



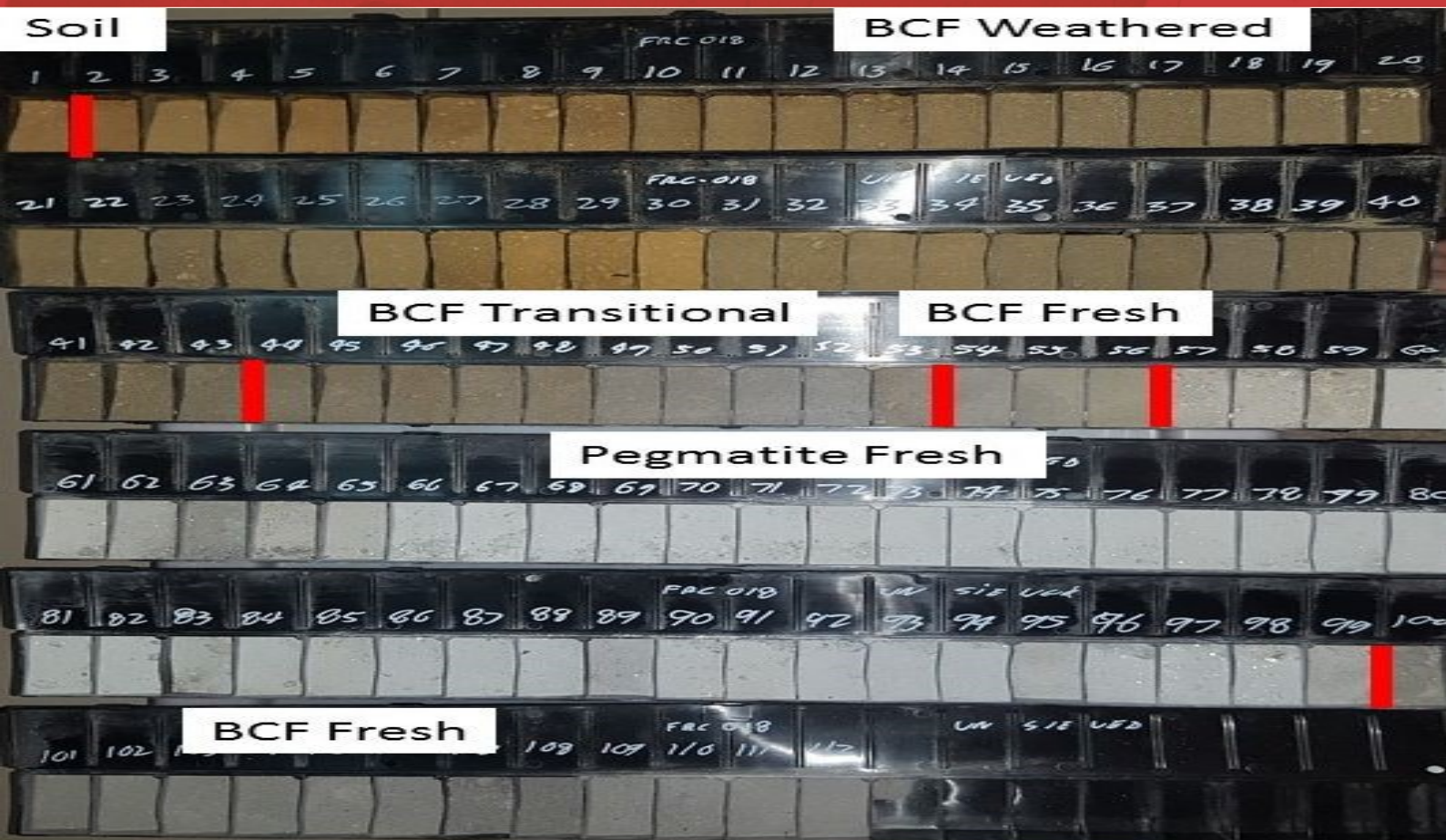
GRANTS LITHIUM PROJECT

Environmental Impact Statement

Appendix E

Materials Characterisation Report

Prepared by EcOz
October 2018



DOCUMENT CONTROL RECORD

Job	EZ18107
Document ID	168883-63
Author(s)	Carel van der Westhuizen

DOCUMENT HISTORY

Rev	Reviewed by	Approved by	Issued to	Date
1	A. Campbell	K. Welch	Core	25/10/2018

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EXECUTIVE SUMMARY

This document details the program, analysis and findings of the materials (soil and waste rock) characterisation completed at Core Exploration's Grants Lithium Project.

Core Exploration Ltd (Core) is developing the Grants Lithium Project to open cast mine a defined maiden spodumene resource of 2.03 million tonnes (Mt), containing approximately 1.5 % concentration by weight of lithium oxide (Li₂O). The site is south-west of Darwin on the Cox Peninsula, approximately 36 km west of Berry Springs township. Mining will produce approximately 9 million bank cubic metres of waste rock which will be stored in the waste rock dump (WRD) on-site.

Waste rock will predominately comprise weathered, transitional and fresh phyllite which comprises the overburden and waste material surrounding the ore body. This geological domain is unlikely to produce acid forming material due to the general low concentration of sulfur as the sedimentary environment in which it was deposited limits the sulfur precipitation. Pyrite was only identified in trace concentrations over 6 intervals totalling 4.44 m of the total 2,465 m of logged drilling cores (0.18%) which supports this contention

Despite the observed low sulfur and pyrite concentrations, materials characterisation was undertaken to identify any potential risks or impacts arising from the geochemical characters of soils and waste rocks, required by both the Northern Territory Environmental Protection Authority (NT EPA) as part of environmental assessment and the Department of Primary Industry and Resources (DPIR) as part of the mining authorisation.

This document has been prepared in accordance with the Western Australian Department of Mines and Petroleum 2016 *Draft Guidance - Materials Characterisation Baseline - Data Requirements for Mining Proposals*.

Soil characterisation

A desktop assessment of soils is supported by sampling and analysis of the surficial red/brown saprolitic soils and weakly-cemented laterite obtained from hand cores to a depth of 0.4 m or refusal if shallower. The location of soil samples reflects the proportion of disturbance within each soil type and horizon with the majority of samples from areas with Rudosol soils. Analytical laboratory testing for the parameters listed in the *Draft Guidance* was undertaken by Australian Laboratory Services (ALS) accredited by the National Association of Testing Authorities (NATA).

The objective of the soil characterisation program was to ascertain the baseline attributes, including nutrient status, of each major soil type to evaluate potential risks associated with salinity, sodicity, dispersion and soil stability and erosion. The key findings include:

- The soils are marginally acidic, with the average pH slightly below the optimal pH range for most plants, but with low salinities falling within the range considered suitable for plant growth.
- A large percentage of the soils are moderately to highly sodic and potentially dispersive (Emerson Class 4), which suggests the potential for development of surface crusts and hard set layers.
- Heavy metal, nutrient and organic carbon concentrations are all very low to low.
- The potential for wind and water erodibility is considered moderate to low, provided soils are adequately protected.

Soil management considerations

The soils at the site, whilst having deficiencies or potential risks with regard to acidity, sodicity and low nutrient concentrations, are considered suitable for rehabilitation. Although the top 100 mm of soil will be stockpiled separately from the underlying material, soils from different land units will be stripped and mixed

during stockpiling. As such the suitability of these soils are best monitored and improved during rehabilitation trials once mining commences.

Rehabilitation trials should commence as soon as mining commences (topsoil is stripped). Trials should replicate the surrounding environment with regard to stability, erosion and plant selection; and incorporate addition of ameliorants to address soil deficiencies to ensure self-sustainable landforms. Aspects that are to be monitored during rehabilitation are the behaviour of the rehabilitated surface with regard to soil structure, erosion, infiltration and plant establishment.

Additionally, appropriate measures should be implemented to handle and manage soils with due consideration of the overarching principles detailed in Section 3.5 of this document.

Waste rock characterisation

The objective of the waste rock characterisation program was to ascertain whether the rocks may cause acid and metalliferous drainage.

Following a preliminary waste rock characterisation in 2017, RC drilling between February 2018 and June 2018 facilitated sampling representative of each weathering zone/lithology consistent with relative contribution to the total waste rock volumes calculated from the mining model. Sampling targeted each representative zone of weathering across the oxide zone, the transitional zone and fresh hard bedrock. The waste stream will comprise weathered, transition and fresh phyllite of the Burrell Creek Formation (90 %) and pegmatite (10 %) totalling between 10.9 million tonnes and 14.3 million tonnes of waste (using bulk densities of 1.3 and 1.7 respectively). The assessment of 156 samples is considered adequate for the Grants Project. Analytical laboratory testing for the parameters listed in the *Draft Guidance* was undertaken by Australian Laboratory Services (ALS) accredited by the National Association of Testing Authorities (NATA).

The waste rocks are considered alkaline with low total sulfur concentrations due to the geological characteristics of the Grants deposit. On the basis of total sulfur alone, only 4 samples (3 within the put shell) may be classified as PAF through analysis of sulfur concentration alone ($S \geq 0.30\%$). Classification based on the NAPP, NAGpH and NAGpH 4.5 as per the WA guidelines results in 2 samples being classified as PAF and 1 sample being classified as uncertain but likely to be PAF. All other samples were classified as non-acid forming through this methodology. The waste rocks contain ANC in excess of MPA indicating that overall, the waste materials have sufficient ANC to offset any potential acidity which is confirmed by a negative NAPP.

The waste rocks are considered low saline waste. Water quality monitoring data seems to corroborate the waste characterisation with circumneutral to alkaline pH's and low concentrations of most ions and metals albeit elevated concentrations of As and Fe in ground water and Al and As in surface water.

Very few of the samples have detectable but very low concentrations of As, Mn, Se and Zn whilst Cd, Cr, Co, Cu, Pb, Ni, V and Hg are all below their limits of reporting. Concentrations of leachable metals are generally well within acceptable ranges and consequently, the risk from metals/metalloids/saline leaching are considered very low.

The waste rocks are generally non sodic. However, the Emerson Class Number of 3 for some materials indicates that remoulding (at moisture content near optimum for compaction) may result in dispersive behaviour. Since these materials will not be used in construction and dispersed throughout the waste rock dump it is unlikely that they will pose a risk; nevertheless, they are best not exposed subaerially because they do not provide an effective substrate for vegetative rehabilitation/stabilisation and the clay fines may be elutriated by rainfall and increase turbidity in runoff.

Radioactive materials

All materials tested were equal to or below background radiation levels and do not warrant further radiological investigation, assessment and/or management measures.

Waste rock management considerations

In conclusion, the waste rocks do not have a potential for acid rock and/or saline metalliferous drainage due to the absence/scarcity of sulfur which is typical of the sedimentary environment in which it was deposited. Waste rocks that classify as PAF will be limited in volume; they are not confined to a specific area and will be excavated with NAF materials and placed in the waste rock dump surrounded and underlain by materials that have sufficient ANC to offset any potential acid generation.

Waste rocks will thus not require special management measures during mining and subsequent to closure other than applying best practice during design and construction of the waste rock dump with measures to contain runoff and shallow surficial seepage. Further waste characterisation is also not warranted.

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ACRONYMS

ALS	Australian Laboratory Services
AMD	Acid Mine Drainage
ASS	Acid Sulfate Soils
BCF	Burrell Creek Formation
bcm	Bank Cubic Metres
DPIR	Department of Primary Industry and Resources
EC	Electrical Conductivity
EIS	Environmental Impact Statement
EPA	Environment Protection Authority
ESCP	Erosion and Sediment Control Plan
ESP	Exchangeable Sodium Percentage
MCP	Mine Closure Plan
MLA	Mineral Lease Application
ML	Mineral Lease
MMP	Mining Management Plan
NATA	National Association of Testing Authorities
NOI	Notice of Intent
NT	Northern Territory
NT EPA	Northern Territory Environmental Protection Agency
NTGS	Northern Territory Geological Survey
PAWC	Plant Available Water Capacity
PSD	Particle Size Distribution
RC	Reverse Circulation
ROM	Run of Mine
ToR	Terms of Reference
WA DPIRD	Department of Primary Industries and Regional Development, Agriculture and Food Division.
WRD	Waste Rock Dump

1 INTRODUCTION

Core proposes to develop Grants Lithium Project (the 'project') on Mineral Lease ML31726. The proposal involves development of an open pit to mine 2.03 million tonnes (Mt) of ore, containing approximately 1.5% concentration by weight of lithium oxide (Li_2O). The proposed mine is located on the Cox Peninsula Road, approximately 36 km west of Berry Springs and 26 km south-east of Belyuen community. The site is located 90 km by road from Darwin CBD, or 25 km as the crow flies. The location of Grants Lithium Project and the site layout are shown in Figure 1-1.

The proposed open pit will cover approximately 14 ha of surface area and will be approximately 180 m deep. The strip ratio for the deposit is 13.8:1, which will result in approximately nine million bank cubic metres (bcm) of waste rock, which will be stored in a waste rock dump (WRD) on-site. There is currently no intent to backfill the open pit due to potential future underground mining and therefore it can be assumed the WRD will remain in perpetuity.

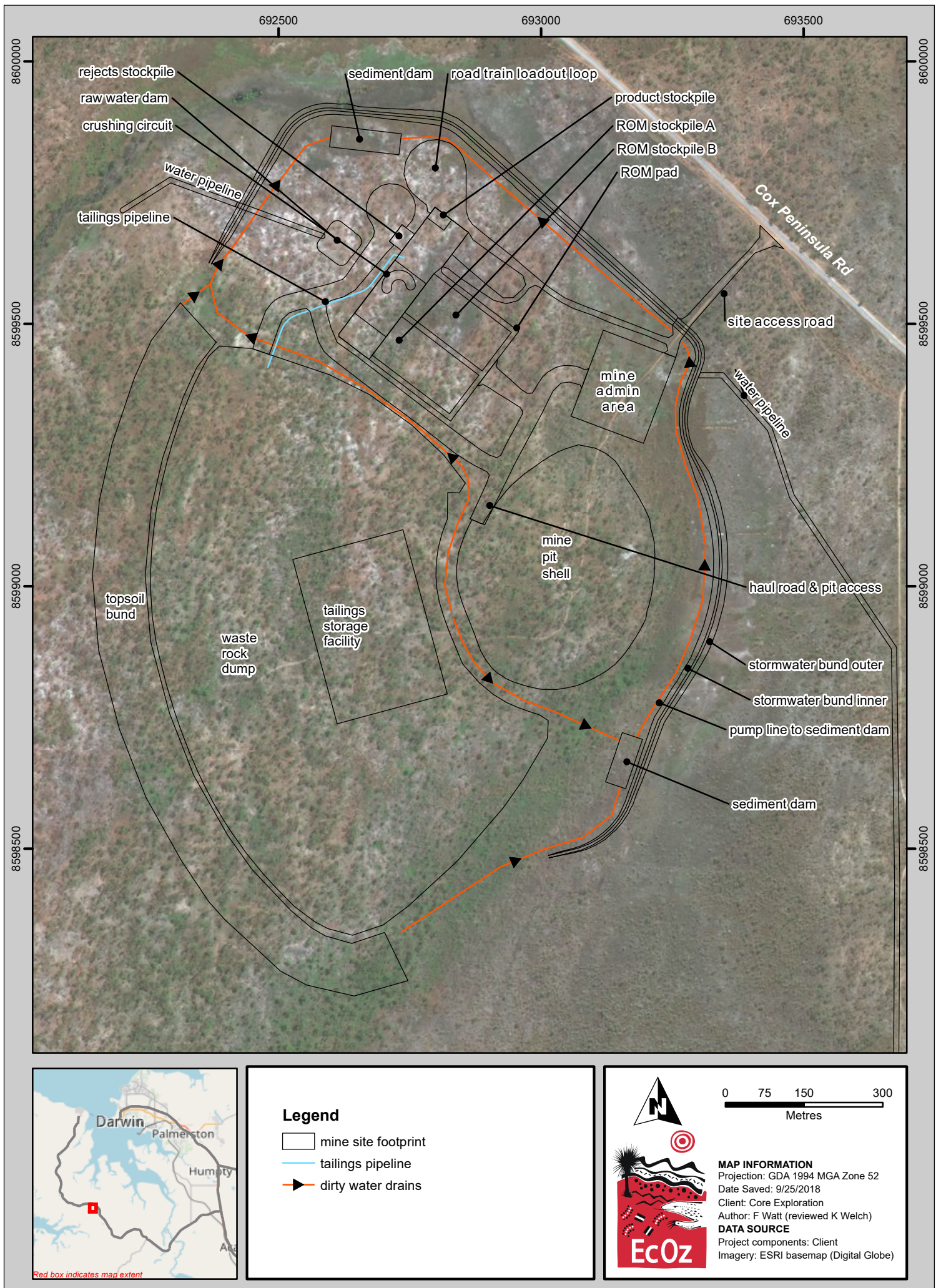
Core submitted a Notice of Intent (NOI) to the Northern Territory Environment Protection Authority (NT EPA) in November 2017. The submission included a "*Preliminary Mine Waste Rock Characterisation Report*" (Pendragon, 2017), based on analysis of 36 samples of waste rock material. This early work indicated that the waste rock is likely to pose a very low risk, if any, of metalliferous mine drainage. The study made recommendations in relation to further work, including undertaking further characterisation of each lithology and each weathering profile, and characterisation of soils to be stockpiled for rehabilitation.

The NT EPA has determined that the project requires assessment at the level of Environmental Impact Statement (EIS). The Terms of Reference (ToR) for the EIS require the following work be undertaken in relation to waste characterisation:

- *Results of a comprehensive waste rock characterisation program to identify and inform an assessment of the potential for Acid/Neutral/Metalliferous/Saline Mine Drainage during and post mining.*
- *Investigation should characterise individual lithologies and the level of homogeneity for each. Mined volumes of each lithology should be identified and characterisations should include analysis for chemical concentration of NORMS. Spatial distribution and density) of sampling) should be designed to define waste and not limited to sampling from locations intended for ore definition.*
- *Avoidance, mitigation and treatment strategies should the waste rock characterisation program identify any non-benign waste material.*

In addition, as part of the Mining Management Plan (MMP) required for authorisation of the project under the *Mining Management Act*, the NT Department of Primary Industry and Resources (DPIR) requires waste characterisation to be undertaken in accordance with the 2016 *Draft Guideline - Materials Characterisation - Baseline Data Requirements for Mining Proposals* of the WA Department of Mines and Petroleum (WA DMP, 2016).

This document details the waste characterisation program which has been undertaken to address recommendations from previous work and the ToR requirements, and reports the analysis and findings of the materials characterisation (soil and waste rock). The results of the waste characterisation program have been used to determine the risks and appropriate management regimes (if any) for soils and waste rock. These can be used to inform the project risk assessment and subsequent mine operations and closure planning.



Path: Z:\01 EcOz_Documents\04 EcOz Vantage GIS\IEZ18086 - Grants Project - EIS\01 Project Files\Chapter 2 maps\Figure 2-3. Mine site footprint and layout.mxd

Figure 1-1. Grants Lithium Project location and site layout

2 GEOLOGICAL INFORMATION

2.1 Overview

The Grants deposit is comprised of 10 geological rock-type domains of homogenous character, as described in Table 2-1 (with estimated volumes) and summarised below:

- Soil and Laterite cover (“surface zone”) no more than 3 m thick and generally <1 m thick.
- Weathered (Oxide) Burrell Creek Formation (BCF) averaging 50 m thick.
- Transitional (Partial Oxide) BCF averaging 10 m thick.
- Fresh (Reduced) BCF to the base of current planned pit, and well beyond.
- Weathered pegmatite averaging 50 m thick.
- Transitional pegmatite averaging 1 m thick.
- Fresh pegmatite to the base of current planned pit (economic ore).
- Weathered quartz veins of several cm to 1 m thickness.
- Transitional quartz veins of several cm to 1 m thickness.
- Fresh quartz veins of 1 cm to 1 m thickness.

Geometrically, these are assembled as per Figure 2-1. The pegmatite body that is host to the economic lithium, is a continuous near-vertical body that is surrounded on each side by host BCF. The pegmatite body is elongated almost north-south (azimuth 015 degrees) and is a simple lozenge shape, tapering to the north and south. There is a southerly plunge component as well, such that at the northern end the tapered base of the pegmatite is reasonably well defined. The mineralised component (i.e. the fresh pegmatite that contains the lithium) is approximately 400 m in strike length and 32 m width based on the latest Mineral Resource Estimate (April 2018).

The gross weathering profile within the proposed pit is horizontal and not unlike the surrounding area, based on Core’s regional drilling experience. It is considered typical of the northern Australian tropical weathering profile. The only diversion is that the transition from oxide to fresh in the pegmatite occurs over a short vertical distance (1m) - the transition in the surrounding BCF is more gradual (10 m) and somewhat arbitrary to define (see Appendix A). Within each of the defined geological rock-type domains there is little variability. This is evidenced by the lack of ambiguity in geological logs beyond the establishment of the degree of weathering/oxidation in the BCF transition zone, which is purely based on colour. This can be somewhat subjective in the logging, as the colour changes are subtle and progressive.

Table 2-1. Summary of the rock types and indicated volumes within the Grants pit shell

Weathering Category	Description			
	BCF Phyllite	Pegmatite	Soil/Laterite	Quartz veins
Surface zone (1-2 m thick)	NA	NA	Thin soil or laterite. Complete destruction and alteration of primary mineralogy and textures. Variable distribution geographically. Usually red/brown in colour.	NA
Volume (m³)	0	0	85,000	0
Weathered (Oxide) Zone (30-60 m thick)	Almost complete destruction of primary mineralogy and textures. Dominated by fine clay and altered mica. Usually orange/brown in colour.	Complete destruction and alteration of primary mineralogy and textures. Dominated by white clay and quartz fragments. Generally soft or rarely silcreted.	NA	White quartz with minor haematite staining.
Volume (m³)	4,230,000	300,000	0	8,000
Transitional Zone (1-20 m thick)	Original mineralogy and textures identifiable with minor iron staining present. Usually light grey to brown in colour.	Predominately hard and competent with primary mineralogy clearly visible. Alteration of minerals to clay along grain boundaries.	NA	White quartz with minor haematite staining.
Volume (m³)	950,000	6,000	0	1,500
Fresh Zone	Fine grain, dark grey, thinly laminated siltstones and minor fine sandstone metamorphosed to phyllite. Usually very finely micaceous with zones of abundant fine garnets.	Very hard and coarse grained white to grey/green in colour. Mineralogy dominated by clear to grey quartz, white feldspar, pale green spodumene and minor clear to brown muscovite.	NA	White quartz with minor sulfides.
Volume (m³)	2,410,000	530,000	0	5,000
TOTALS	7,590,000 m³	836,000 m³	85,000 m³	14,500 m³

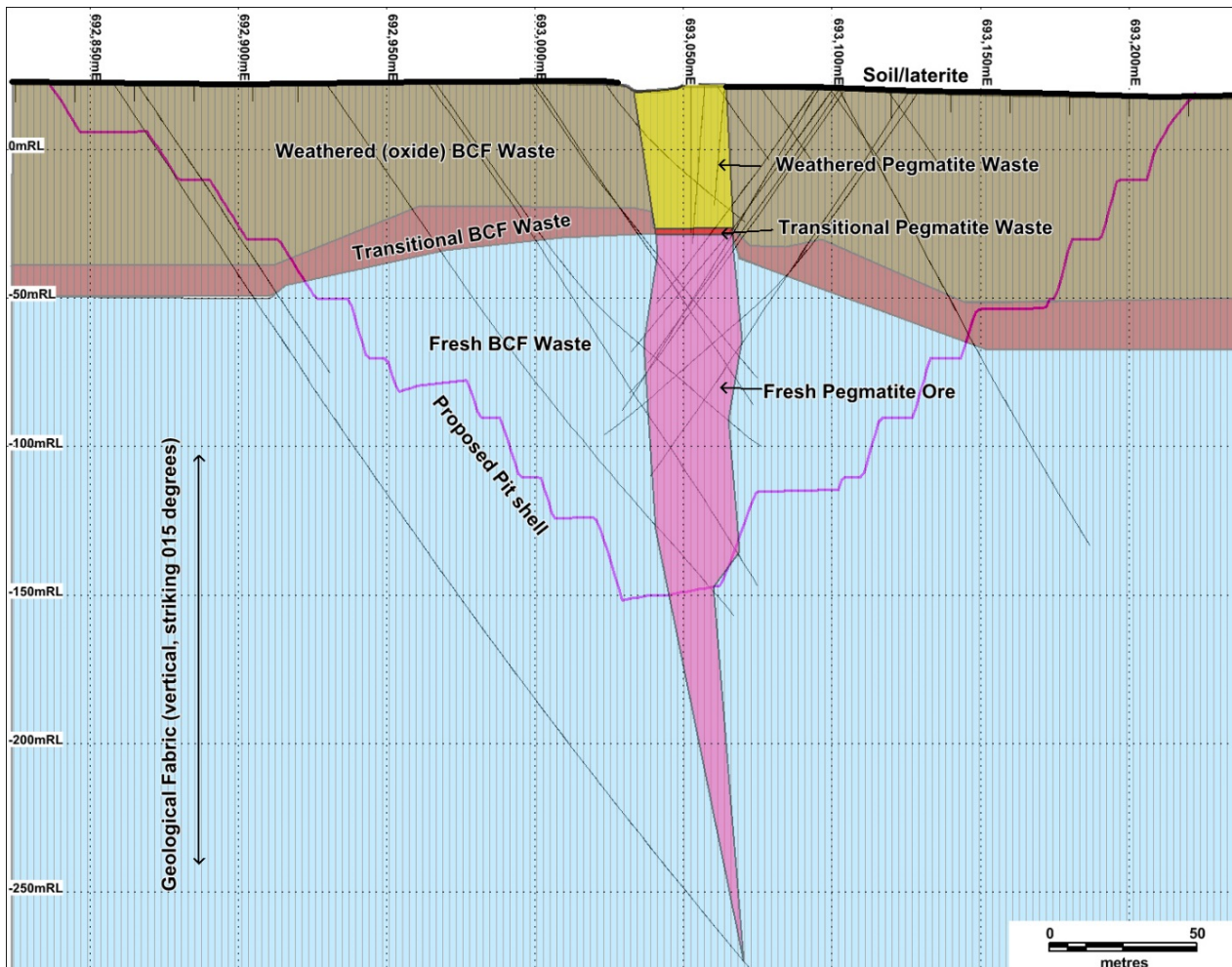


Figure 2-1. Cross-section through Grants pit showing the various rock type.¹

2.2 Geological domains

2.2.1 Burrell Creek Formation Phyllite

Beyond colour variations, the BCF is a homogenous package of turbidites – a poorly sorted mixture of clay, silt and fine sand that was deposited into a vast deep marine fan setting (Mutti & Ricci Lucci, 1975; Bouma 1962). This sedimentary facies association is characterised by its homogenous nature, where turbidity currents derived from distant land masses, deposited their sediment load rapidly and broadly across the seafloor. The BCF has been mapped throughout the Grants deposit and well beyond, in fact the closest different geological unit mapped by the NT Geological Survey (NTGS) is the Wildman Siltstone, some 20 km to the southeast near Darwin River Dam. Mapping by the NTGS and Core suggests there are some sand-rich beds in this formation approximately 1 km east of Grants, but none of these beds have been identified in drilling at Grants.

The BCF turbidites have been weakly metamorphosed to lower greenschist facies, developing a weak fabric that strikes largely parallel to the regional geophysical grain and the orientation of the pegmatite (015 degrees). This is why the rock is referred to as phyllite, a low grade metamorphic equivalent of an immature sandy siltstone. In fresh form, the phyllite is grey, finely bedded or cleaved, and is composed of quartz, feldspar, lithic fragments, micas and clay. These components are assembled into fining-upwards cycles between 0.01 m and 0.5 m thick, called “Bouma cycles” (Bouma, 1962). Photographs of typical intersections

¹ Note that quartz veins are too small and discontinuous to show.

of BCF are shown in Appendix B. It is a reduced rock type and therefore will have some organic matter, albeit very minor.

When weathered, the BCF becomes a brown colour, with the breakdown of labile sedimentary components like feldspar to clay and iron oxides. Any iron sulfide present would be similarly broken down to iron oxide and the sulfur liberated into the groundwater. The transition from fresh to weathered, as you would expect, is affected by local groundwater flow along bedding planes and faults. It is therefore a gradation between weathered and fresh, with redox-state fluctuations on a metre-scale through the transition zone. Photos of typical BCF domains are shown in Appendix B.

The only other lithological variations are the sporadic presence of garnet and andalusite - both metamorphic minerals that form within the phyllite matrix (Appendix B). These minerals can be difficult to recognise during geological logging - in the case of garnet due to the small size and in the case of andalusite due to the same colouration as the host. These minerals are refractory silicates and can be preserved in the deeper part of the weathering environment.

The weathered phyllite is a geological domain unlikely to produce acid forming material. Fresh phyllite is the geological domain at Grants most likely to produce acid forming material. Preliminary waste characterisation laboratory analyses suggested there is little sulfur present and this is typical of the sedimentary environment in which it was deposited – rapid deposition inhibits sea-floor sulfur precipitation. The scarcity of pyrite in geological logging of drill core and reverse circulation (RC) drilling chips supports this contention. Pyrite was identified in trace concentrations over 6 intervals totalling 4.44 m of the total 2,465 m logged (0.18%).

2.2.2 Pegmatite

Pegmatite when fresh is hard, impermeable (apart from when fractured) and densely crystalline – i.e., like granite. It contains a simple mineral assemblage of quartz, feldspar, spodumene (lithium pyroxene) and muscovite (white mica) (see Appendix B). It does not contain any sulfide, which is consistent with having been derived from the final evolved melt of an oxidised granite. Whole-rock analytical data from drill-core indicates an average of 0.005 %S within fresh “pegmatite ore”, with a maximum of 0.03 %S (134 samples from 3 broadly-spaced diamond drill holes (DDH), each through the entire width of the deposit).

In weathered pegmatite, the feldspar and spodumene break down to clay, leaving behind only residual quartz and muscovite from the original mineral assemblage (Appendix B). The absence of iron staining is testimony of the lack of liberatable iron in the host rock. It is likely that most of the iron and sulfur are contained in refractory mica; supported by laser ablation testing of the pegmatite minerals. The narrow transitional weathering zone retains much of the pegmatite texture, but the labile minerals are broken down along grain boundaries, forming a box-work of residual pegmatite surrounded by clay (Appendix B).

2.3 Quartz Veins

Quartz veins are a very minor component of the geological system at Grants. When fresh these are very simple massive microcrystalline quartz with rare iron sulfide (pyrite). In the weathering environment, the veins remain intact apart from the destruction of any sulfide to iron oxide. The veins range from < 1 cm to 1 m in width. Typical quartz veins are shown in Appendix B.

2.4 Volumes of geological domains

The volumes of these rock-type domains in the proposed pit have been calculated using wireframes defined by geological logging of drill core or RC chips. These volumes are indicated on the pie-chart below (Figure 2-2). There are seven geological domains that will make up the WRD:

- Soil and laterite – approx. 5 %.

- Weathered pegmatite clay (homogenous) – approx. 5 %.
- Weathered phyllite (homogenous lithology and chemistry) – approx. 45 %.
- Transitional pegmatite (variable) - <0.5 %
- Transitional phyllite (by definition variable chemically) – approx. 15 %.
- Fresh phyllite (homogeneous lithology and chemistry) – approx. 30 %
- Quartz veins <0.5 %.

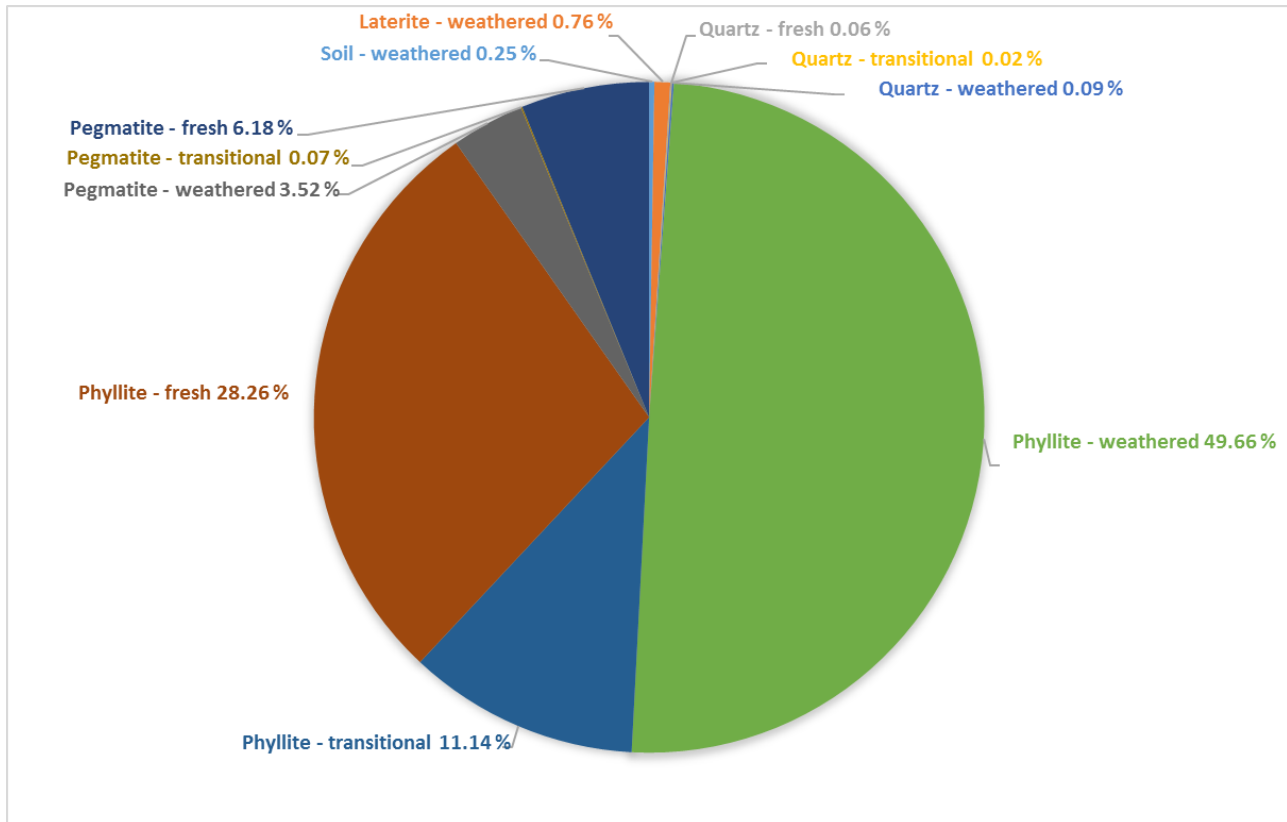


Figure 2-2. Volumes of each geological domain within the proposed pit shell

3 SOIL CHARACTERISATION

During the construction phase, the top 200 mm of topsoil will be removed and stockpiled to the west of the WRD and run of mine (ROM) pad, for later use in rehabilitation of the site. The top 100 mm will be stripped and stockpiled separately to the remaining material. Approximately 211,000 bcm of topsoil will be stockpiled. Sampling and analysis of the characteristics of the surface soil profile was undertaken for the purposes of:

- Characterising the baseline growth medium attributes of each major soil type including nutrient status.
- Evaluating potential risks associated with salinity, wind erosion and water erosion.

The geotechnical characteristics of the soils, for the purpose of mine design and construction, is outside the scope of this report.

3.1 Desktop review

Soils are classified in accordance with *Soil Groups of the Northern Territory* (Table 3-1); land unit mapping for the Grants Project (Greater Darwin 1:25,000) shows there are two soil groups within the mine site disturbance area – Rudosols and Hydrosols.

Table 3-1. Land unit and soils within the mineral lease boundary

Land unit	Vegetation description	Drainage	Soil	Area (ha)	%
Rises					
2a1	Open woodland of <i>Eucalyptus miniata</i> , <i>Eucalyptus tetradonta</i> , or <i>Corymbia foelscheana</i> , <i>Corymbia confertiflora</i> , <i>Eucalyptus tectifica</i> over mixed grasses	Nil to low level of seasonal waterlogging	Rudosols	121	82 %
Drainage systems					
6b	Tall shrub land to low open woodland of <i>Grevillea spp.</i> , <i>Melaleuca spp.</i> , <i>Lophostemon lactifluus</i> over annual <i>Sorghum sp.</i> , <i>Heteropogon triticeus</i> .	Severe level of seasonal soil waterlogging or inundation for extended periods	Hydrosols	14	10 %
Alluvial plains					
5a	Grassland of <i>Sorghum stipoideum</i> , <i>Eriachne burkittii</i> , <i>Paspalum scrobiculatum</i> with emergent trees	Severe level of seasonal soil waterlogging or inundation for extended periods	Hydrosols	12	8 %

The majority of the mine site disturbance area comprises Rudosol soils associated with land unit 2a1, with small areas of Hydrosols associated with land units 6b (drainage systems) and 5a (alluvial plains) (Table 3-2). Rudosol and Hydrosol soils are described below.

Land unit mapping indicates the project area has a Nil (Class 1) risk of Acid Sulfate Soils (ASS). This correlates with the Land Systems of the Northern Part of the Northern Territory, which similarly indicates no potential ASS within the project area.

3.1.1 Rudosols

Rudosols are soils with negligible (rudimentary) pedologic organisation apart from (a) minimal development of an A1 horizon; or (b) the presence of less than 10% of B horizon material (including pedogenic carbonate) in fissures in the parent rock or saprolite. The soils are apedal or only weakly structured in the A1 horizon and show no pedological colour changes apart from the darkening of an A1 horizon. There is little or no texture or colour change with depth unless stratified or buried soils are present.

3.1.2 Hydrosols

Hydrosols refer to a range of seasonally or permanently wet soils and thus there is some diversity within the order. The key criterion is saturation of the greater part of the profile for prolonged periods (2-3 months) in most years. The soils may or may not experience reducing conditions for all or part of the period of saturation, and thus manifestations of reduction and oxidation such as 'gley' colours (greenish-blue-grey) and ochrous mottles may or may not be present.

3.2 Soil assessment from drilling characterisation

The desktop assessment of soils is supported by information from characterisation of the upper most (0-3 m) sediment in drill cores. The upper-most 0-3 m of the Grants area is composed of red/brown saprolitic soils and/or weakly-cemented laterite (Figure 3-1). These contain a large amount of iron oxide and clay/silt, derived from the underlying BCF.

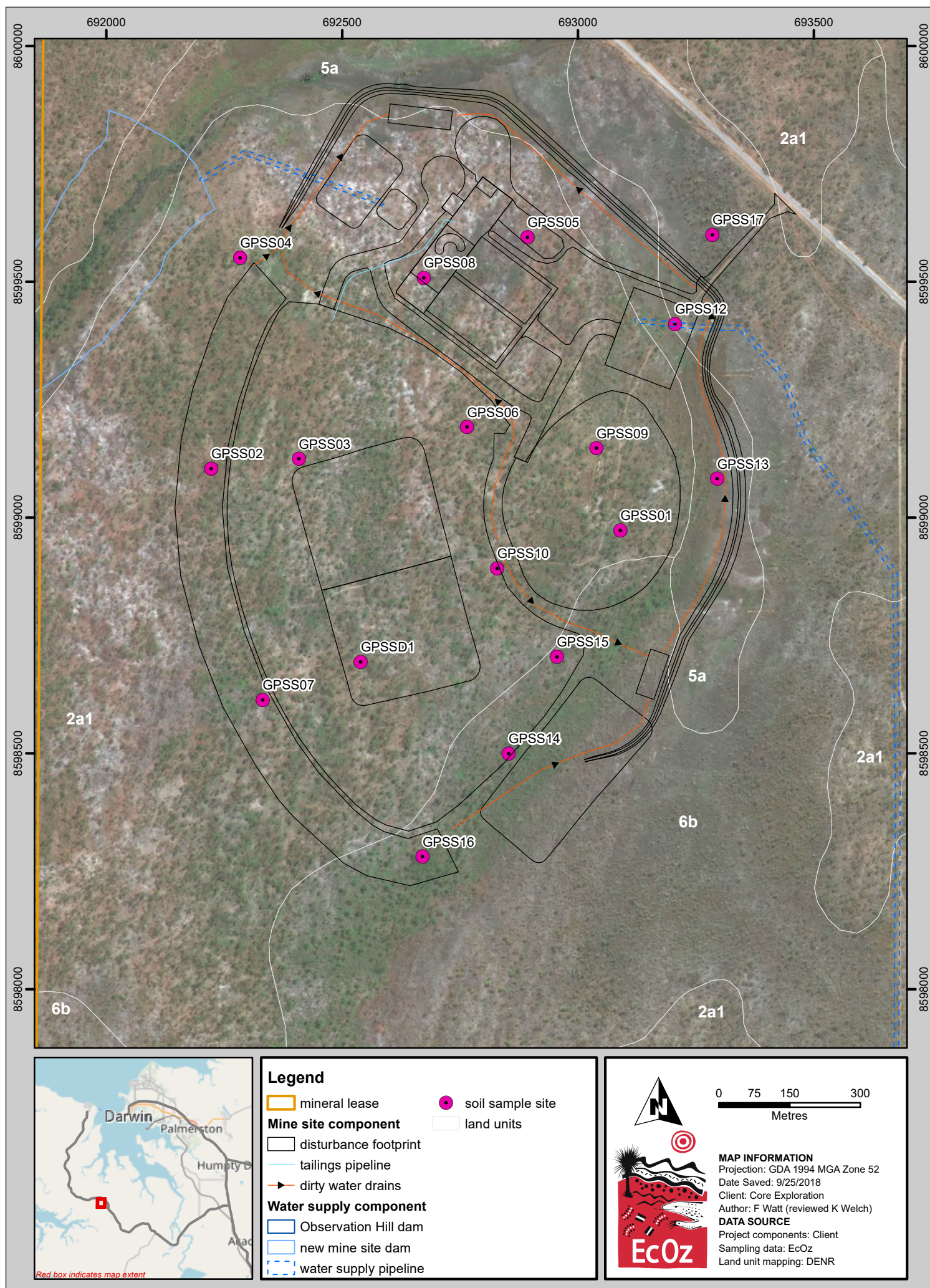


Figure 3-1. Photographs showing typical soil and soil-laterite profiles from Grants

3.3 Soil sampling

3.3.1 Sample locations

The location of soil samples reflects the proportion of disturbance from the project occurring within each soil type. The majority of samples were collected from areas of Rudosol soils (land unit 2a1) as this represents the majority of soil within the disturbance footprint. Sample locations have been selected such that there are four transects of three to four holes each. The transects run up-slope and are designed such that an indication of soil variation along the slope gradient can be obtained. Additional holes have been placed to capture the other land units not covered by these three transects. The soil sample locations are shown in Figure 3-2.



Path: Z:\01 EcOz_Documents\04 EcOz Vantage GIS\EZ18107 - Grants Project - Waste characterisation\01 Project Files\Figure 3-2 Soil sample sites and land units within the mineral lease.mxd

Figure 3-2. Soil sample sites and land units within the mineral lease

3.3.2 Sampling procedures

At each of the sample locations samples were collected adopting the following procedure:

- 1) Hand core hole to 40 cm or refusal.
- 2) Use disposable gloves to collect samples.
- 3) Take soil from sampling tool or hole and separate into heaps for each soil horizon.
- 4) Photograph the soil sample and enter photograph number on data sheet.
- 5) From each identified horizon take a sample and fill:
 - Two Acid Sulfate Soil 250 mg zip lock bags (return to lab within 12 hours or freeze within 24 hours to increase holding time to 28 days)
 - One 150 ml glass jars (refrigerate within 12 hours to increase holding time to 7 days)
 - Label each bag and container with a unique identifier and sample details
- 6) Put samples into esky and transport to ALS on the same day, or store as identified.

3.3.3 Analysis

Soil analysis (Table 3-2) included the parameters specified in the *Draft Guideline - Materials Characterisation – Baseline Data Requirements for Mining Proposals* (WA DMP, 2016). Laboratory tests were performed by ALS, a NATA accredited facility.

Table 3-2. Baseline soil analysis

Parameter	Test	Details
Particle Size Distribution (PSD)	Sieving (75 mm – 75 µm) and hydrometer (75-20 µm, <20-2 µm, <2 µm clay fraction)	Augments field texture classing. Defines the proportion of sands, silts and clays within the soil medium. Particle size distribution informs the assessment of erosion and sodicity risks (where there is a high Exchangeable sodium percentage (ESP) but % clay is <10%, then Sodicity is a low risk).
Bulk Density (BD)	In house method	Required for estimation of water holding capacity and inference of plant available water capacity (PAWC).
Aggregate stability	Emerson aggregate test	Stability of the soil structure units when immersed in water. Instability may be indicated by slaking or dispersion. A soil with a low aggregate stability is likely to be compact and poorly structured or be susceptible to tunnelling erosion.
pH	pH 1:5 soil water ratio	pH characterises the chemical environment of the soil and guides the suitability of soils for growth of particular species. The soil's pH affects the availability of various nutrients, toxic elements and chemical species to plant roots.
Electrical conductivity (EC)	EC 1:5 soil water ratio	The accumulation of water soluble salts. It is a measure of salinity.
Exchangeable cations (Al, Ca, Mg, K & Na)	Relevant NATA laboratory test	The cation exchange capacity (CEC) of a soil is the measure of the soil's capacity to hold important cations such as calcium, magnesium, sodium and potassium ESP is used to calculate sodicity. $ESP = 100 \times \text{exchangeable sodium}$

Parameter	Test	Details
		(cmol/kg) /CEC. If sodium makes up 6% or more of the total cations present, then the soil is classed as sodic. Susceptibility to dispersion will depend on ESP, but also be affected by EC, exchangeable Mg, and clay amount and mineralogy, so competent interpretation of data by a suitably qualified person is advisable.
Organic carbon	Total Organic Carbon (TOC) / Total Organic Matter (TOM) by combustion (sediments)	An indicator of soil nutrient store, it can also affect water retention and biological processes. Organic carbon supports microfauna and microflora in the soil.
Total Nitrogen – TKN + Nox		Total nitrogen baseline information
Available phosphorus and potassium (P& K Colwell method)	Colwell	A measure of phosphorus and potassium that is available for plant uptake. Phosphorous is required for photosynthesis and respiration. Potassium is needed for a wide range of important processes within the plant including cell wall development, flowering and seed set.
Available S	Potassium Chloride – KCl 40 test	A measure of the sulfur that is available for plant uptake.
Metals total (ICP-MS; Hg Cold Vapour AAS) As (0.5), Cd (0.4), Cr (0.5), Cu (0.5), Hg (0.1), Pb (0.5), Ni (0.5), Zn (0.5)	Relevant NATA laboratory analysis.	Hazardous materials

3.4 Results

Tabulated summaries of the analytical data and Laboratory Certificates may be found in Appendix C.

3.4.1 Particle Size Distribution

Particle size distribution (PSD) informs the determination of soil texture, which is the principle component affecting soil erodibility (soil structure, organic matter and profile permeability also contribute). The PSD distribution for soil samples according to land unit is shown in Table 3-3.

Table 3-3. Average PSD for soils within each land unit

Land unit	Clay (<2 µm)	Silt (2-60 µm)	Sand (0.06-2 mm)	Gravel (>2mm)
2a1: Rudosols	11.4	11.5	43.0	34.1
5a: Hydrosols (Alluvial Plains)	10.5	26.0	54.5	18.0
6b: Hydrosols (Drainage Systems)	19.5	21.2	58.2	2.6
Note: Rudosols cover most of the disturbance area.				

Based on the PSD, soil textures may be described as sandy-loams, sandy-clay-loams and gravelly-sands.

The average particle size distribution does not change markedly with depth apart from in land unit 5a where there was a reduction in sand in the A2 horizon compared to the A1 horizon, along with a decrease in gravel with increasing depth (Table 3-4).

Table 3-4. Average PSD with depth

Average Depth	Clay ($<2\ \mu\text{m}$)	Silt ($2\text{--}60\ \mu\text{m}$)	Sand ($0.06\text{--}2.00\ \text{mm}$)	Gravel ($>2\text{mm}$)
0.00 – 0.16	12	14	47	35
0.16 – 0.36	15	16	50	23

3.4.2 Bulk Density

Bulk density is an indicator of soil compaction, which affects infiltration, rooting depth, water holding capacity, soil porosity, the availability of plant nutrients and the activity of soil microbes. Measurements of bulk density enable an estimate the water holding capacity of a soil. Soils that hold water (e.g. clay loams) are less subject to losses of nutrients through leaching than soils with limited water holding capacity (e.g. gravelly sands).

Whilst not specifically measured in the laboratory, the physical descriptors of the soils and PSD (Table 3-3) provide a good indication of bulk density. Soils have a dominant sand and gravel content and consequently will have bulk densities in the range $1.3\ \text{g/cm}^3$ to $1.7\ \text{g/cm}^3$. The critical value restricting root growth is a bulk density greater than $1.6\ \text{g/cm}^3$ (McKenzie *et. al.* 2004). Measurements of bulk densities and determination of water holding capacity should be included in the rehabilitation trials.

3.4.3 Soil pH

Soil pH characterises the chemical environment of the soil and is a measure of acidity or alkalinity. It affects the suitability of soils for plant growth by influencing the availability of various nutrients and toxic elements to plants. The optimal pH range for most plants is between 5.5 and 7.0, however, locally adapted plant communities may thrive at pH values outside this range.

The pH of the soil samples varies across a narrow range between 4.8 and 5.5, averaging 5.2 with a standard deviation of 0.2. As such, all of the soils on the site are considered marginally acidic.

3.4.4 Electrical conductivity

Electrical Conductivity (EC) is a measure of the salinity of a soil. Soil is defined as saline when the level of salinity of soil water (concentration of ions) affects plant growth (due to restricting nutrient availability and microbe activity). EC of soil samples varies between $0.002\ \text{dS/m}$ and $0.025\ \text{dS/m}$, averaging $0.009\ \text{dS/m}$ (Appendix C).

The EC of soils at the site are not saline (within the range 0 to $0.40\ \text{dS/m}$) and are considered suitable as a growth medium (WA DMP, 2016).

3.4.5 Structural stability

The structural stability and ability of soils to support plant growth is influenced by a range of soil physical and chemical properties including texture, pH and organic matter. Analysis of soil dispersion, cation exchange capacity and exchangeable sodium percentage assists in understanding soil behaviour and inform rehabilitation requirements.

Emerson aggregate test

The Emerson aggregate test (EAT) gives a semi-quantitative assessment of the structural stability of a soil and is used to indicate erodibility by water. Structural stability is essential for macro-porosity, the pathway for movement of water through soil (drainage), while micro-porosity functions by capillary action, holding

plant available water. The EAT also indicates the effects of physical manipulation (excavation and compacting) on soils at elevated moisture concentrations. Deterioration of the soil structure occurs from two hydro-mechanical processes: dispersion and/or slaking.

A dispersible soil is a structurally unstable soil that readily disperses into its constituent particles (clay, silt, sand) when placed in water. Dispersed soil colloids in drainage water have the potential to block pores and reduce hydraulic conductivity. Slaking refers to the partial breakdown of soil aggregates in water due to swelling of clay and rapid expulsion of air from pores spaces. Slaking is mostly due to low organic matter and may lead to temporary hard setting on a bare soil surface. These aspects are important considerations during construction and mine closure and rehabilitation.

The site soils fall in the following Emerson classes:

- Class 3 – dispersive: 5 % of samples (sandy loam: samples GPS-S13 Land Unit 5a Drainage; and -SD1 Land Unit 2a1 - Rudosols). These samples occur in areas where disturbance, if any, will be minimal.
- Class 4 - carbonate or gypsum present with slaking but no dispersion upon wetting: 70 % of samples (sandy loam and sandy clay loam: samples across mining footprint in Land Unit 2a1 – Rudosols, and Land Unit 6b – Drainage Systems).
- Class 8 - no slaking, no swelling: 25 % of samples (gravelly sand: GPS-S01, -S04, -S05, -S06, -S09 and -S10; all samples fall within Land Unit 2a1 - Rudosols).

Based on the EAT, the majority of soils within the disturbance area are not dispersive (Class 4 & 8, representing 95 % of soils), with sandy-clay-loam and most sandy-loam soils prone to slaking (Class 4, representing 70 % of soils).

Cation exchange capacity

Cation Exchange Capacity (CEC) is a measure of the soils ability to hold cations by electrical attraction. The most abundant exchangeable cations in soil are calcium, magnesium, potassium, sodium and aluminium. The CEC of soils varies with clay content, pH and amount of organic matter.

Soils at the site have CECs between 0.2 meq/100g and 2.4 meq/100g, averaging 1.2 meq/100g. These soils exhibit low (< 10 meq/100g) CECs, indicating low water holding capacities, leaching and nutrient loss (which may be offset by maintaining organic matter in these soils).

Exchangeable sodium percentage

Exchangeable sodium percentage (ESP) is a measure of the proportion of sodium ions relative to other cations – referred to as sodicity. Sodicity degrades soil properties by weakening the bonds between soil particles.

Soils at the site have ESPs between 1.4 % and 37.3 %, averaging 11.4 % (Table 3-5). Thus a significant portion of the soils at the site may be regarded as moderately to highly sodic.

Table 3-5. Sodicity of soils

Category	ESP	% of samples	Sample Location and Land Unit	Emerson Class
Non Sodic	<6	40 %	GPSS01, GPSS02, GPSS04, GPSS05, GPSS06, GPSS09, GPSS10 (2a1)	4 and 8
Low Sodic	6 - 10	14 %	GPSS12 and GPSS16 (6b) and GPSS03 and GPSSD1 (2a1)	4
Moderately Sodic	10 - 15	14 %	GPSS15 (6b) GPSS07, GPSS08 and GPSS09 (2a1)	4

Category	ESP	% of samples	Sample Location and Land Unit	Emerson Class
Highly Sodic	>15	32 %	GPSS13 (5a) GPSS12, GPSS14 and GPSS17 (6b) GPSS03, GPSS08 and GPSSD1 (2a1)	4
Note: non sodic to sodic soils may occur at the same location at different depths.				

Sodicity leads to the deterioration of the physical condition of the soils and predisposes them to hard setting when dry and being erodible when wet (Rengasamy and Churchman, 1999) which also limits infiltration, drainage and plant growth. Since topsoil will be stripped and stockpiled for reuse in rehabilitation, the effects of these soils are best monitored and corrected during rehabilitation trials once mining has commenced.

The results of EAT, CEC and ESP analysis for site soils indicate the following:

- A low proportion of site soils are dispersible (5 %)
- A high proportion of site soils are prone to slaking (70 %), indicating potential for surface setting
- CECs are low, indicating soils have low water holding capacity and are readily leached of nutrients
- Majority of site soils are sodic, predisposing them to hard setting when dry and potential erosion when wet.

3.4.6 Heavy Metals

Cadmium and Mercury in the soil samples are below detection limits whilst only two detections of Zinc at 10 mg/kg were reported (Appendix C). The concentrations of heavy metals in soil samples are shown in Table 3-6.

Table 3-6. Heavy metals in soils

Statistic	As	Cr	Cu	Pb	Ni
ASC NEPM EILs	20 - 40	130 - 140	75 - 85	110 - 470	40 - 50
Preferred Levels*:	<20	-	2 - 50	<35	1 - 20
Minimum	5.0	2.0	7.0	5.0	2.0
Maximum	18.0	44.0	9.0	14.0	18.0
Average	11.4	11.1	8.0	7.9	3.6

Concentrations are in mg/kg. *Preferred Levels for crop/plant growth (NSW DPI, 2004).

Heavy metal concentrations in the soils are well below the Investigation Levels for Areas of Ecological Significance (ASC NEPM) and with the range of preferred levels for crop/plant growth.

3.4.7 Nutrients and Total Organic Carbon

Plants require nutrients for growth and function, particularly:

- Phosphorous (P) is required for photosynthesis and respiration.
- Potassium (K) is needed for a wide range of important processes within the plant including cell wall development, flowering and seed set.
- Nitrogen (N) is essential to nearly every aspect of plant growth and is absorbed by plants as nitrate (NO₃) and ammonium (NH₄).
- Sulfur (S) is a constituent of amino acids in plant proteins and is involved in energy-producing processes in plants.

Organic carbon is an indicator of the soil nutrient store and affects water retention and biological processes; it supports microfauna and microflora in the soil. The concentration of relevant nutrients and organic carbon in the soils are shown in Table 3-7.

Table 3-7. Nutrients in soils

Statistic	S	K	NO ₂ + NO ₃ as N	P	TOC
Preferred Levels*:	10 - 20	100 to 250	>10	20 to 30	>2
Minimum	<10	215	0.1	5	0.6
Maximum	-	342	1.2	13	20.9
Average	-	270	0.3	9	1.6

Concentrations are in mg/kg except TOC which is in %. Preferred Levels* for crop/plant growth (NSW DPI, 2004).

Sulfur, nitrate (NO₂ + NO₃ as N), phosphorous and organic carbon (TOC) are below their desirable levels. However, these nutrients and their concentrations fluctuate with soil and weather conditions over very short periods of time; a more detailed assessment should be included during the rehabilitation trials.

3.4.8 Erodibility

Wind erodibility for the soils based on PSD (refer Section 3.4.2) is considered moderate (10 to 30% of the proportion of aggregates are >0.85mm) to low (>30% of the aggregates are >0.85mm). Other considerations that should be considered during rehabilitation trials are exposure to wind, slope and wind fetch.

Water erosion is primarily influenced by soil texture (soil structure, organic matter and profile permeability also contribute). Results from analysis of site soil samples (eg. EAT, ESP, CEC) indicate potential for slaking, hard setting and erosion when wet. Accordingly, rehabilitation will require incorporation of practices to promote infiltration (eg. deep ripping, slope length/grade) and establishment of self-sustaining protective groundcover.

3.5 Conclusions

The aims of the soil characterisation were to:

- determine the baseline growth medium attributes of each major soil type including nutrient status;
- evaluate potential risks associated with salinity, wind erosion and water erosion.

By characterising soils to address each of these aims, the suitability of the soils for rehabilitation of the site post closure can be inferred. The soils at the site, whilst having deficiencies, are considered suitable for rehabilitation. The key issues relating to soil suitability for rehabilitation and proposed management (where required) are discussed below.

3.5.1 Baseline growth medium attributes

Based on the soils high sand and gravel content, the soil is estimated to have a bulk density between 1.3 g/cm³ and 1.7 g/cm³ which is towards the upper end of the range where root growth is restricted (1.6 g/cm³). Water holding capacity of sand is lower than other soils types and could affect rehabilitation success. This indicated low water holding capacity is supported by CEC results for soils from the site (0.2 meq/100g to 2.4 meq/100g).

Sulfur, nitrate (NO² + NO³ as N), phosphorous and organic carbon (TOC) are below their desirable levels. However, the concentration of these nutrients fluctuate with soil and weather conditions over very short periods of time.

All of the soils are considered marginally acidic. Local plant species are expected to be adapted to the soil acidity and should be considered in species selection for rehabilitation.

Analysis of baseline growth medium attributes indicates that whilst soils at the site have low nutrient concentrations and likely low water holding capacity, there are no major issues which will cause rehabilitation failure. The effect of nutrient concentrations, water holding capacity and acidity on rehabilitation success should be quantified during rehabilitation trials. Rehabilitation may incorporate addition of ameliorants to address deficiencies (to be determined during trials).

3.5.2 Potential risks associated with salinity, wind erosion and water erosion

Soils within the disturbance area have sandy loam, sandy clay loam or gravelly sand textures. Soil sampling indicates potential for slaking, hard setting and erosion when wet. Erosion hazard and risk is further detailed in the Erosion and Sediment Control Plan (ESCP) for the project (refer Appendix F of EIS). The ESCP considers the natural attributes of soil, in addition to landscape setting, climate and management practices in assessment of erosion hazard.

Accordingly, rehabilitation will require incorporation of practices to promote infiltration (eg. deep ripping, slope length/grade) and establishment of self-sustaining protective groundcover. In order to counteract the

effect of acidity, low CEC, high ESP, and potential for slaking ameliorants including organic matter, nutrients and calcium sulfate (gypsum) may be added (ratios to be determined during rehabilitation trials).

3.5.3 General soil management

The following management measures, designed to maximise soil viability for rehabilitation, have been incorporated into the vegetation clearing procedure (Appendix S of EIS) and ESCP (Appendix F of EIS):

- Strip soils in optimal moisture conditions (not wet, but slightly moist to prevent dust and mechanical breakdown of soil structure)
- The top 100 mm of topsoil (excluding material best described as subsoil) located within areas of proposed soil disturbance should be stripped and stockpiled separately from the remaining soil;
- Topsoil bund to be < 1.5 m in height as far as practical (to enhance preservation of biological activity).
- Topsoil stockpiles are to be shaped so as to remain in a free draining condition to avoid long term saturation.
- Stockpiled material should be protected from wind, rain and concentrated surface flow with stable batters and a vegetative cover.

3.5.4 Rehabilitation trials

Rehabilitation trials should be undertaken on the commencement of mining. The project design allows for progressive rehabilitation, with incorporated rehabilitation trials, of the WRD outer annulus. This will allow for rehabilitation trials to commence following the construction of the annulus (expected to be in year 1 of operations).

The rehabilitation trials should assess:

- Bulk density and water holding capacity.
- Nutrient concentrations in soil immediately prior to rehabilitation.
- Appropriate plant selection to maximise rehabilitation success in soils from site.
- Stability and erosion of soil when applied to final landform.
- Effect of soil amelioration (e.g. gypsum, organic matter, nutrients) on rehabilitation success.

Aspects that are to be monitored during rehabilitation include the behaviour of the rehabilitated surface with regard to soil structure, water infiltration, erosion and plant establishment.

4 WASTE CHARACTERISATION

4.1 Preliminary Waste Characterisation

During 2016, Core drilled 12 exploration holes, utilising reverse circulation (RC), across the western half of the pit shell. From each of these holes, the Core Exploration team collected three samples, each from a ten metre interval. A total of 36 samples² were collected and submitted to ALS for Emerson aggregate testing, pH, total sulfur, net acid producing potential (NAPP), acid neutralising capacity (ANC), electrical conductivity and exchangeable cations. The salient findings of this sampling and analysis program for a preliminary waste characterisation were (Pendragon, 2017):

- Whilst some of the shallow waste rock samples may be considered slightly acidic, most samples may be regarded as alkaline to highly alkaline.
- Seven of the thirty-six samples (fresh meta-siltstone at depths deeper than 70 m) have total sulfur concentrations exceeding the trigger value of 0.05 %S (WA Department of Mines and Petroleum, 2016). However, it is noted that the ANC of these samples exceed their maximum potential acidities calculated from their total sulfur concentrations.
- Total sulfur concentrations are much lower than those used in classification of non-acid and potentially acid forming materials ($S \geq 0.3\%$, DITR, 2016).
- The NAPP value, negative in all samples, and ANC concentrations exceed the calculated maximum potential acidity (MPA) which indicates that there is a high probability that the waste rock samples will remain near-neutral in pH and should not be problematic in terms of acid generation and resultant acidic drainage.
- Electrical conductivities are generally low and consequently the samples may be classified as low saline.
- The weathered strata and bedrock fall in Emerson Classes 4 and 8 with no dispersion, slaking and/or swelling and consequently the samples may be regarded as structurally stable.
- The samples of waste rocks may be considered non-sodic.

The investigation concluded that the potential for acid rock and/or saline drainage is considered very low. However, further sampling was recommended to confirm the assessment and demonstrate that wastes and processing rejects will not require management during mining and subsequent closure.

In line with these recommendations, Core undertook further materials characterisation work at Grants in 2018. The following sections provide details of these activities.

4.2 Current Waste Characterisation Program

A staged approach to sub-surface materials characterisation has been adopted for the Grants Project, whereby representative samples from each weathering zone/lithology are collected progressively as part of the exploration drilling program. The materials characterisation program aims to prove where material is benign (as inferred from pre-screening) and identify any problematic material that may require further analysis to determine management requirements during operations and post-closure.

As described above, a preliminary waste rock characterisation was undertaken in 2017. Subsequent sampling from drilling undertaken between February 2018 and June 2018 was undertaken to facilitate

² Of the 36 samples, 28 were representative of a single lithological/weathering profile and eight samples were composites. The composite samples were considered appropriate for preliminary screening purposes (Pendragon, 2017).

sampling representative of each weathering zone/lithology consistent with relative contribution to the total waste rock volumes calculated from the mining model. Sampling targeted each representative zone of weathering across the oxide zone with more sampling from hard bedrock with a higher potential for containing oxidisable sulfur.

4.3 Methods

4.3.1 Sampling locations and key lithologies

During January and February 2018, Core drilled 18 RC exploration holes across the eastern half of the pit shell at an angle dipping towards the west. For the purpose of a waste characterisation, these holes provide good supplementary horizontal and vertical spatial coverage to the samples collected for the preliminary waste characterisation, which were from the western half of the pit shell and drilled at an angle dipping towards the east (refer Figure 2-1 and Table 4-1). Analysis of the drill database indicated that at least 97 of the 10 m interval samples are representative of a single weathering zone or lithology. Owing to the homogenous nature of the lithology, some profiles are represented by a number of samples collected from the same hole. A single sample was collected for each profile encountered in each drill hole, which provided 38 samples.

In June and July 2018, a further 7 RC exploration holes were drilled within the southern portion of the pit shell. Samples have been collected from each drill hole representing each weathering zone or lithology, with additional samples collected to increase sample numbers in the fresh waste rock which has an inherently higher likelihood of acid forming material. The Waste Rock Dump sterilisation drilling program in June 2018 drilled 8 additional holes to the west and north of Grants pit. Whilst these areas may not contribute to waste, the geological model indicates that they will be representative of the weathering zone/lithologies that occur within the pit shell and thus the waste material. Samples have been collected from each of lithologies/weathering zones intersected in six of the sterilisation drill holes. Together, this sampling has resulted in an additional 90 samples that have been submitted for analysis. Figure 4-1 shows the locations of the drill holes from each of the above drilling programs and indicates that the proposed sampling program provides relatively equal spatial distribution and density of samples over the pit shell.

A total of 156 samples have been analysed to date including the 36 samples obtained for the preliminary waste characterisation program; the number of samples from each material type and weathering profile is shown in Table 4-1. The 8 composite samples were allocated on the basis of the dominant material type present in the composite.

Table 4-1. Total number of samples per dominant lithology/weathering profile

Material Type	Weathered	Transitional	Fresh	Total
Soil	2	-	-	2
Laterite	11	-	-	11
Clay	7	-	-	7
Pegmatite	4	1	2	7
Phyllite	58	15	44	117
Quartz/ Phyllite and Quartz	6	-	2	8
Sandstone	2	1	1	4
Grand Total	90	17	49	156

The volume of waste rock is estimated to be between 10.9 million tonnes and 14.3 million tonnes of waste based on bulk densities of 1.3 and 1.7 respectively. The WA guidelines suggest that operations removing more than 10 million tonnes of material require up to a few hundred samples (WA, DMP 2016). However, the number of samples suggested for operations which remove < 10 million tonnes is between 26 and 80 samples. As the amount of material being removed is less than twice this amount, and that results (section 4.4) do not raise any major risks, the assessment of 156 (more than twice the upper number of samples for operations removing < 10 million tonnes) is considered adequate for the Grants Project.

4.3.2 Sample Analysis

Samples were analysed by ALS, a NATA accredited laboratory, for the parameters listed in Table 4-2. NORM testing on a selection of samples was undertaken using a RadEye B20 – ER contamination meter. This meter characterises alpha, beta and gamma radiation.

Table 4-2. Laboratory analysis of waste materials

Test	Method	Limit of Reporting
Sulfur - Total as S	In house (high temperature furnace method incl. prep charges)	0.01 %
pH (1:2), Electrical Conductivity (1:2) with leach	Rayment and Lyons 3A1 and APHA 2510 B, Rayment and Lyons 4A1 (mod) and APHA 4500-H+ B	1 µS/cm, 0.1 pH Unit
Emerson Aggregate Test	AS1289.3.8.1	
Exchangeable Cations with pre-treatment - All Parameters	Rayment & Lyons (2011) Method 15A2	0.1 %, 0.1 meq/100g, 0.1 %
Leachable metals by ICPAES (where wt%S is ≥ 0.05)	Toxicity Characteristic leaching Procedure (TCLP)	0.0001 - 1 mg/kg
Soluble metals by ICPAES (where wt%S is < 0.05)	1:5 soil to deionised water ratio with 1hr tumble	0.0005 - 1 mg/kg
Acid Neutralising Capacity (ANC)	USEPA 600/2-78-054 & Miller 2000	0.1 % CaCO ₃ , 0.5 kg H ₂ SO ₄ equiv./t, 0.00000 Fizz Unit
Net Acid Production Potential (NAPP)	Coastal Research (mod)	0.5 kg H ₂ SO ₄ /t

Test	Method	Limit of Reporting
Net Acid Generation (NAG)	Miller 1998	0.1 kg H ₂ SO ₄ /t, 0.1 pH Unit
Naturally occurring radioactive material (NORM)	Tested by NT Radiation advisor using a RadEye B20 – ER contamination meter (17 kEv – 3 MeV)	

4.4 Results & Discussion

The purpose of this section is to discuss the analytical assessment of the materials within the shell of the Grants open pit in the context of their potential for acid and metalliferous drainage (AMD), their structural properties and the occurrence of radioactive materials. It should be noted that AMD in this context also refers to neutral mine and saline drainage.

4.4.1 Acid Mine Drainage

The material characterisation framework detailed in the *Draft Guideline - Materials Characterisation – Baseline Data Requirements for Mining Proposals* (WA DMP, 2016) has been applied to the characterisation of the waste materials at Grants Lithium Project. The guidelines primarily use sulfur concentration as a screening tool for classification of material but uses the pH, EC, net acid production potential (NAPP), NAGpH and NAGpH 4.5 to classify the material in terms of AMD.

Acidity

pH characterises the chemical environment and is a measure of the acidity in the waste materials. The pH of the samples varies between 5.0 and 9.7 averaging 7.8. The majority (95%) of samples have a pH > 5.5 and may be regarded as alkaline. Only 5% (8 out of 156) of the samples have a pH less than 5.5; the bores from which these came and the depth at which they were taken appear in Table 4-3. These samples came from bores scattered across the pit area and are all close to the surface.

Table 4-3. pH below 5.5 in waste rocks

Bore	Depth (m)	Description	pH
FRC037	10	Silty Loam	5.4
FRC127	1	Gravelly Sand	5.4
FRC128	1	Sandy Loam	5.3
FRC128	3	Sandy Loam	5.04
FRC130	5	Gravelly Sand	5.0
FRC153	4	Sandy Loam	5.2
FRC154	3	Gravelly Sand	5.2
FRC159	4	Sandy Loam	5.4

The pH of groundwater at the Grants Project (September 2018) varies between 6.3 and 7.5 averaging 7.2 (Bore 6 is apparently contaminated with cement, hence the high pH of 10.3, and was excluded from this assessment) whilst sulphate concentrations are generally < 1 mg/L (except in Bore 6 where it is 15 mg/L). Thus pH of groundwater reinforces a circumneutral pH environment.

Total Sulfur

The sulfur concentrations in samples are low; total sulfur concentrations vary between <0.01 %S and 1.88 %S. This low sulfur concentration is expected given the geological properties of Grants deposit (refer Section 2).

Of the total 156 samples, 148 have total sulfur concentrations <0.05 %S; 16 samples have concentrations ≥ 0.05 %S. All of the samples which had a total sulfur concentration ≥ 0.05 %S were sampled from depths > 50 m below surface level with the majority coming from deeper than 100 m below surface. All samples with a sulfur concentration > 0.10 %S (7 samples) were from greater than 100 m deep (one of these is below the proposed depth of the open pit). The Total Sulfur distributions are listed in Table 4-4.

Table 4-4. Total Sulfur distributions

<0.05 %S	0.05 to <0.10 %S		0.10 to <0.30 %S		>0.30 %S	
91 % of samples	5 % of samples		2 % of samples		2 % of samples	
	Bore	Depth (m)	Bore	Depth (m)	Bore	Depth (m)
	FRC034	106	FRC039	100	FRC121	153
	FRC035	70	FRCD005	100	FRC151	130
	FRC038	124	FRC124	155	FRC151	272
	FRC041	80			FRC152	125
	FRC111	79				
	FRC115	107				
	FRC122	71				
	FRC124	50 and 77				

The highlighted sample FRC151-272 is below the base of the final pit shell and is excluded from further consideration.

Acid Neutralizing Capacity (ANC) and Net Acid Production Potential (NAPP)

The ANC of the samples ranged from 0.9 kgH₂SO₄equiv/t and 20.1 kgH₂SO₄equiv/t, averaging 6.7 kgH₂SO₄equiv/t. Overall, the ANC exceeds the Maximum Potential Acidity (MPA) of the samples which range between 0.7 kgH₂SO₄/t and 57.5 kgH₂SO₄/t (Sample FRC152-125) averaging 2.7 kgH₂SO₄/t. This indicates that overall, the waste materials have sufficient ANC to offset any potential acidity which is confirmed by an average NAPP of the rock samples at -4.5 kgH₂SO₄/t.

Where Total Sulfur was <0.05 %, NAPP tested negative (148 samples). Samples with total sulfur concentrations ≥ 0.05 %S have a negative NAPP (Table 4-5) apart from two samples with a positive NAPP (highlighted cells in Table 4-5).

Table 4-5. ABA, NAG and ANC in samples with total sulfur ≥ 0.05 %

Hole	Depth (m)	Acid Base Accounting			Net Acid Generation			Acid Neutralising Capacity	
		Total Sulfur	Maximum Potential Acidity	Net Acid Production Potential	pH _{ox}	NAG (pH 4.5)	NAG (pH 7.0)	Acid Neutralising Capacity (ANC)	ANC/MPA
		%	kg H ₂ SO ₄ /t		pH unit	kg H ₂ SO ₄ /t		kg H ₂ SO ₄ equiv. /t	-
FRC034	106	0.07	2.1	-5.8	-	-	-	7.9	3.7
FRC035	70	0.08	2.4	-4.2	-	-	-	6.7	2.7
FRC038	124	0.06	1.8	-4.8	-	-	-	6.6	3.6
FRC039	100	0.12	3.7	-4.9	-	-	-	8.6	2.3
FRC041	80	0.06	1.8	-6.4	-	-	-	8.2	4.5
FRC041	215	0.05	1.5	-7.1	-	-	-	8.6	5.6
FRCD005	100	0.11	3.4	-2.6	-	-	-	6.0	1.8
FRC111	79	0.08	2.4	-2.50	4.3	0.2	1.4	5.6	2.3
FRC115	107	0.06	1.8	-7.5	8.00	<0.1	<0.1	9.30	5.1
FRC121	153	0.40	12.2	1.6	6.2	<0.1	0.6	10.6	0.9
FRC122	71	0.08	2.4	-4.20	6.00	<0.1	0.80	6.60	2.7
FRC124	50	0.05	1.5	-7.80	5.00	<0.1	1.00	9.30	6.1
FRC124	155	0.10	3.1	-6.1	6.5	<0.1	0.6	9.2	3.0
FRC151	130	0.46	14.1	-6.0	8.1	<0.1	<0.1	20.1	1.4
FRC152	125	1.88	57.5	49.5	2.4	41.9	49.2	8.0	0.1

The difference between NAG acidity to pH 4.5 and NAG acidity to pH 7.0 is a measure of the amount of oxidisable copper and nickel sulfides in the sample.

Of the two samples with positive NAPP, one has a NAPP greater than 10 kg H₂SO₄/t (FRC152-125) and one (FRC121-153) had a positive but low NAPP (1.6 kg H₂SO₄/t). The sample with a high NAPP (FRC152-125) also recorded a NAGpH (pH_{ox}) below 4.5 (2.4) and a NAGpH (pH_{ox}) 4.5 of greater than 5 indicating it is potentially acid forming material. Sample FRC121-153 had a NAGpH greater than 4.5, conflicting with the positive NAPP and making the classification of the sample uncertain.

The number of samples classified as PAF, PAF-LC and NAF as per the Draft Guideline - Materials Characterisation – Baseline Data Requirements for Mining Proposals are shown in Table 4 6. Only one samples within the pit shell could be classified as PAF. All other samples are classified as non-acid forming (NAF) material or have an uncertain classification. Sample FRC111-79 had a negative NAPP but NAGpH below 4.5 making classification uncertain. However, the NAGpH of 4.3 is only slightly under the guideline value indicating that it is likely to be non-acid forming material (NAF). This is reinforced by an ANC/MPA ratio of 2.3 (see below).

The two samples with positive NAPP are fresh hard rock phyllite located 125 m deep or deeper from the surface. Sample FRC152 is from the south east section of the pit shell and FRC121 from the central western half.

Table 4-6. Classification of samples based on NAPP an and NAGpH (pH_{ox}) results

Geochemical material type	NAPP (kg H ₂ SO ₄ /t)	NAGpH	NAGpH 4.5	Number samples
Potentially acid forming (PAF)	positive	< 4.5	> 5	1
Potentially acid forming – low capacity (PAF-LC)	positive	< 4.5	< 5	0
Non-acid forming (NAF)	negative	> 4.5	-	31
Uncertain	positive	> 4.5	-	1
	negative	< 4.5	-	1

Of the samples which have been classified as uncertain (due to conflicting NAGpH and NAPP values), one (FRC111-79) is expected to be non-acid forming based on the ANC/MPA ratio, the other (FRC121-153) has a slightly positive NAPP (1.6) and NAGpH greater than 4.5 (6.2) and an ANC/MPA ratio just below 1 (0.9). The ANC/MPA ratio provides a relative factor of safety (or lack thereof) for a given material. An ANC/MPA ratio of 2.0 or more signifies that there is a high probability that the material will remain near-neutral in pH and should not be problematic in terms of acidity generation and resultant acidic drainage (DITR, 2007).

Saline Drainage

Electrical Conductivity (EC) is a measure of the salinity of a soil or rock. Drainage of water from saline rocks may release water with high salt concentrations (saline drainage) which may impact and deteriorate the ecological function and particularly water quality in the downstream environment.

The EC's of the waste rock samples varies between 0.004 dS/m and 0.280 dS/m. Consequently, the waste rocks are considered low saline materials and highly unlikely to cause saline drainage.

Metalliferous drainage

Samples of waste rocks (127) were submitted to ALS to determine soluble metal concentrations (Appendix C):

- Only 16 samples (or 13% of the samples) contain As in concentrations between 0.1 mg/kg and 1.1 mg/kg.
- Only 13 samples (or 10% of the samples) contain Mn concentrations between 0.1 mg/kg and 0.3 mg/kg.
- Only 21 samples (or 16% of the samples) contain Se concentrations between 0.1 mg/kg and 0.2 mg/kg.
- Only 3 samples (or 2% of the samples) contain Zn concentrations between 0.3 mg/kg and 1.0 mg/kg.
- Ba, B (except one sample), Cd, Cr, Co, Cu, Pb, Ni, V and Hg are all below their limits of reporting.

From the above assessment very few samples contain reportable concentrations of soluble metals and in very low concentrations. Ten of these samples with Total Sulfur concentrations >0.04 %S was submitted for determination of leachable metals (Appendix C):

- Only 1 sample leached As at a concentration of 0.2 mg/L.
- All ten samples leached Ba at between 0.2 mg/L and 0.3 mg/L.
- Only one sample leached Cu at a concentration of 0.1 mg/L.
- All ten samples leached Zn at concentrations between 0.1 mg/L and 0.4 mg/L averaging 0.2 mg/L.

- All ten samples leached Mn at concentrations between 0.2 mg/L and 11.9 mg/L averaging 2.4 mg/L.
- Be, B, Cd, Cr, Co, Pb, Ni, Se, V and Hg were absent in leachates.

Taking due cognisance of the results of surface and ground water monitoring at the Grants Project, the waste characterisation is seemingly corroborated by water quality data:

- pH in groundwater varies between 6.3 and 7.5 averaging 7.2 indicative of a circumneutral pH environment with sulfate concentrations generally < 1 mg/L;
- Groundwater contains elevated concentrations of As (0.009 mg/L and 0.166mg/L) and Fe. Most other metals i.e. Al, Cd, Cr, Cu, Pb, Ni, Se, Zn and Hg are generally absent except for a few minor detections at very low concentrations.
- Surface water contains Al (between 0.01 mg/L and 0.08 mg/L) and As (between <0.001 mg/L and 0.007 mg/L) whilst metals such as Cd, Cr, Cu, Pb, Ni, Se, Zn, Sn and Hg are below their limits of reporting.
- The BP Historic Pit has a pH of 8.2, TDS of 14.3mg/L with As and Li the only metals at the same concentration of 0.008mg/L.

From current monitoring programs and laboratory leachate testing it is evident that the waste rocks may leach metals that will be well within acceptable limits and consequently, the risk from metals/metalloids/saline leaching are considered very low.

4.4.2 Materials with sodic or dispersive potential

Sodicity is expressed as the amount of sodium relative to exchangeable calcium and magnesium in the material or the exchangeable sodium percentage (ESP). A material is sodic when there is sufficient exchangeable sodium to interfere with its structural stability. Because sodicity causes or enhances the swelling and dispersion of clay particles, it leads to the deterioration of the physical condition of the materials (Rengasamy and Churchman, 1999).

All but three waste rock samples of alkaline material had an ESP below the limit of reporting classifying these materials as non-sodic. Three samples were classified as sodic (Table 4-7); one was from pegmatite ore (FRC 151-191 with ESP 55.9) and will thus not form part of the WRD. The other two samples, FRC 121-90 (ESP 7.6) and FRC 156-125 (ESP 41.2), were from hard rock phyllite material sampled at 90 and 125 m respectively which will not require further management due to their Emerson Class Number, either 4 or 8 i.e. they are not dispersive.

Table 4-7. Alkaline material classified as sodic.

Sample ID	Lithology	Weathering	EC Number	Description	CEC (meq/100g)	ESP
FRC121-90	Phyllite	Fresh	4	No dispersion; carbonate or gypsum present	2.90	7.60
FRC151-191	Pegmatite	Fresh	8	No slaking, no swelling	0.5	55.9
FRC156-125	Phyllite	Fresh	8	No slaking, no swelling	0.5	41.2

Of the acidic material (69 samples), 13 samples (or 19 %), including a sample of pegmatite ore (FRC128-047 from 47m depth) which will not be considered further, have ESP's greater than 6 and classify as sodic.

All 12 of the waste rock samples are from highly weathered overburden materials – predominately laterite (Table 4-8). Nine of the 12 waste rock samples are classified as slightly sodic (ESP 6 to 10), however, four samples (FRC153-4, FRC130-005, FRC151-1 and FRC156-1) are classified as moderately sodic (ESP 10 to 15) and highly sodic (ESP > 15). To determine the dispersive potential (slaking and dispersion) of the waste rocks, the ESP must be interpreted in conjunction with the Emerson Class; if the ESP is >6 it is sodic and potentially dispersive where the dispersion potential is quantified by the Emerson Class Number. The Emerson Classes for the 13 sodic samples are either Class 4 (no dispersion; carbonate or gypsum present) and Class 8 (no slaking, no swelling) and consequently the rocks are considered stable.

Table 4-8. Acidic material classified as sodic.

Sample ID	Depth	Lithology	Weathering	EC Number	Description	CEC (meq/100g)	ESP
FRC128-047	47	Pegmatite	Weathered	8	No slaking, no swelling	1.8	6.4
FRC159-1	1	Laterite	Weathered	8	No slaking, no swelling	0.8	6.6
FRC127-001	1	Laterite	Weathered	8	No slaking, no swelling	1.0	7.1
FRC157-1	1	Laterite	Weathered	8	No slaking, no swelling	0.8	7.2
FRC153-1	1	Laterite	Weathered	8	No slaking, no swelling	0.8	7.6
FRC131-001	1	Laterite	Weathered	8	No slaking, no swelling	0.6	8.2
FRC130-001	1	Laterite	Weathered	4	No dispersion; carbonate or gypsum present	0.7	8.6
FRC128-001	1	Laterite	Weathered	4	No dispersion; carbonate or gypsum present	1.0	8.7
FRC154-3	3	Laterite	Weathered	8	No slaking, no swelling	0.5	9.2
FRC153-4	4	Clay	Weathered	4	No dispersion; carbonate or gypsum present	2.2	10.3
FRC130-005	5	Phyllite	Weathered	8	No slaking, no swelling	2.5	11.2
FRC151-1	1	Laterite	Weathered	8	No slaking, no swelling	0.5	20.5
FRC156-1	1	Laterite	Weathered	8	No slaking, no swelling	1.4	25.2

However, some shallow weathered materials with ESP's <6 may be prone to some slaking and dispersion particularly classes 2 and 3. Factors such as silt and high magnesium content may induce non-sodic materials to disperse. Emerson Class testing semi-quantitatively measures the tendency of the clay fraction of a material to go into colloidal suspension in water and thus the stability of the soil structure when immersed in water.

Two samples of weathered Phyllite at depths of 10 m and 15 m below the surface, from the central western portion of the pit shell have Emerson Class Number 2 (slaking with some dispersion). These materials are unlikely to be used as construction materials, due to their depth, and will be placed at the bottom of the waste rock dump hence do not require management.

Table 4-9. Non sodic material with dispersion potential

Sample ID	Depth	Lithology	Weathering	EC Number	Description
FRC033	10	Phyllite	Weathered	2	Slaking, some dispersion
FRC032	15	Phyllite	Weathered	2	Slaking, some dispersion

Fifty-three out of 160 samples spread across the pit shell and at varying depths, or 33%, have an Emerson Class Number 3 which indicates that remoulding (at moisture content near optimum for compaction) may cause dispersion (Table 4-10). These materials are best not exposed sub-aerially because they do not provide an effective substrate for vegetative rehabilitation/stabilisation and the clay fines may cause turbidity in runoff.

These samples are considered non-sodic but potentially dispersive.

- 12 samples, or 23%, mostly from the eastern portion of the pit shell and predominantly completely to highly weathered phyllite, from between surface and 5 m depth; these materials could be used for construction purposes and would require further detailed geotechnical testing and assessment.
- 29 samples, or 54%, spread across the pit shell and predominantly highly to moderately weathered phyllite, from between 8 m and 54 m depth; these materials will not be used for construction and will be placed in the middle nucleus of the waste rock dump with no further management actions.
- 12 samples, or 23%, spread across the pit shell and predominantly slightly weathered to fresh phyllite, from between 61 m and 137 m depth; these materials will not be used for construction and will be placed across the upper and outside portion of the waste rock dump with no further management.

Table 4-10. Materials which could be dispersive under remoulding

Sample ID	Depth	Lithology	Weathering	EC Number	Description
FRC122-0	0	Phyllite	Weathered	3	Remoulded at plastic limit disperses
FRC113-10	1	Clay	Weathered	3	Remoulded at plastic limit disperses
FRC126-001	1	Soil	Weathered	3	Remoulded at plastic limit disperses
FRC114-0	2	Clay	Weathered	3	Remoulded at plastic limit disperses
FRC120-10	2	Phyllite	Weathered	3	Remoulded at plastic limit disperses
FRC123-10	2	Phyllite	Weathered	3	Remoulded at plastic limit disperses
FRC124-10	2	Phyllite	Weathered	3	Remoulded at plastic limit disperses
FRC160-2	2	Phyllite	Weathered	3	Remoulded at plastic limit disperses
FRC126-003	3	Phyllite	Weathered	3	Remoulded at plastic limit disperses
FRC110-10	4	Clay	Weathered	3	Remoulded at plastic limit disperses
FRC160-4	4	Phyllite/Quartz	Weathered	3	Remoulded at plastic limit disperses
FRC152-5	5	Phyllite	Weathered	3	Remoulded at plastic limit disperses
FRC112-10	8	Cl	Weathered	3	Remoulded at plastic limit disperses
FRC129-008	8	Phyllite	Weathered	3	Remoulded at plastic limit disperses

Sample ID	Depth	Lithology	Weathering	EC Number	Description
FRC159-8	8	Qv	Weathered	3	Remoulded at plastic limit disperses
FRC115-10	9	Phyllite	Weathered	3	Remoulded at plastic limit disperses
FRC151-10	10	Phyllite	Weathered	3	Remoulded at plastic limit disperses
FRC109-20	13	Cl	Weathered	3	Remoulded at plastic limit disperses
FRC121-20	19	Phyllite	Weathered	3	Remoulded at plastic limit disperses
FRC123-20	20	Phyllite	Weathered	3	Remoulded at plastic limit disperses
FRC130-020	20	Phyllite	Weathered	3	Remoulded at plastic limit disperses
FRC126-021	21	Phyllite	Weathered	3	Remoulded at plastic limit disperses
FRC124-30	23	Phyllite	Weathered	3	Remoulded at plastic limit disperses
FRC152-23	23	Phyllite	Weathered	3	Remoulded at plastic limit disperses
FRC120-30	24	Phyllite	Weathered	3	Remoulded at plastic limit disperses
FRC112-30	29	Phyllite	Weathered	3	Remoulded at plastic limit disperses
FRC114-30	30	Phyllite	Weathered	3	Remoulded at plastic limit disperses
FRC151-30	30	Phyllite	Weathered	3	Remoulded at plastic limit disperses
FRC159-30	30	Phyllite	Weathered	3	Remoulded at plastic limit disperses
FRC111-30	33	Clay	Weathered	3	Remoulded at plastic limit disperses
FRC122-40	33	Phyllite	Weathered	3	Remoulded at plastic limit disperses
FRC153-38	38	Phyllite	Transitional	3	Remoulded at plastic limit disperses
FRC128-040	40	Phyllite	Weathered	3	Remoulded at plastic limit disperses
FRC129-040	40	Phyllite	Weathered	3	Remoulded at plastic limit disperses
FRC130-040	40	Phyllite	Weathered	3	Remoulded at plastic limit disperses
FRC156-41	41	Phyllite/Quartz	Weathered	3	Remoulded at plastic limit disperses
FRC156-42	42	Phyllite	Weathered	3	Remoulded at plastic limit disperses
FRC114-50	45	Pegmatite	Weathered	3	Remoulded at plastic limit disperses
FRC129-047	47	Quartz	Weathered	3	Remoulded at plastic limit disperses
FRC131-047	47	Phyllite	Weathered	3	Remoulded at plastic limit disperses
FRC123-50	54	Phyllite	Weathered	3	Remoulded at plastic limit disperses
FRC126-061	61	Phyllite	Transitional	3	Remoulded at plastic limit disperses
FRC129-061	61	Phyllite	Transitional	3	Remoulded at plastic limit disperses
FRC156-61	61	Phyllite	Weathered	3	Remoulded at plastic limit disperses
FRC152-64	64	Phyllite	Transitional	3	Remoulded at plastic limit disperses
FRC120-60	65	Phyllite	Weathered	3	Remoulded at plastic limit disperses
FRC152-70	70	Phyllite	Fresh	3	Remoulded at plastic limit disperses
FRC157-72	72	Phyllite	Weathered	3	Remoulded at plastic limit disperses
FRC160-73	73	Phyllite	Weathered	3	Remoulded at plastic limit disperses
FRC120-70	75	Phyllite	Weathered	3	Remoulded at plastic limit disperses
FRC158-80	80	Phyllite	Weathered	3	Remoulded at plastic limit disperses
FRC127-081	81	Sandstone	Fresh	3	Remoulded at plastic limit disperses
FRC151-137	137	Phyllite/ Sandstone	Fresh	3	Remoulded at plastic limit disperses

4.4.3 Naturally occurring radioactive material

Naturally occurring radioactive material (NORM) was assessed on a sub-set of the stored RC samples used in this waste characterisation. All testing was undertaken using RadEye B20 – ER contamination meter (SN 32215 Calibration expiry 1/12/2018) by registered NT Radiation Advisor Accreditation Number 10/00054A. This meter characterises alpha, beta and gamma radiation. The results are recorded in counts per second (CPS). Background measurement average was 1.34 cps (sd = 0.07) and are shown in Table 4-117.

Table 4-11. background NORM levels at testing location

Sample	Maximum reading (CPS)
1	1.3
2	1.4
3	1.45
4	1.27
5	1.32
6	1.3

NORM testing was undertaken on 82 samples from individual lithology and weathering profiles. NORM values ranged from 0.68 to 1.92 CPS within an average of 1.2 CPS. The samples, the depth from which they were taken and the NORM results are shown in Table 4-12.

Table 4-12. NORM levels in stored RC samples

Core hole	Sample	Maximum reading (CPS)	Core hole	Sample	Maximum reading (CPS)
FRC113	61-70	0.96	FRCD011	1-10	1.04
FRC113	71-80	1.5	FRCD011	11-20	1.07
FRC113	81-90	1.45	FRCD011	21-30	1.08
FRC113	130-140	1.52	FRCD011	31-40	1.48
FRC113	140-150	1.43	FRCD011	41-50	1.4
FRC113	150-160	1.2	FRCD011	51-60	1.71
FRC110	120-130	0.94	FRCD010	31-40	0.71
FRC110	130-140	0.95	FRCD010	41-50	1.11
FRC110	140-150	0.93	FRCD010	51-60	0.95
FRC121	91-100	0.94	FRCD012	1-10	0.71
FRC121	101-110	0.93	FRCD012	11-20	0.68
FRC121	155-165	0.93	FRCD012	21-31	1.62
FRC122	31-40	1.05	FRC111	61-70	1.53
FRC122	41-50	0.92	FRC111	71-80	1.7
FRC122	51-60	0.94	FRC111	81-90	1.63
FRC122	61-70	1.29	FRC120	91-100	1.09
FRC122	71-80	1.16	FRC120	101-110	1.11
FRC122	81-90	1.09	FRC120	130-140	1.43
FRCD009	1-10	1.18	FRC120	141-150	1.07
FRCD009	11-20	1.12	FRC111	31-40	1.09
FRCD009	21-30	1.22	FRC009	51-60	1.04

FRC009	31-40	1.16	FRC009	61-69	1.14
FRC111	41-50	0.91	FRC009	41-50	1.21
FRC111	51-60	1.04	FRC121	61-70	1.11
FRC120	61-70	1.75	FRC121	71-80	1.12
FRC120	71-80	1.68	FRC121	81-90	1.23
FRC120	81-90	1.73	FRC121	31-40	0.87
FRC114	1-10	1.64	FRC121	41-50	0.95
FRC114	21-30	1.76	FRC121	51-60	0.92
FRC114	11-20	1.74	FRC112	1-10	1.01
FRC122	91-100	1.49	FRC112	11-20	1.01
FRC122	126-135	1.59	FRC112	21-30	0.98
FRC122	115-125	1.92	FRC124	61-70	1.02
FRC115	105-115	1.59	FRC124	71-80	1.08
FRC115	115-125	1.58	FRC124	51-60	1.11
FRC124	81-90	1.06	FRC110	1-10	0.9
FRC124	1-10	0.96	FRC110	11-20	0.9
FRC124	11-20	1.08	FRC110	21-30	0.83
FRC124	21-30	1.04	FRC109	31-40	0.98
FRC124	31-40	1.24	FRC109	41-50	1.58
			FRC109	51-60	1.47

Samples from an additional 13 holes were also tested, these samples were stored in chip trays. Each tray was tested and the maximum CPS reading was recorded for each of the 13 core holes. Given the low variability in the results through the first stage of testing, this method was considered appropriate to efficiently expand the coverage of testing. The results of this testing are shown in Table 4-13.

Table 4-13. Maximum NORM reading from 13 core holes

Core hole	Maximum reading (CPS)
FRC147	0.91
FRC151xRF	0.62
FRC152	0.75
FRC153	0.79
FRC015	0.9
FRC157	1.32
FRC161	1.05
FRC162	0.95
FRC014	0.94
FRC166	1.06
FRC167	1.17
FRC168	1.32
FRC189	1.37

The NORM levels for the materials tested were equal to or below background levels and do not warrant any further radiological investigations.

4.5 Conclusions

Materials with AMD or SD potential

The waste rocks are considered alkaline; pH averages 7.8 with the majority (95%) of samples having a pH > 5.5. Samples with a pH < 5.5, at depths between 1m and 10m, were obtained from bores scattered across the pit area; they are thus not confined to a specific area or specific material type.

Total Sulfur concentrations in the waste rocks are low varying between <0.01 %S and 1.88 %S; due to the geological characteristics of the Grants Deposit, these low concentrations are expected. Whilst 148 of the 156 samples have Total Sulfur concentrations <0.05 %S; 16 samples from depths >50m, with the majority from deeper than 100m, have concentrations ≥0.05 %S. Only 7 samples have a Total Sulfur concentration >0.10 %S and only 3 samples (FRC121, FRC151 and FRC152 between 125m and 153m below surface) from within the pit shell exceed 0.30 %S. On the basis of Total Sulfur alone, these 3 samples may be classified as *Potentially Acid Forming* (S≥0.30 %S).

Based on NAPP, NAGpH and NAGpH 4.5, only one of these samples is classified as PAF whilst two others have an uncertain classification.

The ANC of the samples exceed MPA (ratios fall in the range between 0.1 and 19, averaging 7.0 with only four samples having ratios below 2.0) indicating that overall, the waste materials have sufficient ANC to offset any potential acidity which is confirmed by a negative average NAPP. An ANC/MPA ratio of 2.0 or more signifies that there is a high probability that the material will remain near-neutral in pH and should not contribute to acid generation.

In conclusion the waste rocks are considered materials with no AMD potential primarily due to the absence/scarcity of sulfur which is typical of the sedimentary environment in which it was deposited. Waste rocks that classify as PAF will be limited in volume; they are not confined to a specific area and will be excavated with NAF materials and placed in the waste rock dump surrounded and underlain by materials that have sufficient ANC to offset any potential acid generation.

Electrical Conductivity (EC), a measure of the salinity of the waste rocks, range between 0.004 dS/m and 0.280 dS/m and may be considered low saline waste.

Taking due cognisance of the results of surface and ground water monitoring at the Grants Project, the waste characterisation is seemingly corroborated by water quality data:

- pH in groundwater varies between 6.3 and 7.5 averaging 7.2 indicative of a circumneutral pH environment with Sulfate concentrations generally <1 mg/L;
- The BP Historic Pit has a pH of 8.2, TDS of 14.3mg/L

This water quality may be considered as indicative of future open pit and ground water qualities.

Materials with Metalliferous Drainage Potential

Very few of the samples have detectable but very low concentrations of As, Mn, Se and Zn whilst Cd, Cr, Co, Cu, Pb, Ni, V and Hg are all below their limits of reporting.

Ten of these samples with Total Sulfur concentrations >0.04 %S was submitted for determination of leachable metals. The leachates contained As (1 sample at 0.2 mg/L), Ba (ten samples at between 0.2 mg/L and 0.3 mg/L), Cu (one sample at 0.1 mg/L), Zn (ten samples at between 0.1 mg/L and 0.4 mg/L) and Mn (ten samples at between 0.2 mg/L and 11.9 mg/L averaging 2.4 mg/L). Be, B, Cd, Cr, Co, Pb, Ni, Se, V and Hg were absent in leachates.

Waste rocks may leach metals, however, concentration will be low and consequently, the risk from metals/metalloids/saline leaching are considered very low.

Taking due cognisance of the results of surface and ground water monitoring at the Grants Project, the waste characterisation is seemingly corroborated by water quality data:

- Groundwater contains elevated concentrations of As (0.009 mg/L and 0.166mg/L) and Fe. Most other metals i.e. Al, Cd, Cr, Cu, Pb, Ni, Se, Zn and Hg are generally absent except for a few minor detections at very low concentrations.
- Surface water contains Al (between 0.01 mg/L and 0.08 mg/L) and As (between <0.001 mg/L and 0.007 mg/L) whilst metals such as Cd, Cr, Cu, Pb, Ni, Se, Zn, Sn and Hg are below their limits of reporting.
- with As and Li the only metals at the same concentration of 0.008mg/L.

Materials with sodic/dispersive potential

All but three waste rock samples of alkaline material had an ESP below the limit of reporting classifying these materials as predominantly non-sodic. The three sodic samples were obtained from hard bedrock pegmatite and phyllite at depths greater than 90 m below surface.

Factors such as silt and high magnesium content may induce non-sodic waste materials to disperse and cause erosion and/or turbidity to stormwater runoff. The Emerson Class Number of 2 for 2 samples indicates a moderate potential for the soil, to disperse when inundated with water. The Emerson Class Number of 3 for some 53 samples indicates that remoulding (at moisture content near optimum for compaction) may result in dispersive behaviour. Since these materials will not be used in construction and will be placed at the bottom of the waste rock dump, it is unlikely that they will pose a risk. Nevertheless, these materials are best not exposed subaerially because they do not provide an effective substrate for vegetative rehabilitation/stabilisation and the clay fines may be elutriated by rainfall and increase turbidity in runoff.

Of the acidic waste rock materials few samples have ESP's >6 and consequently classify as sodic. These samples are all from highly weathered overburden materials with the majority classify as moderately sodic with very few classifying as moderately to highly sodic. Taking cognisance of the Emerson Class the samples vary between Class 4 (no dispersion; carbonate or gypsum present) and Class 8 (no slaking, no swelling) and consequently these rocks are considered stable.

Radioactive materials

Background and materials to be extracted from the pit shell as waste rocks have low concentrations of NORM which do not warrant further investigation and assessment and/or management measures.

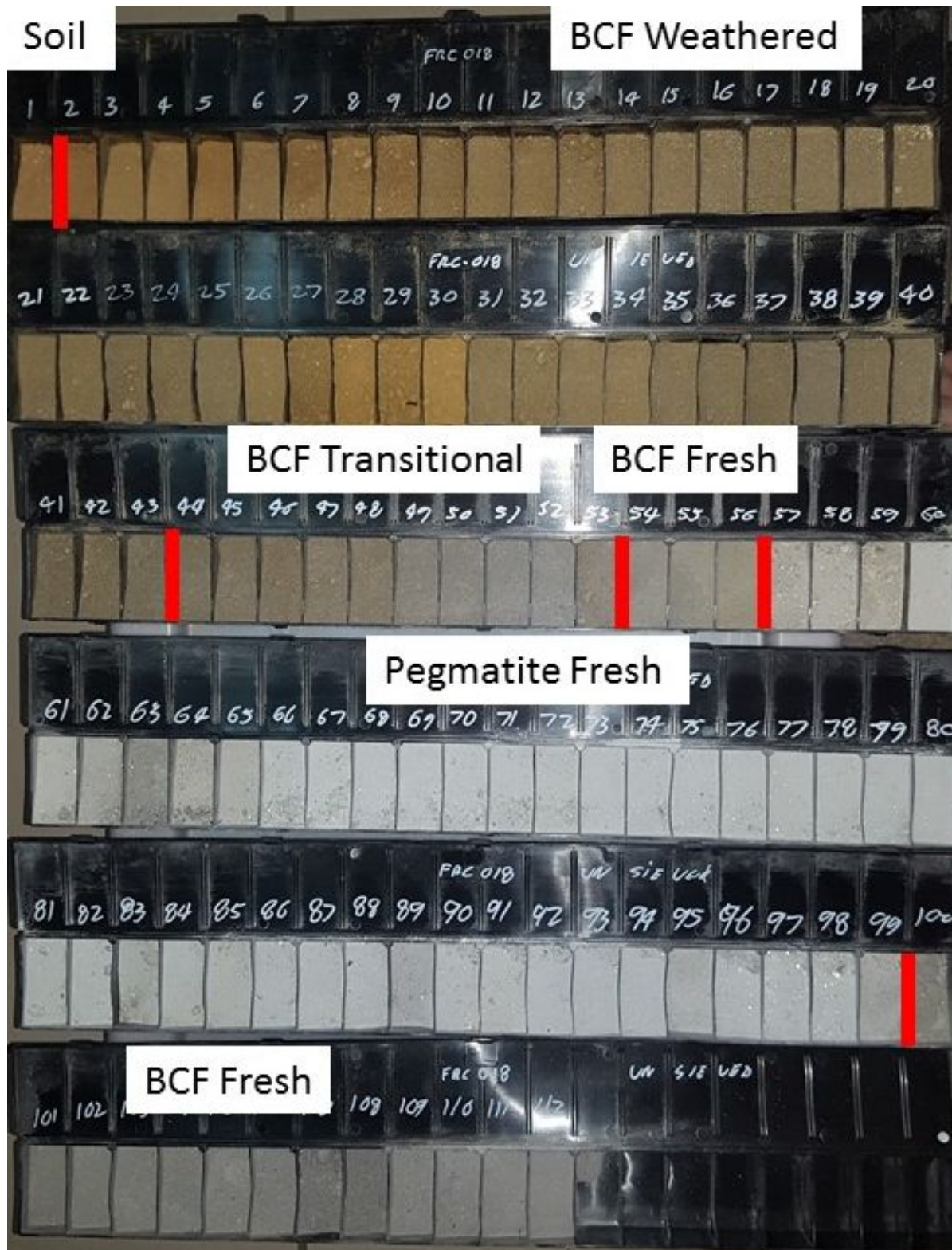
In conclusion, the waste rocks do not have a potential for acid rock and/or saline metalliferous drainage and thus will not require special management measures during mining and subsequent to closure other than applying best practice during design and construction of the waste rock dump with measures to contain runoff and shallow surficial seepage. Further waste characterisation is also not warranted.

5 REFERENCES

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APPENDIX A REPRESENTATIVE GEOLOGICAL INTERSECTIONS

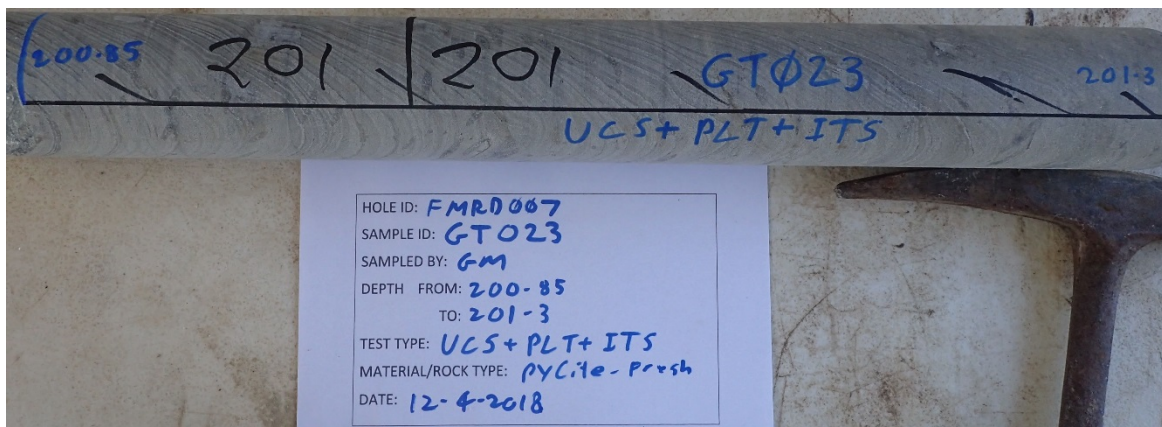
Photograph of representative geological intersection in RC chip trays from Grants (FRC018, 0-112m). This highlights the subtle nature of the colour change that defines the BCF transitional domain.



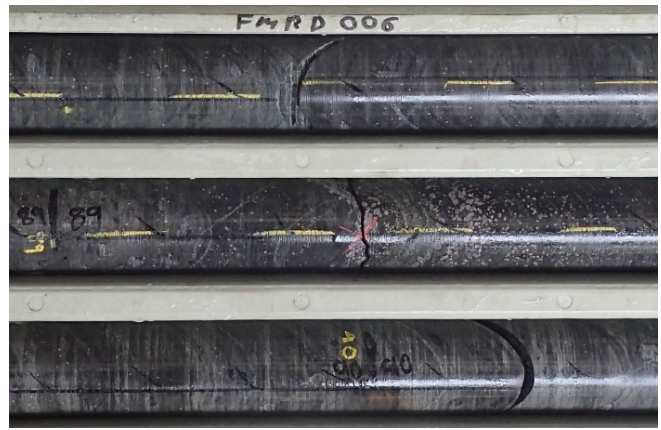
APPENDIX B PHOTOS OF DRILL CORES FROM GRANTS LITHIUM PROJECT



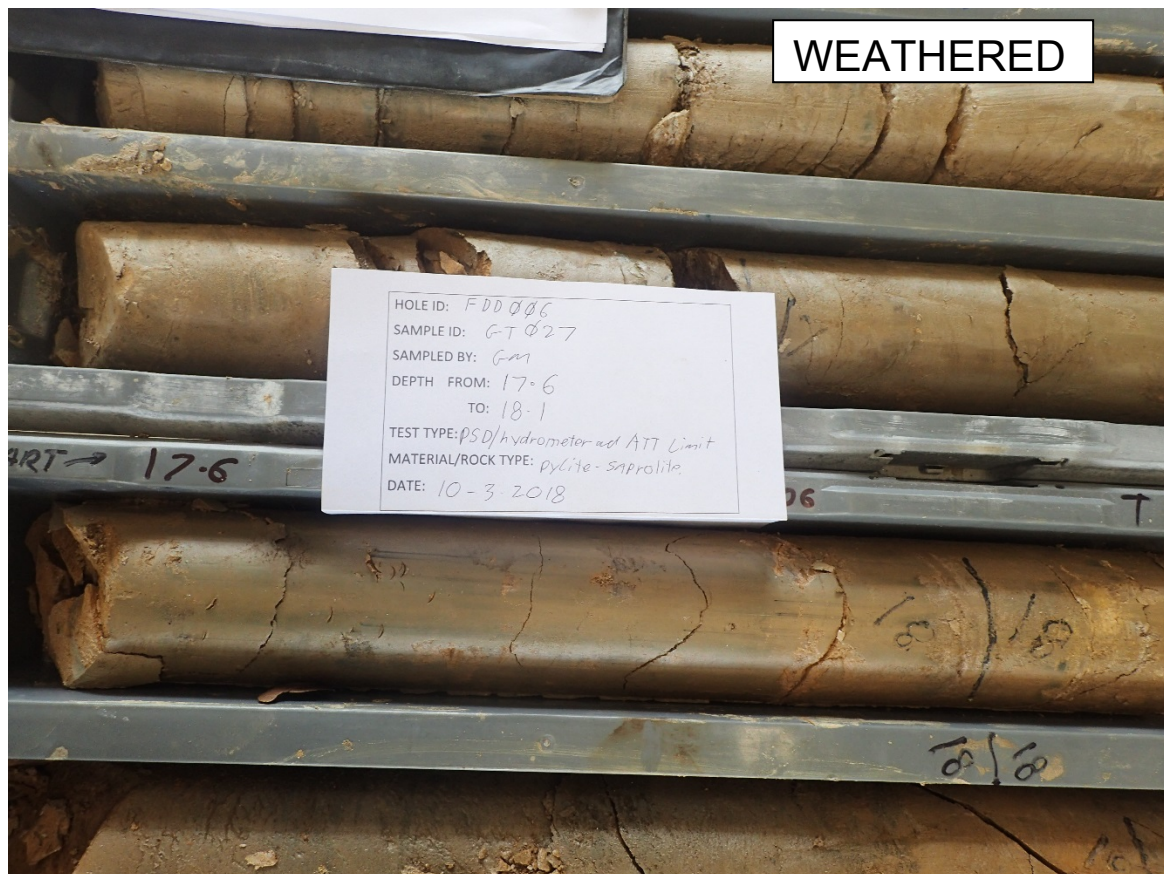
Photograph of typical intersection of Burrell Creek Formation Fresh phyllite from Grants (FMRD006, 175-182m).

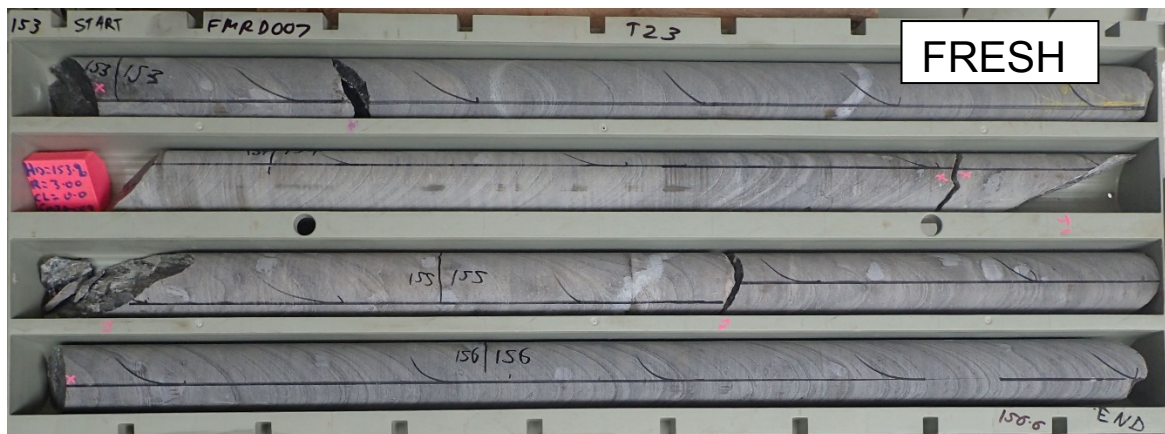


Photograph showing the fine interlamination of silty and sandy beds in a typical BCF turbidite (FMRD007, 201m)



Photographs of Andalusite (left) and Garnet (right) crystals growing in BCF phyllite.





Photographs of the three weathering domains of BCF phyllite from Grants (Top = Weathered, Middle = Transitional, Bottom = Fresh)





Figure H Photographs of the three weathering domains of Quartz Veins from Grants (Top = Weathered, Middle = Transitional, Bottom = Fresh)

APPENDIX C TABULATED SUMMARIES OF ANALYTICAL DATA AND LABORATORY CERTIFICATES

Hole	Sample ID	Easting	Northing	Depth from	Depth to	Emerson Aggregate Test			Acid Base Accounting				Net Acid Generation				Acid Neutralising Capacity				
						Colour (Munsell)	Texture	Emerson Class Number	Description	pH value (1:2)	Sulfur - Total S (LECO)	Maximum Potential Acidity (=30.6 x Total S)	Net Acid Production Potential (NAPP)	pH _{ox}	NAG (pH 4.5)	NAG (pH 7.0)	NAG (pH 4.5) - NAG (pH 7.0)	Acid Neutralising Capacity (ANC)	Acid Neutralising Capacity (ANC)	Fizz Rating	ANC/MPA
Unit	pH unit	%	kg H ₂ SO ₄ /t	pH unit	kg H ₂ SO ₄ /t	kg H ₂ SO ₄ /t eq	%CaCO ₃	-	-												
LoR	0.1	0.01	-	0.5	0.1	0.1	0.1	0.5	0.1	0	-	-									
Trigger Value	5.50	0.05	-	-	-	-	-	-	-	-	-	-									
Work Order: EB1718332; August 2017																					
FRC031	A1798	692,987	8,599,024	20	30	Light Brownish Grey	Sand	8	No slaking, no swelling	6.6	<0.01	-	-1.4	-	-	-	1.4	0.1	0	-	
FRC031	A1799	692,987	8,599,024	60	70	Very Dark Grey	Rock	8	No slaking, no swelling	8.5	<0.01	-	-6.0	-	-	-	6.0	0.6	0	-	
FRC031	A1800	692,987	8,599,024	140	146	Very Dark Grey	Rock	8	No slaking, no swelling	8.9	0.03	0.9	-5.9	-	-	-	6.8	0.7	0	7.4	
FRC032	A1801	693,006	8,599,125	15	25	Brown	Silty Clay Loam	2	Slaking, some dispersion	7.2	<0.01	-	-3.3	-	-	-	3.3	0.3	0	-	
FRC032	A1802	693,006	8,599,125	40	50	Brown	Clay Loam	4	No dispersion; carbonate or gypsum present	7.6	<0.01	-	-4.6	-	-	-	4.6	0.5	0	-	
FRC032	A1803	693,006	8,599,125	108	118	Very Dark Grey	Rock	8	No slaking, no swelling	9.3	0.04	1.2	-8.1	-	-	-	9.3	1.0	0	7.6	
FRC033	A1804	692,982	8,598,977	10	20	Greyish Brown	Clay Loam	2	Slaking, some dispersion	6.9	<0.01	-	-3.0	-	-	-	3.0	0.3	0	-	
FRC033	A1805	692,982	8,598,977	50	60	Dark Grey	Sandy Loam	4	No dispersion; carbonate or gypsum present	7.9	<0.01	-	-6.8	-	-	-	6.8	0.7	0	-	
FRC033	A1806	692,982	8,598,977	124	134	Grey	Sandy Loam	4	No dispersion; carbonate or gypsum present	8.4	0.03	0.9	-6.4	-	-	-	7.3	0.7	0	8.0	
FRC034	A1807	692,971	8,598,923	0	10	Dark Reddish Brown	Silty Loam	4	No dispersion; carbonate or gypsum present	5.6	<0.01	-	-0.9	-	-	-	0.9	<0.1	0	-	
FRC034	A1808	692,971	8,598,923	50	60	Very Dark Grey	Rock	8	No slaking, no swelling	7.7	<0.01	-	-5.3	-	-	-	5.3	0.5	0	-	
FRC034	A1809	692,971	8,598,923	106	114	Very Dark Grey	Rock	8	No slaking, no swelling	8.5	0.07	2.1	-5.8	-	-	-	7.9	0.8	0	3.7	
FRC035	A1810	692,935	8,598,924	30	40	Brown	Loam	4	No dispersion; carbonate or gypsum present	7.6	<0.01	-	-6.1	-	-	-	6.1	0.6	0	-	
FRC035	A1811	692,935	8,598,924	70	80	Grey	Loam	4	No dispersion; carbonate or gypsum present	6.3	0.08	2.4	-4.2	-	-	-	6.7	0.7	0	2.7	
FRC035	A1812	692,935	8,598,924	110	120	Grey	Sandy Loam	4	No dispersion; carbonate or gypsum present	9.2	0.04	1.2	-5.8	-	-	-	7.0	0.7	0	5.7	
FRC036	A1813	692,945	8,598,976	0	10	Olive Brown	Silty Loam	4	No dispersion; carbonate or gypsum present	5.5	<0.01	-	-2.4	-	-	-	2.4	0.2	0	-	
FRC036	A1814	692,945	8,598,976	120	130	Grey	Silty Loam	4	No dispersion; carbonate or gypsum present	9.1	0.02	0.6	-9.1	-	-	-	9.7	1.0	0	15.8	
FRC036	A1815	692,945	8,598,976	180	190	Very Dark Grey	Gravelly Sand	8	No slaking, no swelling	9.2	0.03	0.9	-6.8	-	-	-	7.7	0.8	0	8.4	
FRC037	A1816	692,952	8,599,023	10	20	Dark Yellowish Brown	Silty Loam	4	No dispersion; carbonate or gypsum present	5.4	<0.01	-	-3.1	-	-	-	3.1	0.3	0	-	
FRC037	A1817	692,952	8,599,023	110	120	Very Dark Grey	Gravelly Sand	8	No slaking, no swelling	9.0	0.03	0.9	-8.8	-	-	-	9.7	1.0	1	10.6	
FRC037	A1818	692,952	8,599,023	175	185	Very Dark Grey	Gravelly Sand	8	No slaking, no swelling	9.2	0.02	0.6	-5.7	-	-	-	6.3	0.6	1	10.3	
FRC038	A1819	692,964	8,599,072	20	30	Dark Yellowish Brown	Silty Loam	4	No dispersion; carbonate or gypsum present	5.5	<0.01	-	-2.5	-	-	-	2.5	0.2	0	-	
FRC038	A1820	692,964	8,599,072	124	134	Very Dark Grey	Gravelly Sand	8	No slaking, no swelling	9.0	0.06	1.8	-4.8	-	-	-	6.6	0.7	0	3.6	
FRC038	A1821	692,964	8,599,072	191	201	Very Dark Grey	Gravelly Sand	8	No slaking, no swelling	9.2	0.04	1.2	-6.4	-	-	-	7.6	0.8	0	-	
FRC039	A1822	692,971	8,599,127	30	40	Yellowish Brown	Silty Loam	4	No dispersion; carbonate or gypsum present	7.6	<0.01	-	-3.4	-	-	-	3.4	0.3	0	-	
FRC039	A1823	692,971	8,599,127	100	110	Very Dark Grey	Gravelly Sand	8	No slaking, no swelling	9.1	0.12	3.7	-4.9	-	-	-	8.6	0.9	0	2.3	
FRC039	A1824	692,971	8,599,127	165	175	Very Dark Grey	Gravelly Sand	8	No slaking, no swelling	9.4	0.03	0.9	-4.4	-	-	-	5.3	0.5	0	5.8	
FRC040	A1825	692,978	8,599,173	40	50	Dark Yellowish Brown	Gravelly Sand	8	No slaking, no swelling	7.0	<0.01	-	-1.7	-	-	-	1.7	0.2	0	-	
FRC040	A1826	692,978	8,599,173	90	100	Grey	Silty Loam	4	No dispersion; carbonate or gypsum present	8.8	0.04	1.2	-5.3	-	-	-	6.5	0.7	0	5.3	
FRC040	A1827	692,978	8,599,173	145	155	Very Dark Grey	Gravelly Sand	8	No slaking, no swelling	9.0	0.03	0.9	-7.5	-	-	-	8.4	0.8	1	9.2	
FRC041	A1828	692,930	8,599,070	80	90	Very Dark Grey	Gravelly Sand	8	No slaking, no swelling	9.2	0.06	1.8	-6.4	-	-	-	8.2	0.8	0	4.5	
FRC041	A1829	692,930	8,599,070	175	185	Very Dark Grey	Gravelly Sand	8	No slaking, no swelling	9.5	0.04	1.2	-5.6	-	-	-	6.8	0.7	1	5.6	
FRC041	A1830	692,930	8,599,070	215	225	Very Dark Grey	Gravelly Sand	8	No slaking, no swelling	9.4	0.05	1.5	-7.1	-	-	-	8.6	0.9	0	5.6	
FRCD005	A1831	692,917	8,599,021	60	70	Very Dark Grey	Gravelly Sand	8	No slaking, no swelling	8.9	0.02	0.6	-6.7	-	-	-	7.3	0.7	0	11.9	
FRCD005	A1832	692,917	8,599,021	100	110	Very Dark Grey	Gravelly Sand	8	No slaking, no swelling	9.1	0.11	3.4	-2.6	-	-	-	6.0	0.6	0	1.8	
FRCD005	A1833	692,917	8,599,021	185	195	Very Dark Grey	Gravelly Sand	8	No slaking, no swelling	9.6	0.02	0.6	-6.2	-	-	-	6.8	0.7	0	11.1	
Work Order: EB1817447 and EB1016614; January and February 2018																					
FRC109	FRC109-20	693,135	8,598,929	13	43	Yellowish Brown	Clay Loam	3	Remoulded at plastic limit disperses	6.8	0.02	0.6	-	-	-	-	-	-	-	-	
FRC110	FRC110-10	693,080	8,598,949	4	37	Olive Brown	Loam	3	Remoulded at plastic limit disperses	6.1	<0.01	-	-4.4	6.90	<0.1	0.30	-0.30	4.4	0.4	0	-
FRC110	FRC110-120	693,080	8,598,949	114	135	Olive Grey	Sandy Loam	4	No dispersion; carbonate or gypsum present	9.0	0.02	0.6	-9.2	8.80	<0.1	<0.1	0.00	9.8	1.0	0	16.0
FRC111	FRC111-30	693,112	8,598,949	33	41	Olive Brown	Loam	3	Remoulded at plastic limit disperses	7.2	<0.01	-	-	-	-	-	-	-	-	-	
FRC111	FRC111-80	693,112	8,598,949	79	111	Very Dark Grey	Clay Loam	4	No dispersion; carbonate or gypsum present	8.1	0.08	2.4	-2.5	4.3	0.2	1.4	-1.2	5.6	0.6	0	2.3
FRC112	FRC112-10	693,096	8,599,047	8	28	Olive Brown	Loam	3	Remoulded at plastic limit disperses	6.3	<0.01	-	-	-	-	-	-	-	-	-	
FRC112	FRC112-30	693,096	8,599,047	29	41	Very Dark Grey	Loam	3	Remoulded at plastic limit disperses	7.4	<0.01	-	-	-	-	-	-	-	-	-	
FRC112	FRC112-110	693,096	8,599,047	110	128	Olive Brown	Loamy Sand	4	No dispersion; carbonate or gypsum present	9.3	<0.01	-	-	-	-	-	-	-	-	-	
FRC113	FRC113-10	693,129	8,599,098	1	20	Olive Brown	Loam	3	Remoulded at plastic limit disperses	7.0	<0.01	-	-	-	-	-	-	-	-	-	
FRC113	FRC113-50	693,129	8,599,098	46	65	Very Dark Grey	Gravelly Sand	4	No dispersion; carbonate or gypsum present	8.2	<0.01	-	-9.4	6.9	<0.1	0.1	-0.1	9.4	1.0	0	-

Hole	Sample ID	Easting	Northing	Depth from	Depth to	Emerson Aggregate Test			Acid Base Accounting				Net Acid Generation				Acid Neutralising Capacity				
						Colour (Munsell)	Texture	Emerson Class Number	Description	pH value (1:2)	Sulfur - Total S (LECO)	Maximum Potential Acidity (=30.6 x Total S)	Net Acid Production Potential (NAPP)	pH _{ox}	NAG (pH 4.5)	NAG (pH 7.0)	NAG (pH 4.5) - NAG (pH 7.0)	Acid Neutralising Capacity (ANC)	Acid Neutralising Capacity (ANC)	Fizz Rating	ANC/MPA
										Unit	%	kg H ₂ SO ₄ /t		pH unit	kg H ₂ SO ₄ /t	kg H ₂ SO ₄ /t eq	%CaCO ₃	-	-		
										LoR	0.1	0.01		0.1	0.1	0.1	0.5	0.1	0		
										Trigger Value	5.50	0.05	-	-	-	-	-	-	-	-	
FRC113	FRC113-80	693.129	8,599,098	74	97	Very Dark Grey	Gravelly Sand	8	No slaking, no swelling	9.4	0.02	0.6	-10.7	8.2	<0.1	<0.1	-	11.6	1.2	1	19.0
FRC113	FRC113-130	693.129	8,599,098	129	159	Olive Brown	Loam	8	No slaking, no swelling	9.3	<0.01	-	-	-	-	-	-	-	-	-	-
FRC114	FRC114-0	693.094	8,599,100	2	30	Light Olive Brown	Loam	3	Remoulded at plastic limit disperses	6.5	<0.01	-	-	-	-	-	-	-	-	-	-
FRC114	FRC114-30	693.094	8,599,100	30	41	Olive Brown	Clay Loam	3	Remoulded at plastic limit disperses	7.1	<0.01	-	-	-	-	-	-	-	-	-	-
FRC114	FRC114-50	693.094	8,599,100	45	66	White	Loamy Sand	3	Remoulded at plastic limit disperses	6.8	<0.01	-	-	-	-	-	-	-	-	-	-
FRC115	FRC115-10	693.104	8,599,099	9	52	Olive Brown	Loam	3	Remoulded at plastic limit disperses	6.9	<0.01	-	-	-	-	-	-	-	-	-	-
FRC115	FRC115-110	693.104	8,599,099	107	125	Very Dark Grey	Gravelly Sand	8	No slaking, no swelling	8.9	0.06	1.8	-7.5	8.0	<0.1	<0.1	-	9.3	0.9	0	5.1
FRC117	FRC117-10	693.057	8,599,074	10	31	Grey	Sandy Loam	4	No dispersion; carbonate or gypsum present	5.9	<0.01	-	-	-	-	-	-	-	-	-	-
FRC120	FRC120-10	692.921	8,598,879	2	23	Olive Brown	Loam	3	Remoulded at plastic limit disperses	6.8	<0.01	-	-	-	-	-	-	-	-	-	-
FRC120	FRC120-30	692.921	8,598,879	24	54	Olive Brown	Loam	3	Remoulded at plastic limit disperses	7.8	<0.01	-	-8.8	7.1	<0.1	<0.1	-	8.8	0.9	0	-
FRC120	FRC120-60	692.921	8,598,879	65	74	Dark Greyish Brown	Loam	3	Remoulded at plastic limit disperses	7.3	0.03	0.9	-7.1	6.5	<0.1	0.5	-0.5	8.0	0.8	0	8.7
FRC120	FRC120-70	692.921	8,598,879	75	81	Very Dark Grey	Gravelly Sand	3	Remoulded at plastic limit disperses	8.1	<0.01	-	-7.1	6.6	<0.1	0.5	-0.5	7.1	0.7	0	-
FRC120	FRC120-130	692.921	8,598,879	125	155	Dark Yellowish Brown	Loam	8	No slaking, no swelling	9.2	0.02	0.6	-	-	-	-	-	-	-	-	-
FRC121	FRC121-20	692.966	8,599,053	19	53	Dark Grey	Sandy Clay Loam	3	Remoulded at plastic limit disperses	7.6	<0.01	-	-4.8	7.0	<0.1	<0.1	-	4.8	0.5	0	-
FRC121	FRC121-90	692.966	8,599,053	90	112	Grey	Sandy Clay Loam	4	No dispersion; carbonate or gypsum present	8.9	0.03	0.9	-12.7	8.8	<0.1	<0.1	-	13.6	1.4	1	14.8
FRC121	FRC121-160	692.966	8,599,053	153	166	Olive Brown	Loam	4	No dispersion; carbonate or gypsum present	8.8	0.40	12.2	1.6	6.2	<0.1	0.6	-0.6	10.6	1.1	1	0.9
FRC122	FRC122-0	693.125	8,599,147	0	28	Olive Brown	Loam	3	Remoulded at plastic limit disperses	7.0	<0.01	-	-4.8	6.9	<0.1	<0.1	-	4.8	0.5	0	-
FRC122	FRC122-40	693.125	8,599,147	33	70	Very Dark Grey	Gravelly Sand	3	Remoulded at plastic limit disperses	8.3	0.02	0.6	-6.7	6.6	<0.1	0.8	-0.8	7.3	0.7	0	11.9
FRC122	FRC122-70	693.125	8,599,147	71	97	Dark Grey	Gravelly Sand	8	No slaking, no swelling	8.5	0.08	2.4	-4.2	6.0	<0.1	0.8	-0.8	6.6	0.7	0	2.7
FRC122	FRC122-130	693.125	8,599,147	127	137	Dark Greyish Brown	Sandy Loam	8	No slaking, no swelling	9.4	<0.01	-	-12.1	8.7	<0.1	<0.1	-	12.1	1.2	1	-
FRC123	FRC123-10	693.100	8,599,146	2	20	Olive Brown	Loam	3	Remoulded at plastic limit disperses	7.1	<0.01	-	-	-	-	-	-	-	-	-	-
FRC123	FRC123-20	693.100	8,599,146	20	54	Dark Greyish Brown	Clay Loam	3	Remoulded at plastic limit disperses	7.5	<0.01	-	-	-	-	-	-	-	-	-	-
FRC123	FRC123-50	693.100	8,599,146	54	61	Olive Grey	Sandy Clay Loam	3	Remoulded at plastic limit disperses	7.9	<0.01	-	-	-	-	-	-	-	-	-	-
FRC124	FRC124-10	693.114	8,599,001	2	23	Olive Brown	Loam	3	Remoulded at plastic limit disperses	6.7	<0.01	-	-	-	-	-	-	-	-	-	-
FRC124	FRC124-30	693.114	8,599,001	23	50	Dark Grey	Sandy Loam	3	Remoulded at plastic limit disperses	7.0	<0.01	-	-	-	-	-	-	-	-	-	-
FRC124	FRC124-50	693.114	8,599,001	50	77	Dark Grey	Sandy Loam	4	No dispersion; carbonate or gypsum present	7.7	0.05	1.5	-7.8	5.0	<0.1	1.0	-1.0	9.3	0.9	1	6.1
FRC124	FRC124-80	693.114	8,599,001	77	104	Very Dark Grey	Sandy Loam	4	No dispersion; carbonate or gypsum present	8.8	0.07	2.1	-5.6	5.2	<0.1	1.2	-1.2	7.8	0.8	0	3.6
FRC124	FRC124-160	693.114	8,599,001	155	169	Olive Brown	Sandy Loam	4	No dispersion; carbonate or gypsum present	9.0	0.10	3.1	-6.1	6.5	<0.1	0.6	-0.6	9.2	0.9	1	3.0
Workorders: EB1815150 and EB1814449; June 2018																					
FRC126	FRC126-001	693.134	8,599,248	1	1	Olive Brown	Sandy Loam	3	Remoulded at plastic limit disperses	6.1	<0.01	-	-	-	-	-	-	-	-	-	-
FRC126	FRC126-003	693.134	8,599,248	3	3	Olive Brown	Sandy Loam	3	Remoulded at plastic limit disperses	6.0	<0.01	-	-	-	-	-	-	-	-	-	-
FRC126	FRC126-021	693.134	8,599,248	21	21	Olive Brown	Sandy Loam	3	Remoulded at plastic limit disperses	7.8	<0.01	-	-	-	-	-	-	-	-	-	-
FRC126	FRC126-061	693.134	8,599,248	61	61	Olive Grey	Sandy Loam	3	Remoulded at plastic limit disperses	9.2	0.02	0.6	-	-	-	-	-	-	-	-	-
FRC126	FRC126-081	693.134	8,599,248	81	81	Black	Gravelly Sand	8	No slaking, no swelling	9.5	0.03	0.9	-	-	-	-	-	-	-	-	-
FRC127	FRC127-001	692.862	8,599,197	1	1	Red	Gravelly Sand	8	No slaking, no swelling	5.4	<0.01	-	-	-	-	-	-	-	-	-	-
FRC127	FRC127-014	692.862	8,599,197	14	14	Pale Brown	Gravelly Sand	8	No slaking, no swelling	5.7	<0.01	-	-	-	-	-	-	-	-	-	-
FRC127	FRC127-040	692.862	8,599,197	40	40	Grey	Gravelly Sand	8	No slaking, no swelling	8.3	<0.01	-	-	-	-	-	-	-	-	-	-
FRC127	FRC127-051	692.862	8,599,197	51	51	Grey	Gravelly Sand	8	No slaking, no swelling	8.9	<0.01	-	-	-	-	-	-	-	-	-	-
FRC127	FRC127-060	692.862	8,599,197	60	60	Grey	Gravelly Sand	8	No slaking, no swelling	8.8	<0.01	-	-	-	-	-	-	-	-	-	-
FRC127	FRC127-081	692.862	8,599,197	81	81	Grey	Sandy Loam	3	Remoulded at plastic limit disperses	8.6	0.03	0.9	-	-	-	-	-	-	-	-	-
FRC128	FRC128-001	692.680	8,599,195	1	1	Red	Sandy Loam	4	No dispersion; carbonate or gypsum present	5.3	<0.01	-	-	-	-	-	-	-	-	-	-
FRC128	FRC128-003	692.680	8,599,195	3	3	Light Olive Brown	Sandy Loam	4	No dispersion; carbonate or gypsum present	5.4	<0.01	-	-	-	-	-	-	-	-	-	-
FRC128	FRC128-020	692.680	8,599,195	20	20	Brown	Gravelly Sand	8	No slaking, no swelling	6.2	<0.01	-	-	-	-	-	-	-	-	-	-
FRC128	FRC128-040	692.680	8,599,195	40	40	Light Olive Brown	Sandy Loam	3	Remoulded at plastic limit disperses	6.7	<0.01	-	-	-	-	-	-	-	-	-	-
FRC128	FRC128-047	692.680	8,599,195	47	47	Light Yellowish Brown	Gravelly Sand	8	No slaking, no swelling	7.6	<0.01	-	-	-	-	-	-	-	-	-	-
FRC128	FRC128-060	692.680	8,599,195	60	60	Olive Grey	Sandy Loam	8	No slaking, no swelling	8.4	<0.01	-	-	-	-	-	-	-	-	-	-
FRC128	FRC128-091	692.680	8,599,195	91	91	Light Olive Brown	Gravelly Sand	8	No slaking, no swelling	8.1	<0.01	-	-	-	-	-	-	-	-	-	-
FRC128	FRC128-100	692.680	8,599,195	100	100	Very Dark Grey	Gravelly Sand	8	No slaking, no swelling	9.2	<0.01	-	-	-	-	-	-	-	-	-	-

Hole	Sample ID	Easting	Northing	Depth from	Depth to	Emerson Aggregate Test				Acid Base Accounting				Net Acid Generation				Acid Neutralising Capacity			
						Colour (Munsell)	Texture	Emerson Class Number	Description	pH value (1:2)	Sulfur - Total S (LECO)	Maximum Potential Acidity (=30.6 x Total S)	Net Acid Production Potential (NAPP)	pH _{ox}	NAG (pH 4.5)	NAG (pH 7.0)	NAG (pH 4.5) - NAG (pH 7.0)	Acid Neutralising Capacity (ANC)	Acid Neutralising Capacity (ANC)	Fizz Rating	ANC/MPA
										Unit	%	kg H ₂ SO ₄ /t		pH unit	kg H ₂ SO ₄ /t	kg H ₂ SO ₄ /t eq	%CaCO ₃	-	-		
										LoR	0.1	0.01		0.1	0.1	0.1	0.5	0.1	0		
										Trigger Value	5.50	0.05	-	-	-	-	-	-	-		
FRC129	FRC129-001	692,833	8,599,083	1	1	Yellowish Red	Sandy Loam	4	No dispersion; carbonate or gypsum present	6.0	<0.01	-	-	-	-	-	-	-	-		
FRC129	FRC129-008	692,833	8,599,083	8	8	Olive Brown	Sandy Loam	3	Remoulded at plastic limit disperses	6.1	<0.01	-	-	-	-	-	-	-	-		
FRC129	FRC129-014	692,833	8,599,083	14	14	Brown	Gravelly Sand	8	No slaking, no swelling	5.7	<0.01	-	-	-	-	-	-	-	-		
FRC129	FRC129-040	692,833	8,599,083	40	40	Yellowish Brown	Sandy Loam	3	Remoulded at plastic limit disperses	7.5	<0.01	-	-	-	-	-	-	-	-		
FRC129	FRC129-047	692,833	8,599,083	47	47	Dark Greyish Brown	Sandy Loam	3	Remoulded at plastic limit disperses	7.9	<0.01	-	-	-	-	-	-	-	-		
FRC129	FRC129-061	692,833	8,599,083	61	61	Olive Grey	Sandy Loam	3	Remoulded at plastic limit disperses	8.5	<0.01	-	-	-	-	-	-	-	-		
FRC129	FRC129-088	692,833	8,599,083	88	88	Grey	Gravelly Sand	8	No slaking, no swelling	9.6	<0.01	-	-	-	-	-	-	-	-		
FRC130	FRC130-001	692,740	8,599,075	1	1	Red	Sandy Loam	4	No dispersion; carbonate or gypsum present	5.5	<0.01	-	-	-	-	-	-	-	-		
FRC130	FRC130-005	692,740	8,599,075	5	5	Brown	Gravelly Sand	8	No slaking, no swelling	5.0	<0.01	-	-	-	-	-	-	-	-		
FRC130	FRC130-020	692,740	8,599,075	20	20	Yellowish Brown	Sandy Loam	3	Remoulded at plastic limit disperses	6.6	<0.01	-	-	-	-	-	-	-	-		
FRC130	FRC130-040	692,740	8,599,075	40	40	Dark Grey Brown	Sandy Loam	3	Remoulded at plastic limit disperses	8.0	<0.01	-	-	-	-	-	-	-	-		
FRC130	FRC130-060	692,740	8,599,075	60	60	Very Dark Grey	Gravelly Sand	8	No slaking, no swelling	9.4	0.02	0.6	-	-	-	-	-	-	-		
FRC130	FRC130-080	692,740	8,599,075	80	80	Very Dark Grey	Gravelly Sand	8	No slaking, no swelling	9.3	0.02	0.6	-	-	-	-	-	-	-		
FRC130	FRC130-100	692,740	8,599,075	100	100	Very Dark Grey	Gravelly Sand	8	No slaking, no swelling	9.2	<0.01	-	-	-	-	-	-	-	-		
FRC131	FRC131-001	692,694	8,599,100	1	1	Yellowish Red	Gravelly Sand	8	No slaking, no swelling	5.6	0.02	0.6	-	-	-	-	-	-	-		
FRC131	FRC131-005	692,694	8,599,100	5	5	Dark Red	Gravelly Sand	8	No slaking, no swelling	6.2	<0.01	-	-	-	-	-	-	-	-		
FRC131	FRC131-020	692,694	8,599,100	20	20	Light Olive Brown	Gravelly Sand	8	No slaking, no swelling	6.2	<0.01	-	-	-	-	-	-	-	-		
FRC131	FRC131-047	692,694	8,599,100	47	47	Dark Reddish Brown	Sandy Loam	3	Remoulded at plastic limit disperses	7.0	<0.01	-	-	-	-	-	-	-	-		
FRC131	FRC131-080	692,694	8,599,100	80	80	Grey	Gravelly Sand	8	No slaking, no swelling	8.9	0.02	0.6	-	-	-	-	-	-	-		
FRC151	FRC151-1	693,120	8,598,900	1	1	Yellowish Red	Gravelly Sand	8	No slaking, no swelling	5.6	0.02	0.6	-	-	-	-	-	-	-		
FRC151	FRC151-10	693,120	8,598,900	10	10	Olive Brown	Sandy Loam	3	Remoulded at plastic limit disperses	7.2	<0.01	-	-	-	-	-	-	-	-		
FRC151	FRC151-30	693,120	8,598,900	30	30	Olive Brown	Sandy Loam	3	Remoulded at plastic limit disperses	7.4	<0.01	-	-	-	-	-	-	-	-		
FRC151	FRC151-55	693,120	8,598,900	55	55	Dark Greyish Brown	Gravelly Sand	8	No slaking, no swelling	8.6	0.02	0.6	-	-	-	-	-	-	-		
FRC151	FRC151-62	693,120	8,598,900	62	62	Dark Grey	Gravelly Sand	8	No slaking, no swelling	8.9	0.02	0.6	-	-	-	-	-	-	-		
FRC151	FRC151-80	693,120	8,598,900	80	80	Dark Grey	Gravelly Sand	8	No slaking, no swelling	9.4	0.02	0.6	-	-	-	-	-	-	-		
FRC151	FRC151-130	693,120	8,598,900	130	130	Grey	Gravelly Sand	8	No slaking, no swelling	9.2	0.46	14.1	-6.0	8.1	<0.1	<0.1	0.0	20.1	2.0	1	1.4
FRC151	FRC151-137	693,120	8,598,900	137	137	Grey	Sandy Loam	3	Remoulded at plastic limit disperses	9.2	0.03	0.9	-	-	-	-	-	-	-	-	
FRC151	FRC151-165	693,120	8,598,900	165	165	Dark Grey	Gravelly Sand	8	No slaking, no swelling	9.5	0.04	1.2	-	-	-	-	-	-	-	-	
FRC151	FRC151-191	693,120	8,598,900	191	191	Olive Grey	Gravelly Sand	8	No slaking, no swelling	9.3	0.02	0.6	-	-	-	-	-	-	-	-	
FRC151	FRC151-208	693,120	8,598,900	208	208	Grey	Gravelly Sand	8	No slaking, no swelling	9.7	<0.01	-	-	-	-	-	-	-	-	-	
FRC151	FRC151-272	693,120	8,598,900	272	272	Black	Gravelly Sand	8	No slaking, no swelling	9.4	0.62	19.0	7.7	2.8	11.0	14.2	-3.2	11.3	1.2	1	0.6
FRC152	FRC152-5	693,115	8,598,875	5	5	Yellowish Brown	Sandy Loam	3	Remoulded at plastic limit disperses	6.1	<0.01	-	-	-	-	-	-	-	-	-	
FRC152	FRC152-23	693,115	8,598,875	23	23	Dark Greyish Brown	Sandy Loam	3	Remoulded at plastic limit disperses	8.0	<0.01	-	-	-	-	-	-	-	-	-	
FRC152	FRC152-46	693,115	8,598,875	46	46	Olive Brown	Gravelly Sand	8	No slaking, no swelling	8.4	<0.01	-	-	-	-	-	-	-	-	-	
FRC152	FRC152-51	693,115	8,598,875	51	51	Dark Greyish Brown	Gravelly Sand	8	No slaking, no swelling	9.1	<0.01	-	-	-	-	-	-	-	-	-	
FRC152	FRC152-64	693,115	8,598,875	64	64	Greyish Brown	Sandy Loam	3	Remoulded at plastic limit disperses	9.0	0.02	0.6	-	-	-	-	-	-	-	-	
FRC152	FRC152-70	693,115	8,598,875	70	70	Grey	Sandy Loam	3	Remoulded at plastic limit disperses	9.1	0.02	0.6	-	-	-	-	-	-	-	-	
FRC152	FRC152-125	693,115	8,598,875	125	125	Very Dark Grey	Gravelly Sand	8	No slaking, no swelling	8.7	1.88	57.5	49.5	2.4	41.9	49.2	-7.3	8.0	0.8	0	0.1
FRC152	FRC152-170	693,115	8,598,875	170	170	Very Dark Grey	Gravelly Sand	8	No slaking, no swelling	9.2	0.02	0.6	-	-	-	-	-	-	-	-	
FRC153	FRC153-1	693,085	8,598,790	1	1	Yellowish Red	Gravelly Sand	8	No slaking, no swelling	5.6	0.02	0.6	-	-	-	-	-	-	-	-	
FRC153	FRC153-4	693,085	8,598,790	4	4	Strong Brown	Sandy Loam	4	No dispersion; carbonate or gypsum present	5.2	<0.01	-	-	-	-	-	-	-	-	-	
FRC153	FRC153-21	693,085	8,598,790	21	21	Gravelly Sand	Gravelly Sand	8	No slaking, no swelling	7.6	<0.01	-	-	-	-	-	-	-	-	-	
FRC153	FRC153-38	693,085	8,598,790	38	38	Dary Greyish Brown	Sandy Loam	3	Remoulded at plastic limit disperses	8.7	0.02	0.6	-	-	-	-	-	-	-	-	
FRC154	FRC154-3	692,898	8,598,928	3	3	Red	Gravelly Sand	8	No slaking, no swelling	5.2	<0.01	-	-	-	-	-	-	-	-	-	
FRC154	FRC154-7	692,898	8,598,928	7	7	Olive Brown	Sandy Loam	4	No dispersion; carbonate or gypsum present	5.5	<0.01	-	-	-	-	-	-	-	-	-	
FRC154	FRC154-42	692,898	8,598,928	42	42	Dark Greyish Brown	Sandy Loam	4	No dispersion; carbonate or gypsum present	7.7	<0.01	-	-	-	-	-	-	-	-	-	
FRC154	FRC154-71	692,898	8,598,928	71	71	Dark Greyish Brown	Sandy Loam	4	No dispersion; carbonate or gypsum present	8.2	<0.01	-	-	-	-	-	-	-	-	-	
FRC154	FRC154-109	692,898	8,598,928	109	109	Very Dark Grey	Gravelly Sand	8	No slaking, no swelling	9.1	<0.01	-	-	-	-	-	-	-	-	-	

Hole	Sample ID	Easting	Northing	Depth from	Depth to	Emerson Aggregate Test			Acid Base Accounting				Net Acid Generation				Acid Neutralising Capacity				
						Colour (Munsell)	Texture	Emerson Class Number	Description	pH value (1:2)	Sulfur - Total S (LECO)	Maximum Potential Acidity (≈30.6 x Total S)	Net Acid Production Potential (NAPP)	pH _{ox}	NAG (pH 4.5)	NAG (pH 7.0)	NAG (pH 4.5) - NAG (pH 7.0)	Acid Neutralising Capacity (ANC)	Acid Neutralising Capacity (ANC)	Fizz Rating	ANC/MPA
Unit	pH unit	%	kg H ₂ SO ₄ /t	pH unit	kg H ₂ SO ₄ /t	kg H ₂ SO ₄ /t eq	%CaCO ₃	-	-												
LoR	0.1	0.01	-	0.5	0.1	0.1	0.1	-	0.5	0.1	0	-									
Trigger Value	5.50	0.05	-	-	-	-	-	-	-	-	-	-									
FRC156	FRC156-1	692,920	8,598,815	1	1	Yellowish Red	Gravelly Sand	8	No slaking, no swelling	5.9	<0.01	-	-	-	-	-	-	-	-		
FRC156	FRC156-2	692,920	8,598,815	2	2	Yellowish Brown	Sandy Loam	4	No dispersion; carbonate or gypsum present	5.5	<0.01	-	-	-	-	-	-	-	-		
FRC156	FRC156-41	692,920	8,598,815	41	41	Brown	Sandy Loam	3	Remoulded at plastic limit disperses	7.2	<0.01	-	-	-	-	-	-	-	-		
FRC156	FRC156-42	692,920	8,598,815	42	42	Dark Greyish Brown	Sandy Loam	3	Remoulded at plastic limit disperses	7.4	<0.01	-	-	-	-	-	-	-	-		
FRC156	FRC156-61	692,920	8,598,815	61	61	Greyish Brown	Sandy Loam	3	Remoulded at plastic limit disperses	8.2	<0.01	-	-	-	-	-	-	-	-		
FRC156	FRC156-100	692,920	8,598,815	100	100	Very Dark Grey	Gravelly Sand	8	No slaking, no swelling	9.2	<0.01	-	-	-	-	-	-	-	-		
FRC156	FRC156-125	692,920	8,598,815	125	125	Light Olive Grey	Gravelly Sand	8	No slaking, no swelling	9.2	<0.01	-	-	-	-	-	-	-	-		
FRC157	FRC157-1	692,920	8,598,855	1	1	Red	Gravelly Sand	8	No slaking, no swelling	6.0	<0.01	-	-	-	-	-	-	-	-		
FRC157	FRC157-20	692,920	8,598,855	20	20	Olive Brown	Sandy Loam	4	No dispersion; carbonate or gypsum present	6.7	<0.01	-	-	-	-	-	-	-	-		
FRC157	FRC157-72	692,920	8,598,855	72	72	Olive Brown	Sandy Loam	3	Remoulded at plastic limit disperses	7.6	<0.01	-	-	-	-	-	-	-	-		
Workorders: EB1815858 and EB1817989; June 2018																					
FRC158	FRC158-1	692,890	8,598,855	1	1	Dark Red	Gravelly Sand	8	No slaking, no swelling	5.9	0.02	0.6	-4.7	6.4	<0.1	0.6	-0.6	4.7	0.5	0	7.7
FRC158	FRC158-10	692,890	8,598,855	10	10	Dark Greyish Brown	Sandy Loam	4	No dispersion; carbonate or gypsum present	6.3	0.02	0.6	-5.2	7.1	<0.1	<0.1	-	5.2	0.5	0	8.5
FRC158	FRC158-21	692,890	8,598,855	21	21	Olive Brown	Gravelly Sand	8	No slaking, no swelling	7.5	<0.01	-	-3.0	6.9	<0.1	0.1	-0.1	3.0	0.3	0	-
FRC158	FRC158-80	692,890	8,598,855	80	80	Dark Greyish Brown	Sandy Loam	3	Remoulded at plastic limit disperses	8.8	<0.01	-	-1.7	6.8	<0.1	0.5	-0.5	1.7	0.2	0	-
FRC159	FRC159-1	692,932	8,598,907	1	1	Red	Gravelly Sand	8	No slaking, no swelling	5.5	0.02	0.6	-1.7	5.5	<0.1	0.6	-0.6	2.3	0.2	0	3.8
FRC159	FRC159-4	692,932	8,598,907	4	4	Brown	Sandy Loam	4	No dispersion; carbonate or gypsum present	5.4	<0.01	-	-1.6	5.2	<0.1	1.2	-1.2	1.6	0.2	0	-
FRC159	FRC159-8	692,932	8,598,907	8	8	Yellowish Brown	Sandy Loam	3	Remoulded at plastic limit disperses	6.1	<0.01	-	-1.4	5.8	<0.1	1.0	-1.0	1.4	0.1	0	-
FRC159	FRC159-30	692,932	8,598,907	30	30	Olive Brown	Sandy Loam	3	Remoulded at plastic limit disperses	7.7	<0.01	-	-5.7	6.9	<0.1	0.2	-0.2	5.7	0.6	0	-
FRC159	FRC159-136	692,932	8,598,907	136	136	Black	Gravelly Sand	8	No slaking, no swelling	9.5	0.03	0.9	-10.1	8.0	<0.1	<0.1	0.0	11.0	1.1	1	12.0
FRC160	FRC160-2	693,029	8,599,301	2	2	Olive Brown	Sandy Loam	3	Remoulded at plastic limit disperses	9.0	<0.01	-	-4.2	7.2	<0.1	<0.1	0.0	4.2	0.4	0	-
FRC160	FRC160-4	693,029	8,599,301	4	4	Dark Greyish Brown	Sandy Loam	3	Remoulded at plastic limit disperses	8.2	<0.01	-	-3.8	7.1	<0.1	<0.1	0.0	3.8	0.4	0	-
FRC160	FRC160-73	693,029	8,599,301	73	73	Dark Greyish Brown	Sandy Loam	3	Remoulded at plastic limit disperses	8.8	0.02	0.6	-5.8	6.8	<0.1	0.4	-0.4	6.4	0.6	0	10.5
FRC160	FRC160-91	693,029	8,599,301	91	91	Black	Gravelly Sand	8	No slaking, no swelling	9.3	0.04	1.2	-7.4	7.7	<0.1	<0.1	0.0	8.6	0.9	0	7.0
n									164	64	64	71	35	3	21	27	71	70.0	71	42	
Minimum									5.0	0.02	0.6	-12.7	2.4	<0.1	<0.1	-7.3	0.9	0.1	0	0.1	
Maximum									9.7	1.88	57.5	49.5	8.8	41.9	49.2	0.0	20.1	2.0	1	19.0	
Average									7.8	0.09	2.7	-4.5	6.6	17.7	3.6	-0.8	6.7	0.7	0	7.0	
StDev									1.4	0.25	7.6	7.2	1.5	21.6	10.9	1.4	3.3	0.3	0	4.6	

Hole	Sample ID	Easting	Northing	Texture	pH value (1:2)	Electrical Conductivity @ 25°C (1:2)	Exchange Acidity		Exchangeable Cations on Alkaline Soils (pH 7.6 to 9.3)							Exchangeable Cations on Acidic Soils (pH 5.4 to 7.2)									
							Exchange Acidity	Exchangeable Aluminium	Exchangeable Calcium	Exchangeable Magnesium	Exchangeable Potassium	Exchangeable Sodium	Cation Exchange Capacity	Exchangeable Sodium Percent	Calcium/Magnesium Ratio	Magnesium/Potassium Ratio	Exchangeable Calcium	Exchangeable Magnesium	Exchangeable Potassium	Exchangeable Sodium	Cation Exchange Capacity	Exchangeable Sodium Percent	Calcium/Magnesium ratio	Magnesium/Potassium Ratio	
Unit	pH unit	dS/m	meq/100g							meq/100g							%	-	-						
LoR	0.1	0.001	0.1	0.1	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.1	0.1	0.1	0.1	0.1	0.1	0.02	0.02	
Work Order: EB1718332				Trigger Value	5.5	0.400																			
FRC031	A1798	692,987	8,599,024	Sand	6.6	0.020	-	-	-	-	-	-	-	-	-	-	-	0.2	2.8	0.2	<0.1	3.3	1.4	-	-
FRC031	A1799	692,987	8,599,024	Rock	8.5	0.020	-	-	0.5	0.5	<0.1	<0.1	1.0	<0.1	-	-	-	-	-	-	-	-	-	-	-
FRC031	A1800	692,987	8,599,024	Rock	8.9	0.040	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-
FRC032	A1801	693,006	8,599,125	Silty Clay Loam	7.2	0.040	-	-	-	-	-	-	-	-	-	-	-	1.1	4.2	0.2	<0.1	5.6	1.2	-	-
FRC032	A1802	693,006	8,599,125	Clay Loam	7.6	0.030	-	-	<0.1	0.6	<0.1	<0.1	0.6	<0.1	-	-	-	-	-	-	-	-	-	-	-
FRC032	A1803	693,006	8,599,125	Rock	9.3	0.090	-	-	0.3	<0.1	0.1	<0.1	0.4	<0.1	-	-	-	-	-	-	-	-	-	-	-
FRC033	A1804	692,982	8,598,977	Clay Loam	6.9	0.030	-	-	-	-	-	-	-	-	-	-	-	<0.1	3.3	0.2	<0.1	3.6	0.8	-	-
FRC033	A1805	692,982	8,598,977	Sandy Loam	7.9	0.040	-	-	0.7	1.3	<0.1	<0.1	2.0	<0.1	-	-	-	-	-	-	-	-	-	-	-
FRC033	A1806	692,982	8,598,977	Sandy Loam	8.4	0.040	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-
FRC034	A1807	692,971	8,598,923	Silty Loam	5.6	0.020	0.4	0.2	-	-	-	-	-	-	-	-	-	<0.1	1.9	0.2	<0.1	2.5	3.1	-	-
FRC034	A1808	692,971	8,598,923	Rock	7.7	0.030	-	-	0.5	0.9	<0.1	<0.1	1.4	<0.1	-	-	-	-	-	-	-	-	-	-	-
FRC034	A1809	692,971	8,598,923	Rock	8.5	0.050	-	-	0.4	<0.1	0.2	<0.1	0.6	<0.1	-	-	-	-	-	-	-	-	-	-	-
FRC035	A1810	692,935	8,598,924	Loam	7.6	0.040	-	-	<0.1	0.7	<0.1	<0.1	0.7	<0.1	-	-	-	-	-	-	-	-	-	-	-
FRC035	A1811	692,935	8,598,924	Loam	6.3	0.110	-	-	-	-	-	-	-	-	-	-	-	1.0	2.1	0.2	0.1	3.5	3.0	-	-
FRC035	A1812	692,935	8,598,924	Sandy Loam	9.2	0.120	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-
FRC036	A1813	692,945	8,598,976	Silty Loam	5.5	0.020	0.4	0.1	-	-	-	-	-	-	-	-	-	<0.1	7.4	0.2	<0.1	8.0	1.2	-	-
FRC036	A1814	692,945	8,598,976	Silty Loam	9.1	0.130	-	-	0.4	<0.1	0.2	<0.1	0.6	<0.1	-	-	-	-	-	-	-	-	-	-	-
FRC036	A1815	692,945	8,598,976	Gravelly Sand	9.2	0.140	-	-	0.2	<0.1	0.2	<0.1	0.5	<0.1	-	-	-	-	-	-	-	-	-	-	-
FRC037	A1816	692,952	8,599,023	Silty Loam	5.4	0.040	0.8	0.5	-	-	-	-	-	-	-	-	-	0.7	6.3	0.3	0.2	8.3	2.1	-	-
FRC037	A1817	692,952	8,599,023	Gravelly Sand	9.0	0.140	-	-	-	-	-	<0.1	0.7	<0.1	-	-	-	-	-	-	-	-	-	-	-
FRC037	A1818	692,952	8,599,023	Gravelly Sand	9.2	0.150	-	-	0.3	<0.1	0.3	<0.1	0.6	<0.1	-	-	-	-	-	-	-	-	-	-	-
FRC038	A1819	692,964	8,599,072	Silty Loam	5.5	0.040	0.2	0.2	-	-	-	-	-	-	-	-	-	0.2	2.1	0.2	0.1	2.8	4.8	-	-
FRC038	A1820	692,964	8,599,072	Gravelly Sand	9.0	0.140	-	-	0.4	<0.1	0.4	<0.1	0.8	<0.1	-	-	-	-	-	-	-	-	-	-	-
FRC038	A1821	692,964	8,599,072	Gravelly Sand	9.2	0.130	-	-	0.3	<0.1	0.3	<0.1	0.6	<0.1	-	-	-	-	-	-	-	-	-	-	-
FRC039	A1822	692,971	8,599,127	Silty Loam	7.6	0.040	-	-	0.6	2.1	<0.1	<0.1	2.7	<0.1	-	-	-	-	-	-	-	-	-	-	-
FRC039	A1823	692,971	8,599,127	Gravelly Sand	9.1	0.130	-	-	0.3	<0.1	0.2	<0.1	0.5	<0.1	-	-	-	-	-	-	-	-	-	-	-
FRC039	A1824	692,971	8,599,127	Gravelly Sand	9.4	0.150	-	-	<0.1	<0.1	0.3	<0.1	0.3	<0.1	-	-	-	-	-	-	-	-	-	-	-
FRC040	A1825	692,978	8,599,173	Gravelly Sand	7.0	0.060	-	-	-	-	-	-	-	-	-	-	-	0.3	2.0	0.1	<0.1	2.6	3.8	-	-
FRC040	A1826	692,978	8,599,173	Silty Loam	8.8	0.100	-	-	0.4	0.4	0.1	<0.1	0.9	<0.1	-	-	-	-	-	-	-	-	-	-	-
FRC040	A1827	692,978	8,599,173	Gravelly Sand	9.0	0.200	-	-	0.5	<0.1	0.3	<0.1	0.8	<0.1	-	-	-	-	-	-	-	-	-	-	-
FRC041	A1828	692,930	8,599,070	Gravelly Sand	9.2	0.090	-	-	0.9	<0.1	<0.1	<0.1	0.9	<0.1	-	-	-	-	-	-	-	-	-	-	-
FRC041	A1829	692,930	8,599,070	Gravelly Sand	9.5	0.130	-	-	<0.1	<0.1	0.2	<0.1	0.2	<0.1	-	-	-	-	-	-	-	-	-	-	-
FRC041	A1830	692,930	8,599,070	Gravelly Sand	9.4	0.120	-	-	0.4	<0.1	0.2	<0.1	0.5	-	-	-	-	-	-	-	-	-	-	-	-
FRCD005	A1831	692,917	8,599,021	Gravelly Sand	8.9	0.070	-	-	1.0	1.1	<0.1	<0.1	2.1	<0.1	-	-	-	-	-	-	-	-	-	-	-
FRCD005	A1832	692,917	8,599,021	Gravelly Sand	9.1	0.100	-	-	0.3	<0.1	<0.1	<0.1	0.3	-	-	-	-	-	-	-	-	-	-	-	-
FRCD005	A1833	692,917	8,599,021	Gravelly Sand	9.6	0.140	-	-	0.5	<0.1	0.3	<0.1	0.8	<0.1	-	-	-	-	-	-	-	-	-	-	-
Work Order: EB1817447 and EB1016614																									
FRC109	FRC109-20	693,135	8,598,929	Clay Loam	6.8	0.023	-	-	-	-	-	-	-	-	-	-	-	0.2	1.2	0.2	<0.1	1.6	2.2	0.2	6.6
FRC110	FRC110-10	693,080	8,598,949	Loam	6.1	0.018	-	-	-	-	-	-	-	-	-	-	-	0.2	2.4	0.2	<0.1	2.8	2.1	<0.1	15.3
FRC110	FRC110-120	693,080	8,598,949	Sandy Loam	9.0	0.118	-	-	1.4	0.5	0.4	<0.2	2.3	<0.2	2.7	1.1	-	-	-	-	-	-	-	-	-
FRC111	FRC111-30	693,112	8,598,949	Loam	7.2	0.017	-	-	-	-	-	-	-	-	-	-	-	0.3	2.4	0.2	<0.1	3.0	1.6	0.1	12.9
FRC111	FRC111-80	693,112	8,598,949	Clay Loam	8.1	0.084	-	-	1.2	0.8	0.3	<0.2	2.4	<0.2	1.5	2.4	-	-	-	-	-	-	-	-	-
FRC112	FRC112-10	693,096	8,599,047	Loam	6.3	0.010	-	-	-	-	-	-	-	-	-	-	-	0.2	2.3	0.1	<0.1	2.7	1.3	<0.1	16.2
FRC112	FRC112-30	693,096	8,599,047	Loam	7.4	0.015	-	-	-	-	-	-	-	-	-	-	-	1.2	3.7	0.2	0.1	5.2	2.4	0.3	22.4
FRC112	FRC112-110	693,096	8,599,047	Loamy Sand	9.3	0.090	-	-	1.7	0.5	0.5	<0.2	2.7	<0.2	3.1	1.1	-	-	-	-	-	-	-	-	-
FRC113	FRC113-10	693,129	8,599,098	Loam	7.0	0.014	-	-	-	-	-	-	-	-	-	-	-	0.4	5.1	0.2	<0.1	5.8	1.1	<0.1	27.1

Hole	Sample ID	Easting	Northing	Texture	pH value (1:2)	Electrical Conductivity @ 25°C (1:2)	Exchange Acidity		Exchangeable Cations on Alkaline Soils (pH 7.6 to 9.3)								Exchangeable Cations on Acidic Soils (pH 5.4 to 7.2)							
							Exchange Acidity	Exchangeable Aluminium	Exchangeable Calcium	Exchangeable Magnesium	Exchangeable Potassium	Exchangeable Sodium	Cation Exchange Capacity	Exchangeable Sodium Percent	Calcium/Magnesium Ratio	Magnesium/Potassium Ratio	Exchangeable Calcium	Exchangeable Magnesium	Exchangeable Potassium	Exchangeable Sodium	Cation Exchange Capacity	Exchangeable Sodium Percent	Calcium/Magnesium ratio	Magnesium/Potassium Ratio
Unit	pH unit	dS/m	meq/100g								meq/100g								%	-	-			
LoR	0.1	0.001	0.1	0.1	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.02	0.02	
FRC113	FRC113-50	693,129	8,599,098	Gravelly Sand	8.2	0.020	-	-	2.6	2.9	<0.2	<0.2	5.5	<0.2	0.9	-	-	-	-	-	-	-	-	-
FRC113	FRC113-80	693,129	8,599,098	Gravelly Sand	9.4	0.092	-	-	2.1	1.0	0.5	<0.2	3.7	<0.2	2.0	2.0	-	-	-	-	-	-	-	-
FRC113	FRC113-130	693,129	8,599,098	Loam	9.3	0.120	-	-	1.5	<0.2	0.4	<0.2	1.9	<0.2	-	<0.2	-	-	-	-	-	-	-	-
FRC114	FRC114-0	693,094	8,599,100	Loam	6.5	0.013	-	-	-	-	-	-	-	-	-	-	<0.1	2.6	0.2	<0.1	2.8	1.5	<0.1	14.3
FRC114	FRC114-30	693,094	8,599,100	Clay Loam	7.1	0.015	-	-	-	-	-	-	-	-	-	-	1.2	4.2	0.3	<0.1	5.7	1.0	0.3	15.4
FRC114	FRC114-50	693,094	8,599,100	Loamy Sand	6.8	0.018	-	-	-	-	-	-	-	-	-	-	1.4	3.4	0.2	0.2	5.2	2.9	0.4	14.4
FRC115	FRC115-10	693,104	8,599,099	Loam	6.9	0.016	-	-	-	-	-	-	-	-	-	-	0.4	4.0	0.2	<0.1	4.7	2.0	0.1	19.9
FRC115	FRC115-110	693,104	8,599,099	Gravelly Sand	8.9	0.160	-	-	1.6	<0.2	0.4	<0.2	2.0	<0.2	-	<0.2	-	-	-	-	-	-	-	-
FRC117	FRC117-10	693,057	8,599,074	Sandy Loam	5.9	0.006	0.30	0.20	-	-	-	-	-	-	-	-	<0.1	0.3	0.1	<0.1	0.7	3.4	<0.1	2.9
FRC120	FRC120-10	692,921	8,598,879	Loam	6.8	0.015	-	-	-	-	-	-	-	-	-	-	0.2	2.9	0.2	<0.1	3.4	1.2	<0.1	16.4
FRC120	FRC120-30	692,921	8,598,879	Loam	7.8	0.021	-	-	1.1	3.6	<0.2	<0.2	4.7	<0.2	0.3	-	-	-	-	-	-	-	-	-
FRC120	FRC120-60	692,921	8,598,879	Loam	7.3	0.039	-	-	-	-	-	-	-	-	-	-	0.9	3.0	0.2	0.1	4.2	2.4	0.3	14.0
FRC120	FRC120-70	692,921	8,598,879	Gravelly Sand	8.1	0.026	-	-	0.4	1.3	0.2	<0.2	1.9	<0.2	0.4	6.3	-	-	-	-	-	-	-	-
FRC120	FRC120-130	692,921	8,598,879	Loam	9.2	0.092	-	-	2.7	1.2	0.2	<0.2	4.1	<0.2	2.3	5.2	-	-	-	-	-	-	-	-
FRC121	FRC121-20	692,966	8,599,053	Sandy Clay Loam	7.6	0.018	-	-	-	-	-	-	-	-	-	-	0.6	2.8	0.2	<0.1	3.6	1.8	0.2	18.2
FRC121	FRC121-90	692,966	8,599,053	Sandy Clay Loam	8.9	0.280	-	-	1.6	0.5	0.5	0.2	2.9	7.6	3.1	1.1	-	-	-	-	-	-	-	-
FRC121	FRC121-160	692,966	8,599,053	Loam	8.8	0.251	-	-	2.2	0.7	0.7	<0.2	3.6	<0.2	3.0	1.1	-	-	-	-	-	-	-	-
FRC122	FRC122-0	693,125	8,599,147	Loam	7.0	0.020	-	-	-	-	-	-	-	-	-	-	0.2	3.2	0.2	<0.1	3.6	1.5	<0.1	16.3
FRC122	FRC122-40	693,125	8,599,147	Gravelly Sand	8.3	0.045	-	-	1.2	2.1	<0.2	<0.2	3.5	<0.2	0.6	-	-	-	-	-	-	-	-	-
FRC122	FRC122-70	693,125	8,599,147	Gravelly Sand	8.5	0.152	-	-	1.6	0.8	0.4	<0.2	2.8	<0.2	1.8	2.1	-	-	-	-	-	-	-	-
FRC122	FRC122-130	693,125	8,599,147	Sandy Loam	9.4	0.116	-	-	1.0	<0.2	0.6	<0.2	1.7	<0.2	-	<0.2	-	-	-	-	-	-	-	-
FRC123	FRC123-10	693,100	8,599,146	Loam	7.1	0.018	-	-	-	-	-	-	-	-	-	-	0.6	4.4	0.2	0.1	5.3	2.2	0.1	19.5
FRC123	FRC123-20	693,100	8,599,146	Clay Loam	7.5	0.044	-	-	1.0	3.1	<0.2	<0.2	4.3	<0.2	0.3	-	-	-	-	-	-	-	-	-
FRC123	FRC123-50	693,100	8,599,146	Sandy Clay Loam	7.9	0.018	-	-	1.2	2.2	0.2	<0.2	3.6	<0.2	0.6	9.4	-	-	-	-	-	-	-	-
FRC124	FRC124-10	693,114	8,599,001	Loam	6.7	0.014	-	-	-	-	-	-	-	-	-	-	0.3	3.2	0.2	<0.1	3.7	0.9	<0.1	14.7
FRC124	FRC124-30	693,114	8,599,001	Sandy Loam	7.0	0.016	-	-	-	-	-	-	-	-	-	-	0.8	4.2	0.2	<0.1	5.3	0.9	0.2	19.4
FRC124	FRC124-50	693,114	8,599,001	Sandy Loam	7.7	0.108	-	-	-	-	-	-	-	-	-	-	1.1	3.0	0.4	0.1	4.6	2.3	0.4	7.8
FRC124	FRC124-80	693,114	8,599,001	Sandy Loam	8.8	0.124	-	-	2.2	1.4	0.4	<0.2	3.9	<0.2	1.6	3.5	-	-	-	-	-	-	-	-
FRC124	FRC124-160	693,114	8,599,001	Sandy Loam	9.0	0.194	-	-	1.1	<0.2	0.8	<0.2	1.8	<0.2	-	<0.2	-	-	-	-	-	-	-	-
Workorders: EB1815150 and EB1814449																								
FRC126	FRC126-001	693,134	8,599,248	Sandy Loam	6.1	0.011	-	-	-	-	-	-	-	-	-	-	<0.1	2.5	0.2	<0.1	2.7	2.7	<0.1	15.5
FRC126	FRC126-003	693,134	8,599,248	Sandy Loam	6.0	0.011	-	-	-	-	-	-	-	-	-	-	<0.1	3.5	0.2	0.1	3.8	3.0	<0.1	19.6
FRC126	FRC126-021	693,134	8,599,248	Sandy Loam	7.8	0.016	-	-	0.9	4.3	0.6	<0.2	5.8	<0.2	0.2	7.4	-	-	-	-	-	-	-	-
FRC126	FRC126-061	693,134	8,599,248	Sandy Loam	9.2	0.047	-	-	2.4	1.0	0.3	<0.2	3.7	<0.2	2.4	3.5	-	-	-	-	-	-	-	-
FRC126	FRC126-081	693,134	8,599,248	Gravelly Sand	9.5	0.103	-	-	1.0	<0.2	0.6	<0.2	1.6	<0.2	-	<0.2	-	-	-	-	-	-	-	-
FRC127	FRC127-001	692,862	8,599,197	Gravelly Sand	5.4	0.007	0.7	0.5	-	-	-	-	-	-	-	-	<0.1	0.3	<0.1	<0.1	1.0	7.1	<0.1	-
FRC127	FRC127-014	692,862	8,599,197	Gravelly Sand	5.7	0.004	0.6	0.5	-	-	-	-	-	-	-	-	<0.1	0.1	<0.1	<0.1	0.7	5.7	<0.1	-
FRC127	FRC127-040	692,862	8,599,197	Gravelly Sand	8.3	0.010	-	-	0.6	1.1	<0.2	<0.2	1.8	<0.2	0.6	-	-	-	-	-	-	-	-	-
FRC127	FRC127-051	692,862	8,599,197	Gravelly Sand	8.9	0.016	-	-	0.5	0.8	0.2	<0.2	1.5	<0.2	0.6	3.8	-	-	-	-	-	-	-	-
FRC127	FRC127-060	692,862	8,599,197	Gravelly Sand	8.8	0.017	-	-	0.3	0.6	<0.2	<0.2	1.2	<0.2	0.5	-	-	-	-	-	-	-	-	-
FRC127	FRC127-081	692,862	8,599,197	Sandy Loam	8.6	0.103	-	-	<0.2	<0.2	0.5	<0.2	0.5	<0.2	-	<0.2	-	-	-	-	-	-	-	-
FRC128	FRC128-001	692,680	8,599,195	Sandy Loam	5.3	0.004	0.8	0.6	-	-	-	-	-	-	-	-	<0.1	0.2	<0.1	<0.1	1.0	8.7	<0.1	-
FRC128	FRC128-003	692,680	8,599,195	Sandy Loam	5.4	0.006	8.2	9	-	-	-	-	-	-	-	-	<0.1	4.7	0.2	<0.1	13.1	1.1	<0.1	21.3
FRC128	FRC128-020	692,680	8,599,195	Gravelly Sand	6.2	0.008	-	-	-	-	-	-	-	-	-	-	<0.1	1.3	0.2	<0.1	1.6	2.5	<0.1	7.9
FRC128	FRC128-040	692,680	8,599,195	Sandy Loam	6.7	0.010	-	-	-	-	-	-	-	-	-	-	0.6	2.5	0.1	<0.1	3.2	1.3	0.2	19.5
FRC128	FRC128-047	692,680	8,599,195	Gravelly Sand	7.6	0.015	-	-	-	-	-	-	-	-	-	-	0.3	1.2	<0.1	0.1	1.8	6.4	0.2	-
FRC128	FRC128-060	692,680	8,599,195	Sandy Loam	8.4	0.014	-	-	0.5	1.0	<0.2	<0.2	1.6	<0.2	0.5	-	-	-	-	-	-	-	-	-

Hole	Sample ID	Easting	Northing	Texture	pH value (1:2)	Electrical Conductivity @ 25°C (1:2)	Exchange Acidity		Exchangeable Cations on Alkaline Soils (pH 7.6 to 9.3)							Exchangeable Cations on Acidic Soils (pH 5.4 to 7.2)								
							Exchange Acidity	Exchangeable Aluminium	Exchangeable Calcium	Exchangeable Magnesium	Exchangeable Potassium	Exchangeable Sodium	Cation Exchange Capacity	Exchangeable Sodium Percent	Calcium/Magnesium Ratio	Magnesium/Potassium Ratio	Exchangeable Calcium	Exchangeable Magnesium	Exchangeable Potassium	Exchangeable Sodium	Cation Exchange Capacity	Exchangeable Sodium Percent	Calcium/Magnesium ratio	Magnesium/Potassium Ratio
Unit	pH unit	dS/m	meq/100g							meq/100g							%							
LoR	0.1	0.001	0.1	0.1	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.1	0.1	0.1	0.1	0.1	0.1	0.02	0.02	
FRC128	FRC128-091	692,680	8,599,195	Gravelly Sand	8.1	0.016	-	-	2.7	1.9	<0.2	<0.2	4.6	<0.2	1.5	-	-	-	-	-	-	-	-	-
FRC128	FRC128-100	692,680	8,599,195	Gravelly Sand	9.2	0.031	-	-	0.3	<0.2	0.4	<0.2	0.7	<0.2	-	<0.2	-	-	-	-	-	-	-	-
FRC129	FRC129-001	692,833	8,599,083	Sandy Loam	6.0	0.006	-	-	-	-	-	-	-	-	-	-	<0.1	1.4	0.1	<0.1	1.6	2.8	<0.1	11.0
FRC129	FRC129-008	692,833	8,599,083	Sandy Loam	6.1	0.007	-	-	-	-	-	-	-	-	-	-	<0.1	1.3	0.1	<0.1	1.5	1.5	<0.1	8.8
FRC129	FRC129-014	692,833	8,599,083	Gravelly Sand	5.7	0.005	3.4	3.6	-	-	-	-	-	-	-	-	<0.1	0.8	0.2	<0.1	4.4	2.5	<0.1	4.7
FRC129	FRC129-040	692,833	8,599,083	Sandy Loam	7.5	0.012	-	-	-	-	-	-	-	-	-	-	1.1	3.7	0.1	<0.1	5.0	1.9	0.3	30.6
FRC129	FRC129-047	692,833	8,599,083	Sandy Loam	7.9	0.011	-	-	0.7	1.5	<0.2	<0.2	2.2	<0.2	0.4	-	-	-	-	-	-	-	-	-
FRC129	FRC129-061	692,833	8,599,083	Sandy Loam	8.5	0.015	-	-	1.4	2.4	<0.2	<0.2	4.1	<0.2	0.6	-	-	-	-	-	-	-	-	-
FRC129	FRC129-088	692,833	8,599,083	Gravelly Sand	9.6	0.086	-	-	0.5	<0.2	0.4	<0.2	0.9	<0.2	-	<0.2	-	-	-	-	-	-	-	-
FRC130	FRC130-001	692,740	8,599,075	Sandy Loam	5.5	0.004	0.5	0.4	-	-	-	-	-	-	-	-	<0.1	0.2	<0.1	<0.1	0.7	8.6	<0.1	-
FRC130	FRC130-005	692,740	8,599,075	Gravelly Sand	5.0	0.011	2.4	2.4	-	-	-	-	-	-	-	-	<0.1	<0.1	0.1	<0.1	2.5	11.2	-	<0.1
FRC130	FRC130-020	692,740	8,599,075	Sandy Loam	6.6	0.010	-	-	-	-	-	-	-	-	-	-	0.4	3.5	0.1	<0.1	4.2	1.4	0.1	26.6
FRC130	FRC130-040	692,740	8,599,075	Sandy Loam	8.0	0.018	-	-	1.6	5.1	0.3	<0.2	7.0	<0.2	0.3	18.8	-	-	-	-	-	-	-	-
FRC130	FRC130-060	692,740	8,599,075	Gravelly Sand	9.4	0.090	-	-	0.3	<0.2	0.3	<0.2	0.6	<0.2	-	<0.2	-	-	-	-	-	-	-	-
FRC130	FRC130-080	692,740	8,599,075	Gravelly Sand	9.3	0.088	-	-	0.8	<0.2	0.4	<0.2	1.1	<0.2	-	<0.2	-	-	-	-	-	-	-	-
FRC130	FRC130-100	692,740	8,599,075	Gravelly Sand	9.2	0.036	-	-	0.8	0.4	0.4	<0.2	1.6	<0.2	1.7	1.3	-	-	-	-	-	-	-	-
FRC131	FRC131-001	692,694	8,599,100	Gravelly Sand	5.6	0.004	0.4	0.2	-	-	-	-	-	-	-	-	<0.1	0.2	<0.1	<0.1	0.6	8.2	<0.1	-
FRC131	FRC131-005	692,694	8,599,100	Gravelly Sand	6.2	0.004	-	-	-	-	-	-	-	-	-	-	<0.1	0.2	0.1	<0.1	0.3	5.3	<0.1	1.6
FRC131	FRC131-020	692,694	8,599,100	Gravelly Sand	6.2	0.005	-	-	-	-	-	-	-	-	-	-	<0.1	1.0	0.1	<0.1	1.2	1.3	<0.1	8.7
FRC131	FRC131-047	692,694	8,599,100	Sandy Loam	7.0	0.013	-	-	-	-	-	-	-	-	-	-	2.5	6.1	0.2	<0.1	8.8	1.1	0.4	38.8
FRC131	FRC131-080	692,694	8,599,100	Gravelly Sand	8.9	0.038	-	-	1.1	0.9	<0.2	<0.2	2.2	<0.2	1.2	-	-	-	-	-	-	-	-	-
FRC151	FRC151-1	693,120	8,598,900	Gravelly Sand	5.6	0.025	< 0.1	0.1	-	-	-	-	-	-	-	-	0.2	0.2	<0.1	0.1	0.5	20.5	1.0	-
FRC151	FRC151-10	693,120	8,598,900	Sandy Loam	7.2	0.016	-	-	-	-	-	-	-	-	-	-	0.1	1.7	0.2	<0.1	2.0	2.2	<0.1	9.3
FRC151	FRC151-30	693,120	8,598,900	Sandy Loam	7.4	0.015	-	-	-	-	-	-	-	-	-	-	0.2	0.7	0.2	<0.1	1.1	2.2	0.3	4.6
FRC151	FRC151-55	693,120	8,598,900	Gravelly Sand	8.6	0.019	-	-	1.1	1.3	0.3	<0.2	2.7	<0.2	0.9	4.5	-	-	-	-	-	-	-	-
FRC151	FRC151-62	693,120	8,598,900	Gravelly Sand	8.9	0.026	-	-	3.1	2.3	0.5	<0.2	5.8	<0.2	1.3	4.8	-	-	-	-	-	-	-	-
FRC151	FRC151-80	693,120	8,598,900	Gravelly Sand	9.4	0.066	-	-	0.8	<0.2	0.6	<0.2	1.4	<0.2	-	<0.2	-	-	-	-	-	-	-	-
FRC151	FRC151-130	693,120	8,598,900	Gravelly Sand	9.2	0.142	-	-	0.8	<0.2	0.6	<0.2	1.4	<0.2	-	<0.2	-	-	-	-	-	-	-	-
FRC151	FRC151-137	693,120	8,598,900	Sandy Loam	9.2	0.148	-	-	0.7	<0.2	1.0	<0.2	1.6	<0.2	-	<0.2	-	-	-	-	-	-	-	-
FRC151	FRC151-165	693,120	8,598,900	Gravelly Sand	9.5	0.124	-	-	1.5	<0.2	0.7	<0.2	2.2	<0.2	-	<0.2	-	-	-	-	-	-	-	-
FRC151	FRC151-191	693,120	8,598,900	Gravelly Sand	9.3	0.088	-	-	<0.2	<0.2	0.2	0.3	0.5	55.9	-	<0.2	-	-	-	-	-	-	-	-
FRC151	FRC151-208	693,120	8,598,900	Gravelly Sand	9.7	0.077	-	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	-	-	-	-	-	-	-	-	-
FRC151	FRC151-272	693,120	8,598,900	Gravelly Sand	9.4	0.138	-	-	1.0	<0.2	0.4	<0.2	1.5	<0.2	-	<0.2	-	-	-	-	-	-	-	-
FRC152	FRC152-5	693,115	8,598,875	Sandy Loam	6.1	0.007	-	-	-	-	-	-	-	-	-	-	0.2	1.3	0.2	<0.1	1.8	2.4	0.2	5.6
FRC152	FRC152-23	693,115	8,598,875	Sandy Loam	8.0	0.014	-	-	0.5	2.1	<0.2	<0.2	2.7	<0.2	0.2	-	-	-	-	-	-	-	-	-
FRC152	FRC152-46	693,115	8,598,875	Gravelly Sand	8.4	0.014	-	-	0.8	1.2	<0.2	<0.2	2.2	<0.2	0.6	-	-	-	-	-	-	-	-	-
FRC152	FRC152-51	693,115	8,598,875	Gravelly Sand	9.1	0.027	-	-	0.4	0.8	0.4	<0.2	1.6	<0.2	0.6	2.1	-	-	-	-	-	-	-	-
FRC152	FRC152-64	693,115	8,598,875	Sandy Loam	9.0	0.043	-	-	0.9	0.7	0.4	<0.2	2.0	<0.2	1.2	2.1	-	-	-	-	-	-	-	-
FRC152	FRC152-70	693,115	8,598,875	Sandy Loam	9.1	0.034	-	-	0.8	0.6	0.4	<0.2	1.9	<0.2	1.4	1.4	-	-	-	-	-	-	-	-
FRC152	FRC152-125	693,115	8,598,875	Gravelly Sand	8.7	0.046	-	-	0.4	<0.2	<0.2	<0.2	0.4	<0.2	-	-	-	-	-	-	-	-	-	-
FRC152	FRC152-170	693,115	8,598,875	Gravelly Sand	9.2	0.070	-	-	0.8	<0.2	<0.2	<0.2	0.9	<0.2	-	-	-	-	-	-	-	-	-	-
FRC153	FRC153-1	693,085	8,598,790	Gravelly Sand	5.6	0.008	0.2	0.1	-	-	-	-	-	-	-	-	0.4	0.2	<0.1	<0.1	0.8	7.6	2.0	-
FRC153	FRC153-4	693,085	8,598,790	Sandy Loam	5.2	0.005	2	1.8	-	-	-	-	-	-	-	-	<0.1	0.2	<0.1	<0.1	2.2	10.3	<0.1	-
FRC153	FRC153-21	693,085	8,598,790	Gravelly Sand	7.6	0.018	-	-	0.2	2.4	0.2	<0.2	2.9	<0.2	<0.2	11.4	-	-	-	-	-	-	-	-
FRC153	FRC153-38	693,085	8,598,790	Sandy Loam	8.7	0.020	-	-	0.8	3.1	0.3	<0.2	4.1	<0.2	0.2	10.3	-	-	-	-	-	-	-	-
FRC154	FRC154-3	692,898	8,598,928	Gravelly Sand	5.2	0.007	0.4	0.1	-	-	-	-	-	-	-	-	<0.1	0.1	<0.1	<0.1	0.5	9.2	<0.1	-
FRC154	FRC154-7	692,898	8,598,928	Sandy Loam	5.5	0.008	4	3.1	-	-	-	-	-	-	-	-	<0.1	3.7	0.3	<0.1	8.0	1.0	<0.1	12.8

Hole	Sample ID	Easting	Northing	Texture	pH value (1:2)	Electrical Conductivity @ 25°C (1:2)	Exchange Acidity		Exchangeable Cations on Alkaline Soils (pH 7.6 to 9.3)							Exchangeable Cations on Acidic Soils (pH 5.4 to 7.2)									
							Exchange Acidity	Exchangeable Aluminium	Exchangeable Calcium	Exchangeable Magnesium	Exchangeable Potassium	Exchangeable Sodium	Cation Exchange Capacity	Exchangeable Sodium Percent	Calcium/Magnesium Ratio	Magnesium/Potassium Ratio	Exchangeable Calcium	Exchangeable Magnesium	Exchangeable Potassium	Exchangeable Sodium	Cation Exchange Capacity	Exchangeable Sodium Percent	Calcium/Magnesium ratio	Magnesium/Potassium Ratio	
				Unit LoR	pH unit 0.1	dS/m 0.001	meq/100g							meq/100g							%			-	-
			0.1	0.1	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.1	0.1	0.1	0.1	0.1	0.1	0.02	0.02	
FRC154	FRC154-42	692,898	8,598,928	Sandy Loam	7.7	0.016	-	-	-	-	-	-	-	-	-	-	2.1	5.2	0.3	0.1	7.7	1.6	0.4	18.6	
FRC154	FRC154-71	692,898	8,598,928	Sandy Loam	8.2	0.015	-	-	4.2	4.4	0.2	<0.2	8.8	<0.2	1.0	20.6	-	-	-	-	-	-	-	-	
FRC154	FRC154-109	692,898	8,598,928	Gravelly Sand	9.1	0.052	-	-	0.8	0.6	0.3	<0.2	1.7	<0.2	1.4	1.8	-	-	-	-	-	-	-	-	
FRC156	FRC156-1	692,920	8,598,815	Gravelly Sand	5.9	0.020	0.3	0.2	-	-	-	-	-	-	-	-	<0.1	0.6	0.2	0.3	1.4	25.2	<0.1	3.0	
FRC156	FRC156-2	692,920	8,598,815	Sandy Loam	5.5	0.010	1.5	1.1	-	-	-	-	-	-	-	-	<0.1	1.4	0.2	<0.1	3.1	2.3	<0.1	6.4	
FRC156	FRC156-41	692,920	8,598,815	Sandy Loam	7.2	0.025	-	-	-	-	-	-	-	-	-	-	1.2	3.4	0.2	0.1	5.0	2.2	0.4	18.6	
FRC156	FRC156-42	692,920	8,598,815	Sandy Loam	7.4	0.016	-	-	-	-	-	-	-	-	-	-	1.7	4.5	0.2	0.1	6.6	1.8	0.4	21.8	
FRC156	FRC156-61	692,920	8,598,815	Sandy Loam	8.2	0.022	-	-	2.8	6.5	0.4	<0.2	9.7	<0.2	0.4	17.3	-	-	-	-	-	-	-	-	
FRC156	FRC156-100	692,920	8,598,815	Gravelly Sand	9.2	0.081	-	-	0.6	0.7	0.4	<0.2	1.8	<0.2	0.9	1.7	-	-	-	-	-	-	-	-	
FRC156	FRC156-125	692,920	8,598,815	Gravelly Sand	9.2	0.080	-	-	<0.2	<0.2	0.3	0.2	0.5	41.2	-	<0.2	-	-	-	-	-	-	-	-	
FRC157	FRC157-1	692,920	8,598,855	Gravelly Sand	6.0	0.010	-	-	-	-	-	-	-	-	-	-	0.2	0.2	0.1	<0.1	0.8	7.2	1.0	1.4	
FRC157	FRC157-20	692,920	8,598,855	Sandy Loam	6.7	0.015	-	-	-	-	-	-	-	-	-	-	0.7	5.4	0.2	<0.1	6.5	1.2	0.1	22.4	
FRC157	FRC157-72	692,920	8,598,855	Sandy Loam	7.6	0.013	-	-	0.9	2.2	<0.2	<0.2	3.3	<0.2	0.4	-	-	-	-	-	-	-	-	-	
Workorders: EB1815858 and EB1817989																									
FRC158	FRC158-1	692,890	8,598,855	Gravelly Sand	5.9	0.004	<0.1	<0.1	-	-	-	-	-	-	-	-	0.4	0.2	<0.1	<0.1	0.6	4.6	2.0	-	
FRC158	FRC158-10	692,890	8,598,855	Sandy Loam	6.3	0.008	-	-	-	-	-	-	-	-	-	-	0.1	2.4	0.2	<0.1	2.8	1.6	<0.1	15.9	
FRC158	FRC158-21	692,890	8,598,855	Gravelly Sand	7.5	0.008	-	-	-	-	-	-	-	-	-	-	0.3	1.7	0.2	<0.1	2.2	2.0	0.2	10.8	
FRC158	FRC158-80	692,890	8,598,855	Sandy Loam	8.8	0.017	-	-	2.0	1.9	0.2	<0.2	4.2	<0.2	1.1	9.2	-	-	-	-	-	-	-	-	
FRC159	FRC159-1	692,932	8,598,907	Gravelly Sand	5.5	0.004	0.5	0.3	-	-	-	-	-	-	-	-	<0.1	0.3	<0.1	<0.1	0.8	6.6	<0.1	-	
FRC159	FRC159-4	692,932	8,598,907	Sandy Loam	5.4	0.009	4.6	4.8	-	-	-	-	-	-	-	-	<0.1	3.9	0.2	<0.1	8.7	1.4	<0.1	20.4	
FRC159	FRC159-8	692,932	8,598,907	Sandy Loam	6.1	0.084	-	-	-	-	-	-	-	-	-	-	<0.1	1.7	0.1	<0.1	2.1	2.1	<0.1	12.6	
FRC159	FRC159-30	692,932	8,598,907	Sandy Loam	7.7	0.006	-	-	0.8	3.2	<0.2	<0.2	4.2	<0.2	0.3	17.2	-	-	-	-	-	-	-	-	
FRC159	FRC159-136	692,932	8,598,907	Gravelly Sand	9.5	0.006	-	-	1.4	<0.2	0.5	<0.2	1.9	<0.2	4.3	<0.2	-	-	-	-	-	-	-	-	
FRC160	FRC160-2	693,029	8,599,301	Sandy Loam	9.0	0.033	-	-	0.3	2.3	<0.2	<0.2	2.6	<0.2	<0.2	-	-	-	-	-	-	-	-	-	
FRC160	FRC160-4	693,029	8,599,301	Sandy Loam	8.2	0.011	-	-	<0.2	2.2	<0.2	<0.2	2.2	<0.2	<0.2	15.3	-	-	-	-	-	-	-	-	
FRC160	FRC160-73	693,029	8,599,301	Sandy Loam	8.8	0.018	-	-	1.7	3.6	0.2	<0.2	5.6	<0.2	0.5	14.3	-	-	-	-	-	-	-	-	
FRC160	FRC160-91	693,029	8,599,301	Gravelly Sand	9.3	0.078	-	-	1.0	0.4	0.4	<0.2	1.8	<0.2	2.4	1.2	-	-	-	-	-	-	-	-	
				n	164	164	21	22	83	55	63	3	91	3	45	32	41	68	57	15	69	69	27	47	
				Minimum	5.0	0.004	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
				Maximum	9.7	0.280	8.2	9.0	4.2	6.5	1.0	0.3	9.7	55.9	4.3	20.6	2.5	7.4	0.4	0.3	13.1	25.2	2.0	38.8	
				Average	7.8	0.050	1.6	1.4	1.0	1.7	0.4	-	2.3	-	1.2	6.4	0.6	2.4	0.2	0.1	3.5	3.7	0.4	14.7	
				StDev	1.4	0.053	2.0	2.2	0.8	1.3	0.2	-	1.8	-	1.0	6.1	0.6	1.8	0.1	0.1	2.5	4.2	0.5	7.8	

Hole	Sample ID	Easting	Northing	Texture	Soluble Metals																		
					Depth	pH (1:2)	Total Sulfur	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper	Lead	Manganese	Nickel	Selenium	Vanadium	Zinc	Mercury	
					m	unit	%																
					LoR																		
					Trigger Value																		
FRC109	FRC109-20	693.135	8,598,929	Clay Loam	20	6.8	0.02	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC110	FRC110-10	693.080	8,598,949	Loam	10	6.1	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC110	FRC110-120	693.080	8,598,949	Sandy Loam	120	9.0	0.02	0.8	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.0005	
FRC111	FRC111-30	693.112	8,598,949	Loam	30	7.2	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC111	FRC111-80	693.112	8,598,949	Clay Loam	80	8.1	0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
FRC112	FRC112-10	693.096	8,599,047	Loam	10	6.3	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.0005	
FRC112	FRC112-30	693.096	8,599,047	Loam	30	7.4	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC112	FRC112-110	693.096	8,599,047	Loamy Sand	110	9.3	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.0005	
FRC113	FRC113-10	693.129	8,599,098	Loam	10	7.0	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC113	FRC113-50	693.129	8,599,098	Gravelly Sand	50	8.2	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC113	FRC113-80	693.129	8,599,098	Gravelly Sand	80	9.4	0.02	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC113	FRC113-130	693.129	8,599,098	Loam	30	9.3	<0.01	0.6	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC114	FRC114-0	693.094	8,599,100	Loam	0	6.5	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC114	FRC114-30	693.094	8,599,100	Clay Loam	30	7.1	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC114	FRC114-50	693.094	8,599,100	Loamy Sand	50	6.8	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.0005	
FRC115	FRC115-10	693.104	8,599,099	Loam	10	6.9	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC115	FRC115-110	693.104	8,599,099	Gravelly Sand	110	8.9	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
FRC117	FRC117-10	693.057	8,599,074	Sandy Loam	10	5.9	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	0.1	<0.1	<0.1	<0.0005	
FRC120	FRC120-10	692.921	8,598,879	Loam	10	6.8	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC120	FRC120-30	692.921	8,598,879	Loam	30	7.8	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC120	FRC120-60	692.921	8,598,879	Loam	60	7.3	0.02	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC120	FRC120-70	692.921	8,598,879	Gravelly Sand	70	8.1	<0.01	1.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC120	FRC120-130	692.921	8,598,879	Loam	130	9.2	0.02	0.2	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC121	FRC121-20	692.966	8,599,053	Sandy Clay Loam	20	7.6	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC121	FRC121-90	692.966	8,599,053	Sandy Clay Loam	90	8.9	0.03	0.6	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC121	FRC121-160	692.966	8,599,053	Loam	160	8.8	0.40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
FRC122	FRC122-0	693.125	8,599,147	Loam	0	7.0	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC122	FRC122-40	693.125	8,599,147	Gravelly Sand	40	8.3	0.02	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC122	FRC122-70	693.125	8,599,147	Gravelly Sand	70	8.5	0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
FRC122	FRC122-130	693.125	8,599,147	Sandy Loam	130	9.4	<0.01	0.2	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC123	FRC123-10	693.100	8,599,146	Loam	10	7.1	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC123	FRC123-20	693.100	8,599,146	Clay Loam	20	7.5	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC123	FRC123-50	693.100	8,599,146	Sandy Clay Loam	50	7.9	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC124	FRC124-10	693.114	8,599,001	Loam	10	6.7	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC124	FRC124-30	693.114	8,599,001	Sandy Loam	30	7.0	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC124	FRC124-50	693.114	8,599,001	Sandy Loam	50	7.7	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
FRC124	FRC124-80	693.114	8,599,001	Sandy Loam	80	8.8	0.04	0.2	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC124	FRC124-160	693.114	8,599,001	Sandy Loam	160	9.0	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
FRC126	FRC126-001	693.134	8,599,248	Sandy Loam	1	6.1	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC126	FRC126-003	693.134	8,599,248	Sandy Loam	3	6.0	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC126	FRC126-021	693.134	8,599,248	Sandy Loam	21	7.8	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC126	FRC126-061	693.134	8,599,248	Sandy Loam	61	9.2	0.02	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	0.1	<0.1	<0.0005	
FRC126	FRC126-081	693.134	8,599,248	Gravelly Sand	81	9.5	0.03	0.2	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC127	FRC127-001	692.862	8,599,197	Gravelly Sand	1	5.4	<0.01	<0.1															

Hole	Sample ID	Easting	Northing	Texture	Soluble Metals																		
					Depth	pH (1-2)	Total Sulfur	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper	Lead	Manganese	Nickel	Selenium	Vanadium	Zinc	Mercury	
					m	unit	%																
					LoR											mg/kg							
Trigger Value					-	5.5	0.05	0.1	0.1	0.05	0.1	0.05	0.1	0.1	0.1	0.1	0.1	0.1	0.05	0.1	0.1	0.001	
FRC131	FRC131-001	692,694	8,599,100	Gravelly Sand	1	5.6	0.02	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	0.2	<0.1	<0.1	<0.0005	
FRC131	FRC131-005	692,694	8,599,100	Gravelly Sand	5	6.2	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC131	FRC131-020	692,694	8,599,100	Gravelly Sand	20	6.2	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.0005	
FRC131	FRC131-047	692,694	8,599,100	Sandy Loam	47	7.0	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC131	FRC131-080	692,694	8,599,100	Gravelly Sand	80	8.9	0.02	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.0005	
FRC151	FRC151-1	693,120	8,598,900	Gravelly Sand	1	5.6	0.02	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	1.0	<0.0005	
FRC151	FRC151-10	693,120	8,598,900	Sandy Loam	10	7.2	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC151	FRC151-30	693,120	8,598,900	Sandy Loam	30	7.4	<0.01	<0.1	<1	<0.1	1.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC151	FRC151-55	693,120	8,598,900	Gravelly Sand	55	8.6	0.02	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC151	FRC151-62	693,120	8,598,900	Gravelly Sand	62	8.9	0.02	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC151	FRC151-80	693,120	8,598,900	Gravelly Sand	80	9.4	0.02	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC151	FRC151-130	693,120	8,598,900	Gravelly Sand	130	9.2	0.46	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	
FRC151	FRC151-137	693,120	8,598,900	Sandy Loam	137	9.2	0.03	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC151	FRC151-165	693,120	8,598,900	Gravelly Sand	165	9.5	0.04	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.0005	
FRC151	FRC151-191	693,120	8,598,900	Gravelly Sand	191	9.3	0.02	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC151	FRC151-208	693,120	8,598,900	Gravelly Sand	208	9.7	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC151	FRC151-272	693,120	8,598,900	Gravelly Sand	272	9.4	0.62	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	
FRC152	FRC152-5	693,115	8,598,875	Sandy Loam	5	6.1	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC152	FRC152-23	693,115	8,598,875	Sandy Loam	23	8.0	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC152	FRC152-46	693,115	8,598,875	Gravelly Sand	46	8.4	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.0005	
FRC152	FRC152-51	693,115	8,598,875	Gravelly Sand	51	9.1	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.0005	
FRC152	FRC152-64	693,115	8,598,875	Sandy Loam	64	9.0	0.02	0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC152	FRC152-70	693,115	8,598,875	Sandy Loam	70	9.1	0.02	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC152	FRC152-125	693,115	8,598,875	Gravelly Sand	125	8.7	1.88	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	
FRC152	FRC152-170	693,115	8,598,875	Gravelly Sand	170	9.2	0.02	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC153	FRC153-1	693,085	8,598,790	Gravelly Sand	1	5.6	0.02	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC153	FRC153-4	693,085	8,598,790	Sandy Loam	4	5.2	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.0005	
FRC153	FRC153-21	693,085	8,598,790	Gravelly Sand	21	7.6	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC153	FRC153-38	693,085	8,598,790	Sandy Loam	38	8.7	0.02	0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC154	FRC154-3	692,898	8,598,928	Gravelly Sand	3	5.2	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	<0.0005	
FRC154	FRC154-7	692,898	8,598,928	Sandy Loam	7	5.5	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC154	FRC154-42	692,898	8,598,928	Sandy Loam	42	7.7	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC154	FRC154-71	692,898	8,598,928	Sandy Loam	71	8.2	<0.01	0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC154	FRC154-109	692,898	8,598,928	Gravelly Sand	109	9.1	<0.01	0.2	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC156	FRC156-1	692,920	8,598,815	Gravelly Sand	1	5.9	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC156	FRC156-2	692,920	8,598,815	Sandy Loam	2	5.5	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC156	FRC156-41	692,920	8,598,815	Sandy Loam	41	7.2	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC156	FRC156-42	692,920	8,598,815	Sandy Loam	42	7.4	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC156	FRC156-61	692,920	8,598,815	Sandy Loam	61	8.2	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC156	FRC156-100	692,920	8,598,815	Gravelly Sand	100	9.2	<0.01	0.2	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC156	FRC156-125	692,920	8,598,815	Gravelly Sand	125	9.2	<0.01	0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC157	FRC157-1	692,920	8,598,855	Gravelly Sand	1	6.0	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC157	FRC157-20	692,920	8,598,855	Sandy Loam	20	6.7	<0.01	<0.1	<1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	
FRC157	FRC157-72	692,920	8,598,855	Sandy Loam	72	7.6	<0.01																

Leachable Metals																									
Hole	Sample ID	Easting	Northing	Texture	Depth	pH (1:2)	Total Sulfur	Initial pH	After HCl pH	Final pH	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper	Lead	Manganese	Nickel	Selenium	Vanadium	Zinc	Mercury
					m	pH unit	%	pH unit			mg/L														
LoR					-	0.1	0.01	0.1	0.1	0.1	0.1	0.1	0.05	0.1	0.05	0.1	0.1	0.1	0.1	0.1	0.1	0.05	0.1	0.1	0.001
Trigger Value					-	5.5	0.05																		
FRC111	FRC111-80	693,112	8,598,949	Clay Loam	80	8.1	0.08	7.9	1.5	5.0	<0.1	0.2	<0.05	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.05	<0.1	0.1	<0.001
FRC115	FRC115-110	693,104	8,599,099	Gravelly Sand	110	8.9	0.06	9.2	1.5	5.0	<0.1	0.2	<0.05	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	2.5	<0.1	<0.05	<0.1	0.1	<0.001
FRC121	FRC121-160	692,966	8,599,053	Loam	160	8.8	0.40	8.9	1.5	5.0	<0.1	0.3	<0.05	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	2.7	<0.1	<0.05	<0.1	0.1	<0.001
FRC122	FRC122-70	693,125	8,599,147	Gravelly Sand	70	8.5	0.08	8.3	1.6	4.9	<0.1	0.2	<0.05	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	1.0	<0.1	<0.05	<0.1	0.1	<0.001
FRC124	FRC124-50	693,114	8,599,001	Sandy Loam	50	7.7	0.05	7.6	1.5	4.8	<0.1	0.2	<0.05	<0.1	<0.05	<0.1	<0.1	0.1	<0.1	0.4	<0.1	<0.05	<0.1	0.4	<0.001
FRC124	FRC124-160	693,114	8,599,001	Sandy Loam	160	9.0	0.10	8.9	1.6	4.9	<0.1	0.2	<0.05	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	2.0	<0.1	<0.05	<0.1	0.2	<0.001
FRC151	FRC151-130	693,120	8,598,900	Gravelly Sand	130	9.2	0.46	8.5	1.5	5.1	<0.1	0.2	<0.05	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	11.9	<0.1	<0.05	<0.1	0.4	<0.001
FRC151	FRC151-272	693,120	8,598,900	Gravelly Sand	272	9.4	0.62	8.9	1.5	4.9	<0.1	0.3	<0.05	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	1.2	<0.1	<0.05	<0.1	0.3	<0.001
FRC152	FRC152-125	693,115	8,598,875	Gravelly Sand	125	8.7	1.88	8.1	1.5	4.9	0.2	0.2	<0.05	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	0.9	<0.1	<0.05	<0.1	0.2	<0.001
FRC160	FRC160-91	693,029	8,599,301	Gravelly Sand	78	9.3	0.04	8.7	1.7	5.0	<0.1	0.3	<0.05	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	1.1	<0.1	<0.05	<0.1	0.3	<0.001
n = 10					Minimum	7.7	0.04	7.6	1.5	4.8	0.2	0.2	-	-	-	-	-	0.1	-	0.2	-	-	-	0.1	-
					Maximum	9.4	1.88	9.2	1.7	5.1	0.2	0.3	-	-	-	-	-	0.1	-	11.9	-	-	-	0.4	-
					Average	8.8	0.38	8.5	1.5	5.0	-	0.2	-	-	-	-	-	-	-	2.4	-	-	-	0.2	-
					Std Dev	0.5	0.57	0.5	0.1	0.1	-	0.0	-	-	-	-	-	-	-	3.4	-	-	-	0.1	-

Groundwater Site	Date Sampled	Field Measurements									Comments (algae, aquatic fauna, pollution, water colour, odour etc.)	Major Anions								Major Cations			
		SWL	pH	Temp	ORP	EC	TDS	Salinity	DO	Turbidity		Total Hardness as CaCO ₃	Hydroxide Alkalinity as CaCO ₃	Carbonate Alkalinity as CaCO ₃	Bicarbonate Alkalinity as CaCO ₃	Total Alkalinity as CaCO ₃	Sulfate as SO ₄	Chloride	Calcium	Magnesium	Sodium	Potassium	
		m	pH unit	°C	mV	µS/cm	mg/L	ppt	%sat	NTU		mg/L								mg/L			
ANZECC Freshwater Trigger Values (95% Aquatic Ecosystem Protection)		-	6.0-7.5	-	-	250	-	90-120	15	-	-	-	-	-	-	-	-	-	-	-	-	-	
GWB01	31/01/2018	2.89	7.14	31.5	-53	247	160	0.12	1.7	5		31	<1	<1	126	126	2	4	9	2	36	2	
GWB03	1/02/2018	1.25	6.77	30.8	-39	225	146	0.10	2.1	1		38	<1	<1	105	105	<1	5	7	5	25	4	
GWB06	1/02/2018	1.78	11.35	29.3	-150	2,013	1,341	1.04	45.6	4		422	337	45	<1	383	17	5	169	<1	13	2	
GWB07	1/02/2018	0.20	6.72	30.9	-57	205	133	0.10	1.9	12	H ₂ S smell	16	<1	<1	88	88	<1	7	3	2	34	2	
GWB08	31/01/2018	1.63	6.41	31.3	-7	172	111	0.08	2.1	1	H ₂ S smell	34	<1	<1	79	79	<1	4	7	4	18	3	
GWB10	31/01/2018	0.77	4.97	31.0	2546	21	14	0.01	56.6	6		<1	<1	<1	7	7	<1	2	<1	<1	2	<1	
GWB01	1/05/2018	4.18	7.23	31.4	-134	281	163	0.12	2.0	15		28	<1	<1	143	143	<1	3	8	2	36	2	
GWB03	1/05/2018	0.41	6.96	31.4	-27	250	144	0.10	22.9	21		42	<1	<1	107	107	<1	5	7	6	27	4	
GWB06	1/05/2018	2.00	11.50	32.8	-73	2,563	1,449	1.13	32.4	3		452	394	46	<1	440	9	2	181	<1	13	2	
GWB07	1/05/2018	2.89	6.74	31.5	-49	168	97	0.07	12.1	65	H ₂ S smell	9	<1	<1	67	67	<1	5	2	1	26	3	
GWB08	1/05/2018	2.52	6.57	32.2	-4	189	108	0.08	28.9	18	H ₂ S smell	31	<1	<1	80	80	<1	2	6	4	18	3	
GWB10	1/05/2018	1.99	5.16	33.2	148	25	14	0.01	13.3	45		<1	<1	<1	3	3	<1	2	<1	<1	2	<1	
GWB01	8/08/2018	8.11	7.52	31.4	168	237	154	0.11	3.7	11	H ₂ S smell	37	<1	<1	126	126	<1	3	10	3	34	2	
GWB03	8/09/2018	9.69	7.42	30.2	-102	186	121	0.09	27.0	3	H ₂ S smell	36	<1	<1	92	92	<1	5	6	5	25	4	
GWB06	8/09/2018	14.80	10.34	31.4	-226	1,975	1,280	0.99	65.3	8		344	311	41	<1	352	15	5	138	<1	13	2	
GWB07	8/09/2018	13.30	7.32	30.3	-89	137	89	0.06	13.2	7	H ₂ S smell	9	<1	<1	68	68	<1	6	2	1	23	2	
GWB08	8/08/2018	6.15	7.23	31.3	-98	143	93	0.07	4.2	3		31	<1	<1	72	72	<1	4	6	4	18	3	
GWB10	8/08/2018	6.70	6.39	33.9	102	26	15	0.01	61.0	13		2	<1	<1	4	4	<1	2	1	<1	2	<1	

Groundwater Site	Date Sampled	Dissolved Metals													Nutrients							
		Aluminium	Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Selenium	Zinc	Lithium	Iron	Tin	Mercury	Ammonia as N	Nitrite as N	Nitrate as N	Nitrite + Nitrate as N	TKN as N	Total Nitrogen as N	Total Phosphorus as P	Reactive Phosphorus as P
		mg/L													mg/L							
ANZECC Freshwater Trigger Values (95% Aquatic Ecosystem Protection)		0.055	0.013	0.0002	0.001	0.0014	0.0034	0.011	0.011	0.008	-	-	-	0.0006	0.006	-	-	0.03	-	0.15	0.01	0.005
GWB01	31/01/2018	0.04	0.062	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.005	0.0016	<0.05	<0.001	<0.0001	0.07	<0.01	0.02	0.02	<0.1	<0.1	0.15	0.11
GWB03	1/02/2018	<0.01	0.016	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.005	0.0002	0.16	<0.001	<0.0001	0.20	<0.01	0.02	0.02	0.40	0.40	0.24	0.28
GWB06	1/02/2018	0.71	0.033	<0.0001	0.02	<0.001	<0.001	<0.001	<0.01	<0.005	0.0001	<0.05	<0.001	<0.0001	<0.01	<0.01	0.08	0.08	<0.1	<0.1	0.05	0.02
GWB07	1/02/2018	0.03	0.290	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.005	0.0001	0.30	<0.001	<0.0001	0.03	<0.01	0.03	0.03	<0.1	<0.1	0.50	0.34
GWB08	31/01/2018	<0.01	0.067	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.01	0.010	0.0002	0.38	<0.001	<0.0001	0.04	<0.01	0.03	0.03	0.10	0.10	0.37	0.30
GWB10	31/01/2018	0.03	0.016	<0.0001	<0.001	0.002	<0.001	<0.001	<0.01	0.071	0.0000	0.38	<0.001	<0.0001	0.17	<0.01	0.06	0.06	0.10	0.20	0.04	0.01
GWB01	1/05/2018	<0.01	0.056	<0.0001	0.00	0.001	<0.001	<0.001	<0.01	<0.005	0.0015	0.11	<0.001	<0.0001	0.06	<0.01	<0.01	<0.01	<0.1	<0.1	0.10	0.08
GWB03	1/05/2018	<0.01	0.015	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.005	0.0002	0.13	<0.001	<0.0001	0.19	<0.01	<0.01	<0.01	0.20	0.20	0.23	0.22
GWB06	1/05/2018	1.10	0.016	<0.0001	0.02	<0.001	<0.001	<0.001	<0.01	<0.005	0.0001	<0.05	<0.001	<0.0001	0.04	<0.01	0.04	0.04	<0.1	<0.1	<0.01	<0.001
GWB07	1/05/2018	<0.01	0.167	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.005	0.0001	0.17	<0.001	<0.0001	0.03	<0.01	0.01	0.01	<0.1	<0.1	0.46	0.38
GWB08	1/05/2018	<0.01	0.059	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.005	0.0002	0.44	<0.001	<0.0001	0.04	<0.01	<0.01	<0.01	<0.1	<0.1	0.37	0.31
GWB10	1/05/2018	<0.01	0.008	<0.0001	<0.001	0.002	<0.001	<0.001	<0.01	0.027	0.0000	0.44	<0.001	<0.0001	0.04	<0.01	<0.01	<0.01	<0.1	<0.1	0.03	0.01
GWB01	8/08/2018	<0.01	0.067	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.005	0.0017	0.19	<0.001	<0.0001	0.21	<0.01	<0.01	<0.01	0.20	0.20	0.13	0.09
GWB03	8/09/2018	<0.01	0.014	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.005	0.0001	0.09	<0.001	<0.0001	0.10	<0.01	<0.01	<0.01	0.20	0.20	0.23	0.28
GWB06	8/09/2018	1.39	0.016	<0.0001	0.03	<0.001	<0.001	<0.001	<0.01	<0.005	0.0000	<0.05	<0.001	<0.0001	<0.01	<0.01	0.05	0.05	<0.1	<0.1	<0.01	0.01
GWB07	8/09/2018	<0.01	0.166	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.005	0.0001	0.11	<0.001	<0.0001	0.01	<0.01	<0.01	<0.01	<0.1	<0.1	0.34	0.38
GWB08	8/08/2018	<0.01	0.061	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.01	0.008	0.0003	0.43	<0.001	<0.0001	0.03	<0.01	<0.01	<0.01	<0.1	<0.1	0.32	0.27
GWB10	8/08/2018	0.13	0.009	<0.0001	<0.001	0.019	0.005	0.002	<0.01	0.099	0.0000	0.12	<0.001	<0.0001	0.10	<0.01	0.21	0.21	0.10	0.30	0.08	0.05

Surface Water Site	Date Sampled	Field Measurements				Dissolved Metals												
		Flow Depth	pH	EC	TDS	Aluminium	Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Selenium	Zinc	Lithium	Iron	Tin	Mercury
		m	pH unit	µS/cm	mg/L	mg/L												
ANZECC Freshwater Trigger Values (95% Aquatic Ecosystem Protection)			6.0-7.5	250		0.055	0.013	0.0002	0.001	0.0014	0.0034	0.011	0.011	0.008				0.0006
GDS SW2	15/02/2017	0.30	8.1	51.0	33.1	0.05	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.005	-	0.05	<0.001	<0.0001
GDS SW1	15/02/2017	0.20	6.7	14.0	8.9	0.08	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.005	-	0.08	<0.001	<0.0001
GUS SW3	15/02/2017	0.30	6.6	18.0	11.8	0.07	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.005	-	<0.05	<0.001	<0.0001
BPDS SW2	15/02/2017	1.00	5.1	15.3	10.0	0.03	0.002	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.005	-	0.16	<0.001	<0.0001
BP HISTORIC PIT	15/02/2017	>2.00	6.9	23.9	15.6	0.02	0.008	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.005	-	<0.05	<0.001	<0.0001
BPUS SW1	15/02/2017	0.30	6.5	14.6	9.5	0.04	0.002	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.005	-	0.17	<0.001	<0.0001
GDS SW2	19/04/2017	0.20	5.4	12.1	7.9	0.02	<0.001	<0.0001	<0.001	0.001	<0.001	<0.001	<0.01	<0.005	-	0.06	<0.001	<0.0001
GDS SW1	19/04/2017	0.15	5.7	13.8	9.0	0.04	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.005	-	0.05	<0.001	<0.0001
GUS SW3	19/04/2017	0.15	6.0	11.4	7.4	0.02	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.005	-	<0.05	<0.001	<0.0001
BPDS SW2	19/04/2017	0.30	5.5	17.7	11.5	0.02	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.005	-	0.1	<0.001	<0.0001
BP HISTORIC PIT	19/04/2017	Unknown	6.7	18.8	12.2	<0.01	0.007	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.005	-	<0.05	<0.001	<0.0001
BPUS SW1	19/04/2017	0.30	5.5	18.2	11.8	0.01	0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.005	-	0.09	<0.001	<0.0001
BP HISTORIC PIT	12/10/2017	4.00	7.3	22.6	15.0	<0.01	0.015	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.005	0.006	<0.05	<0.001	<0.0001
Observation Hill Dam (OHD)	12/10/2017	6.00	6.6	19.1	12.4	<0.01	0.002	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.005	<0.001	<0.05	<0.001	<0.0001
GDS SW1	31/01/2018		7.0	13.1	8.5	0.08	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.005	0.002	0.1	<0.001	<0.0001
GDS SW2	31/01/2018		5.7	10.7	7.0	0.04	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.005	0.001	<0.05	<0.001	<0.0001
GUS SW3	1/02/2018	0.20	5.9	11.1	7.2	0.07	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.005	0.001	0.05	<0.001	<0.0001
BPDS SW2	1/02/2018		7.8	16.6	10.3	0.04	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.005	0.002	0.07	<0.001	<0.0001
BP HISTORIC PIT	1/02/2018	Unknown	8.9	26.2	17.3	0.05	0.006	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.005	0.006	<0.05	<0.001	<0.0001
BPUS SW1	1/02/2018	?	7.8	14	9.1	0.04	0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.005	0.002	0.09	<0.001	<0.0001
GDS SW1	14/03/2018	0.20	6.4	11.9	7.8	0.08	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.005	<0.001	0.06	<0.001	<0.0001
GDS SW2	14/03/2018		6.2	9.0	5.9	0.02	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.005	<0.001	0.06	<0.001	<0.0001
GUS SW3	14/03/2018	0.15	6.5	10.5	6.8	0.02	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.005	<0.001	<0.05	<0.001	<0.0001
BPDS SW2	14/03/2018		7.3	16.6	10.8	0.01	0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.005	0.003	0.06	<0.001	<0.0001
BP HISTORIC PIT	14/03/2018	Unknown	8.3	17.1	11.1	0.01	0.007	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.005	0.006	<0.05	<0.001	<0.0001
BPUS SW1	14/03/2018		7.2	15.7	10.2	0.02	0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.005	0.003	0.06	<0.001	<0.0001
GDS SW2	3/05/2018	0.30	5.8	13.1	8.5	<0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.005	<0.001	<0.05	<0.001	<0.0001
GDS SW3	3/05/2018	0.20	8.1	15.3	10.4	0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.005	0.001	<0.05	<0.001	<0.0001
BPDS SW2	3/05/2018	0.25	6.7	24.4	15.6	0.02	0.002	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.005	0.006	0.38	<0.001	<0.0001
BP HISTORIC PIT	3/05/2018	Unknown	7.6	20.7	13.7	<0.01	0.010	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.005	0.008	<0.05	<0.001	<0.0001
BPUS SW1	3/05/2018	0.20	7.4	26.4	16.9	0.02	0.002	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.005	0.007	0.25	<0.001	<0.0001
BP HISTORIC PIT	8/08/2018	0.20	8.2	22.1	14.3	<0.01	0.008	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.005	0.008	<0.05	<0.001	<0.0001
SW DAM	8/09/2018	0.20	9.3	34.7	25.4	<0.01	0.002	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.005	0.001	0.06	<0.001	<0.0001
Total Alkalinity and major cations and anions very low <5mg/L; predominantly Na-HCO ₃ ·Cl.																		

Total Alkalinity and major cations and anions very low <5mg/L; predominantly Na-HCO₃:Cl.

		D005: Exchange Acidity		ED007: Exchangeable Cations																									
Sample ID	Exchange Acidity	Exchangeable Aluminium	Exchangeable Calcium	Exchangeable Magnesium	Exchangeable Potassium	Exchangeable Sodium	Cation Exchange Capacity	Exchangeable Sodium Percent	Calcium/Magnesium Ratio	Magnesium/Potassium Ratio	Bicarbonate Extractable K (Colwell)	Extractable Sulfur (KCl-40)	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Nitrite + Nitrate as N (Sol.)	Total Kjeldahl Nitrogen as N	Total Nitrogen as N	Bicarbonate Ext. P (Colwell)	Organic Matter	Total Organic Carbon			
	meq/100g	meq/100g	meq/100g	meq/100g	meq/100g	meq/100g	meq/100g	%			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	%			
	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	10	10	5	1	2	5	5	0.1	2	5	0.1	20	20	5	0.5	0.5			
GPSS01	GPSS01-A1	1	1.1	0.8	0.6	<0.1	<0.1	2.4	1.9	1.3	----	291	<10	17	<1	44	<5	11	<0.1	3	<5	<0.1	970	970	<5	3.4	2		
GPSS01	GPSS01-B1	1	1.1	<0.1	0.2	<0.1	<0.1	1.2	4.6	<0.1	----	279	<10	10	<1	29	<5	8	<0.1	3	<5	<0.1	510	510	<5	1.2	0.7		
GPSS01	GPSS01-B2	1.1	1.1	<0.1	0.2	<0.1	<0.1	1.3	5.8	<0.1	----	229	<10	11	<1	28	<5	9	<0.1	2	<5	0.1	250	250	<5	3.6	21		
GPSS02	GPSS02-A1	1.6	1.8	0.2	0.3	<0.1	<0.1	2.1	5.5	0.7	----	268	<10	<5	<1	9	<5	<5	<0.1	3	<5	<0.1	890	890	<5	1	0.6		
GPSS03	GPSS03-A1	1	1	<0.1	<0.1	<0.1	<0.1	1	9.3	----	----	285	<10	<5	<1	4	<5	13	<0.1	2	<5	0.1	590	590	<5	3.4	2		
GPSS03	GPSS03-B2	0.8	0.8	<0.1	<0.1	<0.1	<0.1	0.8	19	----	----	260	<10	<5	<1	13	<5	<5	<0.1	2	<5	<0.1	390	390	<5	1.7	1		
GPSS04	GPSS04-A1	0.6	0.6	0.9	0.4	0.1	<0.1	2	1.4	2.2	4	313	<10	16	<1	14	<5	6	<0.1	<2	<5	<0.1	680	680	<5	1.8	1		
GPSS04	GPSS04-B2	0.7	0.8	<0.1	<0.1	<0.1	<0.1	0.7	4.1	----	----	253	<10	6	<1	6	<5	<5	<0.1	<2	<5	<0.1	340	340	<5	2.1	1.2		
GPSS05	GPSS05-A1	0.5	0.5	<0.1	0.2	<0.1	<0.1	0.7	5.6	<0.1	----	215	<10	<5	<1	2	<5	<5	<0.1	<2	<5	<0.1	260	260	<5	1.8	1		
GPSS05	GPSS05-B1	0.4	0.4	<0.1	0.2	<0.1	<0.1	0.6	6	<0.1	----	285	<10	<5	<1	3	<5	<5	<0.1	<2	<5	<0.1	230	230	10	1.7	1		
GPSS06	GPSS06-A1	0.6	0.6	0.8	0.8	0.1	<0.1	2.3	2	1	5.5	342	<10	<5	<1	20	<5	5	<0.1	3	<5	<0.1	1050	1050	6	1.5	0.9		
GPSS06	GPSS06-B2	0.9	1	<0.1	0.2	<0.1	<0.1	1.1	5.5	<0.1	----	222	<10	<5	<1	15	<5	7	<0.1	4	<5	<0.1	470	470	13	3.4	2		
GPSS07	GPSS07-A1	0.9	0.8	<0.1	<0.1	<0.1	<0.1	0.9	10	----	----	<200	<10	<5	<1	4	<5	<5	<0.1	<2	<5	1.2	520	520	<5	1.3	0.7		
GPSS07	GPSS07-B2	0.8	0.9	<0.1	<0.1	<0.1	<0.1	0.8	21	----	----	<200	<10	<5	<1	5	<5	<5	<0.1	<2	<5	0.2	280	280	<5	2.1	1.2		
GPSS08	GPSS08-A1	1.4	1.6	<0.1	0.1	<0.1	<0.1	1.5	14	<0.1	----	<200	<10	<5	<1	5	<5	<5	<0.1	2	<5	0.2	730	730	<5	2.4	1.4		
GPSS08	GPSS08-B2	1	1.2	<0.1	<0.1	<0.1	<0.1	1	17	----	----	<200	<10	<5	<1	5	<5	<5	<0.1	<2	<5	<0.1	360	360	<5	1.5	0.8		
GPSS09	GPSS09-A1	0.5	0.5	0.2	0.2	<0.1	<0.1	0.9	4.8	1	----	<200	<10	14	<1	23	7	10	<0.1	18	10	<0.1	620	620	<5	1.2	0.7		
GPSS09	GPSS09-B2	0.1	0.1	<0.1	<0.1	<0.1	<0.1	0.2	12	----	----	<200	<10	18	<1	43	9	14	<0.1	8	10	<0.1	230	230	<5	1.9	1.1		
GPSS10	GPSS10-A1	0.6	0.6	0.5	0.4	0.1	<0.1	1.6	2.1	1.2	4	<200	<10	<5	<1	10	<5	<5	<0.1	3	<5	0.1	850	850	<5	2.2	1.3		
GPSS10	GPSS10-B2	0.7	0.8	0.1	0.2	<0.1	<0.1	1	3.3	0.5	----	<200	<10	<5	<1	31	<5	<5	<0.1	3	<5	<0.1	580	580	<5	2.1	1.2		
GPSS12	GPSS12-A1	0.6	0.6	<0.1	0.1	<0.1	<0.1	0.7	21	<0.1	----	<200	<10	<5	<1	10	<5	<5	<0.1	<2	<5	0.2	370	370	<5	1.3	0.7		
GPSS12	GPSS12-A2	0.6	0.5	<0.1	0.2	<0.1	<0.1	0.8	6.9	<0.1	----	<200	<10	<5	<1	3	<5	<5	<0.1	<2	<5	<0.1	200	200	<5	1.9	1.1		
GPSS13	GPSS13-A1	0.7	0.7	<0.1	<0.1	<0.1	<0.1	0.7	19	----	----	<200	<10	<5	<1	3	<5	<5	<0.1	<2	<5	0.6	640	640	<5	1.6	0.9		
GPSS13	GPSS13-A2	0.6	0.6	<0.1	<0.1	<0.1	<0.1	0.6	17	----	----	<200	<10	<5	<1	3	<5	<5	<0.1	<2	<5	0.1	390	390	<5	1.4	0.8		
GPSS14	GPSS14-A1	1.2	1.3	<0.1	<0.1	<0.1	<0.1	1.2	29	----	----	<200	<10	<5	<1	5	<5	<5	<0.1	2	<5	<0.1	810	810	<5	1.7	1		
GPSS14	GPSS14-B2	1	1.2	<0.1	<0.1	<0.1	<0.1	1	19	----	----	<200	<10	<5	<1	5	<5	<5	<0.1	<2	<5	<0.1	140	140	<5	1.8	1		
GPSS15	GPSS15-A1	1.1	1.2	<0.1	<0.1	<0.1	<0.1	1.1	10	----	----	<200	<10	<5	<1	4	<5	5	<0.1	2	<5	0.1	600	600	<5	1.3	0.7		
GPSS15	GPSS15-A2	1.2	1.2	<0.1	0.1	<0.1	<0.1	1.3	10	<0.1	----	<200	<10	<5	<1	5	<5	6	<0.1	3	<5	<0.1	260	260	<5	1.6	0.9		
GPSS16	GPSS16-A1	1.1	1.2	0.1	0.4	<0.1	<0.1	1.6	6.6	0.2	----	<200	<10	<5	<1	7	<5	6	<0.1	2	<5	0.2	840	840	<5	2.6	1.5		
GPSS16	GPSS16-B2	0.8	0.7	<0.1	0.3	<0.1	<0.1	1.1	7.3	<0.1	----	<200	<10	<5	<1	9	<5	6	<0.1	2	<5	<0.1	190	190	<5	1.5	0.8		
GPSS17	GPSS17-A1	1.5	1.7	<0.1	<0.1	<0.1	<0.1	1.5	29	----	----	<200	<10	<5	<1	5	<5	7	<0.1	3	<5	0.2	860	860	<5	1.6	0.9		
GPSS17	GPSS17-A2	1.6	1.7	<0.1	<0.1	<0.1	<0.1	1.6	37	----	----	<200	<10	<5	<1	4	<5	7	<0.1	3	<5	<0.1	460	460	<5	1.7	1		
GPSS17	GPSS17-B2	1.4	1.3	<0.1	<0.1	<0.1	<0.1	1.4	23	----	----	<200	<10	<5	<1	10	<5	7	<0.1	2	<5	<0.1	210	210	<5	1.4	0.8		
GPSSD1	GPSSD1-A1	0.8	0.7	<0.1	0.1	<0.1	<0.1	0.9	9.9	<0.1	----	<200	<10	<5	<1	3	<5	<5	<0.1	<2	<5	<0.1	570	570	8	1.5	0.8		
GPSSD1	GPSSD1-B2	0.7	0.6	<0.1	<0.1	<0.1	<0.1	0.7	16	----	----	<200	<10	<5	<1	11	<5	<5	<0.1	<2	<5	<0.1	290	290	5	1.9	1.1		
GPSS04	GPSS04-A2	0.8	0.8	0.3	0.2	<0.1	<0.1	1.3	1.9	1.5	----	<200	<10	5	<1	6	<5	<5	<0.1	<2	<5	<0.1	540	540	10	1.6	0.9		
GPSS04	GPSS04-B1	0.8	0.7	0.2	0.1	<0.1	<0.1	1.1	2.6	2	----	<200	<10	6	<1	5	<5	<5	<0.1	<2	<5	<0.1	340	340	9	1.8	1		
		0.1	0.1	0.1	0.1	0.1	0	0.2	1.4	0.2	4	215	0	5	0	2	7	5	0	2	10	0.1	140	140	5	1	0.6		
		1.6	1.8	0.9	0.8	0.1	0	2.4	37	2.2	5.5	342	0	18	0	44	9	14	0	18	10	1.2	1050	1050	13	3.6	21		
		0.9	0.9	0.4	0.3	0.1	#DIV/0!	1.2	11	1.2	4.5	270.2	#####	11.44	#####	11.11	8	7.938	#####	3.571	10	0.275	500.3	500.3	8.714	1.88	1.6		
		0.3	0.4	0.314289	0.177415	1.7E-17	#DIV/0!	0.5	8.9	0.6	0.9	37.43	#####	5.053	#####	10.98	1.414	2.744	#####	3.558	0	0.322	248.3	248.3	2.69	0.65	3.3		

CERTIFICATE OF ANALYSIS

Work Order : **EB1814449**
Client : **ECOZ ENVIRONMENTAL SERVICES**
Contact : AIDEN CAMPBELL
Address : PO BOX 381
 DARWIN NT, AUSTRALIA 0801
Telephone : ----
Project : EZ18107 - Grants Project - Waste Characterisation
Order number :
C-O-C number : ----
Sampler : ----
Site : ----
Quote number : SY/285/18
No. of samples received : 62
No. of samples analysed : 62

Page : 1 of 29
Laboratory : Environmental Division Brisbane
Contact : Customer Services EB
Address : 2 Byth Street Stafford QLD Australia 4053
Telephone : +61-7-3243 7222
Date Samples Received : 14-Jun-2018 09:00
Date Analysis Commenced : 15-Jun-2018
Issue Date : 29-Jun-2018 14:47



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. 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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Satishkumar Trivedi	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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.

- ALS is not NATA accredited for the analysis of Exchangeable Aluminium and Exchange Acidity in soils when performed under ALS Method ED005.
- ALS is not NATA accredited for the analysis of Exchangeable Cations on Alkaline Soils when performed under ALS Method ED006.
- ED007 (Exchangeable Cations): Magnesium/Potassium ratio could not be determined as both the Magnesium and Potassium results were less than reportable limits for some samples.
- ED006 (Exchangeable Cations on Alkaline Soils): Magnesium/Potassium ratio could not be determined as both the Magnesium and Potassium results were less than reportable limits for some samples.
- ED006 (Exchangeable Cations on Alkaline Soils): Calcium/Magnesium ratio could not be determined as both the Calcium and Magnesium results were less than reportable limits for some samples.
- ED005 (Exchange Acidity): It is recognised that Exchange Acidity is less than Exchangeable Aluminium for sample for some samples. However, the difference is within experimental variation of the methods.
- ED007 (Exchangeable Cations): Calcium/Magnesium ratio could not be determined as both the Calcium and Magnesium results were less than reportable limits for sample EB1814449-054.
- ASS: EA013 (ANC) Fizz Rating: 0- None; 1- Slight; 2- Moderate; 3- Strong; 4- Very Strong; 5- Lime.
- EA058 Emerson: V. = Very, D. = Dark, L. = Light, VD. = Very Dark
- ED007 and ED008: When Exchangeable Al is reported from these methods, it should be noted that Rayment & Lyons (2011) suggests Exchange Acidity by 1M KCl - Method 15G1 (ED005) is a more suitable method for the determination of exchange acidity ($H^+ + Al^{3+}$).



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	FRC151-1	FRC151-10	FRC151-30	FRC151-55	FRC151-62
Client sampling date / time					06-Jun-2018 00:00	06-Jun-2018 00:00	06-Jun-2018 00:00	06-Jun-2018 00:00	06-Jun-2018 00:00
Compound	CAS Number	LOR	Unit		EB1814449-001	EB1814449-002	EB1814449-003	EB1814449-004	EB1814449-005
					Result	Result	Result	Result	Result
EA002 : pH (Soils)									
pH Value	----	0.1	pH Unit		5.6	7.2	7.4	8.6	8.9
pH Value	----	0.1	pH Unit		5.7	7.2	7.3	8.5	8.9
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		25	16	15	19	26
Electrical Conductivity @ 25°C	----	1	µS/cm		14	10	9	11	16
EA058: Emerson Aggregate Test									
Color (Munsell)	----	-	-		Yellowish Red	Olive Brown	Olive Brown	Dark Greyish Brown	Dark Grey
Texture	----	-	-		Gravelly Sand	Sandy Loam	Sandy Loam	Gravelly Sand	Gravelly Sand
Emerson Class Number	EC/TC	-	-		8	3	3	8	8
ED005: Exchange Acidity									
Exchange Acidity	----	0.1	meq/100g		<0.1	----	----	----	----
Exchangeable Aluminium	----	0.1	meq/100g		<0.1	----	----	----	----
ED006: Exchangeable Cations on Alkaline Soils									
Exchangeable Calcium	----	0.2	meq/100g		----	----	----	1.1	3.1
Exchangeable Magnesium	----	0.2	meq/100g		----	----	----	1.3	2.3
Exchangeable Potassium	----	0.2	meq/100g		----	----	----	0.3	0.5
Exchangeable Sodium	----	0.2	meq/100g		----	----	----	<0.2	<0.2
Cation Exchange Capacity	----	0.2	meq/100g		----	----	----	2.7	5.8
Exchangeable Sodium Percent	----	0.2	%		----	----	----	<0.2	<0.2
Calcium/Magnesium Ratio	----	0.2	-		----	----	----	0.9	1.3
Magnesium/Potassium Ratio	----	0.2	-		----	----	----	4.5	4.8
ED007: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g		0.2	0.1	0.2	----	----
Exchangeable Magnesium	----	0.1	meq/100g		0.2	1.7	0.7	----	----
Exchangeable Potassium	----	0.1	meq/100g		<0.1	0.2	0.2	----	----
Exchangeable Sodium	----	0.1	meq/100g		0.1	<0.1	<0.1	----	----
Cation Exchange Capacity	----	0.1	meq/100g		0.5	2.0	1.1	----	----
Exchangeable Sodium Percent	----	0.1	%		20.5	2.2	2.2	----	----
Calcium/Magnesium Ratio	----	0.1	-		1.0	<0.1	0.3	----	----
Magnesium/Potassium Ratio	----	0.1	-		----	9.3	4.6	----	----
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		0.02	<0.01	<0.01	0.02	0.02
EG005S : Soluble Metals by ICPAES									
Arsenic	7440-38-2	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				FRC151-1	FRC151-10	FRC151-30	FRC151-55	FRC151-62
Client sampling date / time				06-Jun-2018 00:00	06-Jun-2018 00:00	06-Jun-2018 00:00	06-Jun-2018 00:00	06-Jun-2018 00:00
Compound	CAS Number	LOR	Unit	EB1814449-001	EB1814449-002	EB1814449-003	EB1814449-004	EB1814449-005
				Result	Result	Result	Result	Result
EG005S : Soluble Metals by ICPAES - Continued								
Barium	7440-39-3	1	mg/kg	<1	<1	<1	<1	<1
Beryllium	7440-41-7	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	7440-42-8	1	mg/kg	<1	<1	1	<1	<1
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	7440-47-3	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Cobalt	7440-48-4	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Copper	7440-50-8	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Lead	7439-92-1	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Manganese	7439-96-5	0.1	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Nickel	7440-02-0	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	7782-49-2	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Vanadium	7440-62-2	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	7440-66-6	0.1	mg/kg	1.0	<0.1	<0.1	<0.1	<0.1
EG035S: Soluble Mercury by FIMS								
Mercury	7439-97-6	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	FRC151-80	FRC151-130	FRC151-137	FRC151-165	FRC151-191
Client sampling date / time					06-Jun-2018 00:00	06-Jun-2018 00:00	06-Jun-2018 00:00	06-Jun-2018 00:00	09-Jun-2018 00:00
Compound	CAS Number	LOR	Unit		EB1814449-006	EB1814449-007	EB1814449-008	EB1814449-009	EB1814449-010
					Result	Result	Result	Result	Result
EA002 : pH (Soils)									
pH Value	----	0.1	pH Unit		9.4	9.2	9.2	9.5	9.3
pH Value	----	0.1	pH Unit		9.3	9.3	9.4	9.6	9.1
EA009: Nett Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		----	-6.0	----	----	----
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		66	142	148	124	88
Electrical Conductivity @ 25°C	----	1	µS/cm		41	92	101	89	47
EA011: Net Acid Generation									
pH (OX)	----	0.1	pH Unit		----	8.1	----	----	----
NAG (pH 4.5)	----	0.1	kg H2SO4/t		----	<0.1	----	----	----
NAG (pH 7.0)	----	0.1	kg H2SO4/t		----	<0.1	----	----	----
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		----	20.1	----	----	----
ANC as CaCO3	----	0.1	% CaCO3		----	2.0	----	----	----
Fizz Rating	----	0	Fizz Unit		----	1	----	----	----
EA058: Emerson Aggregate Test									
Color (Munsell)	----	-	-		Dark Grey	Grey	Grey	Dark Grey	Olive Grey
Texture	----	-	-		Gravelly Sand	Gravelly Sand	Sandy Loam	Gravelly Sand	Gravelly Sand
Emerson Class Number	EC/TC	-	-		8	8	3	8	8
ED006: Exchangeable Cations on Alkaline Soils									
Exchangeable Calcium	----	0.2	meq/100g		0.8	0.8	0.7	1.5	<0.2
Exchangeable Magnesium	----	0.2	meq/100g		<0.2	<0.2	<0.2	<0.2	<0.2
Exchangeable Potassium	----	0.2	meq/100g		0.6	0.6	1.0	0.7	0.2
Exchangeable Sodium	----	0.2	meq/100g		<0.2	<0.2	<0.2	<0.2	0.3
Cation Exchange Capacity	----	0.2	meq/100g		1.4	1.4	1.6	2.2	0.5
Exchangeable Sodium Percent	----	0.2	%		<0.2	<0.2	<0.2	<0.2	55.9
Magnesium/Potassium Ratio	----	0.2	-		<0.2	<0.2	<0.2	<0.2	<0.2
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		0.02	0.46	0.03	0.04	0.02
EG005S : Soluble Metals by ICPAES									
Arsenic	7440-38-2	0.1	mg/kg		<0.1	----	<0.1	<0.1	<0.1
Barium	7440-39-3	1	mg/kg		<1	----	<1	<1	<1
Beryllium	7440-41-7	0.1	mg/kg		<0.1	----	<0.1	<0.1	<0.1



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				FRC151-80	FRC151-130	FRC151-137	FRC151-165	FRC151-191
Client sampling date / time				06-Jun-2018 00:00	06-Jun-2018 00:00	06-Jun-2018 00:00	06-Jun-2018 00:00	09-Jun-2018 00:00
Compound	CAS Number	LOR	Unit	EB1814449-006	EB1814449-007	EB1814449-008	EB1814449-009	EB1814449-010
				Result	Result	Result	Result	Result

EG005S : Soluble Metals by ICPAES - Continued

Boron	7440-42-8	1	mg/kg	<1	----	<1	<1	<1
Cadmium	7440-43-9	0.1	mg/kg	<0.1	----	<0.1	<0.1	<0.1
Chromium	7440-47-3	0.1	mg/kg	<0.1	----	<0.1	<0.1	<0.1
Cobalt	7440-48-4	0.1	mg/kg	<0.1	----	<0.1	<0.1	<0.1
Copper	7440-50-8	0.1	mg/kg	<0.1	----	<0.1	<0.1	<0.1
Lead	7439-92-1	0.1	mg/kg	<0.1	----	<0.1	<0.1	<0.1
Manganese	7439-96-5	0.1	mg/kg	<0.1	----	0.2	<0.1	0.3
Nickel	7440-02-0	0.1	mg/kg	<0.1	----	<0.1	<0.1	<0.1
Selenium	7782-49-2	0.1	mg/kg	<0.1	----	<0.1	0.2	<0.1
Vanadium	7440-62-2	0.1	mg/kg	<0.1	----	<0.1	<0.1	<0.1
Zinc	7440-66-6	0.1	mg/kg	<0.1	----	<0.1	<0.1	<0.1

EG035S: Soluble Mercury by FIMS

Mercury	7439-97-6	0.0005	mg/kg	<0.0005	----	<0.0005	<0.0005	<0.0005

EN33: TCLP Leach

Initial pH	----	0.1	pH Unit	----	8.5	----	----	----
After HCl pH	----	0.1	pH Unit	----	1.5	----	----	----
Extraction Fluid Number	----	1	-	----	1	----	----	----
Final pH	----	0.1	pH Unit	----	5.1	----	----	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	FRC151-208	FRC151-272	FRC152-5	FRC152-23	FRC152-46
Client sampling date / time					09-Jun-2018 00:00	09-Jun-2018 00:00	09-Jun-2018 00:00	09-Jun-2018 00:00	09-Jun-2018 00:00
Compound	CAS Number	LOR	Unit		EB1814449-011	EB1814449-012	EB1814449-013	EB1814449-014	EB1814449-015
					Result	Result	Result	Result	Result
EA002 : pH (Soils)									
pH Value	----	0.1	pH Unit		9.7	9.4	6.1	8.0	8.4
pH Value	----	0.1	pH Unit		9.5	9.4	6.3	7.8	8.3
EA009: Nett Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		----	7.7	----	----	----
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		77	138	7	14	14
Electrical Conductivity @ 25°C	----	1	µS/cm		44	89	4	8	8
EA011: Net Acid Generation									
pH (OX)	----	0.1	pH Unit		----	2.8	----	----	----
NAG (pH 4.5)	----	0.1	kg H2SO4/t		----	11.0	----	----	----
NAG (pH 7.0)	----	0.1	kg H2SO4/t		----	14.2	----	----	----
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		----	11.3	----	----	----
ANC as CaCO3	----	0.1	% CaCO3		----	1.2	----	----	----
Fizz Rating	----	0	Fizz Unit		----	1	----	----	----
EA058: Emerson Aggregate Test									
Color (Munsell)	----	-	-		Grey	Black	Yellowish Brown	Dark Greyish Brown	Olive Brown
Texture	----	-	-		Gravelly Sand	Gravelly Sand	Sandy Loam	Sandy Loam	Gravelly Sand
Emerson Class Number	EC/TC	-	-		8	8	3	3	8
ED006: Exchangeable Cations on Alkaline Soils									
Exchangeable Calcium	----	0.2	meq/100g		<0.2	1.0	----	0.5	0.8
Exchangeable Magnesium	----	0.2	meq/100g		<0.2	<0.2	----	2.1	1.2
Exchangeable Potassium	----	0.2	meq/100g		<0.2	0.4	----	<0.2	<0.2
Exchangeable Sodium	----	0.2	meq/100g		<0.2	<0.2	----	<0.2	<0.2
Cation Exchange Capacity	----	0.2	meq/100g		<0.2	1.5	----	2.7	2.2
Exchangeable Sodium Percent	----	0.2	%		<0.2	<0.2	----	<0.2	<0.2
Calcium/Magnesium Ratio	----	0.2	-		----	----	----	0.2	0.6
Magnesium/Potassium Ratio	----	0.2	-		----	<0.2	----	----	----
ED007: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g		----	----	0.2	----	----
Exchangeable Magnesium	----	0.1	meq/100g		----	----	1.3	----	----
Exchangeable Potassium	----	0.1	meq/100g		----	----	0.2	----	----
Exchangeable Sodium	----	0.1	meq/100g		----	----	<0.1	----	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	FRC151-208	FRC151-272	FRC152-5	FRC152-23	FRC152-46
Client sampling date / time					09-Jun-2018 00:00	09-Jun-2018 00:00	09-Jun-2018 00:00	09-Jun-2018 00:00	09-Jun-2018 00:00
Compound	CAS Number	LOR	Unit		EB1814449-011	EB1814449-012	EB1814449-013	EB1814449-014	EB1814449-015
					Result	Result	Result	Result	Result
ED007: Exchangeable Cations - Continued									
Cation Exchange Capacity	----	0.1	meq/100g		----	----	1.8	----	----
Exchangeable Sodium Percent	----	0.1	%		----	----	2.4	----	----
Calcium/Magnesium Ratio	----	0.1	-		----	----	0.2	----	----
Magnesium/Potassium Ratio	----	0.1	-		----	----	5.6	----	----
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		<0.01	0.62	<0.01	<0.01	<0.01
EG005S : Soluble Metals by ICPAES									
Arsenic	7440-38-2	0.1	mg/kg		<0.1	----	<0.1	<0.1	<0.1
Barium	7440-39-3	1	mg/kg		<1	----	<1	<1	<1
Beryllium	7440-41-7	0.1	mg/kg		<0.1	----	<0.1	<0.1	<0.1
Boron	7440-42-8	1	mg/kg		<1	----	<1	<1	<1
Cadmium	7440-43-9	0.1	mg/kg		<0.1	----	<0.1	<0.1	<0.1
Chromium	7440-47-3	0.1	mg/kg		<0.1	----	<0.1	<0.1	<0.1
Cobalt	7440-48-4	0.1	mg/kg		<0.1	----	<0.1	<0.1	<0.1
Copper	7440-50-8	0.1	mg/kg		<0.1	----	<0.1	<0.1	<0.1
Lead	7439-92-1	0.1	mg/kg		<0.1	----	<0.1	<0.1	<0.1
Manganese	7439-96-5	0.1	mg/kg		0.3	----	<0.1	0.1	<0.1
Nickel	7440-02-0	0.1	mg/kg		<0.1	----	<0.1	<0.1	<0.1
Selenium	7782-49-2	0.1	mg/kg		<0.1	----	<0.1	<0.1	0.1
Vanadium	7440-62-2	0.1	mg/kg		<0.1	----	<0.1	<0.1	<0.1
Zinc	7440-66-6	0.1	mg/kg		<0.1	----	<0.1	<0.1	<0.1
EG035S: Soluble Mercury by FIMS									
Mercury	7439-97-6	0.0005	mg/kg		<0.0005	----	<0.0005	<0.0005	<0.0005
EN33: TCLP Leach									
Initial pH	----	0.1	pH Unit		----	8.9	----	----	----
After HCl pH	----	0.1	pH Unit		----	1.5	----	----	----
Extraction Fluid Number	----	1	-		----	1	----	----	----
Final pH	----	0.1	pH Unit		----	4.9	----	----	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	FRC152-51	FRC152-64	FRC152-70	FRC152-125	FRC152-170
Client sampling date / time					09-Jun-2018 00:00	09-Jun-2018 00:00	09-Jun-2018 00:00	10-Jun-2018 00:00	10-Jun-2018 00:00
Compound	CAS Number	LOR	Unit		EB1814449-017	EB1814449-019	EB1814449-020	EB1814449-021	EB1814449-022
					Result	Result	Result	Result	Result
EA002 : pH (Soils)									
pH Value	----	0.1	pH Unit		9.1	9.0	9.1	8.7	9.2
pH Value	----	0.1	pH Unit		8.9	8.9	9.1	8.3	9.1
EA009: Nett Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		----	----	----	49.5	----
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		27	43	34	46	70
Electrical Conductivity @ 25°C	----	1	µS/cm		20	22	22	22	55
EA011: Net Acid Generation									
pH (OX)	----	0.1	pH Unit		----	----	----	2.4	----
NAG (pH 4.5)	----	0.1	kg H2SO4/t		----	----	----	41.9	----
NAG (pH 7.0)	----	0.1	kg H2SO4/t		----	----	----	49.2	----
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		----	----	----	8.0	----
ANC as CaCO3	----	0.1	% CaCO3		----	----	----	0.8	----
Fizz Rating	----	0	Fizz Unit		----	----	----	0	----
EA058: Emerson Aggregate Test									
Color (Munsell)	----	-	-		Dark Greyish Brown	Greyish Brown	Grey	Very Dark Grey	Very Dark Grey
Texture	----	-	-		Gravelly Sand	Sandy Loam	Sandy Loam	Gravelly Sand	Gravelly Sand
Emerson Class Number	EC/TC	-	-		8	3	3	8	8
ED006: Exchangeable Cations on Alkaline Soils									
Exchangeable Calcium	----	0.2	meq/100g		0.4	0.9	0.8	0.4	0.8
Exchangeable Magnesium	----	0.2	meq/100g		0.8	0.7	0.6	<0.2	<0.2
Exchangeable Potassium	----	0.2	meq/100g		0.4	0.4	0.4	<0.2	<0.2
Exchangeable Sodium	----	0.2	meq/100g		<0.2	<0.2	<0.2	<0.2	<0.2
Cation Exchange Capacity	----	0.2	meq/100g		1.6	2.0	1.9	0.4	0.9
Exchangeable Sodium Percent	----	0.2	%		<0.2	<0.2	<0.2	<0.2	<0.2
Calcium/Magnesium Ratio	----	0.2	-		0.6	1.2	1.4	----	----
Magnesium/Potassium Ratio	----	0.2	-		2.1	2.1	1.4	----	----
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		<0.01	0.02	0.02	1.88	0.02
EG005S : Soluble Metals by ICPAES									
Arsenic	7440-38-2	0.1	mg/kg		<0.1	0.1	<0.1	----	<0.1
Barium	7440-39-3	1	mg/kg		<1	<1	<1	----	<1



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				FRC152-51	FRC152-64	FRC152-70	FRC152-125	FRC152-170
Client sampling date / time				09-Jun-2018 00:00	09-Jun-2018 00:00	09-Jun-2018 00:00	10-Jun-2018 00:00	10-Jun-2018 00:00
Compound	CAS Number	LOR	Unit	EB1814449-017	EB1814449-019	EB1814449-020	EB1814449-021	EB1814449-022
				Result	Result	Result	Result	Result
EG005S : Soluble Metals by ICPAES - Continued								
Beryllium	7440-41-7	0.1	mg/kg	<0.1	<0.1	<0.1	----	<0.1
Boron	7440-42-8	1	mg/kg	<1	<1	<1	----	<1
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	----	<0.1
Chromium	7440-47-3	0.1	mg/kg	<0.1	<0.1	<0.1	----	<0.1
Cobalt	7440-48-4	0.1	mg/kg	<0.1	<0.1	<0.1	----	<0.1
Copper	7440-50-8	0.1	mg/kg	<0.1	<0.1	<0.1	----	<0.1
Lead	7439-92-1	0.1	mg/kg	<0.1	<0.1	<0.1	----	<0.1
Manganese	7439-96-5	0.1	mg/kg	<0.1	0.1	<0.1	----	<0.1
Nickel	7440-02-0	0.1	mg/kg	<0.1	<0.1	<0.1	----	<0.1
Selenium	7782-49-2	0.1	mg/kg	0.1	<0.1	<0.1	----	<0.1
Vanadium	7440-62-2	0.1	mg/kg	<0.1	<0.1	<0.1	----	<0.1
Zinc	7440-66-6	0.1	mg/kg	<0.1	<0.1	<0.1	----	<0.1
EG035S: Soluble Mercury by FIMS								
Mercury	7439-97-6	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	----	<0.0005
EN33: TCLP Leach								
Initial pH	----	0.1	pH Unit	----	----	----	8.1	----
After HCl pH	----	0.1	pH Unit	----	----	----	1.5	----
Extraction Fluid Number	----	1	-	----	----	----	1	----
Final pH	----	0.1	pH Unit	----	----	----	4.9	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	FRC153-1	FRC153-4	FRC153-21	FRC153-38	FRC126-1
Client sampling date / time					11-Jun-2018 00:00	11-Jun-2018 00:00	11-Jun-2018 00:00	11-Jun-2018 00:00	09-Jun-2018 00:00
Compound	CAS Number	LOR	Unit		EB1814449-023	EB1814449-024	EB1814449-025	EB1814449-026	EB1814449-027
					Result	Result	Result	Result	Result
EA002 : pH (Soils)									
pH Value	----	0.1	pH Unit		5.6	5.2	7.6	8.7	6.1
pH Value	----	0.1	pH Unit		5.8	5.4	7.6	8.7	6.4
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		8	5	18	20	11
Electrical Conductivity @ 25°C	----	1	µS/cm		4	3	10	13	6
EA058: Emerson Aggregate Test									
Color (Munsell)	----	-	-		Yellowish Red	Strong Brown	Gravelly Sand	Dary Greyish Brown	Olive Brown
Texture	----	-	-		Gravelly Sand	Sandy Loam	Gravelly Sand	Sandy Loam	Sandy Loam
Emerson Class Number	EC/TC	-	-		8	4	8	3	3
ED005: Exchange Acidity									
Exchange Acidity	----	0.1	meq/100g		0.2	2.0	----	----	----
Exchangeable Aluminium	----	0.1	meq/100g		<0.1	1.8	----	----	----
ED006: Exchangeable Cations on Alkaline Soils									
Exchangeable Calcium	----	0.2	meq/100g		----	----	0.2	0.8	----
Exchangeable Magnesium	----	0.2	meq/100g		----	----	2.4	3.1	----
Exchangeable Potassium	----	0.2	meq/100g		----	----	0.2	0.3	----
Exchangeable Sodium	----	0.2	meq/100g		----	----	<0.2	<0.2	----
Cation Exchange Capacity	----	0.2	meq/100g		----	----	2.9	4.1	----
Exchangeable Sodium Percent	----	0.2	%		----	----	<0.2	<0.2	----
Calcium/Magnesium Ratio	----	0.2	-		----	----	<0.2	0.2	----
Magnesium/Potassium Ratio	----	0.2	-		----	----	11.4	10.3	----
ED007: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g		0.4	<0.1	----	----	<0.1
Exchangeable Magnesium	----	0.1	meq/100g		0.2	0.2	----	----	2.5
Exchangeable Potassium	----	0.1	meq/100g		<0.1	<0.1	----	----	0.2
Exchangeable Sodium	----	0.1	meq/100g		<0.1	<0.1	----	----	<0.1
Cation Exchange Capacity	----	0.1	meq/100g		0.8	2.2	----	----	2.7
Exchangeable Sodium Percent	----	0.1	%		7.6	10.3	----	----	2.7
Calcium/Magnesium Ratio	----	0.1	-		2.0	<0.1	----	----	<0.1
Magnesium/Potassium Ratio	----	0.1	-		----	----	----	----	15.5
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		0.02	<0.01	<0.01	0.02	<0.01
EG005S : Soluble Metals by ICPAES									
Arsenic	7440-38-2	0.1	mg/kg		<0.1	<0.1	<0.1	0.1	<0.1



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				FRC153-1	FRC153-4	FRC153-21	FRC153-38	FRC126-1
Client sampling date / time				11-Jun-2018 00:00	11-Jun-2018 00:00	11-Jun-2018 00:00	11-Jun-2018 00:00	09-Jun-2018 00:00
Compound	CAS Number	LOR	Unit	EB1814449-023	EB1814449-024	EB1814449-025	EB1814449-026	EB1814449-027
				Result	Result	Result	Result	Result
EG005S : Soluble Metals by ICPAES - Continued								
Barium	7440-39-3	1	mg/kg	<1	<1	<1	<1	<1
Beryllium	7440-41-7	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	7440-42-8	1	mg/kg	<1	<1	<1	<1	<1
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	7440-47-3	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Cobalt	7440-48-4	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Copper	7440-50-8	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Lead	7439-92-1	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Manganese	7439-96-5	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	7440-02-0	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	7782-49-2	0.1	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Vanadium	7440-62-2	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	7440-66-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EG035S: Soluble Mercury by FIMS								
Mercury	7439-97-6	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	FRC126-3	FRC126-21	FRC126-61	FRC126-081	FRC127-001
Client sampling date / time					09-Jun-2018 00:00	09-Jun-2018 00:00	09-Jun-2018 00:00	09-Jun-2018 00:00	10-Jun-2018 00:00
Compound	CAS Number	LOR	Unit		EB1814449-028	EB1814449-029	EB1814449-030	EB1814449-031	EB1814449-032
					Result	Result	Result	Result	Result
EA002 : pH (Soils)									
pH Value	----	0.1	pH Unit		6.0	7.8	9.2	9.5	5.4
pH Value	----	0.1	pH Unit		6.2	7.7	9.1	9.5	5.7
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		11	16	47	103	7
Electrical Conductivity @ 25°C	----	1	µS/cm		6	8	25	74	4
EA058: Emerson Aggregate Test									
Color (Munsell)	----	-	-		Olive Brown	Olive Brown	Olive Grey	Black	Red
Texture	----	-	-		Sandy Loam	Sandy Loam	Sandy Loam	Gravelly Sand	Gravelly Sand
Emerson Class Number	EC/TC	-	-		3	3	3	8	8
ED005: Exchange Acidity									
Exchange Acidity	----	0.1	meq/100g		----	----	----	----	0.7
Exchangeable Aluminium	----	0.1	meq/100g		----	----	----	----	0.5
ED006: Exchangeable Cations on Alkaline Soils									
Exchangeable Calcium	----	0.2	meq/100g		----	0.9	2.4	1.0	----
Exchangeable Magnesium	----	0.2	meq/100g		----	4.3	1.0	<0.2	----
Exchangeable Potassium	----	0.2	meq/100g		----	0.6	0.3	0.6	----
Exchangeable Sodium	----	0.2	meq/100g		----	<0.2	<0.2	<0.2	----
Cation Exchange Capacity	----	0.2	meq/100g		----	5.8	3.7	1.6	----
Exchangeable Sodium Percent	----	0.2	%		----	<0.2	<0.2	<0.2	----
Calcium/Magnesium Ratio	----	0.2	-		----	0.2	2.4	----	----
Magnesium/Potassium Ratio	----	0.2	-		----	7.4	3.5	<0.2	----
ED007: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g		<0.1	----	----	----	<0.1
Exchangeable Magnesium	----	0.1	meq/100g		3.5	----	----	----	0.3
Exchangeable Potassium	----	0.1	meq/100g		0.2	----	----	----	<0.1
Exchangeable Sodium	----	0.1	meq/100g		0.1	----	----	----	<0.1
Cation Exchange Capacity	----	0.1	meq/100g		3.8	----	----	----	1.0
Exchangeable Sodium Percent	----	0.1	%		3.0	----	----	----	7.1
Calcium/Magnesium Ratio	----	0.1	-		<0.1	----	----	----	<0.1
Magnesium/Potassium Ratio	----	0.1	-		19.6	----	----	----	----
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		<0.01	<0.01	0.02	0.03	<0.01
EG005S : Soluble Metals by ICPAES									
Arsenic	7440-38-2	0.1	mg/kg		<0.1	<0.1	<0.1	0.2	<0.1



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				FRC126-3	FRC126-21	FRC126-61	FRC126-081	FRC127-001
Client sampling date / time				09-Jun-2018 00:00	09-Jun-2018 00:00	09-Jun-2018 00:00	09-Jun-2018 00:00	10-Jun-2018 00:00
Compound	CAS Number	LOR	Unit	EB1814449-028	EB1814449-029	EB1814449-030	EB1814449-031	EB1814449-032
				Result	Result	Result	Result	Result
EG005S : Soluble Metals by ICPAES - Continued								
Barium	7440-39-3	1	mg/kg	<1	<1	<1	<1	<1
Beryllium	7440-41-7	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	7440-42-8	1	mg/kg	<1	<1	<1	<1	<1
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	7440-47-3	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Cobalt	7440-48-4	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Copper	7440-50-8	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Lead	7439-92-1	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Manganese	7439-96-5	0.1	mg/kg	<0.1	<0.1	0.1	<0.1	<0.1
Nickel	7440-02-0	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	7782-49-2	0.1	mg/kg	<0.1	<0.1	0.1	<0.1	<0.1
Vanadium	7440-62-2	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	7440-66-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EG035S: Soluble Mercury by FIMS								
Mercury	7439-97-6	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	FRC127-014	FRC127-040	FRC127-051	FRC127-060	FRC127-081
Client sampling date / time					10-Jun-2018 00:00	10-Jun-2018 00:00	10-Jun-2018 00:00	10-Jun-2018 00:00	10-Jun-2018 00:00
Compound	CAS Number	LOR	Unit		EB1814449-033	EB1814449-034	EB1814449-035	EB1814449-036	EB1814449-037
				Result	Result	Result	Result	Result	Result
EA002 : pH (Soils)									
pH Value	----	0.1	pH Unit		5.7	8.3	8.9	8.8	8.6
pH Value	----	0.1	pH Unit		5.9	8.1	8.8	8.6	8.5
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		4	10	16	17	103
Electrical Conductivity @ 25°C	----	1	µS/cm		3	7	11	11	50
EA058: Emerson Aggregate Test									
Color (Munsell)	----	-	-		Pale Brown	Grey	Grey	Grey	Grey
Texture	----	-	-		Gravelly Sand	Gravelly Sand	Gravelly Sand	Gravelly Sand	Sandy Loam
Emerson Class Number	EC/TC	-	-		8	8	8	8	3
ED005: Exchange Acidity									
Exchange Acidity	----	0.1	meq/100g		0.6	----	----	----	----
Exchangeable Aluminium	----	0.1	meq/100g		0.5	----	----	----	----
ED006: Exchangeable Cations on Alkaline Soils									
Exchangeable Calcium	----	0.2	meq/100g		----	0.6	0.5	0.3	<0.2
Exchangeable Magnesium	----	0.2	meq/100g		----	1.1	0.8	0.6	<0.2
Exchangeable Potassium	----	0.2	meq/100g		----	<0.2	0.2	<0.2	0.5
Exchangeable Sodium	----	0.2	meq/100g		----	<0.2	<0.2	<0.2	<0.2
Cation Exchange Capacity	----	0.2	meq/100g		----	1.8	1.5	1.2	0.5
Exchangeable Sodium Percent	----	0.2	%		----	<0.2	<0.2	<0.2	<0.2
Calcium/Magnesium Ratio	----	0.2	-		----	0.6	0.6	0.5	----
Magnesium/Potassium Ratio	----	0.2	-		----	----	3.8	----	<0.2
ED007: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g		<0.1	----	----	----	----
Exchangeable Magnesium	----	0.1	meq/100g		0.1	----	----	----	----
Exchangeable Potassium	----	0.1	meq/100g		<0.1	----	----	----	----
Exchangeable Sodium	----	0.1	meq/100g		<0.1	----	----	----	----
Cation Exchange Capacity	----	0.1	meq/100g		0.7	----	----	----	----
Exchangeable Sodium Percent	----	0.1	%		5.7	----	----	----	----
Calcium/Magnesium Ratio	----	0.1	-		<0.1	----	----	----	----
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		<0.01	<0.01	<0.01	<0.01	0.03
EG005S : Soluble Metals by ICPAES									
Arsenic	7440-38-2	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Barium	7440-39-3	1	mg/kg		<1	<1	<1	<1	<1



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				FRC127-014	FRC127-040	FRC127-051	FRC127-060	FRC127-081
Client sampling date / time				10-Jun-2018 00:00	10-Jun-2018 00:00	10-Jun-2018 00:00	10-Jun-2018 00:00	10-Jun-2018 00:00
Compound	CAS Number	LOR	Unit	EB1814449-033	EB1814449-034	EB1814449-035	EB1814449-036	EB1814449-037
				Result	Result	Result	Result	Result
EG005S : Soluble Metals by ICPAES - Continued								
Beryllium	7440-41-7	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	7440-42-8	1	mg/kg	<1	<1	<1	<1	<1
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	7440-47-3	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Cobalt	7440-48-4	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Copper	7440-50-8	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Lead	7439-92-1	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Manganese	7439-96-5	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	0.1
Nickel	7440-02-0	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	7782-49-2	0.1	mg/kg	<0.1	0.1	<0.1	0.1	<0.1
Vanadium	7440-62-2	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	7440-66-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	0.5
EG035S: Soluble Mercury by FIMS								
Mercury	7439-97-6	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	FRC128-001	FRC128-003	FRC128-020	FRC128-040	FRC128-047
Client sampling date / time					10-Jun-2018 00:00	10-Jun-2018 00:00	10-Jun-2018 00:00	10-Jun-2018 00:00	10-Jun-2018 00:00
Compound	CAS Number	LOR	Unit		EB1814449-038	EB1814449-039	EB1814449-040	EB1814449-041	EB1814449-042
					Result	Result	Result	Result	Result
EA002 : pH (Soils)									
pH Value	----	0.1	pH Unit		5.3	5.4	6.2	6.7	7.6
pH Value	----	0.1	pH Unit		5.4	5.5	6.2	6.6	7.2
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		4	6	8	10	15
Electrical Conductivity @ 25°C	----	1	µS/cm		3	3	5	6	9
EA058: Emerson Aggregate Test									
Color (Munsell)	----	-	-		Red	Light Olive Brown	Brown	Light Olive Brown	Light Yellowish Brown
Texture	----	-	-		Sandy Loam	Sandy Loam	Gravelly Sand	Sandy Loam	Gravelly Sand
Emerson Class Number	EC/TC	-	-		4	4	8	3	8
ED005: Exchange Acidity									
Exchange Acidity	----	0.1	meq/100g		0.8	8.2	----	----	----
Exchangeable Aluminium	----	0.1	meq/100g		0.6	9.0	----	----	----
ED007: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g		<0.1	<0.1	<0.1	0.6	0.3
Exchangeable Magnesium	----	0.1	meq/100g		0.2	4.7	1.3	2.5	1.2
Exchangeable Potassium	----	0.1	meq/100g		<0.1	0.2	0.2	0.1	<0.1
Exchangeable Sodium	----	0.1	meq/100g		<0.1	<0.1	<0.1	<0.1	0.1
Cation Exchange Capacity	----	0.1	meq/100g		1.0	13.1	1.6	3.2	1.8
Exchangeable Sodium Percent	----	0.1	%		8.7	1.1	2.5	1.3	6.4
Calcium/Magnesium Ratio	----	0.1	-		<0.1	<0.1	<0.1	0.2	0.2
Magnesium/Potassium Ratio	----	0.1	-		----	21.3	7.9	19.5	----
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		<0.01	<0.01	<0.01	<0.01	<0.01
EG005S : Soluble Metals by ICPAES									
Arsenic	7440-38-2	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Barium	7440-39-3	1	mg/kg		<1	<1	<1	<1	<1
Beryllium	7440-41-7	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Boron	7440-42-8	1	mg/kg		<1	<1	<1	<1	<1
Cadmium	7440-43-9	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	7440-47-3	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Cobalt	7440-48-4	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Copper	7440-50-8	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Lead	7439-92-1	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				FRC128-001	FRC128-003	FRC128-020	FRC128-040	FRC128-047
Client sampling date / time				10-Jun-2018 00:00	10-Jun-2018 00:00	10-Jun-2018 00:00	10-Jun-2018 00:00	10-Jun-2018 00:00
Compound	CAS Number	LOR	Unit	EB1814449-038	EB1814449-039	EB1814449-040	EB1814449-041	EB1814449-042
				Result	Result	Result	Result	Result
EG005S : Soluble Metals by ICPAES - Continued								
Manganese	7439-96-5	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	7440-02-0	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	7782-49-2	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Vanadium	7440-62-2	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	7440-66-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EG035S: Soluble Mercury by FIMS								
Mercury	7439-97-6	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	FRC128-060	FRC128-091	FRC128-100	FRC129-001	FRC129-008
Client sampling date / time					10-Jun-2018 00:00	10-Jun-2018 00:00	10-Jun-2018 00:00	11-Jun-2018 00:00	11-Jun-2018 00:00
Compound	CAS Number	LOR	Unit		EB1814449-043	EB1814449-044	EB1814449-045	EB1814449-046	EB1814449-047
					Result	Result	Result	Result	Result
EA002 : pH (Soils)									
pH Value	----	0.1	pH Unit		8.4	8.1	9.2	6.0	6.1
pH Value	----	0.1	pH Unit		8.0	7.8	9.0	6.2	6.3
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		14	16	31	6	7
Electrical Conductivity @ 25°C	----	1	µS/cm		11	8	21	3	4
EA058: Emerson Aggregate Test									
Color (Munsell)	----	-	-		Olive Grey	Light Olive Brown	Very Dark Grey	Yellowish Red	Olive Brown
Texture	----	-	-		Sandy Loam	Gravelly Sand	Gravelly Sand	Sandy Loam	Sandy Loam
Emerson Class Number	EC/TC	-	-		8	8	8	4	3
ED006: Exchangeable Cations on Alkaline Soils									
Exchangeable Calcium	----	0.2	meq/100g		0.5	2.7	0.3	----	----
Exchangeable Magnesium	----	0.2	meq/100g		1.0	1.9	<0.2	----	----
Exchangeable Potassium	----	0.2	meq/100g		<0.2	<0.2	0.4	----	----
Exchangeable Sodium	----	0.2	meq/100g		<0.2	<0.2	<0.2	----	----
Cation Exchange Capacity	----	0.2	meq/100g		1.6	4.6	0.7	----	----
Exchangeable Sodium Percent	----	0.2	%		<0.2	<0.2	<0.2	----	----
Calcium/Magnesium Ratio	----	0.2	-		0.5	1.5	----	----	----
Magnesium/Potassium Ratio	----	0.2	-		----	----	<0.2	----	----
ED007: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g		----	----	----	<0.1	<0.1
Exchangeable Magnesium	----	0.1	meq/100g		----	----	----	1.4	1.3
Exchangeable Potassium	----	0.1	meq/100g		----	----	----	0.1	0.1
Exchangeable Sodium	----	0.1	meq/100g		----	----	----	<0.1	<0.1
Cation Exchange Capacity	----	0.1	meq/100g		----	----	----	1.6	1.5
Exchangeable Sodium Percent	----	0.1	%		----	----	----	2.8	1.5
Calcium/Magnesium Ratio	----	0.1	-		----	----	----	<0.1	<0.1
Magnesium/Potassium Ratio	----	0.1	-		----	----	----	11.0	8.8
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		<0.01	<0.01	<0.01	<0.01	<0.01
EG005S : Soluble Metals by ICPAES									
Arsenic	7440-38-2	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Barium	7440-39-3	1	mg/kg		<1	<1	<1	<1	<1
Beryllium	7440-41-7	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Boron	7440-42-8	1	mg/kg		<1	<1	<1	<1	<1



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				FRC128-060	FRC128-091	FRC128-100	FRC129-001	FRC129-008
Client sampling date / time				10-Jun-2018 00:00	10-Jun-2018 00:00	10-Jun-2018 00:00	11-Jun-2018 00:00	11-Jun-2018 00:00
Compound	CAS Number	LOR	Unit	EB1814449-043	EB1814449-044	EB1814449-045	EB1814449-046	EB1814449-047
				Result	Result	Result	Result	Result
EG005S : Soluble Metals by ICPAES - Continued								
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	7440-47-3	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Cobalt	7440-48-4	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Copper	7440-50-8	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Lead	7439-92-1	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Manganese	7439-96-5	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	7440-02-0	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	7782-49-2	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	0.2
Vanadium	7440-62-2	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	7440-66-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EG035S: Soluble Mercury by FIMS								
Mercury	7439-97-6	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	FRC129-014	FRC129-040	FRC129-047	FRC129-061	FRC129-088
Client sampling date / time					11-Jun-2018 00:00	11-Jun-2018 00:00	11-Jun-2018 00:00	11-Jun-2018 00:00	11-Jun-2018 00:00
Compound	CAS Number	LOR	Unit		EB1814449-048	EB1814449-049	EB1814449-050	EB1814449-051	EB1814449-052
				Result	Result	Result	Result	Result	Result
EA002 : pH (Soils)									
pH Value	----	0.1	pH Unit		5.7	7.5	7.9	8.5	9.6
pH Value	----	0.1	pH Unit		5.9	7.3	7.5	8.1	9.4
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		5	12	11	15	86
Electrical Conductivity @ 25°C	----	1	µS/cm		3	6	6	10	62
EA058: Emerson Aggregate Test									
Color (Munsell)	----	-	-		Brown	Yellowish Brown	Dark Greyish Brown	Olive Grey	Grey
Texture	----	-	-		Gravelly Sand	Sandy Loam	Sandy Loam	Sandy Loam	Gravelly Sand
Emerson Class Number	EC/TC	-	-		8	3	3	3	8
ED005: Exchange Acidity									
Exchange Acidity	----	0.1	meq/100g		3.4	----	----	----	----
Exchangeable Aluminium	----	0.1	meq/100g		3.6	----	----	----	----
ED006: Exchangeable Cations on Alkaline Soils									
Exchangeable Calcium	----	0.2	meq/100g		----	----	0.7	1.4	0.5
Exchangeable Magnesium	----	0.2	meq/100g		----	----	1.5	2.4	<0.2
Exchangeable Potassium	----	0.2	meq/100g		----	----	<0.2	<0.2	0.4
Exchangeable Sodium	----	0.2	meq/100g		----	----	<0.2	<0.2	<0.2
Cation Exchange Capacity	----	0.2	meq/100g		----	----	2.2	4.1	0.9
Exchangeable Sodium Percent	----	0.2	%		----	----	<0.2	<0.2	<0.2
Calcium/Magnesium Ratio	----	0.2	-		----	----	0.4	0.6	----
Magnesium/Potassium Ratio	----	0.2	-		----	----	----	----	<0.2
ED007: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g		<0.1	1.1	----	----	----
Exchangeable Magnesium	----	0.1	meq/100g		0.8	3.7	----	----	----
Exchangeable Potassium	----	0.1	meq/100g		0.2	0.1	----	----	----
Exchangeable Sodium	----	0.1	meq/100g		<0.1	<0.1	----	----	----
Cation Exchange Capacity	----	0.1	meq/100g		4.4	5.0	----	----	----
Exchangeable Sodium Percent	----	0.1	%		2.5	1.9	----	----	----
Calcium/Magnesium Ratio	----	0.1	-		<0.1	0.3	----	----	----
Magnesium/Potassium Ratio	----	0.1	-		4.7	30.6	----	----	----
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		<0.01	<0.01	<0.01	<0.01	<0.01
EG005S : Soluble Metals by ICPAES									
Arsenic	7440-38-2	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				FRC129-014	FRC129-040	FRC129-047	FRC129-061	FRC129-088
Client sampling date / time				11-Jun-2018 00:00	11-Jun-2018 00:00	11-Jun-2018 00:00	11-Jun-2018 00:00	11-Jun-2018 00:00
Compound	CAS Number	LOR	Unit	EB1814449-048	EB1814449-049	EB1814449-050	EB1814449-051	EB1814449-052
				Result	Result	Result	Result	Result
EG005S : Soluble Metals by ICPAES - Continued								
Barium	7440-39-3	1	mg/kg	<1	<1	<1	<1	<1
Beryllium	7440-41-7	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	7440-42-8	1	mg/kg	<1	<1	<1	<1	<1
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	7440-47-3	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Cobalt	7440-48-4	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Copper	7440-50-8	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Lead	7439-92-1	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Manganese	7439-96-5	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	7440-02-0	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	7782-49-2	0.1	mg/kg	0.2	0.1	<0.1	<0.1	0.1
Vanadium	7440-62-2	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	7440-66-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EG035S: Soluble Mercury by FIMS								
Mercury	7439-97-6	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	FRC130-001	FRC130-005	FRC130-020	FRC130-040	FRC130-060
Client sampling date / time					11-Jun-2018 00:00	11-Jun-2018 00:00	11-Jun-2018 00:00	11-Jun-2018 00:00	11-Jun-2018 00:00
Compound	CAS Number	LOR	Unit		EB1814449-053	EB1814449-054	EB1814449-055	EB1814449-056	EB1814449-057
					Result	Result	Result	Result	Result
EA002 : pH (Soils)									
pH Value	----	0.1	pH Unit		5.5	5.0	6.6	8.0	9.4
pH Value	----	0.1	pH Unit		5.9	5.4	6.6	7.6	9.4
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		4	11	10	18	90
Electrical Conductivity @ 25°C	----	1	µS/cm		2	7	5	8	66
EA058: Emerson Aggregate Test									
Color (Munsell)	----	-	-		Red	Brown	Yellowish Brown	Dark Grey Brown	Very Dark Grey
Texture	----	-	-		Sandy Loam	Gravelly Sand	Sandy Loam	Sandy Loam	Gravelly Sand
Emerson Class Number	EC/TC	-	-		4	8	3	3	8
ED005: Exchange Acidity									
Exchange Acidity	----	0.1	meq/100g		0.5	2.4	----	----	----
Exchangeable Aluminium	----	0.1	meq/100g		0.4	2.4	----	----	----
ED006: Exchangeable Cations on Alkaline Soils									
Exchangeable Calcium	----	0.2	meq/100g		----	----	----	1.6	0.3
Exchangeable Magnesium	----	0.2	meq/100g		----	----	----	5.1	<0.2
Exchangeable Potassium	----	0.2	meq/100g		----	----	----	0.3	0.3
Exchangeable Sodium	----	0.2	meq/100g		----	----	----	<0.2	<0.2
Cation Exchange Capacity	----	0.2	meq/100g		----	----	----	7.0	0.6
Exchangeable Sodium Percent	----	0.2	%		----	----	----	<0.2	<0.2
Calcium/Magnesium Ratio	----	0.2	-		----	----	----	0.3	----
Magnesium/Potassium Ratio	----	0.2	-		----	----	----	18.8	<0.2
ED007: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g		<0.1	<0.1	0.4	----	----
Exchangeable Magnesium	----	0.1	meq/100g		0.2	<0.1	3.5	----	----
Exchangeable Potassium	----	0.1	meq/100g		<0.1	0.1	0.1	----	----
Exchangeable Sodium	----	0.1	meq/100g		<0.1	<0.1	<0.1	----	----
Cation Exchange Capacity	----	0.1	meq/100g		0.7	2.5	4.2	----	----
Exchangeable Sodium Percent	----	0.1	%		8.6	11.2	1.4	----	----
Calcium/Magnesium Ratio	----	0.1	-		<0.1	----	0.1	----	----
Magnesium/Potassium Ratio	----	0.1	-		----	<0.1	26.6	----	----
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		<0.01	<0.01	<0.01	<0.01	0.02
EG005S : Soluble Metals by ICPAES									
Arsenic	7440-38-2	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				FRC130-001	FRC130-005	FRC130-020	FRC130-040	FRC130-060
Client sampling date / time				11-Jun-2018 00:00	11-Jun-2018 00:00	11-Jun-2018 00:00	11-Jun-2018 00:00	11-Jun-2018 00:00
Compound	CAS Number	LOR	Unit	EB1814449-053	EB1814449-054	EB1814449-055	EB1814449-056	EB1814449-057
				Result	Result	Result	Result	Result
EG005S : Soluble Metals by ICPAES - Continued								
Barium	7440-39-3	1	mg/kg	<1	<1	<1	<1	<1
Beryllium	7440-41-7	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	7440-42-8	1	mg/kg	<1	<1	<1	<1	<1
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	7440-47-3	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Cobalt	7440-48-4	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Copper	7440-50-8	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Lead	7439-92-1	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Manganese	7439-96-5	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	7440-02-0	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	7782-49-2	0.1	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Vanadium	7440-62-2	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	7440-66-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EG035S: Soluble Mercury by FIMS								
Mercury	7439-97-6	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	FRC130-080	FRC130-100	FRC131-001	FRC131-005	FRC131-020
Client sampling date / time					11-Jun-2018 00:00	11-Jun-2018 00:00	11-Jun-2018 00:00	11-Jun-2018 00:00	11-Jun-2018 00:00
Compound	CAS Number	LOR	Unit		EB1814449-058	EB1814449-059	EB1814449-060	EB1814449-061	EB1814449-062
				Result	Result	Result	Result	Result	Result
EA002 : pH (Soils)									
pH Value	----	0.1	pH Unit		9.3	9.2	5.6	6.2	6.2
pH Value	----	0.1	pH Unit		9.3	9.0	5.8	6.3	6.3
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		88	36	4	4	5
Electrical Conductivity @ 25°C	----	1	µS/cm		66	21	2	3	3
EA058: Emerson Aggregate Test									
Color (Munsell)	----	-	-		Very Dark Grey	Very Dark Grey	Yellowish Red	Dark Red	Light Olive Brown
Texture	----	-	-		Gravelly Sand	Gravelly Sand	Gravelly Sand	Gravelly Sand	Gravelly Sand
Emerson Class Number	EC/TC	-	-		8	8	8	8	8
ED005: Exchange Acidity									
Exchange Acidity	----	0.1	meq/100g		----	----	0.4	----	----
Exchangeable Aluminium	----	0.1	meq/100g		----	----	0.2	----	----
ED006: Exchangeable Cations on Alkaline Soils									
Exchangeable Calcium	----	0.2	meq/100g		0.8	0.8	----	----	----
Exchangeable Magnesium	----	0.2	meq/100g		<0.2	0.4	----	----	----
Exchangeable Potassium	----	0.2	meq/100g		0.4	0.4	----	----	----
Exchangeable Sodium	----	0.2	meq/100g		<0.2	<0.2	----	----	----
Cation Exchange Capacity	----	0.2	meq/100g		1.1	1.6	----	----	----
Exchangeable Sodium Percent	----	0.2	%		<0.2	<0.2	----	----	----
Calcium/Magnesium Ratio	----	0.2	-		----	1.7	----	----	----
Magnesium/Potassium Ratio	----	0.2	-		<0.2	1.3	----	----	----
ED007: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g		----	----	<0.1	<0.1	<0.1
Exchangeable Magnesium	----	0.1	meq/100g		----	----	0.2	0.2	1.0
Exchangeable Potassium	----	0.1	meq/100g		----	----	<0.1	0.1	0.1
Exchangeable Sodium	----	0.1	meq/100g		----	----	<0.1	<0.1	<0.1
Cation Exchange Capacity	----	0.1	meq/100g		----	----	0.6	0.3	1.2
Exchangeable Sodium Percent	----	0.1	%		----	----	8.2	5.3	1.3
Calcium/Magnesium Ratio	----	0.1	-		----	----	<0.1	<0.1	<0.1
Magnesium/Potassium Ratio	----	0.1	-		----	----	1.6	8.7	
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		0.02	<0.01	0.02	<0.01	<0.01
EG005S : Soluble Metals by ICPAES									
Arsenic	7440-38-2	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				FRC130-080	FRC130-100	FRC131-001	FRC131-005	FRC131-020
Client sampling date / time				11-Jun-2018 00:00	11-Jun-2018 00:00	11-Jun-2018 00:00	11-Jun-2018 00:00	11-Jun-2018 00:00
Compound	CAS Number	LOR	Unit	EB1814449-058	EB1814449-059	EB1814449-060	EB1814449-061	EB1814449-062
				Result	Result	Result	Result	Result
EG005S : Soluble Metals by ICPAES - Continued								
Barium	7440-39-3	1	mg/kg	<1	<1	<1	<1	<1
Beryllium	7440-41-7	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	7440-42-8	1	mg/kg	<1	<1	<1	<1	<1
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	7440-47-3	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Cobalt	7440-48-4	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Copper	7440-50-8	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Lead	7439-92-1	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Manganese	7439-96-5	0.1	mg/kg	<0.1	<0.1	0.1	<0.1	<0.1
Nickel	7440-02-0	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	7782-49-2	0.1	mg/kg	<0.1	0.1	0.2	<0.1	0.1
Vanadium	7440-62-2	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	7440-66-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EG035S: Soluble Mercury by FIMS								
Mercury	7439-97-6	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	FRC131-047	FRC131-080	----	----	----
Client sampling date / time					11-Jun-2018 00:00	11-Jun-2018 00:00	----	----	----
Compound	CAS Number	LOR	Unit		EB1814449-063	EB1814449-064	-----	-----	-----
				Result	Result		----	----	----
EA002 : pH (Soils)									
pH Value	----	0.1	pH Unit		7.0	8.9	----	----	----
pH Value	----	0.1	pH Unit		7.0	8.6	----	----	----
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		13	38	----	----	----
Electrical Conductivity @ 25°C	----	1	µS/cm		8	21	----	----	----
EA058: Emerson Aggregate Test									
Color (Munsell)	----	-	-		Dark Reddish Brown	Grey	----	----	----
Texture	----	-	-		Sandy Loam	Gravelly Sand	----	----	----
Emerson Class Number	EC/TC	-	-		3	8	----	----	----
ED006: Exchangeable Cations on Alkaline Soils									
Exchangeable Calcium	----	0.2	meq/100g		----	1.1	----	----	----
Exchangeable Magnesium	----	0.2	meq/100g		----	0.9	----	----	----
Exchangeable Potassium	----	0.2	meq/100g		----	<0.2	----	----	----
Exchangeable Sodium	----	0.2	meq/100g		----	<0.2	----	----	----
Cation Exchange Capacity	----	0.2	meq/100g		----	2.2	----	----	----
Exchangeable Sodium Percent	----	0.2	%		----	<0.2	----	----	----
Calcium/Magnesium Ratio	----	0.2	-		----	1.2	----	----	----
ED007: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g		2.5	----	----	----	----
Exchangeable Magnesium	----	0.1	meq/100g		6.1	----	----	----	----
Exchangeable Potassium	----	0.1	meq/100g		0.2	----	----	----	----
Exchangeable Sodium	----	0.1	meq/100g		<0.1	----	----	----	----
Cation Exchange Capacity	----	0.1	meq/100g		8.8	----	----	----	----
Exchangeable Sodium Percent	----	0.1	%		1.1	----	----	----	----
Calcium/Magnesium Ratio	----	0.1	-		0.4	----	----	----	----
Magnesium/Potassium Ratio	----	0.1	-		38.8	----	----	----	----
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		<0.01	0.02	----	----	----
EG005S : Soluble Metals by ICPAES									
Arsenic	7440-38-2	0.1	mg/kg		<0.1	<0.1	----	----	----
Barium	7440-39-3	1	mg/kg		<1	<1	----	----	----
Beryllium	7440-41-7	0.1	mg/kg		<0.1	<0.1	----	----	----
Boron	7440-42-8	1	mg/kg		<1	<1	----	----	----
Cadmium	7440-43-9	0.1	mg/kg		<0.1	<0.1	----	----	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	FRC131-047	FRC131-080	----	----	----
Client sampling date / time					11-Jun-2018 00:00	11-Jun-2018 00:00	----	----	----
Compound	CAS Number	LOR	Unit		EB1814449-063	EB1814449-064	-----	-----	-----
					Result	Result	----	----	----
EG005S : Soluble Metals by ICPAES - Continued									
Chromium	7440-47-3	0.1	mg/kg		<0.1	<0.1	----	----	----
Cobalt	7440-48-4	0.1	mg/kg		<0.1	<0.1	----	----	----
Copper	7440-50-8	0.1	mg/kg		<0.1	<0.1	----	----	----
Lead	7439-92-1	0.1	mg/kg		<0.1	<0.1	----	----	----
Manganese	7439-96-5	0.1	mg/kg		0.1	<0.1	----	----	----
Nickel	7440-02-0	0.1	mg/kg		<0.1	<0.1	----	----	----
Selenium	7782-49-2	0.1	mg/kg		<0.1	0.2	----	----	----
Vanadium	7440-62-2	0.1	mg/kg		<0.1	<0.1	----	----	----
Zinc	7440-66-6	0.1	mg/kg		<0.1	<0.1	----	----	----
EG035S: Soluble Mercury by FIMS									
Mercury	7439-97-6	0.0005	mg/kg		<0.0005	<0.0005	----	----	----



Analytical Results

Sub-Matrix: **TCLP LEACHATE**
 (Matrix: **WATER**)

Client sample ID

				FRC151-130	FRC151-272	FRC152-125	----	----
Client sampling date / time				06-Jun-2018 00:00	09-Jun-2018 00:00	10-Jun-2018 00:00	----	----
Compound	CAS Number	LOR	Unit	EB1814449-007	EB1814449-012	EB1814449-021	-----	-----
				Result	Result	Result	----	----
EG005C: Leachable Metals by ICPAES								
Arsenic	7440-38-2	0.1	mg/L	<0.1	<0.1	0.2	----	----
Barium	7440-39-3	0.1	mg/L	0.2	0.3	0.2	----	----
Beryllium	7440-41-7	0.05	mg/L	<0.05	<0.05	<0.05	----	----
Boron	7440-42-8	0.1	mg/L	<0.1	<0.1	<0.1	----	----
Cadmium	7440-43-9	0.05	mg/L	<0.05	<0.05	<0.05	----	----
Chromium	7440-47-3	0.1	mg/L	<0.1	<0.1	<0.1	----	----
Cobalt	7440-48-4	0.1	mg/L	<0.1	<0.1	<0.1	----	----
Copper	7440-50-8	0.1	mg/L	<0.1	<0.1	<0.1	----	----
Lead	7439-92-1	0.1	mg/L	<0.1	<0.1	<0.1	----	----
Manganese	7439-96-5	0.1	mg/L	11.9	1.2	0.9	----	----
Nickel	7440-02-0	0.1	mg/L	<0.1	<0.1	<0.1	----	----
Selenium	7782-49-2	0.05	mg/L	<0.05	<0.05	<0.05	----	----
Vanadium	7440-62-2	0.1	mg/L	<0.1	<0.1	<0.1	----	----
Zinc	7440-66-6	0.1	mg/L	0.4	0.3	0.2	----	----
EG035C: Leachable Mercury by FIMS								
Mercury	7439-97-6	0.0010	mg/L	<0.0010	<0.0010	<0.0010	----	----

QUALITY CONTROL REPORT

Work Order	: EB1814449	Page	: 1 of 13
Client	: ECOZ ENVIRONMENTAL SERVICES	Laboratory	: Environmental Division Brisbane
Contact	: AIDEN CAMPBELL	Contact	: Customer Services EB
Address	: PO BOX 381 DARWIN NT, AUSTRALIA 0801	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: ----	Telephone	: +61-7-3243 7222
Project	: EZ18107 - Grants Project - Waste Characterisation	Date Samples Received	: 14-Jun-2018
Order number	: ----	Date Analysis Commenced	: 15-Jun-2018
C-O-C number	: ----	Issue Date	: 29-Jun-2018
Sampler	: ----		
Site	: ----		
Quote number	: SY/285/18		
No. of samples received	: 62		
No. of samples analysed	: 62		



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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Satishkumar Trivedi	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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

Key :
 Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA002 : pH (Soils) (QC Lot: 1729382)									
EB1814449-001	FRC151-1	EA002-1: pH Value	----	0.1	pH Unit	5.6	5.6	0.00	0% - 20%
EB1814449-011	FRC151-208	EA002-1: pH Value	----	0.1	pH Unit	9.7	9.6	0.00	0% - 20%
EA002 : pH (Soils) (QC Lot: 1729385)									
EB1814449-023	FRC153-1	EA002-1: pH Value	----	0.1	pH Unit	5.6	5.6	0.00	0% - 20%
EB1814449-033	FRC127-014	EA002-1: pH Value	----	0.1	pH Unit	5.7	5.7	0.00	0% - 20%
EA002 : pH (Soils) (QC Lot: 1729387)									
EB1814449-001	FRC151-1	EA002: pH Value	----	0.1	pH Unit	5.7	5.8	0.00	0% - 20%
EB1814449-011	FRC151-208	EA002: pH Value	----	0.1	pH Unit	9.5	9.5	0.00	0% - 20%
EA002 : pH (Soils) (QC Lot: 1729388)									
EB1814449-023	FRC153-1	EA002: pH Value	----	0.1	pH Unit	5.8	5.8	0.00	0% - 20%
EB1814449-033	FRC127-014	EA002: pH Value	----	0.1	pH Unit	5.9	5.9	0.00	0% - 20%
EA002 : pH (Soils) (QC Lot: 1729393)									
EB1814449-038	FRC128-001	EA002-1: pH Value	----	0.1	pH Unit	5.3	5.3	0.00	0% - 20%
EB1814449-048	FRC129-014	EA002-1: pH Value	----	0.1	pH Unit	5.7	5.7	0.00	0% - 20%
EA002 : pH (Soils) (QC Lot: 1729395)									
EB1814449-058	FRC130-080	EA002-1: pH Value	----	0.1	pH Unit	9.3	9.4	0.00	0% - 20%
EA002 : pH (Soils) (QC Lot: 1729396)									
EB1814449-038	FRC128-001	EA002: pH Value	----	0.1	pH Unit	5.4	5.5	0.00	0% - 20%
EB1814449-048	FRC129-014	EA002: pH Value	----	0.1	pH Unit	5.9	5.9	0.00	0% - 20%
EA002 : pH (Soils) (QC Lot: 1729398)									
EB1814449-058	FRC130-080	EA002: pH Value	----	0.1	pH Unit	9.3	9.4	0.00	0% - 20%
EA010: Conductivity (QC Lot: 1729383)									
EB1814449-001	FRC151-1	EA010-1: Electrical Conductivity @ 25°C	----	1	µS/cm	25	25	0.00	0% - 20%

Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA010: Conductivity (QC Lot: 1729383) - continued									
EB1814449-011	FRC151-208	EA010-1: Electrical Conductivity @ 25°C	----	1	µS/cm	77	75	1.97	0% - 20%
EA010: Conductivity (QC Lot: 1729384)									
EB1814449-023	FRC153-1	EA010-1: Electrical Conductivity @ 25°C	----	1	µS/cm	8	8	0.00	No Limit
EB1814449-033	FRC127-014	EA010-1: Electrical Conductivity @ 25°C	----	1	µS/cm	4	4	0.00	No Limit
EA010: Conductivity (QC Lot: 1729386)									
EB1814449-001	FRC151-1	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	14	14	0.00	0% - 50%
EB1814449-011	FRC151-208	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	44	44	0.00	0% - 20%
EA010: Conductivity (QC Lot: 1729389)									
EB1814449-023	FRC153-1	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	4	4	0.00	No Limit
EB1814449-033	FRC127-014	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	3	3	0.00	No Limit
EA010: Conductivity (QC Lot: 1729392)									
EB1814449-038	FRC128-001	EA010-1: Electrical Conductivity @ 25°C	----	1	µS/cm	4	4	0.00	No Limit
EB1814449-048	FRC129-014	EA010-1: Electrical Conductivity @ 25°C	----	1	µS/cm	5	5	0.00	No Limit
EA010: Conductivity (QC Lot: 1729394)									
EB1814449-058	FRC130-080	EA010-1: Electrical Conductivity @ 25°C	----	1	µS/cm	88	86	2.52	0% - 20%
EA010: Conductivity (QC Lot: 1729397)									
EB1814449-038	FRC128-001	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	3	2	0.00	No Limit
EB1814449-048	FRC129-014	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	3	3	0.00	No Limit
EA010: Conductivity (QC Lot: 1729399)									
EB1814449-058	FRC130-080	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	66	67	0.00	0% - 20%
EA011: Net Acid Generation (QC Lot: 1758072)									
EB1815394-009	Anonymous	EA011: NAG (pH 4.5)	----	0.1	kg H2SO4/t	<0.1	<0.1	0.00	No Limit
		EA011: NAG (pH 7.0)	----	0.1	kg H2SO4/t	<0.1	<0.1	0.00	No Limit
		EA011: pH (OX)	----	0.1	pH Unit	8.5	8.4	1.18	0% - 20%
EB1814449-007	FRC151-130	EA011: NAG (pH 4.5)	----	0.1	kg H2SO4/t	<0.1	<0.1	0.00	No Limit
		EA011: NAG (pH 7.0)	----	0.1	kg H2SO4/t	<0.1	<0.1	0.00	No Limit
		EA011: pH (OX)	----	0.1	pH Unit	8.1	8.0	1.24	0% - 20%
EA013: Acid Neutralising Capacity (QC Lot: 1758073)									
EB1815394-004	Anonymous	EA013: ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	399	403	0.966	0% - 20%
EB1814449-007	FRC151-130	EA013: ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	20.1	18.5	7.97	0% - 20%
ED005: Exchange Acidity (QC Lot: 1749222)									
EB1814449-060	FRC131-001	ED005: Exchange Acidity	----	0.1	meq/100g	0.4	0.4	0.00	No Limit
		ED005: Exchangeable Aluminium	----	0.1	meq/100g	0.2	0.2	0.00	No Limit
EB1814449-001	FRC151-1	ED005: Exchange Acidity	----	0.1	meq/100g	<0.1	<0.1	0.00	No Limit
		ED005: Exchangeable Aluminium	----	0.1	meq/100g	<0.1	<0.1	0.00	No Limit
ED006: Exchangeable Cations on Alkaline Soils (QC Lot: 1749208)									



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
ED006: Exchangeable Cations on Alkaline Soils (QC Lot: 1749208) - continued									
EB1814449-004	FRC151-55	ED006: Exchangeable Calcium	----	0.2	meq/100g	1.1	1.1	0.00	No Limit
		ED006: Exchangeable Magnesium	----	0.2	meq/100g	1.3	1.2	0.00	No Limit
		ED006: Exchangeable Potassium	----	0.2	meq/100g	0.3	0.2	0.00	No Limit
		ED006: Exchangeable Sodium	----	0.2	meq/100g	<0.2	<0.2	0.00	No Limit
		ED006: Cation Exchange Capacity	----	0.2	meq/100g	2.7	2.6	4.58	0% - 50%
EB1814449-015	FRC152-46	ED006: Exchangeable Calcium	----	0.2	meq/100g	0.8	0.8	0.00	No Limit
		ED006: Exchangeable Magnesium	----	0.2	meq/100g	1.2	1.2	0.00	No Limit
		ED006: Exchangeable Potassium	----	0.2	meq/100g	<0.2	<0.2	0.00	No Limit
		ED006: Exchangeable Sodium	----	0.2	meq/100g	<0.2	<0.2	0.00	No Limit
		ED006: Cation Exchange Capacity	----	0.2	meq/100g	2.2	2.0	9.20	0% - 50%
ED006: Exchangeable Cations on Alkaline Soils (QC Lot: 1749217)									
EB1814449-031	FRC126-081	ED006: Exchangeable Calcium	----	0.2	meq/100g	1.0	1.0	0.00	No Limit
		ED006: Exchangeable Magnesium	----	0.2	meq/100g	<0.2	<0.2	0.00	No Limit
		ED006: Exchangeable Potassium	----	0.2	meq/100g	0.6	0.5	0.00	No Limit
		ED006: Exchangeable Sodium	----	0.2	meq/100g	<0.2	<0.2	0.00	No Limit
		ED006: Cation Exchange Capacity	----	0.2	meq/100g	1.6	1.5	0.00	No Limit
EB1814449-052	FRC129-088	ED006: Exchangeable Calcium	----	0.2	meq/100g	0.5	0.5	0.00	No Limit
		ED006: Exchangeable Magnesium	----	0.2	meq/100g	<0.2	<0.2	0.00	No Limit
		ED006: Exchangeable Potassium	----	0.2	meq/100g	0.4	0.4	0.00	No Limit
		ED006: Exchangeable Sodium	----	0.2	meq/100g	<0.2	<0.2	0.00	No Limit
		ED006: Cation Exchange Capacity	----	0.2	meq/100g	0.9	0.9	0.00	No Limit
ED007: Exchangeable Cations (QC Lot: 1749219)									
EB1814449-046	FRC129-001	ED007: Exchangeable Calcium	----	0.1	meq/100g	<0.1	<0.1	0.00	No Limit
		ED007: Exchangeable Magnesium	----	0.1	meq/100g	1.4	1.4	0.00	0% - 50%
		ED007: Exchangeable Potassium	----	0.1	meq/100g	0.1	0.1	0.00	No Limit
		ED007: Exchangeable Sodium	----	0.1	meq/100g	<0.1	<0.1	0.00	No Limit
EB1814449-002	FRC151-10	ED007: Exchangeable Calcium	----	0.1	meq/100g	0.1	0.1	0.00	No Limit
		ED007: Exchangeable Magnesium	----	0.1	meq/100g	1.7	1.7	0.00	0% - 50%
		ED007: Exchangeable Potassium	----	0.1	meq/100g	0.2	0.2	0.00	No Limit
		ED007: Exchangeable Sodium	----	0.1	meq/100g	<0.1	<0.1	0.00	No Limit
ED007: Exchangeable Cations (QC Lot: 1749221)									
EB1814449-053	FRC130-001	ED007: Exchangeable Calcium	----	0.1	meq/100g	<0.1	<0.1	0.00	No Limit
		ED007: Exchangeable Magnesium	----	0.1	meq/100g	0.2	0.2	0.00	No Limit
		ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	<0.1	0.00	No Limit
		ED007: Exchangeable Sodium	----	0.1	meq/100g	<0.1	<0.1	0.00	No Limit
EB1814449-001	FRC151-1	ED007: Exchangeable Calcium	----	0.1	meq/100g	0.2	0.2	0.00	No Limit
		ED007: Exchangeable Magnesium	----	0.1	meq/100g	0.2	0.2	0.00	No Limit
		ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	<0.1	0.00	No Limit
		ED007: Exchangeable Sodium	----	0.1	meq/100g	0.1	0.1	0.00	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
ED042T: Total Sulfur by LECO (QC Lot: 1734087)									
EB1814449-001	FRC151-1	ED042T: Sulfur - Total as S (LECO)	----	0.01	%	0.02	0.02	0.00	No Limit
EB1814449-010	FRC151-191	ED042T: Sulfur - Total as S (LECO)	----	0.01	%	0.02	0.02	0.00	No Limit
ED042T: Total Sulfur by LECO (QC Lot: 1734088)									
EB1814449-023	FRC153-1	ED042T: Sulfur - Total as S (LECO)	----	0.01	%	0.02	0.02	0.00	No Limit
EB1814449-032	FRC127-001	ED042T: Sulfur - Total as S (LECO)	----	0.01	%	<0.01	<0.01	0.00	No Limit
ED042T: Total Sulfur by LECO (QC Lot: 1734089)									
EB1814449-043	FRC128-060	ED042T: Sulfur - Total as S (LECO)	----	0.01	%	<0.01	<0.01	0.00	No Limit
EB1814449-052	FRC129-088	ED042T: Sulfur - Total as S (LECO)	----	0.01	%	<0.01	<0.01	0.00	No Limit
ED042T: Total Sulfur by LECO (QC Lot: 1734090)									
EB1814449-063	FRC131-047	ED042T: Sulfur - Total as S (LECO)	----	0.01	%	<0.01	<0.01	0.00	No Limit
EG005S : Soluble Metals by ICPAES (QC Lot: 1756891)									
EB1814449-001	FRC151-1	EG005S: Arsenic	7440-38-2	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Beryllium	7440-41-7	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Chromium	7440-47-3	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Cobalt	7440-48-4	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Copper	7440-50-8	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Lead	7439-92-1	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Manganese	7439-96-5	0.1	mg/kg	0.2	0.1	0.00	No Limit
		EG005S: Nickel	7440-02-0	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Selenium	7782-49-2	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Vanadium	7440-62-2	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Zinc	7440-66-6	0.1	mg/kg	1.0	0.9	0.00	No Limit
		EG005S: Barium	7440-39-3	1	mg/kg	<1	<1	0.00	No Limit
		EG005S: Boron	7440-42-8	1	mg/kg	<1	<1	0.00	No Limit
EB1814449-013	FRC152-5	EG005S: Arsenic	7440-38-2	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Beryllium	7440-41-7	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Chromium	7440-47-3	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Cobalt	7440-48-4	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Copper	7440-50-8	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Lead	7439-92-1	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Manganese	7439-96-5	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Nickel	7440-02-0	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Selenium	7782-49-2	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Vanadium	7440-62-2	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Zinc	7440-66-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Barium	7440-39-3	1	mg/kg	<1	<1	0.00	No Limit
		EG005S: Boron	7440-42-8	1	mg/kg	<1	<1	0.00	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG005S : Soluble Metals by ICPAES (QC Lot: 1756893)									
EB1814449-026	FRC153-38	EG005S: Arsenic	7440-38-2	0.1	mg/kg	0.1	<0.1	0.00	No Limit
		EG005S: Beryllium	7440-41-7	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Chromium	7440-47-3	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Cobalt	7440-48-4	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Copper	7440-50-8	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Lead	7439-92-1	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Manganese	7439-96-5	0.1	mg/kg	<0.1	0.1	0.00	No Limit
		EG005S: Nickel	7440-02-0	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Selenium	7782-49-2	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Vanadium	7440-62-2	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Zinc	7440-66-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Barium	7440-39-3	1	mg/kg	<1	<1	0.00	No Limit
		EG005S: Boron	7440-42-8	1	mg/kg	<1	<1	0.00	No Limit
EB1814449-036	FRC127-060	EG005S: Arsenic	7440-38-2	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Beryllium	7440-41-7	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Chromium	7440-47-3	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Cobalt	7440-48-4	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Copper	7440-50-8	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Lead	7439-92-1	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Manganese	7439-96-5	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Nickel	7440-02-0	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Selenium	7782-49-2	0.1	mg/kg	0.1	<0.1	0.00	No Limit
		EG005S: Vanadium	7440-62-2	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Zinc	7440-66-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Barium	7440-39-3	1	mg/kg	<1	<1	0.00	No Limit
		EG005S: Boron	7440-42-8	1	mg/kg	<1	<1	0.00	No Limit
EG005S : Soluble Metals by ICPAES (QC Lot: 1756895)									
EB1814449-046	FRC129-001	EG005S: Arsenic	7440-38-2	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Beryllium	7440-41-7	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Chromium	7440-47-3	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Cobalt	7440-48-4	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Copper	7440-50-8	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Lead	7439-92-1	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Manganese	7439-96-5	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Nickel	7440-02-0	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Selenium	7782-49-2	0.1	mg/kg	<0.1	0.2	0.00	No Limit
		EG005S: Vanadium	7440-62-2	0.1	mg/kg	<0.1	<0.1	0.00	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG005S : Soluble Metals by ICPAES (QC Lot: 1756895) - continued									
EB1814449-046	FRC129-001	EG005S: Zinc	7440-66-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Barium	7440-39-3	1	mg/kg	<1	<1	0.00	No Limit
		EG005S: Boron	7440-42-8	1	mg/kg	<1	<1	0.00	No Limit
EB1814449-056	FRC130-040	EG005S: Arsenic	7440-38-2	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Beryllium	7440-41-7	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Chromium	7440-47-3	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Cobalt	7440-48-4	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Copper	7440-50-8	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Lead	7439-92-1	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Manganese	7439-96-5	0.1	mg/kg	<0.1	0.1	0.00	No Limit
		EG005S: Nickel	7440-02-0	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Selenium	7782-49-2	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Vanadium	7440-62-2	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Zinc	7440-66-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Barium	7440-39-3	1	mg/kg	<1	<1	0.00	No Limit
		EG005S: Boron	7440-42-8	1	mg/kg	<1	<1	0.00	No Limit
EG035S: Soluble Mercury by FIMS (QC Lot: 1756890)									
EB1814449-001	FRC151-1	EG035S: Mercury	7439-97-6	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
EB1814449-013	FRC152-5	EG035S: Mercury	7439-97-6	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
EG035S: Soluble Mercury by FIMS (QC Lot: 1756892)									
EB1814449-026	FRC153-38	EG035S: Mercury	7439-97-6	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
EB1814449-036	FRC127-060	EG035S: Mercury	7439-97-6	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
EG035S: Soluble Mercury by FIMS (QC Lot: 1756894)									
EB1814449-046	FRC129-001	EG035S: Mercury	7439-97-6	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
EB1814449-056	FRC130-040	EG035S: Mercury	7439-97-6	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG005C: Leachable Metals by ICPAES (QC Lot: 1761153)									
EB1814449-007	FRC151-130	EG005C: Beryllium	7440-41-7	0.05	mg/L	<0.05	<0.05	0.00	No Limit
		EG005C: Cadmium	7440-43-9	0.05	mg/L	<0.05	<0.05	0.00	No Limit
		EG005C: Selenium	7782-49-2	0.05	mg/L	<0.05	<0.05	0.00	No Limit
		EG005C: Arsenic	7440-38-2	0.1	mg/L	<0.1	<0.1	0.00	No Limit
		EG005C: Barium	7440-39-3	0.1	mg/L	0.2	0.2	0.00	No Limit
		EG005C: Boron	7440-42-8	0.1	mg/L	<0.1	<0.1	0.00	No Limit
		EG005C: Chromium	7440-47-3	0.1	mg/L	<0.1	<0.1	0.00	No Limit
		EG005C: Cobalt	7440-48-4	0.1	mg/L	<0.1	<0.1	0.00	No Limit
		EG005C: Copper	7440-50-8	0.1	mg/L	<0.1	<0.1	0.00	No Limit
		EG005C: Lead	7439-92-1	0.1	mg/L	<0.1	<0.1	0.00	No Limit

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 Work Order : EB1814449
 Client : ECOZ ENVIRONMENTAL SERVICES
 Project : EZ18107 - Grants Project - Waste Characterisation



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG005C: Leachable Metals by ICPAES (QC Lot: 1761153) - continued									
EB1814449-007	FRC151-130	EG005C: Manganese	7439-96-5	0.1	mg/L	11.9	11.8	0.00	0% - 20%
		EG005C: Nickel	7440-02-0	0.1	mg/L	<0.1	<0.1	0.00	No Limit
		EG005C: Vanadium	7440-62-2	0.1	mg/L	<0.1	<0.1	0.00	No Limit
		EG005C: Zinc	7440-66-6	0.1	mg/L	0.4	0.4	0.00	No Limit
EG035C: Leachable Mercury by FIMS (QC Lot: 1763999)									
EB1814449-007	FRC151-130	EG035C: Mercury	7439-97-6	0.0001	mg/L	<0.0010	<0.0010	0.00	No Limit

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) LowHigh	
Method: Compound	CAS Number	LOR	Unit	Result				
EA002 : pH (Soils) (QCLot: 1729382)								
EA002-1: pH Value	----	----	pH Unit	----	4 pH Unit	101	98	102
EA002 : pH (Soils) (QCLot: 1729385)								
EA002-1: pH Value	----	----	pH Unit	----	7 pH Unit	100	98	102
EA002 : pH (Soils) (QCLot: 1729387)								
EA002: pH Value	----	----	pH Unit	----	4 pH Unit	100	98	102
				----	7 pH Unit	100	98	102
EA002 : pH (Soils) (QCLot: 1729388)								
EA002: pH Value	----	----	pH Unit	----	4 pH Unit	100	98	102
				----	7 pH Unit	100	98	102
EA002 : pH (Soils) (QCLot: 1729393)								
EA002-1: pH Value	----	----	pH Unit	----	4 pH Unit	100	98	102
EA002 : pH (Soils) (QCLot: 1729395)								
EA002-1: pH Value	----	----	pH Unit	----	7 pH Unit	100	98	102
EA002 : pH (Soils) (QCLot: 1729396)								
EA002: pH Value	----	----	pH Unit	----	4 pH Unit	101	98	102
				----	7 pH Unit	100	98	102
EA002 : pH (Soils) (QCLot: 1729398)								
EA002: pH Value	----	----	pH Unit	----	4 pH Unit	101	98	102
				----	7 pH Unit	100	98	102
EA010: Conductivity (QCLot: 1729383)								
EA010-1: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	98.1	97	103
EA010: Conductivity (QCLot: 1729384)								
EA010-1: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	98.1	97	103
EA010: Conductivity (QCLot: 1729386)								
EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	98.5	97	103
EA010: Conductivity (QCLot: 1729389)								
EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	98.2	97	103
EA010: Conductivity (QCLot: 1729392)								
EA010-1: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	99.7	97	103
EA010: Conductivity (QCLot: 1729394)								
EA010-1: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	97.5	97	103
EA010: Conductivity (QCLot: 1729397)								

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) LowHigh	
Method: Compound	CAS Number	LOR	Unit	Result				
EA010: Conductivity (QCLot: 1729397) - continued								
EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	98.9	97	103
EA010: Conductivity (QCLot: 1729399)								
EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	99.2	97	103
EA011: Net Acid Generation (QCLot: 1758072)								
EA011: NAG (pH 7.0)	----	----	kg H2SO4/t	----	22.5 kg H2SO4/t	106	70	130
EA013: Acid Neutralising Capacity (QCLot: 1758073)								
EA013: ANC as H2SO4	----	----	kg H2SO4 equiv./t	----	196 kg H2SO4 equiv./t	94.3	82	120
ED005: Exchange Acidity (QCLot: 1749222)								
ED005: Exchange Acidity	----	0.1	meq/100g	<0.1	----	----	----	----
ED005: Exchangeable Aluminium	----	0.1	meq/100g	<0.1	----	----	----	----
ED006: Exchangeable Cations on Alkaline Soils (QCLot: 1749208)								
ED006: Exchangeable Calcium	----	0.2	meq/100g	<0.2	9.57 meq/100g	110	70	130
ED006: Exchangeable Magnesium	----	0.2	meq/100g	<0.2	6.32 meq/100g	102	70	130
ED006: Exchangeable Potassium	----	0.2	meq/100g	<0.2	0.65 meq/100g	113	70	130
ED006: Exchangeable Sodium	----	0.2	meq/100g	<0.2	2.86 meq/100g	113	70	130
ED006: Cation Exchange Capacity	----	0.2	meq/100g	<0.2	19.4 meq/100g	108	70	130
ED006: Exchangeable Cations on Alkaline Soils (QCLot: 1749217)								
ED006: Exchangeable Calcium	----	0.2	meq/100g	<0.2	9.57 meq/100g	109	70	130
ED006: Exchangeable Magnesium	----	0.2	meq/100g	<0.2	6.32 meq/100g	102	70	130
ED006: Exchangeable Potassium	----	0.2	meq/100g	<0.2	0.65 meq/100g	113	70	130
ED006: Exchangeable Sodium	----	0.2	meq/100g	<0.2	2.86 meq/100g	114	70	130
ED006: Cation Exchange Capacity	----	0.2	meq/100g	<0.2	19.4 meq/100g	108	70	130
ED007: Exchangeable Cations (QCLot: 1749219)								
ED007: Exchangeable Calcium	----	0.1	meq/100g	<0.1	3.54 meq/100g	94.7	79	113
ED007: Exchangeable Magnesium	----	0.1	meq/100g	<0.1	1.15 meq/100g	93.2	85	115
ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	0.635 meq/100g	89.6	70	122
ED007: Exchangeable Sodium	----	0.1	meq/100g	<0.1	0.382 meq/100g	81.7	76	112
ED007: Cation Exchange Capacity	----	0.1	meq/100g	<0.1	5.707 meq/100g	92.9	82	112
ED007: Exchangeable Cations (QCLot: 1749221)								
ED007: Exchangeable Calcium	----	0.1	meq/100g	<0.1	3.54 meq/100g	112	79	113
ED007: Exchangeable Magnesium	----	0.1	meq/100g	<0.1	1.15 meq/100g	97.4	85	115
ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	0.635 meq/100g	106	70	122
ED007: Exchangeable Sodium	----	0.1	meq/100g	<0.1	0.382 meq/100g	96.0	76	112
ED007: Cation Exchange Capacity	----	----	meq/100g	----	5.707 meq/100g	107	82	112
ED042T: Total Sulfur by LECO (QCLot: 1734087)								
ED042T: Sulfur - Total as S (LECO)	----	0.01	%	<0.01	0.51 %	100	70	130
ED042T: Total Sulfur by LECO (QCLot: 1734088)								



Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
ED042T: Total Sulfur by LECO (QCLot: 1734088) - continued								
ED042T: Sulfur - Total as S (LECO)	----	0.01	%	<0.01	0.16 %	94.5	70	130
ED042T: Total Sulfur by LECO (QCLot: 1734089)								
ED042T: Sulfur - Total as S (LECO)	----	0.01	%	<0.01	0.16 %	98.0	70	130
ED042T: Total Sulfur by LECO (QCLot: 1734090)								
ED042T: Sulfur - Total as S (LECO)	----	0.01	%	<0.01	0.51 %	105	70	130
EG005S : Soluble Metals by ICPAES (QCLot: 1756891)								
EG005S: Arsenic	7440-38-2	0.1	mg/kg	<0.1	5 mg/kg	96.8	83	111
EG005S: Barium	7440-39-3	1	mg/kg	<1	----	----	----	----
EG005S: Beryllium	7440-41-7	0.1	mg/kg	<0.1	----	----	----	----
EG005S: Boron	7440-42-8	1	mg/kg	<1	----	----	----	----
EG005S: Cadmium	7440-43-9	0.1	mg/kg	<0.1	5 mg/kg	99.8	87	112
EG005S: Chromium	7440-47-3	0.1	mg/kg	<0.1	5 mg/kg	100	91	110
EG005S: Cobalt	7440-48-4	0.1	mg/kg	<0.1	----	----	----	----
EG005S: Copper	7440-50-8	0.1	mg/kg	<0.1	5 mg/kg	99.2	84	111
EG005S: Lead	7439-92-1	0.1	mg/kg	<0.1	5 mg/kg	99.2	90	112
EG005S: Manganese	7439-96-5	0.1	mg/kg	<0.1	----	----	----	----
EG005S: Nickel	7440-02-0	0.1	mg/kg	<0.1	5 mg/kg	99.9	82	112
EG005S: Selenium	7782-49-2	0.1	mg/kg	<0.1	----	----	----	----
EG005S: Vanadium	7440-62-2	0.1	mg/kg	<0.1	----	----	----	----
EG005S: Zinc	7440-66-6	0.1	mg/kg	<0.1	5 mg/kg	99.9	94	110
EG005S : Soluble Metals by ICPAES (QCLot: 1756893)								
EG005S: Arsenic	7440-38-2	0.1	mg/kg	<0.1	5 mg/kg	102	83	111
EG005S: Barium	7440-39-3	1	mg/kg	<1	----	----	----	----
EG005S: Beryllium	7440-41-7	0.1	mg/kg	<0.1	----	----	----	----
EG005S: Boron	7440-42-8	1	mg/kg	<1	----	----	----	----
EG005S: Cadmium	7440-43-9	0.1	mg/kg	<0.1	5 mg/kg	105	87	112
EG005S: Chromium	7440-47-3	0.1	mg/kg	<0.1	5 mg/kg	104	91	110
EG005S: Cobalt	7440-48-4	0.1	mg/kg	<0.1	----	----	----	----
EG005S: Copper	7440-50-8	0.1	mg/kg	<0.1	5 mg/kg	103	84	111
EG005S: Lead	7439-92-1	0.1	mg/kg	<0.1	5 mg/kg	103	90	112
EG005S: Manganese	7439-96-5	0.1	mg/kg	<0.1	----	----	----	----
EG005S: Nickel	7440-02-0	0.1	mg/kg	<0.1	5 mg/kg	105	82	112
EG005S: Selenium	7782-49-2	0.1	mg/kg	<0.1	----	----	----	----
EG005S: Vanadium	7440-62-2	0.1	mg/kg	<0.1	----	----	----	----
EG005S: Zinc	7440-66-6	0.1	mg/kg	<0.1	5 mg/kg	105	94	110
EG005S : Soluble Metals by ICPAES (QCLot: 1756895)								
EG005S: Arsenic	7440-38-2	0.1	mg/kg	<0.1	5 mg/kg	101	83	111
EG005S: Barium	7440-39-3	1	mg/kg	<1	----	----	----	----



Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
Method: Compound	CAS Number	LOR	Unit		Result	Spike	Spike Recovery (%)	Recovery Limits (%)	
						Concentration	LCS	Low	High
EG005S : Soluble Metals by ICPAES (QCLot: 1756895) - continued									
EG005S: Beryllium	7440-41-7	0.1	mg/kg	<0.1	----	----	----	----	
EG005S: Boron	7440-42-8	1	mg/kg	<1	----	----	----	----	
EG005S: Cadmium	7440-43-9	0.1	mg/kg	<0.1	5 mg/kg	112	87	112	
EG005S: Chromium	7440-47-3	0.1	mg/kg	<0.1	5 mg/kg	109	91	110	
EG005S: Cobalt	7440-48-4	0.1	mg/kg	<0.1	----	----	----	----	
EG005S: Copper	7440-50-8	0.1	mg/kg	<0.1	5 mg/kg	109	84	111	
EG005S: Lead	7439-92-1	0.1	mg/kg	<0.1	5 mg/kg	97.9	90	112	
EG005S: Manganese	7439-96-5	0.1	mg/kg	<0.1	----	----	----	----	
EG005S: Nickel	7440-02-0	0.1	mg/kg	<0.1	5 mg/kg	111	82	112	
EG005S: Selenium	7782-49-2	0.1	mg/kg	<0.1	----	----	----	----	
EG005S: Vanadium	7440-62-2	0.1	mg/kg	<0.1	----	----	----	----	
EG005S: Zinc	7440-66-6	0.1	mg/kg	<0.1	5 mg/kg	102	94	110	
EG035S: Soluble Mercury by FIMS (QCLot: 1756890)									
EG035S: Mercury	7439-97-6	0.0005	mg/kg	<0.0005	0.05 mg/kg	89.6	83	125	
EG035S: Soluble Mercury by FIMS (QCLot: 1756892)									
EG035S: Mercury	7439-97-6	0.0005	mg/kg	<0.0005	0.05 mg/kg	89.4	83	125	
EG035S: Soluble Mercury by FIMS (QCLot: 1756894)									
EG035S: Mercury	7439-97-6	0.0005	mg/kg	<0.0005	0.05 mg/kg	93.1	83	125	
EN33: TCLP Leach (QCLot: 1757433)									
EN33a: Final pH	----	0.1	pH Unit	4.9	----	----	----	----	

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
Method: Compound	CAS Number	LOR	Unit		Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
						LCS	Low	High
EG005C: Leachable Metals by ICPAES (QCLot: 1761153)								
EG005C: Arsenic	7440-38-2	0.1	mg/L	<0.1	1 mg/L	106	89	123
EG005C: Barium	7440-39-3	0.1	mg/L	<0.1	1 mg/L	102	90	120
EG005C: Beryllium	7440-41-7	0.05	mg/L	<0.05	----	----	----	----
EG005C: Boron	7440-42-8	0.1	mg/L	<0.1	----	----	----	----
EG005C: Cadmium	7440-43-9	0.05	mg/L	<0.05	0.5 mg/L	99.8	88	120
EG005C: Chromium	7440-47-3	0.1	mg/L	<0.1	1 mg/L	98.5	86	115
EG005C: Cobalt	7440-48-4	0.1	mg/L	<0.1	1 mg/L	97.3	87	116
EG005C: Copper	7440-50-8	0.1	mg/L	<0.1	1 mg/L	109	87	117
EG005C: Lead	7439-92-1	0.1	mg/L	<0.1	1 mg/L	101	85	117
EG005C: Manganese	7439-96-5	0.1	mg/L	<0.1	1 mg/L	99.3	83	117
EG005C: Nickel	7440-02-0	0.1	mg/L	<0.1	1 mg/L	98.9	90	116
EG005C: Selenium	7782-49-2	0.05	mg/L	<0.05	----	----	----	----
EG005C: Vanadium	7440-62-2	0.1	mg/L	<0.1	1 mg/L	99.5	88	112
EG005C: Zinc	7440-66-6	0.1	mg/L	<0.1	1 mg/L	101	87	122



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit		Result		LCS	Low
EG035C: Leachable Mercury by FIMS (QCLot: 1763999)								
EG035C: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	106	84	117

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
				Concentration	MS	Low	High
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number				
EG035S: Soluble Mercury by FIMS (QCLot: 1756890)							
EB1814449-002	FRC151-10	EG035S: Mercury	7439-97-6	0.05 mg/kg	121	70	130
EG035S: Soluble Mercury by FIMS (QCLot: 1756892)							
EB1814449-027	FRC126-1	EG035S: Mercury	7439-97-6	0.05 mg/kg	127	70	130
EG035S: Soluble Mercury by FIMS (QCLot: 1756894)							
EB1814449-047	FRC129-008	EG035S: Mercury	7439-97-6	0.05 mg/kg	124	70	130

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG005C: Leachable Metals by ICPAES (QCLot: 1761153)							
EB1814449-012	FRC151-272	EG005C: Arsenic	7440-38-2	1 mg/L	105	70	130
		EG005C: Barium	7440-39-3	1 mg/L	101	70	130
		EG005C: Beryllium	7440-41-7	0.1 mg/L	106	70	130
		EG005C: Cadmium	7440-43-9	0.5 mg/L	98.8	70	130
		EG005C: Chromium	7440-47-3	1 mg/L	98.4	70	130
		EG005C: Cobalt	7440-48-4	1 mg/L	97.0	70	130
		EG005C: Copper	7440-50-8	1 mg/L	109	70	130
		EG005C: Lead	7439-92-1	1 mg/L	101	70	130
		EG005C: Manganese	7439-96-5	1 mg/L	95.3	70	130
		EG005C: Nickel	7440-02-0	1 mg/L	96.6	70	130
		EG005C: Vanadium	7440-62-2	1 mg/L	101	70	130
		EG005C: Zinc	7440-66-6	1 mg/L	99.3	70	130
EG035C: Leachable Mercury by FIMS (QCLot: 1763999)							
EB1814449-012	FRC151-272	EG035C: Mercury	7439-97-6	0.01 mg/L	126	70	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EB1814449	Page	: 1 of 23
Client	: ECOZ ENVIRONMENTAL SERVICES	Laboratory	: Environmental Division Brisbane
Contact	: AIDEN CAMPBELL	Telephone	: +61-7-3243 7222
Project	: EZ18107 - Grants Project - Waste Characterisation	Date Samples Received	: 14-Jun-2018
Site	: ----	Issue Date	: 29-Jun-2018
Sampler	: ----	No. of samples received	: 62
Order number	:	No. of samples analysed	: 62

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- **NO** Matrix Spike outliers occur.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- **NO** Quality Control Sample Frequency Outliers exist.



Outliers : Analysis Holding Time Compliance

Matrix: **SOIL**

Method		Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA002 : pH (Soils)							
Soil Glass Jar - Unpreserved							
FRC151-1, FRC151-30, FRC151-62, FRC151-130, FRC151-165	FRC151-10, FRC151-55, FRC151-80, FRC151-137,	20-Jun-2018	13-Jun-2018	7	----	----	----
Soil Glass Jar - Unpreserved							
FRC151-1, FRC151-30, FRC151-62, FRC151-130, FRC151-165	FRC151-10, FRC151-55, FRC151-80, FRC151-137,	21-Jun-2018	13-Jun-2018	8	----	----	----
Soil Glass Jar - Unpreserved							
FRC151-191, FRC151-272, FRC152-23, FRC152-51, FRC152-70, FRC126-3, FRC126-61,	FRC151-208, FRC152-5, FRC152-46, FRC152-64, FRC126-1, FRC126-21, FRC126-081	20-Jun-2018	16-Jun-2018	4	----	----	----
Soil Glass Jar - Unpreserved							
FRC151-191, FRC151-272, FRC152-23, FRC152-51, FRC152-70, FRC126-3, FRC126-61,	FRC151-208, FRC152-5, FRC152-46, FRC152-64, FRC126-1, FRC126-21, FRC126-081	21-Jun-2018	16-Jun-2018	5	----	----	----
Soil Glass Jar - Unpreserved							
FRC152-125, FRC127-001, FRC127-040, FRC127-060,	FRC152-170, FRC127-014, FRC127-051, FRC127-081	20-Jun-2018	17-Jun-2018	3	----	----	----
Soil Glass Jar - Unpreserved							
FRC128-001, FRC128-020, FRC128-047, FRC128-091,	FRC128-003, FRC128-040, FRC128-060, FRC128-100	20-Jun-2018	17-Jun-2018	3	21-Jun-2018	20-Jun-2018	1

[illegible]



Matrix: **SOIL**

Method		Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA010: Conductivity - Analysis Holding Time Compliance							
Soil Glass Jar - Unpreserved							
FRC151-1, FRC151-30, FRC151-62, FRC151-130, FRC151-165	FRC151-10, FRC151-55, FRC151-80, FRC151-137,	20-Jun-2018	13-Jun-2018	7	----	----	----
Soil Glass Jar - Unpreserved							
FRC151-1, FRC151-30, FRC151-62, FRC151-130, FRC151-165	FRC151-10, FRC151-55, FRC151-80, FRC151-137,	21-Jun-2018	13-Jun-2018	8	----	----	----
Soil Glass Jar - Unpreserved							
FRC151-191, FRC151-272, FRC152-23, FRC152-51, FRC152-70, FRC126-3, FRC126-61,	FRC151-208, FRC152-5, FRC152-46, FRC152-64, FRC126-1, FRC126-21, FRC126-081	20-Jun-2018	16-Jun-2018	4	----	----	----
Soil Glass Jar - Unpreserved							
FRC151-191, FRC151-272, FRC152-23, FRC152-51, FRC152-70, FRC126-3, FRC126-61,	FRC151-208, FRC152-5, FRC152-46, FRC152-64, FRC126-1, FRC126-21, FRC126-081	21-Jun-2018	16-Jun-2018	5	----	----	----
Soil Glass Jar - Unpreserved							
FRC152-125, FRC127-001, FRC127-040, FRC127-060,	FRC152-170, FRC127-014, FRC127-051, FRC127-081	20-Jun-2018	17-Jun-2018	3	----	----	----
Soil Glass Jar - Unpreserved							
FRC128-001, FRC128-020, FRC128-047, FRC128-091,	FRC128-003, FRC128-040, FRC128-060, FRC128-100	20-Jun-2018	17-Jun-2018	3	----	----	----

Method	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA010: Conductivity - Analysis Holding Time Compliance						
Soil Glass Jar - Unpreserved FRC152-125, FRC127-001, FRC127-040, FRC127-060, FRC128-001, FRC128-020, FRC128-047, FRC128-091, FRC152-170, FRC127-014, FRC127-051, FRC127-081, FRC128-003, FRC128-040, FRC128-060, FRC128-100	21-Jun-2018	17-Jun-2018	4	----	----	----
Soil Glass Jar - Unpreserved FRC153-1, FRC153-21, FRC153-4, FRC153-38	20-Jun-2018	18-Jun-2018	2	----	----	----
Soil Glass Jar - Unpreserved FRC129-001, FRC129-014, FRC129-047, FRC129-088, FRC130-005, FRC130-040, FRC130-080, FRC131-001, FRC131-020, FRC131-080, FRC129-008, FRC129-040, FRC129-061, FRC130-001, FRC130-020, FRC130-060, FRC130-100, FRC131-005, FRC131-047	20-Jun-2018	18-Jun-2018	2	----	----	----
Soil Glass Jar - Unpreserved FRC153-1, FRC153-21, FRC129-001, FRC129-014, FRC129-047, FRC129-088, FRC130-005, FRC130-040, FRC130-080, FRC131-001, FRC131-020, FRC131-080, FRC153-4, FRC153-38, FRC129-008, FRC129-040, FRC129-061, FRC130-001, FRC130-020, FRC130-060, FRC130-100, FRC131-005, FRC131-047	21-Jun-2018	18-Jun-2018	3	----	----	----



Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA002 : pH (Soils)								
Soil Glass Jar - Unpreserved (EA002) FRC151-1, FRC151-30, FRC151-62, FRC151-130, FRC151-165	FRC151-10, FRC151-55, FRC151-80, FRC151-137,	06-Jun-2018	20-Jun-2018	13-Jun-2018	✖	20-Jun-2018	20-Jun-2018	✔
Soil Glass Jar - Unpreserved (EA002-1) FRC151-1, FRC151-30, FRC151-62, FRC151-130, FRC151-165	FRC151-10, FRC151-55, FRC151-80, FRC151-137,	06-Jun-2018	21-Jun-2018	13-Jun-2018	✖	21-Jun-2018	22-Jun-2018	✔
Soil Glass Jar - Unpreserved (EA002) FRC151-191, FRC151-272, FRC152-23, FRC152-51, FRC152-70, FRC126-3, FRC126-61,	FRC151-208, FRC152-5, FRC152-46, FRC152-64, FRC126-1, FRC126-21, FRC126-081	09-Jun-2018	20-Jun-2018	16-Jun-2018	✖	20-Jun-2018	20-Jun-2018	✔
Soil Glass Jar - Unpreserved (EA002-1) FRC151-191, FRC151-272, FRC152-23, FRC152-51, FRC152-70, FRC126-3, FRC126-61,	FRC151-208, FRC152-5, FRC152-46, FRC152-64, FRC126-1, FRC126-21, FRC126-081	09-Jun-2018	21-Jun-2018	16-Jun-2018	✖	21-Jun-2018	22-Jun-2018	✔
Soil Glass Jar - Unpreserved (EA002) FRC152-125, FRC127-001, FRC127-040, FRC127-060,	FRC152-170, FRC127-014, FRC127-051, FRC127-081	10-Jun-2018	20-Jun-2018	17-Jun-2018	✖	20-Jun-2018	20-Jun-2018	✔
Soil Glass Jar - Unpreserved (EA002)								



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA002 : pH (Soils) - Continued								
FRC128-001, FRC128-020, FRC128-047, FRC128-091,	FRC128-003, FRC128-040, FRC128-060, FRC128-100	10-Jun-2018	20-Jun-2018	17-Jun-2018	✖	21-Jun-2018	20-Jun-2018	✖
Soil Glass Jar - Unpreserved (EA002-1) FRC152-125, FRC127-001, FRC127-040, FRC127-060, FRC128-001, FRC128-020, FRC128-047, FRC128-091,	FRC152-170, FRC127-014, FRC127-051, FRC127-081, FRC128-003, FRC128-040, FRC128-060, FRC128-100	10-Jun-2018	21-Jun-2018	17-Jun-2018	✖	21-Jun-2018	22-Jun-2018	✔
Soil Glass Jar - Unpreserved (EA002) FRC153-1, FRC153-21,	FRC153-4, FRC153-38	11-Jun-2018	20-Jun-2018	18-Jun-2018	✖	20-Jun-2018	20-Jun-2018	✔
Soil Glass Jar - Unpreserved (EA002) FRC129-001, FRC129-014, FRC129-047, FRC129-088, FRC130-005, FRC130-040, FRC130-080, FRC131-001, FRC131-020, FRC131-080	FRC129-008, FRC129-040, FRC129-061, FRC130-001, FRC130-020, FRC130-060, FRC130-100, FRC131-005, FRC131-047,	11-Jun-2018	20-Jun-2018	18-Jun-2018	✖	21-Jun-2018	20-Jun-2018	✖
Soil Glass Jar - Unpreserved (EA002-1) FRC153-1, FRC153-21, FRC129-001, FRC129-014, FRC129-047, FRC129-088, FRC130-005, FRC130-040, FRC130-080, FRC131-001, FRC131-020, FRC131-080	FRC153-4, FRC153-38, FRC129-008, FRC129-040, FRC129-061, FRC130-001, FRC130-020, FRC130-060, FRC130-100, FRC131-005, FRC131-047,	11-Jun-2018	21-Jun-2018	18-Jun-2018	✖	21-Jun-2018	22-Jun-2018	✔



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA010: Conductivity								
Soil Glass Jar - Unpreserved (EA010) FRC151-1, FRC151-30, FRC151-62, FRC151-130, FRC151-165	FRC151-10, FRC151-55, FRC151-80, FRC151-137,	06-Jun-2018	20-Jun-2018	13-Jun-2018	✖	20-Jun-2018	18-Jul-2018	✔
Soil Glass Jar - Unpreserved (EA010-1) FRC151-1, FRC151-30, FRC151-62, FRC151-130, FRC151-165	FRC151-10, FRC151-55, FRC151-80, FRC151-137,	06-Jun-2018	21-Jun-2018	13-Jun-2018	✖	21-Jun-2018	19-Jul-2018	✔
Soil Glass Jar - Unpreserved (EA010) FRC151-191, FRC151-272, FRC152-23, FRC152-51, FRC152-70, FRC126-3, FRC126-61,	FRC151-208, FRC152-5, FRC152-46, FRC152-64, FRC126-1, FRC126-21, FRC126-081	09-Jun-2018	20-Jun-2018	16-Jun-2018	✖	20-Jun-2018	18-Jul-2018	✔
Soil Glass Jar - Unpreserved (EA010-1) FRC151-191, FRC151-272, FRC152-23, FRC152-51, FRC152-70, FRC126-3, FRC126-61,	FRC151-208, FRC152-5, FRC152-46, FRC152-64, FRC126-1, FRC126-21, FRC126-081	09-Jun-2018	21-Jun-2018	16-Jun-2018	✖	21-Jun-2018	19-Jul-2018	✔
Soil Glass Jar - Unpreserved (EA010) FRC152-125, FRC127-001, FRC127-040, FRC127-060,	FRC152-170, FRC127-014, FRC127-051, FRC127-081	10-Jun-2018	20-Jun-2018	17-Jun-2018	✖	20-Jun-2018	18-Jul-2018	✔
Soil Glass Jar - Unpreserved (EA010) FRC128-001, FRC128-020, FRC128-047, FRC128-091,	FRC128-003, FRC128-040, FRC128-060, FRC128-100	10-Jun-2018	20-Jun-2018	17-Jun-2018	✖	21-Jun-2018	18-Jul-2018	✔
Soil Glass Jar - Unpreserved (EA010-1)								



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA010: Conductivity - Continued								
FRC152-125, FRC127-001, FRC127-040, FRC127-060, FRC128-001, FRC128-020, FRC128-047, FRC128-091,	FRC152-170, FRC127-014, FRC127-051, FRC127-081, FRC128-003, FRC128-040, FRC128-060, FRC128-100	10-Jun-2018	21-Jun-2018	17-Jun-2018	✖	21-Jun-2018	19-Jul-2018	✓
Soil Glass Jar - Unpreserved (EA010) FRC153-1, FRC153-21,	FRC153-4, FRC153-38	11-Jun-2018	20-Jun-2018	18-Jun-2018	✖	20-Jun-2018	18-Jul-2018	✓
Soil Glass Jar - Unpreserved (EA010) FRC129-001, FRC129-014, FRC129-047, FRC129-088, FRC130-005, FRC130-040, FRC130-080, FRC131-001, FRC131-020, FRC131-080	FRC129-008, FRC129-040, FRC129-061, FRC130-001, FRC130-020, FRC130-060, FRC130-100, FRC131-005, FRC131-047,	11-Jun-2018	20-Jun-2018	18-Jun-2018	✖	21-Jun-2018	18-Jul-2018	✓
Soil Glass Jar - Unpreserved (EA010-1) FRC153-1, FRC153-21, FRC129-001, FRC129-014, FRC129-047, FRC129-088, FRC130-005, FRC130-040, FRC130-080, FRC131-001, FRC131-020, FRC131-080	FRC153-4, FRC153-38, FRC129-008, FRC129-040, FRC129-061, FRC130-001, FRC130-020, FRC130-060, FRC130-100, FRC131-005, FRC131-047,	11-Jun-2018	21-Jun-2018	18-Jun-2018	✖	21-Jun-2018	19-Jul-2018	✓
EA011: Net Acid Generation								
Pulp Bag (EA011) FRC151-130		06-Jun-2018	28-Jun-2018	06-Jun-2019	✓	28-Jun-2018	25-Dec-2018	✓
Pulp Bag (EA011) FRC151-272		09-Jun-2018	28-Jun-2018	09-Jun-2019	✓	28-Jun-2018	25-Dec-2018	✓
Pulp Bag (EA011) FRC152-125		10-Jun-2018	28-Jun-2018	10-Jun-2019	✓	28-Jun-2018	25-Dec-2018	✓

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 Work Order : EB1814449
 Client : ECOZ ENVIRONMENTAL SERVICES
 Project : EZ18107 - Grants Project - Waste Characterisation



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA013: Acid Neutralising Capacity							
Pulp Bag (EA013) FRC151-130	06-Jun-2018	28-Jun-2018	06-Jun-2019	✓	28-Jun-2018	25-Dec-2018	✓
Pulp Bag (EA013) FRC151-272	09-Jun-2018	28-Jun-2018	09-Jun-2019	✓	28-Jun-2018	25-Dec-2018	✓
Pulp Bag (EA013) FRC152-125	10-Jun-2018	28-Jun-2018	10-Jun-2019	✓	28-Jun-2018	25-Dec-2018	✓



Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA058: Emerson Aggregate Test								
Soil Glass Jar - Unpreserved (EA058)		06-Jun-2018	----	----	----	27-Jun-2018	03-Dec-2018	✓
FRC151-1,	FRC151-10,							
FRC151-30,	FRC151-55,							
FRC151-62,	FRC151-80,							
FRC151-130,	FRC151-137,							
FRC151-165								
Soil Glass Jar - Unpreserved (EA058)		09-Jun-2018	----	----	----	27-Jun-2018	06-Dec-2018	✓
FRC151-191,	FRC151-208,							
FRC151-272,	FRC152-5,							
FRC152-23,	FRC152-46,							
FRC152-51,	FRC152-64,							
FRC152-70,	FRC126-1,							
FRC126-3,	FRC126-21,							
FRC126-61,	FRC126-081							
Soil Glass Jar - Unpreserved (EA058)		10-Jun-2018	----	----	----	27-Jun-2018	07-Dec-2018	✓
FRC152-125,	FRC152-170,							
FRC127-001,	FRC127-014,							
FRC127-040,	FRC127-051,							
FRC127-060,	FRC127-081,							
FRC128-001,	FRC128-003,							
FRC128-020,	FRC128-040,							
FRC128-047,	FRC128-060,							
FRC128-091,	FRC128-100							
Soil Glass Jar - Unpreserved (EA058)		11-Jun-2018	----	----	----	27-Jun-2018	08-Dec-2018	✓
FRC153-1,	FRC153-4,							
FRC153-21,	FRC153-38,							
FRC129-001,	FRC129-008,							
FRC129-014,	FRC129-040,							
FRC129-047,	FRC129-061,							
FRC129-088,	FRC130-001,							
FRC130-005,	FRC130-020,							
FRC130-040,	FRC130-060,							
FRC130-080,	FRC130-100,							
FRC131-001,	FRC131-005,							
FRC131-020,	FRC131-047,							
FRC131-080								



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED005: Exchange Acidity								
Soil Glass Jar - Unpreserved (ED005)								
FRC151-1, FRC151-30, FRC151-62, FRC151-130, FRC151-165	FRC151-10, FRC151-55, FRC151-80, FRC151-137,	06-Jun-2018	25-Jun-2018	04-Jul-2018	✔	26-Jun-2018	04-Jul-2018	✔
Soil Glass Jar - Unpreserved (ED005)								
FRC151-191, FRC151-272, FRC152-23, FRC152-51, FRC152-70, FRC126-3, FRC126-61,	FRC151-208, FRC152-5, FRC152-46, FRC152-64, FRC126-1, FRC126-21, FRC126-081	09-Jun-2018	25-Jun-2018	07-Jul-2018	✔	26-Jun-2018	07-Jul-2018	✔
Soil Glass Jar - Unpreserved (ED005)								
FRC152-125, FRC127-001, FRC127-040, FRC127-060, FRC128-001, FRC128-020, FRC128-047, FRC128-091,	FRC152-170, FRC127-014, FRC127-051, FRC127-081, FRC128-003, FRC128-040, FRC128-060, FRC128-100	10-Jun-2018	25-Jun-2018	08-Jul-2018	✔	26-Jun-2018	08-Jul-2018	✔
Soil Glass Jar - Unpreserved (ED005)								
FRC153-1, FRC153-21, FRC129-001, FRC129-014, FRC129-047, FRC129-088, FRC130-005, FRC130-040, FRC130-080, FRC131-001, FRC131-020, FRC131-080	FRC153-4, FRC153-38, FRC129-008, FRC129-040, FRC129-061, FRC130-001, FRC130-020, FRC130-060, FRC130-100, FRC131-005, FRC131-047,	11-Jun-2018	25-Jun-2018	09-Jul-2018	✔	26-Jun-2018	09-Jul-2018	✔



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED006: Exchangeable Cations on Alkaline Soils								
Soil Glass Jar - Unpreserved (ED006) FRC151-1, FRC151-30	FRC151-10,	06-Jun-2018	25-Jun-2018	04-Jul-2018	✓	26-Jun-2018	04-Jul-2018	✓
Soil Glass Jar - Unpreserved (ED006) FRC151-55, FRC151-80, FRC151-137,	FRC151-62, FRC151-130, FRC151-165	06-Jun-2018	25-Jun-2018	04-Jul-2018	✓	27-Jun-2018	04-Jul-2018	✓
Soil Glass Jar - Unpreserved (ED006) FRC152-5, FRC126-3	FRC126-1,	09-Jun-2018	25-Jun-2018	07-Jul-2018	✓	26-Jun-2018	07-Jul-2018	✓
Soil Glass Jar - Unpreserved (ED006) FRC151-191, FRC151-272, FRC152-46, FRC152-64, FRC126-21, FRC126-081	FRC151-208, FRC152-23, FRC152-51, FRC152-70, FRC126-61,	09-Jun-2018	25-Jun-2018	07-Jul-2018	✓	27-Jun-2018	07-Jul-2018	✓
Soil Glass Jar - Unpreserved (ED006) FRC127-001, FRC128-001, FRC128-020, FRC128-047	FRC127-014, FRC128-003, FRC128-040,	10-Jun-2018	25-Jun-2018	08-Jul-2018	✓	26-Jun-2018	08-Jul-2018	✓
Soil Glass Jar - Unpreserved (ED006) FRC152-125, FRC127-040, FRC127-060, FRC128-060, FRC128-100	FRC152-170, FRC127-051, FRC127-081, FRC128-091,	10-Jun-2018	25-Jun-2018	08-Jul-2018	✓	27-Jun-2018	08-Jul-2018	✓
Soil Glass Jar - Unpreserved (ED006) FRC153-1, FRC129-001, FRC129-014, FRC130-001, FRC130-020, FRC131-005, FRC131-047	FRC153-4, FRC129-008, FRC129-040, FRC130-005, FRC131-001, FRC131-020,	11-Jun-2018	25-Jun-2018	09-Jul-2018	✓	26-Jun-2018	09-Jul-2018	✓
Soil Glass Jar - Unpreserved (ED006) FRC153-21, FRC129-047, FRC129-088, FRC130-060, FRC130-100,	FRC153-38, FRC129-061, FRC130-040, FRC130-080, FRC131-080	11-Jun-2018	25-Jun-2018	09-Jul-2018	✓	27-Jun-2018	09-Jul-2018	✓



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED007: Exchangeable Cations								
Soil Glass Jar - Unpreserved (ED007)								
FRC151-1, FRC151-30, FRC151-62, FRC151-130, FRC151-165	FRC151-10, FRC151-55, FRC151-80, FRC151-137,	06-Jun-2018	25-Jun-2018	04-Jul-2018	✔	26-Jun-2018	04-Jul-2018	✔
Soil Glass Jar - Unpreserved (ED007)								
FRC151-191, FRC151-272, FRC152-23, FRC152-51, FRC152-70, FRC126-3, FRC126-61,	FRC151-208, FRC152-5, FRC152-46, FRC152-64, FRC126-1, FRC126-21, FRC126-081	09-Jun-2018	25-Jun-2018	07-Jul-2018	✔	26-Jun-2018	07-Jul-2018	✔
Soil Glass Jar - Unpreserved (ED007)								
FRC152-125, FRC127-001, FRC127-040, FRC127-060, FRC128-001, FRC128-020, FRC128-047, FRC128-091,	FRC152-170, FRC127-014, FRC127-051, FRC127-081, FRC128-003, FRC128-040, FRC128-060, FRC128-100	10-Jun-2018	25-Jun-2018	08-Jul-2018	✔	26-Jun-2018	08-Jul-2018	✔
Soil Glass Jar - Unpreserved (ED007)								
FRC153-1, FRC153-21, FRC129-001, FRC129-014, FRC129-047, FRC129-088, FRC130-005, FRC130-040, FRC130-080, FRC131-001, FRC131-020, FRC131-080	FRC153-4, FRC153-38, FRC129-008, FRC129-040, FRC129-061, FRC130-001, FRC130-020, FRC130-060, FRC130-100, FRC131-005, FRC131-047,	11-Jun-2018	25-Jun-2018	09-Jul-2018	✔	26-Jun-2018	09-Jul-2018	✔



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED008: Exchangeable Cations								
Soil Glass Jar - Unpreserved (ED008)								
FRC151-1, FRC151-30, FRC151-62, FRC151-130, FRC151-165	FRC151-10, FRC151-55, FRC151-80, FRC151-137,	06-Jun-2018	25-Jun-2018	04-Jul-2018	✔	26-Jun-2018	04-Jul-2018	✔
Soil Glass Jar - Unpreserved (ED008)								
FRC151-191, FRC151-272, FRC152-23, FRC152-51, FRC152-70, FRC126-3, FRC126-61,	FRC151-208, FRC152-5, FRC152-46, FRC152-64, FRC126-1, FRC126-21, FRC126-081	09-Jun-2018	25-Jun-2018	07-Jul-2018	✔	26-Jun-2018	07-Jul-2018	✔
Soil Glass Jar - Unpreserved (ED008)								
FRC152-125, FRC127-001, FRC127-040, FRC127-060, FRC128-001, FRC128-020, FRC128-047, FRC128-091,	FRC152-170, FRC127-014, FRC127-051, FRC127-081, FRC128-003, FRC128-040, FRC128-060, FRC128-100	10-Jun-2018	25-Jun-2018	08-Jul-2018	✔	26-Jun-2018	08-Jul-2018	✔
Soil Glass Jar - Unpreserved (ED008)								
FRC153-1, FRC153-21, FRC129-001, FRC129-014, FRC129-047, FRC129-088, FRC130-005, FRC130-040, FRC130-080, FRC131-001, FRC131-020, FRC131-080	FRC153-4, FRC153-38, FRC129-008, FRC129-040, FRC129-061, FRC130-001, FRC130-020, FRC130-060, FRC130-100, FRC131-005, FRC131-047,	11-Jun-2018	25-Jun-2018	09-Jul-2018	✔	26-Jun-2018	09-Jul-2018	✔

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED042T: Total Sulfur by LECO								
Pulp Bag (ED042T) FRC151-1, FRC151-30, FRC151-62, FRC151-130, FRC151-165		06-Jun-2018	18-Jun-2018	04-Jul-2018	✓	18-Jun-2018	04-Jul-2018	✓
FRC151-10, FRC151-55, FRC151-80, FRC151-137,								
Pulp Bag (ED042T) FRC151-191, FRC151-272, FRC152-23, FRC152-51, FRC152-70, FRC126-3, FRC126-61,		09-Jun-2018	18-Jun-2018	07-Jul-2018	✓	18-Jun-2018	07-Jul-2018	✓
FRC151-208, FRC152-5, FRC152-46, FRC152-64, FRC126-1, FRC126-21, FRC126-081								
Pulp Bag (ED042T) FRC152-125, FRC127-001, FRC127-040, FRC127-060, FRC128-001, FRC128-020, FRC128-047, FRC128-091,		10-Jun-2018	18-Jun-2018	08-Jul-2018	✓	18-Jun-2018	08-Jul-2018	✓
FRC152-170, FRC127-014, FRC127-051, FRC127-081, FRC128-003, FRC128-040, FRC128-060, FRC128-100								
Pulp Bag (ED042T) FRC153-1, FRC153-21, FRC129-001, FRC129-014, FRC129-047, FRC129-088, FRC130-005, FRC130-040, FRC130-080, FRC131-001, FRC131-020, FRC131-080		11-Jun-2018	18-Jun-2018	09-Jul-2018	✓	18-Jun-2018	09-Jul-2018	✓
FRC153-4, FRC153-38, FRC129-008, FRC129-040, FRC129-061, FRC130-001, FRC130-020, FRC130-060, FRC130-100, FRC131-005, FRC131-047,								



Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG005S : Soluble Metals by ICPAES								
Soil Glass Jar - Unpreserved (EG005S)								
FRC151-1, FRC151-30, FRC151-62, FRC151-137,	FRC151-10, FRC151-55, FRC151-80, FRC151-165	06-Jun-2018	27-Jun-2018	03-Dec-2018	✓	27-Jun-2018	03-Dec-2018	✓
Soil Glass Jar - Unpreserved (EG005S)								
FRC151-191, FRC152-5, FRC152-46, FRC152-64, FRC126-1, FRC126-21, FRC126-081	FRC151-208, FRC152-23, FRC152-51, FRC152-70, FRC126-3, FRC126-61,	09-Jun-2018	27-Jun-2018	06-Dec-2018	✓	27-Jun-2018	06-Dec-2018	✓
Soil Glass Jar - Unpreserved (EG005S)								
FRC152-170, FRC127-014, FRC127-051, FRC127-081, FRC128-003, FRC128-040, FRC128-060, FRC128-100	FRC127-001, FRC127-040, FRC127-060, FRC128-001, FRC128-020, FRC128-047, FRC128-091,	10-Jun-2018	27-Jun-2018	07-Dec-2018	✓	27-Jun-2018	07-Dec-2018	✓
Soil Glass Jar - Unpreserved (EG005S)								
FRC153-1, FRC153-21, FRC129-001, FRC129-014, FRC129-047, FRC129-088, FRC130-005, FRC130-040, FRC130-080, FRC131-001, FRC131-020, FRC131-080	FRC153-4, FRC153-38, FRC129-008, FRC129-040, FRC129-061, FRC130-001, FRC130-020, FRC130-060, FRC130-100, FRC131-005, FRC131-047,	11-Jun-2018	27-Jun-2018	08-Dec-2018	✓	27-Jun-2018	08-Dec-2018	✓



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG035S: Soluble Mercury by FIMS								
Soil Glass Jar - Unpreserved (EG035S) FRC151-1, FRC151-30, FRC151-62, FRC151-137,	FRC151-10, FRC151-55, FRC151-80, FRC151-165	06-Jun-2018	27-Jun-2018	04-Jul-2018	✔	28-Jun-2018	04-Jul-2018	✔
Soil Glass Jar - Unpreserved (EG035S) FRC151-191, FRC152-5, FRC152-46, FRC152-64, FRC126-1, FRC126-21, FRC126-081	FRC151-208, FRC152-23, FRC152-51, FRC152-70, FRC126-3, FRC126-61,	09-Jun-2018	27-Jun-2018	07-Jul-2018	✔	28-Jun-2018	07-Jul-2018	✔
Soil Glass Jar - Unpreserved (EG035S) FRC152-170, FRC127-014, FRC127-051, FRC127-081, FRC128-003, FRC128-040, FRC128-060, FRC128-100	FRC127-001, FRC127-040, FRC127-060, FRC128-001, FRC128-020, FRC128-047, FRC128-091,	10-Jun-2018	27-Jun-2018	08-Jul-2018	✔	28-Jun-2018	08-Jul-2018	✔
Soil Glass Jar - Unpreserved (EG035S) FRC129-001, FRC129-014, FRC129-047, FRC129-088, FRC130-005, FRC130-040, FRC130-080, FRC131-001, FRC131-020, FRC131-080	FRC129-008, FRC129-040, FRC129-061, FRC130-001, FRC130-020, FRC130-060, FRC130-100, FRC131-005, FRC131-047,	11-Jun-2018	27-Jun-2018	09-Jul-2018	✔	27-Jun-2018	09-Jul-2018	✔
Soil Glass Jar - Unpreserved (EG035S) FRC153-1, FRC153-21,	FRC153-4, FRC153-38	11-Jun-2018	27-Jun-2018	09-Jul-2018	✔	28-Jun-2018	09-Jul-2018	✔



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EN33: TCLP Leach							
Non-Volatile Leach: 28 day HT(e.g. Hg, CrVI) (EN33a) FRC151-130	06-Jun-2018	27-Jun-2018	04-Jul-2018	✔	----	----	----
Non-Volatile Leach: 28 day HT(e.g. Hg, CrVI) (EN33a) FRC151-272	09-Jun-2018	27-Jun-2018	07-Jul-2018	✔	----	----	----
Non-Volatile Leach: 28 day HT(e.g. Hg, CrVI) (EN33a) FRC152-125	10-Jun-2018	27-Jun-2018	08-Jul-2018	✔	----	----	----

Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG005C: Leachable Metals by ICPAES								
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG005C)	FRC151-272,	27-Jun-2018	28-Jun-2018	24-Dec-2018	✔	28-Jun-2018	24-Dec-2018	✔
FRC151-130,								
FRC152-125								
EG035C: Leachable Mercury by FIMS								
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035C)	FRC151-272,	27-Jun-2018	----	----	----	29-Jun-2018	25-Jul-2018	✔
FRC151-130,								
FRC152-125								



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)		Quality Control Specification	
Analytical Methods	Method	QC	Regular	Actual	Expected		Evaluation
Laboratory Duplicates (DUP)							
Acid Neutralising Capacity (ANC)	EA013	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Electrical Conductivity (1:2)	EA010-1	7	62	11.29	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Electrical Conductivity (1:5)	EA010	7	62	11.29	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Exchange Acidity by 1M Potassium Chloride	ED005	2	11	18.18	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations	ED007	4	26	15.38	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations on Alkaline Soils	ED006	4	36	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Net Acid Generation	EA011	2	18	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:2)	EA002-1	7	62	11.29	10.00	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:5)	EA002	7	62	11.29	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Soluble Mercury by FIMS	EG035S	6	59	10.17	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Soluble Metals by ICPAES	EG005S	6	59	10.17	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfur - Total as S (LECO)	ED042T	7	62	11.29	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Acid Neutralising Capacity (ANC)	EA013	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Electrical Conductivity (1:2)	EA010-1	4	62	6.45	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Electrical Conductivity (1:5)	EA010	4	62	6.45	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations	ED007	2	26	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations on Alkaline Soils	ED006	2	36	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Net Acid Generation	EA011	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:2)	EA002-1	4	62	6.45	5.00	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:5)	EA002	8	62	12.90	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Soluble Mercury by FIMS	EG035S	3	59	5.08	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Soluble Metals by ICPAES	EG005S	3	59	5.08	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfur - Total as S (LECO)	ED042T	4	62	6.45	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Electrical Conductivity (1:2)	EA010-1	4	62	6.45	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Electrical Conductivity (1:5)	EA010	4	62	6.45	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Exchange Acidity by 1M Potassium Chloride	ED005	1	11	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations	ED007	2	26	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations on Alkaline Soils	ED006	2	36	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Soluble Mercury by FIMS	EG035S	3	59	5.08	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Soluble Metals by ICPAES	EG005S	3	59	5.08	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfur - Total as S (LECO)	ED042T	4	62	6.45	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TCLP for Non & Semivolatile Analytes	EN33a	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Soluble Mercury by FIMS	EG035S	3	59	5.08	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Leachable Mercury by FIMS	EG035C	1	3	33.33	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Leachable Metals by ICPAES	EG005C	1	3	33.33	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Leachable Mercury by FIMS	EG035C	1	3	33.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Leachable Metals by ICPAES	EG005C	1	3	33.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Leachable Mercury by FIMS	EG035C	1	3	33.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Leachable Metals by ICPAES	EG005C	1	3	33.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Leachable Mercury by FIMS	EG035C	1	3	33.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Leachable Metals by ICPAES	EG005C	1	3	33.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH (1:5)	EA002	SOIL	In house: Referenced to Rayment and Lyons 4A1 and APHA 4500H+. pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM (2013) Schedule B(3)
pH (1:2)	EA002-1	SOIL	In house: Referenced to APHA 4500H+. pH is determined on soil samples after a 1:2 soil/water leach.
Net Acid Production Potential	EA009	SOIL	In house: Referenced to Coastech Research (Canada)(Mod.). NAPP = Acid Production Potential (APP or MAP- Maximum Acid Potential) minus Neutralising Capacity (ANC). NAPP may be +ve, zero or -ve.
Electrical Conductivity (1:5)	EA010	SOIL	In house: Referenced to Rayment and Lyons 3A1 and APHA 2510. Conductivity is determined on soil samples using a 1:5 soil/water leach. This method is compliant with NEPM (2013) Schedule B(3)
Electrical Conductivity (1:2)	EA010-1	SOIL	In house: Referenced to APHA 2510. Conductivity is determined on soil samples using a 1:2 soil/water leach.
Net Acid Generation	EA011	SOIL	In house: Referenced to Miller (1998) Titrimetric procedure determines net acidity in a soil following peroxide oxidation. Titrations to both pH 4.5 and pH 7 are reported.
Acid Neutralising Capacity (ANC)	EA013	SOIL	In house: Referenced to USEPA 600/2-78-054, I. Miller (2000). A fizz test is done to semiquantitatively estimate the likely reactivity. The soil is then reacted with an known excess quantity of an appropriate acid. Titration determines the acid remaining, and the ANC can be calculated from comparison with a blank titration.
Emerson Aggregate Test	EA058	SOIL	In house: Referenced to AS1289.3.8.1. Testing is performed only on soils with suitable aggregates; sands and gravels are usually unsuitable for this test. The test classifies the behaviour of soil aggregates, when immersed, on their coherence in water.
Exchange Acidity by 1M Potassium Chloride	ED005	SOIL	In house: referenced to Rayment and Lyons, (2011), method 15G1. This method is unsuitable for near neutral and alkaline soils. NATA accreditation does not cover performance of this service.
Exchangeable Cations on Alkaline Soils	ED006	SOIL	In house: Referenced to Soil Survey Test Method C5. Soluble salts are removed from the sample prior to analysis. Cations are exchanged from the sample by contact with alcoholic ammonium chloride at pH 8.5. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil.
Exchangeable Cations	ED007	SOIL	In house: Referenced to Rayment & Lyons (2011) Method 15A1. Cations are exchanged from the sample by contact with Ammonium Chloride. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil. This method is compliant with NEPM (2013) Schedule B(3) (Method 301)
Exchangeable Cations with pre-treatment	ED008	SOIL	In house: Referenced to Rayment & Higginson (2011) Method 15A2. Soluble salts are removed from the sample prior to analysis. Cations are exchanged from the sample by contact with Ammonium Chloride. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil. This method is compliant with NEPM (2013) Schedule B(3) (Method 301)
Sulfur - Total as S (LECO)	ED042T	SOIL	In house: Dried and pulverised sample is combusted in a high temperature furnace in the presence of strong oxidants / catalysts. The evolved S (as SO ₂) is measured by infra-red detector
Leachable Metals by ICPAES	EG005C	SOIL	In house: referenced to APHA 3120; USEPA SW 846 - 6010: The ICPAES technique ionises leachate sample atoms emitting a characteristic spectrum. This spectrum is then compared against matrix matched standards for quantification. This method is compliant with NEPM (2013) Schedule B(3)
Soluble Metals by ICPAES	EG005S	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Soluble metals are determined following an appropriate soil / water extraction of the soil. The ICPAES technique ionises samples in a plasma, emitting characteristic spectrums based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards.



Analytical Methods	Method	Matrix	Method Descriptions
Leachable Mercury by FIMS	EG035C	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the TCLP solution. The ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Soluble Mercury by FIMS	EG035S	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the extract. Ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve.
Preparation Methods	Method	Matrix	Method Descriptions
Exchangeable Cations Preparation Method (Alkaline Soils)	ED006PR	SOIL	In house: Referenced to Rayment and Lyons 2011 method 15C1.
Exchangeable Cations Preparation Method	ED007PR	SOIL	In house: Referenced to Rayment & Higginson (1992) method 15A1. A 1M NH ₄ Cl extraction by end over end tumbling at a ratio of 1:20. There is no pretreatment for soluble salts. Extracts can be run by ICP for cations.
Drying at 85 degrees, bagging and labelling (ASS)	EN020PR	SOIL	In house
Digestion for Total Recoverable Metals in TCLP Leachate	EN25C	SOIL	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
TCLP for Non & Semivolatile Analytes	EN33a	SOIL	In house QWI-EN/33 referenced to USEPA SW846-1311: The TCLP procedure is designed to determine the mobility of both organic and inorganic analytes present in wastes. The standard TCLP leach is for non-volatile and Semivolatile test parameters.
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of reagent grade water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.
1:2 solid / water leach for soluble analytes	EN40	SOIL	25 g of soil is mixed with 50 mL of distilled water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.
Dry and Pulverise (up to 100g)	GEO30	SOIL	#



CHAIN OF CUSTODY

ALS Laboratory
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USE ONLY FOR CHAIN OF CUSTODY
DO NOT WRITE IN THESE SPACES

CLIENT: Eco2 Environmental Services		TURNAROUND REQUIREMENTS: ☐ Standard TAT (List due date):		FOR LABORATORY USE ONLY (Circle)	
OFFICE: Darwin	(Standard TAT may be longer for some tests e.g., Ultra Trace Organics)		☐ Non Standard or urgent TAT (List due date):		Custody Seal Intact? ☐ Yes ☐ No
PROJECT: EZ18107 - Grants Project - Waste Characterisation	ALS QUOTE NO.:		COC SEQUENCE NUMBER (Circle)		Free Ice / frozen ice blocks present upon receipt? ☐ Yes ☐ No
ORDER NUMBER:			COC: ① 2 3 4 5 6 7		Random Sample Temperature on Receipt: °C
PROJECT MANAGER: Alden Campbell	CONTACT PH: 08 9881 1100			OF: 1 2 3 4 ⑤ 6 7	Other comment:
SAMPLER:	SAMPLER MOBILE:	RECEIVED BY: <i>Alden Campbell</i>		RECEIVED BY: <i>Dean M</i>	
COC emailed to ALS? (YES / NO)	EDD FORMAT (for default):	DATE/TIME: <i>13-06-18 1010</i>		DATE/TIME: <i>14-6-18 930</i>	
Email Reports to: <i>alden.campbell@ecoz.com.au</i>					
Email Invoice to: <i>lynical.nyan@ecoz.com.au</i>					

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required)										Additional Information
						Total S	PH (1:2)	EC (1:2)	Emmerson Aggregate	CEC	ANC	NAPP	NAG	EN020: Prep from ASS bag	Leachable Metals (As, B, Ba, Pb, Se, V, Zn, Hg)	
1	FRC151-1	6/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc. <i>Environmental Division Brisbane Work Order Reference EB1814449</i>
2	FRC151-10	6/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	
3	FRC151-30	6/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	
4	FRC151-55	6/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	
5	FRC151-62	6/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	
6	FRC151-80	6/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	
7	FRC151-130	6/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	
8	FRC151-137	6/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	
9	FRC151-165	6/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	
10	FRC151-191	7/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	
11	FRC151-208	8/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	
12	FRC151-272	8/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	
13	FRC152-5	9/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	
14	FRC152-23	9/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	
15	FRC152-46	9/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	
TOTAL						✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved Plastic; AP = Airtight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulfate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airtight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottle; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

LAB OF ORIGIN:
DARWIN



Telephone: +61-7-3243 7222



CHAIN OF CUSTODY

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CLIENT: Eco2 Environmental Services		TURNAROUND REQUIREMENTS: ☐ Standard TAT (List due date):		FOR LABORATORY USE ONLY (Circle)	
OFFICE: Darwin		(Standard TAT may be longer for some tests ☐ Non Standard or urgent TAT (List due date):		Custody Seal intact? Yes No N/A	
PROJECT: E218107 - Grants Project - Waste Characterisation		ALS QUOTE NO.:		Free / ice frozen / ice blocks present upon receipt? Yes No N/A	
ORDER NUMBER:		COC SEQUENCE NUMBER (Circle)		Random Sample Temperature on Receipt: °C	
PROJECT MANAGER: Alden Campbell CONTACT PH: 08 9881 1100		COC: 1 2 3 4 5 6 7		Other comment:	
SAMPLER: RELINQUISHED BY: ALS		RECEIVED BY: DEAN M		RECEIVED BY: DEAN M	
COC emailed to ALS? (YES / NO) EDD FORMAT (or default):		DATE/TIME:		DATE/TIME: 14-6-18 930	
Email Reports to: alden.campbell@ecoz.com.au		DATE/TIME:		DATE/TIME:	
Email Invoice to: lyndall.ryan@ecoz.com.au		DATE/TIME:		DATE/TIME:	

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS		CONTAINER INFORMATION				ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).										Additional Information
	MATRIX: SOLID (S) WATER (W)	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	ED042T: Total S	PH (1:2)	EC (1:2)	EA058: Emerson Aggregate	ED008: CEC	ANC	NAPP	NAG	EN020: Prep from ASS bag	Leachable Metals (As, B, Ba, Be, Cd, Cr, Co, Cu, Mn, Ni, Pb, Se, V, Zn, Hg)		
LAB ID																Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.	
	16	FRC152-46	9/06/2018	S	G & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold		
	17	FRC152-51	9/06/2018	S	G & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold		
	18	FRC152-51	9/06/2018	S	G & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold		
	19	FRC152-64	9/06/2018	S	G & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold		
	20	FRC152-70	9/06/2018	S	G & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold		
	21	FRC152-125	10/06/2018	S	G & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold		
	22	FRC152-170	10/06/2018	S	G & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold		
	23	FRC163-1	11/06/2018	S	G & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold		
	24	FRC163-4	11/06/2018	S	G & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold		
	25	FRC163-21	11/06/2018	S	G & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold		
	26	FRC163-38	11/06/2018	S	G & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold		
	27	FRC126-1	9/06/2018	S	G & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold		
	28	FRC126-3	9/06/2018	S	G & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold		
	29	FRC126-21	9/06/2018	S	G & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold		
	30	FRC126-51	9/06/2018	S	G & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold		

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LAB OF ORIGIN:
DARWIN



CHAIN OF CUSTODY

ALS
Laboratory
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CH00123, N.E. 32 One - Grants Project CLD 4, 23

CH00123, N.E. 32 One - Grants Project CLD 4, 23

CLIENT: Eco2 Environmental Services		TURNAROUND REQUIREMENTS: ☐ Standard TAT (List due date):	
OFFICE: Darwin		☐ Standard TAT may be longer for some tests	
PROJECT: EZ18107 - Grants Project - Waste Characterisation		☐ Non Standard or urgent TAT (List due date):	
ORDER NUMBER:		ALS QUOTE NO.:	
PROJECT MANAGER: Aiden Campbell		CONTACT PH: 08 9981 1100	
SAMPLER:		SAMPLER MOBILE:	
COC emailed to ALS? (YES / NO):		EDD FORMAT (or default):	
Email Reports to: aiden.campbell@eco2.com.au		DATE/TIME:	
Email Invoice to: lyndall.ryan@eco2.com.au		DATE/TIME:	

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)		CONTAINER INFORMATION		ANALYSIS REQUIRED INCLUDING SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).										Additional Information	
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	Total S	PH (1:2)	EC (1:2)	Emmerson Aggregate	CEC	ANC	NAPP	NAG	EN020: Prep from ASS bag	Leachable Metals (As, B, Ba, Pb, Se, V, Zn, Hg)	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
46	FRC129-001	11/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	
47	FRC129-008	11/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	
48	FRC129-014	11/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	
49	FRC129-040	11/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	
50	FRC129-047	11/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	
51	FRC129-081	11/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	
52	FRC129-088	11/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	
53	FRC130-001	11/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	
54	FRC130-005	11/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	
55	FRC130-020	11/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	
56	FRC130-040	11/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	
57	FRC130-060	11/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	
58	FRC130-080	11/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	
59	FRC130-100	11/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	
60	FRC131-001	11/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved Plastic; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airtight Unpreserved Plastic; V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulfate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airtight Unpreserved Vial SG = Sulfuric Preserved; Amber Glass; H = HCl Preserved Plastic; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottle; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

LAB OF ORIGIN:
DARWIN

RECEIVED BY:
DEAN M
DATE/TIME:
14-6-18 930

RELINQUISHED BY:
ALS
DATE/TIME:

CERTIFICATE OF ANALYSIS

Work Order : **EB1815150**
Client : **ECOZ ENVIRONMENTAL SERVICES**
Contact : AIDEN CAMPBELL
Address : PO BOX 381
 DARWIN NT, AUSTRALIA 0801
Telephone : ----
Project : EZ18107 - Grants Project - Waste Characterisation
Order number :
C-O-C number : ----
Sampler : ----
Site :
Quote number : SY/285/18
No. of samples received : 15
No. of samples analysed : 15

Page : 1 of 8
Laboratory : Environmental Division Brisbane
Contact : Customer Services EB
Address : 2 Byth Street Stafford QLD Australia 4053
Telephone : +61-7-3243 7222
Date Samples Received : 22-Jun-2018 08:00
Date Analysis Commenced : 27-Jun-2018
Issue Date : 03-Jul-2018 13:24



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. 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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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.

- ALS is not NATA accredited for the analysis of Exchangeable Aluminium and Exchange Acidity in soils when performed under ALS Method ED005.
- ALS is not NATA accredited for the analysis of Exchangeable Cations on Alkaline Soils when performed under ALS Method ED006.
- ED006 (Exchangeable Cations on Alkaline Soils): Calcium/Magnesium ratio could not be determined as both the Calcium and Magnesium results were less than reportable limits for sample EB1815150-007 (FRC156_125).
- ED006 (Exchangeable Cations on Alkaline Soils): Magnesium/Potassium ratio could not be determined as both the Magnesium and Potassium results were less than reportable limits for sample EB1815150-010 (FRC157_72).
- EA058 Emerson: V. = Very, D. = Dark, L. = Light, VD. = Very Dark
- ED007 and ED008: When Exchangeable Al is reported from these methods, it should be noted that Rayment & Lyons (2011) suggests Exchange Acidity by 1M KCl - Method 15G1 (ED005) is a more suitable method for the determination of exchange acidity ($H^+ + Al^{3+}$).



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	FRC156_1	FRC156_2	FRC156_41	FRC156_42	FRC156_61
Client sampling date / time					17-Jun-2018 00:00	17-Jun-2018 00:00	17-Jun-2018 00:00	17-Jun-2018 00:00	17-Jun-2018 00:00
Compound	CAS Number	LOR	Unit		EB1815150-001	EB1815150-002	EB1815150-003	EB1815150-004	EB1815150-005
					Result	Result	Result	Result	Result
EA002 : pH (Soils)									
pH Value	----	0.1	pH Unit		5.9	5.5	7.2	7.4	8.2
pH Value	----	0.1	pH Unit		5.8	5.7	6.9	7.2	8.2
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		20	10	25	16	22
Electrical Conductivity @ 25°C	----	1	µS/cm		8	6	12	8	11
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		9.4	5.7	4.0	5.3	5.0
EA058: Emerson Aggregate Test									
Color (Munsell)	----	-	-		Yellowish Red	Yellowish Brown	Brown	Dark Greyish Brown	Greyish Brown
Texture	----	-	-		Gravelly Sand	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam
Emerson Class Number	EC/TC	-	-		8	4	3	3	3
ED005: Exchange Acidity									
Exchange Acidity	----	0.1	meq/100g		0.3	1.5	----	----	----
Exchangeable Aluminium	----	0.1	meq/100g		0.2	1.1	----	----	----
ED006: Exchangeable Cations on Alkaline Soils									
Exchangeable Calcium	----	0.2	meq/100g		----	----	----	----	2.8
Exchangeable Magnesium	----	0.2	meq/100g		----	----	----	----	6.5
Exchangeable Potassium	----	0.2	meq/100g		----	----	----	----	0.4
Exchangeable Sodium	----	0.2	meq/100g		----	----	----	----	<0.2
Cation Exchange Capacity	----	0.2	meq/100g		----	----	----	----	9.7
Exchangeable Sodium Percent	----	0.2	%		----	----	----	----	<0.2
Calcium/Magnesium Ratio	----	0.2	-		----	----	----	----	0.4
Magnesium/Potassium Ratio	----	0.2	-		----	----	----	----	17.3
ED007: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g		<0.1	<0.1	1.2	1.7	----
Exchangeable Magnesium	----	0.1	meq/100g		0.6	1.4	3.4	4.5	----
Exchangeable Potassium	----	0.1	meq/100g		0.2	0.2	0.2	0.2	----
Exchangeable Sodium	----	0.1	meq/100g		0.3	<0.1	0.1	0.1	----
Cation Exchange Capacity	----	0.1	meq/100g		1.4	3.1	5.0	6.6	----
Exchangeable Sodium Percent	----	0.1	%		25.2	2.3	2.2	1.8	----
Calcium/Magnesium Ratio	----	0.1	-		<0.1	<0.1	0.4	0.4	----
Magnesium/Potassium Ratio	----	0.1	-		3.0	6.4	18.6	21.8	----
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		<0.01	<0.01	<0.01	<0.01	<0.01



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				FRC156_1	FRC156_2	FRC156_41	FRC156_42	FRC156_61
Client sampling date / time				17-Jun-2018 00:00	17-Jun-2018 00:00	17-Jun-2018 00:00	17-Jun-2018 00:00	17-Jun-2018 00:00
Compound	CAS Number	LOR	Unit	EB1815150-001	EB1815150-002	EB1815150-003	EB1815150-004	EB1815150-005
				Result	Result	Result	Result	Result
EG005S : Soluble Metals by ICPAES								
Arsenic	7440-38-2	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Barium	7440-39-3	1	mg/kg	<1	<1	<1	<1	<1
Beryllium	7440-41-7	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	7440-42-8	1	mg/kg	<1	<1	<1	<1	<1
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	7440-47-3	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Cobalt	7440-48-4	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Copper	7440-50-8	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Lead	7439-92-1	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Manganese	7439-96-5	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	7440-02-0	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	7782-49-2	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Vanadium	7440-62-2	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	7440-66-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EG035S: Soluble Mercury by FIMS								
Mercury	7439-97-6	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	FRC156_100	FRC156_125	FRC157_1	FRC157_20	FRC157_72
Client sampling date / time					17-Jun-2018 00:00	17-Jun-2018 00:00	19-Jun-2018 00:00	19-Jun-2018 00:00	19-Jun-2018 00:00
Compound	CAS Number	LOR	Unit		EB1815150-006	EB1815150-007	EB1815150-008	EB1815150-009	EB1815150-010
					Result	Result	Result	Result	Result
EA002 : pH (Soils)									
pH Value	----	0.1	pH Unit		9.2	9.2	6.0	6.7	7.6
pH Value	----	0.1	pH Unit		9.2	9.0	6.7	6.9	7.5
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		81	80	10	15	13
Electrical Conductivity @ 25°C	----	1	µS/cm		55	42	7	7	8
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		<1.0	1.4	9.8	6.8	4.6
EA058: Emerson Aggregate Test									
Color (Munsell)	----	-	-		Very Dark Grey	Light Olive Grey	Red	Olive Brown	Olive Brown
Texture	----	-	-		Gravelly Sand	Gravelly Sand	Gravelly Sand	Sandy Loam	Sandy Loam
Emerson Class Number	EC/TC	-	-		8	8	8	4	3
ED006: Exchangeable Cations on Alkaline Soils									
Exchangeable Calcium	----	0.2	meq/100g		0.6	<0.2	----	----	0.9
Exchangeable Magnesium	----	0.2	meq/100g		0.7	<0.2	----	----	2.2
Exchangeable Potassium	----	0.2	meq/100g		0.4	0.3	----	----	<0.2
Exchangeable Sodium	----	0.2	meq/100g		<0.2	0.2	----	----	<0.2
Cation Exchange Capacity	----	0.2	meq/100g		1.8	0.5	----	----	3.3
Exchangeable Sodium Percent	----	0.2	%		<0.2	41.2	----	----	<0.2
Calcium/Magnesium Ratio	----	0.2	-		0.9	----	----	----	0.4
Magnesium/Potassium Ratio	----	0.2	-		1.7	<0.2	----	----	----
ED007: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g		----	----	0.2	0.7	----
Exchangeable Magnesium	----	0.1	meq/100g		----	----	0.2	5.4	----
Exchangeable Potassium	----	0.1	meq/100g		----	----	0.1	0.2	----
Exchangeable Sodium	----	0.1	meq/100g		----	----	<0.1	<0.1	----
Cation Exchange Capacity	----	0.1	meq/100g		----	----	0.8	6.5	----
Exchangeable Sodium Percent	----	0.1	%		----	----	7.2	1.2	----
Calcium/Magnesium Ratio	----	0.1	-		----	----	1.0	0.1	----
Magnesium/Potassium Ratio	----	0.1	-		----	----	1.4	22.4	----
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		<0.01	<0.01	<0.01	<0.01	<0.01
EG005S : Soluble Metals by ICPAES									
Arsenic	7440-38-2	0.1	mg/kg		0.2	0.1	<0.1	<0.1	<0.1
Barium	7440-39-3	1	mg/kg		<1	<1	<1	<1	<1



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				FRC156_100	FRC156_125	FRC157_1	FRC157_20	FRC157_72
Client sampling date / time				17-Jun-2018 00:00	17-Jun-2018 00:00	19-Jun-2018 00:00	19-Jun-2018 00:00	19-Jun-2018 00:00
Compound	CAS Number	LOR	Unit	EB1815150-006	EB1815150-007	EB1815150-008	EB1815150-009	EB1815150-010
				Result	Result	Result	Result	Result
EG005S : Soluble Metals by ICPAES - Continued								
Beryllium	7440-41-7	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	7440-42-8	1	mg/kg	<1	<1	<1	<1	<1
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	7440-47-3	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Cobalt	7440-48-4	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Copper	7440-50-8	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Lead	7439-92-1	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Manganese	7439-96-5	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	7440-02-0	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	7782-49-2	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Vanadium	7440-62-2	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	7440-66-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EG035S: Soluble Mercury by FIMS								
Mercury	7439-97-6	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	FRC154_3	FRC154_7	FRC154_42	FRC154_71	FRC154_109
Client sampling date / time					20-Jun-2018 00:00	20-Jun-2018 00:00	20-Jun-2018 00:00	20-Jun-2018 00:00	20-Jun-2018 00:00
Compound	CAS Number	LOR	Unit		EB1815150-011	EB1815150-012	EB1815150-013	EB1815150-014	EB1815150-015
					Result	Result	Result	Result	Result
EA002 : pH (Soils)									
pH Value	----	0.1	pH Unit		5.2	5.5	7.7	8.2	9.1
pH Value	----	0.1	pH Unit		5.3	5.6	7.2	8.0	8.7
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		7	8	16	15	52
Electrical Conductivity @ 25°C	----	1	µS/cm		5	4	8	8	20
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		10.0	5.2	4.3	4.6	1.9
EA058: Emerson Aggregate Test									
Color (Munsell)	----	-	-		Red	Olive Brown	Dark Greyish Brown	Dark Greyish Brown	Very Dark Grey
Texture	----	-	-		Gravelly Sand	Sandy Loam	Sandy Loam	Sandy Loam	Gravelly Sand
Emerson Class Number	EC/TC	-	-		8	4	4	4	8
ED005: Exchange Acidity									
Exchange Acidity	----	0.1	meq/100g		0.4	4.0	----	----	----
Exchangeable Aluminium	----	0.1	meq/100g		0.1	3.1	----	----	----
ED006: Exchangeable Cations on Alkaline Soils									
Exchangeable Calcium	----	0.2	meq/100g		----	----	----	4.2	0.8
Exchangeable Magnesium	----	0.2	meq/100g		----	----	----	4.4	0.6
Exchangeable Potassium	----	0.2	meq/100g		----	----	----	0.2	0.3
Exchangeable Sodium	----	0.2	meq/100g		----	----	----	<0.2	<0.2
Cation Exchange Capacity	----	0.2	meq/100g		----	----	----	8.8	1.7
Exchangeable Sodium Percent	----	0.2	%		----	----	----	<0.2	<0.2
Calcium/Magnesium Ratio	----	0.2	-		----	----	----	1.0	1.4
Magnesium/Potassium Ratio	----	0.2	-		----	----	----	20.6	1.8
ED007: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g		<0.1	<0.1	2.1	----	----
Exchangeable Magnesium	----	0.1	meq/100g		0.1	3.7	5.2	----	----
Exchangeable Potassium	----	0.1	meq/100g		<0.1	0.3	0.3	----	----
Exchangeable Sodium	----	0.1	meq/100g		<0.1	<0.1	0.1	----	----
Cation Exchange Capacity	----	0.1	meq/100g		0.5	8.0	7.7	----	----
Exchangeable Sodium Percent	----	0.1	%		9.2	1.0	1.6	----	----
Calcium/Magnesium Ratio	----	0.1	-		<0.1	<0.1	0.4	----	----
Magnesium/Potassium Ratio	----	0.1	-		----	12.8	18.6	----	----
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		<0.01	<0.01	<0.01	<0.01	<0.01



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				FRC154_3	FRC154_7	FRC154_42	FRC154_71	FRC154_109
Client sampling date / time				20-Jun-2018 00:00	20-Jun-2018 00:00	20-Jun-2018 00:00	20-Jun-2018 00:00	20-Jun-2018 00:00
Compound	CAS Number	LOR	Unit	EB1815150-011	EB1815150-012	EB1815150-013	EB1815150-014	EB1815150-015
				Result	Result	Result	Result	Result
EG005S : Soluble Metals by ICPAES								
Arsenic	7440-38-2	0.1	mg/kg	<0.1	<0.1	<0.1	0.1	0.2
Barium	7440-39-3	1	mg/kg	<1	<1	<1	<1	<1
Beryllium	7440-41-7	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	7440-42-8	1	mg/kg	<1	<1	<1	<1	<1
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	7440-47-3	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Cobalt	7440-48-4	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Copper	7440-50-8	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Lead	7439-92-1	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Manganese	7439-96-5	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	7440-02-0	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	7782-49-2	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Vanadium	7440-62-2	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	7440-66-6	0.1	mg/kg	0.3	<0.1	<0.1	<0.1	<0.1
EG035S: Soluble Mercury by FIMS								
Mercury	7439-97-6	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

QUALITY CONTROL REPORT

Work Order	: EB1815150	Page	: 1 of 6
Client	: ECOZ ENVIRONMENTAL SERVICES	Laboratory	: Environmental Division Brisbane
Contact	: AIDEN CAMPBELL	Contact	: Customer Services EB
Address	: PO BOX 381 DARWIN NT, AUSTRALIA 0801	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: ----	Telephone	: +61-7-3243 7222
Project	: EZ18107 - Grants Project - Waste Characterisation	Date Samples Received	: 22-Jun-2018
Order number	: ----	Date Analysis Commenced	: 27-Jun-2018
C-O-C number	: ----	Issue Date	: 03-Jul-2018
Sampler	: ----		
Site	: ----		
Quote number	: SY/285/18		
No. of samples received	: 15		
No. of samples analysed	: 15		



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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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

Key :
 Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA002: pH 1:2 (Soils) (QC Lot: 1756690)									
EB1815150-001	FRC156_1	EA002-1: pH Value	----	0.1	pH Unit	5.9	5.9	0.00	0% - 20%
EB1815150-011	FRC154_3	EA002-1: pH Value	----	0.1	pH Unit	5.2	5.2	0.00	0% - 20%
EA002: pH 1:5 (Soils) (QC Lot: 1756693)									
EB1815150-011	FRC154_3	EA002: pH Value	----	0.1	pH Unit	5.3	5.2	0.00	0% - 20%
EB1815150-001	FRC156_1	EA002: pH Value	----	0.1	pH Unit	5.8	5.9	0.00	0% - 20%
EA010: Conductivity (QC Lot: 1756691)									
EB1815150-001	FRC156_1	EA010-1: Electrical Conductivity @ 25°C	----	1	µS/cm	20	16	19.8	0% - 50%
EB1815150-011	FRC154_3	EA010-1: Electrical Conductivity @ 25°C	----	1	µS/cm	7	7	0.00	No Limit
EA010: Conductivity (QC Lot: 1756692)									
EB1815150-011	FRC154_3	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	5	5	0.00	No Limit
EB1815150-001	FRC156_1	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	8	8	0.00	No Limit
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 1756696)									
EB1815150-001	FRC156_1	EA055: Moisture Content	----	0.1	%	9.4	9.8	4.07	No Limit
EB1815150-011	FRC154_3	EA055: Moisture Content	----	0.1	%	10.0	9.6	4.06	No Limit
ED005: Exchange Acidity (QC Lot: 1764336)									
EB1815150-001	FRC156_1	ED005: Exchange Acidity	----	0.1	meq/100g	0.3	0.2	0.00	No Limit
		ED005: Exchangeable Aluminium	----	0.1	meq/100g	0.2	0.2	0.00	No Limit
ED006: Exchangeable Cations on Alkaline Soils (QC Lot: 1764315)									
EB1815150-005	FRC156_61	ED006: Exchangeable Calcium	----	0.2	meq/100g	2.8	2.8	0.00	0% - 50%
		ED006: Exchangeable Magnesium	----	0.2	meq/100g	6.5	6.7	3.01	0% - 20%
		ED006: Exchangeable Potassium	----	0.2	meq/100g	0.4	0.3	0.00	No Limit
		ED006: Exchangeable Sodium	----	0.2	meq/100g	<0.2	<0.2	0.00	No Limit
		ED006: Cation Exchange Capacity	----	0.2	meq/100g	9.7	9.9	2.16	0% - 20%

Page : 3 of 6
 Work Order : EB1815150
 Client : ECOZ ENVIRONMENTAL SERVICES
 Project : EZ18107 - Grants Project - Waste Characterisation



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
ED007: Exchangeable Cations (QC Lot: 1764324)									
EB1815150-003	FRC156_41	ED007: Exchangeable Calcium	----	0.1	meq/100g	1.2	1.2	0.00	0% - 50%
		ED007: Exchangeable Magnesium	----	0.1	meq/100g	3.4	3.4	0.00	0% - 20%
		ED007: Exchangeable Potassium	----	0.1	meq/100g	0.2	0.2	0.00	No Limit
		ED007: Exchangeable Sodium	----	0.1	meq/100g	0.1	0.1	0.00	No Limit
ED007: Exchangeable Cations (QC Lot: 1764335)									
EB1815150-001	FRC156_1	ED007: Exchangeable Calcium	----	0.1	meq/100g	<0.1	<0.1	0.00	No Limit
		ED007: Exchangeable Magnesium	----	0.1	meq/100g	0.6	0.6	0.00	No Limit
		ED007: Exchangeable Potassium	----	0.1	meq/100g	0.2	0.2	0.00	No Limit
		ED007: Exchangeable Sodium	----	0.1	meq/100g	0.3	0.3	0.00	No Limit
ED042T: Total Sulfur by LECO (QC Lot: 1771168)									
EB1815150-001	FRC156_1	ED042T: Sulfur - Total as S (LECO)	----	0.01	%	<0.01	<0.01	0.00	No Limit
EB1815150-010	FRC157_72	ED042T: Sulfur - Total as S (LECO)	----	0.01	%	<0.01	<0.01	0.00	No Limit
EG005S : Soluble Metals by ICPAES (QC Lot: 1756694)									
EB1815150-010	FRC157_72	EG005S: Arsenic	7440-38-2	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Beryllium	7440-41-7	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Chromium	7440-47-3	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Cobalt	7440-48-4	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Copper	7440-50-8	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Lead	7439-92-1	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Manganese	7439-96-5	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Nickel	7440-02-0	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Selenium	7782-49-2	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Vanadium	7440-62-2	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Zinc	7440-66-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Barium	7440-39-3	1	mg/kg	<1	<1	0.00	No Limit
		EG005S: Boron	7440-42-8	1	mg/kg	<1	<1	0.00	No Limit
EB1815150-001	FRC156_1	EG005S: Arsenic	7440-38-2	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Beryllium	7440-41-7	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Chromium	7440-47-3	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Cobalt	7440-48-4	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Copper	7440-50-8	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Lead	7439-92-1	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Manganese	7439-96-5	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Nickel	7440-02-0	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Selenium	7782-49-2	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Vanadium	7440-62-2	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Zinc	7440-66-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Barium	7440-39-3	1	mg/kg	<1	<1	0.00	No Limit

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 Work Order : EB1815150
 Client : ECOZ ENVIRONMENTAL SERVICES
 Project : EZ18107 - Grants Project - Waste Characterisation



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG005S : Soluble Metals by ICPAES (QC Lot: 1756694) - continued									
EB1815150-001	FRC156_1	EG005S: Boron	7440-42-8	1	mg/kg	<1	<1	0.00	No Limit
EG035S: Soluble Mercury by FIMS (QC Lot: 1756695)									
EB1815150-011	FRC154_3	EG035S: Mercury	7439-97-6	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
EB1815150-001	FRC156_1	EG035S: Mercury	7439-97-6	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EA002: pH 1:2 (Soils) (QCLot: 1756690)								
EA002-1: pH Value	----	----	pH Unit	----	4.01 pH Unit	99.8	98	102
EA002: pH 1:5 (Soils) (QCLot: 1756693)								
EA002: pH Value	----	----	pH Unit	----	4 pH Unit	99.8	98	102
				----	7 pH Unit	99.7	98	102
EA010: Conductivity (QCLot: 1756691)								
EA010-1: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	100	97	103
EA010: Conductivity (QCLot: 1756692)								
EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	100	97	103
ED005: Exchange Acidity (QCLot: 1764336)								
ED005: Exchange Acidity	----	0.1	meq/100g	<0.1	----	----	----	----
ED005: Exchangeable Aluminium	----	0.1	meq/100g	<0.1	----	----	----	----
ED006: Exchangeable Cations on Alkaline Soils (QCLot: 1764315)								
ED006: Exchangeable Calcium	----	0.2	meq/100g	<0.2	9.57 meq/100g	108	70	130
ED006: Exchangeable Magnesium	----	0.2	meq/100g	<0.2	6.32 meq/100g	99.7	70	130
ED006: Exchangeable Potassium	----	0.2	meq/100g	<0.2	0.65 meq/100g	99.2	70	130
ED006: Exchangeable Sodium	----	0.2	meq/100g	<0.2	2.86 meq/100g	93.5	70	130
ED006: Cation Exchange Capacity	----	0.2	meq/100g	<0.2	19.4 meq/100g	103	70	130
ED007: Exchangeable Cations (QCLot: 1764324)								
ED007: Exchangeable Calcium	----	0.1	meq/100g	<0.1	3.54 meq/100g	90.8	79	113
ED007: Exchangeable Magnesium	----	0.1	meq/100g	<0.1	1.15 meq/100g	92.5	85	115
ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	0.635 meq/100g	101	70	122
ED007: Exchangeable Sodium	----	0.1	meq/100g	<0.1	0.382 meq/100g	86.0	76	112
ED007: Cation Exchange Capacity	----	0.1	meq/100g	<0.1	5.707 meq/100g	91.1	82	112
ED007: Exchangeable Cations (QCLot: 1764335)								
ED007: Exchangeable Calcium	----	0.1	meq/100g	<0.1	3.54 meq/100g	91.8	79	113
ED007: Exchangeable Magnesium	----	0.1	meq/100g	<0.1	1.15 meq/100g	94.7	85	115
ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	0.635 meq/100g	110	70	122
ED007: Exchangeable Sodium	----	0.1	meq/100g	<0.1	0.382 meq/100g	91.1	76	112
ED007: Cation Exchange Capacity	----	0.1	meq/100g	<0.1	5.707 meq/100g	94.6	82	112
ED042T: Total Sulfur by LECO (QCLot: 1771168)								
ED042T: Sulfur - Total as S (LECO)	----	0.01	%	<0.01	0.16 %	104	70	130
EG005S : Soluble Metals by ICPAES (QCLot: 1756694)								
EG005S: Arsenic	7440-38-2	0.1	mg/kg	<0.1	5 mg/kg	104	83	111



Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EG005S : Soluble Metals by ICPAES (QCLot: 1756694) - continued								
EG005S: Barium	7440-39-3	1	mg/kg	<1	----	----	----	----
EG005S: Beryllium	7440-41-7	0.1	mg/kg	<0.1	----	----	----	----
EG005S: Boron	7440-42-8	1	mg/kg	<1	----	----	----	----
EG005S: Cadmium	7440-43-9	0.1	mg/kg	<0.1	5 mg/kg	102	87	112
EG005S: Chromium	7440-47-3	0.1	mg/kg	<0.1	5 mg/kg	101	91	110
EG005S: Cobalt	7440-48-4	0.1	mg/kg	<0.1	----	----	----	----
EG005S: Copper	7440-50-8	0.1	mg/kg	<0.1	5 mg/kg	103	84	111
EG005S: Lead	7439-92-1	0.1	mg/kg	<0.1	5 mg/kg	103	90	112
EG005S: Manganese	7439-96-5	0.1	mg/kg	<0.1	----	----	----	----
EG005S: Nickel	7440-02-0	0.1	mg/kg	<0.1	5 mg/kg	103	82	112
EG005S: Selenium	7782-49-2	0.1	mg/kg	<0.1	----	----	----	----
EG005S: Vanadium	7440-62-2	0.1	mg/kg	<0.1	----	----	----	----
EG005S: Zinc	7440-66-6	0.1	mg/kg	<0.1	5 mg/kg	102	94	110
EG035S: Soluble Mercury by FIMS (QCLot: 1756695)								
EG035S: Mercury	7439-97-6	0.0005	mg/kg	<0.0005	0.05 mg/kg	97.4	83	125

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%) MS	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number			Low	High
EG035S: Soluble Mercury by FIMS (QCLot: 1756695)							
EB1815150-002	FRC156_2	EG035S: Mercury	7439-97-6	0.05 mg/kg	109	70	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EB1815150	Page	: 1 of 10
Client	: ECOZ ENVIRONMENTAL SERVICES	Laboratory	: Environmental Division Brisbane
Contact	: AIDEN CAMPBELL	Telephone	: +61-7-3243 7222
Project	: EZ18107 - Grants Project - Waste Characterisation	Date Samples Received	: 22-Jun-2018
Site	:	Issue Date	: 03-Jul-2018
Sampler	: ----	No. of samples received	: 15
Order number	:	No. of samples analysed	: 15

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- **NO** Matrix Spike outliers occur.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- **NO** Quality Control Sample Frequency Outliers exist.



Outliers : Analysis Holding Time Compliance

Matrix: **SOIL**

Method		Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA002 : pH (Soils)							
Soil Glass Jar - Unpreserved							
FRC156_1, FRC156_41, FRC156_61, FRC156_125	FRC156_2, FRC156_42, FRC156_100,	28-Jun-2018	24-Jun-2018	4	----	----	----
Soil Glass Jar - Unpreserved							
FRC157_1, FRC157_72	FRC157_20,	28-Jun-2018	26-Jun-2018	2	----	----	----
Soil Glass Jar - Unpreserved							
FRC154_3, FRC154_42, FRC154_109	FRC154_7, FRC154_71,	28-Jun-2018	27-Jun-2018	1	----	----	----
EA010: Conductivity							
Soil Glass Jar - Unpreserved							
FRC156_1, FRC156_41, FRC156_61, FRC156_125	FRC156_2, FRC156_42, FRC156_100,	28-Jun-2018	24-Jun-2018	4	----	----	----
Soil Glass Jar - Unpreserved							
FRC157_1, FRC157_72	FRC157_20,	28-Jun-2018	26-Jun-2018	2	----	----	----
Soil Glass Jar - Unpreserved							
FRC154_3, FRC154_42, FRC154_109	FRC154_7, FRC154_71,	28-Jun-2018	27-Jun-2018	1	----	----	----
ED042T: Total Sulfur by LECO							
Snap Lock Bag							
FRC156_1, FRC156_41, FRC156_61, FRC156_125	FRC156_2, FRC156_42, FRC156_100,	03-Jul-2018	24-Jun-2018	9	----	----	----
Snap Lock Bag							
FRC157_1, FRC157_72	FRC157_20,	03-Jul-2018	26-Jun-2018	7	----	----	----
Snap Lock Bag							
FRC154_3, FRC154_42, FRC154_109	FRC154_7, FRC154_71,	03-Jul-2018	27-Jun-2018	6	----	----	----



Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA002 : pH (Soils)								
Soil Glass Jar - Unpreserved (EA002) FRC156_1, FRC156_41, FRC156_61, FRC156_125	FRC156_2, FRC156_42, FRC156_100,	17-Jun-2018	28-Jun-2018	24-Jun-2018	✖	28-Jun-2018	28-Jun-2018	✔
Soil Glass Jar - Unpreserved (EA002) FRC157_1, FRC157_72	FRC157_20,	19-Jun-2018	28-Jun-2018	26-Jun-2018	✖	28-Jun-2018	28-Jun-2018	✔
Soil Glass Jar - Unpreserved (EA002) FRC154_3, FRC154_42, FRC154_109	FRC154_7, FRC154_71,	20-Jun-2018	28-Jun-2018	27-Jun-2018	✖	28-Jun-2018	28-Jun-2018	✔
EA010: Conductivity								
Soil Glass Jar - Unpreserved (EA010) FRC156_1, FRC156_41, FRC156_61, FRC156_125	FRC156_2, FRC156_42, FRC156_100,	17-Jun-2018	28-Jun-2018	24-Jun-2018	✖	28-Jun-2018	26-Jul-2018	✔
Soil Glass Jar - Unpreserved (EA010) FRC157_1, FRC157_72	FRC157_20,	19-Jun-2018	28-Jun-2018	26-Jun-2018	✖	28-Jun-2018	26-Jul-2018	✔
Soil Glass Jar - Unpreserved (EA010) FRC154_3, FRC154_42, FRC154_109	FRC154_7, FRC154_71,	20-Jun-2018	28-Jun-2018	27-Jun-2018	✖	28-Jun-2018	26-Jul-2018	✔



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content (Dried @ 105-110°C)								
Soil Glass Jar - Unpreserved (EA055) FRC156_1, FRC156_41, FRC156_61, FRC156_125	FRC156_2, FRC156_42, FRC156_100,	17-Jun-2018	----	----	----	27-Jun-2018	01-Jul-2018	✓
Soil Glass Jar - Unpreserved (EA055) FRC157_1, FRC157_72	FRC157_20,	19-Jun-2018	----	----	----	27-Jun-2018	03-Jul-2018	✓
Soil Glass Jar - Unpreserved (EA055) FRC154_3, FRC154_42, FRC154_109	FRC154_7, FRC154_71,	20-Jun-2018	----	----	----	27-Jun-2018	04-Jul-2018	✓
EA058: Emerson Aggregate Test								
Snap Lock Bag (EA058) FRC156_1, FRC156_41, FRC156_61, FRC156_125	FRC156_2, FRC156_42, FRC156_100,	17-Jun-2018	----	----	----	28-Jun-2018	14-Dec-2018	✓
Snap Lock Bag (EA058) FRC157_1, FRC157_72	FRC157_20,	19-Jun-2018	----	----	----	28-Jun-2018	16-Dec-2018	✓
Snap Lock Bag (EA058) FRC154_3, FRC154_42, FRC154_109	FRC154_7, FRC154_71,	20-Jun-2018	----	----	----	28-Jun-2018	17-Dec-2018	✓
ED005: Exchange Acidity								
Soil Glass Jar - Unpreserved (ED005) FRC156_1, FRC156_41,	FRC156_2, FRC156_42	17-Jun-2018	29-Jun-2018	15-Jul-2018	✓	02-Jul-2018	15-Jul-2018	✓
Soil Glass Jar - Unpreserved (ED005) FRC156_61, FRC156_125	FRC156_100,	17-Jun-2018	29-Jun-2018	15-Jul-2018	✓	29-Jun-2018	15-Jul-2018	✓
Soil Glass Jar - Unpreserved (ED005) FRC157_1,	FRC157_20	19-Jun-2018	29-Jun-2018	17-Jul-2018	✓	02-Jul-2018	17-Jul-2018	✓
Soil Glass Jar - Unpreserved (ED005) FRC157_72		19-Jun-2018	29-Jun-2018	17-Jul-2018	✓	29-Jun-2018	17-Jul-2018	✓
Soil Glass Jar - Unpreserved (ED005) FRC154_3, FRC154_42	FRC154_7,	20-Jun-2018	29-Jun-2018	18-Jul-2018	✓	02-Jul-2018	18-Jul-2018	✓
Soil Glass Jar - Unpreserved (ED005) FRC154_71,	FRC154_109	20-Jun-2018	29-Jun-2018	18-Jul-2018	✓	29-Jun-2018	18-Jul-2018	✓



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED006: Exchangeable Cations on Alkaline Soils								
Soil Glass Jar - Unpreserved (ED006) FRC156_61, FRC156_125	FRC156_100,	17-Jun-2018	29-Jun-2018	15-Jul-2018	✔	02-Jul-2018	15-Jul-2018	✔
Soil Glass Jar - Unpreserved (ED006) FRC156_1, FRC156_41,	FRC156_2, FRC156_42	17-Jun-2018	29-Jun-2018	15-Jul-2018	✔	29-Jun-2018	15-Jul-2018	✔
Soil Glass Jar - Unpreserved (ED006) FRC157_72		19-Jun-2018	29-Jun-2018	17-Jul-2018	✔	02-Jul-2018	17-Jul-2018	✔
Soil Glass Jar - Unpreserved (ED006) FRC157_1,	FRC157_20	19-Jun-2018	29-Jun-2018	17-Jul-2018	✔	29-Jun-2018	17-Jul-2018	✔
Soil Glass Jar - Unpreserved (ED006) FRC154_71,	FRC154_109	20-Jun-2018	29-Jun-2018	18-Jul-2018	✔	02-Jul-2018	18-Jul-2018	✔
Soil Glass Jar - Unpreserved (ED006) FRC154_3, FRC154_42	FRC154_7,	20-Jun-2018	29-Jun-2018	18-Jul-2018	✔	29-Jun-2018	18-Jul-2018	✔
ED007: Exchangeable Cations								
Soil Glass Jar - Unpreserved (ED007) FRC156_1, FRC156_41,	FRC156_2, FRC156_42	17-Jun-2018	29-Jun-2018	15-Jul-2018	✔	02-Jul-2018	15-Jul-2018	✔
Soil Glass Jar - Unpreserved (ED007) FRC156_61, FRC156_125	FRC156_100,	17-Jun-2018	29-Jun-2018	15-Jul-2018	✔	29-Jun-2018	15-Jul-2018	✔
Soil Glass Jar - Unpreserved (ED007) FRC157_1,	FRC157_20	19-Jun-2018	29-Jun-2018	17-Jul-2018	✔	02-Jul-2018	17-Jul-2018	✔
Soil Glass Jar - Unpreserved (ED007) FRC157_72		19-Jun-2018	29-Jun-2018	17-Jul-2018	✔	29-Jun-2018	17-Jul-2018	✔
Soil Glass Jar - Unpreserved (ED007) FRC154_3, FRC154_42	FRC154_7,	20-Jun-2018	29-Jun-2018	18-Jul-2018	✔	02-Jul-2018	18-Jul-2018	✔
Soil Glass Jar - Unpreserved (ED007) FRC154_71,	FRC154_109	20-Jun-2018	29-Jun-2018	18-Jul-2018	✔	29-Jun-2018	18-Jul-2018	✔



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation				Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation		Date analysed	Due for analysis	Evaluation
ED008: Exchangeable Cations									
Soil Glass Jar - Unpreserved (ED008) FRC156_1, FRC156_41,	FRC156_2, FRC156_42	17-Jun-2018	29-Jun-2018	15-Jul-2018	✓		02-Jul-2018	15-Jul-2018	✓
Soil Glass Jar - Unpreserved (ED008) FRC156_61, FRC156_125	FRC156_100,	17-Jun-2018	29-Jun-2018	15-Jul-2018	✓		29-Jun-2018	15-Jul-2018	✓
Soil Glass Jar - Unpreserved (ED008) FRC157_1,	FRC157_20	19-Jun-2018	29-Jun-2018	17-Jul-2018	✓		02-Jul-2018	17-Jul-2018	✓
Soil Glass Jar - Unpreserved (ED008) FRC157_72		19-Jun-2018	29-Jun-2018	17-Jul-2018	✓		29-Jun-2018	17-Jul-2018	✓
Soil Glass Jar - Unpreserved (ED008) FRC154_3, FRC154_42	FRC154_7,	20-Jun-2018	29-Jun-2018	18-Jul-2018	✓		02-Jul-2018	18-Jul-2018	✓
Soil Glass Jar - Unpreserved (ED008) FRC154_71,	FRC154_109	20-Jun-2018	29-Jun-2018	18-Jul-2018	✓		29-Jun-2018	18-Jul-2018	✓
ED042T: Total Sulfur by LECO									
Snap Lock Bag (ED042T) FRC156_1, FRC156_41, FRC156_61, FRC156_125	FRC156_2, FRC156_42, FRC156_100,	17-Jun-2018	03-Jul-2018	24-Jun-2018	✗		03-Jul-2018	30-Dec-2018	✓
Snap Lock Bag (ED042T) FRC157_1, FRC157_72	FRC157_20,	19-Jun-2018	03-Jul-2018	26-Jun-2018	✗		03-Jul-2018	30-Dec-2018	✓
Snap Lock Bag (ED042T) FRC154_3, FRC154_42, FRC154_109	FRC154_7, FRC154_71,	20-Jun-2018	03-Jul-2018	27-Jun-2018	✗		03-Jul-2018	30-Dec-2018	✓
EG005S : Soluble Metals by ICPAES									
Soil Glass Jar - Unpreserved (EG005S) FRC156_1, FRC156_41, FRC156_61, FRC156_125	FRC156_2, FRC156_42, FRC156_100,	17-Jun-2018	28-Jun-2018	14-Dec-2018	✓		29-Jun-2018	14-Dec-2018	✓
Soil Glass Jar - Unpreserved (EG005S) FRC157_1, FRC157_72	FRC157_20,	19-Jun-2018	28-Jun-2018	16-Dec-2018	✓		29-Jun-2018	16-Dec-2018	✓
Soil Glass Jar - Unpreserved (EG005S) FRC154_3, FRC154_42, FRC154_109	FRC154_7, FRC154_71,	20-Jun-2018	28-Jun-2018	17-Dec-2018	✓		29-Jun-2018	17-Dec-2018	✓

Page : 7 of 10
 Work Order : EB1815150
 Client : ECOZ ENVIRONMENTAL SERVICES
 Project : EZ18107 - Grants Project - Waste Characterisation



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG035S: Soluble Mercury by FIMS								
Soil Glass Jar - Unpreserved (EG035S)		17-Jun-2018	28-Jun-2018	15-Jul-2018	✔	29-Jun-2018	15-Jul-2018	✔
FRC156_1, FRC156_2,								
FRC156_41, FRC156_42,								
FRC156_61, FRC156_100,								
FRC156_125								
Soil Glass Jar - Unpreserved (EG035S)		19-Jun-2018	28-Jun-2018	17-Jul-2018	✔	29-Jun-2018	17-Jul-2018	✔
FRC157_1, FRC157_20,								
FRC157_72								
Soil Glass Jar - Unpreserved (EG035S)		20-Jun-2018	28-Jun-2018	18-Jul-2018	✔	29-Jun-2018	18-Jul-2018	✔
FRC154_3, FRC154_7,								
FRC154_42, FRC154_71,								
FRC154_109								



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Electrical Conductivity (1:2)	EA010-1	2	15	13.33	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Electrical Conductivity (1:5)	EA010	2	15	13.33	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Exchange Acidity by 1M Potassium Chloride	ED005	1	4	25.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations	ED007	2	9	22.22	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations on Alkaline Soils	ED006	1	6	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Moisture Content	EA055	2	15	13.33	10.00	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:2)	EA002-1	2	15	13.33	10.00	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:5)	EA002	2	15	13.33	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Soluble Mercury by FIMS	EG035S	2	15	13.33	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Soluble Metals by ICPAES	EG005S	2	15	13.33	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfur - Total as S (LECO)	ED042T	2	15	13.33	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Electrical Conductivity (1:2)	EA010-1	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Electrical Conductivity (1:5)	EA010	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations	ED007	2	9	22.22	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations on Alkaline Soils	ED006	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:2)	EA002-1	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:5)	EA002	2	15	13.33	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Soluble Mercury by FIMS	EG035S	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Soluble Metals by ICPAES	EG005S	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfur - Total as S (LECO)	ED042T	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Electrical Conductivity (1:2)	EA010-1	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Electrical Conductivity (1:5)	EA010	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Exchange Acidity by 1M Potassium Chloride	ED005	1	4	25.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations	ED007	2	9	22.22	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations on Alkaline Soils	ED006	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Soluble Mercury by FIMS	EG035S	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Soluble Metals by ICPAES	EG005S	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfur - Total as S (LECO)	ED042T	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Soluble Mercury by FIMS	EG035S	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH (1:5)	EA002	SOIL	In house: Referenced to Rayment and Lyons 4A1 and APHA 4500H+. pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM (2013) Schedule B(3)
pH (1:2)	EA002-1	SOIL	In house: Referenced to APHA 4500H+. pH is determined on soil samples after a 1:2 soil/water leach.
Electrical Conductivity (1:5)	EA010	SOIL	In house: Referenced to Rayment and Lyons 3A1 and APHA 2510. Conductivity is determined on soil samples using a 1:5 soil/water leach. This method is compliant with NEPM (2013) Schedule B(3)
Electrical Conductivity (1:2)	EA010-1	SOIL	In house: Referenced to APHA 2510. Conductivity is determined on soil samples using a 1:2 soil/water leach.
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Emerson Aggregate Test	EA058	SOIL	In house: Referenced to AS1289.3.8.1. Testing is performed only on soils with suitable aggregates; sands and gravels are usually unsuitable for this test. The test classifies the behaviour of soil aggregates, when immersed, on their coherence in water.
Exchange Acidity by 1M Potassium Chloride	ED005	SOIL	In house: referenced to Rayment and Lyons, (2011), method 15G1. This method is unsuitable for near neutral and alkaline soils. NATA accreditation does not cover performance of this service.
Exchangeable Cations on Alkaline Soils	ED006	SOIL	In house: Referenced to Soil Survey Test Method C5. Soluble salts are removed from the sample prior to analysis. Cations are exchanged from the sample by contact with alcoholic ammonium chloride at pH 8.5. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil.
Exchangeable Cations	ED007	SOIL	In house: Referenced to Rayment & Lyons (2011) Method 15A1. Cations are exchanged from the sample by contact with Ammonium Chloride. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil. This method is compliant with NEPM (2013) Schedule B(3) (Method 301)
Exchangeable Cations with pre-treatment	ED008	SOIL	In house: Referenced to Rayment & Higginson (2011) Method 15A2. Soluble salts are removed from the sample prior to analysis. Cations are exchanged from the sample by contact with Ammonium Chloride. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil. This method is compliant with NEPM (2013) Schedule B(3) (Method 301)
Sulfur - Total as S (LECO)	ED042T	SOIL	In house: Dried and pulverised sample is combusted in a high temperature furnace in the presence of strong oxidants / catalysts. The evolved S (as SO ₂) is measured by infra-red detector
Soluble Metals by ICPAES	EG005S	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Soluble metals are determined following an appropriate soil / water extraction of the soil. The ICPAES technique ionises samples in a plasma, emitting characteristic spectrums based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards.
Soluble Mercury by FIMS	EG035S	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the extract. Ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve.

Preparation Methods	Method	Matrix	Method Descriptions



<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Exchangeable Cations Preparation Method (Alkaline Soils)	ED006PR	SOIL	In house: Referenced to Rayment and Lyons 2011 method 15C1.
Exchangeable Cations Preparation Method	ED007PR	SOIL	In house: Referenced to Rayment & Higginson (1992) method 15A1. A 1M NH ₄ Cl extraction by end over end tumbling at a ratio of 1:20. There is no pretreatment for soluble salts. Extracts can be run by ICP for cations.
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of reagent grade water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.
1:2 solid / water leach for soluble analytes	EN40	SOIL	25 g of soil is mixed with 50 mL of distilled water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.
Dry and Pulverise (up to 100g)	GEO30	SOIL	#



CHAIN OF CUSTODY

ALS
Laboratory:
please tick →

13/3/99, 1st 32 Ghena Street, Clifton QLD 4059
Ph: 07 3243 7222 or 1800 608 608 (toll free)

[Signature]
Environmental Division
Brisbane

Work Order Reference
EB1815150



Telephone: +61-7-3243 7222

CLIENT: EcoZ Environmental Services		TURNAROUND REQUIREMENTS: ☐ Standard TAT (List due date): (Standard TAT may be longer for some tests e.g., Ultra Trace Organics)		FOR LABORATORY USE ONLY (Circle) Custody Seal Intact? Yes Free ice / frozen ice bricks present upon receipt? Yes Random Sample Temperature on Receipt Other comment:	
OFFICE: Darwin		☐ Non Standard or urgent TAT (List due date):			
PROJECT: EZ18107 - Grants Project - Waste Characterisation		ALS QUOTE NO.: 54/285/18		COC SEQUENCE NUMBER (Circle) COC: 1 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7	
ORDER NUMBER:					
PROJECT MANAGER: Aiden Campbell		CONTACT PH: 08 8981 1100			
SAMPLER:		SAMPLER MOBILE:		RECEIVED BY: <i>[Signature]</i> ALS <i>[Signature]</i>	
COC emailed to ALS? (YES / NO)		EDD FORMAT (or default):		RECEIVED BY: Jess H	
Email Reports to: aiden.campbell@ecoz.com.au		DATE/TIME: 21/6/18 15:00		DATE/TIME: 22/6/18 8:30	
Email Invoice to: lyndall.ryan@ecoz.com.au; aiden.campbell@ecoz.com.au					
COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:					

ALS USE	SAMPLE DETAILS		CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).										Additional Information	
	MATRIX: SOLID (S) WATER (W)															
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	Total S	pH (1-2)	EC (1-2)	Emmerson Aggregate	CEC	ANC	NAPP	NAG	EN020: Prep from ASS bag	Leachable Metals (As, B, Ba, Be, Cd, Cr, Co, Cu, Mn, Ni, Pb, Se, V, Zn, Hg)	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	FRC156_1	17/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	✓	
2	FRC156_2	17/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	✓	
3	FRC156_41	17/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	✓	
4	FRC156_42	17/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	✓	
5	FRC156_61	17/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	✓	
6	FRC156_100	17/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	✓	
7	FRC156_125	17/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	✓	
8	FRC157_1	19/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	✓	
9	FRC157_20	19/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	✓	
10	FRC157_72	19/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	✓	
11	FRC154_3	20/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	✓	
12	FRC154_7	20/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	✓	
13	FRC154_42	20/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	✓	
14	FRC154_71	20/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	✓	
15	FRC154_109	20/06/2018	S	ST & ASS	4	✓	✓	✓	✓	✓	hold	hold	hold	hold	✓	
TOTAL																

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

LAB OF ORIGIN:
DARWIN

CERTIFICATE OF ANALYSIS

Work Order : **EB1815858**
Client : **ECOZ ENVIRONMENTAL SERVICES**
Contact : AIDEN CAMPBELL
Address : PO BOX 381
 DARWIN NT, AUSTRALIA 0801
Telephone : ----
Project : EZ18107 - Grants Project - Waste Characterisation
Order number :
C-O-C number : ----
Sampler : ----
Site :
Quote number : SY/285/18
No. of samples received : 13
No. of samples analysed : 13

Page : 1 of 5
Laboratory : Environmental Division Brisbane
Contact : Customer Services EB
Address : 2 Byth Street Stafford QLD Australia 4053
Telephone : +61-7-3243 7222
Date Samples Received : 29-Jun-2018 08:50
Date Analysis Commenced : 02-Jul-2018
Issue Date : 09-Jul-2018 13:21



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. 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
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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.

- ED006(Exchangeable Cations on Alkaline Soils): Unable to calculate Magnesium/Potassium Ratio for some samples as the required results for Magnesium/Potassium are below LOR.
- ED007(Exchangeable Cations): Unable to calculate Magnesium/Potassium Ratio for some samples as the required results for Magnesium/Potassium are below LOR.
- ALS is not NATA accredited for the analysis of Exchangeable Aluminium and Exchange Acidity in soils when performed under ALS Method ED005.
- ALS is not NATA accredited for the analysis of Exchangeable Cations on Alkaline Soils when performed under ALS Method ED006.
- ED005 (Exchange Acidity): It is recognised that Exchange Acidity is less than Exchangeable Aluminium for sample EB1815858-011 (FRC159-4). However, the difference is within experimental variation of the methods.
- EA058 Emerson: V. = Very, D. = Dark, L. = Light, VD. = Very Dark
- ED007 and ED008: When Exchangeable Al is reported from these methods, it should be noted that Rayment & Lyons (2011) suggests Exchange Acidity by 1M KCl - Method 15G1 (ED005) is a more suitable method for the determination of exchange acidity (H⁺ + Al³⁺).



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	FRC158-10	FRC158-80	FRC158-21	FRC158-1	FRC159-1
Client sampling date / time					17-Jun-2018 00:00	17-Jun-2018 00:00	17-Jun-2018 00:00	17-Jun-2018 00:00	17-Jun-2018 00:00
Compound	CAS Number	LOR	Unit		EB1815858-001	EB1815858-002	EB1815858-003	EB1815858-004	EB1815858-005
					Result	Result	Result	Result	Result
EA002: pH 1:2 (Soils)									
pH Value	----	0.1	pH Unit		6.3	8.8	7.5	5.9	5.5
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		6.4	8.6	7.3	5.8	5.6
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		11	26	13	6	6
Electrical Conductivity @ 25°C	----	1	µS/cm		8	17	8	4	4
EA058: Emerson Aggregate Test									
Color (Munsell)	----	-	-		Dark Greyish Brown	Dark Greyish Brown	Olive Brown	Dark Red	Red
Texture	----	-	-		Sandy Loam	Sandy Loam	Gravelly Sand	Gravelly Sand	Gravelly Sand
Emerson Class Number	EC/TC	-	-		4	3	8	8	8
ED005: Exchange Acidity									
Exchange Acidity	----	0.1	meq/100g		----	----	----	<0.1	0.5
Exchangeable Aluminium	----	0.1	meq/100g		----	----	----	<0.1	0.3
ED006: Exchangeable Cations on Alkaline Soils									
Exchangeable Calcium	----	0.2	meq/100g		----	2.0	----	----	----
Exchangeable Magnesium	----	0.2	meq/100g		----	1.9	----	----	----
Exchangeable Potassium	----	0.2	meq/100g		----	0.2	----	----	----
Exchangeable Sodium	----	0.2	meq/100g		----	<0.2	----	----	----
Cation Exchange Capacity	----	0.2	meq/100g		----	4.2	----	----	----
Exchangeable Sodium Percent	----	0.2	%		----	<0.2	----	----	----
Calcium/Magnesium Ratio	----	0.2	-		----	1.1	----	----	----
Magnesium/Potassium Ratio	----	0.2	-		----	9.2	----	----	----
ED007: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g		0.1	----	0.3	0.4	<0.1
Exchangeable Magnesium	----	0.1	meq/100g		2.4	----	1.7	0.2	0.3
Exchangeable Potassium	----	0.1	meq/100g		0.2	----	0.2	<0.1	<0.1
Exchangeable Sodium	----	0.1	meq/100g		<0.1	----	<0.1	<0.1	<0.1
Cation Exchange Capacity	----	0.1	meq/100g		----	----	----	0.6	0.8
Cation Exchange Capacity	----	0.1	meq/100g		2.8	----	2.2	----	----
Exchangeable Sodium Percent	----	0.1	%		1.6	----	2.0	4.6	6.6
Calcium/Magnesium Ratio	----	0.1	-		<0.1	----	0.2	2.0	<0.1
Magnesium/Potassium Ratio	----	0.1	-		15.9	----	10.8	----	----
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		0.02	<0.01	<0.01	0.02	<0.01



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	FRC159-136	FRC159-30	FRC160-2	FRC160-4	FRC159-8
Client sampling date / time					17-Jun-2018 00:00	17-Jun-2018 00:00	19-Jun-2018 00:00	19-Jun-2018 00:00	19-Jun-2018 00:00
Compound	CAS Number	LOR	Unit		EB1815858-006	EB1815858-007	EB1815858-008	EB1815858-009	EB1815858-010
					Result	Result	Result	Result	Result
EA002: pH 1:2 (Soils)									
pH Value	----	0.1	pH Unit		9.5	7.7	9.0	8.2	6.1
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		9.4	7.6	8.9	8.0	6.2
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		108	16	56	19	10
Electrical Conductivity @ 25°C	----	1	µS/cm		84	9	33	11	6
EA058: Emerson Aggregate Test									
Color (Munsell)	----	-	-		Black	Olive Brown	Olive Brown	Dark Greyish Brown	Yellowish Brown
Texture	----	-	-		Gravelly Sand	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam
Emerson Class Number	EC/TC	-	-		8	3	3	3	3
ED006: Exchangeable Cations on Alkaline Soils									
Exchangeable Calcium	----	0.2	meq/100g		1.4	0.8	0.3	<0.2	----
Exchangeable Magnesium	----	0.2	meq/100g		<0.2	3.2	2.3	2.2	----
Exchangeable Potassium	----	0.2	meq/100g		0.5	<0.2	<0.2	<0.2	----
Exchangeable Sodium	----	0.2	meq/100g		<0.2	<0.2	<0.2	<0.2	----
Cation Exchange Capacity	----	0.2	meq/100g		1.9	4.2	2.6	2.2	----
Exchangeable Sodium Percent	----	0.2	%		<0.2	<0.2	<0.2	<0.2	----
Calcium/Magnesium Ratio	----	0.2	-		4.3	----	----	----	----
Calcium/Magnesium Ratio	----	0.2	-		----	0.3	<0.2	<0.2	----
Magnesium/Potassium Ratio	----	0.2	-		----	17.2	----	15.3	----
Magnesium/Potassium Ratio	----	0.2	-		<0.2	----	----	----	----
ED007: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g		----	----	----	----	<0.1
Exchangeable Magnesium	----	0.1	meq/100g		----	----	----	----	1.7
Exchangeable Potassium	----	0.1	meq/100g		----	----	----	----	0.1
Exchangeable Sodium	----	0.1	meq/100g		----	----	----	----	<0.1
Cation Exchange Capacity	----	0.1	meq/100g		----	----	----	----	2.1
Exchangeable Sodium Percent	----	0.1	%		----	----	----	----	2.1
Calcium/Magnesium Ratio	----	0.1	-		----	----	----	----	<0.1
Magnesium/Potassium Ratio	----	0.1	-		----	----	----	----	12.6
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		0.03	<0.01	<0.01	<0.01	<0.01



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	FRC159-4	FRC160-91	FRC160-73	----	----
Client sampling date / time					20-Jun-2018 00:00	20-Jun-2018 00:00	20-Jun-2018 00:00	----	----
Compound	CAS Number	LOR	Unit		EB1815858-011	EB1815858-012	EB1815858-013	-----	-----
				Result	Result	Result		----	----
EA002: pH 1:2 (Soils)									
pH Value	----	0.1	pH Unit		5.4	9.3	8.8	----	----
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		5.6	9.3	8.9	----	----
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		10	99	30	----	----
Electrical Conductivity @ 25°C	----	1	µS/cm		6	78	18	----	----
EA058: Emerson Aggregate Test									
Color (Munsell)	----	-	-		Brown	Black	Dark Greyish Brown	----	----
Texture	----	-	-		Sandy Loam	Gravelly Sand	Sandy Loam	----	----
Emerson Class Number	EC/TC	-	-		4	8	3	----	----
ED005: Exchange Acidity									
Exchange Acidity	----	0.1	meq/100g		4.6	----	----	----	----
Exchangeable Aluminium	----	0.1	meq/100g		4.8	----	----	----	----
ED006: Exchangeable Cations on Alkaline Soils									
Exchangeable Calcium	----	0.2	meq/100g		----	1.0	1.7	----	----
Exchangeable Magnesium	----	0.2	meq/100g		----	0.4	3.6	----	----
Exchangeable Potassium	----	0.2	meq/100g		----	0.4	0.2	----	----
Exchangeable Sodium	----	0.2	meq/100g		----	<0.2	<0.2	----	----
Cation Exchange Capacity	----	0.2	meq/100g		----	1.8	5.6	----	----
Exchangeable Sodium Percent	----	0.2	%		----	<0.2	<0.2	----	----
Calcium/Magnesium Ratio	----	0.2	-		----	2.4	0.5	----	----
Magnesium/Potassium Ratio	----	0.2	-		----	1.2	14.3	----	----
ED007: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g		<0.1	----	----	----	----
Exchangeable Magnesium	----	0.1	meq/100g		3.9	----	----	----	----
Exchangeable Potassium	----	0.1	meq/100g		0.2	----	----	----	----
Exchangeable Sodium	----	0.1	meq/100g		<0.1	----	----	----	----
Cation Exchange Capacity	----	0.1	meq/100g		8.7	----	----	----	----
Exchangeable Sodium Percent	----	0.1	%		1.4	----	----	----	----
Calcium/Magnesium Ratio	----	0.1	-		<0.1	----	----	----	----
Magnesium/Potassium Ratio	----	0.1	-		20.4	----	----	----	----
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		<0.01	0.05	0.02	----	----

QUALITY CONTROL REPORT

Work Order : EB1815858

Page : 1 of 5

Client : ECOZ ENVIRONMENTAL SERVICES
Contact : AIDEN CAMPBELL
Address : PO BOX 381
DARWIN NT, AUSTRALIA 0801
Telephone : ----
Project : EZ18107 - Grants Project - Waste Characterisation
Order number : ----
C-O-C number : ----
Sampler : ----
Site : ----
Quote number : SY/285/18
No. of samples received : 13
No. of samples analysed : 13

Laboratory : Environmental Division Brisbane
Contact : Customer Services EB
Address : 2 Byth Street Stafford QLD Australia 4053
Telephone : +61-7-3243 7222
Date Samples Received : 29-Jun-2018
Date Analysis Commenced : 02-Jul-2018
Issue Date : 09-Jul-2018



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. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

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

Signatories	Position	Accreditation Category
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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

Key :
 Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA002: pH 1:2 (Soils) (QC Lot: 1770017)									
EB1815858-001	FRC158-10	EA002-1: pH Value	----	0.1	pH Unit	6.3	6.6	3.73	0% - 20%
EB1815858-011	FRC159-4	EA002-1: pH Value	----	0.1	pH Unit	5.4	5.4	0.00	0% - 20%
EA002: pH 1:5 (Soils) (QC Lot: 1770019)									
EB1815858-001	FRC158-10	EA002: pH Value	----	0.1	pH Unit	6.4	6.6	2.00	0% - 20%
EB1815858-011	FRC159-4	EA002: pH Value	----	0.1	pH Unit	5.6	5.5	0.00	0% - 20%
EA010: Conductivity (QC Lot: 1770018)									
EB1815858-001	FRC158-10	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	8	6	19.6	No Limit
EB1815858-011	FRC159-4	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	6	5	0.00	No Limit
EA010: Conductivity (QC Lot: 1772439)									
EB1815858-001	FRC158-10	EA010-1: Electrical Conductivity @ 25°C	----	1	µS/cm	11	10	0.00	0% - 50%
EB1815858-011	FRC159-4	EA010-1: Electrical Conductivity @ 25°C	----	1	µS/cm	10	10	0.00	0% - 50%
ED005: Exchange Acidity (QC Lot: 1774683)									
EB1815700-046	Anonymous	ED005: Exchange Acidity	----	0.1	meq/100g	8.8	8.8	0.00	0% - 20%
		ED005: Exchangeable Aluminium	----	0.1	meq/100g	5.5	5.2	5.63	0% - 20%
ED006: Exchangeable Cations on Alkaline Soils (QC Lot: 1774358)									
EB1815700-007	Anonymous	ED006: Exchangeable Calcium	----	0.2	meq/100g	4.9	5.1	4.32	0% - 20%
		ED006: Exchangeable Magnesium	----	0.2	meq/100g	1.7	1.8	0.00	No Limit
		ED006: Exchangeable Potassium	----	0.2	meq/100g	<0.2	<0.2	0.00	No Limit
		ED006: Exchangeable Sodium	----	0.2	meq/100g	0.4	0.4	0.00	No Limit
		ED006: Cation Exchange Capacity	----	0.2	meq/100g	7.0	7.4	5.85	0% - 20%
ED007: Exchangeable Cations (QC Lot: 1774355)									
EB1815858-001	FRC158-10	ED007: Exchangeable Calcium	----	0.1	meq/100g	0.1	0.1	0.00	No Limit
		ED007: Exchangeable Magnesium	----	0.1	meq/100g	2.4	2.4	0.00	0% - 20%
		ED007: Exchangeable Potassium	----	0.1	meq/100g	0.2	0.1	0.00	No Limit

Page : 3 of 5
 Work Order : EB1815858
 Client : ECOZ ENVIRONMENTAL SERVICES
 Project : EZ18107 - Grants Project - Waste Characterisation



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
ED007: Exchangeable Cations (QC Lot: 1774355) - continued									
EB1815858-001	FRC158-10	ED007: Exchangeable Sodium	----	0.1	meq/100g	<0.1	<0.1	0.00	No Limit
ED007: Exchangeable Cations (QC Lot: 1774682)									
EB1815700-046	Anonymous	ED007: Exchangeable Calcium	----	0.1	meq/100g	1.2	1.2	0.00	0% - 50%
		ED007: Exchangeable Magnesium	----	0.1	meq/100g	2.3	2.3	0.00	0% - 20%
		ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	<0.1	0.00	No Limit
		ED007: Exchangeable Sodium	----	0.1	meq/100g	0.6	0.6	0.00	No Limit
ED042T: Total Sulfur by LECO (QC Lot: 1778518)									
EB1815858-001	FRC158-10	ED042T: Sulfur - Total as S (LECO)	----	0.01	%	0.02	0.02	0.00	No Limit
EB1815858-010	FRC159-8	ED042T: Sulfur - Total as S (LECO)	----	0.01	%	<0.01	<0.01	0.00	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EA002: pH 1:2 (Soils) (QCLot: 1770017)								
EA002-1: pH Value	----	----	pH Unit	----	4.01 pH Unit	99.0	98	102
EA002: pH 1:5 (Soils) (QCLot: 1770019)								
EA002: pH Value	----	----	pH Unit	----	4 pH Unit	100	98	102
				----	7 pH Unit	100	98	102
EA010: Conductivity (QCLot: 1770018)								
EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	98.4	97	103
EA010: Conductivity (QCLot: 1772439)								
EA010-1: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	101	97	103
ED005: Exchange Acidity (QCLot: 1774683)								
ED005: Exchange Acidity	----	0.1	meq/100g	<0.1	----	----	----	----
ED005: Exchangeable Aluminium	----	0.1	meq/100g	<0.1	----	----	----	----
ED006: Exchangeable Cations on Alkaline Soils (QCLot: 1774358)								
ED006: Exchangeable Calcium	----	0.2	meq/100g	<0.2	9.57 meq/100g	94.5	70	130
ED006: Exchangeable Magnesium	----	0.2	meq/100g	<0.2	6.32 meq/100g	81.2	70	130
ED006: Exchangeable Potassium	----	0.2	meq/100g	<0.2	0.65 meq/100g	80.9	70	130
ED006: Exchangeable Sodium	----	0.2	meq/100g	<0.2	2.86 meq/100g	79.5	70	130
ED006: Cation Exchange Capacity	----	0.2	meq/100g	<0.2	19.4 meq/100g	87.5	70	130
ED007: Exchangeable Cations (QCLot: 1774355)								
ED007: Exchangeable Calcium	----	0.1	meq/100g	<0.1	3.54 meq/100g	104	79	113
ED007: Exchangeable Magnesium	----	0.1	meq/100g	<0.1	1.15 meq/100g	94.2	85	115
ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	0.635 meq/100g	94.5	70	122
ED007: Exchangeable Sodium	----	0.1	meq/100g	<0.1	0.382 meq/100g	87.7	76	112
ED007: Cation Exchange Capacity	----	0.1	meq/100g	<0.1	5.707 meq/100g	99.9	82	112
ED007: Exchangeable Cations (QCLot: 1774682)								
ED007: Exchangeable Calcium	----	0.1	meq/100g	<0.1	3.54 meq/100g	103	79	113
ED007: Exchangeable Magnesium	----	0.1	meq/100g	<0.1	1.15 meq/100g	92.5	85	115
ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	0.635 meq/100g	94.2	70	122
ED007: Exchangeable Sodium	----	0.1	meq/100g	<0.1	0.382 meq/100g	86.7	76	112
ED007: Cation Exchange Capacity	----	0.1	meq/100g	<0.1	5.707 meq/100g	98.8	82	112
ED042T: Total Sulfur by LECO (QCLot: 1778518)								
ED042T: Sulfur - Total as S (LECO)	----	0.01	%	<0.01	0.16 %	101	70	130



Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.**

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EB1815858	Page	: 1 of 8
Client	: ECOZ ENVIRONMENTAL SERVICES	Laboratory	: Environmental Division Brisbane
Contact	: AIDEN CAMPBELL	Telephone	: +61-7-3243 7222
Project	: EZ18107 - Grants Project - Waste Characterisation	Date Samples Received	: 29-Jun-2018
Site	:	Issue Date	: 09-Jul-2018
Sampler	: ----	No. of samples received	: 13
Order number	:	No. of samples analysed	: 13

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- **NO** Matrix Spike outliers occur.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- **NO** Quality Control Sample Frequency Outliers exist.



Outliers : Analysis Holding Time Compliance

Matrix: **SOIL**

Method		Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA002: pH 1:2 (Soils)							
Soil Glass Jar - Unpreserved FRC158-10, FRC158-21, FRC159-1, FRC159-30		FRC158-80, FRC158-1, FRC159-136,	04-Jul-2018	24-Jun-2018	10	----	----
Soil Glass Jar - Unpreserved FRC160-2, FRC159-8		FRC160-4,	04-Jul-2018	26-Jun-2018	8	----	----
Soil Glass Jar - Unpreserved FRC159-4, FRC160-73		FRC160-91,	04-Jul-2018	27-Jun-2018	7	----	----
EA002: pH 1:5 (Soils)							
Soil Glass Jar - Unpreserved FRC158-10, FRC158-21, FRC159-1, FRC159-30		FRC158-80, FRC158-1, FRC159-136,	03-Jul-2018	24-Jun-2018	9	----	----
Soil Glass Jar - Unpreserved FRC160-2, FRC159-8		FRC160-4,	03-Jul-2018	26-Jun-2018	7	----	----
Soil Glass Jar - Unpreserved FRC159-4, FRC160-73		FRC160-91,	03-Jul-2018	27-Jun-2018	6	----	----
EA010: Conductivity							
Soil Glass Jar - Unpreserved FRC158-10, FRC158-21, FRC159-1, FRC159-30		FRC158-80, FRC158-1, FRC159-136,	03-Jul-2018	24-Jun-2018	9	----	----
Soil Glass Jar - Unpreserved FRC158-10, FRC158-21, FRC159-1, FRC159-30		FRC158-80, FRC158-1, FRC159-136,	04-Jul-2018	24-Jun-2018	10	----	----
Soil Glass Jar - Unpreserved FRC160-2, FRC159-8		FRC160-4,	03-Jul-2018	26-Jun-2018	7	----	----



Matrix: **SOIL**

Method		Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA010: Conductivity - Analysis Holding Time Compliance							
Soil Glass Jar - Unpreserved							
FRC160-2, FRC159-8	FRC160-4,	04-Jul-2018	26-Jun-2018	8	----	----	----
Soil Glass Jar - Unpreserved							
FRC159-4, FRC160-73	FRC160-91,	03-Jul-2018	27-Jun-2018	6	----	----	----
Soil Glass Jar - Unpreserved							
FRC159-4, FRC160-73	FRC160-91,	04-Jul-2018	27-Jun-2018	7	----	----	----

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA002: pH 1:2 (Soils)									
Soil Glass Jar - Unpreserved (EA002-1) FRC158-10, FRC158-21, FRC159-1, FRC159-30		FRC158-80, FRC158-1, FRC159-136,	17-Jun-2018	04-Jul-2018	24-Jun-2018	✖	04-Jul-2018	04-Jul-2018	✔
Soil Glass Jar - Unpreserved (EA002-1) FRC160-2, FRC159-8		FRC160-4,	19-Jun-2018	04-Jul-2018	26-Jun-2018	✖	04-Jul-2018	04-Jul-2018	✔
Soil Glass Jar - Unpreserved (EA002-1) FRC159-4, FRC160-73		FRC160-91,	20-Jun-2018	04-Jul-2018	27-Jun-2018	✖	04-Jul-2018	04-Jul-2018	✔



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA002: pH 1:5 (Soils)								
Soil Glass Jar - Unpreserved (EA002) FRC158-10, FRC158-21, FRC159-1, FRC159-30	FRC158-80, FRC158-1, FRC159-136,	17-Jun-2018	03-Jul-2018	24-Jun-2018	✖	03-Jul-2018	03-Jul-2018	✓
Soil Glass Jar - Unpreserved (EA002) FRC160-2, FRC159-8	FRC160-4,	19-Jun-2018	03-Jul-2018	26-Jun-2018	✖	03-Jul-2018	03-Jul-2018	✓
Soil Glass Jar - Unpreserved (EA002) FRC159-4, FRC160-73	FRC160-91,	20-Jun-2018	03-Jul-2018	27-Jun-2018	✖	03-Jul-2018	03-Jul-2018	✓
EA010: Conductivity								
Soil Glass Jar - Unpreserved (EA010) FRC158-10, FRC158-21, FRC159-1, FRC159-30	FRC158-80, FRC158-1, FRC159-136,	17-Jun-2018	03-Jul-2018	24-Jun-2018	✖	03-Jul-2018	31-Jul-2018	✓
Soil Glass Jar - Unpreserved (EA010-1) FRC158-10, FRC158-21, FRC159-1, FRC159-30	FRC158-80, FRC158-1, FRC159-136,	17-Jun-2018	04-Jul-2018	24-Jun-2018	✖	04-Jul-2018	01-Aug-2018	✓
Soil Glass Jar - Unpreserved (EA010) FRC160-2, FRC159-8	FRC160-4,	19-Jun-2018	03-Jul-2018	26-Jun-2018	✖	03-Jul-2018	31-Jul-2018	✓
Soil Glass Jar - Unpreserved (EA010-1) FRC160-2, FRC159-8	FRC160-4,	19-Jun-2018	04-Jul-2018	26-Jun-2018	✖	04-Jul-2018	01-Aug-2018	✓
Soil Glass Jar - Unpreserved (EA010) FRC159-4, FRC160-73	FRC160-91,	20-Jun-2018	03-Jul-2018	27-Jun-2018	✖	03-Jul-2018	31-Jul-2018	✓
Soil Glass Jar - Unpreserved (EA010-1) FRC159-4, FRC160-73	FRC160-91,	20-Jun-2018	04-Jul-2018	27-Jun-2018	✖	04-Jul-2018	01-Aug-2018	✓



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA058: Emerson Aggregate Test								
Snap Lock Bag (EA058) FRC158-10, FRC158-21, FRC159-1, FRC159-30	FRC158-80, FRC158-1, FRC159-136,	17-Jun-2018	----	----	----	02-Jul-2018	14-Dec-2018	✓
Snap Lock Bag (EA058) FRC160-2, FRC159-8	FRC160-4,	19-Jun-2018	----	----	----	02-Jul-2018	16-Dec-2018	✓
Snap Lock Bag (EA058) FRC159-4, FRC160-73	FRC160-91,	20-Jun-2018	----	----	----	02-Jul-2018	17-Dec-2018	✓
ED005: Exchange Acidity								
Soil Glass Jar - Unpreserved (ED005) FRC158-10, FRC158-1,	FRC158-21, FRC159-1	17-Jun-2018	04-Jul-2018	15-Jul-2018	✓	05-Jul-2018	15-Jul-2018	✓
Soil Glass Jar - Unpreserved (ED005) FRC158-80, FRC159-30	FRC159-136,	17-Jun-2018	04-Jul-2018	15-Jul-2018	✓	06-Jul-2018	15-Jul-2018	✓
Soil Glass Jar - Unpreserved (ED005) FRC159-8		19-Jun-2018	04-Jul-2018	17-Jul-2018	✓	05-Jul-2018	17-Jul-2018	✓
Soil Glass Jar - Unpreserved (ED005) FRC160-2,	FRC160-4	19-Jun-2018	04-Jul-2018	17-Jul-2018	✓	06-Jul-2018	17-Jul-2018	✓
Soil Glass Jar - Unpreserved (ED005) FRC159-4		20-Jun-2018	04-Jul-2018	18-Jul-2018	✓	05-Jul-2018	18-Jul-2018	✓
Soil Glass Jar - Unpreserved (ED005) FRC160-91,	FRC160-73	20-Jun-2018	04-Jul-2018	18-Jul-2018	✓	06-Jul-2018	18-Jul-2018	✓
ED006: Exchangeable Cations on Alkaline Soils								
Soil Glass Jar - Unpreserved (ED006) FRC158-80, FRC159-30	FRC159-136,	17-Jun-2018	04-Jul-2018	15-Jul-2018	✓	04-Jul-2018	15-Jul-2018	✓
Soil Glass Jar - Unpreserved (ED006) FRC158-10, FRC158-1,	FRC158-21, FRC159-1	17-Jun-2018	04-Jul-2018	15-Jul-2018	✓	06-Jul-2018	15-Jul-2018	✓
Soil Glass Jar - Unpreserved (ED006) FRC160-2,	FRC160-4	19-Jun-2018	04-Jul-2018	17-Jul-2018	✓	04-Jul-2018	17-Jul-2018	✓
Soil Glass Jar - Unpreserved (ED006) FRC159-8		19-Jun-2018	04-Jul-2018	17-Jul-2018	✓	06-Jul-2018	17-Jul-2018	✓
Soil Glass Jar - Unpreserved (ED006) FRC160-91,	FRC160-73	20-Jun-2018	04-Jul-2018	18-Jul-2018	✓	04-Jul-2018	18-Jul-2018	✓
Soil Glass Jar - Unpreserved (ED006) FRC159-4		20-Jun-2018	04-Jul-2018	18-Jul-2018	✓	06-Jul-2018	18-Jul-2018	✓



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED007: Exchangeable Cations								
Soil Glass Jar - Unpreserved (ED007) FRC158-10, FRC158-1,	FRC158-21, FRC159-1	17-Jun-2018	04-Jul-2018	15-Jul-2018	✔	05-Jul-2018	15-Jul-2018	✔
Soil Glass Jar - Unpreserved (ED007) FRC158-80, FRC159-30	FRC159-136,	17-Jun-2018	04-Jul-2018	15-Jul-2018	✔	06-Jul-2018	15-Jul-2018	✔
Soil Glass Jar - Unpreserved (ED007) FRC159-8		19-Jun-2018	04-Jul-2018	17-Jul-2018	✔	05-Jul-2018	17-Jul-2018	✔
Soil Glass Jar - Unpreserved (ED007) FRC160-2,	FRC160-4	19-Jun-2018	04-Jul-2018	17-Jul-2018	✔	06-Jul-2018	17-Jul-2018	✔
Soil Glass Jar - Unpreserved (ED007) FRC159-4		20-Jun-2018	04-Jul-2018	18-Jul-2018	✔	05-Jul-2018	18-Jul-2018	✔
Soil Glass Jar - Unpreserved (ED007) FRC160-91,	FRC160-73	20-Jun-2018	04-Jul-2018	18-Jul-2018	✔	06-Jul-2018	18-Jul-2018	✔
ED008: Exchangeable Cations								
Soil Glass Jar - Unpreserved (ED008) FRC158-10, FRC158-1,	FRC158-21, FRC159-1	17-Jun-2018	04-Jul-2018	15-Jul-2018	✔	05-Jul-2018	15-Jul-2018	✔
Soil Glass Jar - Unpreserved (ED008) FRC158-80, FRC159-30	FRC159-136,	17-Jun-2018	04-Jul-2018	15-Jul-2018	✔	06-Jul-2018	15-Jul-2018	✔
Soil Glass Jar - Unpreserved (ED008) FRC159-8		19-Jun-2018	04-Jul-2018	17-Jul-2018	✔	05-Jul-2018	17-Jul-2018	✔
Soil Glass Jar - Unpreserved (ED008) FRC160-2,	FRC160-4	19-Jun-2018	04-Jul-2018	17-Jul-2018	✔	06-Jul-2018	17-Jul-2018	✔
Soil Glass Jar - Unpreserved (ED008) FRC159-4		20-Jun-2018	04-Jul-2018	18-Jul-2018	✔	05-Jul-2018	18-Jul-2018	✔
Soil Glass Jar - Unpreserved (ED008) FRC160-91,	FRC160-73	20-Jun-2018	04-Jul-2018	18-Jul-2018	✔	06-Jul-2018	18-Jul-2018	✔
ED042T: Total Sulfur by LECO								
Pulp Bag (ED042T) FRC158-10, FRC158-21, FRC159-1, FRC159-30	FRC158-80, FRC158-1, FRC159-136,	17-Jun-2018	05-Jul-2018	15-Jul-2018	✔	05-Jul-2018	15-Jul-2018	✔
Pulp Bag (ED042T) FRC160-2, FRC159-8	FRC160-4,	19-Jun-2018	05-Jul-2018	17-Jul-2018	✔	05-Jul-2018	17-Jul-2018	✔
Pulp Bag (ED042T) FRC159-4, FRC160-73	FRC160-91,	20-Jun-2018	05-Jul-2018	18-Jul-2018	✔	05-Jul-2018	18-Jul-2018	✔



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Electrical Conductivity (1:2)	EA010-1	2	13	15.38	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Electrical Conductivity (1:5)	EA010	2	13	15.38	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Exchange Acidity by 1M Potassium Chloride	ED005	1	4	25.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations	ED007	2	7	28.57	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations on Alkaline Soils	ED006	1	8	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:2)	EA002-1	2	13	15.38	10.00	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:5)	EA002	2	13	15.38	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfur - Total as S (LECO)	ED042T	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Electrical Conductivity (1:2)	EA010-1	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Electrical Conductivity (1:5)	EA010	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations	ED007	2	7	28.57	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations on Alkaline Soils	ED006	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:2)	EA002-1	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:5)	EA002	2	13	15.38	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfur - Total as S (LECO)	ED042T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Electrical Conductivity (1:2)	EA010-1	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Electrical Conductivity (1:5)	EA010	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Exchange Acidity by 1M Potassium Chloride	ED005	1	4	25.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations	ED007	2	7	28.57	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations on Alkaline Soils	ED006	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfur - Total as S (LECO)	ED042T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH (1:5)	EA002	SOIL	In house: Referenced to Rayment and Lyons 4A1 and APHA 4500H+. pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM (2013) Schedule B(3)
pH (1:2)	EA002-1	SOIL	In house: Referenced to APHA 4500H+. pH is determined on soil samples after a 1:2 soil/water leach.
Electrical Conductivity (1:5)	EA010	SOIL	In house: Referenced to Rayment and Lyons 3A1 and APHA 2510. Conductivity is determined on soil samples using a 1:5 soil/water leach. This method is compliant with NEPM (2013) Schedule B(3)
Electrical Conductivity (1:2)	EA010-1	SOIL	In house: Referenced to APHA 2510. Conductivity is determined on soil samples using a 1:2 soil/water leach.
Emerson Aggregate Test	EA058	SOIL	In house: Referenced to AS1289.3.8.1. Testing is performed only on soils with suitable aggregates; sands and gravels are usually unsuitable for this test. The test classifies the behaviour of soil aggregates, when immersed, on their coherence in water.
Exchange Acidity by 1M Potassium Chloride	ED005	SOIL	In house: referenced to Rayment and Lyons, (2011), method 15G1. This method is unsuitable for near neutral and alkaline soils. NATA accreditation does not cover performance of this service.
Exchangeable Cations on Alkaline Soils	ED006	SOIL	In house: Referenced to Soil Survey Test Method C5. Soluble salts are removed from the sample prior to analysis. Cations are exchanged from the sample by contact with alcoholic ammonium chloride at pH 8.5. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil.
Exchangeable Cations	ED007	SOIL	In house: Referenced to Rayment & Lyons (2011) Method 15A1. Cations are exchanged from the sample by contact with Ammonium Chloride. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil. This method is compliant with NEPM (2013) Schedule B(3) (Method 301)
Exchangeable Cations with pre-treatment	ED008	SOIL	In house: Referenced to Rayment & Higginson (2011) Method 15A2. Soluble salts are removed from the sample prior to analysis. Cations are exchanged from the sample by contact with Ammonium Chloride. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil. This method is compliant with NEPM (2013) Schedule B(3) (Method 301)
Sulfur - Total as S (LECO)	ED042T	SOIL	In house: Dried and pulverised sample is combusted in a high temperature furnace in the presence of strong oxidants / catalysts. The evolved S (as SO ₂) is measured by infra-red detector
Preparation Methods	Method	Matrix	Method Descriptions
Exchangeable Cations Preparation Method (Alkaline Soils)	ED006PR	SOIL	In house: Referenced to Rayment and Lyons 2011 method 15C1.
Exchangeable Cations Preparation Method	ED007PR	SOIL	In house: Referenced to Rayment & Higginson (1992) method 15A1. A 1M NH ₄ Cl extraction by end over end tumbling at a ratio of 1:20. There is no pretreatment for soluble salts. Extracts can be run by ICP for cations.
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of reagent grade water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.
1:2 solid / water leach for soluble analytes	EN40	SOIL	25 g of soil is mixed with 50 mL of distilled water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.
Dry and Pulverise (up to 100g)	GEO30	SOIL	#

sub-soils.



CHAIN OF CUSTODY

ALS Laboratory:
please tick →

On-Site Analysis Service: Soil, Water, Sediment, Air, Noise
Ph: 07 3243 7222 or email: info@ecoz.com.au

CLIENT: EcOz Environmental Services		TURNAROUND REQUIREMENTS: ☐ Standard TAT (List due date):		FOR LABORATORY USE ONLY: (Circle)	
OFFICE: Darwin		(Standard TAT may be longer for some tests e.g., Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):		Custody Seal Intact? Yes No N/A	
PROJECT: EZ18107 - Grants Project - Waste Characterisation		ALS QUOTE NO.: 54/285/18 table 1		Free ice / frozen ice packs present upon receipt? Yes No N/A	
ORDER NUMBER:		COC SEQUENCE NUMBER (Circle)		Random Sample Temperature on Receipt: °C	
PROJECT MANAGER: Aiden Campbell CONTACT PH: 08 8981 1100		COC: 1 2 3 4 5 6 7		Other comment:	
SAMPLER: SAMPLER MOBILE:		RELINQUISHED BY: [Signature]		RECEIVED BY: JB Otim	
COC emailed to ALS? (YES / NO) EDD FORMAT (or default):		DATE/TIME: 28/6/18		DATE/TIME: 29/6 9:30	
Email Reports to: aiden.campbell@ecoz.com.au		RECEIVED BY: lana ALS			
Email Invoice to: aiden.campbell@ecoz.com.au		DATE/TIME: 28-06-18 1500			

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB: Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).										Additional Information	
	MATRIX: SOLID (S) WATER (W)																
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	Total S	pH (1:2)	EC (1:2)	Emmerson Aggregate	CEC	ANC	NAPP	NAG	EN020: Prep from ASS bag	Leachable Metals (As, B, Ba, Be, Cd, Cr, Co, Cu, Mn, Ni, Pb, Se, V, Zn, Hg)	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.	
1	FRC158-10	17/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold		
2	FRC158-80	17/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold		
3	FRC158-21	17/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold		
4	FRC158-1	17/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold		
5	FRC159-1	17/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold		
6	FRC159-136	17/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold		
7	FRC159-30	17/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold		
8	FRC160-2	19/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold		
9	FRC160-4	19/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold		
10	FRC159-8	19/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold		
11	FRC159-4	20/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold		
12	FRC160-91	20/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold		
13	FRC160-73	20/06/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold		
TOTAL																	

LAB OF ORIGIN:
DARWIN

Environmental Division
Brisbane
Work Order Reference
EB1815858



Telephone: + 61-7-3243 7222

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

CERTIFICATE OF ANALYSIS

Work Order : **EB1816614**
Client : **ECOZ ENVIRONMENTAL SERVICES**
Contact : AIDEN CAMPBELL
Address : PO BOX 381
 DARWIN NT, AUSTRALIA 0801
Telephone : ----
Project : EZ18107 - Grants Project - Waste Characterisation
Order number :
C-O-C number : ----
Sampler : AIDEN CAMPBELL
Site : ----
Quote number : SY/285/18
No. of samples received : 38
No. of samples analysed : 38

Page : 1 of 10
Laboratory : Environmental Division Brisbane
Contact : Customer Services EB
Address : 2 Byth Street Stafford QLD Australia 4053
Telephone : +61-7-3243 7222
Date Samples Received : 10-Jul-2018 09:00
Date Analysis Commenced : 12-Jul-2018
Issue Date : 18-Jul-2018 08:43



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. 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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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.

- ALS is not NATA accredited for the analysis of Exchangeable Aluminium and Exchange Acidity in soils when performed under ALS Method ED005.
- ALS is not NATA accredited for the analysis of Exchangeable Cations on Alkaline Soils when performed under ALS Method ED006.
- ED006 (Exchangeable Cations on Alkaline Soils): Calcium/Magnesium ratio could not be determined as both the Calcium and Magnesium results were less than reportable limits for some samples.
- ED006 (Exchangeable Cations on Alkaline Soils): Magnesium/Potassium ratio could not be determined as both the Magnesium and Potassium results were less than reportable limits for some samples.
- EA058 Emerson: V. = Very, D. = Dark, L. = Light, VD. = Very Dark
- ED007 and ED008: When Exchangeable Al is reported from these methods, it should be noted that Rayment & Lyons (2011) suggests Exchange Acidity by 1M KCl - Method 15G1 (ED005) is a more suitable method for the determination of exchange acidity (H^+ + Al^{3+}).



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	FRC109-20	FRC110-10	FRC110-120	FRC111-30	FRC111-80
Client sampling date / time					04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00
Compound	CAS Number	LOR	Unit		EB1816614-001	EB1816614-002	EB1816614-003	EB1816614-004	EB1816614-005
					Result	Result	Result	Result	Result
EA002: pH 1:2 (Soils)									
pH Value	----	0.1	pH Unit		6.8	6.1	9.0	7.2	8.1
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		6.7	6.2	9.2	7.3	7.9
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		23	18	118	17	84
Electrical Conductivity @ 25°C	----	1	µS/cm		13	8	79	8	38
EA058: Emerson Aggregate Test									
Color (Munsell)	----	-	-		Yellowish Brown	Olive Brown	Olive Grey	Olive Brown	Very Dark Grey
Texture	----	-	-		Clay Loam	Loam	Sandy Loam	Loam	Clay Loam
Emerson Class Number	EC/TC	-	-		3	3	4	3	4
ED006: Exchangeable Cations on Alkaline Soils									
Exchangeable Calcium	----	0.2	meq/100g		----	----	1.4	----	1.2
Exchangeable Magnesium	----	0.2	meq/100g		----	----	0.5	----	0.8
Exchangeable Potassium	----	0.2	meq/100g		----	----	0.4	----	0.3
Exchangeable Sodium	----	0.2	meq/100g		----	----	<0.2	----	<0.2
Cation Exchange Capacity	----	0.2	meq/100g		----	----	2.3	----	2.4
Exchangeable Sodium Percent	----	0.2	%		----	----	<0.2	----	<0.2
Calcium/Magnesium Ratio	----	0.2	-		----	----	2.7	----	1.5
Magnesium/Potassium Ratio	----	0.2	-		----	----	1.1	----	2.4
ED007: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g		0.2	0.2	----	0.3	----
Exchangeable Magnesium	----	0.1	meq/100g		1.2	2.4	----	2.4	----
Exchangeable Potassium	----	0.1	meq/100g		0.2	0.2	----	0.2	----
Exchangeable Sodium	----	0.1	meq/100g		<0.1	<0.1	----	<0.1	----
Cation Exchange Capacity	----	0.1	meq/100g		1.6	2.8	----	3.0	----
Exchangeable Sodium Percent	----	0.1	%		2.2	2.1	----	1.6	----
Calcium/Magnesium Ratio	----	0.1	-		0.2	<0.1	----	0.1	----
Magnesium/Potassium Ratio	----	0.1	-		6.6	15.3	----	12.9	----
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		0.02	<0.01	0.02	<0.01	0.08



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	FRC112-10	FRC112-30	FRC112-110	FRC113-10	FRC113-50
Client sampling date / time					04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00
Compound	CAS Number	LOR	Unit		EB1816614-006	EB1816614-007	EB1816614-008	EB1816614-009	EB1816614-010
					Result	Result	Result	Result	Result
EA002: pH 1:2 (Soils)									
pH Value	----	0.1	pH Unit		6.3	7.4	9.3	7.0	8.2
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		7.0	7.1	9.4	7.2	8.1
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		10	15	90	14	20
Electrical Conductivity @ 25°C	----	1	µS/cm		6	9	71	7	9
EA058: Emerson Aggregate Test									
Color (Munsell)	----	-	-		Olive Brown	Olive Brown	Very Dark Grey	Olive Brown	Olive Brown
Texture	----	-	-		Loam	Loamy Sand	Loam	Loam	Loam
Emerson Class Number	EC/TC	-	-		3	3	4	3	4
ED006: Exchangeable Cations on Alkaline Soils									
Exchangeable Calcium	----	0.2	meq/100g		----	----	1.7	----	2.6
Exchangeable Magnesium	----	0.2	meq/100g		----	----	0.5	----	2.9
Exchangeable Potassium	----	0.2	meq/100g		----	----	0.5	----	<0.2
Exchangeable Sodium	----	0.2	meq/100g		----	----	<0.2	----	<0.2
Cation Exchange Capacity	----	0.2	meq/100g		----	----	2.7	----	5.5
Exchangeable Sodium Percent	----	0.2	%		----	----	<0.2	----	<0.2
Calcium/Magnesium Ratio	----	0.2	-		----	----	3.1	----	0.9
Magnesium/Potassium Ratio	----	0.2	-		----	----	1.1	----	----
ED007: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g		0.2	1.2	----	0.4	----
Exchangeable Magnesium	----	0.1	meq/100g		2.3	3.7	----	5.1	----
Exchangeable Potassium	----	0.1	meq/100g		0.1	0.2	----	0.2	----
Exchangeable Sodium	----	0.1	meq/100g		<0.1	0.1	----	<0.1	----
Cation Exchange Capacity	----	0.1	meq/100g		2.7	5.2	----	5.8	----
Exchangeable Sodium Percent	----	0.1	%		1.3	2.4	----	1.1	----
Calcium/Magnesium Ratio	----	0.1	-		<0.1	0.3	----	<0.1	----
Magnesium/Potassium Ratio	----	0.1	-		16.2	22.4	----	27.1	----
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		<0.01	<0.01	<0.01	<0.01	<0.01



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	FRC113-80	FRC113-130	FRC114-0	FRC114-30	FRC114-50
Client sampling date / time					04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00
Compound	CAS Number	LOR	Unit		EB1816614-011	EB1816614-012	EB1816614-013	EB1816614-014	EB1816614-015
					Result	Result	Result	Result	Result
EA002: pH 1:2 (Soils)									
pH Value	----	0.1	pH Unit		9.4	9.3	6.5	7.1	6.8
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		9.4	9.5	6.8	7.0	6.8
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		92	120	13	15	18
Electrical Conductivity @ 25°C	----	1	µS/cm		68	84	6	7	9
EA058: Emerson Aggregate Test									
Color (Munsell)	----	-	-		Very Dark Grey	Very Dark Grey	Light Olive Brown	Olive Brown	White
Texture	----	-	-		Gravelly Sand	Gravelly Sand	Loam	Clay Loam	Loamy Sand
Emerson Class Number	EC/TC	-	-		8	8	3	3	3
ED006: Exchangeable Cations on Alkaline Soils									
Exchangeable Calcium	----	0.2	meq/100g		2.1	1.5	----	----	----
Exchangeable Magnesium	----	0.2	meq/100g		1.0	<0.2	----	----	----
Exchangeable Potassium	----	0.2	meq/100g		0.5	0.4	----	----	----
Exchangeable Sodium	----	0.2	meq/100g		<0.2	<0.2	----	----	----
Cation Exchange Capacity	----	0.2	meq/100g		3.7	1.9	----	----	----
Exchangeable Sodium Percent	----	0.2	%		<0.2	<0.2	----	----	----
Calcium/Magnesium Ratio	----	0.2	-		2.0	----	----	----	----
Magnesium/Potassium Ratio	----	0.2	-		2.0	<0.2	----	----	----
ED007: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g		----	----	<0.1	1.2	1.4
Exchangeable Magnesium	----	0.1	meq/100g		----	----	2.6	4.2	3.4
Exchangeable Potassium	----	0.1	meq/100g		----	----	0.2	0.3	0.2
Exchangeable Sodium	----	0.1	meq/100g		----	----	<0.1	<0.1	0.2
Cation Exchange Capacity	----	0.1	meq/100g		----	----	2.8	5.7	5.2
Exchangeable Sodium Percent	----	0.1	%		----	----	1.5	1.0	2.9
Calcium/Magnesium Ratio	----	0.1	-		----	----	<0.1	0.3	0.4
Magnesium/Potassium Ratio	----	0.1	-		----	----	14.3	15.4	14.4
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		0.02	<0.01	<0.01	<0.01	<0.01



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	FRC115-10	FRC115-110	FRC117-10	FRC120-10	FRC120-30
Client sampling date / time					04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00
Compound	CAS Number	LOR	Unit		EB1816614-016	EB1816614-017	EB1816614-018	EB1816614-019	EB1816614-020
					Result	Result	Result	Result	Result
EA002: pH 1:2 (Soils)									
pH Value	----	0.1	pH Unit		6.9	8.9	5.9	6.8	7.8
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		6.9	9.2	6.0	6.6	7.6
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		16	160	6	15	21
Electrical Conductivity @ 25°C	----	1	µS/cm		8	87	4	7	9
EA058: Emerson Aggregate Test									
Color (Munsell)	----	-	-		Olive Brown	Very Dark Grey	Grey	Olive Brown	Dark Yellowish Brown
Texture	----	-	-		Loam	Gravelly Sand	Sandy Loam	Loam	Loam
Emerson Class Number	EC/TC	-	-		3	8	4	3	3
ED005: Exchange Acidity									
Exchange Acidity	----	0.1	meq/100g		----	----	0.3	----	----
Exchangeable Aluminium	----	0.1	meq/100g		----	----	0.2	----	----
ED006: Exchangeable Cations on Alkaline Soils									
Exchangeable Calcium	----	0.2	meq/100g		----	1.6	----	----	1.1
Exchangeable Magnesium	----	0.2	meq/100g		----	<0.2	----	----	3.6
Exchangeable Potassium	----	0.2	meq/100g		----	0.4	----	----	<0.2
Exchangeable Sodium	----	0.2	meq/100g		----	<0.2	----	----	<0.2
Cation Exchange Capacity	----	0.2	meq/100g		----	2.0	----	----	4.7
Exchangeable Sodium Percent	----	0.2	%		----	<0.2	----	----	<0.2
Calcium/Magnesium Ratio	----	0.2	-		----	----	----	----	0.3
Magnesium/Potassium Ratio	----	0.2	-		----	<0.2	----	----	----
ED007: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g		0.4	----	<0.1	0.2	----
Exchangeable Magnesium	----	0.1	meq/100g		4.0	----	0.3	2.9	----
Exchangeable Potassium	----	0.1	meq/100g		0.2	----	0.1	0.2	----
Exchangeable Sodium	----	0.1	meq/100g		<0.1	----	<0.1	<0.1	----
Cation Exchange Capacity	----	0.1	meq/100g		4.7	----	0.7	3.4	----
Exchangeable Sodium Percent	----	0.1	%		2.0	----	3.4	1.2	----
Calcium/Magnesium Ratio	----	0.1	-		0.1	----	<0.1	<0.1	----
Magnesium/Potassium Ratio	----	0.1	-		19.9	----	2.9	16.4	----
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		<0.01	0.06	<0.01	<0.01	<0.01



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	FRC120-60	FRC120-70	FRC120-130	FRC121-20	FRC121-90
Client sampling date / time					04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00
Compound	CAS Number	LOR	Unit		EB1816614-021	EB1816614-022	EB1816614-023	EB1816614-024	EB1816614-025
					Result	Result	Result	Result	Result
EA002: pH 1:2 (Soils)									
pH Value	----	0.1	pH Unit		7.3	8.1	9.2	7.6	8.9
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		6.9	7.7	9.3	7.3	9.2
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		39	26	92	18	280
Electrical Conductivity @ 25°C	----	1	µS/cm		19	15	67	11	159
EA058: Emerson Aggregate Test									
Color (Munsell)	----	-	-		Olive Brown	Dark Greyish Brown	Very Dark Grey	Olive Brown	Dark Grey
Texture	----	-	-		Loam	Loam	Gravelly Sand	Loam	Sandy Clay Loam
Emerson Class Number	EC/TC	-	-		3	3	8	3	4
ED006: Exchangeable Cations on Alkaline Soils									
Exchangeable Calcium	----	0.2	meq/100g		----	0.4	2.7	----	1.6
Exchangeable Magnesium	----	0.2	meq/100g		----	1.3	1.2	----	0.5
Exchangeable Potassium	----	0.2	meq/100g		----	0.2	0.2	----	0.5
Exchangeable Sodium	----	0.2	meq/100g		----	<0.2	<0.2	----	0.2
Cation Exchange Capacity	----	0.2	meq/100g		----	1.9	4.1	----	2.9
Exchangeable Sodium Percent	----	0.2	%		----	<0.2	<0.2	----	7.6
Calcium/Magnesium Ratio	----	0.2	-		----	0.4	2.3	----	3.1
Magnesium/Potassium Ratio	----	0.2	-		----	6.3	5.2	----	1.1
ED007: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g		0.9	----	----	0.6	----
Exchangeable Magnesium	----	0.1	meq/100g		3.0	----	----	2.8	----
Exchangeable Potassium	----	0.1	meq/100g		0.2	----	----	0.2	----
Exchangeable Sodium	----	0.1	meq/100g		0.1	----	----	<0.1	----
Cation Exchange Capacity	----	0.1	meq/100g		4.2	----	----	3.6	----
Exchangeable Sodium Percent	----	0.1	%		2.4	----	----	1.8	----
Calcium/Magnesium Ratio	----	0.1	-		0.3	----	----	0.2	----
Magnesium/Potassium Ratio	----	0.1	-		14.0	----	----	18.2	----
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		0.02	<0.01	0.02	<0.01	0.03



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	FRC121-160	FRC122-0	FRC122-40	FRC122-70	FRC122-130
Client sampling date / time					04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00
Compound	CAS Number	LOR	Unit		EB1816614-026	EB1816614-027	EB1816614-028	EB1816614-029	EB1816614-030
				Result	Result	Result	Result	Result	Result
EA002: pH 1:2 (Soils)									
pH Value	----	0.1	pH Unit		8.8	7.0	8.3	8.5	9.4
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		9.1	7.2	8.1	8.5	9.4
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		251	20	45	152	116
Electrical Conductivity @ 25°C	----	1	µS/cm		154	9	22	65	84
EA058: Emerson Aggregate Test									
Color (Munsell)	----	-	-		Grey	Olive Brown	Dark Greyish Brown	Very Dark Grey	Dark Grey
Texture	----	-	-		Sandy Clay Loam	Loam	Sandy Loam	Gravelly Sand	Gravelly Sand
Emerson Class Number	EC/TC	-	-		4	3	3	8	8
ED006: Exchangeable Cations on Alkaline Soils									
Exchangeable Calcium	----	0.2	meq/100g		2.2	----	1.2	1.6	1.0
Exchangeable Magnesium	----	0.2	meq/100g		0.7	----	2.1	0.8	<0.2
Exchangeable Potassium	----	0.2	meq/100g		0.7	----	<0.2	0.4	0.6
Exchangeable Sodium	----	0.2	meq/100g		<0.2	----	<0.2	<0.2	<0.2
Cation Exchange Capacity	----	0.2	meq/100g		3.6	----	3.5	2.8	1.7
Exchangeable Sodium Percent	----	0.2	%		<0.2	----	<0.2	<0.2	<0.2
Calcium/Magnesium Ratio	----	0.2	-		3.0	----	0.6	1.8	----
Magnesium/Potassium Ratio	----	0.2	-		1.1	----	----	2.1	<0.2
ED007: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g		----	0.2	----	----	----
Exchangeable Magnesium	----	0.1	meq/100g		----	3.2	----	----	----
Exchangeable Potassium	----	0.1	meq/100g		----	0.2	----	----	----
Exchangeable Sodium	----	0.1	meq/100g		----	<0.1	----	----	----
Cation Exchange Capacity	----	0.1	meq/100g		----	3.6	----	----	----
Exchangeable Sodium Percent	----	0.1	%		----	1.5	----	----	----
Calcium/Magnesium Ratio	----	0.1	-		----	<0.1	----	----	----
Magnesium/Potassium Ratio	----	0.1	-		----	16.3	----	----	----
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		0.11	<0.01	0.02	0.08	<0.01



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	FRC123-10	FRC123-20	FRC123-50	FRC124-10	FRC124-30
Client sampling date / time					04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00
Compound	CAS Number	LOR	Unit		EB1816614-031	EB1816614-032	EB1816614-033	EB1816614-034	EB1816614-035
				Result	Result	Result	Result	Result	Result
EA002: pH 1:2 (Soils)									
pH Value	----	0.1	pH Unit		7.1	7.5	7.9	6.7	7.0
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		7.2	7.5	7.6	6.8	6.9
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		18	44	18	14	16
Electrical Conductivity @ 25°C	----	1	µS/cm		8	18	10	7	8
EA058: Emerson Aggregate Test									
Color (Munsell)	----	-	-		Olive Brown	Dark Greyish Brown	Olive Grey	Olive Brown	Olive Brown
Texture	----	-	-		Loam	Clay Loam	Sandy Clay Loam	Loam	Sandy Loam
Emerson Class Number	EC/TC	-	-		3	3	3	3	3
ED006: Exchangeable Cations on Alkaline Soils									
Exchangeable Calcium	----	0.2	meq/100g		----	1.0	1.2	----	----
Exchangeable Magnesium	----	0.2	meq/100g		----	3.1	2.2	----	----
Exchangeable Potassium	----	0.2	meq/100g		----	<0.2	0.2	----	----
Exchangeable Sodium	----	0.2	meq/100g		----	<0.2	<0.2	----	----
Cation Exchange Capacity	----	0.2	meq/100g		----	4.3	3.6	----	----
Exchangeable Sodium Percent	----	0.2	%		----	<0.2	<0.2	----	----
Calcium/Magnesium Ratio	----	0.2	-		----	0.3	0.6	----	----
Magnesium/Potassium Ratio	----	0.2	-		----	----	9.4	----	----
ED007: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g		0.6	----	----	0.3	0.8
Exchangeable Magnesium	----	0.1	meq/100g		4.4	----	----	3.2	4.2
Exchangeable Potassium	----	0.1	meq/100g		0.2	----	----	0.2	0.2
Exchangeable Sodium	----	0.1	meq/100g		0.1	----	----	<0.1	<0.1
Cation Exchange Capacity	----	0.1	meq/100g		5.3	----	----	3.7	5.3
Exchangeable Sodium Percent	----	0.1	%		2.2	----	----	0.9	0.9
Calcium/Magnesium Ratio	----	0.1	-		0.1	----	----	<0.1	0.2
Magnesium/Potassium Ratio	----	0.1	-		19.5	----	----	14.7	19.4
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		<0.01	<0.01	<0.01	<0.01	<0.01



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	FRC124-50	FRC124-80	FRC124-160	----	----
Client sampling date / time					04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00	----	----
Compound	CAS Number	LOR	Unit		EB1816614-036	EB1816614-037	EB1816614-038	-----	-----
					Result	Result	Result	----	----
EA002: pH 1:2 (Soils)									
pH Value	----	0.1	pH Unit		7.7	8.8	9.0	----	----
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		7.3	8.7	9.1	----	----
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		108	124	194	----	----
Electrical Conductivity @ 25°C	----	1	µS/cm		57	62	122	----	----
EA058: Emerson Aggregate Test									
Color (Munsell)	----	-	-		Dark Grey	Dark Grey	Very Dark Grey	----	----
Texture	----	-	-		Sandy Loam	Sandy Loam	Sandy Loam	----	----
Emerson Class Number	EC/TC	-	-		4	4	4	----	----
ED006: Exchangeable Cations on Alkaline Soils									
Exchangeable Calcium	----	0.2	meq/100g		----	2.2	1.1	----	----
Exchangeable Magnesium	----	0.2	meq/100g		----	1.4	<0.2	----	----
Exchangeable Potassium	----	0.2	meq/100g		----	0.4	0.8	----	----
Exchangeable Sodium	----	0.2	meq/100g		----	<0.2	<0.2	----	----
Cation Exchange Capacity	----	0.2	meq/100g		----	3.9	1.8	----	----
Exchangeable Sodium Percent	----	0.2	%		----	<0.2	<0.2	----	----
Calcium/Magnesium Ratio	----	0.2	-		----	1.6	----	----	----
Magnesium/Potassium Ratio	----	0.2	-		----	3.5	<0.2	----	----
ED007: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g		1.1	----	----	----	----
Exchangeable Magnesium	----	0.1	meq/100g		3.0	----	----	----	----
Exchangeable Potassium	----	0.1	meq/100g		0.4	----	----	----	----
Exchangeable Sodium	----	0.1	meq/100g		0.1	----	----	----	----
Cation Exchange Capacity	----	0.1	meq/100g		4.6	----	----	----	----
Exchangeable Sodium Percent	----	0.1	%		2.3	----	----	----	----
Calcium/Magnesium Ratio	----	0.1	-		0.4	----	----	----	----
Magnesium/Potassium Ratio	----	0.1	-		7.8	----	----	----	----
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		0.07	0.04	0.10	----	----

QUALITY CONTROL REPORT

Work Order	: EB1816614	Page	: 1 of 5
Client	: ECOZ ENVIRONMENTAL SERVICES	Laboratory	: Environmental Division Brisbane
Contact	: AIDEN CAMPBELL	Contact	: Customer Services EB
Address	: PO BOX 381 DARWIN NT, AUSTRALIA 0801	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: ----	Telephone	: +61-7-3243 7222
Project	: EZ18107 - Grants Project - Waste Characterisation	Date Samples Received	: 10-Jul-2018
Order number	: ----	Date Analysis Commenced	: 12-Jul-2018
C-O-C number	: ----	Issue Date	: 18-Jul-2018
Sampler	: AIDEN CAMPBELL		
Site	: ----		
Quote number	: SY/285/18		
No. of samples received	: 38		
No. of samples analysed	: 38		



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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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

Key :
 Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA002: pH 1:2 (Soils) (QC Lot: 1791023)									
EB1816614-001	FRC109-20	EA002-1: pH Value	----	0.1	pH Unit	6.8	6.9	0.00	0% - 20%
EB1816614-011	FRC113-80	EA002-1: pH Value	----	0.1	pH Unit	9.4	9.4	0.00	0% - 20%
EA002: pH 1:2 (Soils) (QC Lot: 1791026)									
EB1816614-021	FRC120-60	EA002-1: pH Value	----	0.1	pH Unit	7.3	7.3	0.00	0% - 20%
EB1816614-031	FRC123-10	EA002-1: pH Value	----	0.1	pH Unit	7.1	7.0	1.56	0% - 20%
EA002: pH 1:5 (Soils) (QC Lot: 1791020)									
EB1816614-001	FRC109-20	EA002: pH Value	----	0.1	pH Unit	6.7	6.8	0.00	0% - 20%
EB1816614-011	FRC113-80	EA002: pH Value	----	0.1	pH Unit	9.4	9.5	0.00	0% - 20%
EA002: pH 1:5 (Soils) (QC Lot: 1791021)									
EB1816614-021	FRC120-60	EA002: pH Value	----	0.1	pH Unit	6.9	7.1	2.72	0% - 20%
EB1816614-031	FRC123-10	EA002: pH Value	----	0.1	pH Unit	7.2	7.1	1.54	0% - 20%
EA010: Conductivity (1:2) (QC Lot: 1791024)									
EB1816614-001	FRC109-20	EA010-1: Electrical Conductivity @ 25°C	----	1	µS/cm	23	24	5.74	0% - 20%
EB1816614-011	FRC113-80	EA010-1: Electrical Conductivity @ 25°C	----	1	µS/cm	92	92	0.00	0% - 20%
EA010: Conductivity (1:2) (QC Lot: 1791025)									
EB1816614-021	FRC120-60	EA010-1: Electrical Conductivity @ 25°C	----	1	µS/cm	39	39	0.00	0% - 20%
EB1816614-031	FRC123-10	EA010-1: Electrical Conductivity @ 25°C	----	1	µS/cm	18	18	0.00	0% - 50%
EA010: Conductivity (1:5) (QC Lot: 1791019)									
EB1816614-001	FRC109-20	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	13	13	0.00	0% - 50%
EB1816614-011	FRC113-80	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	68	71	4.18	0% - 20%
EA010: Conductivity (1:5) (QC Lot: 1791022)									
EB1816614-021	FRC120-60	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	19	20	0.00	0% - 50%
EB1816614-031	FRC123-10	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	8	8	0.00	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
ED005: Exchange Acidity (QC Lot: 1798295)									
EB1816614-018	FRC117-10	ED005: Exchange Acidity	----	0.1	meq/100g	0.3	0.3	0.00	No Limit
		ED005: Exchangeable Aluminium	----	0.1	meq/100g	0.2	0.2	0.00	No Limit
ED006: Exchangeable Cations on Alkaline Soils (QC Lot: 1798282)									
EB1816614-003	FRC110-120	ED006: Exchangeable Calcium	----	0.2	meq/100g	1.4	1.3	0.00	No Limit
		ED006: Exchangeable Magnesium	----	0.2	meq/100g	0.5	0.5	0.00	No Limit
		ED006: Exchangeable Potassium	----	0.2	meq/100g	0.4	0.4	0.00	No Limit
		ED006: Exchangeable Sodium	----	0.2	meq/100g	<0.2	<0.2	0.00	No Limit
		ED006: Cation Exchange Capacity	----	0.2	meq/100g	2.3	2.2	6.61	0% - 50%
EB1816614-025	FRC121-90	ED006: Exchangeable Calcium	----	0.2	meq/100g	1.6	1.5	6.82	No Limit
		ED006: Exchangeable Magnesium	----	0.2	meq/100g	0.5	0.5	0.00	No Limit
		ED006: Exchangeable Potassium	----	0.2	meq/100g	0.5	0.6	23.4	No Limit
		ED006: Exchangeable Sodium	----	0.2	meq/100g	0.2	<0.2	0.00	No Limit
		ED006: Cation Exchange Capacity	----	0.2	meq/100g	2.9	2.6	9.25	0% - 50%
ED007: Exchangeable Cations (QC Lot: 1798290)									
EB1816614-001	FRC109-20	ED007: Exchangeable Calcium	----	0.1	meq/100g	0.2	0.2	0.00	No Limit
		ED007: Exchangeable Magnesium	----	0.1	meq/100g	1.2	1.2	0.00	0% - 50%
		ED007: Exchangeable Potassium	----	0.1	meq/100g	0.2	0.2	0.00	No Limit
		ED007: Exchangeable Sodium	----	0.1	meq/100g	<0.1	<0.1	0.00	No Limit
EB1816614-015	FRC114-50	ED007: Exchangeable Calcium	----	0.1	meq/100g	1.4	1.4	0.00	0% - 50%
		ED007: Exchangeable Magnesium	----	0.1	meq/100g	3.4	3.4	0.00	0% - 20%
		ED007: Exchangeable Potassium	----	0.1	meq/100g	0.2	0.2	0.00	No Limit
		ED007: Exchangeable Sodium	----	0.1	meq/100g	0.2	0.1	0.00	No Limit
ED007: Exchangeable Cations (QC Lot: 1798294)									
EB1816614-018	FRC117-10	ED007: Exchangeable Calcium	----	0.1	meq/100g	<0.1	<0.1	0.00	No Limit
		ED007: Exchangeable Magnesium	----	0.1	meq/100g	0.3	0.3	0.00	No Limit
		ED007: Exchangeable Potassium	----	0.1	meq/100g	0.1	0.1	0.00	No Limit
		ED007: Exchangeable Sodium	----	0.1	meq/100g	<0.1	<0.1	0.00	No Limit
ED042T: Total Sulfur by LECO (QC Lot: 1795387)									
EB1816614-001	FRC109-20	ED042T: Sulfur - Total as S (LECO)	----	0.01	%	0.02	<0.01	0.00	No Limit
EB1816614-010	FRC113-50	ED042T: Sulfur - Total as S (LECO)	----	0.01	%	<0.01	<0.01	0.00	No Limit
ED042T: Total Sulfur by LECO (QC Lot: 1795388)									
EB1816614-021	FRC120-60	ED042T: Sulfur - Total as S (LECO)	----	0.01	%	0.02	0.02	0.00	No Limit
EB1816614-030	FRC122-130	ED042T: Sulfur - Total as S (LECO)	----	0.01	%	<0.01	<0.01	0.00	No Limit

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
	Spike	Spike Recovery (%)	Recovery Limits (%)	
Result	Concentration	LCS	Low	High
----	4.01 pH Unit	101	98	102
----	4.01 pH Unit	100	98	102
----	4 pH Unit	101	98	102
----	7 pH Unit	100	98	102
----	4 pH Unit	100	98	102
----	7 pH Unit	100	98	102
<1	1412 µS/cm	99.9	97	103
<1	1412 µS/cm	100	97	103
<1	1412 µS/cm	101	97	103
<1	1412 µS/cm	101	97	103
<0.1	----	----	----	----
<0.1	----	----	----	----
<0.2	9.57 meq/100g	114	70	130
<0.2	6.32 meq/100g	101	70	130
<0.2	0.65 meq/100g	104	70	130
<0.2	2.86 meq/100g	105	70	130
<0.2	19.4 meq/100g	108	70	130
<0.1	3.54 meq/100g	103	79	113
<0.1	1.15 meq/100g	99.1	85	115
<0.1	0.635 meq/100g	105	70	122
<0.1	0.382 meq/100g	97.8	76	112
0	5.707 meq/100g		82	112



Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
Method: Compound	CAS Number	LOR	Unit		Spike	Spike Recovery (%)	Recovery Limits (%)	
					Concentration	LCS	Low	High
ED007: Exchangeable Cations (QCLot: 1798294) - continued								
ED007: Exchangeable Calcium	----	0.1	meq/100g	<0.1	3.54 meq/100g	101	79	113
ED007: Exchangeable Magnesium	----	0.1	meq/100g	<0.1	1.15 meq/100g	97.7	85	115
ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	0.635 meq/100g	102	70	122
ED007: Exchangeable Sodium	----	0.1	meq/100g	<0.1	0.382 meq/100g	95.7	76	112
ED007: Cation Exchange Capacity	----	0.1	meq/100g	0	5.707 meq/100g		82	112
ED042T: Total Sulfur by LECO (QCLot: 1795387)								
ED042T: Sulfur - Total as S (LECO)	----	0.01	%	<0.01	0.16 %	99.7	70	130
ED042T: Total Sulfur by LECO (QCLot: 1795388)								
ED042T: Sulfur - Total as S (LECO)	----	0.01	%	<0.01	0.16 %	102	70	130

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.**

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EB1816614	Page	: 1 of 13
Client	: ECOZ ENVIRONMENTAL SERVICES	Laboratory	: Environmental Division Brisbane
Contact	: AIDEN CAMPBELL	Telephone	: +61-7-3243 7222
Project	: EZ18107 - Grants Project - Waste Characterisation	Date Samples Received	: 10-Jul-2018
Site	: ----	Issue Date	: 18-Jul-2018
Sampler	: AIDEN CAMPBELL	No. of samples received	: 38
Order number	:	No. of samples analysed	: 38

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- **NO** Matrix Spike outliers occur.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- **NO** Quality Control Sample Frequency Outliers exist.

Matrix: SOIL

Method		Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA002: pH 1:2 (Soils)							
Soil Glass Jar - Unpreserved		12-Jul-2018	11-Jul-2018	1	----	----	----
FRC109-20,	FRC110-10,						
FRC110-120,	FRC111-30,						
FRC111-80,	FRC112-10,						
FRC112-30,	FRC112-110,						
FRC113-10,	FRC113-50,						
FRC113-80,	FRC113-130,						
FRC114-0,	FRC114-30,						
FRC114-50,	FRC115-10,						
FRC115-110,	FRC117-10,						
FRC120-10,	FRC120-30,						
FRC120-60,	FRC120-70,						
FRC120-130,	FRC121-20,						
FRC121-90,	FRC121-160,						
FRC122-0,	FRC122-40,						
FRC122-70,	FRC122-130,						
FRC123-10,	FRC123-20,						
FRC123-50,	FRC124-10,						
FRC124-30,	FRC124-50,						
FRC124-80,	FRC124-160						
EA002: pH 1:5 (Soils)							

Method	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA002: pH 1:5 (Soils) - Analysis Holding Time Compliance						
Soil Glass Jar - Unpreserved						
FRC109-20, FRC110-120, FRC111-80, FRC112-30, FRC113-10, FRC113-80, FRC114-0, FRC114-50, FRC115-110, FRC120-10, FRC120-60, FRC120-130, FRC121-90, FRC122-0, FRC122-70, FRC123-10, FRC123-50, FRC124-30, FRC124-80,	FRC110-10, FRC111-30, FRC112-10, FRC112-110, FRC113-50, FRC113-130, FRC114-30, FRC115-10, FRC117-10, FRC120-30, FRC120-70, FRC121-20, FRC121-160, FRC122-40, FRC122-130, FRC123-20, FRC124-10, FRC124-50, FRC124-160	12-Jul-2018	11-Jul-2018	1	----	----
EA010: Conductivity						
Soil Glass Jar - Unpreserved						
FRC109-20, FRC110-120, FRC111-80, FRC112-30, FRC113-10, FRC113-80, FRC114-0, FRC114-50, FRC115-110, FRC120-10, FRC120-60, FRC120-130, FRC121-90, FRC122-0, FRC122-70, FRC123-10, FRC123-50, FRC124-30, FRC124-80,	FRC110-10, FRC111-30, FRC112-10, FRC112-110, FRC113-50, FRC113-130, FRC114-30, FRC115-10, FRC117-10, FRC120-30, FRC120-70, FRC121-20, FRC121-160, FRC122-40, FRC122-130, FRC123-20, FRC124-10, FRC124-50, FRC124-160	12-Jul-2018	11-Jul-2018	1	----	----

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL** Evaluation: **x** = Holding time breach : **✓** = Within holding time.

Method		Sample Date	Extraction / Preparation			Evaluation	Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation		Date analysed	Due for analysis	Evaluation
EA002: pH 1:2 (Soils)									
Soil Glass Jar - Unpreserved (EA002-1)		04-Jul-2018	12-Jul-2018	11-Jul-2018	✖	12-Jul-2018	12-Jul-2018	✔	
FRC109-20,	FRC110-10,								
FRC110-120,	FRC111-30,								
FRC111-80,	FRC112-10,								
FRC112-30,	FRC112-110,								
FRC113-10,	FRC113-50,								
FRC113-80,	FRC113-130,								
FRC114-0,	FRC114-30,								
FRC114-50,	FRC115-10,								
FRC115-110,	FRC117-10,								
FRC120-10,	FRC120-30,								
FRC120-60,	FRC120-70,								
FRC120-130,	FRC121-20,								
FRC121-90,	FRC121-160,								
FRC122-0,	FRC122-40,								
FRC122-70,	FRC122-130,								
FRC123-10,	FRC123-20,								
FRC123-50,	FRC124-10,								
FRC124-30,	FRC124-50,								
FRC124-80,	FRC124-160								

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA002: pH 1:5 (Soils)								
Soil Glass Jar - Unpreserved (EA002)		04-Jul-2018	12-Jul-2018	11-Jul-2018	✖	12-Jul-2018	12-Jul-2018	✔
FRC109-20,	FRC110-10,							
FRC110-120,	FRC111-30,							
FRC111-80,	FRC112-10,							
FRC112-30,	FRC112-110,							
FRC113-10,	FRC113-50,							
FRC113-80,	FRC113-130,							
FRC114-0,	FRC114-30,							
FRC114-50,	FRC115-10,							
FRC115-110,	FRC117-10,							
FRC120-10,	FRC120-30,							
FRC120-60,	FRC120-70,							
FRC120-130,	FRC121-20,							
FRC121-90,	FRC121-160,							
FRC122-0,	FRC122-40,							
FRC122-70,	FRC122-130,							
FRC123-10,	FRC123-20,							
FRC123-50,	FRC124-10,							
FRC124-30,	FRC124-50,							
FRC124-80,	FRC124-160							
EA010: Conductivity								
Soil Glass Jar - Unpreserved (EA010-1)		04-Jul-2018	12-Jul-2018	11-Jul-2018	✖	12-Jul-2018	09-Aug-2018	✔
FRC109-20,	FRC110-10,							
FRC110-120,	FRC111-30,							
FRC111-80,	FRC112-10,							
FRC112-30,	FRC112-110,							
FRC113-10,	FRC113-50,							
FRC113-80,	FRC113-130,							
FRC114-0,	FRC114-30,							
FRC114-50,	FRC115-10,							
FRC115-110,	FRC117-10,							
FRC120-10,	FRC120-30,							
FRC120-60,	FRC120-70,							
FRC120-130,	FRC121-20,							
FRC121-90,	FRC121-160,							
FRC122-0,	FRC122-40,							
FRC122-70,	FRC122-130,							
FRC123-10,	FRC123-20,							
FRC123-50,	FRC124-10,							
FRC124-30,	FRC124-50,							
FRC124-80,	FRC124-160							

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA058: Emerson Aggregate Test								
Snap Lock Bag (EA058)		04-Jul-2018	----	----	----	13-Jul-2018	31-Dec-2018	✓
FRC109-20,	FRC110-10,							
FRC110-120,	FRC111-30,							
FRC111-80,	FRC112-10,							
FRC112-30,	FRC112-110,							
FRC113-10,	FRC113-50,							
FRC113-80,	FRC113-130,							
FRC114-0,	FRC114-30,							
FRC114-50,	FRC115-10,							
FRC115-110,	FRC117-10,							
FRC120-10,	FRC120-30,							
FRC120-60,	FRC120-70,							
FRC120-130,	FRC121-20,							
FRC121-90,	FRC121-160,							
FRC122-0,	FRC122-40,							
FRC122-70,	FRC122-130,							
FRC123-10,	FRC123-20,							
FRC123-50,	FRC124-10,							
FRC124-30,	FRC124-50,							
FRC124-80,	FRC124-160							

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED005: Exchange Acidity								
Soil Glass Jar - Unpreserved (ED005)		04-Jul-2018	13-Jul-2018	01-Aug-2018	✓	16-Jul-2018	01-Aug-2018	✓
FRC109-20,	FRC110-10,							
FRC111-30,	FRC112-10,							
FRC112-30,	FRC113-10,							
FRC114-0,	FRC114-30,							
FRC114-50,	FRC115-10,							
FRC117-10,	FRC120-10,							
FRC120-60,	FRC121-20,							
FRC122-0,	FRC123-10,							
FRC124-10,	FRC124-30,							
FRC124-50								
Soil Glass Jar - Unpreserved (ED005)		04-Jul-2018	17-Jul-2018	01-Aug-2018	✓	17-Jul-2018	01-Aug-2018	✓
FRC110-120,	FRC111-80,							
FRC112-110,	FRC113-50,							
FRC113-80,	FRC113-130,							
FRC115-110,	FRC120-30,							
FRC120-70,	FRC120-130,							
FRC121-90,	FRC121-160,							
FRC122-40,	FRC122-70,							
FRC122-130,	FRC123-20,							
FRC123-50,	FRC124-80,							
FRC124-160								

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED006: Exchangeable Cations on Alkaline Soils								
Soil Glass Jar - Unpreserved (ED006)		04-Jul-2018	13-Jul-2018	01-Aug-2018	✓	16-Jul-2018	01-Aug-2018	✓
FRC110-120,	FRC111-80,							
FRC112-110,	FRC113-50,							
FRC113-80,	FRC113-130,							
FRC115-110,	FRC120-30,							
FRC120-70,	FRC120-130,							
FRC121-90,	FRC121-160,							
FRC122-40,	FRC122-70,							
FRC122-130,	FRC123-20,							
FRC123-50,	FRC124-80,							
FRC124-160								
Soil Glass Jar - Unpreserved (ED006)		04-Jul-2018	17-Jul-2018	01-Aug-2018	✓	17-Jul-2018	01-Aug-2018	✓
FRC109-20,	FRC110-10,							
FRC111-30,	FRC112-10,							
FRC112-30,	FRC113-10,							
FRC114-0,	FRC114-30,							
FRC114-50,	FRC115-10,							
FRC117-10,	FRC120-10,							
FRC120-60,	FRC121-20,							
FRC122-0,	FRC123-10,							
FRC124-10,	FRC124-30,							
FRC124-50								

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED007: Exchangeable Cations								
Soil Glass Jar - Unpreserved (ED007)		04-Jul-2018	13-Jul-2018	01-Aug-2018	✓	16-Jul-2018	01-Aug-2018	✓
FRC109-20,	FRC110-10,							
FRC111-30,	FRC112-10,							
FRC112-30,	FRC113-10,							
FRC114-0,	FRC114-30,							
FRC114-50,	FRC115-10,							
FRC117-10,	FRC120-10,							
FRC120-60,	FRC121-20,							
FRC122-0,	FRC123-10,							
FRC124-10,	FRC124-30,							
FRC124-50								
Soil Glass Jar - Unpreserved (ED007)		04-Jul-2018	17-Jul-2018	01-Aug-2018	✓	17-Jul-2018	01-Aug-2018	✓
FRC110-120,	FRC111-80,							
FRC112-110,	FRC113-50,							
FRC113-80,	FRC113-130,							
FRC115-110,	FRC120-30,							
FRC120-70,	FRC120-130,							
FRC121-90,	FRC121-160,							
FRC122-40,	FRC122-70,							
FRC122-130,	FRC123-20,							
FRC123-50,	FRC124-80,							
FRC124-160								

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED008: Exchangeable Cations								
Soil Glass Jar - Unpreserved (ED008)		04-Jul-2018	13-Jul-2018	01-Aug-2018	✓	16-Jul-2018	01-Aug-2018	✓
FRC109-20,	FRC110-10,							
FRC111-30,	FRC112-10,							
FRC112-30,	FRC113-10,							
FRC114-0,	FRC114-30,							
FRC114-50,	FRC115-10,							
FRC117-10,	FRC120-10,							
FRC120-60,	FRC121-20,							
FRC122-0,	FRC123-10,							
FRC124-10,	FRC124-30,							
FRC124-50								
Soil Glass Jar - Unpreserved (ED008)		04-Jul-2018	17-Jul-2018	01-Aug-2018	✓	17-Jul-2018	01-Aug-2018	✓
FRC110-120,	FRC111-80,							
FRC112-110,	FRC113-50,							
FRC113-80,	FRC113-130,							
FRC115-110,	FRC120-30,							
FRC120-70,	FRC120-130,							
FRC121-90,	FRC121-160,							
FRC122-40,	FRC122-70,							
FRC122-130,	FRC123-20,							
FRC123-50,	FRC124-80,							
FRC124-160								

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED042T: Total Sulfur by LECO							
Pulp Bag (ED042T)	04-Jul-2018	12-Jul-2018	01-Aug-2018	✓	12-Jul-2018	01-Aug-2018	✓
FRC109-20, FRC110-120, FRC111-80, FRC112-30, FRC113-10, FRC113-80, FRC114-0, FRC114-50, FRC115-110, FRC120-10, FRC120-60, FRC120-130, FRC121-90, FRC122-0, FRC122-70, FRC123-10, FRC123-50, FRC124-30, FRC124-80,	FRC110-10, FRC111-30, FRC112-10, FRC112-110, FRC113-50, FRC113-130, FRC114-30, FRC115-10, FRC117-10, FRC120-30, FRC120-70, FRC121-20, FRC121-160, FRC122-40, FRC122-130, FRC123-20, FRC124-10, FRC124-50, FRC124-160						



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Electrical Conductivity (1:2)	EA010-1	4	38	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Electrical Conductivity (1:5)	EA010	4	38	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Exchange Acidity by 1M Potassium Chloride	ED005	1	1	100.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations	ED007	3	19	15.79	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations on Alkaline Soils	ED006	2	19	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:2)	EA002-1	4	38	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:5)	EA002	4	38	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfur - Total as S (LECO)	ED042T	4	38	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Electrical Conductivity (1:2)	EA010-1	2	38	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Electrical Conductivity (1:5)	EA010	2	38	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations	ED007	2	19	10.53	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations on Alkaline Soils	ED006	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:2)	EA002-1	2	38	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:5)	EA002	4	38	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfur - Total as S (LECO)	ED042T	2	38	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Electrical Conductivity (1:2)	EA010-1	2	38	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Electrical Conductivity (1:5)	EA010	2	38	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Exchange Acidity by 1M Potassium Chloride	ED005	1	1	100.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations	ED007	2	19	10.53	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations on Alkaline Soils	ED006	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfur - Total as S (LECO)	ED042T	2	38	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH (1:5)	EA002	SOIL	In house: Referenced to Rayment and Lyons 4A1 and APHA 4500H+. pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM (2013) Schedule B(3)
pH (1:2)	EA002-1	SOIL	In house: Referenced to APHA 4500H+. pH is determined on soil samples after a 1:2 soil/water leach.
Electrical Conductivity (1:5)	EA010	SOIL	In house: Referenced to Rayment and Lyons 3A1 and APHA 2510. Conductivity is determined on soil samples using a 1:5 soil/water leach. This method is compliant with NEPM (2013) Schedule B(3)
Electrical Conductivity (1:2)	EA010-1	SOIL	In house: Referenced to APHA 2510. Conductivity is determined on soil samples using a 1:2 soil/water leach.
Emerson Aggregate Test	EA058	SOIL	In house: Referenced to AS1289.3.8.1. Testing is performed only on soils with suitable aggregates; sands and gravels are usually unsuitable for this test. The test classifies the behaviour of soil aggregates, when immersed, on their coherence in water.
Exchange Acidity by 1M Potassium Chloride	ED005	SOIL	In house: referenced to Rayment and Lyons, (2011), method 15G1. This method is unsuitable for near neutral and alkaline soils. NATA accreditation does not cover performance of this service.
Exchangeable Cations on Alkaline Soils	ED006	SOIL	In house: Referenced to Soil Survey Test Method C5. Soluble salts are removed from the sample prior to analysis. Cations are exchanged from the sample by contact with alcoholic ammonium chloride at pH 8.5. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil.
Exchangeable Cations	ED007	SOIL	In house: Referenced to Rayment & Lyons (2011) Method 15A1. Cations are exchanged from the sample by contact with Ammonium Chloride. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil. This method is compliant with NEPM (2013) Schedule B(3) (Method 301)
Exchangeable Cations with pre-treatment	ED008	SOIL	In house: Referenced to Rayment & Higginson (2011) Method 15A2. Soluble salts are removed from the sample prior to analysis. Cations are exchanged from the sample by contact with Ammonium Chloride. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil. This method is compliant with NEPM (2013) Schedule B(3) (Method 301)
Sulfur - Total as S (LECO)	ED042T	SOIL	In house: Dried and pulverised sample is combusted in a high temperature furnace in the presence of strong oxidants / catalysts. The evolved S (as SO ₂) is measured by infra-red detector
Preparation Methods	Method	Matrix	Method Descriptions
Exchangeable Cations Preparation Method (Alkaline Soils)	ED006PR	SOIL	In house: Referenced to Rayment and Lyons 2011 method 15C1.
Exchangeable Cations Preparation Method	ED007PR	SOIL	In house: Referenced to Rayment & Higginson (1992) method 15A1. A 1M NH ₄ Cl extraction by end over end tumbling at a ratio of 1:20. There is no pretreatment for soluble salts. Extracts can be run by ICP for cations.
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of reagent grade water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.
1:2 solid / water leach for soluble analytes	EN40	SOIL	25 g of soil is mixed with 50 mL of distilled water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.
Dry and Pulverise (up to 100g)	GEO30	SOIL	#



CHAIN OF CUSTODY

ALS
Laboratory:
please tick →

334, 335-336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

CLIENT: EcOz Environmental Services		TURNAROUND REQUIREMENTS : ☐ Standard TAT (List due date):		FOR LABORATORY USE ONLY (Circle)	
OFFICE: Darwin		(Standard TAT may be longer for some tests e.g., Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):		Custody Seal intact? Yes No N/A	
PROJECT: EZ18107 - Grants Project - Waste Characterisation		ALS QUOTE NO.: SY/258/18		Freeze / frozen ice blocks present upon receipt? Yes No N/A	
ORDER NUMBER:		COC SEQUENCE NUMBER (Circle)		Random Sample Temperature on Receipt: °C	
PROJECT MANAGER: Aiden Campbell CONTACT PH: 08 8981 1100		COC: ① 2 3 4 5 6 7		Other comments:	
SAMPLER: Aiden Campbell SAMPLER MOBILE:		RECEIVED BY: Lara ALS		RECEIVED BY: Jess H	
COC emailed to ALS? (YES / NO) EDD FORMAT (or default):		DATE/TIME: 6.7.18		DATE/TIME: 10/7/18 9:30	
Email Reports to: aiden.campbell@ecoz.com.au		DATE/TIME: 06-07-18 1534			
Email Invoice to: ecoz@ecoz.com.au; aiden.campbell@ecoz.com.au					

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

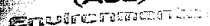
ALS USE	SAMPLE DETAILS		CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).										Additional Information	
	MATRIX: SOLID (S)/WATER (W)															
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	Total S	pH (1:2)	EC (1:2)	Emmerson Aggregate	CEC AG-1	ANC	NAPP	NAG	EN020: Prep from ASS bag	Leachable Metals (As, B, Ba, Be, Cd, Cr, Co, Cu, Mn, Ni, Pb, Se, V, Zn, Hg)	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	FRC109-20	4/07/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	
2	FRC110-10	4/07/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	
3	FRC110-120	4/07/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	
4	FRC111-30	4/07/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	
5	FRC111-80	4/07/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	
6	FRC112-10	4/07/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	
7	FRC112-30	4/07/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	
8	FRC112-110	4/07/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	
9	FRC113-10	4/07/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	
10	FRC113-50	4/07/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	
11	FRC113-80	4/07/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	
12	FRC113-130	4/07/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	
13	FRC114-0	4/07/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	
14	FRC114-30	4/07/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	
15	FRC114-50	4/07/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	hold	
TOTAL																

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

Environmental Division
Brisbane
Work Order Reference
EB1816614



Telephone : + 61-7-3243 7222



ALS
Laboratory:
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35703-ANE 32 Gough Street Gifford Q1D 4E3
Tel: 47 3243 7222 E-mail: enquiries@pragmatics.co.uk

CLIENT: EcOz Environmental Services		TURNAROUND REQUIREMENTS : ☐ Standard TAT (List due date): ☐ Non Standard or urgent TAT (List due date):		FOR LABORATORY USE ONLY (Circle)			
OFFICE: Darwin				Obviously Spill Intake? Yes No N/A Free ice / frozen ice blocks present upon receipt? Yes No N/A Random Sample Temperature on Receipt: °C Other comment:			
PROJECT: EZ18107 - Grants Project - Waste Characterisation		ALS QUOTE NO.:		COC SEQUENCE NUMBER (Circle) COC: 1 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7			
ORDER NUMBER:							
PROJECT MANAGER: Aiden Campbell		CONTACT PH: 08 8981 1100					
SAMPLER:		SAMPLER MOBILE:		RELINQUISHED BY:		RECEIVED BY:	
COC emailed to ALS? (YES / NO)		EDD FORMAT (or default):		DATE/TIME:		DATE/TIME:	
Email Reports to: aiden.campbell@ecoz.com.au							
Email Invoice to: aiden.campbell@ecoz.com.au							

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

[illegible]

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



ALS
Laboratory:
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238/38A/32 Chand Street, Stafford QLD 4053
Ph. 07 3243 7222 E. sams.es.brisbane@aeg.coa.com

[illegible]

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

CERTIFICATE OF ANALYSIS

Work Order : **EB1817447**
Client : **ECOZ ENVIRONMENTAL SERVICES**
Contact : AIDEN CAMPBELL
Address : PO BOX 381
 DARWIN NT, AUSTRALIA 0801
Telephone : ----
Project : EZ18107 - Grants Project - Waste Characterisation
Order number :
C-O-C number : ----
Sampler : AIDEN CAMPBELL
Site :
Quote number : SY/285/18
No. of samples received : 38
No. of samples analysed : 38

Page : 1 of 16
Laboratory : Environmental Division Brisbane
Contact : Customer Services EB
Address : 2 Byth Street Stafford QLD Australia 4053
Telephone : +61-7-3243 7222
Date Samples Received : 19-Jul-2018 08:17
Date Analysis Commenced : 19-Jul-2018
Issue Date : 26-Jul-2018 13:06



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. 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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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.

- ASS: EA013 (ANC) Fizz Rating: 0- None; 1- Slight; 2- Moderate; 3- Strong; 4- Very Strong; 5- Lime.



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	FRC109-20	FRC110-10	FRC110-120	FRC111-30	FRC111-80
Client sampling date / time					04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00
Compound	CAS Number	LOR	Unit		EB1817447-001	EB1817447-002	EB1817447-003	EB1817447-004	EB1817447-005
					Result	Result	Result	Result	Result
EA009: Nett Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		----	----	----	----	-2.5
EA011: Net Acid Generation									
pH (OX)	----	0.1	pH Unit		----	----	----	----	4.3
NAG (pH 4.5)	----	0.1	kg H2SO4/t		----	----	----	----	0.2
NAG (pH 7.0)	----	0.1	kg H2SO4/t		----	----	----	----	1.4
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		----	----	----	----	5.6
ANC as CaCO3	----	0.1	% CaCO3		----	----	----	----	0.6
Fizz Rating	----	0	Fizz Unit		----	----	----	----	0
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		8.4	8.0	8.2	7.4	----
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		----	----	----	----	0.10
EG005S : Soluble Metals by ICPAES									
Arsenic	7440-38-2	0.1	mg/kg		<0.1	<0.1	0.8	<0.1	----
Barium	7440-39-3	1	mg/kg		<1	<1	<1	<1	----
Beryllium	7440-41-7	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	----
Boron	7440-42-8	1	mg/kg		<1	<1	<1	<1	----
Cadmium	7440-43-9	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	----
Chromium	7440-47-3	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	----
Cobalt	7440-48-4	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	----
Copper	7440-50-8	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	----
Lead	7439-92-1	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	----
Manganese	7439-96-5	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	----
Nickel	7440-02-0	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	----
Selenium	7782-49-2	0.1	mg/kg		<0.1	<0.1	0.1	<0.1	----
Vanadium	7440-62-2	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	----
Zinc	7440-66-6	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	----
EG035S: Soluble Mercury by FIMS									
Mercury	7439-97-6	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	----
EN33: TCLP Leach									
Initial pH	----	0.1	pH Unit		----	----	----	----	7.9
After HCl pH	----	0.1	pH Unit		----	----	----	----	1.5



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				FRC109-20	FRC110-10	FRC110-120	FRC111-30	FRC111-80
Client sampling date / time				04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00
Compound	CAS Number	LOR	Unit	EB1817447-001	EB1817447-002	EB1817447-003	EB1817447-004	EB1817447-005
				Result	Result	Result	Result	Result
EN33: TCLP Leach - Continued								
Extraction Fluid Number	----	1	-	----	----	----	----	1
Final pH	----	0.1	pH Unit	----	----	----	----	5.0



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				FRC112-10	FRC112-30	FRC112-110	FRC113-10	FRC113-50
Client sampling date / time				04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00
Compound	CAS Number	LOR	Unit	EB1817447-006	EB1817447-007	EB1817447-008	EB1817447-009	EB1817447-010
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	12.6	4.1	4.6	2.3	1.4
EG005S : Soluble Metals by ICPAES								
Arsenic	7440-38-2	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Barium	7440-39-3	1	mg/kg	<1	<1	<1	<1	<1
Beryllium	7440-41-7	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	7440-42-8	1	mg/kg	<1	<1	<1	<1	<1
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	7440-47-3	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Cobalt	7440-48-4	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Copper	7440-50-8	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Lead	7439-92-1	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Manganese	7439-96-5	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	7440-02-0	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	7782-49-2	0.1	mg/kg	0.1	<0.1	0.2	<0.1	<0.1
Vanadium	7440-62-2	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	7440-66-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EG035S: Soluble Mercury by FIMS								
Mercury	7439-97-6	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	FRC113-80	FRC113-130	FRC114-0	FRC114-30	FRC114-50
Client sampling date / time					04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00
Compound	CAS Number	LOR	Unit		EB1817447-011	EB1817447-012	EB1817447-013	EB1817447-014	EB1817447-015
					Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		<1.0	1.2	7.0	2.9	9.5
EG005S : Soluble Metals by ICPAES									
Arsenic	7440-38-2	0.1	mg/kg		<0.1	0.6	<0.1	<0.1	<0.1
Barium	7440-39-3	1	mg/kg		<1	<1	<1	<1	<1
Beryllium	7440-41-7	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Boron	7440-42-8	1	mg/kg		<1	<1	<1	<1	<1
Cadmium	7440-43-9	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	7440-47-3	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Cobalt	7440-48-4	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Copper	7440-50-8	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Lead	7439-92-1	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Manganese	7439-96-5	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	7440-02-0	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	7782-49-2	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	0.1
Vanadium	7440-62-2	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	7440-66-6	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
EG035S: Soluble Mercury by FIMS									
Mercury	7439-97-6	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	FRC115-10	FRC115-110	FRC117-10	FRC120-10	FRC120-30
Client sampling date / time					04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00
Compound	CAS Number	LOR	Unit		EB1817447-016	EB1817447-017	EB1817447-018	EB1817447-019	EB1817447-020
				Result	Result	Result	Result	Result	Result
EA009: Nett Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t	----	-7.5	----	----	----	----
EA011: Net Acid Generation									
pH (OX)	----	0.1	pH Unit	----	8.0	----	----	----	----
NAG (pH 4.5)	----	0.1	kg H2SO4/t	----	<0.1	----	----	----	----
NAG (pH 7.0)	----	0.1	kg H2SO4/t	----	<0.1	----	----	----	----
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	----	9.3	----	----	----	----
ANC as CaCO3	----	0.1	% CaCO3	----	0.9	----	----	----	----
Fizz Rating	----	0	Fizz Unit	----	0	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%	4.9	----	15.0	2.8	10.8	
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%	----	0.06	----	----	----	----
EG005S : Soluble Metals by ICPAES									
Arsenic	7440-38-2	0.1	mg/kg	<0.1	----	<0.1	<0.1	<0.1	<0.1
Barium	7440-39-3	1	mg/kg	<1	----	<1	<1	<1	<1
Beryllium	7440-41-7	0.1	mg/kg	<0.1	----	<0.1	<0.1	<0.1	<0.1
Boron	7440-42-8	1	mg/kg	<1	----	<1	<1	<1	<1
Cadmium	7440-43-9	0.1	mg/kg	<0.1	----	<0.1	<0.1	<0.1	<0.1
Chromium	7440-47-3	0.1	mg/kg	<0.1	----	<0.1	<0.1	<0.1	<0.1
Cobalt	7440-48-4	0.1	mg/kg	<0.1	----	<0.1	<0.1	<0.1	<0.1
Copper	7440-50-8	0.1	mg/kg	<0.1	----	<0.1	<0.1	<0.1	<0.1
Lead	7439-92-1	0.1	mg/kg	<0.1	----	<0.1	<0.1	<0.1	<0.1
Manganese	7439-96-5	0.1	mg/kg	<0.1	----	0.2	<0.1	<0.1	<0.1
Nickel	7440-02-0	0.1	mg/kg	<0.1	----	<0.1	<0.1	<0.1	<0.1
Selenium	7782-49-2	0.1	mg/kg	<0.1	----	0.1	<0.1	<0.1	<0.1
Vanadium	7440-62-2	0.1	mg/kg	<0.1	----	<0.1	<0.1	<0.1	<0.1
Zinc	7440-66-6	0.1	mg/kg	<0.1	----	<0.1	<0.1	<0.1	<0.1
EG035S: Soluble Mercury by FIMS									
Mercury	7439-97-6	0.0005	mg/kg	<0.0005	----	<0.0005	<0.0005	<0.0005	<0.0005
EN33: TCLP Leach									
Initial pH	----	0.1	pH Unit	----	9.2	----	----	----	----
After HCl pH	----	0.1	pH Unit	----	1.5	----	----	----	----

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 Work Order : EB1817447
 Client : ECOZ ENVIRONMENTAL SERVICES
 Project : EZ18107 - Grants Project - Waste Characterisation



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				FRC115-10	FRC115-110	FRC117-10	FRC120-10	FRC120-30
Client sampling date / time				04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00
Compound	CAS Number	LOR	Unit	EB1817447-016	EB1817447-017	EB1817447-018	EB1817447-019	EB1817447-020
				Result	Result	Result	Result	Result
EN33: TCLP Leach - Continued								
Extraction Fluid Number	----	1	-	----	1	----	----	----
Final pH	----	0.1	pH Unit	----	5.0	----	----	----



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				FRC120-60	FRC120-70	FRC120-130	FRC121-20	FRC121-90
Client sampling date / time				04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00
Compound	CAS Number	LOR	Unit	EB1817447-021	EB1817447-022	EB1817447-023	EB1817447-024	EB1817447-025
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	4.5	10.0	1.5	2.8	6.2
EG005S : Soluble Metals by ICPAES								
Arsenic	7440-38-2	0.1	mg/kg	<0.1	1.1	0.2	<0.1	0.6
Barium	7440-39-3	1	mg/kg	<1	<1	<1	<1	<1
Beryllium	7440-41-7	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	7440-42-8	1	mg/kg	<1	<1	<1	<1	<1
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	7440-47-3	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Cobalt	7440-48-4	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Copper	7440-50-8	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Lead	7439-92-1	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Manganese	7439-96-5	0.1	mg/kg	<0.1	<0.1	<0.1	0.1	<0.1
Nickel	7440-02-0	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	7782-49-2	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Vanadium	7440-62-2	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	7440-66-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EG035S: Soluble Mercury by FIMS								
Mercury	7439-97-6	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	FRC121-160	FRC122-0	FRC122-40	FRC122-70	FRC122-130
Client sampling date / time					04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00
Compound	CAS Number	LOR	Unit		EB1817447-026	EB1817447-027	EB1817447-028	EB1817447-029	EB1817447-030
					Result	Result	Result	Result	Result
EA009: Nett Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		1.6	----	----	-4.2	----
EA011: Net Acid Generation									
pH (OX)	----	0.1	pH Unit		6.2	----	----	6.0	----
NAG (pH 4.5)	----	0.1	kg H2SO4/t		<0.1	----	----	<0.1	----
NAG (pH 7.0)	----	0.1	kg H2SO4/t		0.6	----	----	0.8	----
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		10.6	----	----	6.6	----
ANC as CaCO3	----	0.1	% CaCO3		1.1	----	----	0.7	----
Fizz Rating	----	0	Fizz Unit		1	----	----	0	----
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		----	5.7	<1.0	----	9.0
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		0.40	----	----	0.08	----
EG005S : Soluble Metals by ICPAES									
Arsenic	7440-38-2	0.1	mg/kg		----	<0.1	<0.1	----	0.2
Barium	7440-39-3	1	mg/kg		----	<1	<1	----	<1
Beryllium	7440-41-7	0.1	mg/kg		----	<0.1	<0.1	----	<0.1
Boron	7440-42-8	1	mg/kg		----	<1	<1	----	<1
Cadmium	7440-43-9	0.1	mg/kg		----	<0.1	<0.1	----	<0.1
Chromium	7440-47-3	0.1	mg/kg		----	<0.1	<0.1	----	<0.1
Cobalt	7440-48-4	0.1	mg/kg		----	<0.1	<0.1	----	<0.1
Copper	7440-50-8	0.1	mg/kg		----	<0.1	<0.1	----	<0.1
Lead	7439-92-1	0.1	mg/kg		----	<0.1	<0.1	----	<0.1
Manganese	7439-96-5	0.1	mg/kg		----	<0.1	<0.1	----	<0.1
Nickel	7440-02-0	0.1	mg/kg		----	<0.1	<0.1	----	<0.1
Selenium	7782-49-2	0.1	mg/kg		----	<0.1	<0.1	----	<0.1
Vanadium	7440-62-2	0.1	mg/kg		----	<0.1	<0.1	----	<0.1
Zinc	7440-66-6	0.1	mg/kg		----	<0.1	<0.1	----	<0.1
EG035S: Soluble Mercury by FIMS									
Mercury	7439-97-6	0.0005	mg/kg		----	<0.0005	<0.0005	----	<0.0005
EN33: TCLP Leach									
Initial pH	----	0.1	pH Unit		8.9	----	----	8.3	----
After HCl pH	----	0.1	pH Unit		1.5	----	----	1.6	----



Analytical Results

Sub-Matrix: **SOIL**
 (Matrix: **SOIL**)

Client sample ID

				FRC121-160	FRC122-0	FRC122-40	FRC122-70	FRC122-130
Client sampling date / time				04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00
Compound	CAS Number	LOR	Unit	EB1817447-026	EB1817447-027	EB1817447-028	EB1817447-029	EB1817447-030
				Result	Result	Result	Result	Result
EN33: TCLP Leach - Continued								
Extraction Fluid Number	----	1	-	1	----	----	1	----
Final pH	----	0.1	pH Unit	5.0	----	----	4.9	----



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				FRC123-10	FRC123-20	FRC123-50	FRC124-10	FRC124-30
Client sampling date / time				04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00
Compound	CAS Number	LOR	Unit	EB1817447-031	EB1817447-032	EB1817447-033	EB1817447-034	EB1817447-035
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	8.2	5.5	1.3	2.7	4.5
EG005S : Soluble Metals by ICPAES								
Arsenic	7440-38-2	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Barium	7440-39-3	1	mg/kg	<1	<1	<1	<1	<1
Beryllium	7440-41-7	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	7440-42-8	1	mg/kg	<1	<1	<1	<1	<1
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	7440-47-3	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Cobalt	7440-48-4	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Copper	7440-50-8	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Lead	7439-92-1	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Manganese	7439-96-5	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	7440-02-0	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	7782-49-2	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Vanadium	7440-62-2	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	7440-66-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EG035S: Soluble Mercury by FIMS								
Mercury	7439-97-6	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	FRC124-50	FRC124-80	FRC124-160	----	----
Client sampling date / time					04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00	----	----
Compound	CAS Number	LOR	Unit		EB1817447-036	EB1817447-037	EB1817447-038	-----	-----
				Result	Result	Result		----	----
EA009: Nett Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		-7.8	----	-6.1	----	----
EA011: Net Acid Generation									
pH (OX)	----	0.1	pH Unit		5.0	----	6.5	----	----
NAG (pH 4.5)	----	0.1	kg H2SO4/t		<0.1	----	<0.1	----	----
NAG (pH 7.0)	----	0.1	kg H2SO4/t		1.0	----	0.6	----	----
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		9.3	----	9.2	----	----
ANC as CaCO3	----	0.1	% CaCO3		0.9	----	0.9	----	----
Fizz Rating	----	0	Fizz Unit		1	----	1	----	----
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		----	2.2	----	----	----
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		0.05	----	0.10	----	----
EG005S : Soluble Metals by ICPAES									
Arsenic	7440-38-2	0.1	mg/kg		----	0.2	----	----	----
Barium	7440-39-3	1	mg/kg		----	<1	----	----	----
Beryllium	7440-41-7	0.1	mg/kg		----	<0.1	----	----	----
Boron	7440-42-8	1	mg/kg		----	<1	----	----	----
Cadmium	7440-43-9	0.1	mg/kg		----	<0.1	----	----	----
Chromium	7440-47-3	0.1	mg/kg		----	<0.1	----	----	----
Cobalt	7440-48-4	0.1	mg/kg		----	<0.1	----	----	----
Copper	7440-50-8	0.1	mg/kg		----	<0.1	----	----	----
Lead	7439-92-1	0.1	mg/kg		----	<0.1	----	----	----
Manganese	7439-96-5	0.1	mg/kg		----	<0.1	----	----	----
Nickel	7440-02-0	0.1	mg/kg		----	<0.1	----	----	----
Selenium	7782-49-2	0.1	mg/kg		----	<0.1	----	----	----
Vanadium	7440-62-2	0.1	mg/kg		----	<0.1	----	----	----
Zinc	7440-66-6	0.1	mg/kg		----	<0.1	----	----	----
EG035S: Soluble Mercury by FIMS									
Mercury	7439-97-6	0.0005	mg/kg		----	<0.0005	----	----	----
EN33: TCLP Leach									
Initial pH	----	0.1	pH Unit		7.6	----	8.9	----	----
After HCl pH	----	0.1	pH Unit		1.5	----	1.6	----	----



Analytical Results

Sub-Matrix: **SOIL**
 (Matrix: **SOIL**)

Client sample ID

				FRC124-50	FRC124-80	FRC124-160	----	----
Client sampling date / time				04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00	----	----
Compound	CAS Number	LOR	Unit	EB1817447-036	EB1817447-037	EB1817447-038	-----	-----
				Result	Result	Result	----	----
EN33: TCLP Leach - Continued								
Extraction Fluid Number	----	1	-	1	----	1	----	----
Final pH	----	0.1	pH Unit	4.8	----	4.9	----	----



Analytical Results

Sub-Matrix: **TCLP LEACHATE**
 (Matrix: **WATER**)

Client sample ID

				FRC111-80	FRC115-110	FRC121-160	FRC122-70	FRC124-50
Client sampling date / time				04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00	04-Jul-2018 00:00
Compound	CAS Number	LOR	Unit	EB1817447-005	EB1817447-017	EB1817447-026	EB1817447-029	EB1817447-036
				Result	Result	Result	Result	Result
EG005C: Leachable Metals by ICPAES								
Arsenic	7440-38-2	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Barium	7440-39-3	0.1	mg/L	0.2	0.2	0.3	0.2	0.2
Beryllium	7440-41-7	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Boron	7440-42-8	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Cadmium	7440-43-9	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium	7440-47-3	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Cobalt	7440-48-4	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Copper	7440-50-8	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	0.1
Lead	7439-92-1	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Manganese	7439-96-5	0.1	mg/L	0.2	2.5	2.7	1.0	0.4
Nickel	7440-02-0	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	7782-49-2	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Vanadium	7440-62-2	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	7440-66-6	0.1	mg/L	0.1	0.1	0.1	0.1	0.4
EG035C: Leachable Mercury by FIMS								
Mercury	7439-97-6	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010



Analytical Results

Sub-Matrix: **TCLP LEACHATE**
 (Matrix: **WATER**)

Client sample ID

				FRC124-160	----	----	----	----
Client sampling date / time				04-Jul-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EB1817447-038	-----	-----	-----	-----
Result				----	----	----	----	----
EG005C: Leachable Metals by ICPAES								
Arsenic	7440-38-2	0.1	mg/L	<0.1	----	----	----	----
Barium	7440-39-3	0.1	mg/L	0.2	----	----	----	----
Beryllium	7440-41-7	0.05	mg/L	<0.05	----	----	----	----
Boron	7440-42-8	0.1	mg/L	<0.1	----	----	----	----
Cadmium	7440-43-9	0.05	mg/L	<0.05	----	----	----	----
Chromium	7440-47-3	0.1	mg/L	<0.1	----	----	----	----
Cobalt	7440-48-4	0.1	mg/L	<0.1	----	----	----	----
Copper	7440-50-8	0.1	mg/L	<0.1	----	----	----	----
Lead	7439-92-1	0.1	mg/L	<0.1	----	----	----	----
Manganese	7439-96-5	0.1	mg/L	2.0	----	----	----	----
Nickel	7440-02-0	0.1	mg/L	<0.1	----	----	----	----
Selenium	7782-49-2	0.05	mg/L	<0.05	----	----	----	----
Vanadium	7440-62-2	0.1	mg/L	<0.1	----	----	----	----
Zinc	7440-66-6	0.1	mg/L	0.2	----	----	----	----
EG035C: Leachable Mercury by FIMS								
Mercury	7439-97-6	0.0010	mg/L	<0.0010	----	----	----	----

QUALITY CONTROL REPORT

Work Order	: EB1817447	Page	: 1 of 8
Client	: ECOZ ENVIRONMENTAL SERVICES	Laboratory	: Environmental Division Brisbane
Contact	: AIDEN CAMPBELL	Contact	: Customer Services EB
Address	: PO BOX 381 DARWIN NT, AUSTRALIA 0801	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: ----	Telephone	: +61-7-3243 7222
Project	: EZ18107 - Grants Project - Waste Characterisation	Date Samples Received	: 19-Jul-2018
Order number	: ----	Date Analysis Commenced	: 19-Jul-2018
C-O-C number	: ----	Issue Date	: 26-Jul-2018
Sampler	: AIDEN CAMPBELL		
Site	: ----		
Quote number	: SY/285/18		
No. of samples received	: 38		
No. of samples analysed	: 38		



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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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

Key :
 Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA011: Net Acid Generation (QC Lot: 1821172)									
EB1817447-005	FRC111-80	EA011: NAG (pH 4.5)	----	0.1	kg H2SO4/t	0.2	0.2	0.00	No Limit
		EA011: NAG (pH 7.0)	----	0.1	kg H2SO4/t	1.4	1.3	0.00	0% - 50%
		EA011: pH (OX)	----	0.1	pH Unit	4.3	4.4	2.30	0% - 20%
EB1817562-006	Anonymous	EA011: NAG (pH 4.5)	----	0.1	kg H2SO4/t	<0.1	<0.1	0.00	No Limit
		EA011: NAG (pH 7.0)	----	0.1	kg H2SO4/t	7.5	6.9	8.22	0% - 20%
		EA011: pH (OX)	----	0.1	pH Unit	5.6	5.6	0.00	0% - 20%
EA013: Acid Neutralising Capacity (QC Lot: 1821173)									
EB1817447-005	FRC111-80	EA013: ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	5.6	6.3	10.4	0% - 50%
EB1817562-006	Anonymous	EA013: ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	276	276	0.00	0% - 20%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 1815335)									
EB1817447-001	FRC109-20	EA055: Moisture Content	----	0.1	%	8.4	8.3	0.00	No Limit
EB1817447-012	FRC113-130	EA055: Moisture Content	----	0.1	%	1.2	<1.0	15.0	No Limit
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 1815336)									
EB1817447-023	FRC120-130	EA055: Moisture Content	----	0.1	%	1.5	1.3	15.8	No Limit
EB1817447-035	FRC124-30	EA055: Moisture Content	----	0.1	%	4.5	5.0	9.11	No Limit
ED042T: Total Sulfur by LECO (QC Lot: 1826503)									
EB1817447-005	FRC111-80	ED042T: Sulfur - Total as S (LECO)	----	0.01	%	0.10	0.10	0.00	0% - 50%
EM1811451-004	Anonymous	ED042T: Sulfur - Total as S (LECO)	----	0.01	%	0.02	0.02	0.00	No Limit
EG005S : Soluble Metals by ICPAES (QC Lot: 1815327)									
EB1817447-001	FRC109-20	EG005S: Arsenic	7440-38-2	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Beryllium	7440-41-7	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.00	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG005S : Soluble Metals by ICPAES (QC Lot: 1815327) - continued									
EB1817447-001	FRC109-20	EG005S: Chromium	7440-47-3	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Cobalt	7440-48-4	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Copper	7440-50-8	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Lead	7439-92-1	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Manganese	7439-96-5	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Nickel	7440-02-0	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Selenium	7782-49-2	0.1	mg/kg	<0.1	0.1	0.00	No Limit
		EG005S: Vanadium	7440-62-2	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Zinc	7440-66-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Barium	7440-39-3	1	mg/kg	<1	<1	0.00	No Limit
EG005S: Boron	7440-42-8	1	mg/kg	<1	<1	0.00	No Limit		
EB1817447-011	FRC113-80	EG005S: Arsenic	7440-38-2	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Beryllium	7440-41-7	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Chromium	7440-47-3	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Cobalt	7440-48-4	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Copper	7440-50-8	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Lead	7439-92-1	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Manganese	7439-96-5	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Nickel	7440-02-0	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Selenium	7782-49-2	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Vanadium	7440-62-2	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Zinc	7440-66-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Barium	7440-39-3	1	mg/kg	<1	<1	0.00	No Limit
EG005S: Boron	7440-42-8	1	mg/kg	<1	<1	0.00	No Limit		
EG005S : Soluble Metals by ICPAES (QC Lot: 1815328)									
EB1817447-034	FRC124-10	EG005S: Arsenic	7440-38-2	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Beryllium	7440-41-7	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Chromium	7440-47-3	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Cobalt	7440-48-4	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Copper	7440-50-8	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Lead	7439-92-1	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Manganese	7439-96-5	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Nickel	7440-02-0	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Selenium	7782-49-2	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Vanadium	7440-62-2	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Zinc	7440-66-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Barium	7440-39-3	1	mg/kg	<1	<1	0.00	No Limit
		EG005S: Boron	7440-42-8	1	mg/kg	<1	<1	0.00	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG005S : Soluble Metals by ICPAES (QC Lot: 1815328) - continued									
EB1817447-023	FRC120-130	EG005S: Arsenic	7440-38-2	0.1	mg/kg	0.2	0.2	0.00	No Limit
		EG005S: Beryllium	7440-41-7	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Chromium	7440-47-3	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Cobalt	7440-48-4	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Copper	7440-50-8	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Lead	7439-92-1	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Manganese	7439-96-5	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Nickel	7440-02-0	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Selenium	7782-49-2	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Vanadium	7440-62-2	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Zinc	7440-66-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Barium	7440-39-3	1	mg/kg	<1	<1	0.00	No Limit
		EG005S: Boron	7440-42-8	1	mg/kg	<1	<1	0.00	No Limit
EG035S: Soluble Mercury by FIMS (QC Lot: 1815326)									
EB1817447-001	FRC109-20	EG035S: Mercury	7439-97-6	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
EB1817447-011	FRC113-80	EG035S: Mercury	7439-97-6	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
EG035S: Soluble Mercury by FIMS (QC Lot: 1815329)									
EB1817447-034	FRC124-10	EG035S: Mercury	7439-97-6	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
EB1817447-023	FRC120-130	EG035S: Mercury	7439-97-6	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG005C: Leachable Metals by ICPAES (QC Lot: 1823763)									
EB1817363-001	Anonymous	EG005C: Beryllium	7440-41-7	0.05	mg/L	<0.05	<0.05	0.00	No Limit
		EG005C: Cadmium	7440-43-9	0.05	mg/L	<0.05	<0.05	0.00	No Limit
		EG005C: Selenium	7782-49-2	0.05	mg/L	<0.05	<0.05	0.00	No Limit
		EG005C: Arsenic	7440-38-2	0.1	mg/L	<0.1	<0.1	0.00	No Limit
		EG005C: Barium	7440-39-3	0.1	mg/L	1.3	1.3	0.00	0% - 50%
		EG005C: Boron	7440-42-8	0.1	mg/L	0.1	<0.1	0.00	No Limit
		EG005C: Chromium	7440-47-3	0.1	mg/L	<0.1	<0.1	0.00	No Limit
		EG005C: Cobalt	7440-48-4	0.1	mg/L	<0.1	<0.1	0.00	No Limit
		EG005C: Copper	7440-50-8	0.1	mg/L	<0.1	<0.1	0.00	No Limit
		EG005C: Lead	7439-92-1	0.1	mg/L	0.6	0.5	0.00	No Limit
		EG005C: Manganese	7439-96-5	0.1	mg/L	1.8	1.8	0.00	0% - 50%
		EG005C: Nickel	7440-02-0	0.1	mg/L	<0.1	<0.1	0.00	No Limit
		EG005C: Vanadium	7440-62-2	0.1	mg/L	<0.1	<0.1	0.00	No Limit
		EG005C: Zinc	7440-66-6	0.1	mg/L	0.9	0.9	0.00	No Limit
EB1817563-001	Anonymous	EG005C: Beryllium	7440-41-7	0.05	mg/L	<0.05	<0.05	0.00	No Limit
		EG005C: Cadmium	7440-43-9	0.05	mg/L	<0.05	<0.05	0.00	No Limit

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 Client : ECOZ ENVIRONMENTAL SERVICES
 Project : EZ18107 - Grants Project - Waste Characterisation



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG005C: Leachable Metals by ICPAES (QC Lot: 1823763) - continued									
EB1817563-001	Anonymous	EG005C: Selenium	7782-49-2	0.05	mg/L	<0.05	<0.05	0.00	No Limit
		EG005C: Arsenic	7440-38-2	0.1	mg/L	<0.1	<0.1	0.00	No Limit
		EG005C: Barium	7440-39-3	0.1	mg/L	1.3	1.4	0.00	0% - 50%
		EG005C: Boron	7440-42-8	0.1	mg/L	0.1	0.1	0.00	No Limit
		EG005C: Chromium	7440-47-3	0.1	mg/L	<0.1	<0.1	0.00	No Limit
		EG005C: Cobalt	7440-48-4	0.1	mg/L	<0.1	<0.1	0.00	No Limit
		EG005C: Copper	7440-50-8	0.1	mg/L	<0.1	<0.1	0.00	No Limit
		EG005C: Lead	7439-92-1	0.1	mg/L	0.6	0.7	0.00	No Limit
		EG005C: Manganese	7439-96-5	0.1	mg/L	2.0	2.1	5.18	0% - 20%
		EG005C: Nickel	7440-02-0	0.1	mg/L	<0.1	<0.1	0.00	No Limit
		EG005C: Vanadium	7440-62-2	0.1	mg/L	<0.1	<0.1	0.00	No Limit
		EG005C: Zinc	7440-66-6	0.1	mg/L	1.0	1.0	0.00	No Limit
EG035C: Leachable Mercury by FIMS (QC Lot: 1823769)									
EB1817447-005	FRC111-80	EG035C: Mercury	7439-97-6	0.0001	mg/L	<0.0010	<0.0010	0.00	No Limit
EB1817734-003	Anonymous	EG035C: Mercury	7439-97-6	0.0001	mg/L	<0.0010	<0.0010	0.00	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EA011: Net Acid Generation (QCLot: 1821172)								
EA011: NAG (pH 7.0)	----	----	kg H2SO4/t	----	22.5 kg H2SO4/t	102	70	130
EA013: Acid Neutralising Capacity (QCLot: 1821173)								
EA013: ANC as H2SO4	----	----	kg H2SO4 equiv./t	----	96.2 kg H2SO4 equiv./t	104	82	120
ED042T: Total Sulfur by LECO (QCLot: 1826503)								
ED042T: Sulfur - Total as S (LECO)	----	0.01	%	<0.01	0.16 %	94.1	70	130
EG005S : Soluble Metals by ICPAES (QCLot: 1815327)								
EG005S: Arsenic	7440-38-2	0.1	mg/kg	<0.1	5 mg/kg	99.4	83	111
EG005S: Barium	7440-39-3	1	mg/kg	<1	----	----	----	----
EG005S: Beryllium	7440-41-7	0.1	mg/kg	<0.1	----	----	----	----
EG005S: Boron	7440-42-8	1	mg/kg	<1	----	----	----	----
EG005S: Cadmium	7440-43-9	0.1	mg/kg	<0.1	5 mg/kg	102	87	112
EG005S: Chromium	7440-47-3	0.1	mg/kg	<0.1	5 mg/kg	101	91	110
EG005S: Cobalt	7440-48-4	0.1	mg/kg	<0.1	----	----	----	----
EG005S: Copper	7440-50-8	0.1	mg/kg	<0.1	5 mg/kg	100	84	111
EG005S: Lead	7439-92-1	0.1	mg/kg	<0.1	5 mg/kg	102	90	112
EG005S: Manganese	7439-96-5	0.1	mg/kg	<0.1	----	----	----	----
EG005S: Nickel	7440-02-0	0.1	mg/kg	<0.1	5 mg/kg	104	82	112
EG005S: Selenium	7782-49-2	0.1	mg/kg	<0.1	----	----	----	----
EG005S: Vanadium	7440-62-2	0.1	mg/kg	<0.1	----	----	----	----
EG005S: Zinc	7440-66-6	0.1	mg/kg	<0.1	5 mg/kg	103	94	110
EG005S : Soluble Metals by ICPAES (QCLot: 1815328)								
EG005S: Arsenic	7440-38-2	0.1	mg/kg	<0.1	5 mg/kg	101	83	111
EG005S: Barium	7440-39-3	1	mg/kg	<1	----	----	----	----
EG005S: Beryllium	7440-41-7	0.1	mg/kg	<0.1	----	----	----	----
EG005S: Boron	7440-42-8	1	mg/kg	<1	----	----	----	----
EG005S: Cadmium	7440-43-9	0.1	mg/kg	<0.1	5 mg/kg	103	87	112
EG005S: Chromium	7440-47-3	0.1	mg/kg	<0.1	5 mg/kg	103	91	110
EG005S: Cobalt	7440-48-4	0.1	mg/kg	<0.1	----	----	----	----
EG005S: Copper	7440-50-8	0.1	mg/kg	<0.1	5 mg/kg	103	84	111
EG005S: Lead	7439-92-1	0.1	mg/kg	<0.1	5 mg/kg	103	90	112
EG005S: Manganese	7439-96-5	0.1	mg/kg	<0.1	----	----	----	----
EG005S: Nickel	7440-02-0	0.1	mg/kg	<0.1	5 mg/kg	103	82	112
EG005S: Selenium	7782-49-2	0.1	mg/kg	<0.1	----	----	----	----
EG005S: Vanadium	7440-62-2	0.1	mg/kg	<0.1	----	----	----	----



Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) LowHigh	
Method: Compound	CAS Number	LOR	Unit	Result				
EG005S : Soluble Metals by ICPAES (QCLot: 1815328) - continued								
EG005S: Zinc	7440-66-6	0.1	mg/kg	<0.1	5 mg/kg	103	94	110
EG035S: Soluble Mercury by FIMS (QCLot: 1815326)								
EG035S: Mercury	7439-97-6	0.0005	mg/kg	<0.0005	0.05 mg/kg	97.3	83	125
EG035S: Soluble Mercury by FIMS (QCLot: 1815329)								
EG035S: Mercury	7439-97-6	0.0005	mg/kg	<0.0005	0.05 mg/kg	105	83	125
EN33: TCLP Leach (QCLot: 1820476)								
EN33a: Final pH	----	0.1	pH Unit	4.9	----	----	----	----

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) LowHigh	
Method: Compound	CAS Number	LOR	Unit	Result				
EG005C: Leachable Metals by ICPAES (QCLot: 1823763)								
EG005C: Arsenic	7440-38-2	0.1	mg/L	<0.1	1 mg/L	102	89	123
EG005C: Barium	7440-39-3	0.1	mg/L	<0.1	1 mg/L	110	90	120
EG005C: Beryllium	7440-41-7	0.05	mg/L	<0.05	----	----	----	----
EG005C: Boron	7440-42-8	0.1	mg/L	<0.1	----	----	----	----
EG005C: Cadmium	7440-43-9	0.05	mg/L	<0.05	0.5 mg/L	102	88	120
EG005C: Chromium	7440-47-3	0.1	mg/L	<0.1	1 mg/L	103	86	115
EG005C: Cobalt	7440-48-4	0.1	mg/L	<0.1	1 mg/L	101	87	116
EG005C: Copper	7440-50-8	0.1	mg/L	<0.1	1 mg/L	102	87	117
EG005C: Lead	7439-92-1	0.1	mg/L	<0.1	1 mg/L	104	85	117
EG005C: Manganese	7439-96-5	0.1	mg/L	<0.1	1 mg/L	102	83	117
EG005C: Nickel	7440-02-0	0.1	mg/L	<0.1	1 mg/L	102	90	116
EG005C: Selenium	7782-49-2	0.05	mg/L	<0.05	----	----	----	----
EG005C: Vanadium	7440-62-2	0.1	mg/L	<0.1	1 mg/L	102	88	112
EG005C: Zinc	7440-66-6	0.1	mg/L	<0.1	1 mg/L	105	87	122
EG035C: Leachable Mercury by FIMS (QCLot: 1823769)								
EG035C: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	104	84	117

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%) MS	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number			Low	High
EG035S: Soluble Mercury by FIMS (QCLot: 1815326)							
EB1817447-002	FRC110-10	EG035S: Mercury	7439-97-6	0.05 mg/kg	97.7	70	130

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 Client : ECOZ ENVIRONMENTAL SERVICES
 Project : EZ18107 - Grants Project - Waste Characterisation



Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG035S: Soluble Mercury by FIMS (QCLot: 1815329)							
EB1817447-024	FRC121-20	EG035S: Mercury	7439-97-6	0.05 mg/kg	118	70	130

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG005C: Leachable Metals by ICPAES (QCLot: 1823763)							
EB1817363-002	Anonymous	EG005C: Arsenic	7440-38-2	1 mg/L	97.7	70	130
		EG005C: Barium	7440-39-3	1 mg/L	108	70	130
		EG005C: Beryllium	7440-41-7	0.1 mg/L	113	70	130
		EG005C: Cadmium	7440-43-9	0.5 mg/L	98.4	70	130
		EG005C: Chromium	7440-47-3	1 mg/L	101	70	130
		EG005C: Cobalt	7440-48-4	1 mg/L	98.4	70	130
		EG005C: Copper	7440-50-8	1 mg/L	99.4	70	130
		EG005C: Lead	7439-92-1	1 mg/L	99.4	70	130
		EG005C: Manganese	7439-96-5	1 mg/L	95.6	70	130
		EG005C: Nickel	7440-02-0	1 mg/L	99.8	70	130
		EG005C: Vanadium	7440-62-2	1 mg/L	99.3	70	130
		EG005C: Zinc	7440-66-6	1 mg/L	101	70	130
EG035C: Leachable Mercury by FIMS (QCLot: 1823769)							
EB1817447-017	FRC115-110	EG035C: Mercury	7439-97-6	0.01 mg/L	122	70	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EB1817447	Page	: 1 of 8
Client	: ECOZ ENVIRONMENTAL SERVICES	Laboratory	: Environmental Division Brisbane
Contact	: AIDEN CAMPBELL	Telephone	: +61-7-3243 7222
Project	: EZ18107 - Grants Project - Waste Characterisation	Date Samples Received	: 19-Jul-2018
Site	:	Issue Date	: 26-Jul-2018
Sampler	: AIDEN CAMPBELL	No. of samples received	: 38
Order number	:	No. of samples analysed	: 38

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- **NO** Matrix Spike outliers occur.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- **NO** Quality Control Sample Frequency Outliers exist.



Outliers : Analysis Holding Time Compliance

Matrix: **SOIL**

Method		Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA055: Moisture Content (Dried @ 105-110°C)							
Soil Glass Jar - Unpreserved							
FRC109-20,	FRC110-10,	----	----	----	19-Jul-2018	18-Jul-2018	1
FRC110-120,	FRC111-30,						
FRC112-10,	FRC112-30,						
FRC112-110,	FRC113-10,						
FRC113-50,	FRC113-80,						
FRC113-130,	FRC114-0,						
FRC114-30,	FRC114-50,						
FRC115-10,	FRC117-10,						
FRC120-10,	FRC120-30,						
FRC120-60,	FRC120-70,						
FRC120-130,	FRC121-20,						
FRC121-90,	FRC122-0,						
FRC122-40,	FRC122-130,						
FRC123-10,	FRC123-20,						
FRC123-50,	FRC124-10,						
FRC124-30,	FRC124-80,						

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA011: Net Acid Generation								
Pulp Bag (EA011)								
FRC111-80,	FRC115-110,	04-Jul-2018	24-Jul-2018	04-Jul-2019	✔	24-Jul-2018	20-Jan-2019	✔
FRC121-160,	FRC122-70,							
FRC124-50,	FRC124-160							

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA013: Acid Neutralising Capacity								
Pulp Bag (EA013)								
FRC111-80, FRC121-160, FRC124-50,	FRC115-110, FRC122-70, FRC124-160	04-Jul-2018	24-Jul-2018	04-Jul-2019	✓	24-Jul-2018	20-Jan-2019	✓
EA055: Moisture Content (Dried @ 105-110°C)								
Soil Glass Jar - Unpreserved (EA055)								
FRC109-20, FRC110-120, FRC112-10, FRC112-110, FRC113-50, FRC113-130, FRC114-30, FRC115-10, FRC120-10, FRC120-60, FRC120-130, FRC121-90, FRC122-40, FRC123-10, FRC123-50, FRC124-30,	FRC110-10, FRC111-30, FRC112-30, FRC113-10, FRC113-80, FRC114-0, FRC114-50, FRC117-10, FRC120-30, FRC120-70, FRC121-20, FRC122-0, FRC122-130, FRC123-20, FRC124-10, FRC124-80	04-Jul-2018	----	----	----	19-Jul-2018	18-Jul-2018	✗
ED042T: Total Sulfur by LECO								
Pulp Bag (ED042T)								
FRC111-80, FRC121-160, FRC124-50,	FRC115-110, FRC122-70, FRC124-160	04-Jul-2018	25-Jul-2018	01-Aug-2018	✓	25-Jul-2018	01-Aug-2018	✓



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG005S : Soluble Metals by ICPAES								
Soil Glass Jar - Unpreserved (EG005S)		04-Jul-2018	23-Jul-2018	31-Dec-2018	✔	24-Jul-2018	31-Dec-2018	✔
FRC109-20,	FRC110-10,							
FRC110-120,	FRC111-30,							
FRC112-10,	FRC112-30,							
FRC112-110,	FRC113-10,							
FRC113-50,	FRC113-80,							
FRC113-130,	FRC114-0,							
FRC114-30,	FRC114-50,							
FRC115-10,	FRC117-10,							
FRC120-10,	FRC120-30,							
FRC120-60,	FRC120-70,							
FRC120-130,	FRC121-20,							
FRC121-90,	FRC122-0,							
FRC122-40,	FRC122-130,							
FRC123-10,	FRC123-20,							
FRC123-50,	FRC124-10,							
FRC124-30,	FRC124-80							
EG035S: Soluble Mercury by FIMS								
Soil Glass Jar - Unpreserved (EG035S)		04-Jul-2018	23-Jul-2018	01-Aug-2018	✔	24-Jul-2018	01-Aug-2018	✔
FRC109-20,	FRC110-10,							
FRC110-120,	FRC111-30,							
FRC112-10,	FRC112-30,							
FRC112-110,	FRC113-10,							
FRC113-50,	FRC113-80,							
FRC113-130,	FRC114-0,							
FRC114-30,	FRC114-50,							
FRC115-10,	FRC117-10,							
FRC120-10,	FRC120-30,							
FRC120-60,	FRC120-70,							
FRC120-130,	FRC121-20,							
FRC121-90,	FRC122-0,							
FRC122-40,	FRC122-130,							
FRC123-10,	FRC123-20,							
FRC123-50,	FRC124-10,							
FRC124-30,	FRC124-80							
EN33: TCLP Leach								
Non-Volatile Leach: 28 day HT(e.g. Hg, CrVI) (EN33a)		04-Jul-2018	23-Jul-2018	01-Aug-2018	✔	----	----	----
FRC111-80,	FRC115-110,							
FRC121-160,	FRC122-70,							
FRC124-50,	FRC124-160							

Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG005C: Leachable Metals by ICPAES								
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG005C)		23-Jul-2018	24-Jul-2018	19-Jan-2019	✓	24-Jul-2018	19-Jan-2019	✓
FRC111-80,	FRC115-110,							
FRC121-160,	FRC122-70,							
FRC124-50,	FRC124-160							
EG035C: Leachable Mercury by FIMS								
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035C)		23-Jul-2018	----	----	----	24-Jul-2018	20-Aug-2018	✓
FRC111-80,	FRC115-110,							
FRC121-160,	FRC122-70,							
FRC124-50,	FRC124-160							



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: * = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Acid Neutralising Capacity (ANC)	EA013	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Moisture Content	EA055	4	34	11.76	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Net Acid Generation	EA011	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Soluble Mercury by FIMS	EG035S	4	32	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Soluble Metals by ICPAES	EG005S	4	32	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfur - Total as S (LECO)	ED042T	2	18	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Acid Neutralising Capacity (ANC)	EA013	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Net Acid Generation	EA011	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Soluble Mercury by FIMS	EG035S	2	32	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Soluble Metals by ICPAES	EG005S	2	32	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfur - Total as S (LECO)	ED042T	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Soluble Mercury by FIMS	EG035S	2	32	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Soluble Metals by ICPAES	EG005S	2	32	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfur - Total as S (LECO)	ED042T	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TCLP for Non & Semivolatile Analytes	EN33a	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Soluble Mercury by FIMS	EG035S	2	32	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Evaluation: * = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Leachable Mercury by FIMS	EG035C	2	13	15.38	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Leachable Metals by ICPAES	EG005C	2	18	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Leachable Mercury by FIMS	EG035C	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Leachable Metals by ICPAES	EG005C	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Leachable Mercury by FIMS	EG035C	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Leachable Metals by ICPAES	EG005C	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Leachable Mercury by FIMS	EG035C	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Leachable Metals by ICPAES	EG005C	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Net Acid Production Potential	EA009	SOIL	In house: Referenced to Coastech Research (Canada)(Mod.). NAPP = Acid Production Potential (APP or MAP- Maximum Acid Potential) minus Neutralising Capacity (ANC). NAPP may be +ve, zero or -ve.
Net Acid Generation	EA011	SOIL	In house: Referenced to Miller (1998) Titrimetric procedure determines net acidity in a soil following peroxide oxidation. Titrations to both pH 4.5 and pH 7 are reported.
Acid Neutralising Capacity (ANC)	EA013	SOIL	In house: Referenced to USEPA 600/2-78-054, I. Miller (2000). A fizz test is done to semiquantitatively estimate the likely reactivity. The soil is then reacted with an known excess quantity of an appropriate acid. Titration determines the acid remaining, and the ANC can be calculated from comparison with a blank titration.
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Sulfur - Total as S (LECO)	ED042T	SOIL	In house: Dried and pulverised sample is combusted in a high temperature furnace in the presence of strong oxidants / catalysts. The evolved S (as SO ₂) is measured by infra-red detector
Leachable Metals by ICPAES	EG005C	SOIL	In house: referenced to APHA 3120; USEPA SW 846 - 6010: The ICPAES technique ionises leachate sample atoms emitting a characteristic spectrum. This spectrum is then compared against matrix matched standards for quantification. This method is compliant with NEPM (2013) Schedule B(3)
Soluble Metals by ICPAES	EG005S	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Soluble metals are determined following an appropriate soil / water extraction of the soil. The ICPAES technique ionises samples in a plasma, emitting characteristic spectrums based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards.
Leachable Mercury by FIMS	EG035C	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the TCLP solution. The ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Soluble Mercury by FIMS	EG035S	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the extract. Ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve.
Preparation Methods	Method	Matrix	Method Descriptions
Drying at 85 degrees, bagging and labelling (ASS)	EN020PR	SOIL	In house
Digestion for Total Recoverable Metals in TCLP Leachate	EN25C	SOIL	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)



Preparation Methods	Method	Matrix	Method Descriptions
TCLP for Non & Semivolatile Analytes	EN33a	SOIL	In house QWI-EN/33 referenced to USEPA SW846-1311: The TCLP procedure is designed to determine the mobility of both organic and inorganic analytes present in wastes. The standard TCLP leach is for non-volatile and Semivolatile test parameters.
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of reagent grade water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.
Dry and Pulverise (up to 100g)	GEO30	SOIL	#



CHAIN OF CUSTODY

ALS Laboratory:
please tick →

QLD/NSW/ACT: 32 Sand Street St. Leonards NSW 1585
Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com

Environmental Division
Brisbane
Work Order Reference
EB1817447



Telephone : + 61-7-3243 7222

CLIENT: EcoZ Environmental Services		TURNAROUND REQUIREMENTS : ☐ Standard TAT (List due date):		FOR LABORATORY USE ONLY (Circle) Custody Seal Intact? Yes No Free ice / frozen ice bricks present upon receipt? Yes No Random Sample Temperature on Receipt C Other comment:	
OFFICE: Darwin		(Standard TAT may be longer for some tests e.g. Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):			
PROJECT: EZ18107 - Grants Project - Waste Characterisation		ALS QUOTE NO.: SY/258/18			
ORDER NUMBER:		COC SEQUENCE NUMBER (Circle)			
		COC: 1 2 3 4 5 6 7			
		OF: 1 2 3 4 5 6 7			
PROJECT MANAGER: Aiden Campbell CONTACT PH: 08 8981 1100					
SAMPLER: Aiden Campbell		SAMPLER MOBILE:		RELINQUISHED BY:	
COC emailed to ALS? (YES / NO)		EDD FORMAT (or default):		RECEIVED BY:	
Email Reports to: aiden.campbell@ecoz.com.au				DATE/TIME:	
Email Invoice to: ecoz@ecoz.com.au; aiden.campbell@ecoz.com.au				DATE/TIME:	

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)		CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).										Additional Information	
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	Total S	pH (1:2)	EC (1:2)	Emmerson Aggregate	CEC	ANC	NAPP	NAG	EN020: Prep from ASS bag	Leachable Metals (As, B, Ba, Be, Cd, Cr, Co, Cu, Mn, Ni, Pb, Se, V, Zn, Hg)	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	FRC109-20	4/07/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	✓	Leach as 1:5 DI water ratio with 1 hr tumble
2	FRC110-10	4/07/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	✓	Leach as 1:5 DI water ratio with 1 hr tumble
3	FRC110-120	4/07/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	✓	Leach as 1:5 DI water ratio with 1 hr tumble
4	FRC111-30	4/07/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	✓	Leach as 1:5 DI water ratio with 1 hr tumble
5	FRC111-80	4/07/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	TCLP leach
6	FRC112-10	4/07/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	✓	Leach as 1:5 DI water ratio with 1 hr tumble
7	FRC112-30	4/07/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	✓	Leach as 1:5 DI water ratio with 1 hr tumble
8	FRC112-110	4/07/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	✓	Leach as 1:5 DI water ratio with 1 hr tumble
9	FRC113-10	4/07/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	✓	Leach as 1:5 DI water ratio with 1 hr tumble
10	FRC113-50	4/07/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	✓	Leach as 1:5 DI water ratio with 1 hr tumble
11	FRC113-80	4/07/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	✓	Leach as 1:5 DI water ratio with 1 hr tumble
12	FRC113-130	4/07/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	✓	Leach as 1:5 DI water ratio with 1 hr tumble
13	FRC114-0	4/07/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	✓	Leach as 1:5 DI water ratio with 1 hr tumble
14	FRC114-30	4/07/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	✓	Leach as 1:5 DI water ratio with 1 hr tumble
15	FRC114-50	4/07/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	✓	Leach as 1:5 DI water ratio with 1 hr tumble

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



CHAIN OF CUSTODY

ALS Laboratory:
please tick →

LABORATORY: 32 Shand Street Stollert QLD 4063
PH: 07 3243 7222 E: samples.brisbane@alsglobal.com

CLIENT: EcOz Environmental Services		TURNAROUND REQUIREMENTS : ☐ Standard TAT (List due date):		FOR LABORATORY USE ONLY (Circle)	
OFFICE: Darwin		(Standard TAT may be longer for some tests e.g., Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):		Custody Seal Intact? Yes No N/A	
PROJECT: EZ18107 - Grants Project - Waste Characterisation		ALS QUOTE NO.:		Free ice / frozen ice bricks present upon receipt? Yes No N/A	
ORDER NUMBER:		COC SEQUENCE NUMBER (Circle)		Random Sample Temperature on Receipt: °C	
PROJECT MANAGER: Aiden Campbell		CONTACT PH: 08 8981 1100		Other comment:	
SAMPLER:		SAMPLER MOBILE:		RECEIVED BY:	
COC emailed to ALS? (YES / NO)		EDD FORMAT (or default):		RECEIVED BY:	
Email Reports to: aiden.campbell@ecoz.com.au		DATE/TIME:		DATE/TIME:	
Email Invoice to: lyndall.ryan@ecoz.com.au; aiden.campbell@ecoz.com.au		DATE/TIME:		DATE/TIME:	

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).										Additional Information	
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE <i>(refer to codes below)</i>	TOTAL CONTAINERS	Total S	pH (1:2)	EC (1:2)	Emmerson Aggregate	CEC	ANC	NAPP	NAG	EN020: Prep from ASS bag	Leachable Metals (As, B, Ba, Be, Cd, Cr, Co, Cu, Mn, Ni, Pb, Se, V, Zn, Hg)	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.	
16	FRC115-10	4/07/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	✓	Leach as 1:5 DI water ratio with 1 hr tumble	
17	FRC115-110	4/07/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	TCLP leach	
18	FRC117-10	4/07/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	✓	Leach as 1:5 DI water ratio with 1 hr tumble	
19	FRC120-10	4/07/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	✓	Leach as 1:5 DI water ratio with 1 hr tumble	
20	FRC120-30	4/07/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	✓	Leach as 1:5 DI water ratio with 1 hr tumble	
21	FRC120-60	4/07/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	✓	Leach as 1:5 DI water ratio with 1 hr tumble	
22	FRC120-70	4/07/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	✓	Leach as 1:5 DI water ratio with 1 hr tumble	
23	FRC120-130	4/07/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	✓	Leach as 1:5 DI water ratio with 1 hr tumble	
24	FRC121-20	4/07/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	✓	Leach as 1:5 DI water ratio with 1 hr tumble	
25	FRC121-90	4/07/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	✓	Leach as 1:5 DI water ratio with 1 hr tumble	
26	FRC121-160	4/07/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	TCLP leach	
27	FRC122-0	4/07/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	✓	Leach as 1:5 DI water ratio with 1 hr tumble	
28	FRC122-40	4/07/2018	S	ST & ASS	3	✓	✓	✓	✓	✓	hold	hold	hold	hold	✓	Leach as 1:5 DI water ratio with 1 hr tumble	
-																	

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V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle, ASS = Plastic Bag for Acid Sulphate Solids; B = Unpreserved Bag.



ALS
Laboratory:
please tick →

UBRISBANE 32 Shand Street Stafford QLD 4053
Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com

CLIENT: EcOz Environmental Services		TURNAROUND REQUIREMENTS : ☐ Standard TAT (List due date):		FOR LABORATORY USE ONLY (Circle)						
OFFICE: Darwin		(Standard TAT may be longer for some tests e.g. Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):								
PROJECT: EZ18107 - Grants Project - Waste Characterisation		ALS QUOTE NO.:		COC SEQUENCE NUMBER (Circle)		Custody Seal Intact?		Yes	No	N/A
ORDER NUMBER:				COC: 1 2 3 4 5 6 7		Free ice / frozen ice bricks present upon receipt?		Yes	No	N/A
PROJECT MANAGER: Aiden Campbell		CONTACT PH: 08 8981 1100		OF: 1 2 3 4 5 6 7		Random Sample Temperature on Receipt:		°C		
SAMPLER:		SAMPLER MOBILE:		RELINQUISHED BY:		RECEIVED BY:		RELINQUISHED BY:		RECEIVED BY:
COC emailed to ALS? (YES / NO)		EDD FORMAT (or default):		DATE/TIME:		ALS		DATE/TIME:		DATE/TIME:
Email Reports to: aiden.campbell@ecoz.com.au										
Email Invoice to: lyndall.ryan@ecoz.com.au; aiden.campbell@ecoz.com.au										

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

[illegible]

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

CERTIFICATE OF ANALYSIS

Work Order : **EB1817989**
Client : **ECOZ ENVIRONMENTAL SERVICES**
Contact : AIDEN CAMPBELL
Address : PO BOX 381
 DARWIN NT, AUSTRALIA 0801
Telephone : ----
Project : EZ18107 - Grants Project - Waste Characterisation
Order number :
C-O-C number : ----
Sampler : ----
Site :
Quote number : SY/285/18
No. of samples received : 13
No. of samples analysed : 13

Page : 1 of 7
Laboratory : Environmental Division Brisbane
Contact : Customer Services EB
Address : 2 Byth Street Stafford QLD Australia 4053
Telephone : +61-7-3243 7222
Date Samples Received : 25-Jul-2018 13:43
Date Analysis Commenced : 26-Jul-2018
Issue Date : 02-Aug-2018 09:25



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. 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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Tom Maloney	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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.

- ASS: EA013 (ANC) Fizz Rating: 0- None; 1- Slight; 2- Moderate; 3- Strong; 4- Very Strong; 5- Lime.



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	FRC158-10	FRC158-80	FRC158-21	FRC158-1	FRC159-1
Client sampling date / time					17-Jun-2018 00:00	17-Jun-2018 00:00	17-Jun-2018 00:00	17-Jun-2018 00:00	17-Jun-2018 00:00
Compound	CAS Number	LOR	Unit		EB1817989-001	EB1817989-002	EB1817989-003	EB1817989-004	EB1817989-005
					Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		3.4	3.2	3.6	7.4	8.8
EG005S : Soluble Metals by ICPAES									
Arsenic	7440-38-2	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Barium	7440-39-3	1	mg/kg		<1	<1	<1	<1	<1
Beryllium	7440-41-7	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Boron	7440-42-8	1	mg/kg		<1	<1	<1	<1	<1
Cadmium	7440-43-9	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	7440-47-3	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Cobalt	7440-48-4	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Copper	7440-50-8	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Lead	7439-92-1	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Manganese	7439-96-5	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	7440-02-0	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	7782-49-2	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Vanadium	7440-62-2	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	7440-66-6	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
EG035S: Soluble Mercury by FIMS									
Mercury	7439-97-6	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				FRC159-136	FRC159-30	FRC160-2	FRC160-4	FRC159-8
Client sampling date / time				17-Jun-2018 00:00	17-Jun-2018 00:00	19-Jun-2018 00:00	19-Jun-2018 00:00	19-Jun-2018 00:00
Compound	CAS Number	LOR	Unit	EB1817989-006	EB1817989-007	EB1817989-008	EB1817989-009	EB1817989-010
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	<1.0	5.8	6.8	4.2	4.0
EG005S : Soluble Metals by ICPAES								
Arsenic	7440-38-2	0.1	mg/kg	0.3	<0.1	<0.1	<0.1	<0.1
Barium	7440-39-3	1	mg/kg	<1	<1	<1	<1	<1
Beryllium	7440-41-7	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	7440-42-8	1	mg/kg	<1	<1	<1	<1	<1
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	7440-47-3	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Cobalt	7440-48-4	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Copper	7440-50-8	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Lead	7439-92-1	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Manganese	7439-96-5	0.1	mg/kg	<0.1	<0.1	<0.1	0.1	<0.1
Nickel	7440-02-0	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	7782-49-2	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Vanadium	7440-62-2	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	7440-66-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EG035S: Soluble Mercury by FIMS								
Mercury	7439-97-6	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	FRC159-4	FRC160-91	FRC160-73	----	----
Client sampling date / time					20-Jun-2018 00:00	20-Jun-2018 00:00	20-Jun-2018 00:00	----	----
Compound	CAS Number	LOR	Unit		EB1817989-011	EB1817989-012	EB1817989-013	-----	-----
				Result	Result	Result	Result	----	----
EA009: Nett Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t	----	----	-7.4	----	----	----
EA011: Net Acid Generation									
pH (OX)	----	0.1	pH Unit	----	----	7.7	----	----	----
NAG (pH 4.5)	----	0.1	kg H2SO4/t	----	----	<0.1	----	----	----
NAG (pH 7.0)	----	0.1	kg H2SO4/t	----	----	<0.1	----	----	----
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	----	----	8.6	----	----	----
ANC as CaCO3	----	0.1	% CaCO3	----	----	0.9	----	----	----
Fizz Rating	----	0	Fizz Unit	----	----	0	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%	----	10.1	----	5.8	----	----
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%	----	----	0.04	----	----	----
EG005S : Soluble Metals by ICPAES									
Arsenic	7440-38-2	0.1	mg/kg	<0.1	----	----	0.2	----	----
Barium	7440-39-3	1	mg/kg	<1	----	----	<1	----	----
Beryllium	7440-41-7	0.1	mg/kg	<0.1	----	----	<0.1	----	----
Boron	7440-42-8	1	mg/kg	<1	----	----	<1	----	----
Cadmium	7440-43-9	0.1	mg/kg	<0.1	----	----	<0.1	----	----
Chromium	7440-47-3	0.1	mg/kg	<0.1	----	----	<0.1	----	----
Cobalt	7440-48-4	0.1	mg/kg	<0.1	----	----	<0.1	----	----
Copper	7440-50-8	0.1	mg/kg	<0.1	----	----	<0.1	----	----
Lead	7439-92-1	0.1	mg/kg	<0.1	----	----	<0.1	----	----
Manganese	7439-96-5	0.1	mg/kg	<0.1	----	----	<0.1	----	----
Nickel	7440-02-0	0.1	mg/kg	<0.1	----	----	<0.1	----	----
Selenium	7782-49-2	0.1	mg/kg	<0.1	----	----	<0.1	----	----
Vanadium	7440-62-2	0.1	mg/kg	<0.1	----	----	<0.1	----	----
Zinc	7440-66-6	0.1	mg/kg	<0.1	----	----	<0.1	----	----
EG035S: Soluble Mercury by FIMS									
Mercury	7439-97-6	0.0005	mg/kg	<0.0005	----	----	<0.0005	----	----
EN33: TCLP Leach									
Initial pH	----	0.1	pH Unit	----	----	8.7	----	----	----
After HCl pH	----	0.1	pH Unit	----	----	1.7	----	----	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	FRC159-4	FRC160-91	FRC160-73	----	----
				Client sampling date / time	20-Jun-2018 00:00	20-Jun-2018 00:00	20-Jun-2018 00:00	----	----
Compound	CAS Number	LOR	Unit		EB1817989-011	EB1817989-012	EB1817989-013	-----	-----
					Result	Result	Result	----	----
EN33: TCLP Leach - Continued									
Extraction Fluid Number	----	1	-		----	1	----	----	----
Final pH	----	0.1	pH Unit		----	5.0	----	----	----



Analytical Results

Sub-Matrix: **TCLP LEACHATE**
 (Matrix: **WATER**)

Client sample ID

				FRC160-91	----	----	----	----
Client sampling date / time				20-Jun-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EB1817989-012	-----	-----	-----	-----
Result				----	----	----	----	----
EG005C: Leachable Metals by ICPAES								
Arsenic	7440-38-2	0.1	mg/L	<0.1	----	----	----	----
Barium	7440-39-3	0.1	mg/L	0.3	----	----	----	----
Beryllium	7440-41-7	0.05	mg/L	<0.05	----	----	----	----
Boron	7440-42-8	0.1	mg/L	<0.1	----	----	----	----
Cadmium	7440-43-9	0.05	mg/L	<0.05	----	----	----	----
Chromium	7440-47-3	0.1	mg/L	<0.1	----	----	----	----
Cobalt	7440-48-4	0.1	mg/L	<0.1	----	----	----	----
Copper	7440-50-8	0.1	mg/L	<0.1	----	----	----	----
Lead	7439-92-1	0.1	mg/L	<0.1	----	----	----	----
Manganese	7439-96-5	0.1	mg/L	1.1	----	----	----	----
Nickel	7440-02-0	0.1	mg/L	<0.1	----	----	----	----
Selenium	7782-49-2	0.05	mg/L	<0.05	----	----	----	----
Vanadium	7440-62-2	0.1	mg/L	<0.1	----	----	----	----
Zinc	7440-66-6	0.1	mg/L	0.3	----	----	----	----
EG035C: Leachable Mercury by FIMS								
Mercury	7439-97-6	0.0010	mg/L	<0.0010	----	----	----	----

QUALITY CONTROL REPORT

Work Order	: EB1817989	Page	: 1 of 7
Client	: ECOZ ENVIRONMENTAL SERVICES	Laboratory	: Environmental Division Brisbane
Contact	: AIDEN CAMPBELL	Contact	: Customer Services EB
Address	: PO BOX 381 DARWIN NT, AUSTRALIA 0801	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: ----	Telephone	: +61-7-3243 7222
Project	: EZ18107 - Grants Project - Waste Characterisation	Date Samples Received	: 25-Jul-2018
Order number	: ----	Date Analysis Commenced	: 26-Jul-2018
C-O-C number	: ----	Issue Date	: 02-Aug-2018
Sampler	: ----		
Site	: ----		
Quote number	: SY/285/18		
No. of samples received	: 13		
No. of samples analysed	: 13		



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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Tom Maloney	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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

Key :
 Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA011: Net Acid Generation (QC Lot: 1837767)									
EB1818272-002	Anonymous	EA011: NAG (pH 4.5)	----	0.1	kg H2SO4/t	<0.1	<0.1	0.00	No Limit
		EA011: NAG (pH 7.0)	----	0.1	kg H2SO4/t	<0.1	<0.1	0.00	No Limit
		EA011: pH (OX)	----	0.1	pH Unit	10.2	10.3	0.976	0% - 20%
EB1813036-002	Anonymous	EA011: NAG (pH 4.5)	----	0.1	kg H2SO4/t	9.4	8.9	5.90	0% - 20%
		EA011: NAG (pH 7.0)	----	0.1	kg H2SO4/t	41.2	41.6	0.710	0% - 20%
		EA011: pH (OX)	----	0.1	pH Unit	3.2	3.2	0.00	0% - 20%
EA013: Acid Neutralising Capacity (QC Lot: 1837766)									
EB1817847-002	Anonymous	EA013: ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	59.4	64.8	8.60	0% - 20%
EB1813036-002	Anonymous	EA013: ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	6.7	6.0	10.8	0% - 50%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 1829830)									
EB1817989-001	FRC158-10	EA055: Moisture Content	----	0.1	%	3.4	3.3	0.00	No Limit
EB1817989-011	FRC159-4	EA055: Moisture Content	----	0.1	%	10.1	10.0	0.00	0% - 50%
ED042T: Total Sulfur by LECO (QC Lot: 1838170)									
EB1817443-001	Anonymous	ED042T: Sulfur - Total as S (LECO)	----	0.01	%	<0.01	<0.01	0.00	No Limit
EB1817443-011	Anonymous	ED042T: Sulfur - Total as S (LECO)	----	0.01	%	0.03	0.03	0.00	No Limit
EG005S : Soluble Metals by ICPAES (QC Lot: 1829826)									
EB1817989-001	FRC158-10	EG005S: Arsenic	7440-38-2	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Beryllium	7440-41-7	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Chromium	7440-47-3	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Cobalt	7440-48-4	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG005S: Copper	7440-50-8	0.1	mg/kg	<0.1	<0.1	0.00	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report							
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)		
EG005S : Soluble Metals by ICPAES (QC Lot: 1829826) - continued											
EB1817989-001	FRC158-10	EG005S: Lead	7439-92-1	0.1	mg/kg	<0.1	<0.1	0.00	No Limit		
		EG005S: Manganese	7439-96-5	0.1	mg/kg	<0.1	<0.1	0.00	No Limit		
		EG005S: Nickel	7440-02-0	0.1	mg/kg	<0.1	<0.1	0.00	No Limit		
		EG005S: Selenium	7782-49-2	0.1	mg/kg	<0.1	0.1	0.00	No Limit		
		EG005S: Vanadium	7440-62-2	0.1	mg/kg	<0.1	<0.1	0.00	No Limit		
		EG005S: Zinc	7440-66-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit		
		EG005S: Barium	7440-39-3	1	mg/kg	<1	<1	0.00	No Limit		
		EG005S: Boron	7440-42-8	1	mg/kg	<1	<1	0.00	No Limit		
EB1817989-010	FRC159-8	EG005S: Arsenic	7440-38-2	0.1	mg/kg	<0.1	<0.1	0.00	No Limit		
		EG005S: Beryllium	7440-41-7	0.1	mg/kg	<0.1	<0.1	0.00	No Limit		
		EG005S: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.00	No Limit		
		EG005S: Chromium	7440-47-3	0.1	mg/kg	<0.1	<0.1	0.00	No Limit		
		EG005S: Cobalt	7440-48-4	0.1	mg/kg	<0.1	<0.1	0.00	No Limit		
		EG005S: Copper	7440-50-8	0.1	mg/kg	<0.1	<0.1	0.00	No Limit		
		EG005S: Lead	7439-92-1	0.1	mg/kg	<0.1	<0.1	0.00	No Limit		
		EG005S: Manganese	7439-96-5	0.1	mg/kg	<0.1	<0.1	0.00	No Limit		
		EG005S: Nickel	7440-02-0	0.1	mg/kg	<0.1	<0.1	0.00	No Limit		
		EG005S: Selenium	7782-49-2	0.1	mg/kg	<0.1	<0.1	0.00	No Limit		
		EG005S: Vanadium	7440-62-2	0.1	mg/kg	<0.1	<0.1	0.00	No Limit		
		EG005S: Zinc	7440-66-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit		
		EG005S: Barium	7440-39-3	1	mg/kg	<1	<1	0.00	No Limit		
		EG005S: Boron	7440-42-8	1	mg/kg	<1	<1	0.00	No Limit		
		EG035S: Soluble Mercury by FIMS (QC Lot: 1829825)									
		EB1817989-001	FRC158-10	EG035S: Mercury	7439-97-6	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
EB1817989-010	FRC159-8	EG035S: Mercury	7439-97-6	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit		
Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report							
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)		
EG005C: Leachable Metals by ICPAES (QC Lot: 1840234)											
EB1817944-002	Anonymous	EG005C: Beryllium	7440-41-7	0.05	mg/L	<0.05	<0.05	0.00	No Limit		
		EG005C: Cadmium	7440-43-9	0.05	mg/L	<0.05	<0.05	0.00	No Limit		
		EG005C: Selenium	7782-49-2	0.05	mg/L	<0.05	<0.05	0.00	No Limit		
		EG005C: Arsenic	7440-38-2	0.1	mg/L	<0.1	<0.1	0.00	No Limit		
		EG005C: Barium	7440-39-3	0.1	mg/L	0.6	0.7	0.00	No Limit		
		EG005C: Boron	7440-42-8	0.1	mg/L	<0.1	<0.1	0.00	No Limit		
		EG005C: Chromium	7440-47-3	0.1	mg/L	<0.1	<0.1	0.00	No Limit		
		EG005C: Cobalt	7440-48-4	0.1	mg/L	<0.1	<0.1	0.00	No Limit		
		EG005C: Copper	7440-50-8	0.1	mg/L	<0.1	<0.1	0.00	No Limit		
		EG005C: Lead	7439-92-1	0.1	mg/L	0.3	0.3	0.00	No Limit		
		EG005C: Manganese	7439-96-5	0.1	mg/L	0.4	0.4	0.00	No Limit		
		EG005C: Nickel	7440-02-0	0.1	mg/L	<0.1	<0.1	0.00	No Limit		



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG005C: Leachable Metals by ICPAES (QC Lot: 1840234) - continued									
EB1817944-002	Anonymous	EG005C: Vanadium	7440-62-2	0.1	mg/L	<0.1	<0.1	0.00	No Limit
		EG005C: Zinc	7440-66-6	0.1	mg/L	0.3	0.3	0.00	No Limit
EG035C: Leachable Mercury by FIMS (QC Lot: 1840248)									
EB1817944-002	Anonymous	EG035C: Mercury	7439-97-6	0.0001	mg/L	<0.0010	<0.0010	0.00	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) LowHigh	
Method: Compound	CAS Number	LOR	Unit	Result				
EA011: Net Acid Generation (QCLot: 1837767)								
EA011: NAG (pH 7.0)	----	----	kg H2SO4/t	----	22.5 kg H2SO4/t	98.3	70	130
EA013: Acid Neutralising Capacity (QCLot: 1837766)								
EA013: ANC as H2SO4	----	----	kg H2SO4 equiv./t	----	9.9 kg H2SO4 equiv./t	91.7	82	120
ED042T: Total Sulfur by LECO (QCLot: 1838170)								
ED042T: Sulfur - Total as S (LECO)	----	0.01	%	<0.01	0.16 %	102	70	130
EG005S : Soluble Metals by ICPAES (QCLot: 1829826)								
EG005S: Arsenic	7440-38-2	0.1	mg/kg	<0.1	5 mg/kg	98.7	83	111
EG005S: Barium	7440-39-3	1	mg/kg	<1	----	----	----	----
EG005S: Beryllium	7440-41-7	0.1	mg/kg	<0.1	----	----	----	----
EG005S: Boron	7440-42-8	1	mg/kg	<1	----	----	----	----
EG005S: Cadmium	7440-43-9	0.1	mg/kg	<0.1	5 mg/kg	100	87	112
EG005S: Chromium	7440-47-3	0.1	mg/kg	<0.1	5 mg/kg	99.9	91	110
EG005S: Cobalt	7440-48-4	0.1	mg/kg	<0.1	----	----	----	----
EG005S: Copper	7440-50-8	0.1	mg/kg	<0.1	5 mg/kg	100	84	111
EG005S: Lead	7439-92-1	0.1	mg/kg	<0.1	5 mg/kg	101	90	112
EG005S: Manganese	7439-96-5	0.1	mg/kg	<0.1	----	----	----	----
EG005S: Nickel	7440-02-0	0.1	mg/kg	<0.1	5 mg/kg	100	82	112
EG005S: Selenium	7782-49-2	0.1	mg/kg	<0.1	----	----	----	----
EG005S: Vanadium	7440-62-2	0.1	mg/kg	<0.1	----	----	----	----
EG005S: Zinc	7440-66-6	0.1	mg/kg	<0.1	5 mg/kg	101	94	110
EG035S: Soluble Mercury by FIMS (QCLot: 1829825)								
EG035S: Mercury	7439-97-6	0.0005	mg/kg	<0.0005	0.05 mg/kg	86.6	83	125
EN33: TCLP Leach (QCLot: 1834414)								
EN33a: Final pH	----	0.1	pH Unit	4.9	----	----	----	----

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result			LCS	Low
EG005C: Leachable Metals by ICPAES (QCLot: 1840234)								
EG005C: Arsenic	7440-38-2	0.1	mg/L	<0.1	1 mg/L	100	89	123
EG005C: Barium	7440-39-3	0.1	mg/L	<0.1	1 mg/L	107	90	120
EG005C: Beryllium	7440-41-7	0.05	mg/L	<0.05	----	----	----	----
EG005C: Boron	7440-42-8	0.1	mg/L	<0.1	----	----	----	----
EG005C: Cadmium	7440-43-9	0.05	mg/L	<0.05	0.5 mg/L	100	88	120

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG005C: Leachable Metals by ICPAES (QCLot: 1840234)							
EB1817944-003	Anonymous	EG005C: Arsenic	7440-38-2	1 mg/L	101	70	130
		EG005C: Barium	7440-39-3	1 mg/L	110	70	130
		EG005C: Beryllium	7440-41-7	0.1 mg/L	114	70	130
		EG005C: Cadmium	7440-43-9	0.5 mg/L	102	70	130
		EG005C: Chromium	7440-47-3	1 mg/L	101	70	130
		EG005C: Cobalt	7440-48-4	1 mg/L	96.3	70	130
		EG005C: Copper	7440-50-8	1 mg/L	100	70	130
		EG005C: Lead	7439-92-1	1 mg/L	104	70	130
		EG005C: Manganese	7439-96-5	1 mg/L	100	70	130
		EG005C: Nickel	7440-02-0	1 mg/L	101	70	130
		EG005C: Vanadium	7440-62-2	1 mg/L	103	70	130
		EG005C: Zinc	7440-66-6	1 mg/L	105	70	130
EG035C: Leachable Mercury by FIMS (QCLot: 1840248)							



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG035C: Leachable Mercury by FIMS (QCLot: 1840248) - continued							
EB1817944-003	Anonymous	EG035C: Mercury	7439-97-6	0.01 mg/L	114	70	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EB1817989	Page	: 1 of 7
Client	: ECOZ ENVIRONMENTAL SERVICES	Laboratory	: Environmental Division Brisbane
Contact	: AIDEN CAMPBELL	Telephone	: +61-7-3243 7222
Project	: EZ18107 - Grants Project - Waste Characterisation	Date Samples Received	: 25-Jul-2018
Site	:	Issue Date	: 02-Aug-2018
Sampler	: ----	No. of samples received	: 13
Order number	:	No. of samples analysed	: 13

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- **NO** Matrix Spike outliers occur.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- **NO** Quality Control Sample Frequency Outliers exist.



Outliers : Analysis Holding Time Compliance

Matrix: **SOIL**

Method		Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA055: Moisture Content (Dried @ 105-110°C)							
Soil Glass Jar - Unpreserved							
FRC158-10, FRC158-21, FRC159-1, FRC159-30	FRC158-80, FRC158-1, FRC159-136,	----	----	----	26-Jul-2018	01-Jul-2018	25
Soil Glass Jar - Unpreserved							
FRC160-2, FRC159-8	FRC160-4,	----	----	----	26-Jul-2018	03-Jul-2018	23
Soil Glass Jar - Unpreserved							
FRC159-4,	FRC160-73	----	----	----	26-Jul-2018	04-Jul-2018	22
ED042T: Total Sulfur by LECO							
Pulp Bag							
FRC160-91		30-Jul-2018	18-Jul-2018	12	30-Jul-2018	18-Jul-2018	12
EG035S: Soluble Mercury by FIMS							
Soil Glass Jar - Unpreserved							
FRC158-10, FRC158-21, FRC159-1, FRC159-30	FRC158-80, FRC158-1, FRC159-136,	27-Jul-2018	15-Jul-2018	12	27-Jul-2018	15-Jul-2018	12
Soil Glass Jar - Unpreserved							
FRC160-2, FRC159-8	FRC160-4,	27-Jul-2018	17-Jul-2018	10	27-Jul-2018	17-Jul-2018	10
Soil Glass Jar - Unpreserved							
FRC159-4,	FRC160-73	27-Jul-2018	18-Jul-2018	9	27-Jul-2018	18-Jul-2018	9
EN33: TCLP Leach							
Non-Volatile Leach: 28 day HT(e.g. Hg, CrVI)							
FRC160-91		27-Jul-2018	18-Jul-2018	9	----	----	----

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA011: Net Acid Generation									
Pulp Bag (EA011) FRC160-91		20-Jun-2018	31-Jul-2018	20-Jun-2019	✓	31-Jul-2018	27-Jan-2019	✓	
EA013: Acid Neutralising Capacity									
Pulp Bag (EA013) FRC160-91		20-Jun-2018	31-Jul-2018	20-Jun-2019	✓	31-Jul-2018	27-Jan-2019	✓	
EA055: Moisture Content (Dried @ 105-110°C)									
Soil Glass Jar - Unpreserved (EA055) FRC158-10, FRC158-21, FRC159-1, FRC159-30		FRC158-80, FRC158-1, FRC159-136,	17-Jun-2018	----	----	----	26-Jul-2018	01-Jul-2018	✗
Soil Glass Jar - Unpreserved (EA055) FRC160-2, FRC159-8		FRC160-4,	19-Jun-2018	----	----	----	26-Jul-2018	03-Jul-2018	✗
Soil Glass Jar - Unpreserved (EA055) FRC159-4,		FRC160-73	20-Jun-2018	----	----	----	26-Jul-2018	04-Jul-2018	✗
ED042T: Total Sulfur by LECO									
Pulp Bag (ED042T) FRC160-91			20-Jun-2018	30-Jul-2018	18-Jul-2018	✗	30-Jul-2018	18-Jul-2018	✗
EG005S : Soluble Metals by ICPAES									
Soil Glass Jar - Unpreserved (EG005S) FRC158-10, FRC158-21, FRC159-1, FRC159-30		FRC158-80, FRC158-1, FRC159-136,	17-Jun-2018	27-Jul-2018	14-Dec-2018	✓	27-Jul-2018	14-Dec-2018	✓
Soil Glass Jar - Unpreserved (EG005S) FRC160-2, FRC159-8		FRC160-4,	19-Jun-2018	27-Jul-2018	16-Dec-2018	✓	27-Jul-2018	16-Dec-2018	✓
Soil Glass Jar - Unpreserved (EG005S) FRC159-4,		FRC160-73	20-Jun-2018	27-Jul-2018	17-Dec-2018	✓	27-Jul-2018	17-Dec-2018	✓
EG035S: Soluble Mercury by FIMS									
Soil Glass Jar - Unpreserved (EG035S) FRC158-10, FRC158-21, FRC159-1, FRC159-30		FRC158-80, FRC158-1, FRC159-136,	17-Jun-2018	27-Jul-2018	15-Jul-2018	✗	27-Jul-2018	15-Jul-2018	✗
Soil Glass Jar - Unpreserved (EG035S) FRC160-2, FRC159-8		FRC160-4,	19-Jun-2018	27-Jul-2018	17-Jul-2018	✗	27-Jul-2018	17-Jul-2018	✗
Soil Glass Jar - Unpreserved (EG035S) FRC159-4,		FRC160-73	20-Jun-2018	27-Jul-2018	18-Jul-2018	✗	27-Jul-2018	18-Jul-2018	✗



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EN33: TCLP Leach							
Non-Volatile Leach: 28 day HT(e.g. Hg, CrVI) (EN33a) FRC160-91	20-Jun-2018	27-Jul-2018	18-Jul-2018	✖	----	----	----

Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG005C: Leachable Metals by ICPAES							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG005C) FRC160-91	27-Jul-2018	31-Jul-2018	23-Jan-2019	✓	31-Jul-2018	23-Jan-2019	✓
EG035C: Leachable Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035C) FRC160-91	27-Jul-2018	---	----	----	31-Jul-2018	24-Aug-2018	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: * = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Acid Neutralising Capacity (ANC)	EA013	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Moisture Content	EA055	2	13	15.38	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Net Acid Generation	EA011	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Soluble Mercury by FIMS	EG035S	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Soluble Metals by ICPAES	EG005S	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfur - Total as S (LECO)	ED042T	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Acid Neutralising Capacity (ANC)	EA013	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Net Acid Generation	EA011	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Soluble Mercury by FIMS	EG035S	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Soluble Metals by ICPAES	EG005S	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfur - Total as S (LECO)	ED042T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Soluble Mercury by FIMS	EG035S	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Soluble Metals by ICPAES	EG005S	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfur - Total as S (LECO)	ED042T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TCLP for Non & Semivolatile Analytes	EN33a	1	10	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Soluble Mercury by FIMS	EG035S	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Evaluation: * = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Leachable Mercury by FIMS	EG035C	1	5	20.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Leachable Metals by ICPAES	EG005C	1	6	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Leachable Mercury by FIMS	EG035C	1	5	20.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Leachable Metals by ICPAES	EG005C	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Leachable Mercury by FIMS	EG035C	1	5	20.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Leachable Metals by ICPAES	EG005C	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Leachable Mercury by FIMS	EG035C	1	5	20.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Leachable Metals by ICPAES	EG005C	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard



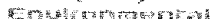
Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Net Acid Production Potential	EA009	SOIL	In house: Referenced to Coastech Research (Canada)(Mod.). NAPP = Acid Production Potential (APP or MAP- Maximum Acid Potential) minus Neutralising Capacity (ANC). NAPP may be +ve, zero or -ve.
Net Acid Generation	EA011	SOIL	In house: Referenced to Miller (1998) Titrimetric procedure determines net acidity in a soil following peroxide oxidation. Titrations to both pH 4.5 and pH 7 are reported.
Acid Neutralising Capacity (ANC)	EA013	SOIL	In house: Referenced to USEPA 600/2-78-054, I. Miller (2000). A fizz test is done to semiquantitatively estimate the likely reactivity. The soil is then reacted with an known excess quantity of an appropriate acid. Titration determines the acid remaining, and the ANC can be calculated from comparison with a blank titration.
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Sulfur - Total as S (LECO)	ED042T	SOIL	In house: Dried and pulverised sample is combusted in a high temperature furnace in the presence of strong oxidants / catalysts. The evolved S (as SO ₂) is measured by infra-red detector
Leachable Metals by ICPAES	EG005C	SOIL	In house: referenced to APHA 3120; USEPA SW 846 - 6010: The ICPAES technique ionises leachate sample atoms emitting a characteristic spectrum. This spectrum is then compared against matrix matched standards for quantification. This method is compliant with NEPM (2013) Schedule B(3)
Soluble Metals by ICPAES	EG005S	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Soluble metals are determined following an appropriate soil / water extraction of the soil. The ICPAES technique ionises samples in a plasma, emitting characteristic spectrums based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards.
Leachable Mercury by FIMS	EG035C	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the TCLP solution. The ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Soluble Mercury by FIMS	EG035S	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the extract. Ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve.
Preparation Methods	Method	Matrix	Method Descriptions
Drying at 85 degrees, bagging and labelling (ASS)	EN020PR	SOIL	In house
Digestion for Total Recoverable Metals in TCLP Leachate	EN25C	SOIL	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)



Preparation Methods	Method	Matrix	Method Descriptions
TCLP for Non & Semivolatile Analytes	EN33a	SOIL	In house QWI-EN/33 referenced to USEPA SW846-1311: The TCLP procedure is designed to determine the mobility of both organic and inorganic analytes present in wastes. The standard TCLP leach is for non-volatile and Semivolatile test parameters.
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of reagent grade water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.
Dry and Pulverise (up to 100g)	GEO30	SOIL	#



ALS
Laboratory: ☐
please tick →

BRISBANE 32 Shand Street Stafford QLD 4053
Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com

Work Order Reference
EB1817989

CLIENT: EcoZ Environmental Services		TURNAROUND REQUIREMENTS : ☐ Standard TAT (List due date):		FOR LABORATORY USE ONLY (Circle)	
OFFICE: Darwin		(Standard TAT may be longer for some tests e.g. Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):		Custody Seal Intact? Yes	
PROJECT: EZ18107 - Grants Project - Waste Characterisation		ALS QUOTE NO.: SY/258/18		Free ice / frozen ice bricks present upon receipt? Yes	
ORDER NUMBER:				Random Sample Temperature on Receipt	
PROJECT MANAGER: Aiden Campbell		CONTACT PH: 08 8981 1100		Other comment:	
SAMPLER:		SAMPLER MOBILE:		RELINQUISHED BY:	
COC emailed to ALS? (YES / NO)		EDD FORMAT (or default):		RECEIVED BY:	
Email Reports to: aiden.campbell@ecoz.com.au		DATE/TIME:		DATE/TIME:	
Email Invoice to: ecoz@ecoz.com.au; aiden.campbell@ecoz.com.au				DATE/TIME:	



Telephone : + 61-7-3243 7222

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

[illegible]

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

CERTIFICATE OF ANALYSIS

Work Order : **EB1815902**
Client : **ECOZ ENVIRONMENTAL SERVICES**
Contact : AIDEN CAMPBELL
Address : PO BOX 381
 DARWIN NT, AUSTRALIA 0801
Telephone : ----
Project : EZ18107 - Grants Project - Waste Characterisation
Order number :
C-O-C number : ----
Sampler : AIDEN CAMPBELL
Site :
Quote number : SY/285/18
No. of samples received : 38
No. of samples analysed : 38

Page : 1 of 18
Laboratory : Environmental Division Brisbane
Contact : Customer Services EB
Address : 2 Byth Street Stafford QLD Australia 4053
Telephone : +61-7-3243 7222
Date Samples Received : 29-Jun-2018 08:50
Date Analysis Commenced : 02-Jul-2018
Issue Date : 17-Jul-2018 13:41



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. 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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics, Mayfield West, NSW
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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.

- ALS is not NATA accredited for the analysis of Exchangeable Aluminium and Exchange Acidity in soils when performed under ALS Method ED005.
- ALS is not NATA accredited for the analysis of Exchangeable Cations on Alkaline Soils when performed under ALS Method ED006.
- ED005 (Exchange Acidity): It is recognised that Exchange Acidity is less than Exchangeable Aluminium for some samples. However, the difference is within experimental variation of the methods.
- ED007 (Exchangeable Cations): Magnesium/Potassium ratio could not be determined as both the Magnesium and Potassium results were less than reportable limits for some samples.
- ED007 (Exchangeable Cations): Calcium/Magnesium ratio could not be determined as both the Calcium and Magnesium results were less than reportable limits for some samples.
- ED007 and ED008: When Exchangeable Al is reported from these methods, it should be noted that Rayment & Lyons (2011) suggests Exchange Acidity by 1M KCl - Method 15G1 (ED005) is a more suitable method for the determination of exchange acidity ($H^+ + Al^{3+}$).



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	GPSS01-A1	GPSS01-B1	GPSS01-B2	GPSS02-A1	GPSS03-A1
Client sampling date / time					27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00
Compound	CAS Number	LOR	Unit		EB1815902-001	EB1815902-002	EB1815902-003	EB1815902-004	EB1815902-005
					Result	Result	Result	Result	Result
EA002: pH 1:2 (Soils)									
pH Value	----	0.1	pH Unit		5.2	5.2	5.3	4.8	5.0
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		5.1	5.3	5.4	4.8	5.1
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		3	7	16	25	16
Electrical Conductivity @ 25°C	----	1	µS/cm		2	3	7	12	10
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		4.2	8.4	8.7	6.0	2.8
EA150: Particle Sizing									
+75µm	----	1	%		78	65	70	82	79
+150µm	----	1	%		62	40	52	63	54
+300µm	----	1	%		58	34	48	54	39
+425µm	----	1	%		57	33	47	51	37
+600µm	----	1	%		56	32	46	50	35
+1180µm	----	1	%		55	31	45	49	34
+2.36mm	----	1	%		47	26	38	47	32
+4.75mm	----	1	%		31	19	23	43	28
+9.5mm	----	1	%		9	15	12	29	16
+19.0mm	----	1	%		<1	3	5	16	<1
+37.5mm	----	1	%		<1	<1	<1	<1	<1
+75.0mm	----	1	%		<1	<1	<1	<1	<1
EA150: Soil Classification based on Particle Size									
Clay (<2 µm)	----	1	%		11	15	17	10	10
Silt (2-60 µm)	----	1	%		10	17	12	8	10
Sand (0.06-2.00 mm)	----	1	%		30	40	31	34	47
Gravel (>2mm)	----	1	%		49	28	40	48	33
Cobbles (>6cm)	----	1	%		<1	<1	<1	<1	<1
EA152: Soil Particle Density									
ø Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3		2.48	2.54	2.63	2.49	2.55
ED005: Exchange Acidity									
Exchange Acidity	----	0.1	meq/100g		1.0	1.0	1.1	1.6	1.0
Exchangeable Aluminium	----	0.1	meq/100g		1.1	1.1	1.1	1.8	1.0
ED007: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g		0.8	<0.1	<0.1	0.2	<0.1



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	GPSS01-A1	GPSS01-B1	GPSS01-B2	GPSS02-A1	GPSS03-A1
Client sampling date / time					27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00
Compound	CAS Number	LOR	Unit		EB1815902-001	EB1815902-002	EB1815902-003	EB1815902-004	EB1815902-005
					Result	Result	Result	Result	Result
ED007: Exchangeable Cations - Continued									
Exchangeable Magnesium	----	0.1	meq/100g		0.6	0.2	0.2	0.3	<0.1
Exchangeable Potassium	----	0.1	meq/100g		<0.1	<0.1	<0.1	<0.1	<0.1
Exchangeable Sodium	----	0.1	meq/100g		<0.1	<0.1	<0.1	<0.1	<0.1
Cation Exchange Capacity	----	0.1	meq/100g		2.4	1.2	1.3	2.1	1.0
Exchangeable Sodium Percent	----	0.1	%		1.9	4.6	5.8	5.5	9.3
Calcium/Magnesium Ratio	----	0.1	-		1.3	<0.1	<0.1	0.7	----
ED021: Bicarbonate Extractable Potassium (Colwell)									
Bicarbonate Extractable K (Colwell)	----	10	mg/kg		291	279	229	268	285
ED047: Potassium Chloride Extractable Sulfur (KCI-40)									
Ø KCI-40 Extractable Sulfur	----	10	mg/kg		<10	<10	<10	<10	<10
EG005T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		17	10	11	<5	<5
Cadmium	7440-43-9	1	mg/kg		<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg		44	29	28	9	4
Copper	7440-50-8	5	mg/kg		<5	<5	<5	<5	<5
Lead	7439-92-1	5	mg/kg		11	8	9	<5	13
Nickel	7440-02-0	2	mg/kg		3	3	2	3	2
Zinc	7440-66-6	5	mg/kg		<5	<5	<5	<5	<5
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg		<0.1	<0.1	0.1	<0.1	0.1
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	20	mg/kg		970	510	250	890	590
EK062: Total Nitrogen as N (TKN + NOx)									
^ Total Nitrogen as N	----	20	mg/kg		970	510	250	890	590
EK080: Bicarbonate Extractable Phosphorus (Colwell)									
Bicarbonate Ext. P (Colwell)	----	5	mg/kg		<5	<5	<5	<5	<5
EP004: Organic Matter									
Organic Matter	----	0.5	%		3.4	1.2	3.6	1.0	3.4
Total Organic Carbon	----	0.5	%		2.0	0.7	20.9	0.6	2.0



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	GPSS03-B2	GPSS04-A1	GPSS04-B2	GPSS05-A1	GPSS05-B1
Client sampling date / time					27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00
Compound	CAS Number	LOR	Unit		EB1815902-006	EB1815902-007	EB1815902-008	EB1815902-009	EB1815902-010
					Result	Result	Result	Result	Result
EA002: pH 1:2 (Soils)									
pH Value	----	0.1	pH Unit		5.1	5.4	5.2	5.3	5.4
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		5.2	5.4	5.2	5.3	5.5
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		8	13	8	6	5
Electrical Conductivity @ 25°C	----	1	µS/cm		3	7	4	4	2
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		4.5	1.2	3.4	1.4	2.2
EA150: Particle Sizing									
+75µm	----	1	%		78	85	78	71	73
+150µm	----	1	%		49	74	59	36	49
+300µm	----	1	%		36	68	49	17	40
+425µm	----	1	%		34	67	47	12	37
+600µm	----	1	%		33	66	45	9	36
+1180µm	----	1	%		31	63	42	5	33
+2.36mm	----	1	%		30	58	37	2	30
+4.75mm	----	1	%		26	37	24	<1	26
+9.5mm	----	1	%		19	6	11	<1	9
+19.0mm	----	1	%		17	3	11	<1	3
+37.5mm	----	1	%		<1	<1	<1	<1	<1
+75.0mm	----	1	%		<1	<1	<1	<1	<1
EA150: Soil Classification based on Particle Size									
Clay (<2 µm)	----	1	%		8	8	10	10	10
Silt (2-60 µm)	----	1	%		13	5	9	14	13
Sand (0.06-2.00 mm)	----	1	%		49	27	42	73	46
Gravel (>2mm)	----	1	%		30	60	39	3	31
Cobbles (>6cm)	----	1	%		<1	<1	<1	<1	<1
EA152: Soil Particle Density									
ø Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3		2.62	2.51	2.62	2.63	2.64
ED005: Exchange Acidity									
Exchange Acidity	----	0.1	meq/100g		0.8	0.6	0.7	0.5	0.4
Exchangeable Aluminium	----	0.1	meq/100g		0.8	0.6	0.8	0.5	0.4
ED007: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g		<0.1	0.9	<0.1	<0.1	<0.1



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	GPSS03-B2	GPSS04-A1	GPSS04-B2	GPSS05-A1	GPSS05-B1
Client sampling date / time					27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00
Compound	CAS Number	LOR	Unit		EB1815902-006	EB1815902-007	EB1815902-008	EB1815902-009	EB1815902-010
					Result	Result	Result	Result	Result
ED007: Exchangeable Cations - Continued									
Exchangeable Magnesium	----	0.1	meq/100g		<0.1	0.4	<0.1	0.2	0.2
Exchangeable Potassium	----	0.1	meq/100g		<0.1	0.1	<0.1	<0.1	<0.1
Exchangeable Sodium	----	0.1	meq/100g		<0.1	<0.1	<0.1	<0.1	<0.1
Cation Exchange Capacity	----	0.1	meq/100g		0.8	2.0	0.7	0.7	0.6
Exchangeable Sodium Percent	----	0.1	%		18.5	1.4	4.1	5.6	6.0
Calcium/Magnesium Ratio	----	0.1	-		----	2.2	----	<0.1	<0.1
Magnesium/Potassium Ratio	----	0.1	-		----	4.0	----	----	----
ED021: Bicarbonate Extractable Potassium (Colwell)									
Bicarbonate Extractable K (Colwell)	----	10	mg/kg		260	313	253	215	285
ED047: Potassium Chloride Extractable Sulfur (KCI-40)									
Ø KCI-40 Extractable Sulfur	----	10	mg/kg		<10	<10	<10	<10	<10
EG005T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		<5	16	6	<5	<5
Cadmium	7440-43-9	1	mg/kg		<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg		13	14	6	2	3
Copper	7440-50-8	5	mg/kg		<5	<5	<5	<5	<5
Lead	7439-92-1	5	mg/kg		<5	6	<5	<5	<5
Nickel	7440-02-0	2	mg/kg		2	<2	<2	<2	<2
Zinc	7440-66-6	5	mg/kg		<5	<5	<5	<5	<5
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	20	mg/kg		390	680	340	260	230
EK062: Total Nitrogen as N (TKN + NOx)									
^ Total Nitrogen as N	----	20	mg/kg		390	680	340	260	230
EK080: Bicarbonate Extractable Phosphorus (Colwell)									
Bicarbonate Ext. P (Colwell)	----	5	mg/kg		<5	<5	<5	<5	10
EP004: Organic Matter									
Organic Matter	----	0.5	%		1.7	1.8	2.1	1.8	1.7
Total Organic Carbon	----	0.5	%		1.0	1.0	1.2	1.0	1.0



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	GPSS06-A1	GPSS06-B2	GPSS07-A1	GPSS07-B2	GPSS08-A1
Client sampling date / time					27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00	28-Jun-2018 00:00
Compound	CAS Number	LOR	Unit		EB1815902-011	EB1815902-012	EB1815902-013	EB1815902-014	EB1815902-015
					Result	Result	Result	Result	Result
EA002: pH 1:2 (Soils)									
pH Value	----	0.1	pH Unit		5.5	5.4	5.1	5.2	4.9
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		5.5	5.3	5.2	5.1	4.9
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		25	8	12	2	12
Electrical Conductivity @ 25°C	----	1	µS/cm		12	4	7	2	5
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		18.4	6.4	3.7	5.0	3.3
EA150: Particle Sizing									
+75µm	----	1	%		72	70	69	69	69
+150µm	----	1	%		57	49	37	35	46
+300µm	----	1	%		51	39	15	16	23
+425µm	----	1	%		50	37	12	13	16
+600µm	----	1	%		49	36	11	12	13
+1180µm	----	1	%		48	34	10	11	10
+2.36mm	----	1	%		45	31	8	10	9
+4.75mm	----	1	%		37	23	6	7	8
+9.5mm	----	1	%		16	6	<1	<1	4
+19.0mm	----	1	%		7	<1	<1	<1	<1
+37.5mm	----	1	%		<1	<1	<1	<1	<1
+75.0mm	----	1	%		<1	<1	<1	<1	<1
EA150: Soil Classification based on Particle Size									
Clay (<2 µm)	----	1	%		13	13	11	13	13
Silt (2-60 µm)	----	1	%		14	14	19	15	16
Sand (0.06-2.00 mm)	----	1	%		27	41	61	62	62
Gravel (>2mm)	----	1	%		46	32	9	10	9
Cobbles (>6cm)	----	1	%		<1	<1	<1	<1	<1
EA152: Soil Particle Density									
ø Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3		2.57	2.60	2.53	2.61	2.54
ED005: Exchange Acidity									
Exchange Acidity	----	0.1	meq/100g		0.6	0.9	0.9	0.8	1.4
Exchangeable Aluminium	----	0.1	meq/100g		0.6	1.0	0.8	0.9	1.6
ED007: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g		0.8	<0.1	<0.1	<0.1	<0.1



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	GPSS06-A1	GPSS06-B2	GPSS07-A1	GPSS07-B2	GPSS08-A1
Client sampling date / time					27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00	28-Jun-2018 00:00
Compound	CAS Number	LOR	Unit		EB1815902-011	EB1815902-012	EB1815902-013	EB1815902-014	EB1815902-015
					Result	Result	Result	Result	Result
ED007: Exchangeable Cations - Continued									
Exchangeable Magnesium	----	0.1	meq/100g		0.8	0.2	<0.1	<0.1	0.1
Exchangeable Potassium	----	0.1	meq/100g		0.1	<0.1	<0.1	<0.1	<0.1
Exchangeable Sodium	----	0.1	meq/100g		<0.1	<0.1	<0.1	<0.1	<0.1
Cation Exchange Capacity	----	0.1	meq/100g		2.3	1.1	0.9	0.8	1.5
Exchangeable Sodium Percent	----	0.1	%		2.0	5.5	10.4	21.0	13.5
Calcium/Magnesium Ratio	----	0.1	-		1.0	<0.1	----	----	<0.1
Magnesium/Potassium Ratio	----	0.1	-		5.5	----	----	----	----
ED021: Bicarbonate Extractable Potassium (Colwell)									
Bicarbonate Extractable K (Colwell)	----	10	mg/kg		342	222	<200	<200	<200
ED047: Potassium Chloride Extractable Sulfur (KCI-40)									
Ø KCI-40 Extractable Sulfur	----	10	mg/kg		<10	<10	<10	<10	<10
EG005T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg		<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg		20	15	4	5	5
Copper	7440-50-8	5	mg/kg		<5	<5	<5	<5	<5
Lead	7439-92-1	5	mg/kg		5	7	<5	<5	<5
Nickel	7440-02-0	2	mg/kg		3	4	<2	<2	2
Zinc	7440-66-6	5	mg/kg		<5	<5	<5	<5	<5
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg		<0.1	<0.1	1.2	0.2	0.2
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	20	mg/kg		1050	470	520	280	730
EK062: Total Nitrogen as N (TKN + NOx)									
^ Total Nitrogen as N	----	20	mg/kg		1050	470	520	280	730
EK080: Bicarbonate Extractable Phosphorus (Colwell)									
Bicarbonate Ext. P (Colwell)	----	5	mg/kg		6	13	<5	<5	<5
EP004: Organic Matter									
Organic Matter	----	0.5	%		1.5	3.4	1.3	2.1	2.4
Total Organic Carbon	----	0.5	%		0.9	2.0	0.7	1.2	1.4



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	GPSS08-B2	GPSS09-A1	GPSS09-B2	GPSS10-A1	GPSS10-B2
Client sampling date / time					28-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00
Compound	CAS Number	LOR	Unit		EB1815902-016	EB1815902-017	EB1815902-018	EB1815902-019	EB1815902-020
					Result	Result	Result	Result	Result
EA002: pH 1:2 (Soils)									
pH Value	----	0.1	pH Unit		5.2	5.4	5.5	5.4	5.4
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		5.1	5.4	5.5	5.4	5.4
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		3	10	3	21	12
Electrical Conductivity @ 25°C	----	1	µS/cm		2	6	1	10	4
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		6.5	4.0	9.3	1.9	4.7
EA150: Particle Sizing									
+75µm	----	1	%		67	83	67	75	71
+150µm	----	1	%		39	64	40	57	51
+300µm	----	1	%		21	58	34	53	46
+425µm	----	1	%		14	56	33	52	45
+600µm	----	1	%		10	54	32	51	44
+1180µm	----	1	%		7	49	29	50	43
+2.36mm	----	1	%		6	36	19	47	40
+4.75mm	----	1	%		5	18	7	34	28
+9.5mm	----	1	%		2	1	3	4	8
+19.0mm	----	1	%		<1	1	3	1	2
+37.5mm	----	1	%		<1	<1	<1	<1	<1
+75.0mm	----	1	%		<1	<1	<1	<1	<1
EA150: Soil Classification based on Particle Size									
Clay (<2 µm)	----	1	%		16	9	16	14	15
Silt (2-60 µm)	----	1	%		13	8	16	11	13
Sand (0.06-2.00 mm)	----	1	%		65	43	46	27	31
Gravel (>2mm)	----	1	%		6	40	22	48	41
Cobbles (>6cm)	----	1	%		<1	<1	<1	<1	<1
EA152: Soil Particle Density									
ø Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3		2.63	2.63	2.73	2.57	2.62
ED005: Exchange Acidity									
Exchange Acidity	----	0.1	meq/100g		1.0	0.5	0.1	0.6	0.7
Exchangeable Aluminium	----	0.1	meq/100g		1.2	0.5	0.1	0.6	0.8
ED007: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g		<0.1	0.2	<0.1	0.5	0.1



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	GPSS08-B2	GPSS09-A1	GPSS09-B2	GPSS10-A1	GPSS10-B2
Client sampling date / time					28-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00
Compound	CAS Number	LOR	Unit		EB1815902-016	EB1815902-017	EB1815902-018	EB1815902-019	EB1815902-020
					Result	Result	Result	Result	Result
ED007: Exchangeable Cations - Continued									
Exchangeable Magnesium	----	0.1	meq/100g		<0.1	0.2	<0.1	0.4	0.2
Exchangeable Potassium	----	0.1	meq/100g		<0.1	<0.1	<0.1	0.1	<0.1
Exchangeable Sodium	----	0.1	meq/100g		<0.1	<0.1	<0.1	<0.1	<0.1
Cation Exchange Capacity	----	0.1	meq/100g		1.0	0.9	0.2	1.6	1.0
Exchangeable Sodium Percent	----	0.1	%		16.8	4.8	12.4	2.1	3.3
Calcium/Magnesium Ratio	----	0.1	-		----	1.0	----	1.2	0.5
Magnesium/Potassium Ratio	----	0.1	-		----	----	----	4.0	----
ED021: Bicarbonate Extractable Potassium (Colwell)									
Bicarbonate Extractable K (Colwell)	----	10	mg/kg		<200	<200	<200	<200	<200
ED047: Potassium Chloride Extractable Sulfur (KCI-40)									
Ø KCI-40 Extractable Sulfur	----	10	mg/kg		<10	<10	<10	<10	<10
EG005T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		<5	14	18	<5	<5
Cadmium	7440-43-9	1	mg/kg		<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg		5	23	43	10	31
Copper	7440-50-8	5	mg/kg		<5	7	9	<5	<5
Lead	7439-92-1	5	mg/kg		<5	10	14	<5	<5
Nickel	7440-02-0	2	mg/kg		<2	18	8	3	3
Zinc	7440-66-6	5	mg/kg		<5	10	10	<5	<5
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg		<0.1	<0.1	<0.1	0.1	<0.1
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	20	mg/kg		360	620	230	850	580
EK062: Total Nitrogen as N (TKN + NOx)									
^ Total Nitrogen as N	----	20	mg/kg		360	620	230	850	580
EK080: Bicarbonate Extractable Phosphorus (Colwell)									
Bicarbonate Ext. P (Colwell)	----	5	mg/kg		<5	<5	<5	<5	<5
EP004: Organic Matter									
Organic Matter	----	0.5	%		1.5	1.2	1.9	2.2	2.1
Total Organic Carbon	----	0.5	%		0.8	0.7	1.1	1.3	1.2



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	GPSS12-A1	GPSS12-A2	GPSS13-A1	GPSS13-A2	GPSS14-A1
Client sampling date / time					27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00
Compound	CAS Number	LOR	Unit		EB1815902-021	EB1815902-022	EB1815902-023	EB1815902-024	EB1815902-025
					Result	Result	Result	Result	Result
EA002: pH 1:2 (Soils)									
pH Value	----	0.1	pH Unit		5.4	5.3	5.2	5.2	5.0
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		5.4	5.3	5.3	5.2	5.0
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		9	3	13	4	4
Electrical Conductivity @ 25°C	----	1	µS/cm		4	2	5	2	2
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		12.4	10.4	8.4	7.9	7.0
EA150: Particle Sizing									
+75µm	----	1	%		56	54	56	62	61
+150µm	----	1	%		17	17	16	29	28
+300µm	----	1	%		4	6	5	22	9
+425µm	----	1	%		2	4	3	20	4
+600µm	----	1	%		1	4	2	20	2
+1180µm	----	1	%		<1	3	<1	19	<1
+2.36mm	----	1	%		<1	3	<1	18	<1
+4.75mm	----	1	%		<1	2	<1	16	<1
+9.5mm	----	1	%		<1	<1	<1	7	<1
+19.0mm	----	1	%		<1	<1	<1	<1	<1
+37.5mm	----	1	%		<1	<1	<1	<1	<1
+75.0mm	----	1	%		<1	<1	<1	<1	<1
EA150: Soil Classification based on Particle Size									
Clay (<2 µm)	----	1	%		13	16	10	11	15
Silt (2-60 µm)	----	1	%		25	25	28	24	23
Sand (0.06-2.00 mm)	----	1	%		62	56	62	47	62
Gravel (>2mm)	----	1	%		<1	3	<1	18	<1
Cobbles (>6cm)	----	1	%		<1	<1	<1	<1	<1
EA152: Soil Particle Density									
ø Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3		2.63	2.64	2.62	2.65	2.58
ED005: Exchange Acidity									
Exchange Acidity	----	0.1	meq/100g		0.6	0.6	0.7	0.6	1.2
Exchangeable Aluminium	----	0.1	meq/100g		0.6	0.5	0.7	0.6	1.3
ED007: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g		<0.1	<0.1	<0.1	<0.1	<0.1



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	GPSS12-A1	GPSS12-A2	GPSS13-A1	GPSS13-A2	GPSS14-A1
Client sampling date / time					27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00
Compound	CAS Number	LOR	Unit		EB1815902-021	EB1815902-022	EB1815902-023	EB1815902-024	EB1815902-025
					Result	Result	Result	Result	Result
ED007: Exchangeable Cations - Continued									
Exchangeable Magnesium	----	0.1	meq/100g		0.1	0.2	<0.1	<0.1	<0.1
Exchangeable Potassium	----	0.1	meq/100g		<0.1	<0.1	<0.1	<0.1	<0.1
Exchangeable Sodium	----	0.1	meq/100g		<0.1	<0.1	<0.1	<0.1	<0.1
Cation Exchange Capacity	----	0.1	meq/100g		0.7	0.8	0.7	0.6	1.2
Exchangeable Sodium Percent	----	0.1	%		21.2	6.9	19.3	17.1	29.2
Calcium/Magnesium Ratio	----	0.1	-		<0.1	<0.1	----	----	----
ED021: Bicarbonate Extractable Potassium (Colwell)									
Bicarbonate Extractable K (Colwell)	----	10	mg/kg		<200	<200	<200	<200	<200
ED047: Potassium Chloride Extractable Sulfur (KCI-40)									
ø KCI-40 Extractable Sulfur	----	10	mg/kg		<10	<10	<10	<10	<10
EG005T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg		<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg		10	3	3	3	5
Copper	7440-50-8	5	mg/kg		<5	<5	<5	<5	<5
Lead	7439-92-1	5	mg/kg		<5	<5	<5	<5	<5
Nickel	7440-02-0	2	mg/kg		<2	<2	<2	<2	2
Zinc	7440-66-6	5	mg/kg		<5	<5	<5	<5	<5
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg		0.2	<0.1	0.6	0.1	<0.1
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	20	mg/kg		370	200	640	390	810
EK062: Total Nitrogen as N (TKN + NOx)									
^ Total Nitrogen as N	----	20	mg/kg		370	200	640	390	810
EK080: Bicarbonate Extractable Phosphorus (Colwell)									
Bicarbonate Ext. P (Colwell)	----	5	mg/kg		<5	<5	<5	<5	<5
EP004: Organic Matter									
Organic Matter	----	0.5	%		1.3	1.9	1.6	1.4	1.7
Total Organic Carbon	----	0.5	%		0.7	1.1	0.9	0.8	1.0



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	GPSS14-B2	GPSS15-A1	GPSS15-A2	GPSS16-A1	GPSS16-B2
Client sampling date / time					27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00
Compound	CAS Number	LOR	Unit		EB1815902-026	EB1815902-027	EB1815902-028	EB1815902-029	EB1815902-030
					Result	Result	Result	Result	Result
EA002: pH 1:2 (Soils)									
pH Value	----	0.1	pH Unit		5.2	5.0	5.1	5.1	5.6
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		5.1	5.0	5.0	5.2	5.3
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		2	7	3	22	2
Electrical Conductivity @ 25°C	----	1	µS/cm		1	3	2	8	1
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		8.7	4.0	4.8	4.8	7.2
EA150: Particle Sizing									
+75µm	----	1	%		60	60	57	61	58
+150µm	----	1	%		22	21	16	35	26
+300µm	----	1	%		8	5	6	14	12
+425µm	----	1	%		4	3	3	8	7
+600µm	----	1	%		2	2	2	6	6
+1180µm	----	1	%		<1	<1	<1	4	4
+2.36mm	----	1	%		<1	<1	<1	4	4
+4.75mm	----	1	%		<1	<1	<1	3	3
+9.5mm	----	1	%		<1	<1	<1	<1	2
+19.0mm	----	1	%		<1	<1	<1	<1	<1
+37.5mm	----	1	%		<1	<1	<1	<1	<1
+75.0mm	----	1	%		<1	<1	<1	<1	<1
EA150: Soil Classification based on Particle Size									
Clay (<2 µm)	----	1	%		20	17	22	22	24
Silt (2-60 µm)	----	1	%		16	20	18	16	17
Sand (0.06-2.00 mm)	----	1	%		64	63	59	58	55
Gravel (>2mm)	----	1	%		<1	<1	1	4	4
Cobbles (>6cm)	----	1	%		<1	<1	<1	<1	<1
EA152: Soil Particle Density									
ø Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3		2.65	2.59	2.60	2.46	2.60
ED005: Exchange Acidity									
Exchange Acidity	----	0.1	meq/100g		1.0	1.1	1.2	1.1	0.8
Exchangeable Aluminium	----	0.1	meq/100g		1.2	1.2	1.2	1.2	0.7
ED007: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g		<0.1	<0.1	<0.1	0.1	<0.1



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	GPSS14-B2	GPSS15-A1	GPSS15-A2	GPSS16-A1	GPSS16-B2
Client sampling date / time					27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00
Compound	CAS Number	LOR	Unit		EB1815902-026	EB1815902-027	EB1815902-028	EB1815902-029	EB1815902-030
					Result	Result	Result	Result	Result
ED007: Exchangeable Cations - Continued									
Exchangeable Magnesium	----	0.1	meq/100g		<0.1	<0.1	0.1	0.4	0.3
Exchangeable Potassium	----	0.1	meq/100g		<0.1	<0.1	<0.1	<0.1	<0.1
Exchangeable Sodium	----	0.1	meq/100g		<0.1	<0.1	<0.1	<0.1	<0.1
Cation Exchange Capacity	----	0.1	meq/100g		1.0	1.1	1.3	1.6	1.1
Exchangeable Sodium Percent	----	0.1	%		19.1	10.4	10.2	6.6	7.3
Calcium/Magnesium Ratio	----	0.1	-		----	----	<0.1	0.2	<0.1
ED021: Bicarbonate Extractable Potassium (Colwell)									
Bicarbonate Extractable K (Colwell)	----	10	mg/kg		<200	<200	<200	<200	<200
ED047: Potassium Chloride Extractable Sulfur (KCI-40)									
ø KCI-40 Extractable Sulfur	----	10	mg/kg		<10	<10	<10	<10	<10
EG005T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg		<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg		5	4	5	7	9
Copper	7440-50-8	5	mg/kg		<5	<5	<5	<5	<5
Lead	7439-92-1	5	mg/kg		<5	5	6	6	6
Nickel	7440-02-0	2	mg/kg		<2	2	3	2	2
Zinc	7440-66-6	5	mg/kg		<5	<5	<5	<5	<5
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg		<0.1	0.1	<0.1	0.2	<0.1
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	20	mg/kg		140	600	260	840	190
EK062: Total Nitrogen as N (TKN + NOx)									
^ Total Nitrogen as N	----	20	mg/kg		140	600	260	840	190
EK080: Bicarbonate Extractable Phosphorus (Colwell)									
Bicarbonate Ext. P (Colwell)	----	5	mg/kg		<5	<5	<5	<5	<5
EP004: Organic Matter									
Organic Matter	----	0.5	%		1.8	1.3	1.6	2.6	1.5
Total Organic Carbon	----	0.5	%		1.0	0.7	0.9	1.5	0.8



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	GPSS17-A1	GPSS17-A2	GPSS17-B2	GPSSD1-A1	GPSSD1-B2
Client sampling date / time					28-Jun-2018 00:00	28-Jun-2018 00:00	28-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00
Compound	CAS Number	LOR	Unit		EB1815902-031	EB1815902-032	EB1815902-033	EB1815902-034	EB1815902-035
					Result	Result	Result	Result	Result
EA002: pH 1:2 (Soils)									
pH Value	----	0.1	pH Unit		5.1	5.2	5.3	5.2	5.4
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		5.1	5.1	5.1	5.2	5.4
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		5	3	2	12	5
Electrical Conductivity @ 25°C	----	1	µS/cm		3	2	1	5	2
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		5.7	7.6	8.5	1.5	3.7
EA150: Particle Sizing									
+75µm	----	1	%		48	48	51	87	86
+150µm	----	1	%		20	18	20	67	66
+300µm	----	1	%		6	6	7	58	55
+425µm	----	1	%		3	3	4	56	53
+600µm	----	1	%		2	1	2	56	53
+1180µm	----	1	%		<1	<1	1	55	52
+2.36mm	----	1	%		<1	<1	<1	54	51
+4.75mm	----	1	%		<1	<1	<1	43	46
+9.5mm	----	1	%		<1	<1	<1	23	32
+19.0mm	----	1	%		<1	<1	<1	<1	10
+37.5mm	----	1	%		<1	<1	<1	<1	<1
+75.0mm	----	1	%		<1	<1	<1	<1	<1
EA150: Soil Classification based on Particle Size									
Clay (<2 µm)	----	1	%		22	20	23	7	8
Silt (2-60 µm)	----	1	%		25	28	20	6	5
Sand (0.06-2.00 mm)	----	1	%		53	52	56	33	36
Gravel (>2mm)	----	1	%		<1	<1	1	54	51
Cobbles (>6cm)	----	1	%		<1	<1	<1	<1	<1
EA152: Soil Particle Density									
ø Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3		2.54	2.56	2.61	2.60	2.63
ED005: Exchange Acidity									
Exchange Acidity	----	0.1	meq/100g		1.5	1.6	1.4	0.8	0.7
Exchangeable Aluminium	----	0.1	meq/100g		1.7	1.7	1.3	0.7	0.6
ED007: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g		<0.1	<0.1	<0.1	<0.1	<0.1



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	GPSS17-A1	GPSS17-A2	GPSS17-B2	GPSSD1-A1	GPSSD1-B2
Client sampling date / time					28-Jun-2018 00:00	28-Jun-2018 00:00	28-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00
Compound	CAS Number	LOR	Unit		EB1815902-031	EB1815902-032	EB1815902-033	EB1815902-034	EB1815902-035
					Result	Result	Result	Result	Result
ED007: Exchangeable Cations - Continued									
Exchangeable Magnesium	----	0.1	meq/100g		<0.1	<0.1	<0.1	0.1	<0.1
Exchangeable Potassium	----	0.1	meq/100g		<0.1	<0.1	<0.1	<0.1	<0.1
Exchangeable Sodium	----	0.1	meq/100g		<0.1	<0.1	<0.1	<0.1	<0.1
Cation Exchange Capacity	----	0.1	meq/100g		1.5	1.6	1.4	0.9	0.7
Exchangeable Sodium Percent	----	0.1	%		28.6	37.3	23.1	9.9	16.1
Calcium/Magnesium Ratio	----	0.1	-		----	----	----	<0.1	----
ED021: Bicarbonate Extractable Potassium (Colwell)									
Bicarbonate Extractable K (Colwell)	----	10	mg/kg		<200	<200	<200	<200	<200
ED047: Potassium Chloride Extractable Sulfur (KCI-40)									
ø KCI-40 Extractable Sulfur	----	10	mg/kg		<10	<10	<10	<10	<10
EG005T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg		<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg		5	4	10	3	11
Copper	7440-50-8	5	mg/kg		<5	<5	<5	<5	<5
Lead	7439-92-1	5	mg/kg		7	7	7	<5	<5
Nickel	7440-02-0	2	mg/kg		3	3	2	<2	<2
Zinc	7440-66-6	5	mg/kg		<5	<5	<5	<5	<5
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg		0.2	<0.1	<0.1	<0.1	<0.1
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	20	mg/kg		860	460	210	570	290
EK062: Total Nitrogen as N (TKN + NOx)									
^ Total Nitrogen as N	----	20	mg/kg		860	460	210	570	290
EK080: Bicarbonate Extractable Phosphorus (Colwell)									
Bicarbonate Ext. P (Colwell)	----	5	mg/kg		<5	<5	<5	8	5
EP004: Organic Matter									
Organic Matter	----	0.5	%		1.6	1.7	1.4	1.5	1.9
Total Organic Carbon	----	0.5	%		0.9	1.0	0.8	0.8	1.1



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	duplicate	GPSS04-A2	GPSS04-B1	----	----
Client sampling date / time					27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00	----	----
Compound	CAS Number	LOR	Unit		EB1815902-036	EB1815902-037	EB1815902-038	-----	-----
					Result	Result	Result	----	----
EA002: pH 1:2 (Soils)									
pH Value	----	0.1	pH Unit		5.6	5.3	5.3	----	----
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		5.4	5.3	5.3	----	----
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		3	12	9	----	----
Electrical Conductivity @ 25°C	----	1	µS/cm		2	6	4	----	----
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		10.2	1.9	3.0	----	----
EA150: Particle Sizing									
+75µm	----	1	%		71	85	83	----	----
+150µm	----	1	%		44	67	61	----	----
+300µm	----	1	%		38	58	52	----	----
+425µm	----	1	%		37	56	50	----	----
+600µm	----	1	%		35	54	48	----	----
+1180µm	----	1	%		31	52	46	----	----
+2.36mm	----	1	%		21	47	40	----	----
+4.75mm	----	1	%		6	32	26	----	----
+9.5mm	----	1	%		<1	9	4	----	----
+19.0mm	----	1	%		<1	3	<1	----	----
+37.5mm	----	1	%		<1	<1	<1	----	----
+75.0mm	----	1	%		<1	<1	<1	----	----
EA150: Soil Classification based on Particle Size									
Clay (<2 µm)	----	1	%		12	8	8	----	----
Silt (2-60 µm)	----	1	%		16	7	9	----	----
Sand (0.06-2.00 mm)	----	1	%		48	37	41	----	----
Gravel (>2mm)	----	1	%		24	48	42	----	----
Cobbles (>6cm)	----	1	%		<1	<1	<1	----	----
EA152: Soil Particle Density									
ø Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3		2.72	2.58	2.61	----	----
ED005: Exchange Acidity									
Exchange Acidity	----	0.1	meq/100g		<0.1	0.8	0.8	----	----
Exchangeable Aluminium	----	0.1	meq/100g		<0.1	0.8	0.7	----	----
ED007: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g		<0.1	0.3	0.2	----	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	duplicate	GPSS04-A2	GPSS04-B1	----	----
Client sampling date / time					27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00	----	----
Compound	CAS Number	LOR	Unit		EB1815902-036	EB1815902-037	EB1815902-038	-----	-----
					Result	Result	Result	----	----
ED007: Exchangeable Cations - Continued									
Exchangeable Magnesium	----	0.1	meq/100g		<0.1	0.2	0.1	----	----
Exchangeable Potassium	----	0.1	meq/100g		<0.1	<0.1	<0.1	----	----
Exchangeable Sodium	----	0.1	meq/100g		<0.1	<0.1	<0.1	----	----
Cation Exchange Capacity	----	0.1	meq/100g		0.2	1.3	1.1	----	----
Exchangeable Sodium Percent	----	0.1	%		12.6	1.9	2.6	----	----
Calcium/Magnesium Ratio	----	0.1	-		----	1.5	2.0	----	----
ED021: Bicarbonate Extractable Potassium (Colwell)									
Bicarbonate Extractable K (Colwell)	----	10	mg/kg		<200	<200	<200	----	----
ED047: Potassium Chloride Extractable Sulfur (KCI-40)									
ø KCI-40 Extractable Sulfur	----	10	mg/kg		<10	<10	<10	----	----
EG005T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		20	5	6	----	----
Cadmium	7440-43-9	1	mg/kg		<1	<1	<1	----	----
Chromium	7440-47-3	2	mg/kg		39	6	5	----	----
Copper	7440-50-8	5	mg/kg		10	<5	<5	----	----
Lead	7439-92-1	5	mg/kg		12	<5	<5	----	----
Nickel	7440-02-0	2	mg/kg		8	<2	<2	----	----
Zinc	7440-66-6	5	mg/kg		11	<5	<5	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg		<0.1	<0.1	<0.1	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	20	mg/kg		240	540	340	----	----
EK062: Total Nitrogen as N (TKN + NOx)									
^ Total Nitrogen as N	----	20	mg/kg		240	540	340	----	----
EK080: Bicarbonate Extractable Phosphorus (Colwell)									
Bicarbonate Ext. P (Colwell)	----	5	mg/kg		<5	10	9	----	----
EP004: Organic Matter									
Organic Matter	----	0.5	%		1.8	1.6	1.8	----	----
Total Organic Carbon	----	0.5	%		1.0	0.9	1.0	----	----

QUALITY CONTROL REPORT

Work Order	: EB1815902	Page	: 1 of 9
Client	: ECOZ ENVIRONMENTAL SERVICES	Laboratory	: Environmental Division Brisbane
Contact	: AIDEN CAMPBELL	Contact	: Customer Services EB
Address	: PO BOX 381 DARWIN NT, AUSTRALIA 0801	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: ----	Telephone	: +61-7-3243 7222
Project	: EZ18107 - Grants Project - Waste Characterisation	Date Samples Received	: 29-Jun-2018
Order number	:	Date Analysis Commenced	: 02-Jul-2018
C-O-C number	: ----	Issue Date	: 17-Jul-2018
Sampler	: AIDEN CAMPBELL		
Site	:		
Quote number	: SY/285/18		
No. of samples received	: 38		
No. of samples analysed	: 38		



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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics, Mayfield West, NSW
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA002: pH 1:2 (Soils) (QC Lot: 1770011)									
EB1815902-001	GPSS01-A1	EA002-1: pH Value	----	0.1	pH Unit	5.2	5.2	0.00	0% - 20%
EB1815902-011	GPSS06-A1	EA002-1: pH Value	----	0.1	pH Unit	5.5	5.5	0.00	0% - 20%
EA002: pH 1:2 (Soils) (QC Lot: 1770014)									
EB1815902-021	GPSS12-A1	EA002-1: pH Value	----	0.1	pH Unit	5.4	5.5	0.00	0% - 20%
EB1815902-031	GPSS17-A1	EA002-1: pH Value	----	0.1	pH Unit	5.1	5.1	0.00	0% - 20%
EA002: pH 1:5 (Soils) (QC Lot: 1770002)									
EB1815902-001	GPSS01-A1	EA002: pH Value	----	0.1	pH Unit	5.1	5.1	0.00	0% - 20%
EB1815902-011	GPSS06-A1	EA002: pH Value	----	0.1	pH Unit	5.5	5.5	0.00	0% - 20%
EA002: pH 1:5 (Soils) (QC Lot: 1770006)									
EB1815902-021	GPSS12-A1	EA002: pH Value	----	0.1	pH Unit	5.4	5.4	0.00	0% - 20%
EB1815902-031	GPSS17-A1	EA002: pH Value	----	0.1	pH Unit	5.1	5.2	0.00	0% - 20%
EA010: Conductivity (1:2) (QC Lot: 1770012)									
EB1815902-001	GPSS01-A1	EA010-1: Electrical Conductivity @ 25°C	----	1	µS/cm	3	2	0.00	No Limit
EB1815902-011	GPSS06-A1	EA010-1: Electrical Conductivity @ 25°C	----	1	µS/cm	25	29	15.3	0% - 20%
EA010: Conductivity (1:2) (QC Lot: 1770013)									
EB1815902-021	GPSS12-A1	EA010-1: Electrical Conductivity @ 25°C	----	1	µS/cm	9	8	0.00	No Limit
EB1815902-031	GPSS17-A1	EA010-1: Electrical Conductivity @ 25°C	----	1	µS/cm	5	8	37.7	No Limit
EA010: Conductivity (1:5) (QC Lot: 1770003)									
EB1815902-001	GPSS01-A1	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	2	2	0.00	No Limit
EB1815902-011	GPSS06-A1	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	12	14	16.5	0% - 50%
EA010: Conductivity (1:5) (QC Lot: 1770007)									
EB1815902-021	GPSS12-A1	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	4	4	0.00	No Limit
EB1815902-031	GPSS17-A1	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	3	2	0.00	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 1770015)									
EB1815902-001	GPSS01-A1	EA055: Moisture Content	----	0.1	%	4.2	4.3	0.00	No Limit
EB1815902-011	GPSS06-A1	EA055: Moisture Content	----	0.1	%	18.4	18.2	1.02	0% - 50%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 1770016)									
EB1815902-021	GPSS12-A1	EA055: Moisture Content	----	0.1	%	12.4	12.2	1.45	0% - 50%
EB1815902-031	GPSS17-A1	EA055: Moisture Content	----	0.1	%	5.7	5.9	3.15	No Limit
ED005: Exchange Acidity (QC Lot: 1774693)									
EB1815902-011	GPSS06-A1	ED005: Exchange Acidity	----	0.1	meq/100g	0.6	0.6	0.00	No Limit
		ED005: Exchangeable Aluminium	----	0.1	meq/100g	0.6	0.6	0.00	No Limit
EB1815902-001	GPSS01-A1	ED005: Exchange Acidity	----	0.1	meq/100g	1.0	0.9	0.00	No Limit
		ED005: Exchangeable Aluminium	----	0.1	meq/100g	1.1	1.1	0.00	0% - 50%
ED005: Exchange Acidity (QC Lot: 1774697)									
EB1815902-031	GPSS17-A1	ED005: Exchange Acidity	----	0.1	meq/100g	1.5	1.5	0.00	0% - 50%
		ED005: Exchangeable Aluminium	----	0.1	meq/100g	1.7	1.7	0.00	0% - 50%
EB1815902-021	GPSS12-A1	ED005: Exchange Acidity	----	0.1	meq/100g	0.6	0.6	0.00	No Limit
		ED005: Exchangeable Aluminium	----	0.1	meq/100g	0.6	0.6	0.00	No Limit
ED007: Exchangeable Cations (QC Lot: 1774692)									
EB1815902-009	GPSS05-A1	ED007: Exchangeable Calcium	----	0.1	meq/100g	<0.1	<0.1	0.00	No Limit
		ED007: Exchangeable Magnesium	----	0.1	meq/100g	0.2	0.2	0.00	No Limit
		ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	<0.1	0.00	No Limit
		ED007: Exchangeable Sodium	----	0.1	meq/100g	<0.1	<0.1	0.00	No Limit
EB1815902-001	GPSS01-A1	ED007: Exchangeable Calcium	----	0.1	meq/100g	0.8	0.8	0.00	No Limit
		ED007: Exchangeable Magnesium	----	0.1	meq/100g	0.6	0.7	0.00	No Limit
		ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	0.1	0.00	No Limit
		ED007: Exchangeable Sodium	----	0.1	meq/100g	<0.1	<0.1	0.00	No Limit
ED007: Exchangeable Cations (QC Lot: 1774696)									
EB1815902-029	GPSS16-A1	ED007: Exchangeable Calcium	----	0.1	meq/100g	0.1	0.1	0.00	No Limit
		ED007: Exchangeable Magnesium	----	0.1	meq/100g	0.4	0.4	0.00	No Limit
		ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	<0.1	0.00	No Limit
		ED007: Exchangeable Sodium	----	0.1	meq/100g	<0.1	<0.1	0.00	No Limit
EB1815902-021	GPSS12-A1	ED007: Exchangeable Calcium	----	0.1	meq/100g	<0.1	<0.1	0.00	No Limit
		ED007: Exchangeable Magnesium	----	0.1	meq/100g	0.1	0.1	0.00	No Limit
		ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	<0.1	0.00	No Limit
		ED007: Exchangeable Sodium	----	0.1	meq/100g	<0.1	<0.1	0.00	No Limit
ED021: Bicarbonate Extractable Potassium (Colwell) (QC Lot: 1774461)									
EB1815902-001	GPSS01-A1	ED021: Bicarbonate Extractable K (Colwell)	----	100	mg/kg	291	<200	37.2	No Limit
EB1815902-009	GPSS05-A1	ED021: Bicarbonate Extractable K (Colwell)	----	100	mg/kg	215	<200	7.20	No Limit
ED021: Bicarbonate Extractable Potassium (Colwell) (QC Lot: 1774462)									
EB1815902-021	GPSS12-A1	ED021: Bicarbonate Extractable K (Colwell)	----	100	mg/kg	<200	<200	0.00	No Limit
EB1815902-029	GPSS16-A1	ED021: Bicarbonate Extractable K (Colwell)	----	100	mg/kg	<200	<200	0.00	No Limit

Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
ED047: Potassium Chloride Extractable Sulfur (KCl-40) (QC Lot: 1774455)									
EB1815902-001	GPSS01-A1	ED047: KCl-40 Extractable Sulfur	----	10	mg/kg	<10	<10	0.00	No Limit
EB1815902-012	GPSS06-B2	ED047: KCl-40 Extractable Sulfur	----	10	mg/kg	<10	<10	0.00	No Limit
ED047: Potassium Chloride Extractable Sulfur (KCl-40) (QC Lot: 1774456)									
EB1815902-021	GPSS12-A1	ED047: KCl-40 Extractable Sulfur	----	10	mg/kg	<10	<10	0.00	No Limit
EB1815902-031	GPSS17-A1	ED047: KCl-40 Extractable Sulfur	----	10	mg/kg	<10	<10	0.00	No Limit
EG005T: Total Metals by ICP-AES (QC Lot: 1769998)									
EB1815902-001	GPSS01-A1	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	44	43	0.00	0% - 20%
		EG005T: Nickel	7440-02-0	2	mg/kg	3	4	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	17	14	17.6	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	11	11	0.00	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	<5	<5	0.00	No Limit
EB1815902-011	GPSS06-A1	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	20	18	13.0	0% - 50%
		EG005T: Nickel	7440-02-0	2	mg/kg	3	5	43.5	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	5	8	43.4	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	<5	<5	0.00	No Limit
EG005T: Total Metals by ICP-AES (QC Lot: 1770000)									
EB1815902-021	GPSS12-A1	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	10	2	120	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	<2	<2	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	<5	<5	0.00	No Limit
EB1815902-031	GPSS17-A1	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	5	5	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	3	3	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	7	7	0.00	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	<5	<5	0.00	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 1769999)									
EB1815902-001	GPSS01-A1	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EB1815902-011	GPSS06-A1	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 1770001)									



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 1770001) - continued									
EB1815902-021	GPSS12-A1	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EB1815902-031	GPSS17-A1	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1770004)									
EB1815902-001	GPSS01-A1	EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EB1815902-011	GPSS06-A1	EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1770005)									
EB1815902-021	GPSS12-A1	EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	0.2	0.1	0.00	No Limit
EB1815902-031	GPSS17-A1	EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	0.2	0.2	0.00	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1770009)									
EB1815902-001	GPSS01-A1	EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	970	1050	8.22	0% - 20%
EB1815902-011	GPSS06-A1	EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	1050	1140	8.19	0% - 20%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1770010)									
EB1815902-021	GPSS12-A1	EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	370	400	7.04	0% - 50%
EB1815902-031	GPSS17-A1	EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	860	840	2.40	0% - 20%
EK080: Bicarbonate Extractable Phosphorus (Colwell) (QC Lot: 1774441)									
EB1815902-001	GPSS01-A1	EK080: Bicarbonate Ext. P (Colwell)	----	5	mg/kg	<5	<5	0.00	No Limit
EB1815902-011	GPSS06-A1	EK080: Bicarbonate Ext. P (Colwell)	----	5	mg/kg	6	<5	0.00	No Limit
EK080: Bicarbonate Extractable Phosphorus (Colwell) (QC Lot: 1774442)									
EB1815902-021	GPSS12-A1	EK080: Bicarbonate Ext. P (Colwell)	----	5	mg/kg	<5	5	0.00	No Limit
EB1815902-031	GPSS17-A1	EK080: Bicarbonate Ext. P (Colwell)	----	5	mg/kg	<5	<5	0.00	No Limit
EP004: Organic Matter (QC Lot: 1771708)									
EB1815902-001	GPSS01-A1	EP004: Organic Matter	----	0.5	%	3.4	3.8	11.6	No Limit
		EP004: Total Organic Carbon	----	0.5	%	2.0	2.2	11.5	No Limit
EB1815902-010	GPSS05-B1	EP004: Organic Matter	----	0.5	%	1.7	1.6	6.69	No Limit
		EP004: Total Organic Carbon	----	0.5	%	1.0	0.9	0.00	No Limit
EP004: Organic Matter (QC Lot: 1771709)									
EB1815902-021	GPSS12-A1	EP004: Organic Matter	----	0.5	%	1.3	1.4	8.30	No Limit
		EP004: Total Organic Carbon	----	0.5	%	0.7	0.8	0.00	No Limit
EB1815902-030	GPSS16-B2	EP004: Organic Matter	----	0.5	%	1.5	1.7	13.2	No Limit
		EP004: Total Organic Carbon	----	0.5	%	0.8	1.0	14.2	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) LowHigh	
Method: Compound	CAS Number	LOR	Unit	Result				
EA002: pH 1:2 (Soils) (QCLot: 1770011)								
EA002-1: pH Value	----	----	pH Unit	----	4.01 pH Unit	99.5	98	102
EA002: pH 1:2 (Soils) (QCLot: 1770014)								
EA002-1: pH Value	----	----	pH Unit	----	4.01 pH Unit	99.8	98	102
EA002: pH 1:5 (Soils) (QCLot: 1770002)								
EA002: pH Value	----	----	pH Unit	----	4 pH Unit	100	98	102
				----	7 pH Unit	100	98	102
EA002: pH 1:5 (Soils) (QCLot: 1770006)								
EA002: pH Value	----	----	pH Unit	----	4 pH Unit	100	98	102
				----	7 pH Unit	100	98	102
EA010: Conductivity (1:2) (QCLot: 1770012)								
EA010-1: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	101	97	103
EA010: Conductivity (1:2) (QCLot: 1770013)								
EA010-1: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	100	97	103
EA010: Conductivity (1:5) (QCLot: 1770003)								
EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	100	97	103
EA010: Conductivity (1:5) (QCLot: 1770007)								
EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	100	97	103
ED005: Exchange Acidity (QCLot: 1774693)								
ED005: Exchange Acidity	----	0.1	meq/100g	<0.1	----	----	----	----
ED005: Exchangeable Aluminium	----	0.1	meq/100g	<0.1	----	----	----	----
ED005: Exchange Acidity (QCLot: 1774697)								
ED005: Exchange Acidity	----	0.1	meq/100g	<0.1	----	----	----	----
ED005: Exchangeable Aluminium	----	0.1	meq/100g	<0.1	----	----	----	----
ED007: Exchangeable Cations (QCLot: 1774692)								
ED007: Exchangeable Calcium	----	0.1	meq/100g	<0.1	3.54 meq/100g	100	79	113
ED007: Exchangeable Magnesium	----	0.1	meq/100g	<0.1	1.15 meq/100g	97.9	85	115
ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	0.635 meq/100g	97.4	70	122
ED007: Exchangeable Sodium	----	0.1	meq/100g	<0.1	0.382 meq/100g	87.5	76	112
ED007: Cation Exchange Capacity	----	0.1	meq/100g	<0.1	5.707 meq/100g	98.1	82	112
ED007: Exchangeable Cations (QCLot: 1774696)								
ED007: Exchangeable Calcium	----	0.1	meq/100g	<0.1	3.54 meq/100g	101	79	113
ED007: Exchangeable Magnesium	----	0.1	meq/100g	<0.1	1.15 meq/100g	98.5	85	115
ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	0.635 meq/100g	101	70	122



Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
Method: Compound	CAS Number	LOR	Unit		Spike	Spike Recovery (%)	Recovery Limits (%)	
					Concentration	LCS	Low	High
ED007: Exchangeable Cations (QCLot: 1774696) - continued								
ED007: Exchangeable Sodium	----	0.1	meq/100g	<0.1	0.382 meq/100g	90.3	76	112
ED007: Cation Exchange Capacity	----	0.1	meq/100g	<0.1	5.707 meq/100g	99.9	82	112
ED021: Bicarbonate Extractable Potassium (Colwell) (QCLot: 1774461)								
ED021: Bicarbonate Extractable K (Colwell)	----	100	mg/kg	<200	----	----	----	----
ED021: Bicarbonate Extractable Potassium (Colwell) (QCLot: 1774462)								
ED021: Bicarbonate Extractable K (Colwell)	----	100	mg/kg	<200	----	----	----	----
ED047: Potassium Chloride Extractable Sulfur (KCI-40) (QCLot: 1774455)								
ED047: KCI-40 Extractable Sulfur	----	10	mg/kg	<10	34 mg/kg	106	70	130
ED047: Potassium Chloride Extractable Sulfur (KCI-40) (QCLot: 1774456)								
ED047: KCI-40 Extractable Sulfur	----	10	mg/kg	<10	34 mg/kg	85.3	70	130
EG005T: Total Metals by ICP-AES (QCLot: 1769998)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	106 mg/kg	99.8	84	123
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	1.4 mg/kg	113	88	117
EG005T: Chromium	7440-47-3	2	mg/kg	<2	16.5 mg/kg	105	83	125
EG005T: Copper	7440-50-8	5	mg/kg	<5	50.6 mg/kg	107	86	122
EG005T: Lead	7439-92-1	5	mg/kg	<5	64.4 mg/kg	101	84	119
EG005T: Nickel	7440-02-0	2	mg/kg	<2	13.3 mg/kg	103	89	126
EG005T: Zinc	7440-66-6	5	mg/kg	<5	151 mg/kg	107	87	127
EG005T: Total Metals by ICP-AES (QCLot: 1770000)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	106 mg/kg	88.6	84	123
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	1.4 mg/kg	93.0	88	117
EG005T: Chromium	7440-47-3	2	mg/kg	<2	16.5 mg/kg	93.9	83	125
EG005T: Copper	7440-50-8	5	mg/kg	<5	50.6 mg/kg	97.4	86	122
EG005T: Lead	7439-92-1	5	mg/kg	<5	64.4 mg/kg	90.1	84	119
EG005T: Nickel	7440-02-0	2	mg/kg	<2	13.3 mg/kg	94.1	89	126
EG005T: Zinc	7440-66-6	5	mg/kg	<5	151 mg/kg	100	87	127
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1769999)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.09821 mg/kg	102	78	122
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1770001)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.09821 mg/kg	88.1	78	122
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1770004)								
EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	2.5 mg/kg	94.6	89	155
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1770005)								
EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	2.5 mg/kg	93.8	89	155
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1770009)								
EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	<20	877 mg/kg	99.4	70	110
				<20	3644 mg/kg	92.1	70	110



Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
Method: <i>Compound</i>	CAS Number	LOR	Unit	Result				
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1770010)								
EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	<20	877 mg/kg	96.8	70	110
				<20	3644 mg/kg	92.5	70	110
EK080: Bicarbonate Extractable Phosphorus (Colwell) (QCLot: 1774441)								
EK080: Bicarbonate Ext. P (Colwell)	----	5	mg/kg	<5	100 mg/kg	98.7	70	130
				<5	27 mg/kg	107	80	120
				<5	58.07 mg/kg	87.8	80	120
EK080: Bicarbonate Extractable Phosphorus (Colwell) (QCLot: 1774442)								
EK080: Bicarbonate Ext. P (Colwell)	----	5	mg/kg	<5	100 mg/kg	98.7	70	130
				<5	27 mg/kg	107	80	120
				<5	58.07 mg/kg	87.8	80	120
EP004: Organic Matter (QCLot: 1771708)								
EP004: Organic Matter	----	0.5	%	<0.5	80 %	106	83	115
EP004: Total Organic Carbon	----	0.5	%	<0.5	46.4 %	106	85	115
EP004: Organic Matter (QCLot: 1771709)								
EP004: Organic Matter	----	0.5	%	<0.5	80 %	106	83	115
EP004: Total Organic Carbon	----	0.5	%	<0.5	46.4 %	106	85	115

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 1769998)							
EB1815902-002	GPSS01-B1	EG005T: Arsenic	7440-38-2	50 mg/kg	83.5	70	130
		EG005T: Cadmium	7440-43-9	25 mg/kg	108	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	75.7	70	130
		EG005T: Copper	7440-50-8	50 mg/kg	103	70	130
		EG005T: Lead	7439-92-1	50 mg/kg	102	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	99.5	70	130
		EG005T: Zinc	7440-66-6	50 mg/kg	100	70	130
EG005T: Total Metals by ICP-AES (QCLot: 1770000)							
EB1815902-022	GPSS12-A2	EG005T: Arsenic	7440-38-2	50 mg/kg	92.6	70	130
		EG005T: Cadmium	7440-43-9	25 mg/kg	97.5	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	99.1	70	130
		EG005T: Copper	7440-50-8	50 mg/kg	100	70	130
		EG005T: Lead	7439-92-1	50 mg/kg	104	70	130



Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 1770000) - continued							
EB1815902-022	GPSS12-A2	EG005T: Nickel	7440-02-0	50 mg/kg	99.9	70	130
		EG005T: Zinc	7440-66-6	50 mg/kg	102	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1769999)							
EB1815902-002	GPSS01-B1	EG035T: Mercury	7439-97-6	5 mg/kg	102	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1770001)							
EB1815902-022	GPSS12-A2	EG035T: Mercury	7439-97-6	5 mg/kg	97.6	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1770004)							
EB1815902-002	GPSS01-B1	EK059G: Nitrite + Nitrate as N (Sol.)	----	2 mg/kg	96.7	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1770005)							
EB1815902-022	GPSS12-A2	EK059G: Nitrite + Nitrate as N (Sol.)	----	2 mg/kg	95.0	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1770009)							
EB1815902-002	GPSS01-B1	EK061G: Total Kjeldahl Nitrogen as N	----	500 mg/kg	89.8	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1770010)							
EB1815902-022	GPSS12-A2	EK061G: Total Kjeldahl Nitrogen as N	----	500 mg/kg	92.9	70	130
EK080: Bicarbonate Extractable Phosphorus (Colwell) (QCLot: 1774441)							
EB1815902-002	GPSS01-B1	EK080: Bicarbonate Ext. P (Colwell)	----	40 mg/kg	98.2	70	130
EK080: Bicarbonate Extractable Phosphorus (Colwell) (QCLot: 1774442)							
EB1815902-022	GPSS12-A2	EK080: Bicarbonate Ext. P (Colwell)	----	40 mg/kg	99.5	70	130
EP004: Organic Matter (QCLot: 1771708)							
EB1815902-002	GPSS01-B1	EP004: Organic Matter	----	2.667 %	91.5	70	130
		EP004: Total Organic Carbon	----	1.547 %	91.8	70	130
EP004: Organic Matter (QCLot: 1771709)							
EB1815902-022	GPSS12-A2	EP004: Organic Matter	----	2.667 %	104	70	130
		EP004: Total Organic Carbon	----	1.547 %	104	70	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EB1815902	Page	: 1 of 24
Client	: ECOZ ENVIRONMENTAL SERVICES	Laboratory	: Environmental Division Brisbane
Contact	: AIDEN CAMPBELL	Telephone	: +61-7-3243 7222
Project	: EZ18107 - Grants Project - Waste Characterisation	Date Samples Received	: 29-Jun-2018
Site	:	Issue Date	: 17-Jul-2018
Sampler	: AIDEN CAMPBELL	No. of samples received	: 38
Order number	:	No. of samples analysed	: 38

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- **NO** Matrix Spike outliers occur.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- **NO** Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- **NO** Quality Control Sample Frequency Outliers exist.

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results. This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein. Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters. Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA002: pH 1:2 (Soils)								
Soil Glass Jar - Unpreserved (EA002-1)								
GPSS01-A1, GPSS01-B2, GPSS03-A1, GPSS04-A1, GPSS05-A1, GPSS06-A1, GPSS07-A1, GPSS09-A1, GPSS10-A1, GPSS12-A1, GPSS13-A1, GPSS14-A1, GPSS15-A1, GPSS16-A1, GPSSD1-A1, duplicate, GPSS04-B1	GPSS01-B1, GPSS02-A1, GPSS03-B2, GPSS04-B2, GPSS05-B1, GPSS06-B2, GPSS07-B2, GPSS09-B2, GPSS10-B2, GPSS12-A2, GPSS13-A2, GPSS14-B2, GPSS15-A2, GPSS16-B2, GPSSD1-B2, GPSS04-A2,	27-Jun-2018	04-Jul-2018	04-Jul-2018	✓	04-Jul-2018	04-Jul-2018	✓
Soil Glass Jar - Unpreserved (EA002-1)								
GPSS08-A1, GPSS17-A1, GPSS17-B2	GPSS08-B2, GPSS17-A2,	28-Jun-2018	04-Jul-2018	05-Jul-2018	✓	04-Jul-2018	04-Jul-2018	✓



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA002: pH 1:5 (Soils)								
Soil Glass Jar - Unpreserved (EA002)		27-Jun-2018	03-Jul-2018	04-Jul-2018	✔	03-Jul-2018	03-Jul-2018	✔
GPSS01-A1,	GPSS01-B1,							
GPSS01-B2,	GPSS02-A1,							
GPSS03-A1,	GPSS03-B2,							
GPSS04-A1,	GPSS04-B2,							
GPSS05-A1,	GPSS05-B1,							
GPSS06-A1,	GPSS06-B2,							
GPSS07-A1,	GPSS07-B2,							
GPSS09-A1,	GPSS09-B2,							
GPSS10-A1,	GPSS10-B2,							
GPSS12-A1,	GPSS12-A2,							
GPSS13-A1,	GPSS13-A2,							
GPSS14-A1,	GPSS14-B2,							
GPSS15-A1,	GPSS15-A2,							
GPSS16-A1,	GPSS16-B2,							
GPSSD1-A1,	GPSSD1-B2,							
duplicate,	GPSS04-A2,							
GPSS04-B1								
Soil Glass Jar - Unpreserved (EA002)		28-Jun-2018	03-Jul-2018	05-Jul-2018	✔	03-Jul-2018	03-Jul-2018	✔
GPSS08-A1,	GPSS08-B2,							
GPSS17-A1,	GPSS17-A2,							
GPSS17-B2								



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA010: Conductivity								
Soil Glass Jar - Unpreserved (EA010)		27-Jun-2018	03-Jul-2018	04-Jul-2018	✓	03-Jul-2018	31-Jul-2018	✓
GPSS01-A1,	GPSS01-B1,							
GPSS01-B2,	GPSS02-A1,							
GPSS03-A1,	GPSS03-B2,							
GPSS04-A1,	GPSS04-B2,							
GPSS05-A1,	GPSS05-B1,							
GPSS06-A1,	GPSS06-B2,							
GPSS07-A1,	GPSS07-B2,							
GPSS09-A1,	GPSS09-B2,							
GPSS10-A1,	GPSS10-B2,							
GPSS12-A1,	GPSS12-A2,							
GPSS13-A1,	GPSS13-A2,							
GPSS14-A1,	GPSS14-B2,							
GPSS15-A1,	GPSS15-A2,							
GPSS16-A1,	GPSS16-B2,							
GPSSD1-A1,	GPSSD1-B2,							
duplicate,	GPSS04-A2,							
GPSS04-B1								
Soil Glass Jar - Unpreserved (EA010-1)		27-Jun-2018	04-Jul-2018	04-Jul-2018	✓	04-Jul-2018	01-Aug-2018	✓
GPSS01-A1,	GPSS01-B1,							
GPSS01-B2,	GPSS02-A1,							
GPSS03-A1,	GPSS03-B2,							
GPSS04-A1,	GPSS04-B2,							
GPSS05-A1,	GPSS05-B1,							
GPSS06-A1,	GPSS06-B2,							
GPSS07-A1,	GPSS07-B2,							
GPSS09-A1,	GPSS09-B2,							
GPSS10-A1,	GPSS10-B2,							
GPSS12-A1,	GPSS12-A2,							
GPSS13-A1,	GPSS13-A2,							
GPSS14-A1,	GPSS14-B2,							
GPSS15-A1,	GPSS15-A2,							
GPSS16-A1,	GPSS16-B2,							
GPSSD1-A1,	GPSSD1-B2,							
duplicate,	GPSS04-A2,							
GPSS04-B1								
Soil Glass Jar - Unpreserved (EA010)		28-Jun-2018	03-Jul-2018	05-Jul-2018	✓	03-Jul-2018	31-Jul-2018	✓
GPSS08-A1,	GPSS08-B2,							
GPSS17-A1,	GPSS17-A2,							
GPSS17-B2								
Soil Glass Jar - Unpreserved (EA010-1)								



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA010: Conductivity - Continued								
GPSS08-A1, GPSS17-A1, GPSS17-B2	GPSS08-B2, GPSS17-A2,	28-Jun-2018	04-Jul-2018	05-Jul-2018	✓	04-Jul-2018	01-Aug-2018	✓
EA055: Moisture Content (Dried @ 105-110°C)								
Soil Glass Jar - Unpreserved (EA055)		27-Jun-2018	----	----	----	02-Jul-2018	11-Jul-2018	✓
GPSS01-A1,	GPSS01-B1,							
GPSS01-B2,	GPSS02-A1,							
GPSS03-A1,	GPSS03-B2,							
GPSS04-A1,	GPSS04-B2,							
GPSS05-A1,	GPSS05-B1,							
GPSS06-A1,	GPSS06-B2,							
GPSS07-A1,	GPSS07-B2,							
GPSS09-A1,	GPSS09-B2,							
GPSS10-A1,	GPSS10-B2,							
GPSS12-A1,	GPSS12-A2,							
GPSS13-A1,	GPSS13-A2,							
GPSS14-A1,	GPSS14-B2,							
GPSS15-A1,	GPSS15-A2,							
GPSS16-A1,	GPSS16-B2,							
GPSSD1-A1,	GPSSD1-B2,							
duplicate,	GPSS04-A2,							
GPSS04-B1								
Soil Glass Jar - Unpreserved (EA055)		28-Jun-2018	----	----	----	02-Jul-2018	12-Jul-2018	✓
GPSS08-A1, GPSS17-A1, GPSS17-B2	GPSS08-B2, GPSS17-A2,							



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA150: Particle Sizing								
Snap Lock Bag (EA150H)		27-Jun-2018	----	----	----	11-Jul-2018	24-Dec-2018	✔
GPSS01-A1,	GPSS01-B1,							
GPSS01-B2,	GPSS02-A1,							
GPSS03-A1,	GPSS03-B2,							
GPSS04-A1,	GPSS04-B2,							
GPSS05-A1,	GPSS05-B1,							
GPSS06-A1,	GPSS06-B2,							
GPSS07-A1,	GPSS07-B2,							
GPSS09-A1,	GPSS09-B2,							
GPSS10-A1,	GPSS10-B2,							
GPSS12-A1,	GPSS12-A2,							
GPSS13-A1,	GPSS13-A2,							
GPSS14-A1,	GPSS14-B2,							
GPSS15-A1,	GPSS15-A2,							
GPSS16-A1,	GPSS16-B2,							
GPSSD1-A1,	GPSSD1-B2,							
duplicate,	GPSS04-A2,							
GPSS04-B1								
Snap Lock Bag (EA150H)		28-Jun-2018	----	----	----	11-Jul-2018	25-Dec-2018	✔
GPSS08-A1,	GPSS08-B2,							
GPSS17-A1,	GPSS17-A2,							
GPSS17-B2								

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA150: Soil Classification based on Particle Size								
Snap Lock Bag (EA150H)		27-Jun-2018	----	----	----	11-Jul-2018	24-Dec-2018	✓
GPSS01-A1, GPSS01-B2, GPSS03-A1, GPSS04-A1, GPSS05-A1, GPSS06-A1, GPSS07-A1, GPSS09-A1, GPSS10-A1, GPSS12-A1, GPSS13-A1, GPSS14-A1, GPSS15-A1, GPSS16-A1, GPSSD1-A1, duplicate, GPSS04-B1	GPSS01-B1, GPSS02-A1, GPSS03-B2, GPSS04-B2, GPSS05-B1, GPSS06-B2, GPSS07-B2, GPSS09-B2, GPSS10-B2, GPSS12-A2, GPSS13-A2, GPSS14-B2, GPSS15-A2, GPSS16-B2, GPSSD1-B2, GPSS04-A2,							
Snap Lock Bag (EA150H)		28-Jun-2018	----	----	----	11-Jul-2018	25-Dec-2018	✓
GPSS08-A1, GPSS17-A1, GPSS17-B2	GPSS08-B2, GPSS17-A2,							



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA152: Soil Particle Density								
Snap Lock Bag (EA152)		27-Jun-2018	----	----	----	11-Jul-2018	24-Dec-2018	✔
GPSS01-A1,	GPSS01-B1,							
GPSS01-B2,	GPSS02-A1,							
GPSS03-A1,	GPSS03-B2,							
GPSS04-A1,	GPSS04-B2,							
GPSS05-A1,	GPSS05-B1,							
GPSS06-A1,	GPSS06-B2,							
GPSS07-A1,	GPSS07-B2,							
GPSS09-A1,	GPSS09-B2,							
GPSS10-A1,	GPSS10-B2,							
GPSS12-A1,	GPSS12-A2,							
GPSS13-A1,	GPSS13-A2,							
GPSS14-A1,	GPSS14-B2,							
GPSS15-A1,	GPSS15-A2,							
GPSS16-A1,	GPSS16-B2,							
GPSSD1-A1,	GPSSD1-B2,							
duplicate,	GPSS04-A2,							
GPSS04-B1								
Snap Lock Bag (EA152)		28-Jun-2018	----	----	----	11-Jul-2018	25-Dec-2018	✔
GPSS08-A1,	GPSS08-B2,							
GPSS17-A1,	GPSS17-A2,							
GPSS17-B2								

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED007: Exchangeable Cations								
Soil Glass Jar - Unpreserved (ED007)		27-Jun-2018	05-Jul-2018	25-Jul-2018	✓	11-Jul-2018	25-Jul-2018	✓
GPSS01-A1,	GPSS01-B1,							
GPSS01-B2,	GPSS02-A1,							
GPSS03-A1,	GPSS03-B2,							
GPSS04-A1,	GPSS04-B2,							
GPSS05-A1,	GPSS05-B1,							
GPSS06-A1,	GPSS06-B2,							
GPSS07-A1,	GPSS07-B2,							
GPSS09-A1,	GPSS09-B2,							
GPSS10-A1,	GPSS10-B2,							
GPSS12-A1,	GPSS12-A2,							
GPSS13-A1,	GPSS13-A2,							
GPSS14-A1,	GPSS14-B2,							
GPSS15-A1,	GPSS15-A2,							
GPSS16-A1,	GPSS16-B2,							
GPSSD1-A1,	GPSSD1-B2,							
duplicate,	GPSS04-A2,							
GPSS04-B1								
Soil Glass Jar - Unpreserved (ED007)		28-Jun-2018	05-Jul-2018	26-Jul-2018	✓	11-Jul-2018	26-Jul-2018	✓
GPSS08-A1,	GPSS08-B2,							
GPSS17-A1,	GPSS17-A2,							
GPSS17-B2								



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED021: Bicarbonate Extractable Potassium (Colwell)								
Soil Glass Jar - Unpreserved (ED021)		27-Jun-2018	12-Jul-2018	24-Dec-2018	✔	12-Jul-2018	24-Dec-2018	✔
GPSS01-A1,	GPSS01-B1,							
GPSS01-B2,	GPSS02-A1,							
GPSS03-A1,	GPSS03-B2,							
GPSS04-A1,	GPSS04-B2,							
GPSS05-A1,	GPSS05-B1,							
GPSS06-A1,	GPSS06-B2,							
GPSS07-A1,	GPSS07-B2,							
GPSS09-A1,	GPSS09-B2,							
GPSS10-A1,	GPSS10-B2,							
GPSS12-A1,	GPSS12-A2,							
GPSS13-A1,	GPSS13-A2,							
GPSS14-A1,	GPSS14-B2,							
GPSS15-A1,	GPSS15-A2,							
GPSS16-A1,	GPSS16-B2,							
GPSSD1-A1,	GPSSD1-B2,							
duplicate,	GPSS04-A2,							
GPSS04-B1								
Soil Glass Jar - Unpreserved (ED021)		28-Jun-2018	12-Jul-2018	25-Dec-2018	✔	12-Jul-2018	25-Dec-2018	✔
GPSS08-A1,	GPSS08-B2,							
GPSS17-A1,	GPSS17-A2,							
GPSS17-B2								

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG005T: Total Metals by ICP-AES								
Soil Glass Jar - Unpreserved (EG005T)		27-Jun-2018	03-Jul-2018	24-Dec-2018	✓	12-Jul-2018	24-Dec-2018	✓
GPSS01-A1, GPSS01-B2, GPSS03-A1, GPSS04-A1, GPSS05-A1, GPSS06-A1, GPSS07-A1, GPSS09-A1, GPSS10-A1, GPSS12-A1, GPSS13-A1, GPSS14-A1, GPSS15-A1, GPSS16-A1, GPSSD1-A1, duplicate, GPSS04-B1	GPSS01-B1, GPSS02-A1, GPSS03-B2, GPSS04-B2, GPSS05-B1, GPSS06-B2, GPSS07-B2, GPSS09-B2, GPSS10-B2, GPSS12-A2, GPSS13-A2, GPSS14-B2, GPSS15-A2, GPSS16-B2, GPSSD1-B2, GPSS04-A2,							
Soil Glass Jar - Unpreserved (EG005T)		28-Jun-2018	03-Jul-2018	25-Dec-2018	✓	12-Jul-2018	25-Dec-2018	✓
GPSS08-A1, GPSS17-A1, GPSS17-B2	GPSS08-B2, GPSS17-A2,							

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG035T: Total Recoverable Mercury by FIMS								
Soil Glass Jar - Unpreserved (EG035T)		27-Jun-2018	03-Jul-2018	25-Jul-2018	✓	12-Jul-2018	25-Jul-2018	✓
GPSS01-A1,	GPSS01-B1,							
GPSS01-B2,	GPSS02-A1,							
GPSS03-A1,	GPSS03-B2,							
GPSS04-A1,	GPSS04-B2,							
GPSS05-A1,	GPSS05-B1,							
GPSS06-A1,	GPSS06-B2,							
GPSS07-A1,	GPSS07-B2,							
GPSS09-A1,	GPSS09-B2,							
GPSS10-A1,	GPSS10-B2,							
GPSS12-A1,	GPSS12-A2,							
GPSS13-A1,	GPSS13-A2,							
GPSS14-A1,	GPSS14-B2,							
GPSS15-A1,	GPSS15-A2,							
GPSS16-A1,	GPSS16-B2,							
GPSSD1-A1,	GPSSD1-B2,							
duplicate,	GPSS04-A2,							
GPSS04-B1								
Soil Glass Jar - Unpreserved (EG035T)		28-Jun-2018	03-Jul-2018	26-Jul-2018	✓	12-Jul-2018	26-Jul-2018	✓
GPSS08-A1,	GPSS08-B2,							
GPSS17-A1,	GPSS17-A2,							
GPSS17-B2								



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Soil Glass Jar - Unpreserved (EK059G)		27-Jun-2018	03-Jul-2018	24-Dec-2018	✔	03-Jul-2018	24-Dec-2018	✔
GPSS01-A1,	GPSS01-B1,							
GPSS01-B2,	GPSS02-A1,							
GPSS03-A1,	GPSS03-B2,							
GPSS04-A1,	GPSS04-B2,							
GPSS05-A1,	GPSS05-B1,							
GPSS06-A1,	GPSS06-B2,							
GPSS07-A1,	GPSS07-B2,							
GPSS09-A1,	GPSS09-B2,							
GPSS10-A1,	GPSS10-B2,							
GPSS12-A1,	GPSS12-A2,							
GPSS13-A1,	GPSS13-A2,							
GPSS14-A1,	GPSS14-B2,							
GPSS15-A1,	GPSS15-A2,							
GPSS16-A1,	GPSS16-B2,							
GPSSD1-A1,	GPSSD1-B2,							
duplicate,	GPSS04-A2,							
GPSS04-B1								
Soil Glass Jar - Unpreserved (EK059G)		28-Jun-2018	03-Jul-2018	25-Dec-2018	✔	03-Jul-2018	25-Dec-2018	✔
GPSS08-A1,	GPSS08-B2,							
GPSS17-A1,	GPSS17-A2,							
GPSS17-B2								



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Soil Glass Jar - Unpreserved (EK061G)		27-Jun-2018	03-Jul-2018	24-Dec-2018	✔	04-Jul-2018	24-Dec-2018	✔
GPSS01-A1,	GPSS01-B1,							
GPSS01-B2,	GPSS02-A1,							
GPSS03-A1,	GPSS03-B2,							
GPSS04-A1,	GPSS04-B2,							
GPSS05-A1,	GPSS05-B1,							
GPSS06-A1,	GPSS06-B2,							
GPSS07-A1,	GPSS07-B2,							
GPSS09-A1,	GPSS09-B2,							
GPSS10-A1,	GPSS10-B2,							
GPSS12-A1,	GPSS12-A2,							
GPSS13-A1,	GPSS13-A2,							
GPSS14-A1,	GPSS14-B2,							
GPSS15-A1,	GPSS15-A2,							
GPSS16-A1,	GPSS16-B2,							
GPSSD1-A1,	GPSSD1-B2,							
duplicate,	GPSS04-A2,							
GPSS04-B1								
Soil Glass Jar - Unpreserved (EK061G)		28-Jun-2018	03-Jul-2018	25-Dec-2018	✔	04-Jul-2018	25-Dec-2018	✔
GPSS08-A1,	GPSS08-B2,							
GPSS17-A1,	GPSS17-A2,							
GPSS17-B2								

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK080: Bicarbonate Extractable Phosphorus (Colwell)								
Soil Glass Jar - Unpreserved (EK080)		27-Jun-2018	----	----	----	04-Jul-2018	24-Dec-2018	✓
GPSS01-A1, GPSS01-B2, GPSS03-A1, GPSS04-A1, GPSS05-A1, GPSS06-A1, GPSS07-A1, GPSS09-A1, GPSS10-A1, GPSS12-A1, GPSS13-A1, GPSS14-A1, GPSS15-A1, GPSS16-A1, GPSSD1-A1, duplicate, GPSS04-B1	GPSS01-B1, GPSS02-A1, GPSS03-B2, GPSS04-B2, GPSS05-B1, GPSS06-B2, GPSS07-B2, GPSS09-B2, GPSS10-B2, GPSS12-A2, GPSS13-A2, GPSS14-B2, GPSS15-A2, GPSS16-B2, GPSSD1-B2, GPSS04-A2,							
Soil Glass Jar - Unpreserved (EK080)		28-Jun-2018	----	----	----	04-Jul-2018	25-Dec-2018	✓
GPSS08-A1, GPSS17-A1, GPSS17-B2	GPSS08-B2, GPSS17-A2,							

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP004: Organic Matter								
Soil Glass Jar - Unpreserved (EP004)		27-Jun-2018	13-Jul-2018	25-Jul-2018	✓	13-Jul-2018	25-Jul-2018	✓
GPSS01-A1, GPSS01-B2, GPSS03-A1, GPSS04-A1, GPSS05-A1, GPSS06-A1, GPSS07-A1, GPSS09-A1, GPSS10-A1, GPSS12-A1, GPSS13-A1, GPSS14-A1, GPSS15-A1, GPSS16-A1, GPSSD1-A1, duplicate, GPSS04-B1	GPSS01-B1, GPSS02-A1, GPSS03-B2, GPSS04-B2, GPSS05-B1, GPSS06-B2, GPSS07-B2, GPSS09-B2, GPSS10-B2, GPSS12-A2, GPSS13-A2, GPSS14-B2, GPSS15-A2, GPSS16-B2, GPSSD1-B2, GPSS04-A2,							
Soil Glass Jar - Unpreserved (EP004)		28-Jun-2018	13-Jul-2018	26-Jul-2018	✓	13-Jul-2018	26-Jul-2018	✓
GPSS08-A1, GPSS17-A1, GPSS17-B2	GPSS08-B2, GPSS17-A2,							



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Bicarbonate Extractable K (Colwell)	ED021	4	38	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Bicarbonate Extractable P (Colwell)	EK080	4	38	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Electrical Conductivity (1:2)	EA010-1	4	38	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Electrical Conductivity (1:5)	EA010	4	38	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Exchange Acidity by 1M Potassium Chloride	ED005	4	38	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations	ED007	4	38	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Moisture Content	EA055	4	38	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	4	38	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Organic Matter	EP004	4	38	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:2)	EA002-1	4	38	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:5)	EA002	4	38	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Potassium Chloride Extractable Sulfur (KCl-40)	ED047	4	38	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TKN as N By Discrete Analyser	EK061G	4	38	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	4	38	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	4	38	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Bicarbonate Extractable P (Colwell)	EK080	6	38	15.79	15.00	✓	NEPM 2013 B3 & ALS QC Standard
Electrical Conductivity (1:2)	EA010-1	2	38	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Electrical Conductivity (1:5)	EA010	2	38	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations	ED007	2	38	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	2	38	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Organic Matter	EP004	2	38	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:2)	EA002-1	2	38	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:5)	EA002	4	38	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Potassium Chloride Extractable Sulfur (KCl-40)	ED047	2	38	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TKN as N By Discrete Analyser	EK061G	4	38	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	38	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	38	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Bicarbonate Extractable K (Colwell)	ED021	2	38	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Bicarbonate Extractable P (Colwell)	EK080	2	38	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Electrical Conductivity (1:2)	EA010-1	2	38	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Electrical Conductivity (1:5)	EA010	2	38	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Exchange Acidity by 1M Potassium Chloride	ED005	2	38	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Matrix: **SOIL**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Method Blanks (MB) - Continued							
Exchangeable Cations	ED007	2	38	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	2	38	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Organic Matter	EP004	2	38	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Potassium Chloride Extractable Sulfur (KCl-40)	ED047	2	38	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TKN as N By Discrete Analyser	EK061G	2	38	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	38	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	38	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Bicarbonate Extractable P (Colwell)	EK080	2	38	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	2	38	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Organic Matter	EP004	2	38	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TKN as N By Discrete Analyser	EK061G	2	38	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	38	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	38	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH (1:5)	EA002	SOIL	In house: Referenced to Rayment and Lyons 4A1 and APHA 4500H+. pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM (2013) Schedule B(3)
pH (1:2)	EA002-1	SOIL	In house: Referenced to APHA 4500H+. pH is determined on soil samples after a 1:2 soil/water leach.
Electrical Conductivity (1:5)	EA010	SOIL	In house: Referenced to Rayment and Lyons 3A1 and APHA 2510. Conductivity is determined on soil samples using a 1:5 soil/water leach. This method is compliant with NEPM (2013) Schedule B(3)
Electrical Conductivity (1:2)	EA010-1	SOIL	In house: Referenced to APHA 2510. Conductivity is determined on soil samples using a 1:2 soil/water leach.
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Particle Size Analysis by Hydrometer	EA150H	SOIL	Particle Size Analysis by Hydrometer according to AS1289.3.6.3 - 2003
Soil Particle Density	* EA152	SOIL	Soil Particle Density by AS 1289.3.5.1-2006 : Methods of testing soils for engineering purposes - Soil classification tests - Determination of the soil particle density of a soil - Standard method
Exchange Acidity by 1M Potassium Chloride	ED005	SOIL	In house: referenced to Rayment and Lyons, (2011), method 15G1. This method is unsuitable for near neutral and alkaline soils. NATA accreditation does not cover performance of this service.
Exchangeable Cations on Alkaline Soils	ED006	SOIL	In house: Referenced to Soil Survey Test Method C5. Soluble salts are removed from the sample prior to analysis. Cations are exchanged from the sample by contact with alcoholic ammonium chloride at pH 8.5. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil.
Exchangeable Cations	ED007	SOIL	In house: Referenced to Rayment & Lyons (2011) Method 15A1. Cations are exchanged from the sample by contact with Ammonium Chloride. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil. This method is compliant with NEPM (2013) Schedule B(3) (Method 301)
Exchangeable Cations with pre-treatment	ED008	SOIL	In house: Referenced to Rayment & Higginson (2011) Method 15A2. Soluble salts are removed from the sample prior to analysis. Cations are exchanged from the sample by contact with Ammonium Chloride. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil. This method is compliant with NEPM (2013) Schedule B(3) (Method 301)
Bicarbonate Extractable K (Colwell)	ED021	SOIL	In house: Referenced to Rayment & Higginson (2011) Method 18A1 Potassium is extracted from the soil using 0.5M NaHCO ₃ at a 1:100 soil:solution ratio and determined by ICP.
Potassium Chloride Extractable Sulfur (KCl-40)	* ED047	SOIL	In house: Referenced to Rayment and Lyons (2011), method 10D1. ALS is not NATA accredited for this testing procedure.
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl ₂) (Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)



Analytical Methods	Method	Matrix	Method Descriptions
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	SOIL	In house: Thermo Scientific Method D08727 and NEMI (National Environmental Method Index) Method ID: 9171. This method covers the determination of total oxidised nitrogen (NOx-N) and nitrate (NO3-N) by calculation, Combined oxidised Nitrogen (NO2+NO3) in a water extract is determined by direct colourimetry by Discrete Analyser.
TKN as N By Discrete Analyser	EK061G	SOIL	In house: Referenced to APHA 4500-Norg-D Soil samples are digested using Kjeldahl digestion followed by determination by Discrete Analyser.
Total Nitrogen as N (TKN + NOx) By Discrete Analyser	EK062G	SOIL	In house: Referenced to APHA 4500 Norg/NO3- Total Nitrogen is determined as the sum of TKN and Oxidised Nitrogen, each determined separately as N.
Bicarbonate Extractable P (Colwell)	EK080	SOIL	In house: Referenced to Rayment & Higginson (2011) Method 9B1 Phosphorus is extracted from the soil using 0.5M NaHCO3 at a 1:100 soil:solution ratio and determined by FIA.
Organic Matter	EP004	SOIL	In house: Referenced to AS1289.4.1.1 - 1997. Dichromate oxidation method after Walkley and Black. This method is compliant with NEPM (2013) Schedule B(3).
Preparation Methods	Method	Matrix	Method Descriptions
Exchangeable Cations Preparation Method (Alkaline Soils)	ED006PR	SOIL	In house: Referenced to Rayment and Lyons 2011 method 15C1.
Exchangeable Cations Preparation Method	ED007PR	SOIL	In house: Referenced to Rayment & Higginson (1992) method 15A1. A 1M NH4Cl extraction by end over end tumbling at a ratio of 1:20. There is no pretreatment for soluble salts. Extracts can be run by ICP for cations.
Bicarbonate Extractable K (Colwell)	ED021PR	SOIL	In house: Referenced to Rayment & Higginson (1992) Method 18A1 Potassium is extracted from the soil using 0.5M NaHCO3 at a 1:100 soil:solution ratio and determined by ICP.
KCI-40 Extractable Sulfur Preparation	ED047-PR	SOIL	KCI-40 Extractable Sulfur Preparation
TKN/TP Digestion	EK061/EK067	SOIL	In house: Referenced to APHA 4500 Norg- D; APHA 4500 P - H. Macro Kjeldahl digestion.
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of reagent grade water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.
1:2 solid / water leach for soluble analytes	EN40	SOIL	25 g of soil is mixed with 50 mL of distilled water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (2013) Schedule B(3) (Method 202)
Organic Matter	EP004-PR	SOIL	In house: Referenced to AS1289.4.1.1 - 1997. Dichromate oxidation method after Walkley and Black. This method is compliant with NEPM (2013) Schedule B(3) (Method 105)



CHAIN OF CUSTODY

ALS
Laboratory:
please tick →

CLIENT: EcoZ Environmental Services	TURNAROUND REQUIREMENTS: ☐ Standard TAT (List due date):	FOR LABORATORY USE ONLY: (Circle)	
OFFICE: Darwin	(Standard TAT may be longer for some tests e.g., Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):	Custody Seal intact?	Yes No N/A
PROJECT: EZ18107 - Grants Project - Waste Characterisation	ALS QUOTE NO.: SY/285/18	Free ice / frozen ice bricks present upon receipt?	Yes No N/A
ORDER NUMBER:		Random Sample Temperature on Receipt:	°C
PROJECT MANAGER: Aiden Campbell	CONTACT PH: 08 8981 1100	Other comment:	
SAMPLER: Aiden Campbell	SAMPLER MOBILE: 0428994586	RECEIVED BY: J Botmu	
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):	DATE/TIME: 29/6 9:20	
Email Reports to: aiden.campbell@ecoz.com.au			
Email Invoice to: ecoz@ecoz.com.au; aiden.campbell@ecoz.com.au			

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS		CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).										Additional Information	
	MATRIX: SOLID (S) WATER (W)															
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	EA150H: particle size analysis by hydrometer: AS1289 Sieves and Classification	EM40: 1:2 leach	EA002-1: pH (1:2 leach)	EA0101-1: Electrical conductivity (1:2 leach)	AG-1 EB only: Agricultural soil suite 1: Cation exchange capacity	EP004 (Carbon): Organic matter & total Organic Carbon (Calc.) (Walkley Black)	EK0623 (Solids): Total Nitrogen as N (TKN + Nox) By discrete analyser	IN-6S: Colwell P and K (available)	ED047: Potassium Chloride Extractable Sulfur (KCL-40) (Available)	S-2: 8 Metals (incl. digestion): As, Cd, Cr, Cu, Pb, Hg, Ni, Zn	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	GPSS01-A1	27/6/18	S	ST & B	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
2	GPSS01-B1	27/6/18	S	ST & B	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
3	GPSS01-B2	27/6/18	S	ST & B	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
4	GPSS02-A1	27/6/18	S	ST & B	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
5	GPSS03-A1	27/6/18	S	ST & B	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
6	GPSS03-B2	27/6/18	S	ST & B	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
7	GPSS04-A1	28/6/18	S	ST & B	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
8	GPSS04-B2	28/6/18	S	ST & B	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
9	GPSS05-A1	28/6/18	S	ST & B	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
10	GPSS05-B1	28/6/18	S	ST & B	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
11	GPSS06-A1	27/6/18	S	ST & B	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
12	GPSS06-B2	27/6/18	S	ST & B	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
13	GPSS07-A1	27/6/18	S	ST & B	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
14	GPSS07-B2	27/6/18	S	ST & B	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
15	GPSS08-A1	28/6/18	S	ST & B	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TOTAL																

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

LAB OF ORIGIN:
DARWIN

Environmental Division
Brisbane
Work Order Reference
EB1815902



Telephone : + 61-7-3243 7222



CHAIN OF CUSTODY

ALS
Laboratory:
please tick →

CLIENT: EcoZ Environmental Services	TURNAROUND REQUIREMENTS: ☐ Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle) Custody Seal intact? Yes No N/A Freeze / frozen ice bricks present upon receipt? Yes No N/A Random Sample Temperature on Receipt °C Other comment:	
OFFICE: Darwin	(Standard TAT may be longer for some tests e.g. Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):		
PROJECT: EZ18107 - Grants Project - Waste Characterisation	ALS QUOTE NO.: SY285/18 table 2.	COC SEQUENCE NUMBER (Circle) COC: 1 2 3 4 5 6 7 OF: 2 3 4 5 6 7	
ORDER NUMBER:			
PROJECT MANAGER: Aiden Campbell	CONTACT PH: 08 8981 1100		
SAMPLER:	SAMPLER MOBILE:	RELINQUISHED BY:	RECEIVED BY: ALS
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):	DATE/TIME:	DATE/TIME:
Email Reports to: aiden.campbell@ecoz.com.au			
Email Invoice to: lyndall.ryan@ecoz.com.au; aiden.campbell@ecoz.com.au			

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).										Additional Information	
	MATRIX: SOLID (S) WATER (W)																
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	EA150H: particle size analysis by hydrometer: AS1285 Sieves and Classification	EN40: 1:2 leach	EA002-1: pH (1:2 leach)	EA010-1: Electrical conductivity (1:2 leach)	AG-1 EB only: Agricultural soil suite 1: Cation exchange capacity	EP004 (Carbon): Organic matter & total Organic Carbon (Calc.) (Walkley Black)	EK002G (Solids): Total Nitrogen as N (TKN + Nox) By discrete analyser	IN-6S: Colwell P and K (available)	ED047: Potassium Chloride Extractable Sulfur (KCL-40) (Available)	S-2: 8 Metals (incl. digestion): As, Cd, Cr, Cu, Pb, Hg, Ni, Zn	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.	
16	GPSS08-B2	28/6/18	S	ST & B	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
17	GPSS09-A1	27/6/18	S	ST & B	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
18	GPSS09-B2	27/6/18	S	ST & B	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
19	GPSS10-A1	27/6/18	S	ST & B	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
20	GPSS10-B2	27/6/18	S	ST & B	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
21	GPSS12-A1	27/6/18	S	ST & B	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
22	GPSS12-A2	27/6/18	S	ST & B	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
23	GPSS13-A1	27/6/18	S	ST & B	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
24	GPSS13-A2	27/6/18	S	ST & B	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
25	GPSS14-A1	27/6/18	S	ST & B	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
26	GPSS14-B2	27/6/18	S	ST & B	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
27	GPSS15-A1	27/6/18	S	ST & B	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
28	GPSS15-A2	27/6/18	S	ST & B	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
29	GPSS16-A1	27/6/18	S	ST & B	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
30	GPSS16-B2	27/6/18	S	ST & B	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		

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

ES1819015

LAB OF ORIGIN:
DARWIN



LAB OF ORIGIN:
DARWIN

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

Certificate of Analysis

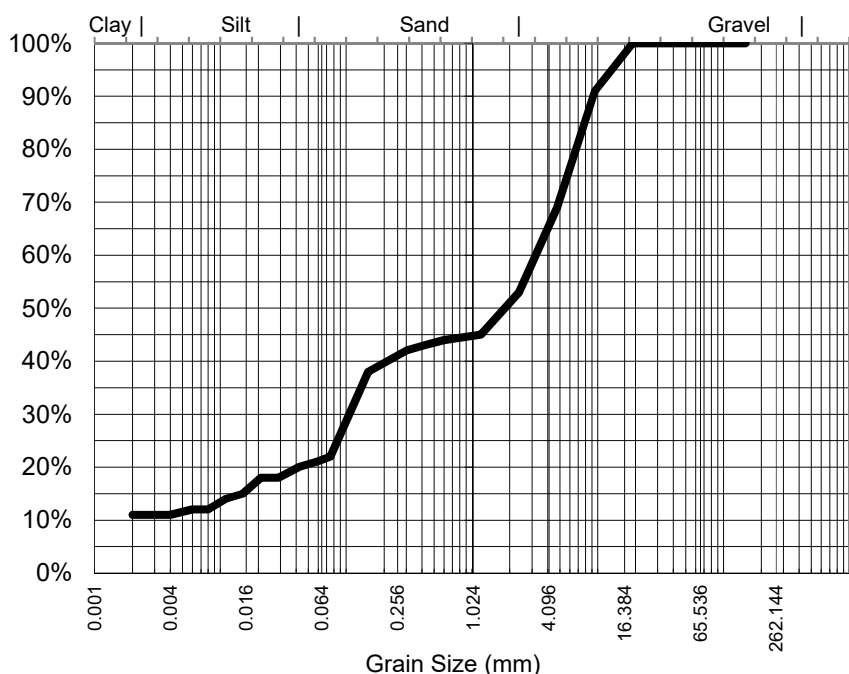
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental
Newcastle, NSW



CLIENT: Aiden Campbell **DATE REPORTED:** 11-Jul-2018
COMPANY: ECOZ ENVIRONMENTAL SERVICES **DATE RECEIVED:** 29-Jun-2018
ADDRESS: PO BOX 381 **REPORT NO:** EB1815902-001 / PSD
DARWIN
NT, AUSTRALIA
PROJECT: EZ18107 - Grants Project - **SAMPLE ID:** GPSS01-A1
Waste Characterisation

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.50	91%
4.75	69%
2.36	53%
1.18	45%
0.600	44%
0.425	43%
0.300	42%
0.150	38%
0.075	22%
Particle Size (microns)	
59	21%
42	20%
21	18%
11	14%
6	12%
2	11%

Median Particle Size (mm)*	1.918

Samples analysed as received.

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Loss on Pretreatment NA

Sample Description: FINE, STONE, VEG

Test Method: AS1289.3.6.3 2003

Soil Particle Density (<2.36mm) 2.48 g/cm3

NATA Accreditation: 825 Site: Newcastle
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Analysed: 5-Jul-18

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

D Blane

Dianne Blane
Laboratory Coordinator
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental
Newcastle, NSW



CLIENT: Aiden Campbell

DATE REPORTED: 11-Jul-2018

COMPANY: ECOZ ENVIRONMENTAL SERVICES

DATE RECEIVED: 29-Jun-2018

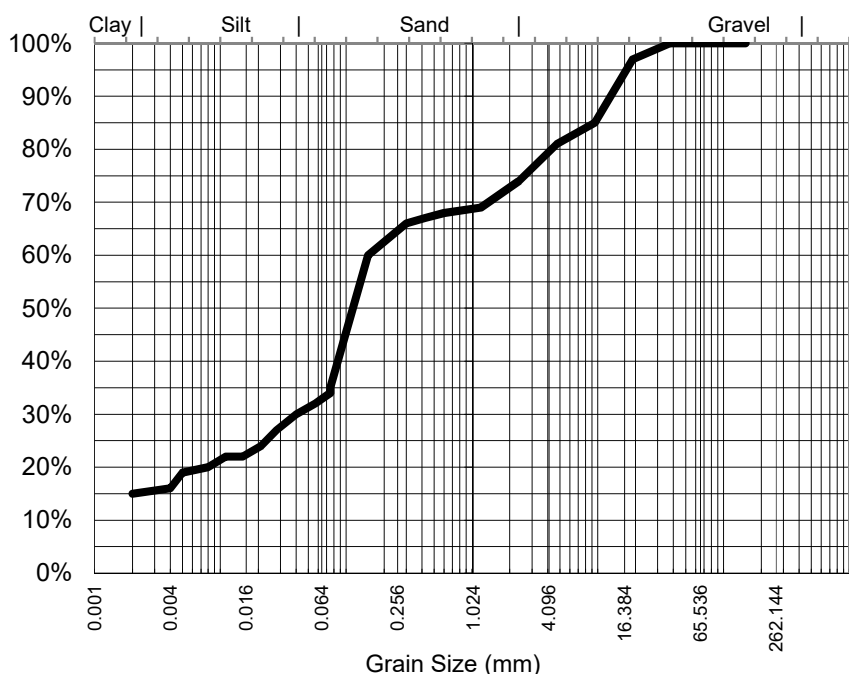
ADDRESS: PO BOX 381
DARWIN

REPORT NO: EB1815902-002 / PSD

PROJECT: EZ18107 - Grants Project -
Waste Characterisation

SAMPLE ID: GPSS01-B1

Particle Size Distribution



Particle Size (mm)	Percent Passing
37.5	100%
19.0	97%
9.50	85%
4.75	81%
2.36	74%
1.18	69%
0.600	68%
0.425	67%
0.300	66%
0.150	60%
0.075	35%
Particle Size (microns)	
57	32%
40	30%
21	24%
11	22%
5	19%
2	15%

Samples analysed as received.

Median Particle Size (mm)*	0.120

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Loss on Pretreatment NA

Sample Description: FINE, STONE, VEG

Test Method: AS1289.3.6.3 2003

Soil Particle Density (<2.36mm) 2.54 g/cm3

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Analysed: 5-Jul-18

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

D Blane

Dianne Blane
Laboratory Coordinator
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental
Newcastle, NSW



CLIENT: Aiden Campbell

DATE REPORTED: 11-Jul-2018

COMPANY: ECOZ ENVIRONMENTAL SERVICES

DATE RECEIVED: 29-Jun-2018

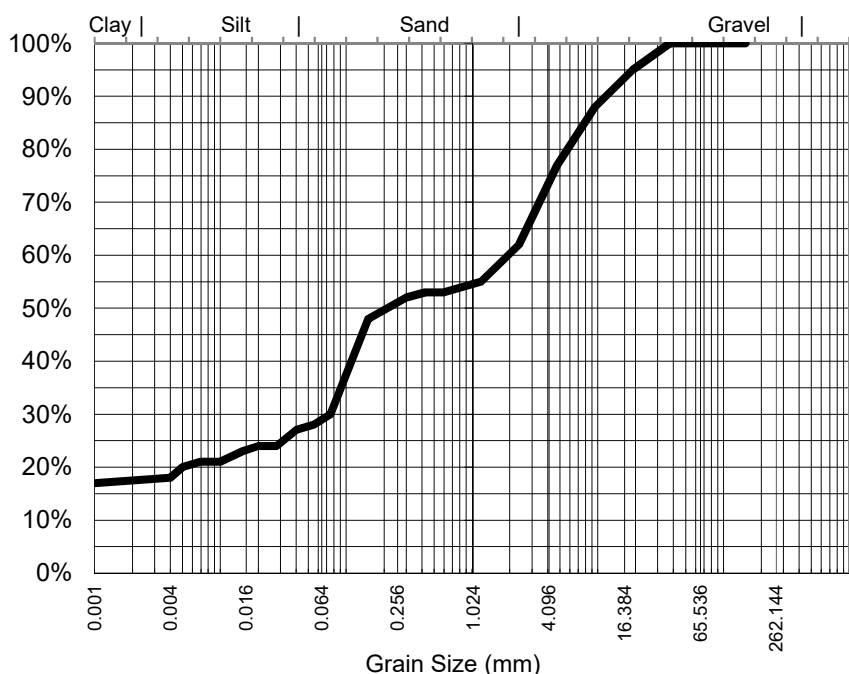
ADDRESS: PO BOX 381
DARWIN

REPORT NO: EB1815902-003 / PSD

PROJECT: EZ18107 - Grants Project -
Waste Characterisation

SAMPLE ID: GPSS01-B2

Particle Size Distribution



Particle Size (mm)	Percent Passing
37.5	100%
19.0	95%
9.50	88%
4.75	77%
2.36	62%
1.18	55%
0.600	53%
0.425	53%
0.300	52%
0.150	48%
0.075	30%
Particle Size (microns)	
55	28%
40	27%
20	24%
10	21%
5	20%
1	17%

Median Particle Size (mm)*	0.225

Samples analysed as received.

* Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Loss on Pretreatment NA

Sample Description: FINE, STONE, VEG

Test Method: AS1289.3.6.3 2003

Soil Particle Density (<2.36mm) 2.63 g/cm³

NATA Accreditation: 825 Site: Newcastle
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Analysed: 5-Jul-18

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

D Blane

Dianne Blane
Laboratory Coordinator
Authorised Signatory

Certificate of Analysis

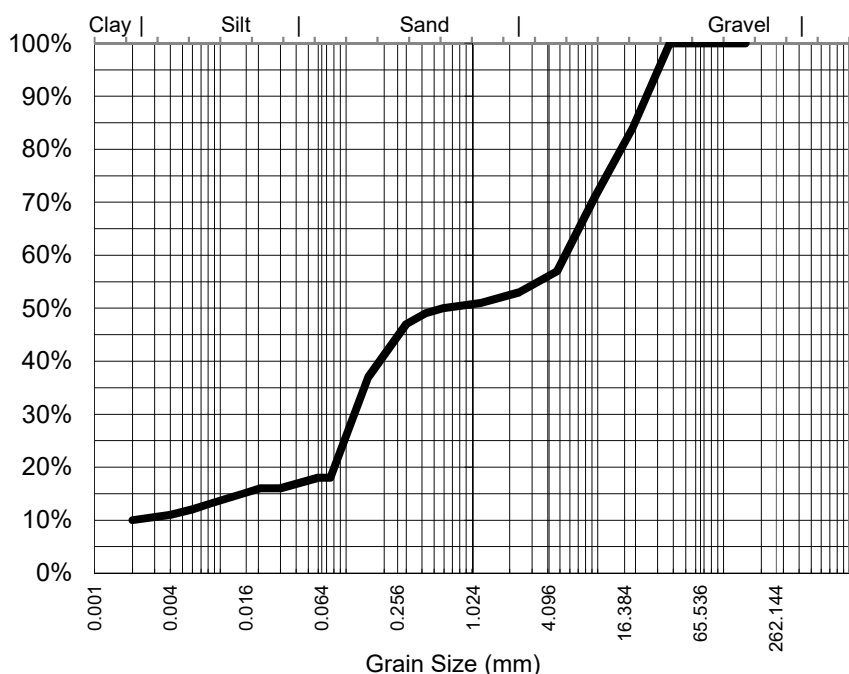
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental
Newcastle, NSW



CLIENT: Aiden Campbell **DATE REPORTED:** 11-Jul-2018
COMPANY: ECOZ ENVIRONMENTAL SERVICES **DATE RECEIVED:** 29-Jun-2018
ADDRESS: PO BOX 381 **REPORT NO:** EB1815902-004 / PSD
DARWIN
NT, AUSTRALIA
PROJECT: EZ18107 - Grants Project - **SAMPLE ID:** GPSS02-A1
Waste Characterisation

Particle Size Distribution



Particle Size (mm)	Percent Passing
37.5	100%
19.0	84%
9.50	71%
4.75	57%
2.36	53%
1.18	51%
0.600	50%
0.425	49%
0.300	47%
0.150	37%
0.075	18%
Particle Size (microns)	
60	18%
42	17%
21	16%
11	14%
6	12%
2	10%

Median Particle Size (mm)*	0.600

Samples analysed as received.

* Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Loss on Pretreatment NA

Sample Description: FINE, STONE, VEG

Test Method: AS1289.3.6.3 2003

Soil Particle Density (<2.36mm) 2.49 g/cm3

NATA Accreditation: 825 Site: Newcastle
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Analysed: 5-Jul-18

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

D Blane

Dianne Blane
Laboratory Coordinator
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental
Newcastle, NSW



CLIENT: Aiden Campbell

DATE REPORTED: 11-Jul-2018

COMPANY: ECOZ ENVIRONMENTAL SERVICES

DATE RECEIVED: 29-Jun-2018

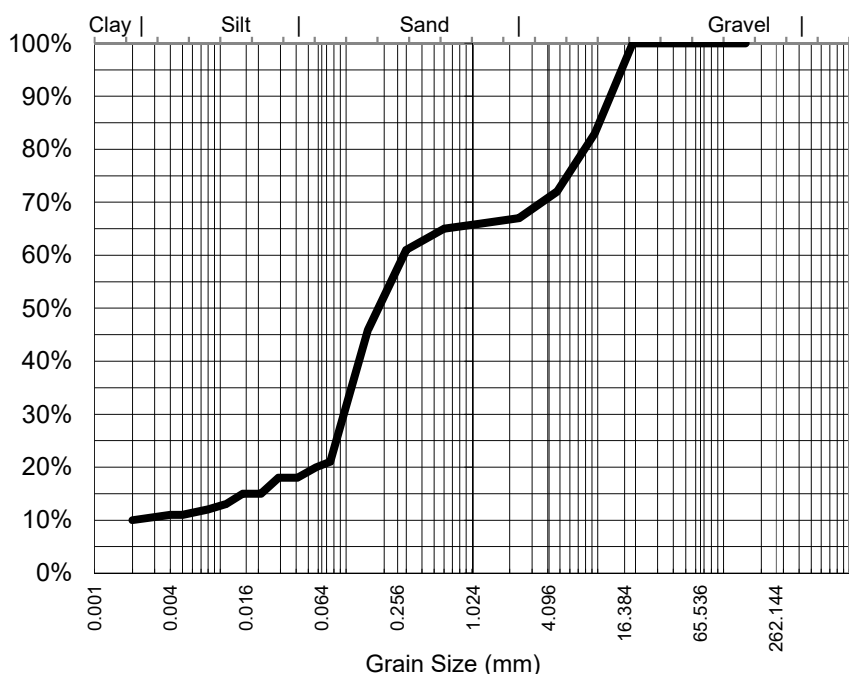
ADDRESS: PO BOX 381
DARWIN

REPORT NO: EB1815902-005 / PSD

PROJECT: EZ18107 - Grants Project -
Waste Characterisation

SAMPLE ID: GPSS03-A1

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.50	83%
4.75	72%
2.36	67%
1.18	66%
0.600	65%
0.425	63%
0.300	61%
0.150	46%
0.075	21%
Particle Size (microns)	
58	20%
41	18%
21	15%
11	13%
5	11%
2	10%

Median Particle Size (mm)*	0.190

Samples analysed as received.

* Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Loss on Pretreatment NA

Sample Description: FINE, STONE, VEG

Test Method: AS1289.3.6.3 2003

Soil Particle Density (<2.36mm) 2.55 g/cm3

NATA Accreditation: 825 Site: Newcastle
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Analysed: 5-Jul-18

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

D Blane

Dianne Blane
Laboratory Coordinator
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental
Newcastle, NSW



CLIENT: Aiden Campbell

DATE REPORTED: 11-Jul-2018

COMPANY: ECOZ ENVIRONMENTAL SERVICES

DATE RECEIVED: 29-Jun-2018

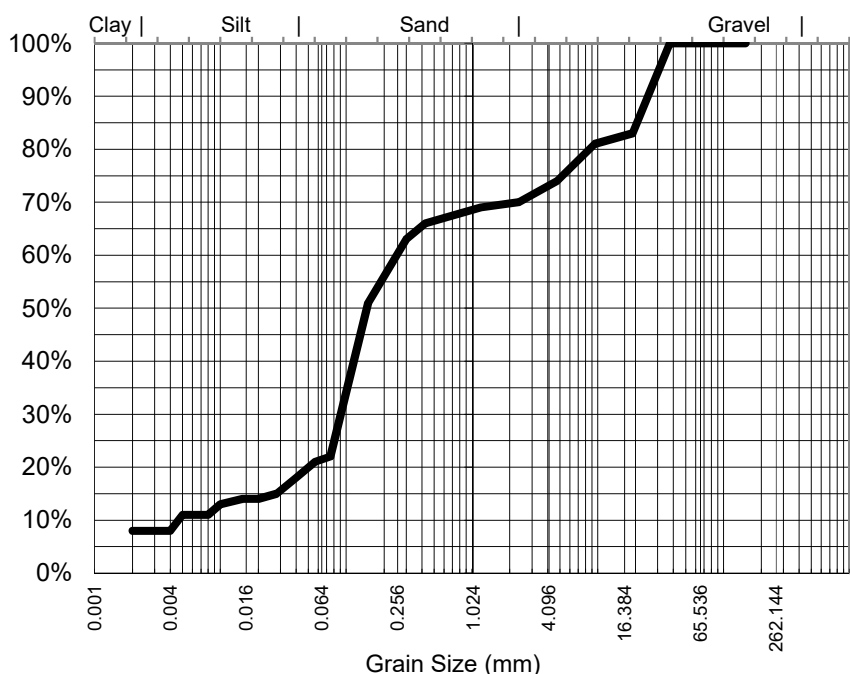
ADDRESS: PO BOX 381
DARWIN

REPORT NO: EB1815902-006 / PSD

PROJECT: EZ18107 - Grants Project -
Waste Characterisation

SAMPLE ID: GPSS03-B2

Particle Size Distribution



Particle Size (mm)	Percent Passing
37.5	100%
19.0	83%
9.50	81%
4.75	74%
2.36	70%
1.18	69%
0.600	67%
0.425	66%
0.300	63%
0.150	51%
0.075	22%
Particle Size (microns)	
57	21%
40	18%
20	14%
10	13%
5	11%
2	8%

Median Particle Size (mm)*	0.147

Samples analysed as received.

* Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Loss on Pretreatment NA

Sample Description: FINE, STONE, VEG

Test Method: AS1289.3.6.3 2003

Soil Particle Density (<2.36mm) 2.62 g/cm3

NATA Accreditation: 825 Site: Newcastle
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Analysed: 5-Jul-18

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

D Blane

Dianne Blane
Laboratory Coordinator
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental
Newcastle, NSW



CLIENT: Aiden Campbell

DATE REPORTED: 11-Jul-2018

COMPANY: ECOZ ENVIRONMENTAL SERVICES

DATE RECEIVED: 29-Jun-2018

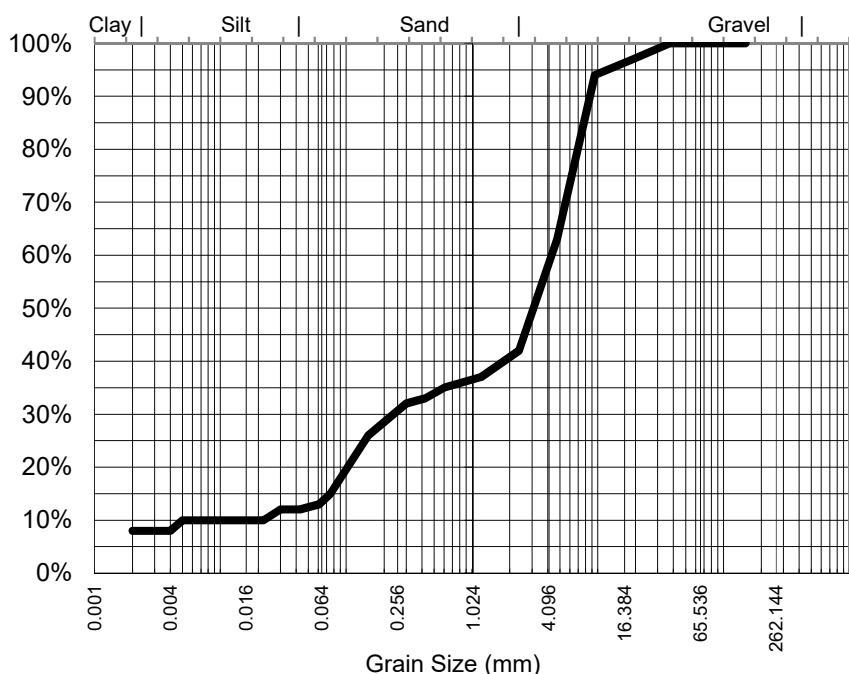
ADDRESS: PO BOX 381
DARWIN

REPORT NO: EB1815902-007 / PSD

PROJECT: EZ18107 - Grants Project -
Waste Characterisation

SAMPLE ID: GPSS04-A1

Particle Size Distribution



Particle Size (mm)	Percent Passing
37.5	100%
19.0	97%
9.50	94%
4.75	63%
2.36	42%
1.18	37%
0.600	35%
0.425	33%
0.300	32%
0.150	26%
0.075	15%
Particle Size (microns)	
61	13%
43	12%
22	10%
11	10%
5	10%
2	8%

Median Particle Size (mm)*	3.270

Samples analysed as received.

* Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Loss on Pretreatment NA

Sample Description: FINE, STONE, VEG

Test Method: AS1289.3.6.3 2003

Soil Particle Density (<2.36mm) 2.51 g/cm3

NATA Accreditation: 825 Site: Newcastle
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Analysed: 5-Jul-18

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

D Blane

Dianne Blane
Laboratory Coordinator
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental
Newcastle, NSW



CLIENT: Aiden Campbell

DATE REPORTED: 11-Jul-2018

COMPANY: ECOZ ENVIRONMENTAL SERVICES

DATE RECEIVED: 29-Jun-2018

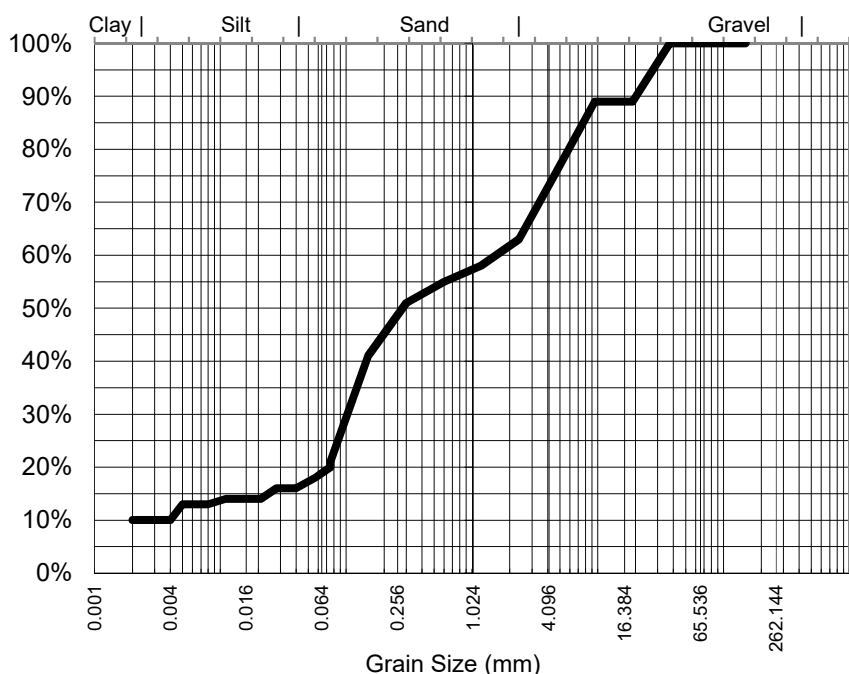
ADDRESS: PO BOX 381
DARWIN

REPORT NO: EB1815902-008 / PSD

PROJECT: EZ18107 - Grants Project -
Waste Characterisation

SAMPLE ID: GPSS04-B2

Particle Size Distribution



Particle Size (mm)	Percent Passing
37.5	100%
19.0	89%
9.50	89%
4.75	76%
2.36	63%
1.18	58%
0.600	55%
0.425	53%
0.300	51%
0.150	41%
0.075	21%
Particle Size (microns)	
57	18%
40	16%
21	14%
11	14%
5	13%
2	10%

Samples analysed as received.

* Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Loss on Pretreatment NA

Sample Description: FINE, STONE, VEG

Test Method: AS1289.3.6.3 2003

Soil Particle Density (<2.36mm) 2.62 g/cm3

NATA Accreditation: 825 Site: Newcastle
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Analysed: 5-Jul-18

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

D Blane

Dianne Blane
Laboratory Coordinator
Authorised Signatory

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ALS Environmental
Newcastle, NSW



CLIENT: Aiden Campbell

DATE REPORTED: 11-Jul-2018

COMPANY: ECOZ ENVIRONMENTAL SERVICES

DATE RECEIVED: 29-Jun-2018

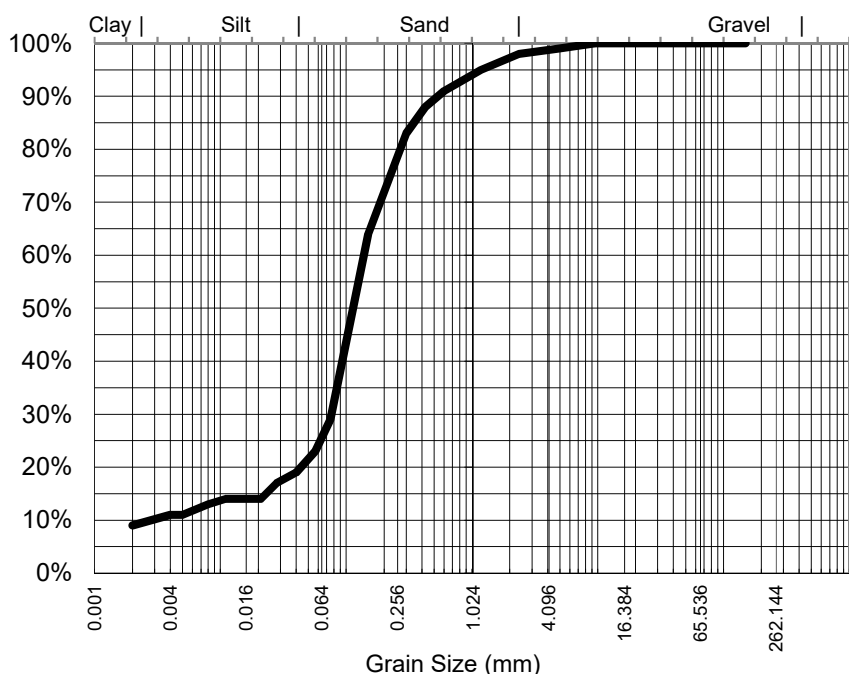
ADDRESS: PO BOX 381
DARWIN

REPORT NO: EB1815902-009 / PSD

PROJECT: EZ18107 - Grants Project -
Waste Characterisation

SAMPLE ID: GPSS05-A1

Particle Size Distribution



Particle Size (mm)	Percent Passing
9.50	100%
4.75	99%
2.36	98%
1.18	95%
0.600	91%
0.425	88%
0.300	83%
0.150	64%
0.075	29%
Particle Size (microns)	
57	23%
40	19%
21	14%
11	14%
5	11%
2	9%

Samples analysed as received.

* Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Loss on Pretreatment NA

Sample Description: FINE, STONE, VEG

Test Method: AS1289.3.6.3 2003

Soil Particle Density (<2.36mm) 2.63 g/cm3

NATA Accreditation: 825 **Site:** Newcastle

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Analysed: 5-Jul-18

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

D Blane

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ALS Environmental
Newcastle, NSW



CLIENT: Aiden Campbell

DATE REPORTED: 11-Jul-2018

COMPANY: ECOZ ENVIRONMENTAL SERVICES

DATE RECEIVED: 29-Jun-2018

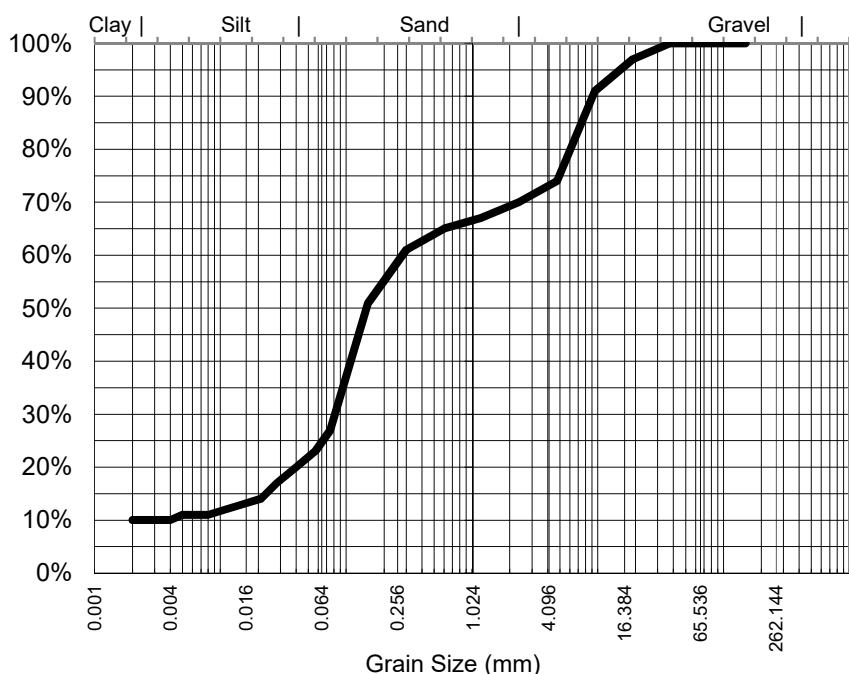
ADDRESS: PO BOX 381
DARWIN

REPORT NO: EB1815902-010 / PSD

PROJECT: EZ18107 - Grants Project -
Waste Characterisation

SAMPLE ID: GPSS05-B1

Particle Size Distribution



Particle Size (mm)	Percent Passing
37.5	100%
19.0	97%
9.50	91%
4.75	74%
2.36	70%
1.18	67%
0.600	65%
0.425	63%
0.300	61%
0.150	51%
0.075	27%
Particle Size (microns)	
57	23%
40	20%
21	14%
11	12%
5	11%
2	10%

Median Particle Size (mm)*	0.147

Samples analysed as received.

* Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Loss on Pretreatment NA

Sample Description: FINE, STONE, VEG

Test Method: AS1289.3.6.3 2003

Soil Particle Density (<2.36mm) 2.64 g/cm3

NATA Accreditation: 825 Site: Newcastle
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Analysed: 5-Jul-18

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

D Blane

Dianne Blane
Laboratory Coordinator
Authorised Signatory

Certificate of Analysis

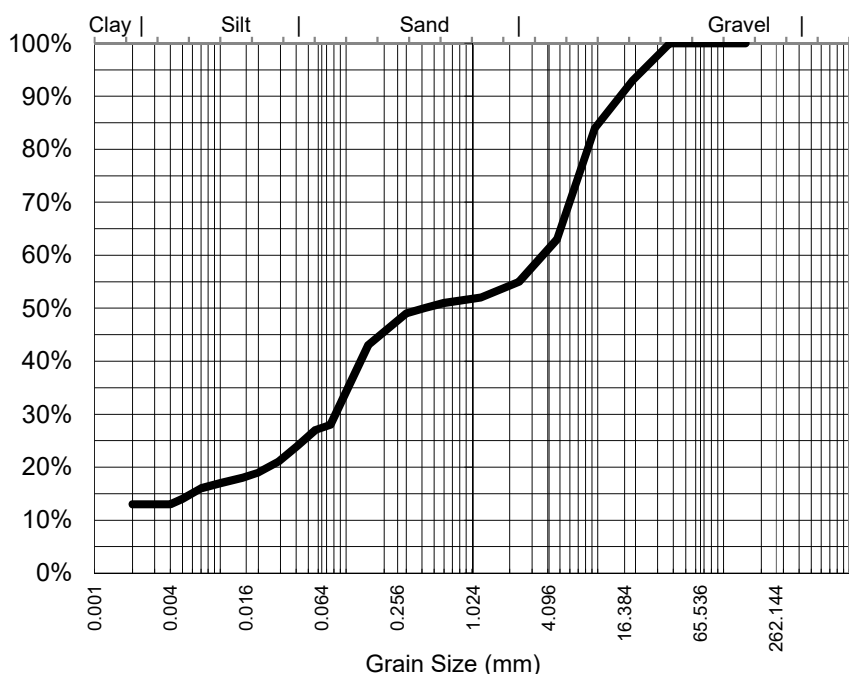
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental
Newcastle, NSW



CLIENT: Aiden Campbell **DATE REPORTED:** 11-Jul-2018
COMPANY: ECOZ ENVIRONMENTAL SERVICES **DATE RECEIVED:** 29-Jun-2018
ADDRESS: PO BOX 381 **REPORT NO:** EB1815902-011 / PSD
DARWIN
NT, AUSTRALIA
PROJECT: EZ18107 - Grants Project - **SAMPLE ID:** GPSS06-A1
Waste Characterisation

Particle Size Distribution



Particle Size (mm)	Percent Passing
37.5	100%
19.0	93%
9.50	84%
4.75	63%
2.36	55%
1.18	52%
0.600	51%
0.425	50%
0.300	49%
0.150	43%
0.075	28%
Particle Size (microns)	
57	27%
41	24%
20	19%
10	17%
5	14%
2	13%

Median Particle Size (mm)*	0.425

Samples analysed as received.

* Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Loss on Pretreatment NA

Sample Description: FINE, STONE, VEG

Test Method: AS1289.3.6.3 2003

Soil Particle Density (<2.36mm) 2.57 g/cm³

NATA Accreditation: 825 Site: Newcastle
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Analysed: 5-Jul-18

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

D Blane

Dianne Blane
Laboratory Coordinator
Authorised Signatory

Certificate of Analysis

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fax 02 4968 0349
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ALS Environmental
Newcastle, NSW



CLIENT: Aiden Campbell

DATE REPORTED: 11-Jul-2018

COMPANY: ECOZ ENVIRONMENTAL SERVICES

DATE RECEIVED: 29-Jun-2018

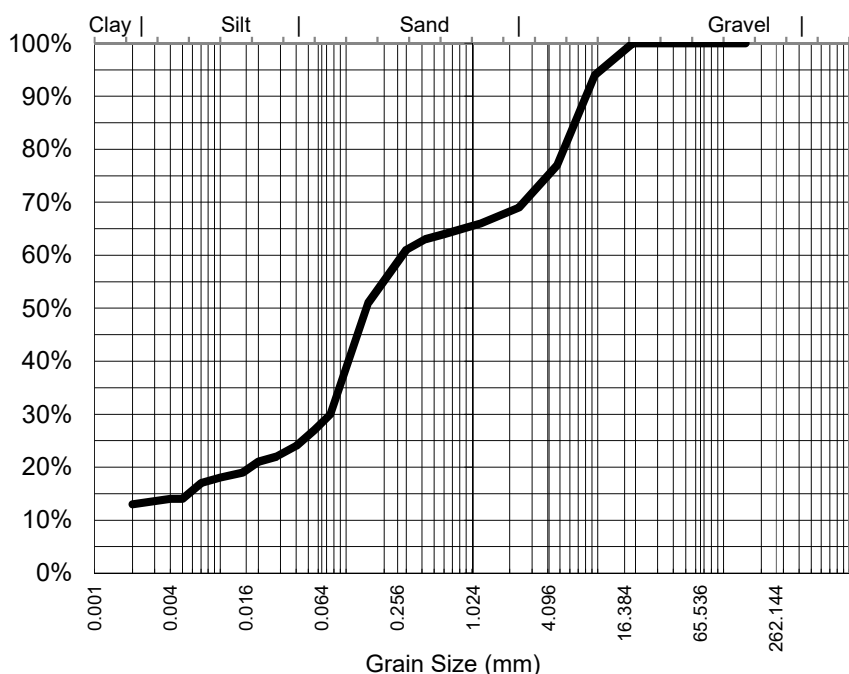
ADDRESS: PO BOX 381
DARWIN

REPORT NO: EB1815902-012 / PSD

PROJECT: EZ18107 - Grants Project -
Waste Characterisation

SAMPLE ID: GPSS06-B2

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.50	94%
4.75	77%
2.36	69%
1.18	66%
0.600	64%
0.425	63%
0.300	61%
0.150	51%
0.075	30%
Particle Size (microns)	
56	27%
40	24%
20	21%
10	18%
5	14%
2	13%

Median Particle Size (mm)*	0.146

Samples analysed as received.

* Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Loss on Pretreatment NA

Sample Description: FINE, STONE, VEG

Test Method: AS1289.3.6.3 2003

Soil Particle Density (<2.36mm) 2.6 g/cm3

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Analysed: 5-Jul-18

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

D Blane

Dianne Blane
Laboratory Coordinator
Authorised Signatory

Certificate of Analysis

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ALS Environmental
Newcastle, NSW



CLIENT: Aiden Campbell

DATE REPORTED: 11-Jul-2018

COMPANY: ECOZ ENVIRONMENTAL SERVICES

DATE RECEIVED: 29-Jun-2018

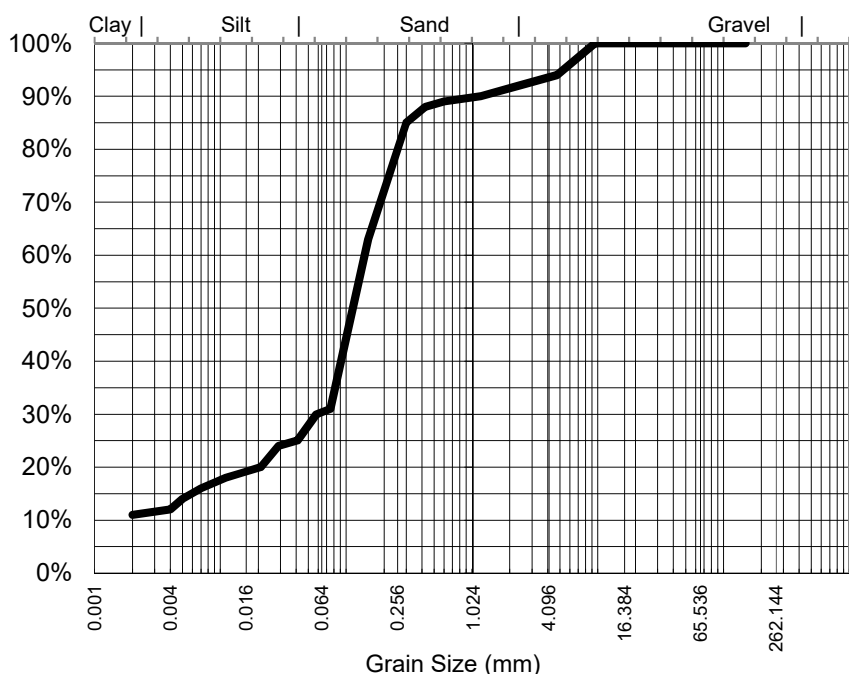
ADDRESS: PO BOX 381
DARWIN

REPORT NO: EB1815902-013 / PSD

PROJECT: EZ18107 - Grants Project -
Waste Characterisation

SAMPLE ID: GPSS07-A1

Particle Size Distribution



Particle Size (mm)	Percent Passing
9.50	100%
4.75	94%
2.36	92%
1.18	90%
0.600	89%
0.425	88%
0.300	85%
0.150	63%
0.075	31%
Particle Size (microns)	
58	30%
41	25%
21	20%
11	18%
5	14%
2	11%

Median Particle Size (mm)*	0.120

Samples analysed as received.

* Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Loss on Pretreatment NA

Sample Description: FINE, STONE, VEG

Test Method: AS1289.3.6.3 2003

Soil Particle Density (<2.36mm) 2.53 g/cm3

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Analysed: 5-Jul-18

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

D Blane

Dianne Blane
Laboratory Coordinator
Authorised Signatory

Certificate of Analysis

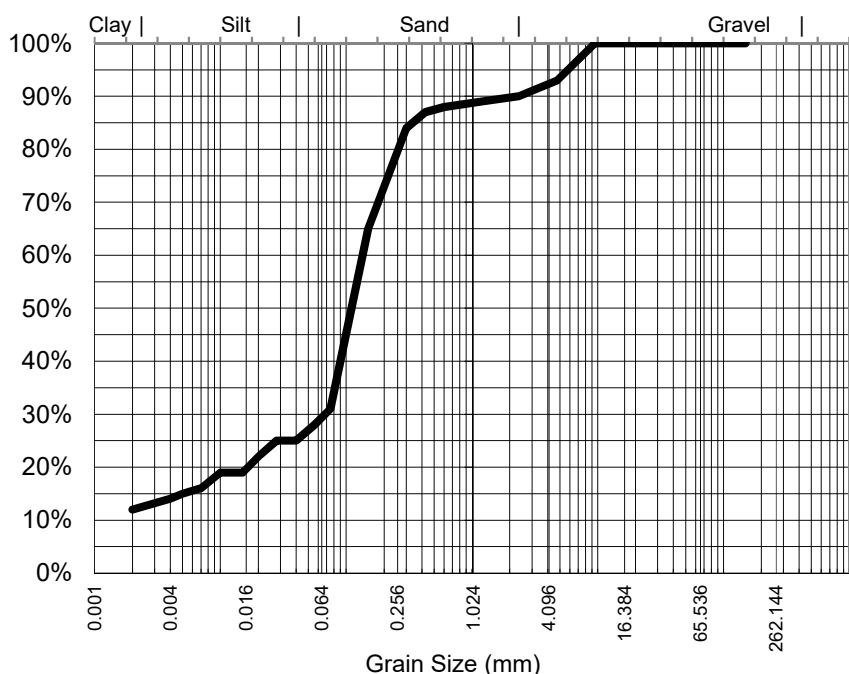
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental
Newcastle, NSW



CLIENT: Aiden Campbell **DATE REPORTED:** 11-Jul-2018
COMPANY: ECOZ ENVIRONMENTAL SERVICES **DATE RECEIVED:** 29-Jun-2018
ADDRESS: PO BOX 381 **REPORT NO:** EB1815902-014 / PSD
DARWIN
NT, AUSTRALIA
PROJECT: EZ18107 - Grants Project - **SAMPLE ID:** GPSS07-B2
Waste Characterisation

Particle Size Distribution



Particle Size (mm)	Percent Passing
9.50	100%
4.75	93%
2.36	90%
1.18	89%
0.600	88%
0.425	87%
0.300	84%
0.150	65%
0.075	31%
Particle Size (microns)	
56	28%
40	25%
20	22%
10	19%
5	15%
2	12%

Median Particle Size (mm)*	0.117

Samples analysed as received.

* Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Loss on Pretreatment NA

Sample Description: FINE, STONE, VEG

Test Method: AS1289.3.6.3 2003

Soil Particle Density (<2.36mm) 2.61 g/cm3

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Analysed: 5-Jul-18

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

Dianne Blane
Laboratory Coordinator
Authorised Signatory

Certificate of Analysis

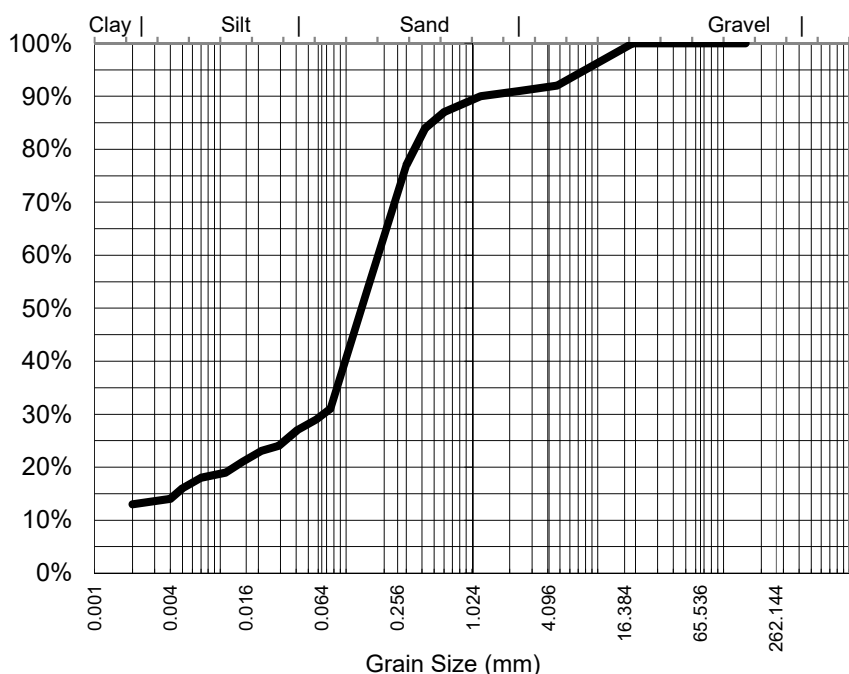
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
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ALS Environmental
Newcastle, NSW



CLIENT: Aiden Campbell **DATE REPORTED:** 11-Jul-2018
COMPANY: ECOZ ENVIRONMENTAL SERVICES **DATE RECEIVED:** 29-Jun-2018
ADDRESS: PO BOX 381 **REPORT NO:** EB1815902-015 / PSD
DARWIN
NT, AUSTRALIA
PROJECT: EZ18107 - Grants Project - **SAMPLE ID:** GPSS08-A1
Waste Characterisation

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.50	96%
4.75	92%
2.36	91%
1.18	90%
0.600	87%
0.425	84%
0.300	77%
0.150	54%
0.075	31%
Particle Size (microns)	
58	29%
41	27%
21	23%
11	19%
5	16%
2	13%

Median Particle Size (mm)*	0.137

Samples analysed as received.

* Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Loss on Pretreatment NA

Sample Description: FINE, STONE, VEG

Test Method: AS1289.3.6.3 2003

Soil Particle Density (<2.36mm) 2.54 g/cm³

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Analysed: 5-Jul-18

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

D Blane

Dianne Blane
Laboratory Coordinator
Authorised Signatory

Certificate of Analysis

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fax 02 4968 0349
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ALS Environmental
Newcastle, NSW



CLIENT: Aiden Campbell

DATE REPORTED: 11-Jul-2018

COMPANY: ECOZ ENVIRONMENTAL SERVICES

DATE RECEIVED: 29-Jun-2018

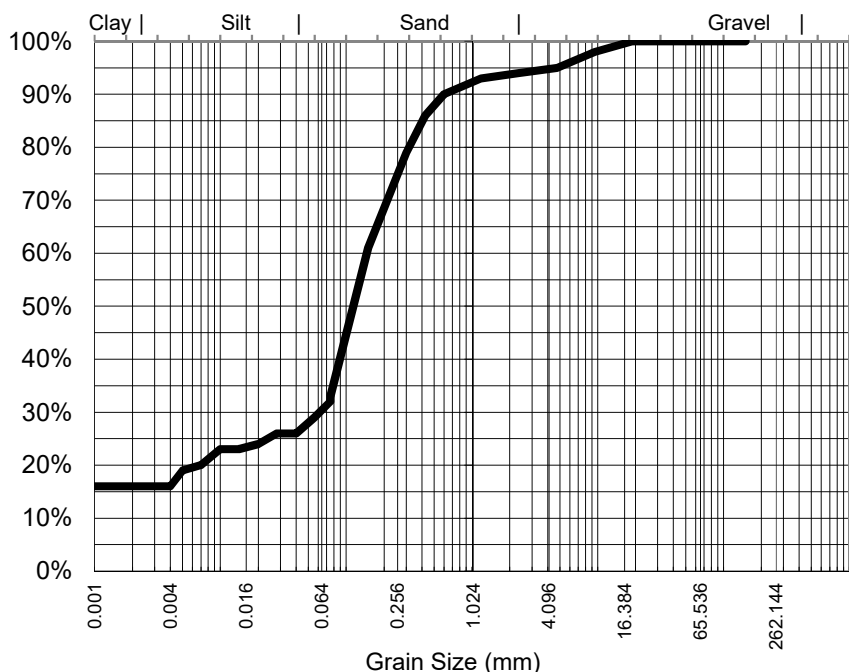
ADDRESS: PO BOX 381
DARWIN

REPORT NO: EB1815902-016 / PSD

PROJECT: EZ18107 - Grants Project - Waste Characterisation

SAMPLE ID: GPSS08-B2

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.50	98%
4.75	95%
2.36	94%
1.18	93%
0.600	90%
0.425	86%
0.300	79%
0.150	61%
0.075	33%
Particle Size (microns)	
56	29%
40	26%
20	24%
10	23%
5	19%
1	16%

Median Particle Size (mm)*	0.121

Samples analysed as received.

* Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Loss on Pretreatment NA

Sample Description: FINE, STONE, VEG

Test Method: AS1289.3.6.3 2003

Soil Particle Density (<2.36mm) 2.63 g/cm3

NATA Accreditation: 825 Site: Newcastle
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Analysed: 5-Jul-18

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

D Blane

Dianne Blane
Laboratory Coordinator
Authorised Signatory

Certificate of Analysis

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Mayfield West, NSW 2304
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fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental
Newcastle, NSW



CLIENT: Aiden Campbell

DATE REPORTED: 11-Jul-2018

COMPANY: ECOZ ENVIRONMENTAL SERVICES

DATE RECEIVED: 29-Jun-2018

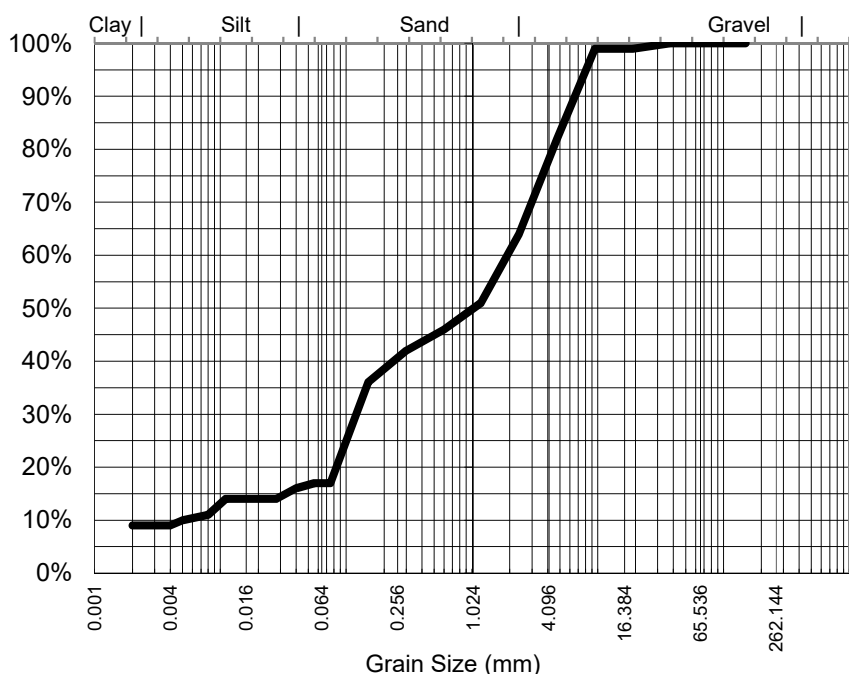
ADDRESS: PO BOX 381
DARWIN

REPORT NO: EB1815902-017 / PSD

PROJECT: EZ18107 - Grants Project -
Waste Characterisation

SAMPLE ID: GPSS09-A1

Particle Size Distribution



Particle Size (mm)	Percent Passing
37.5	100%
19.0	99%
9.50	99%
4.75	82%
2.36	64%
1.18	51%
0.600	46%
0.425	44%
0.300	42%
0.150	36%
0.075	17%
Particle Size (microns)	
56	17%
40	16%
21	14%
11	14%
5	10%
2	9%

Median Particle Size (mm)*	1.064

Samples analysed as received.

* Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Loss on Pretreatment NA

Sample Description: FINE, STONE, VEG

Test Method: AS1289.3.6.3 2003

Soil Particle Density (<2.36mm) 2.63 g/cm3

NATA Accreditation: 825 Site: Newcastle
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Analysed: 5-Jul-18

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

D Blane

Dianne Blane
Laboratory Coordinator
Authorised Signatory

Certificate of Analysis

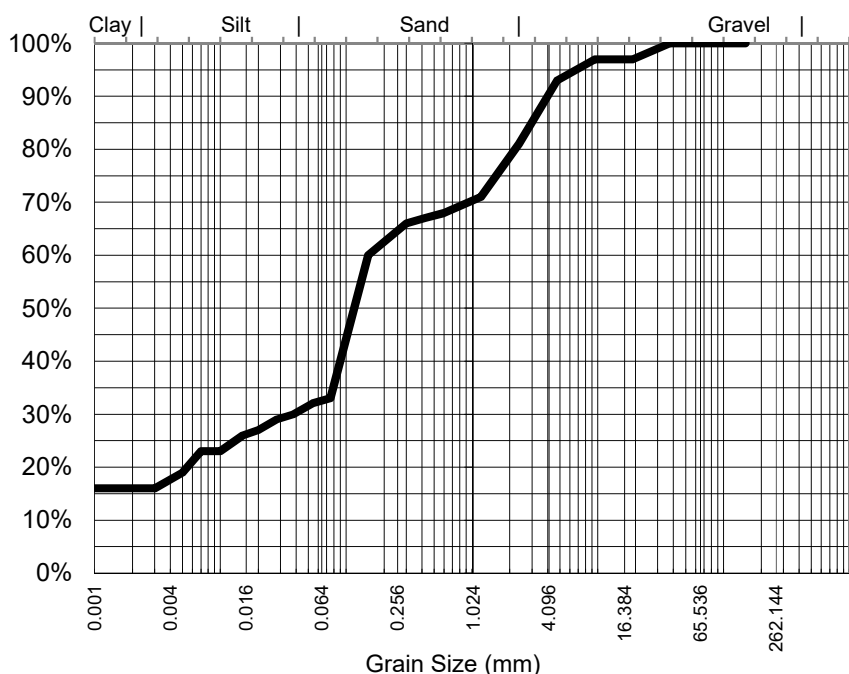
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Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental
Newcastle, NSW



CLIENT: Aiden Campbell **DATE REPORTED:** 11-Jul-2018
COMPANY: ECOZ ENVIRONMENTAL SERVICES **DATE RECEIVED:** 29-Jun-2018
ADDRESS: PO BOX 381 **REPORT NO:** EB1815902-018 / PSD
DARWIN
NT, AUSTRALIA
PROJECT: EZ18107 - Grants Project - **SAMPLE ID:** GPSS09-B2
Waste Characterisation

Particle Size Distribution



Particle Size (mm)	Percent Passing
37.5	100%
19.0	97%
9.50	97%
4.75	93%
2.36	81%
1.18	71%
0.600	68%
0.425	67%
0.300	66%
0.150	60%
0.075	33%
Particle Size (microns)	
54	32%
38	30%
20	27%
10	23%
5	19%
1	16%

Median Particle Size (mm)*	0.122

Samples analysed as received.

* Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Loss on Pretreatment NA

Sample Description: FINE, STONE, VEG

Test Method: AS1289.3.6.3 2003

Soil Particle Density (<2.36mm) 2.73 g/cm3

NATA Accreditation: 825 Site: Newcastle
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Analysed: 5-Jul-18

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

Dianne Blane
Laboratory Coordinator
Authorised Signatory

Certificate of Analysis

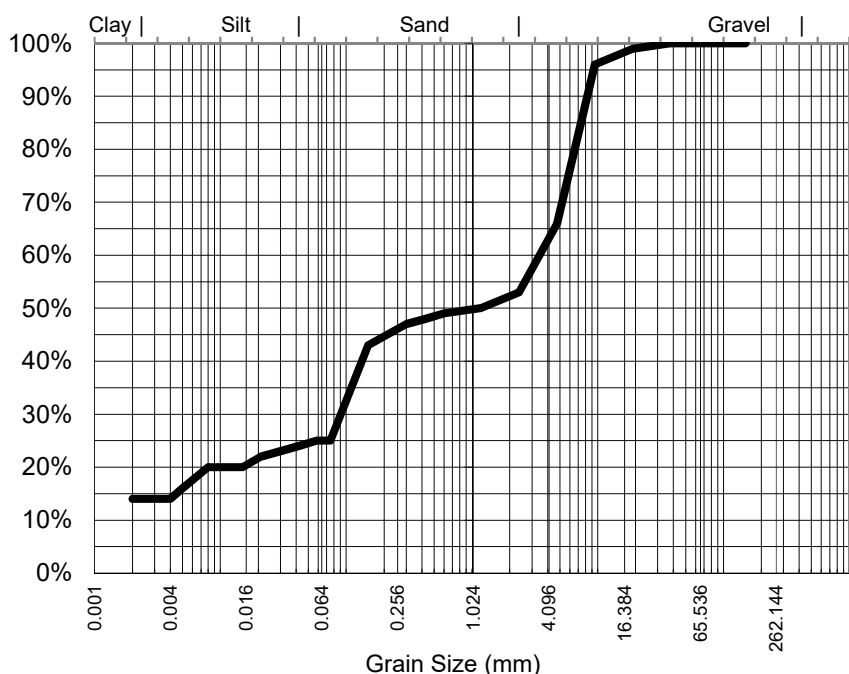
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental
Newcastle, NSW



CLIENT: Aiden Campbell **DATE REPORTED:** 11-Jul-2018
COMPANY: ECOZ ENVIRONMENTAL SERVICES **DATE RECEIVED:** 29-Jun-2018
ADDRESS: PO BOX 381 **REPORT NO:** EB1815902-019 / PSD
DARWIN
NT, AUSTRALIA
PROJECT: EZ18107 - Grants Project - **SAMPLE ID:** GPSS10-A1
Waste Characterisation

Particle Size Distribution



Particle Size (mm)	Percent Passing
37.5	100%
19.0	99%
9.50	96%
4.75	66%
2.36	53%
1.18	50%
0.600	49%
0.425	48%
0.300	47%
0.150	43%
0.075	25%
Particle Size (microns)	
59	25%
42	24%
21	22%
11	20%
5	16%
2	14%

Median Particle Size (mm)*	1.180

Samples analysed as received.

* Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Loss on Pretreatment NA

Sample Description: FINE, STONE, VEG

Test Method: AS1289.3.6.3 2003

Soil Particle Density (<2.36mm) 2.57 g/cm3

NATA Accreditation: 825 Site: Newcastle
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Analysed: 5-Jul-18

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

Dianne Blane
Laboratory Coordinator
Authorised Signatory

Certificate of Analysis

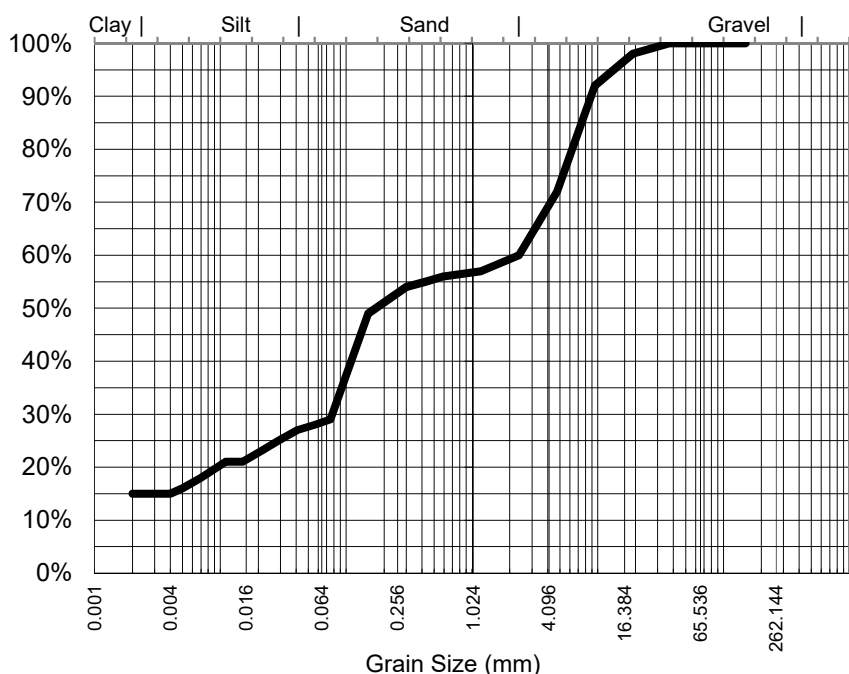
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental
Newcastle, NSW



CLIENT: Aiden Campbell **DATE REPORTED:** 11-Jul-2018
COMPANY: ECOZ ENVIRONMENTAL SERVICES **DATE RECEIVED:** 29-Jun-2018
ADDRESS: PO BOX 381 **REPORT NO:** EB1815902-020 / PSD
DARWIN
NT, AUSTRALIA
PROJECT: EZ18107 - Grants Project - **SAMPLE ID:** GPSS10-B2
Waste Characterisation

Particle Size Distribution



Particle Size (mm)	Percent Passing
37.5	100%
19.0	98%
9.50	92%
4.75	72%
2.36	60%
1.18	57%
0.600	56%
0.425	55%
0.300	54%
0.150	49%
0.075	29%
Particle Size (microns)	
56	28%
41	27%
21	23%
11	21%
5	16%
2	15%

Median Particle Size (mm)*	0.180

Samples analysed as received.

* Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Loss on Pretreatment NA

Sample Description: FINE, STONE, VEG

Test Method: AS1289.3.6.3 2003

Soil Particle Density (<2.36mm) 2.62 g/cm3

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Analysed: 5-Jul-18

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

Dianne Blane
Laboratory Coordinator
Authorised Signatory

Certificate of Analysis

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CLIENT: Aiden Campbell

DATE REPORTED: 11-Jul-2018

COMPANY: ECOZ ENVIRONMENTAL SERVICES

DATE RECEIVED: 29-Jun-2018

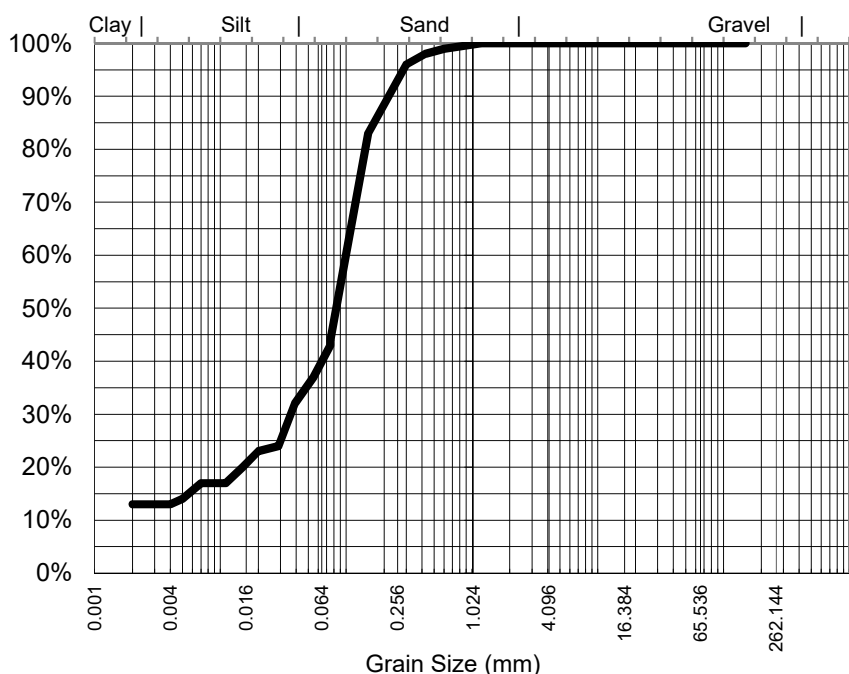
ADDRESS: PO BOX 381
DARWIN

REPORT NO: EB1815902-021 / PSD

PROJECT: EZ18107 - Grants Project - Waste Characterisation

SAMPLE ID: GPSS12-A1

Particle Size Distribution



Particle Size (mm)	Percent Passing
1.18	100%
0.600	99%
0.425	98%
0.300	96%
0.150	83%
0.075	44%
Particle Size (microns)	
55	37%
39	32%
20	23%
11	17%
5	14%
2	13%

Samples analysed as received.

* Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Loss on Pretreatment NA

Sample Description: FINE, STONE, VEG

Test Method: AS1289.3.6.3 2003

Soil Particle Density (<2.36mm) 2.63 g/cm³

NATA Accreditation: 825 **Site:** Newcastle

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Analysed: 5-Jul-18

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

D Blane

Dianne Blane
Laboratory Coordinator
Authorised Signatory

Certificate of Analysis

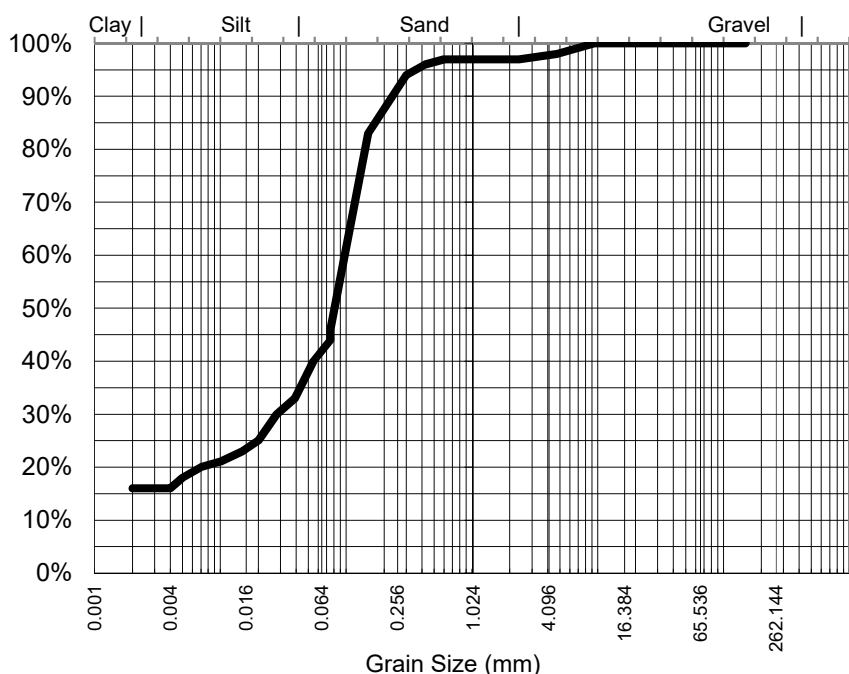
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COMPANY: ECOZ ENVIRONMENTAL SERVICES **DATE RECEIVED:** 29-Jun-2018
ADDRESS: PO BOX 381 **REPORT NO:** EB1815902-022 / PSD
DARWIN
NT, AUSTRALIA
PROJECT: EZ18107 - Grants Project - **SAMPLE ID:** GPSS12-A2
Waste Characterisation

Particle Size Distribution



Particle Size (mm)	Percent Passing
9.50	100%
4.75	98%
2.36	97%
1.18	97%
0.600	97%
0.425	96%
0.300	94%
0.150	83%
0.075	46%
Particle Size (microns)	
55	40%
39	33%
20	25%
10	21%
5	18%
2	16%

Samples analysed as received.

* Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Loss on Pretreatment NA

Sample Description: FINE, STONE, VEG

Test Method: AS1289.3.6.3 2003

Soil Particle Density (<2.36mm) 2.64 g/cm3

NATA Accreditation: 825 Site: Newcastle

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Analysed: 5-Jul-18

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Dispersion Method Shaker

Hydrometer Type ASTM E100

D Blane

Dianne Blane
Laboratory Coordinator
Authorised Signatory

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Newcastle, NSW



CLIENT: Aiden Campbell

DATE REPORTED: 11-Jul-2018

COMPANY: ECOZ ENVIRONMENTAL SERVICES

DATE RECEIVED: 29-Jun-2018

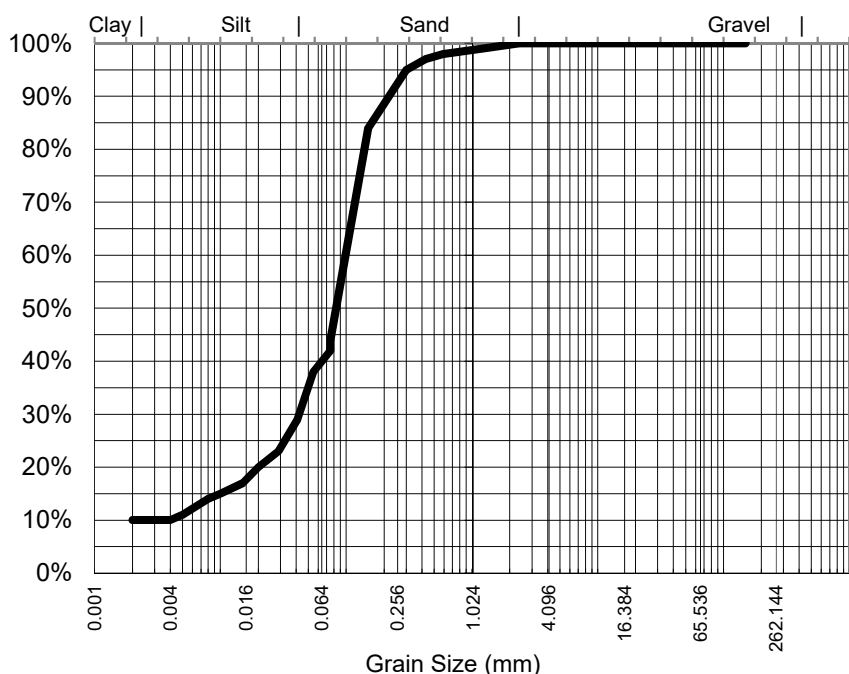
ADDRESS: PO BOX 381
DARWIN

REPORT NO: EB1815902-023 / PSD

PROJECT: EZ18107 - Grants Project -
Waste Characterisation

SAMPLE ID: GPSS13-A1

Particle Size Distribution



Particle Size (mm)	Percent Passing
2.36	100%
1.18	99%
0.600	98%
0.425	97%
0.300	95%
0.150	84%
0.075	44%
Particle Size (microns)	
55	38%
41	29%
20	20%
10	15%
5	11%
2	10%

Samples analysed as received.

* Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Loss on Pretreatment NA

Sample Description: FINE, STONE, VEG

Test Method: AS1289.3.6.3 2003

Soil Particle Density (<2.36mm) 2.62 g/cm3

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Dispersion Method Shaker

Hydrometer Type ASTM E100

Dianne Blane
Laboratory Coordinator
Authorised Signatory

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Newcastle, NSW



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DATE REPORTED: 11-Jul-2018

COMPANY: ECOZ ENVIRONMENTAL SERVICES

DATE RECEIVED: 29-Jun-2018

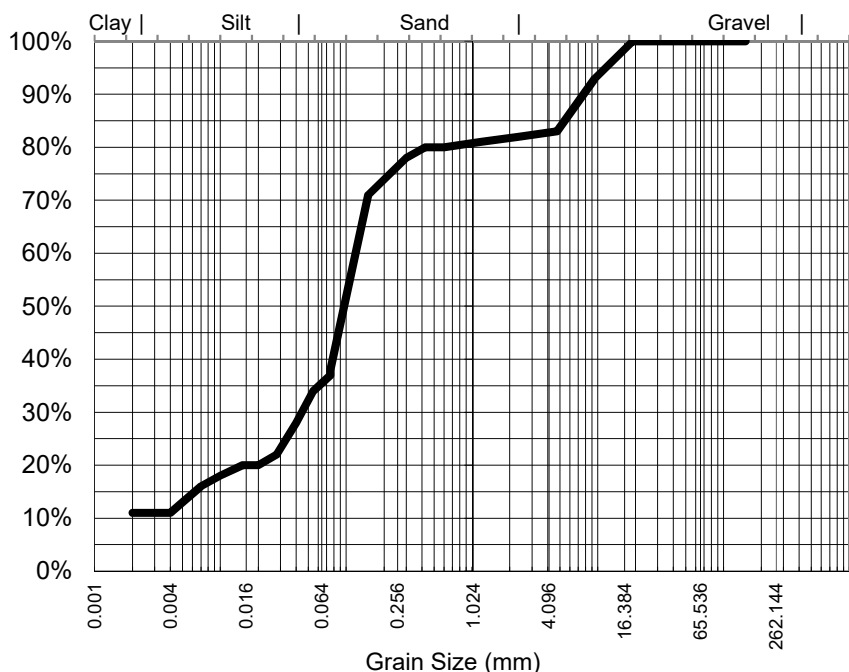
ADDRESS: PO BOX 381
DARWIN

REPORT NO: EB1815902-024 / PSD

PROJECT: EZ18107 - Grants Project -
Waste Characterisation

SAMPLE ID: GPSS13-A2

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.50	93%
4.75	83%
2.36	82%
1.18	81%
0.600	80%
0.425	80%
0.300	78%
0.150	71%
0.075	38%
Particle Size (microns)	
55	34%
40	28%
20	20%
10	18%
5	13%
2	11%

Samples analysed as received.

* Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Loss on Pretreatment NA

Sample Description: FINE, STONE, VEG

Test Method: AS1289.3.6.3 2003

Soil Particle Density (<2.36mm) 2.65 g/cm3

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Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

D Blane

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Authorised Signatory

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ALS Environmental
Newcastle, NSW



CLIENT: Aiden Campbell

DATE REPORTED: 11-Jul-2018

COMPANY: ECOZ ENVIRONMENTAL SERVICES

DATE RECEIVED: 29-Jun-2018

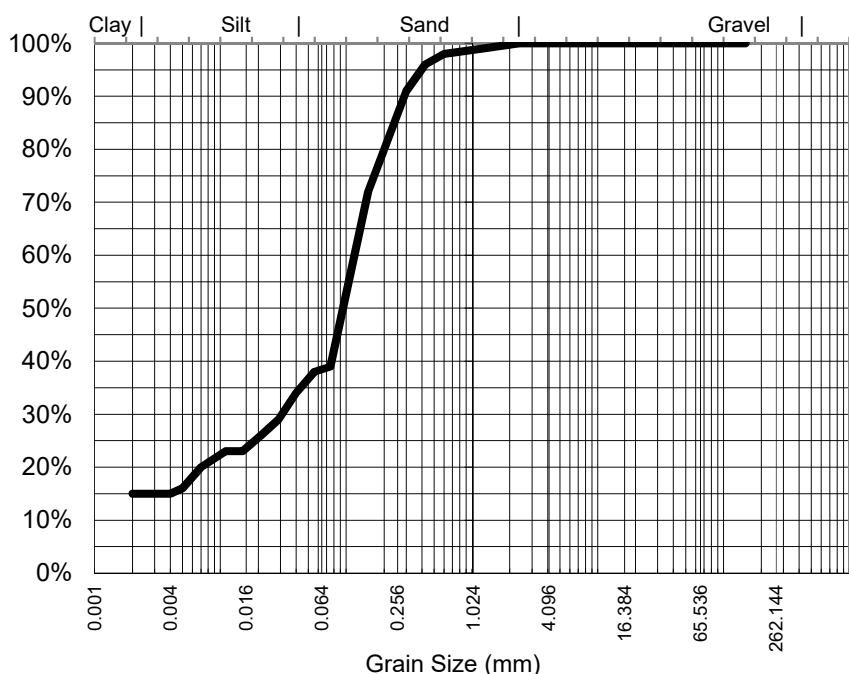
ADDRESS: PO BOX 381
DARWIN

REPORT NO: EB1815902-025 / PSD

PROJECT: EZ18107 - Grants Project -
Waste Characterisation

SAMPLE ID: GPSS14-A1

Particle Size Distribution



Particle Size (mm)	Percent Passing
2.36	100%
1.18	99%
0.600	98%
0.425	96%
0.300	91%
0.150	72%
0.075	39%
Particle Size (microns)	
56	38%
40	34%
21	26%
11	23%
5	16%
2	15%

Samples analysed as received.

* Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Loss on Pretreatment NA

Sample Description: FINE, STONE, VEG

Test Method: AS1289.3.6.3 2003

Soil Particle Density (<2.36mm) 2.58 g/cm3

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Analysed: 5-Jul-18

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

D Blane

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Authorised Signatory

Certificate of Analysis

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ALS Environmental
Newcastle, NSW



CLIENT: Aiden Campbell

DATE REPORTED: 11-Jul-2018

COMPANY: ECOZ ENVIRONMENTAL SERVICES

DATE RECEIVED: 29-Jun-2018

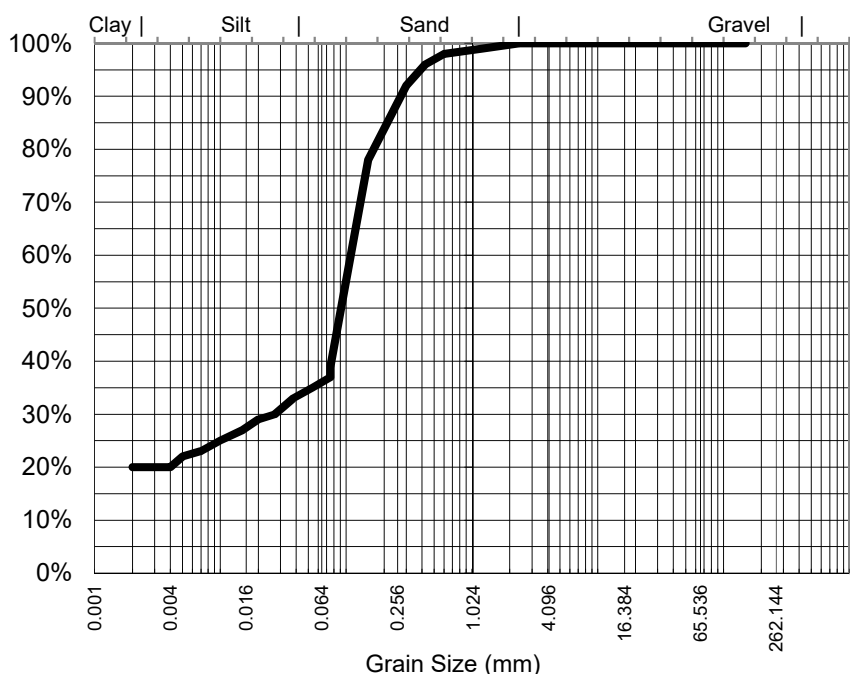
ADDRESS: PO BOX 381
DARWIN

REPORT NO: EB1815902-026 / PSD

PROJECT: EZ18107 - Grants Project - Waste Characterisation

SAMPLE ID: GPSS14-B2

Particle Size Distribution



Particle Size (mm)	Percent Passing
2.36	100%
1.18	99%
0.600	98%
0.425	96%
0.300	92%
0.150	78%
0.075	39%
Particle Size (microns)	
54	35%
38	33%
20	29%
10	25%
5	22%
2	20%

Samples analysed as received.

* Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Loss on Pretreatment NA

Sample Description: FINE, STONE, VEG

Test Method: AS1289.3.6.3 2003

Soil Particle Density (<2.36mm) 2.65 g/cm3

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Analysed: 5-Jul-18

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

D Blane

Dianne Blane
Laboratory Coordinator
Authorised Signatory

Certificate of Analysis

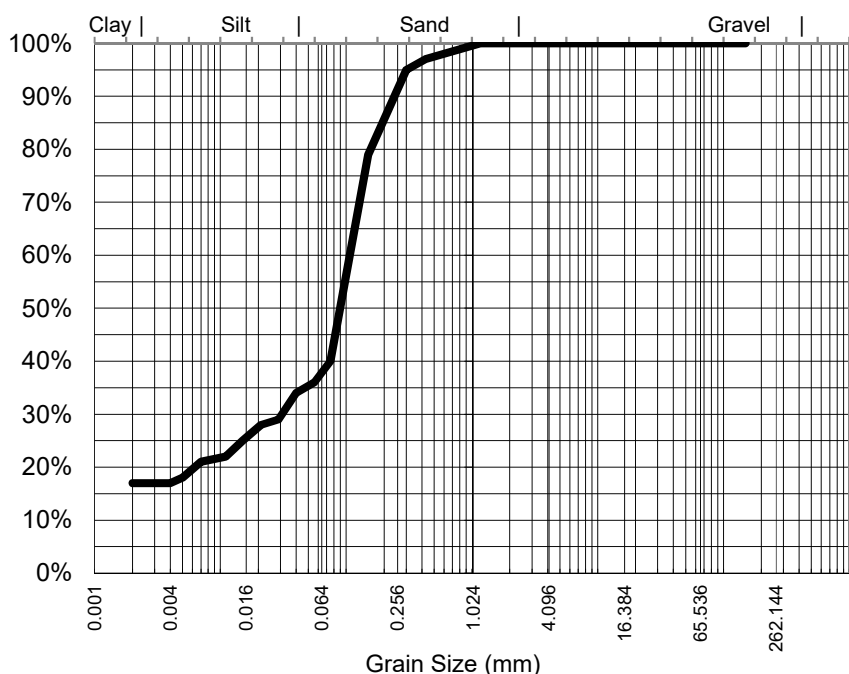
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Newcastle, NSW



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COMPANY: ECOZ ENVIRONMENTAL SERVICES **DATE RECEIVED:** 29-Jun-2018
ADDRESS: PO BOX 381 **REPORT NO:** EB1815902-027 / PSD
DARWIN
NT, AUSTRALIA
PROJECT: EZ18107 - Grants Project - **SAMPLE ID:** GPSS15-A1
Waste Characterisation

Particle Size Distribution



Particle Size (mm)	Percent Passing
1.18	100%
0.600	98%
0.425	97%
0.300	95%
0.150	79%
0.075	40%
Particle Size (microns)	
56	36%
40	34%
21	28%
11	22%
5	18%
2	17%

Samples analysed as received.

* Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Loss on Pretreatment NA

Sample Description: FINE, STONE, VEG

Test Method: AS1289.3.6.3 2003

Soil Particle Density (<2.36mm) 2.59 g/cm³

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Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

D Blane

Dianne Blane
Laboratory Coordinator
Authorised Signatory

Certificate of Analysis

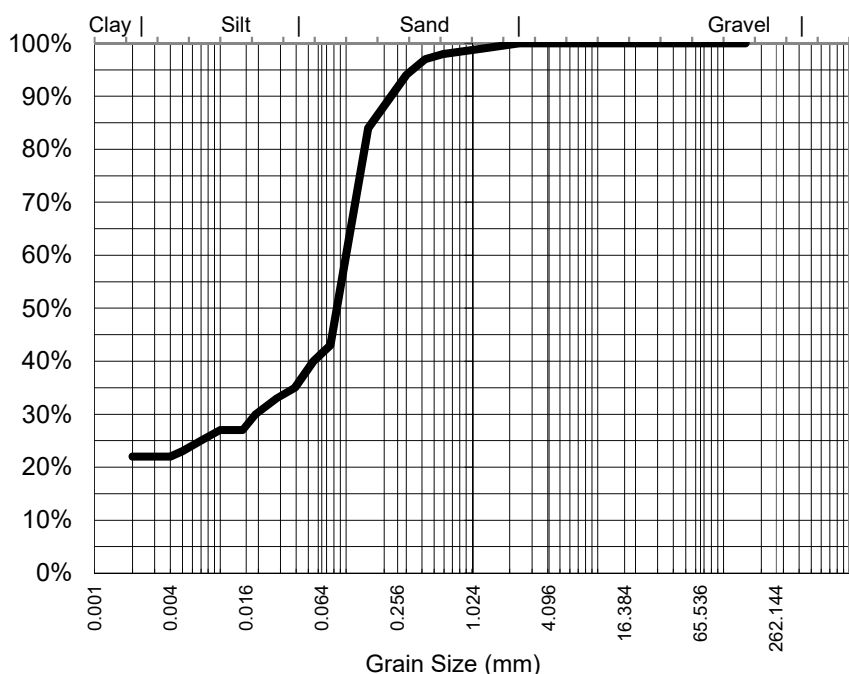
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pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

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Newcastle, NSW



CLIENT: Aiden Campbell **DATE REPORTED:** 11-Jul-2018
COMPANY: ECOZ ENVIRONMENTAL SERVICES **DATE RECEIVED:** 29-Jun-2018
ADDRESS: PO BOX 381 **REPORT NO:** EB1815902-028 / PSD
DARWIN
NT, AUSTRALIA
PROJECT: EZ18107 - Grants Project - **SAMPLE ID:** GPSS15-A2
Waste Characterisation

Particle Size Distribution



Particle Size (mm)	Percent Passing
2.36	100%
1.18	99%
0.600	98%
0.425	97%
0.300	94%
0.150	84%
0.075	43%
Particle Size (microns)	
55	40%
39	35%
19	30%
10	27%
5	23%
2	22%

Samples analysed as received.

* Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Loss on Pretreatment NA

Sample Description: FINE, STONE, VEG

Test Method: AS1289.3.6.3 2003

Soil Particle Density (<2.36mm) 2.6 g/cm3

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Analysed: 5-Jul-18

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

Dianne Blane
Laboratory Coordinator
Authorised Signatory

Certificate of Analysis

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ALS Environmental
Newcastle, NSW



CLIENT: Aiden Campbell

DATE REPORTED: 11-Jul-2018

COMPANY: ECOZ ENVIRONMENTAL SERVICES

DATE RECEIVED: 29-Jun-2018

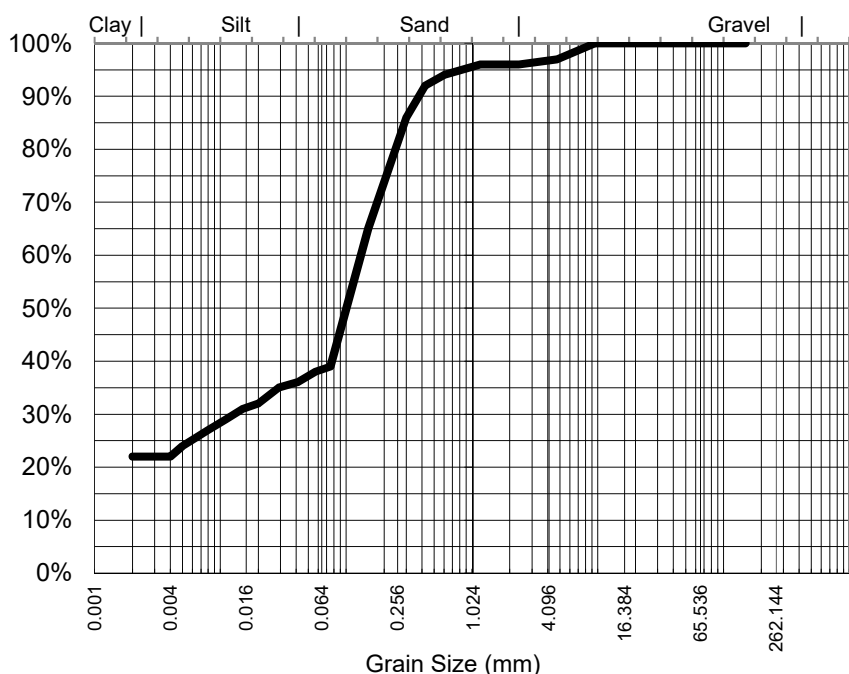
ADDRESS: PO BOX 381
DARWIN

REPORT NO: EB1815902-029 / PSD

PROJECT: EZ18107 - Grants Project -
Waste Characterisation

SAMPLE ID: GPSS16-A1

Particle Size Distribution



Particle Size (mm)	Percent Passing
9.50	100%
4.75	97%
2.36	96%
1.18	96%
0.600	94%
0.425	92%
0.300	86%
0.150	65%
0.075	39%
Particle Size (microns)	
57	38%
41	36%
20	32%
11	29%
5	24%
2	22%

Samples analysed as received.

* Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Loss on Pretreatment NA

Sample Description: FINE, STONE, VEG

Test Method: AS1289.3.6.3 2003

Soil Particle Density (<2.36mm) 2.46 g/cm3

NATA Accreditation: 825 **Site:** Newcastle

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Analysed: 5-Jul-18

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

D Blane

Dianne Blane
Laboratory Coordinator
Authorised Signatory

Certificate of Analysis

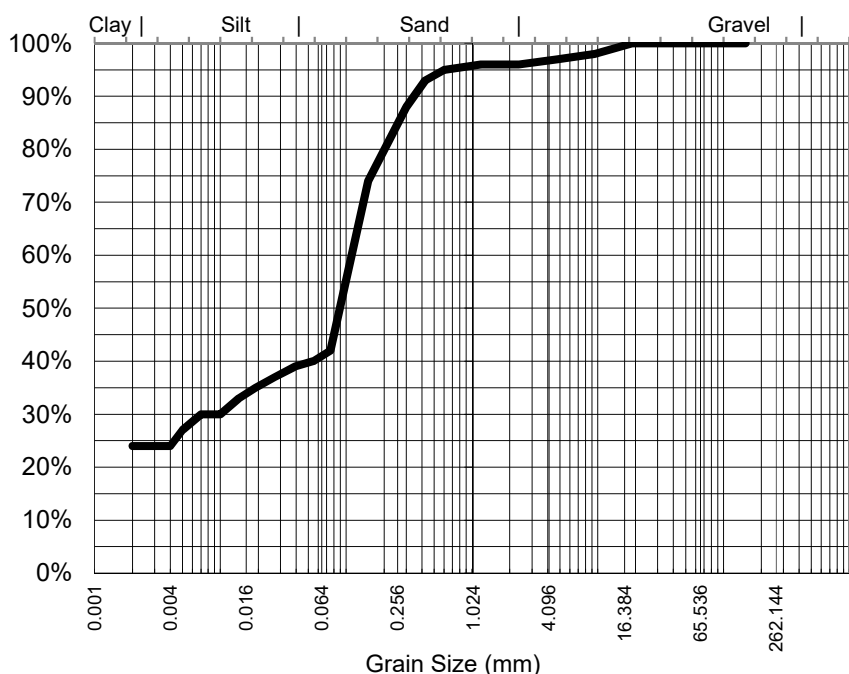
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Mayfield West, NSW 2304
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Newcastle, NSW



CLIENT: Aiden Campbell **DATE REPORTED:** 11-Jul-2018
COMPANY: ECOZ ENVIRONMENTAL SERVICES **DATE RECEIVED:** 29-Jun-2018
ADDRESS: PO BOX 381 **REPORT NO:** EB1815902-030 / PSD
DARWIN
NT, AUSTRALIA
PROJECT: EZ18107 - Grants Project - **SAMPLE ID:** GPSS16-B2
Waste Characterisation

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.50	98%
4.75	97%
2.36	96%
1.18	96%
0.600	95%
0.425	93%
0.300	88%
0.150	74%
0.075	42%
Particle Size (microns)	
55	40%
39	39%
19	35%
10	30%
5	27%
2	24%

Median Particle Size (mm)*	0.094

Samples analysed as received.

* Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Loss on Pretreatment NA

Sample Description: FINE, STONE, VEG

Test Method: AS1289.3.6.3 2003

Soil Particle Density (<2.36mm) 2.6 g/cm3

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Analysed: 5-Jul-18

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

D Blane

Dianne Blane
Laboratory Coordinator
Authorised Signatory

Certificate of Analysis

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ALS Environmental
Newcastle, NSW



CLIENT: Aiden Campbell

DATE REPORTED: 11-Jul-2018

COMPANY: ECOZ ENVIRONMENTAL SERVICES

DATE RECEIVED: 29-Jun-2018

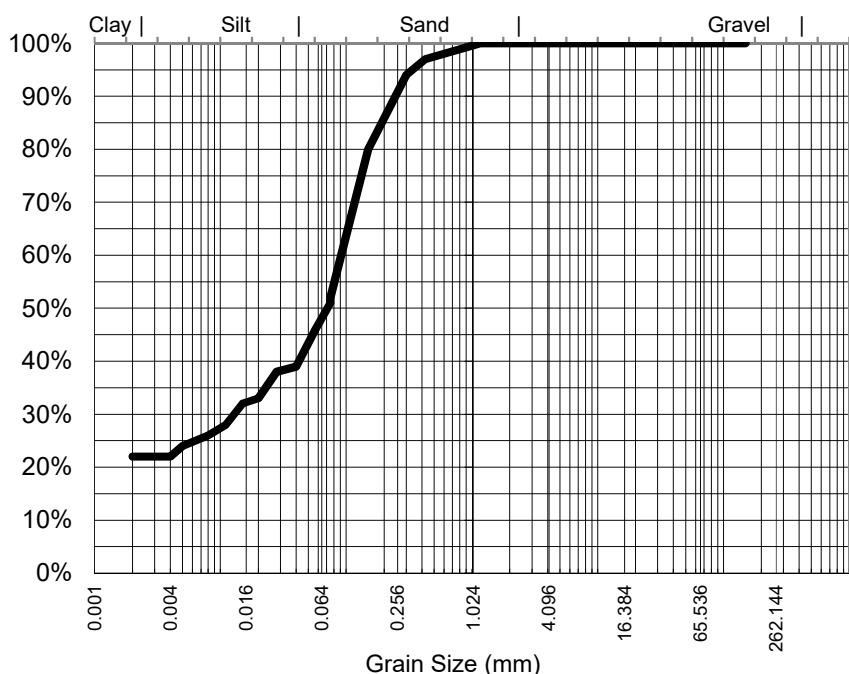
ADDRESS: PO BOX 381
DARWIN

REPORT NO: EB1815902-031 / PSD

PROJECT: EZ18107 - Grants Project -
Waste Characterisation

SAMPLE ID: GPSS17-A1

Particle Size Distribution



Particle Size (mm)	Percent Passing
1.18	100%
0.600	98%
0.425	97%
0.300	94%
0.150	80%
0.075	52%
Particle Size (microns)	
57	46%
40	39%
20	33%
11	28%
5	24%
2	22%

Samples analysed as received.

* Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Loss on Pretreatment NA

Sample Description: FINE, STONE, VEG

Test Method: AS1289.3.6.3 2003

Soil Particle Density (<2.36mm) 2.54 g/cm3

NATA Accreditation: 825 **Site:** Newcastle

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Analysed: 5-Jul-18

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

D Blane

Dianne Blane
Laboratory Coordinator
Authorised Signatory

Certificate of Analysis

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Newcastle, NSW



CLIENT: Aiden Campbell

DATE REPORTED: 11-Jul-2018

COMPANY: ECOZ ENVIRONMENTAL SERVICES

DATE RECEIVED: 29-Jun-2018

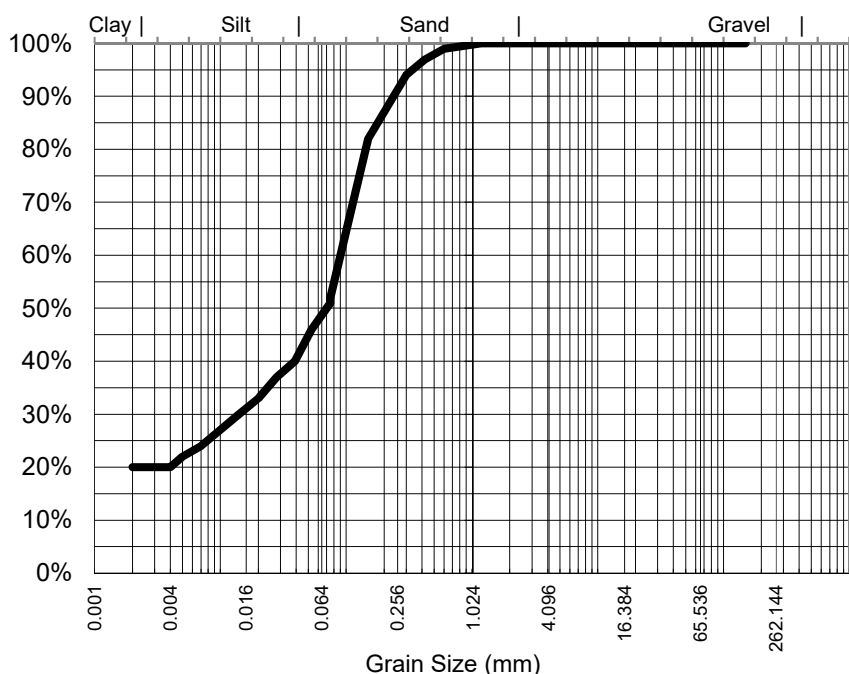
ADDRESS: PO BOX 381
DARWIN

REPORT NO: EB1815902-032 / PSD

PROJECT: EZ18107 - Grants Project -
Waste Characterisation

SAMPLE ID: GPSS17-A2

Particle Size Distribution



Particle Size (mm)	Percent Passing
1.18	100%
0.600	99%
0.425	97%
0.300	94%
0.150	82%
0.075	52%
Particle Size (microns)	
53	46%
39	40%
20	33%
10	27%
5	22%
2	20%

Median Particle Size (mm)*	0.071

Samples analysed as received.

* Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Loss on Pretreatment NA

Sample Description: FINE, STONE, VEG

Test Method: AS1289.3.6.3 2003

Soil Particle Density (<2.36mm) 2.56 g/cm3

NATA Accreditation: 825 Site: Newcastle
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



Analysed: 5-Jul-18

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

D Blane

Dianne Blane
Laboratory Coordinator
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental
Newcastle, NSW



CLIENT: Aiden Campbell

DATE REPORTED: 11-Jul-2018

COMPANY: ECOZ ENVIRONMENTAL SERVICES

DATE RECEIVED: 29-Jun-2018

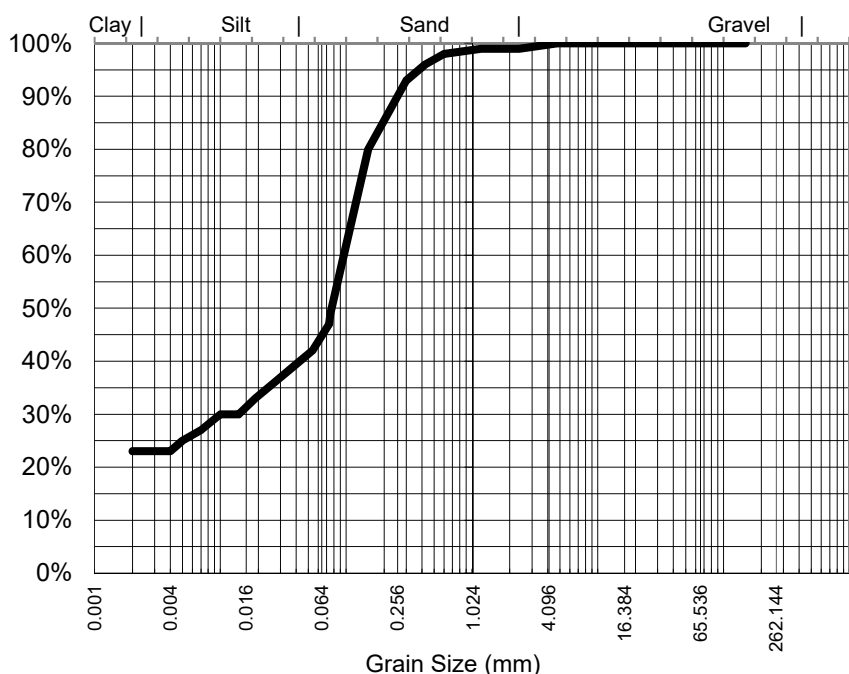
ADDRESS: PO BOX 381
DARWIN

REPORT NO: EB1815902-033 / PSD

PROJECT: EZ18107 - Grants Project -
Waste Characterisation

SAMPLE ID: GPSS17-B2

Particle Size Distribution



Particle Size (mm)	Percent Passing
4.75	100%
2.36	99%
1.18	99%
0.600	98%
0.425	96%
0.300	93%
0.150	80%
0.075	49%
Particle Size (microns)	
54	42%
38	39%
19	33%
10	30%
5	25%
2	23%

Samples analysed as received.

* Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Loss on Pretreatment NA

Sample Description: FINE, STONE, VEG

Test Method: AS1289.3.6.3 2003

Soil Particle Density (<2.36mm) 2.61 g/cm3

NATA Accreditation: 825 Site: Newcastle
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Analysed: 5-Jul-18

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

D Blane

Dianne Blane
Laboratory Coordinator
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental
Newcastle, NSW



CLIENT: Aiden Campbell

DATE REPORTED: 11-Jul-2018

COMPANY: ECOZ ENVIRONMENTAL SERVICES

DATE RECEIVED: 29-Jun-2018

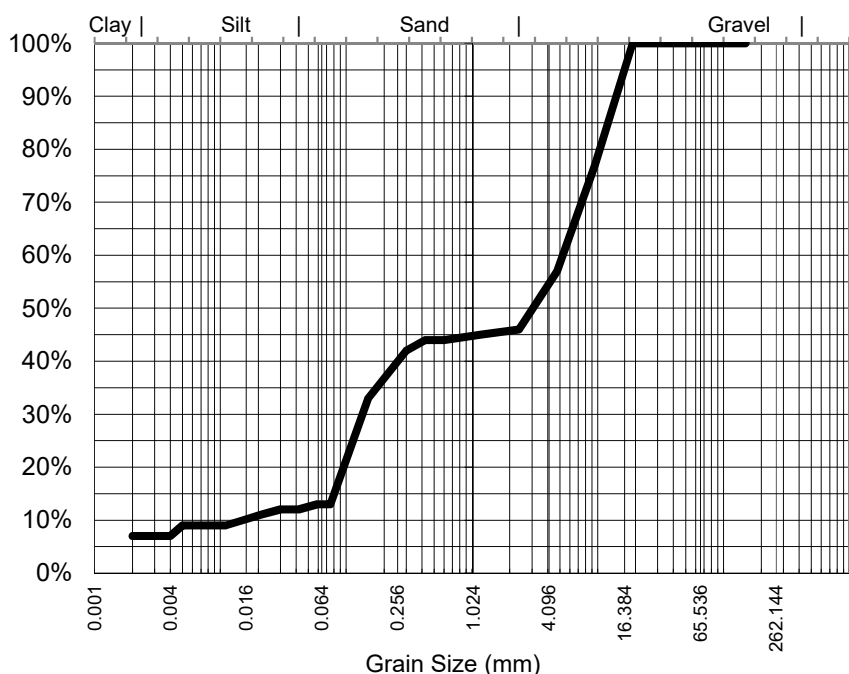
ADDRESS: PO BOX 381
DARWIN

REPORT NO: EB1815902-034 / PSD

PROJECT: EZ18107 - Grants Project -
Waste Characterisation

SAMPLE ID: GPSSD1-A1

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.50	77%
4.75	57%
2.36	46%
1.18	45%
0.600	44%
0.425	44%
0.300	42%
0.150	33%
0.075	13%
Particle Size (microns)	
59	13%
42	12%
21	11%
11	9%
5	9%
2	7%

Median Particle Size (mm)*	3.229

Samples analysed as received.

* Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Loss on Pretreatment NA

Sample Description: FINE, STONE, VEG

Test Method: AS1289.3.6.3 2003

Soil Particle Density (<2.36mm) 2.6 g/cm3

NATA Accreditation: 825 Site: Newcastle
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Analysed: 5-Jul-18

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

D Blane

Dianne Blane
Laboratory Coordinator
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental
Newcastle, NSW



CLIENT: Aiden Campbell

DATE REPORTED: 11-Jul-2018

COMPANY: ECOZ ENVIRONMENTAL SERVICES

DATE RECEIVED: 29-Jun-2018

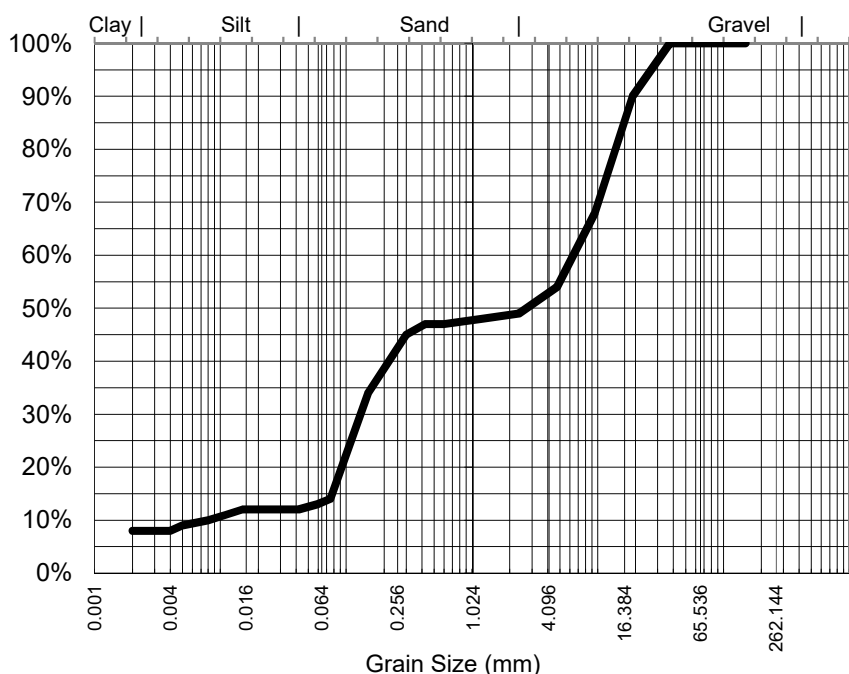
ADDRESS: PO BOX 381
DARWIN

REPORT NO: EB1815902-035 / PSD

PROJECT: EZ18107 - Grants Project -
Waste Characterisation

SAMPLE ID: GPSSD1-B2

Particle Size Distribution



Particle Size (mm)	Percent Passing
37.5	100%
19.0	90%
9.50	68%
4.75	54%
2.36	49%
1.18	48%
0.600	47%
0.425	47%
0.300	45%
0.150	34%
0.075	14%
Particle Size (microns)	
59	13%
42	12%
21	12%
11	11%
5	9%
2	8%

Median Particle Size (mm)*	2.838

Samples analysed as received.

* Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Loss on Pretreatment NA

Sample Description: FINE, STONE, VEG

Test Method: AS1289.3.6.3 2003

Soil Particle Density (<2.36mm) 2.63 g/cm3

NATA Accreditation: 825 Site: Newcastle
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Analysed: 5-Jul-18

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

D Blane

Dianne Blane
Laboratory Coordinator
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental
Newcastle, NSW



CLIENT: Aiden Campbell

DATE REPORTED: 11-Jul-2018

COMPANY: ECOZ ENVIRONMENTAL SERVICES

DATE RECEIVED: 29-Jun-2018

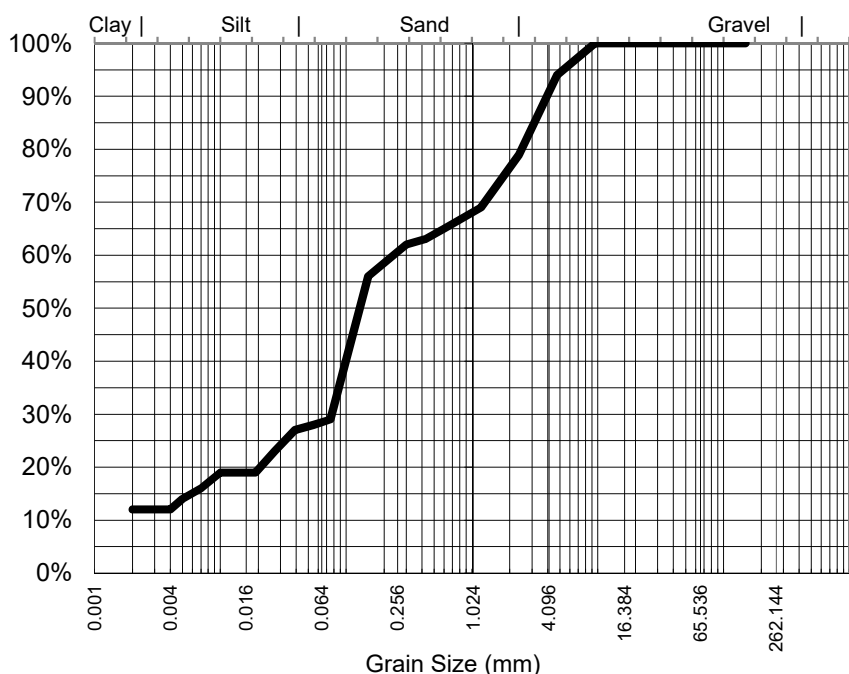
ADDRESS: PO BOX 381
DARWIN

REPORT NO: EB1815902-036 / PSD

PROJECT: EZ18107 - Grants Project - Waste Characterisation

SAMPLE ID: duplicate

Particle Size Distribution



Particle Size (mm)	Percent Passing
9.50	100%
4.75	94%
2.36	79%
1.18	69%
0.600	65%
0.425	63%
0.300	62%
0.150	56%
0.075	29%
Particle Size (microns)	
55	28%
39	27%
19	19%
10	19%
5	14%
2	12%

Median Particle Size (mm)*	0.133

Samples analysed as received.

* Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Loss on Pretreatment NA

Sample Description: FINE, STONE, VEG

Test Method: AS1289.3.6.3 2003

Soil Particle Density (<2.36mm) 2.72 g/cm3

NATA Accreditation: 825 Site: Newcastle
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Analysed: 5-Jul-18

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

D Blane

Dianne Blane
Laboratory Coordinator
Authorised Signatory

Certificate of Analysis

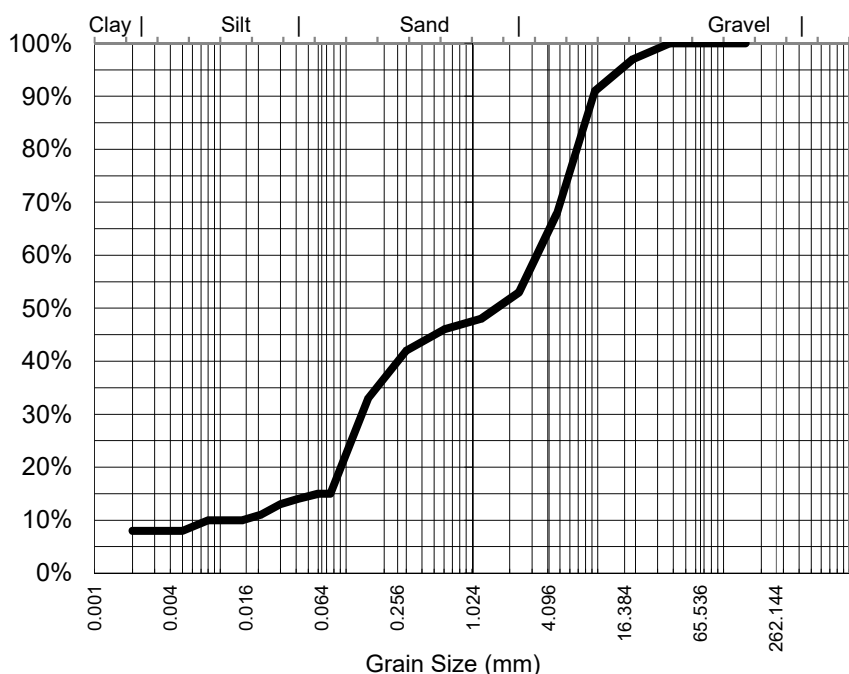
ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental
Newcastle, NSW



CLIENT: Aiden Campbell **DATE REPORTED:** 11-Jul-2018
COMPANY: ECOZ ENVIRONMENTAL SERVICES **DATE RECEIVED:** 29-Jun-2018
ADDRESS: PO BOX 381 **REPORT NO:** EB1815902-037 / PSD
DARWIN
NT, AUSTRALIA
PROJECT: EZ18107 - Grants Project - **SAMPLE ID:** GPSS04-A2
Waste Characterisation

Particle Size Distribution



Particle Size (mm)	Percent Passing
37.5	100%
19.0	97%
9.50	91%
4.75	68%
2.36	53%
1.18	48%
0.600	46%
0.425	44%
0.300	42%
0.150	33%
0.075	15%
Particle Size (microns)	
60	15%
42	14%
21	11%
11	10%
5	8%
2	8%

Median Particle Size (mm)*	1.652

Samples analysed as received.

* Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Loss on Pretreatment NA

Sample Description: FINE, STONE, VEG

Test Method: AS1289.3.6.3 2003

Soil Particle Density (<2.36mm) 2.58 g/cm3

NATA Accreditation: 825 Site: Newcastle
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Analysed: 5-Jul-18

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

Dianne Blane
Laboratory Coordinator
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5/585 Maitland Road
Mayfield West, NSW 2304
pH 02 4014 2500
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental
Newcastle, NSW



CLIENT: Aiden Campbell

DATE REPORTED: 11-Jul-2018

COMPANY: ECOZ ENVIRONMENTAL SERVICES

DATE RECEIVED: 29-Jun-2018

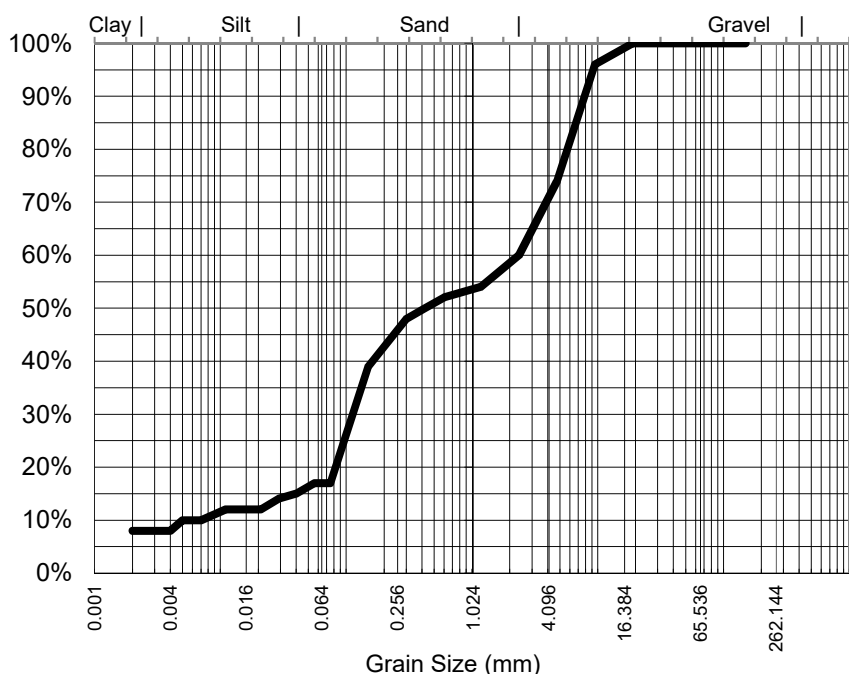
ADDRESS: PO BOX 381
DARWIN

REPORT NO: EB1815902-038 / PSD

PROJECT: EZ18107 - Grants Project -
Waste Characterisation

SAMPLE ID: GPSS04-B1

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.50	96%
4.75	74%
2.36	60%
1.18	54%
0.600	52%
0.425	50%
0.300	48%
0.150	39%
0.075	17%
Particle Size (microns)	
56	17%
40	15%
21	12%
11	12%
5	10%
2	8%

Samples analysed as received.

* Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Loss on Pretreatment NA

Sample Description: FINE, STONE, VEG

Test Method: AS1289.3.6.3 2003

Soil Particle Density (<2.36mm) 2.61 g/cm3

NATA Accreditation: 825 Site: Newcastle
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Analysed: 5-Jul-18

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

D Blane

Dianne Blane
Laboratory Coordinator
Authorised Signatory

CERTIFICATE OF ANALYSIS

Work Order : **EB1817880**
Client : **ECOZ ENVIRONMENTAL SERVICES**
Contact : AIDEN CAMPBELL
Address : PO BOX 381
 DARWIN NT, AUSTRALIA 0801
Telephone : ----
Project : EZ18107 - Grants Project - Waste Characterisation
Order number :
C-O-C number : ----
Sampler : AIDEN CAMPBELL
Site :
Quote number : SY/285/18
No. of samples received : 38
No. of samples analysed : 38

Page : 1 of 10
Laboratory : Environmental Division Brisbane
Contact : Customer Services EB
Address : 2 Byth Street Stafford QLD Australia 4053
Telephone : +61-7-3243 7222
Date Samples Received : 23-Jul-2018 08:54
Date Analysis Commenced : 31-Jul-2018
Issue Date : 02-Aug-2018 16:02



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. 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 the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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.

- EA058 Emerson: V. = Very, D. = Dark, L. = Light, VD. = Very Dark



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				GPSS01-A1	GPSS01-B1	GPSS01-B2	GPSS02-A1	GPSS03-A1
Client sampling date / time				27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00
Compound	CAS Number	LOR	Unit	EB1817880-001	EB1817880-002	EB1817880-003	EB1817880-004	EB1817880-005
				Result	Result	Result	Result	Result
EA058: Emerson Aggregate Test								
Color (Munsell)	----	-	-	Dark Greyish Brown	Brown	Dark Yellowish Brown	Dark Greyish Brown	Dark Greyish Brown
Texture	----	-	-	Gravelly Sand	Sandy Clay Loam	Gravelly Sand	Loamy Sand	Loamy Sand
Emerson Class Number	EC/TC	-	-	8	4	8	4	4



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				GPSS03-B2	GPSS04-A1	GPSS04-B2	GPSS05-A1	GPSS05-B1
Client sampling date / time				27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00
Compound	CAS Number	LOR	Unit	EB1817880-006	EB1817880-007	EB1817880-008	EB1817880-009	EB1817880-010
				Result	Result	Result	Result	Result
EA058: Emerson Aggregate Test								
Color (Munsell)	----	-	-	Olive Brown	Very Dark Greyish Brown	Olive Brown	Very Dark Grey	Greyish Brown
Texture	----	-	-	Sandy Clay Loam	Gravelly Sand	Loamy Sand	Loamy Sand	Gravelly Sand
Emerson Class Number	EC/TC	-	-	4	8	4	4	8



Analytical Results

Sub-Matrix: **SOIL**
 (Matrix: **SOIL**)

Client sample ID

				GPSS06-A1	GPSS06-B2	GPSS07-A1	GPSS07-B2	GPSS08-A1
Client sampling date / time				27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00	28-Jun-2018 00:00
Compound	CAS Number	LOR	Unit	EB1817880-011	EB1817880-012	EB1817880-013	EB1817880-014	EB1817880-015
				Result	Result	Result	Result	Result
EA058: Emerson Aggregate Test								
Color (Munsell)	----	-	-	Very Dark Greyish Brown	Brown	Dark Greyish Brown	Light Olive Brown	Very Dark Greyish Brown
Texture	----	-	-	Gravelly Sand	Sandy Clay Loam	Sandy Clay Loam	Sandy Loam	Sandy Clay
Emerson Class Number	EC/TC	-	-	8	4	4	4	4



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				GPSS08-B2	GPSS09-A1	GPSS09-B2	GPSS10-A1	GPSS10-B2
Client sampling date / time				28-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00
Compound	CAS Number	LOR	Unit	EB1817880-016	EB1817880-017	EB1817880-018	EB1817880-019	EB1817880-020
				Result	Result	Result	Result	Result
EA058: Emerson Aggregate Test								
Color (Munsell)	----	-	-	Brown	Dark Brown	Yellowish Red	Dark Greyish Brown	Brown
Texture	----	-	-	Sandy Clay Loam	Gravelly Sand	Gravelly Sand	Sandy Clay	Gravelly Sand
Emerson Class Number	EC/TC	-	-	4	8	8	4	8



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				GPSS12-A1	GPSS12-A2	GPSS13-A1	GPSS13-A2	GPSS14-A1
Client sampling date / time				27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00
Compound	CAS Number	LOR	Unit	EB1817880-021	EB1817880-022	EB1817880-023	EB1817880-024	EB1817880-025
				Result	Result	Result	Result	Result
EA058: Emerson Aggregate Test								
Color (Munsell)	----	-	-	Dark Grey	Light Brownish Grey	Dark Grey	Grey	Very Dark Grey
Texture	----	-	-	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam
Emerson Class Number	EC/TC	-	-	4	4	4	3	4



Analytical Results

Sub-Matrix: **SOIL**
 (Matrix: **SOIL**)

Client sample ID

				GPSS14-B2	GPSS15-A1	GPSS15-A2	GPSS16-A1	GPSS16-B2
Client sampling date / time				27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00
Compound	CAS Number	LOR	Unit	EB1817880-026	EB1817880-027	EB1817880-028	EB1817880-029	EB1817880-030
				Result	Result	Result	Result	Result
EA058: Emerson Aggregate Test								
Color (Munsell)	----	-	-	Greyish Brown	Dark Grey	Light Brownish Grey	Dark Greyish Brown	Yellowish Brown
Texture	----	-	-	Sandy Clay Loam	Sandy Clay Loam	Sandy Clay Loam	Sandy Loam	Sandy Clay Loam
Emerson Class Number	EC/TC	-	-	4	4	4	4	4



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				GPSS17-A1	GPSS17-A2	GPSS17-B2	GPSSD1-A1	GPSSD1-B2
Client sampling date / time				28-Jun-2018 00:00	28-Jun-2018 00:00	28-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00
Compound	CAS Number	LOR	Unit	EB1817880-031	EB1817880-032	EB1817880-033	EB1817880-034	EB1817880-035
				Result	Result	Result	Result	Result
EA058: Emerson Aggregate Test								
Color (Munsell)	----	-	-	Very Dark Grey	Greyish Brown	Greyish Brown	Very Dark Grey	Dark Greyish Brown
Texture	----	-	-	Sandy Clay	Sandy Clay	Sandy Clay	Sandy Loam	Sandy Loam
Emerson Class Number	EC/TC	-	-	4	4	4	4	3



Analytical Results

Sub-Matrix: **SOIL**
 (Matrix: **SOIL**)

Client sample ID

				duplicate	GPSS04-A2	GPSS04-B1	----	----
Client sampling date / time				27-Jun-2018 00:00	27-Jun-2018 00:00	27-Jun-2018 00:00	----	----
Compound	CAS Number	LOR	Unit	EB1817880-036	EB1817880-037	EB1817880-038	-----	-----
				Result	Result	Result	----	----
EA058: Emerson Aggregate Test								
Color (Munsell)	----	-	-	Yellowish Red	Brown	Olive Brown	----	----
Texture	----	-	-	Gravelly Sand	Gravelly Sand	Loamy Sand	----	----
Emerson Class Number	EC/TC	-	-	8	8	4	----	----

QUALITY CONTROL REPORT

Work Order	: EB1817880	Page	: 1 of 3
Client	: ECOZ ENVIRONMENTAL SERVICES	Laboratory	: Environmental Division Brisbane
Contact	: AIDEN CAMPBELL	Contact	: Customer Services EB
Address	: PO BOX 381 DARWIN NT, AUSTRALIA 0801	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: ----	Telephone	: +61-7-3243 7222
Project	: EZ18107 - Grants Project - Waste Characterisation	Date Samples Received	: 23-Jul-2018
Order number	:	Date Analysis Commenced	: 31-Jul-2018
C-O-C number	: ----	Issue Date	: 02-Aug-2018
Sampler	: AIDEN CAMPBELL		
Site	:		
Quote number	: SY/285/18		
No. of samples received	: 38		
No. of samples analysed	: 38		



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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

- **No Laboratory Duplicate (DUP) Results are required to be reported.**



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

- **No Method Blank (MB) or Laboratory Control Spike (LCS) Results are required to be reported.**

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.**

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EB1817880	Page	: 1 of 4
Client	: ECOZ ENVIRONMENTAL SERVICES	Laboratory	: Environmental Division Brisbane
Contact	: AIDEN CAMPBELL	Telephone	: +61-7-3243 7222
Project	: EZ18107 - Grants Project - Waste Characterisation	Date Samples Received	: 23-Jul-2018
Site	:	Issue Date	: 02-Aug-2018
Sampler	: AIDEN CAMPBELL	No. of samples received	: 38
Order number	:	No. of samples analysed	: 38

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- **NO** Matrix Spike outliers occur.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- **NO** Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- **NO** Quality Control Sample Frequency Outliers exist.

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results. This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein. Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters. Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA058: Emerson Aggregate Test								
Soil Glass Jar - Unpreserved (EA058)								
GPSS01-A1, GPSS01-B2, GPSS03-A1, GPSS04-A1, GPSS05-A1, GPSS06-A1, GPSS07-A1, GPSS09-A1, GPSS10-A1, GPSS12-A1, GPSS13-A1, GPSS14-A1, GPSS15-A1, GPSS16-A1, GPSSD1-A1, duplicate, GPSS04-B1	GPSS01-B1, GPSS02-A1, GPSS03-B2, GPSS04-B2, GPSS05-B1, GPSS06-B2, GPSS07-B2, GPSS09-B2, GPSS10-B2, GPSS12-A2, GPSS13-A2, GPSS14-B2, GPSS15-A2, GPSS16-B2, GPSSD1-B2, GPSS04-A2,	27-Jun-2018	----	----	----	31-Jul-2018	24-Dec-2018	✓
Soil Glass Jar - Unpreserved (EA058)								
GPSS08-A1, GPSS17-A1, GPSS17-B2	GPSS08-B2, GPSS17-A2,	28-Jun-2018	----	----	----	31-Jul-2018	25-Dec-2018	✓



Quality Control Parameter Frequency Compliance

- No Quality Control data available for this section.



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Emerson Aggregate Test	EA058	SOIL	In house: Referenced to AS1289.3.8.1. Testing is performed only on soils with suitable aggregates; sands and gravels are usually unsuitable for this test. The test classifies the behaviour of soil aggregates, when immersed, on their coherence in water.

From: Aiden Campbell [mailto:Aiden.Campbell@ecoz.com.au]

Sent: Monday, 23 July 2018 9:25 AM

To: Lana Civelle

Subject: RE: RESULTS & EDD & INVOICE for ALS Workorder : EB1815902 | Your Reference: EZ18107 - Grants Project - Waste Characterisation

Thanks Lana,

Yes please add for all samples.

Cheers



Aiden Campbell
Environmental Consultant
EcOz Environmental Consultants
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75 Woods Street, Darwin, NT 0801
T (08) 8981 1100
E Aiden.Campbell@ecoz.com.au
W <http://www.ecoz.com.au>



From: Lana Civelle [mailto:lanacivelle@ALSGlobal.com]

Sent: Monday, July 23, 2018 9:24 AM

To: Aiden Campbell <Aiden.Campbell@ecoz.com.au>

Subject: RE: RESULTS & EDD & INVOICE for ALS Workorder : EB1815902 | Your Reference: EZ18107 - Grants Project - Waste Characterisation

Good morning Aiden,

We can add Emerson Aggregate if you wish, will this be for all samples?
Please be aware this may extend your reporting date.

ALS Darwin will be closed on Fridays 3rd and 10th of August.

Kind regards,

Lana Civelle

Services Representative, Environmental
Darwin



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Woolner NT 0820

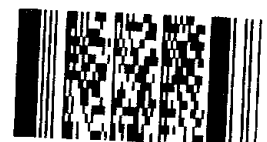
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Environmental Division
Brisbane
Work Order Reference
EB1817880



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