TECHNICAL REPORT

Yallourn: Lake water balance and water quality

Report prepared for

EnergyAustralia Ltd

RGS

MINE WASTE AND WATER MANAGEMENT

TECHNICAL REPORT

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Executive Summary

Background and Objectives

RGS Environmental Consultants (RGS) has been commissioned by EnergyAustralia Ltd (EA) to prepare a technical report to assess the lake(s) water balance and water quality for the Yallourn Declared Mines Rehabilitation Project (DMRP) located in Victoria's Latrobe Valley.

The objectives of the modelling are to assess the potential lake(s) water balance and water quality associated with the project. This includes:

- Estimate the final lake(s) water quality at completion of filling and modelling of how the lake water quality will evolve into the future;
- Modelling the demand for water to fill and maintain the lake(s) level during and beyond creation of the lake(s);
- Assessment of how climate change and climate variability are likely to affect the water balance and water quality of the lake(s); and,
- Comparison of the results for different fill option scenarios.

This report presents the preliminary results of the WB/WQ model which is developed to align with the DMRP and the results are considered to be at an 'inferred' level of confidence.

The results of the inferred model provide an acceptable level of confidence and reliability to forecast likely future environmental outcomes. It is assumed to be suitable for environmental approval level of investigation and suitable for pre-feasibility engineering.

Modelling Scenarios and Sensitivities

The WB/WQ model was developed using GoldSim and the Contaminant Transport (CT) module. The modelling scenarios and sensitivities undertaken as part of the DMRP modelling are outlined in **Table A**. The modelling includes the base case scenario (Scenario 1) and several project scenarios (Scenario 2 to 6).

All scenarios include inflows from direct rainfall, local catchment rainfall runoff, natural groundwater inflow (and outflow) and pumped groundwater. There are no other inflows assumed for the base case scenario (Scenario 1). The base case scenario assumes median climate conditions using probabilistic rainfall simulations.

The project modelling includes two 'pit fill' scenarios with the Morwell River (flood flows) either connected to the pit(s) in some form (Scenario 2 to 5) or not connected (Scenario 6) (**Table A**). The key fill water sources, others than those mentioned above, include commercial surface water allocations of Latrobe water (Scenario 2, 3, 4, 5 and 6) and Moondarra Reservoir water (Scenario 3).

The fill approach is undertaken as a seamless fill whereby external water is pumped into the YEF until the lake is filled to RL +37 m AHD without pause; this is considered acceptable since EA will likely have access to the majority of water required for fill. After the pit is filled, the 'top-up' is triggered if the water level of the lake drops 1 m to RL +36 m AHD (due to evaporation and other losses).

Climate sensitivities for the preferred scenario are modelled for median (Scenario 2) and dry (Scenario 5) climate conditions using probabilistic (rainfall).

Table A: Yallourn DMRP modelling scenarios-

Scenario ID	Fill Sources (annual until reach RL + 37m AHD)	Morwell River connected?	Climate
Scenario 1	Local catchment flows, natural groundwater & pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing).	No	Median
Scenario 2	Local catchment flows, natural groundwater, pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing) & 24 GL Latrobe water.	Yes (flood flows only)	Median
Scenario 3	Local catchment flows, natural groundwater, pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing), 34 GL Latrobe water & 14 GL Moondarra water.	Yes (flood flows only)	Median
Scenario 4	Local catchment flows, natural groundwater, pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing) & 24 GL Latrobe water.	Yes (all)	Median
Scenario 5	Local catchment flows, natural groundwater, pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing) & 24 GL Latrobe water.	Yes (flood flows only)	Dry
Scenario 6	Local catchment flows, natural groundwater, pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing) & 24 GL Latrobe water.	No	Median

Key Conclusions

The key conclusions from the water balance are summarised in **Table B** and in the following points:

- Scenario 1 (base case) did not reach fill elevation (+37 m AHD) over the simulation period (100-years); the maximum lake elevation reached is +15.5 m AHD for both the YTF and YEF lakes.
- For the other scenarios (Scenario 2 to Scenario 6), the modelling showed that the pit filled to RL +37 m AHD within 12.3 to 30 years with the mean values being 12.9 to 28.1 years (**Table B**), depending on which fill scenario was modelled, climate variability/ uncertainty and if the Morwell River is connected.
- The climate change sensitivity analysis showed that the pit fill timeframes were sensitive to climate (medium versus dry showed a +2.8-year (mean probability) increase in fill time). The main reason for the variation in the time to fill the pit for the probabilistic simulations is largely driven by the large contribution of Morwell River flood flows, direct rainfall and catchment runoff to the water balance which are all climate dependent.
- The requirement for the top-up occurs when the evaporation from the lake surface (and groundwater seepage) exceeds the lake inflow volumes. The annual top-up, for those scenarios that require top-up (Scenarios 2, 3 and 6), varies between a mean of approximately 2.61 and 4.66 GL/year depending on the particular scenario (**Table B**). There is an opportunity to reduce the top-up volumes by allowing a freeboard in the lake which would reduce the water loss via Spillway 4 (particularly if a flood event occurs shortly after top-up).

Table B: Summary of water balance results

Scenario	Additional fill sources (annual)*	Morwell River connected?	Climate	Mean years (volume [GL]^) to fill	Mean annual top-up (GL/year)	Mean top-up volume (GL) over simulation
1	None	No	Median	NA	NA	NA
2	24 GL Latrobe water.	Yes (flood flows)	Median	25.3 (606)	2.61	194
3	38 GL Latrobe water & 14 GL Moondarra water.	Yes (flood flows)	Median	12.9 (620)	2.73	237
4	24 GL Latrobe water.	Yes (all)	Median	25.3 (606)	0.00	0
5	24 GL Latrobe water.	Yes (flood flows)	Dry	28.1 (674)	4.66	334
6	24 GL Latrobe water.	No	Median	25.9 (621)	2.80	207

*Additional fill sources include those sources of fill that are not common to all scenarios (i.e. local catchment flow, natural groundwater, direct rainfall, pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing) are consistent for all modelled scenarios.
^Volume pumped water to achieve first fill (+37 m AHD).

The key conclusions from the water quality modelling are summarised in the following points.

- The PHREEQC model predicted pH incorporating atmospheric equilibrium is ~pH 7 and pH 7.6 for the YTF and YEF, respectively. However, incorporation of thermodynamic constraints (i.e. precipitation of ion (oxy)hydroxides)) results in generation of acidity, consumption of alkalinity and a change in lake pH to 4.5 and 7.5, in the YTF and YEF, respectively.
- The modelled acidic pH in YTF is likely due to the iron concentration inputs in the WB/WQ model which may be significantly overestimated due to colloids passing through 45 µm filter for field water samples. If this is the case, iron (oxy)hydroxide precipitation may not release enough acidity to neutralise the available alkalinity in the YTF pit water. Similarly, groundwater inflows from the HHF may oxidise prior to entering the lake; this would also result in a decrease in the iron inputs. Further detailed thermodynamic modelling of source terms and pit lake water may be required to resolve this.
- The general water quality trends for the lake varies for different modelled parameters and reflect the water balance inputs and geochemical source terms during the fill (Latrobe water fill [scenario 2-6], direct rainfall, catchment runoff and Morwell River flood flows (connected only)) and post fill phases (direct rainfall, catchment runoff, Latrobe water top-up (if required) and Morwell River flood flows (connected only)).
- Although the trends differ between scenarios, there is only a relatively tight range in salts and metal and metalloid values between modelled scenarios (e.g. the mean probability TDS range at the end of the simulation for Scenario 2, 3, 5 and 6 is 575 mg/L (minimum) to 591 mg/L (maximum) for YTF lake and 465 mg/L (minimum) to 476 mg/L (maximum) for YEF lake). The tight range in modelled lake water quality values is due to the fill and top-up water qualities dominating the lake water balance regardless of scenario.
- The water qualities for each of the scenarios and sensitivities for all scenarios are dominated by the major ions (namely sulfate, chloride and sodium), with metal and metalloid concentrations relatively low in comparison.
- Comparison of the modelled lake water qualities to the assessment criteria is used to determine potential reduced lake water quality. As mentioned above, the assessment criteria includes the revised *Australian and New Zealand Guidelines* for freshwater aquatic ecosystem (95% species protection) and the recommended guidelines for livestock drinking water (ANZG, 2018) as well as the *Australian Drinking Water Guidelines* (NRMMC, 2011). As mentioned previously, the ANZG freshwater aquatic ecosystem water quality guidelines are considered highly conservative for a pit lake assessment, since they are typically applied in the context of the management of natural and semi-natural water resources. Comparison of the modelled mass balance metals and metalloids to these guidelines indicate that:
    - all modelled parameters are below the livestock drinking water guidelines (ANZG, 2018) for all probabilities and scenarios.
    - Aluminium and zinc exceed the freshwater aquatic ecosystem (95% species protection) guideline (ANZG, 2018) in the YTF and YEF for each of the scenarios over the simulation period.
    - The cause of the aluminium exceedance is due to several source term inputs which also show exceedance: Latrobe water, Morwell River, groundwater and Latrobe top-up (amongst other sources). It is common for colloidal aluminium (and iron) to pass through size 45 µm filter paper resulting in an overestimation of the dissolved concentration. Thermodynamic modelling indicated that some aluminium may precipitate out of the lake as gibbsite (or aluminium (oxy)hydroxide) resulting in corrected concentrations below the guideline (see below).
    - The cause of the zinc exceedance is due to multiple sources, including rainfall and groundwater (natural and pumped).
    - Copper exceeds the freshwater aquatic ecosystem (95% species protection) guideline in the YTF for each of the scenarios over the simulation period. However, copper

concentrations are below guidelines in the YEF except for Scenario 4 where the large Morwell River inflow causes an exceedance in copper concentration after 25 years (shortly after being fully integrated with Morwell River).

- The cause of the copper exceedance (where noted above) is mainly due to Latrobe water, Morwell River, groundwater (natural and pumped) and local rainfall quality.
- Lead exceeds the freshwater aquatic ecosystem (95% species protection) guideline in the YEF for each of the scenarios over the simulation period. However, lead concentrations are below guidelines in the YEF except for Scenario 4 where the YEF and YTF are mixed, resulting in a large increase in lead concertation in the YTF and a decrease in lead concertation in the YEF after 25 years (shortly after being fully integrated with Morwell River).
- As highlighted above, copper and zinc levels are elevated relative to freshwater aquatic ecosystem (95% species protection) guideline throughout the Morwell and Latrobe catchments. Copper and zinc levels are present in rainfall at concentrations of approx. 50 µg/L, possibly due to burning of coal at power stations throughout the Latrobe Valley. It is expected that a reduction in the burning of coal in the Latrobe Valley will reduce the supply of copper and zinc to the system and thus reduce the modelled lake concentrations for these parameters.
- Similarly, the elevated lead concentrations in the YEF, relative to freshwater aquatic ecosystem (95% species protection) guidelines, are associated with runoff and seepage from the pit walls and floor, which is also likely due to burning of coal at power stations throughout the Latrobe Valley. As the burning of coal in the Latrobe Valley is reduce the supply of lead to the system is also expected to decrease and so will the modelled lake lead concentrations.
- Manganese slightly exceeds the ADWG for all scenarios in the YTF lake after ~10 to 25 years; noting that there are no exceedances for manganese in the YEF lake. The full integration of Morwell River into the lake (Scenario 4) reduces the estimated manganese concentration below ADWG. The cause of the manganese exceedance, relative to ADWG, is due mainly to seepage from the Former Ash Ponds and NOB Dump.
- Some of the elevations likely reflect the static nature of the geochemical source terms used in the model. As above, some source term qualities may improve with time improving the modelled lake water qualities.
- For the YEF, the thermodynamic modelling showed that when allowed to precipitate, iron (oxy)hydroxides remove dissolved aluminium from the pit water significantly reducing dissolved aluminium concentration from ~0.3 mg/L to <0.005 mg/L (i.e. below guideline value). Similarly, sorption of copper and zinc ions on precipitating iron (oxy)hydroxides resulted in notable concentration decreases. Mass balance copper decreased to <0.0001 mg/L on thermodynamic modelling. Mass balance zinc decreased significantly but still exceeded the freshwater aquatic ecosystem (95% species protection) guideline.
- For the YTF, the thermodynamic modelling had little influence on the mass balance results for aluminium, manganese, copper and zinc because of the low modelled pH conditions which increase metal solubility keeping metals in solution. However, as mentioned above, if the modelled acidic pH in YTF is due to overestimated iron concentration inputs in the WB/WQ model, then correction/ update could result in neutral pH conditions and decreased solubility which would decrease modelled concentrations similar to the values modelled

- Climate sensitivity and the impacts of climate change on the lake water quality is limited, due to the dominance of fill inputs, and the availability of Latrobe top-up water and Morwell River flood flows (for connected lake).

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Attachments

Attachment A Yallourn Static Geochemistry Report

Attachment B Yallourn Kinetic Geochemistry Assessment

Attachment C Water Balance Results (annual totals)

Attachment D Lake Water Quality Results Table

Attachment E Lake Water Quality Results Graphs

Abbreviations

Term	Definition
AC	Acid Consuming
ADWG	Australian Drinking Water Guidelines
ALS	Australian Laboratory Services
AMD	Acid and metalliferous drainage
ANC	Acid Neutralising Capacity
ANZG	Australian and New Zealand Guidelines
ASS	Acid Sulfate Soils
AWBM	Australian Water Balance Modelling
DMRP	Declared Mines Rehabilitation Plan
EES	Environment Effects Statement
CRS	Chromium Reducible Sulfur
CT	Contaminant Transport
EC	Electrical Conductivity
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EPA	Environment Protection Authority
ERR	Earth Resources Regulator
ERS	Environmental Reference Standard
GED	General Environmental Duty
GWB	Geochemist's Workbench
GL	Gigalitre
HHF	Haunted Hills Formation
KLC	Kinetic leach column
km	Kilometres
m AHD	Metres Australian Height Datum
MNES	Matters of national environmental significance
NAF	Non-Acid Forming
NAF - B	Non-Acid Forming - Barren
NAF - LC	Non-Acid Forming – Low Capacity
NAPP	Net Acid Producing Potential
MPA	Maximum Potential Acidity
MRD	Morwell River Diversion
PAF	Potentially Acid Forming
PAF - LC	Potentially Acid Forming – Low Capacity
PAF - HC	Potentially Acid Forming – High Capacity
RGS	RGS Environnemental Consultants Pty Ltd.
RL	Relative Level
SD	Saline Drainage
TDS	Total Dissolved Solids
TS	Total sulfur
INAP	International Network on Acid Prevention
WB/WQ	Water balance and water quality

Term	Definition
YEF	Yallourn East Field
YTF	Yallourn Township Field

1 Introduction

The Yallourn Coal Mine (YCM) Declared Mines Rehabilitation (DMRP) Project (the project) involves the final rehabilitation of the YCM and Power Station to achieve a safe, stable, sustainable and non-polluting landform capable of supporting productive future land uses. The proposed final landform for the former mine void is a high-level lake(s).

RGS Environmental Consultants (RGS) has been commissioned by EnergyAustralia Pty (EA) to develop a model to assess the lake water balance and water quality (WB/WQ model) for the Yallourn DMRP.

1.1 Purpose of report

The purpose of this report is to assess the potential lake(s) water balance and water quality associated with the project. This includes:

- Estimate the final lake(s) water quality at completion of filling and modelling of how the lake water quality will evolve into the future;
- Modelling the demand for water to fill and maintain the lake(s) level during and beyond creation of the lake(s);
- Assessment of how climate change and climate variability are likely to affect the water balance and water quality of the lake(s); and,
- Comparison of the results for different fill option scenarios.

1.2 RGS scope of work

The RGS scope of work includes:

- Construction of a lake(s) water balance and water quality model which meet the objectives of the project providing results with an ‘inferred’ level of reliability;
- Evaluation of estimated water quality in the lake(s) in relation to applicable water quality standards and guidelines; and,
- Preparation of a standalone technical report for the lake(s) water balance and water quality modelling (i.e. this report).

This report presents the preliminary results of the WB/WQ model which is developed to align with the DMRP and the results are considered to be at an ‘inferred’ level of confidence.

An “Inferred water balance and water quality model" is that part of an environmental and engineering assessment for which quantity and quality can be estimated on the basis of hydrogeological, hydrological, and geochemical ‘evidence’ and reasonably assumed, but not verified, from geological, geochemical and hydro-geological data. The model estimate is based on limited information and sampling gathered through appropriate standard industry practices for sampling and analysis methodology, and conformance to the Australian Groundwater Modelling Guideline.

The results of the inferred model provide an acceptable level of confidence and reliability to forecast likely future environmental outcomes. It is assumed to be suitable for environmental approval level of investigation and suitable for pre-feasibility engineering.

1.3 Lake water balance and water quality context

The YCM open pit is a term used for the excavated area during the mining phase. After mining has ceased and the two open pits are decommissioned, the open pit is termed a mine void. Within the mine void at the YCM there are three overburden dumps and an ash retention area (Former Ash Ponds). When the mine voids are filled with water, a pit lake will develop and inundate the overburden dumps, Former Ash Ponds and a large proportion of the pit walls.

A lake system includes processes influencing pore water quality in the backfilled overburden and ash (i.e. water contained in the pore space of the ash and overburden, respectively) that is inundated by the lake, changes to groundwater as it rebounds towards pre-mine conditions and the resulting water quality in the lake as it evolves over time. The interaction between water and minerals in the local geological environment, and the effect of dissolved minerals on water quality can be studied using hydrogeochemical modelling.

Water balance refers to the accounting of inputs and outputs of water in the lake(s), including precipitation (rainfall entering the lake), streamflow (water potentially entering and leaving the lake), evaporation (loss due to evaporation) and changes in storage (such as through interaction with groundwater, transfer of water between lakes and active filling or top-up from various water sources). There are two types of hydrologic conditions that exist in a lake; flow-through conditions (surface and/ or groundwater flows into and out of this type of lake) and terminal conditions (groundwater flows into the mined void and outflow occurs only as evaporation (and a small amount of groundwater seepage). The latter is referred to herein as the base case scenario, and the terminology for flow-through and terminal conditions is referred to in this report as ‘connected lake’ and ‘unconnected lake’, respectively.

The lake water balance and water quality is important in this context because it may impact water quality of receiving environments (e.g. groundwater and Morwell River in the connected lake scenario). It may also influence the suitability of the lake and surrounding land for future productive land uses once rehabilitation is completed.

2 Project background

The YCM and associated Yallourn Power Station (YPS) is located in Victoria's Latrobe Valley (**Figure 2-1**) and operated by EA. The site is located approximately 150 km south-east of Melbourne on the traditional lands of the Gunaikurnai people. YCM is situated between the townships of Newborough, Morwell and Yallourn North.

Coal mining operations have been part of the Latrobe Valley landscape for over 100 years. Today, EA Yallourn supplies approximately 22% of Victoria's electricity needs and approximately 6% of the national electricity market.

The YPS is scheduled to cease operation in mid-2028, at which point the YCM will also cease production. Following the end of the productive life of the mine, the site will transition to rehabilitation phase and eventually to an anticipated future use beyond mining. The current mining license has been extended to 2051 to incorporate the rehabilitation of the Mine Site.

2.1 Project area

The YCM comprises two adjacent open pits, Township Field and East Field (including Maryvale Field). To the north of the open pits is the Latrobe River which separates the mine from the Yallourn North Open Cut (YNOC) and ash ponds. The two coal open pits (Township and East Field) are separated by a coal dyke with the Morwell River Diversion (MRD) running over this dyke (**Figure 2-2**). YNOC is currently used as the ash storage repository/landfill with no natural connection between YNOC and the mine pit voids.

Pit wall batters comprise both exposed coal, and reshaped and revegetated overburden. Coal exposed in the Township Field batters is heavily weathered relative to the coal exposed in the East Field, with coal in the East Field transitioning toward unweathered at the mining face in the Maryvale Field.

There are three internal overburden dumps at YCM. The Township Field mined void contains the Yallourn Township Field (YTF) Overburden Dump and the Midfield Dump. The East Field mined void contains the operational Yallourn East Field (YEF) Overburden Dump. The Township Field also contains the Former Ash Ponds (FAP) which comprise dumped overburden overlain by layers of coal ash and capped with overburden and soil.

The YTF Overburden Dump is separated into the Northern Overburden (NOB) Dump and Southern Overburden (SOB) Dump. Acid sulfate soils (ASS) were initially identified in one area of the NOB Dump (understood to originate from the excavation of the old Morwell Riverbed and floodplain alignment). Pyrite/marcasite mineralisation has been found within the HHF above the contact with the Yallourn Seam which is likely to have also been placed in the NOB Dump. Since placement of overburden in the NOB Dump, the facility has been generating acidic drainage of approximately pH 3.

Static geochemical testing has confirmed that materials within the NOB Dump are potentially acid forming (PAF) and have also characterised a considerable portion of material placed in the YEF Overburden Dump materials as PAF (RGS, 2024) (**Section 2.6**). YTF SOB and YMF Overburden Dump materials have been generally characterised as non-acid forming (NAF). There is, however, a propensity for the materials placed within the dumps to generate Saline Drainage (SD).

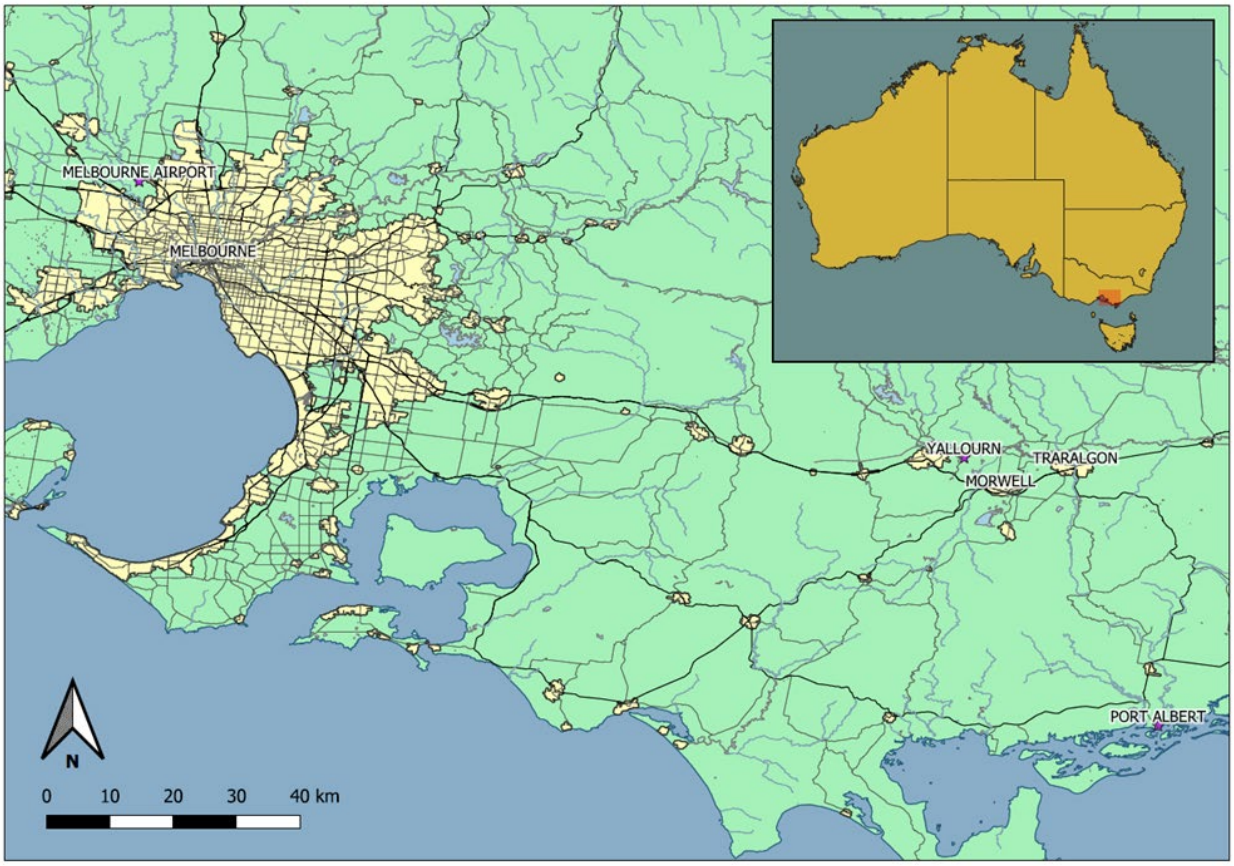

Figure 2-1 Locality map

Source: Energy Australia

RGS	500 0 500 1,000 1,500 2,000 m	**Yallourn water balance water quality modelling**	Job Number: 2021048 12/08/2024
	Scale 1:40,000 Datum: SECLV	**YCM layout and domains**	**Figure 2-2** N
	2021004 EA Yallourn Spatial Data.qgz; YCM Layout and Domains		

Figure 2-2 Project area

2.2 Project description

The main project components related to the pit lake water balance and water quality assessment include the following:

- Filling the mine voids with water to a relative level (RL) of +37 metres Australian Height Datum (m AHD), using predominately groundwater, surface water and any other approved water sources.
- Earthworks to rehabilitate, stabilise and reshape landforms, primarily upper mine batters where they are above the surface level of the future lake (i.e. laying batters back to design profile), to geotechnically stable landforms with adequate stabilising vegetation and drainage.

The key activity is filling of the mine voids. Several lake scenarios are assessed in the DMRP; however, the two key scenarios include an 'unconnected lake' scenario (base case), which does not interact with any other waterways (i.e. terminal conditions), and a 'connected lake' scenario (preferred scenario), which would take a portion of peak flows from the Morwell River during flood events via three spillways constructed on the Morwell River Diversion (MRD) and discharge back into the Latrobe River downstream (i.e. flow-through conditions) via a fourth spillway.

It is proposed to fill the mine void using the following primary water sources:

- Bulk water entitlements sourced from the Latrobe River; 24 GL per year (GL/yr)).
- Continued pumping of groundwater obtained under a groundwater licence at a target rate of 1.5 GL/yr to RL 0 m, 1 GL/yr to RL +37 m and then 0 GL from the M1A aquifer.
- Potential surface water entitlements obtained under an agreement with Gippsland Water (Moondarra Reservoir).

A range of other sources are proposed to contribute to filling of the mine, including:

- Flood flows from the Morwell River in a connected lake scenario, subject to approval. Volumes are dependent upon relevant rainfall (flood) incidents and therefore would be occasional and highly variable.

The baseline project scenario provides a baseline against which to compare the preferred project scenario. It generally refers to the continuation of current activities at site which are already approved or are necessary operational works. This includes implementation of approved earthworks, ongoing groundwater pumping to maintain stability, and retention of groundwater and operations water (fire and dust suppression water, natural catchment drainage) within the mine voids.

The preferred project scenario includes continuous filling of the mine voids to an RL +37 m AHD using the same water included in the base case scenario, plus bulk water entitlement and flood flows from the Morwell River. Water will be transferred between lakes via conveyor tunnels to balance lake levels.

2.3 Regional geology

YCM is located within the Latrobe Valley sub-basin which is part of the greater (onshore) Gippsland Sedimentary Basin. The Latrobe Valley contains Victoria's main deposits of brown coal and hosts the Hazelwood, Yallourn and Loy Yang coal mines. The brown coal reserves occur in three Formations (Kinhill, 1981; Schaeffer *et al.*, 2001):

- Yallourn Formation (mid-Miocene Age, 5 to 11 million years ago).
- Morwell Formation (Oligocene and early Miocene Age, 15 to 37 million years ago).
- Traralgon Formation (Eocene Age, 37 to 53 million years ago).

The Yallourn Formation contains the Yallourn Coal Seam, the top-most and youngest coal in the Latrobe Valley (**Figure 2-4**). It consists of a complex unit of thick coal seams and clay-sand sequences, lying conformably on the Morwell Formation, and grades laterally eastward into the barrier sands of the Balook Formation.

Underlying the Yallourn Formation is the fully-developed Morwell 1A Seam. The Yallourn Interseam Clay can be up to 5m thick (Barton, Gloe and Holdgate, 1993) and separates the Yallourn from the Morwell coal seam. The Morwell 1A Seam is up to 80m thick, including interbedded clays, ligneous clay and minor coal bands and is regionally extensive through the Traralgon syncline and from Yallourn to Glengarry. It is mined at Loy Yang and Hazelwood coal mines. West of the Yallourn Monocline the Morwell 1B Seam grades into interbedded sediments, lavas and tuffs of the Thorpdale Volcanics and into Latrobe Coal Seam (Barton, Gloe and Holdgate, 1993; Holdgate, Osborne and Goldie Divko, 2016)

The Yallourn Seam was eroded during the late Miocene. In Traralgon and Latrobe Synclines, the seam is buried by up to 200m of younger Yallourn and Haunted Hill Formation (HHF) clays.

2.4 Stratigraphy

The Yallourn Formation is the youngest and uppermost coal-bearing formation. The stratigraphic units at YCM include (Schaeffer *et al.*, 2001; Holdgate, Osborne and Goldie Divko, 2016) (**Figure 2-4**):

- Overburden (OB): The OB is a clayey silt, approximately 9m to 45m thick.
- Yallourn Coal Seam: Most development of the coal seam occurred in Maryvale East and Yallourn. Within the confines of the operating mine, the seam ranges from 135m in the north to 50m in the south.
- Yallourn Interseam Clay (West): Interbedded clays, ligneous clay and a minor coal band up to 5m thick.
- M1A Interseam Clay (East): Thin clay parting confined only to the east side of the cut. Interseam sands and clays, typically 15m to 25m thick. The upper portion of this stratum consists of a 3m to > 15m layer of silty clay.
- M1A Coal Seam: M2 Coal Seam has a thickness up to 55m.
- M1A and M1B Aquifer: M1A Interseam Clay and Coal Seam underlain by a sandy aquifer of variable thickness and continuity.
- M1B Coal Seam: M1B Coal Seam grades into barrier sands of the Balook Formation, north of the Latrobe River into clays and minor sands, and west of the Yallourn Monocline into interbedded sediments, lavas and tuffs of the Thorpdale Volcanics, up to 165m of thickness.
- Latrobe Coal Seam (M2 Seam): The oldest Morwell 2 Seam, with thickness up to 140m, occurs in area between Yallourn and Glengarry but usually overlain by younger coal-poor Yallourn and Morwell Formation. This is also known locally as Latrobe Seam that includes a limited component of M1B Seam. M2 Interseam has a variable thickness clay stratum containing one or several sand layers near the base of the M2 coal seam.
- M2 Aquifer: Artesian water pressures have been encountered in the sand layers below M2 Coal Seam.
- Basement**:** Mesozoic and Palaeozoic basement

2.5 Hydrogeology

Before mining commenced, groundwater existed within localised aquifers in the overburden strata. YCM dewatered the underlying confined aquifer (M1A) creating a cone of depression. The deeper underlying M2 aquifer is dewatered by the adjacent Hazelwood Mine, which creates a cone of depression to the southeast of Yallourn. Groundwater recharge occurs via percolation of meteoric water through the regolith and coal seams.

The underlying M1A aquifer is divided into four separate sand layers (known as M1AS0, M1AS1, M1ASM & M1ASL in the Yallourn Mine model). The aquifers range from poorly to moderately sorted fine quartz sands to gravels. The upper sand units (A01 to A1) are thin and discontinuous, compared to the A3 which is continuous and considered the main M1 Aquifer unit.

The M2 aquifer is up to 200 m thick beneath YCM (**Figure 2-4**) and consists of six separate sand layers (2A, 2B, 2C, 2D, 2E and 2F). The aquifers range from well sorted, fine to medium gravel. There is intermittent weathered basalt (Thorpdale Volcanics), which act as an aquitard below the 2A sands. The 2A sand is a fine to medium grained sand, while 2B and 2C aquifers are typically fine sands with low permeability. The 2D aquifer has coarse grained sand and gravel and is the main M2 aquifer with the highest yield and transmissivity. The aquifer is > 12 m thick and in isolated areas > 20 m thick. The 2E and 2F sands are generally low permeability.

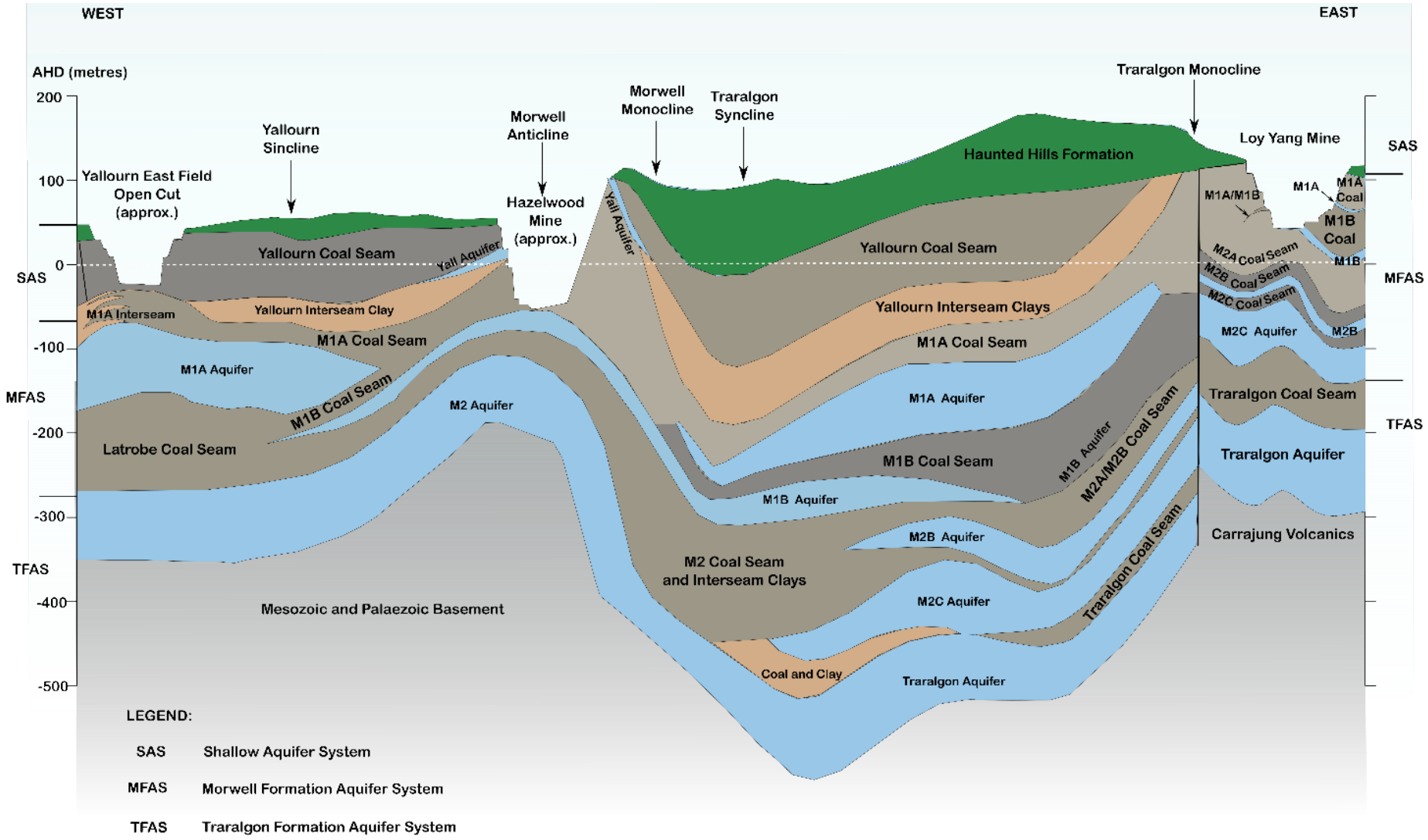

Figure 2-3: Schematic Hydrogeological Section Yallourn - Hazelwood - Loy Yang (Schaeffer et al., 2001)

2.6 Geochemistry

2.6.1 RGS geochemistry testing

Geochemical testing was undertaken to understand the levels of potential contaminants that may be transferred into the water column when various materials (weathered and fresh coal, overburden and ash) come into contact with water.

RGS initially completed a high-level review of relevant available reports and data pertaining to the geochemistry of YCM site and the pit WB/WQ. Based on the outcomes of the high-level geochemistry review, RGS identified the key geochemical data gaps needed to be addressed in order to develop a robust and defensible WB/WQ model and subsequently undertook field sampling and analysis investigations beginning in April 2022. The objective of the field investigation was to characterise the geochemical properties of materials that may affect water quality in the proposed pit water lake(s); therefore, the focus was on in-pit backfilled and in-situ overburden, ash, and pit wall and floor materials as these materials may contribute to the potential for acid to alkaline pH water that may also have the potential to be accompanied by saline and metalliferous drainage.

Over the course of the following year (April 2022 to June 2023), additional coal, ash, and overburden materials were sampled as part of wall washing and in-pit drilling programs (RGS, 2023). Forty-three (43) drill holes were advanced to the target depth across the in-pit overburden dumps and the former ash ponds (41 drill holes), and ex-pit overburden dump above the East Field Northern Batters (2 drill holes). Twelve (12) out of the 43 drill holes were converted to groundwater monitoring wells to enable water quality monitoring within the in-pit dumps and ex-pit dump that can provide source terms for the pit lake WB/WQ model. The field program is summarised in the RGS factual drilling report (RGS, 2023) and is summarised in **Table 2-1**. The water quality monitoring of the groundwater monitoring wells is used to develop geochemical source terms (**Section 4.9.2**).

Table 2-1: Filed drilling program and monitoring wells

Drilling location	No. of drill holes progressed to target depth	No. of drill holes converted to groundwater monitoring wells
Township Field catchment		
Former Ash Ponds (in-pit)	5	3
Midfield Dump/ Midfield Borrow area (in-pit)	9	2
Township Field Northern Overburden dump (in-pit)	7	2
Township Field Southern Overburden dump (in-pit)	7	2
East Field catchment		
East Field Dump (in-pit)	8	2
Maryvale Field Dump (in-pit)	5	0
East Field Northern Batters Overburden Dump (ex-pit)	2	1
Total	**43**	**12**

A total of 1,522 solid grab and drill core samples were included in the programs. These samples were subjected to a series of geochemical screening tests and based on the results, select samples underwent static geochemical testing (RGS, 2024) (**Attachment A**). Based on the static test results, select samples were composited and used for kinetic leach column (KLC) tests (**Attachment B**).

2.6.2 Static geochemistry testing

A summary of the number of samples and material types collected as part of each field program are provided in **Table 2-1**. The results are presented in the static geochemistry assessment technical report for YCM (RGS, 2024) (**Attachment A**).

Table 2-2: Samples subjected to static geochemical testing according to location and material type

Location	Number of Samples	Material Type	Number of Samples
Former Ash Ponds	201	Topsoil	4
Midfield Dump area	341	Overburden	1,259
Township Field North	253	Weathered coal	219
Township Field South	242	Fresh coal	15
East Field	315	Ash	25
Maryvale Field	170		
Total	**1,522**	**Total**	**1,522**

The results of the geochemical data for each of the material types likely to affect or contribute to the final void/ pit lake water quality are summarised in the sections below. The criteria used to classify the potential of the samples to generate acidic drainage are shown in **Table 2-2**. The classification criteria reflect Australian (COA, 2016c) and international (INAP, 2024) guidelines for the classification of mining waste materials.

The NAPP is used as an indicator of materials that may be of concern with respect to acid generation. The NAPP calculation represents the balance between the maximum potential acidity (MPA) of a sample, which is derived from the sulfide sulfur (chromium reducible sulfur; CRS) content, and the acid neutralising capacity (ANC) of the material, which is determined experimentally. By convention, the NAPP result is expressed in units of kg H_2SO_4/t sample. If the capacity of the solids to neutralise acid (ANC) exceeds their capacity to generate acid (MPA), then the NAPP of the material is negative. Conversely, if the MPA exceeds the ANC, the NAPP of the material is positive.

The results of the sulfide sulfur screening tests and geochemical classification criteria are provided in **Figure 2-5** and **Figure 2-6**, respectively, and these results are summarised according to material type is the following sections.

Table 2-3: Classification criteria and sample classifications for samples from the YCM

Classification	S_{CR} (%)	NAPP (kg H_2SO_4/t)
Non-acid Forming (Barren) (NAF-B)	< = 0.1	---
Non-acid Forming (NAF)	> 0.1	< = -10
Uncertain	> 0.1	< = 5
Potentially Acid Forming (Low Capacity) (PAF-LC)	> 0.1	< = 10
Potentially Acid Forming (PAF)	> 0.1	> 10

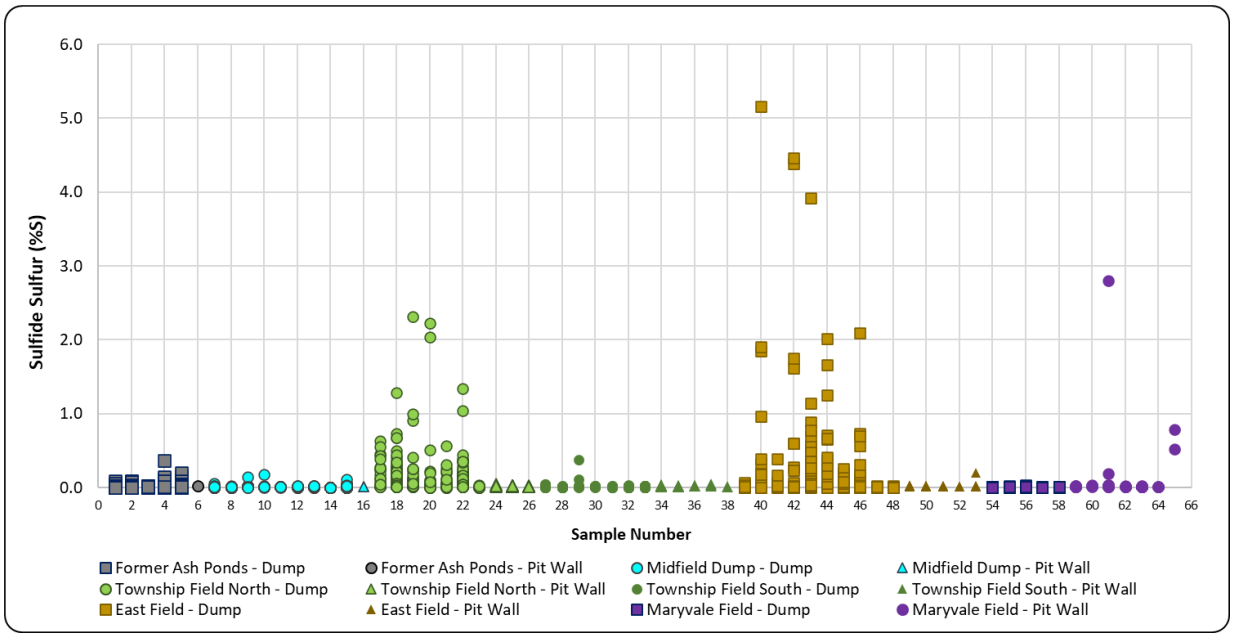

Figure 2-4: Sulfide sulfur (%) for each of the samples according to sampling location at YCM.

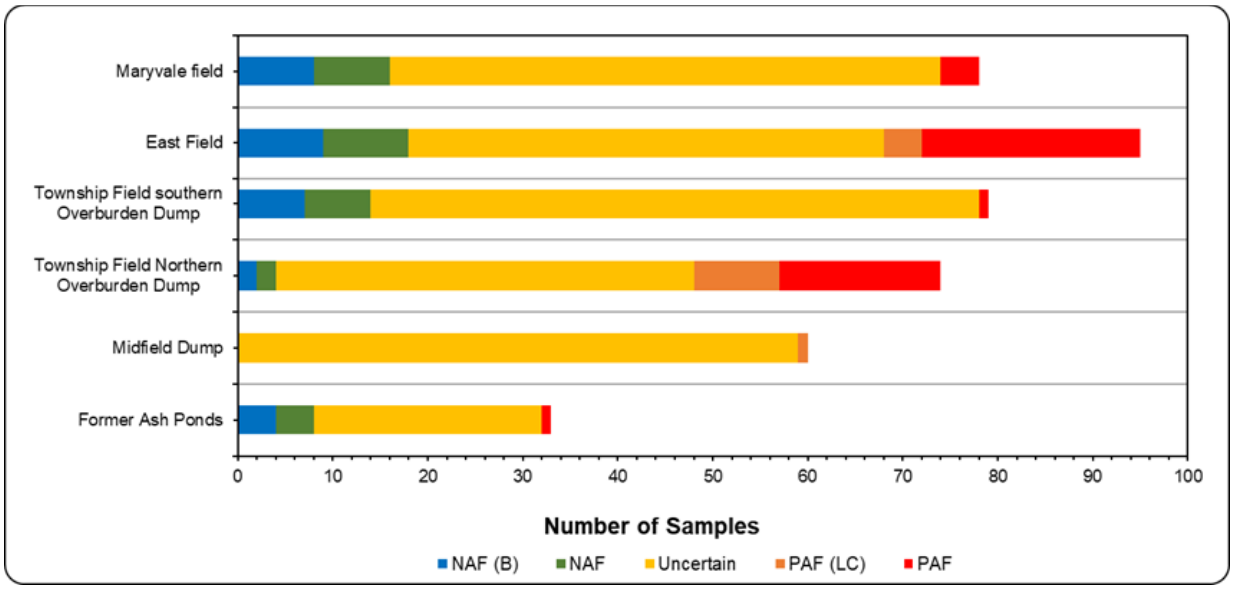

Figure 2-5: Geochemical classification according to sampling location at YCM.

2.6.3 Wall washing experiments

water is collected and analysed for selected chemical parameters. Wall washing provides an indication of runoff quality from an isolated section of in situ coal/overburden after application of a controlled amount of irrigation. The wall washing test is considered to represent a very useful order-of-magnitude estimate of contributions from exposed pit walls (INAP, 2024).

Wall washing was completed at 17 locations across Township Field, East Field, and Maryvale Field (**Table 2-3**). A spray headers manifold was fixed in place adjacent to the pit wall and connected to a potable water supply (**Figure 2-7**). Approximately 20 L/minute of water was sprayed over an area of approximately 2m^2. For 30 minutes, with samples collected at 0 minutes (first flush), 15 minutes and 30 minutes.

The samples collected using wall washing methods allow the filterable fraction (0.45 µm soluble metals) and non-filtered fractions (e.g., suspended sediment and total metals and metalloids) of the water quality to be measured and quantified. Water samples at 0, 15 and 30 minutes were analysed for the filterable fraction, while only samples at 0 minutes were measured for non-filtered fractions.

The results from wall washing are used (together with other data) to develop and verify source terms for pit wall contaminant release (**Section 4.9.2**).

Table 2-4: Wall washing by material type

	Number of wall wash experiments		
Pit wall location	**Weathered coal**	**Fresh coal**	**Topsoil/overburden**
Township Field	5	0	1
East Field	4	0	1
Maryvale Field	3	2	1
Total wall wash experiments	12	2	3
Total water samples collected	36	6	8

Figure 2-6: Wall washing experiments on weathered coal (left) and topsoil/overburden (right) showing spay headers manifold

2.6.4 Coal static geochemistry

Coal materials at YCM occur as both weathered coal in historically mined areas and fresh coal in the YEF and YMF. Minor volumes of coal were also encountered in all the historic dumps.

Weathered coal at YCM has acidic initial pH values that range from pH 3.0 to 5.8, with a median of pH 4.0. Electrical conductivity (EC) values for weathered coal range from 32 to 1,750 µS/cm, with a median value of 179 µS/cm. Sulfide concentration values for weathered coal samples are low relative to the median crustal abundance of sulfur (0.07%)[1], ranging from 0.006% to 1.34% with a median of 0.019%. Samples generally have low acid neutralising capacity (ANC), ranging from below the laboratory limit of reporting (LoR) of 0.5 kg H_2SO_4/t to 38.8 kg H_2SO_4/t with a median value below the LoR.

[1] Bowen H.J.M (1979) Environmental Chemistry of the Elements, Academic Press, New York, p60-61.

Fresh coal samples are expected to have acidic initial contact water with static pH testing values ranging from pH 3.5 to 4.5 and a median of pH 4.2. Salinity in initial contact water is expected to be less variable than in drainage from weathered coal ranging from 100 to 385 µ/cm, but to generally have similar salinity values from most materials (median 186 µS/cm). Sulfide concentrations in fresh coal are expected to range from 0.015% to 2.80% with a median of 0.22%. As with weathered coal, fresh coal is expected to have very low ANC (ranging from below the LoR to 3.2 kg H_2SO_4/t with a median value below the LoR.

The coal samples, particularly weathered coal are generally classified as NAF with the minority of samples classified as PAF – low capacity (LC) (RGS, 2024). They generally have sufficiently low sulfide sulfur concentrations that the materials can be considered to have a negligible risk of generating additional acidity; however, while these materials have a negligible risk of generating additional acid over time, the $pH_{(1:5)}$ values suggest initial drainage may be acidic, potentially due to the previous weathering of sulfide materials (which have become depleted) or the presence of organic acids withing the materials.

2.6.5 Coal ash static geochemistry

Ash materials generally have alkaline pH values in initial contact water (median pH 8.0, range pH 4.8 to 8.4). Initial contact water salinity values are elevated relative to coal materials ranging from 358 to 1,450 µS/cm with a median of 663 µS/cm. Sulfide concentrations are low relative to the median crustal abundance of sulfur, ranging from 0.005% to 0.199%, with a median of 0.027%. The ANC of ash is elevated relative to other material at YCM ranging from below the LoR to 167 kg H_2SO_4/t with a median of 51.2 kg H_2SO_4/t.

The ash samples are all classified as NAF or NAF-barren (B), with negligible risk of generating additional acidity (RGS, 2024). There is, however, a risk of generating saline drainage.

2.6.6 Overburden static geochemistry

Initial drainage from overburden materials placed on pit walls and within the HHF above the coal seam is expected to be slightly acidic with pH values ranging from pH 4.3 to 6.2 and a median of pH 5.5. Contact water salinity is variable, ranging from 17 to 1,510 µS/cm, but with a median value of 107 µS/cm is expected to generally be similar to coal materials. Sulfide is expected to be present in the materials at negligible concentrations, ranging from 0.009% to 0.033% with a median of 0.013%. ANC of the materials is also expected to be low with static testing results ranging from below the LoR to 5.9 kg H_2SO_4/t and a median of 2.1 kg H_2SO_4/t.

Initial pH values in drainage from YTF SOB and YMF Overburden Dump materials is expected to range from slightly acidic to near-neutral (pH 4.8 to 6.5, median 5.5). Salinity values from static testing range from 19 to 304 µS/cm, with a median of 48. Low sulfide concentrations are expected, with sulfide concentrations in tested materials ranging from below the LoR to 0.061% with a median of 0.010%. The materials are also expected to have very little ANC, with tested materials ranging from below the LoR to 8.6 kg H_2SO_4/t, with a median value below the LoR.

Materials from the YTF NOB and YEF Overburden Dumps are expected to generate acidic to slightly acidic initial drainage. Tested materials have pH values ranging from pH 2.8 to 6.0 and a median of pH 4.6. Salinity values in initial contact water are expected to be higher with static testing results ranging from 12 to 1,660 µS/cm and a median of 324 µS/cm. Sulfide concentrations in materials tested were elevated relative to other overburden materials and range from below the LoR of 0.005% to 5.16% with a median of 0.365%. As with other materials, ANC values are expected to be low with results from tested samples ranging from below the LoR to 38.4 kg H_2SO_4/t with a median of 1.65 kg H_2SO_4/t.

Overburden materials at YCM are expected to generally be NAF, with near-neutral pH values, low total sulfur concentrations and low ANC values. Exceptions are the overburden withing the YTF Northern Overburden Dump and the YEF Overburden Dump which are classified as PAF and generally have excess potential to generate additional acidity relative to the neutralising capacities of these materials and so pose an increased risk of generating acidic drainage.

2.6.7 RGS kinetic geochemical testing

The KLC assessment is summarised in a separate report provided in **Attachment B** (RGS, 2024). KLC composite samples were created based on the site location and material type of the samples (**Table 2-4**). The KLC tests were operated under both saturated and unsaturated (free leaching) conditions (**Figure 2-8**). The primary objectives of the KLC test program were to quantify the concentration and rate at which weathering products (acid, soluble salts and metals and metalloids) are leached from the solid phase materials (ash, coal and overburden) over time, under free leaching unsaturated ('wet-dry') versus saturated conditions. The columns were leached weekly for the first five leaches (to remove readily soluble weathering products) and then monthly thereafter. Filtered leachates were analysed for key parameters and metals and metalloids according to **Table 2-5** in the following sections.

Table 2-5: Summary of KLC sample materials, leach types, material sources, and material classifications

KLC ID	Material	Leach Type	Material Source	Material Classification	Number weeks operated
KLC 01	YTF Overburden	Free Leach	YTF	PAF (LC)	48
KLC 02	Weathered Coal	Free leach	YTF Batters	PAF (LC)	80
KLC 03	Overburden	Free leach	YMF Overheight	NAF	80
KLC 04	Overburden	Saturated	YMF Overheight	NAF	80
KLC 05	Weathered coal	Free leach	YEF	Uncertain	80
KLC 06	Weathered coal	Saturated	YEF	Uncertain	80
KLC 07	Fresh Coal	Free leach	YMF	PAF	48
KLC 08	Fresh Coal	Saturated	YMF	PAF	48
KLC 09	Weathered Coal	Free leach	YTF Northern Batters	Uncertain	49
KLC 10	Weathered Coal	Saturated	YTF Northern Batters	Uncertain	49
KLC 11	Weathered and Fresh Coal	Free leach	YMF Western Batters	Uncertain	49
KLC 12	Weathered and Fresh Coal	Saturated	YMF Western Batters	Uncertain	49
KLC 13	Ash	Free leach	Former Ash Ponds	NAF	56
KLC 14	Ash	Saturated	Former Ash Ponds	NAF	52
KLC 15	Ash	Free leach	Former Ash Ponds	NAF	52
KLC 16	Ash	Saturated	Former Ash Ponds	NAF	52
KLC 17	Drill Hole N7440	Free leach	YEF Overburden Dump	PAF	46
KLC 18	Drill Hole N7440	Saturated	YEF Overburden Dump	PAF	46
KLC 19	Drill Hole N7524	Free leach	YTF NOB Dump	PAF	46
KLC 20	Drill Hole N7524	Saturated	YTF NOB Dump	PAF	46
KLC 21	Drill Hole N75256	Free leach	YTF SOB Dump	Uncertain	46
KLC 22	Drill Hole N75256	Saturated	YTF SOB Dump	Uncertain	46
KLC 23	Drill Hole N7521	Free leach	YMF Overburden Dump	NAF	46
KLC 24	Drill Hole N7521	Saturated	YMF Overburden Dump	NAF	24

Table 2-6: Kinetic testing leachate analysis suite-

Analytes	Laboratory Analysis
Key parameters	pH/ EC and acidity/ alkalinity
Major Ions	Ca, K, Mg, Na, Cl, F, SO_4^{2-}
Metals/ metalloids	Al, As, B, Ba, Be, Bi, Cd, Ce, Cs, Co, Cr, Cu, Dy, Er, Eu, Gd, Ga, Hf, Ho, In, La, Li, Lu, Fe, Hg, Mn, Mo, Nd, Ni, Pr, Pb, Sb, Rb, Sm, Se, Ag, Sr, Te, Tb, Tl, Th, Tm, Ti, Sn, U, V, Yb, Y, Zn, Zr
Nutrients	Total organic carbon

Figure 2-7: Kinetic leach column (KLC) tests for YCM at RGS Laboratory.

The key findings from the KLC testing are summarised below:

- Saturated sample materials transitioned from oxidising to reducing conditions over time except for samples from the YTF Northern and SOB Dumps.
- Across all materials, initial high salinity values, major ion, and metal/metalloid concentrations and high loading rates seen in the leachates are likely due to the initial first flush of readily solubilised reaction products resulting in elevated dissolved concentrations.
- Consistent with the static geochemical testing undertaken on YCM materials (RGS, 2024), most materials are expected to generate slightly acidic to acidic drainage initially, apart from ash which is expected to generate circum-neutral to alkaline drainage.
- The pH of drainage from mine materials is expected to increase as the pit lake fills, materials become saturated, and the oxidation of materials slows or stops. With an increase in pH, leached metals and metalloids typically decrease.
- The salinity of contact water from most materials is expected to be less than that of groundwater encountered during the 2022/2023 drilling program undertaken by RGS (RGS, 2023), with major ions in solution dominated by sodium and sulfate.
- Drainage from most materials is expected to have low dissolved acidity and negligible alkalinity.
- Drainage from ash is expected to have elevated alkalinity relative to other material types.
- Drainage from YEF Overburden and YTF NOB Dump materials is likely to be notably elevated in dissolved acidity relative to drainage from other materials.
- While initial metal concentrations in drainage may be elevated relative to selected water quality guideline values, the loading rates of most metals from most materials are generally expected to decline over time and to further decrease as materials become saturated and increasingly reducing.
- Initial drainage from coal materials may contain concentrations of soluble aluminium, arsenic, and cobalt that are elevated relative to the Livestock Drinking Water guideline values; however, concentrations of these elements in solution are expected to decrease over time.

- Initial contact water from ash materials under oxidising conditions is expected to have higher selenium concentrations relative to drainage from other materials but concentrations are expected to decrease over time and under reducing conditions.
- Under oxidising conditions material from the YTF Northern and YEF Overburden Dumps are expected to generate drainage with lower pH values and increased acidity, salinity, and metal and metalloid loads (notably aluminium, cadmium, cobalt, nickel, and selenium) relative to other materials.
- Under oxidising conditions, pH values in drainage from the YTF Northern and YEF Overburden Dumps is expected to decrease over time while acidity, salinity, and metal and metalloid loading rates are expected to increase.
- The acidity, salinity, and metal loads in drainage from the YTF Northern and YEF Overburden Dumps materials is expected to decrease as the materials become saturated and the ingress of oxygen is limited.

3 Hydrogeochemical conceptual model summary

A hydrogeochemical conceptual model has been developed to inform establishment of the numerical modelling approach. A summary of the conceptual model is provided below.

3.1 Hydrological impact on pit lake(s) quality

The water quality of the pit lake(s) is a result of many factors including but not limited to geology and minerology of the host formations, surface water and groundwater quality entering the mined voids, concentrating effects of evaporation (evapoconcentration), geochemical, biological, and limnological processes with the pit lake(s) and anthropogenic impacts. The key water quality inputs to the final void/ pit lake(s) are summarised in the cross section (**Figure 3-1** and **Figure 3-2**).

The hydrology of the pit lake(s) affects the water quality of the pit lake(s) by changing the chemical mass balance associated with the pit lakes.

General statements regarding the impacts of hydrological processes on water quality can be made and these are applicable to Yallourn:

- Groundwater inflows carry dissolved constituents at background concentrations into the lakes. Natural, upgradient groundwater will have a certain water quality and will contribute to the lakes quality. Inflowing groundwater can also pick-up constituents from weathered coal immediately surrounding the mine void or from recharging meteoric water passing through the dewatered zone.
- Surface water runoff from pit walls and local catchment may transport constituents and sediments that will affect the chemistry of the lakes.
- Flood flows from the Morwell River in a connected lake scenario, will carry dissolved constituents via the three spillways.
- In pit overburden dump (and the Former Ash Ponds) seepage and runoff may carry dissolved constituents into the lakes.
- Direct precipitation generally is a diluting factor on lake water quality although Zn regularly exceeded the freshwater aquatic ecosystem (95% species protection) guideline (ANZG, 2018).
- Water transferring from lake-to-lake via the conveyor tunnel (as a result of hydraulic head differences) may have a dilution or concentrating effect on the receiving lake.
- Since evaporation removes water and leaves behind any dissolved constituents, evaporation tends to have a concentrating effect on lake water quality (known as evapoconcentration).
- Groundwater and surface water outflows (via the outflow channel) from the lake(s) typically have the effect of removing constituents from the lake(s). However, if the lake(s) is stratified, these outflows may remove water of different quality, which may result in either improved or reduced water quality in the lakes (note: outflows would only reduce the lake water quality if there was a freshwater surface lens that is flowing out).
- Depending on the water quality of the external water sources used to fill and top-up the lake(s), these may result in either improved or reduced water quality in the lake(s).

3.2 Lake – Groundwater interaction

Before mining commenced at YCM the unsaturated (vadose) zone was limited to the shallow regolith above the coal deposit (i.e. HHF). Mining lowered the standing groundwater table through dewatering thereby increasing the extent of the vadose zone, moving (generally) laterally down through the coal seam in a broad cone of depression. As the groundwater table dropped in response to dewatering air was drawn into the coal and this is likely to have led to the (partial) oxidation of the coal, including oxidation of sulfide minerals that may be present within the coal seam (i.e. at the boundary between the coal and HHF and disseminated through the coal). The extent of oxidation and weathering of coal in the cone of depression is uncertain and it is possible that the pore voids in the vadose zone may be dominated by either oxygen or nitrogen.

When the dewatering ceases and the groundwater level rebounds, the rebound could occur ahead, in equilibrium, or lag behind the pit lake(s) level. In each of these situations the soluble weathering products in the pore voids in the vadose zone may be leached out and mobilised to the pit lake or to groundwater. The vadose zone in the coal will also store a large amount of water and this is an aspect to be considered in the numerical model.

Groundwater will seep in and out of the pit lakes through permeable units exposed in the pit walls. A groundwater quality database is available for each of the aquifer systems (HHF, M1 and M2) potentially contributing groundwater flux into the final void/ pit lakes and impacting pit lake(s) water quality composition; this has been used to develop geochemical source terms for groundwater inflow.

The conceptual groundwater model extends beyond the extent of the pit shell and this is being developed by other consultants.

3.3 Surface water inflows

After closure, there will be various potential surface water inflows to the mined void, that will create two pit lakes (i.e. YEF and YTF). Each inflow will need to be accounted for within the numerical model to allow simulation and comparison of different closure scenarios. The conceptual model for the different closure scenarios identified the key surface water flows into the mined void as:

- Runoff from exposed pit walls (weathered and fresh coal, overburden).
- Runoff and seepage from the In-pit Overburden Dumps (YTF and YEF Overburden Dumps and Midfiled Dump).
- Potential runoff and seepage from coal ash facilities (i.e. the Former Ash Ponds; noting YNOC Central and Western Ash Landfills are not included with the closure catchment).
- Direct rainfall onto the mined voids/ pit lakes surface.
- Local runoff from the catchment within the mining lease (various land use types).
- Potential contribution from the external Morwell River upstream catchment for the connected scenarios.

3.4 Conveyor tunnel transfer

Once (if) the rising lake water level reaches the conveyor tunnel, transfer of water and mixing of solutes will occur between lakes. The direction of transfer will depend on the lake that first reaches the conveyor tunnel elevation. With time, lake water level equilibrium is expected to occur; however, lake water quality may always vary between lakes due to the different water inflows (volume and quality) and materials within the pits/lakes (e.g. pit wall material, overburden dumps and ash facility).

3.5 Overburden dump contact water

Sulfide rich material mainly occurs within the Township Field NOB Dump and Eastfield Dump, while the SOB Dump, Midfield Dump and Maryvale Filed is assumed to contain mainly NAF material; for this reason, the focus of this section is largely around the NOB Dump and Eastfield Dump.

Oxidation of sulfide-rich (e.g. pyrite/ marcasite (FeS_2)) materials within the NOB/ Eastfield Dumps are producing seepage water quality that is acidic and elevated in some salts and metals/ metalloids.

During operation, acidic runoff and seepage from the NOB Dump enters Lake Placid. However, the acid is likely to be neutralised by alkalinity from the Latrobe River/ Cooling Tower which is released to Lake Placid via the Station Drain. Similarly, natural bacterial processes may reduce sulfate (i.e. iron sulphide precipitation) and neutralise acid. These processes need to be captured within the numerical model.

Test pits and drillholes placed in the various overburden dumps (Earth Systems, 2011; RGS, 2023) intersected a shallow water table, which is also seen in ponds in geographical lows within the dump. This suggests that a large portion of the dumps would be saturated preventing (or limiting) the oxidation of sulfides below the water table.

Implementation of a full pit lake scenario (RL + 37 m AHD) will impact the hydrogeological processes that currently affect the overburden dumps. During rainfall events, runoff will occur from the various dumps to the pit lake. A fraction of the direct rainfall will infiltrate into and percolate through the dumps, eventually entering into the pit lake(s) as a potentially acidic or saline seep, or potentially containing elevated metals/ metalloids (depending on the dump composition). The amount of runoff versus seepage will be dependent on the closure strategy for the dumps (e.g. clay cap or cover compared to doing nothing). Mixing of dump seepage and runoff water with other pit lake water sources could result in an overall neutral pit lake water; understanding these interactions are a key objective of the numerical modelling.

Groundwater interaction may occur between the perched water table in the dumps and the underlying aquifer(s).

The following conditions would be expected in the full pit lake scenario;

- The various overburden dumps will be submerged (excluding a small portion of the SOB Dump).
- Runoff and seepage will not be the predominant hydrogeological processes affecting the pit lakes once full.
- Groundwater flow directions will be controlled by the rebounding groundwater table and managed discharge to the pits. Flow towards the mined void would be expected with aquifer rebound. If managed discharge rises the pit lake(s) water faster than the aquifer water table rebounds the flow direction may be reversed and towards the adjacent strata.
- Oxidation of sulfides predominantly within the NOB Dump/ Eastfield Dump would be constrained by water saturation and reduced oxygen availability.
- Once the pit walls and overburden dumps are submerged, diffusion will be the dominant process transferring solutes between the pit walls/overburden dumps and lake(s); however, this is expected to be very low.

3.6 Ash landfill

Potential runoff and seepage from the YNOC Central and Western Ash Landfills are not expected to enter the mined void/ pit lake(s) and will therefore not contribute to the overall pit lake(s) water quality. Coal ash deposited within the Former Ash Ponds is within the mine voids/ lake(s) catchment and will therefore generate runoff (from the sandy clay cap) and seepage while above the lake water level.

3.7 Biological processes

Biogeochemical reactions can affect pit lake water quality. Microbial processes can influence the redox conditions present in the pit lake. Concentrations of dissolved metals can be impacted by the precipitation of sulfide minerals and uptake of dissolved metals by microorganisms. Microbial processes can also be responsible for the removal of organic carbon from the pit lake water.

Biological reactions such as photosynthesis and respiration can alter the concentration of dissolved CO_2 and O_2 in the pit lake waters. Stratification in the pit lake can result in the depletion of O_2 at the base of the pit lake, which will affect any organisms present.

Studying the microbial communities in pit lakes is an important part of understanding element cycling. Element cycling occurs from chemical, geological, and biological factors. Microbes can increase chemical reaction rates and water-rock interactions by metabolising both organic and inorganic components in a system. In effect, these interactions affect the speciation of elements in an environment, which can lead to either an increase or reduction of dissolved metals in water. In mine waters, microbes can act as catalysts in redox reactions, alter mineral compositions, sequester or release toxic metals, and change net pH as a product of their metabolism.

The chemical, physical and biological processes that contribute to the production and neutralisation of acid and the presence of salts and metal(loids) particularly in anoxic and reducing water in the pit lake are extremely complex.

The interaction between biota (bacteria) and oxygen, carbon, sulfate, iron and manganese need to be understood as they have a direct effect on element cycling.

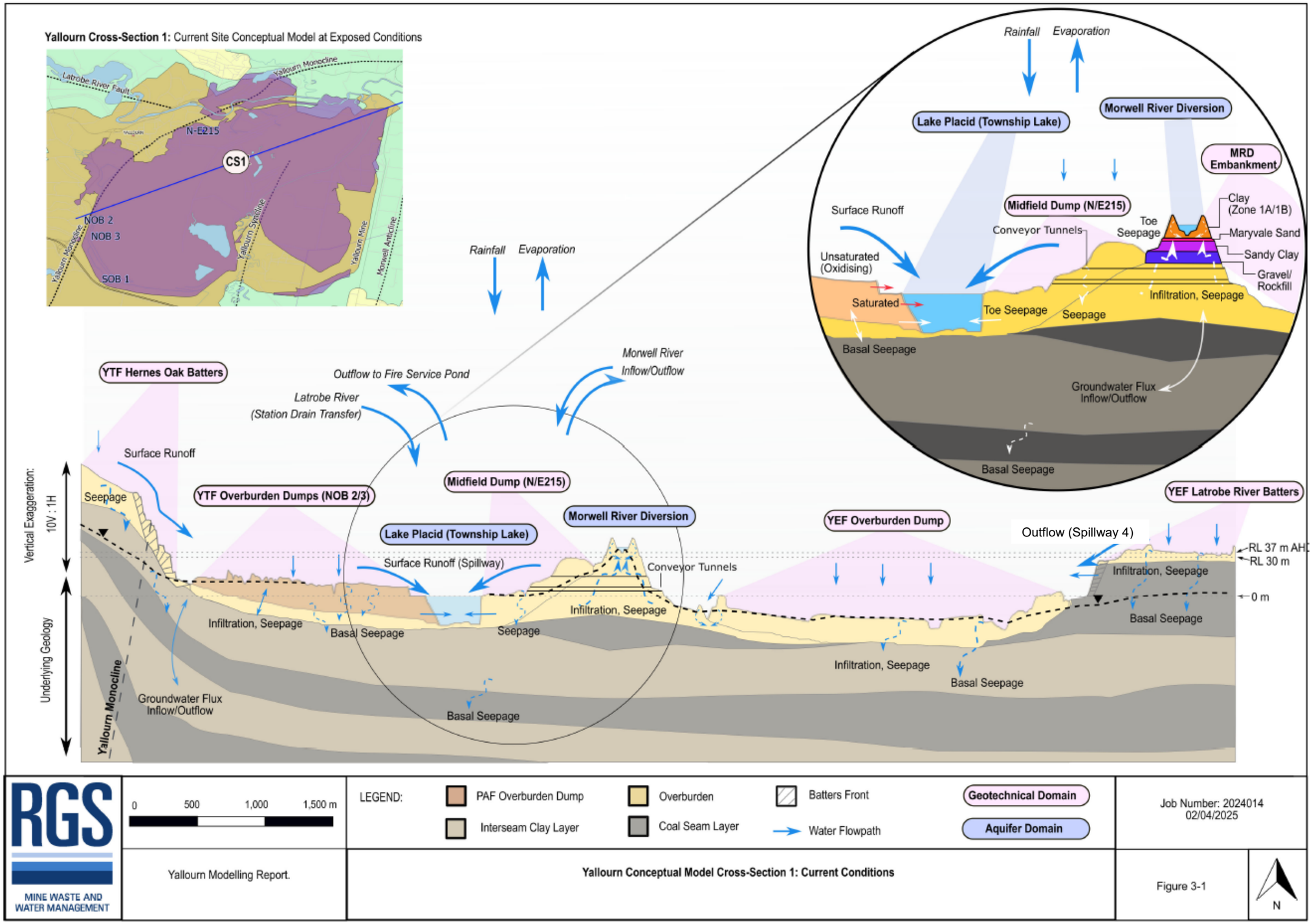

Figure 3-1: **Conceptual hydrogeology model (connected to Morwell River; prior to filling)**

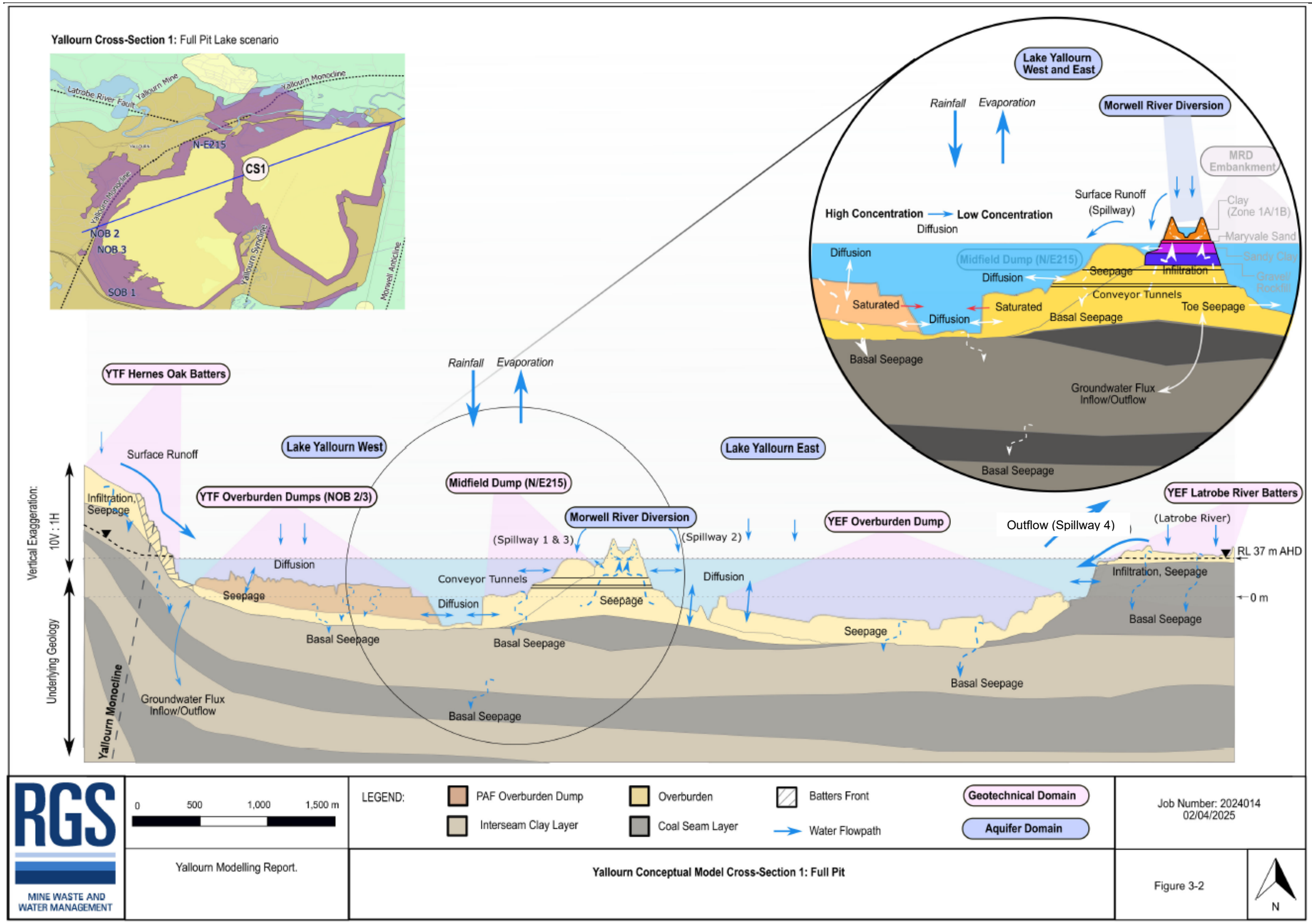

Figure 3-2: **Conceptual hydrogeology model (connected to Morwell River; full lake)**

4 Model Development

The numerical model, including the water balance and water quality components, has been developed using GoldSim Software. The model was developed as a decision support tool for assessing closure options. For this reason, it has been developed with flexibility to allow the user to run a series of different "what-if" scenarios and sensitivity analyses, by varying different inputs and model switches. The model has been developed on a daily time-step, to run probabilistic simulations for periods of up to 100 years (refer to Section 4.3).

The model development is expressed visually in **Figure 4-1**, and depicts the key components of the model, which includes the water balance and water quality. The water balance (direct rainfall, groundwater and surface water contributions to the lake) is controlled by climate (rainfall and evaporation) and external water sources. Each of the key source of water to the lake contributes a water quality (source term) derived from a combination of inferred (e.g. geochemical testing) and measured data.

The sub-sections below describe the numerical model development including input data, model structure and logic, and key assumptions and limitations.

4.1 GoldSim

GoldSim is a dynamic, probabilistic simulation software developed by GoldSim Technology Group. It is a graphical, object-orientated coding platform. This means that it is a flexible platform in which the user can program the software to represent any system (such as a mine site) within a graphical user interface. This makes it user-friendly to lay out equations, code logic and system influences, whilst reducing the risk of errors that might be otherwise hidden in spreadsheets.

GoldSim has been selected for the numerical model development as:

- It is particularly well suited for stochastic or probabilistic simulations with its Monte Carlo simulation framework.
- Its ability to run dynamic simulations of complex systems using a tailored development approach.
- Its ability to simulate both water balance and water quality (using the Contaminant Transport (CT) module).
- It is very well suited to environmental and engineering risk analysis, with applications in the areas of water resource management, mining and water quality assessments.
- Its ability to run a series of different "what-if" scenarios and sensitivity analyses in which input parameters can be varied to understand the impact to the system. This makes it a very useful decision support tool.
- Its dashboard function in which the model can be packaged with a front-end including input and results dashboard. This allows users who are not model developers to run different scenarios in the model to better understand the system and support the decision-making process.

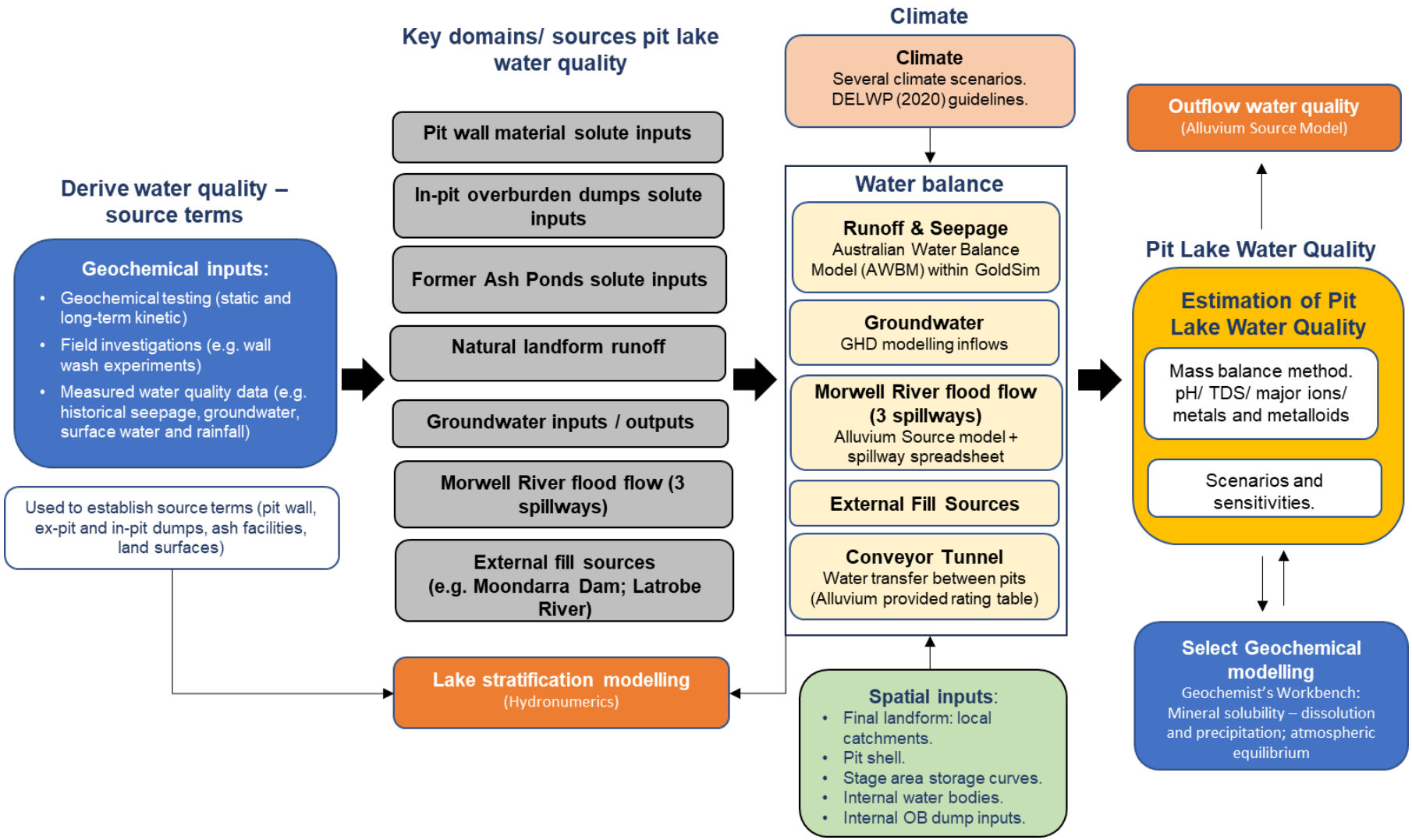

Figure 4-1: Yallourn lake(s) water balance and water quality model development

4.2 Modelling objectives

To evaluate over a 100-year period:

- Lake levels for the proposed YTF and YEF pit lakes.
- Flows between the Morwell River, the proposed pit lake(s) and the Latrobe River.
- The amount of top-up water required to maintain lake levels.
- Lake(s) water quality.
- The influence of climate change and climate variability on the above.

4.2.1 System Boundaries

Plan Boundaries

- Surface water catchments that flow to the YTF and YEF pits/ lakes.
- The MRD as it enters the mine lease.
- The MRD as it exits the mine lease.

Elevation Boundaries

- Lower: the existing surface level of internal and external catchments, plus a conceptual depth to accommodate shallow groundwater water.
- Upper: the existing surface level, or the surface water elevation of water bodies (whichever is higher).

4.2.2 Exogenous (external) influences

- Rainfall and evaporation.
- Groundwater entering the pits (both through pumping and flux).
- River flows.
- Top-up from external sources (e.g. Moondarra Reservoir).

4.2.3 Time Boundaries

From mine closure (01/01/2029) plus 100 years.

4.2.4 Assumptions

- The YEF and YTF lakes will overflow at RL 37. Overflows are unconstrained by spillway capacity and/or tailwater conditions in the MRD.
- All existing in-pit water bodies will be inundated either before or shortly after mine closure, and as such do not need to be explicitly modelled.
- Water will be transferred between YTF and YEF via conveyor tunnels, the capacities of which have been provided by Alluvium (**Section 4.7.3**).
- Witts Gully and Rifle Range Dams will remain operational, however there is currently no modelled demands on these storages (other than evaporation), so they simply overflow to YTF when full.
- The YTF and YEF lakes will be completely mixed.

4.3 Modelling scenarios

The modelling scenarios and sensitivities undertaken as part of the DMRP modelling are outlined in **Table 4-1**. The modelling includes the base case scenario (Scenario 1) and several project scenarios (Scenario 2 to 6).

All model simulations commence on 1/01/2029, with a starting water volume of 13.5 gigalitres (GL) in the YTF (i.e. water level at RL -4 m AHD which is the expected final water level of the Fire Service Pond at the end of mine operations) and a starting water volume of 1.0 GL in the YEF (i.e. water level at RL -49 m AHD m).

All scenarios include inflows from direct rainfall, local catchment rainfall runoff, natural groundwater inflow (and outflow) and pumped groundwater. Groundwater from the M1A aquifer is pumped into the YEF at an initial rate of 1.5 GL/year to a lake level of RL 0 m (i.e. up to the point when one of the pumping bores is assumed to be decommissioned and flooded), then 1 GL/year to RL 37 m AHD, and then 0 GL ongoing.

There are no other inflows assumed for the base case scenario (Scenario 1) (i.e. there is no interconnection to the MRD (Morwell River) and no ongoing top-up water to maintain lake water levels. The base case scenario assumes median climate conditions using probabilistic rainfall simulations.

The project modelling includes two 'pit fill' scenarios with the Morwell River either connected to the pit(s) in some form (Scenario 2 to 5) or not connected (Scenario 6) (**Table 4-1**). The key fill water sources, others than those mentioned above, include commercial surface water allocations of Latrobe water (24 GL/year [Scenario 2, 4, 5 and 6] or 34 GL/ year [Scenario 3]) and Moondarra Reservoir water (14 GL/year [Scenario 3]). Latrobe water is pumped into YTF while Moondarra Reservoir (Scenario 3 only) is pumped into the YEF.

The Morwell River flood flows (Scenario 2, 3 and 5) are connected via three spillways (Spillway 1 – 3) which are introduced at the start of the model start date (refer to **Section 4.5.1**). Scenario 4 assumes the entire Morwell River is connected to the lake at the completion of filling (i.e. at the completion of filling the MRD is removed forming a single lake and the Morwell River flows into the lake which then overflows to the Latrobe River via Spillway 4).

The fill approach is undertaken as a seamless fill whereby external water is pumped into the YEF until the lake is filled to RL +37 m AHD without pause; this is considered acceptable since EA will likely have access to the majority of water required for fill. After the pit is filled, the 'top-up' is triggered if the water level of the lake drops 1 m to RL +36 m AHD (due to evaporation and other losses). Top-up includes pumped Latrobe water with an assumed rate of 0.065 GL/ day, which is based on the annual fill allocation of 24 GL/year (i.e. 24/ 365).

Climate sensitivities for the preferred scenario are modelled for median (Scenario 2) and dry (Scenario 5) climate conditions using probabilistic (rainfall) simulations (refer to **Section 4.4**).

Table 4-1: Yallourn DMRP modelling scenarios-

Scenario ID	Fill Sources (annual until reach RL + 37m AHD)	Morwell River connected?	Top-up water	Climate
Scenario 1	Local catchment flows, natural groundwater & pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing).	No	No	Median
Scenario 2	Local catchment flows, natural groundwater, pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing) & 24 GL Latrobe water.	Yes (flood flows only)	Yes	Median
Scenario 3	Local catchment flows, natural groundwater, pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing), 34 GL Latrobe water & 14 GL Moondarra water.	Yes (flood flows only)	Yes	Median

Scenario ID	Fill Sources (annual until reach RL + 37m AHD)	Morwell River connected?	Top-up water	Climate
Scenario 4	Local catchment flows, natural groundwater, pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing) & 24 GL Latrobe water.	Yes (all)	Yes	Median
Scenario 5	Local catchment flows, natural groundwater, pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing) & 24 GL Latrobe water.	Yes (flood flows only)	Yes	Dry
Scenario 6	Local catchment flows, natural groundwater, pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing) & 24 GL Latrobe water.	No	Yes	Median

4.4 Assessment period

The model has been developed on a daily time-step to run for a period of 100 years, starting on 1/1/2029.

It should be noted that the longer the model simulation period, the greater the bounds of uncertainty in the modelled WB/WQ results that are likely to be observed. For example:

- the inherent uncertainty of some of the key input parameters such as climate, hydrology and chemistry. When the model run time is extended, these uncertainties are magnified.
- the uncertainty in groundwater inflows (Section 0) especially as related to changes to climate and recharge rates and possible climate induced changes to local and regional water use, as well as possible changes to demand are not currently known
- uncertainty in chemistry and reactions e.g. precipitation of materials as concentration increases which may be compounded with modelled time.
- uncertainty in micro(biological) processes.

The key uncertainties around climate change and climate variability are managed through sensitivity analysis in the model. Water quality inputs use a conservative approach.

4.5 Climate

Numerical models developed for mine water assessments are mathematical representations of complex bio-geo-hydro-physico-chemical systems and will always carry inherent uncertainty.

The primary inputs to a mine water balance are climate inputs: namely rainfall and evaporation. Climate inputs are, however, a primary source of uncertainty in a water balance model.

Changes in climate will affect the individual hydrologic components differently. Generally, surface hydrologic processes are impacted immediately upon a change in climate. Groundwater inflows are generally and ultimately generated from precipitation recharge. The groundwater system tends to buffer short-term climatic changes, but long-term climatic changes will be reflected in groundwater inflows over the long-term.

The Intergovernmental Panel on Climate Change (IPCC, 2023) indicated that there is a strong possibility that temperatures will continue to increase into the future if current conditions affecting atmospheric conditions stay constant. Increased temperatures will affect surface hydrologic processes differently in different parts of the world; some places will become wetter while others become drier, and the rate and duration of precipitation can drastically change.

For lakes, a drier climate will result in lower lake water surface elevations and a wetter climate will result in higher lake elevations and potential changes to the groundwater system can occur. Other broad

consequences to pit voids from climate change are difficult to predict as all components of the hydrologic system will be affected. Sensitivity analyses are used in the numerical model to test the effect of climatic changes on water quality and water level, surface and vadose zone water.

The primary uncertainties related to climate modelling which are included in Yallourn GoldSim WB/WQ model include:

- Climate variability
- Future climate change predictions/ assumptions

The approach implemented in the climate module of the WB/WQ model to address future climate uncertainty follows the approach recommended by Department of Environment, Land, Water and Planning (DELWP[2]) presented in "*Guidelines for Assessing the Impact of Climate Change on Water Availability in Victoria* (2020)".

4.5.1 External runoff (connected scenarios)

The lake inflows from the Morwell River were modelled by Alluvium. The models use the same 100 realisations of rainfall data supplied by RGS.

More detail provided is provided in **Section 4.7.2**.

4.5.2 Climate variability

Victoria has a highly variable climate, both spatially across the state, and over time. Climate variability is represented by fluctuations in temperature, evapotranspiration, rainfall and other climate variables on sub-daily, daily, seasonal, annual and decadal (long term) time scales. Climate variability can be chaotic or cyclical in nature.

To address uncertainty associated with climate variability, DELWP (2020) recommends an approach in which two historical reference periods are selected:

- A post-1975 historic climate reference period.
- A post-1997 historic climate reference period.

The purpose of the historic climate reference periods is to enable:

- the generation of estimates of historic climate and water availability under historic greenhouse gas concentrations; and,
- the generation of current and future climate scenarios.

These reference periods are simply the historic climate records over the period July 1975 (and/or July 1997) to end of June of the most recent year of available data. The most recent year of available data should ideally extend to the current year.

The post-1975 historic climate reference period incorporates ~49 years of climate variability. Global Climate Models (GCM) derived projections can be applied to the post-1975 historic climate reference period to represent future climate change scenarios.

The DELWP rationale for selecting the post-1975 historic climate reference period is:

[2] Department of Environment, Land, Water and Planning (DELWP) is now known as Department of Energy, Environment and Climate Action (DEECA).

- It incorporates a wide range of natural climate variability, including the 'Millennium Drought', the 1982–83 drought and several relatively wet years.
- It is long enough to reasonably apply data extension techniques, such as historical data scaling or stochastic data generation, that can incorporate greater natural climate variability.
- It aligns with the reference periods adopted by the Commonwealth Scientific and Industrial Research Organisation (CSIRO) 'climate futures' (e.g. Clarke et al., 2011) when estimating the projected changes in temperature, rainfall, potential evaporation and runoff from global climate models.
- The start date is broadly consistent with observed step changes in climate behaviour in the 1970s, particularly temperature, noting, however, that statistically significant step changes have also been detected in the late 1990s.
- It is consistent with recent research by the Bureau of Meteorology (BoM) that has used GCMs to assess the relative contribution of anthropogenic climate change to Victoria's observed cool season rainfall decline since the late 1990s.

The post-1997 historic climate reference period, assumes that the dry conditions experienced since 1997 represent a permanent step-change in climate from that experienced prior to 1997. It allows for the possibility that a step change in climate has already occurred in 1997.

It is therefore arguable whether a historic record spanning 20–25 years (in the case of a post-1997 historic climate reference period) or 45–50 years (in the case of a post-1975 historic climate reference period) contain sufficient climate variability to reasonably assess water availability under a representative range of wet, dry and average conditions. One of the techniques recommended by DELWP to enable the extension of the historic climate reference period to incorporate more climate variability than observed over that period is stochastic data generation.

Stochastic data used in modelling water systems are random numbers that are generated in a way so that they have the same statistical characteristics (in terms of mean, variance, skew, long-term persistency, etc.) as the reference period data on which they are based. Using historical climate data as inputs into hydrological models, provides results that are based on only one realisation of the past climate. Stochastic climate data provide alternative realisations that are equally likely to occur and can therefore be used as inputs into hydrological and ecological models to quantify uncertainty in environmental systems associated with climate variability (Srikanthan et al., 2007).

For the generation of stochastic data consistent with DELWP climate change guidelines, stochastic data generation can be undertaken directly on the post-1997 and post-1975 historic climate reference periods.

When generating stochastic data for use with GCM-based projections, the adjustment of that data for projected peak (if applicable) and average annual historical climate change from 1995 to date can be undertaken either before or after generating the stochastic data. However, due to the level of effort in generating and checking stochastic data, the guidelines suggest that the stochastic data be generated only once (using the post-1975 historic climate reference period). The adjustment for projected historic low, medium and high climate change from 1995 to date can then be applied to the stochastic dataset.

There are at least three tools that are readily available to Australian practitioners for generating stochastic climate data: Stochastic Climate Library (SCL), foreSIGHT and MSSSCAR (in WATHNET5). Within each of these tools, there are several options that are available to generate stochastic data for a system.

SCL has been used by RGS to generate daily stochastic realisations of climate variables.

SCL software was first released in 2005, with a number of updates over the years. SCL was originally produced by the Cooperative Research Centre for Catchment Hydrology and is still available via the eWater toolkit. It contains the following options for stochastic models:

- Annual rainfall — first order autoregressive model with parameter uncertainty.
- Monthly rainfall — modified method of fragments (with annual data generated using the above annual rainfall model).
- Daily rainfall — transition probability matrix (with Boughton's correction).
- Sub-daily rainfall — DRIP model (short to long time scale generator).
- Annual climate — first order autoregressive multivariate model.
- Monthly climate — modified method of fragments.
- Daily climate — first order autoregressive multivariate model conditioned on rainfall state and nested in monthly and annual models.
- Multi-site daily rainfall — multi-site two-part model nested in monthly and annual models.

Full descriptions for each of these models are provided in Srikanthan *et al*. (2007) and the references therein.

The SCL user interface contains tools that allow the user to calibrate a stochastic data generation model and then to generate stochastic replicates. The SCL user interface contains features that allow the key statistics from the underlying (historical) data to be readily compared against the generated replicates, which is a particularly useful feature during model calibration. The multi-site daily rainfall (long to short time scale) generator from SCL has also been implemented in eWater Source (Srikanthan *et al*. (2007)).

4.5.3 Climate change

An example of the uncertainty that is related to climate science includes the future of anthropogenic greenhouse gas and aerosol emissions (and hence their resultant radiative forcing) that is known to be highly uncertain, encompassing substantial unknowns in population and economic growth, technological developments and transfer, and political and social changes.

The climate modelling community has developed Representative Concentration Pathways (RCPs[3]) to explore credible future options. These scenarios span the range of plausible global warming scenarios.

[3] The RCPs represent a wider set of futures that the previous emissions scenarios used by climate modelling community (Special Report on Emissions scenarios (SRES); IPCC, 2000), and now explicitly include the effect of mitigation strategies. As with SRES, no particular scenario is deemed more likely than the others, however, some require major and rapid change to emissions to be achieved.

There are four RCPS:

RCP8.5 - a future with little curbing of emissions, with a CO_2 concentration continuing to rapidly rise, reaching 940 ppm by year 2100.

RCP6.0 – lower emissions, achieved by application of some mitigation strategies and technologies. CO_2 concentration rising less rapidly (than RCP8.5), but still reaching 660 ppm by year 2100 and total radiative forcing stabilising shortly after year 2100.

RCP4.5 - CO_2 concentrations are slightly above those of RCP6.0 until after mid-century, but emissions peak earlier (around year 2040), and the CO_2 concentration reaches 540 ppm by year 2100.

RCP2.6 - the most ambitious mitigation scenario, with emissions peaking early in the century (around year 2020), then rapidly declining. Such a pathway would require early participation from all emitters, including developing countries, as well as the

They provide a range of options for the world's governments and other institutions for decision making (**Figure 4-2**).

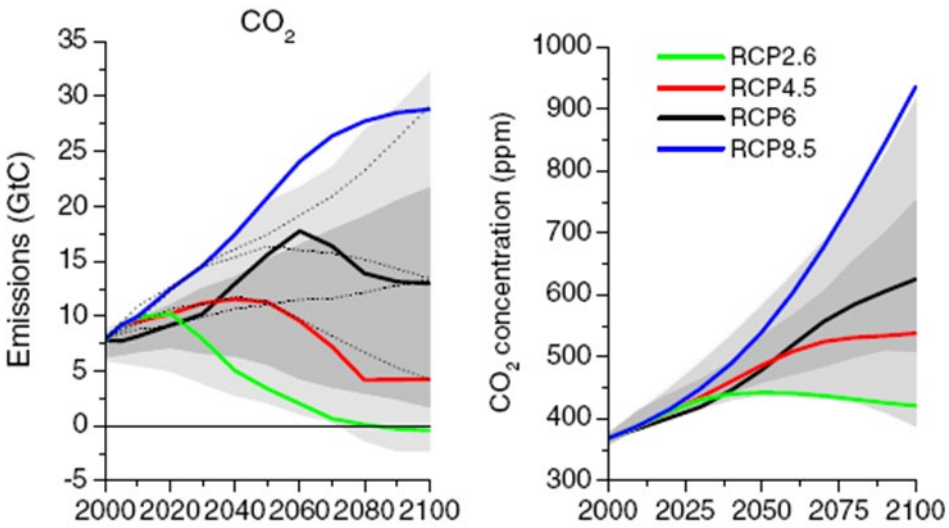

Figure 4-2: Emissions of CO_2 across the RCPs (left), and trends in concentrations of carbon dioxide (right). Grey area indicates the 98th and 90th percentiles (light/dark grey) of the values from the literature. The dotted lines indicate four of the SRES marker scenarios. SOURCE: van Vuuren *et. al*. (2011).

The RCP8.5 scenario is a high emissions scenario that is recommended for water planning applications in Victoria. The RCP8.5 scenario spans a wide range of plausible futures and is consistent with a precautionary approach for water supply impact assessment, which is appropriate in the context of GCM uncertainty and uncertainty around future greenhouse gas emissions and concentrations.
DELWP guidelines recommend the use of the following four climate change scenarios to represent system behaviour under plausible future conditions:

- Low, medium and high climate change scenarios, which are projected from the post-1975 historic climate reference period (with projected changes commencing from 1995). These scenarios make use of climate change projections derived from GCMs.
- Post-1997 step climate change scenario, which is projected as a continuation of the post-1997 historic climate reference period. This scenario is derived independent of global climate modelling. It assumes a continuation of climate and runoff experienced from July 1997 to date.

The guidelines assume that all scenarios are equally plausible. No scenario is recommended in preference to another.

The approach adopted by CSIRO for the guidelines, assumes the 10th, 50th and 90th percentile model outputs as being representative of the range of climate change that could be expected. This provides a wide spread of model results but excludes outlying model results from the wettest (or coolest) and driest (or hottest) 10% of projections.

application of technologies for actively removing carbon dioxide from the atmosphere. The CO_2 concentration reaches 440 ppm by year 2040 then slowly declines to 420 ppm by year 2100).

It should be noted that there is a tendency to interpret the medium projection as the most likely projection. The medium projection is not the most likely projection, because at the current time, all projections are equally likely. As more information is collected on the global climate response to greenhouse gas emissions over time, it is possible that either the driest projection could be the most likely, or the wettest projection, or any projection in between.

The process for estimating climate under projected low, medium and high climate change involves applying GCM-derived factors to the post-1975 historic climate reference period. Tabulated factors for average annual change in rainfall and potential evapotranspiration for the Latrobe catchment are presented below in **Table 4-2** and **Table 4-3**, respectively.

Table 4-2: Projected change in average annual rainfall (DELWP, 2020)-

River Basin	Projection	Rainfall change relative to 1995 (%)		
		Year 2020	Year 2040	Year 2065
		RCP8.5	RCP8.5	RCP8.5
Latrobe	Low (Wet)	1.80%	3.30%	2.20%
	Medium	-2.20%	-4.00%	-4.50%
	High (Dry)	-6.30%	-11.40%	-16.70%

Table 4-3: Projected change in average annual evaporation (DELWP, 2020)-

River Basin	Projection	Evapotranspiration change relative to 1995 (%)		
		Year 2020	Year 2040	Year 2065
		RCP8.5	RCP8.5	RCP8.5
Latrobe	Low (Wet)	1.40%	2.50%	4.80%
	Medium	2.50%	4.50%	7.60%
	High (Dry)	3.20%	5.80%	11.30%

The post-1997 step climate change scenario is projected from the post-1997 historic climate reference period, but without the use of GCM-derived projections. It assumes that the climate and streamflow experienced post-1997 will continue into the future. This scenario is especially important for near-term applications but is also relevant for long-term planning until such time as the high climate change scenario becomes drier than observed post-1997 conditions. This scenario assumes that:

- Projected climate change has already occurred as a step change in 1997;
- No further climate change has occurred from 1997 to date; and,
- No further climate change will occur into the future.

4.5.4 Climate approach

The climate simulated in the numerical WB/WQ model includes rainfall, evaporation and evapotranspiration. The base climate for the model is derived from *Scientific Information for Land Owners* (SILO) point interpolated data for the location of the Yallourn Township Field (geographic reference: -38.20, 146.35). The SILO data available for the location included daily historic rainfall, evaporation and evapotranspiration data.

Two types of climate data were selected from the available historical record (Base, being the post-1975 reference period, and Drought[4], being the post-1997 reference period, climate types; **Figure 4-3)**. These two types were used to generate stochastic realisations of 100-year long climate records for rainfall and evaporation. Base Climate realisations were then be modified by climate change factors to generate three climate scenarios.

Note: only the Median and Dry climate scenarios were used for the DMRP model runs.

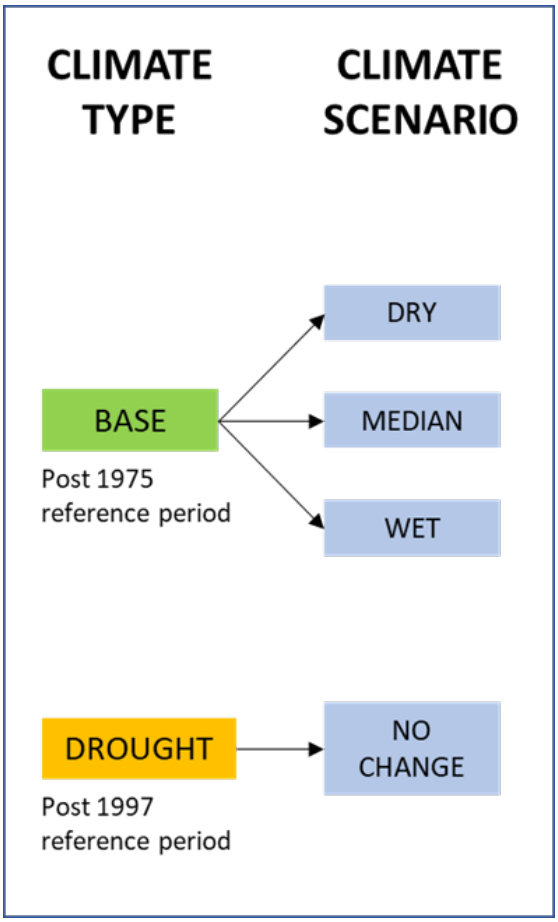

Figure 4-3: Proposed approach to generate climate database

4.5.4.1 *Evaporation*

Two different sets of modelled evaporation datasets are used in the model:

- Morton's Shallow Lake Evaporation (Morton, 1983) is used in the model to represent the evaporation loss from the lake surface. The shallow lake dataset is calculated using Morton's method which converts observed pan evaporation to the evaporation that would likely be observed on a larger body of water. This evaporation dataset will be used to simulate evaporation losses from the lake surface.

[4] Note: Post 1997 step climate scenarios is less conservative than the high (dry) scenario. The scenario is incorporated in the modelling to remain consistent with DELWP (2020) Guidelines.

1. Morton's Actual Evapotranspiration (Mact) represents the combined loss of water from a given catchment area, by evaporation from the soil surface and by transpiration from plants. The Mact dataset provided in the SILO data is calculated using Morton's method (Morton, 1983) and is an input to the hydrological modelling (Australian Water Balance Model; AWBM), to calculate surface runoff to the pit.

4.5.4.2 *Rainfall*

The base and drought climate datasets (rainfall and evaporation) are based on SILO point data from the location of -38.20 and 146.35 for the prescribed period from 1 Jan 1975 to 31 Dec 2023.

Figure 4-5 shows the average monthly rainfall totals for the base climate type. The average long-term annual rainfall is 754 mm, with the highest rainfall occurring in winter and spring.

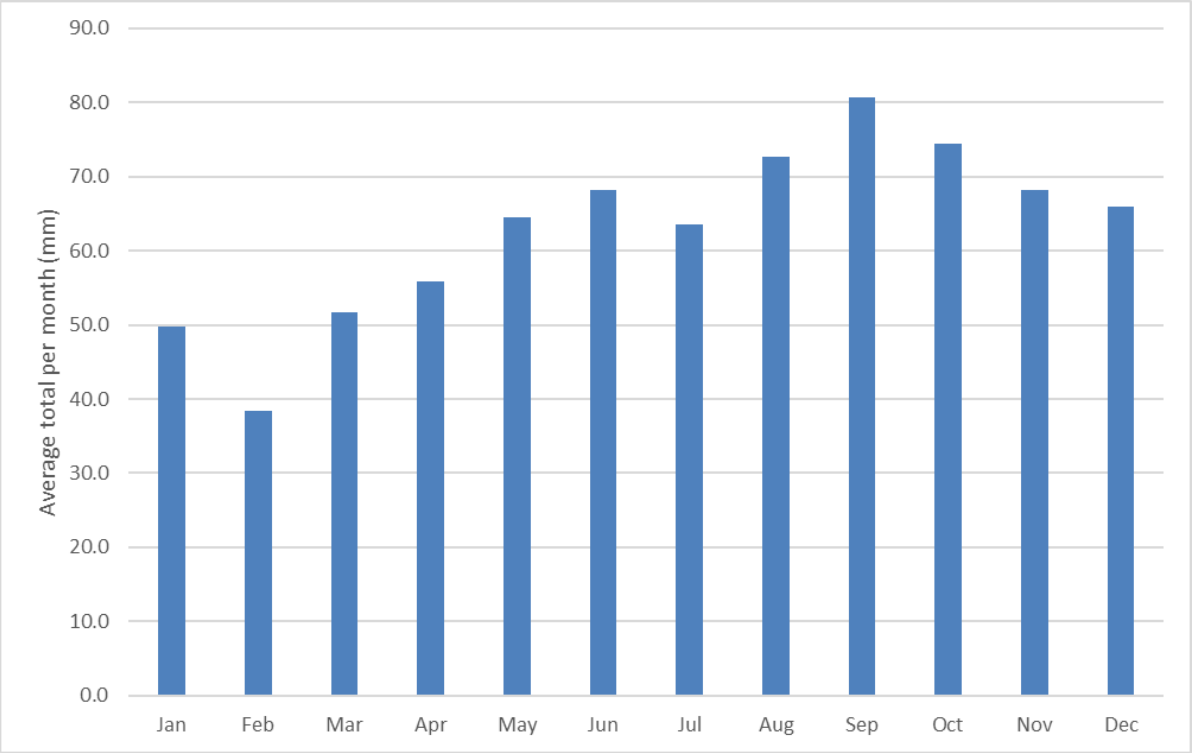

Figure 4-4: Average monthly rainfall totals (base climate: 1 Jan 1975 to 31 Dec 2023)

4.5.4.3 *Probabilistic (stochastic) rainfall*

Each probabilistic dataset was generated using the eWater Stochastic Climate Library Software (SCL), applying the ~49-year daily deterministic sequence as the base climate. Each generated stochastic rainfall dataset is different than the scenario it is based on, but the mean from all generated realisations (100 random realisations, each 100 years long) will have the same statistics as the input dataset. Many of the 100 stochastic rainfall sequences will contain both rainfall events which exceed those experienced in the historical record, and drought periods more extreme than previously experienced. This allows the model to simulate how the pit water balance and water quality may respond to uncertainty in future climate variability.

4.5.4.4 *Validation of stochastic rainfall data*

Validation of the stochastic rainfall model was undertaken according to Srikanthan and McMahon (2003). The stochastic model validation evaluates how well the generated data preserves key statistics of the measured (interpolated) data (i.e. minimum 2-year, 3-year, 5-year, 7-year and 10-year sums; as well as the mean, variation, skew and auto-correlation) by comparing generated climate statistics to a set of tolerance limits (**Table 4-4)**. The number of average annual parameters from all replicates that are within the tolerance limit is counted according to:

1. *N1 (N2)* is the number of basic model parameters (mean, standard deviation, skewness, lag 1 autocorrelation) that are within Tolerance Limit 1 (Tolerance Limit 2).

2. *M1 (M2)* is the number of the remaining eight validation statistics that are within Tolerance Limit 1 (Tolerance Limit 2).

If $N1 = 4$ and $M1 \geq 6$ then the stochastic data is considered a 'good' fit. If $N2 = 4$ and $M2 \geq 6$ then the generated data is considered a 'fair' fit. Alternatively, the stochastically generated data is considered a 'poor' fit.

The results of the validation for the generated stochastic rainfall are provided in **Table 4-5**. The validation results indicate that the stochastic model is performing satisfactorily, with the model ranking as 'fair'.

Table 4-4: Tolerance Limits for differences in key statistics (from Srikanthan and McMahon (2003))

	Parameter	Tolerance Limit 1	Tolerance Limit 2
1	Annual mean (%)	5	10
2	Annual standard deviation (%)	5	10
3	Annual coefficient of skewness	0.5	1
4	Annual lag 1 autocorrelation coefficient	0.15	0.25
5	Annual maximum (%)	10	25
6	Annual minimum (%)	10	25
7	Annual adjusted range (%)	10	25
8	Min 2-yr rainfall sum (%)	10	25
9	Min 3-yr rainfall sum (%)	10	25
10	Min 5-yr rainfall sum (%)	10	25
11	Min 7-yr rainfall sum (%)	10	25
12	Min 10-yr rainfall sum (%)	10	25

Table 4-5: Stochastic model assessment (based on Srikanthan and McMahon (2003)) for stochastic rainfall

Parameter	Historical Rainfall	Generated 100 Realisations	Error	Tolerance Limit 1	Tolerance Limit 2
Annual mean (%)	754.271	754.271	0.00%	1	1
Annual standard	119.324	119.324	0.00%	1	1
Annual coefficient of	-0.095	0.25	0.35	1	1
Annual lag 1	0.212	-0.009	-0.22	0	1
Annual minimum (%)	1.366	1.388	1.61%	1	1
Annual maximum (%)	0.628	0.678	7.96%	1	1
Annual adjusted range	1.665	1.204	-27.69%	0	0
Min 2-yr rainfall sum (%)	1.507	1.527	1.33%	1	1
Min 3-yr rainfall sum (%)	2.469	2.444	-1.01%	1	1
Min 5-yr rainfall sum (%)	4.271	4.321	1.17%	1	1
Min 7-yr rainfall sum (%)	6.14	6.249	1.78%	1	1

Parameter	Historical Rainfall	Generated 100 Realisations	Error	Tolerance Limit 1	Tolerance Limit 2
Min 10-yr rainfall sum	8.781	9.178	4.52%	1	1

4.5.4.5 *Evaporation*

Variability of evaporation is significantly less than variability of rainfall (**Table 4-6**). RGS are thus using average daily (per month) evaporation rate based on historical data for pit lake water quality modelling. The values reported below are "base" values that are subsequently adjusted for climate change.

Table 4-6: Evaporation – average daily per month

Month	Evaporation (Lake Surface)[1]	Actual Evaporation (Catchment)[2]
Jan	5.5	4.3
Feb	4.8	3.5
Mar	3.4	2.3
Apr	2	1.2
May	1.1	0.7
Jun	0.7	0.6
Jul	0.8	0.6
Aug	1.4	1.1
Sep	2.4	2.1
Oct	3.5	3.2
Nov	4.5	4.0
Dec	5.3	4.4

Notes

2. Mortons shallow lake evaporation (BoM)
3. Mortons actual evaporation (BoM)

4.5.4.6 *Application of DELWP climate factors*

The order of applying the DELWP climate factors post stochastic rainfall generation is necessary to preserve the projected climate change trends. The SCL works by decomposing the historical rainfall data to generate rainfall statistics (annual, monthly etc.) and then regenerating new, random rainfall records which honour the historical rainfall statistics. In the process, the long-term trends are "bundled" into the overall statistics and are lost from the new generated probabilistic sequences. By applying the climate factors post-rainfall (evapotranspiration) generation process, the forecasted trends in climate change are preserved. As per DELWP guidelines, the factors are applied to the base climate type only, starting from 1995.

The DELWP climate factors have been provided for a period of up to year 2065. To run the model for the proposed 100 years, the additional ~67 years of predicted climate factors are necessary, which are not available at this stage. The DELWP guidelines do however specify that climate factors can be linearly extrapolated from 2040 to 2065 up to the year 2075, leaving ~57 years without climate factors.

The simplest solution to provide the required climate factors is linearly extended the existing factors for the remainder of simulated 100 years forecast (**Figure 4-6** – dotted lines). RGS recognise that straight line extension to the existing climate factor trends, particularly the dry climate scenario, may provide an overly conservative estimate. An alternative approach to extending the DELWP climate factors is re-

applying the last provided climate factor in the dataset forward for the remainder of simulated 100 years forecast.

For the purpose of the DMRP WB/WQ modelling, RGS has used a combination of both solutions; to linearly extrapolate from 2040 to 2065 up to the year 2075 (according to DELWP guidelines), and then re-apply the climate factor for 2075 forward for the remainder of simulated 100 years forecast (**Figure 4-7**).

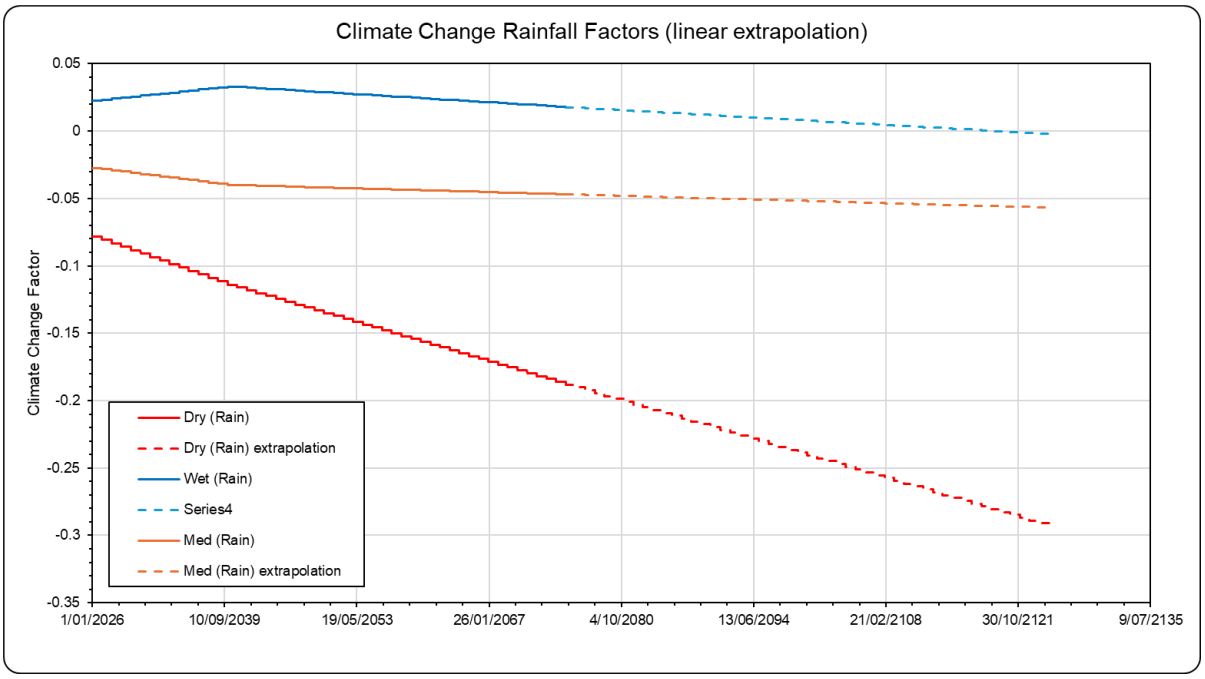

Figure 4-5: Linear extrapolation of DELWP rainfall climate factors.

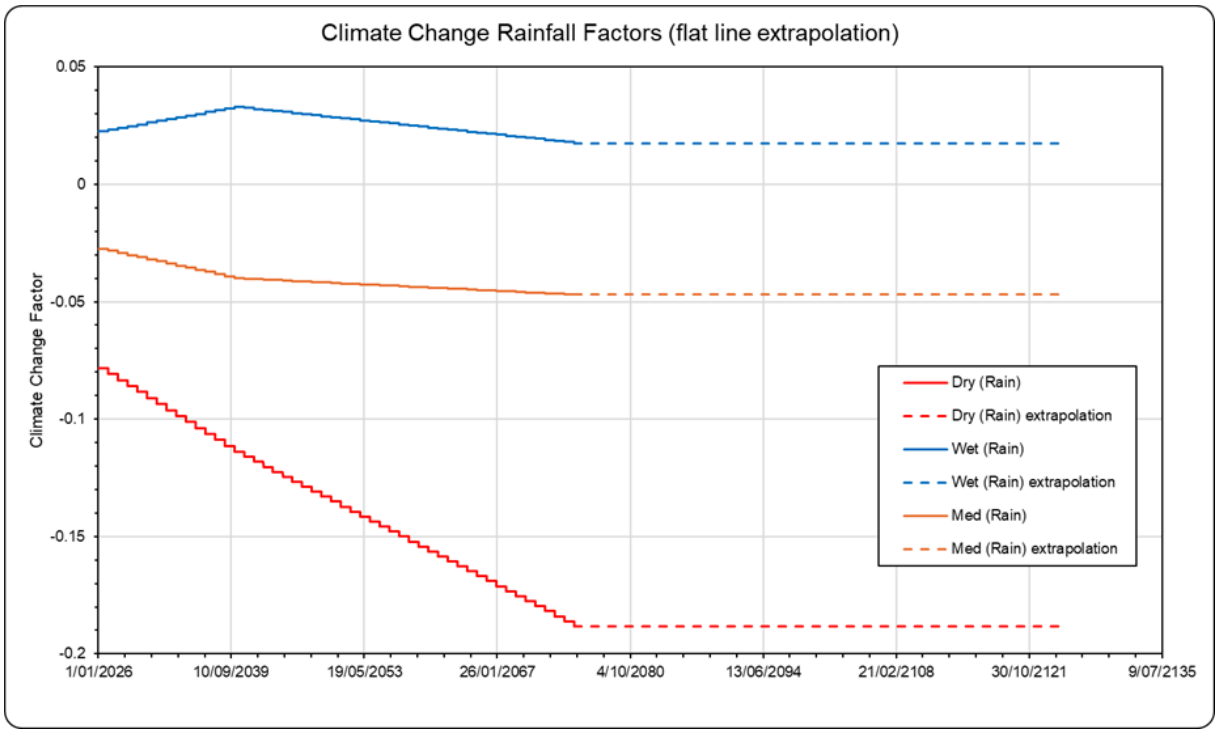

Figure 4-6: Extension of LVRRS rainfall climate factors using last LVRRS value.

4.5.4.7 *Summary of climate approach*

Table 4-7 summarises the proposed approach to climate change modelling in the Yallourn lake WB/WQ model.

Table 4-7: Approach to generating climate data sets for modelling-

Climate Type	Climate Variability	Climate Scenario (Climate Change)
Base Climate Point Climate Data -38.20 146.35 (SILO data) Use data available for years 1975 – 2022	100 stochastic realisations, 100-years long each, using Stochastic Climate Library	High (dry): Modify the realisations using high climate change factors applied after probabilistic sequences generation
		Medium (Median): Modify the realisations using medium climate change factors applied after probabilistic sequences generation
		Low (wet): Modify the realisations using low climate change factors applied after probabilistic sequences generation
Drought Point Climate Data -38.20 146.35 (SILO data) Use data available for years 1997 – 2022	100 stochastic realisations, 100-years long each, using Stochastic Climate Library	No modifications. Use as is.

4.6 Final landform modelling

The “final” landform surface of the pit voids and surrounding catchment area was provided by EA in .dxf format in June, 2022 (**Figure 4-8**).

The final landform surfaces were used in Deswik (geospatial and CAD software) to produce a range of input data to the GoldSim numerical model, including: pit physical characteristics and stage curves and catchment areas. These inputs are described in the sections below.

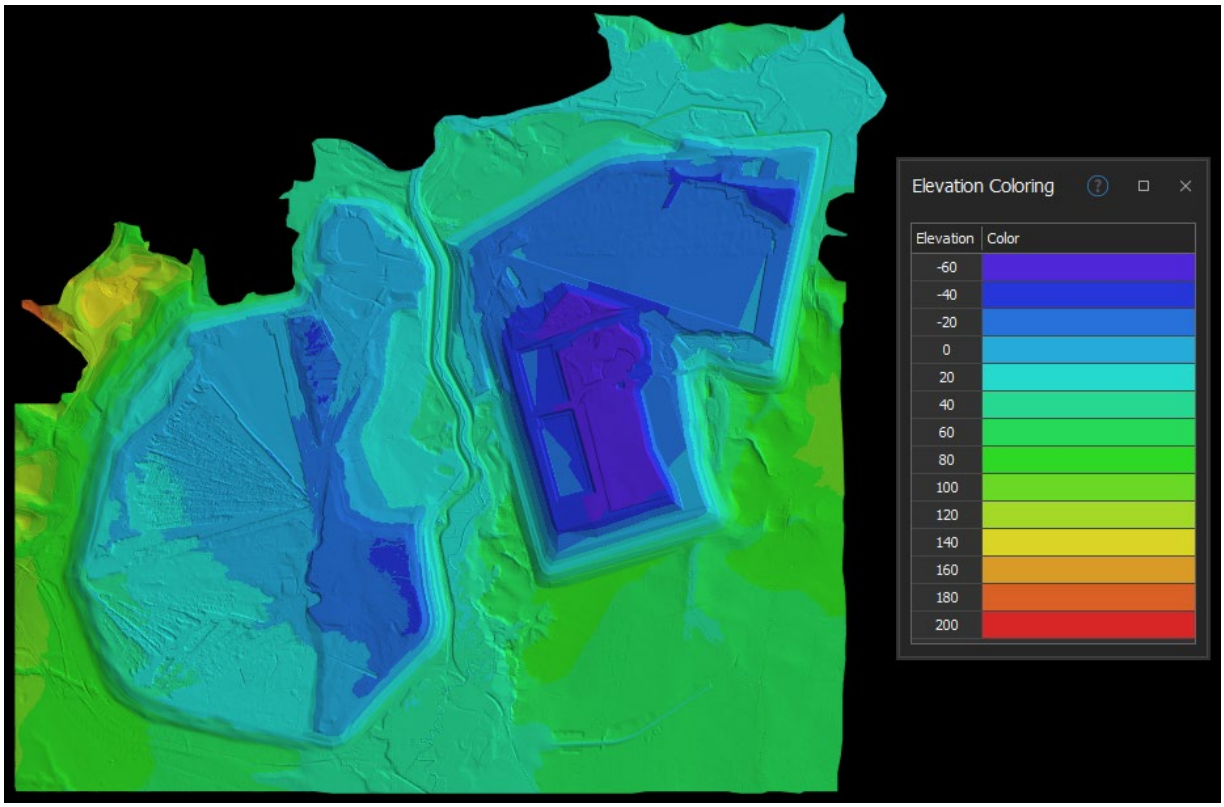

Figure 4-7: Final landform surface for YCM and surrounds

4.6.1 Pit physical characteristics

The numerical model incorporates input data to describe the pit voids geometry and its final landform.

A summary of the pit(s) geometry inputs is provided in **Table 4-8**.

Table 4-8: **Pit Void Geometry Summary-**

Pit Geometry Dataset	Description	Value
Pit maximum elevation	The elevation at which the pits are considered as “full”. At this elevation, external pit fill sources will be switched off in the model. The pits will not require top-up at or above this elevation	RL +37 m
Pit maximum volume	Volume corresponding to the pit(s) maximum elevation. This is the volume at which the pits are considered as “full”. At this volume, fill sources are switched off in the model and the pit does not require any top-up.	YTF: 249,278 ML YEF: 414,255 ML
Pit freeboard elevation	The elevation at which the pit would spill/ overflow or flow through to the Latrobe River.	RL +37 m

Details of each of the pit void geometry inputs which is incorporated in the model, and their application in the water balance is provided in **Table 4-9**. Each of these geometries was extracted from the final landform surface in Deswik at 1 m intervals.

Table 4-9: **Geometry data and application to water balance in pit water body model-**

No.	Pit Geometry Dataset	Application in Water Balance
1	Storage volume vs water surface area curves	Relates the pit water volume to the pit water surface area at each timestep for each pit. This is used to calculate the evaporation volume loss from and direct rainfall volume into the lakes. In this dataset the pit volume includes the water storage volume within the overburden and ash (assumed porosity of 30% and 40% for coal/ overburden and ash, respectively).
2	Elevation vs volume curves	Relates the pit water volume to the pit water surface elevation at each timestep. Essentially a lookup table which returns the volume for a given elevation for each pit. This is used to calculate the pit water elevation at each timestep as the pits fill. In this dataset the pit volume includes the water storage volume within the overburden and ash (assumed porosity of 30% and 40% for coal/ overburden and ash, respectively).
3	Volume vs Elevation curves	This is the same as the Elevation volume curves but simply in the opposite order. As such, it provides a lookup table to return pit water surface elevation for a given water volume.
4	Elevation vs pit wall area curves	Relates the pit elevation to the pit wall surface area at each timestep. This dataset considers the pit wall surface area which is overburden material only. It should be noted that this curve is different to the volume vs water surface area curve (Item 1) in that the water surface area is the 2-dimensional area measured in plan view of the pit, for each elevation, that would contribute to rainfall & evaporation loss. In contrast, the pit wall area at each elevation is measured as a 3-dimensional surface area, taking into account the vertical pit wall areas which would contribute a chemical load. This is used to calculate the chemical load coming from the exposed pit wall surface area during rain events (runoff/baseflow), and also the submerged pit wall area contributing a diffusive flux (i.e. once the pit walls (and overburden dumps) are submerged, they contribute a chemical load to the lake via diffusion).
5	In pit water elevation vs exposed overburden volume curve	Relates the pit water elevation (calculated from the above elevation vs volume curve) to the exposed overburden volume at each timestep. This is also used to calculate the submerged overburden volume at each timestep.
6	In pit water elevation vs exposed overburden area curve	Relates the pit water elevation (calculated from the above elevation vs volume curve) to the exposed overburden area at each timestep. This is also used to calculate the submerged overburden area at each timestep. This is then used to calculate the contributing surface water runoff from the exposed overburden and subsequently attribute exposed geochemistry source terms to this contributing inflow. Similarly, the inverse is used to determine the submerged surface area contributing to diffusion.

4.6.2 Catchments

The local catchment area draining to the pit was provided by Pells Sullivan Meynink: Geotechnical & Engineering Services (PSM) (**Figure 4-9**).

The catchments were then subdivided based on land use type by identifying different landform features to represent different land types. Separation of sub-catchments based on land use type was important in the model construction for two reasons:

- To align with the geochemistry and source term data. Different catchments were assigned with different source terms in the model and therefore must be separated. Note: the geochemical source terms for each of the catchments within the pit are different, however, the ex-pit catchments all carry the same natural runoff source term.
- Different land use types have different hydrology behaviour and different runoff volumes will be expected.

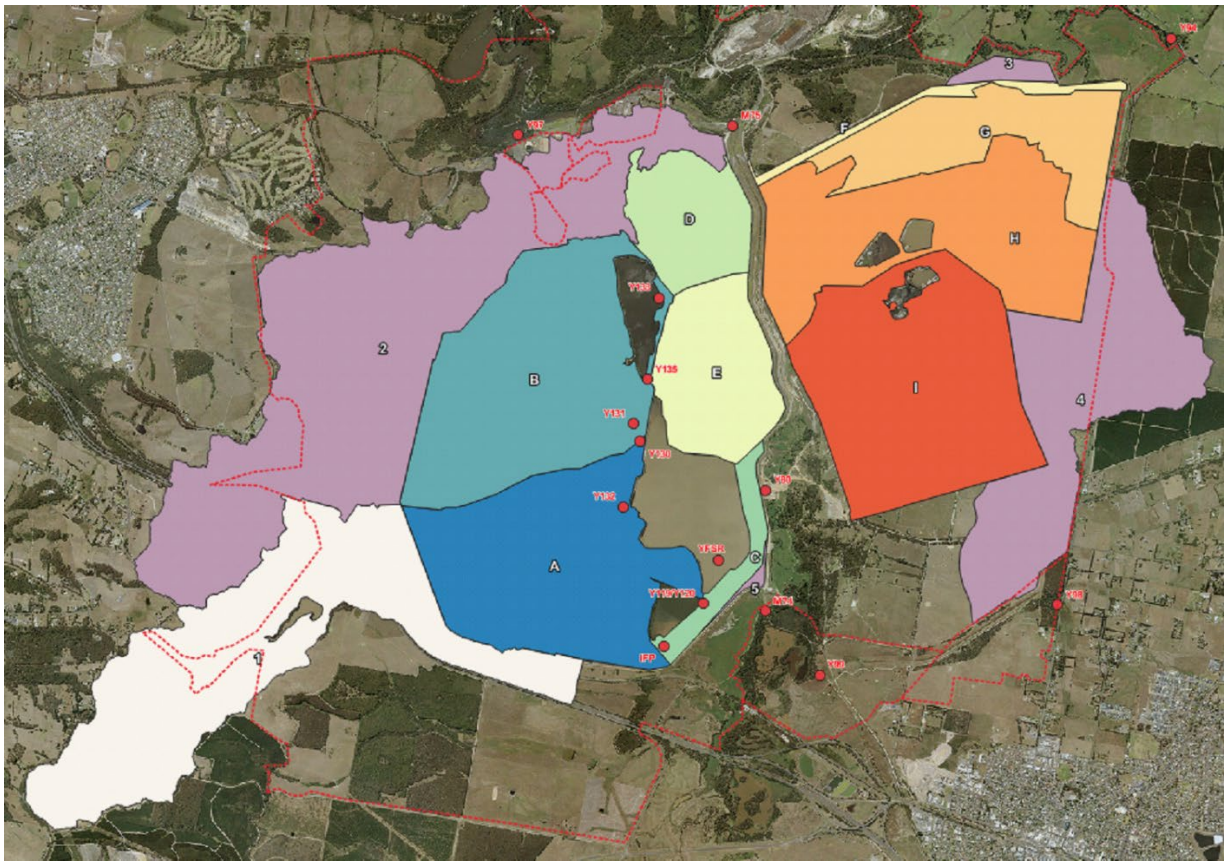

Figure 4-8: **Sub-catchment boundaries draining to pit.**

The different land use types assigned to a particular catchment and the rationale used to categorise each area is provided in **Table 4-10**.

Table 4-10: Sub Catchment Area Descriptions-

Land Use Type	Assigned Catchment	Description
Overburden	A, B, C, D, E, F, G, H, I.	Comprising the internal pit areas (pit floor and walls, up to the top of the batters), noting the majority of the pit floor is/ will be covered with overburden (bare spoil).
Natural undisturbed area	1, 2, 3, 4, 5.	Any area that remains in it's natural, pre-mining project state and has not been disturbed by the pit or overburden areas. This includes all ex-pit catchments.

Table 4-11 summarises the sub-catchments and their areas determined using Deswik.CAD.

Table 4-11: Sub-catchment Areas

Sub-catchment	Area (km^2)
Catchment 1: Witts Gully	5.1
Catchment 2: Railway Drain, Rife Range Gully and Power Station	7.6
Catchment 3: North of YEF Northern Batters	0.2
Catchment 4: Hancock Victorian Plantations (HVP)/ Maryvale Transfer	3.7
Catchment 5: Above YTF MRD Batters	0.04
Catchment A: YTF Southern Overburden Dump	3.7
Catchment B: YTF Northern Overburden Dump	4.1
Catchment C: YTF MRD Batters	0.4
Catchment D: Midfield North	1.2
Catchment E: Midfield South	1.6
Catchment F: YEF North Batters	0.3
Catchment G: East Field	1.9
Catchment H: YEF Extension	3.4
Catchment I: Maryvale Field	4.1
Total	**37.4**

Catchments 1 and 2 contain water storage (Witts Gully Dam and Rifle Range Dam, respectively). From topographical assessment, the model allocates a proportion of catchment runoff to these water storages, with the balance reporting directly to YTF. The model routes flow through these storages with overflows also reporting to YTF. The allocated splits are:

- Catchment 1: 70% to Witts Gully Dam, 30% to YTF
- Catchment 2: 20% to Rifle Range Dam, 80% to YTF

4.7 Surface Water

After closure, there will be various potential surface water inflows to the pit voids from the catchments as described in **Section 4.6.2** and each of these has been accounted for within the model to allow simulation and comparison of different closure scenarios. This section describes the approach to the surface water and hydrology components in the model development.

The catchments included in the model are both local catchments (within the mine lease itself), as well as external catchments which may contribute flow into the lakes (i.e. Morwell River interconnection). The key surface water flows incorporated in the model are:

- Local rainfall and runoff
    - runoff from pit walls (e.g. Catchment F and C);
    - runoff and seepage from the in-pit overburden dumps (e.g. Catchment A, B, E, G, H and I);
    - runoff and seepage from the Former Ash Ponds (Catchment D);
    - direct rainfall onto the lake surface; and,
    - local runoff from the catchments within the mining lease.
- External runoff
    - external Morwell River upstream catchment. This contributes flow to the pit for a connected scenario (via the three spillways or fully integrated). Flow is allowed to leave the lake via Spillway 4.

Local rainfall and runoff are modelled within GoldSim while external runoff, specifically flows from the upper Morwell River catchment, were modelled by Alluvium Consulting (**Section 4.5.1**) and the outputs provided to RGS used as inputs into the WB/WQ model.

4.7.1 Local rainfall and runoff

All local surface water inflows to the pit (and within the pit) and their hydrological response are simulated within the GoldSim model itself, using the Australian Water Balance Model (AWBM) as an in-built module.

The AWBM is a daily timestep hydrology model which takes in rainfall and evapotranspiration data, then simulates the infiltration, soil storage based on antecedent rainfall conditions, and the hydrological lag response in the catchment and produces runoff as a daily timestep. **Figure 4-9** shows a schematic of the model logic. The model is able to simulate both surface runoff and shallow baseflow runoff, which together make up the total runoff.

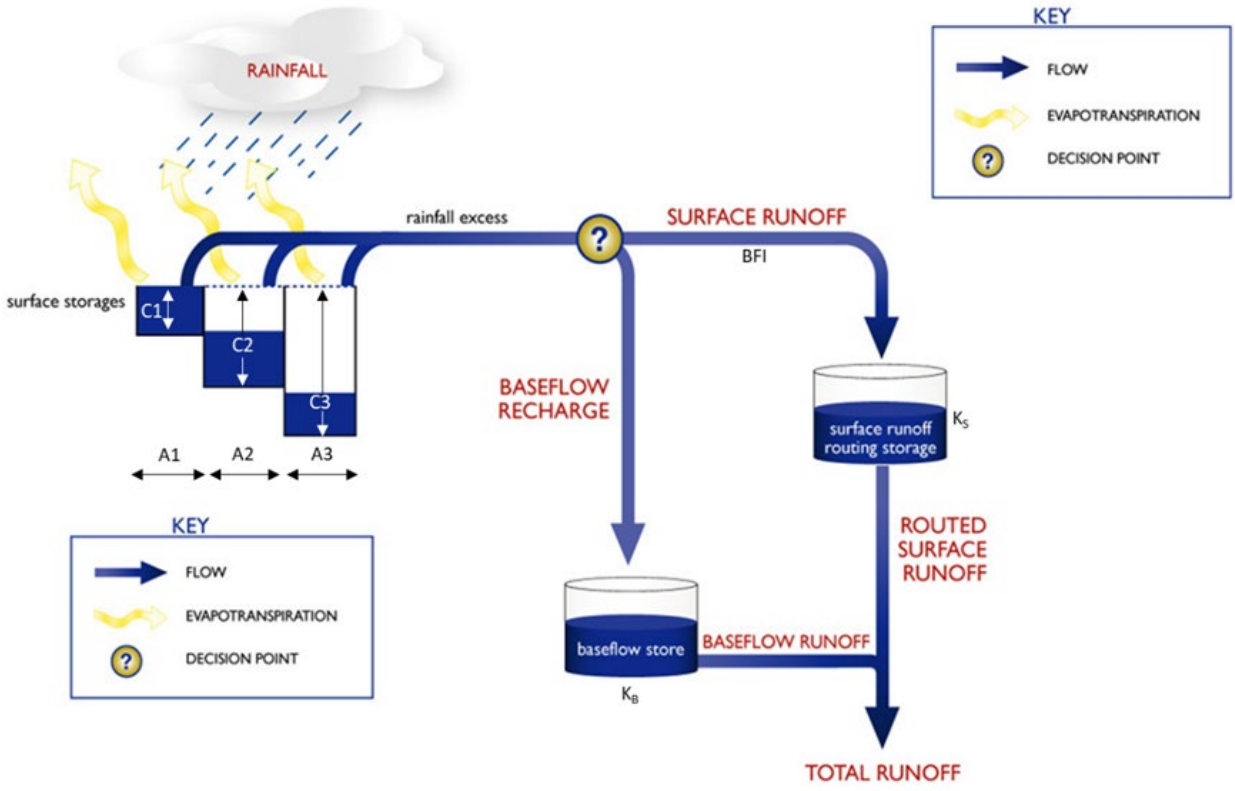

Figure 4-9: Schematic of the Australian Water Balance Model

The parameters in the AWBM model are summarised in **Table 4-12**.

Table 4-12: AWBM parameters

Parameter	Symbol	Description
Surface Area Stores	A_1, A_2, A_3	Proportion of the modelled catchment for each of the surface storages. i.e. storage per square meter of surface area. $A_1 + A_2 + A_3 = 1$
Soil Storage Capacities	C_1, C_2, C_3	Storage capacity for each surface store. Each storage is a depth measured in mm.
Baseflow Index	BFI	Fraction of runoff which reports to baseflow (ranges from 0 to 1)
Surface runoff recession constant	K_s	Fraction of surface runoff recession at each timestep (ranges from 0 to 1)
Baseflow runoff recession constant	K_b	Fraction of baseflow runoff recession at each timestep (ranges from 0 to 1)

A separate hydrology module has been developed for each of the land use types represented in the pit water balance. Each module will produce two hydrology outputs:

- surface runoff; and,
- shallow baseflow.

A summary of the different modules to represent each land-use type, and the proposed hydrology approach is provided in **Table 4-13**.

Table 4-13: Hydrology approach for various Yallourn landforms-

Landform Area	Hydrology module	Simulation approach
Direct rainfall onto the pit(s) water body surface (YTF and YEF)	**Water surface**	The pit water body surface area (for each pit) at each timestep Direct rainfall volumes are calculated at each timestep with the dynamic water surface area and 100% Runoff assumed. i.e. runoff (m^3/day) = rainfall (mm/d) * surface area (ha)
Natural undisturbed surrounding catchments (Catchment 1, 2, 3, 4, 5)	**Natural**	Any area that remains in it's natural, pre-mining project state and has not been disturbed by the pit or overburden areas. The undisturbed AWBM module has been calibrated to river gauging station 226210 Morwell River at Yinnar. This station is situated on the Morwell River approximately 14 km upstream of the YCM. This calibrated module represents land which is not disturbed by mining activities.
In-pit overburden dumps (Catchment A, B, E, G, H and I) Pit walls and floor (Catchment F and C) Former Ash Ponds (Catchment D)	**Overburden**	In the absence of recorded runoff data for overburden land use types or Ash land-use types, the Overburden AWBM module uses parameters adopted from the Australian Coal Association Research Program (ACARP) project C7007 which evaluated water quality and discharge estimates for final void and spoil catchments (ACARP, 2001). Specifically, those parameters adopted were for "bare dragline spoil". Key parameter characteristics are the moderately increased recession coefficients and soil pore storage, to reflect the additional pore storage and lag time of runoff through the overburden which is likely to be observed.

4.7.1.1 *Undisturbed AWBM Hydrology Module Calibration*

The undisturbed module was calibrated to observed streamflow data for the Morwell River at Yinnar gauge - BOM ID 226210. This gauge is about 14 km upstream of the pit voids. The gauged catchment is 249 km^2.

In the calibration, SILO rainfall and potential evapotranspiration data from the nearby Yinnar rainfall gauge (BOM ID 85100) was used. The model was calibrated within GoldSim using the available data from 1951 to 1960. An optimisation algorithm was used to maximise the Nash Sutcliffe efficiency index (as the objective function). The Nash Sutcliffe efficiency (NSE) index is used to measure fit of hydrology models, with an NSE of 0.65 or greater considered to be good fit. The calibration achieved a Nash Sutcliffe efficiency of 0.71.

Figure 4-10 presents the observed flow timeseries plotted against the calibrated simulated flow timeseries. The figure shows that the calibration achieved a very good fit between the observed and modelled streamflow data. Generally, the AWBM model captured both the baseflow and the peaks quite well.

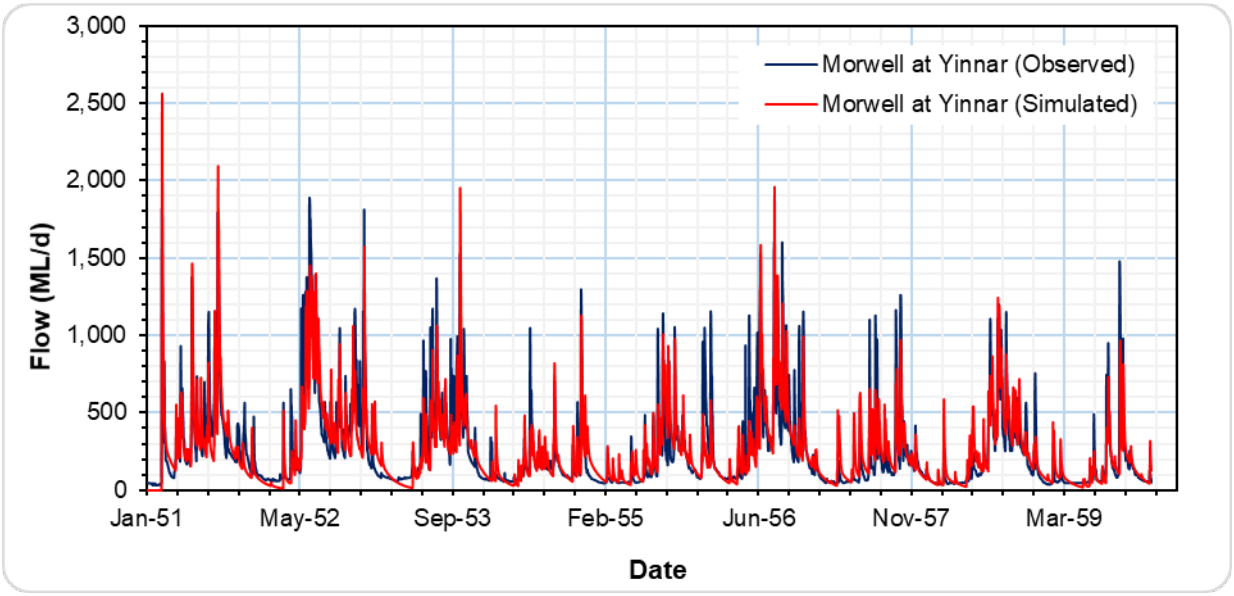

Figure 4-10: Observed versus simulated stream flow data for Morwell at Yinnar

Figure 4-11 shows the flow duration curves for both the observed flow and the simulated flow. This figure demonstrates that the calibration achieved a good representation of the distribution and seasonality of flows, when compared to the observed data.

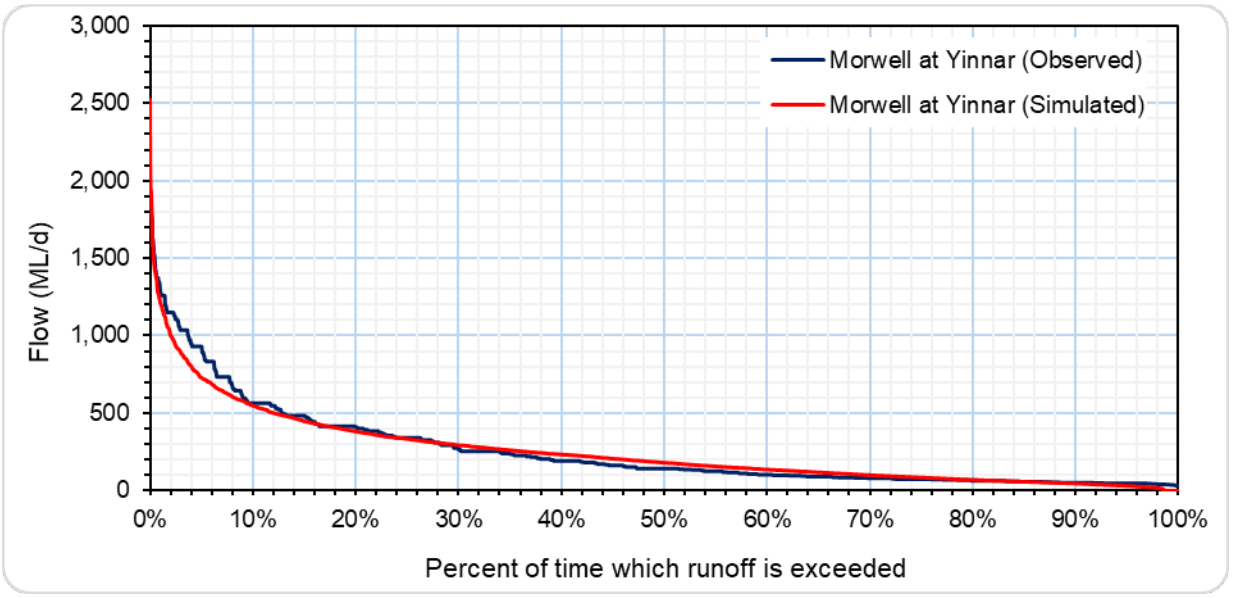

Figure 4-11: Flow duration curves for observed and simulated runoff

In the context of this lake water balance and water quality study, the most important factor for simulated runoff was that the annual and overall volumes were representative of the observed runoff. **Figure 4-12** presents the cumulative volume of the observed flow compared to the simulated flow. The cumulative difference in flow volume over the calibration period was 1.19 %.

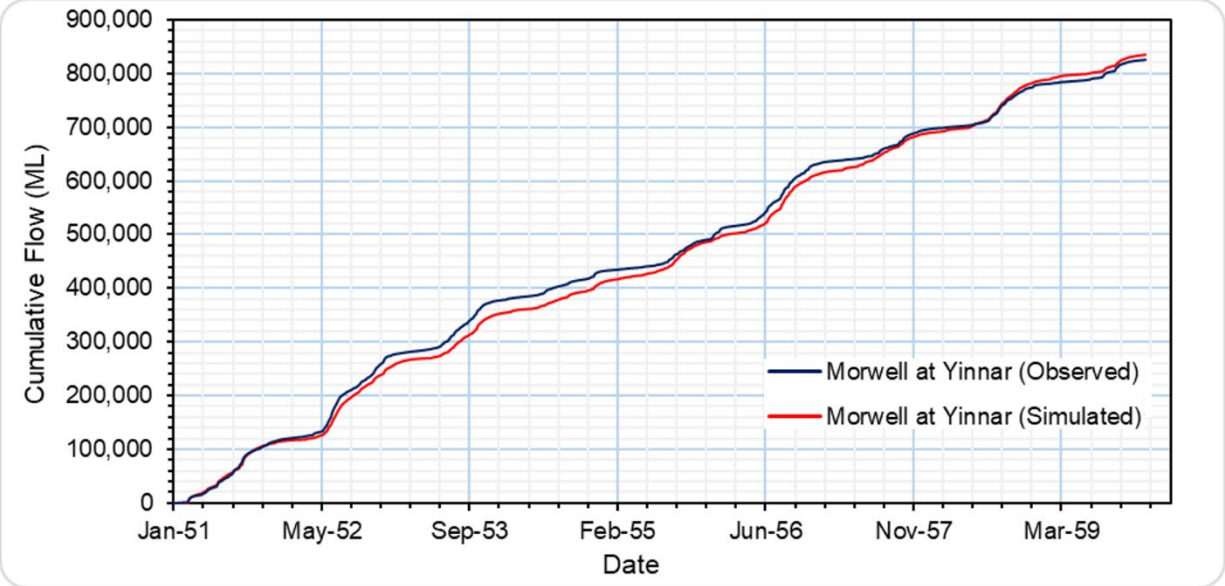

Figure 4-12: Observed versus Modelled (simulated) stream flow data for Morwell at Yinnar

In summary, the calibrated AWBM module for the Morwell catchment was considered a suitable model for use on undisturbed land use types in terms of surface runoff volume estimates. The resultant calibrated parameters for the undisturbed AWBM module are summarised in **Table 4-14**.

Note: EA are in the process of collecting site specific data which can be used in future to update the AWBM calibration.

Table 4-14: Calibrated parameters for natural undisturbed catchments-

Parameter	A_1	A_2	A_3	C_1	C_2	C_3	BFI	K_b	K_s
Calibrated Value	0.4880	0.1755	0.3365	10	100	180	0.3334	0.6915	0.9766

4.7.1.2 *AWBM hydrology modules for overburden modules*

As discussed, for all other areas including overburden, ash (capped with overburden), pit wall and floor (covered with overburden), data was unavailable to calibrate an AWBM model.

These areas have been collectively referred to as the 'Overburden' hydrology module. These parameters have been adapted from ACARP project C7007 (ACARP, 2001). It used a Spoil Hydrology Lumped Parameter Model (SHLPM), which is conceptually similar to the AWBM. Given the pits and overburden dumps may not be completely rehabilitated, we have selected the ACARP values for "bare dragline spoil", presented below in **Table 4-15**.

Table 4-15: Adopted parameters for other land use types-

Parameter	A_1	A_2	A_3	C_1	C_2	C_3	BFI	K_b	K_s
Overburden	0.5	0.3	0.2	70	42.5	5	0.2^	0.95*	0.35*

Notes: ^BFI for dragline spoil (ACARP, 2001) was 0. Since the overburden dumps produce seepage (baseflow), the value has been conservatively updated to 0.2 (i.e. 20% of runoff reports as seepage which carries a different geochemical source term)
*No ACARP parameters were provided for Kb and Ks, so default AWBM values have been adopted.

4.7.2 External: Morwell River inflows

As mentioned above, the water balance of the project site (site water balance; RGS) and the whole catchment (Alluvium) have been simulated using two different hydrological models with different structures and different objectives.

A preliminary spillway design arrangement (**Figure 4-13**) was developed and assessed for the site based on a "Partially Connected Morwell" option and its potential to meet key hydrologic, geomorphic and ecological criteria outlined in *The Latrobe River system: A context statement for EnergyAustralia Yallourn to inform the rehabilitation of the Yallourn Open Cut mine* (Alluvium, 2024).

Daily estimation of flows through each of the spillways has been determined through the use of calibrated flow data from the Regional Hydraulic Modelling Assessment. Using the calibrated flow data, rating curves for each spillway have been determined and used to estimate daily flows over the spillways (for equivalent flow levels in the Morwell and Latrobe Rivers).

Stochastic flows scenarios (101 realisations) for both the dry and medium climate scenarios were run through the spillway rating curves to produce a daily timeseries of flows over the spillways for each model scenario.

These flow series were provided to RGS to use as inputs to the Goldsim model in lake modelling. An example of the data is provided for a single realisation in **Figure 4-14**.

Figure 4-13: Spillway locations.

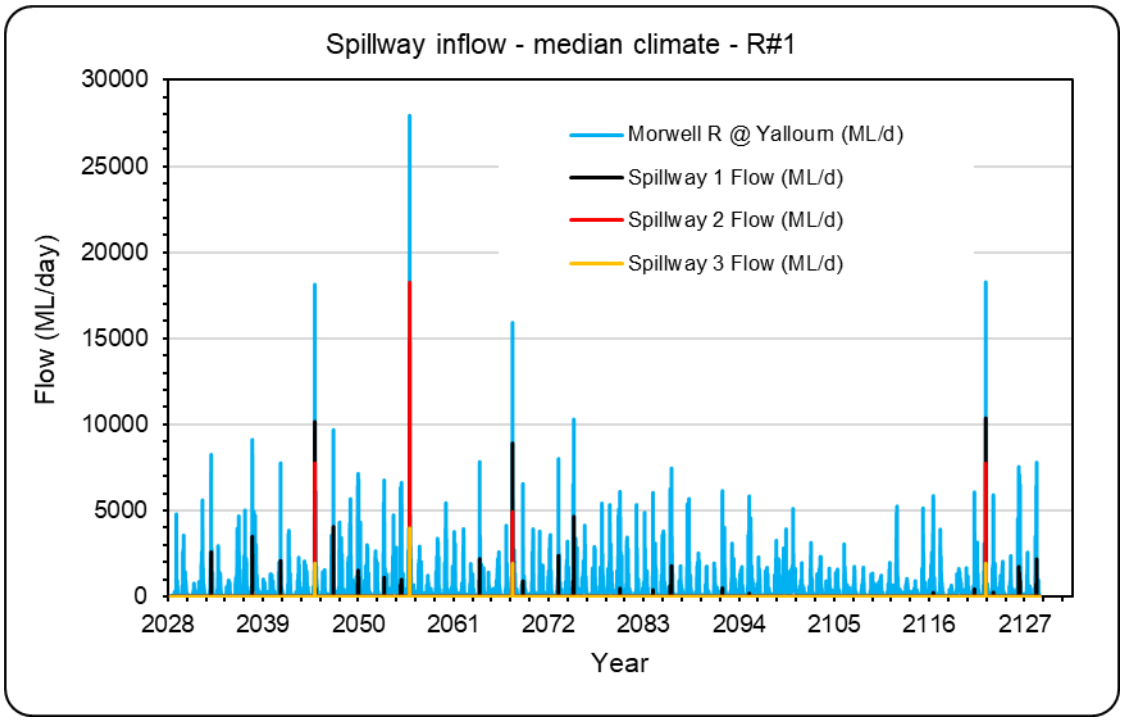

Figure 4-14: Spillway inflow data (Median climate) for Realisation #1 (of 101) (generated by Alluvium).

4.7.3 Tunnel transfer

Existing conveyor tunnels EL210, EL310 and EL410 will be retrofitted with 1.6 m diameter high density polyethylene (HDPE) pipes to transfer water between the YTF and YEF lakes. The balance of the existing cross-sectional area will be backfilled with impermeable material. Transfer will be activated when lake levels reach the conveyor tunnel levels shown in **Table 4-16**.

Table 4-16: Tunnel transfer elevations

Conveyor tunnel ID	Start transfer RL (mAHD)
EL210	17
EL310	13
EL410	12

Alluvium provided a rating table defining the tunnel flow rate versus lake elevation difference, shown in figures **Figure 4-15** to **Figure 4-17**.

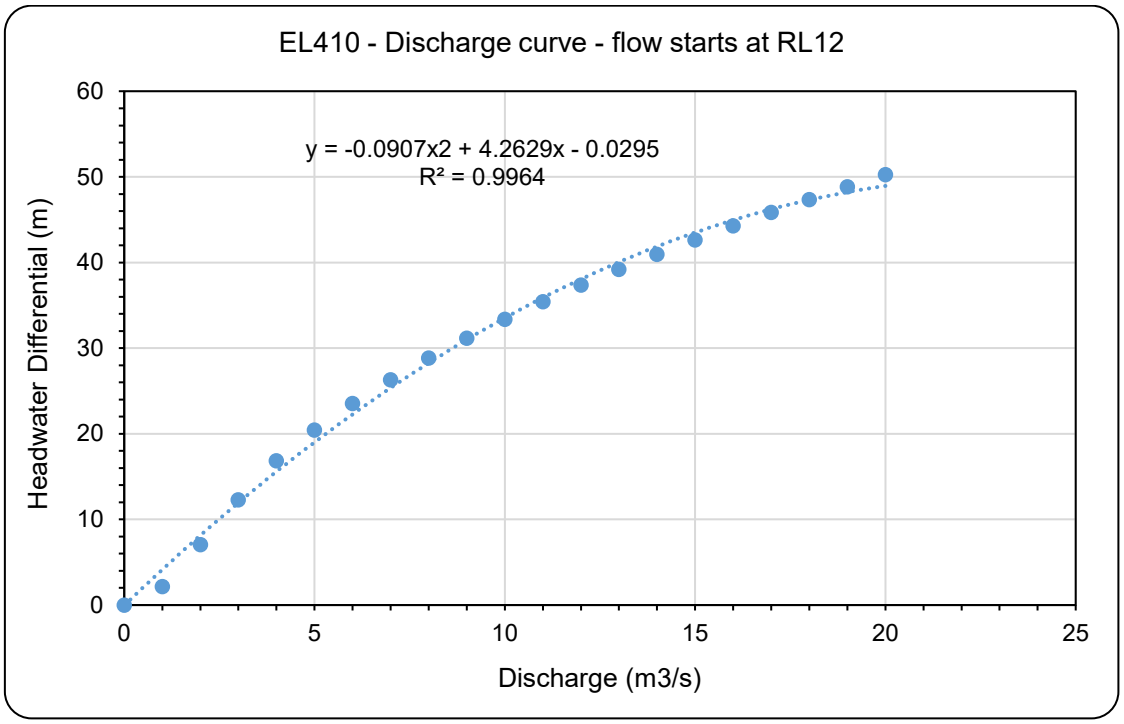

Figure 4-15: Tunnel EL410: Flow rate versus lake elevation

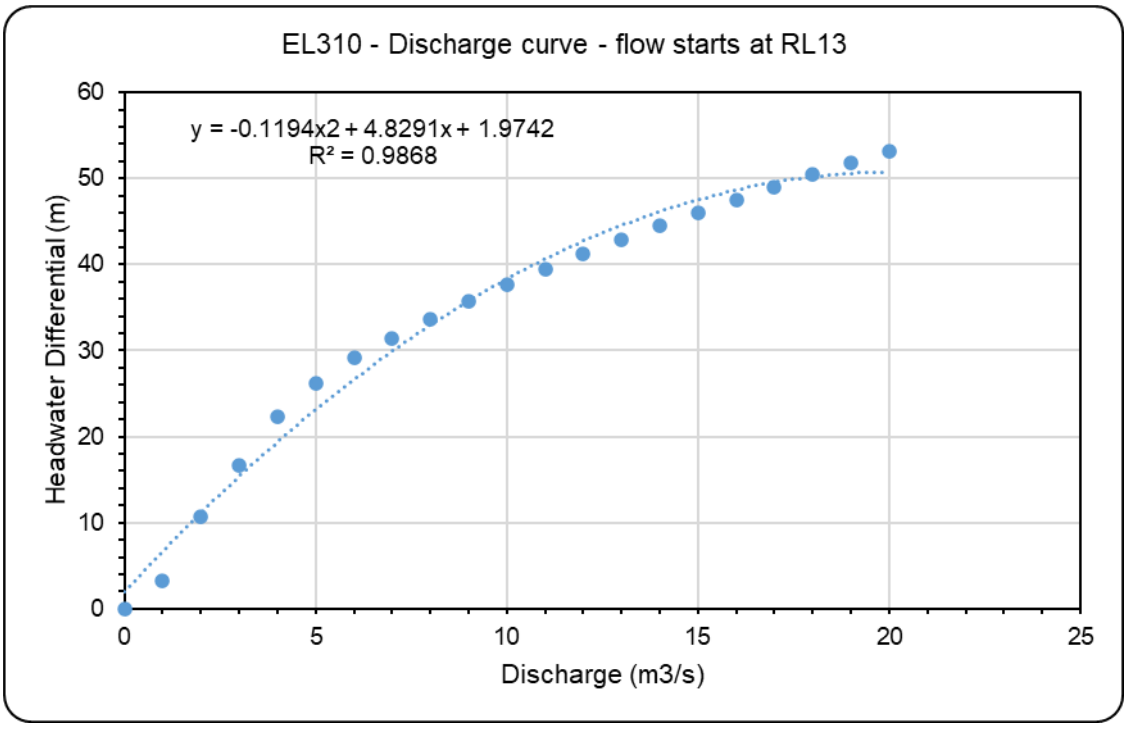

Figure 4-16: Tunnel EL310: Flow rate versus lake elevation

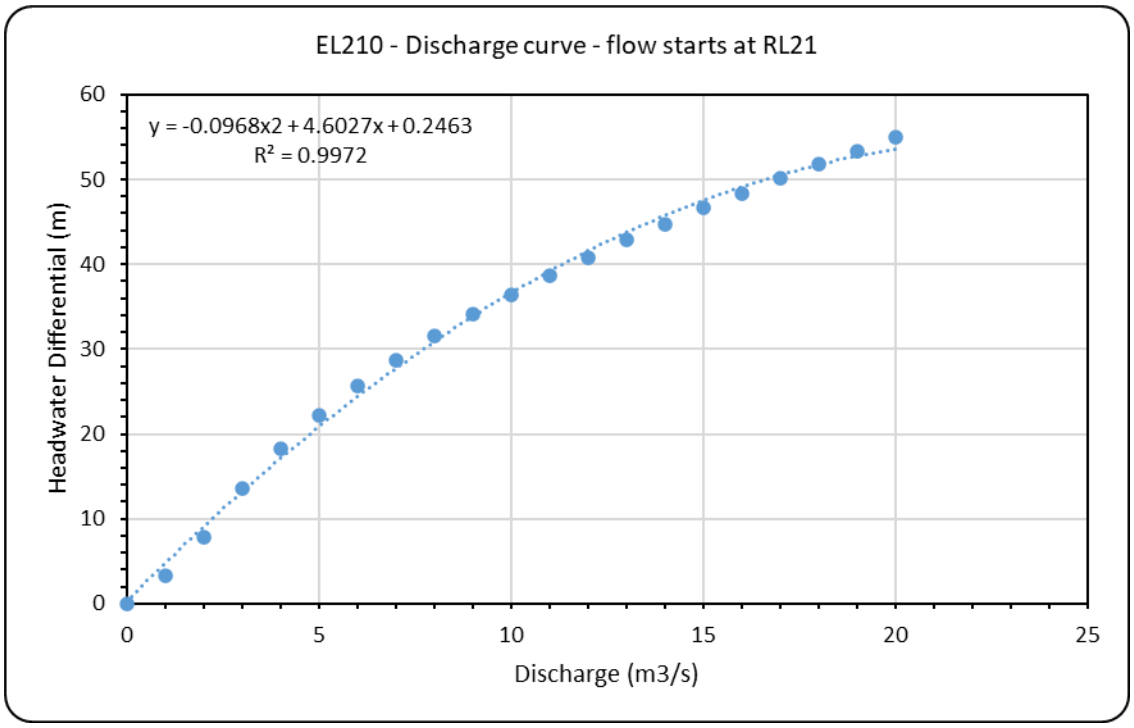

Figure 4-17: Tunnel EL210: Flow rate versus lake elevation

4.8 Groundwater

The conceptual groundwater model extends beyond the extent of the pit shells and is specifically excluded from the RGS scope of work. The conceptual groundwater model outputs were provided by GHD (GHD, 2025).

Groundwater inflow rates into each of the pits were generated and provided to RGS as time series groundwater fluxes generated in the groundwater model under a certain set of hydrodynamic boundary conditions, including complete fill of the lake to +37 m RL. The provided groundwater fluxes into and out of the pits/ lakes were a time series with quarterly timesteps. Fluxes in and out were provided for six different aquifers/geological formations:

- Haunted Hills Formation (L1)
- Yallourn Coal (L2)
- Yallourn Coal (L3)
- Yallourn Coal (L4)
- Yallourn Coal (L5)
- Yallourn Interseam (L6)

The GoldSim model has daily timesteps and so the GHD groundwater inputs needed to be broken down from quarterly fluxes to daily fluxes. The implementation in GoldSim assumed a linear interpolation of the fluxes between the provided 90-day periods.

The groundwater fluxes (inflow and seepage) generated by GHD for the base case scenario are presented for the YTF and TEF in **Figure 4-17** and **Figure 4-18**, respectively.

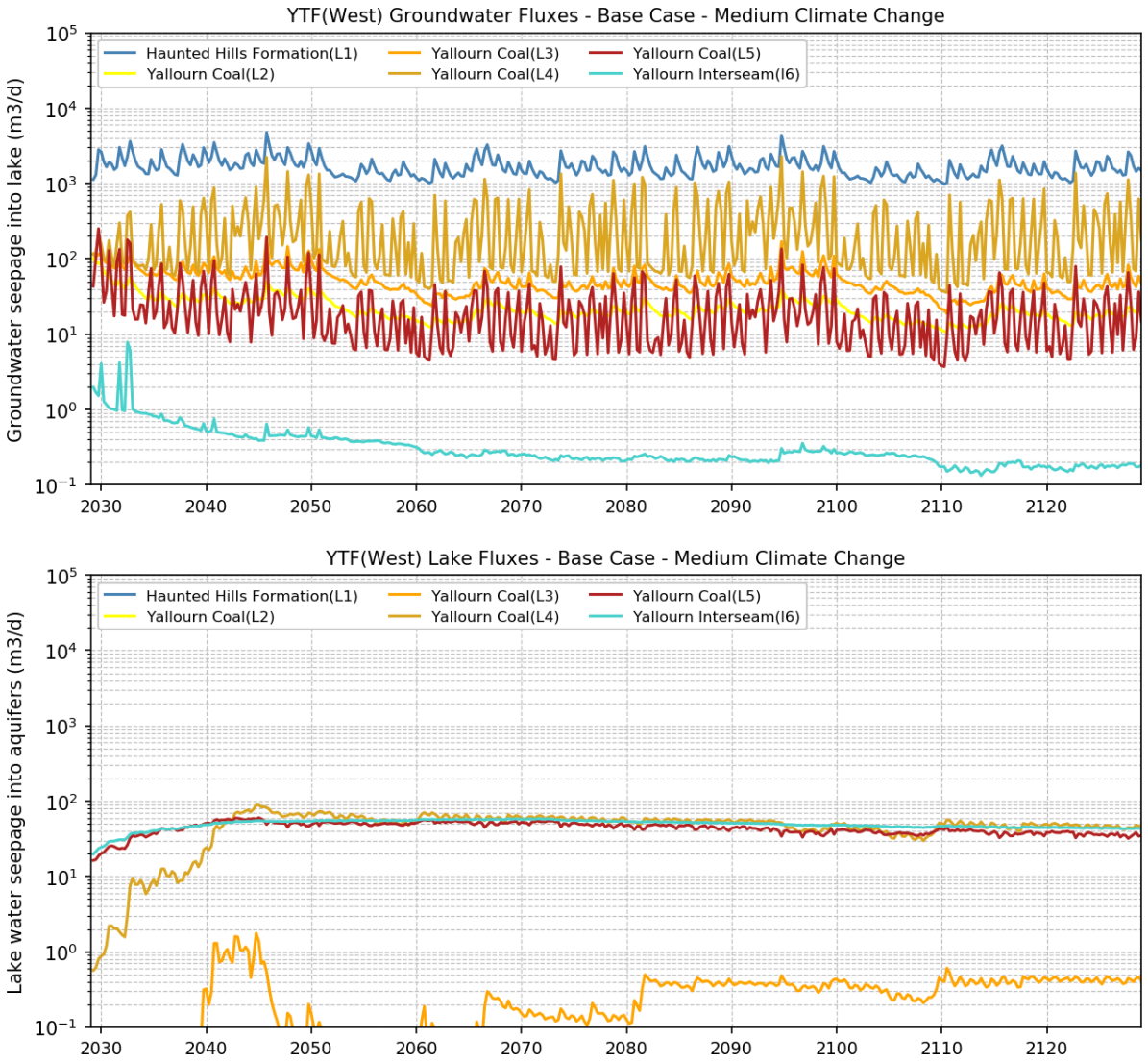

Figure 4-18: Groundwater inflow and outflow (seepage) from YTF base case scenario (from GHD, 2025)

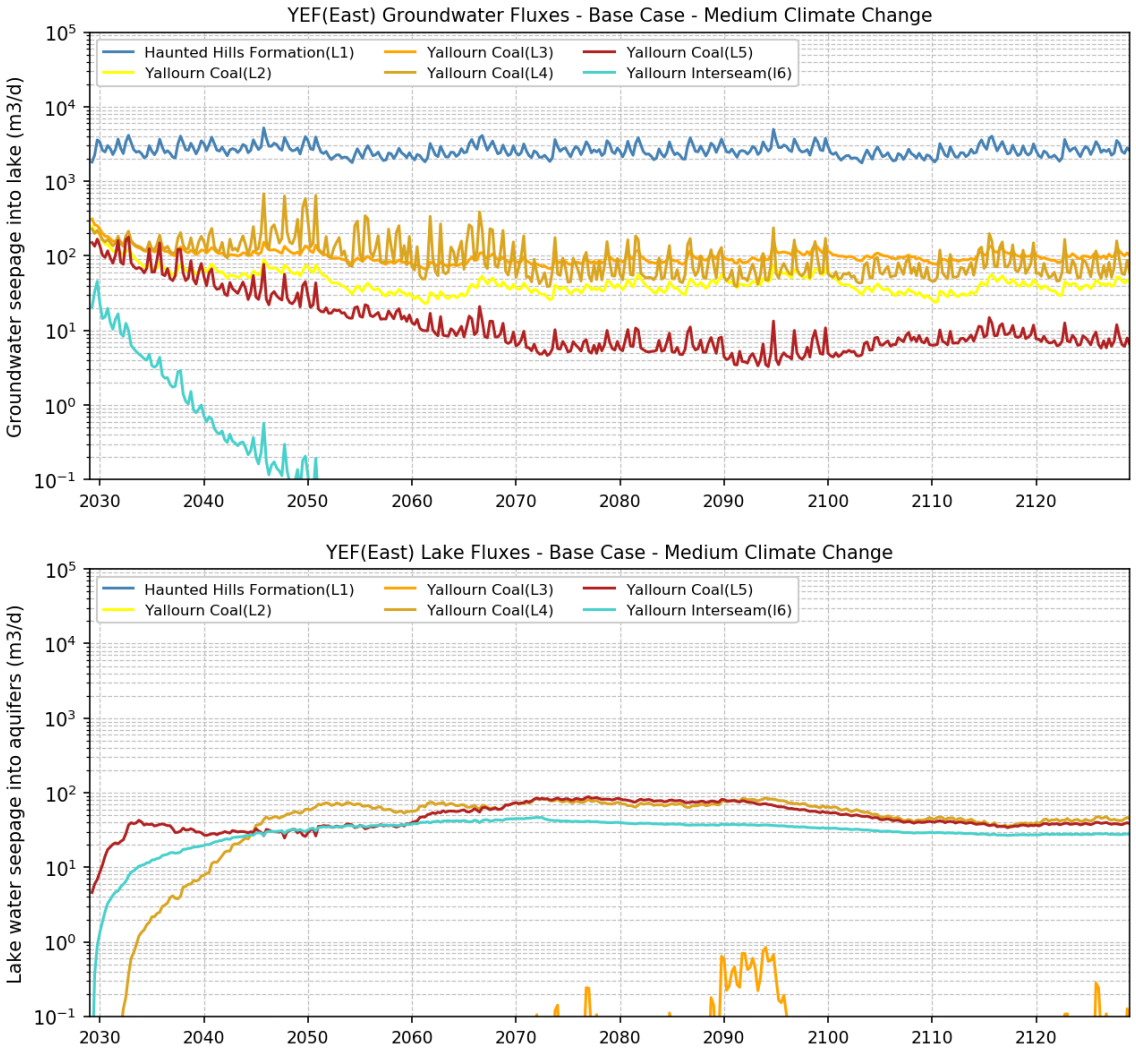

Figure 4-19: Groundwater inflow and outflow (seepage) from YEF base case scenario (from GHD, 2025)

4.9 Water quality components of model

4.9.1 General Approach

The general approach to simulating water quality within the model for each scenario includes:

- Determination of the exposed/ saturated pit wall, overburden dump and water volumes in each (daily) time step of the simulation;
- Addition of dissolved loads added to the system through direct rainfall, groundwater inflows, surface water runoff (including pit wall runoff) and ash/ overburden dump reactions;
- Addition of mass load from the MRD spillways (for select scenarios);
- Mixing of loads and volumes to determine mass balance concentrations;
- Calculation of water losses via evaporation, groundwater, outflow and other losses with distributed dissolved mass loss; subsequent mass additions and water balance considerations;

- Recalculation of lake(s) quality progressively (daily) over the duration of model simulation (100 years); and,
- Selectively apply geochemical controls (e.g. mineral solubility, atmospheric equilibrium).

4.9.2 Geochemical Source Terms

The source terms (geochemical inputs) are used in the WB/WQ model to estimate how the lake(s) water quality may evolve over time. The source terms have been generated from a combination of inferred, assumed and measured data. The general data used to derive the source terms is provided in **Table 4-17**.

Surface water and groundwater quality source terms were generally developed from historical site monitoring data. Seepage water quality for each of the overburden dumps and the Former Ash Ponds was inferred from measured groundwater data collected from bores installed in each of the dumps/ ash pond. Pit wall and overburden dump runoff water quality was inferred from wall washing experiments conducted on site (**Section 2.6.3**) (RGS, 2024).

When water quality data was below instrumental detection limits, concentrations equal to half the detection limit were applied to the source terms. As part of the quality assurance and quality control (QA/ QC) process unit errors were corrected, and in some cases spurious results were deleted.

Median water quality data was applied to the model; however, the option of applying the 95th percentile is included in case of sensitivity analysis.

Some metals and metalloids may become significantly diluted in flood waters during high-rainfall (flood) events, while nutrients tend to be higher (**Figure 4-20)**. For the Morwell River flood flow input, the median value was conservatively used in the model.

The historical groundwater measurements are missing sodium (Na) from the analysis suite, so a value 2/3 of the chloride concentration is applied in the model, this can be updated in future iterations of modelling.

Since pH is on a logarithmic scale, pH was converted to H^+ so that median and 95th percentile could be calculated for source term inputs.

The source terms for natural land runoff were conservatively inferred using median Rifle Range Gully data and Latrobe River water (Location Y97).

Table 4-17: Geochemical data to derive source terms-

Type	Water Quality Input	Type	Description
Direct Precipitation	Rainfall	Measured water quality	Measured site rainfall measurements 14/06/2022 and 12/10/2022.
Pit fill and top-up potential waters	Latrobe Water (fill and top-up)	Measured (routine monitoring)	L'trobe River @ old Yall Pumphouse (Y97).
	Moondarra Reservoir (Gippsland Water)	Measured	Moondarra Offtake (1 – 4) & Pipeline. Measured tap water (Gippsland water) and Moondarra Reservoir.
	Pumped Groundwater (fill and top-up)	Measured (routine monitoring)	M1A aquifer (sampling bores N5056 and N6899).
Surface Water	Morwell River (flood flows)	Measured (routine monitoring)	Morwell River @ Pump House (Y74)

Type	Water Quality Input	Type	Description
	Natural catchments (Catchment 1, 2, 3, 4 and 5)	Inferred (routine monitoring)	Combination Rifle Range Gully and Yallourn River water (sampling location Y97).
	Lake (starting water quality)	Measured (routine monitoring)	Combination of Fire Service Pond, Floc Pond and Lake Placid.
Groundwater (flux)	Haunted Hill Formation (HHF) groundwater	Measured (routine monitoring)	HHF shallow aquifer (YTF): monitoring bores - (N6904, N7156, (N5207, N6656). HHF shallow aquifer (YEF): monitoring bores - (N7043, N5207, N6656).
	Yallourn Coal	Measured (routine monitoring)	Yallourn Coal (YTF): monitoring bores - (N6904, N7156). Yallourn Coal (YEF): monitoring bores - (N7043).
	Yallourn Interseam	Measured (routine monitoring)	Yallourn Interseam (YTF): monitoring bores - (N6713, N6722, N6904, N7156). Yallourn Interseam (YEF): monitoring bores - (N6815).
Seepage/ runoff water quality	Seepage Catchment A: SOB Dump	Measured (routine monitoring)	Shallow groundwater bores: (N7430, N7428).
	Seepage Catchment B: NOB Dump	Measured (routine monitoring)	Shallow groundwater bores: (N7426, N7425).
	Seepage Catchment D: Former Ash Ponds	Measured (routine monitoring)	Shallow groundwater bores: (N7450, N7452, N7449).
	Seepage Catchment E: Midfield Dump	Measured (routine monitoring)	Shallow groundwater bores: (N7431, N7433).
	Catchment G and H: Eastfield Dump	Measured (routine monitoring)	Shallow groundwater bores: (N7442, N7438).
	Runoff/ baseflow Catchment C: Fire Service Pond & Floc Pond batters	Inferred pit wall experiments	Wall wash experiment data for three sites (2 weathered coal wall & 1 overburden wall; fire service pond & floc pond batters).
	Runoff Catchment A, B, D & E (overburden dumps)	Inferred pit wall experiments	Wall wash experiment data (overburden wall); Southern overburden batters.
	Runoff/ baseflow Catchment F: Latrobe River and Northern batters	Inferred pit wall experiments	Wall wash experiment data for two sites (2 weathered coal); Latrobe River and Northern batters.
	Runoff/ baseflow Catchment I: Maryvale Field	Inferred pit wall experiments	Wall wash experiment data for two sites (1 weathered coal; 1 fresh coal); Maryvale field floor.

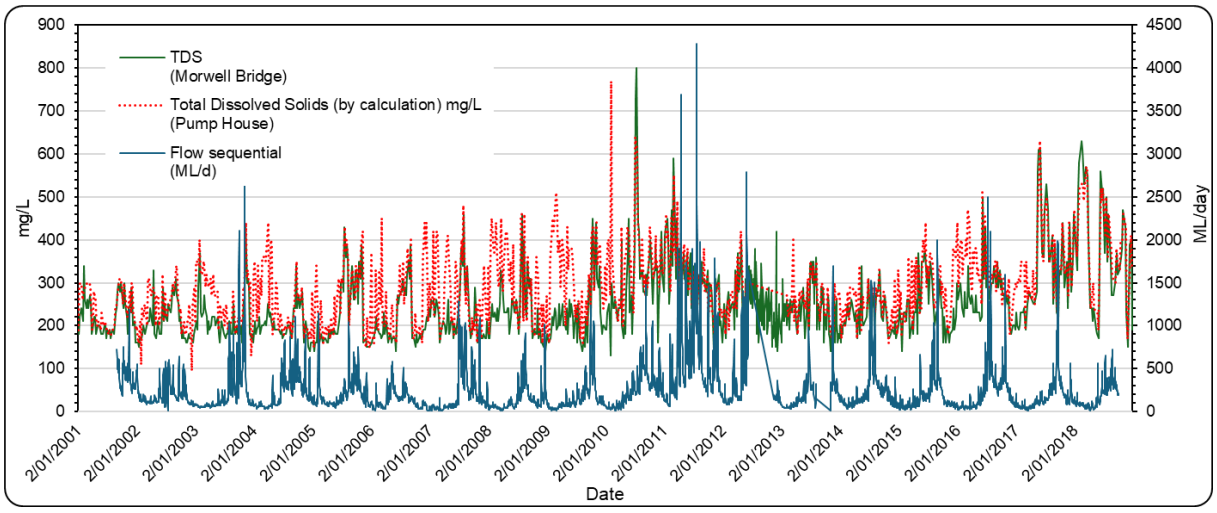

Figure 4-20: Morwell River flow (Yallourn) versus measured TDS (mg/L)

4.9.3 Key water quality inputs

The median hydro-chemistry values of the key water inputs are provided in **Table 4-18** against the assessment criteria (i.e. the revised Australian and New Zealand Guidelines for fresh and marine water quality guidelines – freshwater aquatic ecosystem (95% species protection) and livestock drinking water guidelines (ANZG, 2018), as well as the Australian Drinking Water Guidelines (ADWG) (NRMMC, 2011)) (refer to assessment criteria in **Section 5**).

Comparison of the key water quality inputs against the assessment criteria highlights that a number of the parameters exceed the fresh and marine water quality guidelines – freshwater aquatic ecosystem (95% species protection) (namely median Al, Cu, pH, Ni and Zn), while median Pb and Mn exceed the ADWG guidelines for some of the runoff and seepage qualities. One input (catchment A, B, D & E runoff) exceeds the livestock drinking water guidelines for Al.

Table 4-18: Median key water quality inputs against assessment criteria

Parameter	Assessment Criteria				Fill & top-up	Fill	Spillways	Groundwater						Seepage (ovreburden dumps and Former Ash Pond)							Runoff	pit walls	
	ADWG	Aquatic Ecosystem (95% species protection)	Livestock Drinking Water Guideline	Rainfall	L'trobe River	Moondarra Reservoir	Morewell River	HHF (YTF)	YCoal (YTF)	Yintsm (YTF)	HHF (YEF)	Ycoal (YEF)	Yintsm (YEF)	Natural catchment (1, 2, 3, 4 and 6)	Catchment A (SOB)	Catchment B (NOB)	Catchment D (Former Ash Ponds)	Catchment E (Midfield Dump)	Catchment G and H (Eastfield Dump)	Seepage / Runoff Catchment C (fire service pontd & floc pond batters)	Catchment A, B, D & E.	Catchment F runoff/ seepage (YEF Northern & Latrobe River batters)	Catchment I runoff/seepage
Aluminium (mg/L)	-	0.055	5	0.005	0.27	0.17	0.26	0.068	0.135	0.077	0.25	0.5	0.46	0.27	0.072	0.25	0.011	0.088	0.0205	0.60	9.22	3.49	0.84
Arsenic (mg/L)	0.01	0.024	0.5	0.0005	0.0005	0.0005	0	0.0002	0.0002	0.0002	0.0002	0.0002	0.0005	0.0005	0.0012	0.002	0.002	0.001	0.0014	0.039	0.0005	0.0015	0.0032
Barium (mg/L)	2	-	-	0.002	0.043	0.019	0	0.17	0.026	0.065	0.2	0.07	0.087	0.043	0.08	0.05	0.12	0.12	0.08	0.43	1.1	1.38	1.04
Boron (mg/L)	4	0.37	5	0.15	0.015	0.025	0	0.01	0.008	0.006	0.014	0.016	0.014	0.015	0.008	0.019	0.009	0.004	0.015	0.35	0.74	0.93	0.80
Cadmium (mg/L)	0.002	0.0002	0.01	0.00005	0.00005	0.000075	0.00005	0.00002	0.00002	0.00002	0.000037	0.00005	0.00002	0.00005	0.00002	0.00002	0.00002	0.00002	0.00002	0.00009	0.0002	0.0002	0.0001
Calcium (mg/L)	-	-	1000	0.5	4.6	1.7	11	7.04	0.58	1.68	7.85	2.2	2.5	4.6	1.45	15.2	21	1.35	4.5	0.49	4	2	4
Chloride (mg/L)	-	-	-	4	39	11	85	90	50	71.5	135	140	110	40	110	171	340	265	440	15.8	19	5	68
Chromium (mg/L)	0.05	0.001*	1	0.001	0.0005	0.0007	0.0005	0.0002	0.0002	0.0002	0.00052	0.0008	0.0007	0.0005	0.0002	0.0002	0.0002	0.00025	0.0002	0.003	0.007	0.003	0.0008
Cobalt (mg/L)	-	-	1	0.0005		0.0005		0.001	0.001	0.0005	0.001	0.0009	0.0005		0.0014	0.029	0.04	0.008	0.005	0.0004	0.002	0.001	0.0005
Copper (mg/L)	2	0.0014	1	0.0005	0.001	0.0005	0.002	0.003	0.006	0.003	0.0005	0.0005	0.002	0.001	0.0005	0.004	0.0005	0.0005	0.0005	0.001	0.005	0.002	0.0008
Fluoride (mg/L)	1.5	-	2	0.05	0.05	0.41	0.1	0.1	0.05	0.05	0.1	0.05	0.1	0.05	0.05	0.2	0.05	0.05	0.075				
Iron (mg/L)	-	-	-	0.025	0.51	0.42	0.41	3.18	0.04	0.08	3.24	0.16	4.1	0.52	6.3	35	86	18	16	0.63	4.19	6.2	1.14
Lead (mg/L)	0.01	0.0034	0.1	0.0005	0.0005	0.0005	0.0005	0.0003	0.0005	0.0004	0.0002	0.0003	0.0002	0.0005	0.00035	0.001	0.0001	0.0004	0.0001	0.029	0.007	0.037	0.024
Magnesium (mg/L)	-	-	-	0.5	4.6	1.45	11	12.4	3.9	6.2	13.2	5.4	5.7	4.6	9.7	67	56	21.5	30.5	0.66	4	11	22.5
Manganese (mg/L)	0.5	1.9	-	0.0005	0.02	0.01	0.01	0.28	0.005	0.026	0.295	0.03	0.16	0.023	0.037	1.32	1.6	0.024	0.20	0.028	0.067	0.16	0.06
Mercury (mg/L)	0.001	0.0006	0.002	0.00005	0.00005	<0.0001	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005				
Molybdenum (mg/L)	0.05	-	0.15	0.001	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0004	0.0005	0.0005	0.0005
Nickel (mg/L)	0.02	0.011	1	0.0005	0.001	0.0005	0.001	0.002	0.003	0.003	0.0012	0.001	0.001	0.001	0.004	0.010	0.013	0.011	0.013	0.0008	0.006	0.002	0.0008
pH	-	6 to 9	-	5.3	7.1	6.6	7.3	5.4	4.7	4.9	5.7	5.2	5.3	7	4.9	4.7	5.7	4.8	5.7	4.37	5.8	3.91	4.37
Potassium (mg/L)	-			0.5	2.2	0.7	3.7	1.02	0.25	0.5	1.5	1.2	1.2	2.2	0.805	2.3	1.15	0.48	2	1.32	3	3.5	3.5
Selenium (mg/L)	0.01	0.011	0.02	0.005	0.0005	0.0025	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0049	0.005	0.005	0.005
Sodium (mg/L)	-	-	-	2.5	19.5	11.9	53	59	33	47	89	92	72	19	72	112	224	174	290	13.5	28	50	83
Sulfate (mg/L)	-	-	1000	0.75	5	2.5	31	7	7.5	9	10.2	14	39	5	46	455	150	10.5	57	8.9	12	9	60
Total Alkalinity as $CaCO_3$ (mg/L)	-	-	-	1.75	22	9	43	168	7	14	176	23.5	26	22	21	23.5	315	21	73.5	0.66	32	0.5	0.5
TDS (mg/L)	-	-	2,400	28.4	110	35	270	332	159	225	435	365	352	120	262	925	1105	580	645	64	37	156	45
Zinc (mg/L)	-	0.008	20	0.044	0.0025	0.002	0.0025	0.03	0.039	0.07	0.0295	0.025	0.035	0.0025	0.05	0.125	0.09	0.07	0.008	0.38	0.42	1.19	0.90

*Note: chromium guideline applicable to Cr^{6+} species and applied in the table to total (i.e. Cr^{6+} and Cr^{3+}).
Note: Mercury is included in the table but not modelled because it is below instrumental detection limits. Mercury was not included in the analysis suite for wall washing; however, is below instrumental detection limits for all KLC results including the columns with pit wall materials.

4.9.4 Contaminant transport module

The water quality components of the model are simulated using the contaminant transport module in GoldSim. For each water source (including local rainfall and runoff sources, external fill sources and groundwater flux sources), a cell pathway was used to simulate the loading rates. All Cell pathways were constructed as vectors referencing the array of chemical species. This means that for each input source, one cell pathway element was used to simulate the transport of all modelled species.

Loading rates in the Cell pathways were calculated as follows:

Source terms (Vector of 32 species) [mg/l] x inflow rate [kg/d] = loading rate (kg/d)

4.9.5 Geochemistry inputs

The model has the capacity to simulate 32 species which are defined within the materials container of the model, in the species element. The list of species which has been programmed into the GoldSim model is in **Table 4-19**.

Geochemistry source term data for each of these species is then imported into the model directly from a spreadsheet file *WQ inputs.xlsx.* This file must be located with the same folder directory as the GoldSim model file in order for the model to run. This means that the geochemistry source terms can be easily updated in subsequent stages of work and read straight into the model whilst minimising additional programming within the GoldSim model.

Source terms are read into a spreadsheet element in the GoldSim model, which translates the data into a GoldSim element. A number of selectors are then used to determine which source term datasets will be used based on which geochemistry scenarios have been selected (i.e. average or 95th percentile).

Table 4-19: List of water quality species simulated in GoldSim model

Array number	Parameter
1	Acidity as $CaCO_3$
2	Aluminium
3	Arsenic
4	Barium
5	Placeholder
6	Boron
7	Cadmium
8	Calcium
9	Placeholder
10	Chloride
11	Chromium
12	Cobalt
13	Copper
14	Fluoride
15	H+
16	Placeholder
17	Iron
18	Lead
19	Magnesium
20	Manganese
21	Molybdenum
22	Nickel
23	Placeholder
24	Potassium

Array number	Parameter
25	Selenium
26	Sodium
27	Strontium
28	Sulfate
29	TDS
30	Placeholder
31	Total Alkalinity as $CaCO_3$
32	Zinc

4.9.6 Thermodynamic constraints and atmospheric equilibrium

Consideration of thermodynamic constraints (mineral solubility) and atmospheric equilibrium are incorporated in the WB/WQ modelling results. The median (50th percentile) mass balance water quality outputs from the GoldSim model were used as input to PHREEQC (Parkhurst and Appelo, 2013).

PHREEQC allows for the inclusion of equilibrium reactions based on the lake quality and mineralogy (**Figure 4-21**); the interaction of water and material (e.g. pit wall) may involve dissolution and precipitation of minerals (based on mineral solubilities), which is influenced by factors such as pH and pe (redox) variations.

The PHREEQC model compares modelled pit water body data with theoretical solubility limits of a number of minerals (within the *minteq.v4.dat* database[5]) under different conditions (e.g. variations in pH, redox and temperature). The saturation index (SI) of a mineral is calculated, under these conditions. The SI value of a particular mineral is indicative of whether a mineral will tend to precipitate or dissolve. If the SI value is negative, then the mineral is undersaturated in solution and therefore may dissolve, or if already in solution, remain dissolved. However, if the SI of a mineral is positive, then the mineral is supersaturated and likely to precipitate out of solution (i.e. in the lake); these dissolution/precipitation reactions will affect concentrations of elements in the lake and will become particularly important if the effects of evapo-concentration in the lake are significant enough to concentrate elements to saturation state.

PHREEQC modelling can also be used to equilibrate the lake with atmospheric conditions ($pCO_2 = 10^{-3}$ atm). For example, groundwater pCO_2 is orders of magnitude higher than atmospheric air values; therefore, when groundwater mixes with the lake and is exposed to surface conditions, the water will release CO_2 gas to the atmosphere. This results in the pH of water rising due to loss of carbonic acid.

PHREEQC allows for adsorption of aqueous chemical species to iron (oxy)hydroxide based on a diffuse double layer surface complexation model (Dzombak & Morel, 1990). This can be linked to modelled precipitation of the mineral phase ferrihydrite ($Fe(OH)_3$) from solution.

[5] Mo and Cd species are not part of this database; however, the concentration of these species is low and not likely to be mineralogically constrained. This is conservative as in reality they may be mildly constrained and/or adsorbed to iron (oxy)hydroxides.

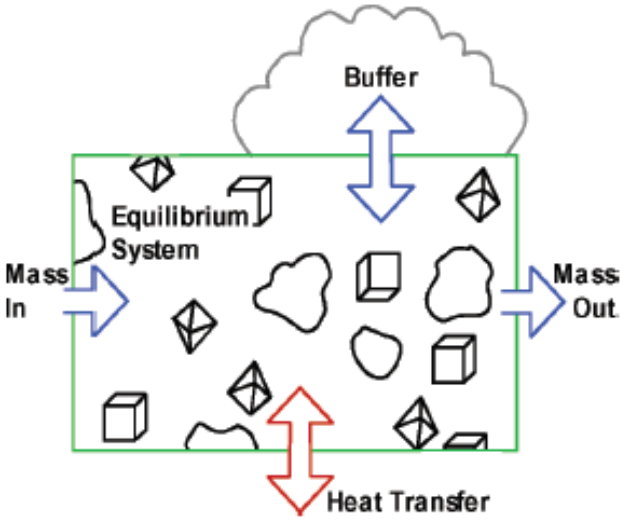

Figure 4-21: Conceptualisation of the geochemical processes considered in PHREEQC

4.9.7 Diffusion modelling

Diffusive mass transport between the submerged features (overburden and ash dumps, pit walls and floor) and lake(s) were modelled in the GoldSim WB/WQ model.

Diffusive mass flux links are used to transport mass through a stagnant or slowly moving fluid via the process of molecular diffusion. Diffusive mass transport is driven by (in fact, proportional to) a concentration difference, with mass diffusing from high concentration to low concentration. The constant of proportionality is referred to as the *diffusive conductance*:

Diffusive Mass Rate = (Diffusive Conductance) x (Concentration Difference)

In this equation, the Diffusive Mass Rate has dimensions of mass/ time, the Diffusive Conductance has dimensions of volume/ time, and the Concentration Difference has dimensions of mass/ volume.

The diffusive conductance is a function of the properties of the species and fluids involved, and the geometry of the diffusive process.

Assuming that the species are diffusing through a single fluid (water), the Diffusive Conductance term is computed in GoldSim as follows:

D = (Ad t n r) / L

where:

D is the Diffusive Conductance (L3/T);

A is the diffusive area (L2);

d is the diffusivity in the fluid (L2/T);

n is the porosity of the porous medium;

t is the tortuosity of the porous medium;

r is a reduction factor to account for the degree of saturation (1 if saturated);

L is the diffusive length (L).

The key assumptions made in the diffusion models include the following:

4. The diffusive area between the in pit feature (i.e. pit walls/ overburden dumps/ Former Ash Pond cap) and the lake is equal to the submerged surface of the feature, which is calculated in daily time-steps. In general, for the modelled scenarios involving a full lake (water level at or around RL+ 37 m AHD), the majority of the in-pit features (excluding the SOB Dump) is always completely saturated past the initial pit filling time. During the pit filling time, the diffusive area increases as lake level rise (i.e. diffusion will only occur through the saturated zone).
    - The diffusivity of the fluid (water) was set to default water self-diffusion coefficient of $1e^{-9}$ m^2/s
    - The porosity of overburden and coal materials was set to 30% (Durie, 1991) for both diffusivity conductance calculations and calculations of saturated pore volume of overburden or coal subject to diffusion. Coal ash material porosity was set to 40% (Mudd, 2000).
    - Bulk density of overburden use default values for sandy clay, while ash use 0.5 g/cm^3 (Mudd, 2000) and coal 1.5 g/cm^3 (Durie, 1991).
    - The tortuosity quantifies the degree to which diffusion is slowed down due to the tortuous path that a diffusing species must travel as it moves through the pore space. The tortuosity of the in-pit features (pit walls, overburden dump and Former Ash Pond cap) pore space was set to 1, which is a conservative assumption (the value can be specified as a value from > 0 to 1).
    - Only the submerged portion of the in-pit features takes account in the diffusivity calculations hence the “r” variable was set to 1. The non-submerged portion of the in-pit features, during the pit filling process contributes runoff and seepage to the lakes (refer to Section 4.6.1).
    - The diffusive length L of the in-pit features is assumed to be ten-centimetres (cm) (i.e. the distance between the feature pore water (of constant concentrations) and the lake water). This is considered conservative, since, in reality, it would be expected that the diffusion zone would be much greater than 10 cm due to a contact zone “mixing” and hence the concentration gradient between these two fluids will be significantly smaller. Similarly, it is conservatively assumed that there is no depletion of porewater concentrations.
    - For the Former Ash Ponds, the diffusive length L was assumed to represent a thickness of the cap cover (i.e. 1 m). It should be noted that no attenuation of the constituents diffusing from the Former Ash Pond to the lake (or vice versa) was modelled within the cap material, which should be considered as a conservative assumption.
5. The volume of water within the saturated in-pit features is calculated in the model as a product of feature porosity and the in-pit feature volume based on its geometry and the relationship to lake water level. The quality of water within the saturated in-pit features is set to the respective seepage/ baseflow quality and it remains constant throughout the simulation.

4.10 Limitations, uncertainties and assumptions

All models estimate future conditions (e.g., physicochemical parameters) by reducing complex systems to a limited number of significant, often simplified, processes. Predicting the water qualities of complex systems requires many assumptions. Even a rigorous sampling and analysis programme cannot precisely determine all the physical, chemical, and geological characteristics of the system. Nor can they precisely indicate how these characteristics might change over time. Even though assumptions are informed by data they include an inherent level of uncertainty. As geochemical models become more sophisticated, the most important thing that gets lost is an understanding of the uncertainties associated with the predictions (Drever, 2011). While these uncertainties are generally hard to quantify, they can be recognised.

The following limitations, uncertainties and assumptions apply to this assessment:

- It should be recognised that the climate forecasting into the future will always have an associated uncertainty. However, the method adopted by RGS attempts to capture the full extent of climatic variability or uncertainty (i.e. through wet, dry and drought scenarios and stochastic modelling).
- There is uncertainty in climate change predictions, which increases the further into the future the predictions are made. However, RGS has modelled the range in potential water qualities using climate factors (linearly and straight line extrapolated past the available dataset) and stochastic modelling. The lack of climate factors beyond year 2065 is a limitation.
- Some of the AWBM modelling has been limited to the use of parameters adopted based on experience from similar assessments and literature.
- Bio-geochemical processes (e.g. nutrient cycle) and stratification are not considered as part of the RGS modelling.
- The groundwater flux inputs provided by GHD were limited to quarterly timesteps which were averaged into daily timesteps. The updated groundwater influx rates were calculated based on the data provided.
- This water balance water quality model was not coupled with the groundwater model for an iterative simulation (i.e. results were not passed between each model dynamically at each timestep). This means that the simulation of the water body elevation and hydrology was undertaken separately in both the WB/WQ model and the Groundwater model. This represented some duplication and overlap of a key driver of the pit water body groundwater flux estimates. Whilst best efforts were undertaken by RGS and GHD to align hydrology estimates and pit fill estimates, it is acknowledged that the model does not integrate with the groundwater modelling dynamically and iterate calculations and this may have impacted the groundwater flux estimates as well as the direct rainfall and evaporation estimates.
- Geochemical source terms are constant median values in the model. There is rarely sufficient data to identify how source terms may vary over time and whether the variation is systematic or random. This limitation is managed by assuming most source terms are constant. For declining source terms, this is a conservative assumption.
- The quality of water sources, such as groundwater, surface water, and rainwater, are the results of other complex systems (aquifer, catchment, atmosphere). While water composition can be determined in the laboratory with some accuracy, it requires a statistically relevant number of samples to establish inherent variability due to factors such as seasons, sediment movement, changes in gradient, etc. The required number of samples is only rarely obtained in practice.
- The technical feasibility of the filling and top-up was not considered by RGS.

5 Assessment criteria

Assessment criteria are used to assess the significance of an impact. For the lake water balance and water quality assessment, the key impact of concern is reduced water quality. A significant impact could eventuate if discharges from the lake (YEF) resulted in a change to the environmental values of surface water in the region. Accordingly, levels of various parameters estimated using modelling will be evaluated against criteria specified in relevant legislation and guidelines as outlined below.

The legislation and guidelines vary depending on a specified land use. Since there is currently no specified Post Mining Land Use (PMLU) for YCM. The results of the modelling will be compared to a range of water quality guidelines which will then be used to guide the PMLU.

The *Guidelines for Managing Risk in Recreational Water* have been developed by the National Health and Medical Research Council (NHMRC, 2008), with the primary aim of protecting the health of humans from threats posed by the recreational use of coastal, estuarine and fresh waters (NHMRC, 2008). For the assessment of chemical hazards, the guidelines have adopted the *Australian Drinking Water Guidelines* (ADWG) (NRMMC, 2004) to provide a point of reference for exposure through ingestion. The guidelines have since been updated in 2011 (NRMMC, 2011) and are used as one of the lake water quality assessment criteria.

The *Environment Reference Standard* (ERS) (2021) pursuant to the *Environment Protection Act 2017* outline the water quality indicators and objectives for the Victorian Central Foothills and Coastal Plains, which includes the Latrobe River basin (Table 2-1.). The ERS also references ADWG, and the revised *Australian and New Zealand Guidelines* for fresh and marine water quality guidelines – freshwater aquatic ecosystem (95% species protection; i.e. the concentration at which it is expected that 95% of species will be protected) and the recommended guidelines for livestock drinking water (ANZG, 2018). These are presented in Table 2-2.

Table 5-1 Water quality indicator and objectives for the receiving waterways as defined in the ERS (2021).

Total Phosphorus (µg/L)	Total Nitrogen (µg/L)	Dissolved Oxygen (% saturation)		Turbidity (NTU)	Electrical Conductivity (µS/cm@ 25°C)	pH (pH units)		Toxicants (Water)
75th Percentile	75th Percentile	25th Percentile	Maximum	75th Percentile	75th Percentile	25th Percentile	75th Percentile	% Protection
≤55	≤1,100	≥75	130	≤25	≤250	≥6.7	≤7.7	95

The fresh and marine water quality guidelines provide authoritative guidance on the management of water quality for natural and semi-natural water resources in Australia and New Zealand. They are therefore considered highly conservative for a pit lake assessment, but included for comparison.

The Livestock drinking water guidelines provide recommended values for biological, chemical and radiological substances that may occur in livestock drinking water. If levels of the substance in drinking water are below these values, there should be little risk of harmful effects on animal health (ANZG, 2018).

The ADWG provide a basis for determining the quality of water to be supplied to consumers in all parts of Australia; they are intended to provide a framework for good management of drinking water supplies.

These water quality guidelines are collectively used as the assessment criteria for lake water balance and water quality.

Table 5-2 Summary of key water quality trigger levels for freshwater aquatic ecosystems (95% species protection), livestock drinking water guidelines (ANZG, 2018) and Australian Drinking Water Guidelines (NRMMC, 2011).

Parameter	Unit	Australian Drinking Water Guidelines		Aquatic Ecosystem (95% species protection) Guideline	Livestock Drinking Water Guideline
		Health	Aesthetic		
Electrical conductivity	µS/cm	-		<1,000#	3,580^
Chlorophyll	mg/L			0.005	
Chloride	mg/L		250		
Sulfate	mg/L	-	250	-	1000
pH	-	6.5 to 8.5		6 to 9	-
Fluoride	mg/L	1.5		-	2
Nitrate	mg/L	-		0.7	400
TDS	mg/L	-		-	2,400
Aluminium	mg/L	-		0.055	5
Arsenic	mg/L	0.01		0.024	0.5
Barium	mg/L	2		-	-
Boron	mg/L	4		0.37	5
Cadmium	mg/L	0.002		0.0002	0.01
Calcium	mg/L	-		-	1000
Chromium (III+VI)	mg/L	0.05		0.001	1
Cobalt	mg/L	-		-	1
Copper	mg/L	2	1	0.0014	1
Mercury	mg/L	0.001		0.0006	0.002
Molybdenum	mg/L	0.05		-	0.15
Lead	mg/L	0.01		0.0034	0.1
Manganese	mg/L	0.5	0.1	1.9	-
Nickel	mg/L	0.02		0.011	1
Total Nitrogen	mg/L			0.35	
Nitrate Nitrogen	mg/L			0.1	
Ammonium	mg/L			0.01	
Total Phosphorous	mg/L			0.01	
Filterable Reactive Phosphorous	mg/L			0.005	
Selenium	mg/L	0.01		0.011	0.02
Zinc	mg/L	-		0.008	20

for still water bodies only, moving rivers at low flow rates should not exceed 2,200µS/cm.
^ Calculated based on total dissolved solids (TDS) conversion rate of 0.67% of EC. TDS is an approximate measure of inorganic dissolved salts and should not exceed 2,400mg/L for livestock drinking water.

6 Modelling results

The following section reports the key findings for the scenarios (i.e. Scenario 1 to Run 6) (**Table 6-1**). These results are of an indicated level of reliability.

Table 6-1: Yallourn project scenarios and sensitivities

Scenario ID	Fill Sources (annual until reach RL + 37m AHD)	Morwell River connected?	Top-up water	Climate
Scenario 1	Local catchment flows, natural groundwater & pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing).	No	No	Median
Scenario 2	Local catchment flows, natural groundwater, pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing) & 24 GL Latrobe water.	Yes (flood flows only)	Yes	Median
Scenario 3	Local catchment flows, natural groundwater, pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing), 34 GL Latrobe water & 14 GL Moondarra water.	Yes (flood flows only)	Yes	Median
Scenario 4	Local catchment flows, natural groundwater, pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing) & 24 GL Latrobe water.	Yes (all)	Yes	Median
Scenario 5	Local catchment flows, natural groundwater, pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing) & 24 GL Latrobe water.	Yes (flood flows only)	Yes	Dry
Scenario 6	Local catchment flows, natural groundwater, pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing) & 24 GL Latrobe water.	No	Yes	Median

6.1 Water balance

The water balance results are discussed below in terms of the time it takes to fill the lake(s) to the target water level (RL +37 m AHD) and the top-up volume required to maintain the lakes level. The sensitivity of the water balance to climate is also discussed.

A full summary of the modelled water balance results for each of the key contributing inflows and outflows (annual) is provided in **Attachment C**.

The greatest contributors to the lake water balance can be separated according to the ‘fill phase’ and ‘post fill phase’. The indicative annual pit inflows and outflows (minimum, maximum and median) during fill and post filling are presented in **Table 6-2** and **Table 6-3**, respectively. Note that Morwell River inflows for the connected scenarios and Latrobe water top-up is not an annual event so annual pit inflow statistics for these inputs can be misleading.

The dominant water balance inputs during the fill phase for the majority of scenarios are (in approximate order of largest volume to smallest):

- Pumped Latrobe water fill (excluding for Scenario 1).
- Morwell River flood flows (connected scenarios if these events occur during the fill phase).
- For the YEF, tunnel transfer from the YTF.
- Direct rainfall (noting this increases with time during fill as the lake surface area increases).

- Moondarra Reservoir water (Scenario 3 only).
- External catchment runoff.
- Internal catchment runoff (particularly for Scenario 1 since more features (overburden dumps, pit walls, etc.) in the pits are exposed for longer).
- Pumped groundwater.
- Groundwater (natural) inflow which is very small.

The only outflows during the fill phase occur via lake surface evaporation followed by groundwater seepage which is very small. The exchange of water from YTF to YEF is the dominant outflow for the YTF pit for all scenarios.

The dominant water balance inputs post filling for the majority of scenarios are (in approximate order of largest volume to smallest):

- Morwell River (only for Scenario 4 where the lake is fully integrated to Morwell River).
- Morwell River flood flows (connected scenarios only when these events occur)
- Conveyor tunnel transfer from YTF to YEF (note: the tunnel transfers for Scenario 4 reflect the complete mixing of the lakes after filling. This was achieved by setting a very high conveyor tunnel transfer rate between the lakes).
- Latrobe top-up water (particularly for the dry Scenario 5 and excluding for Scenario 1 which does not reach fill capacity over the simulation period; **Section 6.1.1**).
- Direct rainfall.
- External catchment runoff.
- Groundwater (natural) and internal catchment runoff is very small.

The dominant outflow post filling is evaporation, except during those years when overflow occurs via Spillway 4; this is particularly evident for Scenario 4 where the lake is fully integrated with the Morwell River so is a flow through system, with flow in approximately equalling flow out. The exchange of water between YTF to YEF is also a dominant outflow for YTF.

Groundwater outflow (seepage) is generally very small relative to the other outflows.

Table 6-2: Indicative annual pit inflows and outflows during filling

Scenario		1			2			3			4			5			6		
Statistic		Min	P50	Max	Min	P50	Max	Min	P50	Max	Min	P50	Max	Min	P50	Max	Min	P50	Max
Fill time		NA	NA	NA	22.3	24.5	26.5	11.9	12.7	13.4	22.3	24.5	26.5	24.8	27.5	29.5	23.4	25.3	26.6
Indicative annual pit lake inflows (GL)																			
Direct rainfall	YTF	0.72	2.98	5.44	1.59	5.57	10.55	1.63	4.60	10.24	1.59	4.47	11.76	1.50	4.28	9.84	1.59	4.51	11.47
	YEF	0.50	4.50	8.54	0.59	5.50	9.34	1.25	5.28	8.91	0.59	5.22	9.95	0.53	4.81	8.48	0.57	5.22	9.70
Internal catchments	YTF	0.11	1.32	4.56	0.08	0.70	3.50	0.08	1.15	3.36	0.08	0.95	3.50	0.06	0.77	3.04	0.08	0.94	3.50
	YEF	0.06	0.70	3.48	0.05	0.52	3.37	0.07	0.66	2.77	0.05	0.58	3.37	0.05	0.46	3.06	0.06	0.59	3.37
External catchments	YTF	0.14	1.63	6.55	0.31	1.70	5.84	0.39	1.82	5.08	0.31	1.76	5.84	0.25	1.30	4.76	0.31	1.75	5.84
	YEF	0.06	0.51	2.01	0.11	0.53	1.79	0.13	0.57	1.56	0.11	0.55	1.79	0.09	0.41	1.47	0.11	0.55	1.79
Groundwater inflow	YTF	0.44	0.74	1.42	0.65	0.80	1.42	0.65	0.88	1.15	0.65	0.89	1.42	0.55	0.86	1.42	0.65	0.88	1.42
	YEF	0.80	1.03	1.46	1.03	1.11	1.46	1.03	1.19	1.39	1.03	1.18	1.46	0.88	1.18	1.46	1.01	1.18	1.46
Groundwater pumped	YTF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	YEF	1.00	1.00	1.50	1.00	1.00	1.50	1.00	1.00	1.50	1.00	1.00	1.50	1.00	1.00	1.50	1.00	1.00	1.50
Conveyer transfer in	YTF	0.00	0.00	0.14	0.00	0.00	0.23	0.00	0.00	0.49	0.00	0.00	6.01	0.00	0.00	1.01	0.00	0.00	0.00
	YEF	0.00	0.83	10.74	8.01	11.93	49.57	8.07	12.62	60.61	8.01	13.22	49.57	6.03	12.73	42.81	7.57	13.03	35.44
MRD spillways	YTF	0.00	0.00	0.00	0.00	0.00	19.11	0.00	0.00	19.11	0.00	0.00	19.11	0.00	0.00	18.30	0.00	0.00	0.00
	YEF	0.00	0.00	0.00	0.00	0.00	15.59	0.00	0.00	15.59	0.00	0.00	15.59	0.00	0.00	15.24	0.00	0.00	0.00
Latrobe pumped in to first fill	YTF	0.00	0.00	0.00	23.98	23.98	24.05	33.98	33.98	34.07	23.98	23.98	24.05	23.98	23.98	24.05	23.98	23.98	24.05
Moondarra pumped in	YTF	0.00	0.00	0.00	0.00	0.00	0.00	13.99	13.99	14.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Indicative annual pit lake outflows (GL)																			
Evaporation	YTF	1.68	5.22	6.78	4.39	9.50	12.16	4.85	7.36	11.95	4.39	7.62	12.17	4.41	7.92	12.54	4.38	7.71	12.15
	YEF	1.13	7.92	8.79	1.26	9.28	10.29	2.72	8.60	10.12	1.26	8.73	10.30	1.22	8.93	10.62	1.22	8.76	10.28
Groundwater seepage	YTF	0.02	0.05	0.08	0.02	0.06	0.08	0.02	0.04	0.06	0.02	0.06	0.08	0.02	0.06	0.08	0.02	0.06	0.08
	YEF	0.01	0.07	0.10	0.01	0.06	0.08	0.01	0.02	0.03	0.01	0.03	0.08	0.01	0.04	0.08	0.01	0.04	0.08
Conveyor transfer out	YTF	0.00	0.83	10.74	8.01	11.93	49.57	8.08	12.62	60.76	8.01	13.22	49.57	6.03	12.72	42.81	7.57	13.02	35.44
	YEF	0.00	0.00	0.14	0.00	0.00	0.23	0.00	0.00	0.49	0.00	0.00	6.03	0.00	0.00	1.01	0.00	0.00	0.00

Notes: *Morwell River flood inflows and outflows are not an annual event.

Table 6-3: Indicative annual pit inflows and outflows once full for each scenario

Scenario		2			3			4			5			6		
Statistic		Min	0.5	Max	Min	0.5	Max	Min	0.5	Max	Min	0.5	Max	Min	0.5	Max
Fill time		22.3	24.5	26.5	11.9	12.7	13.4	22.3	24.5	26.5	24.8	27.5	29.5	23.4	25.3	26.6
Pit lake inflows																
Direct rainfall	YTF	3.26	7.03	12.68	3.25	7.04	12.68	3.48	7.58	13.56	2.79	6.02	11.03	3.25	7.03	12.68
	YEF	2.77	5.97	10.78	2.76	5.97	10.78	2.95	6.41	11.47	2.37	5.12	9.37	2.76	5.96	10.78
Internal catchments	YTF	0.03	0.35	1.22	0.03	0.35	1.22	0.03	0.40	1.33	0.01	0.21	0.90	0.03	0.36	1.23
	YEF	0.03	0.39	1.37	0.03	0.39	1.37	0.03	0.45	1.49	0.01	0.23	1.00	0.03	0.39	1.37
External catchments	YTF	0.14	1.60	6.54	0.14	1.60	6.54	0.25	1.92	7.22	0.03	0.95	4.65	0.14	1.60	6.57
	YEF	0.06	0.50	2.01	0.06	0.50	2.01	0.10	0.60	2.21	0.02	0.31	1.43	0.06	0.50	2.01
Groundwater inflow	YTF	0.44	0.71	1.32	0.44	0.72	1.42	0.44	0.71	1.32	0.44	0.71	1.32	0.44	0.71	1.32
	YEF	0.80	1.00	1.35	0.80	1.01	1.46	0.80	1.00	1.35	0.80	1.00	1.35	0.80	1.00	1.35
Conveyer transfer in	YTF	0.00	0.00	1.12	0.00	0.00	1.13	0.00	4.58	7.73	0.00	0.06	1.22	0.00	0.00	1.13
	YEF	0.00	0.38	30.33	0.00	0.41	30.34	3.91	5.44	7.42	0.00	0.13	15.20	0.00	0.32	9.52
MRD spillways (not annual event)	YTF	0.00	0.00	30.43	0.00	0.00	30.43	0.00	0.00	0.00	0.00	0.00	15.73	0.00	0.00	0.00
	YEF	0.00	0.00	21.70	0.00	0.00	21.70	0.00	114.80	421.70	0.00	0.00	13.90	0.00	0.00	0.00
Latrobe topup after first fill (not annual event)	YTF	0.00	0.00	13.41	0.00	0.00	13.89	0.00	0.00	0.00	0.00	0.21	13.72	0.00	0.00	13.44
Pit lake outflows																
Evaporation	YTF	11.11	12.34	12.49	11.79	12.34	12.49	11.11	12.45	12.51	11.17	12.86	12.99	11.33	12.34	12.48
	YEF	9.81	10.48	10.57	10.05	10.48	10.57	9.81	10.53	10.58	9.96	10.93	11.01	9.88	10.48	10.57
Groundwater	YTF	0.04	0.05	0.07	0.04	0.06	0.08	0.04	0.05	0.07	0.04	0.05	0.07	0.04	0.05	0.07
	YEF	0.06	0.07	0.10	0.04	0.07	0.10	0.06	0.07	0.10	0.06	0.08	0.10	0.06	0.07	0.10
Conveyor transfer out	YTF	0.00	0.38	30.33	0.00	0.42	30.34	3.91	5.44	7.41	0.00	0.13	15.20	0.00	0.32	9.49
	YEF	0.00	0.00	1.12	0.00	0.00	1.12	0.00	4.59	7.74	0.00	0.06	1.22	0.00	0.00	1.13
Overflow	YEF	0.00	0.00	48.21	0.00	0.00	49.10	0.00	111.95	413.65	0.00	0.00	28.51	0.00	0.00	12.52

Notes: *Morwell River flood inflows and outflows are not an annual event.
^Latrobe top-up not an annual event
Scenario 1 (base case) not shown because it doesn't reach fill height.

6.1.1 Pit fill time

The results in **Table 6-4** show the time required to fill the lake to an elevation of RL +37 m AHD, while **Table 6-5** shows the volume of pumped water required to achieve first fill. The key results for each of the scenarios are summarised in the following points.

- Scenario 1 did not fill over the simulation period. The maximum lake elevation reached is +15.5 m AHD for both the YTF and YEF lakes (**Figure 6-1** and **Figure 6-2**).
- Scenario 2 fills between 23 and 27.4 years (mean probability 25.3 years). Scenario 5, the equivalent of Scenario 2 with dry climate, fills between 25.7 and 30 years (mean probability 28.1 years). The dry climate change sensitivity adds an additional 2.8 years (mean probability) to fill time.
- Scenario 3 fills between 12.3 and 13.5 years (mean probability 12.9 years). The faster fill time relative to Scenario 2 is due to the additional 10 GL/year Latrobe water and 14 GL/year Moondarra Reservoir water.
- Scenario 4 is essentially the same as Scenario 2 during the fil phase so fills between 23 and 27.4 years (mean probability 25.3 years).
- Scenario 6 fills between 24.4 and 27.5 years (mean probability 25.9 years). The exclusion of the Morwell River flood flows during the filling period (unlike Scenario 2) adds an additional 0.6 years (mean probability) to fill time. Noting that a large Morwell River flood event during the fill phase will affect the fill time significantly.

Table 6-4: Timeframes required to achieve the desired water level for each scenario

Scenario	Time to fill (years)					
	Mean	Min	P5	P50	P95	Max
1^	NA	NA	NA	NA	NA	NA
2	25.3	23.0	23.6	25.5	26.6	27.4
3	12.9	12.3	12.4	12.9	13.5	13.5
4	25.3	23.0	23.6	25.5	26.6	27.4
5	28.1	25.7	26.6	28.4	29.5	30.0
6	25.9	24.4	24.6	25.7	26.8	27.5

^Scenario 1 did not reach full lake elevation.

Table 6-5: Volume of pumped water to achieve first fill for each scenario

Scenario	Volume pumped water to achieve first fill (GL)					
	Mean	Min	P5	P50	P95	Max
1^	0.0	0.0	0.0	0.0	0.0	0.0
2	606.4	551.8	567.0	610.9	637.5	658.1
3	620.7	588.1	595.9	616.9	646.0	650.2
4	606.4	551.8	567.0	610.9	637.5	658.1
5	674.8	616.0	637.3	681.0	707.1	720.0
6	621.7	585.3	591.6	617.6	642.1	660.9

^Scenario 1 did not reach full lake elevation.

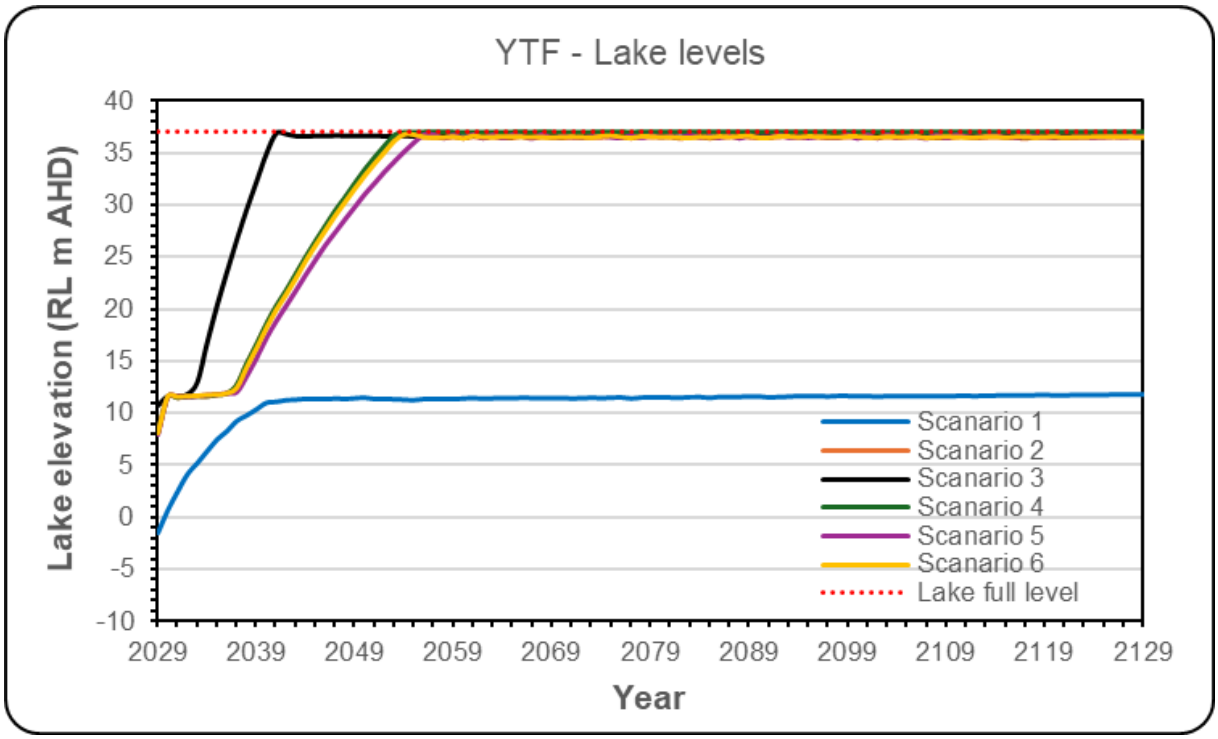

Figure 6-1: Pit lake water level for YTF (50th percentile)

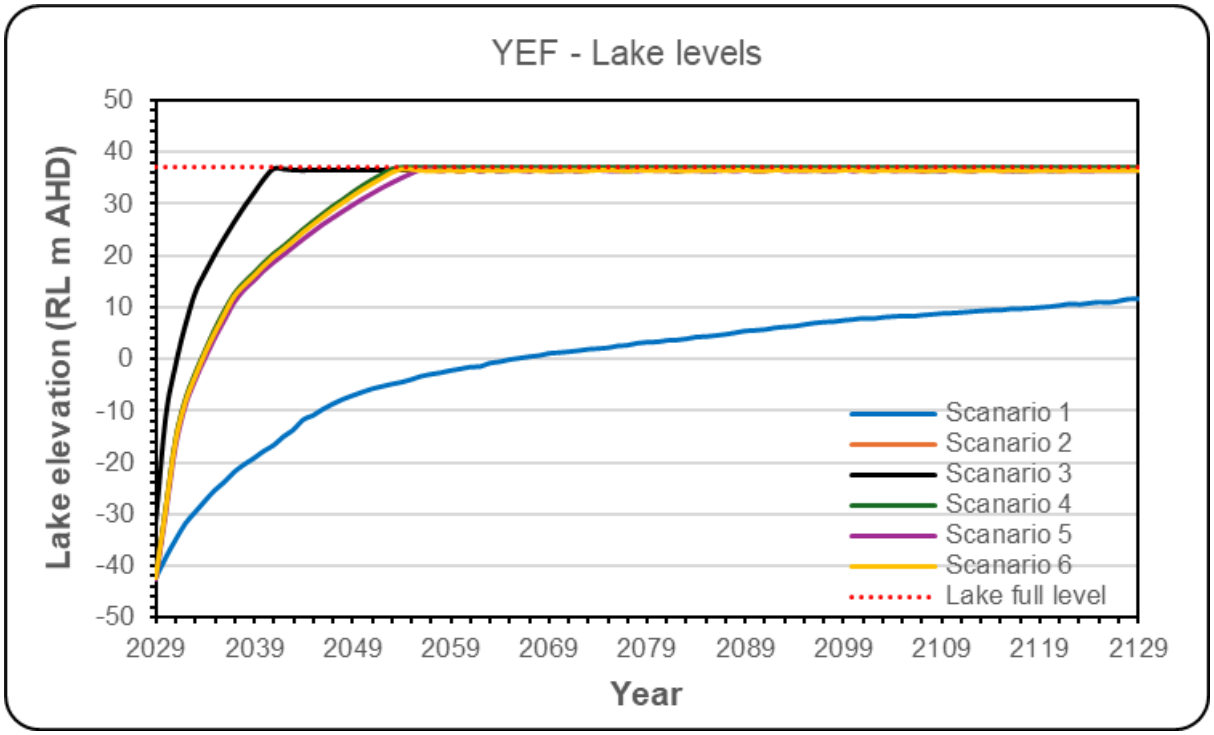

Figure 6-2: Pit lake water level for YEF (50th percentile)

6.1.2 Pit top-up volume

Pit top-up volumes are defined as the 'on going' inflow volumes from Latrobe water required to maintain the lake elevation at around RL +37m AHD. For all scenarios, except Scenario 1 (base case) which does not reach fill height, the top-up takes place when the pit water level falls below minimum elevation of RL +36 m and it stops when the lake reaches the maximum elevation of RL +37 m (at +37.1 m outflow to Latrobe River would occur via Spillway 4).

Table 6-6 shows the annual volume of top-up required once the pit is filled for each scenario. The frequency for top-up is not a fixed event (**Figure 6-3**), therefore **Table 6-6** can be misleading since top-up is not triggered annually (i.e. when lake level drops to RL +36 m). **Table 6-7** shows the total top-up volume required over the simulation for each scenario.

The probability of top-up results is influenced by the relatively narrow band of lake elevation within which the top-up requirement is triggered (i.e. 1 m), resulting in the need to periodically top-up the pit from external water sources. Additionally, decrease in rainfall over time, especially for the dry climate scenario, results in potential increase in annual top-up volume over time.

The only exception is Scenario 4 which is fully integrated with the Morwell River (once full) so does not require top-up over the simulation period. A further benefit of Scenario 4 is that lake levels, once full, only ever drop to a minimum of +36.5 m AHD i.e. a smaller range of lake levels compared to other post-fill scenarios.

For those scenarios that require top-up, the mean annual top-up volume varies from 2.1 to 5.1 GL/year. The climate sensitivity analysis for the preferred scenario (Scenario 2 and Scenario 5) show substantial differences for top-up requirements. For example, the mean annual top-up required in dry climate (Scenario 5), is approximately 45% more than required for the median scenario (Scenario 2) (**Table 6-6** and **Table 6-7**).

It should be noted that the requirement for top-up increases with time and reflects the expected climate change over time with predicted increased evaporation and decreased rainfall.

There is an opportunity to decrease top-up volumes by operating the top-up functionality differently. For example, allowing a freeboard would mean less water is lost via Spillway 4 if a Morwell River flood event occurs soon after a top-up event. Similarly, the top-up pumping rate will affect top-up volumes in the long term.

Table 6-6: Indicative annual pit top-up for each scenario

Scenario	Indicative annual top-up (GL) over simulation period					
	Mean	Min	P5	P50	P95	Max
1	0.00	0.00	0.00	0.00	0.00	0.00
2	2.61	2.10	2.23	2.62	2.96	3.17
3	2.73	2.34	2.41	2.71	3.05	3.14
4	0.00	0.00	0.00	0.00	0.00	0.00
5	4.66	4.13	4.35	4.66	5.00	5.10
6	2.80	2.26	2.49	2.83	3.09	3.21

Note: Scenario 1 (base case) does not reach 'full' elevation, so no top-up required. Scenario 4 has no provision for external top-up, relying entirely on Morwell River inflows to maintain lake level.

Table 6-7: Volume of pumped water to maintain lake water levels (post initial fill)

Scenario	Indicative top-up volume over simulation period (GL)					
	Mean	Min	P5	P50	P95	Max
1	NA	NA	NA	NA	NA	NA
2	195.0	161.6	170.6	195.5	217.4	229.9
3	237.4	205.1	211.5	236.1	263.6	271.3
4	0.0	0.0	0.0	0.0	0.0	0.0
5	334.7	307.0	319.4	333.9	352.8	357.0
6	207.7	170.8	187.8	209.9	226.2	232.4

Note: Scenario 1 (base case) does not reach 'full' elevation, so no top-up required. Scenario 4 has no provision for external top-up, relying entirely on Morwell River inflows to maintain lake level.

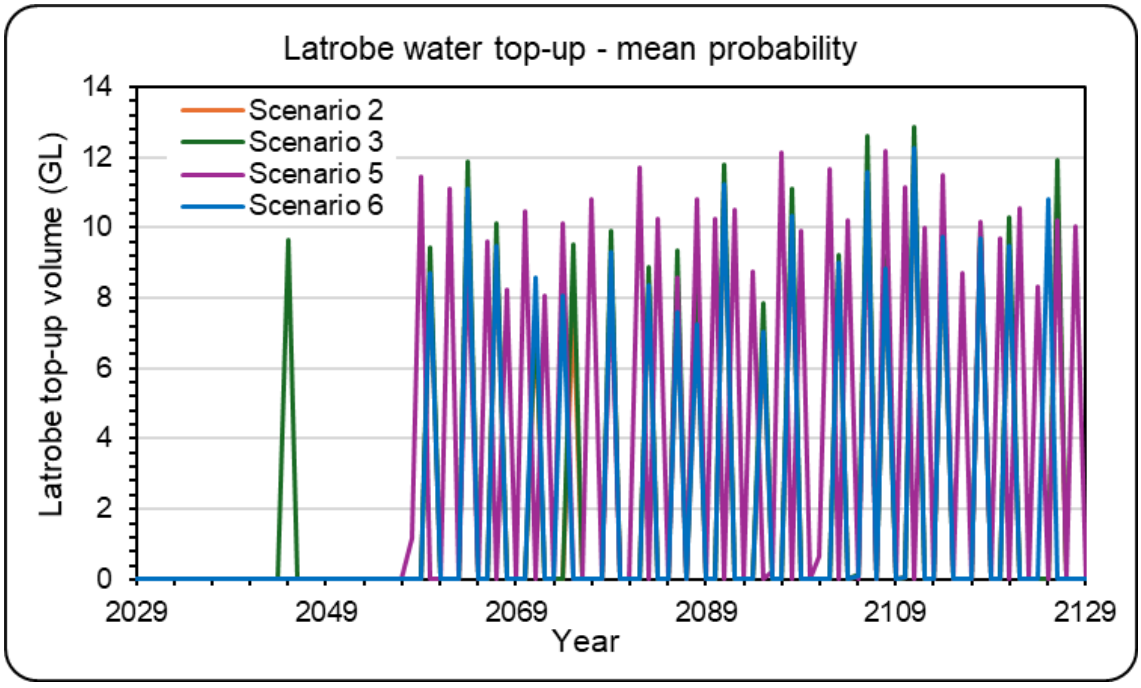

Figure 6-3: Indicative top-up required post fill for each scenario (mean probability realisation 1). Scenario 1 and Scenario 4 not shown because no top-up required.

6.1.3 Climate influence

The probabilistic scenarios applied 100 stochastic climate timeseries replicates over 100 realisations (model runs) to understand how the lake responded under climatic uncertainty, and these were run for median (Scenario 2) and dry (Scenario 5) climate sensitivities.

The probabilistic results for the pit filling timeframes and top-up volumes are presented in **Table 6-4** and **Table 6-7.** Overall, the results show that the pit fill times were sensitive to climatic uncertainty (e.g. **Figure 6-4** and **Figure 6-5** for Scenario 2). The main reason for the variation in the time to fill the pit for the probabilistic simulations is largely driven by the large contribution of Morwell River flood flows, direct rainfall and catchment runoff to the water balance which are all climate dependent. The YTF was more sensitive to climate uncertainty earlier in the model simulation (e.g. **Figure 6-4**), since the YTF lake was initially isolated from the YEF lake which was receiving Latrobe fill

water. Once the lake reached the conveyor tunnel elevation and received transfer of water from YEF, the effects of climate uncertainty were smoothed.

Similarly, the required top-up volumes are also sensitive to climatic uncertainty. The required top-up volume is driven mainly by the balance between the inputs from net rainfall and runoff that the lake receives and loses from evaporation, with Morwell River flood flows affecting the balance.

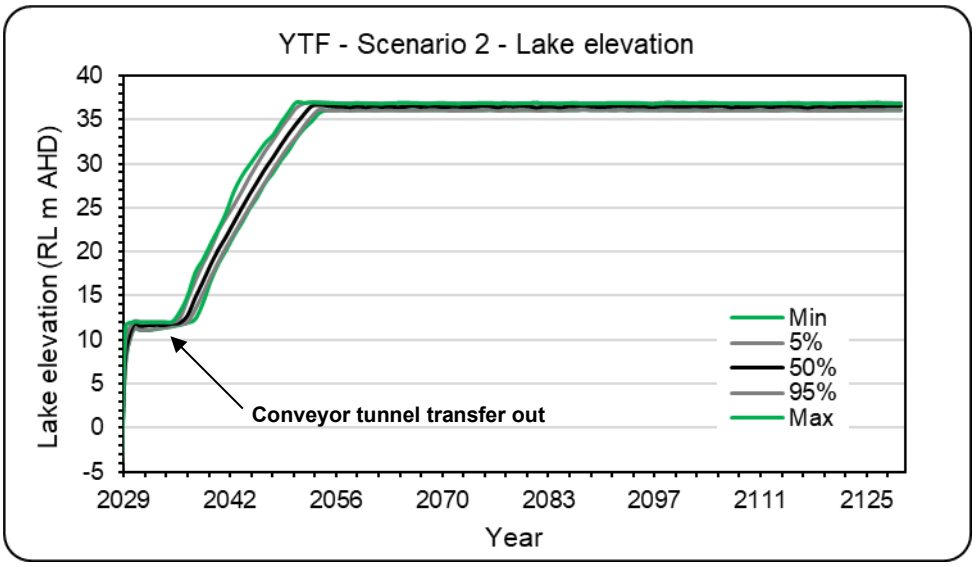

Figure 6-4: YTF modelled probabilistic lake elevations.

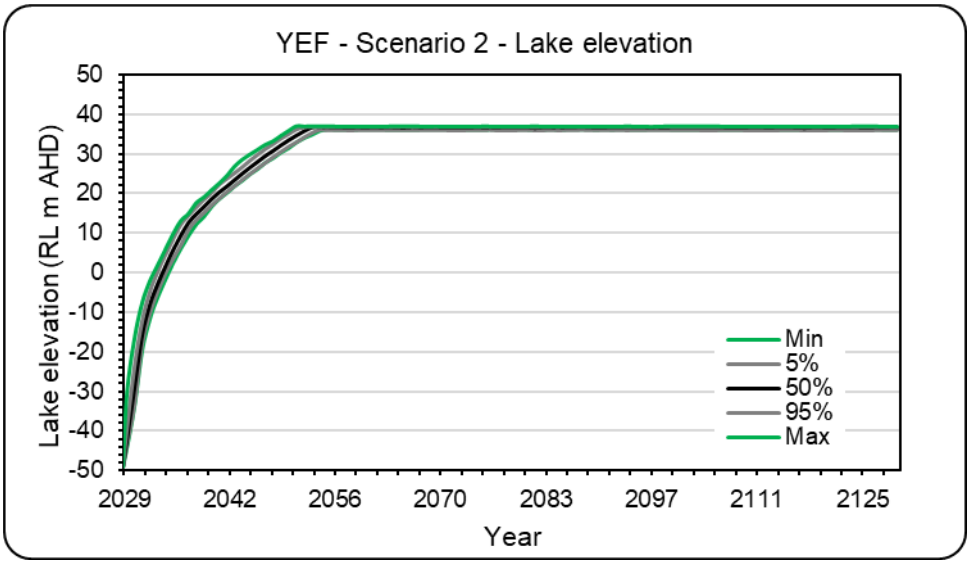

Figure 6-5: YEF modelled probabilistic lake elevations.

6.2 Water Quality

Hydrogeochemical modelling of the lakes water quality is an iterative process similar to the water balance modelling, with results for daily time steps available for the scenarios. Key results were exported from the model to summarise the key water quality results.

A full summary of the water quality results for each of the modelled deterministic scenarios and sensitivities for select years (years 5, 10, 25, 50, 75 and 100) are shown in **Attachment D**. Corresponding water quality versus time graphs are shown for each of the scenarios for each modelled water quality parameter in **Attachment E**.

The modelled concentrations presented in this and following sections are all dissolved, and total concentrations are likely to be significantly higher (due to the contributions from particulates) especially for runoff from surrounding landforms. It also needs to be highlighted that the mass balance approach does not include mineral(s) precipitation (which would reduce dissolved concentrations in the lake for chemical species associated with the precipitated mineral), so the modelled results are considered conservative.

The modelled lake water qualities are compared to the revised Australian and New Zealand Guidelines for fresh and marine water quality guidelines – freshwater aquatic ecosystem (95% species protection) and livestock drinking water guidelines (ANZG, 2018), as well as the Australian Drinking Water Guidelines (NRMMC, 2011) (refer to **Section 5**).

6.2.1 General lake water quality trend

The general water quality trends for the lakes varies for different modelled parameters and reflect the dominant water balance inputs and geochemical source terms during the fill phase (Latrobe water fill [scenario 2-6], direct rainfall, catchment runoff and Morwell River flood flows (connected only)) and post fill phases (direct rainfall, catchment runoff, Latrobe water top-up (if required) and Morwell River flood flows (connected only)).

The estimated water qualities for each of the lakes (YTF and YEF) are different even through there is water transfer via the conveyor tunnels (e.g. **Figure 6-6**). Generally, the water quality of the YEF is marginally better for most modelled parameters than YTF, due a combination of the following points:

- The poorer seepage water quality associated with internal overburden dumps (NOB Dump, SOB Dump) and the Former Ash Ponds.
- The effects of evapoconcentration are greater for YTF lake due to its greater surface area and shallower depth.
- Solutes are generally released from YEF during flood events via Spillway 4 (once full).

The only exception is for Scenario 4 where the Morwell River is completely integrated into the lakes post filling, meaning that there is a single mixed lake with near identical water qualities (**Figure 6-6**).

The conveyor tunnels influence the water qualities of the lakes, particularly earlier on in the simulation (< 5 years) (e.g. **Figure 6-7**). Once the conveyor tunnel elevations are reached, there is a transfer of water from YTF to YEF, resulting in a plateau of water quality concentration (represented as TDS) in the YTF and either an increase (concentration) or decrease (dilution) of water quality concentrations in the YEF. Once the lake levels equilibrate, then there is generally an increase in concentration in the YTF (since there is no longer transfer (removal) of solutes from YTF to YEF) and a plateau in YEF (e.g. **Figure 6-7**). As the lake level in the YTF progressively inundates overburden dumps (NOB, SOB and Midfield Dumps) and the Former Ash Ponds there is a decrease in concentration in YEF (due to a

decrease in seepage and runoff contributions to the lake). Once the lake(s) reach 'full' (except for Scenario 1) there is a slight adjustment in YTF and YEF water quality before reaching steady state.

The water quality results for pH, salinity, metals and metalloids are summarised in the below sections.

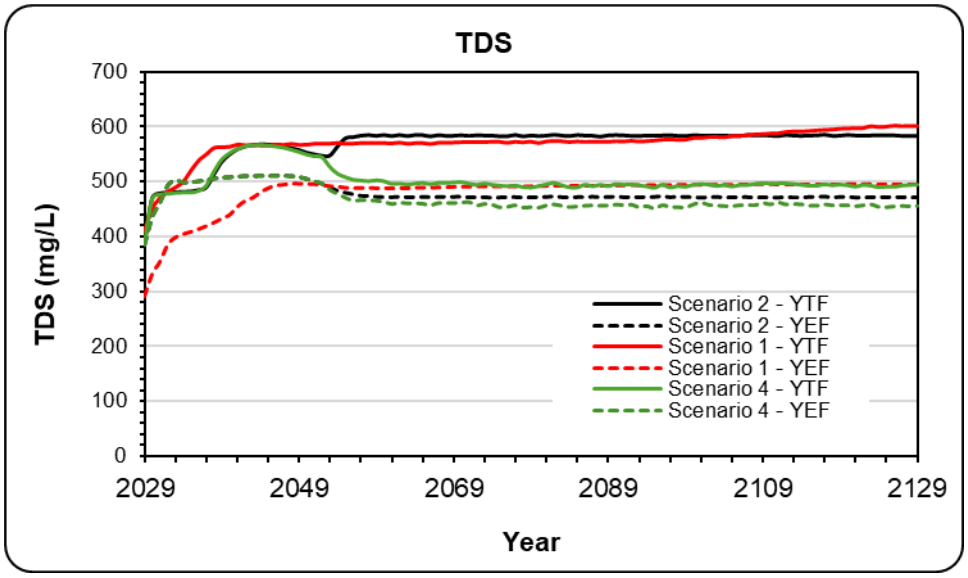

Figure 6-6: Median probability TDS (mg/L) for YEF and YTF highlighting concentration difference between lakes.

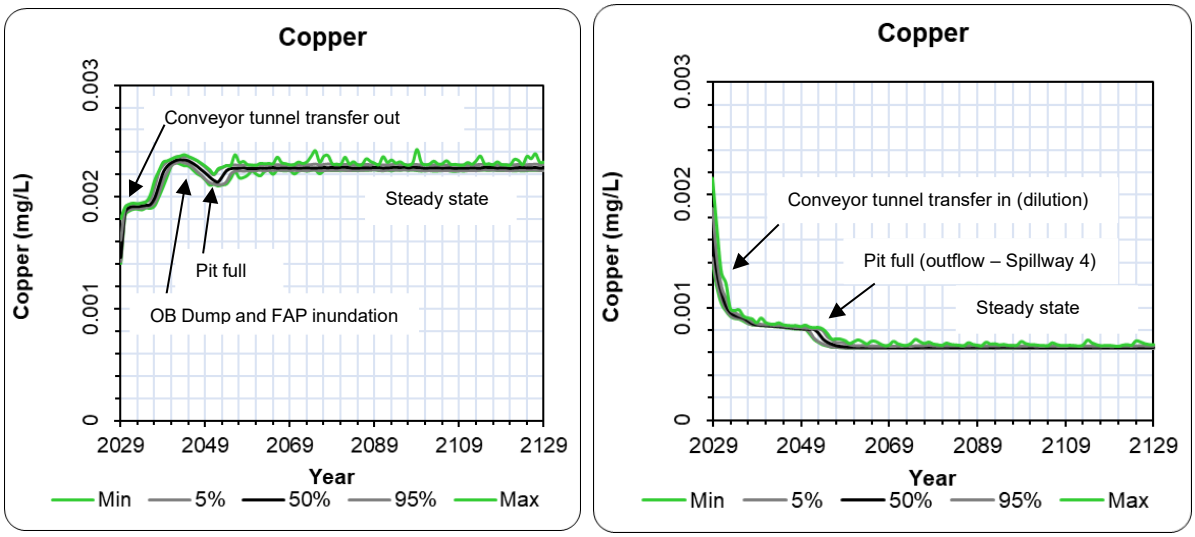

Figure 6-7: Estimated Copper (mg/L) concentration for Scenario 2. YTF left, and YEF right.

6.2.2 Lake pH

The results for each of the modelled scenarios indicate that (mass balance) pH is slightly acidic to neutral over the simulation period, with a pH range of ~ pH 4.11 to pH 6.65 (**Table 6-7**). The pH of the YTF is approximately a 0.5 pH unit less than the modelled YEF pH. The pH of the lake trends towards the key water balance inputs which are generally dominated by Latrobe water (median = pH 7.1), direct rainfall (median pH = 5.3), Morwell River flood flows (median pH = 7.3), external catchments (median pH = 7), internal catchments (seepage and runoff) (median pH = 3.91 to 5.7) and pumped and natural

groundwater (median pH = 4.7 to 5.7). Similarly, the influence of acidic drainage, mainly associated with NOB Dump, Eastfield Dump and some pit walls, contributes to the lakes slightly acid/ acid pH; however, this is expected to become less evident with time as the influence of seepage from the internal overburden dumps and pit wall runoff is less prevalent when the pit is full (i.e. diffusion becomes the dominant process by which acidity enters the lake which is orders of magnitude lower than the contributions from seepage/ runoff).

The mass balance approach of modelling pH excludes key geochemical reaction including the potential acid buffering effects of some materials in the pit (coal ash and some overburden materials), and dissolved alkalinity associated with some of the key water balance inputs (e.g. Latrobe water). Furthermore, atmospheric equilibration of natural and pumped groundwater inflows to the lake may alter pH. For example, as the pumped groundwater in the lake equilibrates with atmospheric concentrations of carbon dioxide ($CO_{2(g)}$) and oxygen ($O_{2(g)}$), excess dissolved carbon dioxide from groundwater is vented to the atmosphere and diffusion of atmospheric oxygen into the lake. The loss of carbon dioxide results in a slight increase in pH due to a decrease in carbonic acid.

The effect of thermodynamic constraints and atmospheric equilibrium are discussed for the lake in **Section 6.2.5**. The PHREEQC model predicted pH which incorporates atmospheric equilibrium is ~pH 7 and pH 7.6 for the YTF and YEF, respectively, over the 100-year modelling period. This is consistent with the water quality of the existing water bodies within the mined voids which include: Lake Placid (median pH = 6.6), Floc Pond (median pH = 7) and Fire Service Pond (median pH = 6.7). However, incorporation of thermodynamic constraints (i.e. precipitation of ion (oxy)hydroxides)) results in generation of acidity, consumption of alkalinity and a change in lake pH to 4.5 and 7.5, in the YTF and YEF, respectively. There are limitations to this modelling discussed in **Section 6.2.5**.

Table 6-8: Estimated pH values for YTF and YEF over time using mass balance approach

Parameter		pH											
Scenario		1		2		3		4		5		6	
Statistic	Year	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
YTF	5	5.08	5.22	4.25	4.45	4.11	4.33	4.25	4.45	4.24	4.40	4.24	4.38
	10	5.06	5.15	4.35	4.58	4.40	4.54	4.35	4.58	4.31	4.48	4.34	4.50
	25	5.06	5.18	4.65	5.15	4.96	5.15	4.65	6.20	4.62	4.96	4.65	5.07
	50	5.06	5.14	4.95	5.19	4.96	5.19	5.61	6.09	4.93	5.07	4.95	5.10
	75	5.05	5.15	4.95	5.18	4.95	5.22	5.55	6.14	4.93	5.11	4.94	5.13
	100	5.05	5.13	4.95	5.27	4.96	5.28	5.56	6.09	4.92	5.07	4.95	5.12
YEF	5	5.37	5.41	6.23	6.42	6.58	6.65	6.23	6.42	6.26	6.47	6.23	6.38
	10	5.47	5.60	6.29	6.33	5.56	5.77	6.29	6.33	6.30	6.33	6.29	6.32
	25	5.56	5.62	5.56	6.23	5.41	5.55	5.39	6.23	5.89	6.28	5.68	6.23
	50	5.59	5.61	5.42	5.58	5.41	5.55	5.38	5.84	5.40	5.54	5.42	5.54
	75	5.59	5.61	5.42	5.54	5.42	5.54	5.34	5.96	5.40	5.52	5.42	5.54
	100	5.60	5.61	5.42	5.56	5.41	5.56	5.38	5.93	5.40	5.54	5.42	5.54

6.2.3 Lake salinity and major ions

The estimated water qualities for the lakes are dominated by the major ions sulfate (SO_4), chloride (Cl), sodium (Na), with lesser magnesium (Mg), calcium (Ca) and potassium (K). Iron, not a major ion, is also a dominant contributor to the lakes water quality; however, this is likely overly conservative due to the mass balance approach of modelling and the potential overestimation of iron concentrations due to colloids passing through filtration (refer to **Section 6.2.5**).

The estimated TDS concentrations for the lakes vary slightly depending on the scenario (**Figure 6-8** and **Figure 6-9**); however, at the end of the simulation period (100 years), there is only a relatively tight range in TDS values between modelled scenarios (e.g. the mean probability TDS range at the end of the simulation for Scenario 2, 3, 5 and 6 is 575 mg/L (minimum) to 591 mg/L (maximum) for YTF lake and 465 mg/L (minimum) to 476 mg/L (maximum) for YEF lake) (**Figure 6-8**). The tight range in estimated TDS values is due to the fill and top-up water qualities dominating the lake water balance regardless of scenario.

The estimated YTF lake TDS concentrations for Scenario 4 are lower (~100 mg/L lower) than for the other scenarios due to the influence of being fully integrated with the Morwell River (after filled) which acts to both dilute lake concentrations and release solutes to Latrobe River via Spillway 4 (**Figure 6-8**).

The estimated YEF lake TDS concentrations for Scenario 1 (base case) are marginally higher (~25 mg/L) than the other scenarios (**Figure 6-8** and **Figure 6-8**) due to a combination of the following points:

- the effects of evapoconcentration with inflows exceeding outflows (excluding evaporation which leaves solute mass in the lake).
- No large dilution inflows are received from the Morwell River like other connected scenarios.
- Seepage and runoff from pit walls and overburden dumps continue to release solutes to the lake due to these features being exposed above the lake surface.

Generally, the TDS results show that during the fill phase for all scenarios, the same general trend occurs (refer to **Section 6.2.1**). For YTF lake, there is an initial increase in TDS with time due to the dominant water balance inputs during the fill phase, but also, to a lesser extent, the minor water balance inputs that contribute a greater mass load to the pit (e.g. seepage water quality from the NOB Dump, Former Ash Ponds and pit walls). After the initial increase, once the lake level reaches the conveyor tunnels, there is a plateau as solutes are removed from the lake to YEF. As the lake water levels equilibrate, the transfer of water from YTF to YEF is significantly reduced so TDS increases. The TDS concentration then plateaus or decreases reflecting the inundation of the overburden dumps, Former Ash Ponds and pit walls, before reaching a steady state post filling (e.g. **Figure 6-8** and **Figure 6-10**). The contribution of mass load from key features within the YTF pit is less pronounced with time as they become inundated (e.g. the NOB Dump becomes inundated at ~ RL 25 m). When the NOB Dump, Former Ash Ponds and pit walls (etc.) become inundated, the contribution of solutes to the lake from these sources is no longer controlled by runoff and seepage but is controlled by diffusive flux which is significantly slower.

The estimated TDS concentrations of the YEF also show a general increase in TDS during the fill phase. There is generally a sharp increase for the first 2- 5 years followed by a plateau (**Figure 6-11**). The increase in estimated TDS concentration reflects the dominant water balance inputs during the fill phase such as conveyor tunnel inflow from the YTF. Once the lakes levels are equilibrated, and the inflows from YTF are significantly reduced, there is a plateau in TDS. There is a release of solutes from YEF to YTF, leading to a plateau in TDS until the lake is full.

During the post fill phase, the lake TDS concentrations tend to diverge between scenarios depending on if the Morwell River is fully integrated (Scenario 4) or not. For Scenario 1 (base case) where the Morwell River is not connected and there is no top-up, the TDS concentration increases slightly with time in both lakes due to evaporation (i.e. evapoconcentration). Since Scenario 1 model simulates a ‘terminal sink’, the only means for removal of solutes (in the model) is via groundwater seepage, which is relatively low/ negligible. Conversely, for the other scenarios where the Morwell River is connected to the lake (whether it be fully integrated or receiving flood flows via the three spillways), there are TDS concentration decreases during Morwell River flood flow events. The connection of the Morwell River acts to dilute lake water quality during flood events, while also removing solutes via Spillway 4. Similarly, the inflows from lake top-up water acts to buffer the effects of climate change and variability. This is

why, for all scenarios (excluding Scenario 1 which receives no top-up), the TDS concentrations are relatively consistent post filling (i.e. a steady state is reached).

The TDS and major ion concentration probabilities (maximum and minimum) at 5, 10, 25, 50, 75 and 100 years were compared with the assessment criteria (**Section 5**; **Table 5-2**). TDS, sulfate and calcium is well below the guideline (2,400 mg/L, 1,000 mg/L and 1,000 mg/L, respectively) for each of the scenarios (**Table 6-10**).

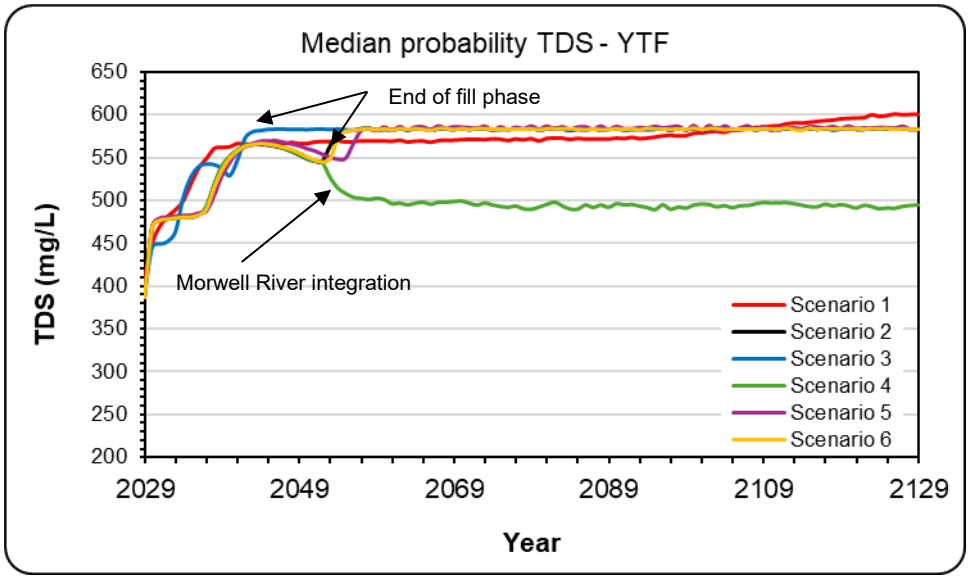

Figure 6-8: YTF median probability TDS versus time for each of the scenarios (annual time steps).

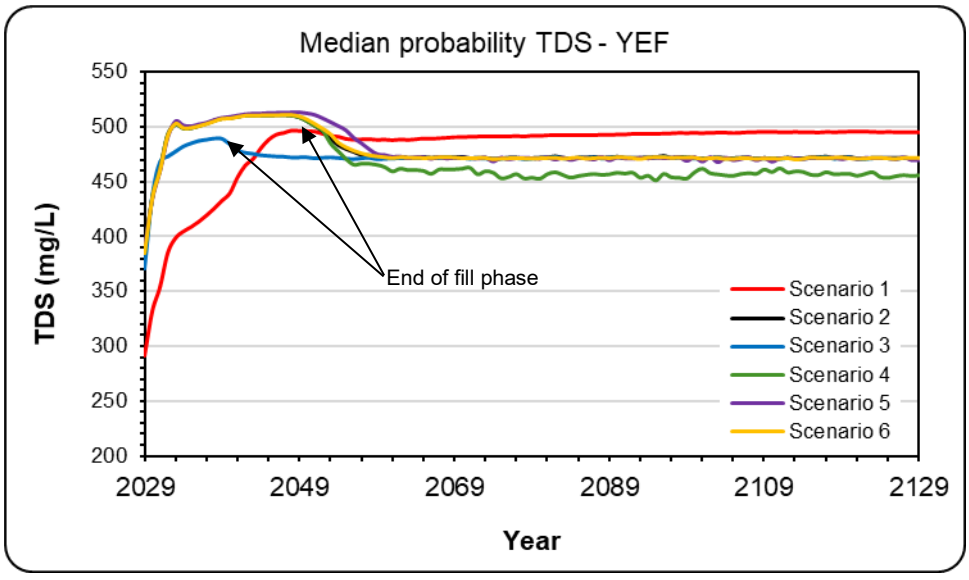

Figure 6-9: YEF median probability TDS versus time for each of the scenarios (annual time steps).

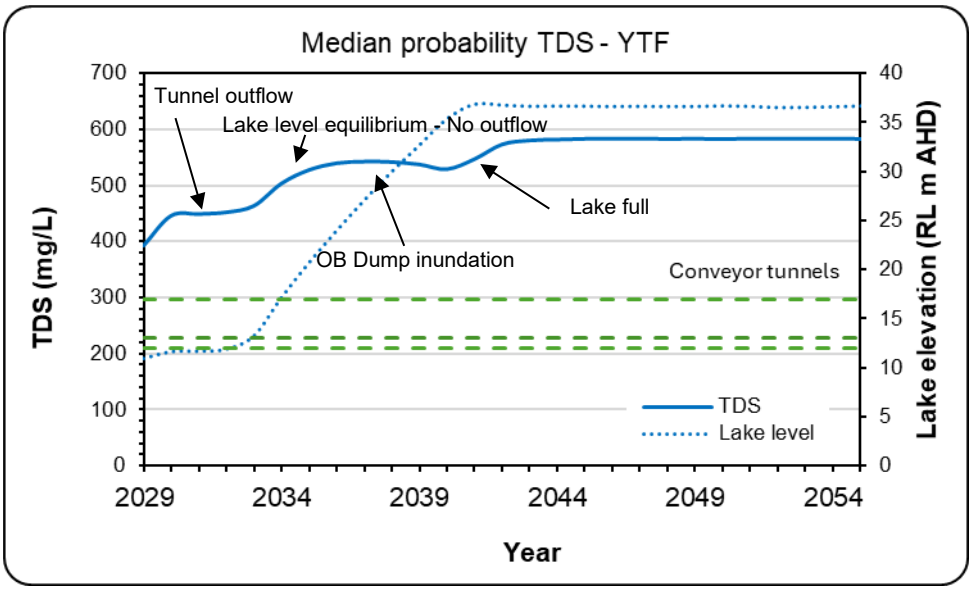

Figure 6-10: YTF median probability TDS for Scenario 3 (annual time steps) during fill with median lake water level.

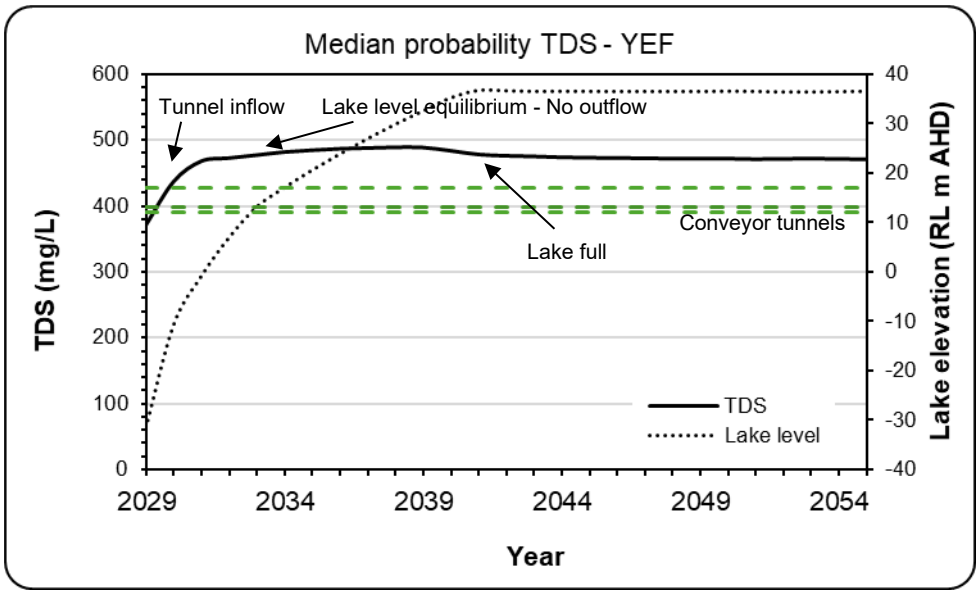

Figure 6-11: YEF median probability TDS for Scenario 3 (annual time steps) during fill with median lake water level.

Table 6-9: Summary of model estimated TDS and major ion water qualities for each of the project scenarios at select years.

Guideline			TDS (mg/L)		Calcium (mg/L)		Chloride (mg/L)		Magnesium (mg/L)		Potassium (mg/L)		Sodium (mg/L)		Sulfate (mg/L)	
ADWG (NRMC, 2011)			-		-		-		-		-		-		-	
Freshwater aquatic ecosystem (ANZG, 2018)			-		-		-		-		-		-		-	
Livestock Drinking Water (ANZG, 2018)			-		1000		-		-		-		-		1000	
Scanario	Pit	Year	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
1	YTF	5	465	542	5.57	6.86	139	147	26	32	1.28	1.51	90	97	149	196
		10	506	579	6.03	7.50	143	150	29	35	1.36	1.57	93	99	172	218
		25	539	582	7.21	7.55	143	151	33	36	1.48	1.61	93	99	199	221
		50	559	587	7.38	7.84	146	151	34	36	1.49	1.59	96	99	209	224
		75	562	626	7.42	8.41	147	156	35	40	1.49	1.64	96	103	211	247
		100	568	632	7.49	8.53	148	156	35	40	1.51	1.62	97	103	214	250
	YEF	5	391	412	4.51	4.58	274	291	26	27	2.67	2.76	195	206	56	57
		10	450	501	4.54	4.83	303	343	28	29	2.41	2.57	211	236	57	72
		25	480	503	4.54	4.68	321	350	28	29	2.42	2.50	221	240	58	66
		50	486	497	4.54	4.62	333	346	29	29	2.44	2.48	230	239	58	63
		75	489	500	4.54	4.59	336	349	28	29	2.44	2.47	232	240	59	62
		100	489	499	4.54	4.58	338	348	28	29	2.44	2.48	233	240	59	61
2	YTF	5	467	489	6.21	6.53	123	127	29	30	1.25	1.37	80	84	173	185
		10	514	558	6.81	7.60	130	138	32	35	1.33	1.48	86	91	198	221
		25	544	588	6.87	7.46	144	156	33	36	1.35	1.50	95	103	200	216
		50	575	591	7.25	7.56	153	156	35	36	1.44	1.52	101	103	211	217
		75	575	591	7.24	7.61	153	156	35	36	1.43	1.53	101	103	211	217
		100	575	591	7.25	7.66	152	157	35	36	1.43	1.55	101	104	211	217
	YEF	5	493	510	5.29	5.50	305	323	29	30	2.55	2.63	209	222	74	79
		10	504	515	5.19	5.35	331	341	29	30	2.61	2.65	227	234	68	70
		25	471	497	4.49	5.09	327	333	28	29	2.48	2.67	227	231	59	66
		50	466	478	4.38	4.58	325	333	28	29	2.45	2.51	226	231	57	59
		75	464	476	4.38	4.50	324	332	28	28	2.45	2.50	225	231	57	59
		100	465	476	4.38	4.55	325	332	28	28	2.45	2.50	226	231	57	59
3	YTF	5	482	527	6.47	7.11	123	130	30	33	1.27	1.39	80	86	185	208
		10	524	545	6.89	7.25	135	138	32	34	1.35	1.40	89	91	197	212
		25	573	591	7.24	7.48	152	156	35	36	1.43	1.50	100	103	210	217
		50	576	591	7.26	7.56	153	156	35	36	1.44	1.52	101	103	211	217
		75	576	591	7.25	7.67	153	156	35	36	1.43	1.54	101	103	211	217
		100	575	591	7.26	7.67	153	157	35	36	1.44	1.55	101	104	211	217
	YEF	5	478	487	5.33	5.45	305	315	28	28	2.64	2.69	208	216	65	68
		10	464	478	4.48	4.67	321	331	28	28	2.48	2.55	222	230	57	60
		25	465	477	4.38	4.51	325	333	28	28	2.45	2.50	226	231	57	59
		50	464	477	4.38	4.58	325	333	28	29	2.45	2.50	226	231	57	59
		75	463	476	4.37	4.50	324	332	28	28	2.45	2.50	225	231	57	59
		100	465	476	4.38	4.55	325	332	28	28	2.45	2.50	226	231	57	59
4	YTF	5	467	489	6.21	6.53	123	127	29	30	1.25	1.37	80	84	173	185
		10	514	558	6.81	7.60	130	138	32	35	1.33	1.48	86	91	198	221
		25	481	588	6.16	7.85	144	252	28	36	1.35	2.31	95	172	121	216
		50	462	522	6.94	7.84	185	217	27	31	2.05	2.25	124	147	119	141
		75	446	533	6.74	8.13	176	220	26	32	2.02	2.29	117	149	111	143
		100	461	520	6.83	7.91	183	217	27	31	2.03	2.25	122	147	117	140
	YEF	5	493	510	5.29	5.50	305	323	29	30	2.55	2.63	209	222	74	79
		10	504	515	5.19	5.35	331	341	29	30	2.61	2.65	227	234	68	70
		25	409	503	4.62	7.26	183	333	23	30	2.04	2.67	123	231	60	120
		50	426	481	6.38	7.35	186	215	24	29	2.03	2.23	125	146	98	120

Guideline			TDS (mg/L)		Calcium (mg/L)		Chloride (mg/L)		Magnesium (mg/L)		Potassium (mg/L)		Sodium (mg/L)		Sulfate (mg/L)	
ADWG (NRMC, 2011)			-		-		-		-		-		-		-	
Freshwater aquatic ecosystem (ANZG, 2018)			-		-		-		-		-		-		-	
Livestock Drinking Water (ANZG, 2018)			-		1000		-		-		-		-		1000	
Scanario	Pit	Year	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
		75	406	491	6.28	7.73	174	220	23	29	2.01	2.29	116	150	90	124
		100	418	484	6.42	7.55	180	217	24	29	2.03	2.26	121	147	95	121
5	**YTF**	**5**	470	489	6.22	6.46	124	127	29	30	1.25	1.34	81	84	175	186
		10	503	545	6.64	7.39	129	136	31	34	1.30	1.42	84	90	192	214
		25	537	579	6.85	7.30	141	154	33	35	1.35	1.44	93	101	199	213
		50	577	591	7.26	7.46	153	157	35	36	1.43	1.48	101	103	212	218
		75	577	591	7.26	7.44	153	157	35	36	1.43	1.48	101	103	212	218
		100	576	591	7.26	7.44	153	157	35	36	1.43	1.47	101	103	211	218
	YEF	**5**	495	517	5.31	5.53	307	324	29	30	2.55	2.65	210	222	74	80
		10	508	517	5.21	5.29	334	342	29	30	2.62	2.65	229	234	69	69
		25	486	509	4.79	5.15	329	340	29	30	2.59	2.68	228	234	62	67
		50	466	476	4.38	4.53	326	333	28	28	2.45	2.50	227	231	57	59
		75	466	475	4.38	4.47	326	332	28	28	2.45	2.49	226	231	57	58
		100	465	475	4.37	4.49	325	332	28	28	2.45	2.50	226	231	57	59
6	**YTF**	**5**	467	488	6.21	6.34	123	127	29	30	1.25	1.35	80	83	174	185
		10	510	553	6.78	7.47	130	137	32	35	1.33	1.45	85	90	196	218
		25	540	588	6.85	7.39	142	156	33	36	1.35	1.46	94	103	199	216
		50	577	591	7.26	7.44	153	156	35	36	1.43	1.47	101	103	211	217
		75	576	591	7.25	7.43	153	156	35	36	1.43	1.48	101	103	211	217
		100	577	591	7.25	7.43	153	157	35	36	1.43	1.47	101	103	211	217
	YEF	**5**	493	508	5.30	5.42	307	323	29	29	2.55	2.63	210	221	74	77
		10	505	515	5.18	5.25	332	341	29	30	2.62	2.65	228	234	68	69
		25	475	498	4.57	5.09	328	334	28	29	2.52	2.67	227	231	60	66
		50	465	476	4.38	4.48	325	333	28	28	2.45	2.50	226	231	57	59
		75	463	476	4.38	4.48	324	332	28	28	2.45	2.50	225	231	57	59
		100	465	475	4.38	4.48	325	332	28	28	2.45	2.50	226	231	57	59

6.2.4 Lake metals and metalloids

The estimated metal and metalloid probabilistic modelling results for each of the project scenarios and sensitivities are provided in **Attachment D** (for years 5, 10, 25, 50, 75 and 100) and concentration versus time graphs for each modelled parameter are provided in **Attachment E**. The minimum and maximum statistics (at 5, 10, 25, 50, 75 and 100 years) are summarised against water quality guidelines (assessment criteria) in **Table 6-10**.

The minimum and maximum probabilities are compared with the revised Australian and New Zealand Guidelines for fresh and marine water quality guidelines – freshwater aquatic ecosystem (95% species protection) and livestock drinking water guidelines (ANZG, 2018), as well as the Australian Drinking Water Guidelines (NRMMC, 2011) (**Table 6-10**). These guidelines are provided for context only as the modelling excludes key biogeochemical processes which may affect solute concentration results. For example, some minerals may become supersaturated (beyond saturation point) and are therefore likely to precipitate out of the lake (forming minerals) which would reduce the estimated modelled concentrations for the associated chemical species. Similarly, some metals and metalloids may co-precipitate with the mineral(s) or adsorb to the surface of mineral(s) reducing their dissolved concentrations in the lake. The mass balance approach to modelling metal and metalloid concentrations is therefore considered conservative.

The guideline comparison is summarised in the following points:

- Aluminium exceeds the freshwater aquatic ecosystem (95% species protection) guideline (ANZG, 2018) (0.055 mg/L) for all scenarios for all probabilities. Aluminium was well below livestock drinking water guidelines (5 mg/L), and no trigger level exists for ADWG. The cause of the aluminium exceedance, relative to freshwater aquatic ecosystem (95% species protection) guideline (ANZG, 2018), is due to several source term inputs which also show exceedance: Latrobe water (median = 0.27 mg/L), Morwell River (median = 0.26 mg/L), groundwater (median = 0.07 to 0.4 mg/L) and Latrobe top-up (median = 0.17 mg/L) (amongst other sources). It is common for colloidal aluminium (and iron) to pass through size 45 µm filter paper resulting in an overestimation of the dissolved concentration.
- Copper exceeds the freshwater aquatic ecosystem (95% species protection) guideline (ANZG, 2018) (0.0014 mg/L) for all scenarios in the YTF; noting copper concentrations are below guidelines in the YEF except for Scenario 4 where the large Morwell River inflow causes an exceedance in copper concentration after 25 years. Copper is well below livestock drinking water guidelines (1 mg/L), and ADWG (2 mg/L). The cause of the copper exceedance, relative to freshwater aquatic ecosystem (95% species protection) guideline (ANZG, 2018), is mainly due to Latrobe water (median =0.001 mg/L), Morwell River (median =0.002 mg/L), groundwater (median =0.002 to 0.003 mg/L) and local rainfall quality (median = 0.005 mg/L).
- Zinc exceeds the freshwater aquatic ecosystem (95% species protection) guideline (ANZG, 2018) (0.008 mg/L) for all scenarios and all probabilities. Zinc was well below livestock drinking water guidelines (20 mg/L), and no trigger level exists for ADWG. The cause of the zinc exceedance, relative to freshwater aquatic ecosystem (95% species protection) guideline (ANZG, 2018), is due to multiple sources, including rainfall (median =0.044 mg/L) and groundwater (median =0.025 to 0.039 mg/L) (amongst other sources).
- Lead exceeds the freshwater aquatic ecosystem (95% species protection) guideline (ANZG, 2018) (0.0034 mg/L) in the YEF. Lead in the YTF is below the same guideline, except for Scenario 4 where some probabilities exceed from years ~25 (due to mixing with YEF which also results in a dilution of the lead concentrations in YEF). Lead briefly exceeded ADWG (0.01 mg/L) for Scenario 1 and was well below the livestock drinking water guidelines (0.1 mg/L. The cause of the lead exceedance, relative to freshwater aquatic ecosystem (95% species protection) guideline (ANZG, 2018), is due to seepage and runoff water quality source terms associated with the pit walls and floor.

- Manganese marginally exceeds the ADWG (0.5 mg/L) for all scenarios in the YTF lake; noting that there are no exceedances for manganese in the YEF lake. Manganese generally exceeds the ADWG guideline after 10 to 25 years. The full integration of Morwell River into the lake (Scenario 4) reduces the estimated manganese concentration below ADWG. The cause of the manganese exceedance, relative to ADWG, is due mainly to seepage from the Former Ash Ponds and NOB Dump.

Copper and zinc levels are elevated relative to freshwater aquatic ecosystem (95% species protection) guideline throughout the Morwell and Latrobe catchments and are present in rainfall at concentrations of approx. 50 µg/L, likely due to burning of coal at power stations throughout the Latrobe Valley. It is expected that a reduction in the burning of coal in the Latrobe Valley will reduce the supply of copper and zinc to the system and thus reduce the modelled lake concentrations for these parameters. Similarly, the presence of lead in the pit walls and floor is likely associated with power stations in the Latrobe Valley. Over time, as the power stations are decommissioned, it is expected that the lead concentrations to the system will also decrease. The modelled results reflect the static nature of the source terms used in the model.

For Scenario 1 and Scenario 6 (unconnected scenarios), the modelled metal and metalloid concentrations are likely to increase with time beyond the simulation period, since lake solutes can only be removed via groundwater seepage which is low. Furthermore, the increase in dry conditions (low rainfall and high evaporation) will result in greater evapoconcentration.

Table 6-10: Summary of estimated metal and metalloid concentrations at select years for various project scenarios and sensitivities

Guideline			Aluminium (mg/L)		Arsenic (mg/L)		Cadmium (mg/L)		Chromium (mg/L)		Copper (mg/L)		Lead (mg/L)		Manganese (mg/L)		Molybdenum (mg/L)		Nickel (mg/L)		Selenium (mg/L)		Zinc (mg/L)	
ADWG (NRMC, 2011)			-		0.01		0.002		0.05		2		0.01		0.5		0.05		0.02		0.01		-	
Freshwater aquatic ecosystem (ANZG, 2018)			0.055		0.024		0.0002		0.001*		0.0014		0.0034		1.9		-		0.011		0.011		0.008	
Livestock Drinking Water (ANZG, 2018)			5		0.5		0.01		1		1		0.1		-		0.15		0.02		0.02		20	
Scenario	**Pit**	**Year**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**
1	YTF	5	0.141	0.173	0.0020	0.0028	0.00003	0.00004	0.00032	0.00040	0.0017	0.0021	0.0010	0.0015	0.40	0.49	0.00053	0.00054	0.0066	0.0074	0.0007	0.0009	0.090	0.103
		10	0.153	0.180	0.0026	0.0029	0.00003	0.00004	0.00036	0.00040	0.0019	0.0023	0.0013	0.0017	0.45	0.59	0.00053	0.00054	0.0071	0.0078	0.0008	0.0009	0.095	0.105
		25	0.172	0.183	0.0028	0.0030	0.00003	0.00004	0.00037	0.00042	0.0022	0.0023	0.0016	0.0017	0.55	0.60	0.00053	0.00054	0.0072	0.0078	0.0008	0.0010	0.103	0.106
		50	0.173	0.183	0.0029	0.0030	0.00003	0.00003	0.00038	0.00040	0.0023	0.0024	0.0016	0.0017	0.58	0.62	0.00053	0.00054	0.0075	0.0078	0.0008	0.0009	0.104	0.106
		75	0.173	0.188	0.0028	0.0030	0.00003	0.00004	0.00037	0.00041	0.0023	0.0026	0.0016	0.0017	0.58	0.68	0.00053	0.00054	0.0075	0.0082	0.0007	0.0009	0.103	0.107
		100	0.176	0.187	0.0028	0.0030	0.00003	0.00003	0.00037	0.00040	0.0023	0.0026	0.0016	0.0017	0.59	0.69	0.00053	0.00054	0.0076	0.0082	0.0008	0.0009	0.104	0.108
	YEF	5	0.347	0.372	0.0021	0.0022	0.00009	0.00009	0.00053	0.00056	0.0007	0.0007	0.0098	0.0111	0.15	0.16	0.00052	0.00053	0.0078	0.0084	0.0023	0.0025	0.358	0.383
		10	0.234	0.298	0.0019	0.0021	0.00007	0.00008	0.00044	0.00050	0.0006	0.0008	0.0078	0.0096	0.16	0.21	0.00053	0.00054	0.0090	0.0102	0.0018	0.0021	0.236	0.303
		25	0.233	0.254	0.0019	0.0020	0.00007	0.00007	0.00044	0.00047	0.0006	0.0007	0.0063	0.0070	0.17	0.19	0.00053	0.00054	0.0097	0.0104	0.0018	0.0019	0.237	0.260
		50	0.243	0.253	0.0020	0.0020	0.00007	0.00007	0.00045	0.00046	0.0006	0.0007	0.0066	0.0070	0.17	0.18	0.00053	0.00054	0.0100	0.0103	0.0018	0.0019	0.247	0.258
		75	0.240	0.248	0.0020	0.0020	0.00007	0.00007	0.00045	0.00046	0.0006	0.0007	0.0065	0.0068	0.17	0.18	0.00053	0.00054	0.0100	0.0104	0.0018	0.0019	0.245	0.253
		100	0.240	0.246	0.0020	0.0020	0.00007	0.00007	0.00045	0.00046	0.0006	0.0007	0.0066	0.0068	0.17	0.18	0.00053	0.00054	0.0101	0.0103	0.0018	0.0019	0.245	0.251
2	YTF	5	0.145	0.164	0.0023	0.0025	0.00003	0.00003	0.00032	0.00035	0.0019	0.0019	0.0014	0.0014	0.47	0.50	0.00045	0.00046	0.0062	0.0066	0.0006	0.0008	0.084	0.090
		10	0.154	0.175	0.0024	0.0025	0.00003	0.00003	0.00032	0.00034	0.0021	0.0023	0.0013	0.0014	0.54	0.61	0.00046	0.00048	0.0068	0.0073	0.0007	0.0008	0.090	0.095
		25	0.160	0.179	0.0027	0.0030	0.00003	0.00003	0.00035	0.00040	0.0021	0.0023	0.0015	0.0017	0.55	0.59	0.00049	0.00054	0.0074	0.0080	0.0007	0.0009	0.096	0.104
		50	0.170	0.182	0.0029	0.0030	0.00003	0.00003	0.00037	0.00039	0.0022	0.0023	0.0016	0.0017	0.57	0.59	0.00052	0.00054	0.0078	0.0080	0.0008	0.0008	0.102	0.104
		75	0.169	0.185	0.0029	0.0030	0.00003	0.00003	0.00037	0.00040	0.0022	0.0023	0.0016	0.0017	0.57	0.59	0.00052	0.00054	0.0078	0.0080	0.0008	0.0009	0.102	0.104
		100	0.170	0.187	0.0029	0.0030	0.00003	0.00003	0.00037	0.00040	0.0022	0.0023	0.0016	0.0017	0.57	0.59	0.00052	0.00055	0.0078	0.0080	0.0008	0.0008	0.102	0.104
	YEF	5	0.267	0.274	0.0020	0.0021	0.00007	0.00007	0.00050	0.00051	0.0009	0.0010	0.0058	0.0062	0.21	0.23	0.00058	0.00060	0.0094	0.0099	0.0017	0.0018	0.224	0.238
		10	0.265	0.271	0.0020	0.0020	0.00007	0.00007	0.00049	0.00050	0.0008	0.0009	0.0061	0.0063	0.20	0.20	0.00058	0.00059	0.0100	0.0103	0.0018	0.0018	0.232	0.239
		25	0.298	0.310	0.0020	0.0021	0.00007	0.00007	0.00050	0.00053	0.0007	0.0008	0.0069	0.0076	0.17	0.19	0.00053	0.00058	0.0097	0.0100	0.0019	0.0020	0.263	0.282
		50	0.296	0.306	0.0020	0.0020	0.00007	0.00007	0.00049	0.00051	0.0006	0.0007	0.0073	0.0077	0.16	0.17	0.00052	0.00054	0.0097	0.0099	0.0019	0.0020	0.278	0.284
		75	0.296	0.304	0.0020	0.0020	0.00007	0.00007	0.00049	0.00051	0.0006	0.0007	0.0074	0.0077	0.16	0.17	0.00052	0.00054	0.0096	0.0099	0.0019	0.0020	0.278	0.284
		100	0.296	0.305	0.0020	0.0020	0.00007	0.00007	0.00049	0.00051	0.0006	0.0007	0.0074	0.0077	0.16	0.17	0.00052	0.00054	0.0097	0.0099	0.0019	0.0020	0.278	0.284
3	YTF	5	0.147	0.165	0.0023	0.0024	0.00002	0.00003	0.00030	0.00033	0.0020	0.0022	0.0013	0.0013	0.51	0.58	0.00043	0.00045	0.0063	0.0069	0.0006	0.0007	0.085	0.090
		10	0.157	0.166	0.0024	0.0025	0.00003	0.00003	0.00032	0.00034	0.0021	0.0022	0.0014	0.0014	0.54	0.59	0.00047	0.00048	0.0069	0.0072	0.0007	0.0007	0.090	0.093
		25	0.170	0.179	0.0029	0.0030	0.00003	0.00003	0.00037	0.00040	0.0022	0.0023	0.0016	0.0017	0.57	0.59	0.00052	0.00054	0.0078	0.0080	0.0008	0.0009	0.102	0.104
		50	0.170	0.182	0.0029	0.0030	0.00003	0.00003	0.00037	0.00039	0.0022	0.0023	0.0016	0.0017	0.57	0.59	0.00052	0.00054	0.0078	0.0080	0.0008	0.0008	0.102	0.104
		75	0.169	0.186	0.0029	0.0030	0.00003	0.00003	0.00037	0.00040	0.0022	0.0023	0.0016	0.0017	0.57	0.59	0.00052	0.00054	0.0078	0.0080	0.0008	0.0009	0.102	0.104
		100	0.170	0.187	0.0029	0.0030	0.00003	0.00003	0.00037	0.00040	0.0022	0.0023	0.0016	0.0017	0.57	0.59	0.00052	0.00055	0.0078	0.0080	0.0008	0.0008	0.102	0.104
	YEF	5	0.276	0.280	0.0019	0.0020	0.00007	0.00007	0.00051	0.00052	0.0009	0.0009	0.0056	0.0058	0.19	0.20	0.00059	0.00060	0.0093	0.0095	0.0017	0.0018	0.216	0.221
		10	0.297	0.305	0.0019	0.0020	0.00007	0.00007	0.00049	0.00052	0.0007	0.0007	0.0060	0.0061	0.16	0.17	0.00053	0.00055	0.0095	0.0098	0.0019	0.0020	0.269	0.280
		25	0.296	0.305	0.0020	0.0020	0.00007	0.00007	0.00049	0.00051	0.0006	0.0007	0.0074	0.0077	0.16	0.17	0.00052	0.00054	0.0097	0.0099	0.0019	0.0020	0.278	0.284
		50	0.296	0.306	0.0020	0.0020	0.00007	0.00007	0.00049	0.00051	0.0006	0.0007	0.0072	0.0077	0.16	0.17	0.00052	0.00054	0.0096	0.0099	0.0019	0.0020	0.278	0.284
		75	0.296	0.304	0.0020	0.0020	0.00007	0.00007	0.00049	0.00051	0.0006	0.0007	0.0074	0.0077	0.16	0.17	0.00052	0.00054	0.0096	0.0099	0.0019	0.0020	0.279	0.284
		100	0.296	0.305	0.0020	0.0020	0.00007	0.00007	0.00049	0.00051	0.0006	0.0007	0.0074	0.0077	0.16	0.17	0.00052	0.00054	0.0096	0.0099	0.0019	0.0020	0.278	0.284
4	YTF	5	0.145	0.164	0.0023	0.0025	0.00003	0.00003	0.00032	0.00035	0.0019	0.0019	0.0014	0.0014	0.47	0.50	0.00045	0.00046	0.0062	0.0066	0.0006	0.0008	0.084	0.090
		10	0.154	0.175	0.0024	0.0025	0.00003	0.00003	0.00032	0.00034	0.0021	0.0023	0.0013	0.0014	0.54	0.61	0.00046	0.00048	0.0068	0.0073	0.0007	0.0008	0.090	0.095
		25	0.160	0.304	0.0020	0.0030	0.00003	0.00005	0.00035	0.00048	0.0015	0.0023	0.0015	0.0045	0.33	0.59	0.00049	0.00057	0.0072	0.0091	0.0007	0.0014	0.096	0.193
		50	0.261	0.298	0.0019	0.0024	0.00005	0.00005	0.00045	0.00047	0.0017	0.0018	0.0029	0.0038	0.32	0.38	0.00053	0.00056	0.0067	0.0081	0.0011	0.0013	0.129	0.164
		75	0.253	0.312	0.0018	0.0024	0.00005	0.00005	0.00044	0.00048	0.0017	0.0018	0.0031	0.0037	0.29	0.39	0.00053	0.00058	0.0062	0.0082	0.0010	0.0013	0.117	0.165
		100	0.258	0.302	0.0019	0.0024	0.00005	0.00005	0.00044	0.00048	0.0017	0.0018	0.0029	0.0037	0.31	0.38	0.00053	0.00056	0.0066	0.0081	0.0011	0.0012	0.126	0.163
	YEF	5	0.267	0.274	0.0020	0.0021	0.00007	0.00007	0.00050	0.00051	0.0009	0.0010	0.0058	0.0062	0.21	0.23	0.00058	0.00060	0.0094	0.0099	0.0017	0.0018	0.224	0.238
		10	0.265	0.271	0.0020	0.0020	0.00007	0.00007	0.00049	0.00050	0.0008	0.0009	0.0061	0.0063	0.20	0.20	0.00058	0.00059	0.0100	0.0103	0.0018	0.0018	0.232	0.239
		25	0.253	0.307	0.0016	0.0023	0.00005	0.00007	0.00044	0.00053	0.0007	0.0016	0.0037	0.0072	0.17	0.32	0.00050	0.00058	0.0061	0.0100	0.0011	0.0020	0.128	0.279
		50	0.257	0.300	0.0017	0.0021	0.00005	0.00005	0.00044	0.00046	0.0015	0.0016	0.0031	0.0041	0.26	0.33	0.00051	0.00053	0.0063	0.0077	0.0011	0.0013	0.131	0.164
		75	0.253	0.315	0.0015	0.0022	0.00005	0.00005	0.00043	0.00046	0.0015	0.0016	0.0033	0.0041	0.24	0.34	0.00050	0.00053	0.0058	0.0079	0.0010	0.0013	0.117	0.170
		100	0.258	0.308	0.0016	0.0022	0.00005	0.00005	0.00043	0.00046	0.0015	0.0016	0.0032	0.0041	0.25	0.33	0.00050	0.00053	0.0061	0.0078	0.0011	0.0013	0.125	0.166

Guideline			Aluminium (mg/L)		Arsenic (mg/L)		Cadmium (mg/L)		Chromium (mg/L)		Copper (mg/L)		Lead (mg/L)		Manganese (mg/L)		Molybdenum (mg/L)		Nickel (mg/L)		Selenium (mg/L)		Zinc (mg/L)	
ADWG (NRMC, 2011)			-		0.01		0.002		0.05		2		0.01		0.5		0.05		0.02		0.01		-	
Freshwater aquatic ecosystem (ANZG, 2018)			0.055		0.024		0.0002		0.001*		0.0014		0.0034		1.9		-		0.011		0.011		0.008	
Livestock Drinking Water (ANZG, 2018)			5		0.5		0.01		1		1		0.1		-		0.15		0.02		0.02		20	
Scenario	**Pit**	**Year**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**
5	YTF	5	0.145	0.159	0.0024	0.0025	0.00002	0.00003	0.00031	0.00034	0.0019	0.0019	0.0014	0.0014	0.48	0.50	0.00044	0.00046	0.0063	0.0066	0.0006	0.0008	0.085	0.089
		10	0.151	0.164	0.0025	0.0025	0.00003	0.00003	0.00032	0.00034	0.0020	0.0022	0.0014	0.0014	0.53	0.59	0.00045	0.00047	0.0067	0.0071	0.0006	0.0007	0.089	0.094
		25	0.160	0.171	0.0027	0.0029	0.00003	0.00003	0.00034	0.00038	0.0021	0.0022	0.0015	0.0016	0.54	0.58	0.00049	0.00052	0.0072	0.0079	0.0007	0.0008	0.095	0.102
		50	0.170	0.176	0.0029	0.0030	0.00003	0.00003	0.00037	0.00039	0.0022	0.0023	0.0017	0.0017	0.58	0.59	0.00052	0.00054	0.0078	0.0080	0.0007	0.0008	0.102	0.104
		75	0.169	0.175	0.0029	0.0030	0.00003	0.00003	0.00037	0.00039	0.0022	0.0023	0.0016	0.0017	0.58	0.59	0.00052	0.00054	0.0078	0.0080	0.0007	0.0008	0.102	0.104
		100	0.169	0.174	0.0029	0.0030	0.00003	0.00003	0.00037	0.00039	0.0022	0.0023	0.0016	0.0017	0.57	0.59	0.00052	0.00054	0.0078	0.0080	0.0007	0.0008	0.102	0.104
	YEF	5	0.265	0.275	0.0021	0.0021	0.00007	0.00007	0.00050	0.00051	0.0009	0.0010	0.0058	0.0062	0.21	0.23	0.00058	0.00060	0.0095	0.0100	0.0017	0.0018	0.225	0.236
		10	0.266	0.268	0.0020	0.0021	0.00007	0.00007	0.00049	0.00050	0.0008	0.0009	0.0061	0.0063	0.20	0.20	0.00058	0.00059	0.0101	0.0103	0.0018	0.0018	0.236	0.239
		25	0.276	0.307	0.0020	0.0021	0.00007	0.00007	0.00050	0.00053	0.0007	0.0008	0.0065	0.0072	0.18	0.19	0.00056	0.00059	0.0099	0.0102	0.0018	0.0020	0.248	0.275
		50	0.296	0.303	0.0020	0.0020	0.00007	0.00007	0.00048	0.00050	0.0006	0.0007	0.0075	0.0077	0.16	0.17	0.00052	0.00053	0.0097	0.0099	0.0019	0.0020	0.278	0.284
		75	0.296	0.301	0.0020	0.0020	0.00007	0.00007	0.00049	0.00050	0.0006	0.0007	0.0075	0.0077	0.16	0.17	0.00052	0.00053	0.0097	0.0099	0.0019	0.0020	0.278	0.283
		100	0.296	0.302	0.0020	0.0020	0.00007	0.00007	0.00049	0.00050	0.0006	0.0007	0.0075	0.0077	0.16	0.17	0.00052	0.00053	0.0097	0.0099	0.0019	0.0020	0.278	0.283
6	YTF	5	0.145	0.154	0.0024	0.0025	0.00003	0.00003	0.00032	0.00035	0.0019	0.0019	0.0014	0.0014	0.48	0.50	0.00045	0.00046	0.0062	0.0065	0.0006	0.0008	0.087	0.090
		10	0.154	0.166	0.0025	0.0025	0.00003	0.00003	0.00032	0.00034	0.0021	0.0023	0.0014	0.0014	0.54	0.60	0.00046	0.00048	0.0067	0.0072	0.0007	0.0008	0.091	0.095
		25	0.160	0.173	0.0027	0.0030	0.00003	0.00003	0.00035	0.00039	0.0021	0.0023	0.0015	0.0017	0.54	0.59	0.00049	0.00054	0.0073	0.0080	0.0007	0.0009	0.095	0.104
		50	0.170	0.174	0.0029	0.0030	0.00003	0.00003	0.00037	0.00039	0.0022	0.0023	0.0016	0.0017	0.58	0.59	0.00052	0.00054	0.0078	0.0080	0.0008	0.0008	0.102	0.104
		75	0.169	0.175	0.0029	0.0030	0.00003	0.00003	0.00037	0.00040	0.0022	0.0023	0.0016	0.0017	0.57	0.59	0.00052	0.00054	0.0078	0.0080	0.0008	0.0009	0.102	0.104
		100	0.170	0.174	0.0029	0.0030	0.00003	0.00003	0.00037	0.00040	0.0022	0.0023	0.0016	0.0017	0.57	0.59	0.00052	0.00054	0.0078	0.0080	0.0008	0.0008	0.102	0.104
	YEF	5	0.267	0.273	0.0021	0.0021	0.00007	0.00007	0.00050	0.00051	0.0009	0.0010	0.0058	0.0062	0.21	0.22	0.00058	0.00059	0.0095	0.0099	0.0017	0.0018	0.227	0.237
		10	0.265	0.267	0.0020	0.0020	0.00007	0.00007	0.00049	0.00050	0.0008	0.0008	0.0062	0.0063	0.20	0.20	0.00058	0.00059	0.0101	0.0103	0.0018	0.0018	0.237	0.239
		25	0.298	0.309	0.0020	0.0021	0.00007	0.00007	0.00051	0.00053	0.0007	0.0008	0.0069	0.0075	0.17	0.19	0.00055	0.00058	0.0098	0.0100	0.0019	0.0020	0.262	0.281
		50	0.296	0.304	0.0020	0.0020	0.00007	0.00007	0.00049	0.00051	0.0006	0.0007	0.0075	0.0077	0.16	0.17	0.00052	0.00054	0.0097	0.0099	0.0019	0.0020	0.278	0.284
		75	0.296	0.303	0.0020	0.0020	0.00007	0.00007	0.00049	0.00051	0.0006	0.0007	0.0075	0.0077	0.16	0.17	0.00052	0.00054	0.0096	0.0099	0.0019	0.0020	0.278	0.284
		100	0.296	0.303	0.0020	0.0020	0.00007	0.00007	0.00049	0.00051	0.0006	0.0007	0.0075	0.0077	0.16	0.17	0.00052	0.00054	0.0097	0.0099	0.0019	0.0020	0.278	0.284

6.2.5 Thermodynamic modelling

Consideration of thermodynamic constraints (mineral solubility) and atmospheric equilibrium was undertaken on the GoldSim generated average mass balance results for Scenario 1 and Scenario 2, Years 2029 to 2129.

The thermodynamic modelling was undertaken in three steps, including the following.

- The mass balance water quality results were equilibrated to atmospheric conditions. This assumed pCO_2 = -3, considered generally consistent with pit lake water in which groundwater is a component and interaction with the atmosphere is somewhat limited through the top surface of the pit lake water body. Oxygen was allowed to enter the pit lake water body sufficient to maintain oxic pit lake conditions.
- The equilibration indicated mineral saturation indices > 0, i.e., supersaturated minerals with the potential to precipitate based on the theoretical solubility limits of these minerals within the *minteq.v4.dat* database. By default, all minerals were initially suppressed (prevented from precipitating). Selected minerals were allowed to precipitate based on the equilibration results and RGS's technical experience on similar systems. This was undertaken stepwise for selected minerals to observe the effects on element concentrations and key chemical parameters (e.g. pH, TDS).
- Sorption of trace elements from solution, including copper and zinc, was associated with precipitating iron (oxy)hydroxides.

The results, including Scenarios 1 and 2 are discussed by pit in the following sections.

6.2.5.1 *YTF pit*

During equilibration with atmospheric conditions, CO_2 is vented to the atmosphere and diffusion of atmospheric oxygen into the lake results in significant changes to pH and alkalinity (**Figure 6-12**).

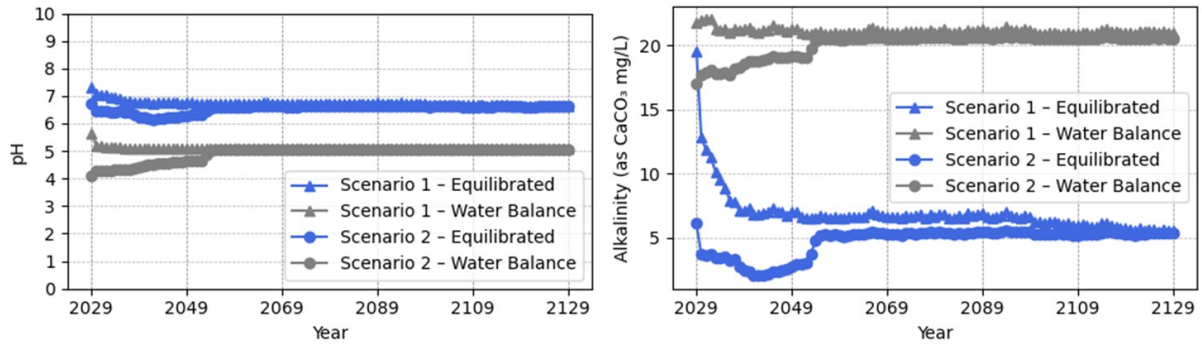

Figure 6-12: Modelled YTF pH and alkalinity after equilibration with atmosphere

The loss of CO_2 shifts the equilibrium and results in a reduction in the amount of carbonic acid, observed as an increased pH relative to the water balance results. The thermodynamic model simulation shows pH in the YTF lake increasing from ~pH 5 to ~pH 7 and alkalinity decreases significantly from ~20 mg/L to ~5 mg/L as $CaCO_3$. Significant changes in pH and alkalinity are limited to the first ~25 years of the simulation after which approximate steady state conditions are reached.

The alkalinity results indicate the YTF pit lake will have limited neutralisation capacity. There are modest differences between Scenario 1 and Scenario 2 although the trends are similar.

The thermodynamic modelling suggests that mineralogical controls on the YTF lake water quality include iron (oxy)hydroxides (e.g. goethite/ hematite) and, to a minor extent, sulfates (e.g. barite). Aluminium (oxy)hydroxides (e.g. gibbsite) are in approximate equilibrium with the pit lake water (-0.5 < SI <0.5).

When allowed to precipitate, iron (oxy)hydroxides remove dissolved iron from the pit water significantly reducing dissolved iron concentration from ~20 mg/L to ~5 mg/L. The iron precipitation releases acidity which neutralises alkalinity in the pit water causing the pH to fall to ~pH 4.5 while the alkalinity decreases to below zero[6] (**Figure 6-13**).

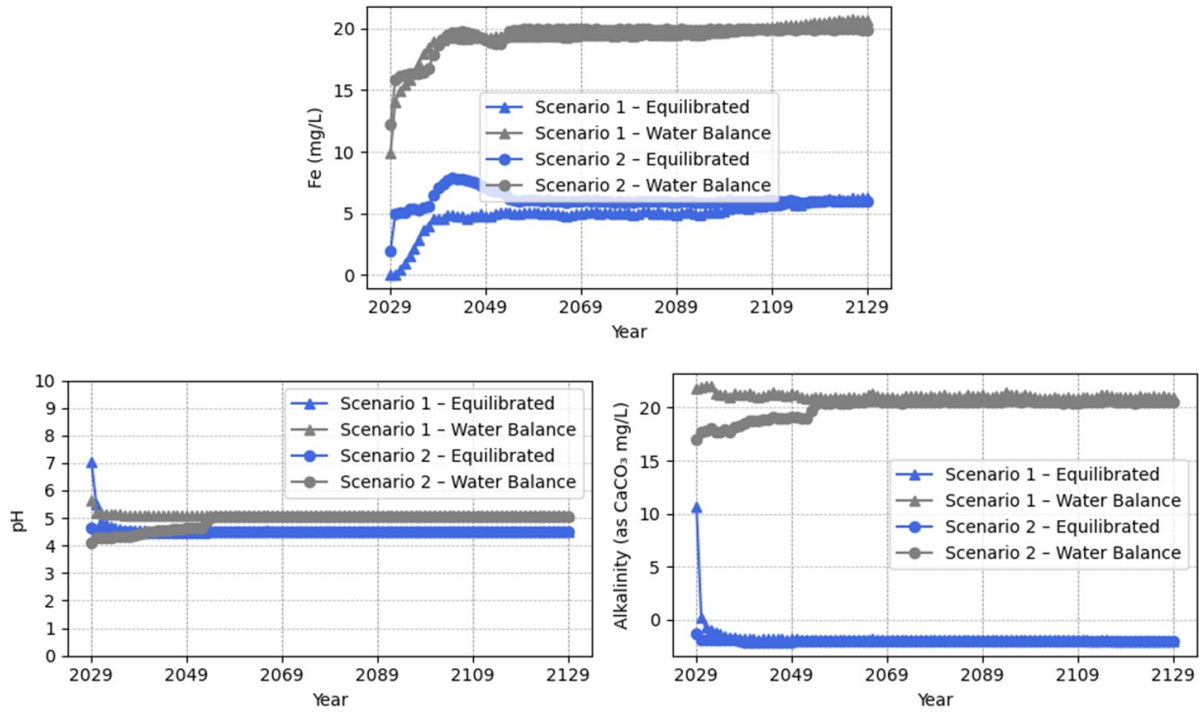

Figure 6-13: Modelled YTF iron, pH and alkalinity after atmospheric equilibration and mineral precipitation

The thermodynamic modelling results indicate the YTF pit lake water quality lacks significant acid buffering capacity. Iron (oxy)hydroxide precipitation combined with other acidity sources (e.g. acid seepage from waste rock or pit walls) will likely consume available alkalinity resulting in acid pH conditions.

Note that the iron inputs from the WB/WQ modelling may be significantly overestimated due to colloids passing through 45 µm filters, as applied to characterise source terms from field water samples. If this is the case, iron (oxy)hydroxide precipitation may not release enough acidity to neutralise the available alkalinity in the YTF pit water. Similarly, groundwater inflows from the HHF may oxidise prior to entering the lake; this would also result in a decrease in the iron inputs. Further detailed thermodynamic modelling of source terms and pit lake water may be required to resolve this.

The thermodynamic modelling had little influence on the mass balance results for aluminium, manganese, copper and zinc because of the low pH conditions. These increase metal solubility and keep the metals in solution in the modelled YTF pit water (**Figure 6-14**). Results for both scenarios were generally similar except for increasing metal concentrations in the last ~30 years of Scenario 1 due to evapoconcentration (Scenario 1 is isolated from the Morwell River, while flood flows are considered in Scenario 2).

[6] A negative alkalinity value in PHREEQC, or in any water chemistry context, signifies that the solution has more H+ ions than proton-consuming species, leading to an acidic condition.

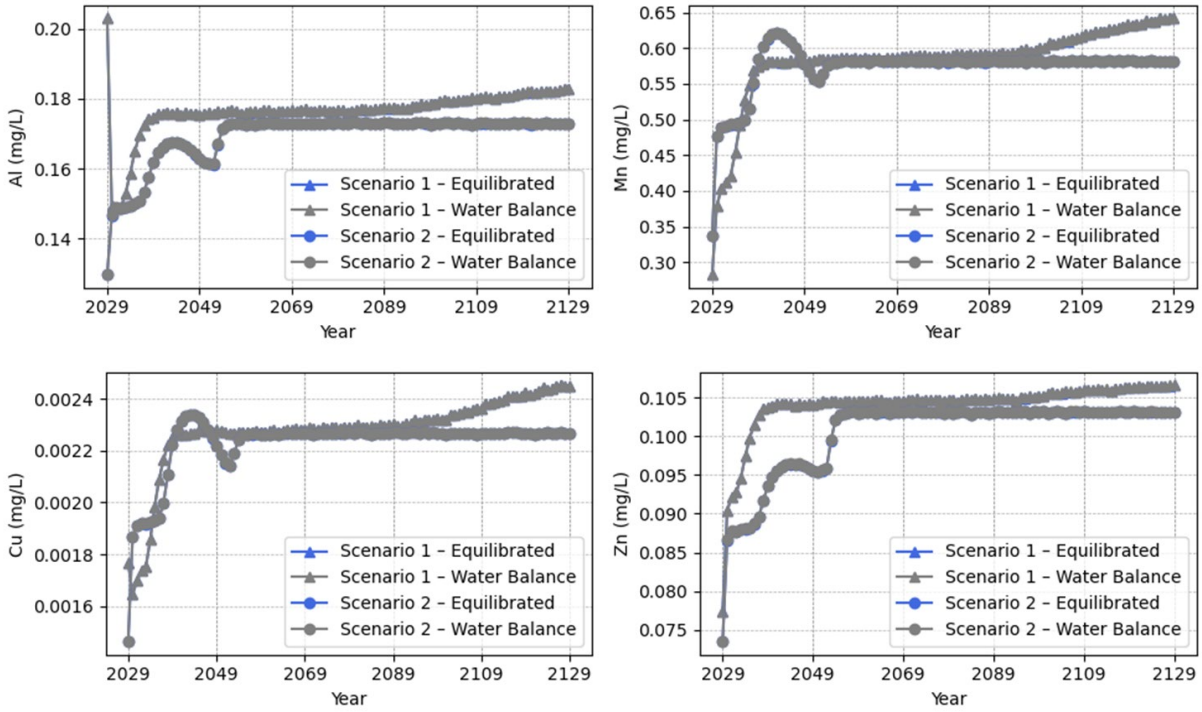

Figure 6-14: Modelled YTF aluminium, manganese, copper and zinc after atmospheric equilibration and mineral precipitation

Similarly, there is no significant sorption of metals on precipitating iron (oxy)hydroxide surfaces due to the low pH.

6.2.5.2 *YEF pit*

Like the YTF pit, during modelled equilibration with atmospheric conditions, CO_2 is vented to the atmosphere from the YEF pit water body, resulting in significant changes to pH and alkalinity (**Figure 6-15**).

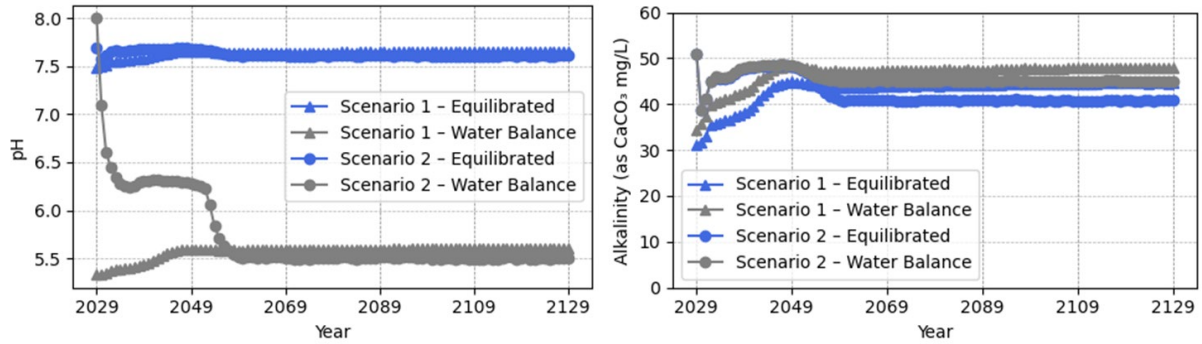

Figure 6-15: Modelled YEF pH and alkalinity after equilibration with atmosphere

The loss of CO_2 increased pH relative to the water balance results from ~pH 5.5 to ~pH 7.6 for both scenarios. Alkalinity decreased in both scenarios and generally remained ~40 mg/L as $CaCO_3$. Significant changes are limited to the first ~25 years of the simulation after which approximate steady state conditions are reached.

The alkalinity results indicate the YEF pit lake will have higher neutralisation capacity than the YTF pit lake. There are modest differences between Scenario 1 and Scenario 2, particularly in the first three years of simulation, although the general trends are similar.

The thermodynamic modelling suggests that mineralogical controls on the YEF lake water quality include iron (oxy)hydroxides (e.g. goethite/ hematite), aluminium (oxy)hydroxides (e.g. gibbsite) and, to a minor extent, sulfates (e.g. barite). Manganese oxides (e.g. birnessite) are not likely controls on manganese concentrations.

When allowed to precipitate, iron (oxy)hydroxides remove dissolved iron from the pit water significantly reducing dissolved iron concentration from ~12 mg/L to <0.001 mg/L. Similarly, allowing aluminium (oxy)hydroxides to precipitate reduces aluminium concentration from ~0.3 mg/L to <0.005 mg/L. The iron and aluminium precipitation both release acidity which neutralises alkalinity in the pit water causing the pH to fall slightly to ~pH 7.5 while the alkalinity decreases and generally remains ~30 mg/L as $CaCO_3$ (**Figure 6-16**).

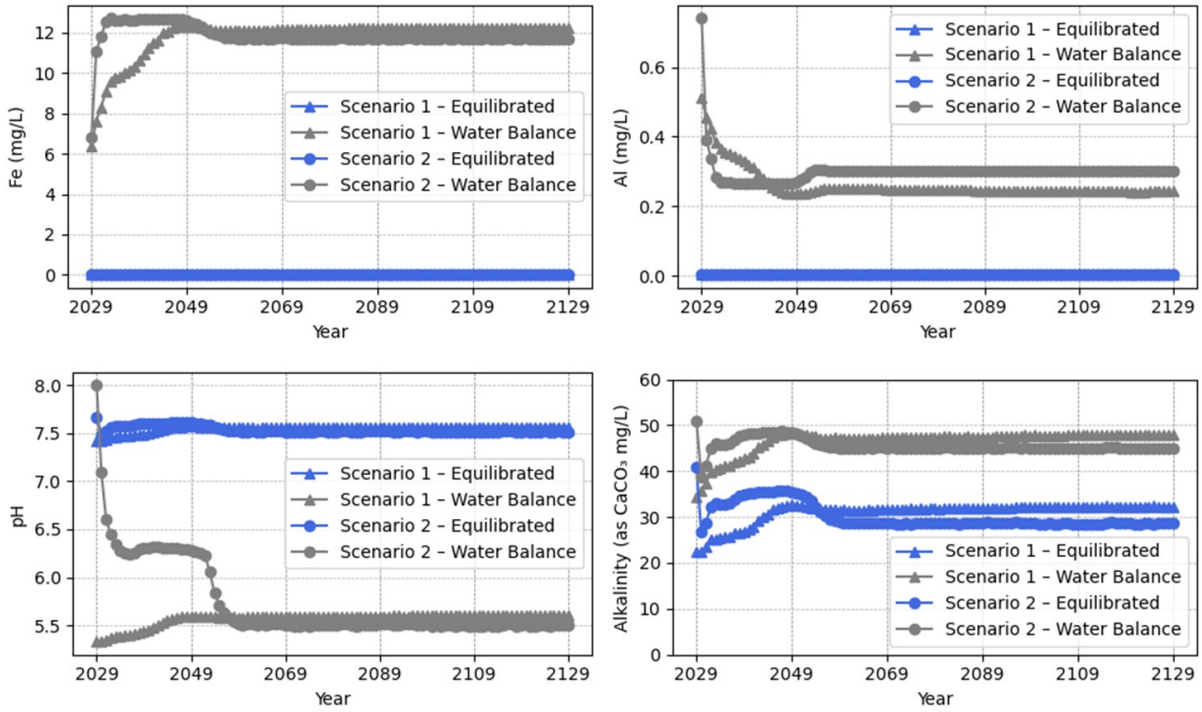

Figure 6-16: Modelled YEF iron, aluminium, pH and alkalinity after atmospheric equilibration and mineral precipitation

The thermodynamic modelling had little influence on the mass balance results for manganese, since the YEF pit lake water was unsaturated with respect to likely manganese minerals. However, sorption of copper and zinc ions on precipitating iron (oxy)hydroxides resulted in notable concentration decreases (**Figure 6-17**). Mass balance copper was already below the freshwater aquatic ecosystem (95% species protection) guideline (ANZG, 2018) of 0.0014 mg/L and decreased to <0.0001 mg/L on thermodynamic modelling. Mass balance zinc decreased significantly but still exceeded the freshwater aquatic ecosystem (95% species protection) guideline of 0.008 mg/L.

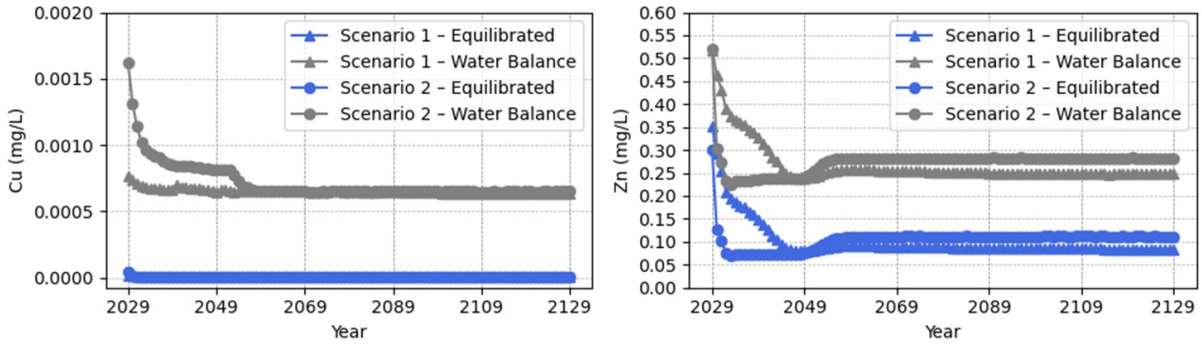

Figure 6-17: Modelled YEF copper and zinc after atmospheric equilibration, mineral precipitation and sorption on iron (oxy)hydroxides

6.2.5.3 *Summary pit water quality*

Table 6-11 presents YTF and YEF pit water quality in terms of key chemical parameters. This compares the water balance results of Scenario 2 with the thermodynamic model results 50 years into the 100-year modelling period (Year 2079).

Table 6-11: Summary of model estimated water qualities for the YTF and YEF pits for Scenario 2 after application of solubility controls and atmospheric equilibrium.

Chemical Para-meter	unit	YTF pit (Year 2079)			YEF pit (Year 2079)		
		Water balance (50th perc.)	Equilibrated with atmosphere	With mineral precipitation and sorption	Water balance (50th perc.)	Equilibrated with atmosphere	With mineral precipitation and sorption
pH	pH unit	5.09	6.62	4.50	5.50	7.61	7.51
Alkalinity	mg/L as $CaCO_3$	25	5.33	<0	55	40.8	28.3
TDS	mg/L	584	540	522	471	720	690
Ca	mg/L	7.37	7.37	7.37	4.45	4.45	4.45
Mg	mg/L	35	35.5	35.5	28	28.2	28.1
Na	mg/L	102	102	102	229	229	229
K	mg/L	1.46	1.46	1.46	2.48	2.49	2.49
SO_4	mg/L	214	214	214	58	58	58
Cl	mg/L	155	155	155	329	330	330
F	mg/L	0.114	0.114	0.114	0.055	0.0549	0.0549
Al	mg/L	0.173	0.173	0.173	0.301	0.301	0.00405
Fe	mg/L	19.9	19.94	5.98	11.7	11.7	0.00010
Mn	mg/L	0.58	0.582	0.582	0.166	0.166	0.166
As	mg/L	0.0030	0.0030	0.0030	0.0020	0.0020	<0.00001
Cd	mg/L	0.00003	0.00003	0.00003	0.00007	0.00007	<0.00001
Cr	mg/L	0.0004	0.0004	0.0004	0.0005	0.0005	<0.00001
Cu	mg/L	0.0023	0.0023	0.0023	0.0007	0.0007	<0.00001
Ni	mg/L	0.0079	0.0079	0.0079	0.0098	0.0098	0.00682
Pb	mg/L	0.0017	0.0017	0.0017	0.0002	0.0002	<0.00001
Zn	mg/L	0.103	0.103	0.103	0.282	0.282	0.112

6.2.6 Climate influence

Climate sensitivity and the impacts of climate change are assessed for the preferred scenario (Scenario 2) using climate factors (i.e. dry and medium climate change factors applied to post 1975 reference

period; **Section 4.5**) under probabilistic climate (100 replicates of stochastic climate datasets applied in 100 simulations or model runs; results are presented as probability distributions). As mentioned in **Section 6.1.3**, the lake water balance is sensitive to climate through Morwell River flood flows (connected lakes only), external catchment runoff, direct rainfall, and evaporation. However, during the fill and post filling phases (excluding Scenario 1), the lake inflows are not entirely climate dependent with the inflows being dominated by Latrobe water (fill or top-up). The impacts of climate change post fill are supressed largely by the top-up water (when required) and Morwell River inflows (when these occur). The impacts of climate change and the effect on lake water quality is highlighted by the median probabilistic TDS results for Scenario 2 (median climate) and Scenario 5 (dry climate) (**Figure 6-13**) and the probabilistic TDS results for Scenario 2 (**Figure 6-14**); there is negligible difference in median TDS at the end of the simulation between Scenario 2 and Scenario 5.

Overall, the influence of climate change and climate variability on the lake water quality is limited, due to the availability of Latrobe top-up water and Morwell River flood flows (for connected lake).

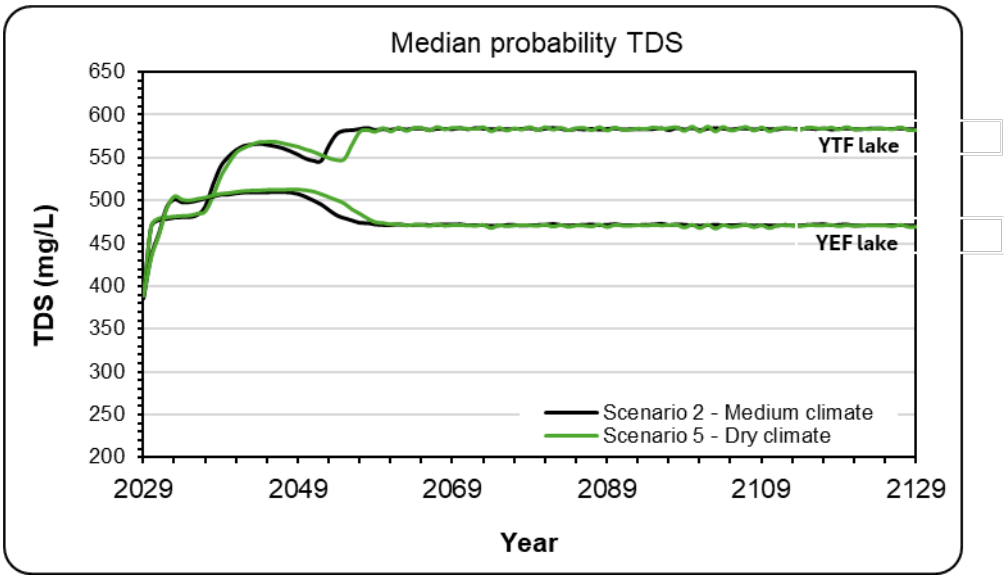

Figure 6-18: Medium probability TDS versus time for Scenario 2 (medium climate) and Scenario 5 (Dry climate).

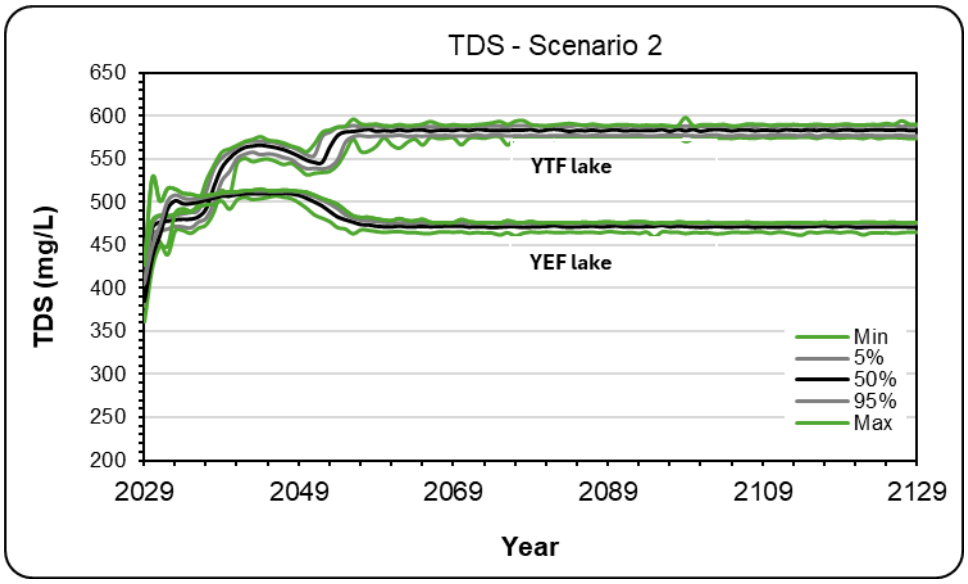

Figure 6-19: Modelling results for TDS probabilities for Scenario 2 (annual time steps).

7 Conclusions

The purpose of this report is to assess the potential lake(s) water balance and water quality associated with the project to inform the preparation of the DMRP. To assess the potential lake water balance and water quality, a numerical GoldSim WB/WQ model was developed with the following objectives:

1. Estimate the final lake(s) water quality at completion of filling and modelling of how the lake water quality will evolve into the future;
2. Modelling the demand for water to fill and maintain the lake(s) level during and beyond creation of the lake(s);
3. Assessment of how climate change and climate variability are likely to affect the water balance and water quality of the lake(s); and,
4. Comparison of the results for different fill option scenarios.

The key conclusions of the modelling for each of the scenarios are summarised in the following points.

The results discussed in this report are considered to be at an 'inferred' level of confidence. The key conclusions from the water balance are summarised in **Table 7-1** and in the following points:

- Scenario 1 (base case) did not reach fill elevation (+37 m AHD) over the simulation period (100-years); the maximum lake elevation reached is +15.5 m AHD for both the YTF and YEF lakes.
- For the other scenarios (Scenario 2 to Scenario 6), the modelling showed that the pit filled to RL +37 m AHD within 12.3 to 30 years with the mean values being 12.9 to 28.1 years (**Table 7-1**), depending on which fill scenario was modelled, climate variability/ uncertainty and if the Morwell River is connected.
- The climate change sensitivity analysis showed that the pit fill timeframes were sensitive to climate (medium versus dry showed a +2.8-year (mean probability) increase in fill time). The main reason for the variation in the time to fill the pit for the probabilistic simulations is largely driven by the large contribution of Morwell River flood flows, direct rainfall and catchment runoff to the water balance which are all climate dependent.
- The requirement for the top-up occurs when the evaporation from the lake surface (and groundwater seepage) exceeds the lake inflow volumes. The annual top-up, for those scenarios that require top-up (Scenarios 2, 3 and 6), varies between a mean of approximately 2.61 and 4.66 GL/year depending on the particular scenario (**Table 7-1**). There is an opportunity to reduce the top-up volumes by allowing a freeboard in the lake which would reduce the water loss via Spillway 4 (particularly if a flood event occurs shortly after top-up).

Table 7-1: Summary of water balance results

Scenario	Additional fill sources (annual)*	Morwell River connected?	Top-up?	Climate	Mean years (volume [GL]^) to fill	Mean annual top-up (GL/year)	Mean top-up volume (GL) over simulation
1	None	No	No	Median	NA	NA	NA
2	24 GL Latrobe water.	Yes (flood flows only)	Yes	Median	25.3 (606)	2.61	194
3	38 GL Latrobe water & 14 GL Moondarra water.	Yes (flood flows only)	Yes	Median	12.9 (620)	2.73	237
4	24 GL Latrobe water.	Yes (all)	Yes	Median	25.3 (606)	0.00	0
5	24 GL Latrobe water.	Yes (flood flows only)	Yes	Dry	28.1 (674)	4.66	334
6	24 GL Latrobe water.	No	Yes	Median	25.9 (621)	2.80	207

*Additional fill sources include those sources of fill that are not common to all scenarios (i.e. local catchment flow, natural groundwater, direct rainfall, pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing) are consistent for all modelled scenarios.
^Volume pumped water to achieve first fill (+37 m AHD).

The key conclusions from the water quality modelling are summarised in the following points.

- The PHREEQC model predicted pH incorporating atmospheric equilibrium is ~pH 7 and pH 7.6 for the YTF and YEF, respectively. However, incorporation of thermodynamic constraints (i.e. precipitation of ion (oxy)hydroxides)) results in generation of acidity, consumption of alkalinity and a change in lake pH to 4.5 and 7.5, in the YTF and YEF, respectively.
- The modelled acidic pH in YTF is likely due to the iron concentration inputs in the WB/WQ model which may be significantly overestimated due to colloids passing through 45 µm filter for field water samples. If this is the case, iron (oxy)hydroxide precipitation may not release enough acidity to neutralise the available alkalinity in the YTF pit water. Similarly, groundwater inflows from the HHF may oxidise prior to entering the lake; this would also result in a decrease in the iron inputs. Further detailed thermodynamic modelling of source terms and pit lake water may be required to resolve this.
- The general water quality trends for the lake varies for different modelled parameters and reflect the water balance inputs and geochemical source terms during the fill (Latrobe water fill [scenario 2-6], direct rainfall, catchment runoff and Morwell River flood flows (connected only)) and post fill phases (direct rainfall, catchment runoff, Latrobe water top-up (if required) and Morwell River flood flows (connected only)).
- Although the trends differ between scenarios, there is only a relatively tight range in salts and metal and metalloid values between modelled scenarios (e.g. the mean probability TDS range at the end of the simulation for Scenario 2, 3, 5 and 6 is 575 mg/L (minimum) to 591 mg/L (maximum) for YTF lake and 465 mg/L (minimum) to 476 mg/L (maximum) for YEF lake). The tight range in modelled lake water quality values is due to the fill and top-up water qualities dominating the lake water balance regardless of scenario.
- The water qualities for each of the scenarios and sensitivities for all scenarios are dominated by the major ions (namely sulfate, chloride and sodium), with metal and metalloid concentrations relatively low in comparison.
- Comparison of the modelled lake water qualities to the assessment criteria is used to determine potential reduced lake water quality. As mentioned above, the assessment criteria includes the revised *Australian and New Zealand Guidelines* for freshwater aquatic ecosystem (95% species protection) and the recommended guidelines for livestock drinking water (ANZG, 2018) as well as the *Australian Drinking Water Guidelines* (NRMMC, 2011). As mentioned previously, the ANZG freshwater aquatic ecosystem water quality guidelines are considered highly conservative for a pit lake assessment, since they are typically applied in the context of the management of natural and semi-natural water resources. Comparison of the modelled mass balance metals and metalloids to these guidelines indicate that:
    - all modelled parameters are below the livestock drinking water guidelines (ANZG, 2018) for all probabilities and scenarios.
    - Aluminium and zinc exceed the freshwater aquatic ecosystem (95% species protection) guideline (ANZG, 2018) in the YTF and YEF for each of the scenarios over the simulation period.
    - The cause of the aluminium exceedance is due to several source term inputs which also show exceedance: Latrobe water, Morwell River, groundwater and Latrobe top-up (amongst other sources). It is common for colloidal aluminium (and iron) to pass through size 45 µm filter paper resulting in an overestimation of the dissolved concentration. Thermodynamic modelling indicated that some aluminium may precipitate out of the lake as gibbsite (or aluminium (oxy)hydroxide) resulting in corrected concentrations below the guideline (see below).
    - The cause of the zinc exceedance is due to multiple sources, including rainfall and groundwater (natural and pumped).

- Copper exceeds the freshwater aquatic ecosystem (95% species protection) guideline in the YTF for each of the scenarios over the simulation period. However, copper concentrations are below guidelines in the YEF except for Scenario 4 where the large Morwell River inflow causes an exceedance in copper concentration after 25 years (shortly after being fully integrated with Morwell River).
- The cause of the copper exceedance (where noted above) is mainly due to Latrobe water, Morwell River, groundwater (natural and pumped) and local rainfall quality.
- Lead exceeds the freshwater aquatic ecosystem (95% species protection) guideline in the YEF for each of the scenarios over the simulation period. However, lead concentrations are below guidelines in the YEF except for Scenario 4 where the YEF and YTF are mixed, resulting in a large increase in lead concertation in the YTF and a decrease in lead concertation in the YEF after 25 years (shortly after being fully integrated with Morwell River).
- As highlighted above, copper and zinc levels are elevated relative to freshwater aquatic ecosystem (95% species protection) guideline throughout the Morwell and Latrobe catchments. Copper and zinc levels are present in rainfall at concentrations of approx. 50 µg/L, possibly due to burning of coal at power stations throughout the Latrobe Valley. It is expected that a reduction in the burning of coal in the Latrobe Valley will reduce the supply of copper and zinc to the system and thus reduce the modelled lake concentrations for these parameters.
- Similarly, the elevated lead concentrations in the YEF, relative to freshwater aquatic ecosystem (95% species protection) guidelines, are associated with runoff and seepage from the pit walls and floor, which is also likely due to burning of coal at power stations throughout the Latrobe Valley. As the burning of coal in the Latrobe Valley is reduce the supply of lead to the system is also expected to decrease and so will the modelled lake lead concentrations.
- Manganese slightly exceeds the ADWG for all scenarios in the YTF lake after ~10 to 25 years; noting that there are no exceedances for manganese in the YEF lake. The full integration of Morwell River into the lake (Scenario 4) reduces the estimated manganese concentration below ADWG. The cause of the manganese exceedance, relative to ADWG, is due mainly to seepage from the Former Ash Ponds and NOB Dump.
- Some of the elevations likely reflect the static nature of the geochemical source terms used in the model. As above, some source term qualities may improve with time improving the modelled lake water qualities.
- For the YEF, the thermodynamic modelling showed that when allowed to precipitate, iron (oxy)hydroxides remove dissolved aluminium from the pit water significantly reducing dissolved aluminium concentration from ~0.3 mg/L to <0.005 mg/L (i.e. below guideline value). Similarly, sorption of copper and zinc ions on precipitating iron (oxy)hydroxides resulted in notable concentration decreases. Mass balance copper decreased to <0.0001 mg/L on thermodynamic modelling. Mass balance zinc decreased significantly but still exceeded the freshwater aquatic ecosystem (95% species protection) guideline.
- For the YTF, the thermodynamic modelling had little influence on the mass balance results for aluminium, manganese, copper and zinc because of the low modelled pH conditions which increase metal solubility keeping metals in solution. However, as mentioned above, if the modelled acidic pH in YTF is due to overestimated iron concentration inputs in the WB/WQ model, then correction/ update could result in neutral pH conditions and decreased solubility which would decrease modelled concentrations similar to the values modelled

- Climate sensitivity and the impacts of climate change on the lake water quality is limited, due to the dominance of fill inputs, and the availability of Latrobe top-up water and Morwell River flood flows (for connected lake).

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Appendix A

Yallourn Static Geochemistry Report

Appendix A Yallourn Static Geochemistry Report

TECHNICAL REPORT

Yallourn Static Geochemistry Assessment

Yallourn Coal Mine

Prepared for: **EnergyAustralia Pty Ltd**

RGS

MINE WASTE AND
WATER MANAGEMENT

TECHNICAL REPORT

Yallourn Static Geochemistry Assessment

Prepared for: **EnergyAustralia Pty Ltd**

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1 Introduction

RGS Environmental Consultants Pty Ltd (RGS) was commissioned by EnergyAustralia Pty Ltd (EA) to develop a Stage 1 geochemical sampling and analysis plan (SaAP) for Yallourn Coal Mine (YCM), located in the Latrobe Valley, approximately 130 km east of Melbourne, Victoria. The key objective of the Stage 1 SaAP is focused on filling hydro-geochemical data gaps needed to develop a numerical pit lake water balance/water quality (WB/WQ) model which will be used as a decision-making tool for closure planning.

The key geochemical data gaps identified are around mine waste characterisation. The characterisation of mine waste materials utilises standard industry static analytical methods. The results of the analyses are used to classify the materials in terms of their potential to produce acid, saline and metalliferous drainage (herein referred to as AMD).

This report summarises the results of static geochemical testing of various mine materials that may contribute runoff or seepage to the mined voids/pit lake(s).

1.1 Background

The YCM is on three mining licenses (ML): ML 5003 (5,000 ha), ML 5304 (151 ha) and ML 5216 (83 ha). The Yallourn, Traralgon and Morwell Formations contain the three main coal seams of the Gippsland Basin brown coal resource (Barton et al., 1993). Mining of brown coal commenced in the 1880's at the old brown coal mine (now Yallourn North Open Cut [YNOC]). Commencement of mining in the Yallourn Open Cut (now Township Field), as well as construction of the Yallourn Township and Yallourn A Power Station, occurred between 1920-1925 under the State Electricity Commission Victoria (SECV).

EA operates the YCM, and the associated Yallourn W Power Station, in Victoria's Latrobe Valley. The Yallourn W Power Station is scheduled to cease operation in mid-2028, at which point YCM will also cease production. Following the end of the productive life of the mine, the site will transition to a rehabilitation phase (extending to 2051) and eventually to an anticipated future use beyond mining.

The YCM operates under its current 2018 Work Plan and mining license issued by the Department of Jobs, Precinct and Resources (DJPR). The Work Plan includes an agreement that the post mining void must be rehabilitated to achieve a safe, stable, and sustainable outcome. The current approved 2019 Rehabilitation and Closure Plan presents a full pit lake with a connection to the Morwell River as the preferred closure solution and future land use beyond mining. EA considers a full pit lake the most feasible option for rehabilitation to address (amongst other factors) long-term geotechnical stability and the risk of fire in the Township Field mined void and the East Field (including Maryvale Field) open pit[1].

RGS has already undertaken a review of existing data and developed a pit lake conceptual model (RGS, 2021). A factual drilling report, linked to the static geochemistry results presented in this report, has also been provided to EA (RGS, 2023).

1.2 Geology

The YCM operates withing the strata of the Haunted Hills Formation and the Yallourn Formation. The overburden at the YCM comprises the Pliocene-aged Haunted Hills Formation (HHF), a generally poorly sorted sedimentary unit with particles sizes ranging from clay-sized to gravel-sized. Locally, the overburden materials have been observed to comprise coarse sand to clay/silt sized particles and be prone to dispersion when disturbed. The Miocene-aged Yallourn Formation primarily comprises the brown coal Yallourn Seam (the targeted seam) with clay found above the coal seam in some synclines (although this is not observed within the YCM).

[1] The term open pit is reserved for the mining phase. Following decommissioning the open pit is considered a mined void.

1.3 Site layout and domains

The YCM comprises two adjacent open pits, Township Field and East Field (including Maryvale Field). To the north of the open pits is the Latrobe River which separates the mine from the Yallourn North Open Cut (YNOC) and ash ponds (YNOC). The two coal open pits (Township and East Field) are separated by a coal dyke with the Morwell River Diversion (MRD) running over this dyke. YNOC is currently used as the ash storage repository/ landfill with no natural connection between YNOC and the mine pit voids.

Pit wall batters comprise both exposed coal, and reshaped and revegetated overburden. Coal exposed in the Township Field batters is heavily weathered relative to the coal exposed in the East Field, with coal in the East Field transitioning toward unweathered at the mining face in the Maryvale Field.

There are three internal overburden dumps at YCM. The Township Field mined void contains the Yallourn Township Field (YTF) Overburden Dump and the Midfield Dump. The East Field mined void contains the operational Yallourn East Field (YEF) Overburden Dump. The Township Field also contains the Former Ash Ponds (FAP) which comprise dumped overburden overlain by layers of coal ash and covered with overburden and soil.

The YTF Overburden Dump is separated into the Northern Overburden Dump (NOB) and Southern Overburden Dump (SOB). Acid sulfate soils were identified in one area of the NOB dump (understood to originate from the excavation of the old Morwell Riverbed and floodplain alignment). Pyrite/marcasite mineralisation has been found within the HHF above the contact with the Yallourn Seam which is likely to have also been placed in the NOB Dump. Since placement of overburden in the NOB Dump, the facility has been generating acidic drainage of approximately pH 3. RGS understands that overburden materials placed in the SOB Dump are generating neutral drainage.

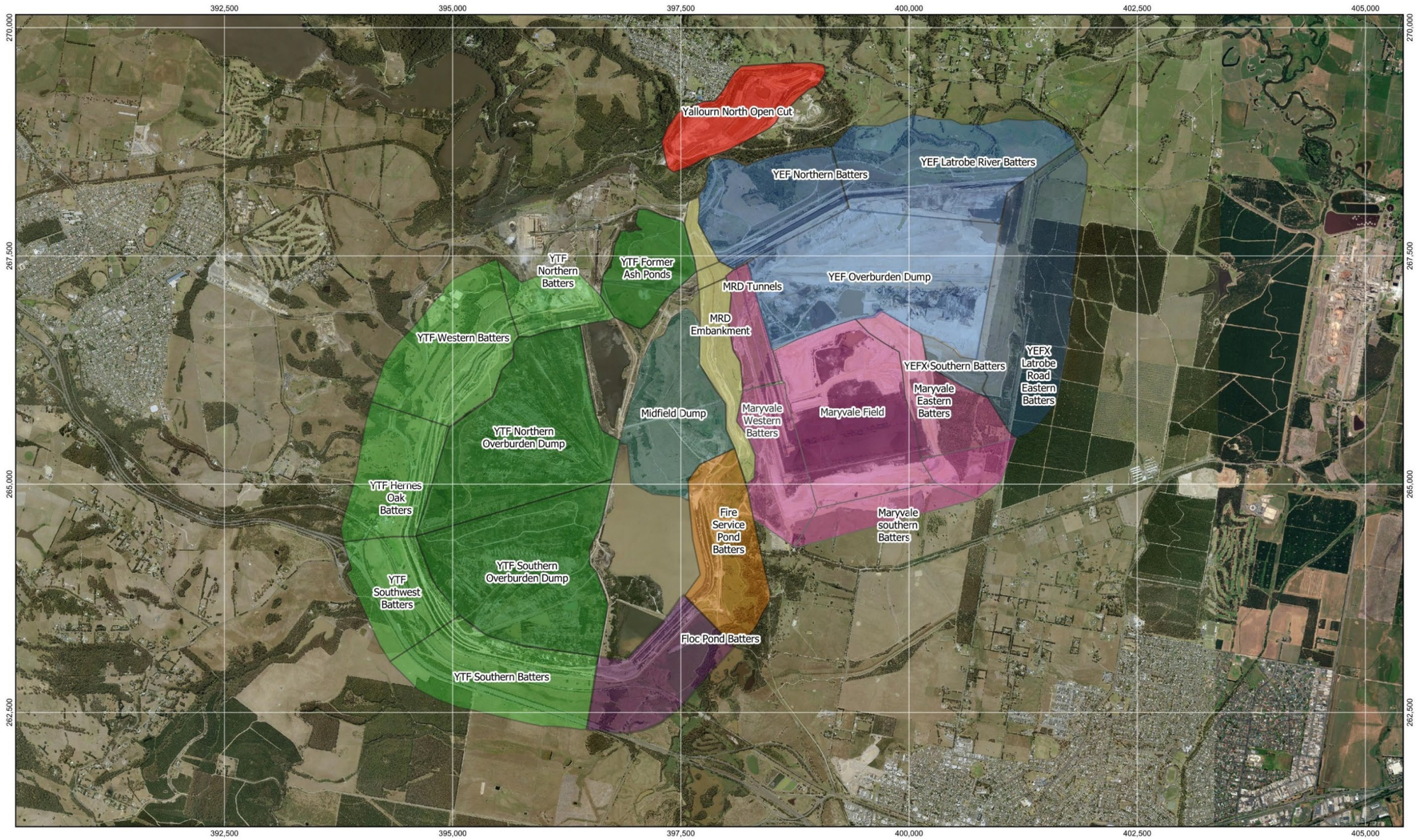


Figure 1-1: Areas sampled for geochemical analysis

1.4 Scope of work

A geochemical assessment of coal, overburden and ash materials sampled from the YCM was conducted. The scope of work was undertaken as a phased approach comprising of the steps outlined below:

- Geochemical characterisation of the solid phase materials (coal, overburden, and ash materials) which may contribute to the evolving pit lake water quality including acid and metalliferous drainage (AMD) as well as neutral/saline drainage.
- Collection of water quality (field wall washing) data associated with all water sources likely to enter the final pit void/pit lake.
- Production of a materials characterisation report (this report) to present the measured (static) geochemical characteristics of the materials.

The static geochemical results presented in this report have been used to select samples for an additional phase of testing: kinetic leach column (KLC) tests. The primary objective of the KLC tests is to quantify the concentration and rate that weathering products (acid, soluble salts, and metal[loid]s) are leached from the solid phase of the materials over time. The KLC test results are provided is a separate kinetic geochemistry assessment report.

2 Report structure

2.1 Material types

The report has been structured to present the material sampling results obtained at each location within the Township Field catchment and East Field catchment at YCM. The Morwell River Diversion (MRD) represents the divide between these catchments with coal and overburden collected on the western and eastern slopes of the MRD assigned to Township Field and East Field, respectively. The associated analytical program for samples collected as part of the sampling is structured to assess each material type (**Table 2-1**).

Table 2-1: Report structure

LOCATION	MATERIAL TYPE DISCUSSED						
	Ash	Overburden		Weathered coal		Fresh coal	
	Dump	Pit wall[1]	Dump	Pit wall[1]	Dump	Pit wall[1]	Pit floor
Township Field catchment							
Former Ash Ponds	✓		✓		✓		✓
Midfield Dump/MRD west			✓	✓	✓		✓
Township Field North		✓	✓	✓	✓		✓
Township Field South		✓	✓	✓	✓		✓
East Field Catchment							
East Field/MRD east		✓	✓	✓	✓		✓
Maryvale Field		✓	✓	✓	✓	✓	✓
East Field Northern Batters[2]			✓				

[1] Overburden, weathered coal, and fresh coal in the pit walls was also subjected to wall-washing (discussed in **Section 3.2.2**).
[2] The ex-pit overburden dump has the potential to contribute runoff and seepage to East Field.

2.2 Terminology

Open pit, mine void, and pit lake. The term open pit is reserved for the mining phase. After the open pit is decommissioned, the open pit is considered a mined void. When the mined void fills with water a pit lake (or two pit lakes) will develop. These terms have been used consistently within this report.

Weathered coal refers to coal sampled from the pit walls and overburden dumps in Township Field and East Field that has been exposed to oxidation for a significant period of time.

Fresh coal refers to coal sampled from the Maryvale Field pit floor/operating face that has been exposed by recent excavation (by dredging and slope mining).

Overburden refers to the sands and gravels, interbedded with clay and sandy clay, comprising the HHF sampled in the pit walls. The HHF material disturbed and relocated by mining comprise the in-pit and ex-pit overburden dumps characterised as part of the drilling program.

3 Field methodology

Collection of solid phase samples and water samples to support the development of a WB/WQ model for the YCM pit lake(s) was undertaken across four field programs:

- **Field program 1** - Pit floor coal sampling in Maryvale Field (5 April 2022)
- **Field program 2** - Pit wall material sampling and wall washing (11-14 April 2022).
- **Field program 3** - Pit wall material sampling (1-3 August 2022).
- **Field program 4** - Drilling program to characterise in-pit and ex-pit overburden dumps and the in-pit former ash ponds (10 October 2022-1 June 2023) (RGS, 2023). It is important to note that the former ash ponds are predominantly made up of overburden with near-surface ash present.

3.1 Field program 1 sampling

Seven (7) weathered coal samples (RGS_YMF_C_01-07) and 13 fresh coal samples (RGS_YMF_C_08-20) were collected into sample bags by RGS personnel from the pit floor/operating face in Maryvale Field (**Figure 3-1**). All sampling locations were surveyed by an EA surveyor.

The sample code applied e.g., RGS_YMF_C_01) indicates 'Company Name_Site Location (Yallourn Maryvale Field)_Sample Type (Coal)_Sample Number'.

3.2 Field program 2 sampling

3.2.1 Pit wall material sampling

Forty-seven (47) pit wall samples were collected across Township Field, East Field, and Maryvale Field into sample bags (**Table 3-1**) (**Figure 3-2**).

The sample code applied (i.e., RGS_YTF_WW-1) indicates 'Company Name_Site_Wall Washing_Sample Number'. This sampling code was applied to water sample collection (from wall washing) as well as pit wall coal and overburden sampling.

Table 3-1: Pit wall sampling by material type – April 2022

Pit wall location	Weathered coal	Fresh coal	Topsoil/overburden
Township Field	18*	0	7
East Field	11	0	1
Maryvale Field	4	2	4
Total samples	33	2	12
* Inclusive of two weathered coal samples collected at the Raw Coal Bunker (RCB) Batters			

Note: There is no fresh exposed coal at Township Field or East Field.

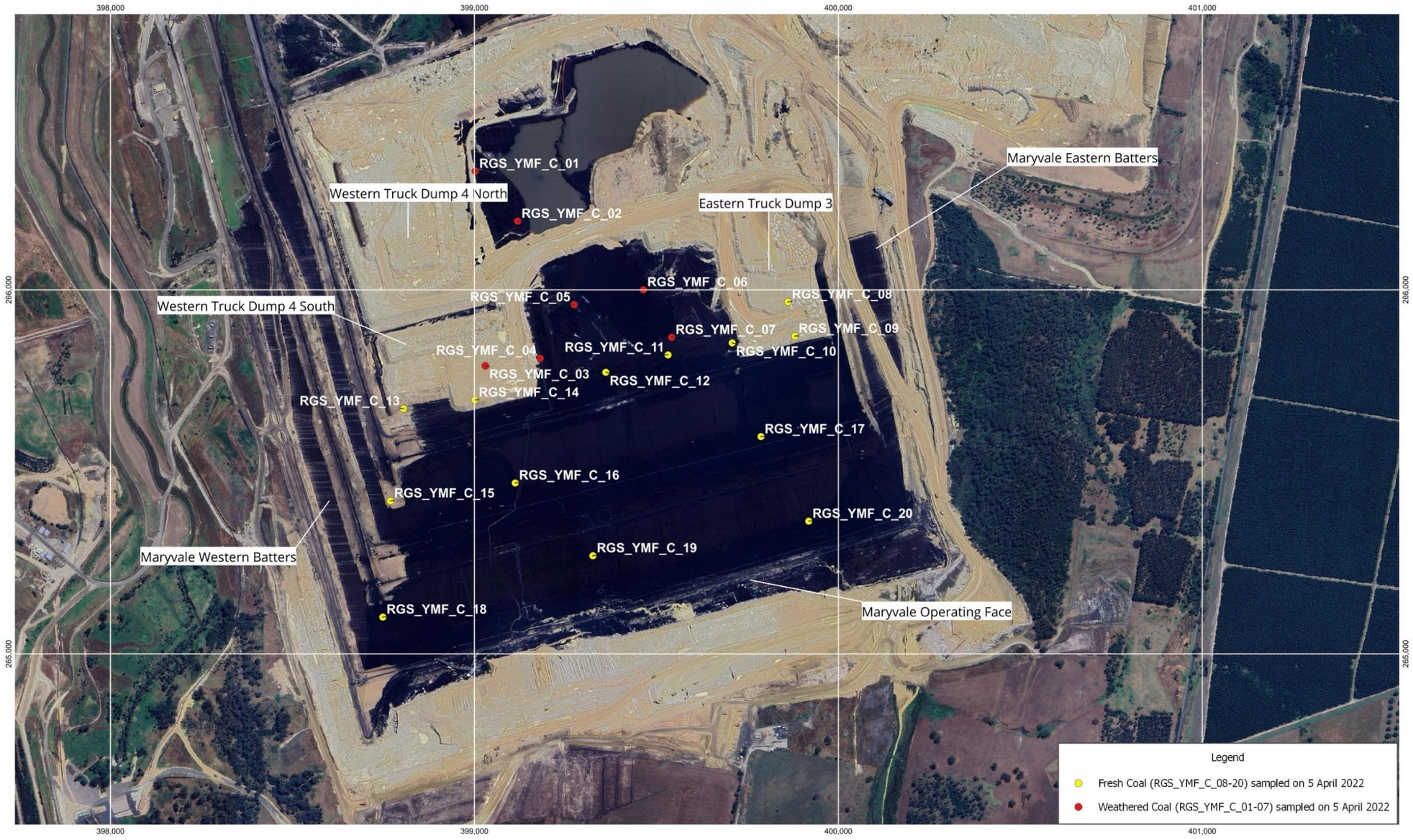


Figure 3-1: Fresh and weathered coal sampling locations at the Maryvale Field pit floor – 5 April 2022.

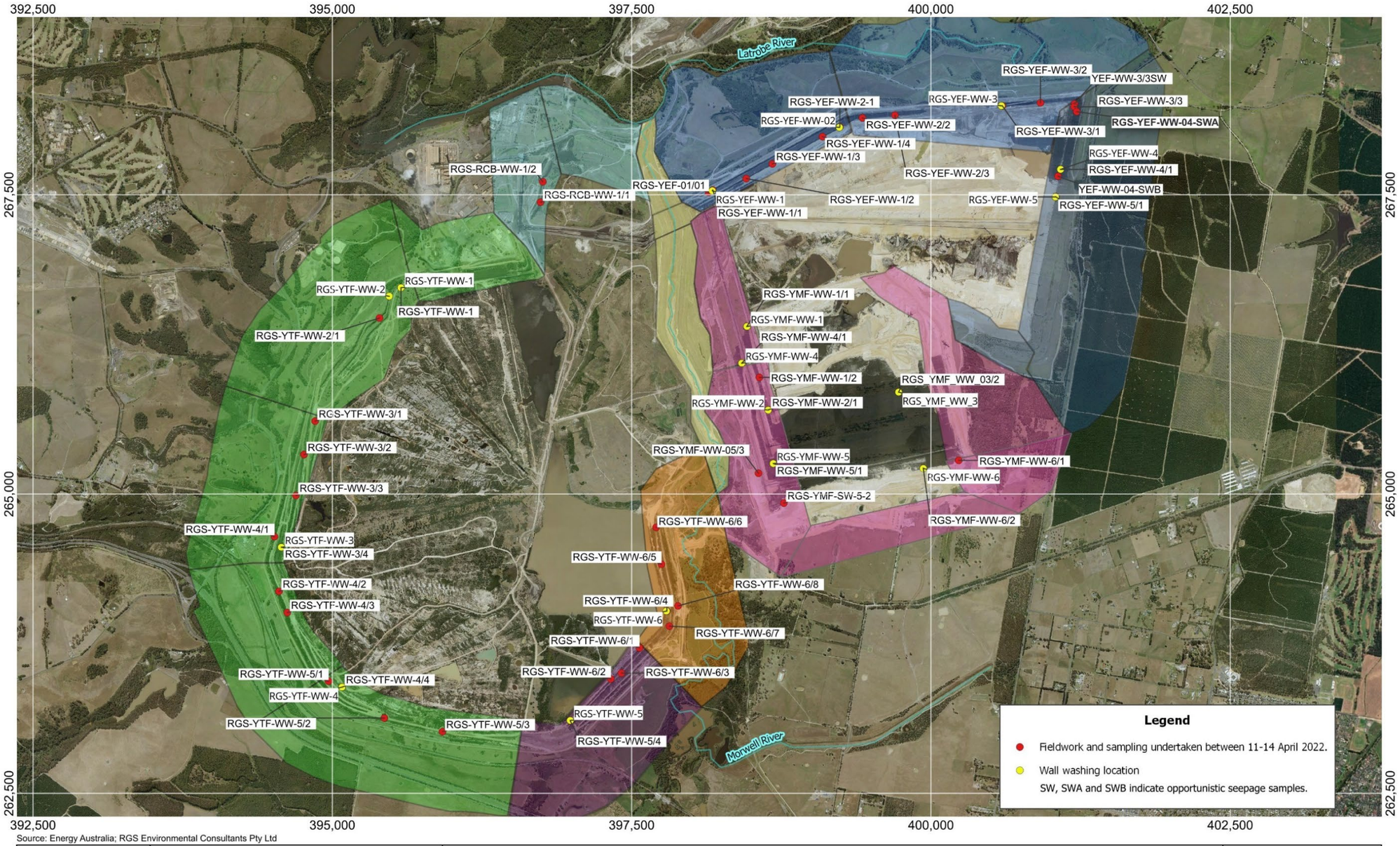


Figure 3-2: Wall washing and coal and overburden sampling locations – 11-14 April 2022

3.2.2 Wall washing

Wall washing at YCM involved the application of potable water to the surface of the pit wall. The runoff water is collected and analysed for selected chemical parameters. Wall washing provides an indication of runoff quality from an isolated section of in situ coal/overburden after application of a controlled amount of irrigation. The wall washing test is considered to represent a very useful order-of-magnitude estimate of contributions from exposed pit walls (INAP, 2024).

Wall washing was completed at 17 locations across Township Field, East Field, and Maryvale Field (**Table 3-2**) (**Figure 3-3**). A spray headers manifold was fixed in place adjacent to the pit wall and connected to a potable water supply. Approximately 20 L/minute of water was sprayed over an area of approximately 2m^2. For 30 minutes, with samples collected at 0 minutes (first flush), 15 minutes and 30 minutes.

The samples collected using wall washing methods allow the filterable fraction (0.45 µm soluble metals) and non-filtered fractions (e.g., suspended sediment and total metals and metalloids) of the water quality to be measured and quantified. Water samples at 0, 15 and 30 minutes were analysed for the filterable fraction, while only samples at 0 minutes were measured for non-filtered fractions.

The results from wall washing are used (together with other data) to develop and verify source terms for pit wall contaminant release.

Table 3-2: Wall washing by material type

	Number of wall wash experiments		
Pit wall location	**Weathered coal**	**Fresh coal**	**Topsoil/overburden**
Township Field	5	0	1*
East Field	4	0	1
Maryvale Field	3	2	1
Total wall wash experiments	12	2	3
Total water samples collected	36	6	8
* Water samples were only collected a 0-minutes (first-flush) and 30 minutes.			

Figure 3-3: Wall washing experiments on weathered coal (left) and topsoil/overburden (right) showing spay headers manifold

3.2.3 Surface water/seep sampling

During the wall washing, opportunistic water samples were collected where natural groundwater seepage (**Figure 3-4**) and flow from horizontal bores was observed in the coal pit walls.

Seven (7) water samples were collected between 12-14 April 2022. These water samples comprised two from Township Field, four from East Field, and one near the Maryvale Field operating face.

Figure 3-4: Groundwater seepage in the coal pit wall at the YEFX Latrobe Road Batters.

3.3 Field program 3 sampling

An additional 80 pit wall and floor samples were collected into sample bags between 1-3 August 2022 (**Table 3-3**) (**Figure 3-5**). The sampling was aimed at filling in the spatial gaps in pit wall sampling undertaken as part of field program 2 and to provide additional sample material for KLC testing at the RGS laboratory.

Table 3-3: Pit wall sampling by material type – August 2022

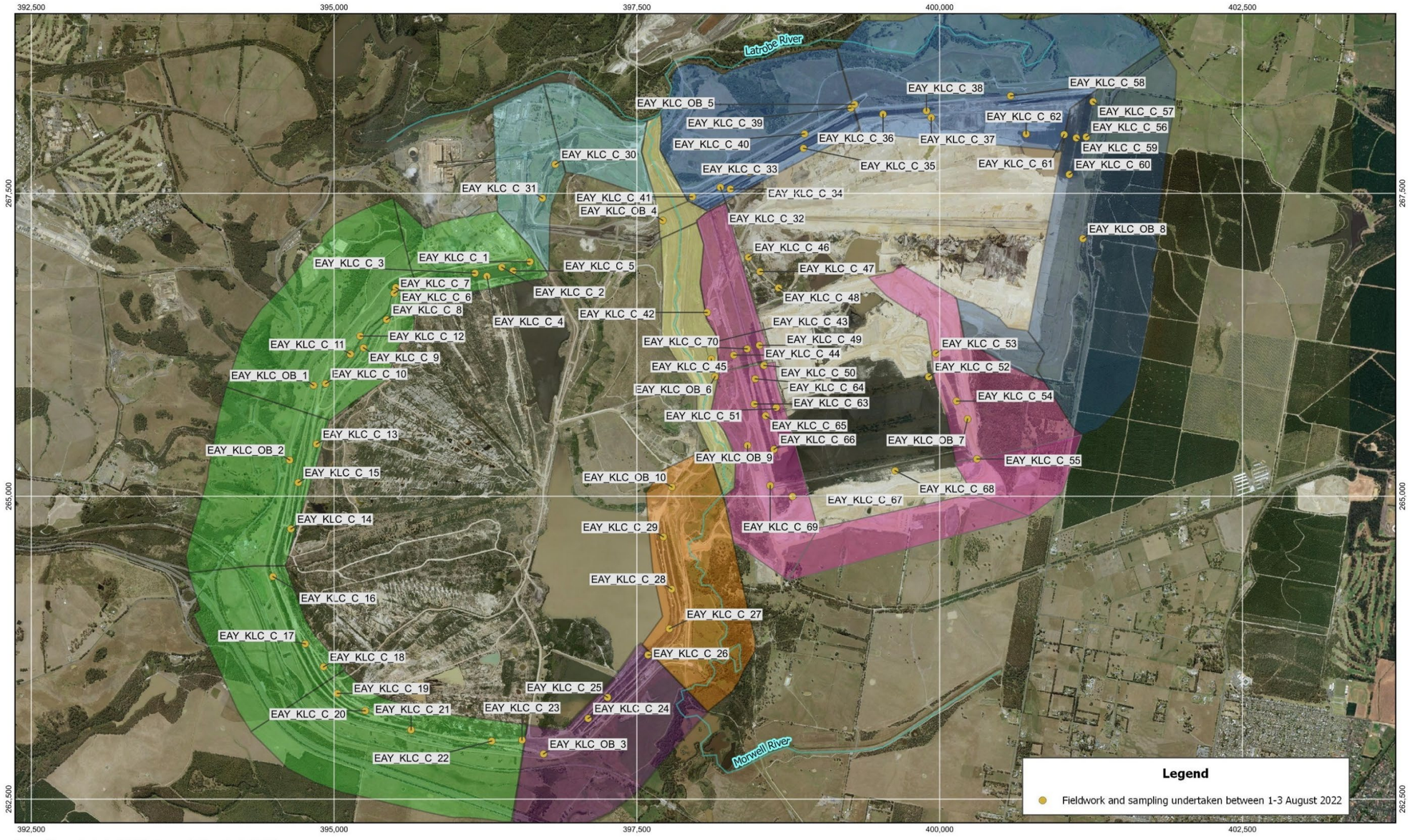
Pit wall location	Weathered coal		Fresh coal	Topsoil/Overburden*
	Pit wall	Pit floor		
Township Field	31	0	0	5
East Field	18	3	0	2
Maryvale Field	14	0	4	3
Total samples	63	3	4	10
* Overburden samples collected on the eastern and western slopes of the MRD were designated to East Field/Maryvale Field and Township Field, respectively.				

3.4 Field program 4 sampling

Forty-three (43) drill holes were advanced to the target depth across the in-pit overburden dumps and the former ash ponds (41 drill holes), and ex-pit overburden dump above the East Field Northern Batters (2 drill holes) (**Figure 3-6**). Twelve (12) out of the 43 drill holes were converted to groundwater monitoring wells to enable water quality monitoring within the in-pit dumps and ex-pit dump that can provide source terms for the pit lake WB/WQ model. The field program is summarised in the RGS factual drilling report (RGS, 2023) and is summarised in **Table 3-4**. The water quality monitoring of the groundwater monitoring wells is not included in this report.

Table 3-4: Field program 4 drilling summary

Drilling location	No. of drill holes progressed to target depth	No. of drill holes converted to groundwater monitoring wells
Township Field catchment		
Former Ash Ponds (in-pit)	5	3
Midfield Dump/ Midfield Borrow area (in-pit)	9	2
Township Field Northern Overburden dump (in-pit)	7	2
Township Field Southern Overburden dump (in-pit)	7	2
East Field catchment		
East Field Dump (in-pit)	8	2
Maryvale Field Dump (in-pit)	5	0
East Field Northern Batters Overburden Dump (ex-pit)	2	1
Total	**43**	**12**



Source: Energy Australia; RGS Environmental Consultants Pty Ltd

RGS 0.5 0 0.5 1 1.5 km Scale 1:30,000 Datum: SECLV 2021004 EA Yallourn Spatial Data.qgz; August 2022 Sample Locations	Yallourn Static Geochemistry Assessment **Pit wall coal (C) and overburden (OB) sampling locations – 1-3 August 2022**	Job Number: 2021048 02/04/2024 Figure: 4-5 **Figure 3-5**

Figure 3-5: Pit wall coal (C) and overburden (OB) sampling locations – 1-3 August 2022

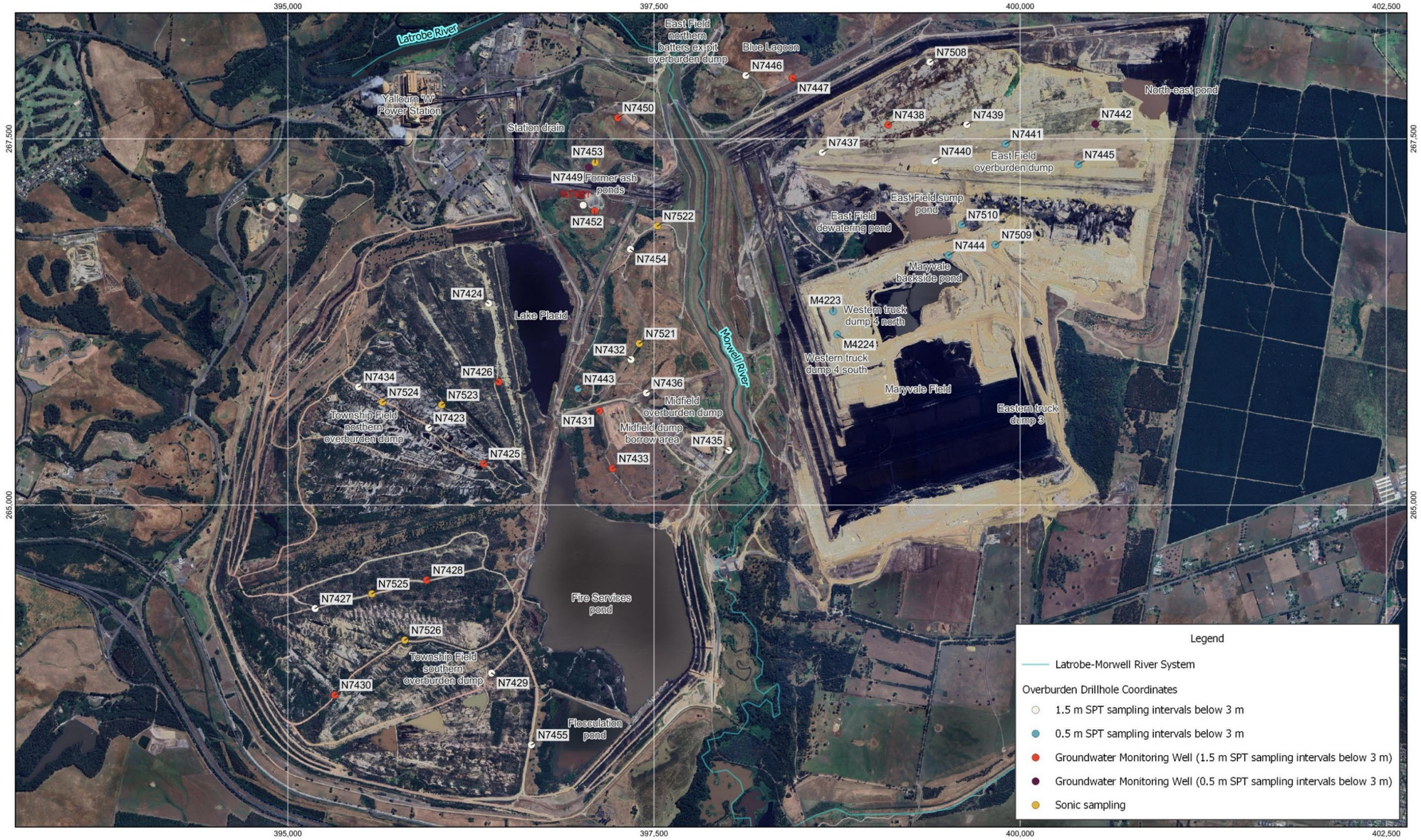


Figure 3-6: Drilling locations – October 2022-June 2023

4 Analytical program

4.1 Sample preparation

All drill core and grab samples were sent from site directly to Indicium Labs (Brisbane) for samples preparation. The samples preparation process included:

- Air dry samples (record masses and calculate fee moisture).
- Crush each 1 m core to < 10 mm to homogenise.
- Riffle or rotary sub-sample ~1.5 kg. From the ~1.5kg sample, riffle split into two samples. One sample is retained for < 10 mm analysis, while the other is pulverise to -212 µm for analysis.
- Sample splits (crushed and pulverised) sent to ALS Laboratories for analytical testing and remaining crushed sample stored.

4.2 Static Geochemical Testing

The static geochemical testing program comprises a total of 1,522 solid samples. A summary of these samples by location and material type are presented in **Table 4-1**.

Table 4-1: Summary of solid samples

Location	Number of Samples	Material Type	Number of Samples
Former Ash Ponds	201	Topsoil	4
Midfield Dump area	341	Overburden	1,259
Township Field North	253	Weathered coal	219
Township Field South	242	Fresh coal	15
East Field	315	Ash	25
Maryvale Field	170		
Total	**1,522**	**Total**	**1,522**

The static analytical program was designed to quantify the potential for AMD primarily from the presence of reactive sulfides including acid generation, and leaching of soluble metal(loid)s in accordance with relevant mine waste geochemistry and mine closure guidelines (COA, 2016; and DMP and EPA, 2015).

The static geochemical analysis program had three main objectives:

1. Investigate the current pH and Electrical Conductivity (EC) value and existing acidity/alkalinity for sample materials.
2. Quantify the total sulfur/sulfide content, Maximum Potential Acidity (MPA), Acid Neutralising Capacity (ANC) and Net Acid Producing Potential (NAPP) of the sample materials to assess any potential for the generation of acidic, neutral, and/or saline drainage.
3. Quantify the total elemental composition of the materials and the potential to leach these under meteoric conditions.

A summary of the parameters typically involved in completing a static geochemical characterisation of mine waste materials is provided in **Attachment A**.

Following the detailed breakdown of analysis in **Table 4-2**, pit wall and overburden dump samples underwent the following analyses:

- pH (1:5 w:v, sample:deionised water) [Rayment and Lyons 4A1 and APHA 4500H+].
- EC (1:5 w:v, sample:deionised water) [Rayment and Lyons 3A1 and APHA 2510].
- Total Sulfur [Combustion Method] and ANC [AMIRA, 2002 method].

- Chromium Reducible Sulfur (S_{CR}) [Australian Standard AS 4969.7, 2008 method].
- Acid Neutralising Capacity (ANC) [AMIRA, 2002 method].
- Titratable acidity and alkalinity (automatic titrator measured as $CaCO_3$).
- Total metal(loid)s [FIMS and/or ICP-AES/MS]) using a 2-acid digest (Aqua-regia) (Ag, Al, As, B, Ba, Be, Bi, Ca, Cd, Ce, Co, Cr, Cs, Cu, F, Fe, Ga, Ge, Hf, Hg, In, K, La, Li, Mg, Mn, Mo, N, Na, Nb, Ni, P, Pb, Rb, Re, S, Sb, Sc, Se, Sn, Sr, Ta, Te, Th, Tl, Ti, U, V, W, Y, Zn, Zr).
- Total major cations using a 2-acid digest (Aqua-regia) (Ca, Mg, Na and K) [ICP-AES].
- Soluble metal(loid)s (full-suite) [ICP-AES/MS and FIMS (1:5 w:v water extracts)].
- Major soluble cations (Ca, Mg, Na and K) [ICP-AES (1:5 w:v water extracts)].
- Major soluble anions (Cl, SO_4, F and reactive phosphorus) [ICP-AES/MS].
- Total Organic Carbon [Combustion Method].
- X-Ray Diffraction (XRD) (semi-quantitative).

The S_{CR} test provides a more accurate representation of the MPA that could be generated from a sample material, as acid generation primarily forms from the reactive sulfide content measured by this method. S_{CR} testing was completed on all 1,522 samples collected as part of the static geochemistry program as a screening test. For samples tested for both S_{CR} and ANC (397 samples), MPA values were calculated using S_{CR} data and these values were compared to the ANC values to calculate the NAPP.

The analytical program outlined in **Table 4-2** aligns with field programs 1-4.

Table 4-2 Geochemical characterisation program and number of samples

Phase	Category	Parameter	Number of samples
Field program 1	ABA	Dry, crush, pulverise as required	20
		$pH_{1:5}$ and $EC_{1:5}$	20
		NAPP (includes Total S and ANC)	20
		Sulfur speciation (CRS)	20
		Suspension peroxide oxidation combined acidity sulfur (SPOCAS)	4
	Multi-Element (Totals)	Multi-element chemical assay (full scan – ME-MS41)	7
		Total cations (Ca, Mg, K, Na)	7
	Multi-Element (Soluble – 1:5, 16-hour leach)	pH, EC, acidity, and alkalinity	7
		Cations (Ca, Mg, K, Na) and anions (Cl, F, SO_4)	7
		Multi-element chemical assay (full scan – ME-MS41)	7
Field program 2	ABA	Dry, crush, pulverise as required	50
		$pH_{1:5}$ and $EC_{1:5}$	50
		NAPP (includes Total S and ANC)	50
		Sulfur speciation (CRS)	50
		SPOCAS	4
	Multi-Element (Totals)	Multi-element chemical assay (full scan – ME-MS41)	13
		Total cations (Ca, Mg, K, Na)	13
		pH, EC, acidity, and alkalinity	13

Phase	Category	Parameter	Number of samples
	Multi-Element (Soluble – 1:5, 16-hour leach)	Cations (Ca, Mg, K, Na) and anions (Cl, F, SO_4)	13
		Multi-element chemical assay (full scan – ME-MS41)	13
Field program 3	ABA	Dry, crush, pulverise as required	80
		$pH_{1:5}$ and $EC_{1:5}$	80
		NAPP (includes Total S and ANC)	80
		Sulfur speciation (CRS)	80
	Multi-Element (Totals)	Multi-element chemical assay (full scan – ME-MS41)	15
		Total cations (Ca, Mg, K, Na)	15
	Multi-Element (Soluble – 1:5, 16-hour leach)	pH, EC, acidity, and alkalinity	15
		Cations (Ca, Mg, K, Na) and anions (Cl, F, SO_4)	15
		Multi-element chemical assay (full scan – ME-MS41)	15
Field program 4	ABA	Dry, crush, pulverise as required	250
		$pH_{1:5}$ and $EC_{1:5}$	250
		NAPP (includes Total S and ANC)	250
		Sulfur speciation (CRS)	1522
		TOC	102
	Multi-Element (Totals)	Multi-element chemical assay (full scan – ME-MS41)	31
		Total cations (Ca, Mg, K, Na)	31
	Multi-Element (Soluble – 1:5, 16-hour leach)	pH, EC, acidity, and alkalinity	31
		Cations (Ca, Mg, K, Na) and anions (Cl, F, SO_4)	31
		Multi-element chemical assay (full scan – ME-MS41)	31

4.3 X-ray Diffraction Analysis

Samples of overburden material collected from dumps, coal from the pit walls, and ash from the Former Ash Ponds were submitted for semi-quantitative X-ray diffraction (QXRD) analysis. The 8 overburden and 4 coal samples were analysed using a Panalytical Aeris Research Powder Diffractometer. Operating conditions were 40kV/15mA, Fe Kß filter, step scan 0.01/29 secs°2Θ at, ½° divergence and a 1.0° ant-scatter slit. Scan range was 5° to 90° 2Θ. Phases were identified by computer search/match of the ICDD PDF4 2022 Database.

Quantitative results were determined with full pattern Rietveld refinement software. Smectite clay was identified from sedimented clay fraction samples and glycol intercalation. Amorphous coal contribution to the traces was modelled with a disordered graphite structure.

The 3 ash samples were mixed with 20% weight/weight of zinc oxide to determine the amorphous component and analysed using a Bruker-AXS D8 Endeavor XRD with copper radiation at 40 kV and 25 mA, over a range of 5 to 80° 2Θ, with an approximately 0.02° step and an effective 192 second per step count time using a Lynx-Eye XE-T detector. Identification of phases present was carried out using Bruker EVA Search/Match software and the ICDD PDF-5 database (2024) with SIROQUANT version 5 software used to further characterise the samples.

5 Results

Summaries of geochemical testing and XRD results are presented in this section by mine area and sample material type. The full tables of results summarised below are provided in the following sections of **Attachment B**:

- Table B1: Acid Base Account (ABA) Test Results
- Table B2: Multi-Element Results for Samples from the Yallourn Project
- Table B3: Geochemical Abundance Index (GAI) Results for Samples from the Yallourn Project
- Table B4: PFAS Test Results for Overburden Samples from the Yallourn Project
- Table B5: PFAS QA/QC Test Results for Overburden Samples from the Yallourn Project
- Table B6: Multi-Element Test Results for Wall Wash Samples from the Yallourn Project
- Table B7: Multi-Element Test Results for Seepage Water Samples from the Yallourn Project
- Table B8: Multi-Element Test Results for Sample Water Extracts from the Yallourn Project

XRD analysis reports are provided in **Attachment C** and the laboratory Certificates of Analysis are provided in **Attachment D**.

5.1 Acid Base Account Results

5.1.1 Former Ash Ponds

A total of 201 samples from five drillholes (N7449-N7453) on the Former Ash Ponds area (199 ash pond samples and 2 wall samples collected from the Raw Coal Bunker batters) underwent testing. Weathered coal samples from the floor of the mine, below the dump were also collected.

Table 5-1: Number of samples tested by material type and analyte

Analysis	Pond Material Samples				Wall Material Samples	Total Number of Samples
	Soil	Ash	Overburden	Weathered Coal		
Acid-base Account	1	7	23	1	2	34
Chromium Reducible Sulfur	2	25	171	1	2	201

There is variability in lithology between the five drillhole locations; however, there is typically a grassed topsoil and sandy clay/clay overburden cap (~1-2 m thick) overlying a dark brown ash material (**Figure 5-1**). Below groundwater level, the ash often has a gelatinous and silky texture with humic silts and fine sands present. Coal fragments ranging from 2-5 mm were often observed within the retrieved ash cores and may be associated with incomplete power station combustion. The vertical extent of the ash material varied between drillholes to a maximum extent of 12 mbgl in N7450 (RGS, 2023). The materials are simplistically referred to as soil, overburden, ash or coal (weathered) in this section.

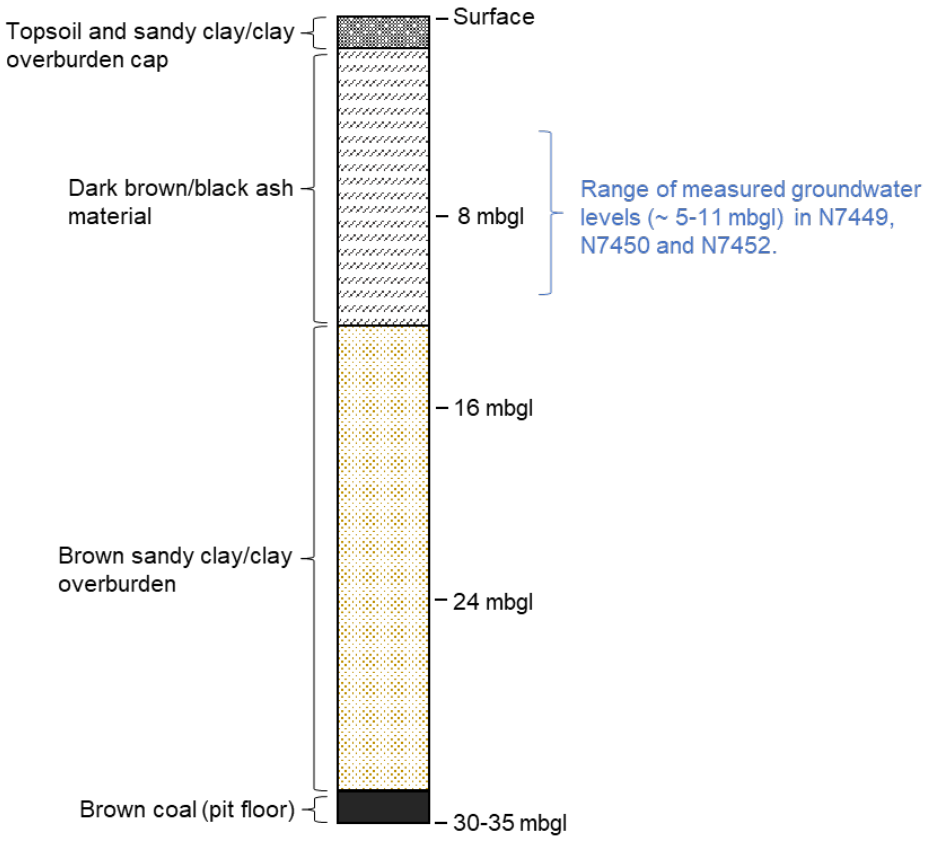


Figure 5-1: Indicative downhole lithology through the Former Ash Ponds (RGS, 2023).

$pH_{(1:5)}$

Samples of dump and wall materials collected from the Former Ash Ponds area of YCM were submitted for $pH_{(1:5)}$.

The pH(1:5) results for the samples range from pH 3.6 to 8.4, with a median pH of 5.9 (**Figure 5-2**). All dump material samples except for three had pH values greater than pH 4.5, while both wall material samples have pH values less than 4.5. Generally, ash samples had higher pH values compared to overburden, soil, and weathered coal samples (**Figure 5-2**).

There is no strong correlation between pH(1:5) and depth (or material type) (**Figure 5-3**) possibly due to the mixed nature of the Former Ash Ponds materials.

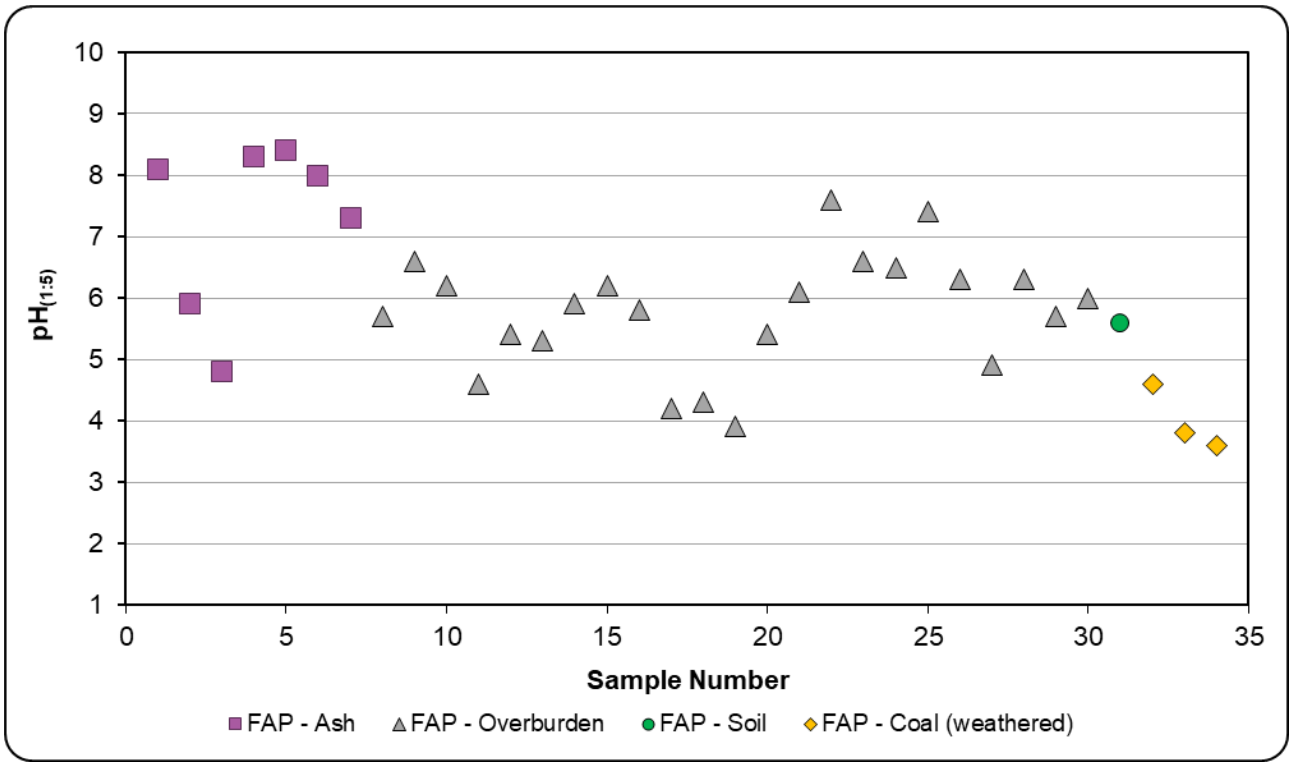


Figure 5-2: $pH_{(1:5)}$ values for Former Ash Pond samples from the YCM

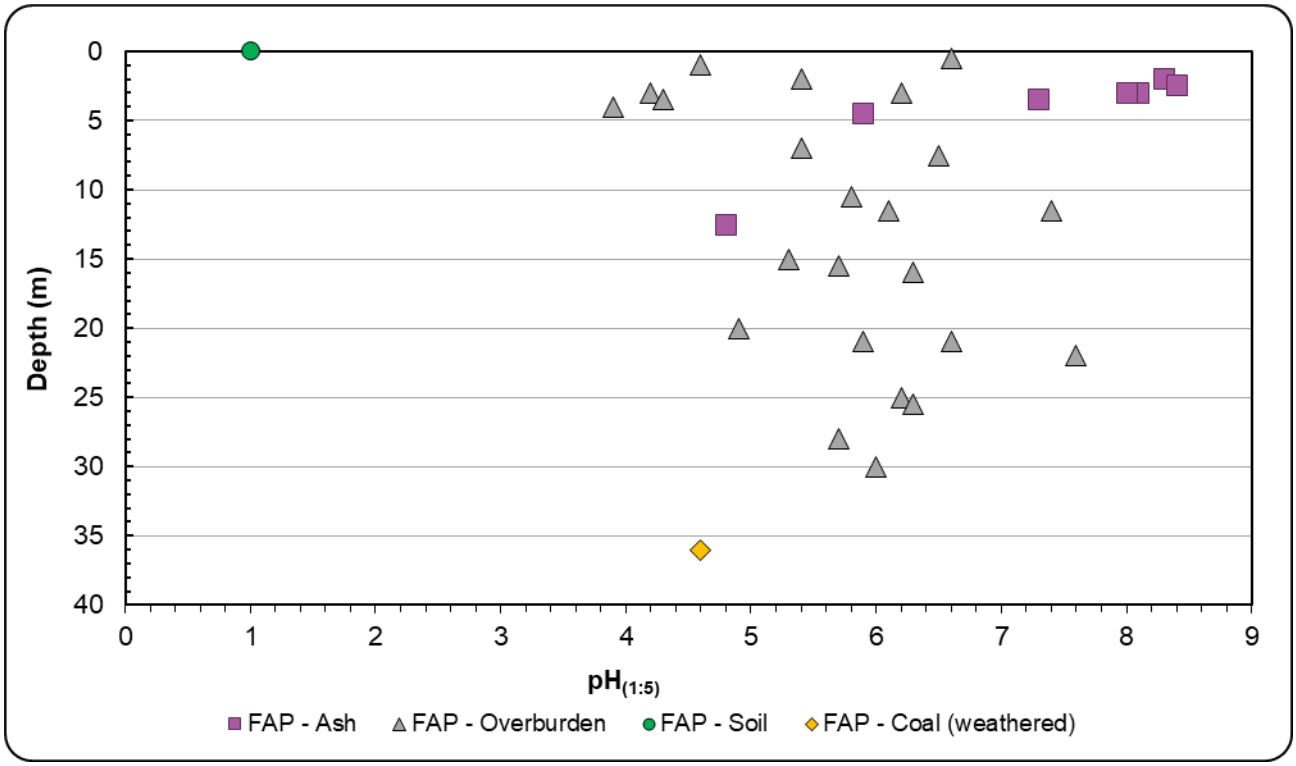


Figure 5-3: $pH_{(1:5)}$ values vs depth by material type

Electrical Conductivity$_{(1:5)}$

$EC_{(1:5)}$ values for the Former Ash Pond samples range from 39 to 1,450 µS/cm, with a median of 232 µS/cm. Ash samples generally have higher $EC_{(1:5)}$ values relative to overburden, soil, and weathered coal samples (**Figure 5-4; Figure 5-5**).

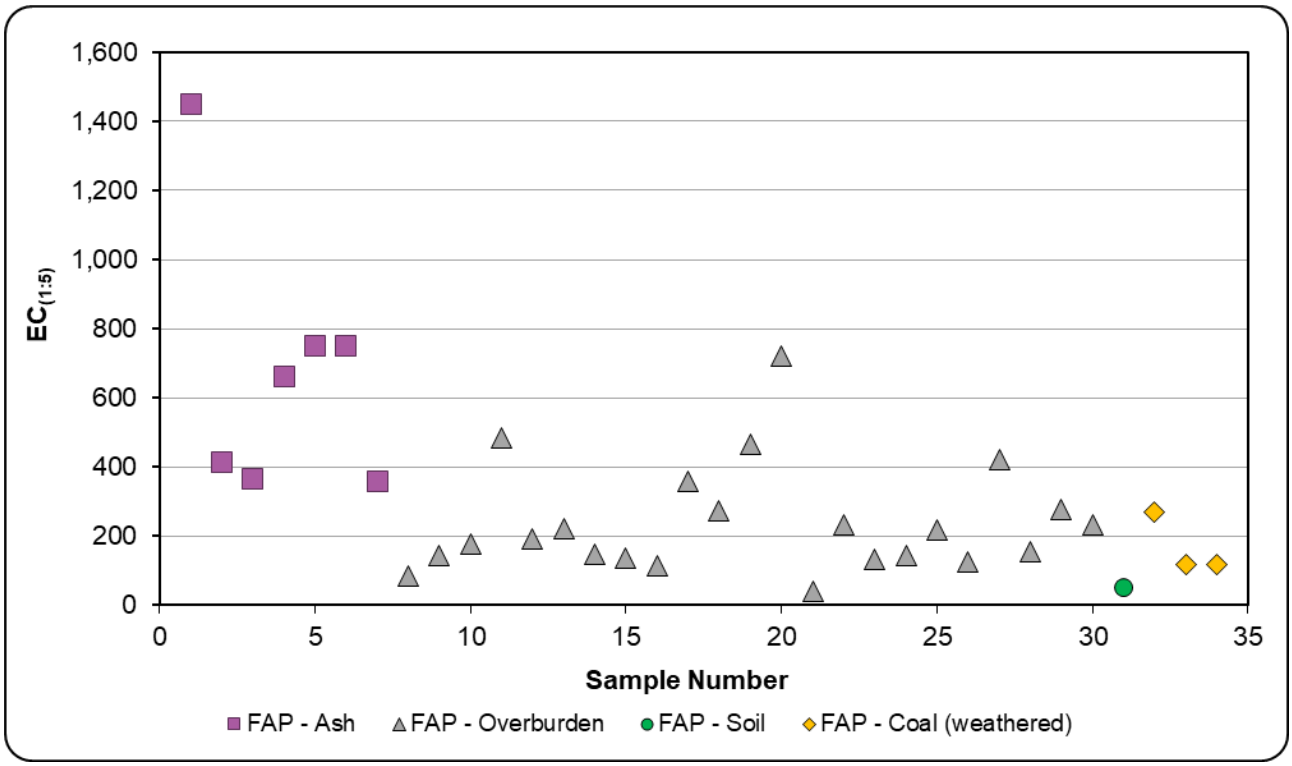


Figure 5-4: $EC_{(1:5)}$ values for Former Ash Pond samples from the YCM

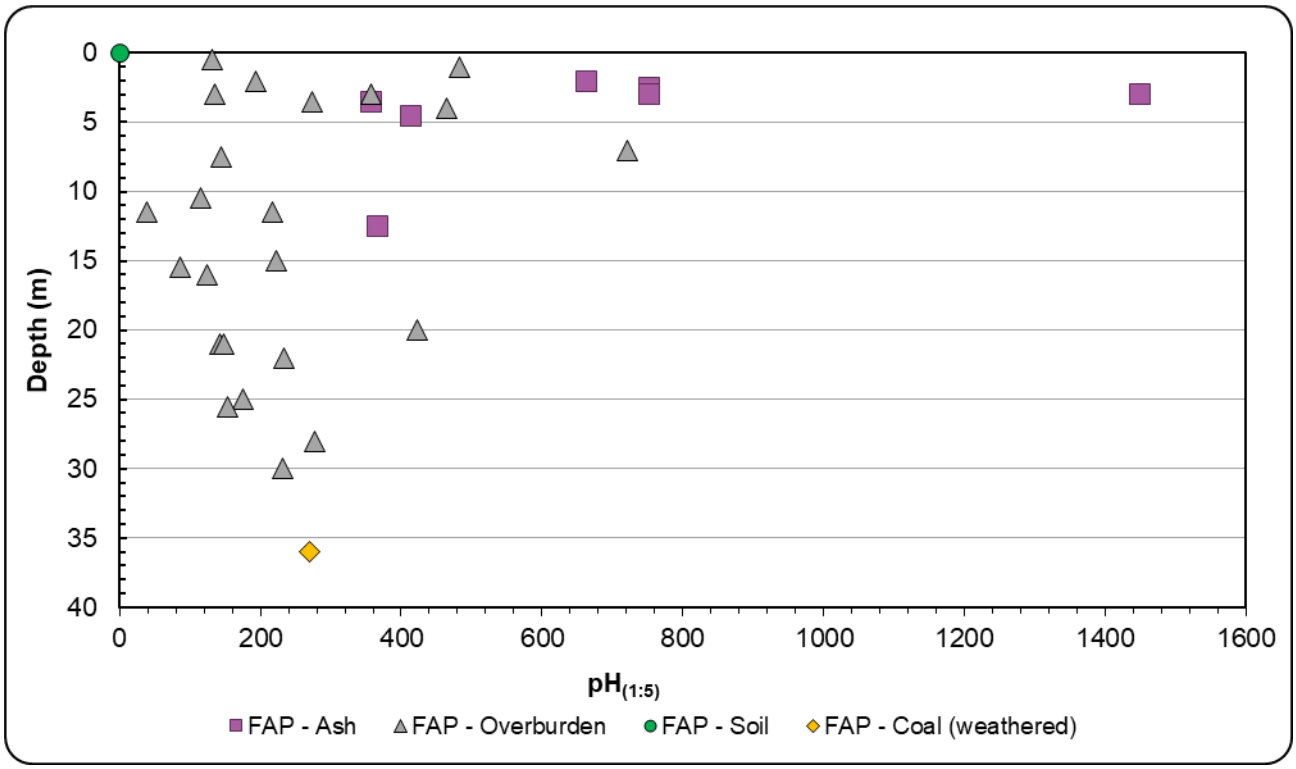


Figure 5-5: $EC_{(1:5)}$ values for Former Ash Pond dump samples vs depth (m)

Total and sulfide sulfur

Samples from the Former Ash Pond dumps and walls have been tested for total (**Figure 5-6**) and sulfide sulfur (**Figure 5-7**) concentrations. Total sulfur concentration results range from below the laboratory limit of reporting (0.01%) to 0.42%, with a median of 0.06% (**Figure 5-6**). Generally, sulfide sulfur concentration results are less than half of the measured total sulfur concentrations (**Figure 5-8**).

Sulfide sulfur concentration results (determined by S_{CR} testing) for samples collected from the Former Ash Ponds dumps range from below the laboratory limit of reporting (0.005%) to 0.366%, with a median of 0.012% (**Figure 5-7**). 94% of the samples have sulfide sulfur concentrations of less than or equal to the median crustal abundance of sulfur (0.07%; Bowen, 1978). The higher sulfide sulfur values are associated with ash samples and some overburden samples (**Figure 5-7**) nearer the surface of the Former Ash Ponds (**Figure 5-9**).

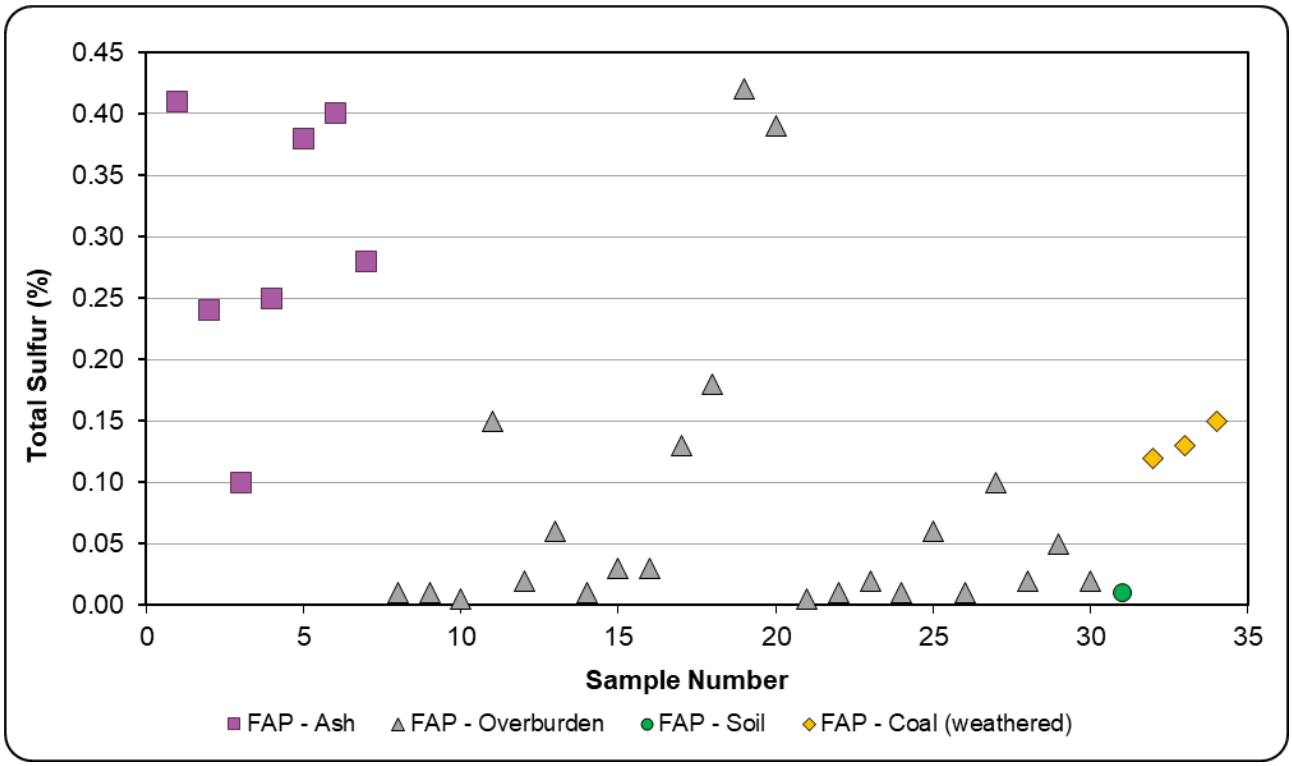


Figure 5-6: Total sulfur concentration values for Former Ash Pond samples from the YCM

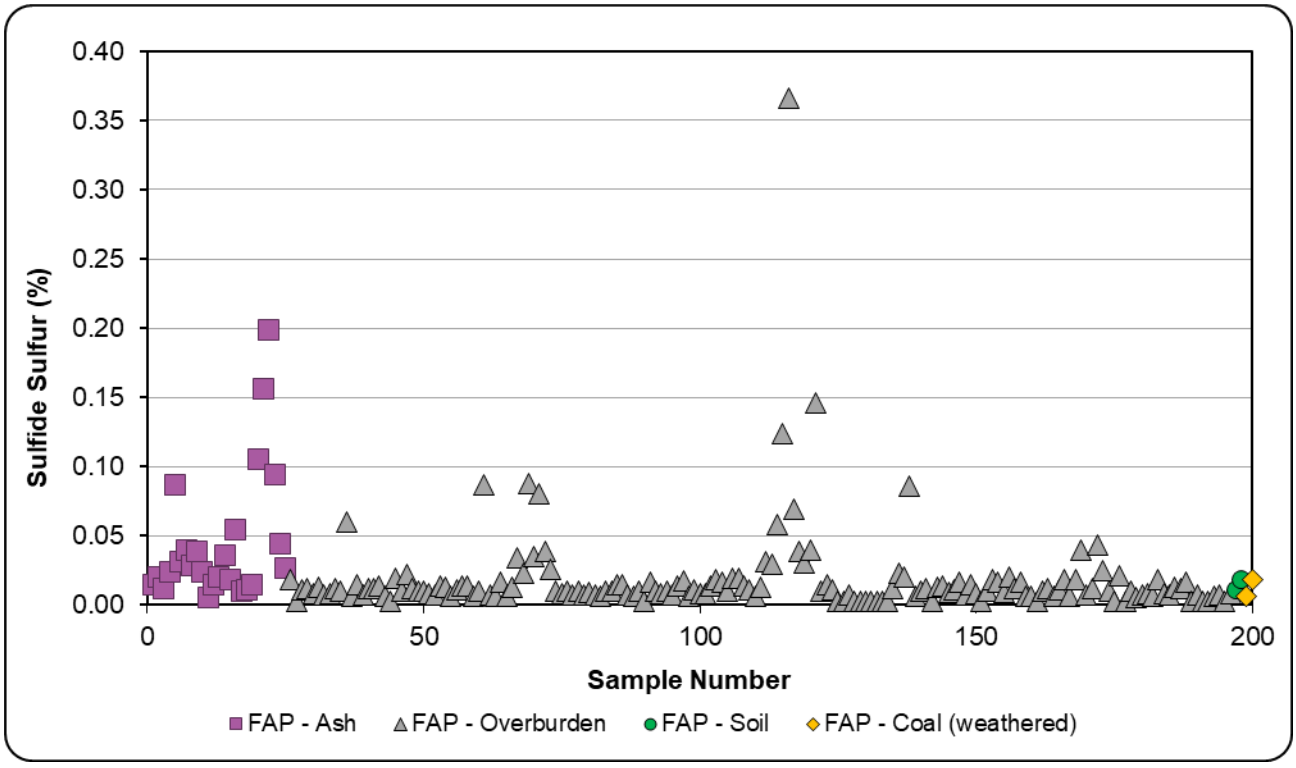


Figure 5-7: Sulfide sulfur concentration values for Former Ash Pond samples from the YCM

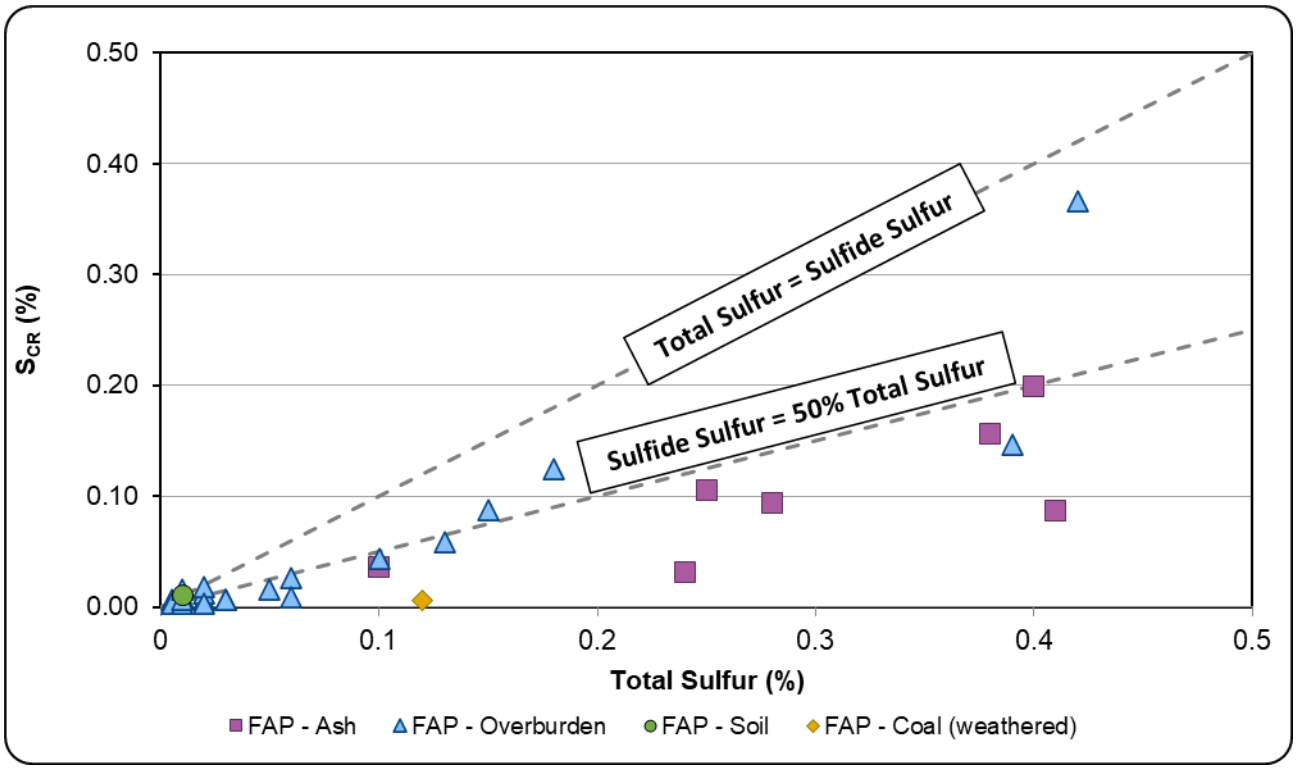


Figure 5-8: Sulfide sulfur vs total sulfur concentration values for Former Ash Pond dump samples from the YCM by material type

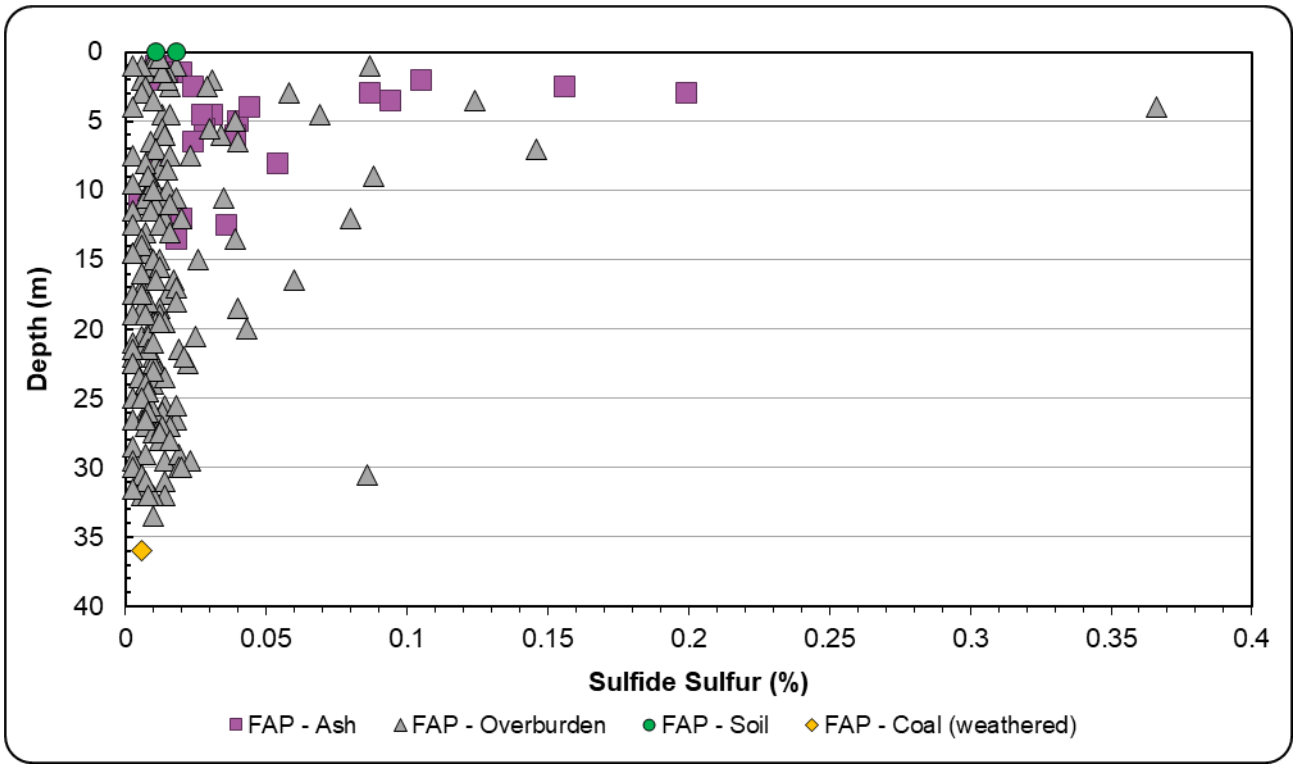


Figure 5-9: Sulfide sulfur concentration values vs depth (m) for Former Ash Pond samples from the YCM

ANC:MPA Ratio

The maximum potential acidity (MPA) of a sample is inferred from the total sulfur concentration value of the sample multiplied by a stoichiometric factor of 30.625 to convert a weight % value into kilograms of H_2SO_4 per tonne of material (kg H_2SO_4/t). As sulfide sulfur concentration values (S_{CR}) are available for all the samples and all sulfide is assumed to be present as pyrite and capable of generating acid, the sulfide sulfur concentration values have been used instead which are considered more accurate. MPA values for the Former Ash Pond samples (n = 201) range from 0.077 to 11.209 kg H_2SO_4/t, with a median of 0.325 kg H_2SO_4/t.

The acid neutralisation capacity (ANC) of a sample is determined by adding HCl of a specific molarity to acidify a sample to between pH 0.8 and 1.5 and back titrating the sample to pH 7 with NaOH. The ANC result is the amount of generated acid that can theoretically be neutralised by the sampled material and is expressed as kg H_2SO_4/t. ANC results for the samples (n = 34) range from below the limit of reporting (0.5 kg H_2SO_4/t) to 167.0 kg H_2SO_4/t, with a median of 1.3 kg H_2SO_4/t. The higher ANC samples are associated with ash.

The ratio of ANC to MPA (referred to as neutralisation potential ratio; NPR) provides an indication of the level of risk of generating acidic drainage posed by a sample. **Figure 5-10** shows that most Former Ash Ponds samples have low concentrations of sulfide sulfur (i.e. < 0.1%) and/ or ANC results over three times greater than the sample's MPA value, so are likely to pose a negligible risk of generating acidic drainage. There are, however, three overburden samples that fall within the 'increased risk' category due to their high sulfide sulfur content and negligible ANC content.

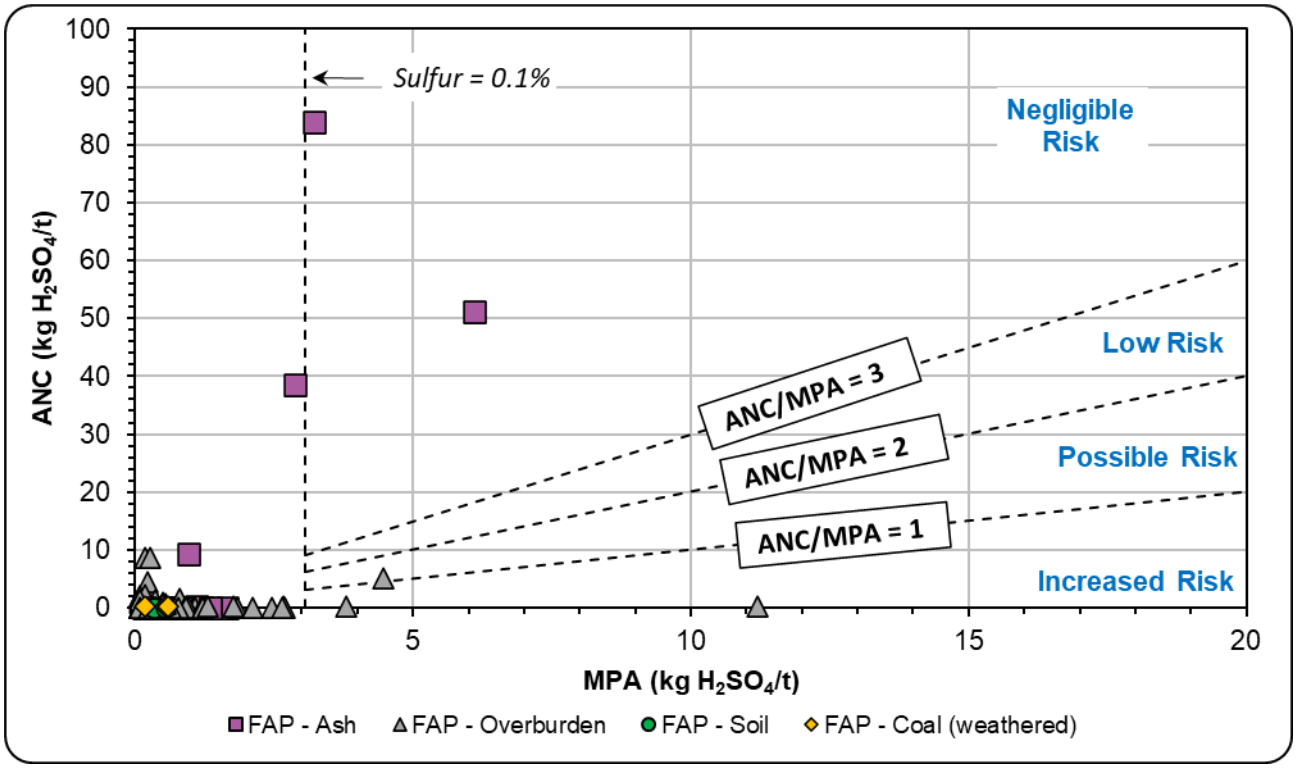


Figure 5-10: ANC vs MPA values for Former Ash Pond samples from the YCM

Net Acid Production Potential

The net acid production potential (NAPP) of a sample shows the balance of a sample's MPA and the ANC of the sample. The NAPP values for the Former Ash Pond samples range from -164.3 to 11 kg H_2SO_4/t, with a median of -0.7 kg H_2SO_4/t (**Figure 5-11**). Strongly negative NAPP values are associated with ash samples collected from 2 to 4 m below ground level (m bgl) (**Figure 5-12** and **Figure 5-13**).

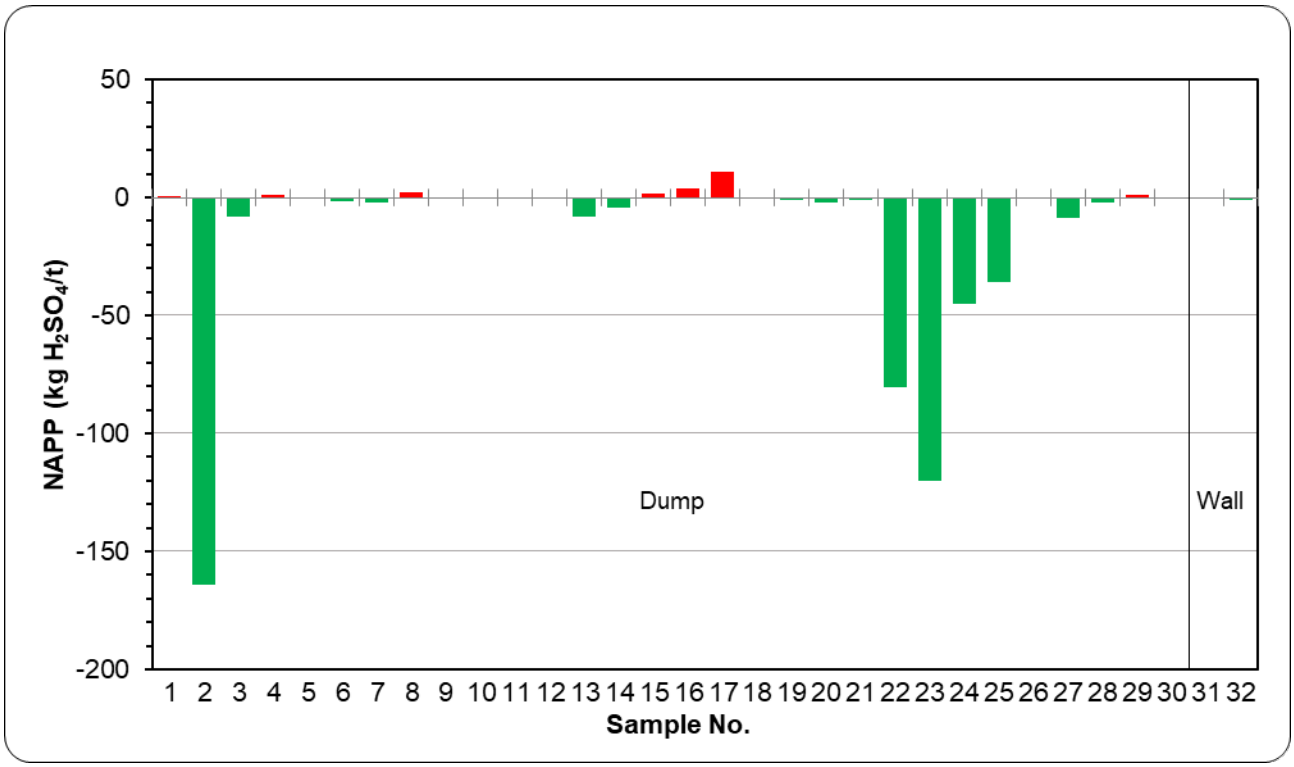


Figure 5-11: NAPP values for Former Ash Pond samples from the YCM

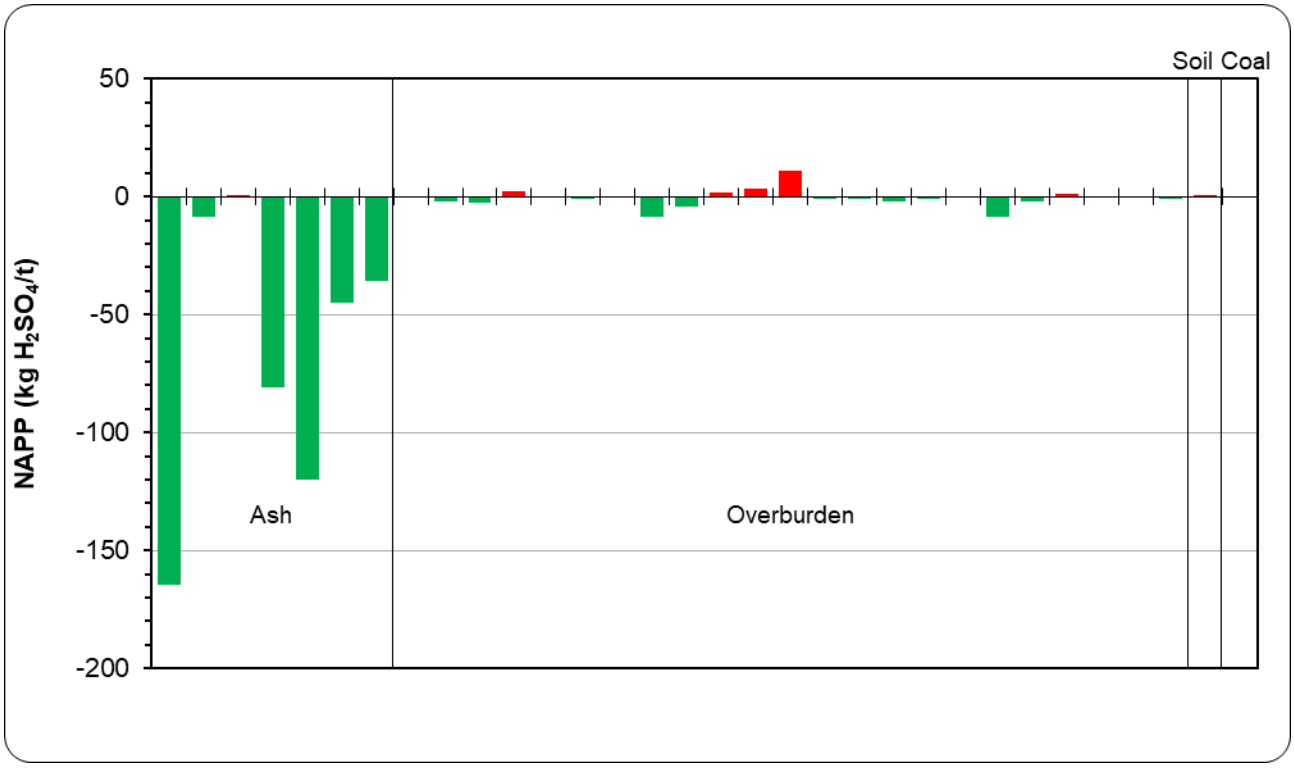


Figure 5-12: NAPP values for Former Ash Pond dump samples from the YCM by material type

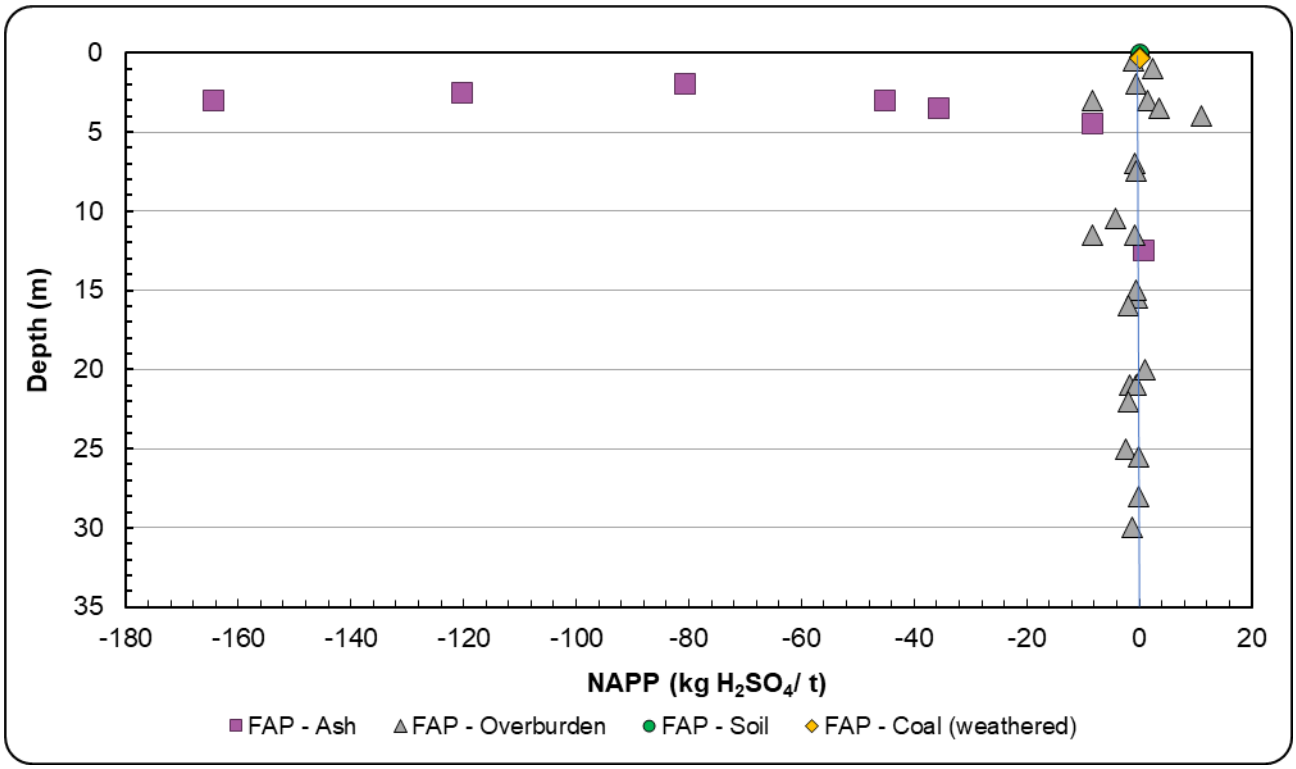


Figure 5-13: NAPP values by depth for Former Ash Pond dump samples from the YCM by material type

Sample classification

The criteria used to classify the potential of the Former Ash Pond samples to generate acidic drainage and the number of samples given each classification are shown in **Table 5-2**. The classification criteria reflect Australian (COA, 2016c) and international (INAP, 2024) guidelines for the classification of mining waste materials. Most samples have low enough concentrations of sulfide sulfur to be considered effectively barren of acid generating sulfides or sufficient ANC to classify the samples as posing a low risk of acid generation (i.e. classified as non-acid forming- barren (NAF-B)). The number and classification of samples from the dump and pit wall areas and the classifications of dump materials from the Former Ash Ponds are shown in **Figure 5-14** and **Figure 5-15**. Only one sample from the overburden was classified as potentially acid forming (PAF), while two overburden samples were classified as Uncertain due to their low ANC content.

Table 5-2: Classification criteria and sample classifications for Former Ash Pond ABA samples from the YCM

Classification	S_{CR} (%)	NAPP (kg H2SO4/t)	Number of Samples
Non-acid Forming (Barren)	< = 0.1	---	28
Non-acid Forming	> 0.1	< = -10	3
Uncertain	> 0.1	< = 5	2
Potentially Acid Forming (Low Capacity)	> 0.1	< = 10	0
Potentially Acid Forming	> 0.1	> 10	1
		Total	**34**

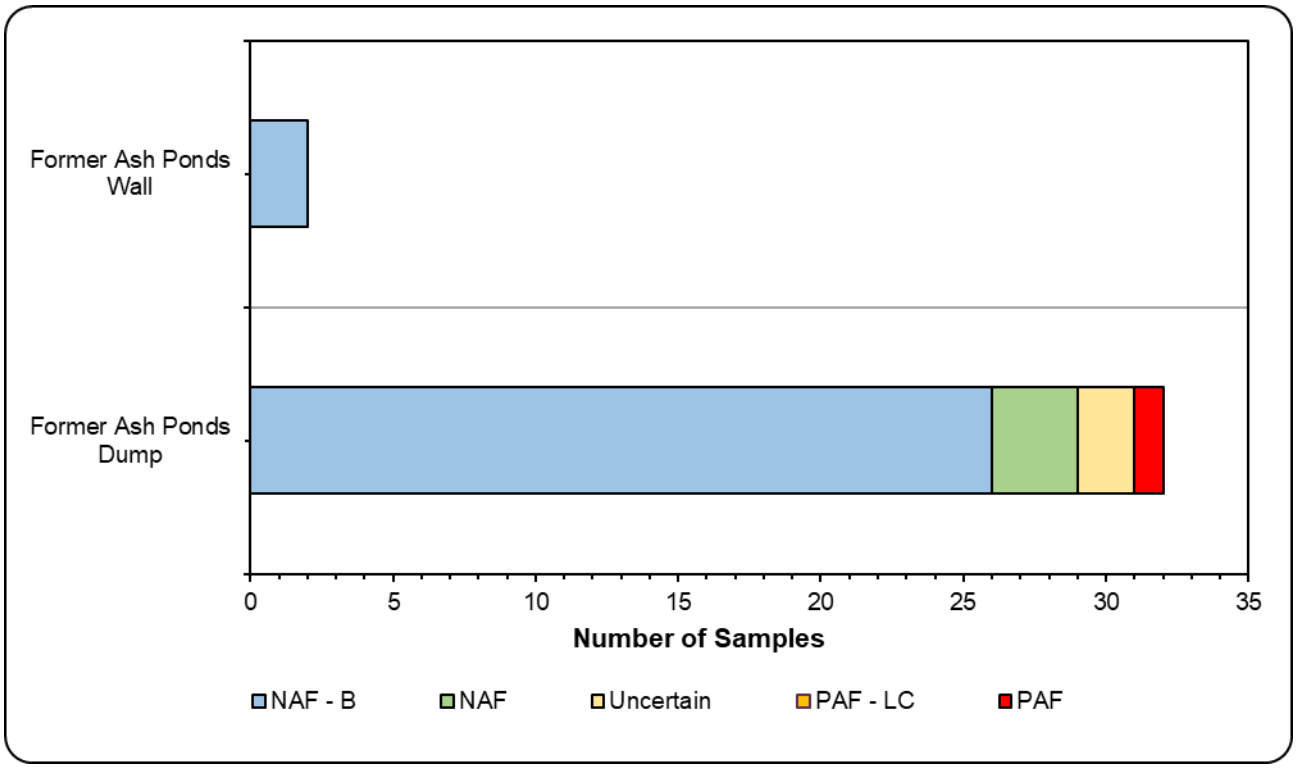


Figure 5-14: Sample type and classifications for Former Ash Pond area ABA samples from the YCM

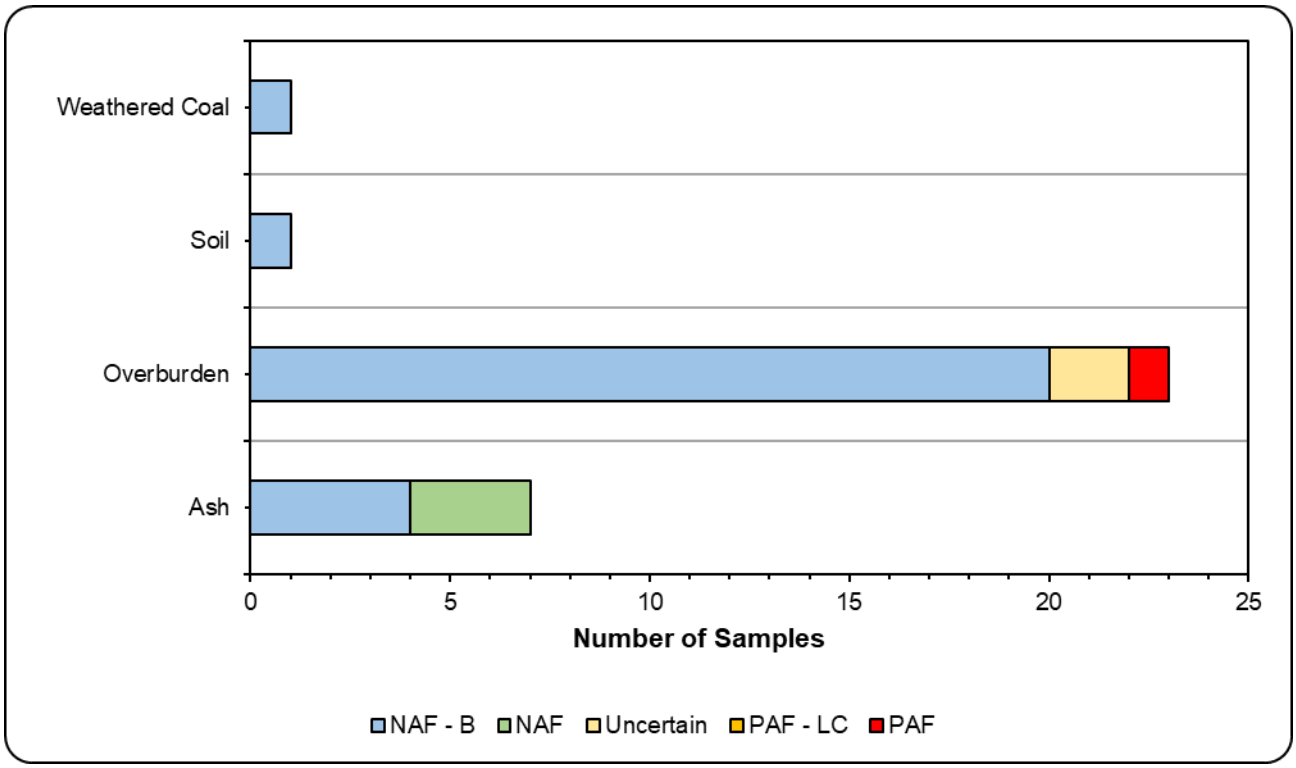


Figure 5-15: Sample type and classifications for Former Ash Pond dump ABA samples from the YCM by material

5.1.2 Midfield Dump

A total of 341 samples from 9 drillholes (N7431-N7433, N7435-N7436, N7443, N7454 and N7521-N7522) in the Midfield Dump and Midfield borrow area underwent testing as shown in **Table 5-3**. The Midfield Dump/ borrow area drillholes predominantly comprised clay and sandy clay with localised sand and loose brown coal units (RGS, 2023). Slight variation, both laterally and vertically, was observed across the dump.

A total of two pit wall overburden grab samples were collected from the MRD near the Midfield Dump. The results are discussed collectively according to material type (i.e. weathered coal and overburden).

Table 5-3: Number of samples tested by material type and analyte

Analysis	Dump Material Samples	Wall Material Samples	Total Number of Samples
Acid-base Account	59	2	61
Chromium Reducible Sulfur	339	2	341

$pH_{(1:5)}$

$pH_{(1:5)}$ values for the samples from the Midfield domain range from pH 3.8 to 6.5, with a median of pH 5.5. Samples are generally slightly acidic (pH 5 to 6) with some dump samples having acidic (< pH 4.5) pH values (**Figure 5-16**); the weathered coal samples are slightly more acidic than the overburden material.

The two overburden pit wall/ MRD samples have a $pH_{(1:5)}$ of 5.9.

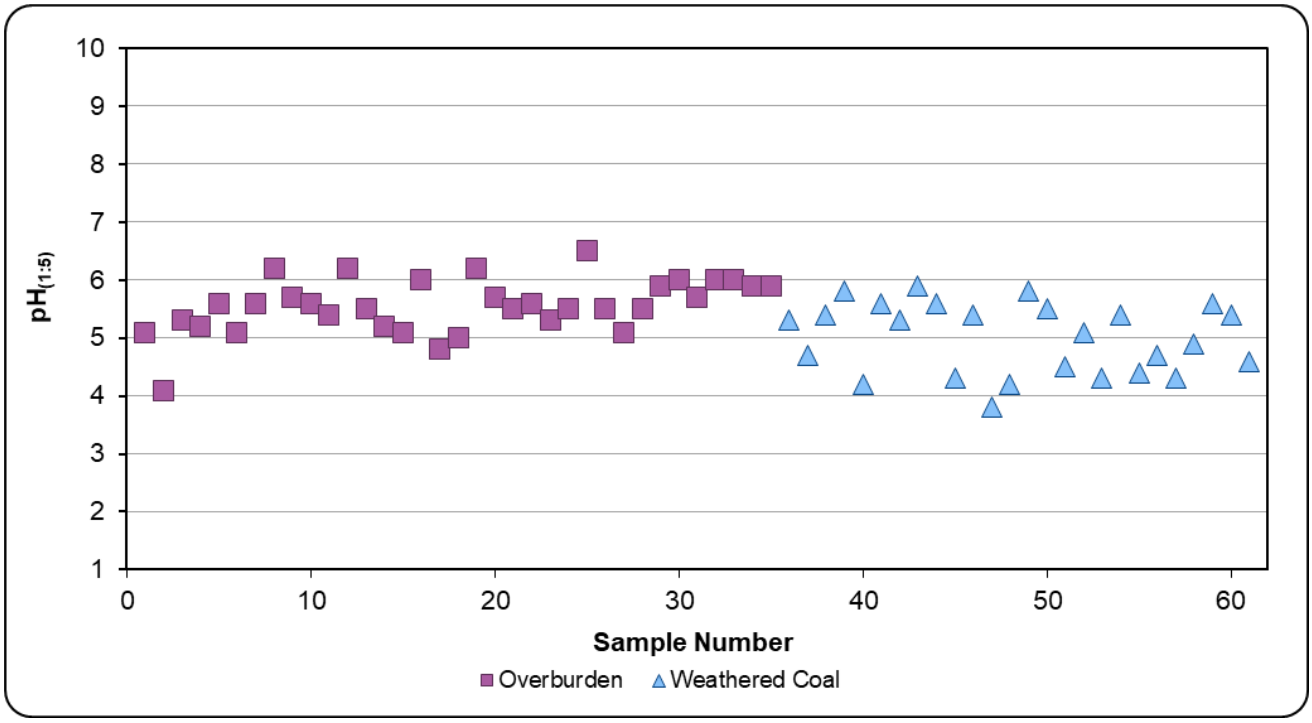


Figure 5-16: $pH_{(1:5)}$ values for Midfield samples from the YCM

Electrical Conductivity$_{(1:5)}$

The $EC_{(1:5)}$ values of samples from the YCM Midfield range from 19 to 964 µS/cm, with a median of 108 µS/cm (**Figure 5-17**). The higher EC samples are generally associated with weathered coal.. There are no strong correlations observed between EC and pH results.

The two overburden pit wall/ MRD samples have a low $EC_{(1:5)}$ of 55 and 67 µS/cm.

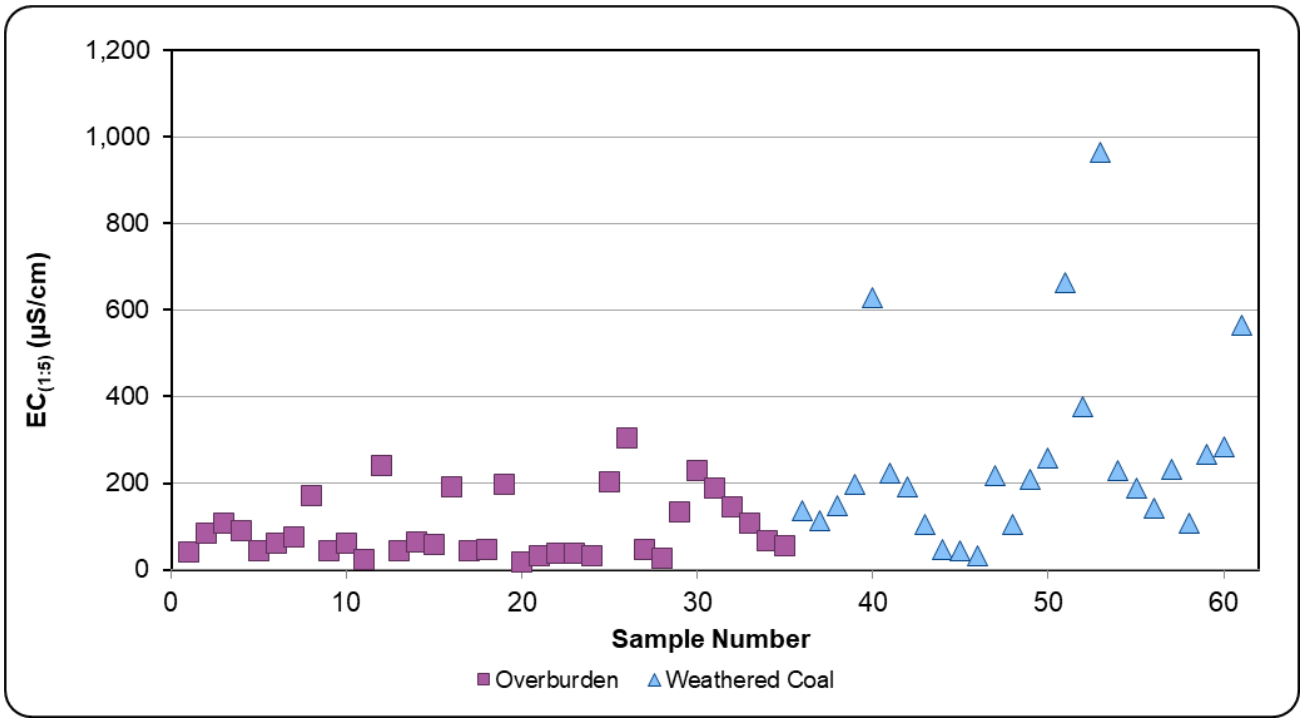


Figure 5-17: $EC_{(1:5)}$ values for Midfield samples from the YCM

Total and sulfide sulfur

A total of 61 samples, 59 dump and 2 pit wall samples collected from the Midfield were tested for total sulfur concentrations. The results are generally less than the median crustal abundance of sulfur (0.7%) and range from 0.01% to 0.31%, with a median of 0.03% (**Figure 5-18**).

The 61 samples plus a further 192 samples were also tested for sulfide sulfur. Sulfide sulfur concentrations in the samples are generally low relative to the median crustal abundance of sulfur (over 90% of samples have below 0.4% sulfide sulfur). Concentration results range from below the limit of reporting (<0.05%) to 0.185%, with a median of 0.010% (**Figure 5-19**).

Generally, in samples that were tested for both sulfide sulfur and total sulfur, sulfide sulfur is present at less than half of the total sulfur concentration (**Figure 5-20**).

There are no clear correlations between sulfide sulfur and depth for each of the material types (**Figure 5-21**).

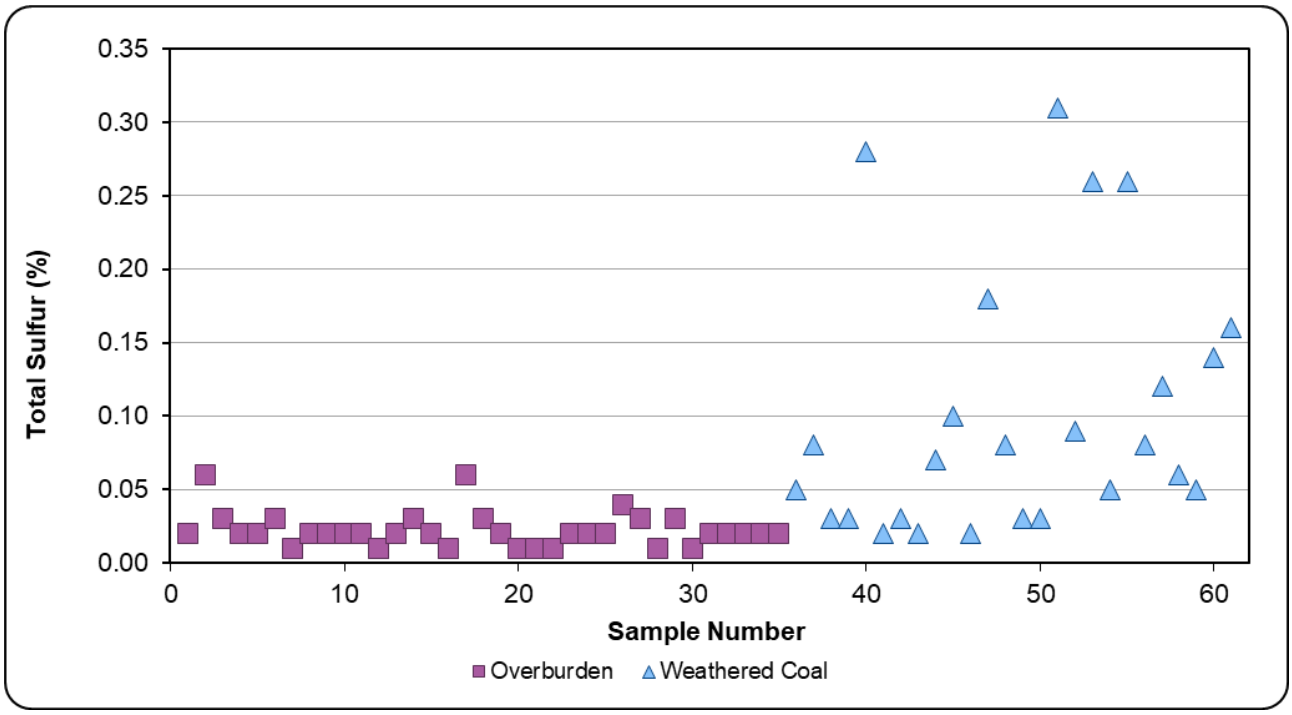


Figure 5-18: Total sulfur concentration values for Midfield samples from the YCM

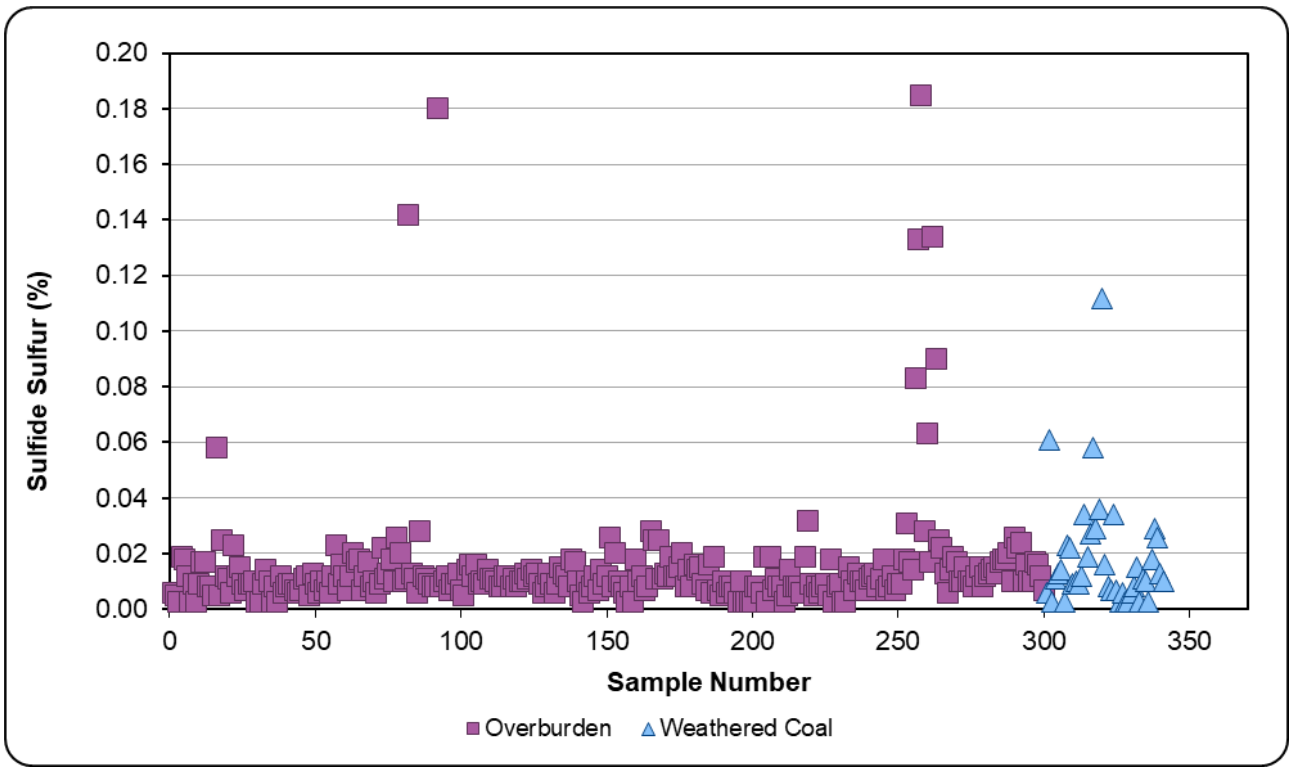


Figure 5-19: Sulfide sulfur concentration values for Midfield samples from the YCM

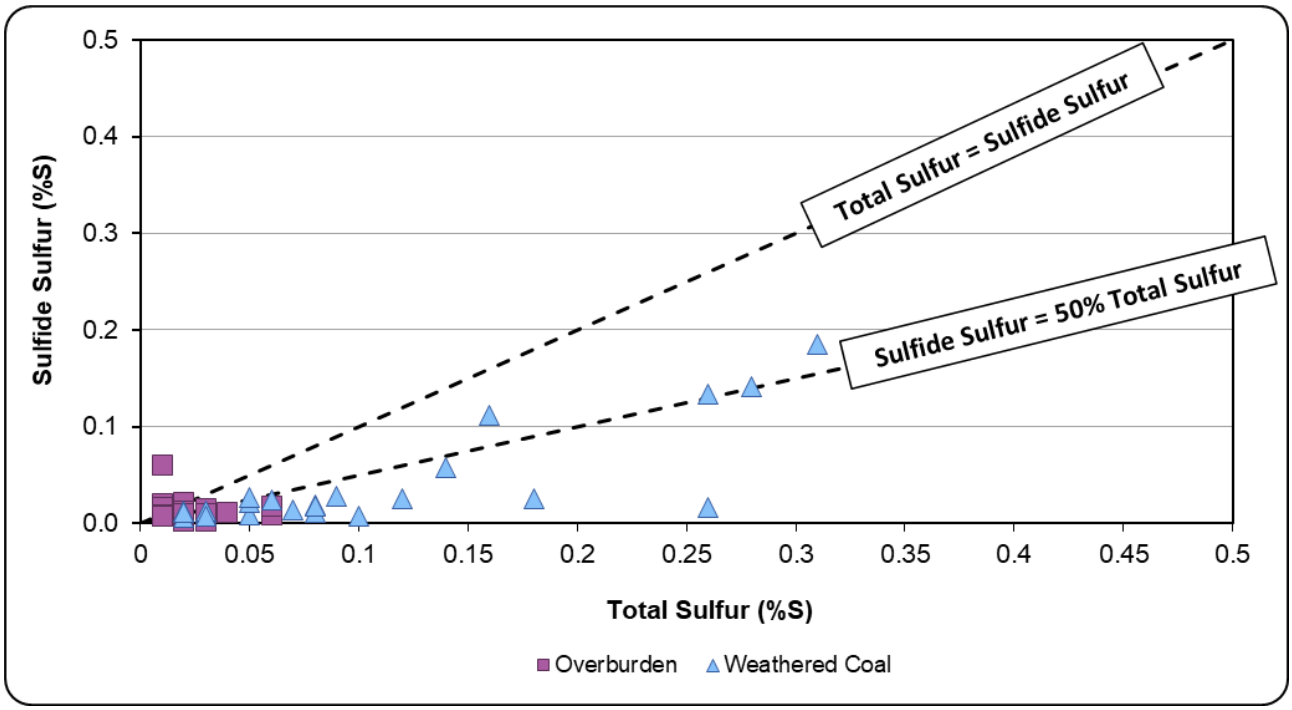


Figure 5-20: Sulfide sulfur vs total sulfur concentration values for Midfield area samples from the YCM

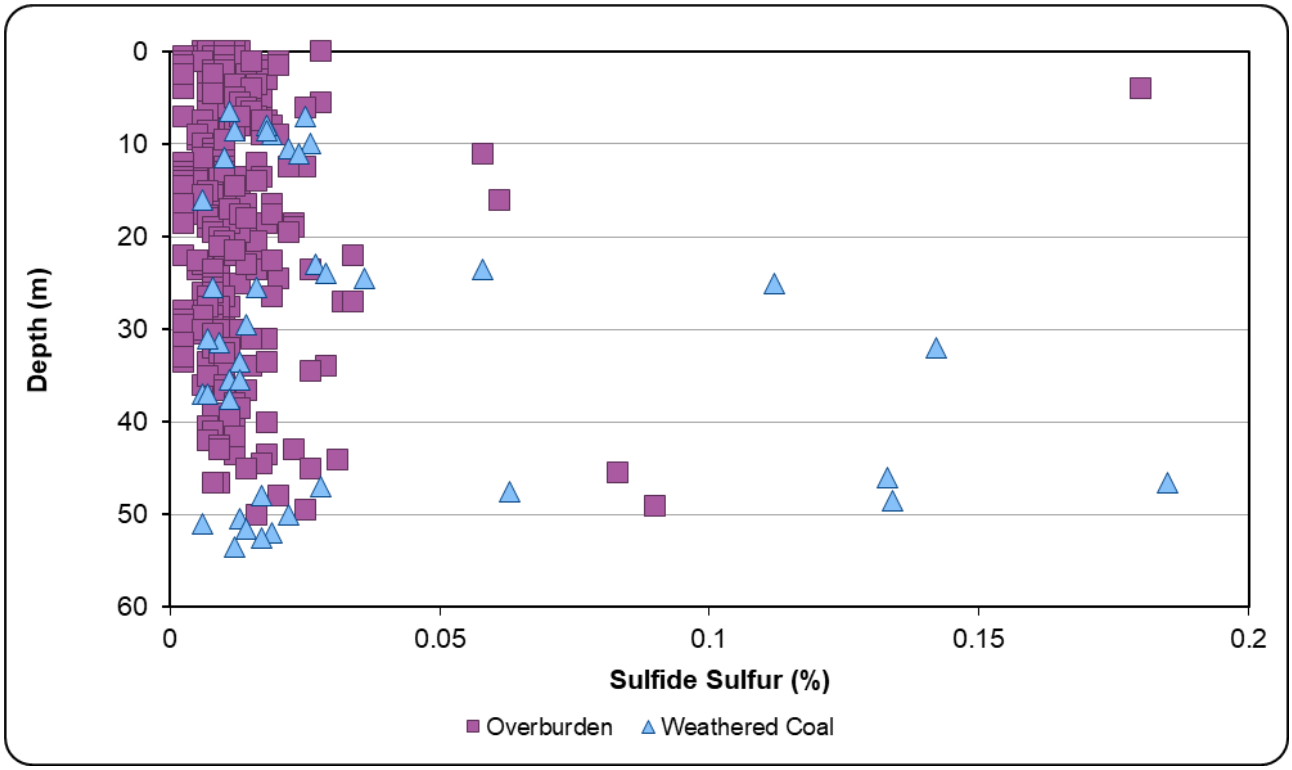


Figure 5-21: Sulfide sulfur concentration values vs depth (m) for Midfield samples from the YCM

ANC:MPA ratio

The ANC values for Midfield samples (n = 61) range from below the limit of reporting (0.5 kg H_2SO_4/t) to 38.8 kg H_2SO_4/t, with a median value below the limit or reporting. There is generally no correlation between material type and ANC. The MPA values for the samples (n = 341) range from 0.1 to 5.7 kg H_2SO_4/t, with a median of 0.3 kg H_2SO_4/t.

Figure 5-22 shows the relationship between ANC and MPA (NPR) for the Midfield samples. Most samples have sufficiently low sulfide sulfur concentrations that they are described as posing a low risk of generating acidic drainage. The four samples that are classified as having an 'Increased Risk' of generating acid are weathered coal.

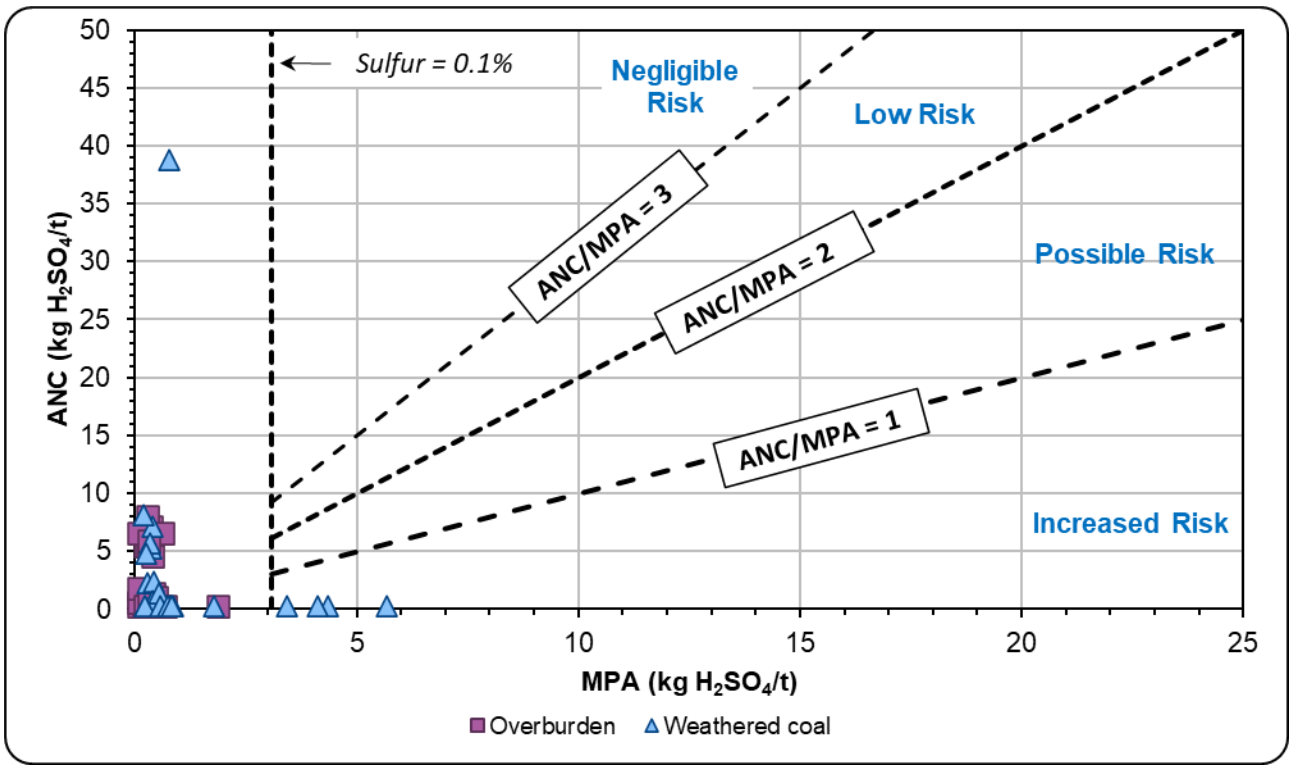


Figure 5-22: ANC vs MPA values for Midfield samples from the YCM

Net Acid Production Potential

Figure 5-23 shows the NAPP values for samples collected from the Midfield area. The values range from -38.03 to 5.42 kg H_2SO_4/t, with a median of -0.17 H_2SO_4/t. The samples with a positive NAPP are generally associated with weathered coal (**Figure 5-24**).

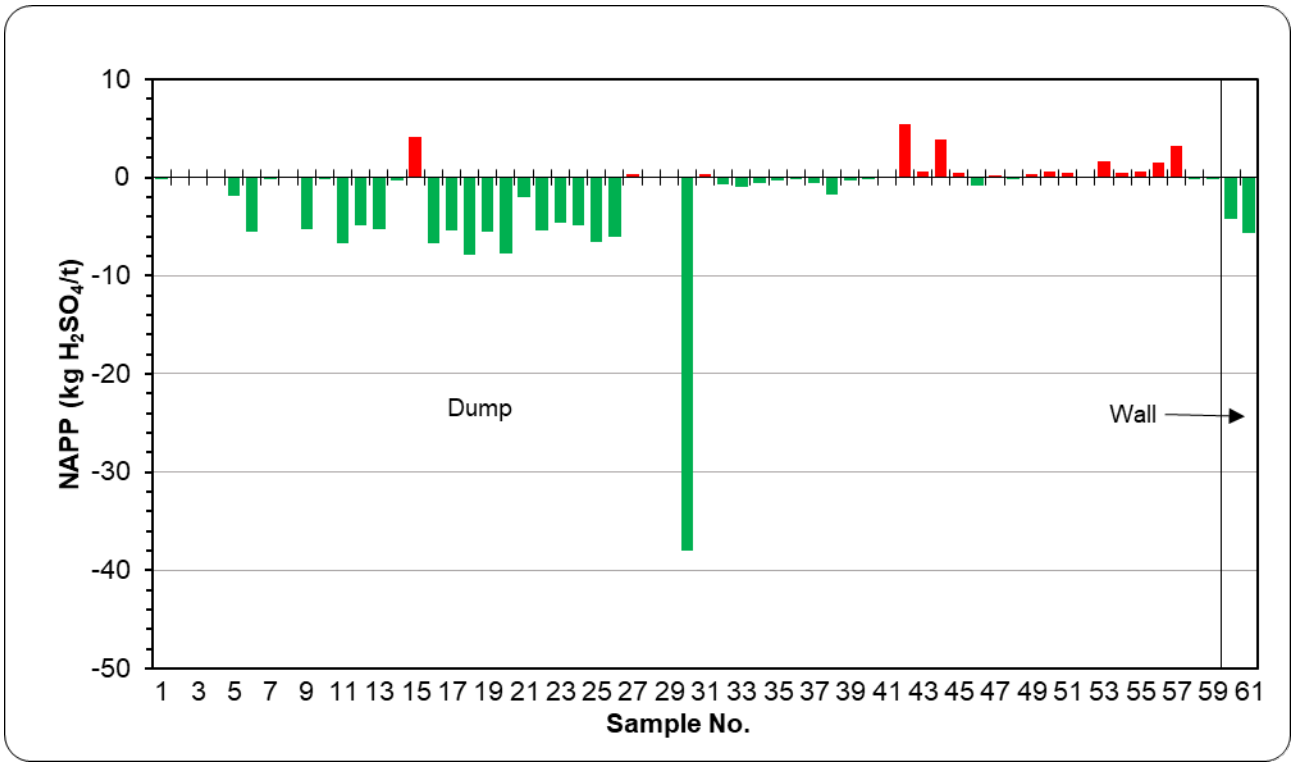


Figure 5-23: NAPP values for Midfield samples from the YCM

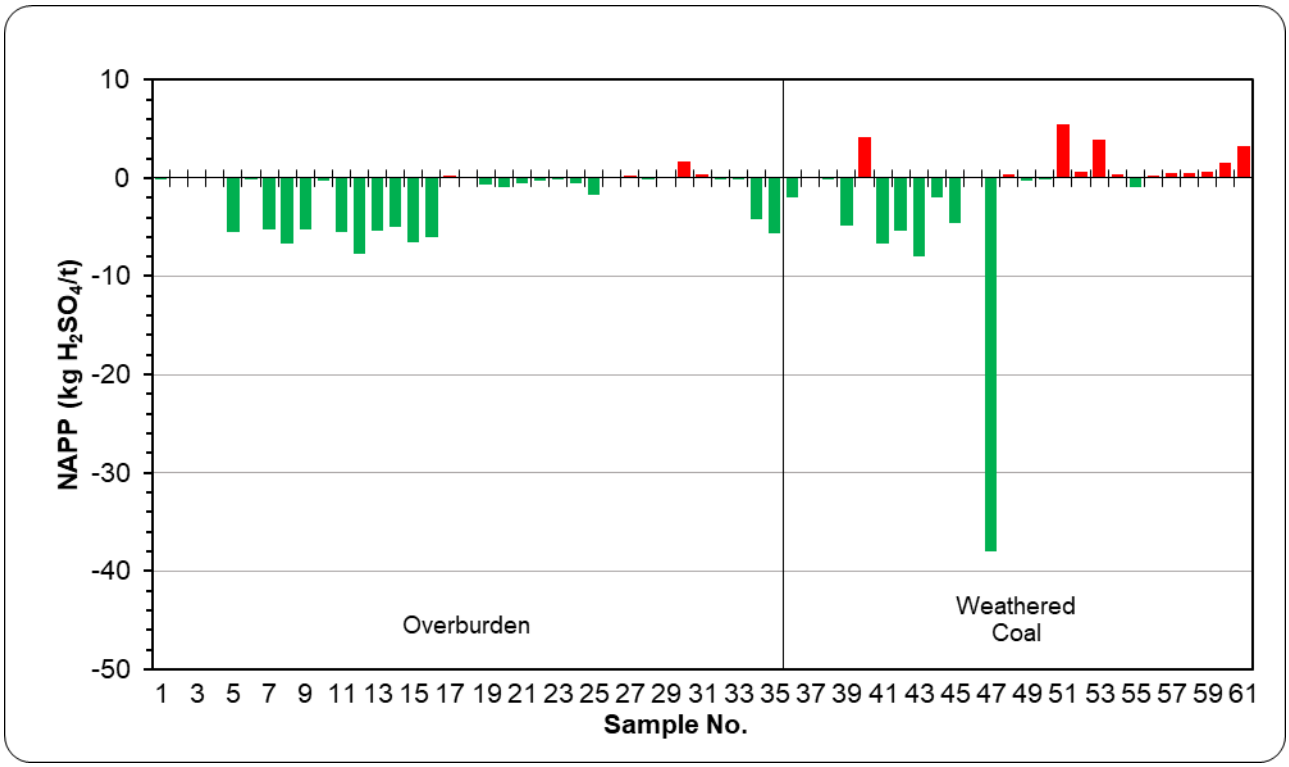


Figure 5-24: NAPP values for Midfield samples from the YCM by material type

Geochemical classification

Approximately 75% of the samples collected from the Midfield area for ABA testing are classified as NAF. Further, these samples have sufficiently low sulfide sulfur concentration results that they can be considered NAF or NAF – Barren. The remaining samples predominately have relatively balanced ANC and MPA values and are classified as having an Uncertain potential for the generation of acid, with one weathered coal sample classified as PAF, although this sample has a low capacity for the generation of acidity (PAF – LC) (**Table 5-4** and **Figure 5-25**).

Table 5-4: Classification criteria and sample classifications for Midfield ABA samples from the YCM

Classification	S_{CR} (%)	NAPP (kg H2SO4/t)	Number of Samples
Non-acid Forming (Barren)	< = 0.1	---	46
Non-acid Forming	> 0.1	< = -10	0
Uncertain	> 0.1	< = 5	14
Potentially Acid Forming (Low Capacity)	> 0.1	< = 10	1
Potentially Acid Forming	> 0.1	> 10	0
		Total	**61**

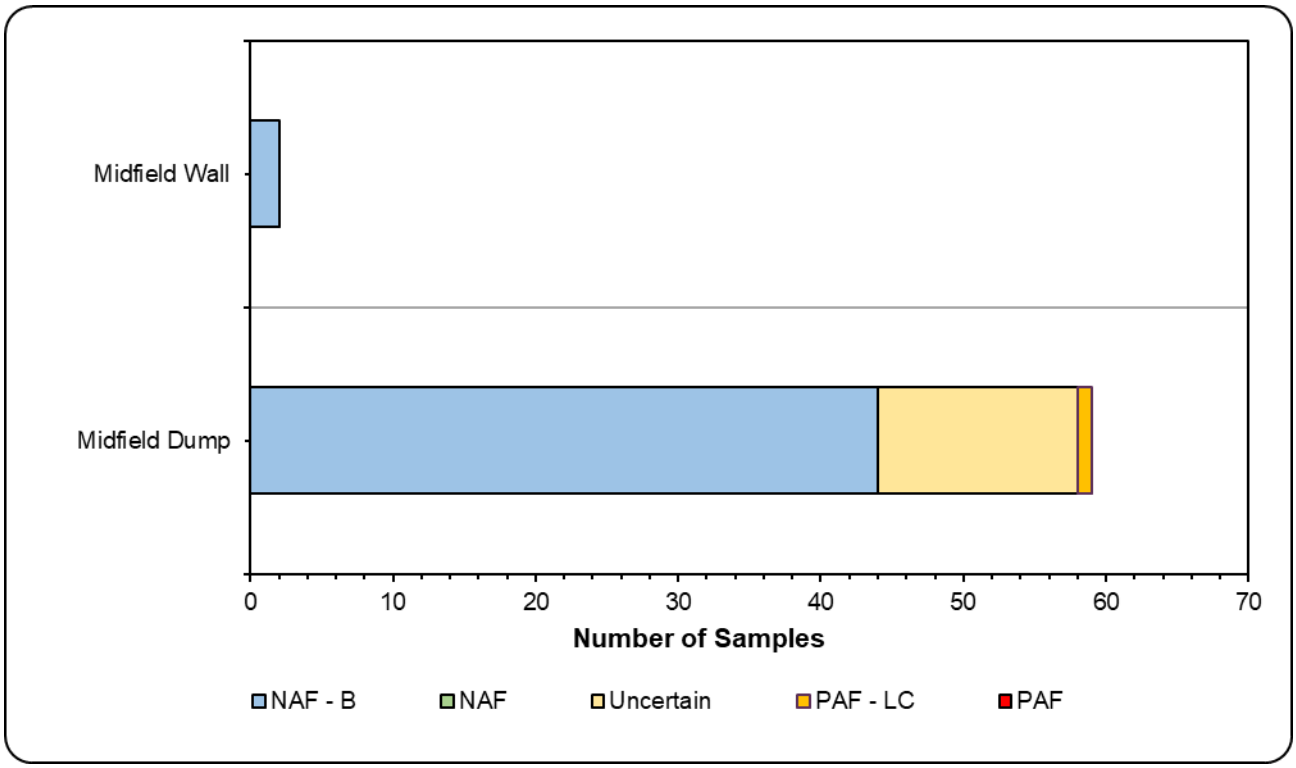


Figure 5-25: Sample type and classifications for Midfield area ABA samples from the YCM

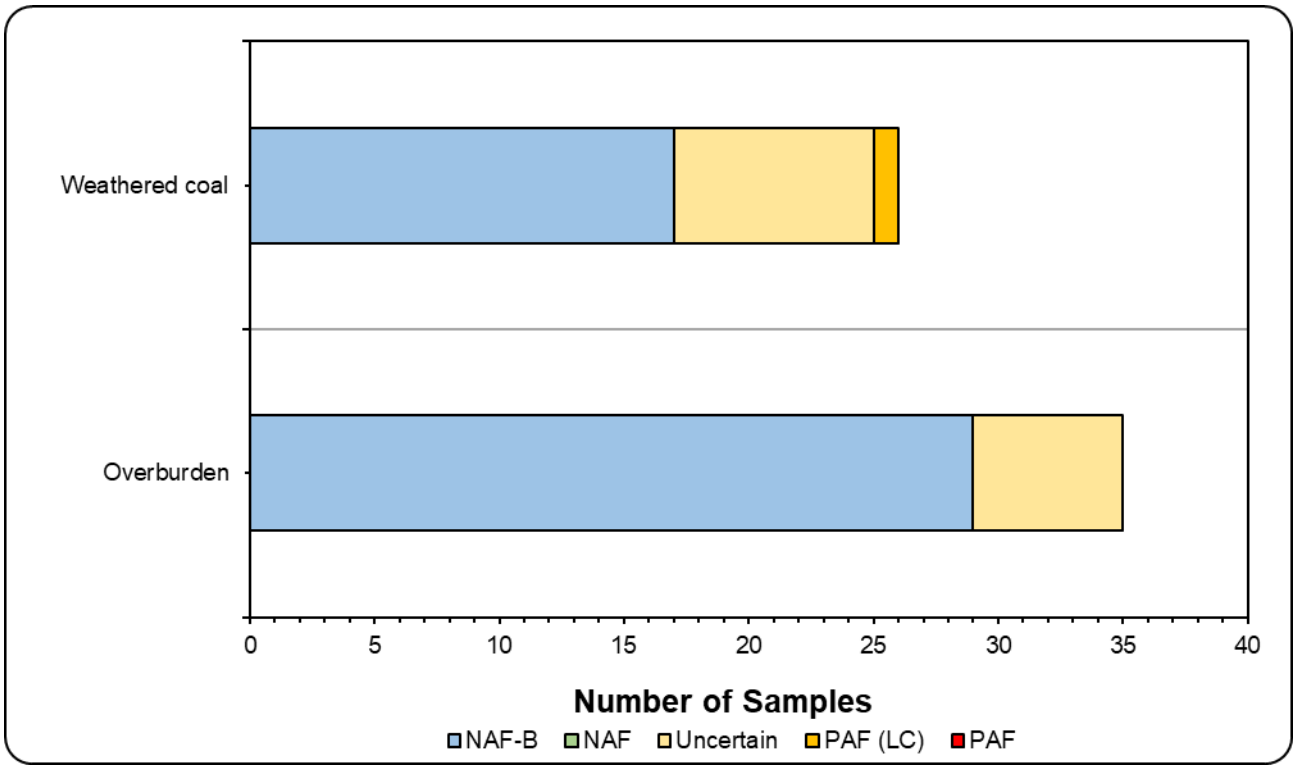


Figure 5-26: Sample type and classifications for Midfield area ABA samples by material type

5.1.3 Township Field – Northern Overburden Dump

A total of 230 samples from 7 drillholes (N7423-N7426, N7434 and N7523-N7524) advanced in the NOB area underwent testing as shown in **Table 5-5**. Drillholes N7424 and N7426, along the western edge of Lake Placid, comprised predominantly sandy clay overburden. Within the central portion of the NOB Dump, N7423 and N7425 intersected thicker bands of brown coal and sandy clay overburden between surface and 20 mbgl. Large mounds of brown coal were observed around N7423 and N7425. The upper bands of unconsolidated overburden and brown coal transitioned to predominantly sandy clay and clay overburden from 20 m to intersection with the pit floor coal. Similar findings were encountered in drillholes N7523-N7524. Drillhole N7434 at the western boundary of the NOB Dump comprised sandy clay and clay overburden with no distinct brown coal bands.

A total of 23 pit wall grab samples were collected from near the NOB Dump comprising 20 weathered coal and three overburden samples.

Table 5-5: Number of samples tested by material type and analyte

Analysis	Dump Material Samples	Wall Material Samples	Total Number of Samples
Acid-base Account	51	23	74
Chromium Reducible Sulfur	230	23	253

$pH_{(1:5)}$

$pH_{(1:5)}$ values for 74 samples collected from the NOB area are acidic to slightly acidic, ranging from pH 3.1 to 6.0, with an acidic median of pH 4.3. Generally, weathered coal samples have lower $pH_{(1:5)}$ values than overburden samples collected from the NOB dump (**Figure 5-27**). Similarly, weathered coal samples in the pit walls has an acidic median of pH 3.7.

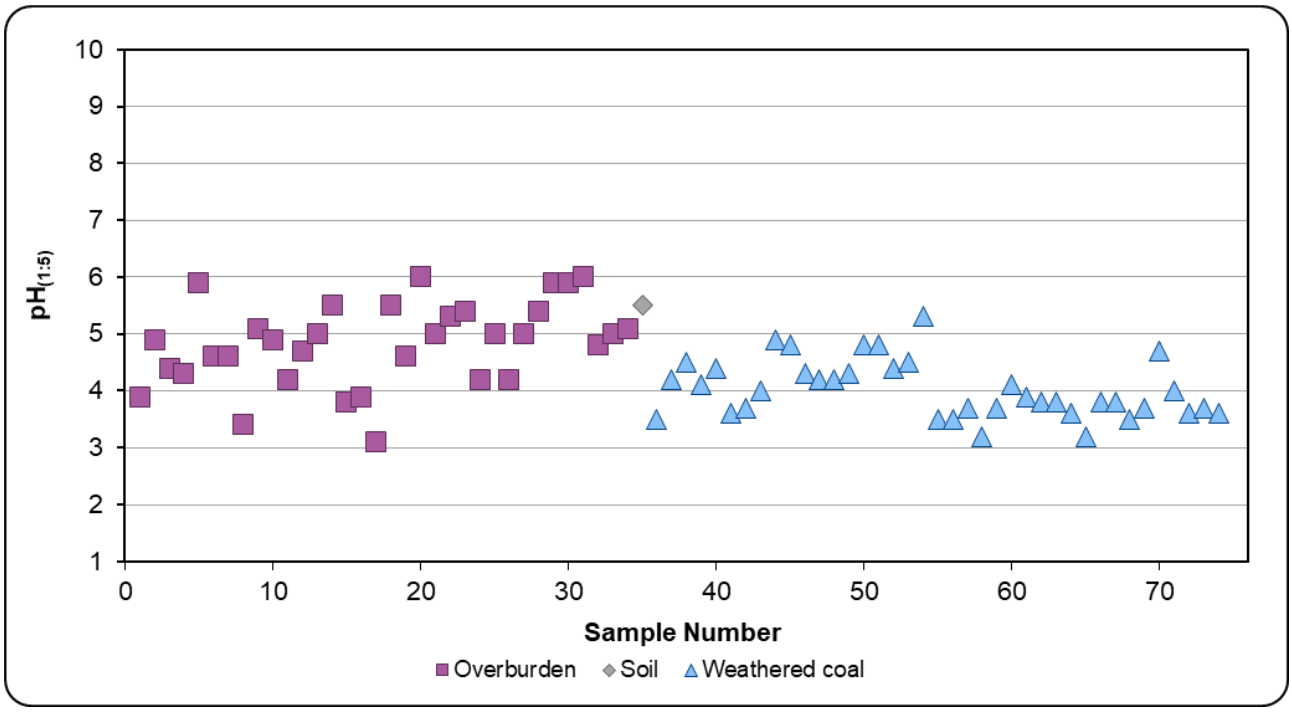


Figure 5-27: $pH_{(1:5)}$ values for NOB area samples according to material type from the YCM

Electrical Conductivity$_{(1:5)}$

$EC_{(1:5)}$ values for 74 samples from the NOB area range from 12 to 1,490 µS/cm, with a median of 240 µS/cm. Overburden from the NOB Dump show a larger range of and slightly higher maximum $EC_{(1:5)}$ values than the weathered coal samples from the NOB Dump (**Figure 5-28**). The median $EC_{(1:5)}$ for weathered coal in the pit walls is 183 µS/cm. Higher $EC_{(1:5)}$ values generally correlate with lower $pH_{(1:5)}$ values in both dump and pit wall samples (**Figure 5-29**).

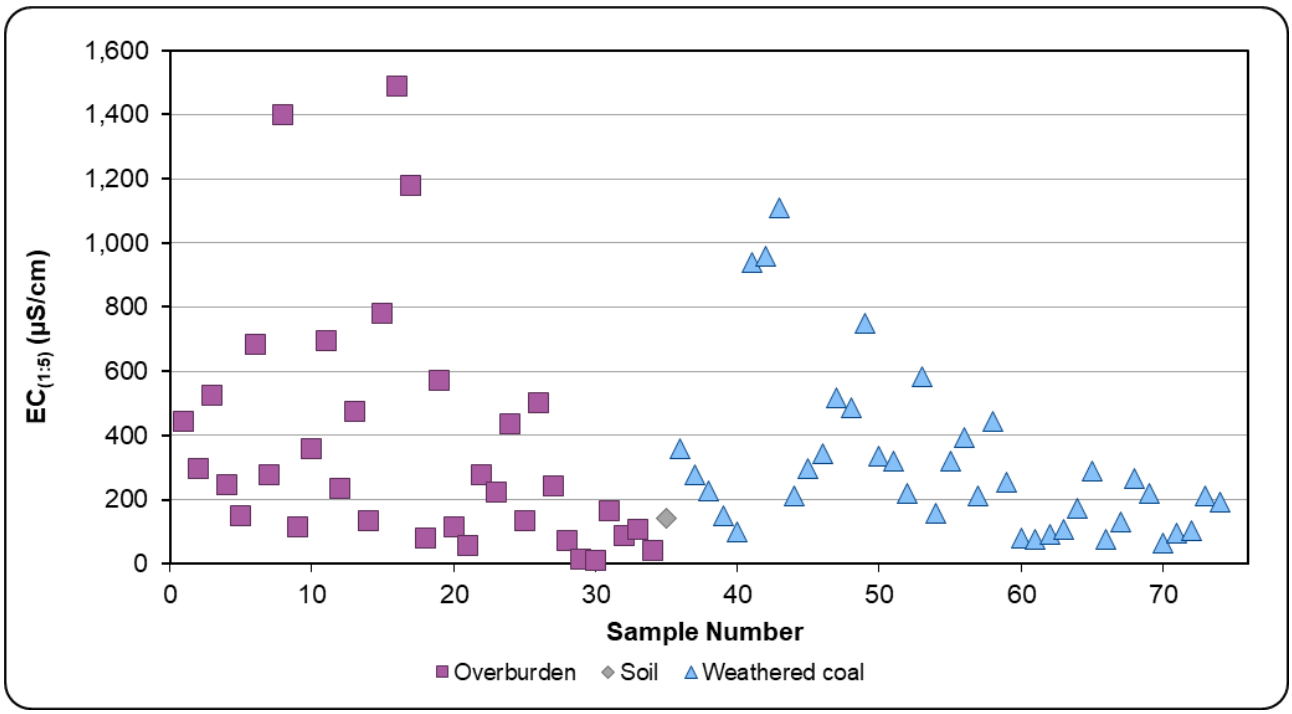


Figure 5-28: $EC_{(1:5)}$ values for NOB area samples from the YCM

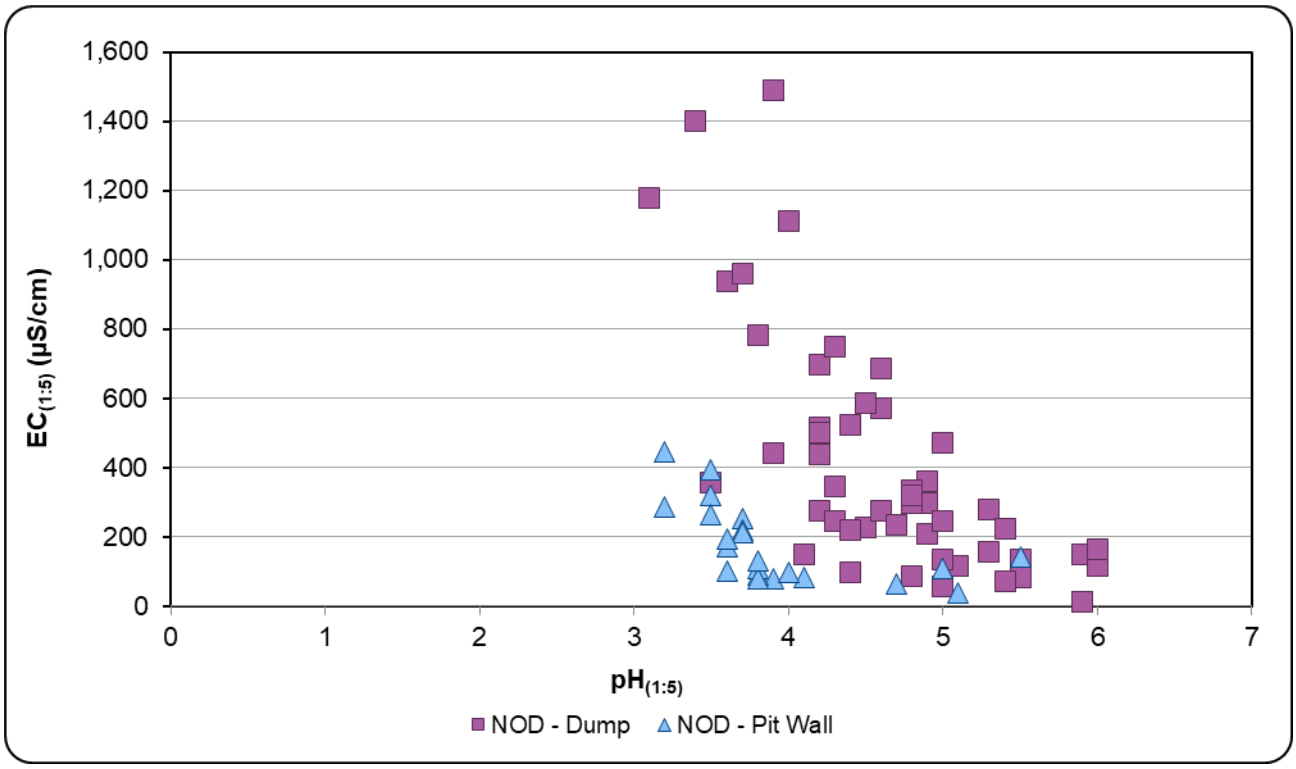


Figure 5-29: $EC_{(1:5)}$ vs $pH_{(1:5)}$ values for NOB area samples from the YCM

Total and sulfide sulfur

A total of 74 samples were tested for total sulfur (**Figure 5-30**) with an additional 179 samples from the NOB are (dump and pit walls) also tested for sulfide sulfur (**Figure 5-31**). Total sulfur concentration values range from less than the limit of reporting (0.01%) to 3.94%, with a median of 0.21%. Pit wall total sulfur concentration values show less variability than dump samples (**Figure 5-30**).

Sulfide sulfur concentration results for the 253 samples tested range from below the limit of reporting (0.005%) to 2.32%, with a median of 0.07% (**Figure 5-31**). The higher sulfide sulfur samples are generally associated with overburden, although there are three weathered coal samples from within the NOB dump with sulfide sulfur > 1.0 %. The median sulfide sulfur concentration for pit wall weathered coal is 0.02%.

In samples tested for both total and sulfide sulfur concentrations, over half of the sulfur present in most NOB dump samples occurred as sulfide, while sulfur predominately occurs in pit wall samples in non-sulfide forms of sulfur (e.g. organic, elemental, or sulfate sulfur) (**Figure 5-32**). This indicated the NOB Dump materials have a greater potential to generate additional acidity and/or sulfate if exposed to atmospheric conditions, whereas the pit wall materials are already significantly oxidised due to long term atmospheric exposure.

There is generally no correlation evident between sulfide sulfur and depth in the NOB Dump (**Figure 5-31**).

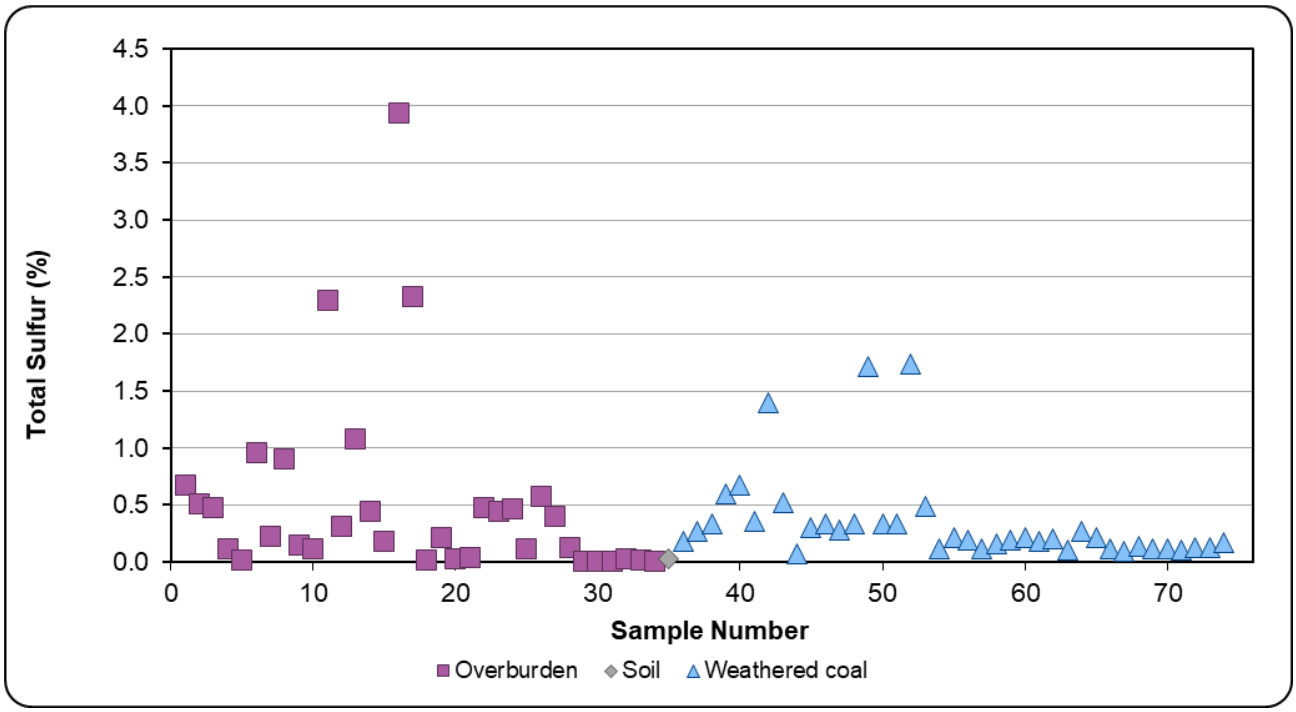


Figure 5-30: Total sulfur concentration values for NOB area samples from the YCM

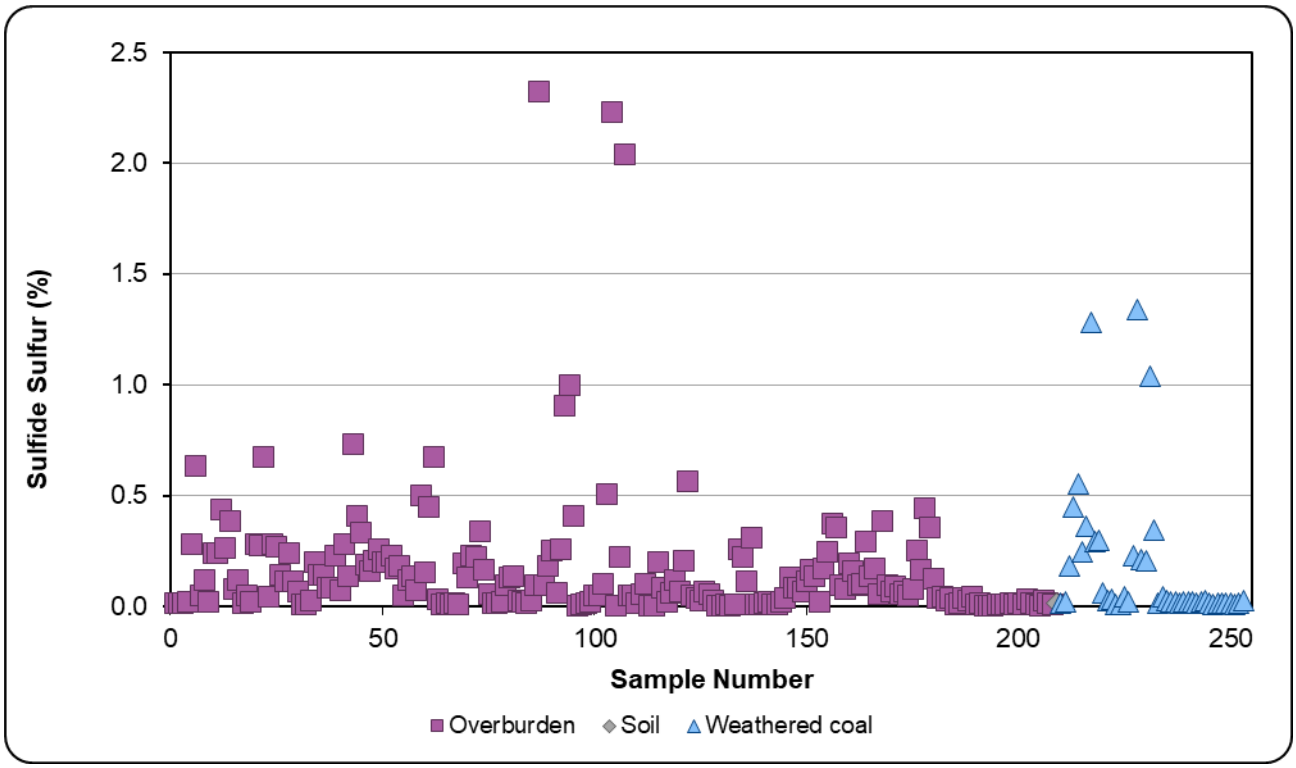


Figure 5-31: Sulfide sulfur concentration values for NOB area samples from the YCM

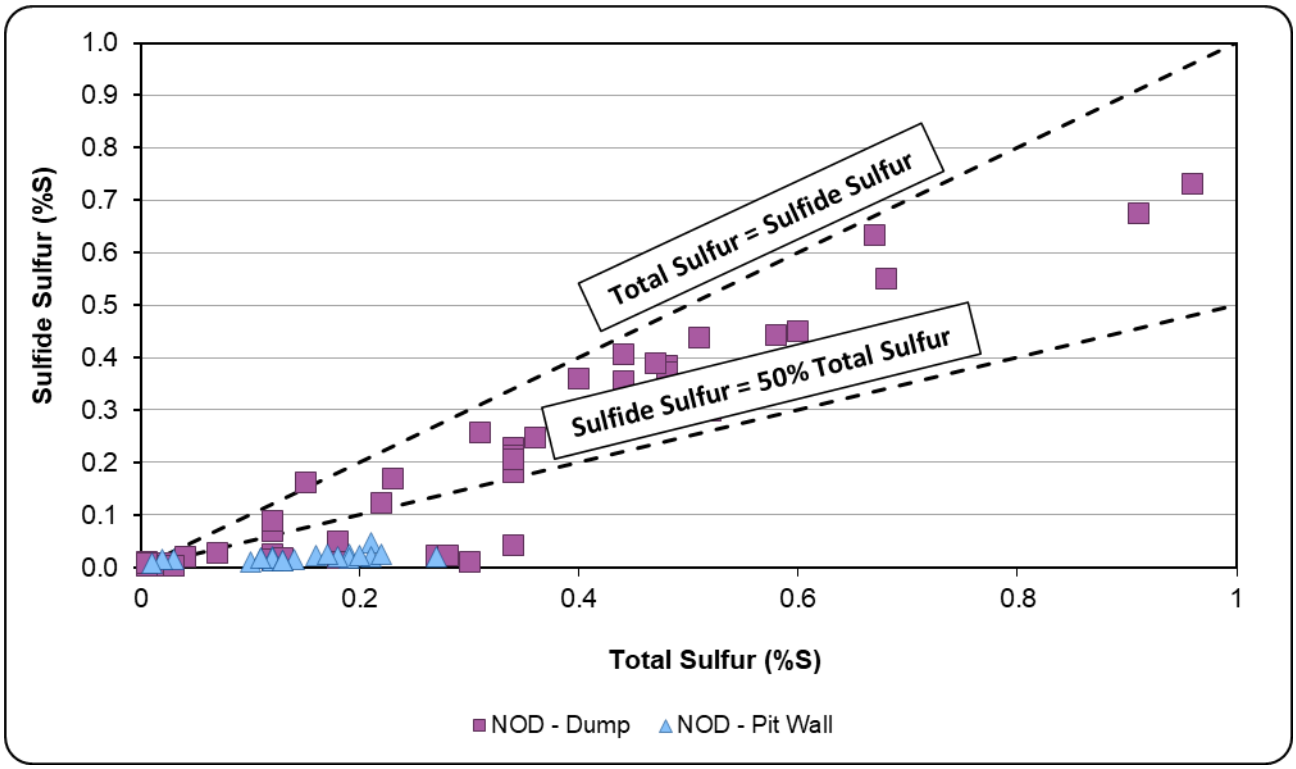


Figure 5-32: Sulfide sulfur vs total sulfur concentration values for NOB area samples from the YCM

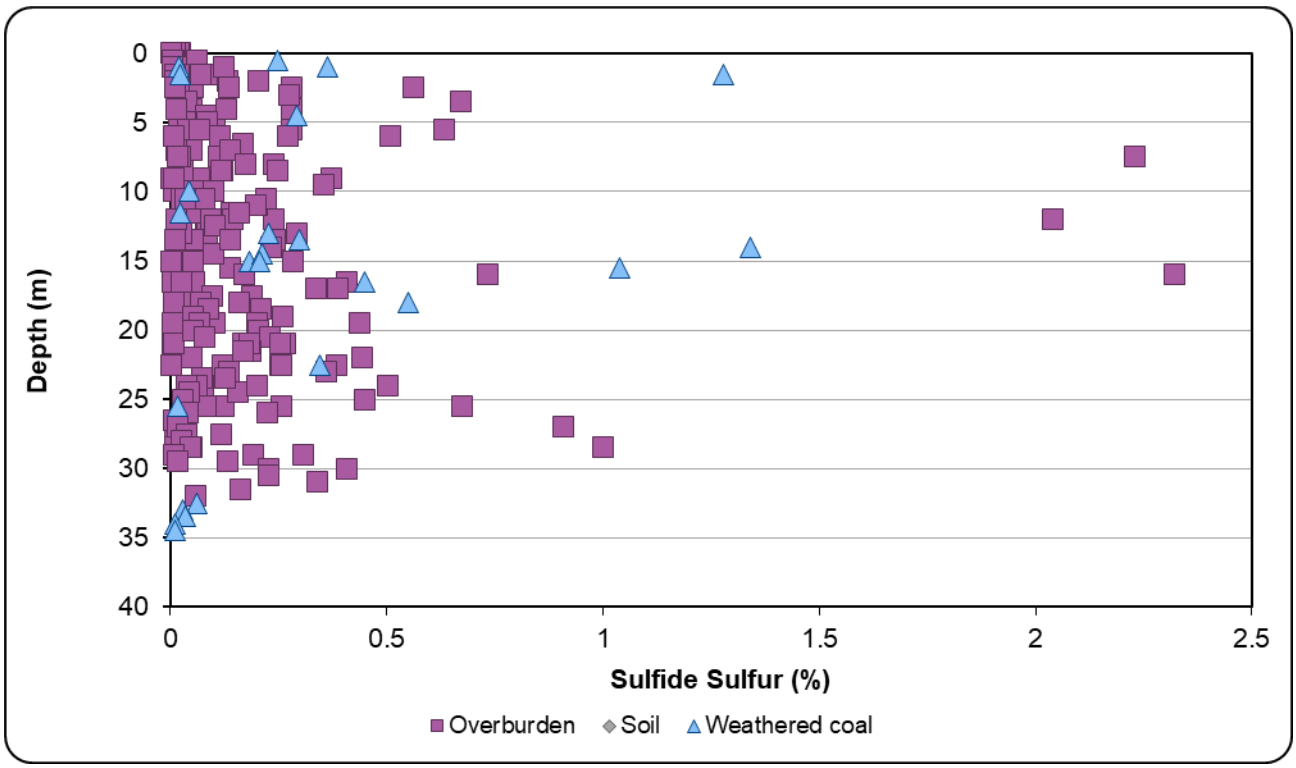


Figure 5-33: Sulfide sulfur concentration vs depth (m) values for NOB area samples from the YCM

ANC:MPA ratio

ANC values for the NOB area samples (n = 74) range from below the limit of reporting (0.5 kg H_2SO_4/t) to 38.4 kg H_2SO_4/t, with a median value below the limit of reporting. MPA values for the samples (n = 253) range from 0.1 to 71.1 kg H_2SO_4/t, with a median of 2.1 kg H_2SO_4/t.

Figure 5-34 shows the relationship between ANC and MPA (NPR) for 74 samples from the NOB area. Most NOB dump material (weathered coal and overburden) samples have very little ANC relative to the MPA of these samples and so pose an increased risk of generating acidic drainage. Pit wall samples all have sulfide sulfur concentrations of less than 0.1% and so have a negligible risk of generating acidic drainage.

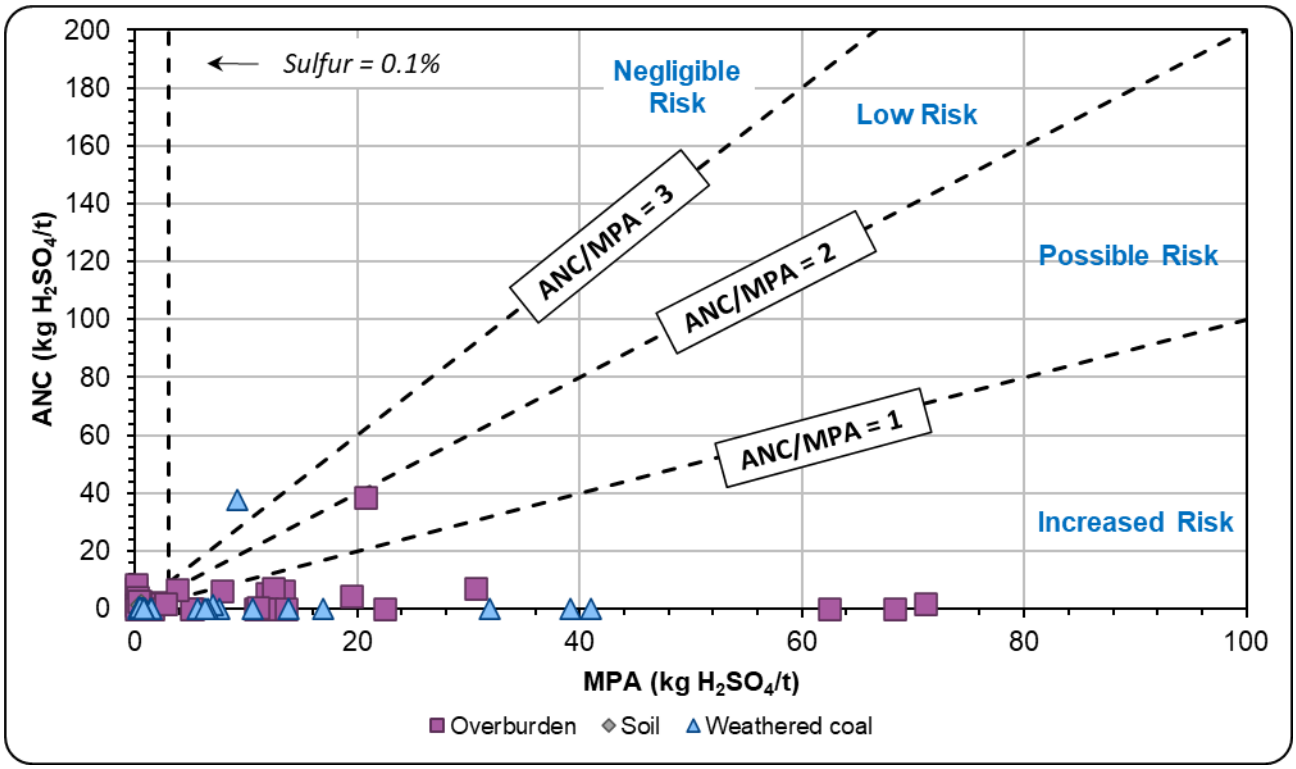


Figure 5-34: ANC vs MPA values for NOB area samples from the YCM

Net Acid Production Potential

NAPP samples for 74 dump and pit wall samples range from -28.37 to 69.15 kg H_2SO_4/t, with a median of 0.44 kg H_2SO_4/t. Strongly positive NAPP values are generally associated with samples from the NOB dump rather than pit wall samples (**Figure 5-35**).There are strongly positive NAPP values from both the overburden and weathered coal within the NOB dump (**Figure 5-36**).

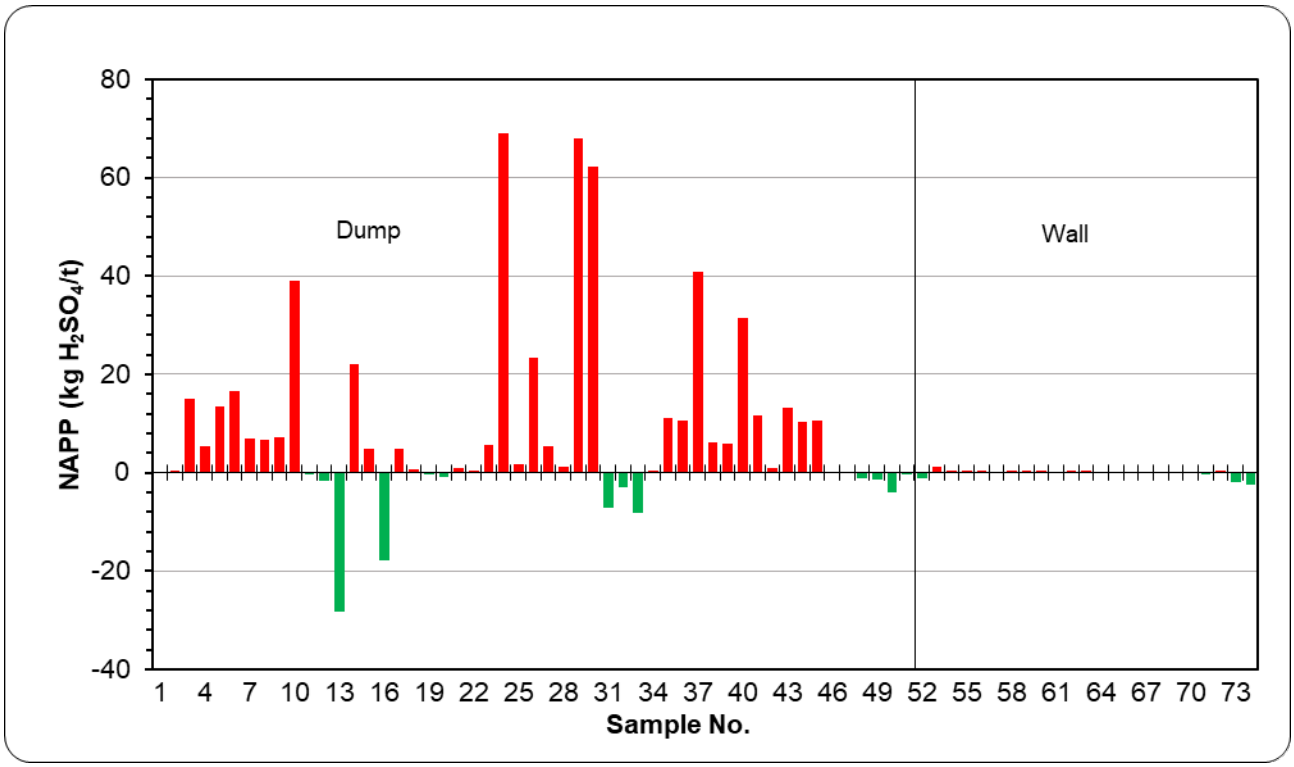


Figure 5-35: NAPP values for NOB area samples from the YCM

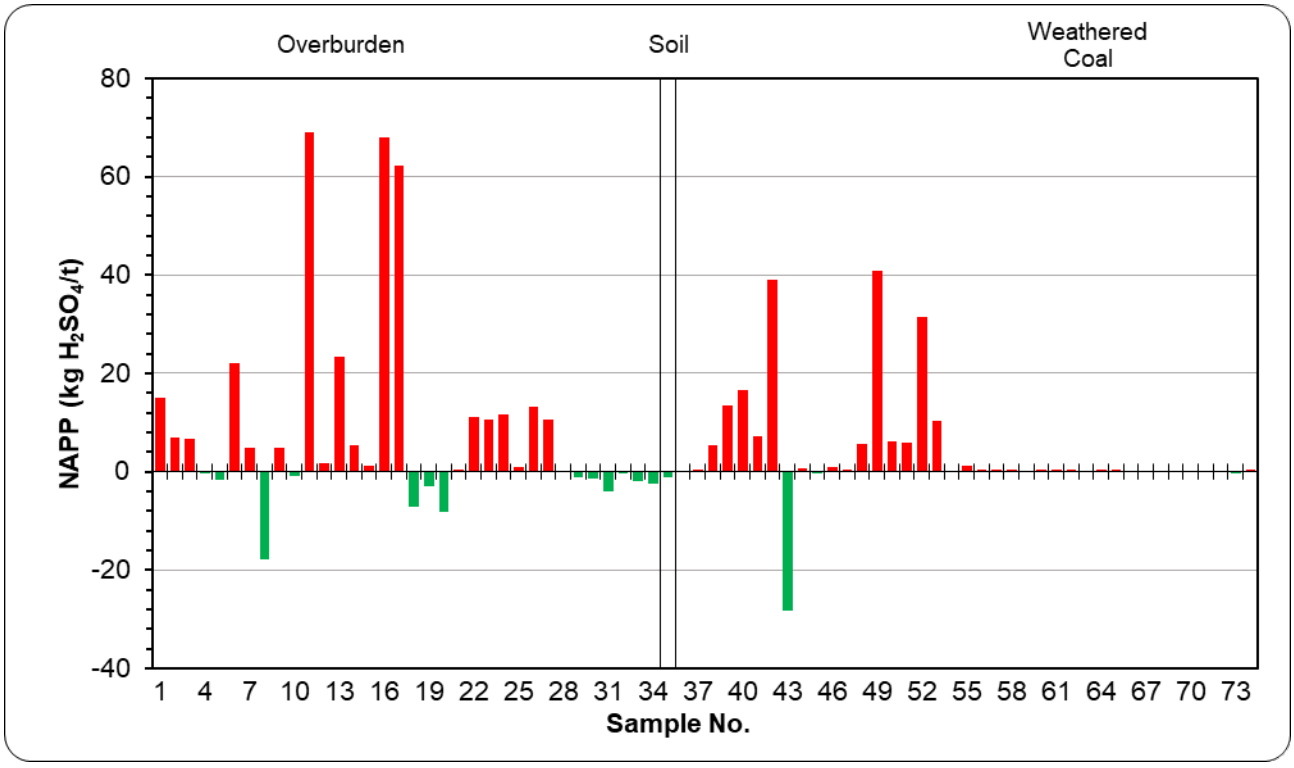


Figure 5-36: NAPP values for NOB area samples from the YCM according to material type

Geochemical classification

A total of 45 of the 74 NOB area dump and pit wall samples are classified as NAF and 25 samples are classified as PAF, with all pit wall samples classified as NAF (**Table 5-6, Figure 5-37** and **Figure 5-38**). There is no correlation between material type and acid drainage risk for materials within the NOB dump.

Table 5-6: Classification criteria and sample classifications for NOB area ABA samples from the YCM

Classification	S_{CR} (%)	NAPP (kg H2SO4/t)	Number of Samples
Non-acid Forming (Barren)	< = 0.1	---	43
Non-acid Forming	> 0.1	< = -10	2
Uncertain	> 0.1	< = 5	4
Potentially Acid Forming (Low Capacity)	> 0.1	< = 10	8
Potentially Acid Forming	> 0.1	> 10	17
		Total	**74**

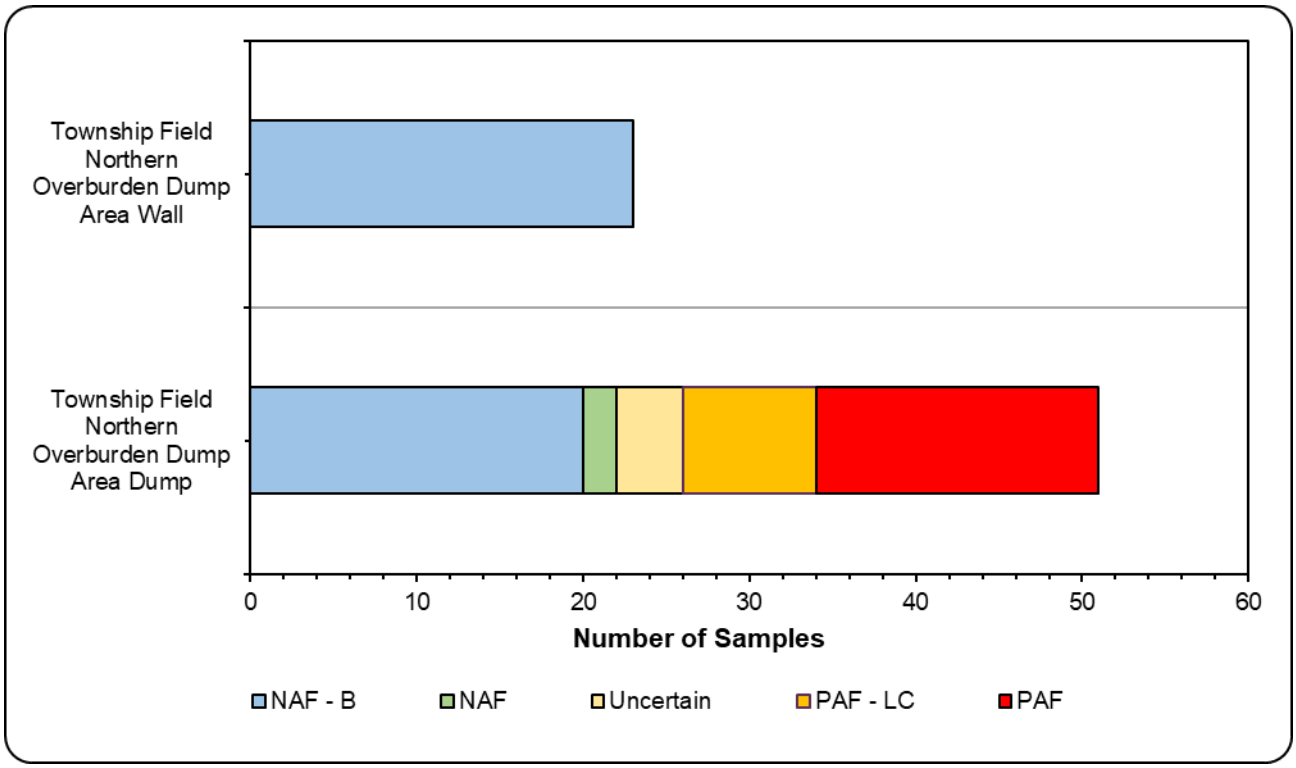


Figure 5-37: Sample type and classifications for NOB area ABA samples from the YCM

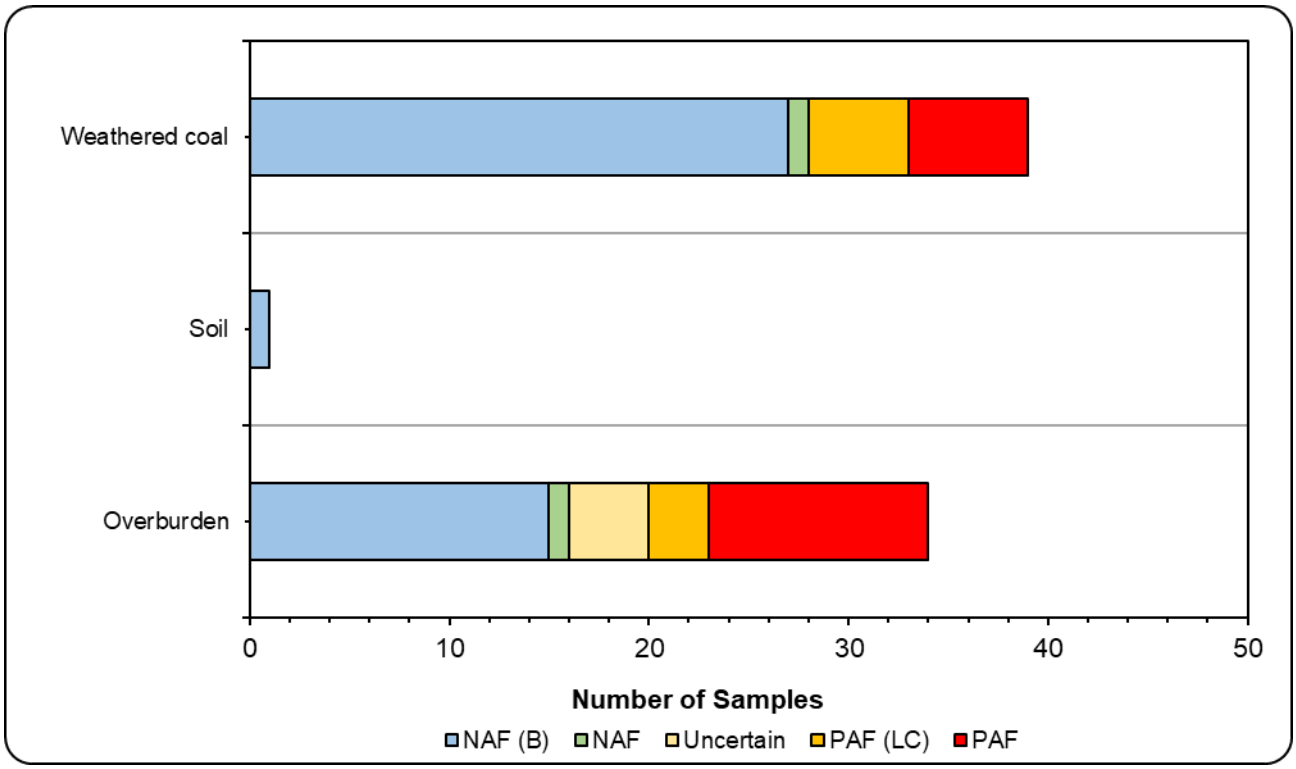


Figure 5-38: Sample type and classifications for NOB area ABA samples according to material type

5.1.4 Township Field – Southern Overburden Dump

A total of 208 samples from 7 drillholes (N7427-N7430, N7455 and N7525-N7526) advanced in the SOB area underwent testing as shown in **Table 5-7**. The drillholes comprised a broad range of materials, from coarse sands and pebbles to lenses of brown coal and clay overburden. No vertical pattern in material layering was observed across the drillholes.

A total of 34 grab samples were collected from the pit walls comprising 7 overburden samples and 27 weathered coal samples.

Table 5-7: Number of samples tested by material type and analyte

Analysis	Dump Material Samples	Wall Material Samples	Total Number of Samples
Acid-base Account	38	34	72
Chromium Reducible Sulfur	208	34	242

$pH_{(1:5)}$

Samples of dump (38 samples) and pit wall (34 samples) materials were collected from the Township Field SOB area and submitted for $pH_{(1:5)}$ testing. $pH_{(1:5)}$ values for the samples range from pH 3.4 to 6.0, with a median of 4.7. Generally, $pH_{(1:5)}$ values are lower in weathered coal pit wall samples compared to dump material samples (**Figure 5-39** and **Figure 5-40**).

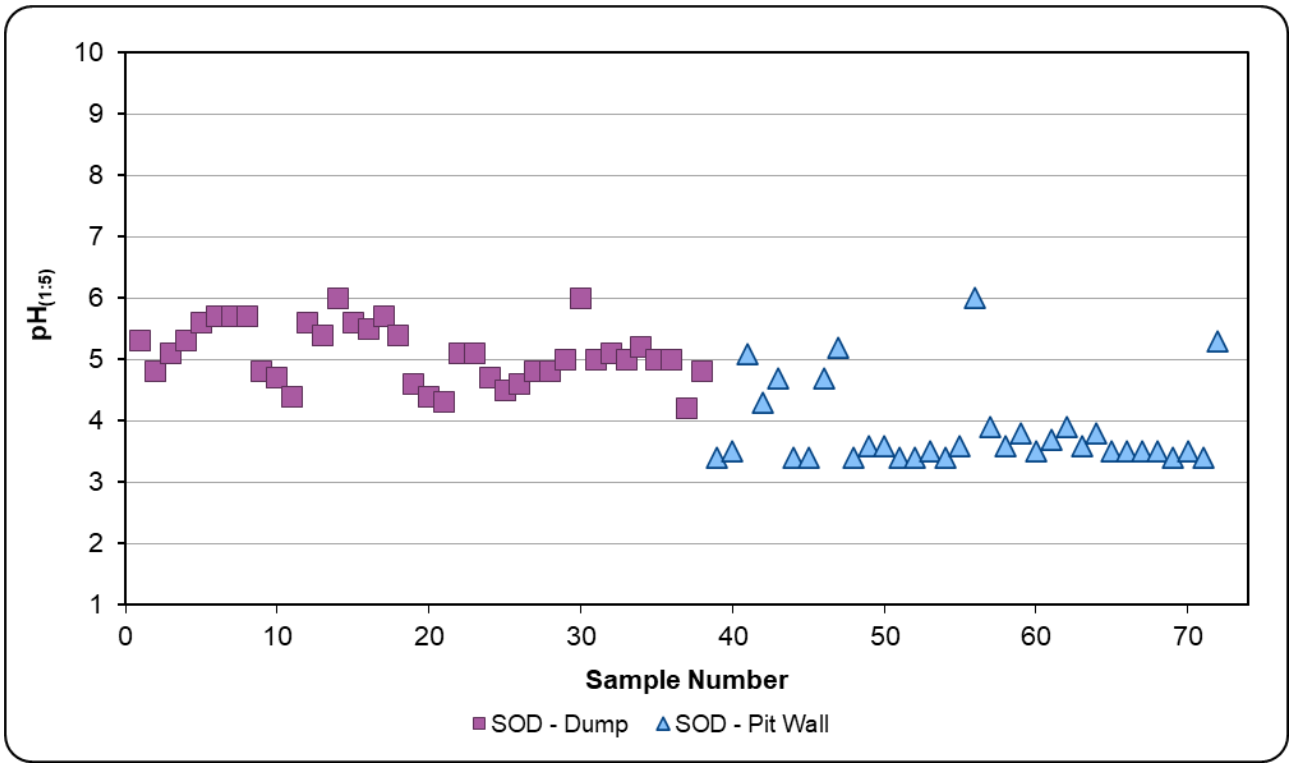


Figure 5-39: $pH_{(1:5)}$ values for SOB area samples from the YCM

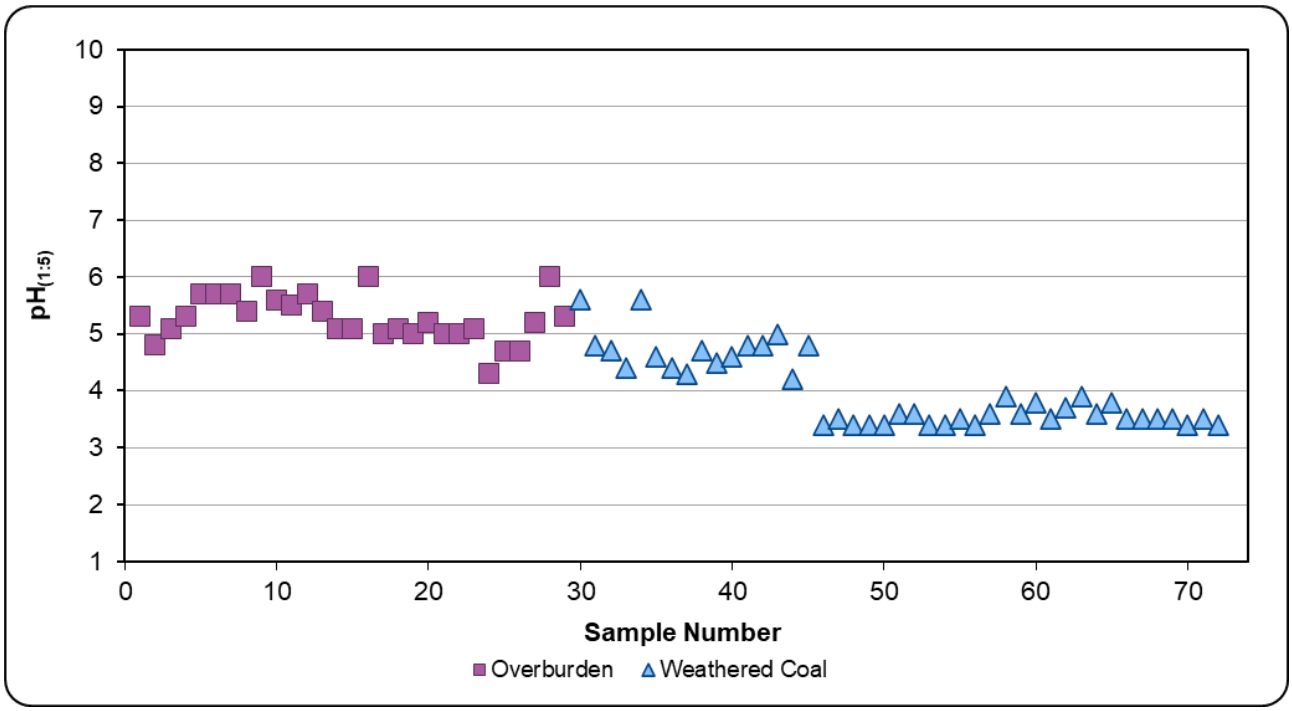


Figure 5-40: $pH_{(1:5)}$ values for SOB area samples according to material type from the YCM

Electrical Conductivity$_{(1:5)}$

$EC_{(1:5)}$ values for 72 Midfield samples range from 22 to 1,510 µS/cm, with a median of 112 µS/cm (**Figure 5-41**). There are no clear associations noted between $pH_{(1:5)}$ and $EC_{(1:5)}$ values. The pit wall overburden samples have slightly higher EC values than overburden within the SOB Dump, and there is one outlier pit wall overburden sample with an $EC_{(1:5)}$ of 1,510 µS/cm.

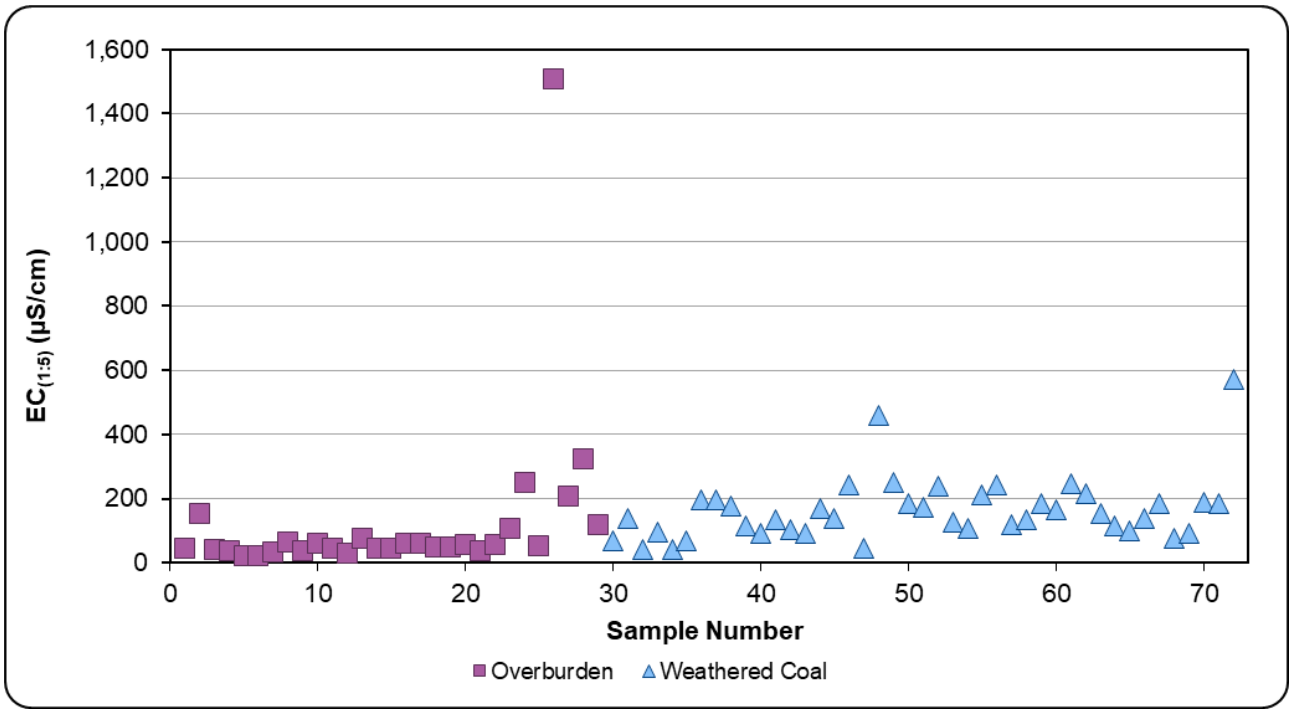


Figure 5-41: $EC_{(1:5)}$ values for SOB area samples from the YCM

Total and sulfide sulfur

A total of 72 samples (38 dump and 34 pit wall) from the SOB area were tested for total sulfur concentrations. These samples, plus an additional 170 samples were also tested for sulfide sulfur concentrations.

Total sulfur concentrations values for the 72 samples range from below the limit of reporting (0.01%) to 0.95%, with a median of 0.10%. Generally, dump samples had lower total sulfur concentration values than samples collected from the SOB area pit walls (**Figure 5-42**).

The sulfide sulfur concentration values for the 242 samples analysed for sulfide sulfur ranges from below the limit of reporting (0.005%) to 0.382%, with a median of 0.013% (**Figure 5-43**). The median sulfide sulfur within the SOB Dump is 0.013% is similar to the pit walls with 0.018%.

The majority of sulfur within each of the samples is oxidised and present as sulfate sulfur as opposed to sulfide sulfur reducing the risk of generating additional acidity (due to pyrite oxidation) (**Figure 5-44**).

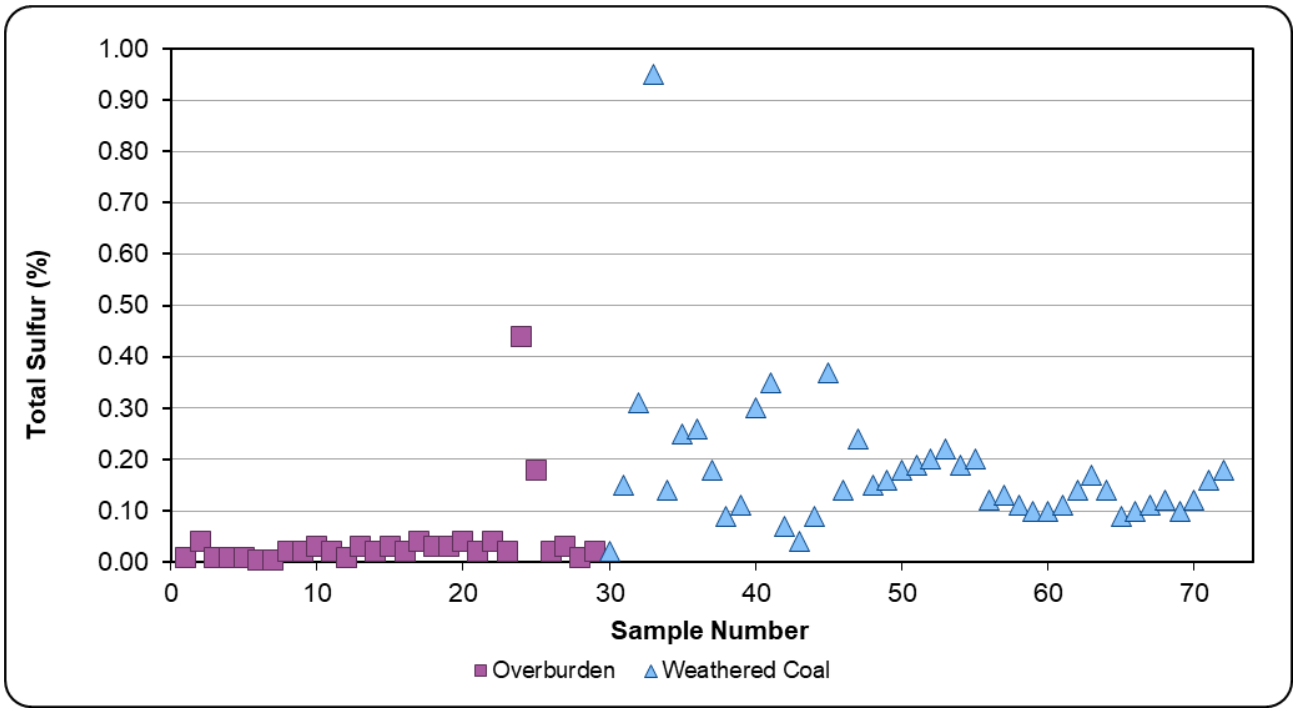


Figure 5-42: Total sulfur concentration values for SOB area samples from the YCM

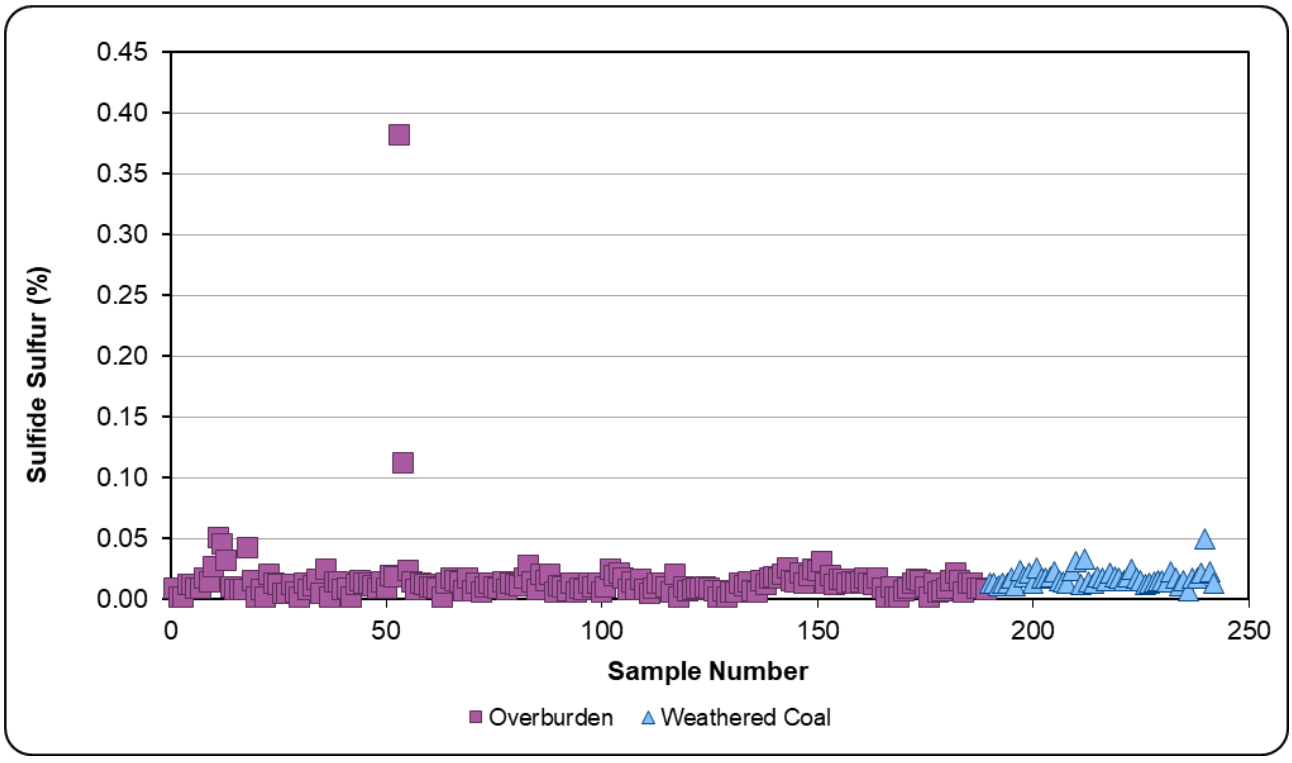


Figure 5-43: Sulfide sulfur concentration values for SOB area samples from the YCM

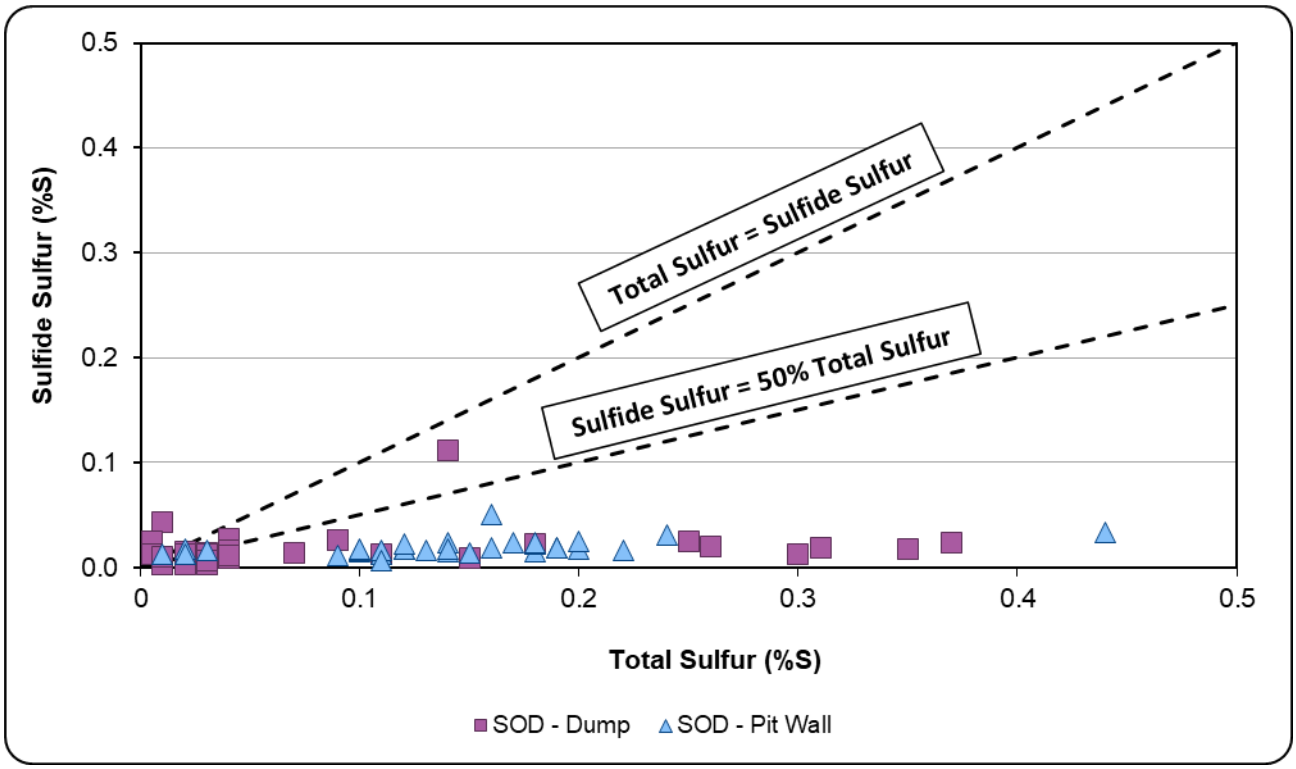


Figure 5-44: Sulfide sulfur vs total sulfur concentration values for SOB area samples from the YCM

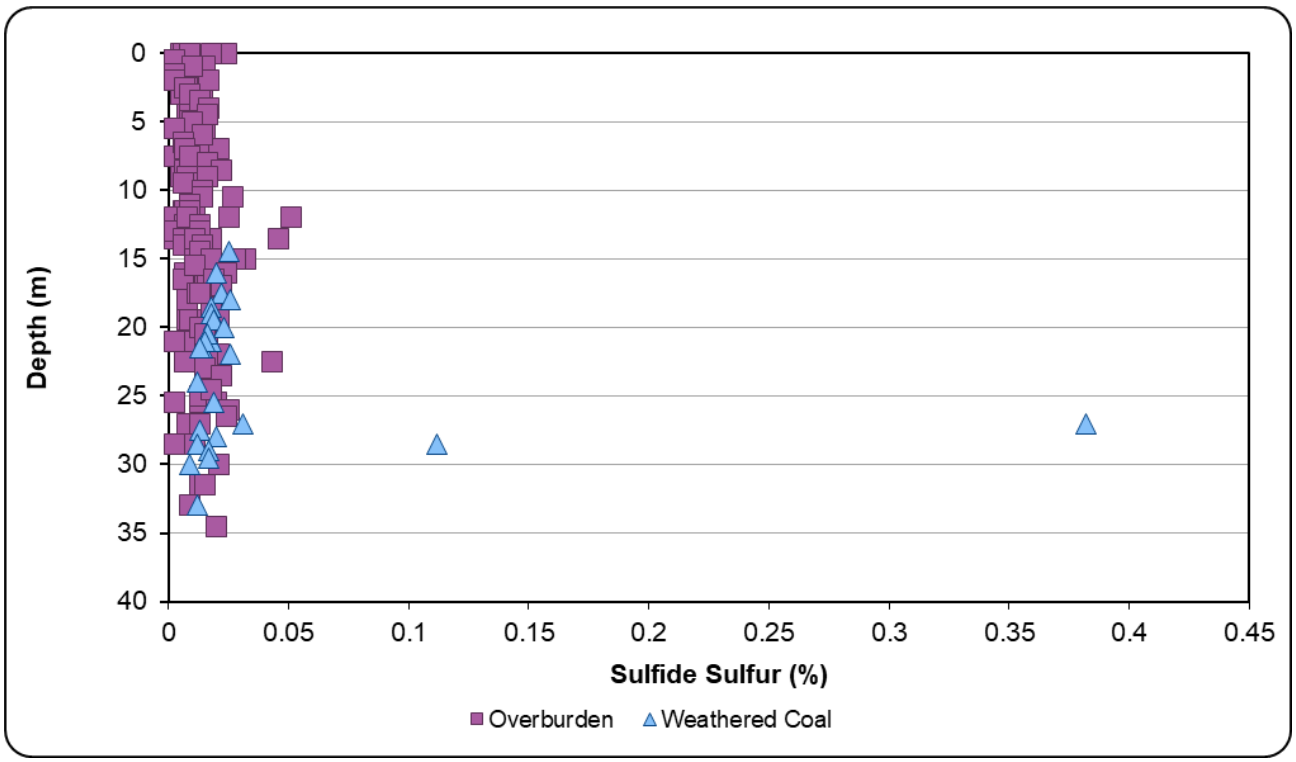


Figure 5-45: Sulfide sulfur concentration vs depth (m) values for SOB area samples from the YCM

ANC:MPA ratio

ANC values for SOB area samples (n = 72) range from below the limit of reporting (0.5 kg H_2SO_4/t) to 8.6 kg H_2SO_4/t, with a median value below the limit of reporting. MPA values for the samples (n = 242) range from 0.1 to 11.7 kg H_2SO_4/t, with a median of 0.4 kg H_2SO_4/t.

A comparison of ANC, MPA, and S_{CR} values for pit wall and SOB dump samples indicates that most samples have sulfide sulfur concentrations of less than 0.1% and so pose a negligible risk of generating acidic drainage (**Figure 5-46**). Two SOB dump samples have elevated MPA values relative to their ANC values and so pose a 'possible' or 'increased' risk of generating acid drainage.

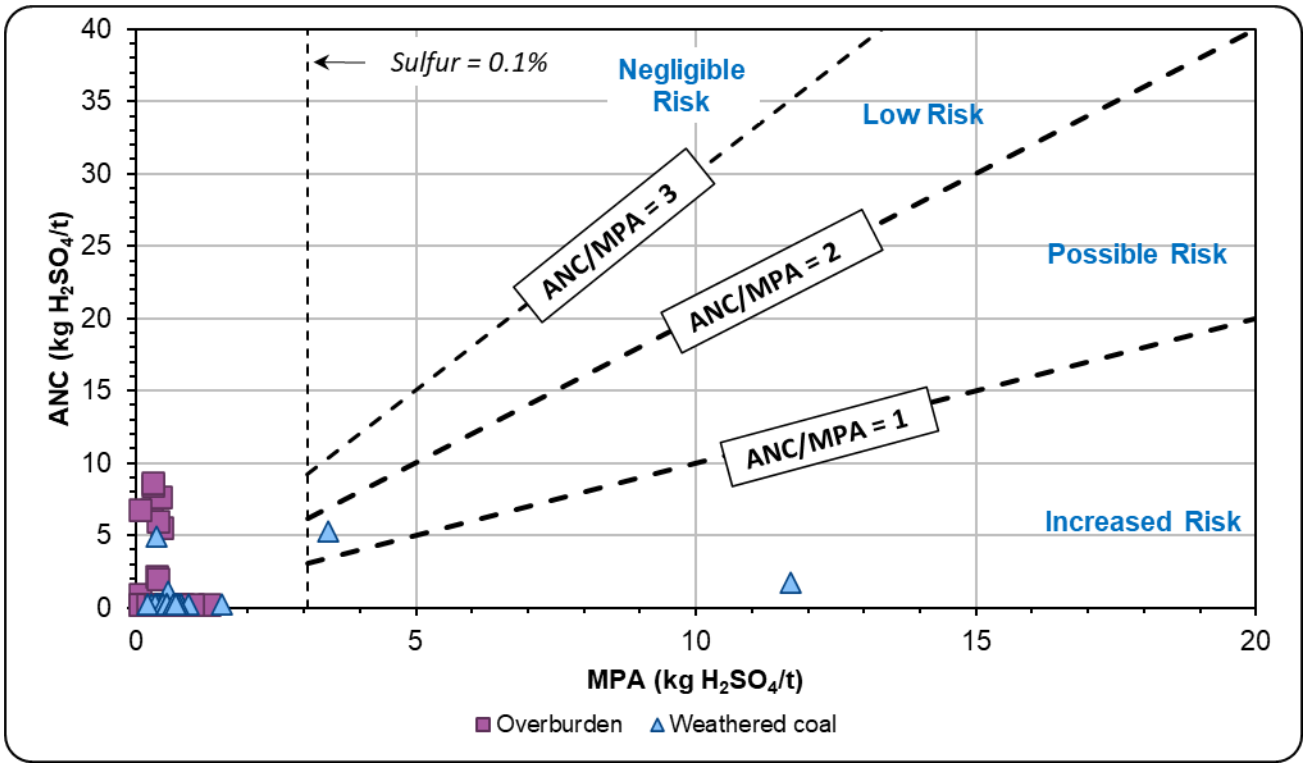


Figure 5-46: ANC vs MPA values for SOB area samples from the YCM

Net Acid Production Potential

NAPP values for the 72 SOB dump and pit wall samples ranges from -8.29 to 10.00 kg H_2SO_4/t, with a median of 0.22 kg H_2SO_4/t. One SOB dump sample has a relatively elevated NAPP value compared to other SOB dump samples, with most NAPP values for SOB dump samples near-zero or negative (**Figure 5-47**). All pit wall samples have near-zero NAPP values, indicating a balance between the sample's potential to generate and neutralise acid.

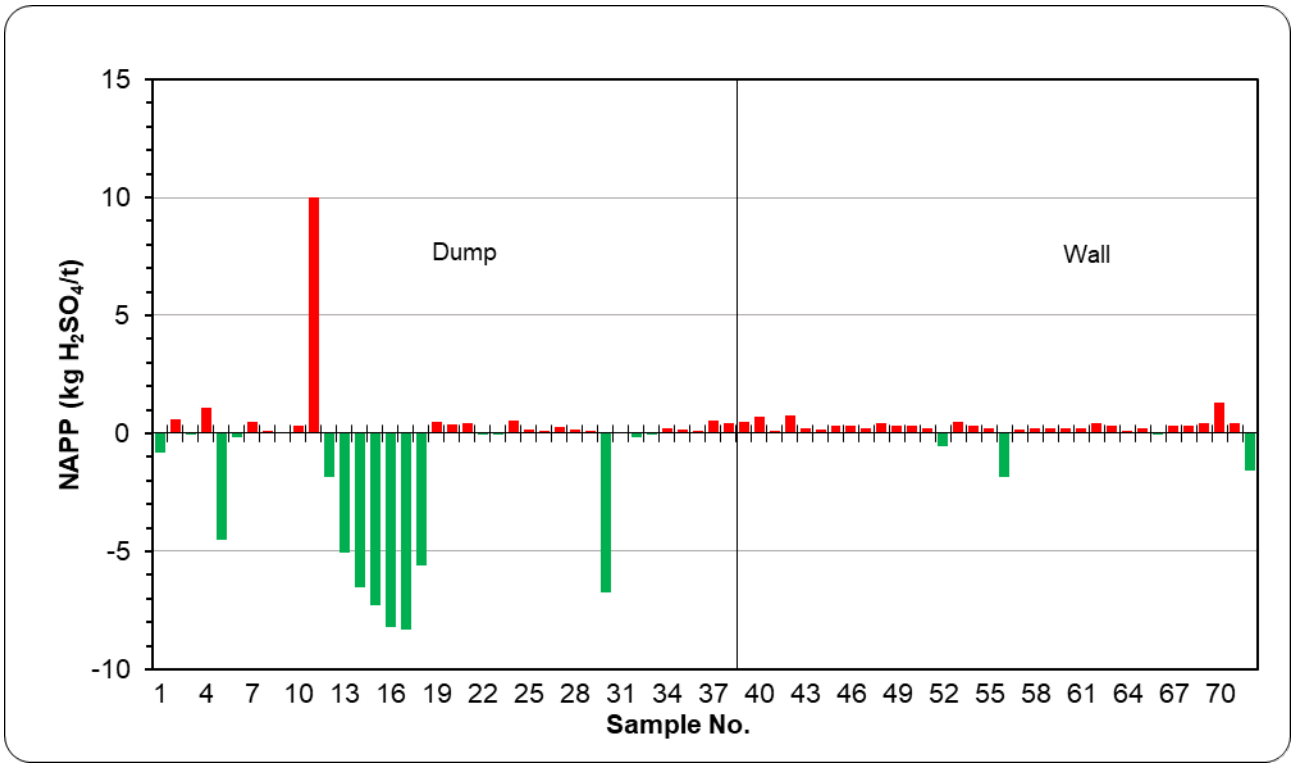


Figure 5-47: NAPP values for SOB area samples from the YCM

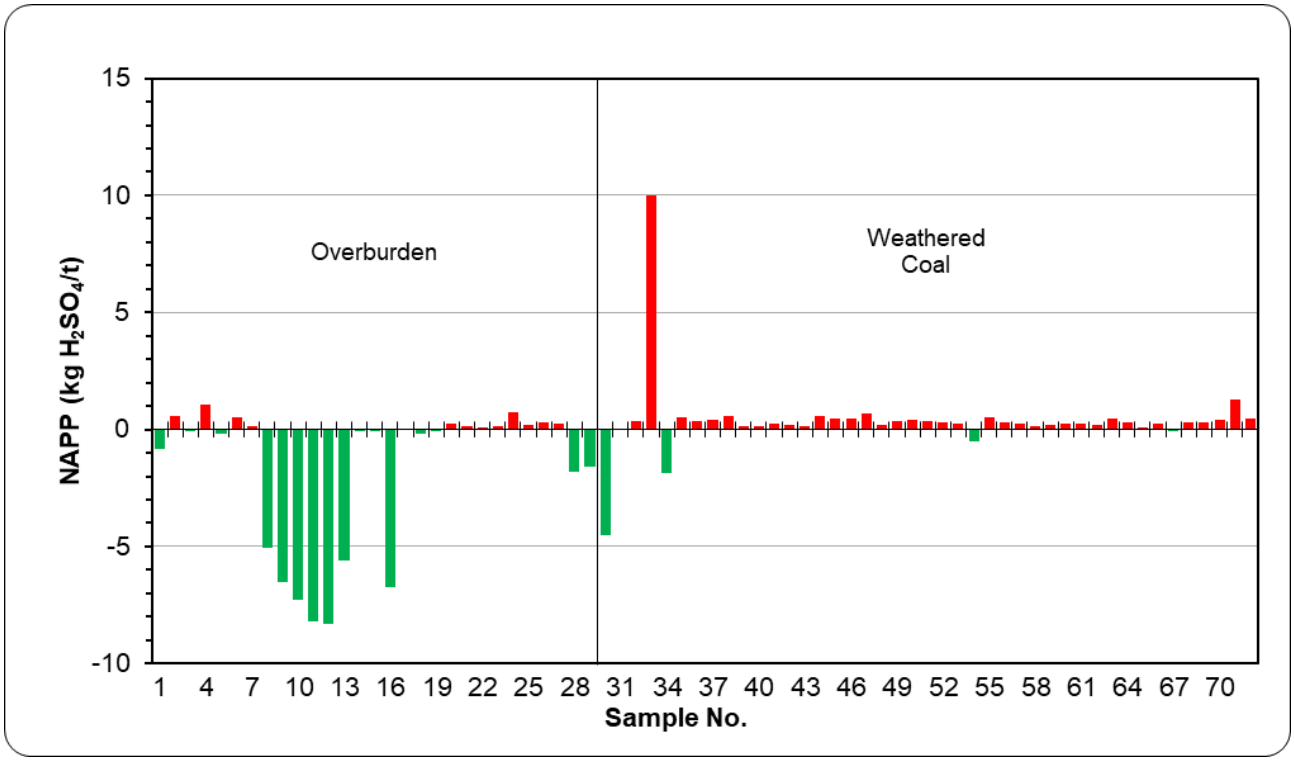


Figure 5-48: NAPP values for SOB area samples according to material type from the YCM

Geochemical classification

70 of the 72 samples submitted for ABA testing are classified as NAF (**Table 5-8**). However, given the low $pH_{(1:5)}$ values for some of these samples, they may have the potential to increase the acidity of contact water in the short-term. One (1)_SOB dump weathered coal sample is classified as Uncertain, and 1 SOB dump weathered coal sample is classified as PAF – Low Capacity (**Figure 5-49**).

Table 5-8: Classification criteria and sample classifications for SOB area ABA samples from the YCM

Classification	S_{CR} (%)	NAPP (kg H2SO4/t)	Number of Samples
Non-acid Forming (Barren)	< = 0.1	---	70
Non-acid Forming	> 0.1	< = -10	0
Uncertain	> 0.1	< = 5	1
Potentially Acid Forming (Low Capacity)	> 0.1	< = 10	1
Potentially Acid Forming	> 0.1	> 10	0
		Total	72

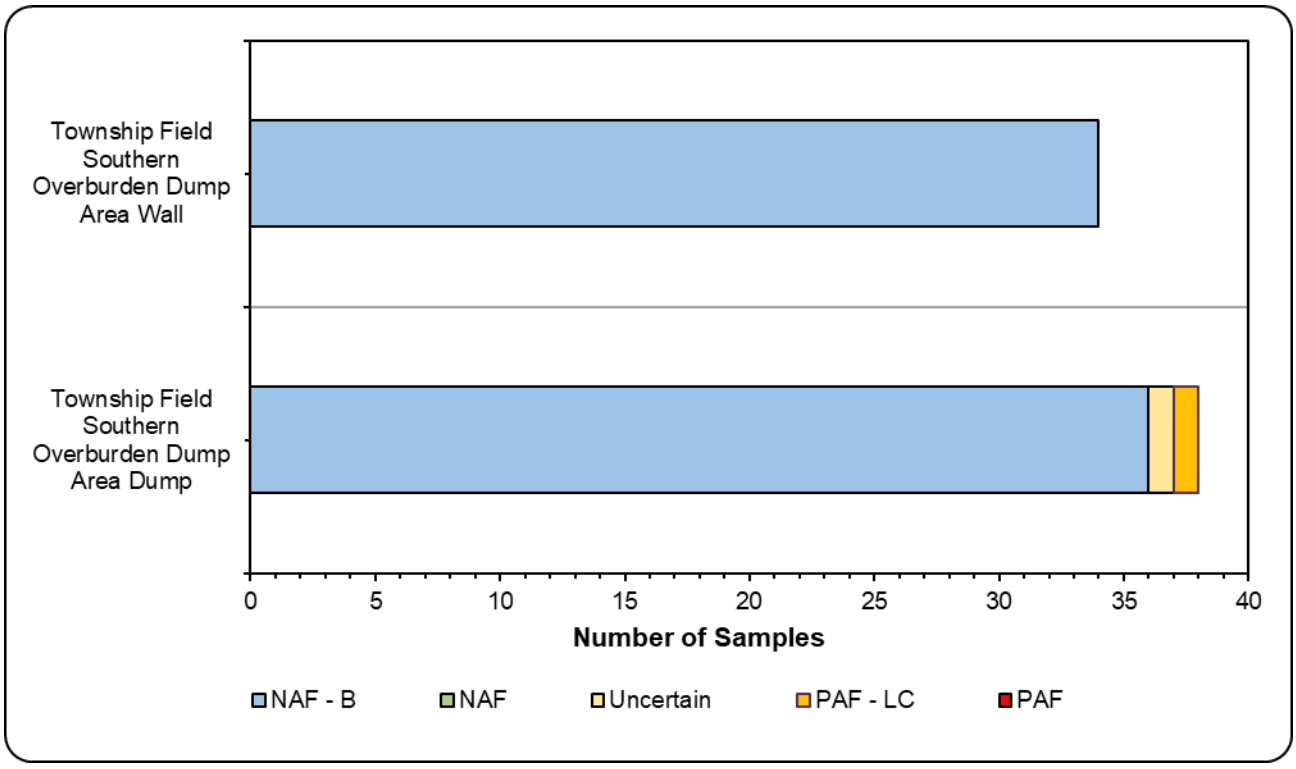


Figure 5-49: Sample type and classifications for SOB area ABA samples from the YCM

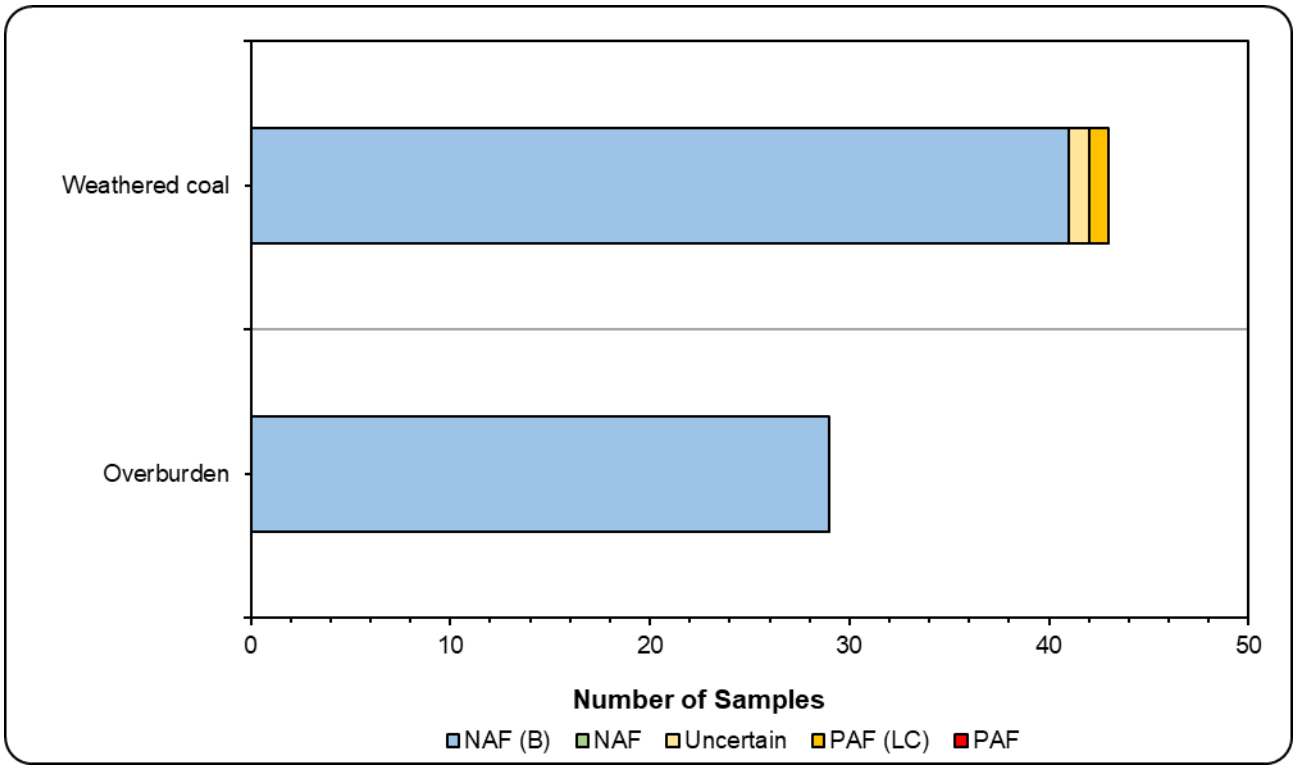


Figure 5-50: Sample type and classifications for SOB area ABA samples according to material type from the YCM

5.1.5 East Field

A total of 281 samples from 8 drillholes (N7437-N7442, N7445 and N7508) were advanced into the East Field Dump underwent testing as shown in **Table 5-9**. The presence of brown coal in the East Field Dump is consistent in N7441 and was observed in thinner lenses in other drillholes. The predominant lithology across the East Field Dump was sandy clay through to thin bands of clay overburden.

A total of 34 pit wall grab samples comprise 31 coal (weathered and fresh) and 3 overburden samples.

Table 5-9: Number of samples tested by material type and analyte

Analysis	Dump Material Samples	Wall Material Samples	Total Number of Samples
Acid-base Account	52	34	86
Chromium Reducible Sulfur	281	34	315

$pH_{(1:5)}$

A total of 86 samples (52 dump and 34 wall) were collected from the East Field and tested for $pH_{(1:5)}$. The $pH_{(1:5)}$ values for the samples range from acidic to neutral with pH values from 2.8 to 7.0 and a median of pH 3.9 (**Figure 5-51**). The $pH_{(1:5)}$ of coal in the pit walls is generally similar to coal within the East Field Dump.

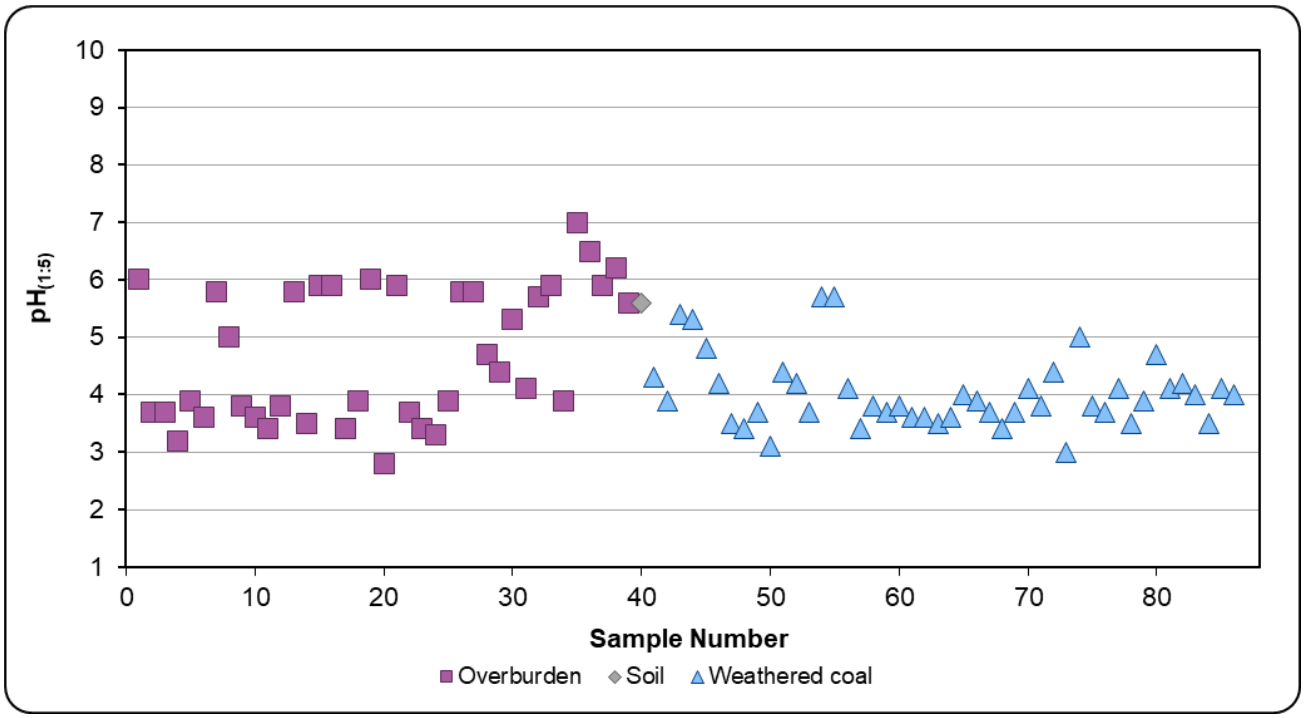


Figure 5-51: $pH_{(1:5)}$ values for East Field samples from the YCM

Electrical Conductivity$_{(1:5)}$

The $EC_{(1:5)}$ values of the 86 samples tested for $pH_{(1:5)}$ range from 12 to 1,660 µS/cm, with a median of 163 µS/cm. East Field Dump material samples showed a greater variability in $EC_{(1:5)}$ values compared to samples of pit wall material (**Figure 5-52**). The higher $EC_{(1:5)}$ values are generally associated with overburden within the dump as opposed to the pit walls.

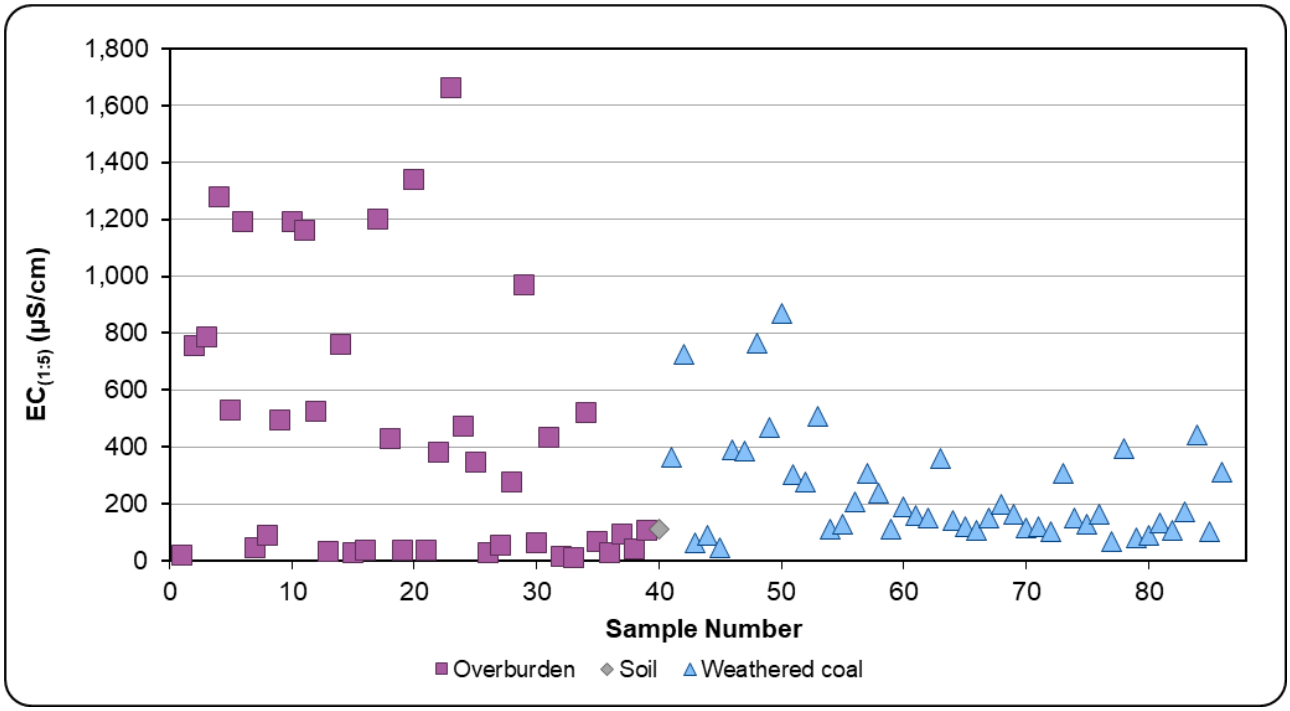


Figure 5-52: $EC_{(1:5)}$ values for East Field samples from the YCM

Total and sulfide sulfur

A total of 86 samples were tested for total sulfur concentration values, with an additional 229 samples tested for sulfide sulfur concentration values. Total sulphur concentration values for the samples range from below the limit of detection (0.01%) to 6.54%, with a median of 0.14% (**Figure 5-53**).

Sulfide sulfur concentration values for the 315 samples range from below the limit of reporting (0.005%) to 5.160%, with a median value of 0.018% (**Figure 5-54**). All but one sample with a sulfide sulfur content > 1% is associated with overburden (typically dark grey to black) from within the East Field Dump. The sulfide sulfur content of weathered coal in the pit wall is <0.025% (excluding one sample).

Generally, most of the sulfur present in the East Field Dump samples occurs as sulfide sulfur (**Figure 5-55**). Conversely, most of the sulfur present in the pit wall samples is present as sulfate sulfur or other oxidised sulfur forms.

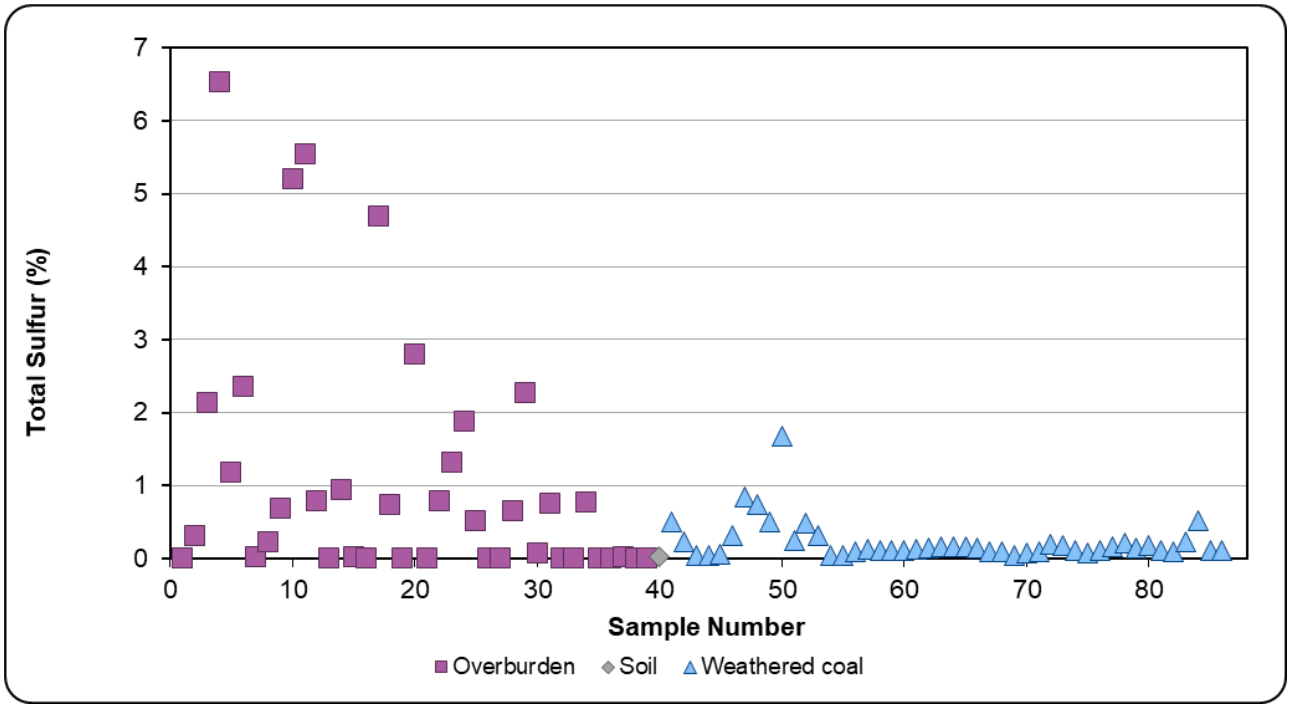


Figure 5-53: Total sulfur concentration values for East Field samples from the YCM

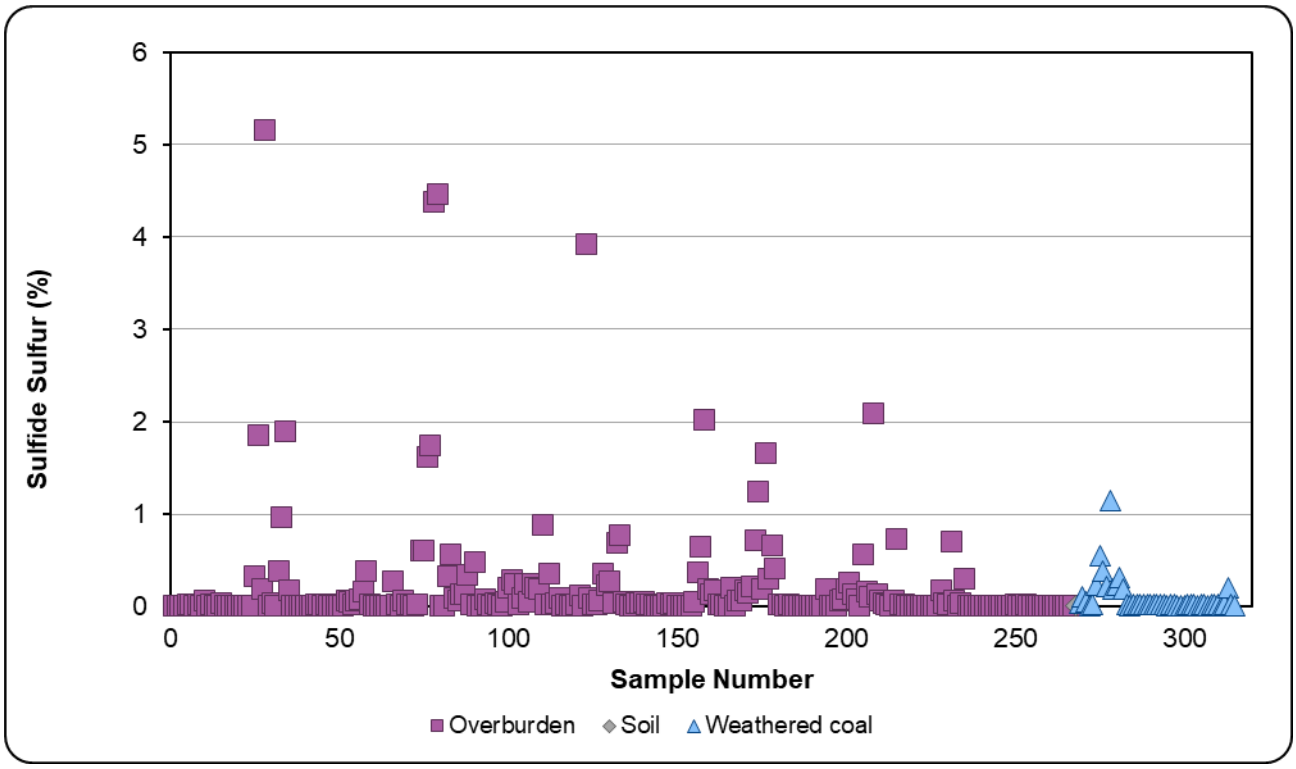


Figure 5-54: Sulfide sulfur concentration values for East Field samples from the YCM

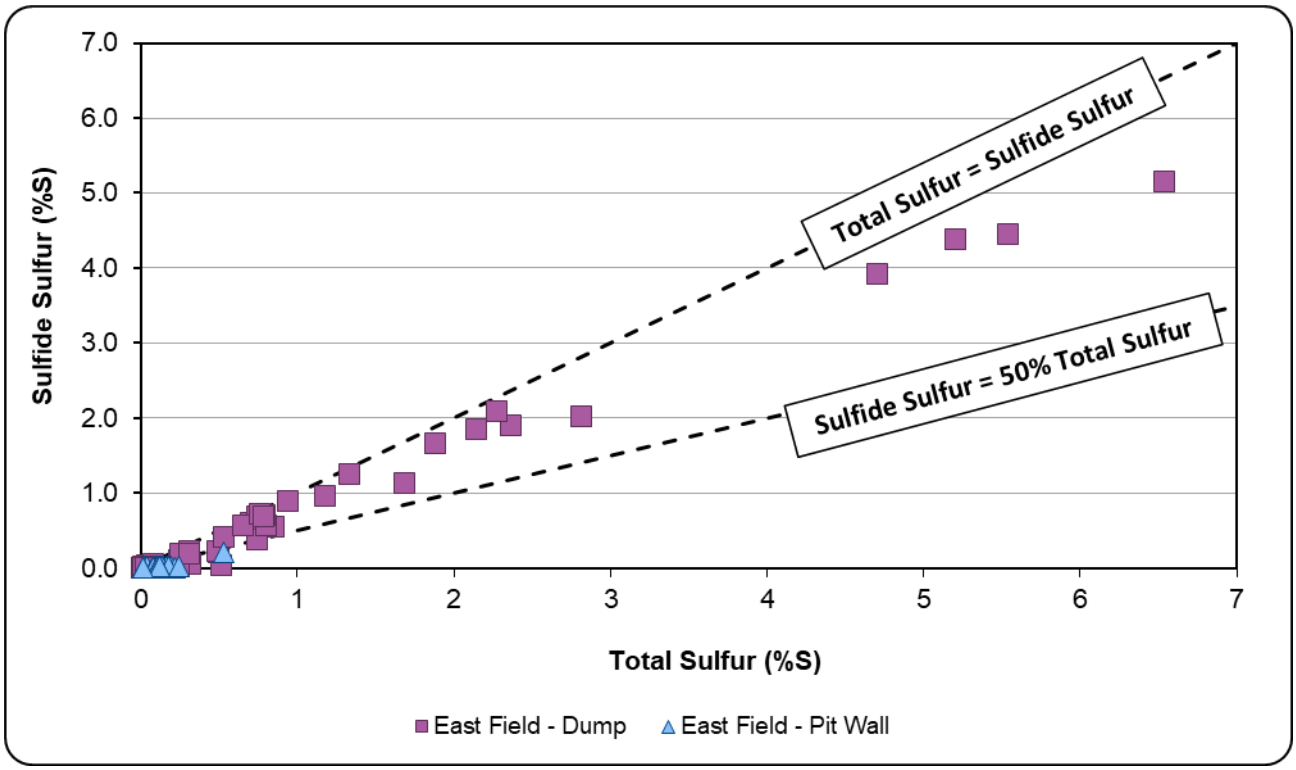


Figure 5-55: Sulfide sulfur vs total sulfur concentration values for East Field samples from the YCM

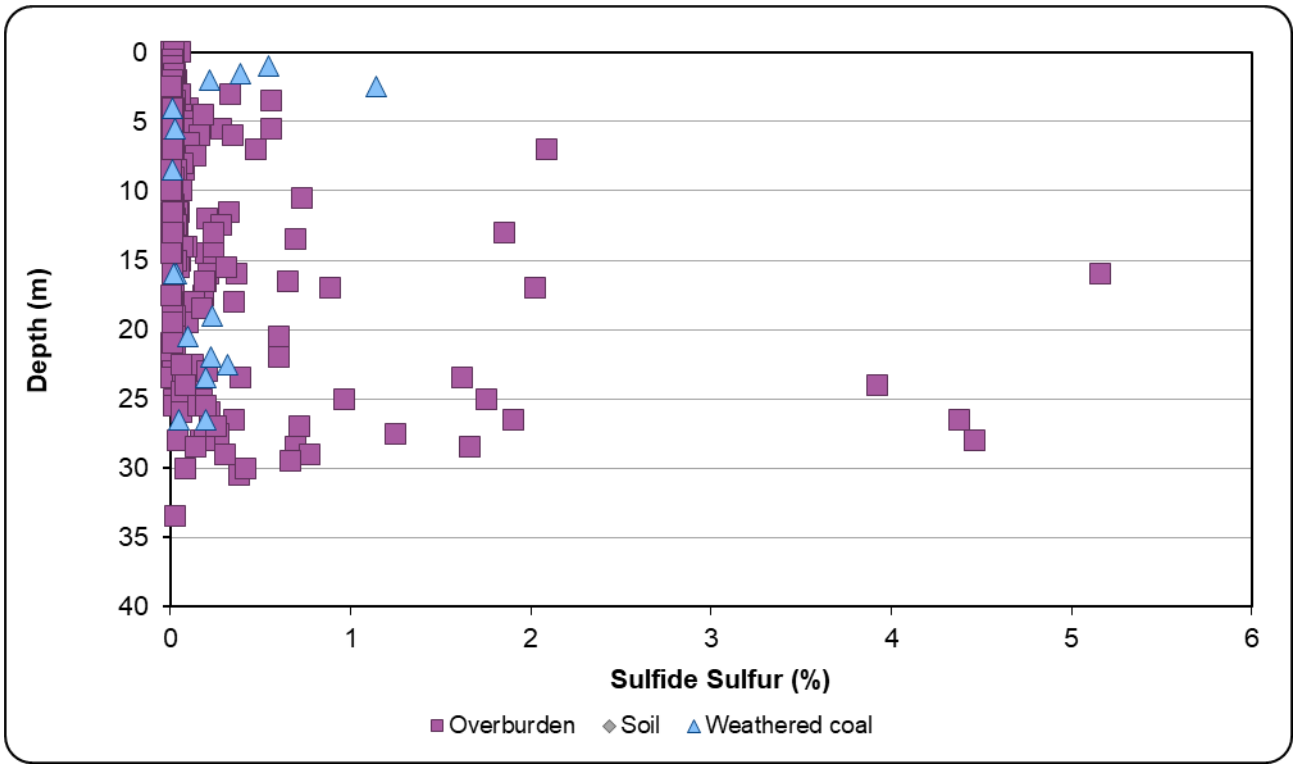


Figure 5-56: Sulfide sulfur concentration vs depth (m) values for East Field area samples from the YCM

ANC:MPA ratio

ANC values for the East Field area samples (n = 86) range from below the limit of reporting (0.5 kg H_2SO_4/t) to 9.3 kg H_2SO_4/t, with a median value below the limit of reporting. MPA values for the samples (n = 315) range from 0.1 to 158.0 kg H_2SO_4/t, with a median of 0.6 kg H_2SO_4/t.

East Field Dump material samples that contain over 0.1% sulfide sulfur generally have very little ANC relative to the MPA of the sample **(Figure 5-57**). These samples pose an increased risk of generating acidic drainage. East Field Dump samples with sulfide sulfur concentration values of less than 0.1% and most pit wall samples are sufficiently low in sulfides that they can be considered to be essentially barren of sulfides and pose a negligible risk of generating acid.

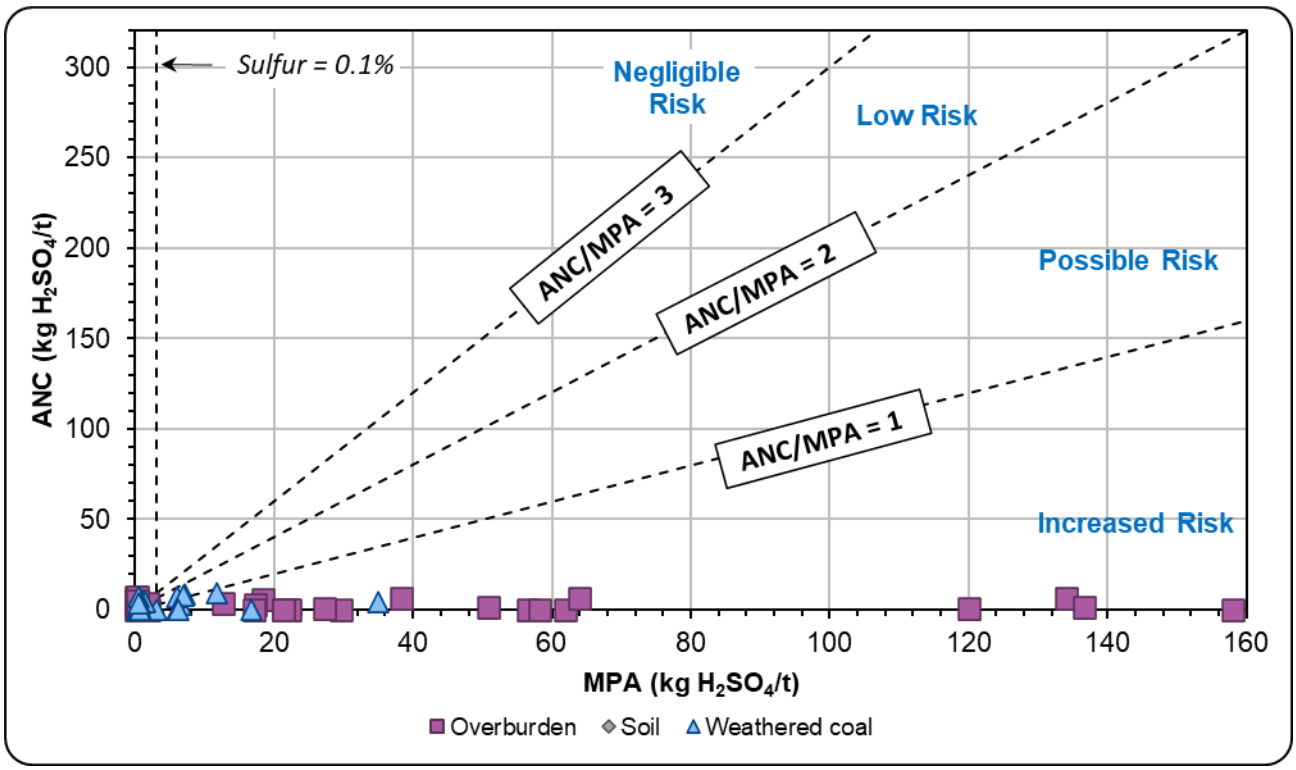


Figure 5-57: ANC vs MPA values for East Field samples from the YCM

Net Acid Production Potential

NAPP values for 86 samples from the East Field range from -9.2 to 157.8 kg H_2SO_4/t, with a median of 0.3 kg H_2SO_4/t. Generally, pit wall samples have balanced ANC and MPA values resulting in near-zero NAPP values, while East Field Dump samples show more positive NAPP values (**Figure 5-58** and **Figure 5-59**), particularly the overburden samples.

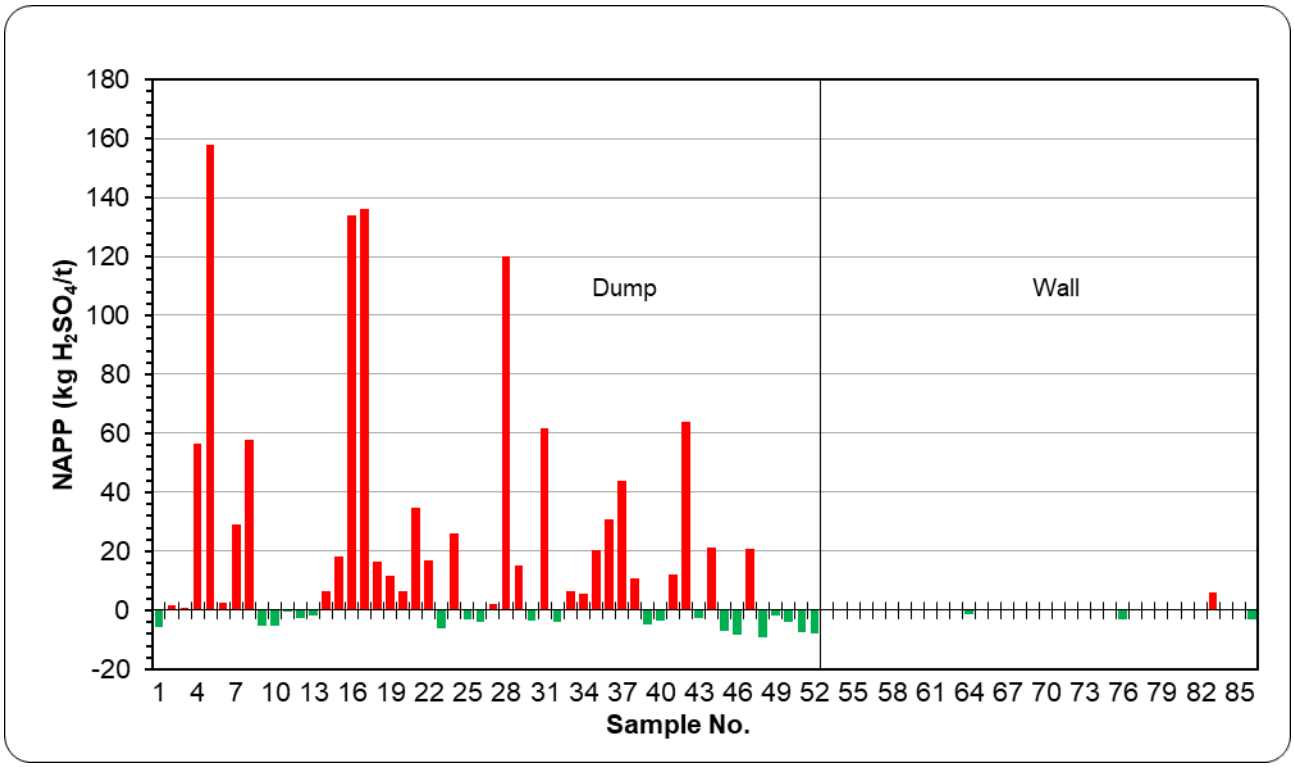


Figure 5-58: NAPP values for East Field samples from the YCM

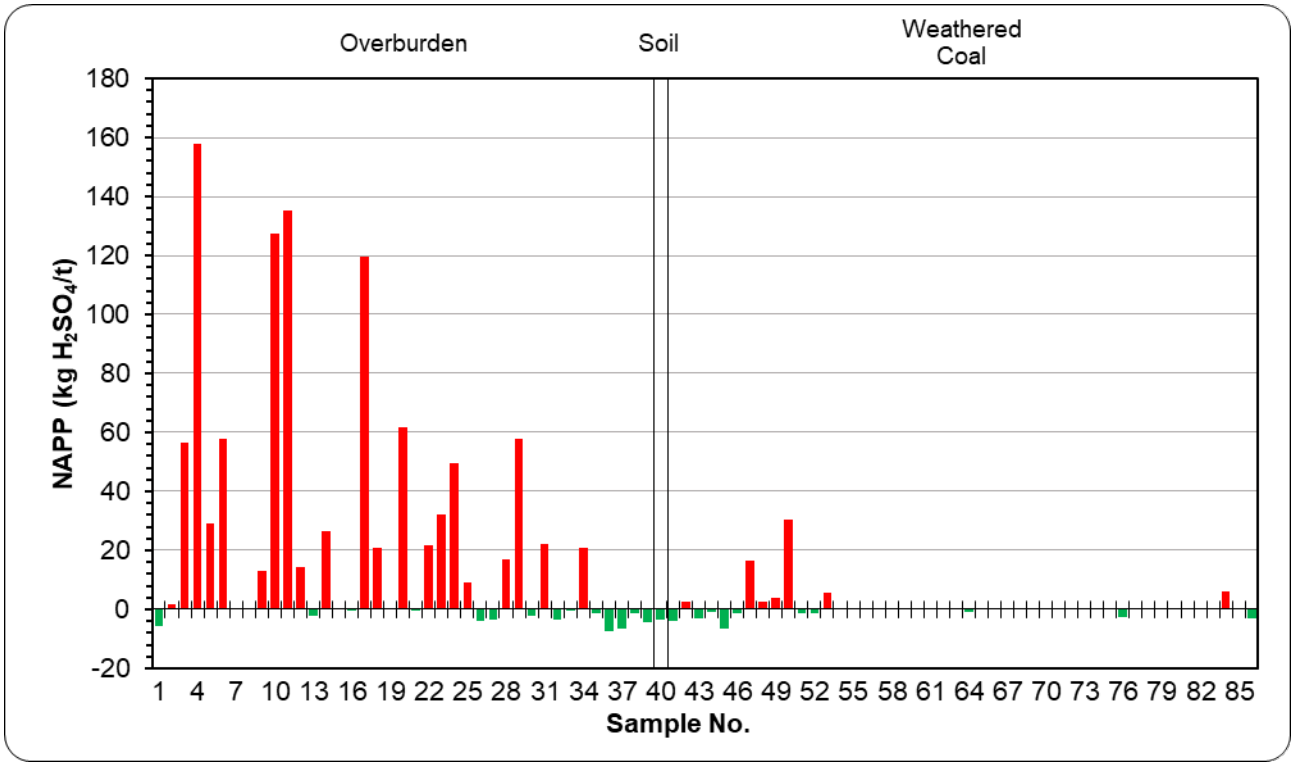


Figure 5-59: NAPP values for East Field samples according to material type from the YCM

Geochemical classification

The majority of samples collected from the East Field are classified as NAF (**Table 5-10**), with 57 samples classified as NAF. However, there are 28 samples classified as PAF, and one sample classified as Uncertain. **Figure 5-60** shows that the bulk of the PAF samples comprise overburden materials collected from the East Field Dump.

Table 5-10: Classification criteria and sample classifications for East Field ABA samples from the YCM

Classification	S_{CR} (%)	NAPP (kg H2SO4/t)	Number of Samples
Non-acid Forming (Barren)	< = 0.1	---	57
Non-acid Forming	> 0.1	< = -10	0
Uncertain	> 0.1	< = 5	1
Potentially Acid Forming (Low Capacity)	> 0.1	< = 10	5
Potentially Acid Forming	> 0.1	> 10	23
		Total	**86**

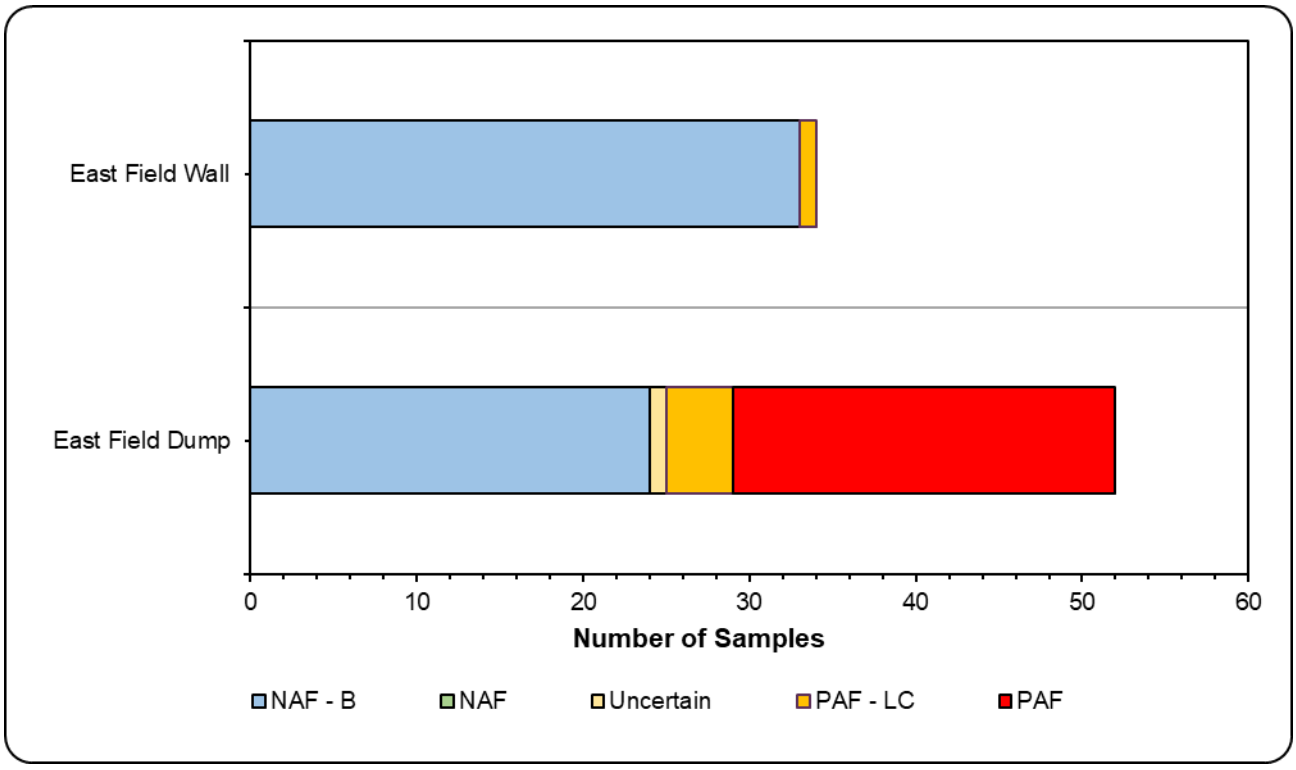


Figure 5-60: Sample type and classifications for East Field ABA samples from the YCM

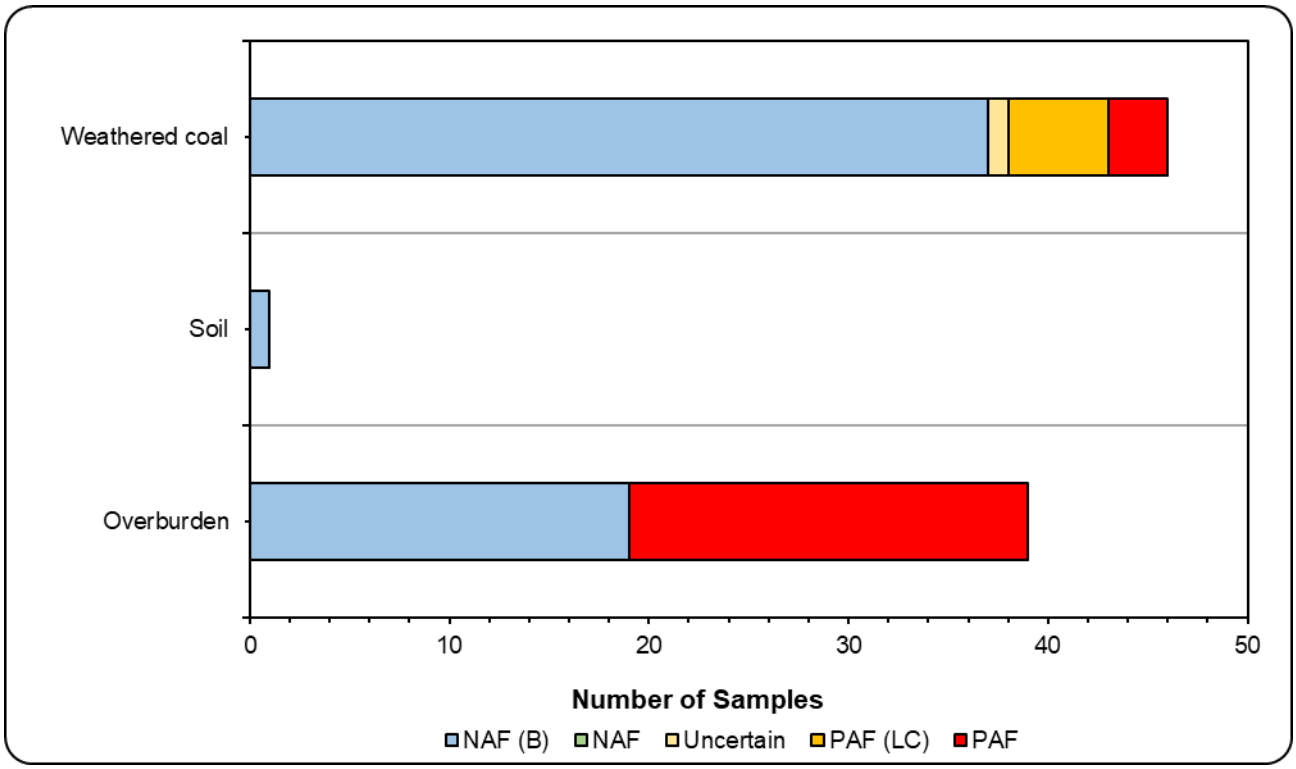


Figure 5-61: Sample type and classifications for East Field ABA samples according to material type from the YCM

5.1.6 Maryvale Field

A total of 118 samples from 5 drillholes (M4223-M4224, N7509-N7510 and N7444) advanced in the Maryvale Field area underwent testing as shown in **Table 5-11**. Maryvale Field largely consists of dumping of the over height portion of the HHF overburden with very little brown coal (RGS, 2023).

Drillholes M4223-M4224, N7444 and N7510 consisted of sandy clay overburden with lenses of gravel overburden. Drillhole N7509 comprised a higher proportion of clay overburden from 0-9 m when compared with the other 4 drillholes.

A total of 52 pit wall grab samples comprise 7 overburden samples and 30 (fresh and weathered) coal samples.

Table 5-11: Number of samples tested by material type and analyte

Analysis	Dump Material Samples	Wall Material Samples	Total Number of Samples
Acid-base Account	18	52	70
Chromium Reducible Sulfur	118	52	170

$pH_{(1:5)}$

$pH_{(1:5)}$ values for Maryvale Field samples range from 3.2 to 6.5, with a median of 4.2. Generally, $pH_{(1:5)}$ values for Maryvale Field Dump material samples are higher than for pit wall material samples (**Figure 5-62**). The fresh and weather coal samples generally have an acidic $pH_{(1:5)}$ (pH < 4.5) compared to the overburden samples which are generally slightly acidic with pH > 5.5 (**Figure 5-63**).

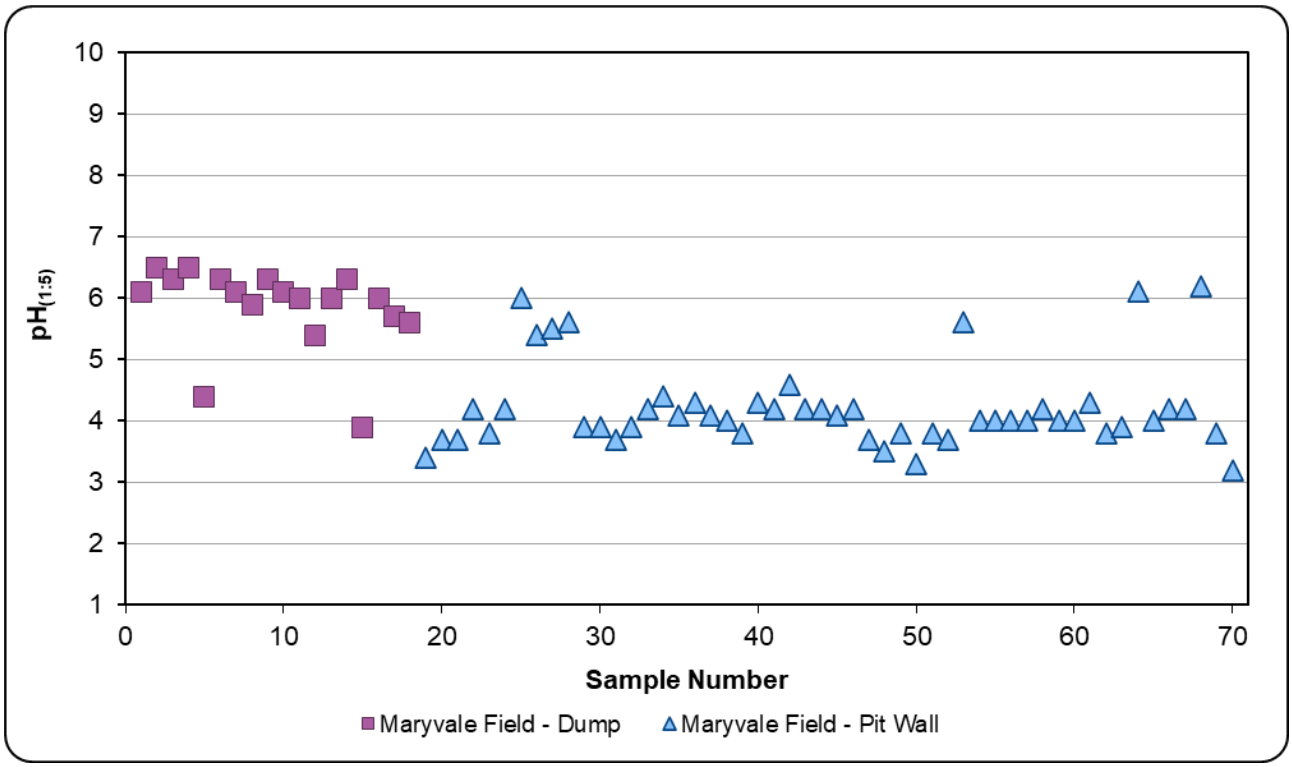


Figure 5-62: $pH_{(1:5)}$ values for Maryvale Field samples from the YCM

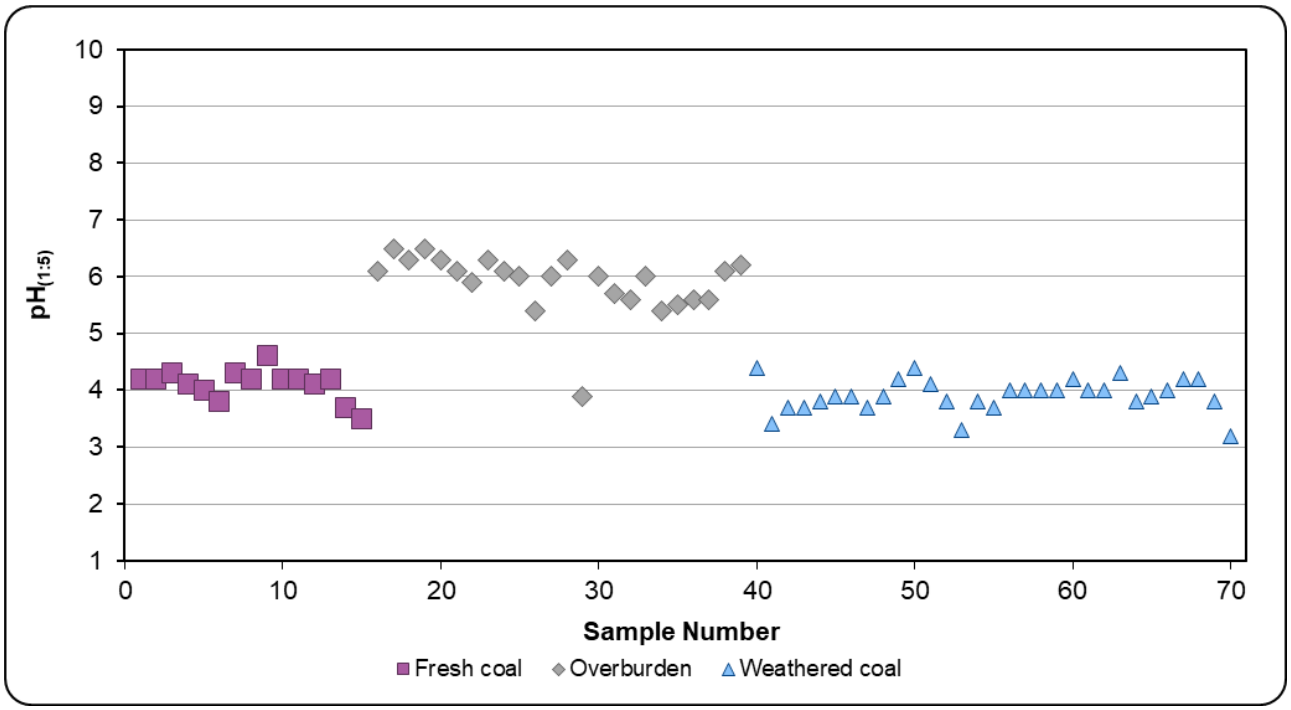


Figure 5-63: $pH_{(1:5)}$ values for Maryvale Field samples according to material type from the YCM

Electrical Conductivity$_{(1:5)}$

$EC_{(1:5)}$ values for Maryvale samples range from 17 to 1,750 µS/cm, with a median of 140 µS/cm. Weathered coal pit wall samples generally have higher $EC_{(1:5)}$ values and show more variability in $EC_{(1:5)}$ values compared

to Maryvale Field Dump material samples (**Figure 5-64**). No obvious association is observed between $pH_{(1:5)}$ and $EC_{(1:5)}$ values.

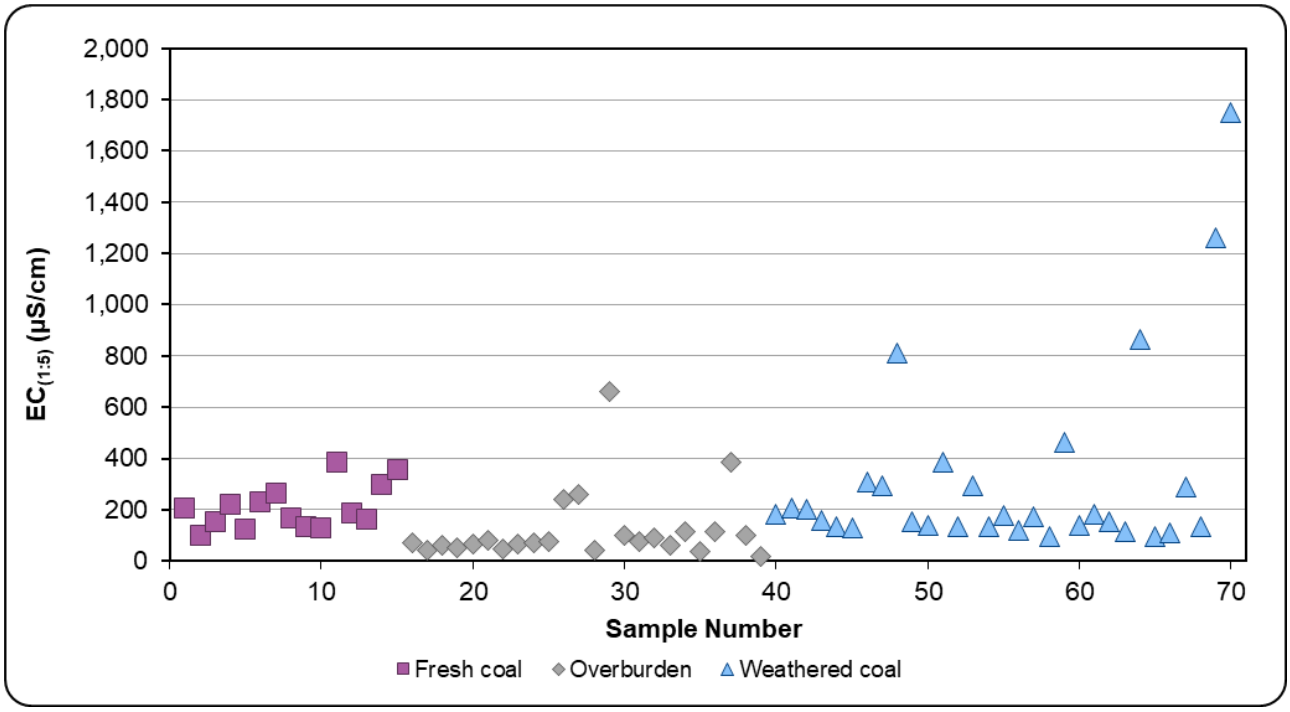


Figure 5-64: $EC_{(1:5)}$ values for Maryvale field Field samples from the YCM

Total and sulfide sulfur

Total sulfur concentration values for Maryvale Field Dump and pit wall material samples range from below the limit of reporting (0.01%) to 4.07%, with a median value of 0.12%. Pit wall samples have more variability in their total sulfur concentration values than Maryvale Field Dump samples (**Figure 5-65**).

Sulfide sulfur concentration values for all samples range from below the limit of reporting (0.005%) to 2.8%, with a median of 0.012% (**Figure 5-66**) which is below the crustal abundance of sulfur (Bowen, 1978).

The proportion of sulfur present as sulfide in the pit wall samples increases in samples with total sulfur concentration values greater than approximately 0.5% (**Figure 5-67**).

There is no apparent correlation between sulfide sulfur content and Maryvale Field Dump depth (**Figure 5-68**).

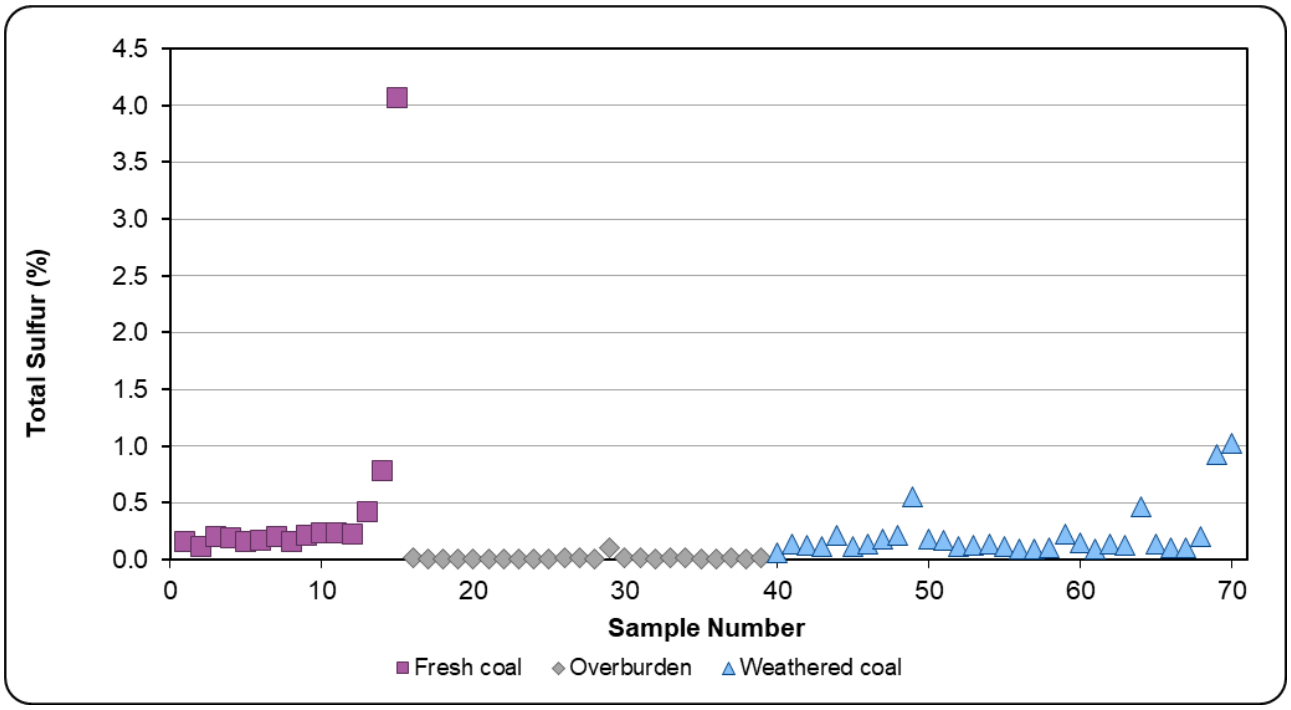


Figure 5-65: Total sulfur values for Maryvale field Field samples from the YCM

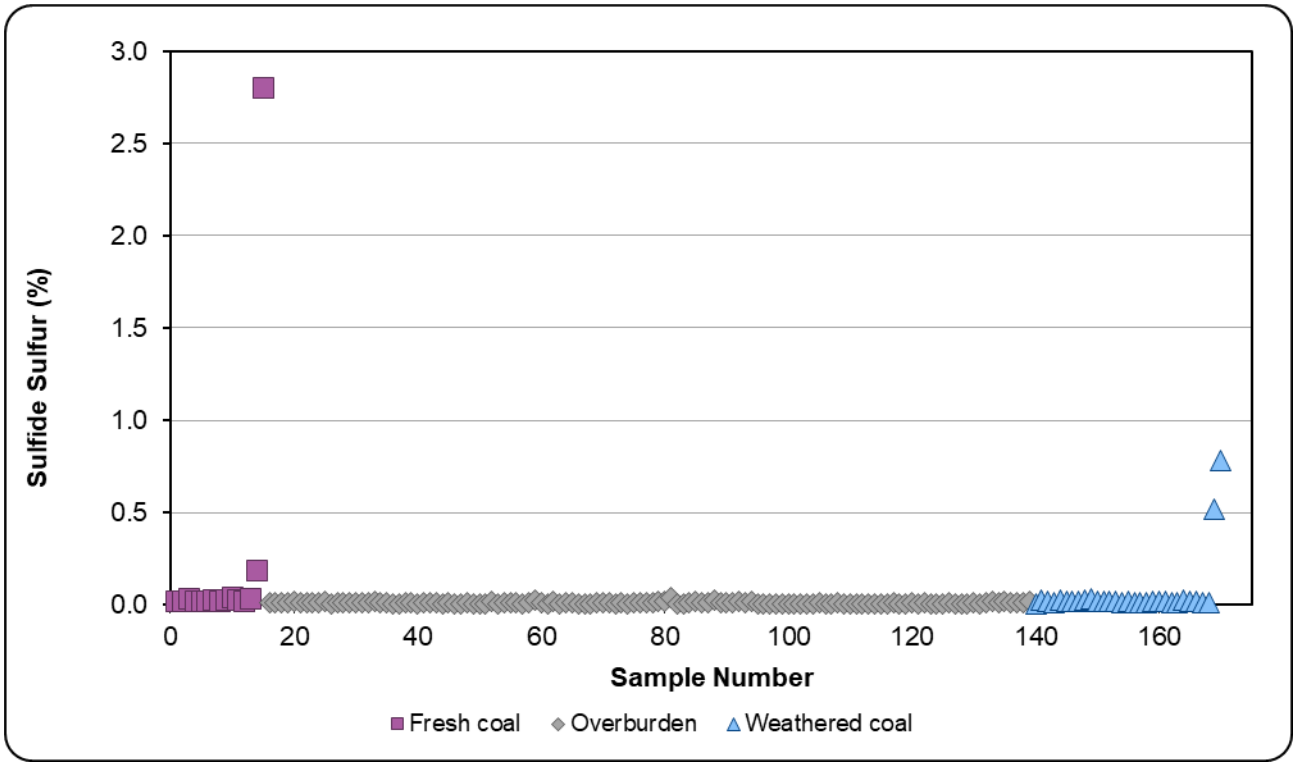


Figure 5-66: Sulfide sulfur values for Maryvale field Field samples from the YCM

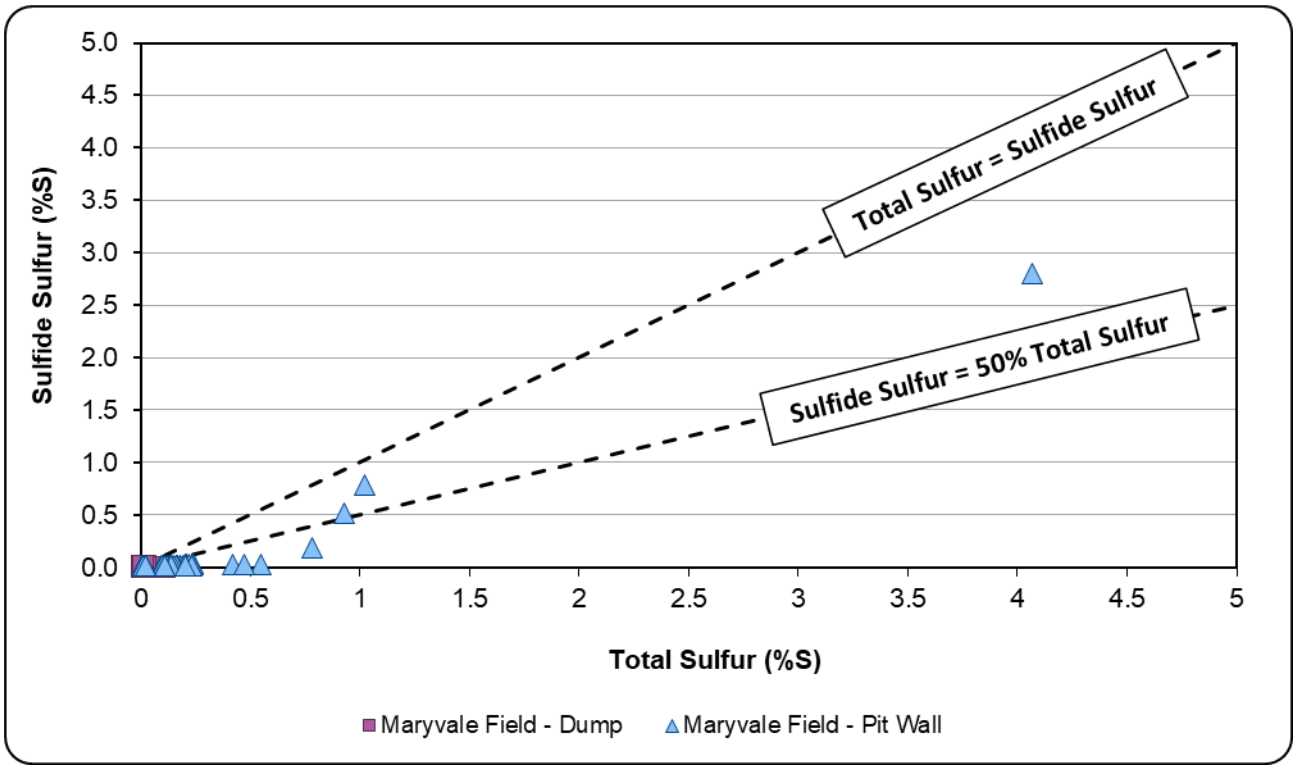


Figure 5-67: Sulfide sulfur vs total sulfur concentration values for Maryvale Field samples from the YCM

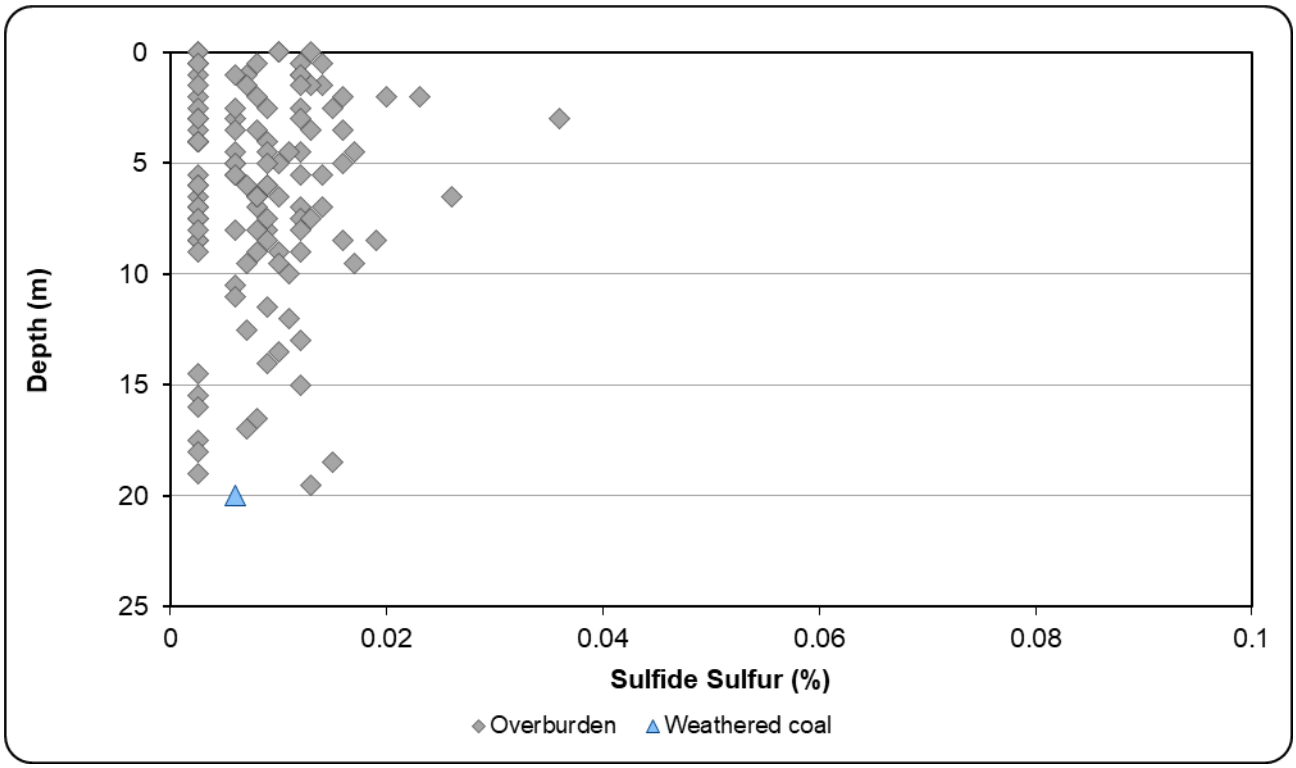


Figure 5-68: Sulfide sulfur concentration vs depth (m) values for Maryvale Field area samples from the YCM

ANC:MPA ratio

ANC values for Midfield samples (n = 70) range from below the limit of reporting (0.5 kg H_2SO_4/t) to 7.7 kg H_2SO_4/t, with a median value below the limit of reporting. MPA values for the samples (n = 170) range from 0.1 to 85.8 kg H_2SO_4/t, with a median 0.4 kg H_2SO_4/t.

Most samples have sulfide sulfur concentration values of less than 0.1% and 4 pit wall coal samples have elevated MPA values relative to their ANC values (**Figure 5-69**). These samples have an 'increased risk' of generating acid.

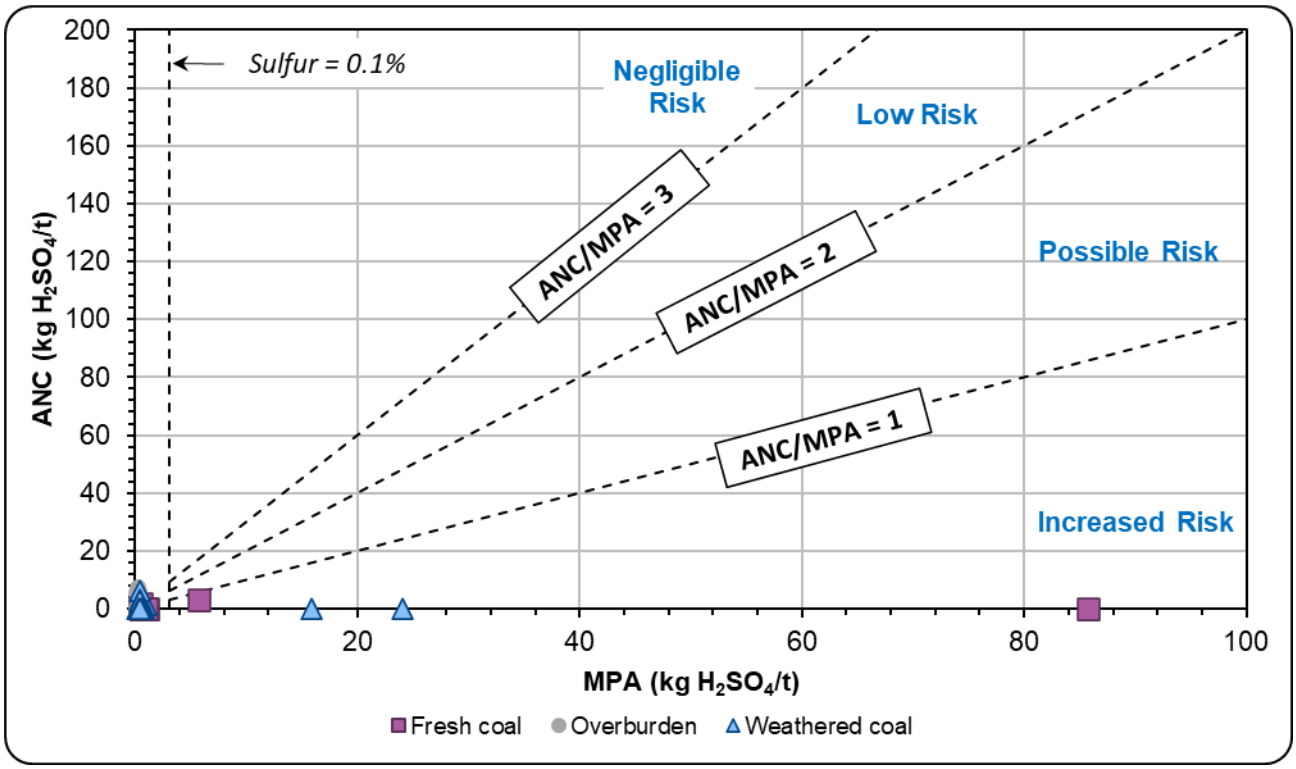


Figure 5-69: ANC vs MPA values for Maryvale Field samples from the YCM

Net Acid Production Potential

NAPP values for samples from the East Field range from -7.5 to 85.5 kg H_2SO_4/t, with a median of 0.2 kg H_2SO_4/t. With the exception of 3 pit wall coal samples, the NAPP values of the samples lie between -10 and 10 kg H_2SO_4/t (**Figure 5-70** and **Figure 5-71**).

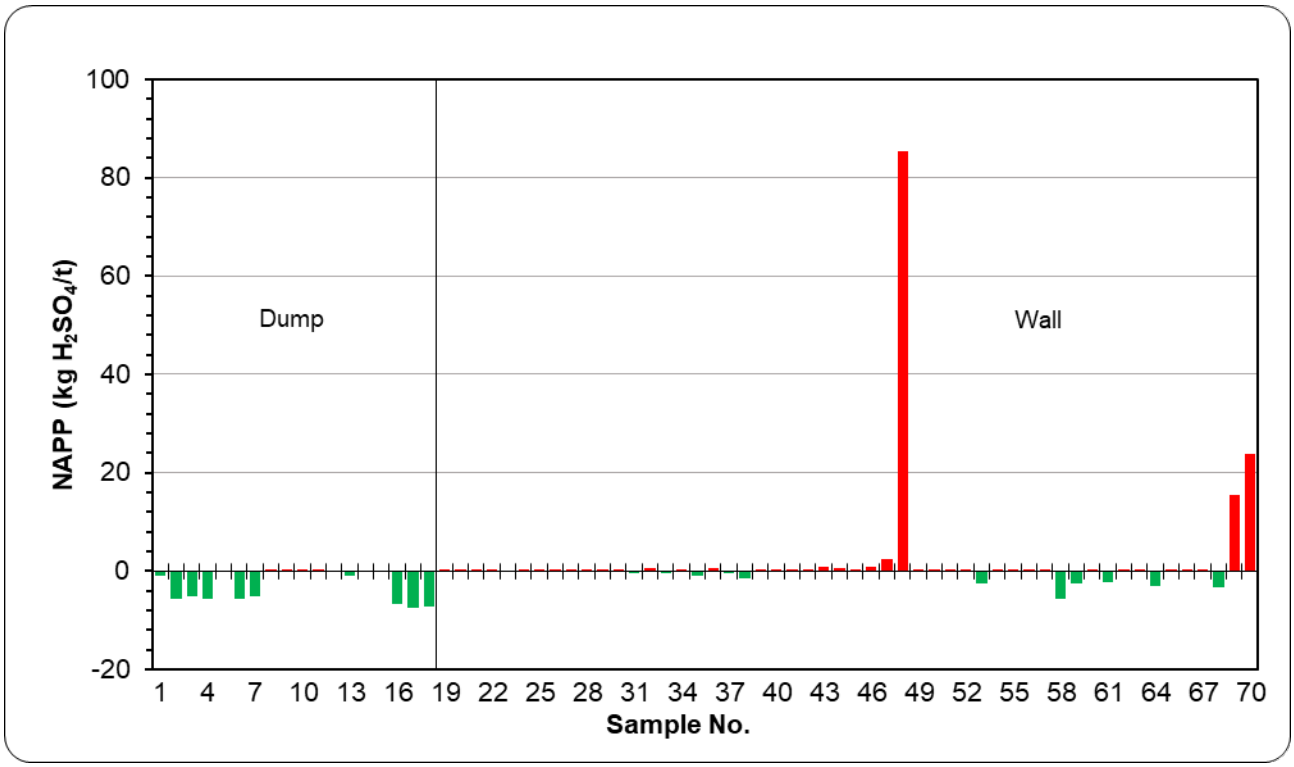


Figure 5-70: NAPP values for Maryvale Field samples from the YCM

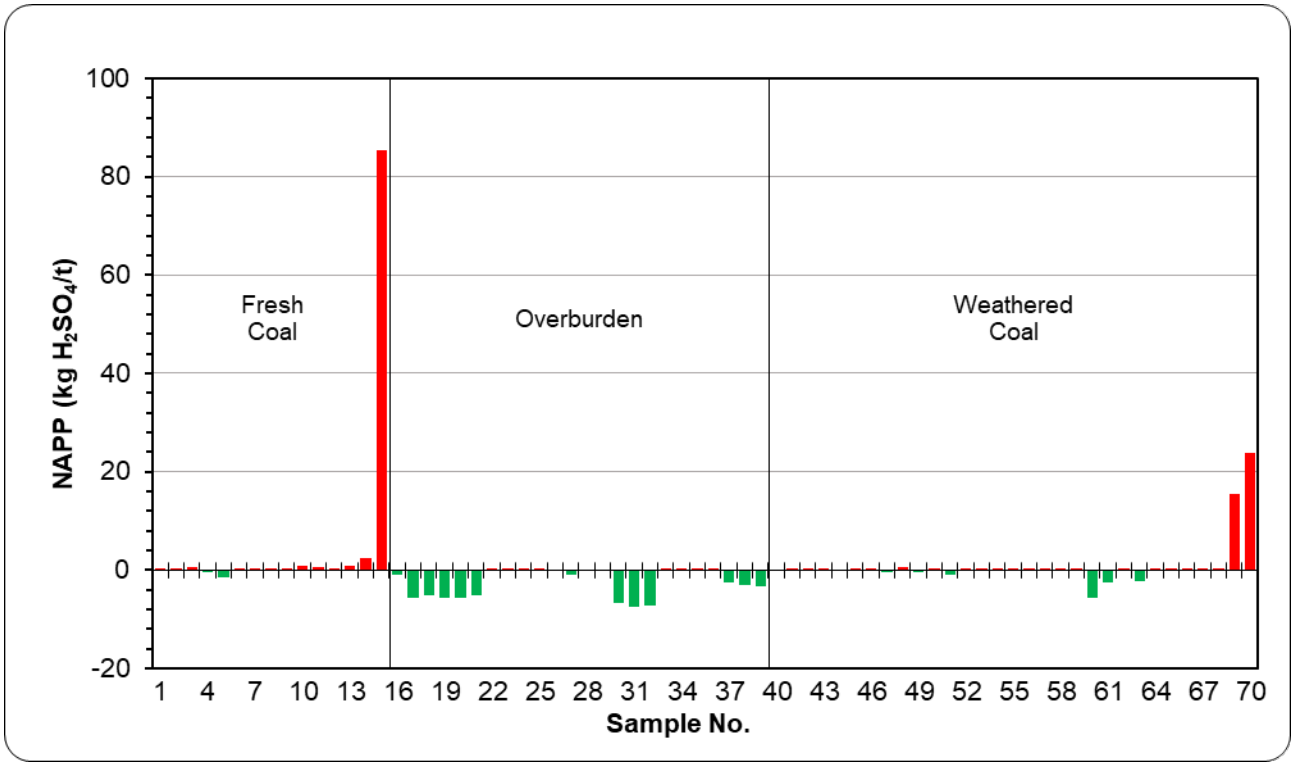


Figure 5-71: NAPP values for Maryvale Field samples according to material type from the YCM

Geochemical classification

The classifications of Maryvale Field Dump and pit wall samples from the Maryvale Field are shown in **Table 5-12**. 94% of the samples are classified as NAF, with 1 coal pit wall sample classified as uncertain and 3 coal pit wall samples classified as PAF (Figure 5-72 and **Figure 5-73**).

Table 5-12: Classification criteria and sample classifications for Maryvale Field ABA samples from the YCM

Classification	S_{CR} (%)	NAPP (kg H2SO4/t)	Number of Samples
Non-acid Forming (Barren)	< = 0.1	---	66
Non-acid Forming	> 0.1	< = -10	0
Uncertain	> 0.1	< = 5	1
Potentially Acid Forming (Low Capacity)	> 0.1	< = 10	0
Potentially Acid Forming	> 0.1	> 10	3
		Total	**70**

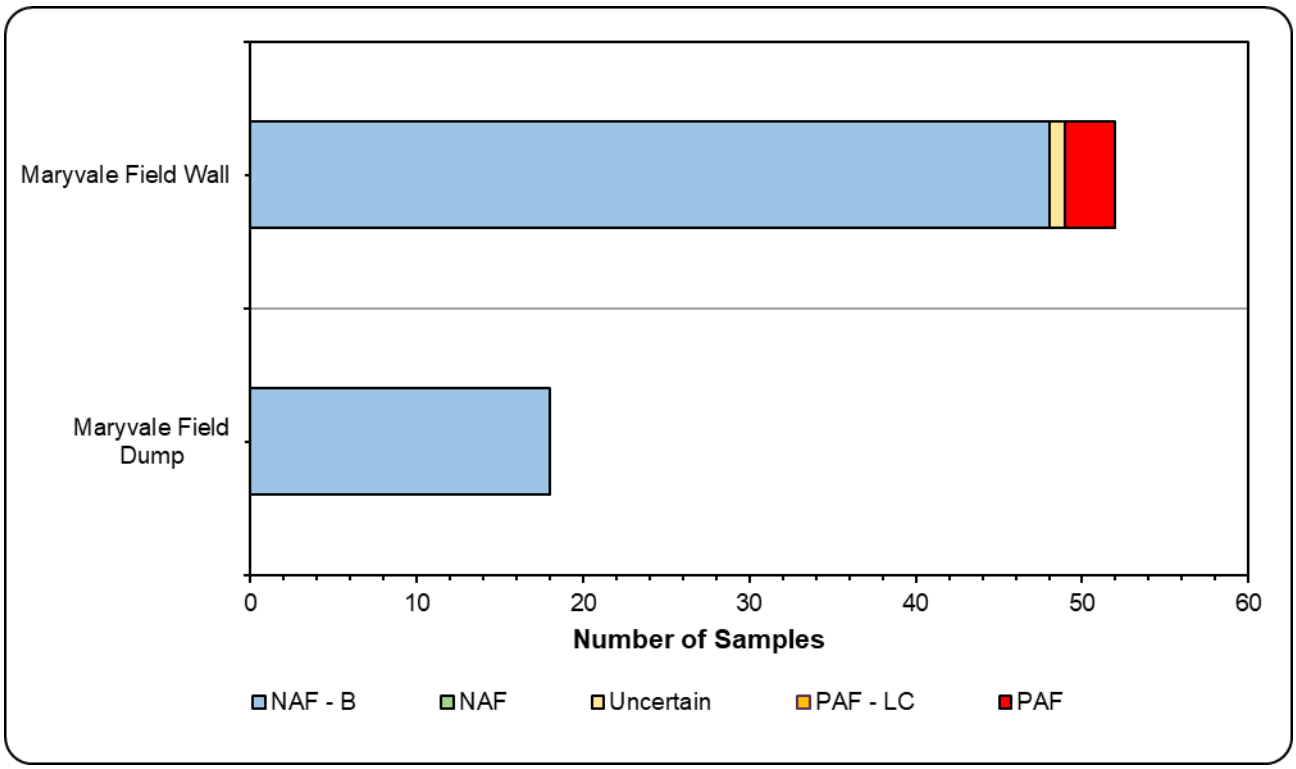


Figure 5-72: Sample type and classifications for Maryvale Field samples from the YCM

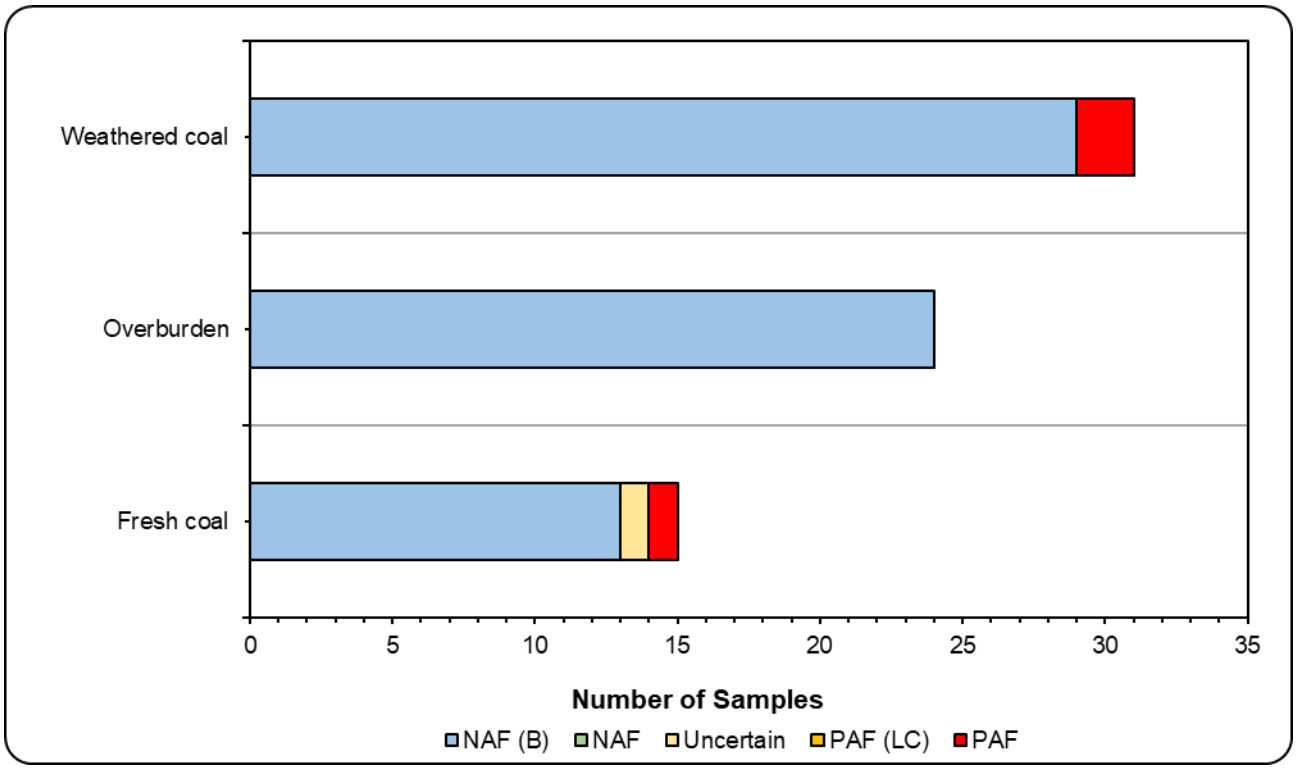


Figure 5-73: Sample type and classifications for Maryvale Field samples according to material type from the YCM

5.2 Multi-element concentration in solids

An aqua regia digestion method and analysis by ICP-MS and FIMS was used to quantify the mass of the major, minor, and trace elements in select samples (n=66). The results were compared to potentially relevant guideline criteria to determine any concerns related to mine operation and final rehabilitation. There are no specific guidelines and/or regulatory criteria in Victoria specifically related to total metal/metalloid concentrations in mine waste materials. In the absence of these and to provide relevant context, RGS has compared the total metal and metalloid concentration in samples (solids) to National Environmental Protection Council (NEPC) health-based investigation levels (HIL(C)) for open spaces (NEPC, 2013). The applicability of the NEPC guidelines for 'open spaces' results from the likely final land use of the mine following closure (e.g., ecological values associated with a pit lake). The total metal/metalloid concentration for individual elements in mine materials can be relevant for revegetation activities and/or where the potential exists for human contact (e.g., if the material was to be used off-site). The results of these analyses are tabulated in **Attachment B: Table B2** and summarised below.

5.2.1 Pit Wall Samples – Township Field

Thirteen (13) weathered coal and overburden pit wall samples were analysed for multi-element concentrations as part of field programs 2-3. All minor and trace elements in the 13 pit wall samples were below the applied NEPC (HIL(C)) guideline for soils.

5.2.2 Pit Wall and Floor Samples – East Field

Twenty-two (22) weathered coal, fresh coal and overburden pit wall and floor samples were analysed for multi-element concentrations as part of field programs 1-3. All minor and trace elements in the 22 pit wall samples were below the applied NEPC (HIL(C)) guideline for soils.

All fresh and weathered coal samples are dominated by varying quantities of iron (Fe), calcium (Ca), Magnesium (Mg), aluminium (Al), sodium (Na) and sulfur (S). Sulfur was highest in the four fresh coal samples at the Maryvale Field operating face, with concentrations ranging from 6,800-39,600 mg/kg.

Overburden was similarly dominated by the major cations with appreciable concentrations of Barium (Ba), manganese (Mn) and phosphorus (P) and sulfur (S).

5.2.3 Overburden Dumps

Thirty-one (31) overburden samples were analysed for multi-element concentrations as part of field program 4. Chromium was reported above NEPC (HIL(C)) values in 14 samples and cobalt in 1 sample (**Table 5-13**). All other minor and trace elements were reported below HIL C.

Table 5-13 Summary of elements above NEPC (HIL(C)) Guidelines

Location	Elements above NEPC (HIL(C)) Guidelines	
	Chromium	Cobalt
Number of Samples exceeding NEPC (HIL(C))	14	1
Former Ash Ponds	2	-
Township Field North	3	-
Township Field South	-	-
Midfield Dump	3	-
East Field	4	1
Maryvale Field	2	-

5.3 Geochemical Abundance Index

Total metal/metalloid concentrations in mine waste materials can be compared to median crustal abundance for unmineralised soils (Bowen, 1979, INAP, 2024)[2]. The extent of enrichment is reported as the Geochemical Abundance Index (GAI), which relates the actual concentration in a sample with the median (or average) crustal abundance on a $\log_{10}$ scale.

GAI is expressed in integer increments from 0 to 6, where a GAI value of 0 indicates that the element is present at a concentration less than, or similar to, the median crustal abundance; and a GAI value of 6 indicates approximately a 100-fold enrichment above median crustal abundance (**Table 5-14**). As a general rule, a GAI of 3 or greater signifies enrichment that may warrant further examination.

Table 5-14 Geochemical Abundance Index (GAI) values and enrichment factors

GAI	Enrichment factor	GAI	Enrichment factor
0	Less than 3-fold enrichment	4	24 – 48 fold enrichment
1	3 – 6 fold enrichment	5	48 – 96 fold enrichment
2	6 – 12 fold enrichment	6	Greater than 96 fold enrichment
3	12 – 24 fold enrichment		

Generally, a GAI value of greater than 3 signifies enrichment that may warrant further examination. This is particularly the case with some environmentally important 'trace' elements, such as arsenic, chromium, cadmium, copper, lead, selenium, and zinc rather than with major rock-forming elements, such as aluminium, calcium, iron, manganese, and sodium.

Elements identified as enriched may not necessarily be a concern for revegetation, drainage water quality or public health, but their significance should still be evaluated. While the GAI provides an indication of

[2] Average crustal abundance values were sourced from the "GARD Guide", Chapter 5 (INAP, 2024) and where values were not available, they were taken from Bowen (1979).

metals/metalloids that may be enriched relative to the global median crustal abundance in un-mineralised soils, the following points should also be considered:

- The median crustal abundance varies between different literature sources, thereby affecting the calculated GAI values.
- Samples that are enriched relative to the median crustal abundance, do not necessarily leach metals/metalloids at elevated concentrations. The mobility of metals/metalloids is dependent on mineralogy, adsorption/desorption, and the environment in which it occurs.

Similarly, because an element is not enriched does not mean it will never be a concern, as under some conditions (e.g., low pH) the solubility of common environmentally important elements such as aluminium, copper, cadmium, iron, and zinc increase significantly.

The GAI for the 66 select samples are presented in **Attachment B: Table B3.** Summaries of the GAI values according to sample material type and sample location are shown in **Table 5-15** and **Table 5-16**.

The GAI results suggest that of sulfur, chromium, cobalt, mercury, silver, tellurium, thallium, and tungsten are enriched compared to average crustal abundance in some overburden samples collected from overburden dumps and the Former Ash Ponds. Some fresh coal samples from the YMF operating face are enriched in sulfur and cobalt, and one soil/overburden sample collected from the YFT Western Batters is enriched in tellurium.

Static leach testing was used to assess the potential solubility of these, and other, metals/metalloids (refer to **Section 5.6**).

Table 5-15 GAI Values above Enrichment Factor of 3 by sample material type

Material	Sulfur (S)	Chromium (Cr)	Cobalt (Co)	Mercury (Hg)	Silver (Ag)	Tellurium (Te)	Thallium (Tl)	Tungsten (W)
Topsoil/overburden	-	-	-	-	-	1	-	-
Overburden	8	4	4	1	1	6	6	5
Weathered Coal	-	-	-	-	-	-	-	-
Fresh Coal	4	-	2	-	-	-	-	-
Total (GAI > 3)	**12**	**4**	**6**	**1**	**1**	**7**	**6**	**5**

Table 5-16: Count of GAI Values above Enrichment Factor of 3 by sample location

Location	Sulfur (S)	Chromium (Cr)	Cobalt (Co)	Mercury (Hg)	Silver (Ag)	Tellurium (Te)	Thallium (Tl)	Tungsten (W)
Former Ash Ponds	-	-	-	1	1	1	2	2
Midfield Dump	-	-	-	-	-	1	2	2
MRD	-	-	-	-	-	-	-	-
YEF Dump	5	2	1	-	-	1	-	-
YEF Northern Batters	-	-	-	-	-	-	-	-
YEF Pit Floor	-	-	-	-	-	-	-	-
YEFX Latrobe Road Batters	-	-	-	-	-	-	-	-
YMF East Dump	-	-	-	-	-	-	-	-
YMF Eastern Batters	-	-	-	-	-	-	-	-
YMF Operating Face	4	-	2	-	-	-	-	-
YMF Pit Floor	-	-	-	-	-	-	-	-
YMF Western Batters	-	-	-	-	-	-	-	-
YMF Western Truck Dump 4 North	-	-	-	-	-	-	-	-
YTF Fire Service Pond Batters	-	-	-	-	-	-	-	-
YTF Floc Pond Batters	-	-	-	-	-	-	-	-
YTF Hernes Oak Batters	-	-	-	-	-	-	-	-
YTF Northern Batters	-	-	-	-	-	-	-	-
YTF Northern Overburden Dump	3	2	3	-	-	3	2	1
YTF RCB Batters	-	-	-	-	-	-	-	-
YTF Southern Batters	-	-	-	-	-	-	-	-
YTF Southern Overburden Dump	-	-	-	-	-	-	-	-
YTF Western Batters	-	-	-	-	-	1	-	-
Total (GAI > 3)	**12**	**4**	**6**	**1**	**1**	**7**	**6**	**5**

5.4 Overburden PFAS Results

Forty-seven (47) drillhole samples were analysed for Per- and Poly-fluoroalkyl Substances (PFAS) (full suite – 28 analytes) (**Attachment B**). PFAS was below the laboratory limit of reporting in 44 out of the 47 samples analysed.

PFAS detections above the laboratory limits of reporting (LOR) were restricted to three samples in the central portion of the former ash ponds (N7449_2-3 m, N7453_1-2 m, and N7453_3-4 m). In these three samples, the sum of PFAS was highest at 1 to 2 m bgl (0.126 mg/kg) and gradually decreased with depth between 2 to 3 m bgl (0.0219 mg/kg) and 3-4 m bgl (0.0011 mg/kg). All concentrations were below the relevant ecological and human health guideline values for soil (NEMP, 2020). The presence of low-level PFAS is likely the result of ash slurry and water inputs that have been discharged to this area from the power station.

Six quality assurance and quality control samples (QAQC) were tested alongside the primary drillhole samples. Intra-laboratory duplicate samples were tested alongside the primary samples at ALS Melbourne, while the interlaboratory triplicate samples were analysed at ALS Sydney. All primary, duplicate, and triplicate samples reported PFAS below the laboratory LOR.

5.5 Wall Washing Results

5.5.1 Township Field

Wall washing was completed at 5 pit wall locations comprising weathered coal and 1 pit wall location comprising topsoil/overburden (rehabilitated batter).

The pH of the water used for wall washing was 6.30. The pH of the weathered coal runoff ranged from 3.57 to 5.73 with a median value of pH 4.06. The lowest pH values were predominantly recorded in the first flush samples, with a very slight increase in pH values with time (towards 30 minutes) (**Figure 5-74**). In contrast, the topsoil/overburden material sample was more alkaline than the weathered coal samples and remained stable at pH 6.31 at 0 and 30 minutes.

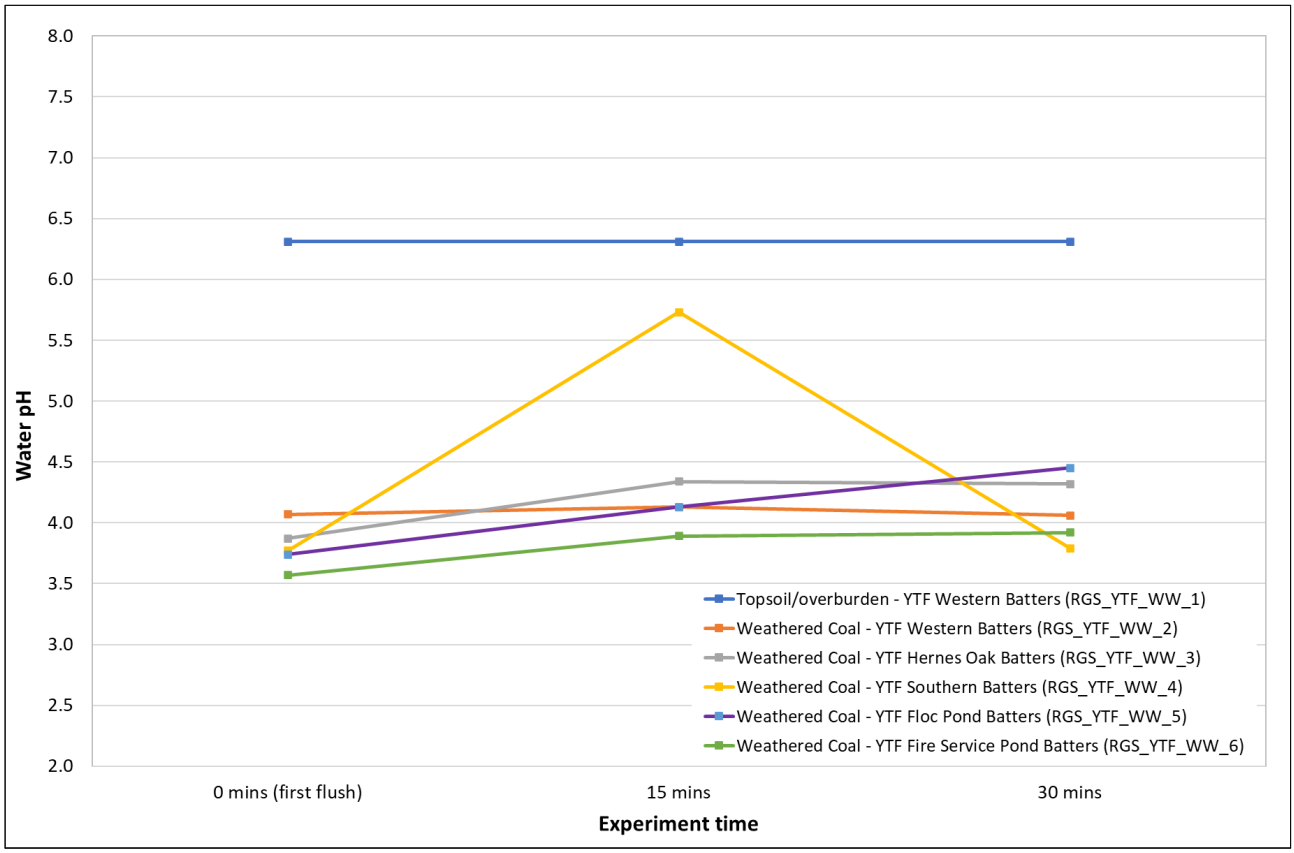


Figure 5-74: pH of pit wall wash water in Township Field (note: no water sample was collected at 15 mins for RGS_YTF_WW_1)

The EC of the weathered coal runoff ranged from 136 to 360 µS/cm with a median value of 187 µS/cm. EC values were highest in the first flush and gradually decreased towards 30 minutes (**Figure 5-75**). The topsoil/overburden material generated EC values of 145 µS/cm and 144 µS/cm at 0 mins and 30 mins, respectively.

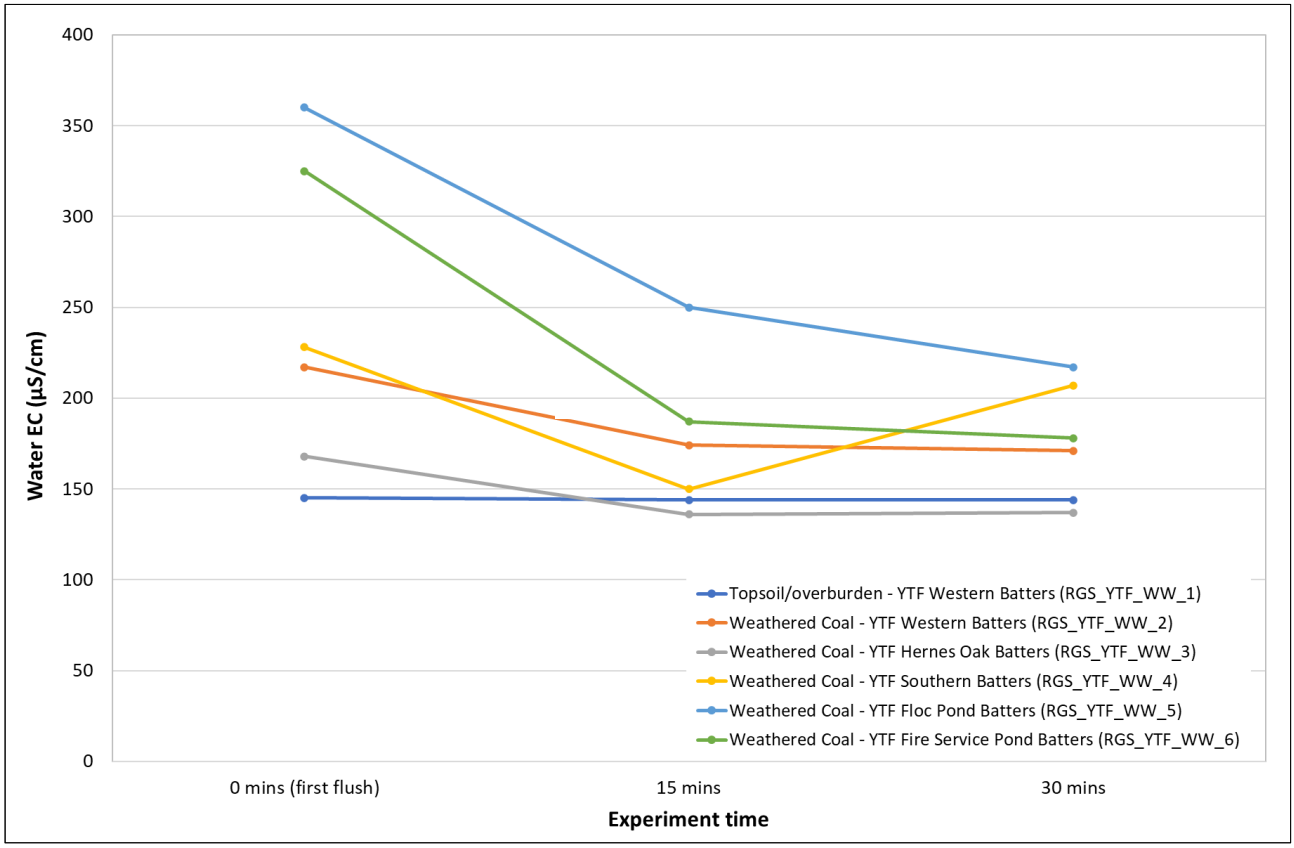


Figure 5-75: EC of pit wall wash water in Township Field

Acidity in the weathered coal runoff ranged from 8 to 24 mg $CaCO_3$/L with a median value of 16 mg $CaCO_3$/L. Comparatively, only the first flush sample from the topsoil/overburden reported any acidity (14 mg $CaCO_3$/L).

Total alkalinity (mg $CaCO_3$/L) was on or below the laboratory LOR in all runoff samples collected from the weathered coal pit walls. Total alkalinity reported in the topsoil/overburden runoff samples was solely in the form of bicarbonate alkalinity (14 to 15 mg $CaCO_3$/L).

Sulfate ranged from 12 to 62 mg/L with a median value of 19 mg/L. Sulfate was shown to stabilise between 15 to 30 minutes at three of the weathered coal wall locations (**Figure 5-76**).

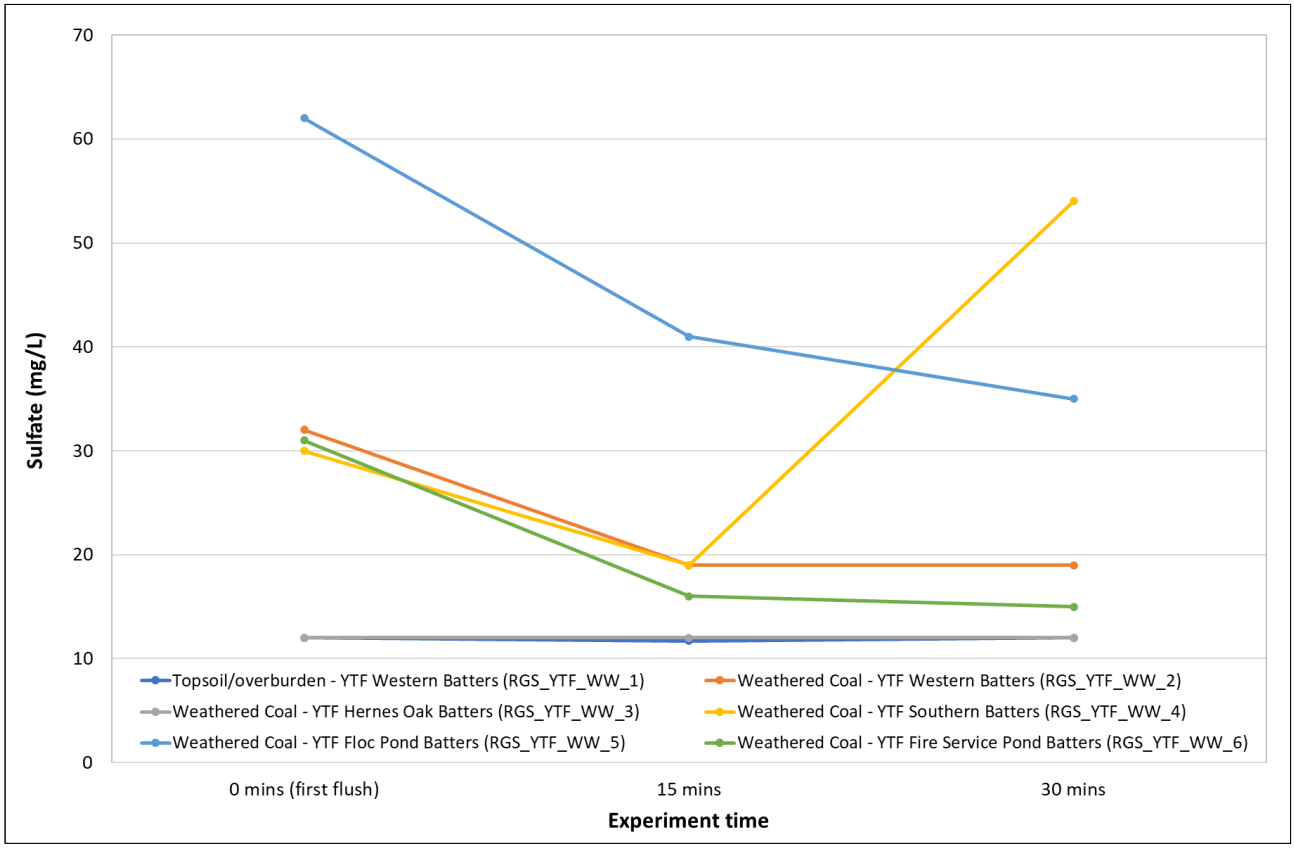


Figure 5-76: Sulfate in pit wall wash water in Township Field

First flush runoff (non-filtered fraction) in both the weathered coal and topsoil/overburden was dominated by aluminium, barium, iron and manganese with a broad range of other metals/metalloids also reported at trace levels. Dissolved metals/metalloids (filterable fraction) concentrations were generally low and varied between wall wash locations. The main dissolved trace level constituents included aluminium, barium, caesium (Cs), lanthanum (La), lutetium (Lu), lead (Pb), antimony (Sb) and yttrium (Y).

Averaged across the 15 water samples collected from the weathered coal, 85% of the total carbon measured was in the form of organic carbon. A greater proportion of inorganic carbon was present in the topsoil/overburden runoff samples.

At the conclusion of the wall washing coal was excavated from the washed face of the wall using the chisel end of a geological hammer and the depth of water penetration into the coal was measured. Measurements collected indicated that the wall wash water penetrated 0.01 to 0.02 m into the weathered coal.

5.5.2 East Field

Wall washing was completed at 4 pit wall locations comprising weathered coal and 1 pit wall location comprising topsoil/overburden (rehabilitated batter).

The pH of the weathered coal runoff ranged from 3.91 to 4.52 with a median value of 4.03. The pH of the topsoil/overburden ranged from 5.66 to 6.15 with a median value of 5.79. The pH values at RGS_YEF_WW_2-4 remained relatively stable across the 30-minute test period (**Figure 5-77**).

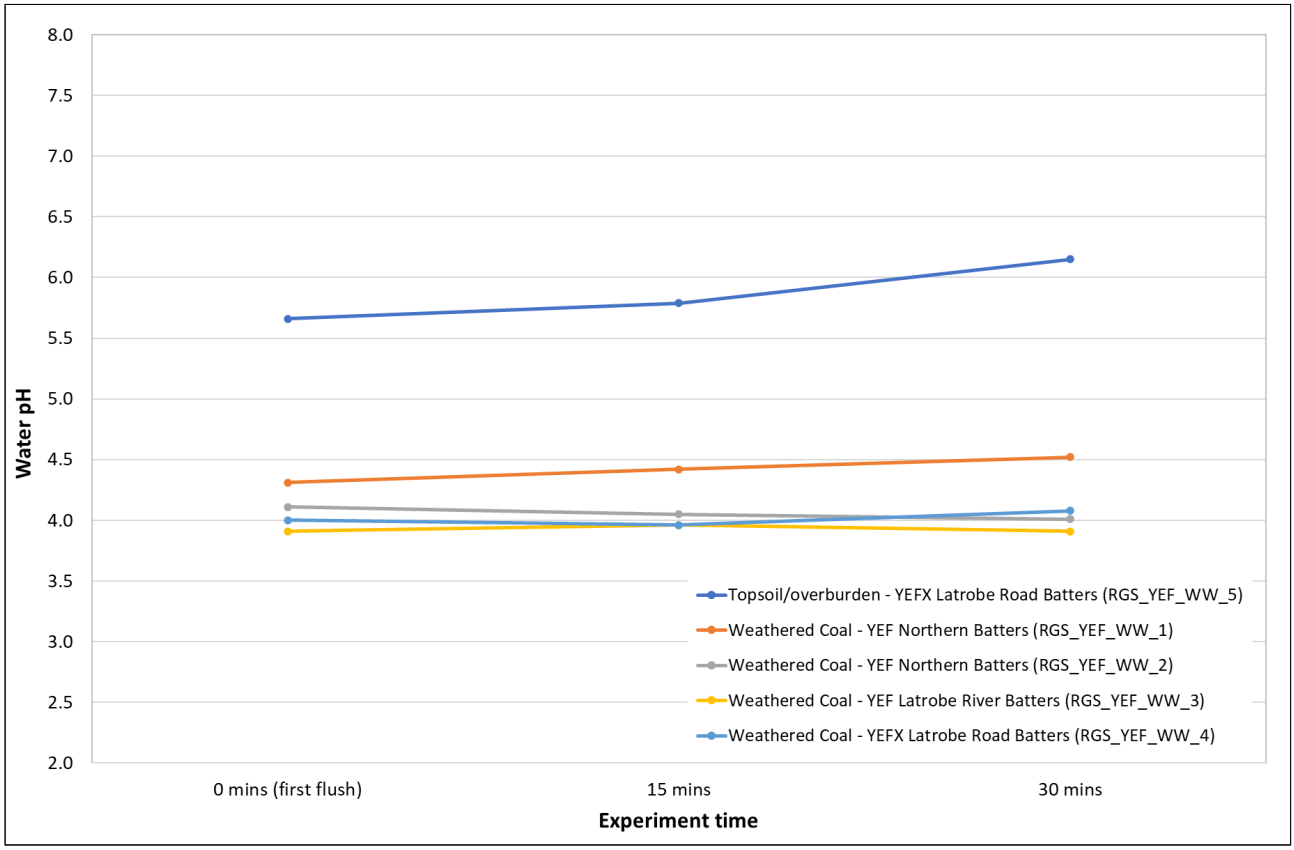


Figure 5-77: pH of pit wall wash water in East Field

The EC of the weathered coal runoff ranged from 146 to 247 µS/cm with a median value of 187 µS/cm. EC values were highest in the first flush and gradually decreased towards 30 minutes (**Figure 5-78**). The topsoil/overburden material generated EC values of 145 µS/cm and 144 µS/cm at 0 mins and 30 mins, respectively.

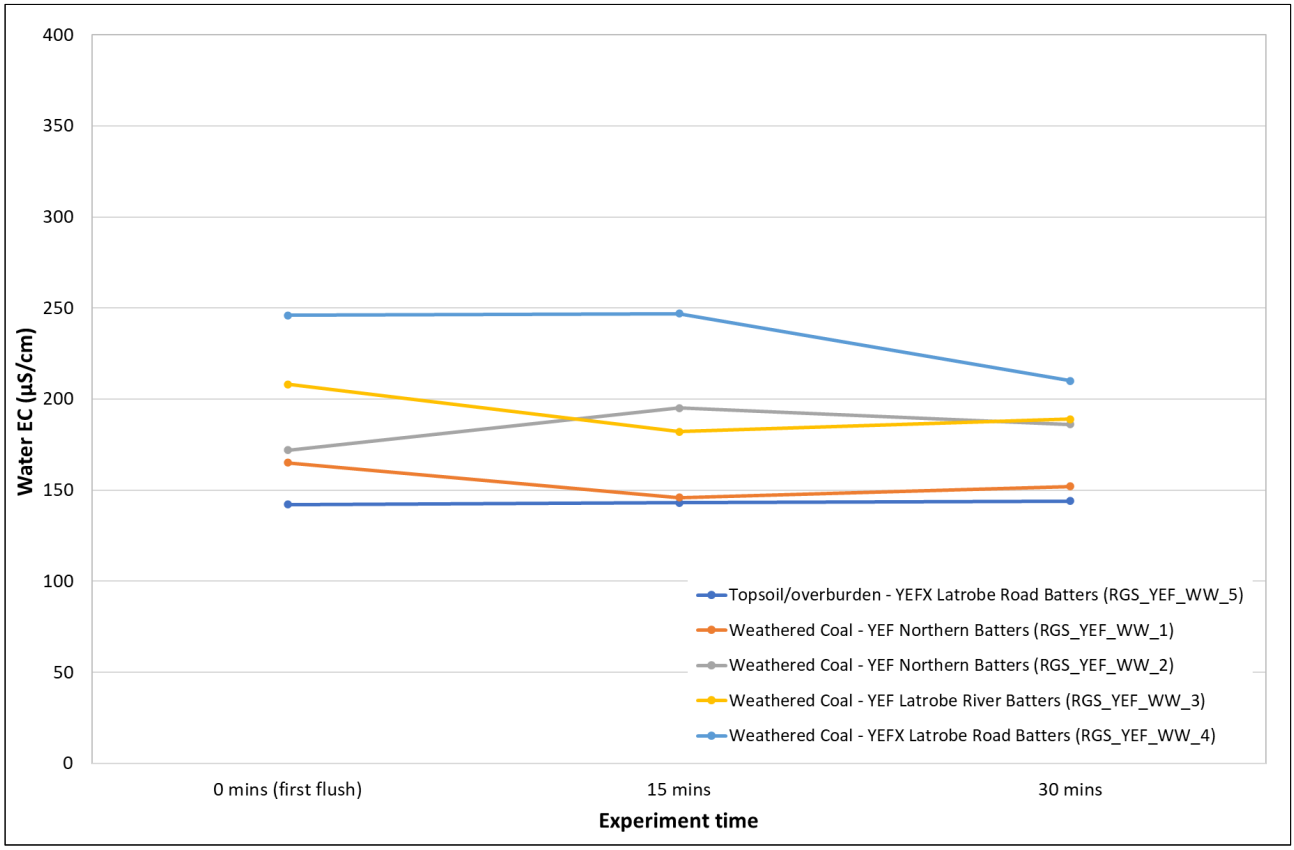


Figure 5-78: EC of pit wall wash water in East Field

Acidity in the weathered coal runoff ranged from 11 to 29 mg $CaCO_3$/L with a median value of 18.5 mg $CaCO_3$/L. Acidity in the topsoil/overburden was comparatively lower, ranging from 3 to 9 mg $CaCO_3$/L with a median value of 5 mg $CaCO_3$/L.

Total alkalinity (mg $CaCO_3$/L) was below the laboratory limit of reporting in all runoff samples collected from the weathered coal pit walls. Total alkalinity reported in the topsoil/overburden runoff samples was solely in the form of bicarbonate alkalinity (9 to 12 mg $CaCO_3$/L).

Major ions in the weathered coal were predominantly sodium, chloride, and sulfate. Sulfate ranged from 14 to 36 mg/L with a median value of 20 mg/L (**Figure 5-79**).

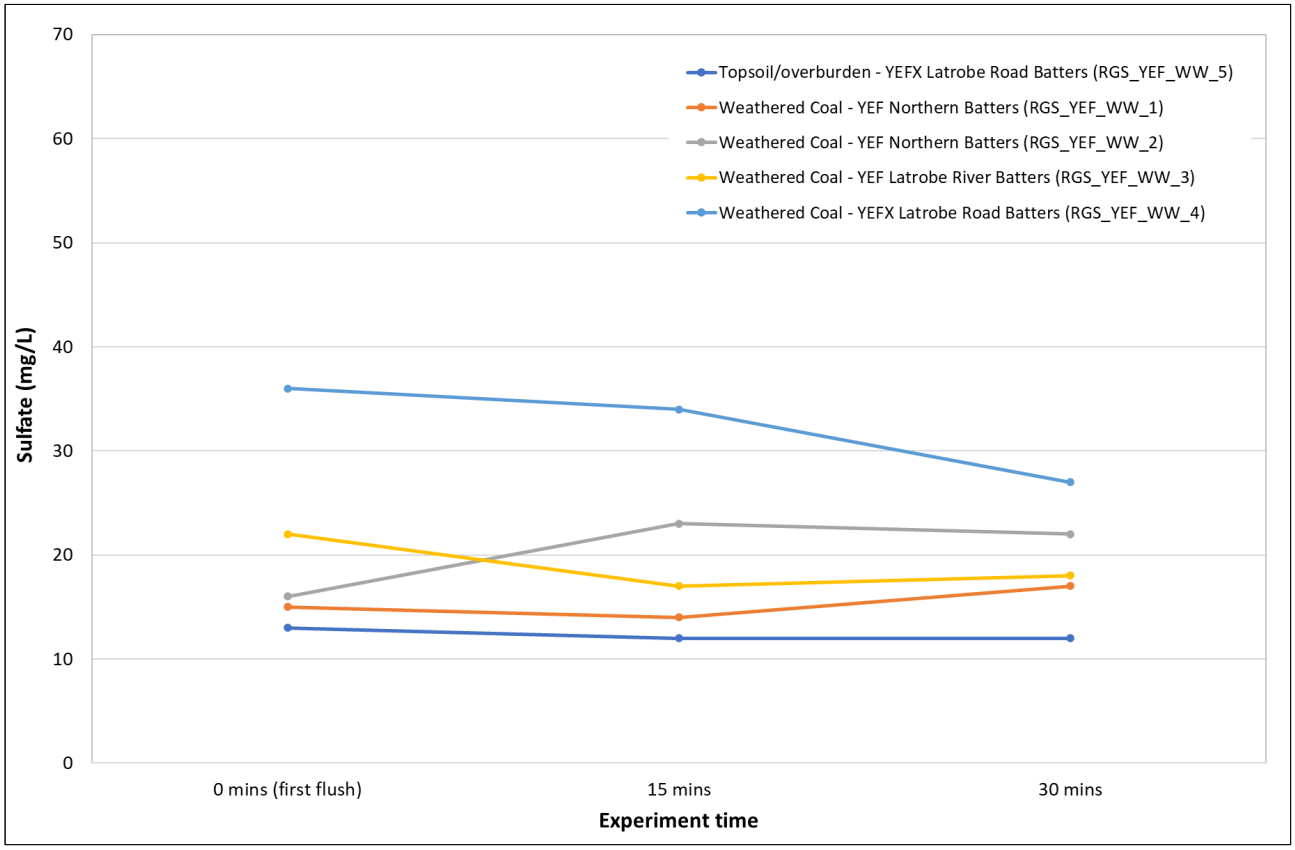


Figure 5-79: Sulfate in pit wall wash water in East Field

Consistent with Township Field, first flush runoff (non-filtered fraction) in both the weathered coal and topsoil/overburden was dominated by aluminium, barium, iron and manganese. A broad range of other trace metals/metalloids were also reported in the topsoil/overburden. Dissolved metals/metal(loid)s (filterable fraction) concentrations were low and varied between wall wash locations. The main dissolved trace level constituents included aluminium, barium, caesium, lanthanum, lutetium, lead, antimony and zirconium (Zr).

Averaged across the 12 water samples collected from the weathered coal, 81% of the total carbon measured was in the form of organic carbon. Total organic carbon ranged between 4 to 29 mg/L (median value of 9 mg/L). A greater proportion of inorganic carbon was present in the topsoil/overburden runoff samples.

5.5.3 Maryvale Field

Wall washing was completed at 3 pit wall locations comprising weathered coal, 2 locations comprising fresh coal, and 1 location comprising overburden (operating face).

The pH of the weathered coal runoff ranged from 3.24 to 5.73 with a median value of 4.57 (**Figure 5-80**). The pH of the fresh coal runoff was slightly higher ranging from 5.84 to 6.22 with a median value of 5.93. The pH of the overburden runoff at the operating face ranged from 4.18 to 4.95 with a median value of 4.59.

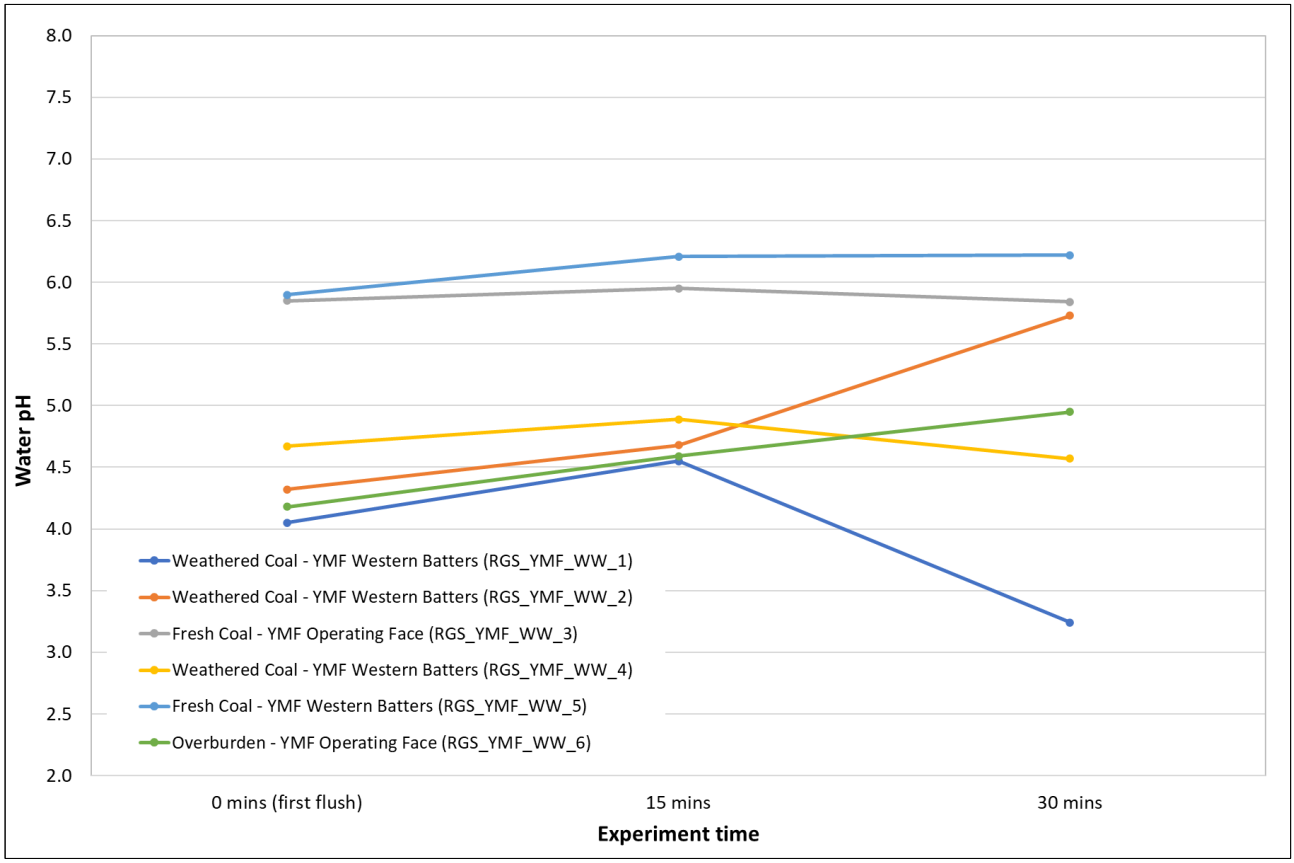


Figure 5-80: pH of pit wall wash water in Maryvale Field

The EC of the weathered coal runoff ranged from 140 to 404 µS/cm with a median value of 157 µS/cm (**Figure 5-81**). The EC of the fresh coal runoff ranged from 132 to 168 µS/cm with a median value of 142 µS/cm. The EC of the overburden runoff was more elevated than the coal, ranging from 232 to 639 µS/cm with a median value of 474 µS/cm. The overburden operating face comprises of loose sands, clays and gravels, and experienced rill erosion and collapse during the wall washing event.

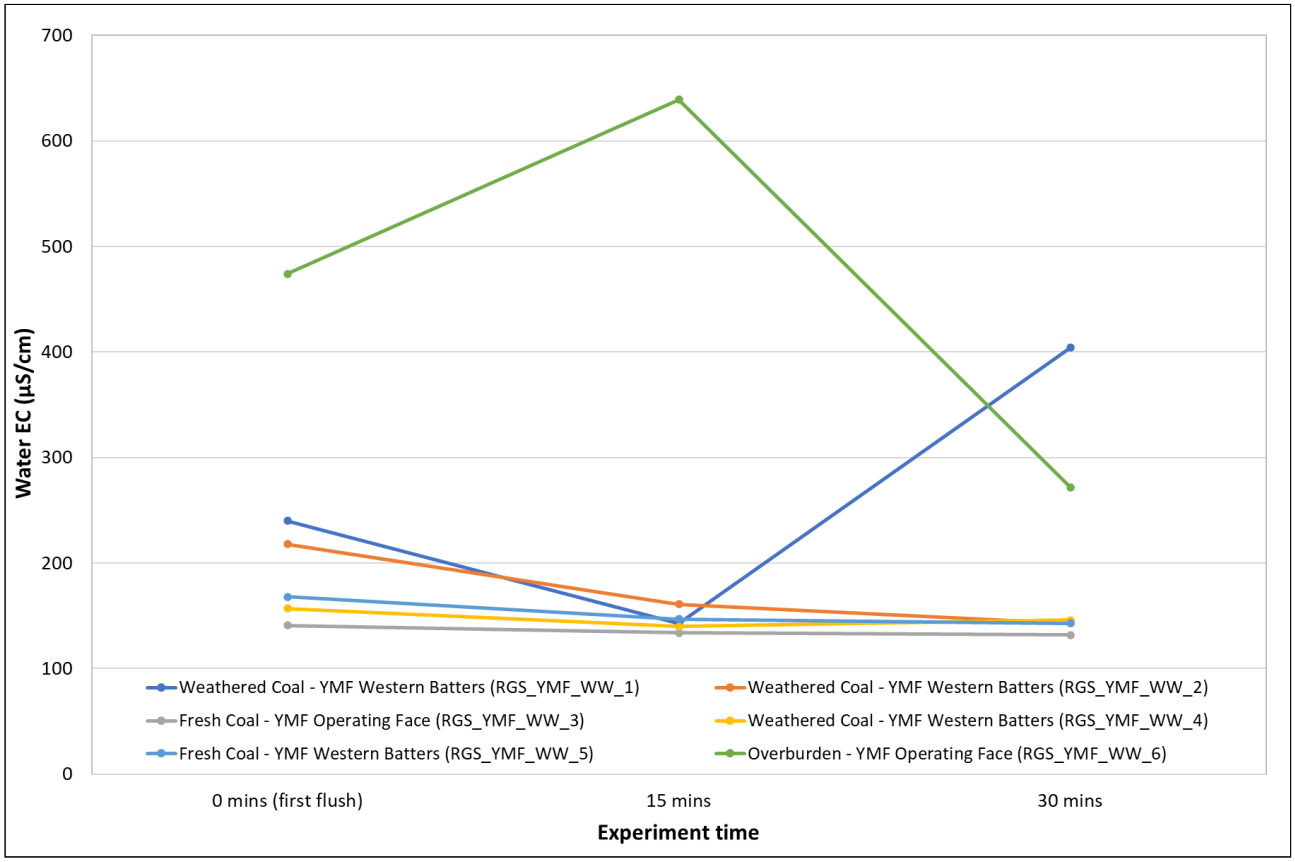


Figure 5-81: EC of pit wall wash water in Maryvale Field

Acidity in the weathered coal runoff ranged from 7-37 mg $CaCO_3$/L with a median value of 12 mg $CaCO_3$/L. Acidity in the fresh coal runoff was comparatively lower, ranging from < 1 to 6 mg $CaCO_3$/L with a median value of 4 mg $CaCO_3$/L. Acidity in the overburden runoff ranged from 10 to 15 mg $CaCO_3$/L with a median value of 13 mg $CaCO_3$/L.

Total alkalinity (mg $CaCO_3$/L) was on or below the laboratory limit of reporting in all runoff samples collected from the overburden and weathered coal pit walls. Total alkalinity reported in the fresh coal runoff samples was solely in the form of bicarbonate alkalinity (3 to 10 mg $CaCO_3$/L).

Major ions in the weathered coal, fresh coal and overburden were predominantly sodium, chloride, and sulfate. When compared with the first flush from weathered coal and fresh coal (< 30 mg/L), sulfate was significantly elevated in the overburden runoff, recording a first flush concentration of 288 mg/L (**Figure 5-82**). The first flush from the fresh coal and overburden at the operating face also had more elevated Ca and Mg when compared with the other wall wash locations in Maryvale Field.

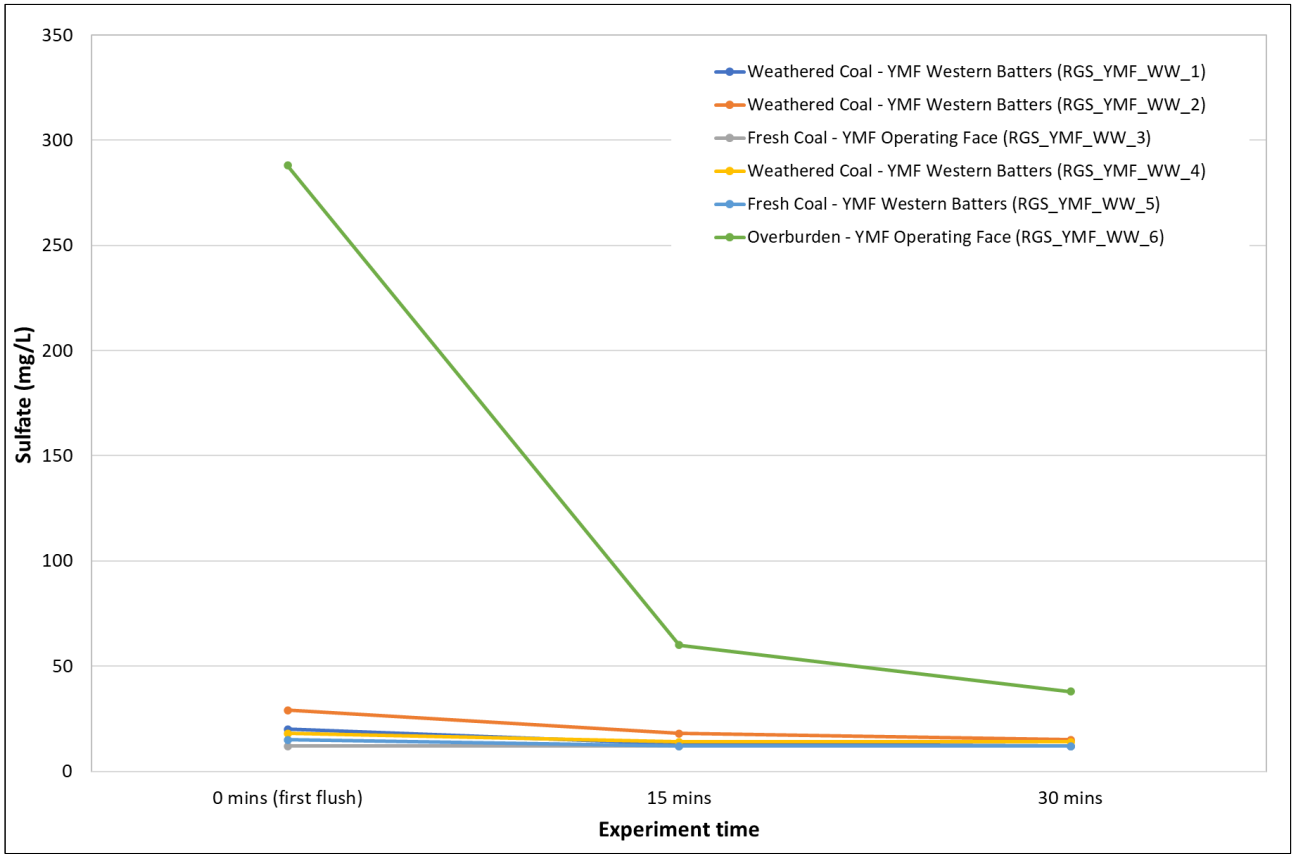


Figure 5-82: Sulfate in pit wall wash water in Maryvale Field

Fluoride was reported at less than 1 mg/L in all wall wash samples collected in Township Field, East Field and Maryvale Field.

First flush runoff (non-filtered fraction) in both the fresh and weathered coal was dominated by aluminium, barium, iron and manganese. The fresh coal sample collected from the YMF operating face was noticeably higher in barium, iron, manganese, nickel and strontium when compared with the other coal samples. First flush runoff from the overburden reported aluminium and iron at 453 mg/L and 73 mg/L, respectively, as well as appreciable concentrations of barium, caesium, chromium, rubidium (Rb) and vanadium (V) in the range of 0.5 to 2 mg/L.

Dissolved metals/metalloids (filterable fraction) concentrations were low and consistent with the findings in East Field and Township. The main dissolved trace level constituents included aluminium, barium, caesium, lanthanum, lutetium, lead, antimony and zirconium. Dissolved iron was reported below the laboratory LOR in all coal and overburden wall wash samples, indicating that the iron is bound to suspended solids.

Averaged across the 15 water samples collected from the weathered coal and fresh coal, 68% of the total carbon measured was in the form of organic carbon. Total organic carbon ranged between 2 to 7 mg/L (median value of 4 mg/L) with little difference between fresh and weathered coal and no discernible trend between 0 to 30 minutes.

Total organic carbon in the overburden ranged from 138 to 307 mg/L (median value of 182 mg/L), comprising more than 90% of the total carbon measured.

5.6 Surface Water/Seep Sampling Results

The seep/runoff samples collected in the East Field extension (03/03, SWA and SWB) and Maryvale Field (05/2) generated the lowest pH values, ranging between 3.31 to 4.77 (**Figure 5-83**). The EC in these four samples ranged between 767 to 1,790 µS/cm (median value of 1,450 µS/cm) and were higher than the EC values recorded during the wall washing.

Sample SWB was collected 20 m downgradient of wall wash location RGS_YEF_WW_4 to demonstrate the impact of coal contact time on pH. Sulfate was reported at 253 mg/L in sample SWB.

Consistent with the wall washing results, sodium and chloride were the major ions and aluminium, iron, barium and manganese the main metals/metalloids across all 7 surface water/seep samples.

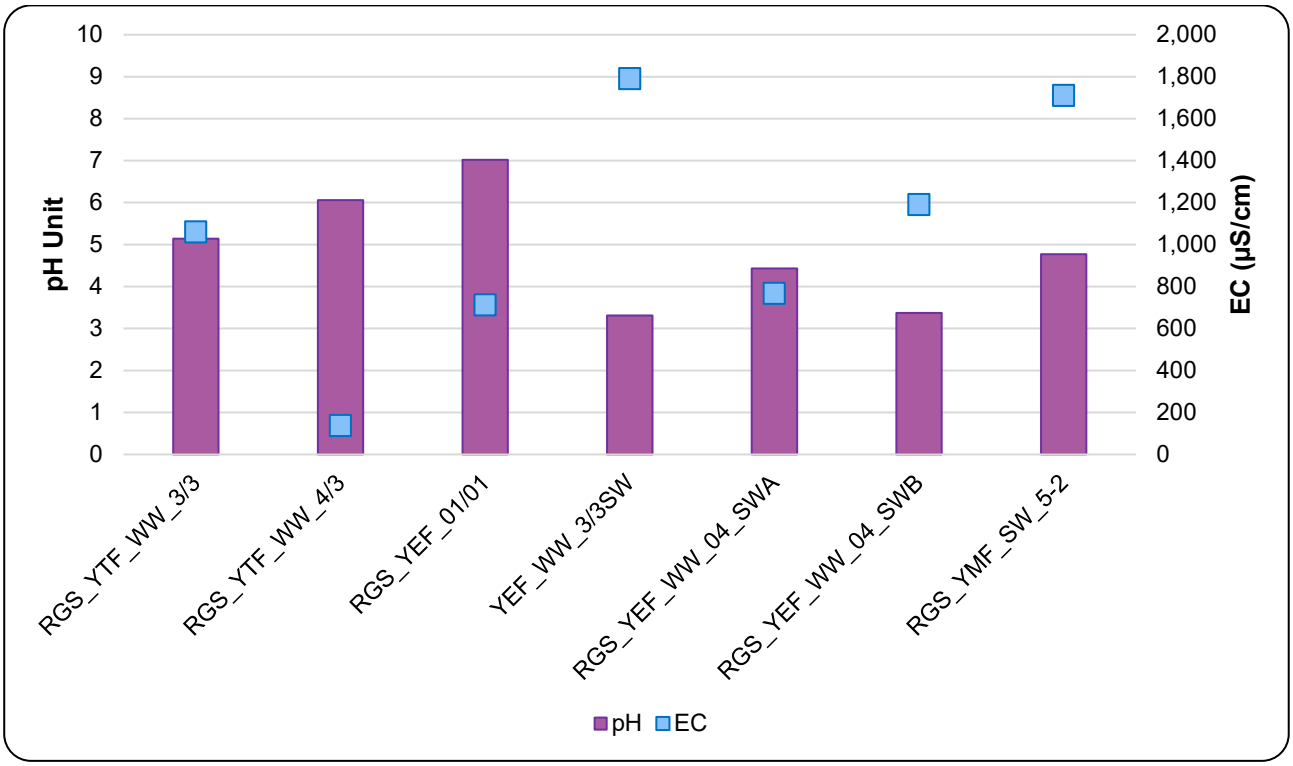


Figure 5-83: pH and EC values for surface water/seep samples

5.7 Water extract multi-element concentrations

To investigate to potential solubility of metals and metalloids from the pit walls, floors, and overburden dumps samples underwent a 16-hour, 1:5 solid:solute shake flask extraction with the water extracts being tested for the relevant analytes. The results of this testing are tabulated in **Attachment B** and summarised below.

To provide context, RGS has compared the multi-element results in water extracts from the 66 samples of mine materials with Australian guidelines for livestock drinking water and conservatively to aquatic freshwater ecosystems (95% species protection) (ANZECC & ARMCANZ, 2000; ANZG, 2018) guideline values. These guidelines are provided for context only and are not intended to be interpreted as “maximum permissible levels” for site water storage or discharge.

It should also be recognised that direct comparison of geochemical data with guideline values can be misleading. For this study, guideline values are only provided for broad context and should not be interpreted as arbitrary “maximum” values or “trigger” values. Using sample pulps (ground to passing 75 µm) provides a very high surface area to solution ratio, which encourages mineral reaction and dissolution of the solid phase. Therefore, the results of screening tests on water extract solutions are assumed to represent a ‘worst-case’ scenario for pore water and initial contact water for mine materials.

5.7.1 Pit wall samples – Township Field

Twelve (12) samples collected from the walls of the Township Field pit were tested for soluble multi-element concentration values. pH values for the samples range from 3.43 to 6.03, with a median of pH 3.95. The pH of deionised water used in the water extract tests is generally pH 5.5 to 6.5. The samples generally have low acidity and alkalinity values, although, 4 weathered coal samples have acidity values that range from the equivalents of 26 to 92 mg $CaCO_3$/L (median equivalent to 54 mg $CaCO_3$/L).

Major ion concentration values in sample water extracts are generally dominated by sodium and chloride, with lesser magnesium and sulfate concentration values. Generally, there is no strong association observed between pH and sulfate concentration values suggesting that in some samples organic acids may be contributing to the low pH values observed instead of, or in conjunction with, the oxidation of sulfides. Concentration values of metals and metalloids in the sample water extracts are generally low with 69% of the results below the laboratory limits of detection. **Table 5-17** summarises the number of samples of each material type and the number of samples of that material type that exceed selected water quality guideline values.

Table 5-17: Count of water quality guideline exceedances by material type for Township Field wall samples

Sample Material	Number of Samples	Analyte	Water Quality Guideline Exceedances	
			Aquatic Ecosystems (Freshwater) - 95% Species Protection	Livestock Drinking Water
Topsoil/Overburden	1	pH	1	0
		Aluminium	0	1
		Boron	1	0
		Chromium	1	0
		Copper	1	0
		Lead	1	0
		Zinc	1	0
Weathered Coal	9	pH	8	0
		Aluminium	8	0
		Arsenic	1	0
		Boron	6	0
		Chromium	4	0
		Copper	7	0
		Lead	1	3
		Zinc	8	0
Overburden	2	pH	2	0
		Aluminium	2	0
		Boron	2	0
		Cadmium	1	0
		Copper	1	0
		Lead	1	0
		Zinc	2	0

5.7.2 Pit wall and floor samples – East Field

Samples tested for various water extract multi-element concentrations from the East Field comprise 12 fresh coal samples, 5 overburden samples, 1 topsoil/overburden sample, and 9 weathered coal samples. 23 of the water extract samples were tested for pH, with values ranging from 3.02 to 6.15 and a median of pH 4.2. Alkalinity and acidity values are generally low in the sample water extracts. 22 extracts have alkalinity values below the limit of detection (equivalent to 1 mg $CaCO_3$/L) and 15 extracts have acidity values below the limit of detection (equivalent to 1 mg $CaCO_3$/L). Alkalinity values above the limit of detection are generally associated with water extracts from topsoil/overburden or overburden samples. Acidity values are generally associated with weathered and fresh coal sample water extracts.

Major ions in sample water extracts are predominately sodium, chloride, and sulfate, with lesser magnesium values. Metal and metalloid concentration values for sample water extracts are generally low, with 75% of results below the limits of reporting for the respective analytes. Exceedances of selected water quality guidelines are summarised in **Table 5-18**.

Table 5-18: Water quality guideline exceedances by material type for East Field wall and floor samples

Sample Material	Number of Samples	Analyte	Water Quality Guideline Exceedances	
			Aquatic Ecosystems (freshwater)	Livestock Drinking Water
Topsoil/Overburden	1	pH	1	0
		Aluminium	0	1
		Boron	1	0
		Chromium	1	0
		Copper	1	0
		Lead	1	0
		Zinc	1	0
Overburden	5	pH	3	0
		Aluminium	5	0
		Boron	1	0
		Cadmium	1	0
		Chromium	2	0
		Copper	3	0
		Nickel	1	0
		Lead	1	0
		Zinc	2	0
Weathered Coal	9	pH	8	0
		Aluminium	7	0
		Boron	4	0
		Cadmium	1	0
		Chromium	3	0
		Copper	3	0
		Lead	4	0
		Zinc	5	0
Fresh Coal	12	pH	9	0
		EC	3	0
		Sulfate	0	1
		Aluminium	6	3
		Boron	5	0
		Cobalt	0	2
		Copper	1	0
		Manganese	1	0
		Nickel	3	0
		Lead	5	0
		Zinc	9	0

5.7.3 Overburden/ ash dumps

Water extracts from 31 samples of overburden material collected from 7 dumps at the YCM (**Table 5-19**) were submitted for multi-element testing. Water extract sample pH values range from 2.88 to 8.15, with a median pH of 5.14. Sample water extracts generally have alkalinity values less than the equivalent of 10 mg $CaCO_3$/L, apart from a sample from 3.0 to 3.5 m bgl in the Former Ash Pond dump. Water extract acidity values are variable, ranging from the equivalents of 1 mg $CaCO_3$/L to 725 mg $CaCO_3$/L, with a median value equivalent to 8 mg $CaCO_3$/L. Water extracts from samples collected from the East Field dump and one sample collected from the Township Field NOB had elevated acidity values relative to other sample water extracts.

Table 5-19: Numbers of samples collected by dump

Location	Number of Samples
YTF Northern Overburden Dump	9
YTF Southern Overburden Dump	2
Midfield Dump	6
East Field	7
YMF Western Truck Dump 4 North	1
Maryvale Field East	2
Former Ash Ponds	4

Major ion concentration values in the sample water extracts are dominated the sodium and sulfate, with lesser concentrations of chloride and magnesium, and minor concentrations of other major ions. Trace metal and metalloid concentration values for sample water extracts are generally low, with 69% of results below the limits of reporting for the analytes tested. The number of samples collected from each dump area and the number of water extract samples with concentration values exceeding the selected water quality guidelines are shown in **Table 5-20**. Water extract sample element concentration values and relevant guideline values are shown in **Attachment B: Table B8**.

Table 5-20: Overburden dump sample water quality guideline exceedances by location

Sample Material	Number of Samples	Analyte	Water Quality Guideline Exceedances	
			Aquatic Ecosystems (freshwater)	Livestock Drinking Water
YTF Northern Overburden Dump	9	pH	8	0
		Aluminium	6	2
		Boron	2	0
		Cadmium	3	0
		Cobalt	0	1
		Chromium	5	0
		Copper	8	0
		Nickel	5	1
		Lead	1	0
		Zinc	9	0
YTF Southern Overburden Dump	2	pH	1	0
		Aluminium	1	0
		Boron	1	0
		Chromium	1	0
		Copper	1	0
		Zinc	1	0
Midfield Dump	6	pH	6	0
		Aluminium	2	1
		Boron	1	0
		Chromium	3	0
		Copper	2	0
		Nickel	2	0
		Lead	1	0
		Zinc	4	0
East Field	7	pH	6	0
		EC	2	0
		Sulfate	0	1
		Aluminium	1	5
		Cadmium	3	0
		Cobalt	0	3
		Chromium	5	0
		Copper	4	0
		Manganese	1	0
		Nickel	4	1
		Lead	1	0
		Zinc	5	0
YMF Western Truck Dump 4 North	1	pH	1	0
		Aluminium	1	0
Maryvale Field East	2	pH	1	0
		Zinc	1	0
Former Ash Ponds	4	pH	3	0
		EC	1	0
		Aluminium	3	0
		Boron	1	0
		Chromium	1	0
		Nickel	1	0
		Lead	1	0
		Selenium	0	1
		Zinc	2	0

5.8 Mineralogy by X-ray diffraction

Mineralogical compositions for the overburden, coal and ash samples are shown in **Table 5-21**, **Table 5-22**, and **Table 5-23**. Overburden samples are dominated by quartz, with variable proportions of clay minerals. Clay mineralogy in overburden samples mostly comprises kaolinite with smaller proportions of the swelling clay minerals montmorillonite and smectite. Coal sample mineralogy is primarily amorphous coal material with minor amounts of iron sulfides (pyrite and marcasite), quartz, cristobalite or opal, and montmorillonite. Ash sample mineralogy is dominated by amorphous material with minor quartz and kaolinite.

The primary acid forming mineral present in some samples is represented as pyrite and marcasite (up to 0.9 wt.%). The presence of pyrite generally corresponds with the samples with elevated sulfide sulfur. Gypsum, a secondary mineral precipitate formed due to the oxidation of sulfides (namely pyrite), is present in trace quantities in some ash samples.

Calcium and magnesium carbonates are commonly the most effective acid neutralising minerals (e.g. calcite and dolomite); calcite and dolomite were detected in all the overburden samples albeit in trace concentrations.

The XRD results also indicated the presence of trace concentrations of siderite in the overburden samples; siderite has limited or negligible capacity to neutralise acidity due to acid producing reactions resulting from the oxidation of Fe^{2+} to Fe^{3+} and subsequent hydrolysis.

The neutralisation potential of most silicate minerals is minimal (e.g. quartz, albite, microcline). In addition, it is generally recognised that the availability of ANC from silicates is limited due to their very slow reaction and dissolution rates. Similarly, ANC from silicate only becomes available after/if acidification has occurred (i.e. silicates are soluble under acidic conditions).

A considerable portion of the overburden and ash samples was composed of clays (montmorillonite and kaolinite). Clays have a high capacity for cation exchange, adsorption/desorption and/or structural incorporation (isomorphous substitution) of trace elements and may therefore affect leaching kinetics of the materials.

It should be noted that in samples primarily comprising amorphous materials qualitative results may have reduced accuracy. Quantitative XRD analysis is also subject to the following limitations:

- Where multiple minerals p exist in a sample, an overlap of diffracted reflections may increase the uncertainty in results.
- Some minerals cannot be unambiguously identified as they are present in minor or trace amounts (i.e. the detection limits are ~1% depending on mineral crystallinity).
- The method as described is standardless as it relies solely on the published crystallographic data available for each phase. Some crystallographic data may not exactly describe the mineral present.
- Effects of the varying crystallinity, mineral orientation in sample preparation, and the differing absorption of X-rays of samples may also introduce increased uncertainty in the results.

Table 5-21: Quantitative mineralogy for overburden dump material samples

Mineral	N7521_ 40.5-41	N7521_ 46-46.5	N7526_ 12-12.5	N7526_ 16-16.5	N7524_ 16-16.5	N7524_ 26.5-27
	Midfield Dump (clay, coal fragments)	Midfield Overburden (coal)	YTF SOB Dump (sandy clay)	YTF SOB Dump (sandy clay, coal fragments)	YTF NOB Dump (sandy clay)	YTF NOB Dump (sandy clay)
Quartz (wt %)	31.9	39.8	47.0	46.0	58.9	87.4
Kaolinite (wt %)	12.3	5.9	38.1	30.9	3.1	0.5
Montmorillonite (wt %)	5.5	5.4	0.6	1.0	<0.4	0.6
Albite (wt %)	12.8	13.8	1.0	0.6	1.2	5.3
Microcline (wt %)	1.6	3.9	1.5	1.8	1.9	3.0
Pyrite (wt %)	0.6	0.1	0.4	0.1	<0.4	0.2
Marcasite (wt %)	<0.4	<0.4	0.2	<0.4	1.1	0.1
Calcite-Mg (wt %)	0.1	0.3	0.2	0.1	0.0	0.3
Cristobalite/opal (wt %)	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Dolomite (wt %)	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Illite (wt %)	1.1	1.9	1.5	1.2	0.9	0.4
Siderite (wt %)	<0.4	<0.4	0.1	<0.4	<0.4	<0.4
Coal-amorphous (wt %)	34.1	28.9	9.4	18.3	32.9	2.2

Table 5-22: Quantitative mineralogy for overburden dump and pit wall coal material samples

Mineral	N7440_ 2.5-3	N7440_ 23.5-24	EAY_KLC_ C_32	EAY_KLC_ C_56	RGS_YMF_ C_20	RGS_YTF_ WW_6/2
	YEF Dump (sandy clay, coal fragments)	YEF Dump (sand)	Pit Wall Coal	Pit Wall Coal	Pit Wall Coal	Pit Wall Coal
Quartz (wt %)	84.1	86.8	1.4	0.6	<0.4	<0.4
Kaolinite (wt %)	7.3	3.1	<0.4	<0.4	<0.4	<0.4
Montmorillonite (wt %)	1.2	0.4	1.3	0.3	0.2	0.6
Albite (wt %)	1.5	1.3	0.3	<0.4	<0.4	<0.4
Microcline (wt %)	2.0	2.7	0.3	<0.4	<0.4	<0.4
Pyrite (wt %)	0.3	0.9	<0.4	0.6	0.2	<0.4
Marcasite (wt %)	0.3	2.8	<0.4	<0.4	6.6	0.2
Calcite-Mg (wt %)	0.3	0.2	<0.4	<0.4	<0.4	<0.4
Cristobalite/opal (wt %)	<0.4	<0.4	1.8	1.1	1.2	<0.4
Dolomite (wt %)	0.1	<0.4	<0.4	<0.4	<0.4	<0.4
Illite (wt %)	1.1	0.9	0.1	<0.4	<0.4	<0.4
Siderite (wt %)	0.2	0.1	<0.4	<0.4	<0.4	<0.4
Coal-amorphous (wt %)	1.6	0.8	94.8	97.4	91.8	99.2

Table 5-23: Quantitative mineralogy for Former Ash Pond ash material samples

Mineral	N7453-5-6m	N7453-Composite	N7453-27-28m
	Ash	Ash	Ash
Quartz (wt %)	8	20	18
Kaolinite (wt %)	1	3	7
Gypsum (wt %)	Poss. Trace	Trace	Poss. Trace
Plagioclase Feldspar (wt %)	Trace	1	4
Potassium Feldspar (wt %)	Poss. Trace	Trace	1
Muscovite (wt %)	Trace	2	1
Magnetite (wt %)	2	4	Trace
Amorphous Material (wt %)	89	70	69

6 Conclusions

RGS completed a geochemical characterisation program of 1,522 solid grab and drill core samples from YCM. The samples include pit wall material (comprising weathered and fresh coal, and overburden) and in-pit overburden and ash dump samples (comprising topsoil, overburden, weathered coal and ash) The key geochemical results are summarised below.

- Pit wall and overburden materials (i.e. pit wall and dump materials) generally have neutral to acidic pH levels. Coal samples often have lower pH values relative to overburden (topsoil and overburden in pit walls and dumps) and ash samples (**Figure 6-1**).
- Overburden and coal materials in the Former Ash Ponds, Midfield area, Township Field SOB, and Maryvale Field, and coal materials from the Township Field NOB and the East Field predominantly have sufficiently low sulfide sulfur **(Figure 6-2**) concentrations that the materials can be considered the have a negligible risk of generating additional acidity.
- While these materials have a negligible risk of generating additional acid over time, the $pH_{(1:5)}$ values suggest initial drainage may be acidic, potentially due to the previous weathering of sulfide materials (which have become depleted) or the presence of organic acids withing the materials.
- Overburden and weathered coal materials from the Township Field NOB and the East Field generally have excess potential to generate additional acidity relative to the neutralising capacities of these materials and so pose an increased risk of generating acidic drainage.
- Most materials are classified as NAF, although, some overburden and weathered coal materials within Township Field NOB and East Field are classified as PAF and some overburden and weathered coal materials within the Midfield are classified as Uncertain (**Figure 6-3**; **Table 6-1**). Again, noting that although the materials classified as NAF have limited capacity to generate additional acidity, they may initially leach acid due to the presence of acidic weathering products or organic acids.
- Total multi-element concentrations in overburden and coal materials are generally not strongly enriched relative to crustal abundances (**Table 6-2**).
- Major ion concentrations in initial contact water with overburden and coal materials are expected to be dominated by sodium, chloride, and sulfate, with generally low metal and metalloid concentrations.
- First flush salinity levels are generally expected to be low relative to the trigger values for freshwater aquatic ecosystems (95% species protection level) with an EC value of 1,000 µS/cm for both dump and pit wall materials, and with less variability in salinity values expected in wall materials.
- Some materials may produce initial drainage with elevated aluminium, arsenic, boron, cadmium, chromium, cobalt, copper, lead, manganese, nickel, selenium, sulfate, and zinc concentrations relative to selected conservative guideline values (**Table 6-3**).

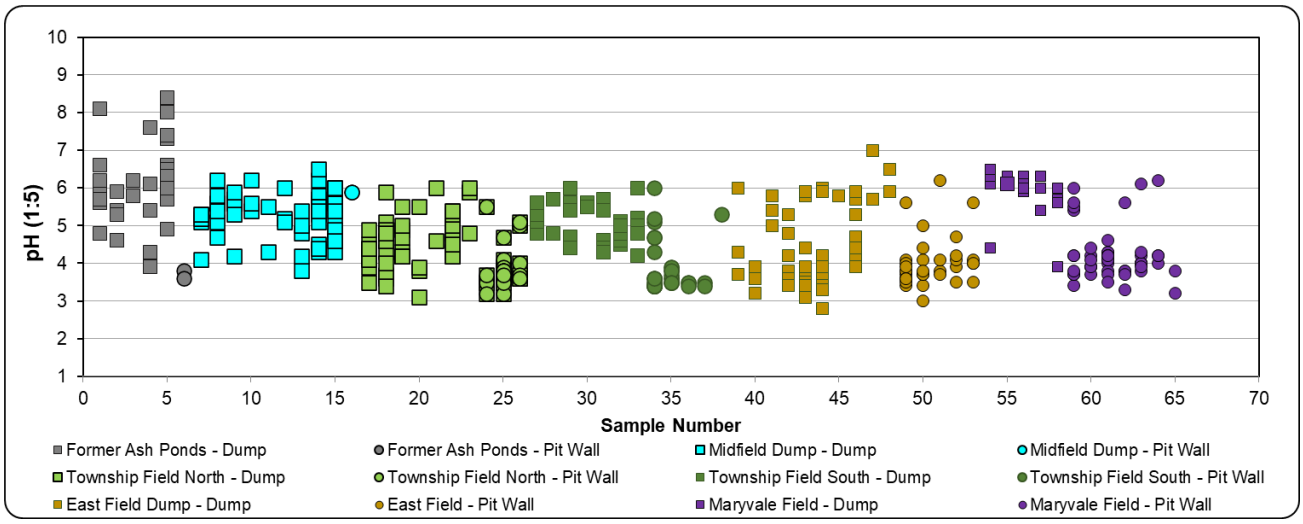


Figure 6-1: $pH_{(1:5)}$ values for each of the samples from different locations at YCM

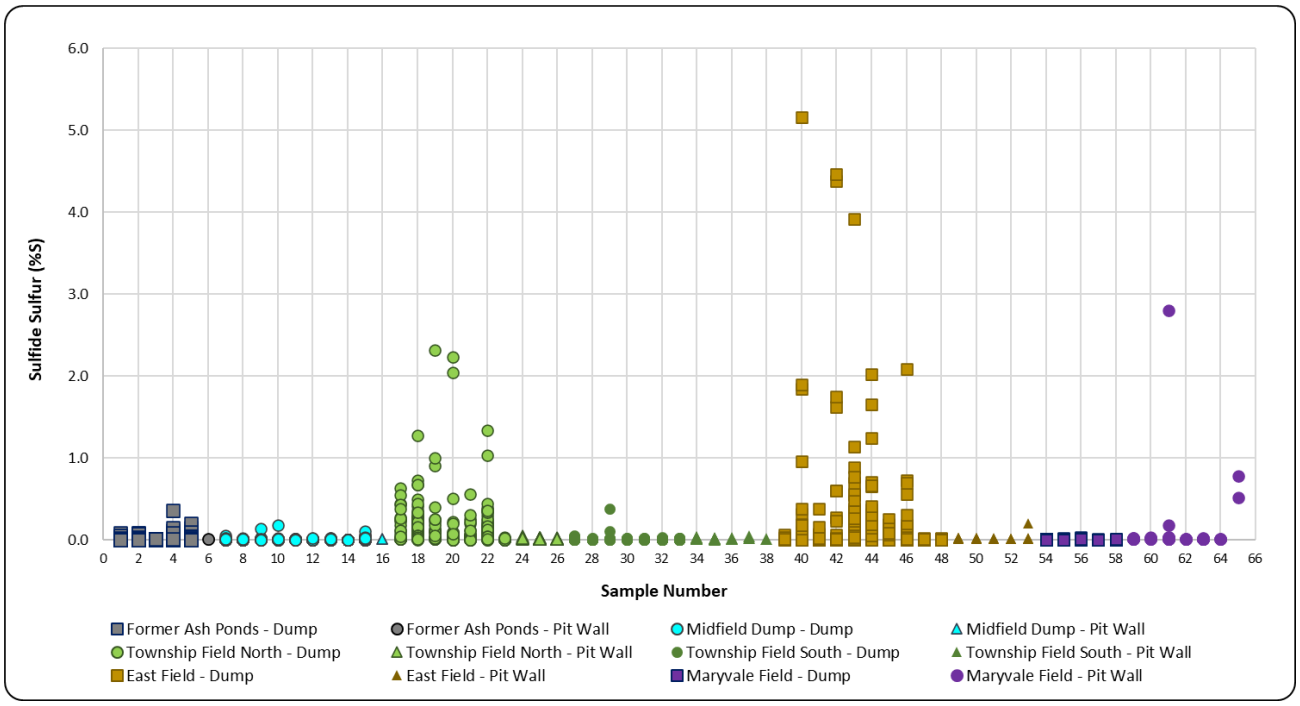


Figure 6-2: Sulfide sulfur (%) values for each of the samples from different locations at YCM

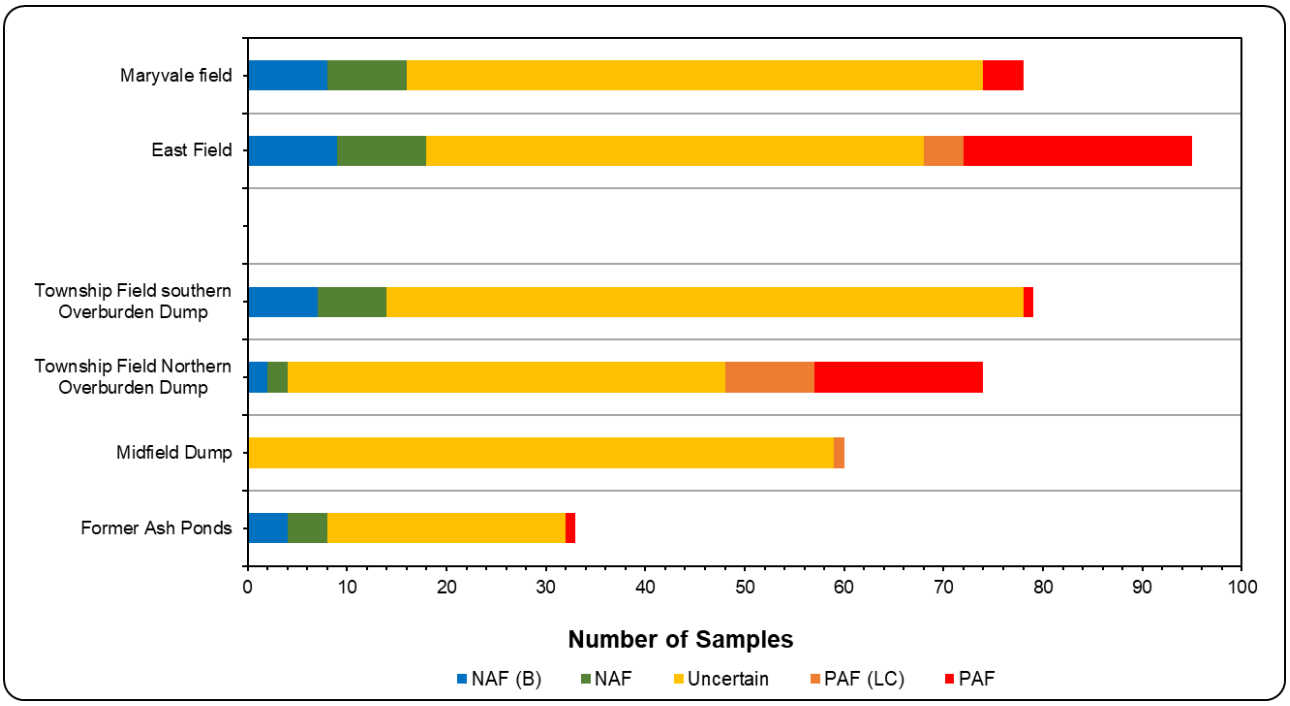


Figure 6-3: Acid drainage classification of the samples from different locations at YCM

Table 6-1: Summary of sample material classifications

Classification	Material Source	Number of Samples	Total
Non-acid Forming (Barren)	Dump	168	310
	Wall	142	
Non-acid Forming	Dump	5	5
	Wall	0	
Uncertain	Dump	22	23
	Wall	1	
Potentially Acid Forming	Dump	41	44
	Wall	3	
Potentially Acid Forming (Low Capacity)	Dump	14	15
	Wall	1	

Table 6-2: Summary of sample GAI greater than or equal to 3

Material	Sulfur (S)	Chromium (Cr)	Cobalt (Co)	Mercury (Hg)	Silver (Ag)	Tellurium (Te)	Thallium (Tl)	Tungsten (W)
Topsoil/overburden	-	-	-	-	-	1	-	-
Overburden	8	4	4	1	1	6	6	5
Weathered Coal	-	-	-	-	-	-	-	-
Fresh Coal	4	-	2	-	-	-	-	-
Total (GAI > 3)	**12**	**4**	**6**	**1**	**1**	**7**	**6**	**5**

Table 6-3: Summary of sample water extracts exceeding selected guideline values

Sample Material	Number of Samples	Analyte	Water Quality Guideline Exceedances	
			Aquatic Ecosystems (Freshwater) - 95% Species Protection	Livestock Drinking Water
Topsoil/Overburden	2	pH	2	0
		Aluminium	0	2
		Boron	2	0
		Chromium	2	0
		Copper	2	0
		Lead	2	0
		Zinc	2	0
		Arsenic	0	0
		Cadmium	0	0
		Nickel	0	0
		EC	0	0
		Sulfate	0	0
		Cobalt	0	0
		Manganese	0	0
		Selenium	0	0
Overburden	38	pH	31	0
		Aluminium	21	8
		Boron	8	0

Sample Material	Number of Samples	Analyte	Water Quality Guideline Exceedances	
			Aquatic Ecosystems (Freshwater) - 95% Species Protection	Livestock Drinking Water
		Chromium	17	0
		Copper	19	0
		Lead	6	0
		Zinc	26	0
		Arsenic	0	0
		Cadmium	8	0
		Nickel	13	2
		EC	3	0
		Sulfate	0	1
		Cobalt	0	4
		Manganese	1	0
		Selenium	0	1
Weathered Coal	18	pH	16	0
		Aluminium	15	0
		Boron	10	0
		Chromium	7	0
		Copper	10	0
		Lead	5	3
		Zinc	13	0
		Arsenic	1	0
		Cadmium	1	0
		Nickel	0	0
		EC	0	0
		Sulfate	0	0
		Cobalt	0	0
		Manganese	0	0
		Selenium	0	0
Fresh Coal	12	pH	9	0
		Aluminium	6	3
		Boron	5	0
		Chromium	0	0
		Copper	1	0
		Lead	5	0
		Zinc	9	0
		Arsenic	0	0
		Cadmium	0	0
		Nickel	3	0
		EC	3	0
		Sulfate	0	1
		Cobalt	0	2
		Manganese	1	0
		Selenium	0	0

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Attachment A: Geochemical assessment of mine materials

Acid generation and prediction

Acid generation is caused by the exposure of sulfide minerals, most commonly pyrite (FeS_2), to atmospheric oxygen and water. Sulfur assay results are used to calculate the maximum acid that could be generated by the sample by either directly determining the pyritic S content or assuming that all sulfur not present as sulfate occurs as pyrite. Pyrite reacts under oxidising conditions to generate acid according to the following overall reaction:

$$FeS_2 + 15/4\ O_2 + 7/2\ H_2O \text{ ---> } Fe(OH)_3 + 2\ H_2SO_4$$

According to this reaction, the maximum potential acidity (MPA) of a sample containing 1 %S as pyrite would be 30.6 kg H_2SO_4/t. The chemical components of the acid generation process consist of the above sulfide oxidation reaction and acid neutralization, which is mainly provided by inherent carbonates and to a lesser extent silicate materials. The amount and rate of acid generation is determined by the interaction and overall balance of the acid generation and neutralisation components.

Determination of pH and Electrical Conductivity

pH and Electrical Conductivity (EC) measured at a ratio of 1:5 sample weight:deionised water volume. This gives an indication of the inherent acidity and salinity of the mine material when initially exposed in an emplacement area.

Total Sulfur Content and Maximum Potential Acidity (MPA)

Total sulfur content is determined by the LECO high temperature combustion method. The total sulfur content is then used to calculate the MPA, which is based on the assumption that the entire sulfur content is present as reactive pyrite. Direct determination of the pyritic sulfur content can provide a more accurate estimate of the MPA.

Acid Neutralising Capacity (ANC)

By addition of acid to a known weight of sample, then titration with NaOH to determine the amount of residual acid. The ANC measures the capacity of a sample to react with and neutralise acid. The ANC can be further evaluated by slow acid titration to a set endpoint in the Acid Buffering Characteristic Curve (ABCC) test through calculation of the amount of acid consumed and evaluation of the resultant titration curve.

Acid Buffering Characteristic Curve (ABCC)

The ABCC (AMIRA, 2002) provides an evaluation of the available ANC in a sample by slow acid titration to a set endpoint, evaluation of the resultant titration curve, and calculation of the amount of acid consumed. Essentially the ABCC results provide an indication of the proportion of the measured ANC that is likely to be readily available to buffer any acid generated through sulfide oxidation.

Net Acid Producing Potential (NAPP)

The net acid producing potential (NAPP) is used as an indicator of materials that may be of concern with respect to acid generation. The NAPP calculation represents the balance between the maximum potential acidity (MPA) of a sample, which is derived from the total or sulfide sulfur content, and the acid neutralising capacity (ANC) of the material, which is determined experimentally. By convention, the NAPP result is expressed in units of kg H_2SO_4/t sample. If the capacity of the solids to neutralise acid (ANC) exceeds their capacity to generate acid (MPA), then the NAPP of the material is negative. Conversely, if the MPA exceeds the ANC, the NAPP of the material is positive.

Total Organic Carbon/Total Inorganic Carbon/Total Carbon

Total Organic Carbon (TOC), Total Inorganic Carbon (TIC) and Total Carbon (TC) are determined by LECO high temperature combustion method. TOC represents all carbon covalently bonded in organic molecules whereas TIC represents carbonate (CO_3^{2-}), bicarbonate (HCO_3^-) and dissolved carbon dioxide (CO_2) present in sample, with TC representing total carbon in both TOC and TIC forms present in samples.

Net Acid Generation (NAG)

The net acid generation (NAG) test involves the addition of hydrogen peroxide to a sample of mine rock or process residue to oxidise reactive sulfide, then measurement of pH and titration of any net acidity produced by the acid generation and neutralisation reactions occurring in the sample. A significant NAG result (i.e., final

NAG_{pH} < 4.5) indicates that the sample is potentially acid forming (PAF) and the test provides a direct measure of the net amount of acid remaining in the sample after all acid generating and acid neutralising reactions have taken place. A NAG_{pH} > 4.5 indicates that the sample is non-acid forming (NAF). The NAG test provides a direct assessment of the potential for a material to produce acid after a period of exposure and weathering and can be used to refine the results of the theoretical NAPP predictions, if required. The NAG test can sometimes be used as a stand-alone test at some hard rock mines, but is recommended that this only be considered after site specific calibration work is carried out. The standard NAG test is generally unsuitable for coal mine waste samples and can produce a false positive result.

Assessment of element enrichment and solubility

In mineralised areas it is common to find a suite of enriched elements that have resulted from natural geological processes. Multi-element scans are carried out to identify any elements that are present in a material (or readily leachable from a material) at concentrations that may be of environmental concern with respect to surface water quality, revegetation, and public health. The samples are generally analysed for the following elements:

Major elements: Al, Ca, Fe, K, Mg, Na, Ti, and S.

Minor elements: Ag, As, B, Ba, Be, Bi, Cd, Ce, Cl, Co, Cr, Cs, Cu, F, Ga, Ge, Hf, Hg, In, La, Li, Mn, Mo, N, Nb, Nd, Ni, P, Pb, Rb, Re, Sb, Sc, Se, Si, Sn, Sr, Ta, Te, Th, Tl, U, V, W, Y, Zn, Zr

The concentration of these elements in samples can be directly compared with relevant state or national environmental and health-based concentration guideline criteria to determine the level of significance. Water extracts are used to determine the immediate element solubilities under the existing sample pH conditions of the sample. The following tests are normally carried out:

Multi-Element Composition of Solids

Multi-element composition of solid samples determined using a combination of ICP-mass spectroscopy (ICP-MS), ICP-optical emission spectroscopy (OES), and atomic absorption spectrometry (AAS).

Multi-Element Composition of Water Extracts

Multi-element composition of water extracts from solid samples determined using a combination of ICP-mass spectroscopy (ICP-MS), ICP-optical emission spectroscopy (OES), and atomic absorption spectrometry (AAS).

Under some conditions (e.g., low pH) the solubility and mobility of common environmentally important elements can increase significantly. If element mobility under initial pH conditions is deemed likely and/or subsequent low pH conditions may occur, kinetic leach column test work may be completed on representative samples.

Attachment B: Static test results

Table B1: Acid-base Account Results for Samples from the Yallourn Project

Date	ALS Lab ID	Client Sample ID	Drill Hole ID	Location[1]	Sample Lithology	Description	Dump/Wall Sample	Easting	Northing	From	To	pH (1:5)	EC (1:5)	pH_F	pH_{FOX}	Total Sulfur	S_{CR}[2]	MPA[2]	ANC[2]	NAPP[2+]	ANC:MPA[2]	TOC[2]	Geochemical Classification[3]
								SECLV		(m)			(µS/cm)			(%)	(%)	(kg H_2SO_4/t)			Ratio	(% C)	
20/04/2023	EB2311867001	N7449 0 - 0.5	N7449	Former Ash Ponds	Soil	Topsoil	Dump	397,055	267,304	0.0	0.5	5.6	50			0.01	0.011	0.3	<0.5	0.1	0.7	0.22	Non-acid Forming (Barren)
20/04/2023	EB2311867007	N7449 3 - 3.5	N7449	Former Ash Ponds	Ash	Ash	Dump	397,055	267,304	3.0	3.5	8.1	1450			0.41	0.087	2.7	167.0	-164.3	62.7		Non-acid Forming (Barren)
20/04/2023	EB2311867008	N7449 4.5 - 5	N7449	Former Ash Ponds	Ash	Ash	Dump	397,055	267,304	4.5	5.0	5.9	414			0.24	0.031	0.9	9.3	-8.4	9.8	47.8	Non-acid Forming (Barren)
20/04/2023	EB2311867022	N7449 12.5 - 13	N7449	Former Ash Ponds	Ash	Ash	Dump	397,055	267,304	12.5	13.0	4.8	366			0.10	0.036	1.1	<0.5	0.9	0.2		Non-acid Forming (Barren)
20/04/2023	EB2311867026	N7449 15 - 15.5	N7449	Former Ash Ponds	Overburden	Clay	Dump	397,055	267,304	15.0	15.5	5.7	86			0.01	0.01	0.3	0.7	-0.4	2.3	0.66	Non-acid Forming (Barren)
20/04/2023	EB2311867035	N7449 20.5 - 21	N7449	Former Ash Ponds	Overburden	Clay	Dump	397,055	267,304	20.5	21.0	6.6	142			0.01	<0.005	0.1	1.9	-1.8	24.8		Uncertain
20/04/2023	EB2311867043	N7449 24.5 - 25	N7449	Former Ash Ponds	Overburden	Clay	Dump	397,055	267,304	24.5	25.0	6.2	176			<0.01	0.007	0.2	2.6	-2.4	12.1	0.26	Non-acid Forming (Barren)
20/04/2023	EB2311867052	N7450 0.5 - 1	N7450	Former Ash Ponds	Overburden	Clay	Dump	397,251	267,643	0.5	1.0	4.6	483			0.15	0.087	2.7	<0.5	2.4	0.1	7.37	Non-acid Forming (Barren)
20/04/2023	EB2311867054	N7450 1.5 - 2	N7450	Former Ash Ponds	Overburden	Clay	Dump	397,251	267,643	1.5	2.0	5.4	193			0.02	0.006	0.2	0.7	-0.5	3.8		Non-acid Forming (Barren)
20/04/2023	EB2311867064	N7450 14.5 - 15	N7450	Former Ash Ponds	Overburden	Clay	Dump	397,251	267,643	14.5	15.0	5.3	222			0.06	0.026	0.8	1.5	-0.7	1.9		Non-acid Forming (Barren)
20/04/2023	EB2311867068	N7450 20.5 - 21	N7450	Former Ash Ponds	Overburden	Clay	Dump	397,251	267,643	20.5	21.0	5.9	148			0.01	0.007	0.2	0.9	-0.7	4.2	0.23	Non-acid Forming (Barren)
20/04/2023	EB2311867075	N7450 36 - 36.5	N7450	Former Ash Ponds	Weathered coal	Coal	Dump	397,251	267,643	36.0	36.5	4.6	270			0.12	0.006	0.2	<0.5	-0.1	1.4		Non-acid Forming (Barren)
23/03/2023	EB2308909052	N7451_2.5 - 3	N7451	Former Ash Ponds	Overburden	Clay	Dump	397,016	267,047	2.5	3.0	6.2	136			0.03	0.006	0.2	8.6	-8.4	46.8	2.48	Non-acid Forming (Barren)
23/03/2023	EB2308909059	N7451_10 - 10.5	N7451	Former Ash Ponds	Overburden	Clay	Dump	397,016	267,047	10.0	10.5	5.8	115			0.03	0.007	0.2	4.5	-4.3	21.0	1.13	Non-acid Forming (Barren)
20/04/2023	EB2311867081	N7452 2.5 - 3	N7452	Former Ash Ponds	Overburden	Clay	Dump	397,094	267,008	2.5	3.0	4.2	358			0.13	0.058	1.8	<0.5	1.5	0.1		Non-acid Forming (Barren)
20/04/2023	EB2311867082	N7452 3 - 3.5	N7452	Former Ash Ponds	Overburden	Clay	Dump	397,094	267,008	3.0	3.5	4.3	274			0.18	0.124	3.8	<0.5	3.5	0.1		Uncertain
20/04/2023	EB2311867083	N7452 3.5 - 4	N7452	Former Ash Ponds	Overburden	Clay	Dump	397,094	267,008	3.5	4.0	3.9	465			0.42	0.366	11.2	<0.5	11.0	0.0	14.1	Potentially Acid Forming
20/04/2023	EB2311867088	N7452 6.5 - 7	N7452	Former Ash Ponds	Overburden	Clay	Dump	397,094	267,008	6.5	7.0	5.4	722			0.39	0.146	4.5	5.2	-0.7	1.2		Uncertain
20/04/2023	EB2311867094	N7452 11 - 11.5	N7452	Former Ash Ponds	Overburden	Sand	Dump	397,094	267,008	11.0	11.5	6.1	39			<0.01	<0.005	0.1	0.9	-0.8	11.8		Uncertain
20/04/2023	EB2311867100	N7452 21.5 - 22	N7452	Former Ash Ponds	Overburden	Clay	Dump	397,094	267,008	21.5	22.0	7.6	234			0.01	<0.005	0.1	2.1	-2.0	27.4		Uncertain
24/07/2023	EB2322621001	N7453_0.0_0.5	N7453	Former Ash Ponds	Overburden	Sand	Dump	397,098	267,337	0.0	0.5	6.6	131			0.02	0.012	0.4	1.4	-1.0	3.8		Non-acid Forming (Barren)
24/07/2023	EB2322621005	N7453 2.0_2.5	N7453	Former Ash Ponds	Ash	Ash	Dump	397,098	267,337	2.0	2.5	8.3	663			0.25	0.105	3.2	83.9	-80.7	26.1		Non-acid Forming
24/07/2023	EB2322621006	N7453 2.5_3.0	N7453	Former Ash Ponds	Ash	Ash	Dump	397,098	267,337	2.5	3.0	8.4	752			0.38	0.156	4.8	125.0	-120.2	26.2	27.8	Non-acid Forming
24/07/2023	EB2322621007	N7453 3.0_3.5	N7453	Former Ash Ponds	Ash	Ash	Dump	397,098	267,337	3.0	3.5	8.0	752			0.40	0.199	6.1	51.2	-45.1	8.4	39.6	Non-acid Forming
24/07/2023	EB2322621008	N7453 3.5_4.0	N7453	Former Ash Ponds	Ash	Ash	Dump	397,098	267,337	3.5	4.0	7.3	358			0.28	0.094	2.9	38.5	-35.6	13.4	46.4	Non-acid Forming (Barren)
24/07/2023	EB2322621015	N7453 7.0_7.5	N7453	Former Ash Ponds	Overburden	Sand	Dump	397,098	267,337	7.0	7.5	6.5	145			0.01	0.016	0.5	1.0	-0.5	2.0		Non-acid Forming (Barren)
24/07/2023	EB2322621023	N7453 11.0_11.5	N7453	Former Ash Ponds	Overburden	Ash/Sand	Dump	397,098	267,337	11.0	11.5	7.4	217			0.06	0.009	0.3	8.7	-8.4	31.6		Non-acid Forming (Barren)
24/07/2023	EB2322621032	N7453 15.5_16.0	N7453	Former Ash Ponds	Overburden	Clay	Dump	397,098	267,337	15.5	16.0	6.3	124			0.01	0.006	0.2	2.2	-2.0	12.0	0.31	Non-acid Forming (Barren)
24/07/2023	EB2322621040	N7453 19.5_20.0	N7453	Former Ash Ponds	Overburden	Clay	Dump	397,098	267,337	19.5	20.0	4.9	422			0.10	0.043	1.3	<0.5	1.1	0.2		Non-acid Forming (Barren)
24/07/2023	EB2322621051	N7453 25.0_25.5	N7453	Former Ash Ponds	Overburden	Sand	Dump	397,098	267,337	25.0	25.5	6.3	154			0.02	0.018	0.6	0.6	0.0	1.1		Non-acid Forming (Barren)
24/07/2023	EB2322621056	N7453 27.5_28.0	N7453	Former Ash Ponds	Overburden	Clay	Dump	397,098	267,337	27.5	28.0	5.7	277			0.05	0.016	0.5	0.7	-0.2	1.4	5.97	Non-acid Forming (Barren)
24/07/2023	EB2322621060	N7453 29.5_30.0	N7453	Former Ash Ponds	Overburden	Clay	Dump	397,098	267,337	29.5	30.0	6.0	232			0.02	<0.005	0.1	1.3	-1.2	17.0		Uncertain
04/05/2022	EB2212349046	RGS_RCD_WW_01/1		Former Ash Ponds	Weathered coal	Weathered coal	Wall					3.80	118	4.4	1.7	0.13	0.018	0.6	<0.5	0.3	0.5		Non-acid Forming (Barren)
04/05/2022	EB2212349047	RGS_RCB_WW_01/2		Former Ash Ponds	Weathered coal	Weathered coal	Wall					3.60	119	3.9	2.1	0.15	0.019	0.6	<0.5	0.3	0.4		Non-acid Forming (Barren)
20/04/2023	EB2311858069	N7431 0.5 - 1	N7431	Midfield borrow area	Overburden	Sand	Dump	397,139	265,655	0.5	1.0	5.1	40			0.02	0.005	0.2	<0.5	-0.1	1.6		Non-acid Forming (Barren)
20/04/2023	EB2311858075	N7431 3.5 - 4	N7431	Midfield borrow area	Overburden	Clay	Dump	397,139	265,655	3.5	4.0	4.1	85			0.06	0.009	0.3	<0.5	0.0	0.9		Non-acid Forming (Barren)
20/04/2023	EB2311858087	N7431 15.5 - 16	N7431	Midfield borrow area	Overburden	Clay	Dump	397,139	265,655	15.5	16.0	5.3	108			0.03	0.011	0.3	<0.5	0.1	0.7	2.57	Non-acid Forming (Barren)
20/04/2023	EB2311858094	N7431 27.5 - 28	N7431	Midfield borrow area	Overburden	Clay	Dump	397,139	265,655	27.5	28.0	5.2	89			0.02	0.009	0.3	<0.5	0.0	0.9	1.55	Non-acid Forming (Barren)
20/04/2023	EB2311858095	N7431 31.5 - 32	N7431	Midfield borrow area	Weathered coal	Coal	Dump	397,139	265,655	31.5	32.0	5.3	136			0.05	0.009	0.3	2.2	-1.9	8.0		Non-acid Forming (Barren)
18/04/2023	EB2311553020	N7432_0 - 0.5	N7432	Midfield OB	Overburden	Clay	Dump	397,320	265,962	0.0	0.5	5.60	43			0.02	0.010	0.3	5.8	-5.5	18.9		Non-acid Forming (Barren)
18/04/2023	EB2311553026	N7432_4 - 4.5	N7432	Midfield OB	Overburden	Sand	Dump	397,320	265,962	4.0	4.5	5.10	61			0.03	<0.005	0.1	<0.5	-0.2	3.3		Uncertain
18/04/2023	EB2311553029	N7432_8.5 - 9	N7432	Midfield OB	Weathered coal	Coal	Dump	397,320	265,962	8.5	9.0	4.70	114			0.08	0.012	0.4	<0.5	0.1	0.7		Non-acid Forming (Barren)
18/04/2023	EB2311553034	N7432_16 - 16.5	N7432	Midfield OB	Overburden	Clay	Dump	397,320	265,962	16.0	16.5	5.60	75			0.01	0.007	0.2	5.5	-5.3	25.7	0.16	Non-acid Forming (Barren)
18/04/2023	EB2311553044	N7432_31 - 31.5	N7432	Midfield OB	Weathered coal	Coal	Dump	397,320	265,962	31.0	31.5	5.40	149			0.03	0.007	0.2	<0.5	0.0	1.2		Non-acid Forming (Barren)
18/04/2023	EB2311553047	N7432_39.5 - 40	N7432	Midfield OB	Overburden	Clay	Dump	397,320	265,962	39.5	40.0	6.20	170			0.02	0.012	0.4	7.1	-6.7	19.3		Non-acid Forming (Barren)
18/04/2023	EB2311553051	N7432_53.5 - 54	N7432	Midfield OB	Weathered coal	Coal	Dump	397,320	265,962	53.5	54.0	5.80	198			0.03	0.012	0.4	5.2	-4.8	14.1	2.35	Non-acid Forming (Barren)
18/04/2023	EB2311553063	N7433_11 - 11.5	N7433	Midfield borrow area	Overburden	Clay	Dump	397,213	265,247	11.0	11.5	5.70	44			0.02	0.009	0.3	5.5	-5.2	20.0		Non-acid Forming (Barren)
18/04/2023	EB2311553068	N7433_21.5 - 22	N7433	Midfield borrow area	Overburden	Clay	Dump	397,213	265,247	21.5	22.0	5.60	61			0.02	0.010	0.3	0.6	-0.3	2.0	0.74	Non-acid Forming (Barren)
18/04/2023	EB2311553073	N7433_32 - 32.5	N7433	Midfield borrow area	Weathered coal	Coal	Dump	397,213	265,247	32.0	32.5	4.20	629			0.28	0.142	4.3	<0.5	4.1	0.1		Uncertain
18/04/2023	EB2311553074	N7433_33.5 - 34	N7433	Midfield borrow area	Weathered coal	Coal	Dump	397,213	265,247	33.5	34.0	5.60	223			0.02	0.013	0.4	7.1	-6.7	17.8		Non-acid Forming (Barren)
18/04/2023	EB2311553075	N7433_35.5 - 36	N7433	Midfield borrow area	Weathered coal	Coal	Dump	397,213	265,247	35.5	36.0	5.30	192			0.03	0.011	0.3	5.7	-5.4	16.9	4.50	Non-acid Forming (Barren)
18/04/2023	EB2311553076	N7433_37 - 37.5	N7433	Midfield borrow area	Weathered coal	Coal	Dump	397,213	265,247	37.0	37.5	5.90	106			0.02	0.006	0.2	8.1	-7.9	44.1	0.12	Non-acid Forming (Barren)
23/03/2023	EB2308902003	N7454_1 - 1.5	N7454	Midfield OB	Overburden	Clay	Dump	397,332	266,703	1.0	1.5	5.4	25			0.02	0.011	0.3	5.9	-5.6	17.5		Non-acid Forming (Barren)
23/03/2023	EB2308902021	N7454_25 - 25.5	N7454	Midfield OB	Overburden	Clay	Dump	397,332	266,703	25.0	25.5	6.2	241			0.01	0.009	0.3	8.0	-7.7	29.0	0.23	Non-acid Forming (Barren)
23/03/2023	EB2308902024	N7454_29.5 - 30	N7454	Midfield OB	Weathered coal	Coal	Dump	397,332	266,703	29.5	30.0	5.6	47			0.07	0.014	0.4	2.4	-2.0	5.6		Non-acid Forming (Barren)
23/03/2023	EB2308902026	N7435_0.5 - 1	N7435	Midfield OB	Overburden	Sand	Dump	398,011	265,373	0.5	1.0	5.5	45			0.02	0.011	0.3	5.7	-5.4	16.9	0.21	Non-acid Forming (Barren)
23/03/2023	EB2308902044	N7435_25.5 - 26	N7435	Midfield OB	Weathered coal	Coal	Dump	398,011	265,373	25.5	26.0	4.3	45			0.10	0.008	0.2	4.8	-4.6	19.6		Non-acid Forming (Barren)
23/03/2023	EB2308902051	N7436_4.5 - 5	N7436	Midfield OB	Overburden	Clay	Dump	397,448	265,765	4.5	5.0	5.2	64			0.03	0.012	0.4	5.3	-4.9	14.4		Non-acid Forming (Barren)
23/03/2023	EB2308902057	N7436_17.5 - 18	N7436	Midfield OB	Overburden	Clay	Dump	397,448	265,765	17.5	18.0	5.1	58			0.02	<0.005	0.1	6.6	-6.5	86.2	1.16	Uncertain
23/03/2023	EB2308902068	N7436_48 - 48.5	N7436	Midfield OB	Overburden	Clay	Dump	397,448	265,765	48.0	48.5	6	191			0.01	0.020	0.6	6.6	-6.0	10.8		Non-acid Forming (Barren)
20/04/2023	EB2311858102	N7443 3 - 3.5	N7443	Midfield OB	Overburden	Clay	Dump	397,007	265,794	3.0	3.5	4.8	43			0.06	0.018	0.6	<0.5	0.3	0.5		Non-acid Forming (Barren)
20/04/2023	EB2311858103	N7443 3.5 - 4	N7443	Midfield OB	Overburden	Clay	Dump	397,007	265,794	3.5	4.0	5	46			0.03	0.010	0.3	<0.5	0.1	0.8	2.62	Non-acid Forming (Barren)
20/04/2023	EB2311858109	N7443 6.5 - 7	N7443	Midfield OB	Weathered coal	Coal	Dump	397,007	265,794	6.5	7.0	5.4	32			0.02	0.011	0.3	<0.5	0.1	0.7	0.19	Non-acid Forming (Barren)
20/04/2023	EB2311858110	N7443 7 - 7.5	N7443	Midfield OB	Weathered coal	Coal	Dump	397,007	265,794	7.0	7.5	3.8	218			0.18	0.025	0.8	38.8	-38.0	50.7		Non-acid Forming (Barren)
20/04/2023	EB2311858114	N7443 9 - 9.5	N7443	Midfield OB	Weathered coal	Coal	Dump	397,007	265,794	9.0	9.5	4.2	106			0.08	0.019	0.6	<0.5	0.3	0.4		Non-acid Forming (Barren)
17/07/2023	EB2321818001	N7521 0.0-0.5	N7521	Midfield OB	Overburden	Clay	Dump	397,400	266,102	0.0	0.5	6.2	197			0.02	0.012	0.4	1.1	-0.7	3.0		Non-acid Forming (Barren)
17/07/2023	EB2321818006	N7521 2.5-3.0	N7521	Midfield OB	Overburden	Sand	Dump	397,400	266,102	2.5	3.0	5.7	19			0.01	0.014	0.4	1.4	-1.0	3.3		Non-acid Forming (Barren)
17/07/2023	EB2321818008	N7521 3.5-4.0	N7521	Midfield OB	Overburden	Sand	Dump	397,400	266,102	3.5	4.0	5.5	31			0.01	0.016	0.5	1.0	-0.5	2.0		Non-acid Forming (Barren)
17/07/2023	EB2321818011	N7521 6.0-6.5	N7521	Midfield OB	Overburden	Sand	Dump	397,400	266,102	6.0	6.5	5.6	38			0.01	0.009	0.3	0.6	-0.3	2.2		Non-acid Forming (Barren)
17/07/2023	EB2321818014	N7521 7.5-8.0	N7521	Midfield OB	Overburden	Sand	Dump	397,400	266,102	7.5	8.0	5.3	38			0.02	0.006	0.2	<0.5	-0.1	1.4		Non-acid Forming (Barren)
17/07/2023	EB2321818023	N7521 12.0-12.5	N7521	Midfield OB	Overburden	Sand	Dump	397,400	266,102	12.0	12.5	5.5	32			0.02	<0.005	0.1	0.6	-0.5	7.8	0.07	Uncertain
17/07/2023	EB2321818059	N7521 33.0-33.5	N7521	Midfield OB	Overburden	Sand	Dump	397,400	266,102	33.0	33.5	6.5	202			0.02	<0.005	0.1	1.8	-1.7	23.5		Uncertain
17/07/2023	EB2321818064	N7521 35.5-36.0	N7521	Midfield OB	Weathered coal	Coal	Dump	397,400	266,102	35.5	36.0	5.8	209			0.03	0.013	0.4	0.7	-0.3	1.8		Non-acid Forming (Barren)
17/07/2023	EB2321818067	N7521 37.0-37.5	N7521	Midfield OB	Weathered coal	Coal	Dump	397,400	266,102	37.0	37.5	5.5	258			0.03	0.007	0.2	<0.5	0.0	1.2	2.35	Non-acid Forming (Barren)
17/07/2023	EB2321818076	N7521 41.5-42.0	N7521	Midfield OB	Overburden	Clay	Dump	397,400	266,102	41.5	42.0	5.5	304			0.04	0.012	0.4	<0.5	0.1	0.7		Non-acid Forming (Barren)
17/07/2023	EB2321818086	N7521 46.5-47.0	N7521	Midfield OB	Weathered coal	Coal	Dump	397,400	266,102	46.5	47.0	4.5	663			0.31	0.185	5.7	<0.5	5.4	0.0	14.1	Potentially Acid Forming (Low Capacity)
17/07/2023	EB2321818087	N7521 47.0-47.5	N7521	Midfield OB	Weathered coal	Coal	Dump	397,400	266,102	47.0	47.5	5.1	376			0.09	0.028	0.9	<0.5	0.6	0.3	6.15	Non-acid Forming (Barren)
17/07/2023	EB2321818090	N7521 48.5-49.0	N7521	Midfield OB	Weathered coal	Coal	Dump	397,400	266,102	48.5	49.0	4.3	964			0.26	0.134	4.1	<0.5	3.9	0.1	26.8	Uncertain
17/07/2023	EB2321818093	N7521 50.0-50.5	N7521	Midfield OB	Weathered coal	Coal	Dump	397,400	266,102	50.0	50.5	5.4	229			0.05	0.022	0.7	<0.5	0.4	0.4		Non-acid Forming (Barren)
17/07/2023	EB2321818098	N7521 52.5-53.0	N7521	Midfield OB	Weathered coal	Coal	Dump	397,400	266,102	52.5	53.0	4.4	190			0.26	0.017	0.5	1.4	-0.9	2.7	46.0	Non-acid Forming (Barren)
01/08/2023	EB2323660003	N7522 1.0-1.5	N7522	Midfield OB	Overburden	Sand	Dump	397,524	266,904	1.0	1.5	5.10	46			0.03	0.015	0.5	<0.5	0.2	1.2		Non-acid Forming (Barren)
01/08/2023	EB2323660009	N7522 4.5-5.0	N7522	Midfield OB	Overburden	Clay	Dump	397,524	266,904	4.5	5.0	5.50	26			0.01	0.008	0.2	<0.5	0.0	<0.01		Non-acid Forming (Barren)
01/08/2023	EB2323660016	N7522 8.0-8.5	N7522	Midfield OB	Weathered coal	Coal	Dump	397,524	266,904	8.0	8.5	4.70	141			0.08	0.018	0.6	<0.5	0.3	0.8		Non-acid Forming (Barren)
01/08/2023	EB2323660020	N7522 10.0-10.5	N7522	Midfield OB	Weathered coal	Coal	Dump	397,524	266,904	10.0	10.5	4.30	233			0.12	0.026	0.8	<0.5	0.5	0.5	19.2	Non-acid Forming (Barren)
01/08/2023	EB2323660022	N7522 11.0-11.5	N7522	Midfield OB	Weathered coal	Coal	Dump	397,524	266,904	11.0	11.5	4.90	108			0.06	0.024	0.7	<0.5	0.5	0.5	5.38	Non-acid Forming (Barren)
01/08/2023	EB2323660025	N7522 12.5-13.0	N7522	Midfield OB	Overburden	Clay	Dump	397,524	266,904	12.5	13.0	5.90	134			0.03	0.01	0.3	<0.5	0.1	4.4		Non-acid Forming (Barren)
01/08/2023	EB2323660032	N7522 16.0-16.5	N7522	Midfield OB	Overburden	Clay	Dump	397,524	266,904	16.0	16.5	6.00	230			0.01	0.061	1.9	<0.5	1.6	0.2		Non-acid Forming (Barren)

Table B1: Acid-base Account Results for Samples from the Yallourn Project

Date	ALS Lab ID	Client Sample ID	Drill Hole ID	Location[1]	Sample Lithology	Description	Dump/Wall Sample	Easting	Northing	From	To	pH (1:5)	EC (1:5)	pH_F	pH_{FOX}	Total Sulfur	S_{CR}[2]	MPA[2]	ANC[2]	NAPP[2+]	ANC:MPA[2]	TOC[2]	Geochemical Classification[3]
								SECLV		(m)			(µS/cm)			(%)	(%)	(kg H_2SO_4/t)			Ratio	(% C)	
01/08/2023	EB2323660039	N7522 19.5-20.0	N7522	Midfield OB	Overburden	Clay	Dump	397,524	266,904	19.5	20.0	5.70	190			0.02	0.022	0.7	<0.5	0.4	0.6	0.36	Non-acid Forming (Barren)
01/08/2023	EB2323660046	N7522 23.0-23.5	N7522	Midfield OB	Weathered coal	Coal	Dump	397,524	266,904	23.0	23.5	5.60	267			0.05	0.027	0.8	<0.5	0.6	0.4	5.60	Non-acid Forming (Barren)
01/08/2023	EB2323660047	N7522 23.5-24.0	N7522	Midfield OB	Weathered coal	Coal	Dump	397,524	266,904	23.5	24.0	5.40	284			0.14	0.058	1.8	<0.5	1.5	0.2		Non-acid Forming (Barren)
01/08/2023	EB2323660050	N7522 25.0-25.5	N7522	Midfield OB	Weathered coal	Coal	Dump	397,524	266,904	25.0	25.5	4.60	565			0.16	0.112	3.4	<0.5	3.2	0.1	7.47	Uncertain
01/08/2023	EB2323660053	N7522 26.5-27.0	N7522	Midfield OB	Overburden	Sand	Dump	397,524	266,904	26.5	27.0	6.00	145			0.02	0.007	0.2	<0.5	0.0	<0.01	0.59	Non-acid Forming (Barren)
01/08/2023	EB2323660065	N7522 32.5-33.0	N7522	Midfield OB	Overburden	Sand	Dump	397,524	266,904	32.5	33.0	6.00	107			0.02	0.01	0.3	0.5	-0.2	1.6		Non-acid Forming (Barren)
15/09/2022	EB2227537074	2022057_074 EAY_KLC_OB_4		MRD	Overburden	Overburden	Wall	397,714	267,276			5.90	67			0.02	0.013	0.4	4.6	-4.2	11.6		Non-acid Forming (Barren)
15/09/2022	EB2227537080	2022057_080 EAY_KLC_OB_10		MRD	Overburden	Overburden	Wall	397,790	265,076			5.90	55			0.02	0.010	0.3	5.9	-5.6	19.3		Non-acid Forming (Barren)
23/03/2023	EB2308909003	N7423_1 - 1.5	N7423	YTF NOB	Weathered coal	Coal	Dump	395,952	265,536	1.0	1.5	3.5	357			0.18	0.018	0.6	<0.5	0.3	0.5		Non-acid Forming (Barren)
23/03/2023	EB2308909004	N7423_1.5 - 2	N7423	YTF NOB	Weathered coal	Coal	Dump	395,952	265,536	1.5	2.0	4.2	277			0.27	0.022	0.7	<0.5	0.4	0.4		Non-acid Forming (Barren)
23/03/2023	EB2308909008	N7423_5.5 - 6	N7423	YTF NOB	Overburden	Sand	Dump	395,952	265,536	5.5	6.0	3.9	443			0.67	0.634	19.4	4.3	15.1	0.2	0.51	Potentially Acid Forming
23/03/2023	EB2308909014	N7423_15 - 15.5	N7423	YTF NOB	Weathered coal	Coal	Dump	395,952	265,536	15.0	15.5	4.5	226			0.34	0.182	5.6	<0.5	5.3	0.0		Potentially Acid Forming (Low Capacity)
23/03/2023	EB2308909015	N7423_16.5 - 17	N7423	YTF NOB	Weathered coal	Coal	Dump	395,952	265,536	16.5	17.0	4.1	149			0.60	0.450	13.8	<0.5	13.5	0.0		Potentially Acid Forming
23/03/2023	EB2308909016	N7423_18 - 18.5	N7423	YTF NOB	Weathered coal	Coal	Dump	395,952	265,536	18.0	18.5	4.4	98			0.68	0.551	16.9	<0.5	16.6	0.0		Potentially Acid Forming
23/03/2023	EB2308909017	N7423_19.5 - 20	N7423	YTF NOB	Overburden	Sand	Dump	395,952	265,536	19.5	20.0	4.9	298			0.51	0.437	13.4	6.3	7.1	0.5	1.59	Potentially Acid Forming (Low Capacity)
23/03/2023	EB2308909019	N7423_22.5 - 23	N7423	YTF NOB	Overburden	Clay	Dump	395,952	265,536	22.5	23.0	4.4	525			0.48	0.385	11.8	5.2	6.6	0.4		Potentially Acid Forming (Low Capacity)
24/07/2023	EB2322612002	N7524 0.5_1.0	N7524	YTF NOB	Weathered coal	Coal	Dump	396,371	266,376	0.5	1.0	3.60	938			0.36	0.248	7.6	<0.5	7.3	0.0		Potentially Acid Forming (Low Capacity)
24/07/2023	EB2322612004	N7524 1.5_2.0	N7524	YTF NOB	Weathered coal	Coal	Dump	396,371	266,376	1.5	2.0	3.70	958			1.40	1.28	39.2	<0.5	39.0	<0.01	3.76	Potentially Acid Forming
24/07/2023	EB2322612016	N7524 9.0_9.5	N7524	YTF NOB	Overburden	Sand	Dump	396,371	266,376	9.0	9.5	4.30	246			0.12	0.068	2.1	2.4	-0.3	1.2		Non-acid Forming (Barren)
24/07/2023	EB2322612018	N7524 10.0_10.5	N7524	YTF NOB	Overburden	Clay	Dump	396,371	266,376	10.0	10.5	5.90	148			0.02	0.009	0.3	1.8	-1.5	6.5		Non-acid Forming (Barren)
24/07/2023	EB2322612025	N7524 13.5_14.0	N7524	YTF NOB	Weathered coal	Coal	Dump	396,371	266,376	13.5	14.0	4.00	1110			0.52	0.298	9.1	37.5	-28.4	4.1		Non-acid Forming
24/07/2023	EB2322612030	N7524 16.0_16.5	N7524	YTF NOB	Overburden	Sand	Dump	396,371	266,376	16.0	16.5	4.60	685			0.96	0.732	22.4	<0.5	22.2	0.0	23.0	Potentially Acid Forming
24/07/2023	EB2322612040	N7524 21.0_21.5	N7524	YTF NOB	Overburden	Sand	Dump	396,371	266,376	21.0	21.5	4.60	277			0.23	0.169	5.2	<0.5	4.9	0.1		Uncertain
24/07/2023	EB2322612049	N7524 25.5_26.0	N7524	YTF NOB	Overburden	Clay	Dump	396,371	266,376	25.5	26.0	3.40	1400			0.91	0.675	20.7	38.4	-17.7	1.9		Non-acid Forming
24/07/2023	EB2322612061	N7524 31.5_32.0	N7524	YTF NOB	Overburden	Clay	Dump	396,371	266,376	31.5	32.0	5.10	116			0.15	0.163	5.0	<0.5	4.7	0.1	3.35	Uncertain
24/07/2023	EB2322612064	N7524 33.0_33.5	N7524	YTF NOB	Weathered coal	Coal	Dump	396,371	266,376	33.0	33.5	4.90	210			0.07	0.028	0.9	<0.5	0.6	0.4		Non-acid Forming (Barren)
24/07/2023	EB2322612066	N7524 34.0_34.5	N7524	YTF NOB	Weathered coal	Coal	Dump	396,371	266,376	34.0	34.5	4.80	298			0.30	0.011	0.3	0.6	-0.3	1.8	45.6	Non-acid Forming (Barren)
23/03/2023	EB2308909033	N7425_8.5 - 9	N7425	YTF NOB	Overburden	Clay	Dump	396,338	265,282	8.5	9.0	4.9	360			0.12	0.026	0.8	1.7	-0.9	2.1	12.8	Non-acid Forming (Barren)
23/03/2023	EB2308909034	N7425_10 - 10.5	N7425	YTF NOB	Weathered coal	Coal	Dump	396,338	265,282	10.0	10.5	4.3	344			0.34	0.042	1.3	<0.5	1.0	0.2		Non-acid Forming (Barren)
23/03/2023	EB2308909035	N7425_11.5 - 12	N7425	YTF NOB	Weathered coal	Coal	Dump	396,338	265,282	11.5	12.0	4.2	517			0.28	0.022	0.7	<0.5	0.4	0.4		Non-acid Forming (Barren)
23/03/2023	EB2308909036	N7425_13 - 13.5	N7425	YTF NOB	Weathered coal	Coal	Dump	396,338	265,282	13.0	13.5	4.2	488			0.34	0.227	7.0	1.4	5.6	0.2		Potentially Acid Forming (Low Capacity)
23/03/2023	EB2308909038	N7425_16 - 16.5	N7425	YTF NOB	Overburden	Sand	Dump	396,338	265,282	16.0	16.5	4.2	696			2.30	2.32	71.1	1.9	69.2	0.0	1.02	Potentially Acid Forming
23/03/2023	EB2308909043	N7425_25.5 - 26	N7425	YTF NOB	Overburden	Sand	Dump	396,338	265,282	25.5	26.0	4.7	236			0.31	0.256	7.8	6.1	1.7	0.8		Uncertain
23/03/2023	EB2308909045	N7425_28.5 - 29	N7425	YTF NOB	Overburden	Clay	Dump	396,338	265,282	28.5	29.0	5	473			1.08	0.999	30.6	7.1	23.5	0.2	0.76	Potentially Acid Forming
23/03/2023	EB2308909046	N7425_30 - 30.5	N7425	YTF NOB	Overburden	Clay	Dump	396,338	265,282	30.0	30.5	5.5	135			0.44	0.407	12.5	7.1	5.4	0.6		Potentially Acid Forming (Low Capacity)
18/04/2023	EB2311551065	N7426_2 - 2.5	N7426	YTF NOB	Overburden	Clay	Dump	396,435	265,841	2.0	2.5	3.80	781			0.18	0.050	1.5	<0.5	1.3	0.2	9.00	Non-acid Forming (Barren)
18/04/2023	EB2311551069	N7426_7.5 - 8	N7426	YTF NOB	Overburden	Sand	Dump	396,435	265,841	7.5	8.0	3.90	1490			3.94	2.23	68.3	<0.5	68.0	<0.01	1.80	Potentially Acid Forming
18/04/2023	EB2311551072	N7426_12 - 12.5	N7426	YTF NOB	Overburden	Clay	Dump	396,435	265,841	12.0	12.5	3.10	1180			2.33	2.04	62.5	<0.5	62.2	<0.01		Potentially Acid Forming
18/04/2023	EB2311551079	N7426_22.5 - 23	N7426	YTF NOB	Overburden	Sand	Dump	396,435	265,841	22.5	23.0	5.50	81			0.02	<0.005	0.1	7.2	-7.1	94.0		Uncertain
18/04/2023	EB2311554003	N7434_1 - 1.5	N7434	YTF NOB	Overburden	Clay	Dump	395,483	265,808	1.0	1.5	4.60	573			0.22	0.122	3.7	6.8	-3.1	1.8		Uncertain
18/04/2023	EB2311554013	N7434_15 - 15.5	N7434	YTF NOB	Overburden	Clay	Dump	395,483	265,808	15.0	15.5	6.00	115			0.03	<0.005	0.1	8.3	-8.2	108.4	1.24	Uncertain
14/07/2023	EB2321650004	N7523 1.5-2.0	N7523	YTF NOB	Overburden	Sand	Dump	396,050	265,683	1.5	2.0	5.0	56			0.04	0.019	0.6	<0.5	0.3	0.4	0.84	Non-acid Forming (Barren)
14/07/2023	EB2321650019	N7523 9.0-9.5	N7523	YTF NOB	Overburden	Clay	Dump	396,050	265,683	9.0	9.5	5.3	278			0.48	0.371	11.4	<0.5	11.1	0.0		Potentially Acid Forming
14/07/2023	EB2321650020	N7523 9.5-10.0	N7523	YTF NOB	Overburden	Clay	Dump	396,050	265,683	9.5	10.0	5.4	223			0.44	0.354	10.8	<0.5	10.6	0.0		Potentially Acid Forming
14/07/2023	EB2321650029	N7523 14.0-14.5	N7523	YTF NOB	Weathered coal	Coal	Dump	396,050	265,683	14.0	14.5	4.3	748			1.71	1.34	41.0	<0.5	40.8	<0.01	11.2	Potentially Acid Forming
14/07/2023	EB2321650030	N7523 14.5-15.0	N7523	YTF NOB	Weathered coal	Coal	Dump	396,050	265,683	14.5	15.0	4.8	335			0.34	0.213	6.5	<0.5	6.3	0.0	10.7	Potentially Acid Forming (Low Capacity)
14/07/2023	EB2321650031	N7523 15.0-15.5	N7523	YTF NOB	Weathered coal	Coal	Dump	396,050	265,683	15.0	15.5	4.8	319			0.34	0.205	6.3	<0.5	6.0	0.0		Potentially Acid Forming (Low Capacity)
14/07/2023	EB2321650032	N7523 15.5-16.0	N7523	YTF NOB	Weathered coal	Coal	Dump	396,050	265,683	15.5	16.0	4.4	219			1.74	1.04	31.9	<0.5	31.6	<0.01	18.4	Potentially Acid Forming
14/07/2023	EB2321650035	N7523 17.0-17.5	N7523	YTF NOB	Overburden	Sand	Dump	396,050	265,683	17.0	17.5	4.2	437			0.47	0.388	11.9	<0.5	11.6	0.0		Potentially Acid Forming
14/07/2023	EB2321650038	N7523 18.5-19.0	N7523	YTF NOB	Overburden	Sand	Dump	396,050	265,683	18.5	19.0	5.0	134			0.12	0.088	2.7	1.7	1.0	0.6		Non-acid Forming (Barren)
14/07/2023	EB2321650045	N7523 22.0-22.5	N7523	YTF NOB	Overburden	Clay	Dump	396,050	265,683	22.0	22.5	4.2	502			0.58	0.442	13.5	<0.5	13.3	0.0	6.06	Potentially Acid Forming
14/07/2023	EB2321650046	N7523 22.5-23.0	N7523	YTF NOB	Weathered coal	Coal	Dump	396,050	265,683	22.5	23.0	4.5	585			0.49	0.345	10.6	<0.5	10.3	0.0		Potentially Acid Forming
14/07/2023	EB2321650047	N7523 23.0-23.5	N7523	YTF NOB	Overburden	Sand	Dump	396,050	265,683	23.0	23.5	5.0	244			0.40	0.359	11.0	0.5	10.5	0.0		Potentially Acid Forming
14/07/2023	EB2321650052	N7523 25.5-26.0	N7523	YTF NOB	Weathered coal	Coal	Dump	396,050	265,683	25.5	26.0	5.3	157			0.12	0.016	0.5	<0.5	0.2	0.5		Non-acid Forming (Barren)
14/07/2023	EB2321650060	N7523 29.5-30.0	N7523	YTF NOB	Overburden	Clay	Dump	396,050	265,683	29.5	30.0	5.4	71			0.13	0.017	0.5	<0.5	0.3	0.5		Non-acid Forming (Barren)
20/04/2023	EB2311858001	N7424 0 - 0.5	N7424	YTF NOB	Overburden	Sand	Dump	395,646	265,702	0.0	0.5	5.9	14			<0.01	<0.005	0.1	1.3	-1.2	17.0	0.1	Uncertain
20/04/2023	EB2311858004	N7424 1.5 - 2	N7424	YTF NOB	Overburden	Sand	Dump	395,646	265,702	1.5	2.0	5.9	12			<0.01	0.010	0.3	1.8	-1.5	5.9		Non-acid Forming (Barren)
20/04/2023	EB2311858010	N7424 9 - 9.5	N7424	YTF NOB	Overburden	Sand	Dump	395,646	265,702	9.0	9.5	6	166			<0.01	0.007	0.2	4.1	-3.9	19.1	0.16	Non-acid Forming (Barren)
20/04/2023	EB2311858014	N7424 15 - 15.5	N7424	YTF NOB	Overburden	Clay	Dump	395,646	265,702	15.0	15.5	4.8	87			0.03	<0.005	0.1	<0.5	-0.2	3.3	3.86	Uncertain
04/05/2022	EB2212349001	RGS_YTF_WW_1		YTF NOB	Soil	Rehab Material	Wall					5.50	143	5.1	3.5	0.03	0.016	0.5	1.5	-1.0	3.1		Non-acid Forming (Barren)
04/05/2022	EB2212349002	RGS_YTF_WW_2		YTF NOB	Weathered coal	Weathered coal	Wall					3.50	320	4.2	2.5	0.21	0.047	1.4	<0.5	1.2	0.2		Non-acid Forming (Barren)
04/05/2022	EB2212349003	RGS_YTF_WW_2/1		YTF NOB	Weathered coal	Weathered coal	Wall					3.50	394	3.9	2.8	0.19	0.024	0.7	<0.5	0.5	0.3		Non-acid Forming (Barren)
04/05/2022	EB2212349004	RGS_YTF_WW_03/1		YTF NOB	Weathered coal	Weathered coal	Wall	394,574	264,556			3.70	213	4.4	2.7	0.12	0.02	0.6	<0.5	0.4	0.4		Non-acid Forming (Barren)
04/05/2022	EB2212349005	RGS_YTF_WW_03/2		YTF NOB	Weathered coal	Weathered coal	Wall	394,574	264,556			3.20	444	4.3	2.5	0.16	0.023	0.7	<0.5	0.5	0.4		Non-acid Forming (Barren)
15/09/2022	EB2227537001	2022057_001 EAY_KLC_C_1		YTF Northern Batters	Weathered coal	Weathered coal	Wall	396,618	266,936			3.70	253			0.19	0.018	0.6	<0.5	0.3	0.5		Non-acid Forming (Barren)
15/09/2022	EB2227537002	2022057_002 EAY_KLC_C_2		YTF Northern Batters	Weathered coal	Weathered coal	Wall	396,385	266,891			4.10	82			0.21	0.020	0.6	<0.5	0.4	0.4		Non-acid Forming (Barren)
15/09/2022	EB2227537003	2022057_003 EAY_KLC_C_3		YTF Northern Batters	Weathered coal	Weathered coal	Wall	396,164	266,842			3.90	78			0.18	0.021	0.6	<0.5	0.4	0.4		Non-acid Forming (Barren)
15/09/2022	EB2227537004	2022057_004 EAY_KLC_C_4		YTF Northern Batters	Weathered coal	Weathered coal	Wall	396,262	266,817			3.80	92			0.20	0.022	0.7	<0.5	0.4	0.4		Non-acid Forming (Barren)
15/09/2022	EB2227537005	2022057_005 EAY_KLC_C_5		YTF Northern Batters	Weathered coal	Weathered coal	Wall	396,477	266,860			3.80	107			0.11	0.018	0.6	<0.5	0.3	0.5		Non-acid Forming (Barren)
15/09/2022	EB2227537006	2022057_006 EAY_KLC_C_6		YTF Northern Batters	Weathered coal	Weathered coal	Wall	395,510	266,723			3.60	173			0.27	0.019	0.6	<0.5	0.3	0.4		Non-acid Forming (Barren)
15/09/2022	EB2227537007	2022057_007 EAY_KLC_C_7		YTF Northern Batters	Weathered coal	Weathered coal	Wall	395,495	266,675			3.20	288			0.22	0.026	0.8	<0.5	0.5	0.3		Non-acid Forming (Barren)
15/09/2022	EB2227537008	2022057_008 EAY_KLC_C_8		YTF Northern Batters	Weathered coal	Weathered coal	Wall	395,433	266,458			3.80	78			0.12	0.013	0.4	<0.5	0.1	0.6		Non-acid Forming (Barren)
15/09/2022	EB2227537009	2022057_009 EAY_KLC_C_9		YTF Northern Batters	Weathered coal	Weathered coal	Wall	395,243	266,226			3.80	130			0.10	0.011	0.3	<0.5	0.1	0.7		Non-acid Forming (Barren)
15/09/2022	EB2227537010	2022057_010 EAY_KLC_C_10		YTF Northern Batters	Weathered coal	Weathered coal	Wall	394,930	265,929			3.50	266			0.14	0.016	0.5	<0.5	0.2	0.5		Non-acid Forming (Barren)
15/09/2022	EB2227537011	2022057_011 EAY_KLC_C_11		YTF Northern Batters	Weathered coal	Weathered coal	Wall	395,135	266,173			3.70	218			0.12	0.014	0.4	<0.5	0.2	0.6		Non-acid Forming (Barren)
15/09/2022	EB2227537012	2022057_012 EAY_KLC_C_12		YTF Northern Batters	Weathered coal	Weathered coal	Wall	395,215	266,322			4.70	65			0.12	0.018	0.6	<0.5	0.3	0.5		Non-acid Forming (Barren)
15/09/2022	EB2227537013	2022057_013 EAY_KLC_C_13		YTF Hermes Oak/Western Batters	Weathered coal	Weathered coal	Wall	394,855	265,431			4.00	96			0.11	0.018	0.6	<0.5	0.3	0.5		Non-acid Forming (Barren)
15/09/2022	EB2227537014	2022057_014 EAY_KLC_C_14		YTF Hermes Oak/Western Batters	Weathered coal	Weathered coal	Wall	394,644	264,730			3.60	102			0.13	0.012	0.4	<0.5	0.1	0.7		Non-acid Forming (Barren)
15/09/2022	EB2227537015	2022057_015 EAY_KLC_C_15		YTF Hermes Oak/Western Batters	Weathered coal	Weathered coal	Wall	394,705	265,113			3.70	211			0.13	0.014	0.4	0.6	-0.2	1.4		Non-acid Forming (Barren)
15/09/2022	EB2227537016	2022057_016 EAY_KLC_C_16		YTF Hermes Oak/Western Batters	Weathered coal	Weathered coal	Wall	394,495	264,337			3.60	194			0.17	0.026	0.8	<0.5	0.5	0.3		Non-acid Forming (Barren)
15/09/2022	EB2227537071	2022057_071 EAY_KLC_OB_1		YTF North West Batters	Overburden	Overburden	Wall	394,831	265,915			5.00	107			0.02	0.015	0.5	2.5	-2.0	5.4		Non-acid Forming (Barren)
15/09/2022	EB2227537072	2022057_072 EAY_KLC_OB_2		YTF Hermes Oak/Western Batters	Overburden	Overburden	Wall	394,634	265,299			5.10	40			0.01	0.009	0.3	2.8	-2.5	10.2		Non-acid Forming (Barren)
20/04/2023	EB2311858018	N7427 1 - 1.5	N7427	YTF SOB	Overburden	Clay	Dump	395,186	264,293	1.0	1.5	5.3	47			0.01	<0.005	0.1	0.9	-0.8	11.8		Uncertain
20/04/2023	EB2311858025	N7427 10.5 - 11	N7427	YTF SOB	Overburden	Clay	Dump	395,186	264,293	10.5	11.0	4.8	155			0.04	0.027	0.8	<0.5	0.6	0.3	2.6	Non-acid Forming (Barren)
20/04/2023	EB2311858030	N7427 18 - 18.5	N7427	YTF SOB	Overburden	Clay	Dump	395,186	264,293	18.0	18.5	5.1	42			0.01	0.008	0.2	<0.5	0.0	1.0		Non-acid Forming (Barren)
20/04/2023	EB2311858033	N7427 22.5 - 23	N7427	YTF SOB	Overburden	Clay	Dump	395,186	264,293	22.5	23.0	5.3	36			0.01	0.043	1.3	<0.5	1.1	0.2	0.25	Non-acid Forming (Barren)
20/04/2023	EB2311858040	N7427 33 - 33.5	N7427	YTF SOB	Weathered coal	Coal.	Dump	395,186	264,293	33.0	33.5	5.6	68			0.02	0.012	0.4	4.9	-4.5	13.3		Non-acid Forming (Barren)

Table B1: Acid-base Account Results for Samples from the Yallourn Project

Date	ALS Lab ID	Client Sample ID	Drill Hole ID	Location[1]	Sample Lithology	Description	Dump/Wall Sample	Easting	Northing	From	To	pH (1:5)	EC (1:5)	pH_F	pH_{FOX}	Total Sulfur	S_{CR}[2]	MPA[2]	ANC[2]	NAPP[2+]	ANC:MPA[2]	TOC[2]	Geochemical Classification[3]
								SECLV		(m)			(µS/cm)			(%)	(%)	(kg H_2SO_4/t)			Ratio	(% C)	
20/04/2023	EB2311858045	N7428 2 - 2.5	N7428	YTF SOB	Overburden	Sand	Dump	395,948	264,487	2.0	2.5	5.7	23			0.01	<0.005	0.1	<0.5	-0.2	3.3	0.23	Uncertain
20/04/2023	EB2311858052	N7428 12 - 12.5	N7428	YTF SOB	Overburden	Sand	Dump	395,948	264,487	12.0	12.5	5.7	22			<0.01	0.025	0.8	<0.5	0.5	0.3		Non-acid Forming (Barren)
20/04/2023	EB2311858059	N7428 22.5 - 23	N7428	YTF SOB	Overburden	Sand	Dump	395,948	264,487	22.5	23.0	5.7	35			<0.01	0.012	0.4	<0.5	0.1	0.7		Non-acid Forming (Barren)
20/04/2023	EB2311858064	N7428 30 - 30.5	N7428	YTF SOB	Weathered coal	Coal	Dump	395,948	264,487	30.0	30.5	4.8	140			0.15	0.009	0.3	<0.5	0.0	0.9	30.2	Non-acid Forming (Barren)
23/03/2023	EB2308891065	N7429_25.5 - 26	N7429	YTF SOB	Weathered coal	Coal	Dump	396,391	263,852	25.5	26.0	4.7	43			0.31	0.019	0.6	<0.5	0.3	0.4		Non-acid Forming (Barren)
23/03/2023	EB2308891066	N7429_27 - 27.5	N7429	YTF SOB	Weathered coal	Coal	Dump	396,391	263,852	27.0	27.5	4.4	94			0.95	0.382	11.7	1.7	10.0	0.1		Potentially Acid Forming (Low Capacity)
23/03/2023	EB2308891067	N7429_28.5 - 29	N7429	YTF SOB	Weathered coal	Coal	Dump	396,391	263,852	28.5	29.0	5.6	43			0.14	0.112	3.4	5.3	-1.9	1.5		Uncertain
18/04/2023	EB2311551083	N7429_0.5 - 1	N7429	YTF SOB	Overburden	Clay	Dump	396,391	263,852	0.5	1.0	5.40	64			0.02	0.015	0.5	5.5	-5.0	12.0		Non-acid Forming (Barren)
18/04/2023	EB2311551089	N7429_6 - 6.5	N7429	YTF SOB	Overburden	Clay	Dump	396,391	263,852	6.0	6.5	6.00	38			0.02	0.009	0.3	6.8	-6.5	24.7		Non-acid Forming (Barren)
18/04/2023	EB2311553005	N7430_2 - 2.5	N7430	YTF SOB	Overburden	Clay	Dump	395,336	263,705	2.0	2.5	5.60	61			0.03	0.014	0.4	7.7	-7.3	18.0	0.39	Non-acid Forming (Barren)
18/04/2023	EB2311553006	N7430_2.5 - 3	N7430	YTF SOB	Overburden	Sand	Dump	395,336	263,705	2.5	3.0	5.50	44			0.02	0.010	0.3	8.5	-8.2	27.8	0.64	Non-acid Forming (Barren)
18/04/2023	EB2311554061	N7455_1 - 1.5	N7455	YTF SOB	Overburden	Clay	Dump	396,667	263,391	1.0	1.5	5.70	30			0.01	0.010	0.3	8.6	-8.3	28.1	0.18	Non-acid Forming (Barren)
18/04/2023	EB2311554069	N7455_10 - 10.5	N7455	YTF SOB	Overburden	Clay	Dump	396,667	263,391	10.0	10.5	5.40	78			0.03	0.013	0.4	6.0	-5.6	15.1	0.26	Non-acid Forming (Barren)
18/04/2023	EB2311554072	N7455_14.5 - 15	N7455	YTF SOB	Weathered coal	Coal	Dump	396,667	263,391	14.5	15.0	4.60	68			0.25	0.025	0.8	<0.5	0.5	0.3	31.6	Non-acid Forming (Barren)
18/04/2023	EB2311554073	N7455_16 - 16.5	N7455	YTF SOB	Weathered coal	Coal	Dump	396,667	263,391	16.0	16.5	4.40	196			0.26	0.020	0.6	<0.5	0.4	0.4		Non-acid Forming (Barren)
18/04/2023	EB2311554074	N7455_17.5 - 18	N7455	YTF SOB	Weathered coal	Coal	Dump	396,667	263,391	17.5	18.0	4.30	197			0.18	0.022	0.7	<0.5	0.4	0.4		Non-acid Forming (Barren)
28/07/2023	EB2323298017	N7525 9.0_9.5	N7525	YTF SOB	Overburden	Clay	Dump	395,574	264,393	9.0	9.5	5.10	45			0.02	0.008	0.2	<0.5	0.0	<0.01	0.11	Non-acid Forming (Barren)
28/07/2023	EB2323298031	N7525 16.0_16.5	N7525	YTF SOB	Overburden	Clay	Dump	395,574	264,393	16.0	16.5	5.10	47			0.03	0.007	0.2	<0.5	0.0	<0.01		Non-acid Forming (Barren)
28/07/2023	EB2323298039	N7525 22.0_22.5	N7525	YTF SOB	Weathered coal	Coal	Dump	395,574	264,393	22.0	22.5	4.70	178			0.09	0.026	0.8	<0.5	0.5	0.5		Non-acid Forming (Barren)
28/07/2023	EB2323298048	N7525 27.5_28.0	N7525	YTF SOB	Weathered coal	Coal	Dump	395,574	264,393	27.5	28.0	4.50	116			0.11	0.013	0.4	<0.5	0.1	1.7	15.3	Non-acid Forming (Barren)
28/07/2023	EB2323298050	N7525 28.5_29.0	N7525	YTF SOB	Weathered coal	Coal	Dump	395,574	264,393	28.5	29.0	4.60	92			0.30	0.012	0.4	<0.5	0.1	2.1		Non-acid Forming (Barren)
28/07/2023	EB2323298052	N7525 29.5_30.0	N7525	YTF SOB	Weathered coal	Coal	Dump	395,574	264,393	29.5	30.0	4.80	133			0.35	0.017	0.5	<0.5	0.3	0.9	34.8	Non-acid Forming (Barren)
28/07/2023	EB2323298066	N7525 21.5-22.0	N7525	YTF SOB	Weathered coal	Coal	Dump	395,574	264,393	21.5	22.0	4.80	102			0.07	0.014	0.4	<0.5	0.2	1.4		Non-acid Forming (Barren)
28/07/2023	EB2323298067	N7525 24.0-24.5	N7525	YTF SOB	Weathered coal	Coal	Dump	395,574	264,393	24.0	24.5	5.00	90			0.04	0.012	0.4	<0.5	0.1	2.1	4.47	Non-acid Forming (Barren)
01/08/2023	EB2323660073	N7526 1.5-2.0	N7526	YTF SOB	Overburden	Clay	Dump	395,798	264,077	1.5	2.0	6.00	60			0.02	<0.005	0.1	6.8	-6.7	88.8		Uncertain
01/08/2023	EB2323660076	N7526 3.0-3.5	N7526	YTF SOB	Overburden	Sand	Dump	395,798	264,077	3.0	3.5	5.00	62			0.04	0.009	0.3	<0.5	0.0	9.8		Non-acid Forming (Barren)
01/08/2023	EB2323660081	N7526 5.5-6.0	N7526	YTF SOB	Overburden	Sand	Dump	395,798	264,077	5.5	6.0	5.10	48			0.03	<0.005	0.1	<0.5	-0.2	<0.01	1.34	Uncertain
01/08/2023	EB2323660084	N7526 7.0-7.5	N7526	YTF SOB	Overburden	Clay	Dump	395,798	264,077	7.0	7.5	5.00	49			0.03	0.007	0.2	<0.5	0.0	<0.01	0.10	Non-acid Forming (Barren)
01/08/2023	EB2323660088	N7526 9.0-9.5	N7526	YTF SOB	Overburden	Clay	Dump	395,798	264,077	9.0	9.5	5.20	56			0.04	0.016	0.5	<0.5	0.2	1.0		Non-acid Forming (Barren)
01/08/2023	EB2323660096	N7526 13.0-13.5	N7526	YTF SOB	Overburden	Clay	Dump	395,798	264,077	13.0	13.5	5.00	38			0.02	0.013	0.4	<0.5	0.1	1.7		Non-acid Forming (Barren)
01/08/2023	EB2323660101	N7526 15.5-16.0	N7526	YTF SOB	Overburden	Clay	Dump	395,798	264,077	15.5	16.0	5.00	58			0.04	0.011	0.3	<0.5	0.1	2.9		Non-acid Forming (Barren)
01/08/2023	EB2323660106	N7526 18.0-18.5	N7526	YTF SOB	Weathered coal	Coal	Dump	395,798	264,077	18.0	18.5	4.20	169			0.09	0.026	0.8	<0.5	0.5	0.5	21.4	Non-acid Forming (Barren)
01/08/2023	EB2323660110	N7526 20.0-20.5	N7526	YTF SOB	Weathered coal	Coal	Dump	395,798	264,077	20.0	20.5	4.80	140			0.37	0.023	0.7	<0.5	0.5	0.6	26.3	Non-acid Forming (Barren)
04/05/2022	EB2212349006	RGS_YTF_WW_03/3		YTF SOB	Weathered coal	Weathered coal	Wall	394,574	264,556			3.40	242	4.1	1.9	0.14	0.024	0.7	<0.5	0.5	0.3		Non-acid Forming (Barren)
04/05/2022	EB2212349007	RGS_YTF_WW_03/4		YTF SOB	Weathered coal	Weathered coal	Wall	394,574	264,556			3.50	45	4.3	2.6	0.24	0.031	0.9	<0.5	0.7	0.3		Non-acid Forming (Barren)
04/05/2022	EB2212349008	RGS_YTF_WW_04/1		YTF SOB	Overburden	Overburden	Wall	395,081	263,387			5.10	106	5.3	3.6	0.02	0.012	0.4	<0.5	0.1	0.7		Non-acid Forming (Barren)
04/05/2022	EB2212349009	RGS_YTF_WW_04/2		YTF SOB	Overburden	Overburden	Wall	395,081	263,387			4.30	251	5.5	4.6	0.44	0.033	1.0	<0.5	0.8	0.2		Non-acid Forming (Barren)
04/05/2022	EB2212349010	RGS_YTF_WW_04/03		YTF SOB	Overburden	Overburden	Wall	395,081	263,387			4.70	54	5.7	2.4	0.18	0.015	0.5	<0.5	0.2	0.5		Non-acid Forming (Barren)
04/05/2022	EB2212349011	RGS_YTF_WW_04/4		YTF SOB	Weathered coal	Weathered coal	Wall	395,081	263,387			3.40	458	3.7	2.4	0.15	0.014	0.4	<0.5	0.2	0.6		Non-acid Forming (Barren)
04/05/2022	EB2212349012	RGS_YTF_WW_05/1		YTF SOB	Weathered coal	Weathered coal	Wall	396,988	263,109			3.40	250	4	3.1	0.16	0.019	0.6	<0.5	0.3	0.4		Non-acid Forming (Barren)
04/05/2022	EB2212349013	RGS_YTF_WW_05/2		YTF SOB	Overburden	Overburden	Wall	396,988	263,109			4.70	1510	4.2	2.8	0.02	0.018	0.6	<0.5	0.3	0.5		Non-acid Forming (Barren)
04/05/2022	EB2212349014	RGS_YTF_WW_05/3		YTF SOB	Overburden	Overburden	Wall	396,988	263,109			5.20	206	5	3.2	0.03	0.016	0.5	<0.5	0.2	0.5		Non-acid Forming (Barren)
04/05/2022	EB2212349015	RGS_YTF_WW_05/04		YTF SOB	Weathered coal	Weathered coal	Wall	396,988	263,109			3.40	184	4.2	2.2	0.18	0.022	0.7	<0.5	0.4	0.4		Non-acid Forming (Barren)
04/05/2022	EB2212349016	RGS_YTF_WW_06/1		YTF SOB	Weathered coal	Weathered coal	Wall	397,790	264,023			3.60	172	4.2	2.3	0.19	0.019	0.6	<0.5	0.3	0.4		Non-acid Forming (Barren)
04/05/2022	EB2212349017	RGS_YTF_WW_06/2		YTF SOB	Weathered coal	Weathered coal	Wall	397,790	264,023			3.60	238	4.2	2.4	0.20	0.018	0.6	<0.5	0.3	0.5		Non-acid Forming (Barren)
04/05/2022	EB2212349018	RGS_YTF_WW_06/3		YTF SOB	Weathered coal	Weathered coal	Wall	397,790	264,023			3.40	126	3.6	1.5	0.22	0.016	0.5	<0.5	0.2	0.5		Non-acid Forming (Barren)
04/05/2022	EB2212349019	RGS_YTF_WW_06/4		YTF SOB	Weathered coal	Weathered coal	Wall	397,790	264,023			3.40	107	4.2	1.8	0.19	0.019	0.6	1.1	-0.5	1.9		Non-acid Forming (Barren)
04/05/2022	EB2212349020	RGS_YTF_WW_06/5		YTF SOB	Weathered coal	Weathered coal	Wall	397,790	264,023			3.50	213	4.4	1.9	0.20	0.025	0.8	<0.5	0.5	0.3		Non-acid Forming (Barren)
04/05/2022	EB2212349021	RGS_YTF_WW_06/6		YTF SOB	Weathered coal	Weathered coal	Wall	397,790	264,023			3.40	243	4.2	1.6	0.12	0.018	0.6	<0.5	0.3	0.5		Non-acid Forming (Barren)
04/05/2022	EB2212349022	RGS_YTF_WW_06/7		YTF SOB	Weathered coal	Weathered coal	Wall	397,790	264,023			3.60	118	4.5	1.7	0.13	0.016	0.5	<0.5	0.2	0.5		Non-acid Forming (Barren)
04/05/2022	EB2212349023	RGS_YTF_WW_06/8		YTF SOB	Overburden	Overburden	Wall	397,790	264,023			6.00	322	5.9	4.5	0.01	0.012	0.4	2.2	-1.8	6.0		Non-acid Forming (Barren)
15/09/2022	EB2227537017	2022057_017 EAY_KLC_C_17		YTF South West Batters	Weathered coal	Weathered coal	Wall	394,762	263,782			3.90	135			0.11	0.013	0.4	<0.5	0.1	0.6		Non-acid Forming (Barren)
15/09/2022	EB2227537018	2022057_018 EAY_KLC_C_18		YTF South West Batters	Weathered coal	Weathered coal	Wall	394,913	263,592			3.60	184			0.10	0.015	0.5	<0.5	0.2	0.5		Non-acid Forming (Barren)
15/09/2022	EB2227537019	2022057_019 EAY_KLC_C_19		YTF South West Batters	Weathered coal	Weathered coal	Wall	395,028	263,373			3.80	167			0.10	0.016	0.5	<0.5	0.2	0.5		Non-acid Forming (Barren)
15/09/2022	EB2227537020	2022057_020 EAY_KLC_C_20		YTF South West Batters	Weathered coal	Weathered coal	Wall	395,258	263,230			3.50	246			0.11	0.016	0.5	<0.5	0.2	0.5		Non-acid Forming (Barren)
15/09/2022	EB2227537021	2022057_021 EAY_KLC_C_21		YTF South West Batters	Weathered coal	Weathered coal	Wall	395,636	263,072			3.70	216			0.14	0.015	0.5	<0.5	0.2	0.5		Non-acid Forming (Barren)
15/09/2022	EB2227537022	2022057_022 EAY_KLC_C_22		YTF Floc Pond Batters	Weathered coal	Weathered coal	Wall	396,301	262,979			3.90	152			0.17	0.023	0.7	<0.5	0.5	0.4		Non-acid Forming (Barren)
15/09/2022	EB2227537023	2022057_023 EAY_KLC_C_23		YTF Floc Pond Batters	Weathered coal	Weathered coal	Wall	396,552	262,987			3.60	116			0.14	0.018	0.6	<0.5	0.3	0.5		Non-acid Forming (Barren)
15/09/2022	EB2227537024	2022057_024 EAY_KLC_C_24		YTF Floc Pond Batters	Weathered coal	Weathered coal	Wall	397,098	263,166			3.80	100			0.09	0.011	0.3	<0.5	0.1	0.7		Non-acid Forming (Barren)
15/09/2022	EB2227537025	2022057_025 EAY_KLC_C_25		YTF Floc Pond Batters	Weathered coal	Weathered coal	Wall	397,258	263,340			3.50	140			0.10	0.016	0.5	<0.5	0.2	0.5		Non-acid Forming (Barren)
15/09/2022	EB2227537026	2022057_026 EAY_KLC_C_26		YTF Floc Pond Batters	Weathered coal	Weathered coal	Wall	397,592	263,690			3.50	186			0.11	0.007	0.2	<0.5	0.0	1.2		Non-acid Forming (Barren)
15/09/2022	EB2227537027	2022057_027 EAY_KLC_C_27		YTF Fire Service Pond Batters	Weathered coal	Weathered coal	Wall	397,768	263,906			3.50	76			0.12	0.018	0.6	<0.5	0.3	0.5		Non-acid Forming (Barren)
15/09/2022	EB2227537028	2022057_028 EAY_KLC_C_28		YTF Fire Service Pond Batters	Weathered coal	Weathered coal	Wall	397,787	264,233			3.50	93			0.10	0.018	0.6	<0.5	0.3	0.5		Non-acid Forming (Barren)
15/09/2022	EB2227537029	2022057_029 EAY_KLC_C_29		YTF Fire Service Pond Batters	Weathered coal	Weathered coal	Wall	397,720	264,664			3.40	189			0.12	0.022	0.7	<0.5	0.4	0.4		Non-acid Forming (Barren)
15/09/2022	EB2227537030	2022057_030 EAY_KLC_C_30		YTF Raw Coal Bunker Batters	Weathered coal	Weathered coal	Wall	396,826	267,739			3.50	185			0.16	0.050	1.5	<0.5	1.3	0.2		Non-acid Forming (Barren)
15/09/2022	EB2227537031	2022057_031 EAY_KLC_C_31		YTF Raw Coal Bunker Batters	Weathered coal	Weathered coal	Wall	396,720	267,460			3.40	571			0.18	0.023	0.7	<0.5	0.5	0.4		Non-acid Forming (Barren)
15/09/2022	EB2227537073	2022057_073 EAY_KLC_OB_3		YTF Floc Pond Batters	Overburden	Overburden	Wall	396,729	262,873			5.30	119			0.02	0.013	0.4	2.0	-1.6	5.0		Non-acid Forming (Barren)
23/03/2023	EB2308909073	N7437_0 - 0.5	N7437	YEF OB	Overburden	Sand	Dump	398,648	267,407	0.0	0.5	6.0	19			0.01	<0.005	0.1	5.9	-5.8	77.1	0.19	Uncertain
18/04/2023	EB2311554022	N7437_10 - 10.5	N7437	YEF OB	Overburden	Clay	Dump	398,648	267,407	10.0	10.5	3.70	756			0.32	0.063	1.9	<0.5	1.7	0.1		Non-acid Forming (Barren)
18/04/2023	EB2311554026	N7437_16 - 16.5	N7437	YEF OB	Weathered coal	Coal	Dump	398,648	267,407	16.0	16.5	4.30	366			0.51	0.032	1.0	<0.5	0.7	0.3	36.0	Non-acid Forming (Barren)
18/04/2023	EB2311554030	N7438_13 - 13.5	N7438	YEF OB	Overburden	Sand	Dump	399,099	267,595	13.0	13.5	3.70	788			2.14	1.85	56.7	<0.5	56.4	<0.01	0.49	Potentially Acid Forming
18/04/2023	EB2311554032	N7438_16 - 16.5	N7438	YEF OB	Overburden	Sand	Dump	399,099	267,595	16.0	16.5	3.20	1280			6.54	5.16	158.0	<0.5	157.8	<0.01		Potentially Acid Forming
18/04/2023	EB2311554035	N7438_20.5 - 21	N7438	YEF OB	Weathered coal	Coal	Dump	399,099	267,595	20.5	21.0	3.90	726			0.24	0.099	3.0	<0.5	2.8	0.1		Non-acid Forming (Barren)
18/04/2023	EB2311554038	N7438_25 - 25.5	N7438	YEF OB	Overburden	Sand	Dump	399,099	267,595	25.0	25.5	3.90	529			1.18	0.965	29.6	<0.5	29.3	<0.01		Potentially Acid Forming
18/04/2023	EB2311554039	N7438_26.5 - 27	N7438	YEF OB	Overburden	Sand	Dump	399,099	267,595	26.5	27.0	3.60	1190			2.36	1.90	58.2	<0.5	57.9	<0.01		Potentially Acid Forming
23/03/2023	EB2308891079	N7439_11.5 - 12	N7439	YEF OB	Overburden	Sand	Dump	399,636	267,596	11.5	12.0	5.8	47			0.02	0.012	0.4	5.4	-5.0	14.7	0.08	Non-acid Forming (Barren)
23/03/2023	EB2308891089	N7439_26.5 - 27	N7439	YEF OB	Weathered coal	Coal	Dump	399,636	267,596	26.5	27.0	5.4	66			0.04	0.044	1.3	6.6	-5.3	4.9		Non-acid Forming (Barren)
23/03/2023	EB2308891092	N7439_33.5 - 34	N7439	YEF OB	Overburden	Clay	Dump	399,636	267,596	33.5	34.0	5	89			0.24	0.025	0.8	1.3	-0.5	1.7		Non-acid Forming (Barren)
23/03/2023	EB2308891039	N7440_4 - 4.5	N7440	YEF OB	Weathered coal	Coal	Dump	399,417	267,347	4.0	4.5	5.3	91			0.04	0.013	0.4	3.0	-2.6	7.5		Non-acid Forming (Barren)
23/03/2023	EB2308891047	N7440_16 - 16.5	N7440	YEF OB	Weathered coal	Coal	Dump	399,417	267,347	16.0	16.5	4.8	45			0.07	0.016	0.5	2.1	-1.6	4.3		Non-acid Forming (Barren)
23/03/2023	EB2308891049	N7440_19 - 19.5	N7440	YEF OB	Weathered coal	Coal	Dump	399,417	267,347	19.0	19.5	4.2	392			0.31	0.233	7.1	0.6	6.5	0.1		Potentially Acid Forming (Low Capacity)
23/03/2023	EB2308891051	N7440_22 - 22.5	N7440	YEF OB	Overburden	Sand	Dump	399,417	267,347	22.0	22.5	3.8	493			0.70	0.600	18.4	<0.5	18.1	0.0	0.49	Potentially Acid Forming
23/03/2023	EB2308891054	N7440_26.5 - 27	N7440	YEF OB	Overburden	Sand	Dump	399,417	267,347	26.5	27.0	3.6	1190			5.20	4.38	134.1	<0.5	133.9	<0.01	2.42	Potentially Acid Forming
23/03/2023	EB2308891055	N7440_28 - 28.5	N7440	YEF OB	Overburden	Sand	Dump	399,417	267,347	28.0	28.5	3.4	1160			5.54	4.46	136.6	0.6	136.0	<0.01	15.4	Potentially Acid Forming
23/03/2023	EB2308889003	N7441_1 - 1.5	N7441	YEF OB	Weathered coal	Coal	Dump	399,900	267,465	1.0	1.5	3.5	385			0.85	0.547	16.8	<0.5	16.5	0.0		Potentially Acid Forming
23/03/2023	EB2308889004	N7441_1.5 - 2	N7441	YEF OB	Weathered coal	Coal	Dump	399,900	267,465	1.5	2.0	3.4	763			0.74	0.385	11.8	<0.5	11.5	0.0		Potentially Acid Forming
23/03/2023	EB2308889005	N7441_2 - 2.5	N7441	YEF OB	Weathered coal	Coal	Dump	399,900	267,465	2.0	2.5	3.7	468			0.50	0.214	6.6	<0.5	6.3	0.0		Potentially Acid Forming (Low Capacity)

Table B1: Acid-base Account Results for Samples from the Yallourn Project

Date	ALS Lab ID	Client Sample ID	Drill Hole ID	Location[1]	Sample Lithology	Description	Dump/Wall Sample	Easting	Northing	From	To	pH (1:5)	EC (1:5)	pH_F	pH_{FOX}	Total Sulfur	S_{CR}[2]	MPA[2]	ANC[2]	NAPP[2+]	ANC:MPA[2]	TOC[2]	Geochemical Classification[3]
								SECLV		(m)			(µS/cm)			(%)	(%)	(kg H_2SO_4/t)			Ratio	(% C)	
23/03/2023	EB2308889006	N7441_2.5 - 3	N7441	YEF OB	Weathered coal	Coal	Dump	399,900	267,465	2.5	3.0	3.1	870			1.68	1.14	34.9	<0.5	34.7	<0.01	34.2	Potentially Acid Forming
23/03/2023	EB2308889008	N7441_3.5 - 4	N7441	YEF OB	Overburden	Sand	Dump	399,900	267,465	3.5	4.0	3.8	524			0.80	0.562	17.2	<0.5	17.0	0.0	18.9	Potentially Acid Forming
23/03/2023	EB2308889020	N7441_9.5 - 10	N7441	YEF OB	Overburden	Sand	Dump	399,900	267,465	9.5	10.0	5.8	33			<0.01	<0.005	0.1	6.1	-6.0	79.7		Uncertain
23/03/2023	EB2308889035	N7441_17 - 17.5	N7441	YEF OB	Overburden	Sand	Dump	399,900	267,465	17.0	17.5	3.5	760			0.94	0.888	27.2	1.2	26.0	0.0	0.07	Potentially Acid Forming
23/03/2023	EB2308889038	N7441_18.5 - 19	N7441	YEF OB	Overburden	Sand	Dump	399,900	267,465	18.5	19.0	5.9	27			0.02	0.018	0.6	3.7	-3.1	6.7		Non-acid Forming (Barren)
23/03/2023	EB2308889043	N7441_21 - 21.5	N7441	YEF OB	Overburden	Sand	Dump	399,900	267,465	21.0	21.5	5.9	39			<0.01	0.007	0.2	4.2	-4.0	19.6	0.08	Non-acid Forming (Barren)
23/03/2023	EB2308889048	N7441_23.5 - 24	N7441	YEF OB	Weathered coal	Coal	Dump	399,900	267,465	23.5	24.0	4.4	302			0.25	0.196	6.0	3.7	2.3	0.6		Uncertain
23/03/2023	EB2308889049	N7441_24 - 24.5	N7441	YEF OB	Overburden	Sand	Dump	399,900	267,465	24.0	24.5	3.4	1200			4.70	3.92	120.1	<0.5	119.8	<0.01	5.83	Potentially Acid Forming
23/03/2023	EB2308889058	N7441_28.5 - 29	N7441	YEF OB	Overburden	Sand	Dump	399,900	267,465	28.5	29.0	3.9	428			0.74	0.695	21.3	6.2	15.1	0.3		Potentially Acid Forming
23/03/2023	EB2308889078	N7442_14 - 14.5	N7442	YEF OB	Overburden	Sand	Dump	400,515	267,601	14.0	14.5	6	40			0.01	0.015	0.5	3.9	-3.4	8.5	0.12	Non-acid Forming (Barren)
23/03/2023	EB2308889084	N7442_17 - 17.5	N7442	YEF OB	Overburden	Clay	Dump	400,515	267,601	17.0	17.5	2.8	1340			2.81	2.02	61.9	<0.5	61.6	<0.01		Potentially Acid Forming
23/03/2023	EB2308889091	N7442_21.5 - 22	N7442	YEF OB	Overburden	Sand	Dump	400,515	267,601	21.5	22.0	5.9	40			<0.01	<0.005	0.1	3.9	-3.8	50.9		Uncertain
23/03/2023	EB2308889092	N7442_22 - 22.5	N7442	YEF OB	Weathered coal	Coal	Dump	400,515	267,601	22.0	22.5	4.2	278			0.49	0.225	6.9	<0.5	6.6	0.0		Potentially Acid Forming (Low Capacity)
23/03/2023	EB2308891001	N7442_26.5 - 27	N7442	YEF OB	Weathered coal	Coal	Dump	400,515	267,601	26.5	27.0	3.7	510			0.31	0.195	6.0	<0.5	5.7	0.0		Potentially Acid Forming (Low Capacity)
23/03/2023	EB2308891002	N7442_27 - 27.5	N7442	YEF OB	Overburden	Sand	Dump	400,515	267,601	27.0	27.5	3.7	380			0.79	0.713	21.8	1.3	20.5	0.1		Potentially Acid Forming
23/03/2023	EB2308891003	N7442_27.5 - 28	N7442	YEF OB	Overburden	Sand	Dump	400,515	267,601	27.5	28.0	3.4	1660			1.33	1.25	38.3	7.4	30.9	0.2		Potentially Acid Forming
23/03/2023	EB2308891005	N7442_28.5 - 29	N7442	YEF OB	Overburden	Sand	Dump	400,515	267,601	28.5	29.0	3.3	474			1.88	1.66	50.8	6.9	43.9	0.1	6.34	Potentially Acid Forming
23/03/2023	EB2308891008	N7442_30 - 30.5	N7442	YEF OB	Overburden	Sand	Dump	400,515	267,601	30.0	30.5	3.9	349			0.53	0.414	12.7	1.6	11.1	0.1	8.56	Potentially Acid Forming
23/03/2023	EB2308891015	N7508_4.5 - 5	N7508	YEF OB	Overburden	Sand	Dump	399,385	268,024	4.5	5.0	5.8	28			<0.01	<0.005	0.1	4.7	-4.6	61.4		Uncertain
23/03/2023	EB2308891026	N7508_21 - 21.5	N7508	YEF OB	Overburden	Sand	Dump	399,385	268,024	21.0	21.5	5.8	56			0.01	0.008	0.2	3.9	-3.7	15.9	0.11	Non-acid Forming (Barren)
23/03/2023	EB2308909083	N7445_5.5 - 6	N7445	YEF OB	Overburden	Sand	Dump	400,396	267,325	5.5	6.0	4.7	278			0.65	0.561	17.2	5.1	12.1	0.3		Potentially Acid Forming
23/03/2023	EB2308909086	N7445_7 - 7.5	N7445	YEF OB	Overburden	Sand	Dump	400,396	267,325	7.0	7.5	4.4	968			2.27	2.09	64.0	<0.5	63.8	<0.01	0.18	Potentially Acid Forming
23/03/2023	EB2308909092	N7445_10 - 10.5	N7445	YEF OB	Overburden	Sand	Dump	400,396	267,325	10.0	10.5	5.3	63			0.08	0.060	1.8	4.3	-2.5	2.3		Non-acid Forming (Barren)
23/03/2023	EB2308909093	N7445_10.5 - 11	N7445	YEF OB	Overburden	Sand	Dump	400,396	267,325	10.5	11.0	4.1	434			0.76	0.727	22.3	1.1	21.2	0.0	0.07	Potentially Acid Forming
18/04/2023	EB2311554043	N7445_1 - 1.5	N7445	YEF OB	Overburden	Sand	Dump	400,396	267,325	1.0	1.5	5.70	18			0.01	0.007	0.2	7.2	-7.0	33.6		Non-acid Forming (Barren)
18/04/2023	EB2311554047	N7445_3 - 3.5	N7445	YEF OB	Overburden	Sand	Dump	400,396	267,325	3.0	3.5	5.90	12			<0.01	0.007	0.2	8.3	-8.1	38.7	0.04	Non-acid Forming (Barren)
18/04/2023	EB2311554053	N7445_13.5 - 14	N7445	YEF OB	Overburden	Sand	Dump	400,396	267,325	13.5	14.0	3.90	523			0.78	0.696	21.3	<0.5	21.1	0.0		Potentially Acid Forming
23/03/2023	EB2308902090	N7446_2.5 - 3	N7446	YEF Northern Batters Ex-pit OB	Overburden	Sand	Dump	398,110	267,939	2.5	3.0	7	69			0.01	<0.005	0.1	9.3	-9.2	121.5	0.42	Uncertain
23/03/2023	EB2308902092	N7446_5.5 - 6	N7446	YEF Northern Batters Ex-pit OB	Weathered coal	Coal	Dump	398,110	267,939	5.5	6.0	5.7	112			0.05	0.022	0.7	2.6	-1.9	3.9		Non-acid Forming (Barren)
23/03/2023	EB2308902094	N7446_8.5 - 9	N7446	YEF Northern Batters Ex-pit OB	Weathered coal	Coal	Dump	398,110	267,939	8.5	9.0	5.7	129			0.04	0.013	0.4	4.5	-4.1	11.3		Non-acid Forming (Barren)
23/03/2023	EB2308902079	N7447_10 - 10.5	N7447	YEF Northern Batters Ex-pit OB	Overburden	Clay	Dump	398,444	267,910	10.0	10.5	6.5	31			0.01	<0.005	0.1	7.3	-7.2	95.3	0.18	Uncertain
23/03/2023	EB2308902081	N7447_13 - 13.5	N7447	YEF Northern Batters Ex-pit OB	Overburden	Sand	Dump	398,444	267,910	13.0	13.5	5.9	93			0.03	0.010	0.3	8.0	-7.7	26.1		Non-acid Forming (Barren)
04/05/2022	EB2212349034	RGS_YEF_WW_01/1		YEF	Weathered coal	Weathered coal	Wall	398,174	267,533			4.10	209	4.7	1.5	0.10	0.02	0.6	<0.5	0.4	0.4		Non-acid Forming (Barren)
04/05/2022	EB2212349035	RGS_YEF_WW_01/2		YEF	Weathered coal	Weathered coal	Wall					3.40	307	4	1.8	0.13	0.016	0.5	<0.5	0.2	0.5		Non-acid Forming (Barren)
04/05/2022	EB2212349036	RGS_YEF_WW_01/3		YEF	Weathered coal	Weathered coal	Wall					3.80	239	4.3	1.4	0.11	0.016	0.5	<0.5	0.2	0.5		Non-acid Forming (Barren)
04/05/2022	EB2212349037	RGS_YEF_WW_01/4		YEF	Weathered coal	Weathered coal	Wall					3.70	113	4.7	1.5	0.12	0.021	0.6	<0.5	0.4	0.4		Non-acid Forming (Barren)
04/05/2022	EB2212349038	RGS_YEF_WW_2/1		YEF	Weathered coal	Weathered coal	Wall					3.80	192	4.8	1.5	0.12	0.018	0.6	<0.5	0.3	0.5		Non-acid Forming (Barren)
04/05/2022	EB2212349039	RGS_YEF_WW_02/2		YEF	Weathered coal	Weathered coal	Wall	399,236	268,063			3.60	159	4.6	1.4	0.13	0.018	0.6	<0.5	0.3	0.5		Non-acid Forming (Barren)
04/05/2022	EB2212349040	RGS_YEF_WW_02/3		YEF	Weathered coal	Weathered coal	Wall					3.60	152	4.3	1.6	0.14	0.022	0.7	<0.5	0.4	0.4		Non-acid Forming (Barren)
04/05/2022	EB2212349041	RGS_YEF_WW_03/1		YEF	Weathered coal	Weathered coal	Wall	400,589	268,243			3.50	361	4.3	1.3	0.16	0.019	0.6	<0.5	0.3	0.4		Non-acid Forming (Barren)
04/05/2022	EB2212349042	RGS_YEF_WW_03/2		YEF	Weathered coal	Weathered coal	Wall	400,589	268,243			3.60	141	4.4	1.3	0.17	0.024	0.7	<0.5	0.5	0.3		Non-acid Forming (Barren)
04/05/2022	EB2212349043	RGS_YEF_WW_03/3		YEF	Weathered coal	Weathered coal	Wall	401,199	268,259			4.00	121	4	1.2	0.17	0.023	0.7	<0.5	0.5	0.4		Non-acid Forming (Barren)
04/05/2022	EB2212349044	RGS_YEF_WW_04/1		YEF	Weathered coal	Weathered coal	Wall	401,083	267,712			3.90	106	4	1.1	0.14	0.015	0.5	<0.5	0.2	0.5		Non-acid Forming (Barren)
04/05/2022	EB2212349045	RGS_YEF_WW_05/01		YEF	Soil	Rehab material	Wall	401,041	267,482			5.60	114	5.9	2.8	0.02	0.013	0.4	1.6	-1.2	4.0		Non-acid Forming (Barren)
15/09/2022	EB2227537032	2022057_032 EAY_KLC_C_32		YEF Northern Batters	Weathered coal	Weathered coal	Wall	398,189	267,551			3.70	151			0.10	0.020	0.6	<0.5	0.4	0.4		Non-acid Forming (Barren)
15/09/2022	EB2227537033	2022057_033 EAY_KLC_C_33		YEF Northern Batters	Weathered coal	Weathered coal	Wall	398,428	267,673			3.40	198			0.10	0.018	0.6	<0.5	0.3	0.5		Non-acid Forming (Barren)
15/09/2022	EB2227537034	2022057_034 EAY_KLC_C_34		YEF Northern Batters	Weathered coal	Weathered coal	Wall	398,272	267,536			3.70	163			0.04	0.015	0.5	<0.5	0.2	0.5		Non-acid Forming (Barren)
15/09/2022	EB2227537035	2022057_035 EAY_KLC_C_35		YEF Northern Batters	Weathered coal	Weathered coal	Wall	398,876	267,872			4.10	117			0.08	0.013	0.4	<0.5	0.1	0.6		Non-acid Forming (Barren)
15/09/2022	EB2227537036	2022057_036 EAY_KLC_C_36		YEF Northern Batters	Weathered coal	Weathered coal	Wall	399,532	268,154			3.80	121			0.09	0.012	0.4	<0.5	0.1	0.7		Non-acid Forming (Barren)
15/09/2022	EB2227537039	2022057_039 EAY_KLC_C_39		YEF Northern Batters	Weathered coal	Weathered coal	Wall	399,267	268,205			4.40	104			0.19	0.022	0.7	<0.5	0.4	0.4		Non-acid Forming (Barren)
15/09/2022	EB2227537040	2022057_040 EAY_KLC_C_40		YEF Northern Batters	Weathered coal	Weathered coal	Wall	398,884	267,991			3.00	306			0.18	0.021	0.6	<0.5	0.4	0.4		Non-acid Forming (Barren)
15/09/2022	EB2227537041	2022057_041 EAY_KLC_C_41		YEF Northern Batters	Weathered coal	Weathered coal	Wall	397,959	267,472			5.00	150			0.12	0.016	0.5	<0.5	0.2	0.5		Non-acid Forming (Barren)
15/09/2022	EB2227537037	2022057_037 EAY_KLC_C_37		YEF Latrobe River Batters	Weathered coal	Weathered coal	Wall	399,930	268,126			3.80	131			0.08	0.010	0.3	<0.5	0.1	0.8		Non-acid Forming (Barren)
15/09/2022	EB2227537038	2022057_038 EAY_KLC_C_38		YEF Latrobe River Batters	Weathered coal	Weathered coal	Wall	399,891	268,181			3.70	162			0.11	0.020	0.6	<0.5	0.4	0.4		Non-acid Forming (Barren)
15/09/2022	EB2227537058	2022057_058 EAY_KLC_C_58		YEFX Latrobe River Batters	Weathered coal	Coal	Wall	400,586	268,304			4.10	70			0.16	0.019	0.6	<0.5	0.3	0.4		Non-acid Forming (Barren)
15/09/2022	EB2227537075	2022057_075 EAY_KLC_OB_5		YEF Latrobe River Batters	Overburden	Overburden	Wall	399,298	268,234			6.20	44			0.01	0.012	0.4	3.4	-3.0	9.3		Non-acid Forming (Barren)
15/09/2022	EB2227537046	2022057_046 EAY_KLC_C_46		YEF Pit Floor	Weathered coal	Weathered coal	Wall	398,420	266,973			3.50	394			0.22	0.012	0.4	<0.5	0.1	0.7		Non-acid Forming (Barren)
15/09/2022	EB2227537047	2022057_047 EAY_KLC_C_47		YEF Pit Floor	Weathered coal	Weathered coal	Wall	398,517	266,855			3.90	80			0.14	0.017	0.5	<0.5	0.3	0.5		Non-acid Forming (Barren)
15/09/2022	EB2227537048	2022057_048 EAY_KLC_C_48		YEF Pit Floor	Weathered coal	Weathered coal	Wall	398,670	266,721			4.70	92			0.18	0.017	0.5	<0.5	0.3	0.5		Non-acid Forming (Barren)
15/09/2022	EB2227537061	2022057_061 EAY_KLC_C_61		YEFX	Weathered coal	Coal	Wall	401,028	267,985			4.10	132			0.12	0.016	0.5	<0.5	0.2	0.5		Non-acid Forming (Barren)
15/09/2022	EB2227537062	2022057_062 EAY_KLC_C_62		YEFX	Weathered coal	Coal	Wall	400,714	267,990			4.20	108			0.10	0.013	0.4	<0.5	0.1	0.6		Non-acid Forming (Barren)
15/09/2022	EB2227537056	2022057_056 EAY_KLC_C_56		YEFX Latrobe Road Batters	Weathered coal	Coal	Wall	401,210	267,965			4.00	171			0.24	0.024	0.7	<0.5	0.5	0.3		Non-acid Forming (Barren)
15/09/2022	EB2227537057	2022057_057 EAY_KLC_C_57		YEFX Latrobe Road Batters	Weathered coal	Coal	Wall	401,266	268,257			3.50	443			0.53	0.205	6.3	<0.5	6.0	0.0		Potentially Acid Forming (Low Capacity)
15/09/2022	EB2227537059	2022057_059 EAY_KLC_C_59		YEFX Latrobe Road Batters	Weathered coal	Coal	Wall	401,128	267,958			4.10	103			0.11	0.019	0.6	<0.5	0.3	0.4		Non-acid Forming (Barren)
15/09/2022	EB2227537060	2022057_060 EAY_KLC_C_60		YEFX Latrobe Road Batters	Weathered coal	Coal	Wall	401,070	267,656			4.00	312			0.12	0.014	0.4	<0.5	0.2	0.6		Non-acid Forming (Barren)
15/09/2022	EB2227537078	2022057_078 EAY_KLC_OB_8		YEFX Latrobe Road Batters	Overburden	Overburden	Wall	401,182	267,126			5.60	107			0.01	0.011	0.3	3.5	-3.2	10.4		Non-acid Forming (Barren)
18/04/2023	EB2311551012	M4223_5.5 - 6	M4223	Western truck dump 4 north	Overburden	Clay	Dump	398,723	266,322	5.5	6.0	6.10	71			0.02	0.012	0.4	1.4	-1.0	3.8		Non-acid Forming (Barren)
18/04/2023	EB2311551013	M4223_6 - 6.5	M4223	Western truck dump 4 north	Overburden	Sand	Dump	398,723	266,322	6.0	6.5	6.50	42			0.01	0.009	0.3	5.8	-5.5	21.0	0.05	Non-acid Forming (Barren)
18/04/2023	EB2311551024	M4223_12 - 12.5	M4223	Western truck dump 4 north	Overburden	Sand	Dump	398,723	266,322	12.0	12.5	6.30	62			0.01	0.011	0.3	5.6	-5.3	16.6		Non-acid Forming (Barren)
18/04/2023	EB2311551032	M4223_16 - 16.5	M4223	Western truck dump 4 north	Overburden	Sand	Dump	398,723	266,322	16.0	16.5	6.50	53			0.01	<0.005	0.1	5.8	-5.7	75.8	0.05	Uncertain
18/04/2023	EB2311551040	M4223_20 - 20.5	M4223	Western truck dump 4 north	Weathered coal	Coal	Dump	398,723	266,322	20.0	20.5	4.40	180			0.06	0.006	0.2	<0.5	-0.1	1.4		Non-acid Forming (Barren)
18/04/2023	EB2311551044	M4224_1.5 - 2	M4224	Western truck dump 4 south	Overburden	Sand	Dump	398,826	266,044	1.5	2.0	6.30	67			0.01	0.013	0.4	6.1	-5.7	15.3		Non-acid Forming (Barren)
18/04/2023	EB2311551054	M4224_6.5 - 7	M4224	Western truck dump 4 south	Overburden	Clay	Dump	398,826	266,044	6.5	7.0	6.10	83			0.01	<0.005	0.1	5.2	-5.1	67.9		Uncertain
20/04/2023	EB2311858116	N7444 0.5 - 1	N7444	YMF	Overburden	Clay	Dump	399,511	266,704	0.5	1.0	5.9	49			<0.01	0.012	0.4	<0.5	0.1	0.7		Non-acid Forming (Barren)
20/04/2023	EB2311858120	N7444 2.5 - 3	N7444	YMF	Overburden	Sand	Dump	399,511	266,704	2.5	3.0	6.3	68			<0.01	0.015	0.5	<0.5	0.2	0.5	0.09	Non-acid Forming (Barren)
20/04/2023	EB2311858129	N7444 7 - 7.5	N7444	YMF	Overburden	Sand	Dump	399,511	266,704	7.0	7.5	6.1	69			<0.01	0.014	0.4	<0.5	0.2	0.6		Non-acid Forming (Barren)
20/04/2023	EB2311858130	N7444 7.5 - 8	N7444	YMF	Overburden	Sand	Dump	399,511	266,704	7.5	8.0	6	75			<0.01	0.013	0.4	<0.5	0.1	0.6		Non-acid Forming (Barren)
20/04/2023	EB2311867111	N7509 0.5 - 1	N7509	YMF	Overburden	Clay	Dump	399,831	266,776	0.5	1.0	5.4	240			0.02	<0.005	0.1	<0.5	-0.2	3.3	0.12	Uncertain
20/04/2023	EB2311867113	N7509 1.5 - 2	N7509	YMF	Overburden	Clay	Dump	399,831	266,776	1.5	2.0	6	261			0.02	0.007	0.2	1.2	-1.0	5.6		Non-acid Forming (Barren)
20/04/2023	EB2311867121	N7509 5.5 - 6	N7509	YMF	Overburden	Sand	Dump	399,831	266,776	5.5	6.0	6.3	41			<0.01	<0.005	0.1	<0.5	-0.2	3.3		Uncertain
18/04/2023	EB2311555001	N7510_0 - 0.5	N7510	(East Field sump pond)	Overburden	Clay	Dump	399,600	266,913	0.0	0.5	3.90	659			0.11	<0.005	0.1	<0.5	-0.2	3.3	10.5	Uncertain
18/04/2023	EB2311555005	N7510_2 - 2.5	N7510	(East Field sump pond)	Overburden	Clay	Dump	399,600	266,913	2.0	2.5	6.00	99			0.02	0.008	0.2	6.9	-6.7	28.2		Non-acid Forming (Barren)
18/04/2023	EB2311555011	N7510_5 - 5.5	N7510	(East Field sump pond)	Overburden	Clay	Dump	399,600	266,913	5.0	5.5	5.70	76			0.02	0.006	0.2	7.7	-7.5	41.9		Non-acid Forming (Barren)
18/04/2023	EB2311555020	N7510_9.5 - 10	N7510	(East Field sump pond)	Overburden	Clay	Dump	399,600	266,913	9.5	10.0	5.60	89			0.01	0.010	0.3	7.5	-7.2	24.5	0.23	Non-acid Forming (Barren)
04/05/2022	EB2212349024	RGS_YMF_WW_01/1		YMF	Weathered coal	Weathered coal	Wall	398,463	266,400			3.40	208	4.2	1.4	0.14	0.022	0.7	<0.5	0.4	0.4		Non-acid Forming (Barren)
04/05/2022	EB2212349025	RGS_YMF_WW_01/2		YMF	Weathered coal	Weathered coal	Wall	398,463	266,400			3.70	200	4.7	1.6	0.13	0.02	0.6	<0.5	0.4	0.4		Non-acid Forming (Barren)
04/05/2022	EB2212349026	RGS_YMF_WW_02/1		YMF	Weathered coal	Weathered coal	Wall	398,641	265,702			3.70	160	4.8	2	0.12	0.014	0.4	<0.5	0.2	0.6		Non-acid Forming (Barren)

Table B1: Acid-base Account Results for Samples from the Yallourn Project

Date	ALS Lab ID	Client Sample ID	Drill Hole ID	Location[1]	Sample Lithology	Description	Dump/Wall Sample	Easting	Northing	From	To	pH (1:5)	EC (1:5)	pH_F	pH_{FOX}	Total Sulfur	S_{CR}[2]	MPA[2]	ANC[2]	NAPP[2,*]	ANC:MPA[2]	TOC[2]	Geochemical Classification[3]
								SECLV		(m)			(µS/cm)			(%)	(%)	(kg H_2SO_4/t)			Ratio	(% C)	
04/05/2022	EB2212349027	RGS_YMF_WW_03/02		YMF	Fresh coal	Fresh coal	Wall					4.20	208	4.6	1.6	0.16	0.017	0.5	<0.5	0.3	0.5		Non-acid Forming (Barren)
04/05/2022	EB2212349028	RGS_YMF_WW_04/1		YMF	Weathered coal	Weathered coal	Wall	398,420	266,093			3.80	133	4.6	1.9	0.21	0.022	0.7	0.7	0.0	1.0		Non-acid Forming (Barren)
04/05/2022	EB2212349029	RGS_YMF_WW_5/1		YMF	Fresh coal	Fresh coal	Wall					4.20	100	5	2	0.12	0.017	0.5	<0.5	0.3	0.5		Non-acid Forming (Barren)
04/05/2022	EB2212349030	RGS_YMF_WW_5/2		YMF	Overburden	Overburden	Wall	398,683	265,255			6.00	61	5.3	3	0.02	0.02	0.6	<0.5	0.4	0.4		Non-acid Forming (Barren)
04/05/2022	EB2212349031	RGS_YMF_WW_05/3		YMF	Overburden	Overburden	Wall	398,683	265,255			5.40	115	4.2	2.6	0.02	0.012	0.4	<0.5	0.1	0.7		Non-acid Forming (Barren)
04/05/2022	EB2212349032	RGS_YMF_WW_06/1		YMF	Overburden	Overburden	Wall	399,936	265,214			5.50	35	5	3.4	<0.01	0.016	0.5	<0.5	0.2	0.5		Non-acid Forming (Barren)
04/05/2022	EB2212349033	RGS_YMF_WW_06/02		YMF	Overburden	Overburden	Wall	399,936	265,214			5.60	115	4.6	2.7	0.01	0.011	0.3	<0.5	0.1	0.7		Non-acid Forming (Barren)
04/05/2022	EB2212349048	RGS_YMF_C_01		YMF	Weathered coal	Weathered coal	Wall	399,002	266,326			3.90	127	4.3	2	0.12	0.015	0.5	<0.5	0.2	0.5		Non-acid Forming (Barren)
04/05/2022	EB2212349049	RGS_YMF_C_02		YMF	Weathered coal	Weathered coal	Wall	399,119	266,189			3.90	308	4.4	2	0.14	0.019	0.6	<0.5	0.3	0.4		Non-acid Forming (Barren)
04/05/2022	EB2212349050	RGS_YMF_C_03		YMF	Weathered coal	Weathered coal	Wall	399,030	265,792			3.70	295	4.1	1.3	0.18	0.019	0.6	1.1	-0.5	1.9		Non-acid Forming (Barren)
04/05/2022	EB2212349051	RGS_YMF_C_04		YMF	Weathered coal	Weathered coal	Wall	399,180	265,812			3.90	809	4.4	1.6	0.21	0.025	0.8	<0.5	0.5	0.3		Non-acid Forming (Barren)
04/05/2022	EB2212349052	RGS_YMF_C_05		YMF	Weathered coal	Weathered coal	Wall	399,274	265,959			4.20	152	4.6	1.4	0.55	0.032	1.0	1.4	-0.4	1.4		Non-acid Forming (Barren)
04/05/2022	EB2212349053	RGS_YMF_C_06		YMF	Weathered coal	Weathered coal	Wall	399,464	266,000			4.40	140	4.5	1.5	0.18	0.021	0.6	<0.5	0.4	0.4		Non-acid Forming (Barren)
04/05/2022	EB2212349054	RGS_YMF_C_07		YMF	Weathered coal	Weathered coal	Wall	399,542	265,870			4.10	384	4.4	1.4	0.17	0.020	0.6	1.6	-1.0	2.6		Non-acid Forming (Barren)
04/05/2022	EB2212349055	RGS_YMF_C_08		YMF	Fresh coal	Fresh coal	Wall	399,861	265,967			4.30	151	5.1	1.4	0.20	0.032	1.0	<0.5	0.7	0.3		Non-acid Forming (Barren)
04/05/2022	EB2212349056	RGS_YMF_C_09		YMF	Fresh coal	Fresh coal	Wall	399,880	265,873			4.10	220	5.2	1.5	0.19	0.015	0.5	0.8	-0.3	1.7		Non-acid Forming (Barren)
04/05/2022	EB2212349057	RGS_YMF_C_10		YMF	Fresh coal	Fresh coal	Wall	399,708	265,854			4.00	126	4.8	1.4	0.16	0.017	0.5	2.0	-1.5	3.8		Non-acid Forming (Barren)
04/05/2022	EB2212349058	RGS_YMF_C_11		YMF	Fresh coal	Fresh coal	Wall	399,532	265,821			3.80	231	4.5	1.6	0.17	0.017	0.5	<0.5	0.3	0.5		Non-acid Forming (Barren)
04/05/2022	EB2212349059	RGS_YMF_C_12		YMF	Fresh coal	Fresh coal	Wall	399,361	265,774			4.30	263	4.6	1.5	0.20	0.022	0.7	<0.5	0.4	0.4		Non-acid Forming (Barren)
04/05/2022	EB2212349060	RGS_YMF_C_13		YMF	Fresh coal	Fresh coal	Wall	398,805	265,673			4.20	167	5	1.7	0.16	0.019	0.6	<0.5	0.3	0.4		Non-acid Forming (Barren)
04/05/2022	EB2212349061	RGS_YMF_C_14		YMF	Fresh coal	Fresh coal	Wall	399,001	265,698			4.60	132	4.7	1.4	0.22	0.022	0.7	<0.5	0.4	0.4		Non-acid Forming (Barren)
04/05/2022	EB2212349062	RGS_YMF_C_15		YMF	Fresh coal	Fresh coal	Wall	398,769	265,420			4.20	128	4.6	1.6	0.24	0.036	1.1	<0.5	0.9	0.2		Non-acid Forming (Barren)
04/05/2022	EB2212349063	RGS_YMF_C_16		YMF	Fresh coal	Fresh coal	Wall	399,112	265,470			4.20	385	4.6	1.7	0.24	0.027	0.8	<0.5	0.6	0.3		Non-acid Forming (Barren)
04/05/2022	EB2212349064	RGS_YMF_C_17		YMF	Fresh coal	Fresh coal	Wall	399,787	265,597			4.10	186	4.4	1.6	0.23	0.018	0.6	<0.5	0.3	0.5		Non-acid Forming (Barren)
04/05/2022	EB2212349065	RGS_YMF_C_18		YMF	Fresh coal	Fresh coal	Wall	398,748	265,101			4.20	164	4.4	2	0.42	0.033	1.0	<0.5	0.8	0.2		Non-acid Forming (Barren)
04/05/2022	EB2212349066	RGS_YMF_C_19		YMF	Fresh coal	Fresh coal	Wall	399,325	265,270			3.70	297	4	1.2	0.78	0.185	5.7	3.2	2.5	0.6		Uncertain
04/05/2022	EB2212349067	RGS_YMF_C_20		YMF	Fresh coal	Fresh coal	Wall	399,918	265,365			3.50	357	3.6	1.3	4.07	2.80	85.8	<0.5	85.5	<0.01		Potentially Acid Forming
15/09/2022	EB2227537042	2022057_042 EAY_KLC_C_42		MRD	Weathered coal	Weathered coal	Wall	398,080	266,518			3.80	133			0.12	0.017	0.5	<0.5	0.3	0.5		Non-acid Forming (Barren)
15/09/2022	EB2227537043	2022057_043 EAY_KLC_C_43		MRD	Weathered coal	Weathered coal	Wall	398,151	266,275			3.30	292			0.13	0.017	0.5	<0.5	0.3	0.5		Non-acid Forming (Barren)
15/09/2022	EB2227537044	2022057_044 EAY_KLC_C_44		MRD	Weathered coal	Weathered coal	Wall	398,299	266,165			3.80	133			0.14	0.012	0.4	<0.5	0.1	0.7		Non-acid Forming (Barren)
15/09/2022	EB2227537045	2022057_045 EAY_KLC_C_45		MRD	Weathered coal	Weathered coal	Wall	398,114	266,132			3.70	179			0.12	0.019	0.6	<0.5	0.3	0.4		Non-acid Forming (Barren)
15/09/2022	EB2227537076	2022057_076 EAY_KLC_OB_6		MRD	Overburden	Overburden	Wall	398,145	265,988			5.60	385			0.02	0.011	0.3	2.9	-2.6	8.6		Non-acid Forming (Barren)
15/09/2022	EB2227537049	2022057_049 EAY_KLC_C_49		YMF Western Batters	Weathered coal	Coal	Wall	398,512	266,246			4.00	121			0.09	0.014	0.4	<0.5	0.2	0.6		Non-acid Forming (Barren)
15/09/2022	EB2227537050	2022057_050 EAY_KLC_C_50		YMF Western Batters	Weathered coal	Coal	Wall	398,549	266,080			4.00	172			0.10	0.013	0.4	<0.5	0.1	0.6		Non-acid Forming (Barren)
15/09/2022	EB2227537051	2022057_051 EAY_KLC_C_51		YMF Western Batters	Weathered coal	Coal	Wall	398,651	265,733			4.00	93			0.11	0.013	0.4	<0.5	0.1	0.6		Non-acid Forming (Barren)
15/09/2022	EB2227537055	2022057_055 EAY_KLC_C_55		YMF Eastern Batters	Weathered coal	Coal	Wall	400,308	265,307			4.00	461			0.23	0.020	0.6	<0.5	0.4	0.4		Non-acid Forming (Barren)
15/09/2022	EB2227537063	2022057_063 EAY_KLC_C_63		YMF Western Batters	Weathered coal	Coal	Wall	398,469	265,761			4.20	140			0.15	0.015	0.5	6.2	-5.7	13.5		Non-acid Forming (Barren)
15/09/2022	EB2227537064	2022057_064 EAY_KLC_C_64		YMF Western Batters	Weathered coal	Coal	Wall	398,477	265,969			4.00	182			0.10	0.015	0.5	3.1	-2.6	6.7		Non-acid Forming (Barren)
15/09/2022	EB2227537065	2022057_065 EAY_KLC_C_65		YMF Western Batters	Weathered coal	Coal	Wall	398,563	265,664			4.00	155			0.14	0.014	0.4	<0.5	0.2	0.6		Non-acid Forming (Barren)
15/09/2022	EB2227537066	2022057_066 EAY_KLC_C_66		YMF Western Batters	Weathered coal	Coal	Wall	398,633	265,388			4.30	114			0.13	0.014	0.4	2.8	-2.4	6.5		Non-acid Forming (Barren)
15/09/2022	EB2227537069	2022057_069 EAY_KLC_C_69		YMF Western Batters	Weathered coal	Coal	Wall	398,601	265,088			3.80	865			0.47	0.022	0.7	<0.5	0.4	0.4		Non-acid Forming (Barren)
15/09/2022	EB2227537070	2022057_070 EAY_KLC_C_70		YMF Western Batters	Weathered coal	Coal	Wall	398,411	266,217			3.90	96			0.14	0.016	0.5	<0.5	0.2	0.5		Non-acid Forming (Barren)
15/09/2022	EB2227537079	2022057_079 EAY_KLC_OB_9		YMF Western Batters/MRD	Overburden	Overburden	Wall	398,414	265,420			6.10	99			0.01	0.013	0.4	3.5	-3.1	8.8		Non-acid Forming (Barren)
15/09/2022	EB2227537052	2022057_052 EAY_KLC_C_52		YMF Eastern Batters	Weathered coal	Coal	Wall	399,910	265,986			4.00	112			0.11	0.017	0.5	<0.5	0.3	0.5		Non-acid Forming (Barren)
15/09/2022	EB2227537053	2022057_053 EAY_KLC_C_53		YMF Eastern Batters	Weathered coal	Coal	Wall	399,968	266,179			4.20	287			0.11	0.010	0.3	<0.5	0.1	0.8		Non-acid Forming (Barren)
15/09/2022	EB2227537054	2022057_054 EAY_KLC_C_54		YMF Eastern Batters	Weathered coal	Coal	Wall	400,139	265,785			4.20	134			0.20	0.014	0.4	<0.5	0.2	0.6		Non-acid Forming (Barren)
15/09/2022	EB2227537077	2022057_077 EAY_KLC_OB_7		YMF Eastern Batters	Overburden	Overburden	Wall	400,231	265,637			6.20	17			0.02	0.015	0.5	3.8	-3.3	8.3		Non-acid Forming (Barren)
15/09/2022	EB2227537067	2022057_067 EAY_KLC_C_67		YMF Operating Face	Weathered coal	Coal	Wall	398,785	264,999			3.80	1260			0.93	0.517	15.8	<0.5	15.6	0.0		Potentially Acid Forming
15/09/2022	EB2227537068	2022057_068 EAY_KLC_C_68		YMF Operating Face	Weathered coal	Coal	Wall	399,632	265,210			3.20	1750			1.02	0.784	24.0	<0.5	23.8	0.0		Potentially Acid Forming

Notes:
1. YTF = Yallourn Township Field; MRD = Morwell River Diversion; YEF = Yallourn East Field; YEFX = Yallourn East Field Extension; YMF = Yallourn Maryvale Field
2. Scr = Chromium Reducible Sulfur; MPA = Maximum Potential Acidity; ANC = Acid Neutralising Capacity; NAPP = Net Acid Producing Potential; TOC = Total Organic Carbon.
3. Sample classification criteria detail provided in report text.

* Where S_{CR} or ANC results are less than the laboratory LoR a value of half of the LoR is used to calculate NAPP.

Table B2: Multi-Element Results for Samples from the Yallourn Project

	RGS Sample Number →		2021048_0001	2021048_0005	2021048_0007	2021048_0008	2021048_0013	2021048_0014	2021048_0020
	Sampling Date →		11/04/2022	12/04/2022	12/04/2022	12/04/2022	12/04/2022	12/04/2022	12/04/2022
	ALS Laboratory ID →		EB2215461001	EB2215461002	EB2215461003	EB2330523014	EB2215461004	EB2215461005	EB2215461006
	Location →		YTF Western Batters	YTF Hernes Oak Batters	YTF Hernes Oak Batters	YTF Hernes Oak Batters	YTF Southern Batters	YTF Southern Batters	YTF Fire Service Pond Batters
	Material Type →		Topsoil/overburden	Weathered coal	Weathered coal	Weathered coal	Overburden	Overburden	Weathered coal
	Client ID →		RGS_YTF_WW_1	RGS_YTF_WW_03/2	RGS_YTF_WW_03/4	RGS_YTF_WW_04/1	RGS_YTF_WW_05/2	RGS_YTF_WW_05/3	RGS_YTF_WW_06/5
Parameters	**LOR**	NEPC[1] Health-Based Investigation Level (HILs)-C							
Major Cations	All units mg/kg		All units mg/kg						
Calcium (Ca)	100	-	2300	1000	400	130	200	700	2500
Magnesium (Mg)	100	-	2200	1400	800	140	500	1500	1900
Potassium (K)	100	-	1,100	<100	<100	120	300	800	300
Sodium (Na)	100	-	200	500	200	<50	1,100	300	400
Aluminium (Al)	100	-	22,700	100	800	---	10,200	11,700	1,100
Iron (Fe)	100	-	29,900	1,600	1,000	---	6,900	30,600	4,000
Minor and Trace Elements	All units mg/kg		All units mg/kg						
Silver (Ag)	0.01	-	0.03	<0.01	<0.01	---	<0.01	<0.01	<0.01
Arsenic (As)	0.1	300	2.1	<0.1	0.2	---	0.4	2.7	4.6
Gold (Au)	0.02	-	<0.02	<0.02	<0.02	---	<0.02	<0.02	<0.02
Boron (B)	10	20,000	<10	10	<10	---	<10	<10	<10
Barium (Ba)	10	-	170	70	20	---	10	110	60
Beryllium (Be)	0.05	90	1.07	<0.05	<0.05	---	0.06	0.76	0.06
Bismuth (Bi)	0.01	-	0.11	<0.01	0.01	---	0.06	0.08	0.01
Cadmium (Cd)	0.01	90	0.03	<0.01	<0.01	---	0.01	0.01	0.01
Cerium (Ce)	0.02	-	56.9	0.19	1.2	---	10.8	31.9	3.18
Cobalt (Co)	0.1	300	10.9	<0.1	0.5	---	0.5	17.8	1.6
Chromium (Cr) *	1	-	30	<1	1	---	14	21	7
Caesium (Cs)	0.05	-	1.16	<0.05	<0.05	---	0.45	0.6	0.09
Copper (Cu)	0.2	17,000	15.4	0.4	0.9	---	1.2	10.4	2.3
Gallium (Ga)	0.05	-	6.75	<0.05	0.19	---	4.6	3.85	0.31
Germanium (Ge)	0.05	-	0.09	<0.05	<0.05	---	<0.05	0.06	<0.05
Hafnium (Hf)	0.02	-	0.02	<0.02	<0.02	---	0.27	0.26	0.03
Mercury (Hg)	0.01	80	0.04	0.04	0.02	---	0.03	0.02	0.07
Indium (In)	0.005	-	0.037	<0.005	<0.005	---	0.016	0.023	<0.005
Lanthanum (La)	0.2	-	25.6	<0.2	0.6	---	5.2	14.3	1.6
Lithium (Li)	0.1	-	10.4	<0.1	0.2	---	1.5	4	0.2
Manganese (Mn)	5	19,000	506	13	14	---	12	677	162
Molybdenum (Mo)	0.05	-	0.41	<0.05	<0.05	---	0.17	0.46	0.08
Niobium (Nb)	0.05	-	0.47	<0.05	<0.05	---	0.14	0.63	0.52
Nickel (Ni)	0.2	1,200	15.2	0.7	2.7	---	2.3	11.6	3
Phosphorus (P)	10	-	540	<10	30	---	30	430	130
Lead (Pb)	0.2	600	13.4	<0.2	0.4	---	4.6	8.5	1.3
Rubidium (Rb)	0.1	-	17.4	0.1	0.3	---	2.1	8	1.4
Rhenium (Re)	0.001	-	0.001	<0.001	<0.001	---	<0.001	<0.001	<0.001
Sulfur (S)	100	-	200	1500	1400	---	200	200	1600
Antimony (Sb)	0.05	-	0.09	<0.05	<0.05	---	<0.05	0.09	<0.05
Scandium (Sc)	0.1	-	5.9	<0.1	0.2	---	2.3	3.9	0.3
Selenium (Se)	0.2	700	0.3	0.2	0.2	---	<0.2	0.4	0.5
Tin (Sn)	0.2	-	0.8	<0.2	<0.2	---	0.5	0.5	<0.2
Strontium (Sr)	0.2	-	46	12.3	5.3	---	2.9	13.2	28.7
Tantalum (Ta)	0.01	-	<0.01	0.02	<0.01	---	<0.01	<0.01	0.01
Tellurium (Te)	0.01	-	0.01	<0.01	<0.01	---	<0.01	<0.01	<0.01
Thorium (Th)	0.2	-	1.7	<0.2	0.2	---	3.9	3.3	0.3
Titanium (Ti)	50	-	110	<50	<50	---	80	320	140
Thallium (Tl)	0.02	-	0.11	<0.02	<0.02	---	0.02	0.1	0.08
Uranium (U)	0.05	-	0.93	<0.05	<0.05	---	0.3	0.58	0.05
Vanadium (V)	1	-	64	<1	2	---	18	47	4
Tungsten (W)	0.05	-	<0.05	<0.05	<0.05	---	<0.05	<0.05	<0.05
Yttrium (Y)	0.05	-	13.85	0.05	0.32	---	1.84	7.73	0.84
Zinc (Zn)	2	30,000	44	2	3	---	2	34	7
Zirconium (Zr)	0.5	-	0.9	<0.5	<0.5	---	8.7	9	1.1

Notes: < indicates less than the laboratory limit of reporting.

Shaded cells exceed applied guideline limit.

* Guideline level for Cr(VI) = 300 mg/kg.

1. NEPC (2013). National Environmental Protection Council (NEPC). National Environmental Protection (Assessment of Site Contamination) Measure (NEPM), Amendment of Schedule B1-B7 of 1999 version. Guideline on Investigation Levels for Soil and Groundwater. Health-Based Investigation Level - HIL(C); public open spaces - recreational use.

Table B2: Multi-Element Results for Samples from the Yallourn Project

Parameters	LOR	NEPC[1] Health-Based Investigation Level (HILs)-C	2021048_0021	2021048_0028	2021048_0031	2021048_0037	2021048_0040	2021048_0045	2021048_0051
RGS Sample Number →			2021048_0021	2021048_0028	2021048_0031	2021048_0037	2021048_0040	2021048_0045	2021048_0051
Sampling Date →			12/04/2022	14/04/2022	14/04/2022	13/04/2022	13/04/2022	13/04/2022	5/04/2022
ALS Laboratory ID →			EB2330523015	EB2215461007	EB2215461008	EB2215461009	EB2330523016	EB2215461010	EB2215461011
Location →			YTF Fire Service Pond Batters	YMF Western Batters	YMF Western Batters	YEF Northern Batters	YEF Latrobe River Batters	YEFX Latrobe Road Batters	YMF Pit Floor
Material Type →			Weathered coal	Overburden	Overburden	Weathered coal	Weathered coal	Topsoil/overburden	Weathered coal
Client ID →			RGS_YTF_WW_06/6	RGS_YMF_WW_04/1	RGS_YMF_WW_05/3	RGS_YEF_WW_01/4	RGS_YEF_WW_02/3	RGS_YEF_WW_05/1	RGS_YMF_C_04
Major Cations	All units mg/kg		All units mg/kg						
Calcium (Ca)	100	-	760	1100	<100	1500	480	1900	1300
Magnesium (Mg)	100	-	680	1600	100	2100	770	2100	1900
Potassium (K)	100	-	120	<100	100	100	50	900	100
Sodium (Na)	100	-	100	700	100	900	260	300	1,500
Aluminium (Al)	100	-	---	200	1,900	1,100	---	19,800	600
Iron (Fe)	100	-	---	3,800	2,800	6,200	---	25,700	6,400
Minor and Trace Elements	All units mg/kg		All units mg/kg						
Silver (Ag)	0.01	-	---	<0.01	<0.01	<0.01	---	0.02	<0.01
Arsenic (As)	0.1	300	---	0.2	0.4	0.3	---	1.8	0.1
Gold (Au)	0.02	-	---	<0.02	<0.02	<0.02	---	<0.02	<0.02
Boron (B)	10	20,000	---	10	<10	<10	---	<10	10
Barium (Ba)	10	-	---	100	10	190	---	180	150
Beryllium (Be)	0.05	90	---	<0.05	0.1	0.08	---	0.92	0.57
Bismuth (Bi)	0.01	-	---	<0.01	0.02	0.01	---	0.1	<0.01
Cadmium (Cd)	0.01	90	---	<0.01	0.02	<0.01	---	0.04	<0.01
Cerium (Ce)	0.02	-	---	0.6	6.97	2.96	---	50	1.48
Cobalt (Co)	0.1	300	---	0.4	2	1.6	---	11.7	1.4
Chromium (Cr) *	1	-	---	<1	4	1	---	26	<1
Caesium (Cs)	0.05	-	---	<0.05	0.28	0.09	---	1.04	0.05
Copper (Cu)	0.2	17,000	---	0.6	1.8	2.1	---	13.4	0.4
Gallium (Ga)	0.05	-	---	0.07	0.73	0.29	---	5.87	0.05
Germanium (Ge)	0.05	-	---	<0.05	<0.05	<0.05	---	0.07	<0.05
Hafnium (Hf)	0.02	-	---	<0.02	0.13	0.02	---	0.02	<0.02
Mercury (Hg)	0.01	80	---	0.06	0.03	0.05	---	0.04	0.03
Indium (In)	0.005	-	---	<0.005	<0.005	<0.005	---	0.032	<0.005
Lanthanum (La)	0.2	-	---	0.3	3.3	1.4	---	23.4	0.9
Lithium (Li)	0.1	-	---	0.1	0.6	0.3	---	9	0.2
Manganese (Mn)	5	19,000	---	50	16	170	---	647	63
Molybdenum (Mo)	0.05	-	---	<0.05	0.14	0.06	---	0.39	<0.05
Niobium (Nb)	0.05	-	---	<0.05	0.18	0.07	---	0.51	<0.05
Nickel (Ni)	0.2	1,200	---	0.9	1.5	3.1	---	14.4	12.6
Phosphorus (P)	10	-	---	<10	20	20	---	440	<10
Lead (Pb)	0.2	600	---	<0.2	1.2	0.8	---	11.6	<0.2
Rubidium (Rb)	0.1	-	---	0.4	1.3	1.1	---	13.8	0.8
Rhenium (Re)	0.001	-	---	<0.001	<0.001	<0.001	---	<0.001	<0.001
Sulfur (S)	100	-	---	1600	100	1200	---	200	1700
Antimony (Sb)	0.05	-	---	<0.05	<0.05	<0.05	---	0.09	<0.05
Scandium (Sc)	0.1	-	---	0.1	0.5	0.4	---	5.2	0.1
Selenium (Se)	0.2	700	---	0.4	<0.2	0.4	---	0.2	0.2
Tin (Sn)	0.2	-	---	<0.2	0.2	<0.2	---	0.7	<0.2
Strontium (Sr)	0.2	-	---	16.2	1.1	24.3	---	37.5	17
Tantalum (Ta)	0.01	-	---	<0.01	<0.01	<0.01	---	<0.01	<0.01
Tellurium (Te)	0.01	-	---	<0.01	<0.01	<0.01	---	<0.01	<0.01
Thorium (Th)	0.2	-	---	<0.2	1.4	0.2	---	1.9	<0.2
Titanium (Ti)	50	-	---	<50	90	<50	---	140	<50
Thallium (Tl)	0.02	-	---	<0.02	0.02	<0.02	---	0.09	<0.02
Uranium (U)	0.05	-	---	<0.05	0.22	0.05	---	0.82	<0.05
Vanadium (V)	1	-	---	<1	3	3	---	52	<1
Tungsten (W)	0.05	-	---	<0.05	<0.05	<0.05	---	<0.05	<0.05
Yttrium (Y)	0.05	-	---	0.23	1.41	0.86	---	11.7	0.8
Zinc (Zn)	2	30,000	---	4	7	7	---	41	3
Zirconium (Zr)	0.5	-	---	<0.5	3.4	<0.5	---	0.9	<0.5

Notes: < indicates less than the laboratory limit of reporting.

Shaded cells exceed applied guideline limit.

* Guideline level for Cr(VI) = 300 mg/kg.

1. NEPC (2013). National Environmental Protection Council (NEPC). National Environmental Protection (Assessment of Site Contamination) Measure (NEPM), Amendment of Schedule B1-B7 of 1999 version. Guideline on Investigation Levels for Soil and Groundwater. Health-Based Investigation Level - HIL(C); public open spaces - recreational use.

Table B2: Multi-Element Results for Samples from the Yallourn Project

	RGS Sample Number →		2021048_0052	2021048_0057	2021048_0062	2021048_0063	2021048_0066	2021048_0067
	Sampling Date →		5/04/2022	5/04/2022	5/04/2022	5/04/2022	5/04/2022	5/04/2022
	ALS Laboratory ID →		EB2215461012	EB2215461013	EB2215461014	EB2215461015	EB2215461016	EB2215461017
	Location →		YMF Pit Floor	YMF Pit Floor	YMF Pit Floor	YMF Pit Floor	YMF Operating Face	YMF Operating Face
	Material Type →		Weathered coal	Fresh coal	Fresh coal	Fresh coal	Fresh coal	Fresh coal
	Client ID →		RGS_YMF_C_05	RGS_YMF_C_10	RGS_YMF_C_15	RGS_YMF_C_16	RGS_YMF_C_19	RGS_YMF_C_20
Parameters	**LOR**	NEPC[1] Health-Based Investigation Level (HILs)-C						
Major Cations	All units mg/kg		All units mg/kg					
Calcium (Ca)	100	-	700	900	1100	1400	1000	1000
Magnesium (Mg)	100	-	900	1100	1700	2300	2,300	2500
Potassium (K)	100	-	<100	<100	<100	100	<100	<100
Sodium (Na)	100	-	500	600	900	1,100	1,200	1000
Aluminium (Al)	100	-	4,700	1,100	100	100	2,700	3700
Iron (Fe)	100	-	3,500	4,200	3,400	4,800	4,300	33700
Minor and Trace Elements	All units mg/kg		All units mg/kg					
Silver (Ag)	0.01	-	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic (As)	0.1	300	1.2	0.1	0.1	<0.1	1	1.9
Gold (Au)	0.02	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Boron (B)	10	20,000	<10	<10	<10	10	<10	<10
Barium (Ba)	10	-	70	100	100	140	50	10
Beryllium (Be)	0.05	90	0.7	0.21	<0.05	<0.05	1	0.82
Bismuth (Bi)	0.01	-	0.05	<0.01	<0.01	<0.01	<0.01	<0.01
Cadmium (Cd)	0.01	90	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cerium (Ce)	0.02	-	9.94	2.06	0.15	0.14	3.82	3.82
Cobalt (Co)	0.1	300	7	1.3	<0.1	<0.1	4	11.2
Chromium (Cr) *	1	-	40	<1	1	<1	<1	<1
Caesium (Cs)	0.05	-	0.09	<0.05	0.05	0.05	<0.05	0.05
Copper (Cu)	0.2	17,000	7.2	0.5	0.5	0.4	0	0.3
Gallium (Ga)	0.05	-	1.92	0.05	<0.05	<0.05	<0.05	<0.05
Germanium (Ge)	0.05	-	0.79	<0.05	<0.05	<0.05	<0.05	<0.05
Hafnium (Hf)	0.02	-	0.04	<0.02	<0.02	<0.02	<0.02	<0.02
Mercury (Hg)	0.01	80	0.02	0.08	0.04	0.03	0.05	0.03
Indium (In)	0.005	-	0.012	<0.005	<0.005	<0.005	<0.005	<0.005
Lanthanum (La)	0.2	-	1.9	0.7	<0.2	<0.2	2.5	2.5
Lithium (Li)	0.1	-	0.1	0.1	0.1	0.1	0.1	0.1
Manganese (Mn)	5	19,000	37	42	47	61	28	35
Molybdenum (Mo)	0.05	-	0.17	<0.05	<0.05	<0.05	<0.05	<0.05
Niobium (Nb)	0.05	-	0.24	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel (Ni)	0.2	1,200	11	10.6	0.3	<0.2	3.6	6.5
Phosphorus (P)	10	-	20	<10	<10	<10	<10	<10
Lead (Pb)	0.2	600	2.3	<0.2	<0.2	<0.2	<0.2	<0.2
Rubidium (Rb)	0.1	-	0.5	0.4	0.4	0.5	0.3	0.4
Rhenium (Re)	0.001	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Sulfur (S)	100	-	2800	1000	1200	1600	6800	39600
Antimony (Sb)	0.05	-	0.2	<0.05	<0.05	<0.05	<0.05	<0.05
Scandium (Sc)	0.1	-	7.3	0.1	0.1	<0.1	0.1	<0.1
Selenium (Se)	0.2	700	0.5	0.4	0.3	<0.2	0.3	<0.2
Tin (Sn)	0.2	-	0.3	<0.2	<0.2	<0.2	<0.2	<0.2
Strontium (Sr)	0.2	-	8.5	11.7	17.4	22.3	18.7	16.9
Tantalum (Ta)	0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tellurium (Te)	0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Thorium (Th)	0.2	-	2.6	<0.2	<0.2	<0.2	<0.2	<0.2
Titanium (Ti)	50	-	170	<50	<50	<50	<50	<50
Thallium (Tl)	0.02	-	0.02	0.02	<0.02	<0.02	0.06	<0.02
Uranium (U)	0.05	-	0.53	<0.05	<0.05	<0.05	<0.05	<0.05
Vanadium (V)	1	-	71	<1	<1	<1	<1	<1
Tungsten (W)	0.05	-	0.1	<0.05	<0.05	<0.05	<0.05	<0.05
Yttrium (Y)	0.05	-	12.5	1.38	<0.05	<0.05	1.34	1.36
Zinc (Zn)	2	30,000	2	2	2	3	5	<2
Zirconium (Zr)	0.5	-	1.1	<0.5	<0.5	<0.5	<0.5	<0.5

Notes: < indicates less than the laboratory limit of reporting.

Shaded cells exceed applied guideline limit.

* Guideline level for Cr(VI) = 300 mg/kg.

1. NEPC (2013). National Environmental Protection Council (NEPC). National Environmental Protection (Assessment of Site Contamination) Measure (NEPM), Amendment of Schedule B1-B7 of 1999 version. Guideline on Investigation Levels for Soil and Groundwater. Health-Based Investigation Level - HIL(C); public open spaces - recreational use.

Table B2: Multi-Element Results for Samples from the Yallourn Project

	RGS Sample Number →		2022057_007	2022057_015	2022057_026	2022057_031	2022057_043	2022057_046	2022057_055	2022057_063
	Sampling Date →		1/08/2022	1/08/2022	1/08/2022	1/08/2022	1/08/2022	1/08/2022	2/08/2022	2/08/2022
	ALS Laboratory ID →		EB2230815001	EB2230815002	EB2230815004	EB2230815005	EB2230815008	EB2230815009	EB2230815011	EB2230815013
	Location →		YTF Northern Batters	YTF Hernes Oak Batters	YTF Floc Pond Batters	YTF RCB Batters	MRD	YEF Pit Floor	YMF Eastern Batters	YMF Western Batters
	Material Type →		Weathered coal	Weathered coal	Weathered coal	Weathered coal	Weathered coal	Weathered coal	Fresh coal	Weathered coal
	Client ID →		EAY_KLC_C_7	EAY_KLC_C_15	EAY_KLC_C_26	EAY_KLC_C_31	EAY_KLC_C_43	EAY_KLC_C_46	EAY_KLC_C_55	EAY_KLC_C_63
Parameters	**LOR**	NEPC[1] Health-Based Investigation Level (HILs)-C								
Major Cations	All units mg/kg		All units mg/kg							
Calcium (Ca)	50	-	300	1300	1000	1500	1900	600	700	1200
Magnesium (Mg)	50	-	400	1500	1100	2900	1600	500	1400	1900
Potassium (K)	50	-	50	100	100	200	100	100	100	50
Sodium (Na)	50	-	100	1,100	400	1,100	700	400	600	800
Aluminium (Al)	50	-	3,000	1,000	300	700	600	6,000	2,300	500
Iron (Fe)	50	-	4,300	4,400	1,900	2,400	5,400	5,900	3,600	2,600
Minor and Trace Elements	All units mg/kg		All units mg/kg							
Silver (Ag)	0.01	-	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01
Arsenic (As)	0.1	300	0.4	0.2	0.1	0.3	0.2	0.5	1.1	0.3
Gold (Au)	0.02	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Boron (B)	10	20,000	<10	<10	<10	<10	<10	<10	<10	<10
Barium (Ba)	10	-	50	90	80	170	140	140	60	80
Beryllium (Be)	0.05	90	0.44	<0.05	<0.05	0.07	0.05	0.56	0.31	<0.05
Bismuth (Bi)	0.01	-	<0.01	0.01	<0.01	0.01	0.01	0.01	0.01	<0.01
Cadmium (Cd)	0.01	90	<0.01	0.01	<0.01	0.01	<0.01	0.01	0.01	<0.01
Cerium (Ce)	0.02	-	4.5	1.25	0.37	0.69	1.3	17.15	3.87	0.78
Cobalt (Co)	0.1	300	3	1	0.3	3.2	1	12.1	2.6	0.7
Chromium (Cr) *	1	-	1	7	3	12	3	20	63	3
Caesium (Cs)	0.05	-	<0.05	0.06	<0.05	0.05	0.05	0.09	0.23	<0.05
Copper (Cu)	0.2	17,000	0.5	2	0.6	1.4	1.2	2.2	1.6	0.8
Gallium (Ga)	0.05	-	<0.05	0.27	0.07	0.21	0.15	0.42	0.58	0.17
Germanium (Ge)	0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05	0.14	<0.05	<0.05
Hafnium (Hf)	0.02	-	<0.02	0.02	<0.02	<0.02	<0.02	0.03	0.04	<0.02
Mercury (Hg)	0.01	80	0.05	0.06	0.04	0.07	0.04	0.12	0.07	0.11
Indium (In)	0.005	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Lanthanum (La)	0.2	-	2.9	0.6	0.2	0.3	0.6	7.9	1.9	0.4
Lithium (Li)	0.1	-	0.3	0.6	0.3	0.4	0.5	0.4	0.8	0.5
Manganese (Mn)	5	19,000	6	23	31	33	97	39	30	61
Molybdenum (Mo)	0.05	-	<0.05	0.07	<0.05	0.05	<0.05	0.15	0.34	<0.05
Niobium (Nb)	0.05	-	<0.05	0.07	<0.05	0.05	<0.05	0.21	0.06	<0.05
Nickel (Ni)	0.2	1,200	3	2.7	2.7	2.6	1.1	18	2.4	1.2
Phosphorus (P)	10	-	30	20	10	20	20	20	10	10
Lead (Pb)	0.2	600	<0.2	0.5	<0.2	0.5	0.4	1.6	0.8	0.2
Rubidium (Rb)	0.1	-	0.1	0.3	0.2	1	0.7	0.7	1	0.3
Rhenium (Re)	0.001	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Sulfur (S)	100	-	2600	1300	1200	1600	1400	2100	2300	1400
Antimony (Sb)	0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	<0.05
Scandium (Sc)	0.1	-	0.1	0.3	0.1	0.2	0.2	1.1	0.5	0.2
Selenium (Se)	0.2	700	0.5	0.4	0.5	0.6	0.6	0.6	0.3	0.6
Tin (Sn)	0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2	<0.2
Strontium (Sr)	0.2	-	5.8	18.7	16.2	23.3	34	12.4	15.1	24.5
Tantalum (Ta)	0.01	-	0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01
Tellurium (Te)	0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Thorium (Th)	0.2	-	<0.2	0.2	<0.2	<0.2	<0.2	0.6	0.5	<0.2
Titanium (Ti)	50	-	<50	<50	<50	<50	<50	<50	<50	<50
Thallium (Tl)	0.02	-	0.09	<0.02	0.02	<0.02	<0.02	<0.02	0.02	<0.02
Uranium (U)	0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05	0.11	0.13	<0.05
Vanadium (V)	1	-	<1	2	<1	1	1	3	3	1
Tungsten (W)	0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	0.11	<0.05
Yttrium (Y)	0.05	-	1.43	0.32	0.11	0.19	0.36	8.26	1.02	0.18
Zinc (Zn)	2	30,000	7	5	2	20	4	14	5	2
Zirconium (Zr)	0.5	-	<0.5	0.5	<0.5	<0.5	<0.5	0.9	1.2	<0.5

Notes: < indicates less than the laboratory limit of reporting.

Shaded cells exceed applied guideline limit.

* Guideline level for Cr(VI) = 300 mg/kg.

1. NEPC (2013). National Environmental Protection Council (NEPC). National Environmental Protection (Assessment of Site Contamination) Measure (NEPM), Amendment of Schedule B1-B7 of 1999 version. Guideline on Investigation Levels for Soil and Groundwater. Health-Based Investigation Level - HIL(C); public open spaces - recreational use.

Table B2: Multi-Element Results for Samples from the Yallourn Project

	RGS Sample Number →		2022057_064	2022057_067	2022057_068	2022057_069	2022057_073	2022057_077	2022057_080
	Sampling Date →		2/08/2022	2/08/2022	2/08/2022	2/08/2022	2/08/2022	2/08/2022	2/08/2022
	ALS Laboratory ID →		EB2230815014	EB2230815015	EB2230815016	EB2230815017	EB2230815018	EB2230815019	EB2230815020
	Location →		YMF Western Batters	YMF Operating Face	YMF Operating Face	YMF Western Batters	YTF Floc Pond Batters	YMF Eastern Batters	MRD
	Material Type →		Weathered coal	Fresh coal	Fresh coal	Fresh coal	Overburden	Overburden	Overburden
	Client ID →		EAY_KLC_C_64	EAY_KLC_C_67	EAY_KLC_C_68	EAY_KLC_C_69	EAY_KLC_OB_3	EAY_KLC_OB_7	EAY_KLC_OB_10
Parameters	**LOR**	NEPC[1] Health-Based Investigation Level (HILs)-C							
Major Cations	All units mg/kg		All units mg/kg						
Calcium (Ca)	50	-	1000	900	600	500	50	100	1300
Magnesium (Mg)	50	-	1600	1600	1100	1400	100	400	1400
Potassium (K)	50	-	100	50	50	50	100	300	400
Sodium (Na)	50	-	900	500	400	1,200	50	200	200
Aluminium (Al)	50	-	200	3,600	2,500	4,300	2,500	6,600	8,700
Iron (Fe)	50	-	3,700	8,700	10,300	1,200	2,600	5,500	16,200
Minor and Trace Elements	All units mg/kg		All units mg/kg						
Silver (Ag)	0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.02
Arsenic (As)	0.1	300	0.3	1.5	1.1	1.4	0.2	0.2	1.0
Gold (Au)	0.02	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Boron (B)	10	20,000	<10	<10	<10	<10	<10	<10	<10
Barium (Ba)	10	-	100	50	40	40	20	40	80
Beryllium (Be)	0.05	90	<0.05	0.71	0.51	0.81	<0.05	0.14	0.34
Bismuth (Bi)	0.01	-	<0.01	<0.01	<0.01	<0.01	0.01	0.04	0.06
Cadmium (Cd)	0.01	90	<0.01	<0.01	<0.01	0.02	0.01	0.01	0.03
Cerium (Ce)	0.02	-	0.45	4.85	3.37	5.75	10.45	18.05	28.6
Cobalt (Co)	0.1	300	0.2	155	165	17.3	0.5	0.8	6.2
Chromium (Cr) *	1	-	2	18	2	13	126	59	64
Caesium (Cs)	0.05	-	0.05	<0.05	<0.05	<0.05	0.37	0.76	0.73
Copper (Cu)	0.2	17,000	0.6	0.6	0.3	0.6	1.3	2.7	6.7
Gallium (Ga)	0.05	-	0.07	0.08	<0.05	0.12	0.95	2.23	2.6
Germanium (Ge)	0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Hafnium (Hf)	0.02	-	<0.02	<0.02	<0.02	0.02	0.19	0.06	0.12
Mercury (Hg)	0.01	80	0.1	0.1	0.06	0.06	0.02	0.02	0.03
Indium (In)	0.005	-	<0.005	<0.005	<0.005	<0.005	<0.005	0.009	0.016
Lanthanum (La)	0.2	-	0.2	3.4	2.4	4.1	4.7	9	14.1
Lithium (Li)	0.1	-	0.3	0.3	0.3	0.4	1	1.5	3.5
Manganese (Mn)	5	19,000	46	25	18	14	25	13	202
Molybdenum (Mo)	0.05	-	<0.05	0.06	<0.05	0.05	0.5	0.14	0.42
Niobium (Nb)	0.05	-	<0.05	<0.05	<0.05	<0.05	0.07	0.21	1.29
Nickel (Ni)	0.2	1,200	0.6	38.7	33.4	5.5	1.9	2.2	9.5
Phosphorus (P)	10	-	<10	10	10	10	20	40	360
Lead (Pb)	0.2	600	0.2	0.2	<0.2	0.3	1.2	5.4	6.2
Rubidium (Rb)	0.1	-	0.6	0.2	0.1	0.2	1.6	4.5	6.2
Rhenium (Re)	0.001	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Sulfur (S)	100	-	1000	10600	13000	3800	<100	100	100
Antimony (Sb)	0.05	-	<0.05	<0.05	0.05	<0.05	<0.05	<0.05	<0.05
Scandium (Sc)	0.1	-	0.1	0.1	0.1	0.3	0.7	1.4	2.3
Selenium (Se)	0.2	700	0.4	0.5	0.5	0.6	<0.2	0.2	0.2
Tin (Sn)	0.2	-	<0.2	<0.2	<0.2	<0.2	0.2	0.4	0.5
Strontium (Sr)	0.2	-	15.5	16.4	10.9	11.3	1.8	3.8	16.6
Tantalum (Ta)	0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tellurium (Te)	0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Thorium (Th)	0.2	-	<0.2	<0.2	<0.2	0.2	2.1	2.4	2.5
Titanium (Ti)	50	-	<50	<50	<50	<50	110	100	460
Thallium (Tl)	0.02	-	<0.02	0.23	0.24	0.03	<0.02	0.03	0.06
Uranium (U)	0.05	-	<0.05	<0.05	<0.05	<0.05	0.29	0.32	0.49
Vanadium (V)	1	-	1	1	<1	1.0	4.0	12.0	29.0
Tungsten (W)	0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Yttrium (Y)	0.05	-	0.13	1.92	1.36	2.07	2.14	1.79	4.67
Zinc (Zn)	2	30,000	5	3	3	25.0	<2	3.0	16.0
Zirconium (Zr)	0.5	-	<0.5	<0.5	<0.5	<0.5	5.7	2.4	6.3

Notes: < indicates less than the laboratory limit of reporting.

Shaded cells exceed applied guideline limit.

* Guideline level for Cr(VI) = 300 mg/kg.

1. NEPC (2013). National Environmental Protection Council (NEPC). National Environmental Protection (Assessment of Site Contamination) Measure (NEPM), Amendment of Schedule B1-B7 of 1999 version. Guideline on Investigation Levels for Soil and Groundwater. Health-Based Investigation Level - HIL(C); public open spaces - recreational use.

Table B2: Multi-Element Results for Samples from the Yallourn Project

	Sampling Date →		1/12/2022	9/11/2022	29/11/2022	30/11/2022	4/12/2022	29/05/2023	29/05/2023	31/05/2023
	ALS Laboratory ID →		EB2314434 - 002	EB2317882-003	EB2314434 - 004	EB2314434 - 005	EB2314571 - 030	EB2324491-001	EB2324491-010	EB2326215-002
	Location →		YTF Northern Overburden Dump	YTF Northern Overburden Dump	YTF Northern Overburden Dump	YTF Northern Overburden Dump	YTF Northern Overburden Dump	YTF Northern Overburden Dump	YTF Northern Overburden Dump	YTF Northern Overburden Dump
	Material Type →		Overburden	Overburden	Overburden	Overburden	Overburden	Overburden	Overburden	Overburden
	Client ID →		N7423_19.5-20	N7424_9-9.5	N7425_16-16.5	N7425_28.5-29	N7434_15.0-15.5	N7523_1.5-2.0	N7523_22.0-22.5	N7524_1.5-2.0
Parameters	**LOR**	NEPC[1] Health-Based Investigation Level (HILs)-C								
Major Cations	All units mg/kg		All units mg/kg							
Calcium (Ca)	50	-	100	100	100	200	2,000	<50	200	100
Magnesium (Mg)	50	-	700	1,300	300	1,100	2,400	200	400	200
Potassium (K)	50	-	700	1,100	300	800	1,400	600	200	200
Sodium (Na)	50	-	200	570	200	500	400	100	200	100
Aluminium (Al)	50	-	10,000	15,400	5,800	12,100	26,600	8,100	3,700	3,300
Iron (Fe)	50	-	14,200	19,600	27,700	33,100	32,800	4,000	8,200	15,600
Minor and Trace Elements	All units mg/kg		All units mg/kg							
Silver (Ag)	0.01	-	0.01	0.01	0.02	0.01	0.05	0.02	0.01	0.01
Arsenic (As)	0.1	300	0.7	1.4	2.4	2.8	1.7	1.2	1.5	1.3
Gold (Au)	0.02	-	<0.02	0.00	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Boron (B)	10	20,000	<10	<10	<10	<10	<10	<10	<10	<10
Barium (Ba)	10	-	60	167	20	150	190	50	30	20
Beryllium (Be)	0.05	90	0.23	0.69	0.20	0.65	1.14	0.36	0.51	0.48
Bismuth (Bi)	0.01	-	0.04	0.11	0.06	0.07	0.15	0.06	0.02	0.02
Cadmium (Cd)	0.01	90	<0.01	<0.001	0.02	0.01	0.06	0.03	0.01	0.01
Cerium (Ce)	0.02	-	16.65	34.50	14.75	34.60	62.30	29.60	16.50	19.60
Cobalt (Co)	0.1	300	24.1	5.0	90.7	83.1	16.9	2.6	33.1	167.5
Chromium (Cr) *	1	300	898	259	716	442	35	166	278	282
Caesium (Cs)	0.05	-	0.81	2.70	2.31	0.98	1.37	1.01	0.48	0.56
Copper (Cu)	0.2	17,000	6.90	7.75	7.30	10.50	25.90	6.50	3.00	3.40
Gallium (Ga)	0.05	-	2.93	5.04	2.74	3.71	8.37	2.53	1.16	1.10
Germanium (Ge)	0.05	-	<0.05	0.04	<0.05	0.05	0.07	<0.05	<0.05	0.05
Hafnium (Hf)	0.02	-	0.22	0.31	0.29	0.26	0.28	0.25	0.16	0.18
Mercury (Hg)	0.01	80	0.04	0.03	0.04	0.03	0.06	0.02	0.02	0.02
Indium (In)	0.005	-	0.014	0.022	0.011	0.021	0.046	0.012	<0.005	<0.005
Lanthanum (La)	0.2	-	7.6	16.3	7.1	14.3	28.3	14.3	8.2	8.6
Lithium (Li)	0.1	-	2.0	4.9	3.5	4.9	12.5	4.1	1.6	0.8
Manganese (Mn)	5	19,000	62	33	75	451	583	22	50	24
Molybdenum (Mo)	0.05	-	0.23	0.16	0.34	0.27	0.23	0.45	0.75	0.88
Niobium (Nb)	0.05	-	0.39	0.05	0.63	0.23	0.57	0.63	0.32	0.45
Nickel (Ni)	0.2	1,200	28.2	10.4	69.2	46.6	20.0	6.0	21.0	61.0
Phosphorus (P)	10	-	30	40	40	200	730	50	40	20
Lead (Pb)	0.2	600	4.5	8.9	4.7	9.7	13.8	4.5	2.1	1.7
Rubidium (Rb)	0.1	-	6.9	23.0	6.4	11.3	17.8	7.8	2.7	2.5
Rhenium (Re)	0.001	-	<0.001	<0.0002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Sulfur (S)	50	-	5,500	<50	25,100	10,800	200	300	5,900	16,100
Antimony (Sb)	0.05	-	0.06	0.08	0.12	0.08	0.07	0.10	0.08	0.08
Scandium (Sc)	0.1	-	2.70	5.45	1.20	3.80	9.90	2.00	0.90	0.90
Selenium (Se)	0.2	700	0.30	0.12	0.30	0.30	0.40	<0.2	0.20	0.20
Tin (Sn)	0.2	-	0.40	0.92	0.60	0.50	1.00	0.50	0.30	0.30
Strontium (Sr)	0.2	-	6.60	4.92	4.60	15.40	47.00	4.30	6.50	3.50
Tantalum (Ta)	0.01	-	<0.01	<0.005	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tellurium (Te)	0.01	-	<0.01	<0.003	<0.01	0.01	<0.01	<0.01	0.010	<0.01
Thorium (Th)	0.2	-	2.3	7.1	2.7	3.1	5.2	3.5	1.5	1.5
Titanium (Ti)	50	-	180	220	230	210	410	280	110	150
Thallium (Tl)	0.02	-	0.13	0.15	0.20	0.12	0.13	280.00	110.00	0.04
Uranium (U)	0.05	-	0.43	0.95	0.61	0.63	0.96	0.07	0.06	0.33
Vanadium (V)	1	-	22.0	35.7	10.0	34.0	63.0	0.7	0.3	8.0
Tungsten (W)	0.05	-	<0.05	0.02	<0.05	<0.05	<0.05	15.00	7.00	0.58
Yttrium (Y)	0.05	-	3.68	5.07	3.76	7.21	17.35	0.07	0.42	6.85
Zinc (Zn)	2	30,000	9.0	15.9	27.0	29.0	65.0	7.6	6.3	105.0
Zirconium (Zr)	0.5	-	7.6	9.1	10.2	8.3	11.8	16.0	51.0	6.1

Notes: < indicates less than the laboratory limit of reporting.

Shaded cells exceed applied guideline limit.

* Guideline level for Cr(VI) = 300 mg/kg.

1. NEPC (2013). National Environmental Protection Council (NEPC). National Environmental Protection (Assessment of Site Contamination) Measure (NEPM), Amendment of Schedule B1-B7 of 1999 version. Guideline on Investigation Levels for Soil and Groundwater. Health-Based Investigation Level - HIL(C); public open spaces - recreational use.

Table B2: Multi-Element Results for Samples from the Yallourn Project

	Sampling Date →		31/05/2023	9/12/2022	30/05/2023	27/10/2022	24/10/2022	30/01/2023	1/06/2023	1/06/2023
	ALS Laboratory ID →		EB2326215-009	EB2314571 - 041	EB2326215-035	EB2314571 - 028	EB2317882-017	EB2317882-021	EB2324491-020	EB2324491-025
	Location →		YTF Northern Overburden Dump	YTF Southern Overburden Dump	YTF Southern Overburden Dump	Midfield Dump	Midfield Dump	Midfield Dump	Midfield Dump	Midfield Dump
	Material Type →		Overburden	Overburden	Overburden	Overburden	Overburden	Overburden	Overburden	Overburden
	Client ID →		N7524_31.5-32.0	N7455_1.0-1.5	N7526_5.5-6.0	N7433_37.0-37.5	N7431_27.5-28.0	N7443_6.5-7.0	N7521_12.0-12.5	N7521_46.5-47.0
Parameters	**LOR**	NEPC[1] Health-Based Investigation Level (HILs)-C								
Major Cations	All units mg/kg		All units mg/kg							
Calcium (Ca)	50	-	700	400	100	<50	100	<50	<50	300
Magnesium (Mg)	50	-	900	500	100	900	300	300	200	1,200
Potassium (K)	50	-	600	200	200	600	200	300	300	700
Sodium (Na)	50	-	100	100	<50	400	180	70	100	800
Aluminium (Al)	50	-	7,400	7,700	6,300	16,200	10,000	15,600	14,200	7,900
Iron (Fe)	50	-	13,600	8,800	5,300	23,600	9,200	8,500	7,300	11,900
Minor and Trace Elements	All units mg/kg		All units mg/kg							
Silver (Ag)	0.01	-	0.01	0.01	<0.01	0.01	0.01	0.01	<0.01	0.01
Arsenic (As)	0.1	300	1.5	1.0	0.8	0.6	0.2	0.3	0.1	2.8
Gold (Au)	0.02	-	<0.02	<0.02	<0.02	<0.02	0.00	0.00	<0.02	<0.02
Boron (B)	10	20,000	<10	<10	<10	<10	<10	<10	<10	<10
Barium (Ba)	10	-	50	20	20	100	27	27	20	110
Beryllium (Be)	0.05	90	0.44	0.10	0.26	0.28	0.23	0.14	0.13	1.29
Bismuth (Bi)	0.01	-	0.05	0.03	0.04	0.27	0.06	0.07	0.07	0.04
Cadmium (Cd)	0.01	90	0.01	0.01	<0.01	<0.01	0.001	<0.001	<0.01	0.04
Cerium (Ce)	0.02	-	16.95	12.10	25.90	21.90	22.70	18.65	20.10	25.40
Cobalt (Co)	0.1	300	12.1	1.5	0.5	2.5	1.7	1.3	0.7	52.1
Chromium (Cr) *	1	300	104	119	98	308	371	339	59	265
Caesium (Cs)	0.05	-	0.58	0.55	0.69	1.38	0.82	1.03	1.24	0.42
Copper (Cu)	0.2	17,000	7.00	3.60	2.70	4.10	4.43	3.02	1.50	8.40
Gallium (Ga)	0.05	-	2.62	2.71	2.92	5.13	3.58	6.37	5.41	2.51
Germanium (Ge)	0.05	-	<0.05	<0.05	0.05	<0.05	0.03	0.03	<0.05	<0.05
Hafnium (Hf)	0.02	-	0.21	0.27	0.20	0.22	0.23	0.41	0.26	0.17
Mercury (Hg)	0.01	80	0.02	0.01	0.03	0.02	0.02	0.04	0.03	0.05
Indium (In)	0.005	-	0.012	0.011	0.010	0.024	0.014	0.022	0.020	0.016
Lanthanum (La)	0.2	-	7.7	6.1	11.6	10.9	11.4	10.3	10.3	11.8
Lithium (Li)	0.1	-	3.4	1.8	0.9	3.1	3.0	3.0	4.1	2.8
Manganese (Mn)	5	19,000	179	35	12	27	30	24	11	70
Molybdenum (Mo)	0.05	-	0.43	0.46	0.43	0.12	0.19	0.15	0.17	0.82
Niobium (Nb)	0.05	-	0.44	0.25	0.29	<0.05	0.51	0.06	<0.05	0.43
Nickel (Ni)	0.2	1,200	10.4	5.4	2.4	7.8	8.8	9.1	3.4	35.7
Phosphorus (P)	10	-	190	130	20	20	30	10	10	110
Lead (Pb)	0.2	600	4.0	3.4	3.2	6.9	5.4	6.1	5.1	5.2
Rubidium (Rb)	0.1	-	6.1	2.1	2.4	8.1	3.8	3.9	3.9	6.1
Rhenium (Re)	0.001	-	<0.001	<0.001	<0.001	<0.001	<0.0002	<0.0002	<0.001	<0.001
Sulfur (S)	50	-	2,100	100	200	<50	<50	100	100	3,100
Antimony (Sb)	0.05	-	0.09	0.05	0.08	<0.05	0.05	0.06	0.06	0.11
Scandium (Sc)	0.1	-	2.40	2.20	2.70	4.40	1.63	4.26	2.40	2.50
Selenium (Se)	0.2	700	<0.2	<0.2	<0.2	<0.2	0.04	0.04	<0.2	0.30
Tin (Sn)	0.2	-	0.30	0.50	0.40	0.70	0.53	0.76	0.70	0.40
Strontium (Sr)	0.2	-	13.80	4.20	1.70	4.60	3.56	3.05	1.90	22.10
Tantalum (Ta)	0.01	-	<0.01	<0.01	<0.01	<0.01	<0.005	<0.005	<0.01	<0.01
Tellurium (Te)	0.01	-	0.010	<0.01	<0.01	<0.01	<0.003	<0.003	<0.01	0.010
Thorium (Th)	0.2	-	1.8	3.0	3.2	5.0	3.7	5.6	3.8	1.7
Titanium (Ti)	50	-	260	330	110	170	210	200	150	200
Thallium (Tl)	0.02	-	0.05	0.02	0.02	0.05	0.04	0.03	150.00	200.00
Uranium (U)	0.05	-	0.37	0.39	0.59	0.54	0.46	0.53	0.03	0.06
Vanadium (V)	1	-	22.0	21.0	14.0	42.0	19.9	24.5	0.4	0.4
Tungsten (W)	0.05	-	0.08	0.05	0.15	<0.05	0.12	0.00	26.00	26.00
Yttrium (Y)	0.05	-	4.80	2.07	4.82	3.38	3.83	3.42	<0.05	0.12
Zinc (Zn)	2	30,000	38.0	5.0	20.0	7.0	9.0	3.5	3.2	8.4
Zirconium (Zr)	0.5	-	6.1	10.2	6.5	7.7	8.2	13.5	9.0	72.0

Notes: < indicates less than the laboratory limit of reporting.

Shaded cells exceed applied guideline limit.

* Guideline level for Cr(VI) = 300 mg/kg.

1. NEPC (2013). National Environmental Protection Council (NEPC). National Environmental Protection (Assessment of Site Contamination) Measure (NEPM), Amendment of Schedule B1-B7 of 1999 version. Guideline on Investigation Levels for Soil and Groundwater. Health-Based Investigation Level - HIL(C); public open spaces - recreational use.

Table B2: Multi-Element Results for Samples from the Yallourn Project

	Sampling Date →		31/05/2023	31/05/2023	20/12/2022	15/01/2023	15/01/2023	13/01/2023	14/01/2023	21/01/2023
	ALS Laboratory ID →		EB2326215-024	EB2314571 - 033	EB2314434 - 011	EB2314434 - 013	EB2314434 - 016	EB2314434 - 018	EB2314434 - 019	EB2314434 - 022
	Location →		Midfield Dump	East Field	East Field	East Field	East Field	East Field	East Field	East Field
	Material Type →		Overburden	Overburden	Overburden	Overburden	Overburden	Overburden	Overburden	Overburden
	Client ID →		N7522_11.0-11.5	N7438_13.0-13.5	N7440_26.5-27.0	N7441_2.5-3.0	N7441_21.0-21.5	N7442_14.0-14.5	N7442_28.5-29.0	N7445_10.5-11.0
Parameters	**LOR**	NEPC[1] Health-Based Investigation Level (HILs)-C								
Major Cations	All units mg/kg		All units mg/kg							
Calcium (Ca)	50	-	100	<50	100	800	<50	<50	100	<50
Magnesium (Mg)	50	-	200	100	200	1,700	<50	100	100	100
Potassium (K)	50	-	100	200	200	<50	100	200	100	100
Sodium (Na)	50	-	100	100	100	300	100	100	100	100
Aluminium (Al)	50	-	7,300	3,500	3,100	3,200	1,800	4,000	3,500	4,200
Iron (Fe)	50	-	4,200	26,400	45,000	17,400	5,600	4,100	18,800	15,300
Minor and Trace Elements	All units mg/kg		All units mg/kg							
Silver (Ag)	0.01	-	<0.01	0.01	0.01	<0.01	0.01	0.01	0.01	0.01
Arsenic (As)	0.1	300	0.6	0.5	9.7	1.7	0.9	1.0	2.0	1.1
Gold (Au)	0.02	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Boron (B)	10	20,000	<10	<10	<10	<10	<10	<10	<10	<10
Barium (Ba)	10	-	20	30	20	50	20	30	20	20
Beryllium (Be)	0.05	90	0.64	0.07	0.13	0.60	0.15	0.13	0.29	0.05
Bismuth (Bi)	0.01	-	0.03	0.02	0.02	<0.01	0.01	0.04	0.02	0.02
Cadmium (Cd)	0.01	90	<0.01	0.01	0.03	<0.01	<0.01	<0.01	0.04	0.01
Cerium (Ce)	0.02	-	37.00	6.34	6.73	5.78	9.61	17.15	9.28	14.85
Cobalt (Co)	0.1	300	1.3	16.2	499	2.6	1.0	0.6	54.2	42.7
Chromium (Cr) *	1	300	176	959	322	325	261	196	290	635
Caesium (Cs)	0.05	-	0.32	0.49	0.51	0.12	0.33	1.05	0.48	0.41
Copper (Cu)	0.2	17,000	2.40	5.40	2.80	3.30	2.60	3.60	3.40	4.00
Gallium (Ga)	0.05	-	2.24	1.40	1.10	0.31	0.68	1.89	1.10	1.44
Germanium (Ge)	0.05	-	0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Hafnium (Hf)	0.02	-	0.16	0.21	0.20	0.03	0.15	0.20	0.15	0.25
Mercury (Hg)	0.01	80	0.08	0.02	0.04	0.05	<0.01	<0.01	0.06	0.02
Indium (In)	0.005	-	0.013	0.006	0.005	<0.005	<0.005	0.007	<0.005	0.005
Lanthanum (La)	0.2	-	17.9	3.1	3.4	3.0	4.9	7.7	4.9	5.4
Lithium (Li)	0.1	-	0.8	1.5	1.2	0.4	0.6	1.3	1.2	1.4
Manganese (Mn)	5	19,000	16	59	25	48	22	17	25	42
Molybdenum (Mo)	0.05	-	0.70	0.30	1.17	0.10	1.04	0.58	0.99	0.21
Niobium (Nb)	0.05	-	0.19	0.29	0.29	0.08	0.18	0.15	0.25	0.09
Nickel (Ni)	0.2	1,200	4.4	24.3	205.0	6.9	3.3	2.9	24.7	27.3
Phosphorus (P)	10	-	20	10	10	10	30	40	20	20
Lead (Pb)	0.2	600	4.0	2.1	1.8	0.4	1.3	2.4	2.1	1.2
Rubidium (Rb)	0.1	-	1.7	2.2	1.8	0.5	1.2	3.6	1.7	1.7
Rhenium (Re)	0.001	-	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001
Sulfur (S)	50	-	500	21,600	47,900	18,000	100	100	19,600	8,200
Antimony (Sb)	0.05	-	0.09	0.07	0.07	<0.05	0.07	0.08	0.08	0.07
Scandium (Sc)	0.1	-	3.10	0.70	0.70	0.50	0.30	0.80	1.00	1.00
Selenium (Se)	0.2	700	0.70	<0.2	0.30	0.40	<0.2	<0.2	0.40	<0.2
Tin (Sn)	0.2	-	0.30	0.20	0.30	0.20	0.30	0.40	0.30	0.20
Strontium (Sr)	0.2	-	2.00	1.90	1.90	15.20	1.10	2.00	2.20	1.20
Tantalum (Ta)	0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tellurium (Te)	0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01
Thorium (Th)	0.2	-	2.2	1.7	1.7	0.4	1.8	2.6	1.4	1.9
Titanium (Ti)	50	-	60	90	90	<50	120	190	90	90
Thallium (Tl)	0.02	-	<0.02	0.02	0.09	0.06	<0.02	0.03	0.14	0.06
Uranium (U)	0.05	-	0.83	0.33	0.30	0.09	0.29	0.50	0.34	0.36
Vanadium (V)	1	-	15.0	6.0	4.0	3.0	7.0	8.0	8.0	9.0
Tungsten (W)	0.05	-	0.16	0.07	0.52	<0.05	0.23	<0.05	0.88	0.05
Yttrium (Y)	0.05	-	8.90	1.54	1.87	2.00	2.17	2.57	2.64	3.31
Zinc (Zn)	2	30,000	126.0	3.0	249.0	29.0	2.0	2.0	17.0	9.0
Zirconium (Zr)	0.5	-	4.3	6.8	6.6	0.8	4.8	7.8	4.9	8.0

Notes: < indicates less than the laboratory limit of reporting.

Shaded cells exceed applied guideline limit.

* Guideline level for Cr(VI) = 300 mg/kg.

1. NEPC (2013). National Environmental Protection Council (NEPC). National Environmental Protection (Assessment of Site Contamination) Measure (NEPM), Amendment of Schedule B1-B7 of 1999 version. Guideline on Investigation Levels for Soil and Groundwater. Health-Based Investigation Level - HIL(C); public open spaces - recreational use.

Table B2: Multi-Element Results for Samples from the Yallourn Project

	Sampling Date →		26/01/2023	31/01/2023	31/01/2023	11/10/2022	19/10/2022	31/05/2023	31/05/2023
	ALS Laboratory ID →		EB2314571 - 002	EB2314571 - 049	EB2317882-046	EB2317882-032	EB2317882-042	EB2324491-033	EB2324491-037
	Location →		YMF Western Truck Dump 4 North	Maryvale Field East	Maryvale Field East	Former Ash Ponds	Former Ash Ponds	Former Ash Ponds	Former Ash Ponds
	Material Type →		Overburden	Overburden	Overburden	Overburden	Overburden/ash	Overburden/ash	Overburden
	Client ID →		M4223_6.0-6.5	N7510_9.5-10.0	N7509_0.5-1.0	N7449_15.0-15.5	N7452_3.5-4.0	N7453_3.0-3.5	N7453_15.5-16.0
Parameters	**LOR**	NEPC[1] Health-Based Investigation Level (HILs)-C							
Major Cations	All units mg/kg		All units mg/kg						
Calcium (Ca)	50	-	<50	100	100	100	500	4,400	100
Magnesium (Mg)	50	-	100	300	500	400	600	21,900	800
Potassium (K)	50	-	200	300	700	500	200	300	800
Sodium (Na)	50	-	100	100	410	220	260	400	500
Aluminium (Al)	50	-	3,600	11,400	14,000	14,800	6,200	11,900	10,000
Iron (Fe)	50	-	6,500	15,600	3,900	9,500	16,300	30,500	11,500
Minor and Trace Elements	All units mg/kg		All units mg/kg						
Silver (Ag)	0.01	-	0.01	0.01	0.01	0.01	0.01	0.52	0.01
Arsenic (As)	0.1	300	0.5	1.8	1.6	0.8	1.7	3.3	0.8
Gold (Au)	0.02	-	<0.02	<0.02	0.00	0.00	0.00	<0.02	<0.02
Boron (B)	10	20,000	<10	<10	<10	<10	<10	70.00	<10
Barium (Ba)	10	-	40	30	52	44	49	680	80
Beryllium (Be)	0.05	90	0.10	0.19	0.28	0.34	0.17	1.78	0.43
Bismuth (Bi)	0.01	-	0.02	0.07	0.20	0.09	0.05	0.13	0.05
Cadmium (Cd)	0.01	90	<0.01	0.01	<0.001	<0.001	0.003	0.25	<0.01
Cerium (Ce)	0.02	-	10.40	15.70	37.30	21.10	9.11	28.30	21.30
Cobalt (Co)	0.1	300	1.4	1.6	0.9	1.5	24.6	15.2	3.4
Chromium (Cr) *	1	300	484	371	136	435	558	29	97
Caesium (Cs)	0.05	-	0.49	0.93	2.97	1.63	0.43	0.79	0.69
Copper (Cu)	0.2	17,000	3.10	3.90	4.31	4.58	3.49	38.20	7.40
Gallium (Ga)	0.05	-	1.23	3.98	8.62	5.94	2.69	2.61	3.22
Germanium (Ge)	0.05	-	<0.05	<0.05	0.05	0.03	0.02	0.14	<0.05
Hafnium (Hf)	0.02	-	0.16	0.25	0.44	0.30	0.21	0.24	0.21
Mercury (Hg)	0.01	80	<0.01	0.02	<0.004	0.04	0.03	0.67	0.02
Indium (In)	0.005	-	0.006	0.016	0.024	0.020	0.011	0.016	0.018
Lanthanum (La)	0.2	-	5.1	7.9	17.7	10.9	4.3	14.0	10.3
Lithium (Li)	0.1	-	1.1	4.0	8.1	5.7	1.3	1.6	3.7
Manganese (Mn)	5	19,000	33	30	18	34	66	188	33
Molybdenum (Mo)	0.05	-	0.23	0.21	0.26	0.22	0.27	1.28	0.26
Niobium (Nb)	0.05	-	0.06	0.13	0.04	0.21	0.43	1.48	0.15
Nickel (Ni)	0.2	1,200	8.6	8.1	5.1	10.3	22.1	52.6	5.3
Phosphorus (P)	10	-	10	20	40	30	40	250	130
Lead (Pb)	0.2	600	2.7	5.4	8.5	7.3	3.9	21.6	5.5
Rubidium (Rb)	0.1	-	2.1	4.9	19.2	7.2	2.7	4.2	7.1
Rhenium (Re)	0.001	-	<0.001	<0.001	<0.0002	<0.0002	<0.0002	0.001	<0.001
Sulfur (S)	50	-	<50	100	100	<50	4,500	3,800	100
Antimony (Sb)	0.05	-	0.05	0.08	0.16	0.08	0.07	0.46	0.06
Scandium (Sc)	0.1	-	1.40	2.70	3.57	3.30	2.15	4.00	2.80
Selenium (Se)	0.2	700	<0.2	0.30	0.08	0.16	0.30	2.90	<0.2
Tin (Sn)	0.2	-	0.20	0.50	1.50	0.79	0.37	1.50	0.40
Strontium (Sr)	0.2	-	3.70	3.70	6.61	3.64	8.42	109.50	9.70
Tantalum (Ta)	0.01	-	<0.01	<0.01	<0.005	<0.005	<0.005	0.04	<0.01
Tellurium (Te)	0.01	-	<0.01	<0.01	0.003	<0.003	0.003	0.020	<0.01
Thorium (Th)	0.2	-	1.9	3.7	9.0	5.2	2.7	3.0	2.4
Titanium (Ti)	50	-	110	110	200	140	130	510	300
Thallium (Tl)	0.02	-	0.02	0.04	0.18	0.06	0.05	510.00	300.00
Uranium (U)	0.05	-	0.23	0.55	1.22	0.79	0.33	0.15	0.04
Vanadium (V)	1	-	8.0	28.0	49.6	22.9	18.9	0.9	0.4
Tungsten (W)	0.05	-	<0.05	<0.05	0.00	0.01	0.03	41.00	25.00
Yttrium (Y)	0.05	-	1.44	2.25	5.04	3.64	2.22	0.46	<0.05
Zinc (Zn)	2	30,000	4.0	4.0	6.9	6.7	29.7	12.3	4.9
Zirconium (Zr)	0.5	-	5.6	9.0	14.5	9.2	6.1	959.0	29.0

Notes: < indicates less than the laboratory limit of reporting.

Shaded cells exceed applied guideline limit.

* Guideline level for Cr(VI) = 300 mg/kg.

1. NEPC (2013). National Environmental Protection Council (NEPC). National Environmental Protection (Assessment of Site Contamination) Measure (NEPM), Amendment of Schedule B1-B7 of 1999 version. Guideline on Investigation Levels for Soil and Groundwater. Health-Based Investigation Level - HIL(C); public open spaces - recreational use.

Table B3: Geochemical Abundance Index (GAI) Results for Samples from the Yallourn Project

	RGS Sample Number →		2021048_0001	2021048_0005	2021048_0007	2021048_0013	2021048_0014	2021048_0020
	Sampling Date →		11/04/2022	12/04/2022	12/04/2022	12/04/2022	12/04/2022	12/04/2022
	ALS Laboratory ID →		EB2215461001	EB2215461002	EB2215461003	EB2215461004	EB2215461005	EB2215461006
	Location →		YTF Western Batters	YTF Hernes Oak Batters	YTF Hernes Oak Batters	YTF Southern Batters	YTF Southern Batters	YTF Fire Service Pond Batters
	Material Type →		Topsoil/overburden	Weathered coal	Weathered coal	Overburden	Overburden	Weathered coal
	Client ID →		RGS_YTF_WW_1	RGS_YTF_WW_03/2	RGS_YTF_WW_03/4	RGS_YTF_WW_05/2	RGS_YTF_WW_05/3	RGS_YTF_WW_06/5
Parameters	**LOR**	Median Crustal Abundance[1,2,3]						
Major Cations	All units in mg/kg		Geochemical Abundance Index					
Calcium (Ca)	100	15,000	0	0	0	0	0	0
Magnesium (Mg)	100	5,000	0	0	0	0	0	0
Potassium (K)	100	14,000	0	-----	-----	0	0	0
Sodium (Na)	100	5,000	0	0	0	0	0	0
Aluminium (Al)	100	71,000	0	0	0	0	0	0
Iron (Fe)	100	40,000	0	0	0	0	0	0
Minor and Trace Elements	All units in mg/kg		Geochemical Abundance Index					
Silver (Ag)	0.01	0.05	0	-----	-----	-----	-----	-----
Arsenic (As)	0.1	6	0	-----	0	0	0	0
Gold (Au)	0.02	0.001	-----	-----	-----	-----	-----	-----
Boron (B)	10	20	-----	0	-----	-----	-----	-----
Barium (Ba)	10	500	0	0	0	0	0	0
Beryllium (Be)	0.05	0.3	1	-----	-----	0	1	0
Bismuth (Bi)	0.01	0.2	0	-----	0	0	0	0
Cadmium (Cd)	0.01	0.35	0	-----	-----	0	0	0
Cerium (Ce)	0.02	50	0	0	0	0	0	0
Cobalt (Co)	0.1	8	0	-----	0	0	1	0
Chromium (Cr)	1	70	0	-----	0	0	0	0
Caesium (Cs)	0.05	4	0	-----	-----	0	0	0
Copper (Cu)	0.2	30	0	0	0	0	0	0
Gallium (Ga)	0.05	20	0	-----	0	0	0	0
Germanium (Ge)	0.05	1	0	-----	-----	-----	0	-----
Hafnium (Hf)	0.02	6	0	-----	-----	0	0	0
Mercury (Hg)	0.01	0.06	0	0	0	0	0	0
Indium (In)	0.005	1	0	-----	-----	0	0	-----
Lanthanum (La)	0.2	40	0	-----	0	0	0	0
Lithium (Li)	0.1	25	0	-----	0	0	0	0
Manganese (Mn)	5	1000	0	0	0	0	0	0
Molybdenum (Mo)	0.05	1.2	0	-----	-----	0	0	0
Niobium (Nb)	0.05	10	0	-----	-----	0	0	0
Nickel (Ni)	0.2	50	0	0	0	0	0	0
Phosphorus (P)	10	800	0	-----	0	0	0	0
Lead (Pb)	0.2	35	0	-----	0	0	0	0
Rubidium (Rb)	0.1	150	0	0	0	0	0	0
Rhenium (Re)	0.001	0.0007	0	-----	-----	-----	-----	-----
Sulfur (S)	100	700	0	1	0	0	0	1
Antimony (Sb)	0.05	1	0	-----	-----	-----	0	-----
Scandium (Sc)	0.1	7	0	-----	0	0	0	0
Selenium (Se)	0.2	0.4	0	0	0	-----	0	0
Tin (Sn)	0.2	4	0	-----	-----	0	0	-----
Strontium (Sr)	0.2	250	0	0	0	0	0	0
Tantalum (Ta)	0.01	2	-----	0	-----	-----	-----	0
Tellurium (Te)	0.01	0.001	3	-----	-----	-----	-----	-----
Thorium (Th)	0.2	9	0	-----	0	0	0	0
Titanium (Ti)	50	5000	0	-----	-----	0	0	0
Thallium (Tl)	0.02	0.2	0	-----	-----	0	0	0
Uranium (U)	0.05	2	0	-----	-----	0	0	0
Vanadium (V)	1	90	0	-----	0	0	0	0
Tungsten (W)	0.05	1.5	-----	-----	-----	-----	-----	-----
Yttrium (Y)	0.05	40	0	0	0	0	0	0
Zinc (Zn)	2	90	0	0	0	0	0	0
Zirconium (Zr)	0.5	400	0	-----	-----	0	0	0

Notes: GAI's greater than or equal to 3 are highlighted. Apparent gold enrichment is an artifact of the laboratory Limit of Reporting (LoR)

1. Median Crustal Abundance values sourced from the "GARD Guide", Chapter 5 (INAP, 2009).

2. When no GARD Guide value is available for particular element, then values are taken from Bowen (1979) Environmental Chemistry of the Elements, p 60-61.

3. If no guide value from GARD or Bowen H.J.M. (1979) exists, up to date, curated data is provided by CRC Handbook of Chemistry and Physics (2000).

Table B3: Geochemical Abundance Index (GAI) Results for Samples from the Yallourn Project

	RGS Sample Number →		2021048_0028	2021048_0031	2021048_0037	2021048_0045	2021048_0051	2021048_0052
	Sampling Date →		14/04/2022	14/04/2022	13/04/2022	13/04/2022	5/04/2022	5/04/2022
	ALS Laboratory ID →		EB2215461007	EB2215461008	EB2215461009	EB2215461010	EB2215461011	EB2215461012
	Location →		YMF Western Batters	YMF Western Batters	YEF Northern Batters	YEFX Latrobe Road Batters	YMF Pit Floor	YMF Pit Floor
	Material Type →		Overburden	Overburden	Weathered coal	Topsoil/overburden	Weathered coal	Weathered coal
	Client ID →		RGS_YMF_WW_04/1	RGS_YMF_WW_05/3	RGS_YEF_WW_01/4	RGS_YEF_WW_05/1	RGS_YMF_C_04	RGS_YMF_C_05
Parameters	**LOR**	Median Crustal Abundance[1,2,3]						
Major Cations	All units in mg/kg		Geochemical Abundance Index					
Calcium (Ca)	100	15,000	0	----	0	0	0	0
Magnesium (Mg)	100	5,000	0	0	0	0	0	0
Potassium (K)	100	14,000	----	0	0	0	0	----
Sodium (Na)	100	5,000	0	0	0	0	0	0
Aluminium (Al)	100	71,000	0	0	0	0	0	0
Iron (Fe)	100	40,000	0	0	0	0	0	0
Minor and Trace Elements	All units in mg/kg		Geochemical Abundance Index					
Silver (Ag)	0.01	0.05	----	----	----	0	----	0
Arsenic (As)	0.1	6	0	0	0	0	0	0
Gold (Au)	0.02	0.001	----	----	----	----	----	----
Boron (B)	10	20	0	----	----	----	0	----
Barium (Ba)	10	500	0	0	0	0	0	0
Beryllium (Be)	0.05	0.3	----	0	0	1	0	1
Bismuth (Bi)	0.01	0.2	----	0	0	0	----	0
Cadmium (Cd)	0.01	0.35	----	0	----	0	----	----
Cerium (Ce)	0.02	50	0	0	0	0	0	0
Cobalt (Co)	0.1	8	0	0	0	0	0	0
Chromium (Cr)	1	70	----	0	0	0	----	0
Caesium (Cs)	0.05	4	----	0	0	0	0	0
Copper (Cu)	0.2	30	0	0	0	0	0	0
Gallium (Ga)	0.05	20	0	0	0	0	0	0
Germanium (Ge)	0.05	1	----	----	----	0	----	0
Hafnium (Hf)	0.02	6	----	0	0	0	----	0
Mercury (Hg)	0.01	0.06	0	0	0	0	0	0
Indium (In)	0.005	1	----	----	----	0	----	0
Lanthanum (La)	0.2	40	0	0	0	0	0	0
Lithium (Li)	0.1	25	0	0	0	0	0	0
Manganese (Mn)	5	1000	0	0	0	0	0	0
Molybdenum (Mo)	0.05	1.2	----	0	0	0	----	0
Niobium (Nb)	0.05	10	----	0	0	0	----	0
Nickel (Ni)	0.2	50	0	0	0	0	0	0
Phosphorus (P)	10	800	----	0	0	0	----	0
Lead (Pb)	0.2	35	----	0	0	0	----	0
Rubidium (Rb)	0.1	150	0	0	0	0	0	0
Rhenium (Re)	0.001	0.0007	----	----	----	----	----	----
Sulfur (S)	100	700	1	0	0	0	1	1
Antimony (Sb)	0.05	1	----	----	----	0	----	0
Scandium (Sc)	0.1	7	0	0	0	0	0	0
Selenium (Se)	0.2	0.4	0	----	0	0	0	0
Tin (Sn)	0.2	4	----	0	----	0	----	0
Strontium (Sr)	0.2	250	0	0	0	0	0	0
Tantalum (Ta)	0.01	2	----	----	----	----	----	----
Tellurium (Te)	0.01	0.001	----	----	----	----	----	----
Thorium (Th)	0.2	9	----	0	0	0	----	0
Titanium (Ti)	50	5000	----	0	----	0	----	0
Thallium (Tl)	0.02	0.2	----	0	----	0	----	0
Uranium (U)	0.05	2	----	0	0	0	----	0
Vanadium (V)	1	90	----	0	0	0	----	0
Tungsten (W)	0.05	1.5	----	----	----	----	----	0
Yttrium (Y)	0.05	40	0	0	0	0	0	0
Zinc (Zn)	2	90	0	0	0	0	0	0
Zirconium (Zr)	0.5	400	----	0	----	0	----	0

Notes: GAI's greater than or equal to 3 are highlighted. Apparent gold enrichment is an artifact of the laboratory Limit of Reporting (LoR)

1. Median Crustal Abundance values sourced from the "GARD Guide", Chapter 5 (INAP, 2009).

2. When no GARD Guide value is available for particular element, then values are taken from Bowen (1979) Environmental Chemistry of the Elements, p 60-61.

3. If no guide value from GARD or Bowen H.J.M. (1979) exists, up to date, curated data is provided by CRC Handbook of Chemistry and Physics (2000).

Table B3: Geochemical Abundance Index (GAI) Results for Samples from the Yallourn Project

	RGS Sample Number →		2021048_0057	2021048_0062	2021048_0063	2021048_0066	2021048_0067
	Sampling Date →		5/04/2022	5/04/2022	5/04/2022	5/04/2022	5/04/2022
	ALS Laboratory ID →		EB2215461013	EB2215461014	EB2215461015	EB2215461016	EB2215461017
	Location →		YMF Pit Floor	YMF Pit Floor	YMF Pit Floor	YMF Operating Face	YMF Operating Face
	Material Type →		Fresh coal	Fresh coal	Fresh coal	Fresh coal	Fresh coal
	Client ID →		RGS_YMF_C_10	RGS_YMF_C_15	RGS_YMF_C_16	RGS_YMF_C_19	RGS_YMF_C_20
Parameters	**LOR**	Median Crustal Abundance[1,2,3]					
Major Cations	All units in mg/kg		Geochemical Abundance Index				
Calcium (Ca)	100	15,000	0	0	0	0	0
Magnesium (Mg)	100	5,000	0	0	0	0	0
Potassium (K)	100	14,000	---	---	0	---	---
Sodium (Na)	100	5,000	0	0	0	0	0
Aluminium (Al)	100	71,000	0	0	0	0	0
Iron (Fe)	100	40,000	0	0	0	0	0
Minor and Trace Elements	All units in mg/kg		Geochemical Abundance Index				
Silver (Ag)	0.01	0.05	---	---	---	---	---
Arsenic (As)	0.1	6	0	0	---	0	0
Gold (Au)	0.02	0.001	---	---	---	---	---
Boron (B)	10	20	---	---	0	---	---
Barium (Ba)	10	500	0	0	0	0	0
Beryllium (Be)	0.05	0.3	0	---	---	0	1
Bismuth (Bi)	0.01	0.2	---	---	---	---	---
Cadmium (Cd)	0.01	0.35	---	---	---	---	---
Cerium (Ce)	0.02	50	0	0	0	0	0
Cobalt (Co)	0.1	8	0	---	---	0	0
Chromium (Cr)	1	70	---	0	---	---	---
Caesium (Cs)	0.05	4	---	0	0	---	0
Copper (Cu)	0.2	30	0	0	0	0	0
Gallium (Ga)	0.05	20	0	---	---	---	---
Germanium (Ge)	0.05	1	---	---	---	---	---
Hafnium (Hf)	0.02	6	---	---	---	---	---
Mercury (Hg)	0.01	0.06	0	0	0	0	0
Indium (In)	0.005	1	---	---	---	---	---
Lanthanum (La)	0.2	40	0	---	---	0	0
Lithium (Li)	0.1	25	0	0	0	0	0
Manganese (Mn)	5	1000	0	0	0	0	0
Molybdenum (Mo)	0.05	1.2	---	---	---	---	---
Niobium (Nb)	0.05	10	---	---	---	---	---
Nickel (Ni)	0.2	50	0	0	---	0	0
Phosphorus (P)	10	800	---	---	---	---	---
Lead (Pb)	0.2	35	---	---	---	---	---
Rubidium (Rb)	0.1	150	0	0	0	0	0
Rhenium (Re)	0.001	0.0007	---	---	---	---	---
Sulfur (S)	100	700	0	0	1	3	5
Antimony (Sb)	0.05	1	---	---	---	---	---
Scandium (Sc)	0.1	7	0	0	---	0	---
Selenium (Se)	0.2	0.4	0	0	---	0	---
Tin (Sn)	0.2	4	---	---	---	---	---
Strontium (Sr)	0.2	250	0	0	0	0	0
Tantalum (Ta)	0.01	2	---	---	---	---	---
Tellurium (Te)	0.01	0.001	---	---	---	---	---
Thorium (Th)	0.2	9	---	---	---	---	---
Titanium (Ti)	50	5000	---	---	---	---	---
Thallium (Tl)	0.02	0.2	0	---	---	0	---
Uranium (U)	0.05	2	---	---	---	---	---
Vanadium (V)	1	90	---	---	---	---	---
Tungsten (W)	0.05	1.5	---	---	---	---	---
Yttrium (Y)	0.05	40	0	---	---	0	0
Zinc (Zn)	2	90					---
Zirconium (Zr)	0.5	400					---

Notes: GAI's greater than or equal to 3 are highlighted. Apparent gold enrichment is an artifact of the laboratory Limit of Reporting (LoR)

1. Median Crustal Abundance values sourced from the "GARD Guide", Chapter 5 (INAP, 2009).

2. When no GARD Guide value is available for particular element, then values are taken from Bowen (1979) Environmental Chemistry of the Elements, p 60-61.

3. If no guide value from GARD or Bowen H.J.M. (1979) exists, up to date, curated data is provided by CRC Handbook of Chemistry and Physics (2000).

Table B3: Geochemical Abundance Index (GAI) Results for Samples from the Yallourn Project

	RGS Sample Number →		2022057_007	2022057_015	2022057_026	2022057_031	2022057_043	2022057_046	2022057_055	2022057_063
	Sampling Date →		1/08/2022	1/08/2022	1/08/2022	1/08/2022	1/08/2022	1/08/2022	2/08/2022	2/08/2022
	ALS Laboratory ID →		EB2230815001	EB2230815002	EB2230815004	EB2230815005	EB2230815008	EB2230815009	EB2230815011	EB2230815013
	Location →		YTF Northern Batters	YTF Hernes Oak Batters	YTF Floc Pond Batters	YTF RCB Batters	MRD	YEF Pit Floor	YMF Eastern Batters	YMF Western Batters
	Material Type →		Weathered coal	Weathered coal	Weathered coal	Weathered coal	Weathered coal	Weathered coal	Fresh coal	Weathered coal
	Client ID →		EAY_KLC_C_7	EAY_KLC_C_15	EAY_KLC_C_26	EAY_KLC_C_31	EAY_KLC_C_43	EAY_KLC_C_46	EAY_KLC_C_55	EAY_KLC_C_63
Parameters	**LOR**	Median Crustal Abundance[1,2,3]								
Major Cations	All units in mg/kg		Geochemical Abundance Index							
Calcium (Ca)	100	15,000	0	0	0	0	0	0	0	0
Magnesium (Mg)	100	5,000	0	0	0	0	0	0	0	0
Potassium (K)	100	14,000	0	0	0	0	0	0	0	0
Sodium (Na)	100	5,000	0	0	0	0	0	0	0	0
Aluminium (Al)	100	71,000	0	0	0	0	0	0	0	0
Iron (Fe)	100	40,000	0	0	0	0	0	0	0	0
Minor and Trace Elements	All units in mg/kg		Geochemical Abundance Index							
Silver (Ag)	0.01	0.05	----	----	----	0	----	----	----	----
Arsenic (As)	0.1	6	0	0	0	0	0	0	0	0
Gold (Au)	0.02	0.001	----	----	----	----	----	----	----	----
Boron (B)	10	20	----	----	----	----	----	----	----	----
Barium (Ba)	10	500	0	0	0	0	0	0	0	0
Beryllium (Be)	0.05	0.3	0	----	----	0	0	0	0	----
Bismuth (Bi)	0.01	0.2	----	0	----	0	0	0	0	----
Cadmium (Cd)	0.01	0.35	----	0	----	0	----	0	0	----
Cerium (Ce)	0.02	50	0	0	0	0	0	0	0	0
Cobalt (Co)	0.1	8	0	0	0	0	0	0	0	0
Chromium (Cr)	1	70	0	0	0	0	0	0	0	0
Caesium (Cs)	0.05	4	----	0	----	0	0	0	0	----
Copper (Cu)	0.2	30	0	0	0	0	0	0	0	0
Gallium (Ga)	0.05	20	----	0	0	0	0	0	0	0
Germanium (Ge)	0.05	1	----	----	----	----	----	0	----	----
Hafnium (Hf)	0.02	6	----	0	----	----	----	0	0	----
Mercury (Hg)	0.01	0.06	0	0	0	0	0	0	0	0
Indium (In)	0.005	1	----	----	----	----	----	----	----	----
Lanthanum (La)	0.2	40	0	0	0	0	0	0	0	0
Lithium (Li)	0.1	25	0	0	0	0	0	0	0	0
Manganese (Mn)	5	1000	0	0	0	0	0	0	0	0
Molybdenum (Mo)	0.05	1.2	----	0	----	0	----	0	0	----
Niobium (Nb)	0.05	10	----	0	----	0	----	0	0	----
Nickel (Ni)	0.2	50	0	0	0	0	0	0	0	0
Phosphorus (P)	10	800	0	0	0	0	0	0	0	0
Lead (Pb)	0.2	35	----	0	----	0	0	0	0	0
Rubidium (Rb)	0.1	150	0	0	0	0	0	0	0	0
Rhenium (Re)	0.001	0.0007	----	----	----	----	----	----	----	----
Sulfur (S)	100	700	1	0	0	1	0	1	1	0
Antimony (Sb)	0.05	1	----	----	----	----	----	----	0	----
Scandium (Sc)	0.1	7	0	0	0	0	0	0	0	0
Selenium (Se)	0.2	0.4	0	0	0	0	0	0	0	0
Tin (Sn)	0.2	4	----	----	----	----	----	----	0	----
Strontium (Sr)	0.2	250	0	0	0	0	0	0	0	0
Tantalum (Ta)	0.01	2	0	----	----	----	----	0	----	----
Tellurium (Te)	0.01	0.001	----	----	----	----	----	----	----	----
Thorium (Th)	0.2	9	----	0	----	----	----	0	0	----
Titanium (Ti)	50	5000	----	----	----	----	----	----	----	----
Thallium (Tl)	0.02	0.2	0	----	0	----	----	----	0	----
Uranium (U)	0.05	2	----	----	----	----	----	0	0	----
Vanadium (V)	1	90	----	0	----	0	0	0	0	0
Tungsten (W)	0.05	1.5	----	----	----	----	----	0	0	----
Yttrium (Y)	0.05	40	0	0	0	0	0	0	0	0
Zinc (Zn)	2	90	0	0	0	0	0	0	0	0
Zirconium (Zr)	0.5	400	----	0	----	----	----	0	0	----

Notes: GAI's greater than or equal to 3 are highlighted. Apparent gold enrichment is an artifact of the laboratory Limit of Reporting (LoR)

1. Median Crustal Abundance values sourced from the "GARD Guide", Chapter 5 (INAP, 2009).
2. When no GARD Guide value is available for particular element, then values are taken from Bowen (1979) Environmental Chemistry of the Elements, p 60-61.
3. If no guide value from GARD or Bowen H.J.M. (1979) exists, up to date, curated data is provided by CRC Handbook of Chemistry and Physics (2000).

Table B3: Geochemical Abundance Index (GAI) Results for Samples from the Yallourn Project

	RGS Sample Number →		2022057_064	2022057_067	2022057_068	2022057_069	2022057_073	2022057_077	2022057_080
	Sampling Date →		2/08/2022	2/08/2022	2/08/2022	2/08/2022	2/08/2022	2/08/2022	2/08/2022
	ALS Laboratory ID →		EB2230815014	EB2230815015	EB2230815016	EB2230815017	EB2230815018	EB2230815019	EB2230815020
	Location →		YMF Western Batters	YMF Operating Face	YMF Operating Face	YMF Western Batters	YTF Floc Pond Batters	YMF Eastern Batters	MRD
	Material Type →		Weathered coal	Fresh coal	Fresh coal	Fresh coal	Overburden	Overburden	Overburden
	Client ID →		EAY_KLC_C_64	EAY_KLC_C_67	EAY_KLC_C_68	EAY_KLC_C_69	EAY_KLC_OB_3	EAY_KLC_OB_7	EAY_KLC_OB_10
Parameters	**LOR**	Median Crustal Abundance[1,2,3]							
Major Cations	All units in mg/kg		Geochemical Abundance Index						
Calcium (Ca)	100	15,000	0	0	0	0	0	0	0
Magnesium (Mg)	100	5,000	0	0	0	0	0	0	0
Potassium (K)	100	14,000	0	0	0	0	0	0	0
Sodium (Na)	100	5,000	0	0	0	0	0	0	0
Aluminium (Al)	100	71,000	0	0	0	0	0	0	0
Iron (Fe)	100	40,000	0	0	0	0	0	0	0
Minor and Trace Elements	All units in mg/kg		Geochemical Abundance Index						
Silver (Ag)	0.01	0.05	----	----	----	----	----	0	0
Arsenic (As)	0.1	6	0	0	0	0	0	0	0
Gold (Au)	0.02	0.001	----	----	----	----	----	----	----
Boron (B)	10	20	----	----	----	----	----	----	----
Barium (Ba)	10	500	0	0	0	0	0	0	0
Beryllium (Be)	0.05	0.3	----	1	0	1	----	0	0
Bismuth (Bi)	0.01	0.2	----	----	----	----	0	0	0
Cadmium (Cd)	0.01	0.35	----	----	----	0	0	0	0
Cerium (Ce)	0.02	50	0	0	0	0	0	0	0
Cobalt (Co)	0.1	8	0	4	4	1	0	0	0
Chromium (Cr)	1	70	0	0	0	0	0	0	0
Caesium (Cs)	0.05	4	0	----	----	----	0	0	0
Copper (Cu)	0.2	30	0	0	0	0	0	0	0
Gallium (Ga)	0.05	20	0	0	----	0	0	0	0
Germanium (Ge)	0.05	1	----	----	----	----	----	----	----
Hafnium (Hf)	0.02	6	----	----	----	0	0	0	0
Mercury (Hg)	0.01	0.06	0	0	0	0	0	0	0
Indium (In)	0.005	1	----	----	----	----	----	0	0
Lanthanum (La)	0.2	40	0	0	0	0	0	0	0
Lithium (Li)	0.1	25	0	0	0	0	0	0	0
Manganese (Mn)	5	1000	0	0	0	0	0	0	0
Molybdenum (Mo)	0.05	1.2	----	0	----	0	0	0	0
Niobium (Nb)	0.05	10	----	----	----	----	0	0	0
Nickel (Ni)	0.2	50	0	0	0	0	0	0	0
Phosphorus (P)	10	800	----	0	0	0	0	0	0
Lead (Pb)	0.2	35	0	0	----	0	0	0	0
Rubidium (Rb)	0.1	150	0	0	0	0	0	0	0
Rhenium (Re)	0.001	0.0007	----	----	----	----	----	----	----
Sulfur (S)	100	700	0	3	4	2	----	0	0
Antimony (Sb)	0.05	1	----	----	0	----	----	----	----
Scandium (Sc)	0.1	7	0	0	0	0	0	0	0
Selenium (Se)	0.2	0.4	0	0	0	0	----	0	0
Tin (Sn)	0.2	4	----	----	----	----	0	0	0
Strontium (Sr)	0.2	250	0	0	0	0	0	0	0
Tantalum (Ta)	0.01	2	----	----	----	----	----	----	----
Tellurium (Te)	0.01	0.001	----	----	----	----	----	----	----
Thorium (Th)	0.2	9	----	----	----	0	0	0	0
Titanium (Ti)	50	5000	----	----	----	----	0	0	0
Thallium (Tl)	0.02	0.2	----	0	0	0	----	0	0
Uranium (U)	0.05	2	----	----	----	----	0	0	0
Vanadium (V)	1	90	0	0	----	0	0	0	0
Tungsten (W)	0.05	1.5	----	----	----	----	----	----	----
Yttrium (Y)	0.05	40	0	0	0	0	0	0	0
Zinc (Zn)	2	90	0	0	0	0			
Zirconium (Zr)	0.5	400	----	----	----	----			

Notes: GAI's greater than or equal to 3 are highlighted. Apparent gold enrichment is an artifact of the laboratory Limit of Reporting (LoR)

1. Median Crustal Abundance values sourced from the "GARD Guide", Chapter 5 (INAP, 2009).
2. When no GARD Guide value is available for particular element, then values are taken from Bowen (1979) Environmental Chemistry of the Elements, p 60-61.
3. If no guide value from GARD or Bowen H.J.M. (1979) exists, up to date, curated data is provided by CRC Handbook of Chemistry and Physics (2000).

Table B3: Geochemical Abundance Index (GAI) Results for Samples from the Yallourn Project

		Sampling Date →	1/12/2022	9/11/2022	29/11/2022	30/11/2022	4/12/2022	29/05/2023	29/05/2023	31/05/2023
		ALS Laboratory ID →	EB2314434 - 002	EB2317882-003	EB2314434 - 004	EB2314434 - 005	EB2314571 - 030	EB2324491-001	EB2324491-010	EB2326215-002
		Location →	YTF Northern Overburden Dump	YTF Northern Overburden Dump	YTF Northern Overburden Dump	YTF Northern Overburden Dump	YTF Northern Overburden Dump	YTF Northern Overburden Dump	YTF Northern Overburden Dump	YTF Northern Overburden Dump
		Material Type →	Overburden	Overburden	Overburden	Overburden	Overburden	Overburden	Overburden	Overburden
		Client ID →	N7423_19.5-20	N7424_9-9.5	N7425_16-16.5	N7425_28.5-29	N7434_15.0-15.5	N7523_1.5-2.0	N7523_22.0-22.5	N7524_1.5-2.0
Parameters	**LOR**	Median Crustal Abundance[1,2,3]								
Major Cations		All units in mg/kg	Geochemical Abundance Index							
Calcium (Ca)	100	15,000	0	0	0	0	0	-----	0	0
Magnesium (Mg)	100	5,000	0	0	0	0	0	0	0	0
Potassium (K)	100	14,000	0	0	0	0	0	0	0	0
Sodium (Na)	100	5,000	0	0	0	0	0	0	0	0
Aluminium (Al)	100	71,000	0	0	0	0	0	0	0	0
Iron (Fe)	100	40,000	0	0	0	0	0	0	0	0
Minor and Trace Elements		All units in mg/kg	Geochemical Abundance Index							
Silver (Ag)	0.01	0.05	0	0	0	0	0	0	0	0
Arsenic (As)	0.1	6	0	0	0	0	0	0	0	0
Gold (Au)	0.02	0.001	-----	0	-----	-----	-----	-----	-----	-----
Boron (B)	10	20	-----	-----	-----	-----	-----	-----	-----	-----
Barium (Ba)	10	500	0	0	0	0	0	0	0	0
Beryllium (Be)	0.05	0.3	0	1	0	1	1	0	0	0
Bismuth (Bi)	0.01	0.2	0	0	0	0	0	0	0	0
Cadmium (Cd)	0.01	0.35	-----	-----	0	0	0	0	0	0
Cerium (Ce)	0.02	50	0	0	0	0	0	0	0	0
Cobalt (Co)	0.1	8	1	0	3	3	0	0	1	4
Chromium (Cr)	1	70	3	1	3	2	0	1	1	1
Caesium (Cs)	0.05	4	0	0	0	0	0	0	0	0
Copper (Cu)	0.2	30	0	0	0	0	0	0	0	0
Gallium (Ga)	0.05	20	0	0	0	0	0	0	0	0
Germanium (Ge)	0.05	1	-----	0	-----	0	0	-----	-----	0
Hafnium (Hf)	0.02	6	0	0	0	0	0	0	0	0
Mercury (Hg)	0.01	0.06	0	0	0	0	0	0	0	0
Indium (In)	0.005	1	0	0	0	0	0	0	-----	-----
Lanthanum (La)	0.2	40	0	0	0	0	0	0	0	0
Lithium (Li)	0.1	25	0	0	0	0	0	0	0	0
Manganese (Mn)	5	1000	0	0	0	0	0	0	0	0
Molybdenum (Mo)	0.05	1.2	0	0	0	0	0	0	0	0
Niobium (Nb)	0.05	10	0	0	0	0	0	0	0	0
Nickel (Ni)	0.2	50	0	0	0	0	0	0	0	0
Phosphorus (P)	10	800	0	0	0	0	0	0	0	0
Lead (Pb)	0.2	35	0	0	0	0	0	0	0	0
Rubidium (Rb)	0.1	150	0	0	0	0	0	0	0	0
Rhenium (Re)	0.001	0.0007	-----	-----	-----	-----	-----	-----	-----	-----
Sulfur (S)	100	700	2	-----	5	3	0	0	2	4
Antimony (Sb)	0.05	1	0	0	0	0	0	0	0	0
Scandium (Sc)	0.1	7	0	0	0	0	0	0	0	0
Selenium (Se)	0.2	0.4	0	0	0	0	0	-----	0	0
Tin (Sn)	0.2	4	0	0	0	0	0	0	0	0
Strontium (Sr)	0.2	250	0	0	0	0	0	0	0	0
Tantalum (Ta)	0.01	2	-----	-----	-----	-----	-----	-----	-----	-----
Tellurium (Te)	0.01	0.001	-----	-----	-----	3	-----	-----	3	-----
Thorium (Th)	0.2	9	0	0	0	0	0	0	0	0
Titanium (Ti)	50	5000	0	0	0	0	0	0	0	0
Thallium (Tl)	0.02	0.2	0	0	0	0	0	6	6	0
Uranium (U)	0.05	2	0	0	0	0	0	0	0	0
Vanadium (V)	1	90	0	0	0	0	0	0	0	0
Tungsten (W)	0.05	1.5	-----	0	-----	-----	-----	3	2	0
Yttrium (Y)	0.05	40	0	0	0	0	0	0	0	0
Zinc (Zn)	2	90	0	0	0	0	0	0	0	0
Zirconium (Zr)	0.5	400	0	0	0	0	0	0	0	0

Notes: GAI's greater than or equal to 3 are highlighted. Apparent gold enrichment is an artifact of the laboratory Limit of Reporting (LoR)

1. Median Crustal Abundance values sourced from the "GARD Guide", Chapter 5 (INAP, 2009).
2. When no GARD Guide value is available for particular element, then values are taken from Bowen (1979) Environmental Chemistry of the Elements, p 60-61.
3. If no guide value from GARD or Bowen H.J.M. (1979) exists, up to date, curated data is provided by CRC Handbook of Chemistry and Physics (2000).

Table B3: Geochemical Abundance Index (GAI) Results for Samples from the Yallourn Project

		Sampling Date →	31/05/2023	9/12/2022	30/05/2023	27/10/2022	24/10/2022	30/01/2023	1/06/2023	1/06/2023
		ALS Laboratory ID →	EB2326215-009	EB2314571 - 041	EB2326215-035	EB2314571 - 028	EB2317882-017	EB2317882-021	EB2324491-020	EB2324491-025
		Location →	YTF Northern Overburden Dump	YTF Southern Overburden Dump	YTF Southern Overburden Dump	Midfield Dump	Midfield Dump	Midfield Dump	Midfield Dump	Midfield Dump
		Material Type →	Overburden	Overburden	Overburden	Overburden	Overburden	Overburden	Overburden	Overburden
		Client ID →	N7524_31.5-32.0	N7455_1.0-1.5	N7526_5.5-6.0	N7433_37.0-37.5	N7431_27.5-28.0	N7443_6.5-7.0	N7521_12.0-12.5	N7521_46.5-47.0
Parameters	**LOR**	Median Crustal Abundance[1,2,3]								
Major Cations		All units in mg/kg	Geochemical Abundance Index							
Calcium (Ca)	100	15,000	0	0	0	----	0	----	----	0
Magnesium (Mg)	100	5,000	0	0	0	0	0	0	0	0
Potassium (K)	100	14,000	0	0	0	0	0	0	0	0
Sodium (Na)	100	5,000	0	0	----	0	0	0	0	0
Aluminium (Al)	100	71,000	0	0	0	0	0	0	0	0
Iron (Fe)	100	40,000	0	0	0	0	0	0	0	0
Minor and Trace Elements		All units in mg/kg	Geochemical Abundance Index							
Silver (Ag)	0.01	0.05	0	0	----	0	0	0	----	0
Arsenic (As)	0.1	6	0	0	0	0	0	0	0	0
Gold (Au)	0.02	0.001	----	----	----	----	0	0	----	----
Boron (B)	10	20	----	----	----	----	----	----	----	----
Barium (Ba)	10	500	0	0	0	0	0	0	0	0
Beryllium (Be)	0.05	0.3	0	0	0	0	0	0	0	2
Bismuth (Bi)	0.01	0.2	0	0	0	0	0	0	0	0
Cadmium (Cd)	0.01	0.35	0	0	----	----	0	----	----	0
Cerium (Ce)	0.02	50	0	0	0	0	0	0	0	0
Cobalt (Co)	0.1	8	0	0	0	0	0	0	0	2
Chromium (Cr)	1	70	0	0	0	2	2	2	0	1
Caesium (Cs)	0.05	4	0	0	0	0	0	0	0	0
Copper (Cu)	0.2	30	0	0	0	0	0	0	0	0
Gallium (Ga)	0.05	20	0	0	0	0	0	0	0	0
Germanium (Ge)	0.05	1	----	----	0	----	0	0	----	----
Hafnium (Hf)	0.02	6	0	0	0	0	0	0	0	0
Mercury (Hg)	0.01	0.06	0	0	0	0	0	0	0	0
Indium (In)	0.005	1	0	0	0	0	0	0	0	0
Lanthanum (La)	0.2	40	0	0	0	0	0	0	0	0
Lithium (Li)	0.1	25	0	0	0	0	0	0	0	0
Manganese (Mn)	5	1000	0	0	0	0	0	0	0	0
Molybdenum (Mo)	0.05	1.2	0	0	0	0	0	0	0	0
Niobium (Nb)	0.05	10	0	0	0	----	0	0	----	0
Nickel (Ni)	0.2	50	0	0	0	0	0	0	0	0
Phosphorus (P)	10	800	0	0	0	0	0	0	0	0
Lead (Pb)	0.2	35	0	0	0	0	0	0	0	0
Rubidium (Rb)	0.1	150	0	0	0	0	0	0	0	0
Rhenium (Re)	0.001	0.0007	----	----	----	----	----	----	----	----
Sulfur (S)	100	700	1	0	0	----	----	0	0	2
Antimony (Sb)	0.05	1	0	0	0	----	0	0	0	0
Scandium (Sc)	0.1	7	0	0	0	0	0	0	0	0
Selenium (Se)	0.2	0.4	----	----	----	----	0	0	----	0
Tin (Sn)	0.2	4	0	0	0	0	0	0	0	0
Strontium (Sr)	0.2	250	0	0	0	0	0	0	0	0
Tantalum (Ta)	0.01	2	----	----	----	----	----	----	----	----
Tellurium (Te)	0.01	0.001	3	----	----	----	----	----	----	3
Thorium (Th)	0.2	9	0	0	0	0	0	0	0	0
Titanium (Ti)	50	5000	0	0	0	0	0	0	0	0
Thallium (Tl)	0.02	0.2	0	0	0	0	0	0	6	6
Uranium (U)	0.05	2	0	0	0	0	0	0	0	0
Vanadium (V)	1	90	0	0	0	0	0	0	0	0
Tungsten (W)	0.05	1.5	0	0	0	----	0	0	4	4
Yttrium (Y)	0.05	40	0	0	0	0	0	0	----	0
Zinc (Zn)	2	90	0	0	0	0	0	0	0	0
Zirconium (Zr)	0.5	400	0	0	0	0	0	0	0	0

Notes: GAI's greater than or equal to 3 are highlighted. Apparent gold enrichment is an artifact of the laboratory Limit of Reporting (LoR)

1. Median Crustal Abundance values sourced from the "GARD Guide", Chapter 5 (INAP, 2009).
2. When no GARD Guide value is available for particular element, then values are taken from Bowen (1979) Environmental Chemistry of the Elements, p 60-61.
3. If no guide value from GARD or Bowen H.J.M. (1979) exists, up to date, curated data is provided by CRC Handbook of Chemistry and Physics (2000).

Table B3: Geochemical Abundance Index (GAI) Results for Samples from the Yallourn Project

		Sampling Date →	31/05/2023	31/05/2023	20/12/2022	15/01/2023	15/01/2023	13/01/2023	14/01/2023	21/01/2023
		ALS Laboratory ID →	EB2326215-024	EB2314571 - 033	EB2314434 - 011	EB2314434 - 013	EB2314434 - 016	EB2314434 - 018	EB2314434 - 019	EB2314434 - 022
		Location →	Midfield Dump	East Field	East Field	East Field	East Field	East Field	East Field	East Field
		Material Type →	Overburden	Overburden	Overburden	Overburden	Overburden	Overburden	Overburden	Overburden
		Client ID →	N7522_11.0-11.5	N7438_13.0-13.5	N7440_26.5-27.0	N7441_2.5-3.0	N7441_21.0-21.5	N7442_14.0-14.5	N7442_28.5-29.0	N7445_10.5-11.0
Parameters	**LOR**	Median Crustal Abundance[1,2,3]								
Major Cations		All units in mg/kg	Geochemical Abundance Index							
Calcium (Ca)	100	15,000	0	----	0	0	----	----	0	----
Magnesium (Mg)	100	5,000	0	0	0	0	----	0	0	0
Potassium (K)	100	14,000	0	0	0	----	0	0	0	0
Sodium (Na)	100	5,000	0	0	0	0	0	0	0	0
Aluminium (Al)	100	71,000	0	0	0	0	0	0	0	0
Iron (Fe)	100	40,000	0	0	0	0	0	0	0	0
Minor and Trace Elements		All units in mg/kg	Geochemical Abundance Index							
Silver (Ag)	0.01	0.05	----	0	0	----	0	0	0	0
Arsenic (As)	0.1	6	0	0	0	0	0	0	0	0
Gold (Au)	0.02	0.001	----	----	----	----	----	----	----	----
Boron (B)	10	20	----	----	----	----	----	----	----	----
Barium (Ba)	10	500	0	0	0	0	0	0	0	0
Beryllium (Be)	0.05	0.3	1	0	0	0	0	0	0	0
Bismuth (Bi)	0.01	0.2	0	0	0	----	0	0	0	0
Cadmium (Cd)	0.01	0.35	----	0	0	----	----	----	0	0
Cerium (Ce)	0.02	50	0	0	0	0	0	0	0	0
Cobalt (Co)	0.1	8	0	0	5	0	0	0	2	2
Chromium (Cr)	1	70	1	3	2	2	1	1	1	3
Caesium (Cs)	0.05	4	0	0	0	0	0	0	0	0
Copper (Cu)	0.2	30	0	0	0	0	0	0	0	0
Gallium (Ga)	0.05	20	0	0	0	0	0	0	0	0
Germanium (Ge)	0.05	1	0	----	----	----	----	----	----	----
Hafnium (Hf)	0.02	6	0	0	0	0	0	0	0	0
Mercury (Hg)	0.01	0.06	0	0	0	0	----	----	0	0
Indium (In)	0.005	1	0	0	0	----	----	0	----	0
Lanthanum (La)	0.2	40	0	0	0	0	0	0	0	0
Lithium (Li)	0.1	25	0	0	0	0	0	0	0	0
Manganese (Mn)	5	1000	0	0	0	0	0	0	0	0
Molybdenum (Mo)	0.05	1.2	0	0	0	0	0	0	0	0
Niobium (Nb)	0.05	10	0	0	0	0	0	0	0	0
Nickel (Ni)	0.2	50	0	0	1	0	0	0	0	0
Phosphorus (P)	10	800	0	0	0	0	0	0	0	0
Lead (Pb)	0.2	35	0	0	0	0	0	0	0	0
Rubidium (Rb)	0.1	150	0	0	0	0	0	0	0	0
Rhenium (Re)	0.001	0.0007	----	----	1	----	----	----	----	----
Sulfur (S)	100	700	0	4	6	4	0	0	4	3
Antimony (Sb)	0.05	1	0	0	0	----	0	0	0	0
Scandium (Sc)	0.1	7	0	0	0	0	0	0	0	0
Selenium (Se)	0.2	0.4	0	----	0	0	----	----	0	----
Tin (Sn)	0.2	4	0	0	0	0	0	0	0	0
Strontium (Sr)	0.2	250	0	0	0	0	0	0	0	0
Tantalum (Ta)	0.01	2	----	----	----	----	----	----	----	----
Tellurium (Te)	0.01	0.001	----	----	----	----	----	3	----	----
Thorium (Th)	0.2	9	0	0	0	0	0	0	0	0
Titanium (Ti)	50	5000	0	0	0	----	0	0	0	0
Thallium (Tl)	0.02	0.2	----	0	0	0	----	0	0	0
Uranium (U)	0.05	2	0	0	0	0	0	0	0	0
Vanadium (V)	1	90	0	0	0	0	0	0	0	0
Tungsten (W)	0.05	1.5	0	0	0	----	0	----	0	0
Yttrium (Y)	0.05	40	0	0	0	0	0	0	0	0
Zinc (Zn)	2	90	0	0	1	0	0	0	0	0
Zirconium (Zr)	0.5	400	0	0	0	0	0	0	0	0

Notes: GAI's greater than or equal to 3 are highlighted. Apparent gold enrichment is an artifact of the laboratory Limit of Reporting (LoR)

1. Median Crustal Abundance values sourced from the "GARD Guide", Chapter 5 (INAP, 2009).
2. When no GARD Guide value is available for particular element, then values are taken from Bowen (1979) Environmental Chemistry of the Elements, p 60-61.
3. If no guide value from GARD or Bowen H.J.M. (1979) exists, up to date, curated data is provided by CRC Handbook of Chemistry and Physics (2000).

Table B3: Geochemical Abundance Index (GAI) Results for Samples from the Yallourn Project

		Sampling Date →	26/01/2023	31/01/2023	31/01/2023	11/10/2022	19/10/2022	31/05/2023	31/05/2023
		ALS Laboratory ID →	EB2314571 - 002	EB2314571 - 049	EB2317882-046	EB2317882-032	EB2317882-042	EB2324491-033	EB2324491-037
		Location →	YMF Western Truck Dump 4 North	Maryvale Field East	Maryvale Field East	Former Ash Ponds	Former Ash Ponds	Former Ash Ponds	Former Ash Ponds
		Material Type →	Overburden	Overburden	Overburden	Overburden	Overburden/ash	Overburden/ash	Overburden
		Client ID →	M4223_6.0-6.5	N7510_9.5-10.0	N7509_0.5-1.0	N7449_15.0-15.5	N7452_3.5-4.0	N7453_3.0-3.5	N7453_15.5-16.0
Parameters	**LOR**	Median Crustal Abundance[1,2,3]							
Major Cations		All units in mg/kg	Geochemical Abundance Index						
Calcium (Ca)	100	15,000	----	0	0	0	0	0	0
Magnesium (Mg)	100	5,000	0	0	0	0	0	2	0
Potassium (K)	100	14,000	0	0	0	0	0	0	0
Sodium (Na)	100	5,000	0	0	0	0	0	0	0
Aluminium (Al)	100	71,000	0	0	0	0	0	0	0
Iron (Fe)	100	40,000	0	0	0	0	0	0	0
Minor and Trace Elements		All units in mg/kg	Geochemical Abundance Index						
Silver (Ag)	0.01	0.05	0	0	0	0	0	3	0
Arsenic (As)	0.1	6	0	0	0	0	0	0	0
Gold (Au)	0.02	0.001	----	----	0	0	0	----	----
Boron (B)	10	20	----	----	----	----	----	1	----
Barium (Ba)	10	500	0	0	0	0	0	0	0
Beryllium (Be)	0.05	0.3	0	0	0	0	0	2	0
Bismuth (Bi)	0.01	0.2	0	0	0	0	0	0	0
Cadmium (Cd)	0.01	0.35	----	0	----	----	0	0	----
Cerium (Ce)	0.02	50	0	0	0	0	0	0	0
Cobalt (Co)	0.1	8	0	0	0	0	1	0	0
Chromium (Cr)	1	70	2	2	0	2	2	0	0
Caesium (Cs)	0.05	4	0	0	0	0	0	0	0
Copper (Cu)	0.2	30	0	0	0	0	0	0	0
Gallium (Ga)	0.05	20	0	0	0	0	0	0	0
Germanium (Ge)	0.05	1	----	----	0	0	0	0	----
Hafnium (Hf)	0.02	6	0	0	0	0	0	0	0
Mercury (Hg)	0.01	0.06	----	0	----	0	0	3	0
Indium (In)	0.005	1	0	0	0	0	0	0	0
Lanthanum (La)	0.2	40	0	0	0	0	0	0	0
Lithium (Li)	0.1	25	0	0	0	0	0	0	0
Manganese (Mn)	5	1000	0	0	0	0	0	0	0
Molybdenum (Mo)	0.05	1.2	0	0	0	0	0	0	0
Niobium (Nb)	0.05	10	0	0	0	0	0	0	0
Nickel (Ni)	0.2	50	0	0	0	0	0	0	0
Phosphorus (P)	10	800	0	0	0	0	0	0	0
Lead (Pb)	0.2	35	0	0	0	0	0	0	0
Rubidium (Rb)	0.1	150	0	0	0	0	0	0	0
Rhenium (Re)	0.001	0.0007	----	----	----	----	----	0	----
Sulfur (S)	100	700	----	0	0	----	2	2	0
Antimony (Sb)	0.05	1	0	0	0	0	0	0	0
Scandium (Sc)	0.1	7	0	0	0	0	0	0	0
Selenium (Se)	0.2	0.4	----	0	0	0	0	2	----
Tin (Sn)	0.2	4	0	0	0	0	0	0	0
Strontium (Sr)	0.2	250	0	0	0	0	0	0	0
Tantalum (Ta)	0.01	2	----	----	----	----	----	0	----
Tellurium (Te)	0.01	0.001	----	----	1	----	1	4	----
Thorium (Th)	0.2	9	0	0	0	0	0	0	0
Titanium (Ti)	50	5000	0	0	0	0	0	0	0
Thallium (Tl)	0.02	0.2	0	0	0	0	0	6	6
Uranium (U)	0.05	2	0	0	0	0	0	0	0
Vanadium (V)	1	90	0	0	0	0	0	0	0
Tungsten (W)	0.05	1.5	----	----	0	0	0	4	3
Yttrium (Y)	0.05	40	0	0	0	0	0	0	----
Zinc (Zn)	2	90	0	0	0	0	0	0	0
Zirconium (Zr)	0.5	400	0	0	0	0	0	1	0

Notes: GAI's greater than or equal to 3 are highlighted. Apparent gold enrichment is an artifact of the laboratory Limit of Reporting (LoR)

1. Median Crustal Abundance values sourced from the "GARD Guide", Chapter 5 (INAP, 2009).
2. When no GARD Guide value is available for particular element, then values are taken from Bowen (1979) Environmental Chemistry of the Elements, p 60-61.
3. If no guide value from GARD or Bowen H.J.M. (1979) exists, up to date, curated data is provided by CRC Handbook of Chemistry and Physics (2000).

Table B4: PFAS Test Results for Overburden Samples from the Yallourn Project

Parameters	LOR	PFAS NEMP 2.0 2020 HIL D[1]	PFAS NEMP 2.0 2020 HIL C[2]	Client Sample ID →	EA_MFD_N7436_2.5-3m	EA_MFD_N7454_2-2.5m	EA_MFD_N7432_2.0-2.5m	EA_MFD_N7433_2.5-3.0m	EA_MFD_N7431_2.5-3.0m	EA_MFD_N7431_26-26.5m	EA_MFD_N7443_3 m	EA_MFD_N7443_8.5 m
				Sampling Date →	03/11/2022	07/12/2022	05/12/2022	25/10/2022	24/10/2022	24/10/2022	30/01/2023	30/01/2023
				Location →	Midfield Dump	Midfield Dump	Midfield Dump	Midfield Dump	Midfield Dump	Midfield Dump	Midfield Dump	Midfield Dump
				ALS Laboratory ID →	EM2301747001	EM2301747002	EM2301747003	EM2301747004	EM2301747006	EM2301747005	EM2301747038	EM2301747035
Moisture Content	0.1 (%)				12.2	13.0	13.5	24.5	43.0	21.9	12.0	2.3
Perfluoroalkyl Sulfonic Acids	All units mg/kg				All units mg/kg							
Perfluorobutane sulfonic acid (PFBS)	0.0002				<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	0.0002				<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	0.0002	20	1		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002
Perfluoroheptane sulfonic acid (PFHpS)	0.0002				<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002
Perfluorooctane sulfonic acid (PFOS)	0.0002	20	1		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002
Perfluorodecane sulfonic acid (PFDS)	0.0002				<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002
Perfluoroalkyl Carboxylic Acids	All units mg/kg				All units mg/kg							
Perfluorobutanoic acid (PFBA)	0.001				<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.001
Perfluoropentanoic acid (PFPeA)	0.0002				<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002
Perfluorohexanoic acid (PFHxA)	0.0002				<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002
Perfluoroheptanoic acid (PFHpA)	0.0002				<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002
Perfluorooctanoic acid (PFOA)	0.0002	50	10		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002
Perfluorononanoic acid (PFNA)	0.0002				<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002
Perfluorodecanoic acid (PFDA)	0.0002				<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002
Perfluoroundecanoic acid (PFUnDA)	0.0002				<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002
Perfluorododecanoic acid (PFDoDA)	0.0002				<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002
Perfluorotridecanoic acid (PFTrDA)	0.0002				<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	0.0005				<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0009	<0.0005
Perfluoroalkyl Sulfonamides	All units mg/kg				All units mg/kg							
Perfluorooctane sulfonamide (FOSA)	0.0002				<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	0.0005				<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0009	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	0.0005				<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0009	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	0.0005				<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0009	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	0.0005				<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0009	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	0.0002				<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	0.0002				<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002
Fluorotelomer Sulfonic Acids	All units mg/kg				All units mg/kg							
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	0.0005				<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	0.0005				<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	0.0005				<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	0.0005				<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
PFAS Sums	All units mg/kg				All units mg/kg							
Sum of PFAS	0.0002				<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002
Sum of PFHxS and PFOS	0.0002	20	1		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002
Sum of PFAS (WA DER List)	0.0002				<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002

Notes: < indicates less than the laboratory limit of reporting.

1. PFAS National Environmental Management Plan (NEMP) Version 2.0 (2020). Health-Based Investigation Level - HIL(D); industrial/open spaces - recreational use.
2. PFAS NEMP Version 2.0 (2020). Health-Based Investigation Level - HIL(C); public open spaces - recreational use.

Table B4: PFAS Test Results for Overburden Samples from the Yallourn Project

			Client Sample ID →	EA_MFDBA_2_1.5m	EA_MFDBA_1-1.0m	EA_EFNB_N7447_11.5-12m	EA_EFNB_N7447_1m	EA_EFNB_N7446_1.5-2m	EA_EFNB_N7446_11.5-12m	EA_YEF_N7439_1.5-2m	EA_YEF_N7440_2.5-3
			Sampling Date →	05/12/2022	05/12/2022	14/12/2022	13/12/2022	09/12/2022	13/12/2022	21/12/2022	20/12/2022
			Location →	Midfield Dump Borrow Area	Midfield Dump Borrow Area	East Field Northern Batters (ex-pit)	East Field Northern Batters (ex-pit)	East Field Northern Batters (ex-pit)	East Field Northern Batters (ex-pit)	East Field	East Field
			ALS Laboratory ID →	EM2301747030	EM2301747031	EM2301747007	EM2301747008	EM2301747010	EM2301747009	EM2301747011	EM2301747012
Parameters	**LOR**	PFAS NEMP 2.0 2020 HIL D[1]	PFAS NEMP 2.0 2020 HIL C[2]								
Moisture Content	0.1 (%)			9.6	10.7	17.9	10.1	16.8	19.1	5.3	11.5
Perfluoroalkyl Sulfonic Acids	All units mg/kg			All units mg/kg							
Perfluorobutane sulfonic acid (PFBS)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	0.0002	20	1	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptane sulfonic acid (PFHpS)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	0.0002	20	1	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecane sulfonic acid (PFDS)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroalkyl Carboxylic Acids	All units mg/kg			All units mg/kg							
Perfluorobutanoic acid (PFBA)	0.001			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	0.0002	50	10	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorononanoic acid (PFNA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluoroalkyl Sulfonamides	All units mg/kg			All units mg/kg							
Perfluorooctane sulfonamide (FOSA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Fluorotelomer Sulfonic Acids	All units mg/kg			All units mg/kg							
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
PFAS Sums	All units mg/kg			All units mg/kg							
Sum of PFAS	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Sum of PFHxS and PFOS	0.0002	20	1	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Sum of PFAS (WA DER List)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002

Notes: < indicates less than the laboratory limit of reporting.

1. PFAS National Environmental Management Plan (NEMP) Version 2.0 (2020). Health-Based Investigation Level - HIL(D); industrial/open spaces - recreational use.
2. PFAS NEMP Version 2.0 (2020). Health-Based Investigation Level - HIL(C); public open spaces - recreational use.

Table B4: PFAS Test Results for Overburden Samples from the Yallourn Project

			Client Sample ID →	EA_YEF_N7445_2.5-3 m	EA_FASH_N7449_2-3m	EA_FASH_N7449_10-11m	EA_FASH_N7449_30.5-31	EA_FASH_N7450_2-2.5	EA_FASH_N7451_0.5-1.0m	EA_FASH_N7451_18.5-19m	EA_FASH_N7451_30m
			Sampling Date →	20/01/2023	10/10/2022	11/10/2022	18/10/2022	07/11/2022	20/10/2022	20/10/2022	21/10/2022
			Location →	East Field	Former Ash Ponds	Former Ash Ponds	Former Ash Ponds	Former Ash Ponds	Former Ash Ponds	Former Ash Ponds	Former Ash Ponds
			ALS Laboratory ID →	EM2301747029	EM2301747016	EM2301747021	EM2301747015	EM2301747013	EM2301747022	EM2301747020	EM2301747017
Parameters	**LOR**	PFAS NEMP 2.0 2020 HIL D[1]	PFAS NEMP 2.0 2020 HIL C[2]								
Moisture Content	0.1 (%)			4.8	63.1	16.4	14.1	28.1	34.6	20.8	22.0
Perfluoroalkyl Sulfonic Acids	All units mg/kg			All units mg/kg							
Perfluorobutane sulfonic acid (PFBS)	0.0002			<0.0002	<0.0004	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	0.0002	20	1	<0.0002	0.0009	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptane sulfonic acid (PFHpS)	0.0002			<0.0002	<0.0004	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	0.0002	20	1	<0.0002	0.0204	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecane sulfonic acid (PFDS)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroalkyl Carboxylic Acids	All units mg/kg			All units mg/kg							
Perfluorobutanoic acid (PFBA)	0.001			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	0.0002	50	10	<0.0002	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorononanoic acid (PFNA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluoroalkyl Sulfonamides	All units mg/kg			All units mg/kg							
Perfluorooctane sulfonamide (FOSA)	0.0002			<0.0002	0.0004	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Fluorotelomer Sulfonic Acids	All units mg/kg			All units mg/kg							
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
PFAS Sums	All units mg/kg			All units mg/kg							
Sum of PFAS	0.0002			<0.0002	0.0219	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Sum of PFHxS and PFOS	0.0002	20	1	<0.0002	0.0213	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Sum of PFAS (WA DER List)	0.0002			<0.0002	0.0215	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002

Notes: < indicates less than the laboratory limit of reporting.

1. PFAS National Environmental Management Plan (NEMP) Version 2.0 (2020). Health-Based Investigation Level - HIL(D); industrial/open spaces - recreational use.
2. PFAS NEMP Version 2.0 (2020). Health-Based Investigation Level - HIL(C); public open spaces - recreational use.

Table B4: PFAS Test Results for Overburden Samples from the Yallourn Project

			Client Sample ID →	EA_FASH_N7452_3.5-4.5m	EA_FASH_N7452_17-17.5m	EA_FASH_N7452_29-29.5	N7453_0-1 m	N7453_1-2 m	N7453_3-4 m	N7453_6-7 m	EA_YTF_N7423_2.5-3m
			Sampling Date →	18/10/2022	19/10/2022	20/10/2022	31/05/2023	31/05/2023	31/05/2023	31/05/2023	30/11/2022
			Location →	Former Ash Ponds	Former Ash Ponds	Former Ash Ponds	Former Ash Ponds	Former Ash Ponds	Former Ash Ponds	Former Ash Ponds	Township Field Northern Overburden Dump
			ALS Laboratory ID →	EM2301747019	EM2301747018	EM2301747014	EM2312404001	EM2312404002	EM2312404003	EM2312404004	EM2301747025
Parameters	**LOR**	PFAS NEMP 2.0 2020 HIL D[1]	PFAS NEMP 2.0 2020 HIL C[2]								
Moisture Content	0.1 (%)			20.3	17.0	23.6	18.2	10.4	13.3	19.1	40.6
Perfluoroalkyl Sulfonic Acids	All units mg/kg			All units mg/kg							
Perfluorobutane sulfonic acid (PFBS)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	0.0006	<0.0002	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	0.0002	20	1	<0.0002	<0.0002	<0.0002	<0.0002	0.0175	<0.0002	<0.0002	<0.0002
Perfluoroheptane sulfonic acid (PFHpS)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	0.0019	<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	0.0002	20	1	<0.0002	<0.0002	<0.0002	<0.0002	0.0996	0.0005	<0.0002	<0.0002
Perfluorodecane sulfonic acid (PFDS)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroalkyl Carboxylic Acids	All units mg/kg			All units mg/kg							
Perfluorobutanoic acid (PFBA)	0.001			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	0.0008	<0.0002	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	0.0002	50	10	<0.0002	<0.0002	<0.0002	<0.0002	0.0044	<0.0002	<0.0002	<0.0002
Perfluorononanoic acid (PFNA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	0.0010	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluoroalkyl Sulfonamides	All units mg/kg			All units mg/kg							
Perfluorooctane sulfonamide (FOSA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0006	<0.0002	<0.0002
Fluorotelomer Sulfonic Acids	All units mg/kg			All units mg/kg							
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
PFAS Sums	All units mg/kg			All units mg/kg							
Sum of PFAS	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	0.126	0.0011	<0.0002	<0.0002
Sum of PFHxS and PFOS	0.0002	20	1	<0.0002	<0.0002	<0.0002	<0.0002	0.117	0.0005	<0.0002	<0.0002
Sum of PFAS (WA DER List)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	0.123	0.0005	<0.0002	<0.0002

Notes: < indicates less than the laboratory limit of reporting.

1. PFAS National Environmental Management Plan (NEMP) Version 2.0 (2020). Health-Based Investigation Level - HIL(D); industrial/open spaces - recreational use.
2. PFAS NEMP Version 2.0 (2020). Health-Based Investigation Level - HIL(C); public open spaces - recreational use.

Table B4: PFAS Test Results for Overburden Samples from the Yallourn Project

			Client Sample ID →	EA_YTF_N7434_2.5-3m	EA_YTF_N7455_2-2.5m	EA_YTF_N7429_2-2.5	EA_YTF_N7428_1-2 m	EA_YTF_N7426_22.5-23	EA_YMF_M4223_2-2.5 m	EA_YMF_M4223_12.5-13 m	EA_YMF_M4224_1 m
			Sampling Date →	02/12/2022	09/12/2022	18/11/2022	10/11/2022	09/11/2022	25/01/2023	30/01/2023	31/01/2023
			Location →	Township Field Northern Overburden Dump	Township Field Southern Overburden Dump	Township Field Southern Overburden Dump	Township Field Southern Overburden Dump	Township Field Southern Overburden Dump	Maryvale Field Western Truck Dump 4 North	Maryvale Field Western Truck Dump 4 North	Maryvale Field Western Truck Dump 4 North
			ALS Laboratory ID →	EM2301747023	EM2301747024	EM2301747026	EM2301747027	EM2301747028	EM2301747043	EM2301747036	EM2301747034
Parameters	**LOR**	PFAS NEMP 2.0 2020 HIL D[1]	PFAS NEMP 2.0 2020 HIL C[2]								
Moisture Content	0.1 (%)			7.4	16.6	10.5	8.4	23.3	7.2	17.6	4.1
Perfluoroalkyl Sulfonic Acids	All units mg/kg			All units mg/kg							
Perfluorobutane sulfonic acid (PFBS)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	0.0002	20	1	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptane sulfonic acid (PFHpS)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	0.0002	20	1	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecane sulfonic acid (PFDS)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroalkyl Carboxylic Acids	All units mg/kg			All units mg/kg							
Perfluorobutanoic acid (PFBA)	0.001			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	0.0002	50	10	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorononanoic acid (PFNA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluoroalkyl Sulfonamides	All units mg/kg			All units mg/kg							
Perfluorooctane sulfonamide (FOSA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Fluorotelomer Sulfonic Acids	All units mg/kg			All units mg/kg							
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
PFAS Sums	All units mg/kg			All units mg/kg							
Sum of PFAS	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Sum of PFHxS and PFOS	0.0002	20	1	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Sum of PFAS (WA DER List)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002

Notes: < indicates less than the laboratory limit of reporting.

1. PFAS National Environmental Management Plan (NEMP) Version 2.0 (2020). Health-Based Investigation Level - HIL(D); industrial/open spaces - recreational use.
2. PFAS NEMP Version 2.0 (2020). Health-Based Investigation Level - HIL(C); public open spaces - recreational use.

Table B4: PFAS Test Results for Overburden Samples from the Yallourn Project

			Client Sample ID →	EA_YMF_M4224_10 m	EA_YMF_N7509_2.5 m	EA_YMF_N7509_9 m	EA_YMF_N7444_1.5 m	EA_YMF_N7444_9.5 m	EA_YMF_N7510_2 m	EA_YMF_N7510_9 m
			Sampling Date →	31/01/2023	31/01/2023	31/01/2023	27/01/2023	27/01/2023	31/01/2023	31/01/2023
			Location →	Maryvale Field Western Truck Dump 4 North	Maryvale Field East	Maryvale Field East	Maryvale Field East	Maryvale Field East	Maryvale Field East	Maryvale Field East
			ALS Laboratory ID →	EM2301747037	EM2301747040	EM2301747039	EM2301747041	EM2301747033	EM2301747042	EM2301747032
Parameters	**LOR**	PFAS NEMP 2.0 2020 HIL D[1]	PFAS NEMP 2.0 2020 HIL C[2]							
Moisture Content	0.1 (%)			9.6	20.7	9.7	3.2	6.4	16.9	7.3
Perfluoroalkyl Sulfonic Acids	All units mg/kg			All units mg/kg						
Perfluorobutane sulfonic acid (PFBS)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	0.0002	20	1	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptane sulfonic acid (PFHpS)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	0.0002	20	1	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecane sulfonic acid (PFDS)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroalkyl Carboxylic Acids	All units mg/kg			All units mg/kg						
Perfluorobutanoic acid (PFBA)	0.001			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	0.0002	50	10	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorononanoic acid (PFNA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluoroalkyl Sulfonamides	All units mg/kg			All units mg/kg						
Perfluorooctane sulfonamide (FOSA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Fluorotelomer Sulfonic Acids	All units mg/kg			All units mg/kg						
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
PFAS Sums	All units mg/kg			All units mg/kg						
Sum of PFAS	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Sum of PFHxS and PFOS	0.0002	20	1	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Sum of PFAS (WA DER List)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002

Notes: < indicates less than the laboratory limit of reporting.

1. PFAS National Environmental Management Plan (NEMP) Version 2.0 (2020). Health-Based Investigation Level - HIL(D); industrial/open spaces - recreational use.
2. PFAS NEMP Version 2.0 (2020). Health-Based Investigation Level - HIL(C); public open spaces - recreational use.

Table B5: PFAS QA/QC Test Results for Overburden Samples from the Yallourn Project

Client Sample ID →		EA_MFD_N7436_2.5-3 m	QC05	QC06	EA_YEF_N7440_2.5-3 m	QC13	QC14
Sampling Type →		Primary	Duplicate	Triplicate	Primary	Duplicate	Triplicate
Sampling Date →		03/11/2022	03/11/2022	03/11/2022	20/12/2022	03/11/2022	07/02/2023
Location →		Midfield Dump			East Field		
ALS Laboratory ID →		EM2301747001	EM2301747045	ES2303840002	EM2301747012	EM2301747048	ES2303840005
Parameters	**LOR**						
Moisture Content	0.1 (%)	12.2	10.5	13.4	11.5	10.4	-
Perfluoroalkyl Sulfonic Acids	mg/kg	All units mg/kg					
Perfluorobutane sulfonic acid (PFBS)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptane sulfonic acid (PFHpS)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecane sulfonic acid (PFDS)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroalkyl Carboxylic Acids	mg/kg	All units mg/kg					
Perfluorobutanoic acid (PFBA)	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorononanoic acid (PFNA)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluoroalkyl Sulfonamides	mg/kg	All units mg/kg					
Perfluorooctane sulfonamide (FOSA)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Fluorotelomer Sulfonic Acids	mg/kg	All units mg/kg					
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
PFAS Sums	mg/kg	All units mg/kg					
Sum of PFAS	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Sum of PFHxS and PFOS	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Sum of PFAS (WA DER List)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002

Notes: < indicates less than the laboratory limit of reporting.

Table B5: PFAS QA/QC Test Results for Overburden Samples from the Yallourn Project

Client Sample ID →		EA_FASH_N7452_3.5-4.5 m	QC01	QC02	EA_YTF_N7455_2-2.5 m	QC11	QC12
Sampling Type →		Primary	Duplicate	Triplicate	Primary	Duplicate	Triplicate
Sampling Date →		18/10/2022	03/11/2022	07/02/2023	09/12/2022	03/11/2022	07/02/2023
Location →		Former Ash Ponds			Township Field Southern Overburden Dump		
ALS Laboratory ID →		EM2301747019	EM2301747044	ES2303840001	EM2301747024	EM2301747047	ES2303840004
Parameters	**LOR**						
Moisture Content	0.1 (%)	20.3	35.0	36.2	16.6	16.7	15.5
Perfluoroalkyl Sulfonic Acids	mg/kg	All units mg/kg					
Perfluorobutane sulfonic acid (PFBS)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptane sulfonic acid (PFHpS)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecane sulfonic acid (PFDS)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroalkyl Carboxylic Acids	mg/kg	All units mg/kg					
Perfluorobutanoic acid (PFBA)	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorononanoic acid (PFNA)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluoroalkyl Sulfonamides	mg/kg	All units mg/kg					
Perfluorooctane sulfonamide (FOSA)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Fluorotelomer Sulfonic Acids	mg/kg	All units mg/kg					
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
PFAS Sums	mg/kg	All units mg/kg					
Sum of PFAS	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Sum of PFHxS and PFOS	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Sum of PFAS (WA DER List)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002

Notes: < indicates less than the laboratory limit of reporting.

Table B5: PFAS QA/QC Test Results for Overburden Samples from the Yallourn Project

Client Sample ID →		EA_YTF_N7428_1-2 m	QC07	QC08	EA_YMF_N7510_2 m	QC19	QC20
Sampling Type →		Primary	Duplicate	Triplicate	Primary	Duplicate	Triplicate
Sampling Date →		10/11/2022	10/11/2022	10/11/2022	31/01/2023	31/01/2023	07/02/2023
Location →		Township Field Southern Overburden Dump			Maryvale Field East		
ALS Laboratory ID →		EM2301747027	EM2301747046	ES2303840003	EM2301747042	EM2301747049	ES2303840006
Parameters	**LOR**						
Moisture Content	0.1 (%)	8.4	9.3	17.3	16.9	13.2	8.6
Perfluoroalkyl Sulfonic Acids	mg/kg	All units mg/kg					
Perfluorobutane sulfonic acid (PFBS)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptane sulfonic acid (PFHpS)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecane sulfonic acid (PFDS)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroalkyl Carboxylic Acids	mg/kg	All units mg/kg					
Perfluorobutanoic acid (PFBA)	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorononanoic acid (PFNA)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluoroalkyl Sulfonamides	mg/kg	All units mg/kg					
Perfluorooctane sulfonamide (FOSA)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Fluorotelomer Sulfonic Acids	mg/kg	All units mg/kg					
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
PFAS Sums	mg/kg	All units mg/kg					
Sum of PFAS	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Sum of PFHxS and PFOS	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Sum of PFAS (WA DER List)	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002

Notes: < indicates less than the laboratory limit of reporting.

Table B6: Multi-Element Test Results for Wall Wash Samples from the Yallourn Project

		RGS Sample Number →	2021048_WW01	2021048_WW02	2021048_WW03	2021048_WW04	2021048_WW05	2021048_WW06	2021048_WW07	2021048_WW08
		Sample Date →	11/04/2022	11/04/2022	12/04/2022	12/04/2022	12/04/2022	12/04/2022	12/04/2022	12/04/2022
		ALS Laboratory ID →	EM2207630001	EM2207630002	EM2207630003	EM2207630004	EM2207630005	EM2207630006	EM2207630007	EM2207630008
		Location →	YTF Western Batters		YTF Western Batters			YTF Hernes Oak Batters		
		Material Type →	Topsoil/overburden		Weathered coal			Weathered coal		
		Sample Type →	Wall washing_first flush	Wall washing_30 mins	Wall washing_first flush	Wall washing_15 mins	Wall washing_30 mins	Wall washing_first flush	Wall washing_15 mins	Wall washing_30 mins
		Client Sample ID →	RGS_YTF_WW_0-1	RGS_YTF_WW_30-1	RGS_YTF_WW_0-2	RGS_YTF_WW_15-2	RGS_YTF_WW_30-2	RGS_YTF_WW_0-3	RGS_YTF_WW_15-3	RGS_YTF_WW_30-3
Parameters	**Limit of Reporting**	Aquatic Ecosystems (freshwater)[1]	Livestock Drinking Water[2]							
pH	0.01 pH unit	6 to 9	-	6.31	6.31	4.07	4.13	4.06	3.87	4.34	4.32
Electrical Conductivity	1 µS/cm	<1,000[#]	3,580[^]	145	144	217	174	171	168	136	137
Carbonate Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	<1	<1	<1	<1	<1	<1	<1
Bicarbonate Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	14	15	<1	<1	<1	<1	<1	<1
Total Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	14	15	<1	<1	<1	<1	<1	<1
Acidity (mg $CaCO_3$/L)	1 mg/L	-	-	14	<1	20	14	16	18	11	11
Net Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	<1	<1	<1	<1	<1	<1	<1
Redox Potential	0.1	-	-	10	11	127	92	132	137	127	126
pH Redox	0.01	-	-	6	6	4	4	4	4	4	4
Major Ions	All units mg/L			All units mg/L							
Calcium (Ca)	1	-	1,000	15	4	14	3	2	4	<1	1
Magnesium (Mg)	1	-	-	12	4	23	6	3	8	2	2
Potassium (K)	1	-	-	6	2	1	<1	<1	1	<1	<1
Sodium (Na)	1	-	-	19	18	22	18	17	15	16	17
Chloride (Cl)	1	-	-	21	20	22	20	22	20	20	21
Fluoride (F)	0.1	-	2	0.4	0.6	0.1	0.3	0.2	0.2	0.4	0.4
Sulfate (SO_4^{2-})	1	-	1,000	12	12	32	19	19	12	12	12
Total Organic Carbon	1	-	-	6	3	18	7	10	5	3	4
Total Inorganic Carbon	1	-	-	5	5	2	1	1	2	1	1
Total Carbon	1	-	-	11	8	20	8	12	8	4	5
Dissolved Oxygen	0.1	-	-	7	8.1	6.4	8.6	8.5	7.2	8.8	8.9
Dissolved Metals/Metalloids	All units mg/L			All units mg/L							
Aluminium (Al)	0.01	0.055	5	0.01	<0.01	0.13	0.16	0.13	0.13	0.13	0.14
Silver (Ag)	0.001	0.00005	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic (As)	0.001	0.024	0.5 *	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Boron (B)	0.05	0.37	5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Barium (Ba)	0.001	-	-	0.008	0.009	0.008	0.007	0.006	0.001	<0.001	<0.001
Beryllium (Be)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth (Bi)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium (Cd)	0.0001	0.0002	0.01	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cerium (Ce)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt (Co)	0.001	-	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium (Cr)	0.001	0.001	1 **	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Caesium (Cs)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper (Cu)	0.001	0.0014	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dysprosium (Dy)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Erbium (Er)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Europium (Eu)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Iron (Fe)	0.05	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Gallium (Ga)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Gadolinium (Gd)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Hafnium (Hf)	0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Mercury (Hg)	0.0001	0.0006	0.002	<0.0001	----	<0.0001	----	----	<0.0001	----	----
Holmium (Ho)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Indium (In)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lanthanum (La)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lithium (li)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lutetium (Lu)	0.001	-	-	<0.001	0.002	0.02	0.01	0.01	0.019	0.007	0.007
Manganese (Mn)	0.001	1.9	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum (Mo)	0.001	-	0.15	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Neodymium (Nd)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel (Ni)	0.001	0.011	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead (Pb)	0.001	0.0034	0.1	<0.001	<0.001	0.002	0.002	0.001	0.001	0.001	0.001
Praseodymium (Pr)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Rubidium (Rb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Samarium (Sa)	0.001	-	-	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Antimony (Sb)	0.001	-	-	0.028	0.029	0.008	0.005	0.004	0.002	0.002	0.002
Selenium (Se)	0.01	0.011	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin (Sn)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Strontium (Sr)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Terbium (Tb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tellurium (Te)	0.005	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Thorium (Th)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Titanium (Ti)	0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Thallium (Tl)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Thulium (Tm)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Uranium (U)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium (V)	0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Yttrium (Y)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ytterbium (Yb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc (Zn)	0.005	0.008	20	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zirconium (Zr)	0.005	-	-	<0.005	<0.005	0.06	<0.005	<0.005	<0.005	<0.005	<0.005

Table B6: Multi-Element Test Results for Wall Wash Samples from the Yallourn Project

		RGS Sample Number →	2021048_WW01	2021048_WW02	2021048_WW03	2021048_WW04	2021048_WW05	2021048_WW06	2021048_WW07	2021048_WW08
		Sample Date →	11/04/2022	11/04/2022	12/04/2022	12/04/2022	12/04/2022	12/04/2022	12/04/2022	12/04/2022
		ALS Laboratory ID →	EM2207630001	EM2207630002	EM2207630003	EM2207630004	EM2207630005	EM2207630006	EM2207630007	EM2207630008
		Location →	YTF Western Batters		YTF Western Batters			YTF Hernes Oak Batters		
		Material Type →	Topsoil/overburden		Weathered coal			Weathered coal		
		Sample Type →	Wall washing_first flush	Wall washing_30 mins	Wall washing_first flush	Wall washing_15 mins	Wall washing_30 mins	Wall washing_first flush	Wall washing_15 mins	Wall washing_30 mins
		Client Sample ID →	RGS_YTF_WW_0-1	RGS_YTF_WW_30-1	RGS_YTF_WW_0-2	RGS_YTF_WW_15-2	RGS_YTF_WW_30-2	RGS_YTF_WW_0-3	RGS_YTF_WW_15-3	RGS_YTF_WW_30-3
Parameters	**Limit of Reporting**	Aquatic Ecosystems (freshwater)[1]	Livestock Drinking Water[2]							
Total Metals/Metalloids										
Aluminium (Al)	0.01	0.055	5	21.8	----	18.4	----	----	9.82	----	----
Silver (Ag)	0.001	0.00005	-	0.001	----	0.002	----	----	0.001	----	----
Arsenic (As)	0.001	0.024	0.5 *	0.003	----	0.001	----	----	0.001	----	----
Boron (B)	0.05	0.37	5	<0.05	----	0.06	----	----	<0.05	----	----
Barium (Ba)	0.001	-	-	0.215	----	0.727	----	----	0.174	----	----
Beryllium (Be)	0.001	-	-	0.001	----	0.003	----	----	<0.001	----	----
Bismuth (Bi)	0.001	-	-	<0.001	----	0.101	----	----	0.02	----	----
Cadmium (Cd)	0.0001	0.0002	0.01	<0.0001	----	0.0001	----	----	<0.0001	----	----
Cerium (Ce)	0.001	-	-	0.065	----	0.009	----	----	0.018	----	----
Cobalt (Co)	0.001	-	1	0.011	----	0.023	----	----	0.006	----	----
Chromium (Cr)	0.001	0.001	1 **	0.024	----	0.005	----	----	0.008	----	----
Caesium (Cs)	0.001	-	-	0.002	----	0.002	----	----	<0.001	----	----
Copper (Cu)	0.001	0.0014	1	0.025	----	0.005	----	----	0.009	----	----
Dysprosium (Dy)	0.001	-	-	0.003	----	<0.001	----	----	<0.001	----	----
Erbium (Er)	0.001	-	-	0.001	----	<0.001	----	----	<0.001	----	----
Europium (Eu)	0.001	-	-	0.001	----	<0.001	----	----	<0.001	----	----
Iron (Fe)	0.05	-	-	30	----	10.2	----	----	7.57	----	----
Gallium (Ga)	0.001	-	-	0.006	----	<0.001	----	----	<0.001	----	----
Gadolinium (Gd)	0.001	-	-	0.004	----	<0.001	----	----	<0.001	----	----
Hafnium (Hf)	0.01	-	-	<0.01	----	<0.01	----	----	<0.01	----	----
Mercury (Hg)	0.0001	0.0006	0.002	<0.0001	----	<0.0001	----	----	<0.0001	----	----
Holmium (Ho)	0.001	-	-	<0.001	----	<0.001	----	----	<0.001	----	----
Indium (In)	0.001	-	-	<0.001	----	<0.001	----	----	<0.001	----	----
Lanthanum (La)	0.001	-	-	0.022	----	<0.001	----	----	<0.001	----	----
Lithium (li)	0.001	-	-	0.01	----	0.002	----	----	0.002	----	----
Lutetium (Lu)	0.001	-	-	<0.001	----	<0.001	----	----	<0.001	----	----
Manganese (Mn)	0.001	1.9	-	0.597	----	0.225	----	----	0.215	----	----
Molybdenum (Mo)	0.001	-	0.15	<0.001	----	0.003	----	----	0.001	----	----
Neodymium (Nd)	0.001	-	-	0.022	----	<0.001	----	----	<0.001	----	----
Nickel (Ni)	0.001	0.011	1	0.017	----	0.017	----	----	0.016	----	----
Lead (Pb)	0.001	0.0034	0.1	0.015	----	0.002	----	----	0.004	----	----
Praseodymium (Pr)	0.001	-	-	0.006	----	<0.001	----	----	<0.001	----	----
Rubidium (Rb)	0.001	-	-	0.031	----	0.006	----	----	0.006	----	----
Samarium (Sa)	0.001	-	-	0.004	----	<0.001	----	----	<0.001	----	----
Antimony (Sb)	0.001	-	-	<0.001	----	0.005	----	----	0.002	----	----
Selenium (Se)	0.01	0.011	0.02	<0.01	----	<0.01	----	----	<0.01	----	----
Tin (Sn)	0.001	-	-	<0.001	----	0.002	----	----	0.001	----	----
Strontium (Sr)	0.001	-	-	0.087	----	0.209	----	----	0.058	----	----
Terbium (Tb)	0.001	-	-	<0.001	----	<0.001	----	----	<0.001	----	----
Tellurium (Te)	0.005	-	-	<0.005	----	0.007	----	----	<0.005	----	----
Thorium (Th)	0.001	-	-	0.003	----	0.003	----	----	0.002	----	----
Titanium (Ti)	0.01	-	-	0.05	----	0.05	----	----	0.06	----	----
Thallium (Tl)	0.001	-	-	<0.001	----	<0.001	----	----	<0.001	----	----
Thulium (Tm)	0.001	-	-	<0.001	----	<0.001	----	----	<0.001	----	----
Uranium (U)	0.001	-	-	0.001	----	<0.001	----	----	<0.001	----	----
Vanadium (V)	0.01	-	-	0.05	----	<0.01	----	----	0.01	----	----
Yttrium (Y)	0.001	-	-	0.013	----	<0.001	----	----	<0.001	----	----
Ytterbium (Yb)	0.001	-	-	<0.001	----	<0.001	----	----	<0.001	----	----
Zinc (Zn)	0.005	0.008	20	0.062	----	0.061	----	----	0.059	----	----
Zirconium (Zr)	0.005	-	-	0.007	----	<0.005	----	----	<0.005	----	----

Notes: < indicates concentration less than the detection limit. Shaded cells exceed applied guideline values. * 0.013 mg/L for pentavalent Arsenic (V). ** Cr (VI) = hexavalent.

for still water bodies only, moving rivers at low flow rates should not exceed 2,200µS/cm. ^ calculated based on total dissolved solids (TDS) conversion rate of 0.67% of EC.

TDS is an approximate measure of inorganic dissolved salts and should not exceed 2,400mg/L for livestock drinking water.

1. ANZG (2018). Trigger values for freshwater aquatic ecosystems (95% species protection level)

2. ANZG (2018). Recommended guideline limits for Livestock Drinking Water.

Table B6: Multi-Element Test Results for Wall Wash Samples from the Yallourn Project

		RGS Sample Number →	2021048_WW09	2021048_WW10	2021048_WW11	2021048_WW12	2021048_WW13	2021048_WW14	2021048_WW15	2021048_WW16	2021048_WW17
		Sample Date →	12/04/2022	12/04/2022	12/04/2022	12/04/2022	12/04/2022	12/04/2022	12/04/2022	12/04/2022	12/04/2022
		ALS Laboratory ID →	EM2207630009	EM2207630010	EM2207630011	EM2207630012	EM2207630013	EM2207630014	EM2207630015	EM2207630016	EM2207630017
		Location →	YTF Southern Batters			YTF Floc Pond Batters			YTF Fire Service Pond Batters		
		Material Type →	Weathered coal			Weathered coal			Weathered coal		
		Sample Type →	Wall washing_first flush	Wall washing_15 mins	Wall washing_30 mins	Wall washing_first flush	Wall washing_15 mins	Wall washing_30 mins	Wall washing_first flush	Wall washing_15 mins	Wall washing_30 mins
		Client Sample ID →	RGS_YTF_WW_0-4	RGS_YTF_WW_15-4	RGS_YTF_WW_30-4	RGS_YTF_WW_0-5	RGS_YTF_WW_15-5	RGS_YTF_WW_30-5	RGS_YTF_WW_0-6	RGS_YTF_WW_15-6	RGS_YTF_WW_30-6
Parameters	**Limit of Reporting**	Aquatic Ecosystems (freshwater)[1]	Livestock Drinking Water[2]								
pH	0.01 pH unit	6 to 9	-	3.77	5.73	3.79	3.74	4.13	4.45	3.57	3.89	3.92
Electrical Conductivity	1 µS/cm	<1,000#	3,580^	228	150	207	360	250	217	325	187	178
Carbonate Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bicarbonate Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	2	<1	<1	<1	<1	<1	<1	<1
Total Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	2	<1	<1	<1	<1	<1	<1	<1
Acidity (mg $CaCO_3$/L)	1 mg/L	-	-	16	8	19	24	15	11	23	15	16
Net Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1
Redox Potential	0.1	-	-	132	114	133	135	138	128	146	147	141
pH Redox	0.01	-	-	4	6	4	4	4	4	4	4	4
Major Ions	All units mg/L			All units mg/L								
Calcium (Ca)	1	-	1,000	8	2	2	2	3	2	<1	1	9
Magnesium (Mg)	1	-	-	32	5	3	6	8	4	3	2	11
Potassium (K)	1	-	-	2	1	1	1	1	1	<1	<1	2
Sodium (Na)	1	-	-	41	22	19	24	28	21	19	16	20
Chloride (Cl)	1	-	-	26	22	27	35	28	26	35	22	22
Fluoride (F)	0.1	-	2	0.5	0.6	0.4	0.5	0.5	0.6	0.3	0.4	0.4
Sulfate (SO_4^{2-})	1	-	1,000	30	19	54	62	41	35	31	16	15
Total Organic Carbon	1	-	-	10	6	28	15	10	8	9	5	5
Total Inorganic Carbon	1	-	-	1	1	1	2	1	<1	1	<1	1
Total Carbon	1	-	-	11	7	30	16	11	9	10	6	6
Dissolved Oxygen	0.1	-	-	8.5	8.8	8.6	7.8	8.8	8.9	8.3	8.6	8.8
Dissolved Metals/Metalloids	All units mg/L			All units mg/L								
Aluminium (Al)	0.01	0.055	5	0.13	0.03	0.15	0.3	0.18	0.15	0.17	0.15	0.14
Silver (Ag)	0.001	0.00005	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic (As)	0.001	0.024	0.5 *	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Boron (B)	0.05	0.37	5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Barium (Ba)	0.001	-	-	0.004	0.003	0.002	0.015	0.014	0.011	0.008	0.005	0.004
Beryllium (Be)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth (Bi)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium (Cd)	0.0001	0.0002	0.01	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cerium (Ce)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt (Co)	0.001	-	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium (Cr)	0.001	0.001	1 **	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Caesium (Cs)	0.001	-	-	<0.001	0.001	0.005	0.002	0.002	0.002	<0.001	<0.001	<0.001
Copper (Cu)	0.001	0.0014	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dysprosium (Dy)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Erbium (Er)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Europium (Eu)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Iron (Fe)	0.05	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Gallium (Ga)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Gadolinium (Gd)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Hafnium (Hf)	0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Mercury (Hg)	0.0001	0.0006	0.002	<0.0001	----	----	<0.0001	----	----	<0.0001	----	----
Holmium (Ho)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Indium (In)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lanthanum (La)	0.001	-	-	0.001	<0.001	0.001	0.002	0.002	0.001	0.003	0.001	0.001
Lithium (li)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lutetium (Lu)	0.001	-	-	0.007	0.004	0.003	0.039	0.034	0.024	0.054	0.024	0.018
Manganese (Mn)	0.001	1.9	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum (Mo)	0.001	-	0.15	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Neodymium (Nd)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel (Ni)	0.001	0.011	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead (Pb)	0.001	0.0034	0.1	0.002	0.002	0.001	0.003	0.002	0.002	0.001	<0.001	<0.001
Praseodymium (Pr)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Rubidium (Rb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Samarium (Sa)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Antimony (Sb)	0.001	-	-	0.005	0.006	0.002	0.019	0.016	0.016	0.01	0.005	0.004
Selenium (Se)	0.01	0.011	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin (Sn)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Strontium (Sr)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Terbium (Tb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tellurium (Te)	0.005	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Thorium (Th)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Titanium (Ti)	0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Thallium (Tl)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Thulium (Tm)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Uranium (U)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium (V)	0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Yttrium (Y)	0.001	-	-	<0.001	0.009	<0.001	0.006	0.007	0.006	<0.001	<0.001	<0.001
Ytterbium (Yb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc (Zn)	0.005	0.008	20	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zirconium (Zr)	0.005	-	-	<0.005	<0.005	<0.005	0.08	<0.005	<0.005	<0.005	<0.005	<0.005

Table B6: Multi-Element Test Results for Wall Wash Samples from the Yallourn Project

		RGS Sample Number →	2021048_WW09	2021048_WW10	2021048_WW11	2021048_WW12	2021048_WW13	2021048_WW14	2021048_WW15	2021048_WW16	2021048_WW17
		Sample Date →	12/04/2022	12/04/2022	12/04/2022	12/04/2022	12/04/2022	12/04/2022	12/04/2022	12/04/2022	12/04/2022
		ALS Laboratory ID →	EM2207630009	EM2207630010	EM2207630011	EM2207630012	EM2207630013	EM2207630014	EM2207630015	EM2207630016	EM2207630017
		Location →	YTF Southern Batters			YTF Floc Pond Batters			YTF Fire Service Pond Batters		
		Material Type →	Weathered coal			Weathered coal			Weathered coal		
		Sample Type →	Wall washing_first flush	Wall washing_15 mins	Wall washing_30 mins	Wall washing_first flush	Wall washing_15 mins	Wall washing_30 mins	Wall washing_first flush	Wall washing_15 mins	Wall washing_30 mins
		Client Sample ID →	RGS_YTF_WW_0-4	RGS_YTF_WW_15-4	RGS_YTF_WW_30-4	RGS_YTF_WW_0-5	RGS_YTF_WW_15-5	RGS_YTF_WW_30-5	RGS_YTF_WW_0-6	RGS_YTF_WW_15-6	RGS_YTF_WW_30-6
Parameters	**Limit of Reporting**	Aquatic Ecosystems (freshwater)[1]	Livestock Drinking Water[2]								
Total Metals/Metalloids											
Aluminium (Al)	0.01	0.055	5	14.4	----	----	0.9	----	----	1.54	----	----
Silver (Ag)	0.001	0.00005	-	0.001	----	----	<0.001	----	----	<0.001	----	----
Arsenic (As)	0.001	0.024	0.5 *	0.002	----	----	<0.001	----	----	<0.001	----	----
Boron (B)	0.05	0.37	5	0.08	----	----	<0.05	----	----	<0.05	----	----
Barium (Ba)	0.001	-	-	0.535	----	----	0.063	----	----	0.032	----	----
Beryllium (Be)	0.001	-	-	0.003	----	----	<0.001	----	----	<0.001	----	----
Bismuth (Bi)	0.001	-	-	0.024	----	----	<0.001	----	----	<0.001	----	----
Cadmium (Cd)	0.0001	0.0002	0.01	<0.0001	----	----	<0.0001	----	----	<0.0001	----	----
Cerium (Ce)	0.001	-	-	0.028	----	----	0.002	----	----	0.002	----	----
Cobalt (Co)	0.001	-	1	0.005	----	----	<0.001	----	----	<0.001	----	----
Chromium (Cr)	0.001	0.001	1 **	0.013	----	----	0.001	----	----	0.002	----	----
Caesium (Cs)	0.001	-	-	0.002	----	----	<0.001	----	----	<0.001	----	----
Copper (Cu)	0.001	0.0014	1	0.012	----	----	0.01	----	----	0.002	----	----
Dysprosium (Dy)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Erbium (Er)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Europium (Eu)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Iron (Fe)	0.05	-	-	15.3	----	----	1.32	----	----	1.75	----	----
Gallium (Ga)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Gadolinium (Gd)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Hafnium (Hf)	0.01	-	-	<0.01	----	----	<0.01	----	----	<0.01	----	----
Mercury (Hg)	0.0001	0.0006	0.002	<0.0001	----	----	<0.0001	----	----	<0.0001	----	----
Holmium (Ho)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Indium (In)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Lanthanum (La)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Lithium (li)	0.001	-	-	0.006	----	----	0.001	----	----	0.002	----	----
Lutetium (Lu)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Manganese (Mn)	0.001	1.9	-	0.128	----	----	0.04	----	----	0.058	----	----
Molybdenum (Mo)	0.001	-	0.15	<0.001	----	----	<0.001	----	----	<0.001	----	----
Neodymium (Nd)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Nickel (Ni)	0.001	0.011	1	0.024	----	----	0.002	----	----	<0.001	----	----
Lead (Pb)	0.001	0.0034	0.1	0.005	----	----	<0.001	----	----	<0.001	----	----
Praseodymium (Pr)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Rubidium (Rb)	0.001	-	-	0.009	----	----	0.002	----	----	0.003	----	----
Samarium (Sa)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Antimony (Sb)	0.001	-	-	0.002	----	----	<0.001	----	----	<0.001	----	----
Selenium (Se)	0.01	0.011	0.02	<0.01	----	----	<0.01	----	----	<0.01	----	----
Tin (Sn)	0.001	-	-	0.001	----	----	<0.001	----	----	<0.001	----	----
Strontium (Sr)	0.001	-	-	0.141	----	----	0.024	----	----	0.012	----	----
Terbium (Tb)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Tellurium (Te)	0.005	-	-	<0.005	----	----	<0.005	----	----	<0.005	----	----
Thorium (Th)	0.001	-	-	0.003	----	----	<0.001	----	----	<0.001	----	----
Titanium (Ti)	0.01	-	-	0.06	----	----	<0.01	----	----	0.02	----	----
Thallium (Tl)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Thulium (Tm)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Uranium (U)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Vanadium (V)	0.01	-	-	0.02	----	----	<0.01	----	----	<0.01	----	----
Yttrium (Y)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Ytterbium (Yb)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Zinc (Zn)	0.005	0.008	20	0.091	----	----	0.012	----	----	0.006	----	----
Zirconium (Zr)	0.005	-	-	<0.005	----	----	<0.005	----	----	<0.005	----	----

Notes: < indicates concentration less than the detection limit. Shaded cells exceed applied guideline values. * 0.013 mg/L for pentavalent Arsenic (V). ** Cr (VI) = hexavalent.

for still water bodies only, moving rivers at low flow rates should not exceed 2,200µS/cm. ^ calculated based on total dissolved solids (TDS) conversion rate of 0.67% of EC.

TDS is an approximate measure of inorganic dissolved salts and should not exceed 2,400mg/L for livestock drinking water.

1. ANZG (2018). Trigger values for freshwater aquatic ecosystems (95% species protection level)

2. ANZG (2018). Recommended guideline limits for Livestock Drinking Water.

Table B6: Multi-Element Test Results for Wall Wash Samples from the Yallourn Project

		RGS Sample Number →	2021048_WW18	2021048_WW19	2021048_WW20	2021048_WW21	2021048_WW22	2021048_WW23	2021048_WW24	2021048_WW25	2021048_WW26
		Sample Date →	13/04/2022	13/04/2022	13/04/2022	13/04/2022	13/04/2022	13/04/2022	13/04/2022	13/04/2022	13/04/2022
		ALS Laboratory ID →	EM2207630018	EM2207630019	EM2207630020	EM2207630021	EM2207630022	EM2207630023	EM2207630024	EM2207630025	EM2207630026
		Location →	YEF Northern Batters			YEF Northern Batters			YEF Latrobe River Batters		
		Material Type →	Weathered coal			Weathered coal			Weathered coal		
		Sample Type →	Wall washing_first flush	Wall washing_15 mins	Wall washing_30 mins	Wall washing_first flush	Wall washing_15 mins	Wall washing_30 mins	Wall washing_first flush	Wall washing_15 mins	Wall washing_30 mins
		Client Sample ID →	RGS_YEF_WW_0-1	RGS_YEF_WW_15-1	RGS_YEF_WW_30-1	RGS_YEF_WW_0-2	RGS_YEF_WW_15-2	RGS_YEF_WW_30-2	RGS_YEF_WW_0-3	RGS_YEF_WW_15-3	RGS_YEF_WW_30-3
Parameters	**Limit of Reporting**	Aquatic Ecosystems (freshwater)[1]	Livestock Drinking Water[2]								
pH	0.01 pH unit	6 to 9	-	4.31	4.42	4.52	4.11	4.05	4.01	3.91	3.96	3.91
Electrical Conductivity	1 µS/cm	<1,000#	3,580^	165	146	152	172	195	186	208	182	189
Carbonate Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bicarbonate Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1
Acidity (mg $CaCO_3$/L)	1 mg/L	-	-	21	12	11	14	23	27	29	20	26
Net Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1
Redox Potential	0.1	-	-	165	147	142	145	145	139	137	137	133
pH Redox	0.01	-	-	4	4	5	4	4	4	4	4	4
Major Ions	All units mg/L			All units mg/L								
Calcium (Ca)	1	-	1,000	3	2	2	11	2	17	11	9	5
Magnesium (Mg)	1	-	-	5	2	3	16	3	27	20	16	9
Potassium (K)	1	-	-	1	<1	<1	2	1	2	3	2	2
Sodium (Na)	1	-	-	19	17	18	24	19	27	42	25	22
Chloride (Cl)	1	-	-	23	21	21	22	23	22	24	22	22
Fluoride (F)	0.1	-	2	0.3	0.5	0.5	0.2	0.2	0.1	0.3	0.4	0.3
Sulfate (SO_4^{2-})	1	-	1,000	15	14	17	16	23	22	22	17	18
Total Organic Carbon	1	-	-	8	5	4	10	15	29	25	14	21
Total Inorganic Carbon	1	-	-	2	1	<1	2	3	5	4	3	4
Total Carbon	1	-	-	10	6	6	12	18	34	30	16	26
Dissolved Oxygen	0.1	-	-	6.2	8.3	8.8	7.1	4.1	3	3.6	5.4	3
Dissolved Metals/Metalloids	All units mg/L			All units mg/L								
Aluminium (Al)	0.01	0.055	5	0.1	0.08	0.06	0.06	0.04	0.18	0.02	0.02	0.02
Silver (Ag)	0.001	0.00005	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic (As)	0.001	0.024	0.5 *	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Boron (B)	0.05	0.37	5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Barium (Ba)	0.001	-	-	0.008	0.007	0.008	0.006	0.009	0.006	0.004	0.003	0.004
Beryllium (Be)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth (Bi)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium (Cd)	0.0001	0.0002	0.01	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cerium (Ce)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt (Co)	0.001	-	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium (Cr)	0.001	0.001	1 **	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Caesium (Cs)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper (Cu)	0.001	0.0014	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dysprosium (Dy)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Erbium (Er)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Europium (Eu)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Iron (Fe)	0.05	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Gallium (Ga)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Gadolinium (Gd)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Hafnium (Hf)	0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Mercury (Hg)	0.0001	0.0006	0.002	<0.0001	----	----	<0.0001	----	----	<0.0001	----	----
Holmium (Ho)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Indium (In)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lanthanum (La)	0.001	-	-	0.001	<0.001	<0.001	0.002	0.002	0.003	0.001	<0.001	0.001
Lithium (li)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lutetium (Lu)	0.001	-	-	0.049	0.028	0.029	0.03	0.039	0.037	0.035	0.021	0.026
Manganese (Mn)	0.001	1.9	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum (Mo)	0.001	-	0.15	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Neodymium (Nd)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel (Ni)	0.001	0.011	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead (Pb)	0.001	0.0034	0.1	0.002	0.002	0.002	0.002	0.002	0.002	0.004	0.004	0.004
Praseodymium (Pr)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Rubidium (Rb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Samarium (Sa)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Antimony (Sb)	0.001	-	-	0.004	0.005	0.007	0.003	0.004	0.003	0.002	0.002	0.002
Selenium (Se)	0.01	0.011	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin (Sn)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Strontium (Sr)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Terbium (Tb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tellurium (Te)	0.005	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Thorium (Th)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Titanium (Ti)	0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Thallium (Tl)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Thulium (Tm)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Uranium (U)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium (V)	0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Yttrium (Y)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ytterbium (Yb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc (Zn)	0.005	0.008	20	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zirconium (Zr)	0.005	-	-	0.1	0.06	0.05	0.06	0.14	0.32	0.13	0.06	0.11

Table B6: Multi-Element Test Results for Wall Wash Samples from the Yallourn Project

		RGS Sample Number →	2021048_WW18	2021048_WW19	2021048_WW20	2021048_WW21	2021048_WW22	2021048_WW23	2021048_WW24	2021048_WW25	2021048_WW26
		Sample Date →	13/04/2022	13/04/2022	13/04/2022	13/04/2022	13/04/2022	13/04/2022	13/04/2022	13/04/2022	13/04/2022
		ALS Laboratory ID →	EM2207630018	EM2207630019	EM2207630020	EM2207630021	EM2207630022	EM2207630023	EM2207630024	EM2207630025	EM2207630026
		Location →	YEF Northern Batters			YEF Northern Batters			YEF Latrobe River Batters		
		Material Type →	Weathered coal			Weathered coal			Weathered coal		
		Sample Type →	Wall washing_first flush	Wall washing_15 mins	Wall washing_30 mins	Wall washing_first flush	Wall washing_15 mins	Wall washing_30 mins	Wall washing_first flush	Wall washing_15 mins	Wall washing_30 mins
		Client Sample ID →	RGS_YEF_WW_0-1	RGS_YEF_WW_15-1	RGS_YEF_WW_30-1	RGS_YEF_WW_0-2	RGS_YEF_WW_15-2	RGS_YEF_WW_30-2	RGS_YEF_WW_0-3	RGS_YEF_WW_15-3	RGS_YEF_WW_30-3
Parameters	**Limit of Reporting**	Aquatic Ecosystems (freshwater)[1]	Livestock Drinking Water[2]								
Total Metals/Metalloids											
Aluminium (Al)	0.01	0.055	5	2.61	----	----	21.4	----	----	1.12	----	----
Silver (Ag)	0.001	0.00005	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Arsenic (As)	0.001	0.024	0.5 *	<0.001	----	----	0.004	----	----	<0.001	----	----
Boron (B)	0.05	0.37	5	<0.05	----	----	0.07	----	----	<0.05	----	----
Barium (Ba)	0.001	-	-	0.254	----	----	1.8	----	----	0.677	----	----
Beryllium (Be)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Bismuth (Bi)	0.001	-	-	<0.001	----	----	0.016	----	----	<0.001	----	----
Cadmium (Cd)	0.0001	0.0002	0.01	<0.0001	----	----	<0.0001	----	----	<0.0001	----	----
Cerium (Ce)	0.001	-	-	0.004	----	----	0.037	----	----	<0.001	----	----
Cobalt (Co)	0.001	-	1	0.001	----	----	0.011	----	----	0.002	----	----
Chromium (Cr)	0.001	0.001	1 **	0.003	----	----	0.019	----	----	0.001	----	----
Caesium (Cs)	0.001	-	-	<0.001	----	----	0.002	----	----	<0.001	----	----
Copper (Cu)	0.001	0.0014	1	0.005	----	----	0.018	----	----	0.003	----	----
Dysprosium (Dy)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Erbium (Er)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Europium (Eu)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Iron (Fe)	0.05	-	-	8.49	----	----	49.4	----	----	16.5	----	----
Gallium (Ga)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Gadolinium (Gd)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Hafnium (Hf)	0.01	-	-	<0.01	----	----	<0.01	----	----	<0.01	----	----
Mercury (Hg)	0.0001	0.0006	0.002	<0.0001	----	----	<0.0001	----	----	<0.0001	----	----
Holmium (Ho)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Indium (In)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Lanthanum (La)	0.001	-	-	0.002	----	----	<0.001	----	----	<0.001	----	----
Lithium (li)	0.001	-	-	0.001	----	----	0.008	----	----	0.002	----	----
Lutetium (Lu)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Manganese (Mn)	0.001	1.9	-	0.15	----	----	0.87	----	----	0.969	----	----
Molybdenum (Mo)	0.001	-	0.15	<0.001	----	----	<0.001	----	----	<0.001	----	----
Neodymium (Nd)	0.001	-	-	0.002	----	----	<0.001	----	----	<0.001	----	----
Nickel (Ni)	0.001	0.011	1	0.003	----	----	0.019	----	----	0.007	----	----
Lead (Pb)	0.001	0.0034	0.1	0.001	----	----	0.009	----	----	<0.001	----	----
Praseodymium (Pr)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Rubidium (Rb)	0.001	-	-	0.004	----	----	0.02	----	----	0.019	----	----
Samarium (Sa)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Antimony (Sb)	0.001	-	-	<0.001	----	----	0.002	----	----	<0.001	----	----
Selenium (Se)	0.01	0.011	0.02	<0.01	----	----	<0.01	----	----	<0.01	----	----
Tin (Sn)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Strontium (Sr)	0.001	-	-	0.044	----	----	0.216	----	----	0.178	----	----
Terbium (Tb)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Tellurium (Te)	0.005	-	-	<0.005	----	----	<0.005	----	----	<0.005	----	----
Thorium (Th)	0.001	-	-	<0.001	----	----	0.003	----	----	<0.001	----	----
Titanium (Ti)	0.01	-	-	0.04	----	----	0.1	----	----	0.01	----	----
Thallium (Tl)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Thulium (Tm)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Uranium (U)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Vanadium (V)	0.01	-	-	<0.01	----	----	0.04	----	----	<0.01	----	----
Yttrium (Y)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Ytterbium (Yb)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Zinc (Zn)	0.005	0.008	20	0.014	----	----	0.071	----	----	0.039	----	----
Zirconium (Zr)	0.005	-	-	<0.005	----	----	<0.005	----	----	<0.005	----	----

Notes: < indicates concentration less than the detection limit. Shaded cells exceed applied guideline values. * 0.013 mg/L for pentavalent Arsenic (V). ** Cr (VI) = hexavalent.

for still water bodies only, moving rivers at low flow rates should not exceed 2,200µS/cm. ^ calculated based on total dissolved solids (TDS) conversion rate of 0.67% of EC.

TDS is an approximate measure of inorganic dissolved salts and should not exceed 2,400mg/L for livestock drinking water.

1. ANZG (2018). Trigger values for freshwater aquatic ecosystems (95% species protection level)

2. ANZG (2018). Recommended guideline limits for Livestock Drinking Water.

Table B6: Multi-Element Test Results for Wall Wash Samples from the Yallourn Project

		RGS Sample Number →	2021048_WW27	2021048_WW28	2021048_WW29	2021048_WW30	2021048_WW31	2021048_WW32	2021048_WW33	2021048_WW34	2021048_WW35
		Sample Date →	13/04/2022	13/04/2022	13/04/2022	13/04/2022	13/04/2022	13/04/2022	13/04/2022	13/04/2022	13/04/2022
		ALS Laboratory ID →	EM2207630027	EM2207630028	EM2207630029	EM2207630030	EM2207630031	EM2207630032	EM2207630033	EM2207630034	EM2207630035
		Location →	YEFX Latrobe Road Batters			YEFX Latrobe Road Batters			YMF Western Batters		
		Material Type →	Weathered coal			Topsoil/overburden			Weathered coal		
		Sample Type →	Wall washing_first flush	Wall washing_15 mins	Wall washing_30 mins	Wall washing_first flush	Wall washing_15 mins	Wall washing_30 mins	Wall washing_first flush	Wall washing_15 mins	Wall washing_30 mins
		Client Sample ID →	RGS_YEF_WW_0-4	RGS_YEF_WW_15-4	RGS_YEF_WW_30-4	RGS_YEF_WW_0-5	RGS_YEF_WW_15-5	RGS_YEF_WW_30-5	RGS_YMF_WW_0-1	RGS_YMF_WW_15-1	RGS_YMF_WW_30-1
Parameters	**Limit of Reporting**	Aquatic Ecosystems (freshwater)[1]	Livestock Drinking Water[2]								
pH	0.01 pH unit	6 to 9	-	4.00	3.96	4.08	5.66	5.79	6.15	4.05	4.55	3.24
Electrical Conductivity	1 µS/cm	<1,000#	3,580^	246	247	210	142	143	144	240	143	404
Carbonate Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bicarbonate Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	<1	<1	9	12	11	<1	<1	<1
Total Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	<1	<1	9	12	11	<1	<1	<1
Acidity (mg $CaCO_3$/L)	1 mg/L	-	-	17	16	14	9	5	3	16	12	37
Net Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1
Redox Potential	0.1	-	-	138	145	142	89	79	77	139	122	154
pH Redox	0.01	-	-	4	4	4	6	6	6	4	5	3
Major Ions	All units mg/L			All units mg/L								
Calcium (Ca)	1	-	1,000	3	1	<1	5	14	5	3	2	2
Magnesium (Mg)	1	-	-	10	5	3	5	10	5	6	3	3
Potassium (K)	1	-	-	1	1	1	5	4	2	1	1	1
Sodium (Na)	1	-	-	28	24	21	18	19	19	22	18	18
Chloride (Cl)	1	-	-	30	28	26	20	21	24	36	25	22
Fluoride (F)	0.1	-	2	0.6	0.5	0.6	0.4	0.5	0.5	0.4	0.6	0.5
Sulfate (SO_4^{2-})	1	-	1,000	36	34	27	13	12	12	20	13	12
Total Organic Carbon	1	-	-	5	5	4	6	3	3	7	4	4
Total Inorganic Carbon	1	-	-	1	<1	<1	5	4	4	2	<1	<1
Total Carbon	1	-	-	6	6	5	10	7	7	9	5	5
Dissolved Oxygen	0.1	-	-	8.3	8.6	8.8	5.4	6.9	7.6	5.8	8.7	8.3
Dissolved Metals/Metalloids	All units mg/L			All units mg/L								
Aluminium (Al)	0.01	0.055	5	0.1	0.08	0.07	0.03	0.02	0.02	0.14	0.03	0.16
Silver (Ag)	0.001	0.00005	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic (As)	0.001	0.024	0.5 *	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Boron (B)	0.05	0.37	5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Barium (Ba)	0.001	-	-	0.016	0.007	0.005	0.007	0.007	0.006	0.008	0.002	0.017
Beryllium (Be)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth (Bi)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium (Cd)	0.0001	0.0002	0.01	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cerium (Ce)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt (Co)	0.001	-	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium (Cr)	0.001	0.001	1 **	0.002	0.003	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Caesium (Cs)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper (Cu)	0.001	0.0014	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dysprosium (Dy)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Erbium (Er)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Europium (Eu)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Iron (Fe)	0.05	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Gallium (Ga)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Gadolinium (Gd)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Hafnium (Hf)	0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Mercury (Hg)	0.0001	0.0006	0.002	<0.0001	----	----	<0.0001	----	----	<0.0001	----	----
Holmium (Ho)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Indium (In)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lanthanum (La)	0.001	-	-	0.002	0.002	0.002	<0.001	<0.001	<0.001	0.001	<0.001	<0.001
Lithium (li)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lutetium (Lu)	0.001	-	-	0.075	0.075	0.049	0.002	<0.001	<0.001	0.078	0.014	0.066
Manganese (Mn)	0.001	1.9	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum (Mo)	0.001	-	0.15	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Neodymium (Nd)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel (Ni)	0.001	0.011	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead (Pb)	0.001	0.0034	0.1	0.003	0.003	0.003	<0.001	<0.001	<0.001	0.003	0.002	0.003
Praseodymium (Pr)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Rubidium (Rb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Samarium (Sa)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Antimony (Sb)	0.001	-	-	0.014	0.012	0.008	0.016	0.018	0.018	0.008	0.003	0.013
Selenium (Se)	0.01	0.011	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin (Sn)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Strontium (Sr)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Terbium (Tb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tellurium (Te)	0.005	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Thorium (Th)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Titanium (Ti)	0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Thallium (Tl)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Thulium (Tm)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Uranium (U)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium (V)	0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Yttrium (Y)	0.001	-	-	0.007	0.006	<0.001	<0.001	<0.001	<0.001	0.007	<0.001	0.008
Ytterbium (Yb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc (Zn)	0.005	0.008	20	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zirconium (Zr)	0.005	-	-	<0.005	0.07	0.07	<0.005	<0.005	<0.005	0.08	<0.005	0.05

Table B6: Multi-Element Test Results for Wall Wash Samples from the Yallourn Project

		RGS Sample Number →	2021048_WW27	2021048_WW28	2021048_WW29	2021048_WW30	2021048_WW31	2021048_WW32	2021048_WW33	2021048_WW34	2021048_WW35
		Sample Date →	13/04/2022	13/04/2022	13/04/2022	13/04/2022	13/04/2022	13/04/2022	13/04/2022	13/04/2022	13/04/2022
		ALS Laboratory ID →	EM2207630027	EM2207630028	EM2207630029	EM2207630030	EM2207630031	EM2207630032	EM2207630033	EM2207630034	EM2207630035
		Location →	YEFX Latrobe Road Batters			YEFX Latrobe Road Batters			YMF Western Batters		
		Material Type →	Weathered coal			Topsoil/overburden			Weathered coal		
		Sample Type →	Wall washing_first flush	Wall washing_15 mins	Wall washing_30 mins	Wall washing_first flush	Wall washing_15 mins	Wall washing_30 mins	Wall washing_first flush	Wall washing_15 mins	Wall washing_30 mins
		Client Sample ID →	RGS_YEF_WW_0-4	RGS_YEF_WW_15-4	RGS_YEF_WW_30-4	RGS_YEF_WW_0-5	RGS_YEF_WW_15-5	RGS_YEF_WW_30-5	RGS_YMF_WW_0-1	RGS_YMF_WW_15-1	RGS_YMF_WW_30-1
Parameters	**Limit of Reporting**	Aquatic Ecosystems (freshwater)[1]	Livestock Drinking Water[2]								
Total Metals/Metalloids											
Aluminium (Al)	0.01	0.055	5	2.08	----	----	20.9	----	----	2.87	----	----
Silver (Ag)	0.001	0.00005	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Arsenic (As)	0.001	0.024	0.5 *	<0.001	----	----	0.003	----	----	<0.001	----	----
Boron (B)	0.05	0.37	5	<0.05	----	----	<0.05	----	----	<0.05	----	----
Barium (Ba)	0.001	-	-	0.144	----	----	0.367	----	----	0.264	----	----
Beryllium (Be)	0.001	-	-	<0.001	----	----	0.002	----	----	<0.001	----	----
Bismuth (Bi)	0.001	-	-	0.003	----	----	<0.001	----	----	0.007	----	----
Cadmium (Cd)	0.0001	0.0002	0.01	<0.0001	----	----	0.0001	----	----	<0.0001	----	----
Cerium (Ce)	0.001	-	-	0.003	----	----	0.084	----	----	0.005	----	----
Cobalt (Co)	0.001	-	1	0.01	----	----	0.013	----	----	0.002	----	----
Chromium (Cr)	0.001	0.001	1 **	0.003	----	----	0.023	----	----	0.003	----	----
Caesium (Cs)	0.001	-	-	<0.001	----	----	0.002	----	----	<0.001	----	----
Copper (Cu)	0.001	0.0014	1	0.005	----	----	0.027	----	----	0.012	----	----
Dysprosium (Dy)	0.001	-	-	<0.001	----	----	0.004	----	----	<0.001	----	----
Erbium (Er)	0.001	-	-	<0.001	----	----	0.002	----	----	<0.001	----	----
Europium (Eu)	0.001	-	-	<0.001	----	----	0.002	----	----	<0.001	----	----
Iron (Fe)	0.05	-	-	4.92	----	----	23.5	----	----	8.55	----	----
Gallium (Ga)	0.001	-	-	<0.001	----	----	0.007	----	----	<0.001	----	----
Gadolinium (Gd)	0.001	-	-	<0.001	----	----	0.006	----	----	<0.001	----	----
Hafnium (Hf)	0.01	-	-	<0.01	----	----	<0.01	----	----	<0.01	----	----
Mercury (Hg)	0.0001	0.0006	0.002	<0.0001	----	----	<0.0001	----	----	<0.0001	----	----
Holmium (Ho)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Indium (In)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Lanthanum (La)	0.001	-	-	0.001	----	----	0.034	----	----	<0.001	----	----
Lithium (li)	0.001	-	-	0.004	----	----	0.009	----	----	0.002	----	----
Lutetium (Lu)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Manganese (Mn)	0.001	1.9	-	0.183	----	----	0.788	----	----	0.166	----	----
Molybdenum (Mo)	0.001	-	0.15	<0.001	----	----	<0.001	----	----	<0.001	----	----
Neodymium (Nd)	0.001	-	-	<0.001	----	----	0.034	----	----	<0.001	----	----
Nickel (Ni)	0.001	0.011	1	0.003	----	----	0.021	----	----	0.009	----	----
Lead (Pb)	0.001	0.0034	0.1	0.001	----	----	0.018	----	----	0.002	----	----
Praseodymium (Pr)	0.001	-	-	<0.001	----	----	0.008	----	----	<0.001	----	----
Rubidium (Rb)	0.001	-	-	0.008	----	----	0.027	----	----	0.007	----	----
Samarium (Sa)	0.001	-	-	<0.001	----	----	0.006	----	----	<0.001	----	----
Antimony (Sb)	0.001	-	-	0.002	----	----	<0.001	----	----	0.001	----	----
Selenium (Se)	0.01	0.011	0.02	<0.01	----	----	<0.01	----	----	<0.01	----	----
Tin (Sn)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Strontium (Sr)	0.001	-	-	0.04	----	----	0.116	----	----	0.04	----	----
Terbium (Tb)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Tellurium (Te)	0.005	-	-	<0.005	----	----	<0.005	----	----	<0.005	----	----
Thorium (Th)	0.001	-	-	0.002	----	----	0.002	----	----	<0.001	----	----
Titanium (Ti)	0.01	-	-	0.02	----	----	0.09	----	----	0.04	----	----
Thallium (Tl)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Thulium (Tm)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Uranium (U)	0.001	-	-	<0.001	----	----	0.001	----	----	<0.001	----	----
Vanadium (V)	0.01	-	-	<0.01	----	----	0.05	----	----	<0.01	----	----
Yttrium (Y)	0.001	-	-	<0.001	----	----	0.022	----	----	<0.001	----	----
Ytterbium (Yb)	0.001	-	-	<0.001	----	----	0.002	----	----	<0.001	----	----
Zinc (Zn)	0.005	0.008	20	0.021	----	----	0.069	----	----	0.035	----	----
Zirconium (Zr)	0.005	-	-	<0.005	----	----	0.008	----	----	<0.005	----	----

Notes: < indicates concentration less than the detection limit. Shaded cells exceed applied guideline values. * 0.013 mg/L for pentavalent Arsenic (V). ** Cr (VI) = hexavalent.

for still water bodies only, moving rivers at low flow rates should not exceed 2,200µS/cm. ^ calculated based on total dissolved solids (TDS) conversion rate of 0.67% of EC.

TDS is an approximate measure of inorganic dissolved salts and should not exceed 2,400mg/L for livestock drinking water.

1. ANZG (2018). Trigger values for freshwater aquatic ecosystems (95% species protection level)

2. ANZG (2018). Recommended guideline limits for Livestock Drinking Water.

Table B6: Multi-Element Test Results for Wall Wash Samples from the Yallourn Project

		RGS Sample Number →	2021048_WW36	2021048_WW37	2021048_WW38	2021048_WW39	2021048_WW40	2021048_WW41	2021048_WW42	2021048_WW43	2021048_WW44
		Sample Date →	13/04/2022	13/04/2022	13/04/2022	13/04/2022	13/04/2022	13/04/2022	14/04/2022	14/04/2022	14/04/2022
		ALS Laboratory ID →	EM2207630036	EM2207630037	EM2207630038	EM2207630039	EM2207630040	EM2207630041	EM2207630042	EM2207630043	EM2207630044
		Location →	YMF Western Batters			YMF Operating Face			YMF Western Batters		
		Material Type →	Weathered coal			Fresh coal			Weathered coal		
		Sample Type →	Wall washing_first flush	Wall washing_15 mins	Wall washing_30 mins	Wall washing_first flush	Wall washing_15 mins	Wall washing_30 mins	Wall washing_first flush	Wall washing_15 mins	Wall washing_30 mins
		Client Sample ID →	RGS_YMF_WW_0-2	RGS_YMF_WW_15-2	RGS_YMF_WW_30-2	RGS_YMF_WW_0-3	RGS_YMF_WW_15-3	RGS_YMF_WW_30-3	RGS_YMF_WW_0-4	RGS_YMF_WW_15-4	RGS_YMF_WW_30-4
Parameters	**Limit of Reporting**	Aquatic Ecosystems (freshwater)[1]	Livestock Drinking Water[2]								
pH	0.01 pH unit	6 to 9	-	4.32	4.68	5.73	5.85	5.95	5.84	4.67	4.89	4.57
Electrical Conductivity	1 µS/cm	<1,000#	3,580^	218	161	143	141	134	132	157	140	146
Carbonate Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bicarbonate Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	1	1	3	4	3	<1	<1	<1
Total Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	1	1	3	4	3	<1	<1	<1
Acidity (mg $CaCO_3$/L)	1 mg/L	-	-	13	13	9	4	2	2	10	7	10
Net Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1
Redox Potential	0.1	-	-	191	172	130	117	92	93	136	130	132
pH Redox	0.01	-	-	4	5	6	6	6	6	5	5	5
Major Ions	All units mg/L			All units mg/L								
Calcium (Ca)	1	-	1,000	6	2	1	40	2	2	5	1	<1
Magnesium (Mg)	1	-	-	12	4	3	56	3	3	8	3	2
Potassium (K)	1	-	-	1	<1	<1	3	1	1	1	<1	<1
Sodium (Na)	1	-	-	29	21	20	44	20	19	20	18	18
Chloride (Cl)	1	-	-	27	22	23	21	22	22	24	21	21
Fluoride (F)	0.1	-	2	0.6	0.6	0.7	0.7	0.7	0.7	0.5	0.6	0.5
Sulfate (SO_4^{2-})	1	-	1,000	29	18	15	12	12	12	18	14	14
Total Organic Carbon	1	-	-	6	4	3	3	3	5	7	4	4
Total Inorganic Carbon	1	-	-	2	1	1	2	2	2	2	1	1
Total Carbon	1	-	-	8	5	4	6	5	7	8	5	6
Dissolved Oxygen	0.1	-	-	7.4	8.4	8.8	5.1	7.5	7.2	7.7	8.9	8.8
Dissolved Metals/Metalloids	All units mg/L			All units mg/L								
Aluminium (Al)	0.01	0.055	5	0.07	0.03	0.01	<0.01	<0.01	<0.01	0.3	0.06	0.09
Silver (Ag)	0.001	0.00005	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic (As)	0.001	0.024	0.5 *	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Boron (B)	0.05	0.37	5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Barium (Ba)	0.001	-	-	0.008	0.003	0.003	0.004	0.005	0.004	0.005	0.003	0.002
Beryllium (Be)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth (Bi)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium (Cd)	0.0001	0.0002	0.01	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cerium (Ce)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt (Co)	0.001	-	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium (Cr)	0.001	0.001	1 **	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Caesium (Cs)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper (Cu)	0.001	0.0014	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dysprosium (Dy)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Erbium (Er)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Europium (Eu)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Iron (Fe)	0.05	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Gallium (Ga)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Gadolinium (Gd)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Hafnium (Hf)	0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Mercury (Hg)	0.0001	0.0006	0.002	<0.0001	----	----	<0.0001	----	----	<0.0001	----	----
Holmium (Ho)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Indium (In)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lanthanum (La)	0.001	-	-	0.002	0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001
Lithium (li)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lutetium (Lu)	0.001	-	-	0.048	0.018	0.009	0.008	0.007	0.007	0.028	0.016	0.025
Manganese (Mn)	0.001	1.9	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum (Mo)	0.001	-	0.15	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Neodymium (Nd)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel (Ni)	0.001	0.011	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead (Pb)	0.001	0.0034	0.1	0.003	0.002	0.002	0.004	0.003	0.004	0.002	0.002	0.002
Praseodymium (Pr)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Rubidium (Rb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Samarium (Sa)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Antimony (Sb)	0.001	-	-	0.009	0.005	0.005	0.002	0.004	0.003	0.004	0.004	0.004
Selenium (Se)	0.01	0.011	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin (Sn)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Strontium (Sr)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Terbium (Tb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tellurium (Te)	0.005	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Thorium (Th)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Titanium (Ti)	0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Thallium (Tl)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Thulium (Tm)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Uranium (U)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium (V)	0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Yttrium (Y)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ytterbium (Yb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc (Zn)	0.005	0.008	20	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zirconium (Zr)	0.005	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

Table B6: Multi-Element Test Results for Wall Wash Samples from the Yallourn Project

		RGS Sample Number →		2021048_WW36	2021048_WW37	2021048_WW38	2021048_WW39	2021048_WW40	2021048_WW41	2021048_WW42	2021048_WW43	2021048_WW44
		Sample Date →		13/04/2022	13/04/2022	13/04/2022	13/04/2022	13/04/2022	13/04/2022	14/04/2022	14/04/2022	14/04/2022
		ALS Laboratory ID →		EM2207630036	EM2207630037	EM2207630038	EM2207630039	EM2207630040	EM2207630041	EM2207630042	EM2207630043	EM2207630044
		Location →		YMF Western Batters			YMF Operating Face			YMF Western Batters		
		Material Type →		Weathered coal			Fresh coal			Weathered coal		
		Sample Type →		Wall washing_first flush	Wall washing_15 mins	Wall washing_30 mins	Wall washing_first flush	Wall washing_15 mins	Wall washing_30 mins	Wall washing_first flush	Wall washing_15 mins	Wall washing_30 mins
		Client Sample ID →		RGS_YMF_WW_0-2	RGS_YMF_WW_15-2	RGS_YMF_WW_30-2	RGS_YMF_WW_0-3	RGS_YMF_WW_15-3	RGS_YMF_WW_30-3	RGS_YMF_WW_0-4	RGS_YMF_WW_15-4	RGS_YMF_WW_30-4
Parameters	**Limit of Reporting**	Aquatic Ecosystems (freshwater)[1]	Livestock Drinking Water[2]									
Total Metals/Metalloids												
Aluminium (Al)	0.01	0.055	5	2.6	----	----	2.08	----	----	3.35	----	----
Silver (Ag)	0.001	0.00005	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Arsenic (As)	0.001	0.024	0.5 *	0.002	----	----	0.002	----	----	0.002	----	----
Boron (B)	0.05	0.37	5	0.07	----	----	0.17	----	----	<0.05	----	----
Barium (Ba)	0.001	-	-	0.341	----	----	5.43	----	----	0.291	----	----
Beryllium (Be)	0.001	-	-	<0.001	----	----	0.004	----	----	<0.001	----	----
Bismuth (Bi)	0.001	-	-	0.009	----	----	0.012	----	----	0.002	----	----
Cadmium (Cd)	0.0001	0.0002	0.01	<0.0001	----	----	<0.0001	----	----	<0.0001	----	----
Cerium (Ce)	0.001	-	-	0.007	----	----	0.005	----	----	0.005	----	----
Cobalt (Co)	0.001	-	1	<0.001	----	----	0.005	----	----	0.002	----	----
Chromium (Cr)	0.001	0.001	1 **	0.003	----	----	0.002	----	----	0.003	----	----
Caesium (Cs)	0.001	-	-	<0.001	----	----	0.002	----	----	<0.001	----	----
Copper (Cu)	0.001	0.0014	1	0.006	----	----	0.004	----	----	0.008	----	----
Dysprosium (Dy)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Erbium (Er)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Europium (Eu)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Iron (Fe)	0.05	-	-	14.7	----	----	189	----	----	8.99	----	----
Gallium (Ga)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Gadolinium (Gd)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Hafnium (Hf)	0.01	-	-	<0.01	----	----	0.02	----	----	<0.01	----	----
Mercury (Hg)	0.0001	0.0006	0.002	<0.0001	----	----	<0.0001	----	----	<0.0001	----	----
Holmium (Ho)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Indium (In)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Lanthanum (La)	0.001	-	-	<0.001	----	----	0.006	----	----	<0.001	----	----
Lithium (li)	0.001	-	-	0.004	----	----	0.003	----	----	0.002	----	----
Lutetium (Lu)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Manganese (Mn)	0.001	1.9	-	0.224	----	----	2.32	----	----	0.21	----	----
Molybdenum (Mo)	0.001	-	0.15	<0.001	----	----	<0.001	----	----	<0.001	----	----
Neodymium (Nd)	0.001	-	-	<0.001	----	----	0.002	----	----	<0.001	----	----
Nickel (Ni)	0.001	0.011	1	0.011	----	----	0.116	----	----	0.003	----	----
Lead (Pb)	0.001	0.0034	0.1	0.002	----	----	0.001	----	----	0.001	----	----
Praseodymium (Pr)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Rubidium (Rb)	0.001	-	-	0.007	----	----	0.022	----	----	0.005	----	----
Samarium (Sa)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Antimony (Sb)	0.001	-	-	0.002	----	----	0.002	----	----	<0.001	----	----
Selenium (Se)	0.01	0.011	0.02	<0.01	----	----	<0.01	----	----	<0.01	----	----
Tin (Sn)	0.001	-	-	0.001	----	----	0.002	----	----	<0.001	----	----
Strontium (Sr)	0.001	-	-	0.071	----	----	0.649	----	----	0.073	----	----
Terbium (Tb)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Tellurium (Te)	0.005	-	-	<0.005	----	----	<0.005	----	----	<0.005	----	----
Thorium (Th)	0.001	-	-	0.001	----	----	0.001	----	----	<0.001	----	----
Titanium (Ti)	0.01	-	-	0.03	----	----	0.04	----	----	0.04	----	----
Thallium (Tl)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Thulium (Tm)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Uranium (U)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Vanadium (V)	0.01	-	-	<0.01	----	----	<0.01	----	----	<0.01	----	----
Yttrium (Y)	0.001	-	-	<0.001	----	----	0.002	----	----	<0.001	----	----
Ytterbium (Yb)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001	----	----
Zinc (Zn)	0.005	0.008	20	0.041	----	----	0.108	----	----	0.051	----	----
Zirconium (Zr)	0.005	-	-	<0.005	----	----	0.02	----	----	<0.005	----	----

Notes: < indicates concentration less than the detection limit. Shaded cells exceed applied guideline values. * 0.013 mg/L for pentavalent Arsenic (V). ** Cr (VI) = hexavalent.
for still water bodies only, moving rivers at low flow rates should not exceed 2,200µS/cm. ^ calculated based on total dissolved solids (TDS) conversion rate of 0.67% of EC.
TDS is an approximate measure of inorganic dissolved salts and should not exceed 2,400mg/L for livestock drinking water.
1. ANZG (2018). Trigger values for freshwater aquatic ecosystems (95% species protection level)
2. ANZG (2018). Recommended guideline limits for Livestock Drinking Water.

Table B6: Multi-Element Test Results for Wall Wash Samples from the Yallourn Project

		RGS Sample Number →	2021048_WW45	2021048_WW46	2021048_WW47	2021048_WW48	2021048_WW49	2021048_WW50	2021048_WW58
		Sample Date →	14/04/2022	14/04/2022	14/04/2022	14/04/2022	14/04/2022	14/04/2022	14/04/2022
		ALS Laboratory ID →	EM2207630045	EM2207630046	EM2207630047	EM2207630048	EM2207630049	EM2207630050	EM2207630058
		Location →	YMF Western Batters			YMF Operating Face			-
		Material Type →	Fresh coal			Fresh overburden			-
		Sample Type →	Wall washing_first flush	Wall washing_15 mins	Wall washing_30 mins	Wall washing_first flush	Wall washing_15 mins	Wall washing_30 mins	-
		Client Sample ID →	RGS_YMF_WW_0-5	RGS_YMF_WW_15-5	RGS_YMF_WW_30-5	RGS_YMF_WW_0-6	RGS_YMF_WW_15-6	RGS_YMF_WW_30-6	RGS_Control
Parameters	**Limit of Reporting**	Aquatic Ecosystems (freshwater)[1]	Livestock Drinking Water[2]						
pH	0.01 pH unit	6 to 9	-	5.90	6.21	6.22	4.18	4.59	4.95	6.30
Electrical Conductivity	1 µS/cm	<1,000#	3,580^	168	147	143	474	639	272	152
Carbonate Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	<1	<1	<1	<1	<1	<1
Bicarbonate Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	4	10	10	<1	<1	<1	16
Total Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	4	10	10	<1	<1	<1	16
Acidity (mg $CaCO_3$/L)	1 mg/L	-	-	6	5	<1	13	10	15	<1
Net Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	<1	<1	<1	<1	<1	<1
Redox Potential	0.1	-	-	113	68	71	147	136	137	181
pH Redox	0.01	-	-	6	6	6	4	5	5	6
Major Ions	All units mg/L			All units mg/L						
Calcium (Ca)	1	-	1,000	3	1	2	16	9	12	3
Magnesium (Mg)	1	-	-	5	2	2	63	26	43	2
Potassium (K)	1	-	-	1	1	1	13	7	9	1
Sodium (Na)	1	-	-	26	21	19	86	25	42	18
Chloride (Cl)	1	-	-	26	20	20	280	132	43	20
Fluoride (F)	0.1	-	2	0.7	0.7	0.7	0.2	<0.1	<0.1	0.7
Sulfate (SO_4^{2-})	1	-	1,000	15	12	12	288	60	38	12
Total Organic Carbon	1	-	-	7	2	2	182	307	138	2
Total Inorganic Carbon	1	-	-	3	3	3	<1	<1	<1	4
Total Carbon	1	-	-	10	6	5	198	320	144	6
Dissolved Oxygen	0.1	-	-	6.9	9	9.1	3.8	3.1	6.6	9.3
Dissolved Metals/Metalloids	All units mg/L			All units mg/L						
Aluminium (Al)	0.01	0.055	5	<0.01	0.01	0.3	1.22	0.09	0.06	0.02
Silver (Ag)	0.001	0.00005	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic (As)	0.001	0.024	0.5 *	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Boron (B)	0.05	0.37	5	<0.05	<0.05	<0.05	0.002	<0.05	<0.05	<0.05
Barium (Ba)	0.001	-	-	0.004	0.009	0.01	0.027	0.083	0.032	0.017
Beryllium (Be)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth (Bi)	0.001	-	-	<0.001	<0.001	<0.001	0.0002	<0.001	<0.001	<0.001
Cadmium (Cd)	0.0001	0.0002	0.01	<0.0001	<0.0001	<0.0001	0.007	<0.0001	<0.0001	<0.0001
Cerium (Ce)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt (Co)	0.001	-	1	<0.001	<0.001	<0.001	0.003	<0.001	<0.001	<0.001
Chromium (Cr)	0.001	0.001	1 **	<0.001	<0.001	<0.001	0.134	0.006	0.002	<0.001
Caesium (Cs)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002
Copper (Cu)	0.001	0.0014	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dysprosium (Dy)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Erbium (Er)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Europium (Eu)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Iron (Fe)	0.05	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Gallium (Ga)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Gadolinium (Gd)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Hafnium (Hf)	0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Mercury (Hg)	0.0001	0.0006	0.002	<0.0001	----	----	<0.0001	----	----	<0.0001
Holmium (Ho)	0.001	-	-	<0.001	<0.001	<0.001	0.005	<0.001	<0.001	<0.001
Indium (In)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lanthanum (La)	0.001	-	-	0.002	<0.001	<0.001	0.022	0.006	0.004	<0.001
Lithium (li)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lutetium (Lu)	0.001	-	-	0.006	0.006	0.005	0.407	0.059	0.021	<0.001
Manganese (Mn)	0.001	1.9	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum (Mo)	0.001	-	0.15	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001
Neodymium (Nd)	0.001	-	-	<0.001	<0.001	<0.001	0.042	0.003	<0.001	<0.001
Nickel (Ni)	0.001	0.011	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead (Pb)	0.001	0.0034	0.1	0.003	0.002	0.002	0.016	0.008	0.005	0.002
Praseodymium (Pr)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Rubidium (Rb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Samarium (Sa)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Antimony (Sb)	0.001	-	-	0.003	0.014	0.015	0.195	0.044	0.019	0.026
Selenium (Se)	0.01	0.011	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin (Sn)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Strontium (Sr)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Terbium (Tb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tellurium (Te)	0.005	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Thorium (Th)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Titanium (Ti)	0.01	-	-	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01
Thallium (Tl)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Thulium (Tm)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Uranium (U)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium (V)	0.01	-	-	<0.01	<0.01	<0.01	0.003	<0.01	<0.01	<0.01
Yttrium (Y)	0.001	-	-	<0.001	<0.001	<0.001	0.047	0.006	<0.001	0.01
Ytterbium (Yb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc (Zn)	0.005	0.008	20	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zirconium (Zr)	0.005	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

Table B6: Multi-Element Test Results for Wall Wash Samples from the Yallourn Project

		RGS Sample Number →		2021048_WW45	2021048_WW46	2021048_WW47	2021048_WW48	2021048_WW49	2021048_WW50	2021048_WW58
		Sample Date →		14/04/2022	14/04/2022	14/04/2022	14/04/2022	14/04/2022	14/04/2022	14/04/2022
		ALS Laboratory ID →		EM2207630045	EM2207630046	EM2207630047	EM2207630048	EM2207630049	EM2207630050	EM2207630058
		Location →		YMF Western Batters			YMF Operating Face			-
		Material Type →		Fresh coal			Fresh overburden			-
		Sample Type →		Wall washing_first flush	Wall washing_15 mins	Wall washing_30 mins	Wall washing_first flush	Wall washing_15 mins	Wall washing_30 mins	-
		Client Sample ID →		RGS_YMF_WW_0-5	RGS_YMF_WW_15-5	RGS_YMF_WW_30-5	RGS_YMF_WW_0-6	RGS_YMF_WW_15-6	RGS_YMF_WW_30-6	RGS_Control
Parameters	**Limit of Reporting**	Aquatic Ecosystems (freshwater)[1]	Livestock Drinking Water[2]							
Total Metals/Metalloids										
Aluminium (Al)	0.01	0.055	5	0.45	----	----	453	----	----	0.03
Silver (Ag)	0.001	0.00005	-	<0.001	----	----	<0.001	----	----	<0.001
Arsenic (As)	0.001	0.024	0.5 *	<0.001	----	----	0.091	----	----	<0.001
Boron (B)	0.05	0.37	5	<0.05	----	----	<0.05	----	----	<0.05
Barium (Ba)	0.001	-	-	0.24	----	----	1.44	----	----	0.021
Beryllium (Be)	0.001	-	-	<0.001	----	----	0.018	----	----	<0.001
Bismuth (Bi)	0.001	-	-	0.001	----	----	0.025	----	----	<0.001
Cadmium (Cd)	0.0001	0.0002	0.01	0.0005	----	----	0.0005	----	----	<0.0001
Cerium (Ce)	0.001	-	-	<0.001	----	----	1.81	----	----	<0.001
Cobalt (Co)	0.001	-	1	<0.001	----	----	0.081	----	----	<0.001
Chromium (Cr)	0.001	0.001	1 **	<0.001	----	----	0.952	----	----	<0.001
Caesium (Cs)	0.001	-	-	<0.001	----	----	0.234	----	----	<0.001
Copper (Cu)	0.001	0.0014	1	0.008	----	----	0.418	----	----	0.007
Dysprosium (Dy)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001
Erbium (Er)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001
Europium (Eu)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001
Iron (Fe)	0.05	-	-	3.74	----	----	72.5	----	----	0.12
Gallium (Ga)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001
Gadolinium (Gd)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001
Hafnium (Hf)	0.01	-	-	<0.01	----	----	<0.01	----	----	<0.01
Mercury (Hg)	0.0001	0.0006	0.002	<0.0001	----	----	0.0046	----	----	<0.0001
Holmium (Ho)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001
Indium (In)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001
Lanthanum (La)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001
Lithium (li)	0.001	-	-	0.002	----	----	0.152	----	----	<0.001
Lutetium (Lu)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001
Manganese (Mn)	0.001	1.9	-	0.079	----	----	0.31	----	----	0.005
Molybdenum (Mo)	0.001	-	0.15	<0.001	----	----	0.005	----	----	<0.001
Neodymium (Nd)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001
Nickel (Ni)	0.001	0.011	1	0.002	----	----	0.115	----	----	<0.001
Lead (Pb)	0.001	0.0034	0.1	0.002	----	----	0.403	----	----	<0.001
Praseodymium (Pr)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001
Rubidium (Rb)	0.001	-	-	0.004	----	----	0.565	----	----	0.002
Samarium (Sa)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001
Antimony (Sb)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001
Selenium (Se)	0.01	0.011	0.02	<0.01	----	----	<0.01	----	----	<0.01
Tin (Sn)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001
Strontium (Sr)	0.001	-	-	0.05	----	----	0.36	----	----	0.03
Terbium (Tb)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001
Tellurium (Te)	0.005	-	-	<0.005	----	----	<0.005	----	----	<0.005
Thorium (Th)	0.001	-	-	<0.001	----	----	0.309	----	----	<0.001
Titanium (Ti)	0.01	-	-	<0.01	----	----	0.17	----	----	<0.01
Thallium (Tl)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001
Thulium (Tm)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001
Uranium (U)	0.001	-	-	<0.001	----	----	0.103	----	----	<0.001
Vanadium (V)	0.01	-	-	<0.01	----	----	1.26	----	----	<0.01
Yttrium (Y)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001
Ytterbium (Yb)	0.001	-	-	<0.001	----	----	<0.001	----	----	<0.001
Zinc (Zn)	0.005	0.008	20	0.028	----	----	0.14	----	----	0.017
Zirconium (Zr)	0.005	-	-	<0.005	----	----	<0.005	----	----	<0.005

Notes: < indicates concentration less than the detection limit. Shaded cells exceed applied guideline values. * 0.013 mg/L for pentavalent Arsenic (V). ** Cr (VI) = hexavalent.

for still water bodies only, moving rivers at low flow rates should not exceed 2,200µS/cm. ^ calculated based on total dissolved solids (TDS) conversion rate of 0.67% of EC.

TDS is an approximate measure of inorganic dissolved salts and should not exceed 2,400mg/L for livestock drinking water.

1. ANZG (2018). Trigger values for freshwater aquatic ecosystems (95% species protection level)

2. ANZG (2018). Recommended guideline limits for Livestock Drinking Water.

Table B7: Multi-Element Test Results for Seepage Water Samples from the Yallourn Project

		RGS Sample Number →	2021048_WW51	2021048_WW52	2021048_WW53	2021048_WW54	2021048_WW55	2021048_WW56	2021048_WW57	2021048_WW58
		Sample Date →	12/04/2022	12/04/2022	13/04/2022	13/04/2022	13/04/2022	13/04/2022	14/04/2022	14/04/2022
		ALS Laboratory ID →	EM2207630051	EM2207630052	EM2207630053	EM2207630054	EM2207630055	EM2207630056	EM2207630057	EM2207630058
		Location →	YTF Hernes Oak Batters	YTF Southwest Batters	YEF Northern Batters	YEFX Latrobe Road Batters	YEFX Latrobe Road Batters	YEFX Latrobe Road Batters	YMF Western Batters	-
		Material Type →	-	-	-	-	-	-	-	-
		Sample Type →	Surface water sample - outflow from horizontal bore.	Surface water sample - pit wall seepage	Surface water sample - pit wall seepage	Surface water sample - pit wall seepage	Surface water sample - collected adjacent to the north-east pond	Long wall wash - collected 20 m downgradient on Latrobe Road Batters	Surface water sample - pit wall seepage	-
		Client Sample ID →	RGS_YTF_WW_3/3	RGS_YTF_WW_4/3	RGS_YEF_01/01	YEF_WW_3/3SW	RGS_YEF_WW_04_SWA	RGS_YEF_WW_04_SWB	RGS_YMF_SW_5-2	RGS_Control
Parameters	**Limit of Reporting**	Aquatic Ecosystems (freshwater)[1]	Livestock Drinking Water[2]							
pH	0.01 pH unit	6 to 9	-	5.14	6.06	7.02	3.31	4.43	3.37	4.77	6.30
Electrical Conductivity	1 µS/cm	<1,000#	3,580^	1,060	137	712	1,790	767	1,190	1,710	152
Carbonate Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	<1	<1	<1	<1	<1	<1	<1
Bicarbonate Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	4	92	<1	<1	<1	<1	16
Total Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	4	92	<1	<1	<1	<1	16
Acidity (mg $CaCO_3$/L)	1 mg/L	-	-	8	13	12	35	14	38	14	<1
Net Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	<1	<1	<1	<1	<1	<1	<1
Redox Potential	0.1	-	-	97	77	63	536	315	290	206	181
pH Redox	0.01	-	-	5	6	7	3	4	3	5	6
Major Ions											
Calcium (Ca)	1	-	1,000	5	<1	4	9	18	4	10	3
Magnesium (Mg)	1	-	-	18	2	12	33	67	14	45	2
Potassium (K)	1	-	-	1	<1	1	3	5	3	2	1
Sodium (Na)	1	-	-	131	19	100	195	110	93	181	18
Chloride (Cl)	1	-	-	327	28	134	490	203	169	499	20
Fluoride (F)	0.1	-	2	<0.1	<0.1	0.1	<0.1	<0.1	0.2	<0.1	0.7
Sulfate (SO_4^{2-})	1	-	1,000	2	1	46	53	38	253	12	12
Total Organic Carbon	1	-	-	8	4	11	5	13	28	1	2
Total Inorganic Carbon	1	-	-	<1	2	21	<1	1	1	<1	4
Total Carbon	1	-	-	8	6	31	5	14	29	2	6
Dissolved Oxygen	0.1	-	-	8.7	8.2	8.7	8.6	7.9	8	8.8	9.3
Dissolved Metals/Metalloids											
Aluminium (Al)	0.01	0.055	5	0.04	0.03	<0.01	0.11	0.1	0.18	0.02	0.02
Silver (Ag)	0.001	0.00005	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic (As)	0.001	0.024	0.5 *	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Boron (B)	0.05	0.37	5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Barium (Ba)	0.001	-	-	0.049	0.001	0.008	0.132	0.036	0.022	0.165	0.017
Beryllium (Be)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth (Bi)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0002	<0.001
Cadmium (Cd)	0.0001	0.0002	0.01	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cerium (Ce)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt (Co)	0.001	-	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium (Cr)	0.001	0.001	1 **	<0.001	<0.001	<0.001	0.015	0.008	0.013	0.022	<0.001
Caesium (Cs)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002
Copper (Cu)	0.001	0.0014	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dysprosium (Dy)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Erbium (Er)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Europium (Eu)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Iron (Fe)	0.05	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Gallium (Ga)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Gadolinium (Gd)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Hafnium (Hf)	0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Mercury (Hg)	0.0001	0.0006	0.002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Holmium (Ho)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Indium (In)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lanthanum (La)	0.001	-	-	0.004	0.001	0.004	0.03	0.005	0.011	0.003	<0.001
Lithium (li)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lutetium (Lu)	0.001	-	-	0.011	<0.001	<0.001	0.75	0.193	1.07	0.063	<0.001
Manganese (Mn)	0.001	1.9	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum (Mo)	0.001	-	0.15	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Neodymium (Nd)	0.001	-	-	0.002	<0.001	0.001	0.005	0.003	0.002	0.008	<0.001
Nickel (Ni)	0.001	0.011	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead (Pb)	0.001	0.0034	0.1	0.004	<0.001	<0.001	0.014	0.011	0.018	0.004	0.002
Praseodymium (Pr)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Rubidium (Rb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Samarium (Sa)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001
Antimony (Sb)	0.001	-	-	0.041	0.001	0.027	0.168	0.038	0.113	0.128	0.026
Selenium (Se)	0.01	0.011	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin (Sn)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Strontium (Sr)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Terbium (Tb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tellurium (Te)	0.005	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Thorium (Th)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Titanium (Ti)	0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Thallium (Tl)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Thulium (Tm)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Uranium (U)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium (V)	0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Yttrium (Y)	0.001	-	-	0.006	<0.001	<0.001	0.012	0.011	0.024	0.044	0.01
Ytterbium (Yb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc (Zn)	0.005	0.008	20	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zirconium (Zr)	0.005	-	-	0.1	<0.005	0.05	2.26	0.17	0.4	<0.005	<0.005

Table B7: Multi-Element Test Results for Seepage Water Samples from the Yallourn Project

		RGS Sample Number →	2021048_WW51	2021048_WW52	2021048_WW53	2021048_WW54	2021048_WW55	2021048_WW56	2021048_WW57	2021048_WW58
		Sample Date →	12/04/2022	12/04/2022	13/04/2022	13/04/2022	13/04/2022	13/04/2022	14/04/2022	14/04/2022
		ALS Laboratory ID →	EM2207630051	EM2207630052	EM2207630053	EM2207630054	EM2207630055	EM2207630056	EM2207630057	EM2207630058
		Location →	YTF Hernes Oak Batters	YTF Southwest Batters	YEF Northern Batters	YEFX Latrobe Road Batters	YEFX Latrobe Road Batters	YEFX Latrobe Road Batters	YMF Western Batters	-
		Material Type →	-	-	-	-	-	-	-	-
		Sample Type →	Surface water sample - outflow from horizontal bore.	Surface water sample - pit wall seepage	Surface water sample - pit wall seepage	Surface water sample - pit wall seepage	Surface water sample - collected adjacent to the north-east pond	Long wall wash - collected 20 m downgradient on Latrobe Road Batters	Surface water sample - pit wall seepage	-
		Client Sample ID →	RGS_YTF_WW_3/3	RGS_YTF_WW_4/3	RGS_YEF_01/01	YEF_WW_3/3SW	RGS_YEF_WW_04_SWA	RGS_YEF_WW_04_SWB	RGS_YMF_SW_5-2	RGS_Control
Parameters	**Limit of Reporting**	Aquatic Ecosystems (freshwater)[1]	Livestock Drinking Water[2]							
Total Metals/Metalloids										
Aluminium (Al)	0.01	0.055	5	0.14	0.35	1.04	0.14	0.75	2.26	45.6	0.03
Silver (Ag)	0.001	0.00005	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001
Arsenic (As)	0.001	0.024	0.5 *	<0.001	<0.001	0.001	<0.001	0.001	0.002	0.004	<0.001
Boron (B)	0.05	0.37	5	<0.05	<0.05	<0.05	<0.05	0.06	<0.05	<0.05	<0.05
Barium (Ba)	0.001	-	-	0.06	0.004	0.046	0.14	0.037	0.27	0.307	0.021
Beryllium (Be)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001
Bismuth (Bi)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001
Cadmium (Cd)	0.0001	0.0002	0.01	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0004	<0.0001
Cerium (Ce)	0.001	-	-	<0.001	0.002	0.003	<0.001	<0.001	0.008	0.115	<0.001
Cobalt (Co)	0.001	-	1	<0.001	<0.001	0.003	0.016	0.019	0.015	0.052	<0.001
Chromium (Cr)	0.001	0.001	1 **	<0.001	<0.001	0.002	<0.001	<0.001	0.004	0.064	<0.001
Caesium (Cs)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.022	<0.001
Copper (Cu)	0.001	0.0014	1	<0.001	<0.001	0.003	<0.001	<0.001	0.002	0.037	0.007
Dysprosium (Dy)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.004	<0.001
Erbium (Er)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001
Europium (Eu)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001
Iron (Fe)	0.05	-	-	1.84	0.22	2.66	5.75	1.71	6.49	14.8	0.12
Gallium (Ga)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.003	<0.001
Gadolinium (Gd)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.006	<0.001
Hafnium (Hf)	0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Mercury (Hg)	0.0001	0.0006	0.002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Holmium (Ho)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Indium (In)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lanthanum (La)	0.001	-	-	<0.001	<0.001	0.001	<0.001	<0.001	0.003	0.031	<0.001
Lithium (li)	0.001	-	-	0.004	0.002	0.004	0.032	0.014	0.006	0.017	<0.001
Lutetium (Lu)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese (Mn)	0.001	1.9	-	0.014	0.003	0.298	0.749	1.65	0.25	0.079	0.005
Molybdenum (Mo)	0.001	-	0.15	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Neodymium (Nd)	0.001	-	-	<0.001	<0.001	0.001	<0.001	<0.001	0.004	0.034	<0.001
Nickel (Ni)	0.001	0.011	1	0.002	<0.001	0.004	0.005	0.005	0.008	0.026	<0.001
Lead (Pb)	0.001	0.0034	0.1	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.033	<0.001
Praseodymium (Pr)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.008	<0.001
Rubidium (Rb)	0.001	-	-	0.004	<0.001	0.003	0.016	0.025	0.014	0.052	0.002
Samarium (Sa)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.006	<0.001
Antimony (Sb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium (Se)	0.01	0.011	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin (Sn)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001
Strontium (Sr)	0.001	-	-	0.044	0.002	0.058	0.185	0.18	0.055	0.168	0.03
Terbium (Tb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tellurium (Te)	0.005	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Thorium (Th)	0.001	-	-	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	0.016	<0.001
Titanium (Ti)	0.01	-	-	<0.01	0.01	0.02	<0.01	0.01	0.03	0.02	<0.01
Thallium (Tl)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Thulium (Tm)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Uranium (U)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.004	<0.001
Vanadium (V)	0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.07	<0.01
Yttrium (Y)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	0.017	<0.001
Ytterbium (Yb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001
Zinc (Zn)	0.005	0.008	20	0.007	<0.005	<0.005	0.009	0.041	0.022	0.117	0.017
Zirconium (Zr)	0.005	-	-	<0.005	<0.005	<0.005	<0.005	0.006	<0.005	<0.005	<0.005

Notes: < indicates concentration less than the detection limit. Shaded cells exceed applied guideline values. * 0.013 mg/L for pentavalent Arsenic (V). ** Cr (VI) = hexavalent.
for still water bodies only, moving rivers at low flow rates should not exceed 2,200µS/cm. ^ calculated based on total dissolved solids (TDS) conversion rate of 0.67% of EC.
TDS is an approximate measure of inorganic dissolved salts and should not exceed 2,400mg/L for livestock drinking water.
1. ANZG (2018). Trigger values for freshwater aquatic ecosystems (95% species protection level)
2. ANZG (2018). Recommended guideline limits for Livestock Drinking Water.

Table B8: Multi-Element Test Results for Sample Water Extracts from the Yallourn Project

		RGS Sample Number →	2021048_0001	2021048_0005	2021048_0007	2021048_0008	2021048_0013	2021048_0014	2021048_0020	2021048_0021
		Sample Date →	11/04/2022	12/04/2022	12/04/2022	12/04/2022	12/04/2022	12/04/2022	12/04/2022	12/04/2022
		ALS Laboratory ID →	EB2215461001	EB2215461002	EB2215461003	EB2330523014	EB2215461004	EB2215461005	EB2215461006	EB2330523-015
		Location →	YTF Western Batters	YTF Hernes Oak Batters	YTF Hernes Oak Batters	YTF Hernes Oak Batters	YTF Southern Batters	YTF Southern Batters	YTF Fire Service Pond Batters	YTF Fire Service Pond Batters
		Material Type →	Topsoil/overburden	Weathered coal	Weathered coal	Weathered coal	Overburden	Overburden	Weathered coal	Weathered coal
		Client Sample ID →	RGS_YTF_WW_1	RGS_YTF_WW_03/2	RGS_YTF_WW_03/4	RGS_YTF_WW_04/1	RGS_YTF_WW_05/2	RGS_YTF_WW_05/3	RGS_YTF_WW_06/5	RGS_YTF_WW_06/6
Parameters	**Limit of Reporting**	Aquatic Ecosystems (freshwater)[1]	Livestock Drinking Water[2]							
pH	0.01 pH unit	6 to 9	-	5.70	3.90	3.70	6.03	4.30	4.90	3.90	4.43
Electrical Conductivity	1 µS/cm	<1,000#	3,580^	41	78	84	136	882	174	95	124
Carbonate Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	<1	<1	<1	<1	<1	<1	<1
Bicarbonate Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	26	<1	<1	4	4	6	<1	<1
Total Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	26	<1	<1	4	4	<1	<1	<1
Acidity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	<1	<1	4	<1	<1	<1	<1
Net Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	26	<1	<1	0	4	<1	<1	<1
Major Ions	All units mg/L			All units mg/L							
Calcium (Ca)	1	-	1,000	6	5	----	2	12	3	----	<1
Magnesium (Mg)	1	-	-	5	28	----	3	36	8	----	1
Potassium (K)	1	-	-	3	3	----	4	10	3	----	3
Sodium (Na)	1	-	-	17	47	----	16	147	28	----	15
Chloride (Cl)	1	-	-	15	24	----	15	395	36	----	23
Fluoride (F)	0.1	-	2	0.2	0.2	----	0.1	0.3	0.3	----	0.2
Sulfate (SO_4^{2-})	1	-	1,000	2	110	----	20	17	39	----	<20
Trace Metals/Metalloids	All units mg/L			All units mg/L							
Aluminium (Al)	0.01	0.055	5	10.2	2.68	1.58	0.04	0.32	0.82	2.00	1.43
Silver (Ag)	0.001	0.00005	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic (As)	0.001	0.024	0.5 *	<0.001	0.002	0.002	<0.001	0.001	<0.001	0.233	<0.001
Boron (B)	0.05	0.37	5	1.20	1.02	1.00	0.43	0.91	0.53	0.90	1.16
Barium (Ba)	0.001	-	-	1.26	1.28	1.34	1.22	3.11	0.374	1.30	1.23
Beryllium (Be)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth (Bi)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium (Cd)	0.0001	0.0002	0.01	0.0002	0.0002	0.0002	0.0002	0.0006	0.0001	0.0002	0.0002
Cerium (Ce)	0.001	-	-	0.006	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt (Co)	0.001	-	1	0.001	<0.001	<0.001	0.001	0.005	0.020	<0.001	<0.001
Chromium (Cr)	0.001	0.001	1 **	0.007	0.013	0.005	0.001	0.001	0.001	0.015	0.002
Caesium (Cs)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper (Cu)	0.001	0.0014	1	0.005	0.004	0.003	<0.001	0.002	<0.001	0.004	0.002
Dysprosium (Dy)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Erbium (Er)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Europium (Eu)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Iron (Fe)	0.05	-	-	3.63	9.87	0.66	0.24	0.20	0.42	1.96	1.36
Gallium (Ga)	0.001	-	-	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Gadolinium (Gd)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Hafnium (Hf)	0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Holmium (Ho)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Indium (In)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lanthanum (La)	0.001	-	-	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lithium (li)	0.001	-	-	0.004	0.002	0.006	0.001	0.004	0.010	0.002	0.002
Lutetium (Lu)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese (Mn)	0.001	1.9	-	0.037	0.071	0.032	0.054	0.329	0.998	0.114	0.035
Molybdenum (Mo)	0.001	-	0.15	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Neodymium (Nd)	0.001	-	-	0.002	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel (Ni)	0.001	0.011	1	0.005	0.001	0.002	0.002	0.005	0.004	0.002	0.001
Lead (Pb)	0.001	0.0034	0.1	0.074	1.040	0.380	<0.001	0.003	0.005	0.168	0.002
Praseodymium (Pr)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Rubidium (Rb)	0.001	-	-	0.009	0.008	0.005	0.001	0.011	0.002	0.008	0.006
Samarium (Sa)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Antimony (Sb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium (Se)	0.01	0.011	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin (Sn)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Strontium (Sr)	0.001	-	-	0.037	0.040	0.032	<0.001	0.122	0.039	0.030	0.027
Terbium (Tb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tellurium (Te)	0.005	-	-	<0.005	<0.005	<0.005	<0.001	<0.005	<0.005	<0.005	<0.005
Thorium (Th)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Titanium (Ti)	0.01	-	-	0.48	0.01	0.06	<0.01	0.02	0.05	0.10	0.09
Thallium (Tl)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Thulium (Tm)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Uranium (U)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium (V)	0.01	-	-	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Yttrium (Y)	0.001	-	-	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ytterbium (Yb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc (Zn)	0.005	0.008	20	0.868	1.250	1.160	0.245	0.568	0.511	1.110	1.200
Zirconium (Zr)	0.005	-	-	0.012	<0.005	0.007	<0.001	<0.005	<0.005	0.006	<0.005

Notes: < indicates concentration less than the detection limit. Shaded cells exceed applied guideline values. * 0.013 mg/L for pentavalent Arsenic (V). ** Cr (VI) = hexavalent.

for still water bodies only, moving rivers at low flow rates should not exceed 2,200µS/cm. ^ calculated based on total dissolved solids (TDS) conversion rate of 0.67% of EC.

TDS is an approximate measure of inorganic dissolved salts and should not exceed 2,400mg/L for livestock drinking water.

1. ANZG (2018). Trigger values for freshwater aquatic ecosystems (95% species protection level)

2. ANZG (2018). Recommended guideline limits for Livestock Drinking Water.

Table B8: Multi-Element Test Results for Sample Water Extracts from the Yallourn Project

		RGS Sample Number →	2021048_0028	2021048_0031	2021048_0037	2021048_0040	2021048_0045	2021048_0051	2021048_0052	2021048_0053
		Sample Date →	14/04/2022	14/04/2022	13/04/2022	13/04/2022	13/04/2022	5/04/2022	5/04/2022	5/04/2023
		ALS Laboratory ID →	EB2215461007	EB2215461008	EB2215461009	EB2330523016	EB2215461010	EB2215461011	EB2215461012	EB2330523009
		Location →	YMF Western Batters	YMF Western Batters	YEF Northern Batters	YEF Latrobe River Batters	YEFX Latrobe Road Batters	YMF Pit Floor	YMF Pit Floor	YMF Pit Floor
		Material Type →	Overburden	Overburden	Weathered coal	Weathered coal	Topsoil/overburden	Weathered coal	Weathered coal	Weathered coal
		Client Sample ID →	RGS_YMF_WW_04/1	RGS_YMF_WW_05/3	RGS_YEF_WW_01/4	RGS_YEF_WW_02/3	RGS_YEF_WW_05/1	RGS_YMF_C_04	RGS_YMF_C_05	RGS_YMF_C_06
Parameters	**Limit of Reporting**	Aquatic Ecosystems (freshwater)[1]	Livestock Drinking Water[2]							
pH	0.01 pH unit	6 to 9	-	4.40	4.20	4.20	3.62	5.80	4.20	4.50	----
Electrical Conductivity	1 µS/cm	<1,000#	3,580^	55	143	78	412	58	377	79	----
Carbonate Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	<1	<1	<1	<1	<1	<1	----
Bicarbonate Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	1	<1	<1	32	<1	<1	----
Total Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	1	<1	<1	32	<1	<1	----
Acidity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	<1	<1	177	<1	<1	<1	----
Net Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	1	<1	-177	32	<1	<1	----
Major Ions	All units mg/L			All units mg/L							
Calcium (Ca)	1	-	1,000	----	2	2	2	4	----	----	4
Magnesium (Mg)	1	-	-	----	4	10	12	4	----	----	19
Potassium (K)	1	-	-	----	1	4	3	3	----	----	4
Sodium (Na)	1	-	-	----	14	57	43	28	----	----	95
Chloride (Cl)	1	-	-	----	15	5	5	19	----	----	102
Fluoride (F)	0.1	-	2	----	0.2	0.4	0.3	0.3	----	----	0.6
Sulfate (SO_4^{2-})	1	-	1,000	----	29	8	10	12	----	----	47
Trace Metals/Metalloids	All units mg/L			All units mg/L							
Aluminium (Al)	0.01	0.055	5	2.57	0.36	4.56	2.42	9.22	1.86	0.58	----
Silver (Ag)	0.001	0.00005	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	----
Arsenic (As)	0.001	0.024	0.5 *	0.004	<0.001	0.001	0.002	<0.001	0.002	0.007	----
Boron (B)	0.05	0.37	5	0.81	0.10	0.91	0.96	0.74	0.66	1.06	----
Barium (Ba)	0.001	-	-	0.944	0.128	1.07	1.70	1.10	1.06	0.846	----
Beryllium (Be)	0.001	-	-	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	----
Bismuth (Bi)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	----
Cadmium (Cd)	0.0001	0.0002	0.01	0.0002	0.0019	0.0002	0.0003	0.0002	0.0002	0.0001	----
Cerium (Ce)	0.001	-	-	<0.001	0.002	0.002	<0.001	0.006	<0.001	<0.001	----
Cobalt (Co)	0.001	-	1	<0.001	0.184	0.001	0.001	0.002	<0.001	<0.001	----
Chromium (Cr)	0.001	0.001	1 **	0.004	<0.001	0.005	0.002	0.007	<0.001	0.002	----
Caesium (Cs)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	----
Copper (Cu)	0.001	0.0014	1	0.002	<0.001	0.002	0.002	0.005	0.002	<0.001	----
Dysprosium (Dy)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	----
Erbium (Er)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	----
Europium (Eu)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	----
Iron (Fe)	0.05	-	-	1.78	<0.05	3.16	9.40	4.19	1.74	0.17	----
Gallium (Ga)	0.001	-	-	<0.001	<0.001	0.001	<0.001	0.002	<0.001	<0.001	----
Gadolinium (Gd)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	----
Hafnium (Hf)	0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	----
Holmium (Ho)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	----
Indium (In)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	----
Lanthanum (La)	0.001	-	-	<0.001	0.001	<0.001	<0.001	0.003	<0.001	<0.001	----
Lithium (li)	0.001	-	-	0.003	0.006	0.008	0.004	0.003	0.009	0.003	----
Lutetium (Lu)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	----
Manganese (Mn)	0.001	1.9	-	0.024	0.048	0.054	0.266	0.067	0.141	0.016	----
Molybdenum (Mo)	0.001	-	0.15	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	----
Neodymium (Nd)	0.001	-	-	<0.001	0.001	<0.001	<0.001	0.003	<0.001	<0.001	----
Nickel (Ni)	0.001	0.011	1	0.002	0.068	0.002	0.002	0.006	0.002	<0.001	----
Lead (Pb)	0.001	0.0034	0.1	0.073	0.001	0.072	0.003	0.007	0.041	0.020	----
Praseodymium (Pr)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	----
Rubidium (Rb)	0.001	-	-	0.004	0.003	0.006	0.008	0.007	0.010	0.002	----
Samarium (Sa)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	----
Antimony (Sb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	----
Selenium (Se)	0.01	0.011	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	----
Tin (Sn)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	----
Strontium (Sr)	0.001	-	-	0.022	0.029	0.025	0.047	0.027	0.036	0.020	----
Terbium (Tb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	----
Tellurium (Te)	0.005	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	----
Thorium (Th)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	----
Titanium (Ti)	0.01	-	-	0.13	<0.01	0.19	<0.01	0.11	<0.01	<0.01	----
Thallium (Tl)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	----
Thulium (Tm)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	----
Uranium (U)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	----
Vanadium (V)	0.01	-	-	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	----
Yttrium (Y)	0.001	-	-	<0.001	0.001	<0.001	<0.001	0.002	<0.001	<0.001	----
Ytterbium (Yb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	----
Zinc (Zn)	0.005	0.008	20	0.930	0.603	1.090	1.290	0.426	0.833	0.917	----
Zirconium (Zr)	0.005	-	-	<0.005	<0.005	0.008	0.005	0.010	<0.005	<0.005	----

Notes: < indicates concentration less than the detection limit. Shaded cells exceed applied guideline values. * 0.013 mg/L for pentavalent Arsenic (V). ** Cr (VI) = hexavalent.

for still water bodies only, moving rivers at low flow rates should not exceed 2,200µS/cm. ^ calculated based on total dissolved solids (TDS) conversion rate of 0.67% of EC.

TDS is an approximate measure of inorganic dissolved salts and should not exceed 2,400mg/L for livestock drinking water.

1. ANZG (2018). Trigger values for freshwater aquatic ecosystems (95% species protection level)

2. ANZG (2018). Recommended guideline limits for Livestock Drinking Water.

Table B8: Multi-Element Test Results for Sample Water Extracts from the Yallourn Project

		RGS Sample Number →	2021048_0057	2021048_0060	2021048_0062	2021048_0063	2021048_0063	2021048_0065	2021048_0066	2021048_0067
		Sample Date →	5/04/2022	5/04/2023	5/04/2022	5/04/2022	5/04/2022	5/04/2022	5/04/2022	5/04/2022
		ALS Laboratory ID →	EB2215461013	EB2330523011	EB2215461014	EB2215461015	EB2215461015	EB2330523013	EB2215461016	EB2215461017
		Location →	YMF Pit Floor	YMF Pit Floor	YMF Pit Floor	YMF Pit Floor	YMF Pit Floor	YMF Pit Floor	YMF Operating Face	YMF Operating Face
		Material Type →	Fresh coal	Fresh coal	Fresh coal	Fresh coal	Fresh coal	Fresh coal	Fresh coal	Fresh coal
		Client Sample ID →	RGS_YMF_C_10	RGS_YMF_C_13	RGS_YMF_C_15	RGS_YMF_C_16	RGS_YMF_C_17	RGS_YMF_C_18	RGS_YMF_C_19	RGS_YMF_C_20
Parameters	**Limit of Reporting**	Aquatic Ecosystems (freshwater)[1]	Livestock Drinking Water[2]							
pH	0.01 pH unit	6 to 9	-	4.30	----	4.40	4.40	----	----	3.80	3.10
Electrical Conductivity	1 µS/cm	<1,000#	3,580^	124	----	162	224	----	----	840	2,080
Carbonate Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	----	<1	<1	----	----	<1	<1
Bicarbonate Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	----	<1	<1	----	----	<1	<1
Total Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	----	<1	<1	----	----	<1	<1
Acidity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	----	<1	<1	----	----	<1	<1
Net Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	----	0	0	----	----	<1	<1
Major Ions	All units mg/L			All units mg/L							
Calcium (Ca)	1	-	1,000	3	2	----	----	5	8	----	----
Magnesium (Mg)	1	-	-	17	16	----	----	35	64	----	----
Potassium (K)	1	-	-	3	3	----	----	4	3	----	----
Sodium (Na)	1	-	-	57	56	----	----	91	86	----	----
Chloride (Cl)	1	-	-	21	16	----	----	61	47	----	----
Fluoride (F)	0.1	-	2	0.3	0.2	----	----	0.2	1.0	----	----
Sulfate (SO_4^{2-})	1	-	1,000	51	29	----	----	97	319	----	----
Trace Metals/Metalloids	All units mg/L			All units mg/L							
Aluminium (Al)	0.01	0.055	5	4.02	----	0.18	0.47	----	----	0.59	30.1
Silver (Ag)	0.001	0.00005	-	<0.001	----	<0.001	<0.001	----	----	<0.001	<0.001
Arsenic (As)	0.001	0.024	0.5 *	0.002	----	0.002	0.002	----	----	0.015	0.011
Boron (B)	0.05	0.37	5	0.62	----	0.75	0.81	----	----	0.48	0.74
Barium (Ba)	0.001	-	-	1.00	----	1.14	1.23	----	----	0.762	0.058
Beryllium (Be)	0.001	-	-	<0.001	----	<0.001	<0.001	----	----	<0.001	0.009
Bismuth (Bi)	0.001	-	-	<0.001	----	<0.001	<0.001	----	----	<0.001	<0.001
Cadmium (Cd)	0.0001	0.0002	0.01	0.0002	----	0.0002	0.0002	----	----	0.0002	0.0002
Cerium (Ce)	0.001	-	-	<0.001	----	<0.001	<0.001	----	----	<0.001	0.010
Cobalt (Co)	0.001	-	1	<0.001	----	<0.001	<0.001	----	----	0.016	0.282
Chromium (Cr)	0.001	0.001	1 **	<0.001	----	<0.001	<0.001	----	----	<0.001	<0.001
Caesium (Cs)	0.001	-	-	<0.001	----	<0.001	<0.001	----	----	<0.001	<0.001
Copper (Cu)	0.001	0.0014	1	<0.001	----	<0.001	<0.001	----	----	<0.001	<0.001
Dysprosium (Dy)	0.001	-	-	<0.001	----	<0.001	<0.001	----	----	<0.001	<0.001
Erbium (Er)	0.001	-	-	<0.001	----	<0.001	<0.001	----	----	<0.001	<0.001
Europium (Eu)	0.001	-	-	<0.001	----	<0.001	<0.001	----	----	<0.001	<0.001
Iron (Fe)	0.05	-	-	1.33	----	0.62	1.71	----	----	0.22	16.50
Gallium (Ga)	0.001	-	-	<0.001	----	<0.001	<0.001	----	----	<0.001	<0.001
Gadolinium (Gd)	0.001	-	-	<0.001	----	<0.001	<0.001	----	----	<0.001	<0.001
Hafnium (Hf)	0.01	-	-	<0.01	----	<0.01	<0.01	----	----	<0.01	<0.01
Holmium (Ho)	0.001	-	-	<0.001	----	<0.001	<0.001	----	----	<0.001	<0.001
Indium (In)	0.001	-	-	<0.001	----	<0.001	<0.001	----	----	<0.001	<0.001
Lanthanum (La)	0.001	-	-	<0.001	----	<0.001	<0.001	----	----	<0.001	0.011
Lithium (li)	0.001	-	-	0.002	----	0.003	0.003	----	----	0.004	0.004
Lutetium (Lu)	0.001	-	-	<0.001	----	<0.001	<0.001	----	----	<0.001	<0.001
Manganese (Mn)	0.001	1.9	-	0.046	----	0.024	0.064	----	----	0.380	1.880
Molybdenum (Mo)	0.001	-	0.15	<0.001	----	<0.001	<0.001	----	----	<0.001	<0.001
Neodymium (Nd)	0.001	-	-	<0.001	----	<0.001	<0.001	----	----	<0.001	0.002
Nickel (Ni)	0.001	0.011	1	0.002	----	<0.001	<0.001	----	----	0.004	0.080
Lead (Pb)	0.001	0.0034	0.1	0.019	----	0.015	0.028	----	----	0.022	0.074
Praseodymium (Pr)	0.001	-	-	<0.001	----	<0.001	<0.001	----	----	<0.001	<0.001
Rubidium (Rb)	0.001	-	-	0.004	----	0.002	0.004	----	----	0.006	0.015
Samarium (Sa)	0.001	-	-	<0.001	----	<0.001	<0.001	----	----	<0.001	<0.001
Antimony (Sb)	0.001	-	-	<0.001	----	<0.001	<0.001	----	----	<0.001	<0.001
Selenium (Se)	0.01	0.011	0.02	<0.01	----	<0.01	<0.01	----	----	<0.01	<0.01
Tin (Sn)	0.001	-	-	<0.001	----	<0.001	<0.001	----	----	<0.001	<0.001
Strontium (Sr)	0.001	-	-	0.022	----	0.024	0.032	----	----	0.161	0.701
Terbium (Tb)	0.001	-	-	<0.001	----	<0.001	<0.001	----	----	<0.001	<0.001
Tellurium (Te)	0.005	-	-	<0.005	----	<0.005	<0.005	----	----	<0.005	<0.005
Thorium (Th)	0.001	-	-	<0.001	----	<0.001	<0.001	----	----	<0.001	<0.001
Titanium (Ti)	0.01	-	-	<0.01	----	<0.01	<0.01	----	----	<0.01	<0.01
Thallium (Tl)	0.001	-	-	<0.001	----	<0.001	<0.001	----	----	<0.001	<0.001
Thulium (Tm)	0.001	-	-	<0.001	----	<0.001	<0.001	----	----	<0.001	<0.001
Uranium (U)	0.001	-	-	<0.001	----	<0.001	<0.001	----	----	<0.001	<0.001
Vanadium (V)	0.01	-	-	<0.01	----	<0.01	<0.01	----	----	<0.01	<0.01
Yttrium (Y)	0.001	-	-	<0.001	----	<0.001	<0.001	----	----	<0.001	0.005
Ytterbium (Yb)	0.001	-	-	<0.001	----	<0.001	<0.001	----	----	<0.001	<0.001
Zinc (Zn)	0.005	0.008	20	0.825	----	0.936	1.090	----	----	0.733	0.896
Zirconium (Zr)	0.005	-	-	<0.005	----	<0.005	<0.005	----	----	<0.005	<0.005

Notes: < indicates concentration less than the detection limit. Shaded cells exceed applied guideline values. * 0.013 mg/L for pentavalent Arsenic (V). ** Cr (VI) = hexavalent.

for still water bodies only, moving rivers at low flow rates should not exceed 2,200µS/cm. ^ calculated based on total dissolved solids (TDS) conversion rate of 0.67% of EC.

TDS is an approximate measure of inorganic dissolved salts and should not exceed 2,400mg/L for livestock drinking water.

1. ANZG (2018). Trigger values for freshwater aquatic ecosystems (95% species protection level)

2. ANZG (2018). Recommended guideline limits for Livestock Drinking Water.

Table B8: Multi-Element Test Results for Sample Water Extracts from the Yallourn Project

		RGS Sample Number →	2022057_007	2022057_015	2022057_026	2022057_031	2022057_043	2022057_046	2022057_055	2022057_063
		Sample Date →	1/08/2022	1/08/2022	1/08/2022	1/08/2022	1/08/2022	1/08/2022	2/08/2022	2/08/2022
		ALS Laboratory ID →	EB2231051003	EB2231051004	EB2231051005	EB2231051006	EB2231051007	EB2231051008	EB2231051009	EB2231051010
		Location →	YTF Northern Batters	YTF Hernes Oak Batters	YTF Floc Pond Batters	YTF RCB Batters	MRD	YEF Pit Floor	YMF Eastern Batters	YMF Western Batters
		Material Type →	Weathered coal	Weathered coal	Weathered coal	Weathered coal	Weathered coal	Weathered coal	Fresh coal	Weathered coal
		Client Sample ID →	EAY_KLC_C_7	EAY_KLC_C_15	EAY_KLC_C_26	EAY_KLC_C_31	EAY_KLC_C_43	EAY_KLC_C_46	EAY_KLC_C_55	EAY_KLC_C_63
Parameters	**Limit of Reporting**	Aquatic Ecosystems (freshwater)[1]	Livestock Drinking Water[2]							
pH	0.01 pH unit	6 to 9	-	3.53	3.99	3.91	3.43	3.49	3.50	3.75	4.22
Electrical Conductivity	1 µS/cm	<1,000#	3,580^	168	161	85	467	220	307	504	214
Carbonate Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	<1	<1	<1	<1	<1	<1	<1
Bicarbonate Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	<1	<1	<1	<1	<1	<1	<1
Total Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	<1	<1	<1	<1	<1	<1	<1
Acidity (mg $CaCO_3$/L)	1 mg/L	-	-	50	58	26	92	82	44	54	37
Net Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	-50	-58	-26	-92	-82	-44	-54	-37
Major Ions	All units mg/L			All units mg/L							
Calcium (Ca)	1	-	1,000	<1	<1	<1	2	<1	3	3	<1
Magnesium (Mg)	1	-	-	2	<1	<1	10	2	7	18	3
Potassium (K)	1	-	-	1	<1	<1	4	<1	1	1	<1
Sodium (Na)	1	-	-	10	28	7	47	18	23	53	32
Chloride (Cl)	1	-	-	5	22	<10	46	8	13	47	17
Fluoride (F)[4]	0.1	-	2	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1
Sulfate (SO_4^{2-})	1	-	1,000	25	<20	<10	78	21	68	117	43
Trace Metals/Metalloids	All units mg/L			All units mg/L							
Aluminium (Al)	0.01	0.055	5	0.32	0.34	0.06	0.16	0.10	0.72	0.97	0.04
Silver (Ag)	0.001	0.00005	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic (As)	0.001	0.024	0.5 *	0.004	<0.001	<0.001	<0.001	<0.001	<0.001	0.009	0.001
Boron (B)	0.05	0.37	5	0.68	0.07	<0.05	0.08	0.06	<0.05	0.08	0.10
Barium (Ba)	0.001	-	-	0.651	0.157	0.021	0.075	0.030	0.030	0.038	0.030
Beryllium (Be)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth (Bi)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium (Cd)	0.0001	0.0002	0.01	0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cerium (Ce)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001
Cobalt (Co)	0.001	-	1	0.002	<0.001	<0.001	0.002	<0.001	0.024	0.004	<0.001
Chromium (Cr)	0.001	0.001	1 **	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Caesium (Cs)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper (Cu)	0.001	0.0014	1	0.004	0.006	<0.001	0.002	0.001	<0.001	<0.001	<0.001
Dysprosium (Dy)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Erbium (Er)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Europium (Eu)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Iron (Fe)	0.05	-	-	0.4	0.9	0.24	0.21	0.35	0.14	0.13	0.08
Gallium (Ga)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Gadolinium (Gd)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Hafnium (Hf)	0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Holmium (Ho)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Indium (In)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lanthanum (La)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lithium (li)	0.001	-	-	<0.001	0.003	<0.001	0.008	0.006	0.004	0.009	0.004
Lutetium (Lu)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese (Mn)	0.001	1.9	-	0.015	0.008	0.007	0.051	0.048	0.247	0.147	0.051
Molybdenum (Mo)	0.001	-	0.15	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Neodymium (Nd)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel (Ni)	0.001	0.011	1	0.001	0.002	<0.001	0.001	<0.001	0.007	<0.001	<0.001
Lead (Pb)	0.001	0.0034	0.1	0.001	0.012	0.003	0.002	0.004	<0.001	<0.001	0.003
Praseodymium (Pr)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Rubidium (Rb)	0.001	-	-	0.002	0.001	<0.001	0.010	0.003	0.006	0.005	0.002
Samarium (Sa)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Antimony (Sb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium (Se)	0.01	0.011	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin (Sn)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Strontium (Sr)	0.001	-	-	0.019	0.007	0.001	0.018	0.006	0.035	0.039	0.008
Terbium (Tb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tellurium (Te)	0.005	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Thorium (Th)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Titanium (Ti)	0.01	-	-	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Thallium (Tl)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Thulium (Tm)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Uranium (U)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium (V)	0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Yttrium (Y)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001
Ytterbium (Yb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc (Zn)	0.005	0.008	20	0.693	0.067	0.006	0.037	0.006	0.035	0.012	0.008
Zirconium (Zr)	0.005	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

Notes: < indicates concentration less than the detection limit. Shaded cells exceed applied guideline values. * 0.013 mg/L for pentavalent Arsenic (V). ** Cr (VI) = hexavalent.

for still water bodies only, moving rivers at low flow rates should not exceed 2,200µS/cm. ^ calculated based on total dissolved solids (TDS) conversion rate of 0.67% of EC.

TDS is an approximate measure of inorganic dissolved salts and should not exceed 2,400mg/L for livestock drinking water.

1. ANZG (2018). Trigger values for freshwater aquatic ecosystems (95% species protection level)

2. ANZG (2018). Recommended guideline limits for Livestock Drinking Water.

Table B8: Multi-Element Test Results for Sample Water Extracts from the Yallourn Project

		RGS Sample Number →	2022057_064	2022057_067	2022057_068	2022057_069	2022057_073	2022057_077	2022057_080
		Sample Date →	2/08/2022	2/08/2022	2/08/2022	2/08/2022	2/08/2022	2/08/2022	2/08/2022
		ALS Laboratory ID →	EB2231051011	EB2231051012	EB2231051013	EB2231051014	EB2231051015	EB2231051016	EB2215461015
		Location →	YMF Western Batters	YMF Operating Face	YMF Operating Face	YMF Western Batters	YTF Floc Pond Batters	YMF Eastern Batters	MRD
		Material Type →	Weathered coal	Fresh coal	Fresh coal	Fresh coal	Overburden	Overburden	Overburden
		Client Sample ID →	EAY_KLC_C_64	EAY_KLC_C_67	EAY_KLC_C_68	EAY_KLC_C_69	EAY_KLC_OB_3	EAY_KLC_OB_7	EAY_KLC_OB_10
Parameters	**Limit of Reporting**	Aquatic Ecosystems (freshwater)[1]	Livestock Drinking Water[2]						
pH	0.01 pH unit	6 to 9	-	3.95	3.59	3.02	3.88	5.17	6.14	6.05
Electrical Conductivity	1 µS/cm	<1,000#	3,580^	201	1630	2290	818	113	11	34
Carbonate Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	<1	<1	<1	<1	<1	<1
Bicarbonate Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	<1	<1	<1	1	3	4
Total Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	<1	<1	<1	1	3	4
Acidity (mg $CaCO_3$/L)	1 mg/L	-	-	59	147	562	38	6	6	34
Net Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	-59	-147	-562	-38	-5	-3	-30
Major Ions	All units mg/L			All units mg/L						
Calcium (Ca)	1	-	1,000	<1	39	77	2	<1	<1	<1
Magnesium (Mg)	1	-	-	2	147	178	28	<1	2	<1
Potassium (K)	1	-	-	<1	1	1	1	<1	2	<1
Sodium (Na)	1	-	-	32	66	57	105	19	2	7
Chloride (Cl)	1	-	-	21	13	8	142	20	<1	2
Fluoride (F)[4]	0.1	-	2	<0.1	1.1	1.1	0.3	<0.1	0.1	<0.1
Sulfate (SO_4^{2-})	1	-	1,000	13	879	1300	159	12	1	3
Trace Metals/Metalloids	All units mg/L			All units mg/L						
Aluminium (Al)	0.01	0.055	5	0.16	10.40	61.50	1.35	0.06	2.86	0.09
Silver (Ag)	0.001	0.00005	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic (As)	0.001	0.024	0.5 *	0.001	0.009	0.008	0.015	<0.001	<0.001	<0.001
Boron (B)	0.05	0.37	5	0.14	0.14	0.10	0.08	<0.05	<0.05	<0.05
Barium (Ba)	0.001	-	-	0.013	0.038	0.030	0.023	0.018	0.034	0.019
Beryllium (Be)	0.001	-	-	<0.001	0.002	0.014	<0.001	<0.001	<0.001	<0.001
Bismuth (Bi)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium (Cd)	0.0001	0.0002	0.01	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cerium (Ce)	0.001	-	-	<0.001	0.001	0.024	<0.001	<0.001	0.021	<0.001
Cobalt (Co)	0.001	-	1	<0.001	1.900	3.920	0.042	<0.001	0.003	<0.001
Chromium (Cr)	0.001	0.001	1 **	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001
Caesium (Cs)	0.001	-	-	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001
Copper (Cu)	0.001	0.0014	1	<0.001	<0.001	<0.001	0.002	<0.001	0.003	0.002
Dysprosium (Dy)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	0.004	<0.001
Erbium (Er)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001
Europium (Eu)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001
Iron (Fe)	0.05	-	-	0.43	2.01	23.5	<0.05	<0.05	0.6	0.1
Gallium (Ga)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	0.00	<0.001
Gadolinium (Gd)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	0.01	<0.001
Hafnium (Hf)	0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Holmium (Ho)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Indium (In)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lanthanum (La)	0.001	-	-	<0.001	0.002	0.027	<0.001	<0.001	0.012	<0.001
Lithium (li)	0.001	-	-	0.004	0.005	0.004	0.004	0.003	0.002	<0.001
Lutetium (Lu)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese (Mn)	0.001	1.9	-	0.033	1.370	2.240	0.110	0.005	0.039	0.003
Molybdenum (Mo)	0.001	-	0.15	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Neodymium (Nd)	0.001	-	-	<0.001	<0.001	0.004	<0.001	<0.001	0.024	<0.001
Nickel (Ni)	0.001	0.011	1	<0.001	0.242	0.920	0.005	<0.001	0.001	0.002
Lead (Pb)	0.001	0.0034	0.1	0.001	<0.001	0.002	<0.001	<0.001	0.002	<0.001
Praseodymium (Pr)	0.001	-	-	<0.001	<0.001	0.001	<0.001	<0.001	0.005	<0.001
Rubidium (Rb)	0.001	-	-	0.005	0.009	0.009	0.004	<0.001	0.005	<0.001
Samarium (Sa)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	0.005	<0.001
Antimony (Sb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium (Se)	0.01	0.011	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin (Sn)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Strontium (Sr)	0.001	-	-	0.004	0.498	0.946	0.040	0.002	0.007	0.001
Terbium (Tb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tellurium (Te)	0.005	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Thorium (Th)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Titanium (Ti)	0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	0.06	<0.01
Thallium (Tl)	0.001	-	-	<0.001	0.002	0.010	<0.001	<0.001	<0.001	<0.001
Thulium (Tm)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Uranium (U)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001
Vanadium (V)	0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01
Yttrium (Y)	0.001	-	-	<0.001	<0.001	0.012	<0.001	<0.001	0.020	<0.001
Ytterbium (Yb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001
Zinc (Zn)	0.005	0.008	20	0.008	0.024	0.098	0.055	<0.005	<0.005	<0.005
Zirconium (Zr)	0.005	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

Notes: < indicates concentration less than the detection limit. Shaded cells exceed applied guideline values. * 0.013 mg/L for pentavalent Arsenic (V). ** Cr (VI) = hexavalent.

for still water bodies only, moving rivers at low flow rates should not exceed 2,200µS/cm. ^ calculated based on total dissolved solids (TDS) conversion rate of 0.67% of EC.

TDS is an approximate measure of inorganic dissolved salts and should not exceed 2,400mg/L for livestock drinking water.

1. ANZG (2018). Trigger values for freshwater aquatic ecosystems (95% species protection level)

2. ANZG (2018). Recommended guideline limits for Livestock Drinking Water.

Table B8: Multi-Element Test Results for Sample Water Extracts from the Yallourn Project

		Sample Date →	1/12/2022	9/11/2022	29/11/2022	30/11/2022	4/12/2022	29/05/2023	29/05/2023	31/05/2023
		ALS Laboratory ID →	EB2314015001	EB2318016001	EB2314015002	EB2314015003	EB2315289003	EB2325314001	EB2325314002	EB2326577001
		Location →	YTF Northern Overburden Dump	YTF Northern Overburden Dump	YTF Northern Overburden Dump	YTF Northern Overburden Dump	YTF Northern Overburden Dump	YTF Northern Overburden Dump	YTF Northern Overburden Dump	YTF Northern Overburden Dump
		Material Type →	Overburden	Overburden	Overburden	Overburden	Overburden	Overburden	Overburden	Overburden
		Client Sample ID →	N7423_19.5-20.0	N7424_9.0-9.5	N7425_16.0-16.5	N7425_28.5-29.0	N7434_15.0-15.5	N7523 1.5-2.0	N7523 22.0-22.5	N7524_1.5-2.0
Parameters	**Limit of Reporting**	Aquatic Ecosystems (freshwater)[1]	Livestock Drinking Water[2]							
pH	0.01 pH unit	6 to 9	-	5.56	4.85	5.21	5.89	6.06	4.17	4.25	3.30
Electrical Conductivity	1 µS/cm	<1,000#	3,580^	253	144	333	343	100	53	418	1240
Carbonate Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	<1	<1	<1	<1	<1	<1	<1
Bicarbonate Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	2	8	1	3	2	<1	<1	<1
Total Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	2	8	1	3	2	<1	<1	<1
Acidity (mg $CaCO_3$/L)	1 mg/L	-	-	12	4	11	23	3	10	24	427
Net Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	-10	4	-10	-20	-1	10	24	427
Major Ions	All units mg/L			All units mg/L							
Calcium (Ca)	1	-	1,000	2	<1	8	<1	<1	<1	9	24
Magnesium (Mg)	1	-	-	10	<1	19	<1	<1	<1	26	42
Potassium (K)	1	-	-	2	<1	3	1	<1	2	1	3
Sodium (Na)	1	-	-	22	23	40	48	18	2	28	34
Chloride (Cl)	1	-	-	22	38	27	24	8	<5	11	11
Fluoride (F)[4]	0.1	-	2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.7	1.4
Sulfate (SO_4^{2-})	1	-	1,000	69	2	135	66	26	10	173	706
Trace Metals/Metalloids	All units mg/L			All units mg/L							
Aluminium (Al)	0.01	0.055	5	0.07	<0.01	0.22	0.07	0.07	0.25	2.14	63.6
Silver (Ag)	0.001	0.00005	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic (As)	0.001	0.024	0.5 *	<0.001	<0.001	0.006	<0.001	<0.001	<0.001	0.005	0.007
Boron (B)	0.05	0.37	5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.92
Barium (Ba)	0.001	-	-	0.146	0.017	0.176	0.051	0.013	0.207	0.050	0.364
Beryllium (Be)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	0.003	0.001	0.060
Bismuth (Bi)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium (Cd)	0.0001	0.0002	0.01	<0.0001	<0.0001	0.0003	<0.0001	<0.0001	0.0006	<0.0001	0.0019
Cerium (Ce)	0.001	-	-	<0.001	<0.001	0.001	<0.001	<0.001	0.001	0.002	0.744
Cobalt (Co)	0.001	-	1	0.069	<0.001	0.400	0.080	<0.001	0.046	0.143	4.37
Chromium (Cr)	0.001	0.001	1 **	0.003	<0.001	0.009	<0.001	<0.001	0.004	0.001	0.024
Caesium (Cs)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper (Cu)	0.001	0.0014	1	0.007	0.002	0.008	0.004	0.002	0.004	<0.001	0.008
Dysprosium (Dy)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.058
Erbium (Er)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.029
Europium (Eu)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.012
Iron (Fe)	0.05	-	-	0.17	<0.05	0.29	0.06	<0.05	0.18	0.44	19.2
Gallium (Ga)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.015
Gadolinium (Gd)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.064
Hafnium (Hf)	0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Holmium (Ho)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.011
Indium (In)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lanthanum (La)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.403
Lithium (li)	0.001	-	-	0.005	0.004	0.009	0.013	0.005	0.014	0.008	0.014
Lutetium (Lu)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002
Manganese (Mn)	0.001	1.9	-	0.039	0.002	0.870	1.560	0.048	0.040	1.290	1.130
Molybdenum (Mo)	0.001	-	0.15	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001
Neodymium (Nd)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.244
Nickel (Ni)	0.001	0.011	1	0.026	<0.001	0.451	0.023	0.001	0.050	0.031	1.59
Lead (Pb)	0.001	0.0034	0.1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.020
Praseodymium (Pr)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.069
Rubidium (Rb)	0.001	-	-	0.007	<0.001	0.033	0.002	0.002	0.032	0.011	0.027
Samarium (Sa)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.043
Antimony (Sb)	0.001	-	-	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium (Se)	0.01	0.011	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin (Sn)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Strontium (Sr)	0.001	-	-	0.044	<0.001	0.108	0.040	0.006	0.023	0.156	0.374
Terbium (Tb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.010
Tellurium (Te)	0.005	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Thorium (Th)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Titanium (Ti)	0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Thallium (Tl)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Thulium (Tm)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.003
Uranium (U)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium (V)	0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.06
Yttrium (Y)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.450
Ytterbium (Yb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.018
Zinc (Zn)	0.005	0.008	20	0.056	0.010	0.556	0.024	0.016	0.306	0.494	11.100
Zirconium (Zr)	0.005	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

Notes: < indicates concentration less than the detection limit. Shaded cells exceed applied guideline values. * 0.013 mg/L for pentavalent Arsenic (V). ** Cr (VI) = hexavalent.
for still water bodies only, moving rivers at low flow rates should not exceed 2,200µS/cm. ^ calculated based on total dissolved solids (TDS) conversion rate of 0.67% of EC.
TDS is an approximate measure of inorganic dissolved salts and should not exceed 2,400mg/L for livestock drinking water.
1. ANZG (2018). Trigger values for freshwater aquatic ecosystems (95% species protection level).
2. ANZG (2018). Recommended guideline limits for Livestock Drinking Water.

Table B8: Multi-Element Test Results for Sample Water Extracts from the Yallourn Project

		Sample Date →	31/05/2023	9/12/2022	30/05/2023	27/10/2022	24/10/2022	30/01/2023	1/06/2023	1/06/2023
		ALS Laboratory ID →	EB2326577002	EB2315289005	EB2326577004	EB2315289002	EB2318016002	EB2318016003	EB2325314003	EB2325314004
		Location →	YTF Northern Overburden Dump	YTF Southern Overburden Dump	YTF Southern Overburden Dump	Midfield Dump	Midfield Dump	Midfield Dump	Midfield Dump	Midfield Dump
		Material Type →	Overburden	Overburden	Overburden	Overburden	Overburden	Overburden	Overburden	Overburden
		Client Sample ID →	N7524_31.5-32.0	N7455_1.0-1.5	N7526_5.5-6.0	N7433_37.0-37.5	N7431_27.5-28.0	N7443_6.5-7.0	N7521_12.0-12.5	N7521_46.5-47.0
Parameters	**Limit of Reporting**	Aquatic Ecosystems (freshwater)[1]	Livestock Drinking Water[2]							
pH	0.01 pH unit	6 to 9	-	5.71	6.41	5.66	5.55	5.43	4.57	5.14	4.35
Electrical Conductivity	1 µS/cm	<1,000#	3,580^	190	33	122	96	74	36	29	716
Carbonate Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	<1	<1	<1	<1	<1	<1	<1
Bicarbonate Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	7	5	9	4	4	<1	<1	<1
Total Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	7	5	9	4	4	<1	<1	<1
Acidity (mg $CaCO_3$/L)	1 mg/L	-	-	7	2	5	2	2	6	2	39
Net Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	7	2	5	2	2	-6	-2	-39
Major Ions	All units mg/L			All units mg/L							
Calcium (Ca)	1	-	1,000	3	<1	<1	<1	<1	<1	<1	2
Magnesium (Mg)	1	-	-	4	<1	<1	<1	<1	<1	<1	20
Potassium (K)	1	-	-	3	<1	<1	<1	<1	<1	<1	2
Sodium (Na)	1	-	-	26	3	20	17	12	4	5	104
Chloride (Cl)	1	-	-	11	2	11	27	12	2	7	97
Fluoride (F)[4]	0.1	-	2	0.2	<0.1	0.3	<0.1	<0.1	<0.1	<0.1	0.3
Sulfate (SO^{2-})	1	-	1,000	38	6	13	3	10	5	<1	149
Trace Metals/Metalloids	All units mg/L			All units mg/L							
Aluminium (Al)	0.01	0.055	5	8.30	0.03	3.30	0.06	0.03	0.03	0.01	3.45
Silver (Ag)	0.001	0.00005	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic (As)	0.001	0.024	0.5 *	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.009
Boron (B)	0.05	0.37	5	0.77	<0.05	0.65	<0.05	<0.05	<0.05	<0.05	<0.05
Barium (Ba)	0.001	-	-	0.794	0.004	0.684	0.004	0.009	0.011	0.039	0.188
Beryllium (Be)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth (Bi)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium (Cd)	0.0001	0.0002	0.01	0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cerium (Ce)	0.001	-	-	0.005	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	0.002
Cobalt (Co)	0.001	-	1	0.018	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	0.076
Chromium (Cr)	0.001	0.001	1 **	0.006	<0.001	0.003	<0.001	0.002	<0.001	<0.001	0.002
Caesium (Cs)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper (Cu)	0.001	0.0014	1	0.003	0.002	<0.001	<0.001	<0.001	0.001	<0.001	0.004
Dysprosium (Dy)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Erbium (Er)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Europium (Eu)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Iron (Fe)	0.05	-	-	3.29	0.07	0.95	<0.05	0.05	0.05	<0.05	0.36
Gallium (Ga)	0.001	-	-	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Gadolinium (Gd)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Hafnium (Hf)	0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Holmium (Ho)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Indium (In)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lanthanum (La)	0.001	-	-	0.002	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lithium (li)	0.001	-	-	0.008	0.002	0.003	0.003	0.001	0.003	0.002	0.017
Lutetium (Lu)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese (Mn)	0.001	1.9	-	0.421	0.059	0.018	<0.001	0.006	0.004	0.002	0.384
Molybdenum (Mo)	0.001	-	0.15	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Neodymium (Nd)	0.001	-	-	0.002	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel (Ni)	0.001	0.011	1	0.010	0.002	0.001	<0.001	<0.001	<0.001	<0.001	0.029
Lead (Pb)	0.001	0.0034	0.1	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001
Praseodymium (Pr)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Rubidium (Rb)	0.001	-	-	0.009	0.002	0.002	<0.001	<0.001	0.001	<0.001	0.006
Samarium (Sa)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Antimony (Sb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium (Se)	0.01	0.011	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin (Sn)	0.001	-	-	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Strontium (Sr)	0.001	-	-	0.062	0.002	0.019	0.002	0.002	0.004	0.001	0.100
Terbium (Tb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tellurium (Te)	0.005	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Thorium (Th)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Titanium (Ti)	0.01	-	-	0.40	<0.01	0.21	<0.01	<0.01	<0.01	<0.01	<0.01
Thallium (Tl)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Thulium (Tm)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Uranium (U)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium (V)	0.01	-	-	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Yttrium (Y)	0.001	-	-	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001
Ytterbium (Yb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc (Zn)	0.005	0.008	20	0.766	<0.005	0.682	0.006	0.008	0.027	0.024	0.254
Zirconium (Zr)	0.005	-	-	0.009	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

Notes: < indicates concentration less than the detection limit. Shaded cells exceed applied guideline values. * 0.013 mg/L for pentavalent Arsenic (V). ** Cr (VI) = hexavalent.

for still water bodies only, moving rivers at low flow rates should not exceed 2,200µS/cm. ^ calculated based on total dissolved solids (TDS) conversion rate of 0.67% of EC.

TDS is an approximate measure of inorganic dissolved salts and should not exceed 2,400mg/L for livestock drinking water.

1. ANZG (2018). Trigger values for freshwater aquatic ecosystems (95% species protection level).

2. ANZG (2018). Recommended guideline limits for Livestock Drinking Water.

Table B8: Multi-Element Test Results for Sample Water Extracts from the Yallourn Project

		Sample Date →		31/05/2023	31/05/2023	20/12/2022	15/01/2023	15/01/2023	13/01/2023	14/01/2023	21/01/2023
		ALS Laboratory ID →		EB2326577003	EB2315289004	EB2314015004	EB2314015005	EB2314015006	EB2314015007	EB2314015008	EB2314015009
		Location →		Midfield Dump	East Field	East Field	East Field	East Field	East Field	East Field	East Field
		Material Type →		Overburden	Overburden	Overburden	Overburden	Overburden	Overburden	Overburden	Overburden
		Client Sample ID →		N7522_11.0-11.5	N7438_13.0-13.5	N7440_26.5-27.0	N7441_2.5-3.0	N7441_21.0-21.5	N7442_14.0-14.5	N7442_28.5-29.0	N7445_10.5-11.0
Parameters	**Limit of Reporting**	Aquatic Ecosystems (freshwater)[1]	Livestock Drinking Water[2]								
pH	0.01 pH unit	6 to 9	-	5.93	3.19	2.88	3.22	5.15	5.55	3.29	3.49
Electrical Conductivity	1 µS/cm	<1,000#	3,580^	129	651	1200	2760	59	46	912	384
Carbonate Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	<1	<1	<1	<1	<1	<1	<1
Bicarbonate Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	6	<1	<1	<1	2	2	<1	<1
Total Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	6	<1	<1	<1	2	2	<1	<1
Acidity (mg $CaCO_3$/L)	1 mg/L	-	-	8	200	725	656	32	62	403	226
Net Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	-2	-200	-725	-656	-30	-60	-403	-226
Major Ions	All units mg/L			All units mg/L							
Calcium (Ca)	1	-	1,000	<1	4	6	74	<1	<1	16	3
Magnesium (Mg)	1	-	-	1	15	14	276	1	<1	25	2
Potassium (K)	1	-	-	1	<1	<1	1	<1	<1	<1	<1
Sodium (Na)	1	-	-	21	4	3	38	6	6	14	2
Chloride (Cl)	1	-	-	9	7	5	22	10	6	28	4
Fluoride (F)[4]	0.1	-	2	0.2	0.4	0.3	0.2	<0.1	<0.1	0.6	0.3
Sulfate (SO^{2-})	1	-	1,000	20	272	470	1480	8	9	464	111
Trace Metals/Metalloids	All units mg/L			All units mg/L							
Aluminium (Al)	0.01	0.055	5	32.7	11.6	15.8	60.4	0.01	0.08	30.4	5.71
Silver (Ag)	0.001	0.00005	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic (As)	0.001	0.024	0.5 *	0.002	0.002	0.005	0.012	<0.001	<0.001	0.008	0.005
Boron (B)	0.05	0.37	5	0.60	<0.05	<0.05	0.11	<0.05	<0.05	<0.05	<0.05
Barium (Ba)	0.001	-	-	0.741	0.042	0.055	0.026	0.008	0.004	0.035	0.066
Beryllium (Be)	0.001	-	-	<0.001	0.004	0.007	0.012	<0.001	<0.001	0.019	<0.001
Bismuth (Bi)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium (Cd)	0.0001	0.0002	0.01	0.0001	0.0005	0.0005	<0.0001	<0.0001	<0.0001	0.0027	<0.0001
Cerium (Ce)	0.001	-	-	0.017	0.145	0.116	0.017	<0.001	<0.001	0.050	0.359
Cobalt (Co)	0.001	-	1	0.006	0.960	7.29	0.130	0.001	0.002	2.46	1.68
Chromium (Cr)	0.001	0.001	1 **	0.025	0.012	0.018	0.004	<0.001	<0.001	0.015	0.002
Caesium (Cs)	0.001	-	-	0.001	<0.001	0.001	0.002	<0.001	<0.001	0.001	<0.001
Copper (Cu)	0.001	0.0014	1	0.002	0.032	0.004	0.001	<0.001	<0.001	0.003	0.004
Dysprosium (Dy)	0.001	-	-	0.001	0.009	0.008	<0.001	<0.001	<0.001	0.003	0.026
Erbium (Er)	0.001	-	-	<0.001	0.003	0.004	<0.001	<0.001	<0.001	0.002	0.012
Europium (Eu)	0.001	-	-	<0.001	0.002	0.002	<0.001	<0.001	<0.001	<0.001	0.008
Iron (Fe)	0.05	-	-	4.92	59.2	87.1	9.82	<0.05	<0.05	10.5	19.3
Gallium (Ga)	0.001	-	-	0.008	0.004	0.003	<0.001	<0.001	<0.001	0.001	0.011
Gadolinium (Gd)	0.001	-	-	0.001	0.014	0.012	0.001	<0.001	<0.001	0.004	0.040
Hafnium (Hf)	0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Holmium (Ho)	0.001	-	-	<0.001	0.001	0.002	<0.001	<0.001	<0.001	<0.001	0.004
Indium (In)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lanthanum (La)	0.001	-	-	0.008	0.065	0.061	0.013	<0.001	<0.001	0.035	0.109
Lithium (li)	0.001	-	-	0.008	0.008	0.004	0.004	0.001	0.002	0.006	0.004
Lutetium (Lu)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001
Manganese (Mn)	0.001	1.9	-	0.017	0.137	0.214	3.70	0.006	0.034	0.367	0.079
Molybdenum (Mo)	0.001	-	0.15	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Neodymium (Nd)	0.001	-	-	0.007	0.054	0.045	0.004	<0.001	<0.001	0.014	0.172
Nickel (Ni)	0.001	0.011	1	0.012	0.402	2.94	0.039	<0.001	<0.001	0.686	0.731
Lead (Pb)	0.001	0.0034	0.1	0.005	0.004	0.003	0.002	<0.001	<0.001	0.003	0.002
Praseodymium (Pr)	0.001	-	-	0.002	0.015	0.012	0.001	<0.001	<0.001	0.004	0.041
Rubidium (Rb)	0.001	-	-	0.009	0.009	0.010	0.017	0.005	0.002	0.018	0.008
Samarium (Sa)	0.001	-	-	0.002	0.010	0.008	<0.001	<0.001	<0.001	0.002	0.037
Antimony (Sb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium (Se)	0.01	0.011	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin (Sn)	0.001	-	-	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Strontium (Sr)	0.001	-	-	0.019	0.050	0.073	1.040	0.004	0.002	0.182	0.026
Terbium (Tb)	0.001	-	-	<0.001	0.002	0.002	<0.001	<0.001	<0.001	<0.001	0.005
Tellurium (Te)	0.005	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Thorium (Th)	0.001	-	-	0.003	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001
Titanium (Ti)	0.01	-	-	1.66	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Thallium (Tl)	0.001	-	-	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	0.001	<0.001
Thulium (Tm)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002
Uranium (U)	0.001	-	-	<0.001	0.008	0.002	<0.001	<0.001	<0.001	<0.001	0.005
Vanadium (V)	0.01	-	-	0.03	<0.01	0.01	<0.01	<0.01	<0.01	0.04	<0.01
Yttrium (Y)	0.001	-	-	0.006	0.038	0.049	0.010	<0.001	<0.001	0.027	0.115
Ytterbium (Yb)	0.001	-	-	<0.001	0.002	0.003	<0.001	<0.001	<0.001	0.001	0.009
Zinc (Zn)	0.005	0.008	20	0.786	0.120	2.970	1.320	0.007	<0.005	1.560	1.340
Zirconium (Zr)	0.005	-	-	0.036	0.006	<0.005	<0.005	<0.005	<0.005	0.006	<0.005

Notes: < indicates concentration less than the detection limit. Shaded cells exceed applied guideline values. * 0.013 mg/L for pentavalent Arsenic (V). ** Cr (VI) = hexavalent.

for still water bodies only, moving rivers at low flow rates should not exceed 2,200µS/cm. ^ calculated based on total dissolved solids (TDS) conversion rate of 0.67% of EC.

TDS is an approximate measure of inorganic dissolved salts and should not exceed 2,400mg/L for livestock drinking water.

1. ANZG (2018). Trigger values for freshwater aquatic ecosystems (95% species protection level).

2. ANZG (2018). Recommended guideline limits for Livestock Drinking Water.

Table B8: Multi-Element Test Results for Sample Water Extracts from the Yallourn Project

		Sample Date →		26/01/2023	31/01/2023	31/01/2023	11/10/2022	19/10/2022	31/05/2023	31/05/2023
		ALS Laboratory ID →		EB2315289001	EB2315289006	EB2318016006	EB2318016004	EB2318016005	EB2324491033	EB2325314005
		Location →		YMF Western Truck Dump 4 North	Maryvale Field East	Maryvale Field East	Former Ash Ponds	Former Ash Ponds	Former Ash Ponds	Former Ash Ponds
		Material Type →		Overburden	Overburden	Overburden	Overburden	Overburden/ash	Overburden/ash	Overburden/ash
		Client Sample ID →		M4223_6.0-6.5	N7510_9.5-10.0	N7509_0.5-1.0	N7449_15.0-15.5	N7452_3.5-4.0	N7453_3.0-3.5	N7453_15.5-16.0
Parameters	**Limit of Reporting**	Aquatic Ecosystems (freshwater)[1]	Livestock Drinking Water[2]							
pH	0.01 pH unit	6 to 9	-	4.27	6.72	4.37	5.27	3.56	8.15	5.01
Electrical Conductivity	1 µS/cm	<1,000#	3,580^	56	84	262	77	548	1070	125
Carbonate Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	<1	<1	<1	<1	<1	<1
Bicarbonate Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	5	<1	3	<1	252	<1
Total Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	<1	5	<1	3	<1	252	<1
Acidity (mg $CaCO_3$/L)	1 mg/L	-	-	4	2	4	2	60	1	2
Net Alkalinity (mg $CaCO_3$/L)	1 mg/L	-	-	-4	3	-4	1	-60	251	-2
Major Ions	All units mg/L			All units mg/L						
Calcium (Ca)	1	-	1,000	<1	<1	<1	<1	10	8	<1
Magnesium (Mg)	1	-	-	<1	<1	2	<1	32	149	<1
Potassium (K)	1	-	-	<1	<1	<1	<1	2	4	<1
Sodium (Na)	1	-	-	8	15	46	14	24	21	23
Chloride (Cl)	1	-	-	6	11	75	14	5	16	30
Fluoride (F)[4]	0.1	-	2	0.1	<0.1	<0.1	<0.1	0.4	0.4	<0.1
Sulfate (SO_4^{2-})	1	-	1,000	4	12	<1	7	195	306	1
Trace Metals/Metalloids	All units mg/L			All units mg/L						
Aluminium (Al)	0.01	0.055	5	0.06	0.02	<0.01	0.11	3.20	<0.01	0.17
Silver (Ag)	0.001	0.00005	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic (As)	0.001	0.024	0.5 *	<0.001	<0.001	<0.001	0.001	0.002	<0.001	<0.001
Boron (B)	0.05	0.37	5	<0.05	<0.05	<0.05	<0.05	0.06	1.58	<0.05
Barium (Ba)	0.001	-	-	0.002	0.002	0.024	0.004	0.055	0.690	0.010
Beryllium (Be)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth (Bi)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium (Cd)	0.0001	0.0002	0.01	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001
Cerium (Ce)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001
Cobalt (Co)	0.001	-	1	<0.001	<0.001	<0.001	<0.001	0.284	<0.001	<0.001
Chromium (Cr)	0.001	0.001	1 **	<0.001	<0.001	<0.001	<0.001	0.005	<0.001	<0.001
Caesium (Cs)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper (Cu)	0.001	0.0014	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dysprosium (Dy)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Erbium (Er)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Europium (Eu)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Iron (Fe)	0.05	-	-	<0.05	<0.05	<0.05	<0.05	2.69	<0.001	0.06
Gallium (Ga)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Gadolinium (Gd)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Hafnium (Hf)	0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Holmium (Ho)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Indium (In)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lanthanum (La)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lithium (li)	0.001	-	-	<0.001	0.002	0.008	0.005	0.007	0.001	0.006
Lutetium (Lu)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese (Mn)	0.001	1.9	-	<0.001	<0.001	0.002	0.001	1.02	0.039	0.004
Molybdenum (Mo)	0.001	-	0.15	<0.001	<0.001	<0.001	<0.001	<0.001	0.043	<0.001
Neodymium (Nd)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001
Nickel (Ni)	0.001	0.011	1	<0.001	<0.001	<0.001	<0.001	0.062	0.002	<0.001
Lead (Pb)	0.001	0.0034	0.1	<0.001	<0.001	<0.001	<0.001	0.006	<0.001	<0.001
Praseodymium (Pr)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Rubidium (Rb)	0.001	-	-	<0.001	<0.001	0.007	<0.001	0.004	0.015	<0.001
Samarium (Sa)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Antimony (Sb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium (Se)	0.01	0.011	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	0.04	<0.01
Tin (Sn)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Strontium (Sr)	0.001	-	-	0.001	<0.001	0.002	<0.001	0.106	0.178	0.001
Terbium (Tb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tellurium (Te)	0.005	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Thorium (Th)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Titanium (Ti)	0.01	-	-	<0.01	<0.01	<0.01	0.01	<0.01	<0.001	0.02
Thallium (Tl)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Thulium (Tm)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Uranium (U)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium (V)	0.01	-	-	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01
Yttrium (Y)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001
Ytterbium (Yb)	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc (Zn)	0.005	0.008	20	<0.005	<0.005	0.013	<0.005	0.788	0.277	0.008
Zirconium (Zr)	0.005	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

Notes: < indicates concentration less than the detection limit. Shaded cells exceed applied guideline values. * 0.013 mg/L for pentavalent Arsenic (V). ** Cr (VI) = hexavalent.
for still water bodies only, moving rivers at low flow rates should not exceed 2,200µS/cm. ^ calculated based on total dissolved solids (TDS) conversion rate of 0.67% of EC.
TDS is an approximate measure of inorganic dissolved salts and should not exceed 2,400mg/L for livestock drinking water.
1. ANZG (2018). Trigger values for freshwater aquatic ecosystems (95% species protection level).
2. ANZG (2018). Recommended guideline limits for Livestock Drinking Water.

Attachment C: X-ray diffraction analysis reports

LEVAY & CO. ENVIRONMENTAL SERVICES

Water Quality, Water Treatment and Environmental Pollution Research Laboratories

Job No.
L&C-23-226

REPORT

QXRD Analysis of Solid Samples

Purchase Order No. 2023015

Prepared for:

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Date: 06th November, 2023

Introduction

Levay & Co. Environmental Services received twelve samples from RGS Environmental on the 19th October, 2023 (RGS Job. No. 2021048 Yallourn) to determine the mineralogical content by (semi-) quantitative x-ray diffraction (QXRD) analysis. The sample details are provided in the table below.

Table 1. List of samples received for QXRD analysis

RGS Sample ID.	Levay & Co. ID.	Sample Description
N7521_40.5-41	23-226-01	Overburden Dump
N7521_46 -46.5	23-226-02	Overburden Dump
N7526_12-12.5	23-226-03	Overburden Dump
N7526_16-16.5	23-226-04	Overburden Dump
N7524_16-16.5	23-226-05	Overburden Dump
N7524_26.5-27	23-226-06	Overburden Dump
N7440_2.5-3	23-226-07	Overburden Dump
N7440_23.5-24	23-226-08	Overburden Dump
EAY_KLC_C_32	23-226-09	Coal Wall
EAY_KLC_C_56	23-226-10	Coal Wall
RGS_YMF_C_20	23-226-11	Coal Wall
RGS_YTF_WW_6/2	23-226-12	Coal Wall

(Semi) - Quantitative X-Ray Diffraction (QXRD)

X-ray diffraction traces were obtained from the sample with a Panalytical Aeris Research Powder Diffractometer. Operating conditions were 40kV/15mA, Fe Kß filter, step scan 0.01/29 secs˚2Θ at, 1/2˚ divergence and a 1.0˚ ant-scatter slit. Scan range was 5° to 90° 2Θ. Phases were identified by computer search/match of the ICDD PDF4 2022 Database.

Quantitative results have been determined with full pattern Rietveld refinement software. Smectite clay has been identified from sedimented clay fraction samples and glycol intercalation.

Amorphous coal contribution to the traces has been modelled with a disordered graphite structure.

Results

The result from QXRD analysis of this sample is shown in Table 2 below. Mineralisation includes silicate (quartz, albite, & microcline), and clay (kaolinite, montmorillonite, & illite) as the dominant phases. An estimate of the coaly amorphous content has been made by modelling the backgrounds.

All twelve samples were sediment air-dried and glycol treated for mineralogy verification.

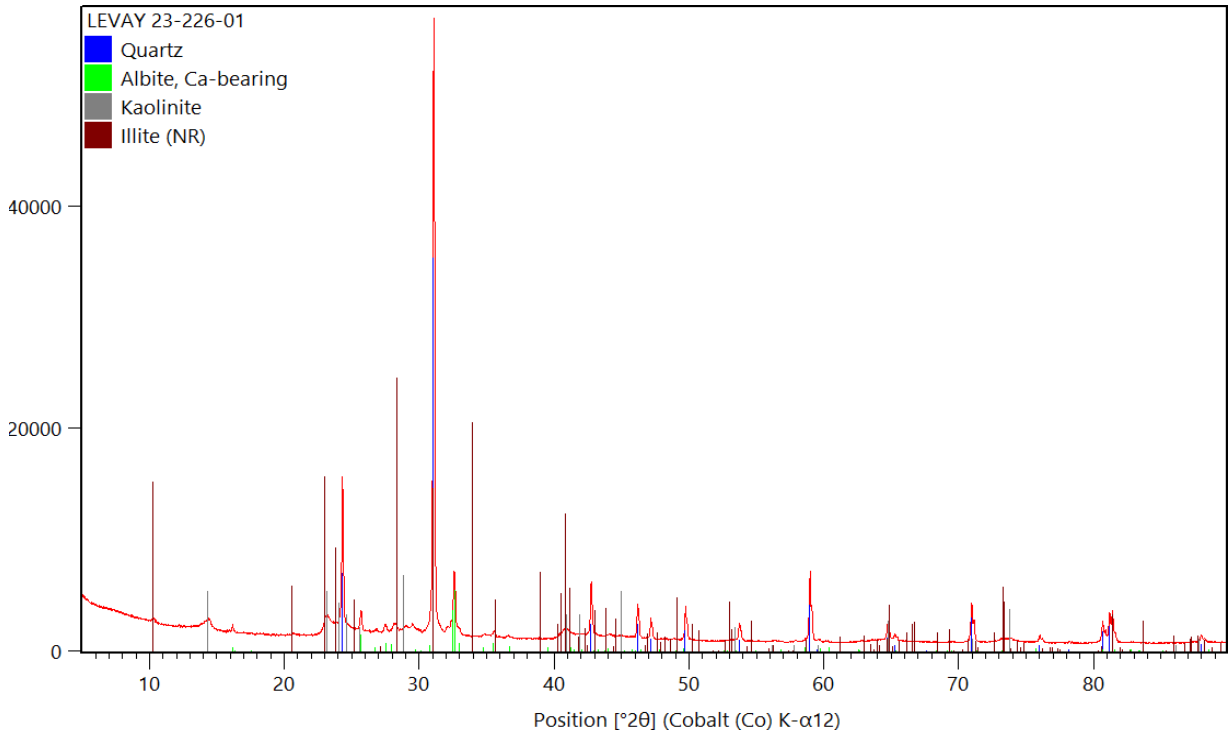
Table 2: QXRD results

Phase	N7521_ 40.5-41	N7521_ 46-46.5	N7526_ 12-12.5	N7526_ 16-16.5	N7524_ 16-16.5	N7524_ 26.5-27	N7440_ 2.5-3	N7440_ 23.5-24	EAY_KLC _C_32	EAY_KLC _C_56	RGS_YMF_ C_20	RGS_YTF_ WW_6/2
Quartz	31.9	39.8	47	46	58.9	87.4	84.1	86.8	1.4	0.6	ND	ND
Kaolinite	12.3	5.9	38.1	30.9	3.1	0.5	7.3	3.1	ND	ND	ND	ND
Montmorillonite	5.5	5.4	0.6	1	ND	0.6	1.2	0.4	1.3	0.3	0.2	0.6
Albite	12.8	13.8	1	0.6	1.2	5.3	1.5	1.3	0.3	ND	ND	ND
Microcline	1.6	3.9	1.5	1.8	1.9	3	2	2.7	0.3	ND	ND	ND
Pyrite	0.6	0.1	0.4	0.1	ND	0.2	0.3	0.9	ND	0.6	0.2	ND
Marcasite	ND	ND	0.2	ND	1.1	0.1	0.3	2.8	ND	ND	6.6	0.2
Calcite-Mg	0.1	0.3	0.2	0.1	0	0.3	0.3	0.2	ND	ND	ND	ND
Cristobalite/opal	ND	ND	ND	ND	ND	ND	ND	ND	1.8	1.1	1.2	ND
Dolomite	ND	ND	ND	ND	ND	ND	0.1	ND	ND	ND	ND	ND
Illite	1.1	1.9	1.5	1.2	0.9	0.4	1.1	0.9	0.1	ND	ND	ND
Siderite	ND	ND	0.1	ND	ND	ND	0.2	0.1	ND	ND	ND	ND
Coal-amorphous	34.1	28.9	9.4	18.3	32.9	2.2	1.6	0.8	94.8	97.4	91.8	99.2

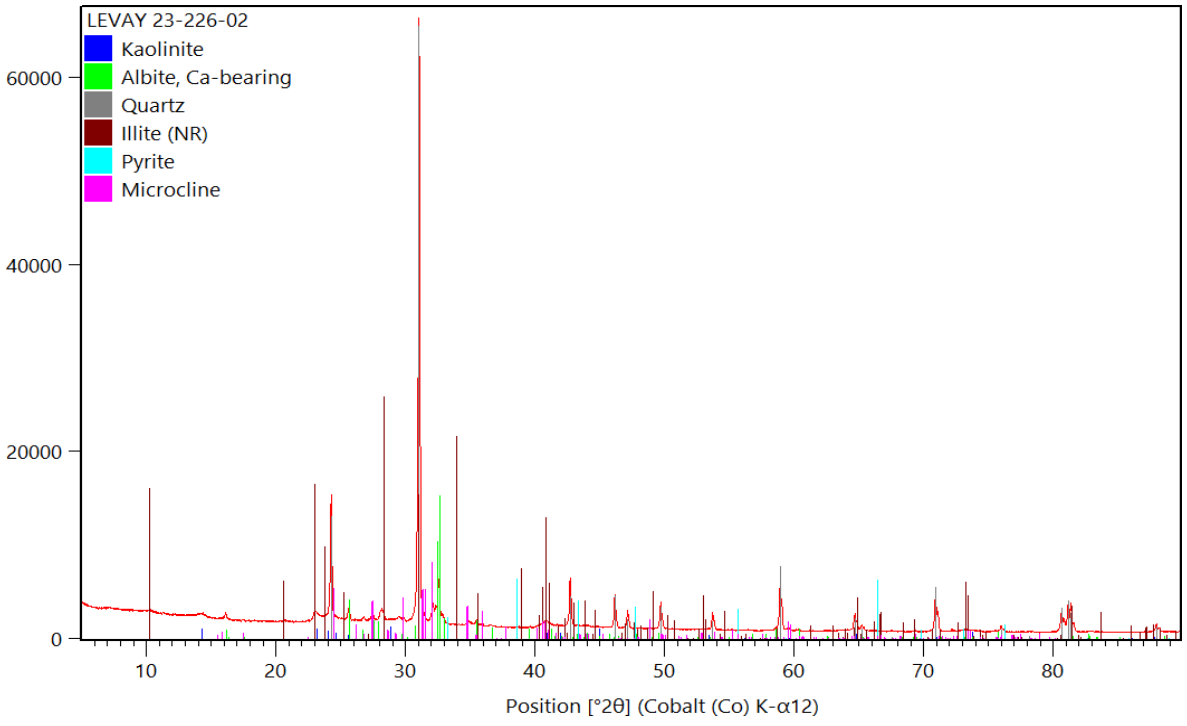
1 Semiquantitative Detection limit ~0.4 wt.%
2 ND = Non Detectable

Results Graphical – Phase ID

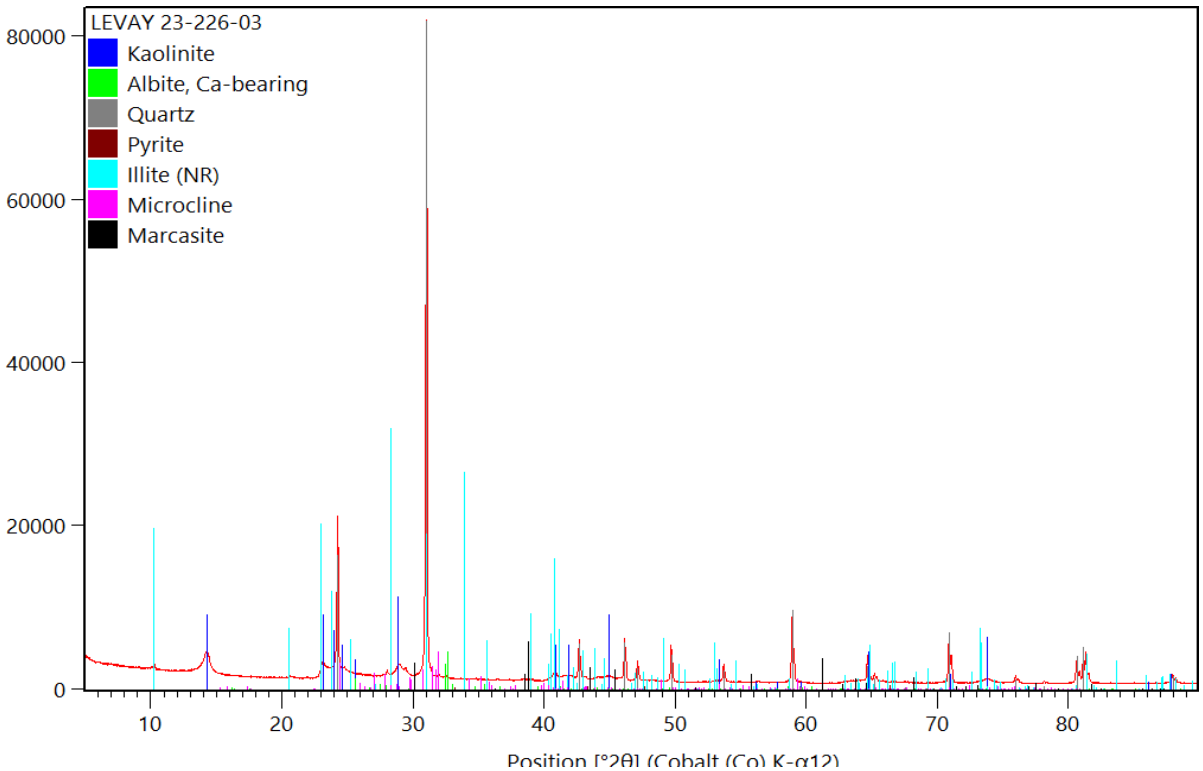
23-226-01: N7521_40.5-41 Overburden dump



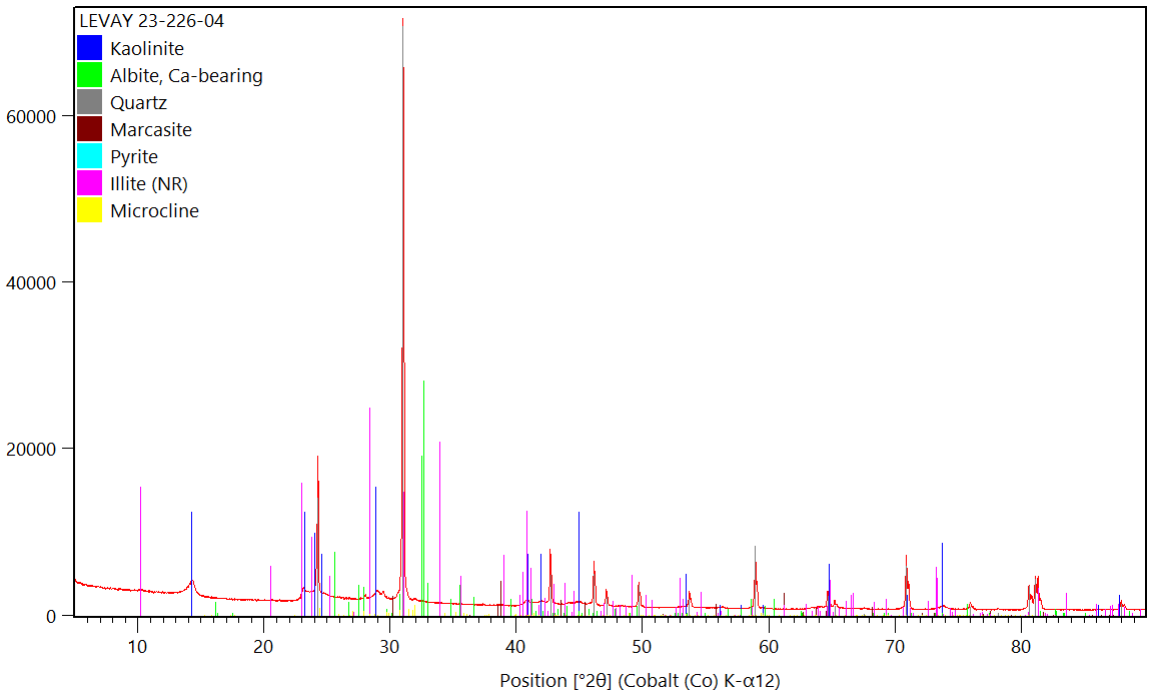
23-226-02: N7521_46-46.5 Overburden dump



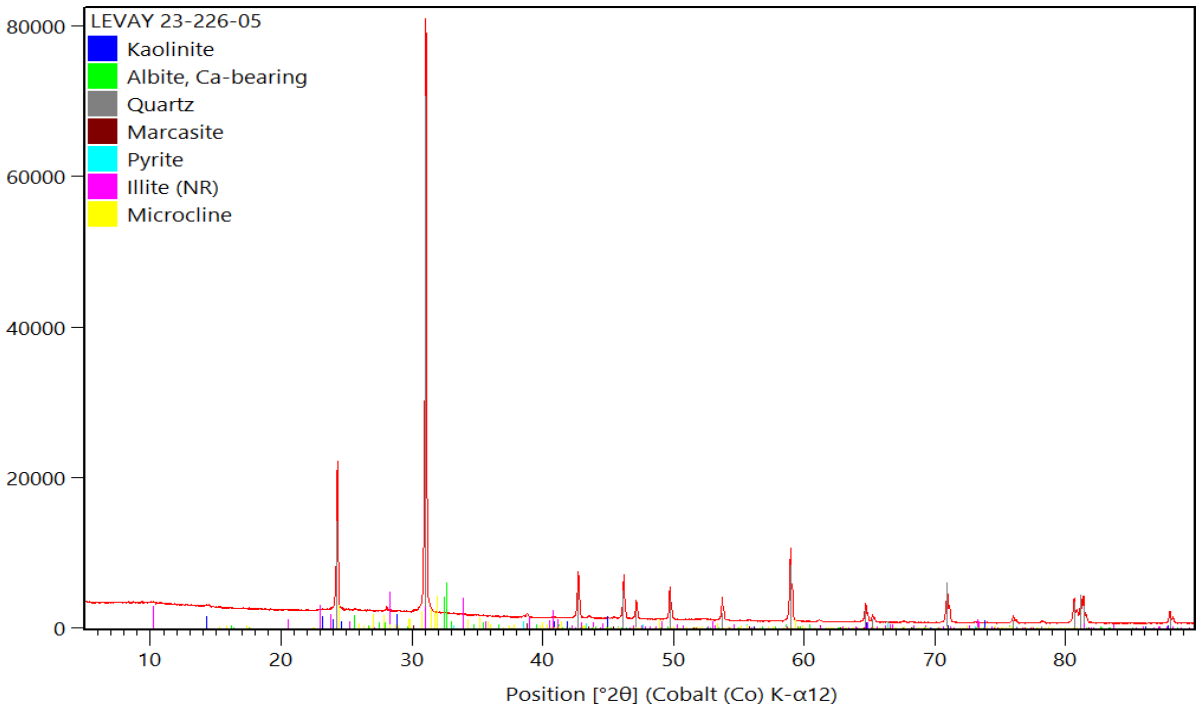
23-226-03: N7526_12-12.5 Overburden dump



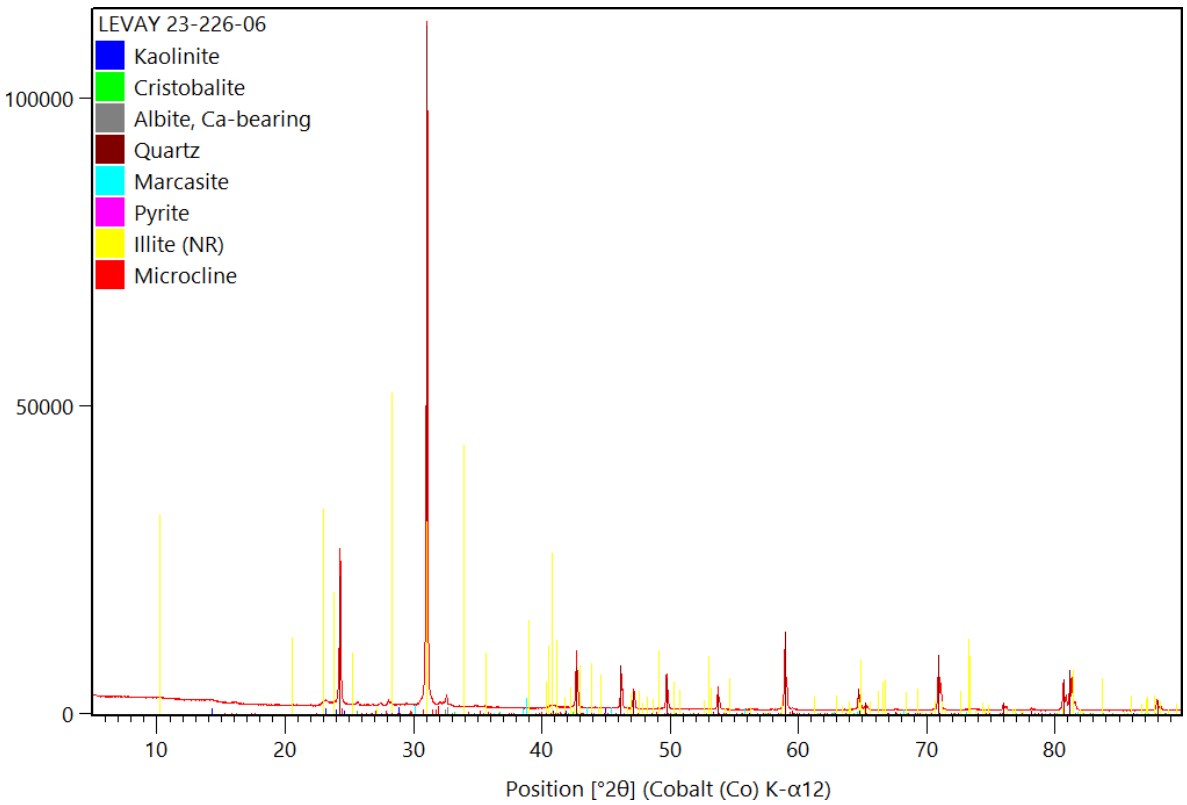
23-226-04: N7526_16-16.5 Overburden dump



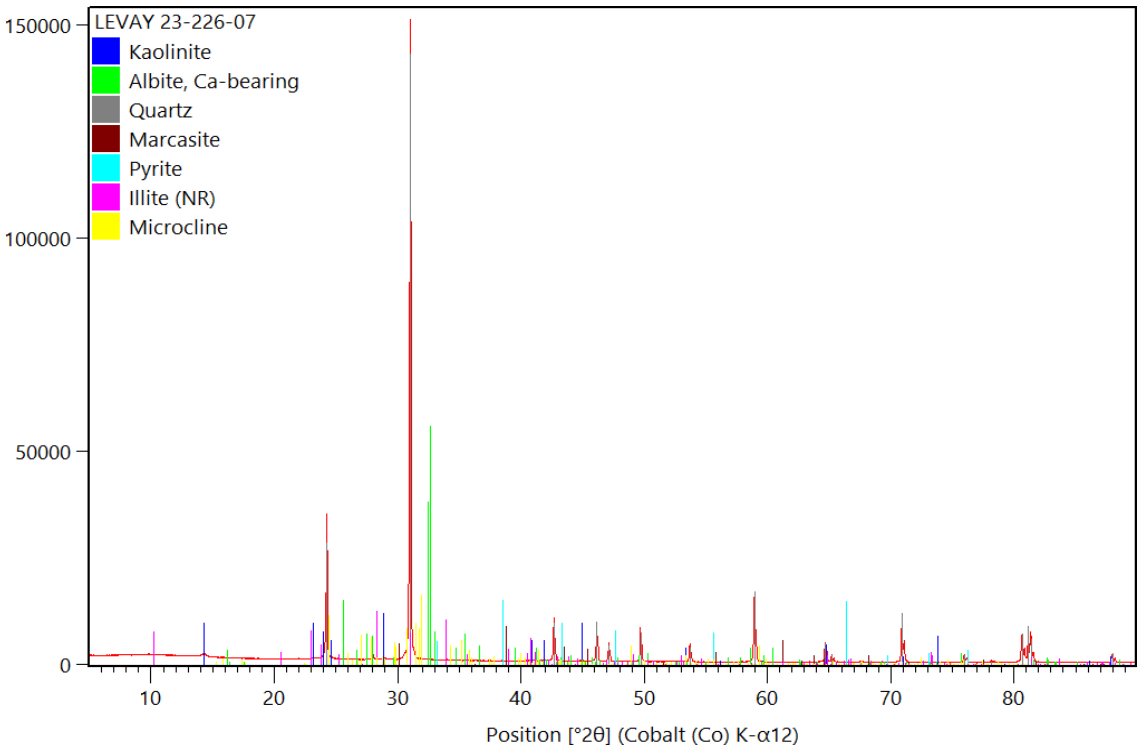
23-226-05: N7524_16-16.5 Overburden dump



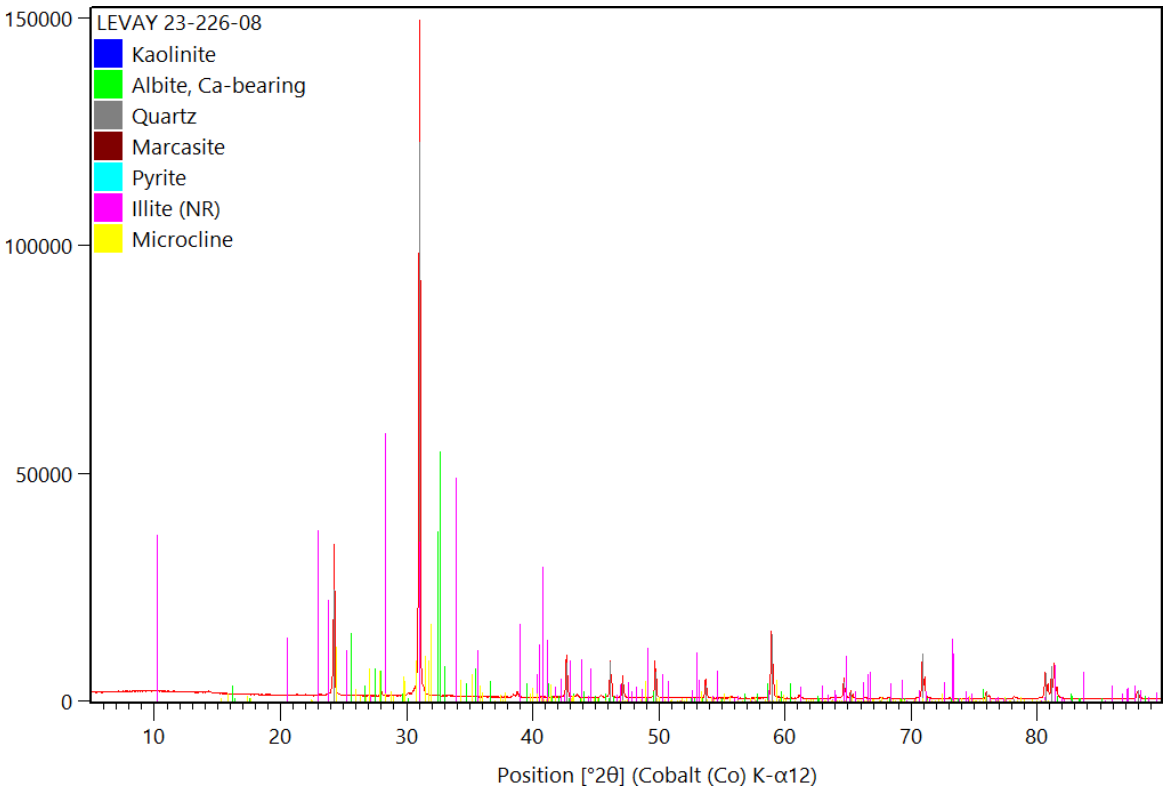
23-226-06: N7524_26.5-27 Overburden dump



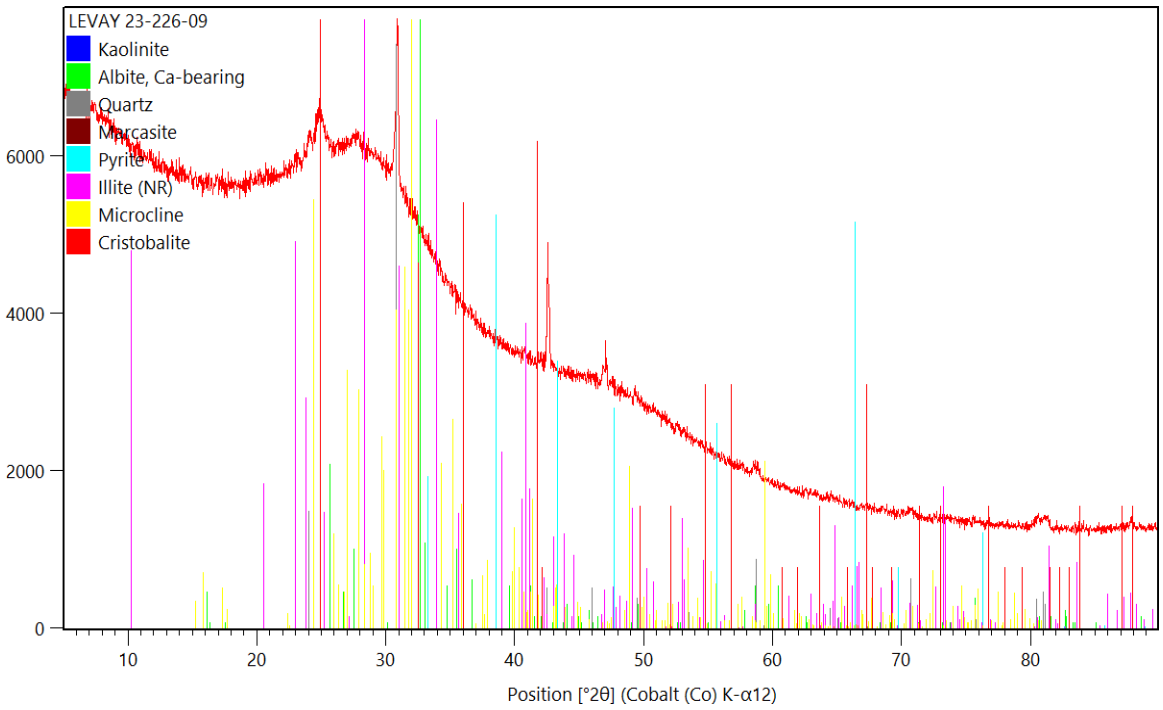
23-226-07: N7440_2.5-3 Overburden dump



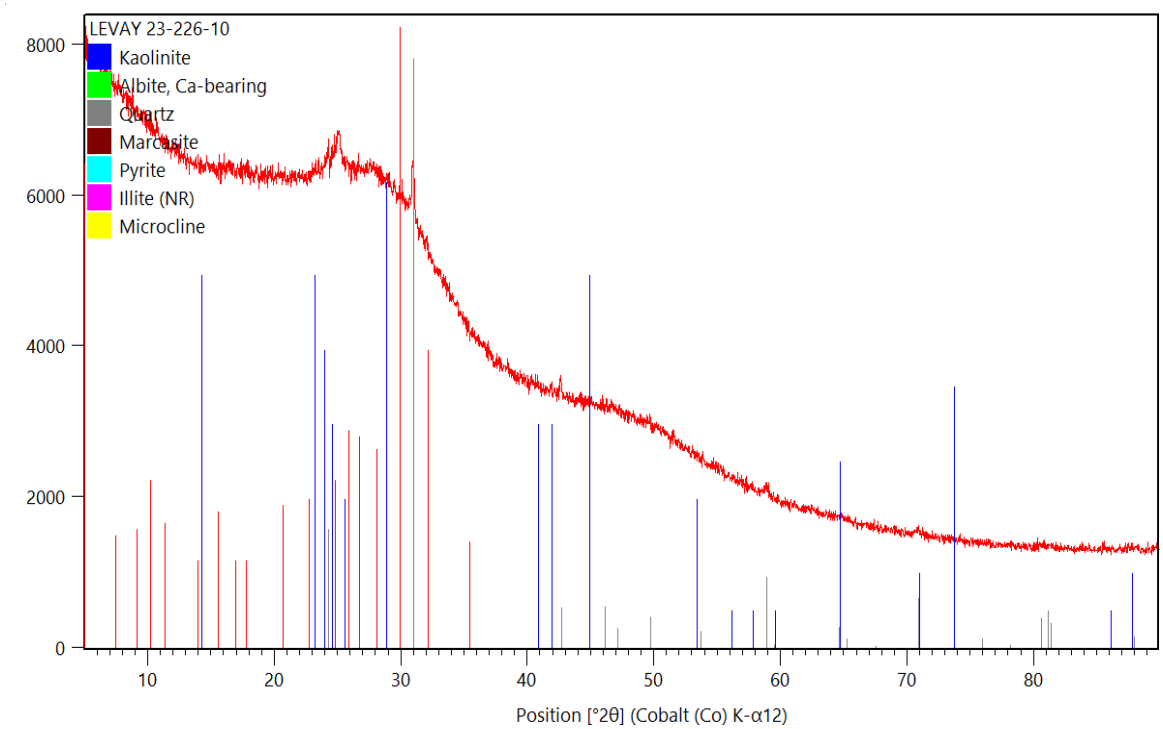
23-226-08: N7440_23.5-24 Overburden dump



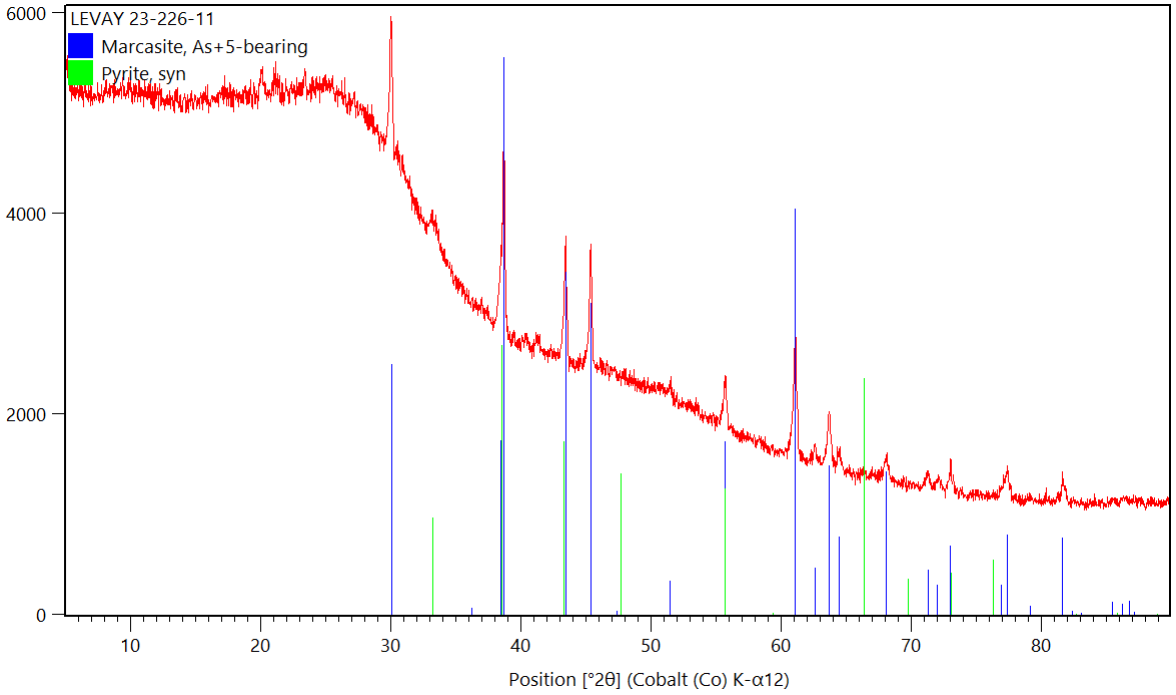
23-226-09: EAY_KLC_C_32 Coal Wall



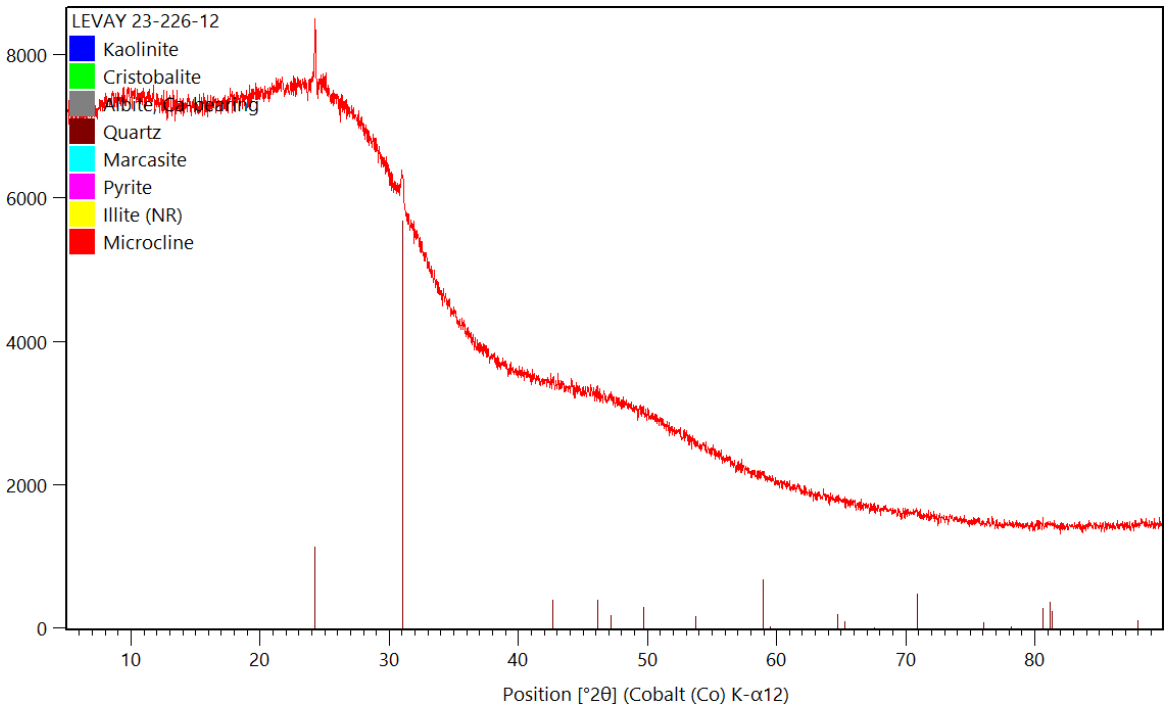
23-226-10: EAY_KLC_C_56 Coal Wall



23-226-11: RGS_YMF_C_20 Coal Wall



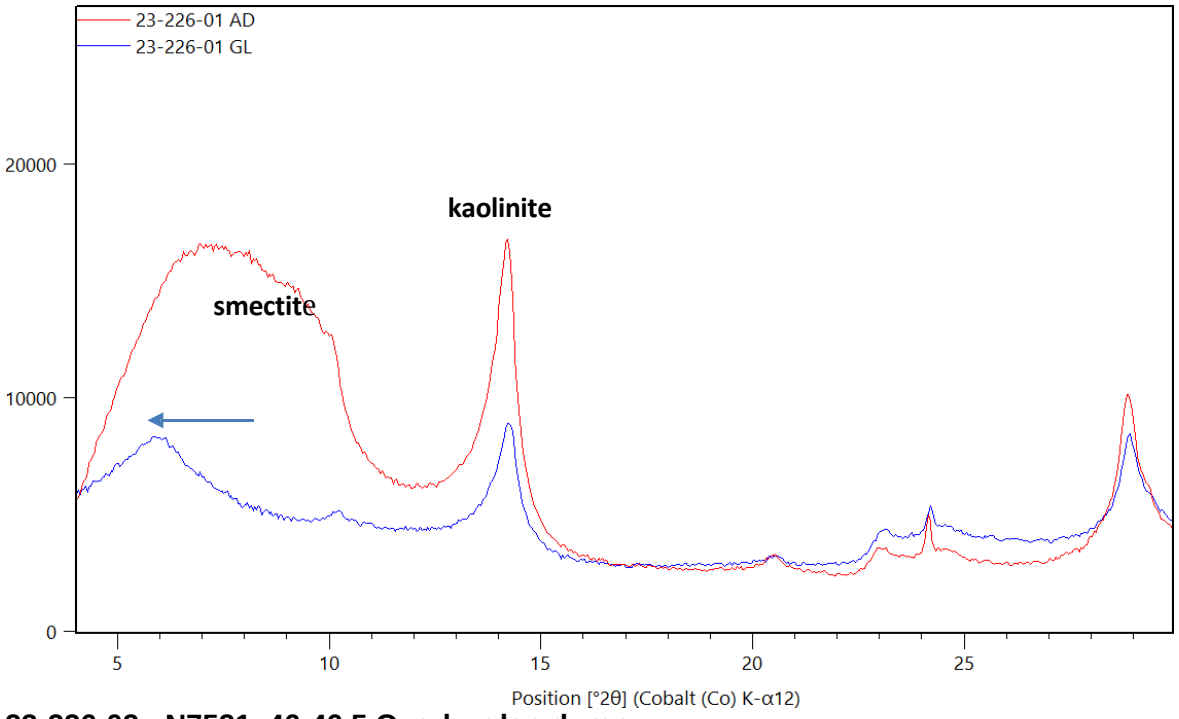
23-226-12: RGS_YTF_WW_6/2 Coal Wall



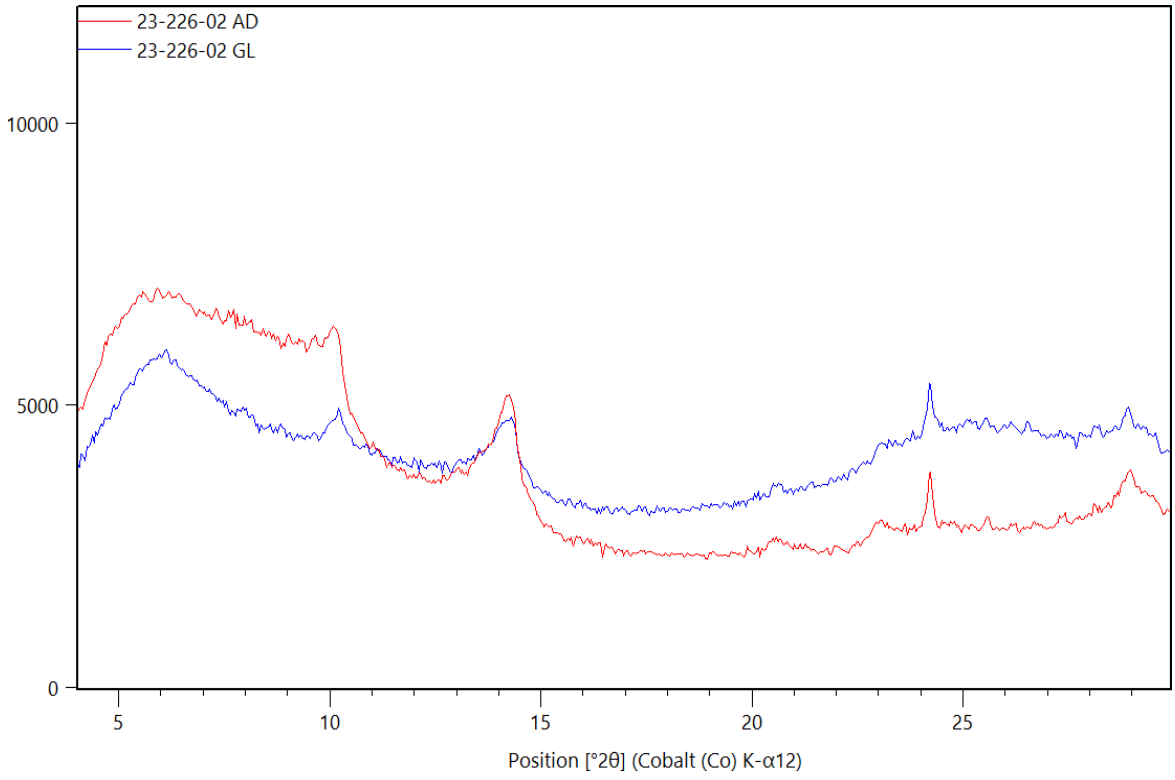
Sedimented and Glycol Treated Samples Result - This demonstrate the presence or absence of smectite clay (montmorillonite).

Red trace = air-dried and blue trace overlaid = after glycol treatment. Sample number 23-226-01 is annotated as an example.

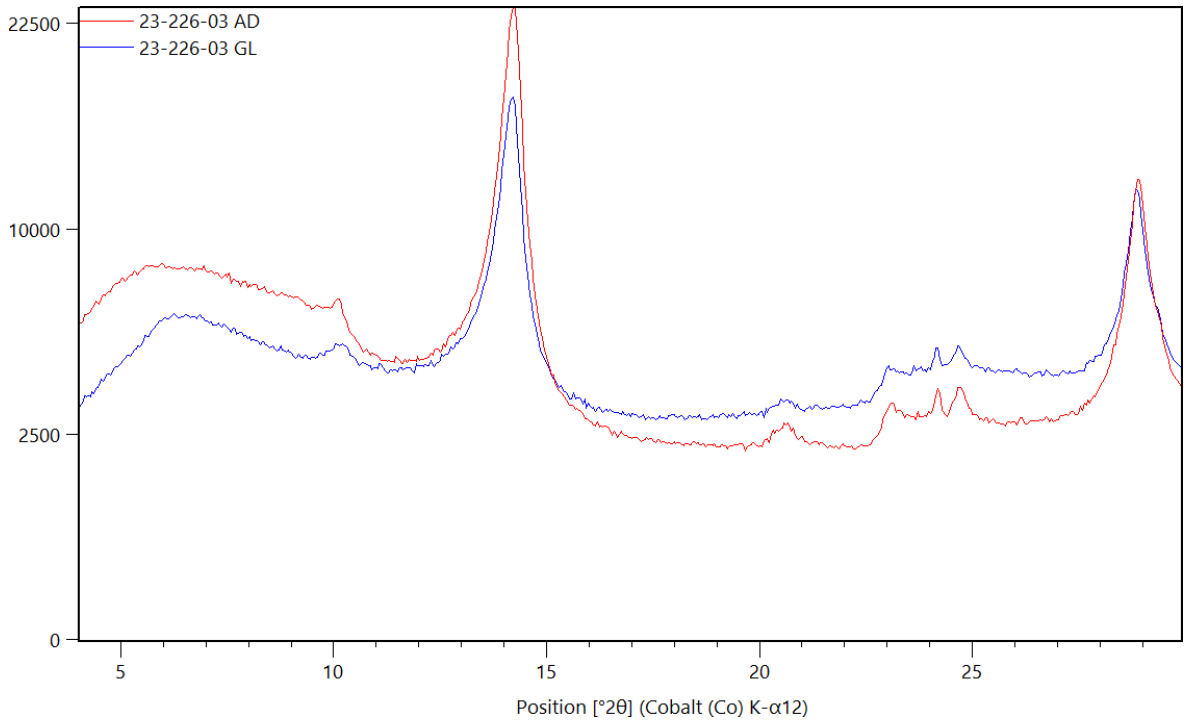
23-226-01: N7521_40.5-41 Overburden dump



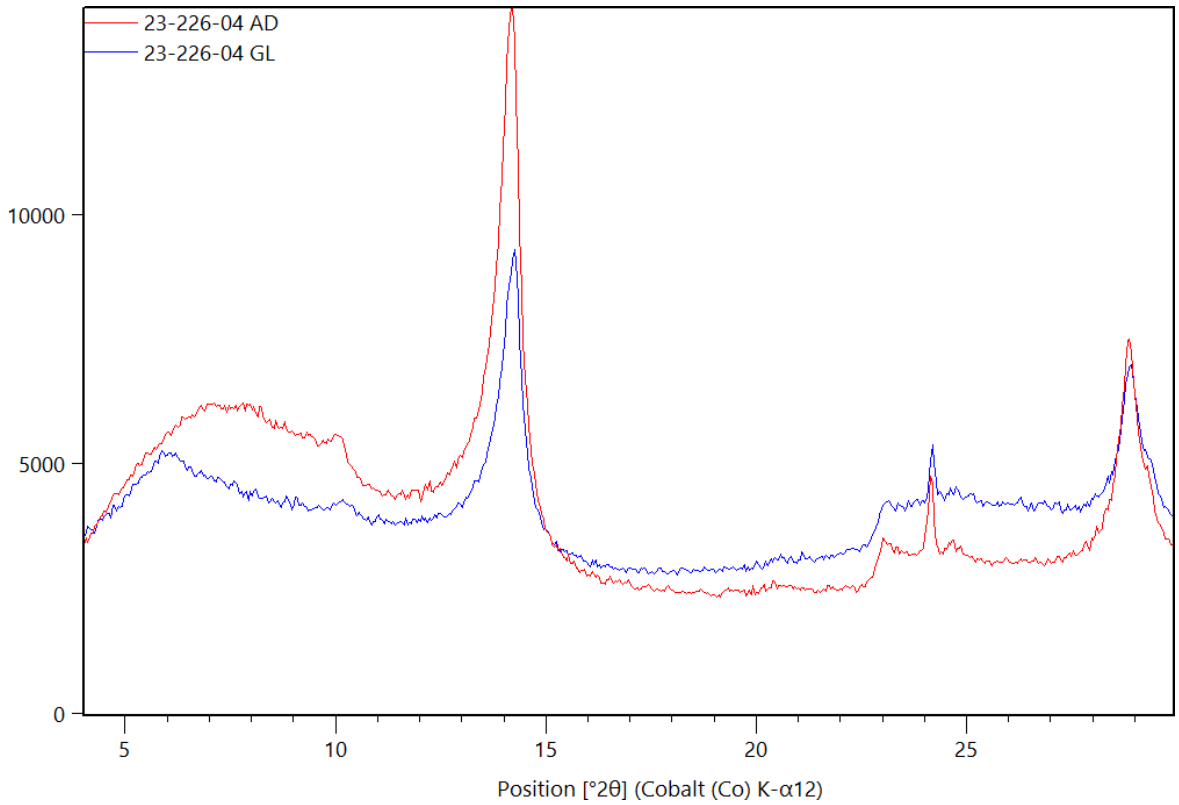
23-226-02: N7521_46-46.5 Overburden dump



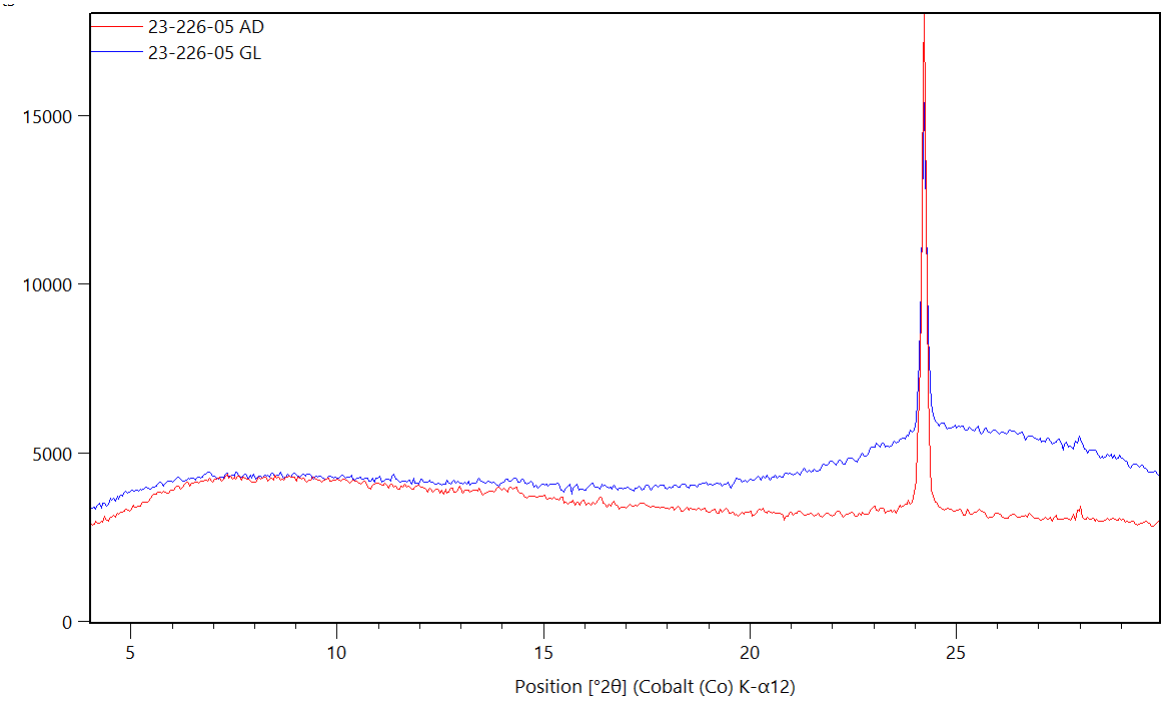
23-226-03: N7526_12-12.5 Overburden dump



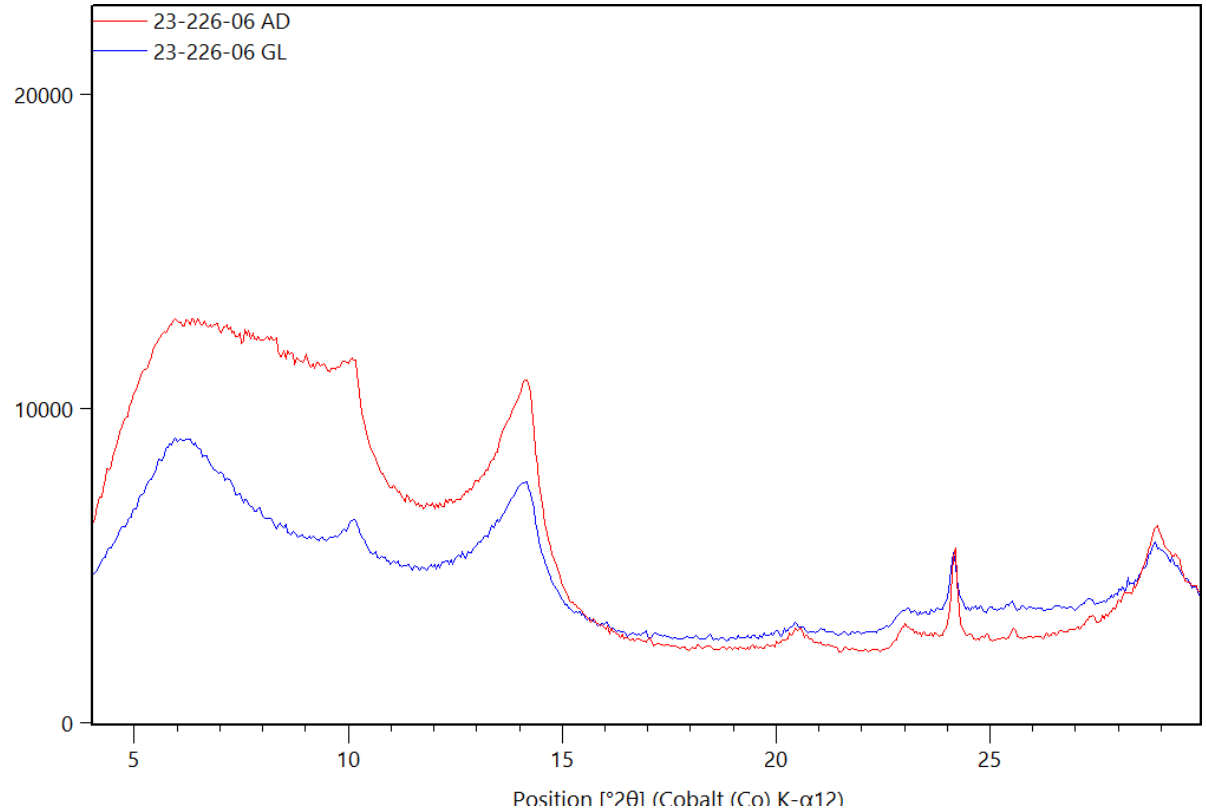
23-226-04: N7526_16-16.5 Overburden dump



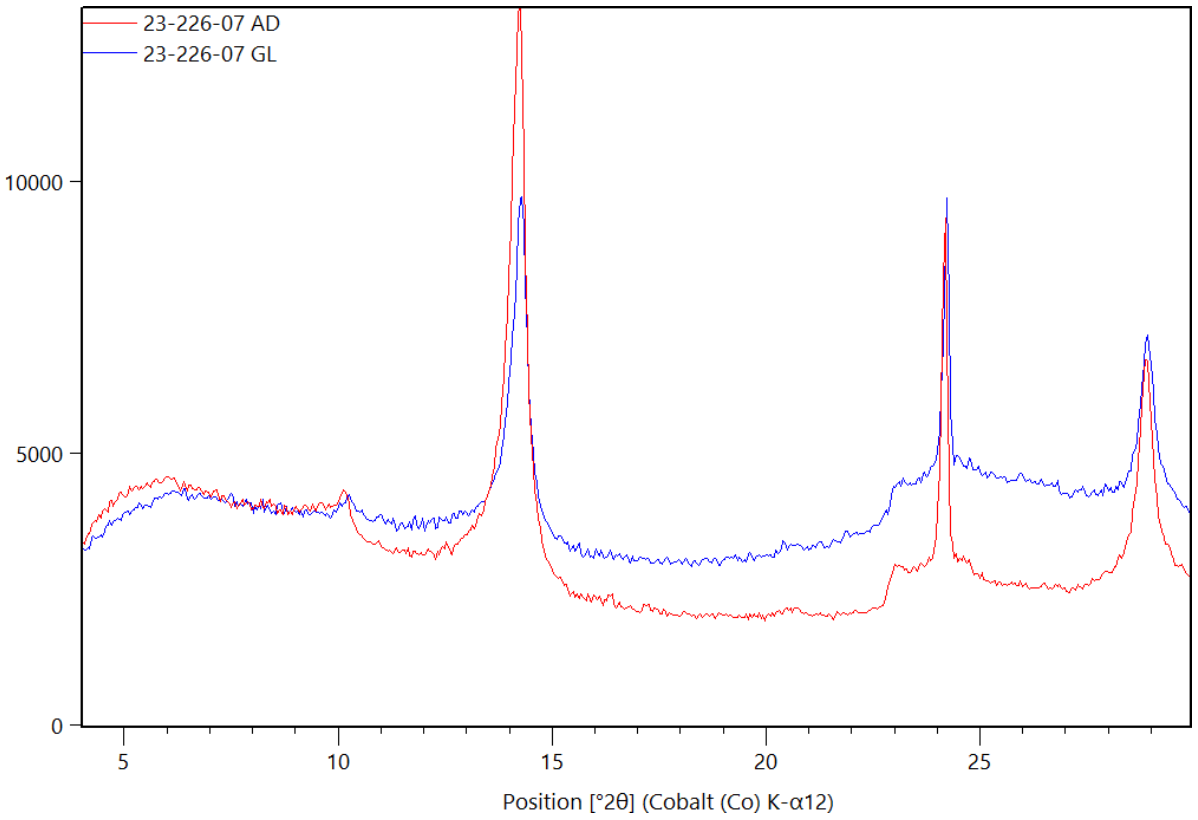
23-226-05: N7524_16-16.5 Overburden dump



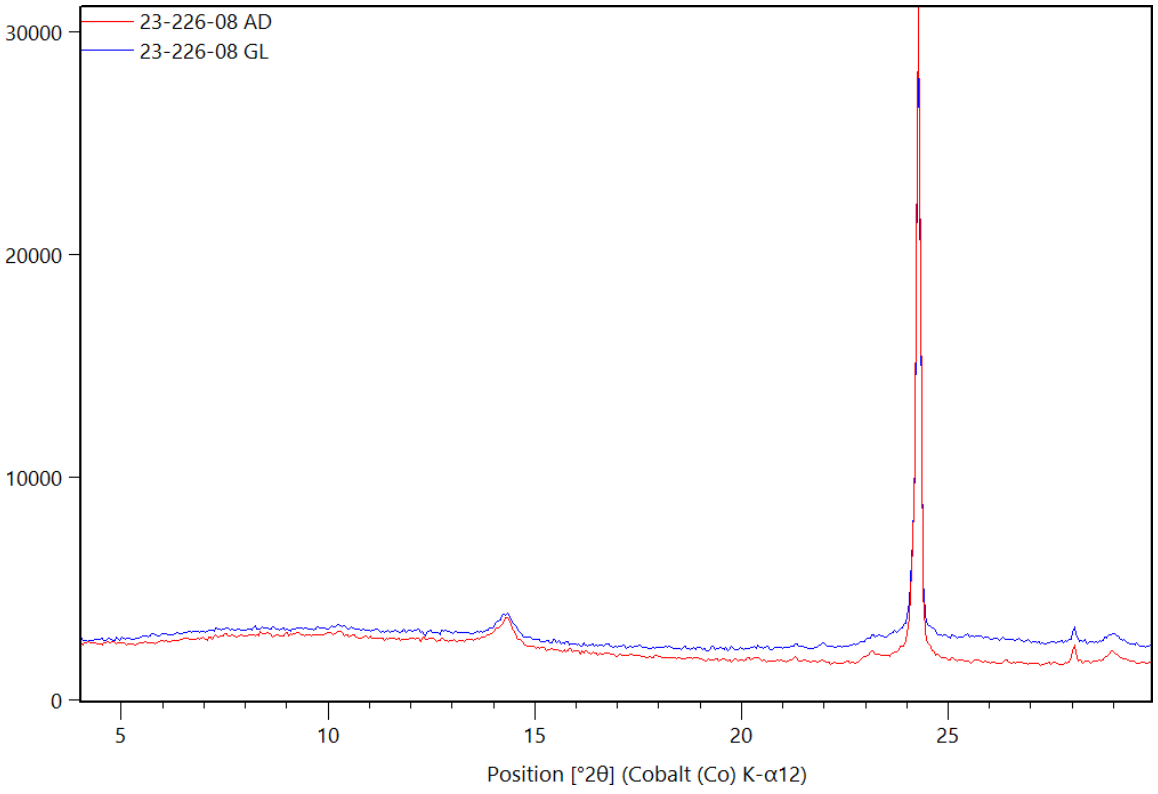
23-226-06: N7524_26.5-27 Overburden dump



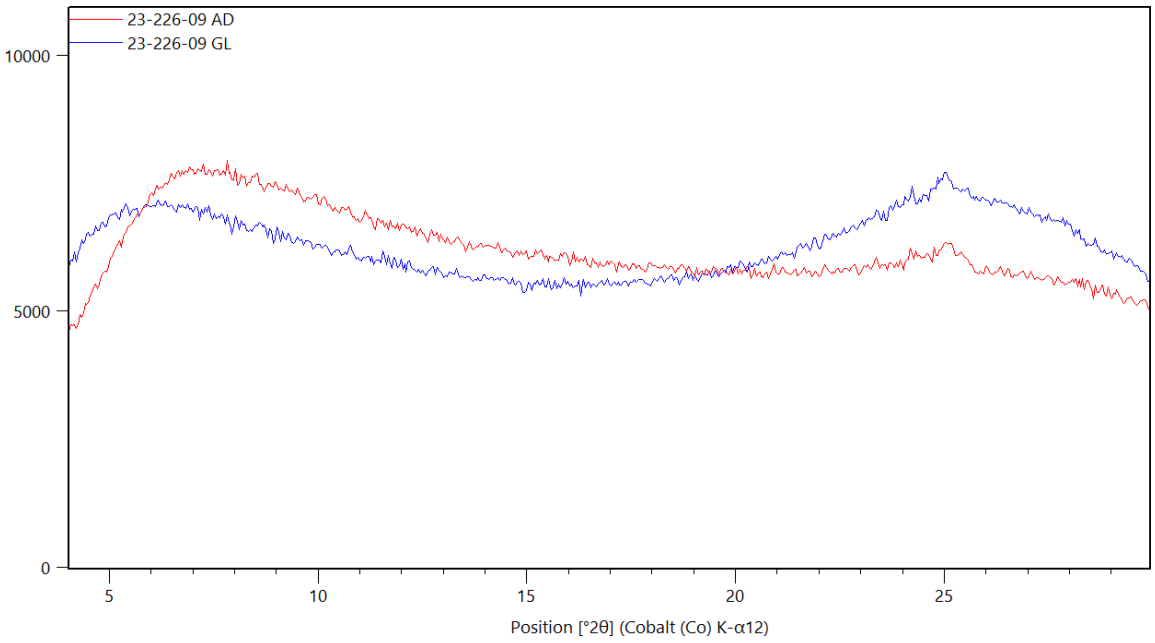
23-226-07: N7440_2.5-3 Overburden dump



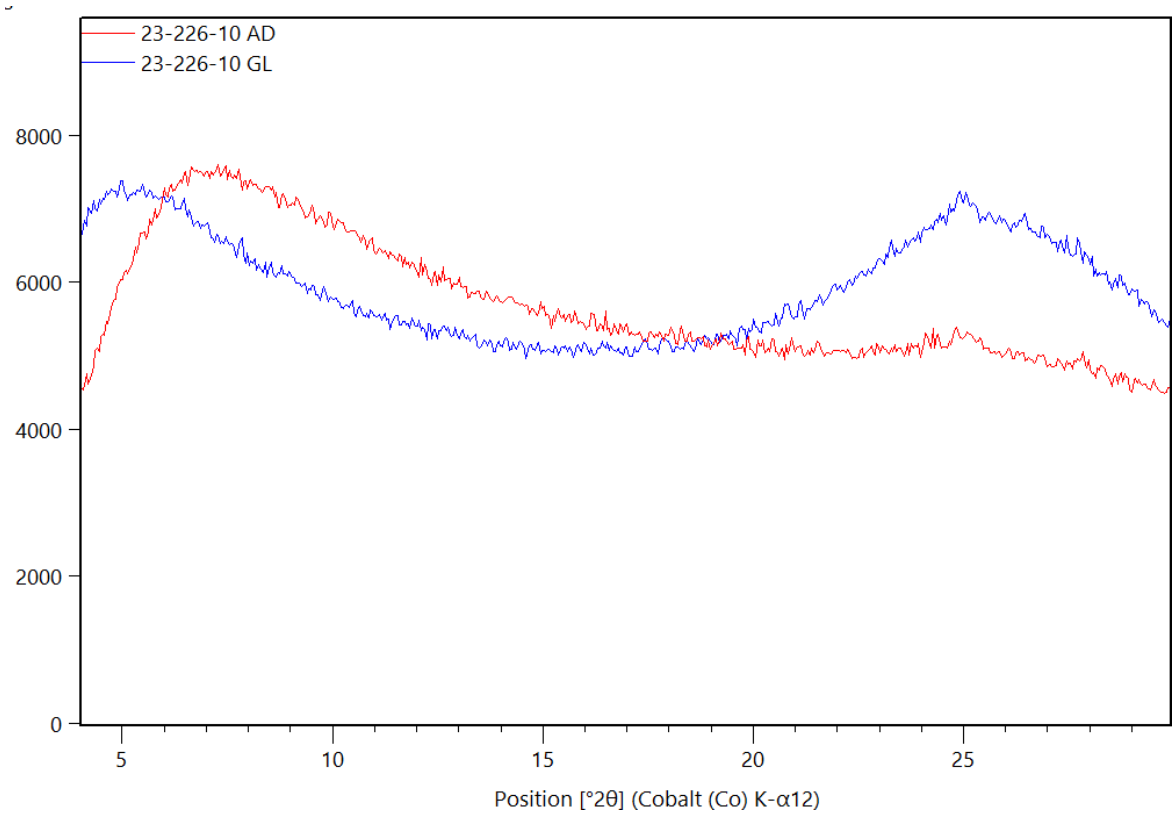
23-226-08: N7440_23.5-24 Overburden dump



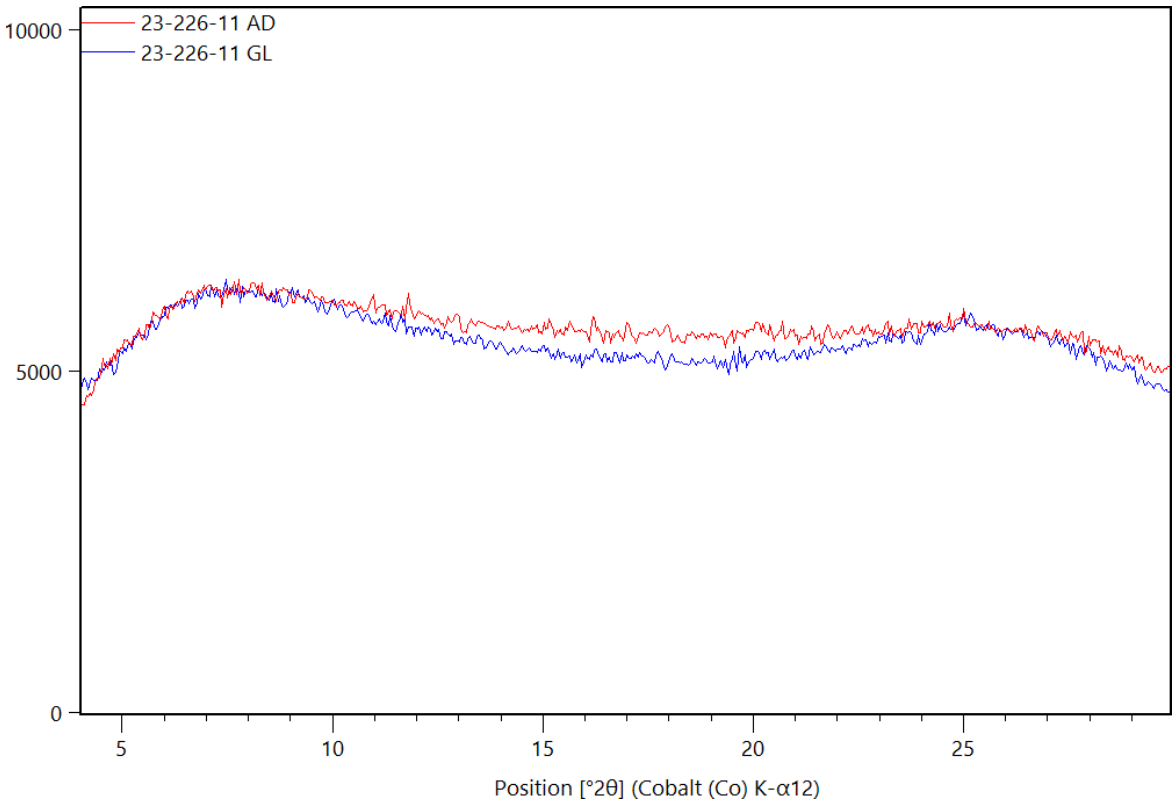
23-226-09: EAY_KLC_C_32 Coal Wall



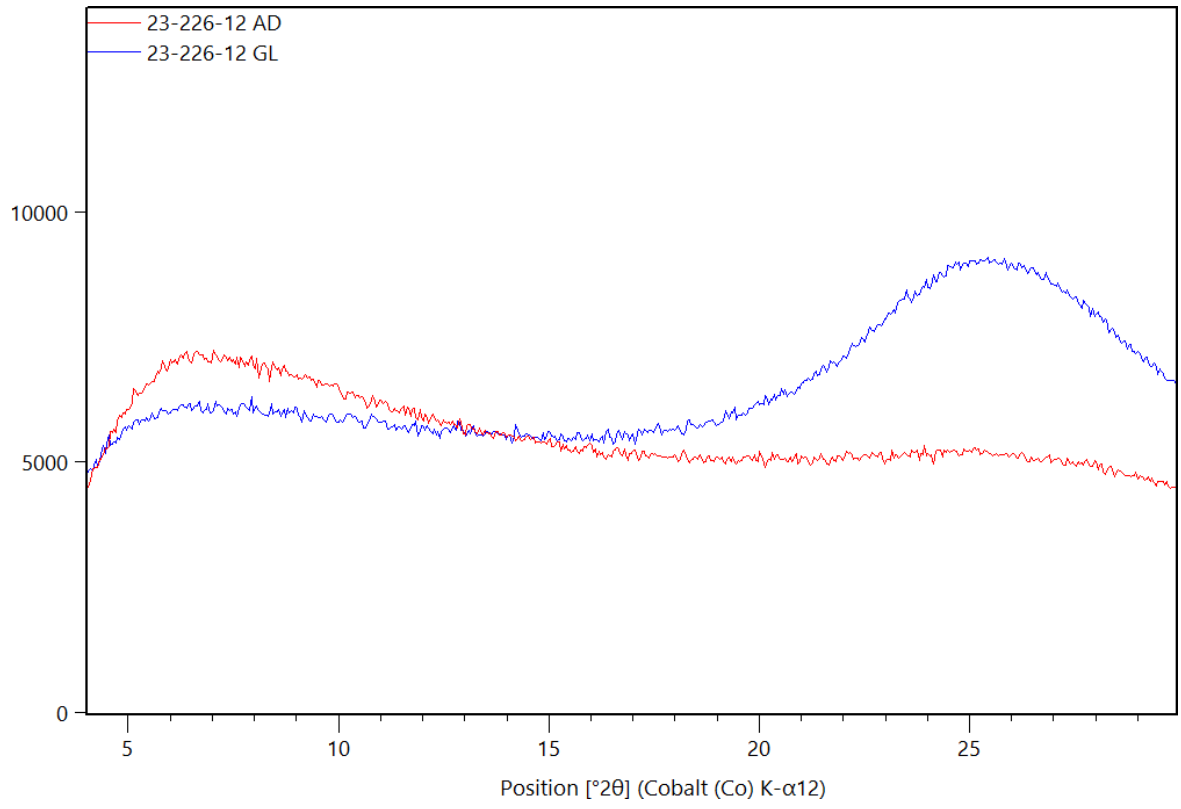
23-226-10: EAY_KLC_C_56 Coal Wall



23-226-11: RGS_YMF_C_20 Coal Wall



23-226-12: RGS_YTF_WW_6/2 Coal Wall



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E chris.kelaart@xva.com.au

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3/30 Lensworth Street,
Coopers Plains QLD 4108

Attention: Asitha Jayasinghe

November 26, 2023

Report Number: LS2997

Quantitative Analysis of Ash Material

Introduction:

Three samples of ash material were submitted for qualitative and quantitative phase analysis using X-ray diffraction (XRD).

Sampling & Preparation:

No sampling information was available for the samples submitted. The samples were supplied in a powder form but 2 samples required some further grinding to reduce to analytical fineness for the XRD.

The samples were mixed with 20% w/w of zinc oxide to determine the non-crystalline (amorphous) component.

Analytical Method:

The XRD patterns were The XRD patterns were produced using a Bruker-AXS D8 Endeavor XRD with copper radiation at 40 kV and 25 mA, over a range of 5 to 80 degrees 2θ, with an approximately 0.02 degree step and an effective 192 second per step count time using a Lynx-Eye XE-T detector.

Identification of phases present was carried out using Bruker EVA Search/Match software and the ICDD PDF-5 database (2024) with SIROQUANT version 5 software used to further characterize the samples.

Results:

The XRD scans are attached including the Search/Match information.

Note that the intensity of the peaks in an XRD pattern depend upon the crystallinity as well as the concentration of the phase.

The quantitative results are summarised in the following tables:

	SPL ID:	LS2997-01	LS2997-02
	Customer ID:	N7453-5-6m	N7453-Composite
Phase Name/Formula	**ICDD Ref**	**Weight %**	**Weight %**
Quartz; SiO_2	00-046-1045	8	20
Kaolinite; $Al_2Si_2O_5(OH)_4$	00-014-0164	1	3
Gypsum; $CaSO_4.2H_2O$	00-033-0311	Poss. Trace	Trace
Plagioclase Feldspar; $NaAlSi_3O_8$	00-019-1184	Trace	1
Potassium Feldspar; KAl_3SiO_8	00-031-0966	Poss. Trace	Trace
Muscovite; $KAl_2(Si_3Al)O_{10}(OH,F)_2$	00-006-0263	Trace	2
Magnetite; $Fe_3O_\$$	00-019-0629	2	4
Amorphous Material	N/A	89	70

	SPL ID:	LS2997-03
	Customer ID:	N7453-27-28m
Phase Name/Formula	**ICDD Ref**	**Weight %**
Quartz; SiO_2	00-046-1045	18
Kaolinite; $Al_2Si_2O_5(OH)_4$	00-014-0164	7
Gypsum; $CaSO_4.2H_2O$	00-033-0311	Poss. Trace
Plagioclase Feldspar; $NaAlSi_3O_8$	00-019-1184	4
Potassium Feldspar; KAl_3SiO_8	00-031-0966	1
Muscovite; $KAl_2(Si_3Al)O_{10}(OH,F)_2$	00-006-0263	1
Magnetite; $Fe_3O_\$$	00-019-0629	Trace
Amorphous Material	N/A	69

Results and Discussion:

The results of the analysis are summarised in the tables and scans attached. Results are given as % of the total.

Each of the samples yielded a pattern consistent with a high proportion of amorphous material with low diffraction of the constituent minerals and a curved background. The quantitative analysis provided should be used as a guide rather than definitive numbers with this high proportion of amorphous.

It's possible that the kaolin material could be more of a halloysite with the diffraction of the main peaks being somewhat ambiguous between these.

The limitations of qualitative XRD analysis are as follows:

1. There is a limit of detection of 1-2% on most crystalline phases.
2. Where there exist multiple phases, overlap of diffracted reflections can occur, thus rendering some ambiguity into the interpretation.

3. Some phases cannot be unambiguously identified as they are present in minor or trace amounts.

The limitations of quantitative XRD analysis by a full-profile Rietveld method are as follows:

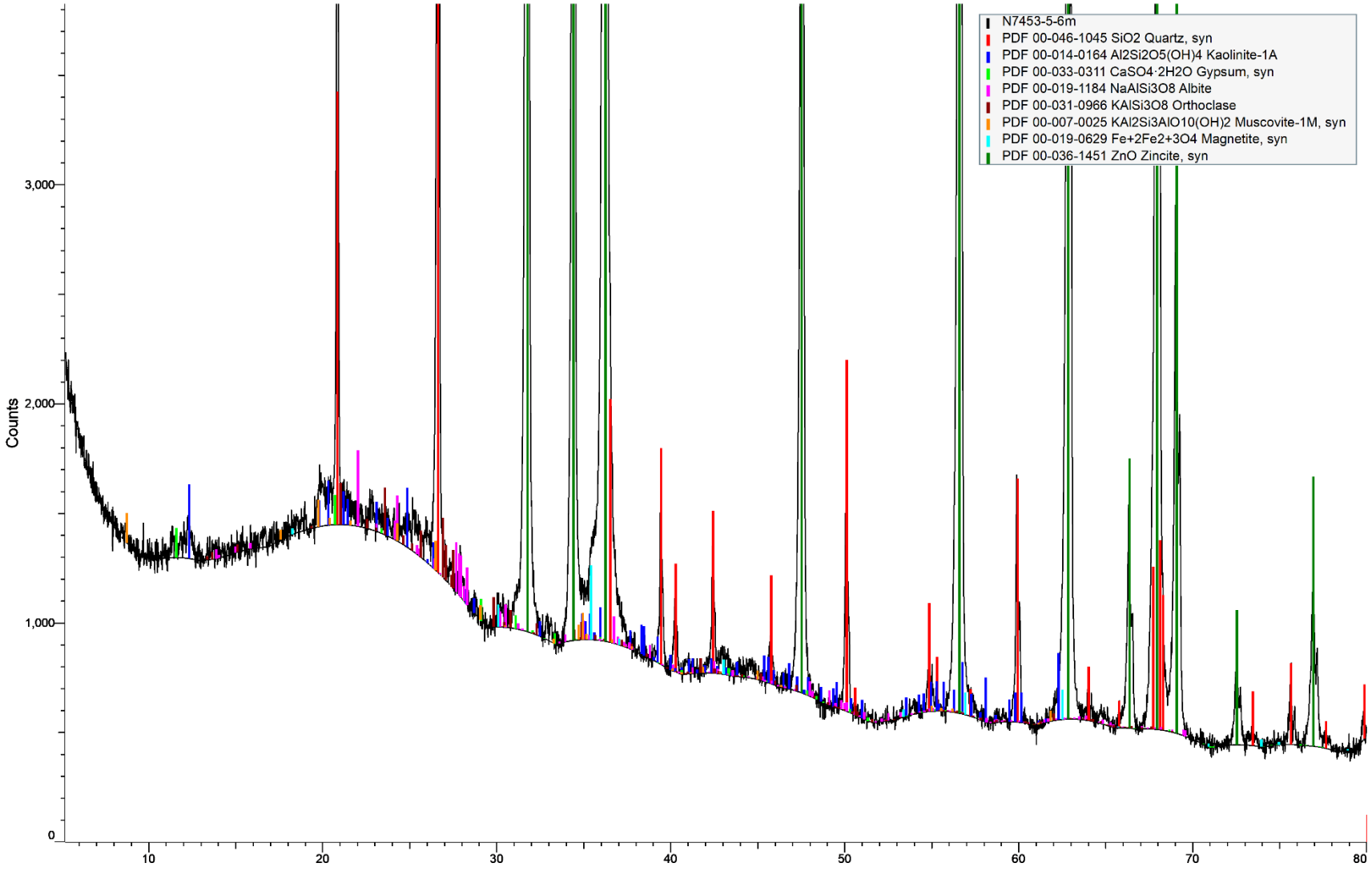
1. The limitations for qualitative XRD analysis all apply
2. The method as described is standardless as it relies solely on the published crystallographic data available for each phase. Some crystallographic data may not exactly describe the phases present.
3. Results are normalized to 100% and do not include estimates of unidentified or amorphous materials unless otherwise stated.

Potential limitations on the quantitative analysis can also include effects from varying crystallinity of each mineral, their preferred orientation in the sample preparation and their differing absorption of the X-rays.

Christopher Kelaart
X-Ray Vision Australia Pty Ltd

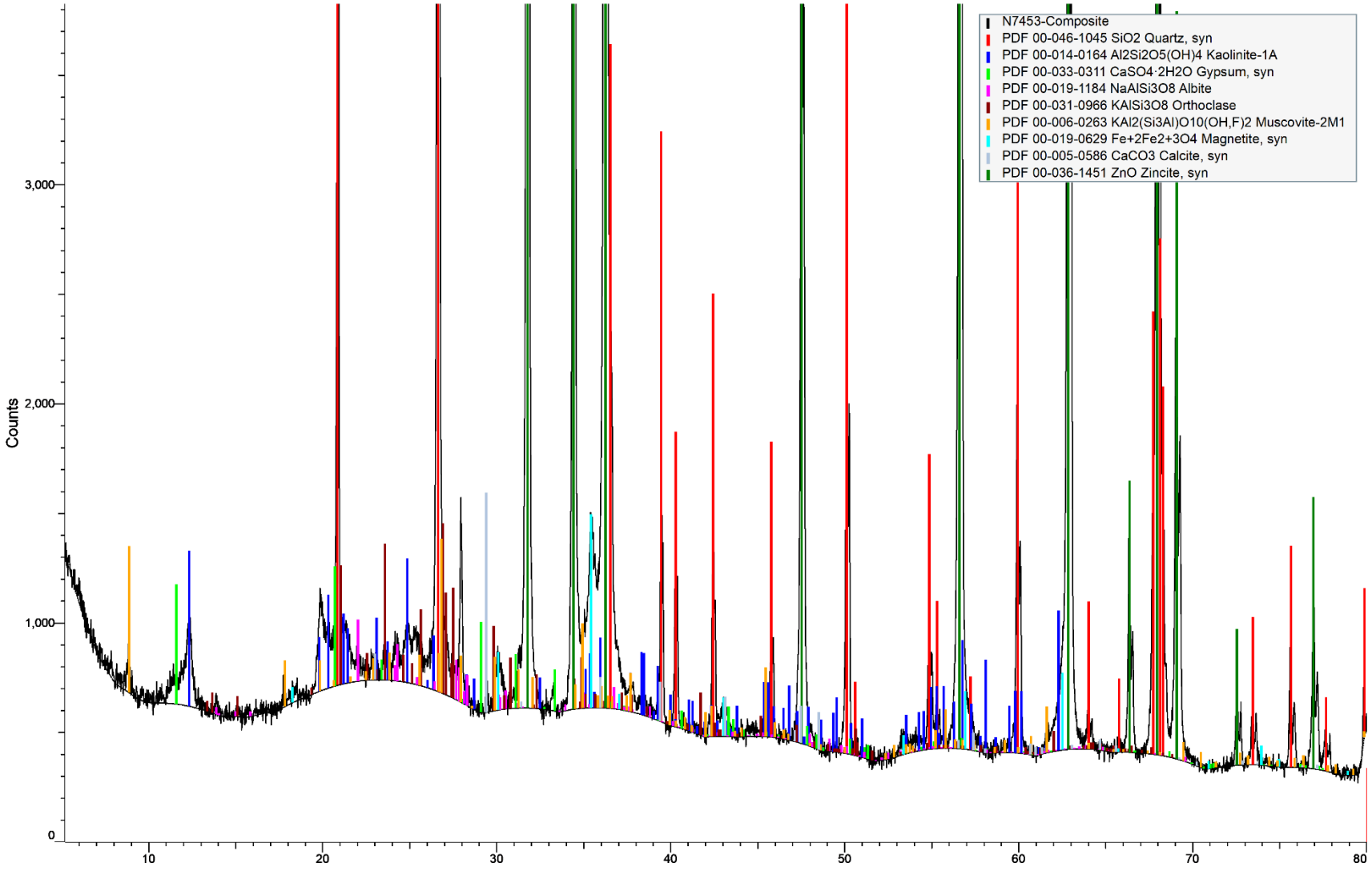
X-RAYvision
AUSTRALIA

LS2997-01



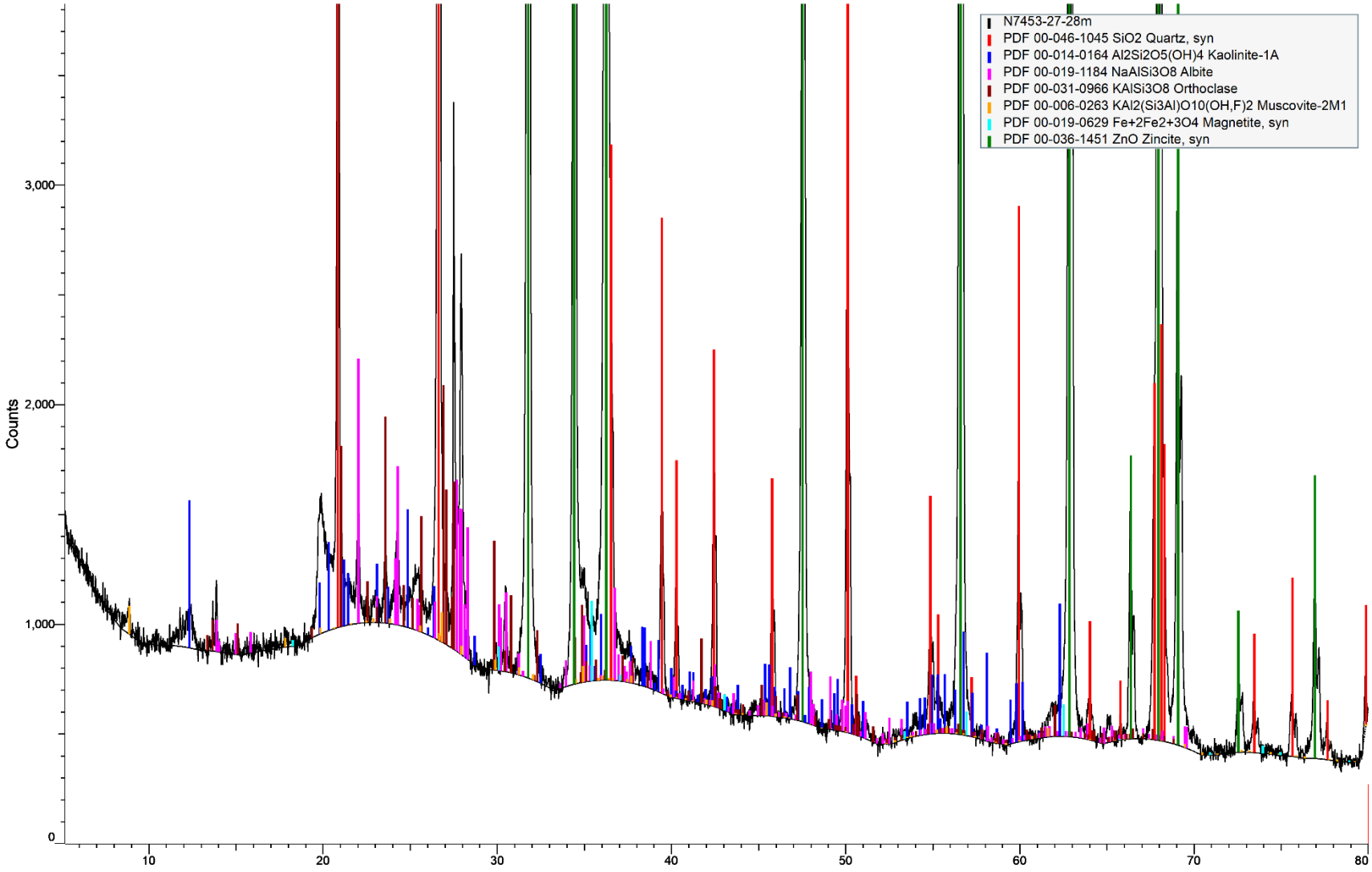
X-RAYvision AUSTRALIA

LS2997-02



X-RAYvision AUSTRALIA

LS2997-03



Attachment D: Laboratory Certificates of Analysis

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2212349**	Page	: 1 of 17
Client	: **RGS ENVIRONMENTAL CONSULTANTS PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MATT LANDERS	Contact	: Customer Services EB
Address	: 3/30 LENSWORTH STREET COOPERS PLAINS 4107	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: 07 3344 1222	Telephone	: +61-7-3243 7222
Project	: 2021048 Yallourn	Date Samples Received	: 04-May-2022 15:39
Order number	: ----	Date Analysis Commenced	: 09-May-2022
C-O-C number	: ----	Issue Date	: 17-May-2022 11:37
Sampler	: ----		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 68		
No. of samples analysed	: 68		

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*
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Inorganics, Stafford, QLD

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.

- ASS: EA037 (Rapid Field and F(ox) screening): pH F(ox) Reaction Rate: 1 - Slight; 2 - Moderate; 3 - Strong; 4 - Extreme
- ASS: EA013 (ANC) Fizz Rating: 0- None; 1- Slight; 2- Moderate; 3- Strong; 4- Very Strong; 5- Lime.
- EA037 ASS Field Screening: NATA accreditation does not cover performance of this service.

Analytical Results

Sub-Matrix: **SOIL**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	2021048__0001 RGS_YTF_WW_1	2021048__0002 RGS_YTF_WW_2	2021048__0003 RGS_YTF_WW_2/1	2021048__0004 RGS_YTF_WW_03/1	2021048__0005 RGS_YTF_WW_03/2
				Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00
					EB2212349-001	EB2212349-002	EB2212349-003	EB2212349-004	EB2212349-005
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**5.5**	**3.5**	**3.5**	**3.7**	**3.2**
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		**-0.6**	**6.4**	**5.8**	**3.7**	**4.9**
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		**143**	**320**	**394**	**213**	**444**
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		**1.5**	<0.5	<0.5	<0.5	<0.5
ANC as CaCO3	----	0.1	% CaCO3		**0.2**	<0.1	<0.1	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit		**0**	**0**	**0**	**0**	**0**
EA037: Ass Field Screening Analysis									
ø pH (F)	----	0.1	pH Unit		**5.1**	**4.2**	**3.9**	**4.4**	**4.3**
ø pH (Fox)	----	0.1	pH Unit		**3.5**	**2.5**	**2.8**	**2.7**	**2.5**
ø Reaction Rate	----	1	-		**3**	**1**	**1**	**1**	**1**
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		**14.8**	**26.3**	**26.1**	**38.5**	**17.2**
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		**0.03**	**0.21**	**0.19**	**0.12**	**0.16**

Analytical Results

Sub-Matrix: **SOIL**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	2021048__0006 RGS_YTF_WW_03/3	2021048__0007 RGS_YTF_WW_03/4	2021048__0008 RGS_YTF_WW_04/1	2021048__0009 RGS_YTF_WW_04/2	2021048__0010 RGS_YTF_WW_04/03
				Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00
					EB2212349-006	EB2212349-007	EB2212349-008	EB2212349-009	EB2212349-010
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**3.4**	**3.5**	**5.1**	**4.3**	**4.7**
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		**4.3**	**7.3**	**0.6**	**13.5**	**5.5**
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		**242**	**45**	**106**	**251**	**54**
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		<0.5	<0.5	<0.5	<0.5	<0.5
ANC as CaCO3	----	0.1	% CaCO3		<0.1	<0.1	<0.1	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit		**0**	**0**	**0**	**0**	**0**
EA037: Ass Field Screening Analysis									
ø pH (F)	----	0.1	pH Unit		**4.1**	**4.3**	**5.3**	**5.5**	**5.7**
ø pH (Fox)	----	0.1	pH Unit		**1.9**	**2.6**	**3.6**	**4.6**	**2.4**
ø Reaction Rate	----	1	-		**2**	**1**	**2**	**1**	**1**
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		**16.1**	**40.7**	**2.2**	**19.4**	**70.8**
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		**0.14**	**0.24**	**0.02**	**0.44**	**0.18**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	2021048__0011 RGS_YTF_WW_04/4	2021048__0012 RGS_YTF_WW_05/1	2021048__0013 RGS_YTF_WW_05/2	2021048__0014 RGS_YTF_WW_05/3	2021048__0015 RGS_YTF_WW_05/04
			Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00
Compound	CAS Number	LOR	Unit	EB2212349-011	EB2212349-012	EB2212349-013	EB2212349-014	EB2212349-015
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	3.4	3.4	4.7	5.2	3.4
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	4.6	4.9	0.6	0.9	5.5
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	458	250	1510	206	184
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	<0.5	<0.5	<0.5	<0.5	<0.5
ANC as CaCO3	----	0.1	% CaCO3	<0.1	<0.1	<0.1	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit	0	0	0	0	0
EA037: Ass Field Screening Analysis								
ø pH (F)	----	0.1	pH Unit	3.7	4.0	4.2	5.0	4.2
ø pH (Fox)	----	0.1	pH Unit	2.4	3.1	2.8	3.2	2.2
ø Reaction Rate	----	1	-	1	1	1	2	1
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	41.4	35.9	2.0	4.9	20.7
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.15	0.16	0.02	0.03	0.18

Analytical Results

Sub-Matrix: **SOIL**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	2021048__0016 RGS_YTF_WW_06/1	2021048__0017 RGS_YTF_WW_06/2	2021048__0018 RGS_YTF_WW_06/3	2021048__0019 RGS_YTF_WW_06/4	2021048__0020 RGS_YTF_WW_06/5
				Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00
					EB2212349-016	EB2212349-017	EB2212349-018	EB2212349-019	EB2212349-020
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**3.6**	**3.6**	**3.4**	**3.4**	**3.5**
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		**5.8**	**6.1**	**6.7**	**4.7**	**6.1**
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		**172**	**238**	**126**	**107**	**213**
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		<0.5	<0.5	<0.5	**1.1**	<0.5
ANC as CaCO3	----	0.1	% CaCO3		<0.1	<0.1	<0.1	**0.1**	<0.1
Fizz Rating	----	0	Fizz Unit		**0**	**0**	**0**	**0**	**0**
EA037: Ass Field Screening Analysis									
ø pH (F)	----	0.1	pH Unit		**4.2**	**4.2**	**3.6**	**4.2**	**4.4**
ø pH (Fox)	----	0.1	pH Unit		**2.3**	**2.4**	**1.5**	**1.8**	**1.9**
ø Reaction Rate	----	1	-		**1**	**1**	**2**	**2**	**2**
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		**39.8**	**23.8**	**28.4**	**37.2**	**17.4**
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		**0.19**	**0.20**	**0.22**	**0.19**	**0.20**

Analytical Results

Sub-Matrix: **SOIL**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	2021048__0021 RGS_YTF_WW_06/6	2021048__0022 RGS_YTF_WW_06/7	2021048__0023 RGS_YTF_WW_06/8	2021048__0024 RGS_YMF_WW_01/1	2021048__0025 RGS_YMF_WW_01/2
				Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00
					EB2212349-021	EB2212349-022	EB2212349-023	EB2212349-024	EB2212349-025
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**3.4**	**3.6**	**6.0**	**3.4**	**3.7**
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		**3.7**	**4.0**	**-1.9**	**4.3**	**4.0**
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		**243**	**118**	**322**	**208**	**200**
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		<0.5	<0.5	**2.2**	<0.5	<0.5
ANC as CaCO3	----	0.1	% CaCO3		<0.1	<0.1	**0.2**	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit		**0**	**0**	**0**	**0**	**0**
EA037: Ass Field Screening Analysis									
ø pH (F)	----	0.1	pH Unit		**4.2**	**4.5**	**5.9**	**4.2**	**4.7**
ø pH (Fox)	----	0.1	pH Unit		**1.6**	**1.7**	**4.5**	**1.4**	**1.6**
ø Reaction Rate	----	1	-		**2**	**2**	**2**	**3**	**2**
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		**28.0**	**27.7**	**4.8**	**24.1**	**27.5**
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		**0.12**	**0.13**	**0.01**	**0.14**	**0.13**

Analytical Results

Sub-Matrix: **SOIL**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	2021048__0026 RGS_YMF_WW_02/1	2021048__0027 RGS_YMF_WW_03/02	2021048__0028 RGS_YMF_WW_04/1	2021048__0029 RGS_YMF_WW_5/1	2021048__0030 RGS_YMF_WW_5/2
				Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00
					EB2212349-026	EB2212349-027	EB2212349-028	EB2212349-029	EB2212349-030
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**3.7**	**4.2**	**3.8**	**4.2**	**6.0**
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		**3.7**	**4.9**	**5.7**	**3.7**	**0.6**
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		**160**	**208**	**133**	**100**	**61**
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		<0.5	<0.5	**0.7**	<0.5	<0.5
ANC as CaCO3	----	0.1	% CaCO3		<0.1	<0.1	<0.1	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit		**0**	**0**	**0**	**0**	**0**
EA037: Ass Field Screening Analysis									
ø pH (F)	----	0.1	pH Unit		**4.8**	**4.6**	**4.6**	**5.0**	**5.3**
ø pH (Fox)	----	0.1	pH Unit		**2.0**	**1.6**	**1.9**	**2.0**	**3.0**
ø Reaction Rate	----	1	-		**2**	**2**	**2**	**2**	**2**
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		**22.6**	**48.4**	**19.5**	**58.8**	**8.8**
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		**0.12**	**0.16**	**0.21**	**0.12**	**0.02**

Analytical Results

Sub-Matrix: **SOIL**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	2021048__0031 RGS_YMF_WW_05/3	2021048__0032 RGS_YMF_WW_06/1	2021048__0033 RGS_YMF_WW_06/02	2021048__0034 RGS_YEF_WW_01/1	2021048__0035 RGS_YEF_WW_01/2
				Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00
					EB2212349-031	EB2212349-032	EB2212349-033	EB2212349-034	EB2212349-035
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**5.4**	**5.5**	**5.6**	**4.1**	**3.4**
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		**0.6**	<0.5	<0.5	**3.1**	**4.0**
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		**115**	**35**	**115**	**209**	**307**
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		<0.5	<0.5	<0.5	<0.5	<0.5
ANC as CaCO3	----	0.1	% CaCO3		<0.1	<0.1	<0.1	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit		**0**	**0**	**0**	**0**	**0**
EA037: Ass Field Screening Analysis									
ø pH (F)	----	0.1	pH Unit		**4.2**	**5.0**	**4.6**	**4.7**	**4.0**
ø pH (Fox)	----	0.1	pH Unit		**2.6**	**3.4**	**2.7**	**1.5**	**1.8**
ø Reaction Rate	----	1	-		**2**	**2**	**2**	**2**	**2**
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		**2.5**	**10.5**	**2.1**	**17.9**	**22.6**
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		**0.02**	<0.01	**0.01**	**0.10**	**0.13**

Analytical Results

Sub-Matrix: **SOIL**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	2021048__0036 RGS_YEF_WW_01/3	2021048__0037 RGS_YEF_WW_01/4	2021048__0038 RGS_YEF_WW_2/1	2021048__0039 RGS_YEF_WW_02/2	2021048__0040 RGS_YEF_WW_02/3
				Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00
					EB2212349-036	EB2212349-037	EB2212349-038	EB2212349-039	EB2212349-040
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**3.8**	**3.7**	**3.8**	**3.6**	**3.6**
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		**3.4**	**3.7**	**3.7**	**4.0**	**4.3**
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		**239**	**113**	**192**	**159**	**152**
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		<0.5	<0.5	<0.5	<0.5	<0.5
ANC as CaCO3	----	0.1	% CaCO3		<0.1	<0.1	<0.1	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit		**0**	**0**	**0**	**0**	**0**
EA037: Ass Field Screening Analysis									
ø pH (F)	----	0.1	pH Unit		**4.3**	**4.7**	**4.8**	**4.6**	**4.3**
ø pH (Fox)	----	0.1	pH Unit		**1.4**	**1.5**	**1.5**	**1.4**	**1.6**
ø Reaction Rate	----	1	-		**3**	**3**	**3**	**3**	**3**
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		**23.3**	**25.6**	**26.1**	**20.2**	**23.8**
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		**0.11**	**0.12**	**0.12**	**0.13**	**0.14**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	2021048__0041 RGS_YEF_WW_03/1	2021048__0042 RGS_YEF_WW_03/2	2021048__0043 RGS_YEF_WW_03/3	2021048__0044 RGS_YEF_WW_04/1	2021048__0045 RGS_YEF_WW_05/01
			Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00
Compound	CAS Number	LOR	Unit	EB2212349-041	EB2212349-042	EB2212349-043	EB2212349-044	EB2212349-045
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	3.5	3.6	4.0	3.9	5.6
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	4.9	5.2	5.2	4.3	-1.0
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	361	141	121	106	114
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	<0.5	<0.5	<0.5	<0.5	1.6
ANC as CaCO3	----	0.1	% CaCO3	<0.1	<0.1	<0.1	<0.1	0.2
Fizz Rating	----	0	Fizz Unit	0	0	0	0	0
EA037: Ass Field Screening Analysis								
ø pH (F)	----	0.1	pH Unit	4.3	4.4	4.0	4.0	5.9
ø pH (Fox)	----	0.1	pH Unit	1.3	1.3	1.2	1.1	2.8
ø Reaction Rate	----	1	-	3	3	3	3	2
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	24.8	39.3	37.8	17.4	11.8
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.16	0.17	0.17	0.14	0.02

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	2021048__0046 RGS_RCD_WW_01/1	2021048__0047 RGS_RCB_WW_01/2	2021048__0048 RGS_YMF_C_01	2021048__0049 RGS_YMF_C_02	2021048__0050 RGS_YMF_C_03
			Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00
Compound	CAS Number	LOR	Unit	EB2212349-046	EB2212349-047	EB2212349-048	EB2212349-049	EB2212349-050
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	3.8	3.6	3.9	3.9	3.7
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	4.0	4.6	3.7	4.3	4.4
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	118	119	127	308	295
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	<0.5	<0.5	<0.5	<0.5	1.1
ANC as CaCO3	----	0.1	% CaCO3	<0.1	<0.1	<0.1	<0.1	0.1
Fizz Rating	----	0	Fizz Unit	0	0	0	0	0
EA037: Ass Field Screening Analysis								
ø pH (F)	----	0.1	pH Unit	4.4	3.9	4.3	4.4	4.1
ø pH (Fox)	----	0.1	pH Unit	1.7	2.1	2.0	2.0	1.3
ø Reaction Rate	----	1	-	3	2	2	2	3
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	30.2	39.1	54.6	49.8	50.1
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.13	0.15	0.12	0.14	0.18

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	2021048__0051 RGS_YMF_C_04	2021048__0052 RGS_YMF_C_05	2021048__0053 RGS_YMF_C_06	2021048__0054 RGS_YMF_C_07	2021048__0055 RGS_YMF_C_08
			Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00
Compound	CAS Number	LOR	Unit	EB2212349-051	EB2212349-052	EB2212349-053	EB2212349-054	EB2212349-055
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**3.9**	**4.2**	**4.4**	**4.1**	**4.3**
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	**6.4**	**15.4**	**5.5**	**3.6**	**6.1**
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**809**	**152**	**140**	**384**	**151**
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	<0.5	**1.4**	<0.5	**1.6**	<0.5
ANC as CaCO3	----	0.1	% CaCO3	<0.1	**0.1**	<0.1	**0.2**	<0.1
Fizz Rating	----	0	Fizz Unit	**0**	**0**	**0**	**0**	**0**
EA037: Ass Field Screening Analysis								
ø pH (F)	----	0.1	pH Unit	**4.4**	**4.6**	**4.5**	**4.4**	**5.1**
ø pH (Fox)	----	0.1	pH Unit	**1.6**	**1.4**	**1.5**	**1.4**	**1.4**
ø Reaction Rate	----	1	-	**2**	**3**	**2**	**3**	**3**
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	**60.6**	**49.4**	**59.1**	**61.3**	**53.8**
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	**0.21**	**0.55**	**0.18**	**0.17**	**0.20**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	2021048__0056 RGS_YMF_C_09	2021048__0057 RGS_YMF_C_10	2021048__0058 RGS_YMF_C_11	2021048__0059 RGS_YMF_C_12	2021048__0060 RGS_YMF_C_13
			Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00
Compound	CAS Number	LOR	Unit	EB2212349-056	EB2212349-057	EB2212349-058	EB2212349-059	EB2212349-060
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	4.1	4.0	3.8	4.3	4.2
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	5.0	2.9	5.2	6.1	4.9
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	220	126	231	263	167
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	0.8	2.0	<0.5	<0.5	<0.5
ANC as CaCO3	----	0.1	% CaCO3	<0.1	0.2	<0.1	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit	0	0	0	0	0
EA037: Ass Field Screening Analysis								
ø pH (F)	----	0.1	pH Unit	5.2	4.8	4.5	4.6	5.0
ø pH (Fox)	----	0.1	pH Unit	1.5	1.4	1.6	1.5	1.7
ø Reaction Rate	----	1	-	2	2	2	2	2
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	55.3	41.9	22.2	59.2	60.3
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.19	0.16	0.17	0.20	0.16

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	2021048__0061 RGS_YMF_C_14	2021048__0062 RGS_YMF_C_15	2021048__0063 RGS_YMF_C_16	2021048__0064 RGS_YMF_C_17	2021048__0065 RGS_YMF_C_18
			Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00
Compound	CAS Number	LOR	Unit	EB2212349-061	EB2212349-062	EB2212349-063	EB2212349-064	EB2212349-065
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	4.6	4.2	4.2	4.1	4.2
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	6.7	7.3	7.3	7.0	12.8
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	132	128	385	186	164
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	<0.5	<0.5	<0.5	<0.5	<0.5
ANC as CaCO3	----	0.1	% CaCO3	<0.1	<0.1	<0.1	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit	0	0	0	0	0
EA037: Ass Field Screening Analysis								
ø pH (F)	----	0.1	pH Unit	4.7	4.6	4.6	4.4	4.4
ø pH (Fox)	----	0.1	pH Unit	1.4	1.6	1.7	1.6	2.0
ø Reaction Rate	----	1	-	2	2	2	2	2
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	34.4	56.1	50.4	56.4	55.5
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.22	0.24	0.24	0.23	0.42

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	2021048__0066 RGS_YMF_C_19	2021048__0067 RGS_YMF_C_20	----	----	----
			Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	----	----	----
Compound	CAS Number	LOR	Unit	EB2212349-066	EB2212349-067	--------	--------	--------
				Result	Result	----	----	----
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**3.7**	**3.5**	----	----	----
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	**20.7**	**124**	----	----	----
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**297**	**357**	----	----	----
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	**3.2**	<0.5	----	----	----
ANC as CaCO3	----	0.1	% CaCO3	**0.3**	<0.1	----	----	----
Fizz Rating	----	0	Fizz Unit	**0**	**0**	----	----	----
EA037: Ass Field Screening Analysis								
ø pH (F)	----	0.1	pH Unit	**4.0**	**3.6**	----	----	----
ø pH (Fox)	----	0.1	pH Unit	**1.2**	**1.3**	----	----	----
ø Reaction Rate	----	1	-	**3**	**2**	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	**52.6**	**53.4**	----	----	----
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	**0.78**	**4.07**	----	----	----

Analytical Results

Sub-Matrix: **WATER** (Matrix: **SOIL**)			Sample ID	**DI Water for 1:5 ph and EC**	**----**	**----**	**----**	**----**
			Sampling date / time	04-May-2022 00:00	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**EB2212349-068**	**--------**	**--------**	**--------**	**--------**
				Result	----	----	----	----
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**5.4**	**----**	**----**	**----**	**----**
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**4**	**----**	**----**	**----**	**----**

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2215448**	Page	: 1 of 10
Client	: **RGS ENVIRONMENTAL CONSULTANTS PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MATT LANDERS	Contact	: Customer Services EB
Address	: 3/30 LENSWORTH STREET COOPERS PLAINS 4107	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: 07 3344 1222	Telephone	: +61-7-3243 7222
Project	: 2021048 Yallourn	Date Samples Received	: 31-May-2022 09:15
Order number	: ----	Date Analysis Commenced	: 03-Jun-2022
C-O-C number	: ----	Issue Date	: 10-Jun-2022 15:38
Sampler	: LE XI NG		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 18		
No. of samples analysed	: 18		

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*
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

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.

- ASS: EA029 (SPOCAS): Excess ANC not required because pH OX less than 6.5.
- ASS: EA029 (SPOCAS): Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime ($CaCO_3$) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from kg/t dry weight to kg/m3 in-situ soil, multiply reported results x wet bulk density of soil in t/m3.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	RGS_YTF_WW_2 2021048_0002	RGS_YTF_WW_03/4 2021048_0007	RGS_YTF_WW_04/2 2021048_0009	RGS_YTF_WW_06/2 2021048_0017	RGS_YTF_WW_06/3 2021048_0018
			Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00
Compound	CAS Number	LOR	Unit	EB2215448-001	EB2215448-002	EB2215448-003	EB2215448-004	EB2215448-005
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.047**	**0.031**	**0.033**	**0.018**	**0.016**
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	**2.6**	**2.6**	----	----	----
pH OX (23B)	----	0.1	pH Unit	**2.1**	**2.0**	----	----	----
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)	----	2	mole H+ / t	**665**	**546**	----	----	----
Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	**5800**	**4690**	----	----	----
Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	**5140**	**4140**	----	----	----
sulfidic - Titratable Actual Acidity (s-23F)	----	0.020	% pyrite S	**1.07**	**0.876**	----	----	----
sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.020	% pyrite S	**9.30**	**7.52**	----	----	----
sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.020	% pyrite S	**8.23**	**6.64**	----	----	----
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)	----	0.020	% S	**0.020**	<0.020	----	----	----
Peroxide Sulfur (23De)	----	0.020	% S	**0.238**	**0.218**	----	----	----
Peroxide Oxidisable Sulfur (23E)	----	0.020	% S	**0.218**	**0.218**	----	----	----
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	**136**	**136**	----	----	----
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.020	% Ca	**0.030**	<0.020	----	----	----
Peroxide Calcium (23Wh)	----	0.020	% Ca	**0.041**	**0.020**	----	----	----
Acid Reacted Calcium (23X)	----	0.020	% Ca	<0.020	**0.020**	----	----	----
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	**10**	----	----	----
sulfidic - Acid Reacted Calcium (s-23X)	----	0.020	% S	<0.020	<0.020	----	----	----
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.020	% Mg	**0.098**	**0.069**	----	----	----
Peroxide Magnesium (23Tm)	----	0.020	% Mg	**0.105**	**0.069**	----	----	----
Acid Reacted Magnesium (23U)	----	0.020	% Mg	<0.020	<0.020	----	----	----
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10	<10	----	----	----
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.020	% S	<0.020	<0.020	----	----	----
EA029-G: Retained Acidity								
HCl Extractable Sulfur (20Be)	----	0.020	% S	**0.020**	<0.020	----	----	----
Net Acid Soluble Sulfur (20Je)	----	0.020	% S	<0.020	<0.020	----	----	----

Analytical Results

Sub-Matrix: **SOIL**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	RGS_YTF_WW_2 2021048_0002	RGS_YTF_WW_03/4 2021048_0007	RGS_YTF_WW_04/2 2021048_0009	RGS_YTF_WW_06/2 2021048_0017	RGS_YTF_WW_06/3 2021048_0018
				Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00
					EB2215448-001	EB2215448-002	EB2215448-003	EB2215448-004	EB2215448-005
					Result	Result	Result	Result	Result
EA029-G: Retained Acidity - Continued									
acidity - Net Acid Soluble Sulfur (a-20J)	----	10	mole H+ / t		<10	<10	----	----	----
sulfidic - Net Acid Soluble Sulfur (s-20J)	----	0.020	% pyrite S		<0.020	<0.020	----	----	----
EA029-H: Acid Base Accounting									
ANC Fineness Factor	----	0.5	-		**1.5**	**1.5**	----	----	----
Net Acidity (sulfur units)	----	0.02	% S		**1.28**	**1.10**	----	----	----
Net Acidity (acidity units)	----	10	mole H+ / t		**801**	**689**	----	----	----
Liming Rate	----	1	kg CaCO3/t		**60**	**52**	----	----	----
Net Acidity excluding ANC (sulfur units)	----	0.02	% S		**1.28**	**1.10**	----	----	----
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t		**801**	**689**	----	----	----
Liming Rate excluding ANC	----	1	kg CaCO3/t		**60**	**52**	----	----	----

Analytical Results

Sub-Matrix: SOIL
(Matrix: SOIL)

Compound	CAS Number	LOR	Unit	Sample ID	RGS_YTF_WW_06/5 2021048_0020	RGS_YMF_WW_04/1 2021048_0028	RGS_YMF_C_04 2021048_0051	RGS_YMF_C_05 2021048_0052	RGS_YMF_C_08 2021048_0055
				Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00
					EB2215448-006	EB2215448-007	EB2215448-008	EB2215448-009	EB2215448-010
					Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur									
Chromium Reducible Sulphur	----	0.005	%		0.025	0.022	0.025	0.032	0.032
EA029-A: pH Measurements									
pH KCl (23A)	----	0.1	pH Unit		2.4	2.6	----	3.2	3.4
pH OX (23B)	----	0.1	pH Unit		2.0	2.0	----	1.9	2.0
EA029-B: Acidity Trail									
Titratable Actual Acidity (23F)	----	2	mole H+ / t		2100	620	----	348	352
Titratable Peroxide Acidity (23G)	----	2	mole H+ / t		6600	6810	----	7230	5940
Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t		4500	6190	----	6880	5590
sulfidic - Titratable Actual Acidity (s-23F)	----	0.020	% pyrite S		3.37	0.994	----	0.557	0.564
sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.020	% pyrite S		10.6	10.9	----	11.6	9.53
sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.020	% pyrite S		7.21	9.93	----	11.0	8.96
EA029-C: Sulfur Trail									
KCl Extractable Sulfur (23Ce)	----	0.020	% S		<0.020	<0.020	----	<0.020	<0.020
Peroxide Sulfur (23De)	----	0.020	% S		0.231	0.256	----	0.621	0.221
Peroxide Oxidisable Sulfur (23E)	----	0.020	% S		0.231	0.256	----	0.621	0.221
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t		144	160	----	387	138
EA029-D: Calcium Values									
KCl Extractable Calcium (23Vh)	----	0.020	% Ca		0.038	0.046	----	0.044	0.061
Peroxide Calcium (23Wh)	----	0.020	% Ca		0.187	0.073	----	0.049	0.069
Acid Reacted Calcium (23X)	----	0.020	% Ca		0.149	0.027	----	<0.020	<0.020
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t		74	13	----	<10	<10
sulfidic - Acid Reacted Calcium (s-23X)	----	0.020	% S		0.119	0.022	----	<0.020	<0.020
EA029-E: Magnesium Values									
KCl Extractable Magnesium (23Sm)	----	0.020	% Mg		0.064	0.126	----	0.081	0.099
Peroxide Magnesium (23Tm)	----	0.020	% Mg		0.169	0.136	----	0.082	0.104
Acid Reacted Magnesium (23U)	----	0.020	% Mg		0.105	<0.020	----	<0.020	<0.020
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t		86	<10	----	<10	<10
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.020	% S		0.138	<0.020	----	<0.020	<0.020
EA029-G: Retained Acidity									
HCl Extractable Sulfur (20Be)	----	0.020	% S		<0.020	<0.020	----	<0.020	<0.020
Net Acid Soluble Sulfur (20Je)	----	0.020	% S		<0.020	<0.020	----	0.037	0.040

Analytical Results

Sub-Matrix: **SOIL**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	RGS_YTF_WW_06/5 2021048_0020	RGS_YMF_WW_04/1 2021048_0028	RGS_YMF_C_04 2021048_0051	RGS_YMF_C_05 2021048_0052	RGS_YMF_C_08 2021048_0055
				Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00
					EB2215448-006	EB2215448-007	EB2215448-008	EB2215448-009	EB2215448-010
					Result	Result	Result	Result	Result
EA029-G: Retained Acidity - Continued									
acidity - Net Acid Soluble Sulfur (a-20J)	----	10	mole H+ / t		<10	<10	**----**	**17**	**18**
sulfidic - Net Acid Soluble Sulfur (s-20J)	----	0.020	% pyrite S		<0.020	<0.020	**----**	**0.028**	**0.030**
EA029-H: Acid Base Accounting									
ANC Fineness Factor	----	0.5	-		**1.5**	**1.5**	**----**	**1.5**	**1.5**
Net Acidity (sulfur units)	----	0.02	% S		**3.61**	**1.26**	**----**	**1.20**	**0.81**
Net Acidity (acidity units)	----	10	mole H+ / t		**2250**	**788**	**----**	**752**	**508**
Liming Rate	----	1	kg CaCO3/t		**169**	**59**	**----**	**56**	**38**
Net Acidity excluding ANC (sulfur units)	----	0.02	% S		**3.61**	**1.26**	**----**	**1.20**	**0.81**
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t		**2250**	**788**	**----**	**752**	**508**
Liming Rate excluding ANC	----	1	kg CaCO3/t		**169**	**59**	**----**	**56**	**38**

Analytical Results

Sub-Matrix: SOIL
(Matrix: SOIL)

Compound	CAS Number	LOR	Unit	Sample ID	RGS_YMF_C_12 2021048_0059	RGS_YMF_C_14 2021048_0061	RGS_YMF_C_15 2021048_0062	RGS_YMF_C_16 2021048_0063	RGS_YMF_C_17 2021048_0064
				Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00
					EB2215448-011	EB2215448-012	EB2215448-013	EB2215448-014	EB2215448-015
					Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur									
Chromium Reducible Sulphur	----	0.005	%		**0.022**	**0.022**	**0.036**	**0.027**	**0.018**
EA029-A: pH Measurements									
pH KCl (23A)	----	0.1	pH Unit		----	----	**3.0**	----	----
pH OX (23B)	----	0.1	pH Unit		----	----	**2.1**	----	----
EA029-B: Acidity Trail									
Titratable Actual Acidity (23F)	----	2	mole H+ / t		----	----	**473**	----	----
Titratable Peroxide Acidity (23G)	----	2	mole H+ / t		----	----	**5200**	----	----
Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t		----	----	**4720**	----	----
sulfidic - Titratable Actual Acidity (s-23F)	----	0.020	% pyrite S		----	----	**0.758**	----	----
sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.020	% pyrite S		----	----	**8.33**	----	----
sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.020	% pyrite S		----	----	**7.57**	----	----
EA029-C: Sulfur Trail									
KCl Extractable Sulfur (23Ce)	----	0.020	% S		----	----	<0.020	----	----
Peroxide Sulfur (23De)	----	0.020	% S		----	----	**0.181**	----	----
Peroxide Oxidisable Sulfur (23E)	----	0.020	% S		----	----	**0.181**	----	----
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t		----	----	**113**	----	----
EA029-D: Calcium Values									
KCl Extractable Calcium (23Vh)	----	0.020	% Ca		----	----	**0.061**	----	----
Peroxide Calcium (23Wh)	----	0.020	% Ca		----	----	**0.064**	----	----
Acid Reacted Calcium (23X)	----	0.020	% Ca		----	----	<0.020	----	----
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t		----	----	<10	----	----
sulfidic - Acid Reacted Calcium (s-23X)	----	0.020	% S		----	----	<0.020	----	----
EA029-E: Magnesium Values									
KCl Extractable Magnesium (23Sm)	----	0.020	% Mg		----	----	**0.154**	----	----
Peroxide Magnesium (23Tm)	----	0.020	% Mg		----	----	**0.161**	----	----
Acid Reacted Magnesium (23U)	----	0.020	% Mg		----	----	<0.020	----	----
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t		----	----	<10	----	----
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.020	% S		----	----	<0.020	----	----
EA029-G: Retained Acidity									
HCl Extractable Sulfur (20Be)	----	0.020	% S		----	----	<0.020	----	----
Net Acid Soluble Sulfur (20Je)	----	0.020	% S		----	----	**0.024**	----	----

Analytical Results

Sub-Matrix: **SOIL**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	RGS_YMF_C_12 2021048_0059	RGS_YMF_C_14 2021048_0061	RGS_YMF_C_15 2021048_0062	RGS_YMF_C_16 2021048_0063	RGS_YMF_C_17 2021048_0064
				Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00
					EB2215448-011	EB2215448-012	EB2215448-013	EB2215448-014	EB2215448-015
					Result	Result	Result	Result	Result
EA029-G: Retained Acidity - Continued									
acidity - Net Acid Soluble Sulfur (a-20J)	----	10	mole H+ / t		----	----	**11**	----	----
sulfidic - Net Acid Soluble Sulfur (s-20J)	----	0.020	% pyrite S		----	----	<0.020	----	----
EA029-H: Acid Base Accounting									
ANC Fineness Factor	----	0.5	-		----	----	**1.5**	----	----
Net Acidity (sulfur units)	----	0.02	% S		----	----	**0.96**	----	----
Net Acidity (acidity units)	----	10	mole H+ / t		----	----	**597**	----	----
Liming Rate	----	1	kg CaCO3/t		----	----	**45**	----	----
Net Acidity excluding ANC (sulfur units)	----	0.02	% S		----	----	**0.96**	----	----
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t		----	----	**597**	----	----
Liming Rate excluding ANC	----	1	kg CaCO3/t		----	----	**45**	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	RGS_YMF_C_18 2021048_0065	RGS_YMF_C_19 2021048_0066	RGS_YMF_C_20 2021048_0067	----	----
			Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	----	----
Compound	CAS Number	LOR	Unit	EB2215448-016	EB2215448-017	EB2215448-018	--------	--------
				Result	Result	Result	----	----
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	0.033	0.185	2.80	----	----
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	----	3.1	----	----	----
pH OX (23B)	----	0.1	pH Unit	----	1.9	----	----	----
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)	----	2	mole H+ / t	----	514	----	----	----
Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	----	7760	----	----	----
Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	----	7240	----	----	----
sulfidic - Titratable Actual Acidity (s-23F)	----	0.020	% pyrite S	----	0.825	----	----	----
sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.020	% pyrite S	----	12.4	----	----	----
sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.020	% pyrite S	----	11.6	----	----	----
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)	----	0.020	% S	----	0.167	----	----	----
Peroxide Sulfur (23De)	----	0.020	% S	----	0.792	----	----	----
Peroxide Oxidisable Sulfur (23E)	----	0.020	% S	----	0.624	----	----	----
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	----	389	----	----	----
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.020	% Ca	----	0.048	----	----	----
Peroxide Calcium (23Wh)	----	0.020	% Ca	----	0.075	----	----	----
Acid Reacted Calcium (23X)	----	0.020	% Ca	----	0.027	----	----	----
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	----	14	----	----	----
sulfidic - Acid Reacted Calcium (s-23X)	----	0.020	% S	----	0.022	----	----	----
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.020	% Mg	----	0.184	----	----	----
Peroxide Magnesium (23Tm)	----	0.020	% Mg	----	0.220	----	----	----
Acid Reacted Magnesium (23U)	----	0.020	% Mg	----	0.036	----	----	----
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	----	30	----	----	----
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.020	% S	----	0.048	----	----	----
EA029-G: Retained Acidity								
HCl Extractable Sulfur (20Be)	----	0.020	% S	----	0.152	----	----	----
Net Acid Soluble Sulfur (20Je)	----	0.020	% S	----	<0.020	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	RGS_YMF_C_18 2021048_0065	RGS_YMF_C_19 2021048_0066	RGS_YMF_C_20 2021048_0067	----	----
			Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	----	----
Compound	CAS Number	LOR	Unit	EB2215448-016	EB2215448-017	EB2215448-018	--------	--------
				Result	Result	Result	----	----
EA029-G: Retained Acidity - Continued								
acidity - Net Acid Soluble Sulfur (a-20J)	----	10	mole H+ / t	**----**	<10	**----**	**----**	**----**
sulfidic - Net Acid Soluble Sulfur (s-20J)	----	0.020	% pyrite S	**----**	<0.020	**----**	**----**	**----**
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	**----**	**1.5**	**----**	**----**	**----**
Net Acidity (sulfur units)	----	0.02	% S	**----**	**1.42**	**----**	**----**	**----**
Net Acidity (acidity units)	----	10	mole H+ / t	**----**	**889**	**----**	**----**	**----**
Liming Rate	----	1	kg CaCO3/t	**----**	**67**	**----**	**----**	**----**
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	**----**	**1.42**	**----**	**----**	**----**
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	**----**	**889**	**----**	**----**	**----**
Liming Rate excluding ANC	----	1	kg CaCO3/t	**----**	**67**	**----**	**----**	**----**

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2215461**	Page	: 1 of 15
Client	: **RGS ENVIRONMENTAL CONSULTANTS PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MATT LANDERS	Contact	: Customer Services EB
Address	: 3/30 LENSWORTH STREET COOPERS PLAINS 4107	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: 07 3344 1222	Telephone	: +61-7-3243 7222
Project	: 2021048 Yallourn	Date Samples Received	: 31-May-2022 09:15
Order number	: ----	Date Analysis Commenced	: 02-Jun-2022
C-O-C number	: ----	Issue Date	: 16-Jun-2022 18:28
Sampler	: LE XI NG		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 19		
No. of samples analysed	: 19		

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*
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Inorganics, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Mark Hallas	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD

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.

- ALS is not NATA accredited for the performance of EN35: Miscellaneous Leaching procedure.

Analytical Results

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

Compound	CAS Number	LOR	Unit	Sample ID	RGS_YTF_WW_1 2021048_0001 - Miscellaneous LEACH	RGS_YTF_WW_03/2 2021048_0005 - Miscellaneous LEACH	RGS_YTF_WW_03/4 2021048_0007 - Miscellaneous LEACH	RGS_YTF_WW_05/2 2021048_0013 - Miscellaneous LEACH	RGS_YTF_WW_05/3 2021048_0014 - Miscellaneous LEACH
				Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00
					EB2215461-001	EB2215461-002	EB2215461-003	EB2215461-004	EB2215461-005
					Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		**8**	<1	<1	**2**	**4**
Total Alkalinity as CaCO3	----	1	mg/L		**8**	<1	<1	**2**	**4**
ED038: Acidity									
Acidity as CaCO3	----	1	mg/L		**18**	**142**	**67**	**19**	**6**
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**10.2**	**2.68**	**1.58**	**0.32**	**0.82**
Dysprosium	7429-91-6	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Silver	7440-22-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic	7440-38-2	0.001	mg/L		<0.001	**0.002**	**0.002**	**0.001**	<0.001
Bismuth	7440-69-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Erbium	7440-52-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Boron	7440-42-8	0.05	mg/L		**1.20**	**1.02**	**1.00**	**0.91**	**0.53**
Europium	7440-53-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Strontium	7440-24-6	0.001	mg/L		**0.037**	**0.040**	**0.032**	**0.122**	**0.039**
Barium	7440-39-3	0.001	mg/L		**1.26**	**1.28**	**1.34**	**3.11**	**0.374**
Gadolinium	7440-54-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Titanium	7440-32-6	0.01	mg/L		**0.48**	**0.01**	**0.06**	**0.02**	**0.05**
Beryllium	7440-41-7	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	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L		**0.0002**	**0.0002**	**0.0002**	**0.0006**	**0.0001**
Hafnium	7440-58-6	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Tellurium	22541-49-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	7440-48-4	0.001	mg/L		**0.001**	<0.001	<0.001	**0.005**	**0.020**
Holmium	7440-60-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Uranium	7440-61-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Caesium	7440-46-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	7440-47-3	0.001	mg/L		**0.007**	**0.013**	**0.005**	**0.001**	**0.001**
Indium	7440-74-6	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		**0.005**	**0.004**	**0.003**	**0.002**	<0.001
Lanthanum	7439-91-0	0.001	mg/L		**0.002**	<0.001	<0.001	<0.001	<0.001
Rubidium	7440-17-7	0.001	mg/L		**0.009**	**0.008**	**0.005**	**0.011**	**0.002**

Analytical Results

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

Compound	CAS Number	LOR	Unit	Sample ID	RGS_YTF_WW_1 2021048_0001 - Miscellaneous LEACH	RGS_YTF_WW_03/2 2021048_0005 - Miscellaneous LEACH	RGS_YTF_WW_03/4 2021048_0007 - Miscellaneous LEACH	RGS_YTF_WW_05/2 2021048_0013 - Miscellaneous LEACH	RGS_YTF_WW_05/3 2021048_0014 - Miscellaneous LEACH
				Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00
					EB2215461-001	EB2215461-002	EB2215461-003	EB2215461-004	EB2215461-005
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Lithium	7439-93-2	0.001	mg/L		**0.004**	**0.002**	**0.006**	**0.004**	**0.010**
Lutetium	7439-94-3	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
Cerium	7440-45-1	0.001	mg/L		**0.006**	<0.001	**0.002**	<0.001	<0.001
Manganese	7439-96-5	0.001	mg/L		**0.037**	**0.071**	**0.032**	**0.329**	**0.998**
Neodymium	7440-00-8	0.001	mg/L		**0.002**	<0.001	**0.001**	<0.001	<0.001
Molybdenum	7439-98-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Praseodymium	7440-10-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L		**0.005**	**0.001**	**0.002**	**0.005**	**0.004**
Samarium	7440-19-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L		**0.074**	**1.04**	**0.380**	**0.003**	**0.005**
Terbium	7440-27-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Antimony	7440-36-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Thulium	7440-30-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Ytterbium	7440-64-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Yttrium	7440-65-5	0.001	mg/L		**0.002**	<0.001	<0.001	<0.001	<0.001
Thallium	7440-28-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Zirconium	7440-67-7	0.005	mg/L		**0.012**	<0.005	**0.007**	<0.005	<0.005
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		**0.868**	**1.25**	**1.16**	**0.568**	**0.511**
Iron	7439-89-6	0.05	mg/L		**3.63**	**9.87**	**0.66**	**0.20**	**0.42**

Analytical Results

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

Compound	CAS Number	LOR	Unit	Sample ID	RGS_YTF_WW_06/5 2021048_0020 - Miscellaneous LEACH	RGS_YMF_WW_04/1 2021048_0028 - Miscellaneous LEACH	RGS_YMF_WW_05/3 2021048_0031 - Miscellaneous LEACH	RGS_YEF_WW_01/4 2021048_0037 - Miscellaneous LEACH	RGS_YEF_WW_05/1 2021048_0045 - Miscellaneous LEACH
				Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00
					EB2215461-006	EB2215461-007	EB2215461-008	EB2215461-009	EB2215461-010
					Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		<1	<1	**2**	**3**	**8**
Total Alkalinity as CaCO3	----	1	mg/L		<1	<1	**2**	**3**	**8**
ED038: Acidity									
Acidity as CaCO3	----	1	mg/L		**49**	**31**	**15**	**28**	**6**
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**2.00**	**2.57**	**0.36**	**4.56**	**9.22**
Dysprosium	7429-91-6	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Silver	7440-22-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic	7440-38-2	0.001	mg/L		**0.233**	**0.004**	<0.001	**0.001**	<0.001
Bismuth	7440-69-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Erbium	7440-52-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Boron	7440-42-8	0.05	mg/L		**0.90**	**0.81**	**0.10**	**0.91**	**0.74**
Europium	7440-53-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Strontium	7440-24-6	0.001	mg/L		**0.030**	**0.022**	**0.029**	**0.025**	**0.027**
Barium	7440-39-3	0.001	mg/L		**1.30**	**0.944**	**0.128**	**1.07**	**1.10**
Gadolinium	7440-54-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Titanium	7440-32-6	0.01	mg/L		**0.10**	**0.13**	<0.01	**0.19**	**0.11**
Beryllium	7440-41-7	0.001	mg/L		<0.001	<0.001	**0.001**	<0.001	<0.001
Gallium	7440-55-3	0.001	mg/L		<0.001	<0.001	<0.001	**0.001**	**0.002**
Cadmium	7440-43-9	0.0001	mg/L		**0.0002**	**0.0002**	**0.0019**	**0.0002**	**0.0002**
Hafnium	7440-58-6	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Tellurium	22541-49-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	7440-48-4	0.001	mg/L		<0.001	<0.001	**0.184**	**0.001**	**0.002**
Holmium	7440-60-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Uranium	7440-61-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Caesium	7440-46-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	7440-47-3	0.001	mg/L		**0.015**	**0.004**	<0.001	**0.005**	**0.007**
Indium	7440-74-6	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		**0.004**	**0.002**	<0.001	**0.002**	**0.005**
Lanthanum	7439-91-0	0.001	mg/L		<0.001	<0.001	**0.001**	<0.001	**0.003**
Rubidium	7440-17-7	0.001	mg/L		**0.008**	**0.004**	**0.003**	**0.006**	**0.007**

Analytical Results

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

Compound	CAS Number	LOR	Unit	Sample ID	RGS_YTF_WW_06/5 2021048_0020 - Miscellaneous LEACH	RGS_YMF_WW_04/1 2021048_0028 - Miscellaneous LEACH	RGS_YMF_WW_05/3 2021048_0031 - Miscellaneous LEACH	RGS_YEF_WW_01/4 2021048_0037 - Miscellaneous LEACH	RGS_YEF_WW_05/1 2021048_0045 - Miscellaneous LEACH
				Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00
					EB2215461-006	**EB2215461-007**	**EB2215461-008**	**EB2215461-009**	**EB2215461-010**
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Lithium	7439-93-2	0.001	mg/L		**0.002**	**0.003**	**0.006**	**0.008**	**0.003**
Lutetium	7439-94-3	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
Cerium	7440-45-1	0.001	mg/L		<0.001	<0.001	**0.002**	**0.002**	**0.006**
Manganese	7439-96-5	0.001	mg/L		**0.114**	**0.024**	**0.048**	**0.054**	**0.067**
Neodymium	7440-00-8	0.001	mg/L		<0.001	<0.001	**0.001**	<0.001	**0.003**
Molybdenum	7439-98-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Praseodymium	7440-10-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L		**0.002**	**0.002**	**0.068**	**0.002**	**0.006**
Samarium	7440-19-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L		**0.168**	**0.073**	**0.001**	**0.072**	**0.007**
Terbium	7440-27-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Antimony	7440-36-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Thulium	7440-30-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Ytterbium	7440-64-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Yttrium	7440-65-5	0.001	mg/L		<0.001	<0.001	**0.001**	<0.001	**0.002**
Thallium	7440-28-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Zirconium	7440-67-7	0.005	mg/L		**0.006**	<0.005	<0.005	**0.008**	**0.010**
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		**1.11**	**0.930**	**0.603**	**1.09**	**0.426**
Iron	7439-89-6	0.05	mg/L		**1.96**	**1.78**	<0.05	**3.16**	**4.19**

Analytical Results

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

Compound	CAS Number	LOR	Unit	Sample ID	RGS_YMF_C_04 2021048_0051 - Miscellaneous LEACH	RGS_YMF_C_05 2021048_0052 - Miscellaneous LEACH	RGS_YMF_C_10 2021048_0057 - Miscellaneous LEACH	RGS_YMF_C_15 2021048_0062 - Miscellaneous LEACH	RGS_YMF_C_16 2021048_0063 - Miscellaneous LEACH
				Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00
					EB2215461-011	EB2215461-012	EB2215461-013	EB2215461-014	EB2215461-015
					Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		<1	**5**	<1	**4**	**2**
Total Alkalinity as CaCO3	----	1	mg/L		<1	**5**	<1	**4**	**2**
ED038: Acidity									
Acidity as CaCO3	----	1	mg/L		**35**	**8**	**40**	**12**	**17**
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**1.86**	**0.58**	**4.02**	**0.18**	**0.47**
Dysprosium	7429-91-6	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Silver	7440-22-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic	7440-38-2	0.001	mg/L		**0.002**	**0.007**	**0.002**	**0.002**	**0.002**
Bismuth	7440-69-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Erbium	7440-52-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Boron	7440-42-8	0.05	mg/L		**0.66**	**1.06**	**0.62**	**0.75**	**0.81**
Europium	7440-53-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Strontium	7440-24-6	0.001	mg/L		**0.036**	**0.020**	**0.022**	**0.024**	**0.032**
Barium	7440-39-3	0.001	mg/L		**1.06**	**0.846**	**1.00**	**1.14**	**1.23**
Gadolinium	7440-54-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Titanium	7440-32-6	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Beryllium	7440-41-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Gallium	7440-55-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L		**0.0002**	**0.0001**	**0.0002**	**0.0002**	**0.0002**
Hafnium	7440-58-6	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Tellurium	22541-49-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	7440-48-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Holmium	7440-60-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Uranium	7440-61-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Caesium	7440-46-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	7440-47-3	0.001	mg/L		<0.001	**0.002**	<0.001	<0.001	<0.001
Indium	7440-74-6	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		**0.002**	<0.001	<0.001	<0.001	<0.001
Lanthanum	7439-91-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Rubidium	7440-17-7	0.001	mg/L		**0.010**	**0.002**	**0.004**	**0.002**	**0.004**

Analytical Results

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

Compound	CAS Number	LOR	Unit	Sample ID	RGS_YMF_C_04 2021048_0051 - Miscellaneous LEACH	RGS_YMF_C_05 2021048_0052 - Miscellaneous LEACH	RGS_YMF_C_10 2021048_0057 - Miscellaneous LEACH	RGS_YMF_C_15 2021048_0062 - Miscellaneous LEACH	RGS_YMF_C_16 2021048_0063 - Miscellaneous LEACH
				Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00
					EB2215461-011	EB2215461-012	EB2215461-013	EB2215461-014	EB2215461-015
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Lithium	7439-93-2	0.001	mg/L		**0.009**	**0.003**	**0.002**	**0.003**	**0.003**
Lutetium	7439-94-3	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
Cerium	7440-45-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	7439-96-5	0.001	mg/L		**0.141**	**0.016**	**0.046**	**0.024**	**0.064**
Neodymium	7440-00-8	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum	7439-98-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Praseodymium	7440-10-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L		**0.002**	<0.001	**0.002**	<0.001	<0.001
Samarium	7440-19-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L		**0.041**	**0.020**	**0.019**	**0.015**	**0.028**
Terbium	7440-27-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Antimony	7440-36-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Thulium	7440-30-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Ytterbium	7440-64-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Yttrium	7440-65-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Thallium	7440-28-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Zirconium	7440-67-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
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		**0.833**	**0.917**	**0.825**	**0.936**	**1.09**
Iron	7439-89-6	0.05	mg/L		**1.74**	**0.17**	**1.33**	**0.62**	**1.71**

Analytical Results

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

Compound	CAS Number	LOR	Unit	Sample ID	RGS_YMF_C_19 2021048_0066 - Miscellaneous LEACH	RGS_YMF_C_20 2021048_0067 - Miscellaneous LEACH	pH and EC of leach water	----	----
				Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	----	----
					EB2215461-016	EB2215461-017	EB2215461-018	--------	--------
					Result	Result	Result	----	----
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		**----**	**----**	**5.84**	**----**	**----**
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		**----**	**----**	<1	**----**	**----**
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	**----**	**----**	**----**
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	**----**	**----**	**----**
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		<1	<1	**----**	**----**	**----**
Total Alkalinity as CaCO3	----	1	mg/L		<1	<1	**----**	**----**	**----**
ED038: Acidity									
Acidity as CaCO3	----	1	mg/L		**19**	**326**	**----**	**----**	**----**
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**0.59**	**30.1**	**----**	**----**	**----**
Dysprosium	7429-91-6	0.001	mg/L		<0.001	<0.001	**----**	**----**	**----**
Silver	7440-22-4	0.001	mg/L		<0.001	<0.001	**----**	**----**	**----**
Arsenic	7440-38-2	0.001	mg/L		**0.015**	**0.011**	**----**	**----**	**----**
Bismuth	7440-69-9	0.001	mg/L		<0.001	<0.001	**----**	**----**	**----**
Erbium	7440-52-0	0.001	mg/L		<0.001	<0.001	**----**	**----**	**----**
Boron	7440-42-8	0.05	mg/L		**0.48**	**0.74**	**----**	**----**	**----**
Europium	7440-53-1	0.001	mg/L		<0.001	<0.001	**----**	**----**	**----**
Strontium	7440-24-6	0.001	mg/L		**0.161**	**0.701**	**----**	**----**	**----**
Barium	7440-39-3	0.001	mg/L		**0.762**	**0.058**	**----**	**----**	**----**
Gadolinium	7440-54-2	0.001	mg/L		<0.001	<0.001	**----**	**----**	**----**
Titanium	7440-32-6	0.01	mg/L		<0.01	<0.01	**----**	**----**	**----**
Beryllium	7440-41-7	0.001	mg/L		<0.001	**0.009**	**----**	**----**	**----**
Gallium	7440-55-3	0.001	mg/L		<0.001	<0.001	**----**	**----**	**----**
Cadmium	7440-43-9	0.0001	mg/L		**0.0002**	**0.0002**	**----**	**----**	**----**
Hafnium	7440-58-6	0.01	mg/L		<0.01	<0.01	**----**	**----**	**----**
Tellurium	22541-49-7	0.005	mg/L		<0.005	<0.005	**----**	**----**	**----**
Cobalt	7440-48-4	0.001	mg/L		**0.016**	**0.282**	**----**	**----**	**----**
Holmium	7440-60-0	0.001	mg/L		<0.001	<0.001	**----**	**----**	**----**
Uranium	7440-61-1	0.001	mg/L		<0.001	<0.001	**----**	**----**	**----**
Caesium	7440-46-2	0.001	mg/L		<0.001	<0.001	**----**	**----**	**----**
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	**----**	**----**	**----**

Analytical Results

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

Compound	CAS Number	LOR	Unit	Sample ID	RGS_YMF_C_19 2021048_0066 - Miscellaneous LEACH	RGS_YMF_C_20 2021048_0067 - Miscellaneous LEACH	pH and EC of leach water	----	----
				Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	----	----
					EB2215461-016	EB2215461-017	EB2215461-018	--------	--------
					Result	Result	Result	----	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Indium	7440-74-6	0.001	mg/L		<0.001	<0.001	----	----	----
Copper	7440-50-8	0.001	mg/L		<0.001	<0.001	----	----	----
Lanthanum	7439-91-0	0.001	mg/L		<0.001	**0.011**	----	----	----
Rubidium	7440-17-7	0.001	mg/L		**0.006**	**0.015**	----	----	----
Lithium	7439-93-2	0.001	mg/L		**0.004**	**0.004**	----	----	----
Lutetium	7439-94-3	0.001	mg/L		<0.001	<0.001	----	----	----
Thorium	7440-29-1	0.001	mg/L		<0.001	<0.001	----	----	----
Cerium	7440-45-1	0.001	mg/L		<0.001	**0.010**	----	----	----
Manganese	7439-96-5	0.001	mg/L		**0.380**	**1.88**	----	----	----
Neodymium	7440-00-8	0.001	mg/L		<0.001	**0.002**	----	----	----
Molybdenum	7439-98-7	0.001	mg/L		<0.001	<0.001	----	----	----
Praseodymium	7440-10-0	0.001	mg/L		<0.001	<0.001	----	----	----
Nickel	7440-02-0	0.001	mg/L		**0.004**	**0.080**	----	----	----
Samarium	7440-19-9	0.001	mg/L		<0.001	<0.001	----	----	----
Lead	7439-92-1	0.001	mg/L		**0.022**	**0.074**	----	----	----
Terbium	7440-27-9	0.001	mg/L		<0.001	<0.001	----	----	----
Antimony	7440-36-0	0.001	mg/L		<0.001	<0.001	----	----	----
Thulium	7440-30-4	0.001	mg/L		<0.001	<0.001	----	----	----
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	----	----	----
Ytterbium	7440-64-4	0.001	mg/L		<0.001	<0.001	----	----	----
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	----	----	----
Yttrium	7440-65-5	0.001	mg/L		<0.001	**0.005**	----	----	----
Thallium	7440-28-0	0.001	mg/L		<0.001	<0.001	----	----	----
Zirconium	7440-67-7	0.005	mg/L		<0.005	<0.005	----	----	----
Vanadium	7440-62-2	0.01	mg/L		<0.01	<0.01	----	----	----
Zinc	7440-66-6	0.005	mg/L		**0.733**	**0.896**	----	----	----
Iron	7439-89-6	0.05	mg/L		**0.22**	**16.5**	----	----	----

Analytical Results

Sub-Matrix: **SOIL**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	RGS_YTF_WW_1 2021048_0001 - Miscellaneous LEACH	RGS_YTF_WW_03/2 2021048_0005 - Miscellaneous LEACH	RGS_YTF_WW_03/4 2021048_0007 - Miscellaneous LEACH	RGS_YTF_WW_05/2 2021048_0013 - Miscellaneous LEACH	RGS_YTF_WW_05/3 2021048_0014 - Miscellaneous LEACH
				Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00
					EB2215461-001	EB2215461-002	EB2215461-003	EB2215461-004	EB2215461-005
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**5.7**	**3.9**	**3.7**	**4.3**	**4.9**
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		**41**	**78**	**84**	**882**	**174**
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		**15.3**	**16.7**	**40.4**	**1.9**	**5.0**
ED093T: Total Major Cations									
Calcium	7440-70-2	50	mg/kg		**2200**	**1100**	**390**	**230**	**360**
Magnesium	7439-95-4	50	mg/kg		**1980**	**1360**	**980**	**480**	**960**
Sodium	7440-23-5	50	mg/kg		**150**	**510**	**340**	**950**	**160**
Potassium	7440-09-7	50	mg/kg		**580**	**330**	**60**	**340**	**380**

Analytical Results

Sub-Matrix: **SOIL**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	RGS_YTF_WW_06/5 2021048_0020 - Miscellaneous LEACH	RGS_YMF_WW_04/1 2021048_0028 - Miscellaneous LEACH	RGS_YMF_WW_05/3 2021048_0031 - Miscellaneous LEACH	RGS_YEF_WW_01/4 2021048_0037 - Miscellaneous LEACH	RGS_YEF_WW_05/1 2021048_0045 - Miscellaneous LEACH
				Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00
					EB2215461-006	EB2215461-007	EB2215461-008	EB2215461-009	EB2215461-010
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**3.9**	**4.4**	**4.2**	**4.2**	**5.8**
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		**95**	**55**	**143**	**78**	**58**
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		**16.5**	**20.9**	**2.4**	**29.4**	**11.9**
ED093T: Total Major Cations									
Calcium	7440-70-2	50	mg/kg		**2020**	**1310**	<50	**1310**	**1770**
Magnesium	7439-95-4	50	mg/kg		**1490**	**1950**	**50**	**2010**	**1810**
Sodium	7440-23-5	50	mg/kg		**430**	**710**	<50	**840**	**220**
Potassium	7440-09-7	50	mg/kg		**380**	**90**	<50	**150**	**630**

Analytical Results

Sub-Matrix: **SOIL**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	RGS_YMF_C_04 2021048_0051 - Miscellaneous LEACH	RGS_YMF_C_05 2021048_0052 - Miscellaneous LEACH	RGS_YMF_C_10 2021048_0057 - Miscellaneous LEACH	RGS_YMF_C_15 2021048_0062 - Miscellaneous LEACH	RGS_YMF_C_16 2021048_0063 - Miscellaneous LEACH
				Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00
					EB2215461-011	EB2215461-012	EB2215461-013	EB2215461-014	EB2215461-015
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**4.2**	**4.5**	**4.3**	**4.4**	**4.4**
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		**377**	**79**	**124**	**162**	**224**
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		**61.3**	**53.4**	**41.6**	**56.5**	**56.7**
ED093T: Total Major Cations									
Calcium	7440-70-2	50	mg/kg		**1300**	**760**	**1030**	**1150**	**1300**
Magnesium	7439-95-4	50	mg/kg		**1990**	**1020**	**1320**	**1930**	**2330**
Sodium	7440-23-5	50	mg/kg		**1630**	**600**	**640**	**1040**	**1150**
Potassium	7440-09-7	50	mg/kg		**110**	**50**	**60**	**80**	**80**

Analytical Results

Sub-Matrix: **SOIL**
(Matrix: **SOIL**)

				Sample ID	RGS_YMF_C_19 2021048_0066 - Miscellaneous LEACH	RGS_YMF_C_20 2021048_0067 - Miscellaneous LEACH	----	----	----
				Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	----	----	----
Compound	CAS Number	LOR	Unit		EB2215461-016	EB2215461-017	--------	--------	--------
					Result	Result	----	----	----
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**3.8**	**3.1**	**----**	**----**	**----**
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		**840**	**2080**	**----**	**----**	**----**
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		**55.5**	**54.8**	**----**	**----**	**----**
ED093T: Total Major Cations									
Calcium	7440-70-2	50	mg/kg		**920**	**850**	**----**	**----**	**----**
Magnesium	7439-95-4	50	mg/kg		**2070**	**2230**	**----**	**----**	**----**
Sodium	7440-23-5	50	mg/kg		**1220**	**1080**	**----**	**----**	**----**
Potassium	7440-09-7	50	mg/kg		**60**	**70**	**----**	**----**	**----**

Analytical Results

Sub-Matrix: **WATER** (Matrix: **SOIL**)			Sample ID	**pH and EC of DI water**	**----**	**----**	**----**	**----**
			Sampling date / time	04-May-2022 00:00	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**EB2215461-019**	**--------**	**--------**	**--------**	**--------**
				Result	----	----	----	----
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**5.4**	**----**	**----**	**----**	**----**
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	<1	**----**	**----**	**----**	**----**

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2222882**	Page	: 1 of 12
Client	: **RGS ENVIRONMENTAL CONSULTANTS PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MATT LANDERS	Contact	: Customer Services EB
Address	: 3/30 LENSWORTH STREET COOPERS PLAINS 4108	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: 07 3344 1222	Telephone	: +61-7-3243 7222
Project	: 2021048 Yallourn	Date Samples Received	: 19-Jul-2022 12:47
Order number	: ----	Date Analysis Commenced	: 11-Aug-2022
C-O-C number	: ----	Issue Date	: 11-Aug-2022 11:29
Sampler	: VERONICA CANALES		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 49		
No. of samples analysed	: 49		

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*
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

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: **PULP** (Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	2021048__0001 RGS_YTF_WW_1	2021048__0003 RGS_YTF_WW_2/1	2021048__0004 RGS_YTF_WW_03/1	2021048__0005 RGS_YTF_WW_03/2	2021048__0006 RGS_YTF_WW_03/3
				Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00
					EB2222882-001	EB2222882-002	EB2222882-003	EB2222882-004	EB2222882-005
					Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur									
Chromium Reducible Sulphur	----	0.005	%		**0.016**	**0.024**	**0.020**	**0.023**	**0.024**

Analytical Results

Sub-Matrix: **PULP**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	2021048__0008 RGS_YTF_WW_04/1	2021048__0010 RGS_YTF_WW_04/03	2021048__0011 RGS_YTF_WW_04/4	2021048__0012 RGS_YTF_WW_05/1	2021048__0013 RGS_YTF_WW_05/2
				Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00
					EB2222882-006	EB2222882-007	EB2222882-008	EB2222882-009	EB2222882-010
					Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur									
Chromium Reducible Sulphur	----	0.005	%		**0.012**	**0.015**	**0.014**	**0.019**	**0.018**

Analytical Results

Sub-Matrix: **PULP** (Matrix: **SOIL**)			Sample ID	2021048__0014 RGS_YTF_WW_05/3	2021048__0015 RGS_YTF_WW_05/04	2021048__0016 RGS_YTF_WW_06/1	2021048__0019 RGS_YTF_WW_06/4	2021048__0021 RGS_YTF_WW_06/6
			Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00
Compound	*CAS Number*	*LOR*	*Unit*	**EB2222882-011**	**EB2222882-012**	**EB2222882-013**	**EB2222882-014**	**EB2222882-015**
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.016**	**0.022**	**0.019**	**0.019**	**0.018**

Analytical Results

Sub-Matrix: **PULP** (Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	2021048__0022 RGS_YTF_WW_06/7	2021048__0023 RGS_YTF_WW_06/8	2021048__0024 RGS_YMF_WW_01/1	2021048__0025 RGS_YMF_WW_01/2	2021048__0026 RGS_YMF_WW_02/1
				Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00
					EB2222882-016	EB2222882-017	EB2222882-018	EB2222882-019	EB2222882-020
					Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur									
Chromium Reducible Sulphur	----	0.005	%		**0.016**	**0.012**	**0.022**	**0.020**	**0.014**

Analytical Results

Sub-Matrix: **PULP** (Matrix: **SOIL**)			Sample ID	2021048__0027 RGS_YMF_WW_03/02	2021048__0029 RGS_YMF_WW_5/1	2021048__0030 RGS_YMF_WW_5/2	2021048__0031 RGS_YMF_WW_05/3	2021048__0032 RGS_YMF_WW_06/1
			Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00
Compound	*CAS Number*	*LOR*	*Unit*	**EB2222882-021**	**EB2222882-022**	**EB2222882-023**	**EB2222882-024**	**EB2222882-025**
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.017**	**0.017**	**0.020**	**0.012**	**0.016**

Analytical Results

Sub-Matrix: **PULP** (Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	2021048__0033 RGS_YMF_WW_06/02	2021048__0034 RGS_YEF_WW_01/1	2021048__0035 RGS_YEF_WW_01/2	2021048__0036 RGS_YEF_WW_01/3	2021048__0037 RGS_YEF_WW_01/4
				Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00
					EB2222882-026	EB2222882-027	EB2222882-028	EB2222882-029	EB2222882-030
					Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur									
Chromium Reducible Sulphur	----	0.005	%		**0.011**	**0.020**	**0.016**	**0.016**	**0.021**

Analytical Results

Sub-Matrix: **PULP** (Matrix: **SOIL**)			Sample ID	2021048__0038 RGS_YEF_WW_2/1	2021048__0039 RGS_YEF_WW_02/2	2021048__0040 RGS_YEF_WW_02/3	2021048__0041 RGS_YEF_WW_03/1	2021048__0042 RGS_YEF_WW_03/2
			Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00
Compound	*CAS Number*	*LOR*	*Unit*	**EB2222882-031**	**EB2222882-032**	**EB2222882-033**	**EB2222882-034**	**EB2222882-035**
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.018**	**0.018**	**0.022**	**0.019**	**0.024**

Analytical Results

Sub-Matrix: **PULP** (Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	2021048__0043 RGS_YEF_WW_03/3	2021048__0044 RGS_YEF_WW_04/1	2021048__0045 RGS_YEF_WW_05/01	2021048__0046 RGS_RCD_WW_01/1	2021048__0047 RGS_RCB_WW_01/2
				Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00
					EB2222882-036	EB2222882-037	EB2222882-038	EB2222882-039	EB2222882-040
					Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur									
Chromium Reducible Sulphur	----	0.005	%		**0.023**	**0.015**	**0.013**	**0.018**	**0.019**

Analytical Results

Sub-Matrix: **PULP** (Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	2021048__0048 RGS_YMF_C_01	2021048__0049 RGS_YMF_C_02	2021048__0050 RGS_YMF_C_03	2021048__0053 RGS_YMF_C_06	2021048__0054 RGS_YMF_C_07
				Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00
					EB2222882-041	EB2222882-042	EB2222882-043	EB2222882-044	EB2222882-045
					Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur									
Chromium Reducible Sulphur	----	0.005	%		**0.015**	**0.019**	**0.019**	**0.021**	**0.020**

Analytical Results

Sub-Matrix: **PULP** (Matrix: **SOIL**)			Sample ID	**2021048__0056 RGS_YMF_C_09**	**2021048__0057 RGS_YMF_C_10**	**2021048__0058 RGS_YMF_C_11**	**2021048__0060 RGS_YMF_C_13**	**----**
			Sampling date / time	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	04-May-2022 00:00	----
Compound	*CAS Number*	*LOR*	*Unit*	**EB2222882-046**	**EB2222882-047**	**EB2222882-048**	**EB2222882-049**	**--------**
				Result	Result	Result	Result	----
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.015**	**0.017**	**0.017**	**0.019**	**----**

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2227537**	Page	: 1 of 19
Client	: **RGS ENVIRONMENTAL CONSULTANTS PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MATT LANDERS	Contact	: Customer Services EB
Address	: 3/30 LENSWORTH STREET COOPERS PLAINS 4108	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: 07 3344 1222	Telephone	: +61-7-3243 7222
Project	: 2022057 Yallourn KLC Extension	Date Samples Received	: 16-Sep-2022 12:15
Order number	: ----	Date Analysis Commenced	: 21-Sep-2022
C-O-C number	: ----	Issue Date	: 06-Oct-2022 14:46
Sampler	: BEN FREIDMAN		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 81		
No. of samples analysed	: 81		

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*
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

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.

- ASS: EA013 (ANC) Fizz Rating: 0- None; 1- Slight; 2- Moderate; 3- Strong; 4- Very Strong; 5- Lime.

Analytical Results

Sub-Matrix: **PULP**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	2022057_001 EAY_KLC_C_1 YTF Northern Batters	2022057_002 EAY_KLC_C_2 YTF Northern Batters	2022057_003 EAY_KLC_C_3 YTF Northern Batters	2022057_004 EAY_KLC_C_4 YTF Northern Batters	2022057_005 EAY_KLC_C_5 YTF Northern Batters
				Sampling date / time	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00
					EB2227537-001	EB2227537-002	EB2227537-003	EB2227537-004	EB2227537-005
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**3.7**	**4.1**	**3.9**	**3.8**	**3.8**
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		**5.8**	**6.4**	**5.5**	**6.1**	**3.4**
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		**253**	**82**	**78**	**92**	**107**
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		<0.5	<0.5	<0.5	<0.5	<0.5
ANC as CaCO3	----	0.1	% CaCO3		<0.1	<0.1	<0.1	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit		**0**	**0**	**0**	**0**	**0**
EA026 : Chromium Reducible Sulfur									
Chromium Reducible Sulphur	----	0.005	%		**0.018**	**0.020**	**0.021**	**0.022**	**0.018**
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		**0.19**	**0.21**	**0.18**	**0.20**	**0.11**

Analytical Results

Sub-Matrix: **PULP**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	2022057_006 EAY_KLC_C_6 YTF Northern Batters	2022057_007 EAY_KLC_C_7 YTF Northern Batters	2022057_008 EAY_KLC_C_8 YTF Northern Batters	2022057_009 EAY_KLC_C_9 YTF Northern Batters	2022057_010 EAY_KLC_C_10 YTF Northern Batters
				Sampling date / time	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00
					EB2227537-006	EB2227537-007	EB2227537-008	EB2227537-009	EB2227537-010
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**3.6**	**3.2**	**3.8**	**3.8**	**3.5**
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		**8.3**	**6.7**	**3.7**	**3.1**	**4.3**
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		**173**	**288**	**78**	**130**	**266**
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		<0.5	<0.5	<0.5	<0.5	<0.5
ANC as CaCO3	----	0.1	% CaCO3		<0.1	<0.1	<0.1	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit		**0**	**0**	**0**	**0**	**0**
EA026 : Chromium Reducible Sulfur									
Chromium Reducible Sulphur	----	0.005	%		**0.019**	**0.026**	**0.013**	**0.011**	**0.016**
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		**0.27**	**0.22**	**0.12**	**0.10**	**0.14**

Analytical Results

Sub-Matrix: **PULP**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	2022057_011 EAY_KLC_C_11 YTF Northern Batters	2022057_012 EAY_KLC_C_12 YTF Northern Batters	2022057_013 EAY_KLC_C_13 YTF Hermes Oak/Western Batters	2022057_014 EAY_KLC_C_14 YTF Hermes Oak/Western Batters	2022057_015 EAY_KLC_C_15 YTF Hermes Oak/Western Batters
				Sampling date / time	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00
					EB2227537-011	EB2227537-012	EB2227537-013	EB2227537-014	EB2227537-015
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**3.7**	**4.7**	**4.0**	**3.6**	**3.7**
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		**3.7**	**3.7**	**3.4**	**4.0**	**3.4**
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		**218**	**65**	**96**	**102**	**211**
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		<0.5	<0.5	<0.5	<0.5	**0.6**
ANC as CaCO3	----	0.1	% CaCO3		<0.1	<0.1	<0.1	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit		**0**	**0**	**0**	**0**	**0**
EA026 : Chromium Reducible Sulfur									
Chromium Reducible Sulphur	----	0.005	%		**0.014**	**0.018**	**0.018**	**0.012**	**0.014**
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		**0.12**	**0.12**	**0.11**	**0.13**	**0.13**

Analytical Results

Sub-Matrix: **PULP**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	2022057_016 EAY_KLC_C_16 YTF Hermes Oak/Western Batters	2022057_017 EAY_KLC_C_17 YTF South West Batters	2022057_018 EAY_KLC_C_18 YTF South West Batters	2022057_019 EAY_KLC_C_19 YTF South West Batters	2022057_020 EAY_KLC_C_20 YTF South West Batters
				Sampling date / time	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00
					EB2227537-016	EB2227537-017	EB2227537-018	EB2227537-019	EB2227537-020
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**3.6**	**3.9**	**3.6**	**3.8**	**3.5**
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		**5.2**	**3.4**	**3.1**	**3.1**	**3.4**
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		**194**	**135**	**184**	**167**	**246**
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		<0.5	<0.5	<0.5	<0.5	<0.5
ANC as CaCO3	----	0.1	% CaCO3		<0.1	<0.1	<0.1	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit		**0**	**0**	**0**	**0**	**0**
EA026 : Chromium Reducible Sulfur									
Chromium Reducible Sulphur	----	0.005	%		**0.026**	**0.013**	**0.015**	**0.016**	**0.016**
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		**0.17**	**0.11**	**0.10**	**0.10**	**0.11**

Analytical Results

Sub-Matrix: **PULP** (Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	2022057_021 EAY_KLC_C_21 YTF South West Batters	2022057_022 EAY_KLC_C_22 YTF Floc Pond Batters	2022057_023 EAY_KLC_C_23 YTF Floc Pond Batters	2022057_024 EAY_KLC_C_24 YTF Floc Pond Batters	2022057_025 EAY_KLC_C_25 YTF Floc Pond Batters
				Sampling date / time	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00
					EB2227537-021	EB2227537-022	EB2227537-023	EB2227537-024	EB2227537-025
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**3.7**	**3.9**	**3.6**	**3.8**	**3.5**
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		**4.3**	**5.2**	**4.3**	**2.8**	**3.1**
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		**216**	**152**	**116**	**100**	**140**
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		<0.5	<0.5	<0.5	<0.5	<0.5
ANC as CaCO3	----	0.1	% CaCO3		<0.1	<0.1	<0.1	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit		**0**	**0**	**0**	**0**	**0**
EA026 : Chromium Reducible Sulfur									
Chromium Reducible Sulphur	----	0.005	%		**0.015**	**0.023**	**0.018**	**0.011**	**0.016**
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		**0.14**	**0.17**	**0.14**	**0.09**	**0.10**

Analytical Results

Sub-Matrix: **PULP**
(Matrix: **SOIL**)

				Sample ID	2022057_026 EAY_KLC_C_26 YTF Floc Pond Batters	2022057_027 EAY_KLC_C_27 YTF Fire Service Pond Batters	2022057_028 EAY_KLC_C_28 YTF Fire Service Pond Batters	2022057_029 EAY_KLC_C_29 YTF Fire Service Pond Batters	2022057_030 EAY_KLC_C_30 YTF Raw Coal Bunker Batters
				Sampling date / time	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00
Compound	CAS Number	LOR	Unit		EB2227537-026	EB2227537-027	EB2227537-028	EB2227537-029	EB2227537-030
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**3.5**	**3.5**	**3.5**	**3.4**	**3.5**
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		**3.4**	**3.7**	**3.1**	**3.7**	**4.9**
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		**186**	**76**	**93**	**189**	**185**
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		<0.5	<0.5	<0.5	<0.5	<0.5
ANC as CaCO3	----	0.1	% CaCO3		<0.1	<0.1	<0.1	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit		**0**	**0**	**0**	**0**	**0**
EA026 : Chromium Reducible Sulfur									
Chromium Reducible Sulphur	----	0.005	%		**0.007**	**0.018**	**0.018**	**0.022**	**0.050**
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		**0.11**	**0.12**	**0.10**	**0.12**	**0.16**

Analytical Results

Sub-Matrix: **PULP**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	2022057_031 EAY_KLC_C_31 YTF Raw Coal Bunker Batters	2022057_032 EAY_KLC_C_32 YEF Northern Batters	2022057_033 EAY_KLC_C_33 YEF Northern Batters	2022057_034 EAY_KLC_C_34 YEF Northern Batters	2022057_035 EAY_KLC_C_35 YEF Northern Batters
				Sampling date / time	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00
					EB2227537-031	EB2227537-032	EB2227537-033	EB2227537-034	EB2227537-035
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**3.4**	**3.7**	**3.4**	**3.7**	**4.1**
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		**5.5**	**3.1**	**3.1**	**1.2**	**2.4**
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		**571**	**151**	**198**	**163**	**117**
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		<0.5	<0.5	<0.5	<0.5	<0.5
ANC as CaCO3	----	0.1	% CaCO3		<0.1	<0.1	<0.1	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit		**0**	**0**	**0**	**0**	**0**
EA026 : Chromium Reducible Sulfur									
Chromium Reducible Sulphur	----	0.005	%		**0.023**	**0.020**	**0.018**	**0.015**	**0.013**
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		**0.18**	**0.10**	**0.10**	**0.04**	**0.08**

Analytical Results

Sub-Matrix: **PULP**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	2022057_036 EAY_KLC_C_36 YEF Northern Batters	2022057_037 EAY_KLC_C_37 YEF Latrobe River Batters	2022057_038 EAY_KLC_C_38 YEF Latrobe River Batters	2022057_039 EAY_KLC_C_39 YEF Northern Batters	2022057_040 EAY_KLC_C_40 YEF Northern Batters
				Sampling date / time	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00
					EB2227537-036	EB2227537-037	EB2227537-038	EB2227537-039	EB2227537-040
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**3.8**	**3.8**	**3.7**	**4.4**	**3.0**
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		**2.8**	**2.4**	**3.4**	**5.8**	**5.5**
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		**121**	**131**	**162**	**104**	**306**
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		<0.5	<0.5	<0.5	<0.5	<0.5
ANC as CaCO3	----	0.1	% CaCO3		<0.1	<0.1	<0.1	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit		**0**	**0**	**0**	**0**	**0**
EA026 : Chromium Reducible Sulfur									
Chromium Reducible Sulphur	----	0.005	%		**0.012**	**0.010**	**0.020**	**0.022**	**0.021**
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		**0.09**	**0.08**	**0.11**	**0.19**	**0.18**

Analytical Results

Sub-Matrix: **PULP**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	2022057_041 EAY_KLC_C_41 YEF Northern Batters	2022057_042 EAY_KLC_C_42 MRD	2022057_043 EAY_KLC_C_43 MRD	2022057_044 EAY_KLC_C_44 MRD	2022057_045 EAY_KLC_C_45 MRD
				Sampling date / time	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00
					EB2227537-041	EB2227537-042	EB2227537-043	EB2227537-044	EB2227537-045
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**5.0**	**3.8**	**3.3**	**3.8**	**3.7**
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		**3.7**	**3.7**	**4.0**	**4.3**	**3.7**
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		**150**	**133**	**292**	**133**	**179**
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		<0.5	<0.5	<0.5	<0.5	<0.5
ANC as CaCO3	----	0.1	% CaCO3		<0.1	<0.1	<0.1	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit		**0**	**0**	**0**	**0**	**0**
EA026 : Chromium Reducible Sulfur									
Chromium Reducible Sulphur	----	0.005	%		**0.016**	**0.017**	**0.017**	**0.012**	**0.019**
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		**0.12**	**0.12**	**0.13**	**0.14**	**0.12**

Analytical Results

Sub-Matrix: **PULP**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	2022057_046 EAY_KLC_C_46 YEF Pit Floor	2022057_047 EAY_KLC_C_47 YEF Pit Floor	2022057_048 EAY_KLC_C_48 YEF Pit Floor	2022057_049 EAY_KLC_C_49 YMF Western Batters	2022057_050 EAY_KLC_C_50 YMF Western Batters
				Sampling date / time	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00
					EB2227537-046	EB2227537-047	EB2227537-048	EB2227537-049	EB2227537-050
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**3.5**	**3.9**	**4.7**	**4.0**	**4.0**
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		**6.7**	**4.3**	**5.5**	**2.8**	**3.1**
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		**394**	**80**	**92**	**121**	**172**
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		<0.5	<0.5	<0.5	<0.5	<0.5
ANC as CaCO3	----	0.1	% CaCO3		<0.1	<0.1	<0.1	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit		**0**	**0**	**0**	**0**	**0**
EA026 : Chromium Reducible Sulfur									
Chromium Reducible Sulphur	----	0.005	%		**0.012**	**0.017**	**0.017**	**0.014**	**0.013**
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		**0.22**	**0.14**	**0.18**	**0.09**	**0.10**

Analytical Results

Sub-Matrix: **PULP**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	2022057_051 EAY_KLC_C_51 YMF Western Batters	2022057_052 EAY_KLC_C_52 YMF Eastern Batters	2022057_053 EAY_KLC_C_53 YMF Eastern Batters	2022057_054 EAY_KLC_C_54 YMF Eastern Batters	2022057_055 EAY_KLC_C_55 YMF Eastern Batters
				Sampling date / time	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00
					EB2227537-051	EB2227537-052	EB2227537-053	EB2227537-054	EB2227537-055
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**4.0**	**4.0**	**4.2**	**4.2**	**4.0**
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		**3.4**	**3.4**	**3.4**	**6.1**	**7.0**
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		**93**	**112**	**287**	**134**	**461**
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		<0.5	<0.5	<0.5	<0.5	<0.5
ANC as CaCO3	----	0.1	% CaCO3		<0.1	<0.1	<0.1	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit		**0**	**0**	**0**	**0**	**0**
EA026 : Chromium Reducible Sulfur									
Chromium Reducible Sulphur	----	0.005	%		**0.013**	**0.017**	**0.010**	**0.014**	**0.020**
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		**0.11**	**0.11**	**0.11**	**0.20**	**0.23**

Analytical Results

Sub-Matrix: **PULP** (Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	2022057_056 EAY_KLC_C_56 YEFX Latrobe Road Batters	2022057_057 EAY_KLC_C_57 YEFX Latrobe Road Batters	2022057_058 EAY_KLC_C_58 YEFX Latrobe River Batters	2022057_059 EAY_KLC_C_59 YEFX Latrobe Road Batters	2022057_060 EAY_KLC_C_60 YEFX Latrobe Road Batters
				Sampling date / time	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00
					EB2227537-056	EB2227537-057	EB2227537-058	EB2227537-059	EB2227537-060
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**4.0**	**3.5**	**4.1**	**4.1**	**4.0**
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		**7.3**	**16.2**	**4.9**	**3.4**	**3.7**
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		**171**	**443**	**70**	**103**	**312**
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		<0.5	<0.5	<0.5	<0.5	<0.5
ANC as CaCO3	----	0.1	% CaCO3		<0.1	<0.1	<0.1	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit		**0**	**0**	**0**	**0**	**0**
EA026 : Chromium Reducible Sulfur									
Chromium Reducible Sulphur	----	0.005	%		**0.024**	**0.205**	**0.019**	**0.019**	**0.014**
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		**0.24**	**0.53**	**0.16**	**0.11**	**0.12**

Analytical Results

Sub-Matrix: **PULP** (Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	2022057_061 EAY_KLC_C_61 YEFX	2022057_062 EAY_KLC_C_62 YEFX	2022057_063 EAY_KLC_C_63 YMF Western Batters	2022057_064 EAY_KLC_C_64 YMF Western Batters	2022057_065 EAY_KLC_C_65 YMF Western Batters
				Sampling date / time	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00
					EB2227537-061	EB2227537-062	EB2227537-063	EB2227537-064	EB2227537-065
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**4.1**	**4.2**	**4.2**	**4.0**	**4.0**
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		**3.7**	**3.1**	**-1.6**	**-0.04**	**4.3**
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		**132**	**108**	**140**	**182**	**155**
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		<0.5	<0.5	**6.2**	**3.1**	<0.5
ANC as CaCO3	----	0.1	% CaCO3		<0.1	<0.1	**0.6**	**0.3**	<0.1
Fizz Rating	----	0	Fizz Unit		**0**	**0**	**0**	**0**	**0**
EA026 : Chromium Reducible Sulfur									
Chromium Reducible Sulphur	----	0.005	%		**0.016**	**0.013**	**0.015**	**0.015**	**0.014**
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		**0.12**	**0.10**	**0.15**	**0.10**	**0.14**

Analytical Results

Sub-Matrix: **PULP**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	2022057_066 EAY_KLC_C_66 YMF Western Batters	2022057_067 EAY_KLC_C_67 YMF Operating Face	2022057_068 EAY_KLC_C_68 YMF Operating Face	2022057_069 EAY_KLC_C_69 YMF Western Batters	2022057_070 EAY_KLC_C_70 YMF Western Batters
				Sampling date / time	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00
					EB2227537-066	EB2227537-067	EB2227537-068	EB2227537-069	EB2227537-070
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**4.3**	**3.8**	**3.2**	**3.8**	**3.9**
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		**1.2**	**28.4**	**31.2**	**14.4**	**4.3**
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		**114**	**1260**	**1750**	**865**	**96**
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		**2.8**	<0.5	<0.5	<0.5	<0.5
ANC as CaCO3	----	0.1	% CaCO3		**0.3**	<0.1	<0.1	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit		**0**	**0**	**0**	**0**	**0**
EA026 : Chromium Reducible Sulfur									
Chromium Reducible Sulphur	----	0.005	%		**0.014**	**0.517**	**0.784**	**0.022**	**0.016**
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		**0.13**	**0.93**	**1.02**	**0.47**	**0.14**

Analytical Results

Sub-Matrix: **PULP**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	2022057_071 EAY_KLC_OB_1 YTF North West Batters	2022057_072 EAY_KLC_OB_2 YTF Hermes Oak/Western Batters	2022057_073 EAY_KLC_OB_3 YTF Floc Pond Batters	2022057_074 EAY_KLC_OB_4 MRD	2022057_075 EAY_KLC_OB_5 YEF Latrobe River Batters
				Sampling date / time	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00
					EB2227537-071	EB2227537-072	EB2227537-073	EB2227537-074	EB2227537-075
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**5.0**	**5.1**	**5.3**	**5.9**	**6.2**
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		**-1.9**	**-2.5**	**-1.4**	**-4.0**	**-3.1**
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		**107**	**40**	**119**	**67**	**44**
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		**2.5**	**2.8**	**2.0**	**4.6**	**3.4**
ANC as CaCO3	----	0.1	% CaCO3		**0.2**	**0.3**	**0.2**	**0.5**	**0.4**
Fizz Rating	----	0	Fizz Unit		**0**	**0**	**0**	**0**	**0**
EA026 : Chromium Reducible Sulfur									
Chromium Reducible Sulphur	----	0.005	%		**0.015**	**0.009**	**0.013**	**0.013**	**0.012**
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		**0.02**	**0.01**	**0.02**	**0.02**	**0.01**

Analytical Results

Sub-Matrix: **PULP** (Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	2022057_076 EAY_KLC_OB_6 MRD	2022057_077 EAY_KLC_OB_7 MYMF Eastern Batters	2022057_078 EAY_KLC_OB_8 YEFX Latrobe Road Batters	2022057_079 EAY_KLC_OB_9 YMF Western Batters/MRD	2022057_080 EAY_KLC_OB_10 MRD
				Sampling date / time	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00
					EB2227537-076	EB2227537-077	EB2227537-078	EB2227537-079	EB2227537-080
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**5.6**	**6.2**	**5.6**	**6.1**	**5.9**
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		**-2.3**	**-3.2**	**-3.2**	**-3.2**	**-5.3**
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		**385**	**17**	**107**	**99**	**55**
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		**2.9**	**3.8**	**3.5**	**3.5**	**5.9**
ANC as CaCO3	----	0.1	% CaCO3		**0.3**	**0.4**	**0.4**	**0.4**	**0.6**
Fizz Rating	----	0	Fizz Unit		**0**	**0**	**0**	**0**	**0**
EA026 : Chromium Reducible Sulfur									
Chromium Reducible Sulphur	----	0.005	%		**0.011**	**0.015**	**0.011**	**0.013**	**0.010**
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		**0.02**	**0.02**	**0.01**	**0.01**	**0.02**

Analytical Results

Sub-Matrix: **PULP** (Matrix: **SOIL**)			Sample ID	**pH & EC of DI Water Used**	----	----	----	----
			Sampling date / time	15-Sep-2022 00:00	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**EB2227537-081**	--------	--------	--------	--------
				Result	----	----	----	----
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**5.3**	**----**	**----**	**----**	**----**
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	<1	**----**	**----**	**----**	**----**

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2230815**	Page	: 1 of 10
Client	: **RGS ENVIRONMENTAL CONSULTANTS PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MATT LANDERS	Contact	: Customer Services EB
Address	: 3/30 LENSWORTH STREET COOPERS PLAINS 4108	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: 07 3344 1222	Telephone	: +61-7-3243 7222
Project	: 2022057 Yallourn KLC Extension	Date Samples Received	: 17-Oct-2022 16:50
Order number	: ----	Date Analysis Commenced	: 21-Oct-2022
C-O-C number	: ----	Issue Date	: 04-Nov-2022 12:30
Sampler	: BEN FREIDMAN		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 20		
No. of samples analysed	: 20		

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*
Layla Hafner	Acid Sulphate Soils - Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Mark Hallas	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD

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.

- ASS: EA029 (SPOCAS): Excess ANC not required because pH OX less than 6.5.
- ASS: EA029 (SPOCAS): Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime ($CaCO_3$) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from kg/t dry weight to kg/m3 in-situ soil, multiply reported results x wet bulk density of soil in t/m3.

Analytical Results

Sub-Matrix: **PULP**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	2022057_007 EAY_KLC_C_7 YTF Northern Batters	2022057_015 EAY_KLC_C_15 YTF Hermes Oak/Western Batters	2022057_018 EAY_KLC_C_18 YTF South West Batters	2022057_026 EAY_KLC_C_26 YTF Floc Pond Batters	2022057_031 EAY_KLC_C_31 YTF Raw Coal Bunker Batters
				Sampling date / time	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00
					EB2230815-001	EB2230815-002	EB2230815-003	EB2230815-004	EB2230815-005
					Result	Result	Result	Result	Result
EA029-A: pH Measurements									
pH KCl (23A)	----	0.1	pH Unit		**2.5**	----	----	**2.5**	**2.5**
pH OX (23B)	----	0.1	pH Unit		**1.6**	----	----	**1.7**	**1.8**
EA029-B: Acidity Trail									
Titratable Actual Acidity (23F)	----	2	mole H+ / t		**888**	----	----	**803**	**1620**
Titratable Peroxide Acidity (23G)	----	2	mole H+ / t		**6660**	----	----	**6010**	**6090**
Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t		**5770**	----	----	**5210**	**4480**
sulfidic - Titratable Actual Acidity (s-23F)	----	0.020	% pyrite S		**1.42**	----	----	**1.29**	**2.59**
sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.020	% pyrite S		**10.7**	----	----	**9.64**	**9.77**
sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.020	% pyrite S		**9.26**	----	----	**8.35**	**7.18**
EA029-C: Sulfur Trail									
KCl Extractable Sulfur (23Ce)	----	0.020	% S		<0.020	----	----	<0.020	**0.022**
Peroxide Sulfur (23De)	----	0.020	% S		**0.166**	----	----	**0.084**	**0.138**
Peroxide Oxidisable Sulfur (23E)	----	0.020	% S		**0.154**	----	----	**0.081**	**0.117**
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t		**96**	----	----	**50**	**73**
EA029-D: Calcium Values									
KCl Extractable Calcium (23Vh)	----	0.020	% Ca		<0.020	----	----	**0.046**	**0.022**
Peroxide Calcium (23Wh)	----	0.020	% Ca		<0.020	----	----	**0.038**	**0.066**
Acid Reacted Calcium (23X)	----	0.020	% Ca		<0.020	----	----	<0.020	**0.043**
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t		<10	----	----	<10	**21**
sulfidic - Acid Reacted Calcium (s-23X)	----	0.020	% S		<0.020	----	----	<0.020	**0.034**
EA029-E: Magnesium Values									
KCl Extractable Magnesium (23Sm)	----	0.020	% Mg		**0.028**	----	----	**0.080**	**0.098**
Peroxide Magnesium (23Tm)	----	0.020	% Mg		<0.020	----	----	**0.051**	**0.150**
Acid Reacted Magnesium (23U)	----	0.020	% Mg		<0.020	----	----	<0.020	**0.051**
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t		<10	----	----	<10	**42**
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.020	% S		<0.020	----	----	<0.020	**0.067**
EA029-G: Retained Acidity									
HCl Extractable Sulfur (20Be)	----	0.020	% S		<0.020	----	----	<0.020	**0.025**
Net Acid Soluble Sulfur (20Je)	----	0.020	% S		<0.020	----	----	<0.020	<0.020

Analytical Results

Sub-Matrix: **PULP**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	2022057_007 EAY_KLC_C_7 YTF Northern Batters	2022057_015 EAY_KLC_C_15 YTF Hermes Oak/Western Batters	2022057_018 EAY_KLC_C_18 YTF South West Batters	2022057_026 EAY_KLC_C_26 YTF Floc Pond Batters	2022057_031 EAY_KLC_C_31 YTF Raw Coal Bunker Batters
				Sampling date / time	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00
					EB2230815-001	EB2230815-002	EB2230815-003	EB2230815-004	EB2230815-005
					Result	Result	Result	Result	Result
EA029-G: Retained Acidity - Continued									
acidity - Net Acid Soluble Sulfur (a-20J)	----	10	mole H+ / t		<10	----	----	<10	<10
sulfidic - Net Acid Soluble Sulfur (s-20J)	----	0.020	% pyrite S		<0.020	----	----	<0.020	<0.020
EA029-H: Acid Base Accounting									
ANC Fineness Factor	----	0.5	-		**1.5**	----	----	**1.5**	**1.5**
Net Acidity (sulfur units)	----	0.02	% S		**1.58**	----	----	**1.37**	**2.71**
Net Acidity (acidity units)	----	10	mole H+ / t		**986**	----	----	**855**	**1690**
Liming Rate	----	1	kg CaCO3/t		**74**	----	----	**64**	**127**
Net Acidity excluding ANC (sulfur units)	----	0.02	% S		**1.58**	----	----	**1.37**	**2.71**
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t		**986**	----	----	**855**	**1690**
Liming Rate excluding ANC	----	1	kg CaCO3/t		**74**	----	----	**64**	**127**
ED093T: Total Major Cations									
Calcium	7440-70-2	50	mg/kg		**330**	**1260**	----	**700**	**1150**
Magnesium	7439-95-4	50	mg/kg		**420**	**1780**	----	**900**	**2600**
Sodium	7440-23-5	50	mg/kg		**90**	**1130**	----	**300**	**970**
Potassium	7440-09-7	50	mg/kg		<50	**70**	----	<50	**260**
EP003: Total Organic Carbon (TOC) in Soil									
Total Organic Carbon	----	0.02	%		**46.2**	**52.2**	**44.6**	**46.3**	**52.6**

Analytical Results

Sub-Matrix: **PULP**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	2022057_035 EAY_KLC_C_35 YEF Northern Batters	2022057_037 EAY_KLC_C_37 YEF Latrobe River Batters	2022057_043 EAY_KLC_C_43 MRD	2022057_046 EAY_KLC_C_46 YEF Pit Floor	2022057_053 EAY_KLC_C_53 YMF Eastern Batters
				Sampling date / time	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00
					EB2230815-006	EB2230815-007	EB2230815-008	EB2230815-009	EB2230815-010
					Result	Result	Result	Result	Result
EA029-A: pH Measurements									
pH KCl (23A)	----	0.1	pH Unit		----	----	**2.4**	----	----
pH OX (23B)	----	0.1	pH Unit		----	----	**1.7**	----	----
EA029-B: Acidity Trail									
Titratable Actual Acidity (23F)	----	2	mole H+ / t		----	----	**1010**	----	----
Titratable Peroxide Acidity (23G)	----	2	mole H+ / t		----	----	**6140**	----	----
Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t		----	----	**5120**	----	----
sulfidic - Titratable Actual Acidity (s-23F)	----	0.020	% pyrite S		----	----	**1.62**	----	----
sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.020	% pyrite S		----	----	**9.84**	----	----
sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.020	% pyrite S		----	----	**8.22**	----	----
EA029-C: Sulfur Trail									
KCl Extractable Sulfur (23Ce)	----	0.020	% S		----	----	<0.020	----	----
Peroxide Sulfur (23De)	----	0.020	% S		----	----	**0.089**	----	----
Peroxide Oxidisable Sulfur (23E)	----	0.020	% S		----	----	**0.083**	----	----
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t		----	----	**52**	----	----
EA029-D: Calcium Values									
KCl Extractable Calcium (23Vh)	----	0.020	% Ca		----	----	**0.077**	----	----
Peroxide Calcium (23Wh)	----	0.020	% Ca		----	----	**0.076**	----	----
Acid Reacted Calcium (23X)	----	0.020	% Ca		----	----	<0.020	----	----
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t		----	----	<10	----	----
sulfidic - Acid Reacted Calcium (s-23X)	----	0.020	% S		----	----	<0.020	----	----
EA029-E: Magnesium Values									
KCl Extractable Magnesium (23Sm)	----	0.020	% Mg		----	----	**0.112**	----	----
Peroxide Magnesium (23Tm)	----	0.020	% Mg		----	----	**0.075**	----	----
Acid Reacted Magnesium (23U)	----	0.020	% Mg		----	----	<0.020	----	----
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t		----	----	<10	----	----
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.020	% S		----	----	<0.020	----	----
EA029-G: Retained Acidity									
HCl Extractable Sulfur (20Be)	----	0.020	% S		----	----	<0.020	----	----
Net Acid Soluble Sulfur (20Je)	----	0.020	% S		----	----	<0.020	----	----

Analytical Results

Sub-Matrix: **PULP**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	2022057_035 EAY_KLC_C_35 YEF Northern Batters	2022057_037 EAY_KLC_C_37 YEF Latrobe River Batters	2022057_043 EAY_KLC_C_43 MRD	2022057_046 EAY_KLC_C_46 YEF Pit Floor	2022057_053 EAY_KLC_C_53 YMF Eastern Batters
			Sampling date / time		15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00
					EB2230815-006	EB2230815-007	EB2230815-008	EB2230815-009	EB2230815-010
					Result	Result	Result	Result	Result
EA029-G: Retained Acidity - Continued									
acidity - Net Acid Soluble Sulfur (a-20J)	----	10	mole H+ / t		----	----	<10	----	----
sulfidic - Net Acid Soluble Sulfur (s-20J)	----	0.020	% pyrite S		----	----	<0.020	----	----
EA029-H: Acid Base Accounting									
ANC Fineness Factor	----	0.5	-		----	----	**1.5**	----	----
Net Acidity (sulfur units)	----	0.02	% S		----	----	**1.71**	----	----
Net Acidity (acidity units)	----	10	mole H+ / t		----	----	**1070**	----	----
Liming Rate	----	1	kg CaCO3/t		----	----	**80**	----	----
Net Acidity excluding ANC (sulfur units)	----	0.02	% S		----	----	**1.71**	----	----
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t		----	----	**1070**	----	----
Liming Rate excluding ANC	----	1	kg CaCO3/t		----	----	**80**	----	----
ED093T: Total Major Cations									
Calcium	7440-70-2	50	mg/kg		----	----	**1260**	**400**	----
Magnesium	7439-95-4	50	mg/kg		----	----	**1300**	**360**	----
Sodium	7440-23-5	50	mg/kg		----	----	**490**	**280**	----
Potassium	7440-09-7	50	mg/kg		----	----	**80**	**60**	----
EP003: Total Organic Carbon (TOC) in Soil									
Total Organic Carbon	----	0.02	%		**43.0**	**37.6**	**41.5**	**51.8**	**48.8**

Analytical Results

Sub-Matrix: **PULP**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	2022057_055 EAY_KLC_C_55 YMF Eastern Batters	2022057_057 EAY_KLC_C_57 YEFX Latrobe Road Batters	2022057_063 EAY_KLC_C_63 YMF Western Batters	2022057_064 EAY_KLC_C_64 YMF Western Batters	2022057_067 EAY_KLC_C_67 YMF Operating Face
				Sampling date / time	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00
					EB2230815-011	EB2230815-012	EB2230815-013	EB2230815-014	EB2230815-015
					Result	Result	Result	Result	Result
EA029-A: pH Measurements									
pH KCl (23A)	----	0.1	pH Unit		**3.0**	----	**2.9**	----	**3.1**
pH OX (23B)	----	0.1	pH Unit		**1.8**	----	**1.9**	----	**1.8**
EA029-B: Acidity Trail									
Titratable Actual Acidity (23F)	----	2	mole H+ / t		**479**	----	**550**	----	**422**
Titratable Peroxide Acidity (23G)	----	2	mole H+ / t		**5100**	----	**5330**	----	**5880**
Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t		**4620**	----	**4780**	----	**5460**
sulfidic - Titratable Actual Acidity (s-23F)	----	0.020	% pyrite S		**0.768**	----	**0.881**	----	**0.677**
sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.020	% pyrite S		**8.18**	----	**8.55**	----	**9.43**
sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.020	% pyrite S		**7.41**	----	**7.67**	----	**8.75**
EA029-C: Sulfur Trail									
KCl Extractable Sulfur (23Ce)	----	0.020	% S		**0.028**	----	<0.020	----	**0.073**
Peroxide Sulfur (23De)	----	0.020	% S		**0.158**	----	**0.102**	----	**0.178**
Peroxide Oxidisable Sulfur (23E)	----	0.020	% S		**0.130**	----	**0.097**	----	**0.104**
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t		**81**	----	**61**	----	**65**
EA029-D: Calcium Values									
KCl Extractable Calcium (23Vh)	----	0.020	% Ca		**0.044**	----	**0.073**	----	**0.028**
Peroxide Calcium (23Wh)	----	0.020	% Ca		**0.025**	----	**0.040**	----	**0.059**
Acid Reacted Calcium (23X)	----	0.020	% Ca		<0.020	----	<0.020	----	**0.031**
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t		<10	----	<10	----	**15**
sulfidic - Acid Reacted Calcium (s-23X)	----	0.020	% S		<0.020	----	<0.020	----	**0.025**
EA029-E: Magnesium Values									
KCl Extractable Magnesium (23Sm)	----	0.020	% Mg		**0.115**	----	**0.152**	----	**0.069**
Peroxide Magnesium (23Tm)	----	0.020	% Mg		**0.067**	----	**0.087**	----	**0.126**
Acid Reacted Magnesium (23U)	----	0.020	% Mg		<0.020	----	<0.020	----	**0.058**
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t		<10	----	<10	----	**48**
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.020	% S		<0.020	----	<0.020	----	**0.076**
EA029-G: Retained Acidity									
HCl Extractable Sulfur (20Be)	----	0.020	% S		**0.031**	----	<0.020	----	**0.243**
Net Acid Soluble Sulfur (20Je)	----	0.020	% S		<0.020	----	<0.020	----	**0.339**

Analytical Results

Sub-Matrix: **PULP**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	2022057_055 EAY_KLC_C_55 YMF Eastern Batters	2022057_057 EAY_KLC_C_57 YEFX Latrobe Road Batters	2022057_063 EAY_KLC_C_63 YMF Western Batters	2022057_064 EAY_KLC_C_64 YMF Western Batters	2022057_067 EAY_KLC_C_67 YMF Operating Face
				Sampling date / time	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00
					EB2230815-011	EB2230815-012	EB2230815-013	EB2230815-014	EB2230815-015
					Result	Result	Result	Result	Result
EA029-G: Retained Acidity - Continued									
acidity - Net Acid Soluble Sulfur (a-20J)	----	10	mole H+ / t		<10	----	<10	----	**159**
sulfidic - Net Acid Soluble Sulfur (s-20J)	----	0.020	% pyrite S		<0.020	----	<0.020	----	**0.254**
EA029-H: Acid Base Accounting									
ANC Fineness Factor	----	0.5	-		**1.5**	----	**1.5**	----	**1.5**
Net Acidity (sulfur units)	----	0.02	% S		**0.90**	----	**0.98**	----	**1.04**
Net Acidity (acidity units)	----	10	mole H+ / t		**563**	----	**613**	----	**646**
Liming Rate	----	1	kg CaCO3/t		**42**	----	**46**	----	**48**
Net Acidity excluding ANC (sulfur units)	----	0.02	% S		**0.90**	----	**0.98**	----	**1.04**
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t		**563**	----	**613**	----	**646**
Liming Rate excluding ANC	----	1	kg CaCO3/t		**42**	----	**46**	----	**48**
ED093T: Total Major Cations									
Calcium	7440-70-2	50	mg/kg		**650**	----	**1060**	**870**	**660**
Magnesium	7439-95-4	50	mg/kg		**1500**	----	**1960**	**1400**	**1400**
Sodium	7440-23-5	50	mg/kg		**590**	----	**730**	**910**	**470**
Potassium	7440-09-7	50	mg/kg		**60**	----	**60**	**80**	<50
EP003: Total Organic Carbon (TOC) in Soil									
Total Organic Carbon	----	0.02	%		**35.7**	**47.9**	**47.2**	**52.0**	**46.4**

Analytical Results

Sub-Matrix: **PULP** (Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	2022057_068 EAY_KLC_C_68 YMF Operating Face	2022057_069 EAY_KLC_C_69 YMF Western Batters	2022057_073 EAY_KLC_OB_3 YTF Floc Pond Batters	2022057_077 EAY_KLC_OB_7 MYMF Eastern Batters	2022057_080 EAY_KLC_OB_10 MRD
				Sampling date / time	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00
					EB2230815-016	EB2230815-017	EB2230815-018	EB2230815-019	EB2230815-020
					Result	Result	Result	Result	Result
EA029-A: pH Measurements									
pH KCl (23A)	----	0.1	pH Unit		**3.0**	----	----	----	----
pH OX (23B)	----	0.1	pH Unit		**1.7**	----	----	----	----
EA029-B: Acidity Trail									
Titratable Actual Acidity (23F)	----	2	mole H+ / t		**568**	----	----	----	----
Titratable Peroxide Acidity (23G)	----	2	mole H+ / t		**6330**	----	----	----	----
Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t		**5760**	----	----	----	----
sulfidic - Titratable Actual Acidity (s-23F)	----	0.020	% pyrite S		**0.911**	----	----	----	----
sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.020	% pyrite S		**10.2**	----	----	----	----
sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.020	% pyrite S		**9.24**	----	----	----	----
EA029-C: Sulfur Trail									
KCl Extractable Sulfur (23Ce)	----	0.020	% S		**0.406**	----	----	----	----
Peroxide Sulfur (23De)	----	0.020	% S		**0.547**	----	----	----	----
Peroxide Oxidisable Sulfur (23E)	----	0.020	% S		**0.141**	----	----	----	----
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t		**88**	----	----	----	----
EA029-D: Calcium Values									
KCl Extractable Calcium (23Vh)	----	0.020	% Ca		**0.048**	----	----	----	----
Peroxide Calcium (23Wh)	----	0.020	% Ca		**0.030**	----	----	----	----
Acid Reacted Calcium (23X)	----	0.020	% Ca		<0.020	----	----	----	----
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t		<10	----	----	----	----
sulfidic - Acid Reacted Calcium (s-23X)	----	0.020	% S		<0.020	----	----	----	----
EA029-E: Magnesium Values									
KCl Extractable Magnesium (23Sm)	----	0.020	% Mg		**0.101**	----	----	----	----
Peroxide Magnesium (23Tm)	----	0.020	% Mg		**0.069**	----	----	----	----
Acid Reacted Magnesium (23U)	----	0.020	% Mg		<0.020	----	----	----	----
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t		<10	----	----	----	----
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.020	% S		<0.020	----	----	----	----
EA029-G: Retained Acidity									
HCl Extractable Sulfur (20Be)	----	0.020	% S		**0.400**	----	----	----	----
Net Acid Soluble Sulfur (20Je)	----	0.020	% S		<0.020	----	----	----	----
acidity - Net Acid Soluble Sulfur (a-20J)	----	10	mole H+ / t		<10	----	----	----	----

Analytical Results

Sub-Matrix: **PULP**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	2022057_068 EAY_KLC_C_68 YMF Operating Face	2022057_069 EAY_KLC_C_69 YMF Western Batters	2022057_073 EAY_KLC_OB_3 YTF Floc Pond Batters	2022057_077 EAY_KLC_OB_7 MYMF Eastern Batters	2022057_080 EAY_KLC_OB_10 MRD
				Sampling date / time	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00	15-Sep-2022 00:00
					EB2230815-016	EB2230815-017	EB2230815-018	EB2230815-019	EB2230815-020
					Result	Result	Result	Result	Result
EA029-G: Retained Acidity - Continued									
sulfidic - Net Acid Soluble Sulfur (s-20J)	----	0.020	% pyrite S		<0.020	----	----	----	----
EA029-H: Acid Base Accounting									
ANC Fineness Factor	----	0.5	-		**1.5**	----	----	----	----
Net Acidity (sulfur units)	----	0.02	% S		**1.04**	----	----	----	----
Net Acidity (acidity units)	----	10	mole H+ / t		**649**	----	----	----	----
Liming Rate	----	1	kg CaCO3/t		**49**	----	----	----	----
Net Acidity excluding ANC (sulfur units)	----	0.02	% S		**1.04**	----	----	----	----
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t		**649**	----	----	----	----
Liming Rate excluding ANC	----	1	kg CaCO3/t		**49**	----	----	----	----
ED093T: Total Major Cations									
Calcium	7440-70-2	50	mg/kg		**480**	**350**	**100**	<50	**1120**
Magnesium	7439-95-4	50	mg/kg		**1010**	**1220**	**360**	**80**	**1330**
Sodium	7440-23-5	50	mg/kg		**340**	**1090**	**160**	<50	**160**
Potassium	7440-09-7	50	mg/kg		<50	<50	**240**	**100**	**350**
EP003: Total Organic Carbon (TOC) in Soil									
Total Organic Carbon	----	0.02	%		**32.6**	**53.8**	**0.89**	**0.20**	**1.18**

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2231051**	Page	: 1 of 12
Client	: **RGS ENVIRONMENTAL CONSULTANTS PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MATT LANDERS	Contact	: Customer Services EB
Address	: 3/30 LENSWORTH STREET COOPERS PLAINS 4108	Address	: 2 Byth Street Stafford QLD Australia 4053
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Project	: 2022057 Yalloum KLC Extension	Date Samples Received	: 20-Oct-2022 15:41
Order number	: ----	Date Analysis Commenced	: 02-Nov-2022
C-O-C number	: ----	Issue Date	: 08-Nov-2022 14:48
Sampler	: BEN FREIDMAN		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 16		
No. of samples analysed	: 16		

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*
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD

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.

- ED041G (Sulfate (Turbidimetric) as SO4 2-) / ED045G (Chloride): Some samples were diluted due to matrix interference. LOR adjusted accordingly.
- ALS is not NATA accredited for the performance of EN35: Miscellaneous Leaching procedure.

Analytical Results

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

				Sample ID	2022057_007EAY_KLC_C_7 YTF Northern Batters	2022057_015EAY_KLC_C_15 YTF Hermes Oak/Western Batters	2022057_026EAY_KLC_C_26 YTF Floc Pond Batters	2022057_031EAY_KLC_C_31 YTF Raw Coal Bunker Batters	2022057_043EAY_KLC_C_43 MRD
				Sampling date / time	20-Oct-2022 00:00	20-Oct-2022 00:00	20-Oct-2022 00:00	20-Oct-2022 00:00	20-Oct-2022 00:00
Compound	CAS Number	LOR	Unit		EB2231051-001	EB2231051-002	EB2231051-003	EB2231051-004	EB2231051-005
					Result	Result	Result	Result	Result
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		**3.53**	**3.99**	**3.91**	**3.43**	**3.49**
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		**168**	**161**	**85**	**467**	**220**
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		<1	<1	<1	<1	<1
Total Alkalinity as CaCO3	----	1	mg/L		<1	<1	<1	<1	<1
ED038: Acidity									
Acidity as CaCO3	----	1	mg/L		**50**	**58**	**26**	**92**	**82**
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		**25**	<20	<10	**78**	**21**
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		**5**	**22**	<10	**46**	**8**
ED093T: Total Major Cations									
Calcium	7440-70-2	1	mg/L		<1	<1	<1	**2**	<1
Magnesium	7439-95-4	1	mg/L		**2**	<1	<1	**10**	**2**
Sodium	7440-23-5	1	mg/L		**10**	**28**	**7**	**47**	**18**
Potassium	7440-09-7	1	mg/L		**1**	<1	<1	**4**	<1
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**0.32**	**0.34**	**0.06**	**0.16**	**0.10**
Dysprosium	7429-91-6	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Silver	7440-22-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic	7440-38-2	0.001	mg/L		**0.004**	<0.001	<0.001	<0.001	<0.001
Bismuth	7440-69-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Erbium	7440-52-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Boron	7440-42-8	0.05	mg/L		**0.68**	**0.07**	<0.05	**0.08**	**0.06**
Europium	7440-53-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Strontium	7440-24-6	0.001	mg/L		**0.019**	**0.007**	**0.001**	**0.018**	**0.006**
Barium	7440-39-3	0.001	mg/L		**0.651**	**0.157**	**0.021**	**0.075**	**0.030**
Gadolinium	7440-54-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Titanium	7440-32-6	0.01	mg/L		<0.01	**0.01**	<0.01	<0.01	<0.01

Analytical Results

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

Compound	CAS Number	LOR	Unit	Sample ID	2022057_007EAY_KLC_C_7 YTF Northern Batters	2022057_015EAY_KLC_C_15 YTF Hermes Oak/Western Batters	2022057_026EAY_KLC_C_26 YTF Floc Pond Batters	2022057_031EAY_KLC_C_31 YTF Raw Coal Bunker Batters	2022057_043EAY_KLC_C_43 MRD
				Sampling date / time	20-Oct-2022 00:00	20-Oct-2022 00:00	20-Oct-2022 00:00	20-Oct-2022 00:00	20-Oct-2022 00:00
					EB2231051-001	EB2231051-002	EB2231051-003	EB2231051-004	EB2231051-005
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Beryllium	7440-41-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Gallium	7440-55-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L		**0.0001**	**0.0001**	<0.0001	<0.0001	<0.0001
Hafnium	7440-58-6	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Tellurium	22541-49-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	7440-48-4	0.001	mg/L		**0.002**	<0.001	<0.001	**0.002**	<0.001
Holmium	7440-60-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Uranium	7440-61-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Caesium	7440-46-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	7440-47-3	0.001	mg/L		<0.001	**0.001**	<0.001	<0.001	<0.001
Indium	7440-74-6	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		**0.004**	**0.006**	<0.001	**0.002**	**0.001**
Lanthanum	7439-91-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Rubidium	7440-17-7	0.001	mg/L		**0.002**	**0.001**	<0.001	**0.010**	**0.003**
Lithium	7439-93-2	0.001	mg/L		<0.001	**0.003**	<0.001	**0.008**	**0.006**
Lutetium	7439-94-3	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
Cerium	7440-45-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	7439-96-5	0.001	mg/L		**0.015**	**0.008**	**0.007**	**0.051**	**0.048**
Neodymium	7440-00-8	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum	7439-98-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Praseodymium	7440-10-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L		**0.001**	**0.002**	<0.001	**0.001**	<0.001
Samarium	7440-19-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L		**0.001**	**0.012**	**0.003**	**0.002**	**0.004**
Terbium	7440-27-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Antimony	7440-36-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Thulium	7440-30-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Ytterbium	7440-64-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Yttrium	7440-65-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001

Analytical Results

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

Compound	CAS Number	LOR	Unit	Sample ID	2022057_007EAY_KLC_C_7 YTF Northern Batters	2022057_015EAY_KLC_C_15 YTF Hermes Oak/Western Batters	2022057_026EAY_KLC_C_26 YTF Floc Pond Batters	2022057_031EAY_KLC_C_31 YTF Raw Coal Bunker Batters	2022057_043EAY_KLC_C_43 MRD
				Sampling date / time	20-Oct-2022 00:00	20-Oct-2022 00:00	20-Oct-2022 00:00	20-Oct-2022 00:00	20-Oct-2022 00:00
					EB2231051-001	EB2231051-002	EB2231051-003	EB2231051-004	EB2231051-005
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Thallium	7440-28-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Zirconium	7440-67-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
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		**0.693**	**0.067**	**0.006**	**0.037**	**0.006**
Iron	7439-89-6	0.05	mg/L		**0.40**	**0.90**	**0.24**	**0.21**	**0.35**
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**0.1**	<0.1	<0.1	<0.1	<0.1

Analytical Results

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

Compound	CAS Number	LOR	Unit	Sample ID	2022057_046EAY_KLC_C_46 YEP Pit Floor	2022057_055EAY_KLC_C_55 YMF Eastern Batters	2022057_063EAY_KLC_C_63 YMF Western Batters	2022057_064EAY_KLC_C_64 YMF Western Batters	2022057_067EAY_KLC_C_67 YMF Operating Face
				Sampling date / time	20-Oct-2022 00:00	20-Oct-2022 00:00	20-Oct-2022 00:00	20-Oct-2022 00:00	20-Oct-2022 00:00
					EB2231051-006	EB2231051-007	EB2231051-008	EB2231051-009	EB2231051-010
					Result	Result	Result	Result	Result
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		**3.50**	**3.75**	**4.22**	**3.95**	**3.59**
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		**307**	**504**	**214**	**201**	**1630**
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		<1	<1	<1	<1	<1
Total Alkalinity as CaCO3	----	1	mg/L		<1	<1	<1	<1	<1
ED038: Acidity									
Acidity as CaCO3	----	1	mg/L		**44**	**54**	**37**	**59**	**147**
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		**68**	**117**	**43**	**13**	**879**
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		**13**	**47**	**17**	**21**	**13**
ED093T: Total Major Cations									
Calcium	7440-70-2	1	mg/L		**3**	**3**	<1	<1	**39**
Magnesium	7439-95-4	1	mg/L		**7**	**18**	**3**	**2**	**147**
Sodium	7440-23-5	1	mg/L		**23**	**53**	**32**	**32**	**66**
Potassium	7440-09-7	1	mg/L		**1**	**1**	<1	<1	**1**
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**0.72**	**0.97**	**0.04**	**0.16**	**10.4**
Dysprosium	7429-91-6	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Silver	7440-22-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic	7440-38-2	0.001	mg/L		<0.001	**0.009**	**0.001**	**0.001**	**0.009**
Bismuth	7440-69-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Erbium	7440-52-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Boron	7440-42-8	0.05	mg/L		<0.05	**0.08**	**0.10**	**0.14**	**0.14**
Europium	7440-53-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Strontium	7440-24-6	0.001	mg/L		**0.035**	**0.039**	**0.008**	**0.004**	**0.498**
Barium	7440-39-3	0.001	mg/L		**0.030**	**0.038**	**0.030**	**0.013**	**0.038**
Gadolinium	7440-54-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Titanium	7440-32-6	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Beryllium	7440-41-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	**0.002**

Analytical Results

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

Compound	CAS Number	LOR	Unit	Sample ID	2022057_046EAY_KLC_C_46 YEP Pit Floor	2022057_055EAY_KLC_C_55 YMF Eastern Batters	2022057_063EAY_KLC_C_63 YMF Western Batters	2022057_064EAY_KLC_C_64 YMF Western Batters	2022057_067EAY_KLC_C_67 YMF Operating Face
				Sampling date / time	20-Oct-2022 00:00	20-Oct-2022 00:00	20-Oct-2022 00:00	20-Oct-2022 00:00	20-Oct-2022 00:00
					EB2231051-006	EB2231051-007	EB2231051-008	EB2231051-009	EB2231051-010
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Gallium	7440-55-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Hafnium	7440-58-6	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Tellurium	22541-49-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	7440-48-4	0.001	mg/L		**0.024**	**0.004**	<0.001	<0.001	**1.90**
Holmium	7440-60-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Uranium	7440-61-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Caesium	7440-46-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Indium	7440-74-6	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lanthanum	7439-91-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	**0.002**
Rubidium	7440-17-7	0.001	mg/L		**0.006**	**0.005**	**0.002**	**0.005**	**0.009**
Lithium	7439-93-2	0.001	mg/L		**0.004**	**0.009**	**0.004**	**0.004**	**0.005**
Lutetium	7439-94-3	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
Cerium	7440-45-1	0.001	mg/L		**0.001**	<0.001	<0.001	<0.001	**0.001**
Manganese	7439-96-5	0.001	mg/L		**0.247**	**0.147**	**0.051**	**0.033**	**1.37**
Neodymium	7440-00-8	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum	7439-98-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Praseodymium	7440-10-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L		**0.007**	<0.001	<0.001	<0.001	**0.242**
Samarium	7440-19-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	**0.003**	**0.001**	<0.001
Terbium	7440-27-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Antimony	7440-36-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Thulium	7440-30-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Ytterbium	7440-64-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Yttrium	7440-65-5	0.001	mg/L		**0.001**	<0.001	<0.001	<0.001	<0.001
Thallium	7440-28-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	**0.002**
Zirconium	7440-67-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005

Analytical Results

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

Compound	CAS Number	LOR	Unit	Sample ID	2022057_046EAY_KLC_C_46 YEP Pit Floor	2022057_055EAY_KLC_C_55 YMF Eastern Batters	2022057_063EAY_KLC_C_63 YMF Western Batters	2022057_064EAY_KLC_C_64 YMF Western Batters	2022057_067EAY_KLC_C_67 YMF Operating Face
				Sampling date / time	20-Oct-2022 00:00	20-Oct-2022 00:00	20-Oct-2022 00:00	20-Oct-2022 00:00	20-Oct-2022 00:00
					EB2231051-006	EB2231051-007	EB2231051-008	EB2231051-009	EB2231051-010
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
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		**0.035**	**0.012**	**0.008**	**0.008**	**0.024**
Iron	7439-89-6	0.05	mg/L		**0.14**	**0.13**	**0.08**	**0.43**	**2.01**
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		<0.1	**0.2**	<0.1	<0.1	**1.1**

Analytical Results

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

Compound	CAS Number	LOR	Unit	Sample ID	2022057_068EAY_KLC_C_68 YMF Operating Face	2022057_069EAY_KLC_C_69 YMF Western Batters	2022057_073EAY_KLC_OB_3 YTF Floc Pond Batters	2022057_077EAY_KLC_OB_7 MYMF Eastern Batters	2022057_080EAY_KLC_OB_10 MRD
				Sampling date / time	20-Oct-2022 00:00	20-Oct-2022 00:00	20-Oct-2022 00:00	20-Oct-2022 00:00	20-Oct-2022 00:00
					EB2231051-011	EB2231051-012	EB2231051-013	EB2231051-014	EB2231051-015
					Result	Result	Result	Result	Result
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		**3.02**	**3.88**	**5.17**	**6.14**	**6.05**
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		**2290**	**818**	**113**	**11**	**34**
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		<1	<1	**1**	**3**	**4**
Total Alkalinity as CaCO3	----	1	mg/L		<1	<1	**1**	**3**	**4**
ED038: Acidity									
Acidity as CaCO3	----	1	mg/L		**562**	**38**	**6**	**6**	**34**
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		**1300**	**159**	**12**	**1**	**3**
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		**8**	**142**	**20**	<1	**2**
ED093T: Total Major Cations									
Calcium	7440-70-2	1	mg/L		**77**	**2**	<1	<1	<1
Magnesium	7439-95-4	1	mg/L		**178**	**28**	<1	**2**	<1
Sodium	7440-23-5	1	mg/L		**57**	**105**	**19**	**2**	**7**
Potassium	7440-09-7	1	mg/L		**1**	**1**	<1	**2**	<1
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**61.5**	**1.35**	**0.06**	**2.86**	**0.09**
Dysprosium	7429-91-6	0.001	mg/L		<0.001	<0.001	<0.001	**0.004**	<0.001
Silver	7440-22-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic	7440-38-2	0.001	mg/L		**0.008**	**0.015**	<0.001	<0.001	<0.001
Bismuth	7440-69-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Erbium	7440-52-0	0.001	mg/L		<0.001	<0.001	<0.001	**0.002**	<0.001
Boron	7440-42-8	0.05	mg/L		**0.10**	**0.08**	<0.05	<0.05	<0.05
Europium	7440-53-1	0.001	mg/L		<0.001	<0.001	<0.001	**0.001**	<0.001
Strontium	7440-24-6	0.001	mg/L		**0.946**	**0.040**	**0.002**	**0.007**	**0.001**
Barium	7440-39-3	0.001	mg/L		**0.030**	**0.023**	**0.018**	**0.034**	**0.019**
Gadolinium	7440-54-2	0.001	mg/L		<0.001	<0.001	<0.001	**0.005**	<0.001
Titanium	7440-32-6	0.01	mg/L		<0.01	<0.01	<0.01	**0.06**	<0.01
Beryllium	7440-41-7	0.001	mg/L		**0.014**	<0.001	<0.001	<0.001	<0.001

Analytical Results

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

Compound	CAS Number	LOR	Unit	Sample ID	2022057_068EAY_KLC_C_68 YMF Operating Face	2022057_069EAY_KLC_C_69 YMF Western Batters	2022057_073EAY_KLC_OB_3 YTF Floc Pond Batters	2022057_077EAY_KLC_OB_7 MYMF Eastern Batters	2022057_080EAY_KLC_OB_10 MRD
				Sampling date / time	20-Oct-2022 00:00	20-Oct-2022 00:00	20-Oct-2022 00:00	20-Oct-2022 00:00	20-Oct-2022 00:00
					EB2231051-011	EB2231051-012	EB2231051-013	EB2231051-014	EB2231051-015
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Gallium	7440-55-3	0.001	mg/L		<0.001	<0.001	<0.001	**0.002**	<0.001
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Hafnium	7440-58-6	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Tellurium	22541-49-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	7440-48-4	0.001	mg/L		**3.92**	**0.042**	<0.001	**0.003**	<0.001
Holmium	7440-60-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Uranium	7440-61-1	0.001	mg/L		<0.001	<0.001	<0.001	**0.001**	<0.001
Caesium	7440-46-2	0.001	mg/L		**0.001**	<0.001	<0.001	<0.001	<0.001
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	**0.002**	<0.001
Indium	7440-74-6	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		<0.001	**0.002**	<0.001	**0.003**	**0.002**
Lanthanum	7439-91-0	0.001	mg/L		**0.027**	<0.001	<0.001	**0.012**	<0.001
Rubidium	7440-17-7	0.001	mg/L		**0.009**	**0.004**	<0.001	**0.005**	<0.001
Lithium	7439-93-2	0.001	mg/L		**0.004**	**0.004**	**0.003**	**0.002**	<0.001
Lutetium	7439-94-3	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
Cerium	7440-45-1	0.001	mg/L		**0.024**	<0.001	<0.001	**0.021**	<0.001
Manganese	7439-96-5	0.001	mg/L		**2.24**	**0.110**	**0.005**	**0.039**	**0.003**
Neodymium	7440-00-8	0.001	mg/L		**0.004**	<0.001	<0.001	**0.024**	<0.001
Molybdenum	7439-98-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Praseodymium	7440-10-0	0.001	mg/L		**0.001**	<0.001	<0.001	**0.005**	<0.001
Nickel	7440-02-0	0.001	mg/L		**0.920**	**0.005**	<0.001	**0.001**	**0.002**
Samarium	7440-19-9	0.001	mg/L		<0.001	<0.001	<0.001	**0.005**	<0.001
Lead	7439-92-1	0.001	mg/L		**0.002**	<0.001	<0.001	**0.002**	<0.001
Terbium	7440-27-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Antimony	7440-36-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Thulium	7440-30-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Ytterbium	7440-64-4	0.001	mg/L		<0.001	<0.001	<0.001	**0.001**	<0.001
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Yttrium	7440-65-5	0.001	mg/L		**0.012**	<0.001	<0.001	**0.020**	<0.001
Thallium	7440-28-0	0.001	mg/L		**0.010**	<0.001	<0.001	<0.001	<0.001
Zirconium	7440-67-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005

Analytical Results

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

Compound	CAS Number	LOR	Unit	Sample ID	2022057_068EAY_KLC_C_68 YMF Operating Face	2022057_069EAY_KLC_C_69 YMF Western Batters	2022057_073EAY_KLC_OB_3 YTF Floc Pond Batters	2022057_077EAY_KLC_OB_7 MYMF Eastern Batters	2022057_080EAY_KLC_OB_10 MRD
				Sampling date / time	20-Oct-2022 00:00	20-Oct-2022 00:00	20-Oct-2022 00:00	20-Oct-2022 00:00	20-Oct-2022 00:00
					EB2231051-011	EB2231051-012	EB2231051-013	EB2231051-014	EB2231051-015
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Vanadium	7440-62-2	0.01	mg/L		<0.01	<0.01	<0.01	**0.02**	<0.01
Zinc	7440-66-6	0.005	mg/L		**0.098**	**0.055**	<0.005	<0.005	<0.005
Iron	7439-89-6	0.05	mg/L		**23.5**	<0.05	<0.05	**0.60**	**0.10**
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**1.1**	**0.3**	<0.1	**0.1**	<0.1

Analytical Results

Sub-Matrix: **LEACHATE** (Matrix: **WATER**)			Sample ID	**DI Water for pH and EC**	**----**	**----**	**----**	**----**
			Sampling date / time	20-Oct-2022 00:00	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**EB2231051-016**	**--------**	**--------**	**--------**	**--------**
				Result	----	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**5.52**	**----**	**----**	**----**	**----**
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	<1	**----**	**----**	**----**	**----**

CERTIFICATE OF ANALYSIS

Work Order	: **EB2308889**	Page	: 1 of 22
Client	: **RGS ENVIRONMENTAL CONSULTANTS PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MATT LANDERS	Contact	: Carsten Emrich
Address	: 3/30 LENSWORTH STREET COOPERS PLAINS 4108	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2021048 Yallourn	Date Samples Received	: 23-Mar-2023 16:20
Order number	: ----	Date Analysis Commenced	: 04-Apr-2023
C-O-C number	: ----	Issue Date	: 05-Apr-2023 11:57
Sampler	: BEN FREIDMAN		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 100		
No. of samples analysed	: 100		

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*
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

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.

- **SPLIT WORK ORDER: It should be noted that ALS has split this work order over the following work orders EB2308889/ EB2308891/ EB2308902/ EB2308909 due to the size of the sample numbers. For any further information regarding this processing of samples please contact ALS client services division on ALSEnviro.Brisbane@alsglobal.com**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7441 0 - 0.5	N7441 0.5 - 1	N7441 1 - 1.5	N7441 1.5 - 2	N7441 2 - 2.5
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308889-001	EB2308889-002	EB2308889-003	EB2308889-004	EB2308889-005
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.012**	**0.009**	**0.547**	**0.385**	**0.214**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7441 2.5 - 3	N7441 3 - 3.5	N7441 3.5 - 4	N7441 4 - 4.5	N7441 4.5 - 5
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308889-006	EB2308889-007	EB2308889-008	EB2308889-009	EB2308889-010
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**1.14**	**0.330**	**0.562**	**0.096**	**0.061**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7441 5 - 5.5	N7441 5.5 - 6	N7441 6 - 6.5	N7441 6.5 - 7	N7441 7 - 7.5
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308889-011	EB2308889-012	EB2308889-013	EB2308889-014	EB2308889-015
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.133**	**0.129**	**0.348**	**0.016**	**0.475**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7441 7.5 - 8	N7441 8 - 8.5	N7441 8.5 - 9	N7441 9 - 9.5	N7441 9.5 - 10
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308889-016	EB2308889-017	EB2308889-018	EB2308889-019	EB2308889-020
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.011**	**0.010**	**0.076**	**0.020**	<0.005

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7441 10 - 10.5	N7441 10.5 - 11	N7441 11 - 11.5	N7441 11.5 - 12	N7441 12 - 12.5
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308889-021	EB2308889-022	EB2308889-023	EB2308889-024	EB2308889-025
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.037**	**0.029**	**0.013**	**0.044**	**0.203**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7441 12.5 - 13	N7441 13 - 13.5	N7441 13.5 - 14	N7441 14 - 14.5	N7441 14.5 - 15
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308889-026	EB2308889-027	EB2308889-028	EB2308889-029	EB2308889-030
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.280**	**0.241**	**0.024**	**0.092**	**0.239**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7441 15 - 15.5	N7441 15.5 - 16	N7441 16 - 16.5	N7441 16.5 - 17	N7441 17 - 17.5
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308889-031	EB2308889-032	EB2308889-033	EB2308889-034	EB2308889-035
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.056**	**0.242**	**0.210**	**0.193**	**0.888**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7441 17.5 - 18	N7441 18 - 18.5	N7441 18.5 - 19	N7441 19 - 19.5	N7441 19.5 - 20
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308889-036	EB2308889-037	EB2308889-038	EB2308889-039	EB2308889-040
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.018**	**0.351**	**0.018**	**0.034**	**0.097**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7441 20 - 20.5	N7441 20.5 - 21	N7441 21 - 21.5	N7441 21.5 - 22	N7441 22 - 22.5
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308889-041	EB2308889-042	EB2308889-043	EB2308889-044	EB2308889-045
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.010**	**0.018**	**0.007**	**0.013**	**0.022**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7441 22.5 - 23	N7441 23 - 23.5	N7441 23.5 - 24	N7441 24 - 24.5	N7441 24.5 - 25
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308889-046	EB2308889-047	EB2308889-048	EB2308889-049	EB2308889-050
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.126**	**0.008**	**0.196**	**3.92**	**0.095**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7441 25 - 25.5	N7441 25.5 - 26	N7441 26 - 26.5	N7441 26.5 - 27	N7441 27 - 27.5
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308889-051	EB2308889-052	EB2308889-053	EB2308889-054	EB2308889-055
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.020**	**0.018**	**0.060**	**0.353**	**0.237**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7441 27.5 - 28	N7441 28 - 28.5	N7441 28.5 - 29	N7441 29 - 29.5	N7442 0 - 0.5
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308889-056	EB2308889-057	EB2308889-058	EB2308889-059	EB2308889-060
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.270**	**0.037**	**0.695**	**0.772**	**0.056**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7442 0.5 - 1	N7442 1 - 1.5	N7442 1.5 - 2	N7442 2 - 2.5	N7442 2.5 - 3
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308889-061	EB2308889-062	EB2308889-063	EB2308889-064	EB2308889-065
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.016**	**0.014**	**0.012**	**0.030**	**0.030**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7442 3 - 3.5	N7442 3.5 - 4	N7442 4 - 4.5	N7442 4.5 - 5	N7442 10 - 10.5
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308889-066	EB2308889-067	EB2308889-068	EB2308889-069	EB2308889-070
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.055**	**0.023**	**0.018**	**0.013**	**0.012**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7442 10.5 - 11	N7442 11 - 11.5	N7442 11.5 - 12	N7442 12 - 12.5	N7442 12.5 - 13
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308889-071	EB2308889-072	EB2308889-073	EB2308889-074	EB2308889-075
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.010**	**0.010**	**0.036**	**0.022**	**0.040**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7442 13 - 13.5	N7442 13.5 - 14	N7442 14 - 14.5	N7442 14.5 - 15	N7442 15 - 15.5
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308889-076	EB2308889-077	EB2308889-078	EB2308889-079	EB2308889-080
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.013**	**0.008**	**0.015**	**0.009**	**0.011**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7442 15.5 - 16	N7442 16 - 16.5	N7442 16.5 - 17	N7442 17 - 17.5	N7442 17.5 - 18
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308889-081	EB2308889-082	EB2308889-083	EB2308889-084	EB2308889-085
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.046**	**0.370**	**0.652**	**2.02**	**0.183**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7442 18 - 18.5	N7442 18.5 - 19	N7442 19 - 19.5	N7442 20.5 - 21	N7442 21 - 21.5
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308889-086	EB2308889-087	EB2308889-088	EB2308889-089	EB2308889-090
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.130**	**0.174**	**0.023**	**0.025**	**0.013**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7442 21.5 - 22	N7442 22 - 22.5	N7442 22.5 - 23	N7442 23 - 23.5	N7442 23.5 - 24
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308889-091	EB2308889-092	EB2308889-093	EB2308889-094	EB2308889-095
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	<0.005	**0.225**	**0.316**	**0.206**	**0.005**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7442 24 - 24.5	N7442 24.5 - 25	N7442 25 - 25.5	N7442 25.5 - 26	N7442 26 - 26.5
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308889-096	EB2308889-097	EB2308889-098	EB2308889-099	EB2308889-100
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.067**	**0.058**	**0.172**	**0.154**	**0.217**

CERTIFICATE OF ANALYSIS

Work Order	: **EB2308891**	Page	: 1 of 21
Client	: **RGS ENVIRONMENTAL CONSULTANTS PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MATT LANDERS	Contact	: Carsten Emrich
Address	: 3/30 LENSWORTH STREET COOPERS PLAINS 4108	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2021048 Yallourn	Date Samples Received	: 23-Mar-2023 16:20
Order number	: ----	Date Analysis Commenced	: 05-Apr-2023
C-O-C number	: ----	Issue Date	: 06-Apr-2023 12:37
Sampler	: BEN FREIDMAN		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 92		
No. of samples analysed	: 92		

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*
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

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.

- **SPLIT WORK ORDER: It should be noted that ALS has split this work order over the following work orders EB2308889/ EB2308891/ EB2308902/ EB2308909 due to the size of the sample numbers. For any further information regarding this processing of samples please contact ALS client services division on ALSEnviro.Brisbane@alsglobal.com**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7442 26.5 - 27	N7442 27 - 27.5	N7442 27.5 - 28	N7442 28 - 28.5	N7442 28.5 - 29
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308891-001	EB2308891-002	EB2308891-003	EB2308891-004	EB2308891-005
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.195**	**0.713**	**1.25**	**0.188**	**1.66**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7442 29 - 29.5	N7442 29.5 - 30	N7442 30 - 30.5	N7508 0 - 0.5	N7508 0.5 - 1
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308891-006	EB2308891-007	EB2308891-008	EB2308891-009	EB2308891-010
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.304**	**0.664**	**0.414**	**0.019**	**0.019**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7508 1 - 1.5	N7508 1.5 - 2	N7508 2 - 2.5	N7508 2.5 - 3	N7508 4.5 - 5
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308891-011	EB2308891-012	EB2308891-013	EB2308891-014	EB2308891-015
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.009**	**0.028**	**0.009**	**0.009**	<0.005

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7508 6 - 6.5	N7508 7.5 - 8	N7508 9 - 9.5	N7508 10.5 - 11	N7508 12 - 12.5
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308891-016	EB2308891-017	EB2308891-018	EB2308891-019	EB2308891-020
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.005**	**0.005**	**0.007**	**0.008**	**0.005**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7508 13.5 - 14	N7508 15 - 15.5	N7508 16.5 - 17	N7508 18 - 18.5	N7508 19.5 - 20
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308891-021	EB2308891-022	EB2308891-023	EB2308891-024	EB2308891-025
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.008**	**0.012**	**0.187**	**0.008**	**0.014**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7508 21 - 21.5	N7508 22.5 - 23	N7508 24 - 24.5	N7508 25.5 - 26	N7508 27 - 27.5
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308891-026	EB2308891-027	EB2308891-028	EB2308891-029	EB2308891-030
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.008**	**0.062**	**0.085**	**0.196**	**0.254**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7508 28.5 - 29	N7508 30 - 30.5	N7440 0 - 0.5	N7440 0.5 - 1	N7440 1 - 1.5
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308891-031	EB2308891-032	EB2308891-033	EB2308891-034	EB2308891-035
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.136**	**0.084**	**0.014**	**0.012**	**0.014**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7440 1.5 - 2	N7440 2 - 2.5	N7440 2.5 - 3	N7440 4 - 4.5	N7440 5.5 - 6
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308891-036	EB2308891-037	EB2308891-038	EB2308891-039	EB2308891-040
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.007**	**0.006**	**0.005**	**0.013**	**0.278**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7440 7 - 7.5	N7440 8.5 - 9	N7440 10 - 10.5	N7440 11.5 - 12	N7440 13 - 13.5
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308891-041	EB2308891-042	EB2308891-043	EB2308891-044	EB2308891-045
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.020**	**0.007**	**0.064**	**0.024**	**0.016**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7440 14.5 - 15	N7440 16 - 16.5	N7440 17.5 - 18	N7440 19 - 19.5	N7440 20.5 - 21
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308891-046	EB2308891-047	EB2308891-048	EB2308891-049	EB2308891-050
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.012**	**0.016**	**0.016**	**0.233**	**0.599**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7440 22 - 22.5	N7440 23.5 - 24	N7440 25 - 25.5	N7440 26.5 - 27	N7440 28 - 28.5
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308891-051	EB2308891-052	EB2308891-053	EB2308891-054	EB2308891-055
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.600**	**1.62**	**1.75**	**4.38**	**4.46**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7438 0 - 0.5	N7438 0.5 - 1	N7438 1 - 1.5	N7438 1.5 - 2	N7438 2 - 2.5
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308891-056	EB2308891-057	EB2308891-058	EB2308891-059	EB2308891-060
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.030**	**0.013**	**0.010**	**0.007**	**0.012**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7438 2.5 - 3	N7438 5.5 - 6	N7438 7 - 7.5	N7438 8.5 - 9	N7429 25.5 - 26
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308891-061	EB2308891-062	EB2308891-063	EB2308891-064	EB2308891-065
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.012**	**0.012**	**0.015**	**0.008**	**0.019**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7429 27 - 27.5	N7429 28.5 - 29	N7439 0 - 0.5	N7439 0.5 - 1	N7439 1 - 1.5
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308891-066	EB2308891-067	EB2308891-068	EB2308891-069	EB2308891-070
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.382**	**0.112**	**0.007**	**0.014**	**0.010**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7439 1.5 - 2	N7439 2 - 2.5	N7439 2.5 - 3	N7439 4 - 4.5	N7439 5.5 - 6
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308891-071	EB2308891-072	EB2308891-073	EB2308891-074	EB2308891-075
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.008**	**0.012**	**0.010**	**0.005**	**0.019**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7439 7 - 7.5	N7439 8.5 - 9	N7439 10 - 10.5	N7439 11.5 - 12	N7439 13 - 13.5
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308891-076	EB2308891-077	EB2308891-078	EB2308891-079	EB2308891-080
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.016**	**0.008**	**0.024**	**0.012**	**0.008**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7439 14.5 - 15	N7439 16 - 16.5	N7439 17.5 - 18	N7439 19 - 19.5	N7439 20.5 - 21
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308891-081	EB2308891-082	EB2308891-083	EB2308891-084	EB2308891-085
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.008**	**0.009**	**0.014**	**0.068**	**0.048**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7439 22 - 22.5	N7439 23.5 - 24	N7439 25 - 25.5	N7439 26.5 - 27	N7439 28 - 28.5
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308891-086	EB2308891-087	EB2308891-088	EB2308891-089	EB2308891-090
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.018**	**0.058**	**0.081**	**0.044**	**0.164**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7439 30.5 - 31	N7439 33.5 - 34	----	----	----
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	----	----	----
Compound	CAS Number	LOR	Unit	EB2308891-091	EB2308891-092	--------	--------	--------
				Result	Result	----	----	----
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.384**	**0.025**	**----**	**----**	**----**

CERTIFICATE OF ANALYSIS

Work Order	: **EB2308902**	Page	: 1 of 22
Client	: **RGS ENVIRONMENTAL CONSULTANTS PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MATT LANDERS	Contact	: Carsten Emrich
Address	: 3/30 LENSWORTH STREET COOPERS PLAINS 4108	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2021048 Yallourn	Date Samples Received	: 23-Mar-2023 16:20
Order number	: ----	Date Analysis Commenced	: 06-Apr-2023
C-O-C number	: ----	Issue Date	: 11-Apr-2023 10:44
Sampler	: BEN FREIDMAN		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 99		
No. of samples analysed	: 99		

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

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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*
Layla Hafner	Acid Sulphate Soils - Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

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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.
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- **SPLIT WORK ORDER: It should be noted that ALS has split this work order over the following work orders EB2308889/ EB2308891/ EB2308902/ EB2308909 due to the size of the sample numbers. For any further information regarding this processing of samples please contact ALS client services division on ALSEnviro.Brisbane@alsglobal.com**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7454 0 - 0.5	N7454 0.5 - 1	N7454 1 - 1.5	N7454 1.5 - 2	N7454 2 - 2.5
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308902-001	EB2308902-002	EB2308902-003	EB2308902-004	EB2308902-005
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.028**	**0.012**	**0.011**	**0.009**	**0.008**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7454 2.5 - 3	N7454 4 - 4.5	N7454 5.5 - 6	N7454 7 - 7.5	N7454 8.5 - 9
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308902-006	EB2308902-007	EB2308902-008	EB2308902-009	EB2308902-010
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.008**	**0.180**	**0.008**	**0.010**	**0.012**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7454 10 - 10.5	N7454 11.5 - 12	N7454 13 - 13.5	N7454 14.5 - 15	N7454 16 - 16.5
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308902-011	EB2308902-012	EB2308902-013	EB2308902-014	EB2308902-015
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.007**	**0.009**	**0.009**	**0.013**	**0.007**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7454 17.5 - 18	N7454 19 - 19.5	N7454 20.5 - 21	N7454 22 - 22.5	N7454 23.5 - 24
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308902-016	EB2308902-017	EB2308902-018	EB2308902-019	EB2308902-020
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.005**	**0.014**	**0.016**	**0.012**	**0.016**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7454 25 - 25.5	N7454 26.5 - 27	N7454 28 - 28.5	N7454 29.5 - 30	N7435 0 - 0.5
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308902-021	EB2308902-022	EB2308902-023	EB2308902-024	EB2308902-025
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.009**	**0.010**	**0.009**	**0.014**	**0.011**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7435 0.5 - 1	N7435 1 - 1.5	N7435 1.5 - 2	N7435 2 - 2.5	N7435 2.5 - 3
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308902-026	EB2308902-027	EB2308902-028	EB2308902-029	EB2308902-030
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.011**	**0.010**	**0.008**	**0.008**	**0.012**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7435 4.5 - 5	N7435 6 - 6.5	N7435 7.5 - 8	N7435 9 - 9.5	N7435 10.5 - 11
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308902-031	EB2308902-032	EB2308902-033	EB2308902-034	EB2308902-035
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.012**	**0.008**	**0.011**	**0.008**	**0.010**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7435 12 - 12.5	N7435 13.5 - 14	N7435 15 - 15.5	N7435 16.5 - 17	N7435 18 - 18.5
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308902-036	EB2308902-037	EB2308902-038	EB2308902-039	EB2308902-040
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.010**	**0.013**	**0.011**	**0.014**	**0.012**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7435 19.5 - 20	N7435 21 - 21.5	N7435 22.5 - 23	N7435 25.5 - 26	N7436 0 - 0.5
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308902-041	EB2308902-042	EB2308902-043	EB2308902-044	EB2308902-045
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.013**	**0.009**	**0.006**	**0.008**	**0.013**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7436 0.5 - 1	N7436 1 - 1.5	N7436 1.5 - 2	N7436 2 - 2.5	N7436 2.5 - 3
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308902-046	EB2308902-047	EB2308902-048	EB2308902-049	EB2308902-050
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.009**	**0.006**	**0.009**	**0.015**	**0.013**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7436 4.5 - 5	N7436 6 - 6.5	N7436 7.5 - 8	N7436 9 - 9.5	N7436 10.5 - 11
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308902-051	EB2308902-052	EB2308902-053	EB2308902-054	EB2308902-055
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.012**	**0.008**	**0.018**	**0.017**	**0.010**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7436 14 - 14.5	N7436 17.5 - 18	N7436 19.5 - 20	N7436 23 - 23.5	N7436 26.5 - 27
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308902-056	EB2308902-057	EB2308902-058	EB2308902-059	EB2308902-060
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.005**	<0.005	**0.010**	**0.006**	**0.008**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7436 30 - 30.5	N7436 33.5 - 34	N7436 36.5 - 37	N7436 40 - 40.5	N7436 43.5 - 44
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308902-061	EB2308902-062	EB2308902-063	EB2308902-064	EB2308902-065
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.012**	**0.007**	**0.014**	**0.009**	**0.012**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7436 45 - 45.5	N7436 46.5 - 47	N7436 48 - 48.5	N7447 0 - 0.5	N7447 0.5 - 1
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308902-066	EB2308902-067	EB2308902-068	EB2308902-069	EB2308902-070
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.026**	**0.008**	**0.020**	**0.020**	**0.010**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7447 1 - 1.5	N7447 1.5 - 2	N7447 2 - 2.5	N7447 2.5 - 3	N7447 4 - 4.5
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308902-071	EB2308902-072	EB2308902-073	EB2308902-074	EB2308902-075
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.008**	**0.016**	**0.011**	**0.006**	**0.009**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7447 5.5 - 6	N7447 7 - 7.5	N7447 8.5 - 9	N7447 10 - 10.5	N7447 11.5 - 12
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308902-076	EB2308902-077	EB2308902-078	EB2308902-079	EB2308902-080
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.008**	**0.009**	<0.005	<0.005	**0.012**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7447 13 - 13.5	N7447 14.5 - 15	N7447 16 - 16.5	N7447 17.5 - 18	N7446 0 - 0.5
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308902-081	EB2308902-082	EB2308902-083	EB2308902-084	EB2308902-085
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.010**	**0.007**	**0.012**	**0.006**	**0.007**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7446 0.5 - 1	N7446 1 - 1.5	N7446 1.5 - 2	N7446 2 - 2.5	N7446 2.5 - 3
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308902-086	EB2308902-087	EB2308902-088	EB2308902-089	EB2308902-090
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.008**	<0.005	**0.010**	**0.006**	<0.005

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7446 4 - 4.5	N7446 5.5 - 6	N7446 7 - 7.5	N7446 8.5 - 9	N7446 10 - 10.5
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308902-091	EB2308902-092	EB2308902-093	EB2308902-094	EB2308902-095
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.012**	**0.022**	**0.015**	**0.013**	**0.012**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7446 11.5 - 12	N7446 13 - 13.5	N7446 14.5 - 15	N7446 16 - 16.5	----
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	----
Compound	CAS Number	LOR	Unit	EB2308902-096	EB2308902-097	EB2308902-098	EB2308902-099	--------
				Result	Result	Result	Result	----
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.006**	**0.006**	**0.008**	**0.009**	**----**

CERTIFICATE OF ANALYSIS

Work Order	: **EB2308909**	Page	: 1 of 22
Client	: **RGS ENVIRONMENTAL CONSULTANTS PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MATT LANDERS	Contact	: Carsten Emrich
Address	: 3/30 LENSWORTH STREET COOPERS PLAINS 4108	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2021048 Yallourn	Date Samples Received	: 23-Mar-2023 16:20
Order number	: ----	Date Analysis Commenced	: 11-Apr-2023
C-O-C number	: ----	Issue Date	: 12-Apr-2023 17:27
Sampler	: BEN FREIDMAN		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 96		
No. of samples analysed	: 96		

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*
Layla Hafner	Acid Sulphate Soils - Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

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^ = 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.

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Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7423 0 - 0.5	N7423 0.5 - 1	N7423 1 - 1.5	N7423 1.5 - 2	N7423 2 - 2.5
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308909-001	EB2308909-002	EB2308909-003	EB2308909-004	EB2308909-005
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.015**	**0.018**	**0.018**	**0.022**	**0.014**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7423 2.5 - 3	N7423 4 - 4.5	N7423 5.5 - 6	N7423 7 - 7.5	N7423 8.5 - 9
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308909-006	EB2308909-007	EB2308909-008	EB2308909-009	EB2308909-010
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.019**	**0.279**	**0.634**	**0.050**	**0.121**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7423 10 - 10.5	N7423 12 - 12.5	N7423 13.5 - 14	N7423 15 - 15.5	N7423 16.5 - 17
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308909-011	EB2308909-012	EB2308909-013	EB2308909-014	EB2308909-015
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.020**	**0.240**	**0.242**	**0.182**	**0.450**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7423 18 - 18.5	N7423 19.5 - 20	N7423 21 - 21.5	N7423 22.5 - 23	N7423 24 - 24.5
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308909-016	EB2308909-017	EB2308909-018	EB2308909-019	EB2308909-020
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.551**	**0.437**	**0.264**	**0.385**	**0.076**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7423 25.5 - 26	N7423 27 - 27.5	N7423 28.5 - 29	N7425 0 - 0.5	N7425 0.5 - 1
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308909-021	EB2308909-022	EB2308909-023	EB2308909-024	EB2308909-025
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.122**	**0.017**	**0.049**	**0.015**	**0.013**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7425 1 - 1.5	N7425 1.5 - 2	N7425 2 - 2.5	N7425 2.5 - 3	N7425 4 - 4.5
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308909-026	EB2308909-027	EB2308909-028	EB2308909-029	EB2308909-030
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.019**	**0.097**	**0.131**	**0.134**	**0.029**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7425 5.5 - 6	N7425 7 - 7.5	N7425 8.5 - 9	N7425 10 - 10.5	N7425 11.5 - 12
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308909-031	EB2308909-032	EB2308909-033	EB2308909-034	EB2308909-035
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.020**	**0.014**	**0.026**	**0.042**	**0.022**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7425 13 - 13.5	N7425 14.5 - 15	N7425 16 - 16.5	N7425 17.5 - 18	N7425 21 - 21.5
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308909-036	EB2308909-037	EB2308909-038	EB2308909-039	EB2308909-040
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.227**	**0.099**	**2.32**	**0.094**	**0.183**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7425 22.5 - 23	N7425 24 - 24.5	N7425 25.5 - 26	N7425 27 - 27.5	N7425 28.5 - 29
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308909-041	EB2308909-042	EB2308909-043	EB2308909-044	EB2308909-045
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.254**	**0.060**	**0.256**	**0.907**	**0.999**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7425 30 - 30.5	N7451 0 - 0.5	N7451 0.5 - 1	N7451 1 - 1.5	N7451 1.5 - 2
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308909-046	EB2308909-047	EB2308909-048	EB2308909-049	EB2308909-050
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.407**	**0.018**	**0.010**	**0.015**	**0.015**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7451 2 - 2.5	N7451 2.5 - 3	N7451 3 - 3.5	N7451 3.5 - 4	N7451 4 - 4.5
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308909-051	EB2308909-052	EB2308909-053	EB2308909-054	EB2308909-055
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.007**	**0.006**	**0.010**	<0.005	**0.016**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7451 6.5 - 7	N7451 8.5 - 9	N7451 9 - 9.5	N7451 10 - 10.5	N7451 11.5 - 12
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308909-056	EB2308909-057	EB2308909-058	EB2308909-059	EB2308909-060
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.010**	**0.008**	**0.010**	**0.007**	**0.014**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7451 16 - 16.5	N7451 18 - 18.5	N7451 19 - 19.5	N7451 20 - 20.5	N7451 21 - 21.5
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308909-061	EB2308909-062	EB2308909-063	EB2308909-064	EB2308909-065
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.017**	**0.006**	**0.011**	**0.008**	**0.008**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7451 23 - 23.5	N7451 26 - 26.5	N7451 26.5 - 27	N7451 27 - 27.5	N7451 28.5 - 29
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308909-066	EB2308909-067	EB2308909-068	EB2308909-069	EB2308909-070
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.014**	**0.018**	**0.016**	**0.010**	**0.019**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7451 29.5 - 30	N7451 31.5 - 32	N7437 0 - 0.5	N7437 0.5 - 1	N7437 1 - 1.5
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308909-071	EB2308909-072	EB2308909-073	EB2308909-074	EB2308909-075
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.019**	**0.014**	<0.005	<0.005	**0.013**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7437 1.5 - 2	N7437 2 - 2.5	N7437 2.5 - 3	N7437 5.5 - 6	N7437 7 - 7.5
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308909-076	EB2308909-077	EB2308909-078	EB2308909-079	EB2308909-080
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.011**	**0.028**	**0.017**	**0.012**	**0.016**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7437 8.5 - 9	N7445 5 - 5.5	N7445 5.5 - 6	N7445 6 - 6.5	N7445 6.5 - 7
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308909-081	EB2308909-082	EB2308909-083	EB2308909-084	EB2308909-085
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.009**	**0.014**	**0.561**	**0.161**	**0.104**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7445 7 - 7.5	N7445 7.5 - 8	N7445 8 - 8.5	N7445 8.5 - 9	N7445 9 - 9.5
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308909-086	EB2308909-087	EB2308909-088	EB2308909-089	EB2308909-090
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**2.09**	**0.136**	**0.065**	**0.034**	**0.016**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7445 9.5 - 10	N7445 10 - 10.5	N7445 10.5 - 11	N7445 11 - 11.5	N7445 11.5 - 12
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2308909-091	EB2308909-092	EB2308909-093	EB2308909-094	EB2308909-095
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.006**	**0.060**	**0.727**	**0.021**	**0.016**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7445 12 - 12.5	----	----	----	----
			Sampling date / time	23-Mar-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EB2308909-096	--------	--------	--------	--------
				Result	----	----	----	----
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.010**	**----**	**----**	**----**	**----**

CERTIFICATE OF ANALYSIS

Work Order	: **EB2311551**	Page	: 1 of 22
Client	: **RGS ENVIRONMENTAL CONSULTANTS PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MATT LANDERS	Contact	: Carsten Emrich
Address	: 3/30 LENSWORTH STREET COOPERS PLAINS 4108	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2021048 Yallourn	Date Samples Received	: 18-Apr-2023 12:40
Order number	: ----	Date Analysis Commenced	: 04-May-2023
C-O-C number	: ----	Issue Date	: 04-May-2023 15:16
Sampler	: BEN FREIDMAN		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 96		
No. of samples analysed	: 96		

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*
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

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.

- **SPLIT WORK ORDER: It should be noted that ALS has split this work order over the following work orders EB2311551/ EB2311553/ EB2311554/ EB2311555 due to the size of the sample numbers. For any further information regarding this processing of samples please contact ALS client services division on ALSEnviro.Brisbane@alsglobal.com**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	M4223 0.0 - 0.5	M4223 0.5 - 1.0	M4223 1.0 - 1.5	M4223 1.5 - 2.0	M4223 2.0 - 2.5
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311551-001	EB2311551-002	EB2311551-003	EB2311551-004	EB2311551-005
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.010**	**0.014**	**0.012**	**0.014**	**0.016**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	M4223 2.5 - 3.0	M4223 3.0 - 3.5	M4223 3.5 - 4.0	M4223 4.0 - 4.5	M4223 4.5 - 5.0
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311551-006	EB2311551-007	EB2311551-008	EB2311551-009	EB2311551-010
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.012**	**0.012**	**0.013**	**0.009**	**0.017**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	M4223 5.0 - 5.5	M4223 5.5 - 6.0	M4223 6.0 - 6.5	M4223 6.5 - 7.0	M4223 7.0 - 7.5
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311551-011	EB2311551-012	EB2311551-013	EB2311551-014	EB2311551-015
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.006**	**0.012**	**0.009**	**0.010**	**0.012**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	M4223 7.5 - 8.0	M4223 8.0 - 8.5	M4223 8.5 - 9.0	M4223 9.0 - 9.5	M4223 10.0 - 10.5
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311551-016	EB2311551-017	EB2311551-018	EB2311551-019	EB2311551-020
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.012**	**0.009**	**0.016**	**0.010**	**0.011**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	M4223 10.5 - 11.0	M4223 11.0 - 11.5	M4223 11.5 - 12.0	M4223 12.0 - 12.5	M4223 12.5 - 13.0
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311551-021	EB2311551-022	EB2311551-023	EB2311551-024	EB2311551-025
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.006**	**0.006**	**0.009**	**0.011**	**0.007**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	M4223 13.0 - 13.5	M4223 13.5 - 14.0	M4223 14.0 - 14.5	M4223 14.5 - 15.0	M4223 15.0 - 15.5
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311551-026	EB2311551-027	EB2311551-028	EB2311551-029	EB2311551-030
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.012**	**0.010**	**0.009**	<0.005	**0.012**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	M4223 15.5 - 16.0	M4223 16.0 - 16.5	M4223 16.5 - 17.0	M4223 17.0 - 17.5	M4223 17.5 - 18.0
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311551-031	EB2311551-032	EB2311551-033	EB2311551-034	EB2311551-035
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	<0.005	<0.005	**0.008**	**0.007**	<0.005

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	M4223 18.0 - 18.5	M4223 18.5 - 19.0	M4223 19.0 - 19.5	M4223 19.5 - 20.0	M4223 20.0 - 20.5
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311551-036	EB2311551-037	EB2311551-038	EB2311551-039	EB2311551-040
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	<0.005	**0.015**	<0.005	**0.013**	**0.006**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	M4224 0.0 - 0.5	M4224 0.5 - 1.0	M4224 1.0 - 1.5	M4224 1.5 - 2.0	M4224 2.0 - 2.5
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311551-041	EB2311551-042	EB2311551-043	EB2311551-044	EB2311551-045
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.010**	**0.008**	**0.007**	**0.013**	**0.023**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	M4224 2.5 - 3.0	M4224 3.0 - 3.5	M4224 3.5 - 4.0	M4224 4.0 - 4.5	M4224 4.5 - 5.0
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311551-046	EB2311551-047	EB2311551-048	EB2311551-049	EB2311551-050
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.009**	**0.006**	**0.016**	<0.005	**0.009**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	M4224 5.0 - 5.5	M4224 5.5 - 6.0	M4224 6.0 - 6.5	M4224 6.5 - 7.0	M4224 7.0 - 7.5
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311551-051	EB2311551-052	EB2311551-053	EB2311551-054	EB2311551-055
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.010**	**0.006**	**0.007**	<0.005	**0.008**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	M4224 7.5 - 8.0	M4224 8.0 - 8.5	M4224 8.5 - 9.0	M4224 9.0 - 9.5	M4224 9.5 - 10.0
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311551-056	EB2311551-057	EB2311551-058	EB2311551-059	EB2311551-060
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.009**	**0.012**	<0.005	**0.008**	**0.007**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7426 0.0 - 0.5	N7426 0.5 - 1.0	N7426 1.0 - 1.5	N7426 1.5 - 2.0	N7426 2.0 - 2.5
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311551-061	EB2311551-062	EB2311551-063	EB2311551-064	EB2311551-065
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.006**	**0.008**	**0.015**	**0.023**	**0.050**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7426 2.5 - 3.0	N7426 4.5 - 5.0	N7426 6.0 - 6.5	N7426 7.5 - 8.0	N7426 9.0 - 9.5
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311551-066	EB2311551-067	EB2311551-068	EB2311551-069	EB2311551-070
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.051**	**0.101**	**0.508**	**2.23**	<0.005

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7426 10.5 - 11.0	N7426 12.0 - 12.5	N7426 13.5 - 14.0	N7426 15.0 - 15.5	N7426 16.5 - 17.0
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311551-071	EB2311551-072	EB2311551-073	EB2311551-074	EB2311551-075
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.222**	**2.04**	**0.052**	**0.051**	**0.018**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7426 18.0 - 18.5	N7426 19.5 - 20.0	N7426 21.0 - 21.5	N7426 22.5 - 23.0	N7426 24.0 - 24.5
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311551-076	EB2311551-077	EB2311551-078	EB2311551-079	EB2311551-080
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.056**	**0.101**	**0.006**	<0.005	**0.200**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7426 25.5 - 26.0	N7429 0.0 - 0.5	N7429 0.5 - 1.0	N7429 1.0 - 1.5	N7429 1.5 - 2.0
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311551-081	EB2311551-082	EB2311551-083	EB2311551-084	EB2311551-085
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.082**	**0.024**	**0.015**	**0.008**	**0.013**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7429 2.0 - 2.5	N7429 2.5 - 3.0	N7429 4.5 - 5.0	N7429 6.0 - 6.5	N7429 7.5 - 8.0
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311551-086	EB2311551-087	EB2311551-088	EB2311551-089	EB2311551-090
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.012**	**0.010**	**0.010**	**0.009**	<0.005

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7429 16.5 - 17.0	N7429 18.0 - 18.5	N7429 19.5 - 20.0	N7429 21.0 - 21.5	N7429 22.5 - 23.0
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311551-092	EB2311551-093	EB2311551-094	EB2311551-095	EB2311551-096
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.013**	**0.018**	**0.016**	**0.015**	**0.007**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7429 24.0 - 24.5	----	----	----	----
			Sampling date / time	18-Apr-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EB2311551-097	--------	--------	--------	--------
				Result	----	----	----	----
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.018**	**----**	**----**	**----**	**----**

CERTIFICATE OF ANALYSIS

Work Order	: **EB2311553**	Page	: 1 of 18
Client	: **RGS ENVIRONMENTAL CONSULTANTS PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MATT LANDERS	Contact	: Carsten Emrich
Address	: 3/30 LENSWORTH STREET COOPERS PLAINS 4108	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2021048 Yallourn	Date Samples Received	: 18-Apr-2023 12:40
Order number	: ----	Date Analysis Commenced	: 08-May-2023
C-O-C number	: ----	Issue Date	: 08-May-2023 12:35
Sampler	: BEN FREIDMAN		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 76		
No. of samples analysed	: 76		

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*
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

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.

- **SPLIT WORK ORDER: It should be noted that ALS has split this work order over the following work orders EB2311551/ EB2311553/ EB2311554/ EB2311555 due to the size of the sample numbers. For any further information regarding this processing of samples please contact ALS client services division on ALSEnviro.Brisbane@alsglobal.com**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7430 0.0 - 0.5	N7430 0.5 - 1.0	N7430 1.0 - 1.5	N7430 1.5 - 2.0	N7430 2.0 - 2.5
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311553-001	EB2311553-002	EB2311553-003	EB2311553-004	EB2311553-005
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.007**	**0.013**	**0.006**	**0.010**	**0.014**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7430 2.5 - 3.0	N7430 4.5 - 5.0	N7430 6.0 - 6.5	N7430 7.5 - 8.0	N7430 9.0 - 9.5
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311553-006	EB2311553-007	EB2311553-008	EB2311553-009	EB2311553-010
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.010**	**0.009**	**0.015**	**0.008**	**0.014**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7430 10.5 - 11.0	N7430 12.0 - 12.5	N7430 13.5 - 14.0	N7430 15.0 - 15.5	N7430 16.5 - 17.0
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311553-011	EB2311553-012	EB2311553-013	EB2311553-014	EB2311553-015
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.012**	**0.011**	**0.018**	**0.028**	**0.015**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7430 18.0 - 18.5	N7430 19.5 - 20.0	N7430 21.0 - 21.5	N7430 22.0 - 22.5	N7432 0.0 - 0.5
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311553-016	EB2311553-017	EB2311553-018	EB2311553-019	EB2311553-020
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.008**	**0.021**	**0.016**	**0.021**	**0.010**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7432 0.5 - 1.0	N7432 1.0 - 1.5	N7432 1.5 - 2.0	N7432 2.0 - 2.5	N7432 2.5 - 3.0
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311553-021	EB2311553-022	EB2311553-023	EB2311553-024	EB2311553-025
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	<0.005	<0.005	**0.009**	**0.014**	**0.010**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7432 4.0 - 4.5	N7432 5.5 - 6.0	N7432 7.0 - 7.5	N7432 8.5 - 9.0	N7432 10.0 - 10.5
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311553-026	EB2311553-027	EB2311553-028	EB2311553-029	EB2311553-030
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	<0.005	**0.008**	<0.005	**0.012**	**0.006**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7432 11.5 - 12.0	N7432 13.0 - 13.5	N7432 14.5 - 15.0	N7432 16.0 - 16.5	N7432 17.5 - 18.0
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311553-031	EB2311553-032	EB2311553-033	EB2311553-034	EB2311553-035
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.008**	**0.009**	**0.009**	**0.007**	**0.006**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7432 19.0 - 19.5	N7432 20.5 - 21.0	N7432 22.0 - 22.5	N7432 23.5 - 24.0	N7432 25.0 - 25.5
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311553-036	EB2311553-037	EB2311553-038	EB2311553-039	EB2311553-040
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.007**	**0.011**	**0.012**	**0.005**	**0.013**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7432 26.5 - 27.0	N7432 28.0 - 28.5	N7432 29.5 - 30.0	N7432 31.0 - 31.5	N7432 32.5 - 33.0
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311553-041	EB2311553-042	EB2311553-043	EB2311553-044	EB2311553-045
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.009**	**0.006**	**0.010**	**0.007**	**0.010**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7432 36.0 - 36.5	N7432 39.5 - 40.0	N7432 43.0 - 43.5	N7432 46.5 - 47.0	N7432 50.0 - 50.5
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311553-046	EB2311553-047	EB2311553-048	EB2311553-049	EB2311553-050
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.006**	**0.012**	**0.023**	**0.009**	**0.016**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7432 53.5 -54.0	N7433 0.0 - 0.5	N7433 0.5 - 1.0	N7433 1.0 - 1.5	N7433 1.5 - 2.0
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311553-051	EB2311553-052	EB2311553-053	EB2311553-054	EB2311553-055
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.012**	**0.007**	**0.012**	**0.020**	**0.017**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7433 2.0 - 2.5	N7433 2.5 - 3.0	N7433 3.5 - 4.0	N7433 5.0 - 5.5	N7433 6.5 - 7.0
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311553-056	EB2311553-057	EB2311553-058	EB2311553-059	EB2311553-060
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.018**	**0.007**	**0.012**	**0.017**	**0.008**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7433 8.0 - 8.5	N7433 9.5 - 10.0	N7433 11.0 - 11.5	N7433 12.5 - 13.0	N7433 14.0 - 14.5
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311553-061	EB2311553-062	EB2311553-063	EB2311553-064	EB2311553-065
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.010**	**0.006**	**0.009**	**0.022**	**0.011**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7433 15.5 - 16.0	N7433 18.5 - 19.0	N7433 21.5 - 22.0	N7433 23.5 - 24.0	N7433 24.5 - 25.0
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311553-066	EB2311553-067	EB2311553-068	EB2311553-069	EB2311553-070
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.013**	**0.018**	**0.010**	**0.026**	**0.020**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7433 27.0 - 27.5	N7433 27.5 - 28.0	N7433 32.0 - 32.5	N7433 33.5 - 34.0	N7433 35.5 - 36.0
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311553-071	EB2311553-072	EB2311553-073	EB2311553-074	EB2311553-075
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.010**	**0.011**	**0.142**	**0.013**	**0.011**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7433 37.0 - 37.5	----	----	----	----
			Sampling date / time	18-Apr-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EB2311553-076	--------	--------	--------	--------
				Result	----	----	----	----
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.006**	**----**	**----**	**----**	**----**

CERTIFICATE OF ANALYSIS

Work Order	: **EB2311554**	Page	: 1 of 17
Client	: **RGS ENVIRONMENTAL CONSULTANTS PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MATT LANDERS	Contact	: Carsten Emrich
Address	: 3/30 LENSWORTH STREET COOPERS PLAINS 4108	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2021048 Yallourn	Date Samples Received	: 18-Apr-2023 12:40
Order number	: ----	Date Analysis Commenced	: 09-May-2023
C-O-C number	: ----	Issue Date	: 10-May-2023 13:57
Sampler	: BEN FREIDMAN		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 74		
No. of samples analysed	: 74		

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*
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

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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.

- **SPLIT WORK ORDER: It should be noted that ALS has split this work order over the following work orders EB2311551/ EB2311553/ EB2311554/ EB2311555 due to the size of the sample numbers. For any further information regarding this processing of samples please contact ALS client services division on ALSEnviro.Brisbane@alsglobal.com**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7434 0.0 - 0.5	N7434 0.5 - 1.0	N7434 1.0 - 1.5	N7434 1.5 - 2.0	N7434 2.0 - 2.5
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311554-001	EB2311554-002	EB2311554-003	EB2311554-004	EB2311554-005
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.020**	**0.062**	**0.122**	**0.069**	**0.204**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7434 2.5 - 3.0	N7434 4.0 - 4.5	N7434 5.5 - 6.0	N7434 8.5 - 9.0	N7434 10.0 - 10.5
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311554-006	EB2311554-007	EB2311554-008	EB2311554-009	EB2311554-010
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.562**	**0.049**	**0.039**	**0.028**	**0.068**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7434 11.5 - 12.0	N7434 13.0 - 13.5	N7434 15.0 - 15.5	N7434 16.5 - 17.0	N7434 18.0 - 18.5
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311554-011	EB2311554-012	EB2311554-013	EB2311554-014	EB2311554-015
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.053**	**0.024**	<0.005	**0.006**	**0.008**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7434 19.5 - 20.0	N7434 21.0 - 21.5	N7434 22.5 - 23.0	N7434 26.0 - 26.5	N7434 27.5 - 28.0
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311554-016	EB2311554-017	EB2311554-018	EB2311554-019	EB2311554-020
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.006**	**0.007**	**0.257**	**0.225**	**0.116**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7434 29.0 - 29.5	N7437 10.0 - 10.5	N7437 11.5 - 12.0	N7437 13.0 - 13.5	N7437 14.5 - 15.0
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311554-021	EB2311554-022	EB2311554-023	EB2311554-024	EB2311554-025
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.308**	**0.063**	**0.011**	**0.017**	**0.013**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7437 16.0 - 16.5	N7437 17.5 - 18.0	N7438 10.0 - 10.5	N7438 11.5 - 12.0	N7438 13.0 - 13.5
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311554-026	EB2311554-027	EB2311554-028	EB2311554-029	EB2311554-030
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.032**	**0.012**	<0.005	**0.322**	**1.85**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7438 14.5 - 15.0	N7438 16.0 - 16.5	N7438 17.5 - 18.0	N7438 19.0 - 19.5	N7438 20.5 - 21.0
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311554-031	EB2311554-032	EB2311554-033	EB2311554-034	EB2311554-035
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.195**	**5.16**	**0.013**	**0.031**	**0.099**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7438 22.0 - 22.5	N7438 23.5 - 24.0	N7438 25.0 - 25.5	N7438 26.5 - 27.0	N7438 28.0 - 28.5
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311554-036	EB2311554-037	EB2311554-038	EB2311554-039	EB2311554-040
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	<0.005	**0.386**	**0.965**	**1.90**	**0.178**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7445 0.0 - 0.5	N7445 0.5 - 1.0	N7445 1.0 - 1.5	N7445 1.5 - 2.0	N7445 2.0 - 2.5
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311554-041	EB2311554-042	EB2311554-043	EB2311554-044	EB2311554-045
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.010**	<0.005	**0.007**	**0.012**	**0.006**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7445 2.5 - 3.0	N7445 3.0 - 3.5	N7445 3.5 - 4.0	N7445 4.0 - 4.5	N7445 4.5 - 5.0
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311554-046	EB2311554-047	EB2311554-048	EB2311554-049	EB2311554-050
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.009**	**0.007**	**0.008**	**0.012**	**0.180**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7445 12.5 - 13.0	N7445 13.0 - 13.5	N7445 13.5 - 14.0	N7445 14.0 - 14.5	N7445 14.5 - 15.0
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311554-051	EB2311554-052	EB2311554-053	EB2311554-054	EB2311554-055
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.030**	**0.019**	**0.696**	**0.071**	**0.011**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7445 15.0 - 15.5	N7445 15.5 - 16.0	N7445 16.0 - 16.5	N7455 0.0 - 0.5	N7455 0.5 - 1.0
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311554-056	EB2311554-057	EB2311554-058	EB2311554-059	EB2311554-060
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.034**	**0.307**	**0.012**	**0.006**	**0.011**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7455 1.0 - 1.5	N7455 1.5 - 2.0	N7455 2.0 - 2.5	N7455 2.5 - 3.0	N7455 4.0 - 4.5
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311554-061	EB2311554-062	EB2311554-063	EB2311554-064	EB2311554-065
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.010**	**0.007**	**0.013**	**0.006**	**0.009**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7455 5.5 - 6.0	N7455 7.0 - 7.5	N7455 8.5 - 9.0	N7455 10.0 - 10.5	N7455 11.5 - 12.0
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311554-066	EB2311554-067	EB2311554-068	EB2311554-069	EB2311554-070
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.008**	**0.014**	**0.010**	**0.013**	**0.006**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7455 13.0 - 13.5	N7455 14.5 - 15.0	N7455 16.0 - 16.5	N7455 17.5 - 18.0	----
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	----
Compound	CAS Number	LOR	Unit	EB2311554-071	EB2311554-072	EB2311554-073	EB2311554-074	--------
				Result	Result	Result	Result	----
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.010**	**0.025**	**0.020**	**0.022**	**----**

CERTIFICATE OF ANALYSIS

Work Order	: **EB2311555**	Page	: 1 of 6
Client	: **RGS ENVIRONMENTAL CONSULTANTS PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MATT LANDERS	Contact	: Carsten Emrich
Address	: 3/30 LENSWORTH STREET COOPERS PLAINS 4108	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2021048 Yallourn	Date Samples Received	: 18-Apr-2023 12:40
Order number	: ----	Date Analysis Commenced	: 10-May-2023
C-O-C number	: ----	Issue Date	: 10-May-2023 14:09
Sampler	: BEN FREIDMAN		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 20		
No. of samples analysed	: 20		

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*
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

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.

- **SPLIT WORK ORDER: It should be noted that ALS has split this work order over the following work orders EB2311551/ EB2311153/ EB231154/ EB231155 due to the size of the sample numbers. For any further information regarding this processing of samples please contact ALS client services division on ALSEnviro.Brisbane@alsglobal.com**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7510 0.0 - 0.5	N7510 0.5 - 1.0	N7510 1.0 - 1.5	N7510 1.5 - 2.0	N7510 2.0 - 2.5
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311555-001	EB2311555-002	EB2311555-003	EB2311555-004	EB2311555-005
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	<0.005	<0.005	**0.006**	<0.005	**0.008**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7510 2.5 - 3.0	N7510 3.0 - 3.5	N7510 3.5 - 4.0	N7510 4.0 - 4.5	N7510 4.5 - 5.0
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311555-006	EB2311555-007	EB2311555-008	EB2311555-009	EB2311555-010
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.006**	<0.005	**0.008**	<0.005	**0.011**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7510 5.0 - 5.5	N7510 5.5 - 6.0	N7510 6.0 - 6.5	N7510 6.5 - 7.0	N7510 7.0 - 7.5
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311555-011	EB2311555-012	EB2311555-013	EB2311555-014	EB2311555-015
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.006**	**0.006**	<0.005	**0.008**	<0.005

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7510 7.5 - 8.0	N7510 8.0 - 8.5	N7510 8.5 - 9.0	N7510 9.0 - 9.5	N7510 9.5 - 10.0
			Sampling date / time	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00	18-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311555-016	EB2311555-017	EB2311555-018	EB2311555-019	EB2311555-020
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	<0.005	<0.005	**0.009**	<0.005	**0.010**

CERTIFICATE OF ANALYSIS

Work Order	: **EB2311858**	Page	: 1 of 29
Client	: **RGS ENVIRONMENTAL CONSULTANTS PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MATT LANDERS	Contact	: Carsten Emrich
Address	: 3/30 LENSWORTH STREET COOPERS PLAINS 4108	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2021048 Yallourn	Date Samples Received	: 20-Apr-2023 14:20
Order number	: ----	Date Analysis Commenced	: 15-May-2023
C-O-C number	: ----	Issue Date	: 15-May-2023 12:24
Sampler	: BEN FREIDMAN		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 133		
No. of samples analysed	: 133		

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*
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

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.

- **SPLIT WORK ORDER: It should be noted that ALS has split this work order over the following work orders (EB2311858, EB2311867) due to the size of the sample numbers. For any further information regarding this processing of samples please contact ALS client services division on ALSEnviro.Brisbane@alsglobal.com**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7424 0 - 0.5	N7424 0.5 - 1	N7424 1 - 1.5	N7424 1.5 - 2	N7424 2 - 2.5
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311858-001	EB2311858-002	EB2311858-003	EB2311858-004	EB2311858-005
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	<0.005	**0.005**	**0.006**	**0.010**	**0.011**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7424 2.5 - 3	N7424 4 - 4.5	N7424 6 - 6.5	N7424 7.5 - 8	N7424 9 - 9.5
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311858-006	EB2311858-007	EB2311858-008	EB2311858-009	EB2311858-010
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.010**	**0.014**	**0.009**	**0.016**	**0.007**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7424 10.5 - 11	N7424 12 - 12.5	N7424 13.5 - 14	N7424 15 - 15.5	N7424 16.5 - 17
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311858-011	EB2311858-012	EB2311858-013	EB2311858-014	EB2311858-015
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.034**	**0.013**	**0.012**	<0.005	**0.026**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7427 0 - 0.5	N7427 0.5 - 1	N7427 1 - 1.5	N7427 1.5 - 2	N7427 2 - 2.5
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311858-016	EB2311858-017	EB2311858-018	EB2311858-019	EB2311858-020
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.009**	<0.005	<0.005	**0.012**	**0.012**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7427 2.5 - 3	N7427 6 - 6.5	N7427 7.5 - 8	N7427 9 - 9.5	N7427 10.5 - 11
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311858-021	EB2311858-022	EB2311858-023	EB2311858-024	EB2311858-025
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.009**	**0.009**	**0.018**	**0.015**	**0.027**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7427 12 - 12.5	N7427 13.5 - 14	N7427 15 - 15.5	N7427 16.5 - 17	N7427 18 - 18.5
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311858-026	EB2311858-027	EB2311858-028	EB2311858-029	EB2311858-030
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.051**	**0.046**	**0.032**	**0.010**	**0.008**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7427 19.5 - 20	N7427 21 - 21.5	N7427 22.5 - 23	N7427 24 - 24.5	N7427 25.5 - 26
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311858-031	EB2311858-032	EB2311858-033	EB2311858-034	EB2311858-035
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.008**	**0.008**	**0.043**	**0.016**	<0.005

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7427 27 - 27.5	N7427 28.5 - 29	N7427 30 - 30.5	N7427 31.5 - 32	N7427 33 - 33.5
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311858-036	EB2311858-037	EB2311858-038	EB2311858-039	EB2311858-040
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.008**	<0.005	**0.021**	**0.013**	**0.012**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7428 0 - 0.5	N7428 0.5 - 1	N7428 1 - 1.5	N7428 1.5 - 2	N7428 2 - 2.5
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311858-041	EB2311858-042	EB2311858-043	EB2311858-044	EB2311858-045
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.005**	**0.005**	**0.012**	**0.006**	<0.005

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7428 2.5 - 3	N7428 4.5 - 5	N7428 6 - 6.5	N7428 7.5 - 8	N7428 9 - 9.5
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311858-046	EB2311858-047	EB2311858-048	EB2311858-049	EB2311858-050
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.014**	**0.008**	**0.011**	**0.017**	**0.005**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)				Sample ID	N7428 12 - 12.5	N7428 13.5 - 14	N7428 15 - 15.5	N7428 16.5 - 17	N7428 18 - 18.5
				Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit		EB2311858-052	EB2311858-053	EB2311858-054	EB2311858-055	EB2311858-056
					Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur									
Chromium Reducible Sulphur	----	0.005	%		**0.025**	<0.005	**0.015**	**0.015**	**0.008**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)				Sample ID	N7428 19.5 - 20	N7428 21 - 21.5	N7428 22.5 - 23	N7428 24 - 24.5	N7428 25.5 - 26
				Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit		EB2311858-057	EB2311858-058	EB2311858-059	EB2311858-060	EB2311858-061
					Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur									
Chromium Reducible Sulphur	----	0.005	%		**0.009**	<0.005	**0.012**	**0.016**	**0.013**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7428 27 - 27.5	N7428 28.5 - 29	N7428 30 - 30.5	N7428 31.5 - 32	N7428 33 - 33.5
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311858-062	EB2311858-063	EB2311858-064	EB2311858-065	EB2311858-066
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.013**	**0.011**	**0.009**	**0.015**	**0.009**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7428 34.5 - 35	N7431 0 - 0.5	N7431 0.5 - 1	N7431 1 - 1.5	N7431 1.5 - 2
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311858-067	EB2311858-068	EB2311858-069	EB2311858-070	EB2311858-071
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.020**	**0.006**	**0.005**	<0.005	**0.019**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7431 2 - 2.5	N7431 2.5 - 3	N7431 3 - 3.5	N7431 3.5 - 4	N7431 4 - 4.5
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311858-072	EB2311858-073	EB2311858-074	EB2311858-075	EB2311858-076
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.018**	**0.012**	<0.005	**0.009**	<0.005

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7431 5 - 5.5	N7431 5.5 - 6	N7431 6.5 - 7	N7431 7 - 7.5	N7431 8 - 8.5
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311858-077	EB2311858-078	EB2311858-079	EB2311858-080	EB2311858-081
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.009**	**0.017**	**0.017**	**0.008**	**0.008**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7431 9.5 - 10	N7431 11 - 11.5	N7431 12 - 12.5	N7431 12.5 - 13	N7431 14 - 14.5
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311858-082	EB2311858-083	EB2311858-084	EB2311858-085	EB2311858-086
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.005**	**0.058**	**0.005**	**0.025**	**0.012**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7431 15.5 - 16	N7431 17 - 17.5	N7431 18.5 - 19	N7431 20 - 20.5	N7431 21.5 - 22
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311858-087	EB2311858-088	EB2311858-089	EB2311858-090	EB2311858-091
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.011**	**0.006**	**0.023**	**0.012**	**0.015**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7431 23 - 23.5	N7431 26 - 26.5	N7431 27.5 - 28	N7431 31.5 - 32	N7443 0 - 0.5
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311858-092	EB2311858-093	EB2311858-094	EB2311858-095	EB2311858-096
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.009**	**0.007**	**0.009**	**0.009**	**0.010**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)				Sample ID	N7443 0.5 - 1	N7443 1 - 1.5	N7443 1.5 - 2	N7443 2 - 2.5	N7443 2.5 - 3
				Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit		EB2311858-097	EB2311858-098	EB2311858-099	EB2311858-100	EB2311858-101
					Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur									
Chromium Reducible Sulphur	----	0.005	%		**0.008**	**0.006**	<0.005	**0.008**	<0.005

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7443 3 - 3.5	N7443 3.5 - 4	N7443 4 - 4.5	N7443 4.5 - 5	N7443 5 - 5.5
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311858-102	EB2311858-103	EB2311858-104	EB2311858-105	EB2311858-106
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.018**	**0.010**	**0.012**	**0.007**	**0.008**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7443 5.5 - 6	N7443 6 - 6.5	N7443 6.5 - 7	N7443 7 - 7.5	N7443 7.5 - 8
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311858-107	EB2311858-108	EB2311858-109	EB2311858-110	EB2311858-111
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.028**	**0.025**	**0.011**	**0.025**	**0.011**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7443 8 - 8.5	N7443 8.5 - 9	N7443 9 - 9.5	N7444 0 - 0.5	N7444 0.5 - 1
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311858-112	EB2311858-113	EB2311858-114	EB2311858-115	EB2311858-116
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.013**	**0.012**	**0.019**	**0.013**	**0.012**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7444 1 - 1.5	N7444 1.5 - 2	N7444 2 - 2.5	N7444 2.5 - 3	N7444 3 - 3.5
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311858-117	EB2311858-118	EB2311858-119	EB2311858-120	EB2311858-121
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.012**	**0.012**	**0.020**	**0.015**	**0.036**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)				Sample ID	N7444 3.5 - 4	N7444 4 - 4.5	N7444 4.5 - 5	N7444 5 - 5.5	N7444 5.5 - 6
				Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit		EB2311858-122	EB2311858-123	EB2311858-124	EB2311858-125	EB2311858-126
					Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur									
Chromium Reducible Sulphur	----	0.005	%		**0.006**	<0.005	**0.012**	**0.016**	**0.014**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7444 6 - 6.5	N7444 6.5 - 7	N7444 7 - 7.5	N7444 7.5 - 8	N7444 8 - 8.5
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311858-127	EB2311858-128	EB2311858-129	EB2311858-130	EB2311858-131
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.009**	**0.026**	**0.014**	**0.013**	**0.008**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7444 8.5 - 9	N7444 9 - 9.5	N7444 9.5 - 10	----	----
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	----	----
Compound	CAS Number	LOR	Unit	EB2311858-132	EB2311858-133	EB2311858-134	--------	--------
				Result	Result	Result	----	----
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.019**	**0.012**	**0.017**	**----**	**----**

CERTIFICATE OF ANALYSIS

Work Order	: **EB2311867**	Page	: 1 of 28
Client	: **RGS ENVIRONMENTAL CONSULTANTS PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MATT LANDERS	Contact	: Carsten Emrich
Address	: 3/30 LENSWORTH STREET COOPERS PLAINS 4108	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2021048 Yallourn	Date Samples Received	: 20-Apr-2023 14:20
Order number	: ----	Date Analysis Commenced	: 18-May-2023
C-O-C number	: ----	Issue Date	: 22-May-2023 13:05
Sampler	: BEN FREIDMAN		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 127		
No. of samples analysed	: 127		

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*
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

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.

- **SPLIT WORK ORDER: It should be noted that ALS has split this work order over the following work orders (EB2311858, EB2311867) due to the size of the sample numbers. For any further information regarding this processing of samples please contact ALS client services division on ALSEnviro.Brisbane@alsglobal.com**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7449 0 - 0.5	N7449 0.5 - 1	N7449 1 - 1.5	N7449 1.5 - 2	N7449 2 - 2.5
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311867-001	EB2311867-002	EB2311867-003	EB2311867-004	EB2311867-005
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.011**	**0.018**	**0.015**	**0.020**	**0.012**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7449 2.5 - 3	N7449 3 - 3.5	N7449 4.5 - 5	N7449 5 - 5.5	N7449 5.5 - 6
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311867-006	EB2311867-007	EB2311867-008	EB2311867-009	EB2311867-010
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.024**	**0.087**	**0.031**	**0.040**	**0.028**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7449 6 - 6.5	N7449 6.5 - 7	N7449 7 - 7.5	N7449 7.5 - 8	N7449 8 - 8.5
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311867-011	EB2311867-012	EB2311867-013	EB2311867-014	EB2311867-015
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.039**	**0.024**	<0.005	**0.011**	**0.012**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7449 9.5 - 10	N7449 10 - 10.5	N7449 10.5 - 11	N7449 11 - 11.5	N7449 11.5 - 12
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311867-016	EB2311867-017	EB2311867-018	EB2311867-019	EB2311867-020
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.008**	**0.013**	**0.007**	**0.005**	**0.015**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7449 12 - 12.5	N7449 12.5 - 13	N7449 13.5 - 14	N7449 14 - 14.5	N7449 14.5 - 15
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311867-021	EB2311867-022	EB2311867-023	EB2311867-024	EB2311867-025
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.020**	**0.036**	**0.018**	**0.008**	**0.012**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7449 15 - 15.5	N7449 16 - 16.5	N7449 16.5 - 17	N7449 17 - 17.5	N7449 17.5 - 18
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311867-026	EB2311867-027	EB2311867-028	EB2311867-029	EB2311867-030
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.010**	**0.060**	**0.006**	**0.015**	**0.007**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7449 18 - 18.5	N7449 18.5 - 19	N7449 19 - 19.5	N7449 20 - 20.5	N7449 20.5 - 21
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311867-031	EB2311867-032	EB2311867-033	EB2311867-034	EB2311867-035
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.012**	**0.012**	**0.014**	**0.006**	<0.005

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7449 21 - 21.5	N7449 21.5 - 22	N7449 22 - 22.5	N7449 22.5 - 23	N7449 23 - 23.5
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311867-036	EB2311867-037	EB2311867-038	EB2311867-039	EB2311867-040
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.019**	**0.010**	**0.022**	**0.012**	**0.010**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7449 23.5 - 24	N7449 24 - 24.5	N7449 24.5 - 25	N7449 25 - 25.5	N7449 25.5 - 26
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311867-041	EB2311867-042	EB2311867-043	EB2311867-044	EB2311867-045
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.010**	**0.008**	**0.007**	**0.014**	**0.013**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7449 26 - 26.5	N7449 27 - 27.5	N7449 29 - 29.5	N7449 30.5 - 31	N7449 31.5 - 32
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311867-046	EB2311867-047	EB2311867-048	EB2311867-049	EB2311867-050
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.006**	**0.011**	**0.014**	**0.014**	**0.006**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7450 0 - 0.5	N7450 0.5 - 1	N7450 1 - 1.5	N7450 1.5 - 2	N7450 2 - 2.5
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311867-051	EB2311867-052	EB2311867-053	EB2311867-054	EB2311867-055
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.010**	**0.087**	**0.007**	**0.006**	**0.016**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)				Sample ID	N7450 2.5 - 3	N7450 4 - 4.5	N7450 5.5 - 6	N7450 7 - 7.5	N7450 8.5 - 9
				Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit		EB2311867-056	EB2311867-057	EB2311867-058	EB2311867-059	EB2311867-060
					Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur									
Chromium Reducible Sulphur	----	0.005	%		**0.006**	**0.013**	**0.034**	**0.023**	**0.088**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7450 10 - 10.5	N7450 11.5 - 12	N7450 13 - 13.5	N7450 14.5 - 15	N7450 16 - 16.5
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311867-061	EB2311867-062	EB2311867-063	EB2311867-064	EB2311867-065
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.035**	**0.080**	**0.039**	**0.026**	**0.010**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7450 17.5 - 18	N7450 19 - 19.5	N7450 20.5 - 21	N7450 22 - 22.5	N7450 23.5 - 24
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311867-066	EB2311867-067	EB2311867-068	EB2311867-069	EB2311867-070
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.008**	**0.010**	**0.007**	**0.010**	**0.007**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7450 25 - 25.5	N7450 26.5 - 27	N7450 30 - 30.5	N7450 33 - 33.5	N7450 36 - 36.5
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311867-071	EB2311867-072	EB2311867-073	EB2311867-074	EB2311867-075
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.009**	**0.007**	**0.006**	**0.010**	**0.006**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7452 0 - 0.5	N7452 0.5 - 1	N7452 1 - 1.5	N7452 1.5 - 2	N7452 2 - 2.5
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311867-076	EB2311867-077	EB2311867-078	EB2311867-079	EB2311867-080
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.011**	**0.006**	**0.013**	**0.031**	**0.029**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7452 2.5 - 3	N7452 3 - 3.5	N7452 3.5 - 4	N7452 4 - 4.5	N7452 4.5 - 5
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311867-081	EB2311867-082	EB2311867-083	EB2311867-084	EB2311867-085
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.058**	**0.124**	**0.366**	**0.069**	**0.039**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7452 5 - 5.5	N7452 6 - 6.5	N7452 6.5 - 7	N7452 8 - 8.5	N7452 8.5 - 9
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311867-086	EB2311867-087	EB2311867-088	EB2311867-089	EB2311867-090
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.030**	**0.040**	**0.146**	**0.054**	**0.010**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7452 9 - 9.5	N7452 9.5 - 10	N7452 10.5 - 11	N7452 11 - 11.5	N7452 12 - 12.5
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311867-091	EB2311867-092	EB2311867-093	EB2311867-094	EB2311867-095
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.010**	**0.015**	**0.011**	<0.005	<0.005

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)				Sample ID	N7452 12.5 - 13	N7452 14 - 14.5	N7452 17 - 17.5	N7452 18.5 - 19	N7452 21.5 - 22
				Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit		EB2311867-096	EB2311867-097	EB2311867-098	EB2311867-099	EB2311867-100
					Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur									
Chromium Reducible Sulphur	----	0.005	%		**0.007**	<0.005	<0.005	<0.005	<0.005

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7452 22 - 22.5	N7452 24.5 - 25	N7452 26 - 26.5	N7452 27.5 - 28	N7452 29 - 29.5
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311867-101	EB2311867-102	EB2311867-103	EB2311867-104	EB2311867-105
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	<0.005	<0.005	<0.005	**0.012**	**0.023**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7452 29.5 - 30	N7452 30 - 30.5	N7452 30.5 - 31	N7452 31.5 - 32	N7509 0 - 0.5
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311867-106	EB2311867-107	EB2311867-108	EB2311867-109	EB2311867-110
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.020**	**0.086**	**0.006**	**0.010**	<0.005

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7509 0.5 - 1	N7509 1 - 1.5	N7509 1.5 - 2	N7509 2 - 2.5	N7509 2.5 - 3
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311867-111	EB2311867-112	EB2311867-113	EB2311867-114	EB2311867-115
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	<0.005	<0.005	**0.007**	<0.005	<0.005

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)				Sample ID	N7509 3 - 3.5	N7509 3.5 - 4	N7509 4 - 4.5	N7509 4.5 - 5	N7509 5 - 5.5
				Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit		EB2311867-116	EB2311867-117	EB2311867-118	EB2311867-119	EB2311867-120
					Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur									
Chromium Reducible Sulphur	----	0.005	%		<0.005	<0.005	<0.005	**0.006**	**0.009**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7509 5.5 - 6	N7509 6 - 6.5	N7509 6.5 - 7	N7509 7 - 7.5	N7509 7.5 - 8
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00	20-Apr-2023 00:00
Compound	CAS Number	LOR	Unit	EB2311867-121	EB2311867-122	EB2311867-123	EB2311867-124	EB2311867-125
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	<0.005	<0.005	**0.008**	<0.005	<0.005

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7509 8 - 8.5	N7509 8.5 - 9	----	----	----
			Sampling date / time	20-Apr-2023 00:00	20-Apr-2023 00:00	----	----	----
Compound	CAS Number	LOR	Unit	EB2311867-126	EB2311867-127	--------	--------	--------
				Result	Result	----	----	----
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.006**	<0.005	**----**	**----**	**----**

CERTIFICATE OF ANALYSIS

Work Order	: **EB2312361**	Page	: 1 of 17
Client	: **RGS ENVIRONMENTAL CONSULTANTS PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MATT LANDERS	Contact	: Carsten Emrich
Address	: 3/30 LENSWORTH STREET COOPERS PLAINS 4108	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2021048 Yallourn	Date Samples Received	: 26-Apr-2023 14:56
Order number	: ----	Date Analysis Commenced	: 04-May-2023
C-O-C number	: ----	Issue Date	: 12-May-2023 16:03
Sampler	: BEN FREIDMAN		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 71		
No. of samples analysed	: 71		

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*
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

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.

- ASS: EA013 (ANC) Fizz Rating: 0- None; 1- Slight; 2- Moderate; 3- Strong; 4- Very Strong; 5- Lime.

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7441 1.0 - 1.5	N7441 1.5 - 2.0	N7441 2.0 - 2.5	N7441 2.5 - 3.0	N7441 3.5 - 4.0
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2312361-001	EB2312361-002	EB2312361-003	EB2312361-004	EB2312361-005
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**3.5**	**3.4**	**3.7**	**3.1**	**3.8**
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	**26.0**	**22.6**	**15.3**	**51.4**	**24.5**
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**385**	**763**	**468**	**870**	**524**
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	<0.5	<0.5	<0.5	<0.5	<0.5
ANC as CaCO3	----	0.1	% CaCO3	<0.1	<0.1	<0.1	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit	**0**	**0**	**0**	**0**	**0**
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	**0.85**	**0.74**	**0.50**	**1.68**	**0.80**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7441 9.5 - 10.0	N7441 17.0 - 17.5	N7441 18.5 - 19.0	N7441 21-0 - 21.5	N7441 23.5 - 24.0
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2312361-006	EB2312361-007	EB2312361-008	EB2312361-009	EB2312361-010
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	5.8	3.5	5.9	5.9	4.4
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	-6.1	27.6	-3.1	-4.2	4.0
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	33	760	27	39	302
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	6.1	1.2	3.7	4.2	3.7
ANC as CaCO3	----	0.1	% CaCO3	0.6	0.1	0.4	0.4	0.4
Fizz Rating	----	0	Fizz Unit	1	0	0	0	0
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	<0.01	0.94	0.02	<0.01	0.25

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7441 24.0 - 24.5	N7441 28.5 - 29.0	N7442 14.0 - 14.5	N7442 17.0 - 17.5	N7442 21.5 - 22.0
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2312361-011	EB2312361-012	EB2312361-013	EB2312361-014	EB2312361-015
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**3.4**	**3.9**	**6.0**	**2.8**	**5.9**
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	**144**	**16.4**	**-3.6**	**86.0**	**-3.9**
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**1200**	**428**	**40**	**1340**	**40**
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	<0.5	**6.2**	**3.9**	<0.5	**3.9**
ANC as CaCO3	----	0.1	% CaCO3	<0.1	**0.6**	**0.4**	<0.1	**0.4**
Fizz Rating	----	0	Fizz Unit	**0**	**1**	**0**	**0**	**0**
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	**4.70**	**0.74**	**0.01**	**2.81**	<0.01

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7442 22.0 - 22.5	N7442 26.5 - 27.0	N7442 27.0 - 27.5	N7442 27.5 - 28.0	N7442 28.5 - 29.0
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2312361-016	EB2312361-017	EB2312361-018	EB2312361-019	EB2312361-020
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**4.2**	**3.7**	**3.7**	**3.4**	**3.3**
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	**15.0**	**9.5**	**22.9**	**33.3**	**50.6**
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**278**	**510**	**380**	**1660**	**474**
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	<0.5	<0.5	**1.3**	**7.4**	**6.9**
ANC as CaCO3	----	0.1	% CaCO3	<0.1	<0.1	**0.1**	**0.8**	**0.7**
Fizz Rating	----	0	Fizz Unit	**0**	**0**	**0**	**1**	**1**
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	**0.49**	**0.31**	**0.79**	**1.33**	**1.88**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7442 30.0 - 30.5	N7508 4.5 - 5.0	N7508 21.0 - 21.5	N7440 4.0 - 4.5	N7440 16.0 - 16.5
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2312361-021	EB2312361-022	EB2312361-023	EB2312361-024	EB2312361-025
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	3.9	5.8	5.8	5.3	4.8
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	14.6	-4.7	-3.6	-1.8	<0.5
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	349	28	56	91	45
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	1.6	4.7	3.9	3.0	2.1
ANC as CaCO3	----	0.1	% CaCO3	0.2	0.5	0.4	0.3	0.2
Fizz Rating	----	0	Fizz Unit	0	0	0	0	0
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.53	<0.01	0.01	0.04	0.07

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7440 19.0 - 19.5	N7440 22.0 - 22.5	N7440 26.5 - 27.0	N7440 28.0 - 28.5	N7429 25.5 - 26.0
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2312361-026	EB2312361-027	EB2312361-028	EB2312361-029	EB2312361-030
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**4.2**	**3.8**	**3.6**	**3.4**	**4.7**
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	**8.9**	**21.4**	**159**	**169**	**9.5**
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**392**	**493**	**1190**	**1160**	**43**
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	**0.6**	<0.5	<0.5	**0.6**	<0.5
ANC as CaCO3	----	0.1	% CaCO3	<0.1	<0.1	<0.1	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit	**0**	**0**	**0**	**0**	**0**
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	**0.31**	**0.70**	**5.20**	**5.54**	**0.31**

Analytical Results

Sub-Matrix: **PULP** (Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	N7429 27.0 - 27.5	N7429 28.5 - 29.0	N7439 11.5 - 12.0	N7439 26.5 - 27.0	N7439 33.5 - 34.0
				Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
					EB2312361-031	EB2312361-032	EB2312361-033	EB2312361-034	EB2312361-035
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**4.4**	**5.6**	**5.8**	**5.4**	**5.0**
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		**27.4**	**-1.0**	**-4.8**	**-5.4**	**6.0**
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		**94**	**43**	**47**	**66**	**89**
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		**1.7**	**5.3**	**5.4**	**6.6**	**1.3**
ANC as CaCO3	----	0.1	% CaCO3		**0.2**	**0.5**	**0.5**	**0.7**	**0.1**
Fizz Rating	----	0	Fizz Unit		**0**	**1**	**1**	**1**	**0**
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		**0.95**	**0.14**	**0.02**	**0.04**	**0.24**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7454 1.0 - 1.5	N7454 25.0 - 25.5	N7454 29.5 - 30.0	N7435 0.5 - 1.0	N7435 25.5 - 26.0
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2312361-036	EB2312361-037	EB2312361-038	EB2312361-039	EB2312361-040
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	5.4	6.2	5.6	5.5	4.3
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	-5.3	-7.7	-0.2	-5.1	-1.7
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	25	241	47	45	45
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	5.9	8.0	2.4	5.7	4.8
ANC as CaCO3	----	0.1	% CaCO3	0.6	0.8	0.2	0.6	0.5
Fizz Rating	----	0	Fizz Unit	1	1	0	1	0
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.02	0.01	0.07	0.02	0.10

Analytical Results

Sub-Matrix: **PULP** (Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	N7436 4.5 - 5.0	N7436 17.5 - 18.0	N7436 48.0 - 48.5	N7447 10.0 - 10.5	N7447 13.0 - 13.5
				Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
					EB2312361-041	EB2312361-042	EB2312361-043	EB2312361-044	EB2312361-045
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**5.2**	**5.1**	**6.0**	**6.5**	**5.9**
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		**-4.4**	**-6.0**	**-6.3**	**-7.0**	**-7.1**
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		**64**	**58**	**191**	**31**	**93**
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		**5.3**	**6.6**	**6.6**	**7.3**	**8.0**
ANC as CaCO3	----	0.1	% CaCO3		**0.5**	**0.7**	**0.7**	**0.7**	**0.8**
Fizz Rating	----	0	Fizz Unit		**1**	**1**	**1**	**1**	**1**
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		**0.03**	**0.02**	**0.01**	**0.01**	**0.03**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7446 2.5 - 3.0	N7446 5.5 - 6.0	N7446 8.5 - 9.0	N7423 1.0 - 1.5	N7423 1.5 - 2.0
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2312361-046	EB2312361-047	EB2312361-048	EB2312361-049	EB2312361-050
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	7.0	5.7	5.7	3.5	4.2
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	-9.0	-1.1	-3.3	5.5	8.3
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	69	112	129	357	277
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	9.3	2.6	4.5	<0.5	<0.5
ANC as CaCO3	----	0.1	% CaCO3	0.9	0.3	0.4	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit	1	0	0	0	0
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.01	0.05	0.04	0.18	0.27

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7423 5.5 - 6.0	N7423 15.0 - 15.5	N7423 16.5 - 17.0	N7423 18.0 - 18.5	N7423 19.5 - 20.0
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2312361-051	EB2312361-052	EB2312361-053	EB2312361-054	EB2312361-055
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**3.9**	**4.5**	**4.1**	**4.4**	**4.9**
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	**16.2**	**10.4**	**18.4**	**20.8**	**9.3**
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**443**	**226**	**149**	**98**	**298**
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	**4.3**	<0.5	<0.5	<0.5	**6.3**
ANC as CaCO3	----	0.1	% CaCO3	**0.4**	<0.1	<0.1	<0.1	**0.6**
Fizz Rating	----	0	Fizz Unit	**0**	**0**	**0**	**0**	**1**
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	**0.67**	**0.34**	**0.60**	**0.68**	**0.51**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7423 22.5 - 23.0	N7425 8.5 - 9.0	N7425 10.0 - 10.5	N7425 11.5 - 12.0	N7425 13.0 - 13.5
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2312361-056	EB2312361-057	EB2312361-058	EB2312361-059	EB2312361-060
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	4.4	4.9	4.3	4.2	4.2
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	9.5	2.0	10.4	8.6	9.0
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	525	360	344	517	488
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	5.2	1.7	<0.5	<0.5	1.4
ANC as CaCO3	----	0.1	% CaCO3	0.5	0.2	<0.1	<0.1	0.1
Fizz Rating	----	0	Fizz Unit	1	0	0	0	0
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.48	0.12	0.34	0.28	0.34

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7425 16.0 - 16.5	N7425 25.5 - 26.0	N7425 28.5 - 29.0	N7425 30.0 - 30.5	N7451 2.5 - 3.0
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2312361-061	EB2312361-062	EB2312361-063	EB2312361-064	EB2312361-065
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	4.2	4.7	5.0	5.5	6.2
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	68.5	3.4	25.9	6.4	-7.7
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	696	236	473	135	136
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	1.9	6.1	7.1	7.1	8.6
ANC as CaCO3	----	0.1	% CaCO3	0.2	0.6	0.7	0.7	0.9
Fizz Rating	----	0	Fizz Unit	0	1	1	1	0
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	2.30	0.31	1.08	0.44	0.03

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7451 10.0 - 10.5	N7437 0.0 - 0.05	N7445 5.5 - 6.0	N7445 7.0 - 7.5	N7445 10.0 - 10.5
			Sampling date / time	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00	23-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	EB2312361-066	EB2312361-067	EB2312361-068	EB2312361-069	EB2312361-070
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	5.8	6.0	4.7	4.4	5.3
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	-3.6	-5.6	14.8	69.5	-1.8
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	115	19	278	968	63
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	4.5	5.9	5.1	<0.5	4.3
ANC as CaCO3	----	0.1	% CaCO3	0.5	0.6	0.5	<0.1	0.4
Fizz Rating	----	0	Fizz Unit	0	1	1	0	0
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.03	0.01	0.65	2.27	0.08

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7445 10.5 - 11.0	----	----	----	----
			Sampling date / time	23-Mar-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EB2312361-071	--------	--------	--------	--------
				Result	----	----	----	----
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**4.1**	----	----	----	----
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	**22.2**	----	----	----	----
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**434**	----	----	----	----
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	**1.1**	----	----	----	----
ANC as CaCO3	----	0.1	% CaCO3	**0.1**	----	----	----	----
Fizz Rating	----	0	Fizz Unit	**0**	----	----	----	----
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	**0.76**	----	----	----	----

CERTIFICATE OF ANALYSIS

Work Order	: **EB2314015**	Page	: 1 of 8
Client	: **RGS ENVIRONMENTAL CONSULTANTS PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MATT LANDERS	Contact	: Carsten Emrich
Address	: 3/30 LENSWORTH STREET COOPERS PLAINS 4108	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2021048 Yallourn	Date Samples Received	: 10-May-2023 12:20
Order number	: ----	Date Analysis Commenced	: 12-May-2023
C-O-C number	: ----	Issue Date	: 18-May-2023 18:37
Sampler	: BEN FREIDMAN		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 9		
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

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*
Beatriz Llarinas	Senior Chemist - Inorganics	Brisbane Inorganics, Stafford, QLD
Mark Hallas	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD

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.

- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- ALS is not NATA accredited for the performance of EN35: Miscellaneous Leaching procedure.
- Ionic Balance out of acceptable limits due to analytes not quantified in this report.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

Sub-Matrix: LEACHATE (Matrix: WATER)			Sample ID	N7423 19.5 - 20.0	N7425 16.0 - 16.5	N7425 28.5 - 29.0	N7440 26.5 - 27.0	N7441 2.5 - 3.0
			Sampling date / time	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00
Compound	CAS Number	LOR	Unit	EB2314015-001	EB2314015-002	EB2314015-003	EB2314015-004	EB2314015-005
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**5.56**	**5.21**	**5.89**	**2.88**	**3.22**
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**253**	**333**	**343**	**1200**	**2760**
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**2**	**1**	**3**	<1	<1
Total Alkalinity as CaCO3	----	1	mg/L	**2**	**1**	**3**	<1	<1
ED038: Acidity								
Acidity as CaCO3	----	1	mg/L	**12**	**11**	**23**	**725**	**656**
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**69**	**135**	**66**	**470**	**1480**
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**22**	**27**	**24**	**5**	**22**
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**2**	**8**	<1	**6**	**74**
Magnesium	7439-95-4	1	mg/L	**10**	**19**	<1	**14**	**276**
Sodium	7440-23-5	1	mg/L	**22**	**40**	**48**	**3**	**38**
Potassium	7440-09-7	1	mg/L	**2**	**3**	**1**	<1	**1**
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**0.07**	**0.22**	**0.07**	**15.8**	**60.4**
Dysprosium	7429-91-6	0.001	mg/L	<0.001	<0.001	<0.001	**0.008**	<0.001
Silver	7440-22-4	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic	7440-38-2	0.001	mg/L	<0.001	**0.006**	<0.001	**0.005**	**0.012**
Bismuth	7440-69-9	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Erbium	7440-52-0	0.001	mg/L	<0.001	<0.001	<0.001	**0.004**	<0.001
Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	**0.11**
Europium	7440-53-1	0.001	mg/L	<0.001	<0.001	<0.001	**0.002**	<0.001
Strontium	7440-24-6	0.001	mg/L	**0.044**	**0.108**	**0.040**	**0.073**	**1.04**
Barium	7440-39-3	0.001	mg/L	**0.146**	**0.176**	**0.051**	**0.055**	**0.026**
Gadolinium	7440-54-2	0.001	mg/L	<0.001	<0.001	<0.001	**0.012**	**0.001**
Titanium	7440-32-6	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	<0.001	**0.007**	**0.012**

Analytical Results

Sub-Matrix: LEACHATE (Matrix: WATER)

Compound	CAS Number	LOR	Unit	Sample ID	N7423 19.5 - 20.0	N7425 16.0 - 16.5	N7425 28.5 - 29.0	N7440 26.5 - 27.0	N7441 2.5 - 3.0
				Sampling date / time	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00
					EB2314015-001	EB2314015-002	EB2314015-003	EB2314015-004	EB2314015-005
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Gallium	7440-55-3	0.001	mg/L		<0.001	<0.001	<0.001	**0.003**	<0.001
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	**0.0003**	<0.0001	**0.0005**	<0.0001
Hafnium	7440-58-6	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Tellurium	22541-49-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	7440-48-4	0.001	mg/L		**0.069**	**0.400**	**0.080**	**7.29**	**0.130**
Holmium	7440-60-0	0.001	mg/L		<0.001	<0.001	<0.001	**0.002**	<0.001
Uranium	7440-61-1	0.001	mg/L		<0.001	<0.001	<0.001	**0.002**	<0.001
Caesium	7440-46-2	0.001	mg/L		<0.001	<0.001	<0.001	**0.001**	**0.002**
Chromium	7440-47-3	0.001	mg/L		**0.003**	**0.009**	<0.001	**0.018**	**0.004**
Indium	7440-74-6	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		**0.007**	**0.008**	**0.004**	**0.004**	**0.001**
Lanthanum	7439-91-0	0.001	mg/L		<0.001	<0.001	<0.001	**0.061**	**0.013**
Rubidium	7440-17-7	0.001	mg/L		**0.007**	**0.033**	**0.002**	**0.010**	**0.017**
Lithium	7439-93-2	0.001	mg/L		**0.005**	**0.009**	**0.013**	**0.004**	**0.004**
Lutetium	7439-94-3	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	**0.002**	<0.001
Cerium	7440-45-1	0.001	mg/L		<0.001	**0.001**	<0.001	**0.116**	**0.017**
Manganese	7439-96-5	0.001	mg/L		**0.039**	**0.870**	**1.56**	**0.214**	**3.70**
Neodymium	7440-00-8	0.001	mg/L		<0.001	<0.001	<0.001	**0.045**	**0.004**
Molybdenum	7439-98-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Praseodymium	7440-10-0	0.001	mg/L		<0.001	<0.001	<0.001	**0.012**	**0.001**
Nickel	7440-02-0	0.001	mg/L		**0.026**	**0.451**	**0.023**	**2.94**	**0.039**
Samarium	7440-19-9	0.001	mg/L		<0.001	<0.001	<0.001	**0.008**	<0.001
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	**0.003**	**0.002**
Terbium	7440-27-9	0.001	mg/L		<0.001	<0.001	<0.001	**0.002**	<0.001
Antimony	7440-36-0	0.001	mg/L		<0.001	**0.001**	<0.001	<0.001	<0.001
Thulium	7440-30-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Ytterbium	7440-64-4	0.001	mg/L		<0.001	<0.001	<0.001	**0.003**	<0.001
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Yttrium	7440-65-5	0.001	mg/L		<0.001	<0.001	<0.001	**0.049**	**0.010**
Thallium	7440-28-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	**0.001**
Zirconium	7440-67-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Vanadium	7440-62-2	0.01	mg/L		<0.01	<0.01	<0.01	**0.01**	<0.01

Analytical Results

Sub-Matrix: LEACHATE (Matrix: WATER)				Sample ID	N7423 19.5 - 20.0	N7425 16.0 - 16.5	N7425 28.5 - 29.0	N7440 26.5 - 27.0	N7441 2.5 - 3.0
				Sampling date / time	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00
Compound	CAS Number	LOR	Unit		EB2314015-001	EB2314015-002	EB2314015-003	EB2314015-004	EB2314015-005
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Zinc	7440-66-6	0.005	mg/L		**0.056**	**0.556**	**0.024**	**2.97**	**1.32**
Iron	7439-89-6	0.05	mg/L		**0.17**	**0.29**	**0.06**	**87.1**	**9.82**
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		<0.1	<0.1	<0.1	**0.3**	**0.2**
EN055: Ionic Balance									
ø **Total Anions**	----	0.01	meq/L		**2.10**	**3.59**	**2.11**	**9.93**	**31.4**
ø **Total Cations**	----	0.01	meq/L		**----**	**----**	**----**	**7.97**	**----**
ø **Total Cations**	----	0.01	meq/L		**1.93**	**3.78**	**2.11**	**----**	**28.1**
ø **Ionic Balance**	----	0.01	%		**----**	**----**	**----**	**10.9**	**----**
ø **Ionic Balance**	----	0.01	%		**----**	**2.54**	**----**	**----**	**5.62**

Analytical Results

Sub-Matrix: LEACHATE (Matrix: WATER)			Sample ID	N7441 21.0 - 21.5	N7442 14.0 - 14.5	N7443 28.5 - 29.0	N7445 10.5 - 11.0	----
			Sampling date / time	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00	----
Compound	CAS Number	LOR	Unit	EB2314015-006	EB2314015-007	EB2314015-008	EB2314015-009	--------
				Result	Result	Result	Result	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**5.15**	**5.55**	**3.29**	**3.49**	**----**
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**59**	**46**	**912**	**384**	**----**
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	**2**	**2**	<1	<1	**----**
Total Alkalinity as CaCO3	----	1	mg/L	**2**	**2**	<1	<1	**----**
ED038: Acidity								
Acidity as CaCO3	----	1	mg/L	**32**	**62**	**403**	**226**	**----**
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**8**	**9**	**464**	**111**	**----**
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**10**	**6**	**28**	**4**	**----**
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	<1	<1	**16**	**3**	**----**
Magnesium	7439-95-4	1	mg/L	**1**	<1	**25**	**2**	**----**
Sodium	7440-23-5	1	mg/L	**6**	**6**	**14**	**2**	**----**
Potassium	7440-09-7	1	mg/L	<1	<1	<1	<1	**----**
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**0.01**	**0.08**	**30.4**	**5.71**	**----**
Dysprosium	7429-91-6	0.001	mg/L	<0.001	<0.001	**0.003**	**0.026**	**----**
Silver	7440-22-4	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	**----**
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	**0.008**	**0.005**	**----**
Bismuth	7440-69-9	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	**----**
Erbium	7440-52-0	0.001	mg/L	<0.001	<0.001	**0.002**	**0.012**	**----**
Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	**----**
Europium	7440-53-1	0.001	mg/L	<0.001	<0.001	<0.001	**0.008**	**----**
Strontium	7440-24-6	0.001	mg/L	**0.004**	**0.002**	**0.182**	**0.026**	**----**
Barium	7440-39-3	0.001	mg/L	**0.008**	**0.004**	**0.035**	**0.066**	**----**
Gadolinium	7440-54-2	0.001	mg/L	<0.001	<0.001	**0.004**	**0.040**	**----**
Titanium	7440-32-6	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	**----**
Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	**0.019**	<0.001	**----**

Analytical Results

Sub-Matrix: LEACHATE (Matrix: WATER)				Sample ID	N7441 21.0 - 21.5	N7442 14.0 - 14.5	N7443 28.5 - 29.0	N7445 10.5 - 11.0	----
				Sampling date / time	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00	----
Compound	CAS Number	LOR	Unit		EB2314015-006	EB2314015-007	EB2314015-008	EB2314015-009	--------
					Result	Result	Result	Result	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Gallium	7440-55-3	0.001	mg/L		<0.001	<0.001	**0.001**	**0.011**	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	**0.0027**	<0.0001	----
Hafnium	7440-58-6	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	----
Tellurium	22541-49-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	----
Cobalt	7440-48-4	0.001	mg/L		**0.001**	**0.002**	**2.46**	**1.68**	----
Holmium	7440-60-0	0.001	mg/L		<0.001	<0.001	<0.001	**0.004**	----
Uranium	7440-61-1	0.001	mg/L		<0.001	<0.001	<0.001	**0.005**	----
Caesium	7440-46-2	0.001	mg/L		<0.001	<0.001	**0.001**	<0.001	----
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	**0.015**	**0.002**	----
Indium	7440-74-6	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	----
Copper	7440-50-8	0.001	mg/L		<0.001	<0.001	**0.003**	**0.004**	----
Lanthanum	7439-91-0	0.001	mg/L		<0.001	<0.001	**0.035**	**0.109**	----
Rubidium	7440-17-7	0.001	mg/L		**0.005**	**0.002**	**0.018**	**0.008**	----
Lithium	7439-93-2	0.001	mg/L		**0.001**	**0.002**	**0.006**	**0.004**	----
Lutetium	7439-94-3	0.001	mg/L		<0.001	<0.001	<0.001	**0.001**	----
Thorium	7440-29-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	----
Cerium	7440-45-1	0.001	mg/L		<0.001	<0.001	**0.050**	**0.359**	----
Manganese	7439-96-5	0.001	mg/L		**0.006**	**0.034**	**0.367**	**0.079**	----
Neodymium	7440-00-8	0.001	mg/L		<0.001	<0.001	**0.014**	**0.172**	----
Molybdenum	7439-98-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	----
Praseodymium	7440-10-0	0.001	mg/L		<0.001	<0.001	**0.004**	**0.041**	----
Nickel	7440-02-0	0.001	mg/L		<0.001	<0.001	**0.686**	**0.731**	----
Samarium	7440-19-9	0.001	mg/L		<0.001	<0.001	**0.002**	**0.037**	----
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	**0.003**	**0.002**	----
Terbium	7440-27-9	0.001	mg/L		<0.001	<0.001	<0.001	**0.005**	----
Antimony	7440-36-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	----
Thulium	7440-30-4	0.001	mg/L		<0.001	<0.001	<0.001	**0.002**	----
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	----
Ytterbium	7440-64-4	0.001	mg/L		<0.001	<0.001	**0.001**	**0.009**	----
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	----
Yttrium	7440-65-5	0.001	mg/L		<0.001	<0.001	**0.027**	**0.115**	----
Thallium	7440-28-0	0.001	mg/L		<0.001	<0.001	**0.001**	<0.001	----
Zirconium	7440-67-7	0.005	mg/L		<0.005	<0.005	**0.006**	<0.005	----
Vanadium	7440-62-2	0.01	mg/L		<0.01	<0.01	**0.04**	<0.01	----

Analytical Results

Sub-Matrix: LEACHATE (Matrix: WATER)				Sample ID	N7441 21.0 - 21.5	N7442 14.0 - 14.5	N7443 28.5 - 29.0	N7445 10.5 - 11.0	----
				Sampling date / time	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00	----
Compound	CAS Number	LOR	Unit		EB2314015-006	EB2314015-007	EB2314015-008	EB2314015-009	--------
					Result	Result	Result	Result	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Zinc	7440-66-6	0.005	mg/L		**0.007**	<0.005	**1.56**	**1.34**	**----**
Iron	7439-89-6	0.05	mg/L		<0.05	<0.05	**10.5**	**19.3**	**----**
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		<0.1	<0.1	**0.6**	**0.3**	**----**
EN055: Ionic Balance									
ø **Total Anions**	----	0.01	meq/L		**0.49**	**0.40**	**10.4**	**2.42**	**----**
ø **Total Cations**	----	0.01	meq/L		**----**	**----**	**6.64**	**2.12**	**----**
ø **Total Cations**	----	0.01	meq/L		**0.34**	**0.26**	**----**	**----**	**----**
ø **Ionic Balance**	----	0.01	%		**----**	**----**	**19.8**	**----**	**----**

CERTIFICATE OF ANALYSIS

Work Order	: **EB2314015**	Page	: 1 of 8
Amendment	: **1**		
Client	: **RGS ENVIRONMENTAL CONSULTANTS PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MATT LANDERS	Contact	: Carsten Emrich
Address	: 3/30 LENSWORTH STREET COOPERS PLAINS 4108	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2021048 Yallourn	Date Samples Received	: 10-May-2023 12:20
Order number	: ----	Date Analysis Commenced	: 12-May-2023
C-O-C number	: ----	Issue Date	: 27-Sep-2023 17:06
Sampler	: BEN FREIDMAN		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 9		
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

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*
Beatriz Llarinas	Senior Chemist - Inorganics	Brisbane Inorganics, Stafford, QLD
Mark Hallas	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD

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.

- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- ALS is not NATA accredited for the performance of EN35: Miscellaneous Leaching procedure.
- Ionic Balance out of acceptable limits due to analytes not quantified in this report.
- Amendment (27/9/2023): This report has been amended acknowledge the correction of ALS sample #8 sample ID from N7443 28.5- 28.0 to N7442 28.5-28.0 as per the COC. All analysis results are as per the previous report.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

Sub-Matrix: LEACHATE (Matrix: WATER)			Sample ID	N7423 19.5 - 20.0	N7425 16.0 - 16.5	N7425 28.5 - 29.0	N7440 26.5 - 27.0	N7441 2.5 - 3.0
			Sampling date / time	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00
Compound	CAS Number	LOR	Unit	EB2314015-001	EB2314015-002	EB2314015-003	EB2314015-004	EB2314015-005
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**5.56**	**5.21**	**5.89**	**2.88**	**3.22**
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**253**	**333**	**343**	**1200**	**2760**
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**2**	**1**	**3**	<1	<1
Total Alkalinity as CaCO3	----	1	mg/L	**2**	**1**	**3**	<1	<1
ED038: Acidity								
Acidity as CaCO3	----	1	mg/L	**12**	**11**	**23**	**725**	**656**
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**69**	**135**	**66**	**470**	**1480**
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**22**	**27**	**24**	**5**	**22**
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**2**	**8**	<1	**6**	**74**
Magnesium	7439-95-4	1	mg/L	**10**	**19**	<1	**14**	**276**
Sodium	7440-23-5	1	mg/L	**22**	**40**	**48**	**3**	**38**
Potassium	7440-09-7	1	mg/L	**2**	**3**	**1**	<1	**1**
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**0.07**	**0.22**	**0.07**	**15.8**	**60.4**
Dysprosium	7429-91-6	0.001	mg/L	<0.001	<0.001	<0.001	**0.008**	<0.001
Silver	7440-22-4	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic	7440-38-2	0.001	mg/L	<0.001	**0.006**	<0.001	**0.005**	**0.012**
Bismuth	7440-69-9	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Erbium	7440-52-0	0.001	mg/L	<0.001	<0.001	<0.001	**0.004**	<0.001
Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	**0.11**
Europium	7440-53-1	0.001	mg/L	<0.001	<0.001	<0.001	**0.002**	<0.001
Strontium	7440-24-6	0.001	mg/L	**0.044**	**0.108**	**0.040**	**0.073**	**1.04**
Barium	7440-39-3	0.001	mg/L	**0.146**	**0.176**	**0.051**	**0.055**	**0.026**
Gadolinium	7440-54-2	0.001	mg/L	<0.001	<0.001	<0.001	**0.012**	**0.001**
Titanium	7440-32-6	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	<0.001	**0.007**	**0.012**

Analytical Results

Sub-Matrix: LEACHATE (Matrix: WATER)

Compound	CAS Number	LOR	Unit	Sample ID	N7423 19.5 - 20.0	N7425 16.0 - 16.5	N7425 28.5 - 29.0	N7440 26.5 - 27.0	N7441 2.5 - 3.0
				Sampling date / time	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00
					EB2314015-001	EB2314015-002	EB2314015-003	EB2314015-004	EB2314015-005
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Gallium	7440-55-3	0.001	mg/L		<0.001	<0.001	<0.001	**0.003**	<0.001
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	**0.0003**	<0.0001	**0.0005**	<0.0001
Hafnium	7440-58-6	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Tellurium	22541-49-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	7440-48-4	0.001	mg/L		**0.069**	**0.400**	**0.080**	**7.29**	**0.130**
Holmium	7440-60-0	0.001	mg/L		<0.001	<0.001	<0.001	**0.002**	<0.001
Uranium	7440-61-1	0.001	mg/L		<0.001	<0.001	<0.001	**0.002**	<0.001
Caesium	7440-46-2	0.001	mg/L		<0.001	<0.001	<0.001	**0.001**	**0.002**
Chromium	7440-47-3	0.001	mg/L		**0.003**	**0.009**	<0.001	**0.018**	**0.004**
Indium	7440-74-6	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		**0.007**	**0.008**	**0.004**	**0.004**	**0.001**
Lanthanum	7439-91-0	0.001	mg/L		<0.001	<0.001	<0.001	**0.061**	**0.013**
Rubidium	7440-17-7	0.001	mg/L		**0.007**	**0.033**	**0.002**	**0.010**	**0.017**
Lithium	7439-93-2	0.001	mg/L		**0.005**	**0.009**	**0.013**	**0.004**	**0.004**
Lutetium	7439-94-3	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	**0.002**	<0.001
Cerium	7440-45-1	0.001	mg/L		<0.001	**0.001**	<0.001	**0.116**	**0.017**
Manganese	7439-96-5	0.001	mg/L		**0.039**	**0.870**	**1.56**	**0.214**	**3.70**
Neodymium	7440-00-8	0.001	mg/L		<0.001	<0.001	<0.001	**0.045**	**0.004**
Molybdenum	7439-98-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Praseodymium	7440-10-0	0.001	mg/L		<0.001	<0.001	<0.001	**0.012**	**0.001**
Nickel	7440-02-0	0.001	mg/L		**0.026**	**0.451**	**0.023**	**2.94**	**0.039**
Samarium	7440-19-9	0.001	mg/L		<0.001	<0.001	<0.001	**0.008**	<0.001
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	**0.003**	**0.002**
Terbium	7440-27-9	0.001	mg/L		<0.001	<0.001	<0.001	**0.002**	<0.001
Antimony	7440-36-0	0.001	mg/L		<0.001	**0.001**	<0.001	<0.001	<0.001
Thulium	7440-30-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Ytterbium	7440-64-4	0.001	mg/L		<0.001	<0.001	<0.001	**0.003**	<0.001
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Yttrium	7440-65-5	0.001	mg/L		<0.001	<0.001	<0.001	**0.049**	**0.010**
Thallium	7440-28-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	**0.001**
Zirconium	7440-67-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Vanadium	7440-62-2	0.01	mg/L		<0.01	<0.01	<0.01	**0.01**	<0.01

Analytical Results

Sub-Matrix: LEACHATE (Matrix: WATER)				Sample ID	N7423 19.5 - 20.0	N7425 16.0 - 16.5	N7425 28.5 - 29.0	N7440 26.5 - 27.0	N7441 2.5 - 3.0
				Sampling date / time	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00
Compound	CAS Number	LOR	Unit		EB2314015-001	EB2314015-002	EB2314015-003	EB2314015-004	EB2314015-005
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Zinc	7440-66-6	0.005	mg/L		**0.056**	**0.556**	**0.024**	**2.97**	**1.32**
Iron	7439-89-6	0.05	mg/L		**0.17**	**0.29**	**0.06**	**87.1**	**9.82**
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		<0.1	<0.1	<0.1	**0.3**	**0.2**
EN055: Ionic Balance									
ø **Total Anions**	----	0.01	meq/L		**2.10**	**3.59**	**2.11**	**9.93**	**31.4**
ø **Total Cations**	----	0.01	meq/L		**----**	**----**	**----**	**7.97**	**----**
ø **Total Cations**	----	0.01	meq/L		**1.93**	**3.78**	**2.11**	**----**	**28.1**
ø **Ionic Balance**	----	0.01	%		**----**	**----**	**----**	**10.9**	**----**
ø **Ionic Balance**	----	0.01	%		**----**	**2.54**	**----**	**----**	**5.62**

Analytical Results

Sub-Matrix: LEACHATE (Matrix: WATER)			Sample ID	N7441 21.0 - 21.5	N7442 14.0 - 14.5	N7442 28.5 - 29.0	N7445 10.5 - 11.0	----
			Sampling date / time	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00	----
Compound	CAS Number	LOR	Unit	EB2314015-006	EB2314015-007	EB2314015-008	EB2314015-009	--------
				Result	Result	Result	Result	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**5.15**	**5.55**	**3.29**	**3.49**	**----**
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**59**	**46**	**912**	**384**	**----**
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	**2**	**2**	<1	<1	**----**
Total Alkalinity as CaCO3	----	1	mg/L	**2**	**2**	<1	<1	**----**
ED038: Acidity								
Acidity as CaCO3	----	1	mg/L	**32**	**62**	**403**	**226**	**----**
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**8**	**9**	**464**	**111**	**----**
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**10**	**6**	**28**	**4**	**----**
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	<1	<1	**16**	**3**	**----**
Magnesium	7439-95-4	1	mg/L	**1**	<1	**25**	**2**	**----**
Sodium	7440-23-5	1	mg/L	**6**	**6**	**14**	**2**	**----**
Potassium	7440-09-7	1	mg/L	<1	<1	<1	<1	**----**
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**0.01**	**0.08**	**30.4**	**5.71**	**----**
Dysprosium	7429-91-6	0.001	mg/L	<0.001	<0.001	**0.003**	**0.026**	**----**
Silver	7440-22-4	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	**----**
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	**0.008**	**0.005**	**----**
Bismuth	7440-69-9	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	**----**
Erbium	7440-52-0	0.001	mg/L	<0.001	<0.001	**0.002**	**0.012**	**----**
Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	**----**
Europium	7440-53-1	0.001	mg/L	<0.001	<0.001	<0.001	**0.008**	**----**
Strontium	7440-24-6	0.001	mg/L	**0.004**	**0.002**	**0.182**	**0.026**	**----**
Barium	7440-39-3	0.001	mg/L	**0.008**	**0.004**	**0.035**	**0.066**	**----**
Gadolinium	7440-54-2	0.001	mg/L	<0.001	<0.001	**0.004**	**0.040**	**----**
Titanium	7440-32-6	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	**----**
Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	**0.019**	<0.001	**----**

Analytical Results

Sub-Matrix: LEACHATE (Matrix: WATER)				Sample ID	N7441 21.0 - 21.5	N7442 14.0 - 14.5	N7442 28.5 - 29.0	N7445 10.5 - 11.0	----
				Sampling date / time	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00	----
Compound	CAS Number	LOR	Unit		EB2314015-006	EB2314015-007	EB2314015-008	EB2314015-009	--------
					Result	Result	Result	Result	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Gallium	7440-55-3	0.001	mg/L		<0.001	<0.001	**0.001**	**0.011**	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	**0.0027**	<0.0001	----
Hafnium	7440-58-6	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	----
Tellurium	22541-49-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	----
Cobalt	7440-48-4	0.001	mg/L		**0.001**	**0.002**	**2.46**	**1.68**	----
Holmium	7440-60-0	0.001	mg/L		<0.001	<0.001	<0.001	**0.004**	----
Uranium	7440-61-1	0.001	mg/L		<0.001	<0.001	<0.001	**0.005**	----
Caesium	7440-46-2	0.001	mg/L		<0.001	<0.001	**0.001**	<0.001	----
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	**0.015**	**0.002**	----
Indium	7440-74-6	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	----
Copper	7440-50-8	0.001	mg/L		<0.001	<0.001	**0.003**	**0.004**	----
Lanthanum	7439-91-0	0.001	mg/L		<0.001	<0.001	**0.035**	**0.109**	----
Rubidium	7440-17-7	0.001	mg/L		**0.005**	**0.002**	**0.018**	**0.008**	----
Lithium	7439-93-2	0.001	mg/L		**0.001**	**0.002**	**0.006**	**0.004**	----
Lutetium	7439-94-3	0.001	mg/L		<0.001	<0.001	<0.001	**0.001**	----
Thorium	7440-29-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	----
Cerium	7440-45-1	0.001	mg/L		<0.001	<0.001	**0.050**	**0.359**	----
Manganese	7439-96-5	0.001	mg/L		**0.006**	**0.034**	**0.367**	**0.079**	----
Neodymium	7440-00-8	0.001	mg/L		<0.001	<0.001	**0.014**	**0.172**	----
Molybdenum	7439-98-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	----
Praseodymium	7440-10-0	0.001	mg/L		<0.001	<0.001	**0.004**	**0.041**	----
Nickel	7440-02-0	0.001	mg/L		<0.001	<0.001	**0.686**	**0.731**	----
Samarium	7440-19-9	0.001	mg/L		<0.001	<0.001	**0.002**	**0.037**	----
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	**0.003**	**0.002**	----
Terbium	7440-27-9	0.001	mg/L		<0.001	<0.001	<0.001	**0.005**	----
Antimony	7440-36-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	----
Thulium	7440-30-4	0.001	mg/L		<0.001	<0.001	<0.001	**0.002**	----
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	----
Ytterbium	7440-64-4	0.001	mg/L		<0.001	<0.001	**0.001**	**0.009**	----
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	----
Yttrium	7440-65-5	0.001	mg/L		<0.001	<0.001	**0.027**	**0.115**	----
Thallium	7440-28-0	0.001	mg/L		<0.001	<0.001	**0.001**	<0.001	----
Zirconium	7440-67-7	0.005	mg/L		<0.005	<0.005	**0.006**	<0.005	----
Vanadium	7440-62-2	0.01	mg/L		<0.01	<0.01	**0.04**	<0.01	----

Analytical Results

Sub-Matrix: LEACHATE (Matrix: WATER)				Sample ID	N7441 21.0 - 21.5	N7442 14.0 - 14.5	N7442 28.5 - 29.0	N7445 10.5 - 11.0	----
				Sampling date / time	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00	----
Compound	CAS Number	LOR	Unit		EB2314015-006	EB2314015-007	EB2314015-008	EB2314015-009	--------
					Result	Result	Result	Result	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Zinc	7440-66-6	0.005	mg/L		**0.007**	<0.005	**1.56**	**1.34**	**----**
Iron	7439-89-6	0.05	mg/L		<0.05	<0.05	**10.5**	**19.3**	**----**
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		<0.1	<0.1	**0.6**	**0.3**	**----**
EN055: Ionic Balance									
ø **Total Anions**	----	0.01	meq/L		**0.49**	**0.40**	**10.4**	**2.42**	**----**
ø **Total Cations**	----	0.01	meq/L		**----**	**----**	**6.64**	**2.12**	**----**
ø **Total Cations**	----	0.01	meq/L		**0.34**	**0.26**	**----**	**----**	**----**
ø **Ionic Balance**	----	0.01	%		**----**	**----**	**19.8**	**----**	**----**

CERTIFICATE OF ANALYSIS

Work Order	: **EB2314434**	Page	: 1 of 8
Client	: **RGS ENVIRONMENTAL CONSULTANTS PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MATT LANDERS	Contact	: Carsten Emrich
Address	: 3/30 LENSWORTH STREET COOPERS PLAINS 4108	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2021048 Yallourn	Date Samples Received	: 09-May-2023 22:40
Order number	: ----	Date Analysis Commenced	: 18-May-2023
C-O-C number	: ----	Issue Date	: 23-May-2023 18:03
Sampler	: ----		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 28		
No. of samples analysed	: 28		

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*
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

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: PULP (Matrix: SOIL)			Sample ID	N7423 5.5-6.0	N7423 19.5-20.0	N7425 8.5-9.0	N7425 16.0-16.5	N7425 28.5-29.0
			Sampling date / time	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00
Compound	CAS Number	LOR	Unit	EB2314434-001	EB2314434-002	EB2314434-003	EB2314434-004	EB2314434-005
				Result	Result	Result	Result	Result
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	**0.51**	**1.59**	**12.8**	**1.02**	**0.76**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7435 0.5-1.0	N7436 17.5-18.0	N7437 0.0-0.5	N7439 11.5-12.0	N7440 22.0-22.5
			Sampling date / time	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00
Compound	CAS Number	LOR	Unit	EB2314434-006	EB2314434-007	EB2314434-008	EB2314434-009	EB2314434-010
				Result	Result	Result	Result	Result
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	**0.21**	**1.16**	**0.19**	**0.08**	**0.49**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7440 26.5-27.0	N7440 28.0-28.5	N7441 2.5-3.0	N7441 3.5-4.0	N7441 17.0-17.5
			Sampling date / time	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00
Compound	CAS Number	LOR	Unit	EB2314434-011	EB2314434-012	EB2314434-013	EB2314434-014	EB2314434-015
				Result	Result	Result	Result	Result
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	**2.42**	**15.4**	**34.2**	**18.9**	**0.07**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7441 21.0-21.5	N7441 24.0-24.5	N7442 14.0-14.5	N7442 28.5-29.0	N7442 30.0-30.5
			Sampling date / time	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00
Compound	CAS Number	LOR	Unit	EB2314434-016	EB2314434-017	EB2314434-018	EB2314434-019	EB2314434-020
				Result	Result	Result	Result	Result
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	**0.08**	**5.83**	**0.12**	**6.34**	**8.56**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7445 7.0-7.5	N7445 10.5-11.0	N7446 2.5-3.0	N7447 10.0-10.5	N7451 2.5-3.0
			Sampling date / time	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00
Compound	CAS Number	LOR	Unit	EB2314434-021	EB2314434-022	EB2314434-023	EB2314434-024	EB2314434-025
				Result	Result	Result	Result	Result
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	**0.18**	**0.07**	**0.42**	**0.18**	**2.48**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7451 10.0-10.5	N7454 25.0-25.5	N7508 21.0-21.5	----	----
			Sampling date / time	09-May-2023 00:00	09-May-2023 00:00	09-May-2023 00:00	----	----
Compound	CAS Number	LOR	Unit	EB2314434-026	EB2314434-027	EB2314434-028	--------	--------
				Result	Result	Result	----	----
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	**1.13**	**0.23**	**0.11**	**----**	**----**

CERTIFICATE OF ANALYSIS

Work Order	: **EB2314571**	Page	: 1 of 12
Client	: **RGS ENVIRONMENTAL CONSULTANTS PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MATT LANDERS	Contact	: Carsten Emrich
Address	: 3/30 LENSWORTH STREET COOPERS PLAINS 4108	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2021048 Yallourn	Date Samples Received	: 12-May-2023 14:24
Order number	: ----	Date Analysis Commenced	: 19-May-2023
C-O-C number	: ----	Issue Date	: 24-May-2023 17:26
Sampler	: BEN FREIDMAN		
Site	:		
Quote number	: BN/1234/19		
No. of samples received	: 49		
No. of samples analysed	: 49		

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.

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- 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*
Layla Hafner	Acid Sulphate Soils - Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

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

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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.

- ASS: EA013 (ANC) Fizz Rating: 0- None; 1- Slight; 2- Moderate; 3- Strong; 4- Very Strong; 5- Lime.

Analytical Results

Sub-Matrix: **PULP** (Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	M4223 5.5 - 6.0	M4223 6.0 - 6.5	M4223 12.0 - 12.5	M4223 16.0 - 16.5	M4223 20.0 - 20.5
				Sampling date / time	12-May-2023 00:00	12-May-2023 00:00	12-May-2023 00:00	12-May-2023 00:00	12-May-2023 00:00
					EB2314571-001	EB2314571-002	EB2314571-003	EB2314571-004	EB2314571-005
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**6.1**	**6.5**	**6.3**	**6.5**	**4.4**
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		**-0.8**	**-5.5**	**-5.3**	**-5.5**	**1.8**
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		**71**	**42**	**62**	**53**	**180**
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		**1.4**	**5.8**	**5.6**	**5.8**	<0.5
ANC as CaCO3	----	0.1	% CaCO3		**0.1**	**0.6**	**0.6**	**0.6**	<0.1
Fizz Rating	----	0	Fizz Unit		**0**	**1**	**1**	**1**	**0**
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		**0.02**	**0.01**	**0.01**	**0.01**	**0.06**
EP003: Total Organic Carbon (TOC) in Soil									
Total Organic Carbon	----	0.02	%		**----**	**0.05**	**----**	**0.05**	**----**

Analytical Results

Sub-Matrix: **PULP** (Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	M4224 1.5 - 2.0	M4224 6.5 - 7.0	N7426 2.0 - 2.5	N7426 7.5 - 8.0	N7426 12.0 - 12.5
				Sampling date / time	12-May-2023 00:00	12-May-2023 00:00	12-May-2023 00:00	12-May-2023 00:00	12-May-2023 00:00
					EB2314571-006	EB2314571-007	EB2314571-008	EB2314571-009	EB2314571-010
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**6.3**	**6.1**	**3.8**	**3.9**	**3.1**
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		**-5.8**	**-4.9**	**5.5**	**120**	**71.3**
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		**67**	**83**	**781**	**1490**	**1180**
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		**6.1**	**5.2**	<0.5	<0.5	<0.5
ANC as CaCO3	----	0.1	% CaCO3		**0.6**	**0.5**	<0.1	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit		**1**	**1**	**0**	**0**	**0**
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		**0.01**	**0.01**	**0.18**	**3.94**	**2.33**
EP003: Total Organic Carbon (TOC) in Soil									
Total Organic Carbon	----	0.02	%		**----**	**----**	**9.00**	**1.80**	**----**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7426 22.5 - 23.0	N7429 0.5 - 1.0	N7429 6.0 - 6.5	N7430 2.0 - 2.5	N7430 2.5 - 3.0
			Sampling date / time	12-May-2023 00:00	12-May-2023 00:00	12-May-2023 00:00	12-May-2023 00:00	12-May-2023 00:00
Compound	CAS Number	LOR	Unit	EB2314571-011	EB2314571-012	EB2314571-013	EB2314571-014	EB2314571-015
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	5.5	5.4	6.0	5.6	5.5
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	-6.6	-4.9	-6.2	-6.8	-7.9
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	81	64	38	61	44
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	7.2	5.5	6.8	7.7	8.5
ANC as CaCO3	----	0.1	% CaCO3	0.7	0.6	0.7	0.8	0.9
Fizz Rating	----	0	Fizz Unit	1	1	1	1	1
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.02	0.02	0.02	0.03	0.02
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	----	----	----	0.39	0.64

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7432 0.0 - 0.5	N7432 4.0 - 4.5	N7432 8.5 - 9.0	N7432 16.0 - 16.5	N7432 31.0 - 31.5
			Sampling date / time	12-May-2023 00:00	12-May-2023 00:00	12-May-2023 00:00	12-May-2023 00:00	12-May-2023 00:00
Compound	CAS Number	LOR	Unit	EB2314571-016	EB2314571-017	EB2314571-018	EB2314571-019	EB2314571-020
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	5.6	5.1	4.7	5.6	5.4
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	-5.2	0.9	2.4	-5.2	0.9
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	43	61	114	75	149
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	5.8	<0.5	<0.5	5.5	<0.5
ANC as CaCO3	----	0.1	% CaCO3	0.6	<0.1	<0.1	0.6	<0.1
Fizz Rating	----	0	Fizz Unit	1	0	0	1	0
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.02	0.03	0.08	0.01	0.03
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	----	----	----	0.16	----

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7432 39.5 - 40.0	N7432 53.0 - 54.0	N7433 11.0 - 11.5	N7433 21.5 - 22.0	N7433 32.0 - 32.5
			Sampling date / time	12-May-2023 00:00	12-May-2023 00:00	12-May-2023 00:00	12-May-2023 00:00	12-May-2023 00:00
Compound	CAS Number	LOR	Unit	EB2314571-021	EB2314571-022	EB2314571-023	EB2314571-024	EB2314571-025
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	6.2	5.8	5.7	5.6	4.2
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	-6.5	-4.3	-4.9	<0.5	8.6
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	170	198	44	61	629
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	7.1	5.2	5.5	0.6	<0.5
ANC as CaCO3	----	0.1	% CaCO3	0.7	0.5	0.6	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit	1	1	1	0	0
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.02	0.03	0.02	0.02	0.28
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	----	2.35	----	0.74	----

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7433 33.5 - 34.0	N7433 35.5 - 36.0	N7433 37.0 - 37.5	N7434 1.0 - 1.5	N7434 15.0 - 15.5
			Sampling date / time	12-May-2023 00:00	12-May-2023 00:00	12-May-2023 00:00	12-May-2023 00:00	12-May-2023 00:00
Compound	CAS Number	LOR	Unit	EB2314571-026	EB2314571-027	EB2314571-028	EB2314571-029	EB2314571-030
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	5.6	5.3	5.9	4.6	6.0
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	-6.5	-4.8	-7.5	-0.07	-7.4
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	223	192	106	573	115
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	7.1	5.7	8.1	6.8	8.3
ANC as CaCO3	----	0.1	% CaCO3	0.7	0.6	0.8	0.7	0.8
Fizz Rating	----	0	Fizz Unit	1	1	1	1	1
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.02	0.03	0.02	0.22	0.03
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	----	4.50	0.12	----	1.24

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7437 10.0 - 10.5	N7437 16.0 - 16.5	N7438 13.0 - 13.5	N7438 16.0 - 16.5	N7438 20.5 - 21.0
			Sampling date / time	12-May-2023 00:00	12-May-2023 00:00	12-May-2023 00:00	12-May-2023 00:00	12-May-2023 00:00
Compound	CAS Number	LOR	Unit	EB2314571-031	EB2314571-032	EB2314571-033	EB2314571-034	EB2314571-035
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	3.7	4.3	3.7	3.2	3.9
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	9.8	15.6	65.5	200	7.3
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	756	366	788	1280	726
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	<0.5	<0.5	<0.5	<0.5	<0.5
ANC as CaCO3	----	0.1	% CaCO3	<0.1	<0.1	<0.1	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit	0	0	0	0	0
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.32	0.51	2.14	6.54	0.24
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	----	36.0	0.49	----	----

Analytical Results

Sub-Matrix: **PULP** (Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	N7438 25.0 - 25.5	N7438 26.5 - 27.0	N7445 1.0 - 1.5	N7445 3.0 - 3.5	N7445 13.5 - 14.0
				Sampling date / time	12-May-2023 00:00	12-May-2023 00:00	12-May-2023 00:00	12-May-2023 00:00	12-May-2023 00:00
					EB2314571-036	EB2314571-037	EB2314571-038	EB2314571-039	EB2314571-040
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**3.9**	**3.6**	**5.7**	**5.9**	**3.9**
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		**36.1**	**72.2**	**-6.9**	**-8.3**	**23.9**
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		**529**	**1190**	**18**	**12**	**523**
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		<0.5	<0.5	**7.2**	**8.3**	<0.5
ANC as CaCO3	----	0.1	% CaCO3		<0.1	<0.1	**0.7**	**0.8**	<0.1
Fizz Rating	----	0	Fizz Unit		**0**	**0**	**1**	**1**	**0**
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		**1.18**	**2.36**	**0.01**	<0.01	**0.78**
EP003: Total Organic Carbon (TOC) in Soil									
Total Organic Carbon	----	0.02	%		**----**	**----**	**----**	**0.04**	**----**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7455 1.0 - 1.5	N7455 10.0 - 10.5	N7455 14.5 - 15.0	N7455 16.0 - 16.5	N7455 17.5 - 18.0
			Sampling date / time	12-May-2023 00:00	12-May-2023 00:00	12-May-2023 00:00	12-May-2023 00:00	12-May-2023 00:00
Compound	CAS Number	LOR	Unit	EB2314571-041	EB2314571-042	EB2314571-043	EB2314571-044	EB2314571-045
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	5.7	5.4	4.6	4.4	4.3
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	-8.3	-5.1	7.6	8.0	5.5
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	30	78	68	196	197
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	8.6	6.0	<0.5	<0.5	<0.5
ANC as CaCO3	----	0.1	% CaCO3	0.9	0.6	<0.1	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit	1	1	0	0	0
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.01	0.03	0.25	0.26	0.18
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	0.18	0.26	31.6	----	----

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7510 0.0 - 0.5	N7510 2.0 - 2.5	N7510 5.0 - 5.5	N7510 9.5 - 10.0	----
			Sampling date / time	12-May-2023 00:00	12-May-2023 00:00	12-May-2023 00:00	12-May-2023 00:00	----
Compound	CAS Number	LOR	Unit	EB2314571-046	EB2314571-047	EB2314571-048	EB2314571-049	--------
				Result	Result	Result	Result	----
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	3.9	6.0	5.7	5.6	----
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	3.4	-6.3	-7.1	-7.2	----
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	659	99	76	89	----
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	<0.5	6.9	7.7	7.5	----
ANC as CaCO3	----	0.1	% CaCO3	<0.1	0.7	0.8	0.8	----
Fizz Rating	----	0	Fizz Unit	0	1	1	1	----
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.11	0.02	0.02	0.01	----
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	10.5	----	----	0.23	----

CERTIFICATE OF ANALYSIS

Work Order	: **EB2315289**	Page	: 1 of 8
Client	: **RGS ENVIRONMENTAL CONSULTANTS PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MATT LANDERS	Contact	: Carsten Emrich
Address	: 3/30 LENSWORTH STREET COOPERS PLAINS 4108	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2021048 Yallourn	Date Samples Received	: 19-May-2023 12:30
Order number	: ----	Date Analysis Commenced	: 23-May-2023
C-O-C number	: ----	Issue Date	: 26-May-2023 18:26
Sampler	: BEN FREIDMAN		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 6		
No. of samples analysed	: 6		

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*
Beatriz Llarinas	Senior Chemist - Inorganics	Brisbane Inorganics, Stafford, QLD
Mark Hallas	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD

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.

- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- ALS is not NATA accredited for the performance of EN35: Miscellaneous Leaching procedure.
- Ionic Balance out of acceptable limits due to analytes not quantified in this report.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

Sub-Matrix: LEACHATE (Matrix: WATER)			Sample ID	M4223 6.0 to 6.5	N7433 37.0 to 37.5	N7434 15.0 to 15.5	N7438 13.0 to 13.5	N7455 1.0 to 1.5
			Sampling date / time	12-May-2023 00:00	12-May-2023 00:00	12-May-2023 00:00	12-May-2023 00:00	12-May-2023 00:00
Compound	CAS Number	LOR	Unit	EB2315289-001	EB2315289-002	EB2315289-003	EB2315289-004	EB2315289-005
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**4.27**	**5.55**	**6.06**	**3.19**	**6.41**
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**56**	**96**	**100**	**651**	**33**
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	**4**	**2**	<1	**5**
Total Alkalinity as CaCO3	----	1	mg/L	<1	**4**	**2**	<1	**5**
ED038: Acidity								
Acidity as CaCO3	----	1	mg/L	**4**	**2**	**3**	**200**	**2**
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**4**	**3**	**26**	**272**	**6**
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**6**	**27**	**8**	**7**	**2**
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	<1	<1	<1	**4**	<1
Magnesium	7439-95-4	1	mg/L	<1	<1	<1	**15**	<1
Sodium	7440-23-5	1	mg/L	**8**	**17**	**18**	**4**	**3**
Potassium	7440-09-7	1	mg/L	<1	<1	<1	<1	<1
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**0.06**	**0.06**	**0.07**	**11.6**	**0.03**
Dysprosium	7429-91-6	0.001	mg/L	<0.001	<0.001	<0.001	**0.009**	<0.001
Silver	7440-22-4	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	**0.002**	<0.001
Bismuth	7440-69-9	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Erbium	7440-52-0	0.001	mg/L	<0.001	<0.001	<0.001	**0.003**	<0.001
Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Europium	7440-53-1	0.001	mg/L	<0.001	<0.001	<0.001	**0.002**	<0.001
Strontium	7440-24-6	0.001	mg/L	**0.001**	**0.002**	**0.006**	**0.050**	**0.002**
Barium	7440-39-3	0.001	mg/L	**0.002**	**0.004**	**0.013**	**0.042**	**0.004**
Gadolinium	7440-54-2	0.001	mg/L	<0.001	<0.001	<0.001	**0.014**	<0.001
Titanium	7440-32-6	0.01	mg/L	<0.01	<0.01	<0.01	**0.01**	<0.01
Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	<0.001	**0.004**	<0.001

Analytical Results

Sub-Matrix: LEACHATE (Matrix: WATER)

Compound	CAS Number	LOR	Unit	Sample ID	M4223 6.0 to 6.5	N7433 37.0 to 37.5	N7434 15.0 to 15.5	N7438 13.0 to 13.5	N7455 1.0 to 1.5
				Sampling date / time	12-May-2023 00:00	12-May-2023 00:00	12-May-2023 00:00	12-May-2023 00:00	12-May-2023 00:00
					EB2315289-001	EB2315289-002	EB2315289-003	EB2315289-004	EB2315289-005
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Gallium	7440-55-3	0.001	mg/L		<0.001	<0.001	<0.001	**0.004**	<0.001
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	**0.0005**	<0.0001
Hafnium	7440-58-6	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Tellurium	22541-49-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	7440-48-4	0.001	mg/L		<0.001	<0.001	<0.001	**0.960**	**0.002**
Holmium	7440-60-0	0.001	mg/L		<0.001	<0.001	<0.001	**0.001**	<0.001
Uranium	7440-61-1	0.001	mg/L		<0.001	<0.001	<0.001	**0.008**	<0.001
Caesium	7440-46-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	**0.012**	<0.001
Indium	7440-74-6	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		<0.001	<0.001	**0.002**	**0.032**	**0.002**
Lanthanum	7439-91-0	0.001	mg/L		<0.001	<0.001	<0.001	**0.065**	<0.001
Rubidium	7440-17-7	0.001	mg/L		<0.001	<0.001	**0.002**	**0.009**	**0.002**
Lithium	7439-93-2	0.001	mg/L		<0.001	**0.003**	**0.005**	**0.008**	**0.002**
Lutetium	7439-94-3	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
Cerium	7440-45-1	0.001	mg/L		<0.001	<0.001	<0.001	**0.145**	<0.001
Manganese	7439-96-5	0.001	mg/L		<0.001	<0.001	**0.048**	**0.137**	**0.059**
Neodymium	7440-00-8	0.001	mg/L		<0.001	<0.001	<0.001	**0.054**	<0.001
Molybdenum	7439-98-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Praseodymium	7440-10-0	0.001	mg/L		<0.001	<0.001	<0.001	**0.015**	<0.001
Nickel	7440-02-0	0.001	mg/L		<0.001	<0.001	**0.001**	**0.402**	**0.002**
Samarium	7440-19-9	0.001	mg/L		<0.001	<0.001	<0.001	**0.010**	<0.001
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	**0.004**	<0.001
Terbium	7440-27-9	0.001	mg/L		<0.001	<0.001	<0.001	**0.002**	<0.001
Antimony	7440-36-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Thulium	7440-30-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Ytterbium	7440-64-4	0.001	mg/L		<0.001	<0.001	<0.001	**0.002**	<0.001
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Yttrium	7440-65-5	0.001	mg/L		<0.001	<0.001	<0.001	**0.038**	<0.001
Thallium	7440-28-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Zirconium	7440-67-7	0.005	mg/L		<0.005	<0.005	<0.005	**0.006**	<0.005
Vanadium	7440-62-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01

Analytical Results

Sub-Matrix: LEACHATE (Matrix: WATER)

Compound	CAS Number	LOR	Unit	Sample ID	M4223 6.0 to 6.5	N7433 37.0 to 37.5	N7434 15.0 to 15.5	N7438 13.0 to 13.5	N7455 1.0 to 1.5
				Sampling date / time	12-May-2023 00:00	12-May-2023 00:00	12-May-2023 00:00	12-May-2023 00:00	12-May-2023 00:00
					EB2315289-001	EB2315289-002	EB2315289-003	EB2315289-004	EB2315289-005
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Zinc	7440-66-6	0.005	mg/L		<0.005	**0.006**	**0.016**	**0.120**	<0.005
Iron	7439-89-6	0.05	mg/L		<0.05	<0.05	<0.05	**59.2**	**0.07**
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**0.1**	<0.1	<0.1	**0.4**	<0.1
EN055: Ionic Balance									
ø **Total Anions**	----	0.01	meq/L		**0.25**	**0.90**	**0.81**	**5.86**	**0.28**
ø **Total Cations**	----	0.01	meq/L		**----**	**----**	**----**	**5.04**	**----**
ø **Total Cations**	----	0.01	meq/L		**0.35**	**0.74**	**0.78**	**----**	**0.13**
ø **Ionic Balance**	----	0.01	%		**----**	**----**	**----**	**7.51**	**----**

Analytical Results

Sub-Matrix: LEACHATE (Matrix: WATER)			Sample ID	N7510 9.5 to 10.00	----	----	----	----
			Sampling date / time	12-May-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EB2315289-006	--------	--------	--------	--------
				Result	----	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**6.72**	----	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**84**	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**5**	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	**5**	----	----	----	----
ED038: Acidity								
Acidity as CaCO3	----	1	mg/L	**2**	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**12**	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**11**	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	<1	----	----	----	----
Magnesium	7439-95-4	1	mg/L	<1	----	----	----	----
Sodium	7440-23-5	1	mg/L	**15**	----	----	----	----
Potassium	7440-09-7	1	mg/L	<1	----	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**0.02**	----	----	----	----
Dysprosium	7429-91-6	0.001	mg/L	<0.001	----	----	----	----
Silver	7440-22-4	0.001	mg/L	<0.001	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L	<0.001	----	----	----	----
Bismuth	7440-69-9	0.001	mg/L	<0.001	----	----	----	----
Erbium	7440-52-0	0.001	mg/L	<0.001	----	----	----	----
Boron	7440-42-8	0.05	mg/L	<0.05	----	----	----	----
Europium	7440-53-1	0.001	mg/L	<0.001	----	----	----	----
Strontium	7440-24-6	0.001	mg/L	<0.001	----	----	----	----
Barium	7440-39-3	0.001	mg/L	**0.002**	----	----	----	----
Gadolinium	7440-54-2	0.001	mg/L	<0.001	----	----	----	----
Titanium	7440-32-6	0.01	mg/L	<0.01	----	----	----	----
Beryllium	7440-41-7	0.001	mg/L	<0.001	----	----	----	----

Analytical Results

Sub-Matrix: LEACHATE (Matrix: WATER)				Sample ID	N7510 9.5 to 10.00	----	----	----	----
				Sampling date / time	12-May-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EB2315289-006	--------	--------	--------	--------
					Result	----	----	----	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Gallium	7440-55-3	0.001	mg/L		<0.001	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	----	----	----	----
Hafnium	7440-58-6	0.01	mg/L		<0.01	----	----	----	----
Tellurium	22541-49-7	0.005	mg/L		<0.005	----	----	----	----
Cobalt	7440-48-4	0.001	mg/L		<0.001	----	----	----	----
Holmium	7440-60-0	0.001	mg/L		<0.001	----	----	----	----
Uranium	7440-61-1	0.001	mg/L		<0.001	----	----	----	----
Caesium	7440-46-2	0.001	mg/L		<0.001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L		<0.001	----	----	----	----
Indium	7440-74-6	0.001	mg/L		<0.001	----	----	----	----
Copper	7440-50-8	0.001	mg/L		<0.001	----	----	----	----
Lanthanum	7439-91-0	0.001	mg/L		<0.001	----	----	----	----
Rubidium	7440-17-7	0.001	mg/L		<0.001	----	----	----	----
Lithium	7439-93-2	0.001	mg/L		**0.002**	----	----	----	----
Lutetium	7439-94-3	0.001	mg/L		<0.001	----	----	----	----
Thorium	7440-29-1	0.001	mg/L		<0.001	----	----	----	----
Cerium	7440-45-1	0.001	mg/L		<0.001	----	----	----	----
Manganese	7439-96-5	0.001	mg/L		<0.001	----	----	----	----
Neodymium	7440-00-8	0.001	mg/L		<0.001	----	----	----	----
Molybdenum	7439-98-7	0.001	mg/L		<0.001	----	----	----	----
Praseodymium	7440-10-0	0.001	mg/L		<0.001	----	----	----	----
Nickel	7440-02-0	0.001	mg/L		<0.001	----	----	----	----
Samarium	7440-19-9	0.001	mg/L		<0.001	----	----	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	----	----	----	----
Terbium	7440-27-9	0.001	mg/L		<0.001	----	----	----	----
Antimony	7440-36-0	0.001	mg/L		<0.001	----	----	----	----
Thulium	7440-30-4	0.001	mg/L		<0.001	----	----	----	----
Selenium	7782-49-2	0.01	mg/L		<0.01	----	----	----	----
Ytterbium	7440-64-4	0.001	mg/L		<0.001	----	----	----	----
Tin	7440-31-5	0.001	mg/L		<0.001	----	----	----	----
Yttrium	7440-65-5	0.001	mg/L		<0.001	----	----	----	----
Thallium	7440-28-0	0.001	mg/L		<0.001	----	----	----	----
Zirconium	7440-67-7	0.005	mg/L		<0.005	----	----	----	----
Vanadium	7440-62-2	0.01	mg/L		<0.01	----	----	----	----

Analytical Results

Sub-Matrix: LEACHATE (Matrix: WATER)				Sample ID	N7510 9.5 to 10.00	----	----	----	----
				Sampling date / time	12-May-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EB2315289-006	--------	--------	--------	--------
					Result	----	----	----	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Zinc	7440-66-6	0.005	mg/L		<0.005	----	----	----	----
Iron	7439-89-6	0.05	mg/L		<0.05	----	----	----	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		<0.1	----	----	----	----
EN055: Ionic Balance									
ø **Total Anions**	----	0.01	meq/L		**0.66**	----	----	----	----
ø **Total Cations**	----	0.01	meq/L		**0.65**	----	----	----	----

CERTIFICATE OF ANALYSIS

Work Order	: **EB2317882**	Page	: 1 of 12
Client	: **RGS ENVIRONMENTAL CONSULTANTS PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MATT LANDERS	Contact	: Carsten Emrich
Address	: 3/30 LENSWORTH STREET COOPERS PLAINS 4108	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2021048 Yallourn	Date Samples Received	: 14-Jun-2023 07:44
Order number	: ----	Date Analysis Commenced	: 16-Jun-2023
C-O-C number	: ----	Issue Date	: 22-Jun-2023 16:48
Sampler	: BEN FREIDMAN		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 48		
No. of samples analysed	: 48		

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*
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

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.

- ASS: EA013 (ANC) Fizz Rating: 0- None; 1- Slight; 2- Moderate; 3- Strong; 4- Very Strong; 5- Lime.

Analytical Results

Sub-Matrix: **PULP** (Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	EB2311858001 N7424 0 - 0.5	EB2311858004 N7424 1.5 - 2	EB2311858010 N7424 9 - 9.5	EB2311858014 N7424 15 - 15.5	EB2311858018 N7427 1 - 1.5
				Sampling date / time	09-Jun-2023 00:00	09-Jun-2023 00:00	09-Jun-2023 00:00	09-Jun-2023 00:00	09-Jun-2023 00:00
					EB2317882-001	EB2317882-002	EB2317882-003	EB2317882-004	EB2317882-005
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**5.9**	**5.9**	**6.0**	**4.8**	**5.3**
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		**-1.3**	**-1.8**	**-4.1**	**0.9**	**-0.6**
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		**14**	**12**	**166**	**87**	**47**
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		**1.3**	**1.8**	**4.1**	<0.5	**0.9**
ANC as CaCO3	----	0.1	% CaCO3		**0.1**	**0.2**	**0.4**	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit		**0**	**0**	**0**	**0**	**0**
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		<0.01	<0.01	<0.01	**0.03**	**0.01**
EP003: Total Organic Carbon (TOC) in Soil									
Total Organic Carbon	----	0.02	%		**0.10**	**----**	**0.16**	**3.86**	**----**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	EB2311858025 N7427 10.5 - 11	EB2311858030 N7427 18 - 18.5	EB2311858033 N7427 22.5 - 23	EB2311858040 N7427 33 - 33.5	EB2311858045 N7428 2 - 2.5
			Sampling date / time	09-Jun-2023 00:00	09-Jun-2023 00:00	09-Jun-2023 00:00	09-Jun-2023 00:00	09-Jun-2023 00:00
Compound	CAS Number	LOR	Unit	EB2317882-006	EB2317882-007	EB2317882-008	EB2317882-009	EB2317882-010
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**4.8**	**5.1**	**5.3**	**5.6**	**5.7**
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	**1.2**	<0.5	<0.5	**-4.3**	<0.5
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**155**	**42**	**36**	**68**	**23**
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	<0.5	<0.5	<0.5	**4.9**	<0.5
ANC as CaCO3	----	0.1	% CaCO3	<0.1	<0.1	<0.1	**0.5**	<0.1
Fizz Rating	----	0	Fizz Unit	**0**	**0**	**0**	**0**	**0**
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	**0.04**	**0.01**	**0.01**	**0.02**	**0.01**
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	**2.60**	**----**	**0.25**	**----**	**0.23**

Analytical Results

Sub-Matrix: **PULP**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	EB2311858052 N7428 12 - 12.5	EB2311858059 N7428 22.5 - 23	EB2311858064 N7428 30 - 30.5	EB2311858069 N7431 0.5 - 1	EB2311858075 N7431 3.5 - 4
				Sampling date / time	09-Jun-2023 00:00	09-Jun-2023 00:00	09-Jun-2023 00:00	09-Jun-2023 00:00	09-Jun-2023 00:00
					EB2317882-011	EB2317882-012	EB2317882-013	EB2317882-014	EB2317882-015
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**5.7**	**5.7**	**4.8**	**5.1**	**4.1**
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		<0.5	<0.5	**4.6**	**0.6**	**1.8**
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		**22**	**35**	**140**	**40**	**85**
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		<0.5	<0.5	<0.5	<0.5	<0.5
ANC as CaCO3	----	0.1	% CaCO3		<0.1	<0.1	<0.1	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit		**0**	**0**	**0**	**0**	**0**
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		<0.01	<0.01	**0.15**	**0.02**	**0.06**
EP003: Total Organic Carbon (TOC) in Soil									
Total Organic Carbon	----	0.02	%		**----**	**----**	**30.2**	**----**	**----**

Analytical Results

Sub-Matrix: **PULP**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	EB2311858087 N7431 15.5 - 16	EB2311858094 N7431 27.5 - 28	EB2311858095 N7431 31.5 - 32	EB2311858102 N7443 3 - 3.5	EB2311858103 N7443 3.5 - 4
				Sampling date / time	09-Jun-2023 00:00	09-Jun-2023 00:00	09-Jun-2023 00:00	09-Jun-2023 00:00	09-Jun-2023 00:00
					EB2317882-016	EB2317882-017	EB2317882-018	EB2317882-019	EB2317882-020
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**5.3**	**5.2**	**5.3**	**4.8**	**5.0**
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		**0.9**	**0.6**	**-0.7**	**1.8**	**0.9**
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		**108**	**89**	**136**	**43**	**46**
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		<0.5	<0.5	**2.2**	<0.5	<0.5
ANC as CaCO3	----	0.1	% CaCO3		<0.1	<0.1	**0.2**	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit		**0**	**0**	**0**	**0**	**0**
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		**0.03**	**0.02**	**0.05**	**0.06**	**0.03**
EP003: Total Organic Carbon (TOC) in Soil									
Total Organic Carbon	----	0.02	%		**2.57**	**1.55**	**----**	**----**	**2.62**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	EB2311858109 N7443 6.5 - 7	EB2311858110 N7443 7 - 7.5	EB2311858114 N7443 9 - 9.5	EB2311858116 N7444 0.5 - 1	EB2311858120 N7444 2.5 - 3
			Sampling date / time	09-Jun-2023 00:00	09-Jun-2023 00:00	09-Jun-2023 00:00	09-Jun-2023 00:00	09-Jun-2023 00:00
Compound	CAS Number	LOR	Unit	EB2317882-021	EB2317882-022	EB2317882-023	EB2317882-024	EB2317882-025
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**5.4**	**3.8**	**4.2**	**5.9**	**6.3**
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	**0.6**	**-33.3**	**2.4**	<0.5	<0.5
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**32**	**218**	**106**	**49**	**68**
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	<0.5	**38.8**	<0.5	<0.5	<0.5
ANC as CaCO3	----	0.1	% CaCO3	<0.1	**4.0**	<0.1	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit	**0**	**1**	**0**	**0**	**0**
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	**0.02**	**0.18**	**0.08**	<0.01	<0.01
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	**0.19**	**----**	**----**	**----**	**0.09**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	EB2311858129 N7444 7 - 7.5	EB2311858130 N7444 7.5 - 8	EB2311867001 N7449 0 - 0.5	EB2311867007 N7449 3 - 3.5	EB2311867008 N7449 4.5 - 5
			Sampling date / time	09-Jun-2023 00:00	09-Jun-2023 00:00	09-Jun-2023 00:00	09-Jun-2023 00:00	09-Jun-2023 00:00
Compound	CAS Number	LOR	Unit	EB2317882-026	EB2317882-027	EB2317882-028	EB2317882-029	EB2317882-030
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**6.1**	**6.0**	**5.6**	**8.1**	**5.9**
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	<0.5	<0.5	<0.5	**-154**	**-2.0**
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**69**	**75**	**50**	**1450**	**414**
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	<0.5	<0.5	<0.5	**167**	**9.3**
ANC as CaCO3	----	0.1	% CaCO3	<0.1	<0.1	<0.1	**17.0**	**0.9**
Fizz Rating	----	0	Fizz Unit	**0**	**0**	**0**	**3**	**0**
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	<0.01	<0.01	**0.01**	**0.41**	**0.24**
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	**----**	**----**	**0.22**	**----**	**47.8**

Analytical Results

Sub-Matrix: **PULP**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	EB2311867022 N7449 12.5 - 13	EB2311867026 N7449 15 - 15.5	EB2311867035 N7449 20.5 - 21	EB2311867043 N7449 24.5 - 25	EB2311867052 N7450 0.5 - 1
				Sampling date / time	09-Jun-2023 00:00	09-Jun-2023 00:00	09-Jun-2023 00:00	09-Jun-2023 00:00	09-Jun-2023 00:00
					EB2317882-031	EB2317882-032	EB2317882-033	EB2317882-034	EB2317882-035
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**4.8**	**5.7**	**6.6**	**6.2**	**4.6**
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		**3.1**	**-0.4**	**-1.6**	**-2.6**	**4.6**
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		**366**	**86**	**142**	**176**	**483**
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		<0.5	**0.7**	**1.9**	**2.6**	<0.5
ANC as CaCO3	----	0.1	% CaCO3		<0.1	<0.1	**0.2**	**0.3**	<0.1
Fizz Rating	----	0	Fizz Unit		**0**	**0**	**0**	**0**	**0**
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		**0.10**	**0.01**	**0.01**	<0.01	**0.15**
EP003: Total Organic Carbon (TOC) in Soil									
Total Organic Carbon	----	0.02	%		**----**	**0.66**	**----**	**0.26**	**7.37**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	EB2311867054 N7450 1.5 - 2	EB2311867064 N7450 14.5 - 15	EB2311867068 N7450 20.5 - 21	EB2311867075 N7450 36 - 36.5	EB2311867081 N7452 2.5 - 3
			Sampling date / time	09-Jun-2023 00:00	09-Jun-2023 00:00	09-Jun-2023 00:00	09-Jun-2023 00:00	09-Jun-2023 00:00
Compound	CAS Number	LOR	Unit	EB2317882-036	EB2317882-037	EB2317882-038	EB2317882-039	EB2317882-040
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**5.4**	**5.3**	**5.9**	**4.6**	**4.2**
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	**-0.09**	<0.5	**-0.6**	**3.7**	**4.0**
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**193**	**222**	**148**	**270**	**358**
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	**0.7**	**1.5**	**0.9**	<0.5	<0.5
ANC as CaCO3	----	0.1	% CaCO3	<0.1	**0.2**	<0.1	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit	**0**	**0**	**0**	**0**	**0**
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	**0.02**	**0.06**	**0.01**	**0.12**	**0.13**
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	**----**	**----**	**0.23**	**----**	**----**

Analytical Results

Sub-Matrix: PULP
(Matrix: SOIL)

Compound	CAS Number	LOR	Unit	Sample ID	EB2311867082 N7452 3 - 3.5	EB2311867083 N7452 3.5 - 4	EB2311867088 N7452 6.5 - 7	EB2311867094 N7452 11 - 11.5	EB2311867100 N7452 21.5 - 22
				Sampling date / time	09-Jun-2023 00:00	09-Jun-2023 00:00	09-Jun-2023 00:00	09-Jun-2023 00:00	09-Jun-2023 00:00
				EB2317882-041	EB2317882-042	EB2317882-043	EB2317882-044	EB2317882-045	
				Result	Result	Result	Result	Result	
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit	**4.3**	**3.9**	**5.4**	**6.1**	**7.6**	
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t	**5.5**	**12.8**	**6.7**	**-0.9**	**-1.8**	
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm	**274**	**465**	**722**	**39**	**234**	
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	<0.5	<0.5	**5.2**	**0.9**	**2.1**	
ANC as CaCO3	----	0.1	% CaCO3	<0.1	<0.1	**0.5**	<0.1	**0.2**	
Fizz Rating	----	0	Fizz Unit	**0**	**0**	**0**	**0**	**0**	
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%	**0.18**	**0.42**	**0.39**	<0.01	**0.01**	
EP003: Total Organic Carbon (TOC) in Soil									
Total Organic Carbon	----	0.02	%	**----**	**14.1**	**----**	**----**	**----**	

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	EB2311867111 N7509 0.5 - 1	EB2311867113 N7509 1.5 - 2	EB2311867121 N7509 5.5 - 6	----	----
			Sampling date / time	09-Jun-2023 00:00	09-Jun-2023 00:00	09-Jun-2023 00:00	----	----
Compound	CAS Number	LOR	Unit	EB2317882-046	EB2317882-047	EB2317882-048	--------	--------
				Result	Result	Result	----	----
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**5.4**	**6.0**	**6.3**	**----**	**----**
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	**0.6**	**-0.6**	<0.5	**----**	**----**
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**240**	**261**	**41**	**----**	**----**
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	<0.5	**1.2**	<0.5	**----**	**----**
ANC as CaCO3	----	0.1	% CaCO3	<0.1	**0.1**	<0.1	**----**	**----**
Fizz Rating	----	0	Fizz Unit	**0**	**0**	**0**	**----**	**----**
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	**0.02**	**0.02**	<0.01	**----**	**----**
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	**0.12**	**----**	**----**	**----**	**----**

CERTIFICATE OF ANALYSIS

Work Order	: **EB2318016**	Page	: 1 of 8
Client	: **RGS ENVIRONMENTAL CONSULTANTS PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MATT LANDERS	Contact	: Carsten Emrich
Address	: 3/30 LENSWORTH STREET COOPERS PLAINS 4108	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2021048 Yallourn	Date Samples Received	: 14-Jun-2023 12:10
Order number	: ----	Date Analysis Commenced	: 15-Jun-2023
C-O-C number	: ----	Issue Date	: 21-Jun-2023 20:22
Sampler	: BEN FREIDMAN		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 6		
No. of samples analysed	: 6		

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*
Beatriz Llarinas	Senior Chemist - Inorganics	Brisbane Inorganics, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD

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.

- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- ALS is not NATA accredited for the performance of EN35: Miscellaneous Leaching procedure.
- Ionic Balance out of acceptable limits due to analytes not quantified in this report.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

Sub-Matrix: LEACHATE (Matrix: WATER)			Sample ID	N7424 9.0-9.5	N7431 27.5-28.0	N7443 6.5-7.0	N7449 15.0-15.5	N7452 3.5-4.0
			Sampling date / time	13-Jun-2023 00:00	13-Jun-2023 00:00	13-Jun-2023 00:00	13-Jun-2023 00:00	13-Jun-2023 00:00
Compound	CAS Number	LOR	Unit	EB2318016-001	EB2318016-002	EB2318016-003	EB2318016-004	EB2318016-005
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**4.85**	**5.43**	**4.57**	**5.27**	**3.56**
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**144**	**74**	**36**	**77**	**548**
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**8**	**4**	<1	**3**	<1
Total Alkalinity as CaCO3	----	1	mg/L	**8**	**4**	<1	**3**	<1
ED038: Acidity								
Acidity as CaCO3	----	1	mg/L	**4**	**2**	**6**	**2**	**60**
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**2**	**10**	**5**	**7**	**195**
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**38**	**12**	**2**	**14**	**5**
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	<1	<1	<1	<1	**10**
Magnesium	7439-95-4	1	mg/L	<1	<1	<1	<1	**32**
Sodium	7440-23-5	1	mg/L	**23**	**12**	**4**	**14**	**24**
Potassium	7440-09-7	1	mg/L	<1	<1	<1	<1	**2**
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	<0.01	**0.03**	**0.03**	**0.11**	**3.20**
Dysprosium	7429-91-6	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Silver	7440-22-4	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	**0.001**	**0.002**
Bismuth	7440-69-9	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Erbium	7440-52-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	**0.06**
Europium	7440-53-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Strontium	7440-24-6	0.001	mg/L	<0.001	**0.002**	**0.004**	<0.001	**0.106**
Barium	7440-39-3	0.001	mg/L	**0.017**	**0.009**	**0.011**	**0.004**	**0.055**
Gadolinium	7440-54-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Titanium	7440-32-6	0.01	mg/L	<0.01	<0.01	<0.01	**0.01**	<0.01
Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001

Analytical Results

Sub-Matrix: LEACHATE (Matrix: WATER)

Compound	CAS Number	LOR	Unit	Sample ID	N7424 9.0-9.5	N7431 27.5-28.0	N7443 6.5-7.0	N7449 15.0-15.5	N7452 3.5-4.0
				Sampling date / time	13-Jun-2023 00:00	13-Jun-2023 00:00	13-Jun-2023 00:00	13-Jun-2023 00:00	13-Jun-2023 00:00
					EB2318016-001	EB2318016-002	EB2318016-003	EB2318016-004	EB2318016-005
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Gallium	7440-55-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Hafnium	7440-58-6	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Tellurium	22541-49-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	7440-48-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	**0.284**
Holmium	7440-60-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Uranium	7440-61-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Caesium	7440-46-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	7440-47-3	0.001	mg/L		<0.001	**0.002**	<0.001	<0.001	**0.005**
Indium	7440-74-6	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		**0.002**	<0.001	**0.001**	<0.001	<0.001
Lanthanum	7439-91-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Rubidium	7440-17-7	0.001	mg/L		<0.001	<0.001	**0.001**	<0.001	**0.004**
Lithium	7439-93-2	0.001	mg/L		**0.004**	**0.001**	**0.003**	**0.005**	**0.007**
Lutetium	7439-94-3	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
Cerium	7440-45-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	**0.002**
Manganese	7439-96-5	0.001	mg/L		**0.002**	**0.006**	**0.004**	**0.001**	**1.02**
Neodymium	7440-00-8	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	**0.001**
Molybdenum	7439-98-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Praseodymium	7440-10-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	**0.062**
Samarium	7440-19-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	**0.006**
Terbium	7440-27-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Antimony	7440-36-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Thulium	7440-30-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Ytterbium	7440-64-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Yttrium	7440-65-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	**0.001**
Thallium	7440-28-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Zirconium	7440-67-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Vanadium	7440-62-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	**0.01**

Analytical Results

Sub-Matrix: LEACHATE (Matrix: WATER)				Sample ID	N7424 9.0-9.5	N7431 27.5-28.0	N7443 6.5-7.0	N7449 15.0-15.5	N7452 3.5-4.0
				Sampling date / time	13-Jun-2023 00:00	13-Jun-2023 00:00	13-Jun-2023 00:00	13-Jun-2023 00:00	13-Jun-2023 00:00
Compound	CAS Number	LOR	Unit		EB2318016-001	EB2318016-002	EB2318016-003	EB2318016-004	EB2318016-005
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Zinc	7440-66-6	0.005	mg/L		**0.010**	**0.008**	**0.027**	<0.005	**0.788**
Iron	7439-89-6	0.05	mg/L		<0.05	**0.05**	**0.05**	<0.05	**2.69**
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		<0.1	<0.1	<0.1	<0.1	**0.4**
EN055: Ionic Balance									
ø **Total Anions**	----	0.01	meq/L		**1.27**	**0.63**	**0.16**	**0.60**	**4.20**
ø **Total Cations**	----	0.01	meq/L		**1.00**	**0.52**	**0.17**	**0.61**	**4.23**
ø **Ionic Balance**	----	0.01	%		**----**	**----**	**----**	**----**	**0.32**

Analytical Results

Sub-Matrix: LEACHATE (Matrix: WATER)				Sample ID	N7509 0.5-1.0	----	----	----	----
				Sampling date / time	13-Jun-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EB2318016-006	--------	--------	--------	--------
					Result	----	----	----	----
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		**4.37**	----	----	----	----
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		**262**	----	----	----	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		<1	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L		<1	----	----	----	----
ED038: Acidity									
Acidity as CaCO3	----	1	mg/L		**4**	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		<1	----	----	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		**75**	----	----	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		<1	----	----	----	----
Magnesium	7439-95-4	1	mg/L		**2**	----	----	----	----
Sodium	7440-23-5	1	mg/L		**46**	----	----	----	----
Potassium	7440-09-7	1	mg/L		<1	----	----	----	----
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		<0.01	----	----	----	----
Dysprosium	7429-91-6	0.001	mg/L		<0.001	----	----	----	----
Silver	7440-22-4	0.001	mg/L		<0.001	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L		<0.001	----	----	----	----
Bismuth	7440-69-9	0.001	mg/L		<0.001	----	----	----	----
Erbium	7440-52-0	0.001	mg/L		<0.001	----	----	----	----
Boron	7440-42-8	0.05	mg/L		<0.05	----	----	----	----
Europium	7440-53-1	0.001	mg/L		<0.001	----	----	----	----
Strontium	7440-24-6	0.001	mg/L		**0.002**	----	----	----	----
Barium	7440-39-3	0.001	mg/L		**0.024**	----	----	----	----
Gadolinium	7440-54-2	0.001	mg/L		<0.001	----	----	----	----
Titanium	7440-32-6	0.01	mg/L		<0.01	----	----	----	----
Beryllium	7440-41-7	0.001	mg/L		<0.001	----	----	----	----

Analytical Results

Sub-Matrix: LEACHATE (Matrix: WATER)				Sample ID	N7509 0.5-1.0	----	----	----	----
				Sampling date / time	13-Jun-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EB2318016-006	--------	--------	--------	--------
					Result	----	----	----	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Gallium	7440-55-3	0.001	mg/L		<0.001	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	----	----	----	----
Hafnium	7440-58-6	0.01	mg/L		<0.01	----	----	----	----
Tellurium	22541-49-7	0.005	mg/L		<0.005	----	----	----	----
Cobalt	7440-48-4	0.001	mg/L		<0.001	----	----	----	----
Holmium	7440-60-0	0.001	mg/L		<0.001	----	----	----	----
Uranium	7440-61-1	0.001	mg/L		<0.001	----	----	----	----
Caesium	7440-46-2	0.001	mg/L		<0.001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L		<0.001	----	----	----	----
Indium	7440-74-6	0.001	mg/L		<0.001	----	----	----	----
Copper	7440-50-8	0.001	mg/L		<0.001	----	----	----	----
Lanthanum	7439-91-0	0.001	mg/L		<0.001	----	----	----	----
Rubidium	7440-17-7	0.001	mg/L		**0.007**	----	----	----	----
Lithium	7439-93-2	0.001	mg/L		**0.008**	----	----	----	----
Lutetium	7439-94-3	0.001	mg/L		<0.001	----	----	----	----
Thorium	7440-29-1	0.001	mg/L		<0.001	----	----	----	----
Cerium	7440-45-1	0.001	mg/L		<0.001	----	----	----	----
Manganese	7439-96-5	0.001	mg/L		**0.002**	----	----	----	----
Neodymium	7440-00-8	0.001	mg/L		<0.001	----	----	----	----
Molybdenum	7439-98-7	0.001	mg/L		<0.001	----	----	----	----
Praseodymium	7440-10-0	0.001	mg/L		<0.001	----	----	----	----
Nickel	7440-02-0	0.001	mg/L		<0.001	----	----	----	----
Samarium	7440-19-9	0.001	mg/L		<0.001	----	----	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	----	----	----	----
Terbium	7440-27-9	0.001	mg/L		<0.001	----	----	----	----
Antimony	7440-36-0	0.001	mg/L		<0.001	----	----	----	----
Thulium	7440-30-4	0.001	mg/L		<0.001	----	----	----	----
Selenium	7782-49-2	0.01	mg/L		<0.01	----	----	----	----
Ytterbium	7440-64-4	0.001	mg/L		<0.001	----	----	----	----
Tin	7440-31-5	0.001	mg/L		<0.001	----	----	----	----
Yttrium	7440-65-5	0.001	mg/L		<0.001	----	----	----	----
Thallium	7440-28-0	0.001	mg/L		<0.001	----	----	----	----
Zirconium	7440-67-7	0.005	mg/L		<0.005	----	----	----	----
Vanadium	7440-62-2	0.01	mg/L		<0.01	----	----	----	----

Analytical Results

Sub-Matrix: LEACHATE (Matrix: WATER)				Sample ID	N7509 0.5-1.0	----	----	----	----
				Sampling date / time	13-Jun-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EB2318016-006	--------	--------	--------	--------
					Result	----	----	----	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Zinc	7440-66-6	0.005	mg/L		**0.013**	----	----	----	----
Iron	7439-89-6	0.05	mg/L		<0.05	----	----	----	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		<0.1	----	----	----	----
EN055: Ionic Balance									
ø **Total Anions**	----	0.01	meq/L		**2.12**	----	----	----	----
ø **Total Cations**	----	0.01	meq/L		**2.16**	----	----	----	----

CERTIFICATE OF ANALYSIS

Work Order	: **EB2321650**	Page	: 1 of 14
Client	: **RGS ENVIRONMENTAL CONSULTANTS PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MATT LANDERS	Contact	: Carsten Emrich
Address	: 3/30 LENSWORTH STREET COOPERS PLAINS 4108	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2021048 Yallourn	Date Samples Received	: 17-Jul-2023 11:30
Order number	: ----	Date Analysis Commenced	: 20-Jul-2023
C-O-C number	: ----	Issue Date	: 24-Jul-2023 11:09
Sampler	: BEN FREIDMAN		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 60		
No. of samples analysed	: 60		

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*
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

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: PULP (Matrix: SOIL)			Sample ID	N7523 0.0-0.5	N7523 0.5-1.0	N7523 1.0-1.5	N7523 1.5-2.0	N7523 2.0-2.5
			Sampling date / time	14-Jul-2023 00:00	14-Jul-2023 00:00	14-Jul-2023 00:00	14-Jul-2023 00:00	14-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2321650-001	EB2321650-002	EB2321650-003	EB2321650-004	EB2321650-005
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.011**	**0.009**	**0.014**	**0.019**	**0.010**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7523 2.5-3.0	N7523 3.0-3.5	N7523 3.5-4.0	N7523 4.0-4.5	N7523 4.5-5.0
			Sampling date / time	14-Jul-2023 00:00	14-Jul-2023 00:00	14-Jul-2023 00:00	14-Jul-2023 00:00	14-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2321650-006	EB2321650-007	EB2321650-008	EB2321650-009	EB2321650-010
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.010**	**0.020**	**0.036**	**0.129**	**0.083**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7523 5.0-5.5	N7523 5.5-6.0	N7523 6.0-6.5	N7523 6.5-7.0	N7523 7.0-7.5
			Sampling date / time	14-Jul-2023 00:00	14-Jul-2023 00:00	14-Jul-2023 00:00	14-Jul-2023 00:00	14-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2321650-011	EB2321650-012	EB2321650-013	EB2321650-014	EB2321650-015
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.085**	**0.067**	**0.114**	**0.167**	**0.138**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7523 7.5-8.0	N7523 8.0-8.5	N7523 8.5-9.0	N7523 9.0-9.5	N7523 9.5-10.0
			Sampling date / time	14-Jul-2023 00:00	14-Jul-2023 00:00	14-Jul-2023 00:00	14-Jul-2023 00:00	14-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2321650-016	EB2321650-017	EB2321650-018	EB2321650-019	EB2321650-020
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.022**	**0.173**	**0.248**	**0.371**	**0.354**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7523 10.0-10.5	N7523 10.5-11.0	N7523 11.0-11.5	N7523 11.5-12.0	N7523 12.0-12.5
			Sampling date / time	14-Jul-2023 00:00	14-Jul-2023 00:00	14-Jul-2023 00:00	14-Jul-2023 00:00	14-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2321650-021	EB2321650-022	EB2321650-023	EB2321650-024	EB2321650-025
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.099**	**0.080**	**0.197**	**0.160**	**0.094**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7523 12.5-13.0	N7523 13.0-13.5	N7523 13.5-14.0	N7523 14.0-14.5	N7523 14.5-15.0
			Sampling date / time	14-Jul-2023 00:00	14-Jul-2023 00:00	14-Jul-2023 00:00	14-Jul-2023 00:00	14-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2321650-026	EB2321650-027	EB2321650-028	EB2321650-029	EB2321650-030
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.103**	**0.293**	**0.137**	**1.34**	**0.213**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7523 15.0-15.5	N7523 15.5-16.0	N7523 16.0-16.5	N7523 16.5-17.0	N7523 17.0-17.5
			Sampling date / time	14-Jul-2023 00:00	14-Jul-2023 00:00	14-Jul-2023 00:00	14-Jul-2023 00:00	14-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2321650-031	EB2321650-032	EB2321650-033	EB2321650-034	EB2321650-035
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.205**	**1.04**	**0.170**	**0.056**	**0.388**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7523 17.5-18.0	N7523 18.0-18.5	N7523 18.5-19.0	N7523 19.0-19.5	N7523 19.5-20.0
			Sampling date / time	14-Jul-2023 00:00	14-Jul-2023 00:00	14-Jul-2023 00:00	14-Jul-2023 00:00	14-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2321650-036	EB2321650-037	EB2321650-038	EB2321650-039	EB2321650-040
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.095**	**0.070**	**0.088**	**0.053**	**0.068**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7523 20.0-20.5	N7523 20.5-21.0	N7523 21.0-21.5	N7523 21.5-22.0	N7523 22.0-22.5
			Sampling date / time	14-Jul-2023 00:00	14-Jul-2023 00:00	14-Jul-2023 00:00	14-Jul-2023 00:00	14-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2321650-041	EB2321650-042	EB2321650-043	EB2321650-044	EB2321650-045
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.052**	**0.080**	**0.254**	**0.167**	**0.442**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7523 22.5-23.0	N7523 23.0-23.5	N7523 23.5-24.0	N7523 24.0-24.5	N7523 24.5-25.0
			Sampling date / time	14-Jul-2023 00:00	14-Jul-2023 00:00	14-Jul-2023 00:00	14-Jul-2023 00:00	14-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2321650-046	EB2321650-047	EB2321650-048	EB2321650-049	EB2321650-050
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.345**	**0.359**	**0.125**	**0.037**	**0.043**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7523 25.0-25.5	N7523 25.5-26.0	N7523 26.0-26.5	N7523 26.5-27.0	N7523 27.0-27.5
			Sampling date / time	14-Jul-2023 00:00	14-Jul-2023 00:00	14-Jul-2023 00:00	14-Jul-2023 00:00	14-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2321650-051	EB2321650-052	EB2321650-053	EB2321650-054	EB2321650-055
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.029**	**0.016**	**0.040**	**0.008**	**0.015**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7523 27.5-28.0	N7523 28.0-28.5	N7523 28.5-29.0	N7523 29.0-29.5	N7523 29.5-30.0
			Sampling date / time	14-Jul-2023 00:00	14-Jul-2023 00:00	14-Jul-2023 00:00	14-Jul-2023 00:00	14-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2321650-056	EB2321650-057	EB2321650-058	EB2321650-059	EB2321650-060
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.037**	**0.026**	**0.045**	**0.008**	**0.017**

CERTIFICATE OF ANALYSIS

Work Order	: **EB2321818**	Page	: 1 of 22
Client	: **RGS ENVIRONMENTAL CONSULTANTS PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MATT LANDERS	Contact	: Carsten Emrich
Address	: 3/30 LENSWORTH STREET COOPERS PLAINS 4108	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2021048 Yallourn	Date Samples Received	: 18-Jul-2023 11:41
Order number	: ----	Date Analysis Commenced	: 26-Jul-2023
C-O-C number	: ----	Issue Date	: 27-Jul-2023 16:30
Sampler	: BEN FREIDMAN		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 98		
No. of samples analysed	: 98		

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*
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

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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: PULP (Matrix: SOIL)			Sample ID	N7521 0.0-0.5	N7521 0.5-1.0	N7521 1.0-1.5	N7521 1.5-2.0	N7521 2.0-2.5
			Sampling date / time	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2321818-001	EB2321818-002	EB2321818-003	EB2321818-004	EB2321818-005
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.012**	**0.012**	**0.015**	**0.020**	**0.008**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7521 2.5-3.0	N7521 3.0-3.5	N7521 3.5-4.0	N7521 5.0-5.5	N7521 5.5-6.0
			Sampling date / time	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2321818-006	EB2321818-007	EB2321818-008	EB2321818-009	EB2321818-010
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.014**	**0.008**	**0.016**	**0.014**	**0.015**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7521 6.0-6.5	N7521 6.5-7.0	N7521 7.0-7.5	N7521 7.5-8.0	N7521 8.0-8.5
			Sampling date / time	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2321818-011	EB2321818-012	EB2321818-013	EB2321818-014	EB2321818-015
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.009**	**0.007**	**0.016**	**0.006**	**0.019**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7521 8.5-9.0	N7521 9.0-9.5	N7521 9.5-10.0	N7521 10.0-10.5	N7521 10.5-11.0
			Sampling date / time	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2321818-016	EB2321818-017	EB2321818-018	EB2321818-019	EB2321818-020
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.007**	**0.005**	**0.010**	**0.006**	**0.008**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7521 11.0-11.5	N7521 11.5-12.0	N7521 12.0-12.5	N7521 12.5-13.0	N7521 13.0-13.5
			Sampling date / time	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2321818-021	EB2321818-022	EB2321818-023	EB2321818-024	EB2321818-025
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.008**	**0.006**	<0.005	**0.010**	<0.005

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7521 13.5-14.0	N7521 14.0-14.5	N7521 14.5-15.0	N7521 15.0-15.5	N7521 15.5-16.0
			Sampling date / time	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2321818-026	EB2321818-027	EB2321818-028	EB2321818-029	EB2321818-030
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	<0.005	<0.005	<0.005	**0.008**	**0.008**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7521 16.0-16.5	N7521 16.5-17.0	N7521 17.0-17.5	N7521 17.5-18.0	N7521 18.0-18.5
			Sampling date / time	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2321818-031	EB2321818-032	EB2321818-033	EB2321818-034	EB2321818-035
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.006**	**0.019**	<0.005	**0.019**	**0.007**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7521 18.5-19.0	N7521 19.0-19.5	N7521 19.5-20.0	N7521 22.0-22.5	N7521 22.5-23.0
			Sampling date / time	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2321818-036	EB2321818-037	EB2321818-038	EB2321818-039	EB2321818-040
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.011**	**0.008**	**0.008**	<0.005	**0.005**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7521 23.0-23.5	N7521 23.5-24.0	N7521 25.0-25.5	N7521 25.5-26.0	N7521 26.0-26.5
			Sampling date / time	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2321818-041	EB2321818-042	EB2321818-043	EB2321818-044	EB2321818-045
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.014**	**0.008**	**0.008**	**0.008**	**0.006**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7521 26.5-27.0	N7521 27.0-27.5	N7521 27.5-28.0	N7521 28.0-28.5	N7521 28.5-29.0
			Sampling date / time	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2321818-046	EB2321818-047	EB2321818-048	EB2321818-049	EB2321818-050
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.019**	**0.032**	**0.009**	**0.005**	**0.008**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7521 29.0-29.5	N7521 29.5-30.0	N7521 30.0-30.5	N7521 30.5-31.0	N7521 31.0-31.5
			Sampling date / time	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2321818-051	EB2321818-052	EB2321818-053	EB2321818-054	EB2321818-055
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.006**	**0.008**	**0.009**	**0.005**	**0.018**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7521 31.5-32.0	N7521 32.0-32.5	N7521 32.5-33.0	N7521 33.0-33.5	N7521 33.5-34.0
			Sampling date / time	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2321818-056	EB2321818-057	EB2321818-058	EB2321818-059	EB2321818-060
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	<0.005	**0.008**	**0.009**	<0.005	<0.005

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7521 34.0-34.5	N7521 34.5-35.0	N7521 35.0-35.5	N7521 35.5-36.0	N7521 36.0-36.5
			Sampling date / time	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2321818-061	EB2321818-062	EB2321818-063	EB2321818-064	EB2321818-065
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.015**	**0.010**	**0.007**	**0.013**	**0.010**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7521 36.5-37.0	N7521 37.0-37.5	N7521 37.5-38.0	N7521 38.0-38.5	N7521 38.5-39.0
			Sampling date / time	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2321818-066	EB2321818-067	EB2321818-068	EB2321818-069	EB2321818-070
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.010**	**0.007**	**0.011**	**0.012**	**0.013**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7521 39.0-39.5	N7521 39.5-40.0	N7521 40.0-40.5	N7521 40.5-41.0	N7521 41.0-41.5
			Sampling date / time	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2321818-071	EB2321818-072	EB2321818-073	EB2321818-074	EB2321818-075
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.008**	**0.011**	**0.018**	**0.007**	**0.008**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7521 41.5-42.0	N7521 42.0-42.5	N7521 42.5-43.0	N7521 43.0-43.5	N7521 43.5-44.0
			Sampling date / time	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2321818-076	EB2321818-077	EB2321818-078	EB2321818-079	EB2321818-080
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.012**	**0.007**	**0.009**	**0.009**	**0.018**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7521 44.0-44.5	N7521 44.5-45.0	N7521 45.0-45.5	N7521 45.5-46.0	N7521 46.0-46.5
			Sampling date / time	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2321818-081	EB2321818-082	EB2321818-083	EB2321818-084	EB2321818-085
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.031**	**0.017**	**0.014**	**0.083**	**0.133**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7521 46.5-47.0	N7521 47.0-47.5	N7521 47.5-48.0	N7521 48.0-48.5	N7521 48.5-49.0
			Sampling date / time	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2321818-086	EB2321818-087	EB2321818-088	EB2321818-089	EB2321818-090
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.185**	**0.028**	**0.063**	**0.017**	**0.134**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7521 49.0-49.5	N7521 49.5-50.0	N7521 50.0-50.5	N7521 50.5-51.0	N7521 51.0-51.5
			Sampling date / time	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2321818-091	EB2321818-092	EB2321818-093	EB2321818-094	EB2321818-095
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.090**	**0.025**	**0.022**	**0.013**	**0.006**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7521 51.5-52.0	N7521 52.0-52.5	N7521 52.5-53.0	----	----
			Sampling date / time	17-Jul-2023 00:00	17-Jul-2023 00:00	17-Jul-2023 00:00	----	----
Compound	CAS Number	LOR	Unit	EB2321818-096	EB2321818-097	EB2321818-098	--------	--------
				Result	Result	Result	----	----
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.014**	**0.019**	**0.017**	**----**	**----**

CERTIFICATE OF ANALYSIS

Work Order	: **EB2322612**	Page	: 1 of 16
Client	: **RGS ENVIRONMENTAL CONSULTANTS PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MATT LANDERS	Contact	: Carsten Emrich
Address	: 3/30 LENSWORTH STREET COOPERS PLAINS 4108	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2021048 Yallourn	Date Samples Received	: 25-Jul-2023 12:20
Order number	: ----	Date Analysis Commenced	: 07-Aug-2023
C-O-C number	: ----	Issue Date	: 07-Aug-2023 17:54
Sampler	: BEN FREIDMAN		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 67		
No. of samples analysed	: 67		

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

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Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

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^ = 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: PULP (Matrix: SOIL)			Sample ID	N7524 0.0_0.5	N7524 0.5_1.0	N7524 1.0_1.5	N7524 1.5_2.0	N7524 2.5_3.0
			Sampling date / time	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2322612-001	EB2322612-002	EB2322612-003	EB2322612-004	EB2322612-005
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.021**	**0.248**	**0.362**	**1.28**	**0.279**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7524 3.0_3.5	N7524 3.5_4.0	N7524 4.0_4.5	N7524 4.5_5.0	N7524 5.5_6.0
			Sampling date / time	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2322612-006	EB2322612-007	EB2322612-008	EB2322612-009	EB2322612-010
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.275**	**0.672**	**0.042**	**0.293**	**0.279**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7524 6.0_6.5	N7524 7.0_7.5	N7524 7.5_8.0	N7524 8.0_8.5	N7524 8.5_9.0
			Sampling date / time	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2322612-011	EB2322612-012	EB2322612-013	EB2322612-014	EB2322612-015
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.271**	**0.141**	**0.112**	**0.240**	**0.116**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7524 9.0_9.5	N7524 9.5_10.0	N7524 10.0_10.5	N7524 10.5_11.0	N7524 11.0_11.5
			Sampling date / time	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2322612-016	EB2322612-017	EB2322612-018	EB2322612-019	EB2322612-020
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.068**	**0.007**	**0.009**	**0.024**	**0.200**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7524 11.5_12.0	N7524 12.0_12.5	N7524 12.5_13.0	N7524 13.0_13.5	N7524 13.5_14.0
			Sampling date / time	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2322612-021	EB2322612-022	EB2322612-023	EB2322612-024	EB2322612-025
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.140**	**0.144**	**0.083**	**0.084**	**0.298**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7524 14.0_14.5	N7524 14.5_15.0	N7524 15.0_15.5	N7524 15.5_16.0	N7524 16.0_16.5
			Sampling date / time	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2322612-026	EB2322612-027	EB2322612-028	EB2322612-029	EB2322612-030
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.232**	**0.072**	**0.282**	**0.139**	**0.732**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7524 16.5_17.0	N7524 17.0_17.5	N7524 17.5_18.0	N7524 18.0_18.5	N7524 18.5_19.0
			Sampling date / time	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2322612-031	EB2322612-032	EB2322612-033	EB2322612-034	EB2322612-035
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.409**	**0.335**	**0.188**	**0.158**	**0.208**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7524 19.0_19.5	N7524 19.5_20.0	N7524 20.0_20.5	N7524 20.5_21.0	N7524 21.0_21.5
			Sampling date / time	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2322612-036	EB2322612-037	EB2322612-038	EB2322612-039	EB2322612-040
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.260**	**0.200**	**0.202**	**0.229**	**0.169**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7524 21.5_22.0	N7524 22.0_22.5	N7524 22.5_23.0	N7524 23.0_23.5	N7524 23.5_24.0
			Sampling date / time	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2322612-041	EB2322612-042	EB2322612-043	EB2322612-044	EB2322612-045
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.185**	**0.049**	**0.121**	**0.135**	**0.072**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7524 24.0_24.5	N7524 24.5_25.0	N7524 25.0_25.5	N7524 25.5_26.0	N7524 26.0_26.5
			Sampling date / time	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2322612-046	EB2322612-047	EB2322612-048	EB2322612-049	EB2322612-050
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.503**	**0.156**	**0.448**	**0.675**	**0.035**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7524 26.5_27.0	N7524 27.0_27.5	N7524 27.5_28.0	N7524 28.0_28.5	N7524 28.5_29.0
			Sampling date / time	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2322612-051	EB2322612-052	EB2322612-053	EB2322612-054	EB2322612-055
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.010**	**0.013**	**0.010**	**0.015**	**0.012**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7524 29.0_29.5	N7524 29.5_30.0	N7524 30.0_30.5	N7524 30.5_31.0	N7524 31.5_31.5
			Sampling date / time	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2322612-056	EB2322612-057	EB2322612-058	EB2322612-059	EB2322612-060
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.192**	**0.132**	**0.228**	**0.226**	**0.340**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7524 31.05_32.0	N7524 32.0_32.5	N7524 32.5_33.0	N7524 33.0_33.5	N7524 33.5_34.0
			Sampling date / time	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2322612-061	EB2322612-062	EB2322612-063	EB2322612-064	EB2322612-065
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.163**	**0.057**	**0.061**	**0.028**	**0.035**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7524 34.0_34.5	N7524 34.5_35.0	----	----	----
			Sampling date / time	24-Jul-2023 00:00	24-Jul-2023 00:00	----	----	----
Compound	CAS Number	LOR	Unit	EB2322612-066	EB2322612-067	--------	--------	--------
				Result	Result	----	----	----
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.010**	**0.011**	**----**	**----**	**----**

CERTIFICATE OF ANALYSIS

Work Order	: **EB2322612**	Page	: 1 of 16
Amendment	: **1**		
Client	: **RGS ENVIRONMENTAL CONSULTANTS PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MATT LANDERS	Contact	: Carsten Emrich
Address	: 3/30 LENSWORTH STREET COOPERS PLAINS 4108	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2021048 Yallourn	Date Samples Received	: 25-Jul-2023 12:20
Order number	: ----	Date Analysis Commenced	: 07-Aug-2023
C-O-C number	: ----	Issue Date	: 31-Aug-2023 09:36
Sampler	: BEN FREIDMAN		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 67		
No. of samples analysed	: 67		

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*
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

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.

- **Amendment (30/8/23):This report has been amended following the the switching of Sample I.Ds N7524 34.0_34.5 & N7524 34.5_35.0 around**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)				Sample ID	N7524 0.0_0.5	N7524 0.5_1.0	N7524 1.0_1.5	N7524 1.5_2.0	N7524 2.5_3.0
				Sampling date / time	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00
Compound	CAS Number	LOR	Unit		EB2322612-001	EB2322612-002	EB2322612-003	EB2322612-004	EB2322612-005
					Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur									
Chromium Reducible Sulphur	----	0.005	%		**0.021**	**0.248**	**0.362**	**1.28**	**0.279**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7524 3.0_3.5	N7524 3.5_4.0	N7524 4.0_4.5	N7524 4.5_5.0	N7524 5.5_6.0
			Sampling date / time	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2322612-006	EB2322612-007	EB2322612-008	EB2322612-009	EB2322612-010
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.275**	**0.672**	**0.042**	**0.293**	**0.279**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7524 6.0_6.5	N7524 7.0_7.5	N7524 7.5_8.0	N7524 8.0_8.5	N7524 8.5_9.0
			Sampling date / time	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2322612-011	EB2322612-012	EB2322612-013	EB2322612-014	EB2322612-015
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.271**	**0.141**	**0.112**	**0.240**	**0.116**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7524 9.0_9.5	N7524 9.5_10.0	N7524 10.0_10.5	N7524 10.5_11.0	N7524 11.0_11.5
			Sampling date / time	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2322612-016	EB2322612-017	EB2322612-018	EB2322612-019	EB2322612-020
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.068**	**0.007**	**0.009**	**0.024**	**0.200**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7524 11.5_12.0	N7524 12.0_12.5	N7524 12.5_13.0	N7524 13.0_13.5	N7524 13.5_14.0
			Sampling date / time	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2322612-021	EB2322612-022	EB2322612-023	EB2322612-024	EB2322612-025
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.140**	**0.144**	**0.083**	**0.084**	**0.298**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7524 14.0_14.5	N7524 14.5_15.0	N7524 15.0_15.5	N7524 15.5_16.0	N7524 16.0_16.5
			Sampling date / time	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2322612-026	EB2322612-027	EB2322612-028	EB2322612-029	EB2322612-030
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.232**	**0.072**	**0.282**	**0.139**	**0.732**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)				Sample ID	N7524 16.5_17.0	N7524 17.0_17.5	N7524 17.5_18.0	N7524 18.0_18.5	N7524 18.5_19.0
				Sampling date / time	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00
Compound	CAS Number	LOR	Unit		EB2322612-031	EB2322612-032	EB2322612-033	EB2322612-034	EB2322612-035
					Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur									
Chromium Reducible Sulphur	----	0.005	%		**0.409**	**0.335**	**0.188**	**0.158**	**0.208**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7524 19.0_19.5	N7524 19.5_20.0	N7524 20.0_20.5	N7524 20.5_21.0	N7524 21.0_21.5
			Sampling date / time	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2322612-036	EB2322612-037	EB2322612-038	EB2322612-039	EB2322612-040
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.260**	**0.200**	**0.202**	**0.229**	**0.169**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)				Sample ID	N7524 21.5_22.0	N7524 22.0_22.5	N7524 22.5_23.0	N7524 23.0_23.5	N7524 23.5_24.0
				Sampling date / time	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00
Compound	CAS Number	LOR	Unit		EB2322612-041	EB2322612-042	EB2322612-043	EB2322612-044	EB2322612-045
					Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur									
Chromium Reducible Sulphur	----	0.005	%		**0.185**	**0.049**	**0.121**	**0.135**	**0.072**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7524 24.0_24.5	N7524 24.5_25.0	N7524 25.0_25.5	N7524 25.5_26.0	N7524 26.0_26.5
			Sampling date / time	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2322612-046	EB2322612-047	EB2322612-048	EB2322612-049	EB2322612-050
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.503**	**0.156**	**0.448**	**0.675**	**0.035**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7524 26.5_27.0	N7524 27.0_27.5	N7524 27.5_28.0	N7524 28.0_28.5	N7524 28.5_29.0
			Sampling date / time	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2322612-051	EB2322612-052	EB2322612-053	EB2322612-054	EB2322612-055
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.010**	**0.013**	**0.010**	**0.015**	**0.012**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7524 29.0_29.5	N7524 29.5_30.0	N7524 30.0_30.5	N7524 30.5_31.0	N7524 31.5_31.5
			Sampling date / time	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2322612-056	EB2322612-057	EB2322612-058	EB2322612-059	EB2322612-060
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.192**	**0.132**	**0.228**	**0.226**	**0.340**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)				Sample ID	N7524 31.05_32.0	N7524 32.0_32.5	N7524 32.5_33.0	N7524 33.0_33.5	N7524 33.5_34.0
				Sampling date / time	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00
Compound	CAS Number	LOR	Unit		EB2322612-061	EB2322612-062	EB2322612-063	EB2322612-064	EB2322612-065
					Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur									
Chromium Reducible Sulphur	----	0.005	%		**0.163**	**0.057**	**0.061**	**0.028**	**0.035**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7524 34.5_35.0	N7524 34.0_34.5	----	----	----
			Sampling date / time	24-Jul-2023 00:00	24-Jul-2023 00:00	----	----	----
Compound	CAS Number	LOR	Unit	EB2322612-066	EB2322612-067	--------	--------	--------
				Result	Result	----	----	----
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.010**	**0.011**	**----**	**----**	**----**

CERTIFICATE OF ANALYSIS

Work Order	: **EB2322621**	Page	: 1 of 15
Client	: **RGS ENVIRONMENTAL CONSULTANTS PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MATT LANDERS	Contact	: Carsten Emrich
Address	: 3/30 LENSWORTH STREET COOPERS PLAINS 4108	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2021048 Yallourn	Date Samples Received	: 25-Jul-2023 12:20
Order number	: ----	Date Analysis Commenced	: 04-Aug-2023
C-O-C number	: ----	Issue Date	: 07-Aug-2023 17:46
Sampler	: BEN FREIDMAN		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 64		
No. of samples analysed	: 64		

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*
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

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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 for details.

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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: PULP (Matrix: SOIL)			Sample ID	N7453 0.0_0.5	N7453 0.5_1.0	N7453 1.0_1.5	N7453 1.5_2.0	N7453 2.0_2.5
			Sampling date / time	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2322621-001	EB2322621-002	EB2322621-003	EB2322621-004	EB2322621-005
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.012**	<0.005	**0.011**	**0.015**	**0.105**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7453 2.5_3.0	N7453 3.0_3.5	N7453 3.5_4.0	N7453 4.0_4.5	N7453 4.5_5.0
			Sampling date / time	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2322621-006	EB2322621-007	EB2322621-008	EB2322621-009	EB2322621-010
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.156**	**0.199**	**0.094**	**0.044**	**0.027**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7453 5.0_5.5	N7453 5.5_6.0	N7453 6.0_6.5	N7453 6.5_7.0	N7453 7.0_7.5
			Sampling date / time	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2322621-011	EB2322621-012	EB2322621-013	EB2322621-014	EB2322621-015
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.013**	**0.014**	**0.009**	**0.011**	**0.016**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7453 7.5_8.0	N7453 8.0_8.5	N7453 8.5_9.0	N7453 9.0_9.5	N7453 9.5_10.0
			Sampling date / time	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2322621-016	EB2322621-017	EB2322621-018	EB2322621-019	EB2322621-020
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.007**	**0.015**	**0.008**	<0.005	**0.010**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7453 10.0_10.5	N7453 10.5_11.0	N7453 11.0_11.5	N7453 11.5_12.0	N7453 12.0_12.5
			Sampling date / time	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2322621-021	EB2322621-022	EB2322621-023	EB2322621-024	EB2322621-025
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.018**	**0.016**	**0.009**	**0.020**	**0.012**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7453 12.5_13.0	N7453 13.0_13.5	N7453 13.5_14.0	N7453 14.0_14.5	N7453 14.5_15.0
			Sampling date / time	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2322621-026	EB2322621-027	EB2322621-028	EB2322621-029	EB2322621-030
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.016**	**0.006**	**0.006**	<0.005	**0.010**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7453 15.0_15.5	N7453 15.5_16.0	N7453 16.0_16.5	N7453 16.5_17.0	N7453 17.0_17.5
			Sampling date / time	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2322621-031	EB2322621-032	EB2322621-033	EB2322621-034	EB2322621-035
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.012**	**0.006**	**0.011**	**0.018**	**0.006**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7453 17.5_18.0	N7453 18.0_18.5	N7453 18.5_19.0	N7453 19.0_19.5	N7453 19.5_20.0
			Sampling date / time	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2322621-036	EB2322621-037	EB2322621-038	EB2322621-039	EB2322621-040
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.018**	**0.040**	**0.007**	**0.012**	**0.043**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7453 20.0_20.5	N7453 20.5_21.0	N7453 21.0_21.5	N7453 21.5_22.0	N7453 22.0_22.5
			Sampling date / time	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2322621-041	EB2322621-042	EB2322621-043	EB2322621-044	EB2322621-045
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.025**	**0.010**	<0.005	**0.021**	<0.005

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7453 22.5_23.0	N7453 23.0_23.5	N7453 23.5_24.0	N7453 24.0_24.5	N7453 24.5_25.0
			Sampling date / time	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2322621-046	EB2322621-047	EB2322621-048	EB2322621-049	EB2322621-050
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.010**	**0.005**	**0.007**	**0.008**	**0.006**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7453 25.0_25.5	N7453 25.5_26.0	N7453 26.0_26.5	N7453 26.5_27.0	N7453 27.0_27.5
			Sampling date / time	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2322621-051	EB2322621-052	EB2322621-053	EB2322621-054	EB2322621-055
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.018**	**0.008**	**0.007**	**0.013**	**0.012**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7453 27.5_28.0	N7453 28.0_28.5	N7453 28.5_29.0	N7453 29.0_29.5	N7453 29.5_30.0
			Sampling date / time	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2322621-056	EB2322621-057	EB2322621-058	EB2322621-059	EB2322621-060
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.016**	<0.005	**0.007**	<0.005	<0.005

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7453 30.0_30.5	N7453 30.5_31.0	N7453 31.0_31.5	N7453 31.5_32.0	----
			Sampling date / time	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	----
Compound	CAS Number	LOR	Unit	EB2322621-061	EB2322621-062	EB2322621-063	EB2322621-064	--------
				Result	Result	Result	Result	----
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.006**	**0.007**	<0.005	**0.008**	**----**

CERTIFICATE OF ANALYSIS

Work Order	: **EB2323298**	Page	: 1 of 14
Client	: **RGS ENVIRONMENTAL CONSULTANTS PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MATT LANDERS	Contact	: Carsten Emrich
Address	: 3/30 LENSWORTH STREET COOPERS PLAINS 4108	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2021048 Yallourn	Date Samples Received	: 31-Jul-2023 12:30
Order number	: ----	Date Analysis Commenced	: 09-Aug-2023
C-O-C number	: ----	Issue Date	: 11-Aug-2023 15:16
Sampler	: BEN FREIDMAN		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 60		
No. of samples analysed	: 60		

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*
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

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: PULP (Matrix: SOIL)			Sample ID	N7525 0.0_0.5	N7525 0.5_1.0	N7525 1.0_1.5	N7525 1.5_2.0	N7525 2.0_2.5
			Sampling date / time	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2323298-001	EB2323298-002	EB2323298-003	EB2323298-004	EB2323298-005
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.018**	**0.008**	**0.015**	**0.008**	**0.017**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7525 2.5_3.0	N7525 3.0_3.5	N7525 3.5_4.0	N7525 5.0_5.5	N7525 5.5_6.0
			Sampling date / time	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2323298-006	EB2323298-007	EB2323298-008	EB2323298-009	EB2323298-010
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.008**	**0.005**	**0.009**	**0.014**	**0.014**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7525 6.0_6.5	N7525 6.5_7.0	N7525 7.0_7.5	N7525 7.5_8.0	N7525 8.0_8.5
			Sampling date / time	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2323298-011	EB2323298-012	EB2323298-013	EB2323298-014	EB2323298-015
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.010**	**0.006**	**0.021**	<0.005	**0.010**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7525 8.5_9.0	N7525 9.0_9.5	N7525 9.5_10.0	N7525 10.0_10.5	N7525 10.5_11.0
			Sampling date / time	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2323298-016	EB2323298-017	EB2323298-018	EB2323298-019	EB2323298-020
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.007**	**0.008**	**0.009**	**0.009**	**0.010**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7525 11.0_11.5	N7525 11.5_12.0	N7525 12.0_12.5	N7525 12.5_13.0	N7525 13.0_13.5
			Sampling date / time	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2323298-021	EB2323298-022	EB2323298-023	EB2323298-024	EB2323298-025
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.009**	**0.007**	<0.005	**0.007**	<0.005

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7525 13.5_14.0	N7525 14.0_14.5	N7525 14.5_15.0	N7525 15.0_15.5	N7525 15.5_16.0
			Sampling date / time	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2323298-026	EB2323298-027	EB2323298-028	EB2323298-029	EB2323298-030
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.006**	**0.006**	**0.014**	**0.011**	**0.015**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7525 16.0_16.5	N7525 16.5_17.0	N7525 17.0_17.5	N7525 17.5_18.0	N7525 18.0_18.5
			Sampling date / time	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2323298-031	EB2323298-032	EB2323298-033	EB2323298-034	EB2323298-035
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.007**	**0.006**	**0.016**	**0.012**	**0.018**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)				Sample ID	N7525 18.5_19.0	N7525 19.0_19.5	N7525 19.5_20.0	N7525 22.0_22.5	N7525 22.5_23.0
				Sampling date / time	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00
Compound	CAS Number	LOR	Unit		EB2323298-036	EB2323298-037	EB2323298-038	EB2323298-039	EB2323298-040
					Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur									
Chromium Reducible Sulphur	----	0.005	%		**0.019**	**0.018**	**0.021**	**0.026**	**0.016**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7525 23.0_23.5	N7525 23.5_24.0	N7525 25.0_25.5	N7525 25.5_26.0	N7525 26.0_26.5
			Sampling date / time	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2323298-041	EB2323298-042	EB2323298-043	EB2323298-044	EB2323298-045
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.015**	**0.022**	**0.013**	**0.020**	**0.025**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7525 26.5_27.0	N7525 27.0_27.5	N7525 27.5_28.0	N7525 28.0_28.5	N7525 28.5_29.0
			Sampling date / time	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2323298-046	EB2323298-047	EB2323298-048	EB2323298-049	EB2323298-050
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.024**	**0.031**	**0.013**	**0.020**	**0.012**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7525 29.0_29.5	N7525 29.5_30.0	N7525 4.0-4.5	N7525 4.5-5.0	N7525 20.0-20.5
			Sampling date / time	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2323298-051	EB2323298-052	EB2323298-061	EB2323298-062	EB2323298-063
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.017**	**0.017**	**0.013**	**0.015**	**0.013**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7525 20.5-21.0	N7525 21.0-21.5	N7525 21.5-22.0	N7525 24.0-24.5	N7525 24.5-25.0
			Sampling date / time	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2323298-064	EB2323298-065	EB2323298-066	EB2323298-067	EB2323298-068
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.015**	**0.018**	**0.014**	**0.012**	**0.018**

CERTIFICATE OF ANALYSIS

Work Order	: **EB2323660**	Page	: 1 of 25
Client	: **RGS ENVIRONMENTAL CONSULTANTS PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MATT LANDERS	Contact	: Carsten Emrich
Address	: 3/30 LENSWORTH STREET COOPERS PLAINS 4108	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2021048 Yallourn	Date Samples Received	: 02-Aug-2023 12:10
Order number	: ----	Date Analysis Commenced	: 09-Aug-2023
C-O-C number	: ----	Issue Date	: 15-Aug-2023 15:49
Sampler	: BEN FREIDMAN		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 113		
No. of samples analysed	: 113		

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.

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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*
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

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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: PULP (Matrix: SOIL)			Sample ID	N7522 0.0_0.5	N7522 0.5_1.0	N7522 1.0_1.5	N7522 1.5_2.0	N7522 2.0_2.5
			Sampling date / time	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00
Compound	CAS Number	LOR	Unit	EB2323660-001	EB2323660-002	EB2323660-003	EB2323660-004	EB2323660-005
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.010**	**0.010**	**0.015**	**0.010**	**0.010**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7522 2.5_3.0	N7522 3.5_4.0	N7522 4.0_4.5	N7522 4.5_5.0	N7522 5.0_5.5
			Sampling date / time	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00
Compound	CAS Number	LOR	Unit	EB2323660-006	EB2323660-007	EB2323660-008	EB2323660-009	EB2323660-010
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.008**	**0.012**	**0.015**	**0.008**	**0.012**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7522 5.5_6.0	N7522 6.0_6.5	N7522 6.5_7.0	N7522 7.0_7.5	N7522 7.5_8.0
			Sampling date / time	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00
Compound	CAS Number	LOR	Unit	EB2323660-011	EB2323660-012	EB2323660-013	EB2323660-014	EB2323660-015
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.013**	**0.014**	**0.015**	**0.013**	**0.017**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7522 8.0_8.5	N7522 8.5_9.0	N7522 9.0_9.5	N7522 9.5_10.0	N7522 10.0_10.5
			Sampling date / time	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00
Compound	CAS Number	LOR	Unit	EB2323660-016	EB2323660-017	EB2323660-018	EB2323660-019	EB2323660-020
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.018**	**0.018**	**0.020**	**0.010**	**0.026**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7522 10.5_11.0	N7522 11.0_11.5	N7522 11.5_12.0	N7522 12.0_12.5	N7522 12.5_13.0
			Sampling date / time	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00
Compound	CAS Number	LOR	Unit	EB2323660-021	EB2323660-022	EB2323660-023	EB2323660-024	EB2323660-025
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.022**	**0.024**	**0.010**	**0.016**	**0.010**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7522 13.0_13.5	N7522 13.5_14.0	N7522 14.0_14.5	N7522 14.5_15.0	N7522 15.0_15.5
			Sampling date / time	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00
Compound	CAS Number	LOR	Unit	EB2323660-026	EB2323660-027	EB2323660-028	EB2323660-029	EB2323660-030
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.010**	**0.017**	**0.016**	**0.012**	**0.007**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7522 15.5_16.0	N7522 16.0_16.5	N7522 16.5_17.0	N7522 17.0_17.5	N7522 17.5_18.0
			Sampling date / time	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00
Compound	CAS Number	LOR	Unit	EB2323660-031	EB2323660-032	EB2323660-033	EB2323660-034	EB2323660-035
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.006**	**0.061**	<0.005	**0.011**	**0.013**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7522 18.0_18.5	N7522 18.5_19.0	N7522 19.0_19.5	N7522 19.5_20.0	N7522 20.0_20.5
			Sampling date / time	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00
Compound	CAS Number	LOR	Unit	EB2323660-036	EB2323660-037	EB2323660-038	EB2323660-039	EB2323660-040
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.014**	<0.005	**0.023**	**0.022**	**0.009**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7522 20.5_21.0	N7522 21.0_21.5	N7522 21.5_22.0	N7522 22.0_22.5	N7522 22.5_23.0
			Sampling date / time	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00
Compound	CAS Number	LOR	Unit	EB2323660-041	EB2323660-042	EB2323660-043	EB2323660-044	EB2323660-045
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.010**	**0.009**	**0.012**	**0.034**	**0.019**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7522 23.0_23.5	N7522 23.5_24.0	N7522 24.0_24.5	N7522 24.5_25.0	N7522 25.0_25.5
			Sampling date / time	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00
Compound	CAS Number	LOR	Unit	EB2323660-046	EB2323660-047	EB2323660-048	EB2323660-049	EB2323660-050
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.027**	**0.058**	**0.029**	**0.036**	**0.112**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7522 25.5_26.0	N7522 26.0_26.5	N7522 26.5_27.0	N7522 27.0_27.5	N7522 27.5_28.0
			Sampling date / time	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00
Compound	CAS Number	LOR	Unit	EB2323660-051	EB2323660-052	EB2323660-053	EB2323660-054	EB2323660-055
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.016**	**0.008**	**0.007**	**0.034**	**0.007**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7522 28.0_28.5	N7522 28.5_29.0	N7522 29.0_29.5	N7522 29.5_30.0	N7522 30.0_30.5
			Sampling date / time	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00
Compound	CAS Number	LOR	Unit	EB2323660-056	EB2323660-057	EB2323660-058	EB2323660-059	EB2323660-060
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	<0.005	**0.006**	<0.005	<0.005	**0.006**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)				Sample ID	N7522 30.5_31.0	N7522 31.0_31.5	N7522 31.5_32.0	N7522 32.0_32.5	N7522 32.5_33.0
				Sampling date / time	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00
Compound	CAS Number	LOR	Unit		EB2323660-061	EB2323660-062	EB2323660-063	EB2323660-064	EB2323660-065
					Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur									
Chromium Reducible Sulphur	----	0.005	%		**0.008**	**0.015**	<0.005	**0.011**	**0.010**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7522 33.0_33.5	N7522 33.5_34.0	N7522 34.0_34.5	N7522 34.5_35.0	N7526 0.0_0.5
			Sampling date / time	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00
Compound	CAS Number	LOR	Unit	EB2323660-066	EB2323660-067	EB2323660-068	EB2323660-069	EB2323660-070
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	<0.005	**0.018**	**0.029**	**0.026**	**0.009**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)				Sample ID	N7526 0.5_1.0	N7526 1.0_1.5	N7526 1.5_2.0	N7526 2.0_2.5	N7526 2.5_3.0
				Sampling date / time	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00
Compound	CAS Number	LOR	Unit		EB2323660-071	EB2323660-072	EB2323660-073	EB2323660-074	EB2323660-075
					Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur									
Chromium Reducible Sulphur	----	0.005	%		<0.005	**0.010**	<0.005	<0.005	**0.007**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7526 3.0_3.5	N7526 3.5_4.0	N7526 4.0_4.5	N7526 4.5_5.0	N7526 5.0_5.5
			Sampling date / time	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00
Compound	CAS Number	LOR	Unit	EB2323660-076	EB2323660-077	EB2323660-078	EB2323660-079	EB2323660-080
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.009**	**0.013**	**0.017**	**0.016**	**0.010**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7526 5.5_6.0	N7526 6.0_6.5	N7526 6.5_7.0	N7526 7.0_7.5	N7526 7.5_8.0
			Sampling date / time	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00
Compound	CAS Number	LOR	Unit	EB2323660-081	EB2323660-082	EB2323660-083	EB2323660-084	EB2323660-085
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	<0.005	**0.014**	**0.006**	**0.007**	**0.009**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7526 8.0_8.5	N7526 8.5_9.0	N7526 9.0_9.5	N7526 9.5_10.0	N7526 10.0_10.5
			Sampling date / time	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00
Compound	CAS Number	LOR	Unit	EB2323660-086	EB2323660-087	EB2323660-088	EB2323660-089	EB2323660-090
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.016**	**0.022**	**0.016**	**0.006**	**0.014**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7526 10.5_11.0	N7526 11.0_11.5	N7526 11.5_12.0	N7526 12.0_12.5	N7526 12.5_13.0
			Sampling date / time	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00
Compound	CAS Number	LOR	Unit	EB2323660-091	EB2323660-092	EB2323660-093	EB2323660-094	EB2323660-095
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.014**	**0.009**	**0.009**	**0.008**	**0.013**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7526 13.0_13.5	N7526 13.5_14.0	N7526 14.0_14.5	N7526 14.5_15.0	N7526 15.0_15.5
			Sampling date / time	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00
Compound	CAS Number	LOR	Unit	EB2323660-096	EB2323660-097	EB2323660-098	EB2323660-099	EB2323660-100
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.013**	**0.011**	**0.014**	**0.013**	**0.018**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7526 15.5_16.0	N7526 16.0_16.5	N7526 16.5_17.0	N7526 17.0_17.5	N7526 17.5_18.0
			Sampling date / time	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00
Compound	CAS Number	LOR	Unit	EB2323660-101	EB2323660-102	EB2323660-103	EB2323660-104	EB2323660-105
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.011**	**0.024**	**0.019**	**0.022**	**0.013**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7526 18.0_18.5	N7526 18.5_19.0	N7526 19.0_19.5	N7526 19.5_20.0	N7526 20.0_20.5
			Sampling date / time	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00
Compound	CAS Number	LOR	Unit	EB2323660-106	EB2323660-107	EB2323660-108	EB2323660-109	EB2323660-110
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.026**	**0.018**	**0.018**	**0.019**	**0.023**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7526 20.5_21.0	N7526 21.0_21.5	N7526 21.5_22.0	----	----
			Sampling date / time	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	----	----
Compound	CAS Number	LOR	Unit	EB2323660-111	EB2323660-112	EB2323660-113	--------	--------
				Result	Result	Result	----	----
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.016**	**0.015**	**0.013**	**----**	**----**

CERTIFICATE OF ANALYSIS

Work Order	: **EB2324491**	Page	: 1 of 11
Client	: **RGS ENVIRONMENTAL CONSULTANTS PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MATT LANDERS	Contact	: Carsten Emrich
Address	: 3/30 LENSWORTH STREET COOPERS PLAINS 4108	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2021048 Yallourn	Date Samples Received	: 09-Aug-2023 16:45
Order number	: ----	Date Analysis Commenced	: 17-Aug-2023
C-O-C number	: ----	Issue Date	: 22-Aug-2023 11:32
Sampler	: BEN FREIDMAN		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 41		
No. of samples analysed	: 41		

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*
Beatriz Llarinas	Senior Chemist - Inorganics	Brisbane Acid Sulphate Soils, Stafford, QLD
Layla Hafner	Acid Sulphate Soils - Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

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.

- ASS: EA013 (ANC) Fizz Rating: 0- None; 1- Slight; 2- Moderate; 3- Strong; 4- Very Strong; 5- Lime.

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7523 1.5-2.0 EB2321650004	N7523 9.0-9.5 EB2321650019	N7523 9.5-10.0 EB2321650020	N7523 14.0-14.5 EB2321650029	N7523 14.5-15.0 EB2321650030
			Sampling date / time	09-Aug-2023 00:00	09-Aug-2023 00:00	09-Aug-2023 00:00	09-Aug-2023 00:00	09-Aug-2023 00:00
Compound	CAS Number	LOR	Unit	EB2324491-001	EB2324491-002	EB2324491-003	EB2324491-004	EB2324491-005
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**5.0**	**5.3**	**5.4**	**4.3**	**4.8**
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	**1.2**	**14.7**	**13.5**	**52.3**	**10.4**
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**56**	**278**	**223**	**748**	**335**
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	<0.5	<0.5	<0.5	<0.5	<0.5
ANC as CaCO3	----	0.1	% CaCO3	<0.1	<0.1	<0.1	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit	**0**	**0**	**0**	**0**	**0**
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	**0.04**	**0.48**	**0.44**	**1.71**	**0.34**
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	**0.84**	**----**	**----**	**11.2**	**10.7**

Analytical Results

Sub-Matrix: **PULP** (Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	N7523 15.0-15.5 EB2321650031	N7523 15.5-16.0 EB2321650032	N7523 17.0-17.5 EB2321650035	N7523 18.5-19.0 EB2321650038	N7523 22.0-22.5 EB2321650045
				Sampling date / time	09-Aug-2023 00:00	09-Aug-2023 00:00	09-Aug-2023 00:00	09-Aug-2023 00:00	09-Aug-2023 00:00
					EB2324491-006	EB2324491-007	EB2324491-008	EB2324491-009	EB2324491-010
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**4.8**	**4.4**	**4.2**	**5.0**	**4.2**
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		**10.4**	**53.2**	**14.4**	**2.0**	**17.7**
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		**319**	**219**	**437**	**134**	**502**
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		<0.5	<0.5	<0.5	**1.7**	<0.5
ANC as CaCO3	----	0.1	% CaCO3		<0.1	<0.1	<0.1	**0.2**	<0.1
Fizz Rating	----	0	Fizz Unit		**0**	**0**	**0**	**0**	**0**
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		**0.34**	**1.74**	**0.47**	**0.12**	**0.58**
EP003: Total Organic Carbon (TOC) in Soil									
Total Organic Carbon	----	0.02	%		**----**	**18.4**	**----**	**----**	**6.06**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7523 22.5-23.0 EB2321650046	N7523 23.0-23.5 EB2321650047	N7523 25.5-26.0 EB2321650052	N7523 29.5-30.0 EB2321650060	N75210 0.0-0.5 EB2321818001
			Sampling date / time	09-Aug-2023 00:00	09-Aug-2023 00:00	09-Aug-2023 00:00	09-Aug-2023 00:00	09-Aug-2023 00:00
Compound	CAS Number	LOR	Unit	EB2324491-011	EB2324491-012	EB2324491-013	EB2324491-014	EB2324491-015
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**4.5**	**5.0**	**5.3**	**5.4**	**6.2**
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	**15.0**	**11.7**	**3.7**	**4.0**	**-0.5**
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**585**	**244**	**157**	**71**	**197**
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	<0.5	**0.5**	<0.5	<0.5	**1.1**
ANC as CaCO3	----	0.1	% CaCO3	<0.1	<0.1	<0.1	<0.1	**0.1**
Fizz Rating	----	0	Fizz Unit	**0**	**0**	**0**	**0**	**0**
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	**0.49**	**0.40**	**0.12**	**0.13**	**0.02**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N75210 2.5-3.0 EB2321818006	N75210 3.5-4.0 EB2321818008	N75210 6.0-6.5 EB2321818011	N75210 7.5-8.0 EB2321818014	N75210 12.0-12.5 EB2321818023
			Sampling date / time	09-Aug-2023 00:00	09-Aug-2023 00:00	09-Aug-2023 00:00	09-Aug-2023 00:00	09-Aug-2023 00:00
Compound	CAS Number	LOR	Unit	EB2324491-016	EB2324491-017	EB2324491-018	EB2324491-019	EB2324491-020
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**5.7**	**5.5**	**5.6**	**5.3**	**5.5**
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	**-1.1**	**-0.7**	**-0.3**	**0.6**	<0.5
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**19**	**31**	**38**	**38**	**32**
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	**1.4**	**1.0**	**0.6**	<0.5	**0.6**
ANC as CaCO3	----	0.1	% CaCO3	**0.1**	**0.1**	<0.1	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit	**0**	**0**	**0**	**0**	**0**
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	**0.01**	**0.01**	**0.01**	**0.02**	**0.02**
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	**----**	**----**	**----**	**----**	**0.07**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N75210 33.0-33.5 EB2321818059	N75210 35.5-36.0 EB2321818064	N75210 37.0-37.5 EB2321818067	N75210 41.5-42.0 EB2321818076	N75210 46.5-47.0 EB2321818086
			Sampling date / time	09-Aug-2023 00:00	09-Aug-2023 00:00	09-Aug-2023 00:00	09-Aug-2023 00:00	09-Aug-2023 00:00
Compound	CAS Number	LOR	Unit	EB2324491-021	EB2324491-022	EB2324491-023	EB2324491-024	EB2324491-025
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**6.5**	**5.8**	**5.5**	**5.5**	**4.5**
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	**-1.2**	<0.5	**0.9**	**1.2**	**9.5**
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**202**	**209**	**258**	**304**	**663**
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	**1.8**	**0.7**	<0.5	<0.5	<0.5
ANC as CaCO3	----	0.1	% CaCO3	**0.2**	<0.1	<0.1	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit	**0**	**0**	**0**	**0**	**0**
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	**0.02**	**0.03**	**0.03**	**0.04**	**0.31**
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	**----**	**----**	**2.35**	**----**	**14.1**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N75210 47.0-47.5 EB2321818087	N75210 48.5-49.0 EB2321818090	N75210 50.0-50.5 EB2321818093	N75210 52.5-53.0 EB2321818098	N7453 0.5-1.0 EB2322621002
			Sampling date / time	09-Aug-2023 00:00	09-Aug-2023 00:00	09-Aug-2023 00:00	09-Aug-2023 00:00	09-Aug-2023 00:00
Compound	CAS Number	LOR	Unit	EB2324491-026	EB2324491-027	EB2324491-028	EB2324491-029	EB2324491-030
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**5.1**	**4.3**	**5.4**	**4.4**	**6.6**
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	**2.8**	**8.0**	**1.5**	**6.6**	**-0.8**
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**376**	**964**	**229**	**190**	**131**
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	<0.5	<0.5	<0.5	**1.4**	**1.4**
ANC as CaCO3	----	0.1	% CaCO3	<0.1	<0.1	<0.1	**0.1**	**0.1**
Fizz Rating	----	0	Fizz Unit	**0**	**0**	**0**	**0**	**0**
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	**0.09**	**0.26**	**0.05**	**0.26**	**0.02**
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	**6.15**	**26.8**	**----**	**46.0**	**----**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7453 2.0-2.5 EB2322621005	N7453 2.5-3.0 EB2322621006	N7453 3.0-3.5 EB2322621007	N7453 3.5-4.0 EB2322621008	N7453 7.0-7.5 EB2322621015
			Sampling date / time	09-Aug-2023 00:00	09-Aug-2023 00:00	09-Aug-2023 00:00	09-Aug-2023 00:00	09-Aug-2023 00:00
Compound	CAS Number	LOR	Unit	EB2324491-031	EB2324491-032	EB2324491-033	EB2324491-034	EB2324491-035
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	8.3	8.4	8.0	7.3	6.5
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	-76.2	-113	-39.0	-29.9	-0.7
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	663	752	752	358	145
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	83.9	125	51.2	38.5	1.0
ANC as CaCO3	----	0.1	% CaCO3	8.6	12.8	5.2	3.9	<0.1
Fizz Rating	----	0	Fizz Unit	2	2	2	1	0
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.25	0.38	0.40	0.28	0.01
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	----	27.8	39.6	46.4	----

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7453 11.0-11.5 EB2322621023	N7453 15.5-16.0 EB2322621032	N7453 19.5-20.0 EB2322621040	N7453 25.0-25.5 EB2322621051	N7453 27.5-28.0 EB2322621056
			Sampling date / time	09-Aug-2023 00:00	09-Aug-2023 00:00	09-Aug-2023 00:00	09-Aug-2023 00:00	09-Aug-2023 00:00
Compound	CAS Number	LOR	Unit	EB2324491-036	EB2324491-037	EB2324491-038	EB2324491-039	EB2324491-040
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	7.4	6.3	4.9	6.3	5.7
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	-6.9	-1.9	3.1	<0.5	0.8
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	217	124	422	154	277
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	8.7	2.2	<0.5	0.6	0.7
ANC as CaCO3	----	0.1	% CaCO3	0.9	0.2	<0.1	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit	1	0	0	0	0
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.06	0.01	0.10	0.02	0.05
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	----	0.31	----	----	5.97

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7453 29.5-30.0 EB2322621060	----	----	----	----
			Sampling date / time	09-Aug-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EB2324491-041	--------	--------	--------	--------
				Result	----	----	----	----
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**6.0**	----	----	----	----
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	**-0.7**	----	----	----	----
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**232**	----	----	----	----
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	**1.3**	----	----	----	----
ANC as CaCO3	----	0.1	% CaCO3	**0.1**	----	----	----	----
Fizz Rating	----	0	Fizz Unit	**0**	----	----	----	----
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	**0.02**	----	----	----	----

CERTIFICATE OF ANALYSIS

Work Order	: **EB2325314**	Page	: 1 of 5
Client	: **RGS ENVIRONMENTAL CONSULTANTS PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MATT LANDERS	Contact	: Carsten Emrich
Address	: 3/30 LENSWORTH STREET COOPERS PLAINS 4108	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2021048 Yallourn	Date Samples Received	: 17-Aug-2023 12:00
Order number	: ----	Date Analysis Commenced	: 21-Aug-2023
C-O-C number	: ----	Issue Date	: 28-Aug-2023 13:42
Sampler	: BEN FREIDMAN		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 5		
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

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*
Beatriz Llarinas	Senior Chemist - Inorganics	Brisbane Inorganics, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD

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.

- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- ALS is not NATA accredited for the performance of EN35: Miscellaneous Leaching procedure.
- ED045G (Chloride): Sample EB2325314-001 (N7523 1.5-2.0) was diluted due to matrix interference. LOR adjusted accordingly.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.

Analytical Results

Sub-Matrix: LEACHATE (Matrix: WATER)			Sample ID	N7523 1.5-2.0	N7523 22.0-22.5	N75210 12.0-12.5	N75210 46.5-47.0	N7453 15.5-16.0
			Sampling date / time	15-Aug-2023 00:00	15-Aug-2023 00:00	15-Aug-2023 00:00	15-Aug-2023 00:00	15-Aug-2023 00:00
Compound	CAS Number	LOR	Unit	EB2325314-001	EB2325314-002	EB2325314-003	EB2325314-004	EB2325314-005
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	4.17	4.25	5.14	4.35	5.01
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	53	418	29	716	125
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	<1	<1	<1	<1
Total Alkalinity as CaCO3	----	1	mg/L	<1	<1	<1	<1	<1
ED038: Acidity								
Acidity as CaCO3	----	1	mg/L	10	24	2	39	2
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	10	173	<1	149	1
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	<5	11	7	97	30
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	<1	9	<1	2	<1
Magnesium	7439-95-4	1	mg/L	<1	26	<1	20	<1
Sodium	7440-23-5	1	mg/L	2	28	5	104	23
Potassium	7440-09-7	1	mg/L	2	1	<1	2	<1
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.25	2.14	0.01	3.45	0.17
Dysprosium	7429-91-6	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Silver	7440-22-4	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic	7440-38-2	0.001	mg/L	<0.001	0.005	<0.001	0.009	<0.001
Bismuth	7440-69-9	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Erbium	7440-52-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Europium	7440-53-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Strontium	7440-24-6	0.001	mg/L	0.023	0.156	0.001	0.100	0.001
Barium	7440-39-3	0.001	mg/L	0.207	0.050	0.039	0.188	0.010
Gadolinium	7440-54-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Titanium	7440-32-6	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	0.02
Beryllium	7440-41-7	0.001	mg/L	0.003	0.001	<0.001	<0.001	<0.001
Gallium	7440-55-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001

Analytical Results

Sub-Matrix: LEACHATE (Matrix: WATER)				Sample ID	N7523 1.5-2.0	N7523 22.0-22.5	N75210 12.0-12.5	N75210 46.5-47.0	N7453 15.5-16.0
				Sampling date / time	15-Aug-2023 00:00	15-Aug-2023 00:00	15-Aug-2023 00:00	15-Aug-2023 00:00	15-Aug-2023 00:00
Compound	CAS Number	LOR	Unit		EB2325314-001	EB2325314-002	EB2325314-003	EB2325314-004	EB2325314-005
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Cadmium	7440-43-9	0.0001	mg/L		**0.0006**	<0.0001	<0.0001	<0.0001	<0.0001
Hafnium	7440-58-6	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Tellurium	22541-49-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	7440-48-4	0.001	mg/L		**0.046**	**0.143**	<0.001	**0.076**	<0.001
Holmium	7440-60-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Uranium	7440-61-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Caesium	7440-46-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	7440-47-3	0.001	mg/L		**0.004**	**0.001**	<0.001	**0.002**	<0.001
Indium	7440-74-6	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		**0.004**	<0.001	<0.001	**0.004**	<0.001
Lanthanum	7439-91-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Rubidium	7440-17-7	0.001	mg/L		**0.032**	**0.011**	<0.001	**0.006**	<0.001
Lithium	7439-93-2	0.001	mg/L		**0.014**	**0.008**	**0.002**	**0.017**	**0.006**
Lutetium	7439-94-3	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
Cerium	7440-45-1	0.001	mg/L		**0.001**	**0.002**	<0.001	**0.002**	<0.001
Manganese	7439-96-5	0.001	mg/L		**0.040**	**1.29**	**0.002**	**0.384**	**0.004**
Neodymium	7440-00-8	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum	7439-98-7	0.001	mg/L		**0.001**	<0.001	<0.001	<0.001	<0.001
Praseodymium	7440-10-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L		**0.050**	**0.031**	<0.001	**0.029**	<0.001
Samarium	7440-19-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	**0.001**	<0.001
Terbium	7440-27-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Antimony	7440-36-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Thulium	7440-30-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Ytterbium	7440-64-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Yttrium	7440-65-5	0.001	mg/L		<0.001	**0.001**	<0.001	**0.001**	<0.001
Thallium	7440-28-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Zirconium	7440-67-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
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		**0.306**	**0.494**	**0.024**	**0.254**	**0.008**

Analytical Results

Sub-Matrix: LEACHATE (Matrix: WATER)				Sample ID	N7523 1.5-2.0	N7523 22.0-22.5	N75210 12.0-12.5	N75210 46.5-47.0	N7453 15.5-16.0
				Sampling date / time	15-Aug-2023 00:00	15-Aug-2023 00:00	15-Aug-2023 00:00	15-Aug-2023 00:00	15-Aug-2023 00:00
Compound	CAS Number	LOR	Unit		EB2325314-001	EB2325314-002	EB2325314-003	EB2325314-004	EB2325314-005
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Iron	7439-89-6	0.05	mg/L		**0.18**	**0.44**	<0.05	**0.36**	**0.06**
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		<0.1	**0.7**	<0.1	**0.3**	<0.1
EN055: Ionic Balance									
ø **Total Anions**	----	0.01	meq/L		**0.21**	**3.91**	**0.20**	**5.84**	**0.87**
ø **Total Cations**	----	0.01	meq/L		**0.14**	**3.83**	**0.22**	**6.32**	**1.00**
ø **Ionic Balance**	----	0.01	%		**----**	**1.03**	**----**	**3.97**	**----**

CERTIFICATE OF ANALYSIS

Work Order	: **EB2326215**	Page	: 1 of 11
Client	: **RGS ENVIRONMENTAL CONSULTANTS PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MATT LANDERS	Contact	: Carsten Emrich
Address	: 3/30 LENSWORTH STREET COOPERS PLAINS 4108	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2021048 Yallourn	Date Samples Received	: 21-Aug-2023 17:08
Order number	: ----	Date Analysis Commenced	: 31-Aug-2023
C-O-C number	: ----	Issue Date	: 06-Sep-2023 17:11
Sampler	: BEN FREIDMAN		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 41		
No. of samples analysed	: 41		

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

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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*
Layla Hafner	Acid Sulphate Soils - Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

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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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.

- ASS: EA013 (ANC) Fizz Rating: 0- None; 1- Slight; 2- Moderate; 3- Strong; 4- Very Strong; 5- Lime.

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7524 0.5-1.0	N7524 1.5-2.0	N7524 9.0-9.5	N7524 10.0-10.5	N7524 13.5-14.0
			Sampling date / time	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2326215-001	EB2326215-002	EB2326215-003	EB2326215-004	EB2326215-005
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**3.6**	**3.7**	**4.3**	**5.9**	**4.0**
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	**11.0**	**42.8**	**1.3**	**-1.2**	**-21.6**
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**938**	**958**	**246**	**148**	**1110**
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	<0.5	<0.5	**2.4**	**1.8**	**37.5**
ANC as CaCO3	----	0.1	% CaCO3	<0.1	<0.1	**0.2**	**0.2**	**3.8**
Fizz Rating	----	0	Fizz Unit	**0**	**0**	**0**	**0**	**1**
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	**0.36**	**1.40**	**0.12**	**0.02**	**0.52**
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	**----**	**3.76**	**----**	**----**	**----**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7524 16.0-16.5	N7524 21.0-21.5	N7524 25.5-26.0	N7524 31.5-32.0	N7524 33.0-33.5
			Sampling date / time	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00	24-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2326215-006	EB2326215-007	EB2326215-008	EB2326215-009	EB2326215-010
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**4.6**	**4.6**	**3.4**	**5.1**	**4.9**
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	**29.4**	**7.0**	**-10.6**	**4.6**	**2.1**
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**685**	**277**	**1400**	**116**	**210**
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	<0.5	<0.5	**38.4**	<0.5	<0.5
ANC as CaCO3	----	0.1	% CaCO3	<0.1	<0.1	**3.9**	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit	**0**	**0**	**1**	**0**	**0**
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	**0.96**	**0.23**	**0.91**	**0.15**	**0.07**
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	**23.0**	**----**	**----**	**3.35**	**----**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7524 34.0-34.5	N7525 9.0-9.5	N7525 16.0-16.5	N7525 22.0-22.5	N7525 27.5-28.0
			Sampling date / time	24-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00
Compound	CAS Number	LOR	Unit	EB2326215-011	EB2326215-012	EB2326215-013	EB2326215-014	EB2326215-015
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**4.8**	**5.1**	**5.1**	**4.7**	**4.5**
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	**8.6**	**0.6**	**0.9**	**2.8**	**3.4**
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**298**	**45**	**47**	**178**	**116**
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	**0.6**	<0.5	<0.5	<0.5	<0.5
ANC as CaCO3	----	0.1	% CaCO3	<0.1	<0.1	<0.1	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit	**0**	**0**	**0**	**0**	**0**
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	**0.30**	**0.02**	**0.03**	**0.09**	**0.11**
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	**45.6**	**0.11**	**----**	**----**	**15.3**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7525 28.5-29.0	N7525 29.5-30.0	N7525 21.5-22.0	N7525 24.0-24.5	N7522 1.0-1.5
			Sampling date / time	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00	01-Aug-2023 00:00
Compound	CAS Number	LOR	Unit	EB2326215-016	EB2326215-017	EB2326215-018	EB2326215-019	EB2326215-020
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**4.6**	**4.8**	**4.8**	**5.0**	**5.1**
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	**9.2**	**10.7**	**2.1**	**1.2**	**0.9**
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**92**	**133**	**102**	**90**	**46**
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	<0.5	<0.5	<0.5	<0.5	<0.5
ANC as CaCO3	----	0.1	% CaCO3	<0.1	<0.1	<0.1	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit	**0**	**0**	**0**	**0**	**0**
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	**0.30**	**0.35**	**0.07**	**0.04**	**0.03**
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	**----**	**34.8**	**----**	**4.47**	**----**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7522 4.5-5.0	N7522 8.0-8.5	N7522 10.0-10.5	N7522 11.0-11.5	N7522 12.5-13.0
			Sampling date / time	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00
Compound	CAS Number	LOR	Unit	EB2326215-021	EB2326215-022	EB2326215-023	EB2326215-024	EB2326215-025
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	5.5	4.7	4.3	4.9	5.9
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	<0.5	2.4	3.7	1.8	0.9
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	26	141	233	108	134
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	<0.5	<0.5	<0.5	<0.5	<0.5
ANC as CaCO3	----	0.1	% CaCO3	<0.1	<0.1	<0.1	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit	0	0	0	0	0
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.01	0.08	0.12	0.06	0.03
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	----	----	19.2	5.38	----

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7522 16.0-16.5	N7522 19.5-20.0	N7522 23.0-23.5	N7522 23.5-24.0	N7522 25.0-25.5
			Sampling date / time	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00
Compound	CAS Number	LOR	Unit	EB2326215-026	EB2326215-027	EB2326215-028	EB2326215-029	EB2326215-030
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	6.0	5.7	5.6	5.4	4.6
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	<0.5	0.6	1.5	4.3	4.9
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	230	190	267	284	565
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	<0.5	<0.5	<0.5	<0.5	<0.5
ANC as CaCO3	----	0.1	% CaCO3	<0.1	<0.1	<0.1	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit	0	0	0	0	0
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.01	0.02	0.05	0.14	0.16
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	----	0.36	5.60	----	7.47

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7522 26.5-27.0	N7522 32.5-33.0	N7526 1.5-2.0	N7526 3.0-3.5	N7526 5.5-6.0
			Sampling date / time	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00
Compound	CAS Number	LOR	Unit	EB2326215-031	EB2326215-032	EB2326215-033	EB2326215-034	EB2326215-035
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**6.0**	**6.0**	**6.0**	**5.0**	**5.1**
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	**0.6**	<0.5	**-6.2**	**1.2**	**0.9**
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**145**	**107**	**60**	**62**	**48**
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	<0.5	**0.5**	**6.8**	<0.5	<0.5
ANC as CaCO3	----	0.1	% CaCO3	<0.1	<0.1	**0.7**	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit	**0**	**0**	**0**	**0**	**0**
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	**0.02**	**0.02**	**0.02**	**0.04**	**0.03**
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	**0.59**	**----**	**----**	**----**	**1.34**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7526 7.0-7.5	N7526 9.0-9.5	N7526 13.0-13.5	N7526 15.5-16.0	N7526 18.0-18.5
			Sampling date / time	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00	01-Aug-2023 00:00
Compound	CAS Number	LOR	Unit	EB2326215-036	EB2326215-037	EB2326215-038	EB2326215-039	EB2326215-040
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**5.0**	**5.2**	**5.0**	**5.0**	**4.2**
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	**0.9**	**1.2**	**0.6**	**1.2**	**2.8**
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**49**	**56**	**38**	**58**	**169**
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	<0.5	<0.5	<0.5	<0.5	<0.5
ANC as CaCO3	----	0.1	% CaCO3	<0.1	<0.1	<0.1	<0.1	<0.1
Fizz Rating	----	0	Fizz Unit	**0**	**0**	**0**	**0**	**0**
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	**0.03**	**0.04**	**0.02**	**0.04**	**0.09**
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	**0.10**	**----**	**----**	**----**	**21.4**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	N7526 20.0-20.5	----	----	----	----
			Sampling date / time	01-Aug-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EB2326215-041	--------	--------	--------	--------
				Result	----	----	----	----
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**4.8**	**----**	**----**	**----**	**----**
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	**11.3**	**----**	**----**	**----**	**----**
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**140**	**----**	**----**	**----**	**----**
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	<0.5	**----**	**----**	**----**	**----**
ANC as CaCO3	----	0.1	% CaCO3	<0.1	**----**	**----**	**----**	**----**
Fizz Rating	----	0	Fizz Unit	**0**	**----**	**----**	**----**	**----**
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	**0.37**	**----**	**----**	**----**	**----**
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	**26.3**	**----**	**----**	**----**	**----**

CERTIFICATE OF ANALYSIS

Work Order	: **EB2326577**	Page	: 1 of 5
Amendment	: **1**		
Client	: **RGS ENVIRONMENTAL CONSULTANTS PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MATT LANDERS	Contact	: Carsten Emrich
Address	: 3/30 LENSWORTH STREET COOPERS PLAINS 4108	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2021048 Yallourn	Date Samples Received	: 28-Aug-2023 11:55
Order number	: ----	Date Analysis Commenced	: 30-Aug-2023
C-O-C number	: ----	Issue Date	: 27-Sep-2023 15:47
Sampler	: BEN FREIDMAN		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 4		
No. of samples analysed	: 4		

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

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Signatories	*Position*	*Accreditation Category*
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD

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~ = Indicates an estimated value.

- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- ALS is not NATA accredited for the performance of EN35: Miscellaneous Leaching procedure.
- Ionic Balance out of acceptable limits for some samples due to analytes not quantified in this report.
- Amendment (27/9): This report has been amended to correct ALS samples ID #3 from N7524 11.0-11.5 to N7522 11.0-11.5 and ALS sample #4 N7524 5.5-6.0 to N7526 5.5-6.0 as per the COC. All analysis results are as per the previous report.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.

Analytical Results

Sub-Matrix: LEACHATE (Matrix: WATER)			Sample ID	N7524 1.5-2.0	N7524 31.5-32.0	N7522 11.0-11.5	N7526 5.5-6.0	----
			Sampling date / time	24-Aug-2023 00:00	24-Aug-2023 00:00	24-Aug-2023 00:00	24-Aug-2023 00:00	----
Compound	CAS Number	LOR	Unit	EB2326577-001	EB2326577-002	EB2326577-003	EB2326577-004	--------
				Result	Result	Result	Result	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**3.30**	**5.71**	**5.93**	**5.66**	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**1240**	**190**	**129**	**122**	----
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	<1	**7**	**6**	**9**	----
Total Alkalinity as CaCO3	----	1	mg/L	<1	**7**	**6**	**9**	----
ED038: Acidity								
Acidity as CaCO3	----	1	mg/L	**427**	**7**	**8**	**5**	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**706**	**38**	**20**	**13**	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**11**	**11**	**9**	**11**	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**24**	**3**	<1	<1	----
Magnesium	7439-95-4	1	mg/L	**42**	**4**	**1**	<1	----
Sodium	7440-23-5	1	mg/L	**34**	**26**	**21**	**20**	----
Potassium	7440-09-7	1	mg/L	**3**	**3**	**1**	<1	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**63.6**	**8.30**	**32.7**	**3.30**	----
Dysprosium	7429-91-6	0.001	mg/L	**0.058**	<0.001	**0.001**	<0.001	----
Silver	7440-22-4	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Arsenic	7440-38-2	0.001	mg/L	**0.007**	**0.002**	**0.002**	<0.001	----
Bismuth	7440-69-9	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Erbium	7440-52-0	0.001	mg/L	**0.029**	<0.001	<0.001	<0.001	----
Boron	7440-42-8	0.05	mg/L	**0.92**	**0.77**	**0.60**	**0.65**	----
Europium	7440-53-1	0.001	mg/L	**0.012**	<0.001	<0.001	<0.001	----
Strontium	7440-24-6	0.001	mg/L	**0.374**	**0.062**	**0.019**	**0.019**	----
Barium	7440-39-3	0.001	mg/L	**0.364**	**0.794**	**0.741**	**0.684**	----
Gadolinium	7440-54-2	0.001	mg/L	**0.064**	<0.001	**0.001**	<0.001	----
Titanium	7440-32-6	0.01	mg/L	<0.01	**0.40**	**1.66**	**0.21**	----
Beryllium	7440-41-7	0.001	mg/L	**0.060**	<0.001	<0.001	<0.001	----

Analytical Results

Sub-Matrix: LEACHATE (Matrix: WATER)				Sample ID	N7524 1.5-2.0	N7524 31.5-32.0	N7522 11.0-11.5	N7526 5.5-6.0	----
				Sampling date / time	24-Aug-2023 00:00	24-Aug-2023 00:00	24-Aug-2023 00:00	24-Aug-2023 00:00	----
Compound	CAS Number	LOR	Unit		EB2326577-001	EB2326577-002	EB2326577-003	EB2326577-004	--------
					Result	Result	Result	Result	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Gallium	7440-55-3	0.001	mg/L		**0.015**	**0.002**	**0.008**	<0.001	**----**
Cadmium	7440-43-9	0.0001	mg/L		**0.0019**	**0.0001**	**0.0001**	**0.0001**	**----**
Hafnium	7440-58-6	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	**----**
Tellurium	22541-49-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	**----**
Cobalt	7440-48-4	0.001	mg/L		**4.37**	**0.018**	**0.006**	<0.001	**----**
Holmium	7440-60-0	0.001	mg/L		**0.011**	<0.001	<0.001	<0.001	**----**
Uranium	7440-61-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	**----**
Caesium	7440-46-2	0.001	mg/L		<0.001	<0.001	**0.001**	<0.001	**----**
Chromium	7440-47-3	0.001	mg/L		**0.024**	**0.006**	**0.025**	**0.003**	**----**
Indium	7440-74-6	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	**----**
Copper	7440-50-8	0.001	mg/L		**0.008**	**0.003**	**0.002**	<0.001	**----**
Lanthanum	7439-91-0	0.001	mg/L		**0.403**	**0.002**	**0.008**	**0.001**	**----**
Rubidium	7440-17-7	0.001	mg/L		**0.027**	**0.009**	**0.009**	**0.002**	**----**
Lithium	7439-93-2	0.001	mg/L		**0.014**	**0.008**	**0.008**	**0.003**	**----**
Lutetium	7439-94-3	0.001	mg/L		**0.002**	<0.001	<0.001	<0.001	**----**
Thorium	7440-29-1	0.001	mg/L		<0.001	<0.001	**0.003**	<0.001	**----**
Cerium	7440-45-1	0.001	mg/L		**0.744**	**0.005**	**0.017**	**0.002**	**----**
Manganese	7439-96-5	0.001	mg/L		**1.13**	**0.421**	**0.017**	**0.018**	**----**
Neodymium	7440-00-8	0.001	mg/L		**0.244**	**0.002**	**0.007**	**0.001**	**----**
Molybdenum	7439-98-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	**----**
Praseodymium	7440-10-0	0.001	mg/L		**0.069**	<0.001	**0.002**	<0.001	**----**
Nickel	7440-02-0	0.001	mg/L		**1.59**	**0.010**	**0.012**	**0.001**	**----**
Samarium	7440-19-9	0.001	mg/L		**0.043**	<0.001	**0.002**	<0.001	**----**
Lead	7439-92-1	0.001	mg/L		**0.020**	**0.002**	**0.005**	<0.001	**----**
Terbium	7440-27-9	0.001	mg/L		**0.010**	<0.001	<0.001	<0.001	**----**
Antimony	7440-36-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	**----**
Thulium	7440-30-4	0.001	mg/L		**0.003**	<0.001	<0.001	<0.001	**----**
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	**----**
Ytterbium	7440-64-4	0.001	mg/L		**0.018**	<0.001	<0.001	<0.001	**----**
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	**0.002**	**0.001**	**----**
Yttrium	7440-65-5	0.001	mg/L		**0.450**	**0.002**	**0.006**	<0.001	**----**
Thallium	7440-28-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	**----**
Zirconium	7440-67-7	0.005	mg/L		<0.005	**0.009**	**0.036**	<0.005	**----**
Vanadium	7440-62-2	0.01	mg/L		**0.06**	**0.01**	**0.03**	<0.01	**----**

Analytical Results

Sub-Matrix: LEACHATE (Matrix: WATER)				Sample ID	N7524 1.5-2.0	N7524 31.5-32.0	N7522 11.0-11.5	N7526 5.5-6.0	----
				Sampling date / time	24-Aug-2023 00:00	24-Aug-2023 00:00	24-Aug-2023 00:00	24-Aug-2023 00:00	----
Compound	CAS Number	LOR	Unit		EB2326577-001	EB2326577-002	EB2326577-003	EB2326577-004	--------
					Result	Result	Result	Result	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Zinc	7440-66-6	0.005	mg/L		**11.1**	**0.766**	**0.786**	**0.682**	**----**
Iron	7439-89-6	0.05	mg/L		**19.2**	**3.29**	**4.92**	**0.95**	**----**
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**1.4**	**0.2**	**0.2**	**0.3**	**----**
EN055: Ionic Balance									
ø **Total Anions**	----	0.01	meq/L		**15.0**	**1.24**	**0.79**	**0.76**	**----**
ø **Total Cations**	----	0.01	meq/L		**14.6**	**----**	**----**	**----**	**----**
ø **Total Cations**	----	0.01	meq/L		**----**	**1.69**	**1.02**	**0.87**	**----**
ø **Ionic Balance**	----	0.01	%		**1.35**	**----**	**----**	**----**	**----**

CERTIFICATE OF ANALYSIS

Work Order	: **EB2330523**	Page	: 1 of 12
Client	: **RGS ENVIRONMENTAL CONSULTANTS PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MATT LANDERS	Contact	: Carsten Emrich
Address	: 3/30 LENSWORTH STREET COOPERS PLAINS 4108	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2021048 Yallourn	Date Samples Received	: 28-Sep-2023 19:50
Order number	: ----	Date Analysis Commenced	: 04-Oct-2023
C-O-C number	: ----	Issue Date	: 26-Oct-2023 13:11
Sampler	: V. HARMAN		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 18		
No. of samples analysed	: 18		

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*
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Soil Preparation, Stafford, QLD

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.

- ED041G (Sulfate as SO4): Sample 2021048_0021 (EB2330523-015) was diluted due to matrix interference. LOR adjusted accordingly.
- ALS is not NATA accredited for the performance of EN35: Miscellaneous Leaching procedure.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.

Analytical Results

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

Compound	CAS Number	LOR	Unit	Sample ID	2021048_0001 RGS_YTF_WW_1	2021048_0005 RGS_YTF_WW_03/2	2021048_0013 RGS_YTF_WW_05/2	2021048_0014 RGS_YTF_WW_05/3	2021048_0031 RGS_YMF_WW_05/3
				Sampling date / time	28-Sep-2023 00:00	28-Sep-2023 00:00	28-Sep-2023 00:00	28-Sep-2023 00:00	28-Sep-2023 00:00
					EB2330523-001	EB2330523-002	EB2330523-003	EB2330523-004	EB2330523-005
					Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		**26**	<1	**4**	**6**	**1**
Total Alkalinity as CaCO3	----	1	mg/L		**26**	<1	**4**	**6**	**1**
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		**2**	**110**	**17**	**39**	**29**
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		**15**	**24**	**395**	**36**	**15**
ED093T: Total Major Cations									
Calcium	7440-70-2	1	mg/L		**6**	**5**	**12**	**3**	**2**
Magnesium	7439-95-4	1	mg/L		**5**	**28**	**36**	**8**	**4**
Sodium	7440-23-5	1	mg/L		**17**	**47**	**147**	**28**	**14**
Potassium	7440-09-7	1	mg/L		**3**	**3**	**10**	**3**	**1**
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**0.2**	**0.2**	**0.3**	**0.3**	**0.2**

Analytical Results

Sub-Matrix: LEACHATE (Matrix: WATER)

Compound	CAS Number	LOR	Unit	Sample ID	2021048_0037 RGS_YEF_WW_01/4	2021048_0045 RGS_YEF_WW_05/01	2021048_0049 RGS_YMF_C_02	2021048_0053 RGS_YMF_C_06	2021048_0057 RGS_YMF_C_10
				Sampling date / time	28-Sep-2023 00:00	28-Sep-2023 00:00	28-Sep-2023 00:00	28-Sep-2023 00:00	28-Sep-2023 00:00
					EB2330523-006	EB2330523-007	EB2330523-008	EB2330523-009	EB2330523-010
					Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		<1	**32**	<1	<1	<1
Total Alkalinity as CaCO3	----	1	mg/L		<1	**32**	<1	<1	<1
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		**8**	**12**	**57**	**47**	**51**
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		**5**	**19**	**47**	**102**	**21**
ED093T: Total Major Cations									
Calcium	7440-70-2	1	mg/L		**2**	**4**	**3**	**4**	**3**
Magnesium	7439-95-4	1	mg/L		**10**	**4**	**16**	**19**	**17**
Sodium	7440-23-5	1	mg/L		**57**	**28**	**69**	**95**	**57**
Potassium	7440-09-7	1	mg/L		**4**	**3**	**3**	**4**	**3**
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**0.4**	**0.3**	**0.5**	**0.6**	**0.3**

Analytical Results

Sub-Matrix: LEACHATE (Matrix: WATER)			Sample ID	2021048_0060 RGS_YMF_C_13	2021048_0064 RGS_YMF_C_17	2021048_0065 RGS_YMF_C_18	2021048_0008 RGS_YTF_WW_04/1	2021048_0021 RGS_YTF_WW_06/6
			Sampling date / time	28-Sep-2023 00:00	28-Sep-2023 00:00	28-Sep-2023 00:00	28-Sep-2023 00:00	28-Sep-2023 00:00
Compound	CAS Number	LOR	Unit	EB2330523-011	EB2330523-012	EB2330523-013	EB2330523-014	EB2330523-015
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	----	----	----	**6.03**	**4.43**
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	----	----	----	**136**	**124**
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	<1	<1	**4**	<1
Total Alkalinity as CaCO3	----	1	mg/L	<1	<1	<1	**4**	<1
ED038: Acidity								
Acidity as CaCO3	----	1	mg/L	----	----	----	**4**	**32**
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**29**	**97**	**319**	**20**	<20
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**16**	**61**	**47**	**15**	**23**
ED093T: Total Major Cations								
Calcium	7440-70-2	1	mg/L	**2**	**5**	**8**	**2**	<1
Magnesium	7439-95-4	1	mg/L	**16**	**35**	**64**	**3**	**1**
Sodium	7440-23-5	1	mg/L	**56**	**91**	**86**	**16**	**15**
Potassium	7440-09-7	1	mg/L	**3**	**4**	**3**	**4**	**3**
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	**0.04**	**1.43**
Dysprosium	7429-91-6	0.001	mg/L	----	----	----	<0.001	<0.001
Silver	7440-22-4	0.001	mg/L	----	----	----	<0.001	<0.001
Arsenic	7440-38-2	0.001	mg/L	----	----	----	<0.001	<0.001
Bismuth	7440-69-9	0.001	mg/L	----	----	----	<0.001	<0.001
Erbium	7440-52-0	0.001	mg/L	----	----	----	<0.001	<0.001
Boron	7440-42-8	0.05	mg/L	----	----	----	**0.43**	**1.16**
Europium	7440-53-1	0.001	mg/L	----	----	----	<0.001	<0.001
Strontium	7440-24-6	0.001	mg/L	----	----	----	**0.027**	**0.027**
Barium	7440-39-3	0.001	mg/L	----	----	----	**1.22**	**1.23**
Gadolinium	7440-54-2	0.001	mg/L	----	----	----	<0.001	<0.001
Titanium	7440-32-6	0.01	mg/L	----	----	----	<0.01	**0.09**
Beryllium	7440-41-7	0.001	mg/L	----	----	----	<0.001	<0.001

Analytical Results

Sub-Matrix: LEACHATE (Matrix: WATER)

Compound	CAS Number	LOR	Unit	Sample ID	2021048_0060 RGS_YMF_C_13	2021048_0064 RGS_YMF_C_17	2021048_0065 RGS_YMF_C_18	2021048_0008 RGS_YTF_WW_04/1	2021048_0021 RGS_YTF_WW_06/6
				Sampling date / time	28-Sep-2023 00:00	28-Sep-2023 00:00	28-Sep-2023 00:00	28-Sep-2023 00:00	28-Sep-2023 00:00
					EB2330523-011	EB2330523-012	EB2330523-013	EB2330523-014	EB2330523-015
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Gallium	7440-55-3	0.001	mg/L		----	----	----	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L		----	----	----	**0.0002**	**0.0002**
Hafnium	7440-58-6	0.01	mg/L		----	----	----	<0.01	<0.01
Tellurium	22541-49-7	0.005	mg/L		----	----	----	<0.005	<0.005
Cobalt	7440-48-4	0.001	mg/L		----	----	----	**0.001**	<0.001
Holmium	7440-60-0	0.001	mg/L		----	----	----	<0.001	<0.001
Uranium	7440-61-1	0.001	mg/L		----	----	----	<0.001	<0.001
Caesium	7440-46-2	0.001	mg/L		----	----	----	<0.001	<0.001
Chromium	7440-47-3	0.001	mg/L		----	----	----	**0.001**	**0.002**
Indium	7440-74-6	0.001	mg/L		----	----	----	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		----	----	----	<0.001	**0.002**
Lanthanum	7439-91-0	0.001	mg/L		----	----	----	<0.001	<0.001
Rubidium	7440-17-7	0.001	mg/L		----	----	----	**0.001**	**0.006**
Lithium	7439-93-2	0.001	mg/L		----	----	----	**0.001**	**0.002**
Lutetium	7439-94-3	0.001	mg/L		----	----	----	<0.001	<0.001
Thorium	7440-29-1	0.001	mg/L		----	----	----	<0.001	<0.001
Cerium	7440-45-1	0.001	mg/L		----	----	----	<0.001	<0.001
Manganese	7439-96-5	0.001	mg/L		----	----	----	**0.054**	**0.035**
Neodymium	7440-00-8	0.001	mg/L		----	----	----	<0.001	<0.001
Molybdenum	7439-98-7	0.001	mg/L		----	----	----	<0.001	<0.001
Praseodymium	7440-10-0	0.001	mg/L		----	----	----	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L		----	----	----	**0.002**	**0.001**
Samarium	7440-19-9	0.001	mg/L		----	----	----	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L		----	----	----	<0.001	**0.002**
Terbium	7440-27-9	0.001	mg/L		----	----	----	<0.001	<0.001
Antimony	7440-36-0	0.001	mg/L		----	----	----	<0.001	<0.001
Thulium	7440-30-4	0.001	mg/L		----	----	----	<0.001	<0.001
Selenium	7782-49-2	0.01	mg/L		----	----	----	<0.01	<0.01
Ytterbium	7440-64-4	0.001	mg/L		----	----	----	<0.001	<0.001
Tin	7440-31-5	0.001	mg/L		----	----	----	<0.001	<0.001
Yttrium	7440-65-5	0.001	mg/L		----	----	----	<0.001	<0.001
Thallium	7440-28-0	0.001	mg/L		----	----	----	<0.001	<0.001
Zirconium	7440-67-7	0.005	mg/L		----	----	----	<0.005	<0.005
Vanadium	7440-62-2	0.01	mg/L		----	----	----	<0.01	<0.01

Analytical Results

Sub-Matrix: LEACHATE (Matrix: WATER)				Sample ID	2021048_0060 RGS_YMF_C_13	2021048_0064 RGS_YMF_C_17	2021048_0065 RGS_YMF_C_18	2021048_0008 RGS_YTF_WW_04/1	2021048_0021 RGS_YTF_WW_06/6
				Sampling date / time	28-Sep-2023 00:00	28-Sep-2023 00:00	28-Sep-2023 00:00	28-Sep-2023 00:00	28-Sep-2023 00:00
Compound	CAS Number	LOR	Unit		EB2330523-011	EB2330523-012	EB2330523-013	EB2330523-014	EB2330523-015
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Zinc	7440-66-6	0.005	mg/L		**----**	**----**	**----**	**0.245**	**1.20**
Iron	7439-89-6	0.05	mg/L		**----**	**----**	**----**	**0.24**	**1.36**
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**0.2**	**0.2**	**1.0**	**0.1**	**0.2**

Analytical Results

Sub-Matrix: LEACHATE (Matrix: WATER)			Sample ID	2021048_0040 RGS_YEF_WW_02/3	N7453 3.0-3.5 EB2324491033	----	----	----
			Sampling date / time	28-Sep-2023 00:00	09-Aug-2023 00:00	----	----	----
Compound	CAS Number	LOR	Unit	EB2330523-016	EB2330523-017	--------	--------	--------
				Result	Result	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**3.62**	**8.15**	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**412**	**1070**	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	**252**	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	<1	**252**	----	----	----
ED038: Acidity								
Acidity as CaCO3	----	1	mg/L	**177**	**1**	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**10**	**306**	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**5**	**16**	----	----	----
ED093T: Total Major Cations								
Calcium	7440-70-2	1	mg/L	**2**	**8**	----	----	----
Magnesium	7439-95-4	1	mg/L	**12**	**149**	----	----	----
Sodium	7440-23-5	1	mg/L	**43**	**21**	----	----	----
Potassium	7440-09-7	1	mg/L	**3**	**4**	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**2.42**	<0.01	----	----	----
Dysprosium	7429-91-6	0.001	mg/L	<0.001	<0.001	----	----	----
Silver	7440-22-4	0.001	mg/L	<0.001	<0.001	----	----	----
Arsenic	7440-38-2	0.001	mg/L	**0.002**	<0.001	----	----	----
Bismuth	7440-69-9	0.001	mg/L	<0.001	<0.001	----	----	----
Erbium	7440-52-0	0.001	mg/L	<0.001	<0.001	----	----	----
Boron	7440-42-8	0.05	mg/L	**0.96**	**1.58**	----	----	----
Europium	7440-53-1	0.001	mg/L	<0.001	<0.001	----	----	----
Strontium	7440-24-6	0.001	mg/L	**0.047**	**0.178**	----	----	----
Barium	7440-39-3	0.001	mg/L	**1.70**	**0.690**	----	----	----
Gadolinium	7440-54-2	0.001	mg/L	<0.001	<0.001	----	----	----
Titanium	7440-32-6	0.01	mg/L	<0.01	<0.01	----	----	----
Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	----	----	----

Analytical Results

Sub-Matrix: LEACHATE (Matrix: WATER)				Sample ID	2021048_0040 RGS_YEF_WW_02/3	N7453 3.0-3.5 EB2324491033	----	----	----
				Sampling date / time	28-Sep-2023 00:00	09-Aug-2023 00:00	----	----	----
Compound	CAS Number	LOR	Unit		EB2330523-016	EB2330523-017	--------	--------	--------
					Result	Result	----	----	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Gallium	7440-55-3	0.001	mg/L		<0.001	<0.001	----	----	----
Cadmium	7440-43-9	0.0001	mg/L		**0.0003**	**0.0001**	----	----	----
Hafnium	7440-58-6	0.01	mg/L		<0.01	<0.01	----	----	----
Tellurium	22541-49-7	0.005	mg/L		<0.005	<0.005	----	----	----
Cobalt	7440-48-4	0.001	mg/L		**0.001**	<0.001	----	----	----
Holmium	7440-60-0	0.001	mg/L		<0.001	<0.001	----	----	----
Uranium	7440-61-1	0.001	mg/L		<0.001	<0.001	----	----	----
Caesium	7440-46-2	0.001	mg/L		<0.001	<0.001	----	----	----
Chromium	7440-47-3	0.001	mg/L		**0.002**	<0.001	----	----	----
Indium	7440-74-6	0.001	mg/L		<0.001	<0.001	----	----	----
Copper	7440-50-8	0.001	mg/L		**0.002**	<0.001	----	----	----
Lanthanum	7439-91-0	0.001	mg/L		<0.001	<0.001	----	----	----
Rubidium	7440-17-7	0.001	mg/L		**0.008**	**0.015**	----	----	----
Lithium	7439-93-2	0.001	mg/L		**0.004**	**0.001**	----	----	----
Lutetium	7439-94-3	0.001	mg/L		<0.001	<0.001	----	----	----
Thorium	7440-29-1	0.001	mg/L		<0.001	<0.001	----	----	----
Cerium	7440-45-1	0.001	mg/L		<0.001	<0.001	----	----	----
Manganese	7439-96-5	0.001	mg/L		**0.266**	**0.039**	----	----	----
Neodymium	7440-00-8	0.001	mg/L		<0.001	<0.001	----	----	----
Molybdenum	7439-98-7	0.001	mg/L		<0.001	**0.043**	----	----	----
Praseodymium	7440-10-0	0.001	mg/L		<0.001	<0.001	----	----	----
Nickel	7440-02-0	0.001	mg/L		**0.002**	**0.002**	----	----	----
Samarium	7440-19-9	0.001	mg/L		<0.001	<0.001	----	----	----
Lead	7439-92-1	0.001	mg/L		**0.003**	<0.001	----	----	----
Terbium	7440-27-9	0.001	mg/L		<0.001	<0.001	----	----	----
Antimony	7440-36-0	0.001	mg/L		<0.001	<0.001	----	----	----
Thulium	7440-30-4	0.001	mg/L		<0.001	<0.001	----	----	----
Selenium	7782-49-2	0.01	mg/L		<0.01	**0.04**	----	----	----
Ytterbium	7440-64-4	0.001	mg/L		<0.001	<0.001	----	----	----
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	----	----	----
Yttrium	7440-65-5	0.001	mg/L		<0.001	<0.001	----	----	----
Thallium	7440-28-0	0.001	mg/L		<0.001	<0.001	----	----	----
Zirconium	7440-67-7	0.005	mg/L		**0.005**	<0.005	----	----	----
Vanadium	7440-62-2	0.01	mg/L		<0.01	<0.01	----	----	----

Analytical Results

Sub-Matrix: LEACHATE (Matrix: WATER)				Sample ID	2021048_0040 RGS_YEF_WW_02/3	N7453 3.0-3.5 EB2324491033	----	----	----
				Sampling date / time	28-Sep-2023 00:00	09-Aug-2023 00:00	----	----	----
Compound	CAS Number	LOR	Unit		EB2330523-016	EB2330523-017	--------	--------	--------
					Result	Result	----	----	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Zinc	7440-66-6	0.005	mg/L		**1.29**	**0.277**	**----**	**----**	**----**
Iron	7439-89-6	0.05	mg/L		**9.40**	<0.05	**----**	**----**	**----**
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**0.3**	**0.4**	**----**	**----**	**----**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	2021048_0008 RGS_YTF_WW_04/1	2021048_0040 RGS_YEF_WW_02/3	----	----	----
			Sampling date / time	28-Sep-2023 00:00	28-Sep-2023 00:00	----	----	----
Compound	CAS Number	LOR	Unit	EB2330523-014	EB2330523-016	--------	--------	--------
				Result	Result	----	----	----
ED093T: Total Major Cations								
Calcium	7440-70-2	50	mg/kg	**130**	**480**	**----**	**----**	**----**
Magnesium	7439-95-4	50	mg/kg	**140**	**770**	**----**	**----**	**----**
Sodium	7440-23-5	50	mg/kg	<50	**260**	**----**	**----**	**----**
Potassium	7440-09-7	50	mg/kg	**120**	**50**	**----**	**----**	**----**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	2021048_0021 RGS_YTF_WW_06/6	pH and EC of DI water	----	----	----
			Sampling date / time	28-Sep-2023 00:00	28-Sep-2023 00:00	----	----	----
Compound	CAS Number	LOR	Unit	EB2330523-015	EB2330523-018	--------	--------	--------
				Result	Result	----	----	----
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**----**	**5.2**	**----**	**----**	**----**
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**----**	<1	**----**	**----**	**----**
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	**27.6**	**----**	**----**	**----**	**----**
ED093T: Total Major Cations								
Calcium	7440-70-2	50	mg/kg	**760**	**----**	**----**	**----**	**----**
Magnesium	7439-95-4	50	mg/kg	**680**	**----**	**----**	**----**	**----**
Sodium	7440-23-5	50	mg/kg	**120**	**----**	**----**	**----**	**----**
Potassium	7440-09-7	50	mg/kg	**100**	**----**	**----**	**----**	**----**

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EM2207630**	Page	: 1 of 51
Client	: **RGS ENVIRONMENTAL CONSULTANTS PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: MATT LANDERS	Contact	: Customer Services EM
Address	: 3/30 LENSWORTH STREET COOPERS PLAINS 4107	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: 07 3344 1222	Telephone	: +61-3-8549 9600
Project	: 2021048	Date Samples Received	: 28-Apr-2022 10:40
Order number	: ----	Date Analysis Commenced	: 29-Apr-2022
C-O-C number	: ----	Issue Date	: 06-May-2022 16:11
Sampler	: ----		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 58		
No. of samples analysed	: 58		

ilac-MRA NATA
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*
Dilani Fernando	Laboratory Coordinator	Melbourne Inorganics, Springvale, VIC
Nikki Stepniewski	Senior Inorganic Instrument Chemist	Melbourne Inorganics, Springvale, VIC

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 Contact 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.

- EG020-T: Metals for EM2207630 #3 #6, #9, #21, #33, #36, #39, #42, #45, #48 and #58 have been diluted prior to analysis due to sample matrix. LORs have been accordingly.
- EG020T: EM2207630 #48, a dilution was required prior to the analysis of Total Metals due to sample matrix. The LOR's have been raised accordingly.
- EG020F: EM2207630 #55-56, the result for Dissolved Metals has been confirmed by re-preparation and re-analysis.
- It is recognised that total metals are less than dissolved metals for EM2207630. However, the difference is within experimental variation of the methods.
- Samples were filtered through a 0.45um filter prior to the dissolved metals analysis.
- EG035T:EM2207630 #1,#3,#6,#9,#12,#15,#18,#21,#24,#27,#30,#33,#36,#39,#42,#45,#48,#51-53,#56-57 particular samples required dilution prior to extraction due to matrix interferences. LOR values have been adjusted accordingly.
- EP006:EM2207630 #48-50 Particular samples required dilution prior to extraction due to matrix interferences. LOR values have been adjusted accordingly.
- EG020-T: EM2207630 #1 Poor duplicate precision for iron due to sample heterogeneity.
- EG035T: EM2207630#48 Sample results for total mercury confirmed by re-extraction and re-analysis.
- EG020-T: EM2207630 #1 Poor matrix spike recovery for metals due to sample matrix. Confirmed by re-extraction and re-analysis.
- EG020-F: EM2207630 #1, #11 and #21 Poor matrix spike recovery for metals due to sample matrix.

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	RGS_YTF_WW_0-1 2021048_WW01	RGS_YTF_WW_30-1 2021048_WW02	RGS_YTF_WW_0-2 2021048_WW03	RGS_YTF_WW_15-2 2021048_WW04	RGS_YTF_WW_30-2 2021048_WW05
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
					EM2207630-001	EM2207630-002	EM2207630-003	EM2207630-004	EM2207630-005
					Result	Result	Result	Result	Result
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		**6.31**	**6.31**	**4.07**	**4.13**	**4.06**
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		**145**	**144**	**217**	**174**	**171**
EA075: Redox Potential									
Redox Potential	----	0.1	mV		**9.9**	**10.7**	**127**	**92.4**	**132**
pH Redox	----	0.01	pH Unit		**6.31**	**6.31**	**4.07**	**4.13**	**4.06**
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		**14**	**15**	<1	<1	<1
Total Alkalinity as CaCO3	----	1	mg/L		**14**	**15**	<1	<1	<1
ED038: Acidity									
Acidity as CaCO3	----	1	mg/L		**14**	<1	**20**	**14**	**16**
ED093T: Total Major Cations									
Calcium	7440-70-2	1	mg/L		**15**	**4**	**14**	**3**	**2**
Magnesium	7439-95-4	1	mg/L		**12**	**4**	**23**	**6**	**3**
Sodium	7440-23-5	1	mg/L		**19**	**18**	**22**	**18**	**17**
Potassium	7440-09-7	1	mg/L		**6**	**2**	**1**	<1	<1
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**0.01**	<0.01	**0.13**	**0.16**	**0.13**
Dysprosium	7429-91-6	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Silver	7440-22-4	0.001	mg/L		**0.001**	<0.001	<0.001	<0.001	<0.001
Arsenic	7440-38-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	7440-69-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Erbium	7440-52-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Boron	7440-42-8	0.05	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05
Europium	7440-53-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Strontium	7440-24-6	0.001	mg/L		**0.028**	**0.029**	**0.008**	**0.005**	**0.004**
Barium	7440-39-3	0.001	mg/L		**0.008**	**0.009**	**0.008**	**0.007**	**0.006**
Gadolinium	7440-54-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Titanium	7440-32-6	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Beryllium	7440-41-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Gallium	7440-55-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	RGS_YTF_WW_0-1 2021048_WW01	RGS_YTF_WW_30-1 2021048_WW02	RGS_YTF_WW_0-2 2021048_WW03	RGS_YTF_WW_15-2 2021048_WW04	RGS_YTF_WW_30-2 2021048_WW05
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
					EM2207630-001	EM2207630-002	EM2207630-003	EM2207630-004	EM2207630-005
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Hafnium	7440-58-6	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Tellurium	22541-49-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	7440-48-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Holmium	7440-60-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Uranium	7440-61-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Caesium	7440-46-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Indium	7440-74-6	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lanthanum	7439-91-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Rubidium	7440-17-7	0.001	mg/L		<0.001	<0.001	**0.002**	**0.002**	**0.001**
Lithium	7439-93-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lutetium	7439-94-3	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
Cerium	7440-45-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	7439-96-5	0.001	mg/L		<0.001	**0.002**	**0.020**	**0.010**	**0.010**
Neodymium	7440-00-8	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum	7439-98-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Praseodymium	7440-10-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Samarium	7440-19-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Terbium	7440-27-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Antimony	7440-36-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Thulium	7440-30-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Ytterbium	7440-64-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Yttrium	7440-65-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Thallium	7440-28-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Zirconium	7440-67-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
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	<0.005	<0.005	<0.005	<0.005
Iron	7439-89-6	0.05	mg/L		<0.05	<0.05	**0.06**	<0.05	<0.05

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	RGS_YTF_WW_0-1 2021048_WW01	RGS_YTF_WW_30-1 2021048_WW02	RGS_YTF_WW_0-2 2021048_WW03	RGS_YTF_WW_15-2 2021048_WW04	RGS_YTF_WW_30-2 2021048_WW05
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
					EM2207630-001	EM2207630-002	EM2207630-003	EM2207630-004	EM2207630-005
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**21.8**	----	**18.4**	----	----
Dysprosium	7429-91-6	0.001	mg/L		**0.003**	----	<0.001	----	----
Silver	7440-22-4	0.001	mg/L		**0.001**	----	**0.002**	----	----
Arsenic	7440-38-2	0.001	mg/L		**0.003**	----	**0.001**	----	----
Bismuth	7440-69-9	0.001	mg/L		<0.001	----	**0.101**	----	----
Erbium	7440-52-0	0.001	mg/L		**0.001**	----	<0.001	----	----
Boron	7440-42-8	0.05	mg/L		<0.05	----	**0.06**	----	----
Europium	7440-53-1	0.001	mg/L		**0.001**	----	<0.001	----	----
Strontium	7440-24-6	0.001	mg/L		**0.087**	----	**0.209**	----	----
Barium	7440-39-3	0.001	mg/L		**0.215**	----	**0.727**	----	----
Gadolinium	7440-54-2	0.001	mg/L		**0.004**	----	<0.001	----	----
Titanium	7440-32-6	0.01	mg/L		**0.05**	----	**0.05**	----	----
Beryllium	7440-41-7	0.001	mg/L		**0.001**	----	**0.003**	----	----
Gallium	7440-55-3	0.001	mg/L		**0.006**	----	<0.001	----	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	----	**0.0001**	----	----
Hafnium	7440-58-6	0.01	mg/L		<0.01	----	<0.01	----	----
Tellurium	22541-49-7	0.005	mg/L		<0.005	----	**0.007**	----	----
Cobalt	7440-48-4	0.001	mg/L		**0.011**	----	**0.023**	----	----
Holmium	7440-60-0	0.001	mg/L		<0.001	----	<0.001	----	----
Uranium	7440-61-1	0.001	mg/L		**0.001**	----	<0.001	----	----
Caesium	7440-46-2	0.001	mg/L		**0.002**	----	**0.002**	----	----
Chromium	7440-47-3	0.001	mg/L		**0.024**	----	**0.005**	----	----
Indium	7440-74-6	0.001	mg/L		<0.001	----	<0.001	----	----
Copper	7440-50-8	0.001	mg/L		**0.025**	----	**0.005**	----	----
Lanthanum	7439-91-0	0.001	mg/L		**0.022**	----	<0.001	----	----
Rubidium	7440-17-7	0.001	mg/L		**0.031**	----	**0.006**	----	----
Lithium	7439-93-2	0.001	mg/L		**0.010**	----	**0.002**	----	----
Lutetium	7439-94-3	0.001	mg/L		<0.001	----	<0.001	----	----
Thorium	7440-29-1	0.001	mg/L		**0.003**	----	**0.003**	----	----
Cerium	7440-45-1	0.001	mg/L		**0.065**	----	**0.009**	----	----
Manganese	7439-96-5	0.001	mg/L		**0.597**	----	**0.225**	----	----
Neodymium	7440-00-8	0.001	mg/L		**0.022**	----	<0.001	----	----
Molybdenum	7439-98-7	0.001	mg/L		<0.001	----	**0.003**	----	----
Praseodymium	7440-10-0	0.001	mg/L		**0.006**	----	<0.001	----	----

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	RGS_YTF_WW_0-1 2021048_WW01	RGS_YTF_WW_30-1 2021048_WW02	RGS_YTF_WW_0-2 2021048_WW03	RGS_YTF_WW_15-2 2021048_WW04	RGS_YTF_WW_30-2 2021048_WW05
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
					EM2207630-001	EM2207630-002	EM2207630-003	EM2207630-004	EM2207630-005
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS - Continued									
Nickel	7440-02-0	0.001	mg/L		**0.017**	----	**0.017**	----	----
Samarium	7440-19-9	0.001	mg/L		**0.004**	----	<0.001	----	----
Lead	7439-92-1	0.001	mg/L		**0.015**	----	**0.002**	----	----
Terbium	7440-27-9	0.001	mg/L		<0.001	----	<0.001	----	----
Antimony	7440-36-0	0.001	mg/L		<0.001	----	**0.005**	----	----
Thulium	7440-30-4	0.001	mg/L		<0.001	----	<0.001	----	----
Selenium	7782-49-2	0.01	mg/L		<0.01	----	<0.01	----	----
Ytterbium	7440-64-4	0.001	mg/L		<0.001	----	<0.001	----	----
Tin	7440-31-5	0.001	mg/L		<0.001	----	**0.002**	----	----
Yttrium	7440-65-5	0.001	mg/L		**0.013**	----	<0.001	----	----
Thallium	7440-28-0	0.001	mg/L		<0.001	----	<0.001	----	----
Zirconium	7440-67-7	0.005	mg/L		**0.007**	----	<0.005	----	----
Vanadium	7440-62-2	0.01	mg/L		**0.05**	----	<0.01	----	----
Zinc	7440-66-6	0.005	mg/L		**0.062**	----	**0.061**	----	----
Iron	7439-89-6	0.05	mg/L		**30.0**	----	**10.2**	----	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	----	<0.0001	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0010	----	<0.0010	----	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		**6**	**3**	**18**	**7**	**10**
EP006 Total Inorganic Carbon									
Total Inorganic Carbon	----	1	mg/L		**5**	**5**	**2**	**1**	**1**
EP007 Total Carbon									
Total Carbon	TC	1	mg/L		**11**	**8**	**20**	**8**	**12**
EP025: Oxygen - Dissolved (DO)									
Dissolved Oxygen	----	0.1	mg/L		**7.0**	**8.1**	**6.4**	**8.6**	**8.5**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	RGS_YTF_WW_0-3 2021048_WW06	RGS_YTF_WW_15-3 2021048_WW07	RGS_YTF_WW_30-3 2021048_WW08	RGS_YTF_WW_0-4 2021048_WW09	RGS_YTF_WW_15-4 2021048_WW10
			Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
Compound	CAS Number	LOR	Unit	EM2207630-006	EM2207630-007	EM2207630-008	EM2207630-009	EM2207630-010
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	3.87	4.34	4.32	3.77	5.73
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	168	136	137	228	150
EA075: Redox Potential								
Redox Potential	----	0.1	mV	137	127	126	132	114
pH Redox	----	0.01	pH Unit	3.87	4.34	4.32	3.77	5.73
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	<1	<1	<1	2
Total Alkalinity as CaCO3	----	1	mg/L	<1	<1	<1	<1	2
ED038: Acidity								
Acidity as CaCO3	----	1	mg/L	18	11	11	16	8
ED093T: Total Major Cations								
Calcium	7440-70-2	1	mg/L	4	<1	1	8	2
Magnesium	7439-95-4	1	mg/L	8	2	2	32	5
Sodium	7440-23-5	1	mg/L	15	16	17	41	22
Potassium	7440-09-7	1	mg/L	1	<1	<1	2	1
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.13	0.13	0.14	0.13	0.03
Dysprosium	7429-91-6	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Silver	7440-22-4	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	7440-69-9	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Erbium	7440-52-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Europium	7440-53-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Strontium	7440-24-6	0.001	mg/L	0.002	0.002	0.002	0.005	0.006
Barium	7440-39-3	0.001	mg/L	0.001	<0.001	<0.001	0.004	0.003
Gadolinium	7440-54-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Titanium	7440-32-6	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Gallium	7440-55-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	RGS_YTF_WW_0-3 2021048_WW06	RGS_YTF_WW_15-3 2021048_WW07	RGS_YTF_WW_30-3 2021048_WW08	RGS_YTF_WW_0-4 2021048_WW09	RGS_YTF_WW_15-4 2021048_WW10
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
					EM2207630-006	EM2207630-007	EM2207630-008	EM2207630-009	EM2207630-010
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Hafnium	7440-58-6	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Tellurium	22541-49-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	7440-48-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Holmium	7440-60-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Uranium	7440-61-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Caesium	7440-46-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Indium	7440-74-6	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	**0.001**
Lanthanum	7439-91-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Rubidium	7440-17-7	0.001	mg/L		**0.001**	**0.001**	**0.001**	**0.002**	**0.002**
Lithium	7439-93-2	0.001	mg/L		<0.001	<0.001	<0.001	**0.001**	<0.001
Lutetium	7439-94-3	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
Cerium	7440-45-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	7439-96-5	0.001	mg/L		**0.019**	**0.007**	**0.007**	**0.007**	**0.004**
Neodymium	7440-00-8	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum	7439-98-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Praseodymium	7440-10-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Samarium	7440-19-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Terbium	7440-27-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Antimony	7440-36-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Thulium	7440-30-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Ytterbium	7440-64-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Yttrium	7440-65-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Thallium	7440-28-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Zirconium	7440-67-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
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	<0.005	<0.005	<0.005	**0.009**
Iron	7439-89-6	0.05	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	RGS_YTF_WW_0-3 2021048_WW06	RGS_YTF_WW_15-3 2021048_WW07	RGS_YTF_WW_30-3 2021048_WW08	RGS_YTF_WW_0-4 2021048_WW09	RGS_YTF_WW_15-4 2021048_WW10
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
					EM2207630-006	EM2207630-007	EM2207630-008	EM2207630-009	EM2207630-010
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**9.82**	----	----	**14.4**	----
Dysprosium	7429-91-6	0.001	mg/L		<0.001	----	----	<0.001	----
Silver	7440-22-4	0.001	mg/L		**0.001**	----	----	**0.001**	----
Arsenic	7440-38-2	0.001	mg/L		**0.001**	----	----	**0.002**	----
Bismuth	7440-69-9	0.001	mg/L		**0.020**	----	----	**0.024**	----
Erbium	7440-52-0	0.001	mg/L		<0.001	----	----	<0.001	----
Boron	7440-42-8	0.05	mg/L		<0.05	----	----	**0.08**	----
Europium	7440-53-1	0.001	mg/L		<0.001	----	----	<0.001	----
Strontium	7440-24-6	0.001	mg/L		**0.058**	----	----	**0.141**	----
Barium	7440-39-3	0.001	mg/L		**0.174**	----	----	**0.535**	----
Gadolinium	7440-54-2	0.001	mg/L		<0.001	----	----	<0.001	----
Titanium	7440-32-6	0.01	mg/L		**0.06**	----	----	**0.06**	----
Beryllium	7440-41-7	0.001	mg/L		<0.001	----	----	**0.003**	----
Gallium	7440-55-3	0.001	mg/L		<0.001	----	----	<0.001	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	----	----	<0.0001	----
Hafnium	7440-58-6	0.01	mg/L		<0.01	----	----	<0.01	----
Tellurium	22541-49-7	0.005	mg/L		<0.005	----	----	<0.005	----
Cobalt	7440-48-4	0.001	mg/L		**0.006**	----	----	**0.005**	----
Holmium	7440-60-0	0.001	mg/L		<0.001	----	----	<0.001	----
Uranium	7440-61-1	0.001	mg/L		<0.001	----	----	<0.001	----
Caesium	7440-46-2	0.001	mg/L		<0.001	----	----	**0.002**	----
Chromium	7440-47-3	0.001	mg/L		**0.008**	----	----	**0.013**	----
Indium	7440-74-6	0.001	mg/L		<0.001	----	----	<0.001	----
Copper	7440-50-8	0.001	mg/L		**0.009**	----	----	**0.012**	----
Lanthanum	7439-91-0	0.001	mg/L		<0.001	----	----	<0.001	----
Rubidium	7440-17-7	0.001	mg/L		**0.006**	----	----	**0.009**	----
Lithium	7439-93-2	0.001	mg/L		**0.002**	----	----	**0.006**	----
Lutetium	7439-94-3	0.001	mg/L		<0.001	----	----	<0.001	----
Thorium	7440-29-1	0.001	mg/L		**0.002**	----	----	**0.003**	----
Cerium	7440-45-1	0.001	mg/L		**0.018**	----	----	**0.028**	----
Manganese	7439-96-5	0.001	mg/L		**0.215**	----	----	**0.128**	----
Neodymium	7440-00-8	0.001	mg/L		<0.001	----	----	<0.001	----
Molybdenum	7439-98-7	0.001	mg/L		**0.001**	----	----	<0.001	----
Praseodymium	7440-10-0	0.001	mg/L		<0.001	----	----	<0.001	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	RGS_YTF_WW_0-3 2021048_WW06	RGS_YTF_WW_15-3 2021048_WW07	RGS_YTF_WW_30-3 2021048_WW08	RGS_YTF_WW_0-4 2021048_WW09	RGS_YTF_WW_15-4 2021048_WW10
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
Compound	CAS Number	LOR	Unit		EM2207630-006	EM2207630-007	EM2207630-008	EM2207630-009	EM2207630-010
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS - Continued									
Nickel	7440-02-0	0.001	mg/L		**0.016**	----	----	**0.024**	----
Samarium	7440-19-9	0.001	mg/L		<0.001	----	----	<0.001	----
Lead	7439-92-1	0.001	mg/L		**0.004**	----	----	**0.005**	----
Terbium	7440-27-9	0.001	mg/L		<0.001	----	----	<0.001	----
Antimony	7440-36-0	0.001	mg/L		**0.002**	----	----	**0.002**	----
Thulium	7440-30-4	0.001	mg/L		<0.001	----	----	<0.001	----
Selenium	7782-49-2	0.01	mg/L		<0.01	----	----	<0.01	----
Ytterbium	7440-64-4	0.001	mg/L		<0.001	----	----	<0.001	----
Tin	7440-31-5	0.001	mg/L		**0.001**	----	----	**0.001**	----
Yttrium	7440-65-5	0.001	mg/L		<0.001	----	----	<0.001	----
Thallium	7440-28-0	0.001	mg/L		<0.001	----	----	<0.001	----
Zirconium	7440-67-7	0.005	mg/L		<0.005	----	----	<0.005	----
Vanadium	7440-62-2	0.01	mg/L		**0.01**	----	----	**0.02**	----
Zinc	7440-66-6	0.005	mg/L		**0.059**	----	----	**0.091**	----
Iron	7439-89-6	0.05	mg/L		**7.57**	----	----	**15.3**	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	----	----	<0.0001	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0010	----	----	<0.0010	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		**5**	**3**	**4**	**10**	**6**
EP006 Total Inorganic Carbon									
Total Inorganic Carbon	----	1	mg/L		**2**	**1**	**1**	**1**	**1**
EP007 Total Carbon									
Total Carbon	TC	1	mg/L		**8**	**4**	**5**	**11**	**7**
EP025: Oxygen - Dissolved (DO)									
Dissolved Oxygen	----	0.1	mg/L		**7.2**	**8.8**	**8.9**	**8.5**	**8.8**

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	RGS_YTF_WW_30-4 2021048_WW11	RGS_YTF_WW_0-5 2021048_WW12	RGS_YTF_WW_15-5 2021048_WW13	RGS_YTF_WW_30-5 2021048_WW14	RGS_YTF_WW_0-6 2021048_WW15
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
					EM2207630-011	EM2207630-012	EM2207630-013	EM2207630-014	EM2207630-015
					Result	Result	Result	Result	Result
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		**3.79**	**3.74**	**4.13**	**4.45**	**3.57**
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		**207**	**360**	**250**	**217**	**325**
EA075: Redox Potential									
Redox Potential	----	0.1	mV		**133**	**135**	**138**	**128**	**146**
pH Redox	----	0.01	pH Unit		**3.79**	**3.74**	**4.13**	**4.45**	**3.57**
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		<1	<1	<1	<1	<1
Total Alkalinity as CaCO3	----	1	mg/L		<1	<1	<1	<1	<1
ED038: Acidity									
Acidity as CaCO3	----	1	mg/L		**19**	**24**	**15**	**11**	**23**
ED093T: Total Major Cations									
Calcium	7440-70-2	1	mg/L		**2**	**2**	**3**	**2**	<1
Magnesium	7439-95-4	1	mg/L		**3**	**6**	**8**	**4**	**3**
Sodium	7440-23-5	1	mg/L		**19**	**24**	**28**	**21**	**19**
Potassium	7440-09-7	1	mg/L		**1**	**1**	**1**	**1**	<1
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**0.15**	**0.30**	**0.18**	**0.15**	**0.17**
Dysprosium	7429-91-6	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Silver	7440-22-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic	7440-38-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	7440-69-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Erbium	7440-52-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Boron	7440-42-8	0.05	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05
Europium	7440-53-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Strontium	7440-24-6	0.001	mg/L		**0.002**	**0.019**	**0.016**	**0.016**	**0.010**
Barium	7440-39-3	0.001	mg/L		**0.002**	**0.015**	**0.014**	**0.011**	**0.008**
Gadolinium	7440-54-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Titanium	7440-32-6	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Beryllium	7440-41-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Gallium	7440-55-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	RGS_YTF_WW_30-4 2021048_WW11	RGS_YTF_WW_0-5 2021048_WW12	RGS_YTF_WW_15-5 2021048_WW13	RGS_YTF_WW_30-5 2021048_WW14	RGS_YTF_WW_0-6 2021048_WW15
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
					EM2207630-011	EM2207630-012	EM2207630-013	EM2207630-014	EM2207630-015
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Hafnium	7440-58-6	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Tellurium	22541-49-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	7440-48-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Holmium	7440-60-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Uranium	7440-61-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Caesium	7440-46-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Indium	7440-74-6	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		**0.005**	**0.002**	**0.002**	**0.002**	<0.001
Lanthanum	7439-91-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Rubidium	7440-17-7	0.001	mg/L		**0.001**	**0.003**	**0.002**	**0.002**	**0.001**
Lithium	7439-93-2	0.001	mg/L		**0.001**	**0.002**	**0.002**	**0.001**	**0.003**
Lutetium	7439-94-3	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
Cerium	7440-45-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	7439-96-5	0.001	mg/L		**0.003**	**0.039**	**0.034**	**0.024**	**0.054**
Neodymium	7440-00-8	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum	7439-98-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Praseodymium	7440-10-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Samarium	7440-19-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Terbium	7440-27-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Antimony	7440-36-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Thulium	7440-30-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Ytterbium	7440-64-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Yttrium	7440-65-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Thallium	7440-28-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Zirconium	7440-67-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
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	**0.006**	**0.007**	**0.006**	<0.005
Iron	7439-89-6	0.05	mg/L		<0.05	**0.08**	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	RGS_YTF_WW_30-4 2021048_WW11	RGS_YTF_WW_0-5 2021048_WW12	RGS_YTF_WW_15-5 2021048_WW13	RGS_YTF_WW_30-5 2021048_WW14	RGS_YTF_WW_0-6 2021048_WW15
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
					EM2207630-011	EM2207630-012	EM2207630-013	EM2207630-014	EM2207630-015
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		----	**0.90**	----	----	**1.54**
Dysprosium	7429-91-6	0.001	mg/L		----	<0.001	----	----	<0.001
Silver	7440-22-4	0.001	mg/L		----	<0.001	----	----	<0.001
Arsenic	7440-38-2	0.001	mg/L		----	<0.001	----	----	<0.001
Bismuth	7440-69-9	0.001	mg/L		----	<0.001	----	----	<0.001
Erbium	7440-52-0	0.001	mg/L		----	<0.001	----	----	<0.001
Boron	7440-42-8	0.05	mg/L		----	<0.05	----	----	<0.05
Europium	7440-53-1	0.001	mg/L		----	<0.001	----	----	<0.001
Strontium	7440-24-6	0.001	mg/L		----	**0.024**	----	----	**0.012**
Barium	7440-39-3	0.001	mg/L		----	**0.063**	----	----	**0.032**
Gadolinium	7440-54-2	0.001	mg/L		----	<0.001	----	----	<0.001
Titanium	7440-32-6	0.01	mg/L		----	<0.01	----	----	**0.02**
Beryllium	7440-41-7	0.001	mg/L		----	<0.001	----	----	<0.001
Gallium	7440-55-3	0.001	mg/L		----	<0.001	----	----	<0.001
Cadmium	7440-43-9	0.0001	mg/L		----	<0.0001	----	----	<0.0001
Hafnium	7440-58-6	0.01	mg/L		----	<0.01	----	----	<0.01
Tellurium	22541-49-7	0.005	mg/L		----	<0.005	----	----	<0.005
Cobalt	7440-48-4	0.001	mg/L		----	<0.001	----	----	<0.001
Holmium	7440-60-0	0.001	mg/L		----	<0.001	----	----	<0.001
Uranium	7440-61-1	0.001	mg/L		----	<0.001	----	----	<0.001
Caesium	7440-46-2	0.001	mg/L		----	<0.001	----	----	<0.001
Chromium	7440-47-3	0.001	mg/L		----	**0.001**	----	----	**0.002**
Indium	7440-74-6	0.001	mg/L		----	<0.001	----	----	<0.001
Copper	7440-50-8	0.001	mg/L		----	**0.010**	----	----	**0.002**
Lanthanum	7439-91-0	0.001	mg/L		----	<0.001	----	----	<0.001
Rubidium	7440-17-7	0.001	mg/L		----	**0.002**	----	----	**0.003**
Lithium	7439-93-2	0.001	mg/L		----	**0.001**	----	----	**0.002**
Lutetium	7439-94-3	0.001	mg/L		----	<0.001	----	----	<0.001
Thorium	7440-29-1	0.001	mg/L		----	<0.001	----	----	<0.001
Cerium	7440-45-1	0.001	mg/L		----	**0.002**	----	----	**0.002**
Manganese	7439-96-5	0.001	mg/L		----	**0.040**	----	----	**0.058**
Neodymium	7440-00-8	0.001	mg/L		----	<0.001	----	----	<0.001
Molybdenum	7439-98-7	0.001	mg/L		----	<0.001	----	----	<0.001
Praseodymium	7440-10-0	0.001	mg/L		----	<0.001	----	----	<0.001

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	RGS_YTF_WW_30-4 2021048_WW11	RGS_YTF_WW_0-5 2021048_WW12	RGS_YTF_WW_15-5 2021048_WW13	RGS_YTF_WW_30-5 2021048_WW14	RGS_YTF_WW_0-6 2021048_WW15
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
					EM2207630-011	EM2207630-012	EM2207630-013	EM2207630-014	EM2207630-015
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS - Continued									
Nickel	7440-02-0	0.001	mg/L		----	**0.002**	----	----	<0.001
Samarium	7440-19-9	0.001	mg/L		----	<0.001	----	----	<0.001
Lead	7439-92-1	0.001	mg/L		----	<0.001	----	----	<0.001
Terbium	7440-27-9	0.001	mg/L		----	<0.001	----	----	<0.001
Antimony	7440-36-0	0.001	mg/L		----	<0.001	----	----	<0.001
Thulium	7440-30-4	0.001	mg/L		----	<0.001	----	----	<0.001
Selenium	7782-49-2	0.01	mg/L		----	<0.01	----	----	<0.01
Ytterbium	7440-64-4	0.001	mg/L		----	<0.001	----	----	<0.001
Tin	7440-31-5	0.001	mg/L		----	<0.001	----	----	<0.001
Yttrium	7440-65-5	0.001	mg/L		----	<0.001	----	----	<0.001
Thallium	7440-28-0	0.001	mg/L		----	<0.001	----	----	<0.001
Zirconium	7440-67-7	0.005	mg/L		----	<0.005	----	----	<0.005
Vanadium	7440-62-2	0.01	mg/L		----	<0.01	----	----	<0.01
Zinc	7440-66-6	0.005	mg/L		----	**0.012**	----	----	**0.006**
Iron	7439-89-6	0.05	mg/L		----	**1.32**	----	----	**1.75**
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		----	<0.0001	----	----	<0.0001
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		----	<0.0010	----	----	<0.0010
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		**28**	**15**	**10**	**8**	**9**
EP006 Total Inorganic Carbon									
Total Inorganic Carbon	----	1	mg/L		**1**	**2**	**1**	<1	**1**
EP007 Total Carbon									
Total Carbon	TC	1	mg/L		**30**	**16**	**11**	**9**	**10**
EP025: Oxygen - Dissolved (DO)									
Dissolved Oxygen	----	0.1	mg/L		**8.6**	**7.8**	**8.8**	**8.9**	**8.3**

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	RGS_YTF_WW_15-6 2021048_WW16	RGS_YTF_WW_30-6 2021048_WW17	RGS_YEF_WW_0-1 2021048_WW18	RGS_YEF_WW_15-1 2021048_WW19	RGS_YEF_WW_30-1 2021048_WW20
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
					EM2207630-016	EM2207630-017	EM2207630-018	EM2207630-019	EM2207630-020
					Result	Result	Result	Result	Result
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		**3.89**	**3.92**	**4.31**	**4.42**	**4.52**
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		**187**	**178**	**165**	**146**	**152**
EA075: Redox Potential									
Redox Potential	----	0.1	mV		**147**	**141**	**165**	**147**	**142**
pH Redox	----	0.01	pH Unit		**3.89**	**3.92**	**4.31**	**4.42**	**4.52**
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		<1	<1	<1	<1	<1
Total Alkalinity as CaCO3	----	1	mg/L		<1	<1	<1	<1	<1
ED038: Acidity									
Acidity as CaCO3	----	1	mg/L		**15**	**16**	**21**	**12**	**11**
ED093T: Total Major Cations									
Calcium	7440-70-2	1	mg/L		**1**	**9**	**3**	**2**	**2**
Magnesium	7439-95-4	1	mg/L		**2**	**11**	**5**	**2**	**3**
Sodium	7440-23-5	1	mg/L		**16**	**20**	**19**	**17**	**18**
Potassium	7440-09-7	1	mg/L		<1	**2**	**1**	<1	<1
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**0.15**	**0.14**	**0.10**	**0.08**	**0.06**
Dysprosium	7429-91-6	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Silver	7440-22-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic	7440-38-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	7440-69-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Erbium	7440-52-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Boron	7440-42-8	0.05	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05
Europium	7440-53-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Strontium	7440-24-6	0.001	mg/L		**0.005**	**0.004**	**0.004**	**0.005**	**0.007**
Barium	7440-39-3	0.001	mg/L		**0.005**	**0.004**	**0.008**	**0.007**	**0.008**
Gadolinium	7440-54-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Titanium	7440-32-6	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Beryllium	7440-41-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Gallium	7440-55-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	RGS_YTF_WW_15-6 2021048_WW16	RGS_YTF_WW_30-6 2021048_WW17	RGS_YEF_WW_0-1 2021048_WW18	RGS_YEF_WW_15-1 2021048_WW19	RGS_YEF_WW_30-1 2021048_WW20
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
					EM2207630-016	EM2207630-017	EM2207630-018	EM2207630-019	EM2207630-020
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Hafnium	7440-58-6	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Tellurium	22541-49-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	7440-48-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Holmium	7440-60-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Uranium	7440-61-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Caesium	7440-46-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Indium	7440-74-6	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lanthanum	7439-91-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Rubidium	7440-17-7	0.001	mg/L		<0.001	<0.001	**0.002**	**0.002**	**0.002**
Lithium	7439-93-2	0.001	mg/L		**0.001**	**0.001**	**0.001**	<0.001	<0.001
Lutetium	7439-94-3	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
Cerium	7440-45-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	7439-96-5	0.001	mg/L		**0.024**	**0.018**	**0.049**	**0.028**	**0.029**
Neodymium	7440-00-8	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum	7439-98-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Praseodymium	7440-10-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Samarium	7440-19-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Terbium	7440-27-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Antimony	7440-36-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Thulium	7440-30-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Ytterbium	7440-64-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Yttrium	7440-65-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Thallium	7440-28-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Zirconium	7440-67-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
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	<0.005	<0.005	<0.005	<0.005
Iron	7439-89-6	0.05	mg/L		<0.05	<0.05	**0.10**	**0.06**	**0.05**

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	RGS_YTF_WW_15-6 2021048_WW16	RGS_YTF_WW_30-6 2021048_WW17	RGS_YEF_WW_0-1 2021048_WW18	RGS_YEF_WW_15-1 2021048_WW19	RGS_YEF_WW_30-1 2021048_WW20
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
					EM2207630-016	EM2207630-017	EM2207630-018	EM2207630-019	EM2207630-020
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		----	----	**2.61**	----	----
Dysprosium	7429-91-6	0.001	mg/L		----	----	<0.001	----	----
Silver	7440-22-4	0.001	mg/L		----	----	<0.001	----	----
Arsenic	7440-38-2	0.001	mg/L		----	----	<0.001	----	----
Bismuth	7440-69-9	0.001	mg/L		----	----	<0.001	----	----
Erbium	7440-52-0	0.001	mg/L		----	----	<0.001	----	----
Boron	7440-42-8	0.05	mg/L		----	----	<0.05	----	----
Europium	7440-53-1	0.001	mg/L		----	----	<0.001	----	----
Strontium	7440-24-6	0.001	mg/L		----	----	**0.044**	----	----
Barium	7440-39-3	0.001	mg/L		----	----	**0.254**	----	----
Gadolinium	7440-54-2	0.001	mg/L		----	----	<0.001	----	----
Titanium	7440-32-6	0.01	mg/L		----	----	**0.04**	----	----
Beryllium	7440-41-7	0.001	mg/L		----	----	<0.001	----	----
Gallium	7440-55-3	0.001	mg/L		----	----	<0.001	----	----
Cadmium	7440-43-9	0.0001	mg/L		----	----	<0.0001	----	----
Hafnium	7440-58-6	0.01	mg/L		----	----	<0.01	----	----
Tellurium	22541-49-7	0.005	mg/L		----	----	<0.005	----	----
Cobalt	7440-48-4	0.001	mg/L		----	----	**0.001**	----	----
Holmium	7440-60-0	0.001	mg/L		----	----	<0.001	----	----
Uranium	7440-61-1	0.001	mg/L		----	----	<0.001	----	----
Caesium	7440-46-2	0.001	mg/L		----	----	<0.001	----	----
Chromium	7440-47-3	0.001	mg/L		----	----	**0.003**	----	----
Indium	7440-74-6	0.001	mg/L		----	----	<0.001	----	----
Copper	7440-50-8	0.001	mg/L		----	----	**0.005**	----	----
Lanthanum	7439-91-0	0.001	mg/L		----	----	**0.002**	----	----
Rubidium	7440-17-7	0.001	mg/L		----	----	**0.004**	----	----
Lithium	7439-93-2	0.001	mg/L		----	----	**0.001**	----	----
Lutetium	7439-94-3	0.001	mg/L		----	----	<0.001	----	----
Thorium	7440-29-1	0.001	mg/L		----	----	<0.001	----	----
Cerium	7440-45-1	0.001	mg/L		----	----	**0.004**	----	----
Manganese	7439-96-5	0.001	mg/L		----	----	**0.150**	----	----
Neodymium	7440-00-8	0.001	mg/L		----	----	**0.002**	----	----
Molybdenum	7439-98-7	0.001	mg/L		----	----	<0.001	----	----
Praseodymium	7440-10-0	0.001	mg/L		----	----	<0.001	----	----

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	RGS_YTF_WW_15-6 2021048_WW16	RGS_YTF_WW_30-6 2021048_WW17	RGS_YEF_WW_0-1 2021048_WW18	RGS_YEF_WW_15-1 2021048_WW19	RGS_YEF_WW_30-1 2021048_WW20
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
					EM2207630-016	EM2207630-017	EM2207630-018	EM2207630-019	EM2207630-020
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS - Continued									
Nickel	7440-02-0	0.001	mg/L		----	----	**0.003**	----	----
Samarium	7440-19-9	0.001	mg/L		----	----	<0.001	----	----
Lead	7439-92-1	0.001	mg/L		----	----	**0.001**	----	----
Terbium	7440-27-9	0.001	mg/L		----	----	<0.001	----	----
Antimony	7440-36-0	0.001	mg/L		----	----	<0.001	----	----
Thulium	7440-30-4	0.001	mg/L		----	----	<0.001	----	----
Selenium	7782-49-2	0.01	mg/L		----	----	<0.01	----	----
Ytterbium	7440-64-4	0.001	mg/L		----	----	<0.001	----	----
Tin	7440-31-5	0.001	mg/L		----	----	<0.001	----	----
Yttrium	7440-65-5	0.001	mg/L		----	----	<0.001	----	----
Thallium	7440-28-0	0.001	mg/L		----	----	<0.001	----	----
Zirconium	7440-67-7	0.005	mg/L		----	----	<0.005	----	----
Vanadium	7440-62-2	0.01	mg/L		----	----	<0.01	----	----
Zinc	7440-66-6	0.005	mg/L		----	----	**0.014**	----	----
Iron	7439-89-6	0.05	mg/L		----	----	**8.49**	----	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		----	----	<0.0001	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		----	----	<0.0010	----	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		**5**	**5**	**8**	**5**	**4**
EP006 Total Inorganic Carbon									
Total Inorganic Carbon	----	1	mg/L		<1	**1**	**2**	**1**	<1
EP007 Total Carbon									
Total Carbon	TC	1	mg/L		**6**	**6**	**10**	**6**	**6**
EP025: Oxygen - Dissolved (DO)									
Dissolved Oxygen	----	0.1	mg/L		**8.6**	**8.8**	**6.2**	**8.3**	**8.8**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	RGS_YEF_WW_0-2 2021048_WW21	RGS_YEF_WW_15-2 2021048_WW22	RGS_YEF_WW_30-2 2021048_WW23	RGS_YEF_WW_0-3 2021048_WW24	RGS_YEF_WW_15-3 2021048_WW25
			Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
Compound	CAS Number	LOR	Unit	EM2207630-021	EM2207630-022	EM2207630-023	EM2207630-024	EM2207630-025
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	4.11	4.05	4.01	3.91	3.96
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	172	195	186	208	182
EA075: Redox Potential								
Redox Potential	----	0.1	mV	145	145	139	137	137
pH Redox	----	0.01	pH Unit	4.11	4.05	4.01	3.91	3.96
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	<1	<1	<1	<1
Total Alkalinity as CaCO3	----	1	mg/L	<1	<1	<1	<1	<1
ED038: Acidity								
Acidity as CaCO3	----	1	mg/L	14	23	27	29	20
ED093T: Total Major Cations								
Calcium	7440-70-2	1	mg/L	11	2	17	11	9
Magnesium	7439-95-4	1	mg/L	16	3	27	20	16
Sodium	7440-23-5	1	mg/L	24	19	27	42	25
Potassium	7440-09-7	1	mg/L	2	1	2	3	2
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.06	0.04	0.18	0.02	0.02
Dysprosium	7429-91-6	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Silver	7440-22-4	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	7440-69-9	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Erbium	7440-52-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Europium	7440-53-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Strontium	7440-24-6	0.001	mg/L	0.003	0.004	0.003	0.002	0.002
Barium	7440-39-3	0.001	mg/L	0.006	0.009	0.006	0.004	0.003
Gadolinium	7440-54-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Titanium	7440-32-6	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Gallium	7440-55-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	RGS_YEF_WW_0-2 2021048_WW21	RGS_YEF_WW_15-2 2021048_WW22	RGS_YEF_WW_30-2 2021048_WW23	RGS_YEF_WW_0-3 2021048_WW24	RGS_YEF_WW_15-3 2021048_WW25
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
					EM2207630-021	EM2207630-022	EM2207630-023	EM2207630-024	EM2207630-025
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Hafnium	7440-58-6	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Tellurium	22541-49-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	7440-48-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Holmium	7440-60-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Uranium	7440-61-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Caesium	7440-46-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Indium	7440-74-6	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lanthanum	7439-91-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Rubidium	7440-17-7	0.001	mg/L		**0.002**	**0.002**	**0.002**	**0.004**	**0.004**
Lithium	7439-93-2	0.001	mg/L		**0.002**	**0.002**	**0.003**	**0.001**	<0.001
Lutetium	7439-94-3	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
Cerium	7440-45-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	7439-96-5	0.001	mg/L		**0.030**	**0.039**	**0.037**	**0.035**	**0.021**
Neodymium	7440-00-8	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum	7439-98-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Praseodymium	7440-10-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Samarium	7440-19-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Terbium	7440-27-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Antimony	7440-36-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Thulium	7440-30-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Ytterbium	7440-64-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Yttrium	7440-65-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Thallium	7440-28-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Zirconium	7440-67-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
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	<0.005	<0.005	<0.005	<0.005
Iron	7439-89-6	0.05	mg/L		**0.06**	**0.14**	**0.32**	**0.13**	**0.06**

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	RGS_YEF_WW_0-2 2021048_WW21	RGS_YEF_WW_15-2 2021048_WW22	RGS_YEF_WW_30-2 2021048_WW23	RGS_YEF_WW_0-3 2021048_WW24	RGS_YEF_WW_15-3 2021048_WW25
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
					EM2207630-021	EM2207630-022	EM2207630-023	EM2207630-024	EM2207630-025
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**21.4**	----	----	**1.12**	----
Dysprosium	7429-91-6	0.001	mg/L		<0.001	----	----	<0.001	----
Silver	7440-22-4	0.001	mg/L		<0.001	----	----	<0.001	----
Arsenic	7440-38-2	0.001	mg/L		**0.004**	----	----	<0.001	----
Bismuth	7440-69-9	0.001	mg/L		**0.016**	----	----	<0.001	----
Erbium	7440-52-0	0.001	mg/L		<0.001	----	----	<0.001	----
Boron	7440-42-8	0.05	mg/L		**0.07**	----	----	<0.05	----
Europium	7440-53-1	0.001	mg/L		<0.001	----	----	<0.001	----
Strontium	7440-24-6	0.001	mg/L		**0.216**	----	----	**0.178**	----
Barium	7440-39-3	0.001	mg/L		**1.80**	----	----	**0.677**	----
Gadolinium	7440-54-2	0.001	mg/L		<0.001	----	----	<0.001	----
Titanium	7440-32-6	0.01	mg/L		**0.10**	----	----	**0.01**	----
Beryllium	7440-41-7	0.001	mg/L		<0.001	----	----	<0.001	----
Gallium	7440-55-3	0.001	mg/L		<0.001	----	----	<0.001	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	----	----	<0.0001	----
Hafnium	7440-58-6	0.01	mg/L		<0.01	----	----	<0.01	----
Tellurium	22541-49-7	0.005	mg/L		<0.005	----	----	<0.005	----
Cobalt	7440-48-4	0.001	mg/L		**0.011**	----	----	**0.002**	----
Holmium	7440-60-0	0.001	mg/L		<0.001	----	----	<0.001	----
Uranium	7440-61-1	0.001	mg/L		<0.001	----	----	<0.001	----
Caesium	7440-46-2	0.001	mg/L		**0.002**	----	----	<0.001	----
Chromium	7440-47-3	0.001	mg/L		**0.019**	----	----	**0.001**	----
Indium	7440-74-6	0.001	mg/L		<0.001	----	----	<0.001	----
Copper	7440-50-8	0.001	mg/L		**0.018**	----	----	**0.003**	----
Lanthanum	7439-91-0	0.001	mg/L		<0.001	----	----	<0.001	----
Rubidium	7440-17-7	0.001	mg/L		**0.020**	----	----	**0.019**	----
Lithium	7439-93-2	0.001	mg/L		**0.008**	----	----	**0.002**	----
Lutetium	7439-94-3	0.001	mg/L		<0.001	----	----	<0.001	----
Thorium	7440-29-1	0.001	mg/L		**0.003**	----	----	<0.001	----
Cerium	7440-45-1	0.001	mg/L		**0.037**	----	----	<0.001	----
Manganese	7439-96-5	0.001	mg/L		**0.870**	----	----	**0.969**	----
Neodymium	7440-00-8	0.001	mg/L		<0.001	----	----	<0.001	----
Molybdenum	7439-98-7	0.001	mg/L		<0.001	----	----	<0.001	----
Praseodymium	7440-10-0	0.001	mg/L		<0.001	----	----	<0.001	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	RGS_YEF_WW_0-2 2021048_WW21	RGS_YEF_WW_15-2 2021048_WW22	RGS_YEF_WW_30-2 2021048_WW23	RGS_YEF_WW_0-3 2021048_WW24	RGS_YEF_WW_15-3 2021048_WW25
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
Compound	CAS Number	LOR	Unit		EM2207630-021	EM2207630-022	EM2207630-023	EM2207630-024	EM2207630-025
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS - Continued									
Nickel	7440-02-0	0.001	mg/L		**0.019**	----	----	**0.007**	----
Samarium	7440-19-9	0.001	mg/L		<0.001	----	----	<0.001	----
Lead	7439-92-1	0.001	mg/L		**0.009**	----	----	<0.001	----
Terbium	7440-27-9	0.001	mg/L		<0.001	----	----	<0.001	----
Antimony	7440-36-0	0.001	mg/L		**0.002**	----	----	<0.001	----
Thulium	7440-30-4	0.001	mg/L		<0.001	----	----	<0.001	----
Selenium	7782-49-2	0.01	mg/L		<0.01	----	----	<0.01	----
Ytterbium	7440-64-4	0.001	mg/L		<0.001	----	----	<0.001	----
Tin	7440-31-5	0.001	mg/L		<0.001	----	----	<0.001	----
Yttrium	7440-65-5	0.001	mg/L		<0.001	----	----	<0.001	----
Thallium	7440-28-0	0.001	mg/L		<0.001	----	----	<0.001	----
Zirconium	7440-67-7	0.005	mg/L		<0.005	----	----	<0.005	----
Vanadium	7440-62-2	0.01	mg/L		**0.04**	----	----	<0.01	----
Zinc	7440-66-6	0.005	mg/L		**0.071**	----	----	**0.039**	----
Iron	7439-89-6	0.05	mg/L		**49.4**	----	----	**16.5**	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	----	----	<0.0001	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0010	----	----	<0.0010	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		**10**	**15**	**29**	**25**	**14**
EP006 Total Inorganic Carbon									
Total Inorganic Carbon	----	1	mg/L		**2**	**3**	**5**	**4**	**3**
EP007 Total Carbon									
Total Carbon	TC	1	mg/L		**12**	**18**	**34**	**30**	**16**
EP025: Oxygen - Dissolved (DO)									
Dissolved Oxygen	----	0.1	mg/L		**7.1**	**4.1**	**3.0**	**3.6**	**5.4**

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	RGS_YEF_WW_30-3 2021048_WW26	RGS_YEF_WW_0-4 2021048_WW27	RGS_YEF_WW_15-4 2021048_WW28	RGS_YEF_WW_30-4 2021048_WW29	RGS_YEF_WW_0-5 2021048_WW30
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
					EM2207630-026	EM2207630-027	EM2207630-028	EM2207630-029	EM2207630-030
					Result	Result	Result	Result	Result
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		**3.91**	**4.00**	**3.96**	**4.08**	**5.66**
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		**189**	**246**	**247**	**210**	**142**
EA075: Redox Potential									
Redox Potential	----	0.1	mV		**133**	**138**	**145**	**142**	**88.9**
pH Redox	----	0.01	pH Unit		**3.91**	**4.00**	**3.96**	**4.08**	**5.66**
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		<1	<1	<1	<1	**9**
Total Alkalinity as CaCO3	----	1	mg/L		<1	<1	<1	<1	**9**
ED038: Acidity									
Acidity as CaCO3	----	1	mg/L		**26**	**17**	**16**	**14**	**9**
ED093T: Total Major Cations									
Calcium	7440-70-2	1	mg/L		**5**	**3**	**1**	<1	**5**
Magnesium	7439-95-4	1	mg/L		**9**	**10**	**5**	**3**	**5**
Sodium	7440-23-5	1	mg/L		**22**	**28**	**24**	**21**	**18**
Potassium	7440-09-7	1	mg/L		**2**	**1**	**1**	**1**	**5**
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**0.02**	**0.10**	**0.08**	**0.07**	**0.03**
Dysprosium	7429-91-6	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Silver	7440-22-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic	7440-38-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	7440-69-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Erbium	7440-52-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Boron	7440-42-8	0.05	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05
Europium	7440-53-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Strontium	7440-24-6	0.001	mg/L		**0.002**	**0.014**	**0.012**	**0.008**	**0.016**
Barium	7440-39-3	0.001	mg/L		**0.004**	**0.016**	**0.007**	**0.005**	**0.007**
Gadolinium	7440-54-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Titanium	7440-32-6	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Beryllium	7440-41-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Gallium	7440-55-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	RGS_YEF_WW_30-3 2021048_WW26	RGS_YEF_WW_0-4 2021048_WW27	RGS_YEF_WW_15-4 2021048_WW28	RGS_YEF_WW_30-4 2021048_WW29	RGS_YEF_WW_0-5 2021048_WW30
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
					EM2207630-026	EM2207630-027	EM2207630-028	EM2207630-029	EM2207630-030
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Hafnium	7440-58-6	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Tellurium	22541-49-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	7440-48-4	0.001	mg/L		<0.001	**0.002**	**0.003**	**0.002**	<0.001
Holmium	7440-60-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Uranium	7440-61-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Caesium	7440-46-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Indium	7440-74-6	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lanthanum	7439-91-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Rubidium	7440-17-7	0.001	mg/L		**0.004**	**0.003**	**0.003**	**0.003**	<0.001
Lithium	7439-93-2	0.001	mg/L		**0.001**	**0.002**	**0.002**	**0.002**	<0.001
Lutetium	7439-94-3	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
Cerium	7440-45-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	7439-96-5	0.001	mg/L		**0.026**	**0.075**	**0.075**	**0.049**	**0.002**
Neodymium	7440-00-8	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum	7439-98-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Praseodymium	7440-10-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Samarium	7440-19-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Terbium	7440-27-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Antimony	7440-36-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Thulium	7440-30-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Ytterbium	7440-64-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Yttrium	7440-65-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Thallium	7440-28-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Zirconium	7440-67-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
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	**0.007**	**0.006**	<0.005	<0.005
Iron	7439-89-6	0.05	mg/L		**0.11**	<0.05	**0.07**	**0.07**	<0.05

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	RGS_YEF_WW_30-3 2021048_WW26	RGS_YEF_WW_0-4 2021048_WW27	RGS_YEF_WW_15-4 2021048_WW28	RGS_YEF_WW_30-4 2021048_WW29	RGS_YEF_WW_0-5 2021048_WW30
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
					EM2207630-026	EM2207630-027	EM2207630-028	EM2207630-029	EM2207630-030
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		----	**2.08**	----	----	**20.9**
Dysprosium	7429-91-6	0.001	mg/L		----	<0.001	----	----	**0.004**
Silver	7440-22-4	0.001	mg/L		----	<0.001	----	----	<0.001
Arsenic	7440-38-2	0.001	mg/L		----	<0.001	----	----	**0.003**
Bismuth	7440-69-9	0.001	mg/L		----	**0.003**	----	----	<0.001
Erbium	7440-52-0	0.001	mg/L		----	<0.001	----	----	**0.002**
Boron	7440-42-8	0.05	mg/L		----	<0.05	----	----	<0.05
Europium	7440-53-1	0.001	mg/L		----	<0.001	----	----	**0.002**
Strontium	7440-24-6	0.001	mg/L		----	**0.040**	----	----	**0.116**
Barium	7440-39-3	0.001	mg/L		----	**0.144**	----	----	**0.367**
Gadolinium	7440-54-2	0.001	mg/L		----	<0.001	----	----	**0.006**
Titanium	7440-32-6	0.01	mg/L		----	**0.02**	----	----	**0.09**
Beryllium	7440-41-7	0.001	mg/L		----	<0.001	----	----	**0.002**
Gallium	7440-55-3	0.001	mg/L		----	<0.001	----	----	**0.007**
Cadmium	7440-43-9	0.0001	mg/L		----	<0.0001	----	----	**0.0001**
Hafnium	7440-58-6	0.01	mg/L		----	<0.01	----	----	<0.01
Tellurium	22541-49-7	0.005	mg/L		----	<0.005	----	----	<0.005
Cobalt	7440-48-4	0.001	mg/L		----	**0.010**	----	----	**0.013**
Holmium	7440-60-0	0.001	mg/L		----	<0.001	----	----	<0.001
Uranium	7440-61-1	0.001	mg/L		----	<0.001	----	----	**0.001**
Caesium	7440-46-2	0.001	mg/L		----	<0.001	----	----	**0.002**
Chromium	7440-47-3	0.001	mg/L		----	**0.003**	----	----	**0.023**
Indium	7440-74-6	0.001	mg/L		----	<0.001	----	----	<0.001
Copper	7440-50-8	0.001	mg/L		----	**0.005**	----	----	**0.027**
Lanthanum	7439-91-0	0.001	mg/L		----	**0.001**	----	----	**0.034**
Rubidium	7440-17-7	0.001	mg/L		----	**0.008**	----	----	**0.027**
Lithium	7439-93-2	0.001	mg/L		----	**0.004**	----	----	**0.009**
Lutetium	7439-94-3	0.001	mg/L		----	<0.001	----	----	<0.001
Thorium	7440-29-1	0.001	mg/L		----	**0.002**	----	----	**0.002**
Cerium	7440-45-1	0.001	mg/L		----	**0.003**	----	----	**0.084**
Manganese	7439-96-5	0.001	mg/L		----	**0.183**	----	----	**0.788**
Neodymium	7440-00-8	0.001	mg/L		----	<0.001	----	----	**0.034**
Molybdenum	7439-98-7	0.001	mg/L		----	<0.001	----	----	<0.001
Praseodymium	7440-10-0	0.001	mg/L		----	<0.001	----	----	**0.008**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	RGS_YEF_WW_30-3 2021048_WW26	RGS_YEF_WW_0-4 2021048_WW27	RGS_YEF_WW_15-4 2021048_WW28	RGS_YEF_WW_30-4 2021048_WW29	RGS_YEF_WW_0-5 2021048_WW30
			Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
Compound	CAS Number	LOR	Unit	EM2207630-026	EM2207630-027	EM2207630-028	EM2207630-029	EM2207630-030
				Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS - Continued								
Nickel	7440-02-0	0.001	mg/L	----	**0.003**	----	----	**0.021**
Samarium	7440-19-9	0.001	mg/L	----	<0.001	----	----	**0.006**
Lead	7439-92-1	0.001	mg/L	----	**0.001**	----	----	**0.018**
Terbium	7440-27-9	0.001	mg/L	----	<0.001	----	----	<0.001
Antimony	7440-36-0	0.001	mg/L	----	**0.002**	----	----	<0.001
Thulium	7440-30-4	0.001	mg/L	----	<0.001	----	----	<0.001
Selenium	7782-49-2	0.01	mg/L	----	<0.01	----	----	<0.01
Ytterbium	7440-64-4	0.001	mg/L	----	<0.001	----	----	**0.002**
Tin	7440-31-5	0.001	mg/L	----	<0.001	----	----	<0.001
Yttrium	7440-65-5	0.001	mg/L	----	<0.001	----	----	**0.022**
Thallium	7440-28-0	0.001	mg/L	----	<0.001	----	----	<0.001
Zirconium	7440-67-7	0.005	mg/L	----	<0.005	----	----	**0.008**
Vanadium	7440-62-2	0.01	mg/L	----	<0.01	----	----	**0.05**
Zinc	7440-66-6	0.005	mg/L	----	**0.021**	----	----	**0.069**
Iron	7439-89-6	0.05	mg/L	----	**4.92**	----	----	**23.5**
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	<0.0001	----	----	<0.0001
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	<0.0010	----	----	<0.0010
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	**21**	**5**	**5**	**4**	**6**
EP006 Total Inorganic Carbon								
Total Inorganic Carbon	----	1	mg/L	**4**	**1**	<1	<1	**5**
EP007 Total Carbon								
Total Carbon	TC	1	mg/L	**26**	**6**	**6**	**5**	**10**
EP025: Oxygen - Dissolved (DO)								
Dissolved Oxygen	----	0.1	mg/L	**3.0**	**8.3**	**8.6**	**8.8**	**5.4**

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

				Sample ID	RGS_YEF_WW_15-5 2021048_WW31	RGS_YEF_WW_30-5 2021048_WW32	2021048_YMF_WW_0-1 2021048_WW33	2021048_YMF_WW_15-1 2021048_WW34	2021048_YMF_WW_30-1 2021048_WW35
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
Compound	CAS Number	LOR	Unit		EM2207630-031	EM2207630-032	EM2207630-033	EM2207630-034	EM2207630-035
					Result	Result	Result	Result	Result
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		**5.79**	**6.15**	**4.05**	**4.55**	**3.24**
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		**143**	**144**	**240**	**143**	**404**
EA075: Redox Potential									
Redox Potential	----	0.1	mV		**78.5**	**76.5**	**139**	**122**	**154**
pH Redox	----	0.01	pH Unit		**5.79**	**6.15**	**4.05**	**4.55**	**3.24**
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		**12**	**11**	<1	<1	<1
Total Alkalinity as CaCO3	----	1	mg/L		**12**	**11**	<1	<1	<1
ED038: Acidity									
Acidity as CaCO3	----	1	mg/L		**5**	**3**	**16**	**12**	**37**
ED093T: Total Major Cations									
Calcium	7440-70-2	1	mg/L		**14**	**5**	**3**	**2**	**2**
Magnesium	7439-95-4	1	mg/L		**10**	**5**	**6**	**3**	**3**
Sodium	7440-23-5	1	mg/L		**19**	**19**	**22**	**18**	**18**
Potassium	7440-09-7	1	mg/L		**4**	**2**	**1**	**1**	**1**
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**0.02**	**0.02**	**0.14**	**0.03**	**0.16**
Dysprosium	7429-91-6	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Silver	7440-22-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic	7440-38-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	7440-69-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Erbium	7440-52-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Boron	7440-42-8	0.05	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05
Europium	7440-53-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Strontium	7440-24-6	0.001	mg/L		**0.018**	**0.018**	**0.008**	**0.003**	**0.013**
Barium	7440-39-3	0.001	mg/L		**0.007**	**0.006**	**0.008**	**0.002**	**0.017**
Gadolinium	7440-54-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Titanium	7440-32-6	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Beryllium	7440-41-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Gallium	7440-55-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	RGS_YEF_WW_15-5 2021048_WW31	RGS_YEF_WW_30-5 2021048_WW32	2021048_YMF_WW_0-1 2021048_WW33	2021048_YMF_WW_15-1 2021048_WW34	2021048_YMF_WW_30-1 2021048_WW35
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
					EM2207630-031	EM2207630-032	EM2207630-033	EM2207630-034	EM2207630-035
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Hafnium	7440-58-6	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Tellurium	22541-49-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	7440-48-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Holmium	7440-60-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Uranium	7440-61-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Caesium	7440-46-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Indium	7440-74-6	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lanthanum	7439-91-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Rubidium	7440-17-7	0.001	mg/L		<0.001	<0.001	**0.003**	**0.002**	**0.003**
Lithium	7439-93-2	0.001	mg/L		<0.001	<0.001	**0.001**	<0.001	<0.001
Lutetium	7439-94-3	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
Cerium	7440-45-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	7439-96-5	0.001	mg/L		<0.001	<0.001	**0.078**	**0.014**	**0.066**
Neodymium	7440-00-8	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum	7439-98-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Praseodymium	7440-10-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Samarium	7440-19-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Terbium	7440-27-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Antimony	7440-36-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Thulium	7440-30-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Ytterbium	7440-64-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Yttrium	7440-65-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Thallium	7440-28-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Zirconium	7440-67-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Vanadium	7440-62-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	RGS_YEF_WW_15-5 2021048_WW31	RGS_YEF_WW_30-5 2021048_WW32	2021048_YMF_WW_0-1 2021048_WW33	2021048_YMF_WW_15-1 2021048_WW34	2021048_YMF_WW_30-1 2021048_WW35
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
					EM2207630-031	EM2207630-032	EM2207630-033	EM2207630-034	EM2207630-035
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Zinc	7440-66-6	0.005	mg/L		<0.005	<0.005	**0.007**	<0.005	**0.008**
Iron	7439-89-6	0.05	mg/L		<0.05	<0.05	**0.08**	<0.05	**0.05**
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		----	----	**2.87**	----	----
Dysprosium	7429-91-6	0.001	mg/L		----	----	<0.001	----	----
Silver	7440-22-4	0.001	mg/L		----	----	<0.001	----	----
Arsenic	7440-38-2	0.001	mg/L		----	----	<0.001	----	----
Bismuth	7440-69-9	0.001	mg/L		----	----	**0.007**	----	----
Erbium	7440-52-0	0.001	mg/L		----	----	<0.001	----	----
Boron	7440-42-8	0.05	mg/L		----	----	<0.05	----	----
Europium	7440-53-1	0.001	mg/L		----	----	<0.001	----	----
Strontium	7440-24-6	0.001	mg/L		----	----	**0.040**	----	----
Barium	7440-39-3	0.001	mg/L		----	----	**0.264**	----	----
Gadolinium	7440-54-2	0.001	mg/L		----	----	<0.001	----	----
Titanium	7440-32-6	0.01	mg/L		----	----	**0.04**	----	----
Beryllium	7440-41-7	0.001	mg/L		----	----	<0.001	----	----
Gallium	7440-55-3	0.001	mg/L		----	----	<0.001	----	----
Cadmium	7440-43-9	0.0001	mg/L		----	----	<0.0001	----	----
Hafnium	7440-58-6	0.01	mg/L		----	----	<0.01	----	----
Tellurium	22541-49-7	0.005	mg/L		----	----	<0.005	----	----
Cobalt	7440-48-4	0.001	mg/L		----	----	**0.002**	----	----
Holmium	7440-60-0	0.001	mg/L		----	----	<0.001	----	----
Uranium	7440-61-1	0.001	mg/L		----	----	<0.001	----	----
Caesium	7440-46-2	0.001	mg/L		----	----	<0.001	----	----
Chromium	7440-47-3	0.001	mg/L		----	----	**0.003**	----	----
Indium	7440-74-6	0.001	mg/L		----	----	<0.001	----	----
Copper	7440-50-8	0.001	mg/L		----	----	**0.012**	----	----
Lanthanum	7439-91-0	0.001	mg/L		----	----	<0.001	----	----
Rubidium	7440-17-7	0.001	mg/L		----	----	**0.007**	----	----
Lithium	7439-93-2	0.001	mg/L		----	----	**0.002**	----	----
Lutetium	7439-94-3	0.001	mg/L		----	----	<0.001	----	----
Thorium	7440-29-1	0.001	mg/L		----	----	<0.001	----	----
Cerium	7440-45-1	0.001	mg/L		----	----	**0.005**	----	----

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	RGS_YEF_WW_15-5 2021048_WW31	RGS_YEF_WW_30-5 2021048_WW32	2021048_YMF_WW_0-1 2021048_WW33	2021048_YMF_WW_15-1 2021048_WW34	2021048_YMF_WW_30-1 2021048_WW35
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
					EM2207630-031	EM2207630-032	EM2207630-033	EM2207630-034	EM2207630-035
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS - Continued									
Manganese	7439-96-5	0.001	mg/L		----	----	**0.166**	----	----
Neodymium	7440-00-8	0.001	mg/L		----	----	<0.001	----	----
Molybdenum	7439-98-7	0.001	mg/L		----	----	<0.001	----	----
Praseodymium	7440-10-0	0.001	mg/L		----	----	<0.001	----	----
Nickel	7440-02-0	0.001	mg/L		----	----	**0.009**	----	----
Samarium	7440-19-9	0.001	mg/L		----	----	<0.001	----	----
Lead	7439-92-1	0.001	mg/L		----	----	**0.002**	----	----
Terbium	7440-27-9	0.001	mg/L		----	----	<0.001	----	----
Antimony	7440-36-0	0.001	mg/L		----	----	**0.001**	----	----
Thulium	7440-30-4	0.001	mg/L		----	----	<0.001	----	----
Selenium	7782-49-2	0.01	mg/L		----	----	<0.01	----	----
Ytterbium	7440-64-4	0.001	mg/L		----	----	<0.001	----	----
Tin	7440-31-5	0.001	mg/L		----	----	<0.001	----	----
Yttrium	7440-65-5	0.001	mg/L		----	----	<0.001	----	----
Thallium	7440-28-0	0.001	mg/L		----	----	<0.001	----	----
Zirconium	7440-67-7	0.005	mg/L		----	----	<0.005	----	----
Vanadium	7440-62-2	0.01	mg/L		----	----	<0.01	----	----
Zinc	7440-66-6	0.005	mg/L		----	----	**0.035**	----	----
Iron	7439-89-6	0.05	mg/L		----	----	**8.55**	----	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		----	----	<0.0001	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		----	----	<0.0010	----	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		**3**	**3**	**7**	**4**	**4**
EP006 Total Inorganic Carbon									
Total Inorganic Carbon	----	1	mg/L		**4**	**4**	**2**	<1	<1
EP007 Total Carbon									
Total Carbon	TC	1	mg/L		**7**	**7**	**9**	**5**	**5**
EP025: Oxygen - Dissolved (DO)									
Dissolved Oxygen	----	0.1	mg/L		**6.9**	**7.6**	**5.8**	**8.7**	**8.3**

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	2021048_YMF_WW_0-2 2021048_WW36	2021048_YMF_WW_15-2 2021048_WW37	2021048_YMF_WW_30-2 2021048_WW38	2021048_YMF_WW_0-3 2021048_WW39	2021048_YMF_WW_15-3 2021048_WW40
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
					EM2207630-036	EM2207630-037	EM2207630-038	EM2207630-039	EM2207630-040
					Result	Result	Result	Result	Result
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		**4.32**	**4.68**	**5.73**	**5.85**	**5.95**
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		**218**	**161**	**143**	**141**	**134**
EA075: Redox Potential									
Redox Potential	----	0.1	mV		**191**	**172**	**130**	**117**	**92.2**
pH Redox	----	0.01	pH Unit		**4.32**	**4.68**	**5.73**	**5.85**	**5.95**
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		<1	**1**	**1**	**3**	**4**
Total Alkalinity as CaCO3	----	1	mg/L		<1	**1**	**1**	**3**	**4**
ED038: Acidity									
Acidity as CaCO3	----	1	mg/L		**13**	**13**	**9**	**4**	**2**
ED093T: Total Major Cations									
Calcium	7440-70-2	1	mg/L		**6**	**2**	**1**	**40**	**2**
Magnesium	7439-95-4	1	mg/L		**12**	**4**	**3**	**56**	**3**
Sodium	7440-23-5	1	mg/L		**29**	**21**	**20**	**44**	**20**
Potassium	7440-09-7	1	mg/L		**1**	<1	<1	**3**	**1**
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**0.07**	**0.03**	**0.01**	<0.01	<0.01
Dysprosium	7429-91-6	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Silver	7440-22-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic	7440-38-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	7440-69-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Erbium	7440-52-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Boron	7440-42-8	0.05	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05
Europium	7440-53-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Strontium	7440-24-6	0.001	mg/L		**0.009**	**0.005**	**0.005**	**0.002**	**0.004**
Barium	7440-39-3	0.001	mg/L		**0.008**	**0.003**	**0.003**	**0.004**	**0.005**
Gadolinium	7440-54-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Titanium	7440-32-6	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Beryllium	7440-41-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Gallium	7440-55-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	2021048_YMF_WW_0-2 2021048_WW36	2021048_YMF_WW_15-2 2021048_WW37	2021048_YMF_WW_30-2 2021048_WW38	2021048_YMF_WW_0-3 2021048_WW39	2021048_YMF_WW_15-3 2021048_WW40
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
					EM2207630-036	EM2207630-037	EM2207630-038	EM2207630-039	EM2207630-040
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Hafnium	7440-58-6	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Tellurium	22541-49-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	7440-48-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Holmium	7440-60-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Uranium	7440-61-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Caesium	7440-46-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Indium	7440-74-6	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lanthanum	7439-91-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Rubidium	7440-17-7	0.001	mg/L		**0.003**	**0.002**	**0.002**	**0.004**	**0.003**
Lithium	7439-93-2	0.001	mg/L		**0.002**	**0.001**	<0.001	<0.001	<0.001
Lutetium	7439-94-3	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
Cerium	7440-45-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	7439-96-5	0.001	mg/L		**0.048**	**0.018**	**0.009**	**0.008**	**0.007**
Neodymium	7440-00-8	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum	7439-98-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Praseodymium	7440-10-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Samarium	7440-19-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Terbium	7440-27-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Antimony	7440-36-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Thulium	7440-30-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Ytterbium	7440-64-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Yttrium	7440-65-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Thallium	7440-28-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Zirconium	7440-67-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Vanadium	7440-62-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	2021048_YMF_WW_0-2 2021048_WW36	2021048_YMF_WW_15-2 2021048_WW37	2021048_YMF_WW_30-2 2021048_WW38	2021048_YMF_WW_0-3 2021048_WW39	2021048_YMF_WW_15-3 2021048_WW40
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
					EM2207630-036	EM2207630-037	EM2207630-038	EM2207630-039	EM2207630-040
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Zinc	7440-66-6	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Iron	7439-89-6	0.05	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**2.60**	----	----	**2.08**	----
Dysprosium	7429-91-6	0.001	mg/L		<0.001	----	----	<0.001	----
Silver	7440-22-4	0.001	mg/L		<0.001	----	----	<0.001	----
Arsenic	7440-38-2	0.001	mg/L		**0.002**	----	----	**0.002**	----
Bismuth	7440-69-9	0.001	mg/L		**0.009**	----	----	**0.012**	----
Erbium	7440-52-0	0.001	mg/L		<0.001	----	----	<0.001	----
Boron	7440-42-8	0.05	mg/L		**0.07**	----	----	**0.17**	----
Europium	7440-53-1	0.001	mg/L		<0.001	----	----	<0.001	----
Strontium	7440-24-6	0.001	mg/L		**0.071**	----	----	**0.649**	----
Barium	7440-39-3	0.001	mg/L		**0.341**	----	----	**5.43**	----
Gadolinium	7440-54-2	0.001	mg/L		<0.001	----	----	<0.001	----
Titanium	7440-32-6	0.01	mg/L		**0.03**	----	----	**0.04**	----
Beryllium	7440-41-7	0.001	mg/L		<0.001	----	----	**0.004**	----
Gallium	7440-55-3	0.001	mg/L		<0.001	----	----	<0.001	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	----	----	<0.0001	----
Hafnium	7440-58-6	0.01	mg/L		<0.01	----	----	**0.02**	----
Tellurium	22541-49-7	0.005	mg/L		<0.005	----	----	<0.005	----
Cobalt	7440-48-4	0.001	mg/L		<0.001	----	----	**0.005**	----
Holmium	7440-60-0	0.001	mg/L		<0.001	----	----	<0.001	----
Uranium	7440-61-1	0.001	mg/L		<0.001	----	----	<0.001	----
Caesium	7440-46-2	0.001	mg/L		<0.001	----	----	**0.002**	----
Chromium	7440-47-3	0.001	mg/L		**0.003**	----	----	**0.002**	----
Indium	7440-74-6	0.001	mg/L		<0.001	----	----	<0.001	----
Copper	7440-50-8	0.001	mg/L		**0.006**	----	----	**0.004**	----
Lanthanum	7439-91-0	0.001	mg/L		<0.001	----	----	**0.006**	----
Rubidium	7440-17-7	0.001	mg/L		**0.007**	----	----	**0.022**	----
Lithium	7439-93-2	0.001	mg/L		**0.004**	----	----	**0.003**	----
Lutetium	7439-94-3	0.001	mg/L		<0.001	----	----	<0.001	----
Thorium	7440-29-1	0.001	mg/L		**0.001**	----	----	**0.001**	----
Cerium	7440-45-1	0.001	mg/L		**0.007**	----	----	**0.005**	----

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	2021048_YMF_WW_0-2 2021048_WW36	2021048_YMF_WW_15-2 2021048_WW37	2021048_YMF_WW_30-2 2021048_WW38	2021048_YMF_WW_0-3 2021048_WW39	2021048_YMF_WW_15-3 2021048_WW40
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
					EM2207630-036	EM2207630-037	EM2207630-038	EM2207630-039	EM2207630-040
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS - Continued									
Manganese	7439-96-5	0.001	mg/L		**0.224**	----	----	**2.32**	----
Neodymium	7440-00-8	0.001	mg/L		<0.001	----	----	**0.002**	----
Molybdenum	7439-98-7	0.001	mg/L		<0.001	----	----	<0.001	----
Praseodymium	7440-10-0	0.001	mg/L		<0.001	----	----	<0.001	----
Nickel	7440-02-0	0.001	mg/L		**0.011**	----	----	**0.116**	----
Samarium	7440-19-9	0.001	mg/L		<0.001	----	----	<0.001	----
Lead	7439-92-1	0.001	mg/L		**0.002**	----	----	**0.001**	----
Terbium	7440-27-9	0.001	mg/L		<0.001	----	----	<0.001	----
Antimony	7440-36-0	0.001	mg/L		**0.002**	----	----	**0.002**	----
Thulium	7440-30-4	0.001	mg/L		<0.001	----	----	<0.001	----
Selenium	7782-49-2	0.01	mg/L		<0.01	----	----	<0.01	----
Ytterbium	7440-64-4	0.001	mg/L		<0.001	----	----	<0.001	----
Tin	7440-31-5	0.001	mg/L		**0.001**	----	----	**0.002**	----
Yttrium	7440-65-5	0.001	mg/L		<0.001	----	----	**0.002**	----
Thallium	7440-28-0	0.001	mg/L		<0.001	----	----	<0.001	----
Zirconium	7440-67-7	0.005	mg/L		<0.005	----	----	**0.020**	----
Vanadium	7440-62-2	0.01	mg/L		<0.01	----	----	<0.01	----
Zinc	7440-66-6	0.005	mg/L		**0.041**	----	----	**0.108**	----
Iron	7439-89-6	0.05	mg/L		**14.7**	----	----	**189**	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	----	----	<0.0001	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0010	----	----	<0.0010	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		**6**	**4**	**3**	**3**	**3**
EP006 Total Inorganic Carbon									
Total Inorganic Carbon	----	1	mg/L		**2**	**1**	**1**	**2**	**2**
EP007 Total Carbon									
Total Carbon	TC	1	mg/L		**8**	**5**	**4**	**6**	**5**
EP025: Oxygen - Dissolved (DO)									
Dissolved Oxygen	----	0.1	mg/L		**7.4**	**8.4**	**8.8**	**5.1**	**7.5**

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	2021048_YMF_WW_30-3 2021048_WW41	2021048_YMF_WW_0-4 2021048_WW42	2021048_YMF_WW_15-4 2021048_WW43	2021048_YMF_WW_30-4 2021048_WW44	2021048_YMF_WW_0-5 2021048_WW45
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
					EM2207630-041	EM2207630-042	EM2207630-043	EM2207630-044	EM2207630-045
					Result	Result	Result	Result	Result
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		**5.84**	**4.67**	**4.89**	**4.57**	**5.90**
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		**132**	**157**	**140**	**146**	**168**
EA075: Redox Potential									
Redox Potential	----	0.1	mV		**93.3**	**136**	**130**	**132**	**113**
pH Redox	----	0.01	pH Unit		**5.84**	**4.67**	**4.89**	**4.57**	**5.90**
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		**3**	<1	<1	<1	**4**
Total Alkalinity as CaCO3	----	1	mg/L		**3**	<1	<1	<1	**4**
ED038: Acidity									
Acidity as CaCO3	----	1	mg/L		**2**	**10**	**7**	**10**	**6**
ED093T: Total Major Cations									
Calcium	7440-70-2	1	mg/L		**2**	**5**	**1**	<1	**3**
Magnesium	7439-95-4	1	mg/L		**3**	**8**	**3**	**2**	**5**
Sodium	7440-23-5	1	mg/L		**19**	**20**	**18**	**18**	**26**
Potassium	7440-09-7	1	mg/L		**1**	**1**	<1	<1	**1**
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		<0.01	**0.30**	**0.06**	**0.09**	<0.01
Dysprosium	7429-91-6	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Silver	7440-22-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic	7440-38-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	7440-69-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Erbium	7440-52-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Boron	7440-42-8	0.05	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05
Europium	7440-53-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Strontium	7440-24-6	0.001	mg/L		**0.003**	**0.004**	**0.004**	**0.004**	**0.003**
Barium	7440-39-3	0.001	mg/L		**0.004**	**0.005**	**0.003**	**0.002**	**0.004**
Gadolinium	7440-54-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Titanium	7440-32-6	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Beryllium	7440-41-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Gallium	7440-55-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	2021048_YMF_WW_30-3 2021048_WW41	2021048_YMF_WW_0-4 2021048_WW42	2021048_YMF_WW_15-4 2021048_WW43	2021048_YMF_WW_30-4 2021048_WW44	2021048_YMF_WW_0-5 2021048_WW45
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
					EM2207630-041	EM2207630-042	EM2207630-043	EM2207630-044	EM2207630-045
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Hafnium	7440-58-6	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Tellurium	22541-49-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	7440-48-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Holmium	7440-60-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Uranium	7440-61-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Caesium	7440-46-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Indium	7440-74-6	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lanthanum	7439-91-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Rubidium	7440-17-7	0.001	mg/L		**0.004**	**0.002**	**0.002**	**0.002**	**0.003**
Lithium	7439-93-2	0.001	mg/L		<0.001	**0.001**	<0.001	<0.001	**0.002**
Lutetium	7439-94-3	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
Cerium	7440-45-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	7439-96-5	0.001	mg/L		**0.007**	**0.028**	**0.016**	**0.025**	**0.006**
Neodymium	7440-00-8	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum	7439-98-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Praseodymium	7440-10-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Samarium	7440-19-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Terbium	7440-27-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Antimony	7440-36-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Thulium	7440-30-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Ytterbium	7440-64-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Yttrium	7440-65-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Thallium	7440-28-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Zirconium	7440-67-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Vanadium	7440-62-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	2021048_YMF_WW_30-3 2021048_WW41	2021048_YMF_WW_0-4 2021048_WW42	2021048_YMF_WW_15-4 2021048_WW43	2021048_YMF_WW_30-4 2021048_WW44	2021048_YMF_WW_0-5 2021048_WW45
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
					EM2207630-041	EM2207630-042	EM2207630-043	EM2207630-044	EM2207630-045
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Zinc	7440-66-6	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Iron	7439-89-6	0.05	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		----	**3.35**	----	----	**0.45**
Dysprosium	7429-91-6	0.001	mg/L		----	<0.001	----	----	<0.001
Silver	7440-22-4	0.001	mg/L		----	<0.001	----	----	<0.001
Arsenic	7440-38-2	0.001	mg/L		----	**0.002**	----	----	<0.001
Bismuth	7440-69-9	0.001	mg/L		----	**0.002**	----	----	**0.001**
Erbium	7440-52-0	0.001	mg/L		----	<0.001	----	----	<0.001
Boron	7440-42-8	0.05	mg/L		----	<0.05	----	----	<0.05
Europium	7440-53-1	0.001	mg/L		----	<0.001	----	----	<0.001
Strontium	7440-24-6	0.001	mg/L		----	**0.073**	----	----	**0.050**
Barium	7440-39-3	0.001	mg/L		----	**0.291**	----	----	**0.240**
Gadolinium	7440-54-2	0.001	mg/L		----	<0.001	----	----	<0.001
Titanium	7440-32-6	0.01	mg/L		----	**0.04**	----	----	<0.01
Beryllium	7440-41-7	0.001	mg/L		----	<0.001	----	----	<0.001
Gallium	7440-55-3	0.001	mg/L		----	<0.001	----	----	<0.001
Cadmium	7440-43-9	0.0001	mg/L		----	<0.0001	----	----	**0.0005**
Hafnium	7440-58-6	0.01	mg/L		----	<0.01	----	----	<0.01
Tellurium	22541-49-7	0.005	mg/L		----	<0.005	----	----	<0.005
Cobalt	7440-48-4	0.001	mg/L		----	**0.002**	----	----	<0.001
Holmium	7440-60-0	0.001	mg/L		----	<0.001	----	----	<0.001
Uranium	7440-61-1	0.001	mg/L		----	<0.001	----	----	<0.001
Caesium	7440-46-2	0.001	mg/L		----	<0.001	----	----	<0.001
Chromium	7440-47-3	0.001	mg/L		----	**0.003**	----	----	<0.001
Indium	7440-74-6	0.001	mg/L		----	<0.001	----	----	<0.001
Copper	7440-50-8	0.001	mg/L		----	**0.008**	----	----	**0.008**
Lanthanum	7439-91-0	0.001	mg/L		----	<0.001	----	----	<0.001
Rubidium	7440-17-7	0.001	mg/L		----	**0.005**	----	----	**0.004**
Lithium	7439-93-2	0.001	mg/L		----	**0.002**	----	----	**0.002**
Lutetium	7439-94-3	0.001	mg/L		----	<0.001	----	----	<0.001
Thorium	7440-29-1	0.001	mg/L		----	<0.001	----	----	<0.001
Cerium	7440-45-1	0.001	mg/L		----	**0.005**	----	----	<0.001

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	2021048_YMF_WW_30-3 2021048_WW41	2021048_YMF_WW_0-4 2021048_WW42	2021048_YMF_WW_15-4 2021048_WW43	2021048_YMF_WW_30-4 2021048_WW44	2021048_YMF_WW_0-5 2021048_WW45
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
					EM2207630-041	EM2207630-042	EM2207630-043	EM2207630-044	EM2207630-045
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS - Continued									
Manganese	7439-96-5	0.001	mg/L		----	**0.210**	----	----	**0.079**
Neodymium	7440-00-8	0.001	mg/L		----	<0.001	----	----	<0.001
Molybdenum	7439-98-7	0.001	mg/L		----	<0.001	----	----	<0.001
Praseodymium	7440-10-0	0.001	mg/L		----	<0.001	----	----	<0.001
Nickel	7440-02-0	0.001	mg/L		----	**0.003**	----	----	**0.002**
Samarium	7440-19-9	0.001	mg/L		----	<0.001	----	----	<0.001
Lead	7439-92-1	0.001	mg/L		----	**0.001**	----	----	**0.002**
Terbium	7440-27-9	0.001	mg/L		----	<0.001	----	----	<0.001
Antimony	7440-36-0	0.001	mg/L		----	<0.001	----	----	<0.001
Thulium	7440-30-4	0.001	mg/L		----	<0.001	----	----	<0.001
Selenium	7782-49-2	0.01	mg/L		----	<0.01	----	----	<0.01
Ytterbium	7440-64-4	0.001	mg/L		----	<0.001	----	----	<0.001
Tin	7440-31-5	0.001	mg/L		----	<0.001	----	----	<0.001
Yttrium	7440-65-5	0.001	mg/L		----	<0.001	----	----	<0.001
Thallium	7440-28-0	0.001	mg/L		----	<0.001	----	----	<0.001
Zirconium	7440-67-7	0.005	mg/L		----	<0.005	----	----	<0.005
Vanadium	7440-62-2	0.01	mg/L		----	<0.01	----	----	<0.01
Zinc	7440-66-6	0.005	mg/L		----	**0.051**	----	----	**0.028**
Iron	7439-89-6	0.05	mg/L		----	**8.99**	----	----	**3.74**
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		----	<0.0001	----	----	<0.0001
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		----	<0.0010	----	----	<0.0010
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		**5**	**7**	**4**	**4**	**7**
EP006 Total Inorganic Carbon									
Total Inorganic Carbon	----	1	mg/L		**2**	**2**	**1**	**1**	**3**
EP007 Total Carbon									
Total Carbon	TC	1	mg/L		**7**	**8**	**5**	**6**	**10**
EP025: Oxygen - Dissolved (DO)									
Dissolved Oxygen	----	0.1	mg/L		**7.2**	**7.7**	**8.9**	**8.8**	**6.9**

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

				Sample ID	2021048_YMF_WW_15-5 2021048_WW46	2021048_YMF_WW_30-5 2021048_WW47	2021048_YMF_WW_0-6 2021048_WW48	2021048_YMF_WW_15-6 2021048_WW49	2021048_YMF_WW_30-6 2021048_WW50
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
Compound	CAS Number	LOR	Unit		EM2207630-046	EM2207630-047	EM2207630-048	EM2207630-049	EM2207630-050
					Result	Result	Result	Result	Result
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		**6.21**	**6.22**	**4.18**	**4.59**	**4.95**
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		**147**	**143**	**474**	**639**	**272**
EA075: Redox Potential									
Redox Potential	----	0.1	mV		**67.7**	**71.4**	**147**	**136**	**137**
pH Redox	----	0.01	pH Unit		**6.21**	**6.22**	**4.18**	**4.59**	**4.95**
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		**10**	**10**	<1	<1	<1
Total Alkalinity as CaCO3	----	1	mg/L		**10**	**10**	<1	<1	<1
ED038: Acidity									
Acidity as CaCO3	----	1	mg/L		**5**	<1	**13**	**10**	**15**
ED093T: Total Major Cations									
Calcium	7440-70-2	1	mg/L		**1**	**2**	**16**	**9**	**12**
Magnesium	7439-95-4	1	mg/L		**2**	**2**	**63**	**26**	**43**
Sodium	7440-23-5	1	mg/L		**21**	**19**	**86**	**25**	**42**
Potassium	7440-09-7	1	mg/L		**1**	**1**	**13**	**7**	**9**
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**0.01**	**0.30**	**1.22**	**0.09**	**0.06**
Dysprosium	7429-91-6	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Silver	7440-22-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic	7440-38-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	7440-69-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Erbium	7440-52-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Boron	7440-42-8	0.05	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05
Europium	7440-53-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Strontium	7440-24-6	0.001	mg/L		**0.014**	**0.015**	**0.195**	**0.044**	**0.019**
Barium	7440-39-3	0.001	mg/L		**0.009**	**0.010**	**0.027**	**0.083**	**0.032**
Gadolinium	7440-54-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Titanium	7440-32-6	0.01	mg/L		<0.01	**0.01**	<0.01	<0.01	<0.01
Beryllium	7440-41-7	0.001	mg/L		<0.001	<0.001	**0.002**	<0.001	<0.001
Gallium	7440-55-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	2021048_YMF_WW_15-5 2021048_WW46	2021048_YMF_WW_30-5 2021048_WW47	2021048_YMF_WW_0-6 2021048_WW48	2021048_YMF_WW_15-6 2021048_WW49	2021048_YMF_WW_30-6 2021048_WW50
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
					EM2207630-046	EM2207630-047	EM2207630-048	EM2207630-049	EM2207630-050
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	**0.0002**	<0.0001	<0.0001
Hafnium	7440-58-6	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Tellurium	22541-49-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	7440-48-4	0.001	mg/L		<0.001	<0.001	**0.134**	**0.006**	**0.002**
Holmium	7440-60-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Uranium	7440-61-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Caesium	7440-46-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	**0.003**	<0.001	<0.001
Indium	7440-74-6	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lanthanum	7439-91-0	0.001	mg/L		<0.001	<0.001	**0.005**	<0.001	<0.001
Rubidium	7440-17-7	0.001	mg/L		**0.002**	**0.002**	**0.016**	**0.008**	**0.005**
Lithium	7439-93-2	0.001	mg/L		<0.001	<0.001	**0.022**	**0.006**	**0.004**
Lutetium	7439-94-3	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
Cerium	7440-45-1	0.001	mg/L		<0.001	<0.001	**0.007**	<0.001	<0.001
Manganese	7439-96-5	0.001	mg/L		**0.006**	**0.005**	**0.407**	**0.059**	**0.021**
Neodymium	7440-00-8	0.001	mg/L		<0.001	<0.001	**0.002**	<0.001	<0.001
Molybdenum	7439-98-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Praseodymium	7440-10-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L		<0.001	<0.001	**0.042**	**0.003**	<0.001
Samarium	7440-19-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Terbium	7440-27-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Antimony	7440-36-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Thulium	7440-30-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Ytterbium	7440-64-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Yttrium	7440-65-5	0.001	mg/L		<0.001	<0.001	**0.003**	<0.001	<0.001
Thallium	7440-28-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Zirconium	7440-67-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Vanadium	7440-62-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	2021048_YMF_WW_15-5 2021048_WW46	2021048_YMF_WW_30-5 2021048_WW47	2021048_YMF_WW_0-6 2021048_WW48	2021048_YMF_WW_15-6 2021048_WW49	2021048_YMF_WW_30-6 2021048_WW50
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
					EM2207630-046	EM2207630-047	EM2207630-048	EM2207630-049	EM2207630-050
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Zinc	7440-66-6	0.005	mg/L		<0.005	<0.005	**0.047**	**0.006**	<0.005
Iron	7439-89-6	0.05	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		----	----	**453**	----	----
Dysprosium	7429-91-6	0.001	mg/L		----	----	<0.001	----	----
Silver	7440-22-4	0.001	mg/L		----	----	<0.005	----	----
Arsenic	7440-38-2	0.001	mg/L		----	----	**0.091**	----	----
Bismuth	7440-69-9	0.001	mg/L		----	----	**0.025**	----	----
Erbium	7440-52-0	0.001	mg/L		----	----	<0.001	----	----
Boron	7440-42-8	0.05	mg/L		----	----	<0.05	----	----
Europium	7440-53-1	0.001	mg/L		----	----	<0.001	----	----
Strontium	7440-24-6	0.001	mg/L		----	----	**0.360**	----	----
Barium	7440-39-3	0.001	mg/L		----	----	**1.44**	----	----
Gadolinium	7440-54-2	0.001	mg/L		----	----	<0.001	----	----
Titanium	7440-32-6	0.01	mg/L		----	----	**0.17**	----	----
Beryllium	7440-41-7	0.001	mg/L		----	----	**0.018**	----	----
Gallium	7440-55-3	0.001	mg/L		----	----	<0.001	----	----
Cadmium	7440-43-9	0.0001	mg/L		----	----	**0.0005**	----	----
Hafnium	7440-58-6	0.01	mg/L		----	----	<0.01	----	----
Tellurium	22541-49-7	0.005	mg/L		----	----	<0.026	----	----
Cobalt	7440-48-4	0.001	mg/L		----	----	**0.081**	----	----
Holmium	7440-60-0	0.001	mg/L		----	----	<0.001	----	----
Uranium	7440-61-1	0.001	mg/L		----	----	**0.103**	----	----
Caesium	7440-46-2	0.001	mg/L		----	----	**0.234**	----	----
Chromium	7440-47-3	0.001	mg/L		----	----	**0.952**	----	----
Indium	7440-74-6	0.001	mg/L		----	----	<0.001	----	----
Copper	7440-50-8	0.001	mg/L		----	----	**0.418**	----	----
Lanthanum	7439-91-0	0.001	mg/L		----	----	<0.001	----	----
Rubidium	7440-17-7	0.001	mg/L		----	----	**0.565**	----	----
Lithium	7439-93-2	0.001	mg/L		----	----	**0.152**	----	----
Lutetium	7439-94-3	0.001	mg/L		----	----	<0.001	----	----
Thorium	7440-29-1	0.001	mg/L		----	----	**0.309**	----	----
Cerium	7440-45-1	0.001	mg/L		----	----	**1.81**	----	----

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	2021048_YMF_WW_15-5 2021048_WW46	2021048_YMF_WW_30-5 2021048_WW47	2021048_YMF_WW_0-6 2021048_WW48	2021048_YMF_WW_15-6 2021048_WW49	2021048_YMF_WW_30-6 2021048_WW50
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
					EM2207630-046	EM2207630-047	EM2207630-048	EM2207630-049	EM2207630-050
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS - Continued									
Manganese	7439-96-5	0.001	mg/L		----	----	**0.310**	----	----
Neodymium	7440-00-8	0.001	mg/L		----	----	<0.001	----	----
Molybdenum	7439-98-7	0.001	mg/L		----	----	**0.005**	----	----
Praseodymium	7440-10-0	0.001	mg/L		----	----	<0.001	----	----
Nickel	7440-02-0	0.001	mg/L		----	----	**0.115**	----	----
Samarium	7440-19-9	0.001	mg/L		----	----	<0.001	----	----
Lead	7439-92-1	0.001	mg/L		----	----	**0.403**	----	----
Terbium	7440-27-9	0.001	mg/L		----	----	<0.001	----	----
Antimony	7440-36-0	0.001	mg/L		----	----	<0.005	----	----
Thulium	7440-30-4	0.001	mg/L		----	----	<0.001	----	----
Selenium	7782-49-2	0.01	mg/L		----	----	<0.05	----	----
Ytterbium	7440-64-4	0.001	mg/L		----	----	<0.001	----	----
Tin	7440-31-5	0.001	mg/L		----	----	<0.005	----	----
Yttrium	7440-65-5	0.001	mg/L		----	----	<0.001	----	----
Thallium	7440-28-0	0.001	mg/L		----	----	<0.005	----	----
Zirconium	7440-67-7	0.005	mg/L		----	----	<0.005	----	----
Vanadium	7440-62-2	0.01	mg/L		----	----	**1.26**	----	----
Zinc	7440-66-6	0.005	mg/L		----	----	**0.140**	----	----
Iron	7439-89-6	0.05	mg/L		----	----	**72.5**	----	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		----	----	<0.0001	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		----	----	**0.0046**	----	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		**2**	**2**	**182**	**307**	**138**
EP006 Total Inorganic Carbon									
Total Inorganic Carbon	----	1	mg/L		**3**	**3**	<50	<50	<20
EP007 Total Carbon									
Total Carbon	TC	1	mg/L		**6**	**5**	**198**	**320**	**144**
EP025: Oxygen - Dissolved (DO)									
Dissolved Oxygen	----	0.1	mg/L		**9.0**	**9.1**	**3.8**	**3.1**	**6.6**

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

				Sample ID	RGS_YTF_WW_03/03 2021048_WW51	RGS_YTF_WW_04/3 2021048_WW52	RGS_YEF_01/01 2021048_WW53	RGS_YEF_WW_03/03 2021048_WW54	RGS_YEF_WW_04_SWA 2021048_WW55
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
Compound	*CAS Number*	*LOR*	*Unit*		**EM2207630-051**	**EM2207630-052**	**EM2207630-053**	**EM2207630-054**	**EM2207630-055**
					Result	Result	Result	Result	Result
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		**5.14**	**6.06**	**7.02**	**3.31**	**4.43**
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		**1060**	**137**	**712**	**1790**	**767**
EA075: Redox Potential									
Redox Potential	----	0.1	mV		**96.5**	**76.5**	**62.8**	**536**	**315**
pH Redox	----	0.01	pH Unit		**5.14**	**6.06**	**7.02**	**3.31**	**4.43**
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		<1	**4**	**92**	<1	<1
Total Alkalinity as CaCO3	----	1	mg/L		<1	**4**	**92**	<1	<1
ED038: Acidity									
Acidity as CaCO3	----	1	mg/L		**8**	**13**	**12**	**35**	**14**
ED093T: Total Major Cations									
Calcium	7440-70-2	1	mg/L		**5**	<1	**4**	**9**	**18**
Magnesium	7439-95-4	1	mg/L		**18**	**2**	**12**	**33**	**67**
Sodium	7440-23-5	1	mg/L		**131**	**19**	**100**	**195**	**110**
Potassium	7440-09-7	1	mg/L		**1**	<1	**1**	**3**	**5**
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**0.04**	**0.03**	<0.01	**0.11**	**0.10**
Dysprosium	7429-91-6	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Silver	7440-22-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic	7440-38-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	7440-69-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Erbium	7440-52-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Boron	7440-42-8	0.05	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05
Europium	7440-53-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Strontium	7440-24-6	0.001	mg/L		**0.041**	**0.001**	**0.027**	**0.168**	**0.038**
Barium	7440-39-3	0.001	mg/L		**0.049**	**0.001**	**0.008**	**0.132**	**0.036**
Gadolinium	7440-54-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Titanium	7440-32-6	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Beryllium	7440-41-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Gallium	7440-55-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	RGS_YTF_WW_03/03 2021048_WW51	RGS_YTF_WW_04/3 2021048_WW52	RGS_YEF_01/01 2021048_WW53	RGS_YEF_WW_03/03 2021048_WW54	RGS_YEF_WW_04_SWA 2021048_WW55
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
					EM2207630-051	EM2207630-052	EM2207630-053	EM2207630-054	EM2207630-055
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Hafnium	7440-58-6	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Tellurium	22541-49-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	7440-48-4	0.001	mg/L		<0.001	<0.001	<0.001	**0.015**	**0.008**
Holmium	7440-60-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Uranium	7440-61-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Caesium	7440-46-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Indium	7440-74-6	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lanthanum	7439-91-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Rubidium	7440-17-7	0.001	mg/L		**0.004**	<0.001	<0.001	**0.014**	**0.011**
Lithium	7439-93-2	0.001	mg/L		**0.004**	**0.001**	**0.004**	**0.030**	**0.005**
Lutetium	7439-94-3	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
Cerium	7440-45-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	7439-96-5	0.001	mg/L		**0.011**	<0.001	<0.001	**0.750**	**0.193**
Neodymium	7440-00-8	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum	7439-98-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Praseodymium	7440-10-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L		**0.002**	<0.001	**0.001**	**0.005**	**0.003**
Samarium	7440-19-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Terbium	7440-27-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Antimony	7440-36-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Thulium	7440-30-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Ytterbium	7440-64-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Yttrium	7440-65-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Thallium	7440-28-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Zirconium	7440-67-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Vanadium	7440-62-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	RGS_YTF_WW_03/03 2021048_WW51	RGS_YTF_WW_04/3 2021048_WW52	RGS_YEF_01/01 2021048_WW53	RGS_YEF_WW_03/03 2021048_WW54	RGS_YEF_WW_04_SWA 2021048_WW55
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
					EM2207630-051	EM2207630-052	EM2207630-053	EM2207630-054	EM2207630-055
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Zinc	7440-66-6	0.005	mg/L		**0.006**	<0.005	<0.005	**0.012**	**0.011**
Iron	7439-89-6	0.05	mg/L		**0.10**	<0.05	**0.05**	**2.26**	**0.17**
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**0.14**	**0.35**	**1.04**	**0.14**	**0.75**
Dysprosium	7429-91-6	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Silver	7440-22-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic	7440-38-2	0.001	mg/L		<0.001	<0.001	**0.001**	<0.001	**0.001**
Bismuth	7440-69-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Erbium	7440-52-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Boron	7440-42-8	0.05	mg/L		<0.05	<0.05	<0.05	<0.05	**0.06**
Europium	7440-53-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Strontium	7440-24-6	0.001	mg/L		**0.044**	**0.002**	**0.058**	**0.185**	**0.180**
Barium	7440-39-3	0.001	mg/L		**0.060**	**0.004**	**0.046**	**0.140**	**0.037**
Gadolinium	7440-54-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Titanium	7440-32-6	0.01	mg/L		<0.01	**0.01**	**0.02**	<0.01	**0.01**
Beryllium	7440-41-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Gallium	7440-55-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Hafnium	7440-58-6	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Tellurium	22541-49-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	7440-48-4	0.001	mg/L		<0.001	<0.001	**0.003**	**0.016**	**0.019**
Holmium	7440-60-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Uranium	7440-61-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Caesium	7440-46-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	**0.002**	<0.001	<0.001
Indium	7440-74-6	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		<0.001	<0.001	**0.003**	<0.001	<0.001
Lanthanum	7439-91-0	0.001	mg/L		<0.001	<0.001	**0.001**	<0.001	<0.001
Rubidium	7440-17-7	0.001	mg/L		**0.004**	<0.001	**0.003**	**0.016**	**0.025**
Lithium	7439-93-2	0.001	mg/L		**0.004**	**0.002**	**0.004**	**0.032**	**0.014**
Lutetium	7439-94-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Thorium	7440-29-1	0.001	mg/L		**0.002**	<0.001	<0.001	<0.001	<0.001
Cerium	7440-45-1	0.001	mg/L		<0.001	**0.002**	**0.003**	<0.001	<0.001

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	RGS_YTF_WW_03/03 2021048_WW51	RGS_YTF_WW_04/3 2021048_WW52	RGS_YEF_01/01 2021048_WW53	RGS_YEF_WW_03/03 2021048_WW54	RGS_YEF_WW_04_SWA 2021048_WW55
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00
					EM2207630-051	EM2207630-052	EM2207630-053	EM2207630-054	EM2207630-055
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS - Continued									
Manganese	7439-96-5	0.001	mg/L		**0.014**	**0.003**	**0.298**	**0.749**	**1.65**
Neodymium	7440-00-8	0.001	mg/L		<0.001	<0.001	**0.001**	<0.001	<0.001
Molybdenum	7439-98-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Praseodymium	7440-10-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L		**0.002**	<0.001	**0.004**	**0.005**	**0.005**
Samarium	7440-19-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Terbium	7440-27-9	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Antimony	7440-36-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Thulium	7440-30-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Ytterbium	7440-64-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Yttrium	7440-65-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Thallium	7440-28-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Zirconium	7440-67-7	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	**0.006**
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		**0.007**	<0.005	<0.005	**0.009**	**0.041**
Iron	7439-89-6	0.05	mg/L		**1.84**	**0.22**	**2.66**	**5.75**	**1.71**
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		**8**	**4**	**11**	**5**	**13**
EP006 Total Inorganic Carbon									
Total Inorganic Carbon	----	1	mg/L		<1	**2**	**21**	<1	**1**
EP007 Total Carbon									
Total Carbon	TC	1	mg/L		**8**	**6**	**31**	**5**	**14**
EP025: Oxygen - Dissolved (DO)									
Dissolved Oxygen	----	0.1	mg/L		**8.7**	**8.2**	**8.7**	**8.6**	**7.9**

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	RGS_YEF_WW_04_SWB 2021048_WW56	RGS_YMF_SW_05/2 2021048_WW57	RGS_Control 2021048_WW58	----	----
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	----	----
					EM2207630-056	EM2207630-057	EM2207630-058	--------	--------
					Result	Result	Result	----	----
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		**3.37**	**4.77**	**6.30**	----	----
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		**1190**	**1710**	**152**	----	----
EA075: Redox Potential									
Redox Potential	----	0.1	mV		**290**	**206**	**181**	----	----
pH Redox	----	0.01	pH Unit		**3.37**	**4.77**	**6.30**	----	----
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		<1	<1	**16**	----	----
Total Alkalinity as CaCO3	----	1	mg/L		<1	<1	**16**	----	----
ED038: Acidity									
Acidity as CaCO3	----	1	mg/L		**38**	**14**	<1	----	----
ED093T: Total Major Cations									
Calcium	7440-70-2	1	mg/L		**4**	**10**	**3**	----	----
Magnesium	7439-95-4	1	mg/L		**14**	**45**	**2**	----	----
Sodium	7440-23-5	1	mg/L		**93**	**181**	**18**	----	----
Potassium	7440-09-7	1	mg/L		**3**	**2**	**1**	----	----
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**0.18**	**0.02**	**0.02**	----	----
Dysprosium	7429-91-6	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Silver	7440-22-4	0.001	mg/L		<0.001	**0.001**	<0.001	----	----
Arsenic	7440-38-2	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Bismuth	7440-69-9	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Erbium	7440-52-0	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Boron	7440-42-8	0.05	mg/L		<0.05	<0.05	<0.05	----	----
Europium	7440-53-1	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Strontium	7440-24-6	0.001	mg/L		**0.113**	**0.128**	**0.026**	----	----
Barium	7440-39-3	0.001	mg/L		**0.022**	**0.165**	**0.017**	----	----
Gadolinium	7440-54-2	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Titanium	7440-32-6	0.01	mg/L		<0.01	<0.01	<0.01	----	----
Beryllium	7440-41-7	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Gallium	7440-55-3	0.001	mg/L		<0.001	<0.001	<0.001	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	RGS_YEF_WW_04_SWB 2021048_WW56	RGS_YMF_SW_05/2 2021048_WW57	RGS_Control 2021048_WW58	----	----
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	----	----
Compound	CAS Number	LOR	Unit		EM2207630-056	EM2207630-057	EM2207630-058	--------	--------
					Result	Result	Result	----	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	**0.0002**	<0.0001	----	----
Hafnium	7440-58-6	0.01	mg/L		<0.01	<0.01	<0.01	----	----
Tellurium	22541-49-7	0.005	mg/L		<0.005	<0.005	<0.005	----	----
Cobalt	7440-48-4	0.001	mg/L		**0.013**	**0.022**	<0.001	----	----
Holmium	7440-60-0	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Uranium	7440-61-1	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Caesium	7440-46-2	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Indium	7440-74-6	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Copper	7440-50-8	0.001	mg/L		<0.001	<0.001	**0.002**	----	----
Lanthanum	7439-91-0	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Rubidium	7440-17-7	0.001	mg/L		**0.018**	**0.004**	**0.002**	----	----
Lithium	7439-93-2	0.001	mg/L		**0.011**	**0.003**	<0.001	----	----
Lutetium	7439-94-3	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Thorium	7440-29-1	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Cerium	7440-45-1	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Manganese	7439-96-5	0.001	mg/L		**1.07**	**0.063**	<0.001	----	----
Neodymium	7440-00-8	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Molybdenum	7439-98-7	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Praseodymium	7440-10-0	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Nickel	7440-02-0	0.001	mg/L		**0.002**	**0.008**	<0.001	----	----
Samarium	7440-19-9	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Terbium	7440-27-9	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Antimony	7440-36-0	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Thulium	7440-30-4	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	----	----
Ytterbium	7440-64-4	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Yttrium	7440-65-5	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Thallium	7440-28-0	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Zirconium	7440-67-7	0.005	mg/L		<0.005	<0.005	<0.005	----	----
Vanadium	7440-62-2	0.01	mg/L		<0.01	<0.01	<0.01	----	----

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	RGS_YEF_WW_04_SWB 2021048_WW56	RGS_YMF_SW_05/2 2021048_WW57	RGS_Control 2021048_WW58	----	----
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	----	----
					EM2207630-056	EM2207630-057	EM2207630-058	--------	--------
					Result	Result	Result	----	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Zinc	7440-66-6	0.005	mg/L		**0.024**	**0.044**	**0.010**	----	----
Iron	7439-89-6	0.05	mg/L		**0.40**	<0.05	<0.05	----	----
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**2.26**	**45.6**	**0.03**	----	----
Dysprosium	7429-91-6	0.001	mg/L		<0.001	**0.004**	<0.001	----	----
Silver	7440-22-4	0.001	mg/L		<0.001	**0.002**	<0.001	----	----
Arsenic	7440-38-2	0.001	mg/L		**0.002**	**0.004**	<0.001	----	----
Bismuth	7440-69-9	0.001	mg/L		<0.001	**0.001**	<0.001	----	----
Erbium	7440-52-0	0.001	mg/L		<0.001	**0.002**	<0.001	----	----
Boron	7440-42-8	0.05	mg/L		<0.05	<0.05	<0.05	----	----
Europium	7440-53-1	0.001	mg/L		<0.001	**0.001**	<0.001	----	----
Strontium	7440-24-6	0.001	mg/L		**0.055**	**0.168**	**0.030**	----	----
Barium	7440-39-3	0.001	mg/L		**0.270**	**0.307**	**0.021**	----	----
Gadolinium	7440-54-2	0.001	mg/L		<0.001	**0.006**	<0.001	----	----
Titanium	7440-32-6	0.01	mg/L		**0.03**	**0.02**	<0.01	----	----
Beryllium	7440-41-7	0.001	mg/L		<0.001	**0.002**	<0.001	----	----
Gallium	7440-55-3	0.001	mg/L		<0.001	**0.003**	<0.001	----	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	**0.0004**	<0.0001	----	----
Hafnium	7440-58-6	0.01	mg/L		<0.01	<0.01	<0.01	----	----
Tellurium	22541-49-7	0.005	mg/L		<0.005	<0.005	<0.005	----	----
Cobalt	7440-48-4	0.001	mg/L		**0.015**	**0.052**	<0.001	----	----
Holmium	7440-60-0	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Uranium	7440-61-1	0.001	mg/L		<0.001	**0.004**	<0.001	----	----
Caesium	7440-46-2	0.001	mg/L		<0.001	**0.022**	<0.001	----	----
Chromium	7440-47-3	0.001	mg/L		**0.004**	**0.064**	<0.001	----	----
Indium	7440-74-6	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Copper	7440-50-8	0.001	mg/L		**0.002**	**0.037**	**0.007**	----	----
Lanthanum	7439-91-0	0.001	mg/L		**0.003**	**0.031**	<0.001	----	----
Rubidium	7440-17-7	0.001	mg/L		**0.014**	**0.052**	**0.002**	----	----
Lithium	7439-93-2	0.001	mg/L		**0.006**	**0.017**	<0.001	----	----
Lutetium	7439-94-3	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Thorium	7440-29-1	0.001	mg/L		<0.001	**0.016**	<0.001	----	----
Cerium	7440-45-1	0.001	mg/L		**0.008**	**0.115**	<0.001	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	RGS_YEF_WW_04_SWB 2021048_WW56	RGS_YMF_SW_05/2 2021048_WW57	RGS_Control 2021048_WW58	----	----
				Sampling date / time	26-Apr-2022 00:00	26-Apr-2022 00:00	26-Apr-2022 00:00	----	----
Compound	CAS Number	LOR	Unit		EM2207630-056	EM2207630-057	EM2207630-058	--------	--------
					Result	Result	Result	----	----
EG020T: Total Metals by ICP-MS - Continued									
Manganese	7439-96-5	0.001	mg/L		**0.250**	**0.079**	**0.005**	----	----
Neodymium	7440-00-8	0.001	mg/L		**0.004**	**0.034**	<0.001	----	----
Molybdenum	7439-98-7	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Praseodymium	7440-10-0	0.001	mg/L		<0.001	**0.008**	<0.001	----	----
Nickel	7440-02-0	0.001	mg/L		**0.008**	**0.026**	<0.001	----	----
Samarium	7440-19-9	0.001	mg/L		<0.001	**0.006**	<0.001	----	----
Lead	7439-92-1	0.001	mg/L		**0.001**	**0.033**	<0.001	----	----
Terbium	7440-27-9	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Antimony	7440-36-0	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Thulium	7440-30-4	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	----	----
Ytterbium	7440-64-4	0.001	mg/L		<0.001	**0.001**	<0.001	----	----
Tin	7440-31-5	0.001	mg/L		<0.001	**0.002**	<0.001	----	----
Yttrium	7440-65-5	0.001	mg/L		**0.002**	**0.017**	<0.001	----	----
Thallium	7440-28-0	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Zirconium	7440-67-7	0.005	mg/L		<0.005	<0.005	<0.005	----	----
Vanadium	7440-62-2	0.01	mg/L		<0.01	**0.07**	<0.01	----	----
Zinc	7440-66-6	0.005	mg/L		**0.022**	**0.117**	**0.017**	----	----
Iron	7439-89-6	0.05	mg/L		**6.49**	**14.8**	**0.12**	----	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0010	<0.0010	<0.0001	----	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		**28**	**1**	**2**	----	----
EP006 Total Inorganic Carbon									
Total Inorganic Carbon	----	1	mg/L		**1**	<1	**4**	----	----
EP007 Total Carbon									
Total Carbon	TC	1	mg/L		**29**	**2**	**6**	----	----
EP025: Oxygen - Dissolved (DO)									
Dissolved Oxygen	----	0.1	mg/L		**8.0**	**8.8**	**9.3**	----	----

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EM2301747**	Page	: 1 of 37
Client	: **RGS ENVIRONMENTAL CONSULTANTS PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: MATT LANDERS	Contact	: Customer Services EM
Address	: 3/30 LENSWORTH STREET COOPERS PLAINS 4108	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: 07 3344 1222	Telephone	: +61-3-8549 9600
Project	: 2021048	Date Samples Received	: 03-Feb-2023 09:10
Order number	: ----	Date Analysis Commenced	: 06-Feb-2023
C-O-C number	: ----	Issue Date	: 15-Feb-2023 16:53
Sampler	: BEN FREIDMAN		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 49		
No. of samples analysed	: 49		

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*
Jarwis Nheu	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Keegan Mullane	Senior Chemist - Organics	Brisbane Organics, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Sanjay Parekh	LCMS Coordinator	Melbourne Organics, Springvale, VIC
Xing Lin	Senior Organic Chemist	Melbourne Organics, Springvale, VIC

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.

- EP231X: Poor matrix spike recovery for sample EM2301747-004 due to sample matrix interference.
- EP231X: Samples EM2301747-016,038 required dilution due to matrix interferences. LOR values have been adjusted accordingly.
- EP231X PFAS: The LOR values of PFBS & PFHpS have been raised for sample "EA_FASH_N7449_2-3m" due to matrix interferences.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	EA_MFD_N7436_2.5-3 m	EA_MFD_N7454_2-2.5 m	EA_MFD_N7432_2.0-2. 5m	EA_MFD_N7433_2.5-3. 0m	EA_MFD_N7431_26-26 .5m
				Sampling date / time	03-Nov-2022 00:00	07-Dec-2022 00:00	05-Dec-2022 00:00	25-Oct-2022 00:00	24-Oct-2022 00:00
Compound	CAS Number	LOR	Unit		EM2301747-001	EM2301747-002	EM2301747-003	EM2301747-004	EM2301747-005
					Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		**12.2**	**13.0**	**13.5**	**24.5**	**21.9**
EP231_TOP_A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg		<0.0002	<0.0002	----	----	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg		<0.0002	<0.0002	----	----	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg		<0.0002	<0.0002	----	----	<0.0002
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg		<0.0002	<0.0002	----	----	<0.0002
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg		<0.0002	<0.0002	----	----	<0.0002
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg		<0.0002	<0.0002	----	----	<0.0002
EP231_TOP_B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg		<0.001	<0.001	----	----	<0.001
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg		<0.0002	<0.0002	----	----	<0.0002
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg		<0.0002	<0.0002	----	----	<0.0002
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg		<0.0002	<0.0002	----	----	<0.0002
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg		<0.0002	<0.0002	----	----	<0.0002
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg		<0.0002	<0.0002	----	----	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg		<0.0002	<0.0002	----	----	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg		<0.0002	<0.0002	----	----	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg		<0.0002	<0.0002	----	----	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg		<0.0002	<0.0002	----	----	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg		<0.0005	<0.0005	----	----	<0.0005
EP231_TOP_C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg		<0.0002	<0.0002	----	----	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		<0.0005	<0.0005	----	----	<0.0005

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	EA_MFD_N7436_2.5-3 m	EA_MFD_N7454_2-2.5 m	EA_MFD_N7432_2.0-2.5m	EA_MFD_N7433_2.5-3.0m	EA_MFD_N7431_26-26.5m
				Sampling date / time	03-Nov-2022 00:00	07-Dec-2022 00:00	05-Dec-2022 00:00	25-Oct-2022 00:00	24-Oct-2022 00:00
Compound	CAS Number	LOR	Unit		EM2301747-001	EM2301747-002	EM2301747-003	EM2301747-004	EM2301747-005
					Result	Result	Result	Result	Result
EP231_TOP_C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	<0.0005	----	----	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg		<0.0005	<0.0005	----	----	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	<0.0005	----	----	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	<0.0002	----	----	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	<0.0002	----	----	<0.0002
EP231_TOP_D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	<0.0005	----	----	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	<0.0005	----	----	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	<0.0005	----	----	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	<0.0005	----	----	<0.0005
EP231_TOP_P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		<0.0002	<0.0002	----	----	<0.0002
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		<0.0002	<0.0002	----	----	<0.0002
Sum of TOP C4 - C14 Carboxylates and C4 - C8 Sulfonates	----	0.0002	mg/kg		<0.0002	<0.0002	----	----	<0.0002
Sum of TOP C4 - C14 as Fluorine	----	0.0002	mg/kg		<0.0002	<0.0002	----	----	<0.0002
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	EA_MFD_N7436_2.5-3 m	EA_MFD_N7454_2-2.5 m	EA_MFD_N7432_2.0-2. 5m	EA_MFD_N7433_2.5-3. 0m	EA_MFD_N7431_26-26 .5m
				Sampling date / time	03-Nov-2022 00:00	07-Dec-2022 00:00	05-Dec-2022 00:00	25-Oct-2022 00:00	24-Oct-2022 00:00
Compound	CAS Number	LOR	Unit		EM2301747-001	EM2301747-002	EM2301747-003	EM2301747-004	EM2301747-005
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids - Continued									
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg		<0.001	<0.001	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	EA_MFD_N7436_2.5-3 m	EA_MFD_N7454_2-2.5 m	EA_MFD_N7432_2.0-2. 5m	EA_MFD_N7433_2.5-3. 0m	EA_MFD_N7431_26-26 .5m
				Sampling date / time	03-Nov-2022 00:00	07-Dec-2022 00:00	05-Dec-2022 00:00	25-Oct-2022 00:00	24-Oct-2022 00:00
Compound	CAS Number	LOR	Unit		EM2301747-001	EM2301747-002	EM2301747-003	EM2301747-004	EM2301747-005
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231_TOP_S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		**98.2**	**93.4**	**----**	**----**	**85.0**
13C8-PFOA	----	0.0002	%		**102**	**106**	**----**	**----**	**96.1**
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		**106**	**111**	**97.3**	**89.2**	**114**
13C8-PFOA	----	0.0002	%		**116**	**112**	**90.5**	**91.6**	**108**

Analytical Results

Sub-Matrix: **SOIL**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	EA_MFD_N7431_2.5-3.0m	EA_EFNB_N7447_11.5-12m	EA_EFNB_N7447_1m	EA_EFNB_N7446_11.5-12m	EA_EFNB_N7446_1.5-2m
				Sampling date / time	24-Oct-2022 00:00	14-Dec-2022 00:00	13-Dec-2022 00:00	13-Dec-2022 00:00	09-Dec-2022 00:00
					EM2301747-006	EM2301747-007	EM2301747-008	EM2301747-009	EM2301747-010
					Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		**43.0**	**17.9**	**10.1**	**19.1**	**16.8**
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg		<0.001	<0.001	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	EA_MFD_N7431_2.5-3.0m	EA_EFNB_N7447_11.5-12m	EA_EFNB_N7447_1m	EA_EFNB_N7446_11.5-12m	EA_EFNB_N7446_1.5-2m
				Sampling date / time	24-Oct-2022 00:00	14-Dec-2022 00:00	13-Dec-2022 00:00	13-Dec-2022 00:00	09-Dec-2022 00:00
Compound	CAS Number	LOR	Unit		EM2301747-006	EM2301747-007	EM2301747-008	EM2301747-009	EM2301747-010
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		**100**	**109**	**98.5**	**104**	**98.5**
13C8-PFOA	----	0.0002	%		**88.0**	**97.7**	**99.7**	**101**	**96.2**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	EA_YEF_N7439_1.5-2 m	EA_YEF_N7440_2.5-3	EA_FASH_N7450_2-2.5	EA_FASH_N7452_29-29.5	EA_FASH_N7449_30.5-31
			Sampling date / time	21-Dec-2022 00:00	20-Dec-2022 00:00	07-Nov-2022 00:00	20-Oct-2022 00:00	18-Oct-2022 00:00
Compound	CAS Number	LOR	Unit	EM2301747-011	EM2301747-012	EM2301747-013	EM2301747-014	EM2301747-015
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	**5.3**	**11.5**	**28.1**	**23.6**	**14.1**
EP231_TOP_A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	----	----	<0.0002	----	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	----	----	<0.0002	----	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	----	----	<0.0002	----	<0.0002
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	----	----	<0.0002	----	<0.0002
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	----	----	<0.0002	----	<0.0002
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	----	----	<0.0002	----	<0.0002
EP231_TOP_B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	----	----	<0.001	----	<0.001
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	----	----	<0.0002	----	<0.0002
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	----	----	<0.0002	----	<0.0002
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	----	----	<0.0002	----	<0.0002
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	----	----	<0.0002	----	<0.0002
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	----	----	<0.0002	----	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	----	----	<0.0002	----	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	----	----	<0.0002	----	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	----	----	<0.0002	----	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	----	----	<0.0002	----	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	----	----	<0.0005	----	<0.0005
EP231_TOP_C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	----	----	<0.0002	----	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	----	----	<0.0005	----	<0.0005

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	EA_YEF_N7439_1.5-2 m	EA_YEF_N7440_2.5-3	EA_FASH_N7450_2-2.5	EA_FASH_N7452_29-29.5	EA_FASH_N7449_30.5-31
				Sampling date / time	21-Dec-2022 00:00	20-Dec-2022 00:00	07-Nov-2022 00:00	20-Oct-2022 00:00	18-Oct-2022 00:00
Compound	CAS Number	LOR	Unit		EM2301747-011	EM2301747-012	EM2301747-013	EM2301747-014	EM2301747-015
					Result	Result	Result	Result	Result
EP231_TOP_C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		----	----	<0.0005	----	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg		----	----	<0.0005	----	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		----	----	<0.0005	----	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		----	----	<0.0002	----	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		----	----	<0.0002	----	<0.0002
EP231_TOP_D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		----	----	<0.0005	----	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		----	----	<0.0005	----	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		----	----	<0.0005	----	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		----	----	<0.0005	----	<0.0005
EP231_TOP_P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		----	----	<0.0002	----	<0.0002
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		----	----	<0.0002	----	<0.0002
Sum of TOP C4 - C14 Carboxylates and C4 - C8 Sulfonates	----	0.0002	mg/kg		----	----	<0.0002	----	<0.0002
Sum of TOP C4 - C14 as Fluorine	----	0.0002	mg/kg		----	----	<0.0002	----	<0.0002
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	EA_YEF_N7439_1.5-2 m	EA_YEF_N7440_2.5-3	EA_FASH_N7450_2-2.5	EA_FASH_N7452_29-29.5	EA_FASH_N7449_30.5-31
				Sampling date / time	21-Dec-2022 00:00	20-Dec-2022 00:00	07-Nov-2022 00:00	20-Oct-2022 00:00	18-Oct-2022 00:00
Compound	CAS Number	LOR	Unit		EM2301747-011	EM2301747-012	EM2301747-013	EM2301747-014	EM2301747-015
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids - Continued									
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg		<0.001	<0.001	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	EA_YEF_N7439_1.5-2 m	EA_YEF_N7440_2.5-3	EA_FASH_N7450_2-2.5	EA_FASH_N7452_29-29.5	EA_FASH_N7449_30.5-31
				Sampling date / time	21-Dec-2022 00:00	20-Dec-2022 00:00	07-Nov-2022 00:00	20-Oct-2022 00:00	18-Oct-2022 00:00
Compound	CAS Number	LOR	Unit		EM2301747-011	EM2301747-012	EM2301747-013	EM2301747-014	EM2301747-015
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231_TOP_S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		**----**	**----**	**102**	**----**	**103**
13C8-PFOA	----	0.0002	%		**----**	**----**	**106**	**----**	**97.6**
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		**98.3**	**105**	**98.5**	**94.0**	**112**
13C8-PFOA	----	0.0002	%		**98.9**	**96.4**	**105**	**90.9**	**112**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	EA_FASH_N7449_2-3 m	EA_FASH_N7451_30m	EA_FASH_N7452_17-17.5m	EA_FASH_N7452_3.5-4.5m	EA_FASH_N7451_18.5-19m
			Sampling date / time	10-Oct-2022 00:00	21-Oct-2022 00:00	19-Oct-2022 00:00	18-Oct-2022 00:00	20-Oct-2022 00:00
Compound	CAS Number	LOR	Unit	EM2301747-016	EM2301747-017	EM2301747-018	EM2301747-019	EM2301747-020
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	**63.1**	**22.0**	**17.0**	**20.3**	**20.8**
EP231_TOP_A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	**0.0005**	----	<0.0002	<0.0002	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	----	<0.0002	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	**0.0015**	----	<0.0002	<0.0002	<0.0002
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	**0.0002**	----	<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	**0.0144**	----	<0.0002	<0.0002	<0.0002
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	----	<0.0002	<0.0002	<0.0002
EP231_TOP_B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	----	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	**0.0012**	----	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	**0.0038**	----	<0.0002	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	**0.0003**	----	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	**0.0011**	----	<0.0002	<0.0002	<0.0002
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	----	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	----	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	----	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	----	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	----	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	----	<0.0005	<0.0005	<0.0005
EP231_TOP_C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	----	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	----	<0.0005	<0.0005	<0.0005

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	EA_FASH_N7449_2-3 m	EA_FASH_N7451_30m	EA_FASH_N7452_17-17.5m	EA_FASH_N7452_3.5-4.5m	EA_FASH_N7451_18.5-19m
				Sampling date / time	10-Oct-2022 00:00	21-Oct-2022 00:00	19-Oct-2022 00:00	18-Oct-2022 00:00	20-Oct-2022 00:00
Compound	CAS Number	LOR	Unit		EM2301747-016	EM2301747-017	EM2301747-018	EM2301747-019	EM2301747-020
					Result	Result	Result	Result	Result
EP231_TOP_C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	----	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg		<0.0005	----	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	----	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	----	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	----	<0.0002	<0.0002	<0.0002
EP231_TOP_D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	----	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	----	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	----	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	----	<0.0005	<0.0005	<0.0005
EP231_TOP_P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		**0.0230**	----	<0.0002	<0.0002	<0.0002
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		**0.0159**	----	<0.0002	<0.0002	<0.0002
Sum of TOP C4 - C14 Carboxylates and C4 - C8 Sulfonates	----	0.0002	mg/kg		**0.0230**	----	<0.0002	<0.0002	<0.0002
Sum of TOP C4 - C14 as Fluorine	----	0.0002	mg/kg		**0.0149**	----	<0.0002	<0.0002	<0.0002
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg		<0.0004	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg		**0.0009**	<0.0002	<0.0002	<0.0002	<0.0002

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	EA_FASH_N7449_2-3 m	EA_FASH_N7451_30m	EA_FASH_N7452_17-17.5m	EA_FASH_N7452_3.5-4.5m	EA_FASH_N7451_18.5-19m
				Sampling date / time	10-Oct-2022 00:00	21-Oct-2022 00:00	19-Oct-2022 00:00	18-Oct-2022 00:00	20-Oct-2022 00:00
Compound	CAS Number	LOR	Unit		EM2301747-016	EM2301747-017	EM2301747-018	EM2301747-019	EM2301747-020
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids - Continued									
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg		<0.0004	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg		**0.0204**	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg		<0.001	<0.001	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg		**0.0002**	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg		**0.0004**	<0.0002	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	EA_FASH_N7449_2-3 m	EA_FASH_N7451_30m	EA_FASH_N7452_17-17.5m	EA_FASH_N7452_3.5-4.5m	EA_FASH_N7451_18.5-19m
				Sampling date / time	10-Oct-2022 00:00	21-Oct-2022 00:00	19-Oct-2022 00:00	18-Oct-2022 00:00	20-Oct-2022 00:00
Compound	CAS Number	LOR	Unit		EM2301747-016	EM2301747-017	EM2301747-018	EM2301747-019	EM2301747-020
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		**0.0219**	<0.0002	<0.0002	<0.0002	<0.0002
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		**0.0213**	<0.0002	<0.0002	<0.0002	<0.0002
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		**0.0215**	<0.0002	<0.0002	<0.0002	<0.0002
EP231_TOP_S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		**86.6**	**----**	**93.4**	**98.7**	**81.4**
13C8-PFOA	----	0.0002	%		**96.1**	**----**	**97.6**	**96.6**	**96.6**
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		**99.5**	**99.8**	**95.5**	**92.0**	**104**
13C8-PFOA	----	0.0002	%		**112**	**98.7**	**112**	**114**	**108**

Analytical Results

Sub-Matrix: SOIL
(Matrix: SOIL)

Compound	CAS Number	LOR	Unit	Sample ID	EA_FASH_N7449_10-11m	EA_FASH_N7451_0.5-1.0m	EA_YTF_N7434_2.5-3m	EA_YTF_N7455_2-2.5m	EA_YTF_N7423_2.5-3m
				Sampling date / time	11-Oct-2022 00:00	20-Oct-2022 00:00	02-Dec-2022 00:00	09-Dec-2022 00:00	30-Nov-2022 00:00
					EM2301747-021	EM2301747-022	EM2301747-023	EM2301747-024	EM2301747-025
					Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		**16.4**	**34.6**	**7.4**	**16.6**	**40.6**
EP231_TOP_A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg		<0.0002	----	----	----	----
EP231_TOP_B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg		<0.001	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg		<0.0005	----	----	----	----
EP231_TOP_C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg		<0.0002	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		<0.0005	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	EA_FASH_N7449_10-11m	EA_FASH_N7451_0.5-1.0m	EA_YTF_N7434_2.5-3m	EA_YTF_N7455_2-2.5m	EA_YTF_N7423_2.5-3m
				Sampling date / time	11-Oct-2022 00:00	20-Oct-2022 00:00	02-Dec-2022 00:00	09-Dec-2022 00:00	30-Nov-2022 00:00
Compound	CAS Number	LOR	Unit		EM2301747-021	EM2301747-022	EM2301747-023	EM2301747-024	EM2301747-025
					Result	Result	Result	Result	Result
EP231_TOP_C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	----	----	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg		<0.0005	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	----	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	----	----	----	----
EP231_TOP_D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	----	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	----	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	----	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	----	----	----	----
EP231_TOP_P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		<0.0002	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		<0.0002	----	----	----	----
Sum of TOP C4 - C14 Carboxylates and C4 - C8 Sulfonates	----	0.0002	mg/kg		<0.0002	----	----	----	----
Sum of TOP C4 - C14 as Fluorine	----	0.0002	mg/kg		<0.0002	----	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	EA_FASH_N7449_10-11m	EA_FASH_N7451_0.5-1.0m	EA_YTF_N7434_2.5-3m	EA_YTF_N7455_2-2.5m	EA_YTF_N7423_2.5-3m
				Sampling date / time	11-Oct-2022 00:00	20-Oct-2022 00:00	02-Dec-2022 00:00	09-Dec-2022 00:00	30-Nov-2022 00:00
Compound	CAS Number	LOR	Unit		EM2301747-021	EM2301747-022	EM2301747-023	EM2301747-024	EM2301747-025
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids - Continued									
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg		<0.001	<0.001	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	EA_FASH_N7449_10-11m	EA_FASH_N7451_0.5-1.0m	EA_YTF_N7434_2.5-3m	EA_YTF_N7455_2-2.5m	EA_YTF_N7423_2.5-3m
				Sampling date / time	11-Oct-2022 00:00	20-Oct-2022 00:00	02-Dec-2022 00:00	09-Dec-2022 00:00	30-Nov-2022 00:00
Compound	CAS Number	LOR	Unit		EM2301747-021	EM2301747-022	EM2301747-023	EM2301747-024	EM2301747-025
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231_TOP_S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		**77.7**	----	----	----	----
13C8-PFOA	----	0.0002	%		**91.4**	----	----	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		**110**	**94.9**	**87.9**	**93.0**	**93.2**
13C8-PFOA	----	0.0002	%		**112**	**91.5**	**89.3**	**98.5**	**86.5**

Analytical Results

Sub-Matrix: **SOIL**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	EA_YTF_N7429_2-2.5	EA_YTF_N7428_1-2 m	EA_YTF_N7426_22.5-23	EA_YEF_N7445_2.5-3 m	EA_MFDBA_2_1.5m
				Sampling date / time	18-Nov-2022 00:00	10-Nov-2022 00:00	09-Nov-2022 00:00	20-Jan-2023 00:00	05-Dec-2022 00:00
					EM2301747-026	EM2301747-027	EM2301747-028	EM2301747-029	EM2301747-030
					Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		**10.5**	**8.4**	**23.3**	**4.8**	**9.6**
EP231_TOP_A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg		<0.0002	----	<0.0002	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg		<0.0002	----	<0.0002	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg		<0.0002	----	<0.0002	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg		<0.0002	----	<0.0002	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg		<0.0002	----	<0.0002	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg		<0.0002	----	<0.0002	----	----
EP231_TOP_B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg		<0.001	----	<0.001	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg		<0.0002	----	<0.0002	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg		<0.0002	----	<0.0002	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg		<0.0002	----	<0.0002	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg		<0.0002	----	<0.0002	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg		<0.0002	----	<0.0002	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg		<0.0002	----	<0.0002	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg		<0.0002	----	<0.0002	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg		<0.0002	----	<0.0002	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg		<0.0002	----	<0.0002	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg		<0.0005	----	<0.0005	----	----
EP231_TOP_C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg		<0.0002	----	<0.0002	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		<0.0005	----	<0.0005	----	----

Analytical Results

Sub-Matrix: **SOIL**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	EA_YTF_N7429_2-2.5	EA_YTF_N7428_1-2 m	EA_YTF_N7426_22.5-23	EA_YEF_N7445_2.5-3 m	EA_MFDBA_2_1.5m
				Sampling date / time	18-Nov-2022 00:00	10-Nov-2022 00:00	09-Nov-2022 00:00	20-Jan-2023 00:00	05-Dec-2022 00:00
					EM2301747-026	EM2301747-027	EM2301747-028	EM2301747-029	EM2301747-030
					Result	Result	Result	Result	Result
EP231_TOP_C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	----	<0.0005	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg		<0.0005	----	<0.0005	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	----	<0.0005	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	----	<0.0002	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	----	<0.0002	----	----
EP231_TOP_D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	----	<0.0005	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	----	<0.0005	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	----	<0.0005	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	----	<0.0005	----	----
EP231_TOP_P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		<0.0002	----	<0.0002	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		<0.0002	----	<0.0002	----	----
Sum of TOP C4 - C14 Carboxylates and C4 - C8 Sulfonates	----	0.0002	mg/kg		<0.0002	----	<0.0002	----	----
Sum of TOP C4 - C14 as Fluorine	----	0.0002	mg/kg		<0.0002	----	<0.0002	----	----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	EA_YTF_N7429_2-2.5	EA_YTF_N7428_1-2 m	EA_YTF_N7426_22.5-23	EA_YEF_N7445_2.5-3 m	EA_MFDBA_2_1.5m
				Sampling date / time	18-Nov-2022 00:00	10-Nov-2022 00:00	09-Nov-2022 00:00	20-Jan-2023 00:00	05-Dec-2022 00:00
Compound	CAS Number	LOR	Unit		EM2301747-026	EM2301747-027	EM2301747-028	EM2301747-029	EM2301747-030
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids - Continued									
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg		<0.001	<0.001	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	EA_YTF_N7429_2-2.5	EA_YTF_N7428_1-2 m	EA_YTF_N7426_22.5-23	EA_YEF_N7445_2.5-3 m	EA_MFDBA_2_1.5m
				Sampling date / time	18-Nov-2022 00:00	10-Nov-2022 00:00	09-Nov-2022 00:00	20-Jan-2023 00:00	05-Dec-2022 00:00
Compound	CAS Number	LOR	Unit		EM2301747-026	EM2301747-027	EM2301747-028	EM2301747-029	EM2301747-030
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231_TOP_S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		**104**	**----**	**92.4**	**----**	**----**
13C8-PFOA	----	0.0002	%		**105**	**----**	**89.8**	**----**	**----**
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		**104**	**98.3**	**118**	**84.4**	**90.1**
13C8-PFOA	----	0.0002	%		**110**	**97.0**	**112**	**99.5**	**103**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	EA_MFDBA_1-1.0m	EA_YMF_N7510_9 m	EA_YMF_N7444_9.5 m	EA_YMF_M4224_1 m	EA_MFD_N7443_8.5 m
			Sampling date / time	05-Dec-2022 00:00	31-Jan-2023 00:00	27-Jan-2023 00:00	31-Jan-2023 00:00	30-Jan-2023 00:00
Compound	CAS Number	LOR	Unit	EM2301747-031	EM2301747-032	EM2301747-033	EM2301747-034	EM2301747-035
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	**10.7**	**7.3**	**6.4**	**4.1**	**2.3**
EP231_TOP_A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	----	----	<0.0002	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	----	----	<0.0002	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	----	----	<0.0002	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	----	----	<0.0002	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	----	----	<0.0002	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	----	----	<0.0002	----	----
EP231_TOP_B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	----	----	<0.001	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	----	----	<0.0002	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	----	----	<0.0002	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	----	----	<0.0002	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	----	----	<0.0002	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	----	----	<0.0002	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	----	----	<0.0002	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	----	----	<0.0002	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	----	----	<0.0002	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	----	----	<0.0002	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	----	----	<0.0005	----	----
EP231_TOP_C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	----	----	<0.0002	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	----	----	<0.0005	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	EA_MFDBA_1-1.0m	EA_YMF_N7510_9 m	EA_YMF_N7444_9.5 m	EA_YMF_M4224_1 m	EA_MFD_N7443_8.5 m
				Sampling date / time	05-Dec-2022 00:00	31-Jan-2023 00:00	27-Jan-2023 00:00	31-Jan-2023 00:00	30-Jan-2023 00:00
Compound	CAS Number	LOR	Unit		EM2301747-031	EM2301747-032	EM2301747-033	EM2301747-034	EM2301747-035
					Result	Result	Result	Result	Result
EP231_TOP_C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		----	----	<0.0005	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg		----	----	<0.0005	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		----	----	<0.0005	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		----	----	<0.0002	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		----	----	<0.0002	----	----
EP231_TOP_D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		----	----	<0.0005	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		----	----	<0.0005	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		----	----	<0.0005	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		----	----	<0.0005	----	----
EP231_TOP_P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		----	----	<0.0002	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		----	----	<0.0002	----	----
Sum of TOP C4 - C14 Carboxylates and C4 - C8 Sulfonates	----	0.0002	mg/kg		----	----	<0.0002	----	----
Sum of TOP C4 - C14 as Fluorine	----	0.0002	mg/kg		----	----	<0.0002	----	----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	EA_MFDBA_1-1.0m	EA_YMF_N7510_9 m	EA_YMF_N7444_9.5 m	EA_YMF_M4224_1 m	EA_MFD_N7443_8.5 m
				Sampling date / time	05-Dec-2022 00:00	31-Jan-2023 00:00	27-Jan-2023 00:00	31-Jan-2023 00:00	30-Jan-2023 00:00
Compound	CAS Number	LOR	Unit		EM2301747-031	EM2301747-032	EM2301747-033	EM2301747-034	EM2301747-035
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids - Continued									
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg		<0.001	<0.001	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	EA_MFDBA_1-1.0m	EA_YMF_N7510_9 m	EA_YMF_N7444_9.5 m	EA_YMF_M4224_1 m	EA_MFD_N7443_8.5 m
				Sampling date / time	05-Dec-2022 00:00	31-Jan-2023 00:00	27-Jan-2023 00:00	31-Jan-2023 00:00	30-Jan-2023 00:00
Compound	CAS Number	LOR	Unit		EM2301747-031	EM2301747-032	EM2301747-033	EM2301747-034	EM2301747-035
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231_TOP_S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		**----**	**----**	**128**	**----**	**----**
13C8-PFOA	----	0.0002	%		**----**	**----**	**96.6**	**----**	**----**
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		**106**	**106**	**118**	**85.0**	**129**
13C8-PFOA	----	0.0002	%		**102**	**99.0**	**110**	**83.2**	**84.2**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	EA_YMF_M4223_12.5-13 m	EA_YMF_M4224_10 m	EA_MFD_N7443_3 m	EA_YMF_N7509_9 m	EA_YMF_N7509_2.5 m
			Sampling date / time	30-Jan-2023 00:00	31-Jan-2023 00:00	30-Jan-2023 00:00	31-Jan-2023 00:00	31-Jan-2023 00:00
Compound	CAS Number	LOR	Unit	EM2301747-036	EM2301747-037	EM2301747-038	EM2301747-039	EM2301747-040
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	**17.6**	**9.6**	**12.0**	**9.7**	**20.7**
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	<0.0004	<0.0002	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0004	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0004	<0.0002	<0.0002
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0004	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0004	<0.0002	<0.0002
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0004	<0.0002	<0.0002
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	<0.002	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0004	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0004	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0004	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0004	<0.0002	<0.0002
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0004	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	<0.0004	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0004	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0004	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0004	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0009	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0004	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0009	<0.0005	<0.0005

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	EA_YMF_M4223_12.5-13 m	EA_YMF_M4224_10 m	EA_MFD_N7443_3 m	EA_YMF_N7509_9 m	EA_YMF_N7509_2.5 m
				Sampling date / time	30-Jan-2023 00:00	31-Jan-2023 00:00	30-Jan-2023 00:00	31-Jan-2023 00:00	31-Jan-2023 00:00
Compound	CAS Number	LOR	Unit		EM2301747-036	EM2301747-037	EM2301747-038	EM2301747-039	EM2301747-040
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0009	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0009	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0009	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0004	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0004	<0.0002	<0.0002
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		<0.0002	<0.0002	<0.0004	<0.0002	<0.0002
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0004	<0.0002	<0.0002
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		<0.0002	<0.0002	<0.0004	<0.0002	<0.0002
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		**98.2**	**97.8**	**133**	**78.2**	**104**
13C8-PFOA	----	0.0002	%		**76.8**	**94.0**	**84.0**	**86.2**	**82.5**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	EA_YMF_N7444_1.5 m	EA_YMF_N7510_2 m	EA_YMF_M4223_2-2.5 m	QC01	QC05
				Sampling date / time	27-Jan-2023 00:00	31-Jan-2023 00:00	25-Jan-2023 00:00	[03-Nov-2022]	03-Nov-2022 00:00
Compound	CAS Number	LOR	Unit		EM2301747-041	EM2301747-042	EM2301747-043	EM2301747-044	EM2301747-045
					Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		**3.2**	**16.9**	**7.2**	**35.0**	**10.5**
EP231_TOP_A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg		----	----	<0.0002	<0.0002	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg		----	----	<0.0002	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg		----	----	<0.0002	<0.0002	<0.0002
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg		----	----	<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg		----	----	<0.0002	<0.0002	<0.0002
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg		----	----	<0.0002	<0.0002	<0.0002
EP231_TOP_B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg		----	----	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg		----	----	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg		----	----	<0.0002	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg		----	----	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg		----	----	<0.0002	<0.0002	<0.0002
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg		----	----	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg		----	----	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg		----	----	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg		----	----	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg		----	----	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg		----	----	<0.0005	<0.0005	<0.0005
EP231_TOP_C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg		----	----	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		----	----	<0.0005	<0.0005	<0.0005

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	EA_YMF_N7444_1.5 m	EA_YMF_N7510_2 m	EA_YMF_M4223_2-2.5 m	QC01	QC05
				Sampling date / time	27-Jan-2023 00:00	31-Jan-2023 00:00	25-Jan-2023 00:00	[03-Nov-2022]	03-Nov-2022 00:00
Compound	CAS Number	LOR	Unit		EM2301747-041	EM2301747-042	EM2301747-043	EM2301747-044	EM2301747-045
					Result	Result	Result	Result	Result
EP231_TOP_C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		----	----	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg		----	----	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		----	----	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		----	----	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		----	----	<0.0002	<0.0002	<0.0002
EP231_TOP_D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		----	----	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		----	----	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		----	----	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		----	----	<0.0005	<0.0005	<0.0005
EP231_TOP_P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		----	----	<0.0002	<0.0002	<0.0002
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		----	----	<0.0002	<0.0002	<0.0002
Sum of TOP C4 - C14 Carboxylates and C4 - C8 Sulfonates	----	0.0002	mg/kg		----	----	<0.0002	<0.0002	<0.0002
Sum of TOP C4 - C14 as Fluorine	----	0.0002	mg/kg		----	----	<0.0002	<0.0002	<0.0002
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	EA_YMF_N7444_1.5 m	EA_YMF_N7510_2 m	EA_YMF_M4223_2-2.5 m	QC01	QC05
			Sampling date / time	27-Jan-2023 00:00	31-Jan-2023 00:00	25-Jan-2023 00:00	[03-Nov-2022]	03-Nov-2022 00:00
Compound	CAS Number	LOR	Unit	EM2301747-041	EM2301747-042	EM2301747-043	EM2301747-044	EM2301747-045
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids - Continued								
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	EA_YMF_N7444_1.5 m	EA_YMF_N7510_2 m	EA_YMF_M4223_2-2.5 m	QC01	QC05
				Sampling date / time	27-Jan-2023 00:00	31-Jan-2023 00:00	25-Jan-2023 00:00	[03-Nov-2022]	03-Nov-2022 00:00
Compound	CAS Number	LOR	Unit		EM2301747-041	EM2301747-042	EM2301747-043	EM2301747-044	EM2301747-045
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231_TOP_S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		----	----	111	103	108
13C8-PFOA	----	0.0002	%		----	----	99.8	78.2	95.0
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		80.2	86.8	102	82.5	104
13C8-PFOA	----	0.0002	%		83.5	79.2	108	112	108

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	QC07	QC11	QC13	QC19	----
			Sampling date / time	10-Nov-2022 00:00	[03-Nov-2022]	[03-Nov-2022]	31-Jan-2023 00:00	----
Compound	CAS Number	LOR	Unit	EM2301747-046	EM2301747-047	EM2301747-048	EM2301747-049	--------
				Result	Result	Result	Result	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	**9.3**	**16.7**	**10.4**	**13.2**	**----**
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	**----**
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	**----**
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	**----**
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	**----**
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	**----**
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	**----**
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	<0.001	<0.001	**----**
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	**----**
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	**----**
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	**----**
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	**----**
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	**----**
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	**----**
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	**----**
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	**----**
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	**----**
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	**----**
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	**----**
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	**----**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	QC07	QC11	QC13	QC19	----
				Sampling date / time	10-Nov-2022 00:00	[03-Nov-2022]	[03-Nov-2022]	31-Jan-2023 00:00	----
Compound	CAS Number	LOR	Unit		EM2301747-046	EM2301747-047	EM2301747-048	EM2301747-049	--------
					Result	Result	Result	Result	----
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	----
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	----
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		**75.2**	**96.0**	**116**	**100**	----
13C8-PFOA	----	0.0002	%		**82.2**	**77.0**	**87.5**	**104**	----

Surrogate Control Limits

Sub-Matrix: **SOIL**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP231_TOP_S: PFAS Surrogate			
13C4-PFOS	----	47	129
13C8-PFOA	----	56	128
EP231S: PFAS Surrogate			
13C4-PFOS	----	76	136
13C8-PFOA	----	78	131

Inter-Laboratory Testing

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

(SOIL) EP231_TOP_A: Perfluoroalkyl Sulfonic Acids

(SOIL) EP231_TOP_B: Perfluoroalkyl Carboxylic Acids

(SOIL) EP231_TOP_C: Perfluoroalkyl Sulfonamides

(SOIL) EP231_TOP_D: (n:2) Fluorotelomer Sulfonic Acids

(SOIL) EP231_TOP_P: PFAS Sums

(SOIL) EP231_TOP_S: PFAS Surrogate

Analysis conducted by ALS Brisbane, NATA accreditation no. 825, site no. 818 (Chemistry) 18958 (Biology). Only applies to samples EM2301747 (001, 002, 005, 013, 015, 016, 018, 019, 020, 021, 026, 028, 033, 043, 044, 045).

(SOIL) EP231B: Perfluoroalkyl Carboxylic Acids

(SOIL) EP231D: (n:2) Fluorotelomer Sulfonic Acids

(SOIL) EP231C: Perfluoroalkyl Sulfonamides

(SOIL) EP231A: Perfluoroalkyl Sulfonic Acids

(SOIL) EP231P: PFAS Sums

(SOIL) EP231S: PFAS Surrogate

(SOIL) EA055: Moisture Content (Dried @ 105-110°C)

CERTIFICATE OF ANALYSIS

Work Order	: **EM2312404**	Page	: 1 of 9
Client	: **RGS ENVIRONMENTAL CONSULTANTS PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: MATT LANDERS	Contact	: Customer Services EM
Address	: 3/30 LENSWORTH STREET COOPERS PLAINS 4108	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: 07 3344 1222	Telephone	: +61-3-8549 9600
Project	: 2021048	Date Samples Received	: 10-Jul-2023 10:05
Order number	: ----	Date Analysis Commenced	: 10-Jul-2023
C-O-C number	: ----	Issue Date	: 18-Jul-2023 14:59
Sampler	: Ben Freidman		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 4		
No. of samples analysed	: 4		

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*
Dilani Fernando	Laboratory Coordinator	Melbourne Inorganics, Springvale, VIC
Evie Sidarta	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Franco Lentini	LCMS Coordinator	Sydney Organics, Smithfield, NSW
Sanjay Parekh	LCMS Coordinator	Melbourne Organics, Springvale, VIC

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.

- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	N7453_0-1 m	N7453_1-2 m	N7453_3-4 m	N7453_6-7 m	----
				Sampling date / time	31-May-2023 00:00	31-May-2023 00:00	31-May-2023 00:00	31-May-2023 00:00	----
Compound	CAS Number	LOR	Unit		EM2312404-001	EM2312404-002	EM2312404-003	EM2312404-004	--------
					Result	Result	Result	Result	----
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		**----**	**10.4**	**13.3**	**19.1**	**----**
Moisture Content	----	0.1	%		**18.2**	**----**	**----**	**----**	**----**
EP231_TOP_A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg		<0.0002	----	----	----	----
EP231_TOP_B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg		<0.001	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg		<0.0005	----	----	----	----
EP231_TOP_C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg		<0.0002	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	N7453_0-1 m	N7453_1-2 m	N7453_3-4 m	N7453_6-7 m	----
				Sampling date / time	31-May-2023 00:00	31-May-2023 00:00	31-May-2023 00:00	31-May-2023 00:00	----
Compound	CAS Number	LOR	Unit		EM2312404-001	EM2312404-002	EM2312404-003	EM2312404-004	--------
					Result	Result	Result	Result	----
EP231_TOP_C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		<0.0005	----	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	----	----	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg		<0.0005	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	----	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	----	----	----	----
EP231_TOP_D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	----	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	----	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	----	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	----	----	----	----
EP231_TOP_P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		<0.0002	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		<0.0002	----	----	----	----
Sum of TOP C4 - C14 Carboxylates and C4 - C8 Sulfonates	----	0.0002	mg/kg		<0.0002	----	----	----	----
Sum of TOP C4 - C14 as Fluorine	----	0.0002	mg/kg		<0.0002	----	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg		----	**0.0002**	<0.0002	<0.0002	----
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg		<0.0002	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	N7453_0-1 m	N7453_1-2 m	N7453_3-4 m	N7453_6-7 m	----
				Sampling date / time	31-May-2023 00:00	31-May-2023 00:00	31-May-2023 00:00	31-May-2023 00:00	----
Compound	CAS Number	LOR	Unit		EM2312404-001	EM2312404-002	EM2312404-003	EM2312404-004	--------
					Result	Result	Result	Result	----
EP231A: Perfluoroalkyl Sulfonic Acids - Continued									
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg		----	**0.0006**	<0.0002	<0.0002	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg		----	**0.0175**	<0.0002	<0.0002	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg		----	**0.0019**	<0.0002	<0.0002	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg		----	**0.0996**	**0.0005**	<0.0002	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg		----	<0.0002	<0.0002	<0.0002	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg		<0.0002	----	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg		----	<0.001	<0.001	<0.001	----
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg		<0.001	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg		----	<0.0002	<0.0002	<0.0002	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg		----	**0.0008**	<0.0002	<0.0002	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg		----	**0.0002**	<0.0002	<0.0002	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg		----	**0.0044**	<0.0002	<0.0002	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg		----	**0.0010**	<0.0002	<0.0002	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg		----	<0.0002	<0.0002	<0.0002	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg		<0.0002	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	N7453_0-1 m	N7453_1-2 m	N7453_3-4 m	N7453_6-7 m	----
				Sampling date / time	31-May-2023 00:00	31-May-2023 00:00	31-May-2023 00:00	31-May-2023 00:00	----
Compound	CAS Number	LOR	Unit		EM2312404-001	EM2312404-002	EM2312404-003	EM2312404-004	--------
					Result	Result	Result	Result	----
EP231B: Perfluoroalkyl Carboxylic Acids - Continued									
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg		----	<0.0002	<0.0002	<0.0002	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg		----	<0.0002	<0.0002	<0.0002	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg		----	<0.0002	<0.0002	<0.0002	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg		----	<0.0005	<0.0005	<0.0005	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg		<0.0005	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg		----	**0.0002**	<0.0002	<0.0002	----
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg		<0.0002	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		----	<0.0005	<0.0005	<0.0005	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		<0.0005	----	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		----	<0.0005	<0.0005	<0.0005	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	----	----	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg		----	<0.0005	<0.0005	<0.0005	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg		<0.0005	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		----	<0.0005	<0.0005	<0.0005	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	N7453_0-1 m	N7453_1-2 m	N7453_3-4 m	N7453_6-7 m	----
				Sampling date / time	31-May-2023 00:00	31-May-2023 00:00	31-May-2023 00:00	31-May-2023 00:00	----
Compound	CAS Number	LOR	Unit		EM2312404-001	EM2312404-002	EM2312404-003	EM2312404-004	--------
					Result	Result	Result	Result	----
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	----	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		----	<0.0002	<0.0002	<0.0002	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		----	<0.0002	**0.0006**	<0.0002	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	----	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		----	<0.0005	<0.0005	<0.0005	----
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	----	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		----	<0.0005	<0.0005	<0.0005	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	----	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		----	<0.0005	<0.0005	<0.0005	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	----	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		----	<0.0005	<0.0005	<0.0005	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	----	----	----	----
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		----	**0.126**	**0.0011**	<0.0002	----
Sum of PFAS	----	0.0002	mg/kg		<0.0002	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		----	**0.117**	**0.0005**	<0.0002	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	N7453_0-1 m	N7453_1-2 m	N7453_3-4 m	N7453_6-7 m	----
				Sampling date / time	31-May-2023 00:00	31-May-2023 00:00	31-May-2023 00:00	31-May-2023 00:00	----
Compound	CAS Number	LOR	Unit		EM2312404-001	EM2312404-002	EM2312404-003	EM2312404-004	--------
					Result	Result	Result	Result	----
EP231P: PFAS Sums - Continued									
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		<0.0002	----	----	----	----
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		----	**0.123**	**0.0005**	<0.0002	----
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		<0.0002	----	----	----	----
EP231_TOP_S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		**90.7**	----	----	----	----
13C8-PFOA	----	0.0002	%		**103**	----	----	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		----	**117**	**134**	**121**	----
13C4-PFOS	----	0.0002	%		**86.8**	----	----	----	----
13C8-PFOA	----	0.0002	%		----	**99.5**	**100**	**103**	----
13C8-PFOA	----	0.0002	%		**96.4**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP231_TOP_S: PFAS Surrogate			
13C4-PFOS	----	60	130
13C8-PFOA	----	60	130
EP231S: PFAS Surrogate			
13C4-PFOS	----	60	120
13C8-PFOA	----	60	120

Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(SOIL) EP231_TOP_A: Perfluoroalkyl Sulfonic Acids

(SOIL) EP231_TOP_B: Perfluoroalkyl Carboxylic Acids

(SOIL) EP231_TOP_C: Perfluoroalkyl Sulfonamides

(SOIL) EP231_TOP_D: (n:2) Fluorotelomer Sulfonic Acids

(SOIL) EP231_TOP_P: PFAS Sums

(SOIL) EP231_TOP_S: PFAS Surrogate

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology). Only applies to samples EM2312404 (001).

(SOIL) EP231B: Perfluoroalkyl Carboxylic Acids

(SOIL) EP231D: (n:2) Fluorotelomer Sulfonic Acids

(SOIL) EP231C: Perfluoroalkyl Sulfonamides

(SOIL) EP231A: Perfluoroalkyl Sulfonic Acids

(SOIL) EP231P: PFAS Sums

(SOIL) EP231S: PFAS Surrogate

(SOIL) EA055: Moisture Content (Dried @ 105-110°C)

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES2303840**	Page	: 1 of 9
Client	: **RGS ENVIRONMENTAL CONSULTANTS PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MATT LANDERS	Contact	: Customer Services ES
Address	: 3/30 LENSWORTH STREET COOPERS PLAINS 4108	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: 07 3344 1222	Telephone	: +61-2-8784 8555
Project	: 2021048 Yallourn	Date Samples Received	: 07-Feb-2023 13:55
Order number	: ----	Date Analysis Commenced	: 09-Feb-2023
C-O-C number	: ----	Issue Date	: 14-Feb-2023 15:55
Sampler	: BEN FREIDMAN		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 6		
No. of samples analysed	: 6		

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*
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Franco Lentini	LCMS Coordinator	Sydney Inorganics, Smithfield, NSW
Franco Lentini	LCMS Coordinator	Sydney Organics, 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.

- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	QC02	QC06	QC08	QC12	QC14
			Sampling date / time	07-Feb-2023 00:00	03-Nov-2022 00:00	10-Nov-2022 00:00	07-Feb-2023 00:00	07-Feb-2023 00:00
Compound	CAS Number	LOR	Unit	ES2303840-001	ES2303840-002	ES2303840-003	ES2303840-004	ES2303840-005
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	36.2	13.4	17.3	15.6	18.7
EP231_TOP_A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
EP231_TOP_B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
EP231_TOP_C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	QC02	QC06	QC08	QC12	QC14
				Sampling date / time	07-Feb-2023 00:00	03-Nov-2022 00:00	10-Nov-2022 00:00	07-Feb-2023 00:00	07-Feb-2023 00:00
Compound	CAS Number	LOR	Unit		ES2303840-001	ES2303840-002	ES2303840-003	ES2303840-004	ES2303840-005
					Result	Result	Result	Result	Result
EP231_TOP_C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	<0.0005	----	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg		<0.0005	<0.0005	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	<0.0005	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	<0.0002	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	<0.0002	----	----	----
EP231_TOP_D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	<0.0005	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	<0.0005	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	<0.0005	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	<0.0005	----	----	----
EP231_TOP_P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		<0.0002	<0.0002	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		<0.0002	<0.0002	----	----	----
Sum of TOP C4 - C14 Carboxylates and C4 - C8 Sulfonates	----	0.0002	mg/kg		<0.0002	<0.0002	----	----	----
Sum of TOP C4 - C14 as Fluorine	----	0.0002	mg/kg		<0.0002	<0.0002	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	QC02	QC06	QC08	QC12	QC14
			Sampling date / time	07-Feb-2023 00:00	03-Nov-2022 00:00	10-Nov-2022 00:00	07-Feb-2023 00:00	07-Feb-2023 00:00
Compound	CAS Number	LOR	Unit	ES2303840-001	ES2303840-002	ES2303840-003	ES2303840-004	ES2303840-005
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids - Continued								
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	QC02	QC06	QC08	QC12	QC14
				Sampling date / time	07-Feb-2023 00:00	03-Nov-2022 00:00	10-Nov-2022 00:00	07-Feb-2023 00:00	07-Feb-2023 00:00
Compound	CAS Number	LOR	Unit		ES2303840-001	ES2303840-002	ES2303840-003	ES2303840-004	ES2303840-005
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231_TOP_S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		**74.0**	**86.6**	**----**	**----**	**----**
13C8-PFOA	----	0.0002	%		**84.0**	**67.2**	**----**	**----**	**----**
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		**102**	**89.5**	**100**	**100**	**92.5**
13C8-PFOA	----	0.0002	%		**94.0**	**104**	**98.5**	**104**	**104**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	QC20	----	----	----	----
			Sampling date / time	07-Feb-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2303840-006	--------	--------	--------	--------
				Result	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	**8.6**	----	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	----	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	----	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	QC20	----	----	----	----
				Sampling date / time	07-Feb-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2303840-006	--------	--------	--------	--------
					Result	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	----	----	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg		<0.0005	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	----	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	----	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	----	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	----	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	----	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	----	----	----	----
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		<0.0002	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		<0.0002	----	----	----	----
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		<0.0002	----	----	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		**96.0**	----	----	----	----
13C8-PFOA	----	0.0002	%		**97.5**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **SOIL**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP231_TOP_S: PFAS Surrogate			
13C4-PFOS	----	60	130
13C8-PFOA	----	60	130
EP231S: PFAS Surrogate			
13C4-PFOS	----	60	120
13C8-PFOA	----	60	120

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To: **ALS ENVIRONMENTAL**
32 SHAND STREET
STAFFORD QLD 4053

Finalized Date: 4-NOV-2022
Account: ALSENV

CERTIFICATE BR22307310

Project: EB2230815

P.O. No.: ME-MS41

This report is for 15 samples of Pulp submitted to our lab in Brisbane, QLD, Australia on 20-OCT-2022.

The following have access to data associated with this certificate:

SUB RESULTS -BRIS		

SAMPLE PREPARATION

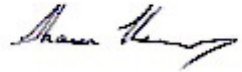
ALS CODE	DESCRIPTION
LOG-24	Pulp Login - Rcd w/o Barcode
LEV-01	Waste Disposal Levy

ANALYTICAL PROCEDURES

ALS CODE	DESCRIPTION	INSTRUMENT
ME-MS41	Ultra Trace Aqua Regia ICP-MS	

This is the Final Report and supersedes any preliminary report with this certificate number.Results apply to samples as submitted.All pages of this report have been checked and approved for release.
***** See Appendix Page for comments regarding this certificate *****

Signature:



Shaun Kenny, Brisbane Laboratory Manager

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STAFFORD QLD 4053

Finalized Date: 4-NOV-2022
Account: ALSENV

Project: EB2230815

CERTIFICATE OF ANALYSIS BR22307310

Sample Description	Method	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41
	Analyte	Ag	Al	As	Au	B	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu
	Units	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm
	LOD	0.01	0.01	0.1	0.02	10	10	0.05	0.01	0.01	0.01	0.02	0.1	1	0.05	0.2
2022057_007 EAY_KLC_C_7		<0.01	0.30	0.4	<0.02	<10	50	0.44	<0.01	0.03	<0.01	4.50	3.0	1	<0.05	0.5
2022057_015 EAY_KLC_C_15		<0.01	0.10	0.2	<0.02	<10	90	<0.05	0.01	0.13	0.01	1.25	1.0	7	0.06	2.0
2022057_026 EAY_KLC_C_26		<0.01	0.03	0.1	<0.02	<10	80	<0.05	<0.01	0.10	<0.01	0.37	0.3	3	<0.05	0.6
2022057_031 EAY_KLC_C_31		0.01	0.07	0.3	<0.02	<10	170	0.07	0.01	0.15	0.01	0.69	3.2	12	0.05	1.4
2022057_043 EAY_KLC_C_43		<0.01	0.06	0.2	<0.02	<10	140	0.05	0.01	0.19	<0.01	1.30	1.0	3	0.05	1.2
2022057_046 EAY_KLC_C_46		<0.01	0.60	0.5	<0.02	<10	140	0.56	0.01	0.06	0.01	17.15	12.1	20	0.09	2.2
2022057_055 EAY_KLC_C_55		<0.01	0.23	1.1	<0.02	<10	60	0.31	0.01	0.07	0.01	3.87	2.6	63	0.23	1.6
2022057_063 EAY_KLC_C_63		<0.01	0.05	0.3	<0.02	<10	80	<0.05	<0.01	0.12	<0.01	0.78	0.7	3	<0.05	0.8
2022057_064 EAY_KLC_C_64		<0.01	0.02	0.3	<0.02	<10	100	<0.05	<0.01	0.10	<0.01	0.45	0.2	2	0.05	0.6
2022057_067 EAY_KLC_C_67		<0.01	0.36	1.5	<0.02	<10	50	0.71	<0.01	0.09	<0.01	4.85	155.0	18	<0.05	0.6
2022057_068 EAY_KLC_C_68		<0.01	0.25	1.1	<0.02	<10	40	0.51	<0.01	0.06	<0.01	3.37	165.0	2	<0.05	0.3
2022057_069 EAY_KLC_C_69		<0.01	0.43	1.4	<0.02	<10	40	0.81	<0.01	0.05	0.02	5.75	17.3	13	<0.05	0.6
2022057_073 EAY_KLC_OB_3		<0.01	0.25	0.2	<0.02	<10	20	<0.05	0.01	<0.01	0.01	10.45	0.5	126	0.37	1.3
2022057_077 EAY_KLC_OB_7		0.01	0.66	0.2	<0.02	<10	40	0.14	0.04	0.01	0.01	18.05	0.8	59	0.76	2.7
2022057_080 EAY_KLC_OB_10		0.02	0.87	1.0	<0.02	<10	80	0.34	0.06	0.13	0.03	28.6	6.2	64	0.73	6.7

***** See Appendix Page for comments regarding this certificate *****

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To: ALS ENVIRONMENTAL
32 SHAND STREET
STAFFORD QLD 4053

Project: EB2230815

CERTIFICATE OF ANALYSIS BR22307310

Sample Description / Method / Analyte / Units / LOD	ME-MS41 Fe % 0.01	ME-MS41 Ga ppm 0.05	ME-MS41 Ge ppm 0.05	ME-MS41 Hf ppm 0.02	ME-MS41 Hg ppm 0.01	ME-MS41 In ppm 0.005	ME-MS41 K % 0.01	ME-MS41 La ppm 0.2	ME-MS41 Li ppm 0.1	ME-MS41 Mg % 0.01	ME-MS41 Mn ppm 5	ME-MS41 Mo ppm 0.05	ME-MS41 Na % 0.01	ME-MS41 Nb ppm 0.05	ME-MS41 Ni ppm 0.2
2022057_007 EAY_KLC_C_7	0.43	<0.05	<0.05	<0.02	0.05	<0.005	<0.01	2.9	0.3	0.04	6	<0.05	0.01	<0.05	3.0
2022057_015 EAY_KLC_C_15	0.44	0.27	<0.05	0.02	0.06	<0.005	0.01	0.6	0.6	0.15	23	0.07	0.11	0.07	2.7
2022057_026 EAY_KLC_C_26	0.19	0.07	<0.05	<0.02	0.04	<0.005	0.01	0.2	0.3	0.11	31	<0.05	0.04	<0.05	2.7
2022057_031 EAY_KLC_C_31	0.24	0.21	<0.05	<0.02	0.07	<0.005	0.02	0.3	0.4	0.29	33	0.05	0.11	0.05	2.6
2022057_043 EAY_KLC_C_43	0.54	0.15	<0.05	<0.02	0.04	<0.005	0.01	0.6	0.5	0.16	97	<0.05	0.07	<0.05	1.1
2022057_046 EAY_KLC_C_46	0.59	0.42	0.14	0.03	0.12	<0.005	0.01	7.9	0.4	0.05	39	0.15	0.04	0.21	18.0
2022057_055 EAY_KLC_C_55	0.36	0.58	<0.05	0.04	0.07	<0.005	0.01	1.9	0.8	0.14	30	0.34	0.06	0.06	2.4
2022057_063 EAY_KLC_C_63	0.26	0.17	<0.05	<0.02	0.11	<0.005	<0.01	0.4	0.5	0.19	61	<0.05	0.08	<0.05	1.2
2022057_064 EAY_KLC_C_64	0.37	0.07	<0.05	<0.02	0.10	<0.005	0.01	0.2	0.3	0.16	46	<0.05	0.09	<0.05	0.6
2022057_067 EAY_KLC_C_67	0.87	0.08	<0.05	<0.02	0.10	<0.005	<0.01	3.4	0.3	0.16	25	0.06	0.05	<0.05	38.7
2022057_068 EAY_KLC_C_68	1.03	<0.05	<0.05	<0.02	0.06	<0.005	<0.01	2.4	0.3	0.11	18	<0.05	0.04	<0.05	33.4
2022057_069 EAY_KLC_C_69	0.12	0.12	<0.05	0.02	0.06	<0.005	<0.01	4.1	0.4	0.14	14	0.05	0.12	<0.05	5.5
2022057_073 EAY_KLC_OB_3	0.26	0.95	<0.05	0.19	0.02	<0.005	0.01	4.7	1.0	0.01	25	0.50	<0.01	0.07	1.9
2022057_077 EAY_KLC_OB_7	0.55	2.23	<0.05	0.06	0.02	0.009	0.03	9.0	1.5	0.04	13	0.14	0.02	0.21	2.2
2022057_080 EAY_KLC_OB_10	1.62	2.60	<0.05	0.12	0.03	0.016	0.04	14.1	3.5	0.14	202	0.42	0.02	1.29	9.5

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32 SHAND STREET
STAFFORD QLD 4053

Finalized Date: 4-NOV-2022
Account: ALSENV

Project: EB2230815

CERTIFICATE OF ANALYSIS BR22307310

Sample Description	Method	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41
	Analyte	P	Pb	Rb	Re	S	Sb	Sc	Se	Sn	Sr	Ta	Te	Th	Ti	Tl
	Units	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm
	LOD	10	0.2	0.1	0.001	0.01	0.05	0.1	0.2	0.2	0.2	0.01	0.01	0.2	0.005	0.02
2022057_007 EAY_KLC_C_7		30	<0.2	0.1	<0.001	0.26	<0.05	0.1	0.5	<0.2	5.8	0.01	<0.01	<0.2	<0.005	0.09
2022057_015 EAY_KLC_C_15		20	0.5	0.3	<0.001	0.13	<0.05	0.3	0.4	<0.2	18.7	<0.01	<0.01	0.2	<0.005	<0.02
2022057_026 EAY_KLC_C_26		10	<0.2	0.2	<0.001	0.12	<0.05	0.1	0.5	<0.2	16.2	<0.01	<0.01	<0.2	<0.005	0.02
2022057_031 EAY_KLC_C_31		20	0.5	1.0	<0.001	0.16	<0.05	0.2	0.6	<0.2	23.3	<0.01	<0.01	<0.2	<0.005	<0.02
2022057_043 EAY_KLC_C_43		20	0.4	0.7	<0.001	0.14	<0.05	0.2	0.6	<0.2	34.0	<0.01	<0.01	<0.2	<0.005	<0.02
2022057_046 EAY_KLC_C_46		20	1.6	0.7	<0.001	0.21	<0.05	1.1	0.6	<0.2	12.4	0.01	<0.01	0.6	0.008	<0.02
2022057_055 EAY_KLC_C_55		10	0.8	1.0	<0.001	0.23	0.05	0.5	0.3	0.2	15.1	<0.01	<0.01	0.5	<0.005	0.02
2022057_063 EAY_KLC_C_63		10	0.2	0.3	<0.001	0.14	<0.05	0.2	0.6	<0.2	24.5	<0.01	<0.01	<0.2	<0.005	<0.02
2022057_064 EAY_KLC_C_64		<10	0.2	0.6	<0.001	0.10	<0.05	0.1	0.4	<0.2	15.5	<0.01	<0.01	<0.2	<0.005	<0.02
2022057_067 EAY_KLC_C_67		10	0.2	0.2	<0.001	1.06	<0.05	0.1	0.5	<0.2	16.4	<0.01	<0.01	<0.2	<0.005	0.23
2022057_068 EAY_KLC_C_68		10	<0.2	0.1	<0.001	1.30	0.05	0.1	0.5	<0.2	10.9	<0.01	<0.01	<0.2	<0.005	0.24
2022057_069 EAY_KLC_C_69		10	0.3	0.2	<0.001	0.38	<0.05	0.3	0.6	<0.2	11.3	<0.01	<0.01	0.2	<0.005	0.03
2022057_073 EAY_KLC_OB_3		20	1.2	1.6	<0.001	<0.01	<0.05	0.7	<0.2	0.2	1.8	<0.01	<0.01	2.1	0.011	<0.02
2022057_077 EAY_KLC_OB_7		40	5.4	4.5	<0.001	0.01	<0.05	1.4	0.2	0.4	3.8	<0.01	<0.01	2.4	0.010	0.03
2022057_080 EAY_KLC_OB_10		360	6.2	6.2	<0.001	0.01	<0.05	2.3	0.2	0.5	16.6	<0.01	<0.01	2.5	0.046	0.06

***** See Appendix Page for comments regarding this certificate *****

Australian Laboratory Services Pty. Ltd.

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www.alsglobal.com/geochemistry

ALS Brisbane is a NATA Accredited Testing Laboratory. Corporate Accreditation No: 825, Corporate Site No: 818.

To: ALS ENVIRONMENTAL
32 SHAND STREET
STAFFORD QLD 4053

Finalized Date: 4-NOV-2022
Account: ALSENV

Project: EB2230815

CERTIFICATE OF ANALYSIS BR22307310

Sample Description	Method	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41
	Analyte	U	V	W	Y	Zn	Zr
	Units	ppm	ppm	ppm	ppm	ppm	ppm
	LOD	0.05	1	0.05	0.05	2	0.5
2022057_007 EAY_KLC_C_7		<0.05	<1	<0.05	1.43	7	<0.5
2022057_015 EAY_KLC_C_15		<0.05	2	<0.05	0.32	5	0.5
2022057_026 EAY_KLC_C_26		<0.05	<1	<0.05	0.11	2	<0.5
2022057_031 EAY_KLC_C_31		<0.05	1	<0.05	0.19	20	<0.5
2022057_043 EAY_KLC_C_43		<0.05	1	<0.05	0.36	4	<0.5
2022057_046 EAY_KLC_C_46		0.11	3	0.05	8.26	14	0.9
2022057_055 EAY_KLC_C_55		0.13	3	0.11	1.02	5	1.2
2022057_063 EAY_KLC_C_63		<0.05	1	<0.05	0.18	2	<0.5
2022057_064 EAY_KLC_C_64		<0.05	1	<0.05	0.13	5	<0.5
2022057_067 EAY_KLC_C_67		<0.05	1	<0.05	1.92	3	<0.5
2022057_068 EAY_KLC_C_68		<0.05	<1	<0.05	1.36	3	<0.5
2022057_069 EAY_KLC_C_69		<0.05	1	<0.05	2.07	25	<0.5
2022057_073 EAY_KLC_OB_3		0.29	4	<0.05	2.14	<2	5.7
2022057_077 EAY_KLC_OB_7		0.32	12	<0.05	1.79	3	2.4
2022057_080 EAY_KLC_OB_10		0.49	29	<0.05	4.67	16	6.3

***** See Appendix Page for comments regarding this certificate *****

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To: ALS ENVIRONMENTAL
32 SHAND STREET
STAFFORD QLD 4053

Finalized Date: 4-NOV-2022
Account: ALSENV

Project: EB2230815

CERTIFICATE OF ANALYSIS BR22307310

CERTIFICATE COMMENTS

ANALYTICAL COMMENTS

Applies to Method: Gold determinations by this method are semi-quantitative due to the small sample weight used (0.5g).
ME-MS41

ACCREDITATION COMMENTS

Applies to Method: NATA Accreditation covers the performance of this service but does not cover the performance of ALS Brisbane Sample Preparation. Corporate Accreditation No: 825, Corporate Site No: 818. The Technical Signatory is David Jones,ICPMS Supervising Chemist
ME-MS41

LABORATORY ADDRESSES

Applies to Method: Processed at ALS Brisbane located at 32 Shand Street, Stafford, Brisbane, QLD, Australia. Processed at ALS Brisbane Sample Preparation at 23 Pineapple Street, Zillmere, QLD, 4034, Australia
LEV-01 LOG-24 ME-MS41

Australian Laboratory Services Pty. Ltd.

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ALS Brisbane is a NATA Accredited Testing Laboratory. Corporate Accreditation No: 825, Corporate Site No: 818.

To: **ALS ENVIRONMENTAL**
32 SHAND STREET
STAFFORD QLD 4053

Finalized Date: 23-MAY-2023
Account: ALSENV

CERTIFICATE BR23132834

Project: EB2314434

P.O. No.: ME-MS41

This report is for 9 samples of Pulp submitted to our lab in Brisbane, QLD, Australia on 18-MAY-2023.

The following have access to data associated with this certificate:

SUB RESULTS -BRIS		

SAMPLE PREPARATION

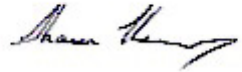
ALS CODE	DESCRIPTION
LOG-24	Pulp Login - Rcd w/o Barcode
LEV-01	Waste Disposal Levy

ANALYTICAL PROCEDURES

ALS CODE	DESCRIPTION	INSTRUMENT
ME-MS41	Ultra Trace Aqua Regia ICP-MS	

This is the Final Report and supersedes any preliminary report with this certificate number.Results apply to samples as submitted.All pages of this report have been checked and approved for release.
***** See Appendix Page for comments regarding this certificate *****

Signature:



Shaun Kenny, Brisbane Laboratory Manager

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To: ALS ENVIRONMENTAL
32 SHAND STREET
STAFFORD QLD 4053

Finalized Date: 23-MAY-2023
Account: ALSENV

Project: EB2314434

CERTIFICATE OF ANALYSIS BR23132834

Sample Description	Method	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41
	Analyte	Ag	Al	As	Au	B	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu
	Units	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm
	LOD	0.01	0.01	0.1	0.02	10	10	0.05	0.01	0.01	0.01	0.02	0.1	1	0.05	0.2
EB2314434 - 002		0.01	1.00	0.7	<0.02	<10	60	0.23	0.04	0.01	<0.01	16.65	24.1	898	0.81	6.9
EB2314434 - 004		0.02	0.58	2.4	<0.02	<10	20	0.20	0.06	0.01	0.02	14.75	90.7	716	2.31	7.3
EB2314434 - 005		0.01	1.21	2.8	<0.02	<10	150	0.65	0.07	0.02	0.01	34.6	83.1	442	0.98	10.5
EB2314434 - 011		0.01	0.31	9.7	<0.02	<10	20	0.13	0.02	0.01	0.03	6.73	499	322	0.51	2.8
EB2314434 - 013		<0.01	0.32	1.7	<0.02	<10	50	0.60	<0.01	0.08	<0.01	5.78	2.6	325	0.12	3.3
EB2314434 - 016		0.01	0.18	0.9	<0.02	<10	20	0.15	0.01	<0.01	<0.01	9.61	1.0	261	0.33	2.6
EB2314434 - 018		0.01	0.40	1.0	<0.02	<10	30	0.13	0.04	<0.01	<0.01	17.15	0.6	196	1.05	3.6
EB2314434 - 019		0.01	0.35	2.0	<0.02	<10	20	0.29	0.02	0.01	0.04	9.28	54.2	290	0.48	3.4
EB2314434 - 022		0.01	0.42	1.1	<0.02	<10	20	0.05	0.02	<0.01	0.01	14.85	42.7	635	0.41	4.0

***** See Appendix Page for comments regarding this certificate *****

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To: ALS ENVIRONMENTAL
32 SHAND STREET
STAFFORD QLD 4053

Finalized Date: 23-MAY-2023
Account: ALSENV

Project: EB2314434

CERTIFICATE OF ANALYSIS BR23132834

Sample Description	Method	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41
	Analyte	Fe	Ga	Ge	Hf	Hg	In	K	La	Li	Mg	Mn	Mo	Na	Nb	Ni
	Units	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm
	LOD	0.01	0.05	0.05	0.02	0.01	0.005	0.01	0.2	0.1	0.01	5	0.05	0.01	0.05	0.2
EB2314434 - 002		1.42	2.93	<0.05	0.22	0.04	0.014	0.07	7.6	2.0	0.07	62	0.23	0.02	0.39	28.2
EB2314434 - 004		2.77	2.74	<0.05	0.29	0.04	0.011	0.03	7.1	3.5	0.03	75	0.34	0.02	0.63	69.2
EB2314434 - 005		3.31	3.71	0.05	0.26	0.03	0.021	0.08	14.3	4.9	0.11	451	0.27	0.05	0.23	46.6
EB2314434 - 011		4.50	1.10	<0.05	0.20	0.04	0.005	0.02	3.4	1.2	0.02	25	1.17	0.01	0.29	205
EB2314434 - 013		1.74	0.31	<0.05	0.03	0.05	<0.005	<0.01	3.0	0.4	0.17	48	0.10	0.03	0.08	6.9
EB2314434 - 016		0.56	0.68	<0.05	0.15	<0.01	<0.005	0.01	4.9	0.6	<0.01	22	1.04	0.01	0.18	3.3
EB2314434 - 018		0.41	1.89	<0.05	0.20	<0.01	0.007	0.02	7.7	1.3	0.01	17	0.58	0.01	0.15	2.9
EB2314434 - 019		1.88	1.10	<0.05	0.15	0.06	<0.005	0.01	4.9	1.2	0.01	25	0.99	0.01	0.25	24.7
EB2314434 - 022		1.53	1.44	<0.05	0.25	0.02	0.005	0.01	5.4	1.4	0.01	42	0.21	0.01	0.09	27.3

***** See Appendix Page for comments regarding this certificate *****

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To: ALS ENVIRONMENTAL
32 SHAND STREET
STAFFORD QLD 4053

Finalized Date: 23-MAY-2023
Account: ALSENV

Project: EB2314434

CERTIFICATE OF ANALYSIS BR23132834

Sample Description	Method	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41
	Analyte	P	Pb	Rb	Re	S	Sb	Sc	Se	Sn	Sr	Ta	Te	Th	Ti	Tl
	Units	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm
	LOD	10	0.2	0.1	0.001	0.01	0.05	0.1	0.2	0.2	0.2	0.01	0.01	0.2	0.005	0.02
EB2314434 - 002		30	4.5	6.9	<0.001	0.55	0.06	2.7	0.3	0.4	6.6	<0.01	<0.01	2.3	0.018	0.13
EB2314434 - 004		40	4.7	6.4	<0.001	2.51	0.12	1.2	0.3	0.6	4.6	<0.01	<0.01	2.7	0.023	0.20
EB2314434 - 005		200	9.7	11.3	<0.001	1.08	0.08	3.8	0.3	0.5	15.4	<0.01	0.01	3.1	0.021	0.12
EB2314434 - 011		10	1.8	1.8	0.002	4.79	0.07	0.7	0.3	0.3	1.9	<0.01	<0.01	1.7	0.009	0.09
EB2314434 - 013		10	0.4	0.5	<0.001	1.80	<0.05	0.5	0.4	0.2	15.2	<0.01	<0.01	0.4	<0.005	0.06
EB2314434 - 016		30	1.3	1.2	<0.001	0.01	0.07	0.3	<0.2	0.3	1.1	<0.01	<0.01	1.8	0.012	<0.02
EB2314434 - 018		40	2.4	3.6	<0.001	0.01	0.08	0.8	<0.2	0.4	2.0	<0.01	0.01	2.6	0.019	0.03
EB2314434 - 019		20	2.1	1.7	<0.001	1.96	0.08	1.0	0.4	0.3	2.2	<0.01	<0.01	1.4	0.009	0.14
EB2314434 - 022		20	1.2	1.7	<0.001	0.82	0.07	1.0	<0.2	0.2	1.2	<0.01	<0.01	1.9	0.009	0.06

***** See Appendix Page for comments regarding this certificate *****

Australian Laboratory Services Pty. Ltd.

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To: ALS ENVIRONMENTAL
32 SHAND STREET
STAFFORD QLD 4053

Finalized Date: 23-MAY-2023
Account: ALSENV

Project: EB2314434

CERTIFICATE OF ANALYSIS BR23132834

Sample Description	Method	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41
	Analyte	U	V	W	Y	Zn	Zr
	Units	ppm	ppm	ppm	ppm	ppm	ppm
	LOD	0.05	1	0.05	0.05	2	0.5
EB2314434 - 002		0.43	22	<0.05	3.68	9	7.6
EB2314434 - 004		0.61	10	<0.05	3.76	27	10.2
EB2314434 - 005		0.63	34	<0.05	7.21	29	8.3
EB2314434 - 011		0.30	4	0.52	1.87	249	6.6
EB2314434 - 013		0.09	3	<0.05	2.00	29	0.8
EB2314434 - 016		0.29	7	0.23	2.17	2	4.8
EB2314434 - 018		0.50	8	<0.05	2.57	2	7.8
EB2314434 - 019		0.34	8	0.88	2.64	17	4.9
EB2314434 - 022		0.36	9	0.05	3.31	9	8.0

***** See Appendix Page for comments regarding this certificate *****

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To: ALS ENVIRONMENTAL
32 SHAND STREET
STAFFORD QLD 4053

Finalized Date: 23-MAY-2023
Account: ALSENV

Project: EB2314434

CERTIFICATE OF ANALYSIS BR23132834

CERTIFICATE COMMENTS

ANALYTICAL COMMENTS

Applies to Method: Gold determinations by this method are semi-quantitative due to the small sample weight used (0.5g).
ME-MS41

ACCREDITATION COMMENTS

Applies to Method: NATA Accreditation covers the performance of this service but does not cover the performance of ALS Brisbane Sample Preparation. Corporate Accreditation No: 825, Corporate Site No: 818. The Technical Signatory is David Jones,ICPMS Supervising Chemist
ME-MS41

LABORATORY ADDRESSES

Applies to Method: Processed at ALS Brisbane located at 32 Shand Street, Stafford, Brisbane, QLD, Australia. Processed at ALS Brisbane Sample Preparation at 23 Pineapple Street, Zillmere, QLD, 4034, Australia
LEV-01 LOG-24 ME-MS41

Australian Laboratory Services Pty. Ltd.

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To: **ALS ENVIRONMENTAL**
32 SHAND STREET
STAFFORD QLD 4053

Finalized Date: 23-MAY-2023
Account: ALSENV

CERTIFICATE BR23132846

Project: EB2314571

P.O. No.: ME-MS41

This report is for 6 samples of Pulp submitted to our lab in Brisbane, QLD, Australia on 18-MAY-2023.

The following have access to data associated with this certificate:

SUB RESULTS -BRIS		

SAMPLE PREPARATION

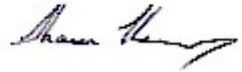
ALS CODE	DESCRIPTION
LOG-24	Pulp Login - Rcd w/o Barcode
LEV-01	Waste Disposal Levy

ANALYTICAL PROCEDURES

ALS CODE	DESCRIPTION	INSTRUMENT
ME-MS41	Ultra Trace Aqua Regia ICP-MS	

This is the Final Report and supersedes any preliminary report with this certificate number.Results apply to samples as submitted.All pages of this report have been checked and approved for release.
***** See Appendix Page for comments regarding this certificate *****

Signature:



Shaun Kenny, Brisbane Laboratory Manager

Australian Laboratory Services Pty. Ltd.

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To: ALS ENVIRONMENTAL
32 SHAND STREET
STAFFORD QLD 4053

Finalized Date: 23-MAY-2023
Account: ALSENV

Project: EB2314571

CERTIFICATE OF ANALYSIS BR23132846

Sample Description	Method	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41
	Analyte	Ag	Al	As	Au	B	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu
	Units	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm
	LOD	0.01	0.01	0.1	0.02	10	10	0.05	0.01	0.01	0.01	0.02	0.1	1	0.05	0.2
EB2314571 - 002		0.01	0.36	0.5	<0.02	<10	40	0.10	0.02	<0.01	<0.01	10.40	1.4	484	0.49	3.1
EB2314571 - 028		0.01	1.62	0.6	<0.02	<10	100	0.28	0.27	<0.01	<0.01	21.9	2.5	308	1.38	4.1
EB2314571 - 030		0.05	2.66	1.7	<0.02	<10	190	1.14	0.15	0.20	0.06	62.3	16.9	35	1.37	25.9
EB2314571 - 033		0.01	0.35	0.5	<0.02	<10	30	0.07	0.02	<0.01	0.01	6.34	16.2	959	0.49	5.4
EB2314571 - 041		0.01	0.77	1.0	<0.02	<10	20	0.10	0.03	0.04	0.01	12.10	1.5	119	0.55	3.6
EB2314571 - 049		0.01	1.14	1.8	<0.02	<10	30	0.19	0.07	0.01	0.01	15.70	1.6	371	0.93	3.9

***** See Appendix Page for comments regarding this certificate *****

Australian Laboratory Services Pty. Ltd.

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To: ALS ENVIRONMENTAL
32 SHAND STREET
STAFFORD QLD 4053

Finalized Date: 23-MAY-2023
Account: ALSENV

Project: EB2314571

CERTIFICATE OF ANALYSIS BR23132846

Sample Description	Method	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41
	Analyte	Fe	Ga	Ge	Hf	Hg	In	K	La	Li	Mg	Mn	Mo	Na	Nb	Ni
	Units	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm
	LOD	0.01	0.05	0.05	0.02	0.01	0.005	0.01	0.2	0.1	0.01	5	0.05	0.01	0.05	0.2
EB2314571 - 002		0.65	1.23	<0.05	0.16	<0.01	0.006	0.02	5.1	1.1	0.01	33	0.23	0.01	0.06	8.6
EB2314571 - 028		2.36	5.13	<0.05	0.22	0.02	0.024	0.06	10.9	3.1	0.09	27	0.12	0.04	<0.05	7.8
EB2314571 - 030		3.28	8.37	0.07	0.28	0.06	0.046	0.14	28.3	12.5	0.24	583	0.23	0.04	0.57	20.0
EB2314571 - 033		2.64	1.40	<0.05	0.21	0.02	0.006	0.02	3.1	1.5	0.01	59	0.30	0.01	0.29	24.3
EB2314571 - 041		0.88	2.71	<0.05	0.27	0.01	0.011	0.02	6.1	1.8	0.05	35	0.46	0.01	0.25	5.4
EB2314571 - 049		1.56	3.98	<0.05	0.25	0.02	0.016	0.03	7.9	4.0	0.03	30	0.21	0.01	0.13	8.1

***** See Appendix Page for comments regarding this certificate *****

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To: ALS ENVIRONMENTAL
32 SHAND STREET
STAFFORD QLD 4053

Finalized Date: 23-MAY-2023
Account: ALSENV

Project: EB2314571

CERTIFICATE OF ANALYSIS BR23132846

Sample Description	Method	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41
	Analyte	P	Pb	Rb	Re	S	Sb	Sc	Se	Sn	Sr	Ta	Te	Th	Ti	Tl
	Units	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm
	LOD	10	0.2	0.1	0.001	0.01	0.05	0.1	0.2	0.2	0.2	0.01	0.01	0.2	0.005	0.02
EB2314571 - 002		10	2.7	2.1	<0.001	<0.01	0.05	1.4	<0.2	0.2	3.7	<0.01	<0.01	1.9	0.011	0.02
EB2314571 - 028		20	6.9	8.1	<0.001	<0.01	<0.05	4.4	<0.2	0.7	4.6	<0.01	<0.01	5.0	0.017	0.05
EB2314571 - 030		730	13.8	17.8	<0.001	0.02	0.07	9.9	0.4	1.0	47.0	<0.01	<0.01	5.2	0.041	0.13
EB2314571 - 033		10	2.1	2.2	<0.001	2.16	0.07	0.7	<0.2	0.2	1.9	<0.01	<0.01	1.7	0.009	0.02
EB2314571 - 041		130	3.4	2.1	<0.001	0.01	0.05	2.2	<0.2	0.5	4.2	<0.01	<0.01	3.0	0.033	0.02
EB2314571 - 049		20	5.4	4.9	<0.001	0.01	0.08	2.7	0.3	0.5	3.7	<0.01	<0.01	3.7	0.011	0.04

***** See Appendix Page for comments regarding this certificate *****

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To: ALS ENVIRONMENTAL
32 SHAND STREET
STAFFORD QLD 4053

Finalized Date: 23-MAY-2023
Account: ALSENV

Project: EB2314571

CERTIFICATE OF ANALYSIS BR23132846

Sample Description	Method	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41
	Analyte	U	V	W	Y	Zn	Zr
	Units	ppm	ppm	ppm	ppm	ppm	ppm
	LOD	0.05	1	0.05	0.05	2	0.5
EB2314571 - 002		0.23	8	<0.05	1.44	4	5.6
EB2314571 - 028		0.54	42	<0.05	3.38	7	7.7
EB2314571 - 030		0.96	63	<0.05	17.35	65	11.8
EB2314571 - 033		0.33	6	0.07	1.54	3	6.8
EB2314571 - 041		0.39	21	0.05	2.07	5	10.2
EB2314571 - 049		0.55	28	<0.05	2.25	4	9.0

***** See Appendix Page for comments regarding this certificate *****

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To: ALS ENVIRONMENTAL
32 SHAND STREET
STAFFORD QLD 4053

Finalized Date: 23-MAY-2023
Account: ALSENV

Project: EB2314571

CERTIFICATE OF ANALYSIS BR23132846

CERTIFICATE COMMENTS

ANALYTICAL COMMENTS

Applies to Method: ME-MS41

Gold determinations by this method are semi-quantitative due to the small sample weight used (0.5g).

ACCREDITATION COMMENTS

Applies to Method: ME-MS41

NATA Accreditation covers the performance of this service but does not cover the performance of ALS Brisbane Sample Preparation. Corporate Accreditation No: 825, Corporate Site No: 818. The Technical Signatory is David Jones,ICPMS Supervising Chemist

LABORATORY ADDRESSES

Applies to Method: LEV-01 LOG-24 ME-MS41

Processed at ALS Brisbane located at 32 Shand Street, Stafford, Brisbane, QLD, Australia. Processed at ALS Brisbane Sample Preparation at 23 Pineapple Street, Zillmere, QLD, 4034, Australia

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To: ALS ENVIRONMENTAL
32 SHAND STREET
STAFFORD QLD 4053

Finalized Date: 22-JUN-2023
Account: ALSENV

CERTIFICATE BR23161342

Project: EB2317882

P.O. No.: ME-MS41L

This report is for 6 samples of Pulp submitted to our lab in Brisbane, QLD, Australia on 15-JUN-2023.

The following have access to data associated with this certificate:

SUB RESULTS -BRIS		

SAMPLE PREPARATION

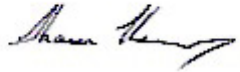
ALS CODE	DESCRIPTION
LOG-24	Pulp Login - Rcd w/o Barcode
LEV-01	Waste Disposal Levy

ANALYTICAL PROCEDURES

ALS CODE	DESCRIPTION	INSTRUMENT
ME-MS41L	Super Trace Lowest DL AR by ICP-MS	

This is the Final Report and supersedes any preliminary report with this certificate number.Results apply to samples as submitted.All pages of this report have been checked and approved for release.
***** See Appendix Page for comments regarding this certificate *****

Signature:



Shaun Kenny, Brisbane Laboratory Manager

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To: ALS ENVIRONMENTAL
32 SHAND STREET
STAFFORD QLD 4053

Project: EB2317882

CERTIFICATE OF ANALYSIS BR23161342

Sample Description	Method	ME-MS41L	ME-MS41L	ME-MS41L	ME-MS41L	ME-MS41L	ME-MS41L	ME-MS41L	ME-MS41L	ME-MS41L	ME-MS41L	ME-MS41L	ME-MS41L	ME-MS41L	ME-MS41L	ME-MS41L
	Analyte	Au	Ag	Al	As	B	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu
	Units	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm
	LOD	0.0002	0.001	0.01	0.01	10	0.5	0.01	0.0005	0.01	0.001	0.003	0.001	0.01	0.005	0.01
EB2317882-003		0.0008	0.007	1.54	1.38	<10	166.5	0.69	0.1095	0.01	<0.001	34.5	4.98	259	2.70	7.75
EB2317882-017		0.0004	0.012	1.00	0.23	<10	27.1	0.23	0.0597	0.01	0.001	22.7	1.660	371	0.821	4.43
EB2317882-021		0.0007	0.007	1.56	0.28	<10	26.5	0.14	0.0683	<0.01	<0.001	18.65	1.260	339	1.030	3.02
EB2317882-032		0.0011	0.013	1.48	0.80	<10	43.6	0.34	0.0922	0.01	<0.001	21.1	1.515	435	1.625	4.58
EB2317882-042		0.0004	0.005	0.62	1.71	<10	48.9	0.17	0.0462	0.05	0.003	9.11	24.6	558	0.426	3.49
EB2317882-046		0.0005	0.008	1.40	1.64	<10	52.4	0.28	0.204	0.01	<0.001	37.3	0.890	136.0	2.97	4.31

***** See Appendix Page for comments regarding this certificate *****

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32 SHAND STREET
STAFFORD QLD 4053

Project: EB2317882

CERTIFICATE OF ANALYSIS BR23161342

Sample Description	Method	ME-MS41L	ME-MS41L	ME-MS41L	ME-MS41L	ME-MS41L	ME-MS41L	ME-MS41L	ME-MS41L	ME-MS41L	ME-MS41L	ME-MS41L	ME-MS41L	ME-MS41L	ME-MS41L	ME-MS41L
	Analyte	Fe	Ga	Ge	Hf	Hg	In	K	La	Li	Mg	Mn	Mo	Na	Nb	Ni
	Units	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm
	LOD	0.001	0.004	0.005	0.002	0.004	0.005	0.01	0.002	0.1	0.01	0.1	0.01	0.001	0.002	0.04
EB2317882-003		1.960	5.04	0.044	0.309	0.025	0.022	0.11	16.25	4.9	0.13	32.7	0.16	0.057	0.051	10.35
EB2317882-017		0.920	3.58	0.029	0.233	0.023	0.014	0.02	11.35	3.0	0.03	29.5	0.19	0.018	0.505	8.79
EB2317882-021		0.850	6.37	0.031	0.409	0.036	0.022	0.03	10.30	3.0	0.03	24.1	0.15	0.007	0.064	9.10
EB2317882-032		0.950	5.94	0.032	0.299	0.038	0.020	0.05	10.90	5.7	0.04	33.5	0.22	0.022	0.214	10.30
EB2317882-042		1.630	2.69	0.021	0.213	0.031	0.011	0.02	4.25	1.3	0.06	65.9	0.27	0.026	0.429	22.1
EB2317882-046		0.390	8.62	0.047	0.442	<0.004	0.024	0.07	17.70	8.1	0.05	18.2	0.26	0.041	0.043	5.14

***** See Appendix Page for comments regarding this certificate *****

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To: ALS ENVIRONMENTAL
32 SHAND STREET
STAFFORD QLD 4053

Project: EB2317882

CERTIFICATE OF ANALYSIS BR23161342

Sample Description	Method	ME-MS41L	ME-MS41L	ME-MS41L	ME-MS41L	ME-MS41L	ME-MS41L	ME-MS41L	ME-MS41L	ME-MS41L	ME-MS41L	ME-MS41L	ME-MS41L	ME-MS41L	ME-MS41L	ME-MS41L
	Analyte	P	Pb	Pd	Pt	Rb	Re	S	Sb	Sc	Se	Sn	Sr	Ta	Te	Th
	Units	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
	LOD	0.001	0.005	0.001	0.002	0.005	0.0002	0.01	0.005	0.005	0.003	0.01	0.01	0.005	0.003	0.002
EB2317882-003		0.004	8.94	<0.001	<0.002	23.0	<0.0002	<0.01	0.080	5.45	0.119	0.92	4.92	<0.005	<0.003	7.05
EB2317882-017		0.003	5.44	<0.001	<0.002	3.77	<0.0002	<0.01	0.049	1.630	0.043	0.53	3.56	<0.005	<0.003	3.73
EB2317882-021		0.001	6.08	<0.001	<0.002	3.93	<0.0002	0.01	0.058	4.26	0.038	0.76	3.05	<0.005	<0.003	5.58
EB2317882-032		0.003	7.31	<0.001	<0.002	7.19	<0.0002	<0.01	0.076	3.30	0.163	0.79	3.64	<0.005	<0.003	5.16
EB2317882-042		0.004	3.86	<0.001	<0.002	2.73	<0.0002	0.45	0.072	2.15	0.300	0.37	8.42	<0.005	0.003	2.71
EB2317882-046		0.004	8.49	<0.001	<0.002	19.15	<0.0002	0.01	0.155	3.57	0.077	1.50	6.61	<0.005	0.003	8.97

***** See Appendix Page for comments regarding this certificate *****

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To: ALS ENVIRONMENTAL
32 SHAND STREET
STAFFORD QLD 4053

Project: EB2317882

CERTIFICATE OF ANALYSIS BR23161342

Sample Description	Method	ME-MS41L	ME-MS41L	ME-MS41L	ME-MS41L	ME-MS41L	ME-MS41L	ME-MS41L	ME-MS41L
	Analyte	Ti	Tl	U	V	W	Y	Zn	Zr
	Units	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm
	LOD	0.001	0.001	0.005	0.1	0.001	0.003	0.1	0.01
EB2317882-003		0.022	0.150	0.954	35.7	0.017	5.07	15.9	9.09
EB2317882-017		0.021	0.040	0.457	19.9	0.120	3.83	9.0	8.18
EB2317882-021		0.020	0.033	0.531	24.5	0.003	3.42	3.5	13.50
EB2317882-032		0.014	0.064	0.786	22.9	0.007	3.64	6.7	9.20
EB2317882-042		0.013	0.048	0.328	18.9	0.032	2.22	29.7	6.07
EB2317882-046		0.020	0.177	1.220	49.6	0.003	5.04	6.9	14.50

***** See Appendix Page for comments regarding this certificate *****

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To: ALS ENVIRONMENTAL
32 SHAND STREET
STAFFORD QLD 4053

Finalized Date: 22-JUN-2023
Account: ALSENV

Project: EB2317882

CERTIFICATE OF ANALYSIS BR23161342

CERTIFICATE COMMENTS

ANALYTICAL COMMENTS

Applies to Method: Gold determinations by this method are semi-quantitative due to the small sample weight used (0.5g).
ME-MS41L

LABORATORY ADDRESSES

Applies to Method: Processed at ALS Brisbane located at 32 Shand Street, Stafford, Brisbane, QLD, Australia. Processed at ALS Brisbane Sample Preparation at 23 Pineapple Street, Zillmere, QLD, 4034, Australia
LEV-01 LOG-24 ME-MS41L

Australian Laboratory Services Pty. Ltd.

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To: **ALS ENVIRONMENTAL**
32 SHAND STREET
STAFFORD QLD 4053

Finalized Date: 18-AUG-2023
Account: ALSENV

CERTIFICATE BR23225539

Project: EB2324491

P.O. No.: ME-MS41

This report is for 6 samples of Pulp submitted to our lab in Brisbane, QLD, Australia on 11-AUG-2023.

The following have access to data associated with this certificate:

SUB RESULTS -BRIS		

SAMPLE PREPARATION

ALS CODE	DESCRIPTION
LOG-24	Pulp Login - Rcd w/o Barcode
LEV-01	Waste Disposal Levy

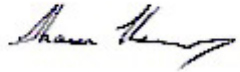
ANALYTICAL PROCEDURES

ALS CODE	DESCRIPTION	INSTRUMENT
ME-MS41	Ultra Trace Aqua Regia ICP-MS	

This is the Final Report and supersedes any preliminary report with this certificate number.Results apply to samples as submitted.All pages of this report have been checked and approved for release.

***** See Appendix Page for comments regarding this certificate *****

Signature:



Shaun Kenny, Brisbane Laboratory Manager

Australian Laboratory Services Pty. Ltd.

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To: ALS ENVIRONMENTAL
32 SHAND STREET
STAFFORD QLD 4053

Finalized Date: 18-AUG-2023
Account: ALSENV

Project: EB2324491

CERTIFICATE OF ANALYSIS BR23225539

Sample Description	Method	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41
	Analyte	Ag	Al	As	Au	B	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu
	Units	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm
	LOD	0.01	0.01	0.1	0.02	10	10	0.05	0.01	0.01	0.01	0.02	0.1	1	0.05	0.2
EB2324491-001		0.02	0.81	1.2	<0.02	<10	50	0.36	0.06	<0.01	0.03	29.6	2.6	166	1.01	6.5
EB2324491-010		0.01	0.37	1.5	<0.02	<10	30	0.51	0.02	0.02	0.01	16.50	33.1	278	0.48	3.0
EB2324491-020		<0.01	1.42	0.1	<0.02	<10	20	0.13	0.07	<0.01	<0.01	20.1	0.7	59	1.24	1.5
EB2324491-025		0.01	0.79	2.8	<0.02	<10	110	1.29	0.04	0.03	0.04	25.4	52.1	265	0.42	8.4
EB2324491-033		0.52	1.19	3.3	<0.02	70	680	1.78	0.13	0.44	0.25	28.3	15.2	29	0.79	38.2
EB2324491-037		0.01	1.00	0.8	<0.02	<10	80	0.43	0.05	0.01	<0.01	21.3	3.4	97	0.69	7.4

***** See Appendix Page for comments regarding this certificate *****

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To: ALS ENVIRONMENTAL
32 SHAND STREET
STAFFORD QLD 4053

Finalized Date: 18-AUG-2023
Account: ALSENV

Project: EB2324491

CERTIFICATE OF ANALYSIS BR23225539

Sample Description	Method	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41
	Analyte	Fe	Ga	Ge	Hf	Hg	In	K	La	Li	Mg	Mn	Mo	Na	Nb	Ni
	Units	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm
	LOD	0.01	0.05	0.05	0.02	0.01	0.005	0.01	0.2	0.1	0.01	5	0.05	0.01	0.05	0.2
EB2324491-001		0.40	2.53	<0.05	0.25	0.02	0.012	0.06	14.3	4.1	0.02	22	0.45	0.01	0.63	6.0
EB2324491-010		0.82	1.16	<0.05	0.16	0.02	<0.005	0.02	8.2	1.6	0.04	50	0.75	0.02	0.32	21.0
EB2324491-020		0.73	5.41	<0.05	0.26	0.03	0.020	0.03	10.3	4.1	0.02	11	0.17	0.01	<0.05	3.4
EB2324491-025		1.19	2.51	<0.05	0.17	0.05	0.016	0.07	11.8	2.8	0.12	70	0.82	0.08	0.43	35.7
EB2324491-033		3.05	2.61	0.14	0.24	0.67	0.016	0.03	14.0	1.6	2.19	188	1.28	0.04	1.48	52.6
EB2324491-037		1.15	3.22	<0.05	0.21	0.02	0.018	0.08	10.3	3.7	0.08	33	0.26	0.05	0.15	5.3

***** See Appendix Page for comments regarding this certificate *****

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To: **ALS ENVIRONMENTAL**
32 SHAND STREET
STAFFORD QLD 4053

Finalized Date: 18-AUG-2023
Account: ALSENV

Project: EB2324491

CERTIFICATE OF ANALYSIS BR23225539

Sample Description	Method	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41
	Analyte	P	Pb	Rb	Re	S	Sb	Sc	Se	Sn	Sr	Ta	Te	Th	Ti	Tl
	Units	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm
	LOD	10	0.2	0.1	0.001	0.01	0.05	0.1	0.2	0.2	0.2	0.01	0.01	0.2	0.005	0.02
EB2324491-001		50	4.5	7.8	<0.001	0.03	0.10	2.0	<0.2	0.5	4.3	<0.01	<0.01	3.5	0.028	0.07
EB2324491-010		40	2.1	2.7	<0.001	0.59	0.08	0.9	0.2	0.3	6.5	<0.01	0.01	1.5	0.011	0.06
EB2324491-020		10	5.1	3.9	<0.001	0.01	0.06	2.4	<0.2	0.7	1.9	<0.01	<0.01	3.8	0.015	0.03
EB2324491-025		110	5.2	6.1	<0.001	0.31	0.11	2.5	0.3	0.4	22.1	<0.01	0.01	1.7	0.020	0.06
EB2324491-033		250	21.6	4.2	0.001	0.38	0.46	4.0	2.9	1.5	109.5	0.04	0.02	3.0	0.051	0.15
EB2324491-037		130	5.5	7.1	<0.001	0.01	0.06	2.8	<0.2	0.4	9.7	<0.01	<0.01	2.4	0.030	0.04

***** See Appendix Page for comments regarding this certificate *****

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Finalized Date: 18-AUG-2023
Account: ALSENV

Project: EB2324491

CERTIFICATE OF ANALYSIS BR23225539

Sample Description	Method	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41
	Analyte	U	V	W	Y	Zn	Zr
	Units	ppm	ppm	ppm	ppm	ppm	ppm
	LOD	0.05	1	0.05	0.05	2	0.5
EB2324491-001		0.65	15	0.07	7.60	16	8.0
EB2324491-010		0.32	7	0.42	6.26	51	4.2
EB2324491-020		0.37	26	<0.05	3.24	9	7.7
EB2324491-025		0.36	26	0.12	8.38	72	4.0
EB2324491-033		0.90	41	0.46	12.25	959	7.9
EB2324491-037		0.37	25	<0.05	4.87	29	6.1

***** See Appendix Page for comments regarding this certificate *****

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Finalized Date: 18-AUG-2023
Account: ALSENV

Project: EB2324491

CERTIFICATE OF ANALYSIS BR23225539

CERTIFICATE COMMENTS

ANALYTICAL COMMENTS

Applies to Method: Gold determinations by this method are semi-quantitative due to the small sample weight used (0.5g).
ME-MS41

ACCREDITATION COMMENTS

Applies to Method: NATA Accreditation covers the performance of this service but does not cover the performance of ALS Brisbane Sample Preparation. Corporate Accreditation No: 825, Corporate Site No: 818. The Technical Signatory is David Jones,ICPMS Supervising Chemist
ME-MS41

LABORATORY ADDRESSES

Applies to Method: Processed at ALS Brisbane located at 32 Shand Street, Stafford, Brisbane, QLD, Australia. Processed at ALS Brisbane Sample Preparation at 23 Pineapple Street, Zillmere, QLD, 4034, Australia
LEV-01 LOG-24 ME-MS41

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STAFFORD QLD 4053

Finalized Date: 6-SEP-2023
Account: ALSENV

CERTIFICATE BR23242293

Project: EB2326215

P.O. No.: ME-MS41

This report is for 4 samples of Pulp submitted to our lab in Brisbane, QLD, Australia on 29-AUG-2023.

The following have access to data associated with this certificate:

SUB RESULTS -BRIS		

SAMPLE PREPARATION

ALS CODE	DESCRIPTION
LOG-24	Pulp Login - Rcd w/o Barcode
LEV-01	Waste Disposal Levy

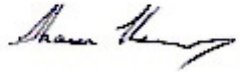
ANALYTICAL PROCEDURES

ALS CODE	DESCRIPTION	INSTRUMENT
ME-MS41	Ultra Trace Aqua Regia ICP-MS	

This is the Final Report and supersedes any preliminary report with this certificate number.Results apply to samples as submitted.All pages of this report have been checked and approved for release.

***** See Appendix Page for comments regarding this certificate *****

Signature:



Shaun Kenny, Brisbane Laboratory Manager

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Finalized Date: 6-SEP-2023
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Project: EB2326215

CERTIFICATE OF ANALYSIS BR23242293

Sample Description	Method	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41
	Analyte	Ag	Al	As	Au	B	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu
	Units	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm
	LOD	0.01	0.01	0.1	0.02	10	10	0.05	0.01	0.01	0.01	0.02	0.1	1	0.05	0.2
EB2326215-002		0.01	0.33	1.3	<0.02	<10	20	0.48	0.02	0.01	0.01	19.60	167.5	282	0.56	3.4
EB2326215-009		0.01	0.74	1.5	<0.02	<10	50	0.44	0.05	0.07	0.01	16.95	12.1	104	0.58	7.0
EB2326215-024		<0.01	0.73	0.6	<0.02	<10	20	0.64	0.03	0.01	<0.01	37.0	1.3	176	0.32	2.4
EB2326215-035		<0.01	0.63	0.8	<0.02	<10	20	0.26	0.04	0.01	<0.01	25.9	0.5	98	0.69	2.7

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Sample Description	Method	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41
	Analyte	Fe	Ga	Ge	Hf	Hg	In	K	La	Li	Mg	Mn	Mo	Na	Nb	Ni
	Units	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm
	LOD	0.01	0.05	0.05	0.02	0.01	0.005	0.01	0.2	0.1	0.01	5	0.05	0.01	0.05	0.2
EB2326215-002		1.56	1.10	0.05	0.18	0.02	<0.005	0.02	8.6	0.8	0.02	24	0.88	0.01	0.45	61.0
EB2326215-009		1.36	2.62	<0.05	0.21	0.02	0.012	0.06	7.7	3.4	0.09	179	0.43	0.01	0.44	10.4
EB2326215-024		0.42	2.24	0.06	0.16	0.08	0.013	0.01	17.9	0.8	0.02	16	0.70	0.01	0.19	4.4
EB2326215-035		0.53	2.92	0.05	0.20	0.03	0.010	0.02	11.6	0.9	0.01	12	0.43	<0.01	0.29	2.4

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Sample Description	Method	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41
	Analyte	P	Pb	Rb	Re	S	Sb	Sc	Se	Sn	Sr	Ta	Te	Th	Ti	Tl
	Units	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm
	LOD	10	0.2	0.1	0.001	0.01	0.05	0.1	0.2	0.2	0.2	0.01	0.01	0.2	0.005	0.02
EB2326215-002		20	1.7	2.5	<0.001	1.61	0.08	0.9	0.2	0.3	3.5	<0.01	<0.01	1.5	0.015	0.04
EB2326215-009		190	4.0	6.1	<0.001	0.21	0.09	2.4	<0.2	0.3	13.8	<0.01	0.01	1.8	0.026	0.05
EB2326215-024		20	4.0	1.7	<0.001	0.05	0.09	3.1	0.7	0.3	2.0	<0.01	<0.01	2.2	0.006	<0.02
EB2326215-035		20	3.2	2.4	<0.001	0.02	0.08	2.7	<0.2	0.4	1.7	<0.01	<0.01	3.2	0.011	0.02

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Finalized Date: 6-SEP-2023
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Project: EB2326215

CERTIFICATE OF ANALYSIS BR23242293

Sample Description	Method	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41	ME-MS41
	Analyte	U	V	W	Y	Zn	Zr
	Units	ppm	ppm	ppm	ppm	ppm	ppm
	LOD	0.05	1	0.05	0.05	2	0.5
EB2326215-002		0.33	8	0.58	6.85	105	6.1
EB2326215-009		0.37	22	0.08	4.80	38	6.1
EB2326215-024		0.83	15	0.16	8.90	126	4.3
EB2326215-035		0.59	14	0.15	4.82	20	6.5

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Project: EB2326215

CERTIFICATE OF ANALYSIS BR23242293

CERTIFICATE COMMENTS

ANALYTICAL COMMENTS

Applies to Method: Gold determinations by this method are semi-quantitative due to the small sample weight used (0.5g).
ME-MS41

ACCREDITATION COMMENTS

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ME-MS41

LABORATORY ADDRESSES

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LEV-01 LOG-24 ME-MS41

MINE WASTE AND
WATER MANAGEMENT

Appendix B

Yallourn Kinetic Geochemistry Assessment

Appendix B Yallourn Kinetic Geochemistry Assessment

Date issued:	**15 August 2023**
Document Number:	**01**
Project Number	**2021048**
Revision Number:	**Draft A**
From:	**RGS Environmental Consultants Pty Ltd** **3/30 Lensworth Street,** **Coopers Plains QLD 4108**
To:	**EnergyAustralia Pty Ltd**
Project Name:	**Yallourn Coal Mine: Sampling and Analysis Plan**
Attention:	**Nikki Jenkins; Rhonda Hastie**
Content:	**Yallourn Stage 1 Kinetic Leach Column Testing Update**

RGS
MINE WASTE AND WATER MANAGEMENT

1 Introduction

RGS Environmental Consultants Pty Ltd (RGS) is commissioned by EnergyAustralia Pty Ltd to (EA) to undertake a kinetic leach column (KLC) test program for materials sampled from the Yallourn Coal Mine (YCM), located in the Latrobe Valley in Victoria. The focus is on materials that may contribute to pit lake water quality (e.g. coal wall, overburden and coal ash). The results from the KLC tests will be used to develop hydrogeochemical inputs to a water balance water quality model for the proposed YCM pit lake.

This report provides a summary of the results associated with the first eight KLC tests commissioned and subsequent recommendations to continue or terminate the columns.

Note: this report is not a KLC interpretation report and the results have only been provided for justification of the continuation of the program.

1.1 Background

RGS have developed a conceptual pit lake water quality model for YCM which was the first stage in the overall objective of developing a numerical pit lake water balance/ water quality (WB/WQ) model (RGS, 2021a). The conceptual model identified several limitations in data needed to develop the model with a sufficient level or reliability and robustness.

Following the development of the conceptual model, RGS developed a sampling and analysis plan (SaAP) for YCM (RGS, 2021b). The objective of the SaAP was focused on filling hydro-geochemical data gaps needed to develop a robust and defensible numerical pit lake WB/WQ model which will be used as a decision-making tool for closure planning.

As part of the SaAP, RGS is undertaking a series of KLC tests. The first approved budget for KLC tests includes 8 columns. The program has also been extended to include an addition 16 KLC tests (i.e. 12 coal and overburden samples and 4 coal ash samples). This interim report provides a high-level summary of the results for the 8 columns and a justification whether to continue or terminate the columns.

1.1.1 Sampling and composites

As part of the initial field sampling and analysis program, RGS collected 63 samples from within the YCM. The samples included materials from the coal wall at Yallourn Township Field (YTF), Yallourn East Field (YEF) and Yallourn Maryvale Field (YMF) (weathered and fresh samples), and overburden from YTF. Based on the results of static geochemical testing, select representative samples were composited and used for the KLC tests as per **Table 2-1**.

Table 2-1 Yallourn samples used for KLC Composites

Composite	Sample Location	Material Type	KLC ID	KLC operation
C001	YTF	Overburden	KLC 1	Free leach
C002	YTF	Weathered coal	KLC 2	Free Leach
C003	YMF	Overburden	KLC 3 and KLC 4	Free leach and Saturated
C004	YEF	Weathered Coal	KLC 5 and KLC 6	Free leach and Saturated
C005	YMF	Fresh Coal	KLC 7 and KLC 8	Free leach and Saturated

The YTF overburden and weathered Coal samples were set up as free leach columns whilst the composites from YMF overburden and fresh coal, and the YEF coal KLCs were operated under both saturated and unsaturated (free leaching) conditions (**Table 2-2**).

Table 2-2 Hazelwood KLC samples used for tests

ID	Composition (static sample ID)	Start Date	Description
KLC 1	YTF composite (Overburden, RGS_YTF_WW_04/1-3)	19/07/2022	Free leach; 2kg
KLC 2	YTF composite (Weathered coal, RGS_YTF_WW_05/4, 06/1-7)	19/07/2022	Free leach; 9kg
KLC 3	YMF composite (Overburden, RGS_YMF_WW_05/2-3, 06/1-2)	19/07/2022	Free leach; 5kg
KLC 4	YMF composite (Overburden, RGS_YMF_WW_05/2-3, 06/1-2)	19/07/2022	Saturated; 5kg
KLC 5	YEF composite (Weathered coal, RGS_YEF_WW_01/1-4, 02/1-3, 03/1-3,	19/07/2022	Free leach; 6kg
KLC 6	YEF composite (Weathered coal, RGS_YEF_WW_01/1-4, 02/1-3, 03/1-3,	19/07/2022	Saturated; 6kg
KLC 7	YMF composite (Fresh coal, RGS_YMF_C_8-19)	19/07/2022	Free leach; 8kg
KLC 8	YMF composite (Fresh coal, RGS_YMF_C_8-19)	19/07/2022	Saturated; 8kg
KCL 9 – KLC 12: Fresh coal material currently being leached under program 2022057.			

The primary objectives of the KLC test program are to quantify the concentration and rate at which weathering products (acid, soluble salts and metals/metalloids) are leached from the solid phase materials (coal and overburden) over time, under free leaching unsaturated ('wet-dry') versus saturated conditions.

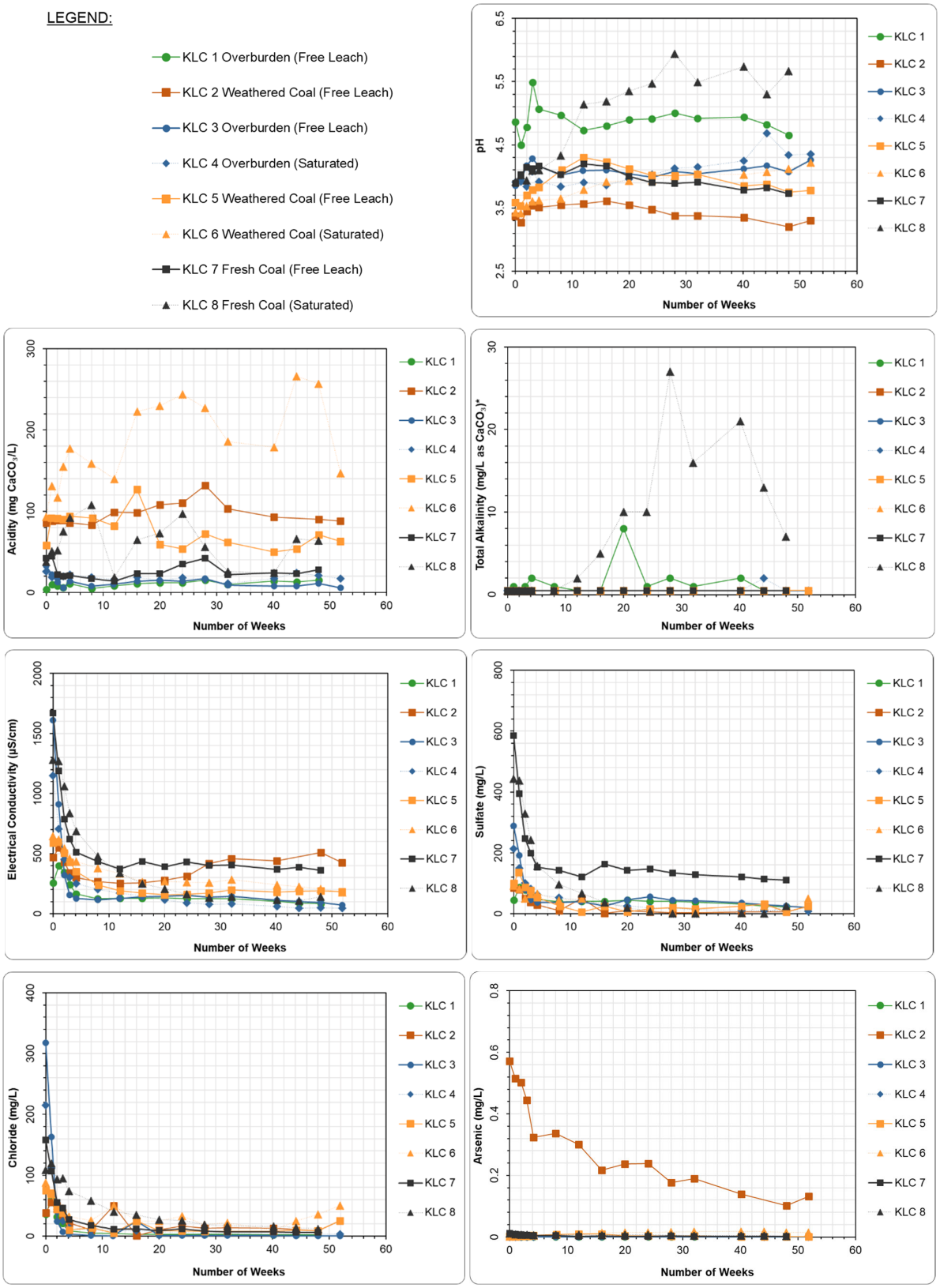
The columns were leached weekly for the first five leaches (to remove readily soluble weathering products) and then monthly thereafter. Filtered leachates were collected and sent to ALS Laboratory for analysis (**Table 2-3**).

Table 2-3 Kinetic testing leachate analysis suite

Analytes	Laboratory Analysis
Key parameters	pH/EC and acidity/ alkalinity
Major Ions	Ca, K, Mg, Na, Cl, F, SO_4 and total organic carbon
Metals/ metalloids	Al, As, B, Ba, Be, Bi, Cd, Ce, Cs, Co, Cr, Cu, Dy, Er, Eu, Gd, Ga, Hf, Ho, In, La, Li, Lu, Fe, Hg, Mn, Mo, Nd, Ni, Pr, Pb, Sb, Rb, Sm, Se, Ag, Sr, Te, Tb, Tl, Th, Ti, Sn, U, V, Yb, Y, Zn and Zr

2 Results Summary

Several of the key parameters are shown graphically in **Figure 2-1** and the key preliminary results are summarised below.


LEGEND:
KLC 1 Overburden (Free Leach)
KLC 2 Weathered Coal (Free Leach)
KLC 3 Overburden (Free Leach)
KLC 4 Overburden (Saturated)
KLC 5 Weathered Coal (Free Leach)
KLC 6 Weathered Coal (Saturated)
KLC 7 Fresh Coal (Free Leach)
KLC 8 Fresh Coal (Saturated)
pH
Acidity (mg CaCO3/L)
Total Alkalinity (mg/L as CaCO3)*
Electrical Conductivity (µS/cm)
Sulfate (mg/L)
Chloride (mg/L)
Arsenic (mg/L)
Number of Weeks

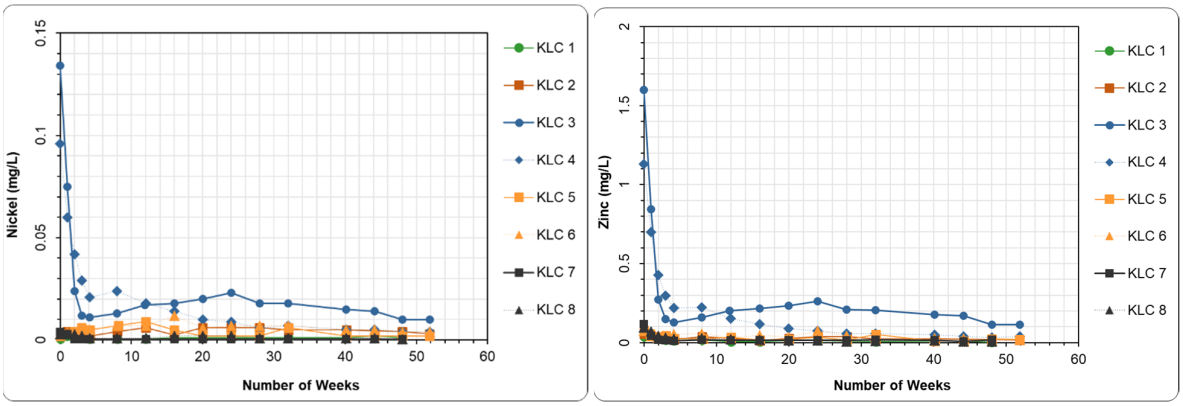


Figure 2-1: KLC results for select parameters.

2.1 Overburden samples

- The KLC results for the YTF composite (KLC 1) show an initial slightly acidic pH (~pH 5) which plateaus over the testing period (twelve-months) to reach a pH between ~pH 4.5 to pH 5.0. Leachates from the YMF columns (KLC 3 and KLC 4, operated under saturated and unsaturated conditions, respectively) show acidic conditions (~pH 3.7) which slightly increases to ~pH 4.0 over the testing period (twelve-months).
- The associated leached acidity from the samples is low and consistent with a range of 6 to 33 mg/L (as $CaCO_3$ equivalent) or an equivalent load of 0.85 to 5.2 mg/kg/month.
- The EC of the leachate water quality for the YMF composite samples has an initial first flush of ~1,600 µS/cm and ~750 µS/cm for the unsaturated and saturated columns, respectively. The EC decreases rapidly over the testing period, particularly over the first 4-weeks, with the values stabilising around 45 µS/cm. The EC of the leachate water quality for the YTF composite sample was similar, albeit, the initial 'first-flush' was only 255 µS/cm.
- Leached sulfate (SO_4) concentrations for the YMF samples are generally low and decrease over the test period. The first flush leachate concentrations are ~200 to 300 mg/L which decrease sharply after the first month of leaching and reach a steady-state at ~20 mg/L and ~10 mg/L for the unsaturated and saturated columns, respectively.
- There are no specific regulatory criteria for metal(loid) concentrations in leachate from waste materials on mine sites in Victoria. As such, the KLC leachate results were compared with Australian guidelines for livestock drinking water and aquatic freshwater ecosystem (ANZECC & ARMCANZ, 2000) guideline values. These guidelines are provided for context only and are not intended to be interpreted as "maximum permissible levels" for site water storage or discharge. Similarly, the aquatic freshwater ecosystem guidelines are highly conservative. The comparison of KLC leachate results to guideline values indicated aluminium, cadmium, chromium, copper, nickel and zinc are above aquatic freshwater ecosystem trigger values but below livestock drinking water guidelines.

2.2 Weathered Coal

- The KLC results for the weathered coal samples showed acidic leachates (pH < 4.5) over the testing period (twelve-months). The YEF free leaching column stabilised at ~ pH 3.7 while the saturated columns reached a ~ pH 4.2 on the last sampling events (i.e. a difference of around 0.5 pH units between saturated and unsaturated).
- The associated leached acidity from KLC 2 (unsaturated) and KLC 5 (unsaturated) is moderate with values ranging between ~80 to 120 mg/L $CaCO_3$. The leached acidity from KLC 6 (saturated) generally increased over the testing period from ~120 to ~270 mg/L $CaCO_3$. Interestingly more acidity was released from saturated column over the testing period which has slightly higher pH values than the unsaturated column.

- The leachate EC values of the weathered coal first flush range from ~470 to ~650 µS/cm for the YEF and YTF composite samples. The leached EC for the YEF columns decreased to ~200 µS/cm over the testing period for both saturated and unsaturated. The YTF composite column increases slightly to ~500 µS/cm towards the end of the 1-year testing period.
- Leached sulfate (SO_4) concentrations initially range between 91 to 136 mg/L for the first flush and continuously decreasing over the testing period to around 25 mg/L
- The comparison of KLC leachate results to guidelines values indicate aluminium, arsenic, chromium, copper and zinc concentrations are regularly above aquatic freshwater ecosystem trigger values with lead and nickel occasionally exceeding the trigger value. The first flush arsenic concentrations in KLC 2 are above livestock drinking water guidelines.

2.3 Fresh Coal

- The KLC results for the composite fresh coal samples show initial acidic leachates (~pH 4) for both the unsaturated and saturated columns. The unsaturated sample remained in the ~pH 4 range for the duration of the testing period, while the saturated sample showed an increase in pH and stabilisation at ~pH 5.7.
- The associated leached acidity from the unsaturated sample shows an initial first flush of ~50 mg/L followed by stabilisation at ~25 mg/L, with no alkalinity detected. However, for the saturated column, the acidity levels fluctuate between 38 to 108 mg/L. Interestingly the associated alkalinity levels also fluctuate (less frequently) over the testing period.
- The EC of the leachate water quality is initially moderately elevated with first flush values of ~1,700 to ~1,300 µS/cm for the YMF composite in both saturated and unsaturated samples, respectively. However, these concentrations decrease rapidly to stabilise at ~350 µS/cm for the unsaturated column, and ~140 µS/cm for the saturated sample.
- Leached sulfate (SO_4) concentrations closely reflect the EC trends, with an initial rapid decrease followed by stabilisation over the testing period. The first flush leachate concentrations are 586 and 443 mg/L for the unsaturated and saturated columns, respectively, with steady-state concentrations of ~120 mg/L and < 5 mg/L (below reporting limits), respectively.
- The comparison of KLC leachate results to guidelines values indicated no metal(loid) concentrations exceeded the Australian guidelines for livestock drinking water (ANZECC & ARMCANZ, 2000); however, some aluminium, copper and zinc values exceeded the Australian guidelines for aquatic freshwater ecosystem (ANZECC & ARMCANZ, 2000) in both, unsaturated and saturated conditions.

3 Recommendations

The key objective of the KLC testing program is to derive source term (geochemical) inputs into a water balance water quality model for the proposed YCM pit lake. The results from the KLC tests will ultimately be used to develop hydrogeochemical inputs for each of the key materials types that will contribute to pit lake water quality (i.e. coal ash, fresh coal, weathered coal and overburden). RGS has thus made recommendation regarding the operation of the KLC tests with meeting the overarching project objectives.

RGS recommends continuing five of the eight KLC tests for an additional six months and terminating the remaining three columns. A summary of the proposed outcome for each of the columns and a justification for continuing or terminating is provided in **Table 3-1**.

Table 3-1: Proposed KLC continuation or termination

ID	Material Type	Recommendation	Justification
KLC 1	Overburden	Terminate	Steady-state has been reached for most parameters and preliminary modelling input will mainly incorporate KLC 3 and KLC 4 data.
KLC 2	Weathered coal	Continue	Some key metals and metalloids (e.g. Arsenic) have not yet reached steady state.

ID	Material Type	Recommendation	Justification
KLC 3	Overburden	Continue	Will for the key source term input to preliminary model for exposed overburden in the pit walls.
KLC 4	Overburden	Continue	Will for the key source term input to preliminary model for saturated (submerged) overburden in the pit walls.
KLC 5	Weathered coal	Continue	Will for the key source term input to preliminary model for exposed weathered coal in the pit walls.
KLC 6	Weathered coal	Continue	Will for the key source term input to preliminary model for saturated (submerged) weathered coal in the pit walls.
KLC 7	Fresh coal	Terminate	One year is sufficient operational time to understand the weathering rate of the material under unsaturated conditions. KLC 9 – 12 (fresh coal saturated and unsaturated) will be used to generate source terms for modelling.
KLC 8	Fresh coal	Terminate	
KCL 9 – KLC 12: Fresh coal material			

MINE WASTE AND
WATER MANAGEMENT

Appendix C

Water Balance Results

Appendix C Water Balance Results

Note: Annual totals.

Scenario ID	Fill Sources (annual until reach RL + 37m AHD)	Morwell River connected?	Top-up water	Climate
Scenario 1	Local catchment flows, natural groundwater & pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing).	No	No	Median
Scenario 2	Local catchment flows, natural groundwater, pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing) & 24 GL Latrobe water.	Yes (flood flows only)	Yes	Median
Scenario 3	Local catchment flows, natural groundwater, pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing), 34 GL Latrobe water & 14 GL Moondarra water.	Yes (flood flows only)	Yes	Median
Scenario 4	Local catchment flows, natural groundwater, pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing) & 24 GL Latrobe water.	Yes (all)	Yes	Median
Scenario 5	Local catchment flows, natural groundwater, pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing) & 24 GL Latrobe water.	Yes (flood flows only)	Yes	Dry
Scenario 6	Local catchment flows, natural groundwater, pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing) & 24 GL Latrobe water.	No	Yes	Median

Inflows (Annual totals)

Inflow	Scenario	Units	Statistic	Yallourn Township Field							Yallourn East Field						
			Year-->	5	10	15	25	50	75	100	5	10	15	25	50	75	100
Direct rainfall	1	GL	Min	0.762	1.514	2.010	1.841	1.888	2.239	2.225	0.498	0.979	1.561	2.410	3.047	3.525	3.322
		GL	50%	1.985	2.708	3.025	3.000	3.016	3.243	3.779	1.125	1.571	2.609	4.046	4.653	4.946	5.084
		GL	Max	2.927	4.547	4.212	4.058	4.947	4.814	6.102	1.529	2.745	4.412	5.502	7.698	7.293	8.114
	2	GL	Min	1.575	2.312	3.586	4.520	4.475	5.024	4.677	1.712	3.224	3.786	3.827	3.815	4.272	3.976
		GL	50%	3.065	3.508	5.237	7.074	7.032	7.061	7.157	3.841	4.781	5.454	6.021	5.977	6.000	6.085
		GL	Max	3.973	5.786	7.361	9.618	11.559	10.625	11.478	5.413	7.725	7.643	8.183	9.789	9.008	9.746
	3	GL	Min	1.633	3.685	4.967	4.479	4.476	5.024	4.673	2.526	3.567	4.231	3.810	3.815	4.272	3.973
		GL	50%	3.212	5.451	7.188	7.084	7.038	7.061	7.159	4.949	5.291	6.114	6.026	5.980	6.000	6.085
		GL	Max	4.360	8.894	10.203	9.645	11.558	10.653	11.478	6.489	8.542	8.642	8.212	9.789	9.026	9.746
	4	GL	Min	1.575	2.312	3.586	4.520	4.825	5.471	5.191	1.712	3.224	3.786	3.876	4.085	4.631	4.396
		GL	50%	3.065	3.508	5.237	7.320	7.602	7.597	7.681	3.841	4.781	5.454	6.206	6.434	6.432	6.502
		GL	Max	3.973	5.786	7.361	10.012	11.906	11.643	12.385	5.413	7.725	7.643	8.474	10.077	9.856	10.482
	5	GL	Min	1.495	1.940	3.164	3.709	3.806	4.297	4.099	1.555	2.966	3.480	3.280	3.241	3.646	3.485
		GL	50%	2.867	2.991	4.518	6.019	6.040	6.019	6.089	3.403	4.418	4.913	5.227	5.124	5.103	5.177
		GL	Max	3.690	4.916	6.316	8.177	9.475	9.090	9.720	4.767	7.157	6.833	7.159	8.032	7.715	8.235
	6	GL	Min	1.581	2.230	3.534	4.458	4.475	5.012	4.677	1.710	3.213	3.771	3.798	3.815	4.270	3.976
		GL	50%	3.077	3.440	5.148	7.077	7.012	7.079	7.187	3.766	4.765	5.442	6.022	5.959	6.011	6.098
		GL	Max	3.965	5.676	7.238	9.565	11.350	10.722	11.434	5.086	7.754	7.601	8.167	9.629	9.091	9.725
Internal catchments	1	GL	Min	0.375	0.251	0.296	0.218	0.214	0.268	0.179	0.295	0.204	0.217	0.131	0.105	0.130	0.094
		GL	50%	1.706	1.365	1.389	1.388	1.253	1.291	1.225	1.389	1.161	1.050	0.830	0.656	0.644	0.659
		GL	Max	3.309	3.802	2.898	3.002	3.551	2.979	2.672	2.745	3.264	2.292	1.779	1.820	1.494	1.407
	2	GL	Min	0.292	0.216	0.180	0.066	0.061	0.084	0.059	0.199	0.106	0.117	0.064	0.063	0.088	0.062
		GL	50%	1.415	1.159	0.853	0.370	0.334	0.375	0.387	0.897	0.610	0.569	0.412	0.372	0.410	0.429
		GL	Max	2.851	3.228	1.852	0.797	0.954	0.785	0.843	1.742	1.702	1.192	0.889	1.066	0.874	0.920
	3	GL	Min	0.287	0.123	0.082	0.061	0.061	0.084	0.059	0.145	0.089	0.085	0.062	0.063	0.088	0.062
		GL	50%	1.387	0.659	0.377	0.376	0.332	0.375	0.387	0.689	0.506	0.415	0.415	0.372	0.410	0.429
		GL	Max	2.775	1.856	0.779	0.808	0.954	0.786	0.843	1.374	1.423	0.861	0.899	1.066	0.875	0.920
	4	GL	Min	0.292	0.216	0.180	0.066	0.071	0.131	0.095	0.199	0.106	0.117	0.064	0.077	0.144	0.103
		GL	50%	1.415	1.159	0.853	0.391	0.401	0.419	0.427	0.897	0.610	0.569	0.429	0.451	0.471	0.477
		GL	Max	2.851	3.228	1.852	0.861	0.928	0.886	0.931	1.742	1.702	1.192	0.963	1.037	0.987	1.038
	5	GL	Min	0.230	0.177	0.148	0.058	0.026	0.036	0.033	0.160	0.086	0.091	0.051	0.028	0.037	0.034
		GL	50%	1.162	1.014	0.689	0.350	0.196	0.211	0.232	0.754	0.507	0.449	0.332	0.211	0.233	0.253
		GL	Max	2.487	2.980	1.642	0.847	0.641	0.586	0.571	1.563	1.493	1.022	0.800	0.711	0.645	0.624
	6	GL	Min	0.292	0.218	0.185	0.067	0.057	0.080	0.059	0.199	0.107	0.117	0.064	0.062	0.084	0.062
		GL	50%	1.417	1.187	0.873	0.380	0.341	0.363	0.399	0.904	0.613	0.575	0.417	0.375	0.407	0.434
		GL	Max	2.851	3.344	1.855	0.841	0.950	0.793	0.859	1.742	1.731	1.192	0.903	1.047	0.883	0.926
External catchments	1	GL	Min	0.690	0.567	0.788	0.695	0.535	0.738	0.576	0.161	0.137	0.186	0.166	0.130	0.172	0.135
		GL	50%	2.544	2.332	2.479	2.330	2.147	2.294	2.596	0.565	0.519	0.550	0.519	0.479	0.512	0.578
		GL	Max	5.436	7.222	5.702	5.904	6.982	6.050	6.068	1.197	1.584	1.254	1.299	1.532	1.329	1.332
	2	GL	Min	0.690	0.567	0.788	0.691	0.535	0.752	0.576	0.161	0.137	0.186	0.166	0.130	0.175	0.135
		GL	50%	2.544	2.332	2.479	2.330	2.136	2.299	2.591	0.565	0.519	0.551	0.519	0.477	0.513	0.577
		GL	Max	5.436	7.113	5.702	5.922	7.030	5.843	6.068	1.197	1.561	1.254	1.303	1.543	1.284	1.332
	3	GL	Min	0.690	0.567	0.788	0.696	0.535	0.752	0.576	0.161	0.137	0.186	0.167	0.130	0.175	0.135
		GL	50%	2.544	2.332	2.479	2.338	2.136	2.341	2.591	0.565	0.519	0.550	0.521	0.477	0.521	0.577
		GL	Max	5.436	7.113	5.707	5.995	7.030	5.868	6.068	1.197	1.561	1.255	1.319	1.542	1.289	1.332
	4	GL	Min	0.690	0.567	0.788	0.708	0.666	1.029	0.812	0.161	0.137	0.186	0.167	0.159	0.237	0.188
		GL	50%	2.544	2.332	2.479	2.515	2.641	2.855	2.967	0.565	0.519	0.551	0.559	0.588	0.635	0.659
		GL	Max	5.436	7.113	5.702	6.351	6.866	6.806	6.943	1.197	1.561	1.254	1.398	1.506	1.493	1.522
	5	GL	Min	0.609	0.429	0.597	0.441	0.259	0.413	0.285	0.144	0.107	0.145	0.110	0.069	0.101	0.074
		GL	50%	2.045	1.835	1.828	1.691	1.299	1.355	1.479	0.457	0.413	0.411	0.382	0.297	0.310	0.336
		GL	Max	4.645	6.050	4.551	4.632	4.362	4.115	3.855	1.025	1.329	1.004	1.023	0.966	0.909	0.859
	6	GL	Min	0.690	0.567	0.788	0.695	0.539	0.738	0.576	0.161	0.137	0.186	0.166	0.131	0.172	0.135

Inflow	Scenario	Units	Statistic	Yallourn Township Field							Yallourn East Field						
			Year-->	5	10	15	25	50	75	100	5	10	15	25	50	75	100
		GL	50%	2.544	2.332	2.479	2.330	2.132	2.314	2.596	0.565	0.519	0.550	0.519	0.476	0.519	0.578
		GL	Max	5.436	7.222	5.702	5.902	6.863	6.003	6.068	1.197	1.584	1.254	1.299	1.506	1.319	1.332
Groundwater inflow	1	GL	Min	0.752	0.890	0.887	0.519	0.865	0.590	0.738	1.115	1.184	1.120	0.842	1.077	0.855	1.033
		GL	50%	0.752	0.890	0.887	0.519	0.865	0.590	0.738	1.115	1.184	1.120	0.843	1.077	0.855	1.033
		GL	Max	0.752	0.890	0.887	0.519	0.865	0.590	0.738	1.115	1.184	1.121	0.843	1.077	0.855	1.033
	2	GL	Min	0.752	0.890	0.887	0.519	0.865	0.590	0.738	1.115	1.184	1.120	0.842	1.077	0.855	1.033
		GL	50%	0.752	0.890	0.887	0.519	0.865	0.590	0.738	1.115	1.184	1.120	0.843	1.077	0.855	1.033
		GL	Max	0.752	0.890	0.887	0.519	0.865	0.590	0.738	1.115	1.184	1.121	0.843	1.077	0.855	1.033
	3	GL	Min	0.752	0.890	0.887	0.519	0.865	0.590	0.738	1.115	1.184	1.120	0.842	1.077	0.855	1.033
		GL	50%	0.752	0.890	0.887	0.519	0.865	0.590	0.738	1.115	1.184	1.120	0.843	1.077	0.855	1.033
		GL	Max	0.752	0.890	0.887	0.519	0.865	0.590	0.738	1.115	1.184	1.121	0.843	1.077	0.855	1.033
	4	GL	Min	0.752	0.890	0.887	0.518	0.866	0.590	0.738	1.115	1.184	1.120	0.842	1.077	0.855	1.033
		GL	50%	0.752	0.890	0.887	0.518	0.866	0.590	0.738	1.115	1.184	1.120	0.842	1.077	0.855	1.033
		GL	Max	0.752	0.890	0.887	0.519	0.866	0.590	0.738	1.115	1.184	1.121	0.843	1.077	0.855	1.033
	5	GL	Min	0.752	0.890	0.887	0.519	0.865	0.590	0.738	1.115	1.184	1.120	0.842	1.077	0.855	1.033
		GL	50%	0.752	0.890	0.887	0.519	0.865	0.590	0.738	1.115	1.184	1.120	0.843	1.077	0.855	1.033
		GL	Max	0.752	0.890	0.887	0.519	0.865	0.590	0.738	1.115	1.184	1.121	0.843	1.077	0.855	1.033
	6	GL	Min	0.752	0.890	0.887	0.519	0.865	0.590	0.738	1.115	1.184	1.120	0.842	1.077	0.855	1.033
		GL	50%	0.752	0.890	0.887	0.519	0.865	0.590	0.738	1.115	1.184	1.120	0.843	1.077	0.855	1.033
		GL	Max	0.752	0.890	0.887	0.519	0.865	0.590	0.738	1.115	1.184	1.121	0.843	1.077	0.855	1.033
Groundwater pumped in	1	GL	Min	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.499	1.499	1.499	0.999	0.999	0.999	1.002
		GL	50%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.499	1.499	1.499	1.499	0.999	0.999	1.002
		GL	Max	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.499	1.499	1.499	1.499	1.309	0.999	1.002
	2	GL	Min	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.192	0.999	0.999	0.000	0.000	0.000	0.000
		GL	50%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.499	0.999	0.999	0.503	0.000	0.000	0.000
		GL	Max	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.499	0.999	0.999	0.999	0.000	0.000	0.000
	3	GL	Min	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.999	0.999	0.000	0.000	0.000	0.000	0.000
		GL	50%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.999	0.999	0.000	0.000	0.000	0.000	0.000
		GL	Max	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.999	0.999	0.000	0.000	0.000	0.000	0.000
	4	GL	Min	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.192	0.999	0.999	0.000	0.000	0.000	0.000
		GL	50%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.499	0.999	0.999	0.503	0.000	0.000	0.000
		GL	Max	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.499	0.999	0.999	0.999	0.000	0.000	0.000
	5	GL	Min	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.393	0.999	0.999	0.824	0.000	0.000	0.000
		GL	50%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.499	0.999	0.999	0.999	0.000	0.000	0.000
		GL	Max	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.499	0.999	0.999	0.999	0.000	0.000	0.000
	6	GL	Min	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.499	0.999	0.999	0.000	0.000	0.000	0.000
		GL	50%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.499	0.999	0.999	0.999	0.000	0.000	0.000
		GL	Max	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.499	0.999	0.999	0.999	0.000	0.000	0.000
Conveyer transfer in	1	GL	Min	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		GL	50%	0.000	0.000	0.000	0.000	0.000	0.007	0.046	0.000	0.000	3.293	0.859	1.992	1.399	1.236
		GL	Max	0.000	0.000	0.000	0.000	0.012	0.113	0.220	0.000	8.617	8.685	7.799	9.067	8.517	3.352
	2	GL	Min	0.000	0.000	0.000	0.000	0.000	0.000	0.000	20.200	13.743	12.087	0.105	0.083	0.135	0.066
		GL	50%	0.000	0.000	0.000	0.000	0.027	0.022	0.027	27.389	15.306	13.099	8.783	0.914	0.774	0.737
		GL	Max	0.000	0.000	0.000	0.065	1.128	1.039	0.917	34.038	22.589	15.607	18.135	16.311	13.107	17.595
	3	GL	Min	0.000	0.000	0.000	0.000	0.000	0.000	0.000	15.355	9.186	0.093	0.075	0.083	0.172	0.065
		GL	50%	0.000	0.000	0.028	0.020	0.026	0.022	0.026	30.489	9.938	0.710	0.875	0.957	0.790	0.762
		GL	Max	0.000	0.000	0.725	1.027	1.166	1.144	1.050	37.661	15.176	8.713	11.625	16.311	16.279	18.450
	4	GL	Min	0.000	0.000	0.000	0.000	17.269	18.259	18.134	20.200	13.743	12.087	10.525	23.059	24.286	24.645
		GL	50%	0.000	0.000	0.000	8.756	20.830	21.064	20.735	27.389	15.306	13.099	18.023	26.345	26.413	26.785
		GL	Max	0.000	0.000	0.000	23.686	24.096	23.917	23.426	34.038	22.589	15.607	29.317	29.581	28.866	29.536
	5	GL	Min	0.000	0.000	0.000	0.000	0.003	0.000	0.002	20.185	14.161	12.287	9.552	0.032	0.004	0.010
		GL	50%	0.000	0.000	0.000	0.000	0.082	0.613	0.221	25.371	16.295	12.940	11.019	0.436	0.441	0.435
		GL	Max	0.000	0.000	0.000	0.000	1.144	1.097	1.196	30.801	24.357	14.795	12.801	4.115	7.574	5.112
	6	GL	Min	0.000	0.000	0.000	0.000	0.000	0.000	0.000	20.200	14.139	12.189	0.289	0.157	0.112	0.066

Inflow	Scenario	Units	Statistic	Yallourn Township Field							Yallourn East Field						
			Year-->	5	10	15	25	50	75	100	5	10	15	25	50	75	100
		GL	50%	0.000	0.000	0.000	0.000	0.030	0.024	0.023	26.517	15.429	12.915	10.640	0.665	0.649	0.736
		GL	Max	0.000	0.000	0.000	0.047	1.139	1.036	0.917	33.094	21.767	14.508	11.956	7.059	5.791	6.005
MRD spillways	1	GL	Min	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		GL	50%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		GL	Max	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	2	GL	Min	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		GL	50%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		GL	Max	4.877	16.582	7.756	11.717	20.425	12.410	15.888	1.332	8.168	5.130	5.594	14.243	4.643	3.806
	3	GL	Min	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		GL	50%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		GL	Max	4.877	16.582	7.509	11.717	20.425	12.424	15.888	1.332	8.168	4.966	5.594	14.243	4.643	3.806
	4	GL	Min	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	35.423	34.594	29.079
		GL	50%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	60.164	136.799	123.583	123.086
		GL	Max	4.877	16.582	7.756	11.717	0.000	0.000	0.000	1.332	8.168	5.130	254.963	321.893	290.651	305.172
	5	GL	Min	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		GL	50%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		GL	Max	2.108	6.951	4.038	4.523	8.027	5.575	2.113	0.000	0.271	0.831	1.317	5.211	0.000	0.000
	6	GL	Min	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		GL	50%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		GL	Max	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Moondarra pumped in	1	GL	Min	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		GL	50%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		GL	Max	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	2	GL	Min	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		GL	50%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		GL	Max	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	3	GL	Min	0.000	0.000	0.000	0.000	0.000	0.000	0.000	13.990	13.990	0.000	0.000	0.000	0.000	0.000
		GL	50%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	13.990	13.990	0.000	0.000	0.000	0.000	0.000
		GL	Max	0.000	0.000	0.000	0.000	0.000	0.000	0.000	13.990	13.990	0.000	0.000	0.000	0.000	0.000
	4	GL	Min	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		GL	50%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		GL	Max	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	5	GL	Min	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		GL	50%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		GL	Max	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	6	GL	Min	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		GL	50%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		GL	Max	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Latrobe pumped in to first fill	1	GL	Min	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		GL	50%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		GL	Max	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	2	GL	Min	23.984	23.984	23.984	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		GL	50%	23.984	23.984	23.984	12.078	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		GL	Max	23.984	23.984	23.984	23.984	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	3	GL	Min	33.977	33.977	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		GL	50%	33.977	33.977	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		GL	Max	33.977	33.977	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	4	GL	Min	23.984	23.984	23.984	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		GL	50%	23.984	23.984	23.984	12.078	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		GL	Max	23.984	23.984	23.984	23.984	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	5	GL	Min	23.984	23.984	23.984	19.775	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		GL	50%	23.984	23.984	23.984	23.984	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		GL	Max	23.984	23.984	23.984	23.984	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	6	GL	Min	23.984	23.984	23.984	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Inflow	Scenario	Units	Statistic	Yallourn Township Field							Yallourn East Field						
			Year-->	5	10	15	25	50	75	100	5	10	15	25	50	75	100
		GL	50%	23.984	23.984	23.984	23.984	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		GL	Max	23.984	23.984	23.984	23.984	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Latrobe topup after first fill	1	ML/d	Min	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		ML/d	50%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		ML/d	Max	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	2	ML/d	Min	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		ML/d	50%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		ML/d	Max	0.000	0.000	0.000	0.000	65.708	65.708	65.708	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	3	ML/d	Min	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		ML/d	50%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		ML/d	Max	0.000	0.000	93.087	93.087	93.087	93.087	93.087	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	4	ML/d	Min	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		ML/d	50%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		ML/d	Max	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	5	ML/d	Min	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		ML/d	50%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		ML/d	Max	0.000	0.000	0.000	0.000	65.708	65.708	65.708	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	6	ML/d	Min	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		ML/d	50%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		ML/d	Max	0.000	0.000	0.000	0.000	65.708	65.708	65.708	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Outflows (Annual totals)

Outflow	Scenario	Units	Statistic	Yallourn Township Field							Yallourn East Field						
			Year-->	5	10	15	25	50	75	100	5	10	15	25	50	75	100
Evaporation	1	GL	Min	2.38	3.36	4.77	4.78	5.03	5.18	5.28	1.56	2.24	3.22	5.91	7.54	8.17	8.53
		GL	50%	3.23	4.78	4.99	5.05	5.26	5.54	6.49	1.84	2.59	4.37	6.85	8.19	8.59	8.76
		GL	Max	3.90	5.09	5.11	5.20	5.94	7.28	7.69	2.02	3.71	6.10	7.64	8.66	8.85	9.02
	2	GL	Min	4.96	5.26	8.12	11.59	12.23	12.24	12.28	5.31	8.16	8.90	10.00	10.43	10.43	10.48
		GL	50%	5.00	6.04	8.50	12.04	12.34	12.34	12.40	6.25	8.33	8.99	10.22	10.48	10.48	10.53
		GL	Max	5.05	6.83	9.13	12.14	12.45	12.44	12.49	7.27	8.47	9.15	10.27	10.52	10.53	10.57
	3	GL	Min	5.10	9.09	11.79	11.93	12.23	12.24	12.28	7.90	9.10	10.05	10.17	10.43	10.43	10.48
		GL	50%	5.26	9.52	11.91	12.03	12.35	12.34	12.41	8.07	9.22	10.11	10.22	10.49	10.48	10.53
		GL	Max	5.91	9.97	11.98	12.12	12.45	12.44	12.49	8.27	9.33	10.14	10.26	10.52	10.53	10.57
	4	GL	Min	4.96	5.26	8.12	11.59	12.41	12.41	12.47	5.31	8.16	8.90	10.00	10.51	10.51	10.56
		GL	50%	5.00	6.04	8.50	12.07	12.43	12.43	12.48	6.25	8.33	8.99	10.23	10.52	10.52	10.57
		GL	Max	5.05	6.83	9.13	12.13	12.43	12.43	12.49	7.27	8.47	9.15	10.26	10.52	10.52	10.57
	5	GL	Min	5.01	5.22	7.92	11.03	12.75	12.75	12.82	5.15	8.17	8.94	9.89	10.87	10.88	10.93
		GL	50%	5.04	5.60	8.22	11.65	12.86	12.86	12.92	6.01	8.36	9.03	10.14	10.93	10.93	10.98
		GL	Max	5.08	6.40	8.75	12.29	12.91	12.93	12.95	7.03	8.47	9.16	10.45	10.95	10.96	10.99
	6	GL	Min	4.96	5.24	8.07	11.54	12.22	12.22	12.28	5.30	8.15	8.88	9.97	10.43	10.42	10.48
		GL	50%	5.00	5.88	8.40	11.99	12.34	12.34	12.40	6.16	8.31	8.97	10.20	10.48	10.48	10.53
		GL	Max	5.04	6.55	8.86	12.14	12.43	12.43	12.48	6.69	8.40	9.08	10.27	10.52	10.53	10.57
Groundwater	1	GL	Min	0.032	0.042	0.075	0.061	0.057	0.047	0.045	0.023	0.024	0.043	0.073	0.088	0.065	0.063
		GL	50%	0.032	0.042	0.075	0.061	0.057	0.047	0.045	0.023	0.024	0.043	0.073	0.088	0.065	0.063
		GL	Max	0.032	0.042	0.075	0.061	0.057	0.047	0.045	0.023	0.024	0.043	0.073	0.088	0.065	0.063
	2	GL	Min	0.032	0.042	0.075	0.061	0.057	0.047	0.045	0.023	0.024	0.043	0.073	0.088	0.065	0.063
		GL	50%	0.032	0.042	0.075	0.061	0.057	0.047	0.045	0.023	0.024	0.043	0.073	0.088	0.065	0.063
		GL	Max	0.032	0.042	0.075	0.061	0.057	0.047	0.045	0.023	0.024	0.043	0.073	0.088	0.065	0.063
	3	GL	Min	0.032	0.042	0.075	0.061	0.057	0.047	0.045	0.023	0.024	0.043	0.073	0.088	0.065	0.063
		GL	50%	0.032	0.042	0.075	0.061	0.057	0.047	0.045	0.023	0.024	0.043	0.073	0.088	0.065	0.063
		GL	Max	0.032	0.042	0.075	0.061	0.057	0.047	0.045	0.023	0.024	0.043	0.073	0.088	0.065	0.063
	4	GL	Min	0.032	0.042	0.075	0.061	0.057	0.047	0.045	0.023	0.024	0.043	0.073	0.088	0.065	0.063
		GL	50%	0.032	0.042	0.075	0.061	0.057	0.047	0.045	0.023	0.024	0.043	0.073	0.088	0.065	0.063
		GL	Max	0.032	0.042	0.075	0.061	0.057	0.047	0.045	0.023	0.024	0.043	0.073	0.088	0.065	0.063
	5	GL	Min	0.032	0.042	0.075	0.061	0.057	0.047	0.045	0.023	0.024	0.043	0.073	0.088	0.065	0.063
		GL	50%	0.032	0.042	0.075	0.061	0.057	0.047	0.045	0.023	0.024	0.043	0.073	0.088	0.065	0.063
		GL	Max	0.032	0.042	0.075	0.061	0.057	0.047	0.045	0.023	0.024	0.043	0.073	0.088	0.065	0.063
	6	GL	Min	0.032	0.042	0.075	0.061	0.057	0.047	0.045	0.023	0.024	0.043	0.073	0.088	0.065	0.063
		GL	50%	0.032	0.042	0.075	0.061	0.057	0.047	0.045	0.023	0.024	0.043	0.073	0.088	0.065	0.063
		GL	Max	0.032	0.042	0.075	0.061	0.057	0.047	0.045	0.023	0.024	0.043	0.073	0.088	0.065	0.063
Conveyor transfer out	1	GL	Min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		GL	50%	0.00	0.00	3.29	0.86	1.99	1.40	1.23	0.00	0.00	0.00	0.00	0.00	0.01	0.05
		GL	Max	0.00	8.62	8.69	7.80	9.07	8.52	3.35	0.00	0.00	0.00	0.00	0.01	0.11	0.22
	2	GL	Min	20.20	13.73	12.07	0.10	0.08	0.13	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		GL	50%	27.39	15.29	13.09	8.76	0.91	0.77	0.74	0.00	0.00	0.00	0.00	0.03	0.02	0.03
		GL	Max	31.75	22.54	15.61	18.13	16.31	13.11	17.60	0.00	0.00	0.00	0.06	1.12	1.03	0.92
	3	GL	Min	15.34	9.18	0.09	0.08	0.08	0.17	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		GL	50%	30.33	9.93	0.71	0.88	0.96	0.79	0.76	0.00	0.00	0.03	0.02	0.03	0.02	0.03
		GL	Max	37.70	15.16	8.72	11.62	16.31	16.28	18.45	0.00	0.00	0.72	1.03	1.16	1.14	1.05
	4	GL	Min	20.20	13.73	12.07	10.52	23.04	24.29	24.63	0.00	0.00	0.00	0.00	17.28	18.26	18.13
		GL	50%	27.39	15.29	13.09	18.04	26.34	26.41	26.80	0.00	0.00	0.00	8.76	20.82	21.07	20.73
		GL	Max	31.75	22.54	15.61	29.32	29.58	28.83	29.50	0.00	0.00	0.00	23.69	24.10	23.88	23.50
	5	GL	Min	20.18	14.16	12.29	9.52	0.03	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		GL	50%	25.37	16.27	12.94	11.02	0.44	0.44	0.44	0.00	0.00	0.00	0.00	0.08	0.61	0.22
		GL	Max	30.80	24.40	14.80	12.80	4.12	7.57	5.11	0.00	0.00	0.00	0.00	1.14	1.09	1.20
	6	GL	Min	20.20	14.14	12.17	0.29	0.16	0.11	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Outflow	Scenario	Units	Statistic	Yallourn Township Field							Yallourn East Field						
			Year-->	5	10	15	25	50	75	100	5	10	15	25	50	75	100
		GL	50%	26.57	15.42	12.91	10.64	0.66	0.65	0.74	0.00	0.00	0.00	0.00	0.03	0.02	0.02
		GL	Max	32.92	21.76	14.51	11.96	7.06	5.79	6.01	0.00	0.00	0.00	0.05	1.13	1.03	0.92
Overflow	1	GL	Min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		GL	50%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		GL	Max	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2	GL	Min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		GL	50%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		GL	Max	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.77	26.52	15.01	19.08
	3	GL	Min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		GL	50%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		GL	Max	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.60	17.97	26.52	20.82	20.53
	4	GL	Min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	33.07	41.33	32.50
		GL	50%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	66.60	138.41	127.50	126.69
		GL	Max	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	262.04	322.89	299.21	310.29
	5	GL	Min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		GL	50%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.00
		GL	Max	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	5.99	8.50	7.87
	6	GL	Min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		GL	50%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		GL	Max	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.81	10.38	8.04	8.72

Appendix D

Lake Water Quality Results Table

Appendix D Lake Water Quality Results Table

Scenario ID	Fill Sources (annual until reach RL + 37m AHD)	Morwell River connected?	Top-up water	Climate
Scenario 1	Local catchment flows, natural groundwater & pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing).	No	No	Median
Scenario 2	Local catchment flows, natural groundwater, pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing) & 24 GL Latrobe water.	Yes (flood flows only)	Yes	Median
Scenario 3	Local catchment flows, natural groundwater, pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing), 34 GL Latrobe water & 14 GL Moondarra water.	Yes (flood flows only)	Yes	Median
Scenario 4	Local catchment flows, natural groundwater, pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing) & 24 GL Latrobe water.	Yes (all)	Yes	Median
Scenario 5	Local catchment flows, natural groundwater, pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing) & 24 GL Latrobe water.	Yes (flood flows only)	Yes	Dry
Scenario 6	Local catchment flows, natural groundwater, pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing) & 24 GL Latrobe water.	No	Yes	Median

Parameter	Scenario	Statistic	Yallourn Township Field						Yallourn East Field					
		Year-->	5	10	25	50	75	100	5	10	25	50	75	100
Aluminium	1	Min	0.141	0.153	0.172	0.173	0.173	0.176	0.347	0.234	0.233	0.243	0.240	0.240
		5%	0.145	0.167	0.173	0.174	0.175	0.178	0.350	0.237	0.235	0.244	0.241	0.241
		50%	0.159	0.175	0.176	0.177	0.179	0.183	0.356	0.256	0.247	0.248	0.243	0.243
		95%	0.171	0.179	0.179	0.180	0.184	0.186	0.364	0.291	0.253	0.250	0.247	0.244
		Max	0.173	0.180	0.183	0.183	0.188	0.187	0.372	0.298	0.254	0.253	0.248	0.246
	2	Min	0.145	0.154	0.160	0.170	0.169	0.170	0.267	0.265	0.298	0.296	0.296	0.296
		5%	0.147	0.157	0.162	0.170	0.170	0.170	0.268	0.266	0.300	0.297	0.297	0.297
		50%	0.149	0.162	0.171	0.173	0.173	0.173	0.270	0.266	0.304	0.301	0.300	0.300
		95%	0.157	0.168	0.175	0.177	0.176	0.178	0.273	0.267	0.308	0.304	0.303	0.303
		Max	0.164	0.175	0.179	0.182	0.185	0.187	0.274	0.271	0.310	0.306	0.304	0.305
	3	Min	0.147	0.157	0.170	0.170	0.169	0.170	0.276	0.297	0.296	0.296	0.296	0.296
		5%	0.148	0.157	0.171	0.171	0.170	0.170	0.276	0.298	0.297	0.297	0.297	0.297
		50%	0.152	0.158	0.173	0.173	0.173	0.173	0.277	0.303	0.300	0.301	0.300	0.301
		95%	0.160	0.161	0.176	0.177	0.176	0.178	0.278	0.305	0.304	0.303	0.303	0.303
		Max	0.165	0.166	0.179	0.182	0.186	0.187	0.280	0.305	0.305	0.306	0.304	0.305
	4	Min	0.145	0.154	0.160	0.261	0.253	0.258	0.267	0.265	0.253	0.257	0.253	0.258
		5%	0.147	0.157	0.162	0.264	0.259	0.259	0.268	0.266	0.257	0.265	0.259	0.263
		50%	0.149	0.162	0.263	0.276	0.275	0.275	0.270	0.266	0.271	0.280	0.277	0.277
		95%	0.157	0.168	0.282	0.294	0.291	0.288	0.273	0.267	0.304	0.296	0.299	0.294
		Max	0.164	0.175	0.304	0.298	0.312	0.302	0.274	0.271	0.307	0.300	0.315	0.308
	5	Min	0.145	0.151	0.160	0.170	0.169	0.169	0.265	0.266	0.276	0.296	0.296	0.296
		5%	0.146	0.154	0.160	0.170	0.170	0.170	0.268	0.266	0.282	0.296	0.296	0.296
		50%	0.148	0.158	0.161	0.172	0.172	0.172	0.270	0.267	0.292	0.299	0.299	0.298
		95%	0.152	0.163	0.165	0.173	0.173	0.173	0.273	0.268	0.306	0.301	0.301	0.301
		Max	0.159	0.164	0.171	0.176	0.175	0.174	0.275	0.268	0.307	0.303	0.301	0.302
	6	Min	0.145	0.154	0.160	0.170	0.169	0.170	0.267	0.265	0.298	0.296	0.296	0.296
		5%	0.146	0.157	0.160	0.170	0.170	0.170	0.268	0.266	0.302	0.297	0.297	0.297
		50%	0.149	0.161	0.170	0.173	0.172	0.173	0.270	0.266	0.304	0.300	0.300	0.300
		95%	0.153	0.164	0.172	0.174	0.173	0.174	0.272	0.267	0.308	0.303	0.302	0.303
		Max	0.154	0.166	0.173	0.174	0.175	0.174	0.273	0.267	0.309	0.304	0.303	0.303
Arsenic	1	Min	0.0020	0.0026	0.0028	0.0029	0.0028	0.0028	0.0021	0.0019	0.0019	0.0020	0.0020	0.0020
		5%	0.0022	0.0028	0.0028	0.0029	0.0029	0.0028	0.0021	0.0019	0.0019	0.0020	0.0020	0.0020
		50%	0.0025	0.0029	0.0029	0.0029	0.0029	0.0029	0.0021	0.0020	0.0020	0.0020	0.0020	0.0020
		95%	0.0028	0.0029	0.0029	0.0030	0.0030	0.0029	0.0021	0.0020	0.0020	0.0020	0.0020	0.0020
		Max	0.0028	0.0029	0.0030	0.0030	0.0030	0.0030	0.0022	0.0021	0.0020	0.0020	0.0020	0.0020
	2	Min	0.0023	0.0024	0.0027	0.0029	0.0029	0.0029	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020
		5%	0.0024	0.0025	0.0028	0.0029	0.0029	0.0029	0.0021	0.0020	0.0020	0.0020	0.0020	0.0020
		50%	0.0024	0.0025	0.0029	0.0030	0.0030	0.0030	0.0021	0.0020	0.0020	0.0020	0.0020	0.0020
		95%	0.0025	0.0025	0.0030	0.0030	0.0030	0.0030	0.0021	0.0020	0.0021	0.0020	0.0020	0.0020
		Max	0.0025	0.0025	0.0030	0.0030	0.0030	0.0030	0.0021	0.0020	0.0021	0.0020	0.0020	0.0020
	3	Min	0.0023	0.0024	0.0029	0.0029	0.0029	0.0029	0.0019	0.0019	0.0020	0.0020	0.0020	0.0020
		5%	0.0023	0.0025	0.0029	0.0029	0.0029	0.0029	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020
		50%	0.0024	0.0025	0.0030	0.0030	0.0030	0.0030	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020
		95%	0.0024	0.0025	0.0030	0.0030	0.0030	0.0030	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020
		Max	0.0024	0.0025	0.0030	0.0030	0.0030	0.0030	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020
	4	Min	0.0023	0.0024	0.0020	0.0019	0.0018	0.0019	0.0020	0.0020	0.0016	0.0017	0.0015	0.0016
		5%	0.0024	0.0025	0.0021	0.0020	0.0020	0.0020	0.0021	0.0020	0.0019	0.0017	0.0017	0.0018
		50%	0.0024	0.0025	0.0023	0.0021	0.0022	0.0022	0.0021	0.0020	0.0021	0.0019	0.0019	0.0019
		95%	0.0025	0.0025	0.0029	0.0023	0.0024	0.0023	0.0021	0.0020	0.0022	0.0021	0.0021	0.0021
		Max	0.0025	0.0025	0.0030	0.0024	0.0024	0.0024	0.0021	0.0020	0.0023	0.0021	0.0022	0.0022
	5	Min	0.0024	0.0025	0.0027	0.0029	0.0029	0.0029	0.0021	0.0020	0.0020	0.0020	0.0020	0.0020
		5%	0.0024	0.0025	0.0027	0.0029	0.0029	0.0029	0.0021	0.0020	0.0021	0.0020	0.0020	0.0020
		50%	0.0025	0.0025	0.0027	0.0030	0.0030	0.0030	0.0021	0.0020	0.0021	0.0020	0.0020	0.0020
		95%	0.0025	0.0025	0.0028	0.0030	0.0030	0.0030	0.0021	0.0020	0.0021	0.0020	0.0020	0.0020
		Max	0.0025	0.0025	0.0029	0.0030	0.0030	0.0030	0.0021	0.0021	0.0021	0.0020	0.0020	0.0020
	6	Min	0.0024	0.0025	0.0027	0.0029	0.0029	0.0029	0.0021	0.0020	0.0020	0.0020	0.0020	0.0020
		5%	0.0024	0.0025	0.0027	0.0029	0.0029	0.0029	0.0021	0.0020	0.0020	0.0020	0.0020	0.0020
		50%	0.0024	0.0025	0.0029	0.0030	0.0030	0.0030	0.0021	0.0020	0.0020	0.0020	0.0020	0.0020
		95%	0.0025	0.0025	0.0030	0.0030	0.0030	0.0030	0.0021	0.0020	0.0021	0.0020	0.0020	0.0020
		Max	0.0025	0.0025	0.0030	0.0030	0.0030	0.0030	0.0021	0.0020	0.0021	0.0020	0.0020	0.0020
Barium	1	Min	0.09	0.09	0.09	0.09	0.09	0.09	0.47	0.33	0.33	0.34	0.34	0.34
		5%	0.10	0.09	0.09	0.09	0.09	0.09	0.47	0.33	0.33	0.34	0.34	0.34
		50%	0.11	0.10	0.10	0.10	0.10	0.09	0.48	0.35	0.35	0.35	0.34	0.34
		95%	0.12	0.11	0.11	0.10	0.10	0.10	0.49	0.40	0.35	0.35	0.35	0.34
		Max	0.13	0.11	0.12	0.11	0.11	0.10	0.51	0.41	0.36	0.35	0.35	0.35
	2	Min	0.08	0.08	0.08	0.09	0.09	0.09	0.31	0.32	0.36	0.37	0.37	0.37
		5%	0.08	0.08	0.08	0.09	0.09	0.09	0.32	0.33	0.36	0.37	0.37	0.37
		50%	0.08	0.08	0.09	0.09	0.09	0.09	0.32	0.33	0.37	0.38	0.38	0.38
		95%	0.09	0.08	0.09	0.09	0.09	0.09	0.33	0.33	0.38	0.38	0.38	0.38
		Max	0.10	0.09	0.09	0.09	0.09	0.09	0.33	0.33	0.38	0.38	0.38	0.38
	3	Min	0.07	0.08	0.09	0.09	0.09	0.09	0.30	0.36	0.37	0.37	0.37	0.37
		5%	0.07	0.08	0.09	0.09	0.09	0.09	0.31	0.37	0.37	0.37	0.37	0.37
		50%	0.08	0.08	0.09	0.09	0.09	0.09	0.31	0.37	0.38	0.38	0.38	0.38
		95%	0.08	0.08	0.09	0.09	0.09	0.09	0.31	0.38	0.38	0.38	0.38	0.38
		Max	0.09	0.08	0.09	0.09	0.09	0.09	0.31	0.38	0.38	0.38	0.38	0.38
	4	Min	0.08	0.08	0.08	0.15	0.13	0.15	0.31	0.32	0.16	0.16	0.14	0.15
		5%	0.08	0.08	0.08	0.15	0.15	0.16	0.32	0.33	0.18	0.16	0.16	0.17
		50%	0.08	0.08	0.19	0.17	0.17	0.17	0.32	0.33	0.21	0.18	0.18	0.18
		95%	0.09	0.08	0.23	0.18	0.19	0.19	0.33	0.33	0.37	0.19	0.20	0.20
		Max	0.10	0.09	0.24	0.19	0.19	0.19	0.33	0.33	0.38	0.20	0.21	0.20
	5	Min	0.08	0.08	0.08	0.09	0.09	0.09	0.31	0.33	0.34	0.37	0.37	0.37

Parameter	Scenario	Statistic	Yallourn Township Field						Yallourn East Field					
		Year-->	5	10	25	50	75	100	5	10	25	50	75	100
Boron		5%	0.08	0.08	0.08	0.09	0.09	0.09	0.32	0.33	0.35	0.37	0.37	0.37
		50%	0.08	0.08	0.08	0.09	0.09	0.09	0.32	0.33	0.35	0.38	0.38	0.38
		95%	0.09	0.08	0.09	0.09	0.09	0.09	0.33	0.33	0.37	0.38	0.38	0.38
		Max	0.09	0.09	0.09	0.09	0.09	0.09	0.33	0.33	0.37	0.38	0.38	0.38
	6	Min	0.08	0.08	0.08	0.09	0.09	0.09	0.32	0.33	0.36	0.37	0.37	0.37
		5%	0.08	0.08	0.08	0.09	0.09	0.09	0.32	0.33	0.36	0.37	0.37	0.37
		50%	0.08	0.08	0.09	0.09	0.09	0.09	0.32	0.33	0.37	0.38	0.38	0.38
		95%	0.09	0.09	0.09	0.09	0.09	0.09	0.33	0.33	0.37	0.38	0.38	0.38
		Max	0.10	0.09	0.09	0.09	0.09	0.09	0.33	0.33	0.38	0.38	0.38	0.38
	1	Min	0.022	0.028	0.028	0.029	0.028	0.029	0.328	0.219	0.221	0.230	0.229	0.229
		5%	0.027	0.029	0.031	0.031	0.030	0.030	0.331	0.222	0.223	0.231	0.229	0.230
		50%	0.033	0.033	0.033	0.033	0.033	0.033	0.336	0.238	0.233	0.234	0.231	0.231
		95%	0.039	0.038	0.038	0.037	0.037	0.035	0.343	0.274	0.239	0.239	0.235	0.232
		Max	0.044	0.040	0.046	0.038	0.040	0.037	0.350	0.279	0.242	0.241	0.236	0.234
	2	Min	0.024	0.025	0.026	0.028	0.028	0.028	0.203	0.215	0.242	0.256	0.256	0.256
		5%	0.026	0.025	0.027	0.028	0.028	0.029	0.207	0.219	0.246	0.257	0.257	0.257
		50%	0.028	0.027	0.029	0.029	0.029	0.029	0.211	0.220	0.254	0.260	0.260	0.260
		95%	0.033	0.030	0.030	0.030	0.031	0.030	0.215	0.221	0.258	0.261	0.261	0.261
		Max	0.035	0.032	0.032	0.030	0.032	0.031	0.216	0.221	0.259	0.262	0.262	0.262
	3	Min	0.023	0.024	0.028	0.028	0.028	0.028	0.199	0.248	0.256	0.256	0.257	0.256
		5%	0.024	0.025	0.028	0.028	0.028	0.029	0.201	0.252	0.257	0.257	0.257	0.257
		50%	0.027	0.026	0.029	0.029	0.029	0.029	0.202	0.255	0.260	0.260	0.260	0.260
		95%	0.030	0.027	0.030	0.030	0.031	0.030	0.203	0.257	0.261	0.261	0.261	0.261
		Max	0.032	0.027	0.032	0.030	0.032	0.031	0.205	0.258	0.262	0.262	0.262	0.262
	4	Min	0.024	0.025	0.026	0.088	0.078	0.086	0.203	0.215	0.097	0.097	0.086	0.093
		5%	0.026	0.025	0.027	0.091	0.091	0.092	0.207	0.219	0.111	0.099	0.100	0.103
		50%	0.028	0.027	0.115	0.101	0.102	0.102	0.211	0.220	0.130	0.110	0.111	0.111
		95%	0.033	0.030	0.143	0.110	0.112	0.111	0.215	0.221	0.255	0.118	0.122	0.122
		Max	0.035	0.032	0.147	0.115	0.116	0.114	0.216	0.221	0.257	0.123	0.127	0.123
	5	Min	0.024	0.024	0.025	0.028	0.027	0.028	0.204	0.218	0.229	0.256	0.256	0.256
		5%	0.025	0.025	0.026	0.028	0.028	0.028	0.207	0.220	0.232	0.256	0.256	0.256
		50%	0.027	0.027	0.027	0.029	0.029	0.029	0.211	0.220	0.238	0.259	0.259	0.258
		95%	0.031	0.029	0.028	0.029	0.030	0.029	0.214	0.220	0.248	0.261	0.260	0.260
		Max	0.034	0.031	0.029	0.030	0.031	0.030	0.215	0.221	0.253	0.261	0.261	0.261
	6	Min	0.024	0.024	0.026	0.028	0.028	0.028	0.207	0.219	0.241	0.256	0.256	0.256
		5%	0.026	0.026	0.027	0.029	0.028	0.029	0.208	0.220	0.244	0.257	0.257	0.257
		50%	0.029	0.027	0.029	0.029	0.029	0.029	0.211	0.220	0.252	0.260	0.260	0.260
		95%	0.033	0.030	0.030	0.030	0.031	0.030	0.215	0.220	0.257	0.262	0.261	0.261
		Max	0.035	0.032	0.032	0.030	0.032	0.031	0.216	0.221	0.258	0.262	0.262	0.262
Cadmium	1	Min	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003	0.00009	0.00007	0.00007	0.00007	0.00007	0.00007
		5%	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003	0.00009	0.00007	0.00007	0.00007	0.00007	0.00007
		50%	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003	0.00009	0.00007	0.00007	0.00007	0.00007	0.00007
		95%	0.00004	0.00003	0.00003	0.00003	0.00003	0.00003	0.00009	0.00008	0.00007	0.00007	0.00007	0.00007
		Max	0.00004	0.00004	0.00004	0.00003	0.00004	0.00003	0.00009	0.00008	0.00007	0.00007	0.00007	0.00007
	2	Min	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003	0.00007	0.00007	0.00007	0.00007	0.00007	0.00007
		5%	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003	0.00007	0.00007	0.00007	0.00007	0.00007	0.00007
		50%	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003	0.00007	0.00007	0.00007	0.00007	0.00007	0.00007
		95%	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003	0.00007	0.00007	0.00007	0.00007	0.00007	0.00007
		Max	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003	0.00007	0.00007	0.00007	0.00007	0.00007	0.00007
	3	Min	0.00002	0.00003	0.00003	0.00003	0.00003	0.00003	0.00007	0.00007	0.00007	0.00007	0.00007	0.00007
		5%	0.00002	0.00003	0.00003	0.00003	0.00003	0.00003	0.00007	0.00007	0.00007	0.00007	0.00007	0.00007
		50%	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003	0.00007	0.00007	0.00007	0.00007	0.00007	0.00007
		95%	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003	0.00007	0.00007	0.00007	0.00007	0.00007	0.00007
		Max	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003	0.00007	0.00007	0.00007	0.00007	0.00007	0.00007
	4	Min	0.00003	0.00003	0.00003	0.00005	0.00005	0.00005	0.00007	0.00007	0.00005	0.00005	0.00005	0.00005
		5%	0.00003	0.00003	0.00003	0.00005	0.00005	0.00005	0.00007	0.00007	0.00005	0.00005	0.00005	0.00005
		50%	0.00003	0.00003	0.00005	0.00005	0.00005	0.00005	0.00007	0.00007	0.00005	0.00005	0.00005	0.00005
		95%	0.00003	0.00003	0.00005	0.00005	0.00005	0.00005	0.00007	0.00007	0.00007	0.00005	0.00005	0.00005
		Max	0.00003	0.00003	0.00005	0.00005	0.00005	0.00005	0.00007	0.00007	0.00007	0.00005	0.00005	0.00005
	5	Min	0.00002	0.00003	0.00003	0.00003	0.00003	0.00003	0.00007	0.00007	0.00007	0.00007	0.00007	0.00007
		5%	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003	0.00007	0.00007	0.00007	0.00007	0.00007	0.00007
		50%	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003	0.00007	0.00007	0.00007	0.00007	0.00007	0.00007
		95%	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003	0.00007	0.00007	0.00007	0.00007	0.00007	0.00007
		Max	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003	0.00007	0.00007	0.00007	0.00007	0.00007	0.00007
	6	Min	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003	0.00007	0.00007	0.00007	0.00007	0.00007	0.00007
		5%	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003	0.00007	0.00007	0.00007	0.00007	0.00007	0.00007
		50%	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003	0.00007	0.00007	0.00007	0.00007	0.00007	0.00007
		95%	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003	0.00007	0.00007	0.00007	0.00007	0.00007	0.00007
		Max	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003	0.00007	0.00007	0.00007	0.00007	0.00007	0.00007
Calcium	1	Min	5.57	6.03	7.21	7.38	7.42	7.49	4.51	4.54	4.54	4.54	4.54	4.54
		5%	5.60	6.89	7.32	7.41	7.45	7.70	4.52	4.56	4.55	4.55	4.55	4.55
		50%	6.05	7.33	7.42	7.47	7.69	8.03	4.54	4.64	4.58	4.58	4.56	4.56
		95%	6.79	7.47	7.53	7.54	8.04	8.35	4.56	4.71	4.63	4.60	4.58	4.57
		Max	6.86	7.50	7.55	7.84	8.41	8.53	4.58	4.83	4.68	4.62	4.59	4.58
	2	Min	6.21	6.81	6.87	7.25	7.24	7.25	5.29	5.19	4.49	4.38	4.38	4.38
		5%	6.24	7.04	6.95	7.27	7.27	7.27	5.31	5.19	4.56	4.39	4.39	4.39
		50%	6.29	7.29	7.29	7.37	7.37	7.36	5.35	5.21	4.74	4.45	4.44	4.45
		95%	6.42	7.50	7.40	7.46	7.43	7.48	5.43	5.24	5.02	4.50	4.48	4.49
		Max	6.53	7.60	7.46	7.56	7.61	7.66	5.50	5.35	5.09	4.58	4.50	4.55
	3	Min	6.47	6.89	7.24	7.26	7.25	7.26	5.33	4.48	4.38	4.38	4.37	4.38
		5%	6.60	6.95	7.28	7.28	7.28	7.28	5.35	4.50	4.38	4.39	4.38	4.38

Parameter	Scenario	Statistic	Yallourn Township Field						Yallourn East Field					
		Year-->	5	10	25	50	75	100	5	10	25	50	75	100
Chloride		50%	6.80	7.08	7.37	7.37	7.37	7.37	5.37	4.58	4.45	4.45	4.44	4.45
		95%	7.03	7.19	7.45	7.46	7.44	7.48	5.41	4.64	4.49	4.50	4.48	4.49
		Max	7.11	7.25	7.48	7.56	7.67	7.67	5.45	4.67	4.51	4.58	4.50	4.55
	4	Min	6.21	6.81	6.16	6.94	6.74	6.83	5.29	5.19	4.62	6.38	6.28	6.42
		5%	6.24	7.04	6.30	6.99	6.87	6.88	5.31	5.19	4.66	6.53	6.41	6.52
		50%	6.29	7.29	6.92	7.28	7.27	7.27	5.35	5.21	6.36	6.89	6.84	6.83
		95%	6.42	7.50	7.40	7.71	7.66	7.56	5.43	5.24	6.93	7.27	7.34	7.23
		Max	6.53	7.60	7.85	7.84	8.13	7.91	5.50	5.35	7.26	7.35	7.73	7.55
	5	Min	6.22	6.64	6.85	7.26	7.26	7.26	5.31	5.21	4.79	4.38	4.38	4.37
		5%	6.25	6.84	6.89	7.27	7.27	7.27	5.33	5.22	4.97	4.39	4.38	4.38
		50%	6.29	7.07	6.99	7.38	7.38	7.34	5.36	5.23	5.11	4.43	4.43	4.42
		95%	6.35	7.29	7.11	7.43	7.43	7.43	5.42	5.26	5.14	4.47	4.45	4.46
		Max	6.46	7.39	7.30	7.46	7.44	7.44	5.53	5.29	5.15	4.53	4.47	4.49
	6	Min	6.21	6.78	6.85	7.26	7.25	7.25	5.30	5.18	4.57	4.38	4.38	4.38
		5%	6.24	7.01	6.89	7.28	7.27	7.27	5.32	5.20	4.64	4.39	4.39	4.39
		50%	6.28	7.22	7.22	7.36	7.35	7.35	5.34	5.21	4.80	4.44	4.44	4.44
		95%	6.33	7.38	7.35	7.42	7.42	7.42	5.38	5.23	5.08	4.48	4.47	4.47
		Max	6.34	7.47	7.39	7.44	7.43	7.43	5.42	5.25	5.09	4.48	4.48	4.48
	1	Min	139	143	143	146	147	148	274	303	321	333	336	338
		5%	141	146	146	147	147	150	280	310	331	335	339	341
		50%	144	148	149	149	150	152	285	328	339	341	343	344
		95%	146	149	150	150	153	155	288	341	348	345	347	346
		Max	147	150	151	151	156	156	291	343	350	346	349	348
	2	Min	123	130	144	153	153	152	305	331	327	325	324	325
		5%	124	132	145	153	153	153	308	333	328	326	326	326
		50%	125	135	153	155	155	155	314	337	331	329	329	329
		95%	126	137	155	156	156	156	320	339	333	332	332	332
		Max	127	138	156	156	156	157	323	341	333	333	332	332
	3	Min	123	135	152	153	153	153	305	321	325	325	324	325
		5%	125	135	153	154	154	153	306	324	325	326	326	325
		50%	126	137	155	155	155	155	310	329	329	329	329	329
		95%	129	138	156	156	156	156	313	331	332	332	332	332
		Max	130	138	156	156	156	157	315	331	333	333	332	332
	4	Min	123	130	144	185	176	183	305	331	183	186	174	180
		5%	124	132	145	189	188	190	308	333	201	188	189	192
		50%	125	135	216	200	201	202	314	337	222	200	201	202
		95%	126	137	246	210	215	212	320	339	332	210	213	214
		Max	127	138	252	217	220	217	323	341	333	215	220	217
	5	Min	124	129	141	153	153	153	307	334	329	326	326	325
		5%	124	131	142	154	154	153	312	335	331	327	326	326
		50%	125	133	143	155	155	155	316	338	335	330	330	329
		95%	127	135	148	156	156	156	323	340	338	332	332	332
		Max	127	136	154	157	157	157	324	342	340	333	332	332
	6	Min	123	130	142	153	153	153	307	332	328	325	324	325
		5%	124	132	144	153	153	153	309	334	329	326	326	326
		50%	125	134	152	155	155	155	315	337	331	329	329	330
		95%	126	136	154	156	156	156	321	339	332	332	332	332
		Max	127	137	156	156	156	157	323	341	334	333	332	332
Chromium	1	Min	0.00032	0.00036	0.00037	0.00038	0.00037	0.00037	0.00053	0.00044	0.00044	0.00045	0.00045	0.00045
		5%	0.00034	0.00037	0.00038	0.00038	0.00038	0.00038	0.00053	0.00045	0.00044	0.00045	0.00045	0.00045
		50%	0.00037	0.00039	0.00039	0.00039	0.00039	0.00038	0.00054	0.00046	0.00046	0.00046	0.00045	0.00045
		95%	0.00039	0.00040	0.00040	0.00040	0.00040	0.00039	0.00055	0.00049	0.00046	0.00046	0.00046	0.00046
		Max	0.00040	0.00040	0.00042	0.00040	0.00041	0.00040	0.00056	0.00050	0.00047	0.00046	0.00046	0.00046
	2	Min	0.00032	0.00032	0.00035	0.00037	0.00037	0.00037	0.00050	0.00049	0.00050	0.00049	0.00049	0.00049
		5%	0.00032	0.00032	0.00036	0.00038	0.00038	0.00038	0.00050	0.00050	0.00051	0.00049	0.00049	0.00049
		50%	0.00033	0.00033	0.00038	0.00038	0.00038	0.00038	0.00050	0.00050	0.00051	0.00050	0.00050	0.00050
		95%	0.00034	0.00034	0.00039	0.00039	0.00039	0.00039	0.00051	0.00050	0.00053	0.00050	0.00050	0.00050
		Max	0.00035	0.00034	0.00040	0.00039	0.00040	0.00040	0.00051	0.00050	0.00053	0.00051	0.00051	0.00051
	3	Min	0.00030	0.00032	0.00037	0.00037	0.00037	0.00037	0.00051	0.00049	0.00049	0.00049	0.00049	0.00049
		5%	0.00031	0.00032	0.00038	0.00038	0.00038	0.00038	0.00052	0.00050	0.00049	0.00049	0.00049	0.00049
		50%	0.00032	0.00033	0.00038	0.00038	0.00038	0.00038	0.00052	0.00051	0.00050	0.00050	0.00050	0.00050
		95%	0.00032	0.00034	0.00039	0.00039	0.00039	0.00039	0.00052	0.00051	0.00050	0.00050	0.00050	0.00050
		Max	0.00033	0.00034	0.00040	0.00039	0.00040	0.00040	0.00052	0.00052	0.00051	0.00051	0.00051	0.00051
	4	Min	0.00032	0.00032	0.00035	0.00045	0.00044	0.00044	0.00050	0.00049	0.00044	0.00044	0.00043	0.00043
		5%	0.00032	0.00032	0.00036	0.00045	0.00045	0.00045	0.00050	0.00050	0.00044	0.00044	0.00044	0.00044
		50%	0.00033	0.00033	0.00046	0.00046	0.00045	0.00046	0.00050	0.00050	0.00045	0.00045	0.00045	0.00045
		95%	0.00034	0.00034	0.00047	0.00047	0.00047	0.00047	0.00051	0.00050	0.00052	0.00046	0.00046	0.00046
		Max	0.00035	0.00034	0.00048	0.00047	0.00048	0.00048	0.00051	0.00050	0.00053	0.00046	0.00046	0.00046
	5	Min	0.00031	0.00032	0.00034	0.00037	0.00037	0.00037	0.00050	0.00049	0.00050	0.00048	0.00049	0.00049
		5%	0.00032	0.00032	0.00034	0.00037	0.00037	0.00037	0.00050	0.00050	0.00051	0.00049	0.00049	0.00049
		50%	0.00033	0.00033	0.00035	0.00038	0.00038	0.00038	0.00050	0.00050	0.00052	0.00049	0.00049	0.00049
		95%	0.00034	0.00034	0.00036	0.00038	0.00039	0.00038	0.00051	0.00050	0.00053	0.00050	0.00050	0.00050
		Max	0.00034	0.00034	0.00038	0.00039	0.00039	0.00039	0.00051	0.00050	0.00053	0.00050	0.00050	0.00050
	6	Min	0.00032	0.00032	0.00035	0.00037	0.00037	0.00037	0.00050	0.00049	0.00051	0.00049	0.00049	0.00049
		5%	0.00032	0.00032	0.00035	0.00038	0.00038	0.00038	0.00050	0.00050	0.00051	0.00049	0.00049	0.00049
		50%	0.00033	0.00033	0.00038	0.00038	0.00038	0.00038	0.00050	0.00050	0.00052	0.00050	0.00050	0.00050
		95%	0.00034	0.00034	0.00038	0.00039	0.00039	0.00039	0.00051	0.00050	0.00053	0.00050	0.00050	0.00050
		Max	0.00035	0.00034	0.00039	0.00039	0.00040	0.00040	0.00051	0.00050	0.00053	0.00051	0.00051	0.00051
Cobalt	1	Min	0.010	0.011	0.013	0.014	0.014	0.014	0.003	0.004	0.004	0.004	0.004	0.004
		5%	0.010	0.013	0.013	0.014	0.014	0.014	0.003	0.004	0.004	0.004	0.004	0.004
		50%	0.011	0.014	0.014	0.014	0.014	0.015	0.003	0.004	0.004	0.004	0.004	0.004

Parameter	Scenario	Statistic	Yallourn Township Field						Yallourn East Field					
		Year-->	5	10	25	50	75	100	5	10	25	50	75	100
		95%	0.012	0.014	0.014	0.014	0.015	0.016	0.003	0.004	0.004	0.004	0.004	0.004
		Max	0.013	0.014	0.014	0.015	0.016	0.016	0.003	0.005	0.004	0.004	0.004	0.004
	2	Min	0.011	0.013	0.013	0.014	0.014	0.014	0.005	0.005	0.004	0.004	0.004	0.004
		5%	0.011	0.013	0.013	0.014	0.014	0.014	0.005	0.005	0.004	0.004	0.004	0.004
		50%	0.012	0.014	0.014	0.014	0.014	0.014	0.005	0.005	0.004	0.004	0.004	0.004
		95%	0.012	0.014	0.014	0.014	0.014	0.014	0.005	0.005	0.004	0.004	0.004	0.004
		Max	0.012	0.014	0.014	0.014	0.014	0.014	0.005	0.005	0.004	0.004	0.004	0.004
	3	Min	0.012	0.013	0.014	0.014	0.014	0.014	0.004	0.004	0.004	0.004	0.004	0.004
		5%	0.012	0.013	0.014	0.014	0.014	0.014	0.004	0.004	0.004	0.004	0.004	0.004
		50%	0.013	0.013	0.014	0.014	0.014	0.014	0.004	0.004	0.004	0.004	0.004	0.004
		95%	0.013	0.014	0.014	0.014	0.014	0.014	0.005	0.004	0.004	0.004	0.004	0.004
		Max	0.013	0.014	0.014	0.014	0.014	0.014	0.005	0.004	0.004	0.004	0.004	0.004
	4	Min	0.011	0.013	0.008	0.008	0.007	0.007	0.005	0.005	0.004	0.006	0.006	0.006
		5%	0.011	0.013	0.008	0.008	0.008	0.008	0.005	0.005	0.004	0.006	0.006	0.007
		50%	0.012	0.014	0.009	0.008	0.008	0.008	0.005	0.005	0.007	0.007	0.007	0.007
		95%	0.012	0.014	0.014	0.009	0.009	0.009	0.005	0.005	0.008	0.008	0.008	0.008
		Max	0.012	0.014	0.014	0.009	0.009	0.009	0.005	0.005	0.008	0.008	0.008	0.008
	5	Min	0.011	0.012	0.013	0.014	0.014	0.014	0.005	0.005	0.004	0.004	0.004	0.004
		5%	0.012	0.013	0.013	0.014	0.014	0.014	0.005	0.005	0.004	0.004	0.004	0.004
		50%	0.012	0.013	0.013	0.014	0.014	0.014	0.005	0.005	0.004	0.004	0.004	0.004
		95%	0.012	0.014	0.014	0.014	0.014	0.014	0.005	0.005	0.004	0.004	0.004	0.004
		Max	0.012	0.014	0.014	0.014	0.014	0.014	0.005	0.005	0.005	0.004	0.004	0.004
	6	Min	0.011	0.013	0.013	0.014	0.014	0.014	0.005	0.005	0.004	0.004	0.004	0.004
		5%	0.011	0.013	0.013	0.014	0.014	0.014	0.005	0.005	0.004	0.004	0.004	0.004
		50%	0.012	0.014	0.014	0.014	0.014	0.014	0.005	0.005	0.004	0.004	0.004	0.004
		95%	0.012	0.014	0.014	0.014	0.014	0.014	0.005	0.005	0.004	0.004	0.004	0.004
		Max	0.012	0.014	0.014	0.014	0.014	0.014	0.005	0.005	0.004	0.004	0.004	0.004
Copper	1	Min	0.0017	0.0019	0.0022	0.0023	0.0023	0.0023	0.0007	0.0006	0.0006	0.0006	0.0006	0.0006
		5%	0.0017	0.0021	0.0022	0.0023	0.0023	0.0024	0.0007	0.0006	0.0006	0.0006	0.0006	0.0006
		50%	0.0019	0.0022	0.0023	0.0023	0.0023	0.0024	0.0007	0.0007	0.0007	0.0006	0.0006	0.0006
		95%	0.0021	0.0023	0.0023	0.0023	0.0025	0.0025	0.0007	0.0007	0.0007	0.0007	0.0007	0.0006
		Max	0.0021	0.0023	0.0023	0.0024	0.0026	0.0026	0.0007	0.0008	0.0007	0.0007	0.0007	0.0007
	2	Min	0.0019	0.0021	0.0021	0.0022	0.0022	0.0022	0.0009	0.0008	0.0007	0.0006	0.0006	0.0006
		5%	0.0019	0.0021	0.0021	0.0022	0.0022	0.0022	0.0009	0.0008	0.0007	0.0006	0.0006	0.0006
		50%	0.0019	0.0022	0.0022	0.0023	0.0023	0.0023	0.0009	0.0008	0.0007	0.0007	0.0006	0.0006
		95%	0.0019	0.0023	0.0023	0.0023	0.0023	0.0023	0.0010	0.0008	0.0008	0.0007	0.0007	0.0007
		Max	0.0019	0.0023	0.0023	0.0023	0.0023	0.0023	0.0010	0.0009	0.0008	0.0007	0.0007	0.0007
	3	Min	0.0020	0.0021	0.0022	0.0022	0.0022	0.0022	0.0009	0.0007	0.0006	0.0006	0.0006	0.0006
		5%	0.0020	0.0021	0.0022	0.0022	0.0022	0.0022	0.0009	0.0007	0.0006	0.0006	0.0006	0.0006
		50%	0.0021	0.0022	0.0023	0.0023	0.0023	0.0023	0.0009	0.0007	0.0006	0.0007	0.0006	0.0007
		95%	0.0021	0.0022	0.0023	0.0023	0.0023	0.0023	0.0009	0.0007	0.0007	0.0007	0.0007	0.0007
		Max	0.0022	0.0022	0.0023	0.0023	0.0023	0.0023	0.0009	0.0007	0.0007	0.0007	0.0007	0.0007
	4	Min	0.0019	0.0021	0.0015	0.0017	0.0017	0.0017	0.0009	0.0008	0.0007	0.0015	0.0015	0.0015
		5%	0.0019	0.0021	0.0015	0.0017	0.0017	0.0017	0.0009	0.0008	0.0007	0.0015	0.0015	0.0015
		50%	0.0019	0.0022	0.0017	0.0017	0.0017	0.0017	0.0009	0.0008	0.0015	0.0016	0.0016	0.0016
		95%	0.0019	0.0023	0.0023	0.0018	0.0018	0.0018	0.0010	0.0008	0.0015	0.0016	0.0016	0.0016
		Max	0.0019	0.0023	0.0023	0.0018	0.0018	0.0018	0.0010	0.0009	0.0016	0.0016	0.0016	0.0016
	5	Min	0.0019	0.0020	0.0021	0.0022	0.0022	0.0022	0.0009	0.0008	0.0007	0.0006	0.0006	0.0006
		5%	0.0019	0.0021	0.0021	0.0022	0.0022	0.0022	0.0009	0.0008	0.0008	0.0006	0.0006	0.0006
		50%	0.0019	0.0022	0.0021	0.0023	0.0023	0.0023	0.0009	0.0008	0.0008	0.0006	0.0006	0.0006
		95%	0.0019	0.0022	0.0022	0.0023	0.0023	0.0023	0.0010	0.0008	0.0008	0.0007	0.0006	0.0006
		Max	0.0019	0.0022	0.0022	0.0023	0.0023	0.0023	0.0010	0.0009	0.0008	0.0007	0.0007	0.0007
	6	Min	0.0019	0.0021	0.0021	0.0022	0.0022	0.0022	0.0009	0.0008	0.0007	0.0006	0.0006	0.0006
		5%	0.0019	0.0021	0.0021	0.0022	0.0022	0.0022	0.0009	0.0008	0.0007	0.0006	0.0006	0.0006
		50%	0.0019	0.0022	0.0022	0.0023	0.0023	0.0023	0.0009	0.0008	0.0007	0.0006	0.0006	0.0006
		95%	0.0019	0.0023	0.0023	0.0023	0.0023	0.0023	0.0009	0.0008	0.0008	0.0007	0.0007	0.0007
		Max	0.0019	0.0023	0.0023	0.0023	0.0023	0.0023	0.0010	0.0008	0.0008	0.0007	0.0007	0.0007
Fluoride	1	Min	0.09	0.10	0.11	0.11	0.11	0.11	0.05	0.05	0.06	0.06	0.06	0.06
		5%	0.09	0.11	0.11	0.11	0.11	0.12	0.05	0.05	0.06	0.06	0.06	0.06
		50%	0.10	0.11	0.11	0.11	0.12	0.12	0.05	0.06	0.06	0.06	0.06	0.06
		95%	0.11	0.11	0.12	0.12	0.12	0.12	0.05	0.06	0.06	0.06	0.06	0.06
		Max	0.11	0.12	0.12	0.12	0.13	0.13	0.05	0.06	0.06	0.06	0.06	0.06
	2	Min	0.09	0.10	0.11	0.11	0.11	0.11	0.07	0.07	0.06	0.05	0.05	0.05
		5%	0.09	0.11	0.11	0.11	0.11	0.11	0.07	0.07	0.06	0.05	0.05	0.05
		50%	0.10	0.11	0.11	0.11	0.11	0.11	0.07	0.07	0.06	0.05	0.05	0.05
		95%	0.10	0.11	0.11	0.12	0.12	0.12	0.07	0.07	0.06	0.06	0.06	0.06
		Max	0.10	0.11	0.11	0.12	0.12	0.12	0.07	0.07	0.06	0.06	0.06	0.06
	3	Min	0.10	0.11	0.11	0.11	0.11	0.11	0.07	0.06	0.05	0.05	0.05	0.05
		5%	0.10	0.11	0.11	0.11	0.11	0.11	0.07	0.06	0.05	0.05	0.05	0.05
		50%	0.10	0.11	0.11	0.11	0.11	0.11	0.07	0.06	0.05	0.05	0.05	0.05
		95%	0.10	0.11	0.11	0.12	0.12	0.12	0.07	0.06	0.06	0.06	0.06	0.06
		Max	0.11	0.11	0.12	0.12	0.12	0.12	0.07	0.06	0.06	0.06	0.06	0.06
	4	Min	0.09	0.10	0.09	0.09	0.09	0.09	0.07	0.07	0.06	0.08	0.08	0.08
		5%	0.09	0.11	0.09	0.09	0.09	0.09	0.07	0.07	0.06	0.08	0.08	0.08
		50%	0.10	0.11	0.09	0.09	0.09	0.09	0.07	0.07	0.08	0.09	0.09	0.09
		95%	0.10	0.11	0.11	0.10	0.10	0.10	0.07	0.07	0.09	0.09	0.09	0.09
		Max	0.10	0.11	0.11	0.10	0.10	0.10	0.07	0.07	0.09	0.09	0.09	0.09
	5	Min	0.09	0.10	0.11	0.11	0.11	0.11	0.07	0.07	0.06	0.05	0.05	0.05
		5%	0.10	0.10	0.11	0.11	0.11	0.11	0.07	0.07	0.06	0.05	0.05	0.05
		50%	0.10	0.11	0.11	0.11	0.11	0.11	0.07	0.07	0.06	0.05	0.05	0.05
		95%	0.10	0.11	0.11	0.12	0.12	0.12	0.07	0.07	0.06	0.05	0.05	0.05

Parameter	Scenario	Statistic	Yallourn Township Field						Yallourn East Field					
		Year-->	5	10	25	50	75	100	5	10	25	50	75	100
Iron		Max	0.10	0.11	0.11	0.12	0.12	0.12	0.07	0.07	0.07	0.06	0.05	0.06
	6	Min	0.09	0.10	0.11	0.11	0.11	0.11	0.07	0.07	0.06	0.05	0.05	0.05
		5%	0.09	0.11	0.11	0.11	0.11	0.11	0.07	0.07	0.06	0.05	0.05	0.05
		50%	0.10	0.11	0.11	0.11	0.11	0.11	0.07	0.07	0.06	0.05	0.05	0.05
		95%	0.10	0.11	0.11	0.12	0.12	0.12	0.07	0.07	0.06	0.06	0.06	0.06
		Max	0.10	0.11	0.11	0.12	0.12	0.12	0.07	0.07	0.06	0.06	0.06	0.06
	1	Min	14.7	16.6	18.0	18.9	19.0	19.3	9.3	11.0	11.9	12.0	12.1	12.1
		5%	15.5	18.1	18.8	19.1	19.2	20.0	9.5	11.2	12.0	12.1	12.2	12.2
		50%	16.3	19.0	19.4	19.5	19.8	20.7	9.7	12.0	12.1	12.2	12.2	12.2
		95%	17.8	19.5	19.7	19.8	20.8	21.6	9.9	12.3	12.3	12.2	12.3	12.3
		Max	18.2	19.7	19.9	20.1	21.8	22.0	10.0	12.4	12.4	12.3	12.3	12.3
	2	Min	15.6	17.6	18.6	19.7	19.6	19.6	12.4	12.4	11.7	11.5	11.5	11.5
		5%	15.9	18.0	18.8	19.7	19.7	19.7	12.5	12.6	11.8	11.6	11.6	11.5
		50%	16.3	18.7	19.7	19.9	19.9	19.9	12.6	12.7	12.0	11.7	11.7	11.7
		95%	16.6	19.2	20.1	20.1	20.1	20.1	12.7	12.7	12.2	11.8	11.8	11.8
		Max	16.7	19.4	20.1	20.2	20.2	20.2	12.9	12.8	12.3	11.9	11.8	11.8
	3	Min	16.5	17.9	19.5	19.7	19.6	19.6	11.7	11.4	11.5	11.5	11.5	11.5
		5%	17.0	18.2	19.7	19.8	19.7	19.7	11.7	11.5	11.5	11.5	11.5	11.5
		50%	17.4	18.6	19.9	19.9	19.9	19.9	11.8	11.7	11.7	11.7	11.7	11.7
		95%	17.9	18.9	20.1	20.1	20.2	20.1	11.9	11.8	11.8	11.8	11.8	11.8
		Max	18.3	18.9	20.2	20.2	20.2	20.2	11.9	11.8	11.8	11.8	11.8	11.8
	4	Min	15.6	17.6	13.3	12.6	11.6	12.4	12.4	12.4	10.2	10.9	9.9	10.5
		5%	15.9	18.0	13.6	12.8	12.9	13.0	12.5	12.6	11.9	11.2	11.3	11.5
		50%	16.3	18.7	14.9	13.9	14.0	14.1	12.6	12.7	13.0	12.4	12.4	12.4
		95%	16.6	19.2	19.8	14.7	15.3	15.0	12.7	12.7	13.9	13.2	13.6	13.6
		Max	16.7	19.4	20.1	15.4	15.6	15.3	12.9	12.8	14.4	13.7	14.1	13.9
	5	Min	15.9	17.2	18.3	19.7	19.7	19.7	12.5	12.6	12.0	11.5	11.5	11.5
		5%	16.1	17.7	18.6	19.8	19.8	19.8	12.5	12.7	12.2	11.6	11.6	11.6
		50%	16.4	18.2	18.8	20.0	20.0	19.9	12.6	12.7	12.4	11.7	11.7	11.6
		95%	16.6	18.7	19.2	20.2	20.2	20.2	12.8	12.8	12.5	11.8	11.7	11.8
		Max	16.7	18.9	19.8	20.2	20.2	20.2	13.1	12.8	12.6	11.8	11.8	11.8
	6	Min	15.7	17.5	18.5	19.7	19.6	19.7	12.5	12.6	11.8	11.5	11.5	11.5
		5%	15.9	18.0	18.7	19.7	19.7	19.7	12.5	12.6	11.9	11.6	11.6	11.5
		50%	16.3	18.5	19.5	19.9	19.9	19.9	12.6	12.7	12.0	11.7	11.7	11.7
		95%	16.6	19.0	19.9	20.1	20.1	20.1	12.7	12.7	12.3	11.8	11.8	11.8
		Max	16.7	19.2	20.1	20.2	20.2	20.2	12.8	12.8	12.3	11.8	11.8	11.8
Lead	1	Min	0.0010	0.0013	0.0016	0.0016	0.0016	0.0016	0.0098	0.0078	0.0063	0.0066	0.0065	0.0066
		5%	0.0010	0.0015	0.0016	0.0016	0.0016	0.0016	0.0098	0.0083	0.0063	0.0066	0.0066	0.0066
		50%	0.0013	0.0016	0.0017	0.0017	0.0017	0.0016	0.0100	0.0091	0.0066	0.0067	0.0066	0.0066
		95%	0.0015	0.0017	0.0017	0.0017	0.0017	0.0017	0.0103	0.0093	0.0069	0.0069	0.0068	0.0067
		Max	0.0015	0.0017	0.0017	0.0017	0.0017	0.0017	0.0111	0.0096	0.0070	0.0070	0.0068	0.0068
	2	Min	0.0014	0.0013	0.0015	0.0016	0.0016	0.0016	0.0058	0.0061	0.0069	0.0073	0.0074	0.0074
		5%	0.0014	0.0014	0.0015	0.0016	0.0016	0.0016	0.0058	0.0062	0.0070	0.0075	0.0075	0.0075
		50%	0.0014	0.0014	0.0016	0.0017	0.0017	0.0017	0.0059	0.0063	0.0073	0.0076	0.0076	0.0076
		95%	0.0014	0.0014	0.0017	0.0017	0.0017	0.0017	0.0061	0.0063	0.0075	0.0077	0.0077	0.0077
		Max	0.0014	0.0014	0.0017	0.0017	0.0017	0.0017	0.0062	0.0063	0.0076	0.0077	0.0077	0.0077
	3	Min	0.0013	0.0014	0.0016	0.0016	0.0016	0.0016	0.0056	0.0060	0.0074	0.0072	0.0074	0.0074
		5%	0.0013	0.0014	0.0016	0.0016	0.0016	0.0016	0.0056	0.0060	0.0075	0.0075	0.0075	0.0075
		50%	0.0013	0.0014	0.0017	0.0017	0.0017	0.0017	0.0057	0.0061	0.0076	0.0076	0.0076	0.0076
		95%	0.0013	0.0014	0.0017	0.0017	0.0017	0.0017	0.0057	0.0061	0.0077	0.0077	0.0077	0.0077
		Max	0.0013	0.0014	0.0017	0.0017	0.0017	0.0017	0.0058	0.0061	0.0077	0.0077	0.0077	0.0077
	4	Min	0.0014	0.0013	0.0015	0.0029	0.0031	0.0029	0.0058	0.0061	0.0037	0.0031	0.0033	0.0032
		5%	0.0014	0.0014	0.0015	0.0030	0.0032	0.0032	0.0058	0.0062	0.0038	0.0032	0.0034	0.0034
		50%	0.0014	0.0014	0.0038	0.0034	0.0034	0.0034	0.0059	0.0063	0.0045	0.0037	0.0037	0.0037
		95%	0.0014	0.0014	0.0045	0.0036	0.0037	0.0037	0.0061	0.0063	0.0072	0.0039	0.0040	0.0040
		Max	0.0014	0.0014	0.0045	0.0038	0.0037	0.0037	0.0062	0.0063	0.0072	0.0041	0.0041	0.0041
	5	Min	0.0014	0.0014	0.0015	0.0017	0.0016	0.0016	0.0058	0.0061	0.0065	0.0075	0.0075	0.0075
		5%	0.0014	0.0014	0.0015	0.0017	0.0017	0.0017	0.0058	0.0062	0.0066	0.0075	0.0075	0.0075
		50%	0.0014	0.0014	0.0015	0.0017	0.0017	0.0017	0.0059	0.0063	0.0068	0.0076	0.0076	0.0076
		95%	0.0014	0.0014	0.0015	0.0017	0.0017	0.0017	0.0060	0.0063	0.0071	0.0077	0.0077	0.0077
		Max	0.0014	0.0014	0.0016	0.0017	0.0017	0.0017	0.0062	0.0063	0.0072	0.0077	0.0077	0.0077
	6	Min	0.0014	0.0014	0.0015	0.0016	0.0016	0.0016	0.0058	0.0062	0.0069	0.0075	0.0075	0.0075
		5%	0.0014	0.0014	0.0015	0.0017	0.0016	0.0017	0.0058	0.0062	0.0069	0.0075	0.0075	0.0075
		50%	0.0014	0.0014	0.0016	0.0017	0.0017	0.0017	0.0059	0.0063	0.0072	0.0076	0.0077	0.0076
		95%	0.0014	0.0014	0.0016	0.0017	0.0017	0.0017	0.0061	0.0063	0.0074	0.0077	0.0077	0.0077
		Max	0.0014	0.0014	0.0017	0.0017	0.0017	0.0017	0.0062	0.0063	0.0075	0.0077	0.0077	0.0077
Magnesium	1	Min	26	29	33	34	35	35	26	28	28	29	28	28
		5%	27	32	34	35	35	36	27	28	28	29	29	29
		50%	29	34	35	35	36	38	27	28	29	29	29	29
		95%	32	35	36	36	38	39	27	29	29	29	29	29
		Max	32	35	36	36	40	40	27	29	29	29	29	29
	2	Min	29	32	33	35	35	35	29	29	28	28	28	28
		5%	29	33	33	35	35	35	29	29	28	28	28	28
		50%	29	34	35	35	35	35	29	30	29	28	28	28
		95%	30	35	36	36	36	36	29	30	29	28	28	28
		Max	30	35	36	36	36	36	30	30	29	29	28	28
	3	Min	30	32	35	35	35	35	28	28	28	28	28	28
		5%	31	33	35	35	35	35	28	28	28	28	28	28
		50%	32	34	35	35	35	35	28	28	28	28	28	28
		95%	33	34	36	36	36	36	28	28	28	28	28	28
		Max	33	34	36	36	36	36	28	28	28	29	28	28

Parameter	Scenario	Statistic	Yallourn Township Field						Yallourn East Field					
		Year-->	5	10	25	50	75	100	5	10	25	50	75	100
Manganese	4	Min	29	32	28	27	26	27	29	29	23	24	23	24
		5%	29	33	28	27	27	27	29	29	26	25	25	25
		50%	29	34	31	29	29	29	29	30	28	27	27	27
		95%	30	35	35	30	31	30	29	30	29	28	28	28
		Max	30	35	36	31	32	31	30	30	30	29	29	29
	5	Min	29	31	33	35	35	35	29	29	29	28	28	28
		5%	29	32	33	35	35	35	29	30	29	28	28	28
		50%	30	33	34	36	36	35	29	30	29	28	28	28
		95%	30	34	34	36	36	36	29	30	30	28	28	28
		Max	30	34	35	36	36	36	30	30	30	28	28	28
	6	Min	29	32	33	35	35	35	29	29	28	28	28	28
		5%	29	33	33	35	35	35	29	29	29	28	28	28
		50%	30	34	35	35	35	35	29	30	29	28	28	28
		95%	30	34	35	36	36	36	29	30	29	28	28	28
		Max	30	35	36	36	36	36	29	30	29	28	28	28
	1	Min	0.40	0.45	0.55	0.58	0.58	0.59	0.15	0.16	0.17	0.17	0.17	0.17
		5%	0.41	0.53	0.57	0.58	0.59	0.61	0.15	0.17	0.17	0.17	0.17	0.17
		50%	0.45	0.57	0.58	0.59	0.61	0.64	0.15	0.18	0.17	0.18	0.17	0.17
		95%	0.52	0.59	0.60	0.60	0.64	0.67	0.16	0.19	0.18	0.18	0.18	0.18
		Max	0.53	0.59	0.60	0.62	0.68	0.69	0.16	0.21	0.19	0.18	0.18	0.18
	2	Min	0.47	0.54	0.55	0.57	0.57	0.57	0.21	0.20	0.17	0.16	0.16	0.16
		5%	0.48	0.56	0.55	0.58	0.57	0.57	0.21	0.20	0.17	0.16	0.16	0.16
		50%	0.49	0.58	0.58	0.58	0.58	0.58	0.22	0.20	0.18	0.17	0.17	0.17
		95%	0.50	0.60	0.59	0.59	0.59	0.59	0.22	0.20	0.19	0.17	0.17	0.17
		Max	0.50	0.61	0.59	0.59	0.59	0.59	0.23	0.20	0.19	0.17	0.17	0.17
	3	Min	0.51	0.54	0.57	0.57	0.57	0.57	0.19	0.16	0.16	0.16	0.16	0.16
		5%	0.53	0.55	0.58	0.58	0.58	0.58	0.19	0.17	0.16	0.16	0.16	0.16
		50%	0.54	0.57	0.58	0.58	0.58	0.58	0.19	0.17	0.17	0.17	0.17	0.17
		95%	0.56	0.58	0.59	0.59	0.59	0.59	0.20	0.17	0.17	0.17	0.17	0.17
		Max	0.58	0.59	0.59	0.59	0.59	0.59	0.20	0.17	0.17	0.17	0.17	0.17
	4	Min	0.47	0.54	0.33	0.32	0.29	0.31	0.21	0.20	0.17	0.26	0.24	0.25
		5%	0.48	0.56	0.34	0.32	0.32	0.33	0.21	0.20	0.17	0.27	0.27	0.27
		50%	0.49	0.58	0.36	0.35	0.35	0.35	0.22	0.20	0.30	0.29	0.30	0.30
		95%	0.50	0.60	0.58	0.37	0.38	0.37	0.22	0.20	0.32	0.31	0.32	0.32
		Max	0.50	0.61	0.59	0.38	0.39	0.38	0.23	0.20	0.32	0.33	0.34	0.33
	5	Min	0.48	0.53	0.54	0.58	0.58	0.57	0.21	0.20	0.18	0.16	0.16	0.16
		5%	0.49	0.55	0.55	0.58	0.58	0.58	0.21	0.20	0.18	0.16	0.16	0.16
		50%	0.50	0.57	0.56	0.59	0.59	0.58	0.22	0.20	0.19	0.17	0.17	0.17
		95%	0.50	0.59	0.57	0.59	0.59	0.59	0.22	0.20	0.19	0.17	0.17	0.17
		Max	0.50	0.59	0.58	0.59	0.59	0.59	0.23	0.20	0.19	0.17	0.17	0.17
	6	Min	0.48	0.54	0.54	0.58	0.57	0.57	0.21	0.20	0.17	0.16	0.16	0.16
		5%	0.49	0.56	0.55	0.58	0.57	0.58	0.21	0.20	0.17	0.16	0.16	0.16
		50%	0.49	0.58	0.57	0.58	0.58	0.58	0.22	0.20	0.18	0.17	0.17	0.17
		95%	0.50	0.59	0.58	0.59	0.59	0.59	0.22	0.20	0.19	0.17	0.17	0.17
		Max	0.50	0.60	0.59	0.59	0.59	0.59	0.22	0.20	0.19	0.17	0.17	0.17
Molybdenum	1	Min	0.00053	0.00053	0.00053	0.00053	0.00053	0.00053	0.00052	0.00053	0.00053	0.00053	0.00053	0.00053
		5%	0.00053	0.00053	0.00053	0.00053	0.00053	0.00053	0.00052	0.00053	0.00053	0.00053	0.00053	0.00053
		50%	0.00053	0.00053	0.00053	0.00054	0.00054	0.00054	0.00053	0.00053	0.00054	0.00054	0.00054	0.00054
		95%	0.00054	0.00054	0.00054	0.00054	0.00054	0.00054	0.00053	0.00054	0.00054	0.00054	0.00054	0.00054
		Max	0.00054	0.00054	0.00054	0.00054	0.00054	0.00054	0.00053	0.00054	0.00054	0.00054	0.00054	0.00054
	2	Min	0.00045	0.00046	0.00049	0.00052	0.00052	0.00052	0.00058	0.00058	0.00053	0.00052	0.00052	0.00052
		5%	0.00045	0.00046	0.00050	0.00053	0.00052	0.00052	0.00058	0.00058	0.00054	0.00052	0.00052	0.00052
		50%	0.00045	0.00047	0.00053	0.00053	0.00053	0.00053	0.00059	0.00059	0.00056	0.00053	0.00053	0.00053
		95%	0.00046	0.00048	0.00054	0.00054	0.00054	0.00054	0.00059	0.00059	0.00058	0.00054	0.00054	0.00054
		Max	0.00046	0.00048	0.00054	0.00054	0.00054	0.00055	0.00060	0.00059	0.00058	0.00054	0.00054	0.00054
	3	Min	0.00043	0.00047	0.00052	0.00052	0.00052	0.00052	0.00059	0.00053	0.00052	0.00052	0.00052	0.00052
		5%	0.00044	0.00047	0.00052	0.00053	0.00053	0.00053	0.00060	0.00053	0.00052	0.00052	0.00052	0.00052
		50%	0.00044	0.00047	0.00053	0.00053	0.00053	0.00053	0.00060	0.00054	0.00053	0.00053	0.00053	0.00053
		95%	0.00045	0.00048	0.00054	0.00054	0.00054	0.00054	0.00060	0.00055	0.00054	0.00054	0.00054	0.00054
		Max	0.00045	0.00048	0.00054	0.00054	0.00054	0.00055	0.00060	0.00055	0.00054	0.00054	0.00054	0.00054
	4	Min	0.00045	0.00046	0.00049	0.00053	0.00053	0.00053	0.00058	0.00058	0.00050	0.00051	0.00050	0.00050
		5%	0.00045	0.00046	0.00050	0.00053	0.00053	0.00053	0.00058	0.00058	0.00051	0.00051	0.00051	0.00051
		50%	0.00045	0.00047	0.00055	0.00054	0.00054	0.00054	0.00059	0.00059	0.00053	0.00052	0.00052	0.00052
		95%	0.00046	0.00048	0.00057	0.00055	0.00055	0.00055	0.00059	0.00059	0.00058	0.00052	0.00053	0.00053
		Max	0.00046	0.00048	0.00057	0.00056	0.00058	0.00056	0.00060	0.00059	0.00058	0.00053	0.00053	0.00053
	5	Min	0.00044	0.00045	0.00049	0.00052	0.00052	0.00052	0.00058	0.00058	0.00056	0.00052	0.00052	0.00052
		5%	0.00045	0.00046	0.00049	0.00052	0.00052	0.00052	0.00058	0.00059	0.00057	0.00052	0.00052	0.00052
		50%	0.00045	0.00046	0.00049	0.00053	0.00053	0.00053	0.00059	0.00059	0.00058	0.00053	0.00053	0.00053
		95%	0.00046	0.00047	0.00051	0.00053	0.00053	0.00053	0.00059	0.00059	0.00058	0.00053	0.00053	0.00053
		Max	0.00046	0.00047	0.00052	0.00054	0.00054	0.00054	0.00060	0.00059	0.00059	0.00053	0.00053	0.00053
	6	Min	0.00045	0.00046	0.00049	0.00052	0.00052	0.00052	0.00058	0.00058	0.00055	0.00052	0.00052	0.00052
		5%	0.00045	0.00046	0.00049	0.00052	0.00052	0.00052	0.00058	0.00059	0.00055	0.00052	0.00052	0.00052
		50%	0.00045	0.00047	0.00052	0.00053	0.00053	0.00053	0.00059	0.00059	0.00056	0.00053	0.00053	0.00053
		95%	0.00046	0.00047	0.00053	0.00054	0.00054	0.00054	0.00059	0.00059	0.00058	0.00054	0.00054	0.00054
		Max	0.00046	0.00048	0.00054	0.00054	0.00054	0.00054	0.00059	0.00059	0.00058	0.00054	0.00054	0.00054
Nickel	1	Min	0.0066	0.0071	0.0072	0.0075	0.0075	0.0076	0.0078	0.0090	0.0097	0.0100	0.0100	0.0101
		5%	0.0069	0.0074	0.0075	0.0075	0.0076	0.0078	0.0080	0.0092	0.0099	0.0100	0.0101	0.0102
		50%	0.0071	0.0076	0.0076	0.0077	0.0077	0.0079	0.0082	0.0098	0.0101	0.0101	0.0102	0.0102
		95%	0.0073	0.0077	0.0078	0.0078	0.0080	0.0081	0.0083	0.0102	0.0103	0.0102	0.0103	0.0103
		Max	0.0074	0.0078	0.0078	0.0078	0.0082	0.0082	0.0084	0.0102	0.0104	0.0103	0.0104	0.0103
	2	Min	0.0062	0.0068	0.0074	0.0078	0.0078	0.0078	0.0094	0.0100	0.0097	0.0097	0.0096	0.0097

Parameter	Scenario	Statistic	Yallourn Township Field						Yallourn East Field					
		Year-->	5	10	25	50	75	100	5	10	25	50	75	100
		5%	0.0063	0.0069	0.0074	0.0078	0.0078	0.0078	0.0095	0.0101	0.0098	0.0097	0.0097	0.0097
		50%	0.0064	0.0070	0.0078	0.0079	0.0079	0.0079	0.0097	0.0102	0.0099	0.0098	0.0098	0.0098
		95%	0.0065	0.0072	0.0080	0.0080	0.0080	0.0080	0.0098	0.0102	0.0099	0.0099	0.0099	0.0099
		Max	0.0066	0.0073	0.0080	0.0080	0.0080	0.0080	0.0099	0.0103	0.0100	0.0099	0.0099	0.0099
	3	Min	0.0063	0.0069	0.0078	0.0078	0.0078	0.0078	0.0093	0.0095	0.0097	0.0096	0.0096	0.0096
		5%	0.0065	0.0070	0.0078	0.0079	0.0078	0.0078	0.0093	0.0096	0.0097	0.0097	0.0097	0.0097
		50%	0.0066	0.0071	0.0079	0.0079	0.0079	0.0079	0.0094	0.0098	0.0098	0.0098	0.0098	0.0098
		95%	0.0067	0.0072	0.0080	0.0080	0.0080	0.0080	0.0095	0.0098	0.0099	0.0099	0.0099	0.0099
		Max	0.0069	0.0072	0.0080	0.0080	0.0080	0.0080	0.0095	0.0098	0.0099	0.0099	0.0099	0.0099
	4	Min	0.0062	0.0068	0.0072	0.0067	0.0062	0.0066	0.0094	0.0100	0.0061	0.0063	0.0058	0.0061
		5%	0.0063	0.0069	0.0073	0.0068	0.0068	0.0069	0.0095	0.0101	0.0069	0.0064	0.0065	0.0066
		50%	0.0064	0.0070	0.0079	0.0074	0.0074	0.0075	0.0097	0.0102	0.0078	0.0070	0.0071	0.0071
		95%	0.0065	0.0072	0.0089	0.0078	0.0081	0.0079	0.0098	0.0102	0.0099	0.0075	0.0076	0.0076
		Max	0.0066	0.0073	0.0091	0.0081	0.0082	0.0081	0.0099	0.0103	0.0100	0.0077	0.0079	0.0078
	5	Min	0.0063	0.0067	0.0072	0.0078	0.0078	0.0078	0.0095	0.0101	0.0099	0.0097	0.0097	0.0097
		5%	0.0063	0.0068	0.0073	0.0079	0.0079	0.0079	0.0096	0.0101	0.0099	0.0097	0.0097	0.0097
		50%	0.0065	0.0070	0.0074	0.0080	0.0080	0.0079	0.0097	0.0102	0.0101	0.0098	0.0098	0.0098
		95%	0.0065	0.0071	0.0076	0.0080	0.0080	0.0080	0.0099	0.0103	0.0102	0.0099	0.0098	0.0099
		Max	0.0066	0.0071	0.0079	0.0080	0.0080	0.0080	0.0100	0.0103	0.0102	0.0099	0.0099	0.0099
	6	Min	0.0062	0.0067	0.0073	0.0078	0.0078	0.0078	0.0095	0.0101	0.0098	0.0097	0.0096	0.0097
		5%	0.0063	0.0069	0.0074	0.0079	0.0078	0.0078	0.0095	0.0101	0.0098	0.0097	0.0097	0.0097
		50%	0.0064	0.0070	0.0078	0.0079	0.0079	0.0079	0.0097	0.0102	0.0099	0.0098	0.0098	0.0098
		95%	0.0065	0.0071	0.0079	0.0080	0.0080	0.0080	0.0098	0.0102	0.0100	0.0099	0.0098	0.0099
		Max	0.0065	0.0072	0.0080	0.0080	0.0080	0.0080	0.0099	0.0103	0.0100	0.0099	0.0099	0.0099
pH	1	Min	5.08	5.06	5.06	5.06	5.05	5.05	5.37	5.47	5.56	5.59	5.59	5.60
		5%	5.09	5.07	5.07	5.07	5.07	5.06	5.38	5.49	5.58	5.59	5.60	5.60
		50%	5.12	5.09	5.09	5.09	5.09	5.08	5.39	5.55	5.59	5.60	5.60	5.60
		95%	5.17	5.13	5.13	5.12	5.13	5.11	5.40	5.59	5.61	5.60	5.61	5.61
		Max	5.22	5.15	5.18	5.14	5.15	5.13	5.41	5.60	5.62	5.61	5.61	5.61
	2	Min	4.25	4.35	4.65	4.95	4.95	4.95	6.23	6.29	5.56	5.42	5.42	5.42
		5%	4.26	4.38	4.72	4.97	4.96	4.97	6.25	6.30	5.64	5.43	5.43	5.43
		50%	4.31	4.44	4.99	5.05	5.05	5.05	6.28	6.31	5.83	5.50	5.50	5.50
		95%	4.38	4.51	5.06	5.10	5.10	5.13	6.35	6.32	6.16	5.54	5.54	5.54
		Max	4.45	4.58	5.15	5.19	5.18	5.27	6.42	6.33	6.23	5.58	5.54	5.56
	3	Min	4.11	4.40	4.96	4.96	4.95	4.96	6.58	5.56	5.41	5.41	5.42	5.41
		5%	4.15	4.41	4.97	4.98	4.97	4.98	6.59	5.57	5.42	5.42	5.42	5.42
		50%	4.21	4.44	5.05	5.05	5.05	5.05	6.61	5.68	5.50	5.50	5.49	5.51
		95%	4.28	4.50	5.10	5.10	5.11	5.13	6.63	5.76	5.54	5.54	5.54	5.54
		Max	4.33	4.54	5.15	5.19	5.22	5.28	6.65	5.77	5.55	5.55	5.54	5.56
	4	Min	4.25	4.35	4.65	5.61	5.55	5.56	6.23	6.29	5.39	5.38	5.34	5.38
		5%	4.26	4.38	4.72	5.65	5.60	5.59	6.25	6.30	5.45	5.48	5.40	5.44
		50%	4.31	4.44	5.73	5.78	5.77	5.79	6.28	6.31	5.60	5.62	5.61	5.61
		95%	4.38	4.51	5.92	5.99	5.98	5.95	6.35	6.32	6.16	5.81	5.85	5.80
		Max	4.45	4.58	6.20	6.09	6.14	6.09	6.42	6.33	6.23	5.84	5.96	5.93
	5	Min	4.24	4.31	4.62	4.93	4.93	4.92	6.26	6.30	5.89	5.40	5.40	5.40
		5%	4.25	4.34	4.64	4.95	4.94	4.94	6.27	6.31	6.10	5.41	5.41	5.41
		50%	4.29	4.40	4.65	5.02	5.02	5.01	6.31	6.32	6.25	5.47	5.47	5.46
		95%	4.34	4.46	4.81	5.05	5.05	5.05	6.37	6.33	6.27	5.51	5.50	5.51
		Max	4.40	4.48	4.96	5.07	5.11	5.07	6.47	6.33	6.28	5.54	5.52	5.54
	6	Min	4.24	4.34	4.65	4.95	4.94	4.95	6.23	6.29	5.68	5.42	5.42	5.42
		5%	4.26	4.38	4.66	4.97	4.95	4.96	6.25	6.30	5.73	5.43	5.43	5.43
		50%	4.30	4.43	4.95	5.04	5.04	5.05	6.29	6.31	5.90	5.49	5.49	5.51
		95%	4.35	4.47	5.03	5.07	5.07	5.07	6.34	6.32	6.22	5.53	5.53	5.53
		Max	4.38	4.50	5.07	5.10	5.13	5.12	6.38	6.32	6.23	5.54	5.54	5.54
Potassium	1	Min	1.28	1.36	1.48	1.49	1.49	1.51	2.67	2.41	2.42	2.44	2.44	2.44
		5%	1.33	1.45	1.50	1.50	1.51	1.54	2.68	2.43	2.43	2.44	2.44	2.44
		50%	1.40	1.51	1.52	1.53	1.55	1.58	2.70	2.47	2.46	2.46	2.46	2.45
		95%	1.50	1.55	1.56	1.56	1.59	1.61	2.73	2.55	2.48	2.48	2.47	2.46
		Max	1.51	1.57	1.61	1.59	1.64	1.62	2.76	2.57	2.50	2.48	2.47	2.48
	2	Min	1.25	1.33	1.35	1.44	1.43	1.43	2.55	2.61	2.48	2.45	2.45	2.45
		5%	1.26	1.35	1.37	1.44	1.44	1.44	2.56	2.62	2.52	2.45	2.45	2.45
		50%	1.29	1.40	1.45	1.46	1.46	1.46	2.58	2.63	2.57	2.48	2.48	2.48
		95%	1.34	1.45	1.47	1.49	1.48	1.49	2.62	2.64	2.65	2.50	2.50	2.50
		Max	1.37	1.48	1.50	1.52	1.53	1.55	2.63	2.65	2.67	2.51	2.50	2.50
	3	Min	1.27	1.35	1.43	1.44	1.43	1.44	2.64	2.48	2.45	2.45	2.45	2.45
		5%	1.28	1.35	1.44	1.44	1.44	1.44	2.65	2.49	2.45	2.45	2.45	2.45
		50%	1.32	1.36	1.46	1.46	1.46	1.46	2.66	2.53	2.48	2.48	2.48	2.48
		95%	1.37	1.37	1.48	1.49	1.48	1.49	2.67	2.55	2.50	2.50	2.50	2.50
		Max	1.39	1.40	1.50	1.52	1.54	1.55	2.69	2.55	2.50	2.50	2.50	2.50
	4	Min	1.25	1.33	1.35	2.05	2.02	2.03	2.55	2.61	2.04	2.03	2.01	2.03
		5%	1.26	1.35	1.37	2.07	2.04	2.05	2.56	2.62	2.07	2.07	2.04	2.06
		50%	1.29	1.40	2.12	2.12	2.12	2.12	2.58	2.63	2.15	2.13	2.12	2.12
		95%	1.34	1.45	2.20	2.21	2.20	2.18	2.62	2.64	2.65	2.21	2.23	2.21
		Max	1.37	1.48	2.31	2.25	2.29	2.25	2.63	2.65	2.67	2.23	2.29	2.26
	5	Min	1.25	1.30	1.35	1.43	1.43	1.43	2.55	2.62	2.59	2.45	2.45	2.45
		5%	1.26	1.33	1.36	1.43	1.43	1.43	2.57	2.63	2.64	2.45	2.45	2.45
		50%	1.28	1.37	1.37	1.46	1.46	1.45	2.59	2.64	2.66	2.48	2.48	2.47
		95%	1.32	1.41	1.40	1.47	1.47	1.47	2.62	2.65	2.67	2.49	2.49	2.49
		Max	1.34	1.42	1.44	1.48	1.48	1.47	2.65	2.65	2.68	2.50	2.49	2.50
	6	Min	1.25	1.33	1.35	1.43	1.43	1.43	2.55	2.62	2.52	2.45	2.45	2.45
		5%	1.26	1.35	1.36	1.44	1.44	1.44	2.56	2.62	2.55	2.45	2.45	2.45

Parameter	Scenario	Statistic	Yallourn Township Field						Yallourn East Field					
		Year-->	5	10	25	50	75	100	5	10	25	50	75	100
		50%	1.29	1.39	1.44	1.46	1.46	1.46	2.59	2.63	2.59	2.48	2.48	2.48
		95%	1.33	1.43	1.46	1.47	1.47	1.47	2.62	2.64	2.66	2.50	2.49	2.50
		Max	1.35	1.45	1.46	1.47	1.48	1.47	2.63	2.65	2.67	2.50	2.50	2.50
Selenium	1	Min	0.0007	0.0008	0.0008	0.0008	0.0007	0.0008	0.0023	0.0018	0.0018	0.0018	0.0018	0.0018
		5%	0.0007	0.0008	0.0008	0.0008	0.0008	0.0008	0.0024	0.0018	0.0018	0.0018	0.0018	0.0018
		50%	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0024	0.0019	0.0018	0.0019	0.0018	0.0018
		95%	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0025	0.0021	0.0019	0.0019	0.0019	0.0018
		Max	0.0009	0.0009	0.0010	0.0009	0.0009	0.0009	0.0025	0.0021	0.0019	0.0019	0.0019	0.0019
	2	Min	0.0006	0.0007	0.0007	0.0008	0.0008	0.0008	0.0017	0.0018	0.0019	0.0019	0.0019	0.0019
		5%	0.0007	0.0007	0.0007	0.0008	0.0008	0.0008	0.0017	0.0018	0.0019	0.0020	0.0020	0.0020
		50%	0.0007	0.0007	0.0008	0.0008	0.0008	0.0008	0.0018	0.0018	0.0020	0.0020	0.0020	0.0020
		95%	0.0007	0.0007	0.0008	0.0008	0.0008	0.0008	0.0018	0.0018	0.0020	0.0020	0.0020	0.0020
		Max	0.0008	0.0008	0.0009	0.0008	0.0009	0.0008	0.0018	0.0018	0.0020	0.0020	0.0020	0.0020
	3	Min	0.0006	0.0007	0.0008	0.0008	0.0008	0.0008	0.0017	0.0019	0.0019	0.0019	0.0019	0.0019
		5%	0.0006	0.0007	0.0008	0.0008	0.0008	0.0008	0.0017	0.0019	0.0019	0.0020	0.0020	0.0020
		50%	0.0007	0.0007	0.0008	0.0008	0.0008	0.0008	0.0017	0.0020	0.0020	0.0020	0.0020	0.0020
		95%	0.0007	0.0007	0.0008	0.0008	0.0008	0.0008	0.0017	0.0020	0.0020	0.0020	0.0020	0.0020
		Max	0.0007	0.0007	0.0009	0.0008	0.0009	0.0008	0.0018	0.0020	0.0020	0.0020	0.0020	0.0020
	4	Min	0.0006	0.0007	0.0007	0.0011	0.0010	0.0011	0.0017	0.0018	0.0011	0.0011	0.0010	0.0011
		5%	0.0007	0.0007	0.0007	0.0011	0.0011	0.0011	0.0017	0.0018	0.0012	0.0011	0.0011	0.0011
		50%	0.0007	0.0007	0.0012	0.0012	0.0012	0.0012	0.0018	0.0018	0.0013	0.0012	0.0012	0.0012
		95%	0.0007	0.0007	0.0014	0.0012	0.0012	0.0012	0.0018	0.0018	0.0020	0.0012	0.0013	0.0013
		Max	0.0008	0.0008	0.0014	0.0013	0.0013	0.0012	0.0018	0.0018	0.0020	0.0013	0.0013	0.0013
	5	Min	0.0006	0.0006	0.0007	0.0007	0.0007	0.0007	0.0017	0.0018	0.0018	0.0019	0.0019	0.0019
		5%	0.0006	0.0007	0.0007	0.0008	0.0008	0.0008	0.0017	0.0018	0.0019	0.0019	0.0019	0.0019
		50%	0.0007	0.0007	0.0007	0.0008	0.0008	0.0008	0.0018	0.0018	0.0019	0.0020	0.0020	0.0020
		95%	0.0007	0.0007	0.0008	0.0008	0.0008	0.0008	0.0018	0.0018	0.0020	0.0020	0.0020	0.0020
		Max	0.0008	0.0007	0.0008	0.0008	0.0008	0.0008	0.0018	0.0018	0.0020	0.0020	0.0020	0.0020
	6	Min	0.0006	0.0007	0.0007	0.0008	0.0008	0.0008	0.0017	0.0018	0.0019	0.0019	0.0019	0.0019
		5%	0.0007	0.0007	0.0007	0.0008	0.0008	0.0008	0.0018	0.0018	0.0019	0.0020	0.0020	0.0020
		50%	0.0007	0.0007	0.0008	0.0008	0.0008	0.0008	0.0018	0.0018	0.0020	0.0020	0.0020	0.0020
		95%	0.0007	0.0007	0.0008	0.0008	0.0008	0.0008	0.0018	0.0018	0.0020	0.0020	0.0020	0.0020
		Max	0.0008	0.0008	0.0009	0.0008	0.0009	0.0008	0.0018	0.0018	0.0020	0.0020	0.0020	0.0020
Sodium	1	Min	90	93	93	96	96	97	195	211	221	230	232	233
		5%	92	95	96	96	96	99	199	216	228	231	233	235
		50%	94	97	98	98	99	100	202	227	234	235	237	237
		95%	96	98	99	99	101	102	205	235	240	238	239	239
		Max	97	99	99	99	103	103	206	236	240	239	240	240
	2	Min	80	86	95	101	101	101	209	227	227	226	225	226
		5%	81	87	96	101	101	101	211	229	227	227	227	226
		50%	82	89	101	102	102	102	215	231	229	229	229	229
		95%	83	90	103	103	103	103	220	232	231	231	231	231
		Max	84	91	103	103	103	104	222	234	231	231	231	231
	3	Min	80	89	100	101	101	101	208	222	226	226	225	226
		5%	82	89	101	101	101	101	209	225	226	226	226	226
		50%	83	90	102	102	102	102	211	228	229	229	229	229
		95%	85	91	103	103	103	103	214	229	231	231	231	231
		Max	86	91	103	103	103	104	216	230	231	231	231	231
	4	Min	80	86	95	124	117	122	209	227	123	125	116	121
		5%	81	87	96	126	126	128	211	229	136	126	127	129
		50%	82	89	146	135	136	136	215	231	151	136	136	136
		95%	83	90	168	142	146	143	220	232	230	142	145	145
		Max	84	91	172	147	149	147	222	234	231	146	150	147
	5	Min	81	84	93	101	101	101	210	229	228	227	226	226
		5%	81	86	94	101	101	101	214	230	229	227	227	227
		50%	82	88	95	103	103	102	217	232	231	229	229	228
		95%	83	89	98	103	103	103	221	233	233	231	231	231
		Max	84	90	101	103	103	103	222	234	234	231	231	231
	6	Min	80	85	94	101	101	101	210	228	227	226	225	226
		5%	81	87	95	101	101	101	212	229	228	227	227	226
		50%	82	88	100	102	102	102	216	231	229	229	229	229
		95%	83	90	102	103	103	103	220	232	230	231	231	231
		Max	83	90	103	103	103	103	221	234	231	231	231	231
Sulfate	1	Min	149	172	199	209	211	214	56	57	58	58	59	59
		5%	157	196	208	211	213	223	56	58	58	59	59	59
		50%	169	210	214	216	221	232	57	62	60	60	60	60
		95%	192	216	219	220	233	243	57	66	63	62	61	60
		Max	196	218	221	224	247	250	57	72	66	63	62	61
	2	Min	173	198	200	211	211	211	74	68	59	57	57	57
		5%	176	203	202	212	211	211	74	68	60	57	57	57
		50%	181	211	212	214	214	213	76	69	62	58	58	58
		95%	184	217	216	217	217	216	77	69	65	59	59	59
		Max	185	221	216	217	217	217	79	70	66	59	59	59
	3	Min	185	197	210	211	211	211	65	57	57	57	57	57
		5%	191	200	212	212	212	212	66	58	57	57	57	57
		50%	196	206	214	214	214	214	67	59	58	58	58	58
		95%	203	211	216	217	217	216	67	59	59	59	59	59
		Max	208	212	217	217	217	217	68	60	59	59	59	59
	4	Min	173	198	121	119	111	117	74	68	60	98	90	95
		5%	176	203	125	121	121	122	74	68	61	100	101	103
		50%	181	211	131	129	130	130	76	69	109	109	110	110

Parameter	Scenario	Statistic	Yallourn Township Field						Yallourn East Field					
		Year-->	5	10	25	50	75	100	5	10	25	50	75	100
TDS		95%	184	217	213	136	140	137	77	69	118	116	119	119
		Max	185	221	216	141	143	140	79	70	120	120	124	121
	5	Min	175	192	199	212	212	211	74	69	62	57	57	57
		5%	178	198	201	212	212	212	74	69	64	57	57	57
		50%	182	205	204	215	215	214	75	69	66	58	58	58
		95%	185	212	208	217	217	217	77	69	67	58	58	58
		Max	186	214	213	218	218	218	80	69	67	59	58	59
	6	Min	174	196	199	211	211	211	74	68	60	57	57	57
		5%	176	203	201	212	211	212	74	68	60	57	57	57
		50%	181	209	210	214	214	214	75	69	62	58	58	58
		95%	184	215	214	217	217	216	77	69	66	59	59	59
		Max	185	218	216	217	217	217	77	69	66	59	59	59
	1	Min	465	506	539	559	562	568	391	450	480	486	489	489
		5%	482	541	557	563	566	585	398	456	485	489	491	493
		50%	500	563	570	573	580	601	404	480	491	492	495	495
		95%	534	574	579	581	604	621	409	496	501	495	499	497
		Max	542	579	582	587	626	632	412	501	503	497	500	499
	2	Min	467	514	544	575	575	575	493	504	471	466	464	465
		5%	471	524	549	578	577	577	494	506	477	466	466	466
		50%	480	539	577	584	584	583	498	510	483	471	471	471
		95%	487	551	587	589	589	589	505	513	492	475	475	476
		Max	489	558	588	591	591	591	510	515	497	478	476	476
	3	Min	482	524	573	576	576	575	478	464	465	464	463	465
		5%	494	529	577	579	578	578	479	467	465	466	466	465
		50%	503	537	584	584	584	583	482	474	472	471	471	471
		95%	517	543	588	589	589	589	485	477	475	475	475	475
		Max	527	545	591	591	591	591	487	478	477	477	476	476
	4	Min	467	514	481	462	446	461	493	504	409	426	406	418
		5%	471	524	487	470	469	471	494	506	448	431	434	436
		50%	480	539	514	489	493	494	498	510	478	454	456	456
		95%	487	551	580	510	519	512	505	513	496	471	478	479
		Max	489	558	588	522	533	520	510	515	503	481	491	484
	5	Min	470	503	537	577	577	576	495	508	486	466	466	465
		5%	475	514	543	579	578	578	496	510	491	467	466	466
		50%	482	528	548	586	586	583	501	512	501	471	472	470
		95%	488	540	559	590	591	590	507	514	506	475	474	475
		Max	489	545	579	591	591	591	517	517	509	476	475	475
	6	Min	467	510	540	577	576	577	493	505	475	465	463	465
		5%	472	523	545	578	577	577	494	507	479	467	466	466
		50%	481	535	572	583	582	583	499	510	486	471	471	472
		95%	487	546	583	589	588	589	504	513	496	475	475	475
		Max	488	553	588	591	591	591	508	515	498	476	476	475
Zinc	1	Min	0.090	0.095	0.103	0.104	0.103	0.104	0.358	0.236	0.237	0.247	0.245	0.245
		5%	0.091	0.101	0.104	0.104	0.104	0.105	0.360	0.239	0.239	0.248	0.246	0.246
		50%	0.097	0.104	0.104	0.105	0.106	0.107	0.365	0.257	0.250	0.252	0.248	0.247
		95%	0.102	0.105	0.105	0.105	0.107	0.107	0.373	0.298	0.257	0.256	0.252	0.249
		Max	0.103	0.105	0.106	0.106	0.107	0.108	0.383	0.303	0.260	0.258	0.253	0.251
	2	Min	0.084	0.090	0.096	0.102	0.102	0.102	0.224	0.232	0.263	0.278	0.278	0.278
		5%	0.086	0.092	0.097	0.102	0.102	0.102	0.229	0.237	0.267	0.279	0.279	0.279
		50%	0.088	0.094	0.102	0.103	0.103	0.103	0.232	0.238	0.276	0.282	0.282	0.282
		95%	0.089	0.095	0.103	0.104	0.104	0.104	0.236	0.239	0.281	0.284	0.284	0.284
		Max	0.090	0.095	0.104	0.104	0.104	0.104	0.238	0.239	0.282	0.284	0.284	0.284
	3	Min	0.085	0.090	0.102	0.102	0.102	0.102	0.216	0.269	0.278	0.278	0.279	0.278
		5%	0.087	0.091	0.102	0.102	0.102	0.102	0.217	0.274	0.279	0.279	0.279	0.279
		50%	0.088	0.092	0.103	0.103	0.103	0.103	0.219	0.277	0.282	0.282	0.282	0.282
		95%	0.090	0.093	0.104	0.104	0.104	0.104	0.220	0.279	0.284	0.284	0.284	0.284
		Max	0.090	0.093	0.104	0.104	0.104	0.104	0.221	0.280	0.284	0.284	0.284	0.284
	4	Min	0.084	0.090	0.096	0.129	0.117	0.126	0.224	0.232	0.128	0.131	0.117	0.125
		5%	0.086	0.092	0.097	0.132	0.132	0.135	0.229	0.237	0.147	0.134	0.135	0.138
		50%	0.088	0.094	0.161	0.145	0.147	0.148	0.232	0.238	0.169	0.148	0.149	0.149
		95%	0.089	0.095	0.190	0.157	0.161	0.159	0.236	0.239	0.277	0.159	0.163	0.163
		Max	0.090	0.095	0.193	0.164	0.165	0.163	0.238	0.239	0.279	0.164	0.170	0.166
	5	Min	0.085	0.089	0.095	0.102	0.102	0.102	0.225	0.236	0.248	0.278	0.278	0.278
		5%	0.087	0.091	0.096	0.102	0.102	0.102	0.228	0.237	0.252	0.279	0.279	0.279
		50%	0.088	0.092	0.096	0.103	0.104	0.103	0.232	0.238	0.259	0.282	0.282	0.281
		95%	0.089	0.094	0.099	0.104	0.104	0.104	0.235	0.239	0.270	0.283	0.283	0.283
		Max	0.089	0.094	0.102	0.104	0.104	0.104	0.236	0.239	0.275	0.284	0.283	0.283
	6	Min	0.087	0.091	0.095	0.102	0.102	0.102	0.227	0.237	0.262	0.278	0.278	0.278
		5%	0.087	0.092	0.096	0.102	0.102	0.102	0.229	0.237	0.265	0.279	0.279	0.279
		50%	0.088	0.093	0.101	0.103	0.103	0.103	0.233	0.238	0.274	0.282	0.282	0.282
		95%	0.089	0.094	0.103	0.104	0.104	0.104	0.236	0.239	0.279	0.284	0.284	0.284
		Max	0.090	0.095	0.104	0.104	0.104	0.104	0.237	0.239	0.281	0.284	0.284	0.284

Appendix E

Lake Water Quality Results Graphs

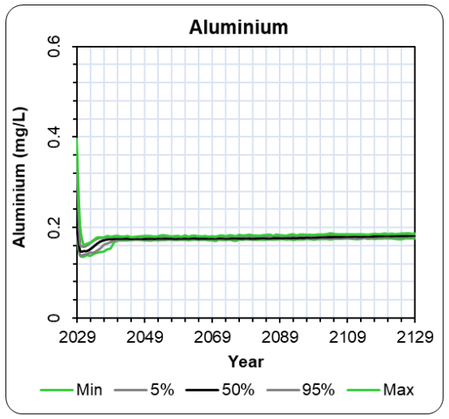
Appendix E Lake Water Quality Results Graphs

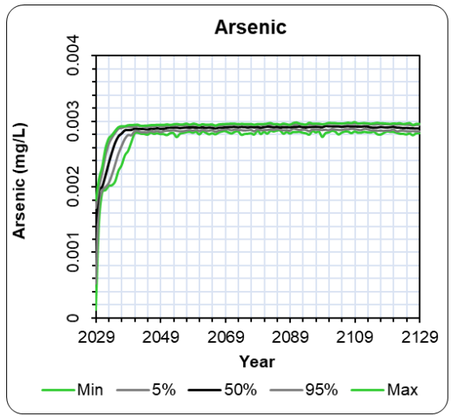
Scenario ID	Fill Sources (annual until reach RL + 37m AHD)	Morwell River connected?	Top-up water	Climate
Scenario 1	Local catchment flows, natural groundwater & pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing).	No	No	Median
Scenario 2	Local catchment flows, natural groundwater, pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing) & 24 GL Latrobe water.	Yes (flood flows only)	Yes	Median
Scenario 3	Local catchment flows, natural groundwater, pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing), 34 GL Latrobe water & 14 GL Moondarra water.	Yes (flood flows only)	Yes	Median
Scenario 4	Local catchment flows, natural groundwater, pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing) & 24 GL Latrobe water.	Yes (all)	Yes	Median
Scenario 5	Local catchment flows, natural groundwater, pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing) & 24 GL Latrobe water.	Yes (flood flows only)	Yes	Dry
Scenario 6	Local catchment flows, natural groundwater, pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing) & 24 GL Latrobe water.	No	Yes	Median

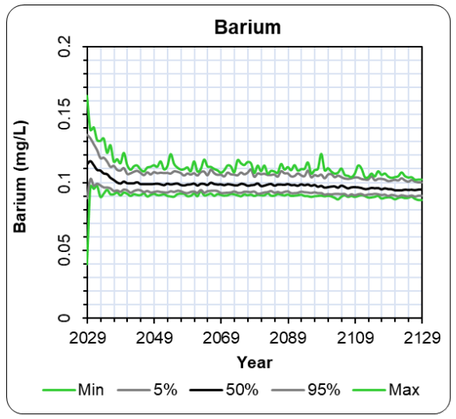
Scenario 1: Base case. Unconnected, median climate

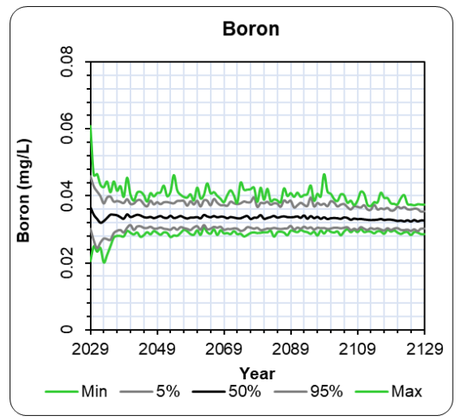
Fill: Local catchment flows, natural groundwater & pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing).

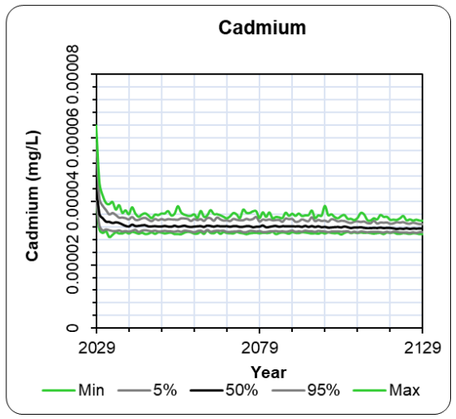
Yallourn Township Field (YTF)

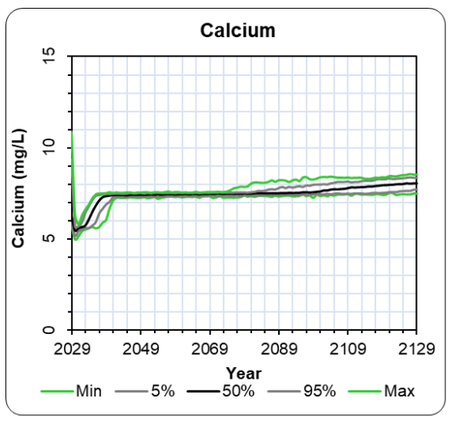


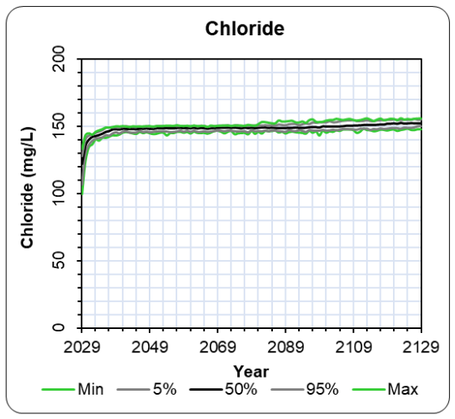


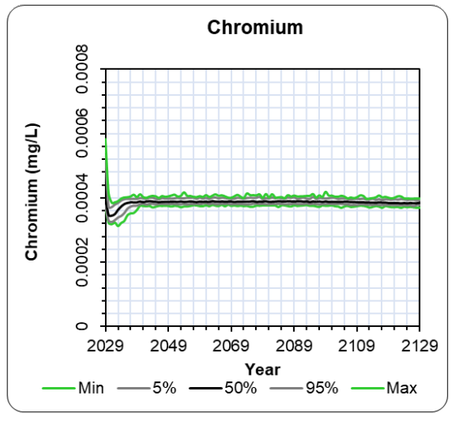


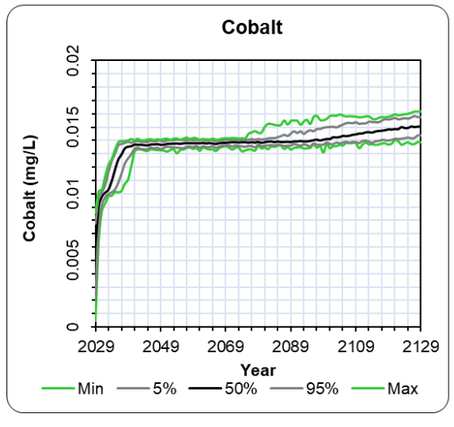


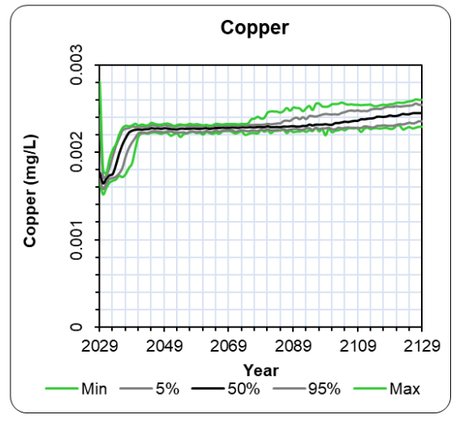


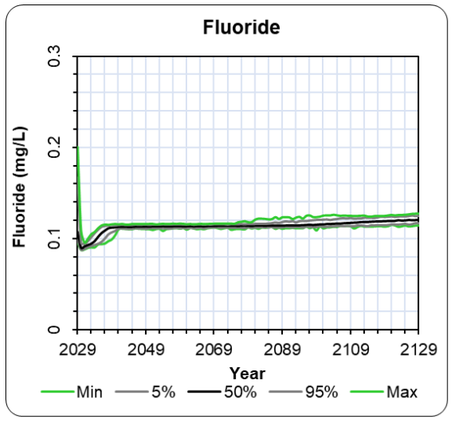


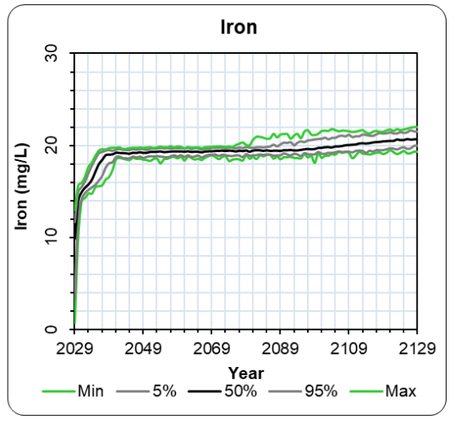


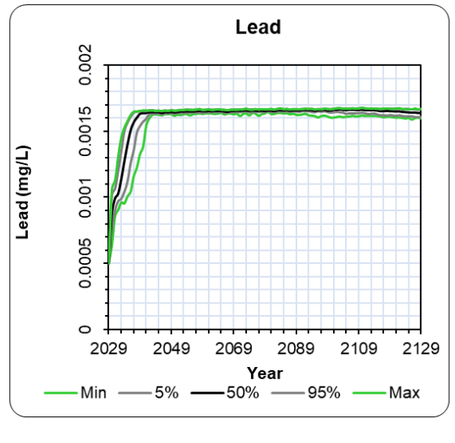


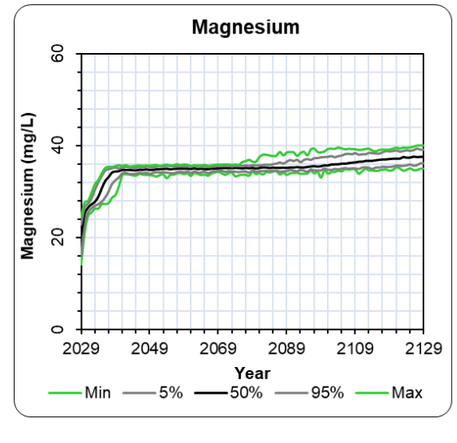


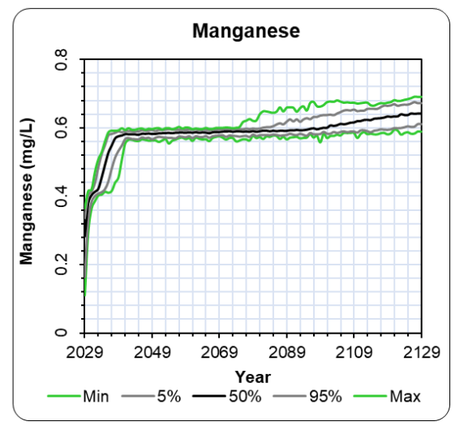


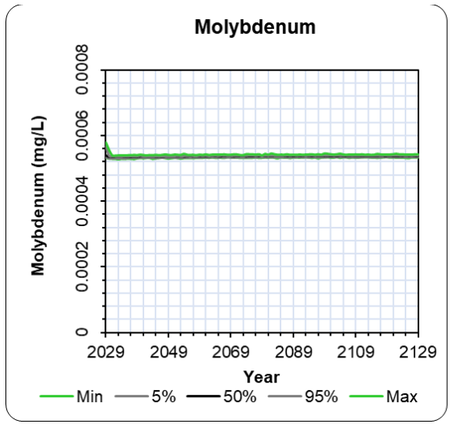


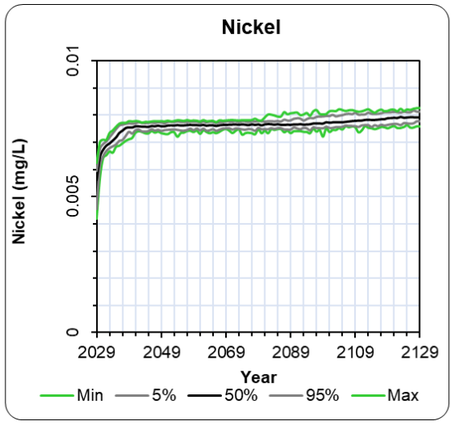


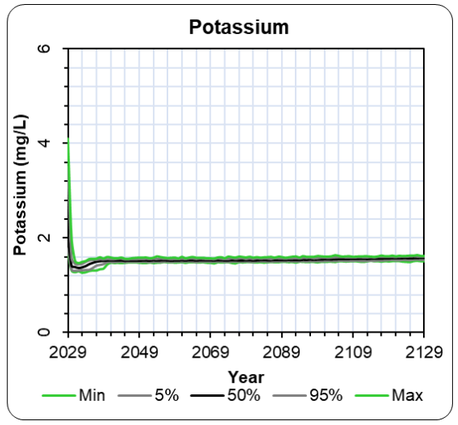


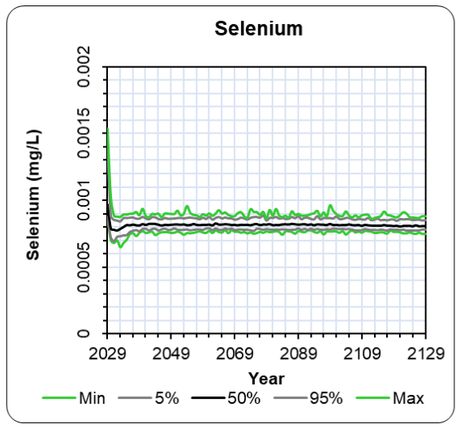


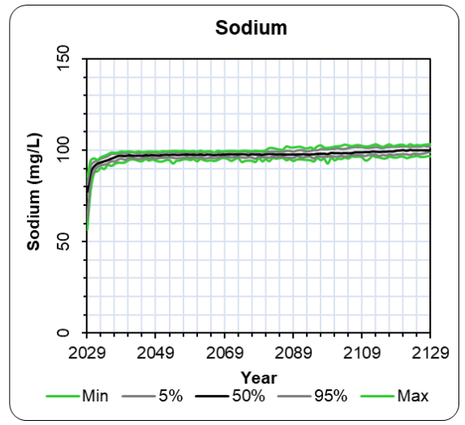


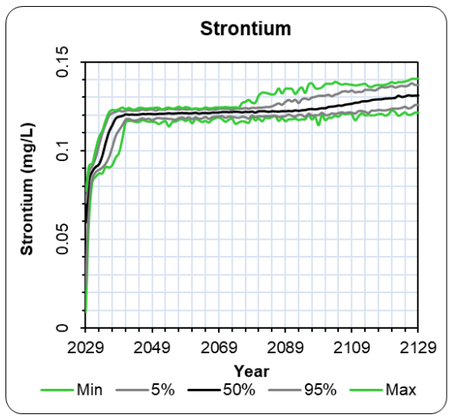


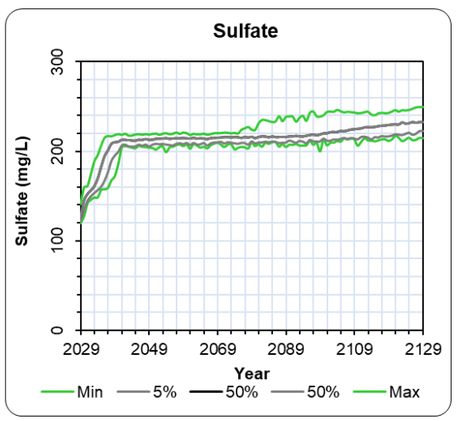


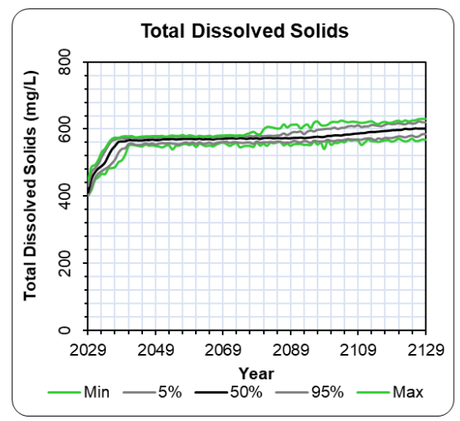


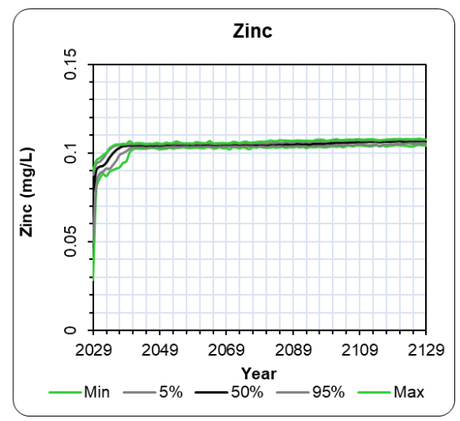




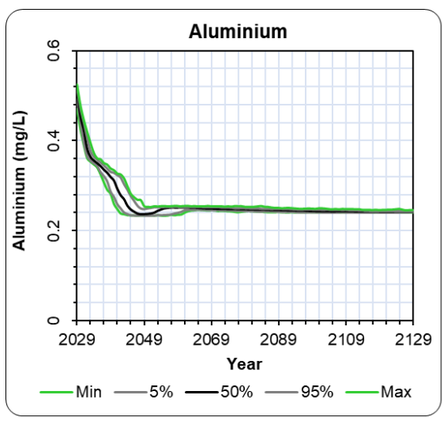


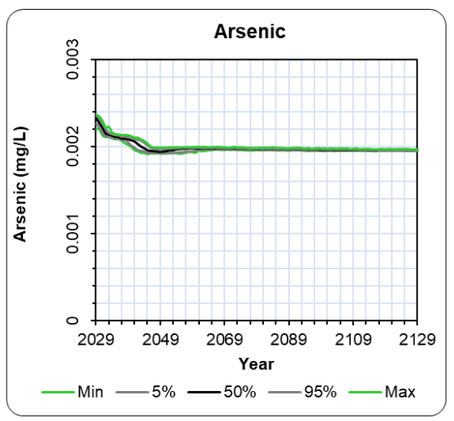


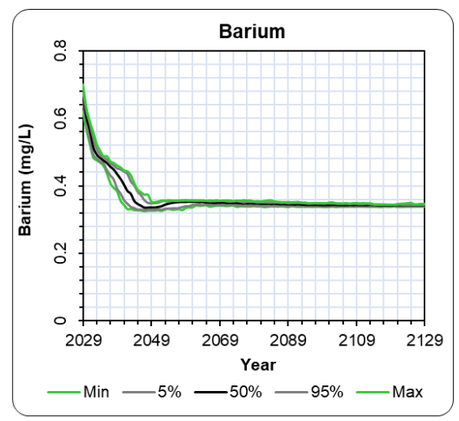


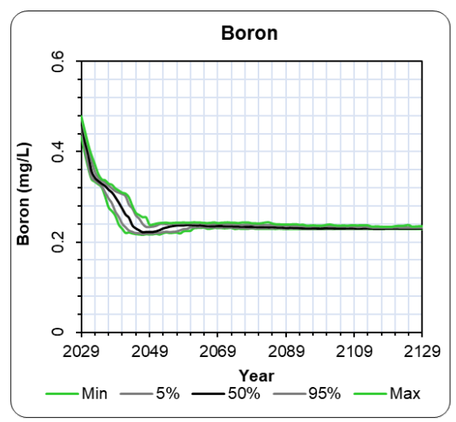


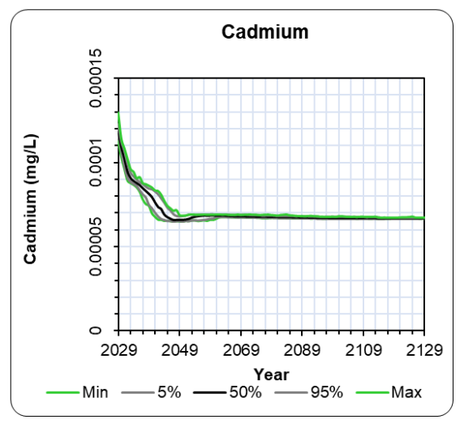
Yallourn East Field (YEF)

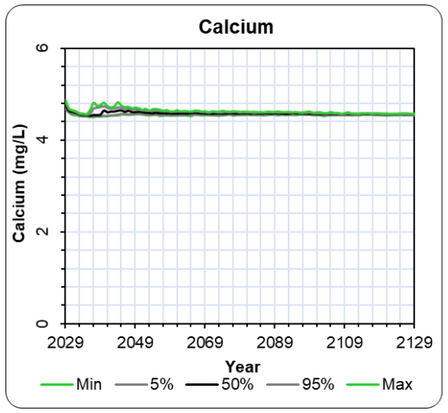


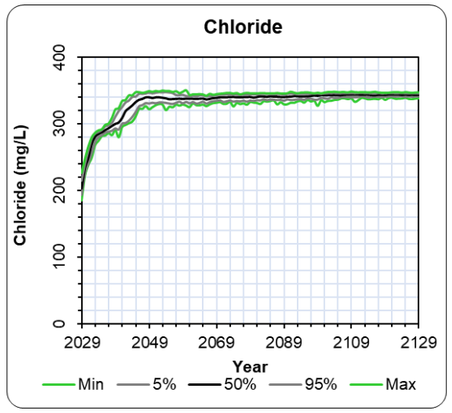


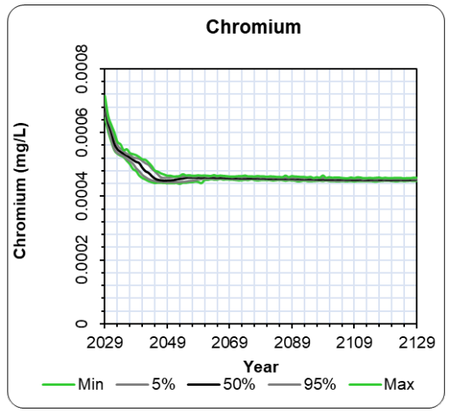


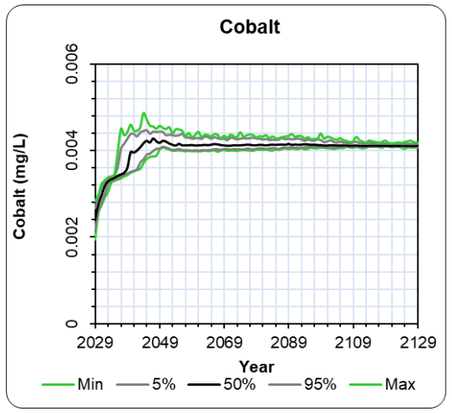


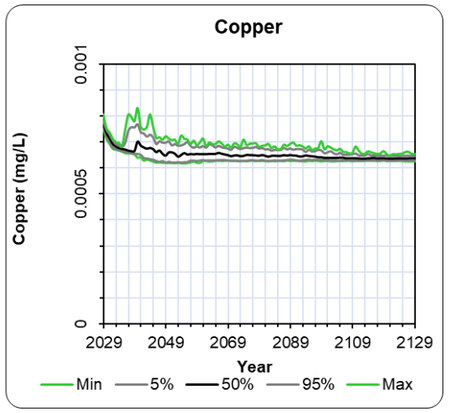


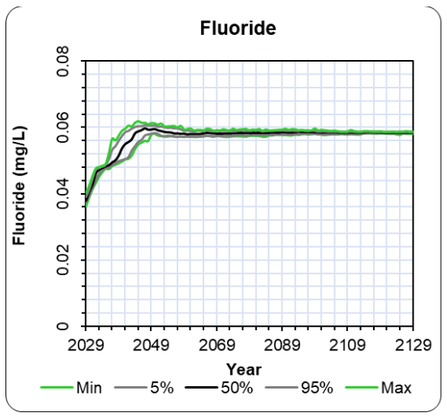

Calcium
Calcium (mg/L)
0
2
4
6
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

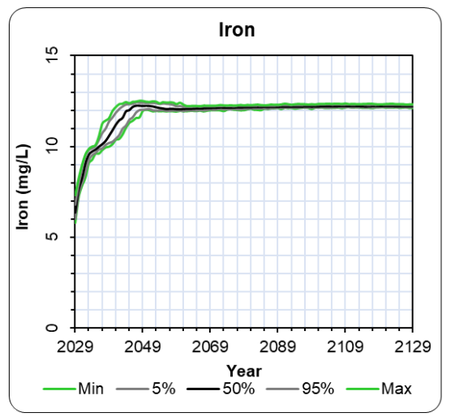

Chloride
Chloride (mg/L)
0
100
200
300
400
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

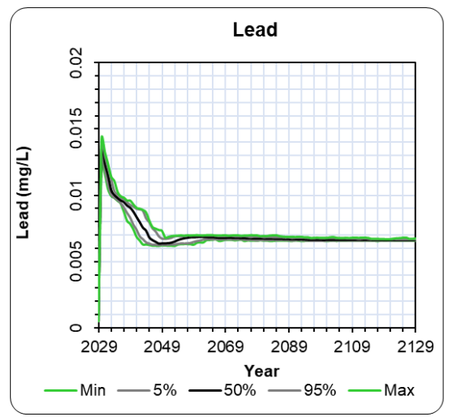

Chromium
Chromium (mg/L)
0
0.0002
0.0004
0.0006
0.0008
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

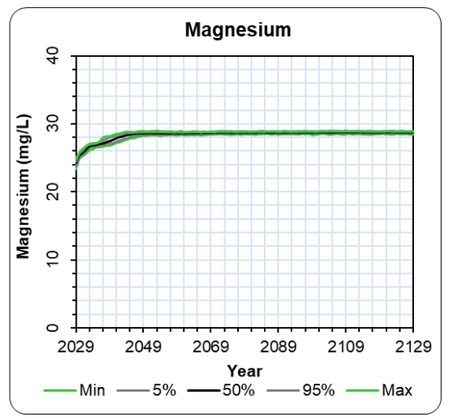

Cobalt
Cobalt (mg/L)
0
0.002
0.004
0.006
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

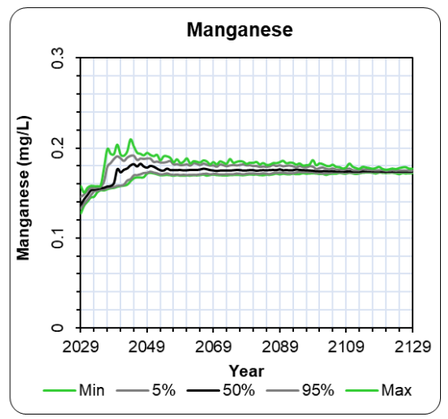

Copper
Copper (mg/L)
0
0.0005
0.001
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

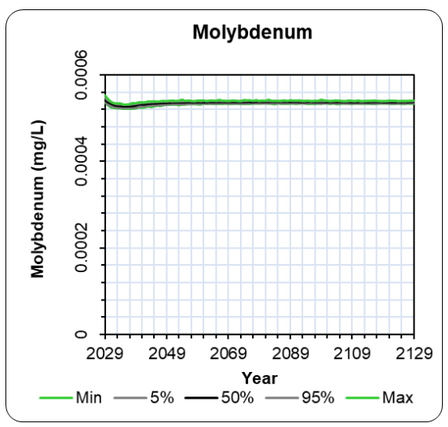

Fluoride
Fluoride (mg/L)
0
0.02
0.04
0.06
0.08
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

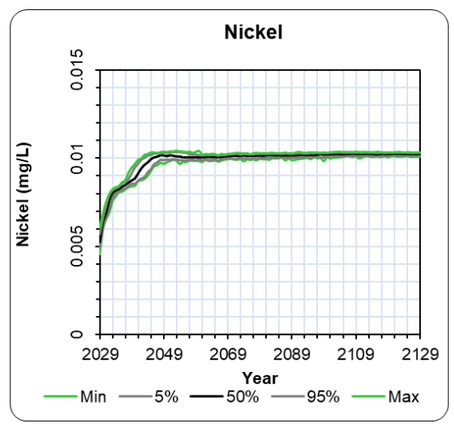

Iron
Iron (mg/L)
0
5
10
15
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

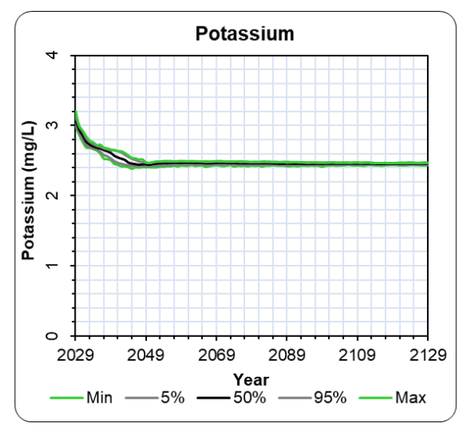

Lead
Lead (mg/L)
0
0.005
0.01
0.015
0.02
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

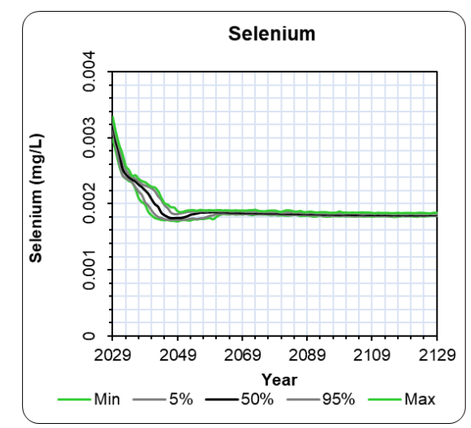

Magnesium
Magnesium (mg/L)
0
10
20
30
40
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

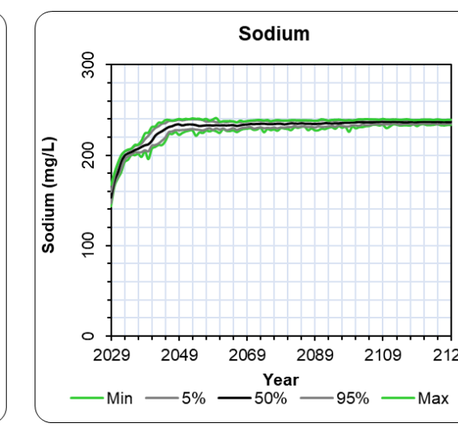

Manganese
Manganese (mg/L)
0
0.1
0.2
0.3
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

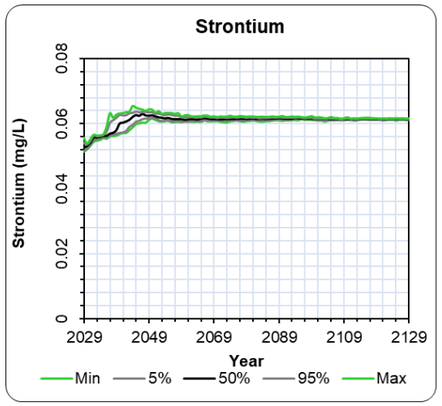

Molybdenum
Molybdenum (mg/L)
0
0.0002
0.0004
0.0006
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

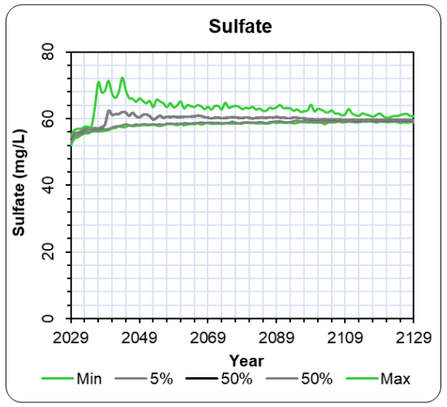

Nickel
Nickel (mg/L)
0
0.005
0.01
0.015
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

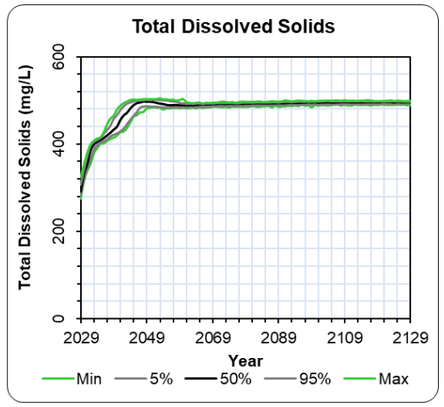

Potassium
Potassium (mg/L)
0
1
2
3
4
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

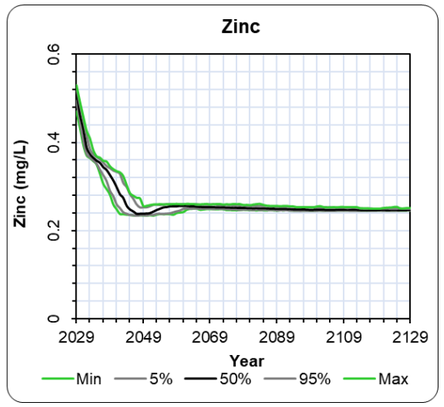

Selenium
Selenium (mg/L)
0
0.001
0.002
0.003
0.004
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max


Sodium
Sodium (mg/L)
0
100
200
300
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max





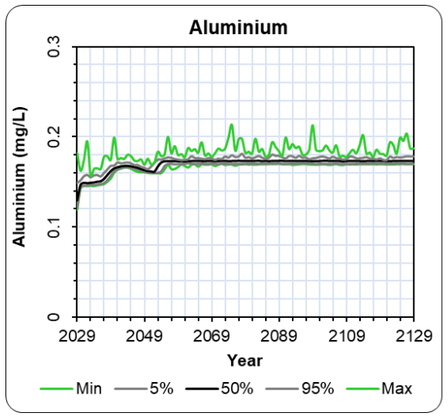


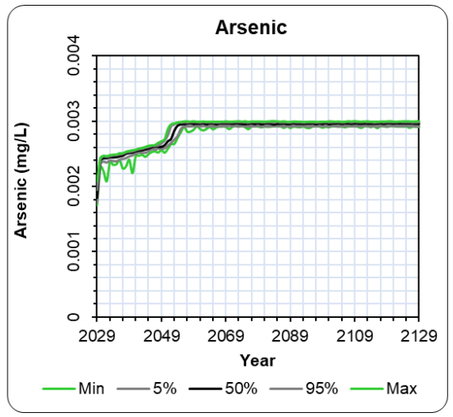


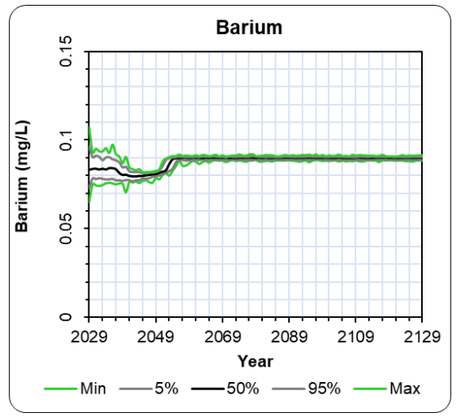
Scenario 2: Connected (flood flows), median climate

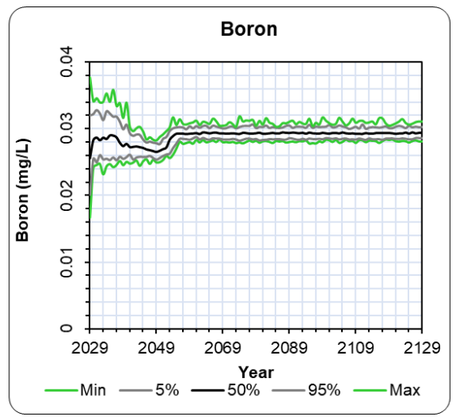
Fill: Local catchment flows, natural groundwater, pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing) & 24 GL Latrobe water.

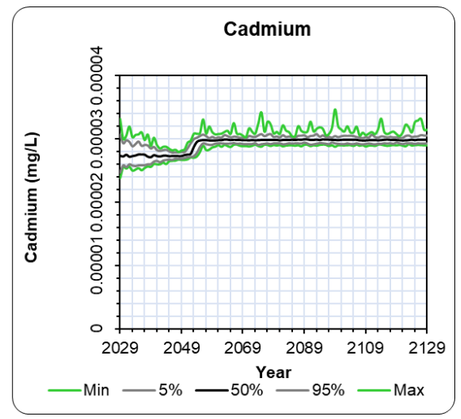
Yallourn Township Field (YTF)

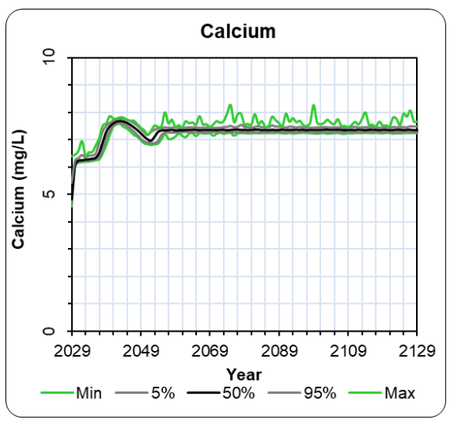


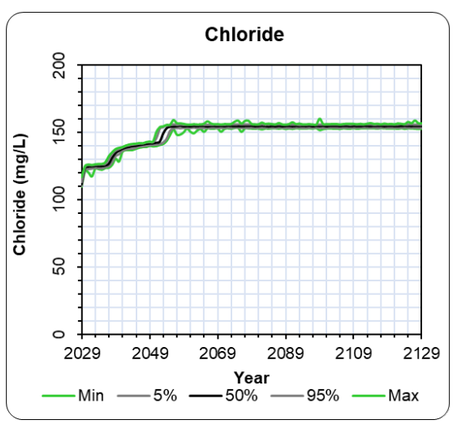


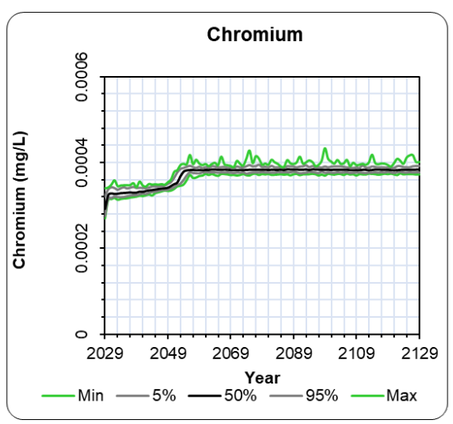


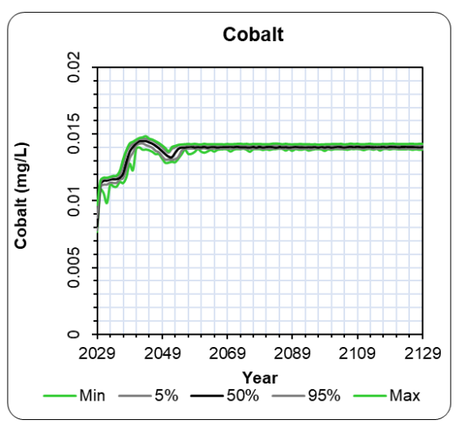


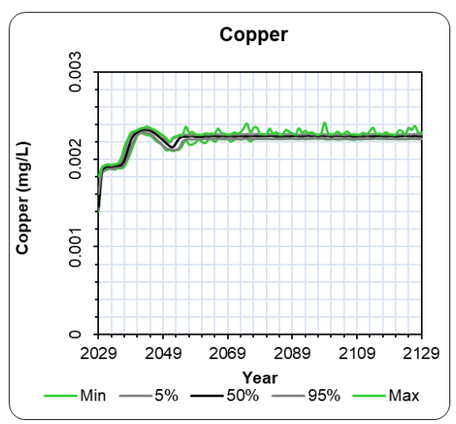


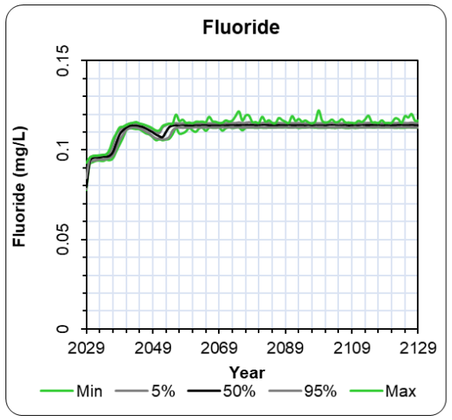


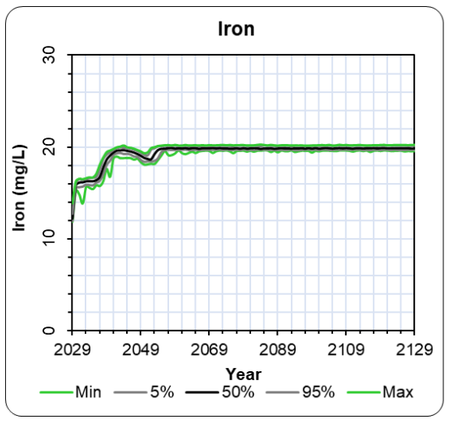


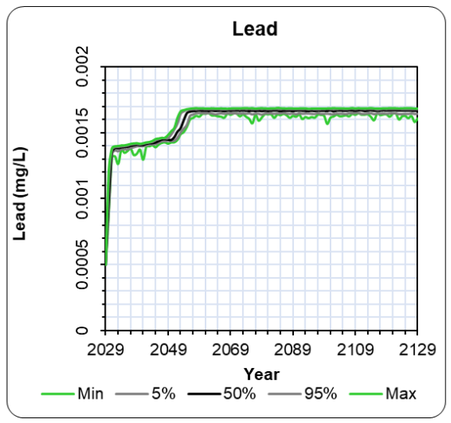


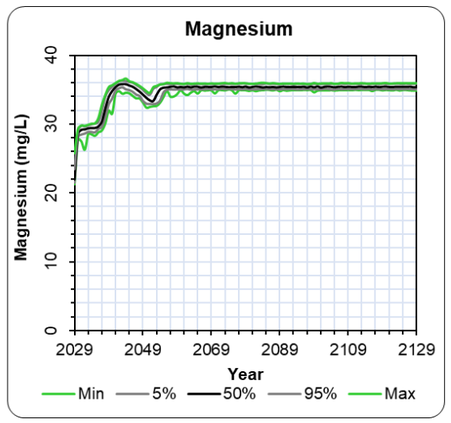


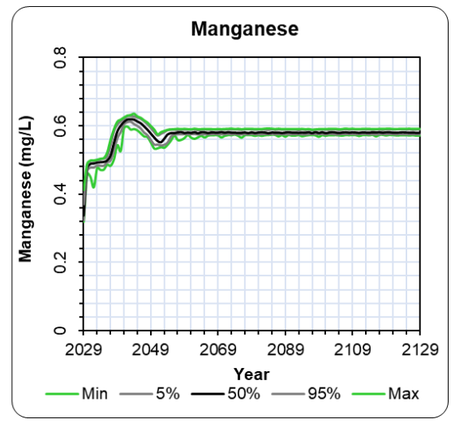


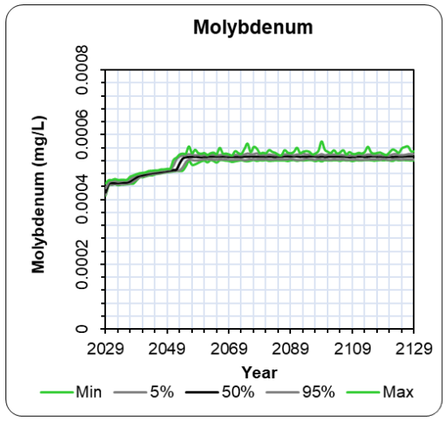


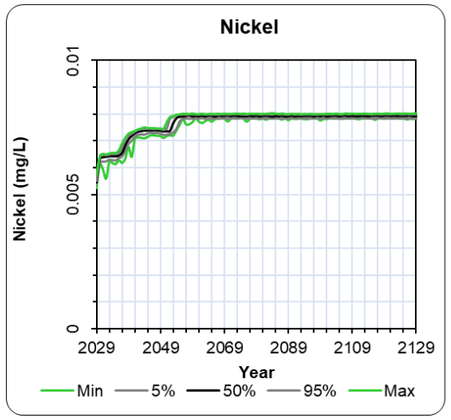


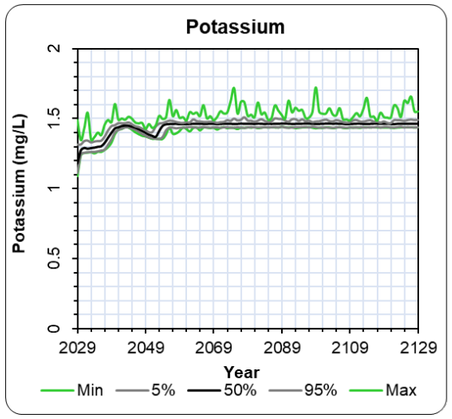


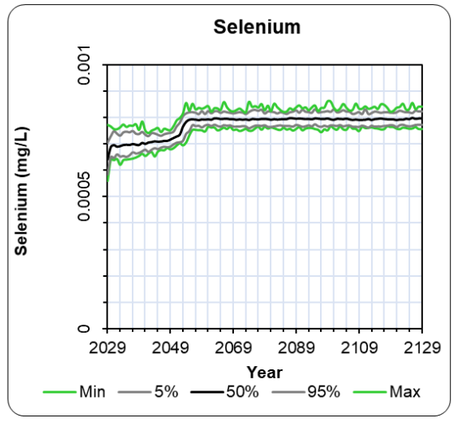


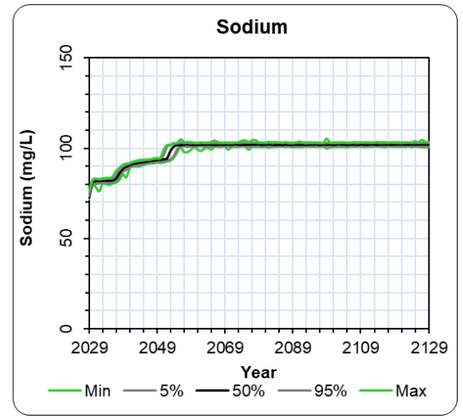


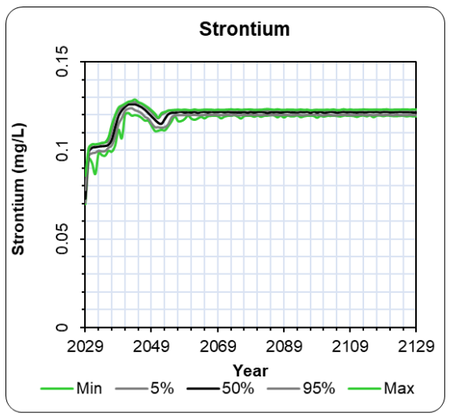


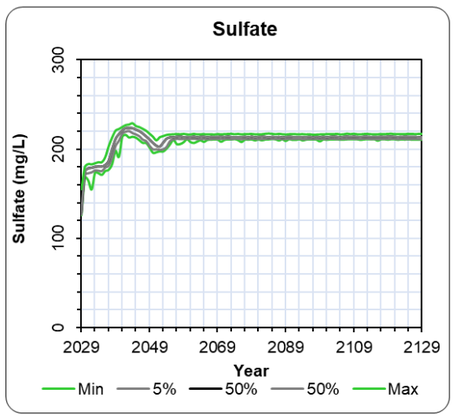


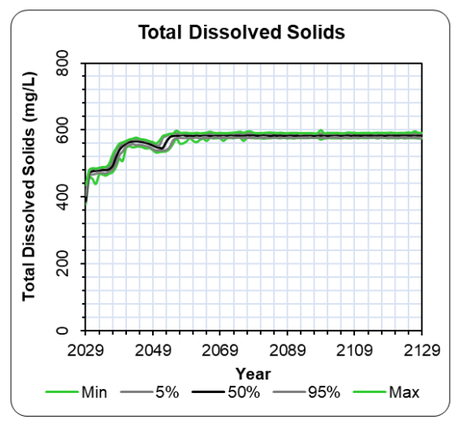


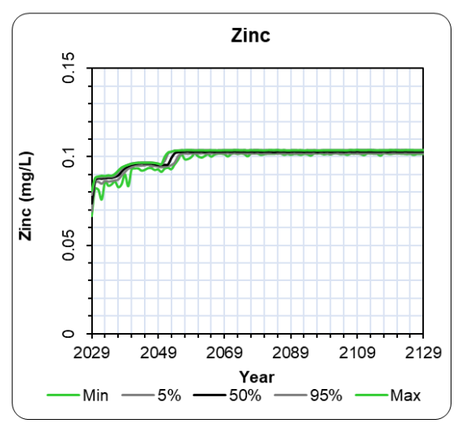




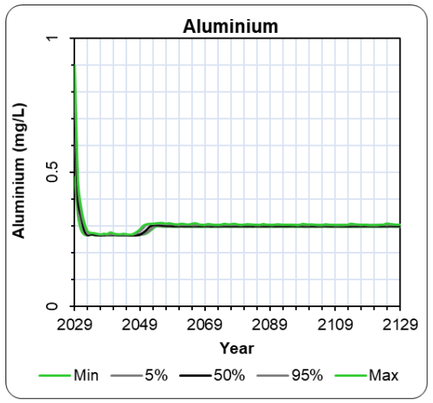


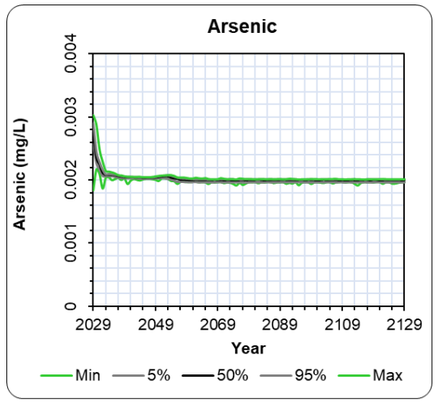


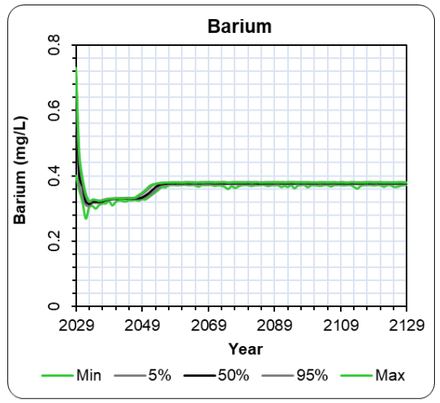


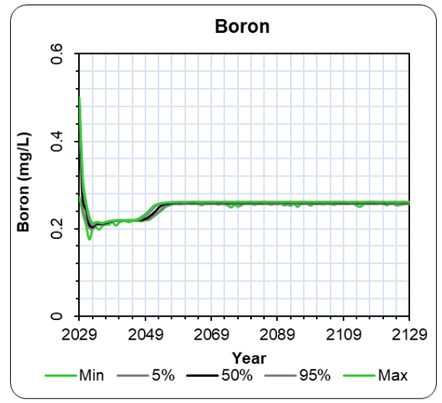


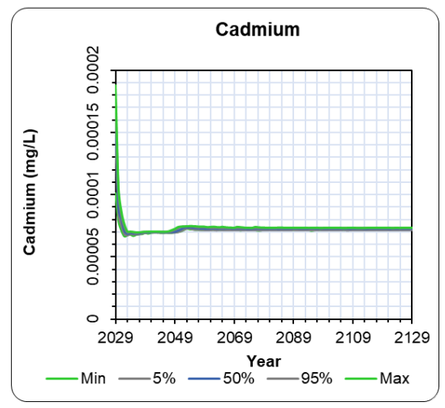
Yallourn East Field (YEF)

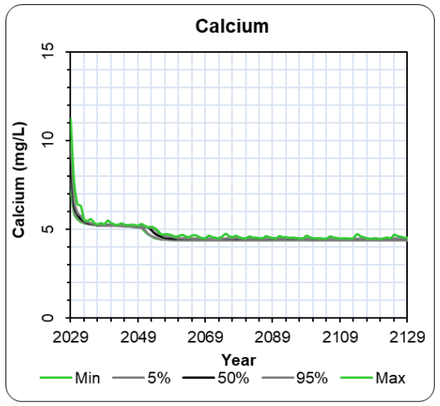

Aluminium
Aluminium (mg/L)
0
0.5
1
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

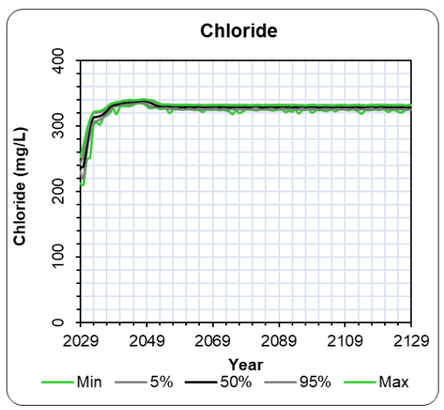

Arsenic
Arsenic (mg/L)
0
0.001
0.002
0.003
0.004
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

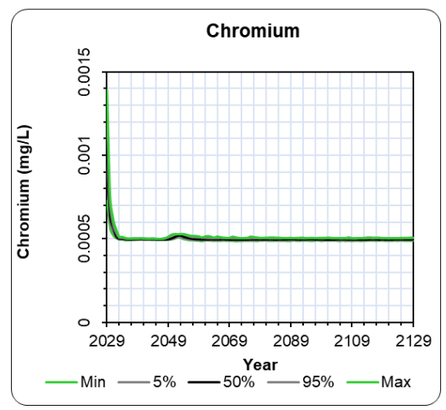

Barium
Barium (mg/L)
0
0.2
0.4
0.6
0.8
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

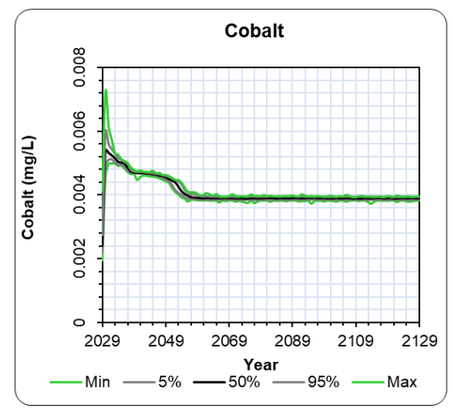

Boron
Boron (mg/L)
0
0.2
0.4
0.6
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

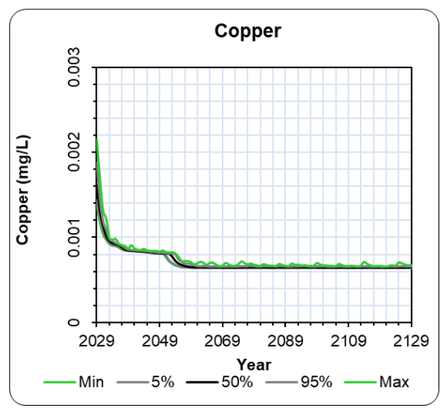

Cadmium
Cadmium (mg/L)
0
0.00005
0.0001
0.00015
0.0002
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

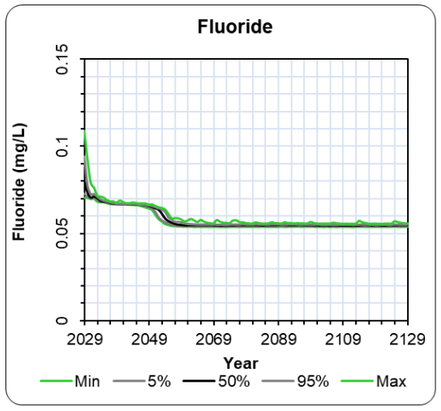

Calcium
Calcium (mg/L)
0
5
10
15
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

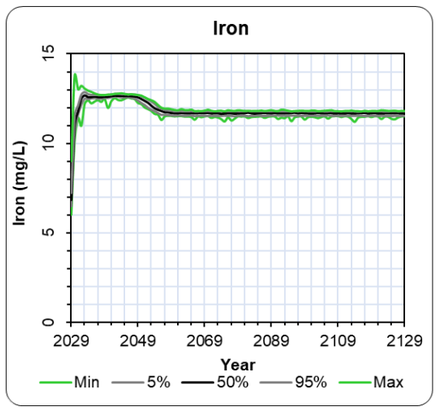

Chloride
Chloride (mg/L)
0
100
200
300
400
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

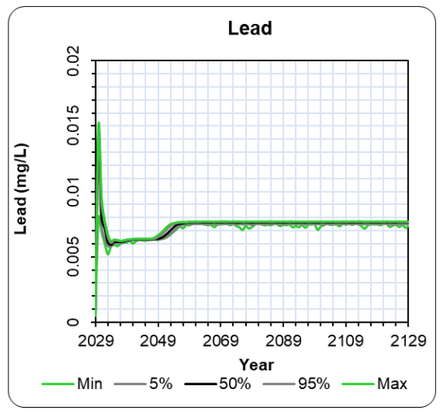

Chromium
Chromium (mg/L)
0
0.0005
0.001
0.0015
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

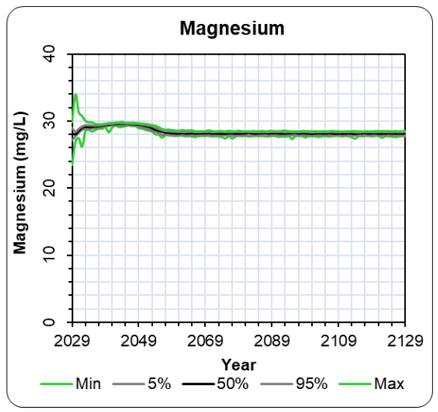

Cobalt
Cobalt (mg/L)
0
0.002
0.004
0.006
0.008
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

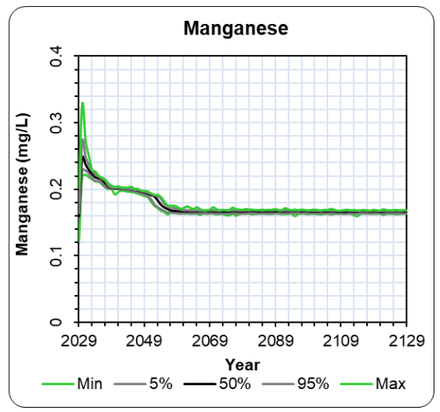

Copper
Copper (mg/L)
0
0.001
0.002
0.003
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

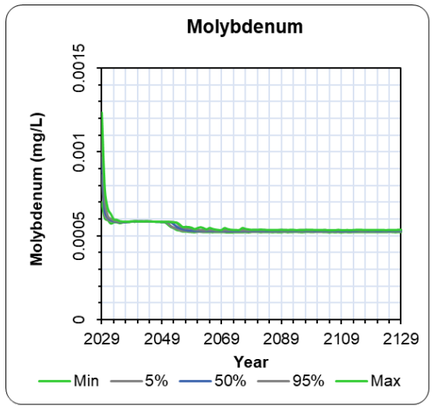

Fluoride
Fluoride (mg/L)
0
0.05
0.1
0.15
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

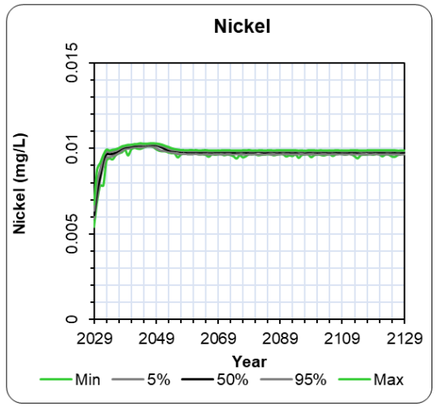

Iron
Iron (mg/L)
0
5
10
15
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

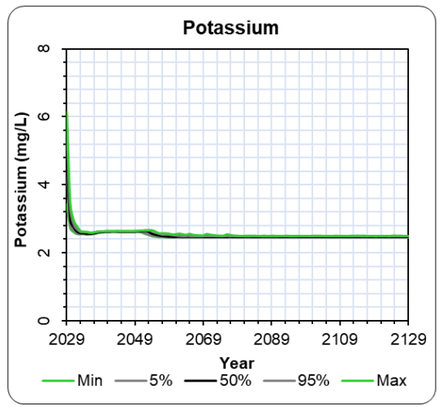

Lead
Lead (mg/L)
0
0.005
0.01
0.015
0.02
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

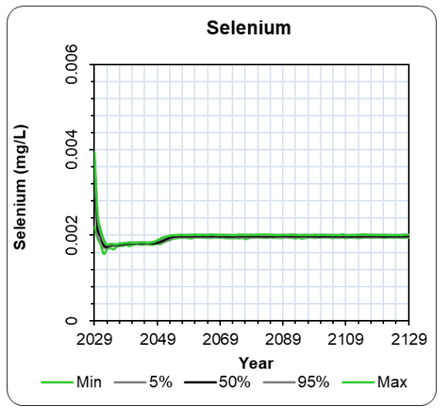

Magnesium
Magnesium (mg/L)
0
10
20
30
40
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

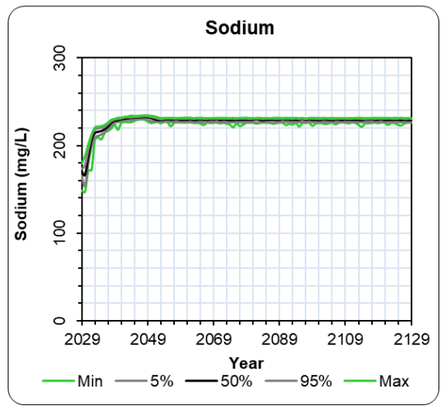

Manganese
Manganese (mg/L)
0
0.1
0.2
0.3
0.4
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

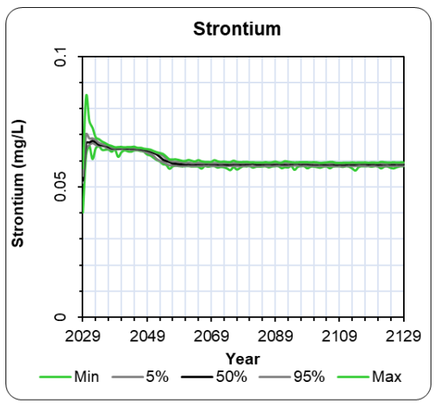


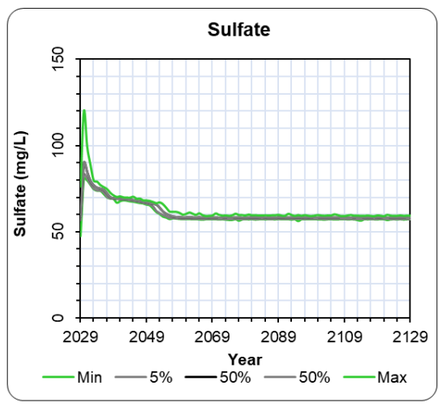


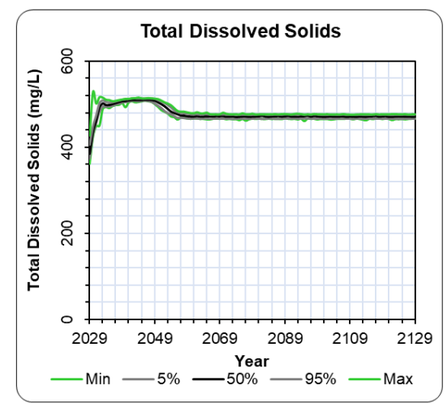


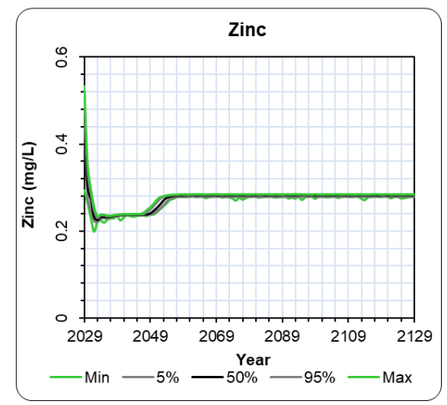








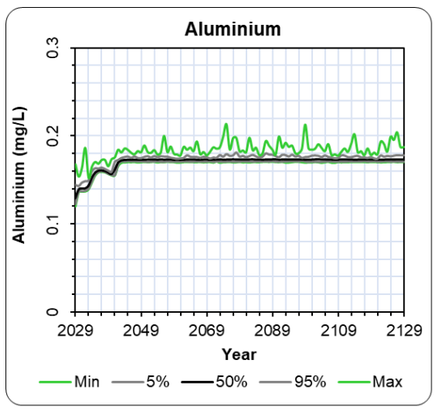


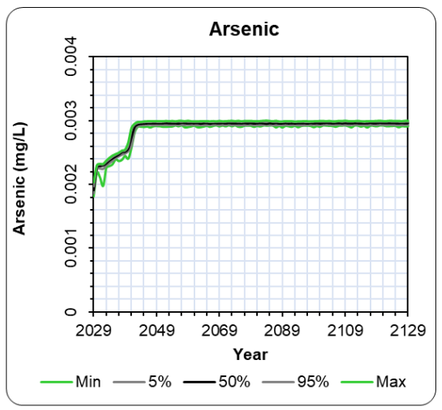


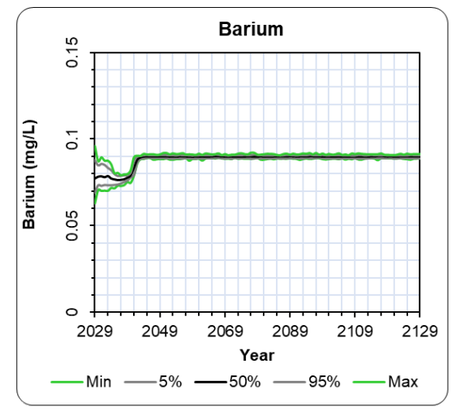
Scenario 3: Connected (flood flows), median climate

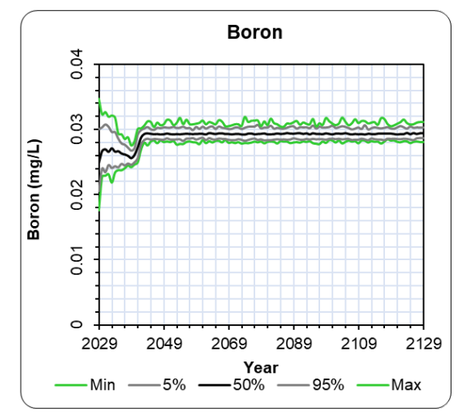
Fill: Local catchment flows, natural groundwater, pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing), 34 GL Latrobe water & 14 GL Moondarra water.

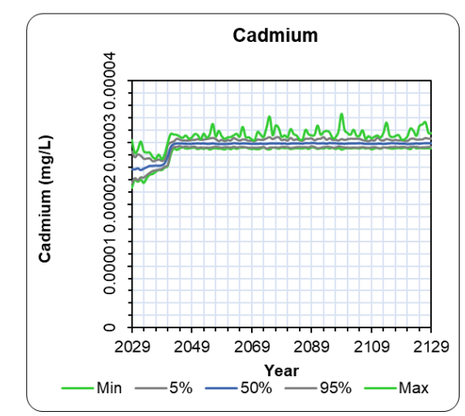
Yallourn Township Field (YTF)

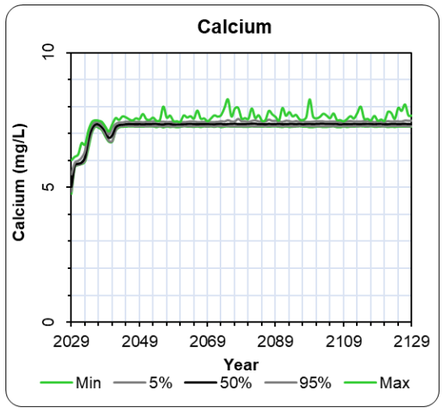


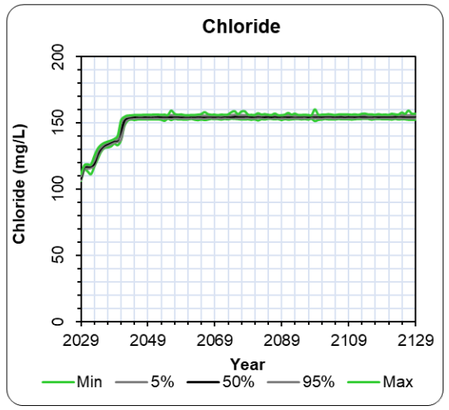


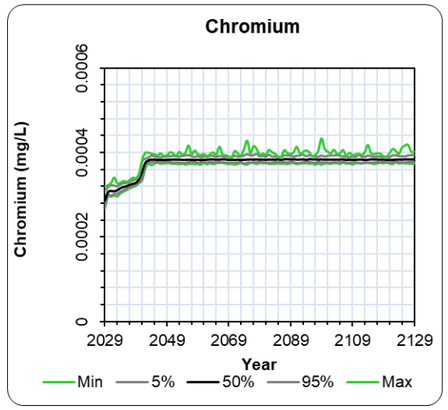


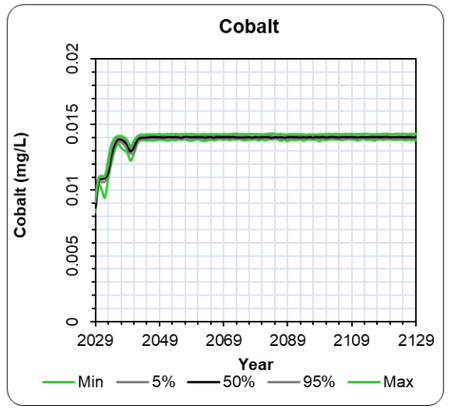


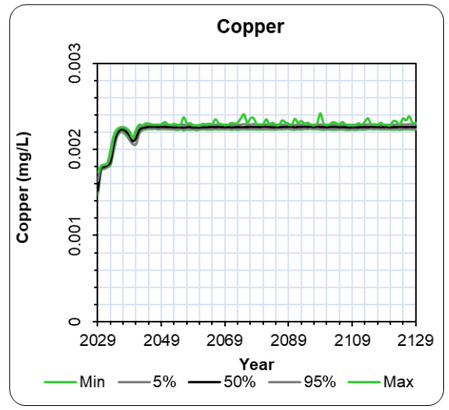


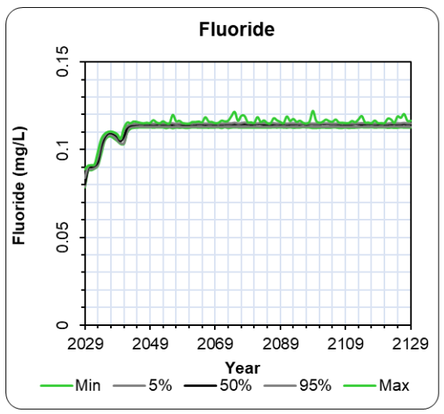

Calcium
Calcium (mg/L)
0
5
10
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

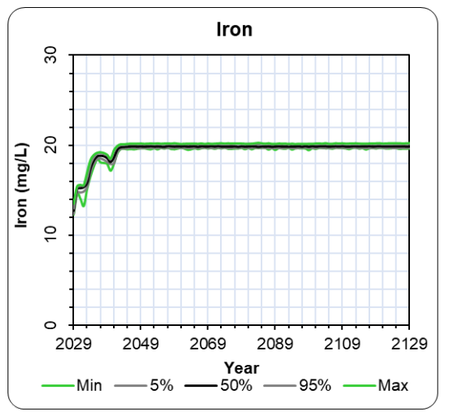

Chloride
Chloride (mg/L)
0
50
100
150
200
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

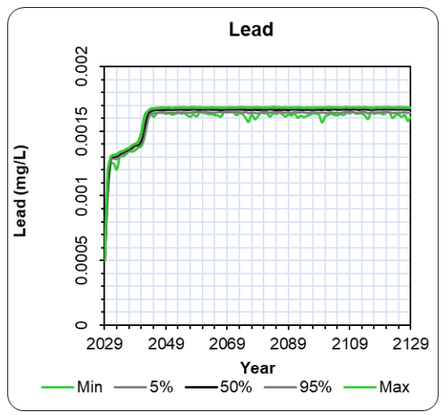

Chromium
Chromium (mg/L)
0
0.0002
0.0004
0.0006
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

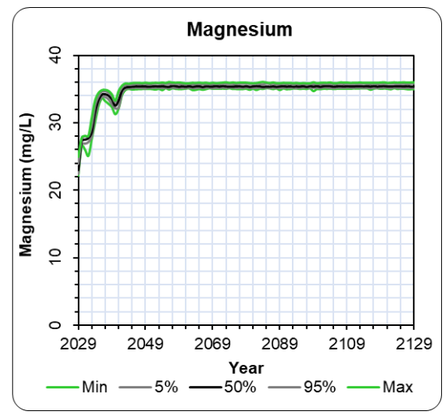

Cobalt
Cobalt (mg/L)
0
0.005
0.01
0.015
0.02
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

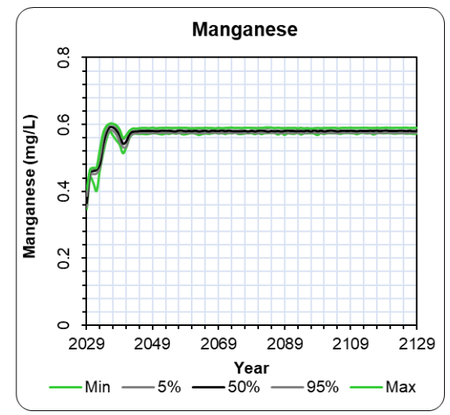

Copper
Copper (mg/L)
0
0.001
0.002
0.003
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

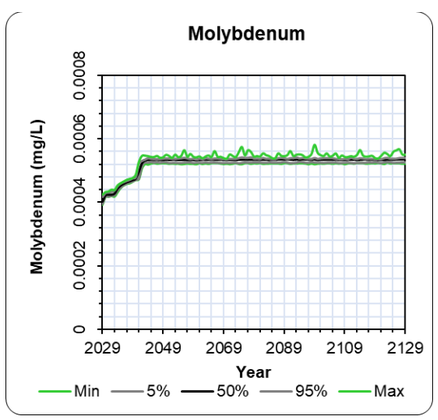

Fluoride
Fluoride (mg/L)
0
0.05
0.1
0.15
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

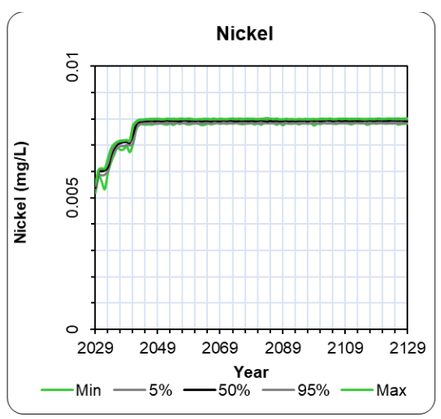

Iron
Iron (mg/L)
0
10
20
30
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

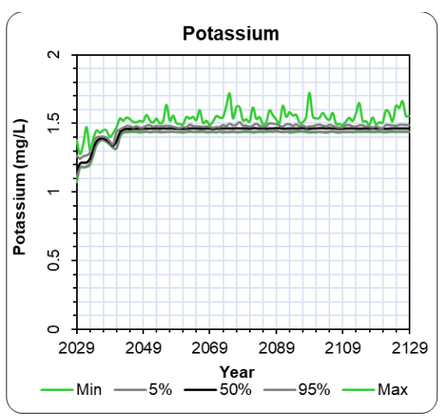

Lead
Lead (mg/L)
0
0.0005
0.001
0.0015
0.002
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

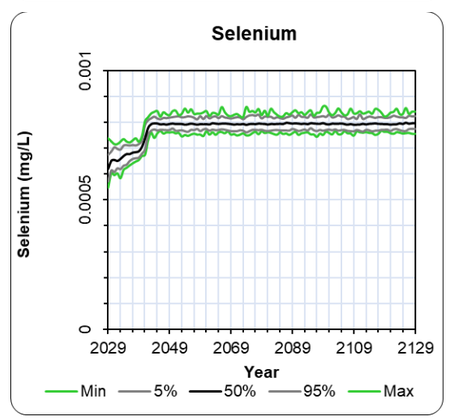

Magnesium
Magnesium (mg/L)
0
10
20
30
40
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

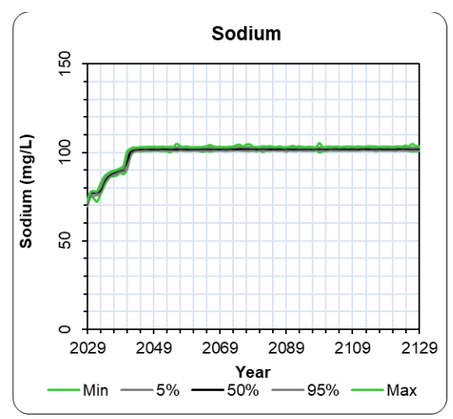

Manganese
Manganese (mg/L)
0
0.2
0.4
0.6
0.8
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

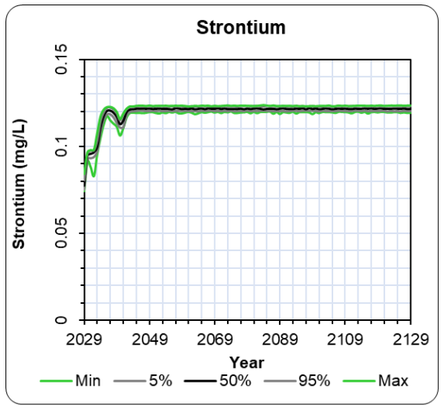

Molybdenum
Molybdenum (mg/L)
0
0.0002
0.0004
0.0006
0.0008
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

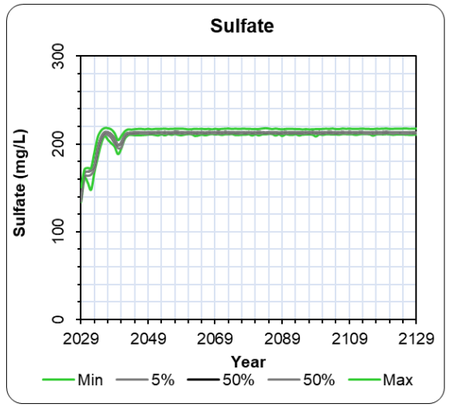

Nickel
Nickel (mg/L)
0
0.005
0.01
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

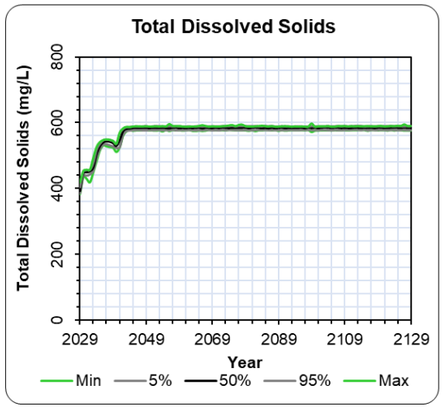

Potassium
Potassium (mg/L)
0
0.5
1
1.5
2
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

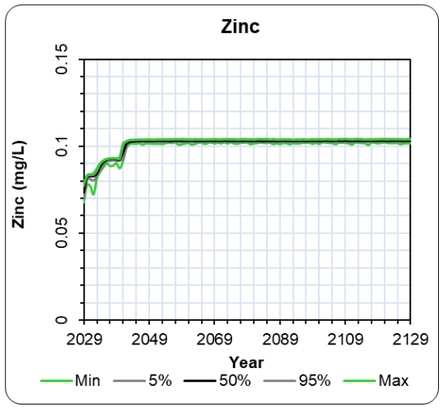

Selenium
Selenium (mg/L)
0
0.0005
0.001
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max


Sodium
Sodium (mg/L)
0
50
100
150
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

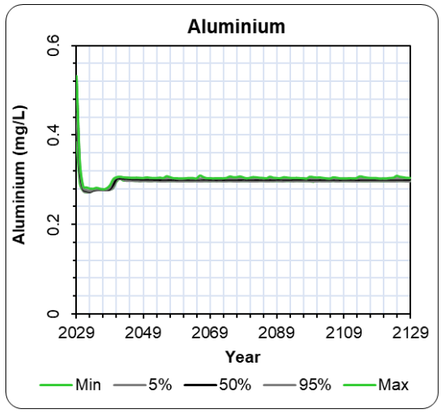


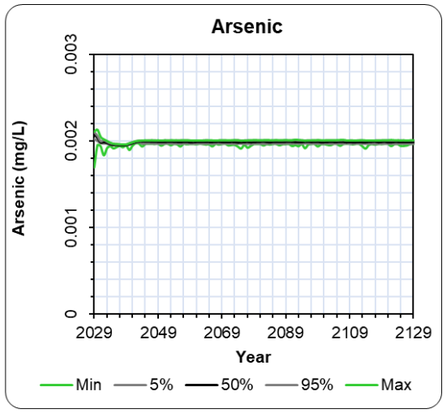


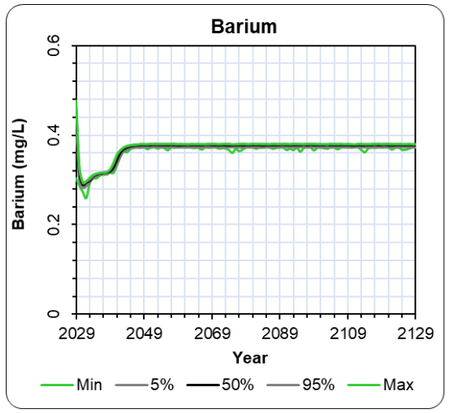


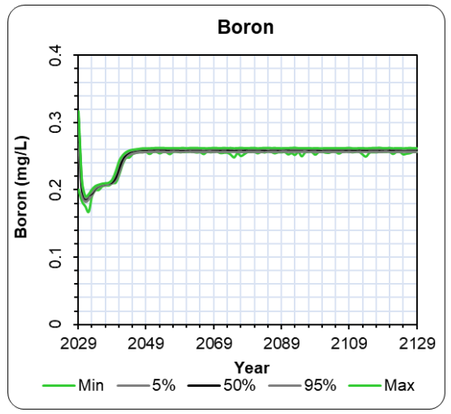


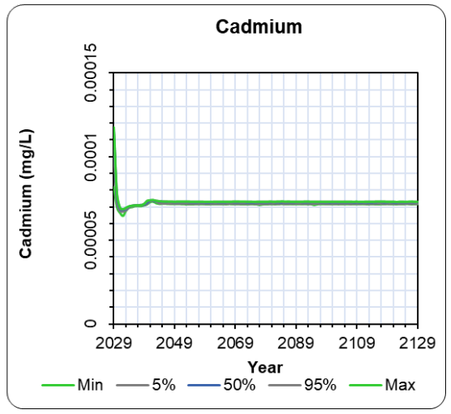
Yallourn East Field (YEF)

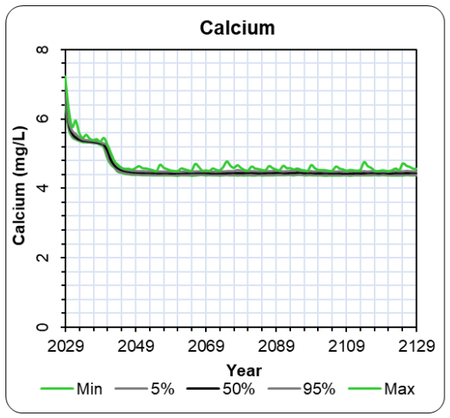


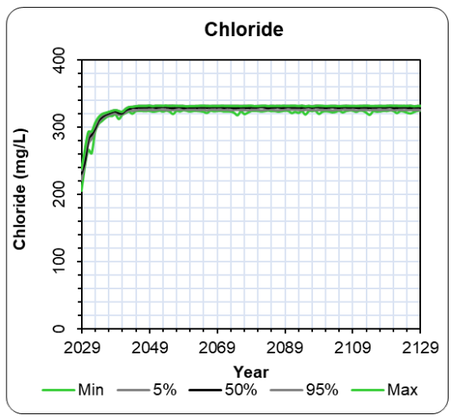


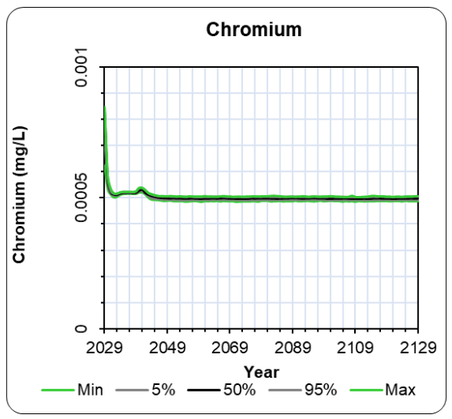


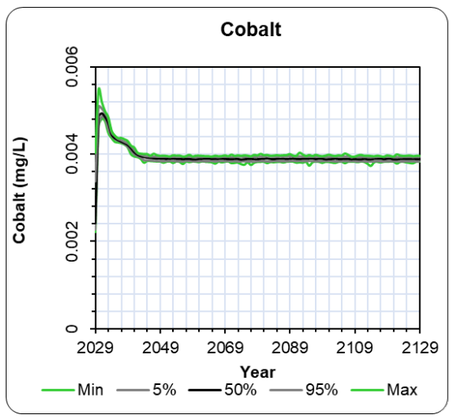


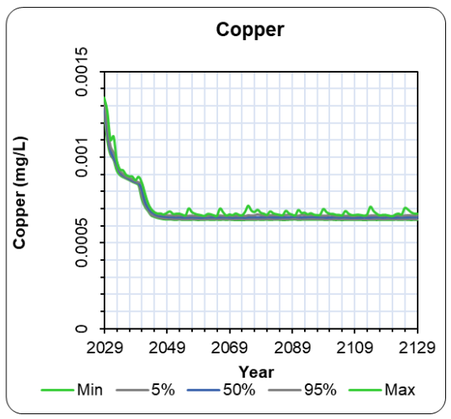


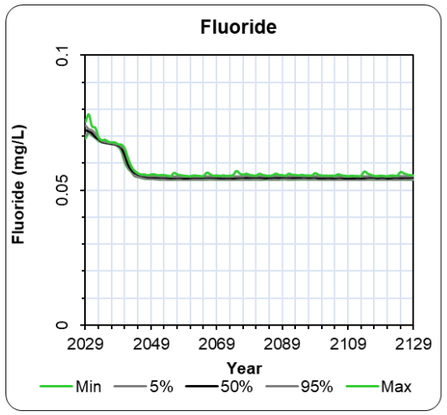


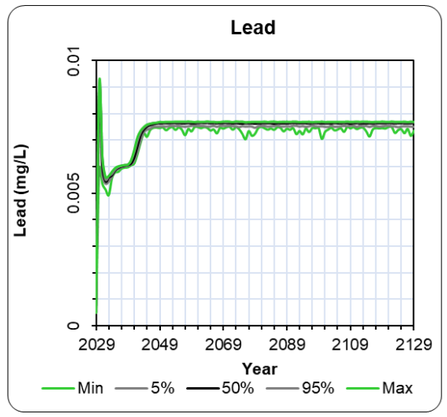


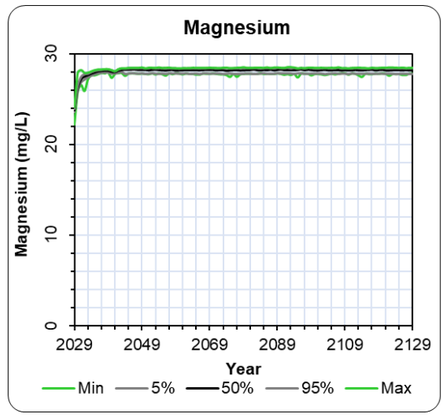


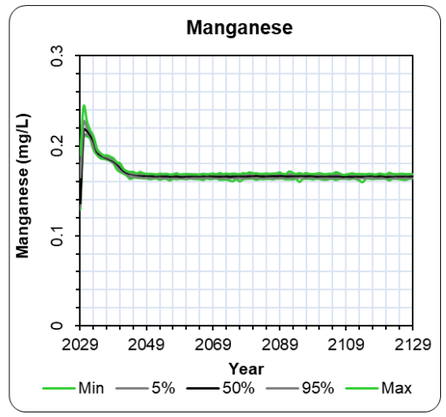


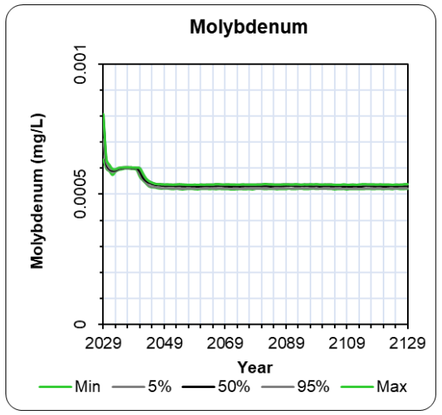


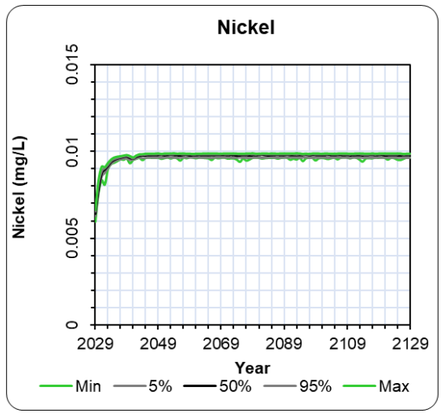


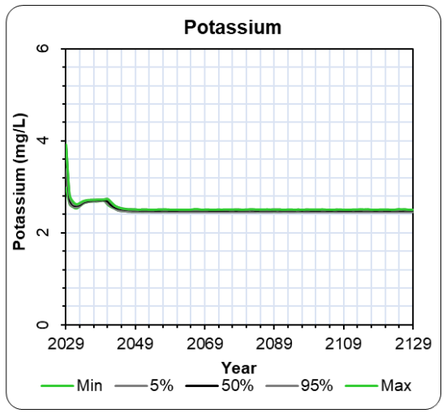


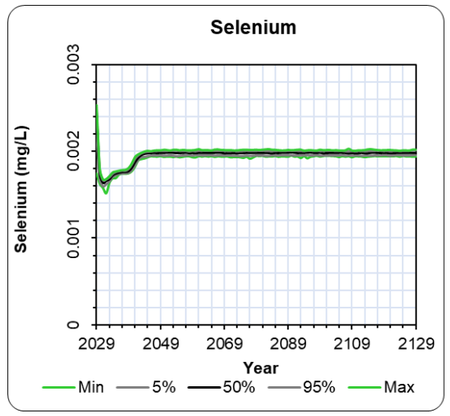


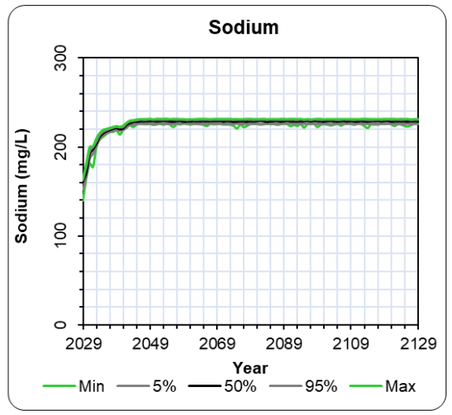


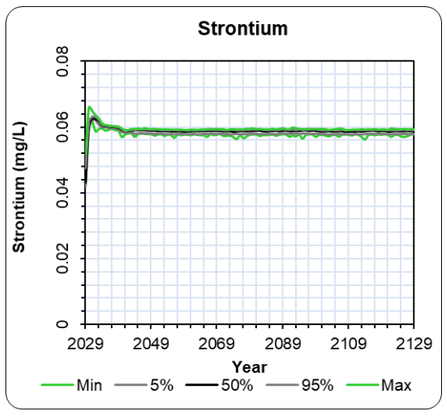


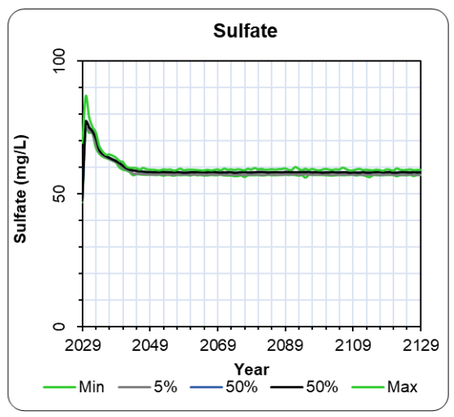


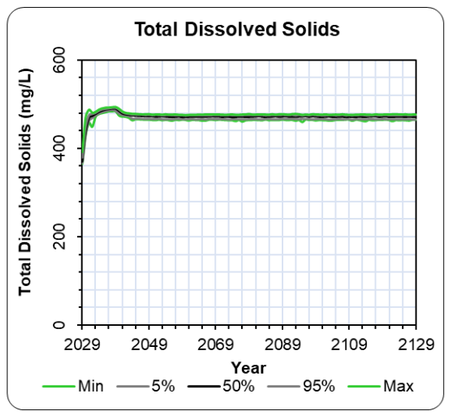


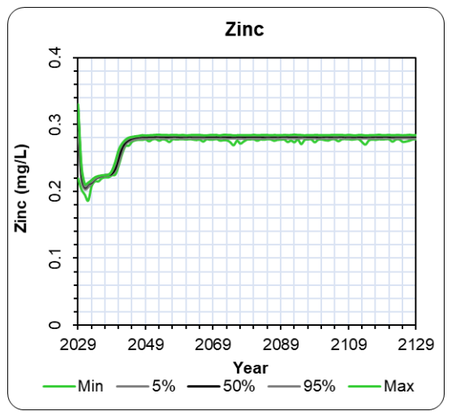








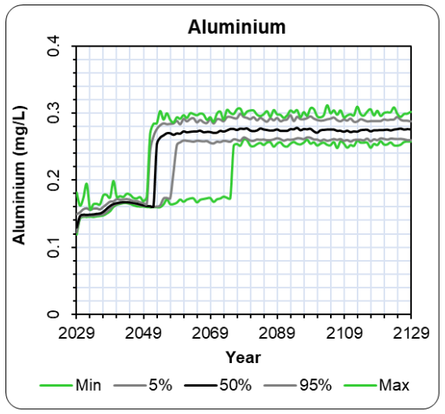


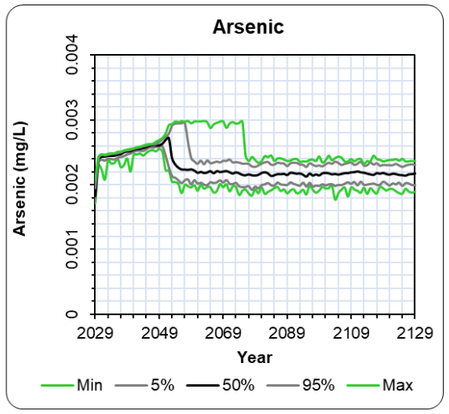


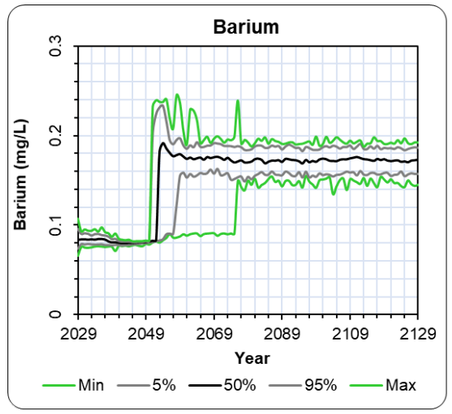
Scenario 4: Connected (fully integrated), median climate

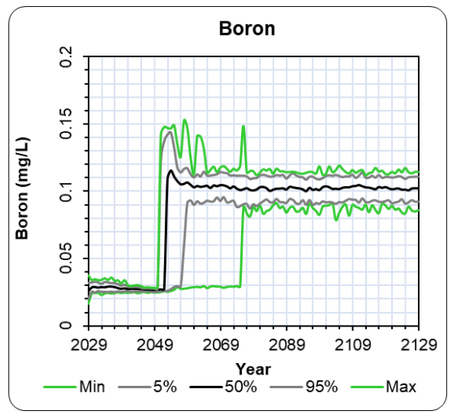
Fill: Local catchment flows, natural groundwater, pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing) & 24 GL Latrobe water.

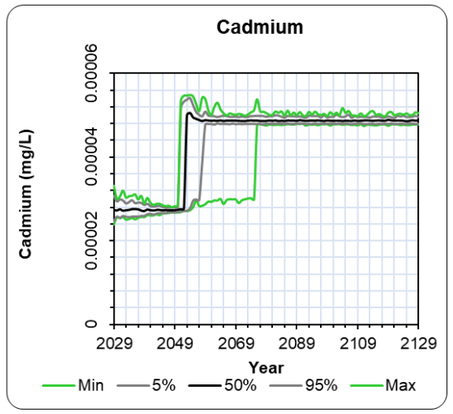
Yallourn Township Field (YTF)

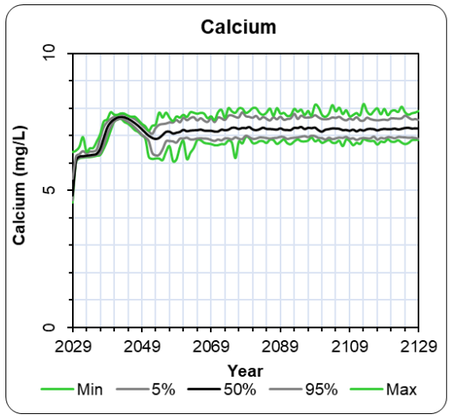

Aluminium
Aluminium (mg/L)
0
0.1
0.2
0.3
0.4
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

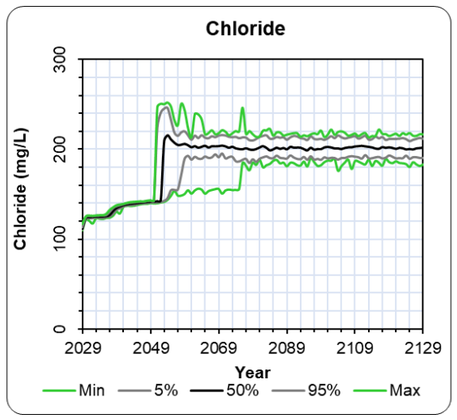

Arsenic
Arsenic (mg/L)
0
0.001
0.002
0.003
0.004
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

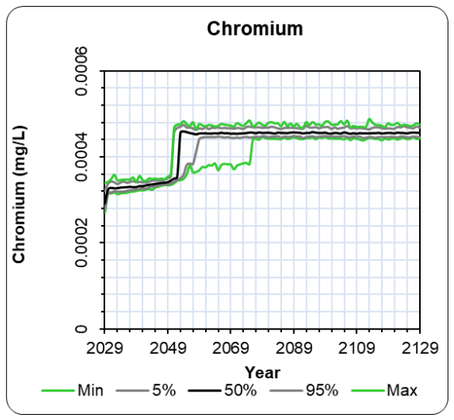

Barium
Barium (mg/L)
0
0.1
0.2
0.3
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

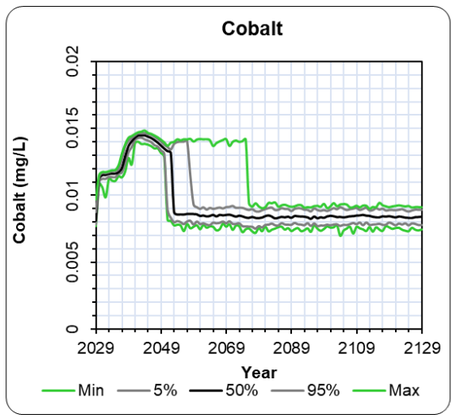

Boron
Boron (mg/L)
0
0.05
0.1
0.15
0.2
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

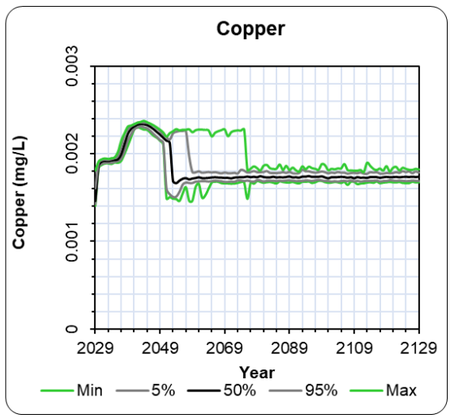

Cadmium
Cadmium (mg/L)
0
0.00002
0.00004
0.00006
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

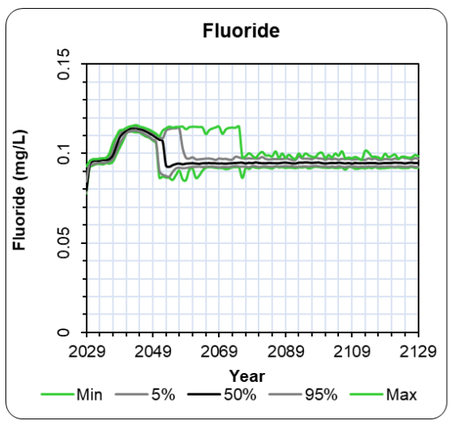

Calcium
Calcium (mg/L)
0
5
10
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

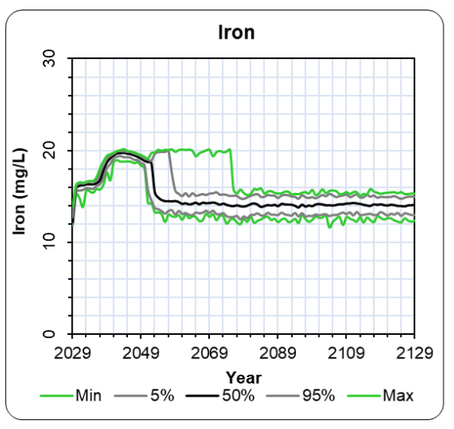

Chloride
Chloride (mg/L)
0
100
200
300
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

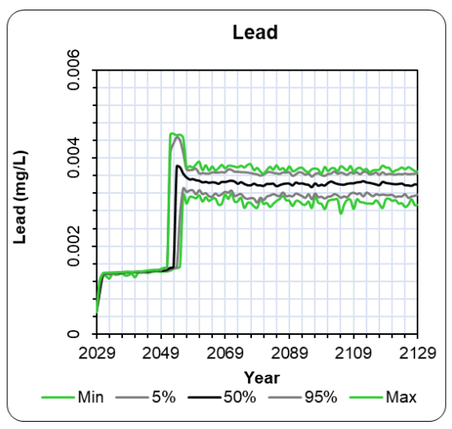

Chromium
Chromium (mg/L)
0
0.0002
0.0004
0.0006
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

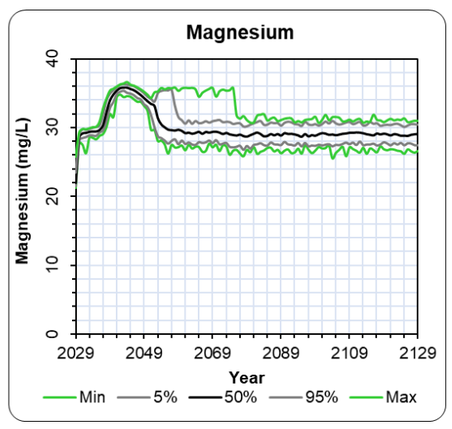

Cobalt
Cobalt (mg/L)
0
0.005
0.01
0.015
0.02
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

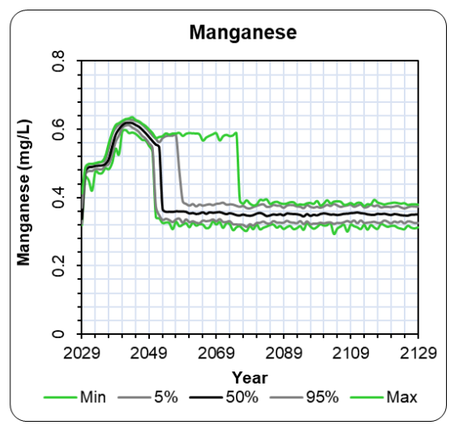

Copper
Copper (mg/L)
0
0.001
0.002
0.003
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

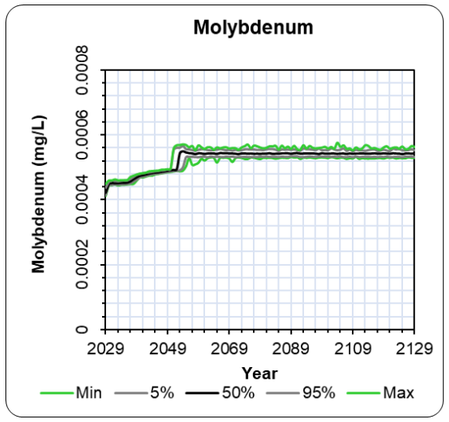

Fluoride
Fluoride (mg/L)
0
0.05
0.1
0.15
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

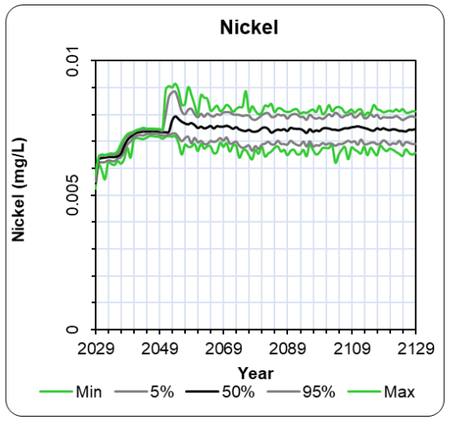

Iron
Iron (mg/L)
0
10
20
30
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

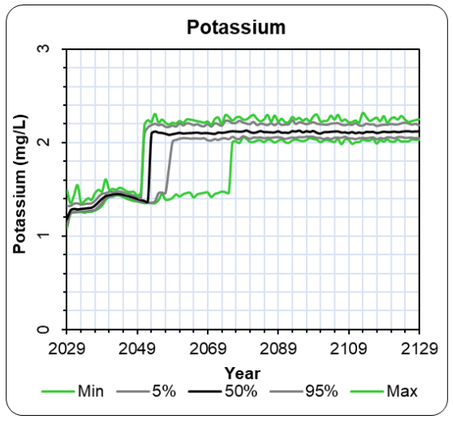

Lead
Lead (mg/L)
0
0.002
0.004
0.006
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

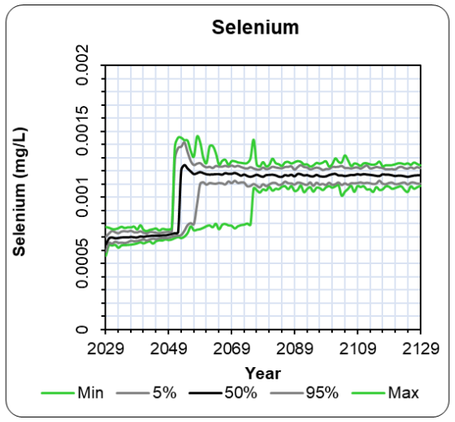

Magnesium
Magnesium (mg/L)
0
10
20
30
40
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

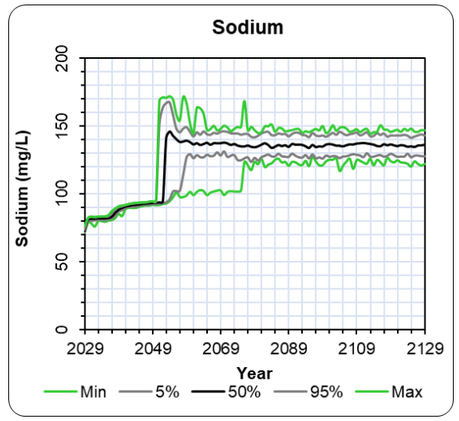

Manganese
Manganese (mg/L)
0
0.2
0.4
0.6
0.8
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

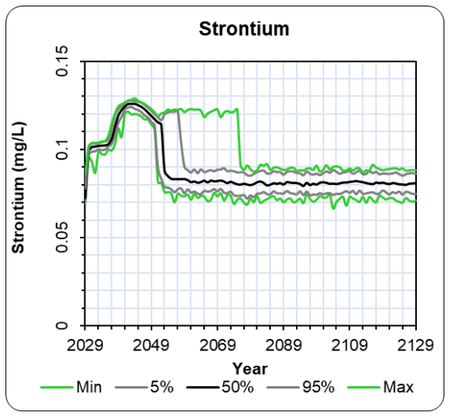


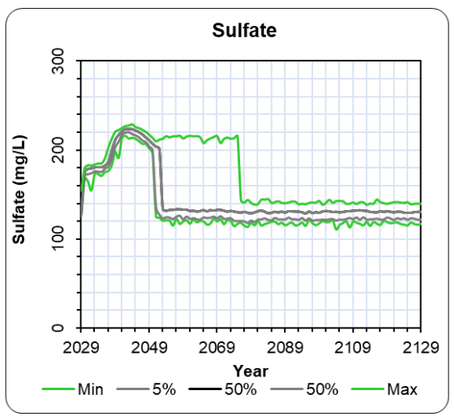


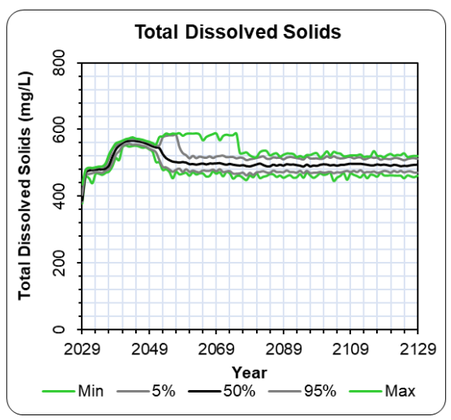


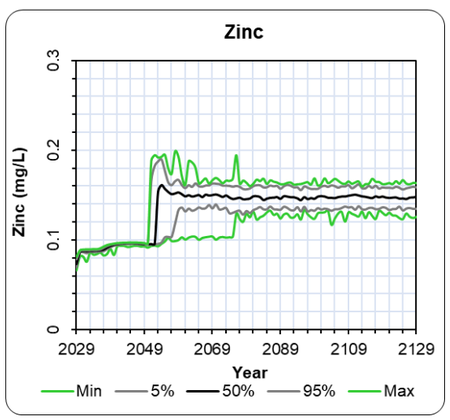




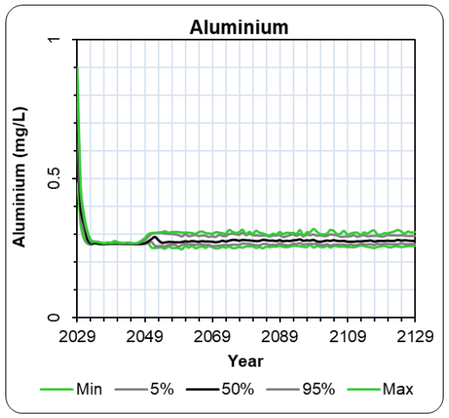


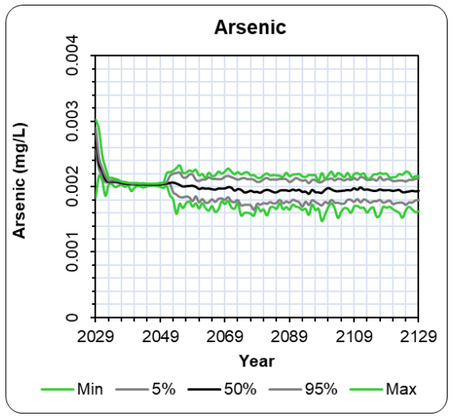


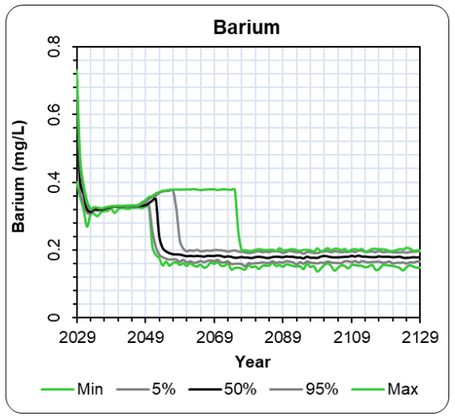


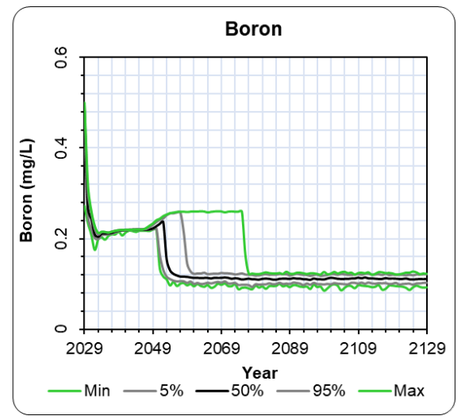


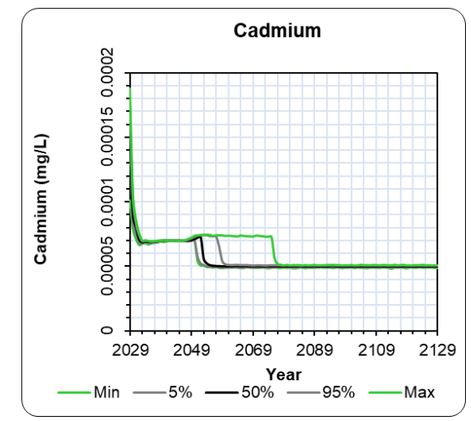
Yallourn East Field (YEF)

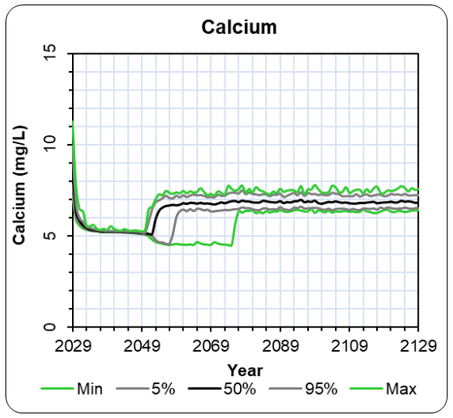


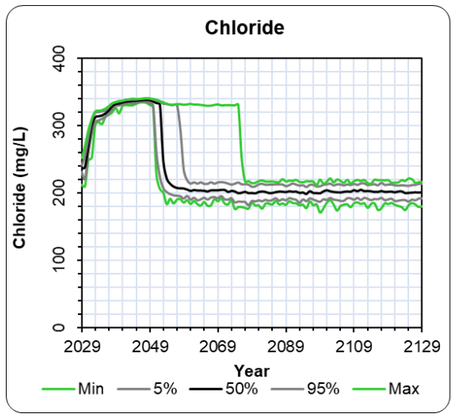


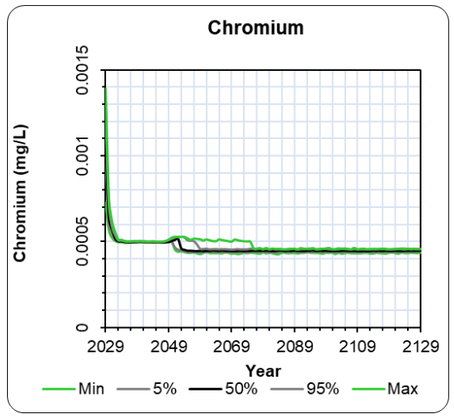


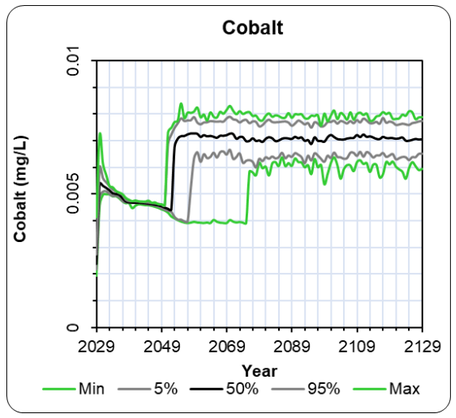


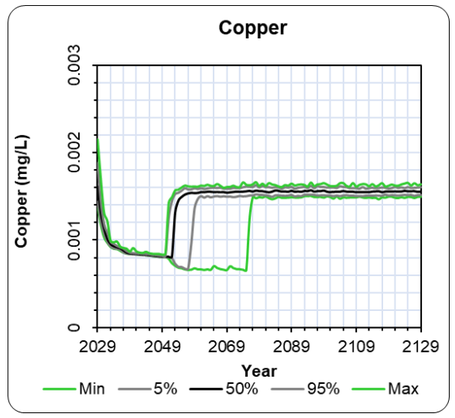


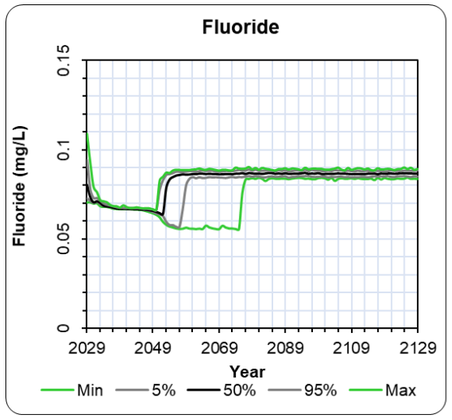

Calcium
Calcium (mg/L)
0
5
10
15
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

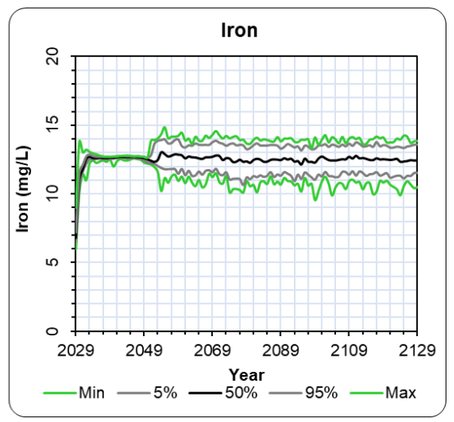

Chloride
Chloride (mg/L)
0
100
200
300
400
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

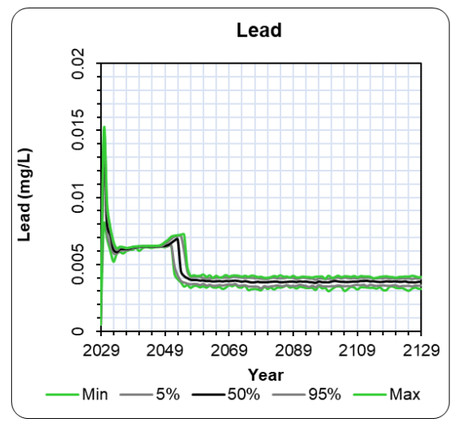

Chromium
Chromium (mg/L)
0
0.0005
0.001
0.0015
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

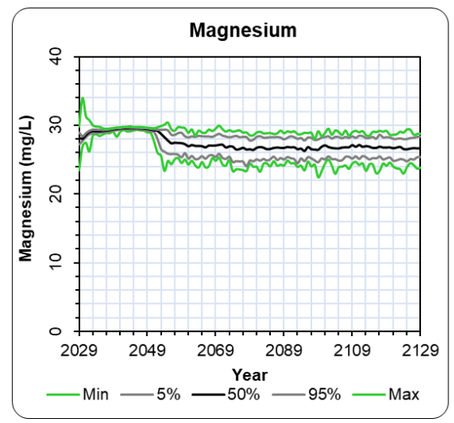

Cobalt
Cobalt (mg/L)
0
0.005
0.01
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

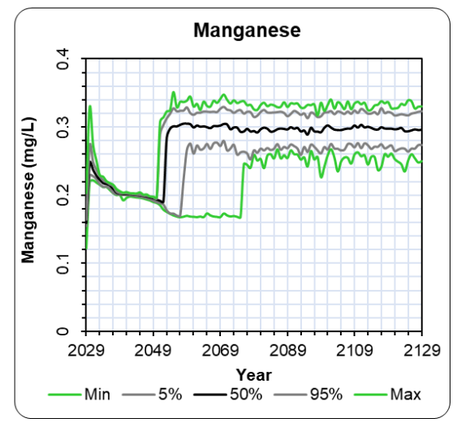

Copper
Copper (mg/L)
0
0.001
0.002
0.003
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

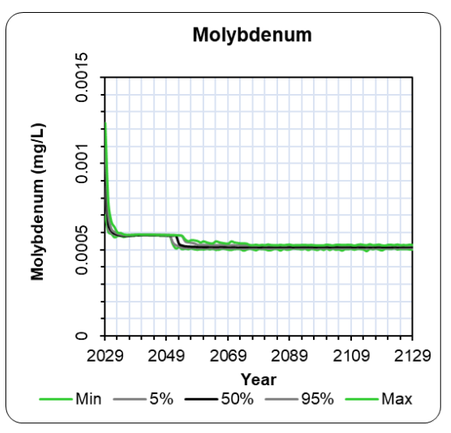

Fluoride
Fluoride (mg/L)
0
0.05
0.1
0.15
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

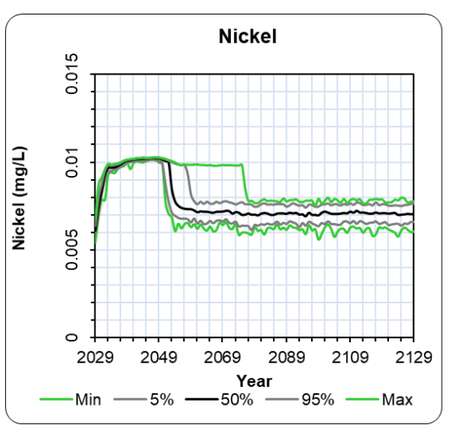

Iron
Iron (mg/L)
0
5
10
15
20
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

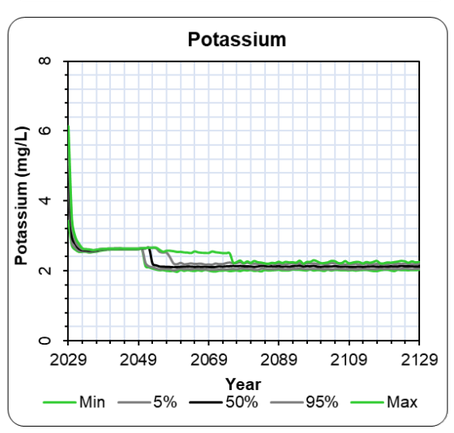

Lead
Lead (mg/L)
0
0.005
0.01
0.015
0.02
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

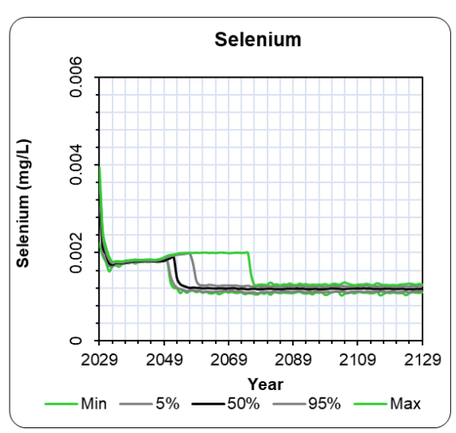

Magnesium
Magnesium (mg/L)
0
10
20
30
40
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

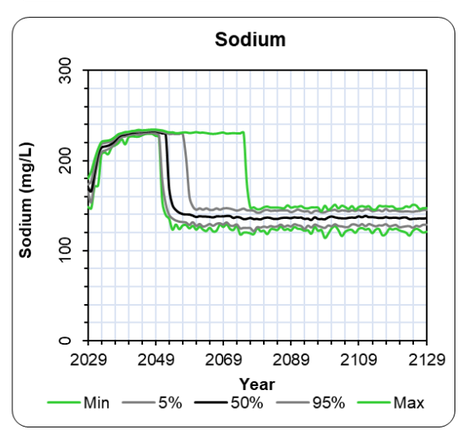

Manganese
Manganese (mg/L)
0
0.1
0.2
0.3
0.4
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

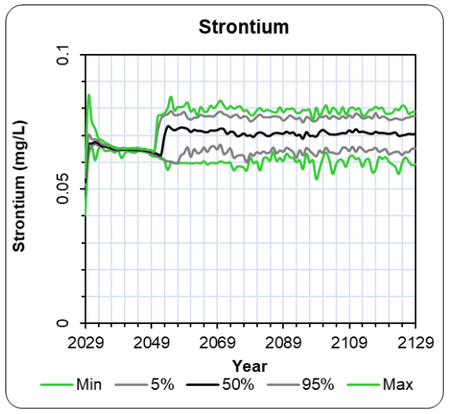

Molybdenum
Molybdenum (mg/L)
0
0.0005
0.001
0.0015
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

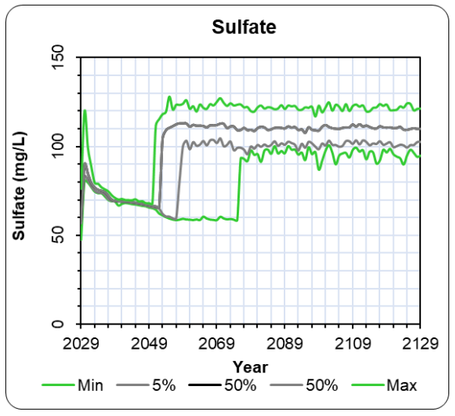

Nickel
Nickel (mg/L)
0
0.005
0.01
0.015
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

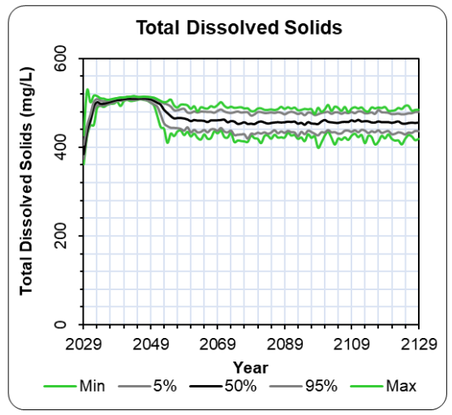

Potassium
Potassium (mg/L)
0
2
4
6
8
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

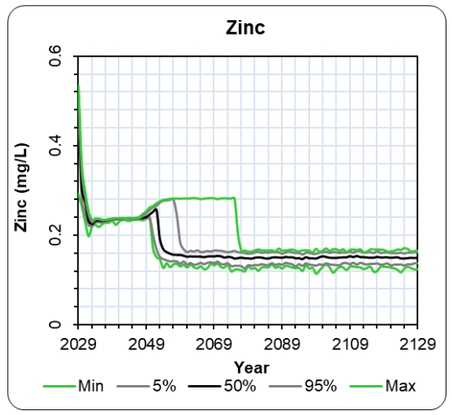

Selenium
Selenium (mg/L)
0
0.002
0.004
0.006
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max


Sodium
Sodium (mg/L)
0
100
200
300
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max





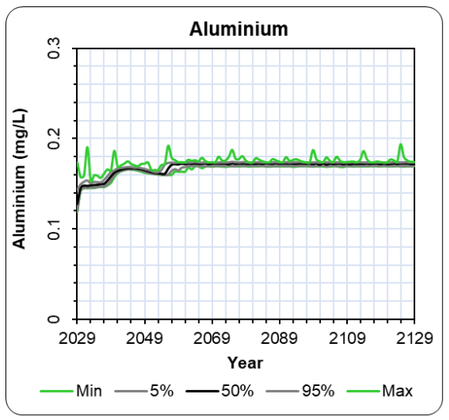


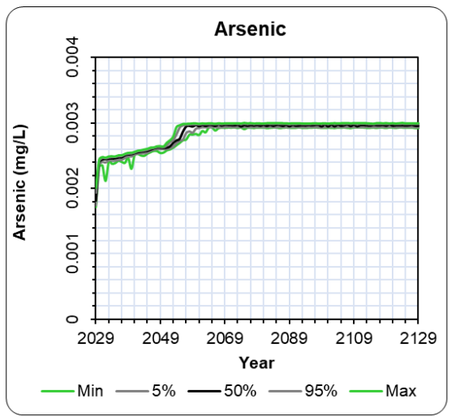


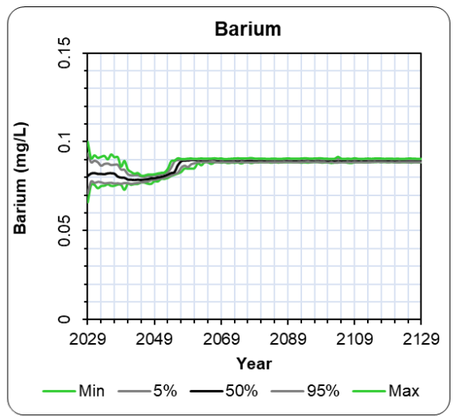
Scenario 5: Connected (flood flows), dry climate

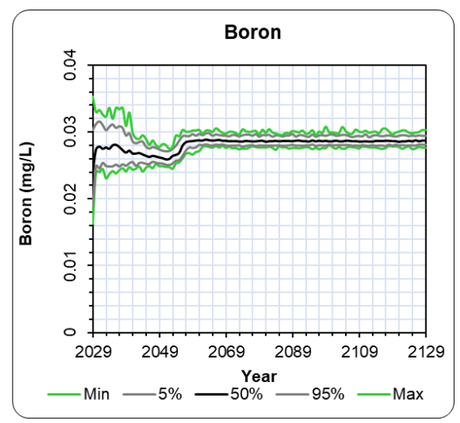
Fill: Local catchment flows, natural groundwater, pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing) & 24 GL Latrobe water.

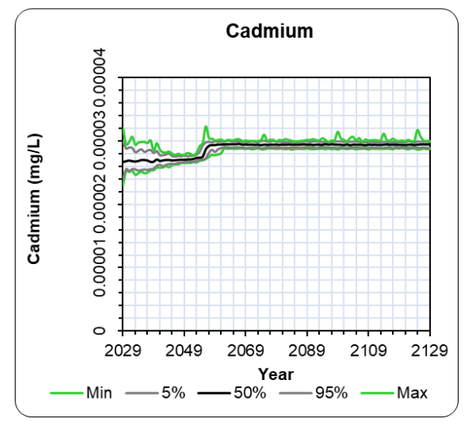
Yallourn Township Field (YTF)

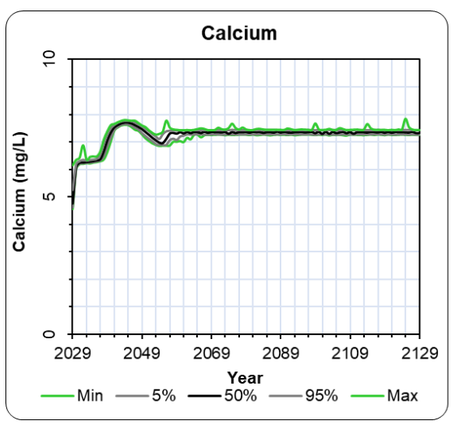


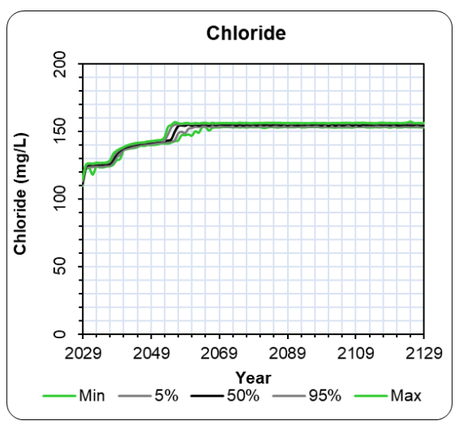


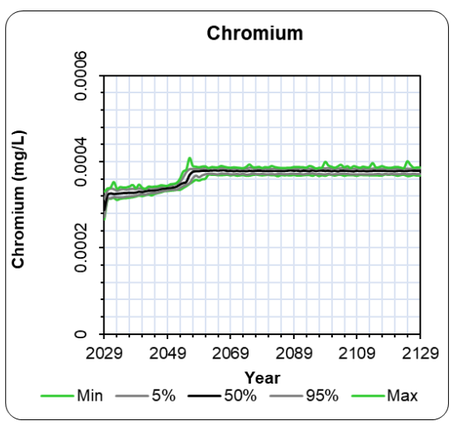


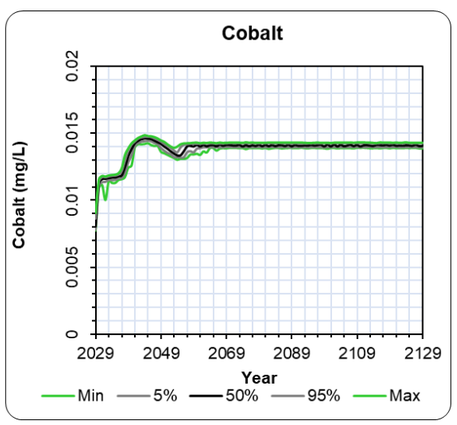


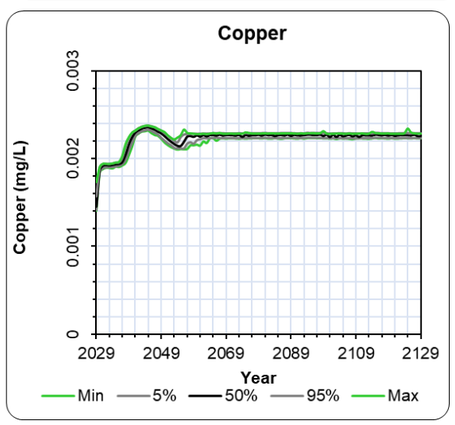


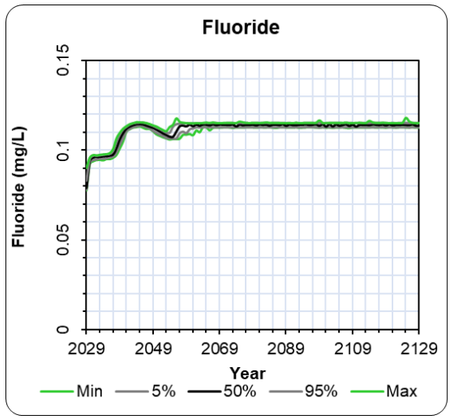


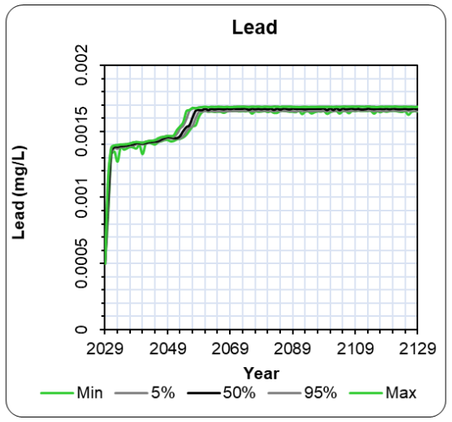


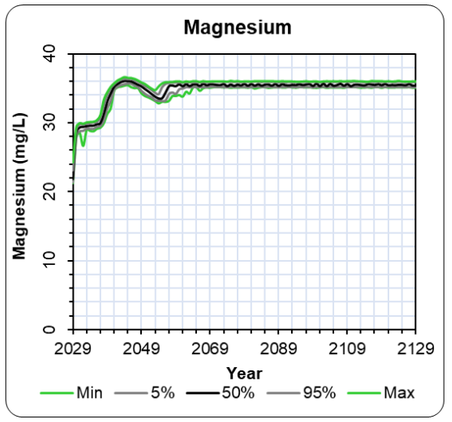


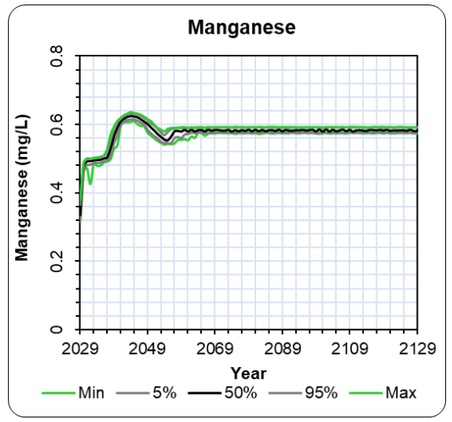


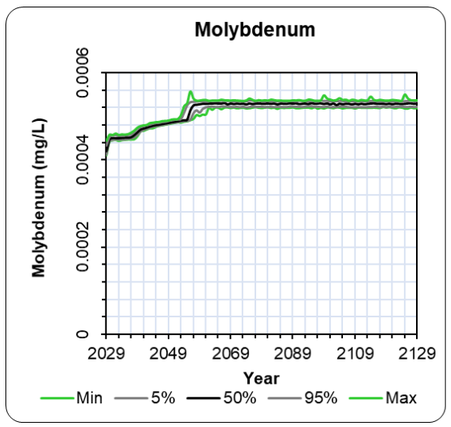


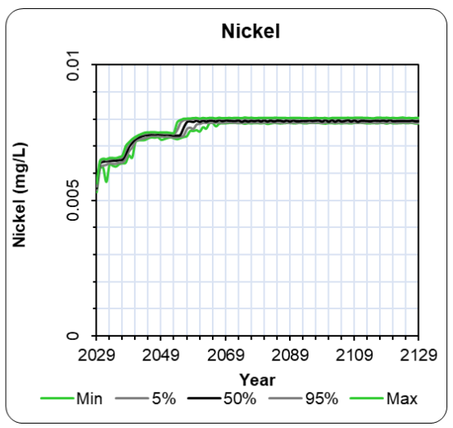


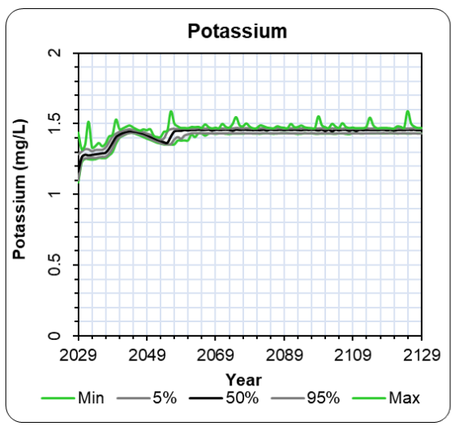


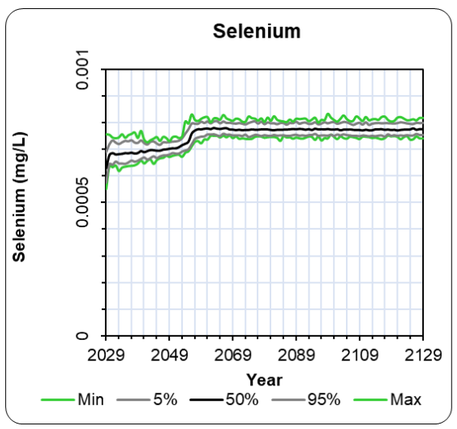


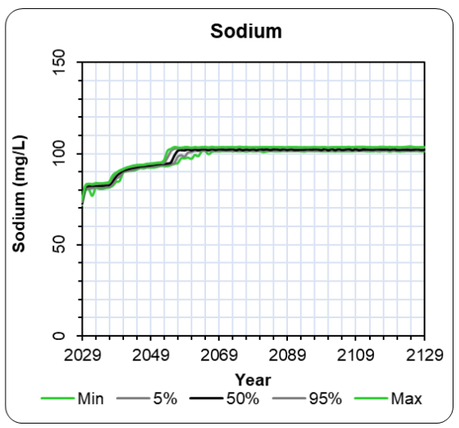


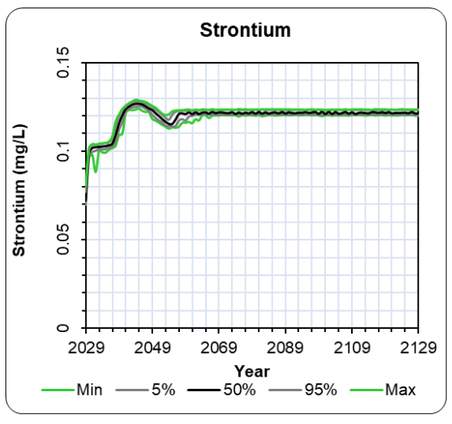


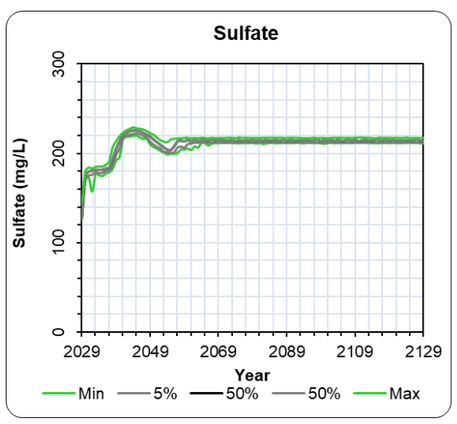


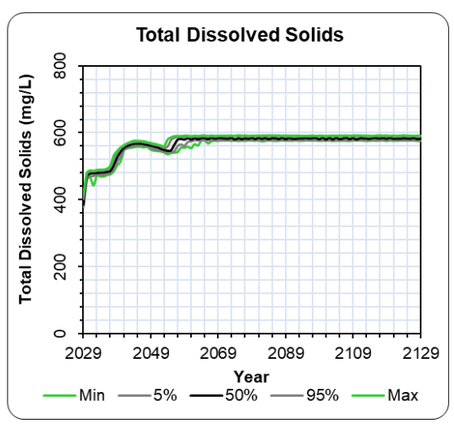


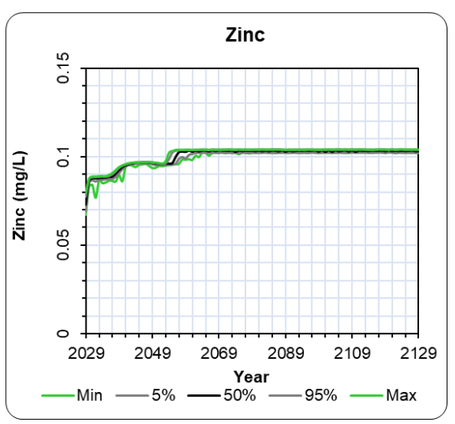




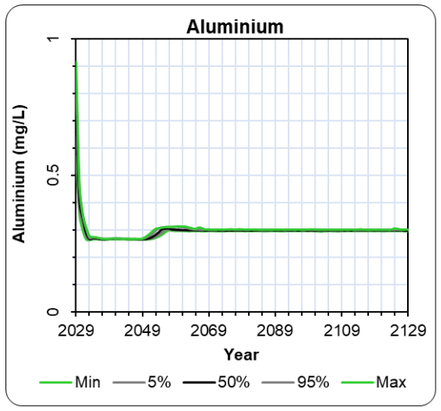


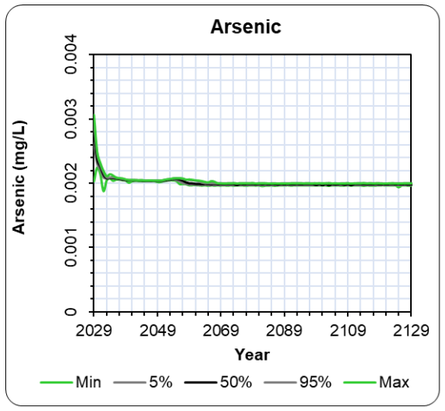


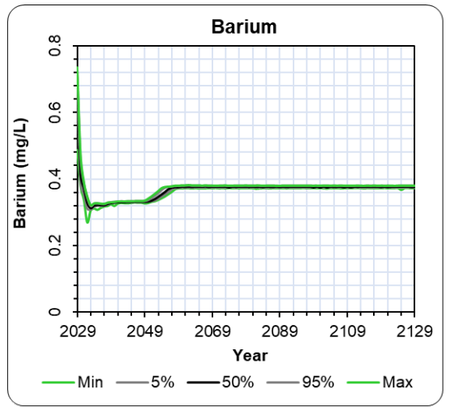


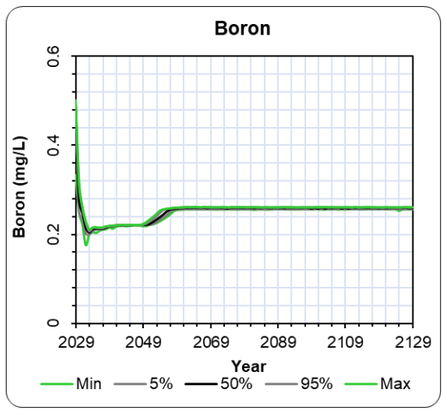


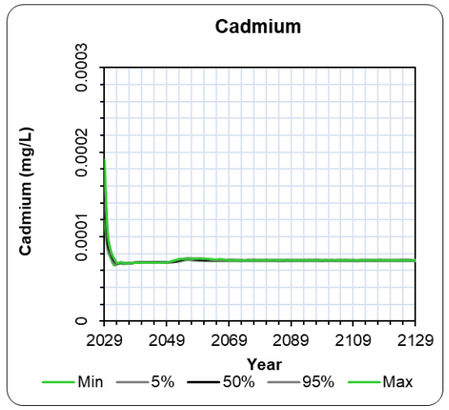
Yallourn East Field (YEF)

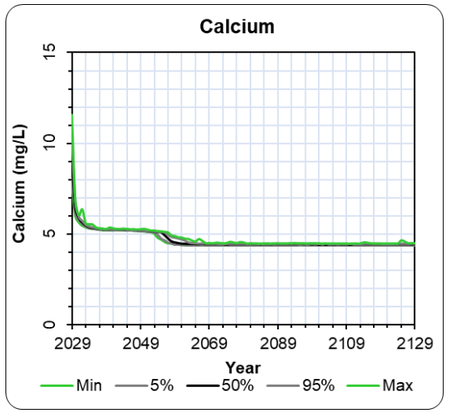

Aluminium
Aluminium (mg/L)
0
0.5
1
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

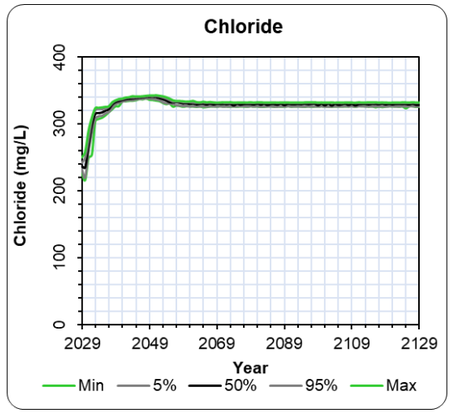

Arsenic
Arsenic (mg/L)
0
0.001
0.002
0.003
0.004
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

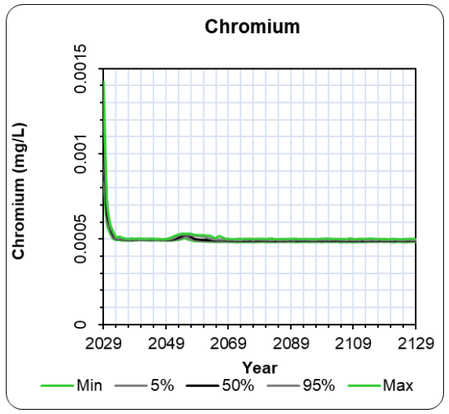

Barium
Barium (mg/L)
0
0.2
0.4
0.6
0.8
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

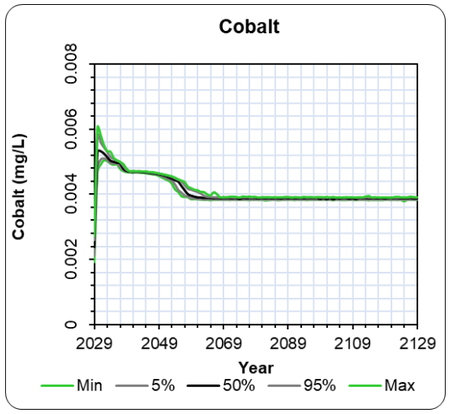

Boron
Boron (mg/L)
0
0.2
0.4
0.6
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

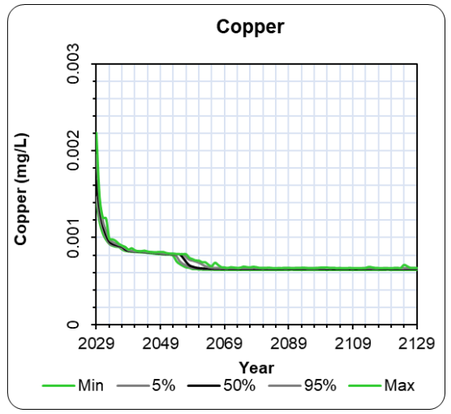

Cadmium
Cadmium (mg/L)
0
0.0001
0.0002
0.0003
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

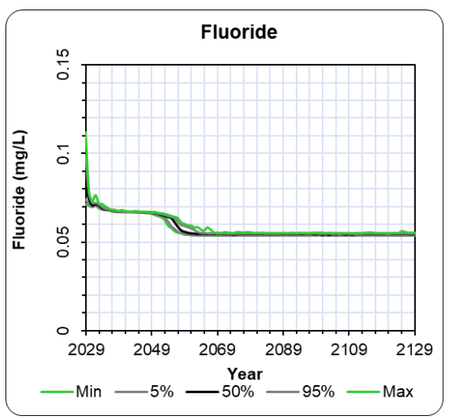

Calcium
Calcium (mg/L)
0
5
10
15
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

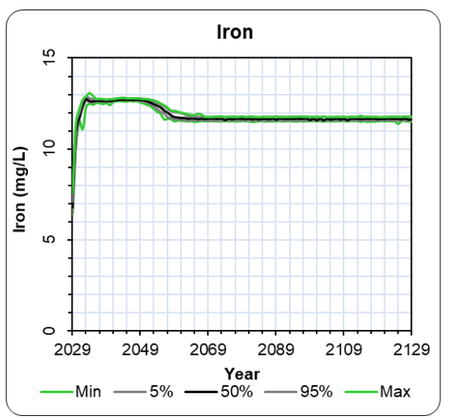

Chloride
Chloride (mg/L)
0
100
200
300
400
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

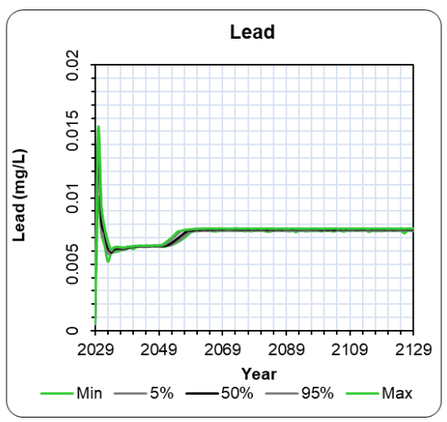

Chromium
Chromium (mg/L)
0
0.0005
0.001
0.0015
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

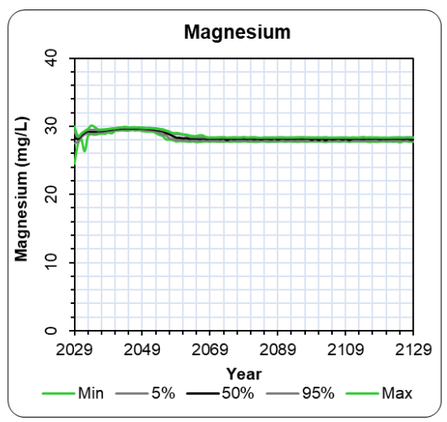

Cobalt
Cobalt (mg/L)
0
0.002
0.004
0.006
0.008
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

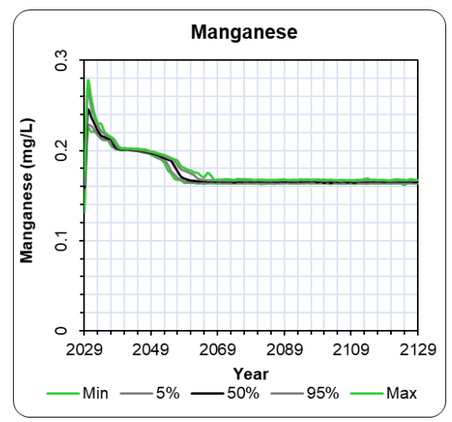

Copper
Copper (mg/L)
0
0.001
0.002
0.003
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

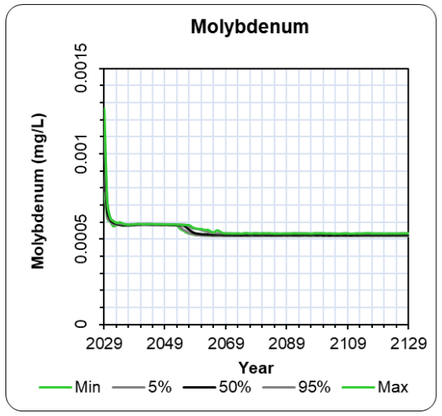

Fluoride
Fluoride (mg/L)
0
0.05
0.1
0.15
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

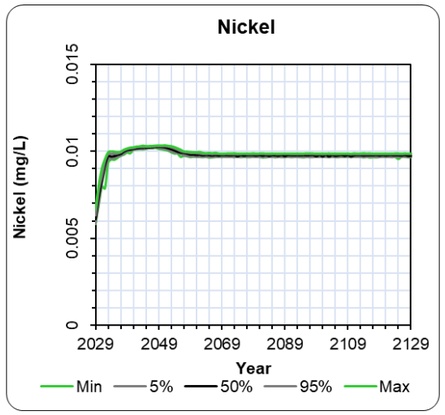

Iron
Iron (mg/L)
0
5
10
15
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

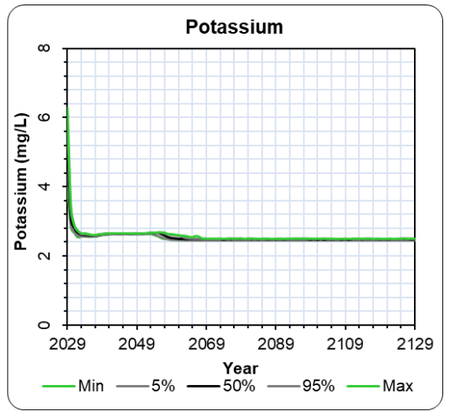

Lead
Lead (mg/L)
0
0.005
0.01
0.015
0.02
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

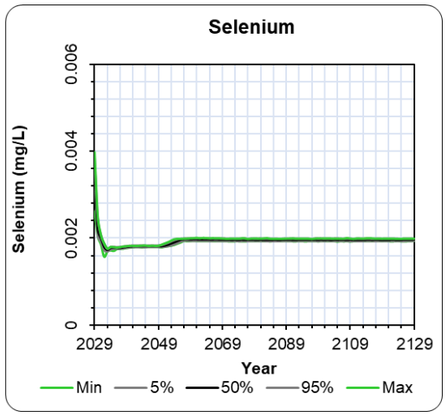

Magnesium
Magnesium (mg/L)
0
10
20
30
40
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max


Manganese
Manganese (mg/L)
0
0.1
0.2
0.3
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max





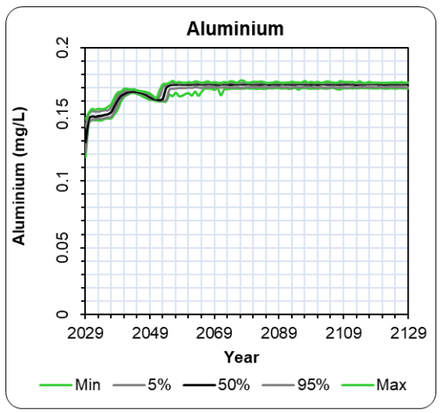


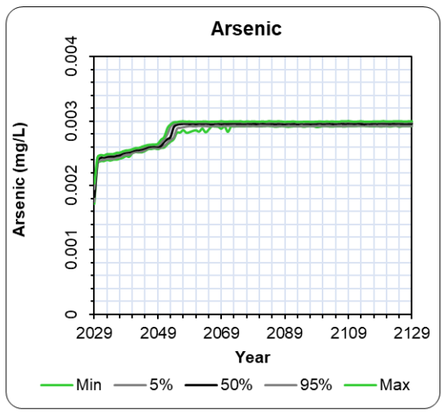


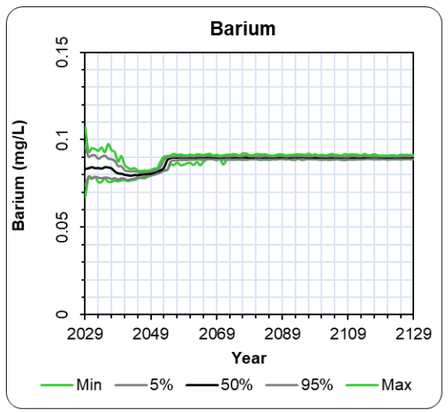
Scenario 6: Not connected, median climate

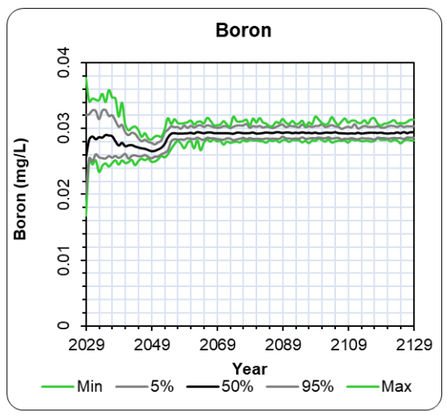
Fill: Local catchment flows, natural groundwater, pumped groundwater (1.5 GL to RL 0; 1 GL to RL 37; 0 GL ongoing) & 24 GL Latrobe water.

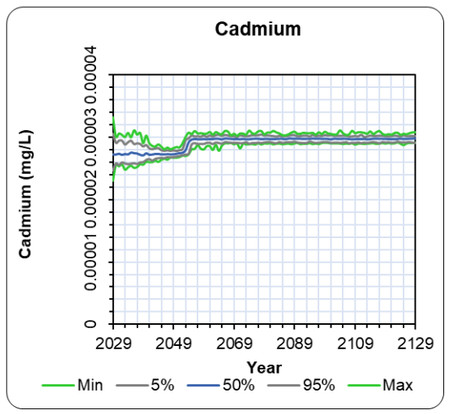
Yallourn Township Field (YTF)

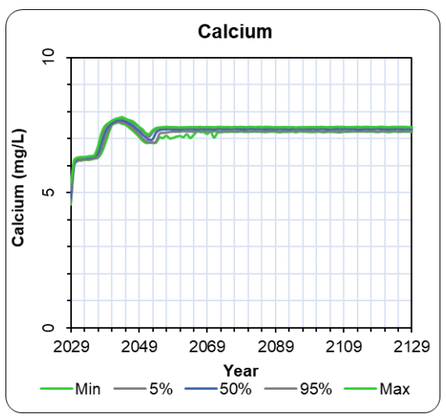


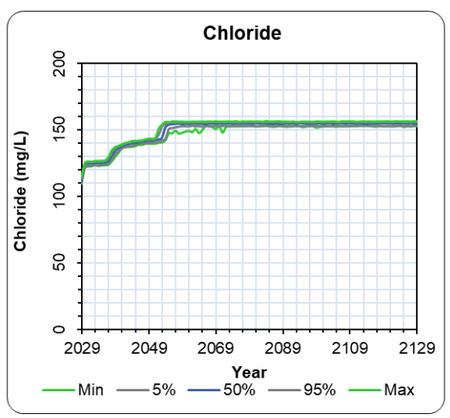


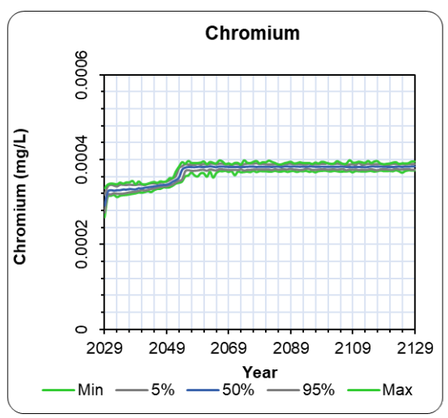


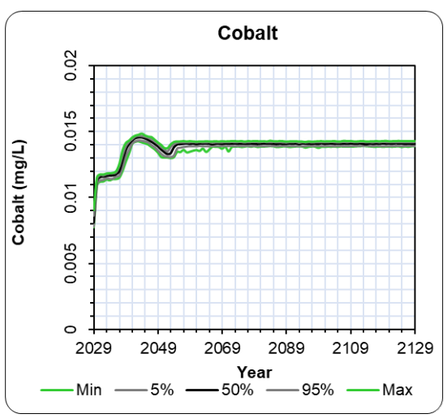


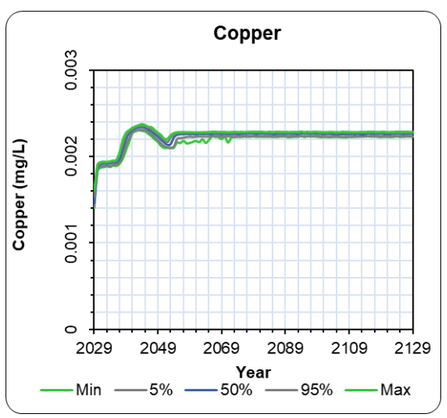


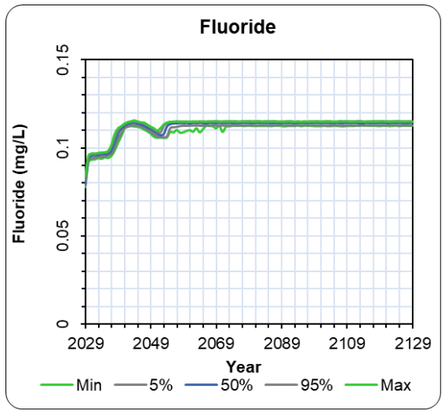


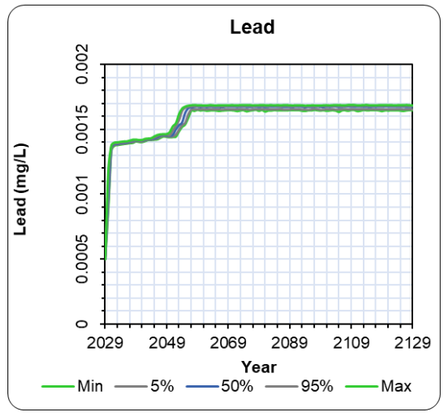


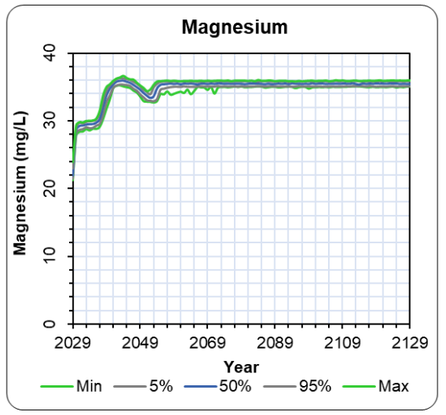


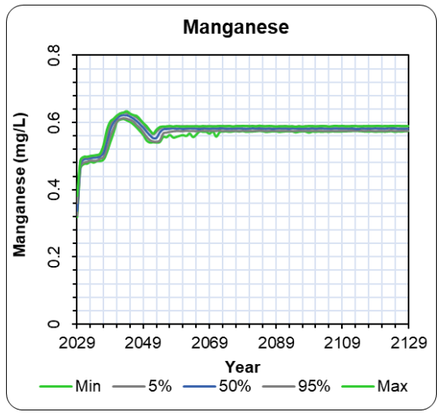


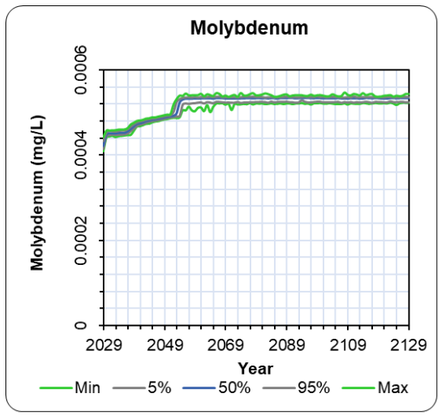


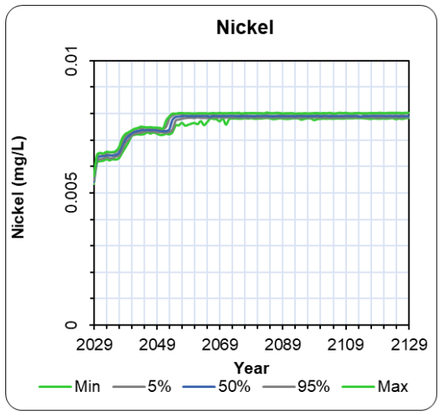


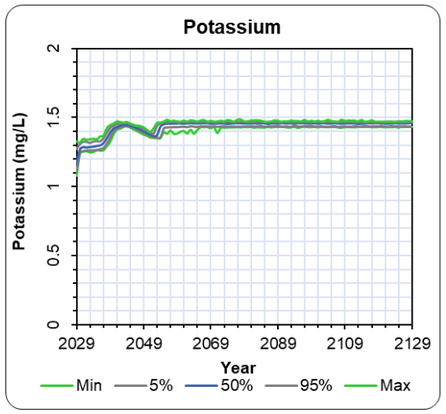


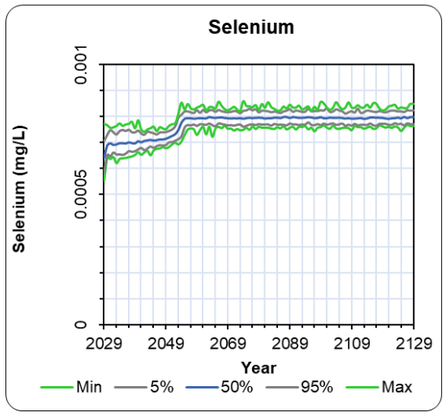


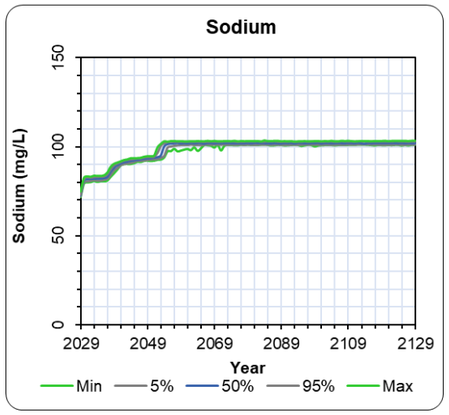


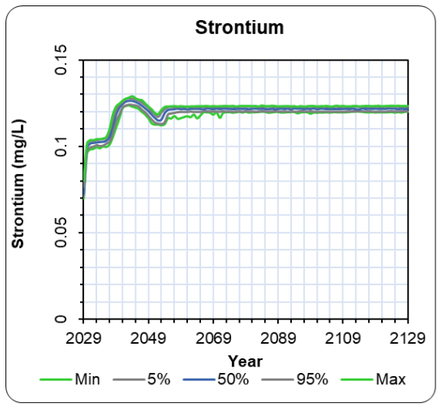


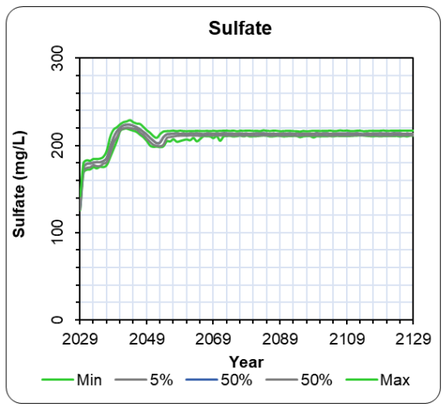


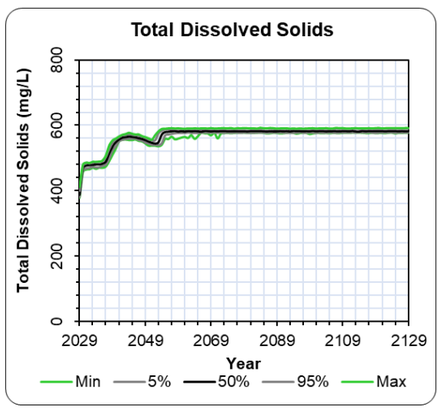


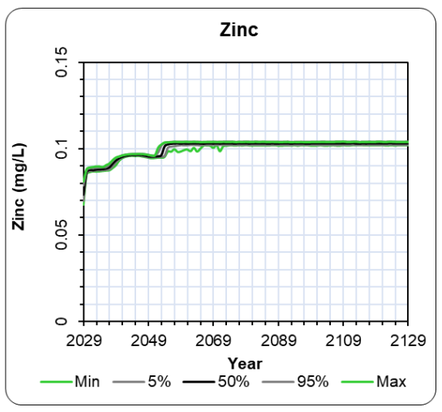




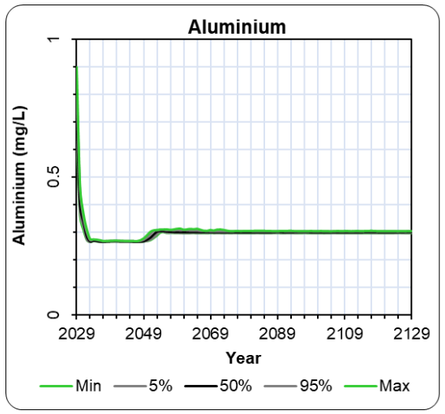


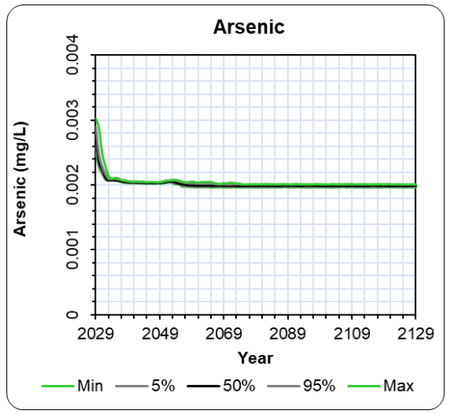


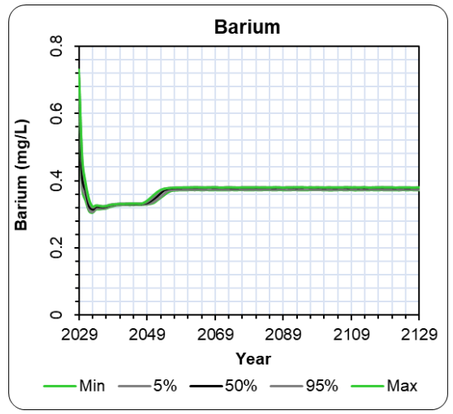


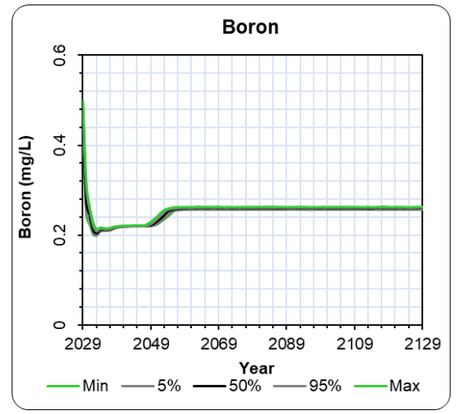


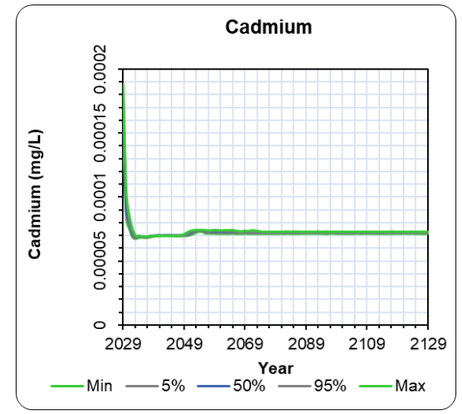
Yallourn East Field (YEF)

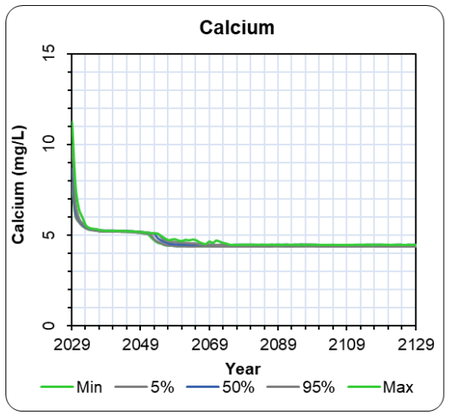

Aluminium
Aluminium (mg/L)
0
0.5
1
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

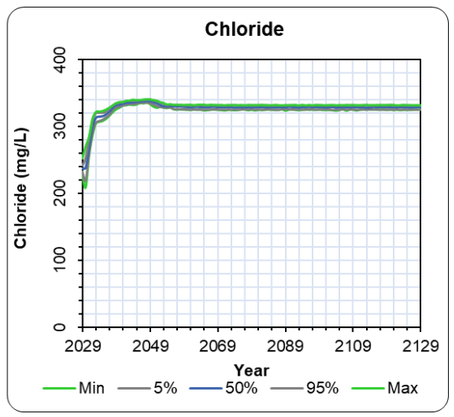

Arsenic
Arsenic (mg/L)
0
0.001
0.002
0.003
0.004
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

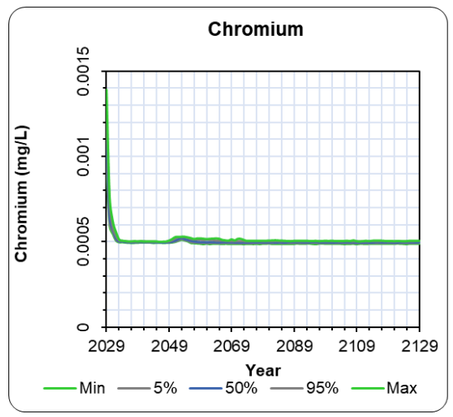

Barium
Barium (mg/L)
0
0.2
0.4
0.6
0.8
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

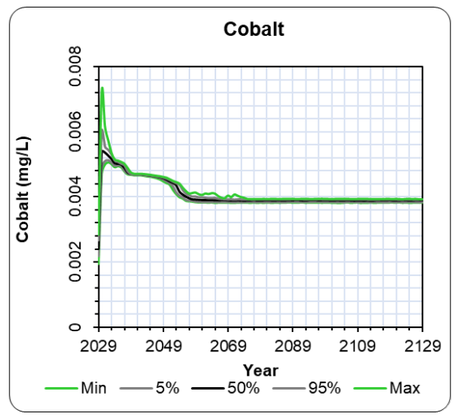

Boron
Boron (mg/L)
0
0.2
0.4
0.6
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

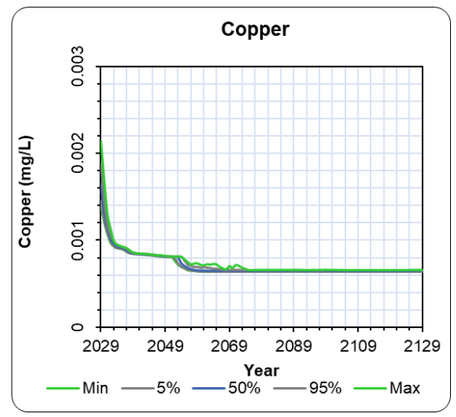

Cadmium
Cadmium (mg/L)
0
0.00005
0.0001
0.00015
0.0002
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

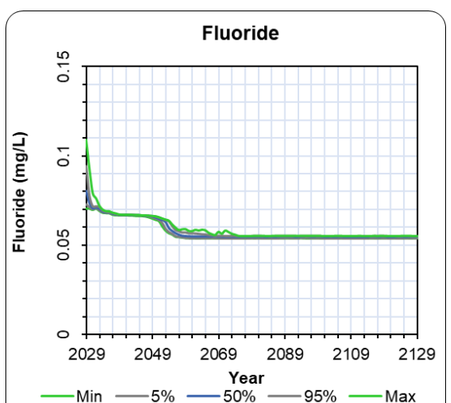

Calcium
Calcium (mg/L)
0
5
10
15
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

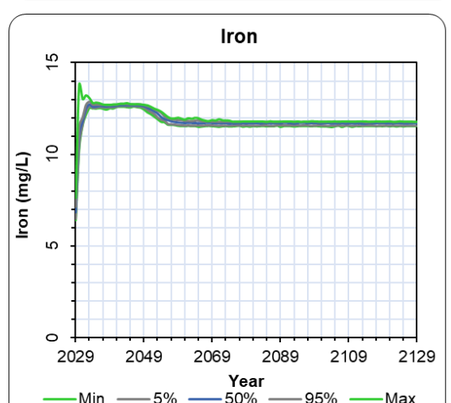

Chloride
Chloride (mg/L)
0
100
200
300
400
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

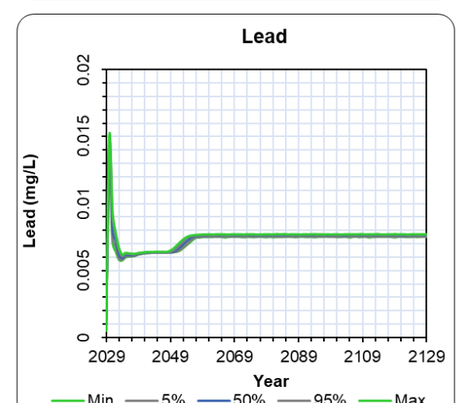

Chromium
Chromium (mg/L)
0
0.0005
0.001
0.0015
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

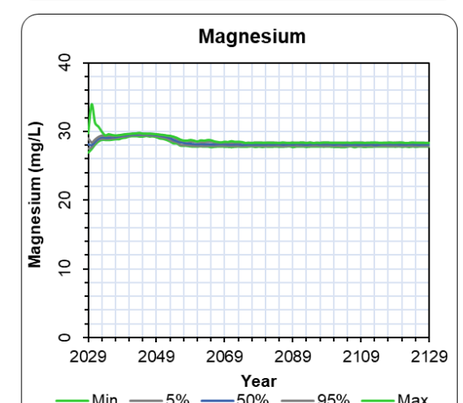

Cobalt
Cobalt (mg/L)
0
0.002
0.004
0.006
0.008
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

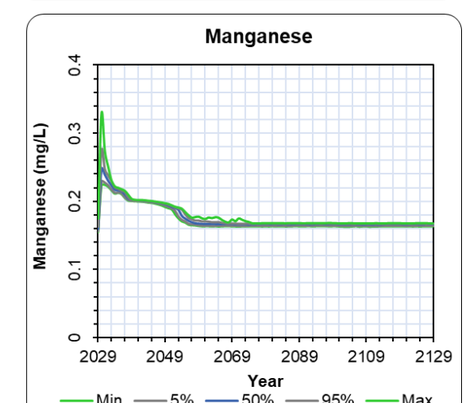

Copper
Copper (mg/L)
0
0.001
0.002
0.003
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

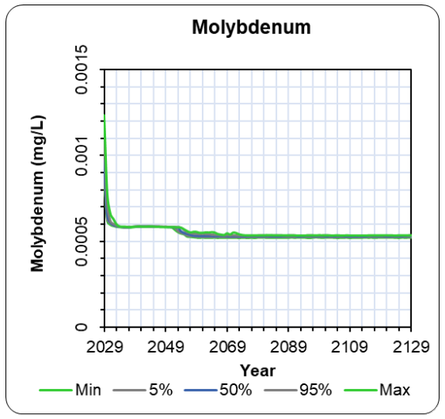

Fluoride
Fluoride (mg/L)
0
0.05
0.1
0.15
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

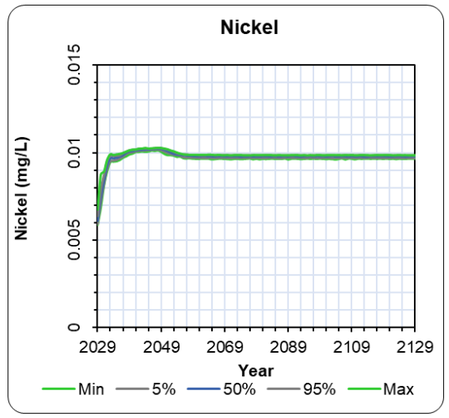

Iron
Iron (mg/L)
0
5
10
15
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

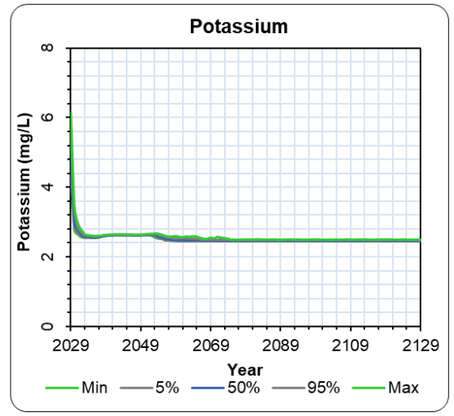

Lead
Lead (mg/L)
0
0.005
0.01
0.015
0.02
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

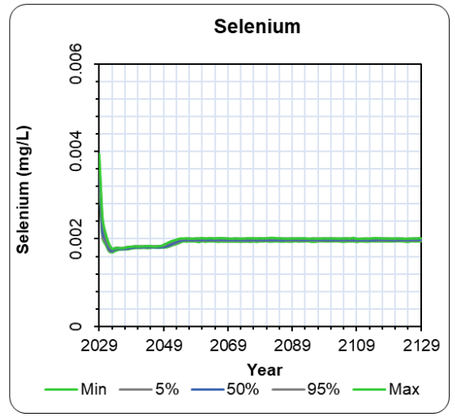

Magnesium
Magnesium (mg/L)
0
10
20
30
40
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

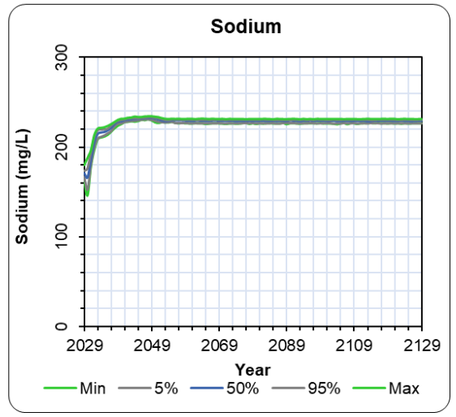

Manganese
Manganese (mg/L)
0
0.1
0.2
0.3
0.4
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

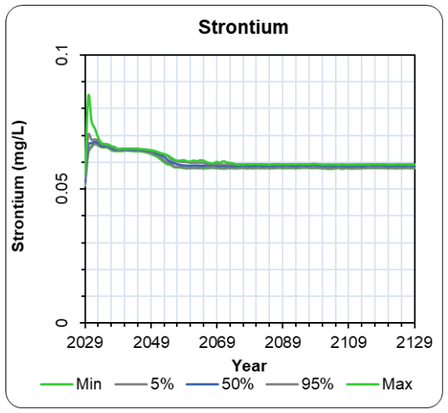

Molybdenum
Molybdenum (mg/L)
0
0.0005
0.001
0.0015
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

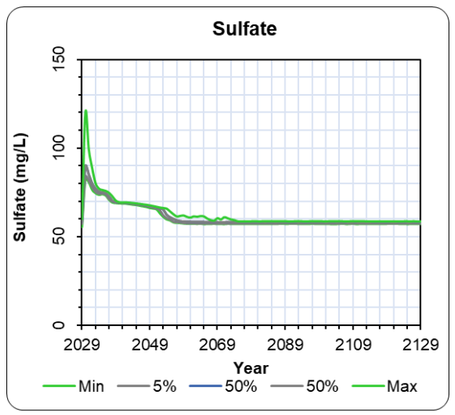

Nickel
Nickel (mg/L)
0
0.005
0.01
0.015
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

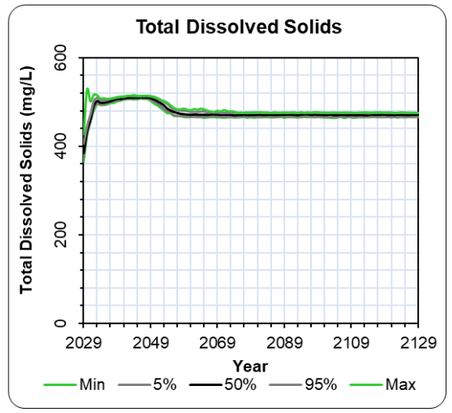

Potassium
Potassium (mg/L)
0
2
4
6
8
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

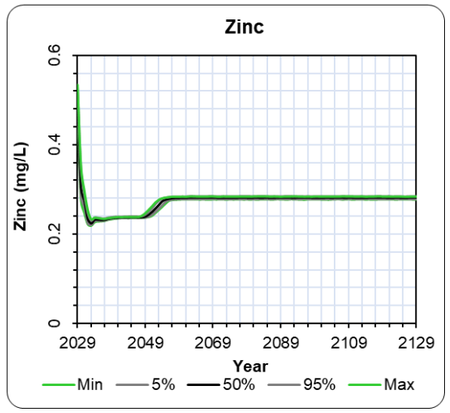

Selenium
Selenium (mg/L)
0
0.002
0.004
0.006
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max


Sodium
Sodium (mg/L)
0
100
200
300
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max


Strontium
Strontium (mg/L)
0
0.05
0.1
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max


Sulfate
Sulfate (mg/L)
0
50
100
150
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
50%
Max


Total Dissolved Solids
Total Dissolved Solids (mg/L)
0
200
400
600
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max


Zinc
Zinc (mg/L)
0
0.2
0.4
0.6
2029
2049
2069
2089
2109
2129
Year
Min
5%
50%
95%
Max

MINE WASTE AND
WATER MANAGEMENT