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Acid Sulfate Soil Management Plan

37 Roseberry Street, Balgowlah NSW 2093

Project No. 24072
Version 2

12 December 2024

Reditus Consulting Pty Ltd
ABN: 34 631 168 502

Acid Sulfate Soil Management Plan

37 Roseberry Street, Balgowlah NSW 2093

DOCUMENT CONTROL

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Approved by	**David Jackson** Principal Environmental Engineer CEnvP Site Contamination Specialist CEnvP SCP: SC40989	

DOCUMENT HISTORY

Report No.	24072RP03	24072RP03
Date	30 October 2024	12 December 2024
Version	Version 1	Version 2
Description	Original version of report	Updated civil plan

Table of Contents

1 Introduction

Reditus Consulting Pty Ltd (Reditus) was engaged by McDonald's Australia Limited (the client) to prepare an Acid Sulfate Soil Management Plan (ASSMP) for the site located at 37 Roseberry Street, Balgowlah NSW 2093 (the site). The site location is provided in **Figure 1**, **Appendix A**.

Reditus notes that this report, including its conclusions and recommendations, must be read in conjunction with the Statement of Limitations provided in **Section 9.**

1.1 Background

To facilitate the proposed development minor excavations will occur onsite, including installation of an on-site trade waste tank and localised deeper footing areas. Based on review of Manly Local Environmental Plan (LEP) Acid Sulfate Soil Risk Mapping the site falls within a Class 4 Acid Sulfate Soil (ASS) zone. Acid sulfate soils are likely present two metres below the natural ground surface in these zones (see **Figure 2, Appendix A**). It is therefore considered that an ASSMP is required to satisfy Clause 6.1 – Acid Sulfate Soil of the Manly LEP 2013 for the excavation works being performed on the site. This will support the proposed development application for the McDonald's operation.

The management procedures outlined in this ASSMP are based on the information provided by the client and available plans for the site at the time of reporting which are presented in **Appendix B.**

1.2 Objective

The ASSMP is intended to provide an assessment of affected media, sampling protocols and treatment methodology with respect to the proposed redevelopment works to mitigate the risk posed by ASS impacted soils.

1.3 Scope of Works

To achieve the objectives outlined above, Reditus completed the following:

- Outline the soil testing requirements to establish ASS treatment liming rates and inform site-specific management strategies prior to commencement of the project.
- Preparation of this ASSMP in accordance NSW Acid Sulfate Soil Management Advisory Committee (ASSMAC) Acid Sulfate Soil Manual 1998, the Australian Governments Department of Agriculture and Water Resources National Acid Sulfate Soils Guidance 2018.

1.4 Regualtory Framework

The following legislation, regulations and industry guidance has been considered in the preparation of this ASSMP:

- NSW Government Protection of the Environment Operations Act 1997.
- NSW Government: Contaminated Land Management Act (1997).
- NSW Government Protection of the Environment Operations (General) Regulation (2009) and the POEO (waste) Regulation 2014.
- NSW EPA Waste Classification Guidelines 2014. Link
  - NSW EPA Waste Classification Guidelines Part 1 Classifying Waste 2014. Link
  - NSW EPA Waste Classification Guidelines Part 4 Acid Sulfate Soils 2014. Link
- The Acid Sulfate Soil Management Advisory Committee (ASSMAC) Acid Sulfate Soils Assessment Guidelines 1998 (known as the "Acid Sulfate Soils Manual"). Link
- Queensland Acid Sulfate Soil Technical Manual, Version 5.1, 2024. Link
- Australian Governments Department of Agriculture and Water Resources National Acid Sulfate Soils (NASS) Guidance National *Acid Sulfate Soils Sampling and Identification Methods Manual* 2018. Link

2 Site Identification

The site identification information has been summarised in **Table 2-1** below.

Table 2-1 Site Identification

ITEM	DETAIL
Address	37 Roseberry Street, Balgowlah NSW 2093
Title and Land Information	Lot 100 DP1199949
Site Area	2,807 m^2 (0.28 hectares)
Local Government Area	Northern Beaches Council
Site Coordinates to the approximate centre of the Site (GDA2020 MGA Zone 56)	Easting: 339596 Northing: 6260119
Zoning	E3 Productivity Support as per the *Manly Local Environmental Plan 2013*
Current Land Use	Light industrial / warehousing Occupied by Seven Miles Coffee Roasters
Future Land Use	McDonald's Operation, carparking and drive through service.
Trigger for Assessment	To inform the clients due diligence process and support a development application for the proposed McDonald's Operation.
Surrounding Land Uses	The land uses currently surrounding the site include: • **North:** Kenneth Street and residential. • **South:** Commercial land use including a furniture warehouse and Woolworths. • **East:** Rosebury Street and Firmenich. • **West:** Bing Lee and Pittwater Road.
Site Location	**Figure 1**, **Appendix A**
Site Layout	**Figure 2**, **Appendix A**

3 Site Condition and Surrounding Environment

3.1 Regional Geology and Acid Sulfate Soil Risk Mapping

According to the 1:100,000 Sydney Geological Map, the site is underlain by Holocene aged alluvium: silt, very fine- to medium grained lithic to quartz rich sand, clay, and Anisian aged Hawkesbury Sandstone: Medium- to coarse-grained quartz sandstone displaying small to large-scale, high-angle crossbedding; minor shale and laminite lenses.

The NSW Department of Planning, Industry and Environment 'eSPADE' NSW Soil and Land information portal identifies the site as being within an area of low probability of ASS occurring less than 3 m below the natural ground surface (L4). The soil landscape is described as consisting of level to gently undulating swales, depressions and infilled lagoons on quaternary sands. This corroborates with data detailed above in **Table 2-1** from Manly LEP mapping, which is presented in **Figure 2, Appendix A.**

3.2 Site Specific Geology

Fill material was encountered at depths between 0.1 – 4.2 mbgl and was comprised predominantly of gravelly sand, silty to gravelly sand, sand and silty sand. No significant anthropogenic material was observed within the fill materails. Natural material was encountered between 2.5 - 4.2 mbgl and comprised of clay and silty to sandy clay.

3.3 Hydrology and Hydrogeology

It is anticipated that surface water that is generated from the site conforms to regional topography and flow east towards the Pacific Ocean. Surface water on the site is expected to drain with the site gradient into the stormwater drains, discharging to Burnt Bridge Creek located approximate 64 m south of site.

A review of the Hydrogeology Map of Australia (Geoscience Australia) indicated the site is underlain by porous extensive aquifers of low to moderate productivity. Based on surveyed measurements and interpolated groundwater elevation contours, groundwater is inferred to flow in a southeast direction.

4 Potential to Oxidise Acid Sulfate Soil

The relatively specific conditions under which ASS are formed usually limit their occurrence to low lying parts of coastal floodplains, rivers and creeks. This includes areas with saline or brackish water such as deltas coastal flats, backswamps and seasonal or permanent freshwater swamps that were formerly brackish. Due to flooding and stormwater erosion, these sulfidic sediments may continue to be re-distributed through the sands and sediments of the estuarine floodplain region. Sulfidic sediment may be found at any depth in suitable coastal sediments – usually beneath the water table.

Any lowering in the water table that covers and protects potential acid sulfate soils (PASS) or excavation of PASS from below the water table, will result in the aeration and the exposure of iron sulfide sediments to oxygen. The lowering in the water table can occur naturally due to the seasonal fluctuations and drought or by human intervention, in particular agricultural drainage and excavation for development. PASS can also be exposed to air during physical disturbance with the material at the disturbance face, as well as the extracted material, both potentially being oxidised. The oxidation of iron sulfide sediments in PASS may result in net generation of acid and result in actual ASS.

4.1 Proposed Development

The proposed development involves construction processes which have the potential to oxidise potential acid sulfate soils beneath the site, which include:

- Installation of a subsurface trade waste tank which is anticipated to be advanced into soil strata impacted by ASS. Excavation has the potential extending to a depth that exceeds 2 m below ground level.
- Other deep (>2.0m depth) building footings and service trenching onsite (unspecified in development plans).

The anticipated volume of spoil is currently unknown based on current plans. Excavated spoil may contain material form within the high probability ASS soil horizon.

5 Determination of Treatment Liming Rates

5.1 Sample Collection and Analysis

To date there has been no collection or analysis of soil samples for ASS within the proposed excavation footprint on site. As such, the nature of any potential or actual ASS is currently not known and therefore specific liming rates required for effective treatment of excavated material prior to off-site disposal is not known.

Prior to commencing site redevelopment activities that involve excavation, soil samples should be collected to ascertain whether potential or actual ASS are present, and as required provide required liming rates for effective treatment.

Soils samples are to be collected using sampling techniques which minimise the disturbance of sampled material in accordance with the ASSMAC (1998). The sample density selected for the site is based on current understanding of the proposed development which will include the installation of a trade waste tank and possibly deeper footings. Four (4) sample locations are proposed for the site, this density is in accordance with Table 4.1, ASSMAC (1998). Sample locations should be set up following a systematic grid within the excavation zones to gain an accurate representation of the soils to be removed and samples should be collected at 0.5m intervals to the maximum depth of 1m below the maximum excavation/soil disturbance depth; which has yet to be finalised based on current plans. Of the four locations proposed for the site, a minimum of one (1) sample will be placed within the footprint of the trade waste tank and areas requiring deeper footings

Samples are to be sent under chain of custody documentation for analysis by a National Association of Testing Authorities (NATA) accredited laboratory. Select samples are to be analysed for chromium reducible sulfur suite (CRS) inclusive of liming rate with the objective of determining the required liming rate for effective treatment of excavated soils (if required) prior to off-site disposal.

Should the results of the soil sampling and analysis not identify any potential or actual ASS, no further ASS management strategies will be required during the excavation works.

6 Management Strategy

6.1 Onsite Soil Treatment

Neutralisation of ASS/PASS should be undertaken in accordance with this ASSMP which has been prepared with reference to the ASSMAC (1998) guidelines. It will be necessary to prepare suitable treatment area(s) onsite, as described below. The treatment methodology will apply to excavated soils, silts, sands and clays at the site identified as being potential or actual ASS. For the purposes of this ASSMP, excavated material will henceforth be referred to as "soil". The treatment methodologies are outlined below.

- Soil sampling, which is to be conducted before excavation onsite, will determine the presence of ASS/PASS by chromium reducible sulfur laboratory analysis. If ASS/PASS is identified, any soil excavated or disturbed during the excavation works should be treated as such. The maximum depth in which ASS/PASS occurs (if any) will be determined by results of the investigation.

Treatment Pad

- The preferred treatment method is to construct a treatment pad to place and store soil within the site boundary during works.
- Construct perimeter bunding around the treatment area(s) to prevent run-off or run-on (minimum height of 300 mm depending on the size of the treatment area and volume of material to be treated). If on-site soils are utilised for the bunding, they should also be lime treated at the rates as discussed below.
- Strip surface vegetation within area(s) to be used for treatment/stockpiling of PASS.
- Where sandy or highly permeable surface soils are present, place appropriate low permeability soils or low permeability membrane over the surface of the treatment area(s).
- Spread a guard layer of agricultural lime over the ground surface to be used for treatment/stockpiling (1 kg/m^2). Re-application of lime may be required if this guard layer is disturbed or removed during treatment of soils.
- Construct a catch drain/sump at the lowest point on the inside of the bund to collect run-off / leachate from the treatment area. The base of the sump should be inspected and must comprise low permeability (i.e., clay) soils. If low permeability soils are not present the sump should be lined with a low permeability membrane (i.e. HDPE). The surface of the sump/catch drain should also be limed with 1 kg/m^2 of agricultural lime. If a membrane is used the lime should be placed beneath the membrane.
- Install appropriate erosion and sediment control measures for the perimeter of the treatment area(s). The diagram below illustrates the basic design a treatment pad.

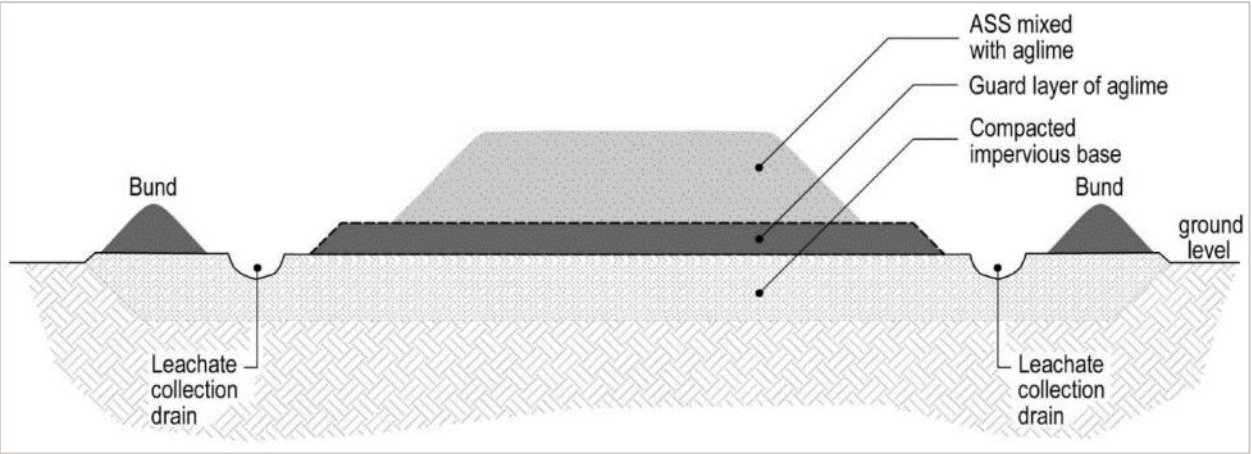

Diagram • *Schematic Treatment Pad • QLD Technical Manual Figure 5*

Samples will be taken from stockpiled soils following treatment and sent for laboratory analysis to validate the effectiveness of treatment. Sampling should be undertaken at a rate of one per 25 m^3 of stockpiled material with a minimum of three samples required.

It is noted that the above recommendations for the preparation of the treatment areas rely on PASS treatment being conducted as soon as practical (i.e., within 24 hours of excavation).

The most suitable neutralising agent for ASS/PASS soils is agricultural lime ($CaCO_3$) and is readily available for purchase in metropolitan areas.

An assessment of the dosing rate for lime treatment should be calculated from the results of detailed laboratory testing completed during the ASS assessment before conducting excavation activities.

6.2 Lime Treatment Procedure

The following liming/monitoring procedures for the treatment of PASS are recommended:

- All excavated PASS should be contained within the suitably excluded area(s) (treatment pad) and kept moist to minimise oxidation, prior to treatment with lime.
- Stockpiled PASS should be treated with lime at prespecified rate, which will be determine based on preliminary soil sampling in accordance with the National Acid Sulfate Soils identification and laboratory methods manual (NASS June 2018).
- The calculated liming rate should be a conservative value and in accordance with the NASS (2018) has assumed the natural buffering capacity is NOT available for neutralisation and includes a safety factor of 1.5 and has been multiplied by the bulk wet density to represent the in-situ soil. This liming rate can be reassessed throughout the treatment process as per the management strategies outlined in Section 7.
- The neutralising agent and PASS should be thoroughly mixed and aerated using, for example, an agricultural lime spreader and excavator, rotary bucket or rotary hoe. The soil should be treated in layers up to 300 mm thick to encourage aeration.
- The liming rate may need to be altered if verification testing indicates that appropriate neutralisation has not been achieved. Conversely the liming rate may decrease if monitoring suggests over-liming has occurred.
- Sampling and testing should be undertaken in accordance with Section 7.1 to verify the neutralisation treatment. The acceptance criteria are discussed in Section 7.2. Depending on the results of testing, reapplication of lime may be necessary to gain adequate neutralisation. Although unlikely, care should be taken to avoid over-liming of soils.
- Upon verification of treatment, the neutralised ASS/PASS soils are to be transported off-site and disposed of at an appropriately licensed landfill facility following confirmation of the waste classification by an appropriate qualified consultant. It is noted that ASS/PASS must be appropriately neutralised prior to off-site landfill disposal in accordance with NSW EPA (2014) Waste Classification Guidelines - Part 4: Acid Sulfate Soils.

HYDRATED LIME MUST NOT BE USED FOR NEUTRALISATION PURPOSES

AGRICULTURAL LIME IS TO BE USED FOR NEUTRALISATION PURPOSES

7 Monitoring Strategies

7.1 Procedures

The monitoring program should be designed to provide feedback on the effectiveness of the management strategy and to provide an early warning of the development of any environmental degradation or impact.

It is important that the monitoring programs are carried out objectively in a way that is clearly auditable. During and immediately after the disturbance of the PASS, parameters may need to be monitored in an agreed upon frequency.

In our case, the following should be monitored:

- Surface and leachate water associated with any disturbance of PASS for parameters including pH and electrical conductivity (EC) or dissolved solids.
- Hydrological observations to ensure the works are not affecting the natural water cover within PASS soil horizons.
- Any soils stockpiled on site should be the subject of an ongoing assessment of the status of any oxidation occurring within the soils, noting that PASS soils are to be treated within 24 hours of disturbance.
- Regular testing of the soils and water should be done by approved laboratory methods.

All monitoring data should be compiled and reviewed regularly against baseline data, appropriate standards and agreed performance targets. Monitoring should ensure that all water discharged from a site complies with the requirements of the relevant water quality legislation, the ANZG Australian Water Quality Guidelines (2018) and any specific water quality objectives set for receiving waters. Performance outside these standards or targets will require remedial action.

A final report should be issued upon completion of the works presenting the monitoring regime and results to confirm that no adverse environmental impact has occurred during the works.

7.1.1 FIELD SCREENING

Onsite field screening is a procedure available to monitor the effectiveness of the initial treatment method and to reduce the reoccurrence of ASS validation results failing. The first component of the procedure includes adding deionised water to the pH_{field} soil sample in a shallow test tube or similar and mix such that a grout mix paste is generated. Insert the calibrated pH meter and record the data.

The second component of the field screening (pH_{fox}) requires the addition of peroxide to the second sample from the same stockpile. The peroxide is to be 30% hydrogen peroxide (H_2O_2) adjusted to pH between 4.5 and 5.5. The pH_{fox} test should be conducted in a heat resistant test tube or similar as vigorous reactions can result in generation of temperatures greater than 80°C. Add a few millilitres to cover the soil with the hydrogen peroxide and stir the mixture. Slowly add the hydrogen peroxide (dependant on the reaction) until a grout like paste is generated. Insert the calibrated pH meter and record the data.

Comparison of pH_{field} and the pH_{fox} results with the trigger levels in Section 7.2 will determine whether the stockpiled material has likely been successfully treated for ASS or if the stockpiled material requires additional lime mixing.

Once the field screening results indicate that the stockpiled material has been successfully treated**,** validation samples should be collected by an appropriately experienced environmental consultant and transported to a NATA accredited laboratory for analysis. Stockpiled material is to remain in the designated area until the NATA accredited laboratory reports indicate that the stockpile has been successfully treated and is suitable for reuse onsite or adequately classified for offsite disposal as outlined in Section 7.1.4.

It should be noted that hydrogen peroxide and pH adjusting chemicals should be treated with care as incorrect use and/or handling can result in adverse impacts on human health. As such, person associated with field screening should be suitably trained with a safe work method statement or similar generated. This document will require review and approval by the Principal contractor prior to undertaking the works.

7.1.2 SOIL NEUTRALISATION / MANAGEMENT

It is recommended that the following inspections and monitoring be undertaken when excavating PASS materials based on guidelines presented in the ASSMAC (1998) & NASS (2018) guidelines:

- Inspection of liming operations during works, including verification of a suitable onsite treatment pad.
- At the completion of treatment and field screening, sampling of the resultant treated stockpile should occur. It is expected that works will be able to occur over a short time period given the minor nature of the excavation and small stockpile size (<75m^3). As such it is deemed that three (3) samples will be required to verify the neutralisation treatment. Subsequent samples will be required if additional stockpiles or greater excavation volumes are required. Samples should be tested in the field for pHfox and at a NATA accredited laboratory for ANC and pH (KCl extraction) using the CRS method of acid/base accounting.
- If the excavation volume exceeds 75m^3 or a secondary stockpile is formed onsite a rate of 1 sample per 25m^3 is required, with a minimum of three (3) samples per stockpile.

7.1.3 TREATMENT OF EFFLUENT

Effluent generated from the treatment area or excavation will require assessment and potential treatment prior to offsite discharge. Alternatively, a licenced liquid waste removal contractor could be engaged to remove the effluent.

Where the effluent is proposed for discharge to stormwater, sampling is required to assess treatment requirements (if any) prior to discharge. Water samples are to be collected by a suitably qualified and experienced environmental consultant. The water samples are to be subjected to field screening (using a calibrated water quality meter) and laboratory analysis, as a minimum for the parameters and thresholds listed below in **Table 7-1:**

Table 7-1: Stormwater Discharge Acceptance Criteria

PARAMETER	FREQUENCY	TARGET LEVEL FOR DISPOSAL TO STORMWATER
pH	Field measurement: • During storage as required to allow timely treatment; • Immediately prior to disposal; and • Daily checks during discharge period.	• pH 6.5 – 8.5
Total suspended solids (TSS)	Field measurement: • Immediately prior to disposal; and • As required based on visual observations; and Visual assessment: • Daily during discharge period.	• water observed to be clear; • turbidity <50 NTU
Oil and grease	Visual assessment: • Immediately prior to disposal; and • Daily checks during discharge period; and Laboratory analysis: • as required based on visual observations.	• none observable • <10 mg/l
Iron (total and soluble)	Laboratory analysis: • Immediately prior to disposal; and • Weekly checks during discharge period; and • As required based on visual observations; and Visual assessment: • Daily during discharge.	• ≤ 0.3 mg/L filterable iron • no obvious sign of iron staining/ settlement

PARAMETER	FREQUENCY	TARGET LEVEL FOR DISPOSAL TO STORMWATER
Metals (aluminium, arsenic, cadmium, chromium, cobalt, copper, lead, manganese, mercury, nickel, zinc)	Laboratory analysis: • one round of testing before first disposal; • if first round of testing exceeds target levels then further testing prior to disposal is required.	• ANZG (2018) trigger levels for 95% level of protection for marine water ecosystems.

Where required, lime is to be added to the effluent to adjust the pH to the level acceptable for discharge. It is considered likely that adjusting the pH will result in precipitation of metals concentrations should they exceed the ANZG (2018) water quality guidelines. A suitably qualified and experienced environmental consultant should be engaged to assist in determining the appropriate application rate for treatment of the effluent. Items to be considered are the type of neutralising agent (e.g. agricultural lime has a low solubility in water) and the method of application. Further, care should be exercised such that the water doesn't become alkaline.

Additional water samples will be required from the treated effluent prior to discharge to confirm successful treatment.

Should discharge into local stormwater be the proposed management strategy, an approval would be required from the Northern Beaches Council. An assessment of discharge water may be required. Where the effluent is not suitable for discharge, or immediate disposal is required, collection by a suitably licensed water transport company for disposal to a suitably licenced disposal facility will be required. Records of water quality monitoring, volume generated, volume removed, waste disposal records, waste tracking records, water quality reports and waste disposal receipts are required.

7.1.4 OFF-SITE DISPOSAL

It should be noted that acceptance of the waste is at the discretion of the receiving body. As such, the waste classification assessment report is to be submitted to the proposed disposal facility, for approval, prior to transport off site. Wastes are to be classified, managed, and disposed in accordance with the relevant council and NSW EPA Guidelines and Legislation.

Material proposed for offsite disposal is to be sampled at the rate outlined in the NSW EPA (2022) Sampling Design Guidelines. Treatment validation soil samples are to be analysed for:

- Field screen (pH_{field}/pH_{fox}).
- CRS - which will occur as part of verification of treatment.

Waste classification soil samples are to be analysed, as a minimum, for:

- Heavy metals (arsenic, cadmium, chromium, lead, mercury and nickel);
- Total recoverable hydrocarbons (TRH).
- Benzene, toluene, ethyl benzene and xylene (BTEX).
- Polycyclic aromatic hydrocarbons (PAH).
- Asbestos.

Soil samples are to be collected, and waste classification reports are to be completed by a suitably qualified and experienced environmental consultant. Treated ASS can, at best, be classified as CT1 General Solid Waste treated acid sulfate soils and the treated material is only suitable for disposal to a suitably licenced waste disposal facility. The analytical results require comparison to the contaminant concentrations outlined in NSW EPA (2014) Waste Classification Guidelines Part 1: Classifying Waste. The landfill should be informed that the ASS has been treated in accordance with the neutralising techniques outlined in the ASS Manual.

7.2 Acceptance Criteria

Further treatment of excavated soil may be required if monitoring of the material reveals any of the following properties:

- pH of soil in water beyond the excavation areas has reduced by more than 0.5 pH unit compared to background values, to be confirmed at the commencement of works.

Soils will be deemed to have been appropriately neutralised as determined by equation 3.3 of the NASS (2018). All liming verification samples (i.e. those tested for ANC in Section 7.1.1) must have a Verification Net Acidity (VNA) of less than or equal to 0 mol H+/t. Given the material is PASS and there is no actual acidity then this can be determined by the following equation:

Verification Net Acidity = Potential Sulfidic Acidity – [post treatment ANC – initial ANC]

If the VNA is greater than zero (0), reapplication of lime may be necessary to gain adequate neutralisation. Care should be taken to ensure over-liming does not occur.

pH results should be within the following ranges:

- pH_{field} 6.0 and 10.0 pH units.
- pH_{KCl} 6.0 and 11.0 pH units.

pH values above these ranges may indicate the materials have been over limed.

7.2.1 WATER

Water quality parameters should not vary from the baseline conditions as indicated as below:

- pH should not be varied by more than 0.2 units from the baseline range.
- TDS should not vary by more than 1,500 mg/L from the baseline range.

In the event of the water quality parameters varying greater than these criteria further assessment and advice from a suitably qualified professional should be sought. As corrective actions may need to be implemented.

8 Contingency Plan

In the case where monitored results indicate the agreed standards or performance indicator levels are not being achieved due to failure or ineffectiveness of the management strategy, then immediate remedial action will be required. These remedial actions may apply to individual components of the construction or operation stage of the project that are responsible for the breach of agreed standards.

Remedial action shall comprise mixing of additional lime through the excavated material and neutralisation of leachate (if under-liming has occurred). If monitoring indicates that over-liming has occurred, additional ASS or leachate should be mixed with soils and leachate respectively to reduce pH to acceptable levels. The required mixing rate to treat the soil or leachate should be confirmed by on-site monitoring tests.

During periods of heavy or prolonged rainfall, stockpiling of ASS should be appropriately contained/bunded to collect leachate for testing and neutralisation (if required) prior to disposal. Alternatively, temporary covering stockpiled PASS could be undertaken to prevent rainwater ingress and the migration of leachate.

Sufficient lime should be stored on site during construction for the neutralisation of ASS and contingency measures. The development should be conducted with due regard to erosion and sediment controls to minimise potential impacts to nearby sensitive receptors.

When remedial action fails or monitoring results identify severe failure of the management strategy to meet agreed standards, the project should cease to operate, and action should be taken to restore the Site to a condition equivalent to that prior to the commencement of the project.

9 Limitations

This report has been prepared in accordance with the scope of services described in the **Section 1.3**. The letter has been prepared for the sole use of the client and has been prepared in accordance with a scope of work agreed by the client.

The report or document does not purport to provide legal advice and any conclusions or recommendations made should not be relied upon as a substitute for such advice.

The report does not constitute a recommendation by Reditus for the client or any other party to engage in any commercial or financial transaction and any decision by the client or other party to engage in such activities is strictly a matter for the client.

The report relies upon data, surveys, measurements and results taken at or under the site at particular times and conditions specified herein. Any findings, conclusions or recommendations only apply to the aforementioned circumstances and no greater reliance should be assumed or drawn by the client. Furthermore, the report has been prepared solely for use by the client and Reditus accepts no responsibility for its use by other parties. The client agrees that Reditus' report or associated correspondence will not be used or reproduced in full or in part for promotional purposes and cannot be used or relied upon by any other individual, party, group or company in any prospectus or offering. Any individual, party, group or company seeking to rely on this report cannot do so and should seek their own independent advice.

No warranties, express or implied, are made. Subject to the scope of work undertaken, Reditus assessment is limited strictly to identifying typical environmental conditions associated with the subject property based on the scope of work and testing undertaken and does not include and evaluation of the structural conditions of any buildings on the subject property or any other issues that relate to the operation of the site and operational compliance of the site with state or federal laws, guidelines, standards or other industry recommendations or best practice. Scope of work undertaken for assessments are agreed in advance with the client and may not necessarily comply with state or federal laws or industry guidelines for the type of assessment conducted.

Additionally, unless otherwise stated Reditus did not conduct soil, air or wastewater analyses including asbestos or perform contaminated sampling of any kind. Nor did Reditus investigate any waste material from the property that may have been disposed off-site or undertake and assessment or review of related site waste management practices.

The results of this assessment are based upon (if undertaken as part of the scope work) a site inspection conducted by Reditus personnel and/or information from interviews with people who have knowledge of site conditions and/or information provided by regulatory agencies. All conclusions and recommendations regarding the property are the professional opinions of the Reditus personnel involved with the project, subject to the qualifications made above.

While normal assessments of data reliability have been made, Reditus assumes no responsibility or liability for errors in any data obtained from regulatory agencies, statements from sources outside of Reditus, or developments resulting from situations outside the scope of this project/assessment.

Reditus is not engaged in environmental auditing and/or reporting of any kind for the purpose of advertising sales promoting, or endorsement of any client's interests, including raising investment capital, recommending investment decisions, or other publicity purposes. Reditus assumes no responsibility or liability for errors in any data obtained from regulatory agencies, statements from sources outside of Reditus, or developments resulting from situations outside the scope of this project.

Reditus' professional opinions are based upon its professional judgment, experience, and training. These opinions are also based upon data derived from the limited testing and analysis described in this report or reports reviewed. It is possible that additional testing and analysis might produce different results and/or different opinions or other opinions. Reditus has limited its investigation(s) to the scope agreed upon with its client. Reditus believes that its opinions are reasonably supported by the testing and analysis that has been undertaken (if any), and that those opinions have been developed according to the professional standard of care for the environmental consulting profession in this area at this time. Other opinions and interpretations may be possible. That standard of care may change and new methods and practices of exploration, testing and analysis may develop in the future, which might produce different results.

A

Figures

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Overview

Inset

Map	24072_rp03_f01_siteloc_v01
Date of Export	30/10/2024
Author	EJ
Approver	DJ
Data Source	Metromap, Google Maps, Open Street Map, NSW Government

Legend

- Site Boundary
- Major Roads
- Railways
- Surface Water

Watercourses

- Rivers
- Stream (Perennial)
- Stream (Non-Perennial)
- Unnamed Stream (Non-Perennial)
- Other Channels

Figure 1 - Site Location

37 Roseberry Street, Balgowlah NSW 2093

24072 - Acid Sulfate Soil Management Plan

McDonald's Australia Limited

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Map	
24072_rp03_f02_sitelayout_v01	
Date of Export	**Map Scale (approx. at A3)**
30/10/2024	1:700
Author	**Approver**
EJ	DJ
Data Source	
Metromap, Google Maps, Open Street Map, Geoscience Australia	

Legend

- Site Boundary
- N/A
- Possible Trade Waste Location

NSW LEP Acid Sulfate Soils

- Class
- Class 1
- Class 2
- Class 2a
- Class 2b
- Class 3
- Class 4
- Class 5

Figure 2 - Site Layout

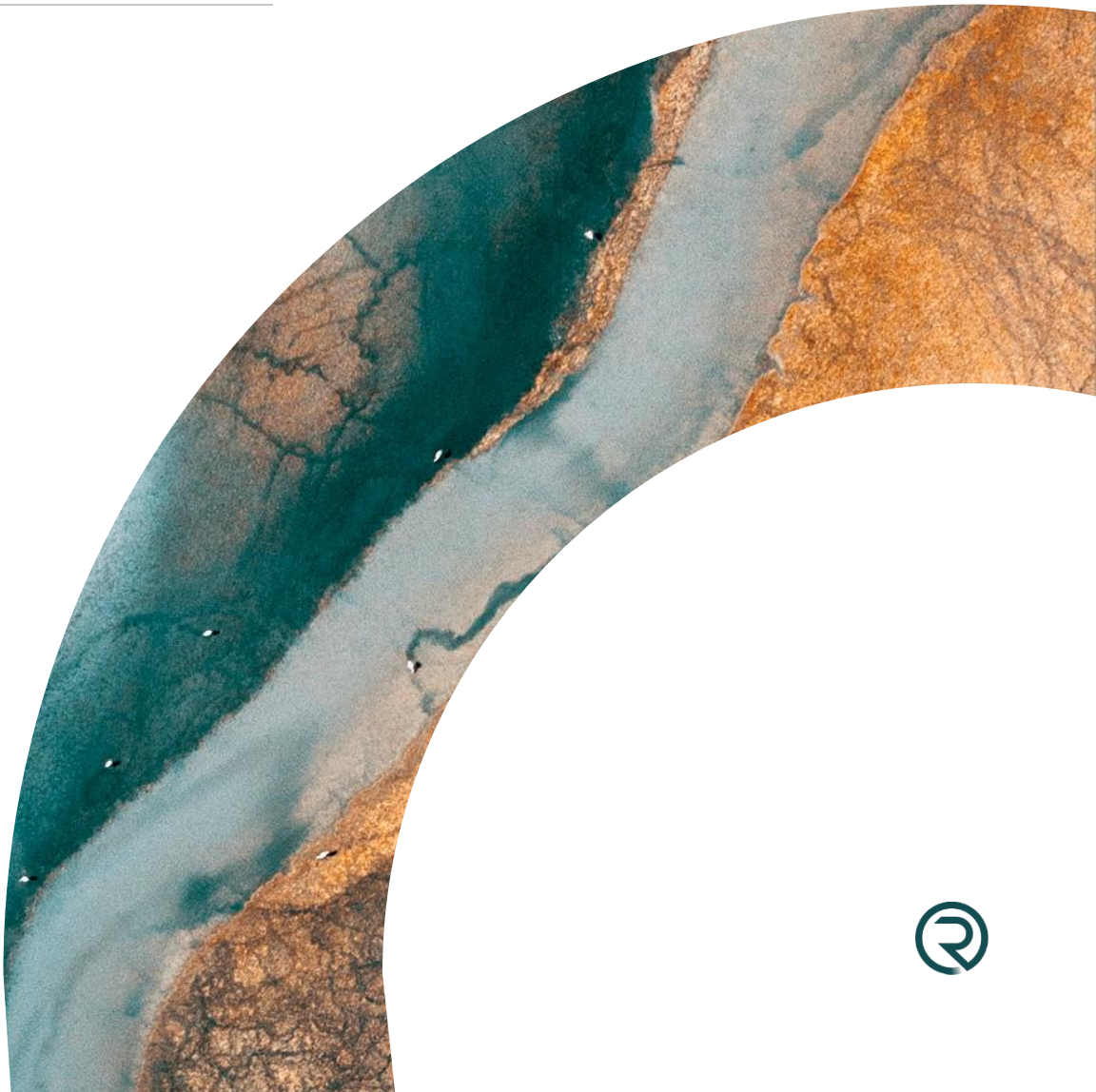
37 Roseberry Street, Balgowlah NSW 2093

24072 - Acid Sulfate Soil Management Plan

McDonald's Austrlia Limited

B

Development Plans



NOTES

1. THE NATURAL SURFACE LEVEL PRIOR EXISITNG SITE DEVELOPMENT AND SITE RETAINING IS UNKNOWN. THESE LEVELS HAVE THEREFORE BEEN INTERPOLATED ALONG THE BOUNDARY WITH ASSUMED LEVELS SHOWN IN RED. THESE LEVELS ARE UNVERIFIED AND THEREFORE THE EXCAVATION DEPTHS SHOWN ARE INDICATIVE ONLY.
2. A 300mm PAVEMENT DEPTH HAS BEEN ALLOWED FOR IN THE DEPTH CONTOURS. THIS IS TO BE CONFIRMED DURING DETAIL DESIGN
3. DETAILED EXCAVATION FOR FOOTINGS AND SERVICE TRENCHES HAVE NOT BEEN INCLUDED

LEGEND

- 0.0 TO -0.5m
- -0.5 TO -1.0m
- -1.0m TO -1.5m
- -1.5m TO -2.0m
- -2.0m >

KENNETH ROAD

ROSEBERRY STREET

PROPOSED MCDONALD'S BUILDING
FFL 8.00

PROPOSED GREASE TRAP LOCATION. EXCAVTION GREATER THAN 2m.

10.15 9.70 9.20 8.70 8.20 7.80 7.43
9.65 9.30 8.90 8.45 8.10 7.70 7.30
9.15 8.85 8.55 8.20 7.95 7.65 7.35
8.65 8.35 8.15 7.95 7.70 7.55 7.35
8.15 8.02 7.90 7.78 7.78 7.54 7.42

EX.10.15 EX.9.50 EX.9.00 EX.8.50 EX.8.25 EX.8.00 EX.7.43
EX.8.50 EX.8.50 EX.8.35 EX.8.20 EX.8.15 EX.7.86 EX.7.68 EX.7.86 EX.7.81 EX.7.66 EX.7.56 EX.7.42
EX.7.50 EX.7.50 EX.7.33 EX.7.31

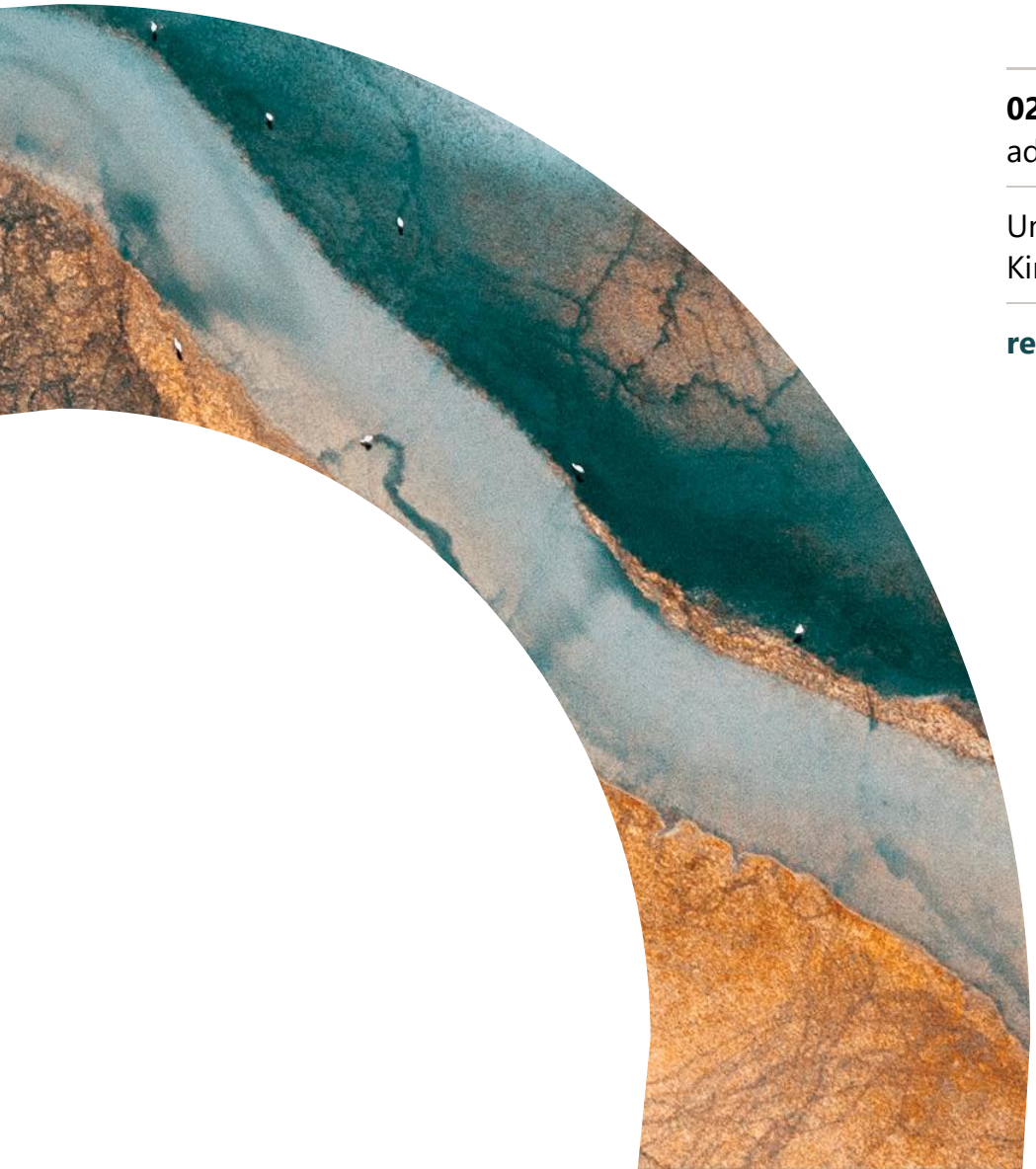
375 DIA. 675 DIA.

EX1

D.P.849654 D.P.1199949 D.P.541511

McD'S BALGOWLAH
PRELIM EXCAVATION PLAN FOR ACID SULPHATE TESTING
REV B 12/12/24
SCALE: 1:250 @ A3

ENTEC CONSULTANTS



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