Acid Sulphate Soil Management Plan

Eldonwood Management Plans

Matamata Development Limited

Prepared by:

SLR Consulting New Zealand

SLR Project No.: 880.016783.00001

27 May 2025

Revision: 2.0

Making Sustainability Happen

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
1.0	27 May 2025	O. Mollentze	S. Ensoll	C. Newland
2.0	27 May 2025	O. Mollentze	C. Newland	

Basis of Report

This report has been prepared by SLR Consulting New Zealand (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Matamata Development 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.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

Table of Contents

Tables

Appendices

Acronyms and Abbreviations

ANC	Acid Neutralizing Capacity
AASS	Actual Acid Sulphate Soil
ASS	Acid Sulphate Soil
ASSMP	Acid Sulphate Soil Management Plan
$CaCO_3$	Calcium Carbonate
CRS	Chromium Reducible Sulphur
EPA	Environmental Protection Authority
FeS_2	Pyrite (Iron Disulfide)
H_2S	Hydrogen Sulphide
H_2SO_4	Sulfuric Acid
m bgl	Meters below ground level
MfE	Ministry for the Environment
mg/kg	Milligrams per kilogram
m^3	Cubic meter
NAG	Net Acid Generation
NAPP	Net Acid Producing Potential
NEPM	National Environment Protection Measure
NESCS	National Environmental Standards for Assessing and Managing Contaminants in Soil
PASS	Potential Acid Sulphate Soil
pH	Potential of Hydrogen (acidity/alkalinity level)
pH_F	Field pH
pH_{FOX}	Peroxide Oxidation pH
SLR	SLR Consulting New Zealand Ltd
SPOCAS	Suspension Peroxide Oxidation Combined Acidity and Sulphur
SNAS	Sulphate – Soluble Actual Sulphate
TAA	Titratable Actual Acidity
TPA	Titratable Peroxide Acidity
TSP	Total Sulphur Percentage
WRC	Waikato Regional Council
%S	Percent Sulphur

1.0 Introduction

Matamata Development Limited (the Client) has engaged SLR Consulting New Zealand Ltd (SLR) to prepare an Acid Sulphate Soils Management Plan (ASSMP) in support of a Fast-track referral application for the proposed development at Eldonwood Drive and Station Road, Matamata.

The proposed development includes the following eight land parcels at Eldonwood Drive and Station Road in Matamata: Part Lot 1 DP 21055, Lot 1 DPS 65481, Lot 2 DP 21055, Lot 2 DP 567678, Lot 3 DPS 14362, Lot 4 DP 384886, Lot 5 DP 384886, and Lot 204 DP 535395 (collectively referred to as 'the Site').

The Site location is presented on **Figure 1**, **Appendix A**.

1.1 Purpose

This ASSMP has been prepared to support the proposed development and outlines how potential or actual acid sulphate soils (PASS/AASS) will be identified, managed, and mitigated during earthworks and construction activities.

1.2 Background

Acid sulphate soils are naturally occurring soils, sediments and peats that contain iron sulphides. The two forms include actual acid sulphate soils (AASS), which have already undergone oxidation and are highly acidic, and potential acid sulphate soils (PASS), which are unoxidised but have potential acidity on exposure to oxygen.

Waikato Regional Council (WRC) commissioned an assessment of acid sulphate soil risk in the Waikato Region[1], following the observation of several adverse environmental impacts attributed to the presence of acid sulphate soils (ASS).

The Waikato Region comprises two primary basins, specifically the Waikato Basin and the Hauraki Basin. The two basins consist of marine coastal deposits which, when combined with erosion and drainage channels from elevated volcanogenic areas, can contribute to the presence of sulphur in sediments and create suitable conditions for acid sulphate soil generation.

A map identifying the probability of occurrence of ASS in the Waikato Region is included in the WRC 2024 report, and has been overlaid with the Site location on **Figure 1**, **Appendix A**. The map identifies isolated pockets of high probability areas within the Site, with the majority of the Site characterised as a low probability area.

The proposed development at the Site includes a change in land use from the current pastoral land use to a mixed land use area, including:

- Two solar farms (northern and southern).
- An eight-stage residential development.
- A commercial area.
- A retirement village.
- Open green space.

Earthworks associated with the proposed development have not yet been confirmed.

[1] Waikato Regional Council, 2024. Waikato region acid sulfate soils preliminary risk assessment (TR 2023/24).

As such, an ASSMP is required to manage the potential risk associated with the presence of PASS or AASS at the Site as part of the proposed development.

1.3 Objectives

The objective of this ASSMP is to ensure that any acid sulphate soils (PASS or AASS) encountered during Site development are managed to:

- Prevent the generation of acid drainage.
- Avoid off-site migration of acidic leachate.
- Comply with regulatory requirements, including Waikato Regional Plan Rule 5.2.3.6.
- Support the safe excavation, treatment, and disposal of impacted soils.

This ASSMP provides:

- Soil sampling methodology (if required).
- Mitigation and control measures.
- A monitoring programme.
- Contingency procedures for unexpected acid sulphate soil discovery or treatment failure.

2.0 Guidance and Standards

This ASSMP has been developed to provide general guidance on the identification, treatment, and management of PASS and AASS that may be encountered during construction activities.

The management approach is informed by industry best practices and technical guidance. These documents have been referenced to ensure the ASSMP aligns with established procedures for environmental protection and compliance.

- Ahern, C.R., McElnea, A.E., & Sullivan, L.A. (2004). Acid Sulfate Soils Laboratory Methods Guidelines. Queensland Department of Natural Resources, Mines and Energy, Indooroopilly, Queensland, Australia.
- Dear, S.E., Ahern, C.R., O'Brien, L.E., Dobos, S.K., McElnea, A.E., Moore, N.G., & Watling, K.M. (2014). Queensland Acid Sulfate Soil Technical Manual: Soil Management Guidelines. Department of Science, Information Technology, Innovation and the Arts, Queensland Government, Brisbane.
- EPA Victoria (2009). Publication 655.1: Acid Sulfate Soil and Rock.
- ISO 31000:2018. Risk Management – Guidelines. International Organization for Standardization.
- Ministry for the Environment (MfE) National Environmental Standards for Assessing and Managing Contaminants in Soil (NESCS).
- Mulvey, P. (2004). Acid Sulfate Soil: A Review of Methods, an Interpretation of Chemistry and Derivation of Hazard Assessment. Technical Paper 17.
- National Environment Protection Council (NEPC) (2013). National Environment Protection (Assessment of Site Contamination) Measure 1999 (Amended 2013).
- Resource Management Act, 1991 (RMA) - Sections relating to discharges of contaminants (Sections 15 and 17).
- Stone, Y., Ahern, C.R., & Blunden, B. (1998a/b). Acid Sulfate Soils Manual & Assessment Guidelines. Acid Sulfate Soils Management Advisory Committee (ASSMAC), NSW.
- Sullivan, L.A., Clay, C., Ward, N.W., Baker, A.K.M., & Shand, P. (2018). Acid Sulfate Soils Guidance: A Synthesis. Department of Agriculture and Water Resources, Canberra.
- Waikato Regional Council (2023). Waikato Region Acid Sulfate Soils Preliminary Risk Assessment.
- Waikato Regional Council - Waikato Regional Plan (Rule 5.2.3.6).
- Water Quality Australia (2018a). National Acid Sulfate Soils Guidance: National Acid Sulfate Soils Identification and Laboratory Methods Manual (June 2018).

These references form the basis for precautionary soil management, especially where ASS risk is suspected based on regional geology, topography, and land use history.

3.0 Potential Issues

3.1 Identification of Acid Sulphate Soils

3.1.1 General

Acid sulphate soils are the common name given to naturally occurring sediments and soils containing iron sulphides (principally iron sulphide or iron disulphide or their precursors).

PASS, when left undisturbed in a waterlogged state, typically do not present a significant risk. However, when PASS is drained or excavated, they become oxygenated and produce AASS which can result in the mobilisation of metals and nutrients that presents a risk to public and private infrastructure and the surrounding environment.

Actual and potential acid sulphate soils are often found in the same soil profile, with AASS generally overlying PASS horizons. AASS are soils containing highly acidic soil horizons or layers resulting from the aeration of soil materials that are rich in iron sulphides. This oxidation results in soils of pH of 4 or less, when measured in dry season conditions, and are usually yellow/orange in colour with red mottling.

PASS are soils which contain iron sulphides or sulfidic material which have not been exposed to air and oxidised. The field pH (pH_F) of these soils in their undisturbed state is pH > 4 and may be neutral or slightly alkaline. PASS soils usually appear as dark grey, dark brown, or medium to pale grey to white in colour.

3.1.2 Visual

A visual assessment of topography and geomorphology, combined with the information collected during the desktop assessment, should provide an indication of areas most likely to have acid sulphate soil occurrence. A list of soil, water and vegetation indicators suggestive of the presence of ASS materials is summarised in **Table 1**.

Table 1 - Summary of Common Visual and Field Indicators of ASS Material

Characteristic		Details and Indicators
Visual Identification	**Sediment Characteristics**	• Sediments of recent geological age (Holocene). • Marine or estuarine sediments. • Areas identified in geological descriptions or in maps as bearing sulphide minerals, coal deposits or former marine shales/sediments (geological maps and accompanying descriptions may need to be checked). • Deep estuarine sediments greater than 10 metres below ground surface, Holocene or Pleistocene age (only an issue if deep excavation or drainage is proposed).
	Landscape Characteristics	• Waterlogged or scalded areas. • Tidal lakes. • Coastal wetlands or back swamp areas. • Interdune swales or coastal sand dunes (if deep excavation or drainage proposed).
	Vegetation Characteristics	• Areas where the dominant vegetation is mangroves, reeds, rushes etc. • Other vegetation associated with areas of shallow water table such as flooded gums (*Eucalyptus rudis*) (*Eucalyptus robusta*), paperbarks (*Melaleuca spp.*) and casuarinas (*Casuarina spp.*).

3.1.3 Field Indicators

Many of the indicators for AASS and PASS are substantially different, and commonly AASS are found overlaying PASS, and both are often covered by non-ASS topsoil layers. Common indicators of PASS are summarised in **Table 2**.

Table 2 - Common Indicators of PASS and AASS Materials

Soil Type	Indicators
PASS	**Soil characteristics:** • Soil pH_F > 4 and commonly neutral. • Soil pH_{FOX} < 3, with large unit change from pH_F to pH_{FOX}, together with volcanic reaction to peroxide. • Waterlogged soils - unripe muds (soft, sticky and can be squeezed between fingers, blue grey or dark greenish grey mud with a high-water content, silty sands or sands (mid to dark grey) or bottom sediments (dark grey to black for example mono-sulfidic black oozes) possibly exposed at sides and bottom of drains or cuttings. • Peat or peaty soils. • Coffee rock horizons. • Sulphurous smell, for example hydrogen sulphide or ‘rotten egg’ gas. **Water characteristics:** • Waterlogged soils. • Water pH, usually neutral but may be acidic. • Oily looking iron bacterial surface scum (the similar appearances of iron bacterial scum and a hydrocarbon slick can be differentiated by disturbing the surface with a stick - bacterial scum will separate if agitated whereas a hydrocarbon slick will adhere to the stick upon removal). **Vegetation characteristics:** • Dominant vegetation is tolerant of salt, acid and/or waterlogging conditions for example samphire, salt couch, Phragmites (a tall acid-tolerant grass species), swamp-tolerant reeds, rushes, paperbarks and casuarinas.
AASS	**Soil characteristics:** • Soil pH_F < 4 (when soil pH_F > 4 but < 5 this may indicate some existing acidity, and other indicators should be used to confirm presence or absence of AASS). • Sulphurous smell for example hydrogen sulphide or ‘rotten egg’ gas. • Red / jarositic horizons or substantial iron oxide mottling in the surface encrustations or in any material dredged or excavated and left exposed. • Presence of corroded mollusc shells. **Water characteristics:** • Water of pH < 5.5 (and particularly below 4.5) in surface water bodies, drains or groundwater (this is not a definitive indicator as organic acids may contribute to low pH in some environments such as Melaleuca swamps). • Unusually clear or milky blue-green water flowing from or within the area (aluminium released by ASS materials acts as a flocculating agent). • Extensive iron stains on any drain or pond surfaces. • Iron-stained water and ochre deposits. • Oily looking bacterial surface scum (differentiated from a hydrocarbon slick of similar appearance as described for PASS). **Vegetation characteristics:** • Dead, dying, stunted vegetation. • Scalded or bare low-lying areas. • Poor vegetation regrowth in previously disturbed areas.

Soil Type	Indicators
	Infrastructure: • Corrosion of concrete and/or steel structures (including foundations, fences, masonry/brick walls, pipes). • Waterlogged or scalded areas. • Tidal lakes. • Coastal wetlands or back swamp areas. • Interdune swales or coastal sand dunes (if deep excavation or drainage proposed).

3.2 Construction Activities

Construction activities which have the potential to cause AASS / PASS related impacts include:

- Shallow / deep excavation.
- Stockpiling of impacted material.
- Transportation of impacted material.
- Dewatering.

3.3 Potential Environmental Impacts

Potential acid sulphate soil impacts from construction activities may include:

- Uncontrolled surface runoff in areas of exposed or stockpiled AASS / PASS, causing the release of acid into the environment.
- Changes to surface run-off patterns promoting the release of acid into the environment.
- Leaching of acid into the environment in the vicinity of the treatment area at the construction site.
- Exposing AASS / PASS at or near new drains or nearby water courses, thus causing the release of acid into the environment in the short- and long-term.
- Exposure of saturated sediments impacted with AASS / PASS to oxygen in excavations causing oxidisation and increased release of acid into the environment.

4.0 Site Identification and Setting

4.1 Site Identification

Site identification details are provided in **Table 3**.

Table 3 - Site Identification

Location	Eldonwood Drive and Station Road, Matamata
Legal Descriptions	• Part Lot 1 DP 21055 • Lot 1 DPS 65481 • Lot 2 DP 21055 • Lot 2 DP 567678 • Lot 3 DPS 14362 • Lot 4 DP 384886 • Lot 5 DP 384886 • Lot 204 DP 535395
Government Authority	• Local Authority: Matamata-Piako District Council (MPDC) • Regional Authority: Waikato Regional Council (WRC)
Land Use Zoning	• East: Rural Residential Zone • West and North: Rural Zone
Site Area (Ha)	Approximate 126 hectares (Ha)

4.2 Site Setting

Site setting details are provided in **Table 4**.

Table 4 - Site Setting

Elevation and Topography	According to Waikato Regional Council LiDAR 5-metre contours, the Site lies between 60–70 metres above sea level. It is predominantly flat, sloping more steeply at the western boundary toward the Waitoa River.
Geology	**Regional Geology -** Based on the GNS 1:250,000 geological map, the Site is underlain by Late Pleistocene river deposits (Hinuera Formation), consisting of cross-bedded pumice sand, silt, and gravel with interbedded peat. **Site Stratigraphy -** The geology encountered in the SLR DSI (2024) was detailed as dark brown sandy silt, underlain by orange-brown sandy silts consistent with the Hinuera Formation. Organic material, including roots, was observed within surficial material.
Hydrology	There are no visible surface water bodies within the Site boundaries. However, the western Site boundary borders the Waitoa River, which flows from south to north.
Hydrogeology	Borehole data (sourced from Wells Aotearoa NZ) identifies six bores on-site and an additional six within 200 m of the Site, with total well depths ranging from 8.25 to 214.4 m below ground level (bgl). Groundwater levels were not recorded in the borehole logs. However, based on topography and previous site investigations, groundwater is expected to be deeper than 5 m bgl and flow west towards Waitoa River.
Preliminary Acid Sulphate Soil Risk	According to the Waikato Region Acid Sulfate Soils Preliminary Risk Assessment, isolated pockets within the Site are considered high probability areas for ASS, with the remainder of the Site considered low probability. pH concentrations, calculated in the analytical laboratory from soil samples collected within the Site, ranged from 5.5 to 7.6.

5.0 Assessment Methodology

5.1 Subsurface investigation

Assessment *in situ* should be undertaken in the footprint of anticipated disturbance, with directed and supervision of a mechanical drilling rig, preferably using a pneumatic push-tube apparatus, to collect undisturbed soil cores.

Selection of core locations should be based upon obtaining a variety of representative geomorphological conditions, with maximum coring depth undertaken at each location to ~1 m past the anticipated depth of proposed disturbance.

5.2 Preliminary / Field Assessment

Preliminary assessment at each core location should be undertaken as follows:

- Record sediment stratigraphy at each core location.
- Conduct field testing in each core at 0.25 m intervals from the surface to gain preliminary information on potential sulfidic content and aid scheduling for laboratory analysis.
- This includes:
    - Test for $pH_{1:5}$ and peroxide pH Test (pH_{FOX}) using 30% hydrogen peroxide solution to be undertaken at the laboratory. The $pH_{1:5}$ represents the pH of the sediment prior to oxidation of sulfides, whereas the pH_{FOX} represents the pH of the sediment following oxidation of sulfides (and generation of acidity where these are present).
    - The $pH_{1:5}$ test, to be performed at the laboratory by placing sediment in a test tube, adding deionised water at a 1:5 sediment/water ratio, stirring the mixture, and then measuring the pH of the suspension using a calibrated field pH meter.
- pH_{FOX} test to be conducted at the laboratory as per the Watling, Ahern and Hey (2004) method. The pH of the hydrogen peroxide was adjusted to pH 4.5-5.5 using dilute sodium hydroxide (NaOH).

Note that pH_{FOX} is only a preliminary test for acid sulphate soil as it can be confounded by the presence of organic matter among other factors. The relevance of this method is to aid selection of samples for further laboratory analysis.

Representative cores should be collected in single-use low-density polyethylene (LDPE) sleeves which result in minimal disturbance and potential for oxidation. Cores are to be placed directly into an ice-filled container for transportation to an IANZ accredited laboratory with full chain-of-custody documentation.

Sample collection comprises the following:

- Samples to be collected at regular depths within the sediment profile at changes of lithology, to a maximum depth of ~1 m past the total depth of proposed works.
- Samples are to be collected in laboratory supplied clean glass jars for contaminants and plastic bags for PASS. Samples need to be placed immediately into an ice-filled container.

5.3 Laboratory Analyses

All laboratory analyses are to be undertaken by an IANZ accredited laboratory.

Two samples from each location should be scheduled for Chromium reducible sulphur (CRS) analyses at the laboratory, which include:

- pH_{KCl}.
- Titratable actual acidity (TAA).
- Net acid soluble sulfur (SNAS).
- Acid neutralising capacity (ANC).
- Acid-base accounting (ABA) of net acidity (NA) = CRS + TAA +SNAS – ANC.

6.0 Risk Matrix

Table 5 below presents a qualitative assessment of the potential risks associated with common construction activities at the Site, assuming the presence of acid sulphate soils (ASS) based on regional context. This matrix has been developed using a precautionary approach, guided by national best-practice literature.

Each activity has been assessed in terms of its likelihood of encountering or disturbing PASS/AASS, the consequences of such disturbance, and the resulting overall risk level. These assessments support planning and Site controls in the absence of site-specific laboratory testing.

Table 5 - Qualitative Risk Assessment for Typical Site Activities in ASS-Potential Areas

Activity	Potential Risk	Likelihood	Consequence	Overall Risk
Excavation >1 m bgl	Exposure of PASS/AASS and acid generation	Possible	Major	High
Shallow trenching (<1 m)	Minor disturbance of PASS	Likely	Moderate	Medium
Stockpiling near waterways	Acid runoff into drainage channels	Unlikely	Major	Medium
Dewatering	Oxidation of sulfidic soils	Possible	Major	High
No disturbance (green space)	No exposure of sulfidic material	Rare	Insignificant	Low

6.1 Sulfidic Hazard Classification

Based on industry guidelines, ASS materials can be classified into broad hazard classes (**Table 6**) depending on their net acidity and sulphide content.

Table 6 - Summary of Hazard Classes

Class	Description
No Risk (No Sulphur)	Soils with negligible sulphur content. No ASS management required.
No Risk (Non-Reactive)	Contains sulphides but lacks acid-generating potential.
Moderate Risk	May generate acid over time. Requires management if disturbed.
High Risk	High sulphur content or low pH. Immediate treatment required upon exposure.

7.0 General Treatment Options

Where PASS or AASS are encountered or suspected during earthworks, a precautionary treatment approach must be adopted to prevent oxidation and acid generation. The treatment strategies detailed in **Table 7** are based on established best practices for managing sulphatic soils in the absence of site-specific analytical data.

Table 7 - Summary of General Treatment Options

Treatment	Application	Description
Liming (Neutralisation)	The most widely used method for neutralising PASS/AASS is the application of agricultural lime (AgLime: $CaCO_3$).	• AgLime acts to buffer acidity and prevent the formation of acid leachate during oxidation. • In the absence of lab testing, a conservative liming rate should be applied where sulphide-bearing or waterlogged soils are disturbed. • A general guidance ratio is 1.5 tonnes of AgLime per 1 tonne of expected sulfuric acid generation (noting this is precautionary and may require adjustment with future testing or validation). • Lime must be thoroughly mixed with affected material in layers not exceeding 300 mm in thickness. • Re-mixing may be required to ensure uniform distribution, especially if the soil is moist or clay-rich.
Minimising Disturbance	Where feasible, the disturbance of suspected ASS should be avoided or limited.	If excavation is unavoidable: • Limit exposure to air by shortening the time between excavation and treatment. • Return material to anaerobic conditions quickly, especially PASS. • Stockpiles must be covered with impermeable material (e.g. geofabric or plastic sheeting) to reduce oxidation risk. • Avoid working in wet weather or when dewatering is active to minimise leachate risk.
Encapsulation	Where treatment is not practical or desired (e.g. deep PASS layers), materials may be permanently encapsulated to prevent future oxidation.	• Material should be placed in a lined cell or low-permeability pit, ideally above the long-term water table. • Clay liners or HDPE sheeting may be used to isolate the material from oxygen and water. • A guard layer of treated soil or inert fill (minimum 500 mm) must cover the encapsulated material to prevent disturbance.
Water Management	Surface and subsurface water interacting with disturbed PASS/AASS must be.	• Collected and monitored for pH and electrical conductivity (EC). • Treated with lime or an alkaline agent before discharge, if required. • Contained using bunds, lined ponds, or settlement basins, particularly during the wet season. • Discharged only when parameters meet environmental criteria, in accordance with the Construction Environmental Management Plan (CEMP) or Soil and Water Management Plan (SWMP).

8.0 Managing Compliance with this ASSMP

This section outlines the procedures, responsibilities, and monitoring requirements necessary to ensure compliance with the ASSMP during construction activities.

8.1 Compliance Protocols

Table 8 summarises the key protocols required to maintain compliance with the ASSMP.

Table 8 - Compliance Protocols for ASS Management

Roles and Responsibilities	Project roles and responsibilities related to ASS management will be defined in the CEMP and communicated via Site inductions and toolbox talks. Key responsibilities include: • Identifying potential ASS in field conditions and managing material accordingly. • Ensuring lime is correctly stored and available onsite. • Applying treatment procedures and verifying effectiveness (e.g. pH>6.0 after liming). • Monitoring treatment areas and water quality daily. • Ensuring subcontractors understand and follow this ASSMP. • Documenting treatment and monitoring activities for compliance records. • Advising the environmental representative of any ASS-related incidents or non-conformances. • Coordinating with lab or council (if validation or verification is needed). • A nominated Site environmental representative (or delegated subcontractor) will oversee compliance with this ASSMP.
Training and Awareness	All relevant Site personnel, including subcontractors and consultants, must be trained on their responsibilities under this ASSMP. Training will be covered through: • Site induction programmes, with a focus on environmental awareness. • Toolbox talks, timed to align with stages of earthworks and stockpile management. Scenario-based training for: • Unexpected discovery of PASS/AASS. • Correct use of lime and protective materials. • Monitoring and reporting procedures. • Training records must be maintained and kept on-site.
Inspections and Monitoring	Daily inspections are required in all areas where: • Excavation, stockpiling, or dewatering occurs. • Treated soils are temporarily stored. • Lime is applied or runoff may occur. These inspections must: • Identify any visible signs of oxidation or leachate (e.g. staining, smell, dying vegetation). • Check lime mixing quality and coverage. • Confirm runoff containment and basin status. • Ensure stockpiles are covered when inactive. • Water discharges from treatment or sediment basins must be tested before release to confirm compliance with environmental requirements (e.g. pH>6.5). • All findings must be documented in the daily Site environmental log.
Soil Treatment Procedure	• Where sulfidic material (PASS or AASS) is suspected, soil must be treated promptly to prevent acid generation. • Place material on a dedicated treatment pad.

	• Spread material in layers no thicker than 300 mm to ensure full contact with lime. • Once material is workable (not saturated), apply agricultural lime (AgLime). • Thoroughly mix lime into the soil, using multiple passes if needed. • Do not leave untreated sulfidic material exposed for more than 2–3 days. • Treated material must remain on the pad until validation pH readings confirm treatment effectiveness.

Liming Specifications	• AgLime (CaCO3) is the preferred neutralising agent.
	• Do not use hydrated lime (Ca(OH)2), as it can lead to pH spikes above acceptable levels (up to ~12.4).
	• AgLime has a safer neutralising range (max pH ~8.2) and is easier to control in field conditions.
	• Maintain a stockpile of at least 4 tonnes of AgLime on-site for contingency.
	• Lime must be free of lumps, evenly graded, and dry at the time of application.
	• Allow extra lime for:
	  o Treatment of drains
	  o Contingency re-treatment
	  o Guard layers for encapsulation if used.

8.2 Reporting

Table 9 summarises the key reporting requirements associated with acid sulphate soils (ASS) management, including daily and weekly obligations, qualitative validation expectations, and procedures for addressing non-conformances in the absence of laboratory testing.

Table 9 - Summary of Reporting and Validation Requirements

General Reporting	The following records and reports must be maintained in accordance with the CEMP: • Daily Site logs covering lime use, soil movement, pH results, and treatment status. • Weekly and monthly environmental inspections, summarising treatment activities, lime volumes used, and any issues or corrective actions taken. • Dewatering records for any water removed from excavation zones or treatment areas.
Validation Reporting	In the absence of laboratory testing, validation may be qualitative and based on: • pH field readings (before and after treatment), • Treatment logs. • Visual indicators of neutralisation (e.g. no staining, odour, visible lime coverage). • Photos or checklists used as evidence of compliance. • If lab testing is carried out later in the project, validation reports may be prepared to formally document outcomes.
Non-Conformance	If ASS management procedures are not followed, the following steps must be taken: • Notify the responsible party and Site environmental representative immediately. • Record the non-conformance in the Site log. • Implement corrective action within 48 hours. • Update toolbox talk content and procedures if needed to prevent recurrence.

8.3 Monitoring Requirements

Table 10 outlines the daily monitoring and record-keeping requirements for managing ASS on-site, including procedures for stockpile inspection, runoff monitoring, and documentation to ensure compliance with this ASSMP.

Table 10 - Summary of Monitoring and Record-Keeping Requirements

Stockpile Monitoring	• Check soil pH daily using the 1:5 soil:water method (field test kit or probe). • If untreated material has pH < 5.5, prioritise treatment immediately. • If treated material pH < 6.0, return it to the treatment pad for re-liming.
Runoff Monitoring	• Measure runoff pH and EC daily using a calibrated probe at treatment areas and sediment basins. • If pH < 6.5, apply lime to neutralise the water before any discharge. • Collect runoff into lined basins or bunded areas for controlled treatment.
Record Keeping	Keep daily logs of: • Material origin and stockpile location • Soil texture and visual description • pH of stockpiles and runoff • Lime quantities used and amount remaining on-site All records should be stored on-site and submitted with weekly environmental compliance reporting.

9.0 Report Status

This ASSMP has been reviewed by Chris Newland, who holds a Bachelor of Science in Applied Physical Geography (Hons) and has over 20 years of experience in the assessment and management of acid sulphate soils in Australia. The content of this report aligns with best practice approaches to ASS risk assessment and management informed by Australian guidelines, including the *Queensland Acid Sulfate Soil Technical Manual* and relevant New South Wales guidance.

Appendix A – Site Location and Likelihood of Acid Sulphate Soils

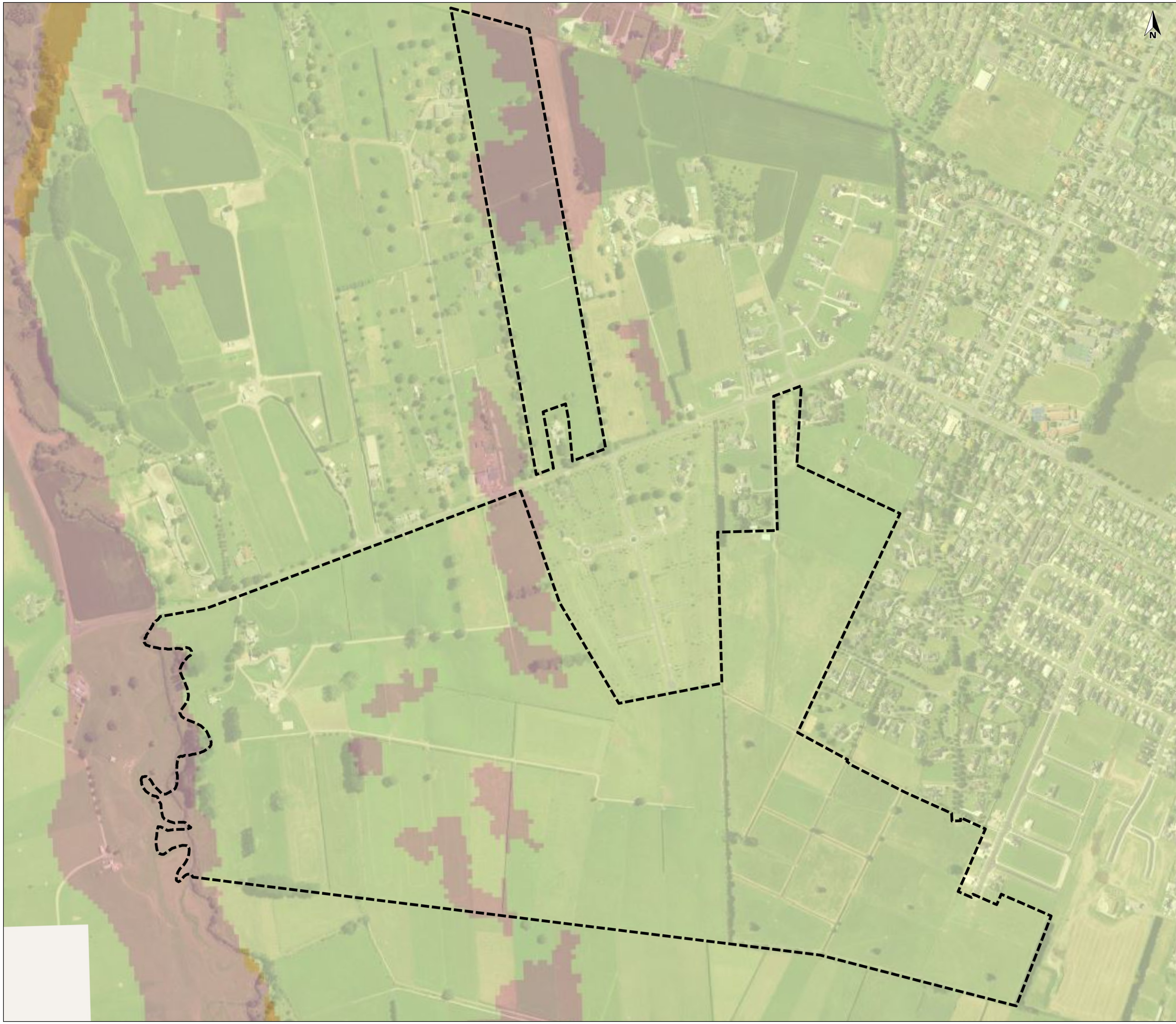
Acid Sulphate Soil Management Plan

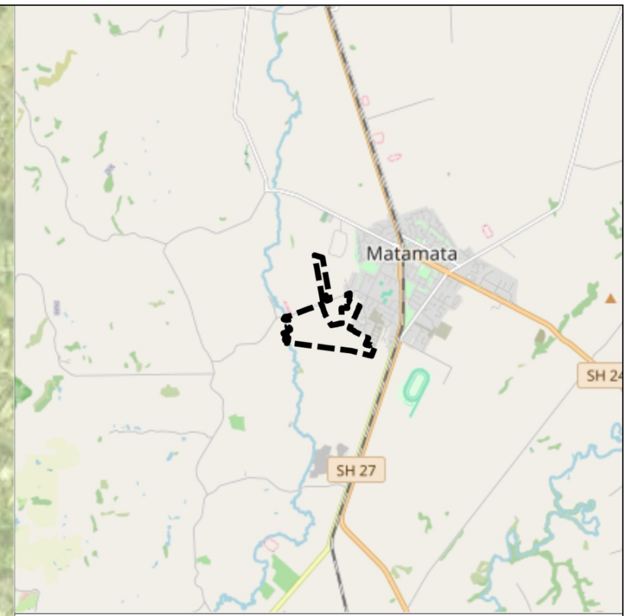
Eldonwood Management Plans

Matamata Development Limited

SLR Project No.: 880.016783.00001

27 May 2025





Legend

- Low Probability of Acid Sulphate Soils
- Moderate Probability of Acid Sulphate Soils
- High Probability of Acid Sulphate Soils
- Site Boundary

0 100 m 200 m

© OpenStreetMap contributors

SLR

Produced by **Datanest.earth**

Title: Site Location Plan and Likelihood of Acid Sulphate Soils		
Client: Matamata Development Ltd		Size: A3
Project: Eldonwood Management Plans	Drawn: SE	Figure No.: 1
Date: 22-04-2025	Checked: CN	
Proj No: 880.016783.00001	Scale: 1:7500	Version: 1.0

Making Sustainability Happen