Christmas Creek
Preliminary Waste Rock Characterisation of Vasse WRD and Eyre Pit

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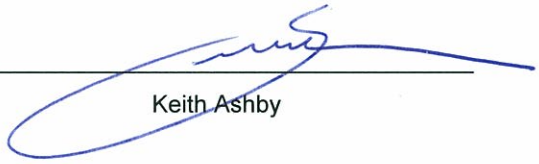

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Executive Summary

Fortescue Metals Group (hereafter referred to as Fortescue) requested that Tetra Tech complete preliminary geochemical and geotechnical characterisation of the waste rock at the Christmas Creek Iron Ore Mine. Thereafter Tetra Tech was to compare the geochemical test results from this initial work with the available Cloud Break mine data in order to address the question of whether or not it is reasonable to present an argument that the waste materials at the two mines are generally similar, and hence should be subject to the same waste rock management practices (and hence WRD basis of design).

The preliminary geochemical characterisation of the waste rock at Christmas Creek was based on samples collected from the Vasse waste rock dump (WRD) and the Eyre mine pit (ie one of the seven WRDs and one of the eight open pits active at the time this report was prepared). All samples were collected in a single site visit in June 2012. Ten bulk samples of in situ waste rock material were collected from the Eyre Pit for geochemical analysis. Bulk samples of waste rock material were collected at the Vasse WRD from 29 test pits excavated to a maximum depth of 3.0 m. Only the samples taken from the Vasse WRD were subject to geotechnical characterisation.

All samples were analysed for total element concentrations, to identify metals or metalloids of potential concern, and assessed for leaching potential with simulated precipitation according to the Australian Standard Leachate Procedure (ASLP). In addition, acid-base accounting was conducted on 65 samples in order to predict the potential acid drainage. A total of eight samples were also investigated by quantitative x-ray diffraction.

A visual inspection of the excavated rock indicated that the Vasse WRD appears to be relatively homogenous with respect to lithological/mineralogical components. Unsurprisingly, mineralogical analysis of the sampled waste rock from both the pit and WRD identified predominantly Fe-oxide minerals. Whilst no sulfide minerals were observed during the site visit, operations personnel report the occasional presence of carbonaceous shales.

Elemental analysis of the samples revealed the waste rock to have a low sulphur content and the associated calculations indicate that the waste has a low acid generation potential. (Clearly, in the event that a shale lithotype is subsequently found, this should be characterised.) The results of the elemental analysis were screened to identify elements with relatively high concentrations as compared to average crustal abundance. This method identified two elements with notionally ‘high concentrations’; these being arsenic and antimony.

ASLP analysis of the waste rock samples identified relatively high concentrations of aluminium, cadmium, chromium, lead and zinc in multiple samples.

Polarised Light Microscopy identified no asbestiform materials.

A preliminary review of the Christmas Creek groundwater chemistry revealed that statistically significant changes have been seen in the results for Barium, Iron and Zinc; each appearing to have increased over time.

A comparison of the geochemical characteristics of the waste rock samples taken from the Eyre Pit and Vasse WRD suggest they are very similar; ie there is no statistically significant difference in their metal concentrations. Further the mineralisation of the samples from the two locations appear similar as is their limited potential to generate acid.

A comparison of the geochemical characteristics of the waste rock samples taken from the Christmas Creek and Cloudbreak sites demonstrate that whilst the mineralogical composition is broadly similar and the acid generating potential of both is generally low, the elemental analysis and ASLP results are sufficiently different to negate an argument that Christmas Creek and Cloudbreak sites have comparable waste from a geochemical perspective. Consequently whilst most of the waste may be regarded as benign from the perspective of potential to cause an unacceptable environmental impact, some waste may be problematic in so far as it may leach metals. Given this, and notwithstanding the limitations of this preliminary review, it appears likely that Fortescue may need to segregate some waste rock lithotypes during disposal into either WRDs or as backfill.

In summary, from a geochemical perspective, the various lithotypes examined at Christmas Creek and Cloudbreak sites do not have sufficiently similar characteristics to justify an assumption that they're similar when making design decisions. Further, the results suggest that some site specific waste rock management practices may be required.

This report also presents the geotechnical analyses of the samples collected from the Vasse WRD. The analytical tests included Moisture Content, Particle size distribution, Atterberg Limits, Emerson Crumb Dispersion, Falling Head Permeability, Direct Shear, Consolidation Oedometer, Triaxial shear, Slake Durability, Moisture/Density Relationship. Insufficient data was available for TetraTech to draw any substantive conclusions as to whether or not the the Christmas Creek and Cloudbreak sites are similar or otherwise in terms of the geotechnical characteristics of the various lithotypes present. Both intra and inter site specific sampling and analysis will be required on an ongoing basis to ensure accurate characterisation of the waste rock and sound engineering design of the waste rock disposal facilities.

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Glossary

Units of Measure

Centimetre	cm
Kilogram	kg
Kilopascal	kPa
Litre	L
Metre cubic	m^3
Metre square	m^2
Metre	m
Milligram	mg
Parts per million	ppm
Percent	%
Weight percent	wt %

Abbreviations and Acronyms

Acid-Base Accounting	ABA
Acid Neutralisation Capacity	ANC
Australian Standard Leaching Procedure	ASLP
Channel Iron Deposit	CID
Factors of Safety	FOS
Fortescue Metals Group Ltd.	Fortescue
Geochemical Abundance Index	GAI
International Centre for Diffraction Database	ICDD
Inductive Coupled Plasma	ICP
Maximum Potential Acidity	MPA
Net Acid Production Potential	NAPP
Neutralisation Potential Ratio	NPR
Non-Acid Forming	NAF
Potentially Acid Forming	PAF
Public Environmental Review	PER
Standard Maximum Dry Density	SMDD
Total Dissolved Solids	TDS
Uniaxial Compressive Strength	UCS
Uniaxial Compressive Strength	UCS
Waste Rock Dump	WRD
X-ray Diffraction	XRD

1.0 Introduction

Fortescue Metals Group (Fortescue)'s Christmas Creek Iron Ore Mine (the Project) is located in the Pilbara region of Western Australia, approximately 110 km north of Newman.

Fortescue requested that Tetra Tech complete preliminary geochemical and geotechnical characterisation the waste rock at the Christmas Creek Iron Ore Mine. Thereafter Tetra Tech was to compare the geochemical results from this initial work with the available Cloud Break mine data in order to address the question of whether or not it is reasonable to present an argument that the waste materials at the two mines are generally similar, and hence should be subject to the same waste rock management practices (and hence WRD basis of design).

At the time of the preparation of this report, the Christmas Creek mine comprised seven WRDs and eight open pits. At Fortescue's direction, Tetra Tech completed an initial geochemical characterisation of the Christmas Creek waste rock was based on samples collected from only the Eyre Pit and Vasse WRD facility. The geotechnical characterisation of waste was limited to samples collected from the Vasse WRD.

1.1 Geology

The regional stratigraphy in the Pilbara region of Western Australia is relatively continuous, with similar geological processes occurring across the region which have resulted in the enrichment of the iron deposits (Fortescue, 2009). The project area lies within the Hamersley Basin where granitoid rocks of the Pilbara Craton (2,800 – 3,500 Ma) are overlain by the Archaean Fortescue Group. This formation is in turn overlain by the Archaean-proterozoic Hamersley Group of which the Marra Mamba Iron Formation (MMIF) is the lowermost unit (Environ Australia, 2005).

Mineralisation is confined to the Nammuldi Member of the MMIF, which is characterised by extensive, thick and podded iron enriched Banded Iron Formation, separated by equally extensive units of siliceous and carbonate rich chert and shale (Fortescue, 2009). The Nammuldi Member is overlain by various Tertiary detrital deposits of varying maturity which may also contain iron mineralisation.

The mineralogy of the ore units is dominated by iron oxides (> 55 %) comprising goethite, hematite and to a lesser extent martite, together with ochreous goethite. Other minerals present are kaolinite (alumina <5%) with free and matrix quartz (silica <10%). High grade ore frequently occurs as lenses within low grade ore, often contains high levels of silica, and can be in contact with waste rock zones.

Overburden includes silts, clays, sands and shales (goethitic & hematitic) of the Nammuldi Member. The geochemistry of a range of mine waste samples from the Christmas Creek Deposit has previously been assessed by Graeme Campbell and Associates (GCA, 2005) with regard to the implications for mine waste management. Based on the results of this previous study, the regolith and waste-bedrocks to be excavated during open-pit mining is expected to be non-acid forming (NAF) sulfide minerals. Enrichment in minor elements from NAF lithotypes is expected to be low and soluble-salt concentrations low to moderate (GCA, 2005).

The Roy Hill Shales, located below the ore zone, are classified as potentially-acid forming (PAF). However, open-pit mining is not anticipated to extend to a depth where the Roy Hill Shales will be intersected (GCA, 2005).

1.2 Climate

The Project is in the semi-arid climatic region with an average maximum daily temperature between 26.8 °C in July and 39.0°C in January. The region experiences an arid tropical climate with the majority of rainfall occurring in the summer months. Rainfall is typically associated with cyclone or thunderstorm activity. Long term average (1970-2009) annual rainfall is 461 mm whilst long term average (1968-2007) annual pan evaporation is 3,059 mm (Fortescue, 2011).

2.0 GEOCHEMICAL CHARACTERISATION & COMPARISON

2.1 Sampling

This section describes the sampling methodology used to characterise the Christmas Creek waste rock.

Samples were collected from purpose excavated pits or directly from surficial materials. The locations of the sampling pits and surface sampling sites are presented in Figures 2-1 and 2-2. Sample site selection was completed so as to achieve a representative horizontal and vertical spatial distribution across the WRD and pit given the pre-defined constraints on the total number of samples to be collected and sampling method (ie the use of a backhoe).

All test pits were systematically excavated, logged and sampled, where by all excavated spoil was initially placed in separate stockpiles of 1 m depth increments. The majority of WRD sample collection was completed by use of a CAT backhoe. Where backhoe access was not available (Vasse WRD samples #1, #11, #14 and #27), samples were collected manually with a spade as surface samples (0.0 m) and from the base of shallow pits (0.3 m).

Samples were collected from the corresponding stockpiles as soon as it was safe to do so following excavation, and sealed in tagged polyurethane mine bags for shipping to the respective laboratory facility. Following sample collection all spoil was logged in regards to relative grain size fractions and lithologic proportions present. Lithologic proportions were determined by combination of scratch plate and hammer/bash plate. All logs were cross checked against any observations of layering noted during excavation. Excavated materials were described for mineralogical and lithological characteristics to assist in categorising potential lithological differences within the interior of the WRDs. Sampling logs are provided in Appendix C.

2.1.1 Eyre Pit Sample Collection

Sample collection at the Eyre Pit facility was conducted in June 2011. Ten bulk samples (labelled as Eyre Pit #1-10, Figure 2-1) were collected from bench cuts within the Eyre Pit. Two additional samples (Eyre Pit #10b – Crystalline, #10b – Globular) were collected from an area adjacent to a temporary waste rock stockpile. This stockpile was associated with active mining at the north eastern corner of Eyre Pit where visible precipitation of solutes was observed at the base and downslope of the stockpile. An additional sample (Eyre Pit #10b) was collected from the stockpile itself. Samples were sealed in tagged polyurethane mine bags for shipping to the sellected analytical laboratories.

2.1.2 Vasse WRD Sample Collection

Sample collection at the Vasse WRD facility was conducted between 12 and 14 June 2012. The Vasse WRD is comprised of two discrete dumps (the north western Vasse WRD and the south western Vasse WRD). In total, 28 of the 33 originally planned pits were excavated across the two Vasse dumps and sellected adjacent areas; each pit being approximately 3m deep. Fifteen pits were excavated within the north western dump, five were taken on the south western dump, five samples were taken from within fill benched, service and stockpile areas, and two samples were taken from areas of undisturbed or cut ground (i.e. in situ;

Figure 2-2). Four pits planned at locations 17, 23, 24, & 32 were not excavated as access was not possible. Pit 33 was used for geotechnical sample collection only.

Samples for geochemical analysis were collected from each of the 28 pits. Two samples were taken from each pit. The first sample was taken from the material excavated from a depth of 0.0 to 1.5 m, and a second from the material excavated from a depth of 1.5 to 3.0 m. Composite samples taken from the entire depth profile were taken from six pits for the purpose of testing for asbestiform materials. Thus a total of 62 geochemical samples were collected from the Vasse WRD facility.

Figure 2-1 Sampling Locations at Eyre Pit

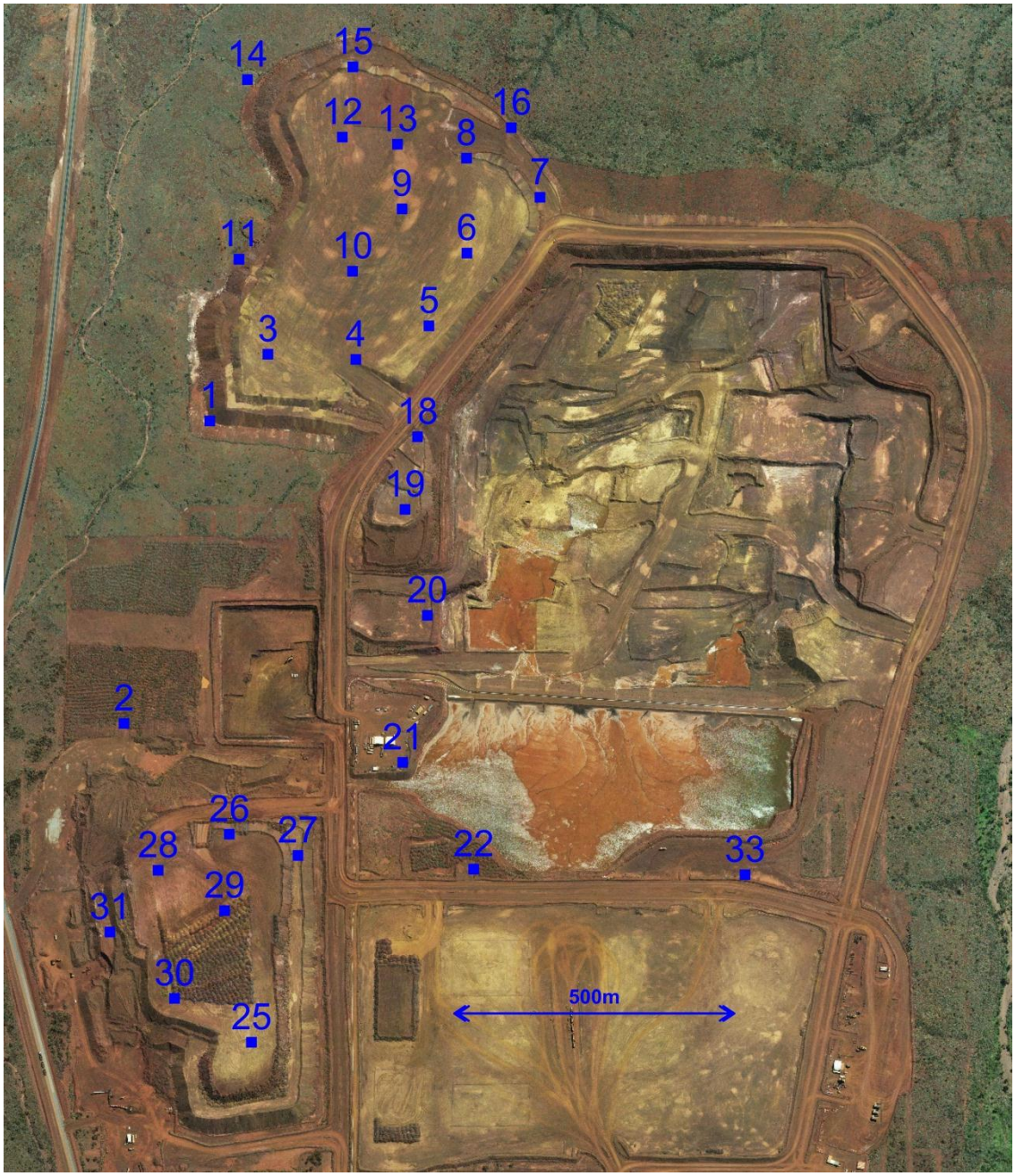

Figure 2-2 Sampling Locations at Vasse WRD

2.2 Geochemical Analytic Methodology

Static test results were used to evaluate the potential for acid formation and short-term release of solutes. Samples were subjected to the following analytical tests:

- Quantitative X-ray diffraction (XRD) with Rietveld analysis
- Total Elemental analysis by Inductively Coupled Plasma - Atomic Emission Spectroscopy; - Mass Spectroscopy (ICP-AES;-MS)
- Leachate analysis by Australian Standard Leaching Procedure (ASLP)

- Acid-base Accounting (ABA) by the modified Sobek method
- Asbestos testing by method AN602.

A summary of the Geochemical Analysis Summary for each sample is presented in Table 2.1. A summary of the analytical methods used for the geochemical analysis of Project waste rock samples is discussed below. All analyses were conducted at SGS-Newburn in Perth, unless otherwise stated.

Supplemental data and raw laboratory data is provided in Appendix A and Appendix B, respectively.

2.2.1 Acid-base Accounting

Acid-base accounting (ABA) was used to estimate the capacity of the waste rock to either produce or neutralise acid. ABA methods compare the maximum potential acidity (MPA) with the acid neutralisation capacity (ANC) for a given material using either the total sulfur or sulfide sulfur content.

ABA results were used to determine the Neutralisation Potential Ratio (NPR = ANC/MPA) and the Net Acid Production Potential (NAPP), where NAPP is the difference between the ANC and MPA (NAPP = MPA-ANC). These criteria are commonly used to categorise material into potentially acid forming (PAF) or non-acid forming (NAF) material. Many interpretation schemes have been developed to assess the potential for acid generation using either criterion. Industry standard criteria categorise samples with NPR ≥ 2 and NAPP < 0 kg of H2SO4 per tonne of material (kg H2SO4/t) as NAF (Table2-2). In contrast, materials with NPR < 1 and NAPP >5 kg H2SO¬/t are considered PAF. Values between these designations are considered to have uncertain acid-generating characteristics and it is generally recommended that they undergo additional testing to assess the dissolution rates of acid-generating (e.g. pyrite) and acid-neutralising (e.g. calcite) minerals.

2.2.2 Rietveld X-ray Diffraction

Quantitative X-ray diffraction (XRD) was conducted on five samples from Eyre Pit. All tests were done by Microanalysis of Victoria Park, WA. Vasse WRD samples were excluded from XRD analysis because the excavated material was mixed with limited insight in the dominant lithology. This exclusion limits the occurrence of a grab sample that may not be representative of the entire sample.

Samples were lightly ground such that 90% passed through a 20 µm mesh to eliminate preferred orientation during analysis. The International Centre for Diffraction Database (ICDD) was used to identify all crystalline material. These amounts represent the relative amounts of crystalline phases normalised to 100%. The complete laboratory reports including the Rietveld refinement plots are provided in Appendix B.

Table 2-1 Geochemical Sample Distribution and Analysis Summary

Location	Interval (m)	Analysis				
		Total Elemental Analysis	ABA	XRD Mineralogy	Asbestos	ASLP
Eyre Pit						
Eyre Pit #1	Surface	X	X	X		X
Eyre Pit #2	Surface	X	X	X		X
Eyre Pit #3	Surface	X	X	X		X
Eyre Pit #4	Surface	X	X			X
Eyre Pit #5	Surface	X	X			X
Eyre Pit #6	Surface	X	X	X		X
Eyre Pit #7	Surface	X	X			X
Eyre Pit #8	Surface	X	X	X		X
Eyre Pit #9	Surface	X	X			X
Eyre Pit #10	Surface	X	X	X		X
Eyre Pit #10b - Bulk	Surface	X	X			X
Eyre Pit #10b – Crystalline	Surface			X		
Eyre Pit #10b - Globular	Surface			x		
Vasse WRD						
Vasse WRD #1	Surface	X	X			X
Vasse WRD #1	0.3	X	X			X
Vasse WRD #2	0.0-1.5	X	X			X
Vasse WRD #2	1.5-3.0	X	X			X
Vasse WRD #3	0.0-1.5	X	X			X
Vasse WRD #3	1.5-3.0	X	X			X
Vasse WRD #4	0.0-1.5	X	X			X
Vasse WRD #4	1.5-3.0	X	X			X
Vasse WRD #5	0.0-1.5	X	X			X
Vasse WRD #5	1.5-3.0	X	X			X
Vasse WRD #5	0.0-3.0				X	
Vasse WRD #6	0.0-1.5	X	X			X
Vasse WRD #6	1.5-3.0	X	X			X
Vasse WRD #7	0.0-1.5	X	X			X
Vasse WRD #7	1.5-3.0	X	X			X
Vasse WRD #8	0.0-1.5	X	X			X
Vasse WRD #8	1.5-3.0	X	X			X
Vasse WRD #9	0.0-1.5	X	X			X
Vasse WRD #9	1.5-3.0	X	X			X
Vasse WRD #10	0.0-1.5	X	X			X
Vasse WRD #10	1.5-3.0	X	X			X
Vasse WRD #10	0.0-3.0				X	
Vasse WRD #11	Surface	X	X			X
Vasse WRD #11	0.3	X	X			X
Vasse WRD #12	0.0-1.5	X	X			X
Vasse WRD #12	1.5-3.0	X	X			X

Location	Interval (m)	Analysis				
		Total Elemental Analysis	ABA	XRD Mineralogy	Asbestos	ASLP
Vasse WRD #13	0.0-1.5	X	X			X
Vasse WRD #13	1.5-3.0	X	X			X
Vasse WRD #14	Surface	X	X			X
Vasse WRD #14	0.3	X	X			X
Vasse WRD #15	0.0-1.5	X	X			X
Vasse WRD #15	1.5-3.0	X	X			X
Vasse WRD #15	0.0-3.0				X	
Vasse WRD #16	0.0-1.5	X	X			X
Vasse WRD #16	1.5-3.0	X	X			X
Vasse WRD #18	0.0-1.5	X	X			X
Vasse WRD #18	1.5-3.0	X	X			X
Vasse WRD #19	0.0-1.5	X	X			X
Vasse WRD #19	1.5-3.0	X	X			X
Vasse WRD #20	0.0-1.5	X	X			X
Vasse WRD #20	1.5-3.0	X	X			X
Vasse WRD #20	0.0-3.0				X	
Vasse WRD #21	0.0-1.5	X	X			X
Vasse WRD #21	1.5-3.0	X	X			X
Vasse WRD #22	0.0-1.5	X	X			X
Vasse WRD #22	1.5-3.0	X	X			X
Vasse WRD #25	0.0-1.5	X	X			X
Vasse WRD #25	1.5-3.0	X	X			X
Vasse WRD #25	0.0-3.0				X	
Vasse WRD #26	0.0-1.5	X	X			X
Vasse WRD #26	1.5-3.0	X	X			X
Vasse WRD #27	Surface	X	X			X
Vasse WRD #27	0.3	X	X			X
Vasse WRD #28	0.0-1.5	X	X			X
Vasse WRD #28	1.5-3.0	X	X			X
Vasse WRD #29	0.0-1.5	X	X			X
Vasse WRD #29	1.5-3.0	X	X			X
Vasse WRD #30	0.0-1.5	X	X			X
Vasse WRD #30	1.5-3.0	X	X			X
Vasse WRD #30	0.0-3.0				X	
Vasse WRD #31	0.0-1.5	X	X			X
Vasse WRD #31	1.5-3.0	X	X			X

Note: Surface and 0.3 m samples were collected from discrete depths

Table 2-2 Acid-base Accounting Criteria

Criteria	NPR	NAPP (kg H_2SO_4/tonnes)
Non-acid forming (NAF)	> or equal to 2	< 0
Uncertain	1 up to 2	0 up to 5

Potentially acid forming (PAF)	< 1	> or equal to 5

2.2.3 Leachate Analysis

The purpose of conducting water leachability testing ("water leaching") was to provide an assessment of the potential for release of constituents due to exposure to meteoric precipitation (e.g., rain and runoff). Water leaching was conducted using Australian Standard Leaching Procedure (ASLP) (Australian Standards AS4439.2 and 44396.3) with de-ionised water. The procedure utilises 500 ml of de-ionised water and 25 g of sample resulting in a 20:1 water to rock ratio. The samples are shaken for 18 hours before being filtered and the extract analysed. This dilution factor is reasonable for a site with heavy rainfall in excess of 250 to 320 mm /annum as seen at Christmas Creek. Leachate analysis was completed on all samples.

2.2.4 Total Elemental Analysis

Multi-element assay data provides the near-total elemental composition and gives an indication of the total potential load (100%) of constituents to the environment. Elemental analysis was completed on 67 samples (56 from the WRD and 11 from the pit). Solid samples were digested in acid and analysed for elements by ICP. A total of 48 whole rock elemental concentrations were determined.

2.2.5 Asbestos Testing

Asbestos testing involves the qualitative identification of silicate minerals that have a tendency to form thin fibrous crystals. Prolonged inhalation of fibers can cause serious illness. Asbestos testing involved the qualitative identification of chrysotile, amosite and crocidolite in bulk samples by polarised light microscopy in conjunction with dispersion staining. Unequivocal identification of the asbestos minerals present is made by obtaining sufficient diagnostic indicators, which provide a reasonable degree of certainty; dispersion staining is a mandatory protocol for positive identification.

Asbestos qualitative testing was completed on the following six samples: (note the numbers at the end of the sample name refer to the depth in meters from top of WRD sampled):

- Vasse WRD #5 Bulk 0.0-3.0
- Vasse WRD #10 Bulk 0.0-3.0
- Vasse WRD #15 Bulk 0.0-3.0
- Vasse WRD #20 Bulk 0.0-3.0
- Vasse WRD #25 Bulk 0.0-3.0
- Vasse WRD #30 Bulk 0.0-3.0.

2.3 Geochemical Results and Discussion

Results from the geochemical characterisation are discussed in the following sections. Tables and figures are included to provide supporting information. Appendix A contains supplemental results while data directly from the laboratories are provided in Appendix B.

2.3.1 Acid-base Accounting

A summary of the waste rock ABA results is provided in Table 2-3. Graphical representation is presented in Figures 2-3 and 2-4. Complete ABA calculations are presented in Appendix A.

All 11 samples from Eyre Pit were classified as NAF based on both NPR and NAPP values. Total and sulfide sulfur was less than 0.24 wt.% in all samples. The majority of Eyre Pit samples were at or near detection limit of 0.005 wt. % for sulfide sulfur. The highest total sulfur value was 0.049 wt. %.

Of the 54 samples taken from the Vasse WRD one of the was classified as PAF based on an NPR ratio of 0.5. The NAPP value for this one sample was 3.5 kg H2SO4/tonne which classified it as uncertain. Seven of the samples were classified as having uncertain potential based on NPR values between 1 and 2. All of these were classified as NAF based on NAPP calculations. The Vasse WRD had a mean total sulfur concentration of 0.01 wt. % with a maximum concentration of 0.24 wt. %.

Table 2-3 Acid-base Accounting Results

Sample	Sulfate Sulfur (wt. %)	Sulfide Sulfur (wt. %)	Total Sulfur (wt. %)	MPA (kg H_2SO_4/tonne)	ANC (kg H_2SO_4/tonne)	NAPP (kg H_2SO_4/tonne)	NPR	Criteria
Eyre Pit								
Eyre Pit #1	0.007	0.006	0.013	<0.5	<1	-0.25	2.0	NAF
Eyre Pit #2	<0.005	<0.005	<0.005	<0.5	<1	-0.25	2.0	NAF
Eyre Pit #3	0.01	<0.005	<0.005	<0.5	1.5	-1.25	6.0	NAF
Eyre Pit #4	<0.005	<0.005	<0.005	<0.5	<1	-0.25	2.0	NAF
Eyre Pit #5	0.008	<0.005	<0.005	<0.5	<1	-0.25	2.0	NAF
Eyre Pit #6	<0.005	<0.005	<0.005	<0.5	<1	-0.25	2.0	NAF
Eyre Pit #7	0.018	<0.005	<0.005	<0.5	<1	-0.25	2.0	NAF
Eyre Pit #8	0.008	<0.005	<0.005	<0.5	<1	-0.25	2.0	NAF
Eyre Pit #9	0.029	<0.005	<0.005	<0.5	<1	-0.25	2.0	NAF
Eyre Pit #10	0.014	<0.005	<0.005	<0.5	3.4	-3.15	13.6	NAF
Eyre Pit #10b Bulk	0.036	0.013	0.049	1.5	3.2	-1.70	2.1	NAF
Vasse WRD								
Vasse WRD, #1 Bulk 0.3	0.01	<0.005	<0.005	<0.5	2.2	-1.95	8.8	NAF
Vasse WRD, #2 Bulk 0.0-1.5	<0.005	<0.005	<0.005	<0.5	2.2	-1.95	8.8	NAF
Vasse WRD, #2 Bulk 1.5-3.0	<0.005	<0.005	<0.005	<0.5	1.5	-1.25	6.0	NAF
Vasse WRD, #3 Bulk 0.0-1.5	0.019	<0.005	<0.005	<0.5	3.4	-3.15	13.6	NAF

Vasse WRD, #3 Bulk 1.5-3.0	0.016	<0.005	<0.005	<0.5	2.2	-1.95	8.8	NAF
Vasse WRD, #4 Bulk 0.0-1.5	0.011	<0.005	<0.005	<0.5	2.2	-1.95	8.8	NAF
Vasse WRD, #4 Bulk 1.5-3.0	0.015	<0.005	<0.005	<0.5	3.4	-3.15	13.6	NAF
Vasse WRD, #5 Bulk 0.0-1.5	0.019	<0.005	<0.005	<0.5	8	-7.75	32.0	NAF
Vasse WRD, #5 Bulk 1.5-3.0	0.007	<0.005	<0.005	<0.5	4.4	-4.15	17.6	NAF
Vasse WRD, #6 Bulk 0.0-1.5	<0.005	<0.005	<0.005	<0.5	5.1	-4.85	20.4	NAF
Vasse WRD, #6 Bulk 1.5-3.0	<0.005	<0.005	<0.005	<0.5	3.4	-3.15	13.6	NAF
Vasse WRD, #7 Bulk 0.0-1.5	0.008	<0.005	<0.005	<0.5	4.6	-4.35	18.4	NAF
Vasse WRD, #7 Bulk 1.5-3.0	<0.005	0.041	0.046	1.4	3.4	-2.00	2.4	NAF
Vasse WRD, #8 Bulk 0.0-1.5	<0.005	0.009	0.005	<0.5	1.7	-1.45	6.8	NAF
Vasse WRD, #8 Bulk 1.5-3.0	<0.005	<0.005	<0.005	<0.5	3.4	-3.15	13.6	NAF
Vasse WRD, #9 Bulk 1.5-3.0	<0.005	**0.055**	**0.059**	**1.8**	**2.4**	**-0.60**	**1.3**	**Uncertain**
Vasse WRD, #10 Bulk 0.0-1.5	<0.005	<0.005	<0.005	<0.5	2.4	-2.15	9.6	NAF
Vasse WRD, #10 Bulk 1.5-3.0	<0.005	0.013	0.015	<0.5	1.9	-1.65	7.6	NAF
Vasse WRD, #11 Bulk 0.3	<0.005	<0.005	<0.005	<0.5	2.9	-2.65	11.6	NAF
Vasse WRD, #12 Bulk 0.0-1.5	0.006	<0.005	<0.005	<0.5	4.8	-4.55	19.2	NAF
Vasse WRD, #12 Bulk 1.5-3.0	0.007	<0.005	<0.005	<0.5	2.4	-2.15	9.6	NAF
Vasse WRD, #13 Bulk 0.0-1.5	<0.005	0.036	0.041	1.3	3.1	-1.80	2.4	NAF
Vasse WRD, #13 Bulk 1.5-3.0	<0.005	0.014	0.017	0.5	1.4	-0.90	2.8	NAF
Vasse WRD, #14 Bulk 0.3	<0.005	**0.036**	**0.034**	**1**	**1.9**	**-0.90**	**1.9**	**Uncertain**
Vasse WRD, #15 Bulk 0.0-1.5	<0.005	0.033	0.036	1.1	3.4	-2.30	3.1	NAF
Vasse WRD, #15 Bulk 1.5-3.0	<0.005	<0.005	<0.005	<0.5	2.2	-1.95	8.8	NAF
Vasse WRD, #16 Bulk 0.0-1.5	<0.005	0.021	0.021	0.6	2.6	-2.00	4.3	NAF
Vasse WRD, #16 Bulk 1.5-3.0	<0.005	0.04	0.037	1.1	2.2	-1.10	2.0	NAF
Vasse WRD, #18 Bulk 0.0-1.5	0.012	<0.005	0.017	0.5	1.9	-1.40	3.8	NAF
Vasse WRD, #18 Bulk 1.5-3.0	0.013	0.01	0.024	0.7	2.6	-1.90	3.7	NAF
Vasse WRD, #19 Bulk 0.0-1.5	0.015	<0.005	0.006	<0.5	19	-18.75	76.0	NAF
Vasse WRD, #19 Bulk 1.5-3.0	0.009	<0.005	<0.005	<0.5	14	-13.75	56.0	NAF

Vasse WRD, #20 Bulk 0.0-1.5	**0.023**	**0.22**	**0.24**	**7.4**	**3.9**	**3.50**	**0.5**	**PAF**
Vasse WRD, #20 Bulk 1.5-3.0	0.025	<0.005	<0.005	<0.5	6.1	-5.85	24.4	NAF
Vasse WRD, #21 Bulk 0.0-1.5	0.015	<0.005	0.019	0.6	2.4	-1.80	4.0	NAF
Vasse WRD, #21 Bulk 1.5-3.0	**0.017**	**0.042**	**0.059**	**1.8**	**2.4**	**-0.60**	**1.3**	**Uncertain**
Vasse WRD, #22 Bulk 0.0-1.5	<0.005	0.008	0.012	<0.5	1.7	-1.45	6.8	NAF
Vasse WRD, #25 Bulk 0.0-1.5	0.012	<0.005	<0.005	<0.5	4.6	-4.35	18.4	NAF
Vasse WRD, #25 Bulk 1.5-3.0	0.013	<0.005	<0.005	<0.5	3.9	-3.65	15.6	NAF
Vasse WRD, #26 Bulk 0.0-1.5	0.013	<0.005	<0.005	<0.5	4.1	-3.85	16.4	NAF
Vasse WRD, #26 Bulk 1.5-3.0	**0.009**	**0.048**	**0.057**	**1.7**	**2.9**	**-1.20**	**1.7**	**Uncertain**
Vasse WRD, #27 Bulk 0.3	**0.043**	<0.005	**0.039**	**1.2**	**2.2**	**-1.00**	**1.8**	**Uncertain**
Vasse WRD, #28 Bulk 0.0-1.5	**0.013**	**0.047**	**0.06**	**1.8**	**2.4**	**-0.60**	**1.3**	**Uncertain**
Vasse WRD, #28 Bulk 1.5-3.0	**0.072**	**0.026**	**0.097**	**3**	**4.4**	**-1.40**	**1.5**	**Uncertain**
Vasse WRD, #29 Bulk 0.0-1.5	0.02	<0.005	<0.005	<0.5	7	-6.75	28.0	NAF
Vasse WRD, #29 Bulk 1.5-3.0	0.019	0.017	0.036	1.1	2.4	-1.30	2.2	NAF
Vasse WRD, #30 Bulk 0.0-1.5	0.028	0.008	0.036	1.1	2.7	-1.60	2.5	NAF
Vasse WRD, #30 Bulk 1.5-3.0	0.015	<0.005	<0.005	<0.5	5.1	-4.85	20.4	NAF
Vasse WRD, #31 Bulk 0.0-1.5	0.018	0.04	0.058	1.8	4.4	-2.60	2.4	NAF
Vasse WRD, #31 Bulk 1.5-3.0	0.015	<0.005	<0.005	<0.5	5.3	-5.05	21.2	NAF
Vasse WRD, #1 Bulk Surface	0.01	<0.005	<0.005	<0.5	2.4	-2.15	9.6	NAF
Vasse WRD, #11 Bulk Surface	0.015	<0.005	<0.005	<0.5	2.4	-2.15	9.6	NAF
Vasse WRD, #14 Bulk Surface	0.039	<0.005	<0.005	<0.5	1.7	-1.45	6.8	NAF
Vasse WRD, #27 Bulk Surface	0.051	<0.005	0.039	1.2	2.7	-1.50	2.3	NAF

Note: All calculations involving values below reporting limit were done using 0.5 x the reporting limit.
* Total sulfur calculated by adding sulfate and sulfide sulfur values

Graphical representation of samples (Figures 2-3 and 2-4) confirm that the majority of samples are NAF, with a smaller population being uncertain. One sample was classified as PAF.

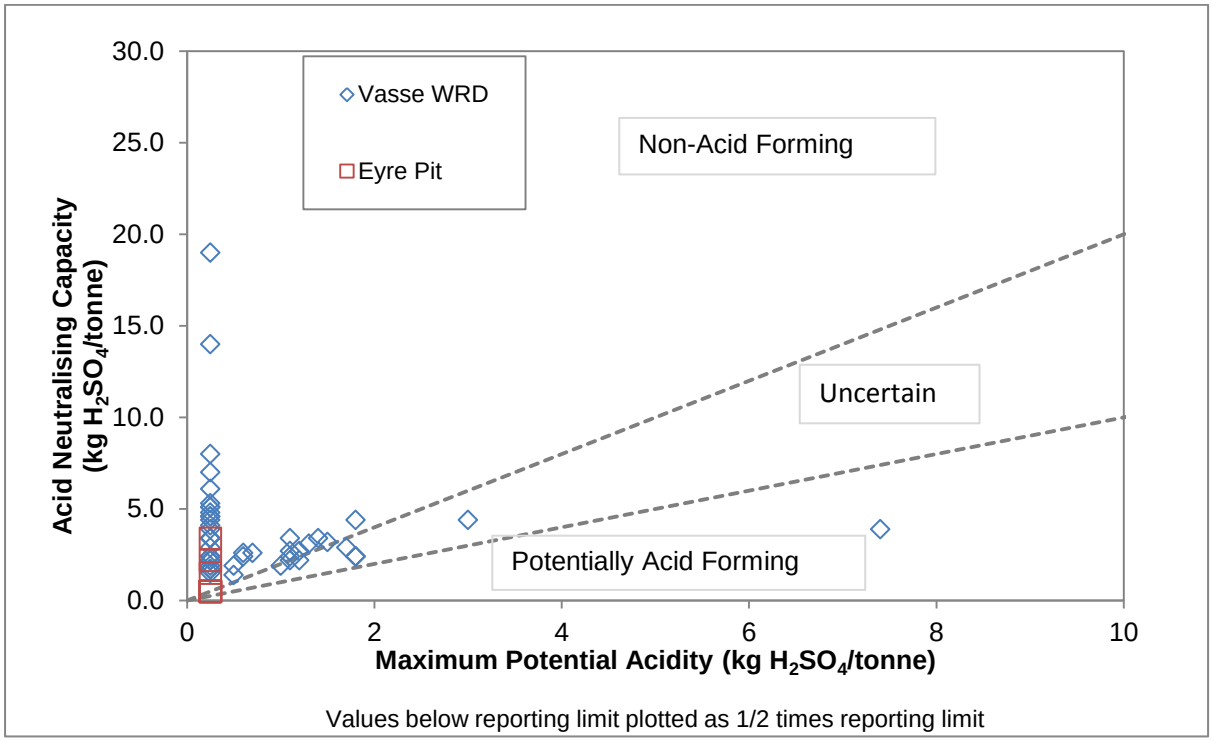

Figure 2-3 ANC vs MPA for Christmas Creek Samples

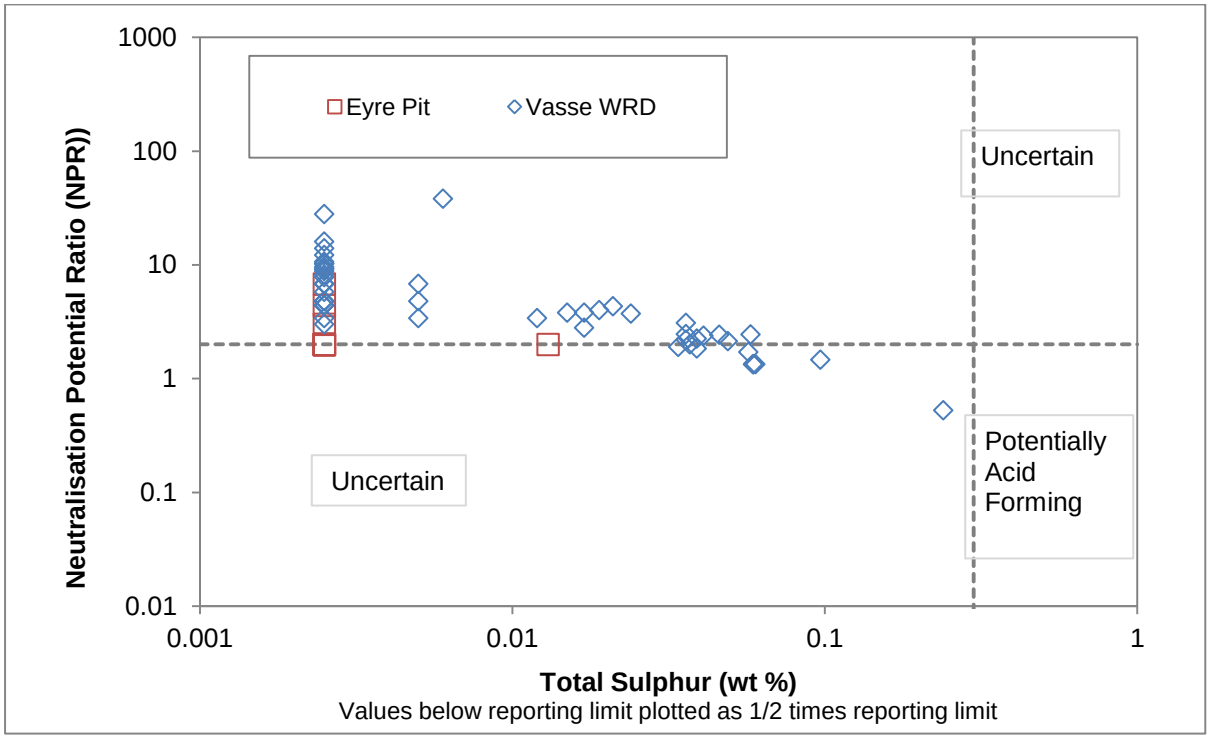

Figure 2-4 NPR vs Total Sulfur for Christmas Creek Samples

Given the above, it appears that waste rock from both Christmas Creek and Cloudbread can be characterised as non-acid forming.

2.3.2 Elemental Analysis

Samples of waste rock from the Eyre pit and Vasse WRD were analysed. A statistical summary of selected elements is presented in Table 2-4.

For the purpose of screening, each element was compared to the Geochemical Abundance Index (GAI). The GAI compares the actual concentration of an element in a sample with the median abundance for that element in the most relevant media (such as crustal abundance as used in this review). The main purpose of the GAI is to provide an indication of any elemental 'enrichment' that may be of environmental importance. The GAI is expressed in integer increments where a GAI-0 indicates the element is present at similar concentration as the crustal abundance. As a general rule, a GAI-3 (approximately a twelve-fold enrichment) or greater indicates enrichment that warrants further examination. However, it should be noted that enrichment does not necessarily mean that an element poses an environmental hazard.

Elemental concentrations compared to the relevant GAI value are provided in Appendix A.

With the exception of Eyre Pit #4 and Vasse WRD #12 1.5-3.0, all samples contained arsenic concentrations greater than GAI 3 GAI (or 12 ppm). Approximately half of samples (34 out of 66) exceeded the GAI-3 value for antimony (2.4 ppm). All other constituents of interest were below the relevant GAI-3 value.

With the exception of Eyre Pit #10, all returned selenium concentrations were at method detection limit (2 ppm, c.f. GAI-3 of 0.6 ppm). Anomalously high selenium levels in Eyre Pit #10 (7 ppm) were statistical outliers both within the Christmas Creek data set, and in comparison to previous Cloudbreak analyses (Section 4.7.2). Due to ongoing works in the vicinity of Eyre Pit, the location of the anomalous selenium result has been buried beneath haul road construction and so receptor pathways and atmospheric exposure have been removed. Should any future excavation take place in the vicinity of sample Eyre #10, additional validation sampling should be undertaken.

Table 2-4 Summary Statistics for Total Element Analysis (mg/L)

Element	Eyre Pit (n=11)				Vasse WRD (n=54)			
	Mean	Minimum	Maximum	Standard Deviation	Mean	Minimum	Maximum	Standard Deviation
Ag	0.1	<0.1	0.3	0.1	<0.1	<0.1	0.1	<0.1
Al	58 943	5 040	142 000	47 076	36 907	10 300	74 100	15 199
As	81	10	229	77	33	11	69	13
Ba	104	6	655	187	166	24	975	165
Cd	<0.1	<0.1	0.5	0.2	<0.01	<0.01	0.1	<0.1
Cr	85	<10	260	858	63	<10	150	44
Fe	326 845	24 700	549 000	184 282	451 074	234 000	584 000	60 087
K	1 520	<100	7 180	2 163	569	<100	4 080	784
Mg	672	190	2 490	696	776	330	2 010	349
Mn	7 310	64.1	67 300	19 940	2 738.1	159	13 400	2 542
Ni	61	8	211	72	28	12	63	11

Element	Eyre Pit (n=11)				Vasse WRD (n=54)			
	Mean	Minimum	Maximum	Standard Deviation	Mean	Minimum	Maximum	Standard Deviation
Pb	32	9	68	19	25	11	60	9
S	315	80	690	214	521	240	1 1 50	180
Sb	2.4	1.0	5.2	1.4	2.8	1.0	6.7	1.2
Se	1	<2	7	2	1	<2	3	1
Ti	3 421	410	12 700	3 596	1998	540	4 000	938
Zn	34	9	84	24	50	22	166	29

2.3.3 Leachate Analysis

A statistical summary of results is shown in Table 2-5 and results of all leachate testing are included in Appendix A. Most of the samples taken from Eyre Pit had leachate pH that was slightly higher or lower than the expected range of 6.5-8.5. The average pH of all the Eyre Pit samples was 6.4 with the highest pH at 8.9 and the lowest at 5.8. For samples taken from Vasse WRD the average pH was 6.8. Six of the 55 Vasse WRD samples had pH values slightly lower than the expected minimum of 6.5.

For the purpose of screening only, the leachate results were compared to ANZECC water quality guidelines (ANZECC 2000, Freshwater 95% protection level). This process identified results that were subject to further consideration. (It should be noted however that background groundwater concentrations for many elements naturally exceed ANZECC water quality guidelines for freshwater protection. Any assessment of potential impacts can only be made by comparing the potential leachate results with the naturally occurring groundwater concentrations. This matter is addressed in Section 4.8.)

Within the above context, for the Eyre Pit, all elemental leachate samples were below ANZECC guideline concentrations with the exception of chromium and zinc. A relatively high concentration of chromium was detected in the vicinity of samples Eyre #7 to Eyre #10, indicating enriched concentrations in the north eastern section of the Eyre pit mining area. Chromium concentrations elsewhere in the Eyre pit mining area were below detection limit. Relatively high zinc concentrations were detected in all samples with the exception of Eyre #10 in the north eastern corner of the area.

Relatively high levels of aluminium, cadmium, chromium, lead and zinc were all detected in analyses of Vasse WRD samples. Concentrations of aluminium, up to 2.5 times the ANZECC value, were detected in 3 samples including an in situ sample from Vasse #2, at a level of 2 times the ANZECC limit.

Relatively high cadmium, up to two orders of magnitude greater than ANZECC limits was detected in approximately 37% of samples. Relatively high levels of chromium, lead and zinc up to one order of magnitude greater than ANZECC limits was detected in 17% (Cr), 28% (Pb) and 98% (Zn) of samples respectively.

Table 2-5 Summary Statistics for Leachate Water Quality (mg/L)

Analyte	ANZECC	Eyre Pit (n=10)				Vasse WRD (n=54)			
		Mean	Minimum	Maximum	Standard Deviation	Mean	Minimum	Maximum	Standard Deviation
pH	-	7.3	5.8	8.9	1.2	7.2	6	8.4	0.6
TDS	-	40	<10	56	59	76	<10	264	57
Al	0.055	0.022	<0.001	**0.110**	0.035	0.017	<0.001	**0.130**	0.024
As	0.013	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001
B	0.37	0.035	0.014	0.069	0.017	0.039	<0.005	0.086	0.017
Ba	-	0.063	0.024	0.120	0.027	0.176	0.058	0.370	0.070
Ca	-	1.3	<0.2	4	1.2	10.5	0.7	48.0	8.3
Cd	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	**0.0034**	<0.0001	**0.0510**	0.0082
ΣCr (A)	0.0033	**0.004**	<0.001	**0.011**	0.004	<0.001	<0.001	**0.005**	<0.001
F	-	0.3	<0.1	0.6	0.2	0.6	0.2	1.2	0.3
Fe	-	0.020	<0.005	0.071	0.025	0.022	<0.005	0.180	0.031
K	-	0.8	0.3	2.2	0.6	1.4	0.2	5.7	1.2
Mn	1.9	0.098	<0.001	0.7	0.221	0.014	<0.001	0.320	0.055
Pb	0.0034	<0.001	<0.001	<0.001	<0.001	**0.007**	<0.001	**0.046**	0.012
Sb	0.009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Se	0.011	<0.002	<0.002	<0.01	<0.01	<0.002	<0.001	<0.002	<0.002
Sr	-	0.014	<0.001	0.037	0.012	0.055	<0.001	0.200	0.039
SO_4	-	6	<1	20	7	16	2	85	14
Zn	0.008	**0.015**	<0.001	**0.021**	0.006	**0.042**	0.007	**0.077**	0.018

Note: Figures in **bold** exceed ANZECC Freshwater Quality Guidelines (ANZECC 2000)
(A) Low Reliability fresh water trigger value for CrIII ("Interim" working value only)

2.3.4 Mineralogy

Quantitative XRD analysis was conducted on five samples from Eyre Pit. Vasse WRD samples were excluded from XRD analysis because the excavated material was mixed and heterogeneous. This exclusion limits the occurrence of a grab sample that may not be representative of the entire sample.

Table 2-6 shows the mineralogical composition of these representative samples from Eyre Pit. Samples are dominated by Fe-oxide minerals. Goethite ranges from 14% to 51%, while hematite ranges from 15% to 56%. Kaolinite was identified in three of the samples with appreciable concentrations as high as 87%. Rutile and quartz were also observed in discrete samples.

No sulphidic minerals were identified in the samples which are consistent with the low sulfide sulfur and total sulfur concentrations reported with the ABA results.

Table 2-6 Quantitative XRD Analysis Results (%)

Mineral	Formula	Eyre Pit #1	Eyre Pit #3	Eyre Pit #6	Eyre Pit #8	Eyre Pit #10
Goethite	$FeO(OH)$	47.4	35.8	38.8	13.5	51
Hematite	$Fe_{1.85}H_{0.45}O_3$	19.2	56.5	14.8	0	25.1
Kaolinite	$Al_2Si_2O_5(OH)_4$	33.4	0	0	86.5	23.9
Pseudo-rutile	$Fe_{9.48}Mn_{0.54}Ti_{19.32}O_{50}$	0	7.7	0	0	0
Quartz	SiO_2	0	0	46.5	0	0

2.3.5 Asbestos Testing

Asbestos was not found in any of the samples.

2.3.6 Comparison of Eyre Pit and Vasse WRD

A comparison of surface samples between Eyre Pit and Vasse WRD was undertaken using T-tests which are a statistical method to compare the distribution of two sets of normal distributed data. These tests were conducted to ascertain whether waste material is considered similar and comparable between Eyre Pit and Vasse WRD. Results shown in Table 2-7 indicate that the geochemical characters are indeed similar with exception of Calcium, although, these results should not be extrapolated to characterise the interior of the WRDs.

Table 2-7 T-tests between Eyre Pit and Vasse WRD Total Metals

Analyte	df	t-value	p-value	Class
Al	10	1.5363	0.15	Similar
As	10	2.09	0.06	Similar
Ca	60	-4.3988	<0.05	Dissimilar
Fe	10	-2.212	0.05	Similar
Mg	11	-0.4821	0.64	Similar
Mn	10	0.7592	0.46	Similar
Pb	11	1.0955	0.30	Similar
Sb	13	-1.032	0.32	Similar
Sr	6	1.1583	0.28	Similar
Zn	17	-1.9694	0.066	Similar

df equals degrees of freedom (n-1)

Set of values are considered similar if p-value > 0.05

2.3.7 Comparison of Christmas Creek and Cloudbreak Samples

The following sections discuss a comparison between the lithologies and chemical character of the waste rock material between the Christmas Creek and Cloudbreak mines. Additional geochemical characterisation of waste material at Cloudbreak is provided in Tetra Tech (2012).

Lithologic Comparison

A geological comparison was completed to determine if lithological units from Christmas Creek were similar to the lithological composition from the Cloudbreak site. Geological interpretation of borehole samples was conducted by Tetra Tech at the Cloudbreak site between March 2012 and April 2012.

Visual observations from Christmas Creek show that the samples are also dominated by Fe-oxide minerals goethite and hematite, with considerable amounts of shale in numerous intermixed waste samples. Operations personnel report the occasional presence of carbonaceous shales but none were found in the samples collected. No detrital alluvium material was observed in the samples which may be due to the samples being collected from the top 3 m of the WRD and at the Eyre Pit floor. The Fe-oxide proportions are fairly similar between the two sites.

Visual observations of sampled intervals from the Cloudbreak site were dominated by meso- and micro-scale banded Fe-oxide minerals. Hematite clasts were typically blue-grey with a metallic lustre with variable concentrations of ochreous coating. Goethite was typically ochreous and friable. Generally, these Fe-oxide minerals accounted for the majority of the collected sample. Minor components observed in the samples were detrital material, composed of chert, shale and clay minerals. Visual observations were supported by mineralogical quantification of representative samples. With the exception of two detrital samples, the majority of samples had cumulative proportions of goethite and hematite ranging from 15% to 66% and 21% to 39%, respectively (Tetra Tech, 2012).

Quantitative mineralogical results between the two sites were comparable. Goethite at Christmas Creek ranges from 14 % to 47 % which is similar to the goethite range observed at Cloudbreak. Likewise, hematite concentrations at Christmas Creek were between 19 % and 56 % (Table 2-6). Excluding the detrital material analysed at the Cloudbreak site, accessory minerals were consistent between the sites.

Geochemical Comparison

The following sections discuss the geochemical character of waste rock samples between the two sites.

Acid-Base Accounting

At Christmas Creek 1.8% of the WRD samples exhibited PAF and 13% presented uncertain characteristics, whereas as at Cloudbreak 8% exhibited PAF characteristics and 16% of the samples exhibited uncertain characteristics. Waste rock at Christmas Creek appears to have a lower acid generating potential than that at Cloudbreak (Figure 2-5).

Leachate and Metal Concentration Comparisons

The ASLP results for waste rock obtained from Cloudbreak and Christmas Creek sites were subject to statistical comparison. Table 2-8 provides the results of the T-tests. While several elements have statistically similar mean concentrations (p-value>0.05) there are enough inconsistencies in the number of valid results above detection limit to suggest that any extrapolation between sites is unadvised and not supported by the elemental concentrations

and leachate water quality content. Of particular note is the mean Cadmium result for Christmas Creek.

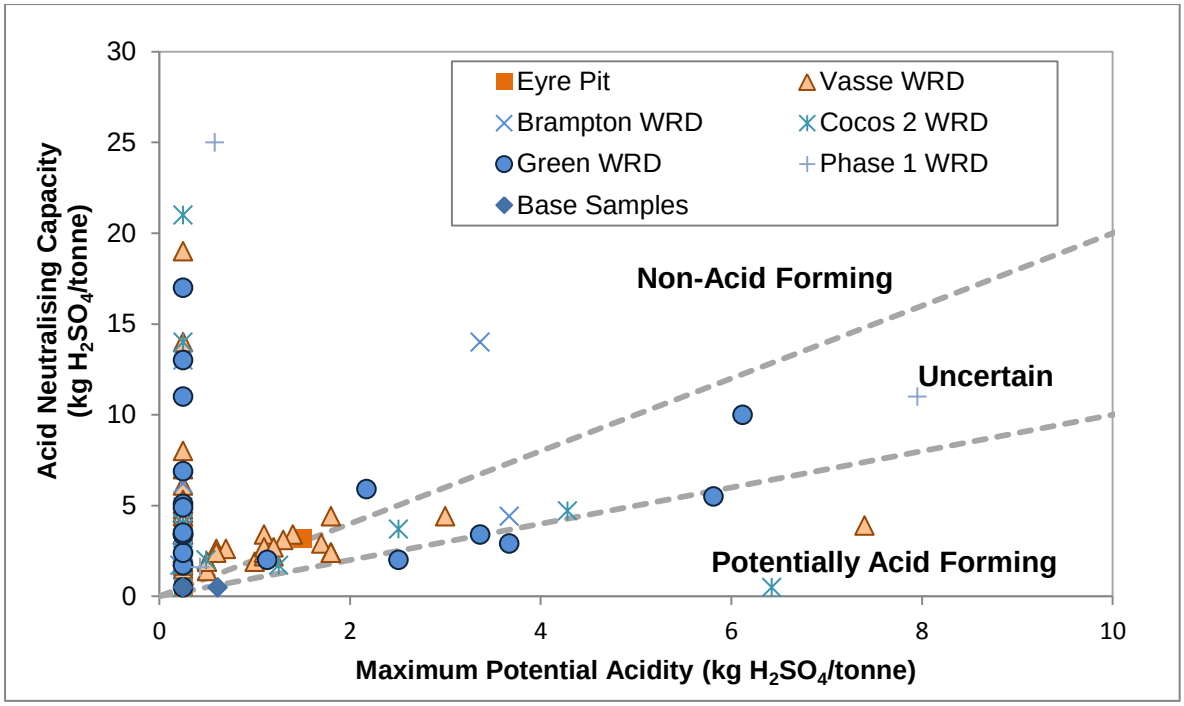

Figure 2-5 Comparison of MPA vs ANC for Christmas Creek (orange) and Cloudbreak Samples (blue)

Table 2-8 T-test Results for Waste Rock and Waste Rock Leachate Comparison

Analyte	Christmas Creek Mean	Cloudbreak Mean	Degrees of freedom (n-1)	t-value	p-value	Class
Analysis of waste rock						
	mg/l	mg/l				
Al	40 636	36 579	112	1.0928	0.27	similar
As	41.4	28.2	82	2.6679	0.01	dissimilar
Cd	0.18	0.23	9	-0.3208	0.76	similar
Ca	949.4	2 302	88	-4.78	**<0.05**	dissimilar
Fe	430 050	387 750	120	2.1989	0.03	dissimilar
K	733	2 023	92	-4.2741	**<0.05**	dissimilar
Mg	758	1 151	103	-4.123	**<0.05**	dissimilar
Mn	3511	4 009	107	-0.4034	0.69	similar
Pb	26.25	17.8	112	4.9346	**<0.05**	dissimilar
Sb	2.76	2.3	119	2.4145	0.02	dissimilar
Se	2.6	2.17	19	1.1575	0.26	similar
Sr	11.93	23.7	103	-4.6499	**<0.05**	dissimilar
Zn	47.52	36.8	118	2.3726	0.02	dissimilar
Analysis of leachate from waste rock						
Al	0.018	0.02	108	-1.2595	0.21	similar
Cd	**0.003**	0.00005	64	2.9668	**<0.05**	dissimilar

Analyte	Christmas Creek Mean	Cloudbreak Mean	Degrees of freedom (n-1)	t-value	p-value	Class
Fe	0.031	0.03	89	0.4333	0.67	similar
K	1.298	2.51	103	-4.5915	**<0.05**	dissimilar
Mg	2.328	2.318	115	0.0249	0.98	similar
Mn	0.027	0.004	65	1.8128	0.07	similar
Sr	0.048	0.099	66	-2.2133	0.03	dissimilar
Zn	0.038	0.022	123	5.0132	**<0.05**	dissimilar

df equals degrees of freedom (n-1)

Set of values are similar if p-value is > 0.05

2.3.8 Changes in Groundwater Chemistry

The following sections provide a) a preliminary review of changes in groundwater chemistry over time at Christmas Creek and b) a comparison of the chemical concentrations as seen in the Christmas Creek waste rock leachate (as characterised be ASLP laboratory testing) and the regional groundwater.

Groundwater Monitoring

For the purpose of completing this initial comparison, groundwater concentrations have been sourced from 13 wells in the region. As some wells have multiple sample depths, these provide a total of 31 individual sampling locations. Records for each of these sampling locations were available for the period 2007 to 2012. Of the 150 records available for this period, 106 are for the period post the commencement of land disturbing activities whilst 44 were available for the pre-disturbance period.

Well locations are shown on Figure 2-6.

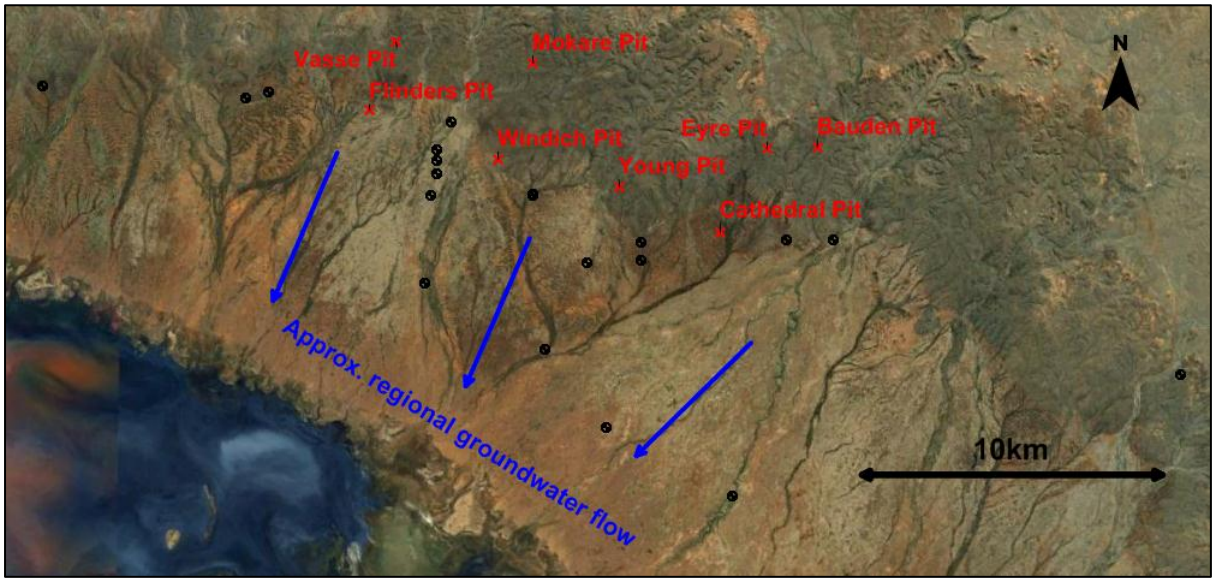

Figure 2-6 Christmas Creek Pit Locations and Plotted Groundwater Bores

Changes in Groundwater Chemistry over time

Figure 2-7 shows the groundwater composition on a piper diagram indicating a high degree of water type variability. Box and Whisker plots of recorded groundwater chemistry are shown in Figures 2-8 and 2-9. Mean and standard error plots are presented in Figures 2-10 and 2-11.

Statistical analysis of the pre and post disturbance concentrations of the analytes suggest that the levels of pH, TDS, calcium, magnesium, potassium, aluminium and sulfate have not changed appreciably since commencement of land disturbance activity in early 2009. Similarly there have been no statistically significant changes in the concentrations of aluminium, chromium and manganese.

In contrast, statistically significant (at the 95% confidence limit) changes have been seen the results for Barium, Iron and Zinc; each appearing to have increased over time. Whilst there was no statistically significant change in the mean aluminium result, some of the individual results were notable high in the post disturbance results.

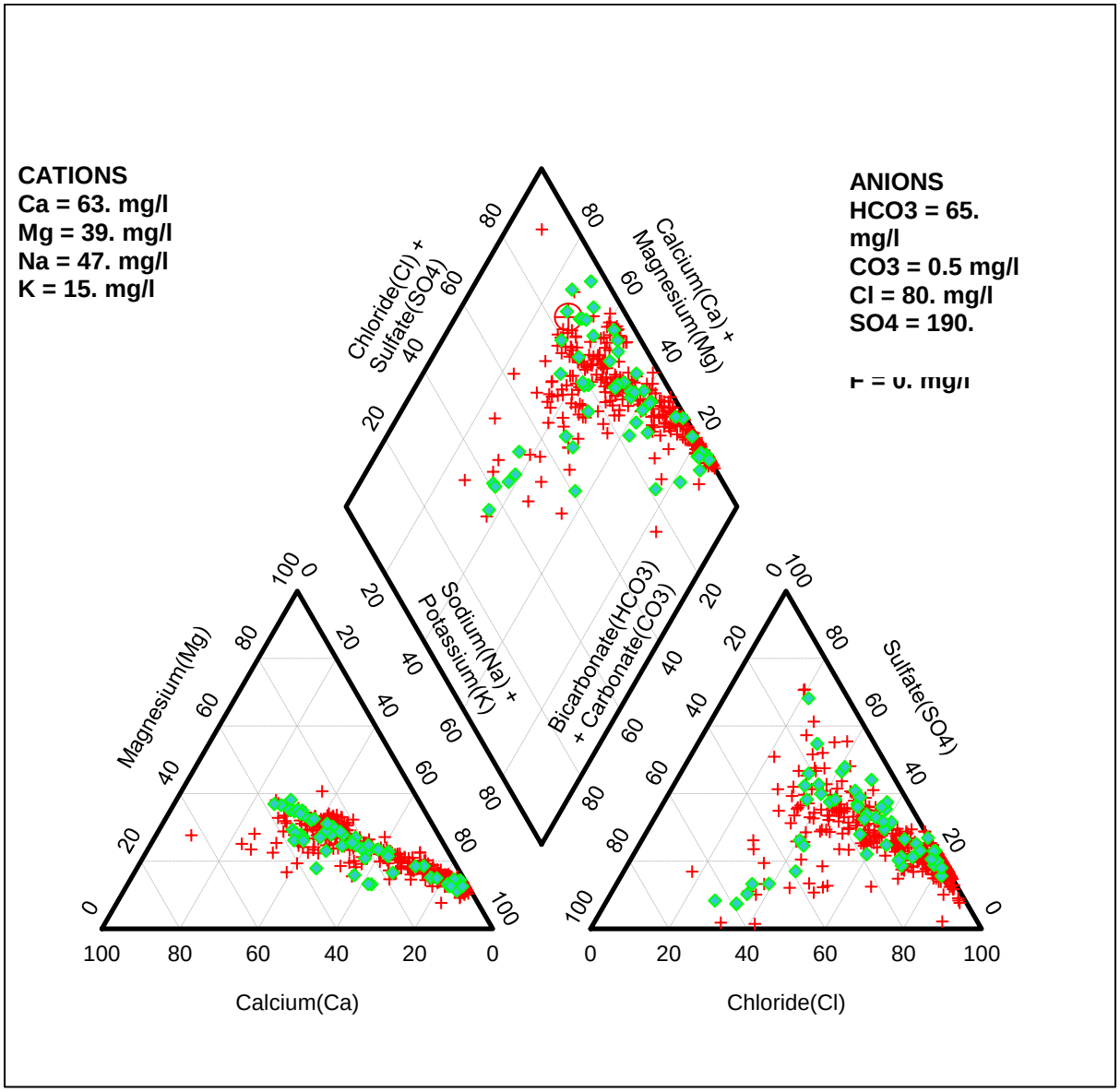

Figure 2-7 Groundwater Bore Data

Green diamonds = Pre-disturbance background groundwater composition
Red crosses = Post-disturbance groundwater composition

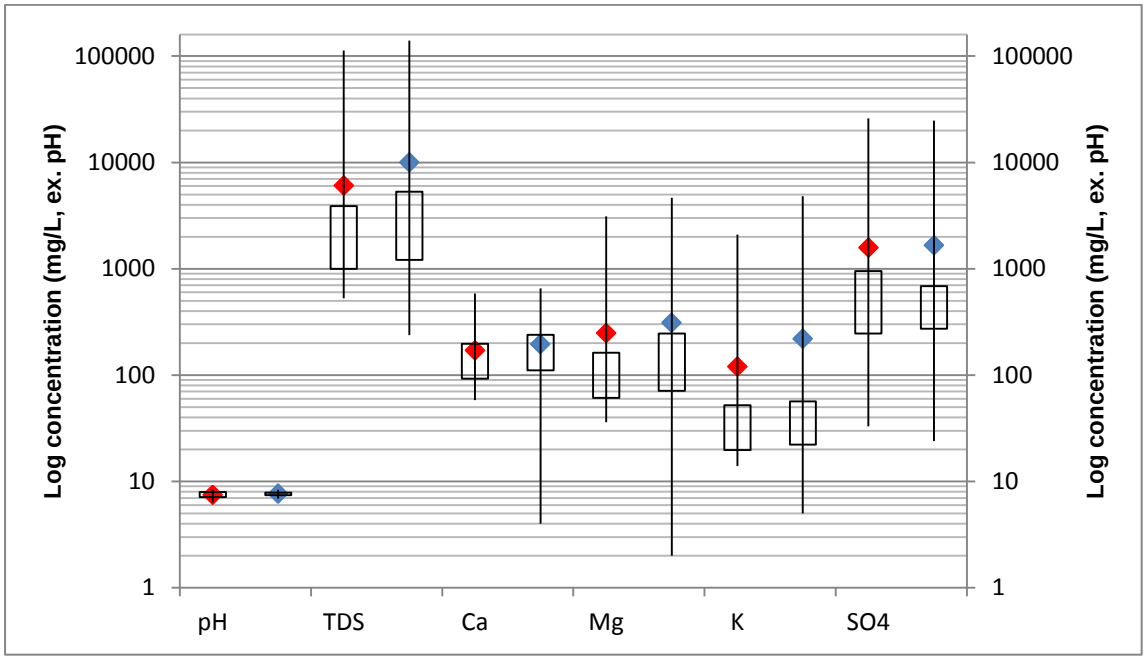

Figure 2-8 Major Groundwater Constituents (Box and Whisker Plot)

Red diamonds = Pre-mining means
Blue diamonds = Post-disturbance means

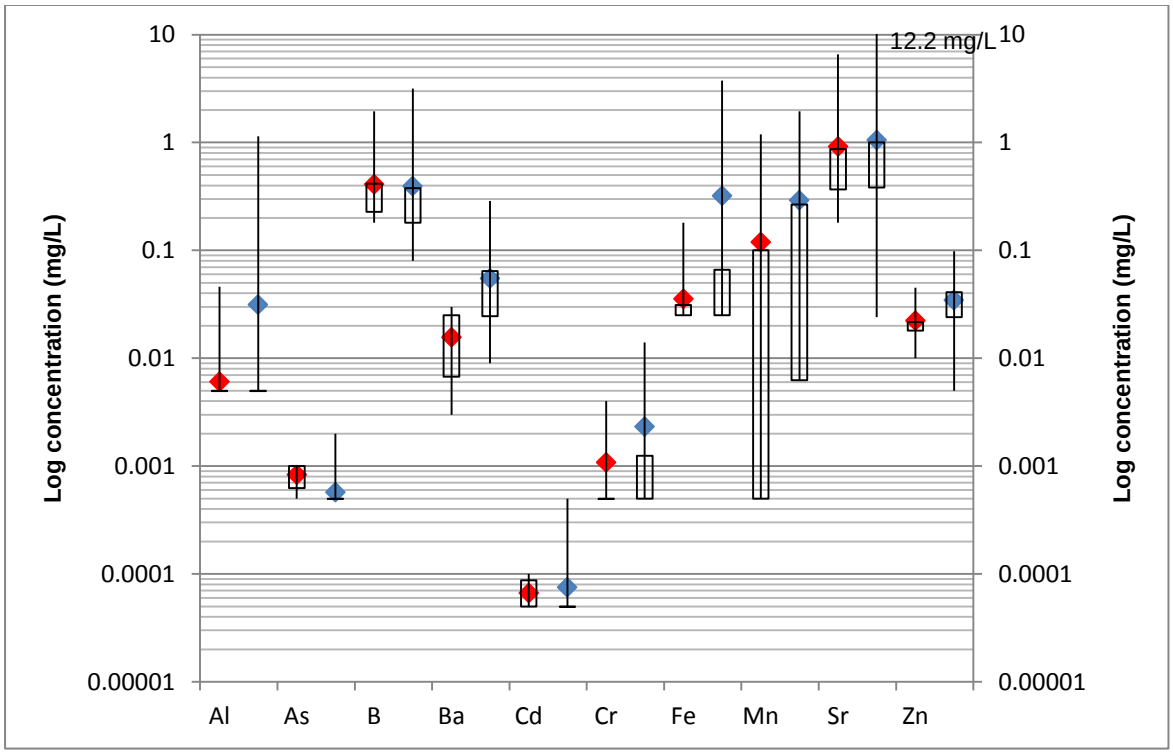

Figure 2-9 Minor Groundwater Constituents (Box and Whisker Plot)

Red diamonds = Pre-mining means
Blue diamonds = Post-disturbance means

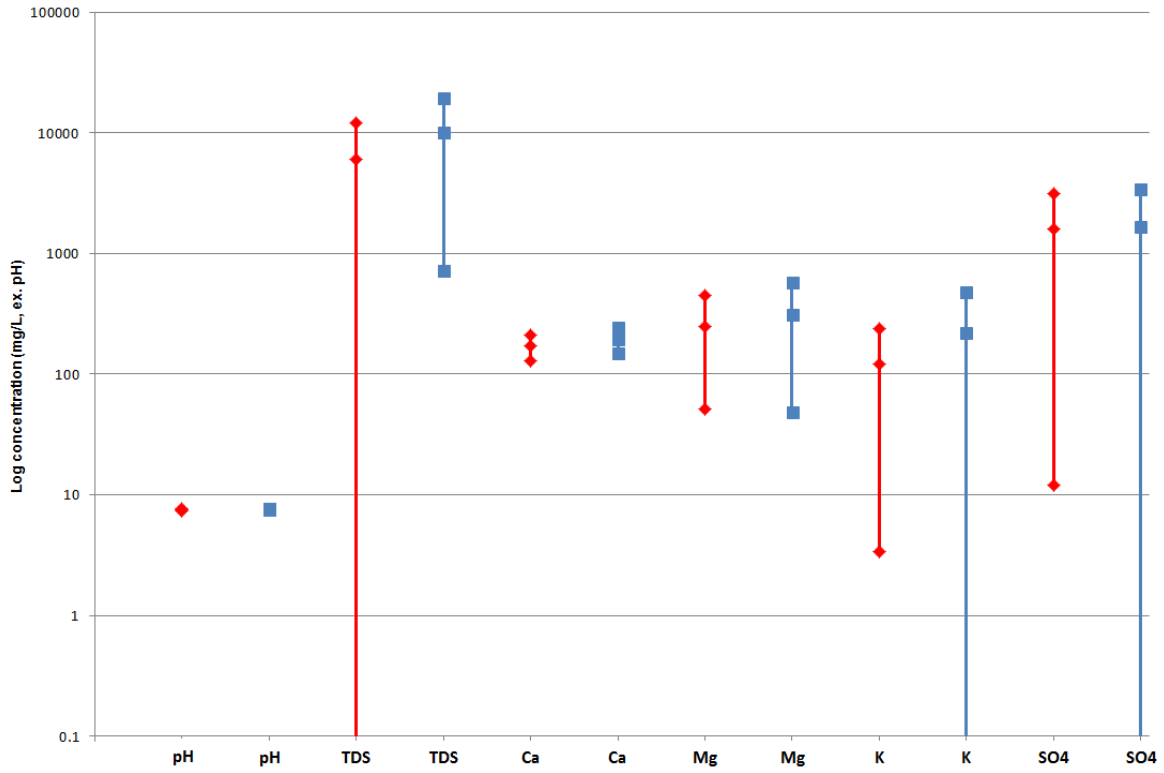

Figure 2-10 Major Groundwater Constituents (Mean and Standard Error)

Diamonds = Pre-mining means
Squares = Post-disturbance means

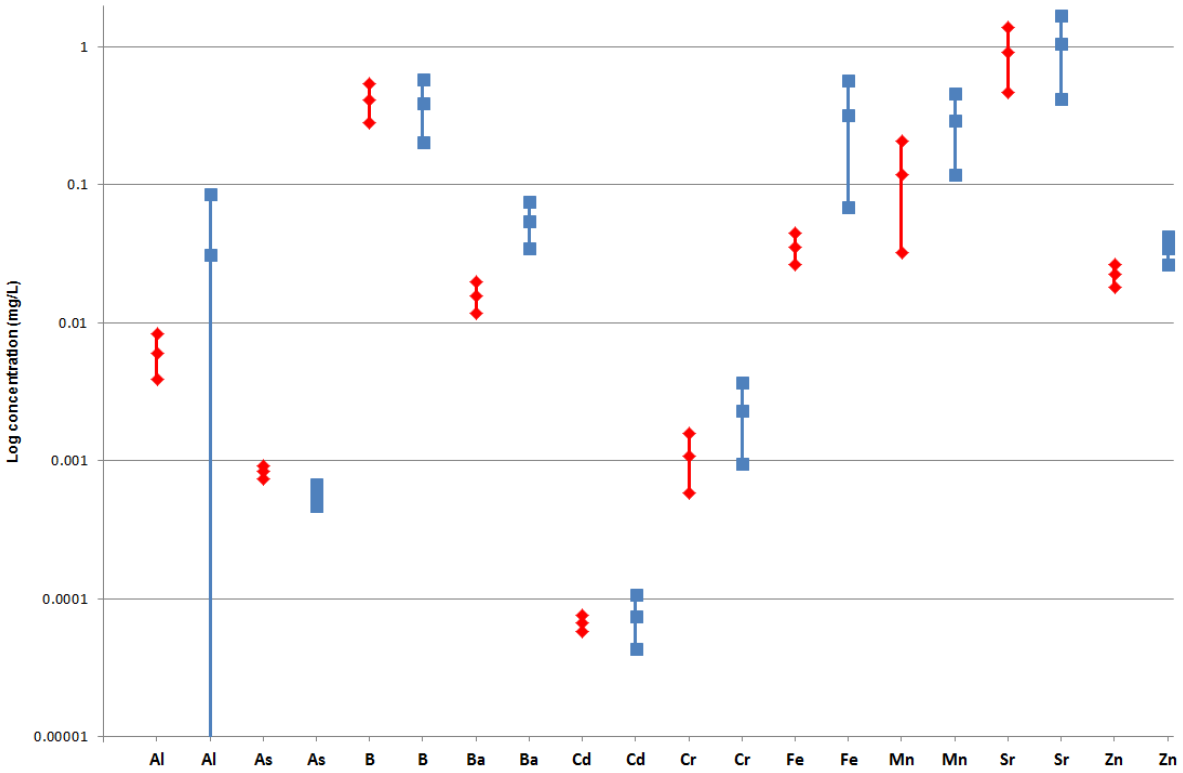

Figure 2-11 Minor Groundwater Constituents (Mean and Standard Error)

Diamonds = Pre-mining means
Squares = Post-disturbance means

Comparison of Leachate and Groundwater Concentrations

As discussed previously, the ALSP testing of the Christmas Creek waste rock samples identified the following predominant elements: Al, Cd, Fe, K, Mg Mn, Sr and Zn. A comparison of these mean leachate values with the mean regional groundwater values at Christmas (both pre and post disturbance) identified only the one element with a statistically significant mean; that being cadmium.

2.4 Conclusions

The general conclusions based on the analytical data for waste rock material at Christmas Creek are summarised below:

Mineralogy

- The waste rock samples were dominated by goethite and hematite with the exception of one sample that contains 86% kaolinite.
- No sulfidic minerals were identified.

Total Metal Analysis

The waste rock samples generally contained arsenic and antimony concentrations greater than the GAI 3 value. All other constituents were below the applicable GAI 3 value.

Leachate Water Quality

- The majority of metal concentrations found in the leached waste rock samples were below the ANZECC freshwater guidelines (95% protection).
- Notwithstanding the above, the ANZECC freshwater guideline fails to provide a meaningful guide when examining changes to a number of metals the groundwater in the Christmas creek region as their baseline values already exceed the defined trigger levels in the guide (eg Zinc and Chromium).
- Multiple samples from Vasse WRD exceeded the ANZECC freshwater guidelines for cadmium, chromium, lead and zinc by one to two orders of magnitude. Relatively high levels of aluminium were also measured in three samples, including one in situ background sample.
- Relatively high concentrations of arsenic and antimony which were observed in the total elemental analysis were not enriched in the effluents suggesting these metals are not readily soluble and are unlikely to pose an environmental issue.

Acid-Base Accounting

- Total sulfur content is low ranging from below reporting limit to 0.24 wt. %. Sulfide ranges from below reporting limit to 0.22 wt. %. On average, sulfide sulfur is greater for Vasse WRD (0.016 wt. %) than Eyre Pit samples (0.004 wt. %).
- Samples contain little potential to generate or consume acid.
- The potential to generate acid from the waste material is considered low.

Asbestos

No asbestos was found in any of the samples.

Comparison of Waste Material at Christmas Creek

Total metals for surficial samples between Eyre Pit and Vasse WRD are similar, however these results should not be extrapolated to the interior of the WRDs.

Comparison between Christmas Creek and Cloudbreak

- Lithologies between the two sites are fairly consistent, dominated by Fe-oxide minerals. Shale was identified in many of the Christmas Creek samples. Excluding detrital material from Cloudbreak, mineralogical comparisons were similar between the two sites.
- Generally, samples from both Cloudbreak and Christmas Creek are NAF with low sulfide and total sulfur values.
- T-tests performed using elemental concentrations show that many metals are not comparable between the two sites and metal concentrations should not universally used across the Chichester Hub.

Changes in Groundwater Chemistry at Christmas Creek

- Pre-disturbance groundwater chemistry indicates variable water type.

- Statistically significant changes in groundwater quality have occurred from the pre disturbance to the post disturbance period. Specifically there have been increases in Barium, Iron and Zinc. Whilst there was no statistically significant change in the mean aluminium result, some of the individual results were notable high in the post disturbance results.

Comparison of leachate with groundwater

- A comparison of mean leachate values with the mean regional groundwater values at Christmas (both pre and post disturbance) identified only the one element with a statistically significant mean; that being cadmium.

3.0 GEOTECHNICAL CHARACTERISATION

TetraTech completed a program of lithotype sample collection within and on the Eyre Pit and Vasse WRD respectively. This section describes methods and results. Some preliminary camparison of the geotechnical properties lithotypes found at Christmas Creek and Cloudbreak was attempted, however this was not persued given the limited data available. Consequently this report provides no commentary as to whether or not the the Christmas Creek and Cloudbreak sites are similar or otherwise in terms of the geotechnical characteristics of the various lithotypes present.

3.1 Sampling

Geotechnical sample collection at the Vasse WRD facility was conducted between 12 and 14 June 2012. Sampling pits were excavated by means of a CAT backhoe. Samples for geotechnical analysis were collected from 12 pits. The locations of each sample pit site was determined in consultation with Fortescue. These locations are presented in Figure 3-1 and are listed in Table 3-1 below. Four samples were taken from each pit. The first sample was taken from the material excavated from a depth of 0.0 to 1 m, the second from the material excavated from a depth of between 1 to 2 m and the third from a depth of between 2 to 3 m. A forth composite sample was also produced for the entire profile of each pit. Thus a total of 48 geotechnical samples were collected from the Vasse WRD facility.

The quantities and field description of the excavated mateterials are listed in Table 3-2. Sampling logs and laboratory data are provided in Appendix C.

All samples were sent to Tri-Lab for geotechnical testing.

Note: No geotechnical samples were taken for the Eyre pit.

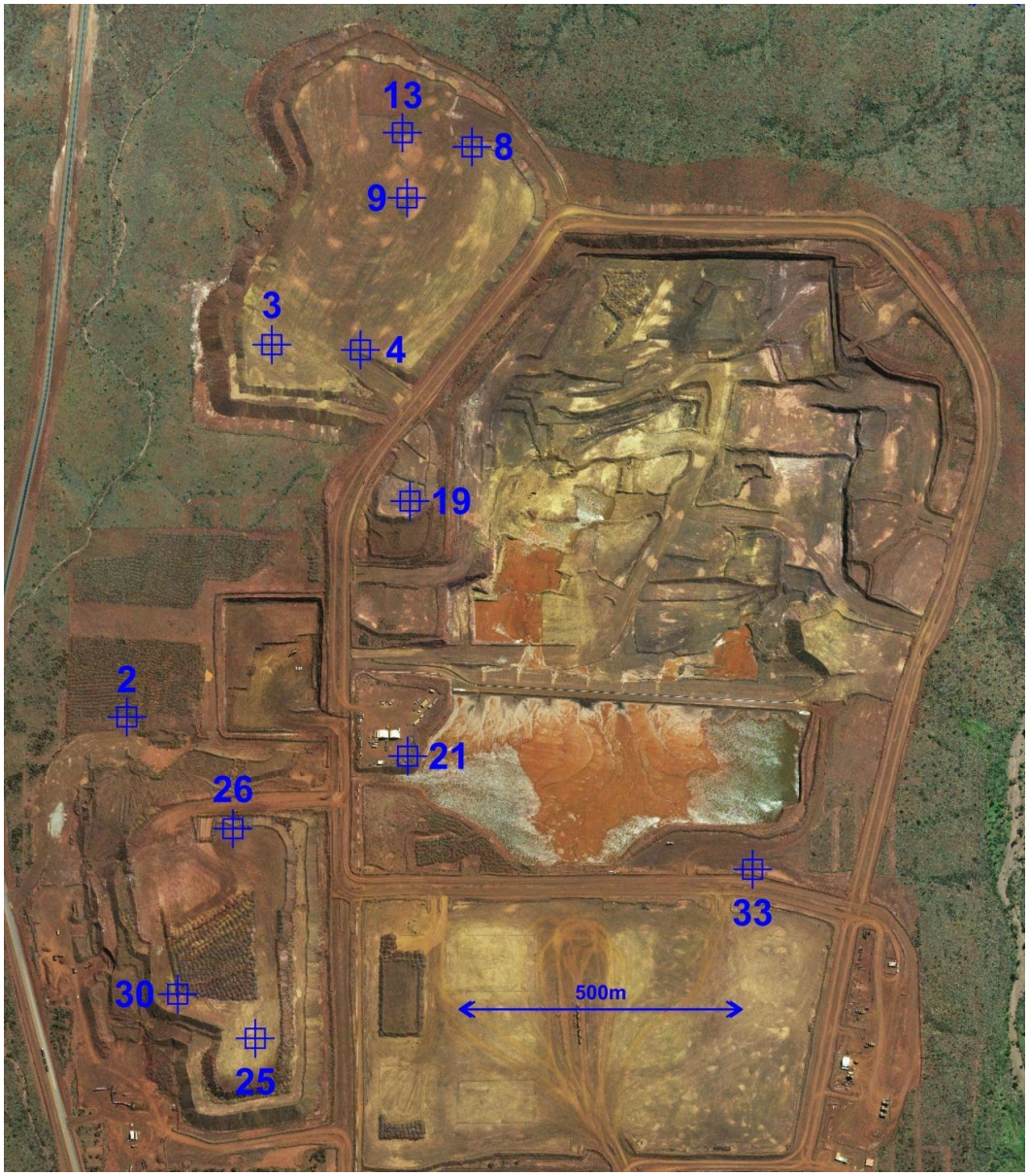

Figure 3-1 Geotechnical Sampling Locations at Vasse WRD

Table 3-1 Geotechnical Sample Distributions

Test Pit No.	Easting (m)	Northing (m)	Depth (m)
TP 2	780094	7525515	3.0
TP 3	780351	7526175	3.0
TP 4	780508	7526166	3.0
TP 8	780706	7526526	3.0
TP 9	780591	7526435	3.0
TP 13	780583	7526551	3.0
TP 19	780596	7525898	3.0
TP 21	780592	7525446	3.0
TP 25	780322	7524945	3.0
TP 26	780282	7525317	3.0
TP 30	780184	7525024	3.0
TP 33	781204	7525245	2.0

Note: Easting & northing measured with Garmin handheld GPS unit accuracy + 3m

Table 3-2 Geotechnical Sample Quantities

Test Pit No	Sample Depth (m)	Quantity	Size (kg)	Sample Location	Field Description
2	0-3	2	15	Natural Ground	Reddish Brown gravelly sand with some silt
	1	1	0.5	Natural ground	Reddish Brown gravelly sand with some silt
	2	1	0.5	Natural Ground	Reddish Brown gravelly sand with some silt
	3	1	0.5	Natural Ground	Reddish Brown gravelly sand with some silt
3	0-3	2	15	WRD	Reddish Brown gravelly Silt
	1	1	0.5	WRD	Reddish Brown gravelly Silt
	2	1	0.5	WRD	Reddish Brown gravelly Silt
	3	1	0.5	WRD	Reddish Brown gravelly Silt
4	0-3	2	15	WRD	Reddish Brown silty SAND
	1	1	0.5	WRD	Reddish Brown silty SAND
	2	1	0.5	WRD	Reddish Brown silty SAND
	3	1	0.5	WRD	Reddish Brown silty SAND
8	0-3	2	15	WRD	Reddish Brown Sandy GRAVEL
	1	1	0.5	WRD	Reddish Brown Sandy GRAVEL
	2	1	0.5	WRD	Reddish Brown Sandy GRAVEL
	3	1	0.5	WRD	Reddish Brown Sandy GRAVEL
9	0-3	2	15	WRD	Reddish Brown silty SAND
	1	1	0.5	WRD	Reddish Brown silty SAND
	2	1	0.5	WRD	Reddish Brown silty SAND
	3	1	0.5	WRD	Reddish Brown silty SAND
13	0-3	2	15	WRD	Reddish Brown Sandy GRAVEL
	1	1	0.5	WRD	Reddish Brown Sandy GRAVEL
	2	1	0.5	WRD	Reddish Brown Sandy GRAVEL
	3	1	0.5	WRD	Reddish Brown Sandy GRAVEL
19	0-3	2	15	WRD	Reddish Brown silty SAND
	1	1	0.5	WRD	Reddish Brown silty SAND
	2	1	0.5	WRD	Reddish Brown silty SAND
	3	1	0.5	WRD	Reddish Brown silty SAND
21	0-3	2	15	Fill	Reddish Brown SAND
	1	1	0.5	Fill	Reddish Brown SAND
	2	1	0.5	Fill	Reddish Brown SAND
	3	1	0.5	Fill	Reddish Brown SAND
25	0-3	2	15	WRD	Reddish Brown gravelly SILT
	1	1	0.5	WRD	Reddish Brown gravelly SILT
	2	1	0.5	WRD	Reddish Brown gravelly SILT
	3	1	0.5	WRD	Reddish Brown gravelly SILT
26	0-3	2	15	WRD	Reddish Brown Sandy GRAVEL
	1	1	0.5	WRD	Reddish Brown Sandy GRAVEL
	2	1	0.5	WRD	Reddish Brown Sandy GRAVEL
	3	1	0.5	WRD	Reddish Brown Sandy GRAVEL
30	0-3	2	15	WRD	Reddish Brown Sandy GRAVEL
	1	1	0.5	WRD	Reddish Brown Sandy GRAVEL

Test Pit No	Sample Depth (m)	Quantity	Size (kg)	Sample Location	Field Description
	2	1	0.5	WRD	Reddish Brown Sandy GRAVEL
	3	1	0.5	WRD	Reddish Brown Sandy GRAVEL
33	0-3	2	15	Natural Ground	Reddish Brown Sandy GRAVEL
	1	1	0.5	Natural Ground	Reddish Brown Sandy GRAVEL
	2	1	0.5	Natural Ground	Reddish Brown Sandy GRAVEL
	3	1	0.5	Natural Ground	Reddish Brown Sandy GRAVEL

3.2 Geotechnical Analysis

A laboratory testing programme was completed to characterise the strength, permeability, settlement potential, liquefaction potential, shrink and swell potential, dispersion potential and susceptibility to weathering of each sample.

Shear strength (triaxial & direct shear), consolidation and permeability testing were carried out on remoulded samples in the laboratory. This was done to replicate field conditions.

The laboratory test results are enclosed in Appendix B and are summarised in Table 3-3.

Table 3-3 Geotechnical Laboratory Testing

Laboratory Test	Test Pit No.	Number of tests performed
Moisture Content	2, 3, 4, 8, 9, 13, 19, 21, 26, 30, 33	32
Particle size distribution	2, 8, 19, 33	4
Atterberg Limits	2, 4, 13, 21, 26, 33	6
Emerson Crumb Dispersion	2, 9, 21, 33	4
Falling head Permeability	2, 8, 26, 30	4
Direct Shear	3, 9, 21, 30	4
Consolidation Oedometer	2, 4, 9, 19	4
Triaxial shear	2, 33	2
Slake Durability	2	1
Moisture/Density Relationship	2, 4, 8, 9, 13, 19, 21, 26, 33	9

Summary of Laboratory Test Results

All laboratory test results are summarised in Tables 3-4 to 3-10.

Table 3-4 Summary of Atterberg Limits and Moisture Content Results

Sample ID	Depth (m)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Linear Shrinkage (%)	Moisture Content (%)	Classification
2	0-3	22	13	9	3	3.3	Silty Sandy GRAVEL
4	0-3	30	25	5	2.0	9.9	No PSD
8	NT	NT	NT	NT	NT	NT	Sandy Silty GRAVEL with traces of Cobbles
13	0-3	31	24	7	1.5	11.1	No PSD
19	NT	NT	NT	NT	NT	NT	Cobbly GRAVEL with traces of sand & silt
21	0-3	NP	NP	NP	1.0	8.4	No PSD
26	0-3	31	21	10	4.5	10.2	No PSD
33	0-3	27	15	12	5.5	6.2	Silty Sandy GRAVEL

Note: NT = not tested – non plastic

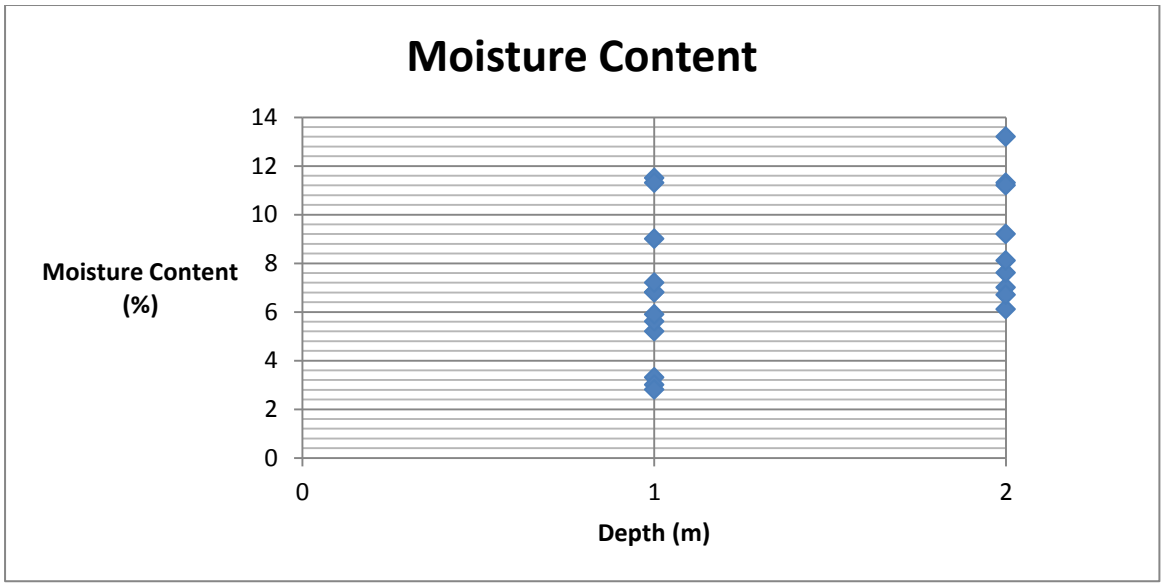

Figure 3-2 Moisture Content Variation with Depth

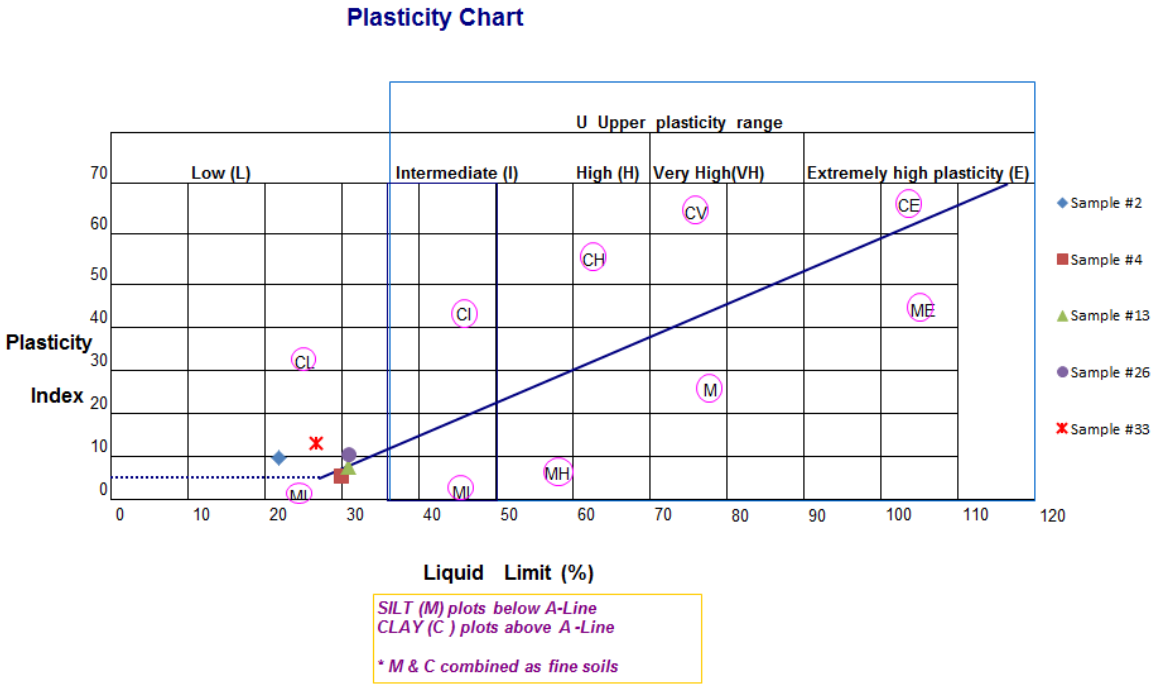

Figure 3-3 Plasticity Chart for Fines

The following general conclusions are presented based on the test results shown in Table 3-4.

- Moisture content generally increases with depth
- Finer fractions of the WRD materials tested are classified as silts or clays of low plasticity with a low medium moisture content
- All materials tested for particle size distribution with a maximum particle size range of 150 mm to a minimum size of 0.035 mm are classified as Sandy Silty GRAVEL with varying amounts of cobbles.

Shear Strength

The shear strength parameters are given in Table 3-5 to Table 3-7.

Table 3-5 Summary of Direct Shear Test Results

Sample ID	Depth(m)	Soil type	Peak		Residual	
			Cohesion (kPa)	Friction angle (°)	Cohesion (kPa)	Friction angle(°)
3	0.00-3.00	Gravelly SILT	0.0	40.0	0.0	39.0
9	0.00-3.00	Silty SAND	0.0	40.5	0.0	39.0
21	0.00-3.00	SAND	37.1	28.4	32.3	28.3
30	0.00-3.00	Silty/sandy GRAVEL	12.0	28.7	12.7	28.2

Since several of the direct shear tests results indicate a cohesion value higher than expected, a stress graph of shear stress versus normal stress from the test results was plotted to determine the shear strength parameters of cohesion (C) and friction angle phi

(Ø). The results are shown in Figures 3-4 and 3-5 for residual and peak shear strengths respectively.

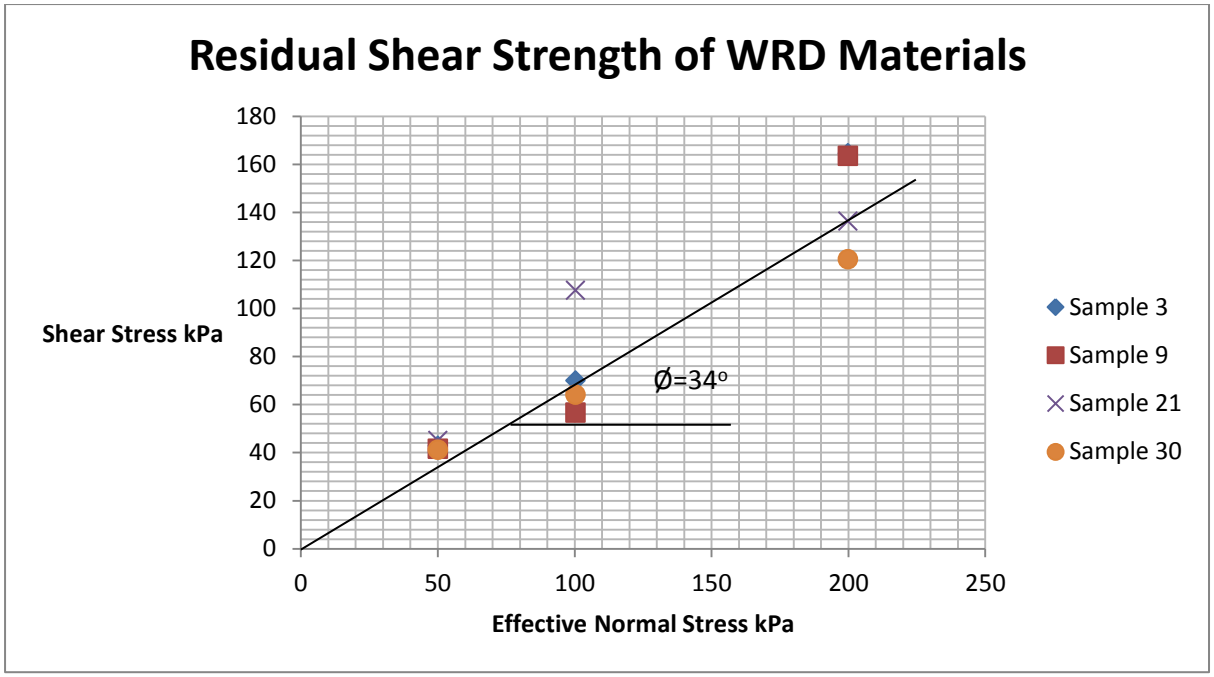

Figure 3-4 Stress Plot for Residual Shear Strength Determination

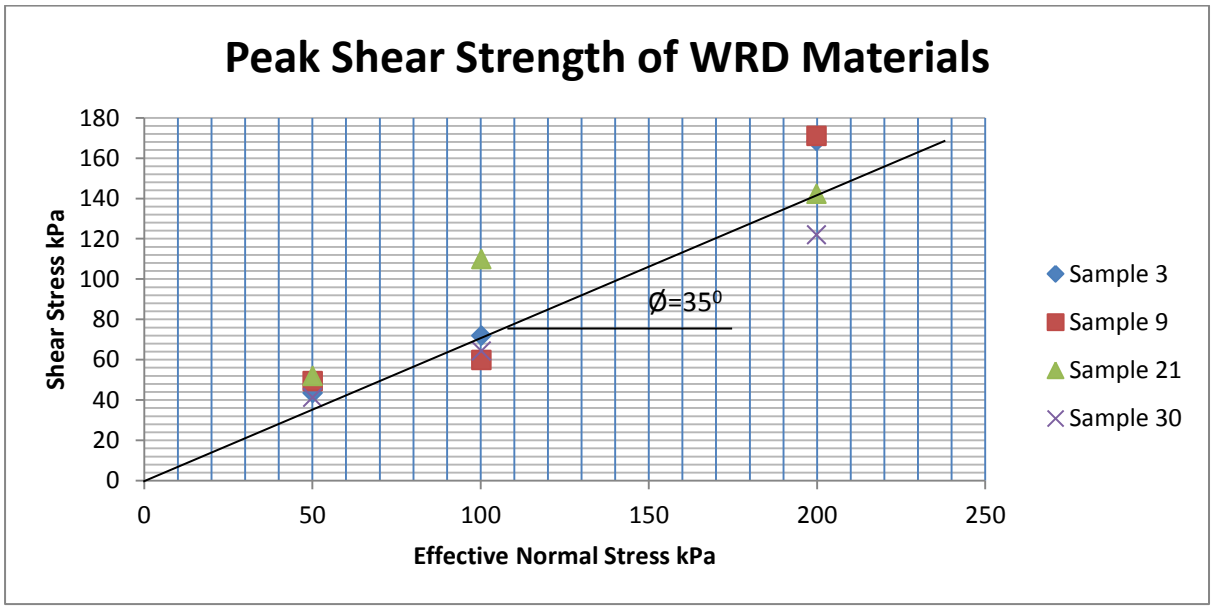

Figure 3-5 Stress Plot for Peak Shear Strength Determination

The line, through the origin, represents a sandy material with low or no cohesion. The line is based on a best fit and was determined to obtain the effective friction angle for a material with very low or no cohesion. Based on these results a set of design strength values have been adopted (Table 3-6).

Table 3-6 Design strength values

Peak		Residual	
Cohesion (C')	Friction (Ø')	Cohesion (C')	Friction(Ø')
0	35	0	34

The results of the triaxial tests are presented in Table 3-7.

Table 3-7 Triaxial test results

BH ID	Depth(m)	Soil Type	Effective Cohesion (kPa)	Effective Friction angle (°)
2	0.00-3.00	Silty Sandy GRAVEL	14.0	37.6
33	0.00-3.00	Silty Sandy GRAVEL	15.4	39.9

Permeability Characteristics

The permeability test results are summarised in Table 3-8. Falling head permeability testing was carried out on selected samples because of the high percentage of fines (clays and silts) within the otherwise gravelly material.

Table 3-8 Summary of falling head permeability test results

Sample ID	Sample Type	Depth (m)	Soil Type	Permeability (m/sec)
2	Disturbed	0.00-3.00	Silty Sandy GRAVEL	1.1 E-09
8	Disturbed	0.00-3.00	Sandy Silty GRAVEL with traces of Cobbles	2.3 E-07
26	Disturbed	0.00-3.00	Silty/sandy GRAVEL	8.4 E-07
30	Disturbed	0.00-3.00	Silty/sandy GRAVEL	4.6 E-07

Dispersion Potential and Slake Durability

The results of the dispersion test and slake durability are summarised in Table 3-9.

Table 3-9 Emerson Class Number & Slake Durability Index

BH ID	Depth (m)	Soil Type	Emerson Class Number	Slake Durability (1st Cycle) (%)	Slake Durability (2nd Cycle) (%)
2	0.00-3.00	Sandy SILT	5	38.0	36.1
9	0.00-3.00	Silty SAND	5	Not Tested	
21	0.00-3.00	SAND	6	Not Tested	
33	0.00-3.00	Silty/sandy GRAVEL	5	Not Tested	

Two conclusions are given on the basis of the slake durability and Emerson Class tests:

- The WRD materials are classified as having low durability. This implies that the material could undergo disintegration under the process of weathering
- High Emerson class numbers imply the WRD materials are less susceptible to dispersion, i.e. the finer material composition within the WRD are non- dispersive.

Compaction Characteristics

All the compaction test results for the WRD materials are presented in Table 3-10.

Table 3-10 Moisture Content & Maximum Dry Density

BH ID	Depth(m)	Moisture Content %	Maximum Dry Density (t/m³)	Optimum Moisture Content (%)
2	1.0	3.3	2.53	9.5
2	2.0	2.8		
2	3.0	3.1		
3	1.0	11.5	Not Tested	Not Tested
3	2.0	11.3		
3	3.0	7.7		
4	1.0	3.0	2.27	15.0
4	2.0	7.0		
4	3.0	8.9		
8	1.0	6.8	2.59	11.5
8	2.0	6.1		
8	3.0	5.6		
9	1.0	5.2	2.67	9.5
9	2.0	7.6		
9	3.0	5.8		
13	1.0	9.0	2.31	13.5
13	2.0	11.2		
13	3.0	12.3		
19	1.0	5.6	2.37	12.01
19	2.0	9.2		
19	3.0	8.2		
21	1.0	5.9	2.48	12.0
21	2.0	8.1		
21	3.0	7.9		
26	1.0	6.8	2.51	10.0
26	2.0	6.7		
26	3.0	7.1		
30	1.0	11.3	Not Tested	Not Tested
30	2.0	13.2		
30	3.0	11.8		
33	1.0	7.2	2.56	9.5
33	2.0	6.8		

Consolidation Characteristics

The test results from the Oedometer consolidation tests are summarised in Tables 3-11 to 3-14.

Table 3-11 Oedometer Testing Sample #2 (0.00-3.00m depth)

Stage	Cc	Cv (m^2/year)		Mv (kPa^{-1} x10^{-3})
		t_{50}	t_{90}	
1	0.001	1.34	45.00	0.012
2	0.013	5.30	51.66	0.052
3	0.018	32.57	53.15	0.036
4	0.025	53.00	45.72	0.025
5	0.057	44.04	73.41	0.030
6	0.120	56.55	71.92	0.032
7	0.011	4.25	68.05	0.004
8	0.009	15.91	48.52	0.012

Table 3-12 Oedometer Testing Sample #4 (0.00-3.00m depth)

Stage	Cc	Cv (m^2/year)		Mv (kPa^{-1} x10^{-3})
		t_{50}	t_{90}	
1	0.000	0.81	64.38	0.004
2	0.002	0.62	109.51	0.022
3	0.015	1.00	61.67	0.068
4	0.025	0.58	39.47	0.060
5	0.089	11.46	28.79	0.105
6	0.149	60.72	33.52	0.090
7	0.154	73.32	40.61	0.049
8	0.008	18.78	63.26	0.004
9	0.007	10.49	66.09	0.012

Table 3-13 Oedometer Testing Sample #9 (0.00-3.00m depth)

Stage	Cc	Cv (m²/yr)		Mv (kPa^{-1} x10^{-3})
		t_{50}	t_{90}	
1	0.000	0.47	25.92	0.004
2	0.004	0.40	27.96	0.005
3	0.014	0.34	59.10	0.053
4	0.016	0.96	32.92	0.030
5	0.022	1.10	62.65	0.021
6	0.040	1.46	29.83	0.019
7	0.147	17.74	39.11	0.035
8	0.009	29.82	41.38	0.003
9	0.008	22.51	29.68	0.010

Table 3-14 Oedometer Testing Sample #19 (0.00-3.00m depth)

Stage	Cc	Cv (m²/yr)		Mv (kPa^{-1} x10^{-3})
		t_{50}	t_{90}	
1	0.002	0.22	75.26	0.025
2	0.002	1.45	36.64	0.018
3	0.006	0.86	28.09	0.023
4	0.012	0.57	65.11	0.023
5	0.013	0.73	51.16	0.013
6	0.019	0.45	23.43	0.010
7	0.003	0.43	56.49	0.008
8	0.009	28.95	70.60	0.003
9	0.007	13.03	72.97	0.009

3.3 Conclusions

Based on the results of the laboratory and field work, the following conclusions are presented.

- Moisture content generally increases with depth
- Waste material has a permeability value of 2.0 E-07 m/sec at a density of 2.6 t/m3
- All materials tested for particle size distribution with a maximum particle size range of 150mm to a minimum size of 0.035mm are classified as Sandy Silty GRAVEL with varying amounts of cobbles
- The WRD materials are classified as having low durability. This implies that the material could undergo disintegration during the process of weathering
- The finer material composition within the WRD is non- dispersive

TetraTech recommends that the geotechnical results presented herein should be integrated with the results derived from the concurrent testing completed by third parties as

commissioned by Fortescue. Further, TetraTech recommends that future testing programs should extend to other waste dumps and potentially some in-pit sampling of waste, and that this testing be used to validate the results gathered to date.

4.0 REFERENCES

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APPENDIX A

Supplementary Geochemistry Data

Parameter	Ag	As	Ba	Be	Bi	Cd	Co	Cu	Mn	Mo	Ni
Detection Limit	0.1	1	2	0.1	0.1	0.1	0.1	2	0.5	0.1	2
Crustal Abundance	0.08	1	250			0.098		75	1400	1	105
GAI-3	0.96	12	3000			1.176		900	16800	12	1260
Eyre Pit #1	0.1	40	71	1	0.3	*0.1*	8.7	29	1000	1.5	37
Eyre Pit #2	0.1	16	60	1.3	0.7	*0.1*	0.8	5	64.1	3.1	12
Eyre Pit #3	0.1	33	30	0.4	0.1	*0.1*	6.4	12	3160	0.8	22
Eyre Pit #4	0.2	10	54	0.5	0.8	*0.1*	5.6	61	284	1	179
Eyre Pit #5	0.1	41	9	0.5	0.2	*0.1*	3.9	8	1650	0.7	15
Eyre Pit #6	0.3	82	36	0.5	0.2	*0.1*	1.4	4	1160	1.3	8
Eyre Pit #7	0.1	187	6	0.8	0.5	*0.1*	1.8	10	646	1.7	19
Eyre Pit #8	*0.1*	86	9	0.2	2	*0.1*	5.1	9	347	1.8	103
Eyre Pit #9	*0.1*	160	65	0.7	0.7	*0.1*	9.7	24	487	2.2	211
Eyre Pit #10	*0.1*	229	152	0.5	0.7	*0.1*	8	59	4310	1.6	51
Vasse WRD, #1 Bulk 0.3	*0.1*	40	43	0.8	0.6	*0.1*	32.3	18	12400	0.8	55
Vasse WRD, #2 Bulk 0.0-	0.1	48	139	0.6	0.5	*0.1*	10.5	39	1020	2.5	38
Vasse WRD, #2 Bulk 1.5-	0.1	57	155	0.6	0.5	*0.1*	10.8	36	1280	2.5	36
Vasse WRD, #3 Bulk 0.0-	*0.1*	21	76	0.5	0.2	0.1	12.3	35	3240	1	28
Vasse WRD, #3 Bulk 1.5-	*0.1*	24	107	0.5	0.3	*0.1*	12.5	26	3040	1	30
Vasse WRD, #4 Bulk 0.0-	*0.1*	14	47	0.4	0.1	*0.1*	6	14	1190	0.5	14
Vasse WRD, #4 Bulk 1.5-	*0.1*	20	59	0.4	0.2	*0.1*	10.2	21	2620	0.8	21
Vasse WRD, #5 Bulk 0.0-	*0.1*	22	53	0.4	0.1	*0.1*	8.9	22	2680	0.7	22
Vasse WRD, #5 Bulk 1.5-	*0.1*	34	60	0.6	0.3	*0.1*	11.7	33	2840	0.8	27
Vasse WRD, #6 Bulk 0.0-	*0.1*	31	102	0.5	0.2	*0.1*	16.4	31	2580	0.8	20
Vasse WRD, #6 Bulk 1.5-	*0.1*	30	95	0.5	0.3	*0.1*	10	25	2210	1	31
Vasse WRD, #7 Bulk 0.0-	0.1	45	446	1	0.6	*0.1*	10.5	53	706	1.8	43
Vasse WRD, #7 Bulk 1.5-	*0.1*	52	300	0.5	0.5	*0.1*	5.9	39	498	1.7	21
Vasse WRD, #8 Bulk 0.0-	*0.1*	17	49	0.4	0.2	*0.1*	10.4	16	2770	0.8	60
Vasse WRD, #8 Bulk 1.5-	*0.1*	22	138	0.3	0.2	*0.1*	5.9	17	1730	0.8	13
Vasse WRD, #9 Bulk 1.5-	*0.1*	32	168	0.4	0.4	*0.1*	8.2	28	1270	1.4	15
Vasse WRD, #10 Bulk 0.0-	*0.1*	19	124	0.4	0.3	*0.1*	7.3	20	2210	0.7	21
Vasse WRD, #10 Bulk 1.5-	*0.1*	31	122	0.6	0.7	*0.1*	21.9	25	2880	0.9	28
Vasse WRD, #11 Bulk 0.3	*0.1*	34	130	0.4	0.5	*0.1*	9.8	30	1290	1.2	23
Vasse WRD, #12 Bulk 0.0-	*0.1*	17	280	0.5	0.2	*0.1*	7.9	26	1610	0.9	25
Vasse WRD, #12 Bulk 1.5-	*0.1*	11	102	0.4	0.1	*0.1*	7.7	17	1310	0.6	17
Vasse WRD, #13 Bulk 0.0-	*0.1*	31	157	0.7	0.4	*0.1*	12.8	30	2340	1	25
Vasse WRD, #13 Bulk 1.5-	*0.1*	43	74	0.6	0.4	*0.1*	26.8	38	1610	1	26
Vasse WRD, #14 Bulk 0.3	*0.1*	24	96	0.5	0.4	*0.1*	6.7	28	1990	1.2	20
Vasse WRD, #15 Bulk 0.0-	*0.1*	29	41	0.8	0.5	*0.1*	20.3	21	5630	0.8	26
Vasse WRD, #15 Bulk 1.5-	*0.1*	14	49	0.5	0.2	*0.1*	7.5	13	1760	0.8	14
Vasse WRD, #16 Bulk 0.0-	0.1	44	292	1	0.4	*0.1*	9.4	42	1110	2.4	42
Vasse WRD, #16 Bulk 1.5-	*0.1*	45	178	0.9	0.4	*0.1*	8.6	36	1100	2.5	34
Vasse WRD, #18 Bulk 0.0-	*0.1*	43	181	0.4	0.4	*0.1*	6.8	37	1090	1.1	14
Vasse WRD, #18 Bulk 1.5-	*0.1*	43	180	0.5	0.4	*0.1*	10.3	34	1390	1.1	17
Vasse WRD, #19 Bulk 0.0-	*0.1*	18	318	0.4	0.3	*0.1*	10.3	28	1070	0.7	29
Vasse WRD, #19 Bulk 1.5-	*0.1*	18	118	0.4	0.3	*0.1*	6.5	30	1210	0.7	29
Vasse WRD, #20 Bulk 0.0-	*0.1*	19	683	0.6	0.2	*0.1*	12.3	32	4840	0.7	12
Vasse WRD, #20 Bulk 1.5-	*0.1*	30	975	0.8	0.3	*0.1*	13.3	35	3110	1.4	33
Vasse WRD, #21 Bulk 0.0-	*0.1*	28	109	0.6	0.3	*0.1*	9.2	24	2810	1.1	25
Vasse WRD, #21 Bulk 1.5-	*0.1*	24	94	0.6	0.2	*0.1*	9	25	2210	2.5	20
Vasse WRD, #22 Bulk 0.0-	*0.1*	69	101	1.1	0.4	*0.1*	7.5	52	566	2.8	45
Vasse WRD, #25 Bulk 0.0-	*0.1*	32	282	1	0.4	0.1	21.3	54	5660	0.9	25
Vasse WRD, #25 Bulk 1.5-	*0.1*	30	141	0.8	0.4	*0.1*	17.4	46	4090	1.1	31
Vasse WRD, #26 Bulk 0.0-	*0.1*	57	291	0.9	0.5	*0.1*	11	27	3780	1.6	26
Vasse WRD, #26 Bulk 1.5-	*0.1*	45	157	0.6	0.3	*0.1*	5.2	20	2750	1	14
Vasse WRD, #27 Bulk 0.3	*0.1*	26	24	0.8	0.6	*0.1*	9.2	16	1140	1.5	30
Vasse WRD, #28 Bulk 0.0-	*0.1*	50	257	0.9	0.6	*0.1*	10.7	30	7010	1.2	26
Vasse WRD, #28 Bulk 1.5-	*0.1*	47	288	1	0.6	*0.1*	9.7	29	6920	1.2	25
Vasse WRD, #29 Bulk 0.0-	*0.1*	33	85	0.6	0.4	*0.1*	12.3	27	2700	0.7	22
Vasse WRD, #29 Bulk 1.5-	*0.1*	30	398	0.9	0.5	0.1	25	42	4980	1	37
Vasse WRD, #30 Bulk 0.0-	*0.1*	31	104	0.8	0.5	*0.1*	14.8	33	3030	1	33
Vasse WRD, #30 Bulk 1.5-	*0.1*	33	70	0.7	0.4	*0.1*	11.3	25	2700	0.9	22
Vasse WRD, #31 Bulk 0.0-	*0.1*	42	76	0.4	0.6	*0.1*	3	47	159	1.6	27
Vasse WRD, #31 Bulk 1.5-	*0.1*	37	114	0.6	0.7	*0.1*	4.5	44	246	1.6	30
Vasse WRD, #1 Bulk	*0.1*	49	29	0.7	0.6	0.1	43.2	19	13400	0.9	63
Vasse WRD, #11 Bulk	*0.1*	44	114	0.4	0.5	*0.1*	8.1	40	1390	1.5	26
Vasse WRD, #14 Bulk	0.1	23	68	0.3	0.2	*0.1*	6.1	18	1530	1	14
Vasse WRD, #27 Bulk	*0.1*	41	25	0.5	0.7	*0.1*	11.4	22	1160	2.3	37
Eyre Pit #10b Bulk	0.2	14	655	0.6	*0.1*	0.5	83.7	21	67300	0.6	19

Italics show values at or below the detection limit

Data in red indicates the result is above GAI-3

Parameter	Pb	Rb	Sb	Se	Sn	Te	Th	Tl	U	W	Zn	Li
Detection Limit	1	0.05	0.1	2	0.3	0.1	0.05	0.1	0.05	0.1	5	0.1
Crustal Abundance	8		0.2	0.05				0.36	0.91		80	
GAI-3	96		2.4	0.6				4.32	10.92		960	
Eyre Pit #1	21	4.17	3.3	*2*	1.1	0.1	4.41	*0.1*	1.71	1.8	54	1.6
Eyre Pit #2	12	16.2	1.8	*2*	2.5	0.3	11.9	0.1	2.83	2.5	11	17
Eyre Pit #3	9	1.26	1.4	*2*	0.6	*0.1*	2.15	*0.1*	1.74	0.8	24	1.3
Eyre Pit #4	39	14.3	1	*2*	2.1	*0.1*	7.72	1.1	3.09	2.1	84	19
Eyre Pit #5	24	0.54	1.7	*2*	0.6	*0.1*	2.76	*0.1*	1.02	1.2	19	0.4
Eyre Pit #6	17	0.84	1.3	*2*	0.6	*0.1*	2.29	*0.1*	0.51	1.5	13	0.7
Eyre Pit #7	31	0.32	3.4	*2*	2.3	*0.1*	8.56	*0.1*	2.23	3.2	9	7.4
Eyre Pit #8	68	0.36	2.1	*2*	7.4	0.4	41.5	*0.1*	9.37	10.4	28	14
Eyre Pit #9	42	4.35	3.9	*2*	3.3	0.6	17.3	*0.1*	3.91	4.9	59	10
Eyre Pit #10	59	29.2	5.2	7	4	0.4	14.9	0.5	4.74	3.8	31	6.2
Vasse WRD, #1 Bulk 0.3	30	0.55	4.3	*2*	2.8	0.2	9.1	0.2	4.08	1.9	74	6.4
Vasse WRD, #2 Bulk 0.0-	29	30	4	2	3	0.3	14.8	0.3	2.53	1.8	59	6.5
Vasse WRD, #2 Bulk 1.5-	30	30.6	4.6	2	2.9	0.3	15.4	0.3	2.38	1.9	54	7.0
Vasse WRD, #3 Bulk 0.0-	20	1.77	2.6	*2*	1.1	*0.1*	4.25	*0.1*	3.34	2.7	75	1.8
Vasse WRD, #3 Bulk 1.5-	17	1.97	2.8	*2*	1.2	*0.1*	5.27	*0.1*	1.99	1.6	56	2.4
Vasse WRD, #4 Bulk 0.0-	13	0.86	1.4	*2*	0.5	*0.1*	1.88	*0.1*	1.27	1.1	28	1.4
Vasse WRD, #4 Bulk 1.5-	15	1.12	2	*2*	0.7	*0.1*	3.26	*0.1*	1.71	1.4	38	1.9
Vasse WRD, #5 Bulk 0.0-	11	0.64	1.8	*2*	0.6	*0.1*	2.57	*0.1*	1.65	1.2	52	1.0
Vasse WRD, #5 Bulk 1.5-	17	2.25	3.1	*2*	1.1	*0.1*	4.72	*0.1*	2.37	1.8	55	5.0
Vasse WRD, #6 Bulk 0.0-	17	1.01	1.9	*2*	0.9	*0.1*	4.18	0.3	2.15	1.1	52	2.8
Vasse WRD, #6 Bulk 1.5-	22	0.86	2.4	*2*	1.2	0.1	6.19	*0.1*	1.96	1.6	47	3.0
Vasse WRD, #7 Bulk 0.0-	31	10.1	4.2	3	2.7	0.3	17.2	0.1	2.92	2	51	20
Vasse WRD, #7 Bulk 1.5-	26	5.49	3.8	2	2.5	0.3	11.8	*0.1*	2.08	1.7	49	8.6
Vasse WRD, #8 Bulk 0.0-	19	1.24	1.6	*2*	0.9	*0.1*	3.75	*0.1*	1.44	8.2	28	2.7
Vasse WRD, #8 Bulk 1.5-	21	1.25	2.2	*2*	0.8	*0.1*	4.55	*0.1*	1.54	2.3	24	2.1
Vasse WRD, #9 Bulk 1.5-	24	2.82	3.5	*2*	1.6	0.2	9.95	*0.1*	2.04	1.7	33	5.7
Vasse WRD, #10 Bulk 0.0-	27	0.82	2.1	*2*	1.2	0.1	7.08	*0.1*	1.97	1.6	36	2.1
Vasse WRD, #10 Bulk 1.5-	37	0.66	2.9	*2*	3	0.3	16.5	*0.1*	2.89	1.7	76	3.4
Vasse WRD, #11 Bulk 0.3	26	1.11	3.2	*2*	1.7	0.3	11.4	*0.1*	1.82	1.5	43	4.9
Vasse WRD, #12 Bulk 0.0-	18	2.99	2.4	*2*	0.9	*0.1*	4.96	*0.1*	2.03	2.1	43	3.9
Vasse WRD, #12 Bulk 1.5-	12	1.31	1.1	*2*	0.4	*0.1*	2.39	*0.1*	1.74	3.6	35	1.6
Vasse WRD, #13 Bulk 0.0-	28	2.31	2.5	*2*	1.7	0.2	10.2	*0.1*	2.68	1.5	60	5.3
Vasse WRD, #13 Bulk 1.5-	27	1.01	3.2	*2*	1.6	0.2	7.97	*0.1*	2.31	1.2	166	3.4
Vasse WRD, #14 Bulk 0.3	24	1.27	2.4	*2*	1.2	0.1	7.61	*0.1*	1.78	1.7	39	6.7
Vasse WRD, #15 Bulk 0.0-	42	0.6	2.9	*2*	1.6	0.1	9.13	*0.1*	3.07	1.5	61	1.4
Vasse WRD, #15 Bulk 1.5-	18	0.69	1.5	*2*	0.6	*0.1*	3.44	*0.1*	1.47	1	31	0.9
Vasse WRD, #16 Bulk 0.0-	29	8.62	4.2	2	2.3	0.2	11.9	0.2	2.73	2.2	36	14
Vasse WRD, #16 Bulk 1.5-	29	8.85	4	2	2.5	0.2	12.8	0.1	2.75	2.3	33	11
Vasse WRD, #18 Bulk 0.0-	25	2.22	2.5	2	1.5	0.3	8.06	*0.1*	1.6	1.2	63	7.1
Vasse WRD, #18 Bulk 1.5-	28	2.21	2.6	2	1.4	0.3	8.67	*0.1*	1.66	1.1	62	5.7
Vasse WRD, #19 Bulk 0.0-	18	3.28	1.7	*2*	1.2	0.1	6.99	0.1	1.57	1.4	31	6.6
Vasse WRD, #19 Bulk 1.5-	15	2.89	1.5	*2*	1.1	*0.1*	6.14	0.1	1.44	1.3	26	4.7
Vasse WRD, #20 Bulk 0.0-	23	3.2	1	3	0.6	0.1	5.07	0.5	1.7	0.5	108	1.8
Vasse WRD, #20 Bulk 1.5-	25	5.88	2.1	*2*	1	0.1	7.07	0.3	2.14	1.1	80	7.0
Vasse WRD, #21 Bulk 0.0-	20	1.18	1.9	*2*	0.8	0.1	5.01	*0.1*	2.71	1.7	64	2.4
Vasse WRD, #21 Bulk 1.5-	50	0.86	1.8	*2*	0.5	0.1	3.19	*0.1*	2.5	1.7	76	1.2
Vasse WRD, #22 Bulk 0.0-	28	11	4.2	2	2.2	0.3	11.7	0.2	3.27	1.6	156	16
Vasse WRD, #25 Bulk 0.0-	60	1.62	2.5	*2*	1.1	0.2	9.59	0.3	3.62	1.9	30	21
Vasse WRD, #25 Bulk 1.5-	25	2.28	2.6	*2*	1	0.2	8.14	0.2	3.32	1.7	34	17
Vasse WRD, #26 Bulk 0.0-	26	5.91	2.4	3	1.6	0.3	12.5	0.3	2.87	1.3	30	7.9
Vasse WRD, #26 Bulk 1.5-	19	3.93	1.6	*2*	1	0.2	9	0.1	1.96	1	23	4.4
Vasse WRD, #27 Bulk 0.3	15	1.17	3.6	*2*	1.3	0.2	9.25	*0.1*	2.4	1.5	30	24
Vasse WRD, #28 Bulk 0.0-	27	5.61	3.1	*2*	1.8	0.2	15.2	0.2	2.77	1.4	33	8.9
Vasse WRD, #28 Bulk 1.5-	29	4.75	3.1	*2*	2	0.2	15.1	0.2	2.3	1.5	29	13
Vasse WRD, #29 Bulk 0.0-	22	1.46	2.1	*2*	1.1	0.1	7.2	*0.1*	2.7	1.5	22	8.4
Vasse WRD, #29 Bulk 1.5-	21	0.74	2.6	*2*	1.5	0.2	11.2	*0.1*	4.17	2.2	22	28
Vasse WRD, #30 Bulk 0.0-	31	0.72	3.2	*2*	1.2	0.2	10.3	0.5	4.1	1.6	22	17
Vasse WRD, #30 Bulk 1.5-	23	1.48	2.1	*2*	1	0.2	7.1	0.1	2.78	1.6	22	7.7
Vasse WRD, #31 Bulk 0.0-	37	2.69	3.1	3	2.7	0.4	14	*0.1*	2.27	2.4	42	16
Vasse WRD, #31 Bulk 1.5-	39	3.58	3.3	2	2.5	0.4	13.5	*0.1*	2.07	2.3	57	18
Vasse WRD, #1 Bulk	34	0.31	6.7	*2*	2.7	0.3	8.03	*0.1*	3.76	1.8	89	2.7
Vasse WRD, #11 Bulk	26	1.25	4.7	2	2.4	0.4	11.1	*0.1*	1.83	2.1	50	4.4
Vasse WRD, #14 Bulk	17	0.56	2.5	*2*	0.9	0.1	3.69	*0.1*	1.3	1.2	42	1.3
Vasse WRD, #27 Bulk	17	0.57	6.1	*2*	1.6	0.3	9.45	*0.1*	2.46	2	36	12
Eyre Pit #10b Bulk	25	3.33	1.1	*2*	0.4	*0.1*	1.43	2	1.1	0.8	44	2.5

Italics show values at or below the detection limit

Data in red indicates the result is above GAI-3

Parameter	Ce	Cs	Ga	Hf	In	La	Nb	Sc	Ta	Al	Cr	Fe
Detection Limit	0.05	0.05	0.2	0.05	0.02	0.05	0.1	0.2	0.05	100	10	100
Crustal Abundance												7.06
GAI-3												84.72
Eyre Pit #1	22	0.15	7.9	1.31	0.05	7.65	4.5	11.5	0.53	31100	30	47
Eyre Pit #2	12.2	0.61	21.6	3.76	0.08	4.77	10.6	12.7	1.26	84700	110	59600
Eyre Pit #3	35.3	0.09	3.5	0.57	*0.02*	12.9	2.2	2.9	0.28	16000	*10*	513000
Eyre Pit #4	108	0.72	7.9	3.38	*0.02*	30.2	10.7	14.6	1.3	116000	*10*	24700
Eyre Pit #5	27	0.09	4	0.69	*0.02*	5.35	2.2	2.7	0.22	5040	30	549000
Eyre Pit #6	24.2	0.09	4.6	0.52	*0.02*	15.8	1.9	2	0.17	5340	20	402000
Eyre Pit #7	18.8	0.07	15.8	2.56	0.07	11.8	7.9	7.6	0.81	60300	90	416000
Eyre Pit #8	22.1	0.12	76.3	11	0.12	10.7	27.8	21.8	2.32	142000	150	134000
Eyre Pit #9	159	0.3	31.3	5.83	0.12	87.2	13.7	25.9	1.46	93900	190	268000
Eyre Pit #10	89.3	5.48	46	3.98	0.14	52.6	10.6	14.1	1.1	73800	260	300000
Vasse WRD, #1 Bulk 0.3	94	0.13	15.4	2.92	0.09	29.1	8.5	13.6	0.86	44900	20	487000
Vasse WRD, #2 Bulk 0.0-	40	2.03	19.8	3.95	0.16	17.7	9.8	15	0.86	49100	140	364000
Vasse WRD, #2 Bulk 1.5-	42.6	2.04	20.6	4	0.16	19.7	10.1	14.3	0.89	47900	150	373000
Vasse WRD, #3 Bulk 0.0-	43.7	0.19	6.5	1.24	0.04	9.67	3.8	7	0.37	21700	20	501000
Vasse WRD, #3 Bulk 1.5-	36.4	0.2	7.7	1.49	0.05	11	4.4	9.6	0.39	23100	20	509000
Vasse WRD, #4 Bulk 0.0-	14.8	0.1	2.9	0.5	*0.02*	5.28	1.7	4.3	0.15	10300	40	437000
Vasse WRD, #4 Bulk 1.5-	25	0.14	4.7	0.89	0.03	6.67	2.6	8.2	0.25	17900	40	500000
Vasse WRD, #5 Bulk 0.0-	16.2	0.09	4.1	0.7	0.02	6.39	2.3	5.7	0.22	13800	40	516000
Vasse WRD, #5 Bulk 1.5-	33.1	0.29	7.5	1.33	0.04	7.59	4	9.4	0.43	30200	*10*	477000
Vasse WRD, #6 Bulk 0.0-	47.8	0.11	6.2	1.15	0.04	7.32	3.2	10.2	0.3	23600	20	493000
Vasse WRD, #6 Bulk 1.5-	32.5	0.1	7.9	1.71	0.06	7.44	4.5	11	0.45	27600	10	499000
Vasse WRD, #7 Bulk 0.0-	59.1	0.69	20.4	4.74	0.17	15.9	9.4	20	0.92	64800	130	373000
Vasse WRD, #7 Bulk 1.5-	22.4	0.44	16.1	3.64	0.13	7.95	7.9	13.7	0.73	50200	110	425000
Vasse WRD, #8 Bulk 0.0-	23	0.1	6.1	1.11	0.03	8.26	3.3	7.2	0.3	17200	10	409000
Vasse WRD, #8 Bulk 1.5-	17.7	0.13	5.6	1.25	0.03	3.71	3.3	8.5	0.29	17000	90	478000
Vasse WRD, #9 Bulk 1.5-	50.4	0.24	11.1	2.73	0.08	6.83	6.4	15.2	0.59	37000	100	455000
Vasse WRD, #10 Bulk 0.0-	40.8	0.07	8.5	1.93	0.05	9.73	4.8	12.5	0.43	28300	50	493000
Vasse WRD, #10 Bulk 1.5-	47.1	0.07	21.5	5.31	0.15	15.9	13.1	19.7	1.12	45200	70	456000
Vasse WRD, #11 Bulk 0.3	34.6	0.09	13.1	3.26	0.08	7.17	7.1	15.2	0.7	45900	70	441000
Vasse WRD, #12 Bulk 0.0-	18.7	0.27	6.6	1.36	0.03	5.25	3.6	9.6	0.36	25200	*10*	458000
Vasse WRD, #12 Bulk 1.5-	13.6	0.12	3.3	0.65	*0.02*	4.78	2	5.1	0.19	14300	*10*	501000
Vasse WRD, #13 Bulk 0.0-	34.1	0.17	13.6	3.1	0.09	12.2	7.7	16.2	0.7	40900	60	454000
Vasse WRD, #13 Bulk 1.5-	32.7	0.08	11.2	2.56	0.08	10.5	6.2	15.2	0.55	30300	70	490000
Vasse WRD, #14 Bulk 0.3	28.7	0.1	9	2.15	0.06	5.45	4.8	11.1	0.47	27800	70	480000
Vasse WRD, #15 Bulk 0.0-	41.3	0.05	12.4	2.65	0.07	9.95	7.1	18.4	0.64	34600	50	482000
Vasse WRD, #15 Bulk 1.5-	19.8	0.07	4.6	0.99	0.03	6.04	2.5	7.6	0.23	13500	*10*	523000
Vasse WRD, #16 Bulk 0.0-	32.3	0.55	19	3.61	0.1	11.5	10.6	15.4	1.04	48500	130	430000
Vasse WRD, #16 Bulk 1.5-	27.4	0.53	19.3	3.89	0.11	9.44	11.7	14.7	1.14	43900	130	430000
Vasse WRD, #18 Bulk 0.0-	21.5	0.18	10.9	2.49	0.08	5.69	5.7	14.5	0.54	34100	90	432000
Vasse WRD, #18 Bulk 1.5-	28.6	0.17	10.3	2.5	0.08	8.14	5.2	15.8	0.5	35900	70	446000
Vasse WRD, #19 Bulk 0.0-	26.6	0.23	9.6	1.9	0.05	8.7	5.1	11	0.5	32400	40	460000
Vasse WRD, #19 Bulk 1.5-	20.4	0.2	8.5	1.66	0.05	6.89	4.5	9.9	0.48	27700	*10*	472000
Vasse WRD, #20 Bulk 0.0-	34.9	0.19	5.4	1.25	0.04	3.55	2.2	13.1	0.2	23000	20	453000
Vasse WRD, #20 Bulk 1.5-	40.9	0.35	7.8	1.84	0.05	10.3	4.2	14.7	0.4	38400	30	433000
Vasse WRD, #21 Bulk 0.0-	32.1	0.1	6.7	1.5	0.04	6.93	3.9	1.9	0.38	25700	30	484000
Vasse WRD, #21 Bulk 1.5-	22.3	0.07	4.7	0.85	0.02	4.64	2.4	1.8	0.25	16600	20	531000
Vasse WRD, #22 Bulk 0.0-	22.6	0.78	17.3	4.28	0.13	8.14	9.5	4.2	1.03	55200	120	421000
Vasse WRD, #25 Bulk 0.0-	246	0.14	11.3	2.91	0.05	13.8	5.2	2.5	0.58	46300	50	420000
Vasse WRD, #25 Bulk 1.5-	78.7	0.22	10.9	2.44	0.04	12.1	4.8	2.6	0.52	43000	80	451000
Vasse WRD, #26 Bulk 0.0-	43.8	0.4	14.3	4	0.08	8.12	7.3	2.4	0.79	45300	120	444000
Vasse WRD, #26 Bulk 1.5-	29.6	0.27	9	2.76	0.06	5.02	4.5	1.6	0.49	29500	120	482000
Vasse WRD, #27 Bulk 0.3	31.7	0.09	11.9	3.19	0.04	11.3	6.3	3.6	0.73	45600	30	234000
Vasse WRD, #28 Bulk 0.0-	43.4	0.39	16.9	4.76	0.1	7.04	8.3	3.1	0.9	52700	90	424000
Vasse WRD, #28 Bulk 1.5-	69.1	0.28	19.1	5.05	0.1	7.73	9.5	3.1	1.03	63200	80	353000
Vasse WRD, #29 Bulk 0.0-	58.5	0.11	10.3	2.24	0.05	10.1	4.8	2.1	0.52	34000	70	466000
Vasse WRD, #29 Bulk 1.5-	36.2	0.09	13.2	3.51	0.07	19.7	6.3	2.6	0.71	57300	70	424000
Vasse WRD, #30 Bulk 0.0-	28.4	0.08	11.4	3.11	0.06	15.1	5.1	3.2	0.58	45400	50	467000
Vasse WRD, #30 Bulk 1.5-	53.2	0.1	9.4	2.16	0.05	9.47	4.3	2.1	0.46	34900	*10*	493000
Vasse WRD, #31 Bulk 0.0-	33.4	0.23	20.8	5.06	0.15	12.2	10.7	3.1	1.14	74100	130	361000
Vasse WRD, #31 Bulk 1.5-	39.9	0.28	20.2	5.12	0.13	13.6	10.1	3.3	1.08	68300	130	343000
Vasse WRD, #1 Bulk	73.8	0.11	16	3.33	0.09	33.1	7.4	12.5	1.01	49700	70	534000
Vasse WRD, #11 Bulk	34.1	0.16	16.3	4.1	0.13	10	7.5	17.5	0.93	43700	110	494000
Vasse WRD, #14 Bulk	22.5	0.14	5	1.45	0.05	4.5	2.6	7	0.35	21500	90	584000
Vasse WRD, #27 Bulk	30	0.12	13.9	3.6	0.06	13.3	7.2	17.3	0.86	54800	70	318000
Eyre Pit #10b Bulk	145	0.18	5.1	0.5	0.02	15.4	1.3	5.4	0.2	20200	60	462000

Italics show values at or below the detection limit

Data in red indicates the result is above GAI-3

Parameter	Fe	Sr	Ti	V	Zr	Ca	K	Mg	Mg	Na	P	S
Detection Limit	100	1	10	1	1	50	100	20	20	50	20	20
Crustal Abundance	7.06	260	5300	230				3.2	3.2			
GAI-3	84.72	3120	63600	2760				38.4	38.4			
Eyre Pit #1	47.0	2	1570	69	42	300	590	290	0.03	160	630	330
Eyre Pit #2	6.0	1	4380	73	118	180	2730	620	0.06	230	30	80
Eyre Pit #3	51.3	5	680	18	19	210	190	640	0.06	80	980	310
Eyre Pit #4	2.5	13	4330	14	110	160	2570	440	0.04	250	90	110
Eyre Pit #5	54.9	*1*	510	19	25	110	0	210	0.02	70	800	190
Eyre Pit #6	40.2	*1*	650	22	21	90	120	190	0.02	0	450	100
Eyre Pit #7	41.6	*1*	2820	67	88	330	0	210	0.02	400	320	350
Eyre Pit #8	13.4	*1*	12700	32	391	460	0	270	0.03	350	130	200
Eyre Pit #9	26.8	27	5570	163	164	230	1130	640	0.06	400	830	440
Eyre Pit #10	30.0	41	4010	111	131	1050	7180	2490	0.25	570	220	670
Vasse WRD, #1 Bulk 0.3	48.7	4	2730	69	100	240	110	630	0.06	60	220	380
Vasse WRD, #2 Bulk 0.0-	36.4	15	3730	184	164	990	4070	810	0.08	480	590	280
Vasse WRD, #2 Bulk 1.5-	37.3	17	3720	202	141	740	4080	790	0.08	520	560	270
Vasse WRD, #3 Bulk 0.0-	50.1	5	1430	40	44	840	310	1040	0.10	420	490	410
Vasse WRD, #3 Bulk 1.5-	50.9	4	1470	50	56	520	340	790	0.08	290	520	450
Vasse WRD, #4 Bulk 0.0-	43.7	1	540	20	19	470	140	460	0.05	260	450	300
Vasse WRD, #4 Bulk 1.5-	50.0	4	840	33	32	810	200	950	0.10	310	370	430
Vasse WRD, #5 Bulk 0.0-	51.6	5	710	32	26	2160	150	1320	0.13	490	360	450
Vasse WRD, #5 Bulk 1.5-	47.7	7	1450	50	45	1420	410	990	0.10	470	480	560
Vasse WRD, #6 Bulk 0.0-	49.3	9	1070	47	37	1710	240	820	0.08	200	250	450
Vasse WRD, #6 Bulk 1.5-	49.9	6	1550	57	60	950	160	710	0.07	240	280	470
Vasse WRD, #7 Bulk 0.0-	37.3	22	3260	141	157	1640	1370	1000	0.10	380	260	590
Vasse WRD, #7 Bulk 1.5-	42.5	14	2710	124	121	1070	850	590	0.06	380	240	680
Vasse WRD, #8 Bulk 0.0-	40.9	2	1120	36	41	360	170	430	0.04	140	430	240
Vasse WRD, #8 Bulk 1.5-	47.8	7	1110	41	45	930	220	450	0.05	160	280	390
Vasse WRD, #9 Bulk 1.5-	45.5	14	2140	91	94	690	430	440	0.04	180	310	640
Vasse WRD, #10 Bulk 0.0-	49.3	10	1560	54	64	690	200	500	0.05	230	280	580
Vasse WRD, #10 Bulk 1.5-	45.6	4	4000	131	176	380	130	410	0.04	160	260	520
Vasse WRD, #11 Bulk 0.3	44.1	8	2550	93	102	550	190	430	0.04	220	240	490
Vasse WRD, #12 Bulk 0.0-	45.8	10	1300	44	45	1260	470	800	0.08	410	360	600
Vasse WRD, #12 Bulk 1.5-	50.1	4	640	19	22	550	230	720	0.07	400	310	420
Vasse WRD, #13 Bulk 0.0-	45.4	5	2510	86	100	700	350	650	0.07	410	280	510
Vasse WRD, #13 Bulk 1.5-	49.0	2	1850	83	84	420	180	400	0.04	330	270	510
Vasse WRD, #14 Bulk 0.3	48.0	6	1640	61	72	430	280	380	0.04	150	310	500
Vasse WRD, #15 Bulk 0.0-	48.2	5	2170	70	85	510	100	610	0.06	240	340	510
Vasse WRD, #15 Bulk 1.5-	52.3	1	800	29	31	520	110	390	0.04	180	460	410
Vasse WRD, #16 Bulk 0.0-	43.0	6	3550	144	127	370	1200	490	0.05	240	310	450
Vasse WRD, #16 Bulk 1.5-	43.0	5	3770	149	137	430	1320	460	0.05	250	300	450
Vasse WRD, #18 Bulk 0.0-	43.2	6	1840	81	84	480	320	330	0.03	230	220	570
Vasse WRD, #18 Bulk 1.5-	44.6	8	1750	83	80	560	340	380	0.04	190	200	590
Vasse WRD, #19 Bulk 0.0-	46.0	19	1760	65	65	6960	540	1250	0.13	320	270	430
Vasse WRD, #19 Bulk 1.5-	47.2	15	1560	49	57	4450	450	1180	0.12	280	290	370
Vasse WRD, #20 Bulk 0.0-	45.3	17	700	35	41	1160	620	540	0.05	350	140	920
Vasse WRD, #20 Bulk 1.5-	43.3	16	1510	66	62	1890	850	640	0.06	300	250	880
Vasse WRD, #21 Bulk 0.0-	48.4	6	1320	47	53	550	210	670	0.07	380	370	580
Vasse WRD, #21 Bulk 1.5-	53.1	4	820	38	30	580	160	740	0.07	460	420	610
Vasse WRD, #22 Bulk 0.0-	42.1	5	3170	170	122	300	1580	390	0.04	270	250	350
Vasse WRD, #25 Bulk 0.0-	42.0	23	1790	62	81	1100	460	2010	0.20	1020	180	320
Vasse WRD, #25 Bulk 1.5-	45.1	18	1640	64	72	890	510	1640	0.16	880	250	330
Vasse WRD, #26 Bulk 0.0-	44.4	24	2330	120	114	1370	950	930	0.09	280	320	580
Vasse WRD, #26 Bulk 1.5-	48.2	6	1410	68	80	540	570	450	0.05	150	270	480
Vasse WRD, #27 Bulk 0.3	23.4	11	2290	71	88	390	160	860	0.09	770	310	610
Vasse WRD, #28 Bulk 0.0-	42.4	11	2620	118	133	620	800	610	0.06	260	210	600
Vasse WRD, #28 Bulk 1.5-	35.3	26	3150	121	139	1970	850	860	0.09	670	190	1150
Vasse WRD, #29 Bulk 0.0-	46.6	15	1450	50	69	2170	320	1240	0.12	670	280	450
Vasse WRD, #29 Bulk 1.5-	42.4	17	2130	77	99	510	210	1250	0.13	1010	230	460
Vasse WRD, #30 Bulk 0.0-	46.7	10	1800	69	88	670	170	1010	0.10	630	290	610
Vasse WRD, #30 Bulk 1.5-	49.3	13	1480	50	61	1470	300	1200	0.12	650	300	410
Vasse WRD, #31 Bulk 0.0-	36.1	53	3530	137	150	1930	1060	880	0.09	500	250	1070
Vasse WRD, #31 Bulk 1.5-	34.3	28	3330	137	149	2110	820	810	0.08	480	210	600
Vasse WRD, #1 Bulk	53.4	*1*	2550	81	101	540	0	1000	0.10	100	200	320
Vasse WRD, #11 Bulk	49.4	*1*	2630	114	119	1090	220	1090	0.11	310	240	500
Vasse WRD, #14 Bulk	58.4	*1*	810	33	40	950	130	420	0.04	160	340	740
Vasse WRD, #27 Bulk	31.8	4	2610	81	100	480	130	1040	0.10	900	420	660
Eyre Pit #10b Bulk	46.2	46	410	13	13	510	2220	1390	0.14	1070	270	690

Italics show values at or below the detection limit

Data in red indicates the result is above GAI-3

Parameter	Hg	Re	Ge
Detection Limit	0.1	0.05	0.5
Crustal Abundance			
GAI-3			
Eyre Pit #1	*0.1*	*0.05*	3.7
Eyre Pit #2	*0.1*	*0.05*	6.6
Eyre Pit #3	*0.1*	*0.05*	5.8
Eyre Pit #4	*0.1*	*0.05*	2.9
Eyre Pit #5	*0.1*	*0.05*	6.9
Eyre Pit #6	*0.1*	*0.05*	5.6
Eyre Pit #7	0.2	*0.05*	10.2
Eyre Pit #8	*0.1*	*0.05*	6.7
Eyre Pit #9	*0.1*	*0.05*	3.3
Eyre Pit #10	0.3	*0.05*	2.8
Vasse WRD, #1 Bulk 0.3	*0.1*	*0.05*	2.5
Vasse WRD, #2 Bulk 0.0-	*0.1*	*0.05*	4.4
Vasse WRD, #2 Bulk 1.5-	*0.1*	*0.05*	4.5
Vasse WRD, #3 Bulk 0.0-	*0.1*	*0.05*	4.3
Vasse WRD, #3 Bulk 1.5-	*0.1*	*0.05*	4.7
Vasse WRD, #4 Bulk 0.0-	*0.1*	*0.05*	6.7
Vasse WRD, #4 Bulk 1.5-	*0.1*	*0.05*	5.7
Vasse WRD, #5 Bulk 0.0-	*0.1*	*0.05*	4.8
Vasse WRD, #5 Bulk 1.5-	*0.1*	*0.05*	6.2
Vasse WRD, #6 Bulk 0.0-	*0.1*	*0.05*	5.8
Vasse WRD, #6 Bulk 1.5-	*0.1*	*0.05*	5.9
Vasse WRD, #7 Bulk 0.0-	*0.1*	*0.05*	5.2
Vasse WRD, #7 Bulk 1.5-	*0.1*	*0.05*	5.4
Vasse WRD, #8 Bulk 0.0-	*0.1*	*0.05*	5.7
Vasse WRD, #8 Bulk 1.5-	*0.1*	*0.05*	6.2
Vasse WRD, #9 Bulk 1.5-	*0.1*	*0.05*	6.4
Vasse WRD, #10 Bulk 0.0-	*0.1*	*0.05*	5.6
Vasse WRD, #10 Bulk 1.5-	*0.1*	*0.05*	4.0
Vasse WRD, #11 Bulk 0.3	*0.1*	*0.05*	5.1
Vasse WRD, #12 Bulk 0.0-	*0.1*	*0.05*	5.4
Vasse WRD, #12 Bulk 1.5-	*0.1*	*0.05*	4.7
Vasse WRD, #13 Bulk 0.0-	*0.1*	*0.05*	4.7
Vasse WRD, #13 Bulk 1.5-	*0.1*	*0.05*	4.6
Vasse WRD, #14 Bulk 0.3	*0.1*	*0.05*	5.8
Vasse WRD, #15 Bulk 0.0-	*0.1*	*0.05*	4.7
Vasse WRD, #15 Bulk 1.5-	*0.1*	*0.05*	5.0
Vasse WRD, #16 Bulk 0.0-	*0.1*	*0.05*	4.7
Vasse WRD, #16 Bulk 1.5-	*0.1*	*0.05*	5.0
Vasse WRD, #18 Bulk 0.0-	*0.1*	*0.05*	6.3
Vasse WRD, #18 Bulk 1.5-	*0.1*	*0.05*	6.1
Vasse WRD, #19 Bulk 0.0-	*0.1*	*0.05*	5.1
Vasse WRD, #19 Bulk 1.5-	*0.1*	*0.05*	4.8
Vasse WRD, #20 Bulk 0.0-	0.1	*0.05*	3.9
Vasse WRD, #20 Bulk 1.5-	*0.1*	*0.05*	4.2
Vasse WRD, #21 Bulk 0.0-	*0.1*	*0.05*	4.2
Vasse WRD, #21 Bulk 1.5-	*0.1*	*0.05*	3.8
Vasse WRD, #22 Bulk 0.0-	*0.1*	*0.05*	3.5
Vasse WRD, #25 Bulk 0.0-	*0.1*	*0.05*	6.1
Vasse WRD, #25 Bulk 1.5-	*0.1*	*0.05*	5.1
Vasse WRD, #26 Bulk 0.0-	*0.1*	*0.05*	4.0
Vasse WRD, #26 Bulk 1.5-	*0.1*	*0.05*	5.6
Vasse WRD, #27 Bulk 0.3	*0.1*	*0.05*	2.7
Vasse WRD, #28 Bulk 0.0-	*0.1*	*0.05*	3.9
Vasse WRD, #28 Bulk 1.5-	*0.1*	*0.05*	3.2
Vasse WRD, #29 Bulk 0.0-	*0.1*	*0.05*	4.8
Vasse WRD, #29 Bulk 1.5-	*0.1*	*0.05*	3.6
Vasse WRD, #30 Bulk 0.0-	*0.1*	*0.05*	4.1
Vasse WRD, #30 Bulk 1.5-	*0.1*	*0.05*	4.8
Vasse WRD, #31 Bulk 0.0-	*0.1*	*0.05*	6.8
Vasse WRD, #31 Bulk 1.5-	*0.1*	*0.05*	5.9
Vasse WRD, #1 Bulk	*0.1*	*0.05*	2.1
Vasse WRD, #11 Bulk	*0.1*	*0.05*	5.3
Vasse WRD, #14 Bulk	*0.1*	*0.05*	6.2
Vasse WRD, #27 Bulk	*0.1*	*0.05*	3.1
Eyre Pit #10b Bulk	0.6	*0.05*	2.7

Italics show values at or below the detection limit

Data in red indicates the result is above GAI-3

	pH	TDS	Bicarbonate Alkalinity as HCO3	Carbonate Alkalinity as CO3	Hydroxide Alkalinity as OH	Total Alkalinity (CaCO3)	SO4	F	Na
	pH Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Australian Drinking Water	6.5-8.5	500					500, 250	1.5	180
Eyre Pit #1	8.9	16	6	*0.05*	*2.5*	5	5	0.2	4.4
Eyre Pit #2	8.6	16	*2.5*	*0.05*	*2.5*	*2.5*	*0.05*	*0.005*	2.4
Eyre Pit #3	8.2	24	7	*0.05*	*2.5*	6	6	0.3	3.3
Eyre Pit #4	8.6	*0.05*	*2.5*	*0.05*	*2.5*	*2.5*	*0.05*	0.5	2.1
Eyre Pit #5	6.1	*0.05*	5	*0.05*	*2.5*	*2.5*	4	0.1	4.1
Eyre Pit #6	6.3	*0.05*	*2.5*	*0.05*	*2.5*	*2.5*	2	*0.005*	0.9
Eyre Pit #7	6.4	52	*2.5*	*0.05*	*2.5*	*2.5*	19	0.2	15
Eyre Pit #8	6.6	20	*2.5*	*0.05*	*2.5*	*2.5*	1	0.4	10
Eyre Pit #9	5.8	56	*2.5*	*0.05*	*2.5*	*2.5*	20	0.1	14
Eyre Pit #10	7.1	200	25	*0.05*	*2.5*	21	2	0.6	5.7
Vasse WRD, #1 Bulk 0.3	6.2	*0.05*	*2.5*	*0.05*	*2.5*	*2.5*	6	0.4	2.9
Vasse WRD, #2 Bulk 0.0-1.5	6.7	36	33	*0.05*	*2.5*	27	2	*0.005*	0.8
Vasse WRD, #2 Bulk 1.5-3.0	6.4	32	14	*0.05*	*2.5*	11	2	*0.005*	0.8
Vasse WRD, #3 Bulk 0.0-1.5	7.3	108	47	*0.05*	*2.5*	38	23	1.2	16
Vasse WRD, #3 Bulk 1.5-3.0	7.1	64	20	*0.05*	*2.5*	17	16	0.6	10
Vasse WRD, #4 Bulk 0.0-1.5	7.6	32	30	*0.05*	*2.5*	25	11	0.6	7.0
Vasse WRD, #4 Bulk 1.5-3.0	7.5	84	46	*0.05*	*2.5*	38	18	1.0	10
Vasse WRD, #5 Bulk 0.0-1.5	8.4	108	55	*0.05*	*2.5*	45	24	1.2	16
Vasse WRD, #5 Bulk 1.5-3.0	8.4	84	54	*0.05*	*2.5*	44	23	1.0	11
Vasse WRD, #6 Bulk 0.0-1.5	7.7	56	56	*0.05*	*2.5*	46	6	1.0	2.8
Vasse WRD, #6 Bulk 1.5-3.0	7.7	36	46	*0.05*	*2.5*	38	8	1.0	5.2
Vasse WRD, #7 Bulk 0.0-1.5	7.8	52	54	*0.05*	*2.5*	45	9	0.4	5.4
Vasse WRD, #7 Bulk 1.5-3.0	7.4	44	32	*0.05*	*2.5*	26	12	0.4	7.8
Vasse WRD, #8 Bulk 0.0-1.5	7.0	16	9	*0.05*	*2.5*	8	8	0.4	4.5
Vasse WRD, #8 Bulk 1.5-3.0	8.2	44	49	*0.05*	*2.5*	40	9	0.6	3.8
Vasse WRD, #9 Bulk 1.5-3.0	7.3	12	17	*0.05*	*2.5*	14	10	0.4	4.1
Vasse WRD, #10 Bulk 0.0-1.5	7.4	40	21	*0.05*	*2.5*	17	10	0.7	5.5
Vasse WRD, #10 Bulk 1.5-3.0	6.5	16	8	*0.05*	*2.5*	6	7	0.3	5.2
Vasse WRD, #11 Bulk 0.3	7.0	20	*2.5*	*0.05*	*2.5*	*2.5*	3	0.2	2.5
Vasse WRD, #12 Bulk 0.0-1.5	8.4	44	57	*0.05*	*2.5*	46	16	0.7	8.2
Vasse WRD, #12 Bulk 1.5-3.0	7.6	56	22	*0.05*	*2.5*	18	22	0.5	12
Vasse WRD, #13 Bulk 0.0-1.5	7.3	40	25	*0.05*	*2.5*	21	16	0.6	10
Vasse WRD, #13 Bulk 1.5-3.0	6.7	16	8	*0.05*	*2.5*	7	17	0.3	10
Vasse WRD, #14 Bulk 0.3	6.8	*0.05*	8	*0.05*	*2.5*	6	7	0.2	2.7
Vasse WRD, #15 Bulk 0.0-1.5	7.1	56	11	*0.05*	*2.5*	9	20	1.0	8.1
Vasse WRD, #15 Bulk 1.5-3.0	7.1	36	21	*0.05*	*2.5*	18	11	0.7	4.2
Vasse WRD, #16 Bulk 0.0-1.5	6.3	12	*2.5*	*0.05*	*2.5*	*2.5*	6	*0.005*	4.3
Vasse WRD, #16 Bulk 1.5-3.0	6.5	20	8	*0.05*	*2.5*	7	9	*0.005*	4.0
Vasse WRD, #18 Bulk 0.0-1.5	6.4	20	6	*0.05*	*2.5*	*2.5*	8	0.2	4.0
Vasse WRD, #18 Bulk 1.5-3.0	6.2	72	6	*0.05*	*2.5*	5	10	0.2	3.8
Vasse WRD, #19 Bulk 0.0-1.5	8.1	104	52	*0.05*	*2.5*	43	11	1.2	4.5
Vasse WRD, #19 Bulk 1.5-3.0	8.0	104	58	*0.05*	*2.5*	47	8	1.2	4.0
Vasse WRD, #20 Bulk 0.0-1.5	7.6	92	40	*0.05*	*2.5*	33	14	0.7	3.6
Vasse WRD, #20 Bulk 1.5-3.0	7.7	140	73	*0.05*	*2.5*	60	12	0.6	3.0
Vasse WRD, #21 Bulk 0.0-1.5	7.2	96	14	*0.05*	*2.5*	12	19	0.6	9.7
Vasse WRD, #21 Bulk 1.5-3.0	7.5	100	18	*0.05*	*2.5*	15	24	0.5	11
Vasse WRD, #22 Bulk 0.0-1.5	6.0	36	*2.5*	*0.05*	*2.5*	*2.5*	5	*0.005*	3.9
Vasse WRD, #25 Bulk 0.0-1.5	7.2	168	31	*0.05*	*2.5*	26	25	0.7	28
Vasse WRD, #25 Bulk 1.5-3.0	7.4	172	20	*0.05*	*2.5*	17	25	0.7	26
Vasse WRD, #26 Bulk 0.0-1.5	7.6	96	56	*0.05*	*2.5*	46	12	0.5	5.2
Vasse WRD, #26 Bulk 1.5-3.0	7.1	56	13	*0.05*	*2.5*	10	8	0.4	2.7
Vasse WRD, #27 Bulk 0.3	6.6	196	*2.5*	*0.05*	*2.5*	*2.5*	47	0.6	27
Vasse WRD, #28 Bulk 0.0-1.5	6.6	68	11	*0.05*	*2.5*	9	12	0.2	6.5
Vasse WRD, #28 Bulk 1.5-3.0	7.3	264	47	*0.05*	*2.5*	39	85	0.5	19
Vasse WRD, #29 Bulk 0.0-1.5	8.3	160	50	*0.05*	*2.5*	41	26	1.0	20
Vasse WRD, #29 Bulk 1.5-3.0	6.6	164	*2.5*	*0.05*	*2.5*	*2.5*	22	0.3	24
Vasse WRD, #30 Bulk 0.0-1.5	6.7	144	7	*0.05*	*2.5*	6	36	0.6	16
Vasse WRD, #30 Bulk 1.5-3.0	8.3	152	61	*0.05*	*2.5*	50	24	0.9	17
Vasse WRD, #31 Bulk 0.0-1.5	8.2	104	71	*0.05*	*2.5*	58	5	0.7	4.2
Vasse WRD, #31 Bulk 1.5-3.0	7.9	108	74	*0.05*	*2.5*	61	5	0.6	4.0
Vasse WRD, #1 Bulk Surface	6.8	32	12	*0.05*	*2.5*	9	7	1.1	1.5
Vasse WRD, #11 Bulk Surface	6.9	40	17	*0.05*	*2.5*	14	4	0.4	2.5
Vasse WRD, #14 Bulk Surface	6.6	76	6	*0.05*	*2.5*	*2.5*	45	0.3	1.7
Vasse WRD, #27 Bulk Surface	6.7	168	*2.5*	*0.05*	*2.5*	*2.5*	48	0.5	31
Eyre Pit #10b Bulk	6.7	100	6	*0.05*	*2.5*	*2.5*	21	0.3	19

	Potassium, K	Magnesium, Mg	Calcium, Ca	Phosphorus, P	Aluminium, Al	Iron, Fe	Silver, Ag	Copper, Cu
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Australian Drinking Water		-			0.2	0.3		2, 1
Eyre Pit #1	0.6	0.8	0.9	0.025	0.0250	0.071	0.00005	0.00005
Eyre Pit #2	1.7	0.5	0.4	0.025	0.0020	0.003	0.00005	0.00005
Eyre Pit #3	0.5	1.2	1.6	0.025	0.0001	0.003	0.00005	0.00005
Eyre Pit #4	0.7	0.1	<0.2	0.025	0.1100	0.034	0.00005	0.00005
Eyre Pit #5	0.4	1.2	1.2	0.025	0.0001	0.003	0.00005	0.00005
Eyre Pit #6	0.4	0.4	0.6	0.025	0.0001	0.003	0.00005	0.00005
Eyre Pit #7	0.5	2.7	4.0	0.025	0.0001	0.003	0.00005	0.00005
Eyre Pit #8	0.3	0.1	0.3	0.025	0.0430	0.045	0.00005	0.00005
Eyre Pit #9	2.2	5.4	2.6	0.025	0.0050	0.003	0.00005	0.00005
Eyre Pit #10	1.1	1.6	1.6	0.025	0.0340	0.039	0.00005	0.00005
Vasse WRD, #1 Bulk 0.3	0.5	1.3	1.0	0.025	0.0060	0.012	0.00005	0.00005
Vasse WRD, #2 Bulk 0.0-1.5	5.6	1.1	8.2	0.025	0.0001	0.008	0.00005	0.00005
Vasse WRD, #2 Bulk 1.5-3.0	5.7	0.5	2.6	0.025	0.1000	0.180	0.00005	0.00005
Vasse WRD, #3 Bulk 0.0-1.5	1.2	5.1	18	0.025	0.0110	0.016	0.00005	0.00005
Vasse WRD, #3 Bulk 1.5-3.0	1.2	2.9	7.1	0.025	0.0040	0.003	0.00005	0.00005
Vasse WRD, #4 Bulk 0.0-1.5	0.8	2.1	9.8	0.025	0.0030	0.008	0.00005	0.00005
Vasse WRD, #4 Bulk 1.5-3.0	1.1	4.0	15	0.025	0.0010	0.003	0.00005	0.00005
Vasse WRD, #5 Bulk 0.0-1.5	1.2	3.4	21	0.025	0.0010	0.005	0.00005	0.00005
Vasse WRD, #5 Bulk 1.5-3.0	0.9	2.1	19	0.025	0.0140	0.014	0.00005	0.00200
Vasse WRD, #6 Bulk 0.0-1.5	0.5	1.2	17	0.025	0.0210	0.020	0.00005	0.00005
Vasse WRD, #6 Bulk 1.5-3.0	0.6	1.6	13	0.025	0.0350	0.048	0.00005	0.00005
Vasse WRD, #7 Bulk 0.0-1.5	4.1	3.0	17	0.025	0.0230	0.007	0.00005	0.00005
Vasse WRD, #7 Bulk 1.5-3.0	2.2	2.2	11	0.025	0.0180	0.008	0.00005	0.00005
Vasse WRD, #8 Bulk 0.0-1.5	0.7	1.4	3.9	0.025	0.0040	0.003	0.00005	0.00005
Vasse WRD, #8 Bulk 1.5-3.0	0.7	1.6	17	0.025	0.0190	0.017	0.00005	0.00005
Vasse WRD, #9 Bulk 1.5-3.0	0.9	1.2	5.3	0.025	0.0130	0.013	0.00005	0.00005
Vasse WRD, #10 Bulk 0.0-1.5	0.8	1.5	7.6	0.025	0.0190	0.019	0.00005	0.00005
Vasse WRD, #10 Bulk 1.5-3.0	0.5	1.2	2.2	0.025	0.0090	0.011	0.00005	0.00005
Vasse WRD, #11 Bulk 0.3	0.2	0.3	0.7	0.025	0.1300	0.067	0.00005	0.00005
Vasse WRD, #12 Bulk 0.0-1.5	0.8	2.0	18	0.025	0.0190	0.019	0.00005	0.00005
Vasse WRD, #12 Bulk 1.5-3.0	1.0	3.7	8.4	0.025	0.0070	0.011	0.00005	0.00005
Vasse WRD, #13 Bulk 0.0-1.5	1.0	2.1	8.0	0.025	0.0160	0.014	0.00005	0.00005
Vasse WRD, #13 Bulk 1.5-3.0	0.9	2.2	4.9	0.025	0.0040	0.003	0.00005	0.00005
Vasse WRD, #14 Bulk 0.3	0.5	0.8	2.4	0.025	0.0060	0.010	0.00005	0.00005
Vasse WRD, #15 Bulk 0.0-1.5	0.5	2.8	7.8	0.025	0.0040	0.003	0.00005	0.00005
Vasse WRD, #15 Bulk 1.5-3.0	0.3	1.5	8.7	0.025	0.0060	0.005	0.00005	0.00005
Vasse WRD, #16 Bulk 0.0-1.5	1.9	0.7	2.1	0.025	0.0060	0.006	0.00005	0.00005
Vasse WRD, #16 Bulk 1.5-3.0	2.3	1.0	3.2	0.025	0.0070	0.011	0.00005	0.00005
Vasse WRD, #18 Bulk 0.0-1.5	0.7	1.0	2.3	0.025	0.0080	0.021	0.00005	0.00005
Vasse WRD, #18 Bulk 1.5-3.0	0.8	1.1	2.7	0.025	0.0110	0.038	0.00005	0.00005
Vasse WRD, #19 Bulk 0.0-1.5	1.7	2.2	17	0.025	0.0280	0.003	0.00005	0.00005
Vasse WRD, #19 Bulk 1.5-3.0	1.3	2.1	18	0.025	0.0540	0.061	0.00005	0.00005
Vasse WRD, #20 Bulk 0.0-1.5	0.6	1.5	15	0.025	0.0250	0.075	0.00005	0.00005
Vasse WRD, #20 Bulk 1.5-3.0	0.9	1.7	24	0.025	0.0280	0.056	0.00005	0.00005
Vasse WRD, #21 Bulk 0.0-1.5	0.8	2.0	6.0	0.025	0.0001	0.003	0.00005	0.00005
Vasse WRD, #21 Bulk 1.5-3.0	0.6	2.3	8.1	0.025	0.0040	0.015	0.00005	0.00005
Vasse WRD, #22 Bulk 0.0-1.5	2.0	0.4	1.4	0.025	0.0050	0.003	0.00005	0.00005
Vasse WRD, #25 Bulk 0.0-1.5	1.6	4.5	7.4	0.025	0.0110	0.003	0.00005	0.00005
Vasse WRD, #25 Bulk 1.5-3.0	1.9	3.9	6.4	0.025	0.0260	0.080	0.00005	0.00005
Vasse WRD, #26 Bulk 0.0-1.5	2.1	2.6	17	0.025	0.0030	0.014	0.00005	0.00005
Vasse WRD, #26 Bulk 1.5-3.0	0.9	1.2	5.1	0.025	0.0130	0.007	0.00005	0.00005
Vasse WRD, #27 Bulk 0.3	1.9	9.2	9.1	0.08	0.0350	0.078	0.00005	0.00005
Vasse WRD, #28 Bulk 0.0-1.5	2.1	1.6	5.3	0.025	0.0001	0.003	0.00005	0.00005
Vasse WRD, #28 Bulk 1.5-3.0	4.2	6.1	48	0.025	0.0060	0.016	0.00005	0.00005
Vasse WRD, #29 Bulk 0.0-1.5	2.6	3.9	17	0.025	0.0090	0.044	0.00005	0.00005
Vasse WRD, #29 Bulk 1.5-3.0	0.4	1.4	1.1	0.025	0.0040	0.050	0.00005	0.00005
Vasse WRD, #30 Bulk 0.0-1.5	0.9	4.2	7.9	0.025	0.0400	0.032	0.00005	0.00005
Vasse WRD, #30 Bulk 1.5-3.0	1.6	3.8	18	0.025	0.0370	0.028	0.00005	0.00005
Vasse WRD, #31 Bulk 0.0-1.5	2.2	2.9	16	0.025	0.0001	0.003	0.00005	0.00005
Vasse WRD, #31 Bulk 1.5-3.0	1.7	2.7	19	0.025	0.0690	0.015	0.00005	0.00005
Vasse WRD, #1 Bulk Surface	0.3	1.5	4.6	0.025	0.0001	0.003	0.00005	0.00005
Vasse WRD, #11 Bulk Surface	0.3	1.4	3.8	0.025	0.0001	0.003	0.00005	0.00005
Vasse WRD, #14 Bulk Surface	0.4	1.7	19	0.025	0.0001	0.003	0.00005	0.00005
Vasse WRD, #27 Bulk Surface	1.8	11	8.5	0.025	0.0001	0.003	0.00005	0.00005
Eyre Pit #10b Bulk	1.1	4.9	4.2	0.025	0.0070	0.030	0.00005	0.00005

	Zinc, Zn	Cadmium, Cd	Lead, Pb	Chromium, Cr	Nickel, Ni	Cobalt, Co	Manganese, Mn	Tin, Sn	Strontium, Sr
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Australian Drinking Water	3	0.002	0.01	0.05	0.02		0.5, 0.1		
Eyre Pit #1	0.0120	*0.000005*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.00005*	0.0130
Eyre Pit #2	0.0180	*0.000005*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	0.0270	*0.00005*	0.0020
Eyre Pit #3	0.0170	*0.000005*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	0.0110	*0.00005*	0.0190
Eyre Pit #4	0.0130	*0.000005*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	0.0070	*0.00005*	*0.0001*
Eyre Pit #5	0.0210	*0.000005*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	0.2100	*0.00005*	0.0210
Eyre Pit #6	0.0130	*0.000005*	*0.0001*	*0.0001*	0.002	*0.0001*	0.7000	*0.00005*	0.0060
Eyre Pit #7	0.0180	*0.000005*	*0.0001*	0.0070	*0.0001*	*0.0001*	0.0140	*0.00005*	0.0250
Eyre Pit #8	0.0120	*0.000005*	*0.0001*	0.0110	*0.0001*	*0.0001*	0.0020	*0.00005*	*0.0001*
Eyre Pit #9	0.0210	*0.000005*	*0.0001*	0.0050	0.012	*0.0001*	0.0110	*0.00005*	0.0370
Eyre Pit #10	0.0001	*0.000005*	*0.0001*	0.0110	*0.0001*	*0.0001*	0.0020	*0.00005*	0.0150
Vasse WRD, #1 Bulk 0.3	0.0100	*0.000005*	*0.0001*	0.0020	*0.0001*	*0.0001*	0.0020	*0.00005*	0.0180
Vasse WRD, #2 Bulk 0.0-1.5	0.0120	*0.000005*	*0.0001*	*0.0001*	*0.0001*	0.0020	0.3200	*0.00005*	0.0430
Vasse WRD, #2 Bulk 1.5-3.0	0.0160	*0.000005*	*0.0001*	*0.0001*	*0.0001*	0.0020	0.2500	*0.00005*	0.0190
Vasse WRD, #3 Bulk 0.0-1.5	0.0140	*0.000005*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	0.0060	*0.00005*	0.1100
Vasse WRD, #3 Bulk 1.5-3.0	0.0190	*0.000005*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	0.0060	*0.00005*	0.0630
Vasse WRD, #4 Bulk 0.0-1.5	0.0100	*0.000005*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.00005*	0.0510
Vasse WRD, #4 Bulk 1.5-3.0	0.0180	*0.000005*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	0.0020	*0.00005*	0.0770
Vasse WRD, #5 Bulk 0.0-1.5	0.0070	*0.000005*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.00005*	0.0970
Vasse WRD, #5 Bulk 1.5-3.0	0.0760	0.0510	0.0360	0.0020	0.001	*0.0001*	*0.0001*	*0.00005*	0.0580
Vasse WRD, #6 Bulk 0.0-1.5	0.0500	0.0250	0.0230	0.0010	0.001	*0.0001*	*0.0001*	*0.00005*	0.0540
Vasse WRD, #6 Bulk 1.5-3.0	0.0580	0.0140	0.0180	0.0020	0.001	*0.0001*	0.0010	*0.00005*	0.0410
Vasse WRD, #7 Bulk 0.0-1.5	0.0420	0.0130	0.0190	0.0010	*0.0001*	*0.0001*	*0.0001*	*0.00005*	0.0750
Vasse WRD, #7 Bulk 1.5-3.0	0.0570	0.0130	0.0230	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.00005*	0.0590
Vasse WRD, #8 Bulk 0.0-1.5	0.0660	0.0100	0.0150	*0.0001*	*0.0001*	*0.0001*	0.0020	*0.00005*	0.0250
Vasse WRD, #8 Bulk 1.5-3.0	0.0500	0.0110	0.0310	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.00005*	0.0600
Vasse WRD, #9 Bulk 1.5-3.0	0.0690	0.0067	0.0160	*0.0001*	*0.0001*	*0.0001*	0.0010	*0.00005*	0.0350
Vasse WRD, #10 Bulk 0.0-1.5	0.0570	0.0071	0.0270	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.00005*	0.0470
Vasse WRD, #10 Bulk 1.5-3.0	0.0630	*0.0000*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	0.0020	*0.00005*	0.0190
Vasse WRD, #11 Bulk 0.3	0.0610	0.0034	0.0340	*0.0001*	*0.0001*	*0.0001*	0.0010	*0.00005*	0.0060
Vasse WRD, #12 Bulk 0.0-1.5	0.0500	0.0	0.0020	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.00005*	0.0620
Vasse WRD, #12 Bulk 1.5-3.0	0.0580	0.0	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.00005*	0.0460
Vasse WRD, #13 Bulk 0.0-1.5	0.0660	0.0	0.0350	0.0030	*0.0001*	*0.0001*	*0.0001*	*0.00005*	0.0330
Vasse WRD, #13 Bulk 1.5-3.0	0.0690	0.0	*0.0001*	*0.0001*	*0.0001*	*0.0001*	0.0020	*0.00005*	0.0300
Vasse WRD, #14 Bulk 0.3	0.0660	0.0	0.0170	*0.0001*	*0.0001*	*0.0001*	0.0020	*0.00005*	0.0200
Vasse WRD, #15 Bulk 0.0-1.5	0.0530	0.0	*0.0001*	0.0050	*0.0001*	*0.0001*	*0.0001*	*0.00005*	0.0440
Vasse WRD, #15 Bulk 1.5-3.0	0.0600	0.0	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.00005*	0.0330
Vasse WRD, #16 Bulk 0.0-1.5	0.0770	0.0	0.0460	*0.0001*	*0.0001*	*0.0001*	0.0410	*0.00005*	0.0140
Vasse WRD, #16 Bulk 1.5-3.0	0.0480	0.0	*0.0001*	*0.0001*	*0.0001*	*0.0001*	0.0300	*0.00005*	0.0190
Vasse WRD, #18 Bulk 0.0-1.5	0.0500	0.0	*0.0001*	*0.0001*	*0.0001*	*0.0001*	0.0020	*0.00005*	0.0190
Vasse WRD, #18 Bulk 1.5-3.0	0.0330	*0.000005*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	0.0030	*0.00005*	0.0310
Vasse WRD, #19 Bulk 0.0-1.5	0.0220	*0.000005*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.00005*	0.0910
Vasse WRD, #19 Bulk 1.5-3.0	0.0350	*0.000005*	*0.0001*	0.0010	*0.0001*	*0.0001*	*0.0001*	*0.00005*	0.1000
Vasse WRD, #20 Bulk 0.0-1.5	0.0270	*0.000005*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	0.0030	*0.00005*	0.0860
Vasse WRD, #20 Bulk 1.5-3.0	0.0390	*0.000005*	*0.0001*	0.0020	*0.0001*	*0.0001*	*0.0001*	*0.00005*	0.0780
Vasse WRD, #21 Bulk 0.0-1.5	0.0330	*0.000005*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.00005*	0.0490
Vasse WRD, #21 Bulk 1.5-3.0	0.0380	*0.000005*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	0.0600	*0.00005*	0.0150
Vasse WRD, #22 Bulk 0.0-1.5	0.0320	*0.000005*	*0.0001*	0.0020	*0.0001*	*0.0001*	0.0020	*0.00005*	0.0550
Vasse WRD, #25 Bulk 0.0-1.5	0.0500	*0.000005*	*0.0001*	0.0030	*0.0001*	*0.0001*	0.0030	*0.00005*	0.0550
Vasse WRD, #25 Bulk 1.5-3.0	0.0520	*0.000005*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	0.0030	*0.00005*	0.0400
Vasse WRD, #26 Bulk 0.0-1.5	0.0520	*0.000005*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	0.0030	*0.00005*	0.0490
Vasse WRD, #26 Bulk 1.5-3.0	0.0390	0.0	0.0100	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.00005*	0.0380
Vasse WRD, #27 Bulk 0.3	0.0320	*0.000005*	*0.0001*	0.0020	*0.0001*	*0.0001*	*0.0001*	*0.00005*	0.1500
Vasse WRD, #28 Bulk 0.0-1.5	0.0340	*0.000005*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	0.0070	*0.00005*	0.0190
Vasse WRD, #28 Bulk 1.5-3.0	0.0270	*0.000005*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	0.0060	*0.00005*	0.2000
Vasse WRD, #29 Bulk 0.0-1.5	0.0400	*0.000005*	0.0050	*0.0001*	*0.0001*	*0.0001*	0.0020	*0.00005*	0.0720
Vasse WRD, #29 Bulk 1.5-3.0	0.0310	*0.000005*	*0.0001*	0.0010	*0.0001*	*0.0001*	0.0010	*0.00005*	0.0150
Vasse WRD, #30 Bulk 0.0-1.5	0.0390	*0.000005*	*0.0001*	0.0010	*0.0001*	*0.0001*	*0.0001*	*0.00005*	0.0990
Vasse WRD, #30 Bulk 1.5-3.0	0.0350	*0.000005*	*0.0001*	0.0010	*0.0001*	*0.0001*	*0.0001*	*0.00005*	0.1100
Vasse WRD, #31 Bulk 0.0-1.5	0.0300	*0.000005*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	0.0010	*0.00005*	0.0300
Vasse WRD, #31 Bulk 1.5-3.0	0.0410	*0.000005*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.00005*	0.0890
Vasse WRD, #1 Bulk Surface	0.0430	*0.000005*	0.0020	*0.0001*	*0.0001*	*0.0001*	0.0030	*0.00005*	0.0340
Vasse WRD, #11 Bulk Surface	0.0390	*0.000005*	0.0020	*0.0001*	*0.0001*	*0.0001*	0.0030	*0.00005*	0.0320
Vasse WRD, #14 Bulk Surface	0.0430	*0.000005*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.00005*	*0.0001*
Vasse WRD, #27 Bulk Surface	0.0460	*0.000005*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.00005*	0.1500
Eyre Pit #10b Bulk	0.0500	*0.000005*	0.0020	*0.0001*	*0.0001*	*0.0001*	0.0040	*0.00005*	0.0300

	Barium, Ba	Thorium, Th	Uranium, U	Thallium, Tl	Vanadium, V	Arsenic, As	Bismuth, Bi	Antimony, Sb	Selenium, Se
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Australian Drinking Water	0.7		0.02			0.007		0.003	0.01
Eyre Pit #1	0.1200	*0.0001*	*0.0001*	*0.00005*	*0.0001*	0.00100	*0.0001*	*0.0001*	*0.0010*
Eyre Pit #2	0.0600	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Eyre Pit #3	0.0620	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Eyre Pit #4	0.0540	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Eyre Pit #5	0.0540	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Eyre Pit #6	0.0510	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Eyre Pit #7	0.0620	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Eyre Pit #8	0.0480	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Eyre Pit #9	0.0950	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Eyre Pit #10	0.0240	*0.0001*	*0.0001*	*0.00005*	*0.0001*	0.00200	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #1 Bulk 0.3	0.0620	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #2 Bulk 0.0-1.5	0.0980	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #2 Bulk 1.5-3.0	0.0820	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #3 Bulk 0.0-1.5	0.1600	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #3 Bulk 1.5-3.0	0.2000	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #4 Bulk 0.0-1.5	0.1900	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #4 Bulk 1.5-3.0	0.1600	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #5 Bulk 0.0-1.5	0.1400	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #5 Bulk 1.5-3.0	0.0960	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #6 Bulk 0.0-1.5	0.1800	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #6 Bulk 1.5-3.0	0.2100	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #7 Bulk 0.0-1.5	0.2900	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #7 Bulk 1.5-3.0	0.2400	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #8 Bulk 0.0-1.5	0.2000	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #8 Bulk 1.5-3.0	0.2800	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #9 Bulk 1.5-3.0	0.2600	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #10 Bulk 0.0-1.5	0.2500	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #10 Bulk 1.5-3.0	0.2700	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #11 Bulk 0.3	0.0980	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #12 Bulk 0.0-1.5	0.2100	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #12 Bulk 1.5-3.0	0.1600	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #13 Bulk 0.0-1.5	0.2000	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #13 Bulk 1.5-3.0	0.2100	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #14 Bulk 0.3	0.2200	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #15 Bulk 0.0-1.5	0.1600	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #15 Bulk 1.5-3.0	0.2000	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #16 Bulk 0.0-1.5	0.3700	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #16 Bulk 1.5-3.0	0.2500	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #18 Bulk 0.0-1.5	0.2400	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #18 Bulk 1.5-3.0	0.2100	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #19 Bulk 0.0-1.5	0.2300	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #19 Bulk 1.5-3.0	0.2400	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #20 Bulk 0.0-1.5	0.2400	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #20 Bulk 1.5-3.0	0.2800	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #21 Bulk 0.0-1.5	0.1500	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #21 Bulk 1.5-3.0	0.1400	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #22 Bulk 0.0-1.5	0.1300	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #25 Bulk 0.0-1.5	0.0850	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #25 Bulk 1.5-3.0	0.0730	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #26 Bulk 0.0-1.5	0.2300	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #26 Bulk 1.5-3.0	0.2100	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #27 Bulk 0.3	0.1000	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #28 Bulk 0.0-1.5	0.2100	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #28 Bulk 1.5-3.0	0.1100	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #29 Bulk 0.0-1.5	0.1300	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #29 Bulk 1.5-3.0	0.0720	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #30 Bulk 0.0-1.5	0.1100	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #30 Bulk 1.5-3.0	0.1100	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #31 Bulk 0.0-1.5	0.1300	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #31 Bulk 1.5-3.0	0.2200	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #1 Bulk Surface	0.0580	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #11 Bulk Surface	0.1000	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #14 Bulk Surface	0.1300	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Vasse WRD, #27 Bulk Surface	0.1200	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*
Eyre Pit #10b Bulk	0.0710	*0.0001*	*0.0001*	*0.00005*	*0.0001*	*0.00005*	*0.0001*	*0.0001*	*0.0010*

	Molybdenum, Mo	Boron, B	Mercury
	mg/L	mg/L	mg/L
Australian Drinking Water	0.05	4	0.001
Eyre Pit #1	*0.0001*	0.0390	*0.0005*
Eyre Pit #2	*0.0001*	0.0300	*0.0005*
Eyre Pit #3	*0.0001*	0.0240	*0.0005*
Eyre Pit #4	*0.0001*	0.0230	*0.0005*
Eyre Pit #5	*0.0001*	0.0280	*0.0005*
Eyre Pit #6	*0.0001*	0.0140	*0.0005*
Eyre Pit #7	*0.0001*	0.0560	*0.0005*
Eyre Pit #8	*0.0001*	0.0690	*0.0005*
Eyre Pit #9	*0.0001*	0.0280	*0.0005*
Eyre Pit #10	*0.0001*	0.0390	*0.0005*
Vasse WRD, #1 Bulk 0.3	*0.0001*	0.0470	*0.0005*
Vasse WRD, #2 Bulk 0.0-1.5	*0.0001*	0.0200	*0.0005*
Vasse WRD, #2 Bulk 1.5-3.0	*0.0001*	0.0270	*0.0005*
Vasse WRD, #3 Bulk 0.0-1.5	*0.0001*	0.0380	*0.0005*
Vasse WRD, #3 Bulk 1.5-3.0	*0.0001*	0.0420	*0.0005*
Vasse WRD, #4 Bulk 0.0-1.5	*0.0001*	0.0190	*0.0005*
Vasse WRD, #4 Bulk 1.5-3.0	*0.0001*	0.0370	*0.0005*
Vasse WRD, #5 Bulk 0.0-1.5	*0.0001*	0.0380	*0.0005*
Vasse WRD, #5 Bulk 1.5-3.0	*0.0001*	0.0410	*0.0005*
Vasse WRD, #6 Bulk 0.0-1.5	*0.0001*	0.0300	*0.0005*
Vasse WRD, #6 Bulk 1.5-3.0	*0.0001*	0.0530	*0.0005*
Vasse WRD, #7 Bulk 0.0-1.5	*0.0001*	0.0580	*0.0005*
Vasse WRD, #7 Bulk 1.5-3.0	*0.0001*	0.0530	*0.0005*
Vasse WRD, #8 Bulk 0.0-1.5	*0.0001*	0.0300	*0.0005*
Vasse WRD, #8 Bulk 1.5-3.0	*0.0001*	0.0270	*0.0005*
Vasse WRD, #9 Bulk 1.5-3.0	*0.0001*	0.0560	*0.0005*
Vasse WRD, #10 Bulk 0.0-1.5	*0.0001*	0.0500	*0.0005*
Vasse WRD, #10 Bulk 1.5-3.0	*0.0001*	0.0290	*0.0005*
Vasse WRD, #11 Bulk 0.3	*0.0001*	0.0410	*0.0005*
Vasse WRD, #12 Bulk 0.0-1.5	*0.0001*	0.0300	*0.0005*
Vasse WRD, #12 Bulk 1.5-3.0	*0.0001*	0.0340	*0.0005*
Vasse WRD, #13 Bulk 0.0-1.5	*0.0001*	0.0350	*0.0005*
Vasse WRD, #13 Bulk 1.5-3.0	*0.0001*	0.0280	*0.0005*
Vasse WRD, #14 Bulk 0.3	*0.0001*	0.0220	*0.0005*
Vasse WRD, #15 Bulk 0.0-1.5	*0.0001*	0.0400	*0.0005*
Vasse WRD, #15 Bulk 1.5-3.0	*0.0001*	0.0370	*0.0005*
Vasse WRD, #16 Bulk 0.0-1.5	*0.0001*	0.0200	*0.0005*
Vasse WRD, #16 Bulk 1.5-3.0	*0.0001*	0.0230	*0.0005*
Vasse WRD, #18 Bulk 0.0-1.5	*0.0001*	0.0280	*0.0005*
Vasse WRD, #18 Bulk 1.5-3.0	*0.0001*	0.0480	*0.0005*
Vasse WRD, #19 Bulk 0.0-1.5	*0.0001*	0.0490	*0.0005*
Vasse WRD, #19 Bulk 1.5-3.0	*0.0001*	0.0620	*0.0005*
Vasse WRD, #20 Bulk 0.0-1.5	*0.0001*	0.0330	*0.0005*
Vasse WRD, #20 Bulk 1.5-3.0	*0.0001*	0.0370	*0.0005*
Vasse WRD, #21 Bulk 0.0-1.5	*0.0001*	0.0270	*0.0005*
Vasse WRD, #21 Bulk 1.5-3.0	*0.0001*	0.0220	*0.0005*
Vasse WRD, #22 Bulk 0.0-1.5	*0.0001*	0.0740	*0.0005*
Vasse WRD, #25 Bulk 0.0-1.5	*0.0001*	0.0480	*0.0005*
Vasse WRD, #25 Bulk 1.5-3.0	*0.0001*	0.0290	*0.0005*
Vasse WRD, #26 Bulk 0.0-1.5	*0.0001*	0.0350	*0.0005*
Vasse WRD, #26 Bulk 1.5-3.0	*0.0001*	0.0720	*0.0005*
Vasse WRD, #27 Bulk 0.3	*0.0001*	0.0860	*0.0005*
Vasse WRD, #28 Bulk 0.0-1.5	*0.0001*	0.0740	*0.0005*
Vasse WRD, #28 Bulk 1.5-3.0	*0.0001*	0.0530	*0.0005*
Vasse WRD, #29 Bulk 0.0-1.5	*0.0001*	0.0410	*0.0005*
Vasse WRD, #29 Bulk 1.5-3.0	*0.0001*	0.0720	*0.0005*
Vasse WRD, #30 Bulk 0.0-1.5	*0.0001*	0.0410	*0.0005*
Vasse WRD, #30 Bulk 1.5-3.0	*0.0001*	0.0440	*0.0005*
Vasse WRD, #31 Bulk 0.0-1.5	*0.0001*	0.0350	*0.0005*
Vasse WRD, #31 Bulk 1.5-3.0	*0.0001*	0.0580	*0.0005*
Vasse WRD, #1 Bulk Surface	*0.0001*	0.0210	*0.0005*
Vasse WRD, #11 Bulk Surface	*0.0001*	0.0180	*0.0005*
Vasse WRD, #14 Bulk Surface	*0.0001*	*0.0025*	*0.0005*
Vasse WRD, #27 Bulk Surface	*0.0001*	*0.0025*	*0.0005*
Eyre Pit #10b Bulk	*0.0001*	0.0260	*0.0005*

Table X.X. ABA results of Eyre Pit and Vasse WRD

Statistics	Sulfate Sulphur	Sulfide Sulphur	Sulfur, Calculated	Maximum Potenital Acidity* (MPA)	Acid Neutralizing Capacity (ANC)	Calculated Net Acid Production Potential (NAPP)	NPR	Criteria Based on NPR
	(wt. %)	(wt. %)	(wt. %)	(kg H_2SO_4/tonn	(kg H_2SO_4/Tonn	(kg H_2SO_4/Tonne)		
Eyre Pit								
Eyre Pit #1	0.007	0.006	0.013	*<0.5*	*<0.5*	-0.25	2	non-pag
Eyre Pit #2	*<0.005*	*<0.005*	*<0.005*	*<0.5*	*<0.5*	-0.25	2	non-pag
Eyre Pit #3	0.01	*<0.005*	0.015	*<0.5*	1.5	-1.25	6	non-pag
Eyre Pit #4	*<0.005*	*<0.005*	*<0.005*	*<0.5*	*<0.5*	-0.25	2	non-pag
Eyre Pit #5	0.008	*<0.005*	0.013	*<0.5*	*<0.5*	-0.25	2	non-pag
Eyre Pit #6	*<0.005*	*<0.005*	*<0.005*	*<0.5*	*<0.5*	-0.25	2	non-pag
Eyre Pit #7	0.018	*<0.005*	0.023	*<0.5*	*<0.5*	-0.25	2	non-pag
Eyre Pit #8	0.008	*<0.005*	0.013	*<0.5*	*<0.5*	-0.25	2	non-pag
Eyre Pit #9	0.029	*<0.005*	0.034	*<0.5*	*<0.5*	-0.25	2	non-pag
Eyre Pit #10	0.014	*<0.005*	0.019	*<0.5*	3.4	-3.15	13.6	non-pag
Eyre Pit #10b Bulk	0.036	0.013	0.049	1.5	3.2	-1.7	2.1	non-pag
Vasse WRD								
Vasse WRD, #1 Bulk 0.3	0.01	*<0.005*	0.015	*<0.5*	2.2	-1.95	8.8	non-pag
Vasse WRD, #2 Bulk 0.0-1.5	*<0.005*	*<0.005*	*<0.005*	*<0.5*	2.2	-1.95	8.8	non-pag
Vasse WRD, #2 Bulk 1.5-3.0	*<0.005*	*<0.005*	*<0.005*	*<0.5*	1.5	-1.25	6	non-pag
Vasse WRD, #3 Bulk 0.0-1.5	0.019	*<0.005*	0.024	*<0.5*	3.4	-3.15	13.6	non-pag
Vasse WRD, #3 Bulk 1.5-3.0	0.016	*<0.005*	0.021	*<0.5*	2.2	-1.95	8.8	non-pag
Vasse WRD, #4 Bulk 0.0-1.5	0.011	*<0.005*	0.016	*<0.5*	2.2	-1.95	8.8	non-pag
Vasse WRD, #4 Bulk 1.5-3.0	0.015	*<0.005*	0.02	*<0.5*	3.4	-3.15	13.6	non-pag
Vasse WRD, #5 Bulk 0.0-1.5	0.019	*<0.005*	0.024	*<0.5*	8	-7.75	32	non-pag
Vasse WRD, #5 Bulk 1.5-3.0	0.007	*<0.005*	0.012	*<0.5*	4.4	-4.15	17.6	non-pag
Vasse WRD, #6 Bulk 0.0-1.5	*<0.005*	*<0.005*	*<0.005*	*<0.5*	5.1	-4.85	20.4	non-pag
Vasse WRD, #6 Bulk 1.5-3.0	*<0.005*	*<0.005*	*<0.005*	*<0.5*	3.4	-3.15	13.6	non-pag
Vasse WRD, #7 Bulk 0.0-1.5	0.008	*<0.005*	0.013	*<0.5*	4.6	-4.35	18.4	non-pag
Vasse WRD, #7 Bulk 1.5-3.0	*<0.005*	0.041	0.046	1.4	3.4	-2	2.4	non-pag
Vasse WRD, #8 Bulk 0.0-1.5	*<0.005*	0.009	0.014	*<0.5*	1.7	-1.45	6.8	non-pag
Vasse WRD, #8 Bulk 1.5-3.0	*<0.005*	*<0.005*	*<0.005*	*<0.5*	3.4	-3.15	13.6	non-pag
Vasse WRD, #9 Bulk 1.5-3.0	*<0.005*	0.055	0.06	1.8	2.4	-0.6	1.3	**Uncertain**
Vasse WRD, #10 Bulk 0.0-1.5	*<0.005*	*<0.005*	*<0.005*	*<0.5*	2.4	-2.15	9.6	non-pag
Vasse WRD, #10 Bulk 1.5-3.0	*<0.005*	0.013	0.018	*<0.5*	1.9	-1.65	7.6	non-pag
Vasse WRD, #11 Bulk 0.3	*<0.005*	*<0.005*	*<0.005*	*<0.5*	2.9	-2.65	11.6	non-pag
Vasse WRD, #12 Bulk 0.0-1.5	0.006	*<0.005*	0.011	*<0.5*	4.8	-4.55	19.2	non-pag
Vasse WRD, #12 Bulk 1.5-3.0	0.007	*<0.005*	0.012	*<0.5*	2.4	-2.15	9.6	non-pag
Vasse WRD, #13 Bulk 0.0-1.5	*<0.005*	0.036	0.041	1.3	3.1	-1.8	2.4	non-pag
Vasse WRD, #13 Bulk 1.5-3.0	*<0.005*	0.014	0.019	0.5	1.4	-0.9	2.8	non-pag
Vasse WRD, #14 Bulk 0.3	***<0.005***	**0.036**	**0.041**	**1**	**1.9**	**-0.9**	**1.9**	**Uncertain**
Vasse WRD, #15 Bulk 0.0-1.5	*<0.005*	0.033	0.038	1.1	3.4	-2.3	3.1	non-pag
Vasse WRD, #15 Bulk 1.5-3.0	*<0.005*	*<0.005*	*<0.005*	*<0.5*	2.2	-1.95	8.8	non-pag
Vasse WRD, #16 Bulk 0.0-1.5	*<0.005*	0.021	0.026	0.6	2.6	-2	4.3	non-pag
Vasse WRD, #16 Bulk 1.5-3.0	*<0.005*	0.04	0.045	1.1	2.2	-1.1	2	non-pag
Vasse WRD, #18 Bulk 0.0-1.5	0.012	*<0.005*	0.017	0.5	1.9	-1.4	3.8	non-pag
Vasse WRD, #18 Bulk 1.5-3.0	0.013	0.01	0.023	0.7	2.6	-1.9	3.7	non-pag
Vasse WRD, #19 Bulk 0.0-1.5	0.015	*<0.005*	0.02	*<0.5*	19	-18.75	76	non-pag
Vasse WRD, #19 Bulk 1.5-3.0	0.009	*<0.005*	0.014	*<0.5*	14	-13.75	56	non-pag
Vasse WRD, #20 Bulk 0.0-1.5	**0.023**	**0.22**	**0.243**	**7.4**	**3.9**	**3.5**	**0.5**	**PAG**
Vasse WRD, #20 Bulk 1.5-3.0	0.025	*<0.005*	0.03	*<0.5*	6.1	-5.85	24.4	non-pag
Vasse WRD, #21 Bulk 0.0-1.5	0.015	*<0.005*	0.02	0.6	2.4	-1.8	4	non-pag
Vasse WRD, #21 Bulk 1.5-3.0	**0.017**	**0.042**	**0.059**	**1.8**	**2.4**	**-0.6**	**1.3**	**Uncertain**

Table X.X. ABA results of Eyre Pit and Vasse WRD

Statistics	Sulfate Sulphur	Sulfide Sulphur	Sulfur, Calculated	Maximum Potenital Acidity* (MPA)	Acid Neutralizing Capacity (ANC)	Calculated Net Acid Production Potential (NAPP)	NPR	Criteria Based on NPR
	(wt. %)	(wt. %)	(wt. %)	(kg H_2SO_4/tonn	(kg H_2SO_4/Tonn	(kg H_2SO_4/Tonne)		
Vasse WRD, #22 Bulk 0.0-1.5	*<0.005*	0.008	0.013	*<0.5*	1.7	-1.45	6.8	non-pag
Vasse WRD, #25 Bulk 0.0-1.5	0.012	*<0.005*	0.017	*<0.5*	4.6	-4.35	18.4	non-pag
Vasse WRD, #25 Bulk 1.5-3.0	0.013	*<0.005*	0.018	*<0.5*	3.9	-3.65	15.6	non-pag
Vasse WRD, #26 Bulk 0.0-1.5	0.013	*<0.005*	0.018	*<0.5*	4.1	-3.85	16.4	non-pag
Vasse WRD, #26 Bulk 1.5-3.0	**0.009**	**0.048**	**0.057**	**1.7**	**2.9**	**-1.2**	**1.7**	**Uncertain**
Vasse WRD, #27 Bulk 0.3	**0.043**	***<0.005***	**0.048**	**1.2**	**2.2**	**-1**	**1.8**	**Uncertain**
Vasse WRD, #28 Bulk 0.0-1.5	**0.013**	**0.047**	**0.06**	**1.8**	**2.4**	**-0.6**	**1.3**	**Uncertain**
Vasse WRD, #28 Bulk 1.5-3.0	**0.072**	**0.026**	**0.098**	**3**	**4.4**	**-1.4**	**1.5**	**Uncertain**
Vasse WRD, #29 Bulk 0.0-1.5	0.02	*<0.005*	0.025	*<0.5*	7	-6.75	28	non-pag
Vasse WRD, #29 Bulk 1.5-3.0	0.019	0.017	0.036	1.1	2.4	-1.3	2.2	non-pag
Vasse WRD, #30 Bulk 0.0-1.5	0.028	0.008	0.036	1.1	2.7	-1.6	2.5	non-pag
Vasse WRD, #30 Bulk 1.5-3.0	0.015	*<0.005*	0.02	*<0.5*	5.1	-4.85	20.4	non-pag
Vasse WRD, #31 Bulk 0.0-1.5	0.018	0.04	0.058	1.8	4.4	-2.6	2.4	non-pag
Vasse WRD, #31 Bulk 1.5-3.0	0.015	*<0.005*	0.02	*<0.5*	5.3	-5.05	21.2	non-pag
Vasse WRD, #1 Bulk Surface	0.01	*<0.005*	0.015	*<0.5*	2.4	-2.15	9.6	non-pag
Vasse WRD, #11 Bulk Surface	0.015	*<0.005*	0.02	*<0.5*	2.4	-2.15	9.6	non-pag
Vasse WRD, #14 Bulk Surface	0.039	*<0.005*	0.044	*<0.5*	1.7	-1.45	6.8	non-pag
Vasse WRD, #27 Bulk Surface	0.051	*<0.005*	0.056	1.2	2.7	-1.5	2.25	non-pag

Calculated values used 0.5 x the reporting limit if variables were below detection limit.
If both sulfate and sulfide were below reporting limit, total sulfur was reported at the reporting lim.

Table X.X. Christmas Creek Groundwater statistical data

		Median	UpperQ (1)	Minimum	Maximum	LowerQ (3)	Mean	SD		two sample t-statistic	probability means are equal		Standard Error	95% confidence limits	lower limit	Upper limit
pre-disturbance	pH	7.465	7.125	6.35	8.36	7.9325	7.4928125	0.506494813		-1.372388517	9.01%		0.090969154	0.178299542	7.314512958	7.671112042
post-disturbance	pH	7.67	7.4275	6.87	8.36	7.855	7.639339623	0.311198203					0.055892847	0.109549981	7.529789642	7.748889603
pre-disturbance	TDS	1900	995	528	113000	3880	6070.697674	17330.30068		-0.69522892	24.61%		3112.613887	6100.723219	-30.02554416	12171.42089
post-disturbance	TDS	2590	1210	237	140000	5290	10012.22581	26383.03047					4738.532156	9287.523026	724.7027802	19299.74883
pre-disturbance	Al	0.005	0.005	0.005	0.046	0.005	0.006068182	0.006207264		-0.910338098	18.50%		0.001114858	0.002185121	0.003883061	0.008253303
post-disturbance	Al	0.005	0.005	0.005	1.14	0.005	0.031367925	0.154612469					0.027769219	0.05442767	-0.023059745	0.085795594
pre-disturbance	As	0.001	0.000625	0.0005	0.001	0.001	0.000833333	0.000258199		3.716281893	0.04%		4.63739E-05	9.08928E-05	0.000742441	0.000924226
post-disturbance	As	0.0005	0.0005	0.0005	0.002	0.0005	0.000571429	0.000295468					5.30677E-05	0.000104013	0.000467416	0.000675441
pre-disturbance	B	0.28	0.2275	0.18	1.94	0.415	0.410357143	0.364096875		0.163592048	43.56%		0.065393729	0.128171709	0.282185434	0.538528852
post-disturbance	B	0.23	0.18	0.08	3.17	0.3775	0.391415094	0.532022983					0.095554149	0.187286131	0.204128963	0.578701226
pre-disturbance	Ba	0.014	0.00675	0.003	0.03	0.025	0.015666667	0.011343133		-3.749830077	0.04%		0.002037287	0.003993082	0.011673584	0.019659749
post-disturbance	Ba	0.038	0.0245	0.009	0.288	0.06425	0.054821429	0.057019849					0.010241067	0.020072492	0.034748937	0.07489392
pre-disturbance	Ca	140	92.5	58	585	197	170.9318182	116.1193047		-0.743185423	23.16%		20.85564279	40.87705986	130.0547583	211.808878
post-disturbance	Ca	144	111	4	652	238.5	194.4245283	132.2607056					23.75472398	46.559259	147.8652693	240.9837873
pre-disturbance	Cd	0.00005	0.00005	0.00005	0.0001	0.0000875	6.66667E-05	2.58199E-05		-0.502164512	30.96%		4.63739E-06	9.08928E-06	5.75774E-05	7.57559E-05
post-disturbance	Cd	0.00005	0.00005	0.00005	0.0005	0.00005	0.000075	8.87151E-05					1.59337E-05	3.12301E-05	4.37699E-05	0.00010623
pre-disturbance	Cr	0.0005	0.0005	0.0005	0.004	0.0005	0.001083333	0.001428869		-1.662452245	5.34%		0.000256632	0.000503	0.000580334	0.001586333
post-disturbance	Cr	0.0005	0.0005	0.0005	0.014	0.00125	0.002321429	0.003892572					0.000699127	0.001370288	0.000951141	0.003691717
pre-disturbance	Fe	0.025	0.025	0.025	0.18	0.03125	0.035568182	0.026308013		-2.221024096	1.70%		0.004725059	0.009261115	0.026307067	0.044829297
post-disturbance	Fe	0.025	0.025	0.025	3.75	0.06625	0.319764151	0.711949497					0.127869904	0.250625013	0.069139138	0.570389164
pre-disturbance	Mg	94.5	61	36	3100	162.5	248.7954545	559.6626716		-0.368012939	35.77%		100.5183832	197.016031	51.77942353	445.8114856
post-disturbance	Mg	98	71.25	2	4660	246.25	310.3018868	743.4348233					133.524836	261.7086785	48.59320826	572.0105653
pre-disturbance	Mn	0.0055	0.0005	0	1.19	0.1	0.119488636	0.247171852		-1.738549834	4.62%		0.044393375	0.087011015	0.032477621	0.206499652
post-disturbance	Mn	0.031	0.00625	0	1.95	0.26625	0.29015566	0.48748481					0.087554857	0.171607519	0.118548142	0.461763179
pre-disturbance	K	29.5	19.75	14	2100	52.25	120.3409091	332.2992447		-0.685912852	24.90%		59.68270621	116.9781042	3.36280491	237.3190133
post-disturbance	K	34	22.25	5	4820	56.75	219.6226415	734.2018206					131.8665397	258.4584179	-38.83577638	478.0810594
pre-disturbance	Sr	0.4885	0.3665	0.18	6.56	0.87	0.919142857	1.28462915		-0.327572943	37.28%		0.230726206	0.452223365	0.466919492	1.371366222
post-disturbance	Sr	0.552	0.38175	0.024	12.2	1.0065	1.048330189	1.780804579					0.319841944	0.626890211	0.421439978	1.675220399
pre-disturbance	Zn	0.0195	0.018	0.01	0.045	0.02175	0.022333333	0.011877149		-2.684095053	0.59%		0.002133199	0.00418107	0.018152263	0.026514403
post-disturbance	Zn	0.032	0.024	0.005	0.098	0.041	0.0345	0.022268563					0.003999552	0.007839122	0.026660878	0.042339122
pre-disturbance	SO4	456	246	33	26000	947.5	1582.090909	4460.115348		-0.071490513	47.17%		801.0603642	1570.078314	12.01259518	3152.169223
post-disturbance	SO4	495	273.75	24	24700	687.25	1666.604167	4840.451866					869.3708193	1703.966806	-37.36263908	3370.570972

APPENDIX B

Geochemical Laboratory Data

ANALYTICAL REPORT

WORLD RECOGNISED ACCREDITATION

CLIENT DETAILS

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Project	**FMG Christmas Creek Ref 1296580100**
Order Number	(Not specified)
Samples	73

LABORATORY DETAILS

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Laboratory	SGS Newburn Environmental
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SGS Reference	**PE068612 R0**
Report Number	0000044855
Date Reported	21 Aug 2012
Date Received	25 Jun 2012

COMMENTS

Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562(898/20210).

Fibre Identification performed by Approved Identifier Karin White.

Four Acid Digest Metals subcontracted to SGS Perth Minerals, 10 Reid Rd Newburn WA, NATA Accreditation Number 1936, WM142946 and WM142962

XRD subcontracted to Microanalysis Australia, Suite 6 642 Albany Hwy Victoria Park WA 6100, Job NUmber 12_0735

ASLP DI Al, Cd and Pb replicate RPD for sample "Vasse WRD, #9 Bulk 1.5-3.0" was outside acceptance criteria due to sample heterogeneity.
ASLP DI Zn, Pb and Ba replicate RPD for sample "Vasse WRD, #15 Bulk 0.0-1.5" was outside acceptance criteria due to sample heterogeneity.
ASLP DI Pb replicate RPD for sample "Vasse WRD, #18 Bulk 0.0-1.5" was outside acceptance criteria due to sample heterogeneity.
ASLP DI Mn replicate RPD for sample "Vasse WRD, #25 Bulk 0.0-1.5" was outside acceptance criteria due to sample heterogeneity.
ASLP DI Al and Fe replicate RPD for sample "Eyre Pit #10b Bulk" was outside acceptance criteria due to sample heterogeneity.

SIGNATORIES

Corey Williams
National Operations Manager

Hue Thanh Ly
Spectroscopy Chemist

Karin White
Hygiene Signatory

Michael McKay
Inorganic Team Leader - Waters

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Laboratory Assistant Manager

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ANALYTICAL REPORT

PE068612 R0

Parameter	Units	LOR	Sample Number: PE068612.001 Sample Matrix: Soil Sample Date: 11 Jun 2012 Sample Name: Eyre Pit #1	PE068612.002 Soil 11 Jun 2012 Eyre Pit #2	PE068612.003 Soil 11 Jun 2012 Eyre Pit #3	PE068612.004 Soil 11 Jun 2012 Eyre Pit #4	PE068612.005 Soil 11 Jun 2012 Eyre Pit #5
Total Sulfur by LECO Furnace Method: AN202							
Total Sulfur*	%w/w	0.005	**0.013**	<0.005	<0.005	<0.005	<0.005
Maximum Potential Acidity*	kg H2SO4/T	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
HCl Extractable S, Ca and Mg in Soil ICP OES Method: AN014							
Acid Soluble Sulphur (SHCl)	%w/w	0.005	**0.007**	<0.005	**0.010**	<0.005	**0.008**
Acid Neutralising Capacity or Neutralisation Potential(ANC/NP) Method: AN212							
Fizz Rating Reaction*	No unit	-	NIL	NIL	NIL	NIL	NIL
Initial Effervescence*	No unit	-	No	No	No	No	No
Effervescence on Warming*	No unit	-	No	No	No	No	No
Titration - Green Colouration?*	No unit	-	No	No	No	No	No
Titration - Precipitate Formed?*	No unit	-	Yes	Yes	Yes	Yes	No
ANC as % $CaCO_3$	% CaCO3	0.1	<0.1	<0.1	**0.1**	<0.1	<0.1
ANC as % $CaMg(CO_3)2$	%w/w	0.1	**0.1**	<0.1	**0.2**	<0.1	<0.1
Acid Neutralisation Capacity/Neutralisation	kg CaCO3/T	1	<1.0	<1.0	**1.5**	<1.0	<1.0
Acid Neutralisation Capacity/Neutralisation	kg H2SO4/T	1	<1.0	<1.0	**1.5**	<1.0	<1.0
Net Acid Generation Potential (NAGP) Method: AN215							
Total Oxidisable Sulphur	kg H2SO4/T	0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Net Acid Production Potential	kg H2SO4/T	-400	**-1**	**0**	**-2**	**0**	**-1**
Total Oxidisable Sulphur	%w/w	0.005	**0.006**	<0.005	<0.005	<0.005	<0.005
Metals in soil by Four Acid digest, ICPMS Method: IMS40Q							
Silver, Ag*	ppm	0.1	**0.1**	**0.1**	**0.1**	**0.2**	**0.1**
Arsenic, As*	ppm	1	**40**	**16**	**33**	**10**	**41**
Barium, Ba*	ppm	2	**71**	**60**	**30**	**54**	**9**
Beryllium, Be*	ppm	0.1	**1**	**1.3**	**0.4**	**0.5**	**0.5**
Bismuth, Bi*	ppm	0.1	**0.3**	**0.7**	**0.1**	**0.8**	**0.2**
Cadmium, Cd*	ppm	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Cobalt, Co*	ppm	0.1	**8.7**	**0.8**	**6.4**	**5.6**	**3.9**
Copper, Cu*	ppm	2	**29**	**5**	**12**	**61**	**8**
Manganese, Mn*	ppm	0.5	**1000**	**64.1**	**3160**	**284**	**1650**
Molybdenum, Mo*	ppm	0.1	**1.5**	**3.1**	**0.8**	**1**	**0.7**
Nickel, Ni*	ppm	2	**37**	**12**	**22**	**179**	**15**
Lead, Pb*	ppm	1	**21**	**12**	**9**	**39**	**24**
Rubidium, Rb*	ppm	0.05	**4.17**	**16.2**	**1.26**	**14.3**	**0.54**
Antimony, Sb*	ppm	0.1	**3.3**	**1.8**	**1.4**	**1**	**1.7**
Selenium, Se*	ppm	2	<2	<2	<2	<2	<2
Tin, Sn*	ppm	0.3	**1.1**	**2.5**	**0.6**	**2.1**	**0.6**
Tellurium, Te*	ppm	0.1	**0.1**	**0.3**	<0.1	<0.1	<0.1
Thorium, Th*	ppm	0.05	**4.41**	**11.9**	**2.15**	**7.72**	**2.76**
Thallium, Tl*	ppm	0.1	<0.1	**0.1**	<0.1	**1.1**	<0.1
Uranium, U*	ppm	0.05	**1.71**	**2.83**	**1.74**	**3.09**	**1.02**
Tungsten, W*	ppm	0.1	**1.8**	**2.5**	**0.8**	**2.1**	**1.2**
Zinc, Zn*	ppm	5	**54**	**11**	**24**	**84**	**19**
Lithium, Li*	ppm	0.1	**1.6**	**17**	**1.3**	**19**	**0.4**
Cerium, Ce*	ppm	0.05	**22**	**12.2**	**35.3**	**108**	**27**
Cesium, Cs*	ppm	0.05	**0.15**	**0.61**	**0.09**	**0.72**	**0.09**
Gallium, Ga*	ppm	0.2	**7.9**	**21.6**	**3.5**	**7.9**	**4**
Hafnium, Hf*	ppm	0.05	**1.31**	**3.76**	**0.57**	**3.38**	**0.69**
Indium, In*	ppm	0.02	**0.05**	**0.08**	<0.02	<0.02	<0.02
Lanthanum, La*	ppm	0.05	**7.65**	**4.77**	**12.9**	**30.2**	**5.35**
Niobium, Nb*	ppm	0.1	**4.5**	**10.6**	**2.2**	**10.7**	**2.2**
Scandium, Sc*	ppm	0.2	**11.5**	**12.7**	**2.9**	**14.6**	**2.7**
Tantalum, Ta*	ppm	0.05	**0.53**	**1.26**	**0.28**	**1.3**	**0.22**

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ANALYTICAL REPORT

PE068612 R0

Parameter	Units	LOR	Sample Number: PE068612.001 Sample Matrix: Soil Sample Date: 11 Jun 2012 Sample Name: Eyre Pit #1	PE068612.002 Soil 11 Jun 2012 Eyre Pit #2	PE068612.003 Soil 11 Jun 2012 Eyre Pit #3	PE068612.004 Soil 11 Jun 2012 Eyre Pit #4	PE068612.005 Soil 11 Jun 2012 Eyre Pit #5
ICPAES after Four Acid Digest Digest Method: ICP40Q							
Aluminium, Al*	ppm	100	**31100**	**84700**	**16000**	**116000**	**5040**
Chromium, Cr*	ppm	10	**30**	**110**	<10	<10	**30**
Iron, Fe*	ppm	100	**467000**	**59600**	**513000**	**24700**	**549000**
Strontium, Sr*	ppm	1	**2**	**1**	**5**	**13**	<1
Titanium, Ti*	ppm	10	**1570**	**4380**	**680**	**4330**	**510**
Vanadium, V*	ppm	1	**69**	**73**	**18**	**14**	**19**
Zirconium, Zr*	ppm	1	**42**	**118**	**19**	**110**	**25**
Calcium, Ca*	ppm	50	**300**	**180**	**210**	**160**	**110**
Potassium, K*	ppm	100	**590**	**2730**	**190**	**2570**	<100
Magnesium, Mg*	ppm	20	**290**	**620**	**640**	**440**	**210**
Sodium, Na*	ppm	50	**160**	**230**	**80**	**250**	**70**
Phosphorus, P*	ppm	20	**630**	**30**	**980**	**90**	**800**
Sulphur, S*	ppm	20	**330**	**80**	**310**	**110**	**190**
Rare Earth Metals in soil by ICPMS Method: IMS12S							
Mercury, Hg*	ppm	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Rhenium, Re*	ppm	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Metals in soil by Nitric/Hydrofluoric Acid Digest, ICPMS Method:							
Ge*	ppm	0.5	**3.7**	**6.6**	**5.8**	**2.9**	**6.9**
ASLP (Australian Standard Leaching Procedure) DI Water Method: AN007							
Percentage Solids*	%	-	-	-	-	-	-
Mass of test sample for extraction	g	-	**50**	**50**	**50**	**50**	**50**
Mass of leaching solution used	g	-	**1000**	**1000**	**1000**	**1000**	**1000**
Leaching solution used*	No unit	-	DI Water	DI Water	DI Water	DI Water	DI Water
pH of solids leachate	pH Units	-	**8.9**	**8.6**	**8.2**	**8.6**	**6.1**
Conductivity @25C	µS/cm	1	**43**	**26**	**42**	**18**	**50**

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ANALYTICAL REPORT

PE068612 R0

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	PE068612.001 Soil 11 Jun 2012 Eyre Pit #1	PE068612.002 Soil 11 Jun 2012 Eyre Pit #2	PE068612.003 Soil 11 Jun 2012 Eyre Pit #3	PE068612.004 Soil 11 Jun 2012 Eyre Pit #4	PE068612.005 Soil 11 Jun 2012 Eyre Pit #5
Total Dissolved Solids (TDS) in ASLP DI Water Extract Method: AN113								
Total Dissolved Solids Dried at 180°C	mg/L	10		**16**	**16**	**24**	<10	<10
Alkalinity in ASLP DI Water Extract Method: AN135								
Bicarbonate Alkalinity as HCO3	mg/L	5		**6**	<5	**7**	<5	**5**
Carbonate Alkalinity as CO3	mg/L	1		<1	<1	<1	<1	<1
Hydroxide Alkalinity as OH	mg/L	5		<5	<5	<5	<5	<5
Total Alkalinity as CaCO3	mg/L	5		**5**	<5	**6**	<5	<5
Sulphate in ASLP DI Water Extract Method: AN275								
Sulphate	mg/L	1		**5**	<1	**6**	<1	**4**
Fluoride by Ion Selective Electrode in ASLP DI Water Leachate Method: AN141								
Fluoride by ISE	mg/L	0.1		**0.2**	<0.1	**0.3**	**0.5**	**0.1**
Metals in Water (ASLP DI) by ICPOES Method: AN320/AN321								
Calcium, Ca	mg/L	0.2		**0.9**	**0.4**	**1.6**	<0.2	**1.2**
Magnesium, Mg	mg/L	0.1		**0.8**	**0.5**	**1.2**	**0.1**	**1.2**
Phosphorus, P	mg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05
Potassium, K	mg/L	0.1		**0.6**	**1.7**	**0.5**	**0.7**	**0.4**
Sodium, Na	mg/L	0.5		**4.4**	**2.4**	**3.3**	**2.1**	**4.1**
Trace Metals in ASLP DI Extract by ICPMS Method: AN318								
Aluminium, Al	µg/L	1		**25**	**2**	<1	**110**	<1
Antimony, Sb	µg/L	1		<1	<1	<1	<1	<1
Arsenic, As	µg/L	1		**1**	<1	<1	<1	<1
Barium, Ba	µg/L	1		**120**	**60**	**62**	**54**	**54**
Bismuth, Bi	µg/L	1		<1	<1	<1	<1	<1
Boron, B	µg/L	5		**39**	**30**	**24**	**23**	**28**
Cadmium, Cd	µg/L	0.1		<0.1	<0.1	<0.1	<0.1	<0.1
Chromium, Cr	µg/L	1		<1	<1	<1	<1	<1
Cobalt, Co	µg/L	1		<1	<1	<1	<1	<1
Copper, Cu	µg/L	1		<1	<1	<1	<1	<1
Iron, Fe	µg/L	5		**71**	<5	<5	**34**	<5
Lead, Pb	µg/L	1		<1	<1	<1	<1	<1
Manganese, Mn	µg/L	1		<1	**27**	**11**	**7**	**210**
Molybdenum, Mo	µg/L	1		<1	<1	<1	<1	<1
Nickel, Ni	µg/L	1		<1	<1	<1	<1	<1
Selenium, Se	µg/L	2		<2	<2	<2	<2	<2
Silver, Ag	µg/L	1		<1	<1	<1	<1	<1
Strontium, Sr	µg/L	1		**13**	**2**	**19**	<1	**21**
Thallium, Tl	µg/L	1		<1	<1	<1	<1	<1
Thorium, Th	µg/L	1		<1	<1	<1	<1	<1
Tin, Sn	µg/L	1		<1	<1	<1	<1	<1
Uranium, U	µg/L	1		<1	<1	<1	<1	<1
Vanadium, V	µg/L	1		<1	<1	<1	<1	<1
Zinc, Zn	µg/L	1		**12**	**18**	**17**	**13**	**21**

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ANALYTICAL REPORT

PE068612 R0

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	PE068612.001 Soil 11 Jun 2012 Eyre Pit #1	PE068612.002 Soil 11 Jun 2012 Eyre Pit #2	PE068612.003 Soil 11 Jun 2012 Eyre Pit #3	PE068612.004 Soil 11 Jun 2012 Eyre Pit #4	PE068612.005 Soil 11 Jun 2012 Eyre Pit #5
Mercury in ASLP DI Water Extract Method: AN311/AN312								
Mercury	mg/L	0.0005		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Sample Subcontracted Method:								
Sample Subcontracted*	No unit	-		-	-	-	-	-
Fibre ID in bulk materials Method: AN602								
FibreID								
Asbestos Detected	No unit	-		-	-	-	-	-

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ANALYTICAL REPORT

PE068612 R0

Parameter	Units	LOR	Sample Number: PE068612.006 Sample Matrix: Soil Sample Date: 11 Jun 2012 Sample Name: Eyre Pit #6	PE068612.007 Soil 11 Jun 2012 Eyre Pit #7	PE068612.008 Soil 11 Jun 2012 Eyre Pit #8	PE068612.009 Soil 11 Jun 2012 Eyre Pit #9	PE068612.010 Soil 11 Jun 2012 Eyre Pit #10
Total Sulfur by LECO Furnace Method: AN202							
Total Sulfur*	%w/w	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Maximum Potential Acidity*	kg H2SO4/T	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
HCl Extractable S, Ca and Mg in Soil ICP OES Method: AN014							
Acid Soluble Sulphur (SHCl)	%w/w	0.005	<0.005	**0.018**	**0.008**	**0.029**	**0.014**
Acid Neutralising Capacity or Neutralisation Potential(ANC/NP) Method: AN212							
Fizz Rating Reaction*	No unit	-	NIL	NIL	NIL	NIL	NIL
Initial Effervescence*	No unit	-	No	No	No	No	No
Effervescence on Warming*	No unit	-	No	No	No	No	No
Titration - Green Colouration?*	No unit	-	No	No	No	No	No
Titration - Precipitate Formed?*	No unit	-	No	No	No	Yes	Yes
ANC as % $CaCO_3$	% CaCO3	0.1	<0.1	<0.1	<0.1	<0.1	**0.3**
ANC as % $CaMg(CO_3)2$	%w/w	0.1	<0.1	<0.1	<0.1	<0.1	**0.4**
Acid Neutralisation Capacity/Neutralisation	kg CaCO3/T	1	<1.0	<1.0	<1.0	<1.0	**3.5**
Acid Neutralisation Capacity/Neutralisation	kg H2SO4/T	1	<1.0	<1.0	<1.0	<1.0	**3.4**
Net Acid Generation Potential (NAGP) Method: AN215							
Total Oxidisable Sulphur	kg H2SO4/T	0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Net Acid Production Potential	kg H2SO4/T	-400	**-1**	**-1**	**0**	**-1**	**-4**
Total Oxidisable Sulphur	%w/w	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Metals in soil by Four Acid digest, ICPMS Method: IMS40Q							
Silver, Ag*	ppm	0.1	**0.3**	**0.1**	<0.1	<0.1	<0.1
Arsenic, As*	ppm	1	**82**	**187**	**86**	**160**	**229**
Barium, Ba*	ppm	2	**36**	**6**	**9**	**65**	**152**
Beryllium, Be*	ppm	0.1	**0.5**	**0.8**	**0.2**	**0.7**	**0.5**
Bismuth, Bi*	ppm	0.1	**0.2**	**0.5**	**2**	**0.7**	**0.7**
Cadmium, Cd*	ppm	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Cobalt, Co*	ppm	0.1	**1.4**	**1.8**	**5.1**	**9.7**	**8**
Copper, Cu*	ppm	2	**4**	**10**	**9**	**24**	**59**
Manganese, Mn*	ppm	0.5	**1160**	**646**	**347**	**487**	**4310**
Molybdenum, Mo*	ppm	0.1	**1.3**	**1.7**	**1.8**	**2.2**	**1.6**
Nickel, Ni*	ppm	2	**8**	**19**	**103**	**211**	**51**
Lead, Pb*	ppm	1	**17**	**31**	**68**	**42**	**59**
Rubidium, Rb*	ppm	0.05	**0.84**	**0.32**	**0.36**	**4.35**	**29.2**
Antimony, Sb*	ppm	0.1	**1.3**	**3.4**	**2.1**	**3.9**	**5.2**
Selenium, Se*	ppm	2	<2	<2	<2	<2	**7**
Tin, Sn*	ppm	0.3	**0.6**	**2.3**	**7.4**	**3.3**	**4**
Tellurium, Te*	ppm	0.1	<0.1	<0.1	**0.4**	**0.6**	**0.4**
Thorium, Th*	ppm	0.05	**2.29**	**8.56**	**41.5**	**17.3**	**14.9**
Thallium, Tl*	ppm	0.1	<0.1	<0.1	<0.1	<0.1	**0.5**
Uranium, U*	ppm	0.05	**0.51**	**2.23**	**9.37**	**3.91**	**4.74**
Tungsten, W*	ppm	0.1	**1.5**	**3.2**	**10.4**	**4.9**	**3.8**
Zinc, Zn*	ppm	5	**13**	**9**	**28**	**59**	**31**
Lithium, Li*	ppm	0.1	**0.7**	**7.4**	**14**	**10**	**6.2**
Cerium, Ce*	ppm	0.05	**24.2**	**18.8**	**22.1**	**159**	**89.3**
Cesium, Cs*	ppm	0.05	**0.09**	**0.07**	**0.12**	**0.3**	**5.48**
Gallium, Ga*	ppm	0.2	**4.6**	**15.8**	**76.3**	**31.3**	**46**
Hafnium, Hf*	ppm	0.05	**0.52**	**2.56**	**11**	**5.83**	**3.98**
Indium, In*	ppm	0.02	<0.02	**0.07**	**0.12**	**0.12**	**0.14**
Lanthanum, La*	ppm	0.05	**15.8**	**11.8**	**10.7**	**87.2**	**52.6**
Niobium, Nb*	ppm	0.1	**1.9**	**7.9**	**27.8**	**13.7**	**10.6**
Scandium, Sc*	ppm	0.2	**2**	**7.6**	**21.8**	**25.9**	**14.1**
Tantalum, Ta*	ppm	0.05	**0.17**	**0.81**	**2.32**	**1.46**	**1.1**

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ANALYTICAL REPORT

PE068612 R0

Parameter	Units	LOR	Sample Number: PE068612.006 Sample Matrix: Soil Sample Date: 11 Jun 2012 Sample Name: Eyre Pit #6	PE068612.007 Soil 11 Jun 2012 Eyre Pit #7	PE068612.008 Soil 11 Jun 2012 Eyre Pit #8	PE068612.009 Soil 11 Jun 2012 Eyre Pit #9	PE068612.010 Soil 11 Jun 2012 Eyre Pit #10
ICPAES after Four Acid Digest Digest Method: ICP40Q							
Aluminium, Al*	ppm	100	**5340**	**60300**	**142000**	**93900**	**73800**
Chromium, Cr*	ppm	10	**20**	**90**	**150**	**190**	**260**
Iron, Fe*	ppm	100	**402000**	**416000**	**134000**	**268000**	**300000**
Strontium, Sr*	ppm	1	<1	<1	<1	**27**	**41**
Titanium, Ti*	ppm	10	**650**	**2820**	**12700**	**5570**	**4010**
Vanadium, V*	ppm	1	**22**	**67**	**32**	**163**	**111**
Zirconium, Zr*	ppm	1	**21**	**88**	**391**	**164**	**131**
Calcium, Ca*	ppm	50	**90**	**330**	**460**	**230**	**1050**
Potassium, K*	ppm	100	**120**	<100	<100	**1130**	**7180**
Magnesium, Mg*	ppm	20	**190**	**210**	**270**	**640**	**2490**
Sodium, Na*	ppm	50	<50	**400**	**350**	**400**	**570**
Phosphorus, P*	ppm	20	**450**	**320**	**130**	**830**	**220**
Sulphur, S*	ppm	20	**100**	**350**	**200**	**440**	**670**
Rare Earth Metals in soil by ICPMS Method: IMS12S							
Mercury, Hg*	ppm	0.1	<0.1	**0.2**	<0.1	<0.1	**0.3**
Rhenium, Re*	ppm	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Metals in soil by Nitric/Hydrofluoric Acid Digest, ICPMS Method:							
Ge*	ppm	0.5	**5.6**	**10.2**	**6.7**	**3.3**	**2.8**
ASLP (Australian Standard Leaching Procedure) DI Water Method: AN007							
Percentage Solids*	%	-	-	-	-	-	-
Mass of test sample for extraction	g	-	**50**	**50**	**50**	**50**	**50**
Mass of leaching solution used	g	-	**1000**	**1000**	**1000**	**1000**	**1000**
Leaching solution used*	No unit	-	DI Water	DI Water	DI Water	DI Water	DI Water
pH of solids leachate	pH Units	-	**6.3**	**6.4**	**6.6**	**5.8**	**7.1**
Conductivity @25C	µS/cm	1	**19**	**160**	**73**	**190**	**62**

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ANALYTICAL REPORT

PE068612 R0

Parameter	Units	LOR	Sample Number: PE068612.006 Sample Matrix: Soil Sample Date: 11 Jun 2012 Sample Name: Eyre Pit #6	PE068612.007 Soil 11 Jun 2012 Eyre Pit #7	PE068612.008 Soil 11 Jun 2012 Eyre Pit #8	PE068612.009 Soil 11 Jun 2012 Eyre Pit #9	PE068612.010 Soil 11 Jun 2012 Eyre Pit #10
Total Dissolved Solids (TDS) in ASLP DI Water Extract Method: AN113							
Total Dissolved Solids Dried at 180°C	mg/L	10	<10	**52**	**20**	**56**	**200**
Alkalinity in ASLP DI Water Extract Method: AN135							
Bicarbonate Alkalinity as HCO3	mg/L	5	<5	<5	<5	<5	**25**
Carbonate Alkalinity as CO3	mg/L	1	<1	<1	<1	<1	<1
Hydroxide Alkalinity as OH	mg/L	5	<5	<5	<5	<5	<5
Total Alkalinity as CaCO3	mg/L	5	<5	<5	<5	<5	**21**
Sulphate in ASLP DI Water Extract Method: AN275							
Sulphate	mg/L	1	**2**	**19**	**1**	**20**	**2**
Fluoride by Ion Selective Electrode in ASLP DI Water Leachate Method: AN141							
Fluoride by ISE	mg/L	0.1	<0.1	**0.2**	**0.4**	**0.1**	**0.6**
Metals in Water (ASLP DI) by ICPOES Method: AN320/AN321							
Calcium, Ca	mg/L	0.2	**0.6**	**4.0**	**0.3**	**2.6**	**1.6**
Magnesium, Mg	mg/L	0.1	**0.4**	**2.7**	**0.1**	**5.4**	**1.6**
Phosphorus, P	mg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Potassium, K	mg/L	0.1	**0.4**	**0.5**	**0.3**	**2.2**	**1.1**
Sodium, Na	mg/L	0.5	**0.9**	**15**	**10**	**14**	**5.7**
Trace Metals in ASLP DI Extract by ICPMS Method: AN318							
Aluminium, Al	µg/L	1	<1	<1	**43**	**5**	**34**
Antimony, Sb	µg/L	1	<1	<1	<1	<1	<1
Arsenic, As	µg/L	1	<1	<1	<1	<1	**2**
Barium, Ba	µg/L	1	**51**	**62**	**48**	**95**	**24**
Bismuth, Bi	µg/L	1	<1	<1	<1	<1	<1
Boron, B	µg/L	5	**14**	**56**	**69**	**28**	**39**
Cadmium, Cd	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium, Cr	µg/L	1	<1	**7**	**11**	**5**	**11**
Cobalt, Co	µg/L	1	<1	<1	<1	<1	<1
Copper, Cu	µg/L	1	<1	<1	<1	<1	<1
Iron, Fe	µg/L	5	<5	<5	**45**	<5	**39**
Lead, Pb	µg/L	1	<1	<1	<1	<1	<1
Manganese, Mn	µg/L	1	**700**	**14**	**2**	**11**	**2**
Molybdenum, Mo	µg/L	1	<1	<1	<1	<1	<1
Nickel, Ni	µg/L	1	**2**	<1	<1	**12**	<1
Selenium, Se	µg/L	2	<2	<2	<2	<2	<2
Silver, Ag	µg/L	1	<1	<1	<1	<1	<1
Strontium, Sr	µg/L	1	**6**	**25**	<1	**37**	**15**
Thallium, Tl	µg/L	1	<1	<1	<1	<1	<1
Thorium, Th	µg/L	1	<1	<1	<1	<1	<1
Tin, Sn	µg/L	1	<1	<1	<1	<1	<1
Uranium, U	µg/L	1	<1	<1	<1	<1	<1
Vanadium, V	µg/L	1	<1	<1	<1	<1	<1
Zinc, Zn	µg/L	1	**13**	**18**	**12**	**21**	<1

ANALYTICAL REPORT

PE068612 R0

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	PE068612.006 Soil 11 Jun 2012 Eyre Pit #6	PE068612.007 Soil 11 Jun 2012 Eyre Pit #7	PE068612.008 Soil 11 Jun 2012 Eyre Pit #8	PE068612.009 Soil 11 Jun 2012 Eyre Pit #9	PE068612.010 Soil 11 Jun 2012 Eyre Pit #10
Mercury in ASLP DI Water Extract Method: AN311/AN312								
Mercury	mg/L	0.0005		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Sample Subcontracted Method:								
Sample Subcontracted*	No unit	-		-	-	-	-	-
Fibre ID in bulk materials Method: AN602								
FibreID								
Asbestos Detected	No unit	-		-	-	-	-	-

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ANALYTICAL REPORT

PE068612 R0

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	PE068612.011 Soil 12 Jun 2012 Eyre Pit #10b - Crystalline	PE068612.012 Soil 12 Jun 2012 Eyre Pit #10b - Globular	PE068612.013 Soil 12 Jun 2012 Vasse WRD, #1 Bulk 0.3	PE068612.014 Soil 14 Jun 2012 Vasse WRD, #2 Bulk 0.0-1.5	PE068612.015 Soil 14 Jun 2012 Vasse WRD, #2 Bulk 1.5-3.0
Total Sulfur by LECO Furnace Method: AN202								
Total Sulfur*	%w/w	0.005		-	-	<0.005	<0.005	<0.005
Maximum Potential Acidity*	kg H2SO4/T	0.5		-	-	<0.5	<0.5	<0.5
HCl Extractable S, Ca and Mg in Soil ICP OES Method: AN014								
Acid Soluble Sulphur (SHCl)	%w/w	0.005		-	-	**0.010**	<0.005	<0.005
Acid Neutralising Capacity or Neutralisation Potential(ANC/NP) Method: AN212								
Fizz Rating Reaction*	No unit	-		-	-	NIL	NIL	NIL
Initial Effervescence*	No unit	-		-	-	No	No	No
Effervescence on Warming*	No unit	-		-	-	No	No	No
Titration - Green Colouration?*	No unit	-		-	-	No	No	No
Titration - Precipitate Formed?*	No unit	-		-	-	Yes	Yes	Yes
ANC as % $CaCO_3$	% CaCO3	0.1		-	-	**0.2**	**0.2**	**0.1**
ANC as % $CaMg(CO_3)2$	%w/w	0.1		-	-	**0.2**	**0.2**	**0.2**
Acid Neutralisation Capacity/Neutralisation	kg CaCO3/T	1		-	-	**2.2**	**2.2**	**1.5**
Acid Neutralisation Capacity/Neutralisation	kg H2SO4/T	1		-	-	**2.2**	**2.2**	**1.5**
Net Acid Generation Potential (NAGP) Method: AN215								
Total Oxidisable Sulphur	kg H2SO4/T	0.25		-	-	<0.25	<0.25	<0.25
Net Acid Production Potential	kg H2SO4/T	-400		-	-	**-2**	**-2**	**-2**
Total Oxidisable Sulphur	%w/w	0.005		-	-	<0.005	<0.005	<0.005
Metals in soil by Four Acid digest, ICPMS Method: IMS40Q								
Silver, Ag*	ppm	0.1		-	-	<0.1	**0.1**	**0.1**
Arsenic, As*	ppm	1		-	-	**40**	**48**	**57**
Barium, Ba*	ppm	2		-	-	**43**	**139**	**155**
Beryllium, Be*	ppm	0.1		-	-	**0.8**	**0.6**	**0.6**
Bismuth, Bi*	ppm	0.1		-	-	**0.6**	**0.5**	**0.5**
Cadmium, Cd*	ppm	0.1		-	-	<0.1	<0.1	<0.1
Cobalt, Co*	ppm	0.1		-	-	**32.3**	**10.5**	**10.8**
Copper, Cu*	ppm	2		-	-	**18**	**39**	**36**
Manganese, Mn*	ppm	0.5		-	-	**12400**	**1020**	**1280**
Molybdenum, Mo*	ppm	0.1		-	-	**0.8**	**2.5**	**2.5**
Nickel, Ni*	ppm	2		-	-	**55**	**38**	**36**
Lead, Pb*	ppm	1		-	-	**30**	**29**	**30**
Rubidium, Rb*	ppm	0.05		-	-	**0.55**	**30**	**30.6**
Antimony, Sb*	ppm	0.1		-	-	**4.3**	**4**	**4.6**
Selenium, Se*	ppm	2		-	-	<2	**2**	**2**
Tin, Sn*	ppm	0.3		-	-	**2.8**	**3**	**2.9**
Tellurium, Te*	ppm	0.1		-	-	**0.2**	**0.3**	**0.3**
Thorium, Th*	ppm	0.05		-	-	**9.1**	**14.8**	**15.4**
Thallium, Tl*	ppm	0.1		-	-	**0.2**	**0.3**	**0.3**
Uranium, U*	ppm	0.05		-	-	**4.08**	**2.53**	**2.38**
Tungsten, W*	ppm	0.1		-	-	**1.9**	**1.8**	**1.9**
Zinc, Zn*	ppm	5		-	-	**74**	**59**	**54**
Lithium, Li*	ppm	0.1		-	-	**6.4**	**6.5**	**7.0**
Cerium, Ce*	ppm	0.05		-	-	**94**	**40**	**42.6**
Cesium, Cs*	ppm	0.05		-	-	**0.13**	**2.03**	**2.04**
Gallium, Ga*	ppm	0.2		-	-	**15.4**	**19.8**	**20.6**
Hafnium, Hf*	ppm	0.05		-	-	**2.92**	**3.95**	**4**
Indium, In*	ppm	0.02		-	-	**0.09**	**0.16**	**0.16**
Lanthanum, La*	ppm	0.05		-	-	**29.1**	**17.7**	**19.7**
Niobium, Nb*	ppm	0.1		-	-	**8.5**	**9.8**	**10.1**
Scandium, Sc*	ppm	0.2		-	-	**13.6**	**15**	**14.3**
Tantalum, Ta*	ppm	0.05		-	-	**0.86**	**0.86**	**0.89**

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ANALYTICAL REPORT

PE068612 R0

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	PE068612.011 Soil 12 Jun 2012 Eyre Pit #10b - Crystalline	PE068612.012 Soil 12 Jun 2012 Eyre Pit #10b - Globular	PE068612.013 Soil 12 Jun 2012 Vasse WRD, #1 Bulk 0.3	PE068612.014 Soil 14 Jun 2012 Vasse WRD, #2 Bulk 0.0-1.5	PE068612.015 Soil 14 Jun 2012 Vasse WRD, #2 Bulk 1.5-3.0
ICPAES after Four Acid Digest Digest Method: ICP40Q								
Aluminium, Al*	ppm	100		-	-	**44900**	**49100**	**47900**
Chromium, Cr*	ppm	10		-	-	**20**	**140**	**150**
Iron, Fe*	ppm	100		-	-	**487000**	**364000**	**373000**
Strontium, Sr*	ppm	1		-	-	**4**	**15**	**17**
Titanium, Ti*	ppm	10		-	-	**2730**	**3730**	**3720**
Vanadium, V*	ppm	1		-	-	**69**	**184**	**202**
Zirconium, Zr*	ppm	1		-	-	**100**	**164**	**141**
Calcium, Ca*	ppm	50		-	-	**240**	**990**	**740**
Potassium, K*	ppm	100		-	-	**110**	**4070**	**4080**
Magnesium, Mg*	ppm	20		-	-	**630**	**810**	**790**
Sodium, Na*	ppm	50		-	-	**60**	**480**	**520**
Phosphorus, P*	ppm	20		-	-	**220**	**590**	**560**
Sulphur, S*	ppm	20		-	-	**380**	**280**	**270**
Rare Earth Metals in soil by ICPMS Method: IMS12S								
Mercury, Hg*	ppm	0.1		-	-	<0.1	<0.1	<0.1
Rhenium, Re*	ppm	0.05		-	-	<0.05	<0.05	<0.05
Metals in soil by Nitric/Hydrofluoric Acid Digest, ICPMS Method:								
Ge*	ppm	0.5		-	-	**2.5**	**4.4**	**4.5**
ASLP (Australian Standard Leaching Procedure) DI Water Method: AN007								
Percentage Solids*	%	-		-	-	-	-	-
Mass of test sample for extraction	g	-		-	-	**50**	**50**	**50**
Mass of leaching solution used	g	-		-	-	**1000**	**1000**	**1000**
Leaching solution used*	No unit	-		-	-	DI Water	DI Water	DI Water
pH of solids leachate	pH Units	-		-	-	**6.2**	**6.7**	**6.4**
Conductivity @25C	µS/cm	1		-	-	**45**	**93**	**55**

ANALYTICAL REPORT

PE068612 R0

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	PE068612.011 Soil 12 Jun 2012 Eyre Pit #10b - Crystalline	PE068612.012 Soil 12 Jun 2012 Eyre Pit #10b - Globular	PE068612.013 Soil 12 Jun 2012 Vasse WRD, #1 Bulk 0.3	PE068612.014 Soil 14 Jun 2012 Vasse WRD, #2 Bulk 0.0-1.5	PE068612.015 Soil 14 Jun 2012 Vasse WRD, #2 Bulk 1.5-3.0
Total Dissolved Solids (TDS) in ASLP DI Water Extract Method: AN113								
Total Dissolved Solids Dried at 180°C	mg/L	10		-	-	<10	**36**	**32**
Alkalinity in ASLP DI Water Extract Method: AN135								
Bicarbonate Alkalinity as HCO3	mg/L	5		-	-	<5	**33**	**14**
Carbonate Alkalinity as CO3	mg/L	1		-	-	<1	<1	<1
Hydroxide Alkalinity as OH	mg/L	5		-	-	<5	<5	<5
Total Alkalinity as CaCO3	mg/L	5		-	-	<5	**27**	**11**
Sulphate in ASLP DI Water Extract Method: AN275								
Sulphate	mg/L	1		-	-	**6**	**2**	**2**
Fluoride by Ion Selective Electrode in ASLP DI Water Leachate Method: AN141								
Fluoride by ISE	mg/L	0.1		-	-	**0.4**	<0.1	<0.1
Metals in Water (ASLP DI) by ICPOES Method: AN320/AN321								
Calcium, Ca	mg/L	0.2		-	-	**1.0**	**8.2**	**2.6**
Magnesium, Mg	mg/L	0.1		-	-	**1.3**	**1.1**	**0.5**
Phosphorus, P	mg/L	0.05		-	-	<0.05	<0.05	<0.05
Potassium, K	mg/L	0.1		-	-	**0.5**	**5.6**	**5.7**
Sodium, Na	mg/L	0.5		-	-	**2.9**	**0.8**	**0.8**
Trace Metals in ASLP DI Extract by ICPMS Method: AN318								
Aluminium, Al	µg/L	1		-	-	**6**	<1	**100**
Antimony, Sb	µg/L	1		-	-	<1	<1	<1
Arsenic, As	µg/L	1		-	-	<1	<1	<1
Barium, Ba	µg/L	1		-	-	**62**	**98**	**82**
Bismuth, Bi	µg/L	1		-	-	<1	<1	<1
Boron, B	µg/L	5		-	-	**47**	**20**	**27**
Cadmium, Cd	µg/L	0.1		-	-	<0.1	<0.1	<0.1
Chromium, Cr	µg/L	1		-	-	**2**	<1	<1
Cobalt, Co	µg/L	1		-	-	<1	**2**	**2**
Copper, Cu	µg/L	1		-	-	<1	<1	<1
Iron, Fe	µg/L	5		-	-	**12**	**8**	**180**
Lead, Pb	µg/L	1		-	-	<1	<1	<1
Manganese, Mn	µg/L	1		-	-	**2**	**320**	**250**
Molybdenum, Mo	µg/L	1		-	-	<1	<1	<1
Nickel, Ni	µg/L	1		-	-	<1	<1	<1
Selenium, Se	µg/L	2		-	-	<2	<2	<2
Silver, Ag	µg/L	1		-	-	<1	<1	<1
Strontium, Sr	µg/L	1		-	-	**18**	**43**	**19**
Thallium, Tl	µg/L	1		-	-	<1	<1	<1
Thorium, Th	µg/L	1		-	-	<1	<1	<1
Tin, Sn	µg/L	1		-	-	<1	<1	<1
Uranium, U	µg/L	1		-	-	<1	<1	<1
Vanadium, V	µg/L	1		-	-	<1	<1	<1
Zinc, Zn	µg/L	1		-	-	**10**	**12**	**16**

ANALYTICAL REPORT

PE068612 R0

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	PE068612.011 Soil 12 Jun 2012 Eyre Pit #10b - Crystalline	PE068612.012 Soil 12 Jun 2012 Eyre Pit #10b - Globular	PE068612.013 Soil 12 Jun 2012 Vasse WRD, #1 Bulk 0.3	PE068612.014 Soil 14 Jun 2012 Vasse WRD, #2 Bulk 0.0-1.5	PE068612.015 Soil 14 Jun 2012 Vasse WRD, #2 Bulk 1.5-3.0
Mercury in ASLP DI Water Extract Method: AN311/AN312								
Mercury	mg/L	0.0005		-	-	<0.0005	<0.0005	<0.0005
Sample Subcontracted Method:								
Sample Subcontracted*	No unit	-		-	-	-	-	-
Fibre ID in bulk materials Method: AN602								
FibreID								
Asbestos Detected	No unit	-		-	-	-	-	-

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ANALYTICAL REPORT

PE068612 R0

Parameter	Units	LOR	Sample Number: PE068612.016 Sample Matrix: Soil Sample Date: 13 Jun 2012 Sample Name: Vasse WRD, #3 Bulk 0.0-1.5	PE068612.017 Soil 13 Jun 2012 Vasse WRD, #3 Bulk 1.5-3.0	PE068612.018 Soil 13 Jun 2012 Vasse WRD, #4 Bulk 0.0-1.5	PE068612.019 Soil 13 Jun 2012 Vasse WRD, #4 Bulk 1.5-3.0	PE068612.020 Soil 13 Jun 2012 Vasse WRD, #5 Bulk 0.0-1.5
Total Sulfur by LECO Furnace Method: AN202							
Total Sulfur*	%w/w	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Maximum Potential Acidity*	kg H2SO4/T	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
HCl Extractable S, Ca and Mg in Soil ICP OES Method: AN014							
Acid Soluble Sulphur (SHCl)	%w/w	0.005	**0.019**	**0.016**	**0.011**	**0.015**	**0.019**
Acid Neutralising Capacity or Neutralisation Potential(ANC/NP) Method: AN212							
Fizz Rating Reaction*	No unit	-	NIL	NIL	NIL	NIL	NIL
Initial Effervescence*	No unit	-	No	No	No	No	No
Effervescence on Warming*	No unit	-	No	No	No	No	No
Titration - Green Colouration?*	No unit	-	No	No	No	No	No
Titration - Precipitate Formed?*	No unit	-	Yes	Yes	Yes	No	No
ANC as % $CaCO_3$	% CaCO3	0.1	**0.3**	**0.2**	**0.2**	**0.3**	**0.8**
ANC as % $CaMg(CO_3)2$	%w/w	0.1	**0.4**	**0.2**	**0.2**	**0.4**	**0.9**
Acid Neutralisation Capacity/Neutralisation	kg CaCO3/T	1	**3.5**	**2.2**	**2.2**	**3.5**	**8.2**
Acid Neutralisation Capacity/Neutralisation	kg H2SO4/T	1	**3.4**	**2.2**	**2.2**	**3.4**	**8.0**
Net Acid Generation Potential (NAGP) Method: AN215							
Total Oxidisable Sulphur	kg H2SO4/T	0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Net Acid Production Potential	kg H2SO4/T	-400	**-4**	**-3**	**-3**	**-4**	**-9**
Total Oxidisable Sulphur	%w/w	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Metals in soil by Four Acid digest, ICPMS Method: IMS40Q							
Silver, Ag*	ppm	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Arsenic, As*	ppm	1	**21**	**24**	**14**	**20**	**22**
Barium, Ba*	ppm	2	**76**	**107**	**47**	**59**	**53**
Beryllium, Be*	ppm	0.1	**0.5**	**0.5**	**0.4**	**0.4**	**0.4**
Bismuth, Bi*	ppm	0.1	**0.2**	**0.3**	**0.1**	**0.2**	**0.1**
Cadmium, Cd*	ppm	0.1	**0.1**	<0.1	<0.1	<0.1	<0.1
Cobalt, Co*	ppm	0.1	**12.3**	**12.5**	**6**	**10.2**	**8.9**
Copper, Cu*	ppm	2	**35**	**26**	**14**	**21**	**22**
Manganese, Mn*	ppm	0.5	**3240**	**3040**	**1190**	**2620**	**2680**
Molybdenum, Mo*	ppm	0.1	**1**	**1**	**0.5**	**0.8**	**0.7**
Nickel, Ni*	ppm	2	**28**	**30**	**14**	**21**	**22**
Lead, Pb*	ppm	1	**20**	**17**	**13**	**15**	**11**
Rubidium, Rb*	ppm	0.05	**1.77**	**1.97**	**0.86**	**1.12**	**0.64**
Antimony, Sb*	ppm	0.1	**2.6**	**2.8**	**1.4**	**2**	**1.8**
Selenium, Se*	ppm	2	<2	<2	<2	<2	<2
Tin, Sn*	ppm	0.3	**1.1**	**1.2**	**0.5**	**0.7**	**0.6**
Tellurium, Te*	ppm	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Thorium, Th*	ppm	0.05	**4.25**	**5.27**	**1.88**	**3.26**	**2.57**
Thallium, Tl*	ppm	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Uranium, U*	ppm	0.05	**3.34**	**1.99**	**1.27**	**1.71**	**1.65**
Tungsten, W*	ppm	0.1	**2.7**	**1.6**	**1.1**	**1.4**	**1.2**
Zinc, Zn*	ppm	5	**75**	**56**	**28**	**38**	**52**
Lithium, Li*	ppm	0.1	**1.8**	**2.4**	**1.4**	**1.9**	**1.0**
Cerium, Ce*	ppm	0.05	**43.7**	**36.4**	**14.8**	**25**	**16.2**
Cesium, Cs*	ppm	0.05	**0.19**	**0.2**	**0.1**	**0.14**	**0.09**
Gallium, Ga*	ppm	0.2	**6.5**	**7.7**	**2.9**	**4.7**	**4.1**
Hafnium, Hf*	ppm	0.05	**1.24**	**1.49**	**0.5**	**0.89**	**0.7**
Indium, In*	ppm	0.02	**0.04**	**0.05**	<0.02	**0.03**	**0.02**
Lanthanum, La*	ppm	0.05	**9.67**	**11**	**5.28**	**6.67**	**6.39**
Niobium, Nb*	ppm	0.1	**3.8**	**4.4**	**1.7**	**2.6**	**2.3**
Scandium, Sc*	ppm	0.2	**7**	**9.6**	**4.3**	**8.2**	**5.7**
Tantalum, Ta*	ppm	0.05	**0.37**	**0.39**	**0.15**	**0.25**	**0.22**

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ANALYTICAL REPORT

PE068612 R0

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	PE068612.016 Soil 13 Jun 2012 Vasse WRD, #3 Bulk 0.0-1.5	PE068612.017 Soil 13 Jun 2012 Vasse WRD, #3 Bulk 1.5-3.0	PE068612.018 Soil 13 Jun 2012 Vasse WRD, #4 Bulk 0.0-1.5	PE068612.019 Soil 13 Jun 2012 Vasse WRD, #4 Bulk 1.5-3.0	PE068612.020 Soil 13 Jun 2012 Vasse WRD, #5 Bulk 0.0-1.5
ICPAES after Four Acid Digest Digest Method: ICP40Q								
Aluminium, Al*	ppm	100		21700	23100	10300	17900	13800
Chromium, Cr*	ppm	10		20	20	40	40	40
Iron, Fe*	ppm	100		501000	509000	437000	500000	516000
Strontium, Sr*	ppm	1		5	4	1	4	5
Titanium, Ti*	ppm	10		1430	1470	540	840	710
Vanadium, V*	ppm	1		40	50	20	33	32
Zirconium, Zr*	ppm	1		44	56	19	32	26
Calcium, Ca*	ppm	50		840	520	470	810	2160
Potassium, K*	ppm	100		310	340	140	200	150
Magnesium, Mg*	ppm	20		1040	790	460	950	1320
Sodium, Na*	ppm	50		420	290	260	310	490
Phosphorus, P*	ppm	20		490	520	450	370	360
Sulphur, S*	ppm	20		410	450	300	430	450
Rare Earth Metals in soil by ICPMS Method: IMS12S								
Mercury, Hg*	ppm	0.1		<0.1	<0.1	<0.1	<0.1	<0.1
Rhenium, Re*	ppm	0.05		<0.05	<0.05	<0.05	<0.05	<0.05
Metals in soil by Nitric/Hydrofluoric Acid Digest, ICPMS Method:								
Ge*	ppm	0.5		4.3	4.7	6.7	5.7	4.8
ASLP (Australian Standard Leaching Procedure) DI Water Method: AN007								
Percentage Solids*	%	-		-	-	-	-	-
Mass of test sample for extraction	g	-		50	50	50	50	50
Mass of leaching solution used	g	-		1000	1000	1000	1000	1000
Leaching solution used*	No unit	-		DI Water	DI Water	DI Water	DI Water	DI Water
pH of solids leachate	pH Units	-		7.3	7.1	7.6	7.5	8.4
Conductivity @25C	µS/cm	1		280	150	130	210	270

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ANALYTICAL REPORT

PE068612 R0

Parameter	Units	LOR	Sample Number: PE068612.016 Sample Matrix: Soil Sample Date: 13 Jun 2012 Sample Name: Vasse WRD, #3 Bulk 0.0-1.5	PE068612.017 Soil 13 Jun 2012 Vasse WRD, #3 Bulk 1.5-3.0	PE068612.018 Soil 13 Jun 2012 Vasse WRD, #4 Bulk 0.0-1.5	PE068612.019 Soil 13 Jun 2012 Vasse WRD, #4 Bulk 1.5-3.0	PE068612.020 Soil 13 Jun 2012 Vasse WRD, #5 Bulk 0.0-1.5
Total Dissolved Solids (TDS) in ASLP DI Water Extract Method: AN113							
Total Dissolved Solids Dried at 180°C	mg/L	10	108	64	32	84	108
Alkalinity in ASLP DI Water Extract Method: AN135							
Bicarbonate Alkalinity as HCO3	mg/L	5	47	20	30	46	55
Carbonate Alkalinity as CO3	mg/L	1	<1	<1	<1	<1	<1
Hydroxide Alkalinity as OH	mg/L	5	<5	<5	<5	<5	<5
Total Alkalinity as CaCO3	mg/L	5	38	17	25	38	45
Sulphate in ASLP DI Water Extract Method: AN275							
Sulphate	mg/L	1	23	16	11	18	24
Fluoride by Ion Selective Electrode in ASLP DI Water Leachate Method: AN141							
Fluoride by ISE	mg/L	0.1	1.2	0.6	0.6	1.0	1.2
Metals in Water (ASLP DI) by ICPOES Method: AN320/AN321							
Calcium, Ca	mg/L	0.2	18	7.1	9.8	15	21
Magnesium, Mg	mg/L	0.1	5.1	2.9	2.1	4.0	3.4
Phosphorus, P	mg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Potassium, K	mg/L	0.1	1.2	1.2	0.8	1.1	1.2
Sodium, Na	mg/L	0.5	16	10	7.0	10	16
Trace Metals in ASLP DI Extract by ICPMS Method: AN318							
Aluminium, Al	µg/L	1	11	4	3	1	1
Antimony, Sb	µg/L	1	<1	<1	<1	<1	<1
Arsenic, As	µg/L	1	<1	<1	<1	<1	<1
Barium, Ba	µg/L	1	160	200	190	160	140
Bismuth, Bi	µg/L	1	<1	<1	<1	<1	<1
Boron, B	µg/L	5	38	42	19	37	38
Cadmium, Cd	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium, Cr	µg/L	1	<1	<1	<1	<1	<1
Cobalt, Co	µg/L	1	<1	<1	<1	<1	<1
Copper, Cu	µg/L	1	<1	<1	<1	<1	<1
Iron, Fe	µg/L	5	16	<5	8	<5	5
Lead, Pb	µg/L	1	<1	<1	<1	<1	<1
Manganese, Mn	µg/L	1	6	6	<1	2	<1
Molybdenum, Mo	µg/L	1	<1	<1	<1	<1	<1
Nickel, Ni	µg/L	1	<1	<1	<1	<1	<1
Selenium, Se	µg/L	2	<2	<2	<2	<2	<2
Silver, Ag	µg/L	1	<1	<1	<1	<1	<1
Strontium, Sr	µg/L	1	110	63	51	77	97
Thallium, Tl	µg/L	1	<1	<1	<1	<1	<1
Thorium, Th	µg/L	1	<1	<1	<1	<1	<1
Tin, Sn	µg/L	1	<1	<1	<1	<1	<1
Uranium, U	µg/L	1	<1	<1	<1	<1	<1
Vanadium, V	µg/L	1	<1	<1	<1	<1	<1
Zinc, Zn	µg/L	1	14	19	10	18	7

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PE068612 R0

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	PE068612.016 Soil 13 Jun 2012 Vasse WRD, #3 Bulk 0.0-1.5	PE068612.017 Soil 13 Jun 2012 Vasse WRD, #3 Bulk 1.5-3.0	PE068612.018 Soil 13 Jun 2012 Vasse WRD, #4 Bulk 0.0-1.5	PE068612.019 Soil 13 Jun 2012 Vasse WRD, #4 Bulk 1.5-3.0	PE068612.020 Soil 13 Jun 2012 Vasse WRD, #5 Bulk 0.0-1.5
Mercury in ASLP DI Water Extract Method: AN311/AN312								
Mercury	mg/L	0.0005		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Sample Subcontracted Method:								
Sample Subcontracted*	No unit	-		-	-	-	-	-
Fibre ID in bulk materials Method: AN602								
FibreID								
Asbestos Detected	No unit	-		-	-	-	-	-

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ANALYTICAL REPORT

PE068612 R0

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	PE068612.021 Soil 13 Jun 2012 Vasse WRD, #5 Bulk 1.5-3.0	PE068612.022 Soil 13 Jun 2012 Vasse WRD, #5 Bulk 0.0-3.0 Asbestos	PE068612.023 Soil 13 Jun 2012 Vasse WRD, #6 Bulk 0.0-1.5	PE068612.024 Soil 13 Jun 2012 Vasse WRD, #6 Bulk 1.5-3.0	PE068612.025 Soil 14 Jun 2012 Vasse WRD, #7 Bulk 0.0-1.5
Total Sulfur by LECO Furnace Method: AN202								
Total Sulfur*	%w/w	0.005		<0.005	-	<0.005	<0.005	<0.005
Maximum Potential Acidity*	kg H2SO4/T	0.5		<0.5	-	<0.5	<0.5	<0.5
HCl Extractable S, Ca and Mg in Soil ICP OES Method: AN014								
Acid Soluble Sulphur (SHCl)	%w/w	0.005		**0.007**	-	<0.005	<0.005	**0.008**
Acid Neutralising Capacity or Neutralisation Potential(ANC/NP) Method: AN212								
Fizz Rating Reaction*	No unit	-		NIL	-	NIL	NIL	NIL
Initial Effervescence*	No unit	-		No	-	No	NO	NO
Effervescence on Warming*	No unit	-		No	-	No	NO	NO
Titration - Green Colouration?*	No unit	-		No	-	No	NO	NO
Titration - Precipitate Formed?*	No unit	-		No	-	No	YES	YES
ANC as % $CaCO_3$	% CaCO3	0.1		**0.4**	-	**0.5**	**0.3**	**0.5**
ANC as % $CaMg(CO_3)2$	%w/w	0.1		**0.5**	-	**0.6**	**0.4**	**0.5**
Acid Neutralisation Capacity/Neutralisation	kg CaCO3/T	1		**4.5**	-	**5.2**	**3.4**	**4.7**
Acid Neutralisation Capacity/Neutralisation	kg H2SO4/T	1		**4.4**	-	**5.1**	**3.4**	**4.6**
Net Acid Generation Potential (NAGP) Method: AN215								
Total Oxidisable Sulphur	kg H2SO4/T	0.25		<0.25	-	<0.25	<0.25	<0.25
Net Acid Production Potential	kg H2SO4/T	-400		**-5**	-	**-5**	**-3**	**-5**
Total Oxidisable Sulphur	%w/w	0.005		<0.005	-	<0.005	<0.005	<0.005
Metals in soil by Four Acid digest, ICPMS Method: IMS40Q								
Silver, Ag*	ppm	0.1		<0.1	-	<0.1	<0.1	**0.1**
Arsenic, As*	ppm	1		**34**	-	**31**	**30**	**45**
Barium, Ba*	ppm	2		**60**	-	**102**	**95**	**446**
Beryllium, Be*	ppm	0.1		**0.6**	-	**0.5**	**0.5**	**1**
Bismuth, Bi*	ppm	0.1		**0.3**	-	**0.2**	**0.3**	**0.6**
Cadmium, Cd*	ppm	0.1		<0.1	-	<0.1	<0.1	<0.1
Cobalt, Co*	ppm	0.1		**11.7**	-	**16.4**	**10**	**10.5**
Copper, Cu*	ppm	2		**33**	-	**31**	**25**	**53**
Manganese, Mn*	ppm	0.5		**2840**	-	**2580**	**2210**	**706**
Molybdenum, Mo*	ppm	0.1		**0.8**	-	**0.8**	**1**	**1.8**
Nickel, Ni*	ppm	2		**27**	-	**20**	**31**	**43**
Lead, Pb*	ppm	1		**17**	-	**17**	**22**	**31**
Rubidium, Rb*	ppm	0.05		**2.25**	-	**1.01**	**0.86**	**10.1**
Antimony, Sb*	ppm	0.1		**3.1**	-	**1.9**	**2.4**	**4.2**
Selenium, Se*	ppm	2		<2	-	<2	<2	**3**
Tin, Sn*	ppm	0.3		**1.1**	-	**0.9**	**1.2**	**2.7**
Tellurium, Te*	ppm	0.1		<0.1	-	<0.1	**0.1**	**0.3**
Thorium, Th*	ppm	0.05		**4.72**	-	**4.18**	**6.19**	**17.2**
Thallium, Tl*	ppm	0.1		<0.1	-	**0.3**	<0.1	**0.1**
Uranium, U*	ppm	0.05		**2.37**	-	**2.15**	**1.96**	**2.92**
Tungsten, W*	ppm	0.1		**1.8**	-	**1.1**	**1.6**	**2**
Zinc, Zn*	ppm	5		**55**	-	**52**	**47**	**51**
Lithium, Li*	ppm	0.1		**5.0**	-	**2.8**	**3.0**	**20**
Cerium, Ce*	ppm	0.05		**33.1**	-	**47.8**	**32.5**	**59.1**
Cesium, Cs*	ppm	0.05		**0.29**	-	**0.11**	**0.1**	**0.69**
Gallium, Ga*	ppm	0.2		**7.5**	-	**6.2**	**7.9**	**20.4**
Hafnium, Hf*	ppm	0.05		**1.33**	-	**1.15**	**1.71**	**4.74**
Indium, In*	ppm	0.02		**0.04**	-	**0.04**	**0.06**	**0.17**
Lanthanum, La*	ppm	0.05		**7.59**	-	**7.32**	**7.44**	**15.9**
Niobium, Nb*	ppm	0.1		**4**	-	**3.2**	**4.5**	**9.4**
Scandium, Sc*	ppm	0.2		**9.4**	-	**10.2**	**11**	**20**
Tantalum, Ta*	ppm	0.05		**0.43**	-	**0.3**	**0.45**	**0.92**

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PE068612 R0

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	PE068612.021 Soil 13 Jun 2012 Vasse WRD, #5 Bulk 1.5-3.0	PE068612.022 Soil 13 Jun 2012 Vasse WRD, #5 Bulk 0.0-3.0 Asbestos	PE068612.023 Soil 13 Jun 2012 Vasse WRD, #6 Bulk 0.0-1.5	PE068612.024 Soil 13 Jun 2012 Vasse WRD, #6 Bulk 1.5-3.0	PE068612.025 Soil 14 Jun 2012 Vasse WRD, #7 Bulk 0.0-1.5
ICPAES after Four Acid Digest Digest Method: ICP40Q								
Aluminium, Al*	ppm	100		**30200**	-	**23600**	**27600**	**64800**
Chromium, Cr*	ppm	10		<10	-	**20**	**10**	**130**
Iron, Fe*	ppm	100		**477000**	-	**493000**	**499000**	**373000**
Strontium, Sr*	ppm	1		**7**	-	**9**	**6**	**22**
Titanium, Ti*	ppm	10		**1450**	-	**1070**	**1550**	**3260**
Vanadium, V*	ppm	1		**50**	-	**47**	**57**	**141**
Zirconium, Zr*	ppm	1		**45**	-	**37**	**60**	**157**
Calcium, Ca*	ppm	50		**1420**	-	**1710**	**950**	**1640**
Potassium, K*	ppm	100		**410**	-	**240**	**160**	**1370**
Magnesium, Mg*	ppm	20		**990**	-	**820**	**710**	**1000**
Sodium, Na*	ppm	50		**470**	-	**200**	**240**	**380**
Phosphorus, P*	ppm	20		**480**	-	**250**	**280**	**260**
Sulphur, S*	ppm	20		**560**	-	**450**	**470**	**590**
Rare Earth Metals in soil by ICPMS Method: IMS12S								
Mercury, Hg*	ppm	0.1		<0.1	-	<0.1	<0.1	<0.1
Rhenium, Re*	ppm	0.05		<0.05	-	<0.05	<0.05	<0.05
Metals in soil by Nitric/Hydrofluoric Acid Digest, ICPMS Method:								
Ge*	ppm	0.5		**6.2**	-	**5.8**	**5.9**	**5.2**
ASLP (Australian Standard Leaching Procedure) DI Water Method: AN007								
Percentage Solids*	%	-		-	-	-	-	-
Mass of test sample for extraction	g	-		**50**	-	**50**	**50**	**50**
Mass of leaching solution used	g	-		**1000**	-	**1000**	**1000**	**1000**
Leaching solution used*	No unit	-		DI Water	-	DI Water	DI Water	DI Water
pH of solids leachate	pH Units	-		**8.4**	-	**7.7**	**7.7**	**7.8**
Conductivity @25C	µS/cm	1		**130**	-	**120**	**120**	**180**

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	PE068612.021 Soil 13 Jun 2012 Vasse WRD, #5 Bulk 1.5-3.0	PE068612.022 Soil 13 Jun 2012 Vasse WRD, #5 Bulk 0.0-3.0 Asbestos	PE068612.023 Soil 13 Jun 2012 Vasse WRD, #6 Bulk 0.0-1.5	PE068612.024 Soil 13 Jun 2012 Vasse WRD, #6 Bulk 1.5-3.0	PE068612.025 Soil 14 Jun 2012 Vasse WRD, #7 Bulk 0.0-1.5
Total Dissolved Solids (TDS) in ASLP DI Water Extract Method: AN113								
Total Dissolved Solids Dried at 180°C	mg/L	10		**84**	-	**56**	**36**	**52**
Alkalinity in ASLP DI Water Extract Method: AN135								
Bicarbonate Alkalinity as HCO3	mg/L	5		**54**	-	**56**	**46**	**54**
Carbonate Alkalinity as CO3	mg/L	1		<1	-	<1	<1	<1
Hydroxide Alkalinity as OH	mg/L	5		<5	-	<5	<5	<5
Total Alkalinity as CaCO3	mg/L	5		**44**	-	**46**	**38**	**45**
Sulphate in ASLP DI Water Extract Method: AN275								
Sulphate	mg/L	1		**23**	-	**6**	**8**	**9**
Fluoride by Ion Selective Electrode in ASLP DI Water Leachate Method: AN141								
Fluoride by ISE	mg/L	0.1		**1.0**	-	**1.0**	**1.0**	**0.4**
Metals in Water (ASLP DI) by ICPOES Method: AN320/AN321								
Calcium, Ca	mg/L	0.2		**19**	-	**17**	**13**	**17**
Magnesium, Mg	mg/L	0.1		**2.1**	-	**1.2**	**1.6**	**3.0**
Phosphorus, P	mg/L	0.05		<0.05	-	<0.05	<0.05	<0.05
Potassium, K	mg/L	0.1		**0.9**	-	**0.5**	**0.6**	**4.1**
Sodium, Na	mg/L	0.5		**11**	-	**2.8**	**5.2**	**5.4**
Trace Metals in ASLP DI Extract by ICPMS Method: AN318								
Aluminium, Al	µg/L	1		**14**	-	**21**	**35**	**23**
Antimony, Sb	µg/L	1		<1	-	<1	<1	<1
Arsenic, As	µg/L	1		<1	-	<1	<1	<1
Barium, Ba	µg/L	1		**96**	-	**180**	**210**	**290**
Bismuth, Bi	µg/L	1		<1	-	<1	<1	<1
Boron, B	µg/L	5		**41**	-	**30**	**53**	**58**
Cadmium, Cd	µg/L	0.1		**51**	-	**25**	**14**	**13**
Chromium, Cr	µg/L	1		**2**	-	**1**	**2**	**1**
Cobalt, Co	µg/L	1		<1	-	<1	<1	<1
Copper, Cu	µg/L	1		**2**	-	<1	<1	<1
Iron, Fe	µg/L	5		**14**	-	**20**	**48**	**7**
Lead, Pb	µg/L	1		**36**	-	**23**	**18**	**19**
Manganese, Mn	µg/L	1		<1	-	<1	**1**	<1
Molybdenum, Mo	µg/L	1		<1	-	<1	<1	<1
Nickel, Ni	µg/L	1		**1**	-	**1**	**1**	<1
Selenium, Se	µg/L	2		<2	-	<2	<2	<2
Silver, Ag	µg/L	1		<1	-	<1	<1	<1
Strontium, Sr	µg/L	1		**58**	-	**54**	**41**	**75**
Thallium, Tl	µg/L	1		<1	-	<1	<1	<1
Thorium, Th	µg/L	1		<1	-	<1	<1	<1
Tin, Sn	µg/L	1		<1	-	<1	<1	<1
Uranium, U	µg/L	1		<1	-	<1	<1	<1
Vanadium, V	µg/L	1		<1	-	<1	<1	<1
Zinc, Zn	µg/L	1		**76**	-	**50**	**58**	**42**

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Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	PE068612.021 Soil 13 Jun 2012 Vasse WRD, #5 Bulk 1.5-3.0	PE068612.022 Soil 13 Jun 2012 Vasse WRD, #5 Bulk 0.0-3.0 Asbestos	PE068612.023 Soil 13 Jun 2012 Vasse WRD, #6 Bulk 0.0-1.5	PE068612.024 Soil 13 Jun 2012 Vasse WRD, #6 Bulk 1.5-3.0	PE068612.025 Soil 14 Jun 2012 Vasse WRD, #7 Bulk 0.0-1.5
Mercury in ASLP DI Water Extract Method: AN311/AN312								
Mercury	mg/L	0.0005		<0.0005	-	<0.0005	<0.0005	<0.0005
Sample Subcontracted Method:								
Sample Subcontracted*	No unit	-		-	-	-	-	-
Fibre ID in bulk materials Method: AN602								
FibreID								
Asbestos Detected	No unit	-		-	No	-	-	-

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ANALYTICAL REPORT

PE068612 R0

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	PE068612.026 Soil 14 Jun 2012 Vasse WRD, #7 Bulk 1.5-3.0	PE068612.027 Soil 13 Jun 2012 Vasse WRD, #8 Bulk 0.0-1.5	PE068612.028 Soil 13 Jun 2012 Vasse WRD, #8 Bulk 1.5-3.0	PE068612.030 Soil 13 Jun 2012 Vasse WRD, #9 Bulk 1.5-3.0
Total Sulfur by LECO Furnace Method: AN202							
Total Sulfur*	%w/w	0.005		**0.046**	**0.005**	<0.005	**0.059**
Maximum Potential Acidity*	kg H2SO4/T	0.5		**1.4**	<0.5	<0.5	**1.8**
HCl Extractable S, Ca and Mg in Soil ICP OES Method: AN014							
Acid Soluble Sulphur (SHCl)	%w/w	0.005		<0.005	<0.005	<0.005	<0.005
Acid Neutralising Capacity or Neutralisation Potential(ANC/NP) Method: AN212							
Fizz Rating Reaction*	No unit	-		NIL	NIL	NIL	NIL
Initial Effervescence*	No unit	-		NO	NO	NO	NO
Effervescence on Warming*	No unit	-		NO	NO	NO	NO
Titration - Green Colouration?*	No unit	-		NO	NO	NO	NO
Titration - Precipitate Formed?*	No unit	-		YES	YES	YES	YES
ANC as % $CaCO_3$	% CaCO3	0.1		**0.3**	**0.2**	**0.3**	**0.2**
ANC as % $CaMg(CO_3)2$	%w/w	0.1		**0.4**	**0.2**	**0.4**	**0.3**
Acid Neutralisation Capacity/Neutralisation	kg CaCO3/T	1		**3.4**	**1.7**	**3.4**	**2.5**
Acid Neutralisation Capacity/Neutralisation	kg H2SO4/T	1		**3.4**	**1.7**	**3.4**	**2.4**
Net Acid Generation Potential (NAGP) Method: AN215							
Total Oxidisable Sulphur	kg H2SO4/T	0.25		**1.3**	**0.27**	<0.25	**1.7**
Net Acid Production Potential	kg H2SO4/T	-400		**-2**	**-1**	**-3**	**-1**
Total Oxidisable Sulphur	%w/w	0.005		**0.041**	**0.009**	<0.005	**0.055**
Metals in soil by Four Acid digest, ICPMS Method: IMS40Q							
Silver, Ag*	ppm	0.1		<0.1	<0.1	<0.1	<0.1
Arsenic, As*	ppm	1		**52**	**17**	**22**	**32**
Barium, Ba*	ppm	2		**300**	**49**	**138**	**168**
Beryllium, Be*	ppm	0.1		**0.5**	**0.4**	**0.3**	**0.4**
Bismuth, Bi*	ppm	0.1		**0.5**	**0.2**	**0.2**	**0.4**
Cadmium, Cd*	ppm	0.1		<0.1	<0.1	<0.1	<0.1
Cobalt, Co*	ppm	0.1		**5.9**	**10.4**	**5.9**	**8.2**
Copper, Cu*	ppm	2		**39**	**16**	**17**	**28**
Manganese, Mn*	ppm	0.5		**498**	**2770**	**1730**	**1270**
Molybdenum, Mo*	ppm	0.1		**1.7**	**0.8**	**0.8**	**1.4**
Nickel, Ni*	ppm	2		**21**	**60**	**13**	**15**
Lead, Pb*	ppm	1		**26**	**19**	**21**	**24**
Rubidium, Rb*	ppm	0.05		**5.49**	**1.24**	**1.25**	**2.82**
Antimony, Sb*	ppm	0.1		**3.8**	**1.6**	**2.2**	**3.5**
Selenium, Se*	ppm	2		**2**	<2	<2	<2
Tin, Sn*	ppm	0.3		**2.5**	**0.9**	**0.8**	**1.6**
Tellurium, Te*	ppm	0.1		**0.3**	<0.1	<0.1	**0.2**
Thorium, Th*	ppm	0.05		**11.8**	**3.75**	**4.55**	**9.95**
Thallium, Tl*	ppm	0.1		<0.1	<0.1	<0.1	<0.1
Uranium, U*	ppm	0.05		**2.08**	**1.44**	**1.54**	**2.04**
Tungsten, W*	ppm	0.1		**1.7**	**8.2**	**2.3**	**1.7**
Zinc, Zn*	ppm	5		**49**	**28**	**24**	**33**
Lithium, Li*	ppm	0.1		**8.6**	**2.7**	**2.1**	**5.7**
Cerium, Ce*	ppm	0.05		**22.4**	**23**	**17.7**	**50.4**
Cesium, Cs*	ppm	0.05		**0.44**	**0.1**	**0.13**	**0.24**
Gallium, Ga*	ppm	0.2		**16.1**	**6.1**	**5.6**	**11.1**
Hafnium, Hf*	ppm	0.05		**3.64**	**1.11**	**1.25**	**2.73**
Indium, In*	ppm	0.02		**0.13**	**0.03**	**0.03**	**0.08**
Lanthanum, La*	ppm	0.05		**7.95**	**8.26**	**3.71**	**6.83**
Niobium, Nb*	ppm	0.1		**7.9**	**3.3**	**3.3**	**6.4**
Scandium, Sc*	ppm	0.2		**13.7**	**7.2**	**8.5**	**15.2**
Tantalum, Ta*	ppm	0.05		**0.73**	**0.3**	**0.29**	**0.59**

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Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	PE068612.026 Soil 14 Jun 2012 Vasse WRD, #7 Bulk 1.5-3.0	PE068612.027 Soil 13 Jun 2012 Vasse WRD, #8 Bulk 0.0-1.5	PE068612.028 Soil 13 Jun 2012 Vasse WRD, #8 Bulk 1.5-3.0	PE068612.030 Soil 13 Jun 2012 Vasse WRD, #9 Bulk 1.5-3.0
ICPAES after Four Acid Digest Digest Method: ICP40Q							
Aluminium, Al*	ppm	100		**50200**	**17200**	**17000**	**37000**
Chromium, Cr*	ppm	10		**110**	**10**	**90**	**100**
Iron, Fe*	ppm	100		**425000**	**409000**	**478000**	**455000**
Strontium, Sr*	ppm	1		**14**	**2**	**7**	**14**
Titanium, Ti*	ppm	10		**2710**	**1120**	**1110**	**2140**
Vanadium, V*	ppm	1		**124**	**36**	**41**	**91**
Zirconium, Zr*	ppm	1		**121**	**41**	**45**	**94**
Calcium, Ca*	ppm	50		**1070**	**360**	**930**	**690**
Potassium, K*	ppm	100		**850**	**170**	**220**	**430**
Magnesium, Mg*	ppm	20		**590**	**430**	**450**	**440**
Sodium, Na*	ppm	50		**380**	**140**	**160**	**180**
Phosphorus, P*	ppm	20		**240**	**430**	**280**	**310**
Sulphur, S*	ppm	20		**680**	**240**	**390**	**640**
Rare Earth Metals in soil by ICPMS Method: IMS12S							
Mercury, Hg*	ppm	0.1		<0.1	<0.1	<0.1	<0.1
Rhenium, Re*	ppm	0.05		<0.05	<0.05	<0.05	<0.05
Metals in soil by Nitric/Hydrofluoric Acid Digest, ICPMS Method:							
Ge*	ppm	0.5		**5.4**	**5.7**	**6.2**	**6.4**
ASLP (Australian Standard Leaching Procedure) DI Water Method: AN007							
Percentage Solids*	%	-		-	-	-	-
Mass of test sample for extraction	g	-		**50**	**50**	**50**	**50**
Mass of leaching solution used	g	-		**1000**	**1000**	**1000**	**1000**
Leaching solution used*	No unit	-		DI Water	DI Water	DI Water	DI Water
pH of solids leachate	pH Units	-		**7.4**	**7.0**	**8.2**	**7.3**
Conductivity @25C	µS/cm	1		**150**	**72**	**130**	**75**

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	PE068612.026 Soil 14 Jun 2012 Vasse WRD, #7 Bulk 1.5-3.0	PE068612.027 Soil 13 Jun 2012 Vasse WRD, #8 Bulk 0.0-1.5	PE068612.028 Soil 13 Jun 2012 Vasse WRD, #8 Bulk 1.5-3.0	PE068612.030 Soil 13 Jun 2012 Vasse WRD, #9 Bulk 1.5-3.0
Total Dissolved Solids (TDS) in ASLP DI Water Extract Method: AN113							
Total Dissolved Solids Dried at 180°C	mg/L	10		44	16	44	12
Alkalinity in ASLP DI Water Extract Method: AN135							
Bicarbonate Alkalinity as HCO3	mg/L	5		32	9	49	17
Carbonate Alkalinity as CO3	mg/L	1		<1	<1	<1	<1
Hydroxide Alkalinity as OH	mg/L	5		<5	<5	<5	<5
Total Alkalinity as CaCO3	mg/L	5		26	8	40	14
Sulphate in ASLP DI Water Extract Method: AN275							
Sulphate	mg/L	1		12	8	9	10
Fluoride by Ion Selective Electrode in ASLP DI Water Leachate Method: AN141							
Fluoride by ISE	mg/L	0.1		0.4	0.4	0.6	0.4
Metals in Water (ASLP DI) by ICPOES Method: AN320/AN321							
Calcium, Ca	mg/L	0.2		11	3.9	17	5.3
Magnesium, Mg	mg/L	0.1		2.2	1.4	1.6	1.2
Phosphorus, P	mg/L	0.05		<0.05	<0.05	<0.05	<0.05
Potassium, K	mg/L	0.1		2.2	0.7	0.7	0.9
Sodium, Na	mg/L	0.5		7.8	4.5	3.8	4.1
Trace Metals in ASLP DI Extract by ICPMS Method: AN318							
Aluminium, Al	µg/L	1		18	4	19	13
Antimony, Sb	µg/L	1		<1	<1	<1	<1
Arsenic, As	µg/L	1		<1	<1	<1	<1
Barium, Ba	µg/L	1		240	200	280	260
Bismuth, Bi	µg/L	1		<1	<1	<1	<1
Boron, B	µg/L	5		53	30	27	56
Cadmium, Cd	µg/L	0.1		13	10	11	6.7
Chromium, Cr	µg/L	1		<1	<1	<1	<1
Cobalt, Co	µg/L	1		<1	<1	<1	<1
Copper, Cu	µg/L	1		<1	<1	<1	<1
Iron, Fe	µg/L	5		8	<5	17	13
Lead, Pb	µg/L	1		23	15	31	16
Manganese, Mn	µg/L	1		<1	2	<1	1
Molybdenum, Mo	µg/L	1		<1	<1	<1	<1
Nickel, Ni	µg/L	1		<1	<1	<1	<1
Selenium, Se	µg/L	2		<2	<2	<2	<2
Silver, Ag	µg/L	1		<1	<1	<1	<1
Strontium, Sr	µg/L	1		59	25	60	35
Thallium, Tl	µg/L	1		<1	<1	<1	<1
Thorium, Th	µg/L	1		<1	<1	<1	<1
Tin, Sn	µg/L	1		<1	<1	<1	<1
Uranium, U	µg/L	1		<1	<1	<1	<1
Vanadium, V	µg/L	1		<1	<1	<1	<1
Zinc, Zn	µg/L	1		57	66	50	69

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	PE068612.026 Soil 14 Jun 2012 Vasse WRD, #7 Bulk 1.5-3.0	PE068612.027 Soil 13 Jun 2012 Vasse WRD, #8 Bulk 0.0-1.5	PE068612.028 Soil 13 Jun 2012 Vasse WRD, #8 Bulk 1.5-3.0	PE068612.030 Soil 13 Jun 2012 Vasse WRD, #9 Bulk 1.5-3.0
Mercury in ASLP DI Water Extract Method: AN311/AN312							
Mercury	mg/L	0.0005		<0.0005	<0.0005	<0.0005	<0.0005
Sample Subcontracted Method:							
Sample Subcontracted*	No unit	-		-	-	-	-
Fibre ID in bulk materials Method: AN602							
FibreID							
Asbestos Detected	No unit	-		-	-	-	-

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Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	PE068612.031 Soil 13 Jun 2012 Vasse WRD, #10 Bulk 0.0-1.5	PE068612.032 Soil 13 Jun 2012 Vasse WRD, #10 Bulk 1.5-3.0	PE068612.033 Soil 13 Jun 2012 Vasse WRD, #10 Bulk 0.0-3.0 Asbestos	PE068612.034 Soil 12 Jun 2012 Vasse WRD, #11 Bulk 0.3	PE068612.035 Soil 13 Jun 2012 Vasse WRD, #12 Bulk 0.0-1.5
Total Sulfur by LECO Furnace Method: AN202								
Total Sulfur*	%w/w	0.005		<0.005	**0.015**	-	<0.005	<0.005
Maximum Potential Acidity*	kg H2SO4/T	0.5		<0.5	<0.5	-	<0.5	<0.5
HCl Extractable S, Ca and Mg in Soil ICP OES Method: AN014								
Acid Soluble Sulphur (SHCl)	%w/w	0.005		<0.005	<0.005	-	<0.005	**0.006**
Acid Neutralising Capacity or Neutralisation Potential(ANC/NP) Method: AN212								
Fizz Rating Reaction*	No unit	-		NIL	NIL	-	NIL	NIL
Initial Effervescence*	No unit	-		NO	NO	-	NO	NO
Effervescence on Warming*	No unit	-		NO	NO	-	NO	NO
Titration - Green Colouration?*	No unit	-		NO	NO	-	NO	NO
Titration - Precipitate Formed?*	No unit	-		YES	YES	-	YES	YES
ANC as % $CaCO_3$	% CaCO3	0.1		**0.2**	**0.2**	-	**0.3**	**0.5**
ANC as % $CaMg(CO_3)2$	%w/w	0.1		**0.3**	**0.2**	-	**0.3**	**0.5**
Acid Neutralisation Capacity/Neutralisation	kg CaCO3/T	1		**2.5**	**2.0**	-	**2.9**	**4.9**
Acid Neutralisation Capacity/Neutralisation	kg H2SO4/T	1		**2.4**	**1.9**	-	**2.9**	**4.8**
Net Acid Generation Potential (NAGP) Method: AN215								
Total Oxidisable Sulphur	kg H2SO4/T	0.25		<0.25	**0.41**	-	<0.25	<0.25
Net Acid Production Potential	kg H2SO4/T	-400		**-2**	**-2**	-	**-3**	**-5**
Total Oxidisable Sulphur	%w/w	0.005		<0.005	**0.013**	-	<0.005	<0.005
Metals in soil by Four Acid digest, ICPMS Method: IMS40Q								
Silver, Ag*	ppm	0.1		<0.1	<0.1	-	<0.1	<0.1
Arsenic, As*	ppm	1		**19**	**31**	-	**34**	**17**
Barium, Ba*	ppm	2		**124**	**122**	-	**130**	**280**
Beryllium, Be*	ppm	0.1		**0.4**	**0.6**	-	**0.4**	**0.5**
Bismuth, Bi*	ppm	0.1		**0.3**	**0.7**	-	**0.5**	**0.2**
Cadmium, Cd*	ppm	0.1		<0.1	<0.1	-	<0.1	<0.1
Cobalt, Co*	ppm	0.1		**7.3**	**21.9**	-	**9.8**	**7.9**
Copper, Cu*	ppm	2		**20**	**25**	-	**30**	**26**
Manganese, Mn*	ppm	0.5		**2210**	**2880**	-	**1290**	**1610**
Molybdenum, Mo*	ppm	0.1		**0.7**	**0.9**	-	**1.2**	**0.9**
Nickel, Ni*	ppm	2		**21**	**28**	-	**23**	**25**
Lead, Pb*	ppm	1		**27**	**37**	-	**26**	**18**
Rubidium, Rb*	ppm	0.05		**0.82**	**0.66**	-	**1.11**	**2.99**
Antimony, Sb*	ppm	0.1		**2.1**	**2.9**	-	**3.2**	**2.4**
Selenium, Se*	ppm	2		<2	<2	-	<2	<2
Tin, Sn*	ppm	0.3		**1.2**	**3**	-	**1.7**	**0.9**
Tellurium, Te*	ppm	0.1		**0.1**	**0.3**	-	**0.3**	<0.1
Thorium, Th*	ppm	0.05		**7.08**	**16.5**	-	**11.4**	**4.96**
Thallium, Tl*	ppm	0.1		<0.1	<0.1	-	<0.1	<0.1
Uranium, U*	ppm	0.05		**1.97**	**2.89**	-	**1.82**	**2.03**
Tungsten, W*	ppm	0.1		**1.6**	**1.7**	-	**1.5**	**2.1**
Zinc, Zn*	ppm	5		**36**	**76**	-	**43**	**43**
Lithium, Li*	ppm	0.1		**2.1**	**3.4**	-	**4.9**	**3.9**
Cerium, Ce*	ppm	0.05		**40.8**	**47.1**	-	**34.6**	**18.7**
Cesium, Cs*	ppm	0.05		**0.07**	**0.07**	-	**0.09**	**0.27**
Gallium, Ga*	ppm	0.2		**8.5**	**21.5**	-	**13.1**	**6.6**
Hafnium, Hf*	ppm	0.05		**1.93**	**5.31**	-	**3.26**	**1.36**
Indium, In*	ppm	0.02		**0.05**	**0.15**	-	**0.08**	**0.03**
Lanthanum, La*	ppm	0.05		**9.73**	**15.9**	-	**7.17**	**5.25**
Niobium, Nb*	ppm	0.1		**4.8**	**13.1**	-	**7.1**	**3.6**
Scandium, Sc*	ppm	0.2		**12.5**	**19.7**	-	**15.2**	**9.6**
Tantalum, Ta*	ppm	0.05		**0.43**	**1.12**	-	**0.7**	**0.36**

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Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	PE068612.031 Soil 13 Jun 2012 Vasse WRD, #10 Bulk 0.0-1.5	PE068612.032 Soil 13 Jun 2012 Vasse WRD, #10 Bulk 1.5-3.0	PE068612.033 Soil 13 Jun 2012 Vasse WRD, #10 Bulk 0.0-3.0 Asbestos	PE068612.034 Soil 12 Jun 2012 Vasse WRD, #11 Bulk 0.3	PE068612.035 Soil 13 Jun 2012 Vasse WRD, #12 Bulk 0.0-1.5
ICPAES after Four Acid Digest Digest Method: ICP40Q								
Aluminium, Al*	ppm	100		**28300**	**45200**	-	**45900**	**25200**
Chromium, Cr*	ppm	10		**50**	**70**	-	**70**	<10
Iron, Fe*	ppm	100		**493000**	**456000**	-	**441000**	**458000**
Strontium, Sr*	ppm	1		**10**	**4**	-	**8**	**10**
Titanium, Ti*	ppm	10		**1560**	**4000**	-	**2550**	**1300**
Vanadium, V*	ppm	1		**54**	**131**	-	**93**	**44**
Zirconium, Zr*	ppm	1		**64**	**176**	-	**102**	**45**
Calcium, Ca*	ppm	50		**690**	**380**	-	**550**	**1260**
Potassium, K*	ppm	100		**200**	**130**	-	**190**	**470**
Magnesium, Mg*	ppm	20		**500**	**410**	-	**430**	**800**
Sodium, Na*	ppm	50		**230**	**160**	-	**220**	**410**
Phosphorus, P*	ppm	20		**280**	**260**	-	**240**	**360**
Sulphur, S*	ppm	20		**580**	**520**	-	**490**	**600**
Rare Earth Metals in soil by ICPMS Method: IMS12S								
Mercury, Hg*	ppm	0.1		<0.1	<0.1	-	<0.1	<0.1
Rhenium, Re*	ppm	0.05		<0.05	<0.05	-	<0.05	<0.05
Metals in soil by Nitric/Hydrofluoric Acid Digest, ICPMS Method:								
Ge*	ppm	0.5		**5.6**	**4.0**	-	**5.1**	**5.4**
ASLP (Australian Standard Leaching Procedure) DI Water Method: AN007								
Percentage Solids*	%	-		-	-	-	-	-
Mass of test sample for extraction	g	-		**50**	**50**	-	**50**	**50**
Mass of leaching solution used	g	-		**1000**	**1000**	-	**1000**	**1000**
Leaching solution used*	No unit	-		DI Water	DI Water	-	DI Water	DI Water
pH of solids leachate	pH Units	-		**7.4**	**6.5**	-	**7.0**	**8.4**
Conductivity @25C	µS/cm	1		**97**	**61**	-	**25**	**4**

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Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	PE068612.031 Soil 13 Jun 2012 Vasse WRD, #10 Bulk 0.0-1.5	PE068612.032 Soil 13 Jun 2012 Vasse WRD, #10 Bulk 1.5-3.0	PE068612.033 Soil 13 Jun 2012 Vasse WRD, #10 Bulk 0.0-3.0 Asbestos	PE068612.034 Soil 12 Jun 2012 Vasse WRD, #11 Bulk 0.3	PE068612.035 Soil 13 Jun 2012 Vasse WRD, #12 Bulk 0.0-1.5
Total Dissolved Solids (TDS) in ASLP DI Water Extract Method: AN113								
Total Dissolved Solids Dried at 180°C	mg/L	10		**40**	**16**	-	**20**	**44**
Alkalinity in ASLP DI Water Extract Method: AN135								
Bicarbonate Alkalinity as HCO3	mg/L	5		**21**	**8**	-	<5	**57**
Carbonate Alkalinity as CO3	mg/L	1		<1	<1	-	<1	<1
Hydroxide Alkalinity as OH	mg/L	5		<5	<5	-	<5	<5
Total Alkalinity as CaCO3	mg/L	5		**17**	**6**	-	<5	**46**
Sulphate in ASLP DI Water Extract Method: AN275								
Sulphate	mg/L	1		**10**	**7**	-	**3**	**16**
Fluoride by Ion Selective Electrode in ASLP DI Water Leachate Method: AN141								
Fluoride by ISE	mg/L	0.1		**0.7**	**0.3**	-	**0.2**	**0.7**
Metals in Water (ASLP DI) by ICPOES Method: AN320/AN321								
Calcium, Ca	mg/L	0.2		**7.6**	**2.2**	-	**0.7**	**18**
Magnesium, Mg	mg/L	0.1		**1.5**	**1.2**	-	**0.3**	**2.0**
Phosphorus, P	mg/L	0.05		<0.05	<0.05	-	<0.05	<0.05
Potassium, K	mg/L	0.1		**0.8**	**0.5**	-	**0.2**	**0.8**
Sodium, Na	mg/L	0.5		**5.5**	**5.2**	-	**2.5**	**8.2**
Trace Metals in ASLP DI Extract by ICPMS Method: AN318								
Aluminium, Al	µg/L	1		**19**	**9**	-	**130**	**19**
Antimony, Sb	µg/L	1		<1	<1	-	<1	<1
Arsenic, As	µg/L	1		<1	<1	-	<1	<1
Barium, Ba	µg/L	1		**250**	**270**	-	**98**	**210**
Bismuth, Bi	µg/L	1		<1	<1	-	<1	<1
Boron, B	µg/L	5		**50**	**29**	-	**41**	**30**
Cadmium, Cd	µg/L	0.1		**7.1**	<0.1	-	**3.4**	**6.7**
Chromium, Cr	µg/L	1		<1	<1	-	<1	<1
Cobalt, Co	µg/L	1		<1	<1	-	<1	<1
Copper, Cu	µg/L	1		<1	<1	-	<1	<1
Iron, Fe	µg/L	5		**19**	**11**	-	**67**	**19**
Lead, Pb	µg/L	1		**27**	<1	-	**34**	**2**
Manganese, Mn	µg/L	1		<1	**2**	-	**1**	<1
Molybdenum, Mo	µg/L	1		<1	<1	-	<1	<1
Nickel, Ni	µg/L	1		<1	<1	-	<1	<1
Selenium, Se	µg/L	2		<2	<2	-	<2	<2
Silver, Ag	µg/L	1		<1	<1	-	<1	<1
Strontium, Sr	µg/L	1		**47**	**19**	-	**6**	**62**
Thallium, Tl	µg/L	1		<1	<1	-	<1	<1
Thorium, Th	µg/L	1		<1	<1	-	<1	<1
Tin, Sn	µg/L	1		<1	<1	-	<1	<1
Uranium, U	µg/L	1		<1	<1	-	<1	<1
Vanadium, V	µg/L	1		<1	<1	-	<1	<1
Zinc, Zn	µg/L	1		**57**	**63**	-	**61**	**50**

ANALYTICAL REPORT

PE068612 R0

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	PE068612.031 Soil 13 Jun 2012 Vasse WRD, #10 Bulk 0.0-1.5	PE068612.032 Soil 13 Jun 2012 Vasse WRD, #10 Bulk 1.5-3.0	PE068612.033 Soil 13 Jun 2012 Vasse WRD, #10 Bulk 0.0-3.0 Asbestos	PE068612.034 Soil 12 Jun 2012 Vasse WRD, #11 Bulk 0.3	PE068612.035 Soil 13 Jun 2012 Vasse WRD, #12 Bulk 0.0-1.5
Mercury in ASLP DI Water Extract Method: AN311/AN312								
Mercury	mg/L	0.0005		<0.0005	<0.0005	-	<0.0005	<0.0005
Sample Subcontracted Method:								
Sample Subcontracted*	No unit	-		-	-	-	-	-
Fibre ID in bulk materials Method: AN602								
FibreID								
Asbestos Detected	No unit	-		-	-	No	-	-

SGS

ANALYTICAL REPORT

PE068612 R0

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	PE068612.036 Soil 13 Jun 2012 Vasse WRD, #12 Bulk 1.5-3.0	PE068612.037 Soil 13 Jun 2012 Vasse WRD, #13 Bulk 0.0-1.5	PE068612.038 Soil 13 Jun 2012 Vasse WRD, #13 Bulk 1.5-3.0	PE068612.039 Soil 12 Jun 2012 Vasse WRD, #14 Bulk 0.3	PE068612.040 Soil 13 Jun 2012 Vasse WRD, #15 Bulk 0.0-1.5
Total Sulfur by LECO Furnace Method: AN202								
Total Sulfur*	%w/w	0.005		<0.005	**0.041**	**0.017**	**0.034**	**0.036**
Maximum Potential Acidity*	kg H2SO4/T	0.5		<0.5	**1.3**	**0.5**	**1.0**	**1.1**
HCl Extractable S, Ca and Mg in Soil ICP OES Method: AN014								
Acid Soluble Sulphur (SHCl)	%w/w	0.005		**0.007**	<0.005	<0.005	<0.005	<0.005
Acid Neutralising Capacity or Neutralisation Potential(ANC/NP) Method: AN212								
Fizz Rating Reaction*	No unit	-		NIL	NIL	NIL	NIL	NIL
Initial Effervescence*	No unit	-		NO	NO	NO	NO	NO
Effervescence on Warming*	No unit	-		NO	NO	NO	NO	NO
Titration - Green Colouration?*	No unit	-		NO	NO	NO	NO	NO
Titration - Precipitate Formed?*	No unit	-		No	No	No	No	YES
ANC as % $CaCO_3$	% CaCO3	0.1		**0.2**	**0.3**	**0.1**	**0.2**	**0.3**
ANC as % $CaMg(CO_3)2$	%w/w	0.1		**0.3**	**0.3**	**0.2**	**0.2**	**0.4**
Acid Neutralisation Capacity/Neutralisation	kg CaCO3/T	1		**2.5**	**3.2**	**1.5**	**2.0**	**3.4**
Acid Neutralisation Capacity/Neutralisation	kg H2SO4/T	1		**2.4**	**3.1**	**1.4**	**1.9**	**3.4**
Net Acid Generation Potential (NAGP) Method: AN215								
Total Oxidisable Sulphur	kg H2SO4/T	0.25		<0.25	**1.1**	**0.43**	**1.1**	**1.0**
Net Acid Production Potential	kg H2SO4/T	-400		**-3**	**-2**	**-1**	**-1**	**-2**
Total Oxidisable Sulphur	%w/w	0.005		<0.005	**0.036**	**0.014**	**0.036**	**0.033**
Metals in soil by Four Acid digest, ICPMS Method: IMS40Q								
Silver, Ag*	ppm	0.1		<0.1	<0.1	<0.1	<0.1	<0.1
Arsenic, As*	ppm	1		**11**	**31**	**43**	**24**	**29**
Barium, Ba*	ppm	2		**102**	**157**	**74**	**96**	**41**
Beryllium, Be*	ppm	0.1		**0.4**	**0.7**	**0.6**	**0.5**	**0.8**
Bismuth, Bi*	ppm	0.1		**0.1**	**0.4**	**0.4**	**0.4**	**0.5**
Cadmium, Cd*	ppm	0.1		<0.1	<0.1	<0.1	<0.1	<0.1
Cobalt, Co*	ppm	0.1		**7.7**	**12.8**	**26.8**	**6.7**	**20.3**
Copper, Cu*	ppm	2		**17**	**30**	**38**	**28**	**21**
Manganese, Mn*	ppm	0.5		**1310**	**2340**	**1610**	**1990**	**5630**
Molybdenum, Mo*	ppm	0.1		**0.6**	**1**	**1**	**1.2**	**0.8**
Nickel, Ni*	ppm	2		**17**	**25**	**26**	**20**	**26**
Lead, Pb*	ppm	1		**12**	**28**	**27**	**24**	**42**
Rubidium, Rb*	ppm	0.05		**1.31**	**2.31**	**1.01**	**1.27**	**0.6**
Antimony, Sb*	ppm	0.1		**1.1**	**2.5**	**3.2**	**2.4**	**2.9**
Selenium, Se*	ppm	2		<2	<2	<2	<2	<2
Tin, Sn*	ppm	0.3		**0.4**	**1.7**	**1.6**	**1.2**	**1.6**
Tellurium, Te*	ppm	0.1		<0.1	**0.2**	**0.2**	**0.1**	**0.1**
Thorium, Th*	ppm	0.05		**2.39**	**10.2**	**7.97**	**7.61**	**9.13**
Thallium, Tl*	ppm	0.1		<0.1	<0.1	<0.1	<0.1	<0.1
Uranium, U*	ppm	0.05		**1.74**	**2.68**	**2.31**	**1.78**	**3.07**
Tungsten, W*	ppm	0.1		**3.6**	**1.5**	**1.2**	**1.7**	**1.5**
Zinc, Zn*	ppm	5		**35**	**60**	**166**	**39**	**61**
Lithium, Li*	ppm	0.1		**1.6**	**5.3**	**3.4**	**6.7**	**1.4**
Cerium, Ce*	ppm	0.05		**13.6**	**34.1**	**32.7**	**28.7**	**41.3**
Cesium, Cs*	ppm	0.05		**0.12**	**0.17**	**0.08**	**0.1**	**0.05**
Gallium, Ga*	ppm	0.2		**3.3**	**13.6**	**11.2**	**9**	**12.4**
Hafnium, Hf*	ppm	0.05		**0.65**	**3.1**	**2.56**	**2.15**	**2.65**
Indium, In*	ppm	0.02		<0.02	**0.09**	**0.08**	**0.06**	**0.07**
Lanthanum, La*	ppm	0.05		**4.78**	**12.2**	**10.5**	**5.45**	**9.95**
Niobium, Nb*	ppm	0.1		**2**	**7.7**	**6.2**	**4.8**	**7.1**
Scandium, Sc*	ppm	0.2		**5.1**	**16.2**	**15.2**	**11.1**	**18.4**
Tantalum, Ta*	ppm	0.05		**0.19**	**0.7**	**0.55**	**0.47**	**0.64**

ANALYTICAL REPORT

PE068612 R0

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	PE068612.036 Soil 13 Jun 2012 Vasse WRD, #12 Bulk 1.5-3.0	PE068612.037 Soil 13 Jun 2012 Vasse WRD, #13 Bulk 0.0-1.5	PE068612.038 Soil 13 Jun 2012 Vasse WRD, #13 Bulk 1.5-3.0	PE068612.039 Soil 12 Jun 2012 Vasse WRD, #14 Bulk 0.3	PE068612.040 Soil 13 Jun 2012 Vasse WRD, #15 Bulk 0.0-1.5
ICPAES after Four Acid Digest Digest Method: ICP40Q								
Aluminium, Al*	ppm	100		**14300**	**40900**	**30300**	**27800**	**34600**
Chromium, Cr*	ppm	10		<10	**60**	**70**	**70**	**50**
Iron, Fe*	ppm	100		**501000**	**454000**	**490000**	**480000**	**482000**
Strontium, Sr*	ppm	1		**4**	**5**	**2**	**6**	**5**
Titanium, Ti*	ppm	10		**640**	**2510**	**1850**	**1640**	**2170**
Vanadium, V*	ppm	1		**19**	**86**	**83**	**61**	**70**
Zirconium, Zr*	ppm	1		**22**	**100**	**84**	**72**	**85**
Calcium, Ca*	ppm	50		**550**	**700**	**420**	**430**	**510**
Potassium, K*	ppm	100		**230**	**350**	**180**	**280**	**100**
Magnesium, Mg*	ppm	20		**720**	**650**	**400**	**380**	**610**
Sodium, Na*	ppm	50		**400**	**410**	**330**	**150**	**240**
Phosphorus, P*	ppm	20		**310**	**280**	**270**	**310**	**340**
Sulphur, S*	ppm	20		**420**	**510**	**510**	**500**	**510**
Rare Earth Metals in soil by ICPMS Method: IMS12S								
Mercury, Hg*	ppm	0.1		<0.1	<0.1	<0.1	<0.1	<0.1
Rhenium, Re*	ppm	0.05		<0.05	<0.05	<0.05	<0.05	<0.05
Metals in soil by Nitric/Hydrofluoric Acid Digest, ICPMS Method:								
Ge*	ppm	0.5		**4.7**	**4.7**	**4.6**	**5.8**	**4.7**
ASLP (Australian Standard Leaching Procedure) DI Water Method: AN007								
Percentage Solids*	%	-		-	-	-	-	-
Mass of test sample for extraction	g	-		**50**	**50**	**50**	**50**	**50**
Mass of leaching solution used	g	-		**1000**	**1000**	**1000**	**1000**	**1000**
Leaching solution used*	No unit	-		DI Water	DI Water	DI Water	DI Water	DI Water
pH of solids leachate	pH Units	-		**7.6**	**7.3**	**6.7**	**6.8**	**7.1**
Conductivity @25C	µS/cm	1		**160**	**140**	**130**	**42**	**130**

Parameter	Units	LOR	Sample Number: PE068612.036 Sample Matrix: Soil Sample Date: 13 Jun 2012 Sample Name: Vasse WRD, #12 Bulk 1.5-3.0	PE068612.037 Soil 13 Jun 2012 Vasse WRD, #13 Bulk 0.0-1.5	PE068612.038 Soil 13 Jun 2012 Vasse WRD, #13 Bulk 1.5-3.0	PE068612.039 Soil 12 Jun 2012 Vasse WRD, #14 Bulk 0.3	PE068612.040 Soil 13 Jun 2012 Vasse WRD, #15 Bulk 0.0-1.5
Total Dissolved Solids (TDS) in ASLP DI Water Extract Method: AN113							
Total Dissolved Solids Dried at 180°C	mg/L	10	56	40	16	<10	56
Alkalinity in ASLP DI Water Extract Method: AN135							
Bicarbonate Alkalinity as HCO3	mg/L	5	22	25	8	8	11
Carbonate Alkalinity as CO3	mg/L	1	<1	<1	<1	<1	<1
Hydroxide Alkalinity as OH	mg/L	5	<5	<5	<5	<5	<5
Total Alkalinity as CaCO3	mg/L	5	18	21	7	6	9
Sulphate in ASLP DI Water Extract Method: AN275							
Sulphate	mg/L	1	22	16	17	7	20
Fluoride by Ion Selective Electrode in ASLP DI Water Leachate Method: AN141							
Fluoride by ISE	mg/L	0.1	0.5	0.6	0.3	0.2	1.0
Metals in Water (ASLP DI) by ICPOES Method: AN320/AN321							
Calcium, Ca	mg/L	0.2	8.4	8.0	4.9	2.4	7.8
Magnesium, Mg	mg/L	0.1	3.7	2.1	2.2	0.8	2.8
Phosphorus, P	mg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Potassium, K	mg/L	0.1	1.0	1.0	0.9	0.5	0.5
Sodium, Na	mg/L	0.5	12	10	10	2.7	8.1
Trace Metals in ASLP DI Extract by ICPMS Method: AN318							
Aluminium, Al	µg/L	1	7	16	4	6	4
Antimony, Sb	µg/L	1	<1	<1	<1	<1	<1
Arsenic, As	µg/L	1	<1	<1	<1	<1	<1
Barium, Ba	µg/L	1	160	200	210	220	160
Bismuth, Bi	µg/L	1	<1	<1	<1	<1	<1
Boron, B	µg/L	5	34	35	28	22	40
Cadmium, Cd	µg/L	0.1	3.7	3.6	2.2	1.4	2.8
Chromium, Cr	µg/L	1	<1	3	<1	<1	5
Cobalt, Co	µg/L	1	<1	<1	<1	<1	<1
Copper, Cu	µg/L	1	<1	<1	<1	<1	<1
Iron, Fe	µg/L	5	11	14	<5	10	<5
Lead, Pb	µg/L	1	<1	35	<1	17	<1
Manganese, Mn	µg/L	1	<1	<1	2	2	<1
Molybdenum, Mo	µg/L	1	<1	<1	<1	<1	<1
Nickel, Ni	µg/L	1	<1	<1	<1	<1	<1
Selenium, Se	µg/L	2	<2	<2	<2	<2	<2
Silver, Ag	µg/L	1	<1	<1	<1	<1	<1
Strontium, Sr	µg/L	1	46	33	30	20	44
Thallium, Tl	µg/L	1	<1	<1	<1	<1	<1
Thorium, Th	µg/L	1	<1	<1	<1	<1	<1
Tin, Sn	µg/L	1	<1	<1	<1	<1	<1
Uranium, U	µg/L	1	<1	<1	<1	<1	<1
Vanadium, V	µg/L	1	<1	<1	<1	<1	<1
Zinc, Zn	µg/L	1	58	66	69	66	53

ANALYTICAL REPORT

PE068612 R0

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	PE068612.036 Soil 13 Jun 2012 Vasse WRD, #12 Bulk 1.5-3.0	PE068612.037 Soil 13 Jun 2012 Vasse WRD, #13 Bulk 0.0-1.5	PE068612.038 Soil 13 Jun 2012 Vasse WRD, #13 Bulk 1.5-3.0	PE068612.039 Soil 12 Jun 2012 Vasse WRD, #14 Bulk 0.3	PE068612.040 Soil 13 Jun 2012 Vasse WRD, #15 Bulk 0.0-1.5
Mercury in ASLP DI Water Extract Method: AN311/AN312								
Mercury	mg/L	0.0005		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Sample Subcontracted Method:								
Sample Subcontracted*	No unit	-		-	-	-	-	-
Fibre ID in bulk materials Method: AN602								
FibreID								
Asbestos Detected	No unit	-		-	-	-	-	-

SGS

ANALYTICAL REPORT

PE068612 R0

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	PE068612.041 Soil 13 Jun 2012 Vasse WRD, #15 Bulk 1.5-3.0	PE068612.042 Soil 13 Jun 2012 Vasse WRD, #15 Bulk 0.0-3.0 Asbestos	PE068612.043 Soil 14 Jun 2012 Vasse WRD, #16 Bulk 0.0-1.5	PE068612.044 Soil 14 Jun 2012 Vasse WRD, #16 Bulk 1.5-3.0	PE068612.045 Soil 13 Jun 2012 Vasse WRD, #18 Bulk 0.0-1.5
Total Sulfur by LECO Furnace Method: AN202								
Total Sulfur*	%w/w	0.005		<0.005	-	**0.021**	**0.037**	**0.017**
Maximum Potential Acidity*	kg H2SO4/T	0.5		<0.5	-	**0.6**	**1.1**	**0.5**
HCl Extractable S, Ca and Mg in Soil ICP OES Method: AN014								
Acid Soluble Sulphur (SHCl)	%w/w	0.005		<0.005	-	<0.005	<0.005	**0.012**
Acid Neutralising Capacity or Neutralisation Potential(ANC/NP) Method: AN212								
Fizz Rating Reaction*	No unit	-		NIL	-	NIL	NIL	NIL
Initial Effervescence*	No unit	-		NO	-	NO	NO	NO
Effervescence on Warming*	No unit	-		NO	-	NO	NO	NO
Titration - Green Colouration?*	No unit	-		NO	-	NO	NO	NO
Titration - Precipitate Formed?*	No unit	-		YES	-	YES	YES	YES
ANC as % $CaCO_3$	% CaCO3	0.1		**0.2**	-	**0.3**	**0.2**	**0.2**
ANC as % $CaMg(CO_3)2$	%w/w	0.1		**0.2**	-	**0.3**	**0.2**	**0.2**
Acid Neutralisation Capacity/Neutralisation	kg CaCO3/T	1		**2.2**	-	**2.7**	**2.2**	**2.0**
Acid Neutralisation Capacity/Neutralisation	kg H2SO4/T	1		**2.2**	-	**2.6**	**2.2**	**1.9**
Net Acid Generation Potential (NAGP) Method: AN215								
Total Oxidisable Sulphur	kg H2SO4/T	0.25		<0.25	-	**0.65**	**1.2**	<0.25
Net Acid Production Potential	kg H2SO4/T	-400		**-2**	-	**-2**	**-1**	**-2**
Total Oxidisable Sulphur	%w/w	0.005		<0.005	-	**0.021**	**0.040**	<0.005
Metals in soil by Four Acid digest, ICPMS Method: IMS40Q								
Silver, Ag*	ppm	0.1		<0.1	-	**0.1**	<0.1	<0.1
Arsenic, As*	ppm	1		**14**	-	**44**	**45**	**43**
Barium, Ba*	ppm	2		**49**	-	**292**	**178**	**181**
Beryllium, Be*	ppm	0.1		**0.5**	-	**1**	**0.9**	**0.4**
Bismuth, Bi*	ppm	0.1		**0.2**	-	**0.4**	**0.4**	**0.4**
Cadmium, Cd*	ppm	0.1		<0.1	-	<0.1	<0.1	<0.1
Cobalt, Co*	ppm	0.1		**7.5**	-	**9.4**	**8.6**	**6.8**
Copper, Cu*	ppm	2		**13**	-	**42**	**36**	**37**
Manganese, Mn*	ppm	0.5		**1760**	-	**1110**	**1100**	**1090**
Molybdenum, Mo*	ppm	0.1		**0.8**	-	**2.4**	**2.5**	**1.1**
Nickel, Ni*	ppm	2		**14**	-	**42**	**34**	**14**
Lead, Pb*	ppm	1		**18**	-	**29**	**29**	**25**
Rubidium, Rb*	ppm	0.05		**0.69**	-	**8.62**	**8.85**	**2.22**
Antimony, Sb*	ppm	0.1		**1.5**	-	**4.2**	**4**	**2.5**
Selenium, Se*	ppm	2		<2	-	**2**	**2**	**2**
Tin, Sn*	ppm	0.3		**0.6**	-	**2.3**	**2.5**	**1.5**
Tellurium, Te*	ppm	0.1		<0.1	-	**0.2**	**0.2**	**0.3**
Thorium, Th*	ppm	0.05		**3.44**	-	**11.9**	**12.8**	**8.06**
Thallium, Tl*	ppm	0.1		<0.1	-	**0.2**	**0.1**	<0.1
Uranium, U*	ppm	0.05		**1.47**	-	**2.73**	**2.75**	**1.6**
Tungsten, W*	ppm	0.1		**1**	-	**2.2**	**2.3**	**1.2**
Zinc, Zn*	ppm	5		**31**	-	**36**	**33**	**63**
Lithium, Li*	ppm	0.1		**0.9**	-	**14**	**11**	**7.1**
Cerium, Ce*	ppm	0.05		**19.8**	-	**32.3**	**27.4**	**21.5**
Cesium, Cs*	ppm	0.05		**0.07**	-	**0.55**	**0.53**	**0.18**
Gallium, Ga*	ppm	0.2		**4.6**	-	**19**	**19.3**	**10.9**
Hafnium, Hf*	ppm	0.05		**0.99**	-	**3.61**	**3.89**	**2.49**
Indium, In*	ppm	0.02		**0.03**	-	**0.1**	**0.11**	**0.08**
Lanthanum, La*	ppm	0.05		**6.04**	-	**11.5**	**9.44**	**5.69**
Niobium, Nb*	ppm	0.1		**2.5**	-	**10.6**	**11.7**	**5.7**
Scandium, Sc*	ppm	0.2		**7.6**	-	**15.4**	**14.7**	**14.5**
Tantalum, Ta*	ppm	0.05		**0.23**	-	**1.04**	**1.14**	**0.54**

SGS

ANALYTICAL REPORT

PE068612 R0

Parameter	Units	LOR	Sample Number: PE068612.041 Sample Matrix: Soil Sample Date: 13 Jun 2012 Sample Name: Vasse WRD, #15 Bulk 1.5-3.0	PE068612.042 Soil 13 Jun 2012 Vasse WRD, #15 Bulk 0.0-3.0 Asbestos	PE068612.043 Soil 14 Jun 2012 Vasse WRD, #16 Bulk 0.0-1.5	PE068612.044 Soil 14 Jun 2012 Vasse WRD, #16 Bulk 1.5-3.0	PE068612.045 Soil 13 Jun 2012 Vasse WRD, #18 Bulk 0.0-1.5
ICPAES after Four Acid Digest Digest Method: ICP40Q							
Aluminium, Al*	ppm	100	**13500**	-	**48500**	**43900**	**34100**
Chromium, Cr*	ppm	10	<10	-	**130**	**130**	**90**
Iron, Fe*	ppm	100	**523000**	-	**430000**	**430000**	**432000**
Strontium, Sr*	ppm	1	**1**	-	**6**	**5**	**6**
Titanium, Ti*	ppm	10	**800**	-	**3550**	**3770**	**1840**
Vanadium, V*	ppm	1	**29**	-	**144**	**149**	**81**
Zirconium, Zr*	ppm	1	**31**	-	**127**	**137**	**84**
Calcium, Ca*	ppm	50	**520**	-	**370**	**430**	**480**
Potassium, K*	ppm	100	**110**	-	**1200**	**1320**	**320**
Magnesium, Mg*	ppm	20	**390**	-	**490**	**460**	**330**
Sodium, Na*	ppm	50	**180**	-	**240**	**250**	**230**
Phosphorus, P*	ppm	20	**460**	-	**310**	**300**	**220**
Sulphur, S*	ppm	20	**410**	-	**450**	**450**	**570**
Rare Earth Metals in soil by ICPMS Method: IMS12S							
Mercury, Hg*	ppm	0.1	<0.1	-	<0.1	<0.1	<0.1
Rhenium, Re*	ppm	0.05	<0.05	-	<0.05	<0.05	<0.05
Metals in soil by Nitric/Hydrofluoric Acid Digest, ICPMS Method:							
Ge*	ppm	0.5	**5.0**	-	**4.7**	**5.0**	**6.3**
ASLP (Australian Standard Leaching Procedure) DI Water Method: AN007							
Percentage Solids*	%	-	-	-	-	-	-
Mass of test sample for extraction	g	-	**50**	-	**50**	**50**	**50**
Mass of leaching solution used	g	-	**1000**	-	**1000**	**1000**	**1000**
Leaching solution used*	No unit	-	DI Water	-	DI Water	DI Water	DI Water
pH of solids leachate	pH Units	-	**7.1**	-	**6.3**	**6.5**	**6.4**
Conductivity @25C	µS/cm	1	**98**	-	**56**	**63**	**51**

ANALYTICAL REPORT

PE068612 R0

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	PE068612.041 Soil 13 Jun 2012 Vasse WRD, #15 Bulk 1.5-3.0	PE068612.042 Soil 13 Jun 2012 Vasse WRD, #15 Bulk 0.0-3.0 Asbestos	PE068612.043 Soil 14 Jun 2012 Vasse WRD, #16 Bulk 0.0-1.5	PE068612.044 Soil 14 Jun 2012 Vasse WRD, #16 Bulk 1.5-3.0	PE068612.045 Soil 13 Jun 2012 Vasse WRD, #18 Bulk 0.0-1.5
Total Dissolved Solids (TDS) in ASLP DI Water Extract	**Method: AN113**							
Total Dissolved Solids Dried at 180°C	mg/L	10		**36**	-	**12**	**20**	**20**
Alkalinity in ASLP DI Water Extract	**Method: AN135**							
Bicarbonate Alkalinity as HCO3	mg/L	5		**21**	-	<5	**8**	**6**
Carbonate Alkalinity as CO3	mg/L	1		<1	-	<1	<1	<1
Hydroxide Alkalinity as OH	mg/L	5		<5	-	<5	<5	<5
Total Alkalinity as CaCO3	mg/L	5		**18**	-	<5	**7**	<5
Sulphate in ASLP DI Water Extract	**Method: AN275**							
Sulphate	mg/L	1		**11**	-	**6**	**9**	**8**
Fluoride by Ion Selective Electrode in ASLP DI Water Leachate	**Method: AN141**							
Fluoride by ISE	mg/L	0.1		**0.7**	-	<0.1	<0.1	**0.2**
Metals in Water (ASLP DI) by ICPOES	**Method: AN320/AN321**							
Calcium, Ca	mg/L	0.2		**8.7**	-	**2.1**	**3.2**	**2.3**
Magnesium, Mg	mg/L	0.1		**1.5**	-	**0.7**	**1.0**	**1.0**
Phosphorus, P	mg/L	0.05		<0.05	-	<0.05	<0.05	<0.05
Potassium, K	mg/L	0.1		**0.3**	-	**1.9**	**2.3**	**0.7**
Sodium, Na	mg/L	0.5		**4.2**	-	**4.3**	**4.0**	**4.0**
Trace Metals in ASLP DI Extract by ICPMS	**Method: AN318**							
Aluminium, Al	µg/L	1		**6**	-	**6**	**7**	**8**
Antimony, Sb	µg/L	1		<1	-	<1	<1	<1
Arsenic, As	µg/L	1		<1	-	<1	<1	<1
Barium, Ba	µg/L	1		**200**	-	**370**	**250**	**240**
Bismuth, Bi	µg/L	1		<1	-	<1	<1	<1
Boron, B	µg/L	5		**37**	-	**20**	**23**	**28**
Cadmium, Cd	µg/L	0.1		**2.6**	-	**1.8**	**1.6**	**1.6**
Chromium, Cr	µg/L	1		<1	-	<1	<1	<1
Cobalt, Co	µg/L	1		<1	-	<1	<1	<1
Copper, Cu	µg/L	1		<1	-	<1	<1	<1
Iron, Fe	µg/L	5		**5**	-	**6**	**11**	**21**
Lead, Pb	µg/L	1		<1	-	**46**	<1	<1
Manganese, Mn	µg/L	1		<1	-	**41**	**30**	**2**
Molybdenum, Mo	µg/L	1		<1	-	<1	<1	<1
Nickel, Ni	µg/L	1		<1	-	<1	<1	<1
Selenium, Se	µg/L	2		<2	-	<2	<2	<2
Silver, Ag	µg/L	1		<1	-	<1	<1	<1
Strontium, Sr	µg/L	1		**33**	-	**14**	**19**	**19**
Thallium, Tl	µg/L	1		<1	-	<1	<1	<1
Thorium, Th	µg/L	1		<1	-	<1	<1	<1
Tin, Sn	µg/L	1		<1	-	<1	<1	<1
Uranium, U	µg/L	1		<1	-	<1	<1	<1
Vanadium, V	µg/L	1		<1	-	<1	<1	<1
Zinc, Zn	µg/L	1		**60**	-	**77**	**48**	**50**

ANALYTICAL REPORT

PE068612 R0

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	PE068612.041 Soil 13 Jun 2012 Vasse WRD, #15 Bulk 1.5-3.0	PE068612.042 Soil 13 Jun 2012 Vasse WRD, #15 Bulk 0.0-3.0 Asbestos	PE068612.043 Soil 14 Jun 2012 Vasse WRD, #16 Bulk 0.0-1.5	PE068612.044 Soil 14 Jun 2012 Vasse WRD, #16 Bulk 1.5-3.0	PE068612.045 Soil 13 Jun 2012 Vasse WRD, #18 Bulk 0.0-1.5
Mercury in ASLP DI Water Extract Method: AN311/AN312								
Mercury	mg/L	0.0005		<0.0005	-	<0.0005	<0.0005	<0.0005
Sample Subcontracted Method:								
Sample Subcontracted*	No unit	-		-	-	-	-	-
Fibre ID in bulk materials Method: AN602								
FibreID								
Asbestos Detected	No unit	-		-	No	-	-	-

SGS

ANALYTICAL REPORT

PE068612 R0

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	PE068612.046 Soil 13 Jun 2012 Vasse WRD, #18 Bulk 1.5-3.0	PE068612.047 Soil 13 Jun 2012 Vasse WRD, #19 Bulk 0.0-1.5	PE068612.048 Soil 13 Jun 2012 Vasse WRD, #19 Bulk 1.5-3.0	PE068612.049 Soil 13 Jun 2012 Vasse WRD, #20 Bulk 0.0-1.5	PE068612.050 Soil 13 Jun 2012 Vasse WRD, #20 Bulk 1.5-3.0
Total Sulfur by LECO Furnace Method: AN202								
Total Sulfur*	%w/w	0.005		**0.024**	**0.006**	<0.005	**0.24**	<0.005
Maximum Potential Acidity*	kg H2SO4/T	0.5		**0.7**	<0.5	<0.5	**7.4**	<0.5
HCl Extractable S, Ca and Mg in Soil ICP OES Method: AN014								
Acid Soluble Sulphur (SHCl)	%w/w	0.005		**0.013**	**0.015**	**0.009**	**0.023**	**0.025**
Acid Neutralising Capacity or Neutralisation Potential(ANC/NP) Method: AN212								
Fizz Rating Reaction*	No unit	-		NIL	Slight	Slight	NIL	NIL
Initial Effervescence*	No unit	-		NO	NO	NO	NO	NO
Effervescence on Warming*	No unit	-		NO	NO	NO	NO	NO
Titration - Green Colouration?*	No unit	-		NO	NO	NO	NO	NO
Titration - Precipitate Formed?*	No unit	-		YES	YES	YES	YES	YES
ANC as % $CaCO_3$	% CaCO3	0.1		**0.3**	**2.0**	**1.4**	**0.4**	**0.6**
ANC as % $CaMg(CO_3)2$	%w/w	0.1		**0.3**	**2.2**	**1.5**	**0.4**	**0.7**
Acid Neutralisation Capacity/Neutralisation	kg CaCO3/T	1		**2.7**	**20**	**14**	**4.0**	**6.2**
Acid Neutralisation Capacity/Neutralisation	kg H2SO4/T	1		**2.6**	**19**	**14**	**3.9**	**6.1**
Net Acid Generation Potential (NAGP) Method: AN215								
Total Oxidisable Sulphur	kg H2SO4/T	0.25		**0.32**	<0.25	<0.25	**6.6**	<0.25
Net Acid Production Potential	kg H2SO4/T	-400		**-2**	**-20**	**-14**	**3**	**-7**
Total Oxidisable Sulphur	%w/w	0.005		**0.010**	<0.005	<0.005	**0.22**	<0.005
Metals in soil by Four Acid digest, ICPMS Method: IMS40Q								
Silver, Ag*	ppm	0.1		<0.1	<0.1	<0.1	<0.1	<0.1
Arsenic, As*	ppm	1		**43**	**18**	**18**	**19**	**30**
Barium, Ba*	ppm	2		**180**	**318**	**118**	**683**	**975**
Beryllium, Be*	ppm	0.1		**0.5**	**0.4**	**0.4**	**0.6**	**0.8**
Bismuth, Bi*	ppm	0.1		**0.4**	**0.3**	**0.3**	**0.2**	**0.3**
Cadmium, Cd*	ppm	0.1		<0.1	<0.1	<0.1	<0.1	<0.1
Cobalt, Co*	ppm	0.1		**10.3**	**10.3**	**6.5**	**12.3**	**13.3**
Copper, Cu*	ppm	2		**34**	**28**	**30**	**32**	**35**
Manganese, Mn*	ppm	0.5		**1390**	**1070**	**1210**	**4840**	**3110**
Molybdenum, Mo*	ppm	0.1		**1.1**	**0.7**	**0.7**	**0.7**	**1.4**
Nickel, Ni*	ppm	2		**17**	**29**	**29**	**12**	**33**
Lead, Pb*	ppm	1		**28**	**18**	**15**	**23**	**25**
Rubidium, Rb*	ppm	0.05		**2.21**	**3.28**	**2.89**	**3.2**	**5.88**
Antimony, Sb*	ppm	0.1		**2.6**	**1.7**	**1.5**	**1**	**2.1**
Selenium, Se*	ppm	2		**2**	<2	<2	**3**	<2
Tin, Sn*	ppm	0.3		**1.4**	**1.2**	**1.1**	**0.6**	**1**
Tellurium, Te*	ppm	0.1		**0.3**	**0.1**	<0.1	**0.1**	**0.1**
Thorium, Th*	ppm	0.05		**8.67**	**6.99**	**6.14**	**5.07**	**7.07**
Thallium, Tl*	ppm	0.1		<0.1	**0.1**	**0.1**	**0.5**	**0.3**
Uranium, U*	ppm	0.05		**1.66**	**1.57**	**1.44**	**1.7**	**2.14**
Tungsten, W*	ppm	0.1		**1.1**	**1.4**	**1.3**	**0.5**	**1.1**
Zinc, Zn*	ppm	5		**62**	**31**	**26**	**108**	**80**
Lithium, Li*	ppm	0.1		**5.7**	**6.6**	**4.7**	**1.8**	**7.0**
Cerium, Ce*	ppm	0.05		**28.6**	**26.6**	**20.4**	**34.9**	**40.9**
Cesium, Cs*	ppm	0.05		**0.17**	**0.23**	**0.2**	**0.19**	**0.35**
Gallium, Ga*	ppm	0.2		**10.3**	**9.6**	**8.5**	**5.4**	**7.8**
Hafnium, Hf*	ppm	0.05		**2.5**	**1.9**	**1.66**	**1.25**	**1.84**
Indium, In*	ppm	0.02		**0.08**	**0.05**	**0.05**	**0.04**	**0.05**
Lanthanum, La*	ppm	0.05		**8.14**	**8.7**	**6.89**	**3.55**	**10.3**
Niobium, Nb*	ppm	0.1		**5.2**	**5.1**	**4.5**	**2.2**	**4.2**
Scandium, Sc*	ppm	0.2		**15.8**	**11**	**9.9**	**13.1**	**14.7**
Tantalum, Ta*	ppm	0.05		**0.5**	**0.5**	**0.48**	**0.2**	**0.4**

ANALYTICAL REPORT

PE068612 R0

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	PE068612.046 Soil 13 Jun 2012 Vasse WRD, #18 Bulk 1.5-3.0	PE068612.047 Soil 13 Jun 2012 Vasse WRD, #19 Bulk 0.0-1.5	PE068612.048 Soil 13 Jun 2012 Vasse WRD, #19 Bulk 1.5-3.0	PE068612.049 Soil 13 Jun 2012 Vasse WRD, #20 Bulk 0.0-1.5	PE068612.050 Soil 13 Jun 2012 Vasse WRD, #20 Bulk 1.5-3.0
ICPAES after Four Acid Digest Digest Method: ICP40Q								
Aluminium, Al*	ppm	100		**35900**	**32400**	**27700**	**23000**	**38400**
Chromium, Cr*	ppm	10		**70**	**40**	<10	**20**	**30**
Iron, Fe*	ppm	100		**446000**	**460000**	**472000**	**453000**	**433000**
Strontium, Sr*	ppm	1		**8**	**19**	**15**	**17**	**16**
Titanium, Ti*	ppm	10		**1750**	**1760**	**1560**	**700**	**1510**
Vanadium, V*	ppm	1		**83**	**65**	**49**	**35**	**66**
Zirconium, Zr*	ppm	1		**80**	**65**	**57**	**41**	**62**
Calcium, Ca*	ppm	50		**560**	**6960**	**4450**	**1160**	**1890**
Potassium, K*	ppm	100		**340**	**540**	**450**	**620**	**850**
Magnesium, Mg*	ppm	20		**380**	**1250**	**1180**	**540**	**640**
Sodium, Na*	ppm	50		**190**	**320**	**280**	**350**	**300**
Phosphorus, P*	ppm	20		**200**	**270**	**290**	**140**	**250**
Sulphur, S*	ppm	20		**590**	**430**	**370**	**920**	**880**
Rare Earth Metals in soil by ICPMS Method: IMS12S								
Mercury, Hg*	ppm	0.1		<0.1	<0.1	<0.1	**0.1**	<0.1
Rhenium, Re*	ppm	0.05		<0.05	<0.05	<0.05	<0.05	<0.05
Metals in soil by Nitric/Hydrofluoric Acid Digest, ICPMS Method:								
Ge*	ppm	0.5		**6.1**	**5.1**	**4.8**	**3.9**	**4.2**
ASLP (Australian Standard Leaching Procedure) DI Water Method: AN007								
Percentage Solids*	%	-		-	-	-	-	-
Mass of test sample for extraction	g	-		**50**	**50**	**50**	**50**	**50**
Mass of leaching solution used	g	-		**1000**	**1000**	**1000**	**1000**	**1000**
Leaching solution used*	No unit	-		DI Water	DI Water	DI Water	DI Water	DI Water
pH of solids leachate	pH Units	-		**6.2**	**8.1**	**8.0**	**7.6**	**7.7**
Conductivity @25C	µS/cm	1		**56**	**130**	**130**	**120**	**150**

SGS

ANALYTICAL REPORT

PE068612 R0

Parameter	Units	LOR	Sample Number: PE068612.046 Sample Matrix: Soil Sample Date: 13 Jun 2012 Sample Name: Vasse WRD, #18 Bulk 1.5-3.0	PE068612.047 Soil 13 Jun 2012 Vasse WRD, #19 Bulk 0.0-1.5	PE068612.048 Soil 13 Jun 2012 Vasse WRD, #19 Bulk 1.5-3.0	PE068612.049 Soil 13 Jun 2012 Vasse WRD, #20 Bulk 0.0-1.5	PE068612.050 Soil 13 Jun 2012 Vasse WRD, #20 Bulk 1.5-3.0
Total Dissolved Solids (TDS) in ASLP DI Water Extract Method: AN113							
Total Dissolved Solids Dried at 180°C	mg/L	10	**72**	**104**	**104**	**92**	**140**
Alkalinity in ASLP DI Water Extract Method: AN135							
Bicarbonate Alkalinity as HCO3	mg/L	5	**6**	**52**	**58**	**40**	**73**
Carbonate Alkalinity as CO3	mg/L	1	<1	<1	<1	<1	<1
Hydroxide Alkalinity as OH	mg/L	5	<5	<5	<5	<5	<5
Total Alkalinity as CaCO3	mg/L	5	**5**	**43**	**47**	**33**	**60**
Sulphate in ASLP DI Water Extract Method: AN275							
Sulphate	mg/L	1	**10**	**11**	**8**	**14**	**12**
Fluoride by Ion Selective Electrode in ASLP DI Water Leachate Method: AN141							
Fluoride by ISE	mg/L	0.1	**0.2**	**1.2**	**1.2**	**0.7**	**0.6**
Metals in Water (ASLP DI) by ICPOES Method: AN320/AN321							
Calcium, Ca	mg/L	0.2	**2.7**	**17**	**18**	**15**	**24**
Magnesium, Mg	mg/L	0.1	**1.1**	**2.2**	**2.1**	**1.5**	**1.7**
Phosphorus, P	mg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Potassium, K	mg/L	0.1	**0.8**	**1.7**	**1.3**	**0.6**	**0.9**
Sodium, Na	mg/L	0.5	**3.8**	**4.5**	**4.0**	**3.6**	**3.0**
Trace Metals in ASLP DI Extract by ICPMS Method: AN318							
Aluminium, Al	µg/L	1	**11**	**28**	**54**	**25**	**28**
Antimony, Sb	µg/L	1	<1	<1	<1	<1	<1
Arsenic, As	µg/L	1	<1	<1	<1	<1	<1
Barium, Ba	µg/L	1	**210**	**230**	**240**	**240**	**280**
Bismuth, Bi	µg/L	1	<1	<1	<1	<1	<1
Boron, B	µg/L	5	**48**	**49**	**62**	**33**	**37**
Cadmium, Cd	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium, Cr	µg/L	1	<1	<1	**1**	<1	**2**
Cobalt, Co	µg/L	1	<1	<1	<1	<1	<1
Copper, Cu	µg/L	1	<1	<1	<1	<1	<1
Iron, Fe	µg/L	5	**38**	<5	**61**	**75**	**56**
Lead, Pb	µg/L	1	<1	<1	<1	<1	<1
Manganese, Mn	µg/L	1	**3**	<1	<1	**3**	<1
Molybdenum, Mo	µg/L	1	<1	<1	<1	<1	<1
Nickel, Ni	µg/L	1	<1	<1	<1	<1	<1
Selenium, Se	µg/L	2	<2	<2	<2	<2	<2
Silver, Ag	µg/L	1	<1	<1	<1	<1	<1
Strontium, Sr	µg/L	1	**31**	**91**	**100**	**86**	**78**
Thallium, Tl	µg/L	1	<1	<1	<1	<1	<1
Thorium, Th	µg/L	1	<1	<1	<1	<1	<1
Tin, Sn	µg/L	1	<1	<1	<1	<1	<1
Uranium, U	µg/L	1	<1	<1	<1	<1	<1
Vanadium, V	µg/L	1	<1	<1	<1	<1	<1
Zinc, Zn	µg/L	1	**33**	**22**	**35**	**27**	**39**

ANALYTICAL REPORT

PE068612 R0

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	PE068612.046 Soil 13 Jun 2012 Vasse WRD, #18 Bulk 1.5-3.0	PE068612.047 Soil 13 Jun 2012 Vasse WRD, #19 Bulk 0.0-1.5	PE068612.048 Soil 13 Jun 2012 Vasse WRD, #19 Bulk 1.5-3.0	PE068612.049 Soil 13 Jun 2012 Vasse WRD, #20 Bulk 0.0-1.5	PE068612.050 Soil 13 Jun 2012 Vasse WRD, #20 Bulk 1.5-3.0
Mercury in ASLP DI Water Extract Method: AN311/AN312								
Mercury	mg/L	0.0005		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Sample Subcontracted Method:								
Sample Subcontracted*	No unit	-		-	-	-	-	-
Fibre ID in bulk materials Method: AN602								
FibreID								
Asbestos Detected	No unit	-		-	-	-	-	-

SGS

ANALYTICAL REPORT

PE068612 R0

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	PE068612.051 Soil 13 Jun 2012 Vasse WRD, #20 Bulk 0.0-3.0 Asbestos	PE068612.052 Soil 14 Jun 2012 Vasse WRD, #21 Bulk 0.0-1.5	PE068612.053 Soil 14 Jun 2012 Vasse WRD, #21 Bulk 1.5-3.0	PE068612.054 Soil 14 Jun 2012 Vasse WRD, #22 Bulk 0.0-1.5
Total Sulfur by LECO Furnace Method: AN202							
Total Sulfur*	%w/w	0.005		-	**0.019**	**0.059**	**0.012**
Maximum Potential Acidity*	kg H2SO4/T	0.5		-	**0.6**	**1.8**	<0.5
HCl Extractable S, Ca and Mg in Soil ICP OES Method: AN014							
Acid Soluble Sulphur (SHCl)	%w/w	0.005		-	**0.015**	**0.017**	<0.005
Acid Neutralising Capacity or Neutralisation Potential(ANC/NP) Method: AN212							
Fizz Rating Reaction*	No unit	-		-	NIL	NIL	NIL
Initial Effervescence*	No unit	-		-	NO	NO	NO
Effervescence on Warming*	No unit	-		-	NO	NO	NO
Titration - Green Colouration?*	No unit	-		-	NO	NO	NO
Titration - Precipitate Formed?*	No unit	-		-	YES	YES	NO
ANC as % $CaCO_3$	% CaCO3	0.1		-	**0.2**	**0.2**	**0.2**
ANC as % $CaMg(CO_3)2$	%w/w	0.1		-	**0.3**	**0.3**	**0.2**
Acid Neutralisation Capacity/Neutralisation	kg CaCO3/T	1		-	**2.5**	**2.5**	**1.7**
Acid Neutralisation Capacity/Neutralisation	kg H2SO4/T	1		-	**2.4**	**2.4**	**1.7**
Net Acid Generation Potential (NAGP) Method: AN215							
Total Oxidisable Sulphur	kg H2SO4/T	0.25		-	<0.25	**1.3**	**0.26**
Net Acid Production Potential	kg H2SO4/T	-400		-	**-2**	**-1**	**-1**
Total Oxidisable Sulphur	%w/w	0.005		-	<0.005	**0.042**	**0.008**
Metals in soil by Four Acid digest, ICPMS Method: IMS40Q							
Silver, Ag*	ppm	0.1		-	<0.1	<0.1	<0.1
Arsenic, As*	ppm	1		-	**28**	**24**	**69**
Barium, Ba*	ppm	2		-	**109**	**94**	**101**
Beryllium, Be*	ppm	0.1		-	**0.6**	**0.6**	**1.1**
Bismuth, Bi*	ppm	0.1		-	**0.3**	**0.2**	**0.4**
Cadmium, Cd*	ppm	0.1		-	<0.1	<0.1	<0.1
Cobalt, Co*	ppm	0.1		-	**9.2**	**9**	**7.5**
Copper, Cu*	ppm	2		-	**24**	**25**	**52**
Manganese, Mn*	ppm	0.5		-	**2810**	**2210**	**566**
Molybdenum, Mo*	ppm	0.1		-	**1.1**	**2.5**	**2.8**
Nickel, Ni*	ppm	2		-	**25**	**20**	**45**
Lead, Pb*	ppm	1		-	**20**	**50**	**28**
Rubidium, Rb*	ppm	0.05		-	**1.18**	**0.86**	**11**
Antimony, Sb*	ppm	0.1		-	**1.9**	**1.8**	**4.2**
Selenium, Se*	ppm	2		-	<2	<2	**2**
Tin, Sn*	ppm	0.3		-	**0.8**	**0.5**	**2.2**
Tellurium, Te*	ppm	0.1		-	**0.1**	**0.1**	**0.3**
Thorium, Th*	ppm	0.05		-	**5.01**	**3.19**	**11.7**
Thallium, Tl*	ppm	0.1		-	<0.1	<0.1	**0.2**
Uranium, U*	ppm	0.05		-	**2.71**	**2.5**	**3.27**
Tungsten, W*	ppm	0.1		-	**1.7**	**1.7**	**1.6**
Zinc, Zn*	ppm	5		-	**64**	**76**	**156**
Lithium, Li*	ppm	0.1		-	**2.4**	**1.2**	**16**
Cerium, Ce*	ppm	0.05		-	**32.1**	**22.3**	**22.6**
Cesium, Cs*	ppm	0.05		-	**0.1**	**0.07**	**0.78**
Gallium, Ga*	ppm	0.2		-	**6.7**	**4.7**	**17.3**
Hafnium, Hf*	ppm	0.05		-	**1.5**	**0.85**	**4.28**
Indium, In*	ppm	0.02		-	**0.04**	**0.02**	**0.13**
Lanthanum, La*	ppm	0.05		-	**6.93**	**4.64**	**8.14**
Niobium, Nb*	ppm	0.1		-	**3.9**	**2.4**	**9.5**
Scandium, Sc*	ppm	0.2		-	**1.9**	**1.8**	**4.2**
Tantalum, Ta*	ppm	0.05		-	**0.38**	**0.25**	**1.03**

ANALYTICAL REPORT

PE068612 R0

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name Asbestos	PE068612.051 Soil 13 Jun 2012 Vasse WRD, #20 Bulk 0.0-3.0	PE068612.052 Soil 14 Jun 2012 Vasse WRD, #21 Bulk 0.0-1.5	PE068612.053 Soil 14 Jun 2012 Vasse WRD, #21 Bulk 1.5-3.0	PE068612.054 Soil 14 Jun 2012 Vasse WRD, #22 Bulk 0.0-1.5
ICPAES after Four Acid Digest Digest Method: ICP40Q							
Aluminium, Al*	ppm	100	-	**25700**	**16600**	**55200**
Chromium, Cr*	ppm	10	-	**30**	**20**	**120**
Iron, Fe*	ppm	100	-	**484000**	**531000**	**421000**
Strontium, Sr*	ppm	1	-	**6**	**4**	**5**
Titanium, Ti*	ppm	10	-	**1320**	**820**	**3170**
Vanadium, V*	ppm	1	-	**47**	**38**	**170**
Zirconium, Zr*	ppm	1	-	**53**	**30**	**122**
Calcium, Ca*	ppm	50	-	**550**	**580**	**300**
Potassium, K*	ppm	100	-	**210**	**160**	**1580**
Magnesium, Mg*	ppm	20	-	**670**	**740**	**390**
Sodium, Na*	ppm	50	-	**380**	**460**	**270**
Phosphorus, P*	ppm	20	-	**370**	**420**	**250**
Sulphur, S*	ppm	20	-	**580**	**610**	**350**
Rare Earth Metals in soil by ICPMS Method: IMS12S							
Mercury, Hg*	ppm	0.1	-	<0.1	<0.1	<0.1
Rhenium, Re*	ppm	0.05	-	<0.05	<0.05	<0.05
Metals in soil by Nitric/Hydrofluoric Acid Digest, ICPMS Method:							
Ge*	ppm	0.5	-	**4.2**	**3.8**	**3.5**
ASLP (Australian Standard Leaching Procedure) DI Water Method: AN007							
Percentage Solids*	%	-	-	-	-	-
Mass of test sample for extraction	g	-	-	**50**	**50**	**50**
Mass of leaching solution used	g	-	-	**1000**	**1000**	**1000**
Leaching solution used*	No unit	-	-	DI Water	DI Water	DI Water
pH of solids leachate	pH Units	-	-	**7.2**	**7.5**	**6.0**
Conductivity @25C	µS/cm	1	-	**120**	**140**	**48**

ANALYTICAL REPORT

PE068612 R0

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	PE068612.051 Soil 13 Jun 2012 Vasse WRD, #20 Bulk 0.0-3.0 Asbestos	PE068612.052 Soil 14 Jun 2012 Vasse WRD, #21 Bulk 0.0-1.5	PE068612.053 Soil 14 Jun 2012 Vasse WRD, #21 Bulk 1.5-3.0	PE068612.054 Soil 14 Jun 2012 Vasse WRD, #22 Bulk 0.0-1.5
Total Dissolved Solids (TDS) in ASLP DI Water Extract Method: AN113							
Total Dissolved Solids Dried at 180°C	mg/L	10	-	**96**	**100**	**36**
Alkalinity in ASLP DI Water Extract Method: AN135							
Bicarbonate Alkalinity as HCO3	mg/L	5	-	**14**	**18**	<5
Carbonate Alkalinity as CO3	mg/L	1	-	<1	<1	<1
Hydroxide Alkalinity as OH	mg/L	5	-	<5	<5	<5
Total Alkalinity as CaCO3	mg/L	5	-	**12**	**15**	<5
Sulphate in ASLP DI Water Extract Method: AN275							
Sulphate	mg/L	1	-	**19**	**24**	**5**
Fluoride by Ion Selective Electrode in ASLP DI Water Leachate Method: AN141							
Fluoride by ISE	mg/L	0.1	-	**0.6**	**0.5**	<0.1
Metals in Water (ASLP DI) by ICPOES Method: AN320/AN321							
Calcium, Ca	mg/L	0.2	-	**6.0**	**8.1**	**1.4**
Magnesium, Mg	mg/L	0.1	-	**2.0**	**2.3**	**0.4**
Phosphorus, P	mg/L	0.05	-	<0.05	<0.05	<0.05
Potassium, K	mg/L	0.1	-	**0.8**	**0.6**	**2.0**
Sodium, Na	mg/L	0.5	-	**9.7**	**11**	**3.9**
Trace Metals in ASLP DI Extract by ICPMS Method: AN318							
Aluminium, Al	µg/L	1	-	<1	**4**	**5**
Antimony, Sb	µg/L	1	-	<1	<1	<1
Arsenic, As	µg/L	1	-	<1	<1	<1
Barium, Ba	µg/L	1	-	**150**	**140**	**130**
Bismuth, Bi	µg/L	1	-	<1	<1	<1
Boron, B	µg/L	5	-	**27**	**22**	**74**
Cadmium, Cd	µg/L	0.1	-	<0.1	<0.1	<0.1
Chromium, Cr	µg/L	1	-	<1	<1	**2**
Cobalt, Co	µg/L	1	-	<1	<1	<1
Copper, Cu	µg/L	1	-	<1	<1	<1
Iron, Fe	µg/L	5	-	<5	**15**	<5
Lead, Pb	µg/L	1	-	<1	<1	<1
Manganese, Mn	µg/L	1	-	<1	**60**	**2**
Molybdenum, Mo	µg/L	1	-	<1	<1	<1
Nickel, Ni	µg/L	1	-	<1	<1	<1
Selenium, Se	µg/L	2	-	<2	<2	<2
Silver, Ag	µg/L	1	-	<1	<1	<1
Strontium, Sr	µg/L	1	-	**49**	**15**	**55**
Thallium, Tl	µg/L	1	-	<1	<1	<1
Thorium, Th	µg/L	1	-	<1	<1	<1
Tin, Sn	µg/L	1	-	<1	<1	<1
Uranium, U	µg/L	1	-	<1	<1	<1
Vanadium, V	µg/L	1	-	<1	<1	<1
Zinc, Zn	µg/L	1	-	**33**	**38**	**32**

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name Asbestos	PE068612.051 Soil 13 Jun 2012 Vasse WRD, #20 Bulk 0.0-3.0	PE068612.052 Soil 14 Jun 2012 Vasse WRD, #21 Bulk 0.0-1.5	PE068612.053 Soil 14 Jun 2012 Vasse WRD, #21 Bulk 1.5-3.0	PE068612.054 Soil 14 Jun 2012 Vasse WRD, #22 Bulk 0.0-1.5
Mercury in ASLP DI Water Extract Method: AN311/AN312							
Mercury	mg/L	0.0005	-	<0.0005	<0.0005	<0.0005	
Sample Subcontracted Method:							
Sample Subcontracted*	No unit	-	-	-	-	-	
Fibre ID in bulk materials Method: AN602							
FibreID							
Asbestos Detected	No unit	-	No	-	-	-	

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ANALYTICAL REPORT

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Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	PE068612.056 Soil 14 Jun 2012 Vasse WRD, #25 Bulk 0.0-1.5	PE068612.057 Soil 14 Jun 2012 Vasse WRD, #25 Bulk 1.5-3.0	PE068612.058 Soil 14 Jun 2012 Vasse WRD, #25 Bulk 0.0-3.0 Asbestos	PE068612.059 Soil 14 Jun 2012 Vasse WRD, #26 Bulk 0.0-1.5	PE068612.060 Soil 14 Jun 2012 Vasse WRD, #26 Bulk 1.5-3.0
Total Sulfur by LECO Furnace Method: AN202								
Total Sulfur*	%w/w	0.005		<0.005	<0.005	-	<0.005	**0.057**
Maximum Potential Acidity*	kg H2SO4/T	0.5		<0.5	<0.5	-	<0.5	**1.7**
HCl Extractable S, Ca and Mg in Soil ICP OES Method: AN014								
Acid Soluble Sulphur (SHCl)	%w/w	0.005		**0.012**	**0.013**	-	**0.013**	**0.009**
Acid Neutralising Capacity or Neutralisation Potential(ANC/NP) Method: AN212								
Fizz Rating Reaction*	No unit	-		NIL	NIL	-	NIL	NIL
Initial Effervescence*	No unit	-		NO	NO	-	NO	NO
Effervescence on Warming*	No unit	-		NO	NO	-	NO	NO
Titration - Green Colouration?*	No unit	-		NO	NO	-	NO	NO
Titration - Precipitate Formed?*	No unit	-		NO	NO	-	NO	NO
ANC as % $CaCO_3$	% CaCO3	0.1		**0.5**	**0.4**	-	**0.4**	**0.3**
ANC as % $CaMg(CO_3)2$	%w/w	0.1		**0.5**	**0.4**	-	**0.5**	**0.3**
Acid Neutralisation Capacity/Neutralisation	kg CaCO3/T	1		**4.7**	**4.0**	-	**4.2**	**3.0**
Acid Neutralisation Capacity/Neutralisation	kg H2SO4/T	1		**4.6**	**3.9**	-	**4.1**	**2.9**
Net Acid Generation Potential (NAGP) Method: AN215								
Total Oxidisable Sulphur	kg H2SO4/T	0.25		<0.25	<0.25	-	<0.25	**1.5**
Net Acid Production Potential	kg H2SO4/T	-400		**-5**	**-4**	-	**-5**	**-1**
Total Oxidisable Sulphur	%w/w	0.005		<0.005	<0.005	-	<0.005	**0.048**
Metals in soil by Four Acid digest, ICPMS Method: IMS40Q								
Silver, Ag*	ppm	0.1		<0.1	<0.1	-	<0.1	<0.1
Arsenic, As*	ppm	1		**32**	**30**	-	**57**	**45**
Barium, Ba*	ppm	2		**282**	**141**	-	**291**	**157**
Beryllium, Be*	ppm	0.1		**1**	**0.8**	-	**0.9**	**0.6**
Bismuth, Bi*	ppm	0.1		**0.4**	**0.4**	-	**0.5**	**0.3**
Cadmium, Cd*	ppm	0.1		**0.1**	<0.1	-	<0.1	<0.1
Cobalt, Co*	ppm	0.1		**21.3**	**17.4**	-	**11**	**5.2**
Copper, Cu*	ppm	2		**54**	**46**	-	**27**	**20**
Manganese, Mn*	ppm	0.5		**5660**	**4090**	-	**3780**	**2750**
Molybdenum, Mo*	ppm	0.1		**0.9**	**1.1**	-	**1.6**	**1**
Nickel, Ni*	ppm	2		**25**	**31**	-	**26**	**14**
Lead, Pb*	ppm	1		**60**	**25**	-	**26**	**19**
Rubidium, Rb*	ppm	0.05		**1.62**	**2.28**	-	**5.91**	**3.93**
Antimony, Sb*	ppm	0.1		**2.5**	**2.6**	-	**2.4**	**1.6**
Selenium, Se*	ppm	2		<2	<2	-	**3**	<2
Tin, Sn*	ppm	0.3		**1.1**	**1**	-	**1.6**	**1**
Tellurium, Te*	ppm	0.1		**0.2**	**0.2**	-	**0.3**	**0.2**
Thorium, Th*	ppm	0.05		**9.59**	**8.14**	-	**12.5**	**9**
Thallium, Tl*	ppm	0.1		**0.3**	**0.2**	-	**0.3**	**0.1**
Uranium, U*	ppm	0.05		**3.62**	**3.32**	-	**2.87**	**1.96**
Tungsten, W*	ppm	0.1		**1.9**	**1.7**	-	**1.3**	**1**
Zinc, Zn*	ppm	5		**30**	**34**	-	**30**	**23**
Lithium, Li*	ppm	0.1		**21**	**17**	-	**7.9**	**4.4**
Cerium, Ce*	ppm	0.05		**246**	**78.7**	-	**43.8**	**29.6**
Cesium, Cs*	ppm	0.05		**0.14**	**0.22**	-	**0.4**	**0.27**
Gallium, Ga*	ppm	0.2		**11.3**	**10.9**	-	**14.3**	**9**
Hafnium, Hf*	ppm	0.05		**2.91**	**2.44**	-	**4**	**2.76**
Indium, In*	ppm	0.02		**0.05**	**0.04**	-	**0.08**	**0.06**
Lanthanum, La*	ppm	0.05		**13.8**	**12.1**	-	**8.12**	**5.02**
Niobium, Nb*	ppm	0.1		**5.2**	**4.8**	-	**7.3**	**4.5**
Scandium, Sc*	ppm	0.2		**2.5**	**2.6**	-	**2.4**	**1.6**
Tantalum, Ta*	ppm	0.05		**0.58**	**0.52**	-	**0.79**	**0.49**

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ANALYTICAL REPORT

PE068612 R0

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	PE068612.056 Soil 14 Jun 2012 Vasse WRD, #25 Bulk 0.0-1.5	PE068612.057 Soil 14 Jun 2012 Vasse WRD, #25 Bulk 1.5-3.0	PE068612.058 Soil 14 Jun 2012 Vasse WRD, #25 Bulk 0.0-3.0 Asbestos	PE068612.059 Soil 14 Jun 2012 Vasse WRD, #26 Bulk 0.0-1.5	PE068612.060 Soil 14 Jun 2012 Vasse WRD, #26 Bulk 1.5-3.0
ICPAES after Four Acid Digest Digest Method: ICP40Q								
Aluminium, Al*	ppm	100		**46300**	**43000**	-	**45300**	**29500**
Chromium, Cr*	ppm	10		**50**	**80**	-	**120**	**120**
Iron, Fe*	ppm	100		**420000**	**451000**	-	**444000**	**482000**
Strontium, Sr*	ppm	1		**23**	**18**	-	**24**	**6**
Titanium, Ti*	ppm	10		**1790**	**1640**	-	**2330**	**1410**
Vanadium, V*	ppm	1		**62**	**64**	-	**120**	**68**
Zirconium, Zr*	ppm	1		**81**	**72**	-	**114**	**80**
Calcium, Ca*	ppm	50		**1100**	**890**	-	**1370**	**540**
Potassium, K*	ppm	100		**460**	**510**	-	**950**	**570**
Magnesium, Mg*	ppm	20		**2010**	**1640**	-	**930**	**450**
Sodium, Na*	ppm	50		**1020**	**880**	-	**280**	**150**
Phosphorus, P*	ppm	20		**180**	**250**	-	**320**	**270**
Sulphur, S*	ppm	20		**320**	**330**	-	**580**	**480**
Rare Earth Metals in soil by ICPMS Method: IMS12S								
Mercury, Hg*	ppm	0.1		<0.1	<0.1	-	<0.1	<0.1
Rhenium, Re*	ppm	0.05		<0.05	<0.05	-	<0.05	<0.05
Metals in soil by Nitric/Hydrofluoric Acid Digest, ICPMS Method:								
Ge*	ppm	0.5		**6.1**	**5.1**	-	**4.0**	**5.6**
ASLP (Australian Standard Leaching Procedure) DI Water Method: AN007								
Percentage Solids*	%	-		-	-	-	-	-
Mass of test sample for extraction	g	-		**50**	**50**	-	**50**	**50**
Mass of leaching solution used	g	-		**1000**	**1000**	-	**1000**	**1000**
Leaching solution used*	No unit	-		DI Water	DI Water	-	DI Water	DI Water
pH of solids leachate	pH Units	-		**7.2**	**7.4**	-	**7.6**	**7.1**
Conductivity @25C	µS/cm	1		**240**	**220**	-	**130**	**65**

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ANALYTICAL REPORT

PE068612 R0

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	PE068612.056 Soil 14 Jun 2012 Vasse WRD, #25 Bulk 0.0-1.5	PE068612.057 Soil 14 Jun 2012 Vasse WRD, #25 Bulk 1.5-3.0	PE068612.058 Soil 14 Jun 2012 Vasse WRD, #25 Bulk 0.0-3.0 Asbestos	PE068612.059 Soil 14 Jun 2012 Vasse WRD, #26 Bulk 0.0-1.5	PE068612.060 Soil 14 Jun 2012 Vasse WRD, #26 Bulk 1.5-3.0
Total Dissolved Solids (TDS) in ASLP DI Water Extract Method: AN113								
Total Dissolved Solids Dried at 180°C	mg/L	10		**168**	**172**	-	**96**	**56**
Alkalinity in ASLP DI Water Extract Method: AN135								
Bicarbonate Alkalinity as HCO3	mg/L	5		**31**	**20**	-	**56**	**13**
Carbonate Alkalinity as CO3	mg/L	1		<1	<1	-	<1	<1
Hydroxide Alkalinity as OH	mg/L	5		<5	<5	-	<5	<5
Total Alkalinity as CaCO3	mg/L	5		**26**	**17**	-	**46**	**10**
Sulphate in ASLP DI Water Extract Method: AN275								
Sulphate	mg/L	1		**25**	**25**	-	**12**	**8**
Fluoride by Ion Selective Electrode in ASLP DI Water Leachate Method: AN141								
Fluoride by ISE	mg/L	0.1		**0.7**	**0.7**	-	**0.5**	**0.4**
Metals in Water (ASLP DI) by ICPOES Method: AN320/AN321								
Calcium, Ca	mg/L	0.2		**7.4**	**6.4**	-	**17**	**5.1**
Magnesium, Mg	mg/L	0.1		**4.5**	**3.9**	-	**2.6**	**1.2**
Phosphorus, P	mg/L	0.05		<0.05	<0.05	-	<0.05	<0.05
Potassium, K	mg/L	0.1		**1.6**	**1.9**	-	**2.1**	**0.9**
Sodium, Na	mg/L	0.5		**28**	**26**	-	**5.2**	**2.7**
Trace Metals in ASLP DI Extract by ICPMS Method: AN318								
Aluminium, Al	µg/L	1		**11**	**26**	-	**3**	**13**
Antimony, Sb	µg/L	1		<1	<1	-	<1	<1
Arsenic, As	µg/L	1		<1	<1	-	<1	<1
Barium, Ba	µg/L	1		**85**	**73**	-	**230**	**210**
Bismuth, Bi	µg/L	1		<1	<1	-	<1	<1
Boron, B	µg/L	5		**48**	**29**	-	**35**	**72**
Cadmium, Cd	µg/L	0.1		<0.1	<0.1	-	<0.1	**0.2**
Chromium, Cr	µg/L	1		**3**	<1	-	<1	<1
Cobalt, Co	µg/L	1		<1	<1	-	<1	<1
Copper, Cu	µg/L	1		<1	<1	-	<1	<1
Iron, Fe	µg/L	5		<5	**80**	-	**14**	**7**
Lead, Pb	µg/L	1		<1	<1	-	<1	**10**
Manganese, Mn	µg/L	1		**3**	**3**	-	**3**	<1
Molybdenum, Mo	µg/L	1		<1	<1	-	<1	<1
Nickel, Ni	µg/L	1		<1	<1	-	<1	<1
Selenium, Se	µg/L	2		<2	<2	-	<2	<2
Silver, Ag	µg/L	1		<1	<1	-	<1	<1
Strontium, Sr	µg/L	1		**55**	**40**	-	**49**	**38**
Thallium, Tl	µg/L	1		<1	<1	-	<1	<1
Thorium, Th	µg/L	1		<1	<1	-	<1	<1
Tin, Sn	µg/L	1		<1	<1	-	<1	<1
Uranium, U	µg/L	1		<1	<1	-	<1	<1
Vanadium, V	µg/L	1		<1	<1	-	<1	<1
Zinc, Zn	µg/L	1		**50**	**52**	-	**52**	**39**

ANALYTICAL REPORT

PE068612 R0

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	PE068612.056 Soil 14 Jun 2012 Vasse WRD, #25 Bulk 0.0-1.5	PE068612.057 Soil 14 Jun 2012 Vasse WRD, #25 Bulk 1.5-3.0	PE068612.058 Soil 14 Jun 2012 Vasse WRD, #25 Bulk 0.0-3.0 Asbestos	PE068612.059 Soil 14 Jun 2012 Vasse WRD, #26 Bulk 0.0-1.5	PE068612.060 Soil 14 Jun 2012 Vasse WRD, #26 Bulk 1.5-3.0
Mercury in ASLP DI Water Extract Method: AN311/AN312								
Mercury	mg/L	0.0005		<0.0005	<0.0005	-	<0.0005	<0.0005
Sample Subcontracted Method:								
Sample Subcontracted*	No unit	-		-	-	-	-	-
Fibre ID in bulk materials Method: AN602								
FibreID								
Asbestos Detected	No unit	-		-	-	No	-	-

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ANALYTICAL REPORT

PE068612 R0

Parameter	Units	LOR	Sample Number: PE068612.061 Sample Matrix: Soil Sample Date: 12 Jun 2012 Sample Name: Vasse WRD, #27 Bulk 0.3	Sample Number: PE068612.062 Sample Matrix: Soil Sample Date: 14 Jun 2012 Sample Name: Vasse WRD, #28 Bulk 0.0-1.5	Sample Number: PE068612.063 Sample Matrix: Soil Sample Date: 14 Jun 2012 Sample Name: Vasse WRD, #28 Bulk 1.5-3.0	Sample Number: PE068612.064 Sample Matrix: Soil Sample Date: 14 Jun 2012 Sample Name: Vasse WRD, #29 Bulk 0.0-1.5	Sample Number: PE068612.065 Sample Matrix: Soil Sample Date: 14 Jun 2012 Sample Name: Vasse WRD, #29 Bulk 1.5-3.0
Total Sulfur by LECO Furnace Method: AN202							
Total Sulfur*	%w/w	0.005	**0.039**	**0.060**	**0.097**	<0.005	**0.036**
Maximum Potential Acidity*	kg H2SO4/T	0.5	**1.2**	**1.8**	**3.0**	<0.5	**1.1**
HCl Extractable S, Ca and Mg in Soil ICP OES Method: AN014							
Acid Soluble Sulphur (SHCl)	%w/w	0.005	**0.043**	**0.013**	**0.072**	**0.020**	**0.019**
Acid Neutralising Capacity or Neutralisation Potential(ANC/NP) Method: AN212							
Fizz Rating Reaction*	No unit	-	NIL	NIL	NIL	NIL	NIL
Initial Effervescence*	No unit	-	NO	NO	NO	NO	NO
Effervescence on Warming*	No unit	-	NO	NO	NO	NO	NO
Titration - Green Colouration?*	No unit	-	NO	NO	NO	NO	NO
Titration - Precipitate Formed?*	No unit	-	NO	NO	YES	YES	YES
ANC as % $CaCO_3$	% CaCO3	0.1	**0.2**	**0.2**	**0.4**	**0.7**	**0.2**
ANC as % $CaMg(CO_3)2$	%w/w	0.1	**0.2**	**0.3**	**0.5**	**0.8**	**0.3**
Acid Neutralisation Capacity/Neutralisation	kg CaCO3/T	1	**2.2**	**2.5**	**4.5**	**7.2**	**2.5**
Acid Neutralisation Capacity/Neutralisation	kg H2SO4/T	1	**2.2**	**2.4**	**4.4**	**7.0**	**2.4**
Net Acid Generation Potential (NAGP) Method: AN215							
Total Oxidisable Sulphur	kg H2SO4/T	0.25	<0.25	**1.4**	**0.78**	<0.25	**0.52**
Net Acid Production Potential	kg H2SO4/T	-400	**-2**	**-1**	**-4**	**-8**	**-2**
Total Oxidisable Sulphur	%w/w	0.005	<0.005	**0.047**	**0.026**	<0.005	**0.017**
Metals in soil by Four Acid digest, ICPMS Method: IMS40Q							
Silver, Ag*	ppm	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Arsenic, As*	ppm	1	**26**	**50**	**47**	**33**	**30**
Barium, Ba*	ppm	2	**24**	**257**	**288**	**85**	**398**
Beryllium, Be*	ppm	0.1	**0.8**	**0.9**	**1**	**0.6**	**0.9**
Bismuth, Bi*	ppm	0.1	**0.6**	**0.6**	**0.6**	**0.4**	**0.5**
Cadmium, Cd*	ppm	0.1	<0.1	<0.1	<0.1	<0.1	**0.1**
Cobalt, Co*	ppm	0.1	**9.2**	**10.7**	**9.7**	**12.3**	**25**
Copper, Cu*	ppm	2	**16**	**30**	**29**	**27**	**42**
Manganese, Mn*	ppm	0.5	**1140**	**7010**	**6920**	**2700**	**4980**
Molybdenum, Mo*	ppm	0.1	**1.5**	**1.2**	**1.2**	**0.7**	**1**
Nickel, Ni*	ppm	2	**30**	**26**	**25**	**22**	**37**
Lead, Pb*	ppm	1	**15**	**27**	**29**	**22**	**21**
Rubidium, Rb*	ppm	0.05	**1.17**	**5.61**	**4.75**	**1.46**	**0.74**
Antimony, Sb*	ppm	0.1	**3.6**	**3.1**	**3.1**	**2.1**	**2.6**
Selenium, Se*	ppm	2	<2	<2	<2	<2	<2
Tin, Sn*	ppm	0.3	**1.3**	**1.8**	**2**	**1.1**	**1.5**
Tellurium, Te*	ppm	0.1	**0.2**	**0.2**	**0.2**	**0.1**	**0.2**
Thorium, Th*	ppm	0.05	**9.25**	**15.2**	**15.1**	**7.2**	**11.2**
Thallium, Tl*	ppm	0.1	<0.1	**0.2**	**0.2**	<0.1	<0.1
Uranium, U*	ppm	0.05	**2.4**	**2.77**	**2.3**	**2.7**	**4.17**
Tungsten, W*	ppm	0.1	**1.5**	**1.4**	**1.5**	**1.5**	**2.2**
Zinc, Zn*	ppm	5	**30**	**33**	**29**	**22**	**22**
Lithium, Li*	ppm	0.1	**24**	**8.9**	**13**	**8.4**	**28**
Cerium, Ce*	ppm	0.05	**31.7**	**43.4**	**69.1**	**58.5**	**36.2**
Cesium, Cs*	ppm	0.05	**0.09**	**0.39**	**0.28**	**0.11**	**0.09**
Gallium, Ga*	ppm	0.2	**11.9**	**16.9**	**19.1**	**10.3**	**13.2**
Hafnium, Hf*	ppm	0.05	**3.19**	**4.76**	**5.05**	**2.24**	**3.51**
Indium, In*	ppm	0.02	**0.04**	**0.1**	**0.1**	**0.05**	**0.07**
Lanthanum, La*	ppm	0.05	**11.3**	**7.04**	**7.73**	**10.1**	**19.7**
Niobium, Nb*	ppm	0.1	**6.3**	**8.3**	**9.5**	**4.8**	**6.3**
Scandium, Sc*	ppm	0.2	**3.6**	**3.1**	**3.1**	**2.1**	**2.6**
Tantalum, Ta*	ppm	0.05	**0.73**	**0.9**	**1.03**	**0.52**	**0.71**

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Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	PE068612.061 Soil 12 Jun 2012 Vasse WRD, #27 Bulk 0.3	PE068612.062 Soil 14 Jun 2012 Vasse WRD, #28 Bulk 0.0-1.5	PE068612.063 Soil 14 Jun 2012 Vasse WRD, #28 Bulk 1.5-3.0	PE068612.064 Soil 14 Jun 2012 Vasse WRD, #29 Bulk 0.0-1.5	PE068612.065 Soil 14 Jun 2012 Vasse WRD, #29 Bulk 1.5-3.0
ICPAES after Four Acid Digest Digest Method: ICP40Q								
Aluminium, Al*	ppm	100		**45600**	**52700**	**63200**	**34000**	**57300**
Chromium, Cr*	ppm	10		**30**	**90**	**80**	**70**	**70**
Iron, Fe*	ppm	100		**234000**	**424000**	**353000**	**466000**	**424000**
Strontium, Sr*	ppm	1		**11**	**11**	**26**	**15**	**17**
Titanium, Ti*	ppm	10		**2290**	**2620**	**3150**	**1450**	**2130**
Vanadium, V*	ppm	1		**71**	**118**	**121**	**50**	**77**
Zirconium, Zr*	ppm	1		**88**	**133**	**139**	**69**	**99**
Calcium, Ca*	ppm	50		**390**	**620**	**1970**	**2170**	**510**
Potassium, K*	ppm	100		**160**	**800**	**850**	**320**	**210**
Magnesium, Mg*	ppm	20		**860**	**610**	**860**	**1240**	**1250**
Sodium, Na*	ppm	50		**770**	**260**	**670**	**670**	**1010**
Phosphorus, P*	ppm	20		**310**	**210**	**190**	**280**	**230**
Sulphur, S*	ppm	20		**610**	**600**	**1150**	**450**	**460**
Rare Earth Metals in soil by ICPMS Method: IMS12S								
Mercury, Hg*	ppm	0.1		<0.1	<0.1	<0.1	<0.1	<0.1
Rhenium, Re*	ppm	0.05		<0.05	<0.05	<0.05	<0.05	<0.05
Metals in soil by Nitric/Hydrofluoric Acid Digest, ICPMS Method:								
Ge*	ppm	0.5		**2.7**	**3.9**	**3.2**	**4.8**	**3.6**
ASLP (Australian Standard Leaching Procedure) DI Water Method: AN007								
Percentage Solids*	%	-		-	-	-	-	-
Mass of test sample for extraction	g	-		**50**	**50**	**50**	**50**	**50**
Mass of leaching solution used	g	-		**1000**	**1000**	**1000**	**1000**	**1000**
Leaching solution used*	No unit	-		DI Water	DI Water	DI Water	DI Water	DI Water
pH of solids leachate	pH Units	-		**6.6**	**6.6**	**7.3**	**8.3**	**6.6**
Conductivity @25C	µS/cm	1		**300**	**100**	**410**	**230**	**160**

Parameter	Units	LOR	Sample Number: PE068612.061 Sample Matrix: Soil Sample Date: 12 Jun 2012 Sample Name: Vasse WRD, #27 Bulk 0.3	PE068612.062 Soil 14 Jun 2012 Vasse WRD, #28 Bulk 0.0-1.5	PE068612.063 Soil 14 Jun 2012 Vasse WRD, #28 Bulk 1.5-3.0	PE068612.064 Soil 14 Jun 2012 Vasse WRD, #29 Bulk 0.0-1.5	PE068612.065 Soil 14 Jun 2012 Vasse WRD, #29 Bulk 1.5-3.0
Total Dissolved Solids (TDS) in ASLP DI Water Extract Method: AN113							
Total Dissolved Solids Dried at 180°C	mg/L	10	**196**	**68**	**264**	**160**	**164**
Alkalinity in ASLP DI Water Extract Method: AN135							
Bicarbonate Alkalinity as HCO3	mg/L	5	<5	**11**	**47**	**50**	<5
Carbonate Alkalinity as CO3	mg/L	1	<1	<1	<1	<1	<1
Hydroxide Alkalinity as OH	mg/L	5	<5	<5	<5	<5	<5
Total Alkalinity as CaCO3	mg/L	5	<5	**9**	**39**	**41**	<5
Sulphate in ASLP DI Water Extract Method: AN275							
Sulphate	mg/L	1	**47**	**12**	**85**	**26**	**22**
Fluoride by Ion Selective Electrode in ASLP DI Water Leachate Method: AN141							
Fluoride by ISE	mg/L	0.1	**0.6**	**0.2**	**0.5**	**1.0**	**0.3**
Metals in Water (ASLP DI) by ICPOES Method: AN320/AN321							
Calcium, Ca	mg/L	0.2	**9.1**	**5.3**	**48**	**17**	**1.1**
Magnesium, Mg	mg/L	0.1	**9.2**	**1.6**	**6.1**	**3.9**	**1.4**
Phosphorus, P	mg/L	0.05	**0.08**	<0.05	<0.05	<0.05	<0.05
Potassium, K	mg/L	0.1	**1.9**	**2.1**	**4.2**	**2.6**	**0.4**
Sodium, Na	mg/L	0.5	**27**	**6.5**	**19**	**20**	**24**
Trace Metals in ASLP DI Extract by ICPMS Method: AN318							
Aluminium, Al	µg/L	1	**35**	<1	**6**	**9**	**4**
Antimony, Sb	µg/L	1	<1	<1	<1	<1	<1
Arsenic, As	µg/L	1	<1	<1	<1	<1	<1
Barium, Ba	µg/L	1	**100**	**210**	**110**	**130**	**72**
Bismuth, Bi	µg/L	1	<1	<1	<1	<1	<1
Boron, B	µg/L	5	**86**	**74**	**53**	**41**	**72**
Cadmium, Cd	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium, Cr	µg/L	1	**2**	<1	<1	<1	**1**
Cobalt, Co	µg/L	1	<1	<1	<1	<1	<1
Copper, Cu	µg/L	1	<1	<1	<1	<1	<1
Iron, Fe	µg/L	5	**78**	<5	**16**	**44**	**50**
Lead, Pb	µg/L	1	<1	<1	<1	**5**	<1
Manganese, Mn	µg/L	1	<1	**7**	**6**	**2**	**1**
Molybdenum, Mo	µg/L	1	<1	<1	<1	<1	<1
Nickel, Ni	µg/L	1	<1	<1	<1	<1	<1
Selenium, Se	µg/L	2	<2	<2	<2	<2	<2
Silver, Ag	µg/L	1	<1	<1	<1	<1	<1
Strontium, Sr	µg/L	1	**150**	**19**	**200**	**72**	**15**
Thallium, Tl	µg/L	1	<1	<1	<1	<1	<1
Thorium, Th	µg/L	1	<1	<1	<1	<1	<1
Tin, Sn	µg/L	1	<1	<1	<1	<1	<1
Uranium, U	µg/L	1	<1	<1	<1	<1	<1
Vanadium, V	µg/L	1	<1	<1	<1	<1	<1
Zinc, Zn	µg/L	1	**32**	**34**	**27**	**40**	**31**

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Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	PE068612.061 Soil 12 Jun 2012 Vasse WRD, #27 Bulk 0.3	PE068612.062 Soil 14 Jun 2012 Vasse WRD, #28 Bulk 0.0-1.5	PE068612.063 Soil 14 Jun 2012 Vasse WRD, #28 Bulk 1.5-3.0	PE068612.064 Soil 14 Jun 2012 Vasse WRD, #29 Bulk 0.0-1.5	PE068612.065 Soil 14 Jun 2012 Vasse WRD, #29 Bulk 1.5-3.0
Mercury in ASLP DI Water Extract Method: AN311/AN312								
Mercury	mg/L	0.0005		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Sample Subcontracted Method:								
Sample Subcontracted*	No unit	-		-	-	-	-	-
Fibre ID in bulk materials Method: AN602								
FibreID								
Asbestos Detected	No unit	-		-	-	-	-	-

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Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	PE068612.066 Soil 14 Jun 2012 Vasse WRD, #30 Bulk 0.0-1.5	PE068612.067 Soil 14 Jun 2012 Vasse WRD, #30 Bulk 1.5-3.0	PE068612.068 Soil 14 Jun 2012 Vasse WRD, #30 Bulk 0.0-3.0 Asbestos	PE068612.069 Soil Vasse WRD, #31 Bulk 0.0-1.5	PE068612.070 Soil Vasse WRD, #31 Bulk 1.5-3.0
Total Sulfur by LECO Furnace Method: AN202								
Total Sulfur*	%w/w	0.005		**0.036**	<0.005	-	**0.058**	<0.005
Maximum Potential Acidity*	kg H2SO4/T	0.5		**1.1**	<0.5	-	**1.8**	<0.5
HCl Extractable S, Ca and Mg in Soil ICP OES Method: AN014								
Acid Soluble Sulphur (SHCl)	%w/w	0.005		**0.028**	**0.015**	-	**0.018**	**0.015**
Acid Neutralising Capacity or Neutralisation Potential(ANC/NP) Method: AN212								
Fizz Rating Reaction*	No unit	-		NIL	NIL	-	NIL	NIL
Initial Effervescence*	No unit	-		NO	NO	-	NO	NO
Effervescence on Warming*	No unit	-		NO	NO	-	NO	NO
Titration - Green Colouration?*	No unit	-		NO	NO	-	NO	NO
Titration - Precipitate Formed?*	No unit	-		YES	YES	-	YES	YES
ANC as % $CaCO_3$	% CaCO3	0.1		**0.3**	**0.5**	-	**0.4**	**0.5**
ANC as % $CaMg(CO_3)2$	%w/w	0.1		**0.3**	**0.6**	-	**0.5**	**0.6**
Acid Neutralisation Capacity/Neutralisation	kg CaCO3/T	1		**2.7**	**5.2**	-	**4.5**	**5.4**
Acid Neutralisation Capacity/Neutralisation	kg H2SO4/T	1		**2.7**	**5.1**	-	**4.4**	**5.3**
Net Acid Generation Potential (NAGP) Method: AN215								
Total Oxidisable Sulphur	kg H2SO4/T	0.25		**0.25**	<0.25	-	**1.2**	<0.25
Net Acid Production Potential	kg H2SO4/T	-400		**-2**	**-6**	-	**-3**	**-6**
Total Oxidisable Sulphur	%w/w	0.005		**0.008**	<0.005	-	**0.040**	<0.005
Metals in soil by Four Acid digest, ICPMS Method: IMS40Q								
Silver, Ag*	ppm	0.1		<0.1	<0.1	-	<0.1	<0.1
Arsenic, As*	ppm	1		**31**	**33**	-	**42**	**37**
Barium, Ba*	ppm	2		**104**	**70**	-	**76**	**114**
Beryllium, Be*	ppm	0.1		**0.8**	**0.7**	-	**0.4**	**0.6**
Bismuth, Bi*	ppm	0.1		**0.5**	**0.4**	-	**0.6**	**0.7**
Cadmium, Cd*	ppm	0.1		<0.1	<0.1	-	<0.1	<0.1
Cobalt, Co*	ppm	0.1		**14.8**	**11.3**	-	**3**	**4.5**
Copper, Cu*	ppm	2		**33**	**25**	-	**47**	**44**
Manganese, Mn*	ppm	0.5		**3030**	**2700**	-	**159**	**246**
Molybdenum, Mo*	ppm	0.1		**1**	**0.9**	-	**1.6**	**1.6**
Nickel, Ni*	ppm	2		**33**	**22**	-	**27**	**30**
Lead, Pb*	ppm	1		**31**	**23**	-	**37**	**39**
Rubidium, Rb*	ppm	0.05		**0.72**	**1.48**	-	**2.69**	**3.58**
Antimony, Sb*	ppm	0.1		**3.2**	**2.1**	-	**3.1**	**3.3**
Selenium, Se*	ppm	2		<2	<2	-	**3**	**2**
Tin, Sn*	ppm	0.3		**1.2**	**1**	-	**2.7**	**2.5**
Tellurium, Te*	ppm	0.1		**0.2**	**0.2**	-	**0.4**	**0.4**
Thorium, Th*	ppm	0.05		**10.3**	**7.1**	-	**14**	**13.5**
Thallium, Tl*	ppm	0.1		**0.5**	**0.1**	-	<0.1	<0.1
Uranium, U*	ppm	0.05		**4.1**	**2.78**	-	**2.27**	**2.07**
Tungsten, W*	ppm	0.1		**1.6**	**1.6**	-	**2.4**	**2.3**
Zinc, Zn*	ppm	5		**22**	**22**	-	**42**	**57**
Lithium, Li*	ppm	0.1		**17**	**7.7**	-	**16**	**18**
Cerium, Ce*	ppm	0.05		**28.4**	**53.2**	-	**33.4**	**39.9**
Cesium, Cs*	ppm	0.05		**0.08**	**0.1**	-	**0.23**	**0.28**
Gallium, Ga*	ppm	0.2		**11.4**	**9.4**	-	**20.8**	**20.2**
Hafnium, Hf*	ppm	0.05		**3.11**	**2.16**	-	**5.06**	**5.12**
Indium, In*	ppm	0.02		**0.06**	**0.05**	-	**0.15**	**0.13**
Lanthanum, La*	ppm	0.05		**15.1**	**9.47**	-	**12.2**	**13.6**
Niobium, Nb*	ppm	0.1		**5.1**	**4.3**	-	**10.7**	**10.1**
Scandium, Sc*	ppm	0.2		**3.2**	**2.1**	-	**3.1**	**3.3**
Tantalum, Ta*	ppm	0.05		**0.58**	**0.46**	-	**1.14**	**1.08**

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Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	PE068612.066 Soil 14 Jun 2012 Vasse WRD, #30 Bulk 0.0-1.5	PE068612.067 Soil 14 Jun 2012 Vasse WRD, #30 Bulk 1.5-3.0	PE068612.068 Soil 14 Jun 2012 Vasse WRD, #30 Bulk 0.0-3.0 Asbestos	PE068612.069 Soil Vasse WRD, #31 Bulk 0.0-1.5	PE068612.070 Soil Vasse WRD, #31 Bulk 1.5-3.0
ICPAES after Four Acid Digest Digest Method: ICP40Q								
Aluminium, Al*	ppm	100		**45400**	**34900**	-	**74100**	**68300**
Chromium, Cr*	ppm	10		**50**	<10	-	**130**	**130**
Iron, Fe*	ppm	100		**467000**	**493000**	-	**361000**	**343000**
Strontium, Sr*	ppm	1		**10**	**13**	-	**53**	**28**
Titanium, Ti*	ppm	10		**1800**	**1480**	-	**3530**	**3330**
Vanadium, V*	ppm	1		**69**	**50**	-	**137**	**137**
Zirconium, Zr*	ppm	1		**88**	**61**	-	**150**	**149**
Calcium, Ca*	ppm	50		**670**	**1470**	-	**1930**	**2110**
Potassium, K*	ppm	100		**170**	**300**	-	**1060**	**820**
Magnesium, Mg*	ppm	20		**1010**	**1200**	-	**880**	**810**
Sodium, Na*	ppm	50		**630**	**650**	-	**500**	**480**
Phosphorus, P*	ppm	20		**290**	**300**	-	**250**	**210**
Sulphur, S*	ppm	20		**610**	**410**	-	**1070**	**600**
Rare Earth Metals in soil by ICPMS Method: IMS12S								
Mercury, Hg*	ppm	0.1		<0.1	<0.1	-	<0.1	<0.1
Rhenium, Re*	ppm	0.05		<0.05	<0.05	-	<0.05	<0.05
Metals in soil by Nitric/Hydrofluoric Acid Digest, ICPMS Method:								
Ge*	ppm	0.5		**4.1**	**4.8**	-	**6.8**	**5.9**
ASLP (Australian Standard Leaching Procedure) DI Water Method: AN007								
Percentage Solids*	%	-		-	-	-	-	-
Mass of test sample for extraction	g	-		**50**	**50**	-	**50**	**50**
Mass of leaching solution used	g	-		**1000**	**1000**	-	**1000**	**1000**
Leaching solution used*	No unit	-		DI Water	DI Water	-	DI Water	DI Water
pH of solids leachate	pH Units	-		**6.7**	**8.3**	-	**8.2**	**7.9**
Conductivity @25C	µS/cm	1		**170**	**230**	-	**120**	**130**

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PE068612 R0

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	PE068612.066 Soil 14 Jun 2012 Vasse WRD, #30 Bulk 0.0-1.5	PE068612.067 Soil 14 Jun 2012 Vasse WRD, #30 Bulk 1.5-3.0	PE068612.068 Soil 14 Jun 2012 Vasse WRD, #30 Bulk 0.0-3.0 Asbestos	PE068612.069 Soil Vasse WRD, #31 Bulk 0.0-1.5	PE068612.070 Soil Vasse WRD, #31 Bulk 1.5-3.0
Total Dissolved Solids (TDS) in ASLP DI Water Extract Method: AN113								
Total Dissolved Solids Dried at 180°C	mg/L	10		144	152	-	104	108
Alkalinity in ASLP DI Water Extract Method: AN135								
Bicarbonate Alkalinity as HCO3	mg/L	5		7	61	-	71	74
Carbonate Alkalinity as CO3	mg/L	1		<1	<1	-	<1	<1
Hydroxide Alkalinity as OH	mg/L	5		<5	<5	-	<5	<5
Total Alkalinity as CaCO3	mg/L	5		6	50	-	58	61
Sulphate in ASLP DI Water Extract Method: AN275								
Sulphate	mg/L	1		36	24	-	5	5
Fluoride by Ion Selective Electrode in ASLP DI Water Leachate Method: AN141								
Fluoride by ISE	mg/L	0.1		0.6	0.9	-	0.7	0.6
Metals in Water (ASLP DI) by ICPOES Method: AN320/AN321								
Calcium, Ca	mg/L	0.2		7.9	18	-	16	19
Magnesium, Mg	mg/L	0.1		4.2	3.8	-	2.9	2.7
Phosphorus, P	mg/L	0.05		<0.05	<0.05	-	<0.05	<0.05
Potassium, K	mg/L	0.1		0.9	1.6	-	2.2	1.7
Sodium, Na	mg/L	0.5		16	17	-	4.2	4.0
Trace Metals in ASLP DI Extract by ICPMS Method: AN318								
Aluminium, Al	µg/L	1		40	37	-	<1	69
Antimony, Sb	µg/L	1		<1	<1	-	<1	<1
Arsenic, As	µg/L	1		<1	<1	-	<1	<1
Barium, Ba	µg/L	1		110	110	-	130	220
Bismuth, Bi	µg/L	1		<1	<1	-	<1	<1
Boron, B	µg/L	5		41	44	-	35	58
Cadmium, Cd	µg/L	0.1		<0.1	<0.1	-	<0.1	<0.1
Chromium, Cr	µg/L	1		1	1	-	<1	<1
Cobalt, Co	µg/L	1		<1	<1	-	<1	<1
Copper, Cu	µg/L	1		<1	<1	-	<1	<1
Iron, Fe	µg/L	5		32	28	-	<5	15
Lead, Pb	µg/L	1		<1	<1	-	<1	<1
Manganese, Mn	µg/L	1		<1	<1	-	1	<1
Molybdenum, Mo	µg/L	1		<1	<1	-	<1	<1
Nickel, Ni	µg/L	1		<1	<1	-	<1	<1
Selenium, Se	µg/L	2		<2	<2	-	<2	<2
Silver, Ag	µg/L	1		<1	<1	-	<1	<1
Strontium, Sr	µg/L	1		99	110	-	30	89
Thallium, Tl	µg/L	1		<1	<1	-	<1	<1
Thorium, Th	µg/L	1		<1	<1	-	<1	<1
Tin, Sn	µg/L	1		<1	<1	-	<1	<1
Uranium, U	µg/L	1		<1	<1	-	<1	<1
Vanadium, V	µg/L	1		<1	<1	-	<1	<1
Zinc, Zn	µg/L	1		39	35	-	30	41

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	PE068612.066 Soil 14 Jun 2012 Vasse WRD, #30 Bulk 0.0-1.5	PE068612.067 Soil 14 Jun 2012 Vasse WRD, #30 Bulk 1.5-3.0	PE068612.068 Soil 14 Jun 2012 Vasse WRD, #30 Bulk 0.0-3.0 Asbestos	PE068612.069 Soil Vasse WRD, #31 Bulk 0.0-1.5	PE068612.070 Soil Vasse WRD, #31 Bulk 1.5-3.0
Mercury in ASLP DI Water Extract Method: AN311/AN312								
Mercury	mg/L	0.0005		<0.0005	<0.0005	-	<0.0005	<0.0005
Sample Subcontracted Method:								
Sample Subcontracted*	No unit	-		-	-	-	-	-
Fibre ID in bulk materials Method: AN602								
FibreID								
Asbestos Detected	No unit	-		-	-	No	-	-

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ANALYTICAL REPORT

PE068612 R0

Parameter	Units	LOR	Sample Number Sample Matrix Sample Name	PE068612.071 Soil Vasse WRD, #1 Bulk Surface	PE068612.072 Soil Vasse WRD, #11 Bulk Surface	PE068612.073 Soil Vasse WRD, #14 Bulk Surface	PE068612.074 Soil Vasse WRD, #27 Bulk Surface	PE068612.075 Soil Eyre Pit #10b Bulk
Total Sulfur by LECO Furnace Method: AN202								
Total Sulfur*	%w/w	0.005		<0.005	<0.005	<0.005	**0.039**	**0.049**
Maximum Potential Acidity*	kg H2SO4/T	0.5		<0.5	<0.5	<0.5	**1.2**	**1.5**
HCl Extractable S, Ca and Mg in Soil ICP OES Method: AN014								
Acid Soluble Sulphur (SHCl)	%w/w	0.005		**0.010**	**0.015**	**0.039**	**0.051**	**0.036**
Acid Neutralising Capacity or Neutralisation Potential(ANC/NP) Method: AN212								
Fizz Rating Reaction*	No unit	-		NIL	NIL	NIL	NIL	NIL
Initial Effervescence*	No unit	-		NO	NO	NO	NO	NO
Effervescence on Warming*	No unit	-		NO	NO	NO	NO	NO
Titration - Green Colouration?*	No unit	-		NO	NO	NO	NO	NO
Titration - Precipitate Formed?*	No unit	-		YES	YES	YES	YES	No
ANC as % $CaCO_3$	% CaCO3	0.1		**0.2**	**0.2**	**0.2**	**0.3**	**0.3**
ANC as % $CaMg(CO_3)2$	%w/w	0.1		**0.3**	**0.3**	**0.2**	**0.3**	**0.3**
Acid Neutralisation Capacity/Neutralisation	kg CaCO3/T	1		**2.5**	**2.5**	**1.7**	**2.7**	**3.2**
Acid Neutralisation Capacity/Neutralisation	kg H2SO4/T	1		**2.4**	**2.4**	**1.7**	**2.7**	**3.2**
Net Acid Generation Potential (NAGP) Method: AN215								
Total Oxidisable Sulphur	kg H2SO4/T	0.25		<0.25	<0.25	<0.25	<0.25	**0.40**
Net Acid Production Potential	kg H2SO4/T	-400		**-3**	**-3**	**-3**	**-3**	**-3**
Total Oxidisable Sulphur	%w/w	0.005		<0.005	<0.005	<0.005	<0.005	**0.013**
Metals in soil by Four Acid digest, ICPMS Method: IMS40Q								
Silver, Ag*	ppm	0.1		<0.1	<0.1	**0.1**	<0.1	**0.2**
Arsenic, As*	ppm	1		**49**	**44**	**23**	**41**	**14**
Barium, Ba*	ppm	2		**29**	**114**	**68**	**25**	**655**
Beryllium, Be*	ppm	0.1		**0.7**	**0.4**	**0.3**	**0.5**	**0.6**
Bismuth, Bi*	ppm	0.1		**0.6**	**0.5**	**0.2**	**0.7**	<0.1
Cadmium, Cd*	ppm	0.1		**0.1**	<0.1	<0.1	<0.1	**0.5**
Cobalt, Co*	ppm	0.1		**43.2**	**8.1**	**6.1**	**11.4**	**83.7**
Copper, Cu*	ppm	2		**19**	**40**	**18**	**22**	**21**
Manganese, Mn*	ppm	0.5		**13400**	**1390**	**1530**	**1160**	**67300**
Molybdenum, Mo*	ppm	0.1		**0.9**	**1.5**	**1**	**2.3**	**0.6**
Nickel, Ni*	ppm	2		**63**	**26**	**14**	**37**	**19**
Lead, Pb*	ppm	1		**34**	**26**	**17**	**17**	**25**
Rubidium, Rb*	ppm	0.05		**0.31**	**1.25**	**0.56**	**0.57**	**3.33**
Antimony, Sb*	ppm	0.1		**6.7**	**4.7**	**2.5**	**6.1**	**1.1**
Selenium, Se*	ppm	2		<2	**2**	<2	<2	<2
Tin, Sn*	ppm	0.3		**2.7**	**2.4**	**0.9**	**1.6**	**0.4**
Tellurium, Te*	ppm	0.1		**0.3**	**0.4**	**0.1**	**0.3**	<0.1
Thorium, Th*	ppm	0.05		**8.03**	**11.1**	**3.69**	**9.45**	**1.43**
Thallium, Tl*	ppm	0.1		<0.1	<0.1	<0.1	<0.1	**2**
Uranium, U*	ppm	0.05		**3.76**	**1.83**	**1.3**	**2.46**	**1.1**
Tungsten, W*	ppm	0.1		**1.8**	**2.1**	**1.2**	**2**	**0.8**
Zinc, Zn*	ppm	5		**89**	**50**	**42**	**36**	**44**
Lithium, Li*	ppm	0.1		**2.7**	**4.4**	**1.3**	**12**	**2.5**
Cerium, Ce*	ppm	0.05		**73.8**	**34.1**	**22.5**	**30**	**145**
Cesium, Cs*	ppm	0.05		**0.11**	**0.16**	**0.14**	**0.12**	**0.18**
Gallium, Ga*	ppm	0.2		**16**	**16.3**	**5**	**13.9**	**5.1**
Hafnium, Hf*	ppm	0.05		**3.33**	**4.1**	**1.45**	**3.6**	**0.5**
Indium, In*	ppm	0.02		**0.09**	**0.13**	**0.05**	**0.06**	**0.02**
Lanthanum, La*	ppm	0.05		**33.1**	**10**	**4.5**	**13.3**	**15.4**
Niobium, Nb*	ppm	0.1		**7.4**	**7.5**	**2.6**	**7.2**	**1.3**
Scandium, Sc*	ppm	0.2		**12.5**	**17.5**	**7**	**17.3**	**5.4**
Tantalum, Ta*	ppm	0.05		**1.01**	**0.93**	**0.35**	**0.86**	**0.2**

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ANALYTICAL REPORT

PE068612 R0

Parameter	Units	LOR	Sample Number Sample Matrix Sample Name PE068612.071 Soil Vasse WRD, #1 Bulk Surface	PE068612.072 Soil Vasse WRD, #11 Bulk Surface	PE068612.073 Soil Vasse WRD, #14 Bulk Surface	PE068612.074 Soil Vasse WRD, #27 Bulk Surface	PE068612.075 Soil Eyre Pit #10b Bulk
ICPAES after Four Acid Digest Digest Method: ICP40Q							
Aluminium, Al*	ppm	100	**49700**	**43700**	**21500**	**54800**	**20200**
Chromium, Cr*	ppm	10	**70**	**110**	**90**	**70**	**60**
Iron, Fe*	ppm	100	**534000**	**494000**	**584000**	**318000**	**462000**
Strontium, Sr*	ppm	1	<1	<1	<1	**4**	**46**
Titanium, Ti*	ppm	10	**2550**	**2630**	**810**	**2610**	**410**
Vanadium, V*	ppm	1	**81**	**114**	**33**	**81**	**13**
Zirconium, Zr*	ppm	1	**101**	**119**	**40**	**100**	**13**
Calcium, Ca*	ppm	50	**540**	**1090**	**950**	**480**	**510**
Potassium, K*	ppm	100	<100	**220**	**130**	**130**	**2220**
Magnesium, Mg*	ppm	20	**1000**	**1090**	**420**	**1040**	**1390**
Sodium, Na*	ppm	50	**100**	**310**	**160**	**900**	**1070**
Phosphorus, P*	ppm	20	**200**	**240**	**340**	**420**	**270**
Sulphur, S*	ppm	20	**320**	**500**	**740**	**660**	**690**
Rare Earth Metals in soil by ICPMS Method: IMS12S							
Mercury, Hg*	ppm	0.1	<0.1	<0.1	<0.1	<0.1	**0.6**
Rhenium, Re*	ppm	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Metals in soil by Nitric/Hydrofluoric Acid Digest, ICPMS Method:							
Ge*	ppm	0.5	**2.1**	**5.3**	**6.2**	**3.1**	**2.7**
ASLP (Australian Standard Leaching Procedure) DI Water Method: AN007							
Percentage Solids*	%	-	-	-	-	-	-
Mass of test sample for extraction	g	-	**50**	**50**	**50**	**50**	**50**
Mass of leaching solution used	g	-	**1000**	**1000**	**1000**	**1000**	**1000**
Leaching solution used*	No unit	-	DI Water	DI Water	DI Water	DI Water	DI Water
pH of solids leachate	pH Units	-	**6.8**	**6.9**	**6.6**	**6.7**	**6.7**
Conductivity @25C	µS/cm	1	**51**	**52**	**130**	**320**	**170**

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ANALYTICAL REPORT

PE068612 R0

Parameter	Units	LOR	Sample Number Sample Matrix Sample Name PE068612.071 Soil Vasse WRD, #1 Bulk Surface	PE068612.072 Soil Vasse WRD, #11 Bulk Surface	PE068612.073 Soil Vasse WRD, #14 Bulk Surface	PE068612.074 Soil Vasse WRD, #27 Bulk Surface	PE068612.075 Soil Eyre Pit #10b Bulk
Total Dissolved Solids (TDS) in ASLP DI Water Extract Method: AN113							
Total Dissolved Solids Dried at 180°C	mg/L	10	**32**	**40**	**76**	**168**	**100**
Alkalinity in ASLP DI Water Extract Method: AN135							
Bicarbonate Alkalinity as HCO3	mg/L	5	**12**	**17**	**6**	<5	**6**
Carbonate Alkalinity as CO3	mg/L	1	<1	<1	<1	<1	<1
Hydroxide Alkalinity as OH	mg/L	5	<5	<5	<5	<5	<5
Total Alkalinity as CaCO3	mg/L	5	**9**	**14**	<5	<5	<5
Sulphate in ASLP DI Water Extract Method: AN275							
Sulphate	mg/L	1	**7**	**4**	**45**	**48**	**21**
Fluoride by Ion Selective Electrode in ASLP DI Water Leachate Method: AN141							
Fluoride by ISE	mg/L	0.1	**1.1**	**0.4**	**0.3**	**0.5**	**0.3**
Metals in Water (ASLP DI) by ICPOES Method: AN320/AN321							
Calcium, Ca	mg/L	0.2	**4.6**	**3.8**	**19**	**8.5**	**4.2**
Magnesium, Mg	mg/L	0.1	**1.5**	**1.4**	**1.7**	**11**	**4.9**
Phosphorus, P	mg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Potassium, K	mg/L	0.1	**0.3**	**0.3**	**0.4**	**1.8**	**1.1**
Sodium, Na	mg/L	0.5	**1.5**	**2.5**	**1.7**	**31**	**19**
Trace Metals in ASLP DI Extract by ICPMS Method: AN318							
Aluminium, Al	µg/L	1	<1	<1	<1	<1	**7**
Antimony, Sb	µg/L	1	<1	<1	<1	<1	<1
Arsenic, As	µg/L	1	<1	<1	<1	<1	<1
Barium, Ba	µg/L	1	**58**	**100**	**130**	**120**	**71**
Bismuth, Bi	µg/L	1	<1	<1	<1	<1	<1
Boron, B	µg/L	5	**21**	**18**	<5	<5	**26**
Cadmium, Cd	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium, Cr	µg/L	1	<1	<1	<1	<1	<1
Cobalt, Co	µg/L	1	<1	<1	<1	<1	<1
Copper, Cu	µg/L	1	<1	<1	<1	<1	<1
Iron, Fe	µg/L	5	<5	<5	<5	<5	**30**
Lead, Pb	µg/L	1	**2**	**2**	<1	<1	**2**
Manganese, Mn	µg/L	1	**3**	**3**	<1	<1	**4**
Molybdenum, Mo	µg/L	1	<1	<1	<1	<1	<1
Nickel, Ni	µg/L	1	<1	<1	<1	<1	<1
Selenium, Se	µg/L	2	<2	<2	<2	<2	<2
Silver, Ag	µg/L	1	<1	<1	<1	<1	<1
Strontium, Sr	µg/L	1	**34**	**32**	<1	**150**	**30**
Thallium, Tl	µg/L	1	<1	<1	<1	<1	<1
Thorium, Th	µg/L	1	<1	<1	<1	<1	<1
Tin, Sn	µg/L	1	<1	<1	<1	<1	<1
Uranium, U	µg/L	1	<1	<1	<1	<1	<1
Vanadium, V	µg/L	1	<1	<1	<1	<1	<1
Zinc, Zn	µg/L	1	**43**	**39**	**43**	**46**	**50**

ANALYTICAL REPORT

PE068612 R0

Parameter	Units	LOR	Sample Number Sample Matrix Sample Name PE068612.071 Soil Vasse WRD, #1 Bulk Surface	PE068612.072 Soil Vasse WRD, #11 Bulk Surface	PE068612.073 Soil Vasse WRD, #14 Bulk Surface	PE068612.074 Soil Vasse WRD, #27 Bulk Surface	PE068612.075 Soil Eyre Pit #10b Bulk
Mercury in ASLP DI Water Extract Method: AN311/AN312							
Mercury	mg/L	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Sample Subcontracted Method:							
Sample Subcontracted*	No unit	-	-	-	-	-	-
Fibre ID in bulk materials Method: AN602							
FibreID							
Asbestos Detected	No unit	-	-	-	-	-	-

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QC SUMMARY

PE068612 R0

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula: *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Acid Neutralising Capacity or Neutralisation Potential(ANC/NP) Method: ME-(AU)-[ENV]AN212

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Fizz Rating Reaction*	LB044685	No unit	-	NIL		
	LB044687	No unit	-	NIL		
	LB044688	No unit	-	NIL		
	LB044689	No unit	-	NIL		
Initial Effervescence*	LB044685	No unit	-	No		
	LB044687	No unit	-	NO		
	LB044688	No unit	-	NO		
	LB044689	No unit	-	NO		
Effervescence on Warming*	LB044685	No unit	-	No		
	LB044687	No unit	-	NO		
	LB044688	No unit	-	NO		
	LB044689	No unit	-	NO		
Titration - Green Colouration?*	LB044685	No unit	-	No		
	LB044687	No unit	-	NO		
	LB044688	No unit	-	NO		
	LB044689	No unit	-	NO		
Titration - Precipitate Formed?*	LB044685	No unit	-	No		
	LB044687	No unit	-	NO		
	LB044688	No unit	-	NO		
	LB044689	No unit	-	NO		
ANC as % $CaCO_3$	LB044685	% CaCO3	0.1	<0.1		
	LB044687	% CaCO3	0.1	<0.1		
	LB044688	% CaCO3	0.1	<0.1		
	LB044689	% CaCO3	0.1	<0.1		
ANC as % $CaMg(CO_3)2$	LB044685	%w/w	0.1	<0.1		
	LB044687	%w/w	0.1	<0.1		
	LB044688	%w/w	0.1	<0.1		
	LB044689	%w/w	0.1	<0.1		
Acid Neutralisation Capacity/Neutralisation Potential	LB044685	kg CaCO3/T	1	<1.0	9 - 15%	NA
	LB044687	kg CaCO3/T	1	<1.0	0 - 10%	NA
	LB044688	kg CaCO3/T	1	<1.0	0 - 6%	NA
	LB044689	kg CaCO3/T	1	<1.0	0 - 21%	NA
Acid Neutralisation Capacity/Neutralisation Potential kg H_2SO_4/t	LB044685	kg H2SO4/T	1	<1.0	9 - 15%	NA
	LB044687	kg H2SO4/T	1	<1.0	0 - 10%	NA
	LB044688	kg H2SO4/T	1	<1.0	0 - 6%	NA
	LB044689	kg H2SO4/T	1	<1.0	0 - 21%	NA

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QC SUMMARY

PE068612 R0

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula: *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Alkalinity in ASLP DI Water Extract Method: ME-(AU)-[ENV]AN135

Parameter	QC Reference	Units	LOR	MB	DUP %RPD
Bicarbonate Alkalinity as HCO3	LB045276	mg/L	5	<5	
	LB045897	mg/L	5	<5	
	LB046072	mg/L	5	<5	
Carbonate Alkalinity as CO3	LB045276	mg/L	1	<1	
	LB045897	mg/L	1	<1	
	LB046072	mg/L	1	<1	
Hydroxide Alkalinity as OH	LB045276	mg/L	5	<5	
	LB045897	mg/L	5	<5	
	LB046072	mg/L	5	<5	
Total Alkalinity as CaCO3	LB045276	mg/L	5	<5	2 - 14%
	LB045897	mg/L	5	<5	0 - 3%
	LB046072	mg/L	5	<5	0 - 2%

ASLP (Australian Standard Leaching Procedure) DI Water Method: ME-(AU)-[ENV]AN007

Parameter	QC Reference	Units	LOR	MB
Mass of test sample for extraction	LB044168	g	-	50
	LB044169	g	-	50
	LB044171	g	-	50
	LB044282	g	-	50
Mass of leaching solution used	LB044168	g	-	1000
	LB044169	g	-	1000
	LB044171	g	-	1000
	LB044282	g	-	1000
Leaching solution used*	LB044168	No unit	-	DI Water
	LB044169	No unit	-	DI Water
	LB044171	No unit	-	DI Water
	LB044282	No unit	-	DI Water
pH of solids leachate	LB044168	pH Units	-	5.9
	LB044169	pH Units	-	5.6
	LB044171	pH Units	-	5.3 - 5.5
	LB044282	pH Units	-	5.5
Conductivity @25C	LB044168	µS/cm	1	<1
	LB044169	µS/cm	1	2 - 8
	LB044171	µS/cm	1	<1 - 4
	LB044282	µS/cm	1	<1

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QC SUMMARY

PE068612 R0

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula: *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Fluoride by Ion Selective Electrode in ASLP DI Water Leachate Method: ME-(AU)-[ENV]AN141

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Fluoride by ISE	LB045249	mg/L	0.1		0 - 2%	95 - 96%	
	LB045620	mg/L	0.1	<0.1	0 - 2%	95%	
	LB045909	mg/L	0.1	<0.1	0 - 3%	94 - 96%	84 - 90%

HCl Extractable S, Ca and Mg in Soil ICP OES Method: ME-(AU)-[ENV]AN014

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Acid Soluble Sulphur (SHCl)	LB044676	%w/w	0.005	<0.005	3 - 4%	NA
	LB044677	%w/w	0.005	<0.005	0%	NA
	LB044678	%w/w	0.005	<0.005	1 - 3%	NA
	LB044680	%w/w	0.005	<0.005	1%	NA

Mercury in ASLP DI Water Extract Method: ME-(AU)-[ENV]AN311/AN312

Parameter	QC Reference	Units	LOR	MB	DUP %RPD
Mercury	LB045268	mg/L	0.0005	<0.0005	0%
	LB045496	mg/L	0.0005	<0.0005	0%

Metals in Water (ASLP DI) by ICPOES Method: ME-(AU)-[ENV]AN320/AN321

Parameter	QC Reference	Units	LOR	MB	DUP %RPD
Calcium, Ca	LB045269	mg/L	0.2	<0.2	1 - 4%
	LB045494	mg/L	0.2	<0.2	5 - 15%
Magnesium, Mg	LB045269	mg/L	0.1	<0.1	1 - 4%
	LB045494	mg/L	0.1	<0.1	2%
Phosphorus, P	LB045269	mg/L	0.05	<0.05	0%
	LB045494	mg/L	0.05	<0.05	0%
Potassium, K	LB045269	mg/L	0.1	<0.1	1 - 3%
	LB045494	mg/L	0.1	<0.1	3%
Sodium, Na	LB045269	mg/L	0.5	<0.5	2%
	LB045494	mg/L	0.5	<0.5	1 - 8%

Sulphate in ASLP DI Water Extract Method: ME-(AU)-[ENV]AN275

Parameter	QC Reference	Units	LOR	MB	DUP %RPD
Sulphate	LB045730	mg/L	1	<1	1 - 6%
	LB046126	mg/L	1	<1	8 - 14%

SGS

QC SUMMARY

PE068612 R0

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula: *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Total Dissolved Solids (TDS) in ASLP DI Water Extract Method: ME-(AU)-[ENV]AN113

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Total Dissolved Solids Dried at 180°C	LB045319	mg/L	10	<10	10 - 17%	NA
	LB045530	mg/L	10	<10	33 - 50%	NA
	LB046178	mg/L	10	<10	4 - 8%	NA

Total Sulfur by LECO Furnace Method: ME-(AU)-[ENV]AN202

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Total Sulfur*	LB044305	%w/w	0.005	<0.005	0 - 20%	100 - 114%

Trace Metals in ASLP DI Extract by ICPMS Method: ME-(AU)-[ENV]AN318

Parameter	QC Reference	Units	LOR	MB	DUP %RPD
Aluminium, Al	LB045270	µg/L	1	<1	0 - 4%
	LB045757	µg/L	1	<1	12 - 27%
	LB046050	µg/L	1	<1	6 - 20%
Antimony, Sb	LB045270	µg/L	1	<1	0%
	LB045757	µg/L	1	<1	0%
	LB046050	µg/L	1	<1	0%
Arsenic, As	LB045270	µg/L	1	<1	0 - 32%
	LB045757	µg/L	1	<1	0%
	LB046050	µg/L	1	<1	0%
Barium, Ba	LB045270	µg/L	1	<1	5 - 10%
	LB045757	µg/L	1	<1	7 - 19%
	LB046050	µg/L	1	<1	3 - 8%
Bismuth, Bi	LB045270	µg/L	1	<1	0%
	LB045757	µg/L	1	<1	0%
	LB046050	µg/L	1	<1	0%
Boron, B	LB045270	µg/L	5	<5	0 - 12%
	LB045757	µg/L	5	<5	10 - 23%
	LB046050	µg/L	5	<5	0 - 5%
Cadmium, Cd	LB045270	µg/L	0.1	<0.1	0%
	LB045757	µg/L	0.1	<0.1	5 - 194%
	LB046050	µg/L	0.1	<0.1	0%
Chromium, Cr	LB045270	µg/L	1	<1	0 - 3%
	LB045757	µg/L	1	<1	0 - 3%
	LB046050	µg/L	1	<1	0 - 5%
Cobalt, Co	LB045270	µg/L	1	<1	0%
	LB045757	µg/L	1	<1	0%
	LB046050	µg/L	1	<1	0%
Copper, Cu	LB045270	µg/L	1	<1	0%
	LB045757	µg/L	1	<1	0%
	LB046050	µg/L	1	<1	0%
Iron, Fe	LB045270	µg/L	5	<5	7 - 12%
	LB045757	µg/L	5	<5	3 - 34%
	LB046050	µg/L	5	<5	0 - 69%
Lead, Pb	LB045270	µg/L	1	<1	0%
	LB045757	µg/L	1	<1	176 - 190%
	LB046050	µg/L	1	<1	0 - 30%
Manganese, Mn	LB045270	µg/L	1	<1	0 - 39%
	LB045757	µg/L	1	<1	0 - 4%
	LB046050	µg/L	1	<1	0 - 87%
Molybdenum, Mo	LB045270	µg/L	1	<1	0%
	LB045757	µg/L	1	<1	0%
	LB046050	µg/L	1	<1	0%
Nickel, Ni	LB045270	µg/L	1	<1	0%
	LB045757	µg/L	1	<1	0%
	LB046050	µg/L	1	<1	0%

SGS

QC SUMMARY

PE068612 R0

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula: *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Trace Metals in ASLP DI Extract by ICPMS **Method: ME-(AU)-[ENV]AN318 (continued)**

				MB	DUP %RPD
Selenium, Se	LB045270	µg/L	2	<2	0%
	LB045757	µg/L	2	<2	0%
	LB046050	µg/L	2	<2	0%
Silver, Ag	LB045270	µg/L	1	<1	0%
	LB045757	µg/L	1	<1	0%
	LB046050	µg/L	1	<1	0%
Strontium, Sr	LB045270	µg/L	1	<1	0 - 6%
	LB045757	µg/L	1	<1	0 - 5%
	LB046050	µg/L	1	<1	1 - 3%
Thallium, Tl	LB045270	µg/L	1	<1	0%
	LB045757	µg/L	1	<1	0%
	LB046050	µg/L	1	<1	0%
Thorium, Th	LB045270	µg/L	1	<1	0%
	LB045757	µg/L	1	<1	0%
	LB046050	µg/L	1	<1	0%
Tin, Sn	LB045270	µg/L	1	<1	0%
	LB045757	µg/L	1	<1	0%
	LB046050	µg/L	1	<1	0%
Uranium, U	LB045270	µg/L	1	<1	0%
	LB045757	µg/L	1	<1	0%
	LB046050	µg/L	1	<1	0%
Vanadium, V	LB045270	µg/L	1	<1	0%
	LB045757	µg/L	1	<1	0%
	LB046050	µg/L	1	<1	0%
Zinc, Zn	LB045270	µg/L	1	<1	0 - 14%
	LB045757	µg/L	1	<1	0 - 30%
	LB046050	µg/L	1	<1	7 - 12%

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METHOD SUMMARY

PE068612 R0

METHOD	METHODOLOGY SUMMARY
AN007	Contaminants of interest in a waste material are leached out of the waste with a selected leaching solution under controlled conditions. The ratio of sample to extraction fluid is 100 g to 2 L (1 to 20 by mass). The concentration of each contaminant of interest is determined in the leachate by appropriate methods after separation from the sample by filtering.
AN014	This method is for the determination of soluble sulphate (SO4-S) by extraction with hydrochloric acid. Sulphides should not react and would normally be expelled. Sulphur is determined by ICP.
AN113	Total Dissolved Solids: A well-mixed filtered sample of known volume is evaporated to dryness at 180°C and the residue weighed. Approximate methods for correlating chemical analysis with dissolved solids are available. Reference APHA 2540 C.
AN135	Alkalinity (and forms of) by Titration: The sample Extract is titrated with standard acid to pH 8.3 (P titre) and pH 4.5 (T titre) and permanent and/or total alkalinity calculated. The results are expressed as equivalents of calcium carbonate or recalculated as bicarbonate, carbonate and hydroxide. Reference APHA 2320. Internal Reference AN135
AN141	Determination of Fluoride by ISE: A fluoride ion selective electrode and reference electrode combination, in the presence of a pH/complexation buffer, is used to determine the fluoride concentration. The electrode millivolt response is measured logarithmically against fluoride concentration. Reference APHA F- C.
AN202	The sulphur is oxidised to sulphur dioxide gas in a tube furnace using oxygen to aid the oxidation process. The evolved sulphur dioxide is measure by an infra red cell. The infra red cell output is calibrated against the value of a known standard sample to provide the total sulphur value of the unknown sample.
AN202	Maximum Potential Acidity of the sample is a calculation that expresses the total sulphur result as kg of H2SO4/tonne.
AN212	Samples are initially evaluated to determine the strength of reagents needed using a ``fizz' test. Samples are then subjected to an excess of hydrochloric acid followed by alkaline back titration to pH 7. Results are expressed in kg H2SO4/tonne or Kg CaCO3/tonne after correction for moisture content if applicable.
AN215	This is purely a calculation based on results obtained from Total Sulphur, Sulphate Method, and Acid Neutralisation Capacity Method (ME-(AU)-[ENV]AN212).
AN275	Sulphate by Aquakem DA from ASLP DI Water Extract: Sulphate is precipitated in an acidic medium with barium chloride. The resulting turbidity is measured photometrically at 405nm and compared with standard calibration solutions to determine the sulphate concentration in the sample. Reference APHA 4500-SO42-. Internal reference AN275.
AN311/AN312	Mercury by Cold Vapour AAS in Waters: Mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500.
AN318	Determination of elements at trace level in waters by ICP-MS technique, in accordance with USEPA 6020A.
AN320/AN321	Metals by ICP-OES: Samples are preserved with 10% nitric acid for a wide range of metals and some non-metals. This solution is measured by Inductively Coupled Plasma. Solutions are aspirated into an argon plasma at 8000-10000K and emit characteristic energy or light as a result of electron transitions through unique energy levels. The emitted light is focused onto a diffraction grating where it is separated into components.
AN320/AN321	Photomultipliers or CCDs are used to measure the light intensity at specific wavelengths. This intensity is directly proportional to concentration. Corrections are required to compensate for spectral overlap between elements. Reference APHA 3120 B.

METHOD SUMMARY

PE068612 R0

METHOD	METHODOLOGY SUMMARY
AN602	Qualitative identification of chrysotile, amosite and crocidolite in bulk samples by polarised light microscopy (PLM) in conjunction with dispersion staining (DS). AS4964 provides the basis for this document. Unequivocal identification of the asbestos minerals present is made by obtaining sufficient diagnostic `clues`, which provide a reasonable degree of certainty, dispersion staining is a mandatory `clue` for positive identification. If sufficient `clues` are absent, then positive identification of asbestos is not possible. This procedure requires removal of suspect fibres/bundles from the sample which cannot be returned.

FOOTNOTES

IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
*	This analysis is not covered by the scope of accreditation.
^	Performed by outside laboratory.
LOR	Limit of Reporting
↑↓	Raised or Lowered Limit of Reporting
QFH	QC result is above the upper tolerance
QFL	QC result is below the lower tolerance
-	The sample was not analysed for this analyte
NVL	Not Validated

Samples analysed as received.
Solid samples expressed on a dry weight basis.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: http://www.au.sgs.com/sgs-mp-au-env-qu-022-qa-qc-plan-en-11.pdf

microanalysis australia

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Client: SGS
Job number: 12_0735
Sample: 12_0735_01
Client ID: **PE068612.001 eyre pit 1**
Date: 01/08/12
Analysis: Semi-quantitative mineralogical analysis by x-ray diffraction (XRD)

Sample Preparation

The sample was supplied to Microanalysis Australia as particulates in a bag. A representative sub –sample was removed and lightly ground such that 90% was passing 20 µm. Grinding to this size helps eliminate preferred orientation.

Analysis

Only crystalline material present in the sample will give peaks in the XRD scan. Amorphous (non crystalline) material will add to the background. The search match software used was Eva or SIeve+. An up to date ICDD card set was used. The x-ray source was copper radiation.

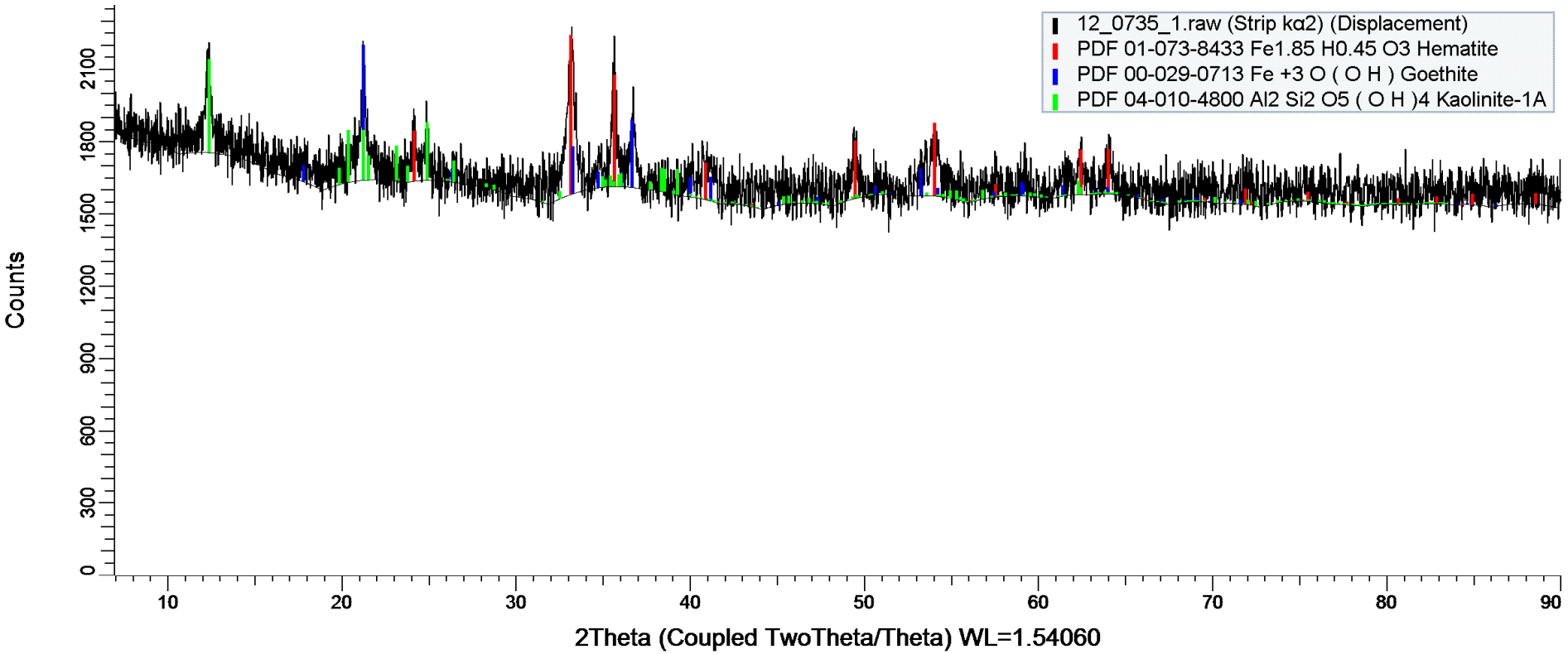
No standards were used in the quantification process. The concentrations were calculated using the peak area integration method where the area of the 100 % peak for each mineral phase is summed and the relative percentages of each phase calculated based on the relative contribution to the sum. This method allows for some attention to be paid to preferred orientation but is limited in considering substitution and lattice strain.

Summary

The phases are listed in order of interpreted concentration:

Mineral phase	Concentration (%w/w)	ICDD match probability
Goethite (Fe +3 O (O H))	47.4%	good
Kaolinite-1A (Al2 Si2 O5 (O H)4)	33.4%	good
Hematite (Fe1.85 H0.45 O3)	19.2%	good

The ICDD match probability is reported as an indication as to how well the peak positions and relative intensities for the sample matched those in the published literature (www.icdd.org) for that particular compound.


12_0735_1.raw (Strip kα2) (Displacement)
PDF 01-073-8433 Fe1.85 H0.45 O3 Hematite
PDF 00-029-0713 Fe +3 O (O H) Goethite
PDF 04-010-4800 Al2 Si2 O5 (O H)4 Kaolinite-1A
Counts
0
300
600
900
1200
1500
1800
2100
10
20
30
40
50
60
70
80
90
2Theta (Coupled TwoTheta/Theta) WL=1.54060

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WA 6100

Client: SGS
Job number: 12_0735
Sample: 12_0735_03
Client ID: **PE068612.003 eyre pit 3**
Date: 01/08/12
Analysis: Semi-quantitative mineralogical analysis by x-ray diffraction (XRD)

Sample Preparation

The sample was supplied to Microanalysis Australia as particulates in a bag. A representative sub –sample was removed and lightly ground such that 90% was passing 20 µm. Grinding to this size helps eliminate preferred orientation.

Analysis

Only crystalline material present in the sample will give peaks in the XRD scan. Amorphous (non crystalline) material will add to the background. The search match software used was Eva or SIeve+. An up to date ICDD card set was used. The x-ray source was copper radiation.

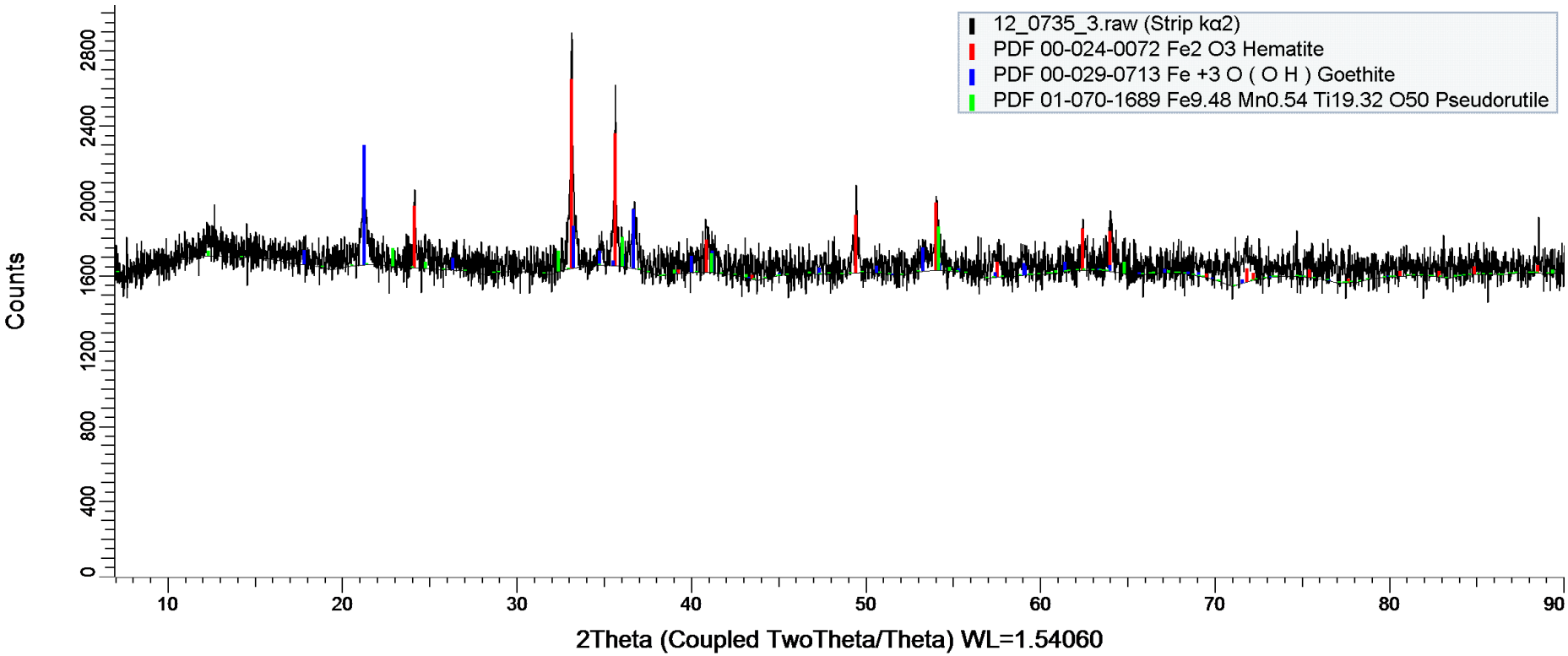
No standards were used in the quantification process. The concentrations were calculated using the peak area integration method where the area of the 100 % peak for each mineral phase is summed and the relative percentages of each phase calculated based on the relative contribution to the sum. This method allows for some attention to be paid to preferred orientation but is limited in considering substitution and lattice strain.

Summary

The phases are listed in order of interpreted concentration:

Mineral phase	Concentration (%w/w)	ICDD match probability
Hematite (Fe2 O3)	56.5%	good
Goethite (Fe +3 O (O H))	35.8%	good
Pseudorutile (Fe9.48 Mn0.54 Ti19.32 O50)	7.7%	low

The ICDD match probability is reported as an indication as to how well the peak positions and relative intensities for the sample matched those in the published literature (www.icdd.org) for that particular compound.


12_0735_3.raw (Strip kα2)
PDF 00-024-0072 Fe2 O3 Hematite
PDF 00-029-0713 Fe +3 O (O H) Goethite
PDF 01-070-1689 Fe9.48 Mn0.54 Ti19.32 O50 Pseudorutile
Counts
0
400
800
1200
1600
2000
2400
2800
10
20
30
40
50
60
70
80
90
2Theta (Coupled TwoTheta/Theta) WL=1.54060

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Victoria Park
WA 6100

Client: SGS
Job number: 12_0735
Sample: 12_0735_06
Client ID: **PE068612.010 eyre pit 10**
Date: 01/08/12
Analysis: Semi-quantitative mineralogical analysis by x-ray diffraction (XRD)

Sample Preparation

The sample was supplied to Microanalysis Australia as particulates in a bag. A representative sub –sample was removed and lightly ground such that 90% was passing 20 µm. Grinding to this size helps eliminate preferred orientation.

Analysis

Only crystalline material present in the sample will give peaks in the XRD scan. Amorphous (non crystalline) material will add to the background. The search match software used was Eva or SIeve+. An up to date ICDD card set was used. The x-ray source was copper radiation.

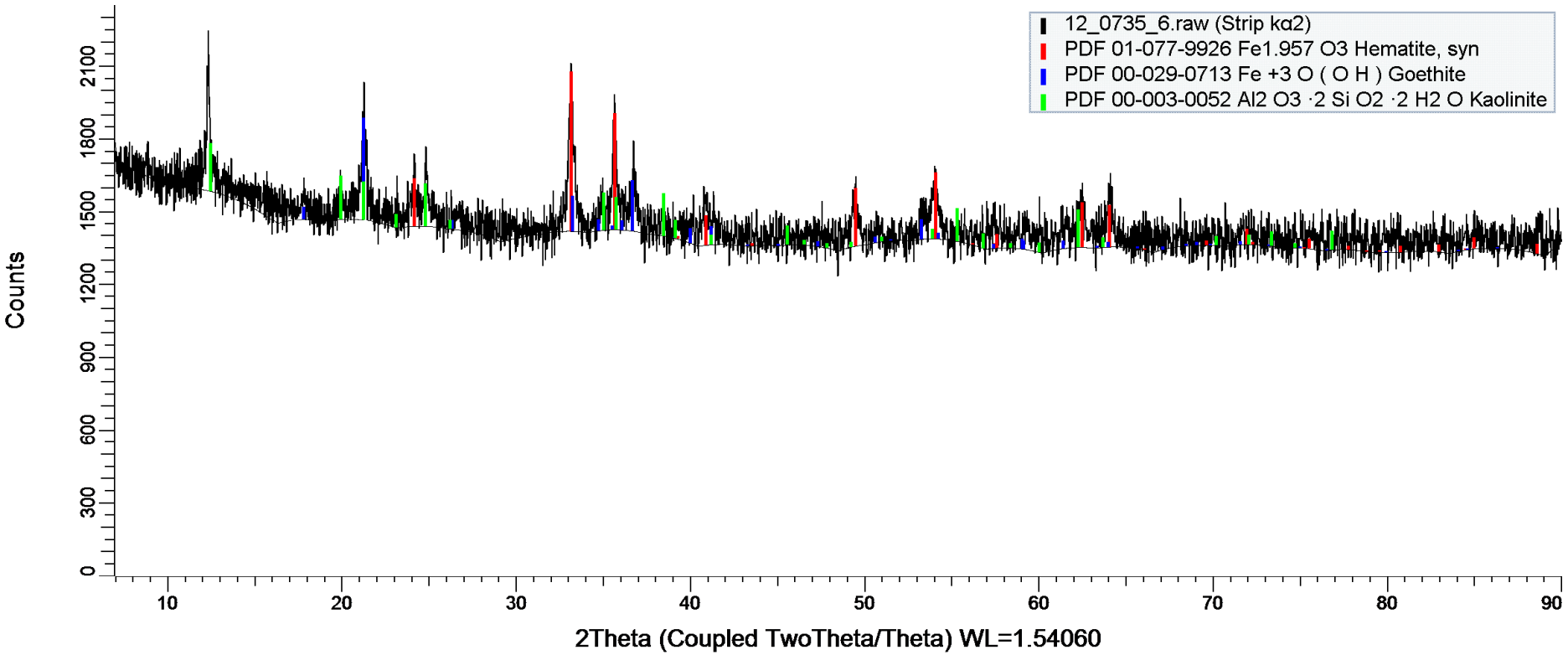
No standards were used in the quantification process. The concentrations were calculated using the peak area integration method where the area of the 100 % peak for each mineral phase is summed and the relative percentages of each phase calculated based on the relative contribution to the sum. This method allows for some attention to be paid to preferred orientation but is limited in considering substitution and lattice strain.

Summary

The phases are listed in order of interpreted concentration:

Mineral phase	Concentration (%w/w)	ICDD match probability
Goethite (Fe +3 O (O H))	51.0%	good
Hematite, syn (Fe1.957 O3)	25.1%	good
Kaolinite (Al2 O3 ·2 Si O2 ·2 H2 O)	23.9%	good

The ICDD match probability is reported as an indication as to how well the peak positions and relative intensities for the sample matched those in the published literature (www.icdd.org) for that particular compound.


12_0735_6.raw (Strip kα2)
PDF 01-077-9926 Fe1.957 O3 Hematite, syn
PDF 00-029-0713 Fe +3 O (O H) Goethite
PDF 00-003-0052 Al2 O3 ·2 Si O2 ·2 H2 O Kaolinite
Counts
0
300
600
900
1200
1500
1800
2100
10
20
30
40
50
60
70
80
90
2Theta (Coupled TwoTheta/Theta) WL=1.54060

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Client: SGS
Job number: 12_0735
Sample: 12_0735_05
Client ID: **PE068612.008 eyre pit 8**
Date: 01/08/12
Analysis: Semi-quantitative mineralogical analysis by x-ray diffraction (XRD)

Sample Preparation

The sample was supplied to Microanalysis Australia as particulates in a bag. A representative sub –sample was removed and lightly ground such that 90% was passing 20 µm. Grinding to this size helps eliminate preferred orientation.

Analysis

Only crystalline material present in the sample will give peaks in the XRD scan. Amorphous (non crystalline) material will add to the background. The search match software used was Eva or SIeve+. An up to date ICDD card set was used. The x-ray source was copper radiation.

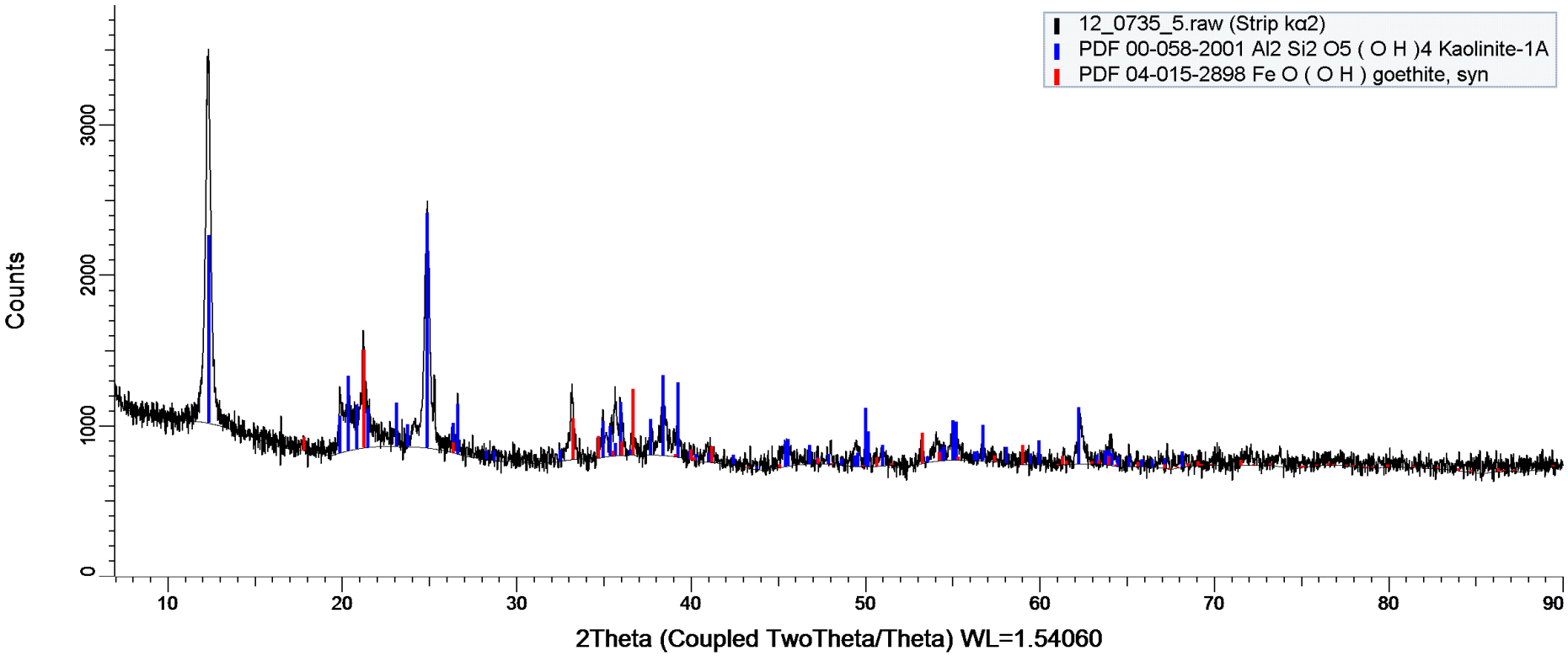
No standards were used in the quantification process. The concentrations were calculated using the peak area integration method where the area of the 100 % peak for each mineral phase is summed and the relative percentages of each phase calculated based on the relative contribution to the sum. This method allows for some attention to be paid to preferred orientation but is limited in considering substitution and lattice strain.

Summary

The phases are listed in order of interpreted concentration:

Mineral phase	Concentration (%w/w)	ICDD match probability
Kaolinite-1A (Al2 Si2 O5 (O H)4)	86.5%	good
Goethite, syn (Fe O (O H))	13.5%	good

The ICDD match probability is reported as an indication as to how well the peak positions and relative intensities for the sample matched those in the published literature (www.icdd.org) for that particular compound.


12_0735_5.raw (Strip kα2)
PDF 00-058-2001 Al2 Si2 O5 (O H)4 Kaolinite-1A
PDF 04-015-2898 Fe O (O H) goethite, syn
Counts
0
1000
2000
3000
10
20
30
40
50
60
70
80
90
2Theta (Coupled TwoTheta/Theta) WL=1.54060

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Client: SGS
Job number: 12_0735
Sample: 12_0735_04
Client ID: **PE068612.006 eyre pit 6**
Date: 01/08/12
Analysis: Semi-quantitative mineralogical analysis by x-ray diffraction (XRD)

Sample Preparation

The sample was supplied to Microanalysis Australia as particulates in a bag. A representative sub –sample was removed and lightly ground such that 90% was passing 20 µm. Grinding to this size helps eliminate preferred orientation.

Analysis

Only crystalline material present in the sample will give peaks in the XRD scan. Amorphous (non crystalline) material will add to the background. The search match software used was Eva or SIeve+. An up to date ICDD card set was used. The x-ray source was copper radiation.

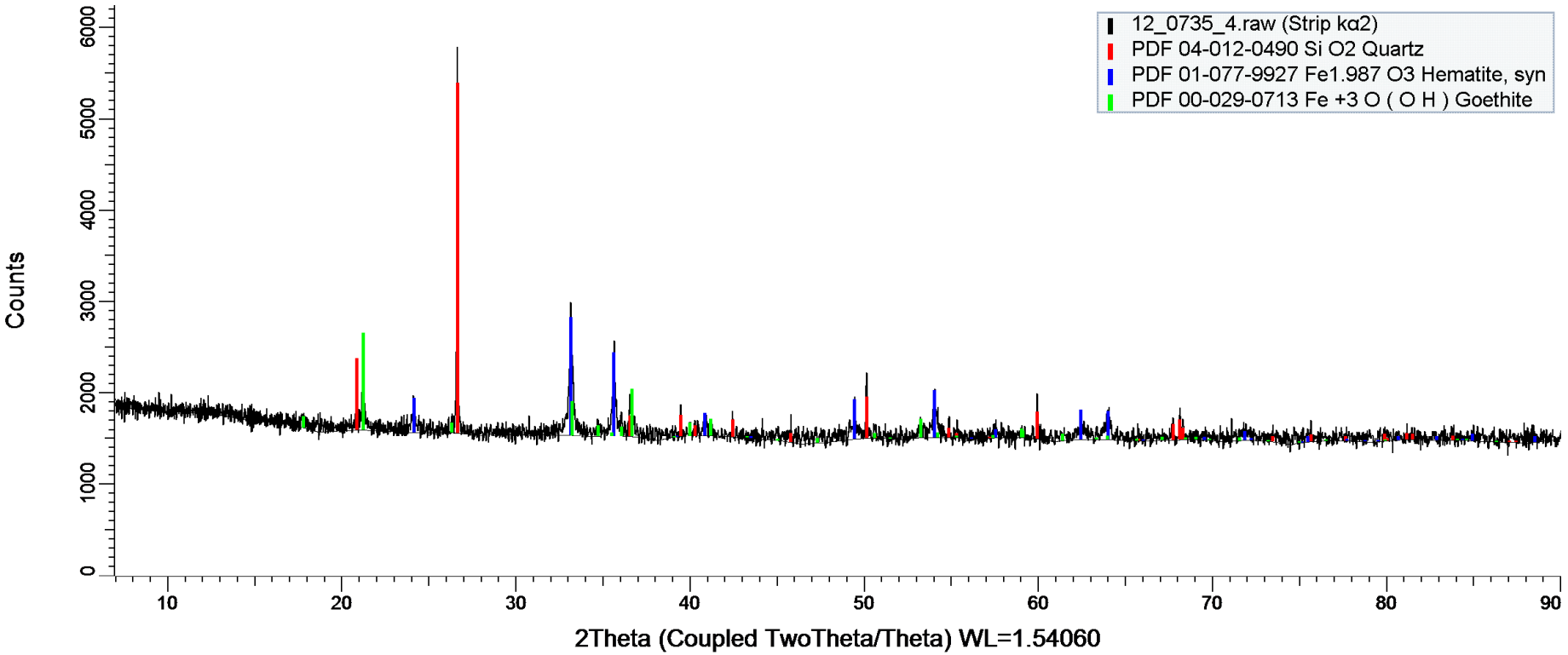
No standards were used in the quantification process. The concentrations were calculated using the peak area integration method where the area of the 100 % peak for each mineral phase is summed and the relative percentages of each phase calculated based on the relative contribution to the sum. This method allows for some attention to be paid to preferred orientation but is limited in considering substitution and lattice strain.

Summary

The phases are listed in order of interpreted concentration:

Mineral phase	Concentration (%w/w)	ICDD match probability
Quartz (Si O2)	46.5%	good
Goethite (Fe +3 O (O H))	38.8%	good
Hematite, syn (Fe1.987 O3)	14.8%	good

The ICDD match probability is reported as an indication as to how well the peak positions and relative intensities for the sample matched those in the published literature (www.icdd.org) for that particular compound.


12_0735_4.raw (Strip kα2)
PDF 04-012-0490 Si O2 Quartz
PDF 01-077-9927 Fe1.987 O3 Hematite, syn
PDF 00-029-0713 Fe +3 O (O H) Goethite
Counts
0
1000
2000
3000
4000
5000
6000
10
20
30
40
50
60
70
80
90
2Theta (Coupled TwoTheta/Theta) WL=1.54060

ANALYTICAL REPORT

WORLD RECOGNISED ACCREDITATION

CLIENT DETAILS

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Project	**FMG Christmas Creek Ref 1296580100**
Order Number	(Not specified)
Samples	73

LABORATORY DETAILS

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Email	au.environmental.perth@sgs.com
SGS Reference	PE068612 R0
Report Number	0000044859
Date Reported	21/08/2012 12:21:08
Date Received	25 Jun 2012

COMMENTS

The document is issued in accordance with NATA's accreditation requirements.
Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562(898/20210).

Fibre Identification performed by Approved Identifier Karin White.

Four Acid Digest Metals subcontracted to SGS Perth Minerals, 10 Reid Rd Newburn WA, NATA Accreditation Number 1936, WM142946 and WM142962

XRD subcontracted to Microanalysis Australia, Suite 6 642 Albany Hwy Victoria Park WA 6100, Job NUmber 12_0735

ASLP DI Al, Cd and Pb replicate RPD for sample "Vasse WRD, #9 Bulk 1.5-3.0" was outside acceptance criteria due to sample heterogeneity.
ASLP DI Zn, Pb and Ba replicate RPD for sample "Vasse WRD, #15 Bulk 0.0-1.5" was outside acceptance criteria due to sample heterogeneity.
ASLP DI Pb replicate RPD for sample "Vasse WRD, #18 Bulk 0.0-1.5" was outside acceptance criteria due to sample heterogeneity.
ASLP DI Mn replicate RPD for sample "Vasse WRD, #25 Bulk 0.0-1.5" was outside acceptance criteria due to sample heterogeneity.
ASLP DI Al and Fe replicate RPD for sample "Eyre Pit #10b Bulk" was outside acceptance criteria due to sample heterogeneity.

SIGNATORIES

Corey Williams
National Operations Manager

Hue Thanh Ly
Spectroscopy Chemist

Karin White
Hygiene Signatory

Michael McKay
Inorganic Team Leader - Waters

Ohmar David
Spectroscopy Chemist

Ros Ma
Laboratory Assistant Manager

ANALYTICAL REPORT

PE068612 R0

RESULTS

Fibre ID in bulk materials — Method AN602

Laboratory Reference	Client Reference	Matrix	Sample Description	Date Sampled	Fibre Identification	Est.%w/w
PE068612.022	Vasse WRD, #5 Bulk 0.0-3.0 Asbestos	Soil	rocks, soil, 495g	13 Jun 2012	No Asbestos Detected Organic Fibres Detected	
PE068612.033	Vasse WRD, #10 Bulk 0.0-3.0 Asbestos	Soil	rocks, soil, 620g	13 Jun 2012	No Asbestos Detected Organic Fibres Detected	
PE068612.042	Vasse WRD, #15 Bulk 0.0-3.0 Asbestos	Soil	rocks, soil, 710g	13 Jun 2012	No Asbestos Detected Organic Fibres Detected	
PE068612.051	Vasse WRD, #20 Bulk 0.0-3.0 Asbestos	Soil	rocks, soil, 860g	13 Jun 2012	No Asbestos Detected Organic Fibres Detected	
PE068612.058	Vasse WRD, #25 Bulk 0.0-3.0 Asbestos	Soil	rocks, soil, 470g	14 Jun 2012	No Asbestos Detected Organic Fibres Detected	
PE068612.068	Vasse WRD, #30 Bulk 0.0-3.0 Asbestos	Soil	rocks, soil, 680g	14 Jun 2012	No Asbestos Detected Organic Fibres Detected	

METHOD SUMMARY

PE068612 R0

METHOD	METHODOLOGY SUMMARY
AN602	Qualitative identification of chrysotile, amosite and crocidolite in bulk samples by polarised light microscopy (PLM) in conjunction with dispersion staining (DS). AS4964 provides the basis for this document. Unequivocal identification of the asbestos minerals present is made by obtaining sufficient diagnostic `clues`, which provide a reasonable degree of certainty, dispersion staining is a mandatory `clue` for positive identification. If sufficient `clues` are absent, then positive identification of asbestos is not possible. This procedure requires removal of suspect fibres/bundles from the sample which cannot be returned.

FOOTNOTES

Amosite	-	Brown Asbestos	NA	-	Not Analysed
Chrysotile	-	White Asbestos	LNR	-	Listed, Not Required
Crocidolite	-	Blue Asbestos	*	-	Not Accredited
Amphiboles	-	Amosite and/or Crocidolite			

Insofar as is technically feasible, this report is consistent with the analytical reporting recommendations in the Western Australia Department of Health Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia-May 2009.

Sampled by the client.

Where reported: 'Asbestos Detected': Asbestos detected by polarized light microscopy, including dispersion staining.
Where reported: 'No Asbestos Found': No Asbestos Found by polarized light microscopy, including dispersion staining.
Where reported: 'UMF Detected': Mineral fibres of unknown type detected by polarized light microscopy, including dispersion staining. Confirmation by another independent analytical technique may be necessary.

Even after disintegration it can be very difficult, or impossible, to detect the presence of asbestos in some asbestos -containing bulk materials using polarised light microscopy. This is due to the low grade or small length or diameter of asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here : http://www.au.sgs.com/sgs-mp-au-env-qu-022-qa-qc-plan-en-11.pdf

APPENDIX C

Geotechnical Laboratory Data and Testpit Logs

TETRA TECH TEST PIT LOGGING SHEET

TP No: 1

Project No: 1296580100

Sheet 1 of 1

Client: Fortescue Metal Group Christmas Creek	Date Started: 12 June 2012
Project Title: FMG Christmas Creek, Vasse Waste Rock Dump Geotechnical Investigation	Dated Completed: 12 June 2012
Location: Vasse WRD, Christmas Creek	Logged By: S Berry

EASTING	NORTHING	RL(m)

Depth(M) From	Depth(M) To	Graphic Log	Classification	Material Description strength, Soil type, particle size, plasticity, moisture state, colour	Moisture Condition	DCP Blows/100mm	Sample Type & ID	General Comments
0	0.5		Fill	Moderately sorted GRAVEL, subangular to subrounded, coarse, some cobbles, minor boulders, trace silt and clay, red/brown, dry: 80% porous Hematite shale, 20% Kaolinite, trace Goethite & Chert				

TETRA TECH TEST PIT LOGGING SHEET

TP No: 2

Project No: 1296580100

Sheet 1 of 1

Client: Fortescue Metal Group Christmas Creek	Date Started: 14 June 2012
Project Title: FMG Christmas Creek, Vasse Waste Rock Dump Geotechnical Investigation	Dated Completed: 14 June 2012
Location: Vasse WRD, Christmas Creek	Logged By: S Berry

EASTING	NORTHING	RL(m)

Depth(M) From	Depth(M) To	Graphic Log	Classification	Material Description strength, Soil type, particle size, plasticity, moisture state, colour	Moisture Condition	DCP Blows/100mm	Sample Type & ID	General Comments
0	3		Natural / Alluvium	Well sorted silty (50%) GRAVEL (50%), subangular to rounded, fine to medium, red/brown, dry: 60% Goethite (medium), 40% Goethite (friable)				

TETRA TECH TEST PIT LOGGING SHEET

TP No: 3

Project No: 1296580100

Sheet 1 of 1

Client: Fortescue Metal Group Christmas Creek	Date Started: 13 June 2012
Project Title: FMG Christmas Creek, Vasse Waste Rock Dump Geotechnical Investigation	Dated Completed: 13 June 2012
Location: Vasse WRD, Christmas Creek	Logged By: S Berry

EASTING	NORTHING	RL(m)

Depth(M) From	Depth(M) To	Graphic Log	Classification	Material Description strength, Soil type, particle size, plasticity, moisture state, colour	Moisture Condition	DCP Blows/100mm	Sample Type & ID	General Comments
0	1		Fill	Poorly sorted gravelly SILT, angular to subrounded, fine to coarse, some cobbles, red/brown, dry: 70% Shale, 30% Goethite				
1	2		Fill	60% Shale, 40% Goethite				
2	3		Fill	30% Shale, 20% Goethite, 50% Chert				

TETRA TECH TEST PIT LOGGING SHEET

TP No: 4

Project No: 1296580100

Sheet 1 of 1

Client: Fortescue Metal Group Christmas Creek	Date Started: 13 June 2012
Project Title: FMG Christmas Creek, Vasse Waste Rock Dump Geotechnical Investigation	Dated Completed: 13 June 2012
Location: Vasse WRD, Christmas Creek	Logged By: S Berry

EASTING	NORTHING	RL(m)

Depth(M) From	Depth(M) To	Graphic Log	Classification	Material Description strength, Soil type, particle size, plasticity, moisture state, colour	Moisture Condition	DCP Blows/100mm	Sample Type & ID	General Comments
0	1		Fill	Poorly sorted silty GRAVEL, angular to subrounded, fine to medium, some cobbles up to 30cm, red/brown, dry: 50% Martite (medium), 50% Goethite (hard)				
1	2		Fill	Moderately sorted gravelly SILT, angular to subrounded, medium to coarse, some cobbles up to 15cm, red/brown, dry: 40% Goethite (medium), 40% Goethite (friable) 20% Shale				
2	3		Fill	40% Goethite (friable), 40% Martite (friable), 2-% Goethite (medium)				

TETRA TECH TEST PIT LOGGING SHEET

TP No: 5

Project No: 1296580100

Sheet 1 of 1

Client: Fortescue Metal Group Christmas Creek	Date Started: 13 June 2012
Project Title: FMG Christmas Creek, Vasse Waste Rock Dump Geotechnical Investigation	Dated Completed: 13 June 2012
Location: Vasse WRD, Christmas Creek	Logged By: S Berry

EASTING	NORTHING	RL(m)

Depth(M) From	Depth(M) To	Graphic Log	Classification	Material Description strength, Soil type, particle size, plasticity, moisture state, colour	Moisture Condition	DCP Blows/100mm	Sample Type & ID	General Comments
0	1		Fill	Poorly sorted GRAVEL (50%), angular to subrounded, medium to coarse, some cobbles (20%) and silt (30%), red/brown, dry: 40% Martite (hard), 30% Martite (friable), 30% Goethite (friable)				
1	2		Fill	Poorly sorted GRAVEL (40%), angular to subrounded, fine to coarse, some cobbles (40%) and silt (20%), red/brown, dry: 60% Goethite (friable), 30% glassy Goethite, 10% Goethite (medium)				
2	3		Fill	Poorly sorted GRAVEL (60%), angular to subrounded, medium to coarse, some cobbles (30%), minor silt (10%), red/brown, dry: 80% Goethite (medium), 20% Martite (medium)				

TETRA TECH TEST PIT LOGGING SHEET

TP No: 6

Project No: 1296580100

Sheet 1 of 1

Client: Fortescue Metal Group Christmas Creek	Date Started: 13 June 2012
Project Title: FMG Christmas Creek, Vasse Waste Rock Dump Geotechnical Investigation	Dated Completed: 13 June 2012
Location: Vasse WRD, Christmas Creek	Logged By: S Berry

EASTING	NORTHING	RL(m)

Depth(M) From	Depth(M) To	Graphic Log	Classification	Material Description strength, Soil type, particle size, plasticity, moisture state, colour	Moisture Condition	DCP Blows/100mm	Sample Type & ID	General Comments
0	1		Fill	Poorly sorted GRAVEL (40%), angular to subrounded, fine to medium, some cobbles (20%) and silt (40%), red/brown, dry: 60% glassy Goethite, 30% Goethite (hard) 10% Martite (medium)				
1	2		Fill	Poorly sorted GRAVEL (40%), angular to subrounded, fine to medium, some cobbles (40%) and silt (20%), red/brown, dry: 60% glassy Goethite, 30% Goethite (hard) 10% Martite (medium)				
2	3		Fill	Moderately sorted silty (40%) GRAVEL (50%), angular to subrounded, fine to coarse, minor cobbles (10%), red/brown, dry: 50% Goethite (medium), 40% Goethite (friable), 10% Shale				

TETRA TECH TEST PIT LOGGING SHEET

TP No: 7

Project No: 1296580100

Sheet 1 of 1

Client: Fortescue Metal Group Christmas Creek	Date Started: 14 June 2012
Project Title: FMG Christmas Creek, Vasse Waste Rock Dump Geotechnical Investigation	Dated Completed: 14 June 2012
Location: Vasse WRD, Christmas Creek	Logged By: S Berry

EASTING	NORTHING	RL(m)

Depth(M) From	Depth(M) To	Graphic Log	Classification	Material Description strength, Soil type, particle size, plasticity, moisture state, colour	Moisture Condition	DCP Blows/100mm	Sample Type & ID	General Comments
0	1		Fill	Moderately sorted GRAVEL (30%), angular to subrounded, medium to coarse, cobbles (55%) up to 40cm, trace to minor silt (15%), red/brown, dry: 70% Shale, 30% Goethite (friable)				
1	2		Fill	Poorly sorted GRAVEL (30%), angular to subrounded, fine to coarse, cobbles (50%) up to 50cm, some to minor silt (20%), red/brown, dry: 70% glassy Goethite, 30% Shale				
2	3		Fill	Moderately sorted GRAVEL (30%), angular to subrounded, fine to coarse, cobbles (65%) up to 80cm, trace silt (5%), red/brown, dry: 100% glassy Goethite				

TETRA TECH TEST PIT LOGGING SHEET

TP No: 8

Project No: 1296580100

Sheet 1 of 1

Client: Fortescue Metal Group Christmas Creek	Date Started: 13 June 2012
Project Title: FMG Christmas Creek, Vasse Waste Rock Dump Geotechnical Investigation	Dated Completed: 13 June 2012
Location: Vasse WRD, Christmas Creek	Logged By: S Berry

EASTING	NORTHING	RL(m)

Depth(M) From	Depth(M) To	Graphic Log	Classification	Material Description strength, Soil type, particle size, plasticity, moisture state, colour	Moisture Condition	DCP Blows/100mm	Sample Type & ID	General Comments
0	1		Fill	Moderately sorted GRAVEL (40%), angular to subrounded, medium to coarse, cobbles (50%) up to 50cm, minor silt (10%), red/brown, dry: 50% Martite (medium), 40% Goethite (medium), 10% Goethite (friable)				
1	2		Fill	Moderately sorted GRAVEL (40%), angular to subrounded, medium to coarse, some cobbles (30%) up to 20cm & silt (30%), red/brown, dry: 70% Goethite (medium), 30% Goethite (friable)				
2	3		Fill	Moderately sorted GRAVEL (30%), angular to subrounded, medium to coarse, cobbles (65%) up to 70cm, trace silt (5%), red/brown, dry: 70% Goethite (hard), 30% Goethite (friable)				

TETRA TECH TEST PIT LOGGING SHEET

TP No: 9

Project No: 1296580100

Sheet 1 of 1

Client: Fortescue Metal Group Christmas Creek	Date Started: 13 June 2012
Project Title: FMG Christmas Creek, Vasse Waste Rock Dump Geotechnical Investigation	Dated Completed: 13 June 2012
Location: Vasse WRD, Christmas Creek	Logged By: S Berry

EASTING	NORTHING	RL(m)

Depth(M) From	Depth(M) To	Graphic Log	Classification	Material Description strength, Soil type, particle size, plasticity, moisture state, colour	Moisture Condition	DCP Blows/100mm	Sample Type & ID	General Comments
0	1		Fill	Poorly sorted silty GRAVEL, angular to subrounded, fine to coarse, some cobbles, red/brown, dry: 80% glassy Goethite, 20% Goethite				
1	2		Fill	50% glassy Goethite, 30% Goethite, 20% Chert				
2	3		Fill	50% glassy Goethite, 30% Goethite, 20% Chert				

TETRA TECH TEST PIT LOGGING SHEET

TP No: 10

Project No: 1296580100

Sheet 1 of 1

Client: Fortescue Metal Group Christmas Creek	Date Started: 13 June 2012
Project Title: FMG Christmas Creek, Vasse Waste Rock Dump Geotechnical Investigation	Dated Completed: 13 June 2012
Location: Vasse WRD, Christmas Creek	Logged By: S Berry

EASTING	NORTHING	RL(m)

Depth(M) From	Depth(M) To	Graphic Log	Classification	Material Description strength, Soil type, particle size, plasticity, moisture state, colour	Moisture Condition	DCP Blows/100mm	Sample Type & ID	General Comments
0	1		Fill	Poorly sorted silty GRAVEL, angular to subrounded, fine to coarse, some cobbles up to 20cm, red/brown, dry: 50% Martite (medium), 30% Goethite (medium), 20% Goethite (friable)				
1	2		Fill	50 Goethite (friable), 30 Goethite (medium), 20% glassy Goethite				
2	3		Fill	SILT, some moderately sorted gravel, medium to coarse, some cobbles up to 10cm, red/brown, dry: 20% Goethite (friable), 80% Shale				

TETRA TECH TEST PIT LOGGING SHEET

TP No: 11

Project No: 1296580100

Sheet 1 of 1

Client: Fortescue Metal Group Christmas Creek	Date Started: 12 June 2012
Project Title: FMG Christmas Creek, Vasse Waste Rock Dump Geotechnical Investigation	Dated Completed: 12 June 2012
Location: Vasse WRD, Christmas Creek	Logged By: S Berry

EASTING	NORTHING	RL(m)

Depth(M) From	Depth(M) To	Graphic Log	Classification	Material Description strength, Soil type, particle size, plasticity, moisture state, colour	Moisture Condition	DCP Blows/100mm	Sample Type & ID	General Comments
0	0.5		Fill	Poorly sorted GRAVEL, angular to subrounded, medium to coarse, some cobblles and small boulders, trace silt and clay, red/brown, dry: 60% Hematite shale, 20% Goethite shale, 20% Chert, minor Kaolinite				Minor salt precipitae on surface of some clasts, minor upslope vegetation

TETRA TECH TEST PIT LOGGING SHEET

TP No: 12

Project No: 1296580100

Sheet 1 of 1

Client: Fortescue Metal Group Christmas Creek	Date Started: 13 June 2012
Project Title: FMG Christmas Creek, Vasse Waste Rock Dump Geotechnical Investigation	Dated Completed: 13 June 2012
Location: Vasse WRD, Christmas Creek	Logged By: S Berry

EASTING	NORTHING	RL(m)

Depth(M) From	Depth(M) To	Graphic Log	Classification	Material Description strength, Soil type, particle size, plasticity, moisture state, colour	Moisture Condition	DCP Blows/100mm	Sample Type & ID	General Comments
0	1		Fill	Poorly sorted GRAVEL (60%), angular to subrounded, fine to coarse, some cobbles (20%) & silt (20%), red/brown, dry: 80% Goethite (hard), 20% glassy Goethite				
1	2		Fill	Moderately sorted GRAVEL (40%), angular to subrounded, medium to coarse, cobbles (40%) up to 25cm, some to minor silt (20%), red/brown, dry: 40% Goethite (medium), 30% Hematite (hard), 30% glassy Goethite				
2	3		Fill	Moderately sorted GRAVEL (40%), angular to subrounded, medium to coarse, some cobbles (30%) up to 15cm & silt (30%), red/brown, dry: 30% Hematite (medium), 30% Martite (medium), 40% Goethite (medium)				

TETRA TECH TEST PIT LOGGING SHEET

TP No: 13

Project No: 1296580100

Sheet 1 of 1

Client: Fortescue Metal Group Christmas Creek	Date Started: 13 June 2012
Project Title: FMG Christmas Creek, Vasse Waste Rock Dump Geotechnical Investigation	Dated Completed: 13 June 2012
Location: Vasse WRD, Christmas Creek	Logged By: S Berry

EASTING	NORTHING	RL(m)

Depth(M) From	Depth(M) To	Graphic Log	Classification	Material Description strength, Soil type, particle size, plasticity, moisture state, colour	Moisture Condition	DCP Blows/100mm	Sample Type & ID	General Comments
0	1		Fill	Moderately sorted GRAVEL (25%), angular to subrounded, medium to coarse, cobbles (45%) up to 30cm, some to minor silt (30%), red/brown, dry: 50% Martite (hard), 50% Shale				
1	2		Fill	Moderately sorted GRAVEL (20%), angular to subrounded, medium to coarse, cobbles (50%) up to 20cm, some to minor silt (30%), red/brown, dry: 50% glassy Goethite, 50% Goethite (friable)				
2	3		Fill	Poorly sorted GRAVEL (20%), angular to subrounded, medium to coarse, cobbles (50%) up to 20cm, some silt (30%), red/brown, dry: 70% Goethite (friable), 30% Shale				

TETRA TECH TEST PIT LOGGING SHEET

TP No: 14

Project No: 1296580100

Sheet 1 of 1

Client: Fortescue Metal Group Christmas Creek	Date Started: 12 June 2012
Project Title: FMG Christmas Creek, Vasse Waste Rock Dump Geotechnical Investigation	Dated Completed: 12 June 2012
Location: Vasse WRD, Christmas Creek	Logged By: S Berry

EASTING	NORTHING	RL(m)

Depth(M) From	Depth(M) To	Graphic Log	Classification	Material Description strength, Soil type, particle size, plasticity, moisture state, colour	Moisture Condition	DCP Blows/100mm	Sample Type & ID	General Comments
0	0.5		Fill	Poorly sorted GRAVEL, subangular to subrounded, medium to coarse, some cobbles & boulders, trace silt, red/brown, dry: 60% Hematite shale, 30% Goethite, 10% Martite				Minor upslope vegetation

TETRA TECH TEST PIT LOGGING SHEET

TP No: 15

Project No: 1296580100

Sheet 1 of 1

Client: Fortescue Metal Group Christmas Creek	Date Started: 13 June 2012
Project Title: FMG Christmas Creek, Vasse Waste Rock Dump Geotechnical Investigation	Dated Completed: 13 June 2012
Location: Vasse WRD, Christmas Creek	Logged By: S Berry

EASTING	NORTHING	RL(m)

Depth(M) From	Depth(M) To	Graphic Log	Classification	Material Description strength, Soil type, particle size, plasticity, moisture state, colour	Moisture Condition	DCP Blows/100mm	Sample Type & ID	General Comments
0	1		Fill	Poorly sorted GRAVEL (40%), angular to subrounded, fine to coarse, some cobbles (20%) up to 50cm & silt (40%), red/brown, dry: 50% Goethite (medium), 50% Goethite (friable)				
1	2		Fill	Poorly sorted GRAVEL (40%), angular to subrounded, fine to coarse, cobbles (40%) up to 70cm, some to minor silt (20%), red/brown, dry: 40% Goethite (friable), 40% Goethite (hard), 20% Hematite (hard)				
2	3		Fill	Poorly sorted GRAVEL (30%), angular to subrounded, fine to coarse, cobbles (40%) up to 70cm & silt (30%), red/brown, dry: 30% Goethite (medium), 30% Goethite (friable), 40% Martite (hard)				

TETRA TECH TEST PIT LOGGING SHEET

TP No: 16

Project No: 1296580100

Sheet 1 of 1

Client: Fortescue Metal Group Christmas Creek	Date Started: 14 June 2012
Project Title: FMG Christmas Creek, Vasse Waste Rock Dump Geotechnical Investigation	Dated Completed: 14 June 2012
Location: Vasse WRD, Christmas Creek	Logged By: S Berry

EASTING	NORTHING	RL(m)

Depth(M) From	Depth(M) To	Graphic Log	Classification	Material Description strength, Soil type, particle size, plasticity, moisture state, colour	Moisture Condition	DCP Blows/100mm	Sample Type & ID	General Comments
0	1		Fill	Poorly sorted GRAVEL (40%), angular to subrounded, fine to coarse, cobbles (55%) up to 40cm, trace silt (5%), red/brown, dry: 100% glassy Goethite				
1	2		Fill	Poorly sorted GRAVEL (50%), angular to subrounded, fine to coarse, cobbles (40%) up to 50cm, trace to minor silt (10%), red/brown, moist to wet: 70% glassy Goethite, 30% Goethite (hard)				
2	3		Fill	Moderately sorted GRAVEL (50%), angular to subrounded, medium to coarse, cobbles (30%) up to 40cm, some to minor silt (20%), red/brown, moist to wet, trace fibrous organic material at base: 50% Goethite (medium), 50% Goethite (friable)				

TETRA TECH TEST PIT LOGGING SHEET

TP No: 18

Project No: 1296580100

Sheet 1 of 1

Client: Fortescue Metal Group Christmas Creek	Date Started: 13 June 2012
Project Title: FMG Christmas Creek, Vasse Waste Rock Dump Geotechnical Investigation	Dated Completed: 13 June 2012
Location: Vasse WRD, Christmas Creek	Logged By: S Berry

EASTING	NORTHING	RL(m)

Depth(M) From	Depth(M) To	Graphic Log	Classification	Material Description strength, Soil type, particle size, plasticity, moisture state, colour	Moisture Condition	DCP Blows/100mm	Sample Type & ID	General Comments
0	1		Fill	Moderately sorted GRAVEL (50%), angular to subrounded, medium to coarse, some cobbles (20%) up to 80cm & silt (30%), red/brown, dry: 30% Goethite (medium), 30% glassy Goethite, 40% Shale				
1	2		Fill	Poorly sorted GRAVEL (40%), angular to subrounded, fine to coarse, cobbles (40%) up to 50cm, some to minor silt (20%), red/brown, dry: 60% Goethite (friable), 40% Goethite (medium)				
2	3		Fill	Poorly sorted GRAVEL (50%), angular to subrounded, fine to coarse, cobbles (30%) up to 50cm & silt (30%), red/brown, dry: 80% Goethite (friable), 20% glassy Geothite				

TETRA TECH TEST PIT LOGGING SHEET

TP No: 19

Project No: 1296580100

Sheet 1 of 1

Client: Fortescue Metal Group Christmas Creek	Date Started: 13 June 2012
Project Title: FMG Christmas Creek, Vasse Waste Rock Dump Geotechnical Investigation	Dated Completed: 13 June 2012
Location: Vasse WRD, Christmas Creek	Logged By: S Berry

EASTING	NORTHING	RL(m)

Depth(M) From	Depth(M) To	Graphic Log	Classification	Material Description strength, Soil type, particle size, plasticity, moisture state, colour	Moisture Condition	DCP Blows/100mm	Sample Type & ID	General Comments
0	1		Fill	Poorly sorted GRAVEL (40%), angular to subrounded, fine to coarse, some cobbles (30%) up to 40cm & silt (30%), red/brown, dry: 50% Hematite (hard), 50% Goethite (hard)				
1	2		Fill	Poorly sorted GRAVEL (30%), angular to subrounded, fine to coarse, cobbles (40%) up to 90cm, some silt (30%), red/brown, dry: 60% Goethite (medium), 30% Goethite (friable), 10% glassy Goethite				
2	3		Fill	Poorly sorted GRAVEL (50%), angular to subrounded, fine to coarse, cobbles (30%) up to 50cm & silt (20%), red/brown, dry: 50% Goethite (hard), 40% Hematite (hard), 10% Goethite (friable)				

TETRA TECH TEST PIT LOGGING SHEET

TP No: 36

Project No: 1296580100

Sheet 1 of 1

Client: Fortescue Metal Group Christmas Creek	Date Started: 13 June 2012
Project Title: FMG Christmas Creek, Vasse Waste Rock Dump Geotechnical Investigation	Dated Completed: 13 June 2012
Location: Vasse WRD, Christmas Creek	Logged By: S Berry

EASTING	NORTHING	RL(m)

Depth(M) From	Depth(M) To	Graphic Log	Classification	Material Description strength, Soil type, particle size, plasticity, moisture state, colour	Moisture Condition	DCP Blows/100mm	Sample Type & ID	General Comments
0	1		Fill	Poorly sorted GRAVEL (40%), angular to subrounded, fine to coarse, cobbles (40%) up to 70cm, boulders up to 1m, some silt (20%), red/brown, dry: 30% glassy Goethite, 70% Goethite (friable)				
1	2		Fill	60% Shale, 30% glassy Goethite, 10% Goethite (medium)				
2	3		Fill	60% Shale, 30% glassy Goethite, 10% Goethite (medium)				

TETRA TECH TEST PIT LOGGING SHEET

TP No: 21

Project No: 1296580100

Sheet 1 of 1

Client: Fortescue Metal Group Christmas Creek	Date Started: 14 June 2012
Project Title: FMG Christmas Creek, Vasse Waste Rock Dump Geotechnical Investigation	Dated Completed: 14 June 2012
Location: Vasse WRD, Christmas Creek	Logged By: S Berry

EASTING	NORTHING	RL(m)

Depth(M) From	Depth(M) To	Graphic Log	Classification	Material Description strength, Soil type, particle size, plasticity, moisture state, colour	Moisture Condition	DCP Blows/100mm	Sample Type & ID	General Comments
0	1		Fill	Poorly sorted GRAVEL (70%), angular to subrounded, fine to coarse, cobbles (10%) up to 30cm, some to minor silt (20%), red/brown, dry: 80% Goethite (hard), 20% glassy Goethite				
1	2		Fill	Poorly sorted GRAVEL (80%), angular to subrounded, fine to coarse, cobbles (5%) up to 15cm, minor silt (15%), red/brown, dry: 80% glassy Goethite, 20% Hematite (hard)				
2	3		Fill	Well sorted GRAVEL (80%), angular to subrounded, medium to coarse, cobbles (5%) up to 20cm, minor silt (15%), red/brown, dry: 80% glassy Goethite, 20% Hematite (hard)				

TETRA TECH TEST PIT LOGGING SHEET

TP No: 22

Project No: 1296580100

Sheet 1 of 1

Client: Fortescue Metal Group Christmas Creek	Date Started: 14 June 2012
Project Title: FMG Christmas Creek, Vasse Waste Rock Dump Geotechnical Investigation	Dated Completed: 14 June 2012
Location: Vasse WRD, Christmas Creek	Logged By: S Berry

EASTING	NORTHING	RL(m)

Depth(M) From	Depth(M) To	Graphic Log	Classification	Material Description strength, Soil type, particle size, plasticity, moisture state, colour	Moisture Condition	DCP Blows/100mm	Sample Type & ID	General Comments
0	1		Natural / Alluvium	Moderately sorted GRAVEL (40%), subangular to subrounded, medium to coarse, cobbles (40%) up to 20cm, some to minor silt (20%), red/brown, dry: 100% glassy Goethite				
1				Inferred Bedrock				

TETRA TECH TEST PIT LOGGING SHEET

TP No: 25

Project No: 1296580100

Sheet 1 of 1

Client: Fortescue Metal Group Christmas Creek	Date Started: 14 June 2012
Project Title: FMG Christmas Creek, Vasse Waste Rock Dump Geotechnical Investigation	Dated Completed: 14 June 2012
Location: Vasse WRD, Christmas Creek	Logged By: S Berry

EASTING	NORTHING	RL(m)

Depth(M) From	Depth(M) To	Graphic Log	Classification	Material Description strength, Soil type, particle size, plasticity, moisture state, colour	Moisture Condition	DCP Blows/100mm	Sample Type & ID	General Comments
0	1		Fill	Moderately sorted gravelly (35%) SILT (45%), angular to subrounded, fine to coarse, cobbles (20%) up to 30cm, red/brown, dry: 50% Goethie (friable), 50% Shale				
1	3		Fill	Moderately sorted silty (40%) GRAVEL (40%), angular to subrounded, fine to coarse, cobbles (20%) up to 60cm, red/brown, dry: 100% Goethite (hard)				

TETRA TECH TEST PIT LOGGING SHEET

TP No: 26

Project No: 1296580100

Sheet 1 of 1

Client: Fortescue Metal Group Christmas Creek	Date Started: 14 June 2012
Project Title: FMG Christmas Creek, Vasse Waste Rock Dump Geotechnical Investigation	Dated Completed: 14 June 2012
Location: Vasse WRD, Christmas Creek	Logged By: S Berry

EASTING	NORTHING	RL(m)

Depth(M) From	Depth(M) To	Graphic Log	Classification	Material Description strength, Soil type, particle size, plasticity, moisture state, colour	Moisture Condition	DCP Blows/100mm	Sample Type & ID	General Comments
0	1		Fill	Poorly sorted GRAVEL (40%), angular to subrounded, fine to coarse, cobbles (45%) up to 90cm, minor silt (15%), red/brown, dry: 70% Goethite (friable), 30% Goethite (medium)				
1	2		Fill	Poorly sorted GRAVEL (40%), angular to subrounded, fine to coarse, cobbles (45%) up to 80cm, minor silt (15%), red/brown, dry: 25% glassy Goethite, 25% Goethite (friable), 25% Goethite (medium), 25% Shale				
2	3		Fill	Poorly sorted GRAVEL (40%), angular to subrounded, fine to coarse, cobbles (45%) up to 30cm, minor silt (15%), red/brown, dry: 40% Goethite (hard), 20% Goethite (friable), 40% Hematite (hard)				

TETRA TECH TEST PIT LOGGING SHEET

TP No: 27

Project No: 1296580100

Sheet 1 of 1

Client: Fortescue Metal Group Christmas Creek	Date Started: 12 June 2012
Project Title: FMG Christmas Creek, Vasse Waste Rock Dump Geotechnical Investigation	Dated Completed: 12 June 2012
Location: Vasse WRD, Christmas Creek	Logged By: S Berry

EASTING	NORTHING	RL(m)

Depth(M) From	Depth(M) To	Graphic Log	Classification	Material Description strength, Soil type, particle size, plasticity, moisture state, colour	Moisture Condition	DCP Blows/100mm	Sample Type & ID	General Comments
0	0.5		Fill	Poorly sorted GRAVEL, subangular to subrounded, fine to medium, some cobbles & boulders, trace silt, red/brown, dry: 40% Chert, 30% Ochreous Goethite friable, trace Hematite shale				

TETRA TECH TEST PIT LOGGING SHEET

TP No: 28

Project No: 1296580100

Sheet 1 of 1

Client: Fortescue Metal Group Christmas Creek	Date Started: 14 June 2012
Project Title: FMG Christmas Creek, Vasse Waste Rock Dump Geotechnical Investigation	Dated Completed: 14 June 2012
Location: Vasse WRD, Christmas Creek	Logged By: S Berry

EASTING	NORTHING	RL(m)

Depth(M) From	Depth(M) To	Graphic Log	Classification	Material Description strength, Soil type, particle size, plasticity, moisture state, colour	Moisture Condition	DCP Blows/100mm	Sample Type & ID	General Comments
0	1		Fill	Poorly sorted GRAVEL (50%), angular to subrounded, fine to coarse, cobbles (35%) up to 40cm, minor silt (15%), red/brown, dry: 70% Goethite (medium), 30% Goethite (friable)				
1	2		Fill	Moderately sorted GRAVEL (60%), angular to subrounded, fine to coarse, cobbles (30%) up to 70cm, trace to minor silt (10%), red/brown, dry: 30% Goethite (friable), 70% Goethite (medium)				
2	3		Fill	Poorly sorted GRAVEL (60%), angular to subrounded, fine to coarse, cobbles & boulders (30%) up to 100cm, trace to minor silt (10%), red/brown, dry: 50% Goethite (friable), 50% Shale				

TETRA TECH TEST PIT LOGGING SHEET

TP No: 29

Project No: 1296580100

Sheet 1 of 1

Client: Fortescue Metal Group Christmas Creek	Date Started: 14 June 2012
Project Title: FMG Christmas Creek, Vasse Waste Rock Dump Geotechnical Investigation	Dated Completed: 14 June 2012
Location: Vasse WRD, Christmas Creek	Logged By: S Berry

EASTING	NORTHING	RL(m)

Depth(M) From	Depth(M) To	Graphic Log	Classification	Material Description strength, Soil type, particle size, plasticity, moisture state, colour	Moisture Condition	DCP Blows/100mm	Sample Type & ID	General Comments
0	1		Fill	Poorly sorted silty (30%) GRAVEL (30%), angular to subrounded, fine to coarse, cobbles & boulders (40%) up to 100cm, red/brown, dry: 40% Hematite (hard), 30% Hematite (friable), 30% Martite (friable)				
1	2		Fill	Poorly sorted GRAVEL (30%), angular to subrounded, fine to coarse, cobbles (55%) up to 60cm, minor silt (15%), red/brown, dry: 50% Goethite (hard), 50% Hematite (friable)				
2	3		Fill	Poorly sorted GRAVEL (40%), angular to subrounded, fine to coarse, cobbles (45%) up to 30cm, minor silt (15%), red/brown, dry: 50% glassy Goethite, 50% Goethite (medium)				

TETRA TECH TEST PIT LOGGING SHEET

TP No: 30

Project No: 1296580100

Sheet 1 of 1

Client: Fortescue Metal Group Christmas Creek	Date Started: 14 June 2012
Project Title: FMG Christmas Creek, Vasse Waste Rock Dump Geotechnical Investigation	Dated Completed: 14 June 2012
Location: Vasse WRD, Christmas Creek	Logged By: S Berry

EASTING	NORTHING	RL(m)

Depth(M) From	Depth(M) To	Graphic Log	Classification	Material Description strength, Soil type, particle size, plasticity, moisture state, colour	Moisture Condition	DCP Blows/100mm	Sample Type & ID	General Comments
0	1		Fill	Poorly sorted gravelly (30%) SILT (40%), angular to subrounded, fine to coarse, cobbles (30%) up to 50cm, red/brown, dry: 40% Hematite (hard), 30% Goethite (medium), 30% Goethite (friable)				
1	2		Fill	Poorly sorted silty (30%) GRAVEL (40%), angular to subrounded, fine to coarse, cobbles (30%) up to 60cm, red/brown, moist: 100% Goethite (friable)				
2	3		Fill	Poorly sorted silty (30%) GRAVEL (40%), angular to subrounded, fine to coarse, cobbles (30%) up to 80cm, red/brown, moist: 70% Goethite (friable), 30% glassy Goethite				

TETRA TECH TEST PIT LOGGING SHEET

TP No: 31

Project No: 1296580100

Sheet 1 of 1

Client: Fortescue Metal Group Christmas Creek	Date Started: 14 June 2012
Project Title: FMG Christmas Creek, Vasse Waste Rock Dump Geotechnical Investigation	Dated Completed: 14 June 2012
Location: Vasse WRD, Christmas Creek	Logged By: S Berry

EASTING	NORTHING	RL(m)

Depth(M) From	Depth(M) To	Graphic Log	Classification	Material Description strength, Soil type, particle size, plasticity, moisture state, colour	Moisture Condition	DCP Blows/100mm	Sample Type & ID	General Comments
0	2		Fill	Poorly sorted GRAVEL (50%), angular to subrounded, fine to coarse, cobbles (45%) up to 80cm, trace silt (5%), red/brown, moist: 50% Shale, 50% glassy Goethite				
2	3		Fill	Poorly sorted GRAVEL (50%), angular to subrounded, fine to coarse, cobbles (40%) up to 30cm, trace to minor silt (10%), red/brown, moist: 30% Shale, 40% glassy Goethite, 30% Goethite (friable)				

TETRA TECH TEST PIT LOGGING SHEET

TP No: 33

Project No: 1296580100

Sheet 1 of 1

Client: Fortescue Metal Group Christmas Creek	Date Started: 14 June 2012
Project Title: FMG Christmas Creek, Vasse Waste Rock Dump Geotechnical Investigation	Dated Completed: 14 June 2012
Location: Vasse WRD, Christmas Creek	Logged By: S Berry

EASTING	NORTHING	RL(m)

Depth(M) From	Depth(M) To	Graphic Log	Classification	Material Description strength, Soil type, particle size, plasticity, moisture state, colour	Moisture Condition	DCP Blows/100mm	Sample Type & ID	General Comments
0	1		Natural / Alluvium	Moderately sorted GRAVEL (40%), subangular to subrounded, fine to coarse, cobbles (40%) up to 30cm, some to minor silt (20%), red/brown, dry: 100% glassy Goethite				
1	2		Natural / Alluvium	Moderately sorted GRAVEL (40%), subangular to subrounded, fine to coarse, cobbles (40%) up to 30cm, some to minor silt (20%), red/brown, dry: 100% glassy Goethite				
2				Inferred Bedrock				

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MOISTURE CONTENT TEST REPORT

Test Method : AS1289.2.1.1

Client	Tetratech Pty Ltd	**Report No.**	P 12060524-MC
Project	Christmas Creek	**Test Date**	07/07/2012
		Report Date	10/07/2012

Sample No.	12060524	12060526	12060528	12060530	12060532	12060534	12060536
Client ID	#2	#3	#4	#8	#9	#13	#19
Depth (m)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Moisture Content (%)	3.3	11.5	3.0	6.8	5.2	9	5.6

Sample No.	12060538	12060542	12060544	12060546	12060524	12060526	12060528
Client ID	#21	#26	#30	#33	#2	#3	#4
Depth (m)	1.0	1.0	1.0	1.0	2.0	2.0	2.0
Moisture Content (%)	5.9	6.8	11.3	7.2	2.8	11.3	7.0

Sample No.	12060530	12060532	12060534	12060536	12060538	12060542	12060544
Client ID	#8	#9	#13	#19	#21	#26	#30
Depth (m)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Moisture Content (%)	6.1	7.6	11.2	9.2	8.1	6.7	13.2

NOTES/REMARKS:

Sample/s supplied by the client

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Authorised Signatory

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MOISTURE CONTENT TEST REPORT

Test Method : AS1289.2.1.1

Client	Tetratech Pty Ltd	**Report No.**	P 12060546-MC
Project	Christmas Creek	**Test Date**	07/07/2012
		Report Date	10/07/2012

Sample No.	12060546	12060524	12060526	12060528	12060530	12060532	12060534
Client ID	#33	#2	#3	#4	#8	#9	#13
Depth (m)	2.0	3.0	3.0	3.0	3.0	3.0	3.0
Moisture Content (%)	6.8	3.1	7.7	8.9	5.6	5.8	12.3

Sample No.	12060536	12060538	12060542	12060544			
Client ID	#19	#21	#26	#30			
Depth (m)	3.0	3.0	3.0	3.0			
Moisture Content (%)	8.2	7.9	7.1	11.8			

NOTES/REMARKS:

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PARTICLE SIZE DISTRIBUTION TEST REPORT

Test Method: AS 1289 3.6.1, 2.1.1

Client	Tetratech Pty Ltd	**Report No.**	P 12060523-G
Project	Christmas Creek	**Test Date**	25/07/2012
		Report Date	01/08/2012

Sample No.	12060523	12060529	12060535	12060545			
Client ID	#2	#8	#19	#33			
Depth (m)	0.0-3.0	0.00-3.0	0.00-3.0	0.0-3.0			
Moisture (%)	3.3	6.7	8.7	6.2			
AS SIEVE SIZE (mm)	**PERCENT PASSING**						
150							
75							
53			100				
37.5	100	100	89	100			
26.5	99	92	89	93			
19	97	83	69	77			
9.5	87	76	38	76			
4.75	74	55	14	74			
2.36	59	39	11	52			
1.18	47	29	8	39			
0.600	40	20	6	33			
0.425	38	15	5	31			
0.300	35	13	5	28			
0.150	30	11	3	23			
0.075	24	7	2	19			

NOTES/REMARKS:

Sample/s supplied by the client

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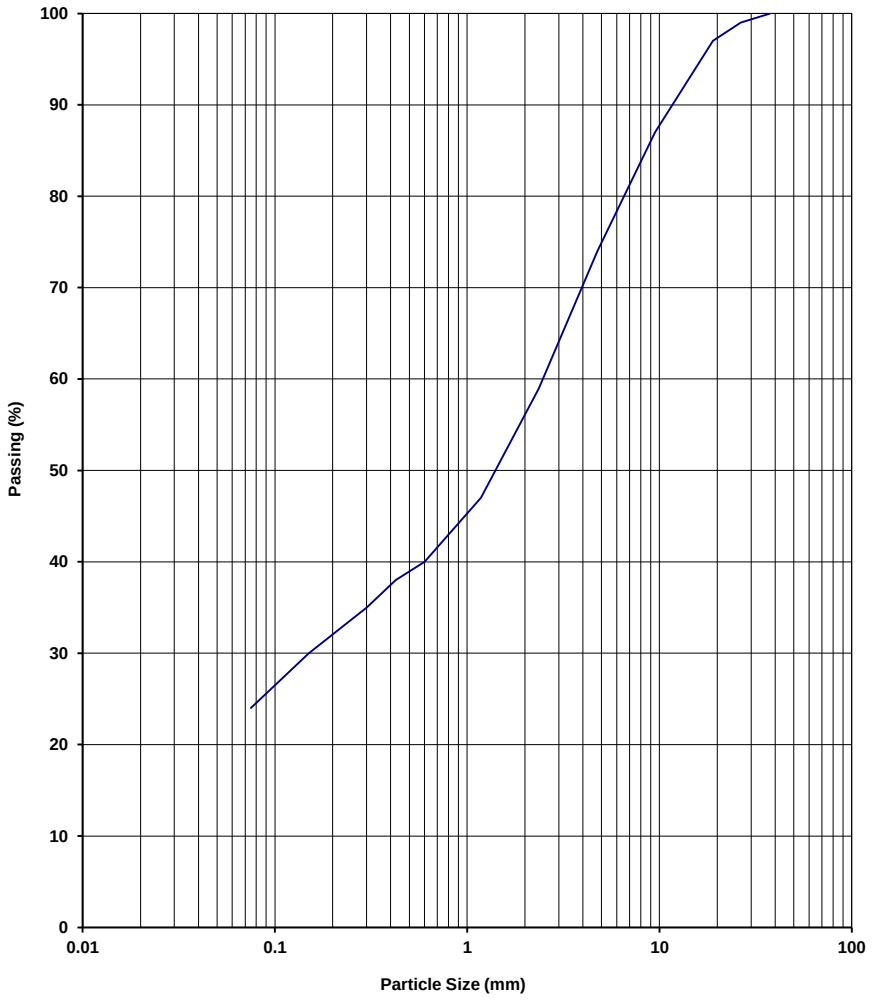
PARTICLE SIZE DISTRIBUTION TEST REPORT

Test Method: AS 1289 3.6.1

Client	Tetratech Pty Ltd	**Report No.**	P 12060523-G
Project	Christmas Creek	**Test Date**	25/7/2012
		Report Date	1/8/2012
Client ID	#2	**Depth (m)**	0.0-3.0

Sieve Size (mm)	Passing %
150.0	
75.0	
53.0	
37.5	100
26.5	99
19.0	97
9.5	87
4.75	74
2.36	59
1.18	47
0.600	40
0.425	38
0.300	35
0.150	30
0.075	24



NOTES/REMARKS:

Moisture Content 3.3%
Sample/s supplied by the client

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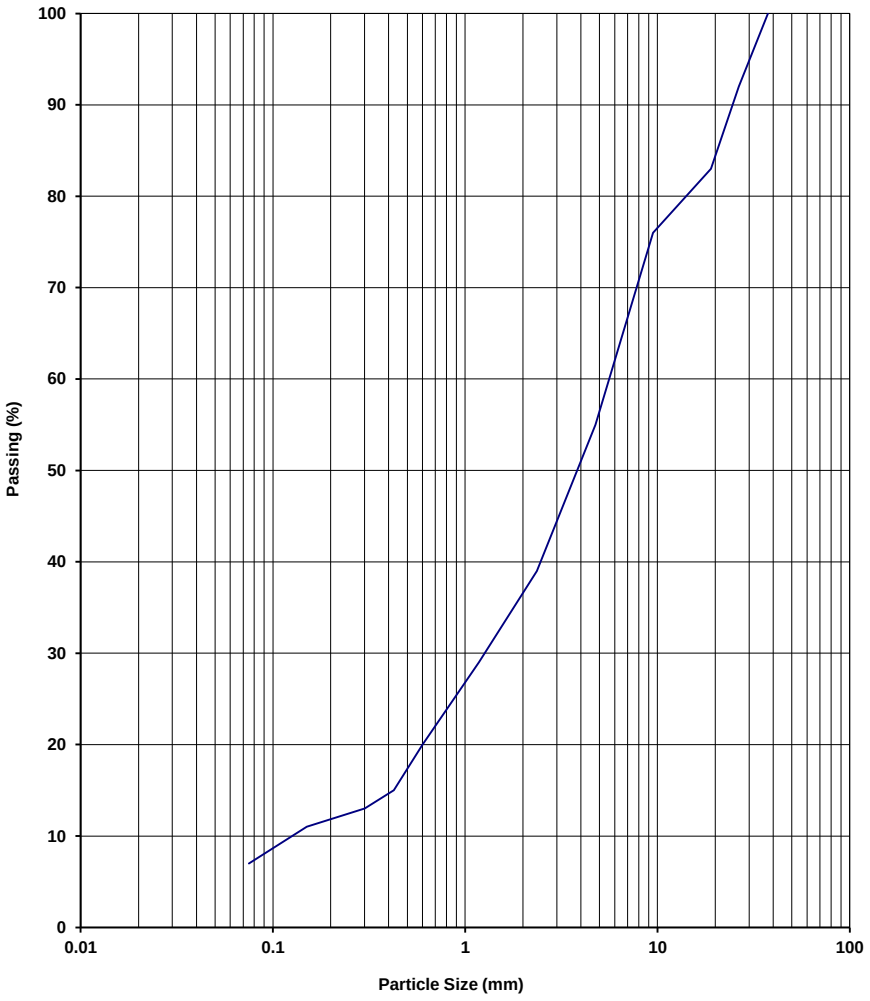
PARTICLE SIZE DISTRIBUTION TEST REPORT

Test Method: AS 1289 3.6.1

Client	Tetratech Pty Ltd	**Report No.**	P 12060529-G
Project	Christmas Creek	**Test Date**	25/7/2012
		Report Date	1/8/2012
Client ID	#8	**Depth (m)**	0.00-3.0

Sieve Size (mm)	Passing %
150.0	
75.0	
53.0	
37.5	100
26.5	92
19.0	83
9.5	76
4.75	55
2.36	39
1.18	29
0.600	20
0.425	15
0.300	13
0.150	11
0.075	7



NOTES/REMARKS:

Moisture Content 6.7%
Sample/s supplied by the client

 REP33901

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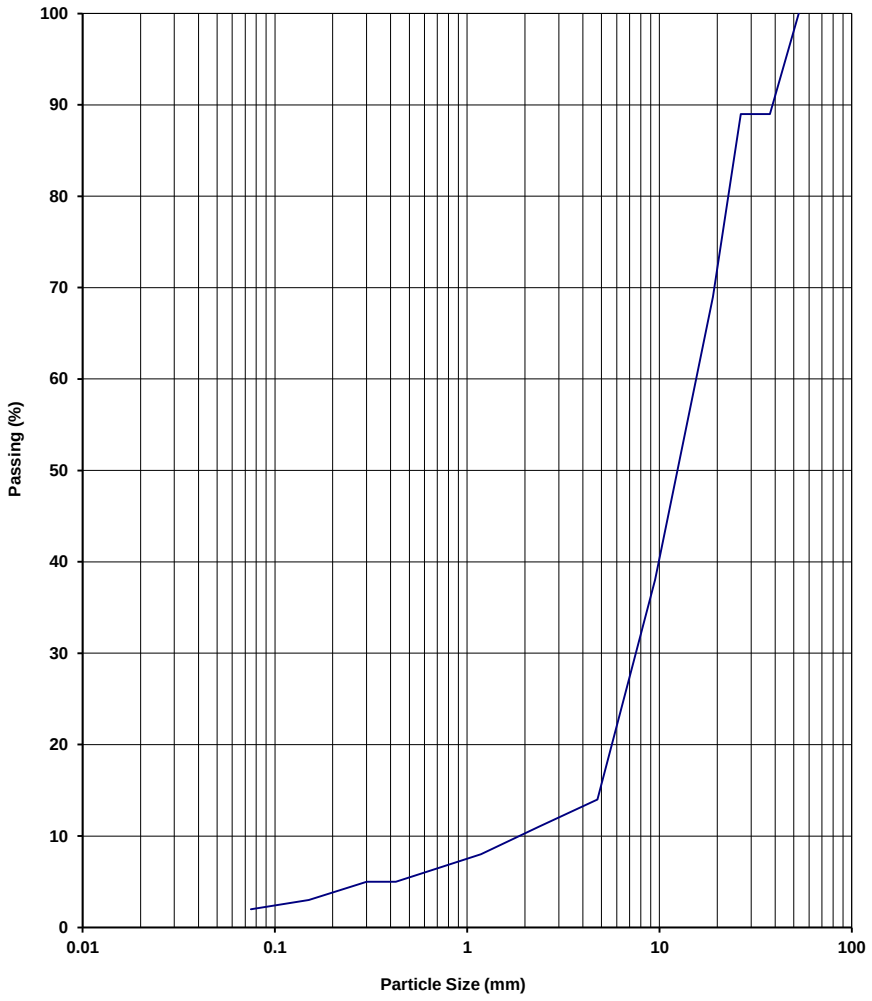
PARTICLE SIZE DISTRIBUTION TEST REPORT

Test Method: AS 1289 3.6.1

Client	Tetratech Pty Ltd	**Report No.**	P 12060535-G
Project	Christmas Creek	**Test Date**	25/7/2012
		Report Date	1/8/2012
Client ID	#19	**Depth (m)**	0.00-3.0

Sieve Size (mm)	Passing %
150.0	
75.0	
53.0	100
37.5	89
26.5	89
19.0	69
9.5	38
4.75	14
2.36	11
1.18	8
0.600	6
0.425	5
0.300	5
0.150	3
0.075	2



NOTES/REMARKS:

Moisture Content 8.7%
Sample/s supplied by the client

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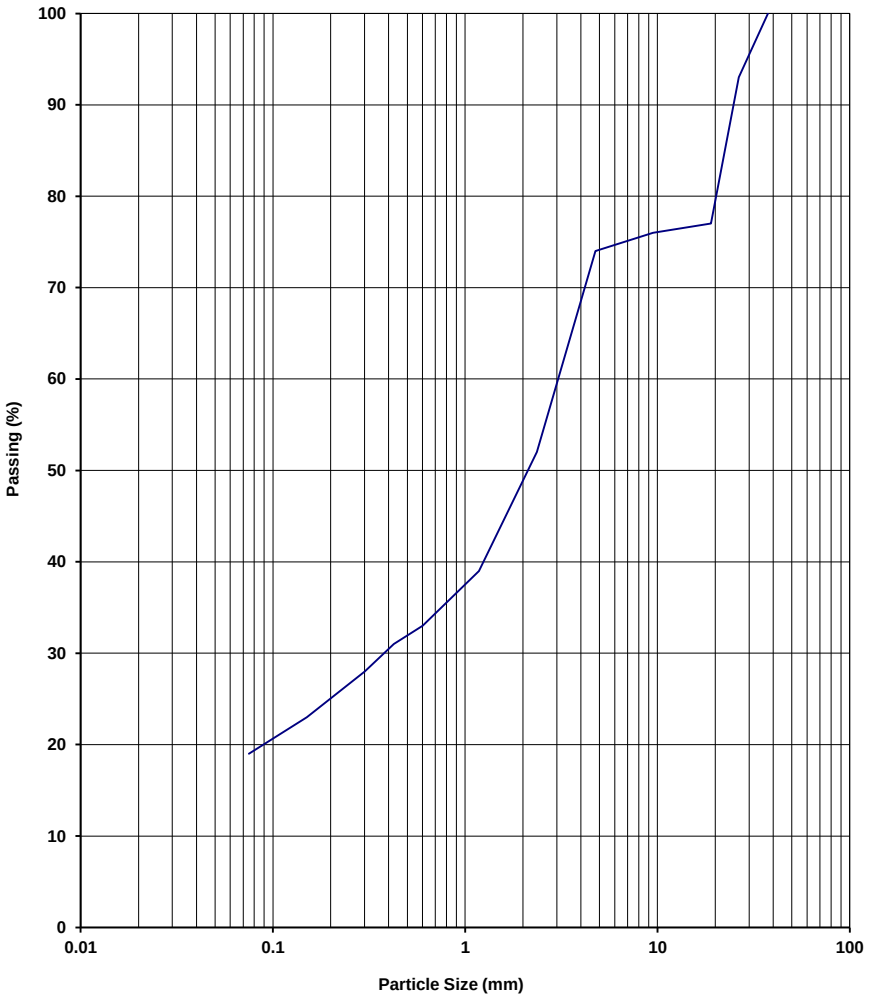
PARTICLE SIZE DISTRIBUTION TEST REPORT

Test Method: AS 1289 3.6.1

Client	Tetratech Pty Ltd	**Report No.**	P 12060545-G
Project	Christmas Creek	**Test Date**	25/7/2012
		Report Date	1/8/2012
Client ID	#33	**Depth (m)**	0.0-3.0

Sieve Size (mm)	Passing %
150.0	
75.0	
53.0	
37.5	100
26.5	93
19.0	77
9.5	76
4.75	74
2.36	52
1.18	39
0.600	33
0.425	31
0.300	28
0.150	23
0.075	19



NOTES/REMARKS:

Moisture Content 6.2%
Sample/s supplied by the client

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ATTERBERG LIMITS TEST REPORT

Test Method: AS 1289 2.1.1, 3.1.1, 3.1.2, 3.2.1, 3.3.1, 3.4.1

Client	Tetratech Pty Ltd	**Report No.**	P 12060523-AL
Project	Christmas Creek	**Test Date**	19/07/2012
		Report Date	25/07/2012

Sample No.	12060523	12060527	12060533	12060537	12060541	12060545
Client ID	#2	#4	#13	#21	#26	#33
Depth (m)	0.0-3.0	0.00-3.0	0.00-3.0	0.00-3.0	0.00-3.0	0.0-3.0
Liquid Limit (%)	22	30	31	NP	31	27
Plastic Limit (%)	13	25	24	NP	21	15
Plasticity Index (%)	9	5	7	NP	10	12
Linear Shrinkage (%)	3.0*	2.0	1.5*	1.0	4.5*	5.5
Field Moisture Content (%)	3.3	9.9	11.1	8.4	10.2	6.2

NOTES/REMARKS: The samples were tested oven dried, dry sieved and in a 125-250mm mould.
NP=Non Plastic

Sample/s supplied by the client * Crumbling occurred + Curling occurred

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EMERSON CLASS NUMBER TEST REPORT

Test Method: AS 1289 3.8.1

Client	Tetratech Pty Ltd	**Report No.**	P 12060523-EM
Project	Christmas Creek	**Test Date**	17/07/2012
		Report Date	25/07/2012

Sample No.	12060523	12060531	12060537	12060545			
Client ID	#2	#9	#21	#33			
Depth (m)	0.0-3.0	0.00-3.0	0.00-3.0	0.0-3.0			
Description	Red Sand	Red Sand	Brown Sand	Red Sand			
Emerson Class Number	**5**	**5**	**6**	**5**			

NOTES/REMARKS:

Sample/s supplied by the client

Tested with Distilled water at 21°C

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PERMEABILITY BY FALLING HEAD TEST REPORT

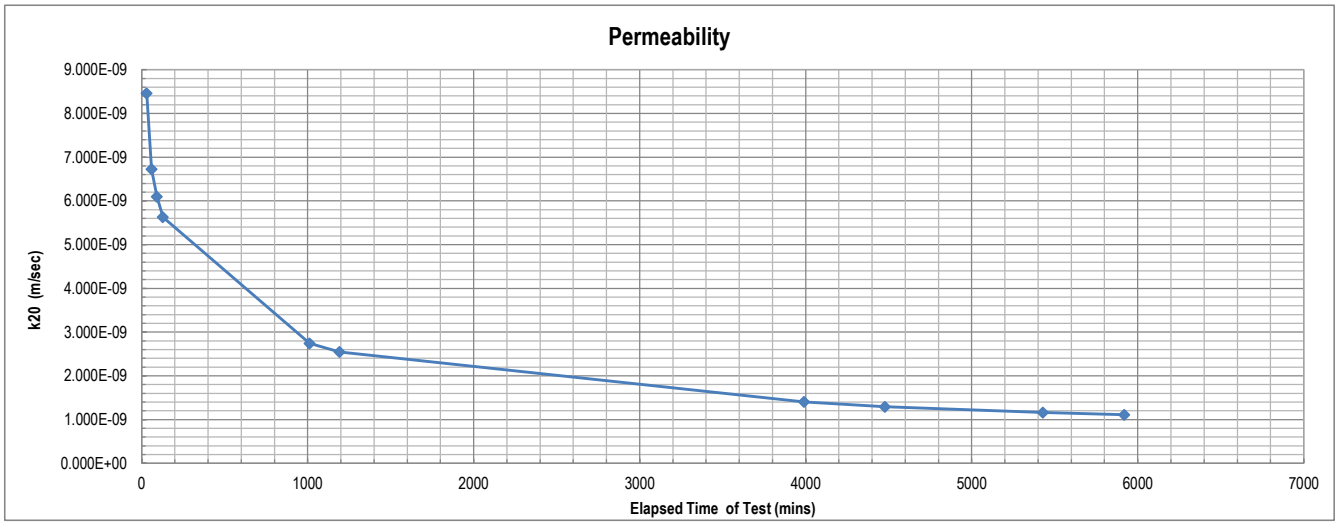
Test Method AS 1289 6.7.2, 5.1.1 , KH2 (Based on K H Head (1988) Manual of Laboratory Testing,10.7)

Client	Tetratech Pty Ltd	**Report No.**	P 12060523-FHPT
Project	Christmas Creek	**Test Date**	10/08/2012
		Report Date	14/08/2012
Client ID	#2	**Depth (m)**	0.0-3.0
Description	Brown Lightly Gravelled Sandy Silt	**Sample Type**	Disturbed

RESULTS OF TESTING

Compaction Method	**AS1289.5.1.1 - Standard Compaction**		
Maximum Dry Density (t/m^3)	**2.53**	Hydraulic Gradient	**15.3**
Optimum Moisture Content (%)	**9.5**	Surcharge (kPa)	**2.9**
Placement Moisture Content (%)	**9.6**	Head Pressure Applied (kPa)	**11.62**
Moisture Ratio (%)	**100.6**	Water Type	**Distilled**
Placement Wet Density (t/m^3)	**2.72**	Percentage Material Retained/Sieve Size (mm)	**0 % on 19 mm**
Density Ratio (%)	**98.0**	Sample Height and Diameter (mm)	**77.6 by 101.4 mm**

PERMEABILITY $k_{(20)}$ = 1.1E-09 (m/sec)



Remarks: The above specimen was remoulded to a target of 98% of Standard Dry Density and at 102% of Optimum Moisture Content.

Sample/s supplied by client | The compaction data was supplied by the client. | Tested as received | **Page: 1 of 1** | REP36301

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Authorised Signatory
G. Hamilton

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PERMEABILITY BY FALLING HEAD TEST REPORT

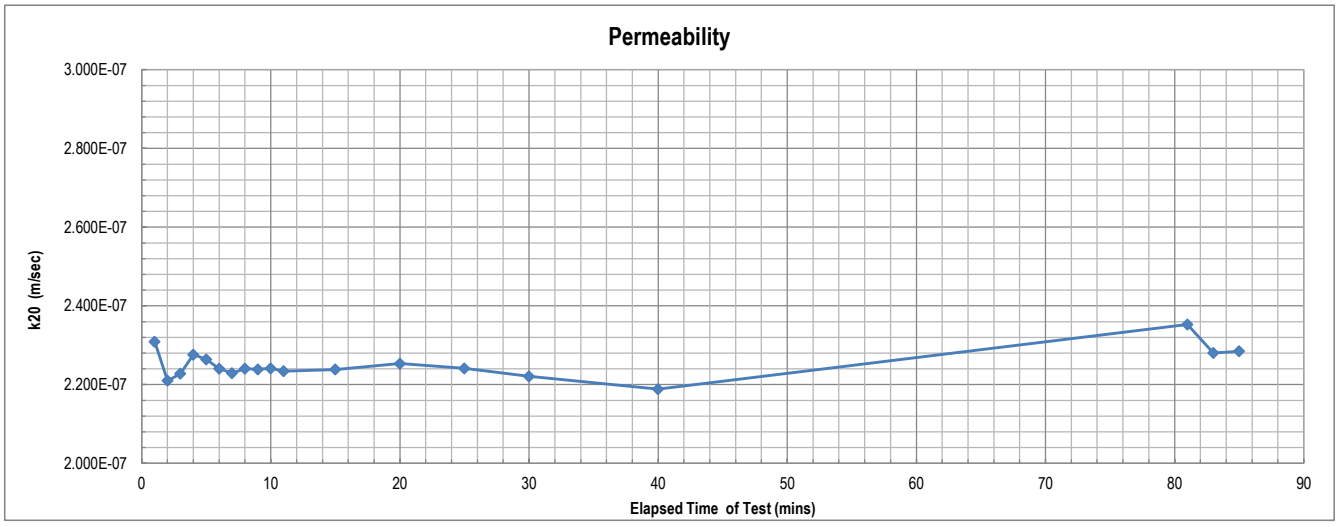
Test Method AS 1289 6.7.2, 5.1.1 , KH2 (Based on K H Head (1988) Manual of Laboratory Testing,10.7)

Client	Tetratech Pty Ltd	**Report No.**	P 12060529-FHPT
Project	Christmas Creek	**Test Date**	0/01/1900
		Report Date	0/01/1900
Client ID	#8	**Depth (m)**	0.00-3.0
Description	Brown Slity Sandy Gravell	**Sample Type**	Disturbed

RESULTS OF TESTING

Compaction Method	**AS1289.5.1.1 - Standard Compaction**		
Maximum Dry Density (t/m^3)	**2.59**	Hydraulic Gradient	**6.9**
Optimum Moisture Content (%)	**11.5**	Surcharge (kPa)	**2.7**
Placement Moisture Content (%)	**11.6**	Head Pressure Applied (kPa)	**12.12**
Moisture Ratio (%)	**101.3**	Water Type	**Distilled**
Placement Wet Density (t/m^3)	**2.83**	Percentage Material Retained/Sieve Size (mm)	**0 % on 19 mm**
Density Ratio (%)	**97.9**	Sample Height and Diameter (mm)	**177.9 by 152 mm**

PERMEABILITY $k_{(20)}$ = 2.3E-07 (m/sec)



Remarks: The above specimen was remoulded to a target of 98% of Standard Dry Density and at 102% of Optimum Moisture Content.

Sample/s supplied by client | The compaction data was supplied by the client. | Tested as received | **Page: 1 of 1** | REP36301

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PERMEABILITY BY FALLING HEAD TEST REPORT

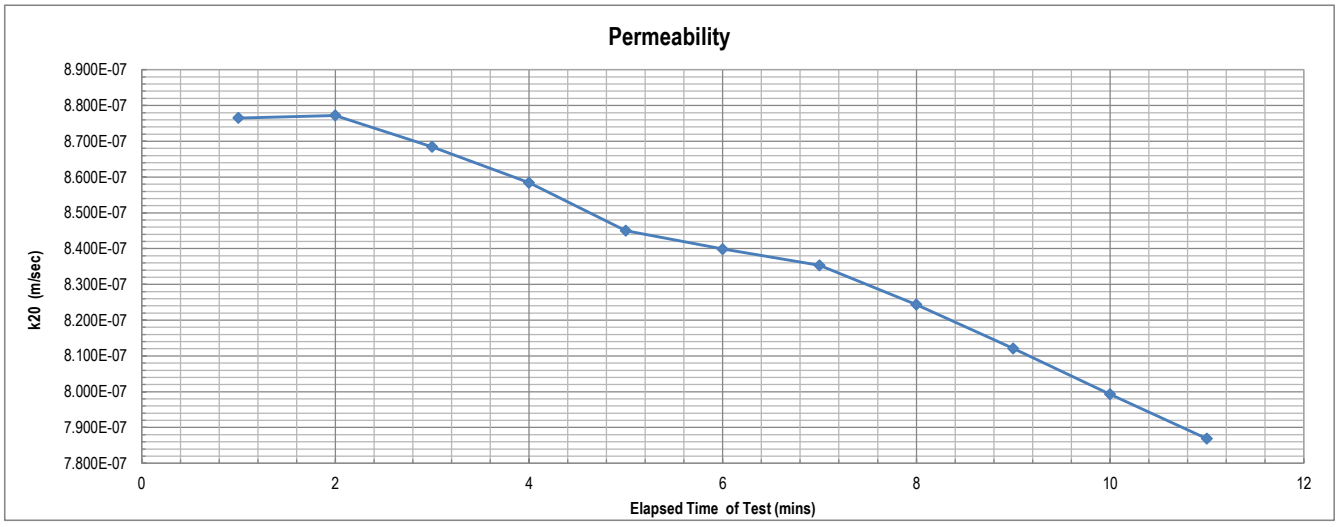
Test Method AS 1289 6.7.2, 5.1.1 , KH2 (Based on K H Head (1988) Manual of Laboratory Testing,10.7)

Client	Tetratech Pty Ltd	**Report No.**	P 12060541-FHPT
Project	Christmas Creek	**Test Date**	18/08/2012
		Report Date	14/08/2012
Client ID	#26	**Depth (m)**	0.00-3.0
Description	Brown Silty Sandy Gravell	**Sample Type**	Disturbed

RESULTS OF TESTING

Compaction Method	**AS1289.5.1.1 - Standard Compaction**		
Maximum Dry Density (t/m^3)	**2.51**	Hydraulic Gradient	**10.6**
Optimum Moisture Content (%)	**10.0**	Surcharge (kPa)	**0.0**
Placement Moisture Content (%)	**10.2**	Head Pressure Applied (kPa)	**12.12**
Moisture Ratio (%)	**102.0**	Water Type	**Distilled**
Placement Wet Density (t/m^3)	**2.71**	Percentage Material Retained/Sieve Size (mm)	**0 % on 19 mm**
Density Ratio (%)	**97.8**	Sample Height and Diameter (mm)	**116.6 by 152.4 mm**

PERMEABILITY $k_{(20)}$ = 8.4E-07 (m/sec)



Remarks: The above specimen was remoulded to a target of 98% of Standard Dry Density and at 102% of Optimum Moisture Content.

Sample/s supplied by client | The compaction data was supplied by the client. | Tested as received

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PERMEABILITY BY FALLING HEAD TEST REPORT

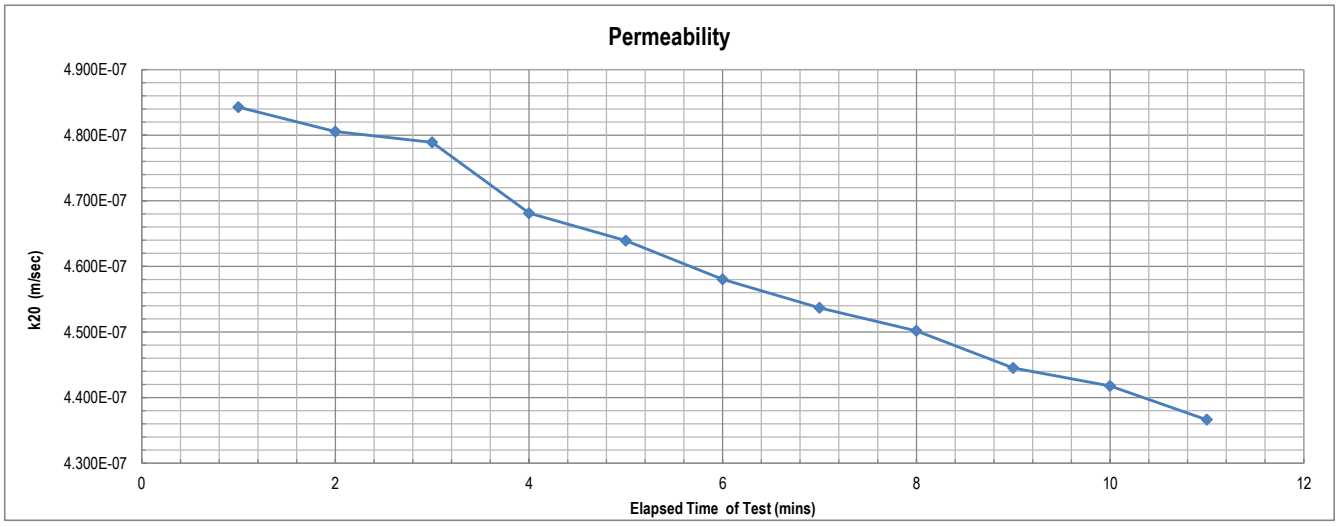
Test Method AS 1289 6.7.2, 5.1.1 , KH2 (Based on K H Head (1988) Manual of Laboratory Testing,10.7)

Client	Tetratech Pty Ltd	**Report No.**	P 12060543-FHPT
Project	Christmas Creek	**Test Date**	17/08/2012
		Report Date	13/08/2012
Client ID	#30	**Depth (m)**	0.00-3.0
Description	Brown Silty Sandy Gravell	**Sample Type**	Disturbed

RESULTS OF TESTING

Compaction Method	**AS1289.5.1.1 - Standard Compaction**		
Maximum Dry Density (t/m^3)	**2.32**	Hydraulic Gradient	**10.6**
Optimum Moisture Content (%)	**14.0**	Surcharge (kPa)	**0.0**
Placement Moisture Content (%)	**14.2**	Head Pressure Applied (kPa)	**12.12**
Moisture Ratio (%)	**101.2**	Water Type	**Distilled**
Placement Wet Density (t/m^3)	**2.59**	Percentage Material Retained/Sieve Size (mm)	**0 % on 19 mm**
Density Ratio (%)	**97.9**	Sample Height and Diameter (mm)	**116.6 by 152.4 mm**

PERMEABILITY $k_{(20)}$ = 4.6E-07 (m/sec)



Remarks: The above specimen was remoulded to a target of 98% of Standard Dry Density and at 102% of Optimum Moisture Content.

Sample/s supplied by client | The compaction data was supplied by the client. | Tested as received | **Page: 1 of 1** | REP36301

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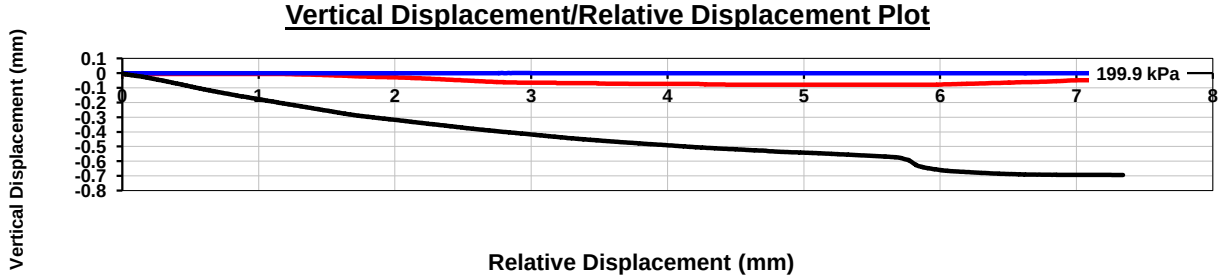
DIRECT SHEAR TEST REPORT

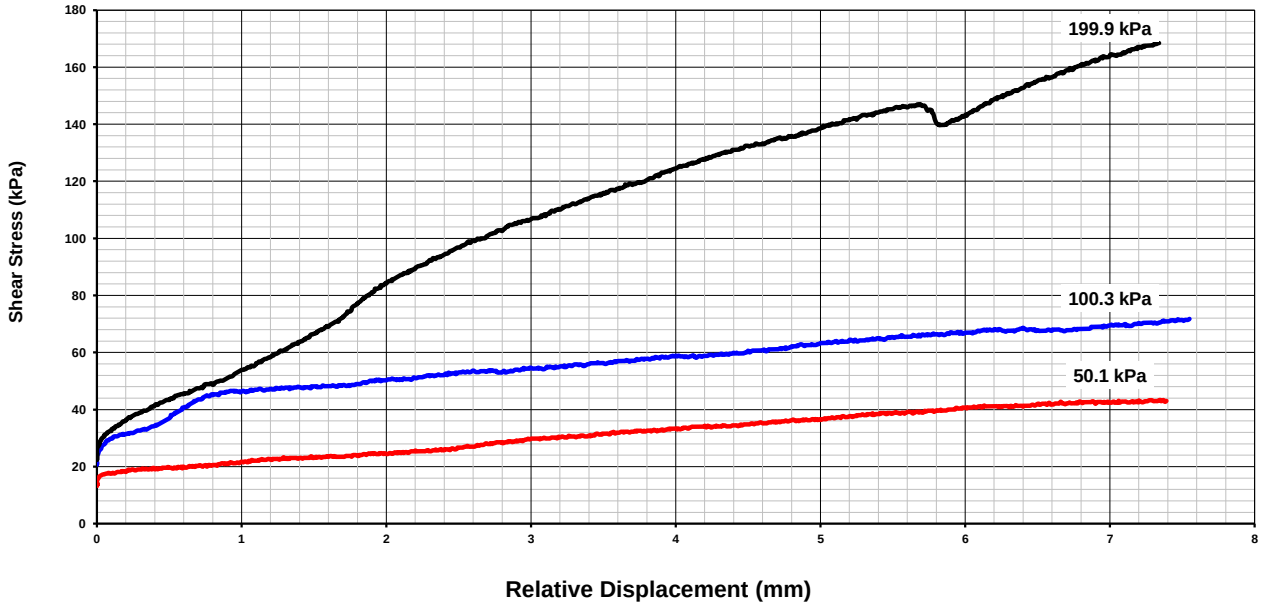
Test Method: AS 1289.6.2.2 / KH2 based on K.H. Head Vol. 2

Client	Tetra Tech Australia Pty Ltd	**Report No.**	12080180- DS
Project	Christmas Creek	**Test Date**	6/08/2012
		Report Date	14/08/2012
Client ID	Sample #3	**Depth (m)**	0.00-3.00
Description		**Sample Type**	Three individual -4.75mm specimens - remoulded as requested by the client
Failure Criteria		**Residual @ 7 mm Displacement**	

Vertical Displacement/Relative Displacement Plot



Shear Stress/Displacement Plot



Notes/Remarks: Please review the results if the Cohesion is above 2 kPa when plotted with a line of best fit.
Note: Area correction based on square sample equation.

Graph not to scale — Sample/s supplied by the client

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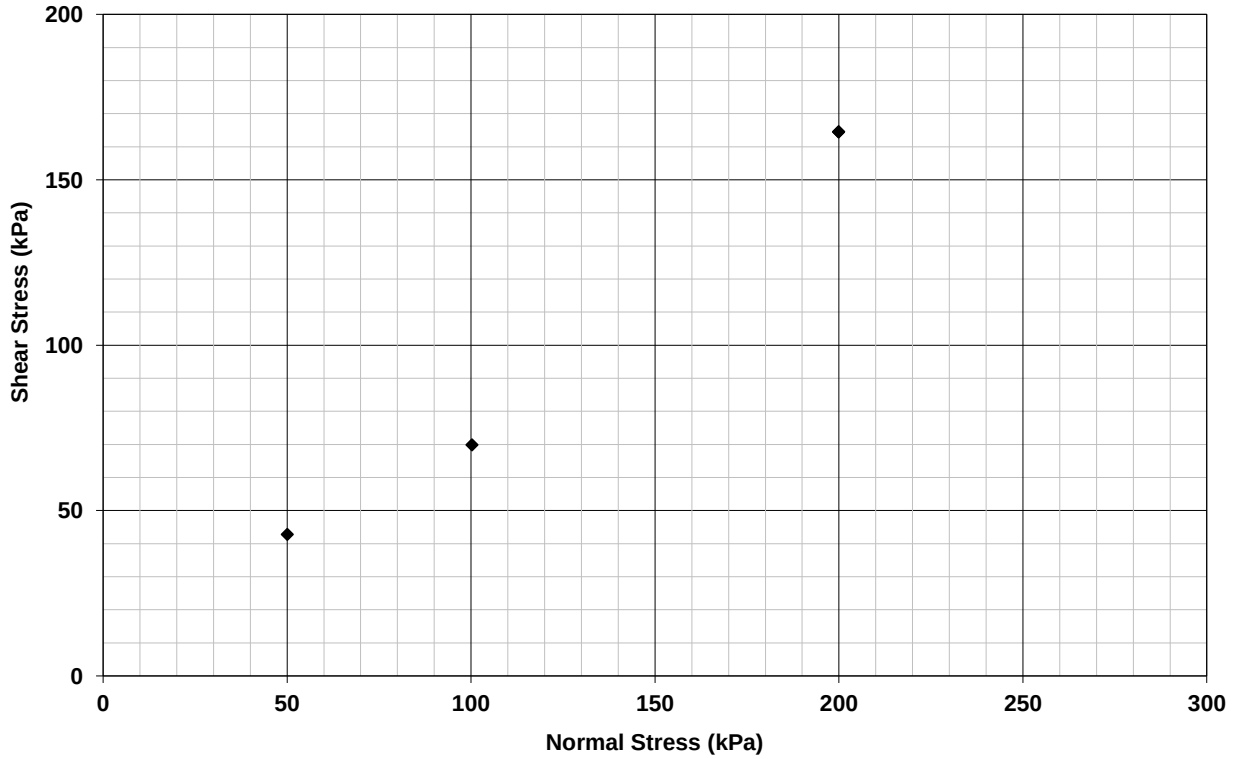
DIRECT SHEAR TEST REPORT

Test Method: AS 1289.6.2.2 / KH2 based on K.H. Head Vol. 2

Client	Tetra Tech Australia Pty Ltd	**Report No.**	12080180- DS
Project	Christmas Creek	**Test Date**	6/08/2012
		Report Date	14/08/2012
Client ID	Sample #3	**Depth (m)**	0.00-3.00
Description		**Sample Type**	Three individual -4.75mm specimens - remoulded as requested by the client
Failure Criteria		**Residual @ 7 mm Displacement**	

Residual - Normal Stress vs Shear Stress



Shear Angle (°)	**39.0**	#	**Cohesion (kPa)**	**0.0**	**# Hand drawn through the origin**
Specimen Condition	Inundated		Normal Stress (kPa)		Shear Stress (kPa)
Specimen Dimensions (mm)	60*60		Stage 1	50.1	42.8
Rate of Strain (mm/min)	0.008		Stage 2	100.3	69.9
Initial Moisture Content (%)	17.6		Stage 3	199.9	164.5
Initial Wet Density(t/m^3)	2.50				

Notes/Remarks: Please review the results if the Cohesion is above 2 kPa when plotted with a line of best fit.
Note: Area correction based on square sample equation.

Graph not to scale — Sample/s supplied by the client

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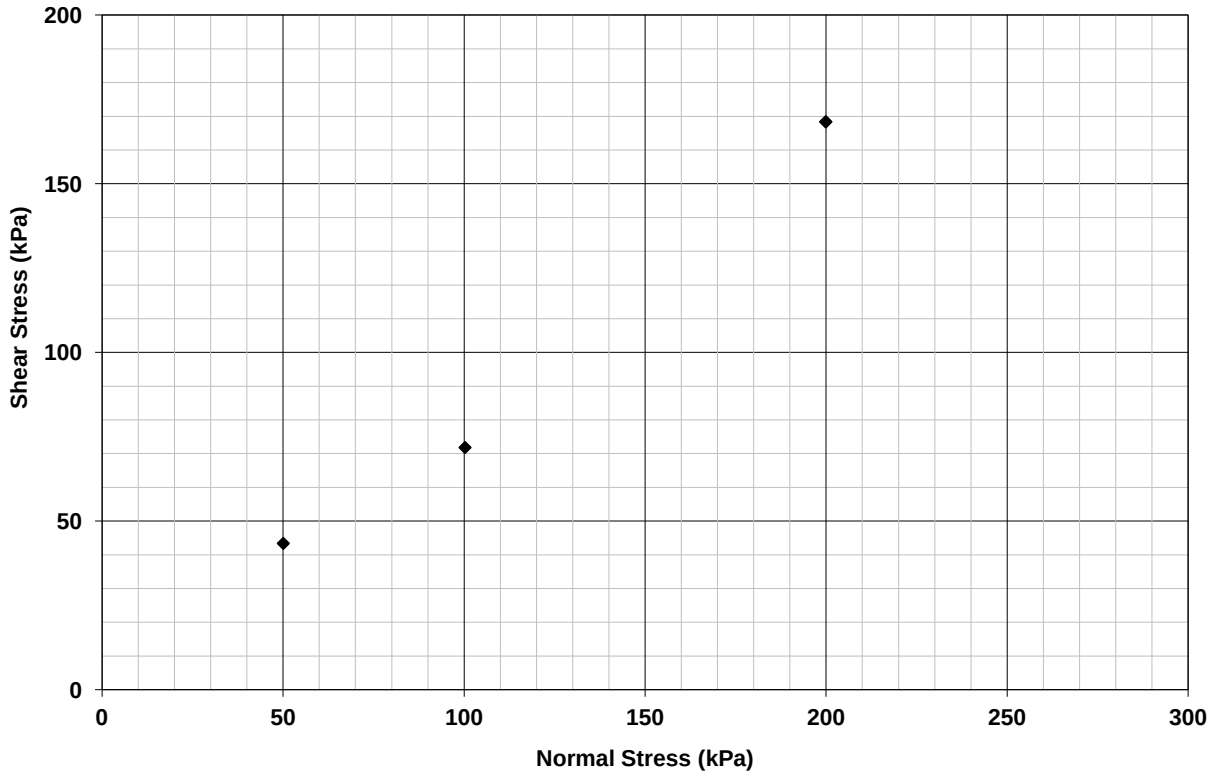
DIRECT SHEAR TEST REPORT

Test Method: AS 1289.6.2.2 / KH2 based on K.H. Head Vol. 2

Client	Tetra Tech Australia Pty Ltd	**Report No.**	12080180- DS
Project	Christmas Creek	**Test Date**	6/08/2012
		Report Date	14/08/2012
Client ID	Sample #3	**Depth (m)**	0.00-3.00
Description		**Sample Type**	Three individual -4.75mm specimens - remoulded as requested by the client
Failure Criteria		**Peak**	

Peak - Normal Stress vs Shear Stress



Shear Angle (°)	**40.0**	#	**Cohesion (kPa)**	**0.0**	**# Hand drawn through the origin**
Specimen Condition	Inundated		Normal Stress (kPa)		Shear Stress (kPa)
Specimen Dimensions (mm)	60*60		Stage 1	50.1	43.4
Rate of Strain (mm/min)	0.008		Stage 2	100.3	71.8
Initial Moisture Content (%)	17.6		Stage 3	199.9	168.4
Initial Wet Density(t/m^3)	2.50				

Notes/Remarks: Please review the results if the Cohesion is above 2 kPa when plotted with a line of best fit.
Note: Area correction based on square sample equation.

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DIRECT SHEAR TEST REPORT

Test Method: AS 1289.6.2.2 / KH2 based on K.H. Head Vol. 2

Client	Tetra Tech Australia Pty Ltd	**Report No.**	12080180- DS
Project	Christmas Creek	**Test Date**	6/08/2012
		Report Date	14/08/2012
Client ID	Sample #3	**Depth (m)**	0.00-3.00
Description		**Sample Type**	Three individual -4.75mm specimens - remoulded as requested by the client

Notes/Remarks: Please review the results if the Cohesion is above 2 kPa when plotted with a line of best fit.
Note: Area correction based on square sample equation.

Photo not to scale — Sample/s supplied by the client

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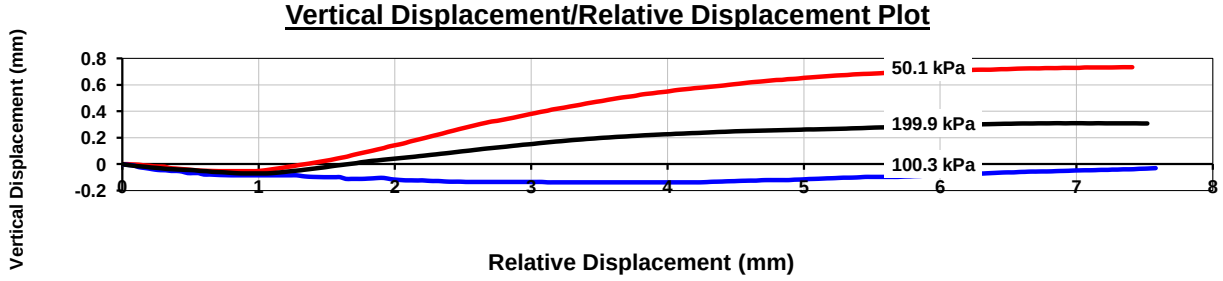
DIRECT SHEAR TEST REPORT

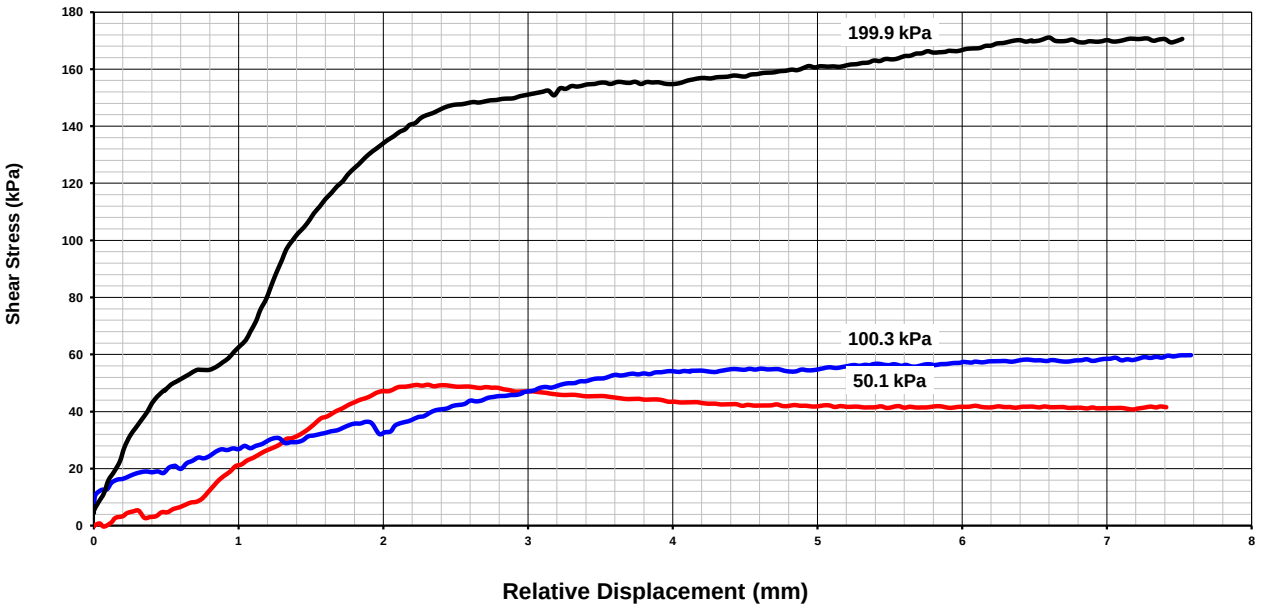
Test Method: AS 1289.6.2.2 / KH2 based on K.H. Head Vol. 2

Client	Tetra Tech Australia Pty Ltd	**Report No.**	12080181- DS
Project	Christmas Creek	**Test Date**	8/08/2012
		Report Date	14/08/2012
Client ID	Sample #9	**Depth (m)**	0.00-3.00
Description		**Sample Type**	Three individual -4.75mm specimens - remoulded as requested by the client
Failure Criteria		**Residual @ 5.5 mm Displacement**	

Vertical Displacement/Relative Displacement Plot



Shear Stress/Displacement Plot



Notes/Remarks: Please review the results if the Cohesion is above 2 kPa when plotted with a line of best fit
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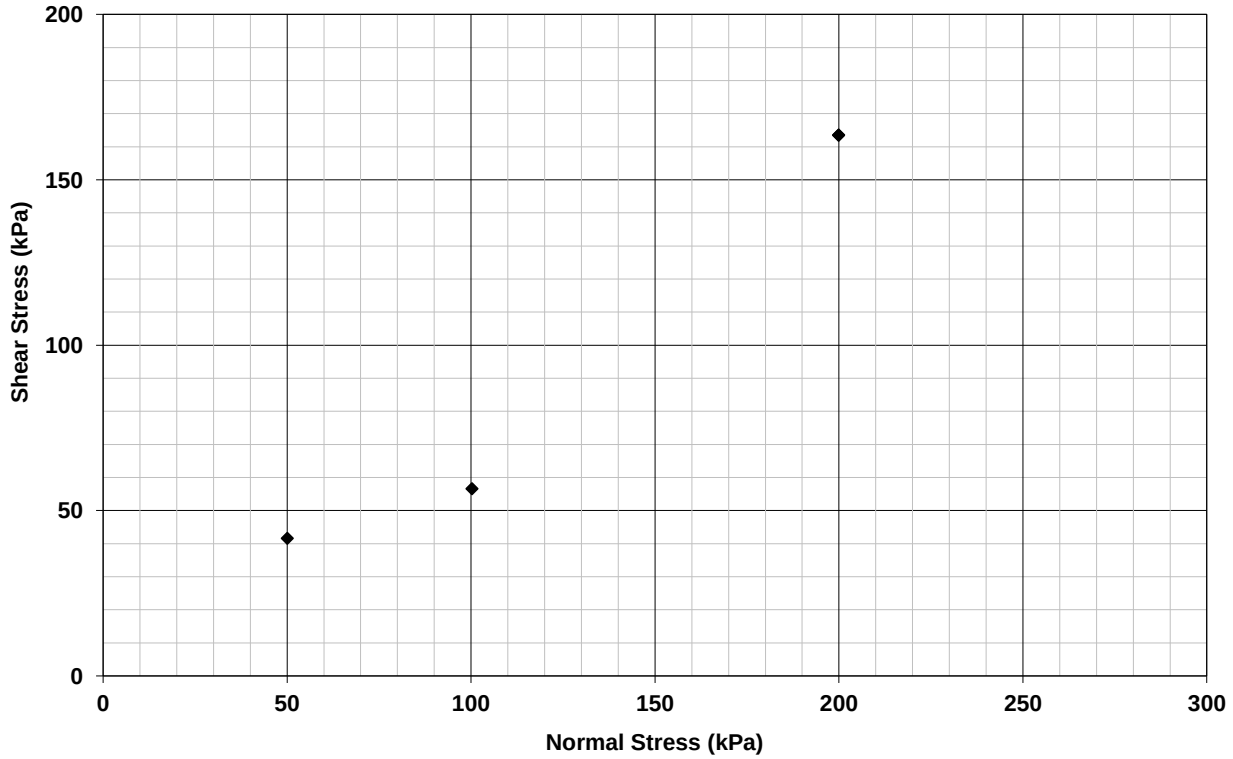
DIRECT SHEAR TEST REPORT

Test Method: AS 1289.6.2.2 / KH2 based on K.H. Head Vol. 2

Client	Tetra Tech Australia Pty Ltd	**Report No.**	12080181- DS
Project	Christmas Creek	**Test Date**	8/08/2012
		Report Date	14/08/2012
Client ID	Sample #9	**Depth (m)**	0.00-3.00
Description		**Sample Type**	Three individual -4.75mm specimens - remoulded as requested by the client
Failure Criteria	**Residual @ 5.5 mm Displacement**		

Residual - Normal Stress vs Shear Stress



Shear Angle (°)	**39.0**	#	**Cohesion (kPa)**	**0.0**	**# Hand drawn through the origin**
Specimen Condition	Inundated		Normal Stress (kPa)		Shear Stress (kPa)
Specimen Dimensions (mm)	60*60		Stage 1	50.1	41.6
Rate of Strain (mm/min)	0.060		Stage 2	100.3	56.6
Initial Moisture Content (%)	9.3		Stage 3	199.9	163.5
Initial Wet Density(t/m^3)	2.87				

Notes/Remarks: Please review the results if the Cohesion is above 2 kPa when plotted with a line of best fit
Note: Area correction based on square sample equation.

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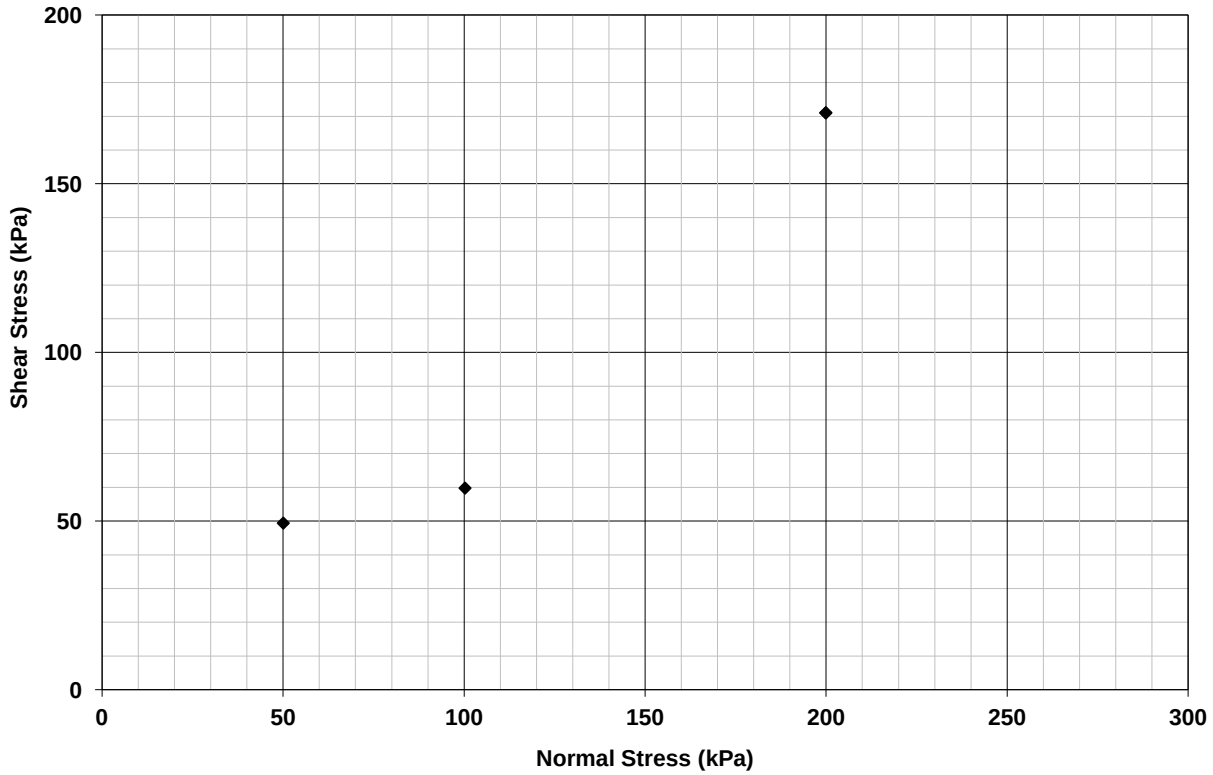
DIRECT SHEAR TEST REPORT

Test Method: AS 1289.6.2.2 / KH2 based on K.H. Head Vol. 2

Client	Tetra Tech Australia Pty Ltd	**Report No.**	12080181- DS
Project	Christmas Creek	**Test Date**	8/08/2012
		Report Date	14/08/2012
Client ID	Sample #9	**Depth (m)**	0.00-3.00
Description		**Sample Type**	Three individual -4.75mm specimens - remoulded as requested by the client
Failure Criteria		**Peak**	

Peak - Normal Stress vs Shear Stress



Shear Angle (°)	**40.5**	#	**Cohesion (kPa)**	**0.0**	**# Hand drawn through the origin**
Specimen Condition	Inundated		Normal Stress (kPa)		Shear Stress (kPa)
Specimen Dimensions (mm)	60*60		Stage 1	50.1	49.4
Rate of Strain (mm/min)	0.060		Stage 2	100.3	59.8
Initial Moisture Content (%)	9.3		Stage 3	199.9	171.0
Initial Wet Density(t/m^3)	2.87				

Notes/Remarks: Please review the results if the Cohesion is above 2 kPa when plotted with a line of best fit
Note: Area correction based on square sample equation.

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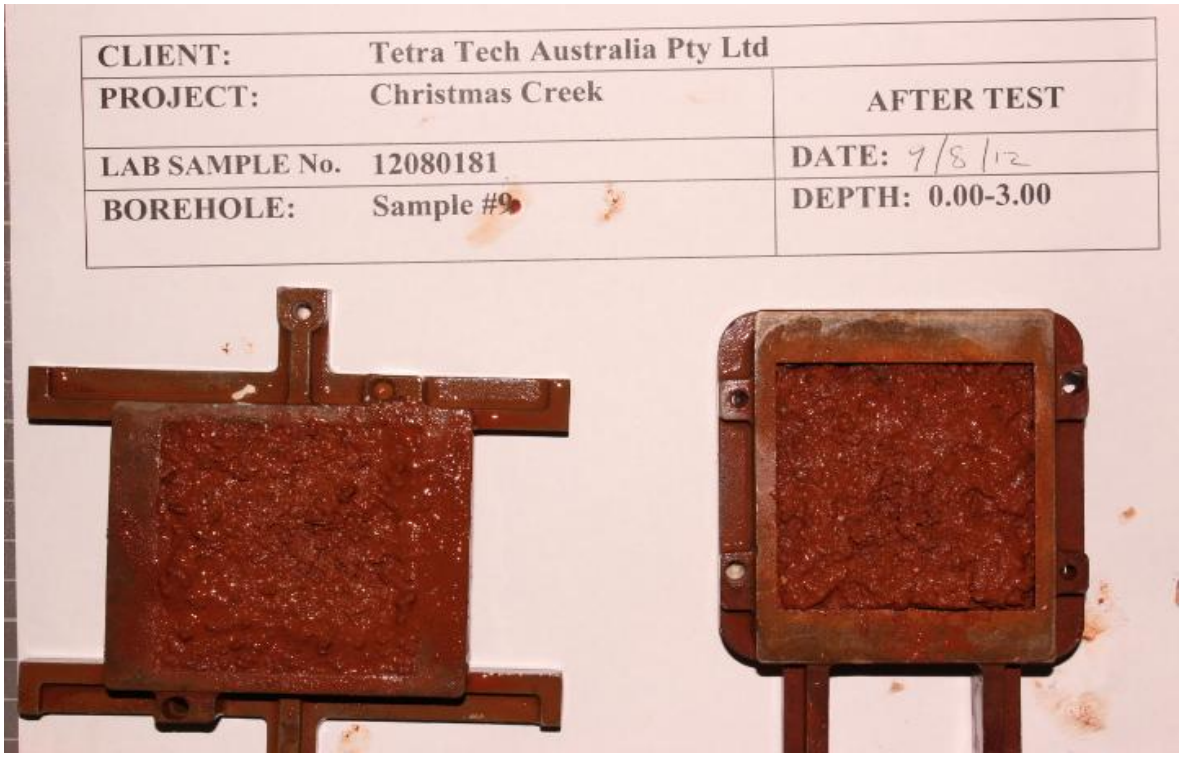
DIRECT SHEAR TEST REPORT

Test Method: AS 1289.6.2.2 / KH2 based on K.H. Head Vol. 2

Client	Tetra Tech Australia Pty Ltd	**Report No.**	12080181- DS
Project	Christmas Creek	**Test Date**	8/08/2012
		Report Date	14/08/2012
Client ID	Sample #9	**Depth (m)**	0.00-3.00
Description		**Sample Type**	Three individual -4.75mm specimens - remoulded as requested by the client



Notes/Remarks: Please review the results if the Cohesion is above 2 kPa when plotted with a line of best fit
Note: Area correction based on square sample equation.

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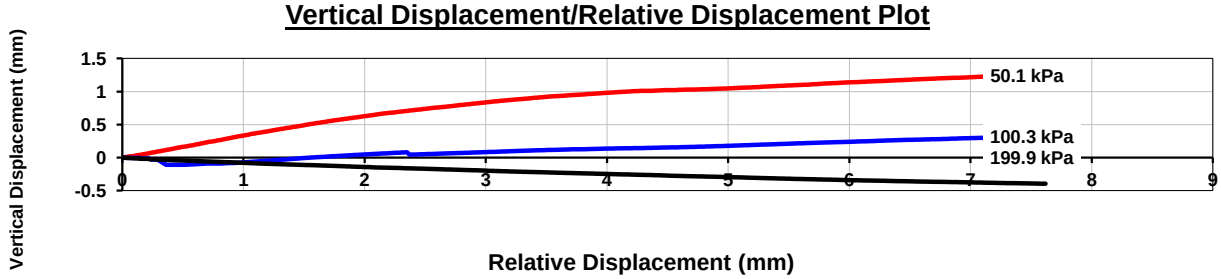
DIRECT SHEAR TEST REPORT

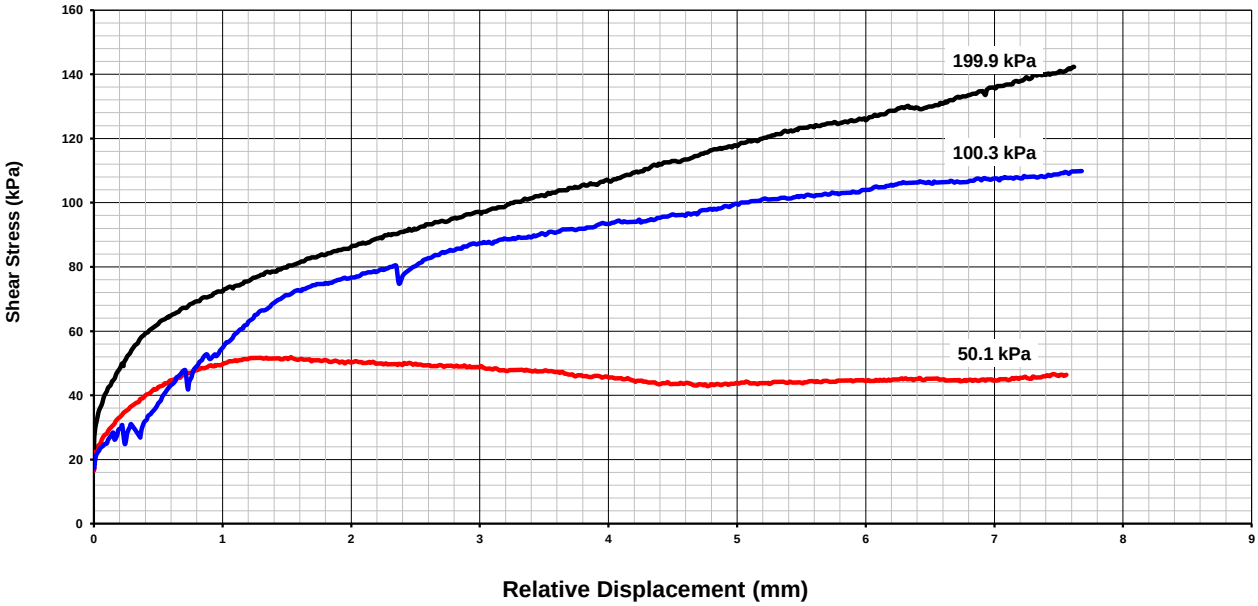
Test Method: AS 1289.6.2.2 / KH2 based on K.H. Head Vol. 2

Client	Tetra Tech Australia Pty Ltd	**Report No.**	12080182- DS
Project	Christmas Creek	**Test Date**	9/08/2012
		Report Date	14/08/2012
Client ID	Sample #21	**Depth (m)**	0.00-3.00
Description		**Sample Type**	Three individual -4.75mm specimens - remoulded as requested by the client
Failure Criteria		**Residual @ 7 mm Displacement**	

Vertical Displacement/Relative Displacement Plot



Shear Stress/Displacement Plot



Notes/Remarks: Please review the results if the Cohesion is above 2 kPa when plotted with a line of best fit
Note: Area correction based on square sample equation.

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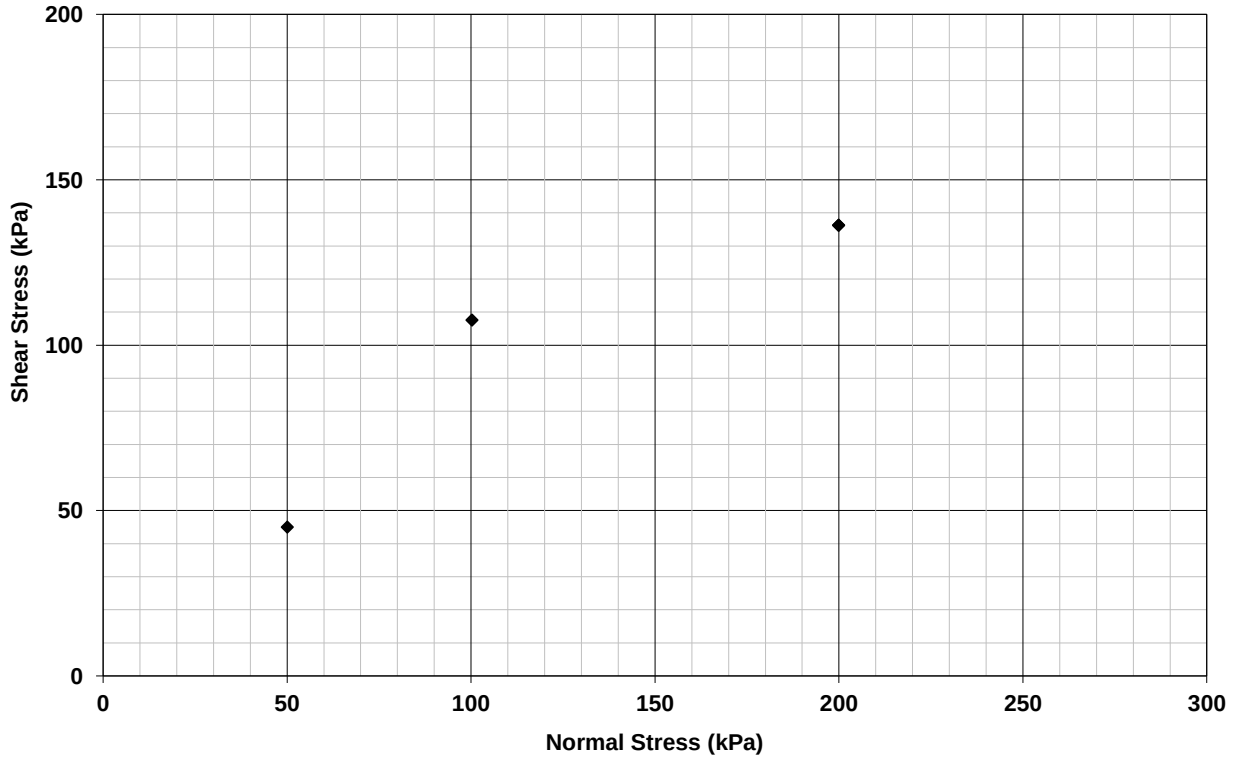
DIRECT SHEAR TEST REPORT

Test Method: AS 1289.6.2.2 / KH2 based on K.H. Head Vol. 2

Client	Tetra Tech Australia Pty Ltd	**Report No.**	12080182- DS
Project	Christmas Creek	**Test Date**	9/08/2012
		Report Date	14/08/2012
Client ID	Sample #21	**Depth (m)**	0.00-3.00
Description		**Sample Type**	Three individual -4.75mm specimens - remoulded as requested by the client
Failure Criteria	**Residual @ 7 mm Displacement**		

Residual - Normal Stress vs Shear Stress



Shear Angle (°)	**28.3**	**Cohesion (kPa)**	**32.3**	**R^2**	**0.936**
Specimen Condition	As Received	Normal Stress (kPa)		Shear Stress (kPa)	
Specimen Dimensions (mm)	60*60	Stage 1	50.1	45.0	
Rate of Strain (mm/min)	0.008	Stage 2	100.3	107.6	
Initial Moisture Content (%)	12.4	Stage 3	199.9	136.3	
Initial Wet Density(t/m^3)	2.72				

Notes/Remarks: Please review the results if the Cohesion is above 2 kPa when plotted with a line of best fit
Note: Area correction based on square sample equation.

Graph not to scale — Sample/s supplied by the client

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Authorised Signatory
J. Russell

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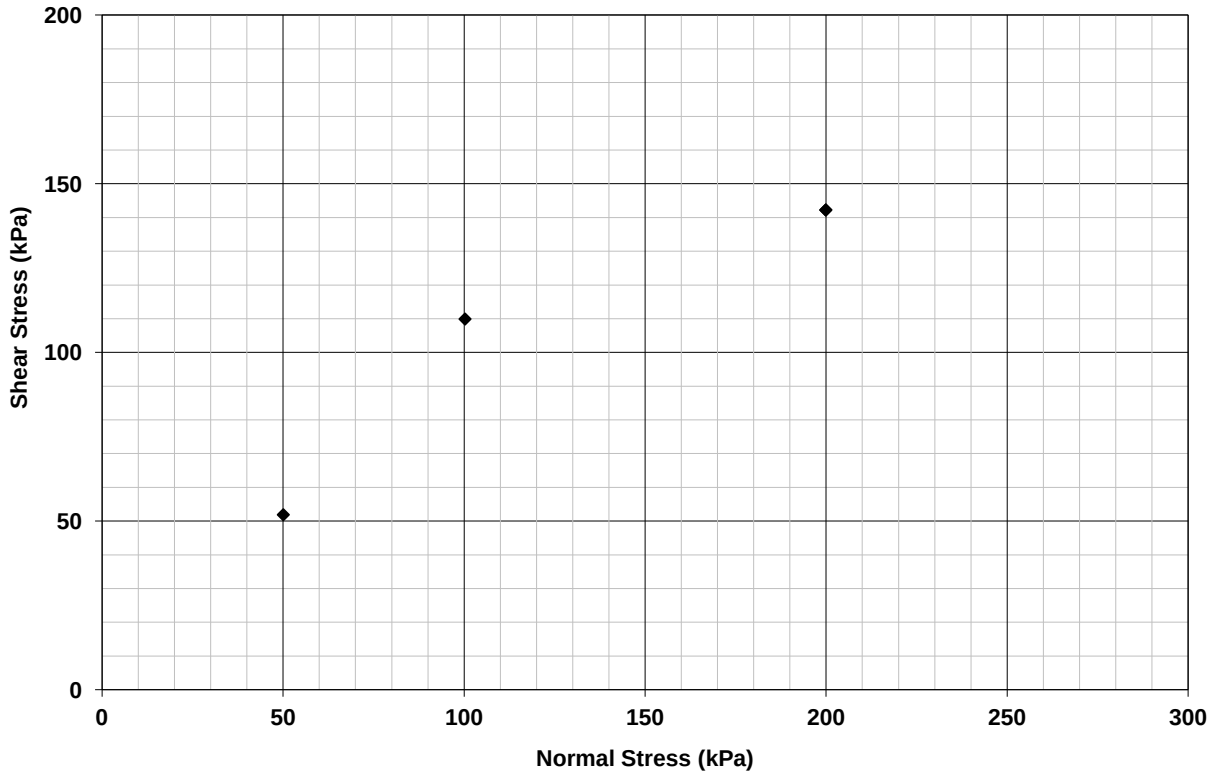
DIRECT SHEAR TEST REPORT

Test Method: AS 1289.6.2.2 / KH2 based on K.H. Head Vol. 2

Client	Tetra Tech Australia Pty Ltd	**Report No.**	12080182- DS
Project	Christmas Creek	**Test Date**	9/08/2012
		Report Date	14/08/2012
Client ID	Sample #21	**Depth (m)**	0.00-3.00
Description		**Sample Type**	Three individual -4.75mm specimens - remoulded as requested by the client
Failure Criteria		**Peak**	

Peak - Normal Stress vs Shear Stress



Shear Angle (°)	**28.4**	**Cohesion (kPa)**	**37.1**	**R^2**	**0.952**

		Normal Stress (kPa)	Shear Stress (kPa)
Specimen Condition	As Received		
Specimen Dimensions (mm)	60*60	Stage 1	50.1	51.9
Rate of Strain (mm/min)	0.008	Stage 2	100.3	109.9
Initial Moisture Content (%)	12.4	Stage 3	199.9	142.2
Initial Wet Density(t/m^3)	2.72			

Notes/Remarks: Please review the results if the Cohesion is above 2 kPa when plotted with a line of best fit
Note: Area correction based on square sample equation.

Graph not to scale — Sample/s supplied by the client

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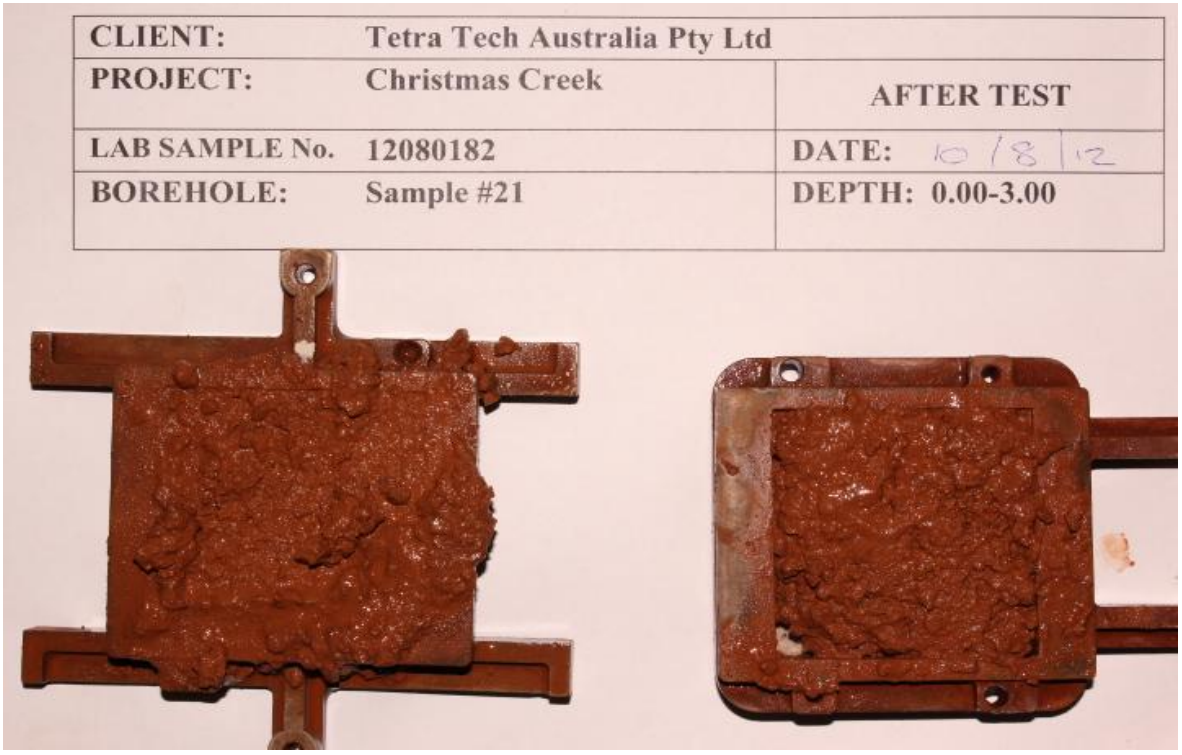
DIRECT SHEAR TEST REPORT

Test Method: AS 1289.6.2.2 / KH2 based on K.H. Head Vol. 2

Client	Tetra Tech Australia Pty Ltd	**Report No.**	12080182- DS
Project	Christmas Creek	**Test Date**	9/08/2012
		Report Date	14/08/2012
Client ID	Sample #21	**Depth (m)**	0.00-3.00
Description		**Sample Type**	Three individual -4.75mm specimens - remoulded as requested by the client



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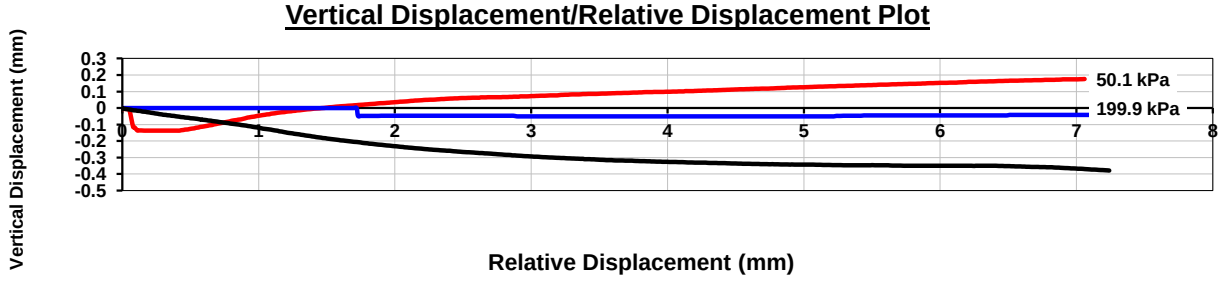
DIRECT SHEAR TEST REPORT

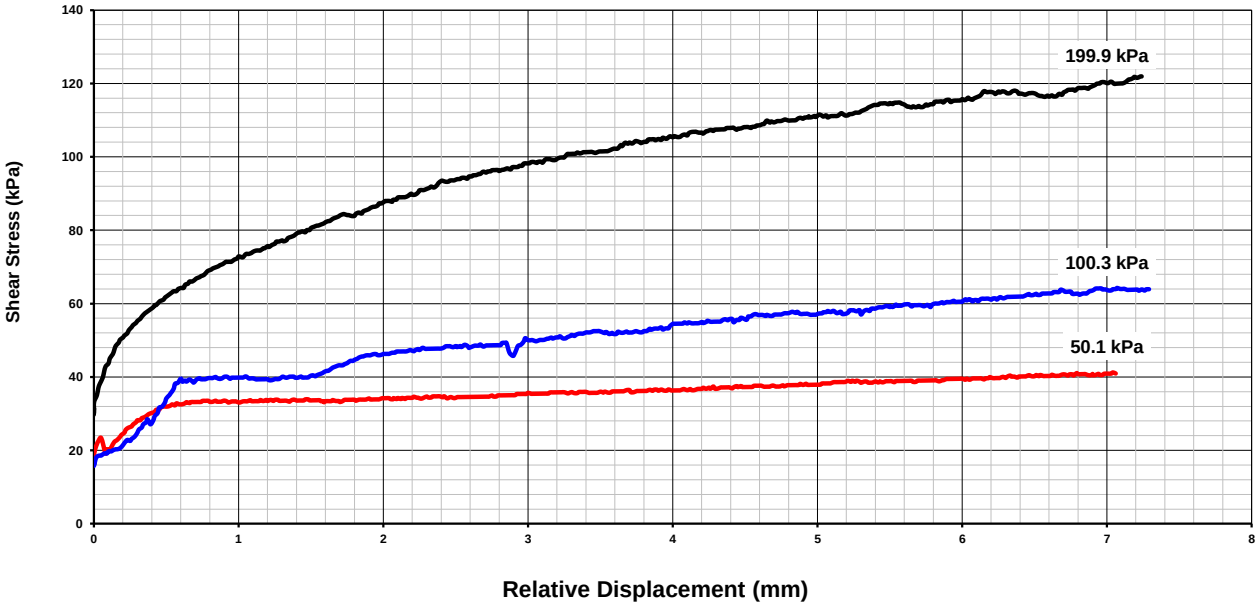
Test Method: AS 1289.6.2.2 / KH2 based on K.H. Head Vol. 2

Client	Tetra Tech Australia Pty Ltd	**Report No.**	12080183- DS
Project	Christmas Creek	**Test Date**	10/08/2012
		Report Date	14/08/2012
Client ID	Sample #30	**Depth (m)**	0.00-3.00
Description		**Sample Type**	Three individual -4.75mm specimens - remoulded as requested by the client
Failure Criteria		**Residual @ 7 mm Displacement**	

Vertical Displacement/Relative Displacement Plot



Shear Stress/Displacement Plot



Notes/Remarks: Please review the results if the Cohesion is above 2 kPa when plotted with a line of best fit
Note: Area correction based on square sample equation.

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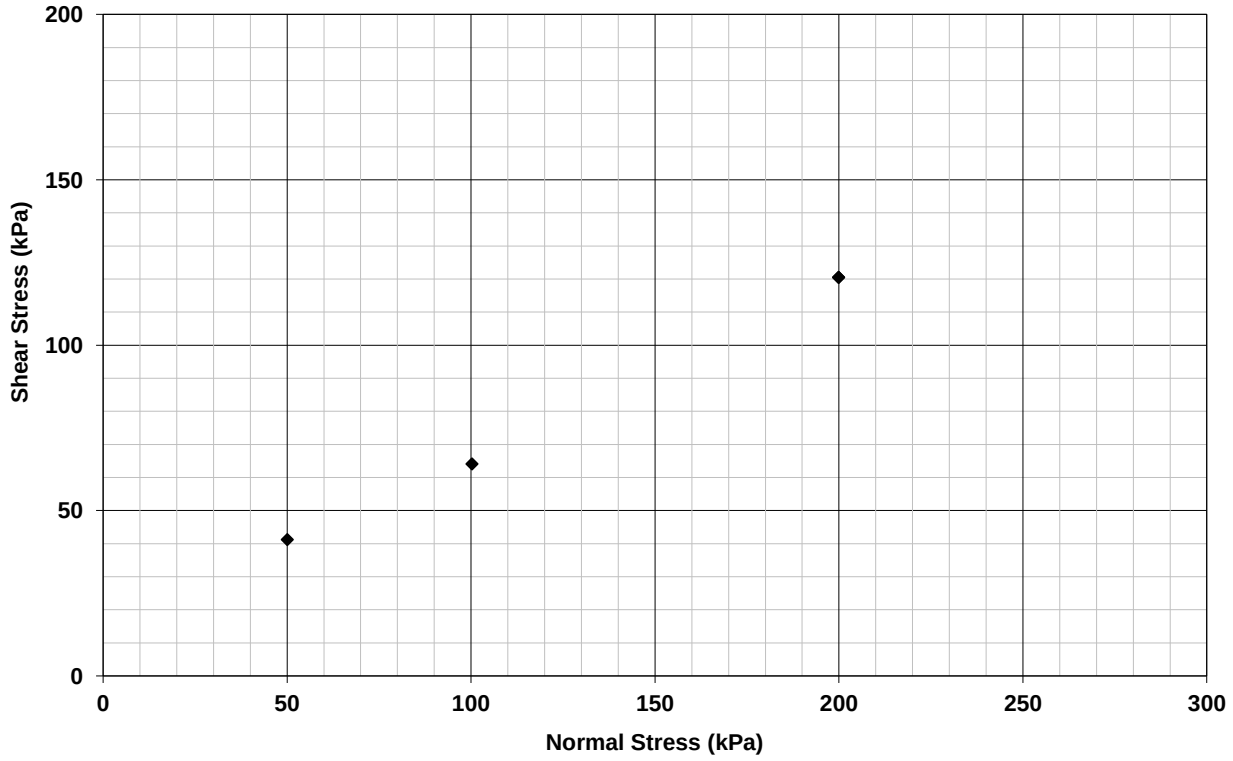
Test Method: AS 1289.6.2.2 / KH2 based on K.H. Head Vol. 2

Client	Tetra Tech Australia Pty Ltd	**Report No.**	12080183- DS
Project	Christmas Creek	**Test Date**	10/08/2012
		Report Date	14/08/2012
Client ID	Sample #30	**Depth (m)**	0.00-3.00
Description		**Sample Type**	Three individual -4.75mm specimens - remoulded as requested by the client
Failure Criteria		**Residual @ 7 mm Displacement**	

Residual - Normal Stress vs Shear Stress



Shear Angle (°)	**28.2**	**Cohesion (kPa)**	**12.7**	**R^2**	**0.999**
Specimen Condition	Inundated	Normal Stress (kPa)		Shear Stress (kPa)	
Specimen Dimensions (mm)	60*60	Stage 1	50.1	41.2	
Rate of Strain (mm/min)	0.008	Stage 2	100.3	64.1	
Initial Moisture Content (%)	13.7	Stage 3	199.9	120.5	
Initial Wet Density(t/m^3)	2.53				

Notes/Remarks: Please review the results if the Cohesion is above 2 kPa when plotted with a line of best fit
Note: Area correction based on square sample equation.

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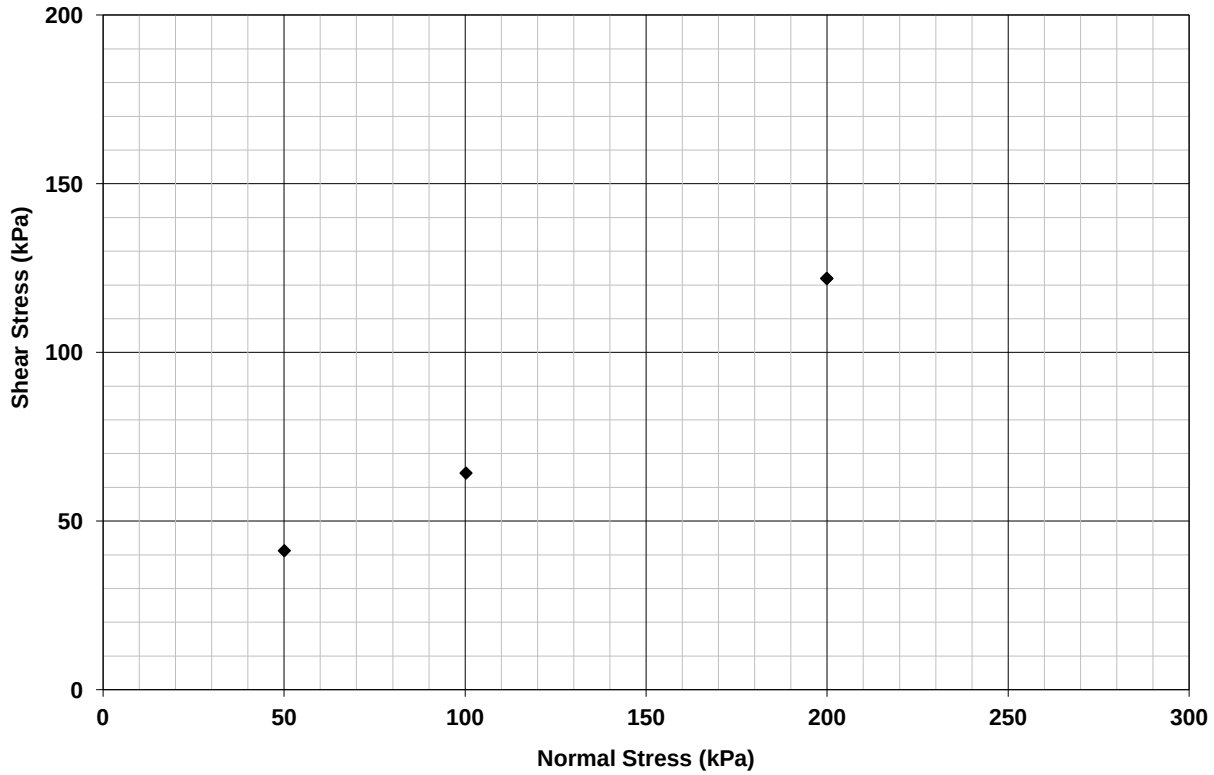
DIRECT SHEAR TEST REPORT

Test Method: AS 1289.6.2.2 / KH2 based on K.H. Head Vol. 2

Client	Tetra Tech Australia Pty Ltd	**Report No.**	12080183- DS
Project	Christmas Creek	**Test Date**	10/08/2012
		Report Date	14/08/2012
Client ID	Sample #30	**Depth (m)**	0.00-3.00
Description		**Sample Type**	Three individual -4.75mm specimens - remoulded as requested by the client
Failure Criteria		**Peak**	

Peak - Normal Stress vs Shear Stress



Shear Angle (°)	**28.7**	**Cohesion (kPa)**	**12.0**	**R^2**	**0.999**

		Normal Stress (kPa)		Shear Stress (kPa)
Specimen Condition	Inundated			
Specimen Dimensions (mm)	60*60	Stage 1	50.1	41.2
Rate of Strain (mm/min)	0.008	Stage 2	100.3	64.2
Initial Moisture Content (%)	13.7	Stage 3	199.9	121.9
Initial Wet Density(t/m^3)	2.53			

Notes/Remarks: Please review the results if the Cohesion is above 2 kPa when plotted with a line of best fit
Note: Area correction based on square sample equation.

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DIRECT SHEAR TEST REPORT

Test Method: AS 1289.6.2.2 / KH2 based on K.H. Head Vol. 2

Client	Tetra Tech Australia Pty Ltd	**Report No.**	12080183- DS
Project	Christmas Creek	**Test Date**	10/08/2012
		Report Date	14/08/2012
Client ID	Sample #30	**Depth (m)**	0.00-3.00
Description		**Sample Type**	Three individual -4.75mm specimens - remoulded as requested by the client

Notes/Remarks: Please review the results if the Cohesion is above 2 kPa when plotted with a line of best fit
Note: Area correction based on square sample equation.

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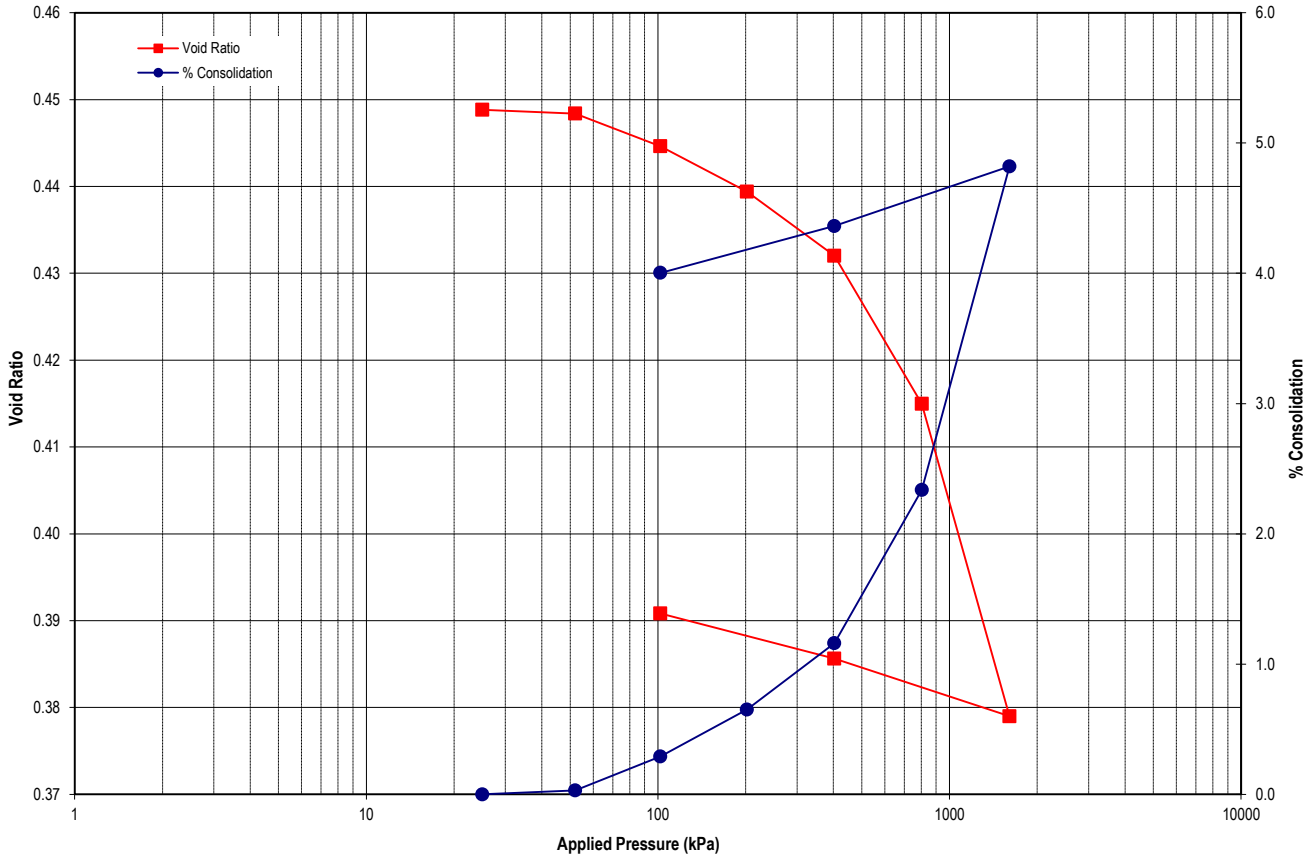
OEDOMETER TEST REPORT

Test Method: AS1289.6.6.1, 3.5.1

Client:	Tetratech Pty Ltd	**Report No.:**	P 12060523-OED
Project:	Christmas Creek	**Test Date:**	23/7/2012
		Report Date:	5/08/2012
Client Id.:	#2	**Depth (m):**	0.0-3.0

Description: SILTY SAND- brown



Wet Density (t/m^3):	2.42	Initial Moisture (%):	9.6	Test Condition:	Inundated on load
Particle Density (t/m^3):	3.19	Initial Voids Ratio:	0.445	Initial Degree of Saturation (%):	68.3
		Remarks:	Sample remoulded as requested by the client		Page 1 of 2

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OEDOMETER TEST REPORT

Test Method: AS1289.6.6.1, 3.5.1

Client:	Tetratech Pty Ltd	**Report No.:**	P 12060523-OED
Project:	Christmas Creek	**Test Date:**	23/7/2012
		Report Date:	5/08/2012
Client Id.:	#2	**Depth (m):**	0.0-3.0

Description: SILTY SAND- brown

TEST RESULTS

Stage	Load (kPa)	Cc	k (m/s)	Cv (m^2/yr) t_{50}	Cv (m^2/yr) t_{90}	Mv ($kPa^{-1}x10^{-3}$)	C_a x 10^{-3}	% Consolidation
1	25-52	0.001	2.E-10	1.34	45.00	0.012	0.50	0.0
2	52-102	0.013	8.E-10	5.30	51.66	0.052	0.43	0.3
3	102-202	0.018	6.E-10	32.57	53.15	0.036	0.48	0.7
4	202-403	0.025	4.E-10	53.00	45.72	0.025	0.72	1.2
5	403-804	0.057	7.E-10	44.04	73.41	0.030	1.51	2.3
6	804-1606	0.120	7.E-10	56.55	71.92	0.032	2.34	4.8
7	1606-403	0.011	8.E-11	4.25	68.05	0.004	0.11	4.4
8	403-102	0.009	2.E-10	15.91	48.52	0.012	0.25	4.0

Remarks: Sample remoulded as requested by the client

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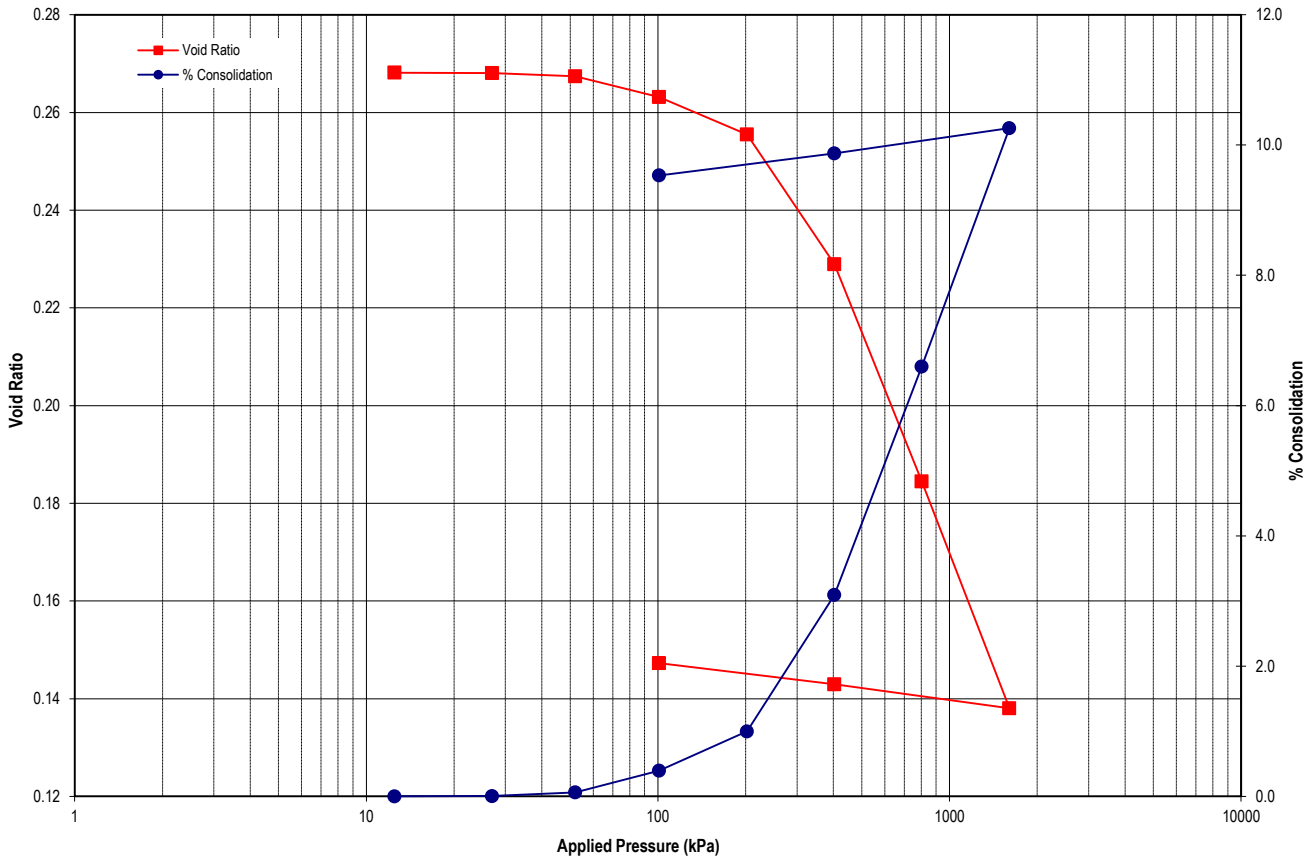
OEDOMETER TEST REPORT

Test Method: AS1289.6.6.1, 3.5.1

Client:	Tetratech Pty Ltd	**Report No.:**	P 12060527-OED
Project:	Christmas Creek	**Test Date:**	23/7/2012
		Report Date:	10/08/2012
Client Id.:	#4	**Depth (m):**	0.00-3.0

Description: SILTY SAND- brown



Wet Density (t/m^3):	2.07	Initial Moisture (%):	15.2	Test Condition:	Inundated on load
Particle Density (t/m^3):	2.27	Initial Voids Ratio:	0.266	Initial Degree of Saturation (%):	128.8
		Remarks:	Sample remoulded as requested by the client		Page 1 of 2

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OEDOMETER TEST REPORT

Test Method: AS1289.6.6.1, 3.5.1

Client:	Tetratech Pty Ltd	**Report No.:**	P 12060527-OED
Project:	Christmas Creek	**Test Date:**	23/7/2012
		Report Date:	10/08/2012
Client Id.:	#4	**Depth (m):**	0.00-3.0

Description: SILTY SAND- brown

TEST RESULTS

Stage	Load (kPa)	Cc	k (m/s)	Cv (m^2/yr) t_{50}	Cv (m^2/yr) t_{90}	Mv ($kPa^{-1}x10^{-3}$)	C_a x 10^{-3}	% Consolidation
1	12.5-27	0.000	7.E-11	0.81	64.38	0.004	0.31	0.0
2	27-52	0.002	7.E-10	0.62	109.51	0.022	0.26	0.1
3	52-101	0.015	1.E-09	1.00	61.67	0.068	0.52	0.4
4	101-202	0.025	7.E-10	0.58	39.47	0.060	0.93	1.0
5	202-403	0.089	9.E-10	11.46	28.79	0.105	2.44	3.1
6	403-803	0.149	9.E-10	60.72	33.52	0.090	2.96	6.6
7	803-1604	0.154	6.E-10	73.32	40.61	0.049	3.06	10.3
8	1604-403	0.008	7.E-11	18.78	63.26	0.004	0.03	9.9
9	403-101	0.007	3.E-10	10.49	66.09	0.012	0.29	9.5

Remarks: Sample remoulded as requested by the client

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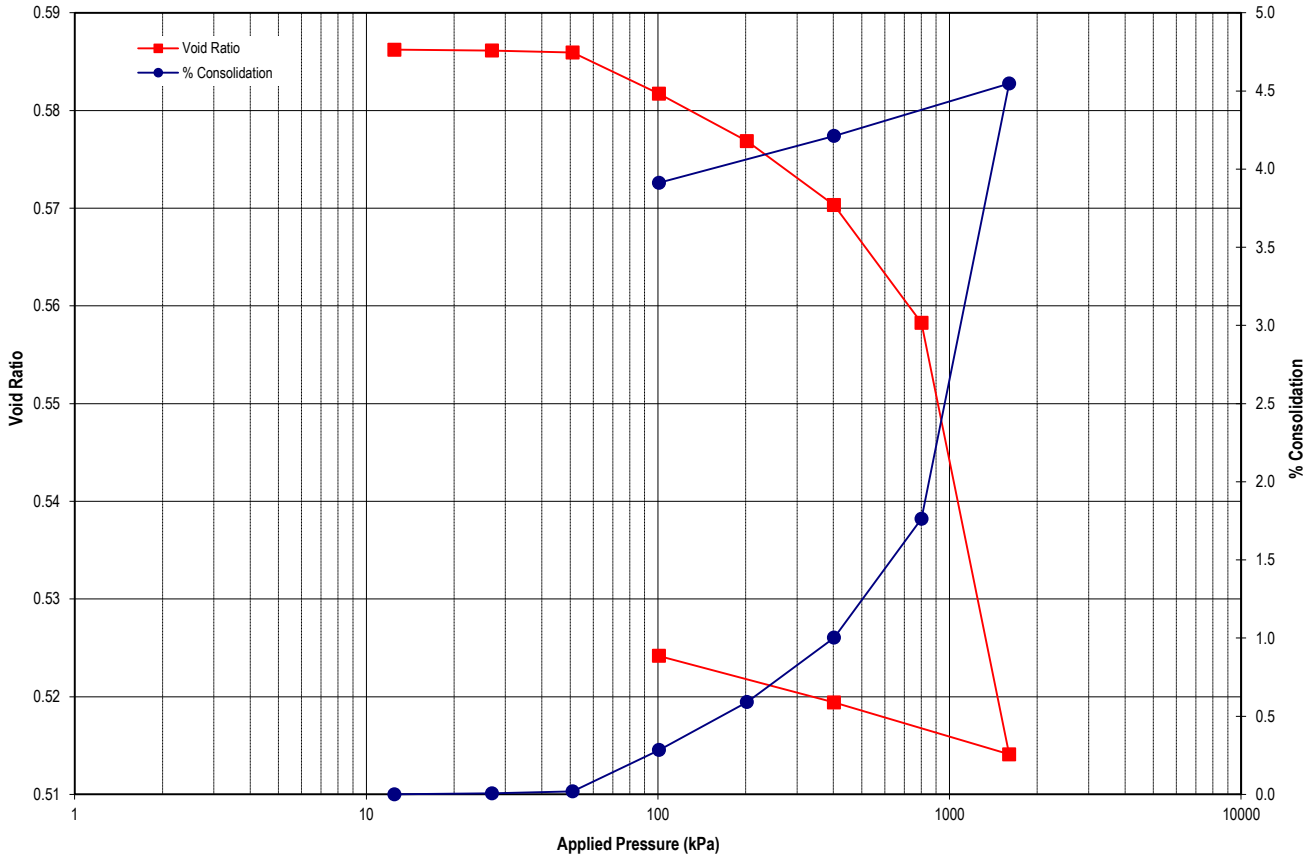
OEDOMETER TEST REPORT

Test Method: AS1289.6.6.1, 3.5.1

Client:	Tetratech Pty Ltd	**Report No.:**	P 12060531-OED
Project:	Christmas Creek	**Test Date:**	23/7/2012
		Report Date:	7/08/2012
Client Id.:	#9	**Depth (m):**	0.00-3.0

Description: SILTY SAND- brown



Wet Density (t/m^3):	2.24	Initial Moisture (%):	10.9	Test Condition:	Inundated on load
Particle Density (t/m^3):	3.20	Initial Voids Ratio:	0.583	Initial Degree of Saturation (%):	67.5
		Remarks:	Sample remoulded as requested by the client		Page 1 of 2

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OEDOMETER TEST REPORT

Test Method: AS1289.6.6.1, 3.5.1

Client:	Tetratech Pty Ltd	**Report No.:**	P 12060531-OED
Project:	Christmas Creek	**Test Date:**	23/7/2012
		Report Date:	7/08/2012
Client Id.:	#9	**Depth (m):**	0.00-3.0

Description: SILTY SAND- brown

TEST RESULTS

Stage	Load (kPa)	Cc	k (m/s)	Cv (m^2/yr) t_{50}	Cv (m^2/yr) t_{90}	Mv ($kPa^{-1}x10^{-3}$)	C_a x 10^{-3}	% Consolidation
1	12.5-27	0.000	3.E-11	0.47	25.92	0.004	0.25	0.0
2	27-51	0.001	5.E-11	0.40	27.96	0.005	0.19	0.0
3	51-101	0.014	1.E-09	0.34	59.10	0.053	0.46	0.3
4	101-202	0.016	3.E-10	0.96	32.92	0.030	0.43	0.6
5	202-402	0.022	4.E-10	1.10	62.65	0.021	0.19	1.0
6	402-802	0.040	2.E-10	1.46	29.83	0.019	0.77	1.8
7	802-1603	0.147	4.E-10	17.74	39.11	0.035	3.24	4.5
8	1603-402	0.009	4.E-11	29.82	41.38	0.003	0.07	4.2
9	402-101	0.008	1.E-10	22.51	29.68	0.010	0.30	3.9

Remarks: Sample remoulded as requested by the client

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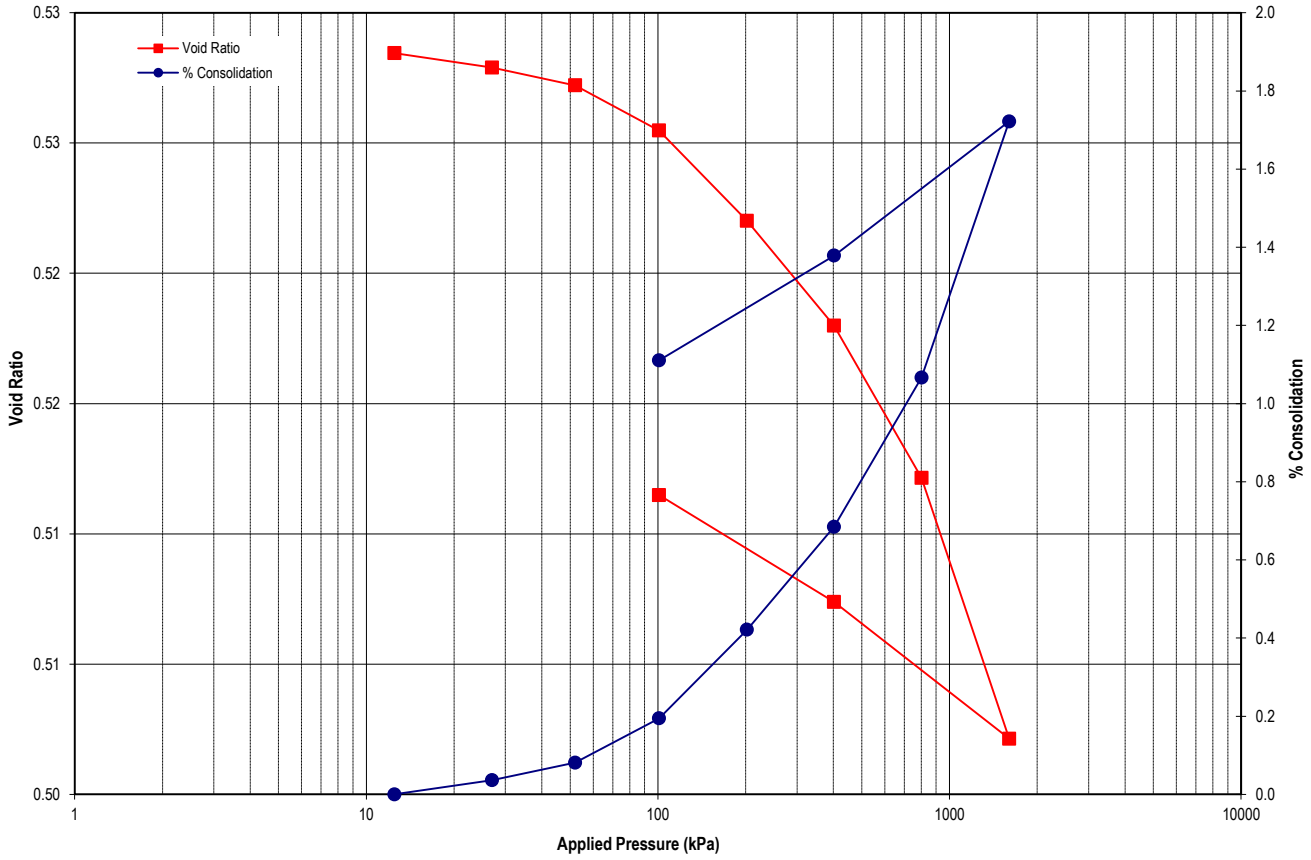
OEDOMETER TEST REPORT

Test Method: AS1289.6.6.1, 3.5.1

Client:	Tetratech Pty Ltd	**Report No.:**	P 12060535-OED
Project:	Christmas Creek	**Test Date:**	23/7/2012
		Report Date:	3/08/2012
Client Id.:	#19	**Depth (m):**	0.00-3.0

Description: SILTY SAND- brown



Wet Density (t/m^3):	2.19	Initial Moisture (%):	12.2	Test Condition: Inundated on load	
Particle Density (t/m^3):	2.98	Initial Voids Ratio:	0.524	Initial Degree of Saturation (%):	69.2
		Remarks:	Sample remoulded as requested by the client		Page 1 of 2

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Authorised Signatory

C. Channon

Doc. Id.: REP33101

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OEDOMETER TEST REPORT

Test Method: AS1289.6.6.1, 3.5.1

Client:	Tetratech Pty Ltd	**Report No.:**	P 12060535-OED
Project:	Christmas Creek	**Test Date:**	23/7/2012
		Report Date:	3/08/2012
Client Id.:	#19	**Depth (m):**	0.00-3.0

Description: SILTY SAND- brown

TEST RESULTS

Stage	Load (kPa)	Cc	k (m/s)	Cv (m^2/yr) t_{50}	Cv (m^2/yr) t_{90}	Mv ($kPa^{-1}x10^{-3}$)	C_a x 10^{-3}	% Consolidation
1	12.5-27	0.002	6.E-10	0.22	75.26	0.025	0.22	0.0
2	27-52	0.002	2.E-10	1.45	36.64	0.018	0.38	0.1
3	52-101	0.006	2.E-10	0.86	28.09	0.023	0.21	0.2
4	101-202	0.012	5.E-10	0.57	65.11	0.023	0.44	0.4
5	202-402	0.013	2.E-10	0.73	51.16	0.013	0.37	0.7
6	402-802	0.019	7.E-11	0.45	23.43	0.010	0.50	1.1
7	802-1602	0.033	1.E-10	0.43	56.49	0.008	0.68	1.7
8	1602-402	0.009	6.E-11	28.95	70.60	0.003	0.09	1.4
9	402-101	0.007	2.E-10	13.03	72.97	0.009	0.22	1.1

Remarks: Sample remoulded as requested by the client

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TRIAXIAL TEST REPORT

Test Method: AS1289.6.4.2

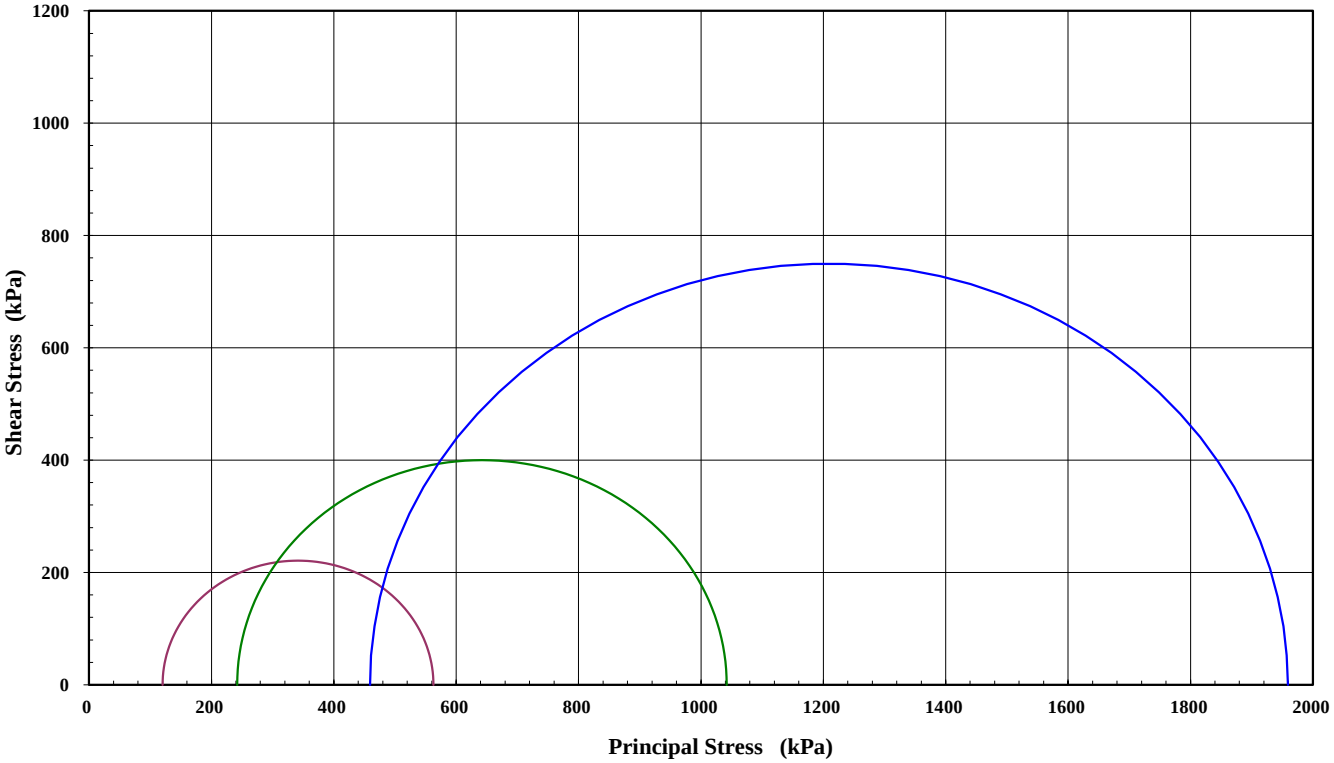
Client:	Tetra Tech Australia Pty Ltd	**Report No.:**	12080179 - CU
Project:	Christmas Creek	**Test Date:**	14/08/2012
		Report Date:	21/08/2012
Client Id.:	Sample #2	**Depth (m):**	0.00-3.00

Description: SANDY GRAVELLY SILT- red brown

SAMPLE & TEST DETAILS

Initial Height:	200.0	mm	Initial Moisture Content:	9.2	%	Rate of Strain:	0.006	%/min
Initial Diameter:	100.0	mm	Final Moisture Content:	11.3	%	B Response:	98	%
L/D Ratio:	2.0 : 1		Wet Density:	2.67	t/m^3			
			Dry Density:	2.44	t/m^3			

Mohr Circle Diagram



	1 to 2	2 to 3	1 to 3
Interpretation between stages :			
Cohesion C' (kPa) :	22.9	4.8	14.0
Angle of Shear Resistance Φ' (Degrees) :	36.5	38.1	37.6

Failure Criteria: Peak Principal Stress Ratio

Sample Type: Single Individual Specimen (-19.0mm) remoulded to a target of 98% of Standard Maximum Dry Density

Sample/s supplied by the client — Note: Graph not to scale

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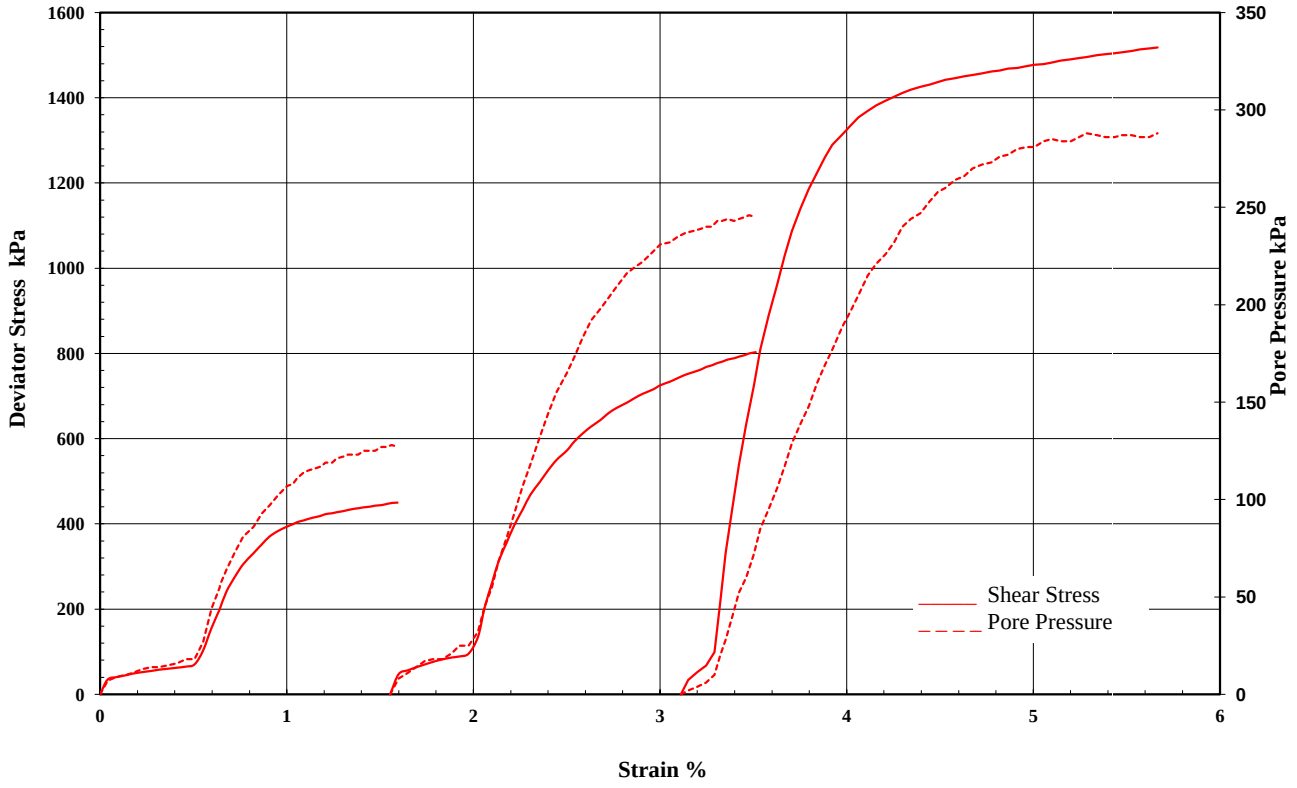
TRIAXIAL TEST REPORT

Test Method: AS1289.6.4.2

Client:	Tetra Tech Australia Pty Ltd	**Report No.:**	12080179 - CU
Project:	Christmas Creek	**Test Date:**	14/08/2012
		Report Date:	21/08/2012
Client Id.:	Sample #2	**Depth (m):**	0.00-3.00

Description: SANDY GRAVELLY SILT- red brown

Stress/Strain & Pore Pressure/Strain Diagram



FAILURE DETAILS

Confining Pressure	Back Pressure	Initial Pore	Failure Pore	Principal Effective Stresses σ'_1	Principal Effective Stresses σ'_3	σ'_1 / σ'_3	Deviator Stress	Strain
748 kPa	503 kPa	503 kPa	628 kPa	563 kPa	120 kPa	4.688	443 kPa	1.47 %
789 kPa	301 kPa	301 kPa	547 kPa	1042 kPa	242 kPa	4.306	800 kPa	3.48 %
1050 kPa	304 kPa	304 kPa	591 kPa	1959 kPa	459 kPa	4.268	1500 kPa	5.34 %

Sample Type: Single Individual Specimen (-19.0mm) remoulded to a target of 98% of Standard Maximum Dry Density

Sample/s supplied by the client

Note: Graph not to scale

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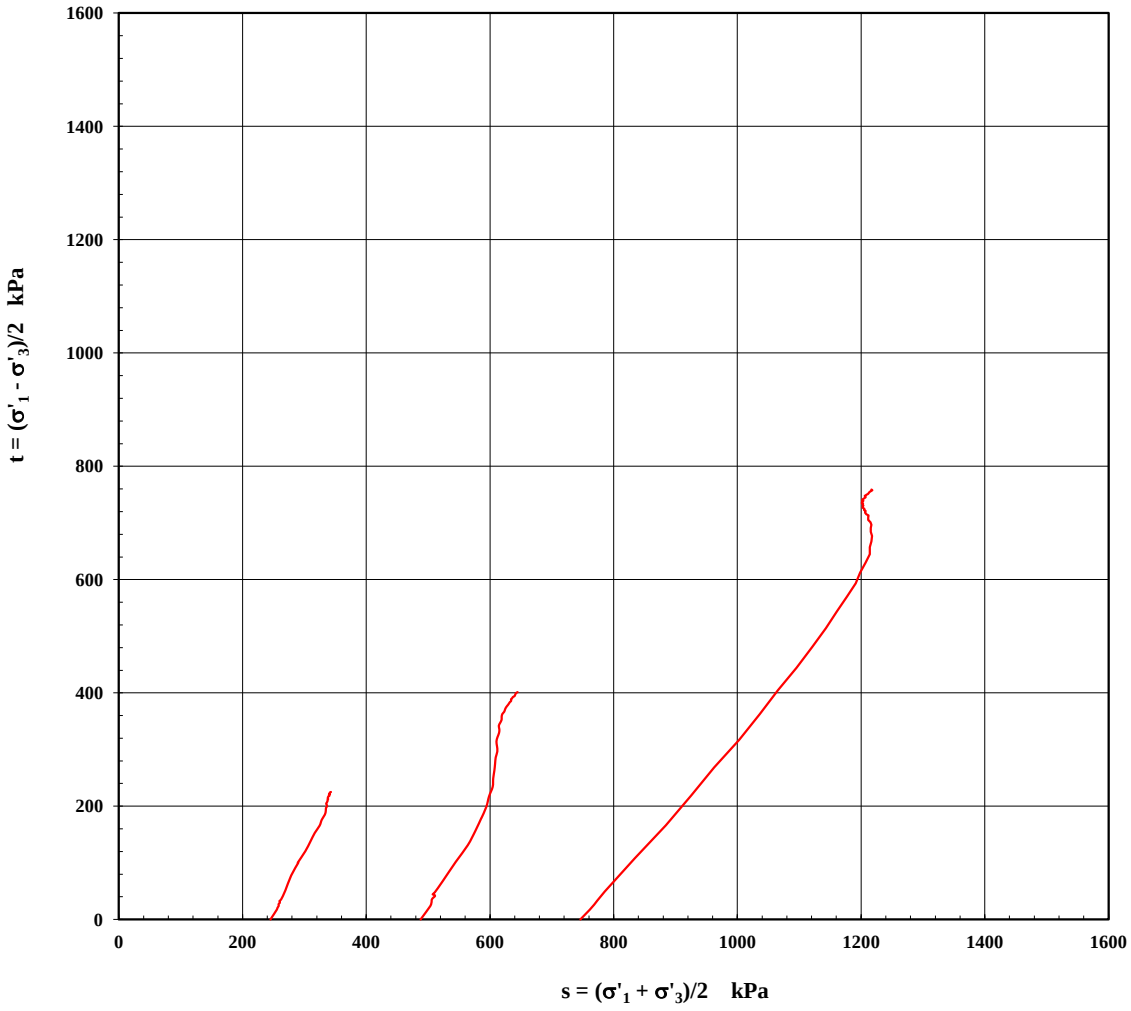
TRIAXIAL TEST REPORT

Test Method: AS1289.6.4.2

Client:	Tetra Tech Australia Pty Ltd	**Report No.:**	12080179 - CU
Project:	Christmas Creek	**Test Date:**	14/08/2012
		Report Date:	21/08/2012
Client Id.:	Sample #2	**Depth (m):**	0.00-3.00

Description: SANDY GRAVELLY SILT- red brown

MIT Method - Effective Stress Path



Sample Type: Single Individual Specimen (-19.0mm) remoulded to a target of 98% of Standard Maximum Dry Density

Sample/s supplied by the client

Note: Graph not to scale

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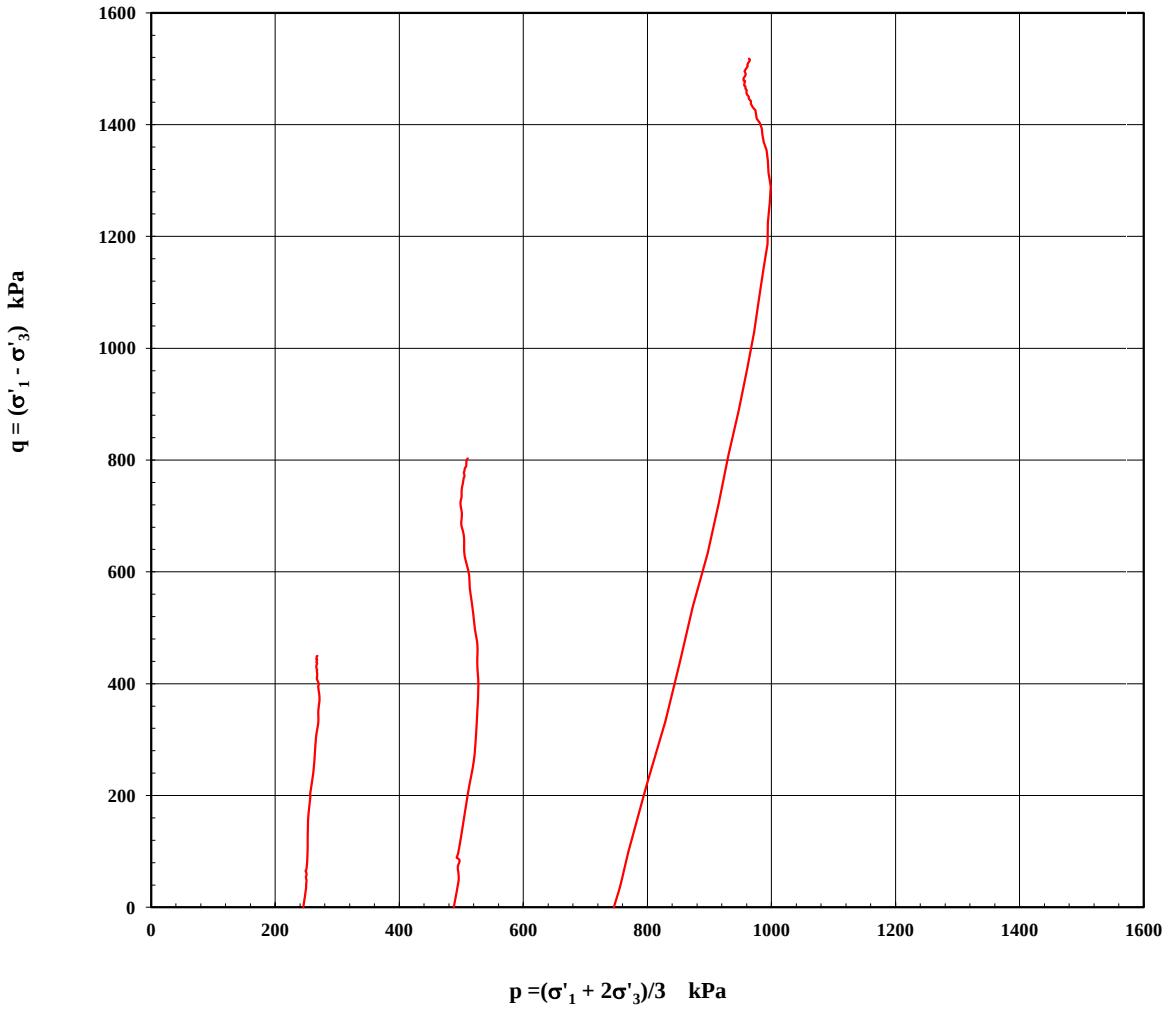
TRIAXIAL TEST REPORT

Test Method: AS1289.6.4.2

Client:	Tetra Tech Australia Pty Ltd	**Report No.:**	12080179 - CU
Project:	Christmas Creek	**Test Date:**	14/08/2012
		Report Date:	21/08/2012
Client Id.:	Sample #2	**Depth (m):**	0.00-3.00

Description: SANDY GRAVELLY SILT- red brown

Cambridge Method - Effective Stress Path



Sample Type: Single Individual Specimen (-19.0mm) remoulded to a target of 98% of Standard Maximum Dry Density

Sample/s supplied by the client

Note: Graph not to scale

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Test Method: AS1289.6.4.2

Client:	Tetra Tech Australia Pty Ltd	**Report No.:**	12080179 - CU
Project:	Christmas Creek	**Test Date:**	14/08/2012
		Report Date:	21/08/2012
Client Id.:	Sample #2	**Depth (m):**	0.00-3.00

Description: SANDY GRAVELLY SILT- red brown

Sample Type: Single Individual Specimen (-19.0mm) remoulded to a target of 98% of Standard Maximum Dry Density

Sample/s supplied by the client

Note: Graph not to scale

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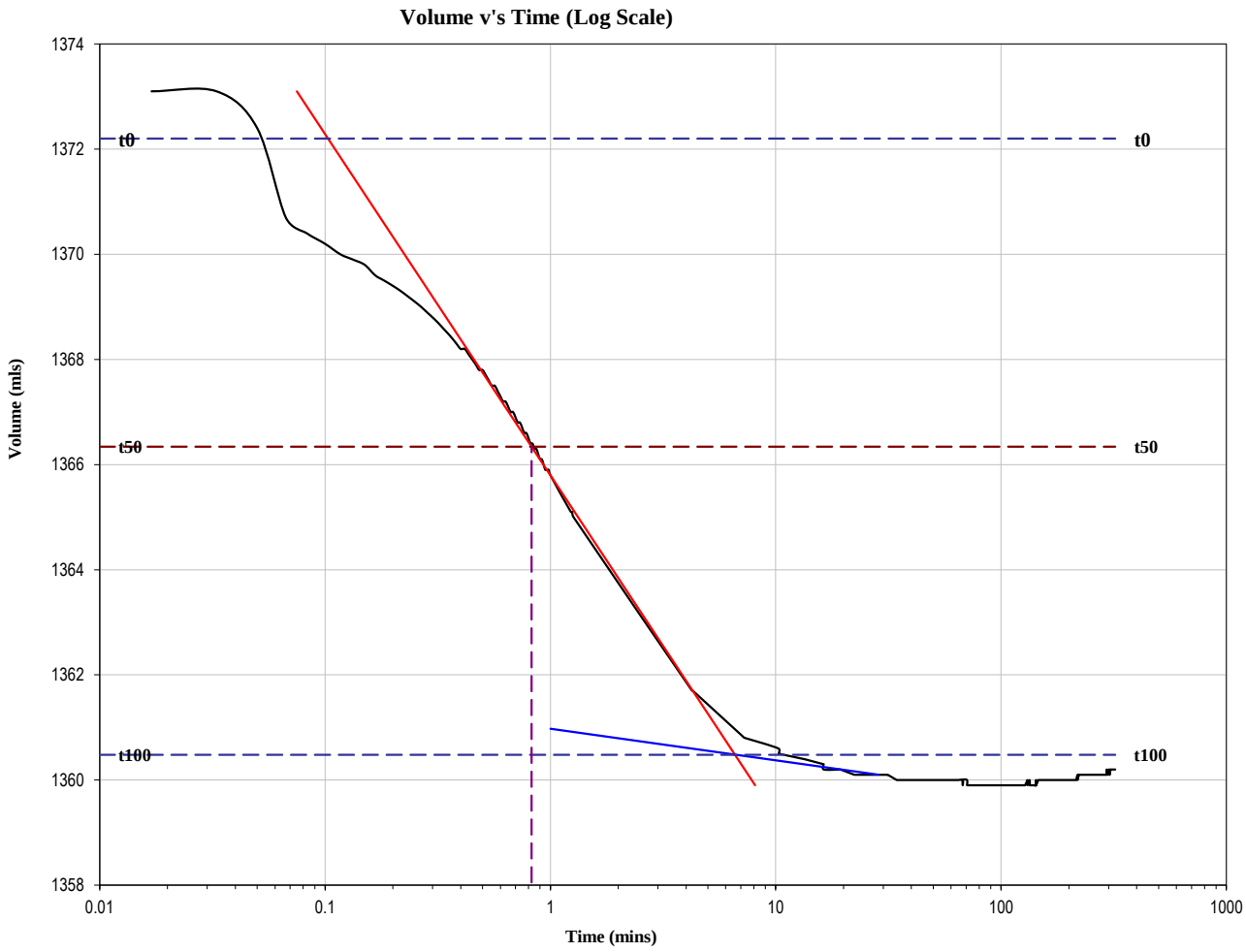
Project:	Christmas Creek	**Test Date:**	14/08/2012
		Report Date:	21/08/2012
Client Id.:	Sample #2	**Depth (m):**	0.00-3.00

Description: SANDY GRAVELLY SILT- red brown



Cv:	**36.80**	**m^2/year**
Mv:	**0.546**	**m^2/MN**
k:	**6.23E-09**	**m/s**

Sample Type: Single Individual Specimen (-19.0mm) remoulded to a target of 98% of Standard Maximum Dry Density

Sample/s supplied by the client — Note: Graph not to scale

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TRIAXIAL TEST REPORT

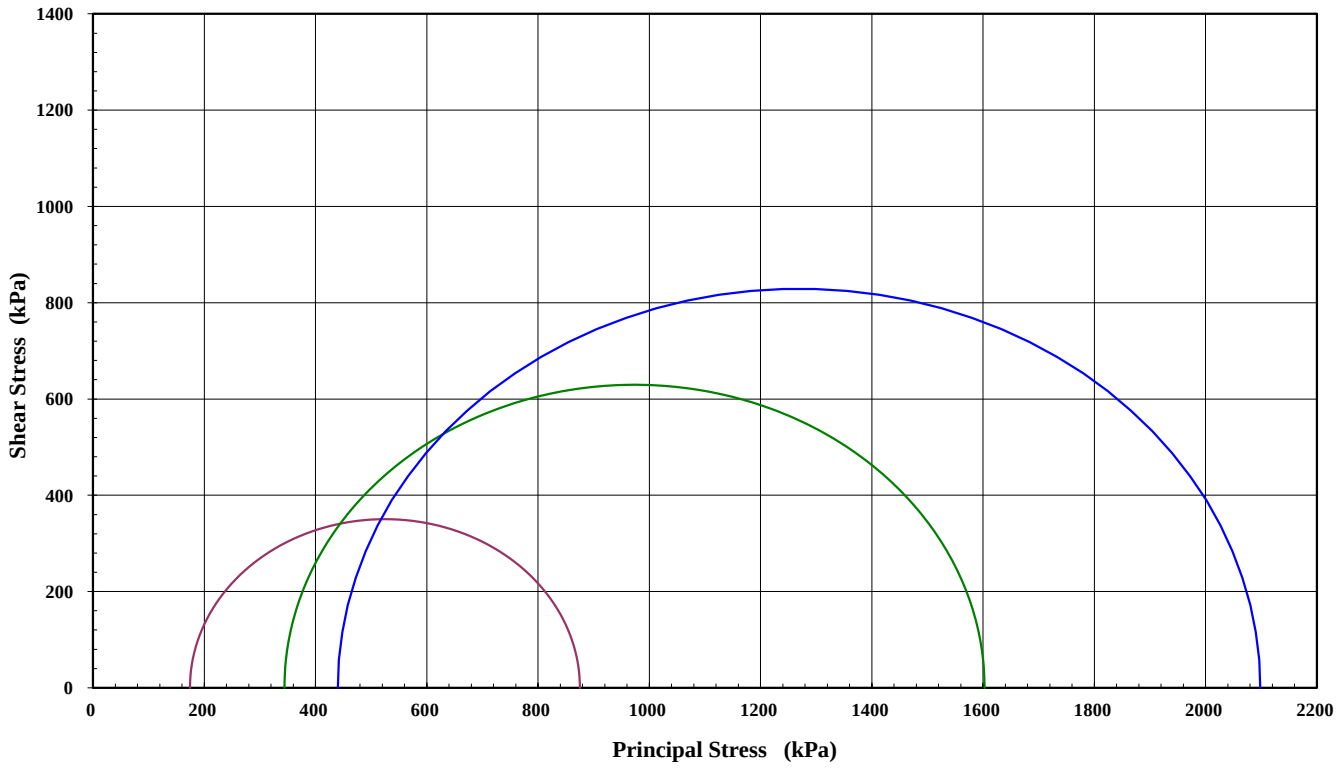
Test Method: AS1289.6.4.2

Client:	Tetra Tech Australia Pty Ltd	**Report No.:**	12080184 - CU
Project:	Christmas Creek	**Test Date:**	6/08/2012
		Report Date:	21/08/2012
Client Id.:	Sample #33	**Depth (m):**	0.00-3.00
Description:	SILTY SANDY GRAVEL - red brown		

SAMPLE & TEST DETAILS

Initial Height:	170.0	mm	Initial Moisture Content:	9.3	%	Rate of Strain:	0.006 %/min
Initial Diameter:	85.2	mm	Final Moisture Content:	10.3	%	B Response:	96 %
L/D Ratio:	2.0 : 1		Wet Density:	2.73	t/m^3		
			Dry Density:	2.50	t/m^3		

Mohr Circle Diagram



Interpretation between stages :	**1 to 2**	**1 to 3**
Cohesion C' (kPa) :	**31.5**	**15.4**
Angle of Shear Resistance Φ' (Degrees) :	**38.4**	**39.9**
Failure Criteria:	Peak Principal Stress Ratio	

Sample Type: Single Individual Specimen (-19mm) remoulded to a target of 98% of Standard Maximum Dry Density

Sample/s supplied by the client — Note: Graph not to scale

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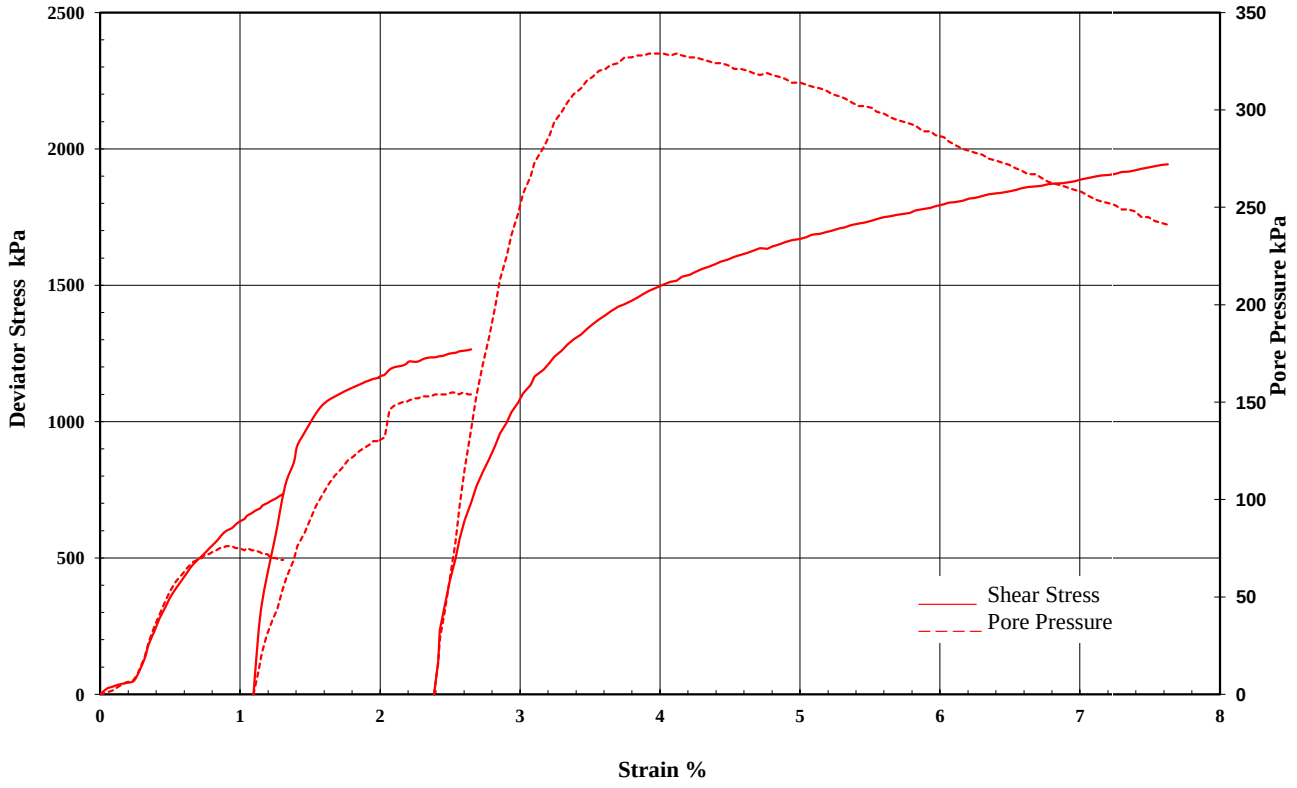
TRIAXIAL TEST REPORT

Test Method: AS1289.6.4.2

Client:	Tetra Tech Australia Pty Ltd	**Report No.:**	12080184 - CU
Project:	Christmas Creek	**Test Date:**	6/08/2012
		Report Date:	21/08/2012
Client Id.:	Sample #33	**Depth (m):**	0.00-3.00

Description: SILTY SANDY GRAVEL - red brown

Stress/Strain & Pore Pressure/Strain Diagram



FAILURE DETAILS

Confining Pressure	Back Pressure	Initial Pore	Failure Pore	Principal Effective Stresses σ'_1	Principal Effective Stresses σ'_3	σ'_1 / σ'_3	Deviator Stress	Strain
747 kPa	501 kPa	501 kPa	573 kPa	875 kPa	174 kPa	5.030	701 kPa	1.20 %
1000 kPa	501 kPa	501 kPa	656 kPa	1603 kPa	344 kPa	4.660	1259 kPa	2.59 %
1250 kPa	494 kPa	494 kPa	786 kPa	2098 kPa	440 kPa	4.769	1658 kPa	4.90 %

Sample Type: Single Individual Specimen (-19mm) remoulded to a target of 98% of Standard Maximum Dry Density

Sample/s supplied by the client

Note: Graph not to scale

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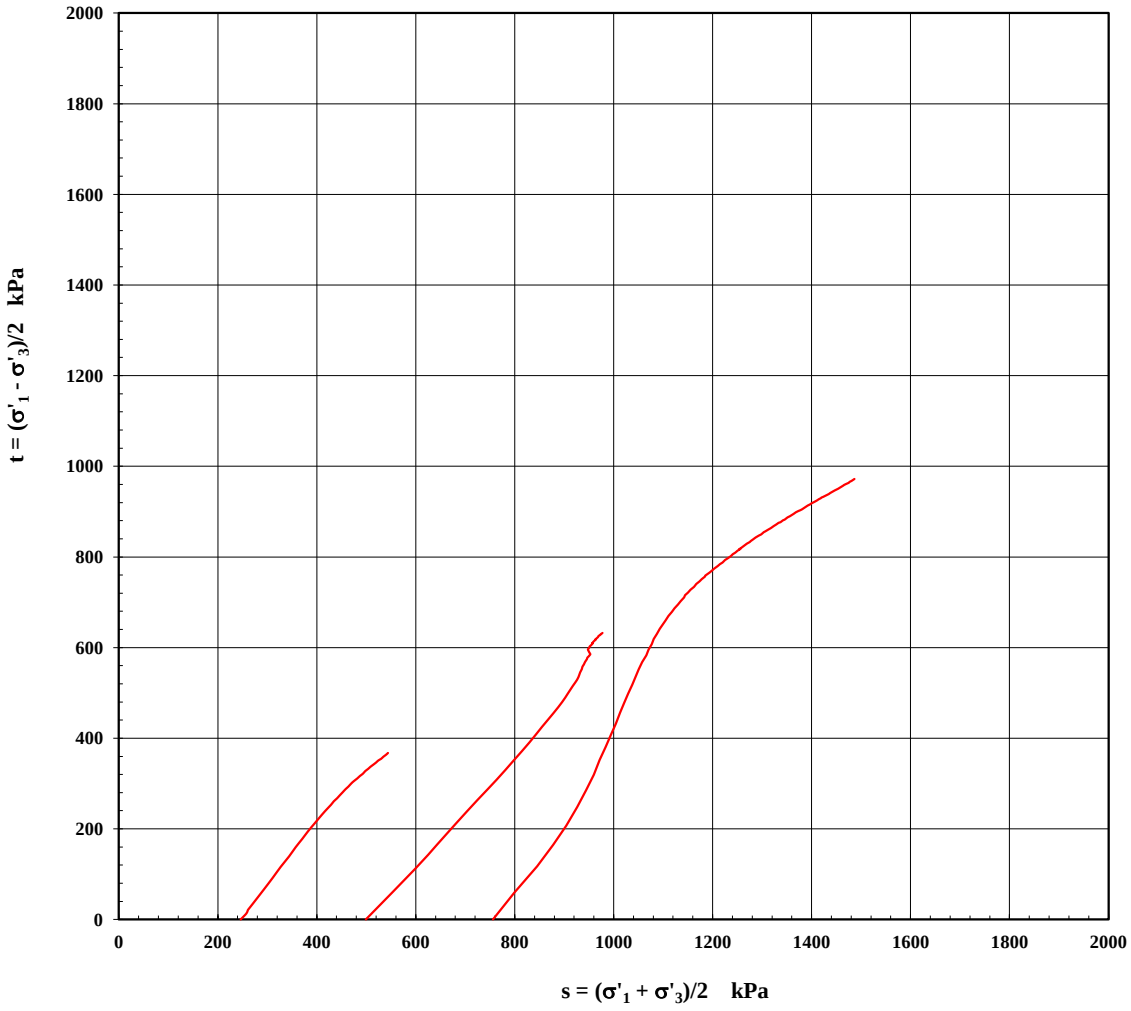
TRIAXIAL TEST REPORT

Test Method: AS1289.6.4.2

Client:	Tetra Tech Australia Pty Ltd	**Report No.:**	12080184 - CU
Project:	Christmas Creek	**Test Date:**	6/08/2012
		Report Date:	21/08/2012
Client Id.:	Sample #33	**Depth (m):**	0.00-3.00

Description: SILTY SANDY GRAVEL - red brown

MIT Method - Effective Stress Path



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Sample/s supplied by the client

Note: Graph not to scale

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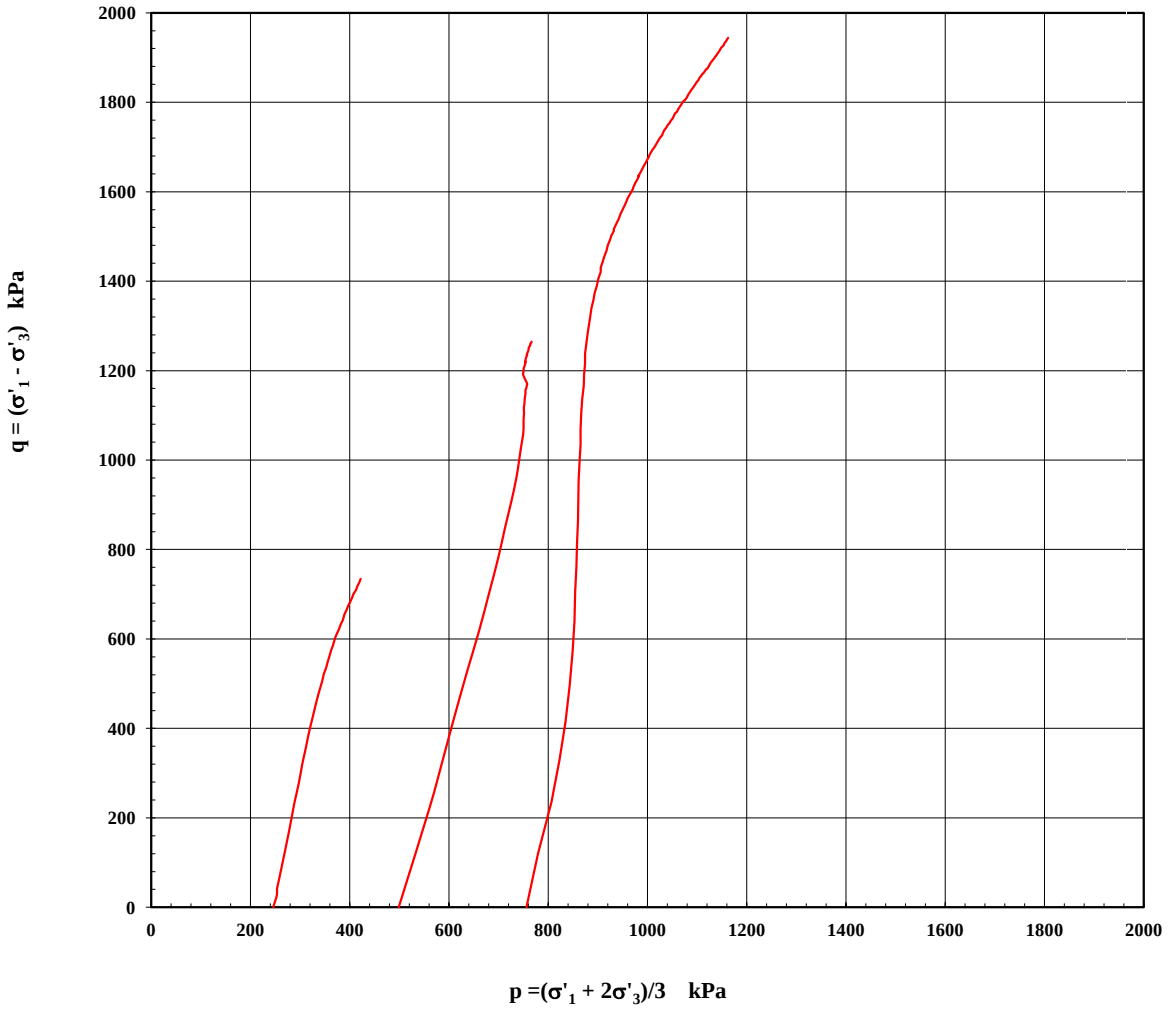
TRIAXIAL TEST REPORT

Test Method: AS1289.6.4.2

Client:	Tetra Tech Australia Pty Ltd	**Report No.:**	12080184 - CU
Project:	Christmas Creek	**Test Date:**	6/08/2012
		Report Date:	21/08/2012
Client Id.:	Sample #33	**Depth (m):**	0.00-3.00

Description: SILTY SANDY GRAVEL - red brown

Cambridge Method - Effective Stress Path



Sample Type: Single Individual Specimen (-19mm) remoulded to a target of 98% of Standard Maximum Dry Density

Sample/s supplied by the client

Note: Graph not to scale

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TRIAXIAL TEST REPORT

Test Method: AS1289.6.4.2

Client:	Tetra Tech Australia Pty Ltd	**Report No.:**	12080184 - CU
Project:	Christmas Creek	**Test Date:**	6/08/2012
		Report Date:	21/08/2012
Client Id.:	Sample #33	**Depth (m):**	0.00-3.00

Description: SILTY SANDY GRAVEL - red brown

Sample Type: Single Individual Specimen (-19mm) remoulded to a target of 98% of Standard Maximum Dry Density

Sample/s supplied by the client

Note: Graph not to scale

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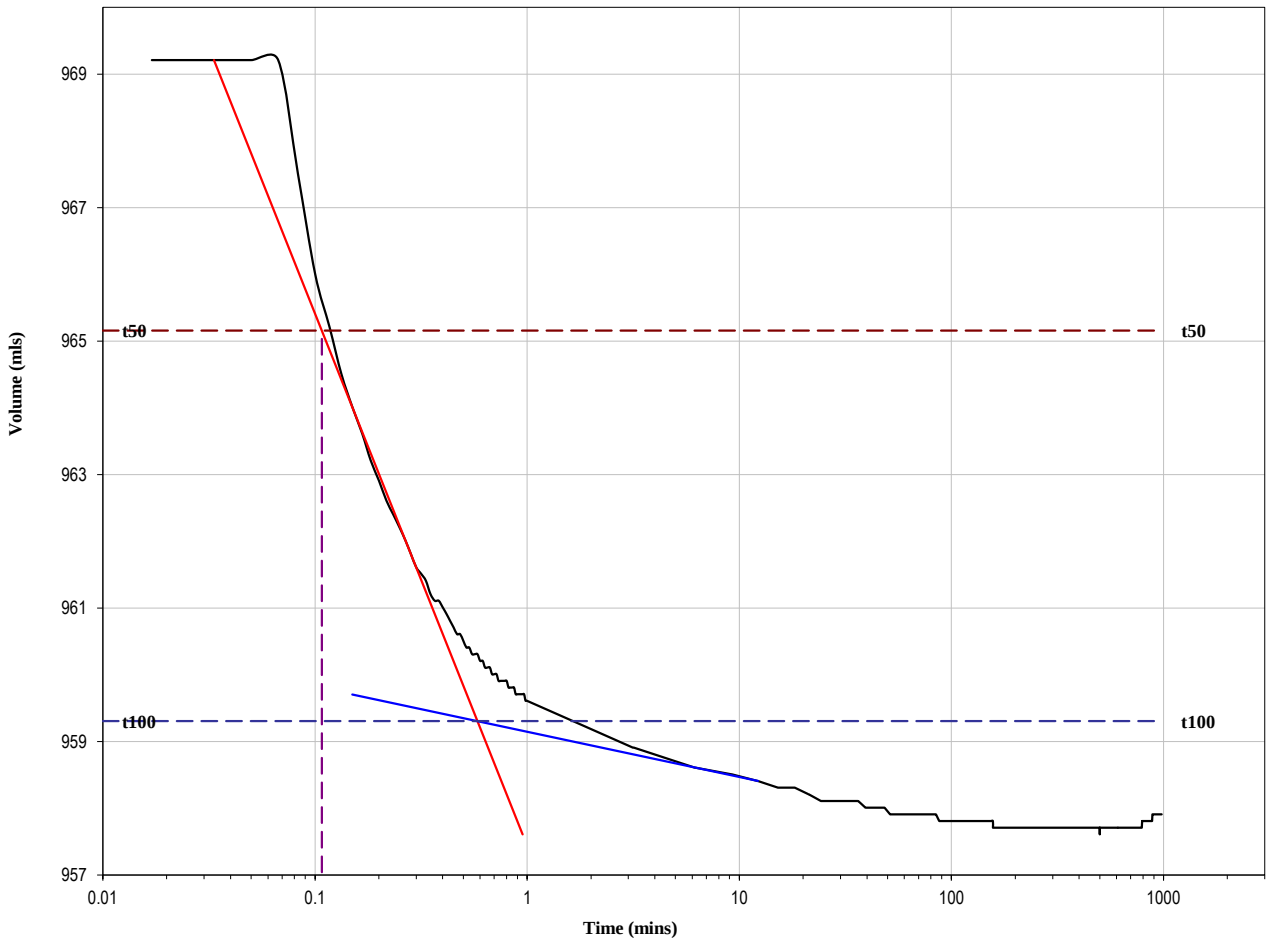
TRIAXIAL TEST REPORT

Test Method: AS1289.6.4.2

Client:	Tetra Tech Australia Pty Ltd	**Report No.:**	12080184 - CU
Project:	Christmas Creek	**Test Date:**	6/08/2012
		Report Date:	21/08/2012
Client Id.:	Sample #33	**Depth (m):**	0.00-3.00

Description: SILTY SANDY GRAVEL - red brown

Volume v's Time (Log Scale)



Cv:	**303.47**	**m^2/year**
Mv:	**0.042**	**m^2/MN**
k:	**3.91E-09**	**m/s**

Sample Type: Single Individual Specimen (-19mm) remoulded to a target of 98% of Standard Maximum Dry Density

Sample/s supplied by the client — Note: Graph not to scale

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SLAKE DURABILITY INDEX TEST REPORT

Test Method: AS 1289 4.133.3.4

Client	Tetra Tech Australia Pty Ltd	**Report No.**	12080179-SD
Project	Christmas Creek	**Test Date**	21/08/2012
		Report Date	22/08/2012

Sample No.	12080179	-
Client ID	Sample #2	-
Depth (m)	0.00-3.00	-
Slake Durability (2nd cycle) (%)	36.1	-
Slake Durability (1st cycle) (%)	38.0	-
Water Used	Tap	-
Temperature (^{o}C)	21.1	-
Appearance of fragments retained in the drum	Moderate Deterioration	-
Appearance of fragments passing through the drum	Fragments & Fines	-

Sample No.	-	-
Client ID	-	-
Depth (m)	-	-
Slake Durability (2nd cycle) (%)	-	-
Slake Durability (1st cycle) (%)	-	-
Water Used	-	-
Temperature (^{o}C)	-	-
Appearance of fragments retained in the drum	-	-
Appearance of fragments passing through the drum	-	-

NOTES/REMARKS: Sample remoulded to 98% MMDD @ 100% OMC

Sample/s supplied by the client

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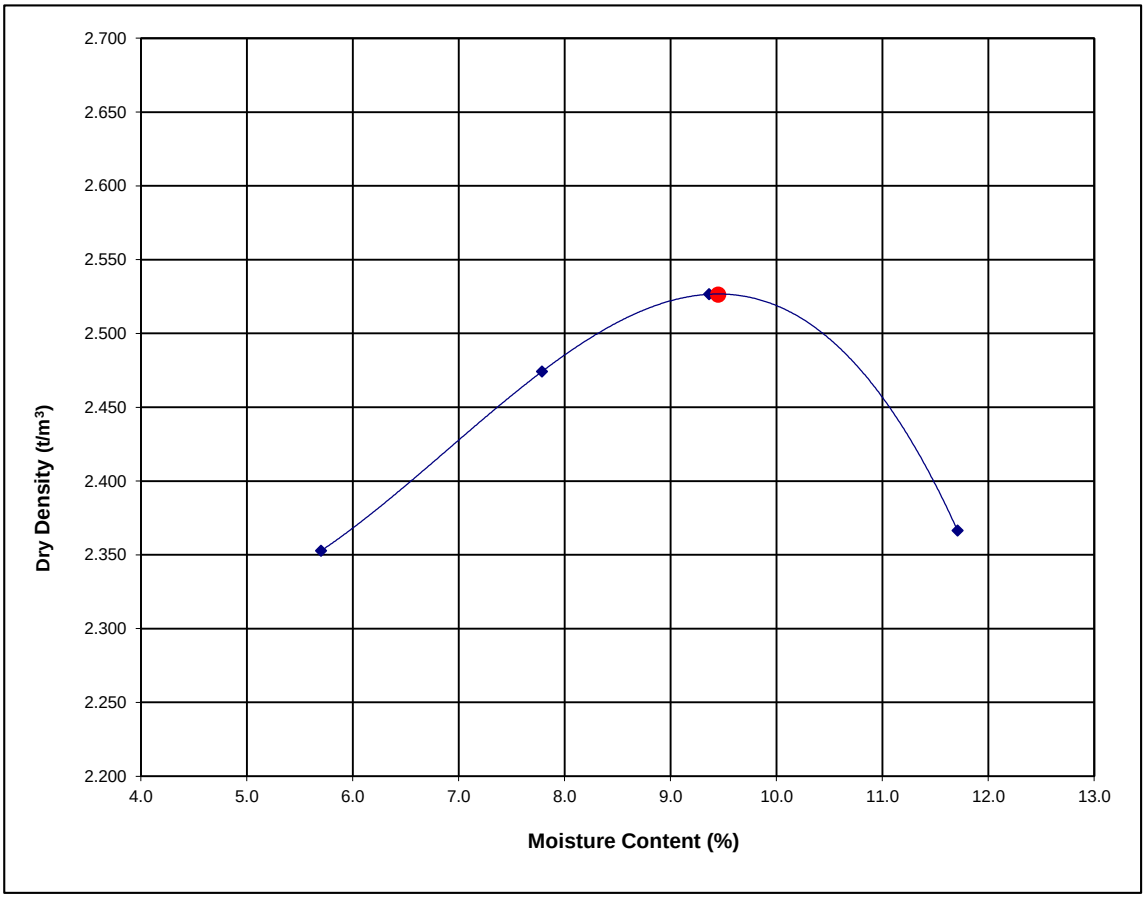
MOISTURE/DENSITY RELATIONSHIP TEST REPORT

Test Method: AS 1289 5.1.1

Client	Tetratech Pty Ltd	**Report No.**	12060523-MDD
Project	Christmas Creek	**Test Date**	13/07/2012
		Report Date	17/07/2012
Client ID	#2	**Depth (m)**	0.0-3.0
Description	-		



Maximum Dry Density (t/m^3)	2.53	**Optimum Moisture Content (%)**	9.5
Moisture Content (%)	3.3	**Percentage of Oversize/Sieve Size (mm)**	0/19

NOTES/REMARKS: This is a computer generated plot so estimates may show some minor variations from the results summarised.

Sample/s supplied by the client

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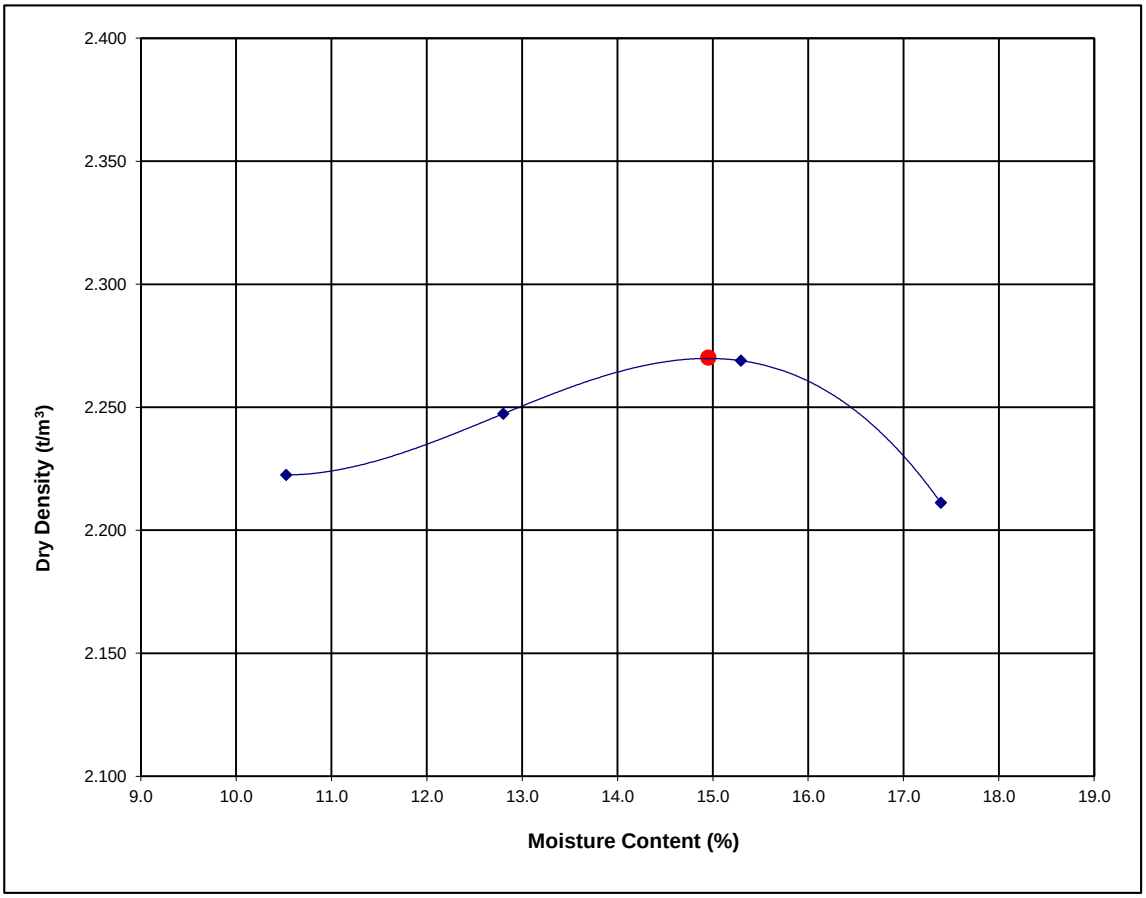
MOISTURE/DENSITY RELATIONSHIP TEST REPORT

Test Method: AS 1289 5.1.1

Client	Tetratech Pty Ltd	**Report No.**	12060527-MDD
Project	Christmas Creek	**Test Date**	13/07/2012
		Report Date	17/07/2012
Client ID	#4	**Depth (m)**	0.00-3.0
Description	-		



Maximum Dry Density (t/m^3)	2.27	**Optimum Moisture Content (%)**	15.0
Moisture Content (%)	9.9	**Percentage of Oversize/Sieve Size (mm)**	0/19

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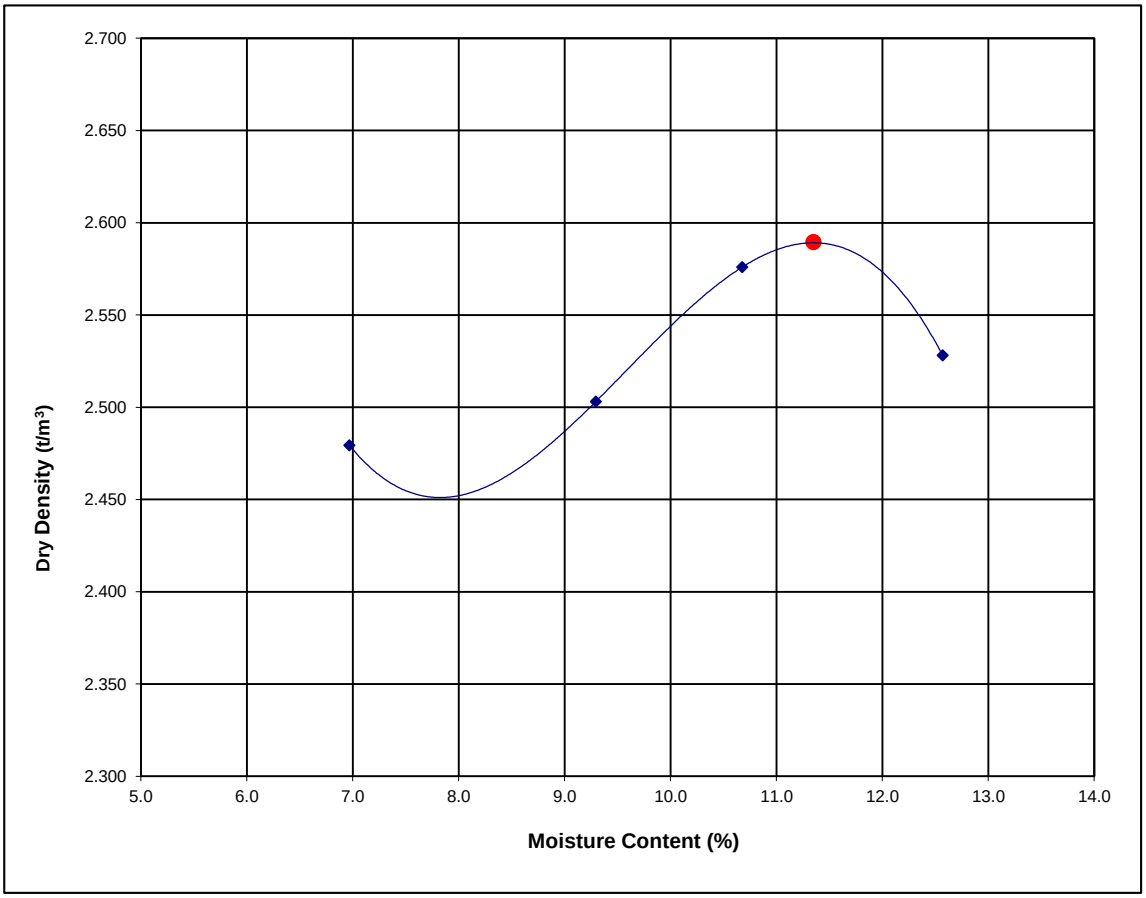
MOISTURE/DENSITY RELATIONSHIP TEST REPORT

Test Method: AS 1289 5.1.1

Client	Tetratech Pty Ltd	**Report No.**	12060529-MDD
Project	Christmas Creek	**Test Date**	13/07/2012
		Report Date	17/07/2012
Client ID	#8	**Depth (m)**	0.00-3.0
Description	-		



Maximum Dry Density (t/m^3)	2.59	**Optimum Moisture Content (%)**	11.5
Moisture Content (%)	6.7	**Percentage of Oversize/Sieve Size (mm)**	0/19

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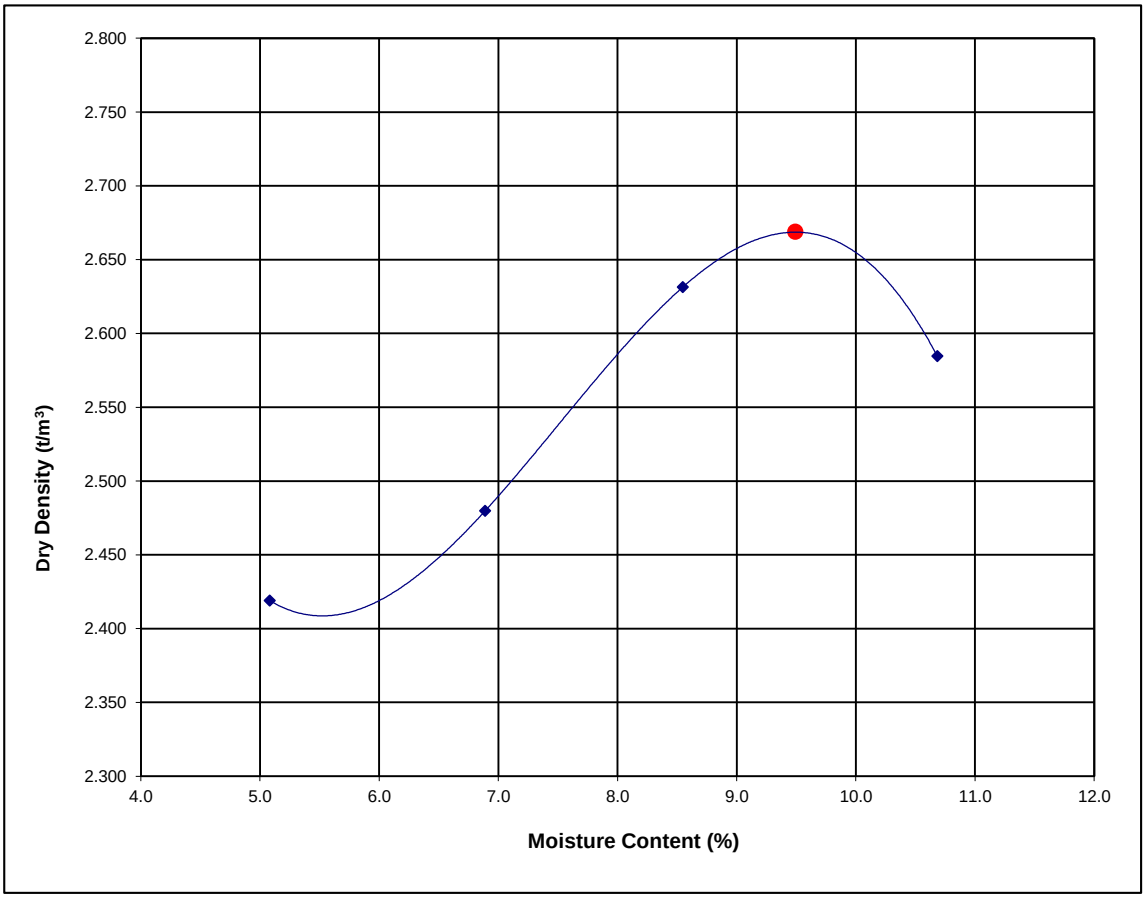
MOISTURE/DENSITY RELATIONSHIP TEST REPORT

Test Method: AS 1289 5.1.1

Client	Tetratech Pty Ltd	**Report No.**	12060531-MDD
Project	Christmas Creek	**Test Date**	12/07/2012
		Report Date	16/07/2012
Client ID	#9	**Depth (m)**	0.00-3.0
Description	-		



Maximum Dry Density (t/m^3)	2.67	**Optimum Moisture Content (%)**	9.5
Moisture Content (%)	7.1	**Percentage of Oversize/Sieve Size (mm)**	0/19

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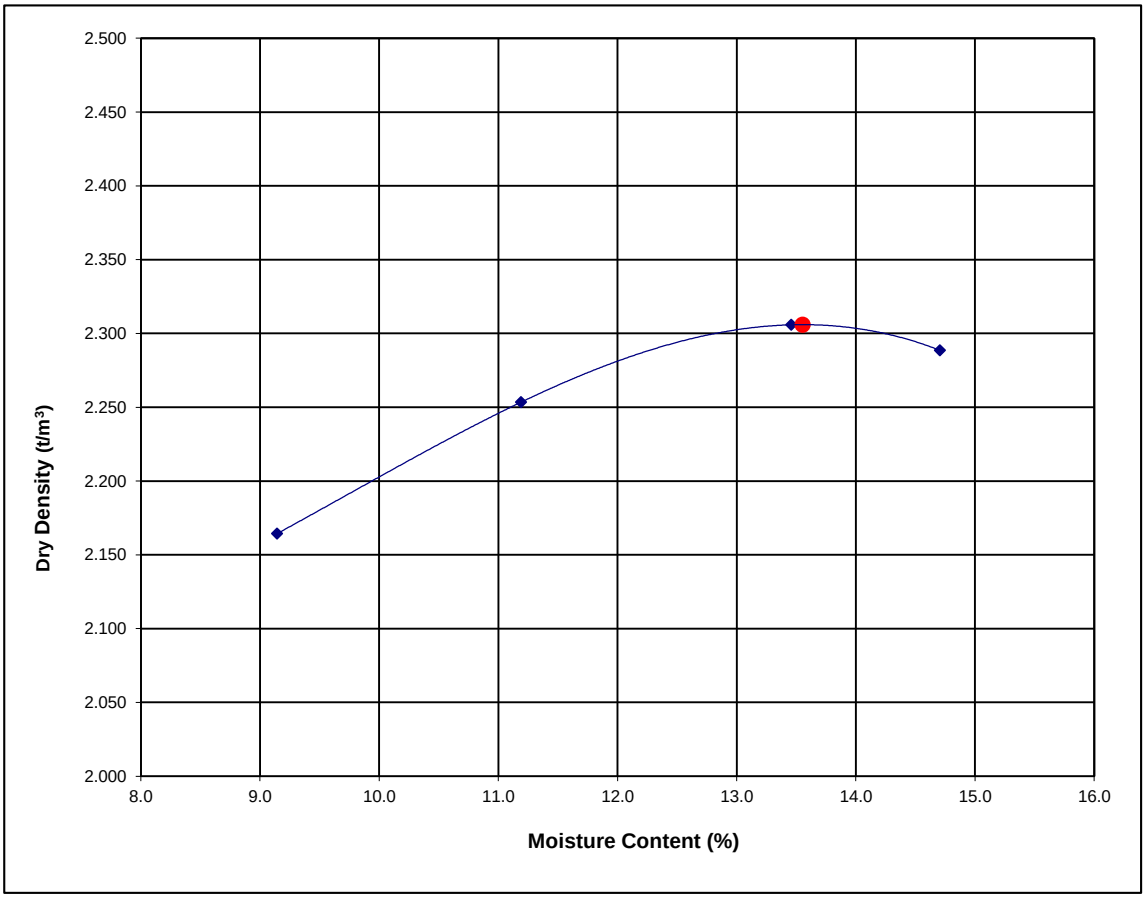
Client	Tetratech Pty Ltd	**Report No.**	12060533-MDD
Project	Christmas Creek	**Test Date**	12/07/2012
		Report Date	16/07/2012
Client ID	#13	**Depth (m)**	0.00-3.0
Description	-		



Maximum Dry Density (t/m^3)	2.31	**Optimum Moisture Content (%)**	13.5
Moisture Content (%)	11.1	**Percentage of Oversize/Sieve Size (mm)**	0/19

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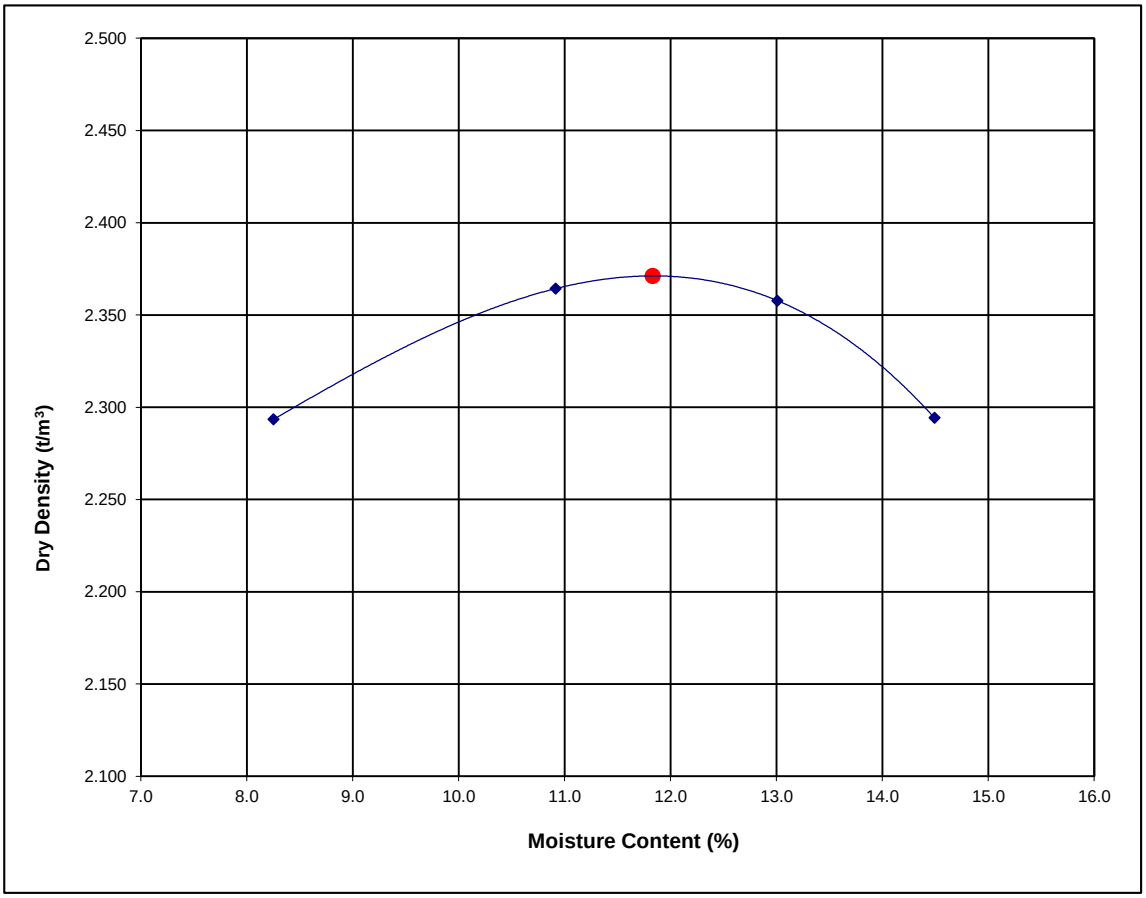
MOISTURE/DENSITY RELATIONSHIP TEST REPORT

Test Method: AS 1289 5.1.1

Client	Tetratech Pty Ltd	**Report No.**	12060535-MDD
Project	Christmas Creek	**Test Date**	7/12/2012
		Report Date	13/07/2012
Client ID	#19	**Depth (m)**	0.00-3.0
Description	0		



Maximum Dry Density (t/m^3)	2.37	**Optimum Moisture Content (%)**	12.0
Moisture Content (%)	8.7	**Percentage of Oversize/Sieve Size (mm)**	0/19

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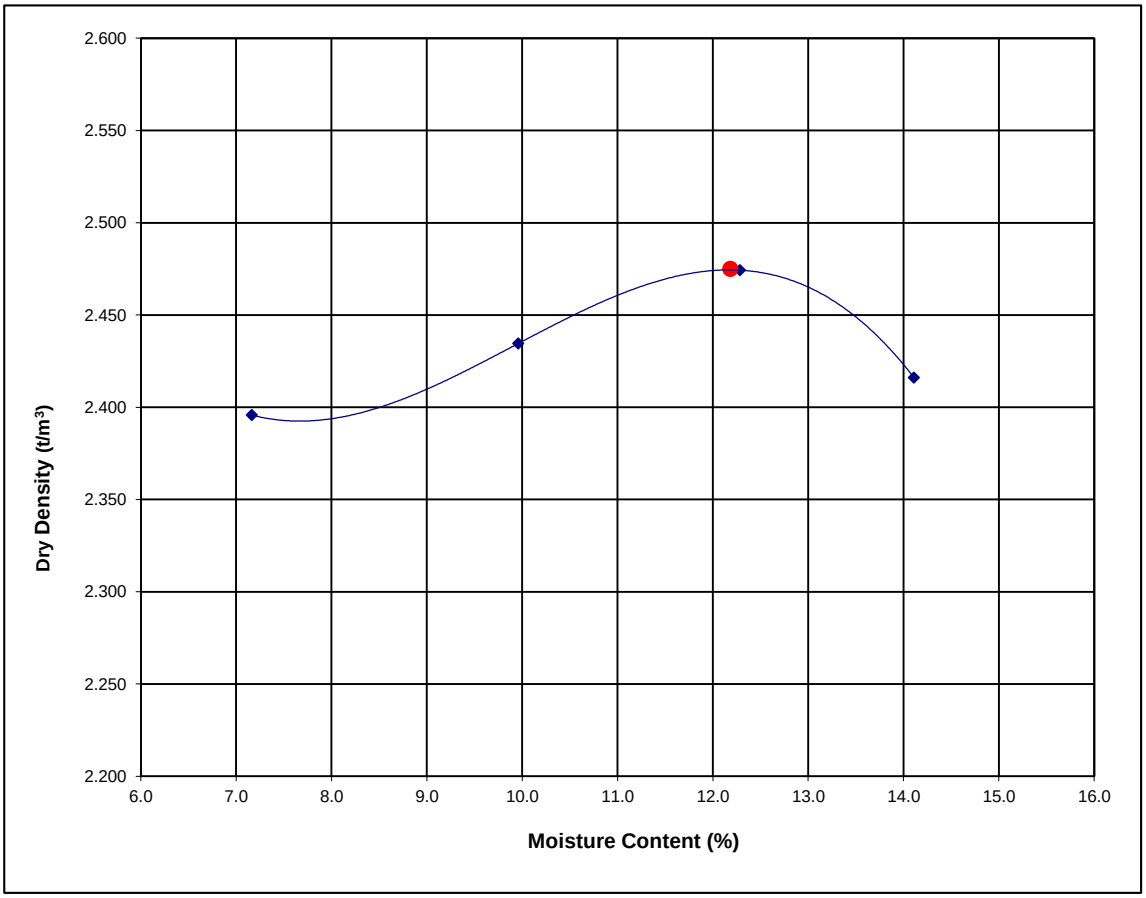
MOISTURE/DENSITY RELATIONSHIP TEST REPORT

Test Method: AS 1289 5.1.1

Client	Tetratech Pty Ltd	**Report No.**	12060537-MDD
Project	Christmas Creek	**Test Date**	12/07/2012
		Report Date	16/07/2012
Client ID	#21	**Depth (m)**	0.00-3.0
Description	-		



Maximum Dry Density (t/m^3)	2.48	**Optimum Moisture Content (%)**	12.0
Moisture Content (%)	8.4	**Percentage of Oversize/Sieve Size (mm)**	0/19

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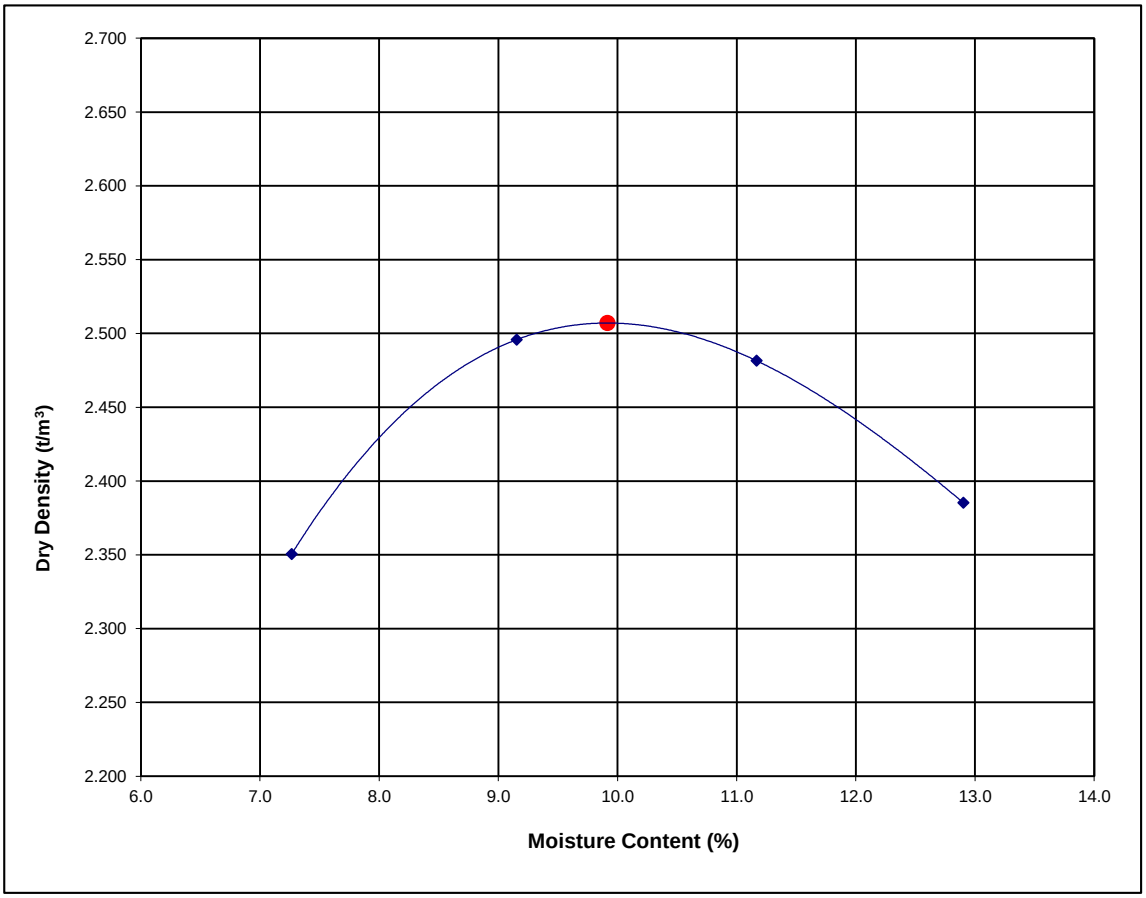
MOISTURE/DENSITY RELATIONSHIP TEST REPORT

Test Method: AS 1289 5.1.1

Client	Tetratech Pty Ltd	**Report No.**	12060541-MDD
Project	Christmas Creek	**Test Date**	12/07/2012
		Report Date	16/07/2012
Client ID	#26	**Depth (m)**	0.00-3.0
Description	-		



Maximum Dry Density (t/m^3)	2.51	**Optimum Moisture Content (%)**	10.0
Moisture Content (%)	10.2	**Percentage of Oversize/Sieve Size (mm)**	0/19

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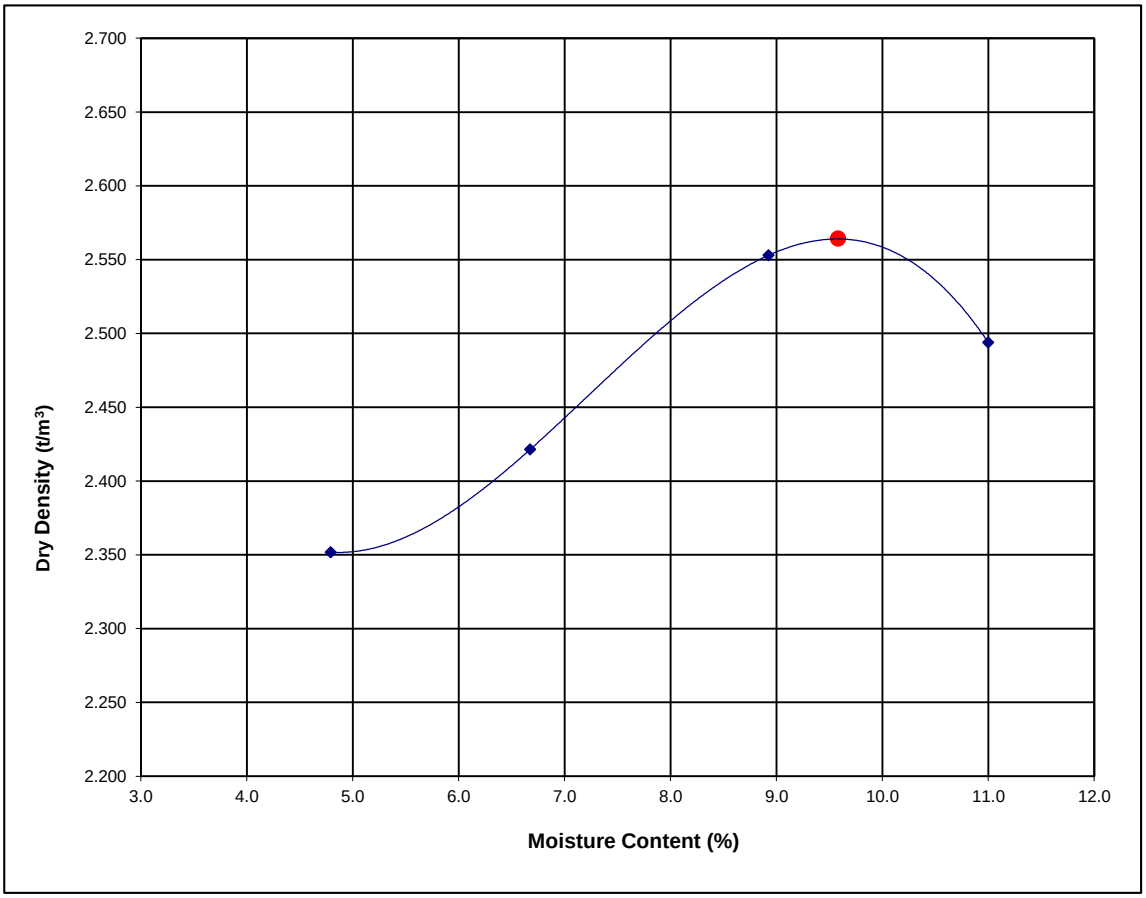
MOISTURE/DENSITY RELATIONSHIP TEST REPORT

Test Method: AS 1289 5.1.1

Client	Tetratech Pty Ltd	**Report No.**	12060545-MDD
Project	Christmas Creek	**Test Date**	12/07/2012
		Report Date	16/07/2012
Client ID	#33	**Depth (m)**	0.0-3.0
Description	-		



Maximum Dry Density (t/m^3)	2.56	**Optimum Moisture Content (%)**	9.5
Moisture Content (%)	6.2	**Percentage of Oversize/Sieve Size (mm)**	0/19

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