South West Rocks Development Pty Ltd

Preliminary (Desktop) Acid Sulfate Soil Assessment

Proposed Rezoning

Western Portion of Lot 44 DP1274452, South West Rocks

Report No. RGS20970.2-AH

23 December 2021

REGIONAL GEOTECHNICAL SOLUTIONS

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Manning-Great Lakes
Port Macquarie
Coffs Harbour

RGS20970.2-AH

23 December 2021

South West Rocks Development Pty Ltd
Email: lex@swrd.com.au

Attention: Lex Tall

Dear Lex,

RE: Proposed Rezoning – Western Portion of Lot 44 DP1274452, South West Rocks
Preliminary (Desktop) Acid Sulfate Soil Assessment

As requested, Regional Geotechnical Solutions Pty Ltd (RGS) has undertaken a preliminary (desktop)Acid Sulfate Soil (ASS) assessment for the western portion of Lot 44 DP1274452, South West Rocks.

Based on the results obtained from this desktop assessment the site is considered to have a low probability of encountering ASS on the basis that excavations are not proposed below 1.5m from the existing surface. If excavation works are proposed >2m below the existing ground surface then an ASS investigation is recommended.

If you have any questions regarding this project, please contact the undersigned.

For and on behalf of **Regional Geotechnical Solutions Pty Ltd**

Prepared by

Tim Morris

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1 INTRODUCTION

Regional Geotechnical Solutions Pty Ltd have undertaken a preliminary geotechnical assessment for the proposed rezoning of the Western Portion of Lot 44 DP1274452, South West Rocks.

Regional Geotechnical Solutions Pty Ltd (RGS) have undertaken a Preliminary (Desktop) Acid Sulfate Soil (ASS) Contamination Assessment for the proposed rezoning of the Western Portion of Lot 44 DP1274452, South West Rocks. It is noted that Lot 44 was only recently created from the original Lot 35 DP1214419.

The site is approximately 14.5ha and is situated on a gently undulating Pleistocene back barrier marine flat covered with mostly low vegetation.

Details of the civile design for the proposed residential subdivision are not yet available, however, it is understood that excavations are not envisaged below 1.5m from the existing ground surface.

The purpose of the assessment of the site was to assess for the presence of Acid Sulfate Soils (ASS) that may be disturbed by future residential development of the site. The assessment was undertaken with reference to the ASS Assessment Guidelines (Ahern et al 1998).

The work was commissioned by Lex Tall of South West Rocks Development Pty Ltd and was undertaken in accordance with proposal number RGS20970.4-AA dated 17 December 2021

2 SITE CONDITIONS

2.1 Surface Conditions

The site is approximately 14.5ha and is situated on a gently undulating Pleistocene back barrier marine flat.

A satellite image that shows the location of the site and the site setting is reproduced in Plate 1.

***Plate 1**: Satellite image dated 2012 obtained from the NSW Government 'Six Maps' website that illustrates the site location and setting. The approximate site boundaries of the site, western portion of Lot 44 DP1274452 are outlined in red.*

The site is vegetated with thick bushes and trees along the northern boundary and northwest corner. The remainder of the site appears to have been previously cleared with some vegetation regrowth occurring. Several access tracks cross the site. An open drain is present near the eastern boundary.

The site is bordered by a golf course to the west, residential subdivision to the north and undeveloped land to the south and east. To the north east of the site, a residential subdivision has been recently constructed where a historical fuel storage facility was previously located. The Council sewerage treatment plant (STP) is located approximately 150m to the south of the site.

Surface elevations are approximately 5m AHD along the northern boundary of the site and approximately 3m AHD in the south-east corner.

2.2 Subsurface Conditions

Reference to published soil landscape mapping (eSPADE) indicates that the site is underlain by the Hat Head Soil (Variant hha) Landscape comprising Pleistocene silicious sands.

The supplied *Report on Groundwater Impact Assessment,* Ref: 39787.02, dated 4 August 2016 prepared by Douglas Partners included Bore 7A within the subject site. The profile encountered in Bore 7A was described as sand with numerous indurated sand and clay inter-layers overlying basement clay from 2.7m.

2.3 Groundwater

The Review of Groundwater Management for Concept Plan by Douglas Partners notes the average groundwater depth in Bore 7A was 0.45m. The groundwater contour diagram indicates a gradient to the south, towards the STP.

A groundwater bore search on the Water NSW website indicates that there is a large number of licensed groundwater bores within 200 m of the site boundary, however there are no registered boreholes within the site.

3 ACID SULFATE SOILS

3.1 Presence of ASS

Acid Sulfate Soils (ASS) produce sulphuric acid when exposed to oxygen due to the presence of iron sulphides in the form of pyrite within the soil matrix. These soils form when iron-rich sediments are deposited in saltwater or brackish water environments. Prior to oxidation, these pyritic soils are referred to as Potential ASS. ASS that have produced acid as a result of oxidation are referred to as Actual ASS. They typically occur in natural, low-lying coastal depositional environments below approximately 5m AHD. In the field ASS are generally identified as saline sediments such as alluvial or estuarine soils or bottom sediments in creeks and estuaries.

Reference to the South West Rocks ASS Risk Map (DLWC, 2000) indicates the subject area within Lot 44 DP1274452 is situated on a aeolian sand plain that has a low probability of Acid Sulfate Soil (ASS) from 3m below the ground surface. The western site boundary adjacent to the existing golf course is shown as "Disturbed Terrain"

An excerpt from the eSPADE website which shows the extent of ASS is reproduced in Plate 2.

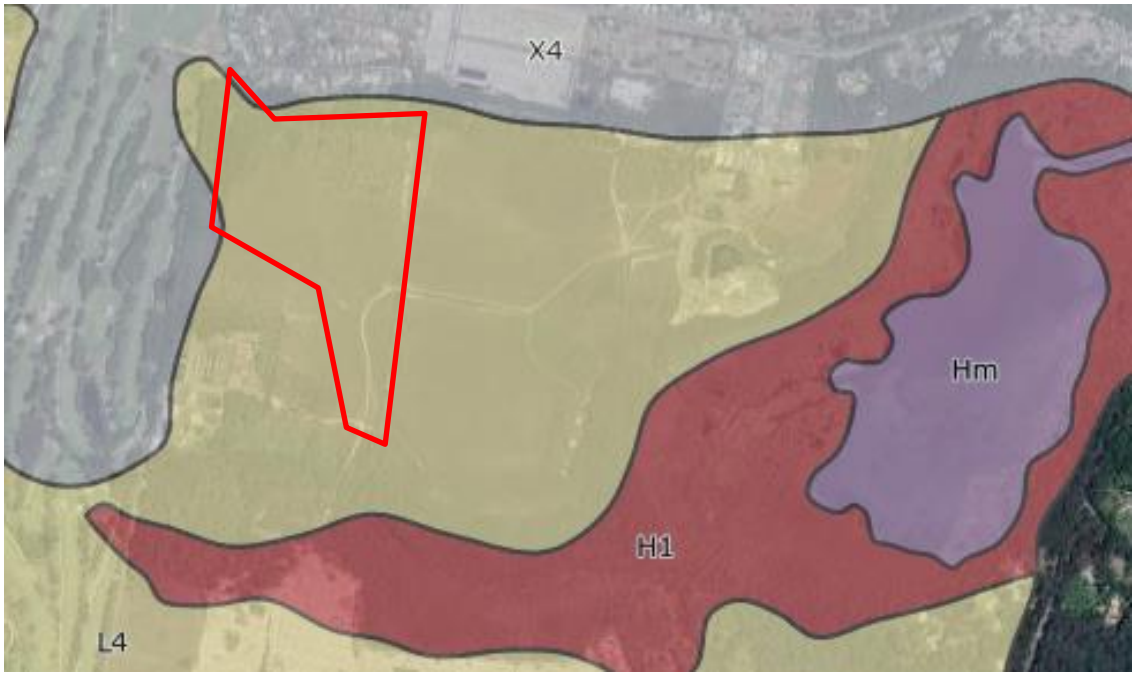

***Plate 2**: Excerpt from the NSW Government 'eSPADE' website that illustrates the site setting within ASS probability. The approximate site boundaries of the site are outlined in red. "L4"= Low probability of ASS below 3m from surface, and surface elevations >4m.*

An excerpt from the Kempsey Shire Council Acid Sulfate Soil Planning Map is reproduced in Plate 3. The site is mapped as "Class 4" and works beyond 2m below the natural ground surface, or, work by which the water table is to be lowered beyond 2m below natural surface will require an ASS assessment and preparation of an ASS Management Plan.

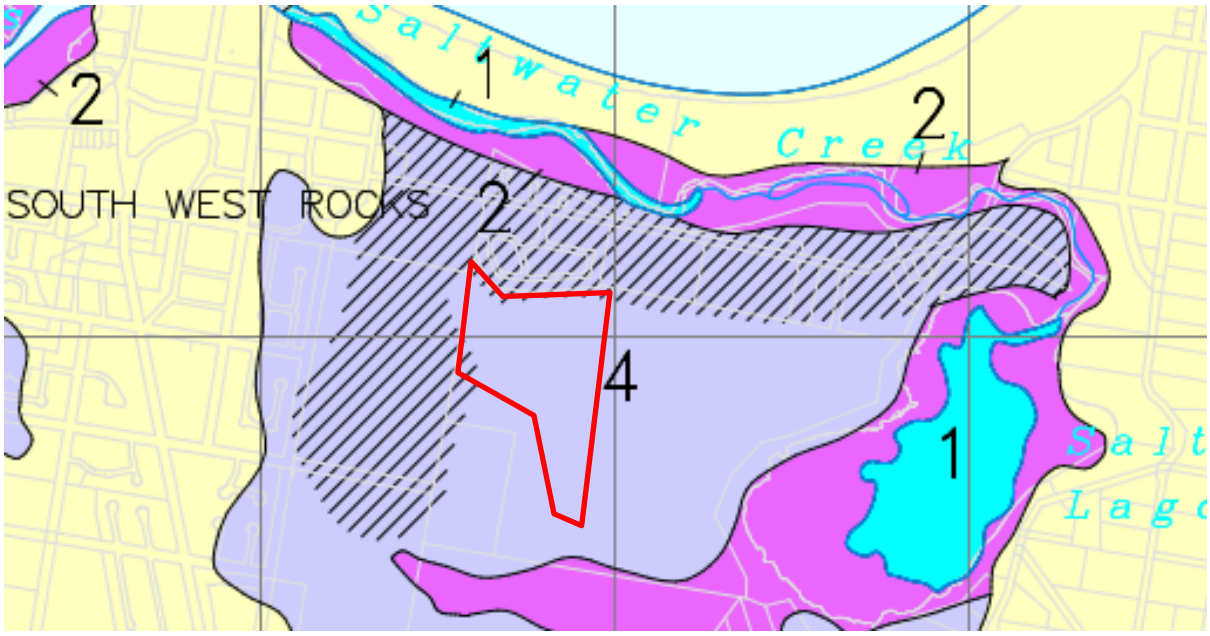

***Plate 3**: Excerpt from the Council ASS Planning Map. The approximate site boundaries of the site are outlined in red.*

3.2 Site Conditions

Reference to the National Acid Sulfate Soils Guidance (*Water Quality Australia 2018*) provides a summary of general site conditions (Table 2.1) that can be indicative of Potential and Actual ASS. A summary of relevant site conditions is presented below:

- Land elevation of less than 5m AHD can be characteristic of ASS.
  (*Surface elevations range from approximately 3m to 5m AHD*)
- Water table less than 3m from surface can be characteristic of ASS
  (*Average water table depth is 0.45m from surface*)
- Well drained sand soils exposed at surface are not considered indicative of ASS

3.3 ASS Assessment Summary

The desk top assessment indicates that the site is a marine sand plain with a low probability of ASS below 3m at the site.

Naturally occurring non-ASS acidic soils are known to occur in low lying coastal sand plain environments and may be encountered at the site.

4 LIMITATIONS

This report comprises the results of an investigation carried out for a specific purpose and client as defined in the document. The report should not be used by other parties or for purposes or projects other than those assumed and stated within the report, as it may not contain adequate or appropriate information for applications other than those assumed or advised at the time of its preparation. The contents of the report are for the sole use of the client and no responsibility or liability will be accepted to any third party. The report should not be reproduced either in part or in full, without the express permission of Regional Geotechnical Solutions Pty Ltd.

Geotechnical site investigation is based on data collection, judgment, experience, and opinion. By its nature, it is less exact than other engineering disciplines. The findings presented in this report and used as the basis for the recommendations presented herein were obtained using normal, industry accepted geotechnical design practises and standards. To our knowledge, they represent a reasonable interpretation of the general condition of the site. Under no circumstances, however, can it be considered that these findings represent the actual state of the site at all points.

The recommended depth and properties of any soil, rock, groundwater, or other material referred to in this report is an engineering estimate based on the information available at the time of its writing. The estimate is influenced and limited by the fieldwork method and testing carried out in the site investigation, and other relevant information as has been made available. In cases where information has been provided to Regional Geotechnical Solutions for the purposes of preparing this report it has been assumed that the information is accurate and appropriate for such use. No responsibility is accepted by Regional Geotechnical Solutions for inaccuracies within any data supplied by others.

If site conditions encountered during construction vary significantly from those discussed in this report, Regional Geotechnical Solutions Pty Ltd should be contacted for further advice.

This report alone should not be used by contractors as the basis for preparation of tender documents or project estimates. Contractors using this report as a basis for preparation of tender documents should avail themselves of all relevant background information regarding the site before deciding on selection of construction materials and equipment.

If you have any questions regarding this project, or require any additional consultations, please contact the undersigned.

For and on behalf of **Regional Geotechnical Solutions Pty Ltd**

Prepared by

Tim Morris

Associate Engineering Geologist