Appendix G Acid Sulfate Soils Investigation

Fast-Track Approvals Act 2024 Substantive Application

Hinuera Solar Farm

Harmony Energy NZ #6 Limited

SLR Project No.: 880.016894.00001

19 August 2026

Technical Memorandum

			Lindsay Lutes
To:	Christina Walker, Planning Director	**From:**	Chris Newland
			Nigel Mather
Company:	Harmony Energy NZ #6 Limited	**SLR Consulting New Zealand Limited**	
cc:		**Date:**	25 March 2026
		Project No.	880.016894.00006

RE: Acid Sulfate Soils Investigation
Hinuera Solar Farm Fast Track Approval Application

Basis of Report

This technical memorandum has been prepared by SLR Consulting New Zealand Limited (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Harmony Energy NZ #6 Limited (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

It is intended to support the Client's application under the Fast Track Approvals Act 2024 and may be relied upon by the Expert Panel and relevant administering agencies for the purposes of assessing the application.

While SLR has exercised due care in preparing this technical memorandum, it does not accept liability for any use of the technical memorandum beyond its intended purpose. Where information has been supplied by the Client or obtained from external sources, it has been assumed to be accurate unless otherwise stated. SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

Statement of Qualifications and Experience

Lindsay Lutes – Senior Project Consultant – Land Quality and Remediation, SLR Consulting

I am a Senior Project Consultant – Land Quality and Remediation at SLR Consulting Limited (SLR). SLR is a global environmental and advisory consultancy specialising in sustainability and climate change strategy, planning, environmental management and impact assessment and waste management and remediation. I have been employed at SLR New Zealand since 2025. I previously worked for SLR in Regina, Saskatchewan, Canada from 2021 to 2023.

I hold the qualification of Bachelor of Environmental Science degree from the University of Royal Roads in Victoria, British Columbia, Canada.

I have over ten years of experience in preliminary and detailed site investigations and remediation.

I confirm that, in my capacity as author of this report, I have read and abide by the Environment Court of New Zealand Practice Note 2023, and in particular section 9 the Code of Conduct for Expert Witnesses.

Chris Newland – Principal Consultant – Land Quality and Remediation, SLR Consulting

I am a Principal Consultant – Land Quality and Remediation at SLR Consulting Limited (SLR). SLR is a global environmental and advisory consultancy specialising in sustainability and climate change strategy, planning, environmental management and impact assessment and waste management and remediation. I have been employed at SLR Australia since July 2025.

I hold the qualification of Bachelor of Science (Applied Physical Geography) degree from the University of New South Wales, Australia.

I have 27 years' experience in the consulting industry specialising in contamination assessment / management and remediation planning. I have worked in the United Kingdom, Australia and New Zealand. Key areas of expertise include contaminated land site characterisation, remediation options planning, quantitative risk assessment and modelling, acid sulfate soils assessment / management, contaminated land auditor assistant, preparation of long-term environmental management plans for managing ongoing risk.

I confirm that, in my capacity as reviewer of this report, I have read and abide by the Environment Court of New Zealand Practice Note 2023, and in particular section 9 the Code of Conduct for Expert Witnesses.

Nigel Mather – Practice Manager – Land Quality and Remediation – SLR Consulting

I am a Practice Manager – Land Quality and Remediation at SLR Consulting Limited (SLR). I have been employed at SLR New Zealand since 2016.

I hold the qualification of Master of Science degree from the University of Auckland.

I have over 20 years of experience covering a broad range of environmental management and risk assessment experience, including contaminated land and groundwater assessment and remediation, consent application and technical peer review, hazardous substances management and auditing, environmental due diligence and risk assessment (transactional and advisory services), and HSE management systems implementation and auditing.

I confirm that, in my capacity as approver of this report, I have read and abide by the Environment Court of New Zealand Practice Note 2023, and in particular section 9 the Code of Conduct for Expert Witnesses.

1.0 Introduction

Harmony Energy NZ #6 Limited engaged SLR Consulting New Zealand Ltd (SLR) to undertake an Acid Sulfate Soil (ASS) investigation to support the substantive fast-track lodgement of the Hinuera Solar Farm project (the Project). The Project is located at the corner of State Highway 29 and State Highway 27, Hinuera (the site). Refer to **Figure 1** in **Attachment A** for the Project location and layout.

This technical memorandum summarises the scope, methodology, and outcomes of the ASS investigation completed to date.

This investigation provides an indicative assessment of ASS risk based on soil sampling from representative strata types likely to be disturbed during earthworks. It does not provide comprehensive spatial certainty across the entire Project area. The Acid Sulfate Soils Management Advisory Committee (ASSMAC) guidance notes that sampling frequency depends on project scale and risk rather than a fixed number of samples per hectare.

The results of this assessment confirm that the investigated soil horizons do not contain sulfidic materials (SHC1: No Risk / No Sulfur), and therefore ASS management measures are not required. No further assessment is needed unless unexpected soil conditions are encountered during construction.

2.0 Background

ASS are soils containing iron sulphides that can generate acidity when exposed to oxygen. These include Actual ASS (AASS), which are already acidic, and Potential ASS (PASS), which have not yet oxidised but may produce acidity upon disturbance.

The Waikato Regional Council (WRC) has mapped the probability of ASS occurrence across the region[1], identifying that the majority of the southern portion of the Project footprint lies within areas of high ASS probability. Several smaller areas show a negligible likelihood of ASS.

3.0 Guidelines

This assessment has been undertaken with reference to procedures documented in the following guidelines:

- Stone Y, Ahern CR, and Blunden B (1998), *Acid Sulfate Soils Manual*. Acid Sulfate Soils Management and Advisory Committee (ASSMAC), Wollongbar NSW.
- Water Quality Australia (2018a), *National Acid Sulfate Soils Guidance, Sampling and Identification Methods Manual* (June 2018).
- Water Quality Australia (2018b), *National Acid Sulfate Soils Guidance, Identification and Laboratory Methods Manual* (June 2018).

We acknowledge that WRC released guidance on ASS (*WRC Acid Sulfate Soils Technical Guidance, Technical report 25/25*) on 3 March 2026.On the basis this investigation was designed and undertaken prior to the release of this document, it is not specifically referenced. The approach taken as part of this assessment is considered to generally align with the expectations in the WRC technical guidance.

[1] Waikato region acid sulfate soils preliminary risk assessment. Waikato Regional Council Technical Report 2023/24

4.0 Objectives

4.1 Technical

The objective of the investigation was to provide preliminary information to inform a site-specific acid sulfate soil management plan (ASSMP). Specifically, the investigation aimed to:

- Identify the presence or absence of AASS and/or PASS within the proposed development footprint through pH and chromium-reducible sulphur (CRS) analysis within areas mapped by WRC as having a potentially high likelihood of ASS.
- Identify areas where excavation, disturbance, or soil management activities may require ASS management / controls during construction to minimise potential risk posed from generation of sulphuric acid upon excavation.
- Provide recommendations on management considerations for incorporation into the site-specific ASSMP to ensure pre-emptive compliance with WRC consent conditions and to prevent acid drainage or off-site impacts.

4.2 Administrative

The investigation was commissioned to pre-emptively satisfy the pre-construction site investigation requirements under WRC resource consents, which would require characterisation of the ASS status of subsurface soils. The results of this investigation will inform a site-specific ASSMP to support earthworks within these potentially high-risk areas.

5.0 Scope of Works

SLR undertook an ASS investigation to characterise the presence and properties of potential ASS at targeted locations across the site, specifically locations identified as high-risk by WRC ASS probability maps. The scope of work included:

- Advancement of six soil cores using manual hand auger across targeted areas of the site to obtain subsurface soil samples (sample locations ASS01-ASS06).
- Field screening of samples using field pH (pH_F) and field oxidised pH (pH_{FOX}) peroxide testing.
- Confirmatory laboratory analysis for selected soils using the CRS suite to identify any AASS or PASS, determine self-buffering capacity of soil and ascertain net acidity.
- Assessment of results in accordance with New Zealand best-practice guidance for ASS investigations and pre-emptively satisfy consenting requirements of WRC.
- Preparation of this technical memorandum summarising the investigation findings and their implications for Project development.

6.0 Sulfidic Hazard Classes & Acid-Base Accounting

Soil hazard classes for the management of ASS are used to assist with the interpretation of the potential environmental impact of soil acidification as a result of reduced inorganic sulphide (RIS or S) oxidation.

These soil hazard classes refer to procedures in the Acid Sulfate Soils Management Advisory Committee (ASSMAC) guidelines (Stone *et al* 1998) (refer to **Table 1**).

The soil hazard classes are based on the soil sulphur (S) and net acidity (NA) values. Classes normally used are no risk (no-sulphur or non-reactive), moderate risk and high risk. An explanation of these classes is presented in the following subsections. NA is calculated based on the acid-base account (ABA) of the soil being analysed:

- NA = Total potential acidity (TPA) + Existing acidity (CRS) – Acid neutralising capacity (ANC).
- Existing acidity (CRS) = Titratable actual acidity (TAA) + Retained acidity (S_{NAS}) x TPA.

Hence, the final equation is:

$$\mathbf{NA = CRS + TAA + S_{NAS} – ANC}$$

The Sulphide Hazard Class (SHC) in kg sulphuric acid (H_2SO_4) per tonne is expressed by converting the %S threshold values into the equivalent amount of H_2SO_4 produced if all sulphide oxidises. This comes from atomic mass relationship:

$$\mathbf{1\%\ S = 10\ kg\ S\ per\ tonne \rightarrow \times 3.06 = 30.6\ kg\ H_2SO_4}$$

- SHC1 / low-no hazard threshold corresponds to:
  - < 0.03 %S
  - < 0.918 kg H_2SO_4 / tonne.
- SHC2 / moderate hazard threshold corresponds to:
  - 0.03 -0.75 %S
  - 0.918 – 22.95 kg H_2SO_4 / tonne.
- SHC3 / high hazard threshold corresponds to:
  - > 0.75 %S
  - > 22.95 kg H_2SO_4 / tonne.

Table 1: Sulphide Hazard Class Determination

	No Risk (SHC1)				Risk			
Soil Texture Group	**No – Sulphur (SHC1)**		**Non – reactive (SHC1)**		**Moderate Risk (SHC2)**		**High Risk (SHC3)**	
	Sulphur	**NA**	**Sulphur**	**NA**	**Sulphur**	**NA**	**Sulphur**	**NA**
Sands	<1	---	>1	<3	>1	>3	>10	>5
Sandy Silts & Silts	<2	---	>2	<6	>2	>6	>20	>10
Clays	<3	---	>3	<9	>3	>9	>30	>15

Notes:
NA Net acidity
SHC Sulfide hazard class
H_2SO_4 Sulphuric acid
With the exception of the 'no sulphur' category, samples require both Sulphur & NA values to define hazard classes.
CRS = Actual S x 30.6 (conversion to H_2SO_4 per tonne of soil equivalent)
All units are in kg H_2SO_4 / tonne

6.1 No Risk (No-Sulfur / Non-reactive)

The non-reactive category (SHC1) is based on NA and is defined as having a CRS value greater than the no-sulphur threshold and a NA value below three times that of the no-sulphur value in **Table 1**. These levels are based on SLR's experience with ASS and require calibration using accelerated weathering trials (AWTs) to define the exact value, because soil variation can cause significant deviation from the anticipated value.

6.2 Moderate and High Risk

Moderate (SHC2) and high-risk (SHC3) sulfidic sediment and soil is likely to cause a significant adverse risk to the environment. Essentially, moderate risk will generate a small amount of acid slowly while high risk will either generate acid quickly and/or in large volumes.

If possible, high-risk soil/sediment should not be disturbed. If disturbance cannot be avoided, high risk soil/sediment is recommended to be kept in an anoxic state. Risk categories for soil samples collected from the site, based on the hazard classes is detailed in **Table 1**.

6.3 Action Criteria

The action criteria in **Table 2** that trigger the need to prepare an ASS management plan are grouped by three broad soil texture categories – coarse, medium and fine. If the Net Acidity of any individual soil material tested is equal to or greater than the action criterion, a detailed ASS management will need to be prepared (WQA, 2018).

However, it is important to note the acidity hazard of soil materials that are strongly acidic due to processes other than RIS oxidation, are not considered an ASS acidity hazard. Actual ASS are acid soil materials, but not all acid soil materials are Actual ASS. Naturally occurring acidic soils are not uncommon and are not considered an environmental hazard that require management to change their acidity. Indeed, these naturally occurring acidic soils are usually part of acidophilic ecosystems whose health depends on maintaining the acidic environment.

Accordingly, the trigger values in **Table 2** apply only to ASS materials and not to other acidic soils. As an example, many soil materials in naturally acidic landscapes, such as acidic peatlands and coastal heaths, often have NA's exceeding the action criteria in **Table** 2.

Table 2: Action Criteria

Material Type	Approx Clay Content	Net Acidity #			
Texture Range	(%)	1 – 1,000 Tonnes Material Disturbed		> 1,000 Tonnes Material Disturbed	
		% S-equiv. (oven-dried basis)	mol H+/t (oven-dried basis)	% S-equiv. (oven-dried basis)	mol H+/t (oven-dried basis)
Fine: Light medium to heavy clays	> 40	≥ 0.10	≥ 62	≥ 0.03	≥ 18
Medium: Clayey sand to light clays	5 – 40	≥ 0.06	≥ 36	≥ 0.03	≥ 18
Coarse and Peats: Sands to loamy sands	< 5	≥ 0.03	≥ 18	≥ 0.03	≥ 18

Notes:
If bulk density values are not available for the conversion of cubic meters to tonnes of soil, then the default bulk densities based on the soil texture may be used.
Net Acidity can only include a soil material's measured Acid Neutralising Capacity where this measure has been corroborated by other data

7.0 Site Investigation

7.1 Sampling Methodology

The ASS investigation was undertaken on 17 February 2026 by SLR Consulting, targeting high-risk areas identified from the WRC ASS probability map (**Figure 1**). A total of six hand auger locations (ASS01-ASS06) were advanced across the site to provide representative coverage, with additional focus on areas of potential elevated ASS risk.

Soil samples were collected at 0.25 m intervals to a maximum depth of 2.0 metres below ground level (m bgl) at each hand auger location. In addition to this, field screening was undertaken every 0.25 m bgl to determine soil pH_F and pH_{FOX}, providing an initial assessment for the presence of reduced inorganic sulphur.

Two samples from each location (total of 12) were submitted to the laboratory for analysis of the CRS suite. Soil sampling and analysis were completed in general accordance with:

- SLR Standard Operating Procedure (SOP) 2.1 - Soil Sampling, October 2018, and
- Ministry for the Environment Contaminated Land Management Guidelines No.5: Site Investigation and Analysis of Soils (1999, revised 2021).

All samples were collected by suitably trained SLR personnel using clean sampling techniques, placed in laboratory-supplied containers, and transported under chain-of-custody to ALS Global New Zealand for analysis. Sampling locations are shown in **Figure 1**, with details summarised in **Table 3**.

7.2 Sampling Observations

At each location soil temperature, qualitative reaction intensity, soil texture, and moisture condition was measured at 0.25 m intervals alongside pH_F and peroxide pH_{FOX}. Selected samples were collected for laboratory analysis where field screening results or soil conditions indicated potential ASS risk. All field observations including depth, soil classification, pH measurements, reactions, and sample collection points are summarised in **Table 3**.

Across the site, soils generally comprised silts, sandy silts, sands, silty sands, with minor clayey silts. Moisture conditions ranged from moist to wet, consistent with the season and soil types encountered.

The soil log details and soil profile photographs are presented in **Attachment B**.

7.3 pH Field Results Summary

Overall, the field sampling pH_F and peroxide pH_{FOX} dataset indicates the potential for acid generation conditions across the majority of samples collected:

- 94% of field samples exceeded the threshold of ΔpH >1.0. These elevated ΔpH values were associated with all soil types identified across the site (sand, silt and clayey silt).
- 4% of field samples exhibited a ΔpH values between 0.0 and 0.6.

Field results indicate that acidity potential across the Project area is potentially widespread. Generally, the pH_F and peroxide pH_{FOX} assessment indicates the potential presence of reactive sulphides throughout the soil profile.

7.4 CRS Sample Selection

A total of 12 samples (two from each hand auger location) were submitted for analysis of the CRS suite based on the following considerations:

- Most significant pH decreases.
- Notable oxidation reactions.
- Higher organic content.
- Soil textures typically associated with ASS (e.g., fine-grained silts and clays).

Table 3: Field Oxidation Testing Results Summary

Sample ID	Depth (m bgl)	pH_F	pH_{FOX}	Temp (°C)	Reaction	ΔpH	Material	Moisture	Sample Collected	CRS Analysis
ASS01	0.25	6	4.5	18.5	Minor	-1.5	SILT	Moist	Yes	Hold Cold
	0.50	6.4	4.5	18.7	Minor	-1.9	Clayey SILT	Moist	Yes	Hold Cold
	0.75	6.6	4.6	14.3	None	-2	SILT	Moist	Yes	Yes
	1.00	6.7	5	15.5	Minor	-1.7	SILT	Moist	Yes	Hold Cold
	1.25	6.7	4.8	14.7	Minor	-1.9	SILT	Moist	Yes	Hold Cold
	1.50	6.7	4.8	15.5	Minor	-1.9	SAND	Moist - wet	Yes	Hold Cold
	1.75	6.7	4.3	14.2	Minor	-2.4	SAND	Moist - wet	Yes	Yes
	2.00	6.5	4.2	14.4	Minor	-2.3	SAND	Moist - wet	Yes	Hold Cold
ASS02	0.25	5.7	4.4	19.3	Minor	-1.3	SILT	Moist	Yes	Hold Cold
	0.50	6.2	4.8	14.5	Minor	-1.4	SILT	Moist	Yes	Hold Cold
	0.75	6.7	4.2	16.3	Minor	-2.5	SILT	Moist	Yes	Hold Cold
	1.00	6.6	4.1	14.9	Minor	-2.5	SAND	Moist	Yes	Hold Cold
	1.25	6.5	3.5	13.5	Minor	-3	SILT	Moist	Yes	Yes
	1.50	6.3	4.7	16.7	None	-1.6	SAND	Wet	Yes	Hold Cold
	1.75	6.2	4.7	18.1	Minor	-1.5	SAND	Wet	Yes	Hold Cold
	2.00	6.2	4.6	18.2	Minor	-1.6	SAND	Wet	Yes	Yes
ASS03	0.25	4.6	4.3	15.7	Minor	-0.3	SILT	Moist	Yes	Hold Cold
	0.50	4.5	5	14.8	Minor	0.5	SILT	Moist	Yes	Hold Cold
	0.75	6.6	5.3	13.4	Minor	-1.3	SAND	Moist	Yes	Hold Cold
	1.00	6.3	4.9	14.6	Minor	-1.4	SAND	Moist	Yes	Hold Cold
	1.25	6.4	3.9	14.4	Minor	-2.5	SAND	Moist	Yes	Yes
	1.50	6.4	3.8	15.3	Minor	-2.6	SAND	Moist	Yes	Hold Cold
	1.75	6.3	4.1	15.9	Minor	-2.2	SAND	Wet	Yes	Yes
	2.00	6.2	4.3	15.9	Minor	-1.9	SAND	Wet	Yes	Hold Cold
ASS04	0.25	5.8	3.9	13.5	Minor	-1.9	SILT	Moist	Yes	Hold Cold

Sample ID	Depth (m bgl)	pH_F	pH_{FOX}	Temp (°C)	Reaction	ΔpH	Material	Moisture	Sample Collected	CRS Analysis
	0.50	6.1	4.6	18.4	Moderate	-1.5	SILT	Moist	Yes	Hold Cold
	0.75	6.5	3.7	17.1	None	-2.8	SILT	Moist	Yes	Yes
	1.00	6.3	5.2	20.2	Minor	-1.1	SAND	Moist	Yes	Hold Cold
	1.25	6.4	4.4	19.7	Minor	-2	SAND	Moist	Yes	Hold Cold
	1.50	5.9	4.1	19.8	Minor	-1.8	SAND	Wet	Yes	Yes
	1.75	6	4.7	20.4	Minor	-1.3	SAND	Wet	Yes	Hold Cold
	2.00	5.8	4.1	21	Minor	-1.7	SAND	Wet	Yes	Hold Cold
ASS05	0.25	6.1	4.3	9.5	Minor	-1.8	SILT	Moist	Yes	Hold Cold
	0.50	5.7	3.8	18.2	Minor	-1.9	SILT	Moist	Yes	Hold Cold
	0.75	6.2	4.2	18.6	High	-2	SILT	Moist	Yes	Yes
	1.00	6	3.7	19.5	Moderate	-2.3	SAND	Moist	Yes	Hold Cold
	1.25	6	4	17.1	Moderate	-2	SAND	Wet	Yes	Hold Cold
	1.50	6.1	4	17	Minor	-2.1	SAND	Wet	Yes	Yes
	1.75	6.1	4.2	18.4	Minor	-1.9	SAND	Wet	Yes	Hold Cold
	2.00	5.9	4.7	15.6	Minor	-1.2	SAND	Wet	Yes	Hold Cold
ASS06	0.25	6.2	4.8	15.3	Moderate	-1.4	SILT	Moist	Yes	Hold Cold
	0.50	6.6	5.1	17.3	Minor	-1.5	SILT	Moist	Yes	Hold Cold
	0.75	7	4.9	16.1	Minor	-2.1	Clayey SILT	Moist	Yes	Hold Cold
	1.00	7	4.3	15.8	None	-2.7	Silty SAND	Moist	Yes	Yes
	1.25	6.4	4.5	13.2	Minor	-1.9	Silty SAND	Moist	Yes	Hold Cold
	1.50	6.6	4.5	12.3	Minor	-2.1	Silty SAND	Moist	Yes	Hold Cold
	1.75	6.3	4.8	15.6	None	-1.5	SILT	Wet	Yes	Yes
	2.00	5.9	5.1	19.2	None	-0.8	SILT	Wet	Yes	Hold Cold

Notes:

Highlighted cell = sample CRS analysed

7.5 Laboratory Results

Laboratory analysis of selected soil samples was undertaken to confirm the presence and magnitude of potential or actual acidity indicated during field screening. CRS testing was completed to quantify reduced inorganic sulphur content and to calculate corresponding acidity, net acidity, and indicative liming rates. The results provide the basis for determining ASS risk categories across the sampled profile and for informing appropriate management measures within a site-specific ASSMP. The CRS results are summarised in **Table 4**, and the laboratory certificates are presented in **Attachment C**.

Table 4: Suggested Liming Rate / Risk Category

Sample ID	Depth (m bgl)	Material	Sulphur (%S)	Sulphur (kg/H2SO4/T)	Net Acidity (%S)	Net Acidity (mole H+/t)	Net Acidity (kg/H2SO4/T)	Liming Rate (kg/CaCO3/T)	Risk Category
ASS01	0.75	SILT	<0.02	<0.612	0.02	15	0.612	1	SHC1: No Sulphur
	1.75	SAND	<0.02	<0.612	<0.02	<10	<0.612	<1	SHC1: No Sulphur
ASS02	1.25	SILT	<0.02	<0.612	0.02	13	0.612	<1	SHC1: No Sulphur
	2.00	SAND	<0.02	<0.612	<0.02	<10	<0.612	<1	SHC1: No Sulphur
ASS03	1.25	SAND	<0.02	<0.612	<0.02	<10	<0.612	<1	SHC1: No Sulphur
	1.75	SAND	<0.02	<0.612	<0.02	<10	<0.612	<1	SHC1: No Sulphur
ASS04	0.75	SILT	<0.02	<0.612	<0.02	11	<0.612	<1	SHC1: No Sulphur
	1.50	SAND	<0.02	<0.612	<0.02	<10	<0.612	<1	SHC1: No Sulphur
ASS05	0.75	SILT	<0.02	<0.612	<0.02	12	<0.612	<1	SHC1: No Sulphur
	1.50	SAND	<0.02	<0.612	<0.02	<10	<0.612	<1	SHC1: No Sulphur
ASS06	1.00	Silty SAND	<0.02	<0.612	<0.02	<10	<0.612	<1	SHC1: No Sulphur
	1.75	SILT	0.02	0.612	0.02	14	0.612	1	SHC1: No Sulphur

Notes:

%S	Percentage sulphur
$Kg/H_2SO_4/t$	Kilograms of sulphuric acid per tonne
$Kg/CaCO_3/t$	Kilograms of calcium carbonate per tonne
Mole H+/t	Moles of hydrogen ions per tonne
SHC	Sulphide hazard classification

8.0 Discussion

The hand auger investigation across the site has provided a site-specific assessment for ASS occurrence, acidity potential and implications for earthworks management. Key findings and considerations are summarised below:

- **Soil Types and Depth Profiles**: The soil profile between 0.25–2.00 m bgl was reasonably consistent across all investigated locations (ASS01–ASS06). The profile comprised predominantly mineral sediment containing interbedded sandy and silty layers with occasional clay-enriched zones. No explicit organic-enriched (peat) layers were recorded in the field logs. Several deeper horizons exhibited elevated ΔpH values during field peroxide testing, however these changes are not interpreted as definitive evidence of sulphidic material.

  As described in the NSW EPA (1998) *Acid Sulfate Soil Assessment Guidelines*, field peroxide tests can produce false positives due to reactions unrelated to pyrite oxidation. These include the potential oxidation of manganese oxides, reduced iron species within saturated zones, and the presence of residual organic matter. Based on laboratory results, the soil horizons do not contain significant reduced inorganic sulfur or sulfide minerals.

- **Field pH Assessment**:
  - pHF and pHFOX indicated variable acidity potential across sampled horizons, with ΔpH values ranging between 0.3 and 3.0 (ASS02 at 1.25m), although the majority (94%) of field samples exceeded the threshold of ΔpH >1.0.
  - The strongest ΔpH reactions were recorded within the mid- to lower-profile horizons (approximately 0.75–2.00 m bgl), including -3.0 (ASS02 at 1.25 m), -2.8 (ASS04 at 0.75 m), -2.7 (ASS06 at 1.00 m), -2.6 (ASS03 at 1.50 m), and -2.5 (ASS03 at 1.25 m, and ASS02 at 1.00 m), indicating elevated acidity potential is predominantly associated with silt, sand, and silty/sandy mixtures below 0.75 m bgl.
  - Approximately 94% of all field samples (45/48) exceeded the threshold of ΔpH > 1.0, indicating moderate to high acidity potential in isolated mid- to lower-profile layers. Elevated ΔpH values were particularly associated with sand (most frequent), silt, and silty sand materials.
  - Positive or low ΔpH values (0.0–0.6) were recorded in ~4% of samples (2/48) and were restricted to shallow horizons (0.25–0.5 m bgl at ASS03), suggesting that near-surface soils at the investigated locations generally express non-acidic to minor acidity potential.
  - Depth trends show elevated acidity potential across all depth intervals, with the highest proportion of ΔpH > 1.0 observed in mid-profile horizons (0.75–1.5 m; ~100%), followed by deeper soils (>1.5 m; ~92%), and the lowest proportion in shallow soils (0.0–0.5 m; ~83%).
- **Laboratory CRS Results**:
  - CRS analysis confirmed low sulphur content across all tested samples, reporting NA < Action Criteria of 18 moles H+/t / 0.03 %S for management of >1,000 tonnes of disturbed material, as set out in **Table 2**.
  - Risk categories (SHC) indicate that all samples fall within SHC1: *No Sulphur*.

- Reported NA corresponded to negligible and low suggested liming rates (<1 kg CaCO3/t), consistent with soils expressing no risk of PASS. The highest liming rate (1 kg CaCO3/t) occurred in both ASS01/0.75 and ASS06/1.75 associated with surficial and deeper silt horizons.
- Calculated liming rates are consistent with the CRS content observed.

- **Spatial Distribution of ASS Risk**:
  - Shallow mineral soils (0.0–0.5 m bgl) generally returned ΔpH values >1, which indicate a moderate to high potential for acid generation. One isolated interval (e.g., ASS03 at 0.25–0.50 m) exhibited lower ΔpH responses (≤0.6). However, laboratory CRS results were consistently low (≤0.017 %S), with corresponding NA <10 mol H^+/t, placing all sampled materials within SHC1: No Risk / No Sulfur.
  - The discrepancy between the field ΔpH responses and laboratory sulfur measurements is considered consistent with known behaviour in non-sulfidic mineral soils, where field peroxide tests can produce false positive pH drops (e.g., due to oxidation of manganese oxides, reduced iron species in saturated zones, or minor organic matter; NSW EPA, 1998). In this context, the CRS data are taken as definitive, and the soil horizons are assessed as non-reactive with no appreciable sulfide content, despite the strong peroxide reaction observed in the field.
  - The Site footprint presents low-risk conditions, with the majority of shallow and many mid-profile sands and silts exhibiting low CRS (<0.02 %S), low to no measurable net acidity (<10 mol H^+/t), and moderate ΔpH reactivity patterns consistent with non-reactive behaviour for sampled locations.

- **Implications for Earthworks**:
  - Based on laboratory CRS results and no-risk, non-reactive conditions classified as SHC1: No Risk / No Sulfur, ASS management measures are not required for the proposed earthworks.
  - Standard earthworks practices will be sufficient with no ASS-related constraints anticipated.
  - Routine environmental awareness should be maintained during earthworks, with further assessment required if unexpected sulfidic or strongly acidic materials are encountered.

9.0 Conclusion

Based upon observations and results from this ASS investigation, the following key conclusions are made:

- All assessed soil horizons are classified as SHC1: No Risk / No Sulfur, with no evidence of sulfidic materials or significant reduced inorganic sulfur across the investigated areas.
- Elevated field ΔpH values recorded in the assessment soil horizons are interpreted as false positives, with reactions potentially involving manganese oxides, reduced iron species, or minor organic matter in non-sulfidic mineral soils.
- Laboratory CRS results confirm that no AASS or PASS materials are present. Reported CRS concentrations and NA values were well below the ASS management action criteria (18 mol H+/t).

- No ASS management, liming, special handling, or ASSMP is necessary for the proposed works. Standard construction earthworks practices will be sufficient.
- The overall risk of encountering sulfidic or highly acidic materials is low. Further assessment is only necessary if unexpected conditions are observed during earthworks.
- No additional laboratory testing is recommended at this stage.

10.0 Recommendations

Overall, ASS management measures are not required for the proposed earthworks. Routine environmental awareness should be maintained during earthworks, and further assessment is only recommended if unexpected sulfidic or acidic materials are encountered.

11.0 Closure

Should you have any questions on the contents of this technical memorandum, please do not hesitate to contact the undersigned.

Regards,

SLR Consulting New Zealand Limited

Lindsay Lutes
Senior Contaminated Lands Consultant
Land Quality and Remediation

Nigel Mather
Practice Manager
Land Quality and Remediation

Chris Newland
Principal Consultant
Land Quality & Remediation

12.0 References

Ministry for the Environment 2021, Contaminated Land Management Guidelines No. 5: Site Investigation and Analysis of Soils, Wellington, New Zealand (originally published 1999, revised 2021).

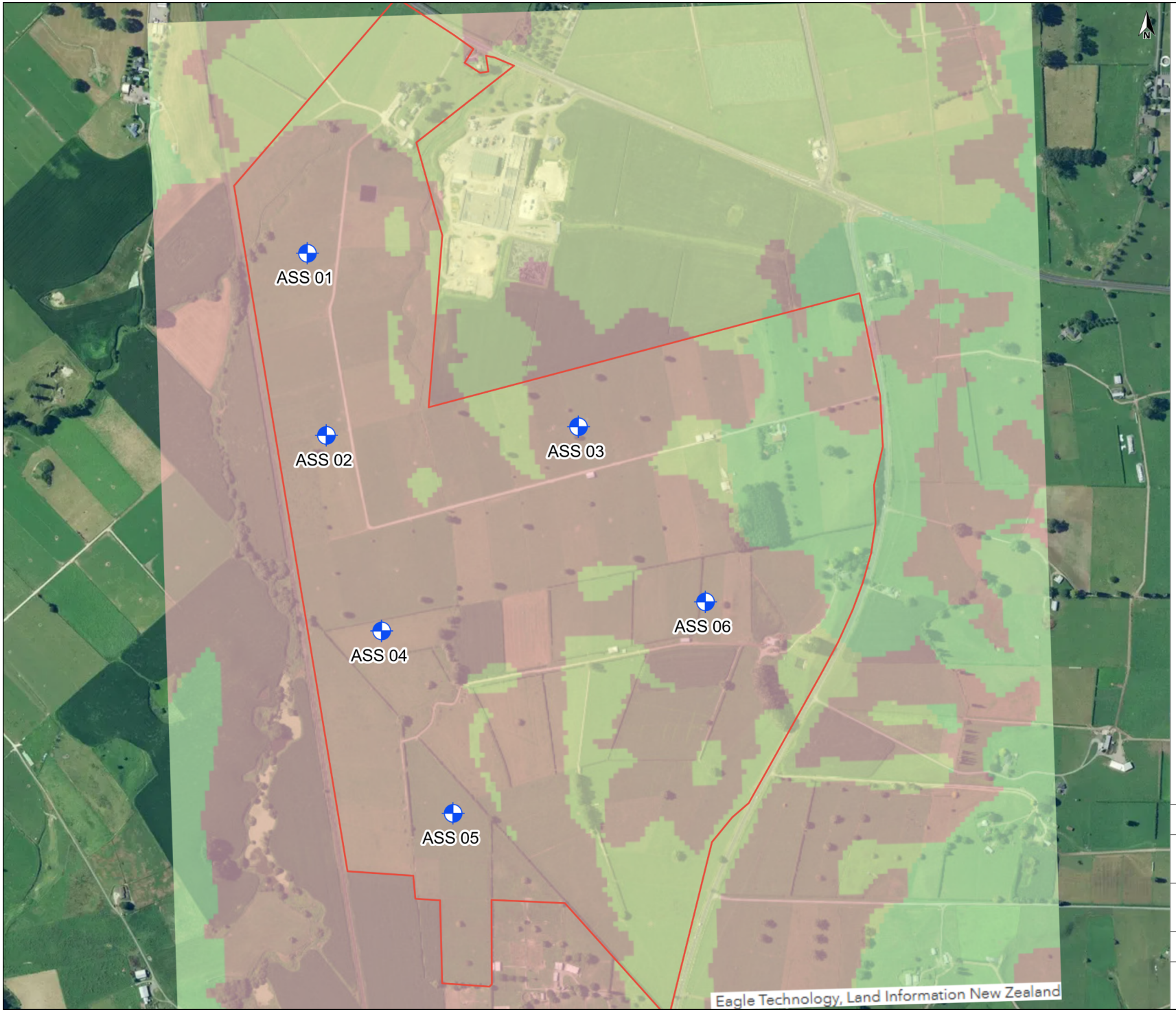
SLR Consulting 2018, Standard Operating Procedure (SOP) 2.1 – Soil Sampling, SLR Consulting New Zealand Ltd, October 2018.

Waikato Regional Council n.d., ASS Probability Mapping for the Waikato Region, Waikato Regional Council GIS Viewer, Hamilton.

Stone Y, Ahern CR, and Blunden B (1998), *Acid Sulfate Soils Manual*. Acid Sulfate Soils Management and Advisory Committee (ASSMAC), Wollongbar NSW.

Water Quality Australia (2018a), *National Acid Sulfate Soils Guidance, National Acid Sulfate Soils Identification and Laboratory Methods Manual* (June 2018).

Attachment A – Figures



Legend

- Site Boundary
- ASS Sampling Locations
- Acid Sulphate Soil ProbabilityMap
- Negligible Probability
- Low Probability
- Moderate Probability
- High Probability

0 100 m 200 m

SLR

Produced by **Datanest.earth**

Title: Project Location and Layout		
Client: Harmony Energy NZ #06 Limited		Size: A4
Project: Harmony Hinuera	Drawn: LL	Figure No.: 1
Date: 25-03-2026	Checked: NM	
Proj No: 14302	Scale: 1:10500	Version: 1.0

Attachment B – Soil Log and Assessment Photographs

TabLogs

Borehole No: ASS 01

UTM	: 60H	Driller Rig	: Hand Auger	Job Number	: 14302
Latitude	: -37.88954	Driller Supplier	: NA	Client	: Harmony Energy NZ #06 Limited
Longitude	: 175.76320	Logged By	: Sandra Hamler	Project	: Harmony Hinuera
Elevation	: Not Surveyed	Reviewed By	: Nigel Mather	Location	: 8270 State Highway 27, Okoroire, New Zealand
Total Depth	: 2 m	Date	: 17/02/2026	Loc Comment	:

PID (ppm)	Sample	Moisture	Water Level	Depth (m)	Graphic Log	LITHOLOGICAL DESCRIPTION	COMMENTS / CONTAMINANT INDICATORS	Well Diagram	Elevation (m)
		M		0.1		SILT trace of fine sand, rootlets; dark brown. moist; low plasticity. [TOPSOIL]			
		M		0.2 0.3		SILT minor clay; light brown. moist; medium plasticity.			
		M		0.4		Clayey SILT; light brown and orange. moist; high plasticity.			
		M		0.5 0.6 0.7		SILT trace of clay; light grey. moist; medium plasticity.			
		M		0.8 0.9 1.0 1.1 1.2		SILT; light grey. moist; medium plasticity.			
		VM	1.40 m	1.3 1.4 1.5 1.6 1.7 1.8 1.9		fine to medium SAND trace of silt, and gravel; light grey. dense; very moist.			
						ASS 01 Terminated at 2 m (Target depth was reached at 2 m.)			

TabLogs

Borehole No: ASS 02

UTM	: 60H	**Driller Rig**	: Hand Auger	**Job Number**	: 14302
Latitude	: -37.89285	**Driller Supplier**	: NA	**Client**	: Harmony Energy NZ #06 Limited
Longitude	: 175.76364	**Logged By**	: Sandra Hamler	**Project**	: Harmony Hinuera
Elevation	: Not Surveyed	**Reviewed By**	: Nigel Mather	**Location**	: 8270 State Highway 27, Okoroire, New Zealand
Total Depth	: 2 m	**Date**	: 17/02/2026	**Loc Comment**	:

PID (ppm)	Sample	Moisture	Water Level	Depth (m)	Graphic Log	LITHOLOGICAL DESCRIPTION	COMMENTS / CONTAMINANT INDICATORS	Well Diagram	Elevation (m)
		M		0.1		SILT rootlets; dark brown. moist; low plasticity. [TOPSOIL]			
		M		0.3		SILT some clay; light brown. moist; medium plasticity.			
		M		0.6		SILT; light grey. moist; low plasticity.			
		M		0.8		fine to medium SAND; grey. dense; moist.			
		W		1.1		SILT some fine sand; light grey. wet; low plasticity.			
		W	1.30 m	1.3		fine to medium SAND; grey. mildly dense; wet.			
						ASS 02 Terminated at 2 m (Target depth was reached at 2 m.)			

TabLogs

Borehole No: ASS 03

UTM	: 60H	Driller Rig	: Hand Auger	Job Number	: 14302
Latitude	: -37.89270	Driller Supplier	: NA	Client	: Harmony Energy NZ #06 Limited
Longitude	: 175.76944	Logged By	: Sandra Hamler	Project	: Harmony Hinuera
Elevation	: Not Surveyed	Reviewed By	: Nigel Mather	Location	: 8270 State Highway 27, Okoroire, New Zealand
Total Depth	: 2 m	Date	: 17/02/2026	Loc Comment	:

PID (ppm)	Sample	Moisture	Water Level	Depth (m)	Graphic Log	LITHOLOGICAL DESCRIPTION	COMMENTS / CONTAMINANT INDICATORS	Well Diagram	Elevation (m)
		M		0.1		SILT minor clay; dark brown. moist; low plasticity.			
		M		0.2 0.3 0.4 0.5 0.6 0.7		SILT trace of fine sand; light brown and light grey. moist; low plasticity.			
		M	1.70 m	0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9		fine to medium SAND; light brown. mildly dense; moist.			
						ASS 03 Terminated at 2 m (Target depth was reached at 2 m.)			

TabLogs

Borehole No: ASS 04

UTM	: 60H	Driller Rig	: Hand Auger	Job Number	: 14302
Latitude	: -37.89640	Driller Supplier	: NA	Client	: Harmony Energy NZ #06 Limited
Longitude	: 175.76491	Logged By	: Sandra Hamler	Project	: Harmony Hinuera
Elevation	: Not Surveyed	Reviewed By	: Nigel Mather	Location	: 8270 State Highway 27, Okoroire, New Zealand
Total Depth	: 2 m	Date	: 17/02/2026	Loc Comment	:

PID (ppm)	Sample	Moisture	Water Level	Depth (m)	Graphic Log	LITHOLOGICAL DESCRIPTION	COMMENTS / CONTAMINANT INDICATORS	Well Diagram	Elevation (m)
		M		0.1		SILT some fine sand, rootlets; dark brown. moist; low plasticity. [TOPSOIL]			
		M		0.2 – 0.7		SILT some clay, black organics; light brown and light grey. moist; medium plasticity.			
		M		0.8		SILT; light grey. moist; low plasticity.			
		M		0.9		fine to coarse SAND; light grey. mildly dense; moist.			
		M		1.0 – 1.1		SILT; light grey. moist; low plasticity.			
		M	1.30 m	1.2 – 1.9		coarse SAND; light grey. mildly dense; moist.			
						ASS 04 Terminated at 2 m (Target depth was reached at 2 m.)			

TabLogs

Borehole No: ASS 05

UTM	: 60H	**Driller Rig**	: Hand Auger	**Job Number**	: 14302
Latitude	: -37.89971	**Driller Supplier**	: NA	**Client**	: Harmony Energy NZ #06 Limited
Longitude	: 175.76656	**Logged By**	: Sandra Hamler	**Project**	: Harmony Hinuera
Elevation	: Not Surveyed	**Reviewed By**	: Nigel Mather	**Location**	: 8270 State Highway 27, Okoroire, New Zealand
Total Depth	: 2 m	**Date**	: 17/02/2026	**Loc Comment**	:

PID (ppm)	Sample	Moisture	Water Level	Depth (m)	Graphic Log	LITHOLOGICAL DESCRIPTION	COMMENTS / CONTAMINANT INDICATORS	Well Diagram	Elevation (m)
		M		0.1		SILT minor fine sand, rootlets; dark brown. moist; low plasticity. [TOPSOIL]			
		M		0.2 – 0.6		SILT some clay, black organics, fine gravel; light brown. moist; medium plasticity.			
		M		0.7 – 0.8		SILT some fine sand and fine gravel; light grey and brown. moist; high plasticity.			
		W	1.20 m	0.9 – 1.9		coarse SAND; light grey. mildly dense; wet.			
						ASS 05 Terminated at 2 m (Target depth was reached at 2 m.)			

TabLogs

Borehole No: ASS 06

UTM	: 60H	Driller Rig	: Hand Auger	Job Number	: 14302
Latitude	: -37.89587	Driller Supplier	: NA	Client	: Harmony Energy NZ #06 Limited
Longitude	: 175.77236	Logged By	: Sandra Hamler	Project	: Harmony Hinuera
Elevation	: Not Surveyed	Reviewed By	: Nigel Mather	Location	: 8270 State Highway 27, Okoroire, New Zealand
Total Depth	: 2 m	Date	: 17/02/2026	Loc Comment	:

PID (ppm)	Sample	Moisture	Water Level	Depth (m)	Graphic Log	LITHOLOGICAL DESCRIPTION	COMMENTS / CONTAMINANT INDICATORS	Well Diagram	Elevation (m)
		M		0.1 – 0.3		SILT minor fine sand, rootlets; dark brown. moist; low plasticity. [TOPSOIL]			
		M		0.3 – 0.7		SILT trace of fine sand and minor fine gravel; light brown. moist; medium plasticity.			
		M		0.7 – 0.8		Clayey SILT; light grey and orange. moist; high plasticity.			
		M	1.60 m	0.8 – 1.7		Silty fine SAND; light grey and orange. moist.			
		W		1.7 – 1.9		SILT some fine sand and black organics; light grey. wet; low plasticity.			
						ASS 06 Terminated at 2 m (Target depth was reached at 2 m.)			

Photolog

Photo 1: ASS01 _0.25 m bgl – pHF (right) and pHFOX (left) reactions (17 February 2026).

Photo 2: ASS01_Soil profile (17 February 2026).

Photo 3: ASS02 _0.5 m bgl – pHF (right) and pHFOX (left) reactions (17 February 2026).

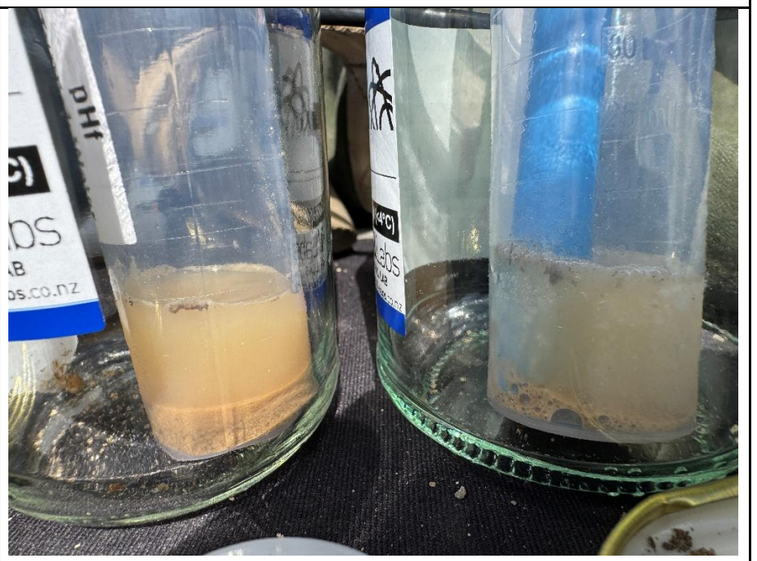


Photo 4: ASS02_Soil profile (17 February 2026).

Photo 5: ASS03_0.75 m bgl – pHF (right) and pHFOX (left) reactions (17 February 2026).

Photo 6: ASS03_Soil profile (17 February 2026).

Photo 7: ASS04 _1.0 m bgl – pHF (right) and pHFOX (left) reactions (17 February 2026).	**Photo 8: ASS04_Soil profile (17 February 2026).**	**Photo 9: ASS05 _1.25 m bgl – pHF (right) and pHFOX (left) reactions (17 February 2026).**
		
Photo 10: ASS05_Soil profile (17 February 2026).	**Photo 11: ASS06_1.5 m bgl – pHF (right) and pHFOX (left) reactions (17 February 2026).**	**Photo 12: ASS06_Soil profile (17 February 2026).**
		

Attachment C – Laboratory Certificates

CERTIFICATE OF ANALYSIS

Work Order	:	**NH2600725**			
Client	:	**SLR CONSULTING NEW ZEALAND LIMITED**	Laboratory	:	Environmental Hamilton
Contact	:	Lindsay Lutes	Contact	:	Customer Services NH
Address	:	201 Victoria Street West Auckland Auckland New Zealand 1010	Address	:	Ruakura Research Centre, 10 Bisley Rd Hamilton WKO New Zealand 3214
Telephone	:	----	Telephone	:	+64 7 974 4740
Project	:	----	Date Samples Received	:	17-Feb-2026 17:30
Order number	:	----	Date Analysis Commenced	:	23-Feb-2026
C-O-C number	:	----	Issue Date	:	05-Mar-2026 14:04
Sampler	:	Sandra Hamler			
Site	:	----			
Quote number	:	NH25SRLCON0006			
No. of samples received	:	48			
No. of samples analysed	:	12			

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.

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

General Comments

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

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

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

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

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

Key: CAS Number: CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	No Unit
% pyrite S	% pyrite Sulfur
% S	% Sulfur
kg CaCO3/t	kg CaCO3 per tonne
mole H+ / t	H+ / tonne
pH Unit	pH Unit

>: greater than.
<: less than.
ø: ALS is not IANZ accredited for these tests.
^: This result is computed from individual analyte detections at or above the level of reporting.
~: Indicates an estimated value.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Workorder Comments

ASS: EA033 (CRS Suite): Retained Acidity not required because pH KCl greater than or equal to 4.5

ASS: EA033 (CRS Suite): ANC not required because pH KCl less than 6.5

Samples were collected by yourselves (or your agent) and analysed as received at ALS NZ (or at the subcontracted laboratories, when applicable). Samples were in acceptable condition unless otherwise noted on this report.

Analytical Results

Sub-Matrix: SOIL
(Matrix: SOIL)

Compound	CAS Number	LOR	Unit	Client Sample ID	ASS01/0.75 Depth: 0.75	ASS01/1.75 Depth: 1.75	ASS02/1.25 Depth: 1.25	ASS02/2.0 Depth: 2.0	ASS03/1.25 Depth: 1.25
				Client Sampling date / time	17-Feb-2026 00:00	17-Feb-2026 00:00	17-Feb-2026 00:00	17-Feb-2026 00:00	17-Feb-2026 00:00
					NH2600725-003	NH2600725-007	NH2600725-013	NH2600725-016	NH2600725-021
					Result	Result	Result	Result	Result
EA033-A: Actual Acidity									
pH KCl (23A)	----	0.1	pH Unit		**5.8**	**5.9**	**5.7**	**5.8**	**5.8**
Titratable Actual Acidity (23F)	----	2	mole H+ / t		**4**	<2	**3**	<2	<2
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S		<0.02	<0.02	<0.02	<0.02	<0.02
EA033-B: Potential Acidity									
Chromium Reducible Sulfur (22B)	----	0.005	% S		**0.017**	**0.013**	**0.015**	**0.014**	**0.010**
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t		**11**	<10	<10	<10	<10
EA033-E: Acid Base Accounting									
ANC Fineness Factor	----	0.5	-		**1.5**	**1.5**	**1.5**	**1.5**	**1.5**
Net Acidity (sulfur units)	----	0.02	% S		**0.02**	<0.02	**0.02**	<0.02	<0.02
Net Acidity (acidity units)	----	10	mole H+ / t		**15**	<10	**13**	<10	<10
Liming Rate	----	1	kg CaCO3/t		**1**	<1	<1	<1	<1
Net Acidity excluding ANC (sulfur units)	----	0.02	% S		**0.02**	<0.02	**0.02**	<0.02	<0.02
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t		**15**	<10	**13**	<10	<10
Liming Rate excluding ANC	----	1	kg CaCO3/t		**1**	<1	<1	<1	<1

Analytical Results

Sub-Matrix: SOIL
(Matrix: SOIL)

Compound	CAS Number	LOR	Unit	Client Sample ID	ASS03/1.75 Depth: 1.75	ASS04/0.75 Depth: 0.75	ASS04/1.5 Depth: 1.5	ASS05/0.75 Depth: 0.75	ASS05/1.5 Depth: 1.5
				Client Sampling date / time	17-Feb-2026 00:00	17-Feb-2026 00:00	17-Feb-2026 00:00	17-Feb-2026 00:00	17-Feb-2026 00:00
					NH2600725-023	NH2600725-027	NH2600725-030	NH2600725-035	NH2600725-038
					Result	Result	Result	Result	Result
EA033-A: Actual Acidity									
pH KCl (23A)	----	0.1	pH Unit		**6.0**	**5.6**	**5.7**	**5.3**	**5.7**
Titratable Actual Acidity (23F)	----	2	mole H+ / t		<2	**4**	<2	**6**	<2
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S		<0.02	<0.02	<0.02	<0.02	<0.02
EA033-B: Potential Acidity									
Chromium Reducible Sulfur (22B)	----	0.005	% S		**0.008**	**0.012**	**0.014**	**0.009**	**0.011**
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t		<10	<10	<10	<10	<10
EA033-E: Acid Base Accounting									
ANC Fineness Factor	----	0.5	-		**1.5**	**1.5**	**1.5**	**1.5**	**1.5**
Net Acidity (sulfur units)	----	0.02	% S		<0.02	<0.02	<0.02	<0.02	<0.02
Net Acidity (acidity units)	----	10	mole H+ / t		<10	**11**	<10	**12**	<10
Liming Rate	----	1	kg CaCO3/t		<1	<1	<1	<1	<1
Net Acidity excluding ANC (sulfur units)	----	0.02	% S		<0.02	<0.02	<0.02	<0.02	<0.02
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t		<10	**11**	<10	**12**	<10
Liming Rate excluding ANC	----	1	kg CaCO3/t		<1	<1	<1	<1	<1

Analytical Results

Sub-Matrix: SOIL
(Matrix: SOIL)

Compound	CAS Number	LOR	Unit	Client Sample ID	ASS06/1.0 Depth: 1.0	ASS06/1.75 Depth: 1.75	----	----	----
				Client Sampling date / time	17-Feb-2026 00:00	17-Feb-2026 00:00	----	----	----
					NH2600725-044	**NH2600725-047**	**----**	**----**	**----**
					Result	Result	----	----	----
EA033-A: Actual Acidity									
pH KCl (23A)	----	0.1	pH Unit		**6.0**	**5.7**	----	----	----
Titratable Actual Acidity (23F)	----	2	mole H+ / t		<2	**6**	----	----	----
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S		<0.02	<0.02	----	----	----
EA033-B: Potential Acidity									
Chromium Reducible Sulfur (22B)	----	0.005	% S		**0.010**	**0.014**	----	----	----
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t		<10	<10	----	----	----
EA033-E: Acid Base Accounting									
ANC Fineness Factor	----	0.5	-		**1.5**	**1.5**	----	----	----
Net Acidity (sulfur units)	----	0.02	% S		<0.02	**0.02**	----	----	----
Net Acidity (acidity units)	----	10	mole H+ / t		<10	**14**	----	----	----
Liming Rate	----	1	kg CaCO3/t		<1	**1**	----	----	----
Net Acidity excluding ANC (sulfur units)	----	0.02	% S		<0.02	**0.02**	----	----	----
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t		<10	**14**	----	----	----
Liming Rate excluding ANC	----	1	kg CaCO3/t		<1	**1**	----	----	----

Brief Method Summaries

Analytical Methods	Method	Matrix	Method Descriptions
Chromium Suite for Acid Sulphate Soils	EA033	SOIL	In house: Referenced to Ahern et al 2004. This method covers the determination of Chromium Reducible Sulfur (SCR); pHKCl; titratable actual acidity (TAA); acid neutralising capacity by back titration (ANC); and net acid soluble sulfur (SNAS) which incorporates peroxide sulfur. It applies to soils and sediments (including sands) derived from coastal regions. Liming Rate is based on results for samples as submitted and incorporates a minimum safety factor of 1.5.