Appendix 11

Tomingley Gold Extension Project Geochemical Assessment

prepared by

RGS Environmental Consultants Pty Ltd

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TECHNICAL REPORT

Tomingley Gold Extension Project Geochemical Assessment

Tomingley Gold Operations

Prepared for: **R. W. Corkery and Co. Pty Ltd on behalf of Alkane Resources Ltd**

RGS

MINE WASTE AND
WATER MANAGEMENT

TECHNICAL REPORT

Tomingley Gold Extension Project Geochemical Assessment

Tomingley Gold Operations

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Glossary of Terms and Acronyms

Acidity	A measure of hydrogen ion (H+) concentration; generally expressed as pH.
Alkalinity	A measure of the capacity of a water to neutralise acids.
ABA	Acid Base Account, an evaluation of the balance between acid generation and acid neutralisation processes. Generally, determines the MPA and the inherent ANC, as defined below, and is commonly used in assessing the potential for AMD associated with mining.
AMD	Acid and metalliferous drainage caused by exposure of sulfide minerals in mine waste materials to oxygen and water. Typically characterised by low pH and elevated concentrations of salts, sulfate and metals.
ANC	Acid neutralising capacity of a sample as kg H_2SO_4 per tonne of sample. Commonly referred to as the buffering capacity.
ANC:MPA	Ratio of the acid neutralising capacity and maximum potential acidity of a sample. Used to assess the risk of a sample generating acid conditions.
Dispersive	Dispersive soil and rock materials are structurally unstable and disperse into basic particles such as sand, silt and clay in water. When a dispersive soil is wet, the basic structure has a tendency to collapse, whereas when it is dry it is prone to surface sealing and crusting.
EC	Electrical Conductivity, expressed as µS/cm, is a measure of electrical conductance.
eCEC	Effective cation exchange capacity provides a measure of the amount of exchangeable cations (Ca, Mg, Na and K) in a sample.
ESP	Exchangeable sodium percentage provides a measure of the sodicity of a materials and propensity to erode.
MPA	Maximum Potential Acidity calculated by multiplying the total sulfur content of a sample by 30.625 (stoichiometric factor) and expressed as kg H_2SO_4 per tonne.
NAG test	Net acid generation test. Hydrogen peroxide solution is used to oxidise sulfides in a sample, then any acid generated through oxidation may be consumed by neutralising components in the sample. Any remaining acidity is expressed as kg H_2SO_4 per tonne. The more elaborate extended boil NAG test can be used if a sample has a high organic carbon content to attempt to eliminate interference and false positive results.
NAF	Non-acid forming. Geochemical classification criterion for a sample that will not generate acid conditions.
NAF-Barren	Non-acid forming and barren of sulfur (i.e., less than or equal to 0.07% sulfur). Geochemical classification criterion for a sample that will not generate acid conditions.
NAPP	Net acid producing potential expressed as kg H_2SO_4 per tonne. NAPP is the balance between the capacity of a sample to generate acidity (MPA) minus its capacity to neutralise acidity (ANC).
NMD	Neutral mine drainage typically caused by exposure of sulfide minerals in mine waste materials to oxygen and water and then neutralisation by gangue minerals. Typically characterised by neutral pH and elevated concentrations of salts, sulfate and metals.
Ore	Material that is been mined with sufficient value to warrant processing. Low-grade ore may be left as waste.
PAF	Potentially acid forming. Geochemical classification criterion for a sample that has the potential to generate acid conditions.
pH	Measure of the hydrogen ion (H+) activity in a sample solution, expressed in pH units.
Scr	Chromium reducible sulfur test measures the sulfide sulfur content of a sample material.

Sodic	Sodic soil and rock materials are characterized by a disproportionately high concentration of sodium (Na) in their cation exchange complex and are innately unstable, exhibiting poor physical and chemical properties, which impede water infiltration, water availability, and ultimately plant growth.
Static test	Procedure for characterising the geochemical nature of a sample at one point in time. Static tests may include measurements of mineral and chemical composition of a sample and the Acid Base Account.
Tailing	A form of process residue generated as a result of processing or ore.
Total Sulfur	Total sulfur content of a sample generally measured using a 'Leco' analyser expressed as % S.
Uncertain	Geochemical classification criterion for a sample where the potential to generate acid conditions remains uncertain and may require further analysis.
Waste Rock	Material that surrounds an ore body and must be removed to mine the ore.
WRE	Waste Rock Emplacement. A facility used to store waste rock.

1 Introduction

1.1 Background

RGS Environmental Pty Ltd (RGS) was commissioned by R.W. Corkery & Co. Pty. Limited (RWC) on behalf of Alkane Resources Ltd (Alkane) to complete a Geochemical Assessment of waste rock materials for the Tomingley Gold Extension Project (the Project). The objectives of the Geochemical Assessment were to:

- review exploration drilling and laboratory assay data and develop an appropriate sampling and geochemical characterisation program for waste rock (and some ore) samples from the Project;
- collect and geochemically characterise representative samples of waste rock (and some ore) materials;
- to identify any waste rock (and ore) materials with the potential to generate acid, metalliferous, and/or saline drainage; and
- assess the potential for waste rock materials to be sodic and dispersive.

It is understood that this Geochemical Assessment will be used to support the submission of an Environmental Impact Statement (EIS) for the Project.

1.2 Project description

The existing Tomingley Gold Operations (TGO) is operated by Tomingley Gold Operations Pty Ltd (the Applicant), a subsidiary of Alkane, and comprises both open cut and underground gold mining. TGO is located in the Great Western Plains of New South Wales (NSW) approximately 40 km south of Narromine and 50 km south-west of Dubbo (the TGO Mine Site) (**Figure 1-1**).

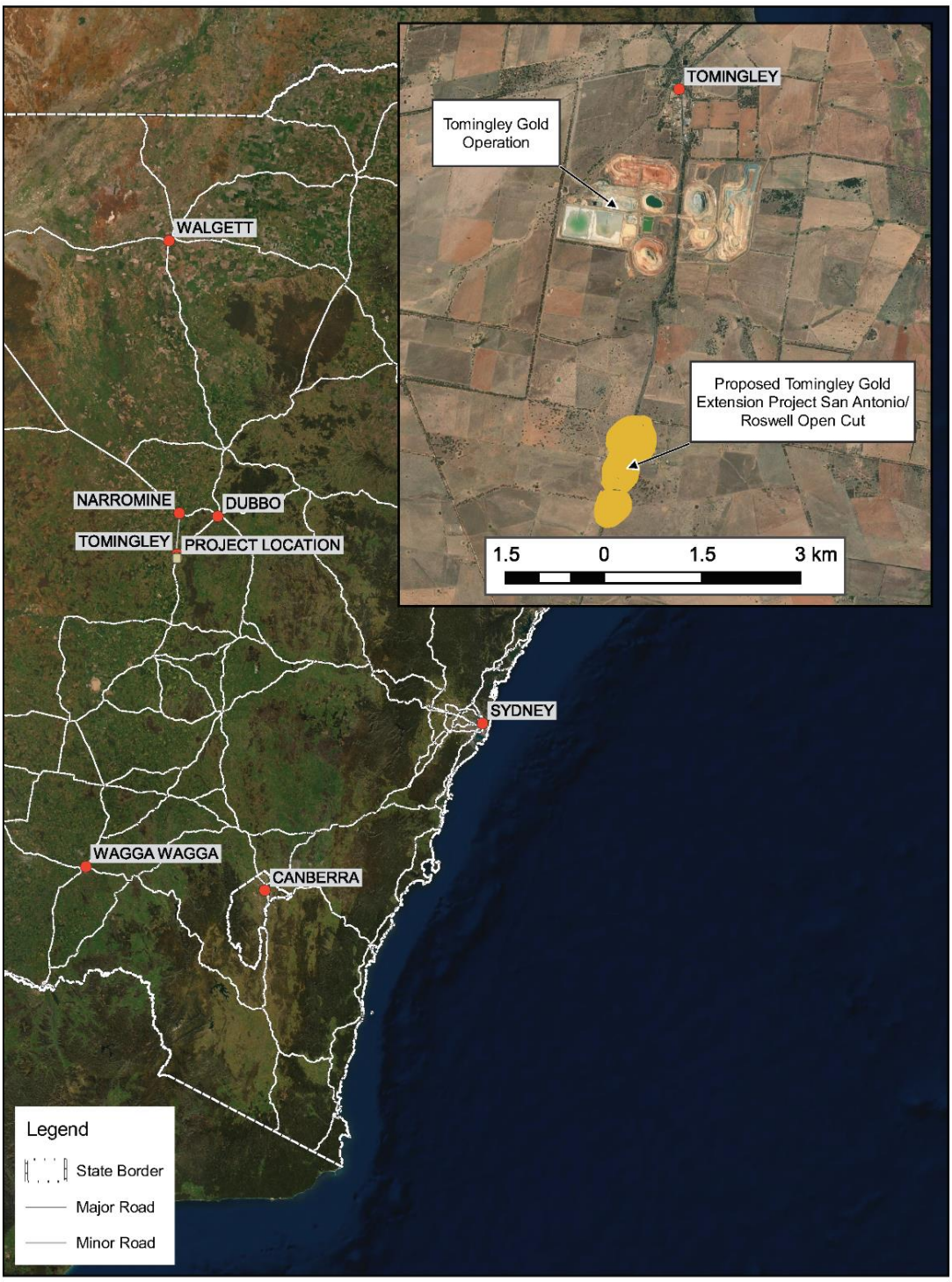
The Project aims to develop the San Antonio and Roswell (SAR) deposits to the south of the TGO Mine Site through both underground and open cut mining works (the SAR Mine Site).

The Project would include the development of the SAR open cut mine, the transition of the existing SAR exploration drive into a production drive for an underground mine targeting the SAR deposits, construction of the Caloma Waste Rock Emplacement (WRE) within the existing and approved Caloma 1 and Caloma 2 Open Cuts within the TGO Mine Site, and the construction of the SAR WRE within the southern and central sections of the SAR Open Cut. There would be minor modifications to the existing TGO Mine Site to increase the approved maximum processing rate from 1.5 million tonnes per annum (Mtpa) to 1.75 Mtpa and use of the Processing Plant to process ore from both the SAR Mine Site and TGO Mine Site.

The Project would include the proposed realignment of sections of the Newell Highway and Kyalite Road, including the associated intersections of the Newell Highway with Back Tomingley West Road, McNivens Lane, and Kyalite Road. In addition, the Project would include the SAR Amenity Bund, Haul Road and Services Road between the SAR Open Cut and the Caloma 2 Open Cut, increased capacity for RSF2 from Stage 2 to Stage 9, (or to a maximum elevation of 286 m AHD), as well as associated surface and underground activities and infrastructure. Additionally, an extension of the approved mine life, from 31 December 2025 to 31 December 2032, is sought.

1.3 Project geology

The SAR deposits targeted by the Project are hosted within the Mingelo Volcanics and flanked by the Cotton Formation. Current interpretation describes the SAR deposits as orogenic gold systems, derived from the circulation of gold-enriched fluids associated with convergent plate margins and compressional to transgressional shear zones (Robb, 2005; RWC, 2021). The Mingelo Volcanics comprise Ordovician aged andesites, volcaniclastic breccias, and volcaniclastic sandstones and siltstones intruded by feldspar porphyries. The Cotton formation on the western edge of the Mingelo Volcanics comprises siltstones and sandstones. Alluvial sequences of clays, sands, and gravel overlie the basement geologies ranging from 20 to 60 m in thickness.



Source: Tomingley Gold Operation; Google Satellite

RGS	Scale 1:5,000,000 Datum: GDA94 / MGA zone 55	Tomingley Gold Extension Project Geochemical Assessment	50 0 50 100 150 km
	2021054_RWCC Tomingley Gold Extension_Spatial Data.qgz; Project Location	**Project Location**	Figure: 1-1 Job Number: 2021054 31/08/2021 N

Figure 1-1: Project location

1.4 Acid and Metalliferous Drainage

In Australia, the term Acid and Metalliferous Drainage (AMD) is used and addresses all mine water issues that can include acid, neutral or alkaline pH, saline drainage, and metalliferous drainage. In North America, the terms Acid Rock Drainage and Metal Leaching (ARD & ML) are used. AMD is not just about acid.

Terms used to **classify mined materials** can include the following:

- **AF** (Acid Forming) – sample is producing acid (< pH 5), contains no available Acid Neutralising Capacity (ANC) and may have additional sulfide content that could oxidise and produce additional acidity.
- **PAF** (Potentially Acid Forming) – has sufficient reactive sulfide minerals to potentially produce acidity when all available ANC is consumed.
- **PAF-LC** (Potentially Acid Forming - Low Capacity) - has the potential to produce relatively minor acidity.
- **NAF-Barren** (Non-Acid Forming - Barren) - is geochemically inert in respect to total sulfur and will produce circum-neutral drainage generally in the range pH 6 to 9 with low sulfate concentrations.
- **NAF** (Non-Acid Forming) - will not produce acid but may leach salts and some metals/metalloids due to the presence of low concentrations of sulfide minerals.
- **AC** (Acid Consuming) - has significant available ANC that may contribute to ongoing acid neutralisation (e.g., calcite, dolomite).

Other terminology used to classify geological materials include the following:

- Saline - material may leach salts dominated by sodium chloride (NaCl) and/or calcium (Ca), magnesium (Mg) and sulfate (SO_4).
- Sodic – this material has a proportionally high concentration of exchangeable Na and has the potential to disperse and tunnel.

General industry terms that can be used to **describe water quality** at mines include the following:

- Acid Mine Drainage;
- Acid Rock Drainage and Metal Leaching;
- Acid and Metalliferous Drainage;
- Neutral and Metalliferous Drainage;
- Saline Drainage; and
- Mine Impacted Water.

Mine water that is in contact with mining materials can have the follow geochemical characteristics:

- acid, neutral, or alkaline pH;
- variable concentrations of major ions (salts e.g., Ca, Mg, potassium (K), Na, chloride (Cl), SO4, boron (B), fluoride (F), phosphate (P)); and
- variable concentrations of metals (e.g., aluminium (Al), iron (Fe), manganese (Mn) and zinc (Zn)) or metalloids (e.g., arsenic (As), selenium (Se) and antimony (Sb)) with specific concentrations often linked to pH.

Potential sources of acidity in contact water at metalliferous mine sites can include:

- oxidation of sulfide minerals such as pyrite that produce sulfuric acid (INAP, 2009);
- rainfall and leaching of cations such as Ca, Mg, K, and Na that reduce soil acidification by atmospheric carbonic, nitric, or sulfuric acid;
- organic matter decay; and

- use of ammonium-based nitrogen fertilisers.

Potential sources of salts in contact water at mine sites can include:

- oxidation of sulfide minerals, the production of sulfuric acid and subsequent neutralisation reactions that mobilise major ions such as SO4, Ca and Mg;
- chemical weathering of adjacent soil and rock by sulfuric acid that releases major ions such as Na, K, Mg and Cl; and
- the mobilisation of NaCl or sodium bi-carbonate (NaHCO3) that are present within geological units and groundwater which is then released in fluxes as mined materials are extracted (blasted), processed (crushed) and placed into mine landforms.

Potential sources of metal ions (e.g., Al^{3+}, Fe^{2+}, Fe^{3+}, Mn^{2+} and Zn^{2+}) and oxyanions (e.g., $[MoO_4]^{2-}$ in water at mine sites can include elements present:

- as ancillary minerals that weather very slowly within primary sulfide minerals;
- in a range of minerals in geological units with increasing environmental mobility that include immobile oxide minerals which are less mobile than carbonate minerals which are less mobile than exchangeable minerals which are less mobile than water soluble minerals; and
- in pore water.

1.5 Quality, standards, regulation, legislation, and guidelines

The purpose of this Geochemical Assessment is to characterise and assess waste rock materials likely to be generated by the Project in accordance with applicable legislation, regulation, guidelines, and standards. These may include:

- AMIRA (2002). ARD Test Handbook: Project 387A Prediction and Kinetic Control of Acid Mine Drainage, Australian Minerals Industry Research Association, Ian Wark Research Institute and Environmental Geochemistry International Pty Ltd, May.
- Australian and New Zealand Water Quality Guidelines (ANZG, 2018) that supersede the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000) (ANZECC & ARMCANZ).
- Global Acid Rock Drainage Guide (INAP, 2021).
- Commonwealth of Australia Leading Practice Sustainable Development Program (LPSDP) for the Mining Industry: Prevention of Acid and Metalliferous Drainage (2016a).
- Commonwealth of Australia Leading Practice Sustainable Development Program (LPSDP) for the Mining Industry: Rehabilitation (COA, 2016b).
- Commonwealth of Australia Leading Practice Sustainable Development Program (LPSDP) for the Mining Industry: Mine Closure (COA, 2016c).

2 Methodology

2.1 Geochemical Sampling and Analysis Plan

RGS reviewed existing information at the Project including exploration drilling and assay data and mine planning for potential ore and waste rock materials. This information was used by RGS to develop a Geochemical Sampling and Analysis Plan (GSaAP) (RGS, 2021). The objective of the GSaAP was to assist TGO Geology personnel to collect representative samples of waste rock materials likely to be generated by the Project and to effectively characterise the geochemical properties of these materials. The sampling and geochemical testing program for waste rock materials was completed to align with the relevant requirements of the technical guidelines listed in **Section 1.5**.

2.2 Sampling program

Samples representing waste rock materials likely to be generated at the Project were collected from specific intervals of diamond drill core and reverse circulation drill chips sourced from exploration and geotechnical drill holes. The waste rock samples were selected to be representative of major lithologies (greater than 2% of total) encountered during exploration drilling.

As waste rock and low-grade ore (assumed to be circa-0.5 g/tonne gold (Alkane 2020a; Alkane 2020b; Alkane 2020c)) may be exposed to oxidising conditions when in their respective emplacements and ore may undergo oxidation while stockpiled on the run-of-mine (ROM) pad several intervals of potential ore and low-grade ore, were sampled along with waste rock. The number, lithology and locations of the selected samples were informed by the following factors:

- Geological variability and complexity in material types;
- information/experience from geologically comparable mine sites;
- potential for significant environmental or health impacts;
- size of the operation and volume of material type;
- statistical requirements which ensure samples are representative;
- level of confidence in predictive ability; and
- relative costs.

A total of 85 samples from nine major lithology types were collected from nine drill holes across the Project area (**Table 2-1** and **Figure 2-1**). Drill hole traces were also plotted against the proposed pit shell to constrain sampling to materials within the pit. Samples were selected at semi-regular intervals along each drill hole to ensure the samples were adequately representative of vertical variability in potential pit materials. The samples were collected by TGO personnel and shipped to ALS Environmental (ALS), a NATA accredited laboratory located in Stafford, Queensland.

Table 2-1: Major lithologies sampled from the Project area

Lithology	Number of Samples	Lithology	Number of Samples
Alluvium	11	Saprock/Saprolite	13
Andesite	26	Volcaniclastic conglomerate	4
Dacite	3	Volcaniclastic sandstone	18
Monzodiorite	4	Volcaniclastic siltstone	3
Quartz	3	Total	85

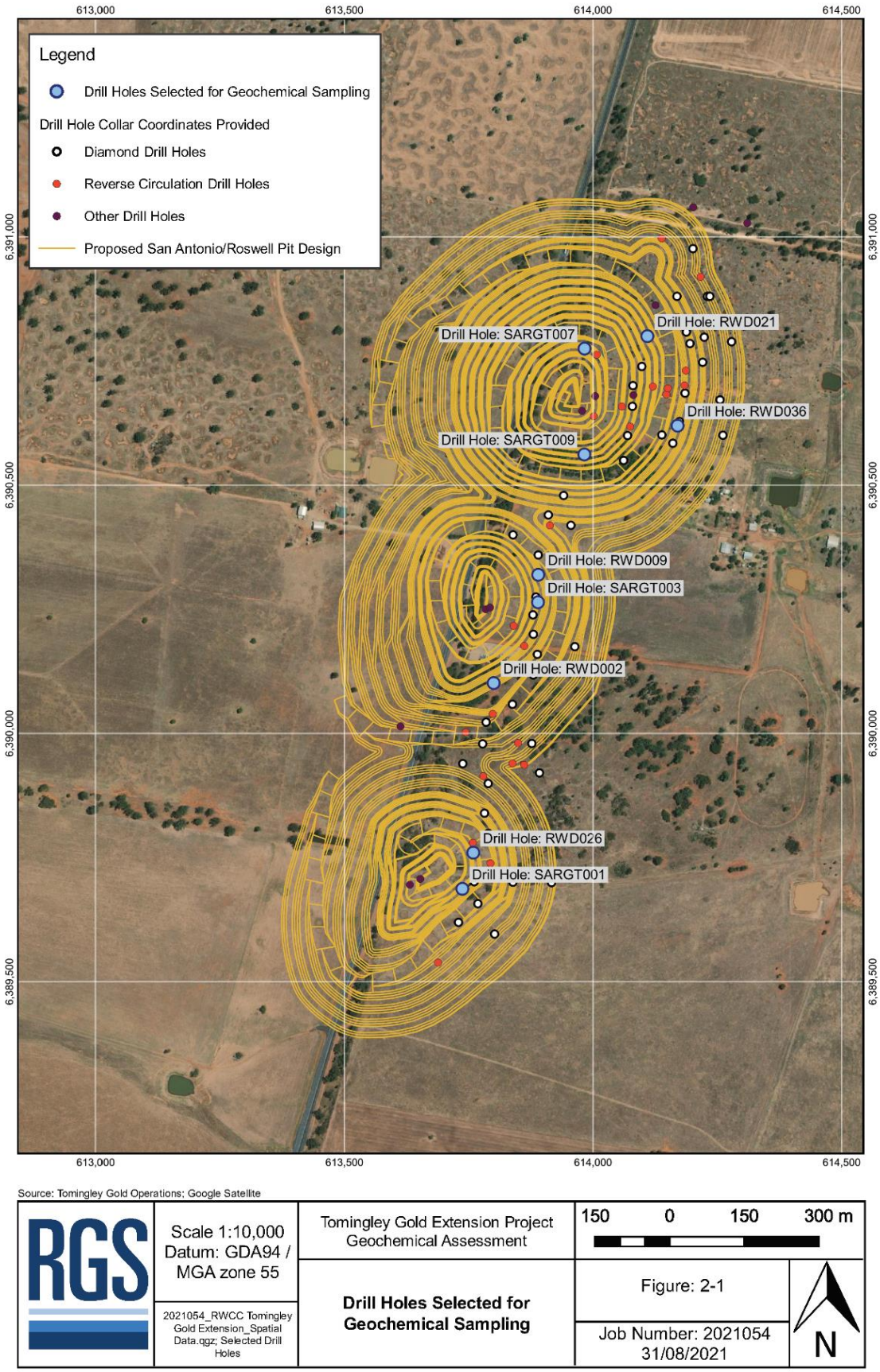


Figure 2-1: Drill holes selected for geochemical sampling

3 Geochemical and Physical Characterisation

3.1 Analysis program

The 85 samples received by ALS were prepared for geochemical testing by crushing to pass 20 mm (where necessary), sub-sampling and pulverising the sub-sample to ≤ 75 µm particle size. This standard laboratory procedure provides a more homogenous sample but also generates a larger sample surface area in contact with the resultant assay solution, thereby providing greater potential for dissolution and reaction, and represents an assumed initial 'worst case' scenario for these materials.

The geochemical analysis program had four main objectives:

1. Investigate the current pH and Electrical Conductivity (EC) value and existing acidity/alkalinity for sample materials.
2. Quantify the total sulfur/sulfide content and ANC, Net Acid Producing Potential and Net Acid Generation (NAG) capacity of the sample materials to assess any potential for the generation of AMD or NMD.
3. Quantify the metal/metalloid and major ion concentrations in the sample materials and potential solubility/mobility in contact water.
4. Determine the cation exchange capacity, particle size distribution and Emerson Aggregate class of waste rock samples to assess the potential for erosion and dispersion of these materials.

A summary of the parameters typically involved in completing a static geochemical characterisation of mine waste materials is provided in **Attachment A**. Static geochemical tests provide a 'snapshot' of the characteristics of a sample material at a single point in time. These tests were completed on individual rock samples prior to selected composite samples being prepared and subjected to additional static tests.

The 85 individual samples were initially screened using the static geochemical (Acid Base Account) analyses:

- pH (1:5 w:v, sample:deionised water);
- Electrical conductivity (EC) (1:5 w:v, sample:deionised water);
- Total Sulfur [Leco Analyser]; and
- Acid Neutralising Capacity [AMIRA, 2002 method].

A total of 43 samples with a total sulfur concentration greater than 0.1 % total sulfur were subjected to the Chromium Reducible Sulfur (Scr) test to determine the sulfide sulfur content of the samples (Australian Standard AS 4969.7, 2008 method). The Scr test provides a more accurate representation of the Maximum Potential Acidity (MPA) that could be generated from a sample material, as acid generation primarily forms from the reactive sulfide content measured by this method. MPA values were calculated using total sulfur data or Scr data (where available) and these values were balanced against the ANC values to calculate the Net Acid Producing Potential (NAPP).

Based on static Acid Base Account results, sample lithology and sample weathering 11 composite samples were prepared from the 85 individual samples. The 11 composite samples underwent a series of tests on both the solid and soluble fractions and were specifically tested for:

- titratable acidity and alkalinity (automatic titrator measured as $CaCO_3$);
- metals/metalloids in whole rock (Al, As, B, Ba, Be, Cd, Co, Cr, Cu, Fe, Hg, Mn, Ni, P, Pb, Sb, Se, Th, U, and Zn) in solids [HCl and HNO_3 acid digest followed by FIMS and/or ICP-AES/MS];
- cations in whole rock (Ca, Mg, Na, K, and Ca) [HCl and HNO_3 acid digest followed by ICP-AES/MS];
- soluble metals/metalloids (Al, As, B, Ba, Be, Cd, Co, Cr, Cu, Fe, Hg, Mn, Mo, Ni, Pb, Sb, Se, Si, Th, U, V, and Zn) [ICP-AES/MS and FIMS (1:5 w:v water extracts)];
- major cations (Ca, Mg, Na and K) [ICP-AES/MS (1:5 w:v water extracts)]; and

- major anions Cl and SO_4) [ICP-AES/MS].

The 11 composite samples were also subjected to the following series of tests to provide an indication of their physical characteristics and potential for erosion and dispersion.

- Exchangeable cations;
- Emerson Aggregate Testing
- Particle Sizing and Particle Size Classification
- Particle Density

3.2 Acid Base Account

The Acid Base Account test results for the 85 rock samples are provided in **Table B1 (Attachment B)**. An explanation of the methodology used in this section, including a description of the Acid Base Account screening method, is provided at **Section 3.1** and a glossary of terms and acronyms used is listed on **Page iv**. The ABA data trends discussed in this section are presented in **Figures 3-1** to **3-6**.

3.2.1 pH

The pH value for the 85 samples ranges from slightly acidic to alkaline (pH 5.3 to 10.0) and has an alkaline median value of pH 9.1. The deionised water used in the analysis has a pH of 6.0. **Figure 3-1** illustrates that most of the rock samples increase the pH of the sample solution. Only two samples (alluvium samples) slightly decrease the pH of the sample solution to less than 6.0.

Overall it is expected that initial leachate from most bulk rock lithologies represented by the samples tested would have an alkaline pH value and leachate from bulk alluvium would have a neutral pH value.

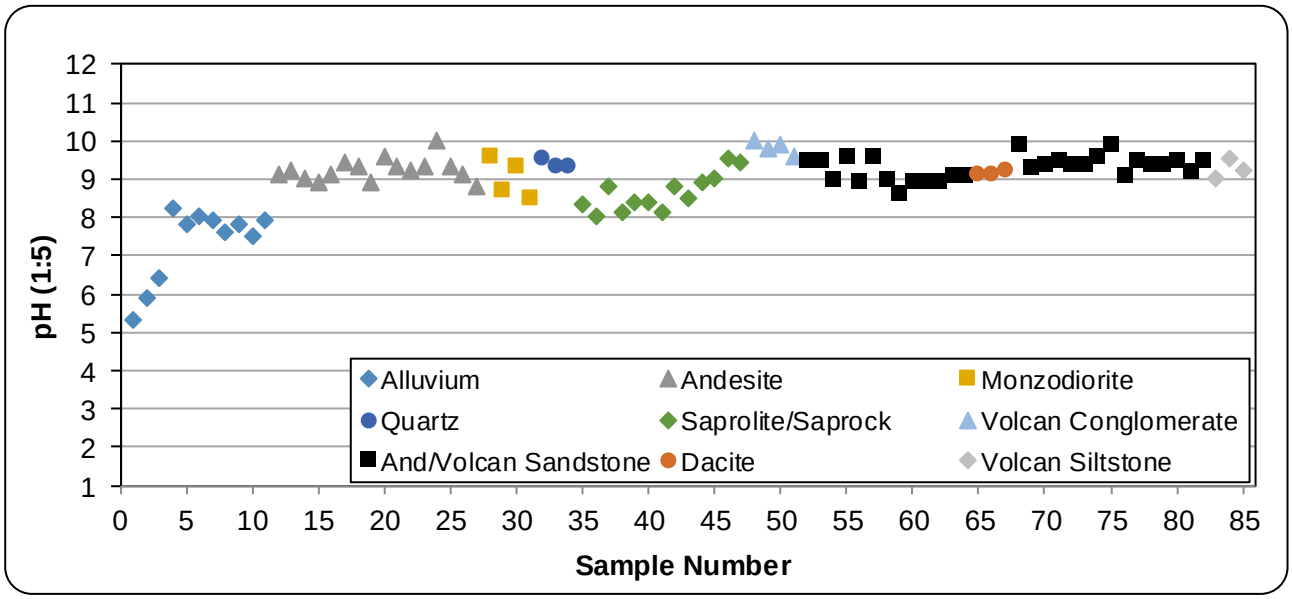


Figure 3-1: $pH_{(1:5)}$ results for samples from the Tomingley Gold Extension Project

3.2.2 Electrical conductivity (EC)

The EC values for the 85 samples provide an indication of the potential salinity that may be initially generated by the rock materials. The EC results range from 85 to 2,390 micro-Siemens/cm (µS/cm) and have a relatively low median value of 222 µS/cm. **Figure 3-2** shows that the weathered alluvium and some of the saprolite/saprock and unweathered monzodiorite samples have higher EC values relative to most samples.

Overall it is expected that initial salinity release from most bulk rock lithologies represented by the samples tested would be relatively low, although this could be expected to increase for some materials containing elevated total sulfur concentrations (if present as sulfides) are allowed to freely oxidise over time.

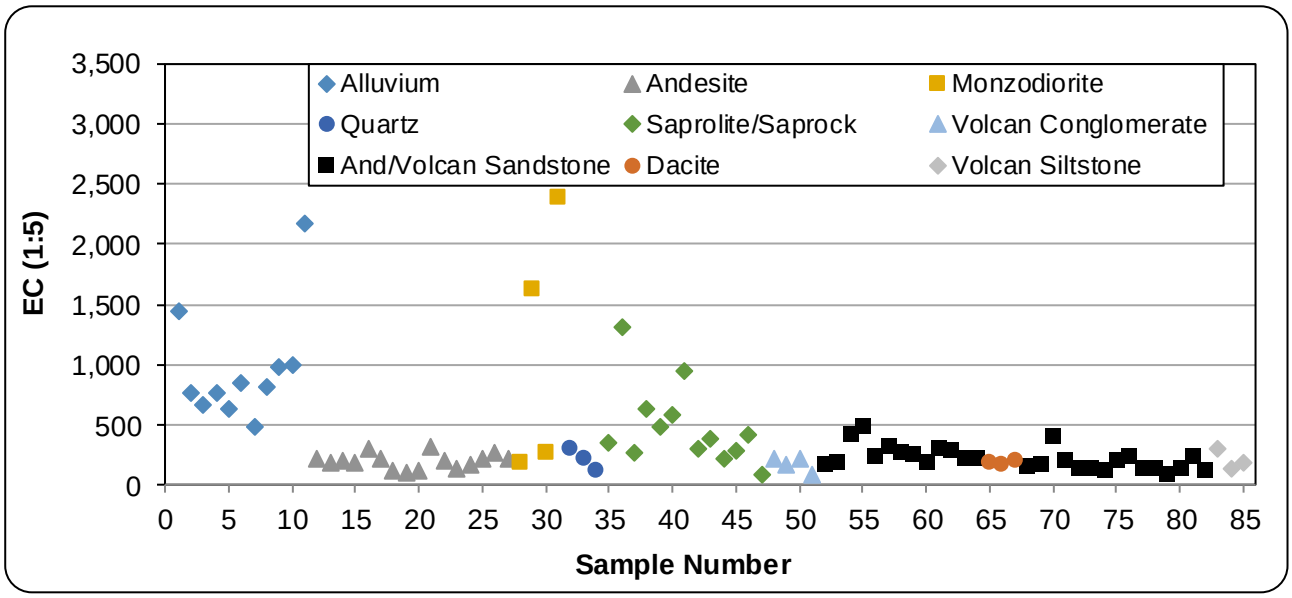


Figure 3-2: $EC_{(1:5)}$ results for samples from the Tomingley Gold Extension Project

3.2.3 Total sulfur

The total sulfur concentrations of samples were used as screening analyses to help determine which samples contained sufficient concentrations of sulfide sulfur to potentially form AMD. Samples with a total sulfur concentration of less than 0.1% are effectively barren of sulfide sulfur and so unlikely to potentially produce acidic drainage.

Figure 3-3 illustrates that the total sulfur content of the 85 rock samples ranged from below the laboratory limit of reporting (0.01 %S) to a maximum of 4.57 %S, and has a low median value of 0.11 %S. The lowest total sulfur values are associated with the alluvium, saprolite/saprock and volcaniclastic conglomerate is low whilst the remaining lithologies can contain samples with elevated total sulfur content.

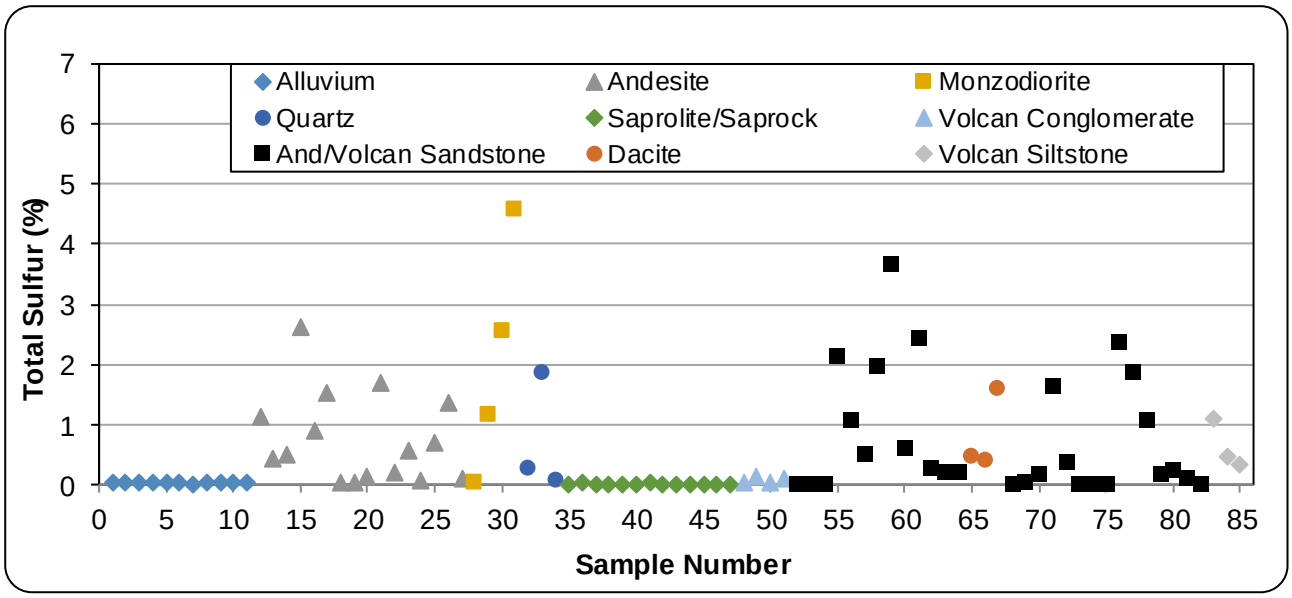


Figure 3-3: Total sulfur results for samples from the Tomingley Gold Extension Project

3.2.4 Sulfide sulfur

Samples with a total sulfur concentration of greater that 0.1 %S were analysed to determine the chromium reducible sulfur (Scr) concentrations of the samples. The Scr analysis is used to determine the concentration of sulfur present in the samples as sulfide. Sulfide is the reduced form of sulfur (e.g. pyrite) which, depending on the mineralogy of the sample, may oxidise under surface conditions to generate acidity.

Of the 85 samples collected, 43 samples have a total sulfur concentration more than 0.1%. In most samples, sulfide sulfur comprises approximately 80 % of the total sulfur present.

3.2.5 Maximum potential acidity (MPA)

The MPA of a sample is a calculated value describing the maximum amount of acidity that a sample could potentially produce. The total sulfur concentration (or sulfide sulfur concentration. if available) of a sample is multiplied by a stoichiometric factor to determine the amount of sulfuric acid that a sample could potentially produce.

The MPA of the samples ranges from 0.2 to 95.2 kg H_2SO_4/tonne and has a low median value of 2.8 kg H_2SO_4/tonne.

3.2.6 Acid neutralising capacity (ANC)

The ANC of a sample is the maximum amount of acid a sample could potentially neutralise acid and assumes that the full neutralising capacity of a sample is available to neutralise acid.

The ANC of the samples range from 3.2 to 528.0 kg H_2SO_4/tonne and has an elevated median value of 89.2 kg H_2SO_4/tonne. In simplistic terms, the median ANC value is more than an order of magnitude greater than the median MPA value.

3.2.7 Net acid production potential (NAPP)

The NAPP describes the balance of the MPA and ANC of a sample and is calculated by subtracting the ANC from the MPA of a sample.

The NAPP value of the samples ranges from -525.2 to 41.2 kg H_2SO_4/tonne and has a negative median value of -61.6 kg H_2SO_4/tonne.

Figure 3-4 illustrates that the NAPP for all but one of the samples (a fresh monzodiorite sample collected from 210.5 to 211.0 m depth) is negative or close to zero. These results indicate that the overwhelming majority materials represented by the samples tested are unlikely to generate acidic drainage under oxidising conditions.

3.2.8 ANC:MPA ratio

The ANC to MPA ratio is an indicator of a samples ability to produce or neutralise acidic drainage. Samples with and ANC:MPA ratio of three or greater are considered to have an excess of ANC and are unlikely to generate acidic drainage. Samples with an ANC:MPA ratio of less than one may have the potential to generate acidic drainage, dependent on mineralogy.

Figure 3-5 shows a plot of ANC versus MPA for the 85 rock samples. Most (77) of the samples have an ANC:MPA ratio greater than two, indicating that most materials represented by these samples have a high factor of safety and negligible to low risk of generating acidic drainage. Seven of the remaining eight samples plot in the possible risk domain and only one sample (a fresh monzodiorite sample collected from 210.5 to 211.0 m depth) plots in the increased risk domain and may have an increased risk of acid generation.

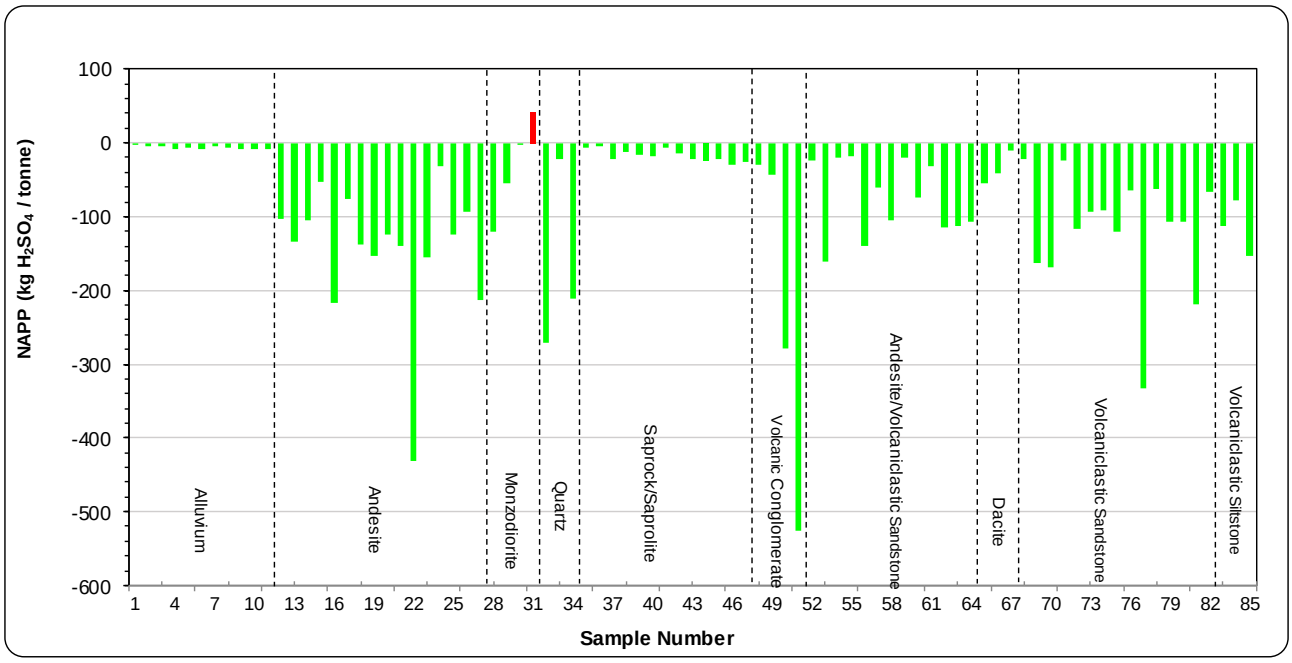


Figure 3-4: NAPP results for samples from the Tomingley Gold Extension Project

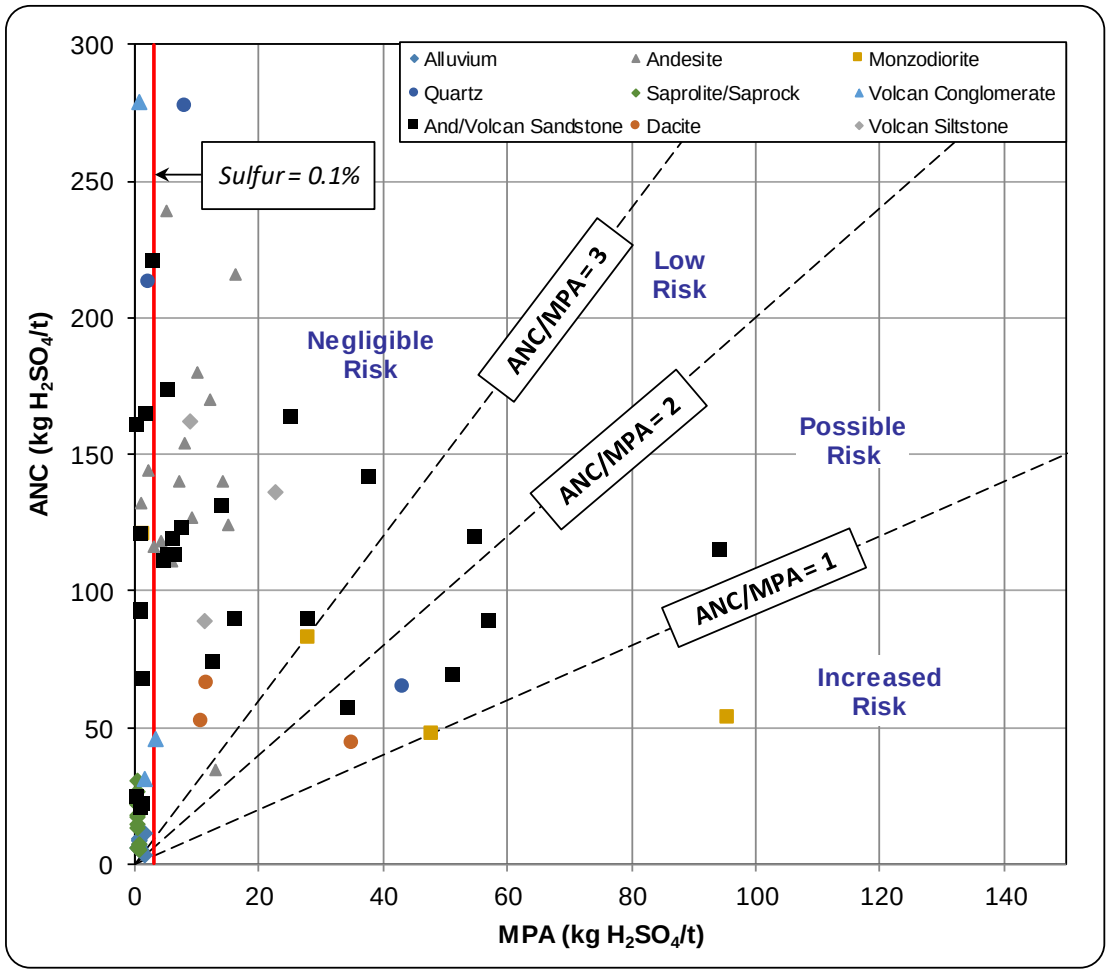


Figure 3-5: ANC vs MPA results for samples from the Tomingley Gold Extension Project

3.2.9 Net Acid Generation (NAG)

The standard Net Acid Generation (NAG) test involves the oxidation of sulfides within a sample material and subsequent neutralisation by inherent neutralising minerals (e.g., calcite) using hydrogen peroxide (H_2O_2) oxidising solution buffered to pH 4.5 (AMIRA, 2002). The intent is to oxidise all inherent sulfides with the potential to contribute to the MPA of the sample and to consume all the available inherent ANC. The standard NAG test results can, however, produce erroneous final NAG_{pH} and NAG capacity when samples contain sulfur in concentrations exceeding 1 %S and relatively high amounts of available neutralising capacity. The catalytic breakdown of the peroxide by reaction with sulfide species may prevent all sulfides in the sample being oxidised as the peroxide is consumed (AMIRA, 2002). It is therefore important that standard NAG test results are considered within the context of existing Acid Base Account results.

As with Scr, 43 samples with total sulfur concentrations greater than 0.1 %S were analysed for NAG_{pH} and NAG capacity titrated to both pH 4.5 and pH 7.0. NAG_{pH} results for the rock samples range from pH 2.2 to 11.7 and are typically alkaline. The relationship between NAG_{pH} and NAPP is plotted in **Figure 3-6** which illustrates that while three rock samples have a NAG_{pH} less than 4.5, only one of these samples (a fresh monzodiorite sample collected from 210.5 to 211.0 m depth), also has a positive NAPP value and plots in the Potentially Acid Forming (PAF) domain. The remaining two samples with a NAG_{pH} less than 4.5 do not have a positive NAPP value and plot in the lower Uncertain domain (i.e., these two samples have conflicting NAPP and NAG test results. The remaining 40 rock samples plot in the Non-Acid Forming (NAF) domain.

Geochemical classification criterion for a sample where the potential to generate acid conditions remains uncertain and may require further analysis.

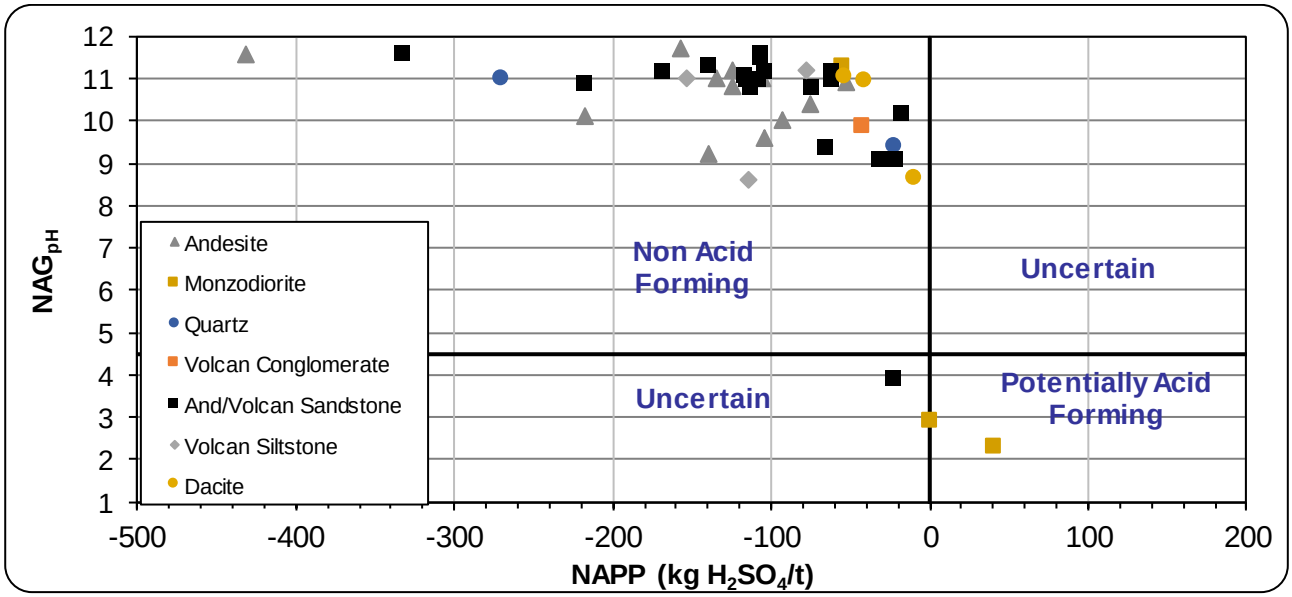


Figure 3-6: NAG_{pH} vs NAPP results for samples from the Tomingley Gold Extension Project

3.2.10 Geochemical classification

Table 3-1 illustrates the sample classification methodology used by RGS to classify the acid forming nature of the 85 rock samples, with the number of samples in each specific classification category provided. The results demonstrate that of the 85 rock samples analysed, 82 (96.5 %) are classified as NAF and approximately half of these samples (43 samples) have a sufficiently low concentration of sulfur to be considered barren of sulfides and have a high factor of safety with respect to potential to generate acidic drainage. Thirty-nine (39) of the 82 NAF samples have excess ANC although some samples have elevated total sulfur content and could still potentially be a source of saline and or metalliferous drainage. Two samples are classified as Uncertain due to conflicting NAPP and NAG test results, and one sample is classified as PAF.

Based on static Acid Base Account and NAG test data, materials represented by most waste rock samples have no capacity to generate acidic drainage. However, some of these materials with elevated sulfur content may still have the potential to generate saline and/or metalliferous drainage. Similarly, for the small amount of rock samples classified as Uncertain or PAF, there may be some risk of metals, metalloids, or salts being generated and released into contact water although most metals would be expected to precipitate in the bulk NAF rock materials with excess ANC. If these solutes are not fully removed by the neutralisation of the acidic drainage, it may still lead to the production of metalliferous or saline drainage.

Table 3-1: Geochemical classification of samples from the Tomingley Gold Extension Project

Classification	Total Sulfur or Scr (%)	NAPP (kg H_2SO_4/t)	ANC:MPA ratio	Number of samples
Non-Acid Forming (Barren)	≤ 0.1	-	-	43
Non-Acid Forming	> 0.1	≤ -5	≥ 2	39
Uncertain	> 0.1	> -5 to ≤ +5	< 2	2
Potentially Acid Forming - Low Capacity	> 0.1	> 5 to ≤ 10	< 2	0
Potentially Acid Forming	> 0.1	> 10	< 2	1

Multi-element testing was undertaken to assess the concentration of metals/metalloids in composite whole rock samples and the potential for this to be released as saline and/or metalliferous drainage (**Sections 3.3** to **3.5**).

3.3 Multi-elements in solids

Multi-element analysis was completed on 11 composite rock samples made up from the 85 waste rock and ore samples described in in **Section 3.1**. The selection of samples was based on logged sample lithology, weathering, geochemistry and location. The samples used to prepare each composite sample are listed in **Table B2** (**Attachment B**). The 11 composite samples were tested to identify any elements (metals/metalloids) present at concentrations that may be of environmental concern with respect to materials handling, storage, and/or water quality. To provide relevant context, RGS has compared the total metal/metalloid concentration in samples to National Environmental Protection Council (NEPC) Health-based Investigation Levels (HIL(C)) for soils in public open spaces (NEPC, 2013).

The results from multi-element testing (total metals/metalloids) of the 11 composite samples are presented in **Table B3** (**Attachment B**).

Lithologies produced through weathering (i.e., alluvium, saprolite, and saprock) generally have lower total major ions relative to both weathered and fresh igneous lithologies. The exception to this is sodium and chloride, where weathered lithologies are enriched in total sodium and chloride relative to igneous lithologies. The NAF monzodiorite is also relatively depleted in potassium compared to PAF monzodiorite and the other lithologies.

Total major, minor and trace element concentrations are generally lower than NEPC guideline limits, with approximately 40 % of results below the relevant laboratory limit of reporting. Total arsenic concentrations are greater than the guideline limit concentration of 300 mg/kg in the Fresh Andesite (346 mg/kg) and Quartz (628 mg/kg) composite rock samples. Arsenopyrite (FeAsS) mineralisation is known to be present in parts of this deposit and likely the primary source of arsenic in these samples (Alkane, 2020a).

3.4 Assessment of element enrichment in solids

To provide additional context and in line with mining industry guidelines, the multi-element results described in **Section 3.3** were also compared to the typical background concentrations (median crustal abundance) of those elements (metal/metalloids) in un-mineralised soils (COA, 2016; INAP, 2020).

The extent of enrichment is reported as the Geochemical Abundance Index (GAI), which relates the actual concentration in a sample with the median crustal abundance on a $\log_{10}$ scale. The GAI is expressed in integer increments from 0 to 6, where a GAI value of 0 indicates that the element is present at a concentration less than, or similar to, the median crustal abundance; and a GAI value of 6 indicates approximately a 100-fold enrichment above median crustal abundance (**Table 3-2**).

Table 3-2: Geochemical Abundance Index (GAI) values and Enrichment Factors

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

As a general rule, a GAI of 3 or greater signifies enrichment that may warrant further examination. This is particularly the case with some environmentally important 'trace' elements, such as As, Cr, Cd, Cu, Pb, Se and Zn, more so than with major rock-forming elements, such as Al, Ca, Fe, Mg and Na.

Elements identified as enriched using the GAI may not necessarily be a concern for revegetation, drainage water quality or public health and the following points should also be noted:

- The median crustal abundance varies between different literature sources, therefore affecting the calculated GAI values.
- If a sample is enriched relative to the median crustal abundance, there is no direct correlation that the sample will also leach metals/metalloids at elevated concentrations. The mobility of metals/metalloids is dependent on mineralogy, adsorption/desorption and the environment in which it occurs.
- Whilst some element concentrations can be elevated relative to the median crustal abundance, the nature of a deposit means the background levels of some elements are generally expected to be elevated.

Similarly, because an element is not enriched does not mean it will never be a concern, because under some conditions (e.g., low pH) the solubility of common environmentally important elements such as Al, Cu, Cd, Fe and Zn can increase significantly.

Table B3 (Attachment B) provides total metal/metalloid concentrations for the 11 composite rock samples. The relative enrichment of metals/metalloids in these samples compared to median crustal abundance (the GAI) is presented in **Table B4 (Attachment B)**.

All major ions and most major, minor and trace elements have a GAI value of less than 3. Arsenic is relatively enriched compared to un-mineralised soils in the weathered andesite (GAI = 5), fresh andesite (GAI = 5), quartz (GAI = 6), fresh volcaniclastic sandstone (GAI = 4), and fresh volcaniclastic siltstone (GAI = 4) rock samples.

This relative enrichment in arsenic is expected given the known mineralisation and geology of the deposit area. The potential mobility of arsenic and other elements in water extracts is presented in **Section 3.5**.

3.5 Multi-elements in solution

The potential solubility and mobility of the metals/metalloids contained in the 11 composite rock samples was investigated further through water extract tests as described in **Section 3.1**. Using sample pulps (ground to passing 75 µm) provides a very high surface area to solution ratio, which encourages mineral reaction and dissolution of the solid phase. As such, the results of screening tests on water extract solutions are assumed to represent an assumed 'worst case' scenario for initial surface runoff and seepage from sample materials.

RGS has compared the multi-element test results for water extracts from the 11 composite rock samples with ANZG (2018) water quality guideline values. These guidelines are provided for context only and are not intended to be interpreted as "maximum permissible levels" for site water storage or discharge.

It should also be recognised that direct comparison of geochemical data with guideline values can be misleading. For the purposes of this study, guideline values are only provided for broad context and should not be interpreted as arbitrary 'maximum' values or 'trigger' values. Whilst arbitrary comparisons against guideline concentrations can be useful in some situations and help to provide relevant context, such comparisons cannot be directly extrapolated to the field situation at the Project.

The results from multi-element testing of water extracts (1:5 solid:water) from the 11 composite samples are presented in **Table B5** (**Attachment B**).

The pH of the water extracts ranges from neutral (pH 7.1) to alkaline (pH 9.9), with an alkaline median pH value of 9.2. The alluvium, PAF monzodiorite and saprock/saprolite composite samples have pH values within the range of applied guideline values for freshwater aquatic ecosystems (pH 6 to 9). The remainder of the lithologies tested had pH values slightly above the upper end of this range (i.e., greater than pH 9).

The EC values for the water extracts is generally low relative to applied guideline values, with only the alluvium and PAF monzodiorite being greater than the freshwater aquatic ecosystem guideline value of 1,000 µS/cm. All of the samples have EC results less than the livestock drinking water guideline value of 3,580 µS/cm.

The water extracts from the 11 composite rock samples have elevated alkalinity values, with the acidity of all composites lower than the laboratory limit of reporting of 1 mg $CaCO_3$/kg (except for Alluvium). These characteristics lead to a positive net alkalinity value being recorded in water extracts collected from all composite rock samples. The excess alkalinity was mainly present as bicarbonate with smaller concentrations of carbonate being recorded.

The concentration of soluble major ions in most of the water extracts from the composite rock samples are relatively low and generally dominated by sodium, chloride and sulfate. The main exception is the water extract from the PAF monzodiorite, which has elevated concentrations of calcium and sulfate relative to the water extracts from the other lithologies. However, only the sulfate concentration of 1,644 mg/L is greater than the applied livestock drinking water guideline value of 1,000 mg/L.

Soluble trace metals and metalloid concentrations in the composite rock samples are generally low with approximately 76 % of the results below the relevant laboratory limit of reporting. Some water extract samples have elevated concentrations of aluminium (8 samples), arsenic (2 samples) and chromium (2 samples) greater than the applied the freshwater aquatic ecosystems guideline values. However, all trace metal/ metalloid concentrations are well within the livestock drinking water guideline values. The elevated concentration of aluminium in the water extracts may be at least partly due to a breakthrough of fine colloidal particles through the 0.45 mm filter used in the in the water extract laboratory preparation stage.

Slightly elevated concentrations of some metals/metalloids in water extracts from rock samples, compared to receiving environment water quality guidelines, is common for mine waste materials. It should also be noted that during sample collection and laboratory preparation, the physical agitation and mixing of the samples can affect the physical stability of minerals and increase their solubility in a "first flush" leaching event, such as a static water extract test, which may not reflect the field situation where rocks of varying sizes will be dumped/stockpiled and rainfall/hydrological interaction with these materials is highly variable.

3.6 Cation exchange capacity and sodicity

The cation exchange capacity (CEC) results presented in **Table B3 (Attachment B)** indicate that the CEC of the sample composites ranges from very low to very high (**Table 3-3**). The exchangeable sodium percentage (ESP) results are derived from the exchangeable sodium and CEC results and are also tabulated in **Table B3 (Attachment B).** The ESP of the composites ranges from non-sodic to strongly sodic (**Table 3-4**).

Table 3-3: Cation exchange capacity ratings

Rating	CEC (meq/100 g)
Very low	<6
Low	6–12
Moderate	12–25
High	25–40
Very high	>40

From Hazelton and Murphy (2007)

Table 3-4: Exchangeable sodium percentage ratings

Sodicity rating	ESP range for Australian soils
Non-sodic	0–6
Marginally sodic to sodic	6–14
Strongly sodic	>14

The CEC and ESP ratings of the composite rock samples are shown in **Table 3-5**. The PAF monzodiorite sample was not assessed for CEC and ESP as PAF material would not be used for construction or rehabilitation.

Table 3-5: Sample composite CEC and ESP ratings

Composite	CEC Rating	CEC (meq/100 g)	ESP Rating	ESP (%)
Alluvium	Moderate	12.8	Strongly sodic	37.8
Weathered andesite	Very Low	0.7	Non-sodic	<0.2
Fresh andesite	Very Low	1.5	Strongly sodic	18.8
NAF monzodiorite	Very Low	1.2	Strongly sodic	28.2
PAF monzodiorite	---	----	----	----
Quartz	Very High	77.2	Non-sodic	0.4
Saprock and saprolite	Moderate	15.0	Strongly sodic	65.3
Volcaniclastic conglomerate	Very Low	2.7	Strongly sodic	14.8
Weathered volcaniclastic sandstone	Low	10.1	Strongly sodic	57.6
Fresh volcaniclastic sandstone	Very Low	1.7	Strongly sodic	30.6
Fresh volcaniclastic siltstone	Very Low	5.0	Marginally sodic to sodic	8.6

Overall, the results indicate that most composite samples derived from igneous lithologies are likely to have a low pH buffering ability, and low resistance to changes in available nutrients and calcium. This contrasts with the weathering derived lithologies of alluvium, saprolite, and saprock, however, these samples are indicated to be sodic and so may be prone to dispersion. It is important to note that because the ESP describes exchangeable sodium as a proportion of CEC, composites with a very low to low CEC may have a sodic rating despite relatively low levels of exchangeable sodium. The susceptibility of the composites to slaking and dispersion is further discussed in **Section 3.7**.

3.7 Sample physical properties

On the assumption that some waste rock materials may be used on the external faces of WRE's, or as construction or rehabilitation materials, selected physical properties of the 11 composite samples were analysed. The results of these analyses are presented in **Table B6** (**Attachment B**).

Emerson Aggregate Test results for the composite samples indicate that alluvium, saprolite, and saprock lithologies may be prone to slaking, dispersion, and potentially tunnelling. In contrast, Igneous rock and quartz composite samples may be prone to slaking but are unlikely to be dispersive.

Particle size results indicate for the 11 composite samples indicate that igneous and quartz composite samples are unlikely to break down to soil ped sizes, i.e., these samples yield only minor proportions of sand, silt and clay sized particles after crushing to sub-20 mm. In contrast, the alluvium material comprised mostly clay sized particles, followed by silt and sand. The saprolite and saprock material comprised primarily silt, followed by sand and clay sized particles.

4 Conclusions and recommendations

4.1 Conclusions

RGS has completed a Geochemical Assessment of waste rock (and some ore) materials for the Tomingley Gold Extension Project. The results of the program of work indicate that:

- The overwhelming majority of waste rock and ore materials represented by the samples tested are classified as NAF, with a low risk of acid generation and a high factor of safety with respect to AMD.
- Some of the igneous lithologies have elevated sulfur content (as sulfide) and has the potential to oxidise over time and be a potential source of NMD and saline drainage.
- The only lithology that contains some material classified as PAF is fresh monzodiorite sampled from below 200m depth.
- Initial contact water with most waste rock and ore materials is likely to be slightly to moderately alkaline and be fresh to slightly brackish. The main source of alkalinity is in the form of bicarbonate.
- Total metal concentrations in waste rock (and ore) are generally not significantly enriched compared to applied guideline values and median crustal abundance in un-mineralised soils. The only exception is arsenic in some of the fresh igneous and quartz lithologies and is expected given that arsenopyrite mineralisation is known to be present in parts of this deposit.
- Apart from bicarbonate, the concentrations of major ions in initial contact water with waste rock and ore materials are likely to be relatively low and dominated by sodium, chloride and sulfate. Compared to the other lithologies, material represented by the single PAF composite monzodiorite rock sample, is likely to generate higher concentrations of calcium and sulfate in initial (and ongoing) contact water.
- The majority of metals/metalloids in material represented by the waste rock and ore samples tested are likely to be sparingly soluble and generally remain within applied freshwater aquatic ecosystem and livestock drinking water quality guideline criteria under the observed slightly alkaline pH conditions (ANZG, 2018).
- Aluminium, arsenic and chromium may be marginally more soluble in initial contact water from some lithologies than other elements tested compared to applied freshwater aquatic ecosystem guideline values. However, all trace metal/ metalloid concentrations are well within the livestock drinking water guideline values.
- In the short term soluble metal/metalloid concentrations are unlikely to impact upon the quality of surface and groundwater resources. However, in the longer term metal/metalloid solubility from any PAF materials has the potential to increase, if these materials are not covered and are left exposed to oxidising conditions
- Some waste rock materials may have low exchangeable cation concentrations and may benefit from fertilizer addition if used for rehabilitation. Some was rock materials may be slaking and sodic and potentially susceptible to dispersion and erosion.

4.2 Recommendations

As a result of the findings of the geochemical assessment on waste rock (and ore) materials at the Project, the following recommendations are made:

- Placement of any PAF waste rock materials or materials with total sulfur content greater than 1 %S on the surface of the final waste rock landform (s) should be avoided.
- Placement of any waste rock lithologies known to contain elevated arsenopyrite mineralogy on the surface of the final waste rock landform (s) should be avoided.

- Alkane should monitor pH, EC, major ions and selected soluble metals/metalloids (e.g., Al, As, Cu, Cr, Cd, Cu, and Zn) in surface runoff and in seepage downstream of the proposed waste rock placement and ore stockpile areas at the Project. Should the monitored pH drop below 6.0 and/or the EC increase by more than 100 %, a wider range of water quality parameters should be tested including acidity, alkalinity and the range of soluble metals in **Table B5** (**Attachment B**) of this report.
- The geochemical and physical suitability of any waste rock materials for use in surface infrastructure and rehabilitation activities at the Project should be verified using monitored field trials during operations when bulk waste rock materials become available.

5 References

Alkane (2020a). *Initial Roswell Inferred Resource.* Alkane Resources Ltd. 28 January.

Alkane (2020b). Initial San Antonio Inferred Resource Lifts Tomingley Corridor Resources To Over 1 Million Ounces of Gold. Alkane Resources Ltd. 20 April.

Alkane (2020c). Updated Roswell Resource Estimation Lifts Contained Ounces by 50% to 660,000oz. Alkane Resources Ltd. 4 November.

AMIRA (2002). *ARD Test Handbook: Project 387A Prediction and Kinetic Control of Acid Mine Drainage*, Australian Minerals Industry Research Association, Ian Wark Research Institute and Environmental Geochemistry International Pty Ltd, May.

ANZG 2018. Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia. Available at www.waterquality.gov.au/anz-guidelines

Australian Standard AS 4969.7 (2008). Analysis of acid sulfate soil – Dried samples – Methods of test. Method 7: Determination of chromium reducible sulfur (Scr). Standards Australia, June 2008.

Bowen, H.J.M. (1979). *Environmental Chemistry of the Elements*, Academic Press. pp.60-61. New York.

COA (2016a). Leading Practice Sustainable Development Program for the Mining Industry. Prevention and Acid and Metalliferous Drainage. Commonwealth of Australia, Canberra ACT. September.

COA (2016b). Leading Practice Sustainable Development Program for the Mining Industry. Mine Rehabilitation. Commonwealth of Australia, Canberra ACT. September.

COA (2016c). Leading Practice Sustainable Development Program for the Mining Industry. Mine Closure. Commonwealth of Australia, Canberra ACT. September.

Hazelton, P. and Murphy, B. (2007). *Interpreting soil test results: What do all the numbers mean?* NSW Department of Natural Resources. CSIRO Publishing. Victoria, Australia.

INAP (2020). *Global Acid Rock Drainage Guide (GARD Guide)*. Document prepared by Golder Associates on behalf of the International Network on Acid Prevention (INAP). June 2009 (http://www.inap.com.au/).

Metson, A. J. (1961). *Methods of chemical analysis for soil survey samples*. Soil Bureau Bulletin No. 12, New Zealand Department of Scientific and Industrial Research, pp. 168–175. (Government Printer: Wellington, New Zealand.)

Robb. L. (2005). *Introduction to Ore-Forming Processes*. Blackwell Science Limited. Oxford, UK. 2005.

RWC (2021). *Scoping Report. Tomingley Gold Extension Project. Ref No. 616/34.* Prepared for Tomingley Gold Operations Pty Ltd by R.W. Corkery & Co. Pty. Limited. June 2021.

RGS (2021) *Geochemical Sampling and Analysis Plan. Tomingley Gold Extension Project.* Report prepared for R. W. Corkery & Co Pty Ltd and Alkane Resources Ltd. 22 July.

ATTACHMENT A

GEOCHEMICAL ASSESSMENT OF MINING WASTE MATERIALS

ACID GENERATION AND PREDICTION

Acid generation is caused by the exposure of sulfide minerals, most commonly pyrite (FeS_2), to atmospheric oxygen and water. Sulfur assay results are used to calculate the maximum acid that could be generated by the sample by either directly determining the pyritic S content or assuming that all sulfur not present as sulfate occurs as pyrite. Pyrite reacts under oxidising conditions to generate acid according to the following overall reaction:

$$FeS_2 + 15/4\ O_2 + 7/2\ H_2O \text{ ---> } Fe(OH)_3 + 2\ H_2SO_4$$

According to this reaction, the maximum potential acidity (MPA) of a sample containing 1% S as pyrite would be 30.6 kg H_2SO_4/t. The chemical components of the acid generation process consist of the above sulfide oxidation reaction and acid neutralization, which is mainly provided by inherent carbonates and to a lesser extent silicate materials. The amount and rate of acid generation is determined by the interaction and overall balance of the acid generation and neutralisation components.

Net Acid Producing Potential

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

Determination of pH and EC

pH and EC measured on 1:5 w/w water extract. This gives an indication of the inherent acidity and salinity of the waste material when initially exposed in a waste emplacement area.

Total sulfur content and Maximum Potential Acidity (MPA)

Total sulfur content is determined by the Leco high temperature combustion method. The total sulfur content is then used to calculate the MPA, which assumes that the entire sulfur content is present as reactive pyrite. Direct determination of the pyritic sulfur content can provide a more accurate estimate of the MPA.

Acid neutralising capacity (ANC)

By addition of acid to a known weight of sample, then titration with NaOH to determine the amount of residual acid. The ANC measures the capacity of a sample to react with and neutralise acid. The ANC can be further evaluated by slow acid titration to a set endpoint in the Acid Buffering Characteristic Curve (ABCC) test through calculation of the amount of acid consumed and evaluation of the resultant titration curve.

Net Acid Generation (NAG)

The net acid generation (NAG) test involves the addition of hydrogen peroxide to a sample of mine rock or process residue to oxidise reactive sulfide, then measurement of pH and titration of any net acidity produced by the acid generation and neutralisation reactions occurring in the sample. A significant NAG result (*i.e.,* final $NAG_{pH} < 4.5$) indicates that the sample is potentially acid forming (PAF) and the test provides a direct measure of the net amount of acid remaining in the sample after all acid generating and acid neutralising reactions have taken place. A $NAG_{pH} > 4.5$ indicates that the sample is non-acid forming (NAF). The NAG test can provide a direct assessment of the potential for a material to produce acid after a period of exposure and weathering and is used to refine the results of the theoretical NAPP predictions. The NAG test can be used as a stand-alone test but is recommended that this only be considered after site specific calibration work is carried out.

ASSESSMENT OF ELEMENT ENRICHMENT AND SOLUBILITY

In mineralised areas it is common to find a suite of enriched elements that have resulted from natural geological processes. Multi-element scans are carried out to identify any elements that are present in a material (or readily leachable from a material) at concentrations that may be of environmental concern with respect to surface water quality, revegetation and public health. The samples are generally analysed for the following elements:

Major elements Al, Ca, Fe, K, Mg, Na and S.

Minor elements As, B, Cd, Co, Cr, Cu, F, Hg, Mn, Mo, Ni, Pb, Sb, Se and Zn.

The concentration of these elements in samples can be directly compared with relevant state or national environmental and health-based concentration guideline criteria to determine the level of significance. Water extracts are used to determine the immediate element solubilities under the existing sample pH conditions of the sample. The following tests are normally carried out:

Multi-element composition of solids.

Multi-element composition of solid samples determined using a combination of ICP-mass spectroscopy (ICP-MS), ICP-optical emission spectroscopy (OES), and atomic absorption spectrometry (AAS).

Multi-element composition of water extracts (1:5 sample:deionised water).

Multi-element composition of water extracts from solid samples determined using a combination of ICP-mass spectroscopy (ICP-MS), ICP-optical emission spectroscopy (OES), and atomic absorption spectrometry (AAS).

Under some conditions (*e.*g., low pH) the solubility and mobility of common environmentally important elements can increase significantly. If element mobility under initial pH conditions is deemed likely and/or subsequent low pH conditions may occur, kinetic leach column test work may be completed on representative samples.

ATTACHMENT B

Summary Tables for Static Geochemical and Physical Test Results

LIST OF TABLES

Table B1: Acid Base Account (ABA) Test Results for the Tomingley Gold Extension Project

RGS Sample No.	Drill Hole ID	TGEP Sample ID	Sample Lithology	From	To	Interval	Weathering	Material	pH[1]	EC[1]	Total S	Scr[2]	MPA[2]	ANC[2]	NAPP[2]	ANC:MPA Ratio	NAG_{pH}	Sample Classification[3]
				(m)						(µS/cm)	(%)	(%)	kg H_2SO_4/t					
2021054_058	SARGT001	SARGT001: 4.8 - 5.4	Alluvium	4.8	5.4	0.6	Completely Weathered		5.9	769	0.03		0.92	5.1	-4.2	5.6		Non-Acid Forming (Barren)
2021054_059	SARGT001	SARGT001: 13 - 13.5	Alluvium	13	13.5	0.5	Completely Weathered		7.8	628	0.02		0.61	6.5	-5.9	10.6		Non-Acid Forming (Barren)
2021054_060	SARGT001	SARGT001: 22 - 22.6	Alluvium	22	22.6	0.6	Completely Weathered		7.9	487	0.01		0.31	5.7	-5.4	18.6		Non-Acid Forming (Barren)
2021054_061	SARGT001	SARGT001: 26 - 26.6	Alluvium	26	26.6	0.6	Completely Weathered		7.6	810	0.02		0.61	7.5	-6.9	12.2		Non-Acid Forming (Barren)
2021054_062	SARGT001	SARGT001: 37 - 37.5	Alluvium	37	37.5	0.5	Completely Weathered		7.5	993	0.02		0.61	8.5	-7.9	13.9		Non-Acid Forming (Barren)
2021054_067	SARGT003	SARGT003: 8 - 8.5	Alluvium	8	8.5	0.5	Completely Weathered		6.4	656	0.02		0.61	5.6	-5.0	9.1		Non-Acid Forming (Barren)
2021054_071	SARGT007	SARGT007: 4 - 4.6	Alluvium	4	4.6	0.6	Completely Weathered		5.3	1450	0.05		1.53	3.2	-1.7	2.1		Non-Acid Forming (Barren)
2021054_072	SARGT007	SARGT007: 49 - 49.6	Alluvium	49	49.6	0.6	Completely Weathered		7.9	2170	0.05		1.53	11	-9.5	7.2		Non-Acid Forming (Barren)
2021054_075	SARGT009	SARGT009: 10 - 10.8	Alluvium	10	10.8	0.8	Completely Weathered		8.2	769	0.02		0.61	9.4	-8.8	15.3		Non-Acid Forming (Barren)
2021054_076	SARGT009	SARGT009: 19 - 19.7	Alluvium	19	19.7	0.7	Completely Weathered		8	846	0.02		0.61	9	-8.4	14.7		Non-Acid Forming (Barren)
2021054_077	SARGT009	SARGT009: 27 - 27.6	Alluvium	27	27.6	0.6	Completely Weathered		7.8	979	0.02		0.61	8.8	-8.2	14.4		Non-Acid Forming (Barren)
2021054_025	RWD021	RWD021: 155 - 156	Andesite	155	156	1	Moderately Weathered	Waste	9.1	294	0.89	0.70	21.28	239	-217.7	11.2	10.1	Non-Acid Forming
2021054_030	RWD021	RWD021: 207 - 208	Andesite	207	208	1	Moderately Weathered	Waste	9.4	220	1.52	1.16	35.53	111	-75.5	3.1	10.4	Non-Acid Forming
2021054_001	RWD002	RWD002: 101 - 102	Andesite	101	102	1	Slightly Weathered	Waste	9.1	220	1.13	0.93	28.45	132	-103.5	4.6	9.6	Non-Acid Forming
2021054_002	RWD002	RWD002: 102 - 103	Andesite	102	103	1	Slightly Weathered	Waste	9.2	182	0.44	0.34	10.47	144	-133.5	13.7	11	Non-Acid Forming
2021054_003	RWD002	RWD002: 103 - 104	Andesite	103	104	1	Slightly Weathered	Waste	9	198	0.5	0.37	11.30	116	-104.7	10.3	11	Non-Acid Forming
2021054_004	RWD002	RWD002: 107 - 107.5	Andesite	107	107.5	0.5	Slightly Weathered	Waste	8.9	188	2.61	2.13	65.23	118	-52.8	1.8	10.9	Non-Acid Forming
2021054_005	RWD002	RWD002: 115 - 115.5	Andesite	115	115.5	0.5	Fresh	Waste	9.3	110	0.05		1.53	140	-138.5	91.4		Non-Acid Forming (Barren)
2021054_006	RWD002	RWD002: 116 - 116.5	Andesite	116	116.5	0.5	Fresh	Waste	8.9	109	0.04		1.23	154	-152.8	125.7		Non-Acid Forming (Barren)
2021054_007	RWD002	RWD002: 117 - 117.5	Andesite	117	117.5	0.5	Fresh	Waste	9.6	124	0.12	0.10	3.12	127	-123.9	40.7	11.2	Non-Acid Forming
2021054_023	RWD021	RWD021: 132 - 133	Andesite	132	133	1	Fresh	Waste	9.3	324	1.68	1.32	40.43	180	-139.6	4.5	9.2	Non-Acid Forming
2021054_026	RWD021	RWD021: 163 - 163.5	Andesite	163	163.5	0.5	Fresh	Waste	9.2	195	0.2	0.16	4.78	436	-431.2	91.3	11.6	Non-Acid Forming
2021054_027	RWD021	RWD021: 173.9 - 174.4	Andesite	173.9	174.4	0.5	Fresh	Waste	9.3	137	0.56	0.45	13.78	170	-156.2	12.3	11.7	Non-Acid Forming
2021054_028	RWD021	RWD021: 183.5 - 184	Andesite	183.5	184	0.5	Fresh	Ore	10	165	0.06		1.84	34.2	-32.4	18.6		Non-Acid Forming (Barren)
2021054_029	RWD021	RWD021: 196.6 - 197.5	Andesite	196.6	197.5	0.9	Fresh	Ore	9.3	216	0.71	0.54	16.48	140	-123.5	8.5	10.8	Non-Acid Forming
2021054_032	RWD021	RWD021: 228 - 229	Andesite	228	229	1	Fresh	Ore	9.1	268	1.37	1.02	31.24	124	-92.8	4.0	10	Non-Acid Forming
2021054_033	RWD021	RWD021: 240 - 240.5	Andesite	240	240.5	0.5	Fresh	Waste	8.8	219	0.09		2.76	216	-213.2	78.4		Non-Acid Forming (Barren)
2021054_037	RWD026	RWD026: 119.3 - 120.3	Andesite	119.3	120.3	1	Moderately Weathered	Waste	9.6	489	2.14	1.67	51.14	69.1	-18.0	1.4	10.2	Non-Acid Forming
2021054_038	RWD026	RWD026: 124.5 - 125	Andesite	124.5	125	0.5	Slightly Weathered	Waste	8.9	249	1.09	0.81	24.87	164	-139.1	6.6	11.3	Non-Acid Forming
2021054_019	RWD009	RWD009: 219.15 - 220.15	Andesite	219.15	220.15	1	Fresh	Waste	9.1	228	0.23	0.19	5.94	119	-113.1	20.0	10.8	Non-Acid Forming
2021054_020	RWD009	RWD009: 227 - 228	Andesite	227	228	1	Fresh	Waste	9.1	220	0.22	0.17	5.21	113	-107.8	21.7	11	Non-Acid Forming
2021054_035	RWD026	RWD026: 107 - 107.5	Andesite	107	107.5	0.5	Fresh	Waste	9.6	320	0.51	0.41	12.50	74.1	-61.6	5.9	11.2	Non-Acid Forming
2021054_036	RWD026	RWD026: 113 - 114	Andesite	113	114	1	Fresh	Waste	9	272	1.98	1.23	37.67	142	-104.3	3.8	11.2	Non-Acid Forming
2021054_039	RWD026	RWD026: 130 - 130.5	Andesite	130	130.5	0.5	Fresh	Waste	8.6	265	3.67	3.07	94.02	115	-21.0	1.2	9.1	Non-Acid Forming
2021054_040	RWD026	RWD026: 136 - 136.5	Andesite	136	136.5	0.5	Fresh	Waste	8.9	200	0.62	0.516	15.80	90.2	-74.4	5.7	10.8	Non-Acid Forming
2021054_041	RWD026	RWD026: 139 - 140	Andesite	139	140	1	Fresh	Ore	8.9	300	2.43	1.86	56.96	89	-32.0	1.6	9.1	Non-Acid Forming
2021054_042	RWD026	RWD026: 148 - 148.5	Andesite	148	148.5	0.5	Fresh	Waste	8.9	295	0.3	0.243	7.44	123	-115.6	16.5	11	Non-Acid Forming
2021054_043	RWD026	RWD026: 154 - 155	Dacite	154	155	1	Fresh	Waste	9.1	188	0.47	0.377	11.55	66.1	-54.6	5.7	11.1	Non-Acid Forming
2021054_044	RWD026	RWD026: 160 - 160.5	Dacite	160	160.5	0.5	Fresh	Waste	9.1	174	0.41	0.344	10.54	52.6	-42.1	5.0	11	Non-Acid Forming
2021054_045	RWD026	RWD026: 165 - 166	Dacite	165	166	1	Fresh	Ore	9.2	194	1.59	1.14	34.91	44.6	-9.7	1.3	8.7	Non-Acid Forming
2021054_046	RWD036	RWD036: 135.1 - 135.5	Monzodiorite	135.1	135.5	0.4	Fresh		9.6	178	0.04		1.23	121	-119.8	98.8		Non-Acid Forming (Barren)
2021054_048	RWD036	RWD036: 192 - 192.5	Monzodiorite	192	192.5	0.5	Fresh	Waste	8.7	1630	1.16	0.903	27.65	82.8	-55.1	3.0	11.3	Non-Acid Forming
2021054_049	RWD036	RWD036: 201.1 - 201.6	Monzodiorite	201.1	201.6	0.5	Fresh	Waste	9.3	260	2.54	1.56	47.78	47.8	0.0	1.0	2.9	Uncertain
2021054_050	RWD036	RWD036: 210.5 - 211	Monzodiorite	210.5	211	0.5	Fresh	Waste	8.5	2390	4.57	3.11	95.24	54	41.2	0.6	2.3	Potentially Acid Forming

Table B1: Acid Base Account (ABA) Test Results for the Tomingley Gold Extension Project

RGS Sample No.	Drill Hole ID	TGEP Sample ID	Sample Lithology	From	To	Interval	Weathering	Material	pH[1]	EC[1]	Total S	Scr[2]	MPA[2]	ANC[2]	NAPP[2]	ANC:MPA Ratio	NAG_{pH}	Sample Classification[3]
				(m)						(µS/cm)	(%)	(%)	kg H_2SO_4/t					
2021054_024	RWD021	RWD021: 142 - 143	Quartz	142	143	1	Moderately Weathered	Waste	9.5	305	0.28	0.254	7.78	278	-270.2	35.7	11	Non-Acid Forming
2021054_031	RWD021	RWD021: 220.5 - 221.5	Quartz	220.5	221.5	1	Fresh	Waste	9.3	214	1.87	1.4	42.88	65.1	-22.2	1.5	9.4	Non-Acid Forming
2021054_053	RWD036	RWD036: 237 - 237.7	Quartz	237	237.7	0.7	Fresh	Waste	9.3	118	0.07		2.14	213	-210.9	99.4		Non-Acid Forming (Barren)
2021054_064	SARGT001	SARGT001: 57 - 57.7	Saprock	57	57.7	0.7	Extremely Weathered		8.8	300	0.005		0.15	14.7	-14.5	96.0		Non-Acid Forming (Barren)
2021054_065	SARGT001	SARGT001: 68.75 - 69.3	Saprock	68.75	69.3	0.55	Extremely Weathered		8.9	222	0.005		0.15	23.9	-23.7	156.1		Non-Acid Forming (Barren)
2021054_069	SARGT003	SARGT003: 46 - 46.5	Saprock	46	46.5	0.5	Extremely Weathered		8.8	265	0.01		0.31	22.2	-21.9	72.5		Non-Acid Forming (Barren)
2021054_070	SARGT003	SARGT003: 54 - 54.5	Saprock	54	54.5	0.5	Extremely Weathered		8.4	576	0.01		0.31	17.8	-17.5	58.1		Non-Acid Forming (Barren)
2021054_074	SARGT007	SARGT007: 86 - 86.8	Saprock	86	86.8	0.8	Extremely Weathered		9.5	414	0.005		0.15	30.7	-30.5	200.5		Non-Acid Forming (Barren)
2021054_079	SARGT009	SARGT009: 53 - 53.4	Saprock	53	53.4	0.4	Extremely Weathered		8.4	490	0.01		0.31	17	-16.7	55.5		Non-Acid Forming (Barren)
2021054_080	SARGT009	SARGT009: 64 - 64.4	Saprock	64	64.4	0.4	Extremely Weathered		8.5	387	0.005		0.15	21.8	-21.6	142.4		Non-Acid Forming (Barren)
2021054_066	SARGT001	SARGT001: 88.2 - 88.8	Saprock	88.2	88.8	0.6	Heavily Weathered		9.4	85	0.005		0.15	26.2	-26.0	171.1		Non-Acid Forming (Barren)
2021054_081	SARGT009	SARGT009: 76.6 - 77	Saprock	76.6	77	0.4	Heavily Weathered		9	288	0.01		0.31	21.9	-21.6	71.5		Non-Acid Forming (Barren)
2021054_063	SARGT001	SARGT001: 50 - 51	Saprolite	50	51	1	Extremely Weathered		8.1	627	0.01		0.31	13.5	-13.2	44.1		Non-Acid Forming (Barren)
2021054_068	SARGT003	SARGT003: 25.7 - 26.4	Saprolite	25.7	26.4	0.7	Extremely Weathered		8.3	347	0.01		0.31	6.1	-5.8	19.9		Non-Acid Forming (Barren)
2021054_073	SARGT007	SARGT007: 55 - 55.95	Saprolite	55	55.95	0.95	Extremely Weathered		8.1	938	0.02		0.61	7.2	-6.6	11.8		Non-Acid Forming (Barren)
2021054_078	SARGT009	SARGT009: 37 - 37.7	Saprolite	37	37.7	0.7	Extremely Weathered		8	1310	0.02		0.61	5.4	-4.8	8.8		Non-Acid Forming (Barren)
2021054_009	RWD009	RWD009: 85.95 - 86.3	Volcaniclastic conglomerate	85.95	86.3	0.35	Slightly Weathered		10	213	0.05		1.53	31.4	-29.9	20.5		Non-Acid Forming (Barren)
2021054_011	RWD009	RWD009: 118 - 118.3	Volcaniclastic conglomerate	118	118.3	0.3	Slightly Weathered	Waste	9.9	209	0.02		0.61	279	-278.4	455.5		Non-Acid Forming (Barren)
2021054_010	RWD009	RWD009: 111 - 111.5	Volcaniclastic conglomerate	111	111.5	0.5	Fresh		9.8	163	0.12	0.109	3.34	45.8	-42.5	13.7	9.9	Non-Acid Forming
2021054_012	RWD009	RWD009: 164 - 164.3	Volcaniclastic conglomerate	164	164.3	0.3	Fresh		9.6	88	0.09		2.76	528	-525.2	191.6		Non-Acid Forming (Barren)
2021054_008	RWD009	RWD009: 71.5 - 72.1	Volcaniclastic sandstone	71.5	72.1	0.6	Extremely Weathered		9.5	179	0.005		0.15	24.9	-24.7	162.6		Non-Acid Forming (Barren)
2021054_021	RWD021	RWD021: 100 - 100.5	Volcaniclastic sandstone	100	100.5	0.5	Slightly Weathered	Waste	9	422	0.02		0.61	20.8	-20.2	34.0		Non-Acid Forming (Barren)
2021054_082	SARGT009	SARGT009: 81 - 81.5	Volcaniclastic sandstone	81	81.5	0.5	Slightly Weathered	Waste	9.5	185	0.005		0.15	161	-160.8	1051.4		Non-Acid Forming (Barren)
2021054_014	RWD009	RWD009: 175 - 176	Volcaniclastic sandstone	175	176	1	Fresh	Waste	9.4	143	0.4	0.458	14.03	131	-117.0	9.3	11.1	Non-Acid Forming
2021054_015	RWD009	RWD009: 182 - 182.5	Volcaniclastic sandstone	182	182.5	0.5	Fresh	Waste	9.4	142	0.02		0.61	93.4	-92.8	152.5		Non-Acid Forming (Barren)
2021054_016	RWD009	RWD009: 188 - 188.5	Volcaniclastic sandstone	188	188.5	0.5	Fresh	Ore	9.6	124	0.02		0.61	92.4	-91.8	150.9		Non-Acid Forming (Barren)
2021054_017	RWD009	RWD009: 206 - 206.5	Volcaniclastic sandstone	206	206.5	0.5	Fresh		9.9	210	0.02		0.61	121	-120.4	197.6		Non-Acid Forming (Barren)
2021054_018	RWD009	RWD009: 213 - 214	Volcaniclastic sandstone	213	214	1	Fresh	Waste	9.1	248	2.37	1.78	54.51	120	-65.5	2.2	9.4	Non-Acid Forming
2021054_022	RWD021	RWD021: 122 - 122.5	Volcaniclastic sandstone	122	122.5	0.5	Fresh		9.4	415	0.18	0.17	5.21	174	-168.8	33.4	11.2	Non-Acid Forming
2021054_034	RWD026	RWD026: 97.25 - 97.6	Volcaniclastic sandstone	97.25	97.6	0.35	Fresh		9.9	162	0.03		0.92	22.2	-21.3	24.2		Non-Acid Forming (Barren)
2021054_047	RWD036	RWD036: 169 - 169.5	Volcaniclastic sandstone	169	169.5	0.5	Fresh	Waste	9.5	206	1.65	1.11	33.99	57.2	-23.2	1.7	3.9	Uncertain
2021054_051	RWD036	RWD036: 219 - 219.5	Volcaniclastic sandstone	219	219.5	0.5	Fresh	Waste	9.5	142	1.89	1.44	44.10	377	-332.9	8.5	11.6	Non-Acid Forming
2021054_052	RWD036	RWD036: 227 - 227.5	Volcaniclastic sandstone	227	227.5	0.5	Fresh	Waste	9.4	139	1.09	0.9	27.56	89.9	-62.3	3.3	11	Non-Acid Forming
2021054_054	RWD036	RWD036: 245 - 245.5	Volcaniclastic sandstone	245	245.5	0.5	Fresh	Waste	9.4	95	0.2	0.146	4.47	111	-106.5	24.8	11.6	Non-Acid Forming
2021054_055	RWD036	RWD036: 254 - 254.5	Volcaniclastic sandstone	254	254.5	0.5	Fresh	Waste	9.5	146	0.24	0.202	6.19	113	-106.8	18.3	11.5	Non-Acid Forming
2021054_056	RWD036	RWD036: 263 - 263.5	Volcaniclastic sandstone	263	263.5	0.5	Fresh	Waste	9.2	243	0.11	0.09	2.76	221	-218.2	80.2	10.9	Non-Acid Forming (Barren)
2021054_057	RWD036	RWD036: 272 - 272.5	Volcaniclastic sandstone	272	272.5	0.5	Fresh		9.5	133	0.03		0.92	67.9	-67.0	73.9		Non-Acid Forming (Barren)
2021054_083	SARGT009	SARGT009: 100 - 100.35	Volcaniclastic sandstone	100	100.35	0.35	Fresh		9.3	170	0.05		1.53	165	-163.5	107.8		Non-Acid Forming (Barren)
2021054_013	RWD009	RWD009: 174 - 175	Volcaniclastic siltstone	174	175	1	Fresh		9.5	130	0.47	0.363	11.12	89.2	-78.1	8.0	11.2	Non-Acid Forming
2021054_084	SARGT009	SARGT009: 140.4 - 141	Volcaniclastic siltstone	140.4	141	0.6	Fresh		9	307	1.09	0.739	22.63	136	-113.4	6.0	8.6	Non-Acid Forming
2021054_085	SARGT009	SARGT009: 143.1 - 143.6	Volcaniclastic siltstone	143.1	143.6	0.5	Fresh		9.2	184	0.32	0.284	8.70	162	-153.3	18.6	11	Non-Acid Forming

1. Current pH, EC, Alkalinity and Acidity provided for 1:5 sample:water extracts
2. Scr = Chromium Reducible Sulfur; MPA = Maximum Potential Acidity; ANC = Acid Neutralising Capacity; and NAPP = Net Acid Producing Potential.
3. Sample classification criteria detail provided in report text.

* Where total sulfur or ANC results are less than the laboratory LoR a value of half of the LoR is used.

Table B2: Sample Composites Created for the Tomingley Gold Extension Project

RGS Sample No.	TGEP Sample ID	Sample Lithology	Drill Hole ID	From	To	Interval	Weathering	Composite
				m bgl		m		
2021054_058	SARGT001: 4.8 - 5.4	Alluvium	SARGT001	4.8	5.4	0.6	Completely Weathered	2021054_C001
2021054_059	SARGT001: 13 - 13.5	Alluvium	SARGT001	13	13.5	0.5	Completely Weathered	2021054_C001
2021054_060	SARGT001: 22 - 22.6	Alluvium	SARGT001	22	22.6	0.6	Completely Weathered	2021054_C001
2021054_061	SARGT001: 26 - 26.6	Alluvium	SARGT001	26	26.6	0.6	Completely Weathered	2021054_C001
2021054_062	SARGT001: 37 - 37.5	Alluvium	SARGT001	37	37.5	0.5	Completely Weathered	2021054_C001
2021054_067	SARGT003: 8 - 8.5	Alluvium	SARGT003	8	8.5	0.5	Completely Weathered	2021054_C001
2021054_071	SARGT007: 4 - 4.6	Alluvium	SARGT007	4	4.6	0.6	Completely Weathered	2021054_C001
2021054_072	SARGT007: 49 - 49.6	Alluvium	SARGT007	49	49.6	0.6	Completely Weathered	2021054_C001
2021054_075	SARGT009: 10 - 10.8	Alluvium	SARGT009	10	10.8	0.8	Completely Weathered	2021054_C001
2021054_076	SARGT009: 19 - 19.7	Alluvium	SARGT009	19	19.7	0.7	Completely Weathered	2021054_C001
2021054_077	SARGT009: 27 - 27.6	Alluvium	SARGT009	27	27.6	0.6	Completely Weathered	2021054_C001
2021054_001	RWD002: 101 - 102	Andesite	RWD002	101	102	1	Slightly Weathered	2021054_C002
2021054_002	RWD002: 102 - 103	Andesite	RWD002	102	103	1	Slightly Weathered	2021054_C002
2021054_003	RWD002: 103 - 104	Andesite	RWD002	103	104	1	Slightly Weathered	2021054_C002
2021054_004	RWD002: 107 - 107.5	Andesite	RWD002	107	107.5	0.5	Slightly Weathered	2021054_C002
2021054_025	RWD021: 155 - 156	Andesite	RWD021	155	156	1	Moderately Weathered	2021054_C002
2021054_030	RWD021: 207 - 208	Andesite	RWD021	207	208	1	Moderately Weathered	2021054_C002
2021054_005	RWD002: 115 - 115.5	Andesite	RWD002	115	115.5	0.5	Fresh	2021054_C003
2021054_006	RWD002: 116 - 116.5	Andesite	RWD002	116	116.5	0.5	Fresh	2021054_C003
2021054_007	RWD002: 117 - 117.5	Andesite	RWD002	117	117.5	0.5	Fresh	2021054_C003
2021054_023	RWD021: 132 - 133	Andesite	RWD021	132	133	1	Fresh	2021054_C003
2021054_026	RWD021: 163 - 163.5	Andesite	RWD021	163	163.5	0.5	Fresh	2021054_C003
2021054_027	RWD021: 173.9 - 174.4	Andesite	RWD021	173.9	174.4	0.5	Fresh	2021054_C003
2021054_028	RWD021: 183.5 - 184	Andesite	RWD021	183.5	184	0.5	Fresh	2021054_C003
2021054_029	RWD021: 196.6 - 197.5	Andesite	RWD021	196.6	197.5	0.9	Fresh	2021054_C003
2021054_032	RWD021: 228 - 229	Andesite	RWD021	228	229	1	Fresh	2021054_C003
2021054_033	RWD021: 240 - 240.5	Andesite	RWD021	240	240.5	0.5	Fresh	2021054_C003
2021054_046	RWD036: 135.1 - 135.5	Monzodiorite	RWD036	135.1	135.5	0.4	Fresh	2021054_C004
2021054_048	RWD036: 192 - 192.5	Monzodiorite	RWD036	192	192.5	0.5	Fresh	2021054_C004
2021054_049	RWD036: 201.1 - 201.6	Monzodiorite	RWD036	201.1	201.6	0.5	Fresh	2021054_C005
2021054_050	RWD036: 210.5 - 211	Monzodiorite	RWD036	210.5	211	0.5	Fresh	2021054_C005
2021054_024	RWD021: 142 - 143	Quartz	RWD021	142	143	1	Moderately Weathered	2021054_C006
2021054_031	RWD021: 220.5 - 221.5	Quartz	RWD021	220.5	221.5	1	Fresh	2021054_C006
2021054_053	RWD036: 237 - 237.7	Quartz	RWD036	237	237.7	0.7	Fresh	2021054_C006
2021054_064	SARGT001: 57 - 57.7	Saprock	SARGT001	57	57.7	0.7	Extremely Weathered	2021054_C007
2021054_065	SARGT001: 68.75 - 69.3	Saprock	SARGT001	68.75	69.3	0.55	Extremely Weathered	2021054_C007
2021054_066	SARGT001: 88.2 - 88.8	Saprock	SARGT001	88.2	88.8	0.6	Heavily Weathered	2021054_C007
2021054_069	SARGT003: 46 - 46.5	Saprock	SARGT003	46	46.5	0.5	Extremely Weathered	2021054_C007
2021054_070	SARGT003: 54 - 54.5	Saprock	SARGT003	54	54.5	0.5	Extremely Weathered	2021054_C007
2021054_074	SARGT007: 86 - 86.8	Saprock	SARGT007	86	86.8	0.8	Extremely Weathered	2021054_C007
2021054_079	SARGT009: 53 - 53.4	Saprock	SARGT009	53	53.4	0.4	Extremely Weathered	2021054_C007
2021054_080	SARGT009: 64 - 64.4	Saprock	SARGT009	64	64.4	0.4	Extremely Weathered	2021054_C007
2021054_081	SARGT009: 76.6 - 77	Saprock	SARGT009	76.6	77	0.4	Heavily Weathered	2021054_C007

Table B2: Sample Composites Created for the Tomingley Gold Extension Project

RGS Sample No.	TGEP Sample ID	Sample Lithology	Drill Hole ID	From	To	Interval	Weathering	Composite
				m bgl		m		
2021054_063	SARGT001: 50 - 51	Saprolite	SARGT001	50	51	1	Extremely Weathered	2021054_C007
2021054_068	SARGT003: 25.7 - 26.4	Saprolite	SARGT003	25.7	26.4	0.7	Extremely Weathered	2021054_C007
2021054_073	SARGT007: 55 - 55.95	Saprolite	SARGT007	55	55.95	0.95	Extremely Weathered	2021054_C007
2021054_078	SARGT009: 37 - 37.7	Saprolite	SARGT009	37	37.7	0.7	Extremely Weathered	2021054_C007
2021054_009	RWD009: 85.95 - 86.3	Volcaniclastic conglomerate	RWD009	85.95	86.3	0.35	Slightly Weathered	2021054_C008
2021054_010	RWD009: 111 - 111.5	Volcaniclastic conglomerate	RWD009	111	111.5	0.5	Fresh	2021054_C008
2021054_011	RWD009: 118 - 118.3	Volcaniclastic conglomerate	RWD009	118	118.3	0.3	Slightly Weathered	2021054_C008
2021054_012	RWD009: 164 - 164.3	Volcaniclastic conglomerate	RWD009	164	164.3	0.3	Fresh	2021054_C008
2021054_037	RWD026: 119.3 - 120.3	Andesite/Volcaniclastic sandstone	RWD026	119.3	120.3	1	Moderately Weathered	2021054_C009
2021054_038	RWD026: 124.5 - 125	Andesite/Volcaniclastic sandstone	RWD026	124.5	125	0.5	Slightly Weathered	2021054_C009
2021054_008	RWD009: 71.5 - 72.1	Volcaniclastic sandstone	RWD009	71.5	72.1	0.6	Extremely Weathered	2021054_C009
2021054_021	RWD021: 100 - 100.5	Volcaniclastic sandstone	RWD021	100	100.5	0.5	Slightly Weathered	2021054_C009
2021054_082	SARGT009: 81 - 81.5	Volcaniclastic sandstone	SARGT009	81	81.5	0.5	Slightly Weathered	2021054_C009
2021054_019	RWD009: 219.15 - 220.15	Andesite/Volcaniclastic sandstone	RWD009	219.15	220.15	1	Fresh	2021054_C010
2021054_020	RWD009: 227 - 228	Andesite/Volcaniclastic sandstone	RWD009	227	228	1	Fresh	2021054_C010
2021054_035	RWD026: 107 - 107.5	Andesite/Volcaniclastic sandstone	RWD026	107	107.5	0.5	Fresh	2021054_C010
2021054_036	RWD026: 113 - 114	Andesite/Volcaniclastic sandstone	RWD026	113	114	1	Fresh	2021054_C010
2021054_039	RWD026: 130 - 130.5	Andesite/Volcaniclastic sandstone	RWD026	130	130.5	0.5	Fresh	2021054_C010
2021054_040	RWD026: 136 - 136.5	Andesite/Volcaniclastic sandstone	RWD026	136	136.5	0.5	Fresh	2021054_C010
2021054_041	RWD026: 139 - 140	Andesite/Volcaniclastic sandstone	RWD026	139	140	1	Fresh	2021054_C010
2021054_042	RWD026: 148 - 148.5	Andesite/Volcaniclastic sandstone	RWD026	148	148.5	0.5	Fresh	2021054_C010
2021054_043	RWD026: 154 - 155	Dacite	RWD026	154	155	1	Fresh	2021054_C010
2021054_044	RWD026: 160 - 160.5	Dacite	RWD026	160	160.5	0.5	Fresh	2021054_C010
2021054_045	RWD026: 165 - 166	Dacite	RWD026	165	166	1	Fresh	2021054_C010
2021054_014	RWD009: 175 - 176	Volcaniclastic sandstone	RWD009	175	176	1	Fresh	2021054_C010
2021054_015	RWD009: 182 - 182.5	Volcaniclastic sandstone	RWD009	182	182.5	0.5	Fresh	2021054_C010
2021054_016	RWD009: 188 - 188.5	Volcaniclastic sandstone	RWD009	188	188.5	0.5	Fresh	2021054_C010
2021054_017	RWD009: 206 - 206.5	Volcaniclastic sandstone	RWD009	206	206.5	0.5	Fresh	2021054_C010
2021054_018	RWD009: 213 - 214	Volcaniclastic sandstone	RWD009	213	214	1	Fresh	2021054_C010
2021054_022	RWD021: 122 - 122.5	Volcaniclastic sandstone	RWD021	122	122.5	0.5	Fresh	2021054_C010
2021054_034	RWD026: 97.25 - 97.6	Volcaniclastic sandstone	RWD026	97.25	97.6	0.35	Fresh	2021054_C010
2021054_047	RWD036: 169 - 169.5	Volcaniclastic sandstone	RWD036	169	169.5	0.5	Fresh	2021054_C010
2021054_051	RWD036: 219 - 219.5	Volcaniclastic sandstone	RWD036	219	219.5	0.5	Fresh	2021054_C010
2021054_052	RWD036: 227 - 227.5	Volcaniclastic sandstone	RWD036	227	227.5	0.5	Fresh	2021054_C010
2021054_054	RWD036: 245 - 245.5	Volcaniclastic sandstone	RWD036	245	245.5	0.5	Fresh	2021054_C010
2021054_055	RWD036: 254 - 254.5	Volcaniclastic sandstone	RWD036	254	254.5	0.5	Fresh	2021054_C010
2021054_056	RWD036: 263 - 263.5	Volcaniclastic sandstone	RWD036	263	263.5	0.5	Fresh	2021054_C010
2021054_057	RWD036: 272 - 272.5	Volcaniclastic sandstone	RWD036	272	272.5	0.5	Fresh	2021054_C010
2021054_083	SARGT009: 100 - 100.35	Volcaniclastic sandstone	SARGT009	100	100.35	0.35	Fresh	2021054_C010
2021054_013	RWD009: 174 - 175	Volcaniclastic siltstone	RWD009	174	175	1	Fresh	2021054_C011
2021054_084	SARGT009: 140.4 - 141	Volcaniclastic siltstone	SARGT009	140.4	141	0.6	Fresh	2021054_C011
2021054_085	SARGT009: 143.1 - 143.6	Volcaniclastic siltstone	SARGT009	143.1	143.6	0.5	Fresh	2021054_C011

Table B3: Multi-Element Test Results for Sample Composites from the Tomingley Gold Extension Project

			RGS Sample Number →	2021054_C001	2021054_C002	2021054_C003	2021054_C004	2021054_C005	2021054_C006	2021054_C007	2021054_C008	2021054_C009	2021054_C010	2021054_C011
			ALS Laboratory ID →	EB2122755001	EB2122755002	EB2122755003	EB2122755004	EB2122755005	EB2122755006	EB2122755007	EB2122755008	EB2122755009	EB2122755010	EB2122755011
Parameters	Limit of Reporting	NEPC[1] Health-Based Investigation Level (HILs)-C		Alluvium	Weathered Andesite	Fresh Andesite	NAF Monzodiorite	PAF Monzodiorite	Quartz	Saprock and Saprolite	Volcaniclastic Conglomerate	Weathered Volcaniclastic Sandstone	Fresh Volcaniclastic Sandstone	Fresh Volcaniclastic Siltstone
Major Cations	All units mg/kg													
Calcium (Ca)	50	-		230	40600	51800	35100	26200	48000	1370	87100	18400	44300	38600
Magnesium (Mg)	50	-		1420	11500	11700	10600	7710	13000	8890	8460	15800	11300	15700
Potassium (K)	50	-		320	510	640	<50	280	340	950	760	390	470	400
Sodium (Na)	50	-		2640	200	280	280	350	160	3790	280	2820	280	240
Chloride	10	-		1260	40	40	60	90	30	400	10	120	40	40
Major, Minor and Trace Elements	All units mg/kg													
Aluminium (Al)	50	-		4710	6650	8600	8990	6020	3930	11300	8790	17000	7020	8160
Antimony (Sb)	5	-		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Arsenic (As)	5	300		<5	242	346	<5	<5	628	8	<5	40	128	136
Barium (Ba)	10	-		80	20	10	<10	30	10	150	<10	40	<10	10
Beryllium (Be)	1	90		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Boron (B)	50	20,000		<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Cadmium (Cd)	1	90		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chromium (Cr) - hexavalent	2	300 **		29	5	7	119	42	30	48	24	41	21	28
Cobalt (Co)	2	300		5	16	14	16	26	15	41	12	21	16	19
Copper (Cu)	5	17,000		20	106	71	51	29	11	51	68	237	77	89
Iron (Fe)	50	-		31400	48800	35400	16700	33700	29300	34700	16700	36100	42100	35100
Lead (Pb)	5	600		7	6	<5	<5	<5	<5	<5	<5	<5	7	<5
Manganese (Mn)	5	19,000		242	900	756	462	217	650	1070	942	678	870	659
Mercury (Hg)	0.1	80		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel (Ni)	2	1,200		5	4	15	39	43	39	32	6	31	13	28
Reactive Phosphorus (P)	0.1	-		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.7	<0.1	0.2	<0.1	<0.1
Selenium (Se)	5	700		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Thorium (Th)	0.1	-		3.7	0.6	0.7	0.6	0.5	0.3	0.7	0.2	0.8	0.6	0.4
Uranium (U)	0.1	-		0.9	0.2	0.2	0.1	<0.1	0.2	0.4	0.3	0.1	0.1	0.2
Zinc (Zn)	5	30,000		7	59	40	30	13	35	105	24	62	54	47
Exchangable Cations	All units meq/100g (except Exchangable Sodium Percentage (%))													
Exch. Calcium	0.2			0.7	0.7	1.2	0.9	----	68.8	1.3	2.3	2.3	1.2	3.2
Exch. Magnesium	0.2			6.8	<0.2	<0.2	<0.2	----	7.9	3.9	<0.2	1.8	<0.2	1.2
Exch. Potassium	0.2			0.3	<0.2	<0.2	<0.2	----	<0.2	<0.2	<0.2	<0.2	<0.2	0.2
Exch. Sodium	0.2			4.8	<0.2	0.3	0.3	----	0.3	9.8	0.4	5.8	0.5	0.4
Cation Exchange Capacity	0.2			12.8	0.7	1.5	1.2	----	77.2	15.0	2.7	10.1	1.7	5.0
Calcium:Magnesium Ratio	---			0.1	----	----	----	----	8.7	0.3	----	1.3	----	2.6
Magnesium:Potassium Ratio	---			26.3	----	----	----	----	----	----	----	----	----	5.7
Exchangable Sodium Percentage	0.2			37.8	<0.2	18.8	28.2	----	0.4	65.3	14.8	57.6	30.6	8.6

Notes: < indicates less than the laboratory limit of reporting. Shaded cells exceed applied guideline limit.

** Guideline level for Cr(VI) = 300 mg/kg. Guideline level for Cr(III) = 24% of total Cr.

1. NEPC (2013). National Environmental Protection Council (NEPC). *National Environmental Protection (Assessment of Site Contamination) Measure (NEPM)* , Amendment of Schedule B1-B7 of 1999 version. Guideline on Investigation Levels for Soil and Groundwater. Health-Based Investigation Level - HIL(C); public open spaces - recreational use.

Table B4: Geochemical Abundance Index (GAI) Results for the Tomingley Gold Extension Project

	RGS Sample Number →		2021054_C001	2021054_C002	2021054_C003	2021054_C004	2021054_C005	2021054_C006	2021054_C007	2021054_C008	2021054_C009	2021054_C010	2021054_C011
	ALS Laboratory ID →		EB2122755001	EB2122755002	EB2122755003	EB2122755004	EB2122755005	EB2122755006	EB2122755007	EB2122755008	EB2122755009	EB2122755010	EB2122755011
Parameters	Limit of Reporting	Average Crustal Abundance[1]	Alluvium	Weathered Andesite	Fresh Andesite	NAF Monzodiorite	PAF Monzodiorite	Quartz	Saprock and Saprolite	Volcaniclastic Conglomerate	Weathered Volcaniclastic Sandstone	Fresh Volcaniclastic Sandstone	Fresh Volcaniclastic Siltstone
Major Elements	all units in mg/kg		Geochemical Abundance Index										
Calcium (Ca)	50	15,000	0	1	1	1	0	1	0	2	0	1	1
Magnesium (Mg)	50	5,000	0	1	1	0	0	1	0	0	1	1	1
Potassium (K)	50	14,000	0	0	0	---	0	0	0	0	0	0	0
Sodium (Na)	50	5,000	0	0	0	0	0	0	0	0	0	0	0
Chloride	50	500	1	0	0	0	0	0	0	0	0	0	0
Major, Minor and Trace Elements	all units in mg/kg		Geochemical Abundance Index										
Aluminium (Al)	50	71,000	0	0	0	0	0	0	0	0	0	0	0
Antimony (Sb)	5	5	---	---	---	---	---	---	---	---	---	---	---
Arsenic (As)	5	6	---	5	5	---	---	6	0	---	2	4	4
Barium (Ba)	10	500	0	0	0	---	0	0	0	---	0	---	0
Beryllium (Be)	1	6	---	---	---	---	---	---	---	---	---	---	---
Boron (B)	50	100	---	---	---	---	---	---	---	---	---	---	---
Cadmium (Cd)	1	0.35	---	---	---	---	---	---	---	---	---	---	---
Chromium (Cr) - hexavalent	2	70	0	0	0	0	0	0	0	0	0	0	0
Cobalt (Co)	2	8	0	0	0	0	1	0	2	0	1	0	1
Copper (Cu)	5	30	0	1	1	0	0	0	0	1	2	1	1
Iron (Fe)	50	40,000	0	0	0	0	0	0	0	0	0	0	0
Lead (Pb)	5	35	0	0	---	---	---	---	---	---	---	0	---
Manganese (Mn)	5	1,000	0	0	0	0	0	0	0	0	0	0	0
Mercury (Hg)	0.1	0.06	---	---	---	---	---	---	---	---	---	---	---
Nickel (Ni)	2	50	0	0	0	0	0	0	0	0	0	0	0
Reactive Phosphorus (P)	0.1	800	---	---	---	---	---	---	0	---	0	---	---
Selenium (Se)	5	0.4	---	---	---	---	---	---	---	---	---	---	---
Thorium (Th)	0.1	9	0	0	0	0	0	0	0	0	0	0	0
Uranium (U)	0.1	2	0	0	0	0	---	0	0	0	0	0	0
Zinc (Zn)	5	90	0	0	0	0	0	0	0	0	0	0	0

Notes: GAI's greater than or equal to 3 are highlighted.

1. Average Crustal Abundance values sourced from the "GARD Guide", Chapter 5 (INAP, 2009).

1. When no GARD Guide value is available for particular element, then values are taken from Bowen H.J.M.(1979) Environmental Chemistry of the Elements, pages 60-61.

Table B5: Multi-Element Test Results for Water Extracts for the Tomingley Gold Extension Project

		RGS Sample Number →	2021054_C001	2021054_C002	2021054_C003	2021054_C004	2021054_C005	2021054_C006	2021054_C007	2021054_C008	2021054_C009	2021054_C010	2021054_C011
		ALS Laboratory ID →	EB2122755001	EB2122755002	EB2122755003	EB2122755004	EB2122755005	EB2122755006	EB2122755007	EB2122755008	EB2122755009	EB2122755010	EB2122755011
		Water Quality Guidelines:											
Parameters	Limit of Reporting	Aquatic Ecosystems (freshwater)[1]	Livestock Drinking Water[2]	Alluvium	Weathered Andesite	Fresh Andesite	NAF Monzodiorite	PAF Monzodiorite	Quartz	Saprock and Saprolite	Volcaniclastic Conglomerate	Weathered Volcaniclastic Sandstone	Fresh Volcaniclastic Sandstone	Fresh Volcaniclastic Siltstone
pH	0.01 pH unit	6 to 9	-	7.1	9.1	9.2	9.4	8.7	9.3	9	9.9	9.8	9.2	9.2
Electrical Conductivity	1 µS/cm	<1,000#	3,580^	1020	241	218	235	2310	172	433	154	479	184	171
Carbonate Alkalinity (mg $CaCO_3$/kg)	1	-	-	<1	9.8	104.6	104.6	<1	210	9.8	104.6	197.6	104.6	104.6
Bicarbonate Alkalinity (mg$CaCO_3$/kg)	1	-	-	300	4280	17160	8780	5240	8160	460	23400	5680	4760	4920
Total Alkalinity (mg $CaCO_3$/kg)	1	-	-	300	4300	17260	8900	5240	8360	468	23600	5880	4860	5020
Acidity (mg $CaCO_3$/kg)	1	-	-	80	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Net Alkalinity (mg $CaCO_3$/kg)	1	-	-	220	4299	17259	8899	5239	8359	467	23599	5879	4859	5019
Major Ions	All units mg/L													
Calcium (Ca)	2	-	1,000	<2	10	6	8	636	6	<2	<2	<2	4	6
Magnesium (Mg)	2	-	-	<2	10	4	6	22	8	<2	<2	<2	4	4
Potassium (K)	2	-	-	2	18	12	<2	14	16	<2	2	2	10	10
Sodium (Na)	2	-	-	190	26	32	32	44	14	92	32	106	30	20
Sulfate (SO_4)	2	-	1,000	116	28	28	90	1644	26	40	12	58	28	32
Trace Metals/Metalloids	All units mg/L													
Aluminium (Al)	0.02	0.055	5	<0.02	0.16	0.26	0.20	0.04	0.20	0.04	0.38	0.12	0.26	0.28
Antimony (Sb)	0.002	-	-	0	0.018	0.006	<0.002	<0.002	0.004	<0.002	<0.002	0.006	0.008	0.014
Arsenic (As) - pentavalent	0.002	0.013 **	0.5	<0.002	0.008	0.012	<0.002	<0.002	0.056	0.022	0.004	0.106	0.014	0.012
Barium (Ba)	0.002	-	-	0	0.006	0.07	0.044	0.036	0.004	<0.002	<0.002	<0.002	0.004	0.002
Beryllium (Be)	0.002	-	-	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Boron (B)	0.2	0.37	5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Cadmium (Cd)	0.002	0.0002	0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Chromium (Cr) - total	0.002	0.001 (hex)*	1 (total)	<0.002	<0.002	<0.002	0.016	<0.002	<0.002	0.004	<0.002	<0.002	<0.002	<0.002
Cobalt (Co)	0.002	-	1	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Copper (Cu)	0.002	0.0014	1	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Iron (Fe)	0.2	-	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Lead (Pb)	0.002	0.0034	0.1	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Manganese (Mn)	0.002	1.90	-	0	0.004	<0.002	<0.002	0.014	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Mercury (Hg)	0.0001	0.0006	0.002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Molybdenum (Mo)	0.002	-	0.15	<0.002	0.004	0.004	<0.002	0.002	0.006	0.004	<0.002	0.002	0.004	0.006
Nickel (Ni)	0.002	0.011	1	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Selenium (Se)	0.02	0.011	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Silica (SiO_2)	0.2	-	-	26	1.8	1.8	2.4	2.4	2.2	10.4	4.6	5.4	2	2
Thorium (Th)	0.002	-	-	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Uranium (U)	0.002	-	0.2	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium (V)	0.02	-	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02
Zinc (Zn)	0.01	0.008	20	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

* Cr (VI) = hexavalent. ** 0.024 mg/Lfor trivalent Arsenic (III).

for still water bodies only, moving rivers at low flow rates should not exceed 2,200µS/cm

^ calculated based on total dissolved solids (TDS) conversion rate of 0.67% of EC. TDS is an approximate measure of inorganic dissolved salts and should not exceed 2,400mg/L for livestock drinking water.

Notes: < indicates concentration less than the detection limit. Shaded cells exceed applied guideline values.

1. ANZECC & ARMCANZ (2000). Trigger values for aquatic ecosystems (95% species protection level)

2. ANZECC & ARMCANZ (2000). Recommended guideline limits for Livestock Drinking Water.

1 + 2. both taken from the "Australian and New Zealand Guidelines for Fresh and Marine Water Quality", National Water Quality Management Strategy, 2000, compilation by ANZECC and ARMCANZ.

Table B6: Physical Test Results for Sample Composites from the Tomingley Gold Extension Project

RGS Sample Number →		2021054_C001	2021054_C002	2021054_C003	2021054_C004	2021054_C006	2021054_C007	2021054_C008	2021054_C009	2021054_C010	2021054_C011
ALS Laboratory ID →		EB2122755001	EB2122755002	EB2122755003	EB2122755004	EB2122755006	EB2122755007	EB2122755008	EB2122755009	EB2122755010	EB2122755011
Emerson Aggregate Test		Alluvium	Weathered Andesite	Fresh Andesite	NAF Monzodiorite	Quartz	Saprock and Saprolite	Volcaniclastic Conglomerate	Weathered Volcaniclastic Sandstone	Fresh Volcaniclastic Sandstone	Fresh Volcaniclastic Siltstone
Color (Munsell)		Reddish Brown (5YR 4/3)	Dark Greenish Gray (5GY 4/1)	Very Dark Greenish Gray (5GY 3/1)	Very Dark Grayish Green (5G 3/2)	Greenish Gray (10Y 5/1)	Light Yellowish Brown (10YR 6/4)	Very Dark Greenish Gray (5GY 3/1)	Dark Grayish Brown (10YR 4/2)	Very Dark Greenish Gray (5GY 3/1)	Very Dark Greenish Gray (5GY 3/1)
Texture		Sandy Clay Loam	Loamy Sand	Loamy Sand	Loamy Sand	Loamy Sand	Sandy Clay Loam	Loamy Sand	Loamy Sand	Loamy Sand	Loamy Sand
Emerson Class Number		2	3	3	3	3	2	3	3	3	3
Particle Sizing	Limit of Reporting	%									
+75µm	1%	26	96	95	88	96	38	94	80	97	96
+150µm	1%	21	96	95	87	96	32	94	80	97	96
+300µm	1%	14	96	94	85	96	29	93	79	97	95
+425µm	1%	11	95	93	84	96	27	93	79	97	95
+600µm	1%	8	94	92	81	96	25	92	78	97	94
+1180µm	1%	5	90	88	72	94	21	88	76	96	92
+2.36mm	1%	2	73	77	54	82	15	73	65	91	79
+4.75mm	1%	<1	32	43	18	34	4	29	27	45	34
+9.5mm	1%	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
+19.0mm	1%	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
+37.5mm	1%	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
+75.0mm	1%	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Soil Classification based on Particle Size		%									
Clay (<2 µm)	1%	47	1	<1	3	<1	20	3	5	1	2
Silt (2-60 µm)	1%	26	2	4	8	3	41	2	15	2	2
Sand (0.06-2.00 mm)	1%	24	19	16	30	12	23	17	12	5	13
Gravel (>2mm)	1%	3	78	80	59	85	16	78	68	92	83
Cobbles (>6cm)	1%	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Soil Particle Density		g/cm^3									
Soil Particle Density (Clay/Silt/Sand)	0.01 g/cm^3	2.78	2.91	2.77	2.79	2.79	2.55	2.86	2.79	2.80	2.80

Notes: < indicates less than the laboratory limit of reporting. Shaded cells exceed applied guideline limit.

** Guideline level for Cr(VI) = 300 mg/kg. Guideline level for Cr(III) = 24% of total Cr.

1. NEPC (2013). National Environmental Protection Council (NEPC). *National Environmental Protection (Assessment of Site Contamination) Measure (NEPM)* , Amendment of Schedule B1-B7 of 1999 version. Guideline on Investigation Levels for Soil and Groundwater. Health-Based Investigation Level - HIL(C); public open spaces - recreational use.

ATTACHMENT C
ALS Laboratory Data

(Certificates of Analysis)

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2121672**	Page	: 1 of 20
Client	: **ALKANE RESOURCES LTD**	Laboratory	: Environmental Division Brisbane
Contact	: Alex Cherry	Contact	: Customer Services EB
Address	: Level 4, 66 Kings Park Road West Perth, WA 6005 6005	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: ----	Telephone	: +61-7-3243 7222
Project	: ----	Date Samples Received	: 02-Aug-2021 11:25
Order number	: ----	Date Analysis Commenced	: 06-Aug-2021
C-O-C number	: ----	Issue Date	: 10-Aug-2021 12:42
Sampler	: ALEX CHERRY		
Site	: ----		
Quote number	: EN/333		
No. of samples received	: 86		
No. of samples analysed	: 86		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Satishkumar Trivedi	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

General Comments

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

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

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

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

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

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

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

- Samples xxx have been crushed prior to preparation and analysis.
- ASS: EA013 (ANC) Fizz Rating: 0- None; 1- Slight; 2- Moderate; 3- Strong; 4- Very Strong; 5- Lime.

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Sample ID	2021054_001	2021054_002	2021054_003	2021054_004	2021054_005
			Sampling date / time	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00
Compound	CAS Number	LOR	Unit	EB2121672-001	EB2121672-002	EB2121672-003	EB2121672-004	EB2121672-005
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	9.1	9.2	9.0	8.9	9.3
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	-97.4	-130	-101	-38.1	-138
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	220	182	198	188	110
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	132	144	116	118	140
ANC as CaCO3	----	0.1	% CaCO3	13.5	14.7	11.9	12.0	14.3
Fizz Rating	----	0	Fizz Unit	2	2	2	2	3
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	1.13	0.44	0.50	2.61	0.05

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Sample ID	2021054_006	2021054_007	2021054_008	2021054_009	2021054_010
			Sampling date / time	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00
Compound	CAS Number	LOR	Unit	EB2121672-006	EB2121672-007	EB2121672-008	EB2121672-009	EB2121672-010
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**8.9**	**9.6**	**9.5**	**10.0**	**9.8**
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	**-153**	**-123**	**-24.9**	**-29.9**	**-42.1**
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**109**	**124**	**179**	**213**	**163**
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	**154**	**127**	**24.9**	**31.4**	**45.8**
ANC as CaCO3	----	0.1	% CaCO3	**15.8**	**13.0**	**2.5**	**3.2**	**4.7**
Fizz Rating	----	0	Fizz Unit	**3**	**3**	**1**	**1**	**2**
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	**0.04**	**0.12**	<0.01	**0.05**	**0.12**

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Sample ID	2021054_011	2021054_012	2021054_013	2021054_014	2021054_015
			Sampling date / time	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00
Compound	CAS Number	LOR	Unit	EB2121672-011	EB2121672-012	EB2121672-013	EB2121672-014	EB2121672-015
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	9.9	9.6	9.5	9.4	9.4
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	-278	-525	-74.8	-119	-92.8
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	209	88	130	143	142
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	279	528	89.2	131	93.4
ANC as CaCO3	----	0.1	% CaCO3	28.5	53.8	9.1	13.4	9.5
Fizz Rating	----	0	Fizz Unit	4	5	2	2	2
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.02	0.09	0.47	0.40	0.02

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Sample ID	2021054_016	2021054_017	2021054_018	2021054_019	2021054_020
			Sampling date / time	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00
Compound	CAS Number	LOR	Unit	EB2121672-016	EB2121672-017	EB2121672-018	EB2121672-019	EB2121672-020
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	9.6	9.9	9.1	9.1	9.1
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	-91.8	-120	-47.5	-112	-106
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	124	210	248	228	220
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	92.4	121	120	119	113
ANC as CaCO3	----	0.1	% CaCO3	9.4	12.3	12.3	12.1	11.5
Fizz Rating	----	0	Fizz Unit	2	2	2	2	2
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.02	0.02	2.37	0.23	0.22

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Sample ID	2021054_021	2021054_022	2021054_023	2021054_024	2021054_025
			Sampling date / time	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00
Compound	CAS Number	LOR	Unit	EB2121672-021	EB2121672-022	EB2121672-023	EB2121672-024	EB2121672-025
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	9.0	9.4	9.3	9.5	9.1
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	-20.2	-168	-128	-269	-212
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	422	415	324	305	294
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	20.8	174	180	278	239
ANC as CaCO3	----	0.1	% CaCO3	2.1	17.7	18.3	28.4	24.4
Fizz Rating	----	0	Fizz Unit	1	3	3	3	3
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.02	0.18	1.68	0.28	0.89

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Sample ID	2021054_026	2021054_027	2021054_028	2021054_029	2021054_030
			Sampling date / time	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00
Compound	CAS Number	LOR	Unit	EB2121672-026	EB2121672-027	EB2121672-028	EB2121672-029	EB2121672-030
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	9.2	9.3	10.0	9.3	9.4
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	-430	-153	-32.4	-118	-64.5
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	195	137	165	216	220
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	436	170	34.2	140	111
ANC as CaCO3	----	0.1	% CaCO3	44.5	17.3	3.5	14.2	11.3
Fizz Rating	----	0	Fizz Unit	5	3	2	2	2
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.20	0.56	0.06	0.71	1.52

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Sample ID	2021054_031	2021054_032	2021054_033	2021054_034	2021054_035
			Sampling date / time	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00
Compound	CAS Number	LOR	Unit	EB2121672-031	EB2121672-032	EB2121672-033	EB2121672-034	EB2121672-035
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	9.3	9.1	8.8	9.9	9.6
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	-7.9	-82.1	-213	-21.3	-58.5
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	214	268	219	162	320
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	65.1	124	216	22.2	74.1
ANC as CaCO3	----	0.1	% CaCO3	6.6	12.6	22.0	2.3	7.6
Fizz Rating	----	0	Fizz Unit	2	2	4	1	2
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	1.87	1.37	0.09	0.03	0.51

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Sample ID	2021054_036	2021054_037	2021054_038	2021054_039	2021054_040
			Sampling date / time	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00
Compound	CAS Number	LOR	Unit	EB2121672-036	EB2121672-037	EB2121672-038	EB2121672-039	EB2121672-040
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	9.0	9.6	8.9	8.6	8.9
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	-81.4	-3.6	-131	-2.7	-71.2
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	272	489	249	265	200
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	142	69.1	164	115	90.2
ANC as CaCO3	----	0.1	% CaCO3	14.4	7.0	16.7	11.7	9.2
Fizz Rating	----	0	Fizz Unit	3	2	3	2	2
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	1.98	2.14	1.09	3.67	0.62

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Sample ID	2021054_041	2021054_042	2021054_043	2021054_044	2021054_045
			Sampling date / time	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00
Compound	CAS Number	LOR	Unit	EB2121672-041	EB2121672-042	EB2121672-043	EB2121672-044	EB2121672-045
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	8.9	8.9	9.1	9.1	9.2
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	-14.6	-114	-51.7	-40.0	4.0
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	300	295	188	174	194
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	89.0	123	66.1	52.6	44.6
ANC as CaCO3	----	0.1	% CaCO3	9.1	12.5	6.7	5.4	4.5
Fizz Rating	----	0	Fizz Unit	2	2	2	2	2
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	2.43	0.30	0.47	0.41	1.59

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Sample ID	2021054_046	2021054_047	2021054_048	2021054_049	2021054_050
			Sampling date / time	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00
Compound	CAS Number	LOR	Unit	EB2121672-046	EB2121672-047	EB2121672-048	EB2121672-049	EB2121672-050
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	9.6	9.5	8.7	9.3	8.5
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	-120	-6.7	-47.3	29.9	85.8
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	178	206	1630	260	2390
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	121	57.2	82.8	47.8	54.0
ANC as CaCO3	----	0.1	% CaCO3	12.3	5.8	8.4	4.9	5.5
Fizz Rating	----	0	Fizz Unit	3	2	2	2	2
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.04	1.65	1.16	2.54	4.57

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Sample ID	2021054_051	2021054_052	2021054_053	2021054_054	2021054_055
			Sampling date / time	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00
Compound	CAS Number	LOR	Unit	EB2121672-051	EB2121672-052	EB2121672-053	EB2121672-054	EB2121672-055
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	9.5	9.4	9.3	9.4	9.5
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	-319	-56.5	-211	-105	-106
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	142	139	118	95	146
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	377	89.9	213	111	113
ANC as CaCO3	----	0.1	% CaCO3	38.5	9.2	21.7	11.4	11.5
Fizz Rating	----	0	Fizz Unit	4	2	3	2	2
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	1.89	1.09	0.07	0.20	0.24

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Sample ID	2021054_056	2021054_057	2021054_058	2021054_059	2021054_060
			Sampling date / time	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00
Compound	CAS Number	LOR	Unit	EB2121672-056	EB2121672-057	EB2121672-058	EB2121672-059	EB2121672-060
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	9.2	9.5	5.9	7.8	7.9
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	-218	-67.0	-4.2	-5.9	-5.4
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	243	133	769	628	487
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	221	67.9	5.1	6.5	5.7
ANC as CaCO3	----	0.1	% CaCO3	22.5	6.9	0.5	0.7	0.6
Fizz Rating	----	0	Fizz Unit	3	2	0	0	0
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.11	0.03	0.03	0.02	0.01

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Sample ID	2021054_061	2021054_062	2021054_063	2021054_064	2021054_065
			Sampling date / time	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00
Compound	CAS Number	LOR	Unit	EB2121672-061	EB2121672-062	EB2121672-063	EB2121672-064	EB2121672-065
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**7.6**	**7.5**	**8.1**	**8.8**	**8.9**
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	**-6.9**	**-7.9**	**-13.2**	**-14.7**	**-23.9**
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**810**	**993**	**627**	**300**	**222**
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	**7.5**	**8.5**	**13.5**	**14.7**	**23.9**
ANC as CaCO3	----	0.1	% CaCO3	**0.8**	**0.9**	**1.4**	**1.5**	**2.4**
Fizz Rating	----	0	Fizz Unit	**0**	**0**	**1**	**1**	**1**
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	**0.02**	**0.02**	**0.01**	<0.01	<0.01

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Sample ID	2021054_066	2021054_067	2021054_068	2021054_069	2021054_070
			Sampling date / time	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00
Compound	CAS Number	LOR	Unit	EB2121672-066	EB2121672-067	EB2121672-068	EB2121672-069	EB2121672-070
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**9.4**	**6.4**	**8.3**	**8.8**	**8.4**
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	**-26.2**	**-5.0**	**-5.8**	**-21.9**	**-17.5**
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**85**	**656**	**347**	**265**	**576**
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	**26.2**	**5.6**	**6.1**	**22.2**	**17.8**
ANC as CaCO3	----	0.1	% CaCO3	**2.7**	**0.6**	**0.6**	**2.3**	**1.8**
Fizz Rating	----	0	Fizz Unit	**1**	**0**	**0**	**1**	**1**
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	<0.01	**0.02**	**0.01**	**0.01**	**0.01**

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Sample ID	2021054_071	2021054_072	2021054_073	2021054_074	2021054_075
			Sampling date / time	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00
Compound	CAS Number	LOR	Unit	EB2121672-071	EB2121672-072	EB2121672-073	EB2121672-074	EB2121672-075
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**5.3**	**7.9**	**8.1**	**9.5**	**8.2**
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	**-1.7**	**-9.5**	**-6.6**	**-30.7**	**-8.8**
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**1450**	**2170**	**938**	**414**	**769**
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	**3.2**	**11.0**	**7.2**	**30.7**	**9.4**
ANC as CaCO3	----	0.1	% CaCO3	**0.3**	**1.1**	**0.7**	**3.1**	**1.0**
Fizz Rating	----	0	Fizz Unit	**0**	**1**	**0**	**1**	**0**
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	**0.05**	**0.05**	**0.02**	<0.01	**0.02**

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Sample ID	2021054_076	2021054_077	2021054_078	2021054_079	2021054_080
			Sampling date / time	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00
Compound	CAS Number	LOR	Unit	EB2121672-076	EB2121672-077	EB2121672-078	EB2121672-079	EB2121672-080
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**8.0**	**7.8**	**8.0**	**8.4**	**8.5**
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	**-8.4**	**-8.2**	**-4.8**	**-16.7**	**-21.8**
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**846**	**979**	**1310**	**490**	**387**
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	**9.0**	**8.8**	**5.4**	**17.0**	**21.8**
ANC as CaCO3	----	0.1	% CaCO3	**0.9**	**0.9**	**0.6**	**1.7**	**2.2**
Fizz Rating	----	0	Fizz Unit	**0**	**0**	**0**	**1**	**1**
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	**0.02**	**0.02**	**0.02**	**0.01**	<0.01

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Sample ID	2021054_081	2021054_082	2021054_083	2021054_084	2021054_085
			Sampling date / time	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00
Compound	CAS Number	LOR	Unit	EB2121672-081	EB2121672-082	EB2121672-083	EB2121672-084	EB2121672-085
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	9.0	9.5	9.3	9.0	9.2
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	-21.6	-161	-163	-103	-152
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	288	185	170	307	184
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	21.9	161	165	136	162
ANC as CaCO3	----	0.1	% CaCO3	2.2	16.4	16.8	13.9	16.5
Fizz Rating	----	0	Fizz Unit	1	3	3	2	3
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.01	<0.01	0.05	1.09	0.32

Analytical Results

Sub-Matrix: **WATER** (Matrix: **SOIL**)				Sample ID	**pH and EC of DI Water**	**----**	**----**	**----**	**----**
				Sampling date / time	27-Jul-2021 00:00	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*		**EB2121672-086**	**--------**	**--------**	**--------**	**--------**
					Result	----	----	----	----
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**6.0**	**----**	**----**	**----**	**----**
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		<1	**----**	**----**	**----**	**----**

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2122716**	Page	: 1 of 11
Client	: **ALKANE RESOURCES LTD**	Laboratory	: Environmental Division Brisbane
Contact	: Alex Cherry	Contact	: Customer Services EB
Address	: Level 4, 66 Kings Park Road West Perth, WA 6005 6005	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: ----	Telephone	: +61-7-3243 7222
Project	: 2021054 Tomingley Gold Extension Project	Date Samples Received	: 12-Aug-2021 11:10
Order number	: ----	Date Analysis Commenced	: 16-Aug-2021
C-O-C number	: ----	Issue Date	: 19-Aug-2021 10:51
Sampler	: Alex Cherry		
Site	: ----		
Quote number	: EN/333		
No. of samples received	: 43		
No. of samples analysed	: 43		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

General Comments

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

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

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

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

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

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

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Sample ID	2021054_001	2021054_002	2021054_003	2021054_004	2021054_007
			Sampling date / time	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00
Compound	CAS Number	LOR	Unit	EB2122716-001	EB2122716-002	EB2122716-003	EB2122716-004	EB2122716-007
				Result	Result	Result	Result	Result
EA011: Net Acid Generation								
pH (OX)	----	0.1	pH Unit	**9.6**	**11.0**	**11.0**	**10.9**	**11.2**
NAG (pH 4.5)	----	0.1	kg H2SO4/t	<0.1	<0.1	<0.1	<0.1	<0.1
NAG (pH 7.0)	----	0.1	kg H2SO4/t	<0.1	<0.1	<0.1	<0.1	<0.1
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.929**	**0.342**	**0.369**	**2.13**	**0.102**

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Sample ID	2021054_010	2021054_013	2021054_014	2021054_018	2021054_019
			Sampling date / time	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00
Compound	CAS Number	LOR	Unit	EB2122716-010	EB2122716-013	EB2122716-014	EB2122716-018	EB2122716-019
				Result	Result	Result	Result	Result
EA011: Net Acid Generation								
pH (OX)	----	0.1	pH Unit	**9.9**	**11.2**	**11.1**	**9.4**	**10.8**
NAG (pH 4.5)	----	0.1	kg H2SO4/t	<0.1	<0.1	<0.1	<0.1	<0.1
NAG (pH 7.0)	----	0.1	kg H2SO4/t	<0.1	<0.1	<0.1	<0.1	<0.1
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.109**	**0.363**	**0.458**	**1.78**	**0.194**

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Sample ID	2021054_020	2021054_022	2021054_023	2021054_024	2021054_025
			Sampling date / time	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00
Compound	CAS Number	LOR	Unit	EB2122716-020	EB2122716-022	EB2122716-023	EB2122716-024	EB2122716-025
				Result	Result	Result	Result	Result
EA011: Net Acid Generation								
pH (OX)	----	0.1	pH Unit	**11.0**	**11.2**	**9.2**	**11.0**	**10.1**
NAG (pH 4.5)	----	0.1	kg H2SO4/t	<0.1	<0.1	<0.1	<0.1	<0.1
NAG (pH 7.0)	----	0.1	kg H2SO4/t	<0.1	<0.1	<0.1	<0.1	<0.1
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.170**	**0.170**	**1.32**	**0.254**	**0.695**

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Sample ID	2021054_026	2021054_027	2021054_029	2021054_030	2021054_031
			Sampling date / time	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00
Compound	CAS Number	LOR	Unit	EB2122716-026	EB2122716-027	EB2122716-029	EB2122716-030	EB2122716-031
				Result	Result	Result	Result	Result
EA011: Net Acid Generation								
pH (OX)	----	0.1	pH Unit	**11.6**	**11.7**	**10.8**	**10.4**	**9.4**
NAG (pH 4.5)	----	0.1	kg H2SO4/t	<0.1	<0.1	<0.1	<0.1	<0.1
NAG (pH 7.0)	----	0.1	kg H2SO4/t	<0.1	<0.1	<0.1	<0.1	<0.1
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.156**	**0.450**	**0.538**	**1.16**	**1.40**

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Sample ID	2021054_032	2021054_035	2021054_036	2021054_037	2021054_038
			Sampling date / time	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00
Compound	CAS Number	LOR	Unit	EB2122716-032	EB2122716-035	EB2122716-036	EB2122716-037	EB2122716-038
				Result	Result	Result	Result	Result
EA011: Net Acid Generation								
pH (OX)	----	0.1	pH Unit	**10.0**	**11.2**	**11.2**	**10.2**	**11.3**
NAG (pH 4.5)	----	0.1	kg H2SO4/t	<0.1	<0.1	<0.1	<0.1	<0.1
NAG (pH 7.0)	----	0.1	kg H2SO4/t	<0.1	<0.1	<0.1	<0.1	<0.1
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**1.02**	**0.408**	**1.23**	**1.67**	**0.812**

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Sample ID	2021054_039	2021054_040	2021054_041	2021054_042	2021054_043
			Sampling date / time	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00
Compound	CAS Number	LOR	Unit	EB2122716-039	EB2122716-040	EB2122716-041	EB2122716-042	EB2122716-043
				Result	Result	Result	Result	Result
EA011: Net Acid Generation								
pH (OX)	----	0.1	pH Unit	**9.1**	**10.8**	**9.1**	**11.0**	**11.1**
NAG (pH 4.5)	----	0.1	kg H2SO4/t	<0.1	<0.1	<0.1	<0.1	<0.1
NAG (pH 7.0)	----	0.1	kg H2SO4/t	<0.1	<0.1	<0.1	<0.1	<0.1
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**3.07**	**0.516**	**1.86**	**0.243**	**0.377**

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Sample ID	2021054_044	2021054_045	2021054_047	2021054_048	2021054_049
			Sampling date / time	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00
Compound	CAS Number	LOR	Unit	EB2122716-044	EB2122716-045	EB2122716-047	EB2122716-048	EB2122716-049
				Result	Result	Result	Result	Result
EA011: Net Acid Generation								
pH (OX)	----	0.1	pH Unit	**11.0**	**8.7**	**3.9**	**11.3**	**2.9**
NAG (pH 4.5)	----	0.1	kg H2SO4/t	<0.1	<0.1	**1.1**	<0.1	**17.8**
NAG (pH 7.0)	----	0.1	kg H2SO4/t	<0.1	<0.1	**3.8**	<0.1	**23.1**
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.344**	**1.14**	**1.11**	**0.903**	**1.56**

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Sample ID	2021054_050	2021054_051	2021054_052	2021054_054	2021054_055
			Sampling date / time	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00
Compound	CAS Number	LOR	Unit	EB2122716-050	EB2122716-051	EB2122716-052	EB2122716-054	EB2122716-055
				Result	Result	Result	Result	Result
EA011: Net Acid Generation								
pH (OX)	----	0.1	pH Unit	**2.3**	**11.6**	**11.0**	**11.6**	**11.5**
NAG (pH 4.5)	----	0.1	kg H2SO4/t	**51.2**	<0.1	<0.1	<0.1	<0.1
NAG (pH 7.0)	----	0.1	kg H2SO4/t	**61.8**	<0.1	<0.1	<0.1	<0.1
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**3.11**	**1.44**	**0.900**	**0.146**	**0.202**

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Sample ID	2021054_056	2021054_084	2021054_085	----	----
			Sampling date / time	27-Jul-2021 00:00	27-Jul-2021 00:00	27-Jul-2021 00:00	----	----
Compound	CAS Number	LOR	Unit	EB2122716-056	EB2122716-084	EB2122716-085	--------	--------
				Result	Result	Result	----	----
EA011: Net Acid Generation								
pH (OX)	----	0.1	pH Unit	**10.9**	**8.6**	**11.0**	**----**	**----**
NAG (pH 4.5)	----	0.1	kg H2SO4/t	<0.1	<0.1	<0.1	**----**	**----**
NAG (pH 7.0)	----	0.1	kg H2SO4/t	<0.1	<0.1	<0.1	**----**	**----**
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.090**	**0.739**	**0.284**	**----**	**----**

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2122755**	Page	: 1 of 15
Client	: **ALKANE RESOURCES LTD**	Laboratory	: Environmental Division Brisbane
Contact	: PETER	Contact	: Customer Services EB
Address	: Level 4, 66 Kings Park Road West Perth, WA 6005 6005	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: ----	Telephone	: +61-7-3243 7222
Project	: ----	Date Samples Received	: 12-Aug-2021 14:24
Order number	: ----	Date Analysis Commenced	: 13-Aug-2021
C-O-C number	: ----	Issue Date	: 25-Aug-2021 07:53
Sampler	: PRIYA RAJENDRAN		
Site	: ----		
Quote number	: EN/333		
No. of samples received	: 12		
No. of samples analysed	: 12		

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

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- Analytical Results

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Signatories

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

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

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

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

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

- EA150H: Soil particle density results fell outside the scope of AS1289.3.6.3. Results should be scrutinised accordingly.
- ED037 (Alkalinity): NATA accreditation does not cover the performance of this service.
- ED038 (Acidity): NATA accreditation does not cover the performance of this service.
- ALS is not NATA accredited for the analysis of Exchangeable Aluminium and Exchange Acidity in soils when performed under ALS Method ED005.
- ALS is not NATA accredited for the analysis of Exchangeable Cations on Alkaline Soils when performed under ALS Method ED006.
- EG005T (Total Metals by ICP-AES): Sample EB2122365-004 shows poor duplicate results due to sample heterogeneity. Confirmed by visual inspection.
- ED006 (Exchangeable Cations on Alkaline Soils): Unable to calculate Calcium/Magnesium Ratio result for some samples as required Calcium & Magnesium results are less than the limit of reporting.
- ED006 (Exchangeable Cations on Alkaline Soils): Unable to calculate Magnesium/Potassium Ratio result for some samples as required Exchangeable Magnesium and/or Potassium results are less than the limit of reporting.
- ED008-Exchangeable Cations with prep-treatment:Sample EB2123087-001 shows poor duplicate results due to sample heterogeneity. Confirmed by visual inspection.
- EG020-S (Soluble Metals): High LCS recovery for Se deemed acceptable as all associated analyte results are less than LOR.
- EA058 Emerson: V. = Very, D. = Dark, L. = Light, VD. = Very Dark
- ED007 and ED008: When Exchangeable Al is reported from these methods, it should be noted that Rayment & Lyons (2011) suggests Exchange Acidity by 1M KCl - Method 15G1 (ED005) is a more suitable method for the determination of exchange acidity (H+ + Al3+).

Analytical Results

Sub-Matrix: SOLID (Matrix: SOIL)			Sample ID	2021054_C001	2021054_C002	2021054_C003	2021054_C004	2021054_C005
			Sampling date / time	11-Aug-2021 00:00	11-Aug-2021 00:00	11-Aug-2021 00:00	11-Aug-2021 00:00	11-Aug-2021 00:00
Compound	CAS Number	LOR	Unit	EB2122755-001	EB2122755-002	EB2122755-003	EB2122755-004	EB2122755-005
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	7.1	9.1	9.2	9.4	8.7
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	1020	241	218	235	2310
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	<1.0	<1.0	<1.0	<1.0	<1.0
EA058: Emerson Aggregate Test								
Color (Munsell)	----	-	-	Reddish Brown (5YR 4/3)	Dark Greenish Gray (5GY 4/1)	Very Dark Greenish Gray (5GY 3/1)	Very Dark Grayish Green (5G 3/2)	----
Texture	----	-	-	Sandy Clay Loam	Loamy Sand	Loamy Sand	Loamy Sand	----
Emerson Class Number	EC/TC	-	-	2	3	3	3	----
EA150: Particle Sizing								
+75µm	----	1	%	26	96	95	88	----
+150µm	----	1	%	21	96	95	87	----
+300µm	----	1	%	14	96	94	85	----
+425µm	----	1	%	11	95	93	84	----
+600µm	----	1	%	8	94	92	81	----
+1180µm	----	1	%	5	90	88	72	----
+2.36mm	----	1	%	2	73	77	54	----
+4.75mm	----	1	%	<1	32	43	18	----
+9.5mm	----	1	%	<1	<1	<1	<1	----
+19.0mm	----	1	%	<1	<1	<1	<1	----
+37.5mm	----	1	%	<1	<1	<1	<1	----
+75.0mm	----	1	%	<1	<1	<1	<1	----
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	47	1	<1	3	----
Silt (2-60 µm)	----	1	%	26	2	4	8	----
Sand (0.06-2.00 mm)	----	1	%	24	19	16	30	----
Gravel (>2mm)	----	1	%	3	78	80	59	----
Cobbles (>6cm)	----	1	%	<1	<1	<1	<1	----
EA152: Soil Particle Density								
Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3	2.78	2.91	2.77	2.79	----
ED006: Exchangeable Cations on Alkaline Soils								
ø Exchangeable Calcium	----	0.2	meq/100g	----	0.7	1.2	0.9	----
ø Exchangeable Magnesium	----	0.2	meq/100g	----	<0.2	<0.2	<0.2	----

Analytical Results

Sub-Matrix: SOLID (Matrix: SOIL)			Sample ID	2021054_C001	2021054_C002	2021054_C003	2021054_C004	2021054_C005
			Sampling date / time	11-Aug-2021 00:00	11-Aug-2021 00:00	11-Aug-2021 00:00	11-Aug-2021 00:00	11-Aug-2021 00:00
Compound	CAS Number	LOR	Unit	EB2122755-001	EB2122755-002	EB2122755-003	EB2122755-004	EB2122755-005
				Result	Result	Result	Result	Result
ED006: Exchangeable Cations on Alkaline Soils - Continued								
ø Exchangeable Potassium	----	0.2	meq/100g	----	<0.2	<0.2	<0.2	----
ø Exchangeable Sodium	----	0.2	meq/100g	----	<0.2	0.3	0.3	----
ø Cation Exchange Capacity	----	0.2	meq/100g	----	0.7	1.5	1.2	----
ø Exchangeable Sodium Percent	----	0.2	%	----	<0.2	18.8	28.2	----
ED008: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	0.7	----	----	----	----
Exchangeable Magnesium	----	0.1	meq/100g	6.8	----	----	----	----
Exchangeable Potassium	----	0.1	meq/100g	0.3	----	----	----	----
Exchangeable Sodium	----	0.1	meq/100g	4.8	----	----	----	----
Cation Exchange Capacity	----	0.1	meq/100g	12.8	----	----	----	----
Exchangeable Sodium Percent	----	0.1	%	37.8	----	----	----	----
Calcium/Magnesium Ratio	----	0.1	-	0.1	----	----	----	----
Magnesium/Potassium Ratio	----	0.1	-	26.3	----	----	----	----
ED037: Alkalinity								
ø Carbonate Alkalinity as CaCO3	3812-32-6	5	mg/kg	<5	49	523	523	<5
ø Bicarbonate Alkalinity as CaCO3	71-52-3	5	mg/kg	1500	21400	85800	43900	26200
ø Total Alkalinity as CaCO3	----	5	mg/kg	1500	21500	86300	44500	26200
ED038A: Acidity								
Acidity	----	5	mg/kg	399	<5	<5	<5	<5
ED040S: Soluble Major Anions								
Sulfate as SO4 2-	14808-79-8	10	mg/kg	580	140	140	450	8220
Silica	7631-86-9	1	mg/kg	132	9	9	12	12
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	10	mg/kg	1260	40	40	60	90
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	<10	50	30	40	3180
Magnesium	7439-95-4	10	mg/kg	<10	50	20	30	110
Sodium	7440-23-5	10	mg/kg	950	130	160	160	220
Potassium	7440-09-7	10	mg/kg	10	90	60	<10	70
ED093T: Total Major Cations								
Calcium	7440-70-2	50	mg/kg	230	40600	51800	35100	26200
Magnesium	7439-95-4	50	mg/kg	1420	11500	11700	10600	7710
Sodium	7440-23-5	50	mg/kg	2640	200	280	280	350
Potassium	7440-09-7	50	mg/kg	320	510	640	<50	280

Analytical Results

Sub-Matrix: SOLID (Matrix: SOIL)				Sample ID	2021054_C001	2021054_C002	2021054_C003	2021054_C004	2021054_C005
				Sampling date / time	11-Aug-2021 00:00	11-Aug-2021 00:00	11-Aug-2021 00:00	11-Aug-2021 00:00	11-Aug-2021 00:00
Compound	CAS Number	LOR	Unit		EB2122755-001	EB2122755-002	EB2122755-003	EB2122755-004	EB2122755-005
					Result	Result	Result	Result	Result
EG005(ED093)S : Soluble Metals by ICPAES									
Boron	7440-42-8	1	mg/kg		<1	<1	<1	<1	<1
Iron	7439-89-6	1	mg/kg		<1	<1	<1	<1	<1
EG005(ED093)T: Total Metals by ICP-AES									
Aluminium	7429-90-5	50	mg/kg		**4710**	**6650**	**8600**	**8990**	**6020**
Antimony	7440-36-0	5	mg/kg		<5	<5	<5	<5	<5
Barium	7440-39-3	10	mg/kg		**80**	**20**	**10**	<10	**30**
Beryllium	7440-41-7	1	mg/kg		<1	<1	<1	<1	<1
Boron	7440-42-8	50	mg/kg		<50	<50	<50	<50	<50
Cobalt	7440-48-4	2	mg/kg		**5**	**16**	**14**	**16**	**26**
Iron	7439-89-6	50	mg/kg		**31400**	**48800**	**35400**	**16700**	**33700**
Manganese	7439-96-5	5	mg/kg		**242**	**900**	**756**	**462**	**217**
Molybdenum	7439-98-7	2	mg/kg		<2	<2	<2	<2	<2
Selenium	7782-49-2	5	mg/kg		<5	<5	<5	<5	<5
Silver	7440-22-4	2	mg/kg		<2	<2	<2	<2	<2
Arsenic	7440-38-2	5	mg/kg		<5	**242**	**346**	<5	<5
Cadmium	7440-43-9	1	mg/kg		<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg		**29**	**5**	**7**	**119**	**42**
Copper	7440-50-8	5	mg/kg		**20**	**106**	**71**	**51**	**29**
Lead	7439-92-1	5	mg/kg		**7**	**6**	<5	<5	<5
Nickel	7440-02-0	2	mg/kg		**5**	**4**	**15**	**39**	**43**
Zinc	7440-66-6	5	mg/kg		**7**	**59**	**40**	**30**	**13**
EG020S: Soluble Metals by ICPMS									
Arsenic	7440-38-2	0.01	mg/kg		<0.01	**0.04**	**0.06**	<0.01	<0.01
Selenium	7782-49-2	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Barium	7440-39-3	0.01	mg/kg		**0.03**	**0.03**	**0.35**	**0.22**	**0.18**
Beryllium	7440-41-7	0.01	mg/kg		<0.01	<0.01	<0.01	<0.01	<0.01
Cadmium	7440-43-9	0.01	mg/kg		<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt	7440-48-4	0.01	mg/kg		<0.01	<0.01	<0.01	<0.01	<0.01
Chromium	7440-47-3	0.01	mg/kg		<0.01	<0.01	<0.01	**0.08**	<0.01
Thorium	7440-29-1	0.01	mg/kg		<0.01	<0.01	<0.01	<0.01	<0.01
Copper	7440-50-8	0.01	mg/kg		<0.01	<0.01	<0.01	<0.01	<0.01
Manganese	7439-96-5	0.01	mg/kg		**0.02**	**0.02**	<0.01	<0.01	**0.07**
Molybdenum	7439-98-7	0.01	mg/kg		<0.01	**0.02**	**0.02**	<0.01	**0.01**
Nickel	7440-02-0	0.01	mg/kg		<0.01	<0.01	<0.01	<0.01	<0.01

Analytical Results

Sub-Matrix: SOLID (Matrix: SOIL)				Sample ID	2021054_C001	2021054_C002	2021054_C003	2021054_C004	2021054_C005
				Sampling date / time	11-Aug-2021 00:00	11-Aug-2021 00:00	11-Aug-2021 00:00	11-Aug-2021 00:00	11-Aug-2021 00:00
Compound	CAS Number	LOR	Unit		EB2122755-001	EB2122755-002	EB2122755-003	EB2122755-004	EB2122755-005
					Result	Result	Result	Result	Result
EG020S: Soluble Metals by ICPMS - Continued									
Lead	7439-92-1	0.01	mg/kg		<0.01	<0.01	<0.01	<0.01	<0.01
Antimony	7440-36-0	0.01	mg/kg		**0.01**	**0.09**	**0.03**	<0.01	<0.01
Uranium	7440-61-1	0.01	mg/kg		<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	7440-66-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Vanadium	7440-62-2	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Aluminium	7429-90-5	0.1	mg/kg		<0.1	**0.8**	**1.3**	**1.0**	**0.2**
EG020T: Total Metals by ICP-MS									
Thorium	7440-29-1	0.1	mg/kg		**3.7**	**0.6**	**0.7**	**0.6**	**0.5**
Uranium	7440-61-1	0.1	mg/kg		**0.9**	**0.2**	**0.2**	**0.1**	<0.1
EG035S: Soluble Mercury by FIMS									
Mercury	7439-97-6	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
EK040S: Fluoride Soluble									
Fluoride	16984-48-8	1	mg/kg		<1	**2**	**2**	**2**	**2**
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1

Analytical Results

Sub-Matrix: SOLID (Matrix: SOIL)			Sample ID	2021054_C006	2021054_C007	2021054_C008	2021054_C009	2021054_C010
			Sampling date / time	11-Aug-2021 00:00	11-Aug-2021 00:00	11-Aug-2021 00:00	11-Aug-2021 00:00	11-Aug-2021 00:00
Compound	CAS Number	LOR	Unit	EB2122755-006	EB2122755-007	EB2122755-008	EB2122755-009	EB2122755-010
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	9.3	9.0	9.9	9.8	9.2
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	172	433	154	479	184
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	<1.0	<1.0	<1.0	<1.0	<1.0
EA058: Emerson Aggregate Test								
Color (Munsell)	----	-	-	Greenish Gray (10Y 5/1)	Light Yellowish Brown (10YR 6/4)	Very Dark Greenish Gray (5GY 3/1)	Dark Grayish Brown (10YR 4/2)	Very Dark Greenish Gray (5GY 3/1)
Texture	----	-	-	Loamy Sand	Sandy Clay Loam	Loamy Sand	Loamy Sand	Loamy Sand
Emerson Class Number	EC/TC	-	-	3	2	3	3	3
EA150: Particle Sizing								
+75µm	----	1	%	96	38	94	80	97
+150µm	----	1	%	96	32	94	80	97
+300µm	----	1	%	96	29	93	79	97
+425µm	----	1	%	96	27	93	79	97
+600µm	----	1	%	96	25	92	78	97
+1180µm	----	1	%	94	21	88	76	96
+2.36mm	----	1	%	82	15	73	65	91
+4.75mm	----	1	%	34	4	29	27	45
+9.5mm	----	1	%	<1	<1	<1	<1	<1
+19.0mm	----	1	%	<1	<1	<1	<1	<1
+37.5mm	----	1	%	<1	<1	<1	<1	<1
+75.0mm	----	1	%	<1	<1	<1	<1	<1
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	<1	20	3	5	1
Silt (2-60 µm)	----	1	%	3	41	2	15	2
Sand (0.06-2.00 mm)	----	1	%	12	23	17	12	5
Gravel (>2mm)	----	1	%	85	16	78	68	92
Cobbles (>6cm)	----	1	%	<1	<1	<1	<1	<1
EA152: Soil Particle Density								
Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3	2.79	2.55	2.86	2.79	2.80
ED006: Exchangeable Cations on Alkaline Soils								
ø Exchangeable Calcium	----	0.2	meq/100g	68.8	1.3	2.3	2.3	1.2
ø Exchangeable Magnesium	----	0.2	meq/100g	7.9	3.9	<0.2	1.8	<0.2

Analytical Results

Sub-Matrix: SOLID (Matrix: SOIL)			Sample ID	2021054_C006	2021054_C007	2021054_C008	2021054_C009	2021054_C010
			Sampling date / time	11-Aug-2021 00:00	11-Aug-2021 00:00	11-Aug-2021 00:00	11-Aug-2021 00:00	11-Aug-2021 00:00
Compound	CAS Number	LOR	Unit	EB2122755-006	EB2122755-007	EB2122755-008	EB2122755-009	EB2122755-010
				Result	Result	Result	Result	Result
ED006: Exchangeable Cations on Alkaline Soils - Continued								
ø Exchangeable Potassium	----	0.2	meq/100g	<0.2	<0.2	<0.2	<0.2	<0.2
ø Exchangeable Sodium	----	0.2	meq/100g	**0.3**	**9.8**	**0.4**	**5.8**	**0.5**
ø Cation Exchange Capacity	----	0.2	meq/100g	**77.2**	**15.0**	**2.7**	**10.1**	**1.7**
ø Exchangeable Sodium Percent	----	0.2	%	**0.4**	**65.3**	**14.8**	**57.6**	**30.6**
ø Calcium/Magnesium Ratio	----	0.2	-	**8.7**	**0.3**	**----**	**1.3**	**----**
ED037: Alkalinity								
ø Carbonate Alkalinity as CaCO3	3812-32-6	5	mg/kg	**1050**	**49**	**523**	**988**	**523**
ø Bicarbonate Alkalinity as CaCO3	71-52-3	5	mg/kg	**40800**	**2300**	**117000**	**28400**	**23800**
ø Total Alkalinity as CaCO3	----	5	mg/kg	**41800**	**2340**	**118000**	**29400**	**24300**
ED038A: Acidity								
Acidity	----	5	mg/kg	<5	<5	<5	<5	<5
ED040S: Soluble Major Anions								
Sulfate as SO4 2-	14808-79-8	10	mg/kg	**130**	**200**	**60**	**290**	**140**
Silica	7631-86-9	1	mg/kg	**11**	**52**	**23**	**27**	**10**
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	10	mg/kg	**30**	**400**	**10**	**120**	**40**
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	**30**	<10	<10	<10	**20**
Magnesium	7439-95-4	10	mg/kg	**40**	<10	<10	<10	**20**
Sodium	7440-23-5	10	mg/kg	**70**	**460**	**160**	**530**	**150**
Potassium	7440-09-7	10	mg/kg	**80**	<10	**10**	**10**	**50**
ED093T: Total Major Cations								
Calcium	7440-70-2	50	mg/kg	**48000**	**1370**	**87100**	**18400**	**44300**
Magnesium	7439-95-4	50	mg/kg	**13000**	**8890**	**8460**	**15800**	**11300**
Sodium	7440-23-5	50	mg/kg	**160**	**3790**	**280**	**2820**	**280**
Potassium	7440-09-7	50	mg/kg	**340**	**950**	**760**	**390**	**470**
EG005(ED093)S : Soluble Metals by ICPAES								
Boron	7440-42-8	1	mg/kg	<1	<1	<1	<1	<1
Iron	7439-89-6	1	mg/kg	<1	<1	<1	<1	<1
EG005(ED093)T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	**3930**	**11300**	**8790**	**17000**	**7020**
Antimony	7440-36-0	5	mg/kg	<5	<5	<5	<5	<5
Barium	7440-39-3	10	mg/kg	**10**	**150**	<10	**40**	<10
Beryllium	7440-41-7	1	mg/kg	<1	<1	<1	<1	<1

Analytical Results

Sub-Matrix: SOLID (Matrix: SOIL)				Sample ID	2021054_C006	2021054_C007	2021054_C008	2021054_C009	2021054_C010
				Sampling date / time	11-Aug-2021 00:00	11-Aug-2021 00:00	11-Aug-2021 00:00	11-Aug-2021 00:00	11-Aug-2021 00:00
Compound	CAS Number	LOR	Unit		EB2122755-006	EB2122755-007	EB2122755-008	EB2122755-009	EB2122755-010
					Result	Result	Result	Result	Result
EG005(ED093)T: Total Metals by ICP-AES - Continued									
Boron	7440-42-8	50	mg/kg		<50	<50	<50	<50	<50
Cobalt	7440-48-4	2	mg/kg		**15**	**41**	**12**	**21**	**16**
Iron	7439-89-6	50	mg/kg		**29300**	**34700**	**16700**	**36100**	**42100**
Manganese	7439-96-5	5	mg/kg		**650**	**1070**	**942**	**678**	**870**
Molybdenum	7439-98-7	2	mg/kg		<2	<2	<2	<2	<2
Selenium	7782-49-2	5	mg/kg		<5	<5	<5	<5	<5
Silver	7440-22-4	2	mg/kg		<2	<2	<2	<2	<2
Arsenic	7440-38-2	5	mg/kg		**628**	**8**	<5	**40**	**128**
Cadmium	7440-43-9	1	mg/kg		<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg		**30**	**48**	**24**	**41**	**21**
Copper	7440-50-8	5	mg/kg		**11**	**51**	**68**	**237**	**77**
Lead	7439-92-1	5	mg/kg		<5	<5	<5	<5	**7**
Nickel	7440-02-0	2	mg/kg		**39**	**32**	**6**	**31**	**13**
Zinc	7440-66-6	5	mg/kg		**35**	**105**	**24**	**62**	**54**
EG020S: Soluble Metals by ICPMS									
Arsenic	7440-38-2	0.01	mg/kg		**0.28**	**0.11**	**0.02**	**0.53**	**0.07**
Selenium	7782-49-2	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Barium	7440-39-3	0.01	mg/kg		**0.02**	<0.01	<0.01	<0.01	**0.02**
Beryllium	7440-41-7	0.01	mg/kg		<0.01	<0.01	<0.01	<0.01	<0.01
Cadmium	7440-43-9	0.01	mg/kg		<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt	7440-48-4	0.01	mg/kg		<0.01	<0.01	<0.01	<0.01	<0.01
Chromium	7440-47-3	0.01	mg/kg		<0.01	**0.02**	<0.01	<0.01	<0.01
Thorium	7440-29-1	0.01	mg/kg		<0.01	<0.01	<0.01	<0.01	<0.01
Copper	7440-50-8	0.01	mg/kg		<0.01	<0.01	<0.01	<0.01	<0.01
Manganese	7439-96-5	0.01	mg/kg		<0.01	<0.01	<0.01	<0.01	<0.01
Molybdenum	7439-98-7	0.01	mg/kg		**0.03**	**0.02**	<0.01	**0.01**	**0.02**
Nickel	7440-02-0	0.01	mg/kg		<0.01	<0.01	<0.01	<0.01	<0.01
Lead	7439-92-1	0.01	mg/kg		<0.01	<0.01	<0.01	<0.01	<0.01
Antimony	7440-36-0	0.01	mg/kg		**0.02**	<0.01	<0.01	**0.03**	**0.04**
Uranium	7440-61-1	0.01	mg/kg		<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	7440-66-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Vanadium	7440-62-2	0.1	mg/kg		<0.1	<0.1	**0.1**	<0.1	<0.1
Aluminium	7429-90-5	0.1	mg/kg		**1.0**	**0.2**	**1.9**	**0.6**	**1.3**
EG020T: Total Metals by ICP-MS									

Analytical Results

Sub-Matrix: SOLID (Matrix: SOIL)				Sample ID	2021054_C006	2021054_C007	2021054_C008	2021054_C009	2021054_C010
				Sampling date / time	11-Aug-2021 00:00	11-Aug-2021 00:00	11-Aug-2021 00:00	11-Aug-2021 00:00	11-Aug-2021 00:00
Compound	CAS Number	LOR	Unit		EB2122755-006	EB2122755-007	EB2122755-008	EB2122755-009	EB2122755-010
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS - Continued									
Thorium	7440-29-1	0.1	mg/kg		**0.3**	**0.7**	**0.2**	**0.8**	**0.6**
Uranium	7440-61-1	0.1	mg/kg		**0.2**	**0.4**	**0.3**	**0.1**	**0.1**
EG035S: Soluble Mercury by FIMS									
Mercury	7439-97-6	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
EK040S: Fluoride Soluble									
Fluoride	16984-48-8	1	mg/kg		**1**	**4**	**2**	**3**	**2**
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.1	mg/kg		<0.1	**0.7**	<0.1	**0.2**	<0.1

Analytical Results

Sub-Matrix: SOLID (Matrix: SOIL)			Sample ID	2021054_C011	----	----	----	----
			Sampling date / time	11-Aug-2021 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EB2122755-011	--------	--------	--------	--------
				Result	----	----	----	----
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**9.2**	----	----	----	----
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**171**	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	<1.0	----	----	----	----
EA058: Emerson Aggregate Test								
Color (Munsell)	----	-	-	**Very Dark Greenish Gray (5GY 3/1)**	----	----	----	----
Texture	----	-	-	**Loamy Sand**	----	----	----	----
Emerson Class Number	EC/TC	-	-	**3**	----	----	----	----
EA150: Particle Sizing								
+75µm	----	1	%	**96**	----	----	----	----
+150µm	----	1	%	**96**	----	----	----	----
+300µm	----	1	%	**95**	----	----	----	----
+425µm	----	1	%	**95**	----	----	----	----
+600µm	----	1	%	**94**	----	----	----	----
+1180µm	----	1	%	**92**	----	----	----	----
+2.36mm	----	1	%	**79**	----	----	----	----
+4.75mm	----	1	%	**34**	----	----	----	----
+9.5mm	----	1	%	<1	----	----	----	----
+19.0mm	----	1	%	<1	----	----	----	----
+37.5mm	----	1	%	<1	----	----	----	----
+75.0mm	----	1	%	<1	----	----	----	----
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	**2**	----	----	----	----
Silt (2-60 µm)	----	1	%	**2**	----	----	----	----
Sand (0.06-2.00 mm)	----	1	%	**13**	----	----	----	----
Gravel (>2mm)	----	1	%	**83**	----	----	----	----
Cobbles (>6cm)	----	1	%	<1	----	----	----	----
EA152: Soil Particle Density								
Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3	**2.80**	----	----	----	----
ED006: Exchangeable Cations on Alkaline Soils								
ø Exchangeable Calcium	----	0.2	meq/100g	**3.2**	----	----	----	----
ø Exchangeable Magnesium	----	0.2	meq/100g	**1.2**	----	----	----	----

Analytical Results

Sub-Matrix: SOLID (Matrix: SOIL)				Sample ID	2021054_C011	----	----	----	----
				Sampling date / time	11-Aug-2021 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EB2122755-011	--------	--------	--------	--------
					Result	----	----	----	----
ED006: Exchangeable Cations on Alkaline Soils - Continued									
ø Exchangeable Potassium	----	0.2	meq/100g		0.2	----	----	----	----
ø Exchangeable Sodium	----	0.2	meq/100g		0.4	----	----	----	----
ø Cation Exchange Capacity	----	0.2	meq/100g		5.0	----	----	----	----
ø Exchangeable Sodium Percent	----	0.2	%		8.6	----	----	----	----
ø Calcium/Magnesium Ratio	----	0.2	-		2.6	----	----	----	----
ø Magnesium/Potassium Ratio	----	0.2	-		5.7	----	----	----	----
ED037: Alkalinity									
ø Carbonate Alkalinity as CaCO3	3812-32-6	5	mg/kg		523	----	----	----	----
ø Bicarbonate Alkalinity as CaCO3	71-52-3	5	mg/kg		24600	----	----	----	----
ø Total Alkalinity as CaCO3	----	5	mg/kg		25100	----	----	----	----
ED038A: Acidity									
Acidity	----	5	mg/kg		<5	----	----	----	----
ED040S: Soluble Major Anions									
Sulfate as SO4 2-	14808-79-8	10	mg/kg		160	----	----	----	----
Silica	7631-86-9	1	mg/kg		10	----	----	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	10	mg/kg		40	----	----	----	----
ED093S: Soluble Major Cations									
Calcium	7440-70-2	10	mg/kg		30	----	----	----	----
Magnesium	7439-95-4	10	mg/kg		20	----	----	----	----
Sodium	7440-23-5	10	mg/kg		100	----	----	----	----
Potassium	7440-09-7	10	mg/kg		50	----	----	----	----
ED093T: Total Major Cations									
Calcium	7440-70-2	50	mg/kg		38600	----	----	----	----
Magnesium	7439-95-4	50	mg/kg		15700	----	----	----	----
Sodium	7440-23-5	50	mg/kg		240	----	----	----	----
Potassium	7440-09-7	50	mg/kg		400	----	----	----	----
EG005(ED093)S : Soluble Metals by ICPAES									
Boron	7440-42-8	1	mg/kg		<1	----	----	----	----
Iron	7439-89-6	1	mg/kg		<1	----	----	----	----
EG005(ED093)T: Total Metals by ICP-AES									
Aluminium	7429-90-5	50	mg/kg		8160	----	----	----	----
Antimony	7440-36-0	5	mg/kg		<5	----	----	----	----
Barium	7440-39-3	10	mg/kg		10	----	----	----	----

Analytical Results

Sub-Matrix: SOLID (Matrix: SOIL)				Sample ID	2021054_C011	----	----	----	----
				Sampling date / time	11-Aug-2021 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EB2122755-011	--------	--------	--------	--------
					Result	----	----	----	----
EG005(ED093)T: Total Metals by ICP-AES - Continued									
Beryllium	7440-41-7	1	mg/kg		<1	----	----	----	----
Boron	7440-42-8	50	mg/kg		<50	----	----	----	----
Cobalt	7440-48-4	2	mg/kg		**19**	----	----	----	----
Iron	7439-89-6	50	mg/kg		**35100**	----	----	----	----
Manganese	7439-96-5	5	mg/kg		**659**	----	----	----	----
Molybdenum	7439-98-7	2	mg/kg		<2	----	----	----	----
Selenium	7782-49-2	5	mg/kg		<5	----	----	----	----
Silver	7440-22-4	2	mg/kg		<2	----	----	----	----
Arsenic	7440-38-2	5	mg/kg		**136**	----	----	----	----
Cadmium	7440-43-9	1	mg/kg		<1	----	----	----	----
Chromium	7440-47-3	2	mg/kg		**28**	----	----	----	----
Copper	7440-50-8	5	mg/kg		**89**	----	----	----	----
Lead	7439-92-1	5	mg/kg		<5	----	----	----	----
Nickel	7440-02-0	2	mg/kg		**28**	----	----	----	----
Zinc	7440-66-6	5	mg/kg		**47**	----	----	----	----
EG020S: Soluble Metals by ICPMS									
Arsenic	7440-38-2	0.01	mg/kg		**0.06**	----	----	----	----
Selenium	7782-49-2	0.1	mg/kg		<0.1	----	----	----	----
Barium	7440-39-3	0.01	mg/kg		**0.01**	----	----	----	----
Beryllium	7440-41-7	0.01	mg/kg		<0.01	----	----	----	----
Cadmium	7440-43-9	0.01	mg/kg		<0.01	----	----	----	----
Cobalt	7440-48-4	0.01	mg/kg		<0.01	----	----	----	----
Chromium	7440-47-3	0.01	mg/kg		<0.01	----	----	----	----
Thorium	7440-29-1	0.01	mg/kg		<0.01	----	----	----	----
Copper	7440-50-8	0.01	mg/kg		<0.01	----	----	----	----
Manganese	7439-96-5	0.01	mg/kg		<0.01	----	----	----	----
Molybdenum	7439-98-7	0.01	mg/kg		**0.03**	----	----	----	----
Nickel	7440-02-0	0.01	mg/kg		<0.01	----	----	----	----
Lead	7439-92-1	0.01	mg/kg		<0.01	----	----	----	----
Antimony	7440-36-0	0.01	mg/kg		**0.07**	----	----	----	----
Uranium	7440-61-1	0.01	mg/kg		<0.01	----	----	----	----
Zinc	7440-66-6	0.05	mg/kg		<0.05	----	----	----	----
Vanadium	7440-62-2	0.1	mg/kg		<0.1	----	----	----	----
Aluminium	7429-90-5	0.1	mg/kg		**1.4**	----	----	----	----

Analytical Results

Sub-Matrix: SOLID (Matrix: SOIL)				Sample ID	2021054_C011	----	----	----	----
				Sampling date / time	11-Aug-2021 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EB2122755-011	--------	--------	--------	--------
					Result	----	----	----	----
EG020T: Total Metals by ICP-MS									
Thorium	7440-29-1	0.1	mg/kg		**0.4**	----	----	----	----
Uranium	7440-61-1	0.1	mg/kg		**0.2**	----	----	----	----
EG035S: Soluble Mercury by FIMS									
Mercury	7439-97-6	0.0005	mg/kg		<0.0005	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	----	----	----	----
EK040S: Fluoride Soluble									
Fluoride	16984-48-8	1	mg/kg		**1**	----	----	----	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.1	mg/kg		<0.1	----	----	----	----

Analytical Results

Sub-Matrix: **WATER** (Matrix: **SOIL**)				Sample ID	**pH and EC of DI Water**	**----**	**----**	**----**	**----**
				Sampling date / time	11-Aug-2021 00:00	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*		**EB2122755-012**	**--------**	**--------**	**--------**	**--------**
					Result	----	----	----	----
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**6.3**	**----**	**----**	**----**	**----**
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		<1	**----**	**----**	**----**	**----**

MINE WASTE AND
WATER MANAGEMENT