	<2	<2	<2	----	----
beta-Endosulfan	33213-65-9	2	µg/L	<2	<2	<2	----	----
4.4`-DDD	72-54-8	2	µg/L	<2	<2	<2	----	----
Endosulfan sulfate	1031-07-8	2	µg/L	<2	<2	<2	----	----
4.4`-DDT	50-29-3	4	µg/L	<4	<4	<4	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	4	µg/L	<4	<4	<4	----	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	4	µg/L	<4	<4	<4	----	----
EP075J: Organophosphorus Pesticides								
Dichlorvos	62-73-7	2	µg/L	<2	<2	<2	----	----
Dimethoate	60-51-5	2	µg/L	<2	<2	<2	----	----

Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)			Sample ID	MB02B_0-9	MB03B_7-20	MB02B_178-187	----	----
			Sampling date / time	12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00	----	----
Compound	CAS Number	LOR	Unit	ES2233009-002	ES2233009-004	ES2233009-007	--------	--------
				Result	Result	Result	----	----
EP075J: Organophosphorus Pesticides - Continued								
Diazinon	333-41-5	2	µg/L	<2	<2	<2	----	----
Chlorpyrifos-methyl	5598-13-0	2	µg/L	<2	<2	<2	----	----
Malathion	121-75-5	2	µg/L	<2	<2	<2	----	----
Fenthion	55-38-9	2	µg/L	<2	<2	<2	----	----
Chlorpyrifos	2921-88-2	2	µg/L	<2	<2	<2	----	----
Pirimphos-ethyl	23505-41-1	2	µg/L	<2	<2	<2	----	----
Chlorfenvinphos	470-90-6	2	µg/L	<2	<2	<2	----	----
Prothiofos	34643-46-4	2	µg/L	<2	<2	<2	----	----
Ethion	563-12-2	2	µg/L	<2	<2	<2	----	----
EP075K: Miscellaneous Compounds								
1.3.5-Trichlorobenzene	108-70-3	2	µg/L	<2	<2	<2	----	----
1.2.4.5-Tetrachlorobenzene	95-94-3	2	µg/L	<2	<2	<2	----	----
Methanesulfonate methyl	66-27-3	2	µg/L	<2	<2	<2	----	----
cis-Isosafrole	17627-76-8	2	µg/L	<2	<2	<2	----	----
trans-Isosafrole	4043-71-4	2	µg/L	<2	<2	<2	----	----
Safrole	94-59-7	2	µg/L	<2	<2	<2	----	----
Diallate	2303-16-4	2	µg/L	<2	<2	<2	----	----
2.3.4.6-Tetrachlorophenol	58-90-2	2	µg/L	<2	<2	<2	----	----
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.5	%	71.6	93.8	73.3	----	----
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.5	%	84.0	104	88.7	----	----
EP075S: Acid Extractable Surrogates								
2-Fluorophenol	367-12-4	2	%	30.3	25.9	11.9	----	----
Phenol-d6	13127-88-3	2	%	25.7	26.3	23.3	----	----
2-Chlorophenol-D4	93951-73-6	2	%	50.1	48.7	30.3	----	----
2.4.6-Tribromophenol	118-79-6	2	%	42.9	31.5	10.9	----	----
EP075T: Base/Neutral Extractable Surrogates								
Nitrobenzene-D5	4165-60-0	2	%	57.5	62.7	61.1	----	----
1.2-Dichlorobenzene-D4	2199-69-1	2	%	53.3	58.6	56.1	----	----
2-Fluorobiphenyl	321-60-8	2	%	59.8	65.5	62.3	----	----
Anthracene-d10	1719-06-8	2	%	67.4	79.8	71.9	----	----
4-Terphenyl-d14	1718-51-0	2	%	70.1	85.5	74.2	----	----

Analytical Results

Sub-Matrix: DI WATER ZHE LEACHATE (Matrix: WATER)				Sample ID	MB02B_0-9	MB03B_7-20	MB02B_178-187	----	----
				Sampling date / time	12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00	----	----
Compound	CAS Number	LOR	Unit		ES2233009-002	ES2233009-004	ES2233009-007	--------	--------
					Result	Result	Result	----	----
EK026SF: Total CN by Segmented Flow Analyser									
Total Cyanide	57-12-5	0.004	mg/L		<0.004	<0.004	<0.004	----	----
EK028SF: Weak Acid Dissociable CN by Segmented Flow Analyser									
Weak Acid Dissociable Cyanide	----	0.004	mg/L		<0.004	<0.004	<0.004	----	----
EP074A: Monocyclic Aromatic Hydrocarbons									
Benzene	71-43-2	1	µg/L		<1	<1	<1	----	----
Toluene	108-88-3	2	µg/L		<2	<2	<2	----	----
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	----	----
Styrene	100-42-5	5	µg/L		<5	<5	<5	----	----
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	----	----
Isopropylbenzene	98-82-8	5	µg/L		<5	<5	<5	----	----
n-Propylbenzene	103-65-1	5	µg/L		<5	<5	<5	----	----
1.3.5-Trimethylbenzene	108-67-8	5	µg/L		<5	<5	<5	----	----
sec-Butylbenzene	135-98-8	5	µg/L		<5	<5	<5	----	----
1.2.4-Trimethylbenzene	95-63-6	5	µg/L		<5	<5	<5	----	----
tert-Butylbenzene	98-06-6	5	µg/L		<5	<5	<5	----	----
p-Isopropyltoluene	99-87-6	5	µg/L		<5	<5	<5	----	----
n-Butylbenzene	104-51-8	5	µg/L		<5	<5	<5	----	----
EP074B: Oxygenated Compounds									
2-Propanone (Acetone)	67-64-1	50	µg/L		<50	<50	<50	----	----
Vinyl Acetate	108-05-4	50	µg/L		<50	<50	<50	----	----
2-Butanone (MEK)	78-93-3	50	µg/L		<50	<50	<50	----	----
4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L		<50	<50	<50	----	----
2-Hexanone (MBK)	591-78-6	50	µg/L		<50	<50	<50	----	----
EP074C: Sulfonated Compounds									
Carbon disulfide	75-15-0	5	µg/L		<5	<5	<5	----	----
EP074D: Fumigants									
2.2-Dichloropropane	594-20-7	5	µg/L		<5	<5	<5	----	----
1.2-Dichloropropane	78-87-5	5	µg/L		<5	<5	<5	----	----
cis-1.3-Dichloropropylene	10061-01-5	5	µg/L		<5	<5	<5	----	----
trans-1.3-Dichloropropylene	10061-02-6	5	µg/L		<5	<5	<5	----	----
1.2-Dibromoethane (EDB)	106-93-4	5	µg/L		<5	<5	<5	----	----
EP074E: Halogenated Aliphatic Compounds									
Dichlorodifluoromethane	75-71-8	50	µg/L		<50	<50	<50	----	----

Analytical Results

Sub-Matrix: DI WATER ZHE LEACHATE (Matrix: WATER)				Sample ID	MB02B_0-9	MB03B_7-20	MB02B_178-187	----	----
				Sampling date / time	12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00	----	----
Compound	CAS Number	LOR	Unit		ES2233009-002	ES2233009-004	ES2233009-007	--------	--------
					Result	Result	Result	----	----
EP074E: Halogenated Aliphatic Compounds - Continued									
Chloromethane	74-87-3	50	µg/L		<50	<50	<50	----	----
Vinyl chloride	75-01-4	50	µg/L		<50	<50	<50	----	----
Bromomethane	74-83-9	50	µg/L		<50	<50	<50	----	----
Chloroethane	75-00-3	50	µg/L		<50	<50	<50	----	----
Trichlorofluoromethane	75-69-4	50	µg/L		<50	<50	<50	----	----
1.1-Dichloroethene	75-35-4	5	µg/L		<5	<5	<5	----	----
Iodomethane	74-88-4	5	µg/L		<5	<5	<5	----	----
Methylene chloride	75-09-2	5	µg/L		<5	<5	<5	----	----
trans-1.2-Dichloroethene	156-60-5	5	µg/L		<5	<5	<5	----	----
1.1-Dichloroethane	75-34-3	5	µg/L		<5	<5	<5	----	----
cis-1.2-Dichloroethene	156-59-2	5	µg/L		<5	<5	<5	----	----
1.1.1-Trichloroethane	71-55-6	5	µg/L		<5	<5	<5	----	----
1.1-Dichloropropylene	563-58-6	5	µg/L		<5	<5	<5	----	----
Carbon Tetrachloride	56-23-5	5	µg/L		<5	<5	<5	----	----
1.2-Dichloroethane	107-06-2	5	µg/L		<5	<5	<5	----	----
Trichloroethene	79-01-6	5	µg/L		<5	<5	<5	----	----
Dibromomethane	74-95-3	5	µg/L		<5	<5	<5	----	----
1.1.2-Trichloroethane	79-00-5	5	µg/L		<5	<5	<5	----	----
1.3-Dichloropropane	142-28-9	5	µg/L		<5	<5	<5	----	----
Tetrachloroethene	127-18-4	5	µg/L		<5	<5	<5	----	----
1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L		<5	<5	<5	----	----
trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L		<5	<5	<5	----	----
cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L		<5	<5	<5	----	----
1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L		<5	<5	<5	----	----
1.2.3-Trichloropropane	96-18-4	5	µg/L		<5	<5	<5	----	----
Pentachloroethane	76-01-7	5	µg/L		<5	<5	<5	----	----
1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L		<5	<5	<5	----	----
Hexachlorobutadiene	87-68-3	5	µg/L		<5	<5	<5	----	----
EP074F: Halogenated Aromatic Compounds									
Chlorobenzene	108-90-7	5	µg/L		<5	<5	<5	----	----
Bromobenzene	108-86-1	5	µg/L		<5	<5	<5	----	----
2-Chlorotoluene	95-49-8	5	µg/L		<5	<5	<5	----	----
4-Chlorotoluene	106-43-4	5	µg/L		<5	<5	<5	----	----
1.3-Dichlorobenzene	541-73-1	5	µg/L		<5	<5	<5	----	----
1.4-Dichlorobenzene	106-46-7	5	µg/L		<5	<5	<5	----	----

Analytical Results

Sub-Matrix: **DI WATER ZHE LEACHATE** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	MB02B_0-9	MB03B_7-20	MB02B_178-187	----	----
				Sampling date / time	12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00	----	----
					ES2233009-002	ES2233009-004	ES2233009-007	--------	--------
					Result	Result	Result	----	----
EP074F: Halogenated Aromatic Compounds - Continued									
1.2-Dichlorobenzene	95-50-1	5	µg/L		<5	<5	<5	----	----
1.2.4-Trichlorobenzene	120-82-1	5	µg/L		<5	<5	<5	----	----
1.2.3-Trichlorobenzene	87-61-6	5	µg/L		<5	<5	<5	----	----
EP074G: Trihalomethanes									
Chloroform	67-66-3	5	µg/L		<5	<5	<5	----	----
Bromodichloromethane	75-27-4	5	µg/L		<5	<5	<5	----	----
Dibromochloromethane	124-48-1	5	µg/L		<5	<5	<5	----	----
Bromoform	75-25-2	5	µg/L		<5	<5	<5	----	----
EP074H: Naphthalene									
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	----	----
EP074S: VOC Surrogates									
1.2-Dichloroethane-D4	17060-07-0	5	%		**118**	**110**	**111**	----	----
Toluene-D8	2037-26-5	5	%		**117**	**106**	**109**	----	----
4-Bromofluorobenzene	460-00-4	5	%		**119**	**111**	**112**	----	----

Analytical Results

Sub-Matrix: SOLID (Matrix: SOIL)			Sample ID	MB01A_26-36.5	MB02B_0-9	MB03B_7-20	MB03B_21-29	MB02B_178-187
			Sampling date / time	12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 00:00	12-Sep-2022 15:00
Compound	CAS Number	LOR	Unit	ES2233009-001	ES2233009-002	ES2233009-004	ES2233009-006	ES2233009-007
				Result	Result	Result	Result	Result
EA003 :pH (field/fox)								
pH (F)	----	0.1	pH Unit	8.5	----	----	9.3	----
pH (Fox)	----	0.1	pH Unit	6.2	----	----	5.7	----
Reaction Rate	----	1	Reaction Unit	1	----	----	1	----
EA011: Net Acid Generation								
pH (OX)	----	0.1	pH Unit	9.8	----	----	5.9	----
NAG (pH 4.5)	----	0.1	kg H2SO4/t	<0.1	----	----	<0.1	----
NAG (pH 7.0)	----	0.1	kg H2SO4/t	<0.1	----	----	1.2	----
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	43.3	----	----	18.7	----
ANC as CaCO3	----	0.1	% CaCO3	4.4	----	----	1.9	----
Fizz Rating	----	0	Fizz Unit	2	----	----	1	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	----	0.3	2.0	----	0.6
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.03	----	----	0.16	----
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	----	<5	<5	----	<5
Beryllium	7440-41-7	1	mg/kg	----	<1	<1	----	<1
Cadmium	7440-43-9	1	mg/kg	----	<1	<1	----	<1
Lead	7439-92-1	5	mg/kg	----	<5	<5	----	<5
Molybdenum	7439-98-7	2	mg/kg	----	<2	<2	----	<2
Nickel	7440-02-0	2	mg/kg	----	3	4	----	3
Selenium	7782-49-2	5	mg/kg	----	<5	<5	----	<5
Silver	7440-22-4	2	mg/kg	----	<2	<2	----	<2
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	----	<0.1	<0.1	----	<0.1
EG048: Hexavalent Chromium (Alkaline Digest)								
Hexavalent Chromium	18540-29-9	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
EK026SF: Total CN by Segmented Flow Analyser								
Total Cyanide	57-12-5	1	mg/kg	----	<1	<1	----	<1
EK028SF: Weak Acid Dissociable CN by Segmented Flow Analyser								
Weak Acid Dissociable Cyanide	----	1	mg/kg	----	<1	<1	----	<1
EK040T: Fluoride Total								

Analytical Results

Sub-Matrix: SOLID (Matrix: SOIL)			Sample ID	MB01A_26-36.5	MB02B_0-9	MB03B_7-20	MB03B_21-29	MB02B_178-187
			Sampling date / time	12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 00:00	12-Sep-2022 15:00
Compound	CAS Number	LOR	Unit	ES2233009-001	ES2233009-002	ES2233009-004	ES2233009-006	ES2233009-007
				Result	Result	Result	Result	Result
EK040T: Fluoride Total - Continued								
Fluoride	16984-48-8	40	mg/kg	----	320	330	----	250
EN60-DI: Bottle Leaching Procedure - Inorganics/Non-Volatile Organics (Glass Vessel)								
Final pH	----	0.1	pH Unit	----	7.2	7.4	----	8.8
EN60Z: ASLP Leachate - ZHE								
Extraction Fluid pH	----	0.1	pH Unit	----	7.2	7.4	----	8.8
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	<0.02	----	----	0.02	----
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	----	<0.1	<0.1	----	<0.1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
beta-BHC	319-85-7	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
delta-BHC	319-86-8	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
Heptachlor	76-44-8	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
Aldrin	309-00-2	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
Dieldrin	60-57-1	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
4.4`-DDE	72-55-9	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
Endrin	72-20-8	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
4.4`-DDT	50-29-3	0.2	mg/kg	----	<0.2	<0.2	----	<0.2
EP068B: Organophosphorus Pesticides (OP)								
Chlorpyrifos	2921-88-2	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup								
>C10 - C16 Fraction	----	50	mg/kg	----	<50	<50	----	<50

Analytical Results

Sub-Matrix: SOLID (Matrix: SOIL)				Sample ID	MB01A_26-36.5	MB02B_0-9	MB03B_7-20	MB03B_21-29	MB02B_178-187
				Sampling date / time	12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 00:00	12-Sep-2022 15:00
Compound	CAS Number	LOR	Unit		ES2233009-001	ES2233009-002	ES2233009-004	ES2233009-006	ES2233009-007
					Result	Result	Result	Result	Result
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup - Continued									
>C16 - C34 Fraction	----	100	mg/kg		----	<100	<100	----	<100
>C34 - C40 Fraction	----	100	mg/kg		----	<100	<100	----	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		----	<50	<50	----	<50
EP071 SG-S: Total Petroleum Hydrocarbons in Soil - Silica gel cleanup									
C10 - C14 Fraction	----	50	mg/kg		----	<50	<50	----	<50
C15 - C28 Fraction	----	100	mg/kg		----	<100	<100	----	<100
C29 - C36 Fraction	----	100	mg/kg		----	<100	<100	----	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		----	<50	<50	----	<50
EP074A: Monocyclic Aromatic Hydrocarbons									
Benzene	71-43-2	0.2	mg/kg		----	<0.2	<0.2	----	<0.2
Toluene	108-88-3	0.5	mg/kg		----	<0.5	<0.5	----	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		----	<0.5	<0.5	----	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		----	<0.5	<0.5	----	<0.5
Styrene	100-42-5	0.5	mg/kg		----	<0.5	<0.5	----	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		----	<0.5	<0.5	----	<0.5
EP074B: Oxygenated Compounds									
2-Butanone (MEK)	78-93-3	5	mg/kg		----	<5	<5	----	<5
EP074E(SIM): Halogenated Aliphatic Compounds									
Vinyl chloride	75-01-4	0.2	mg/kg		----	<0.2	<0.2	----	<0.2
EP074E: Halogenated Aliphatic Compounds									
Vinyl chloride	75-01-4	4	mg/kg		----	<4	<4	----	<4
1.1-Dichloroethene	75-35-4	0.5	mg/kg		----	<0.5	<0.5	----	<0.5
Methylene chloride	75-09-2	0.5	mg/kg		----	<0.5	<0.5	----	<0.5
1.1.1-Trichloroethane	71-55-6	0.5	mg/kg		----	<0.5	<0.5	----	<0.5
Carbon Tetrachloride	56-23-5	0.5	mg/kg		----	<0.5	<0.5	----	<0.5
1.2-Dichloroethane	107-06-2	0.5	mg/kg		----	<0.5	<0.5	----	<0.5
Trichloroethene	79-01-6	0.5	mg/kg		----	<0.5	<0.5	----	<0.5
1.1.2-Trichloroethane	79-00-5	0.5	mg/kg		----	<0.5	<0.5	----	<0.5
Tetrachloroethene	127-18-4	0.5	mg/kg		----	<0.5	<0.5	----	<0.5
1.1.1.2-Tetrachloroethane	630-20-6	0.5	mg/kg		----	<0.5	<0.5	----	<0.5
1.1.2.2-Tetrachloroethane	79-34-5	0.5	mg/kg		----	<0.5	<0.5	----	<0.5
EP074F: Halogenated Aromatic Compounds									
Chlorobenzene	108-90-7	0.5	mg/kg		----	<0.5	<0.5	----	<0.5
EP074G: Trihalomethanes									

Analytical Results

Sub-Matrix: SOLID (Matrix: SOIL)			Sample ID	MB01A_26-36.5	MB02B_0-9	MB03B_7-20	MB03B_21-29	MB02B_178-187
			Sampling date / time	12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 00:00	12-Sep-2022 15:00
Compound	CAS Number	LOR	Unit	ES2233009-001	ES2233009-002	ES2233009-004	ES2233009-006	ES2233009-007
				Result	Result	Result	Result	Result
EP074G: Trihalomethanes - Continued								
Chloroform	67-66-3	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
EP075A: Phenolic Compounds								
Phenol	108-95-2	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
2-Methylphenol	95-48-7	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
3- & 4-Methylphenol	1319-77-3	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Pentachlorophenol	87-86-5	1	mg/kg	----	<1	<1	----	<1
EP075B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Fluorene	86-73-7	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Anthracene	120-12-7	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Pyrene	129-00-0	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Chrysene	218-01-9	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Benzo(b+j) & Benzo(k)fluoranthene	205-99-2 207-08-9	1	mg/kg	----	<1	<1	----	<1
Benzo(a)pyrene	50-32-8	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
^ Sum of PAHs	----	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
EP075C: Phthalate Esters								
bis(2-ethylhexyl) phthalate	117-81-7	5.0	mg/kg	----	<5.0	<5.0	----	<5.0
EP075E: Nitroaromatics and Ketones								
Nitrobenzene	98-95-3	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
2.4-Dinitrotoluene	121-14-2	1.0	mg/kg	----	<1.0	<1.0	----	<1.0
Pentachloronitrobenzene	82-68-8	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
EP075G: Chlorinated Hydrocarbons								

Analytical Results

Sub-Matrix: SOLID (Matrix: SOIL)			Sample ID	MB01A_26-36.5	MB02B_0-9	MB03B_7-20	MB03B_21-29	MB02B_178-187
			Sampling date / time	12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 00:00	12-Sep-2022 15:00
Compound	CAS Number	LOR	Unit	ES2233009-001	ES2233009-002	ES2233009-004	ES2233009-006	ES2233009-007
				Result	Result	Result	Result	Result
EP075G: Chlorinated Hydrocarbons - Continued								
1.4-Dichlorobenzene	106-46-7	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
1.2-Dichlorobenzene	95-50-1	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
1.2.4-Trichlorobenzene	120-82-1	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Pentachlorobenzene	608-93-5	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
1.2.3.4-Tetrachlorobenzene	634-66-2	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
EP075K: Miscellaneous Compounds								
1.2.4.5-Tetrachlorobenzene	95-94-3	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
2.3.4.6-Tetrachlorophenol	58-90-2	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Isodrin	465-73-6	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Di (2-ethylhexyl) adipate	103-23-1	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	----	<10	<10	----	<10
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	----	<10	<10	----	<10
EP132A: Phenolic Compounds								
Hexachlorophene	70-30-4	0.01	mg/kg	----	<0.01	<0.01	----	<0.01
EP202A: Phenoxyacetic Acid Herbicides by LCMS								
2.4-D	94-75-7	0.02	mg/kg	----	<0.02	<0.02	----	<0.02
Triclopyr	55335-06-3	0.02	mg/kg	----	<0.02	<0.02	----	<0.02
2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg	----	<0.02	<0.02	----	<0.02
2.4.5-T	93-76-5	0.02	mg/kg	----	<0.02	<0.02	----	<0.02
Picloram	1918-02-1	0.02	mg/kg	----	<0.02	<0.02	----	<0.02
Fluroxypyr	69377-81-7	0.02	mg/kg	----	<0.02	<0.02	----	<0.02
NSW-CWG: Aggregate Organics for Guideline Evaluation								
^ øSum of Endosulfans (inc. sulfate)	----	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
ø Sum of Scheduled Chemicals	----	0.05	mg/kg	----	<10.0	<10.0	----	<10.0
^ øSum of plasticisers	----	0.50	mg/kg	----	<5.00	<5.00	----	<5.00
EP066S: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	----	**117**	**93.9**	----	**104**
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.05	%	----	**89.9**	**83.6**	----	**70.0**
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	----	**86.9**	**107**	----	**81.1**

Analytical Results

Sub-Matrix: SOLID (Matrix: SOIL)				Sample ID	MB01A_26-36.5	MB02B_0-9	MB03B_7-20	MB03B_21-29	MB02B_178-187
				Sampling date / time	12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 00:00	12-Sep-2022 15:00
Compound	CAS Number	LOR	Unit		ES2233009-001	ES2233009-002	ES2233009-004	ES2233009-006	ES2233009-007
					Result	Result	Result	Result	Result
EP074S(SIM) : VOC Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		----	111	101	----	103
EP074S: VOC Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.5	%		----	109	92.4	----	106
Toluene-D8	2037-26-5	0.5	%		----	116	102	----	98.1
4-Bromofluorobenzene	460-00-4	0.5	%		----	112	95.6	----	97.4
EP075S: Acid Extractable Surrogates									
2-Fluorophenol	367-12-4	0.5	%		----	90.1	92.3	----	82.8
Phenol-d6	13127-88-3	0.5	%		----	73.6	77.2	----	72.8
2-Chlorophenol-D4	93951-73-6	0.5	%		----	90.0	90.6	----	86.6
2.4.6-Tribromophenol	118-79-6	0.5	%		----	49.2	48.8	----	38.7
EP075T: Base/Neutral Extractable Surrogates									
Nitrobenzene-D5	4165-60-0	0.5	%		----	88.9	96.8	----	88.1
1.2-Dichlorobenzene-D4	2199-69-1	0.5	%		----	94.8	97.8	----	88.0
2-Fluorobiphenyl	321-60-8	0.5	%		----	98.0	102	----	95.0
Anthracene-d10	1719-06-8	0.5	%		----	92.2	91.2	----	77.7
4-Terphenyl-d14	1718-51-0	0.5	%		----	80.3	79.8	----	89.1
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		----	109	92.6	----	106
Toluene-D8	2037-26-5	0.2	%		----	125	107	----	102
4-Bromofluorobenzene	460-00-4	0.2	%		----	121	114	----	112
EP202S: Phenoxyacetic Acid Herbicide Surrogate									
2.4-Dichlorophenyl Acetic Acid	19719-28-9	0.02	%		----	91.1	78.4	----	91.0

Surrogate Control Limits

Sub-Matrix: DI WATER LEACHATE		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	67	111
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	67	111
EP075S: Acid Extractable Surrogates			
2-Fluorophenol	367-12-4	10	117
Phenol-d6	13127-88-3	10	69
2-Chlorophenol-D4	93951-73-6	21	130
2.4.6-Tribromophenol	118-79-6	10	151
EP075T: Base/Neutral Extractable Surrogates			
Nitrobenzene-D5	4165-60-0	29	142
1.2-Dichlorobenzene-D4	2199-69-1	24	121
2-Fluorobiphenyl	321-60-8	27	135
Anthracene-d10	1719-06-8	27	113
4-Terphenyl-d14	1718-51-0	21	123

Sub-Matrix: DI WATER ZHE LEACHATE		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP074S: VOC Surrogates			
1.2-Dichloroethane-D4	17060-07-0	78	133
Toluene-D8	2037-26-5	79	129
4-Bromofluorobenzene	460-00-4	81	124

Sub-Matrix: SOLID		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	39	149
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	49	147
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	35	143
EP074S(SIM) : VOC Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	131
EP074S: VOC Surrogates			
1.2-Dichloroethane-D4	17060-07-0	64	130
Toluene-D8	2037-26-5	66	136
4-Bromofluorobenzene	460-00-4	60	122
EP075S: Acid Extractable Surrogates			
2-Fluorophenol	367-12-4	29	149

Sub-Matrix: SOLID		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP075S: Acid Extractable Surrogates - Continued			
Phenol-d6	13127-88-3	32	128
2-Chlorophenol-D4	93951-73-6	32	128
2.4.6-Tribromophenol	118-79-6	13	121
EP075T: Base/Neutral Extractable Surrogates			
Nitrobenzene-D5	4165-60-0	33	125
1.2-Dichlorobenzene-D4	2199-69-1	34	108
2-Fluorobiphenyl	321-60-8	35	121
Anthracene-d10	1719-06-8	35	123
4-Terphenyl-d14	1718-51-0	33	125
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130
EP202S: Phenoxyacetic Acid Herbicide Surrogate			
2.4-Dichlorophenyl Acetic Acid	19719-28-9	45	139

Inter-Laboratory Testing

Analysis conducted by ALS Brisbane, NATA accreditation no. 825, site no. 818 (Chemistry) 18958 (Biology).

(SOIL) EP003: Total Organic Carbon (TOC) in Soil

(SOIL) EA013: Acid Neutralising Capacity

(SOIL) EA003 :pH (field/fox)

(SOIL) ED042T: Total Sulfur by LECO

(SOIL) EA011: Net Acid Generation

Analysis conducted by ALS Newcastle, NATA accreditation no. 825, site no. 1656 (Chemistry) 9854 (Biology).

(SOIL) EK040T: Fluoride Total

CERTIFICATE OF ANALYSIS (GUIDELINE EVALUATION)

Work Order	: **ES2233009**	Page	: 1 of 27
Amendment	: **(Preliminary Report)**		
Client	: **EMM CONSULTING PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: HENRY NOAKES	Contact	: Cez Bautista
Address	: Ground Floor Suite 1 20 Chandos Street St Leonards NSW NSW 2065	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: J200096 Oven Mountain Pumped Storage Project	Date Samples Received	: 14-Sep-2022 15:15
Order number	: J200096	Date Analysis Commenced	: 16-Sep-2022
C-O-C number	: ----	Issue Date	: 11-Oct-2022 09:51
Sampler	: HENRY NOAKES		
Site	: ----		
Quote number	: SY/284/22		
No. of samples received	: 6		
No. of samples analysed	: 5		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to Assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Hez Weldermariam	Lab Technician	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Zoran Grozdanovski	Laboratory Operator	Newcastle - Inorganics, Mayfield West, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty **must be** considered. Refer to the ALS Contract Terms and Conditions for details, and EnviroMail 53 for a guide on how to interpret the measurement of uncertainty (MU).

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

This report contains preliminary authorised results. The report may contain semi-quantitative results. Any result presented in this preliminary report may be subject to change in the final report.

- EP202: Poor matrix spike recoveries for Clopyralid due to matrix effects.
- EG048G: Poor spike recovery for Hexavalent Chromium by Alkaline Digestion due to matrix interferences.
- EP075: Where reported, Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP068: Where reported, Total Chlordane (sum) is the sum of the reported concentrations of cis-Chlordane and trans-Chlordane at or above the LOR.
- EP068: Where reported, Total OCP is the sum of the reported concentrations of all Organochlorine Pesticides at or above LOR.
- NSW-WCG: Where reported, Total Chlorinated Hydrocarbons is the sum of the reported concentrations of all Chlorinated Hydrocarbons at or above the LOR.
- EP074: Where reported, Total Trihalomethanes is the sum of the reported concentrations of all Trihalomethanes at or above the LOR.
- EP074: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP074: Where reported, Sum of chlorinated hydrocarbons includes carbon tetrachloride, chlorobenzene, chloroform, 1,2-dichlorobenzene, 1,4-dichlorobenzene, 1,2-dichloroethane, 1,1-dichloroethene, cis-1,2-dichlorothene, trans-1,2-dichlorothene, 1,1,1,2-tetrachloroethane, 1,1,2,2-tetrachloroethane, 1,2,4-trichlorobenzene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, trichloroethene, vinyl chloride, hexachlorobutadiene and methylene chloride.
- EP074: Where reported, Total Trimethylbenzenes is the sum of the reported concentrations of 1.2.3-Trimethylbenzene, 1.2.4-Trimethylbenzene and 1.3.5-Trimethylbenzene at or above the LOR.
- EG048G: Poor spike recovery for Alkaline Hexavalent Chromium due to matrix interferences
- ASS: EA013 (ANC) Fizz Rating: 0- None; 1- Slight; 2- Moderate; 3- Strong; 4- Very Strong; 5- Lime.
- EP075: Where reported, 'Sum of PAH' is the sum of the USEPA 16 priority PAHs
- ASS: EA003 (NATA Field and F(ox) screening): pH F(ox) Reaction Rate: 1 - Slight; 2 - Moderate; 3 - Strong; 4 - Extreme
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.

- EP132: Where reported, Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.

Analytical Results

NSW DECCW Table 1 - Contaminant Threshold Values for Classifying Waste by Chemical Assessment 2009: General Waste - CT1

Sub-Matrix: **SOLID**

Compound	Method	LOR	Unit	Lower Limit	Upper Limit	Sample ID / Sampling date/time	MB01A_26-36.5 12-Sep-2022 15:00 ES2233009-001 MU	MB02B_0-9 12-Sep-2022 15:00 ES2233009-002 MU	MB03B_7-20 12-Sep-2022 15:00 ES2233009-004 MU	MB03B_21-29 12-Sep-2022 15:00 ES2233009-006 MU	MB02B_178-187 12-Sep-2022 15:00 ES2233009-007 MU
EG005(ED093)T: Total Metals by ICP-AES											
Arsenic	EG005T	5	mg/kg	----	100		----	<5 --	<5 --	----	<5 --
Beryllium	EG005T	1	mg/kg	----	20		----	<1 --	<1 --	----	<1 --
Cadmium	EG005T	1	mg/kg	----	20		----	<1 --	<1 --	----	<1 --
Lead	EG005T	5	mg/kg	----	100		----	<5 --	<5 --	----	<5 --
Molybdenum	EG005T	2	mg/kg	----	100		----	<2	<2	----	<2
Nickel	EG005T	2	mg/kg	----	40		----	**3** ± 0.5	**4** ± 0.6	----	**3** ± 0.6
Selenium	EG005T	5	mg/kg	----	20		----	<5 --	<5 --	----	<5 --
Silver	EG005T	2	mg/kg	----	100		----	<2 --	<2 --	----	<2 --
EG035T: Total Recoverable Mercury by FIMS											
Mercury	EG035T	0.1	mg/kg	----	4		----	<0.1	<0.1	----	<0.1
EG048: Hexavalent Chromium (Alkaline Digest)											
Hexavalent Chromium	EG048G	0.5	mg/kg	----	100		----	<0.5	<0.5	----	<0.5
EK026SF: Total CN by Segmented Flow Analyser											
Total Cyanide	EK026SF	1	mg/kg	----	320		----	<1	<1	----	<1
EK028SF: Weak Acid Dissociable CN by Segmented Flow Analyser											
Weak Acid Dissociable Cyanide	EK028SF	1	mg/kg	----	70		----	<1	<1	----	<1
EK040T: Fluoride Total											
Fluoride	EK040T	40	mg/kg	----	3000		----	**320**	**330**	----	**250**
EP066: Polychlorinated Biphenyls (PCB)											
Total Polychlorinated biphenyls	EP066	0.1	mg/kg	----	49		----	<0.1	<0.1	----	<0.1
EP068B: Organophosphorus Pesticides (OP)											
Chlorpyrifos	EP068	0.05	mg/kg	----	4		----	<0.05	<0.05	----	<0.05
EP071 SG-S: Total Petroleum Hydrocarbons in Soil - Silica gel cleanup											
C10 - C36 Fraction (sum)	EP071SG-S	50	mg/kg	----	10000		----	<50	<50	----	<50
EP074A: Monocyclic Aromatic Hydrocarbons											
Benzene	EP074	0.2	mg/kg	----	10		----	<0.2	<0.2	----	<0.2
Toluene	EP074	0.5	mg/kg	----	288		----	<0.5	<0.5	----	<0.5
Ethylbenzene	EP074	0.5	mg/kg	----	600		----	<0.5	<0.5	----	<0.5
Styrene	EP074	0.5	mg/kg	----	60		----	<0.5	<0.5	----	<0.5
EP074B: Oxygenated Compounds											
2-Butanone (MEK)	EP074	5	mg/kg	----	4000		----	<5	<5	----	<5
EP074E(SIM): Halogenated Aliphatic Compounds											
Vinyl chloride	EP074E(SIM)	0.2	mg/kg	----	4		----	<0.2	<0.2	----	<0.2
EP074E: Halogenated Aliphatic Compounds											
Vinyl chloride	EP074	4	mg/kg	----	4		----	<4	<4	----	<4

NSW DECCW Table 1 - Contaminant Threshold Values for Classifying Waste by Chemical Assessment 2009: General Waste - CT1

Sub-Matrix: **SOLID**

Compound	Method	LOR	Unit	Lower Limit	Upper Limit	MB01A_26-36.5	MB02B_0-9	MB03B_7-20	MB03B_21-29	MB02B_178-187
Sample ID						ES2233009-001 MU	ES2233009-002 MU	ES2233009-004 MU	ES2233009-006 MU	ES2233009-007 MU
Sampling date/time						12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00
EP074E: Halogenated Aliphatic Compounds - Continued										
1.1-Dichloroethene	EP074	0.5	mg/kg	----	14	----	<0.5	<0.5	----	<0.5
Methylene chloride	EP074	0.5	mg/kg	----	172	----	<0.5	<0.5	----	<0.5
1.1.1-Trichloroethane	EP074	0.5	mg/kg	----	600	----	<0.5	<0.5	----	<0.5
Carbon Tetrachloride	EP074	0.5	mg/kg	----	10	----	<0.5	<0.5	----	<0.5
1.2-Dichloroethane	EP074	0.5	mg/kg	----	10	----	<0.5	<0.5	----	<0.5
Trichloroethene	EP074	0.5	mg/kg	----	10	----	<0.5	<0.5	----	<0.5
1.1.2-Trichloroethane	EP074	0.5	mg/kg	----	24	----	<0.5	<0.5	----	<0.5
Tetrachloroethene	EP074	0.5	mg/kg	----	14	----	<0.5	<0.5	----	<0.5
1.1.1.2-Tetrachloroethane	EP074	0.5	mg/kg	----	200	----	<0.5	<0.5	----	<0.5
1.1.2.2-Tetrachloroethane	EP074	0.5	mg/kg	----	26	----	<0.5	<0.5	----	<0.5
EP074F: Halogenated Aromatic Compounds										
Chlorobenzene	EP074	0.5	mg/kg	----	2000	----	<0.5	<0.5	----	<0.5
EP074G: Trihalomethanes										
Chloroform	EP074	0.5	mg/kg	----	120	----	<0.5	<0.5	----	<0.5
EP075A: Phenolic Compounds										
Phenol	EP075	0.5	mg/kg	----	288	----	<0.5	<0.5	----	<0.5
2-Methylphenol	EP075	0.5	mg/kg	----	4000	----	<0.5	<0.5	----	<0.5
3- & 4-Methylphenol	EP075	0.5	mg/kg	----	4000	----	<0.5	<0.5	----	<0.5
2.4.6-Trichlorophenol	EP075	0.5	mg/kg	----	40	----	<0.5	<0.5	----	<0.5
2.4.5-Trichlorophenol	EP075	0.5	mg/kg	----	8000	----	<0.5	<0.5	----	<0.5
EP075B: Polynuclear Aromatic Hydrocarbons										
Benzo(a)pyrene	EP075	0.5	mg/kg	----	0.8	----	<0.5	<0.5	----	<0.5
Sum of PAHs	EP075	0.5	mg/kg	----	200	----	<0.5	<0.5	----	<0.5
EP075E: Nitroaromatics and Ketones										
Nitrobenzene	EP075	0.5	mg/kg	----	40	----	<0.5	<0.5	----	<0.5
2.4-Dinitrotoluene	EP075	1.0	mg/kg	----	2.6	----	<1.0	<1.0	----	<1.0
EP075G: Chlorinated Hydrocarbons										
1.4-Dichlorobenzene	EP075	0.5	mg/kg	----	150	----	<0.5	<0.5	----	<0.5
1.2-Dichlorobenzene	EP075	0.5	mg/kg	----	86	----	<0.5	<0.5	----	<0.5
1.2.3.4-Tetrachlorobenzene	EP075	0.5	mg/kg	----	10	----	<0.5	<0.5	----	<0.5
EP080/071: Total Petroleum Hydrocarbons										
C6 - C9 Fraction	EP080	10	mg/kg	----	650	----	<10	<10	----	<10
EP202A: Phenoxyacetic Acid Herbicides by LCMS										
2.4-D	EP202	0.02	mg/kg	----	200	----	<0.02	<0.02	----	<0.02
Triclopyr	EP202	0.02	mg/kg	----	40	----	<0.02	<0.02	----	<0.02
Picloram	EP202	0.02	mg/kg	----	60	----	<0.02	<0.02	----	<0.02
Fluroxypyr	EP202	0.02	mg/kg	----	40	----	<0.02	<0.02	----	<0.02

NSW DECCW Table 1 - Contaminant Threshold Values for Classifying Waste by Chemical Assessment 2009: General Waste - CT1

Sub-Matrix: **SOLID**

Compound	Method	LOR	Unit	Lower Limit	Upper Limit	Sample ID / Sampling date/time	MB01A_26-36.5	MB02B_0-9	MB03B_7-20	MB03B_21-29	MB02B_178-187
						Sampling date/time	12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00
						Sample ID	ES2233009-001 MU	ES2233009-002 MU	ES2233009-004 MU	ES2233009-006 MU	ES2233009-007 MU
NSW-CWG: Aggregate Organics for Guideline Evaluation											
ø Sum of Endosulfans (inc. sulfate)	NSW-WCG	0.05	mg/kg	----	60		**----**	<0.05	<0.05	**----**	<0.05
ø Sum of Scheduled Chemicals	NSW-WCG	0.05	mg/kg	----	49		**----**	<10.0	<10.0	**----**	<10.0
ø Sum of plasticisers	NSW-WCG	0.50	mg/kg	----	600		**----**	<5.00	<5.00	**----**	<5.00

NSW DECCW Table 1 - Contaminant Threshold Values for Classifying Waste by Chemical Assessment 2009: Restricted Soild Waste - CT2

Sub-Matrix: **SOLID**

Compound	Method	LOR	Unit	Lower Limit	Upper Limit	Sample ID	MB01A_26-36.5	MB02B_0-9	MB03B_7-20	MB03B_21-29	MB02B_178-187
						Sampling date/time	12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00
							ES2233009-001 MU	ES2233009-002 MU	ES2233009-004 MU	ES2233009-006 MU	ES2233009-007 MU
EG005(ED093)T: Total Metals by ICP-AES											
Arsenic	EG005T	5	mg/kg	----	400		----	<5 --	<5 --	----	<5 --
Beryllium	EG005T	1	mg/kg	----	80		----	<1 --	<1 --	----	<1 --
Cadmium	EG005T	1	mg/kg	----	80		----	<1 --	<1 --	----	<1 --
Lead	EG005T	5	mg/kg	----	400		----	<5 --	<5 --	----	<5 --
Molybdenum	EG005T	2	mg/kg	----	400		----	<2	<2	----	<2
Nickel	EG005T	2	mg/kg	----	160		----	**3** ± 0.5	**4** ± 0.6	----	**3** ± 0.6
Selenium	EG005T	5	mg/kg	----	80		----	<5 --	<5 --	----	<5 --
Silver	EG005T	2	mg/kg	----	400		----	<2 --	<2 --	----	<2 --
EG035T: Total Recoverable Mercury by FIMS											
Mercury	EG035T	0.1	mg/kg	----	16		----	<0.1	<0.1	----	<0.1
EG048: Hexavalent Chromium (Alkaline Digest)											
Hexavalent Chromium	EG048G	0.5	mg/kg	----	400		----	<0.5	<0.5	----	<0.5
EK026SF: Total CN by Segmented Flow Analyser											
Total Cyanide	EK026SF	1	mg/kg	----	1280		----	<1	<1	----	<1
EK028SF: Weak Acid Dissociable CN by Segmented Flow Analyser											
Weak Acid Dissociable Cyanide	EK028SF	1	mg/kg	----	280		----	<1	<1	----	<1
EK040T: Fluoride Total											
Fluoride	EK040T	40	mg/kg	----	12000		----	**320**	**330**	----	**250**
EP066: Polychlorinated Biphenyls (PCB)											
Total Polychlorinated biphenyls	EP066	0.1	mg/kg	----	49		----	<0.1	<0.1	----	<0.1
EP068B: Organophosphorus Pesticides (OP)											
Chlorpyrifos	EP068	0.05	mg/kg	----	16		----	<0.05	<0.05	----	<0.05
EP071 SG-S: Total Petroleum Hydrocarbons in Soil - Silica gel cleanup											
C10 - C36 Fraction (sum)	EP071SG-S	50	mg/kg	----	40000		----	<50	<50	----	<50
EP074A: Monocyclic Aromatic Hydrocarbons											
Benzene	EP074	0.2	mg/kg	----	40		----	<0.2	<0.2	----	<0.2
Toluene	EP074	0.5	mg/kg	----	1152		----	<0.5	<0.5	----	<0.5
Ethylbenzene	EP074	0.5	mg/kg	----	2400		----	<0.5	<0.5	----	<0.5
Styrene	EP074	0.5	mg/kg	----	240		----	<0.5	<0.5	----	<0.5
EP074B: Oxygenated Compounds											
2-Butanone (MEK)	EP074	5	mg/kg	----	16000		----	<5	<5	----	<5
EP074E(SIM): Halogenated Aliphatic Compounds											
Vinyl chloride	EP074E(SIM)	0.2	mg/kg	----	16		----	<0.2	<0.2	----	<0.2
EP074E: Halogenated Aliphatic Compounds											
Vinyl chloride	EP074	4	mg/kg	----	16		----	<4	<4	----	<4
1.1-Dichloroethene	EP074	0.5	mg/kg	----	56		----	<0.5	<0.5	----	<0.5

NSW DECCW Table 1 - Contaminant Threshold Values for Classifying Waste by Chemical Assessment 2009: Restricted Soild Waste - CT2

Sub-Matrix: **SOLID**

Compound	Method	LOR	Unit	Lower Limit	Upper Limit	Sample ID	MB01A_26-36.5	MB02B_0-9	MB03B_7-20	MB03B_21-29	MB02B_178-187
						Sampling date/time	12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00
							ES2233009-001 MU	ES2233009-002 MU	ES2233009-004 MU	ES2233009-006 MU	ES2233009-007 MU
EP074E: Halogenated Aliphatic Compounds - Continued											
Methylene chloride	EP074	0.5	mg/kg	----	688		----	<0.5	<0.5	----	<0.5
1.1.1-Trichloroethane	EP074	0.5	mg/kg	----	2400		----	<0.5	<0.5	----	<0.5
Carbon Tetrachloride	EP074	0.5	mg/kg	----	40		----	<0.5	<0.5	----	<0.5
1.2-Dichloroethane	EP074	0.5	mg/kg	----	40		----	<0.5	<0.5	----	<0.5
Trichloroethene	EP074	0.5	mg/kg	----	40		----	<0.5	<0.5	----	<0.5
1.1.2-Trichloroethane	EP074	0.5	mg/kg	----	96		----	<0.5	<0.5	----	<0.5
Tetrachloroethene	EP074	0.5	mg/kg	----	56		----	<0.5	<0.5	----	<0.5
1.1.1.2-Tetrachloroethane	EP074	0.5	mg/kg	----	800		----	<0.5	<0.5	----	<0.5
1.1.2.2-Tetrachloroethane	EP074	0.5	mg/kg	----	104		----	<0.5	<0.5	----	<0.5
EP074F: Halogenated Aromatic Compounds											
Chlorobenzene	EP074	0.5	mg/kg	----	8000		----	<0.5	<0.5	----	<0.5
EP074G: Trihalomethanes											
Chloroform	EP074	0.5	mg/kg	----	480		----	<0.5	<0.5	----	<0.5
EP075A: Phenolic Compounds											
Phenol	EP075	0.5	mg/kg	----	1152		----	<0.5	<0.5	----	<0.5
2-Methylphenol	EP075	0.5	mg/kg	----	16000		----	<0.5	<0.5	----	<0.5
3- & 4-Methylphenol	EP075	0.5	mg/kg	----	16000		----	<0.5	<0.5	----	<0.5
2.4.6-Trichlorophenol	EP075	0.5	mg/kg	----	160		----	<0.5	<0.5	----	<0.5
2.4.5-Trichlorophenol	EP075	0.5	mg/kg	----	32000		----	<0.5	<0.5	----	<0.5
EP075B: Polynuclear Aromatic Hydrocarbons											
Benzo(a)pyrene	EP075	0.5	mg/kg	----	3.2		----	<0.5	<0.5	----	<0.5
Sum of PAHs	EP075	0.5	mg/kg	----	800		----	<0.5	<0.5	----	<0.5
EP075E: Nitroaromatics and Ketones											
Nitrobenzene	EP075	0.5	mg/kg	----	160		----	<0.5	<0.5	----	<0.5
2.4-Dinitrotoluene	EP075	1.0	mg/kg	----	10.4		----	<1.0	<1.0	----	<1.0
EP075G: Chlorinated Hydrocarbons											
1.4-Dichlorobenzene	EP075	0.5	mg/kg	----	600		----	<0.5	<0.5	----	<0.5
1.2-Dichlorobenzene	EP075	0.5	mg/kg	----	344		----	<0.5	<0.5	----	<0.5
1.2.3.4-Tetrachlorobenzene	EP075	0.5	mg/kg	----	40		----	<0.5	<0.5	----	<0.5
EP080/071: Total Petroleum Hydrocarbons											
C6 - C9 Fraction	EP080	10	mg/kg	----	2600		----	<10	<10	----	<10
EP202A: Phenoxyacetic Acid Herbicides by LCMS											
2.4-D	EP202	0.02	mg/kg	----	800		----	<0.02	<0.02	----	<0.02
Triclopyr	EP202	0.02	mg/kg	----	160		----	<0.02	<0.02	----	<0.02
Picloram	EP202	0.02	mg/kg	----	240		----	<0.02	<0.02	----	<0.02
Fluroxypyr	EP202	0.02	mg/kg	----	160		----	<0.02	<0.02	----	<0.02
NSW-CWG: Aggregate Organics for Guideline Evaluation											

NSW DECCW Table 1 - Contaminant Threshold Values for Classifying Waste by Chemical Assessment 2009: Restricted Soild Waste - CT2

Sub-Matrix: **SOLID**

Compound	Method	LOR	Unit	Lower Limit	Upper Limit	MB01A_26-36.5	MB02B_0-9	MB03B_7-20	MB03B_21-29	MB02B_178-187
Sample ID										
Sampling date/time						12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00
						ES2233009-001 MU	ES2233009-002 MU	ES2233009-004 MU	ES2233009-006 MU	ES2233009-007 MU
NSW-CWG: Aggregate Organics for Guideline Evaluation - Continued										
ø Sum of Endosulfans (inc. sulfate)	NSW-WCG	0.05	mg/kg	----	240	**----**	<0.05	<0.05	**----**	<0.05
ø Sum of Scheduled Chemicals	NSW-WCG	0.05	mg/kg	----	49	**----**	<10.0	<10.0	**----**	<10.0
ø Sum of plasticisers	NSW-WCG	0.50	mg/kg	----	2400	**----**	<5.00	<5.00	**----**	<5.00

No Guideline Evaluation Required

Sub-Matrix: **DI WATER LEACHATE**

Compound	Method	LOR	Unit	Lower Limit	Upper Limit	Sample ID	MB02B_0-9	MB03B_7-20	MB02B_178-187	----	----
						Sampling date/time	12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00	----	----
							ES2233009-002 MU	ES2233009-004 MU	ES2233009-007 MU	-------- MU	-------- MU
EA005P: pH by PC Titrator											
pH Value	EA005-P	0.01	pH Unit	----	----		**6.73** ± 0.08	**6.52** ± 0.08	**7.03** ± 0.08	----	----
EA010P: Conductivity by PC Titrator											
Electrical Conductivity @ 25°C	EA010-P	1	µS/cm	----	----		**19** ± 2	**25** ± 3	**27** ± 3	----	----
ED037P: Alkalinity by PC Titrator											
Hydroxide Alkalinity as CaCO3	ED037-P	1	mg/L	----	----		<1	<1	<1	----	----
Carbonate Alkalinity as CaCO3	ED037-P	1	mg/L	----	----		<1	<1	<1	----	----
Bicarbonate Alkalinity as CaCO3	ED037-P	1	mg/L	----	----		**4**	**6**	**11**	----	----
Total Alkalinity as CaCO3	ED037-P	1	mg/L	----	----		**4** ± 0.8	**6** ± 1	**11** ± 2	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA											
Sulfate as SO4 - Turbidimetric	ED041G	1	mg/L	----	----		<1 - -	**4** ± 0.7	<1 - -	----	----
ED045G: Chloride by Discrete Analyser											
Chloride	ED045G	1	mg/L	----	----		**2** ± 0.7	**2** ± 0.7	**2** ± 0.7	----	----
EG005(ED093)C: Leachable Metals by ICPAES											
Aluminium	EG005C	0.1	mg/L	----	----		**3.9**	**2.4**	**3.0**	----	----
Antimony	EG005C	0.1	mg/L	----	----		<0.1	<0.1	<0.1	----	----
Arsenic	EG005C	0.1	mg/L	----	----		<0.1	<0.1	<0.1	----	----
Beryllium	EG005C	0.05	mg/L	----	----		<0.05	<0.05	<0.05	----	----
Boron	EG005C	0.1	mg/L	----	----		<0.1	<0.1	<0.1	----	----
Cadmium	EG005C	0.05	mg/L	----	----		<0.05	<0.05	<0.05	----	----
Chromium	EG005C	0.1	mg/L	----	----		<0.1	<0.1	<0.1	----	----
Iron	EG005C	0.1	mg/L	----	----		**5.9**	**2.1**	**4.8**	----	----
Lead	EG005C	0.1	mg/L	----	----		<0.1	<0.1	<0.1	----	----
Manganese	EG005C	0.1	mg/L	----	----		**0.1**	<0.1	<0.1	----	----
Nickel	EG005C	0.1	mg/L	----	----		<0.1	<0.1	<0.1	----	----
Selenium	EG005C	0.05	mg/L	----	----		<0.05	<0.05	<0.05	----	----
Silver	EG005C	0.1	mg/L	----	----		<0.1	<0.1	<0.1	----	----
Molybdenum	EG005C	0.1	mg/L	----	----		<0.1	<0.1	<0.1	----	----
EG035C: Leachable Mercury by FIMS											
Mercury	EG035C	0.0010	mg/L	----	----		<0.0010	<0.0010	<0.0010	----	----
EG050G-W: Hexavalent Chromium - Water Leachable											
Hexavalent Chromium	EG050G-W	0.01	mg/L	----	----		<0.01	<0.01	<0.01	----	----
EK040P: Fluoride by PC Titrator											
Fluoride	EK040P	0.1	mg/L	----	----		**0.2** ± 0.05	**0.1** ± 0.04	<0.1 - -	----	----
EP068A: Organochlorine Pesticides (OC)											
alpha-BHC	EP068	0.5	µg/L	----	----		<0.5	<0.5	<0.5	----	----
Hexachlorobenzene (HCB)	EP068	0.5	µg/L	----	----		<0.5	<0.5	<0.5	----	----
beta-BHC	EP068	0.5	µg/L	----	----		<0.5	<0.5	<0.5	----	----

No Guideline Evaluation Required

Sub-Matrix: **DI WATER LEACHATE**

Compound	Method	LOR	Unit	Lower Limit	Upper Limit	Sample ID: MB02B_0-9 Sampling date/time: 12-Sep-2022 15:00 ES2233009-002 MU	Sample ID: MB03B_7-20 Sampling date/time: 12-Sep-2022 15:00 ES2233009-004 MU	Sample ID: MB02B_178-187 Sampling date/time: 12-Sep-2022 15:00 ES2233009-007 MU	Sample ID: ---- Sampling date/time: ---- -------- MU	Sample ID: ---- Sampling date/time: ---- -------- MU
EP068A: Organochlorine Pesticides (OC) - Continued										
gamma-BHC	EP068	0.5	µg/L	----	----	<0.5	<0.5	<0.5	----	----
delta-BHC	EP068	0.5	µg/L	----	----	<0.5	<0.5	<0.5	----	----
Heptachlor	EP068	0.5	µg/L	----	----	<0.5	<0.5	<0.5	----	----
Aldrin	EP068	0.5	µg/L	----	----	<0.5	<0.5	<0.5	----	----
Heptachlor epoxide	EP068	0.5	µg/L	----	----	<0.5	<0.5	<0.5	----	----
trans-Chlordane	EP068	0.5	µg/L	----	----	<0.5	<0.5	<0.5	----	----
alpha-Endosulfan	EP068	0.5	µg/L	----	----	<0.5	<0.5	<0.5	----	----
cis-Chlordane	EP068	0.5	µg/L	----	----	<0.5	<0.5	<0.5	----	----
Dieldrin	EP068	0.5	µg/L	----	----	<0.5	<0.5	<0.5	----	----
4.4`-DDE	EP068	0.5	µg/L	----	----	<0.5	<0.5	<0.5	----	----
Endrin	EP068	0.5	µg/L	----	----	<0.5	<0.5	<0.5	----	----
beta-Endosulfan	EP068	0.5	µg/L	----	----	<0.5	<0.5	<0.5	----	----
4.4`-DDD	EP068	0.5	µg/L	----	----	<0.5	<0.5	<0.5	----	----
Endrin aldehyde	EP068	0.5	µg/L	----	----	<0.5	<0.5	<0.5	----	----
Endosulfan sulfate	EP068	0.5	µg/L	----	----	<0.5	<0.5	<0.5	----	----
4.4`-DDT	EP068	2.0	µg/L	----	----	<2.0	<2.0	<2.0	----	----
Endrin ketone	EP068	0.5	µg/L	----	----	<0.5	<0.5	<0.5	----	----
Methoxychlor	EP068	2.0	µg/L	----	----	<2.0	<2.0	<2.0	----	----
^ Total Chlordane (sum)	EP068	0.5	µg/L	----	----	<0.5	<0.5	<0.5	----	----
^ Sum of DDD + DDE + DDT	EP068	0.5	µg/L	----	----	<0.5	<0.5	<0.5	----	----
^ Sum of Aldrin + Dieldrin	EP068	0.5	µg/L	----	----	<0.5	<0.5	<0.5	----	----
EP068B: Organophosphorus Pesticides (OP)										
Dichlorvos	EP068	0.5	µg/L	----	----	<0.5	<0.5	<0.5	----	----
Demeton-S-methyl	EP068	0.5	µg/L	----	----	<0.5	<0.5	<0.5	----	----
Monocrotophos	EP068	2.0	µg/L	----	----	<2.0	<2.0	<2.0	----	----
Dimethoate	EP068	0.5	µg/L	----	----	<0.5	<0.5	<0.5	----	----
Diazinon	EP068	0.5	µg/L	----	----	<0.5	<0.5	<0.5	----	----
Chlorpyrifos-methyl	EP068	0.5	µg/L	----	----	<0.5	<0.5	<0.5	----	----
Parathion-methyl	EP068	2.0	µg/L	----	----	<2.0	<2.0	<2.0	----	----
Malathion	EP068	0.5	µg/L	----	----	<0.5	<0.5	<0.5	----	----
Fenthion	EP068	0.5	µg/L	----	----	<0.5	<0.5	<0.5	----	----
Chlorpyrifos	EP068	0.5	µg/L	----	----	<0.5	<0.5	<0.5	----	----
Parathion	EP068	2.0	µg/L	----	----	<2.0	<2.0	<2.0	----	----
Pirimphos-ethyl	EP068	0.5	µg/L	----	----	<0.5	<0.5	<0.5	----	----
Chlorfenvinphos	EP068	0.5	µg/L	----	----	<0.5	<0.5	<0.5	----	----
Bromophos-ethyl	EP068	0.5	µg/L	----	----	<0.5	<0.5	<0.5	----	----
Fenamiphos	EP068	0.5	µg/L	----	----	<0.5	<0.5	<0.5	----	----

No Guideline Evaluation Required

Sub-Matrix: **DI WATER LEACHATE**

Compound	Method	LOR	Unit	Lower Limit	Upper Limit	MB02B_0-9	MB03B_7-20	MB02B_178-187	----	----
Sample ID										
Sampling date/time						12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00	----	----
						ES2233009-002 MU	ES2233009-004 MU	ES2233009-007 MU	-------- MU	-------- MU
EP068B: Organophosphorus Pesticides (OP) - Continued										
Prothiofos	EP068	0.5	µg/L	----	----	<0.5	<0.5	<0.5	----	----
Ethion	EP068	0.5	µg/L	----	----	<0.5	<0.5	<0.5	----	----
Carbophenothion	EP068	0.5	µg/L	----	----	<0.5	<0.5	<0.5	----	----
Azinphos Methyl	EP068	0.5	µg/L	----	----	<0.5	<0.5	<0.5	----	----
EP068C: Triazines										
Atrazine	EP068	0.5	µg/L	----	----	<0.5	<0.5	<0.5	----	----
Simazine	EP068	0.5	µg/L	----	----	<0.5	<0.5	<0.5	----	----
EP068D: Cypermethrins										
Cypermethrins	EP068	2.0	µg/L	----	----	<2.0	<2.0	<2.0	----	----
EP068E: Other Pesticides										
Methoprene	EP068	0.5	µg/L	----	----	<0.5	<0.5	<0.5	----	----
EP075A: Phenolic Compounds										
Phenol	EP075	2	µg/L	----	----	<2	<2	<2	----	----
2-Chlorophenol	EP075	2	µg/L	----	----	<2	<2	<2	----	----
2-Methylphenol	EP075	2	µg/L	----	----	<2	<2	<2	----	----
3- & 4-Methylphenol	EP075	4	µg/L	----	----	<4	<4	<4	----	----
2-Nitrophenol	EP075	2	µg/L	----	----	<2	<2	<2	----	----
2.4-Dimethylphenol	EP075	2	µg/L	----	----	<2	<2	<2	----	----
2.4-Dichlorophenol	EP075	2	µg/L	----	----	<2	<2	<2	----	----
2.6-Dichlorophenol	EP075	2	µg/L	----	----	<2	<2	<2	----	----
4-Chloro-3-methylphenol	EP075	2	µg/L	----	----	<2	<2	<2	----	----
2.4.6-Trichlorophenol	EP075	2	µg/L	----	----	<2	<2	<2	----	----
2.4.5-Trichlorophenol	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Pentachlorophenol	EP075	4	µg/L	----	----	<4	<4	<4	----	----
EP075B: Polynuclear Aromatic Hydrocarbons										
Naphthalene	EP075	2	µg/L	----	----	<2	<2	<2	----	----
2-Methylnaphthalene	EP075	2	µg/L	----	----	<2	<2	<2	----	----
2-Chloronaphthalene	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Acenaphthylene	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Acenaphthene	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Fluorene	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Phenanthrene	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Anthracene	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Fluoranthene	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Pyrene	EP075	2	µg/L	----	----	<2	<2	<2	----	----
N-2-Fluorenyl Acetamide	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Benz(a)anthracene	EP075	2	µg/L	----	----	<2	<2	<2	----	----

No Guideline Evaluation Required

Sub-Matrix: **DI WATER LEACHATE**

Compound	Method	LOR	Unit	Lower Limit	Upper Limit	MB02B_0-9	MB03B_7-20	MB02B_178-187	----	----
Sample ID										
Sampling date/time						12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00	----	----
						ES2233009-002 MU	ES2233009-004 MU	ES2233009-007 MU	-------- MU	-------- MU
EP075B: Polynuclear Aromatic Hydrocarbons - Continued										
Chrysene	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Benzo(b+j) & Benzo(k)fluoranthene	EP075	4	µg/L	----	----	<4	<4	<4	----	----
7.12-Dimethylbenz(a)anthracene	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Benzo(a)pyrene	EP075	2	µg/L	----	----	<2	<2	<2	----	----
3-Methylcholanthrene	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Indeno(1.2.3.cd)pyrene	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Dibenz(a.h)anthracene	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Benzo(g.h.i)perylene	EP075	2	µg/L	----	----	<2	<2	<2	----	----
^ Sum of PAHs	EP075	2	µg/L	----	----	<2	<2	<2	----	----
^ Benzo(a)pyrene TEQ (zero)	EP075	2	µg/L	----	----	<2	<2	<2	----	----
EP075C: Phthalate Esters										
Dimethyl phthalate	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Diethyl phthalate	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Di-n-butyl phthalate	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Butyl benzyl phthalate	EP075	2	µg/L	----	----	<2	<2	<2	----	----
bis(2-ethylhexyl) phthalate	EP075	10	µg/L	----	----	<10	<10	<10	----	----
Di-n-octylphthalate	EP075	2	µg/L	----	----	<2	<2	<2	----	----
EP075D: Nitrosamines										
N-Nitrosomethylethylamine	EP075	2	µg/L	----	----	<2	<2	<2	----	----
N-Nitrosodiethylamine	EP075	2	µg/L	----	----	<2	<2	<2	----	----
N-Nitrosopyrrolidine	EP075	4	µg/L	----	----	<4	<4	<4	----	----
N-Nitrosomorpholine	EP075	2	µg/L	----	----	<2	<2	<2	----	----
N-Nitrosodi-n-propylamine	EP075	2	µg/L	----	----	<2	<2	<2	----	----
N-Nitrosopiperidine	EP075	2	µg/L	----	----	<2	<2	<2	----	----
N-Nitrosodibutylamine	EP075	2	µg/L	----	----	<2	<2	<2	----	----
N-Nitrosodiphenyl & Diphenylamine	EP075	4	µg/L	----	----	<4	<4	<4	----	----
Methapyrilene	EP075	2	µg/L	----	----	<2	<2	<2	----	----
EP075E: Nitroaromatics and Ketones										
2-Picoline	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Acetophenone	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Nitrobenzene	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Isophorone	EP075	2	µg/L	----	----	<2	<2	<2	----	----
2.6-Dinitrotoluene	EP075	4	µg/L	----	----	<4	<4	<4	----	----
2.4-Dinitrotoluene	EP075	4	µg/L	----	----	<4	<4	<4	----	----
1-Naphthylamine	EP075	2	µg/L	----	----	<2	<2	<2	----	----
4-Nitroquinoline-N-oxide	EP075	2	µg/L	----	----	<2	<2	<2	----	----
5-Nitro-o-toluidine	EP075	2	µg/L	----	----	<2	<2	<2	----	----

No Guideline Evaluation Required

Sub-Matrix: **DI WATER LEACHATE**

Compound	Method	LOR	Unit	Lower Limit	Upper Limit	MB02B_0-9	MB03B_7-20	MB02B_178-187	----	----
Sample ID										
Sampling date/time						12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00	----	----
						ES2233009-002 MU	ES2233009-004 MU	ES2233009-007 MU	-------- MU	-------- MU
EP075E: Nitroaromatics and Ketones - Continued										
Azobenzene	EP075	2	µg/L	----	----	<2	<2	<2	----	----
1.3.5-Trinitrobenzene	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Phenacetin	EP075	2	µg/L	----	----	<2	<2	<2	----	----
4-Aminobiphenyl	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Pentachloronitrobenzene	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Pronamide	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Dimethylaminoazobenzene	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Chlorobenzilate	EP075	2	µg/L	----	----	<2	<2	<2	----	----
EP075F: Haloethers										
Bis(2-chloroethyl) ether	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Bis(2-chloroethoxy) methane	EP075	2	µg/L	----	----	<2	<2	<2	----	----
4-Chlorophenyl phenyl ether	EP075	2	µg/L	----	----	<2	<2	<2	----	----
4-Bromophenyl phenyl ether	EP075	2	µg/L	----	----	<2	<2	<2	----	----
EP075G: Chlorinated Hydrocarbons										
1.3-Dichlorobenzene	EP075	2	µg/L	----	----	<2	<2	<2	----	----
1.4-Dichlorobenzene	EP075	2	µg/L	----	----	<2	<2	<2	----	----
1.2-Dichlorobenzene	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Hexachloroethane	EP075	2	µg/L	----	----	<2	<2	<2	----	----
1.2.4-Trichlorobenzene	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Hexachloropropylene	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Hexachlorobutadiene	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Hexachlorocyclopentadiene	EP075	10	µg/L	----	----	<10	<10	<10	----	----
Pentachlorobenzene	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Hexachlorobenzene (HCB)	EP075	4	µg/L	----	----	<4	<4	<4	----	----
EP075H: Anilines and Benzidines										
Aniline	EP075	2	µg/L	----	----	<2	<2	<2	----	----
4-Chloroaniline	EP075	2	µg/L	----	----	<2	<2	<2	----	----
2-Nitroaniline	EP075	4	µg/L	----	----	<4	<4	<4	----	----
3-Nitroaniline	EP075	4	µg/L	----	----	<4	<4	<4	----	----
Dibenzofuran	EP075	2	µg/L	----	----	<2	<2	<2	----	----
4-Nitroaniline	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Carbazole	EP075	2	µg/L	----	----	<2	<2	<2	----	----
3.3`-Dichlorobenzidine	EP075	2	µg/L	----	----	<2	<2	<2	----	----
EP075I: Organochlorine Pesticides										
alpha-BHC	EP075	2	µg/L	----	----	<2	<2	<2	----	----
beta-BHC	EP075	2	µg/L	----	----	<2	<2	<2	----	----
gamma-BHC	EP075	2	µg/L	----	----	<2	<2	<2	----	----

No Guideline Evaluation Required

Sub-Matrix: **DI WATER LEACHATE**

Compound	Method	LOR	Unit	Lower Limit	Upper Limit	MB02B_0-9	MB03B_7-20	MB02B_178-187	----	----
Sample ID										
Sampling date/time						12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00	----	----
						ES2233009-002 MU	ES2233009-004 MU	ES2233009-007 MU	-------- MU	-------- MU
EP075I: Organochlorine Pesticides - Continued										
delta-BHC	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Heptachlor	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Aldrin	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Heptachlor epoxide	EP075	2	µg/L	----	----	<2	<2	<2	----	----
alpha-Endosulfan	EP075	2	µg/L	----	----	<2	<2	<2	----	----
4.4`-DDE	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Dieldrin	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Endrin	EP075	2	µg/L	----	----	<2	<2	<2	----	----
beta-Endosulfan	EP075	2	µg/L	----	----	<2	<2	<2	----	----
4.4`-DDD	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Endosulfan sulfate	EP075	2	µg/L	----	----	<2	<2	<2	----	----
4.4`-DDT	EP075	4	µg/L	----	----	<4	<4	<4	----	----
^ Sum of Aldrin + Dieldrin	EP075	4	µg/L	----	----	<4	<4	<4	----	----
^ Sum of DDD + DDE + DDT	EP075	4	µg/L	----	----	<4	<4	<4	----	----
EP075J: Organophosphorus Pesticides										
Dichlorvos	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Dimethoate	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Diazinon	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Chlorpyrifos-methyl	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Malathion	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Fenthion	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Chlorpyrifos	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Pirimphos-ethyl	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Chlorfenvinphos	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Prothiofos	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Ethion	EP075	2	µg/L	----	----	<2	<2	<2	----	----
EP075K: Miscellaneous Compounds										
1.3.5-Trichlorobenzene	EP075	2	µg/L	----	----	<2	<2	<2	----	----
1.2.4.5-Tetrachlorobenzene	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Methanesulfonate methyl	EP075	2	µg/L	----	----	<2	<2	<2	----	----
cis-Isosafrole	EP075	2	µg/L	----	----	<2	<2	<2	----	----
trans-Isosafrole	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Safrole	EP075	2	µg/L	----	----	<2	<2	<2	----	----
Diallate	EP075	2	µg/L	----	----	<2	<2	<2	----	----
2.3.4.6-Tetrachlorophenol	EP075	2	µg/L	----	----	<2	<2	<2	----	----

No Guideline Evaluation Required

Sub-Matrix: **DI WATER ZHE LEACHATE**

Compound	Method	LOR	Unit	Lower Limit	Upper Limit	MB02B_0-9	MB03B_7-20	MB02B_178-187	----	----
Sample ID										
Sampling date/time						12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00	----	----
						ES2233009-002 MU	ES2233009-004 MU	ES2233009-007 MU	-------- MU	-------- MU
EK026SF: Total CN by Segmented Flow Analyser										
Total Cyanide	EK026SF	0.004	mg/L	----	----	<0.004	<0.004	<0.004	----	----
EK028SF: Weak Acid Dissociable CN by Segmented Flow Analyser										
Weak Acid Dissociable Cyanide	EK028SF	0.004	mg/L	----	----	<0.004	<0.004	<0.004	----	----
EP074A: Monocyclic Aromatic Hydrocarbons										
Benzene	EP074	1	µg/L	----	----	<1	<1	<1	----	----
Toluene	EP074	2	µg/L	----	----	<2	<2	<2	----	----
Ethylbenzene	EP074	2	µg/L	----	----	<2	<2	<2	----	----
meta- & para-Xylene	EP074	2	µg/L	----	----	<2	<2	<2	----	----
Styrene	EP074	5	µg/L	----	----	<5	<5	<5	----	----
ortho-Xylene	EP074	2	µg/L	----	----	<2	<2	<2	----	----
Isopropylbenzene	EP074	5	µg/L	----	----	<5	<5	<5	----	----
n-Propylbenzene	EP074	5	µg/L	----	----	<5	<5	<5	----	----
1.3.5-Trimethylbenzene	EP074	5	µg/L	----	----	<5	<5	<5	----	----
sec-Butylbenzene	EP074	5	µg/L	----	----	<5	<5	<5	----	----
1.2.4-Trimethylbenzene	EP074	5	µg/L	----	----	<5	<5	<5	----	----
tert-Butylbenzene	EP074	5	µg/L	----	----	<5	<5	<5	----	----
p-Isopropyltoluene	EP074	5	µg/L	----	----	<5	<5	<5	----	----
n-Butylbenzene	EP074	5	µg/L	----	----	<5	<5	<5	----	----
EP074B: Oxygenated Compounds										
2-Propanone (Acetone)	EP074	50	µg/L	----	----	<50	<50	<50	----	----
Vinyl Acetate	EP074	50	µg/L	----	----	<50	<50	<50	----	----
2-Butanone (MEK)	EP074	50	µg/L	----	----	<50	<50	<50	----	----
4-Methyl-2-pentanone (MIBK)	EP074	50	µg/L	----	----	<50	<50	<50	----	----
2-Hexanone (MBK)	EP074	50	µg/L	----	----	<50	<50	<50	----	----
EP074C: Sulfonated Compounds										
Carbon disulfide	EP074	5	µg/L	----	----	<5	<5	<5	----	----
EP074D: Fumigants										
2.2-Dichloropropane	EP074	5	µg/L	----	----	<5	<5	<5	----	----
1.2-Dichloropropane	EP074	5	µg/L	----	----	<5	<5	<5	----	----
cis-1.3-Dichloropropylene	EP074	5	µg/L	----	----	<5	<5	<5	----	----
trans-1.3-Dichloropropylene	EP074	5	µg/L	----	----	<5	<5	<5	----	----
1.2-Dibromoethane (EDB)	EP074	5	µg/L	----	----	<5	<5	<5	----	----
EP074E: Halogenated Aliphatic Compounds										
Dichlorodifluoromethane	EP074	50	µg/L	----	----	<50	<50	<50	----	----
Chloromethane	EP074	50	µg/L	----	----	<50	<50	<50	----	----
Vinyl chloride	EP074	50	µg/L	----	----	<50	<50	<50	----	----
Bromomethane	EP074	50	µg/L	----	----	<50	<50	<50	----	----

No Guideline Evaluation Required

Sub-Matrix: **DI WATER ZHE LEACHATE**

Compound	Method	LOR	Unit	Lower Limit	Upper Limit	MB02B_0-9	MB03B_7-20	MB02B_178-187	----	----
Sample ID										
Sampling date/time						12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00	----	----
						ES2233009-002 MU	ES2233009-004 MU	ES2233009-007 MU	-------- MU	-------- MU
EP074E: Halogenated Aliphatic Compounds - Continued										
Chloroethane	EP074	50	µg/L	----	----	<50	<50	<50	----	----
Trichlorofluoromethane	EP074	50	µg/L	----	----	<50	<50	<50	----	----
1.1-Dichloroethene	EP074	5	µg/L	----	----	<5	<5	<5	----	----
Iodomethane	EP074	5	µg/L	----	----	<5	<5	<5	----	----
Methylene chloride	EP074	5	µg/L	----	----	<5	<5	<5	----	----
trans-1.2-Dichloroethene	EP074	5	µg/L	----	----	<5	<5	<5	----	----
1.1-Dichloroethane	EP074	5	µg/L	----	----	<5	<5	<5	----	----
cis-1.2-Dichloroethene	EP074	5	µg/L	----	----	<5	<5	<5	----	----
1.1.1-Trichloroethane	EP074	5	µg/L	----	----	<5	<5	<5	----	----
1.1-Dichloropropylene	EP074	5	µg/L	----	----	<5	<5	<5	----	----
Carbon Tetrachloride	EP074	5	µg/L	----	----	<5	<5	<5	----	----
1.2-Dichloroethane	EP074	5	µg/L	----	----	<5	<5	<5	----	----
Trichloroethene	EP074	5	µg/L	----	----	<5	<5	<5	----	----
Dibromomethane	EP074	5	µg/L	----	----	<5	<5	<5	----	----
1.1.2-Trichloroethane	EP074	5	µg/L	----	----	<5	<5	<5	----	----
1.3-Dichloropropane	EP074	5	µg/L	----	----	<5	<5	<5	----	----
Tetrachloroethene	EP074	5	µg/L	----	----	<5	<5	<5	----	----
1.1.1.2-Tetrachloroethane	EP074	5	µg/L	----	----	<5	<5	<5	----	----
trans-1.4-Dichloro-2-butene	EP074	5	µg/L	----	----	<5	<5	<5	----	----
cis-1.4-Dichloro-2-butene	EP074	5	µg/L	----	----	<5	<5	<5	----	----
1.1.2.2-Tetrachloroethane	EP074	5	µg/L	----	----	<5	<5	<5	----	----
1.2.3-Trichloropropane	EP074	5	µg/L	----	----	<5	<5	<5	----	----
Pentachloroethane	EP074	5	µg/L	----	----	<5	<5	<5	----	----
1.2-Dibromo-3-chloropropane	EP074	5	µg/L	----	----	<5	<5	<5	----	----
Hexachlorobutadiene	EP074	5	µg/L	----	----	<5	<5	<5	----	----
EP074F: Halogenated Aromatic Compounds										
Chlorobenzene	EP074	5	µg/L	----	----	<5	<5	<5	----	----
Bromobenzene	EP074	5	µg/L	----	----	<5	<5	<5	----	----
2-Chlorotoluene	EP074	5	µg/L	----	----	<5	<5	<5	----	----
4-Chlorotoluene	EP074	5	µg/L	----	----	<5	<5	<5	----	----
1.3-Dichlorobenzene	EP074	5	µg/L	----	----	<5	<5	<5	----	----
1.4-Dichlorobenzene	EP074	5	µg/L	----	----	<5	<5	<5	----	----
1.2-Dichlorobenzene	EP074	5	µg/L	----	----	<5	<5	<5	----	----
1.2.4-Trichlorobenzene	EP074	5	µg/L	----	----	<5	<5	<5	----	----
1.2.3-Trichlorobenzene	EP074	5	µg/L	----	----	<5	<5	<5	----	----
EP074G: Trihalomethanes										
Chloroform	EP074	5	µg/L	----	----	<5	<5	<5	----	----

No Guideline Evaluation Required

Sub-Matrix: **DI WATER ZHE LEACHATE**

Compound	*Method*	*LOR*	*Unit*	*Sample ID* / *Sampling date/time* / Lower Limit	Upper Limit	**MB02B_0-9** 12-Sep-2022 15:00 **ES2233009-002 MU**	**MB03B_7-20** 12-Sep-2022 15:00 **ES2233009-004 MU**	**MB02B_178-187** 12-Sep-2022 15:00 **ES2233009-007 MU**	**----** ---- **-------- MU**	**----** ---- **-------- MU**
EP074G: Trihalomethanes - Continued										
Bromodichloromethane	EP074	5	µg/L	----	----	<5	<5	<5	**----**	**----**
Dibromochloromethane	EP074	5	µg/L	----	----	<5	<5	<5	**----**	**----**
Bromoform	EP074	5	µg/L	----	----	<5	<5	<5	**----**	**----**
EP074H: Naphthalene										
Naphthalene	EP074	5	µg/L	----	----	<5	<5	<5	**----**	**----**

No Guideline Evaluation Required

Sub-Matrix: **SOLID**

Compound	Method	LOR	Unit	Lower Limit	Upper Limit	MB01A_26-36.5	MB02B_0-9	MB03B_7-20	MB03B_21-29	MB02B_178-187
Sample ID						ES2233009-001 MU	ES2233009-002 MU	ES2233009-004 MU	ES2233009-006 MU	ES2233009-007 MU
Sampling date/time						12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00
EA003 :pH (field/fox)										
pH (F)	EA003	0.1	pH Unit	----	----	**8.5**	**----**	**----**	**9.3**	**----**
pH (Fox)	EA003	0.1	pH Unit	----	----	**6.2**	**----**	**----**	**5.7**	**----**
Reaction Rate	EA003	1	Reaction Unit	----	----	**1**	**----**	**----**	**1**	**----**
EA011: Net Acid Generation										
pH (OX)	EA011	0.1	pH Unit	----	----	**9.8**	**----**	**----**	**5.9**	**----**
NAG (pH 4.5)	EA011	0.1	kg H2SO4/t	----	----	<0.1	**----**	**----**	<0.1	**----**
NAG (pH 7.0)	EA011	0.1	kg H2SO4/t	----	----	<0.1	**----**	**----**	**1.2**	**----**
EA013: Acid Neutralising Capacity										
ANC as H2SO4	EA013	0.5	kg H2SO4 equiv./t	----	----	**43.3**	**----**	**----**	**18.7**	**----**
ANC as CaCO3	EA013	0.1	% CaCO3	----	----	**4.4**	**----**	**----**	**1.9**	**----**
Fizz Rating	EA013	0	Fizz Unit	----	----	**2**	**----**	**----**	**1**	**----**
EA055: Moisture Content (Dried @ 105-110°C)										
Moisture Content	EA055	0.1	%	----	----	**----**	**0.3**	**2.0**	**----**	**0.6**
ED042T: Total Sulfur by LECO										
Sulfur - Total as S (LECO)	ED042T	0.01	%	----	----	**0.03**	**----**	**----**	**0.16**	**----**
EN60-DI: Bottle Leaching Procedure - Inorganics/Non-Volatile Organics (Glass Vessel)										
Final pH	EN60-DIa-G	0.1	pH Unit	----	----	**----**	**7.2**	**7.4**	**----**	**8.8**
EN60Z: ASLP Leachate - ZHE										
Extraction Fluid pH	EN60Za	0.1	pH Unit	----	----	**----**	**7.2**	**7.4**	**----**	**8.8**
EP003: Total Organic Carbon (TOC) in Soil										
Total Organic Carbon	EP003	0.02	%	----	----	<0.02	**----**	**----**	**0.02**	**----**
EP068A: Organochlorine Pesticides (OC)										
alpha-BHC	EP068	0.05	mg/kg	----	----	**----**	<0.05	<0.05	**----**	<0.05
Hexachlorobenzene (HCB)	EP068	0.05	mg/kg	----	----	**----**	<0.05	<0.05	**----**	<0.05
beta-BHC	EP068	0.05	mg/kg	----	----	**----**	<0.05	<0.05	**----**	<0.05
gamma-BHC	EP068	0.05	mg/kg	----	----	**----**	<0.05	<0.05	**----**	<0.05
delta-BHC	EP068	0.05	mg/kg	----	----	**----**	<0.05	<0.05	**----**	<0.05
Heptachlor	EP068	0.05	mg/kg	----	----	**----**	<0.05	<0.05	**----**	<0.05
Aldrin	EP068	0.05	mg/kg	----	----	**----**	<0.05	<0.05	**----**	<0.05
Heptachlor epoxide	EP068	0.05	mg/kg	----	----	**----**	<0.05	<0.05	**----**	<0.05
^ Total Chlordane (sum)	EP068	0.05	mg/kg	----	----	**----**	<0.05	<0.05	**----**	<0.05
trans-Chlordane	EP068	0.05	mg/kg	----	----	**----**	<0.05	<0.05	**----**	<0.05
alpha-Endosulfan	EP068	0.05	mg/kg	----	----	**----**	<0.05	<0.05	**----**	<0.05
cis-Chlordane	EP068	0.05	mg/kg	----	----	**----**	<0.05	<0.05	**----**	<0.05
Dieldrin	EP068	0.05	mg/kg	----	----	**----**	<0.05	<0.05	**----**	<0.05
4.4`-DDE	EP068	0.05	mg/kg	----	----	**----**	<0.05	<0.05	**----**	<0.05

No Guideline Evaluation Required

Sub-Matrix: **SOLID**

Compound	Method	LOR	Unit	Lower Limit	Upper Limit	MB01A_26-36.5	MB02B_0-9	MB03B_7-20	MB03B_21-29	MB02B_178-187
Sample ID						ES2233009-001 MU	ES2233009-002 MU	ES2233009-004 MU	ES2233009-006 MU	ES2233009-007 MU
Sampling date/time						12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00
EP068A: Organochlorine Pesticides (OC) - Continued										
Endrin	EP068	0.05	mg/kg	----	----	----	<0.05	<0.05	----	<0.05
beta-Endosulfan	EP068	0.05	mg/kg	----	----	----	<0.05	<0.05	----	<0.05
4.4`-DDD	EP068	0.05	mg/kg	----	----	----	<0.05	<0.05	----	<0.05
Endrin aldehyde	EP068	0.05	mg/kg	----	----	----	<0.05	<0.05	----	<0.05
Endosulfan sulfate	EP068	0.05	mg/kg	----	----	----	<0.05	<0.05	----	<0.05
4.4`-DDT	EP068	0.2	mg/kg	----	----	----	<0.2	<0.2	----	<0.2
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup										
>C10 - C16 Fraction	EP071SG-S	50	mg/kg	----	----	----	<50	<50	----	<50
>C16 - C34 Fraction	EP071SG-S	100	mg/kg	----	----	----	<100	<100	----	<100
>C34 - C40 Fraction	EP071SG-S	100	mg/kg	----	----	----	<100	<100	----	<100
^ >C10 - C40 Fraction (sum)	EP071SG-S	50	mg/kg	----	----	----	<50	<50	----	<50
EP071 SG-S: Total Petroleum Hydrocarbons in Soil - Silica gel cleanup										
C10 - C14 Fraction	EP071SG-S	50	mg/kg	----	----	----	<50	<50	----	<50
C15 - C28 Fraction	EP071SG-S	100	mg/kg	----	----	----	<100	<100	----	<100
C29 - C36 Fraction	EP071SG-S	100	mg/kg	----	----	----	<100	<100	----	<100
EP074A: Monocyclic Aromatic Hydrocarbons										
meta- & para-Xylene	EP074	0.5	mg/kg	----	----	----	<0.5	<0.5	----	<0.5
ortho-Xylene	EP074	0.5	mg/kg	----	----	----	<0.5	<0.5	----	<0.5
EP075A: Phenolic Compounds										
4-Chloro-3-methylphenol	EP075	0.5	mg/kg	----	----	----	<0.5	<0.5	----	<0.5
Pentachlorophenol	EP075	1	mg/kg	----	----	----	<1	<1	----	<1
EP075B: Polynuclear Aromatic Hydrocarbons										
Naphthalene	EP075	0.5	mg/kg	----	----	----	<0.5	<0.5	----	<0.5
Acenaphthylene	EP075	0.5	mg/kg	----	----	----	<0.5	<0.5	----	<0.5
Acenaphthene	EP075	0.5	mg/kg	----	----	----	<0.5	<0.5	----	<0.5
Fluorene	EP075	0.5	mg/kg	----	----	----	<0.5	<0.5	----	<0.5
Phenanthrene	EP075	0.5	mg/kg	----	----	----	<0.5	<0.5	----	<0.5
Anthracene	EP075	0.5	mg/kg	----	----	----	<0.5	<0.5	----	<0.5
Fluoranthene	EP075	0.5	mg/kg	----	----	----	<0.5	<0.5	----	<0.5
Pyrene	EP075	0.5	mg/kg	----	----	----	<0.5	<0.5	----	<0.5
Benz(a)anthracene	EP075	0.5	mg/kg	----	----	----	<0.5	<0.5	----	<0.5
Chrysene	EP075	0.5	mg/kg	----	----	----	<0.5	<0.5	----	<0.5
Benzo(b+j) & Benzo(k)fluoranthene	EP075	1	mg/kg	----	----	----	<1	<1	----	<1
Indeno(1.2.3.cd)pyrene	EP075	0.5	mg/kg	----	----	----	<0.5	<0.5	----	<0.5
Dibenz(a.h)anthracene	EP075	0.5	mg/kg	----	----	----	<0.5	<0.5	----	<0.5
Benzo(g.h.i)perylene	EP075	0.5	mg/kg	----	----	----	<0.5	<0.5	----	<0.5
EP075C: Phthalate Esters										

No Guideline Evaluation Required

Sub-Matrix: **SOLID**

Compound	Method	LOR	Unit	Lower Limit	Upper Limit	MB01A_26-36.5	MB02B_0-9	MB03B_7-20	MB03B_21-29	MB02B_178-187
Sample ID						ES2233009-001 MU	ES2233009-002 MU	ES2233009-004 MU	ES2233009-006 MU	ES2233009-007 MU
Sampling date/time						12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00	12-Sep-2022 15:00
EP075C: Phthalate Esters - Continued										
bis(2-ethylhexyl) phthalate	EP075	5.0	mg/kg	----	----	----	<5.0	<5.0	----	<5.0
EP075E: Nitroaromatics and Ketones										
Pentachloronitrobenzene	EP075	0.5	mg/kg	----	----	----	<0.5	<0.5	----	<0.5
EP075G: Chlorinated Hydrocarbons										
1.2.4-Trichlorobenzene	EP075	0.5	mg/kg	----	----	----	<0.5	<0.5	----	<0.5
Pentachlorobenzene	EP075	0.5	mg/kg	----	----	----	<0.5	<0.5	----	<0.5
EP075K: Miscellaneous Compounds										
1.2.4.5-Tetrachlorobenzene	EP075	0.5	mg/kg	----	----	----	<0.5	<0.5	----	<0.5
2.3.4.6-Tetrachlorophenol	EP075	0.5	mg/kg	----	----	----	<0.5	<0.5	----	<0.5
Isodrin	EP075	0.5	mg/kg	----	----	----	<0.5	<0.5	----	<0.5
Di (2-ethylhexyl) adipate	EP075	0.5	mg/kg	----	----	----	<0.5	<0.5	----	<0.5
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions										
C6 - C10 Fraction	EP080	10	mg/kg	----	----	----	<10	<10	----	<10
EP132A: Phenolic Compounds										
Hexachlorophene	EP132	0.01	mg/kg	----	----	----	<0.01	<0.01	----	<0.01
EP202A: Phenoxyacetic Acid Herbicides by LCMS										
2.4.5-TP (Silvex)	EP202	0.02	mg/kg	----	----	----	<0.02	<0.02	----	<0.02
2.4.5-T	EP202	0.02	mg/kg	----	----	----	<0.02	<0.02	----	<0.02

Guideline values - NSW EPA Waste Classification Guidelines - Part 1: Classifying Waste (2014) - Table 1

		Limits
General Waste - CT1		
1.1.1.2-Tetrachloroethane:	No overview description available for this compound in this guideline.	< 200 mg/kg
1.1.1-Trichloroethane:	No overview description available for this compound in this guideline.	< 600 mg/kg
1.1.2.2-Tetrachloroethane:	No overview description available for this compound in this guideline.	< 26 mg/kg
1.1.2-Trichloroethane:	No overview description available for this compound in this guideline.	< 24 mg/kg
1.1-Dichloroethene:	No overview description available for this compound in this guideline.	< 14 mg/kg
1.2.3.4-Tetrachlorobenzene:	No overview description available for this compound in this guideline.	< 10 mg/kg
1.2-Dichlorobenzene:	No overview description available for this compound in this guideline.	< 86 mg/kg
1.2-Dichloroethane:	No overview description available for this compound in this guideline.	< 10 mg/kg
1.4-Dichlorobenzene:	No overview description available for this compound in this guideline.	< 150 mg/kg
2.4.5-Trichlorophenol:	No overview description available for this compound in this guideline.	< 8,000 mg/kg
2.4.6-Trichlorophenol:	No overview description available for this compound in this guideline.	< 40 mg/kg
2.4-D:	No overview description available for this compound in this guideline.	< 200 mg/kg
2.4-Dinitrotoluene:	No overview description available for this compound in this guideline.	< 2.6 mg/kg
2-Butanone (MEK):	No overview description available for this compound in this guideline.	< 4,000 mg/kg
2-Methylphenol:	No overview description available for this compound in this guideline.	< 4,000 mg/kg
3- & 4-Methylphenol:	No overview description available for this compound in this guideline.	< 4,000 mg/kg
Arsenic:	No overview description available for this compound in this guideline.	< 100 mg/kg
Benzene:	No overview description available for this compound in this guideline.	< 10 mg/kg
Benzo(a)pyrene:	No overview description available for this compound in this guideline.	< 0.8 mg/kg
Beryllium:	No overview description available for this compound in this guideline.	< 20 mg/kg
C10 - C36 Fraction (sum):	No overview description available for this compound in this guideline.	< 10,000 mg/kg
C6 - C9 Fraction:	No overview description available for this compound in this guideline.	< 650 mg/kg
Cadmium:	No overview description available for this compound in this guideline.	< 20 mg/kg
Carbon Tetrachloride:	No overview description available for this compound in this guideline.	< 10 mg/kg
Chlorobenzene:	No overview description available for this compound in this guideline.	< 2,000 mg/kg
Chloroform:	No overview description available for this compound in this guideline.	< 120 mg/kg
Chlorpyrifos:	No overview description available for this compound in this guideline.	< 4 mg/kg
Ethylbenzene:	No overview description available for this compound in this guideline.	< 600 mg/kg
Fluoride:	No overview description available for this compound in this guideline.	< 3,000 mg/kg
Fluroxypyr:	No overview description available for this compound in this guideline.	< 40 mg/kg

Guideline values - NSW EPA Waste Classification Guidelines - Part 1: Classifying Waste (2014) - Table 1

		Limits
General Waste - CT1		
Hexavalent Chromium:	No overview description available for this compound in this guideline.	< 100 mg/kg
Lead:	No overview description available for this compound in this guideline.	< 100 mg/kg
Mercury:	No overview description available for this compound in this guideline.	< 4 mg/kg
Methylene chloride:	No overview description available for this compound in this guideline.	< 172 mg/kg
Molybdenum:	No overview description available for this compound in this guideline.	< 100 mg/kg
Nickel:	No overview description available for this compound in this guideline.	< 40 mg/kg
Nitrobenzene:	No overview description available for this compound in this guideline.	< 40 mg/kg
Phenol:	No overview description available for this compound in this guideline.	< 288 mg/kg
Picloram:	No overview description available for this compound in this guideline.	< 60 mg/kg
Selenium:	No overview description available for this compound in this guideline.	< 20 mg/kg
Silver:	No overview description available for this compound in this guideline.	< 100 mg/kg
Styrene:	No overview description available for this compound in this guideline.	< 60 mg/kg
Sum of Endosulfans (inc. sulfate):	No overview description available for this compound in this guideline.	< 60 mg/kg
Sum of PAHs:	No overview description available for this compound in this guideline.	< 200 mg/kg
Sum of plasticisers:	No overview description available for this compound in this guideline.	< 600 mg/kg
Sum of Scheduled Chemicals:	No overview description available for this compound in this guideline.	< 49 mg/kg
Tetrachloroethene:	No overview description available for this compound in this guideline.	< 14 mg/kg
Toluene:	No overview description available for this compound in this guideline.	< 288 mg/kg
Total Cyanide:	No overview description available for this compound in this guideline.	< 320 mg/kg
Total Polychlorinated biphenyls:	No overview description available for this compound in this guideline.	< 49 mg/kg
Trichloroethene:	No overview description available for this compound in this guideline.	< 10 mg/kg
Triclopyr:	No overview description available for this compound in this guideline.	< 40 mg/kg
Vinyl chloride:	No overview description available for this compound in this guideline.	< 4 mg/kg
Weak Acid Dissociable Cyanide:	No overview description available for this compound in this guideline.	< 70 mg/kg
Restricted Soild Waste - CT2		
1.1.1.2-Tetrachloroethane :	No overview description available for this compound in this guideline.	< 800 mg/kg
1.1.1-Trichloroethane:	No overview description available for this compound in this guideline.	< 2,400 mg/kg
1.1.2.2-Tetrachloroethane :	No overview description available for this compound in this guideline.	< 104 mg/kg

Guideline values - NSW EPA Waste Classification Guidelines - Part 1: Classifying Waste (2014) - Table 1

		Limits
Restricted Soild Waste - CT2		
1.1.2-Trichloroethane:	No overview description available for this compound in this guideline.	< 96 mg/kg
1.1-Dichloroethene:	No overview description available for this compound in this guideline.	< 56 mg/kg
1.2.3.4-Tetrachlorobenzene:	No overview description available for this compound in this guideline.	< 40 mg/kg
1.2-Dichlorobenzene:	No overview description available for this compound in this guideline.	< 344 mg/kg
1.2-Dichloroethane:	No overview description available for this compound in this guideline.	< 40 mg/kg
1.4-Dichlorobenzene:	No overview description available for this compound in this guideline.	< 600 mg/kg
2.4.5-Trichlorophenol:	No overview description available for this compound in this guideline.	< 32,000 mg/kg
2.4.6-Trichlorophenol:	No overview description available for this compound in this guideline.	< 160 mg/kg
2.4-D:	No overview description available for this compound in this guideline.	< 800 mg/kg
2.4-Dinitrotoluene:	No overview description available for this compound in this guideline.	< 10.4 mg/kg
2-Butanone (MEK):	No overview description available for this compound in this guideline.	< 16,000 mg/kg
2-Methylphenol:	No overview description available for this compound in this guideline.	< 16,000 mg/kg
3- & 4-Methylphenol:	No overview description available for this compound in this guideline.	< 16,000 mg/kg
Arsenic:	No overview description available for this compound in this guideline.	< 400 mg/kg
Benzene:	No overview description available for this compound in this guideline.	< 40 mg/kg
Benzo(a)pyrene:	No overview description available for this compound in this guideline.	< 3.2 mg/kg
Beryllium:	No overview description available for this compound in this guideline.	< 80 mg/kg
C10 - C36 Fraction (sum):	No overview description available for this compound in this guideline.	< 40,000 mg/kg
C6 - C9 Fraction:	No overview description available for this compound in this guideline.	< 2,600 mg/kg
Cadmium:	No overview description available for this compound in this guideline.	< 80 mg/kg
Carbon Tetrachloride:	No overview description available for this compound in this guideline.	< 40 mg/kg
Chlorobenzene:	No overview description available for this compound in this guideline.	< 8,000 mg/kg
Chloroform:	No overview description available for this compound in this guideline.	< 480 mg/kg
Chlorpyrifos:	No overview description available for this compound in this guideline.	< 16 mg/kg
Ethylbenzene:	No overview description available for this compound in this guideline.	< 2,400 mg/kg
Fluoride:	No overview description available for this compound in this guideline.	< 12,000 mg/kg
Fluroxypyr:	No overview description available for this compound in this guideline.	< 160 mg/kg
Hexavalent Chromium:	No overview description available for this compound in this guideline.	< 400 mg/kg
Lead:	No overview description available for this compound in this guideline.	< 400 mg/kg
Mercury:	No overview description available for this compound in this guideline.	< 16 mg/kg
Methylene chloride:	No overview description available for this compound in this guideline.	< 688 mg/kg

Guideline values - NSW EPA Waste Classification Guidelines - Part 1: Classifying Waste (2014) - Table 1

		Limits
Restricted Soild Waste - CT2		
Molybdenum:	No overview description available for this compound in this guideline.	< 400 mg/kg
Nickel:	No overview description available for this compound in this guideline.	< 160 mg/kg
Nitrobenzene:	No overview description available for this compound in this guideline.	< 160 mg/kg
Phenol:	No overview description available for this compound in this guideline.	< 1,152 mg/kg
Picloram:	No overview description available for this compound in this guideline.	< 240 mg/kg
Selenium:	No overview description available for this compound in this guideline.	< 80 mg/kg
Silver:	No overview description available for this compound in this guideline.	< 400 mg/kg
Styrene:	No overview description available for this compound in this guideline.	< 240 mg/kg
Sum of Endosulfans (inc. sulfate):	No overview description available for this compound in this guideline.	< 240 mg/kg
Sum of PAHs:	No overview description available for this compound in this guideline.	< 800 mg/kg
Sum of plasticisers:	No overview description available for this compound in this guideline.	< 2,400 mg/kg
Sum of Scheduled Chemicals:	No overview description available for this compound in this guideline.	< 49 mg/kg
Tetrachloroethene:	No overview description available for this compound in this guideline.	< 56 mg/kg
Toluene:	No overview description available for this compound in this guideline.	< 1,152 mg/kg
Total Cyanide:	No overview description available for this compound in this guideline.	< 1,280 mg/kg
Total Polychlorinated biphenyls:	No overview description available for this compound in this guideline.	< 49 mg/kg
Trichloroethene:	No overview description available for this compound in this guideline.	< 40 mg/kg
Triclopyr:	No overview description available for this compound in this guideline.	< 160 mg/kg
Vinyl chloride:	No overview description available for this compound in this guideline.	< 16 mg/kg
Weak Acid Dissociable Cyanide:	No overview description available for this compound in this guideline.	< 280 mg/kg

Surrogate Control Limits

Sub-Matrix: DI WATER LEACHATE		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	67	111
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	67	111
EP075S: Acid Extractable Surrogates			
2-Fluorophenol	367-12-4	10	117
Phenol-d6	13127-88-3	10	69
2-Chlorophenol-D4	93951-73-6	21	130
2.4.6-Tribromophenol	118-79-6	10	151
EP075T: Base/Neutral Extractable Surrogates			
Nitrobenzene-D5	4165-60-0	29	142
1.2-Dichlorobenzene-D4	2199-69-1	24	121
2-Fluorobiphenyl	321-60-8	27	135
Anthracene-d10	1719-06-8	27	113
4-Terphenyl-d14	1718-51-0	21	123

Sub-Matrix: DI WATER ZHE LEACHATE		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP074S: VOC Surrogates			
1.2-Dichloroethane-D4	17060-07-0	78	133
Toluene-D8	2037-26-5	79	129
4-Bromofluorobenzene	460-00-4	81	124

Sub-Matrix: SOLID		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	39	149
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	49	147
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	35	143
EP074S(SIM) : VOC Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	131
EP074S: VOC Surrogates			
1.2-Dichloroethane-D4	17060-07-0	64	130
Toluene-D8	2037-26-5	66	136
4-Bromofluorobenzene	460-00-4	60	122
EP075S: Acid Extractable Surrogates			
2-Fluorophenol	367-12-4	29	149
Phenol-d6	13127-88-3	32	128

Sub-Matrix: **SOLID**

Compound	CAS Number	Recovery Limits (%) Low	High
EP075S: Acid Extractable Surrogates - Continued			
2-Chlorophenol-D4	93951-73-6	32	128
2.4.6-Tribromophenol	118-79-6	13	121
EP075T: Base/Neutral Extractable Surrogates			
Nitrobenzene-D5	4165-60-0	33	125
1.2-Dichlorobenzene-D4	2199-69-1	34	108
2-Fluorobiphenyl	321-60-8	35	121
Anthracene-d10	1719-06-8	35	123
4-Terphenyl-d14	1718-51-0	33	125
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130
EP202S: Phenoxyacetic Acid Herbicide Surrogate			
2.4-Dichlorophenyl Acetic Acid	19719-28-9	45	139

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES2233009**	Page	: 1 of 30
Amendment	: **(Preliminary Report)**		
Client	: **EMM CONSULTING PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: HENRY NOAKES	Contact	: Cez Bautista
Address	: Ground Floor Suite 1 20 Chandos Street St Leonards NSW NSW 2065	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: J200096 Oven Mountain Pumped Storage Project	Date Samples Received	: 14-Sep-2022
Order number	: J200096	Date Analysis Commenced	: 16-Sep-2022
C-O-C number	: ----	Issue Date	: 11-Oct-2022
Sampler	: HENRY NOAKES		
Site	: ----		
Quote number	: SY/284/22		
No. of samples received	: 6		
No. of samples analysed	: 5		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Hez Weldermariam	Lab Technician	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Zoran Grozdanovski	Laboratory Operator	Newcastle - Inorganics, Mayfield West, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 4585113)									
ES2232912-003	Anonymous	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Molybdenum	7439-98-7	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Silver	7440-22-4	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	19	19	0.0	No Limit
		EG005T: Selenium	7782-49-2	5	mg/kg	<5	<5	0.0	No Limit
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 4588949)									
ES2233009-007	MB02B_178-187	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Molybdenum	7439-98-7	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	3	3	0.0	No Limit
		EG005T: Silver	7440-22-4	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Selenium	7782-49-2	5	mg/kg	<5	<5	0.0	No Limit
EA003 :pH (field/fox) (QC Lot: 4594163)									
EM2218261-008	Anonymous	EA003: pH (F)	----	0.1	pH Unit	6.7	7.0	3.6	0% - 20%
		EA003: pH (Fox)	----	0.1	pH Unit	4.4	4.4	0.0	0% - 20%
EA011: Net Acid Generation (QC Lot: 4597028)									
ES2233009-001	MB01A_26-36.5	EA011: NAG (pH 4.5)	----	0.1	kg H2SO4/t	<0.1	<0.1	0.0	No Limit
		EA011: NAG (pH 7.0)	----	0.1	kg H2SO4/t	<0.1	<0.1	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EA011: Net Acid Generation (QC Lot: 4597028) - continued									
ES2233009-001	MB01A_26-36.5	EA011: pH (OX)	----	0.1	pH Unit	9.8	9.8	0.0	0% - 20%
EA013: Acid Neutralising Capacity (QC Lot: 4597029)									
ES2233009-001	MB01A_26-36.5	EA013: ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	43.3	44.8	3.4	0% - 20%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 4585120)									
ES2232842-001	Anonymous	EA055: Moisture Content	----	0.1	%	6.4	6.7	5.1	No Limit
ES2232912-003	Anonymous	EA055: Moisture Content	----	0.1	%	13.6	15.8	15.1	0% - 50%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 4585121)									
ES2233013-001	Anonymous	EA055: Moisture Content	----	0.1	%	22.4	21.8	2.7	0% - 20%
ED042T: Total Sulfur by LECO (QC Lot: 4599111)									
ES2233009-001	MB01A_26-36.5	ED042T: Sulfur - Total as S (LECO)	----	0.01	%	0.03	0.03	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 4585112)									
ES2232912-003	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 4588950)									
ES2233287-005	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.1	0.0	No Limit
ES2233009-007	MB02B_178-187	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EG048: Hexavalent Chromium (Alkaline Digest) (QC Lot: 4584078)									
ES2232407-004	Anonymous	EG048G: Hexavalent Chromium	18540-29-9	0.5	mg/kg	1.4	2.8	63.4	No Limit
ES2232708-001	Anonymous	EG048G: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	1.4	93.9	No Limit
EG048: Hexavalent Chromium (Alkaline Digest) (QC Lot: 4587216)									
ES2231661-001	Anonymous	EG048G: Hexavalent Chromium	18540-29-9	0.5	mg/kg	4.1	7.7	60.3	No Limit
ES2233009-007	MB02B_178-187	EG048G: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EK026SF: Total CN by Segmented Flow Analyser (QC Lot: 4585506)									
ES2231661-001	Anonymous	EK026SF: Total Cyanide	57-12-5	1	mg/kg	<4	<4	0.0	No Limit
ES2233009-004	MB03B_7-20	EK026SF: Total Cyanide	57-12-5	1	mg/kg	<1	<1	0.0	No Limit
EK028SF: Weak Acid Dissociable CN by Segmented Flow Analyser (QC Lot: 4585505)									
ES2231661-001	Anonymous	EK028SF: Weak Acid Dissociable Cyanide	----	1	mg/kg	<4	<4	0.0	No Limit
ES2233009-004	MB03B_7-20	EK028SF: Weak Acid Dissociable Cyanide	----	1	mg/kg	<1	<1	0.0	No Limit
EK040T: Fluoride Total (QC Lot: 4589794)									
ES2233009-002	MB02B_0-9	EK040T: Fluoride	16984-48-8	40	mg/kg	320	360	13.0	No Limit
EP003: Total Organic Carbon (TOC) in Soil (QC Lot: 4599112)									
ES2233009-001	MB01A_26-36.5	EP003: Total Organic Carbon	----	0.02	%	<0.02	<0.02	0.0	No Limit
EP066: Polychlorinated Biphenyls (PCB) (QC Lot: 4584740)									
ES2233009-002	MB02B_0-9	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EP066: Polychlorinated Biphenyls (PCB) (QC Lot: 4585917)									
ES2233009-007	MB02B_178-187	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EP068A: Organochlorine Pesticides (OC) (QC Lot: 4584738)									

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP068A: Organochlorine Pesticides (OC) (QC Lot: 4584738) - continued									
ES2233009-002	MB02B_0-9	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
EP068A: Organochlorine Pesticides (OC) (QC Lot: 4585920)									
ES2233009-007	MB02B_178-187	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 4584738)									

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 4584738) - continued									
ES2233009-002	MB02B_0-9	EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 4585920)									
ES2233009-007	MB02B_178-187	EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup (QC Lot: 4584739)									
ES2233009-002	MB02B_0-9	EP071SG-S: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071SG-S: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071SG-S: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
		EP071SG-S: C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	0.0	No Limit
EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup (QC Lot: 4585918)									
ES2233009-007	MB02B_178-187	EP071SG-S: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071SG-S: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071SG-S: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
		EP071SG-S: C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	0.0	No Limit
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup (QC Lot: 4584739)									
ES2233009-002	MB02B_0-9	EP071SG-S: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071SG-S: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071SG-S: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup (QC Lot: 4585918)									
ES2233009-007	MB02B_178-187	EP071SG-S: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071SG-S: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071SG-S: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP074A: Monocyclic Aromatic Hydrocarbons (QC Lot: 4584521)									
ES2233009-002	MB02B_0-9	EP074: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP074: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Styrene	100-42-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP074A: Monocyclic Aromatic Hydrocarbons (QC Lot: 4585545)									
ES2233009-007	MB02B_178-187	EP074: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP074: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Styrene	100-42-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP074B: Oxygenated Compounds (QC Lot: 4584521)									
ES2233009-002	MB02B_0-9	EP074: 2-Butanone (MEK)	78-93-3	5	mg/kg	<5	<5	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP074B: Oxygenated Compounds (QC Lot: 4585545)									
ES2233009-007	MB02B_178-187	EP074: 2-Butanone (MEK)	78-93-3	5	mg/kg	<5	<5	0.0	No Limit
EP074E(SIM): Halogenated Aliphatic Compounds (QC Lot: 4584523)									
ES2233009-002	MB02B_0-9	EP074E(SIM): Vinyl chloride	75-01-4	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
EP074E(SIM): Halogenated Aliphatic Compounds (QC Lot: 4585544)									
ES2233009-007	MB02B_178-187	EP074E(SIM): Vinyl chloride	75-01-4	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
EP074E: Halogenated Aliphatic Compounds (QC Lot: 4584521)									
ES2233009-002	MB02B_0-9	EP074: 1.1-Dichloroethene	75-35-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Methylene chloride	75-09-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.1.1-Trichloroethane	71-55-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Carbon Tetrachloride	56-23-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.2-Dichloroethane	107-06-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Trichloroethene	79-01-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.1.2-Trichloroethane	79-00-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Tetrachloroethene	127-18-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.1.1.2-Tetrachloroethane	630-20-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.1.2.2-Tetrachloroethane	79-34-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Vinyl chloride	75-01-4	5	mg/kg	<4	<4	0.0	No Limit
EP074E: Halogenated Aliphatic Compounds (QC Lot: 4585545)									
ES2233009-007	MB02B_178-187	EP074: 1.1-Dichloroethene	75-35-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Methylene chloride	75-09-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.1.1-Trichloroethane	71-55-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Carbon Tetrachloride	56-23-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.2-Dichloroethane	107-06-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Trichloroethene	79-01-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.1.2-Trichloroethane	79-00-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Tetrachloroethene	127-18-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.1.1.2-Tetrachloroethane	630-20-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.1.2.2-Tetrachloroethane	79-34-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Vinyl chloride	75-01-4	5	mg/kg	<4	<4	0.0	No Limit
EP074F: Halogenated Aromatic Compounds (QC Lot: 4584521)									
ES2233009-002	MB02B_0-9	EP074: Chlorobenzene	108-90-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP074F: Halogenated Aromatic Compounds (QC Lot: 4585545)									
ES2233009-007	MB02B_178-187	EP074: Chlorobenzene	108-90-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP074G: Trihalomethanes (QC Lot: 4584521)									
ES2233009-002	MB02B_0-9	EP074: Chloroform	67-66-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP074G: Trihalomethanes (QC Lot: 4585545)									
ES2233009-007	MB02B_178-187	EP074: Chloroform	67-66-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP075A: Phenolic Compounds (QC Lot: 4584737)									

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP075A: Phenolic Compounds (QC Lot: 4584737) - continued									
ES2233009-002	MB02B_0-9	EP075: Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 3- & 4-Methylphenol	1319-77-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Pentachlorophenol	87-86-5	1	mg/kg	<1	<1	0.0	No Limit
EP075A: Phenolic Compounds (QC Lot: 4585919)									
ES2233009-007	MB02B_178-187	EP075: Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 3- & 4-Methylphenol	1319-77-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Pentachlorophenol	87-86-5	1	mg/kg	<1	<1	0.0	No Limit
EP075B: Polynuclear Aromatic Hydrocarbons (QC Lot: 4584737)									
ES2233009-002	MB02B_0-9	EP075: Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Benzo(b+j) & Benzo(k)fluoranthene	205-99-2 207-08-9	1	mg/kg	<1	<1	0.0	No Limit
EP075B: Polynuclear Aromatic Hydrocarbons (QC Lot: 4585919)									
ES2233009-007	MB02B_178-187	EP075: Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP075B: Polynuclear Aromatic Hydrocarbons (QC Lot: 4585919) - continued									
ES2233009-007	MB02B_178-187	EP075: Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Benzo(b+j) & Benzo(k)fluoranthene	205-99-2 207-08-9	1	mg/kg	<1	<1	0.0	No Limit
EP075E: Nitroaromatics and Ketones (QC Lot: 4584737)									
ES2233009-002	MB02B_0-9	EP075: Nitrobenzene	98-95-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 2.4-Dinitrotoluene	121-14-2	0.5	mg/kg	<1.0	<1.0	0.0	No Limit
		EP075: Pentachloronitrobenzene	82-68-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP075E: Nitroaromatics and Ketones (QC Lot: 4585919)									
ES2233009-007	MB02B_178-187	EP075: Nitrobenzene	98-95-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 2.4-Dinitrotoluene	121-14-2	0.5	mg/kg	<1.0	<1.0	0.0	No Limit
		EP075: Pentachloronitrobenzene	82-68-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP075G: Chlorinated Hydrocarbons (QC Lot: 4584737)									
ES2233009-002	MB02B_0-9	EP075: 1.4-Dichlorobenzene	106-46-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 1.2-Dichlorobenzene	95-50-1	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 1.2.4-Trichlorobenzene	120-82-1	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Pentachlorobenzene	608-93-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP075G: Chlorinated Hydrocarbons (QC Lot: 4585919)									
ES2233009-007	MB02B_178-187	EP075: 1.4-Dichlorobenzene	106-46-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 1.2-Dichlorobenzene	95-50-1	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 1.2.4-Trichlorobenzene	120-82-1	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Pentachlorobenzene	608-93-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP075K: Miscellaneous Compounds (QC Lot: 4584737)									
ES2233009-002	MB02B_0-9	EP075: 1.2.4.5-Tetrachlorobenzene	95-94-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 2.3.4.6-Tetrachlorophenol	58-90-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP075K: Miscellaneous Compounds (QC Lot: 4585919)									
ES2233009-007	MB02B_178-187	EP075: 1.2.4.5-Tetrachlorobenzene	95-94-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 2.3.4.6-Tetrachlorophenol	58-90-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4584522)									
ES2233009-002	MB02B_0-9	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4585543)									
ES2233009-007	MB02B_178-187	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4584522)									

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4584522) - continued									
ES2233009-002	MB02B_0-9	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4585543)									
ES2233009-007	MB02B_178-187	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QC Lot: 4586607)									
EB2226985-001	Anonymous	EP202: 2.4-D	94-75-7	0.02	mg/kg	<0.04	<0.04	0.0	No Limit
		EP202: Triclopyr	55335-06-3	0.02	mg/kg	<0.04	<0.04	0.0	No Limit
		EP202: 2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg	<0.04	<0.04	0.0	No Limit
		EP202: 2.4.5-T	93-76-5	0.02	mg/kg	<0.04	<0.04	0.0	No Limit
		EP202: Picloram	1918-02-1	0.02	mg/kg	<0.04	<0.04	0.0	No Limit
		EP202: Fluroxypyr	69377-81-7	0.02	mg/kg	0.16	0.16	0.0	No Limit
EP2211723-002	Anonymous	EP202: 2.4-D	94-75-7	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: Triclopyr	55335-06-3	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: 2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: 2.4.5-T	93-76-5	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: Picloram	1918-02-1	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: Fluroxypyr	69377-81-7	0.02	mg/kg	<0.02	<0.02	0.0	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG005(ED093)C: Leachable Metals by ICPAES (QC Lot: 4590347)									
ES2233009-002	MB02B_0-9	EG005C: Beryllium	7440-41-7	0.05	mg/L	<0.05	<0.05	0.0	No Limit
		EG005C: Cadmium	7440-43-9	0.05	mg/L	<0.05	<0.05	0.0	No Limit
		EG005C: Selenium	7782-49-2	0.05	mg/L	<0.05	<0.05	0.0	No Limit
		EG005C: Aluminium	7429-90-5	0.1	mg/L	3.9	3.8	0.0	0% - 20%
		EG005C: Antimony	7440-36-0	0.1	mg/L	<0.1	<0.1	0.0	No Limit
		EG005C: Arsenic	7440-38-2	0.1	mg/L	<0.1	<0.1	0.0	No Limit
		EG005C: Boron	7440-42-8	0.1	mg/L	<0.1	<0.1	0.0	No Limit
		EG005C: Chromium	7440-47-3	0.1	mg/L	<0.1	<0.1	0.0	No Limit
		EG005C: Iron	7439-89-6	0.1	mg/L	5.9	6.1	3.8	0% - 20%
		EG005C: Lead	7439-92-1	0.1	mg/L	<0.1	<0.1	0.0	No Limit
		EG005C: Manganese	7439-96-5	0.1	mg/L	0.1	0.1	0.0	No Limit
		EG005C: Nickel	7440-02-0	0.1	mg/L	<0.1	<0.1	0.0	No Limit
		EG005C: Silver	7440-22-4	0.1	mg/L	<0.1	<0.1	0.0	No Limit
		EG005C: Molybdenum	7439-98-7	0.1	mg/L	<0.1	<0.1	0.0	No Limit
EA005P: pH by PC Titrator (QC Lot: 4591666)									
ES2232949-001	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	7.90	8.04	1.8	0% - 20%
ES2233009-002	MB02B_0-9	EA005-P: pH Value	----	0.01	pH Unit	6.73	6.10	9.8	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 4591665)									
EW2204279-004	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	1700	1700	0.1	0% - 20%
ES2232949-001	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	52800	52600	0.4	0% - 20%

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EA010P: Conductivity by PC Titrator (QC Lot: 4591665) - continued									
ES2233009-002	MB02B_0-9	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	19	16	16.8	0% - 50%
ED037P: Alkalinity by PC Titrator (QC Lot: 4591668)									
ES2232949-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	134	136	1.9	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	134	136	1.9	0% - 20%
ES2233009-002	MB02B_0-9	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	4	2	53.5	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	4	2	53.5	No Limit
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 4590993)									
ES2233009-002	MB02B_0-9	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	<1	0.0	No Limit
ED045G: Chloride by Discrete Analyser (QC Lot: 4590992)									
ES2233009-002	MB02B_0-9	ED045G: Chloride	16887-00-6	1	mg/L	2	2	0.0	No Limit
EG035C: Leachable Mercury by FIMS (QC Lot: 4590440)									
ES2233009-002	MB02B_0-9	EG035C: Mercury	7439-97-6	0.0001	mg/L	<0.0010	<0.0010	0.0	No Limit
EG050G-W: Hexavalent Chromium - Water Leachable (QC Lot: 4591356)									
ES2233009-002	MB02B_0-9	EG050G-W: Hexavalent Chromium	18540-29-9	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK026SF: Total CN by Segmented Flow Analyser (QC Lot: 4593212)									
ES2233009-002	MB02B_0-9	EK026SF: Total Cyanide	57-12-5	0.004	mg/L	<0.004	<0.004	0.0	No Limit
EK028SF: Weak Acid Dissociable CN by Segmented Flow Analyser (QC Lot: 4593213)									
ES2233009-002	MB02B_0-9	EK028SF: Weak Acid Dissociable Cyanide	----	0.004	mg/L	<0.004	<0.004	0.0	No Limit
EK040P: Fluoride by PC Titrator (QC Lot: 4591669)									
ES2233009-002	MB02B_0-9	EK040P: Fluoride	16984-48-8	0.1	mg/L	0.2	0.2	0.0	No Limit

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 4585113)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	121.1 mg/kg	105	88.0	113
EG005T: Beryllium	7440-41-7	1	mg/kg	<1	0.5 mg/kg	106	70.0	130
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	0.74 mg/kg	110	70.0	130
EG005T: Lead	7439-92-1	5	mg/kg	<5	60.8 mg/kg	105	82.0	119
EG005T: Molybdenum	7439-98-7	2	mg/kg	<2	2.3 mg/kg	119	77.0	119
EG005T: Nickel	7440-02-0	2	mg/kg	<2	15.3 mg/kg	106	80.0	120
EG005T: Selenium	7782-49-2	5	mg/kg	<5	----	----	----	----
EG005T: Silver	7440-22-4	2	mg/kg	<2	2.3 mg/kg	136	42.0	158
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 4588949)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	121.1 mg/kg	91.0	88.0	113
EG005T: Beryllium	7440-41-7	1	mg/kg	<1	0.5 mg/kg	91.3	70.0	130
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	0.74 mg/kg	94.7	70.0	130
EG005T: Lead	7439-92-1	5	mg/kg	<5	60.8 mg/kg	97.8	82.0	119
EG005T: Molybdenum	7439-98-7	2	mg/kg	<2	2.3 mg/kg	108	77.0	119
EG005T: Nickel	7440-02-0	2	mg/kg	<2	15.3 mg/kg	98.0	80.0	120
EG005T: Selenium	7782-49-2	5	mg/kg	<5	----	----	----	----
EG005T: Silver	7440-22-4	2	mg/kg	<2	2.3 mg/kg	111	42.0	158
EA011: Net Acid Generation (QCLot: 4597028)								
EA011: NAG (pH 7.0)	----	----	kg H2SO4/t	----	22.83 kg H2SO4/t	108	70.0	130
EA013: Acid Neutralising Capacity (QCLot: 4597029)								
EA013: ANC as H2SO4	----	----	kg H2SO4 equiv./t	----	49 kg H2SO4 equiv./t	104	82.0	120
ED042T: Total Sulfur by LECO (QCLot: 4599111)								
ED042T: Sulfur - Total as S (LECO)	----	0.01	%	<0.01	0.16 %	102	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4585112)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.087 mg/kg	99.4	70.0	125
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4588950)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.087 mg/kg	80.4	70.0	125
EG048: Hexavalent Chromium (Alkaline Digest) (QCLot: 4584078)								
EG048G: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	20 mg/kg	106	68.0	114
EG048: Hexavalent Chromium (Alkaline Digest) (QCLot: 4587216)								
EG048G: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	20 mg/kg	98.9	68.0	114
EK026SF: Total CN by Segmented Flow Analyser (QCLot: 4585506)								
EK026SF: Total Cyanide	57-12-5	1	mg/kg	<1	40 mg/kg	92.8	81.0	129

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EK028SF: Weak Acid Dissociable CN by Segmented Flow Analyser (QCLot: 4585505)								
EK028SF: Weak Acid Dissociable Cyanide	----	1	mg/kg	<1	40 mg/kg	110	70.0	130
EK040T: Fluoride Total (QCLot: 4589794)								
EK040T: Fluoride	16984-48-8	40	mg/kg	<40	400 mg/kg	82.1	67.2	96.3
EP003: Total Organic Carbon (TOC) in Soil (QCLot: 4599112)								
EP003: Total Organic Carbon	----	0.02	%	<0.02	0.56 %	96.1	80.0	120
				<0.02	27.8 %	99.9	80.0	120
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 4584740)								
EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	1 mg/kg	79.0	62.0	126
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 4585917)								
EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	1 mg/kg	80.1	62.0	126
EP068A: Organochlorine Pesticides (OC) (QCLot: 4584738)								
EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.5 mg/kg	94.6	69.0	113
EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	0.5 mg/kg	96.8	65.0	117
EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	0.5 mg/kg	94.0	67.0	119
EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	0.5 mg/kg	95.2	68.0	116
EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	91.7	65.0	117
EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.5 mg/kg	93.8	67.0	115
EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	0.5 mg/kg	97.9	69.0	115
EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.5 mg/kg	92.4	62.0	118
EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	0.5 mg/kg	89.3	63.0	117
EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	0.5 mg/kg	98.1	66.0	116
EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	0.5 mg/kg	92.3	64.0	116
EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	0.5 mg/kg	94.1	66.0	116
EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	0.5 mg/kg	92.4	67.0	115
EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	0.5 mg/kg	104	67.0	123
EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	0.5 mg/kg	91.4	69.0	115
EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	0.5 mg/kg	88.4	69.0	121
EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	0.5 mg/kg	78.1	56.0	120
EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.5 mg/kg	83.7	62.0	124
EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	0.5 mg/kg	96.2	66.0	120
EP068A: Organochlorine Pesticides (OC) (QCLot: 4585920)								
EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.5 mg/kg	94.8	69.0	113
EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	0.5 mg/kg	96.3	65.0	117
EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	0.5 mg/kg	95.4	67.0	119
EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	0.5 mg/kg	96.0	68.0	116
EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	93.1	65.0	117
EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.5 mg/kg	93.1	67.0	115
EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	0.5 mg/kg	97.3	69.0	115

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP068A: Organochlorine Pesticides (OC) (QCLot: 4585920) - continued								
EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.5 mg/kg	94.6	62.0	118
EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	0.5 mg/kg	90.8	63.0	117
EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	0.5 mg/kg	99.9	66.0	116
EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	0.5 mg/kg	95.4	64.0	116
EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	0.5 mg/kg	98.9	66.0	116
EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	0.5 mg/kg	94.6	67.0	115
EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	0.5 mg/kg	99.0	67.0	123
EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	0.5 mg/kg	93.7	69.0	115
EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	0.5 mg/kg	90.2	69.0	121
EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	0.5 mg/kg	88.8	56.0	120
EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.5 mg/kg	90.2	62.0	124
EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	0.5 mg/kg	89.3	66.0	120
EP068B: Organophosphorus Pesticides (OP) (QCLot: 4584738)								
EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	0.5 mg/kg	96.8	76.0	118
EP068B: Organophosphorus Pesticides (OP) (QCLot: 4585920)								
EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	0.5 mg/kg	99.6	76.0	118
EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup (QCLot: 4584739)								
EP071SG-S: C10 - C14 Fraction	----	50	mg/kg	<50	300 mg/kg	90.8	80.0	116
EP071SG-S: C15 - C28 Fraction	----	100	mg/kg	<100	450 mg/kg	98.3	85.0	115
EP071SG-S: C29 - C36 Fraction	----	100	mg/kg	<100	300 mg/kg	100	75.0	123
EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup (QCLot: 4585918)								
EP071SG-S: C10 - C14 Fraction	----	50	mg/kg	<50	300 mg/kg	98.0	80.0	116
EP071SG-S: C15 - C28 Fraction	----	100	mg/kg	<100	450 mg/kg	104	85.0	115
EP071SG-S: C29 - C36 Fraction	----	100	mg/kg	<100	300 mg/kg	106	75.0	123
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup (QCLot: 4584739)								
EP071SG-S: >C10 - C16 Fraction	----	50	mg/kg	<50	375 mg/kg	96.5	89.0	109
EP071SG-S: >C16 - C34 Fraction	----	100	mg/kg	<100	525 mg/kg	98.3	84.0	112
EP071SG-S: >C34 - C40 Fraction	----	100	mg/kg	<100	225 mg/kg	108	71.0	119
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup (QCLot: 4585918)								
EP071SG-S: >C10 - C16 Fraction	----	50	mg/kg	<50	375 mg/kg	102	89.0	109
EP071SG-S: >C16 - C34 Fraction	----	100	mg/kg	<100	525 mg/kg	100	84.0	112
EP071SG-S: >C34 - C40 Fraction	----	100	mg/kg	<100	225 mg/kg	97.0	71.0	119
EP074A: Monocyclic Aromatic Hydrocarbons (QCLot: 4584521)								
EP074: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	96.4	71.0	121
EP074: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	95.4	65.0	131
EP074: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	95.8	72.0	114
EP074: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	94.6	70.0	116

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP074A: Monocyclic Aromatic Hydrocarbons (QCLot: 4584521) - continued								
EP074: Styrene	100-42-5	0.5	mg/kg	<0.5	1 mg/kg	90.7	67.0	113
EP074: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	92.5	75.0	115
EP074A: Monocyclic Aromatic Hydrocarbons (QCLot: 4585545)								
EP074: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	100	71.0	121
EP074: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	100	65.0	131
EP074: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	100	72.0	114
EP074: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	99.4	70.0	116
EP074: Styrene	100-42-5	0.5	mg/kg	<0.5	1 mg/kg	97.8	67.0	113
EP074: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	101	75.0	115
EP074B: Oxygenated Compounds (QCLot: 4584521)								
EP074: 2-Butanone (MEK)	78-93-3	5	mg/kg	<5	10 mg/kg	92.8	58.0	136
EP074B: Oxygenated Compounds (QCLot: 4585545)								
EP074: 2-Butanone (MEK)	78-93-3	5	mg/kg	<5	10 mg/kg	88.0	58.0	136
EP074E(SIM): Halogenated Aliphatic Compounds (QCLot: 4584523)								
EP074E(SIM): Vinyl chloride	75-01-4	0.2	mg/kg	<0.2	1 mg/kg	94.5	73.0	124
EP074E(SIM): Halogenated Aliphatic Compounds (QCLot: 4585544)								
EP074E(SIM): Vinyl chloride	75-01-4	0.2	mg/kg	<0.2	1 mg/kg	100	73.0	124
EP074E: Halogenated Aliphatic Compounds (QCLot: 4584521)								
EP074: Vinyl chloride	75-01-4	5	mg/kg	<5	10 mg/kg	96.8	43.0	147
EP074: 1.1-Dichloroethene	75-35-4	0.5	mg/kg	<0.5	1 mg/kg	97.4	54.0	126
EP074: Methylene chloride	75-09-2	0.5	mg/kg	<0.5	1 mg/kg	106	58.0	148
EP074: 1.1.1-Trichloroethane	71-55-6	0.5	mg/kg	<0.5	1 mg/kg	95.8	65.0	117
EP074: Carbon Tetrachloride	56-23-5	0.5	mg/kg	<0.5	1 mg/kg	94.2	59.0	125
EP074: 1.2-Dichloroethane	107-06-2	0.5	mg/kg	<0.5	1 mg/kg	103	65.0	125
EP074: Trichloroethene	79-01-6	0.5	mg/kg	<0.5	1 mg/kg	95.6	70.0	118
EP074: 1.1.2-Trichloroethane	79-00-5	0.5	mg/kg	<0.5	1 mg/kg	95.2	64.0	126
EP074: Tetrachloroethene	127-18-4	0.5	mg/kg	<0.5	1 mg/kg	94.2	67.0	143
EP074: 1.1.1.2-Tetrachloroethane	630-20-6	0.5	mg/kg	<0.5	1 mg/kg	96.5	62.0	122
EP074: 1.1.2.2-Tetrachloroethane	79-34-5	0.5	mg/kg	<0.5	1 mg/kg	98.9	65.0	121
EP074E: Halogenated Aliphatic Compounds (QCLot: 4585545)								
EP074: Vinyl chloride	75-01-4	5	mg/kg	<5	10 mg/kg	104	43.0	147
EP074: 1.1-Dichloroethene	75-35-4	0.5	mg/kg	<0.5	1 mg/kg	97.3	54.0	126
EP074: Methylene chloride	75-09-2	0.5	mg/kg	<0.5	1 mg/kg	105	58.0	148
EP074: 1.1.1-Trichloroethane	71-55-6	0.5	mg/kg	<0.5	1 mg/kg	98.0	65.0	117
EP074: Carbon Tetrachloride	56-23-5	0.5	mg/kg	<0.5	1 mg/kg	97.8	59.0	125
EP074: 1.2-Dichloroethane	107-06-2	0.5	mg/kg	<0.5	1 mg/kg	102	65.0	125
EP074: Trichloroethene	79-01-6	0.5	mg/kg	<0.5	1 mg/kg	99.9	70.0	118

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP074E: Halogenated Aliphatic Compounds (QCLot: 4585545) - continued								
EP074: 1.1.2-Trichloroethane	79-00-5	0.5	mg/kg	<0.5	1 mg/kg	101	64.0	126
EP074: Tetrachloroethene	127-18-4	0.5	mg/kg	<0.5	1 mg/kg	99.1	67.0	143
EP074: 1.1.1.2-Tetrachloroethane	630-20-6	0.5	mg/kg	<0.5	1 mg/kg	99.8	62.0	122
EP074: 1.1.2.2-Tetrachloroethane	79-34-5	0.5	mg/kg	<0.5	1 mg/kg	102	65.0	121
EP074F: Halogenated Aromatic Compounds (QCLot: 4584521)								
EP074: Chlorobenzene	108-90-7	0.5	mg/kg	<0.5	1 mg/kg	95.7	68.0	116
EP074F: Halogenated Aromatic Compounds (QCLot: 4585545)								
EP074: Chlorobenzene	108-90-7	0.5	mg/kg	<0.5	1 mg/kg	101	68.0	116
EP074G: Trihalomethanes (QCLot: 4584521)								
EP074: Chloroform	67-66-3	0.5	mg/kg	<0.5	1 mg/kg	99.6	66.0	124
EP074G: Trihalomethanes (QCLot: 4585545)								
EP074: Chloroform	67-66-3	0.5	mg/kg	<0.5	1 mg/kg	102	66.0	124
EP075A: Phenolic Compounds (QCLot: 4584737)								
EP075: Phenol	108-95-2	0.5	mg/kg	<0.5	1.5 mg/kg	92.6	64.0	114
EP075: 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	1.5 mg/kg	88.1	55.0	117
EP075: 3- & 4-Methylphenol	1319-77-3	0.5	mg/kg	<0.5	1.5 mg/kg	81.7	46.0	122
EP075: 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	1.5 mg/kg	76.4	57.0	113
EP075: 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	1.5 mg/kg	70.4	49.0	109
EP075: 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	1.5 mg/kg	74.5	49.0	107
EP075: Pentachlorophenol	87-86-5	1	mg/kg	<1	3 mg/kg	35.4	12.0	76.0
EP075A: Phenolic Compounds (QCLot: 4585919)								
EP075: Phenol	108-95-2	0.5	mg/kg	<0.5	1.5 mg/kg	81.0	64.0	114
EP075: 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	1.5 mg/kg	75.4	55.0	117
EP075: 3- & 4-Methylphenol	1319-77-3	0.5	mg/kg	<0.5	1.5 mg/kg	92.5	46.0	122
EP075: 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	1.5 mg/kg	67.6	57.0	113
EP075: 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	1.5 mg/kg	55.1	49.0	109
EP075: 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	1.5 mg/kg	58.7	49.0	107
EP075: Pentachlorophenol	87-86-5	1	mg/kg	<1	3 mg/kg	18.2	12.0	76.0
EP075B: Polynuclear Aromatic Hydrocarbons (QCLot: 4584737)								
EP075: Naphthalene	91-20-3	0.5	mg/kg	<0.5	1.5 mg/kg	90.2	62.0	118
EP075: Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	1.5 mg/kg	84.4	56.0	114
EP075: Acenaphthene	83-32-9	0.5	mg/kg	<0.5	1.5 mg/kg	84.4	62.0	112
EP075: Fluorene	86-73-7	0.5	mg/kg	<0.5	1.5 mg/kg	88.3	59.0	115
EP075: Phenanthrene	85-01-8	0.5	mg/kg	<0.5	1.5 mg/kg	83.7	63.0	113
EP075: Anthracene	120-12-7	0.5	mg/kg	<0.5	1.5 mg/kg	81.7	57.0	111
EP075: Fluoranthene	206-44-0	0.5	mg/kg	<0.5	1.5 mg/kg	79.5	58.0	114
EP075: Pyrene	129-00-0	0.5	mg/kg	<0.5	1.5 mg/kg	80.2	57.0	117
EP075: Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	1.5 mg/kg	76.2	59.0	115

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP075B: Polynuclear Aromatic Hydrocarbons (QCLot: 4584737) - continued								
EP075: Chrysene	218-01-9	0.5	mg/kg	<0.5	1.5 mg/kg	78.8	61.0	117
EP075: Benzo(b+j) & Benzo(k)fluoranthene	205-99-2 207-08-9	1	mg/kg	<1	3 mg/kg	74.0	57.0	119
EP075: Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	1.5 mg/kg	76.2	56.0	116
EP075: Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	1.5 mg/kg	70.2	55.0	117
EP075: Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	1.5 mg/kg	69.9	53.0	119
EP075: Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	1.5 mg/kg	68.7	56.0	120
EP075B: Polynuclear Aromatic Hydrocarbons (QCLot: 4585919)								
EP075: Naphthalene	91-20-3	0.5	mg/kg	<0.5	1.5 mg/kg	78.2	62.0	118
EP075: Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	1.5 mg/kg	79.4	56.0	114
EP075: Acenaphthene	83-32-9	0.5	mg/kg	<0.5	1.5 mg/kg	78.5	62.0	112
EP075: Fluorene	86-73-7	0.5	mg/kg	<0.5	1.5 mg/kg	74.8	59.0	115
EP075: Phenanthrene	85-01-8	0.5	mg/kg	<0.5	1.5 mg/kg	80.7	63.0	113
EP075: Anthracene	120-12-7	0.5	mg/kg	<0.5	1.5 mg/kg	78.1	57.0	111
EP075: Fluoranthene	206-44-0	0.5	mg/kg	<0.5	1.5 mg/kg	75.5	58.0	114
EP075: Pyrene	129-00-0	0.5	mg/kg	<0.5	1.5 mg/kg	74.0	57.0	117
EP075: Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	1.5 mg/kg	72.5	59.0	115
EP075: Chrysene	218-01-9	0.5	mg/kg	<0.5	1.5 mg/kg	71.9	61.0	117
EP075: Benzo(b+j) & Benzo(k)fluoranthene	205-99-2 207-08-9	1	mg/kg	<1	3 mg/kg	70.9	57.0	119
EP075: Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	1.5 mg/kg	72.4	56.0	116
EP075: Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	1.5 mg/kg	67.8	55.0	117
EP075: Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	1.5 mg/kg	65.4	53.0	119
EP075: Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	1.5 mg/kg	66.8	56.0	120
EP075C: Phthalate Esters (QCLot: 4584737)								
EP075: bis(2-ethylhexyl) phthalate	117-81-7	----	mg/kg	----	1.5 mg/kg	79.9	69.0	133
EP075C: Phthalate Esters (QCLot: 4585919)								
EP075: bis(2-ethylhexyl) phthalate	117-81-7	----	mg/kg	----	1.5 mg/kg	80.1	69.0	133
EP075E: Nitroaromatics and Ketones (QCLot: 4584737)								
EP075: Nitrobenzene	98-95-3	0.5	mg/kg	<0.5	1.5 mg/kg	92.6	65.0	119
EP075: 2.4-Dinitrotoluene	121-14-2	0.5	mg/kg	<0.5	1.5 mg/kg	88.5	59.0	115
EP075: Pentachloronitrobenzene	82-68-8	0.5	mg/kg	<0.5	1.5 mg/kg	90.1	56.0	110
EP075E: Nitroaromatics and Ketones (QCLot: 4585919)								
EP075: Nitrobenzene	98-95-3	0.5	mg/kg	<0.5	1.5 mg/kg	79.3	65.0	119
EP075: 2.4-Dinitrotoluene	121-14-2	0.5	mg/kg	<0.5	1.5 mg/kg	70.7	59.0	115
EP075: Pentachloronitrobenzene	82-68-8	0.5	mg/kg	<0.5	1.5 mg/kg	70.6	56.0	110
EP075G: Chlorinated Hydrocarbons (QCLot: 4584737)								
EP075: 1.4-Dichlorobenzene	106-46-7	0.5	mg/kg	<0.5	1.5 mg/kg	89.2	58.0	116

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP075G: Chlorinated Hydrocarbons (QCLot: 4584737) - continued								
EP075: 1.2-Dichlorobenzene	95-50-1	0.5	mg/kg	<0.5	1.5 mg/kg	89.8	57.0	115
EP075: 1.2.4-Trichlorobenzene	120-82-1	0.5	mg/kg	<0.5	1.5 mg/kg	86.5	62.9	108
EP075: Pentachlorobenzene	608-93-5	0.5	mg/kg	<0.5	1.5 mg/kg	85.7	57.0	109
EP075: 1.2.3.4-Tetrachlorobenzene	634-66-2	0.5	mg/kg	<0.5	----	----	----	----
EP075G: Chlorinated Hydrocarbons (QCLot: 4585919)								
EP075: 1.4-Dichlorobenzene	106-46-7	0.5	mg/kg	<0.5	1.5 mg/kg	78.0	58.0	116
EP075: 1.2-Dichlorobenzene	95-50-1	0.5	mg/kg	<0.5	1.5 mg/kg	83.7	57.0	115
EP075: 1.2.4-Trichlorobenzene	120-82-1	0.5	mg/kg	<0.5	1.5 mg/kg	81.6	62.9	108
EP075: Pentachlorobenzene	608-93-5	0.5	mg/kg	<0.5	1.5 mg/kg	78.4	57.0	109
EP075: 1.2.3.4-Tetrachlorobenzene	634-66-2	0.5	mg/kg	<0.5	----	----	----	----
EP075K: Miscellaneous Compounds (QCLot: 4584737)								
EP075: 1.2.4.5-Tetrachlorobenzene	95-94-3	0.5	mg/kg	<0.5	1.5 mg/kg	79.2	54.0	120
EP075: 2.3.4.6-Tetrachlorophenol	58-90-2	0.5	mg/kg	<0.5	----	----	----	----
EP075: Isodrin	465-73-6	0.5	mg/kg	<0.5	----	----	----	----
EP075: Di (2-ethylhexyl) adipate	103-23-1	0.5	mg/kg	<0.5	----	----	----	----
EP075K: Miscellaneous Compounds (QCLot: 4585919)								
EP075: 1.2.4.5-Tetrachlorobenzene	95-94-3	0.5	mg/kg	<0.5	1.5 mg/kg	79.4	54.0	120
EP075: 2.3.4.6-Tetrachlorophenol	58-90-2	0.5	mg/kg	<0.5	----	----	----	----
EP075: Isodrin	465-73-6	0.5	mg/kg	<0.5	----	----	----	----
EP075: Di (2-ethylhexyl) adipate	103-23-1	0.5	mg/kg	<0.5	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4584522)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	86.4	68.4	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4585543)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	79.1	68.4	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4584522)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	90.1	68.4	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4585543)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	81.3	68.4	128
EP132A: Phenolic Compounds (QCLot: 4585925)								
EP132: Hexachlorophene	70-30-4	10	µg/kg	<10	100 µg/kg	48.2	15.6	94.0
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QCLot: 4586607)								
EP202: 2.4-D	94-75-7	0.02	mg/kg	<0.02	0.1 mg/kg	95.7	68.5	131
EP202: Triclopyr	55335-06-3	0.02	mg/kg	<0.02	0.1 mg/kg	94.8	50.8	141
EP202: 2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg	<0.02	0.1 mg/kg	82.6	40.8	126
EP202: 2.4.5-T	93-76-5	0.02	mg/kg	<0.02	0.1 mg/kg	93.9	57.4	139
EP202: Picloram	1918-02-1	0.02	mg/kg	<0.02	0.1 mg/kg	76.7	48.7	129
EP202: Fluroxypyr	69377-81-7	0.02	mg/kg	<0.02	0.1 mg/kg	99.8	53.2	128

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EG005(ED093)C: Leachable Metals by ICPAES (QCLot: 4590347)								
EG005C: Aluminium	7429-90-5	0.1	mg/L	<0.1	0.5 mg/L	101	80.0	122
EG005C: Antimony	7440-36-0	0.1	mg/L	<0.1	0.02 mg/L	130	70.0	130
EG005C: Arsenic	7440-38-2	0.1	mg/L	<0.1	0.1 mg/L	98.8	80.0	124
EG005C: Beryllium	7440-41-7	0.05	mg/L	<0.05	0.1 mg/L	104	87.0	117
EG005C: Boron	7440-42-8	0.1	mg/L	<0.1	0.5 mg/L	101	80.0	130
EG005C: Cadmium	7440-43-9	0.05	mg/L	<0.05	0.1 mg/L	98.8	80.0	118
EG005C: Chromium	7440-47-3	0.1	mg/L	<0.1	0.1 mg/L	98.7	88.0	114
EG005C: Iron	7439-89-6	0.1	mg/L	<0.1	0.5 mg/L	103	83.0	123
EG005C: Lead	7439-92-1	0.1	mg/L	<0.1	0.1 mg/L	95.2	80.0	118
EG005C: Manganese	7439-96-5	0.1	mg/L	<0.1	0.1 mg/L	98.2	81.0	111
EG005C: Nickel	7440-02-0	0.1	mg/L	<0.1	0.1 mg/L	96.6	83.0	115
EG005C: Selenium	7782-49-2	0.05	mg/L	<0.05	0.1 mg/L	101	77.0	125
EG005C: Silver	7440-22-4	0.1	mg/L	<0.1	----	----	----	----
EG005C: Molybdenum	7439-98-7	0.1	mg/L	<0.1	0.1 mg/L	110	86.0	122
EA005P: pH by PC Titrator (QCLot: 4591666)								
EA005-P: pH Value	----	----	pH Unit	----	4 pH Unit	99.5	98.8	101
				----	7 pH Unit	99.7	99.2	101
EA010P: Conductivity by PC Titrator (QCLot: 4591665)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	220 µS/cm	95.4	89.9	110
				<1	2100 µS/cm	99.8	90.2	111
ED037P: Alkalinity by PC Titrator (QCLot: 4591668)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	102	81.0	111
				----	50 mg/L	107	80.0	120
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 4590993)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	97.6	82.0	122
				<1	500 mg/L	94.0	82.0	122
ED045G: Chloride by Discrete Analyser (QCLot: 4590992)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	50 mg/L	104	80.9	127
				<1	1000 mg/L	99.5	80.9	127
EG035C: Leachable Mercury by FIMS (QCLot: 4590440)								
EG035C: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	92.1	79.0	109
EG050G-W: Hexavalent Chromium - Water Leachable (QCLot: 4591356)								
EG050G-W: Hexavalent Chromium	18540-29-9	0.01	mg/L	<0.01	0.05 mg/L	106	70.0	130
EK026SF: Total CN by Segmented Flow Analyser (QCLot: 4593212)								
EK026SF: Total Cyanide	57-12-5	0.004	mg/L	<0.004	0.2 mg/L	110	73.0	133
EK028SF: Weak Acid Dissociable CN by Segmented Flow Analyser (QCLot: 4593213)								
EK028SF: Weak Acid Dissociable Cyanide	----	0.004	mg/L	<0.004	0.2 mg/L	115	93.0	127

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EK040P: Fluoride by PC Titrator (QCLot: 4591669)								
EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	5 mg/L	110	82.0	116
EP068A: Organochlorine Pesticides (OC) (QCLot: 4590453)								
EP068: alpha-BHC	319-84-6	0.5	µg/L	<0.5	5 µg/L	83.0	64.9	107
EP068: Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L	<0.5	5 µg/L	79.0	58.3	111
EP068: beta-BHC	319-85-7	0.5	µg/L	<0.5	5 µg/L	85.8	69.0	117
EP068: gamma-BHC	58-89-9	0.5	µg/L	<0.5	5 µg/L	82.2	70.0	112
EP068: delta-BHC	319-86-8	0.5	µg/L	<0.5	5 µg/L	86.3	68.9	110
EP068: Heptachlor	76-44-8	0.5	µg/L	<0.5	5 µg/L	81.9	65.2	108
EP068: Aldrin	309-00-2	0.5	µg/L	<0.5	5 µg/L	81.9	65.8	109
EP068: Heptachlor epoxide	1024-57-3	0.5	µg/L	<0.5	5 µg/L	84.8	67.1	107
EP068: trans-Chlordane	5103-74-2	0.5	µg/L	<0.5	5 µg/L	78.8	64.1	110
EP068: alpha-Endosulfan	959-98-8	0.5	µg/L	<0.5	5 µg/L	77.3	66.7	112
EP068: cis-Chlordane	5103-71-9	0.5	µg/L	<0.5	5 µg/L	81.4	63.2	111
EP068: Dieldrin	60-57-1	0.5	µg/L	<0.5	5 µg/L	83.2	65.2	113
EP068: 4.4`-DDE	72-55-9	0.5	µg/L	<0.5	5 µg/L	81.0	66.0	112
EP068: Endrin	72-20-8	0.5	µg/L	<0.5	5 µg/L	84.7	65.2	113
EP068: beta-Endosulfan	33213-65-9	0.5	µg/L	<0.5	5 µg/L	86.0	67.3	114
EP068: 4.4`-DDD	72-54-8	0.5	µg/L	<0.5	5 µg/L	82.5	72.0	122
EP068: Endrin aldehyde	7421-93-4	0.5	µg/L	<0.5	5 µg/L	84.1	66.9	109
EP068: Endosulfan sulfate	1031-07-8	0.5	µg/L	<0.5	5 µg/L	100	65.2	112
EP068: 4.4`-DDT	50-29-3	2	µg/L	<2.0	5 µg/L	98.4	65.2	112
EP068: Endrin ketone	53494-70-5	0.5	µg/L	<0.5	5 µg/L	104	63.8	110
EP068: Methoxychlor	72-43-5	2	µg/L	<2.0	5 µg/L	101	61.1	114
EP068B: Organophosphorus Pesticides (OP) (QCLot: 4590453)								
EP068: Dichlorvos	62-73-7	0.5	µg/L	<0.5	5 µg/L	92.1	65.6	114
EP068: Demeton-S-methyl	919-86-8	0.5	µg/L	<0.5	5 µg/L	74.7	63.7	113
EP068: Monocrotophos	6923-22-4	2	µg/L	<2.0	5 µg/L	23.5	19.7	48.0
EP068: Dimethoate	60-51-5	0.5	µg/L	<0.5	5 µg/L	80.8	69.5	110
EP068: Diazinon	333-41-5	0.5	µg/L	<0.5	5 µg/L	85.0	71.1	110
EP068: Chlorpyrifos-methyl	5598-13-0	0.5	µg/L	<0.5	5 µg/L	82.9	77.0	119
EP068: Parathion-methyl	298-00-0	2	µg/L	<2.0	5 µg/L	84.4	70.0	124
EP068: Malathion	121-75-5	0.5	µg/L	<0.5	5 µg/L	86.3	68.4	116
EP068: Fenthion	55-38-9	0.5	µg/L	<0.5	5 µg/L	81.4	68.6	112
EP068: Chlorpyrifos	2921-88-2	0.5	µg/L	<0.5	5 µg/L	84.9	75.0	119
EP068: Parathion	56-38-2	2	µg/L	<2.0	5 µg/L	83.1	67.0	121
EP068: Pirimphos-ethyl	23505-41-1	0.5	µg/L	<0.5	5 µg/L	83.4	69.0	121
EP068: Chlorfenvinphos	470-90-6	0.5	µg/L	<0.5	5 µg/L	85.9	71.8	110
EP068: Bromophos-ethyl	4824-78-6	0.5	µg/L	<0.5	5 µg/L	78.0	67.5	112
EP068: Fenamiphos	22224-92-6	0.5	µg/L	<0.5	5 µg/L	106	64.1	116

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP068B: Organophosphorus Pesticides (OP) (QCLot: 4590453) - continued								
EP068: Prothiofos	34643-46-4	0.5	µg/L	<0.5	5 µg/L	81.1	67.8	114
EP068: Ethion	563-12-2	0.5	µg/L	<0.5	5 µg/L	83.3	74.0	120
EP068: Carbophenothion	786-19-6	0.5	µg/L	<0.5	5 µg/L	106	66.2	114
EP068: Azinphos Methyl	86-50-0	0.5	µg/L	<0.5	5 µg/L	54.3	51.6	128
EP068C: Triazines (QCLot: 4590453)								
EP068: Atrazine	1912-24-9	0.5	µg/L	<0.5	5 µg/L	91.7	69.3	113
EP068: Simazine	122-34-9	0.5	µg/L	<0.5	5 µg/L	84.8	62.6	118
EP068D: Pyrethroids (QCLot: 4590453)								
EP068: Cypermethrins	----	2	µg/L	<2.0	5 µg/L	86.2	64.2	113
EP074A: Monocyclic Aromatic Hydrocarbons (QCLot: 4593223)								
EP074: Benzene	71-43-2	1	µg/L	<1	10 µg/L	102	77.0	119
EP074: Toluene	108-88-3	2	µg/L	<2	10 µg/L	105	69.0	129
EP074: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	110	76.0	118
EP074: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	20 µg/L	108	77.0	119
EP074: Styrene	100-42-5	5	µg/L	<5	10 µg/L	105	73.0	119
EP074: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	108	79.0	117
EP074: Isopropylbenzene	98-82-8	5	µg/L	<5	10 µg/L	104	76.0	118
EP074: n-Propylbenzene	103-65-1	5	µg/L	<5	10 µg/L	101	69.0	119
EP074: 1.3.5-Trimethylbenzene	108-67-8	5	µg/L	<5	10 µg/L	101	74.0	116
EP074: sec-Butylbenzene	135-98-8	5	µg/L	<5	10 µg/L	103	73.0	119
EP074: 1.2.4-Trimethylbenzene	95-63-6	5	µg/L	<5	10 µg/L	103	74.0	116
EP074: tert-Butylbenzene	98-06-6	5	µg/L	<5	10 µg/L	101	72.0	116
EP074: p-Isopropyltoluene	99-87-6	5	µg/L	<5	10 µg/L	100	71.0	119
EP074: n-Butylbenzene	104-51-8	5	µg/L	<5	10 µg/L	102	65.0	123
EP074B: Oxygenated Compounds (QCLot: 4593223)								
EP074: 2-Propanone (Acetone)	67-64-1	50	µg/L	<50	100 µg/L	71.8	64.7	137
EP074: Vinyl Acetate	108-05-4	50	µg/L	<50	100 µg/L	105	61.4	134
EP074: 2-Butanone (MEK)	78-93-3	50	µg/L	<50	100 µg/L	93.7	73.6	130
EP074: 4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L	<50	100 µg/L	104	66.0	132
EP074: 2-Hexanone (MBK)	591-78-6	50	µg/L	<50	100 µg/L	105	65.0	137
EP074C: Sulfonated Compounds (QCLot: 4593223)								
EP074: Carbon disulfide	75-15-0	5	µg/L	<5	10 µg/L	77.0	72.8	127
EP074D: Fumigants (QCLot: 4593223)								
EP074: 2.2-Dichloropropane	594-20-7	5	µg/L	<5	10 µg/L	103	68.0	122
EP074: 1.2-Dichloropropane	78-87-5	5	µg/L	<5	10 µg/L	98.3	76.0	118
EP074: cis-1.3-Dichloropropylene	10061-01-5	5	µg/L	<5	10 µg/L	96.7	62.0	120
EP074: trans-1.3-Dichloropropylene	10061-02-6	5	µg/L	<5	10 µg/L	98.0	60.0	114

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP074D: Fumigants (QCLot: 4593223) - continued								
EP074: 1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	10 µg/L	107	69.0	117
EP074E: Halogenated Aliphatic Compounds (QCLot: 4593223)								
EP074: Dichlorodifluoromethane	75-71-8	50	µg/L	<50	100 µg/L	78.8	60.6	138
EP074: Chloromethane	74-87-3	50	µg/L	<50	100 µg/L	91.2	67.4	130
EP074: Vinyl chloride	75-01-4	50	µg/L	<50	100 µg/L	99.0	69.4	129
EP074: Bromomethane	74-83-9	50	µg/L	<50	100 µg/L	98.1	56.0	140
EP074: Chloroethane	75-00-3	50	µg/L	<50	100 µg/L	98.3	61.0	139
EP074: Trichlorofluoromethane	75-69-4	50	µg/L	<50	100 µg/L	76.8	69.0	131
EP074: 1.1-Dichloroethene	75-35-4	5	µg/L	<5	10 µg/L	89.4	70.0	124
EP074: Iodomethane	74-88-4	5	µg/L	<5	10 µg/L	78.5	70.2	128
EP074: Methylene chloride	75-09-2	5	µg/L	<5	10 µg/L	69.5	69.3	133
EP074: trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	10 µg/L	102	74.0	118
EP074: 1.1-Dichloroethane	75-34-3	5	µg/L	<5	10 µg/L	102	74.0	120
EP074: cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	10 µg/L	103	77.0	119
EP074: 1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	10 µg/L	103	67.0	119
EP074: 1.1-Dichloropropylene	563-58-6	5	µg/L	<5	10 µg/L	104	73.0	119
EP074: Carbon Tetrachloride	56-23-5	5	µg/L	<5	10 µg/L	104	62.0	120
EP074: 1.2-Dichloroethane	107-06-2	5	µg/L	<5	10 µg/L	101	73.0	123
EP074: Trichloroethene	79-01-6	5	µg/L	<5	10 µg/L	104	76.0	118
EP074: Dibromomethane	74-95-3	5	µg/L	<5	10 µg/L	100	73.0	119
EP074: 1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	10 µg/L	109	72.0	126
EP074: 1.3-Dichloropropane	142-28-9	5	µg/L	<5	10 µg/L	108	71.0	129
EP074: Tetrachloroethene	127-18-4	5	µg/L	<5	10 µg/L	98.0	72.0	124
EP074: 1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	10 µg/L	104	66.0	114
EP074: trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	10 µg/L	95.6	60.0	120
EP074: cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	10 µg/L	92.6	70.6	128
EP074: 1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	10 µg/L	113	70.0	124
EP074: 1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	10 µg/L	98.6	74.0	126
EP074: Pentachloroethane	76-01-7	5	µg/L	<5	10 µg/L	125	71.8	126
EP074: 1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	10 µg/L	94.3	66.4	136
EP074: Hexachlorobutadiene	87-68-3	5	µg/L	<5	10 µg/L	95.2	58.0	130
EP074F: Halogenated Aromatic Compounds (QCLot: 4593223)								
EP074: Chlorobenzene	108-90-7	5	µg/L	<5	10 µg/L	104	79.0	117
EP074: Bromobenzene	108-86-1	5	µg/L	<5	10 µg/L	102	76.0	116
EP074: 2-Chlorotoluene	95-49-8	5	µg/L	<5	10 µg/L	114	73.0	119
EP074: 4-Chlorotoluene	106-43-4	5	µg/L	<5	10 µg/L	104	73.0	119
EP074: 1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	10 µg/L	100	75.0	117
EP074: 1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	10 µg/L	99.1	74.0	118
EP074: 1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	10 µg/L	102	75.0	117

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP074F: Halogenated Aromatic Compounds (QCLot: 4593223) - continued								
EP074: 1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	10 µg/L	94.0	61.0	125
EP074: 1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	10 µg/L	99.8	67.0	123
EP074G: Trihalomethanes (QCLot: 4593223)								
EP074: Chloroform	67-66-3	5	µg/L	<5	10 µg/L	104	72.0	120
EP074: Bromodichloromethane	75-27-4	5	µg/L	<5	10 µg/L	98.4	64.0	118
EP074: Dibromochloromethane	124-48-1	5	µg/L	<5	10 µg/L	96.2	65.0	115
EP074: Bromoform	75-25-2	5	µg/L	<5	10 µg/L	94.3	73.5	126
EP074H: Naphthalene (QCLot: 4593223)								
EP074: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	107	72.0	122
EP075A: Phenolic Compounds (QCLot: 4590454)								
EP075: Phenol	108-95-2	2	µg/L	<2	10 µg/L	39.9	25.5	64.1
EP075: 2-Chlorophenol	95-57-8	2	µg/L	<2	10 µg/L	68.9	52.0	88.0
EP075: 2-Methylphenol	95-48-7	2	µg/L	<2	10 µg/L	68.6	50.0	94.0
EP075: 3- & 4-Methylphenol	1319-77-3	2	µg/L	<2	10 µg/L	67.1	45.0	96.2
EP075: 2-Nitrophenol	88-75-5	2	µg/L	<2	10 µg/L	82.7	48.0	98.0
EP075: 2.4-Dimethylphenol	105-67-9	2	µg/L	<2	10 µg/L	90.1	50.0	94.0
EP075: 2.4-Dichlorophenol	120-83-2	2	µg/L	<2	10 µg/L	89.3	61.9	109
EP075: 2.6-Dichlorophenol	87-65-0	2	µg/L	<2	10 µg/L	86.1	61.5	108
EP075: 4-Chloro-3-methylphenol	59-50-7	2	µg/L	<2	10 µg/L	96.9	61.4	107
EP075: 2.4.6-Trichlorophenol	88-06-2	2	µg/L	<2	10 µg/L	102	57.6	112
EP075: 2.4.5-Trichlorophenol	95-95-4	2	µg/L	<2	10 µg/L	104	58.0	110
EP075: Pentachlorophenol	87-86-5	4	µg/L	<4	20 µg/L	91.1	12.8	95.0
EP075B: Polynuclear Aromatic Hydrocarbons (QCLot: 4590454)								
EP075: Naphthalene	91-20-3	2	µg/L	<2	10 µg/L	76.7	51.0	95.0
EP075: 2-Methylnaphthalene	91-57-6	2	µg/L	<2	10 µg/L	82.8	59.0	108
EP075: 2-Chloronaphthalene	91-58-7	2	µg/L	<2	10 µg/L	84.4	60.6	106
EP075: Acenaphthylene	208-96-8	2	µg/L	<2	10 µg/L	98.4	64.0	108
EP075: Acenaphthene	83-32-9	2	µg/L	<2	10 µg/L	83.3	65.0	108
EP075: Fluorene	86-73-7	2	µg/L	<2	10 µg/L	86.6	65.2	107
EP075: Phenanthrene	85-01-8	2	µg/L	<2	10 µg/L	92.7	66.7	108
EP075: Anthracene	120-12-7	2	µg/L	<2	10 µg/L	92.9	65.8	108
EP075: Fluoranthene	206-44-0	2	µg/L	<2	10 µg/L	95.9	64.9	109
EP075: Pyrene	129-00-0	2	µg/L	<2	10 µg/L	96.8	60.1	111
EP075: N-2-Fluorenyl Acetamide	53-96-3	2	µg/L	<2	10 µg/L	# 111	59.7	110
EP075: Benz(a)anthracene	56-55-3	2	µg/L	<2	10 µg/L	106	62.2	112
EP075: Chrysene	218-01-9	2	µg/L	<2	10 µg/L	102	59.3	114
EP075: Benzo(b+j) & Benzo(k)fluoranthene	205-99-2 207-08-9	4	µg/L	<4	20 µg/L	100	60.1	111

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP075B: Polynuclear Aromatic Hydrocarbons (QCLot: 4590454) - continued								
EP075: 7.12-Dimethylbenz(a)anthracene	57-97-6	2	µg/L	<2	10 µg/L	# 125	50.0	108
EP075: Benzo(a)pyrene	50-32-8	2	µg/L	<2	10 µg/L	102	59.2	112
EP075: 3-Methylcholanthrene	56-49-5	2	µg/L	<2	10 µg/L	103	60.1	110
EP075: Indeno(1.2.3.cd)pyrene	193-39-5	2	µg/L	<2	10 µg/L	101	59.6	110
EP075: Dibenz(a.h)anthracene	53-70-3	2	µg/L	<2	10 µg/L	102	57.2	109
EP075: Benzo(g.h.i)perylene	191-24-2	2	µg/L	<2	10 µg/L	99.3	60.6	110
EP075: Benzo(a)pyrene TEQ (zero)	----	2	µg/L	<2	----	----	----	----
EP075C: Phthalate Esters (QCLot: 4590454)								
EP075: Dimethyl phthalate	131-11-3	2	µg/L	<2	10 µg/L	108	64.3	112
EP075: Diethyl phthalate	84-66-2	2	µg/L	<2	10 µg/L	95.7	67.3	111
EP075: Di-n-butyl phthalate	84-74-2	2	µg/L	<2	10 µg/L	104	68.4	122
EP075: Butyl benzyl phthalate	85-68-7	2	µg/L	<2	10 µg/L	100	61.2	114
EP075: bis(2-ethylhexyl) phthalate	117-81-7	----	µg/L	----	10 µg/L	104	60.0	132
EP075: Di-n-octylphthalate	117-84-0	2	µg/L	<2	10 µg/L	96.7	62.1	115
EP075D: Nitrosamines (QCLot: 4590454)								
EP075: N-Nitrosomethylethylamine	10595-95-6	2	µg/L	<2	10 µg/L	56.9	46.0	110
EP075: N-Nitrosodiethylamine	55-18-5	2	µg/L	<2	10 µg/L	69.4	60.6	113
EP075: N-Nitrosopyrrolidine	930-55-2	4	µg/L	<4	10 µg/L	76.7	45.0	91.0
EP075: N-Nitrosomorpholine	59-89-2	2	µg/L	<2	10 µg/L	78.8	42.0	100
EP075: N-Nitrosodi-n-propylamine	621-64-7	2	µg/L	<2	10 µg/L	89.4	63.5	108
EP075: N-Nitrosopiperidine	100-75-4	2	µg/L	<2	10 µg/L	85.8	61.7	107
EP075: N-Nitrosodibutylamine	924-16-3	2	µg/L	<2	10 µg/L	89.0	62.5	108
EP075: N-Nitrosodiphenyl & Diphenylamine	86-30-6 122-39-4	4	µg/L	<4	20 µg/L	89.7	64.6	112
EP075: Methapyrilene	91-80-5	2	µg/L	<2	10 µg/L	33.9	23.3	125
EP075E: Nitroaromatics and Ketones (QCLot: 4590454)								
EP075: 2-Picoline	109-06-8	2	µg/L	<2	10 µg/L	46.8	41.0	109
EP075: Acetophenone	98-86-2	2	µg/L	<2	10 µg/L	84.2	68.3	112
EP075: Nitrobenzene	98-95-3	2	µg/L	<2	10 µg/L	82.1	68.3	112
EP075: Isophorone	78-59-1	2	µg/L	<2	10 µg/L	92.9	67.6	111
EP075: 2.6-Dinitrotoluene	606-20-2	4	µg/L	<4	10 µg/L	104	64.4	113
EP075: 2.4-Dinitrotoluene	121-14-2	4	µg/L	<4	10 µg/L	89.9	59.5	109
EP075: 1-Naphthylamine	134-32-7	2	µg/L	<2	10 µg/L	82.8	46.8	102
EP075: 4-Nitroquinoline-N-oxide	56-57-5	2	µg/L	<2	10 µg/L	91.0	40.0	96.0
EP075: 5-Nitro-o-toluidine	99-55-8	2	µg/L	<2	10 µg/L	87.4	58.3	106
EP075: Azobenzene	103-33-3	2	µg/L	<2	10 µg/L	88.5	66.0	112
EP075: 1.3.5-Trinitrobenzene	99-35-4	2	µg/L	<2	10 µg/L	93.1	46.0	108
EP075: Phenacetin	62-44-2	2	µg/L	<2	10 µg/L	91.5	57.8	101

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP075E: Nitroaromatics and Ketones (QCLot: 4590454) - continued								
EP075: 4-Aminobiphenyl	92-67-1	2	µg/L	<2	10 µg/L	75.4	60.1	112
EP075: Pentachloronitrobenzene	82-68-8	2	µg/L	<2	10 µg/L	104	59.0	109
EP075: Pronamide	23950-58-5	2	µg/L	<2	10 µg/L	95.4	62.7	109
EP075: Dimethylaminoazobenzene	60-11-7	2	µg/L	<2	10 µg/L	94.9	59.4	108
EP075: Chlorobenzilate	510-15-6	2	µg/L	<2	10 µg/L	102	57.7	110
EP075F: Haloethers (QCLot: 4590454)								
EP075: Bis(2-chloroethyl) ether	111-44-4	2	µg/L	<2	10 µg/L	75.2	69.1	112
EP075: Bis(2-chloroethoxy) methane	111-91-1	2	µg/L	<2	10 µg/L	84.2	66.2	111
EP075: 4-Chlorophenyl phenyl ether	7005-72-3	2	µg/L	<2	10 µg/L	90.2	64.7	109
EP075: 4-Bromophenyl phenyl ether	101-55-3	2	µg/L	<2	10 µg/L	93.3	61.6	108
EP075G: Chlorinated Hydrocarbons (QCLot: 4590454)								
EP075: 1.4-Dichlorobenzene	106-46-7	2	µg/L	<2	10 µg/L	70.0	41.0	97.0
EP075: 1.3-Dichlorobenzene	541-73-1	2	µg/L	<2	10 µg/L	70.2	40.0	96.0
EP075: 1.2-Dichlorobenzene	95-50-1	2	µg/L	<2	10 µg/L	72.3	41.0	95.0
EP075: Hexachloroethane	67-72-1	2	µg/L	<2	10 µg/L	79.8	46.0	88.0
EP075: 1.2.4-Trichlorobenzene	120-82-1	2	µg/L	<2	10 µg/L	77.3	46.0	96.0
EP075: Hexachloropropylene	1888-71-7	2	µg/L	<2	10 µg/L	82.2	34.0	96.0
EP075: Hexachlorobutadiene	87-68-3	2	µg/L	<2	10 µg/L	85.0	37.4	100
EP075: Hexachlorocyclopentadiene	77-47-4	10	µg/L	<10	10 µg/L	80.9	23.5	107
EP075: Pentachlorobenzene	608-93-5	2	µg/L	<2	10 µg/L	86.2	64.5	107
EP075: Hexachlorobenzene (HCB)	118-74-1	4	µg/L	<4	10 µg/L	95.0	65.7	110
EP075H: Anilines and Benzidines (QCLot: 4590454)								
EP075: Aniline	62-53-3	2	µg/L	<2	10 µg/L	63.3	50.0	104
EP075: 4-Chloroaniline	106-47-8	2	µg/L	<2	10 µg/L	79.3	42.0	106
EP075: 2-Nitroaniline	88-74-4	4	µg/L	<4	10 µg/L	99.0	60.9	110
EP075: 3-Nitroaniline	99-09-2	4	µg/L	<4	10 µg/L	80.2	51.5	96.9
EP075: Dibenzofuran	132-64-9	2	µg/L	<2	10 µg/L	84.0	65.3	108
EP075: 4-Nitroaniline	100-01-6	2	µg/L	<2	10 µg/L	82.4	48.9	99.5
EP075: Carbazole	86-74-8	2	µg/L	<2	10 µg/L	93.5	64.3	107
EP075: 3.3`-Dichlorobenzidine	91-94-1	2	µg/L	<2	10 µg/L	111	60.3	119
EP075I: Organochlorine Pesticides (QCLot: 4590454)								
EP075: alpha-BHC	319-84-6	2	µg/L	<2	10 µg/L	100	64.3	110
EP075: beta-BHC	319-85-7	2	µg/L	<2	10 µg/L	89.9	53.0	107
EP075: gamma-BHC	58-89-9	2	µg/L	<2	10 µg/L	95.5	51.0	111
EP075: delta-BHC	319-86-8	2	µg/L	<2	10 µg/L	102	57.0	111
EP075: Heptachlor	76-44-8	2	µg/L	<2	10 µg/L	96.0	57.9	108
EP075: Aldrin	309-00-2	2	µg/L	<2	10 µg/L	102	56.0	112
EP075: Heptachlor epoxide	1024-57-3	2	µg/L	<2	10 µg/L	99.2	50.0	118

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP075I: Organochlorine Pesticides (QCLot: 4590454) - continued								
EP075: alpha-Endosulfan	959-98-8	2	µg/L	<2	10 µg/L	109	59.0	111
EP075: 4.4`-DDE	72-55-9	2	µg/L	<2	10 µg/L	107	53.0	115
EP075: Dieldrin	60-57-1	2	µg/L	<2	10 µg/L	107	59.0	115
EP075: Endrin	72-20-8	2	µg/L	<2	10 µg/L	103	58.0	114
EP075: beta-Endosulfan	33213-65-9	2	µg/L	<2	10 µg/L	101	54.0	116
EP075: 4.4`-DDD	72-54-8	2	µg/L	<2	10 µg/L	103	55.0	115
EP075: Endosulfan sulfate	1031-07-8	2	µg/L	<2	10 µg/L	110	52.8	114
EP075: 4.4`-DDT	50-29-3	4	µg/L	<4	10 µg/L	101	56.0	114
EP075: Sum of Aldrin + Dieldrin	309-00-2/60-57-1	4	µg/L	<4	----	----	----	----
EP075: Sum of DDD + DDE + DDT	72-54-8/72-5 5-9/50-2	4	µg/L	<4	----	----	----	----
EP075J: Organophosphorus Pesticides (QCLot: 4590454)								
EP075: Dichlorvos	62-73-7	2	µg/L	<2	10 µg/L	109	51.0	113
EP075: Dimethoate	60-51-5	2	µg/L	<2	10 µg/L	89.7	43.0	109
EP075: Diazinon	333-41-5	2	µg/L	<2	10 µg/L	100.0	49.0	113
EP075: Chlorpyrifos-methyl	5598-13-0	2	µg/L	<2	10 µg/L	102	54.1	116
EP075: Malathion	121-75-5	2	µg/L	<2	10 µg/L	110	54.0	124
EP075: Fenthion	55-38-9	2	µg/L	<2	10 µg/L	105	57.0	115
EP075: Chlorpyrifos	2921-88-2	2	µg/L	<2	10 µg/L	99.1	53.0	109
EP075: Pirimphos-ethyl	23505-41-1	2	µg/L	<2	10 µg/L	102	55.0	111
EP075: Chlorfenvinphos	470-90-6	2	µg/L	<2	10 µg/L	99.6	50.0	116
EP075: Prothiofos	34643-46-4	2	µg/L	<2	10 µg/L	97.4	54.0	118
EP075: Ethion	563-12-2	2	µg/L	<2	10 µg/L	104	51.0	117
EP075K: Miscellaneous Compounds (QCLot: 4590454)								
EP075: 1.3.5-Trichlorobenzene	108-70-3	2	µg/L	<2	10 µg/L	71.9	40.9	110
EP075: 1.2.4.5-Tetrachlorobenzene	95-94-3	2	µg/L	<2	10 µg/L	80.3	52.5	109
EP075: Methanesulfonate methyl	66-27-3	2	µg/L	<2	10 µg/L	63.3	41.0	115
EP075: cis-Isosafrole	17627-76-8	2	µg/L	<2	10 µg/L	87.4	61.7	106
EP075: trans-Isosafrole	4043-71-4	2	µg/L	<2	10 µg/L	95.4	57.3	114
EP075: Safrole	94-59-7	2	µg/L	<2	10 µg/L	108	64.5	110
EP075: Diallate	2303-16-4	2	µg/L	<2	10 µg/L	84.4	53.0	111
EP075: 2.3.4.6-Tetrachlorophenol	58-90-2	2	µg/L	<2	10 µg/L	95.1	50.0	110

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

Matrix Spike (MS) Report

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 4585113)							
ES2232912-003	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	99.7	70.0	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	101	70.0	130
		EG005T: Lead	7439-92-1	250 mg/kg	101	70.0	130
		EG005T: Nickel	7440-02-0	50 mg/kg	100	70.0	130
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 4588949)							
ES2233009-007	MB02B_178-187	EG005T: Arsenic	7440-38-2	50 mg/kg	99.8	70.0	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	107	70.0	130
		EG005T: Lead	7439-92-1	250 mg/kg	98.6	70.0	130
		EG005T: Nickel	7440-02-0	50 mg/kg	95.7	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4585112)							
ES2232912-003	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	94.5	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4588950)							
ES2233009-007	MB02B_178-187	EG035T: Mercury	7439-97-6	5 mg/kg	97.6	70.0	130
EG048: Hexavalent Chromium (Alkaline Digest) (QCLot: 4584078)							
ES2232708-001	Anonymous	EG048G: Hexavalent Chromium	18540-29-9	20 mg/kg	# 0.6	70.0	130
ES2232708-001	Anonymous	EG048G: Hexavalent Chromium	18540-29-9	20 mg/kg	# 6.6	70.0	130
EG048: Hexavalent Chromium (Alkaline Digest) (QCLot: 4587216)							
ES2233009-007	MB02B_178-187	EG048G: Hexavalent Chromium	18540-29-9	20 mg/kg	97.6	70.0	130
ES2233009-007	MB02B_178-187	EG048G: Hexavalent Chromium	18540-29-9	20 mg/kg	# 68.0	70.0	130
EK026SF: Total CN by Segmented Flow Analyser (QCLot: 4585506)							
ES2231661-001	Anonymous	EK026SF: Total Cyanide	57-12-5	40 mg/kg	98.9	70.0	130
EK028SF: Weak Acid Dissociable CN by Segmented Flow Analyser (QCLot: 4585505)							
ES2231661-001	Anonymous	EK028SF: Weak Acid Dissociable Cyanide	----	40 mg/kg	109	70.0	130
EK040T: Fluoride Total (QCLot: 4589794)							
ES2233009-002	MB02B_0-9	EK040T: Fluoride	16984-48-8	400 mg/kg	89.7	70.0	130
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 4584740)							
ES2233009-002	MB02B_0-9	EP066: Total Polychlorinated biphenyls	----	1 mg/kg	110	70.0	130
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 4585917)							
ES2233009-007	MB02B_178-187	EP066: Total Polychlorinated biphenyls	----	1 mg/kg	103	70.0	130
EP068A: Organochlorine Pesticides (OC) (QCLot: 4584738)							
ES2233009-002	MB02B_0-9	EP068: gamma-BHC	58-89-9	0.5 mg/kg	114	70.0	130
		EP068: Heptachlor	76-44-8	0.5 mg/kg	104	70.0	130
		EP068: Aldrin	309-00-2	0.5 mg/kg	98.6	70.0	130
		EP068: Dieldrin	60-57-1	0.5 mg/kg	101	70.0	130
		EP068: Endrin	72-20-8	2 mg/kg	72.6	70.0	130

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP068A: Organochlorine Pesticides (OC) (QCLot: 4584738) - continued							
ES2233009-002	MB02B_0-9	EP068: 4.4`-DDT	50-29-3	2 mg/kg	95.4	70.0	130
EP068A: Organochlorine Pesticides (OC) (QCLot: 4585920)							
ES2233009-007	MB02B_178-187	EP068: gamma-BHC	58-89-9	0.5 mg/kg	90.8	70.0	130
		EP068: Heptachlor	76-44-8	0.5 mg/kg	83.9	70.0	130
		EP068: Aldrin	309-00-2	0.5 mg/kg	83.6	70.0	130
		EP068: Dieldrin	60-57-1	0.5 mg/kg	87.6	70.0	130
		EP068: Endrin	72-20-8	2 mg/kg	71.6	70.0	130
		EP068: 4.4`-DDT	50-29-3	2 mg/kg	74.7	70.0	130
EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup (QCLot: 4584739)							
ES2233009-002	MB02B_0-9	EP071SG-S: C10 - C14 Fraction	----	480 mg/kg	124	43.0	139
		EP071SG-S: C15 - C28 Fraction	----	3100 mg/kg	108	49.0	131
		EP071SG-S: C29 - C36 Fraction	----	2060 mg/kg	120	64.0	158
EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup (QCLot: 4585918)							
ES2233009-007	MB02B_178-187	EP071SG-S: C10 - C14 Fraction	----	480 mg/kg	89.8	43.0	139
		EP071SG-S: C15 - C28 Fraction	----	3100 mg/kg	94.3	49.0	131
		EP071SG-S: C29 - C36 Fraction	----	2060 mg/kg	107	64.0	158
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup (QCLot: 4584739)							
ES2233009-002	MB02B_0-9	EP071SG-S: >C10 - C16 Fraction	----	900 mg/kg	106	33.0	137
		EP071SG-S: >C16 - C34 Fraction	----	4320 mg/kg	126	40.0	137
		EP071SG-S: >C34 - C40 Fraction	----	890 mg/kg	115	30.0	190
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup (QCLot: 4585918)							
ES2233009-007	MB02B_178-187	EP071SG-S: >C10 - C16 Fraction	----	900 mg/kg	91.8	33.0	137
		EP071SG-S: >C16 - C34 Fraction	----	4320 mg/kg	99.0	40.0	137
		EP071SG-S: >C34 - C40 Fraction	----	890 mg/kg	104	30.0	190
EP074A: Monocyclic Aromatic Hydrocarbons (QCLot: 4584521)							
ES2233009-002	MB02B_0-9	EP074: Benzene	71-43-2	2.5 mg/kg	95.9	70.0	130
		EP074: Toluene	108-88-3	2.5 mg/kg	95.4	70.0	130
EP074A: Monocyclic Aromatic Hydrocarbons (QCLot: 4585545)							
ES2233009-007	MB02B_178-187	EP074: Benzene	71-43-2	2.5 mg/kg	96.3	70.0	130
		EP074: Toluene	108-88-3	2.5 mg/kg	94.5	70.0	130
EP074E(SIM): Halogenated Aliphatic Compounds (QCLot: 4584523)							
ES2233009-002	MB02B_0-9	EP074E(SIM): Vinyl chloride	75-01-4	2.5 mg/kg	109	70.0	130
EP074E(SIM): Halogenated Aliphatic Compounds (QCLot: 4585544)							
ES2233009-007	MB02B_178-187	EP074E(SIM): Vinyl chloride	75-01-4	2.5 mg/kg	107	70.0	130
EP074E: Halogenated Aliphatic Compounds (QCLot: 4584521)							
ES2233009-002	MB02B_0-9						

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP074E: Halogenated Aliphatic Compounds (QCLot: 4584521) - continued							
ES2233009-002	MB02B_0-9	EP074: 1.1-Dichloroethene	75-35-4	2.5 mg/kg	85.1	70.0	130
		EP074: Trichloroethene	79-01-6	2.5 mg/kg	94.2	70.0	130
EP074E: Halogenated Aliphatic Compounds (QCLot: 4585545)							
ES2233009-007	MB02B_178-187	EP074: 1.1-Dichloroethene	75-35-4	2.5 mg/kg	82.0	70.0	130
		EP074: Trichloroethene	79-01-6	2.5 mg/kg	93.7	70.0	130
EP074F: Halogenated Aromatic Compounds (QCLot: 4584521)							
ES2233009-002	MB02B_0-9	EP074: Chlorobenzene	108-90-7	2.5 mg/kg	93.8	70.0	130
EP074F: Halogenated Aromatic Compounds (QCLot: 4585545)							
ES2233009-007	MB02B_178-187	EP074: Chlorobenzene	108-90-7	2.5 mg/kg	90.8	70.0	130
EP075A: Phenolic Compounds (QCLot: 4584737)							
ES2233009-002	MB02B_0-9	EP075: Phenol	108-95-2	10 mg/kg	95.1	60.0	130
		EP075: 4-Chloro-3-methylphenol	59-50-7	10 mg/kg	87.5	50.0	130
		EP075: Pentachlorophenol	87-86-5	10 mg/kg	60.6	10.0	130
EP075A: Phenolic Compounds (QCLot: 4585919)							
ES2233009-007	MB02B_178-187	EP075: Phenol	108-95-2	10 mg/kg	98.3	60.0	130
		EP075: 4-Chloro-3-methylphenol	59-50-7	10 mg/kg	90.6	50.0	130
		EP075: Pentachlorophenol	87-86-5	10 mg/kg	31.1	10.0	130
EP075B: Polynuclear Aromatic Hydrocarbons (QCLot: 4584737)							
ES2233009-002	MB02B_0-9	EP075: Acenaphthene	83-32-9	10 mg/kg	84.8	50.0	130
		EP075: Pyrene	129-00-0	10 mg/kg	80.7	50.0	130
EP075B: Polynuclear Aromatic Hydrocarbons (QCLot: 4585919)							
ES2233009-007	MB02B_178-187	EP075: Acenaphthene	83-32-9	10 mg/kg	88.3	50.0	130
		EP075: Pyrene	129-00-0	10 mg/kg	90.5	50.0	130
EP075E: Nitroaromatics and Ketones (QCLot: 4584737)							
ES2233009-002	MB02B_0-9	EP075: 2.4-Dinitrotoluene	121-14-2	10 mg/kg	68.8	40.0	130
EP075E: Nitroaromatics and Ketones (QCLot: 4585919)							
ES2233009-007	MB02B_178-187	EP075: 2.4-Dinitrotoluene	121-14-2	10 mg/kg	81.7	40.0	130
EP075G: Chlorinated Hydrocarbons (QCLot: 4584737)							
ES2233009-002	MB02B_0-9	EP075: 1.4-Dichlorobenzene	106-46-7	10 mg/kg	83.2	60.0	130
		EP075: 1.2.4-Trichlorobenzene	120-82-1	10 mg/kg	90.4	50.0	130
EP075G: Chlorinated Hydrocarbons (QCLot: 4585919)							
ES2233009-007	MB02B_178-187	EP075: 1.4-Dichlorobenzene	106-46-7	10 mg/kg	83.8	60.0	130
		EP075: 1.2.4-Trichlorobenzene	120-82-1	10 mg/kg	89.8	50.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4584522)							
ES2233009-002	MB02B_0-9	EP080: C6 - C9 Fraction	----	32.5 mg/kg	110	70.0	130

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4585543)							
ES2233009-007	MB02B_178-187	EP080: C6 - C9 Fraction	----	32.5 mg/kg	108	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4584522)							
ES2233009-002	MB02B_0-9	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	115	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4585543)							
ES2233009-007	MB02B_178-187	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	110	70.0	130
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QCLot: 4586607)							
EB2226985-001	Anonymous	EP202: 2.4-D	94-75-7	0.1 mg/kg	81.8	68.0	139
		EP202: Triclopyr	55335-06-3	0.1 mg/kg	72.8	51.0	145
		EP202: 2.4.5-T	93-76-5	0.1 mg/kg	95.0	57.0	142
		EP202: Picloram	1918-02-1	0.1 mg/kg	59.1	49.0	138

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EG005(ED093)C: Leachable Metals by ICPAES (QCLot: 4590347)							
ES2233009-004	MB03B_7-20	EG005C: Arsenic	7440-38-2	1 mg/L	97.9	70.0	130
		EG005C: Beryllium	7440-41-7	1 mg/L	101	70.0	130
		EG005C: Cadmium	7440-43-9	0.25 mg/L	101	70.0	130
		EG005C: Chromium	7440-47-3	1 mg/L	98.6	70.0	130
		EG005C: Lead	7439-92-1	1 mg/L	101	70.0	130
		EG005C: Manganese	7439-96-5	1 mg/L	100.0	70.0	130
		EG005C: Nickel	7440-02-0	1 mg/L	98.8	70.0	130
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 4590993)							
ES2233009-002	MB02B_0-9	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	104	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 4590992)							
ES2233009-002	MB02B_0-9	ED045G: Chloride	16887-00-6	50 mg/L	101	70.0	130
EG035C: Leachable Mercury by FIMS (QCLot: 4590440)							
ES2233009-004	MB03B_7-20	EG035C: Mercury	7439-97-6	0.01 mg/L	91.5	70.0	130
EG050G-W: Hexavalent Chromium - Water Leachable (QCLot: 4591356)							
ES2233009-002	MB02B_0-9	EG050G-W: Hexavalent Chromium	18540-29-9	0.05 mg/L	98.0	70.0	130
EK026SF: Total CN by Segmented Flow Analyser (QCLot: 4593212)							
ES2233009-002	MB02B_0-9	EK026SF: Total Cyanide	57-12-5	0.2 mg/L	102	70.0	130
EK028SF: Weak Acid Dissociable CN by Segmented Flow Analyser (QCLot: 4593213)							
ES2233009-002	MB02B_0-9	EK028SF: Weak Acid Dissociable Cyanide	----	0.2 mg/L	97.5	70.0	130
EK040P: Fluoride by PC Titrator (QCLot: 4591669)							
ES2233009-004	MB03B_7-20	EK040P: Fluoride	16984-48-8	5 mg/L	89.0	70.0	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2233009**	Page	: 1 of 19
Amendment	: **(Preliminary Report)**		
Client	: **EMM CONSULTING PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: HENRY NOAKES	Telephone	: +61-2-8784 8555
Project	: J200096 Oven Mountain Pumped Storage Project	Date Samples Received	: 14-Sep-2022
Site	: ----	Issue Date	: 11-Oct-2022
Sampler	: HENRY NOAKES	No. of samples received	: 6
Order number	: J200096	No. of samples analysed	: 5

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **Laboratory Control outliers exist - please see following pages for full details.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **Analysis Holding Time Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EG048: Hexavalent Chromium (Alkaline Digest)	ES2232708--001	Anonymous	**Hexavalent Chromium**	18540-29-9	0.6 %	70.0-130%	**Recovery less than lower data quality objective**
EG048: Hexavalent Chromium (Alkaline Digest)	ES2232708--001	Anonymous	**Hexavalent Chromium**	18540-29-9	6.6 %	70.0-130%	**Recovery less than lower data quality objective**
EG048: Hexavalent Chromium (Alkaline Digest)	ES2233009--007	MB02B_178-187	**Hexavalent Chromium**	18540-29-9	68.0 %	70.0-130%	**Recovery less than lower data quality objective**

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
EP075B: Polynuclear Aromatic Hydrocarbons	QC-4590454-002	----	**N-2-Fluorenyl Acetamide**	53-96-3	111 %	59.7-110%	**Recovery greater than upper control limit**
EP075B: Polynuclear Aromatic Hydrocarbons	QC-4590454-002	----	**7.12-Dimethylbenz(a)anthracene**	57-97-6	125 %	50.0-108%	**Recovery greater than upper control limit**

Outliers : Analysis Holding Time Compliance

Matrix: **SOIL**

Method / Container / Client Sample ID(s)		Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA003 :pH (field/fox)							
Soil Glass Jar - Unpreserved							
MB01A_26-36.5,	MB03B_21-29	21-Sep-2022	13-Sep-2022	**8**	----	----	----
EN60Z: ASLP Leachate - ZHE							
ZHE Leach: 7 day HT (e.g. VOC)							
MB02B_0-9, MB02B_178-187	MB03B_7-20,	20-Sep-2022	19-Sep-2022	**1**	----	----	----

Matrix: **WATER**

Method / Container / Client Sample ID(s)		Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA005P: pH by PC Titrator							
Clear Plastic Bottle - Natural							
MB02B_0-9, MB02B_178-187	MB03B_7-20,	----	----	----	20-Sep-2022	18-Sep-2022	**2**

Outliers : Frequency of Quality Control Samples

Matrix: **SOIL**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	

Matrix: **SOIL**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Moisture Content	3	34	8.82	10.00	NEPM 2013 B3 & ALS QC Standard
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	0	3	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	0	3	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Pesticides by GCMS	0	3	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Semivolatile Organic Compounds	0	3	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	0	4	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Pesticides by GCMS	0	3	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
Semivolatile Organic Compounds	0	3	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	0	4	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / *Container* / Client Sample ID(s)		*Sample Date*	*Extraction / Preparation*			*Analysis*		
			Date extracted	Due for extraction	Evaluation	*Date analysed*	Due for analysis	Evaluation
EA003 :pH (field/fox)								
Soil Glass Jar - Unpreserved (EA003)								
MB01A_26-36.5,	MB03B_21-29	**12-Sep-2022**	**21-Sep-2022**	13-Sep-2022	×	**23-Sep-2022**	20-Dec-2022	✓
EA011: Net Acid Generation								
Soil Glass Jar - Unpreserved (EA011)								
MB01A_26-36.5,	MB03B_21-29	**12-Sep-2022**	**23-Sep-2022**	12-Sep-2023	✓	**23-Sep-2022**	22-Mar-2023	✓
EA013: Acid Neutralising Capacity								
Soil Glass Jar - Unpreserved (EA013)								
MB01A_26-36.5,	MB03B_21-29	**12-Sep-2022**	**23-Sep-2022**	12-Sep-2023	✓	**23-Sep-2022**	22-Mar-2023	✓
EA055: Moisture Content (Dried @ 105-110°C)								
Soil Glass Jar - Unpreserved (EA055)								
MB02B_0-9, MB02B_178-187	MB03B_7-20,	**12-Sep-2022**	**----**	----	----	**16-Sep-2022**	26-Sep-2022	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED042T: Total Sulfur by LECO							
Pulp Bag (ED042T)							
MB01A_26-36.5, MB03B_21-29	**12-Sep-2022**	**26-Sep-2022**	11-Mar-2023	✓	**26-Sep-2022**	11-Mar-2023	✓
EG005(ED093)T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T)							
MB02B_0-9, MB03B_7-20	**12-Sep-2022**	**16-Sep-2022**	11-Mar-2023	✓	**19-Sep-2022**	11-Mar-2023	✓
Soil Glass Jar - Unpreserved (EG005T)							
MB02B_178-187	**12-Sep-2022**	**19-Sep-2022**	11-Mar-2023	✓	**19-Sep-2022**	11-Mar-2023	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T)							
MB02B_0-9, MB03B_7-20	**12-Sep-2022**	**16-Sep-2022**	10-Oct-2022	✓	**19-Sep-2022**	10-Oct-2022	✓
Soil Glass Jar - Unpreserved (EG035T)							
MB02B_178-187	**12-Sep-2022**	**19-Sep-2022**	10-Oct-2022	✓	**19-Sep-2022**	10-Oct-2022	✓
EG048: Hexavalent Chromium (Alkaline Digest)							
Soil Glass Jar - Unpreserved (EG048G)							
MB02B_0-9, MB03B_7-20	**12-Sep-2022**	**16-Sep-2022**	10-Oct-2022	✓	**16-Sep-2022**	23-Sep-2022	✓
Soil Glass Jar - Unpreserved (EG048G)							
MB02B_178-187	**12-Sep-2022**	**19-Sep-2022**	10-Oct-2022	✓	**19-Sep-2022**	26-Sep-2022	✓
EK026SF: Total CN by Segmented Flow Analyser							
Soil Glass Jar - Unpreserved (EK026SF)							
MB02B_0-9, MB03B_7-20, MB02B_178-187	**12-Sep-2022**	**16-Sep-2022**	26-Sep-2022	✓	**19-Sep-2022**	30-Sep-2022	✓
EK028SF: Weak Acid Dissociable CN by Segmented Flow Analyser							
Soil Glass Jar - Unpreserved (EK028SF)							
MB02B_0-9, MB03B_7-20, MB02B_178-187	**12-Sep-2022**	**16-Sep-2022**	26-Sep-2022	✓	**19-Sep-2022**	30-Sep-2022	✓
EK040T: Fluoride Total							
Snap Lock Bag (EK040T)							
MB02B_0-9, MB03B_7-20, MB02B_178-187	**12-Sep-2022**	**20-Sep-2022**	10-Oct-2022	✓	**20-Sep-2022**	10-Oct-2022	✓
EN60-DI: Bottle Leaching Procedure - Inorganics/Non-Volatile Organics (Glass Vessel)							
Non-Volatile Leach: 14 day HT(e.g. SV organics) (EN60-DIa-G)							
MB02B_0-9, MB03B_7-20, MB02B_178-187	**12-Sep-2022**	**18-Sep-2022**	26-Sep-2022	✓	**----**	----	----
EN60Z: ASLP Leachate - ZHE							
ZHE Leach: 7 day HT (e.g. VOC) (EN60Za)							
MB02B_0-9, MB03B_7-20, MB02B_178-187	**12-Sep-2022**	**20-Sep-2022**	19-Sep-2022	✓	**----**	----	----
EP003: Total Organic Carbon (TOC) in Soil							
Pulp Bag (EP003)							
MB01A_26-36.5, MB03B_21-29	**12-Sep-2022**	**26-Sep-2022**	10-Oct-2022	✓	**26-Sep-2022**	10-Oct-2022	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP066: Polychlorinated Biphenyls (PCB)							
Soil Glass Jar - Unpreserved (EP066) MB02B_0-9, MB03B_7-20	**12-Sep-2022**	**16-Sep-2022**	26-Sep-2022	✓	**19-Sep-2022**	26-Oct-2022	✓
Soil Glass Jar - Unpreserved (EP066) MB02B_178-187	**12-Sep-2022**	**19-Sep-2022**	26-Sep-2022	✓	**19-Sep-2022**	29-Oct-2022	✓
EP068A: Organochlorine Pesticides (OC)							
Soil Glass Jar - Unpreserved (EP068) MB02B_0-9, MB03B_7-20	**12-Sep-2022**	**16-Sep-2022**	26-Sep-2022	✓	**19-Sep-2022**	26-Oct-2022	✓
Soil Glass Jar - Unpreserved (EP068) MB02B_178-187	**12-Sep-2022**	**19-Sep-2022**	26-Sep-2022	✓	**19-Sep-2022**	29-Oct-2022	✓
EP068B: Organophosphorus Pesticides (OP)							
Soil Glass Jar - Unpreserved (EP068) MB02B_0-9, MB03B_7-20	**12-Sep-2022**	**16-Sep-2022**	26-Sep-2022	✓	**19-Sep-2022**	26-Oct-2022	✓
Soil Glass Jar - Unpreserved (EP068) MB02B_178-187	**12-Sep-2022**	**19-Sep-2022**	26-Sep-2022	✓	**19-Sep-2022**	29-Oct-2022	✓
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup							
Soil Glass Jar - Unpreserved (EP071SG-S) MB02B_0-9, MB03B_7-20	**12-Sep-2022**	**16-Sep-2022**	26-Sep-2022	✓	**19-Sep-2022**	26-Oct-2022	✓
Soil Glass Jar - Unpreserved (EP071SG-S) MB02B_178-187	**12-Sep-2022**	**19-Sep-2022**	26-Sep-2022	✓	**19-Sep-2022**	29-Oct-2022	✓
EP071 SG-S: Total Petroleum Hydrocarbons in Soil - Silica gel cleanup							
Soil Glass Jar - Unpreserved (EP071SG-S) MB02B_0-9, MB03B_7-20	**12-Sep-2022**	**16-Sep-2022**	26-Sep-2022	✓	**19-Sep-2022**	26-Oct-2022	✓
Soil Glass Jar - Unpreserved (EP071SG-S) MB02B_178-187	**12-Sep-2022**	**19-Sep-2022**	26-Sep-2022	✓	**19-Sep-2022**	29-Oct-2022	✓
EP074A: Monocyclic Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP074) MB02B_178-187	**12-Sep-2022**	**16-Sep-2022**	19-Sep-2022	✓	**16-Sep-2022**	19-Sep-2022	✓
Soil Glass Jar - Unpreserved (EP074) MB02B_0-9, MB03B_7-20	**12-Sep-2022**	**16-Sep-2022**	19-Sep-2022	✓	**18-Sep-2022**	19-Sep-2022	✓
EP074B: Oxygenated Compounds							
Soil Glass Jar - Unpreserved (EP074) MB02B_178-187	**12-Sep-2022**	**16-Sep-2022**	19-Sep-2022	✓	**16-Sep-2022**	19-Sep-2022	✓
Soil Glass Jar - Unpreserved (EP074) MB02B_0-9, MB03B_7-20	**12-Sep-2022**	**16-Sep-2022**	19-Sep-2022	✓	**18-Sep-2022**	19-Sep-2022	✓
EP074E(SIM): Halogenated Aliphatic Compounds							
Soil Glass Jar - Unpreserved (EP074E(SIM)) MB02B_178-187	**12-Sep-2022**	**16-Sep-2022**	19-Sep-2022	✓	**16-Sep-2022**	19-Sep-2022	✓
Soil Glass Jar - Unpreserved (EP074E(SIM)) MB02B_0-9, MB03B_7-20	**12-Sep-2022**	**16-Sep-2022**	19-Sep-2022	✓	**18-Sep-2022**	19-Sep-2022	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP074E: Halogenated Aliphatic Compounds							
Soil Glass Jar - Unpreserved (EP074) MB02B_178-187	**12-Sep-2022**	**16-Sep-2022**	19-Sep-2022	✓	**16-Sep-2022**	19-Sep-2022	✓
Soil Glass Jar - Unpreserved (EP074) MB02B_0-9, MB03B_7-20	**12-Sep-2022**	**16-Sep-2022**	19-Sep-2022	✓	**18-Sep-2022**	19-Sep-2022	✓
EP074F: Halogenated Aromatic Compounds							
Soil Glass Jar - Unpreserved (EP074) MB02B_178-187	**12-Sep-2022**	**16-Sep-2022**	19-Sep-2022	✓	**16-Sep-2022**	19-Sep-2022	✓
Soil Glass Jar - Unpreserved (EP074) MB02B_0-9, MB03B_7-20	**12-Sep-2022**	**16-Sep-2022**	19-Sep-2022	✓	**18-Sep-2022**	19-Sep-2022	✓
EP074G: Trihalomethanes							
Soil Glass Jar - Unpreserved (EP074) MB02B_178-187	**12-Sep-2022**	**16-Sep-2022**	19-Sep-2022	✓	**16-Sep-2022**	19-Sep-2022	✓
Soil Glass Jar - Unpreserved (EP074) MB02B_0-9, MB03B_7-20	**12-Sep-2022**	**16-Sep-2022**	19-Sep-2022	✓	**18-Sep-2022**	19-Sep-2022	✓
EP075A: Phenolic Compounds							
Soil Glass Jar - Unpreserved (EP075) MB02B_0-9, MB03B_7-20	**12-Sep-2022**	**16-Sep-2022**	26-Sep-2022	✓	**19-Sep-2022**	26-Oct-2022	✓
Soil Glass Jar - Unpreserved (EP075) MB02B_178-187	**12-Sep-2022**	**19-Sep-2022**	26-Sep-2022	✓	**19-Sep-2022**	29-Oct-2022	✓
EP075B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075) MB02B_0-9, MB03B_7-20	**12-Sep-2022**	**16-Sep-2022**	26-Sep-2022	✓	**19-Sep-2022**	26-Oct-2022	✓
Soil Glass Jar - Unpreserved (EP075) MB02B_178-187	**12-Sep-2022**	**19-Sep-2022**	26-Sep-2022	✓	**19-Sep-2022**	29-Oct-2022	✓
EP075C: Phthalate Esters							
Soil Glass Jar - Unpreserved (EP075) MB02B_0-9, MB03B_7-20	**12-Sep-2022**	**16-Sep-2022**	26-Sep-2022	✓	**19-Sep-2022**	26-Oct-2022	✓
Soil Glass Jar - Unpreserved (EP075) MB02B_178-187	**12-Sep-2022**	**19-Sep-2022**	26-Sep-2022	✓	**19-Sep-2022**	29-Oct-2022	✓
EP075E: Nitroaromatics and Ketones							
Soil Glass Jar - Unpreserved (EP075) MB02B_0-9, MB03B_7-20	**12-Sep-2022**	**16-Sep-2022**	26-Sep-2022	✓	**19-Sep-2022**	26-Oct-2022	✓
Soil Glass Jar - Unpreserved (EP075) MB02B_178-187	**12-Sep-2022**	**19-Sep-2022**	26-Sep-2022	✓	**19-Sep-2022**	29-Oct-2022	✓
EP075G: Chlorinated Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075) MB02B_0-9, MB03B_7-20	**12-Sep-2022**	**16-Sep-2022**	26-Sep-2022	✓	**19-Sep-2022**	26-Oct-2022	✓
Soil Glass Jar - Unpreserved (EP075) MB02B_178-187	**12-Sep-2022**	**19-Sep-2022**	26-Sep-2022	✓	**19-Sep-2022**	29-Oct-2022	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP075K: Miscellaneous Compounds								
Soil Glass Jar - Unpreserved (EP075)								
MB02B_0-9,	MB03B_7-20	**12-Sep-2022**	**16-Sep-2022**	26-Sep-2022	✓	**19-Sep-2022**	26-Oct-2022	✓
Soil Glass Jar - Unpreserved (EP075)								
MB02B_178-187		**12-Sep-2022**	**19-Sep-2022**	26-Sep-2022	✓	**19-Sep-2022**	29-Oct-2022	✓
EP080/071: Total Petroleum Hydrocarbons								
Soil Glass Jar - Unpreserved (EP080)								
MB02B_178-187		**12-Sep-2022**	**16-Sep-2022**	26-Sep-2022	✓	**16-Sep-2022**	26-Sep-2022	✓
Soil Glass Jar - Unpreserved (EP080)								
MB02B_0-9,	MB03B_7-20	**12-Sep-2022**	**16-Sep-2022**	26-Sep-2022	✓	**18-Sep-2022**	26-Sep-2022	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Soil Glass Jar - Unpreserved (EP080)								
MB02B_178-187		**12-Sep-2022**	**16-Sep-2022**	26-Sep-2022	✓	**16-Sep-2022**	26-Sep-2022	✓
Soil Glass Jar - Unpreserved (EP080)								
MB02B_0-9,	MB03B_7-20	**12-Sep-2022**	**16-Sep-2022**	26-Sep-2022	✓	**18-Sep-2022**	26-Sep-2022	✓
EP132A: Phenolic Compounds								
Soil Glass Jar - Unpreserved (EP132)								
MB02B_0-9, MB02B_178-187	MB03B_7-20,	**12-Sep-2022**	**16-Sep-2022**	26-Sep-2022	✓	**19-Sep-2022**	26-Oct-2022	✓
EP202A: Phenoxyacetic Acid Herbicides by LCMS								
Soil Glass Jar - Unpreserved (EP202)								
MB02B_0-9, MB02B_178-187	MB03B_7-20,	**12-Sep-2022**	**20-Sep-2022**	26-Sep-2022	✓	**20-Sep-2022**	30-Oct-2022	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA005P: pH by PC Titrator								
Clear Plastic Bottle - Natural (EA005-P)								
MB02B_0-9, MB02B_178-187	MB03B_7-20,	**18-Sep-2022**	**----**	----	----	**20-Sep-2022**	18-Sep-2022	×
EA010P: Conductivity by PC Titrator								
Clear Plastic Bottle - Natural (EA010-P)								
MB02B_0-9, MB02B_178-187	MB03B_7-20,	**18-Sep-2022**	**----**	----	----	**20-Sep-2022**	16-Oct-2022	✓
ED037P: Alkalinity by PC Titrator								
Clear Plastic Bottle - Natural (ED037-P)								
MB02B_0-9, MB02B_178-187	MB03B_7-20,	**18-Sep-2022**	**----**	----	----	**20-Sep-2022**	02-Oct-2022	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Clear Plastic Bottle - Natural (ED041G)								
MB02B_0-9, MB02B_178-187	MB03B_7-20,	**18-Sep-2022**	**----**	----	----	**20-Sep-2022**	16-Oct-2022	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G)							
MB02B_0-9, MB03B_7-20, MB02B_178-187	**18-Sep-2022**	**----**	----	----	**20-Sep-2022**	16-Oct-2022	✓
EG005(ED093)C: Leachable Metals by ICPAES							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG005C)							
MB02B_0-9, MB03B_7-20, MB02B_178-187	**18-Sep-2022**	**20-Sep-2022**	17-Mar-2023	✓	**20-Sep-2022**	17-Mar-2023	✓
EG035C: Leachable Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035C)							
MB02B_0-9, MB03B_7-20, MB02B_178-187	**18-Sep-2022**	**----**	----	----	**20-Sep-2022**	16-Oct-2022	✓
EG050G-W: Hexavalent Chromium - Water Leachable							
Clear Plastic Bottle - NaOH (EG050G-W)							
MB02B_0-9, MB03B_7-20, MB02B_178-187	**18-Sep-2022**	**----**	----	----	**20-Sep-2022**	16-Oct-2022	✓
EK026SF: Total CN by Segmented Flow Analyser							
Opaque plastic bottle - NaOH (EK026SF)							
MB02B_0-9, MB03B_7-20, MB02B_178-187	**20-Sep-2022**	**----**	----	----	**21-Sep-2022**	04-Oct-2022	✓
EK028SF: Weak Acid Dissociable CN by Segmented Flow Analyser							
Opaque plastic bottle - NaOH (EK028SF)							
MB02B_0-9, MB03B_7-20, MB02B_178-187	**20-Sep-2022**	**----**	----	----	**21-Sep-2022**	04-Oct-2022	✓
EK040P: Fluoride by PC Titrator							
Clear Plastic Bottle - Natural (EK040P)							
MB02B_0-9, MB03B_7-20, MB02B_178-187	**18-Sep-2022**	**----**	----	----	**20-Sep-2022**	16-Oct-2022	✓
EP068A: Organochlorine Pesticides (OC)							
Amber Glass Bottle - Unpreserved (EP068)							
MB02B_0-9, MB03B_7-20, MB02B_178-187	**18-Sep-2022**	**20-Sep-2022**	25-Sep-2022	✓	**20-Sep-2022**	30-Oct-2022	✓
EP068B: Organophosphorus Pesticides (OP)							
Amber Glass Bottle - Unpreserved (EP068)							
MB02B_0-9, MB03B_7-20, MB02B_178-187	**18-Sep-2022**	**20-Sep-2022**	25-Sep-2022	✓	**20-Sep-2022**	30-Oct-2022	✓
EP068C: Triazines							
Amber Glass Bottle - Unpreserved (EP068)							
MB02B_0-9, MB03B_7-20, MB02B_178-187	**18-Sep-2022**	**20-Sep-2022**	25-Sep-2022	✓	**20-Sep-2022**	30-Oct-2022	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP068D: Cypermethrins							
Amber Glass Bottle - Unpreserved (EP068)							
MB02B_0-9, MB03B_7-20, MB02B_178-187	**18-Sep-2022**	**20-Sep-2022**	25-Sep-2022	✓	**20-Sep-2022**	30-Oct-2022	✓
EP068E: Other Pesticides							
Amber Glass Bottle - Unpreserved (EP068)							
MB02B_0-9, MB03B_7-20, MB02B_178-187	**18-Sep-2022**	**20-Sep-2022**	25-Sep-2022	✓	**20-Sep-2022**	30-Oct-2022	✓
EP074A: Monocyclic Aromatic Hydrocarbons							
Amber VOC Vial - Sulfuric Acid (EP074)							
MB02B_0-9, MB03B_7-20, MB02B_178-187	**20-Sep-2022**	**21-Sep-2022**	04-Oct-2022	✓	**21-Sep-2022**	04-Oct-2022	✓
EP074B: Oxygenated Compounds							
Amber VOC Vial - Sulfuric Acid (EP074)							
MB02B_0-9, MB03B_7-20, MB02B_178-187	**20-Sep-2022**	**21-Sep-2022**	04-Oct-2022	✓	**21-Sep-2022**	04-Oct-2022	✓
EP074C: Sulfonated Compounds							
Amber VOC Vial - Sulfuric Acid (EP074)							
MB02B_0-9, MB03B_7-20, MB02B_178-187	**20-Sep-2022**	**21-Sep-2022**	04-Oct-2022	✓	**21-Sep-2022**	04-Oct-2022	✓
EP074D: Fumigants							
Amber VOC Vial - Sulfuric Acid (EP074)							
MB02B_0-9, MB03B_7-20, MB02B_178-187	**20-Sep-2022**	**21-Sep-2022**	04-Oct-2022	✓	**21-Sep-2022**	04-Oct-2022	✓
EP074E: Halogenated Aliphatic Compounds							
Amber VOC Vial - Sulfuric Acid (EP074)							
MB02B_0-9, MB03B_7-20, MB02B_178-187	**20-Sep-2022**	**21-Sep-2022**	04-Oct-2022	✓	**21-Sep-2022**	04-Oct-2022	✓
EP074F: Halogenated Aromatic Compounds							
Amber VOC Vial - Sulfuric Acid (EP074)							
MB02B_0-9, MB03B_7-20, MB02B_178-187	**20-Sep-2022**	**21-Sep-2022**	04-Oct-2022	✓	**21-Sep-2022**	04-Oct-2022	✓
EP074G: Trihalomethanes							
Amber VOC Vial - Sulfuric Acid (EP074)							
MB02B_0-9, MB03B_7-20, MB02B_178-187	**20-Sep-2022**	**21-Sep-2022**	04-Oct-2022	✓	**21-Sep-2022**	04-Oct-2022	✓
EP074H: Naphthalene							
Amber VOC Vial - Sulfuric Acid (EP074)							
MB02B_0-9, MB03B_7-20, MB02B_178-187	**20-Sep-2022**	**21-Sep-2022**	04-Oct-2022	✓	**21-Sep-2022**	04-Oct-2022	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP075A: Phenolic Compounds							
Amber Glass Bottle - Unpreserved (EP075) MB02B_0-9, MB02B_178-187, MB03B_7-20,	**18-Sep-2022**	**20-Sep-2022**	25-Sep-2022	✓	**20-Sep-2022**	30-Oct-2022	✓
EP075B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP075) MB02B_0-9, MB02B_178-187, MB03B_7-20,	**18-Sep-2022**	**20-Sep-2022**	25-Sep-2022	✓	**20-Sep-2022**	30-Oct-2022	✓
EP075C: Phthalate Esters							
Amber Glass Bottle - Unpreserved (EP075) MB02B_0-9, MB02B_178-187, MB03B_7-20,	**18-Sep-2022**	**20-Sep-2022**	25-Sep-2022	✓	**20-Sep-2022**	30-Oct-2022	✓
EP075D: Nitrosamines							
Amber Glass Bottle - Unpreserved (EP075) MB02B_0-9, MB02B_178-187, MB03B_7-20,	**18-Sep-2022**	**20-Sep-2022**	25-Sep-2022	✓	**20-Sep-2022**	30-Oct-2022	✓
EP075E: Nitroaromatics and Ketones							
Amber Glass Bottle - Unpreserved (EP075) MB02B_0-9, MB02B_178-187, MB03B_7-20,	**18-Sep-2022**	**20-Sep-2022**	25-Sep-2022	✓	**20-Sep-2022**	30-Oct-2022	✓
EP075F: Haloethers							
Amber Glass Bottle - Unpreserved (EP075) MB02B_0-9, MB02B_178-187, MB03B_7-20,	**18-Sep-2022**	**20-Sep-2022**	25-Sep-2022	✓	**20-Sep-2022**	30-Oct-2022	✓
EP075G: Chlorinated Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP075) MB02B_0-9, MB02B_178-187, MB03B_7-20,	**18-Sep-2022**	**20-Sep-2022**	25-Sep-2022	✓	**20-Sep-2022**	30-Oct-2022	✓
EP075H: Anilines and Benzidines							
Amber Glass Bottle - Unpreserved (EP075) MB02B_0-9, MB02B_178-187, MB03B_7-20,	**18-Sep-2022**	**20-Sep-2022**	25-Sep-2022	✓	**20-Sep-2022**	30-Oct-2022	✓
EP075I: Organochlorine Pesticides							
Amber Glass Bottle - Unpreserved (EP075) MB02B_0-9, MB02B_178-187, MB03B_7-20,	**18-Sep-2022**	**20-Sep-2022**	25-Sep-2022	✓	**20-Sep-2022**	30-Oct-2022	✓
EP075J: Organophosphorus Pesticides							
Amber Glass Bottle - Unpreserved (EP075) MB02B_0-9, MB02B_178-187, MB03B_7-20,	**18-Sep-2022**	**20-Sep-2022**	25-Sep-2022	✓	**20-Sep-2022**	30-Oct-2022	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP075K: Miscellaneous Compounds							
Amber Glass Bottle - Unpreserved (EP075)							
MB02B_0-9, MB03B_7-20, MB02B_178-187	**18-Sep-2022**	**20-Sep-2022**	25-Sep-2022	✓	**20-Sep-2022**	30-Oct-2022	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Acid Neutralising Capacity (ANC)	EA013	1	2	**50.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	4	35	**11.43**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Low level CHC (SIM)	EP074E(SIM)	2	4	**50.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Moisture Content	EA055	3	34	**8.82**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Net Acid Generation	EA011	1	2	**50.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	2	3	**66.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH field/fox	EA003	1	8	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	2	3	**66.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	0	3	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Semivolatile Organic Compounds	EP075	2	3	**66.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfur - Total as S (LECO)	ED042T	1	2	**50.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Fluoride	EK040T	1	4	**25.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	3	22	**13.64**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP003	1	2	**50.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction (Silica Gel Clean Up)	EP071SG-S	2	3	**66.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	11	**18.18**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	2	11	**18.18**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
WAD Cyanide by Segmented Flow Analyser	EK028SF	2	11	**18.18**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Acid Neutralising Capacity (ANC)	EA013	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	4	35	**11.43**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Low level CHC (SIM)	EP074E(SIM)	2	4	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Net Acid Generation	EA011	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	2	3	**66.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	2	3	**66.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Semivolatile Organic Compounds	EP075	2	3	**66.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfur - Total as S (LECO)	ED042T	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Fluoride	EK040T	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	22	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	17	**11.76**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Control Samples (LCS) - Continued							
Total Organic Carbon	EP003	2	2	**100.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction (Silica Gel Clean Up)	EP071SG-S	2	3	**66.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	11	**18.18**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	2	11	**18.18**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
WAD Cyanide by Segmented Flow Analyser	EK028SF	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	2	35	**5.71**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Low level CHC (SIM)	EP074E(SIM)	2	4	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	2	3	**66.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	2	3	**66.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Semivolatile Organic Compounds	EP075	2	3	**66.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfur - Total as S (LECO)	ED042T	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Fluoride	EK040T	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	22	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	17	**11.76**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP003	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction (Silica Gel Clean Up)	EP071SG-S	2	3	**66.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	11	**18.18**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	2	11	**18.18**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
WAD Cyanide by Segmented Flow Analyser	EK028SF	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	4	35	**11.43**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Low level CHC (SIM)	EP074E(SIM)	2	4	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	2	3	**66.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	2	3	**66.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	0	3	**0.00**	**5.00**	✗	NEPM 2013 B3 & ALS QC Standard
Semivolatile Organic Compounds	EP075	2	3	**66.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Fluoride	EK040T	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	22	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	17	**11.76**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction (Silica Gel Clean Up)	EP071SG-S	2	3	**66.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	11	**18.18**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	2	11	**18.18**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
WAD Cyanide by Segmented Flow Analyser	EK028SF	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	3	**33.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	3	20	**15.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by Auto Titrator	EK040P	1	7	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Hexavalent Chromium by Discrete Analyser - Water Leachable	EG050G-W	1	3	**33.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Leachable Mercury by FIMS	EG035C	1	3	**33.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Leachable Metals by ICPAES	EG005C	1	3	**33.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	0	3	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Semivolatile Organic Compounds	EP075	0	3	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	3	**33.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	1	3	**33.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	0	4	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Weak Acid Dissociable Cyanide by Segmented Flow Analyser	EK028SF	1	3	**33.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	3	**66.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	3	20	**15.00**	**8.33**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by Auto Titrator	EK040P	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Hexavalent Chromium by Discrete Analyser - Water Leachable	EG050G-W	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Leachable Mercury by FIMS	EG035C	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Leachable Metals by ICPAES	EG005C	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Semivolatile Organic Compounds	EP075	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	3	**66.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	2	3	**66.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Weak Acid Dissociable Cyanide by Segmented Flow Analyser	EK028SF	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Chloride by Discrete Analyser	ED045G	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	1	20	**5.00**	**1.67**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by Auto Titrator	EK040P	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Hexavalent Chromium by Discrete Analyser - Water Leachable	EG050G-W	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Leachable Mercury by FIMS	EG035C	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Method Blanks (MB) - Continued							
Leachable Metals by ICPAES	EG005C	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Semivolatile Organic Compounds	EP075	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Weak Acid Dissociable Cyanide by Segmented Flow Analyser	EK028SF	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Chloride by Discrete Analyser	ED045G	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by Auto Titrator	EK040P	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Hexavalent Chromium by Discrete Analyser - Water Leachable	EG050G-W	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Leachable Mercury by FIMS	EG035C	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Leachable Metals by ICPAES	EG005C	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	0	3	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
Semivolatile Organic Compounds	EP075	0	3	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	0	4	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
Weak Acid Dissociable Cyanide by Segmented Flow Analyser	EK028SF	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH field/fox	EA003	SOIL	In house: Referenced to Ahern et al 1998 - determined on a 1:5 soil/water extract designed to simulate field measured pH and pH after the extract has been oxidised with peroxide.
pH by Auto Titrator	EA005-P	SOIL	In house: Referenced to APHA 4500 H+ B. This procedure determines pH of water samples by automated ISE. This method is compliant with NEPM Schedule B(3)
Conductivity by Auto Titrator	EA010-P	SOIL	In house: Referenced to APHA 2510 B. This procedure determines conductivity by automated ISE. This method is compliant with NEPM Schedule B(3)
Net Acid Generation	EA011	SOIL	In house: Referenced to Miller (1998) Titremetric procedure determines net acidity in a soil following peroxide oxidation. Titrations to both pH 4.5 and pH 7 are reported.
Acid Neutralising Capacity (ANC)	EA013	SOIL	In house: Referenced to USEPA 600/2-78-054, I. Miller (2000). A fizz test is done to semiquanititatively estimate the likely reactivity. The soil is then reacted with an known excess quanitity of an appropriate acid. Titration determines the acid remaining, and the ANC can be calculated from comparison with a blank titration.
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3).
Alkalinity by Auto Titrator	ED037-P	SOIL	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	SOIL	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Sulfur - Total as S (LECO)	ED042T	SOIL	In house: Dried and pulverised sample is combusted in a high temperature furnace in the presence of strong oxidants / catalysts. The evolved S (as SO2) is measured by infra-red detector
Chloride by Discrete Analyser	ED045G	SOIL	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm.
Leachable Metals by ICPAES	EG005C	SOIL	In house: referenced to APHA 3120; USEPA SW 846 - 6010: The ICPAES technique ionises leachate sample atoms emitting a characteristic spectrum. This spectrum is then compared against matrix matched standards for quantification. This method is compliant with NEPM Schedule B(3).
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM Schedule B(3)
Leachable Mercury by FIMS	EG035C	SOIL	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the TCLP solution. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).

Analytical Methods	Method	Matrix	Method Descriptions
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2) (Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3)
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	SOIL	In house: Referenced to USEPA SW846, Method 3060. Hexavalent chromium is extracted by alkaline digestion. The digest is determined by photometrically by automatic discrete analyser, following pH adjustment. The instrument uses colour development using dephenylcarbazide. Each run of samples is measured against a five-point calibration curve. This method is compliant with NEPM Schedule B(3)
Hexavalent Chromium by Discrete Analyser - Water Leachable	EG050G-W	SOIL	In house: Referenced to APHA 3500 Cr-A & B. Hexavalent chromium is determined directly on pH adjusted water leachate samples by Descrete Analyser and colour development using dephenylcarbazide. Each run of samples is measured against a five-point calibration curve. This method is compliant with NEPM Schedule B(3).
Total Cyanide by Segmented Flow Analyser	EK026SF	SOIL	In house: Referenced to APHA 4500-CN C / ASTM D7511 / ISO 14403. Caustic leachates of soil samples are introduced into an automated segmented flow analyser. Complex bound cyanide is decomposed in a continuously flowing stream, at a pH of 3.8, by the effect of UV light. A UV-B lamp (312 nm) and a decomposition spiral of borosilicate glass are used to filter out UV light with a wavelength of less than 290 nm thus preventing the conversion of thiocyanate into cyanide. The hydrogen cyanide present at a pH of 3.8 is separated by gas dialysis. The hydrogen cyanide is then determined photometrically, based on the reaction of cyanide with chloramine-T to form cyanogen chloride. This then reacts with 4-pyridine carboxylic acid and 1,3-dimethylbarbituric acid to give a red colour which is measured at 600 nm. This method is compliant with NEPM Schedule B(3).
Weak Acid Dissociable Cyanide by Segmented Flow Analyser	EK028SF	SOIL	In house: Referenced to APHA 4500-CN C&O / ISO 14403. Samples preserved with sodium hydroxide are introduced into an automated segmented flow analyser. Hydrogen cyanide is liberated from a slightly acidified (pH 4.5) and is dialysed. Tight cyanide complexes that would not be amenable to oxidation by chlorine are not converted. Iron cyanide complexes are precipitated with zinc acetate. Liberated HCN diffuses through a membrane into a stream of sodium hydroxide where it is carried as CN- The cyanide in caustic solution is buffered to pH 5.2 and further converted to cyanogen chloride by reaction with chloramine-T. Cyanogen chloride subsequently reacts with 4 ¿pyridine carboxylic and 1,3 - dimethylbarbituric acids to give a red colour complex. This colour is measured at 600 nm. This method is compliant with NEPM Schedule B(3)
Fluoride by Auto Titrator	EK040P	SOIL	In house: Referenced to APHA 4500-F C: CDTA is added to the sample to provide a uniform ionic strength background, adjust pH, and break up complexes. Fluoride concentration is determined by either manual or automatic ISE measurement. This method is compliant with NEPM Schedule B(3)
Total Fluoride	EK040T	SOIL	(In-house) Total fluoride is determined by ion specific electrode (ISE) in a solution obtained after a Sodium Carbonate / Potassium Carbonate fusion dissolution.
Total Organic Carbon	EP003	SOIL	In house C-IR17. Dried and pulverised sample is reacted with acid to remove inorganic Carbonates, then combusted in a furnace in the presence of strong oxidants / catalysts. The evolved (Organic) Carbon (as CO2) is automatically measured by infra-red detector.
Polychlorinated Biphenyls (PCB)	EP066	SOIL	In house: Referenced to USEPA SW 846 - 8270 Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3).

Analytical Methods	Method	Matrix	Method Descriptions
Pesticides by GCMS	EP068	SOIL	In house: Referenced to USEPA SW 846 - 8270 Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This technique is compliant with NEPM Schedule B(3).
TRH - Semivolatile Fraction (Silica Gel Clean Up)	EP071SG-S	SOIL	In house: Referenced to USEPA SW 846 - 8015. Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40. Compliant with NEPM Schedule B(3).
Volatile Organic Compounds	EP074	SOIL	In house: Referenced to USEPA SW 846 - 8260 Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)
Low level CHC (SIM)	EP074E(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8260 Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3).
Semivolatile Organic Compounds	EP075	SOIL	In house: Referenced to USEPA SW 846 - 8270 Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This technique is compliant with NEPM Schedule B(3).
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM Schedule B(3) amended.
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	SOIL	In house: Referenced to USEPA 8270 GCMS Capiliary column, SIM mode.
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202	SOIL	In house: LCMS (Electrospray in negative mode). Residues of acid herbicides are extracted from soil samples under the alkaline condition. An aliquot of the alkaline aqueous phase is taken and acidified before a SPE cleanup. After eluting off from the SPE cartridge, residues of acid herbicides are dissolved in HPLC mobile phase prior to instrument analysis.
NSW Waste Classification Guidelines - Aggregate Sums	* NSW-WCG	SOIL	In house: This method provides rounded sums for diverse trace organics to suit NSW Waste Classification Guidelines.

Preparation Methods	Method	Matrix	Method Descriptions
NaOH leach for CN in Soils	CN-PR	SOIL	In house: APHA 4500 CN. Samples are extracted by end-over-end tumbling with NaOH.
Alkaline digestion for Hexavalent Chromium	EG048PR	SOIL	In house: Referenced to USEPA SW846, Method 3060A.
Total Fluoride	EK040T-PR	SOIL	In house: Samples are fused with Sodium Carbonate / Potassium Carbonate flux.
Drying only	EN020D	SOIL	In house
Drying at 85 degrees, bagging and labelling (ASS)	EN020PR	SOIL	In house
Digestion for Total Recoverable Metals in TCLP Leachate	EN25C	SOIL	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)
Deionised Water Leach - Glass Leaching Vessel	EN60-Dla-G	SOIL	In house QWI-EN/60 referenced to AS4439.3 Preparation of Leachates
ASLP for Volatile Analytes (Zero Headspace Extraction)	EN60Za	SOIL	In house QWI-EN/60 referenced to AS4439.2 Preparation of Leachates

Preparation Methods	Method	Matrix	Method Descriptions
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM Schedule B(3).
Extraction for Phenoxy Acid Herbicides in Soils.	EP202-PR	SOIL	In-House: Alkaline extract followed by SPE clean up of acidified portion of the sample extract.
Dry and Pulverise (up to 100g)	GEO30	SOIL	#
Separatory Funnel Extraction of Liquids	ORG14	SOIL	In house: Referenced to USEPA SW 846 - 3510 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Volatiles Water Preparation	ORG16-W	SOIL	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for purging.
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.
Tumbler Extraction of Solids/ Acetylation	ORG17A-AC	SOIL	In house: Mechanical agitation (tumbler). 20g of sample, Na2SO4 and surrogate are extracted with 150mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to 1 mL with exchange into cyclohexane. Phenolic compounds are reacted with acetic anhydride to yield phenyl acetates suitable for ultra-trace analysis.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

ALS Laboratory addresses

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☐ BRISBANE: 2 Byth Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com	☐ MELBOURNE: 4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com	☐ HOBART: 4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: hobart@alsglobal.com	☐ TOWNSVILLE: 14-15 Desma Court Blacks Beach QLD 4740 Ph: 07 4796 0600 E: townsville@alsglobal.com
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CLIENT: EMM CONSULTING			TURNAROUND REQUIREMENTS :	☐ ☑ Standard TAT (List due date):			FOR LABORATORY USE ONLY (Circle)		
OFFICE: 20 Chandos Street, St Leonards			(Standard TAT may be longer for some tests e.g. Ultra Trace Organics)	☐ Non Standard or urgent TAT (List due date):			Custody Seal Intact?	Yes	No N/A
PROJECT: Oven Mountain Pumped Storage Project	PROJECT NO.:	J200098	ALS QUOTE NO: NA				Free ice / frozen ice bricks present upon receipt?	Yes	No N/A
PURCHASE ORDER: J200098			COUNTRY OF ORIGIN:				Random Sample Temperature on Receipt		C
PROJECT MANAGER: Henry Noakes			CONTACT PH: 0445 772 835				Other comment:		
SAMPLER: KB			SAMPLER MOBILE: 0401 881 447						
COC Emailed to ALS? (YES)			EDD FORMAT (or default): esdat						
Email Reports to: hnoakes@emmconsulting.com.au / scassidy@emmconsulting.com.au / abayer@emmconsulting.com.au / emmconsulting@esdat.net; rirusoos@emmconsulting.com.au; mbold@emmconsulting.com.au									
Email Invoice to: finance@emmconsulting.com.au / hnoakes@emmconsulting.com.au									
COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:									

COC SEQUENCE NUMBER (Circle)							
COC:	①	2	3	4	5	6	7
OF:	①	2	3	4	5	6	7

RELINQUISHED BY: KB	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
DATE/TIME: 26/08/2022	DATE/TIME: 26/08/22 1920	DATE/TIME:	DATE/TIME:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)				CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).									Additional Information
LAB ID	SAMPLE ID	DATE	TIME	MATRIX	TYPE & PRESERVATIVE *(refer to codes below)*	TOTAL BAGS	Hold - analytical suite to be confirmed via email								Please forward to Envirolab for similar analysis	
1	BH4B_2.39-2.51	25/08/2022		Rock		1	x									
2	BH4B_6.40-6.52	25/08/2022		Rock		1	x									
3	BH4B_13.85-14.0	25/08/2022		Rock		1	x									
4	BH4B_22.05-22.30	26/08/2022		Rock		1	x									
5	BH4B_33.0-33.27	26/08/2022		Rock		1	x									
6	BH4B_39.74-39.91	26/08/2022		Rock		1	x									
7	BH4B_47.89-48.00	26/08/2022		Rock		1	x									
8	BH4B_56.81-57.0	25/08/2022		Rock		1	x									
9	BH4B_62.10-62.30	25/08/2022		Rock		1	x									
10	BH4B_71.07-71.20	25/08/2022		Rock		1	x									
11	BH4B_84.0-84.15	25/08/2022		Rock		1	x									
12	BH4B_86.0-86.15	25/08/2022		Rock		1	x									
13	BH4B_99.82-99.95	25/08/2022		Rock		1	x									
14	BH4B_126.27-126.37	25/08/2022		Rock		1	x									
15	BH4B_148.17-148.36	25/08/2022		Rock		1	x									
16	BH4B_191.75-191.94	25/08/2022		Rock		1	x									
17	BH4B_221.74-221.87	25/08/2022		Rock		1	x									
18	BH4B_325.0-325.16	25/08/2022		Rock		1	x									
19	BH4B_349.86-350.0	25/08/2022		Rock		1	x									

Environmental Division
Sydney
Work Order Reference
ES2230654

Telephone : +61-2-8784 8555

20	BH4B_373.86-374.0	25/08/2022		Rock				1	x																								
21	BH4B_388.0-388.13	25/08/2022		Rock				1	x																								
22	BH4B_419.0-419.14	25/08/2022		Rock				1	x																								
							TOTAL	22	0	0	0	0	0	0	0	0	0																

Water Container Codes: P = Unpreserved Plastic, N = Nitric Preserved Plastic, ORC = Nitric Preserved ORC, SH = Sodium Hydroxide/Cd Preserved, S = Sodium Hydroxide Preserved Plastic, AG = Amber Glass Unpreserved, AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved, VB = VOA Vial Sodium Bisulphate Preserved, VS = VOA Vial Sulfuric Preserved, AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass, H = HCl preserved Plastic, HG = HCl preserved Speciation bottle, SP = Sulfuric Preserved Plastic, F = Formaldehyde Preserved Glass,
Z = Zinc Acetate Preserved Bottle, E = EDTA Preserved Bottles, ST = Sterile Bottle, ASS = Plastic Bag for Acid Sulphate Soils, B = Unpreserved Bag, U = Lugols Iodine Preserved Bottles, STT = Sterile Sodium Thiosulfate Preserved Bottles

Rec: 2 Cas 26/08/22 1920

UPDATED COC

CHAIN OF CUSTODY
ALS Laboratory: please tick →

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BRISBANE 2 Byth Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
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MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
MUDGEE 1/73 Sydney Road Mudgee NSW 2850 Ph: 02 6372 0735 E: mudgee.mail@alsglobal.com
NEWCASTLE 5/585 Maitland Road Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com
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WOLLONGONG 1/19-21 Rach Black Dr. North Wollongong NSW 2500 Ph: 02 4225 3125 E: wollongong@alsglobal.com

CLIENT: EMM CONSULTING	TURNAROUND REQUIREMENTS: ☐ Standard TAT (List due date):		FOR LABORATORY USE ONLY (Circle)
OFFICE: 20 Chandos Street, St Leonards	(Standard TAT may be longer for some tests e.g. Ultra Trace Organics) X Non Standard or urgent TAT (List due date): FRIDAY - 16 December 2022		Custody Seal Intact? Yes No N/A
PROJECT: Oven Mountain Pumped Storage Project PROJECT NO.: J200096	ALS QUOTE NO: NA	COC SEQUENCE NUMBER (Circle)	Frozen ice / frozen ice bricks present upon receipt? Yes No N/A
PURCHASE ORDER: J200096	COUNTRY OF ORIGIN:	COC: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt: C
PROJECT MANAGER: Henry Noakes	CONTACT PH: 0448 772 835	OF: 1 2 3 4 5 6 7	Other comment:

SAMPLER: KB	SAMPLER MOBILE: 0401 881 447	RELINQUISHED BY: KJN	RECEIVED BY: J G	RELINQUISHED BY: / RECEIVED BY:
COC Emailed to ALS? (YES)	EDD FORMAT (or default): esdat			
Email Reports to: hnoakes@emmconsulting.com.au / kcassidy@emmconsulting.com.au / abayor@emmconsulting.com.au / emmconsulting@esdat.net; rbrusaolt@emmconsulting.com.au, mskold@emmconsulting.com.au		DATE/TIME: 14/09/1902	DATE/TIME: 14/09/22 1550	DATE/TIME: / DATE/TIME:
Email Invoice to: finance@emmconsulting.com.au / hnoakes@emmconsulting.com.au				

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)				CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).									Additional Information
LAB ID	SAMPLE ID	DATE	TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL	Waste classification (P-773 leng)	Acid neutralising capacity	Total sulfur (S-IR08)	Metals and metalloids (ME-MS61m)	ASLP Suite (as per attached quote)	Rock analysis (as per attached quote)				
1	BH4B_2.39-2.51	25/08/2022		Rock	BAG	1	1				1					
2	BH4B_6.40-6.52	25/08/2022		Rock	BAG	1				1	1	1				
3	BH4B_13.85-14.0	25/08/2022		Rock	BAG	1										
4	BH4B_22.05-22.30	25/08/2022		Rock	BAG	1	1				1					
5	BH4B_33.0-33.27	25/08/2022		Rock	BAG	1										
6	BH4B_39.74-39.91	25/08/2022		Rock	BAG	1				1	1	1				
7	BH4B_47.89-48.00	25/08/2022		Rock	BAG	1										
8	BH4B_56.81-57.0	25/08/2022		Rock	BAG	1										
9	BH4B_62.10-62.30	25/08/2022		Rock	BAG	1										
10	BH4B_71.07-71.20	25/08/2022		Rock	BAG	1				1	1	1				
11	BH4B_84.0-84.15	25/08/2022		Rock	BAG	1										
12	BH4B_86.0-86.15	25/08/2022		Rock	BAG	1										
13	BH4B_99.82-99.95	25/08/2022		Rock	BAG	1										
14	BH4B_126.27-126.37	25/08/2022		Rock	BAG	1	1				1					
15	BH4B_148.17-148.36	25/08/2022		Rock	BAG	1				1	1	1				
16	BH4B_191.75-191.94	25/08/2022		Rock	BAG	1										
17	BH4B_221.74-221.87	25/08/2022		Rock	BAG	1										
18	BH4B_325.0-325.16	25/08/2022		Rock	BAG	1										
19	BH4B_349.86-350.0	25/08/2022		Rock	BAG	1										
20	BH4B_373.86-374.0	25/08/2022		Rock	BAG	1										
21	BH4B_388.0-388.13	25/08/2022		Rock	BAG	1										
22	BH4B_419.0-419.14	25/08/2022		Rock	BAG	1				1	1	1				
23	MB01A_26-36.5	12/09/2022	15:00	Solids	JAR	1				1	1	1				

Environmental Division
Sydney
Work Order Reference
ES2230654

Telephone : – 61-2-8784 8555

24	MB02B_0-9	12/09/2022	15:00	Solids	JAR	1	1				1					
25	MB02B_178-187	12/09/2022	15:00	Solids	JAR	1										
26	MB03B_7-20	12/09/2022	15:00	Solids	JAR	1	1			1	1	1				
29	MB03B_54-63	12/09/2022	15:00	Solids	JAR	1										
					TOTAL	27	5	0	0	7	11	7	0	0	0	

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VS = VOA Vial Sodium Bisulphate Preserved; VA = VOA Vial Sulfuric Preserved, AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass, H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag; U = Lugols Iodine Preserved Bottles; STT = Sterile Sodium Thiosulfate Preserved Bottles

Rec: L Cu 14/09/22 1550

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES2230654**	Page	: 1 of 28
Amendment	: **(Preliminary Report)**		
Client	: **EMM CONSULTING PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: HENRY NOAKES	Contact	: Cez Bautista
Address	: Ground Floor Suite 1 20 Chandos Street St Leonards NSW NSW 2065	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: ----	Date Samples Received	: 26-Aug-2022 19:20
Order number	: J200096	Date Analysis Commenced	: 26-Sep-2022
C-O-C number	: ----	Issue Date	: 11-Oct-2022 09:52
Sampler	: KB		
Site	: ----		
Quote number	: SY/284/22		
No. of samples received	: 22		
No. of samples analysed	: 9		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Alex Rossi	Organic Chemist	Sydney Inorganics, Smithfield, NSW
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Khin Htwe	LAB TECH	Sydney Organics, Smithfield, NSW
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Layla Hafner	Acid Sulphate Soils - Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, Smithfield, NSW
Zoran Grozdanovski	Laboratory Operator	Newcastle - Inorganics, Mayfield West, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

This report contains preliminary authorised results. The report may contain semi-quantitative results. Any result presented in this preliminary report may be subject to change in the final report.

- EP202: Poor matrix spike recoveries for Clopyralid due to matrix effects.
- EG050G: Poor spike recovery for Hexavalent Chromium due to matrix interferences(confirmed by re-analysis).
- EG048G: Poor spike recovery forAlkaline Hexavalent Chromium due to matrix interferences.
- EG050G: LOR raised for Hexavalent Chromium on sample 1 due to sample matrix.
- EP075: Where reported, Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP068: Where reported, Total Chlordane (sum) is the sum of the reported concentrations of cis-Chlordane and trans-Chlordane at or above the LOR.
- EP068: Where reported, Total OCP is the sum of the reported concentrations of all Organochlorine Pesticides at or above LOR.
- NSW-WCG: Where reported, Total Chlorinated Hydrocarbons is the sum of the reported concentrations of all Chlorinated Hydrocarbons at or above the LOR.
- EP074: Where reported, Total Trihalomethanes is the sum of the reported concentrations of all Trihalomethanes at or above the LOR.
- EP074: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP074: Where reported, Sum of chlorinated hydrocarbons includes carbon tetrachloride, chlorobenzene, chloroform, 1,2-dichlorobenzene, 1,4-dichlorobenzene, 1,2-dichloroethane, 1,1-dichloroethene, cis-1,2-dichlorothene, trans-1,2-dichlorothene, 1,1,1,2-tetrachloroethane, 1,1,2,2-tetrachloroethane, 1,2,4-trichlorobenzene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, trichloroethene, vinyl chloride, hexachlorobutadiene and methylene chloride.
- EP074: Where reported, Total Trimethylbenzenes is the sum of the reported concentrations of 1.2.3-Trimethylbenzene, 1.2.4-Trimethylbenzene and 1.3.5-Trimethylbenzene at or above the LOR.
- EP075: Poor surrogate recovery due to sample heterogeneity. Confirmed by re-extraction and re-analysis.
- ASS: EA013 (ANC) Fizz Rating: 0- None; 1- Slight; 2- Moderate; 3- Strong; 4- Very Strong; 5- Lime.
- EP075: Where reported, 'Sum of PAH' is the sum of the USEPA 16 priority PAHs
- ASS: EA003 (NATA Field and F(ox) screening): pH F(ox) Reaction Rate: 1 - Slight; 2 - Moderate; 3 - Strong; 4 - Extreme
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.

- EP132: Where reported, Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.

Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)			Sample ID	BH4B_2.39-2.51	BH4B_22.05-22.30	BH4B_126.27-126.37	BH4B_388.0-388.13	----
			Sampling date / time	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	----
Compound	CAS Number	LOR	Unit	ES2230654-001	ES2230654-004	ES2230654-014	ES2230654-021	--------
				Result	Result	Result	Result	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**7.21**	**7.62**	**7.53**	**7.62**	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**19**	**37**	**31**	**27**	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**7**	**14**	**16**	**15**	----
Total Alkalinity as CaCO3	----	1	mg/L	**7**	**14**	**16**	**15**	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	<1	<1	<1	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	<1	<1	<1	<1	----
EG005(ED093)C: Leachable Metals by ICPAES								
Aluminium	7429-90-5	0.1	mg/L	**4.1**	**3.1**	**4.0**	**4.2**	----
Antimony	7440-36-0	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	----
Arsenic	7440-38-2	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	----
Beryllium	7440-41-7	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	----
Boron	7440-42-8	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	----
Cadmium	7440-43-9	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	----
Chromium	7440-47-3	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	----
Iron	7439-89-6	0.1	mg/L	**2.6**	**1.0**	**4.2**	**4.3**	----
Lead	7439-92-1	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	----
Manganese	7439-96-5	0.1	mg/L	**0.1**	**0.1**	<0.1	<0.1	----
Nickel	7440-02-0	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	----
Selenium	7782-49-2	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	----
Silver	7440-22-4	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	----
Molybdenum	7439-98-7	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	----
EG035C: Leachable Mercury by FIMS								
Mercury	7439-97-6	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	----
EG050G: Hexavalent Chromium by Discrete Analyser								
Hexavalent Chromium	18540-29-9	0.01	mg/L	<0.10	<0.01	<0.01	<0.01	----
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	<0.1	**0.1**	**0.1**	<0.1	----
EP068A: Organochlorine Pesticides (OC)								

Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)				Sample ID	BH4B_2.39-2.51	BH4B_22.05-22.30	BH4B_126.27-126.37	BH4B_388.0-388.13	----
				Sampling date / time	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	----
Compound	CAS Number	LOR	Unit		ES2230654-001	ES2230654-004	ES2230654-014	ES2230654-021	--------
					Result	Result	Result	Result	----
EP068A: Organochlorine Pesticides (OC) - Continued									
alpha-BHC	319-84-6	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
beta-BHC	319-85-7	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
gamma-BHC	58-89-9	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
delta-BHC	319-86-8	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
Heptachlor	76-44-8	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
Aldrin	309-00-2	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
Heptachlor epoxide	1024-57-3	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
trans-Chlordane	5103-74-2	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
alpha-Endosulfan	959-98-8	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
cis-Chlordane	5103-71-9	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
Dieldrin	60-57-1	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
4.4`-DDE	72-55-9	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
Endrin	72-20-8	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
beta-Endosulfan	33213-65-9	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
4.4`-DDD	72-54-8	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
Endrin aldehyde	7421-93-4	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
Endosulfan sulfate	1031-07-8	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
4.4`-DDT	50-29-3	2.0	µg/L		<2.0	<2.0	<2.0	<2.0	----
Endrin ketone	53494-70-5	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
Methoxychlor	72-43-5	2.0	µg/L		<2.0	<2.0	<2.0	<2.0	----
^ Total Chlordane (sum)	----	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
Demeton-S-methyl	919-86-8	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
Monocrotophos	6923-22-4	2.0	µg/L		<2.0	<2.0	<2.0	<2.0	----
Dimethoate	60-51-5	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
Diazinon	333-41-5	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
Chlorpyrifos-methyl	5598-13-0	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
Parathion-methyl	298-00-0	2.0	µg/L		<2.0	<2.0	<2.0	<2.0	----
Malathion	121-75-5	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
Fenthion	55-38-9	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----

Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)				Sample ID	BH4B_2.39-2.51	BH4B_22.05-22.30	BH4B_126.27-126.37	BH4B_388.0-388.13	----
				Sampling date / time	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	----
Compound	CAS Number	LOR	Unit		ES2230654-001	ES2230654-004	ES2230654-014	ES2230654-021	--------
					Result	Result	Result	Result	----
EP068B: Organophosphorus Pesticides (OP) - Continued									
Chlorpyrifos	2921-88-2	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
Parathion	56-38-2	2.0	µg/L		<2.0	<2.0	<2.0	<2.0	----
Pirimphos-ethyl	23505-41-1	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
Chlorfenvinphos	470-90-6	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
Bromophos-ethyl	4824-78-6	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
Fenamiphos	22224-92-6	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
Prothiofos	34643-46-4	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
Ethion	563-12-2	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
Carbophenothion	786-19-6	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
Azinphos Methyl	86-50-0	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
EP068C: Triazines									
Atrazine	1912-24-9	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
Simazine	122-34-9	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
EP068D: Cypermethrins									
Cypermethrins	----	2.0	µg/L		<2.0	<2.0	<2.0	<2.0	----
EP068E: Other Pesticides									
Methoprene	40596-69-8	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
EP075A: Phenolic Compounds									
Phenol	108-95-2	2	µg/L		<2	<2	<2	<2	----
2-Chlorophenol	95-57-8	2	µg/L		<2	<2	<2	<2	----
2-Methylphenol	95-48-7	2	µg/L		<2	<2	<2	<2	----
3- & 4-Methylphenol	1319-77-3	4	µg/L		<4	<4	<4	<4	----
2-Nitrophenol	88-75-5	2	µg/L		<2	<2	<2	<2	----
2.4-Dimethylphenol	105-67-9	2	µg/L		<2	<2	<2	<2	----
2.4-Dichlorophenol	120-83-2	2	µg/L		<2	<2	<2	<2	----
2.6-Dichlorophenol	87-65-0	2	µg/L		<2	<2	<2	<2	----
4-Chloro-3-methylphenol	59-50-7	2	µg/L		<2	<2	<2	<2	----
2.4.6-Trichlorophenol	88-06-2	2	µg/L		<2	<2	<2	<2	----
2.4.5-Trichlorophenol	95-95-4	2	µg/L		<2	<2	<2	<2	----
Pentachlorophenol	87-86-5	4	µg/L		<4	<4	<4	<4	----
EP075B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	2	µg/L		<2	<2	<2	<2	----
2-Methylnaphthalene	91-57-6	2	µg/L		<2	<2	<2	<2	----
2-Chloronaphthalene	91-58-7	2	µg/L		<2	<2	<2	<2	----

Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)				Sample ID	BH4B_2.39-2.51	BH4B_22.05-22.30	BH4B_126.27-126.37	BH4B_388.0-388.13	----
				Sampling date / time	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	----
Compound	CAS Number	LOR	Unit		ES2230654-001	ES2230654-004	ES2230654-014	ES2230654-021	--------
					Result	Result	Result	Result	----
EP075B: Polynuclear Aromatic Hydrocarbons - Continued									
Acenaphthylene	208-96-8	2	µg/L		<2	<2	<2	<2	----
Acenaphthene	83-32-9	2	µg/L		<2	<2	<2	<2	----
Fluorene	86-73-7	2	µg/L		<2	<2	<2	<2	----
Phenanthrene	85-01-8	2	µg/L		<2	<2	<2	<2	----
Anthracene	120-12-7	2	µg/L		<2	<2	<2	<2	----
Fluoranthene	206-44-0	2	µg/L		<2	<2	<2	<2	----
Pyrene	129-00-0	2	µg/L		<2	<2	<2	<2	----
N-2-Fluorenyl Acetamide	53-96-3	2	µg/L		<2	<2	<2	<2	----
Benz(a)anthracene	56-55-3	2	µg/L		<2	<2	<2	<2	----
Chrysene	218-01-9	2	µg/L		<2	<2	<2	<2	----
Benzo(b+j) & Benzo(k)fluoranthene	205-99-2 207-08-9	4	µg/L		<4	<4	<4	<4	----
7.12-Dimethylbenz(a)anthracene	57-97-6	2	µg/L		<2	<2	<2	<2	----
Benzo(a)pyrene	50-32-8	2	µg/L		<2	<2	<2	<2	----
3-Methylcholanthrene	56-49-5	2	µg/L		<2	<2	<2	<2	----
Indeno(1.2.3.cd)pyrene	193-39-5	2	µg/L		<2	<2	<2	<2	----
Dibenz(a.h)anthracene	53-70-3	2	µg/L		<2	<2	<2	<2	----
Benzo(g.h.i)perylene	191-24-2	2	µg/L		<2	<2	<2	<2	----
^ Sum of PAHs	----	2	µg/L		<2	<2	<2	<2	----
^ Benzo(a)pyrene TEQ (zero)	----	2	µg/L		<2	<2	<2	<2	----
EP075C: Phthalate Esters									
Dimethyl phthalate	131-11-3	2	µg/L		<2	<2	<2	<2	----
Diethyl phthalate	84-66-2	2	µg/L		<2	<2	<2	<2	----
Di-n-butyl phthalate	84-74-2	2	µg/L		<2	<2	<2	<2	----
Butyl benzyl phthalate	85-68-7	2	µg/L		<2	<2	<2	<2	----
bis(2-ethylhexyl) phthalate	117-81-7	10	µg/L		<10	<10	<10	<10	----
Di-n-octylphthalate	117-84-0	2	µg/L		<2	<2	<2	<2	----
EP075D: Nitrosamines									
N-Nitrosomethylethylamine	10595-95-6	2	µg/L		<2	<2	<2	<2	----
N-Nitrosodiethylamine	55-18-5	2	µg/L		<2	<2	<2	<2	----
N-Nitrosopyrrolidine	930-55-2	4	µg/L		<4	<4	<4	<4	----
N-Nitrosomorpholine	59-89-2	2	µg/L		<2	<2	<2	<2	----
N-Nitrosodi-n-propylamine	621-64-7	2	µg/L		<2	<2	<2	<2	----
N-Nitrosopiperidine	100-75-4	2	µg/L		<2	<2	<2	<2	----
N-Nitrosodibutylamine	924-16-3	2	µg/L		<2	<2	<2	<2	----

Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)				Sample ID	BH4B_2.39-2.51	BH4B_22.05-22.30	BH4B_126.27-126.37	BH4B_388.0-388.13	----
				Sampling date / time	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	----
Compound	CAS Number	LOR	Unit		ES2230654-001	ES2230654-004	ES2230654-014	ES2230654-021	--------
					Result	Result	Result	Result	----
EP075D: Nitrosamines - Continued									
N-Nitrosodiphenyl & Diphenylamine	86-30-6 122-39-4	4	µg/L		<4	<4	<4	<4	----
Methapyrilene	91-80-5	2	µg/L		<2	<2	<2	<2	----
EP075E: Nitroaromatics and Ketones									
2-Picoline	109-06-8	2	µg/L		<2	<2	<2	<2	----
Acetophenone	98-86-2	2	µg/L		<2	<2	<2	<2	----
Nitrobenzene	98-95-3	2	µg/L		<2	<2	<2	<2	----
Isophorone	78-59-1	2	µg/L		<2	<2	<2	<2	----
2.6-Dinitrotoluene	606-20-2	4	µg/L		<4	<4	<4	<4	----
2.4-Dinitrotoluene	121-14-2	4	µg/L		<4	<4	<4	<4	----
1-Naphthylamine	134-32-7	2	µg/L		<2	<2	<2	<2	----
4-Nitroquinoline-N-oxide	56-57-5	2	µg/L		<2	<2	<2	<2	----
5-Nitro-o-toluidine	99-55-8	2	µg/L		<2	<2	<2	<2	----
Azobenzene	103-33-3	2	µg/L		<2	<2	<2	<2	----
1.3.5-Trinitrobenzene	99-35-4	2	µg/L		<2	<2	<2	<2	----
Phenacetin	62-44-2	2	µg/L		<2	<2	<2	<2	----
4-Aminobiphenyl	92-67-1	2	µg/L		<2	<2	<2	<2	----
Pentachloronitrobenzene	82-68-8	2	µg/L		<2	<2	<2	<2	----
Pronamide	23950-58-5	2	µg/L		<2	<2	<2	<2	----
Dimethylaminoazobenzene	60-11-7	2	µg/L		<2	<2	<2	<2	----
Chlorobenzilate	510-15-6	2	µg/L		<2	<2	<2	<2	----
EP075F: Haloethers									
Bis(2-chloroethyl) ether	111-44-4	2	µg/L		<2	<2	<2	<2	----
Bis(2-chloroethoxy) methane	111-91-1	2	µg/L		<2	<2	<2	<2	----
4-Chlorophenyl phenyl ether	7005-72-3	2	µg/L		<2	<2	<2	<2	----
4-Bromophenyl phenyl ether	101-55-3	2	µg/L		<2	<2	<2	<2	----
EP075G: Chlorinated Hydrocarbons									
1.3-Dichlorobenzene	541-73-1	2	µg/L		<2	<2	<2	<2	----
1.4-Dichlorobenzene	106-46-7	2	µg/L		<2	<2	<2	<2	----
1.2-Dichlorobenzene	95-50-1	2	µg/L		<2	<2	<2	<2	----
Hexachloroethane	67-72-1	2	µg/L		<2	<2	<2	<2	----
1.2.4-Trichlorobenzene	120-82-1	2	µg/L		<2	<2	<2	<2	----
Hexachloropropylene	1888-71-7	2	µg/L		<2	<2	<2	<2	----
Hexachlorobutadiene	87-68-3	2	µg/L		<2	<2	<2	<2	----

Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)				Sample ID	BH4B_2.39-2.51	BH4B_22.05-22.30	BH4B_126.27-126.37	BH4B_388.0-388.13	----
				Sampling date / time	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	----
Compound	CAS Number	LOR	Unit		ES2230654-001	ES2230654-004	ES2230654-014	ES2230654-021	--------
					Result	Result	Result	Result	----
EP075G: Chlorinated Hydrocarbons - Continued									
Hexachlorocyclopentadiene	77-47-4	10	µg/L		<10	<10	<10	<10	----
Pentachlorobenzene	608-93-5	2	µg/L		<2	<2	<2	<2	----
Hexachlorobenzene (HCB)	118-74-1	4	µg/L		<4	<4	<4	<4	----
EP075H: Anilines and Benzidines									
Aniline	62-53-3	2	µg/L		<2	<2	<2	<2	----
4-Chloroaniline	106-47-8	2	µg/L		<2	<2	<2	<2	----
2-Nitroaniline	88-74-4	4	µg/L		<4	<4	<4	<4	----
3-Nitroaniline	99-09-2	4	µg/L		<4	<4	<4	<4	----
Dibenzofuran	132-64-9	2	µg/L		<2	<2	<2	<2	----
4-Nitroaniline	100-01-6	2	µg/L		<2	<2	<2	<2	----
Carbazole	86-74-8	2	µg/L		<2	<2	<2	<2	----
3.3`-Dichlorobenzidine	91-94-1	2	µg/L		<2	<2	<2	<2	----
EP075I: Organochlorine Pesticides									
alpha-BHC	319-84-6	2	µg/L		<2	<2	<2	<2	----
beta-BHC	319-85-7	2	µg/L		<2	<2	<2	<2	----
gamma-BHC	58-89-9	2	µg/L		<2	<2	<2	<2	----
delta-BHC	319-86-8	2	µg/L		<2	<2	<2	<2	----
Heptachlor	76-44-8	2	µg/L		<2	<2	<2	<2	----
Aldrin	309-00-2	2	µg/L		<2	<2	<2	<2	----
Heptachlor epoxide	1024-57-3	2	µg/L		<2	<2	<2	<2	----
alpha-Endosulfan	959-98-8	2	µg/L		<2	<2	<2	<2	----
4.4`-DDE	72-55-9	2	µg/L		<2	<2	<2	<2	----
Dieldrin	60-57-1	2	µg/L		<2	<2	<2	<2	----
Endrin	72-20-8	2	µg/L		<2	<2	<2	<2	----
beta-Endosulfan	33213-65-9	2	µg/L		<2	<2	<2	<2	----
4.4`-DDD	72-54-8	2	µg/L		<2	<2	<2	<2	----
Endosulfan sulfate	1031-07-8	2	µg/L		<2	<2	<2	<2	----
4.4`-DDT	50-29-3	4	µg/L		<4	<4	<4	<4	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	4	µg/L		<4	<4	<4	<4	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	4	µg/L		<4	<4	<4	<4	----
EP075J: Organophosphorus Pesticides									
Dichlorvos	62-73-7	2	µg/L		<2	<2	<2	<2	----
Dimethoate	60-51-5	2	µg/L		<2	<2	<2	<2	----

Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)				Sample ID	BH4B_2.39-2.51	BH4B_22.05-22.30	BH4B_126.27-126.37	BH4B_388.0-388.13	----
				Sampling date / time	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	----
Compound	CAS Number	LOR	Unit		ES2230654-001	ES2230654-004	ES2230654-014	ES2230654-021	--------
					Result	Result	Result	Result	----
EP075J: Organophosphorus Pesticides - Continued									
Diazinon	333-41-5	2	µg/L		<2	<2	<2	<2	----
Chlorpyrifos-methyl	5598-13-0	2	µg/L		<2	<2	<2	<2	----
Malathion	121-75-5	2	µg/L		<2	<2	<2	<2	----
Fenthion	55-38-9	2	µg/L		<2	<2	<2	<2	----
Chlorpyrifos	2921-88-2	2	µg/L		<2	<2	<2	<2	----
Pirimphos-ethyl	23505-41-1	2	µg/L		<2	<2	<2	<2	----
Chlorfenvinphos	470-90-6	2	µg/L		<2	<2	<2	<2	----
Prothiofos	34643-46-4	2	µg/L		<2	<2	<2	<2	----
Ethion	563-12-2	2	µg/L		<2	<2	<2	<2	----
EP075K: Miscellaneous Compounds									
1.3.5-Trichlorobenzene	108-70-3	2	µg/L		<2	<2	<2	<2	----
1.2.4.5-Tetrachlorobenzene	95-94-3	2	µg/L		<2	<2	<2	<2	----
Methanesulfonate methyl	66-27-3	2	µg/L		<2	<2	<2	<2	----
cis-Isosafrole	17627-76-8	2	µg/L		<2	<2	<2	<2	----
trans-Isosafrole	4043-71-4	2	µg/L		<2	<2	<2	<2	----
Safrole	94-59-7	2	µg/L		<2	<2	<2	<2	----
Diallate	2303-16-4	2	µg/L		<2	<2	<2	<2	----
2.3.4.6-Tetrachlorophenol	58-90-2	2	µg/L		<2	<2	<2	<2	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.5	%		89.8	116	82.6	93.1	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.5	%		78.1	109	77.3	92.8	----
EP075S: Acid Extractable Surrogates									
2-Fluorophenol	367-12-4	2	%		10.3	5.1	7.5	8.6	----
Phenol-d6	13127-88-3	2	%		23.1	19.2	22.2	24.6	----
2-Chlorophenol-D4	93951-73-6	2	%		26.6	13.9	21.8	24.0	----
2.4.6-Tribromophenol	118-79-6	2	%		13.2	5.4	7.9	9.3	----
EP075T: Base/Neutral Extractable Surrogates									
Nitrobenzene-D5	4165-60-0	2	%		65.1	72.3	65.8	69.4	----
1.2-Dichlorobenzene-D4	2199-69-1	2	%		56.5	59.2	55.3	58.9	----
2-Fluorobiphenyl	321-60-8	2	%		59.8	65.1	58.4	62.1	----
Anthracene-d10	1719-06-8	2	%		69.8	82.1	65.4	72.8	----
4-Terphenyl-d14	1718-51-0	2	%		75.3	94.6	72.0	80.5	----

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Sample ID	BH4B_2.39-2.51	BH4B_6.40-6.52	BH4B_22.05-22.30	BH4B_39.74-39.91	BH4B_71.0-71.20
			Sampling date / time	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00
Compound	CAS Number	LOR	Unit	ES2230654-001	ES2230654-002	ES2230654-004	ES2230654-006	ES2230654-010
				Result	Result	Result	Result	Result
EA003 :pH (field/fox)								
pH (F)	----	0.1	pH Unit	----	8.5	----	8.1	7.0
pH (Fox)	----	0.1	pH Unit	----	4.9	----	3.4	2.9
Reaction Rate	----	1	Reaction Unit	----	2	----	2	2
EA011: Net Acid Generation								
pH (OX)	----	0.1	pH Unit	----	7.1	----	6.9	4.6
NAG (pH 4.5)	----	0.1	kg H2SO4/t	----	<0.1	----	<0.1	<0.1
NAG (pH 7.0)	----	0.1	kg H2SO4/t	----	<0.1	----	0.5	3.5
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	----	17.8	----	9.5	14.8
ANC as CaCO3	----	0.1	% CaCO3	----	1.8	----	1.0	1.5
Fizz Rating	----	0	Fizz Unit	----	1	----	0	1
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	<1.0	----	<1.0	----	----
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	----	0.03	----	0.05	0.18
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	6	----	<5	----	----
Beryllium	7440-41-7	1	mg/kg	<1	----	<1	----	----
Cadmium	7440-43-9	1	mg/kg	<1	----	<1	----	----
Lead	7439-92-1	5	mg/kg	<5	----	19	----	----
Molybdenum	7439-98-7	2	mg/kg	<2	----	<2	----	----
Nickel	7440-02-0	2	mg/kg	3	----	<2	----	----
Selenium	7782-49-2	5	mg/kg	<5	----	<5	----	----
Silver	7440-22-4	2	mg/kg	<2	----	<2	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	----	<0.1	----	----
EG048: Hexavalent Chromium (Alkaline Digest)								
Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	----	<0.5	----	----
EK026SF: Total CN by Segmented Flow Analyser								
Total Cyanide	57-12-5	1	mg/kg	<1	----	<1	----	----
EK028SF: Weak Acid Dissociable CN by Segmented Flow Analyser								
Weak Acid Dissociable Cyanide	----	1	mg/kg	<1	----	<1	----	----
EK040T: Fluoride Total								

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Sample ID	BH4B_2.39-2.51	BH4B_6.40-6.52	BH4B_22.05-22.30	BH4B_39.74-39.91	BH4B_71.0-71.20
			Sampling date / time	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00
Compound	CAS Number	LOR	Unit	ES2230654-001	ES2230654-002	ES2230654-004	ES2230654-006	ES2230654-010
				Result	Result	Result	Result	Result
EK040T: Fluoride Total - Continued								
Fluoride	16984-48-8	40	mg/kg	500	----	770	----	----
EN60-DI: Bottle Leaching Procedure - Inorganics/Non-Volatile Organics (Glass Vessel)								
Final pH	----	0.1	pH Unit	8.9	----	9.6	----	----
EN60Z: ASLP Leachate - ZHE								
Extraction Fluid pH	----	0.1	pH Unit	8.9	----	9.6	----	----
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	----	0.02	----	0.38	0.06
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	----	<0.1	----	----
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	----	<0.05	----	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	----	<0.05	----	----
beta-BHC	319-85-7	0.05	mg/kg	<0.05	----	<0.05	----	----
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	----	<0.05	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	----	<0.05	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	----	<0.05	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	----	<0.05	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	----	<0.05	----	----
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	----	<0.05	----	----
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	----	<0.05	----	----
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	----	<0.05	----	----
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	----	<0.05	----	----
Dieldrin	60-57-1	0.05	mg/kg	<0.05	----	<0.05	----	----
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	----	<0.05	----	----
Endrin	72-20-8	0.05	mg/kg	<0.05	----	<0.05	----	----
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	----	<0.05	----	----
4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	----	<0.05	----	----
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	----	<0.05	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	----	<0.05	----	----
4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	----	<0.2	----	----
EP068B: Organophosphorus Pesticides (OP)								
Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	----	<0.05	----	----
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup								
>C10 - C16 Fraction	----	50	mg/kg	<50	----	<50	----	----

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)				Sample ID	BH4B_2.39-2.51	BH4B_6.40-6.52	BH4B_22.05-22.30	BH4B_39.74-39.91	BH4B_71.0-71.20
				Sampling date / time	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00
Compound	CAS Number	LOR	Unit		ES2230654-001	ES2230654-002	ES2230654-004	ES2230654-006	ES2230654-010
					Result	Result	Result	Result	Result
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup - Continued									
>C16 - C34 Fraction	----	100	mg/kg		<100	----	<100	----	----
>C34 - C40 Fraction	----	100	mg/kg		<100	----	<100	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	----	<50	----	----
EP071 SG-S: Total Petroleum Hydrocarbons in Soil - Silica gel cleanup									
C10 - C14 Fraction	----	50	mg/kg		<50	----	<50	----	----
C15 - C28 Fraction	----	100	mg/kg		<100	----	<100	----	----
C29 - C36 Fraction	----	100	mg/kg		<100	----	<100	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	----	<50	----	----
EP074A: Monocyclic Aromatic Hydrocarbons									
Benzene	71-43-2	0.2	mg/kg		<0.2	----	<0.2	----	----
Toluene	108-88-3	0.5	mg/kg		<0.5	----	<0.5	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	----	<0.5	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	----	<0.5	----	----
Styrene	100-42-5	0.5	mg/kg		<0.5	----	<0.5	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	----	<0.5	----	----
EP074B: Oxygenated Compounds									
2-Butanone (MEK)	78-93-3	5	mg/kg		<5	----	<5	----	----
EP074E(SIM): Halogenated Aliphatic Compounds									
Vinyl chloride	75-01-4	0.2	mg/kg		<0.2	----	<0.2	----	----
EP074E: Halogenated Aliphatic Compounds									
Vinyl chloride	75-01-4	4	mg/kg		<4	----	<4	----	----
1.1-Dichloroethene	75-35-4	0.5	mg/kg		<0.5	----	<0.5	----	----
Methylene chloride	75-09-2	0.5	mg/kg		<0.5	----	<0.5	----	----
1.1.1-Trichloroethane	71-55-6	0.5	mg/kg		<0.5	----	<0.5	----	----
Carbon Tetrachloride	56-23-5	0.5	mg/kg		<0.5	----	<0.5	----	----
1.2-Dichloroethane	107-06-2	0.5	mg/kg		<0.5	----	<0.5	----	----
Trichloroethene	79-01-6	0.5	mg/kg		<0.5	----	<0.5	----	----
1.1.2-Trichloroethane	79-00-5	0.5	mg/kg		<0.5	----	<0.5	----	----
Tetrachloroethene	127-18-4	0.5	mg/kg		<0.5	----	<0.5	----	----
1.1.1.2-Tetrachloroethane	630-20-6	0.5	mg/kg		<0.5	----	<0.5	----	----
1.1.2.2-Tetrachloroethane	79-34-5	0.5	mg/kg		<0.5	----	<0.5	----	----
EP074F: Halogenated Aromatic Compounds									
Chlorobenzene	108-90-7	0.5	mg/kg		<0.5	----	<0.5	----	----
EP074G: Trihalomethanes									

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Sample ID	BH4B_2.39-2.51	BH4B_6.40-6.52	BH4B_22.05-22.30	BH4B_39.74-39.91	BH4B_71.0-71.20
			Sampling date / time	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00
Compound	CAS Number	LOR	Unit	ES2230654-001	ES2230654-002	ES2230654-004	ES2230654-006	ES2230654-010
				Result	Result	Result	Result	Result
EP074G: Trihalomethanes - Continued								
Chloroform	67-66-3	0.5	mg/kg	<0.5	----	<0.5	----	----
EP075A: Phenolic Compounds								
Phenol	108-95-2	0.5	mg/kg	<0.5	----	<0.5	----	----
2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	----	<0.5	----	----
3- & 4-Methylphenol	1319-77-3	0.5	mg/kg	<0.5	----	<0.5	----	----
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	----	<0.5	----	----
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	----	<0.5	----	----
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	----	<0.5	----	----
Pentachlorophenol	87-86-5	1	mg/kg	<1	----	<1	----	----
EP075B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	----	<0.5	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	----	<0.5	----	----
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	----	<0.5	----	----
Fluorene	86-73-7	0.5	mg/kg	<0.5	----	<0.5	----	----
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	----	<0.5	----	----
Anthracene	120-12-7	0.5	mg/kg	<0.5	----	<0.5	----	----
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	----	<0.5	----	----
Pyrene	129-00-0	0.5	mg/kg	<0.5	----	<0.5	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	----	<0.5	----	----
Chrysene	218-01-9	0.5	mg/kg	<0.5	----	<0.5	----	----
Benzo(b+j) & Benzo(k)fluoranthene	205-99-2 207-08-9	1	mg/kg	<1	----	<1	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	----	<0.5	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	----	<0.5	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	----	<0.5	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	----	<0.5	----	----
^ Sum of PAHs	----	0.5	mg/kg	<0.5	----	<0.5	----	----
EP075C: Phthalate Esters								
bis(2-ethylhexyl) phthalate	117-81-7	5.0	mg/kg	<5.0	----	<5.0	----	----
EP075E: Nitroaromatics and Ketones								
Nitrobenzene	98-95-3	0.5	mg/kg	<0.5	----	<0.5	----	----
2.4-Dinitrotoluene	121-14-2	1.0	mg/kg	<1.0	----	<1.0	----	----
Pentachloronitrobenzene	82-68-8	0.5	mg/kg	<0.5	----	<0.5	----	----
EP075G: Chlorinated Hydrocarbons								

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Sample ID	BH4B_2.39-2.51	BH4B_6.40-6.52	BH4B_22.05-22.30	BH4B_39.74-39.91	BH4B_71.0-71.20
			Sampling date / time	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00
Compound	CAS Number	LOR	Unit	ES2230654-001	ES2230654-002	ES2230654-004	ES2230654-006	ES2230654-010
				Result	Result	Result	Result	Result
EP075G: Chlorinated Hydrocarbons - Continued								
1.4-Dichlorobenzene	106-46-7	0.5	mg/kg	<0.5	----	<0.5	----	----
1.2-Dichlorobenzene	95-50-1	0.5	mg/kg	<0.5	----	<0.5	----	----
1.2.4-Trichlorobenzene	120-82-1	0.5	mg/kg	<0.5	----	<0.5	----	----
Pentachlorobenzene	608-93-5	0.5	mg/kg	<0.5	----	<0.5	----	----
1.2.3.4-Tetrachlorobenzene	634-66-2	0.5	mg/kg	<1.5	----	<1.5	----	----
EP075K: Miscellaneous Compounds								
1.2.4.5-Tetrachlorobenzene	95-94-3	0.5	mg/kg	<0.5	----	<0.5	----	----
2.3.4.6-Tetrachlorophenol	58-90-2	0.5	mg/kg	<0.5	----	<0.5	----	----
Isodrin	465-73-6	0.5	mg/kg	<0.5	----	<0.5	----	----
Di (2-ethylhexyl) adipate	103-23-1	0.5	mg/kg	<0.5	----	<0.5	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	----	<10	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	----	<10	----	----
EP132A: Phenolic Compounds								
Hexachlorophene	70-30-4	0.01	mg/kg	<0.01	----	<0.01	----	----
EP202A: Phenoxyacetic Acid Herbicides by LCMS								
2.4-D	94-75-7	0.02	mg/kg	<0.02	----	<0.02	----	----
Triclopyr	55335-06-3	0.02	mg/kg	<0.02	----	<0.02	----	----
2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg	<0.02	----	<0.02	----	----
2.4.5-T	93-76-5	0.02	mg/kg	<0.02	----	<0.02	----	----
Picloram	1918-02-1	0.02	mg/kg	<0.02	----	<0.02	----	----
Fluroxypyr	69377-81-7	0.02	mg/kg	<0.02	----	<0.02	----	----
NSW-CWG: Aggregate Organics for Guideline Evaluation								
^ øSum of Endosulfans (inc. sulfate)	----	0.05	mg/kg	<0.05	----	<0.05	----	----
ø Sum of Scheduled Chemicals	----	0.05	mg/kg	<10.0	----	<10.0	----	----
^ øSum of plasticisers	----	0.50	mg/kg	<5.00	----	<5.00	----	----
EP066S: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	**82.8**	----	**77.2**	----	----
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.05	%	**113**	----	**101**	----	----
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	**89.7**	----	**73.2**	----	----

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)				Sample ID	BH4B_2.39-2.51	BH4B_6.40-6.52	BH4B_22.05-22.30	BH4B_39.74-39.91	BH4B_71.0-71.20
				Sampling date / time	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00
Compound	CAS Number	LOR	Unit		ES2230654-001	ES2230654-002	ES2230654-004	ES2230654-006	ES2230654-010
					Result	Result	Result	Result	Result
EP074S(SIM) : VOC Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		104	----	106	----	----
EP074S: VOC Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.5	%		108	----	105	----	----
Toluene-D8	2037-26-5	0.5	%		113	----	103	----	----
4-Bromofluorobenzene	460-00-4	0.5	%		118	----	108	----	----
EP075S: Acid Extractable Surrogates									
2-Fluorophenol	367-12-4	0.5	%		84.5	----	78.5	----	----
Phenol-d6	13127-88-3	0.5	%		70.7	----	62.4	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		79.5	----	74.6	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%		66.6	----	67.8	----	----
EP075T: Base/Neutral Extractable Surrogates									
Nitrobenzene-D5	4165-60-0	0.5	%		85.9	----	82.1	----	----
1.2-Dichlorobenzene-D4	2199-69-1	0.5	%		78.4	----	80.2	----	----
2-Fluorobiphenyl	321-60-8	0.5	%		86.6	----	78.7	----	----
Anthracene-d10	1719-06-8	0.5	%		82.8	----	85.2	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		80.3	----	79.6	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		110	----	107	----	----
Toluene-D8	2037-26-5	0.2	%		112	----	102	----	----
4-Bromofluorobenzene	460-00-4	0.2	%		121	----	111	----	----
EP202S: Phenoxyacetic Acid Herbicide Surrogate									
2.4-Dichlorophenyl Acetic Acid	19719-28-9	0.02	%		91.6	----	90.0	----	----

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Sample ID	BH4B_126.27-126.37	BH4B_148.17-148.36	BH4B_388.0-388.13	BH4B_419.0-419.14	----
			Sampling date / time	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	----
Compound	CAS Number	LOR	Unit	ES2230654-014	ES2230654-015	ES2230654-021	ES2230654-022	--------
				Result	Result	Result	Result	----
EA003 :pH (field/fox)								
pH (F)	----	0.1	pH Unit	----	9.3	----	9.4	----
pH (Fox)	----	0.1	pH Unit	----	3.0	----	5.3	----
Reaction Rate	----	1	Reaction Unit	----	2	----	2	----
EA011: Net Acid Generation								
pH (OX)	----	0.1	pH Unit	----	10.8	----	6.7	----
NAG (pH 4.5)	----	0.1	kg H2SO4/t	----	<0.1	----	<0.1	----
NAG (pH 7.0)	----	0.1	kg H2SO4/t	----	<0.1	----	1.9	----
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	----	59.0	----	7.2	----
ANC as CaCO3	----	0.1	% CaCO3	----	6.0	----	0.7	----
Fizz Rating	----	0	Fizz Unit	----	2	----	0	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	<1.0	----	<1.0	----	----
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	----	0.91	----	<0.01	----
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	----	<5	----	----
Beryllium	7440-41-7	1	mg/kg	<1	----	<1	----	----
Cadmium	7440-43-9	1	mg/kg	<1	----	<1	----	----
Lead	7439-92-1	5	mg/kg	<5	----	<5	----	----
Molybdenum	7439-98-7	2	mg/kg	<2	----	<2	----	----
Nickel	7440-02-0	2	mg/kg	<2	----	2	----	----
Selenium	7782-49-2	5	mg/kg	<5	----	<5	----	----
Silver	7440-22-4	2	mg/kg	<2	----	<2	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	----	<0.1	----	----
EG048: Hexavalent Chromium (Alkaline Digest)								
Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	----	<0.5	----	----
EK026SF: Total CN by Segmented Flow Analyser								
Total Cyanide	57-12-5	1	mg/kg	<1	----	<1	----	----
EK028SF: Weak Acid Dissociable CN by Segmented Flow Analyser								
Weak Acid Dissociable Cyanide	----	1	mg/kg	<1	----	<1	----	----
EK040T: Fluoride Total								

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Sample ID	BH4B_126.27-126.37	BH4B_148.17-148.36	BH4B_388.0-388.13	BH4B_419.0-419.14	----
			Sampling date / time	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	----
Compound	CAS Number	LOR	Unit	ES2230654-014	ES2230654-015	ES2230654-021	ES2230654-022	--------
				Result	Result	Result	Result	----
EK040T: Fluoride Total - Continued								
Fluoride	16984-48-8	40	mg/kg	**490**	----	**360**	----	----
EN60-DI: Bottle Leaching Procedure - Inorganics/Non-Volatile Organics (Glass Vessel)								
Final pH	----	0.1	pH Unit	**9.4**	----	**9.3**	----	----
EN60Z: ASLP Leachate - ZHE								
Extraction Fluid pH	----	0.1	pH Unit	**9.4**	----	**9.3**	----	----
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	----	<0.02	----	<0.02	----
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	----	<0.1	----	----
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	----	<0.05	----	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	----	<0.05	----	----
beta-BHC	319-85-7	0.05	mg/kg	<0.05	----	<0.05	----	----
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	----	<0.05	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	----	<0.05	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	----	<0.05	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	----	<0.05	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	----	<0.05	----	----
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	----	<0.05	----	----
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	----	<0.05	----	----
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	----	<0.05	----	----
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	----	<0.05	----	----
Dieldrin	60-57-1	0.05	mg/kg	<0.05	----	<0.05	----	----
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	----	<0.05	----	----
Endrin	72-20-8	0.05	mg/kg	<0.05	----	<0.05	----	----
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	----	<0.05	----	----
4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	----	<0.05	----	----
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	----	<0.05	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	----	<0.05	----	----
4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	----	<0.2	----	----
EP068B: Organophosphorus Pesticides (OP)								
Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	----	<0.05	----	----
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup								
>C10 - C16 Fraction	----	50	mg/kg	<50	----	<50	----	----

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)				Sample ID	BH4B_126.27-126.37	BH4B_148.17-148.36	BH4B_388.0-388.13	BH4B_419.0-419.14	----
				Sampling date / time	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	----
Compound	CAS Number	LOR	Unit		ES2230654-014	ES2230654-015	ES2230654-021	ES2230654-022	--------
					Result	Result	Result	Result	----
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup - Continued									
>C16 - C34 Fraction	----	100	mg/kg		<100	----	<100	----	----
>C34 - C40 Fraction	----	100	mg/kg		<100	----	<100	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	----	<50	----	----
EP071 SG-S: Total Petroleum Hydrocarbons in Soil - Silica gel cleanup									
C10 - C14 Fraction	----	50	mg/kg		<50	----	<50	----	----
C15 - C28 Fraction	----	100	mg/kg		<100	----	<100	----	----
C29 - C36 Fraction	----	100	mg/kg		<100	----	<100	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	----	<50	----	----
EP074A: Monocyclic Aromatic Hydrocarbons									
Benzene	71-43-2	0.2	mg/kg		<0.2	----	<0.2	----	----
Toluene	108-88-3	0.5	mg/kg		<0.5	----	<0.5	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	----	<0.5	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	----	<0.5	----	----
Styrene	100-42-5	0.5	mg/kg		<0.5	----	<0.5	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	----	<0.5	----	----
EP074B: Oxygenated Compounds									
2-Butanone (MEK)	78-93-3	5	mg/kg		<5	----	<5	----	----
EP074E(SIM): Halogenated Aliphatic Compounds									
Vinyl chloride	75-01-4	0.2	mg/kg		<0.2	----	<0.2	----	----
EP074E: Halogenated Aliphatic Compounds									
Vinyl chloride	75-01-4	4	mg/kg		<4	----	<4	----	----
1.1-Dichloroethene	75-35-4	0.5	mg/kg		<0.5	----	<0.5	----	----
Methylene chloride	75-09-2	0.5	mg/kg		<0.5	----	<0.5	----	----
1.1.1-Trichloroethane	71-55-6	0.5	mg/kg		<0.5	----	<0.5	----	----
Carbon Tetrachloride	56-23-5	0.5	mg/kg		<0.5	----	<0.5	----	----
1.2-Dichloroethane	107-06-2	0.5	mg/kg		<0.5	----	<0.5	----	----
Trichloroethene	79-01-6	0.5	mg/kg		<0.5	----	<0.5	----	----
1.1.2-Trichloroethane	79-00-5	0.5	mg/kg		<0.5	----	<0.5	----	----
Tetrachloroethene	127-18-4	0.5	mg/kg		<0.5	----	<0.5	----	----
1.1.1.2-Tetrachloroethane	630-20-6	0.5	mg/kg		<0.5	----	<0.5	----	----
1.1.2.2-Tetrachloroethane	79-34-5	0.5	mg/kg		<0.5	----	<0.5	----	----
EP074F: Halogenated Aromatic Compounds									
Chlorobenzene	108-90-7	0.5	mg/kg		<0.5	----	<0.5	----	----
EP074G: Trihalomethanes									

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)				Sample ID	BH4B_126.27-126.37	BH4B_148.17-148.36	BH4B_388.0-388.13	BH4B_419.0-419.14	----
				Sampling date / time	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	----
Compound	CAS Number	LOR	Unit		ES2230654-014	ES2230654-015	ES2230654-021	ES2230654-022	--------
					Result	Result	Result	Result	----
EP074G: Trihalomethanes - Continued									
Chloroform	67-66-3	0.5	mg/kg		<0.5	----	<0.5	----	----
EP075A: Phenolic Compounds									
Phenol	108-95-2	0.5	mg/kg		<0.5	----	<0.5	----	----
2-Methylphenol	95-48-7	0.5	mg/kg		<0.5	----	<0.5	----	----
3- & 4-Methylphenol	1319-77-3	0.5	mg/kg		<0.5	----	<0.5	----	----
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg		<0.5	----	<0.5	----	----
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg		<0.5	----	<0.5	----	----
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg		<0.5	----	<0.5	----	----
Pentachlorophenol	87-86-5	1	mg/kg		<1	----	<1	----	----
EP075B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	----	<0.5	----	----
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	----	<0.5	----	----
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	----	<0.5	----	----
Fluorene	86-73-7	0.5	mg/kg		<0.5	----	<0.5	----	----
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	----	<0.5	----	----
Anthracene	120-12-7	0.5	mg/kg		<0.5	----	<0.5	----	----
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	----	<0.5	----	----
Pyrene	129-00-0	0.5	mg/kg		<0.5	----	<0.5	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	----	<0.5	----	----
Chrysene	218-01-9	0.5	mg/kg		<0.5	----	<0.5	----	----
Benzo(b+j) & Benzo(k)fluoranthene	205-99-2 207-08-9	1	mg/kg		<1	----	<1	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	----	<0.5	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	----	<0.5	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	----	<0.5	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	----	<0.5	----	----
^ Sum of PAHs	----	0.5	mg/kg		<0.5	----	<0.5	----	----
EP075C: Phthalate Esters									
bis(2-ethylhexyl) phthalate	117-81-7	5.0	mg/kg		<5.0	----	<5.0	----	----
EP075E: Nitroaromatics and Ketones									
Nitrobenzene	98-95-3	0.5	mg/kg		<0.5	----	<0.5	----	----
2.4-Dinitrotoluene	121-14-2	1.0	mg/kg		<1.0	----	<1.0	----	----
Pentachloronitrobenzene	82-68-8	0.5	mg/kg		<0.5	----	<0.5	----	----
EP075G: Chlorinated Hydrocarbons									

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)				Sample ID	BH4B_126.27-126.37	BH4B_148.17-148.36	BH4B_388.0-388.13	BH4B_419.0-419.14	----
				Sampling date / time	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	----
Compound	CAS Number	LOR	Unit		ES2230654-014	ES2230654-015	ES2230654-021	ES2230654-022	--------
					Result	Result	Result	Result	----
EP075G: Chlorinated Hydrocarbons - Continued									
1.4-Dichlorobenzene	106-46-7	0.5	mg/kg		<0.5	----	<0.5	----	----
1.2-Dichlorobenzene	95-50-1	0.5	mg/kg		<0.5	----	<0.5	----	----
1.2.4-Trichlorobenzene	120-82-1	0.5	mg/kg		<0.5	----	<0.5	----	----
Pentachlorobenzene	608-93-5	0.5	mg/kg		<0.5	----	<0.5	----	----
1.2.3.4-Tetrachlorobenzene	634-66-2	0.5	mg/kg		<1.5	----	<1.5	----	----
EP075K: Miscellaneous Compounds									
1.2.4.5-Tetrachlorobenzene	95-94-3	0.5	mg/kg		<0.5	----	<0.5	----	----
2.3.4.6-Tetrachlorophenol	58-90-2	0.5	mg/kg		<0.5	----	<0.5	----	----
Isodrin	465-73-6	0.5	mg/kg		<0.5	----	<0.5	----	----
Di (2-ethylhexyl) adipate	103-23-1	0.5	mg/kg		<0.5	----	<0.5	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	----	<10	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	----	<10	----	----
EP132A: Phenolic Compounds									
Hexachlorophene	70-30-4	0.01	mg/kg		<0.01	----	<0.01	----	----
EP202A: Phenoxyacetic Acid Herbicides by LCMS									
2.4-D	94-75-7	0.02	mg/kg		<0.02	----	<0.02	----	----
Triclopyr	55335-06-3	0.02	mg/kg		<0.02	----	<0.02	----	----
2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg		<0.02	----	<0.02	----	----
2.4.5-T	93-76-5	0.02	mg/kg		<0.02	----	<0.02	----	----
Picloram	1918-02-1	0.02	mg/kg		<0.02	----	<0.02	----	----
Fluroxypyr	69377-81-7	0.02	mg/kg		<0.02	----	<0.02	----	----
NSW-CWG: Aggregate Organics for Guideline Evaluation									
^ øSum of Endosulfans (inc. sulfate)	----	0.05	mg/kg		<0.05	----	<0.05	----	----
ø Sum of Scheduled Chemicals	----	0.05	mg/kg		<10.0	----	<10.0	----	----
^ øSum of plasticisers	----	0.50	mg/kg		<5.00	----	<5.00	----	----
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		**85.3**	----	**94.8**	----	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		**95.6**	----	**103**	----	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		**71.6**	----	**66.8**	----	----

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)				Sample ID	BH4B_126.27-126.37	BH4B_148.17-148.36	BH4B_388.0-388.13	BH4B_419.0-419.14	----
				Sampling date / time	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	----
Compound	CAS Number	LOR	Unit		ES2230654-014	ES2230654-015	ES2230654-021	ES2230654-022	--------
					Result	Result	Result	Result	----
EP074S(SIM) : VOC Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		103	----	112	----	----
EP074S: VOC Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.5	%		111	----	106	----	----
Toluene-D8	2037-26-5	0.5	%		114	----	101	----	----
4-Bromofluorobenzene	460-00-4	0.5	%		116	----	101	----	----
EP075S: Acid Extractable Surrogates									
2-Fluorophenol	367-12-4	0.5	%		87.4	----	78.3	----	----
Phenol-d6	13127-88-3	0.5	%		71.4	----	60.8	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		81.9	----	80.0	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%		66.5	----	64.6	----	----
EP075T: Base/Neutral Extractable Surrogates									
Nitrobenzene-D5	4165-60-0	0.5	%		87.3	----	79.0	----	----
1.2-Dichlorobenzene-D4	2199-69-1	0.5	%		81.0	----	77.5	----	----
2-Fluorobiphenyl	321-60-8	0.5	%		91.8	----	83.4	----	----
Anthracene-d10	1719-06-8	0.5	%		84.9	----	83.8	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		79.0	----	74.8	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		113	----	106	----	----
Toluene-D8	2037-26-5	0.2	%		112	----	100	----	----
4-Bromofluorobenzene	460-00-4	0.2	%		118	----	103	----	----
EP202S: Phenoxyacetic Acid Herbicide Surrogate									
2.4-Dichlorophenyl Acetic Acid	19719-28-9	0.02	%		97.6	----	81.4	----	----

Analytical Results

Sub-Matrix: ZHE LEACHATE (Matrix: WATER)				Sample ID	BH4B_2.39-2.51	BH4B_22.05-22.30	BH4B_126.27-126.37	BH4B_388.0-388.13	----
				Sampling date / time	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	----
Compound	CAS Number	LOR	Unit		ES2230654-001	ES2230654-004	ES2230654-014	ES2230654-021	--------
					Result	Result	Result	Result	----
EK026SF: Total CN by Segmented Flow Analyser									
Total Cyanide	57-12-5	0.004	mg/L		<0.004	<0.004	<0.004	**0.024**	----
EK028SF: Weak Acid Dissociable CN by Segmented Flow Analyser									
Weak Acid Dissociable Cyanide	----	0.004	mg/L		<0.004	<0.004	<0.004	<0.004	----
EP074A: Monocyclic Aromatic Hydrocarbons									
Benzene	71-43-2	1	µg/L		<1	<1	<1	<1	----
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	----
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	----
Styrene	100-42-5	5	µg/L		<5	<5	<5	<5	----
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	----
Isopropylbenzene	98-82-8	5	µg/L		<5	<5	<5	<5	----
n-Propylbenzene	103-65-1	5	µg/L		<5	<5	<5	<5	----
1.3.5-Trimethylbenzene	108-67-8	5	µg/L		<5	<5	<5	<5	----
sec-Butylbenzene	135-98-8	5	µg/L		<5	<5	<5	<5	----
1.2.4-Trimethylbenzene	95-63-6	5	µg/L		<5	<5	<5	<5	----
tert-Butylbenzene	98-06-6	5	µg/L		<5	<5	<5	<5	----
p-Isopropyltoluene	99-87-6	5	µg/L		<5	<5	<5	<5	----
n-Butylbenzene	104-51-8	5	µg/L		<5	<5	<5	<5	----
EP074B: Oxygenated Compounds									
2-Propanone (Acetone)	67-64-1	50	µg/L		<50	<50	<50	<50	----
Vinyl Acetate	108-05-4	50	µg/L		<50	<50	<50	<50	----
2-Butanone (MEK)	78-93-3	50	µg/L		<50	<50	<50	<50	----
4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L		<50	<50	<50	<50	----
2-Hexanone (MBK)	591-78-6	50	µg/L		<50	<50	<50	<50	----
EP074C: Sulfonated Compounds									
Carbon disulfide	75-15-0	5	µg/L		<5	<5	<5	<5	----
EP074D: Fumigants									
2.2-Dichloropropane	594-20-7	5	µg/L		<5	<5	<5	<5	----
1.2-Dichloropropane	78-87-5	5	µg/L		<5	<5	<5	<5	----
cis-1.3-Dichloropropylene	10061-01-5	5	µg/L		<5	<5	<5	<5	----
trans-1.3-Dichloropropylene	10061-02-6	5	µg/L		<5	<5	<5	<5	----
1.2-Dibromoethane (EDB)	106-93-4	5	µg/L		<5	<5	<5	<5	----
EP074E: Halogenated Aliphatic Compounds									
Dichlorodifluoromethane	75-71-8	50	µg/L		<50	<50	<50	<50	----

Analytical Results

Sub-Matrix: ZHE LEACHATE (Matrix: WATER)				Sample ID	BH4B_2.39-2.51	BH4B_22.05-22.30	BH4B_126.27-126.37	BH4B_388.0-388.13	----
				Sampling date / time	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	----
Compound	CAS Number	LOR	Unit		ES2230654-001	ES2230654-004	ES2230654-014	ES2230654-021	--------
					Result	Result	Result	Result	----
EP074E: Halogenated Aliphatic Compounds - Continued									
Chloromethane	74-87-3	50	µg/L		<50	<50	<50	<50	----
Vinyl chloride	75-01-4	50	µg/L		<50	<50	<50	<50	----
Bromomethane	74-83-9	50	µg/L		<50	<50	<50	<50	----
Chloroethane	75-00-3	50	µg/L		<50	<50	<50	<50	----
Trichlorofluoromethane	75-69-4	50	µg/L		<50	<50	<50	<50	----
1.1-Dichloroethene	75-35-4	5	µg/L		<5	<5	<5	<5	----
Iodomethane	74-88-4	5	µg/L		<5	<5	<5	<5	----
Methylene chloride	75-09-2	5	µg/L		<5	<5	<5	<5	----
trans-1.2-Dichloroethene	156-60-5	5	µg/L		<5	<5	<5	<5	----
1.1-Dichloroethane	75-34-3	5	µg/L		<5	<5	<5	<5	----
cis-1.2-Dichloroethene	156-59-2	5	µg/L		<5	<5	<5	<5	----
1.1.1-Trichloroethane	71-55-6	5	µg/L		<5	<5	<5	<5	----
1.1-Dichloropropylene	563-58-6	5	µg/L		<5	<5	<5	<5	----
Carbon Tetrachloride	56-23-5	5	µg/L		<5	<5	<5	<5	----
1.2-Dichloroethane	107-06-2	5	µg/L		<5	<5	<5	<5	----
Trichloroethene	79-01-6	5	µg/L		<5	<5	<5	<5	----
Dibromomethane	74-95-3	5	µg/L		<5	<5	<5	<5	----
1.1.2-Trichloroethane	79-00-5	5	µg/L		<5	<5	<5	<5	----
1.3-Dichloropropane	142-28-9	5	µg/L		<5	<5	<5	<5	----
Tetrachloroethene	127-18-4	5	µg/L		<5	<5	<5	<5	----
1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L		<5	<5	<5	<5	----
trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L		<5	<5	<5	<5	----
cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L		<5	<5	<5	<5	----
1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L		<5	<5	<5	<5	----
1.2.3-Trichloropropane	96-18-4	5	µg/L		<5	<5	<5	<5	----
Pentachloroethane	76-01-7	5	µg/L		<5	<5	<5	<5	----
1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L		<5	<5	<5	<5	----
Hexachlorobutadiene	87-68-3	5	µg/L		<5	<5	<5	<5	----
EP074F: Halogenated Aromatic Compounds									
Chlorobenzene	108-90-7	5	µg/L		<5	<5	<5	<5	----
Bromobenzene	108-86-1	5	µg/L		<5	<5	<5	<5	----
2-Chlorotoluene	95-49-8	5	µg/L		<5	<5	<5	<5	----
4-Chlorotoluene	106-43-4	5	µg/L		<5	<5	<5	<5	----
1.3-Dichlorobenzene	541-73-1	5	µg/L		<5	<5	<5	<5	----
1.4-Dichlorobenzene	106-46-7	5	µg/L		<5	<5	<5	<5	----

Analytical Results

Sub-Matrix: ZHE LEACHATE (Matrix: WATER)				Sample ID	BH4B_2.39-2.51	BH4B_22.05-22.30	BH4B_126.27-126.37	BH4B_388.0-388.13	----
				Sampling date / time	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	----
Compound	CAS Number	LOR	Unit		ES2230654-001	ES2230654-004	ES2230654-014	ES2230654-021	--------
					Result	Result	Result	Result	----
EP074F: Halogenated Aromatic Compounds - Continued									
1.2-Dichlorobenzene	95-50-1	5	µg/L		<5	<5	<5	<5	----
1.2.4-Trichlorobenzene	120-82-1	5	µg/L		<5	<5	<5	<5	----
1.2.3-Trichlorobenzene	87-61-6	5	µg/L		<5	<5	<5	<5	----
EP074G: Trihalomethanes									
Chloroform	67-66-3	5	µg/L		<5	<5	<5	<5	----
Bromodichloromethane	75-27-4	5	µg/L		<5	<5	<5	<5	----
Dibromochloromethane	124-48-1	5	µg/L		<5	<5	<5	<5	----
Bromoform	75-25-2	5	µg/L		<5	<5	<5	<5	----
EP074H: Naphthalene									
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	----
EP074S: VOC Surrogates									
1.2-Dichloroethane-D4	17060-07-0	5	%		**97.0**	**88.0**	**103**	**104**	----
Toluene-D8	2037-26-5	5	%		**99.8**	**90.0**	**106**	**106**	----
4-Bromofluorobenzene	460-00-4	5	%		**90.7**	**82.2**	**97.1**	**95.6**	----

Surrogate Control Limits

Sub-Matrix: DI WATER LEACHATE		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	67	111
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	67	111
EP075S: Acid Extractable Surrogates			
2-Fluorophenol	367-12-4	10	117
Phenol-d6	13127-88-3	10	69
2-Chlorophenol-D4	93951-73-6	21	130
2.4.6-Tribromophenol	118-79-6	10	151
EP075T: Base/Neutral Extractable Surrogates			
Nitrobenzene-D5	4165-60-0	29	142
1.2-Dichlorobenzene-D4	2199-69-1	24	121
2-Fluorobiphenyl	321-60-8	27	135
Anthracene-d10	1719-06-8	27	113
4-Terphenyl-d14	1718-51-0	21	123

Sub-Matrix: ROCK		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	39	149
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	49	147
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	35	143
EP074S(SIM) : VOC Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	131
EP074S: VOC Surrogates			
1.2-Dichloroethane-D4	17060-07-0	64	130
Toluene-D8	2037-26-5	66	136
4-Bromofluorobenzene	460-00-4	60	122
EP075S: Acid Extractable Surrogates			
2-Fluorophenol	367-12-4	29	149
Phenol-d6	13127-88-3	32	128
2-Chlorophenol-D4	93951-73-6	32	128
2.4.6-Tribromophenol	118-79-6	13	121
EP075T: Base/Neutral Extractable Surrogates			
Nitrobenzene-D5	4165-60-0	33	125
1.2-Dichlorobenzene-D4	2199-69-1	34	108
2-Fluorobiphenyl	321-60-8	35	121

Sub-Matrix: ROCK		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP075T: Base/Neutral Extractable Surrogates - Continued			
Anthracene-d10	1719-06-8	35	123
4-Terphenyl-d14	1718-51-0	33	125
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130
EP202S: Phenoxyacetic Acid Herbicide Surrogate			
2.4-Dichlorophenyl Acetic Acid	19719-28-9	45	139

Sub-Matrix: ZHE LEACHATE		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP074S: VOC Surrogates			
1.2-Dichloroethane-D4	17060-07-0	78	133
Toluene-D8	2037-26-5	79	129
4-Bromofluorobenzene	460-00-4	81	124

Inter-Laboratory Testing

Analysis conducted by ALS Brisbane, NATA accreditation no. 825, site no. 818 (Chemistry) 18958 (Biology).

(SOIL) EA013: Acid Neutralising Capacity

(SOIL) EA003 :pH (field/fox)

(SOIL) ED042T: Total Sulfur by LECO

(SOIL) EA011: Net Acid Generation

(SOIL) EP003: Total Organic Carbon (TOC) in Soil

Analysis conducted by ALS Newcastle, NATA accreditation no. 825, site no. 1656 (Chemistry) 9854 (Biology).

(SOIL) EK040T: Fluoride Total

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES2230654**	Page	: 1 of 27
Amendment	: **(Preliminary Report)**		
Client	: **EMM CONSULTING PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: HENRY NOAKES	Contact	: Cez Bautista
Address	: Ground Floor Suite 1 20 Chandos Street St Leonards NSW NSW 2065	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: ----	Date Samples Received	: 26-Aug-2022
Order number	: J200096	Date Analysis Commenced	: 26-Sep-2022
C-O-C number	: ----	Issue Date	: 11-Oct-2022
Sampler	: KB		
Site	: ----		
Quote number	: SY/284/22		
No. of samples received	: 22		
No. of samples analysed	: 9		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Alex Rossi	Organic Chemist	Sydney Inorganics, Smithfield, NSW
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
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Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, Smithfield, NSW
Zoran Grozdanovski	Laboratory Operator	Newcastle - Inorganics, Mayfield West, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 4621224)									
ES2230654-001	BH4B_2.39-2.51	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Molybdenum	7439-98-7	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	3	<2	53.0	No Limit
		EG005T: Silver	7440-22-4	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	6	<5	25.1	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Selenium	7782-49-2	5	mg/kg	<5	<5	0.0	No Limit
ES2234814-011	Anonymous	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Molybdenum	7439-98-7	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	29	28	0.0	0% - 50%
		EG005T: Silver	7440-22-4	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Selenium	7782-49-2	5	mg/kg	<5	<5	0.0	No Limit
EA003 :pH (field/fox) (QC Lot: 4612025)									
EM2217957-001	Anonymous	EA003: pH (F)	----	0.1	pH Unit	6.8	6.8	0.0	0% - 20%
		EA003: pH (Fox)	----	0.1	pH Unit	3.4	3.5	0.0	0% - 20%
EM2218038-001	Anonymous	EA003: pH (F)	----	0.1	pH Unit	5.8	5.8	0.0	0% - 20%
		EA003: pH (Fox)	----	0.1	pH Unit	2.9	2.9	0.0	0% - 20%
EA003 :pH (field/fox) (QC Lot: 4612026)									
ES2230654-022	BH4B_419.0-419.14	EA003: pH (F)	----	0.1	pH Unit	9.4	9.4	0.0	0% - 20%
		EA003: pH (Fox)	----	0.1	pH Unit	5.3	5.4	0.0	0% - 20%

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EA011: Net Acid Generation (QC Lot: 4621904)									
EM2218112-001	Anonymous	EA011: NAG (pH 4.5)	----	0.1	kg H2SO4/t	<0.1	<0.1	0.0	No Limit
		EA011: NAG (pH 7.0)	----	0.1	kg H2SO4/t	4.0	3.8	5.5	0% - 20%
		EA011: pH (OX)	----	0.1	pH Unit	6.2	6.2	0.0	0% - 20%
ES2230654-022	BH4B_419.0-419.14	EA011: NAG (pH 4.5)	----	0.1	kg H2SO4/t	<0.1	<0.1	0.0	No Limit
		EA011: NAG (pH 7.0)	----	0.1	kg H2SO4/t	1.9	1.6	18.0	0% - 50%
		EA011: pH (OX)	----	0.1	pH Unit	6.7	6.7	0.0	0% - 20%
EA013: Acid Neutralising Capacity (QC Lot: 4621905)									
EM2218112-001	Anonymous	EA013: ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	3.8	4.0	7.4	No Limit
ES2230654-022	BH4B_419.0-419.14	EA013: ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	7.2	7.1	0.0	0% - 50%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 4600771)									
ES2230654-014	BH4B_126.27-126.37	EA055: Moisture Content	----	0.1	%	<1.0	<1.0	0.0	No Limit
ED042T: Total Sulfur by LECO (QC Lot: 4617862)									
ES2230654-002	BH4B_6.40-6.52	ED042T: Sulfur - Total as S (LECO)	----	0.01	%	0.03	0.03	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 4621223)									
ES2230654-001	BH4B_2.39-2.51	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
ES2234814-011	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EG048: Hexavalent Chromium (Alkaline Digest) (QC Lot: 4610058)									
ES2230654-004	BH4B_22.05-22.30	EG048G: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
ES2234636-001	Anonymous	EG048G: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EK026SF: Total CN by Segmented Flow Analyser (QC Lot: 4600770)									
ES2230654-001	BH4B_2.39-2.51	EK026SF: Total Cyanide	57-12-5	1	mg/kg	<1	<1	0.0	No Limit
EK028SF: Weak Acid Dissociable CN by Segmented Flow Analyser (QC Lot: 4600769)									
ES2230654-001	BH4B_2.39-2.51	EK028SF: Weak Acid Dissociable Cyanide	----	1	mg/kg	<1	<1	0.0	No Limit
EK040T: Fluoride Total (QC Lot: 4601823)									
ES2230654-001	BH4B_2.39-2.51	EK040T: Fluoride	16984-48-8	40	mg/kg	500	520	3.7	0% - 50%
ES2233994-007	Anonymous	EK040T: Fluoride	16984-48-8	40	mg/kg	50	50	0.0	No Limit
EP003: Total Organic Carbon (TOC) in Soil (QC Lot: 4617861)									
EB2227789-010	Anonymous	EP003: Total Organic Carbon	----	0.02	%	0.36	0.35	0.0	0% - 50%
EP2212387-001	Anonymous	EP003: Total Organic Carbon	----	0.02	%	2.48	2.44	1.4	0% - 20%
EP066: Polychlorinated Biphenyls (PCB) (QC Lot: 4597635)									
ES2230654-001	BH4B_2.39-2.51	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EP068A: Organochlorine Pesticides (OC) (QC Lot: 4597633)									
ES2230654-001	BH4B_2.39-2.51	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP068A: Organochlorine Pesticides (OC) (QC Lot: 4597633) - continued									
ES2230654-001	BH4B_2.39-2.51	EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 4597633)									
ES2230654-001	BH4B_2.39-2.51	EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup (QC Lot: 4597634)									
ES2230654-001	BH4B_2.39-2.51	EP071SG-S: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071SG-S: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071SG-S: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
		EP071SG-S: C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	0.0	No Limit
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup (QC Lot: 4597634)									
ES2230654-001	BH4B_2.39-2.51	EP071SG-S: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071SG-S: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071SG-S: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP074A: Monocyclic Aromatic Hydrocarbons (QC Lot: 4605667)									
ES2234505-001	Anonymous	EP074: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP074: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Styrene	100-42-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP074B: Oxygenated Compounds (QC Lot: 4605667)									
ES2234505-001	Anonymous	EP074: 2-Butanone (MEK)	78-93-3	5	mg/kg	<5	<5	0.0	No Limit
EP074E(SIM): Halogenated Aliphatic Compounds (QC Lot: 4605666)									
ES2234505-001	Anonymous	EP074E(SIM): Vinyl chloride	75-01-4	0.2	mg/kg	<0.4	<0.4	0.0	No Limit
EP074E: Halogenated Aliphatic Compounds (QC Lot: 4605667)									

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP074E: Halogenated Aliphatic Compounds (QC Lot: 4605667) - continued									
ES2234505-001	Anonymous	EP074: 1.1-Dichloroethene	75-35-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Methylene chloride	75-09-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.1.1-Trichloroethane	71-55-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Carbon Tetrachloride	56-23-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.2-Dichloroethane	107-06-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Trichloroethene	79-01-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.1.2-Trichloroethane	79-00-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Tetrachloroethene	127-18-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.1.1.2-Tetrachloroethane	630-20-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.1.2.2-Tetrachloroethane	79-34-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Vinyl chloride	75-01-4	5	mg/kg	<5	<5	0.0	No Limit
EP074F: Halogenated Aromatic Compounds (QC Lot: 4605667)									
ES2234505-001	Anonymous	EP074: Chlorobenzene	108-90-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP074G: Trihalomethanes (QC Lot: 4605667)									
ES2234505-001	Anonymous	EP074: Chloroform	67-66-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP075A: Phenolic Compounds (QC Lot: 4597632)									
ES2230654-001	BH4B_2.39-2.51	EP075: Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 3- & 4-Methylphenol	1319-77-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Pentachlorophenol	87-86-5	1	mg/kg	<1	<1	0.0	No Limit
EP075B: Polynuclear Aromatic Hydrocarbons (QC Lot: 4597632)									
ES2230654-001	BH4B_2.39-2.51	EP075: Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP075B: Polynuclear Aromatic Hydrocarbons (QC Lot: 4597632) - continued									
ES2230654-001	BH4B_2.39-2.51	EP075: Benzo(b+j) & Benzo(k)fluoranthene	205-99-2 207-08-9	1	mg/kg	<1	<1	0.0	No Limit
EP075E: Nitroaromatics and Ketones (QC Lot: 4597632)									
ES2230654-001	BH4B_2.39-2.51	EP075: Nitrobenzene	98-95-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 2.4-Dinitrotoluene	121-14-2	0.5	mg/kg	<1.0	<1.0	0.0	No Limit
		EP075: Pentachloronitrobenzene	82-68-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP075G: Chlorinated Hydrocarbons (QC Lot: 4597632)									
ES2230654-001	BH4B_2.39-2.51	EP075: 1.4-Dichlorobenzene	106-46-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 1.2-Dichlorobenzene	95-50-1	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 1.2.4-Trichlorobenzene	120-82-1	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Pentachlorobenzene	608-93-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP075K: Miscellaneous Compounds (QC Lot: 4597632)									
ES2230654-001	BH4B_2.39-2.51	EP075: 1.2.4.5-Tetrachlorobenzene	95-94-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 2.3.4.6-Tetrachlorophenol	58-90-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4605665)									
ES2234505-001	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4605665)									
ES2234505-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EP132A: Phenolic Compounds (QC Lot: 4597586)									
ES2230654-004	BH4B_22.05-22.30	EP132: Hexachlorophene	70-30-4	10	µg/kg	<0.01 mg/kg	<10	0.0	No Limit
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QC Lot: 4604346)									
EB2227467-015	Anonymous	EP202: 2.4-D	94-75-7	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: Triclopyr	55335-06-3	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: 2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: 2.4.5-T	93-76-5	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: Picloram	1918-02-1	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: Fluroxypyr	69377-81-7	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
ES2230654-021	BH4B_388.0-388.13	EP202: 2.4-D	94-75-7	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: Triclopyr	55335-06-3	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: 2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: 2.4.5-T	93-76-5	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: Picloram	1918-02-1	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: Fluroxypyr	69377-81-7	0.02	mg/kg	<0.02	<0.02	0.0	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG005(ED093)C: Leachable Metals by ICPAES (QC Lot: 4605788)									
ES2230654-001	BH4B_2.39-2.51	EG005C: Beryllium	7440-41-7	0.05	mg/L	<0.05	<0.05	0.0	No Limit
		EG005C: Cadmium	7440-43-9	0.05	mg/L	<0.05	<0.05	0.0	No Limit
		EG005C: Selenium	7782-49-2	0.05	mg/L	<0.05	<0.05	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EG005(ED093)C: Leachable Metals by ICPAES (QC Lot: 4605788) - continued									
ES2230654-001	BH4B_2.39-2.51	EG005C: Aluminium	7429-90-5	0.1	mg/L	4.1	4.1	0.0	0% - 20%
		EG005C: Antimony	7440-36-0	0.1	mg/L	<0.1	<0.1	0.0	No Limit
		EG005C: Arsenic	7440-38-2	0.1	mg/L	<0.1	<0.1	0.0	No Limit
		EG005C: Boron	7440-42-8	0.1	mg/L	<0.1	<0.1	0.0	No Limit
		EG005C: Chromium	7440-47-3	0.1	mg/L	<0.1	<0.1	0.0	No Limit
		EG005C: Iron	7439-89-6	0.1	mg/L	2.6	2.7	0.0	0% - 20%
		EG005C: Lead	7439-92-1	0.1	mg/L	<0.1	<0.1	0.0	No Limit
		EG005C: Manganese	7439-96-5	0.1	mg/L	0.1	0.1	0.0	No Limit
		EG005C: Nickel	7440-02-0	0.1	mg/L	<0.1	<0.1	0.0	No Limit
		EG005C: Silver	7440-22-4	0.1	mg/L	<0.1	<0.1	0.0	No Limit
		EG005C: Molybdenum	7439-98-7	0.1	mg/L	<0.1	<0.1	0.0	No Limit
ES2232715-006	Anonymous	EG005C: Beryllium	7440-41-7	0.05	mg/L	<0.05	<0.05	0.0	No Limit
		EG005C: Cadmium	7440-43-9	0.05	mg/L	<0.05	<0.05	0.0	No Limit
		EG005C: Selenium	7782-49-2	0.05	mg/L	<0.05	<0.05	0.0	No Limit
		EG005C: Aluminium	7429-90-5	0.1	mg/L	<0.1	<0.1	0.0	No Limit
		EG005C: Antimony	7440-36-0	0.1	mg/L	0.2	0.2	0.0	No Limit
		EG005C: Arsenic	7440-38-2	0.1	mg/L	<0.1	<0.1	0.0	No Limit
		EG005C: Boron	7440-42-8	0.1	mg/L	<0.1	<0.1	0.0	No Limit
		EG005C: Chromium	7440-47-3	0.1	mg/L	<0.1	<0.1	0.0	No Limit
		EG005C: Iron	7439-89-6	0.1	mg/L	<0.1	<0.1	0.0	No Limit
		EG005C: Lead	7439-92-1	0.1	mg/L	<0.1	<0.1	0.0	No Limit
		EG005C: Manganese	7439-96-5	0.1	mg/L	<0.1	<0.1	0.0	No Limit
		EG005C: Nickel	7440-02-0	0.1	mg/L	<0.1	<0.1	0.0	No Limit
		EG005C: Silver	7440-22-4	0.1	mg/L	<0.1	<0.1	0.0	No Limit
		EG005C: Molybdenum	7439-98-7	0.1	mg/L	<0.1	<0.1	0.0	No Limit
EA005P: pH by PC Titrator (QC Lot: 4606370)									
ES2233838-006	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	6.92	6.91	0.1	0% - 20%
ES2230654-001	BH4B_2.39-2.51	EA005-P: pH Value	----	0.01	pH Unit	7.21	7.07	2.0	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 4606371)									
ES2233838-006	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	917	917	0.0	0% - 20%
ES2234452-008	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	158	157	0.0	0% - 20%
ES2230654-001	BH4B_2.39-2.51	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	19	18	5.4	0% - 50%
ED037P: Alkalinity by PC Titrator (QC Lot: 4606372)									
ES2233838-006	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	90	90	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	90	90	0.0	0% - 20%
ES2230654-001	BH4B_2.39-2.51	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	7	7	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
ED037P: Alkalinity by PC Titrator (QC Lot: 4606372) - continued									
ES2230654-001	BH4B_2.39-2.51	ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	7	7	0.0	No Limit
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 4608256)									
ES2234575-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	1	1	0.0	No Limit
ES2230654-001	BH4B_2.39-2.51	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	<1	0.0	No Limit
ED045G: Chloride by Discrete Analyser (QC Lot: 4608257)									
ES2230654-004	BH4B_22.05-22.30	ED045G: Chloride	16887-00-6	1	mg/L	<1	<1	0.0	No Limit
ES2230654-001	BH4B_2.39-2.51	ED045G: Chloride	16887-00-6	1	mg/L	<1	<1	0.0	No Limit
EG035C: Leachable Mercury by FIMS (QC Lot: 4614888)									
ES2230654-001	BH4B_2.39-2.51	EG035C: Mercury	7439-97-6	0.0001	mg/L	<0.0010	<0.0010	0.0	No Limit
ES2234907-007	Anonymous	EG035C: Mercury	7439-97-6	0.0001	mg/L	<0.0010	<0.0010	0.0	No Limit
EG050G: Hexavalent Chromium by Discrete Analyser (QC Lot: 4610168)									
ES2230654-001	BH4B_2.39-2.51	EG050G-C: Hexavalent Chromium	18540-29-9	0.01	mg/L	<0.10	<0.10	0.0	No Limit
EK026SF: Total CN by Segmented Flow Analyser (QC Lot: 4610715)									
ES2230654-001	BH4B_2.39-2.51	EK026SF: Total Cyanide	57-12-5	0.004	mg/L	<0.004	<0.004	0.0	No Limit
EK028SF: Weak Acid Dissociable CN by Segmented Flow Analyser (QC Lot: 4610714)									
ES2230654-001	BH4B_2.39-2.51	EK028SF: Weak Acid Dissociable Cyanide	----	0.004	mg/L	<0.004	<0.004	0.0	No Limit
EK040P: Fluoride by PC Titrator (QC Lot: 4606373)									
ES2230654-001	BH4B_2.39-2.51	EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	<0.1	0.0	No Limit
EP074A: Monocyclic Aromatic Hydrocarbons (QC Lot: 4619697)									
ES2234420-001	Anonymous	EP074: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP074: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP074: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP074: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP074: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP074: Styrene	100-42-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: Isopropylbenzene	98-82-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: n-Propylbenzene	103-65-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3.5-Trimethylbenzene	108-67-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: sec-Butylbenzene	135-98-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.4-Trimethylbenzene	95-63-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: tert-Butylbenzene	98-06-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: p-Isopropyltoluene	99-87-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: n-Butylbenzene	104-51-8	5	µg/L	<5	<5	0.0	No Limit
ES2234420-007	Anonymous	EP074: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP074: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP074: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP074: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP074A: Monocyclic Aromatic Hydrocarbons (QC Lot: 4619697) - continued									
ES2234420-007	Anonymous	EP074: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP074: Styrene	100-42-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: Isopropylbenzene	98-82-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: n-Propylbenzene	103-65-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3.5-Trimethylbenzene	108-67-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: sec-Butylbenzene	135-98-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.4-Trimethylbenzene	95-63-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: tert-Butylbenzene	98-06-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: p-Isopropyltoluene	99-87-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: n-Butylbenzene	104-51-8	5	µg/L	<5	<5	0.0	No Limit
EP074B: Oxygenated Compounds (QC Lot: 4619697)									
ES2234420-001	Anonymous	EP074: 2-Propanone (Acetone)	67-64-1	50	µg/L	<50	<50	0.0	No Limit
		EP074: Vinyl Acetate	108-05-4	50	µg/L	<50	<50	0.0	No Limit
		EP074: 2-Butanone (MEK)	78-93-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: 4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L	<50	<50	0.0	No Limit
		EP074: 2-Hexanone (MBK)	591-78-6	50	µg/L	<50	<50	0.0	No Limit
ES2234420-007	Anonymous	EP074: 2-Propanone (Acetone)	67-64-1	50	µg/L	<50	<50	0.0	No Limit
		EP074: Vinyl Acetate	108-05-4	50	µg/L	<50	<50	0.0	No Limit
		EP074: 2-Butanone (MEK)	78-93-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: 4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L	<50	<50	0.0	No Limit
		EP074: 2-Hexanone (MBK)	591-78-6	50	µg/L	<50	<50	0.0	No Limit
EP074C: Sulfonated Compounds (QC Lot: 4619697)									
ES2234420-001	Anonymous	EP074: Carbon disulfide	75-15-0	5	µg/L	<5	<5	0.0	No Limit
ES2234420-007	Anonymous	EP074: Carbon disulfide	75-15-0	5	µg/L	<5	<5	0.0	No Limit
EP074D: Fumigants (QC Lot: 4619697)									
ES2234420-001	Anonymous	EP074: 2.2-Dichloropropane	594-20-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichloropropane	78-87-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.3-Dichloropropylene	10061-01-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.3-Dichloropropylene	10061-02-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	<5	0.0	No Limit
ES2234420-007	Anonymous	EP074: 2.2-Dichloropropane	594-20-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichloropropane	78-87-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.3-Dichloropropylene	10061-01-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.3-Dichloropropylene	10061-02-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	<5	0.0	No Limit
EP074E: Halogenated Aliphatic Compounds (QC Lot: 4619697)									
ES2234420-001	Anonymous	EP074: 1.1-Dichloroethene	75-35-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Iodomethane	74-88-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Methylene chloride	75-09-2	5	µg/L	<5	<5	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP074E: Halogenated Aliphatic Compounds (QC Lot: 4619697) - continued									
ES2234420-001	Anonymous	EP074: trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloroethane	75-34-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloropropylene	563-58-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Carbon Tetrachloride	56-23-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichloroethane	107-06-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: Trichloroethene	79-01-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dibromomethane	74-95-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3-Dichloropropane	142-28-9	5	µg/L	<5	<5	0.0	No Limit
		EP074: Tetrachloroethene	127-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Pentachloroethane	76-01-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: Hexachlorobutadiene	87-68-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dichlorodifluoromethane	75-71-8	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloromethane	74-87-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Vinyl chloride	75-01-4	50	µg/L	<50	<50	0.0	No Limit
		EP074: Bromomethane	74-83-9	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloroethane	75-00-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Trichlorofluoromethane	75-69-4	50	µg/L	<50	<50	0.0	No Limit
ES2234420-007	Anonymous	EP074: 1.1-Dichloroethene	75-35-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Iodomethane	74-88-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Methylene chloride	75-09-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloroethane	75-34-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloropropylene	563-58-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Carbon Tetrachloride	56-23-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichloroethane	107-06-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: Trichloroethene	79-01-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dibromomethane	74-95-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3-Dichloropropane	142-28-9	5	µg/L	<5	<5	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP074E: Halogenated Aliphatic Compounds (QC Lot: 4619697) - continued									
ES2234420-007	Anonymous	EP074: Tetrachloroethene	127-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Pentachloroethane	76-01-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: Hexachlorobutadiene	87-68-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dichlorodifluoromethane	75-71-8	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloromethane	74-87-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Vinyl chloride	75-01-4	50	µg/L	<50	<50	0.0	No Limit
		EP074: Bromomethane	74-83-9	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloroethane	75-00-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Trichlorofluoromethane	75-69-4	50	µg/L	<50	<50	0.0	No Limit
EP074F: Halogenated Aromatic Compounds (QC Lot: 4619697)									
ES2234420-001	Anonymous	EP074: Chlorobenzene	108-90-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromobenzene	108-86-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 2-Chlorotoluene	95-49-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: 4-Chlorotoluene	106-43-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	<5	0.0	No Limit
ES2234420-007	Anonymous	EP074: Chlorobenzene	108-90-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromobenzene	108-86-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 2-Chlorotoluene	95-49-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: 4-Chlorotoluene	106-43-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	<5	0.0	No Limit
EP074G: Trihalomethanes (QC Lot: 4619697)									
ES2234420-001	Anonymous	EP074: Chloroform	67-66-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromodichloromethane	75-27-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dibromochloromethane	124-48-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromoform	75-25-2	5	µg/L	<5	<5	0.0	No Limit
ES2234420-007	Anonymous	EP074: Chloroform	67-66-3	5	µg/L	<5	<5	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP074G: Trihalomethanes (QC Lot: 4619697) - continued									
ES2234420-007	Anonymous	EP074: Bromodichloromethane	75-27-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dibromochloromethane	124-48-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromoform	75-25-2	5	µg/L	<5	<5	0.0	No Limit
EP074H: Naphthalene (QC Lot: 4619697)									
ES2234420-001	Anonymous	EP074: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
ES2234420-007	Anonymous	EP074: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 4621224)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	121.1 mg/kg	96.1	88.0	113
EG005T: Beryllium	7440-41-7	1	mg/kg	<1	0.5 mg/kg	109	70.0	130
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	0.74 mg/kg	99.2	70.0	130
EG005T: Lead	7439-92-1	5	mg/kg	<5	60.8 mg/kg	98.0	82.0	119
EG005T: Molybdenum	7439-98-7	2	mg/kg	<2	2.3 mg/kg	110	77.0	119
EG005T: Nickel	7440-02-0	2	mg/kg	<2	15.3 mg/kg	98.3	80.0	120
EG005T: Selenium	7782-49-2	5	mg/kg	<5	----	----	----	----
EG005T: Silver	7440-22-4	2	mg/kg	<2	2.3 mg/kg	108	42.0	158
EA011: Net Acid Generation (QCLot: 4621904)								
EA011: NAG (pH 7.0)	----	----	kg H2SO4/t	----	22.83 kg H2SO4/t	111	70.0	130
EA013: Acid Neutralising Capacity (QCLot: 4621905)								
EA013: ANC as H2SO4	----	----	kg H2SO4 equiv./t	----	9.9 kg H2SO4 equiv./t	108	82.0	120
ED042T: Total Sulfur by LECO (QCLot: 4617862)								
ED042T: Sulfur - Total as S (LECO)	----	0.01	%	<0.01	0.16 %	101	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4621223)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.087 mg/kg	109	70.0	125
EG048: Hexavalent Chromium (Alkaline Digest) (QCLot: 4610058)								
EG048G: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	20 mg/kg	102	68.0	114
EK026SF: Total CN by Segmented Flow Analyser (QCLot: 4600770)								
EK026SF: Total Cyanide	57-12-5	1	mg/kg	<1	40 mg/kg	96.1	81.0	129
EK028SF: Weak Acid Dissociable CN by Segmented Flow Analyser (QCLot: 4600769)								
EK028SF: Weak Acid Dissociable Cyanide	----	1	mg/kg	<1	40 mg/kg	101	70.0	130
EK040T: Fluoride Total (QCLot: 4601823)								
EK040T: Fluoride	16984-48-8	40	mg/kg	<40	400 mg/kg	73.8	67.2	96.3
EP003: Total Organic Carbon (TOC) in Soil (QCLot: 4617861)								
EP003: Total Organic Carbon	----	0.02	%	<0.02	0.55 %	99.4	80.0	120
				<0.02	27.5 %	98.7	80.0	120
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 4597635)								
EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	1 mg/kg	82.3	62.0	126
EP068A: Organochlorine Pesticides (OC) (QCLot: 4597633)								
EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.5 mg/kg	84.6	69.0	113
EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	0.5 mg/kg	84.7	65.0	117
EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	0.5 mg/kg	85.9	67.0	119

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP068A: Organochlorine Pesticides (OC) (QCLot: 4597633) - continued								
EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	0.5 mg/kg	86.8	68.0	116
EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	80.9	65.0	117
EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.5 mg/kg	84.5	67.0	115
EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	0.5 mg/kg	85.0	69.0	115
EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.5 mg/kg	87.7	62.0	118
EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	0.5 mg/kg	84.9	63.0	117
EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	0.5 mg/kg	87.5	66.0	116
EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	0.5 mg/kg	85.4	64.0	116
EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	0.5 mg/kg	82.7	66.0	116
EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	0.5 mg/kg	82.5	67.0	115
EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	0.5 mg/kg	85.1	67.0	123
EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	0.5 mg/kg	84.7	69.0	115
EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	0.5 mg/kg	88.3	69.0	121
EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	0.5 mg/kg	88.6	56.0	120
EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.5 mg/kg	89.5	62.0	124
EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	0.5 mg/kg	94.0	66.0	120
EP068B: Organophosphorus Pesticides (OP) (QCLot: 4597633)								
EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	0.5 mg/kg	83.8	76.0	118
EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup (QCLot: 4597634)								
EP071SG-S: C10 - C14 Fraction	----	50	mg/kg	<50	300 mg/kg	96.5	80.0	116
EP071SG-S: C15 - C28 Fraction	----	100	mg/kg	<100	450 mg/kg	101	85.0	115
EP071SG-S: C29 - C36 Fraction	----	100	mg/kg	<100	300 mg/kg	98.0	75.0	123
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup (QCLot: 4597634)								
EP071SG-S: >C10 - C16 Fraction	----	50	mg/kg	<50	375 mg/kg	99.3	89.0	109
EP071SG-S: >C16 - C34 Fraction	----	100	mg/kg	<100	525 mg/kg	96.2	84.0	112
EP071SG-S: >C34 - C40 Fraction	----	100	mg/kg	<100	225 mg/kg	100	71.0	119
EP074A: Monocyclic Aromatic Hydrocarbons (QCLot: 4605667)								
EP074: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	94.4	71.0	121
EP074: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	98.1	65.0	131
EP074: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	98.8	72.0	114
EP074: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	99.5	70.0	116
EP074: Styrene	100-42-5	0.5	mg/kg	<0.5	1 mg/kg	102	67.0	113
EP074: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	102	75.0	115
EP074B: Oxygenated Compounds (QCLot: 4605667)								
EP074: 2-Butanone (MEK)	78-93-3	5	mg/kg	<5	10 mg/kg	127	58.0	136
EP074E(SIM): Halogenated Aliphatic Compounds (QCLot: 4605666)								
EP074E(SIM): Vinyl chloride	75-01-4	0.2	mg/kg	<0.2	1 mg/kg	95.0	73.0	124

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP074E: Halogenated Aliphatic Compounds (QCLot: 4605667)								
EP074: Vinyl chloride	75-01-4	5	mg/kg	<5	10 mg/kg	87.4	43.0	147
EP074: 1.1-Dichloroethene	75-35-4	0.5	mg/kg	<0.5	1 mg/kg	96.0	54.0	126
EP074: Methylene chloride	75-09-2	0.5	mg/kg	<0.5	1 mg/kg	108	58.0	148
EP074: 1.1.1-Trichloroethane	71-55-6	0.5	mg/kg	<0.5	1 mg/kg	97.0	65.0	117
EP074: Carbon Tetrachloride	56-23-5	0.5	mg/kg	<0.5	1 mg/kg	90.2	59.0	125
EP074: 1.2-Dichloroethane	107-06-2	0.5	mg/kg	<0.5	1 mg/kg	107	65.0	125
EP074: Trichloroethene	79-01-6	0.5	mg/kg	<0.5	1 mg/kg	95.7	70.0	118
EP074: 1.1.2-Trichloroethane	79-00-5	0.5	mg/kg	<0.5	1 mg/kg	108	64.0	126
EP074: Tetrachloroethene	127-18-4	0.5	mg/kg	<0.5	1 mg/kg	82.4	67.0	143
EP074: 1.1.1.2-Tetrachloroethane	630-20-6	0.5	mg/kg	<0.5	1 mg/kg	99.4	62.0	122
EP074: 1.1.2.2-Tetrachloroethane	79-34-5	0.5	mg/kg	<0.5	1 mg/kg	118	65.0	121
EP074F: Halogenated Aromatic Compounds (QCLot: 4605667)								
EP074: Chlorobenzene	108-90-7	0.5	mg/kg	<0.5	1 mg/kg	100	68.0	116
EP074G: Trihalomethanes (QCLot: 4605667)								
EP074: Chloroform	67-66-3	0.5	mg/kg	<0.5	1 mg/kg	103	66.0	124
EP075A: Phenolic Compounds (QCLot: 4597632)								
EP075: Phenol	108-95-2	0.5	mg/kg	<0.5	1.5 mg/kg	93.8	64.0	114
EP075: 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	1.5 mg/kg	95.0	55.0	117
EP075: 3- & 4-Methylphenol	1319-77-3	0.5	mg/kg	<0.5	1.5 mg/kg	97.1	46.0	122
EP075: 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	1.5 mg/kg	99.0	57.0	113
EP075: 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	1.5 mg/kg	88.9	49.0	109
EP075: 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	1.5 mg/kg	86.3	49.0	107
EP075: Pentachlorophenol	87-86-5	1	mg/kg	<1	3 mg/kg	52.1	12.0	76.0
EP075B: Polynuclear Aromatic Hydrocarbons (QCLot: 4597632)								
EP075: Naphthalene	91-20-3	0.5	mg/kg	<0.5	1.5 mg/kg	88.8	62.0	118
EP075: Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	1.5 mg/kg	95.0	56.0	114
EP075: Acenaphthene	83-32-9	0.5	mg/kg	<0.5	1.5 mg/kg	87.0	62.0	112
EP075: Fluorene	86-73-7	0.5	mg/kg	<0.5	1.5 mg/kg	91.7	59.0	115
EP075: Phenanthrene	85-01-8	0.5	mg/kg	<0.5	1.5 mg/kg	89.2	63.0	113
EP075: Anthracene	120-12-7	0.5	mg/kg	<0.5	1.5 mg/kg	89.7	57.0	111
EP075: Fluoranthene	206-44-0	0.5	mg/kg	<0.5	1.5 mg/kg	90.2	58.0	114
EP075: Pyrene	129-00-0	0.5	mg/kg	<0.5	1.5 mg/kg	93.6	57.0	117
EP075: Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	1.5 mg/kg	92.7	59.0	115
EP075: Chrysene	218-01-9	0.5	mg/kg	<0.5	1.5 mg/kg	94.1	61.0	117
EP075: Benzo(b+j) & Benzo(k)fluoranthene	205-99-2 207-08-9	1	mg/kg	<1	3 mg/kg	86.0	57.0	119
EP075: Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	1.5 mg/kg	83.8	56.0	116
EP075: Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	1.5 mg/kg	80.9	55.0	117

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP075B: Polynuclear Aromatic Hydrocarbons (QCLot: 4597632) - continued								
EP075: Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	1.5 mg/kg	78.4	53.0	119
EP075: Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	1.5 mg/kg	81.2	56.0	120
EP075C: Phthalate Esters (QCLot: 4597632)								
EP075: bis(2-ethylhexyl) phthalate	117-81-7	----	mg/kg	----	1.5 mg/kg	84.7	69.0	133
EP075E: Nitroaromatics and Ketones (QCLot: 4597632)								
EP075: Nitrobenzene	98-95-3	0.5	mg/kg	<0.5	1.5 mg/kg	95.4	65.0	119
EP075: 2.4-Dinitrotoluene	121-14-2	0.5	mg/kg	<0.5	1.5 mg/kg	89.2	59.0	115
EP075: Pentachloronitrobenzene	82-68-8	0.5	mg/kg	<0.5	1.5 mg/kg	86.9	56.0	110
EP075G: Chlorinated Hydrocarbons (QCLot: 4597632)								
EP075: 1.4-Dichlorobenzene	106-46-7	0.5	mg/kg	<0.5	1.5 mg/kg	88.6	58.0	116
EP075: 1.2-Dichlorobenzene	95-50-1	0.5	mg/kg	<0.5	1.5 mg/kg	92.1	57.0	115
EP075: 1.2.4-Trichlorobenzene	120-82-1	0.5	mg/kg	<0.5	1.5 mg/kg	90.6	62.9	108
EP075: Pentachlorobenzene	608-93-5	0.5	mg/kg	<0.5	1.5 mg/kg	89.6	57.0	109
EP075: 1.2.3.4-Tetrachlorobenzene	634-66-2	0.5	mg/kg	<1.5	----	----	----	----
EP075K: Miscellaneous Compounds (QCLot: 4597632)								
EP075: 1.2.4.5-Tetrachlorobenzene	95-94-3	0.5	mg/kg	<0.5	1.5 mg/kg	92.0	54.0	120
EP075: 2.3.4.6-Tetrachlorophenol	58-90-2	0.5	mg/kg	<0.5	----	----	----	----
EP075: Isodrin	465-73-6	0.5	mg/kg	<0.5	----	----	----	----
EP075: Di (2-ethylhexyl) adipate	103-23-1	0.5	mg/kg	<0.5	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4605665)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	109	68.4	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4605665)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	106	68.4	128
EP132A: Phenolic Compounds (QCLot: 4597586)								
EP132: Hexachlorophene	70-30-4	10	µg/kg	<10	100 µg/kg	18.2	15.6	94.0
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QCLot: 4604346)								
EP202: 2.4-D	94-75-7	0.02	mg/kg	<0.02	0.1 mg/kg	95.0	68.5	131
EP202: Triclopyr	55335-06-3	0.02	mg/kg	<0.02	0.1 mg/kg	95.9	50.8	141
EP202: 2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg	<0.02	0.1 mg/kg	94.1	40.8	126
EP202: 2.4.5-T	93-76-5	0.02	mg/kg	<0.02	0.1 mg/kg	94.3	57.4	139
EP202: Picloram	1918-02-1	0.02	mg/kg	<0.02	0.1 mg/kg	70.2	48.7	129
EP202: Fluroxypyr	69377-81-7	0.02	mg/kg	<0.02	0.1 mg/kg	90.0	53.2	128

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EG005(ED093)C: Leachable Metals by ICPAES (QCLot: 4605788)								
EG005C: Aluminium	7429-90-5	0.1	mg/L	<0.1	0.5 mg/L	100	80.0	122

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EG005(ED093)C: Leachable Metals by ICPAES (QCLot: 4605788) - continued								
EG005C: Antimony	7440-36-0	0.1	mg/L	<0.1	0.02 mg/L	120	70.0	130
EG005C: Arsenic	7440-38-2	0.1	mg/L	<0.1	0.1 mg/L	97.0	80.0	124
EG005C: Beryllium	7440-41-7	0.05	mg/L	<0.05	0.1 mg/L	103	87.0	117
EG005C: Boron	7440-42-8	0.1	mg/L	<0.1	0.5 mg/L	110	80.0	130
EG005C: Cadmium	7440-43-9	0.05	mg/L	<0.05	0.1 mg/L	97.6	80.0	118
EG005C: Chromium	7440-47-3	0.1	mg/L	<0.1	0.1 mg/L	97.3	88.0	114
EG005C: Iron	7439-89-6	0.1	mg/L	<0.1	0.5 mg/L	100	83.0	123
EG005C: Lead	7439-92-1	0.1	mg/L	<0.1	0.1 mg/L	92.9	80.0	118
EG005C: Manganese	7439-96-5	0.1	mg/L	<0.1	0.1 mg/L	96.6	81.0	111
EG005C: Nickel	7440-02-0	0.1	mg/L	<0.1	0.1 mg/L	94.6	83.0	115
EG005C: Selenium	7782-49-2	0.05	mg/L	<0.05	0.1 mg/L	94.1	77.0	125
EG005C: Silver	7440-22-4	0.1	mg/L	<0.1	----	----	----	----
EG005C: Molybdenum	7439-98-7	0.1	mg/L	<0.1	0.1 mg/L	108	86.0	122
EA005P: pH by PC Titrator (QCLot: 4606370)								
EA005-P: pH Value	----	----	pH Unit	----	4 pH Unit	100	98.8	101
				----	7 pH Unit	100	99.2	101
EA010P: Conductivity by PC Titrator (QCLot: 4606371)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	220 µS/cm	97.1	89.9	110
				<1	2100 µS/cm	99.3	90.2	111
ED037P: Alkalinity by PC Titrator (QCLot: 4606372)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	109	81.0	111
				----	50 mg/L	113	80.0	120
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 4608256)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	98.0	82.0	122
				<1	500 mg/L	99.5	82.0	122
ED045G: Chloride by Discrete Analyser (QCLot: 4608257)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	50 mg/L	96.4	80.9	127
				<1	1000 mg/L	95.4	80.9	127
EG035C: Leachable Mercury by FIMS (QCLot: 4614888)								
EG035C: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	96.7	79.0	109
EG050G: Hexavalent Chromium by Discrete Analyser (QCLot: 4610168)								
EG050G-C: Hexavalent Chromium	18540-29-9	0.01	mg/L	<0.01	0.05 mg/L	97.5	83.0	117
EK026SF: Total CN by Segmented Flow Analyser (QCLot: 4610715)								
EK026SF: Total Cyanide	57-12-5	0.004	mg/L	<0.004	0.2 mg/L	93.8	73.0	133
EK028SF: Weak Acid Dissociable CN by Segmented Flow Analyser (QCLot: 4610714)								
EK028SF: Weak Acid Dissociable Cyanide	----	0.004	mg/L	<0.004	0.2 mg/L	105	93.0	127
EK040P: Fluoride by PC Titrator (QCLot: 4606373)								

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EK040P: Fluoride by PC Titrator (QCLot: 4606373) - continued								
EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	5 mg/L	100	82.0	116
EP068A: Organochlorine Pesticides (OC) (QCLot: 4605552)								
EP068: alpha-BHC	319-84-6	0.5	µg/L	<0.5	5 µg/L	97.7	64.9	107
EP068: Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L	<0.5	5 µg/L	79.1	58.3	111
EP068: beta-BHC	319-85-7	0.5	µg/L	<0.5	5 µg/L	103	69.0	117
EP068: gamma-BHC	58-89-9	0.5	µg/L	<0.5	5 µg/L	106	70.0	112
EP068: delta-BHC	319-86-8	0.5	µg/L	<0.5	5 µg/L	108	68.9	110
EP068: Heptachlor	76-44-8	0.5	µg/L	<0.5	5 µg/L	93.0	65.2	108
EP068: Aldrin	309-00-2	0.5	µg/L	<0.5	5 µg/L	91.4	65.8	109
EP068: Heptachlor epoxide	1024-57-3	0.5	µg/L	<0.5	5 µg/L	92.0	67.1	107
EP068: trans-Chlordane	5103-74-2	0.5	µg/L	<0.5	5 µg/L	89.5	64.1	110
EP068: alpha-Endosulfan	959-98-8	0.5	µg/L	<0.5	5 µg/L	98.2	66.7	112
EP068: cis-Chlordane	5103-71-9	0.5	µg/L	<0.5	5 µg/L	89.8	63.2	111
EP068: Dieldrin	60-57-1	0.5	µg/L	<0.5	5 µg/L	101	65.2	113
EP068: 4.4`-DDE	72-55-9	0.5	µg/L	<0.5	5 µg/L	98.0	66.0	112
EP068: Endrin	72-20-8	0.5	µg/L	<0.5	5 µg/L	98.3	65.2	113
EP068: beta-Endosulfan	33213-65-9	0.5	µg/L	<0.5	5 µg/L	99.4	67.3	114
EP068: 4.4`-DDD	72-54-8	0.5	µg/L	<0.5	5 µg/L	101	72.0	122
EP068: Endrin aldehyde	7421-93-4	0.5	µg/L	<0.5	5 µg/L	84.8	66.9	109
EP068: Endosulfan sulfate	1031-07-8	0.5	µg/L	<0.5	5 µg/L	94.6	65.2	112
EP068: 4.4`-DDT	50-29-3	2	µg/L	<2.0	5 µg/L	96.7	65.2	112
EP068: Endrin ketone	53494-70-5	0.5	µg/L	<0.5	5 µg/L	91.1	63.8	110
EP068: Methoxychlor	72-43-5	2	µg/L	<2.0	5 µg/L	96.4	61.1	114
EP068B: Organophosphorus Pesticides (OP) (QCLot: 4605552)								
EP068: Dichlorvos	62-73-7	0.5	µg/L	<0.5	5 µg/L	104	65.6	114
EP068: Demeton-S-methyl	919-86-8	0.5	µg/L	<0.5	5 µg/L	100	63.7	113
EP068: Monocrotophos	6923-22-4	2	µg/L	<2.0	5 µg/L	25.0	19.7	48.0
EP068: Dimethoate	60-51-5	0.5	µg/L	<0.5	5 µg/L	86.6	69.5	110
EP068: Diazinon	333-41-5	0.5	µg/L	<0.5	5 µg/L	97.1	71.1	110
EP068: Chlorpyrifos-methyl	5598-13-0	0.5	µg/L	<0.5	5 µg/L	102	77.0	119
EP068: Parathion-methyl	298-00-0	2	µg/L	<2.0	5 µg/L	106	70.0	124
EP068: Malathion	121-75-5	0.5	µg/L	<0.5	5 µg/L	104	68.4	116
EP068: Fenthion	55-38-9	0.5	µg/L	<0.5	5 µg/L	97.2	68.6	112
EP068: Chlorpyrifos	2921-88-2	0.5	µg/L	<0.5	5 µg/L	101	75.0	119
EP068: Parathion	56-38-2	2	µg/L	<2.0	5 µg/L	98.6	67.0	121
EP068: Pirimphos-ethyl	23505-41-1	0.5	µg/L	<0.5	5 µg/L	89.8	69.0	121
EP068: Chlorfenvinphos	470-90-6	0.5	µg/L	<0.5	5 µg/L	106	71.8	110
EP068: Bromophos-ethyl	4824-78-6	0.5	µg/L	<0.5	5 µg/L	93.0	67.5	112
EP068: Fenamiphos	22224-92-6	0.5	µg/L	<0.5	5 µg/L	105	64.1	116

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP068B: Organophosphorus Pesticides (OP) (QCLot: 4605552) - continued								
EP068: Prothiofos	34643-46-4	0.5	µg/L	<0.5	5 µg/L	96.8	67.8	114
EP068: Ethion	563-12-2	0.5	µg/L	<0.5	5 µg/L	107	74.0	120
EP068: Carbophenothion	786-19-6	0.5	µg/L	<0.5	5 µg/L	90.0	66.2	114
EP068: Azinphos Methyl	86-50-0	0.5	µg/L	<0.5	5 µg/L	98.9	51.6	128
EP068C: Triazines (QCLot: 4605552)								
EP068: Atrazine	1912-24-9	0.5	µg/L	<0.5	5 µg/L	92.5	69.3	113
EP068: Simazine	122-34-9	0.5	µg/L	<0.5	5 µg/L	105	62.6	118
EP068D: Pyrethroids (QCLot: 4605552)								
EP068: Cypermethrins	----	2	µg/L	<2.0	5 µg/L	87.6	64.2	113
EP074A: Monocyclic Aromatic Hydrocarbons (QCLot: 4619697)								
EP074: Benzene	71-43-2	1	µg/L	<1	10 µg/L	101	77.0	119
EP074: Toluene	108-88-3	2	µg/L	<2	10 µg/L	103	69.0	129
EP074: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	102	76.0	118
EP074: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	20 µg/L	101	77.0	119
EP074: Styrene	100-42-5	5	µg/L	<5	10 µg/L	100	73.0	119
EP074: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	102	79.0	117
EP074: Isopropylbenzene	98-82-8	5	µg/L	<5	10 µg/L	102	76.0	118
EP074: n-Propylbenzene	103-65-1	5	µg/L	<5	10 µg/L	102	69.0	119
EP074: 1.3.5-Trimethylbenzene	108-67-8	5	µg/L	<5	10 µg/L	101	74.0	116
EP074: sec-Butylbenzene	135-98-8	5	µg/L	<5	10 µg/L	101	73.0	119
EP074: 1.2.4-Trimethylbenzene	95-63-6	5	µg/L	<5	10 µg/L	101	74.0	116
EP074: tert-Butylbenzene	98-06-6	5	µg/L	<5	10 µg/L	102	72.0	116
EP074: p-Isopropyltoluene	99-87-6	5	µg/L	<5	10 µg/L	101	71.0	119
EP074: n-Butylbenzene	104-51-8	5	µg/L	<5	10 µg/L	102	65.0	123
EP074B: Oxygenated Compounds (QCLot: 4619697)								
EP074: 2-Propanone (Acetone)	67-64-1	50	µg/L	<50	100 µg/L	90.8	64.7	137
EP074: Vinyl Acetate	108-05-4	50	µg/L	<50	100 µg/L	108	61.4	134
EP074: 2-Butanone (MEK)	78-93-3	50	µg/L	<50	100 µg/L	92.2	73.6	130
EP074: 4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L	<50	100 µg/L	97.6	66.0	132
EP074: 2-Hexanone (MBK)	591-78-6	50	µg/L	<50	100 µg/L	94.4	65.0	137
EP074C: Sulfonated Compounds (QCLot: 4619697)								
EP074: Carbon disulfide	75-15-0	5	µg/L	<5	10 µg/L	94.9	72.8	127
EP074D: Fumigants (QCLot: 4619697)								
EP074: 2.2-Dichloropropane	594-20-7	5	µg/L	<5	10 µg/L	101	68.0	122
EP074: 1.2-Dichloropropane	78-87-5	5	µg/L	<5	10 µg/L	104	76.0	118
EP074: cis-1.3-Dichloropropylene	10061-01-5	5	µg/L	<5	10 µg/L	99.4	62.0	120
EP074: trans-1.3-Dichloropropylene	10061-02-6	5	µg/L	<5	10 µg/L	99.6	60.0	114

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP074D: Fumigants (QCLot: 4619697) - continued								
EP074: 1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	10 µg/L	104	69.0	117
EP074E: Halogenated Aliphatic Compounds (QCLot: 4619697)								
EP074: Dichlorodifluoromethane	75-71-8	50	µg/L	<50	100 µg/L	92.2	60.6	138
EP074: Chloromethane	74-87-3	50	µg/L	<50	100 µg/L	98.9	67.4	130
EP074: Vinyl chloride	75-01-4	50	µg/L	<50	100 µg/L	97.1	69.4	129
EP074: Bromomethane	74-83-9	50	µg/L	<50	100 µg/L	102	56.0	140
EP074: Chloroethane	75-00-3	50	µg/L	<50	100 µg/L	99.2	61.0	139
EP074: Trichlorofluoromethane	75-69-4	50	µg/L	<50	100 µg/L	99.5	69.0	131
EP074: 1.1-Dichloroethene	75-35-4	5	µg/L	<5	10 µg/L	98.7	70.0	124
EP074: Iodomethane	74-88-4	5	µg/L	<5	10 µg/L	85.9	70.2	128
EP074: Methylene chloride	75-09-2	5	µg/L	<5	10 µg/L	114	69.3	133
EP074: trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	10 µg/L	102	74.0	118
EP074: 1.1-Dichloroethane	75-34-3	5	µg/L	<5	10 µg/L	103	74.0	120
EP074: cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	10 µg/L	101	77.0	119
EP074: 1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	10 µg/L	101	67.0	119
EP074: 1.1-Dichloropropylene	563-58-6	5	µg/L	<5	10 µg/L	101	73.0	119
EP074: Carbon Tetrachloride	56-23-5	5	µg/L	<5	10 µg/L	98.8	62.0	120
EP074: 1.2-Dichloroethane	107-06-2	5	µg/L	<5	10 µg/L	104	73.0	123
EP074: Trichloroethene	79-01-6	5	µg/L	<5	10 µg/L	101	76.0	118
EP074: Dibromomethane	74-95-3	5	µg/L	<5	10 µg/L	103	73.0	119
EP074: 1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	10 µg/L	105	72.0	126
EP074: 1.3-Dichloropropane	142-28-9	5	µg/L	<5	10 µg/L	104	71.0	129
EP074: Tetrachloroethene	127-18-4	5	µg/L	<5	10 µg/L	93.4	72.0	124
EP074: 1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	10 µg/L	101	66.0	114
EP074: trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	10 µg/L	101	60.0	120
EP074: cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	10 µg/L	100	70.6	128
EP074: 1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	10 µg/L	105	70.0	124
EP074: 1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	10 µg/L	107	74.0	126
EP074: Pentachloroethane	76-01-7	5	µg/L	<5	10 µg/L	109	71.8	126
EP074: 1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	10 µg/L	99.6	66.4	136
EP074: Hexachlorobutadiene	87-68-3	5	µg/L	<5	10 µg/L	105	58.0	130
EP074F: Halogenated Aromatic Compounds (QCLot: 4619697)								
EP074: Chlorobenzene	108-90-7	5	µg/L	<5	10 µg/L	103	79.0	117
EP074: Bromobenzene	108-86-1	5	µg/L	<5	10 µg/L	104	76.0	116
EP074: 2-Chlorotoluene	95-49-8	5	µg/L	<5	10 µg/L	100	73.0	119
EP074: 4-Chlorotoluene	106-43-4	5	µg/L	<5	10 µg/L	101	73.0	119
EP074: 1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	10 µg/L	103	75.0	117
EP074: 1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	10 µg/L	100	74.0	118
EP074: 1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	10 µg/L	105	75.0	117

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP074F: Halogenated Aromatic Compounds (QCLot: 4619697) - continued								
EP074: 1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	10 µg/L	107	61.0	125
EP074: 1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	10 µg/L	109	67.0	123
EP074G: Trihalomethanes (QCLot: 4619697)								
EP074: Chloroform	67-66-3	5	µg/L	<5	10 µg/L	103	72.0	120
EP074: Bromodichloromethane	75-27-4	5	µg/L	<5	10 µg/L	98.8	64.0	118
EP074: Dibromochloromethane	124-48-1	5	µg/L	<5	10 µg/L	97.8	65.0	115
EP074: Bromoform	75-25-2	5	µg/L	<5	10 µg/L	96.0	73.5	126
EP074H: Naphthalene (QCLot: 4619697)								
EP074: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	109	72.0	122
EP075A: Phenolic Compounds (QCLot: 4605551)								
EP075: Phenol	108-95-2	2	µg/L	<2	10 µg/L	35.6	25.5	64.1
EP075: 2-Chlorophenol	95-57-8	2	µg/L	<2	10 µg/L	64.8	52.0	88.0
EP075: 2-Methylphenol	95-48-7	2	µg/L	<2	10 µg/L	61.0	50.0	94.0
EP075: 3- & 4-Methylphenol	1319-77-3	2	µg/L	<2	10 µg/L	59.4	45.0	96.2
EP075: 2-Nitrophenol	88-75-5	2	µg/L	<2	10 µg/L	76.2	48.0	98.0
EP075: 2.4-Dimethylphenol	105-67-9	2	µg/L	<2	10 µg/L	56.0	50.0	94.0
EP075: 2.4-Dichlorophenol	120-83-2	2	µg/L	<2	10 µg/L	76.0	61.9	109
EP075: 2.6-Dichlorophenol	87-65-0	2	µg/L	<2	10 µg/L	73.4	61.5	108
EP075: 4-Chloro-3-methylphenol	59-50-7	2	µg/L	<2	10 µg/L	79.9	61.4	107
EP075: 2.4.6-Trichlorophenol	88-06-2	2	µg/L	<2	10 µg/L	79.1	57.6	112
EP075: 2.4.5-Trichlorophenol	95-95-4	2	µg/L	<2	10 µg/L	77.4	58.0	110
EP075: Pentachlorophenol	87-86-5	4	µg/L	<4	20 µg/L	77.2	12.8	95.0
EP075B: Polynuclear Aromatic Hydrocarbons (QCLot: 4605551)								
EP075: Naphthalene	91-20-3	2	µg/L	<2	10 µg/L	70.0	51.0	95.0
EP075: 2-Methylnaphthalene	91-57-6	2	µg/L	<2	10 µg/L	73.1	59.0	108
EP075: 2-Chloronaphthalene	91-58-7	2	µg/L	<2	10 µg/L	79.4	60.6	106
EP075: Acenaphthylene	208-96-8	2	µg/L	<2	10 µg/L	78.0	64.0	108
EP075: Acenaphthene	83-32-9	2	µg/L	<2	10 µg/L	80.9	65.0	108
EP075: Fluorene	86-73-7	2	µg/L	<2	10 µg/L	86.0	65.2	107
EP075: Phenanthrene	85-01-8	2	µg/L	<2	10 µg/L	91.7	66.7	108
EP075: Anthracene	120-12-7	2	µg/L	<2	10 µg/L	90.3	65.8	108
EP075: Fluoranthene	206-44-0	2	µg/L	<2	10 µg/L	95.0	64.9	109
EP075: Pyrene	129-00-0	2	µg/L	<2	10 µg/L	96.0	60.1	111
EP075: N-2-Fluorenyl Acetamide	53-96-3	2	µg/L	<2	10 µg/L	96.5	59.7	110
EP075: Benz(a)anthracene	56-55-3	2	µg/L	<2	10 µg/L	91.8	62.2	112
EP075: Chrysene	218-01-9	2	µg/L	<2	10 µg/L	98.6	59.3	114
EP075: Benzo(b+j) & Benzo(k)fluoranthene	205-99-2 207-08-9	4	µg/L	<4	20 µg/L	98.0	60.1	111

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP075B: Polynuclear Aromatic Hydrocarbons (QCLot: 4605551) - continued								
EP075: 7.12-Dimethylbenz(a)anthracene	57-97-6	2	µg/L	<2	10 µg/L	# 124	50.0	108
EP075: Benzo(a)pyrene	50-32-8	2	µg/L	<2	10 µg/L	101	59.2	112
EP075: 3-Methylcholanthrene	56-49-5	2	µg/L	<2	10 µg/L	97.7	60.1	110
EP075: Indeno(1.2.3.cd)pyrene	193-39-5	2	µg/L	<2	10 µg/L	99.1	59.6	110
EP075: Dibenz(a.h)anthracene	53-70-3	2	µg/L	<2	10 µg/L	95.8	57.2	109
EP075: Benzo(g.h.i)perylene	191-24-2	2	µg/L	<2	10 µg/L	98.6	60.6	110
EP075: Benzo(a)pyrene TEQ (zero)	----	2	µg/L	<2	----	----	----	----
EP075C: Phthalate Esters (QCLot: 4605551)								
EP075: Dimethyl phthalate	131-11-3	2	µg/L	<2	10 µg/L	88.9	64.3	112
EP075: Diethyl phthalate	84-66-2	2	µg/L	<2	10 µg/L	94.6	67.3	111
EP075: Di-n-butyl phthalate	84-74-2	2	µg/L	<2	10 µg/L	98.7	68.4	122
EP075: Butyl benzyl phthalate	85-68-7	2	µg/L	<2	10 µg/L	98.4	61.2	114
EP075: bis(2-ethylhexyl) phthalate	117-81-7	----	µg/L	----	10 µg/L	105	60.0	132
EP075: Di-n-octylphthalate	117-84-0	2	µg/L	<2	10 µg/L	99.5	62.1	115
EP075D: Nitrosamines (QCLot: 4605551)								
EP075: N-Nitrosomethylethylamine	10595-95-6	2	µg/L	<2	10 µg/L	56.9	46.0	110
EP075: N-Nitrosodiethylamine	55-18-5	2	µg/L	<2	10 µg/L	69.0	60.6	113
EP075: N-Nitrosopyrrolidine	930-55-2	4	µg/L	<4	10 µg/L	63.2	45.0	91.0
EP075: N-Nitrosomorpholine	59-89-2	2	µg/L	<2	10 µg/L	59.7	42.0	100
EP075: N-Nitrosodi-n-propylamine	621-64-7	2	µg/L	<2	10 µg/L	81.1	63.5	108
EP075: N-Nitrosopiperidine	100-75-4	2	µg/L	<2	10 µg/L	76.8	61.7	107
EP075: N-Nitrosodibutylamine	924-16-3	2	µg/L	<2	10 µg/L	102	62.5	108
EP075: N-Nitrosodiphenyl & Diphenylamine	86-30-6 122-39-4	4	µg/L	<4	20 µg/L	88.9	64.6	112
EP075: Methapyrilene	91-80-5	2	µg/L	<2	10 µg/L	74.3	23.3	125
EP075E: Nitroaromatics and Ketones (QCLot: 4605551)								
EP075: 2-Picoline	109-06-8	2	µg/L	<2	10 µg/L	41.0	41.0	109
EP075: Acetophenone	98-86-2	2	µg/L	<2	10 µg/L	76.0	68.3	112
EP075: Nitrobenzene	98-95-3	2	µg/L	<2	10 µg/L	74.7	68.3	112
EP075: Isophorone	78-59-1	2	µg/L	<2	10 µg/L	81.2	67.6	111
EP075: 2.6-Dinitrotoluene	606-20-2	4	µg/L	<4	10 µg/L	83.8	64.4	113
EP075: 2.4-Dinitrotoluene	121-14-2	4	µg/L	<4	10 µg/L	90.6	59.5	109
EP075: 1-Naphthylamine	134-32-7	2	µg/L	<2	10 µg/L	93.5	46.8	102
EP075: 4-Nitroquinoline-N-oxide	56-57-5	2	µg/L	<2	10 µg/L	95.3	40.0	96.0
EP075: 5-Nitro-o-toluidine	99-55-8	2	µg/L	<2	10 µg/L	93.1	58.3	106
EP075: Azobenzene	103-33-3	2	µg/L	<2	10 µg/L	90.0	66.0	112
EP075: 1.3.5-Trinitrobenzene	99-35-4	2	µg/L	<2	10 µg/L	98.0	46.0	108
EP075: Phenacetin	62-44-2	2	µg/L	<2	10 µg/L	95.8	57.8	101

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP075E: Nitroaromatics and Ketones (QCLot: 4605551) - continued								
EP075: 4-Aminobiphenyl	92-67-1	2	µg/L	<2	10 µg/L	90.0	60.1	112
EP075: Pentachloronitrobenzene	82-68-8	2	µg/L	<2	10 µg/L	88.7	59.0	109
EP075: Pronamide	23950-58-5	2	µg/L	<2	10 µg/L	98.3	62.7	109
EP075: Dimethylaminoazobenzene	60-11-7	2	µg/L	<2	10 µg/L	86.9	59.4	108
EP075: Chlorobenzilate	510-15-6	2	µg/L	<2	10 µg/L	95.0	57.7	110
EP075F: Haloethers (QCLot: 4605551)								
EP075: Bis(2-chloroethyl) ether	111-44-4	2	µg/L	<2	10 µg/L	# 68.1	69.1	112
EP075: Bis(2-chloroethoxy) methane	111-91-1	2	µg/L	<2	10 µg/L	79.8	66.2	111
EP075: 4-Chlorophenyl phenyl ether	7005-72-3	2	µg/L	<2	10 µg/L	84.6	64.7	109
EP075: 4-Bromophenyl phenyl ether	101-55-3	2	µg/L	<2	10 µg/L	88.0	61.6	108
EP075G: Chlorinated Hydrocarbons (QCLot: 4605551)								
EP075: 1.4-Dichlorobenzene	106-46-7	2	µg/L	<2	10 µg/L	61.7	41.0	97.0
EP075: 1.3-Dichlorobenzene	541-73-1	2	µg/L	<2	10 µg/L	62.2	40.0	96.0
EP075: 1.2-Dichlorobenzene	95-50-1	2	µg/L	<2	10 µg/L	65.2	41.0	95.0
EP075: Hexachloroethane	67-72-1	2	µg/L	<2	10 µg/L	62.4	46.0	88.0
EP075: 1.2.4-Trichlorobenzene	120-82-1	2	µg/L	<2	10 µg/L	65.3	46.0	96.0
EP075: Hexachloropropylene	1888-71-7	2	µg/L	<2	10 µg/L	65.4	34.0	96.0
EP075: Hexachlorobutadiene	87-68-3	2	µg/L	<2	10 µg/L	65.1	37.4	100
EP075: Hexachlorocyclopentadiene	77-47-4	10	µg/L	<10	10 µg/L	78.4	23.5	107
EP075: Pentachlorobenzene	608-93-5	2	µg/L	<2	10 µg/L	78.2	64.5	107
EP075: Hexachlorobenzene (HCB)	118-74-1	4	µg/L	<4	10 µg/L	83.9	65.7	110
EP075H: Anilines and Benzidines (QCLot: 4605551)								
EP075: Aniline	62-53-3	2	µg/L	<2	10 µg/L	59.5	50.0	104
EP075: 4-Chloroaniline	106-47-8	2	µg/L	<2	10 µg/L	70.9	42.0	106
EP075: 2-Nitroaniline	88-74-4	4	µg/L	<4	10 µg/L	84.5	60.9	110
EP075: 3-Nitroaniline	99-09-2	4	µg/L	<4	10 µg/L	86.4	51.5	96.9
EP075: Dibenzofuran	132-64-9	2	µg/L	<2	10 µg/L	81.6	65.3	108
EP075: 4-Nitroaniline	100-01-6	2	µg/L	<2	10 µg/L	91.0	48.9	99.5
EP075: Carbazole	86-74-8	2	µg/L	<2	10 µg/L	97.8	64.3	107
EP075: 3.3`-Dichlorobenzidine	91-94-1	2	µg/L	<2	10 µg/L	95.4	60.3	119
EP075I: Organochlorine Pesticides (QCLot: 4605551)								
EP075: alpha-BHC	319-84-6	2	µg/L	<2	10 µg/L	93.9	64.3	110
EP075: beta-BHC	319-85-7	2	µg/L	<2	10 µg/L	98.4	53.0	107
EP075: gamma-BHC	58-89-9	2	µg/L	<2	10 µg/L	89.6	51.0	111
EP075: delta-BHC	319-86-8	2	µg/L	<2	10 µg/L	97.1	57.0	111
EP075: Heptachlor	76-44-8	2	µg/L	<2	10 µg/L	93.3	57.9	108
EP075: Aldrin	309-00-2	2	µg/L	<2	10 µg/L	93.2	56.0	112
EP075: Heptachlor epoxide	1024-57-3	2	µg/L	<2	10 µg/L	90.8	50.0	118

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP075I: Organochlorine Pesticides (QCLot: 4605551) - continued								
EP075: alpha-Endosulfan	959-98-8	2	µg/L	<2	10 µg/L	97.7	59.0	111
EP075: 4.4`-DDE	72-55-9	2	µg/L	<2	10 µg/L	98.6	53.0	115
EP075: Dieldrin	60-57-1	2	µg/L	<2	10 µg/L	92.7	59.0	115
EP075: Endrin	72-20-8	2	µg/L	<2	10 µg/L	94.2	58.0	114
EP075: beta-Endosulfan	33213-65-9	2	µg/L	<2	10 µg/L	98.8	54.0	116
EP075: 4.4`-DDD	72-54-8	2	µg/L	<2	10 µg/L	97.4	55.0	115
EP075: Endosulfan sulfate	1031-07-8	2	µg/L	<2	10 µg/L	100	52.8	114
EP075: 4.4`-DDT	50-29-3	4	µg/L	<4	10 µg/L	96.7	56.0	114
EP075: Sum of Aldrin + Dieldrin	309-00-2/60-57-1	4	µg/L	<4	----	----	----	----
EP075: Sum of DDD + DDE + DDT	72-54-8/72-5 5-9/50-2	4	µg/L	<4	----	----	----	----
EP075J: Organophosphorus Pesticides (QCLot: 4605551)								
EP075: Dichlorvos	62-73-7	2	µg/L	<2	10 µg/L	84.6	51.0	113
EP075: Dimethoate	60-51-5	2	µg/L	<2	10 µg/L	90.6	43.0	109
EP075: Diazinon	333-41-5	2	µg/L	<2	10 µg/L	98.2	49.0	113
EP075: Chlorpyrifos-methyl	5598-13-0	2	µg/L	<2	10 µg/L	93.9	54.1	116
EP075: Malathion	121-75-5	2	µg/L	<2	10 µg/L	107	54.0	124
EP075: Fenthion	55-38-9	2	µg/L	<2	10 µg/L	97.5	57.0	115
EP075: Chlorpyrifos	2921-88-2	2	µg/L	<2	10 µg/L	94.4	53.0	109
EP075: Pirimphos-ethyl	23505-41-1	2	µg/L	<2	10 µg/L	97.2	55.0	111
EP075: Chlorfenvinphos	470-90-6	2	µg/L	<2	10 µg/L	79.9	50.0	116
EP075: Prothiofos	34643-46-4	2	µg/L	<2	10 µg/L	99.4	54.0	118
EP075: Ethion	563-12-2	2	µg/L	<2	10 µg/L	97.8	51.0	117
EP075K: Miscellaneous Compounds (QCLot: 4605551)								
EP075: 1.3.5-Trichlorobenzene	108-70-3	2	µg/L	<2	10 µg/L	62.7	40.9	110
EP075: 1.2.4.5-Tetrachlorobenzene	95-94-3	2	µg/L	<2	10 µg/L	67.9	52.5	109
EP075: Methanesulfonate methyl	66-27-3	2	µg/L	<2	10 µg/L	49.2	41.0	115
EP075: cis-Isosafrole	17627-76-8	2	µg/L	<2	10 µg/L	75.4	61.7	106
EP075: trans-Isosafrole	4043-71-4	2	µg/L	<2	10 µg/L	77.0	57.3	114
EP075: Safrole	94-59-7	2	µg/L	<2	10 µg/L	80.5	64.5	110
EP075: Diallate	2303-16-4	2	µg/L	<2	10 µg/L	95.4	53.0	111
EP075: 2.3.4.6-Tetrachlorophenol	58-90-2	2	µg/L	<2	10 µg/L	86.1	50.0	110

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

Matrix Spike (MS) Report

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 4621224)							
ES2230654-001	BH4B_2.39-2.51	EG005T: Arsenic	7440-38-2	50 mg/kg	102	70.0	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	94.4	70.0	130
		EG005T: Lead	7439-92-1	250 mg/kg	94.8	70.0	130
		EG005T: Nickel	7440-02-0	50 mg/kg	100	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4621223)							
ES2230654-001	BH4B_2.39-2.51	EG035T: Mercury	7439-97-6	5 mg/kg	98.3	70.0	130
EG048: Hexavalent Chromium (Alkaline Digest) (QCLot: 4610058)							
ES2230654-004	BH4B_22.05-22.30	EG048G: Hexavalent Chromium	18540-29-9	20 mg/kg	77.7	70.0	130
ES2230654-004	BH4B_22.05-22.30	EG048G: Hexavalent Chromium	18540-29-9	20 mg/kg	# 53.4	70.0	130
EK026SF: Total CN by Segmented Flow Analyser (QCLot: 4600770)							
ES2230654-001	BH4B_2.39-2.51	EK026SF: Total Cyanide	57-12-5	40 mg/kg	97.1	70.0	130
EK028SF: Weak Acid Dissociable CN by Segmented Flow Analyser (QCLot: 4600769)							
ES2230654-001	BH4B_2.39-2.51	EK028SF: Weak Acid Dissociable Cyanide	----	40 mg/kg	95.5	70.0	130
EK040T: Fluoride Total (QCLot: 4601823)							
ES2230654-001	BH4B_2.39-2.51	EK040T: Fluoride	16984-48-8	400 mg/kg	79.6	70.0	130
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 4597635)							
ES2230654-001	BH4B_2.39-2.51	EP066: Total Polychlorinated biphenyls	----	1 mg/kg	86.2	70.0	130
EP068A: Organochlorine Pesticides (OC) (QCLot: 4597633)							
ES2230654-001	BH4B_2.39-2.51	EP068: gamma-BHC	58-89-9	0.5 mg/kg	84.5	70.0	130
		EP068: Heptachlor	76-44-8	0.5 mg/kg	85.3	70.0	130
		EP068: Aldrin	309-00-2	0.5 mg/kg	85.9	70.0	130
		EP068: Dieldrin	60-57-1	0.5 mg/kg	94.1	70.0	130
		EP068: Endrin	72-20-8	2 mg/kg	84.4	70.0	130
		EP068: 4.4`-DDT	50-29-3	2 mg/kg	83.1	70.0	130
EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup (QCLot: 4597634)							
ES2230654-001	BH4B_2.39-2.51	EP071SG-S: C10 - C14 Fraction	----	480 mg/kg	107	43.0	139
		EP071SG-S: C15 - C28 Fraction	----	3100 mg/kg	104	49.0	131
		EP071SG-S: C29 - C36 Fraction	----	2060 mg/kg	126	64.0	158
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup (QCLot: 4597634)							
ES2230654-001	BH4B_2.39-2.51	EP071SG-S: >C10 - C16 Fraction	----	900 mg/kg	104	33.0	137
		EP071SG-S: >C16 - C34 Fraction	----	4320 mg/kg	118	40.0	137
		EP071SG-S: >C34 - C40 Fraction	----	890 mg/kg	117	30.0	190
EP074A: Monocyclic Aromatic Hydrocarbons (QCLot: 4605667)							
ES2234505-001	Anonymous	EP074: Benzene	71-43-2	2.5 mg/kg	110	70.0	130
		EP074: Toluene	108-88-3	2.5 mg/kg	111	70.0	130

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP074E(SIM): Halogenated Aliphatic Compounds (QCLot: 4605666)							
ES2234505-001	Anonymous	EP074E(SIM): Vinyl chloride	75-01-4	2.5 mg/kg	112	70.0	130
EP074E: Halogenated Aliphatic Compounds (QCLot: 4605667)							
ES2234505-001	Anonymous	EP074: 1.1-Dichloroethene	75-35-4	2.5 mg/kg	116	70.0	130
		EP074: Trichloroethene	79-01-6	2.5 mg/kg	105	70.0	130
EP074F: Halogenated Aromatic Compounds (QCLot: 4605667)							
ES2234505-001	Anonymous	EP074: Chlorobenzene	108-90-7	2.5 mg/kg	107	70.0	130
EP075A: Phenolic Compounds (QCLot: 4597632)							
ES2230654-001	BH4B_2.39-2.51	EP075: Phenol	108-95-2	10 mg/kg	91.0	60.0	130
		EP075: 4-Chloro-3-methylphenol	59-50-7	10 mg/kg	89.7	50.0	130
		EP075: Pentachlorophenol	87-86-5	10 mg/kg	55.0	10.0	130
EP075B: Polynuclear Aromatic Hydrocarbons (QCLot: 4597632)							
ES2230654-001	BH4B_2.39-2.51	EP075: Acenaphthene	83-32-9	10 mg/kg	80.9	50.0	130
		EP075: Pyrene	129-00-0	10 mg/kg	85.3	50.0	130
EP075E: Nitroaromatics and Ketones (QCLot: 4597632)							
ES2230654-001	BH4B_2.39-2.51	EP075: 2.4-Dinitrotoluene	121-14-2	10 mg/kg	83.2	40.0	130
EP075G: Chlorinated Hydrocarbons (QCLot: 4597632)							
ES2230654-001	BH4B_2.39-2.51	EP075: 1.4-Dichlorobenzene	106-46-7	10 mg/kg	84.4	60.0	130
		EP075: 1.2.4-Trichlorobenzene	120-82-1	10 mg/kg	89.5	50.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4605665)							
ES2234505-001	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	117	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4605665)							
ES2234505-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	115	70.0	130
EP132A: Phenolic Compounds (QCLot: 4597586)							
ES2230654-004	BH4B_22.05-22.30	EP132: Hexachlorophene	70-30-4	100 µg/kg	67.5	6.80	91.0
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QCLot: 4604346)							
EB2227467-015	Anonymous	EP202: 2.4-D	94-75-7	0.1 mg/kg	97.9	68.0	139
		EP202: Triclopyr	55335-06-3	0.1 mg/kg	98.4	51.0	145
		EP202: 2.4.5-T	93-76-5	0.1 mg/kg	89.0	57.0	142
		EP202: Picloram	1918-02-1	0.1 mg/kg	70.8	49.0	138

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EG005(ED093)C: Leachable Metals by ICPAES (QCLot: 4605788)							
ES2230654-004	BH4B_22.05-22.30	EG005C: Arsenic	7440-38-2	1 mg/L	104	70.0	130
		EG005C: Beryllium	7440-41-7	1 mg/L	106	70.0	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EG005(ED093)C: Leachable Metals by ICPAES (QCLot: 4605788) - continued							
ES2230654-004	BH4B_22.05-22.30	EG005C: Cadmium	7440-43-9	0.25 mg/L	106	70.0	130
		EG005C: Chromium	7440-47-3	1 mg/L	104	70.0	130
		EG005C: Lead	7439-92-1	1 mg/L	105	70.0	130
		EG005C: Manganese	7439-96-5	1 mg/L	103	70.0	130
		EG005C: Nickel	7440-02-0	1 mg/L	104	70.0	130
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 4608256)							
ES2230654-001	BH4B_2.39-2.51	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	106	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 4608257)							
ES2230654-001	BH4B_2.39-2.51	ED045G: Chloride	16887-00-6	50 mg/L	102	70.0	130
EG035C: Leachable Mercury by FIMS (QCLot: 4614888)							
ES2230654-004	BH4B_22.05-22.30	EG035C: Mercury	7439-97-6	0.01 mg/L	98.7	70.0	130
EG050G: Hexavalent Chromium by Discrete Analyser (QCLot: 4610168)							
ES2230654-001	BH4B_2.39-2.51	EG050G-C: Hexavalent Chromium	18540-29-9	0.5 mg/L	# 59.1	70.0	130
EK026SF: Total CN by Segmented Flow Analyser (QCLot: 4610715)							
ES2230654-001	BH4B_2.39-2.51	EK026SF: Total Cyanide	57-12-5	0.2 mg/L	80.9	70.0	130
EK028SF: Weak Acid Dissociable CN by Segmented Flow Analyser (QCLot: 4610714)							
ES2230654-001	BH4B_2.39-2.51	EK028SF: Weak Acid Dissociable Cyanide	----	0.2 mg/L	87.6	70.0	130
EK040P: Fluoride by PC Titrator (QCLot: 4606373)							
ES2234595-001	Anonymous	EK040P: Fluoride	16984-48-8	5 mg/L	75.0	70.0	130
EP074A: Monocyclic Aromatic Hydrocarbons (QCLot: 4619697)							
ES2234420-001	Anonymous	EP074: Benzene	71-43-2	25 µg/L	83.0	70.0	130
		EP074: Toluene	108-88-3	25 µg/L	82.4	70.0	130
EP074E: Halogenated Aliphatic Compounds (QCLot: 4619697)							
ES2234420-001	Anonymous	EP074: 1.1-Dichloroethene	75-35-4	25 µg/L	81.3	70.0	130
		EP074: Trichloroethene	79-01-6	25 µg/L	80.8	70.0	130
EP074F: Halogenated Aromatic Compounds (QCLot: 4619697)							
ES2234420-001	Anonymous	EP074: Chlorobenzene	108-90-7	25 µg/L	84.9	70.0	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2230654**	Page	: 1 of 22
Amendment	: **(Preliminary Report)**		
Client	: **EMM CONSULTING PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: HENRY NOAKES	Telephone	: +61-2-8784 8555
Project	: ----	Date Samples Received	: 26-Aug-2022
Site	: ----	Issue Date	: 11-Oct-2022
Sampler	: KB	No. of samples received	: 22
Order number	: J200096	No. of samples analysed	: 9

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **Laboratory Control outliers exist - please see following pages for full details.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **Surrogate recovery outliers exist for all regular sample matrices - please see following pages for full details.**

Outliers : Analysis Holding Time Compliance

- **Analysis Holding Time Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EG048: Hexavalent Chromium (Alkaline Digest)	ES2230654--004	BH4B_22.05-22.30	**Hexavalent Chromium**	18540-29-9	53.4 %	70.0-130%	**Recovery less than lower data quality objective**

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
EP075B: Polynuclear Aromatic Hydrocarbons	QC-4605551-002	----	**7.12-Dimethylbenz(a)anthracene**	57-97-6	124 %	50.0-108%	**Recovery greater than upper control limit**
EP075F: Haloethers	QC-4605551-002	----	**Bis(2-chloroethyl) ether**	111-44-4	68.1 %	69.1-112%	**Recovery less than lower control limit**
Matrix Spike (MS) Recoveries							
EG050G: Hexavalent Chromium by Discrete Analyser	ES2230654--001	BH4B_2.39-2.51	**Hexavalent Chromium**	18540-29-9	59.1 %	70.0-130%	**Recovery less than lower data quality objective**

Regular Sample Surrogates

Sub-Matrix: **ROCK**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Samples Submitted							
EP068S: Organochlorine Pesticide Surrogate	ES2230654-004	BH4B_22.05-22.30	**Dibromo-DDE**	21655-73-2	116 %	66.5-111 %	**Recovery greater than upper data quality objective**
EP075S: Acid Extractable Surrogates	ES2230654-004	BH4B_22.05-22.30	**2-Fluorophenol**	367-12-4	5.1 %	10.0-117 %	**Recovery less than lower data quality objective**
EP075S: Acid Extractable Surrogates	ES2230654-014	BH4B_126.27-126.37	**2-Fluorophenol**	367-12-4	7.5 %	10.0-117 %	**Recovery less than lower data quality objective**
EP075S: Acid Extractable Surrogates	ES2230654-021	BH4B_388.0-388.13	**2-Fluorophenol**	367-12-4	8.6 %	10.0-117 %	**Recovery less than lower data quality objective**
EP075S: Acid Extractable Surrogates	ES2230654-004	BH4B_22.05-22.30	**2-Chlorophenol-D4**	93951-73-6	13.9 %	20.9-130 %	**Recovery less than lower data quality objective**
EP075S: Acid Extractable Surrogates	ES2230654-004	BH4B_22.05-22.30	**2.4.6-Tribromophenol**	118-79-6	5.4 %	10.0-151 %	**Recovery less than lower data quality objective**
EP075S: Acid Extractable Surrogates	ES2230654-014	BH4B_126.27-126.37	**2.4.6-Tribromophenol**	118-79-6	7.9 %	10.0-151 %	**Recovery less than lower data quality objective**
EP075S: Acid Extractable Surrogates	ES2230654-021	BH4B_388.0-388.13	**2.4.6-Tribromophenol**	118-79-6	9.3 %	10.0-151 %	**Recovery less than lower data quality objective**

Outliers : Analysis Holding Time Compliance

Matrix: **SOIL**

Method / Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA003 :pH (field/fox)						

Matrix: **SOIL**

Method / Container / Client Sample ID(s)		Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA003 :pH (field/fox) - Analysis Holding Time Compliance							
Snap Lock Bag							
BH4B_6.40-6.52,	BH4B_39.74-39.91,	04-Oct-2022	26-Aug-2022	**39**	----	----	----
BH4B_71.0-71.20,	BH4B_148.17-148.36,						
BH4B_419.0-419.14							
EA055: Moisture Content (Dried @ 105-110°C)							
Snap Lock Bag							
BH4B_2.39-2.51,	BH4B_22.05-22.30,	----	----	----	26-Sep-2022	08-Sep-2022	**18**
BH4B_126.27-126.37,	BH4B_388.0-388.13						
ED042T: Total Sulfur by LECO							
Snap Lock Bag							
BH4B_71.0-71.20,	BH4B_148.17-148.36,	05-Oct-2022	01-Sep-2022	**34**	----	----	----
BH4B_419.0-419.14							
EG035T: Total Recoverable Mercury by FIMS							
Snap Lock Bag							
BH4B_2.39-2.51,	BH4B_22.05-22.30,	06-Oct-2022	22-Sep-2022	**14**	07-Oct-2022	22-Sep-2022	**15**
BH4B_126.27-126.37,	BH4B_388.0-388.13						
EG048: Hexavalent Chromium (Alkaline Digest)							
Snap Lock Bag							
BH4B_2.39-2.51,	BH4B_22.05-22.30,	30-Sep-2022	22-Sep-2022	**8**	----	----	----
BH4B_126.27-126.37,	BH4B_388.0-388.13						
EK026SF: Total CN by Segmented Flow Analyser							
Snap Lock Bag							
BH4B_2.39-2.51,	BH4B_22.05-22.30,	26-Sep-2022	08-Sep-2022	**18**	----	----	----
BH4B_126.27-126.37,	BH4B_388.0-388.13						
EK028SF: Weak Acid Dissociable CN by Segmented Flow Analyser							
Snap Lock Bag							
BH4B_2.39-2.51,	BH4B_22.05-22.30,	26-Sep-2022	08-Sep-2022	**18**	----	----	----
BH4B_126.27-126.37,	BH4B_388.0-388.13						
EK040T: Fluoride Total							
Snap Lock Bag							
BH4B_2.39-2.51,	BH4B_22.05-22.30,	27-Sep-2022	22-Sep-2022	**5**	27-Sep-2022	22-Sep-2022	**5**
BH4B_126.27-126.37,	BH4B_388.0-388.13						
EN60Z: ASLP Leachate - ZHE							
ZHE Leach: 14 day HT(e.g. CN, BTEX)							
BH4B_2.39-2.51,	BH4B_22.05-22.30,	26-Sep-2022	08-Sep-2022	**18**	----	----	----
BH4B_126.27-126.37,	BH4B_388.0-388.13						
EP003: Total Organic Carbon (TOC) in Soil							
Pulp Bag							
BH4B_6.40-6.52,	BH4B_39.74-39.91	05-Oct-2022	22-Sep-2022	**13**	05-Oct-2022	22-Sep-2022	**13**

Matrix: **SOIL**

Method / Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EP003: Total Organic Carbon (TOC) in Soil - Analysis Holding Time Compliance						
Snap Lock Bag BH4B_71.0-71.20, BH4B_148.17-148.36, BH4B_419.0-419.14	05-Oct-2022	22-Sep-2022	**13**	05-Oct-2022	22-Sep-2022	**13**
EP066: Polychlorinated Biphenyls (PCB)						
Snap Lock Bag BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	26-Sep-2022	08-Sep-2022	**18**	----	----	----
EP068A: Organochlorine Pesticides (OC)						
Snap Lock Bag BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	26-Sep-2022	08-Sep-2022	**18**	----	----	----
EP068B: Organophosphorus Pesticides (OP)						
Snap Lock Bag BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	26-Sep-2022	08-Sep-2022	**18**	----	----	----
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup						
Snap Lock Bag BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	26-Sep-2022	08-Sep-2022	**18**	----	----	----
EP071 SG-S: Total Petroleum Hydrocarbons in Soil - Silica gel cleanup						
Snap Lock Bag BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	26-Sep-2022	08-Sep-2022	**18**	----	----	----
EP074A: Monocyclic Aromatic Hydrocarbons						
Snap Lock Bag BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	28-Sep-2022	01-Sep-2022	**27**	28-Sep-2022	01-Sep-2022	**27**
EP074B: Oxygenated Compounds						
Snap Lock Bag BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	28-Sep-2022	01-Sep-2022	**27**	28-Sep-2022	01-Sep-2022	**27**
EP074E(SIM): Halogenated Aliphatic Compounds						
Snap Lock Bag BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	28-Sep-2022	01-Sep-2022	**27**	28-Sep-2022	01-Sep-2022	**27**
EP074E: Halogenated Aliphatic Compounds						
Snap Lock Bag BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	28-Sep-2022	01-Sep-2022	**27**	28-Sep-2022	01-Sep-2022	**27**

Matrix: **SOIL**

Method / Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EP074F: Halogenated Aromatic Compounds						
Snap Lock Bag BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	28-Sep-2022	01-Sep-2022	**27**	28-Sep-2022	01-Sep-2022	**27**
EP074G: Trihalomethanes						
Snap Lock Bag BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	28-Sep-2022	01-Sep-2022	**27**	28-Sep-2022	01-Sep-2022	**27**
EP075A: Phenolic Compounds						
Snap Lock Bag BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	26-Sep-2022	08-Sep-2022	**18**	----	----	----
EP075B: Polynuclear Aromatic Hydrocarbons						
Snap Lock Bag BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	26-Sep-2022	08-Sep-2022	**18**	----	----	----
EP075C: Phthalate Esters						
Snap Lock Bag BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	26-Sep-2022	08-Sep-2022	**18**	----	----	----
EP075E: Nitroaromatics and Ketones						
Snap Lock Bag BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	26-Sep-2022	08-Sep-2022	**18**	----	----	----
EP075G: Chlorinated Hydrocarbons						
Snap Lock Bag BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	26-Sep-2022	08-Sep-2022	**18**	----	----	----
EP075K: Miscellaneous Compounds						
Snap Lock Bag BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	26-Sep-2022	08-Sep-2022	**18**	----	----	----
EP080/071: Total Petroleum Hydrocarbons						
Snap Lock Bag BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	28-Sep-2022	08-Sep-2022	**20**	28-Sep-2022	08-Sep-2022	**20**
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions						
Snap Lock Bag BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	28-Sep-2022	08-Sep-2022	**20**	28-Sep-2022	08-Sep-2022	**20**

Matrix: **SOIL**

Method / Container / Client Sample ID(s)	Extraction / Preparation: Date extracted	Extraction / Preparation: Due for extraction	Extraction / Preparation: Days overdue	Analysis: Date analysed	Analysis: Due for analysis	Analysis: Days overdue
EP132A: Phenolic Compounds						
Snap Lock Bag						
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	26-Sep-2022	08-Sep-2022	**18**	----	----	----
EP202A: Phenoxyacetic Acid Herbicides by LCMS						
Snap Lock Bag						
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	28-Sep-2022	08-Sep-2022	**20**	----	----	----

Matrix: **WATER**

Method / Container / Client Sample ID(s)	Extraction / Preparation: Date extracted	Extraction / Preparation: Due for extraction	Extraction / Preparation: Days overdue	Analysis: Date analysed	Analysis: Due for analysis	Analysis: Days overdue
EA005P: pH by PC Titrator						
Clear Plastic Bottle - Natural						
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	----	----	----	28-Sep-2022	27-Sep-2022	**1**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type / Method	Count: QC	Count: Regular	Rate (%): Actual	Rate (%): Expected	Quality Control Specification
Laboratory Duplicates (DUP)					
Pesticides by GCMS	0	4	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Semivolatile Organic Compounds	0	4	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Pesticides by GCMS	0	4	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
Semivolatile Organic Compounds	0	4	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation: Date extracted	Extraction / Preparation: Due for extraction	Extraction / Preparation: Evaluation	Analysis: Date analysed	Analysis: Due for analysis	Analysis: Evaluation

(Preliminary Report)

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA003 :pH (field/fox)							
Snap Lock Bag (EA003)							
BH4B_6.40-6.52, BH4B_71.0-71.20, BH4B_419.0-419.14	BH4B_39.74-39.91, BH4B_148.17-148.36,	**25-Aug-2022**	**04-Oct-2022**	26-Aug-2022	×	**04-Oct-2022**	02-Jan-2023 ✓
EA011: Net Acid Generation							
Snap Lock Bag (EA011)							
BH4B_6.40-6.52, BH4B_71.0-71.20, BH4B_419.0-419.14	BH4B_39.74-39.91, BH4B_148.17-148.36,	**25-Aug-2022**	**07-Oct-2022**	25-Aug-2023	✓	**07-Oct-2022**	05-Apr-2023 ✓
EA013: Acid Neutralising Capacity							
Snap Lock Bag (EA013)							
BH4B_6.40-6.52, BH4B_71.0-71.20, BH4B_419.0-419.14	BH4B_39.74-39.91, BH4B_148.17-148.36,	**25-Aug-2022**	**07-Oct-2022**	25-Aug-2023	✓	**07-Oct-2022**	05-Apr-2023 ✓
EA055: Moisture Content (Dried @ 105-110°C)							
Snap Lock Bag (EA055)							
BH4B_2.39-2.51, BH4B_126.27-126.37,	BH4B_22.05-22.30, BH4B_388.0-388.13	**25-Aug-2022**	**----**	----	----	**26-Sep-2022**	08-Sep-2022 ×
ED042T: Total Sulfur by LECO							
Pulp Bag (ED042T)							
BH4B_6.40-6.52,	BH4B_39.74-39.91	**25-Aug-2022**	**05-Oct-2022**	21-Feb-2023	✓	**05-Oct-2022**	21-Feb-2023 ✓
Snap Lock Bag (ED042T)							
BH4B_71.0-71.20, BH4B_419.0-419.14	BH4B_148.17-148.36,	**25-Aug-2022**	**05-Oct-2022**	01-Sep-2022	×	**05-Oct-2022**	03-Apr-2023 ✓
EG005(ED093)T: Total Metals by ICP-AES							
Snap Lock Bag (EG005T)							
BH4B_2.39-2.51, BH4B_126.27-126.37,	BH4B_22.05-22.30, BH4B_388.0-388.13	**25-Aug-2022**	**06-Oct-2022**	21-Feb-2023	✓	**07-Oct-2022**	21-Feb-2023 ✓
EG035T: Total Recoverable Mercury by FIMS							
Snap Lock Bag (EG035T)							
BH4B_2.39-2.51, BH4B_126.27-126.37,	BH4B_22.05-22.30, BH4B_388.0-388.13	**25-Aug-2022**	**06-Oct-2022**	22-Sep-2022	×	**07-Oct-2022**	22-Sep-2022 ×
EG048: Hexavalent Chromium (Alkaline Digest)							
Snap Lock Bag (EG048G)							
BH4B_2.39-2.51, BH4B_126.27-126.37,	BH4B_22.05-22.30, BH4B_388.0-388.13	**25-Aug-2022**	**30-Sep-2022**	22-Sep-2022	×	**30-Sep-2022**	07-Oct-2022 ✓
EK026SF: Total CN by Segmented Flow Analyser							
Snap Lock Bag (EK026SF)							
BH4B_2.39-2.51, BH4B_126.27-126.37,	BH4B_22.05-22.30, BH4B_388.0-388.13	**25-Aug-2022**	**26-Sep-2022**	08-Sep-2022	×	**27-Sep-2022**	10-Oct-2022 ✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK028SF: Weak Acid Dissociable CN by Segmented Flow Analyser							
Snap Lock Bag (EK028SF)							
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**25-Aug-2022**	**26-Sep-2022**	08-Sep-2022	×	**27-Sep-2022**	10-Oct-2022	✓
EK040T: Fluoride Total							
Snap Lock Bag (EK040T)							
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**25-Aug-2022**	**27-Sep-2022**	22-Sep-2022	×	**27-Sep-2022**	22-Sep-2022	×
EN60-DI: Bottle Leaching Procedure - Inorganics/Non-Volatile Organics (Glass Vessel)							
Non-Volatile Leach: 180 day HT (e.g. PFAS, metals ex.Hg) (EN60-Dla-G)							
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**25-Aug-2022**	**27-Sep-2022**	21-Feb-2023	✓	**----**	----	----
EN60Z: ASLP Leachate - ZHE							
ZHE Leach: 14 day HT(e.g. CN, BTEX) (EN60Za)							
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**25-Aug-2022**	**26-Sep-2022**	08-Sep-2022	×	**----**	----	----
EP003: Total Organic Carbon (TOC) in Soil							
Pulp Bag (EP003)							
BH4B_6.40-6.52, BH4B_39.74-39.91	**25-Aug-2022**	**05-Oct-2022**	22-Sep-2022	×	**05-Oct-2022**	22-Sep-2022	×
Snap Lock Bag (EP003)							
BH4B_71.0-71.20, BH4B_148.17-148.36, BH4B_419.0-419.14	**25-Aug-2022**	**05-Oct-2022**	22-Sep-2022	×	**05-Oct-2022**	22-Sep-2022	×
EP066: Polychlorinated Biphenyls (PCB)							
Snap Lock Bag (EP066)							
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**25-Aug-2022**	**26-Sep-2022**	08-Sep-2022	×	**28-Sep-2022**	05-Nov-2022	✓
EP068A: Organochlorine Pesticides (OC)							
Snap Lock Bag (EP068)							
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**25-Aug-2022**	**26-Sep-2022**	08-Sep-2022	×	**28-Sep-2022**	05-Nov-2022	✓
EP068B: Organophosphorus Pesticides (OP)							
Snap Lock Bag (EP068)							
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**25-Aug-2022**	**26-Sep-2022**	08-Sep-2022	×	**28-Sep-2022**	05-Nov-2022	✓
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup							
Snap Lock Bag (EP071SG-S)							
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**25-Aug-2022**	**26-Sep-2022**	08-Sep-2022	×	**29-Sep-2022**	05-Nov-2022	✓
EP071 SG-S: Total Petroleum Hydrocarbons in Soil - Silica gel cleanup							
Snap Lock Bag (EP071SG-S)							
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**25-Aug-2022**	**26-Sep-2022**	08-Sep-2022	×	**29-Sep-2022**	05-Nov-2022	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP074A: Monocyclic Aromatic Hydrocarbons							
Snap Lock Bag (EP074) BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**25-Aug-2022**	**28-Sep-2022**	01-Sep-2022	×	**28-Sep-2022**	01-Sep-2022	×
EP074B: Oxygenated Compounds							
Snap Lock Bag (EP074) BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**25-Aug-2022**	**28-Sep-2022**	01-Sep-2022	×	**28-Sep-2022**	01-Sep-2022	×
EP074E(SIM): Halogenated Aliphatic Compounds							
Snap Lock Bag (EP074E(SIM)) BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**25-Aug-2022**	**28-Sep-2022**	01-Sep-2022	×	**28-Sep-2022**	01-Sep-2022	×
EP074E: Halogenated Aliphatic Compounds							
Snap Lock Bag (EP074) BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**25-Aug-2022**	**28-Sep-2022**	01-Sep-2022	×	**28-Sep-2022**	01-Sep-2022	×
EP074F: Halogenated Aromatic Compounds							
Snap Lock Bag (EP074) BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**25-Aug-2022**	**28-Sep-2022**	01-Sep-2022	×	**28-Sep-2022**	01-Sep-2022	×
EP074G: Trihalomethanes							
Snap Lock Bag (EP074) BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**25-Aug-2022**	**28-Sep-2022**	01-Sep-2022	×	**28-Sep-2022**	01-Sep-2022	×
EP075A: Phenolic Compounds							
Snap Lock Bag (EP075) BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**25-Aug-2022**	**26-Sep-2022**	08-Sep-2022	×	**29-Sep-2022**	05-Nov-2022	✓
EP075B: Polynuclear Aromatic Hydrocarbons							
Snap Lock Bag (EP075) BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**25-Aug-2022**	**26-Sep-2022**	08-Sep-2022	×	**29-Sep-2022**	05-Nov-2022	✓
EP075C: Phthalate Esters							
Snap Lock Bag (EP075) BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**25-Aug-2022**	**26-Sep-2022**	08-Sep-2022	×	**29-Sep-2022**	05-Nov-2022	✓
EP075E: Nitroaromatics and Ketones							
Snap Lock Bag (EP075) BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**25-Aug-2022**	**26-Sep-2022**	08-Sep-2022	×	**29-Sep-2022**	05-Nov-2022	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP075G: Chlorinated Hydrocarbons							
Snap Lock Bag (EP075) BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**25-Aug-2022**	**26-Sep-2022**	08-Sep-2022	×	**29-Sep-2022**	05-Nov-2022	✓
EP075K: Miscellaneous Compounds							
Snap Lock Bag (EP075) BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**25-Aug-2022**	**26-Sep-2022**	08-Sep-2022	×	**29-Sep-2022**	05-Nov-2022	✓
EP080/071: Total Petroleum Hydrocarbons							
Snap Lock Bag (EP080) BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**25-Aug-2022**	**28-Sep-2022**	08-Sep-2022	×	**28-Sep-2022**	08-Sep-2022	×
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Snap Lock Bag (EP080) BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**25-Aug-2022**	**28-Sep-2022**	08-Sep-2022	×	**28-Sep-2022**	08-Sep-2022	×
EP132A: Phenolic Compounds							
Snap Lock Bag (EP132) BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**25-Aug-2022**	**26-Sep-2022**	08-Sep-2022	×	**29-Sep-2022**	05-Nov-2022	✓
EP202A: Phenoxyacetic Acid Herbicides by LCMS							
Snap Lock Bag (EP202) BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**25-Aug-2022**	**28-Sep-2022**	08-Sep-2022	×	**28-Sep-2022**	07-Nov-2022	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA005P: pH by PC Titrator							
Clear Plastic Bottle - Natural (EA005-P) BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**27-Sep-2022**	**----**	----	----	**28-Sep-2022**	27-Sep-2022	×
EA010P: Conductivity by PC Titrator							
Clear Plastic Bottle - Natural (EA010-P) BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**27-Sep-2022**	**----**	----	----	**28-Sep-2022**	25-Oct-2022	✓
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P) BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**27-Sep-2022**	**----**	----	----	**28-Sep-2022**	11-Oct-2022	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G)							
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**27-Sep-2022**	**----**	----	----	**29-Sep-2022**	25-Oct-2022	✓
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G)							
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**27-Sep-2022**	**----**	----	----	**29-Sep-2022**	25-Oct-2022	✓
EG005(ED093)C: Leachable Metals by ICPAES							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG005C)							
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**27-Sep-2022**	**28-Sep-2022**	26-Mar-2023	✓	**28-Sep-2022**	26-Mar-2023	✓
EG035C: Leachable Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035C)							
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**27-Sep-2022**	**----**	----	----	**04-Oct-2022**	25-Oct-2022	✓
EG050G: Hexavalent Chromium by Discrete Analyser							
Clear Plastic Bottle - NaOH (EG050G-C)							
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**27-Sep-2022**	**----**	----	----	**30-Sep-2022**	25-Oct-2022	✓
EK026SF: Total CN by Segmented Flow Analyser							
Opaque plastic bottle - NaOH (EK026SF)							
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**26-Sep-2022**	**----**	----	----	**30-Sep-2022**	10-Oct-2022	✓
EK028SF: Weak Acid Dissociable CN by Segmented Flow Analyser							
Opaque plastic bottle - NaOH (EK028SF)							
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**26-Sep-2022**	**----**	----	----	**30-Sep-2022**	10-Oct-2022	✓
EK040P: Fluoride by PC Titrator							
Clear Plastic Bottle - Natural (EK040P)							
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**27-Sep-2022**	**----**	----	----	**28-Sep-2022**	25-Oct-2022	✓
EP068A: Organochlorine Pesticides (OC)							
Amber Glass Bottle - Unpreserved (EP068)							
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**27-Sep-2022**	**28-Sep-2022**	04-Oct-2022	✓	**29-Sep-2022**	07-Nov-2022	✓
EP068B: Organophosphorus Pesticides (OP)							
Amber Glass Bottle - Unpreserved (EP068)							
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**27-Sep-2022**	**28-Sep-2022**	04-Oct-2022	✓	**29-Sep-2022**	07-Nov-2022	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP068C: Triazines							
Amber Glass Bottle - Unpreserved (EP068)							
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**27-Sep-2022**	**28-Sep-2022**	04-Oct-2022	✓	**29-Sep-2022**	07-Nov-2022	✓
EP068D: Cypermethrins							
Amber Glass Bottle - Unpreserved (EP068)							
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**27-Sep-2022**	**28-Sep-2022**	04-Oct-2022	✓	**29-Sep-2022**	07-Nov-2022	✓
EP068E: Other Pesticides							
Amber Glass Bottle - Unpreserved (EP068)							
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**27-Sep-2022**	**28-Sep-2022**	04-Oct-2022	✓	**29-Sep-2022**	07-Nov-2022	✓
EP074A: Monocyclic Aromatic Hydrocarbons							
Amber VOC Vial - Sulfuric Acid (EP074)							
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**26-Sep-2022**	**06-Oct-2022**	10-Oct-2022	✓	**06-Oct-2022**	10-Oct-2022	✓
EP074B: Oxygenated Compounds							
Amber VOC Vial - Sulfuric Acid (EP074)							
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**26-Sep-2022**	**06-Oct-2022**	10-Oct-2022	✓	**06-Oct-2022**	10-Oct-2022	✓
EP074C: Sulfonated Compounds							
Amber VOC Vial - Sulfuric Acid (EP074)							
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**26-Sep-2022**	**06-Oct-2022**	10-Oct-2022	✓	**06-Oct-2022**	10-Oct-2022	✓
EP074D: Fumigants							
Amber VOC Vial - Sulfuric Acid (EP074)							
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**26-Sep-2022**	**06-Oct-2022**	10-Oct-2022	✓	**06-Oct-2022**	10-Oct-2022	✓
EP074E: Halogenated Aliphatic Compounds							
Amber VOC Vial - Sulfuric Acid (EP074)							
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**26-Sep-2022**	**06-Oct-2022**	10-Oct-2022	✓	**06-Oct-2022**	10-Oct-2022	✓
EP074F: Halogenated Aromatic Compounds							
Amber VOC Vial - Sulfuric Acid (EP074)							
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**26-Sep-2022**	**06-Oct-2022**	10-Oct-2022	✓	**06-Oct-2022**	10-Oct-2022	✓
EP074G: Trihalomethanes							
Amber VOC Vial - Sulfuric Acid (EP074)							
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**26-Sep-2022**	**06-Oct-2022**	10-Oct-2022	✓	**06-Oct-2022**	10-Oct-2022	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP074H: Naphthalene							
Amber VOC Vial - Sulfuric Acid (EP074)							
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**26-Sep-2022**	**06-Oct-2022**	10-Oct-2022	✓	**06-Oct-2022**	10-Oct-2022	✓
EP075A: Phenolic Compounds							
Amber Glass Bottle - Unpreserved (EP075)							
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**27-Sep-2022**	**28-Sep-2022**	04-Oct-2022	✓	**29-Sep-2022**	07-Nov-2022	✓
EP075B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP075)							
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**27-Sep-2022**	**28-Sep-2022**	04-Oct-2022	✓	**29-Sep-2022**	07-Nov-2022	✓
EP075C: Phthalate Esters							
Amber Glass Bottle - Unpreserved (EP075)							
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**27-Sep-2022**	**28-Sep-2022**	04-Oct-2022	✓	**29-Sep-2022**	07-Nov-2022	✓
EP075D: Nitrosamines							
Amber Glass Bottle - Unpreserved (EP075)							
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**27-Sep-2022**	**28-Sep-2022**	04-Oct-2022	✓	**29-Sep-2022**	07-Nov-2022	✓
EP075E: Nitroaromatics and Ketones							
Amber Glass Bottle - Unpreserved (EP075)							
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**27-Sep-2022**	**28-Sep-2022**	04-Oct-2022	✓	**29-Sep-2022**	07-Nov-2022	✓
EP075F: Haloethers							
Amber Glass Bottle - Unpreserved (EP075)							
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**27-Sep-2022**	**28-Sep-2022**	04-Oct-2022	✓	**29-Sep-2022**	07-Nov-2022	✓
EP075G: Chlorinated Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP075)							
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**27-Sep-2022**	**28-Sep-2022**	04-Oct-2022	✓	**29-Sep-2022**	07-Nov-2022	✓
EP075H: Anilines and Benzidines							
Amber Glass Bottle - Unpreserved (EP075)							
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**27-Sep-2022**	**28-Sep-2022**	04-Oct-2022	✓	**29-Sep-2022**	07-Nov-2022	✓
EP075I: Organochlorine Pesticides							
Amber Glass Bottle - Unpreserved (EP075)							
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**27-Sep-2022**	**28-Sep-2022**	04-Oct-2022	✓	**29-Sep-2022**	07-Nov-2022	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP075J: Organophosphorus Pesticides							
Amber Glass Bottle - Unpreserved (EP075)							
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**27-Sep-2022**	**28-Sep-2022**	04-Oct-2022	✓	**29-Sep-2022**	07-Nov-2022	✓
EP075K: Miscellaneous Compounds							
Amber Glass Bottle - Unpreserved (EP075)							
BH4B_2.39-2.51, BH4B_22.05-22.30, BH4B_126.27-126.37, BH4B_388.0-388.13	**27-Sep-2022**	**28-Sep-2022**	04-Oct-2022	✓	**29-Sep-2022**	07-Nov-2022	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Acid Neutralising Capacity (ANC)	EA013	2	11	**18.18**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Low level CHC (SIM)	EP074E(SIM)	1	8	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Moisture Content	EA055	1	6	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Net Acid Generation	EA011	2	11	**18.18**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	4	**25.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH field/fox	EA003	3	21	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	4	**25.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	4	**25.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Semivolatile Organic Compounds	EP075	1	4	**25.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfur - Total as S (LECO)	ED042T	1	6	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	1	6	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Fluoride	EK040T	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP003	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction (Silica Gel Clean Up)	EP071SG-S	1	4	**25.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	8	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	1	7	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
WAD Cyanide by Segmented Flow Analyser	EK028SF	1	4	**25.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Acid Neutralising Capacity (ANC)	EA013	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Low level CHC (SIM)	EP074E(SIM)	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Net Acid Generation	EA011	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Semivolatile Organic Compounds	EP075	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfur - Total as S (LECO)	ED042T	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	2	6	**33.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Fluoride	EK040T	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Control Samples (LCS) - Continued							
Total Organic Carbon	EP003	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction (Silica Gel Clean Up)	EP071SG-S	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
WAD Cyanide by Segmented Flow Analyser	EK028SF	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Low level CHC (SIM)	EP074E(SIM)	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Semivolatile Organic Compounds	EP075	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfur - Total as S (LECO)	ED042T	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Fluoride	EK040T	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP003	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction (Silica Gel Clean Up)	EP071SG-S	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
WAD Cyanide by Segmented Flow Analyser	EK028SF	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Low level CHC (SIM)	EP074E(SIM)	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Semivolatile Organic Compounds	EP075	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Fluoride	EK040T	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction (Silica Gel Clean Up)	EP071SG-S	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
WAD Cyanide by Segmented Flow Analyser	EK028SF	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	3	27	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by Auto Titrator	EK040P	1	8	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Hexavalent Chromium by Discrete Analyser - Leachable	EG050G-C	1	4	**25.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Leachable Mercury by FIMS	EG035C	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Leachable Metals by ICPAES	EG005C	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	0	4	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Semivolatile Organic Compounds	EP075	0	4	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	1	7	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Weak Acid Dissociable Cyanide by Segmented Flow Analyser	EK028SF	1	4	**25.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	3	27	**11.11**	**8.33**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by Auto Titrator	EK040P	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Hexavalent Chromium by Discrete Analyser - Leachable	EG050G-C	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Leachable Mercury by FIMS	EG035C	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Leachable Metals by ICPAES	EG005C	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Semivolatile Organic Compounds	EP075	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	2	7	**28.57**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Weak Acid Dissociable Cyanide by Segmented Flow Analyser	EK028SF	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Chloride by Discrete Analyser	ED045G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	1	27	**3.70**	**1.67**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by Auto Titrator	EK040P	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Hexavalent Chromium by Discrete Analyser - Leachable	EG050G-C	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Leachable Mercury by FIMS	EG035C	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Leachable Metals by ICPAES	EG005C	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Semivolatile Organic Compounds	EP075	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Method Blanks (MB) - Continued							
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Weak Acid Dissociable Cyanide by Segmented Flow Analyser	EK028SF	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Chloride by Discrete Analyser	ED045G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by Auto Titrator	EK040P	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Hexavalent Chromium by Discrete Analyser - Leachable	EG050G-C	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Leachable Mercury by FIMS	EG035C	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Leachable Metals by ICPAES	EG005C	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	0	4	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
Semivolatile Organic Compounds	EP075	0	4	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Weak Acid Dissociable Cyanide by Segmented Flow Analyser	EK028SF	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH field/fox	EA003	SOIL	In house: Referenced to Ahern et al 1998 - determined on a 1:5 soil/water extract designed to simulate field measured pH and pH after the extract has been oxidised with peroxide.
pH by Auto Titrator	EA005-P	SOIL	In house: Referenced to APHA 4500 H+ B. This procedure determines pH of water samples by automated ISE. This method is compliant with NEPM Schedule B(3)
Conductivity by Auto Titrator	EA010-P	SOIL	In house: Referenced to APHA 2510 B. This procedure determines conductivity by automated ISE. This method is compliant with NEPM Schedule B(3)
Net Acid Generation	EA011	SOIL	In house: Referenced to Miller (1998) Titremetric procedure determines net acidity in a soil following peroxide oxidation. Titrations to both pH 4.5 and pH 7 are reported.
Acid Neutralising Capacity (ANC)	EA013	SOIL	In house: Referenced to USEPA 600/2-78-054, I. Miller (2000). A fizz test is done to semiquanititatively estimate the likely reactivity. The soil is then reacted with an known excess quanitity of an appropriate acid. Titration determines the acid remaining, and the ANC can be calculated from comparison with a blank titration.
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3).
Alkalinity by Auto Titrator	ED037-P	SOIL	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	SOIL	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Sulfur - Total as S (LECO)	ED042T	SOIL	In house: Dried and pulverised sample is combusted in a high temperature furnace in the presence of strong oxidants / catalysts. The evolved S (as SO2) is measured by infra-red detector
Chloride by Discrete Analyser	ED045G	SOIL	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm.
Leachable Metals by ICPAES	EG005C	SOIL	In house: referenced to APHA 3120; USEPA SW 846 - 6010: The ICPAES technique ionises leachate sample atoms emitting a characteristic spectrum. This spectrum is then compared against matrix matched standards for quantification. This method is compliant with NEPM Schedule B(3).
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM Schedule B(3)
Leachable Mercury by FIMS	EG035C	SOIL	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the TCLP solution. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).

Analytical Methods	Method	Matrix	Method Descriptions
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2) (Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3)
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	SOIL	In house: Referenced to USEPA SW846, Method 3060. Hexavalent chromium is extracted by alkaline digestion. The digest is determined by photometrically by automatic discrete analyser, following pH adjustment. The instrument uses colour development using dephenylcarbazide. Each run of samples is measured against a five-point calibration curve. This method is compliant with NEPM Schedule B(3)
Hexavalent Chromium by Discrete Analyser - Leachable	EG050G-C	SOIL	In house: Referenced to APHA 3500 Cr-A & B. Hexavalent chromium is determined directly on leachate samples by Descrete Analyser as received by pH adjustment and colour development using dephenylcarbazide. Each run of samples is measured against a five-point calibration curve. This method is compliant with NEPM Schedule B(3).
Total Cyanide by Segmented Flow Analyser	EK026SF	SOIL	In house: Referenced to APHA 4500-CN C&O / ASTM D7511 / ISO 14403. Sodium hydroxide preserved samples are introduced into an automated segmented flow analyser. Complex bound cyanide is decomposed in a continuously flowing stream, at a pH of 3.8, by the effect of UV light. A UV-B lamp (312 nm) and a decomposition spiral of borosilicate glass are used to filter out UV light with a wavelength of less than 290 nm thus preventing the conversion of thiocyanate into cyanide. The hydrogen cyanide present at a pH of 3.8 is separated by gas dialysis. The hydrogen cyanide is then determined photometrically, based on the reaction of cyanide with chloramine-T to form cyanogen chloride. This then reacts with 4-pyridine carboxylic acid and 1,3-dimethylbarbituric acid to give a red colour which is measured at 600 nm. This method is compliant with NEPM Schedule B(3)
WAD Cyanide by Segmented Flow Analyser	EK028SF	SOIL	In house: Referenced to APHA 4500-CN C&O / ISO 14403. Caustic leachates of soil samples are introduced into an automated segmented flow analyser. Hydrogen cyanide is liberated from a slightly acidified (pH 4.5) and is dialysed. Tight cyanide complexes that would not be amenable to oxidation by chlorine are not converted. Iron cyanide complexes are precipitated with zinc acetate. Liberated HCN diffuses through a membrane into a stream of sodium hydroxide where it is carried as CN- The cyanide in caustic solution is buffered to pH 5.2 and further converted to cyanogen chloride by reaction with chloramine-T. Cyanogen chloride subsequently reacts with 4 ¿pyridine carboxylic and 1,3 - dimethylbarbituric acids to give a red colour complex. This colour is measured at 600 nm. This method is compliant with NEPM Schedule B(3).
Fluoride by Auto Titrator	EK040P	SOIL	In house: Referenced to APHA 4500-F C: CDTA is added to the sample to provide a uniform ionic strength background, adjust pH, and break up complexes. Fluoride concentration is determined by either manual or automatic ISE measurement. This method is compliant with NEPM Schedule B(3)
Total Fluoride	EK040T	SOIL	(In-house) Total fluoride is determined by ion specific electrode (ISE) in a solution obtained after a Sodium Carbonate / Potassium Carbonate fusion dissolution.
Total Organic Carbon	EP003	SOIL	In house C-IR17. Dried and pulverised sample is reacted with acid to remove inorganic Carbonates, then combusted in a furnace in the presence of strong oxidants / catalysts. The evolved (Organic) Carbon (as CO2) is automatically measured by infra-red detector.
Polychlorinated Biphenyls (PCB)	EP066	SOIL	In house: Referenced to USEPA SW 846 - 8270 Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3).

Analytical Methods	Method	Matrix	Method Descriptions
Pesticides by GCMS	EP068	SOIL	In house: Referenced to USEPA SW 846 - 8270 Sample extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)
TRH - Semivolatile Fraction (Silica Gel Clean Up)	EP071SG-S	SOIL	In house: Referenced to USEPA SW 846 - 8015. Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40. Compliant with NEPM Schedule B(3).
Volatile Organic Compounds	EP074	SOIL	In house: Referenced to USEPA SW 846 - 8260 Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)
Low level CHC (SIM)	EP074E(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8260 Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3).
Semivolatile Organic Compounds	EP075	SOIL	In house: Referenced to USEPA SW 846 - 8270 Sample extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM Schedule B(3) amended.
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	SOIL	In house: Referenced to USEPA 8270 GCMS Capiliary column, SIM mode.
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202	SOIL	In house: LCMS (Electrospray in negative mode). Residues of acid herbicides are extracted from soil samples under the alkaline condition. An aliquot of the alkaline aqueous phase is taken and acidified before a SPE cleanup. After eluting off from the SPE cartridge, residues of acid herbicides are dissolved in HPLC mobile phase prior to instrument analysis.
NSW Waste Classification Guidelines - Aggregate Sums	* NSW-WCG	SOIL	In house: This method provides rounded sums for diverse trace organics to suit NSW Waste Classification Guidelines.

Preparation Methods	Method	Matrix	Method Descriptions
NaOH leach for CN in Soils	CN-PR	SOIL	In house: APHA 4500 CN. Samples are extracted by end-over-end tumbling with NaOH.
Alkaline digestion for Hexavalent Chromium	EG048PR	SOIL	In house: Referenced to USEPA SW846, Method 3060A.
Total Fluoride	EK040T-PR	SOIL	In house: Samples are fused with Sodium Carbonate / Potassium Carbonate flux.
Drying only	EN020D	SOIL	In house
Drying at 85 degrees, bagging and labelling (ASS)	EN020PR	SOIL	In house
Digestion for Total Recoverable Metals in TCLP Leachate	EN25C	SOIL	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)
Deionised Water Leach - Glass Leaching Vessel	EN60-Dla-G	SOIL	In house QWI-EN/60 referenced to AS4439.3 Preparation of Leachates
ASLP for Volatile Analytes (Zero Headspace Extraction)	EN60Za	SOIL	In house QWI-EN/60 referenced to AS4439.2 Preparation of Leachates

Preparation Methods	Method	Matrix	Method Descriptions
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM Schedule B(3).
Extraction for Phenoxy Acid Herbicides in Soils.	EP202-PR	SOIL	In-House: Alkaline extract followed by SPE clean up of acidified portion of the sample extract.
Dry and Pulverise (up to 100g)	GEO30	SOIL	#
Separatory Funnel Extraction of Liquids	ORG14	SOIL	In house: Referenced to USEPA SW 846 - 3510 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Volatiles Water Preparation	ORG16-W	SOIL	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for purging.
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.
Tumbler Extraction of Solids/ Acetylation	ORG17A-AC	SOIL	In house: Mechanical agitation (tumbler). 20g of sample, Na2SO4 and surrogate are extracted with 150mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to 1 mL with exchange into cyclohexane. Phenolic compounds are reacted with acetic anhydride to yield phenyl acetates suitable for ultra-trace analysis.

Fadi Soro

Rec: 1 CS 01/11/22 1530

From: Helen Simpson
Sent: Wednesday, 26 October 2022 6:12 PM
To: Cez Bautista; rebatches.sydney
Cc: Wisam Marassa
Subject: RE: ES2233009 + ES2230654 - EMM - Standard

Cez,

Please organise for samples to be returned to ES from EB and Minerals for highlighted samples.

	Sample	Volume
1	ES2233009-001	80.00g
2	ES2233009-004	70.00g
3	ES2230654-002	20.70g
4	ES2230654-006	21.80g
5	ES2230654-010	26.30g
6	ES2230654-015	31.90g
7	ES2230654-022	28.90g

Environmental Division
Sydney
Work Order Reference
ES2239415

Telephone : +61-2-8784 9555

Kind Regards,

Helen Simpson
Sample Receipt Coordinator, Environmental
Sydney, NSW

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Helen.Simpson@alsglobal.com
277-289 Woodpark Road
Smithfield NSW 2164 AUSTRALIA

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From: Cez Bautista <cez.bautista@ALSGlobal.com>
Sent: Wednesday, 26 October 2022 5:45 PM
To: rebatches.sydney <rebatches.sydney@ALSGlobal.com>
Cc: Helen Simpson <helen.simpson@alsglobal.com>; Wisam Marassa <Wisam.Marassa@alsglobal.com>
Subject: ES2233009 + ES2230654 - EMM - Standard

Hi Team!

Could we please organise for an ASLP Di leach for the below samples to undergo metals testing stipulated below, I have also included volumes that we currently have for these samples. I have attached the original email chain for reference.

I have confirmed with Wisam that we will be able to conduct the ASLP leach with Di with this limited volume amount and have confirmed with Magnus Skold that they are happy to proceed noting the method deviation breach.

Sample	Volume
ES2233009-001	80.00g
ES2233009-004	70.00g
ES2230654-~~001~~ 2	20.70g
ES2230654-~~002~~ 6	21.80g
ES2230654-~~003~~ 10	26.30g
ES2230654-~~004~~ 15	31.90g

ES2230654-005 ?2	28.90g

Metals required for testing: Al, Sb, As, Ba, B, Cd, Cr, Co, Cu, Ga, Fe, Ph, Mn, Mo, Ni, Se, Ag, Sr, Tl, Th, Sn, Ti, W, U, V, and Zn.

Thank you so much everyone! Please let me know if there is anything that requires clarification ☺

Kind regards,

Cez Bautista
Client Services Officer
Sydney, NSW

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ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES2239415**	Page	: 1 of 6
Client	: **EMM CONSULTING PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: HENRY NOAKES	Contact	: Cez Bautista
Address	: Ground Floor Suite 1 20 Chandos Street St Leonards NSW NSW 2065	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: J200096 Oven Mountain Pumped Storage Project	Date Samples Received	: 01-Nov-2022 15:30
Order number	: J200096	Date Analysis Commenced	: 03-Nov-2022
C-O-C number	: ----	Issue Date	: 08-Nov-2022 17:39
Sampler	: ----		
Site	: ----		
Quote number	: SY/284/22		
No. of samples received	: 7		
No. of samples analysed	: 7		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)				Sample ID	MB01A_26-36.5	MB03B_7-20	BH4B_6.40-6.52	BH4B_39.74-39.91	BH4B_71.0-71.20
				Sampling date / time	12-Sep-2022 15:00	12-Sep-2022 15:00	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00
Compound	CAS Number	LOR	Unit		ES2239415-001	ES2239415-002	ES2239415-003	ES2239415-004	ES2239415-005
					Result	Result	Result	Result	Result
EG020W: Water Leachable Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**2.39**	**3.97**	**4.88**	**3.82**	**4.30**
Antimony	7440-36-0	0.001	mg/L		**0.016**	<0.001	<0.001	**0.004**	**0.003**
Arsenic	7440-38-2	0.001	mg/L		**0.019**	**0.003**	**0.008**	**0.004**	**0.008**
Barium	7440-39-3	0.001	mg/L		**0.015**	**0.024**	**0.032**	**0.026**	**0.025**
Cadmium	7440-43-9	0.0001	mg/L		**0.0003**	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt	7440-48-4	0.001	mg/L		**0.002**	**0.003**	**0.002**	**0.002**	**0.002**
Copper	7440-50-8	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Gallium	7440-55-3	0.001	mg/L		**0.002**	**0.001**	**0.002**	**0.002**	**0.001**
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	**0.001**	<0.001	**0.005**
Manganese	7439-96-5	0.001	mg/L		**0.041**	**0.088**	**0.068**	**0.044**	**0.121**
Molybdenum	7439-98-7	0.001	mg/L		<0.001	<0.001	**0.001**	<0.001	**0.015**
Nickel	7440-02-0	0.001	mg/L		**0.001**	**0.006**	**0.004**	**0.003**	**0.005**
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Silver	7440-22-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Strontium	7440-24-6	0.001	mg/L		**0.016**	**0.028**	**0.015**	**0.008**	**0.025**
Thallium	7440-28-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Thorium	7440-29-1	0.001	mg/L		**0.001**	<0.001	<0.001	<0.001	<0.001
Tin	7440-31-5	0.001	mg/L		**0.002**	**0.005**	**0.006**	**0.008**	**0.002**
Titanium	7440-32-6	0.01	mg/L		**0.10**	**0.25**	**0.34**	**0.30**	**0.21**
Uranium	7440-61-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium	7440-62-2	0.01	mg/L		<0.01	<0.01	**0.01**	<0.01	<0.01
Zinc	7440-66-6	0.005	mg/L		<0.005	**0.019**	**0.016**	<0.005	**0.029**
Boron	7440-42-8	0.05	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05
Iron	7439-89-6	0.05	mg/L		**2.06**	**3.20**	**4.96**	**3.09**	**5.14**
Tungsten	7440-33-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001

Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)			Sample ID	BH4B_148.17-148.36	BH4B_419.0-419.14	----	----	----
			Sampling date / time	25-Aug-2022 00:00	25-Aug-2022 00:00	----	----	----
Compound	CAS Number	LOR	Unit	ES2239415-006	ES2239415-007	--------	--------	--------
				Result	Result	----	----	----
EG020W: Water Leachable Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**0.79**	**3.38**	----	----	----
Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	----	----	----
Arsenic	7440-38-2	0.001	mg/L	**0.005**	<0.001	----	----	----
Barium	7440-39-3	0.001	mg/L	**0.002**	**0.033**	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	----	----	----
Chromium	7440-47-3	0.001	mg/L	<0.001	**0.003**	----	----	----
Cobalt	7440-48-4	0.001	mg/L	<0.001	**0.001**	----	----	----
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	----	----	----
Gallium	7440-55-3	0.001	mg/L	**0.001**	**0.001**	----	----	----
Lead	7439-92-1	0.001	mg/L	<0.001	**0.001**	----	----	----
Manganese	7439-96-5	0.001	mg/L	**0.005**	**0.051**	----	----	----
Molybdenum	7439-98-7	0.001	mg/L	**0.002**	<0.001	----	----	----
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	----	----	----
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	----	----	----
Silver	7440-22-4	0.001	mg/L	<0.001	<0.001	----	----	----
Strontium	7440-24-6	0.001	mg/L	**0.021**	**0.005**	----	----	----
Thallium	7440-28-0	0.001	mg/L	<0.001	<0.001	----	----	----
Thorium	7440-29-1	0.001	mg/L	<0.001	<0.001	----	----	----
Tin	7440-31-5	0.001	mg/L	<0.001	**0.006**	----	----	----
Titanium	7440-32-6	0.01	mg/L	<0.01	**0.44**	----	----	----
Uranium	7440-61-1	0.001	mg/L	**0.001**	**0.002**	----	----	----
Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	----	----	----
Zinc	7440-66-6	0.005	mg/L	<0.005	**0.011**	----	----	----
Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	----	----	----
Iron	7439-89-6	0.05	mg/L	**0.38**	**4.11**	----	----	----
Tungsten	7440-33-7	0.001	mg/L	**0.032**	**0.002**	----	----	----

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Sample ID	BH4B_6.40-6.52	BH4B_39.74-39.91	BH4B_71.0-71.20	BH4B_148.17-148.36	BH4B_419.0-419.14
			Sampling date / time	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00	25-Aug-2022 00:00
Compound	CAS Number	LOR	Unit	ES2239415-003	ES2239415-004	ES2239415-005	ES2239415-006	ES2239415-007
				Result	Result	Result	Result	Result
EN60-DI: Bottle Leaching Procedure - Inorganics/Non-Volatile Organics (Glass Vessel)								
Final pH	----	0.1	pH Unit	**7.8**	**7.9**	**7.9**	**8.7**	**8.6**

Analytical Results

Sub-Matrix: **SOLID** (Matrix: **SOIL**)			Sample ID	**MB01A_26-36.5**	**MB03B_7-20**	**----**	**----**	**----**
			Sampling date / time	12-Sep-2022 15:00	12-Sep-2022 15:00	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**ES2239415-001**	**ES2239415-002**	**--------**	**--------**	**--------**
				Result	Result	----	----	----
EN60-DI: Bottle Leaching Procedure - Inorganics/Non-Volatile Organics (Glass Vessel)								
Final pH	----	0.1	pH Unit	**8.7**	**8.0**	**----**	**----**	**----**

CERTIFICATE OF ANALYSIS (GUIDELINE EVALUATION)

Work Order	: **ES2239415**	Page	: 1 of 6
Client	: **EMM CONSULTING PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: HENRY NOAKES	Contact	: Cez Bautista
Address	: Ground Floor Suite 1 20 Chandos Street St Leonards NSW NSW 2065	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: J200096 Oven Mountain Pumped Storage Project	Date Samples Received	: 01-Nov-2022 15:30
Order number	: J200096	Date Analysis Commenced	: 03-Nov-2022
C-O-C number	: ----	Issue Date	: 08-Nov-2022 17:38
Sampler	: ----		
Site	: ----		
Quote number	: SY/284/22		
No. of samples received	: 7		
No. of samples analysed	: 7		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

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- General Comments
- Analytical Results

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Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

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Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty **must be** considered. Refer to the ALS Contract Terms and Conditions for details, and EnviroMail 53 for a guide on how to interpret the measurement of uncertainty (MU).

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

Analytical Results

No Guideline Evaluation Required

Sub-Matrix: **DI WATER LEACHATE**

Compound	Method	LOR	Unit	Lower Limit	Upper Limit	MB01A_26-36.5	MB03B_7-20	BH4B_6.40-6.52	BH4B_39.74-39.91	BH4B_71.0-71.20
Sample ID										
Sampling date/time						12-Sep-2022 15:00	12-Sep-2022 15:00	25-Aug-2022 15:00	25-Aug-2022 15:00	25-Aug-2022 15:00
						ES2239415-001 MU	ES2239415-002 MU	ES2239415-003 MU	ES2239415-004 MU	ES2239415-005 MU
EG020W: Water Leachable Metals by ICP-MS										
Aluminium	EG020A-W	0.01	mg/L	----	----	**2.39**	**3.97**	**4.88**	**3.82**	**4.30**
Antimony	EG020A-W	0.001	mg/L	----	----	**0.016**	<0.001	<0.001	**0.004**	**0.003**
Arsenic	EG020A-W	0.001	mg/L	----	----	**0.019**	**0.003**	**0.008**	**0.004**	**0.008**
Barium	EG020A-W	0.001	mg/L	----	----	**0.015**	**0.024**	**0.032**	**0.026**	**0.025**
Cadmium	EG020A-W	0.0001	mg/L	----	----	**0.0003**	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	EG020A-W	0.001	mg/L	----	----	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt	EG020A-W	0.001	mg/L	----	----	**0.002**	**0.003**	**0.002**	**0.002**	**0.002**
Copper	EG020A-W	0.001	mg/L	----	----	<0.001	<0.001	<0.001	<0.001	<0.001
Gallium	EG020D-W	0.001	mg/L	----	----	**0.002**	**0.001**	**0.002**	**0.002**	**0.001**
Lead	EG020A-W	0.001	mg/L	----	----	<0.001	<0.001	**0.001**	<0.001	**0.005**
Manganese	EG020A-W	0.001	mg/L	----	----	**0.041**	**0.088**	**0.068**	**0.044**	**0.121**
Molybdenum	EG020A-W	0.001	mg/L	----	----	<0.001	<0.001	**0.001**	<0.001	**0.015**
Nickel	EG020A-W	0.001	mg/L	----	----	**0.001**	**0.006**	**0.004**	**0.003**	**0.005**
Selenium	EG020A-W	0.01	mg/L	----	----	<0.01	<0.01	<0.01	<0.01	<0.01
Silver	EG020B-W	0.001	mg/L	----	----	<0.001	<0.001	<0.001	<0.001	<0.001
Strontium	EG020B-W	0.001	mg/L	----	----	**0.016**	**0.028**	**0.015**	**0.008**	**0.025**
Thallium	EG020A-W	0.001	mg/L	----	----	<0.001	<0.001	<0.001	<0.001	<0.001
Thorium	EG020B-W	0.001	mg/L	----	----	**0.001**	<0.001	<0.001	<0.001	<0.001
Tin	EG020A-W	0.001	mg/L	----	----	**0.002**	**0.005**	**0.006**	**0.008**	**0.002**
Titanium	EG020B-W	0.01	mg/L	----	----	**0.10**	**0.25**	**0.34**	**0.30**	**0.21**
Uranium	EG020B-W	0.001	mg/L	----	----	<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium	EG020A-W	0.01	mg/L	----	----	<0.01	<0.01	**0.01**	<0.01	<0.01
Zinc	EG020A-W	0.005	mg/L	----	----	<0.005	**0.019**	**0.016**	<0.005	**0.029**
Boron	EG020A-W	0.05	mg/L	----	----	<0.05	<0.05	<0.05	<0.05	<0.05
Iron	EG020A-W	0.05	mg/L	----	----	**2.06**	**3.20**	**4.96**	**3.09**	**5.14**
Tungsten	EG020E-W	0.001	mg/L	----	----	<0.001	<0.001	<0.001	<0.001	<0.001

No Guideline Evaluation Required

Sub-Matrix: **DI WATER LEACHATE**

Compound	Method	LOR	Unit	Lower Limit	Upper Limit	Sample ID: BH4B_148.17-148.36	BH4B_419.0-419.14	----	----	----
						Sampling date/time: 25-Aug-2022 15:00	25-Aug-2022 15:00	----	----	----
						ES2239415-006 MU	ES2239415-007 MU	-------- MU	-------- MU	-------- MU
EG020W: Water Leachable Metals by ICP-MS										
Aluminium	EG020A-W	0.01	mg/L	----	----	**0.79**	**3.38**	----	----	----
Antimony	EG020A-W	0.001	mg/L	----	----	<0.001	<0.001	----	----	----
Arsenic	EG020A-W	0.001	mg/L	----	----	**0.005**	<0.001	----	----	----
Barium	EG020A-W	0.001	mg/L	----	----	**0.002**	**0.033**	----	----	----
Cadmium	EG020A-W	0.0001	mg/L	----	----	<0.0001	<0.0001	----	----	----
Chromium	EG020A-W	0.001	mg/L	----	----	<0.001	**0.003**	----	----	----
Cobalt	EG020A-W	0.001	mg/L	----	----	<0.001	**0.001**	----	----	----
Copper	EG020A-W	0.001	mg/L	----	----	<0.001	<0.001	----	----	----
Gallium	EG020D-W	0.001	mg/L	----	----	**0.001**	**0.001**	----	----	----
Lead	EG020A-W	0.001	mg/L	----	----	<0.001	**0.001**	----	----	----
Manganese	EG020A-W	0.001	mg/L	----	----	**0.005**	**0.051**	----	----	----
Molybdenum	EG020A-W	0.001	mg/L	----	----	**0.002**	<0.001	----	----	----
Nickel	EG020A-W	0.001	mg/L	----	----	<0.001	<0.001	----	----	----
Selenium	EG020A-W	0.01	mg/L	----	----	<0.01	<0.01	----	----	----
Silver	EG020B-W	0.001	mg/L	----	----	<0.001	<0.001	----	----	----
Strontium	EG020B-W	0.001	mg/L	----	----	**0.021**	**0.005**	----	----	----
Thallium	EG020A-W	0.001	mg/L	----	----	<0.001	<0.001	----	----	----
Thorium	EG020B-W	0.001	mg/L	----	----	<0.001	<0.001	----	----	----
Tin	EG020A-W	0.001	mg/L	----	----	<0.001	**0.006**	----	----	----
Titanium	EG020B-W	0.01	mg/L	----	----	<0.01	**0.44**	----	----	----
Uranium	EG020B-W	0.001	mg/L	----	----	**0.001**	**0.002**	----	----	----
Vanadium	EG020A-W	0.01	mg/L	----	----	<0.01	<0.01	----	----	----
Zinc	EG020A-W	0.005	mg/L	----	----	<0.005	**0.011**	----	----	----
Boron	EG020A-W	0.05	mg/L	----	----	<0.05	<0.05	----	----	----
Iron	EG020A-W	0.05	mg/L	----	----	**0.38**	**4.11**	----	----	----
Tungsten	EG020E-W	0.001	mg/L	----	----	**0.032**	**0.002**	----	----	----

No Guideline Evaluation Required

Sub-Matrix: **ROCK**

Compound	Method	LOR	Unit	Lower Limit	Upper Limit	Sample ID: BH4B_6.40-6.52	BH4B_39.74-39.91	BH4B_71.0-71.20	BH4B_148.17-148.36	BH4B_419.0-419.14
						Sampling date/time: 25-Aug-2022 15:00	25-Aug-2022 15:00	25-Aug-2022 15:00	25-Aug-2022 15:00	25-Aug-2022 15:00
						ES2239415-003 MU	ES2239415-004 MU	ES2239415-005 MU	ES2239415-006 MU	ES2239415-007 MU
EN60-DI: Bottle Leaching Procedure - Inorganics/Non-Volatile Organics (Glass Vessel)										
Final pH	EN60-DIa-G	0.1	pH Unit	----	----	**7.8**	**7.9**	**7.9**	**8.7**	**8.6**

No Guideline Evaluation Required

Sub-Matrix: **SOLID**

Compound	Method	LOR	Unit	Lower Limit	Upper Limit	Sample ID: MB01A_26-36.5	Sample ID: MB03B_7-20	Sample ID: ----	Sample ID: ----	Sample ID: ----
						Sampling date/time: 12-Sep-2022 15:00	Sampling date/time: 12-Sep-2022 15:00	Sampling date/time: ----	Sampling date/time: ----	Sampling date/time: ----
						ES2239415-001 MU	**ES2239415-002 MU**	**-------- MU**	**-------- MU**	**-------- MU**
EN60-DI: Bottle Leaching Procedure - Inorganics/Non-Volatile Organics (Glass Vessel)										
Final pH	EN60-DIa-G	0.1	pH Unit	----	----	**8.7**	**8.0**	**----**	**----**	**----**

No guidelines available for this workorder

QUALITY CONTROL REPORT

Work Order	: **ES2239415**	Page	: 1 of 5
Client	: **EMM CONSULTING PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: HENRY NOAKES	Contact	: Cez Bautista
Address	: Ground Floor Suite 1 20 Chandos Street St Leonards NSW NSW 2065	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: J200096 Oven Mountain Pumped Storage Project	Date Samples Received	: 01-Nov-2022
Order number	: J200096	Date Analysis Commenced	: 03-Nov-2022
C-O-C number	: ----	Issue Date	: 08-Nov-2022
Sampler	: ----		
Site	: ----		
Quote number	: SY/284/22		
No. of samples received	: 7		
No. of samples analysed	: 7		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG020W: Water Leachable Metals by ICP-MS (QC Lot: 4681728)									
ES2239415-001	MB01A_26-36.5	EG020B-W: Silver	7440-22-4	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020B-W: Strontium	7440-24-6	0.001	mg/L	0.016	0.018	13.0	0% - 50%
		EG020B-W: Thorium	7440-29-1	0.001	mg/L	0.001	<0.001	0.0	No Limit
		EG020B-W: Uranium	7440-61-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020B-W: Titanium	7440-32-6	0.01	mg/L	0.10	0.11	15.1	0% - 50%
EG020W: Water Leachable Metals by ICP-MS (QC Lot: 4681729)									
ES2239415-001	MB01A_26-36.5	EG020D-W: Gallium	7440-55-3	0.001	mg/L	0.002	0.001	0.0	No Limit
EG020W: Water Leachable Metals by ICP-MS (QC Lot: 4681730)									
ES2239415-001	MB01A_26-36.5	EG020E-W: Tungsten	7440-33-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EG020W: Water Leachable Metals by ICP-MS (QC Lot: 4681731)									
ES2239415-001	MB01A_26-36.5	EG020A-W: Aluminium	7429-90-5	0.01	mg/L	2.39	2.46	2.6	0% - 20%
ES2239415-001	MB01A_26-36.5	EG020A-W: Cadmium	7440-43-9	0.0001	mg/L	0.0003	0.0003	0.0	No Limit
		EG020A-W: Antimony	7440-36-0	0.001	mg/L	0.016	0.016	0.0	0% - 50%
		EG020A-W: Arsenic	7440-38-2	0.001	mg/L	0.019	0.020	0.0	0% - 50%
		EG020A-W: Barium	7440-39-3	0.001	mg/L	0.015	0.019	23.4	0% - 50%
		EG020A-W: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-W: Cobalt	7440-48-4	0.001	mg/L	0.002	0.003	0.0	No Limit
		EG020A-W: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-W: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-W: Manganese	7439-96-5	0.001	mg/L	0.041	0.044	7.0	0% - 20%
		EG020A-W: Molybdenum	7439-98-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-W: Nickel	7440-02-0	0.001	mg/L	0.001	0.003	66.5	No Limit
		EG020A-W: Thallium	7440-28-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EG020W: Water Leachable Metals by ICP-MS (QC Lot: 4681731) - continued									
ES2239415-001	MB01A_26-36.5	EG020A-W: Tin	7440-31-5	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-W: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-W: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-W: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-W: Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	0.0	No Limit
		EG020A-W: Iron	7439-89-6	0.05	mg/L	2.06	2.37	14.0	0% - 20%

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG020W: Water Leachable Metals by ICP-MS (QCLot: 4681728)								
EG020B-W: Silver	7440-22-4	0.001	mg/L	<0.001	----	----	----	----
EG020B-W: Strontium	7440-24-6	0.001	mg/L	<0.001	0.1 mg/L	97.9	70.0	130
EG020B-W: Thorium	7440-29-1	0.001	mg/L	<0.001	0.1 mg/L	107	85.0	115
EG020B-W: Titanium	7440-32-6	0.01	mg/L	<0.01	0.1 mg/L	93.8	70.0	130
EG020B-W: Uranium	7440-61-1	0.001	mg/L	<0.001	0.1 mg/L	101	85.0	115
EG020W: Water Leachable Metals by ICP-MS (QCLot: 4681729)								
EG020D-W: Gallium	7440-55-3	0.001	mg/L	<0.001	0.1 mg/L	106	70.0	130
EG020W: Water Leachable Metals by ICP-MS (QCLot: 4681730)								
EG020E-W: Tungsten	7440-33-7	0.001	mg/L	<0.001	0.1 mg/L	108	70.0	130
EG020W: Water Leachable Metals by ICP-MS (QCLot: 4681731)								
EG020A-W: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	87.2	81.0	121
EG020A-W: Antimony	7440-36-0	----	mg/L	----	0.02 mg/L	107	70.0	130
EG020A-W: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	101	79.0	119
EG020A-W: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	99.5	88.0	108
EG020A-W: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	99.6	84.0	108
EG020A-W: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	88.7	84.0	114
EG020A-W: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	100	81.0	115
EG020A-W: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	99.0	81.0	117
EG020A-W: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	96.1	83.0	115
EG020A-W: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	88.0	84.0	112
EG020A-W: Molybdenum	7439-98-7	0.001	mg/L	<0.001	0.1 mg/L	102	81.0	121
EG020A-W: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	110	80.0	116
EG020A-W: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	96.5	74.0	122
EG020A-W: Thallium	7440-28-0	0.001	mg/L	<0.001	0.1 mg/L	97.4	85.0	117
EG020A-W: Tin	7440-31-5	0.001	mg/L	<0.001	0.1 mg/L	112	81.0	121
EG020A-W: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	97.5	83.0	113
EG020A-W: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	87.5	80.0	114
EG020A-W: Boron	7440-42-8	0.05	mg/L	<0.05	0.5 mg/L	88.6	74.0	128
EG020A-W: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	90.8	83.0	117

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020W: Water Leachable Metals by ICP-MS (QCLot: 4681731)							
ES2239415-002	MB03B_7-20	EG020A-W: Arsenic	7440-38-2	1 mg/L	96.6	70.0	130
		EG020A-W: Barium	7440-39-3	1 mg/L	98.1	70.0	130
		EG020A-W: Cadmium	7440-43-9	0.25 mg/L	99.8	70.0	130
		EG020A-W: Chromium	7440-47-3	1 mg/L	96.1	70.0	130
		EG020A-W: Cobalt	7440-48-4	1 mg/L	97.2	70.0	130
		EG020A-W: Copper	7440-50-8	1 mg/L	102	70.0	130
		EG020A-W: Lead	7439-92-1	1 mg/L	87.2	70.0	130
		EG020A-W: Manganese	7439-96-5	1 mg/L	96.7	70.0	130
		EG020A-W: Nickel	7440-02-0	1 mg/L	103	70.0	130
		EG020A-W: Vanadium	7440-62-2	1 mg/L	94.9	70.0	130
		EG020A-W: Zinc	7440-66-6	1 mg/L	98.8	70.0	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2239415**	Page	: 1 of 4
Client	: **EMM CONSULTING PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: HENRY NOAKES	Telephone	: +61-2-8784 8555
Project	: J200096 Oven Mountain Pumped Storage Project	Date Samples Received	: 01-Nov-2022
Site	: ----	Issue Date	: 08-Nov-2022
Sampler	: ----	No. of samples received	: 7
Order number	: J200096	No. of samples analysed	: 7

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EN60-DI: Bottle Leaching Procedure - Inorganics/Non-Volatile Organics (Glass Vessel)							
Non-Volatile Leach: 180 day HT (e.g. PFAS, metals ex.Hg) (EN60-Dla-G)							
MB01A_26-36.5, MB03B_7-20	**12-Sep-2022**	**03-Nov-2022**	11-Mar-2023	✓	**----**	----	----
Non-Volatile Leach: 180 day HT (e.g. PFAS, metals ex.Hg) (EN60-Dla-G)							
BH4B_6.40-6.52, BH4B_39.74-39.91, BH4B_71.0-71.20, BH4B_148.17-148.36, BH4B_419.0-419.14	**25-Aug-2022**	**03-Nov-2022**	21-Feb-2023	✓	**----**	----	----

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020W: Water Leachable Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020E-W)							
MB01A_26-36.5, MB03B_7-20, BH4B_6.40-6.52, BH4B_39.74-39.91, BH4B_71.0-71.20, BH4B_148.17-148.36, BH4B_419.0-419.14	**03-Nov-2022**	**04-Nov-2022**	02-May-2023	✓	**04-Nov-2022**	02-May-2023	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Water Leachable Metals by ICP-MS - Suite A	EG020A-W	2	7	**28.57**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Water Leachable Metals by ICP-MS - Suite B	EG020B-W	1	7	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Water Leachable Metals by ICP-MS - Suite C	EG020D-W	1	7	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Water Leachable Metals by ICP-MS - Suite E	EG020E-W	1	7	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Water Leachable Metals by ICP-MS - Suite A	EG020A-W	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Water Leachable Metals by ICP-MS - Suite B	EG020B-W	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Water Leachable Metals by ICP-MS - Suite C	EG020D-W	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Water Leachable Metals by ICP-MS - Suite E	EG020E-W	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Water Leachable Metals by ICP-MS - Suite A	EG020A-W	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Water Leachable Metals by ICP-MS - Suite B	EG020B-W	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Water Leachable Metals by ICP-MS - Suite C	EG020D-W	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Water Leachable Metals by ICP-MS - Suite E	EG020E-W	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Water Leachable Metals by ICP-MS - Suite A	EG020A-W	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Water Leachable Metals by ICP-MS - Suite A	EG020A-W	SOIL	In house: Referenced to APHA 3125; USEPA SW846 - 6020, AS 4439.3, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Water Leachable Metals by ICP-MS - Suite B	EG020B-W	SOIL	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Water Leachable Metals by ICP-MS - Suite C	EG020D-W	SOIL	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Water Leachable Metals by ICP-MS - Suite E	EG020E-W	SOIL	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.

Preparation Methods	Method	Matrix	Method Descriptions
Digestion for Total Recoverable Metals in DI Water Leachate	EN25W	SOIL	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)
Deionised Water Leach - Glass Leaching Vessel	EN60-DIa-G	SOIL	In house QWI-EN/60 referenced to AS4439.3 Preparation of Leachates

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