REGIONAL GEOTECHNICAL SOLUTIONS

Manning-Great Lakes
Port Macquarie
Coffs Harbour

RGS32813.1-AC

14 December 2021

Rise Projects
57/6-8 Herbert Street,
St Leonards NSW 2065

Attention: Liam Porritt

Dear Liam,

RE: Proposed Residential Development – Lot 2 Phillip Drive, South West Rocks

Acid Sulfate Soil Management Plan

1 INTRODUCTION

This Acid Sulfate Soil Management Plan (ASSMP) has been prepared for the proposed residential development at Lot 2 Phillip Drive, South West Rocks. Based on the drawings provided, it is proposed to:

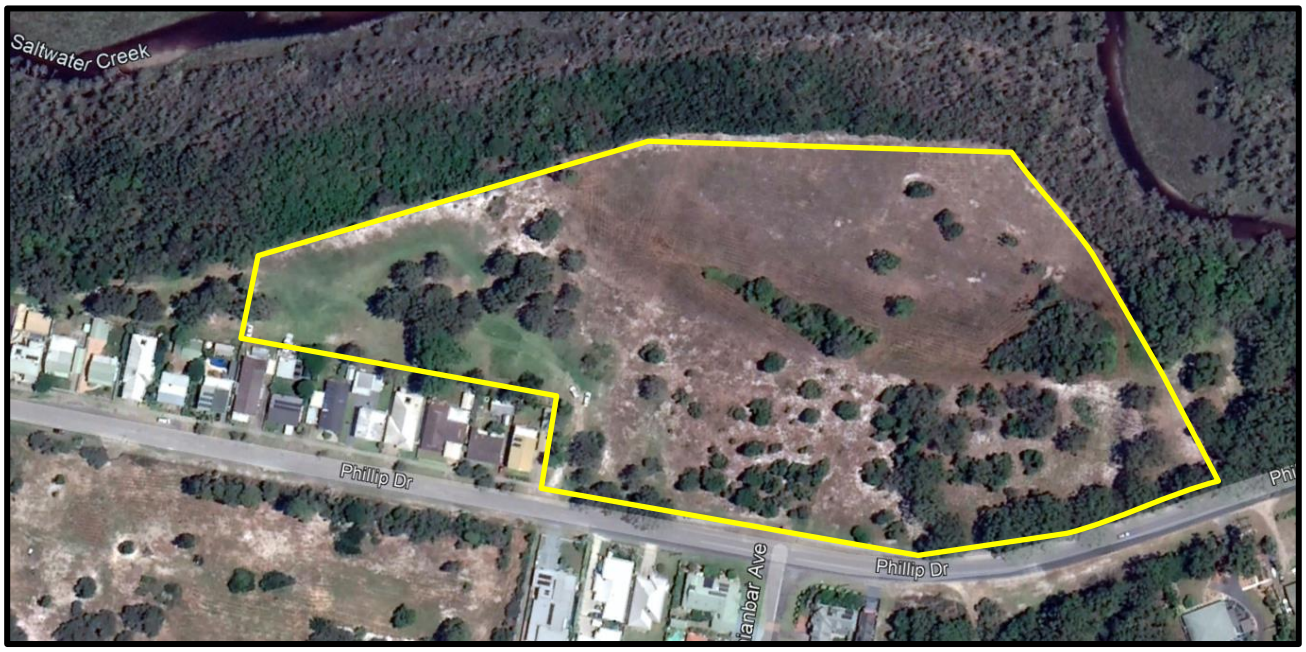
- Develop the elevated southern parts of the site with townhouses and dual occupancy flats and
- Develop the lower lying northern parts of the site with medium density residential buildings.

As part of the development works it is anticipated that the lower lying northern parts of the site will require filling to raise the area to mitigate flood impacts.

The site is located in an area of gently undulating topography, the Coastal Quaternary Geology map of Kempsey indicates the site is underlain by Holocene age inter-barrier creek deposits (northern low lying are) and pleistocene dune deposits (southern elevated area). Reference to the South West Rocks ASS Risk Map (DLWC, 2000) indicates the southern area of the site is located in an area of "no known occurrence of ASS" and the northern area of the site is located in an area of "high probability" at or within 1m of the ground surface.

The site encompasses an area of approximately 43,400m^2 and is currently a green field site.

Diagram 1: Site Location and Setting



2 PROPOSED DEVELOPMENT

The proposed buildings are expected to be multi-level with ground floor car parking area. Surface levels vary between 2m and 6.5m AHD.

At this stage the final design of the development is unknown, however the excavations at the site are expected to be up to 2.0m depth for buried services such as stormwater and sewer and localised deeper excavations up to 15m for installation of piled foundations. It is assumed that greater than 1000 tonnes of material are to be disturbed as part of the development.

3 ACID SULFATE SOIL ASSESSMENT

An acid sulfate soil (ASS) assessment was undertaken as part of the geotechnical assessment completed for the project by RGS (Ref: RGS32813.1-AB. 1 dated 16 September 2011). The results of the assessment are summarised below.

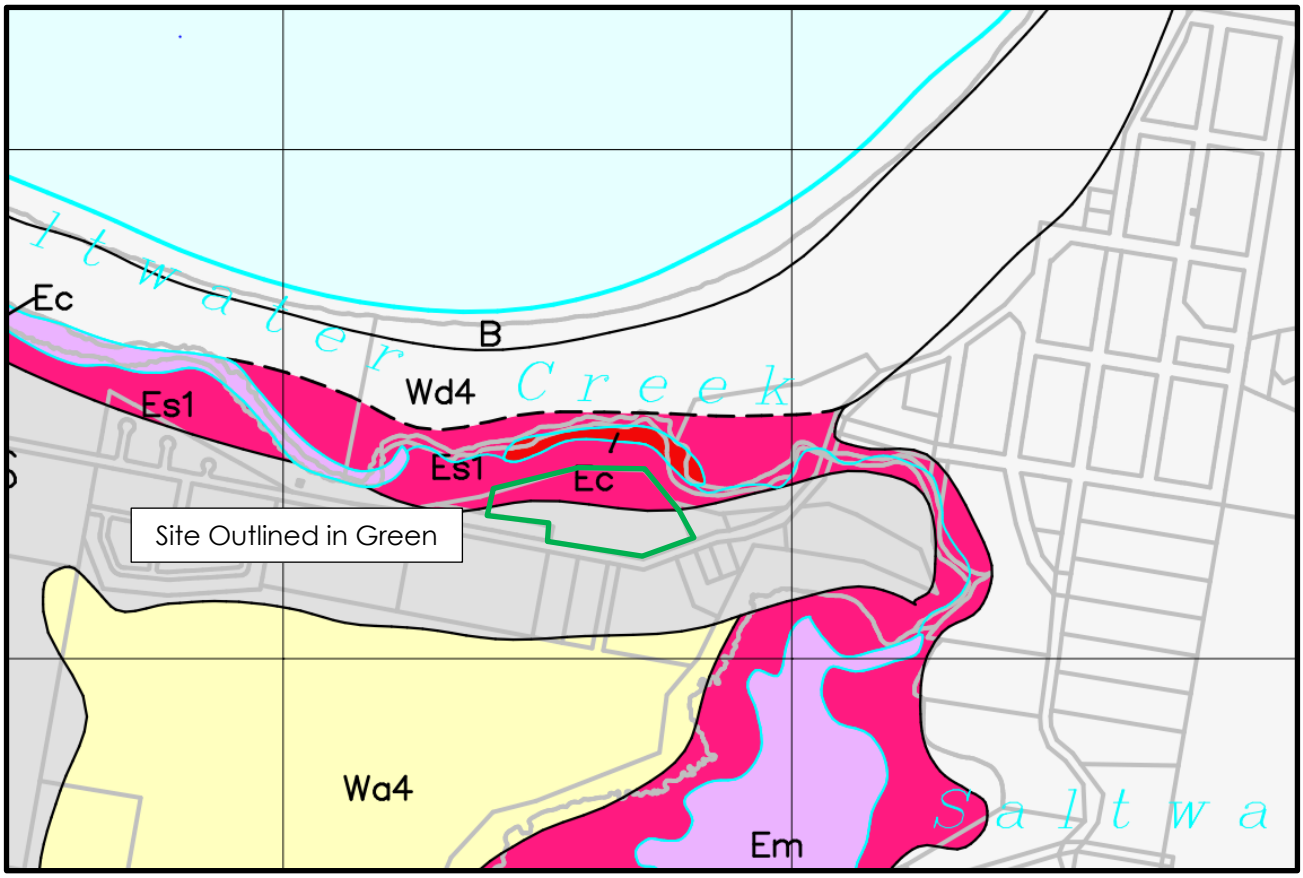
Investigations in the more elevated southern and western areas (materials between 3 to 6.5m AHD) generally encountered a subsurface profile comprising pale grey / white loose to medium dense dune sand. Below about 3m AHD the materials changed to dense to very dense dark brown estuarine silty sand to depths of at least 10m.

Investigations in the low lying north and northeastern areas (below RL 3m AHD) the areas generally encountered a subsurface profile comprising dense to very dense dark brown estuarine silty sand to depths of at least 30m.

An extract of the acid sulfate soils risk map for South West Rocks is presented below, the map indicates the site is situated on estuarine deposits with the soils within 1m of the ground surface (shaded pink) having a high probability of being acid sulfate soil. Based on the survey data

provided this correlates to the dark brown sand soil below 2m AHD having a high probability of being acid sulfate soil.

Diagram 2: Acid Sulfate Soil Risk Map for Site



Sourced from the NSW Government Environment and Heritage eSPADE website.

For the assessment, soils were sampled across the site within the upper pale grey / white dune sand and into the underlying dark brown marine sand.

ASS screening tests were undertaken on 60 samples taken during the investigation. The findings from the screening tests are discussed below.

- The samples revealed pH_F values between 3.92 and 6.47 in distilled water. pH_F less than 4 is an indicator of Actual ASS;
- The samples revealed pH_{FOX} values between 1.47 and 6.11 in hydrogen peroxide. Values less than 3 can be an indicator of Potential ASS (PASS) but can also be the result of high organic content in the soil;
- A pH change of more than 1 unit was recorded between pH_F and pH_{FOX} in 39 samples. A pH change of more than 1 unit is an indicator of PASS.

Based on the results of the testing the pale grey / white dune sand had a low reaction and are not considered acid sulfate soils. The dark brown silty sand materials (typically below 2.5m AHD) had a medium to high reactivity and were submitted for Chromium Reducible Sulphur (CRS) analysis. A summary of the test results is presented in Table 1.

Table 1: Summary of CRS Results

Location	Depth	Texture	Net Acidicy (mol H^+/t)	Lime Calculation (kg $CaCO_3$/t DW)
TP3	1.0 to 1.2	Coarse	**34**	3
TP3	1.5 to 1.7	Coarse	**28**	2
TP4	1.0 to 1.2	Coarse	4	0
TP4	2.0 to 2.2	Coarse	3	0
TP5	0.5 to 0.7	Coarse	**52**	4
TP5	1.5 to 1.7	Coarse	**62**	5
TP6	2.0 to 2.2	Coarse	**58**	4
TP14	1.5 to 1.7	Coarse	10	1
TP18	2.0 to 2.2	Coarse	5	0
BH1	4.0 to 4.45	Coarse	**48**	4
BH1	5.5 to 5.6	Coarse	**130**	10
BH1	7.0 to 7.07	Coarse	**170**	13
BH3	5.5 to 5.95	Coarse	**107**	8
BH3	7.0 to 7.45	Coarse	**59**	4
BH3	11.5 to 11.95	Coarse	**34**	3

3.1 ASS Assessment Summary

The results of the analysis were compared against the action criteria as presented in Table 5.4 of the Water Quality Australia National Acid Sulfate Soils Guidance National acid sulfate soils sampling and identification methods manual June 2018.

The net acidity concentration's exceeded the ASS Assessment Guidelines Action Criteria of 18 moles H+/ tonne for both the test pits and boreholes where samples were taken in the dark brown silty sand materials taken below 2.5m AHD.

On the basis of the laboratory testing results summarised in Table 1:

- The upper pale grey / white dune sand materials are not considered to be ASS.
- All of the dark brown silty sand materials are considered ASS. An ASS Management Plan would therefore be required for works such as services installations and pile excavations that disturb the dark brown sand soils. The following liming rates are recommended:
    - A liming rate of 10 kg/m^3 in the upper 2.5m of the dark brown silty sand soils (between 0m and 2.5m AHD). These materials are typically encountered at the ground surface in the northern and north eastern areas of the site and below the pale grey / white dune sand in the southern and western areas of the site.
    - A liming rate of 26 kg/m^3 in the dark brown and grey sand soils below 0m AHD.

The purpose of an ASS Management Plan is to consider both the potential on-site and off-site impacts of the disturbance of the soils present, with any potential acid leachate being managed appropriately. The preferred option for management of ASS is treatment and reuse on site. Off site disposal of ASS will require neutralisation to pH 7 prior to disposal at an appropriate licensed landfill facility in accordance with NSW EPA requirements.

4 RESPONSIBILITIES

The project superintendent is responsible for implementing the ASS management protocols detailed within this ASSMP. Only a suitably experienced ASS consultant may vary the procedures detailed herein.

The superintendent shall:

- Record a daily log showing the volume of material that has been excavated, and treated; and
- Ensure that validation testing is undertaken by an independent monitoring consultant on a regular basis.

The requirements of the ASSMP are in addition to, but do not override any other standard procedures such as safety considerations. Where conflict results, or may result from, the implementation of the ASS management as against other performance criteria, the project superintendent shall obtain directives from the project manager or the ASS consultant as appropriate.

5 NEUTRALISING MATERIALS

Fine Agricultural Lime (ag-lime) must be used for liming of excavated materials. Hydrated lime, Dolomatic ag-lime, or magnesium blend ag-lime, should not be used. The ag-lime grind shall have:

- At least 85% by weight passing 1mm, and 100% passing 2.5mm. In general, a finer grind is better; and
- Ag-lime shall have a Neutralising Value (NV) of 90% or better (i.e. NV>90).
- Given the estimated 13,000m^3 of material requiring treatment, a preliminary estimate indicates that a total of 234,000kg of lime will be required to treat the inferred ASS materials.

6 MANAGEMENT AND TREATMENT

6.1 Options

The management and treatment of the Actual ASS will be dependent on where the material is treated. The materials may be treated on site, or if space does not permit then the materials could be moved to an offsite treatment area to allow more efficient treatment of the excavated materials.

NSW EPA requirements (Waste Classification Part 5 – ASS) note Actual ASS is to be treated on site prior to removal off site to a licenced waste disposal facility. Transport of ASS off site for treatment and then potential reuse of the material as a general fill will require a Site Specific Exemption application to NSW EPA for disposal at a nominated site that has a Development Approval for filling works. This process requires the material to be described in detail and an assessment on potential environmental risks the material poses. Based on previous experience with such applications, a minimum turn around time of three months is anticipated.

6.2 Treatment Area

The treatment area shall be fully enclosed by a bund wall to prevent runoff to other areas of the site. The bund must have a height of at least 0.5m that comprises of soils that are not ASS or are treated ASS. The size of the treatment area should be of sufficient size to treat the excavated materials at the proposed excavation rate and to store material for the period required to undertake the verification testing (approximately two (2) weeks). The treatment area should be lined with several layers of heavy duty plastic (HDPE). The lining should be replaced periodically as required, where it is damaged during the treatment process. Treatment may also be undertaken in an area underlain by low permeability material such as concrete or clay. Alternatively, the material may be placed in a large metal skip bin for treatment. It is noted that this may not be efficient for treatment of large volumes of material.

The treatment area should always be covered with heavy duty plastic to prevent runoff, particularly when inclement weather is forecast.

The stockpile pad should grade to a low point where potential leachate can be captured within the bunded area for further treatment if required.

6.3 Treatment

The ASS shall be placed in the treatment area and spread in a layer of not more than 200mm thickness with approved ag-lime being applied across the treatment area at the rates provided in Section 3.3. In calculating the quantity of lime required, the theoretical requirement has been multiplied by a factor of safety of 1.5 to account for the rate of lime reactivity and the possibility of non-homogenous mixing.

The following liming procedures (or equivalent) should be undertaken:

- Spreading of soil in thin (<200mm) layers at the prepared treatment pad;
- Addition of lime by a spreader or pug;
- Cultivate the lime thoroughly into the soil using a disc plough or cultivator before placement of next layer;

- Placement of second layer onto stockpile and addition of lime, repeating the process until the maximum height of the stockpile is achieved; and
- Removal of the material and disposal (Refer Section 6.6).

The soil undergoing treatment should be kept moist at all times but not wet.

6.4 Validation Testing

Validation testing shall be undertaken by an independent ASS consultant at the initial rate of one sample per 250m^3 or part thereof. The samples shall be submitted to a NATA accredited laboratory for validation testing using the Chromium Reducible Sulfur suite.

All records applicable to acid sulfate testing and treatment shall be collated to substantiate treatment.

It is noted that validation testing takes about 7 to 10 days, therefore this should be allowed in the earthworks management plan to reduce the potential for delays during construction.

Should leachate accumulate in the bunded area, the pH should be monitored daily. Neutralisation may be required should the leachate pH fall below background levels.

6.5 Monitoring

The following monitoring regime is recommended:

- Prior to commencement of works a round of water quality monitoring from adjacent surface waters and drains is recommended to confirm background parameters;
- Treated ASS should be assessed using validation techniques to ensure net acidity is less than Action Criteria (18 moles H+/ tonne):
  - *Action – Where net acidity > 18 moles H+/ tonne further lime treatment will be required.*
- Water quality monitoring should be undertaken on any leachate captured within the bunded areas. Representative background values are to be confirmed:
  - *Action – Where leachate water has a pH <background value it will require neutralisation which can be undertaken using a neutralising agent such as calcined magnesia or hydrated lime. Further pH monitoring of the treated water will be required to ensure neutralisation has occurred. Treated water should be discharged overland, away from surface water bodies, to allow infiltration into the soil;*
- Record details of all monitoring results.

6.6 Post Treatment

Once the ASS materials have been treated in accordance with this ASSMP, the materials may be reused onsite as general fill or be disposed of in accordance with the relevant regulatory requirements. To comply with the NSW EPA Waste Classification Guidelines (2014) any material to be disposed of off-site requires waste classification. As the material will be treated acid sulfate soil it cannot be classified as virgin excavated natural material (VENM) or excavated natural material (ENM). Therefore, the material will need to be disposed of at a licenced landfill. A site-specific

exemption for the material could be sort from the EPA to enable the material to be used elsewhere, rather than having to be disposed of to landfill.

7 MANAGEMENT OF ONSITE DEWATERING

Should deep excavations with dewatering be proposed which have the potential to lower the natural groundwater level at the site (i.e. the design of basement excavation with dewatering to levels below the natural groundwater level of 2m AHD). Then the lowering of the groundwater could expose actual ASS materials.

In these situations, the contractor must install and / or employ an appropriate groundwater monitoring and control system such that the surrounding groundwater table will be maintained at existing levels. Options such as installing a groundwater cut off wall or groundwater re-injection could be employed to maintain groundwater levels outside the site.

7.1 Treatment of Water

Groundwater and surface water collected from within the site during excavation should be assessed prior to disposal. The following procedures will be required depending on the contamination status of the water.

- The water should be assessed for pH. If pH is below 6.5, the water will require treatment prior to discharge or disposal;
- pH change can take some time to occur, therefore, a suitable holding tank and a water pump should be installed to store collected water. The tank may fulfil a dual purpose and provide suspended solids removal prior to discharge; and
- Hydrated lime in a pre-mixed slurry should be added and the water thoroughly agitated. The pH of the water should be measured for one day to confirm stabilisation of water conditions, until pH is within the optimum level of 6.5 to 8.5 pH Units. The application of hydrated lime should continue until the water quality objectives are met.

Alternatively, the acidic waters can be disposed of to a licensed treatment facility in accordance with the NSW EPA Waste Classification Guidelines.

8 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

Matt Rowbotham

Associate Engineering Geologist

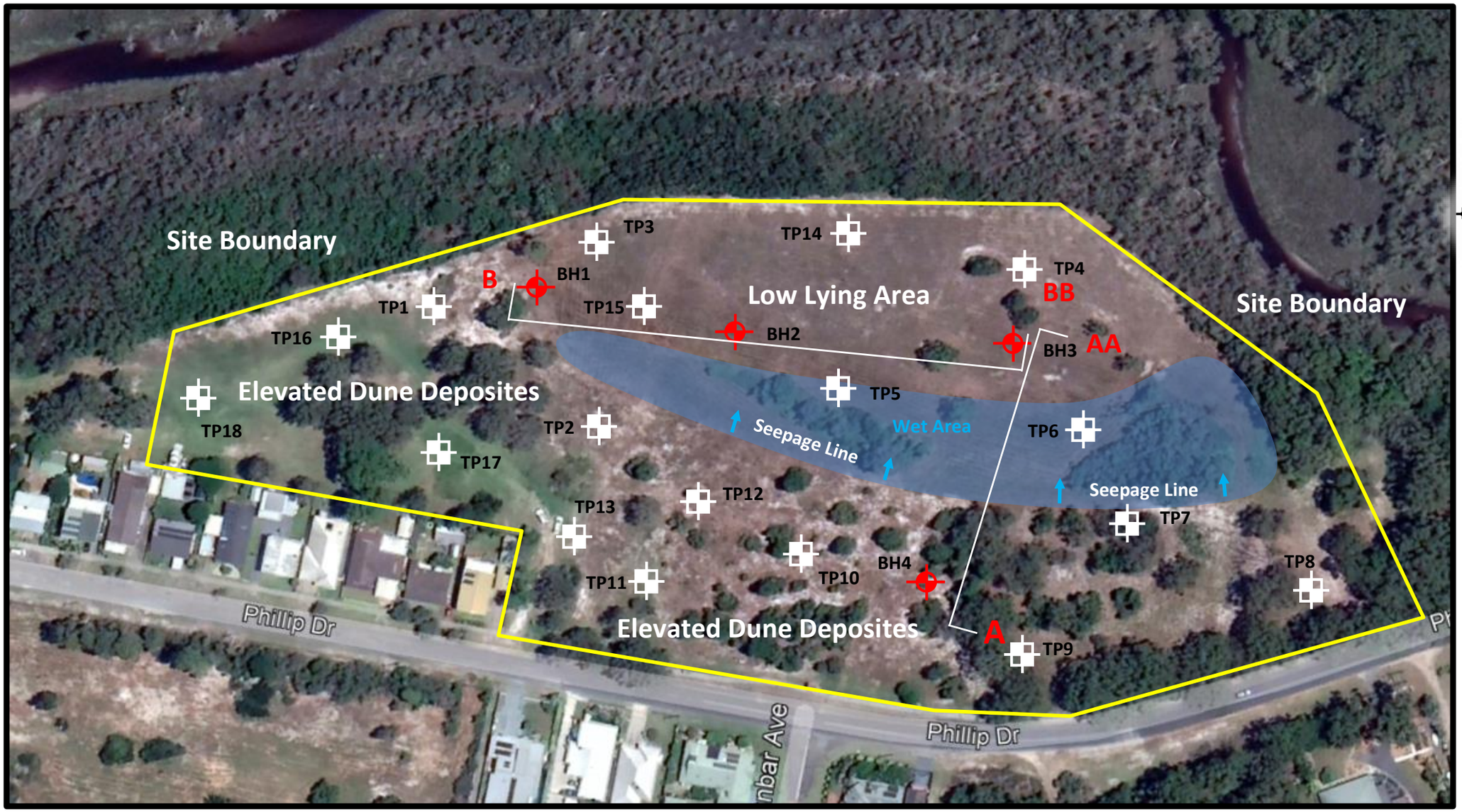
Attachments

Figure 1

Laboratory Results

Borehole and Test Pit Logs

Survey Plan



REGIONAL GEOTECHNICAL SOLUTIONS	**Client:**	Rise Projects	Job No.	RGS32813.1
	Project:	Residential Development	Drawn By:	MR
		Lot 2 Phillip Drive, South West Rocks	Date:	10.12.21
	Title:	Borehole and Test Pit Locations	Drawing No.	Figure 1

RESULTS OF ACID SULFATE SOIL ANALYSIS

60 samples supplied by Regional Geotechnical Solutions Pty Ltd on 20/08/2021. Lab Job No. M0509.
Analysis requested by Matt Rowbotham. Your Job: RGS21813.1.

1/21 Cook Drive COFFS HARBOUR NSW 2450

Sample Identification	EAL Lab Code	Texture	Moisture Content		pH_F and pH_{FOX}				KCl-extractable sulfur (S_{KCl})		Potential Sulfidic Acidity (Chromium Reducible Sulfur - CRS)		pH_{KCl}	Actual Acidity (Titratable Actual Acidity - TAA)	Retained Acidity		Non-treated soil: Acid Neutralising Capacity (ANC_{BT})		Non-treated soil: Net Acidity	Non-treated soil: Lime Calculation
			(% moisture of total wet weight)	(g moisture / g of oven dry soil)	pH_F	pH_{FOX}	pH change	Reaction	(% S_{KCl})	(equiv. mol H^+/t)	(% S_{Cr})	(mol H^+/t)		(mol H^+/t)	(%S_{NAS})	(mol H^+/t)	(% $CaCO_3$)	(mol H^+/t)	(mol H^+/t)	(kg $CaCO_3$/t DW)
Method Info.		**		**	*(In-house method S21)*					**	*(In-house method S20)*		*(In-house method 16b)*		**		*(In-house method ST4)*		**	**
TP1 0.5-0.7	*M0509/1*	Coarse	13.8	0.16	5.77	4.83	-0.94	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP1 1.5-1.7	*M0509/2*	Coarse	17.0	0.20	4.60	4.21	-0.39	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP2 0.5-0.7	*M0509/3*	Coarse	18.2	0.22	5.10	3.34	-1.76	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP2 1.5-1.7	*M0509/4*	Coarse	18.4	0.23	5.19	4.25	-0.94	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP3 0.5-0.7	*M0509/5*	Coarse	21.4	0.27	4.63	3.51	-1.12	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP3 1.0-1.2	*M0509/6*	Coarse	19.4	0.24	4.62	2.04	-2.58	Medium	0.003	2	0.007	5	4.31	29	<0.001	0	..	..	34	3
TP4 0.5-0.7	*M0509/7*	Coarse	17.0	0.20	5.64	4.93	-0.71	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP4 1.5-1.7	*M0509/8*	Coarse	19.2	0.24	5.36	3.09	-2.27	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP5 0.5-0.7	*M0509/9*	Coarse	20.6	0.26	4.38	2.50	-1.88	Medium	0.004	3	0.012	8	4.31	44	<0.001	0	..	..	52	4
TP5 1.0-1.2	*M0509/10*	Coarse	20.1	0.25	4.66	3.55	-1.11	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP6 0.5-0.7	*M0509/11*	Coarse	18.7	0.23	4.55	3.02	-1.53	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP6 2.0-2.2	*M0509/12*	Coarse	18.2	0.22	3.92	1.65	-2.27	Medium	0.024	15	0.043	27	4.64	31	..	..	..	..	58	4
TP7 0.5-0.2	*M0509/13*	Coarse	4.4	0.05	4.94	4.49	-0.45	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP7 2.0-2.2	*M0509/14*	Coarse	17.5	0.21	5.44	5.02	-0.42	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP8 0.5-0.7	*M0509/15*	Coarse	4.1	0.04	4.74	4.36	-0.38	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP8 1.5-1.7	*M0509/16*	Coarse	4.1	0.04	5.11	4.74	-0.37	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP9 0.5-0.7	*M0509/17*	Coarse	2.9	0.03	5.19	4.88	-0.31	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP9 1.5-1.7	*M0509/18*	Coarse	3.9	0.04	4.92	4.43	-0.49	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP10 1.5-1.7	*M0509/19*	Coarse	5.2	0.05	5.18	4.92	-0.26	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP10 0.5-0.7	*M0509/20*	Coarse	15.7	0.19	4.92	4.32	-0.60	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP10 1.0-1.2	*M0509/21*	Coarse	5.4	0.06	5.08	5.08	0.00	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP12 0.5-0.7	*M0509/22*	Coarse	9.8	0.11	4.90	4.64	-0.26	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP12 1.0-1.2	*M0509/23*	Coarse	16.7	0.20	5.38	4.87	-0.51	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP12 1.5-1.7	*M0509/24*	Coarse	19.3	0.24	5.67	4.44	-1.23	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP13 0.5-0.7	*M0509/25*	Coarse	4.4	0.05	5.37	4.71	-0.66	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP14 0.5-0.7	*M0509/26*	Coarse	15.6	0.18	5.65	5.08	-0.57	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP14 1.0-1.2	*M0509/27*	Coarse	18.0	0.22	5.82	5.11	-0.71	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP14 1.5-1.7	*M0509/28*	Coarse	17.9	0.22	5.58	4.71	-0.87	Low	0.002	1	< 0.005	0	5.30	10	..	..	..	..	10	1
TP15 0.5-0.7	*M0509/29*	Coarse	18.7	0.23	4.55	2.90	-1.65	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP15 1.0-1.2	*M0509/30*	Coarse	35.2	0.54	4.38	2.54	-1.84	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP15 1.5-1.7	*M0509/31*	Coarse	19.9	0.25	4.60	3.10	-1.50	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP15 2.0-2.2	*M0509/32*	Coarse	24.2	0.32	4.69	2.25	-2.44	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP16 0.5-0.7	*M0509/33*	Coarse	8.7	0.09	5.41	4.27	-1.14	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP16 1.0-1.2	*M0509/34*	Coarse	15.9	0.19	5.33	3.90	-1.43	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP16 1.5-1.7	*M0509/35*	Coarse	18.5	0.23	5.35	3.48	-1.87	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP16 2.0-2.2	*M0509/36*	Coarse	18.7	0.23	5.15	4.11	-1.04	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP17 0.5-0.7	*M0509/37*	Coarse	14.9	0.18	5.75	4.60	-1.15	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP17 1.0-1.2	*M0509/38*	Coarse	17.0	0.20	5.86	4.70	-1.16	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP17 1.5-1.7	*M0509/39*	Coarse	12.7	0.15	5.72	4.86	-0.86	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP18 0.5-0.7	*M0509/40*	Coarse	13.8	0.16	6.12	5.10	-1.02	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP18 1.0-1.2	*M0509/41*	Coarse	16.3	0.19	6.02	4.30	-1.73	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP18 1.5-1.7	*M0509/42*	Coarse	10.5	0.12	6.21	5.00	-1.21	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP18 2.0-2.2	*M0509/43*	Coarse	16.8	0.20	5.86	2.90	-2.96	Medium	0.002	1	< 0.005	0	5.70	5	..	..	..	..	5	0
TP1 1.0-1.2	*M0509/44*	Coarse	20.6	0.26	5.82	2.10	-3.72	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP5 1.5-1.7	*M0509/45*	Coarse	19.3	0.24	5.17	1.47	-3.70	High	0.012	8	0.030	19	5.17	43	..	..	..	..	62	5
TP4 2.0-2.2	*M0509/46*	Coarse	17.4	0.21	5.99	3.29	-2.70	Medium	0.003	2	< 0.005	0	6.03	3	..	..	..	..	3	0
TP4 1.0-1.2	*M0509/47*	Coarse	18.1	0.22	5.82	4.27	-1.55	Medium	0.002	1	< 0.005	0	6.05	4	..	..	..	..	4	0
TP3 1.5-1.7	*M0509/48*	Coarse	18.8	0.23	5.40	1.82	-3.58	Medium	0.003	2	0.008	5	5.53	23	..	..	..	..	28	2
TP6 1.5-1.7	*M0509/49*	Coarse	19.7	0.25	4.04	1.52	-2.52	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP6 1.0-1.2	*M0509/50*	Coarse	19.2	0.24	4.72	1.52	-3.21	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP2 1.0-1.2	*M0509/51*	Coarse	18.2	0.22	5.09	2.57	-2.52	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP8 2.0-2.2	*M0509/52*	Coarse	12.7	0.15	6.06	3.37	-2.69	Low	..	..	..	..	..	..	..	..	..	..	..	..
BH1 7.-7.07	*M0509/53*	Coarse	20.1	0.25	4.85	2.28	-2.57	Medium	0.006	4	0.015	9	4.28	158	0.005	2	..	..	170	13
BH1 5.5-5.6	*M0509/54*	Coarse	18.3	0.22	5.07	2.94	-2.13	Medium	0.005	3	0.014	9	4.67	121	..	..	..	..	130	10
BH1 4.0-4.45	*M0509/55*	Coarse	22.1	0.28	5.11	3.72	-1.39	Medium	0.003	2	0.013	8	5.07	40	..	..	..	..	48	4
BH1 13.0-13.45	*M0509/56*	Coarse	16.3	0.20	5.79	4.16	-1.63	Low	..	..	..	..	..	..	..	..	..	..	..	..
BH3 8.5-8.95	*M0509/57*	Coarse	20.9	0.26	5.61	1.67	-3.94	Low	..	..	..	..	..	..	..	..	..	..	..	..
BH3 11.5-11.95	*M0509/58*	Coarse	21.0	0.27	6.47	2.10	-4.37	Medium	0.005	3	0.041	25	6.01	9	..	..	..	..	34	3
BH3 5.5-5.95	*M0509/59*	Coarse	20.9	0.26	5.95	2.75	-3.20	Volcanic	0.007	5	0.160	100	5.70	7	..	..	..	..	107	8
BH3 7.0-7.45	*M0509/60*	Coarse	20.9	0.26	5.03	2.72	-2.31	Extreme	0.007	5	0.082	51	5.83	7	..	..	..	..	59	4

NOTES:

1. All analysis is reported on a dry weight (DW) basis, unless wet weight (WW) is specified.
2. Samples are dried and ground immediately upon arrival (unless supplied dried and ground).
3. Analytical procedures are sourced from Sullivan L, Ward N, Toppler N and Lancaster G. 2018. National acid sulfate soils guidance: national acid sulfate soils identification and laboratory methods manual, Department of Agriculture and Water Resources, Canberra, ACT. CC BY 4.0.
4. The Acid Base Accounting Equation, where Acid Neutralising Capacity has not been corroborated by other data, is Net Acidity = Potential Acidity + Actual Acidity + Retained Acidity (Eq. 3.2; Sullivan et al. 2018 - full reference above).
5. The Acid Base Accounting Equation for post-limed soil materials is Net Acidity = Potential Acidity + Actual Acidity + Retained Acidity - (post treatment Acid Neutralising Capacity - initial Acid Neutralising Capacity) (Eq. 3.3; Sullivan et al. 2018 - full reference above).
   While the Acid Neutralising Capacity of a soil material may not be included in the Net Acidity calculation (Note 4), it must be measured to give an Initial Acid Neutralising Capacity if verification testing is planned post-liming.
   The Inital Acid Neutralising Capacity must be provided by the client to enable EAL to produce Verification Net Acidity and Liming calculations for post-limed soil materials.
6. The Acid Base Accounting Equation, where Acid Neutralising Capacity has been corroborated by other data, is Net Acidity = Potential Acidity + Actual Acidity + Retained Acidity - Acid Neutralising Capacity (Eq. 3.1; Sullivan et al. 2018 - full reference above).
7. The lime calculation includes a Safety Factor of 1.5 as a safety margin for acid neutralisation (Sullivan et al. 2018). This is only applied to positive values. An increased Safety Factor may be required in some cases.
8. Retained Acidity is required when the pHKCl < 4.5 or where jarosite has been visually observed.
9. A negative Net Acidity result indicates an excess acid neutralising capacity.
10. If insufficient mixing occurs during intial sampling, or during post-liming, or both: the Potential Sulfidic Acidity may be greater in the post-limed sample than in the intial sample; the post-liming Acid Neutralising Capacity may be lower in the post-limed sample than in the intial sample.
11. **An acid sulfate soil management plan is triggered by Net Acidity results greater than the texture dependent criterion: coarse texture ≥ 0.03% S or 18 mol H+/t; medium texture ≥ 0.06% S or 36 mol H+/t; fine texture ≥ 0.1% S or 62 mol H+/t) (Table 1.1; Sullivan et al. 2018 - full reference above)**
12. For projects that disturb > 1000 t of soil material, the coarse trigger of ≥ 0.03% S or ≥ 18 mol H+/t must be applied in accordance with Sullivan et al. (2018) (full reference above).
13. Acid sulfate soil texture triggers can be related to NCST (2009) textures: coarse and peats = sands to loamy sands; medium = clayey sand to light clays; fine = light medium to heavy clays (Sullivan et al. 2018 - full reference above).
14. Bulk density is required to convert liming rates to soil volume based results. Field bulk density rings can be submitted to EAL for bulk density determination.
15. A negative Net Acidity result indicates an excess acid neutralising capacity.
16. '..' is reported where a test is either not requested or not required. Where pHKCl is < 4.5 or > 6.5, zero is reported for SNAS and ANC in Net Acidity calculations, respectively.
17. Results refer to samples as received at the laboratory. This report is not to be reproduced except in full.
18. ** NATA accreditation does not cover the performance of this service.
19. Analysis conducted between sample arrival date and reporting date.
20. All services undertaken by EAL are covered by the EAL Laboratory Services Terms and Conditions (refer SCU.edu.au/eal/t&cs or on request).
21. Results relate to the samples tested.
22. This report was issued on 02/09/2021.

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Accreditation No. 14960
Accredited for compliance with ISO/IEC 17025 - Testing

checked: .....
Graham Lancaster
Laboratory Manager

ENGINEERING LOG - TEST PIT

REGIONAL GEOTECHNICAL SOLUTIONS

CLIENT:	De Groot and Benson	**TEST PIT NO:**	**TP1**
PROJECT NAME:	Proposed Development	**PAGE:**	1 of 1
SITE LOCATION:	Lot 2 Phillip Drive, South West Rocks	**JOB NO:**	RGS32813.1
TEST LOCATION:	Refer to Site Plan	**LOGGED BY:**	MR
		DATE:	26/7/21

EQUIPMENT TYPE: 5 Tonne Excavator **EASTING:** 505629 m **SURFACE RL:**
TEST PIT LENGTH: **WIDTH:** 0.5 m **NORTHING:** 6582531 m **DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E	26/07/2021	B 0.30m				SM	**Silty SAND:** fine to medium grained, grey, root affected.		MD	DCP (0-1.6m)	1 1 2	TOPSOIL
		0.50m		0.5		SP	**SAND:** fine to medium grained, pale grey/white.	W			2 2 2 2 2 2 2 2	AEOLIAN
		B&E 0.90m 1.00m		1.0			Colour change to brown/dark brown, some silt.				3	COLLAPSING PIT WALLS @ 1.0M
		B 1.40m									5 4 2	
		1.50m		1.5							3 3	SULFUR SMELL
		B&E 1.80m										
				2.0			Due to Collapsing Pit Walls Hole Terminated at 1.80 m					
				2.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP2

CLIENT: De Groot and Benson | **PAGE:** 1 of 1

PROJECT NAME: Proposed Development | **JOB NO:** RGS32813.1

SITE LOCATION: Lot 2 Phillip Drive, South West Rocks | **LOGGED BY:** MR

TEST LOCATION: Refer to Site Plan | **DATE:** 26/7/21

EQUIPMENT TYPE: 5 Tonne Excavator | **EASTING:** 505661 m | **SURFACE RL:**

TEST PIT LENGTH: | **WIDTH:** 0.5 m | **NORTHING:** 6582479 m | **DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E	26/07/2021	E 0.15m				SM	**Silty SAND:** fine to medium grained, dark brown/dark grey.		MD	DCP (0-1.7m)	1	TOPSOIL
							0.15m				1	
						SP	**SAND:** fine to medium grained, pale grey/white.	M			1	AEOLIAN
		0.50m		0.5							2	
											1	
		B									1	
											2	
		0.90m									3	
		1.00m		1.0				W			3	COLLAPSING PIT WALLS @ 0.8M
		B									3	
											4	
		1.40m									3	
		1.50m		1.5							3	
		B&E									3	
		1.90m					1.90m					
				2.0			Due to Collapsing Pit Walls Hole Terminated at 1.90 m					
				2.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Moisture Condition	
D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

Density		
V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP3

CLIENT: De Groot and Benson
PAGE: 1 of 1
PROJECT NAME: Proposed Development
JOB NO: RGS32813.1
SITE LOCATION: Lot 2 Phillip Drive, South West Rocks
LOGGED BY: MR
TEST LOCATION: Refer to Site Plan
DATE: 26/7/21

EQUIPMENT TYPE: 5 Tonne Excavator
EASTING: 505660 m
SURFACE RL:
TEST PIT LENGTH:
WIDTH: 0.5 m
NORTHING: 6582535 m
DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E	26/07/2021	E&B 0.20m				SM	**Silty SAND:** fine to medium grained, grey, root affected.		MD	DCP (0-1.8m)	0	TOPSOIL
							0.20m				1	
						SP	**SAND:** fine to medium grained, grey.	M			1	MARINE/AEOLIAN
											2	
		0.50m		0.5							1	
		B									2	
		0.70m					0.70m				2	
						SM	**Silty SAND:** fine to medium grained, brown.	W			3	COLLAPSING PIT WALLS @ 0.7M
											4	
		1.00m		1.0							4	
											4	SULFUR SMELL
		B									6	
											3	
		1.40m									4	
		1.50m		1.5							3	
		B									4	
		1.70m									4	
							1.80m				4	
							Hole Terminated at 1.80 m					
				2.0								
				2.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP4

CLIENT: De Groot and Benson
PAGE: 1 of 1
PROJECT NAME: Proposed Development
JOB NO: RGS32813.1
SITE LOCATION: Lot 2 Phillip Drive, South West Rocks
LOGGED BY: MR
TEST LOCATION: Refer to Site Plan
DATE: 26/7/21

EQUIPMENT TYPE: 5 Tonne Excavator
EASTING: 505801 m
SURFACE RL:
TEST PIT LENGTH:
WIDTH: 0.5 m
NORTHING: 6582532 m
DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E	26/07/2021	E 0.15m				SM	**Silty SAND:** fine to medium grained, grey, root affected.	M	MD	DCP (0-1.6m)	1	TOPSOIL
							0.15m				2	
						SP	**SAND:** fine to medium grained, pale grey to grey, some silt.	M			2	MARINE/AEOLIAN
		0.50m		0.5							2	
		B 0.60m									3	
											3	
											3	
											3	
								W			3	COLLAPSING PIT WALLS @ 0.7M
											3	
		1.00m		1.0							4	
											3	
		B&E									4	SULFUR SMELL
		1.40m									4	
		1.50m		1.5							5	
		B									4	
		1.90m										
		2.00m		2.0			2.00m					
		B					Due to Collapsing Pit Walls Hole Terminated at 2.00 m					
		2.40m										
				2.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Moisture Condition	
D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

Density		
V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

ENGINEERING LOG - TEST PIT

REGIONAL GEOTECHNICAL SOLUTIONS

CLIENT:	De Groot and Benson	**TEST PIT NO:**	**TP5**
PROJECT NAME:	Proposed Development	**PAGE:**	1 of 1
SITE LOCATION:	Lot 2 Phillip Drive, South West Rocks	**JOB NO:**	RGS32813.1
TEST LOCATION:	Refer to Site Plan	**LOGGED BY:**	MR
		DATE:	26/7/21

EQUIPMENT TYPE: 5 Tonne Excavator **EASTING:** 505734 m **SURFACE RL:**
TEST PIT LENGTH: **WIDTH:** 0.5 m **NORTHING:** 6582509 m **DATUM:** AHD

Drilling and Sampling					Material description and profile information						Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E	26/07/2021	E 0.20m				SM	**Silty SAND:** fine to medium grained, grey, root affected.	M	MD	DCP (0-1.3m)	1	TOPSOIL
							0.20m				2	
						SP	**SAND:** fine to medium grained, grey.				2	MARINE/AEOLIAN
											2	
		0.50m		0.5							3	
		B 0.60m					0.60m				3	
						SM	**Silty SAND:** fine to medium grained, brown.				3	
								W			3	
											4	
		1.00m		1.0							7	
											7	SULFUR SMELL
		B&E 1.20m									7	
											7	
				1.5			Becoming brown/grey					
							2.00m					
				2.0			Hole Terminated at 2.00 m					
				2.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Moisture Condition	
D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

Density		
V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP6

CLIENT: De Groot and Benson | **PAGE:** 1 of 1

PROJECT NAME: Proposed Development | **JOB NO:** RGS32813.1

SITE LOCATION: Lot 2 Phillip Drive, South West Rocks | **LOGGED BY:** MR

TEST LOCATION: Refer to Site Plan | **DATE:** 26/7/21

EQUIPMENT TYPE: 5 Tonne Excavator | **EASTING:** 505822 m | **SURFACE RL:**

TEST PIT LENGTH: | **WIDTH:** 0.5 m | **NORTHING:** 6582487 m | **DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E	26/07/2021	E 0.15m				SM	**Silty SAND:** fine to medium grained, grey, root affected.		MD	DCP (0-1.6m)	1	TOPSOIL
							0.15m				1	
						SM	**SAND:** fine to medium grained, grey.	M			2	MARINE/AEOLIAN
		0.50m		0.5							3	
											4	
		B 0.70m									3	
								W			3	
							0.70m				6	
							Silty SAND: fine to medium grained, brown.				6	
		1.00m		1.0							7	
							Becoming brown/orange				5	SULFUR SMELL
		B&E 1.30m									6	
											7	
		1.50m		1.5							7	
							Becoming grey/brown				7	COLLAPSING PIT WALLS
		B 1.70m										
		2.00m		2.0								
		B 2.20m					2.20m					
							Hole Terminated at 2.20 m					
				2.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP7

CLIENT: De Groot and Benson | **PAGE:** 1 of 1

PROJECT NAME: Proposed Development | **JOB NO:** RGS32813.1

SITE LOCATION: Lot 2 Phillip Drive, South West Rocks | **LOGGED BY:** MR

TEST LOCATION: Refer to Site Plan | **DATE:** 26/7/21

EQUIPMENT TYPE: 5 Tonne Excavator | **EASTING:** 505837 m | **SURFACE RL:**

TEST PIT LENGTH: | **WIDTH:** 0.5 m | **NORTHING:** 6582450 m | **DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
0.45m Tooth	Not Encountered	E 0.15m				SM	**Silty SAND:** fine to medium grained, grey, root affected.		VL	DCP (0-1.8m)	0	TOPSOIL
							0.15m				1	
						SP	**SAND:** fine to medium grained, pale grey/white, root affected to 0.6m.	M	L		0	AEOLIAN
		0.50m		0.5							1	
		B 0.70m									1	
											1	
											1	
											1	
		1.00m		1.0					MD		2	
		B 1.30m									2	
											3	
											2	COLLAPSING PIT WALLS
		1.50m		1.5							3	
		B 1.70m									2	
											3	
											3	
		2.00m		2.0							3	
		B 2.20m					2.20m					
							Due to Collapsing Pit Hole Terminated at 2.20 m					
				2.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density		
V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition	
D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP8

CLIENT: De Groot and Benson | **PAGE:** 1 of 1

PROJECT NAME: Proposed Development | **JOB NO:** RGS32813.1

SITE LOCATION: Lot 2 Phillip Drive, South West Rocks | **LOGGED BY:** MR

TEST LOCATION: Refer to Site Plan | **DATE:** 26/7/21

EQUIPMENT TYPE: 5 Tonne Excavator | **EASTING:** 505897 m | **SURFACE RL:**

TEST PIT LENGTH: | **WIDTH:** 0.5 m | **NORTHING:** 6582432 m | **DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E	Not Encountered	E 0.15m				SM	**Silty SAND:** fine to medium grained, grey, some roots.	M	MD	DCP (0-1.6m)	1	TOPSOIL
							0.20m				2	
						SP	**SAND:** fine to medium grained, pale grey/white, root affected to 0.9m.				1	AEOLIAN
											1	
		0.50m		0.5							2	
		B 0.70m									1	
											1	
											1	
		1.00m		1.0							2	
		B&E 1.30m									2	
											2	
		1.50m		1.5							2	
		B 1.70m									3	
											3	
		2.00m		2.0							3	
		B 2.20m					2.20m				3	
							Hole Terminated at 2.20 m					
				2.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density		
V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition	
D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP9

CLIENT: De Groot and Benson | **PAGE:** 1 of 1

PROJECT NAME: Proposed Development | **JOB NO:** RGS32813.1

SITE LOCATION: Lot 2 Phillip Drive, South West Rocks | **LOGGED BY:** MR

TEST LOCATION: Refer to Site Plan | **DATE:** 26/7/21

EQUIPMENT TYPE: 5 Tonne Excavator | **EASTING:** 505801 m | **SURFACE RL:**

TEST PIT LENGTH: | **WIDTH:** 0.5 m | **NORTHING:** 6582409 m | **DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E	Not Encountered	E 0.20m				SM	**Silty SAND:** fine to medium grained, grey, root affected.		L	DCP (0-1.6m)	0	TOPSOIL
							0.20m				1	
						SP	**SAND:** fine to medium grained, pale grey/white, root affected (tree roots) to 0.9m.	M	L to MD		1	AEOLIAN
		0.50m		0.5							2	
											1	
		B 0.70m									2	
											1	
											1	
		1.00m		1.0					MD		2	
											2	
		E 1.30m									2	
											2	
											3	COLLAPSING PIT WALLS
		1.50m		1.5							3	
		B 1.70m									3	
											4	
				2.0			2.00m					
							Due to Collapsing Walls Hole Terminated at 2.00 m					
				2.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP10

CLIENT: De Groot and Benson
PAGE: 1 of 1
PROJECT NAME: Proposed Development
JOB NO: RGS32813.1
SITE LOCATION: Lot 2 Phillip Drive, South West Rocks
LOGGED BY: MR
TEST LOCATION: Refer to Site Plan
DATE: 26/7/21

EQUIPMENT TYPE: 5 Tonne Excavator
EASTING: 505734 m
SURFACE RL:
TEST PIT LENGTH:
WIDTH: 0.5 m
NORTHING: 6582443 m
DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E	Not Encountered	E 0.20m				SM	**Silty SAND:** fine to medium grained, grey, some roots.		MD	DCP (0-1.6m)	0	TOPSOIL
							0.20m				1	
						SP	**SAND:** fine to medium grained, pale grey/white.	M			3	AEOLIAN
		0.50m		0.5							1	
		B 0.70m									1	
											2	
		1.00m		1.0							1	
		B 1.30m									2	COLLAPSING PIT WALLS
											3	
		1.50m		1.5							2	
		B&E 1.70m									2	
							1.75m				3	
											3	
							Due to Collapsing Pit Hole Terminated at 1.75 m					
				2.0								
				2.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Moisture Condition	
D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

Density		
V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

ENGINEERING LOG - TEST PIT

REGIONAL GEOTECHNICAL SOLUTIONS

CLIENT:	De Groot and Benson	**TEST PIT NO:**	**TP11**
PROJECT NAME:	Proposed Development	**PAGE:**	1 of 1
SITE LOCATION:	Lot 2 Phillip Drive, South West Rocks	**JOB NO:**	RGS32813.1
TEST LOCATION:	Refer to Site Plan	**LOGGED BY:**	MR
		DATE:	26/7/21

EQUIPMENT TYPE: 5 Tonne Excavator **EASTING:** 505677 m **SURFACE RL:**
TEST PIT LENGTH: **WIDTH:** 0.5 m **NORTHING:** 6582432 m **DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
0.45m Tooth Bucket	Not Encountered			0		SM	**Silty SAND:** fine to medium grained, grey, root affected.	M	L	DCP (0-1.9m)	0	TOPSOIL
							0.20m				1	
						SP	**SAND:** fine to medium grained, pale grey/white, root affected to 0.6m (tree roots).	M			1	AEOLIAN
											1	
				0.5							2	
											1	
											1	
											1	
											1	
				1.0					MD		2	
											2	COLLAPSING PIT WALLS
											2	
											2	
											3	
				1.5							3	
											4	
											4	
											3	
											4	
				2.0			2.00m					
							Hole Terminated at 2.00 m					
				2.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

ENGINEERING LOG - TEST PIT

REGIONAL GEOTECHNICAL SOLUTIONS

CLIENT:	De Groot and Benson	**TEST PIT NO:**	**TP12**
PROJECT NAME:	Proposed Development	**PAGE:**	1 of 1
SITE LOCATION:	Lot 2 Phillip Drive, South West Rocks	**JOB NO:**	RGS32813.1
TEST LOCATION:	Refer to Site Plan	**LOGGED BY:**	MR
		DATE:	26/7/21

EQUIPMENT TYPE: 5 Tonne Excavator **EASTING:** 505696 m **SURFACE RL:**
TEST PIT LENGTH: **WIDTH:** 0.5 m **NORTHING:** 6582454 m **DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E		E 0.15m				SM	**Silty SAND:** fine to medium grained, grey, root affected.		MD	DCP (0-1.7m)	1	TOPSOIL
							0.15m				2	
						SP	**SAND:** fine to medium grained, pale grey/white.	M			1	AEOLIAN
		0.50m		0.5							2	
		B 0.80m									1	
											2	
											1	
											2	
											3	
		1.00m		1.0							4	
	26/07/2021										4	
		B 1.30m						W			4	COLLAPSING PIT WALLS @ 1.1M
											3	
		1.50m		1.5							4	
											4	
		B 1.80m									4	
											5	
				2.0			2.00m					
							Hole Terminated at 2.00 m					
				2.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

ENGINEERING LOG - TEST PIT

REGIONAL GEOTECHNICAL SOLUTIONS

CLIENT:	De Groot and Benson	**TEST PIT NO:**	**TP13**
PROJECT NAME:	Proposed Development	**PAGE:**	1 of 1
SITE LOCATION:	Lot 2 Phillip Drive, South West Rocks	**JOB NO:**	RGS32813.1
TEST LOCATION:	Refer to Site Plan	**LOGGED BY:**	MR
		DATE:	26/7/21

EQUIPMENT TYPE: 5 Tonne Excavator **EASTING:** 505658 m **SURFACE RL:**
TEST PIT LENGTH: **WIDTH:** 0.5 m **NORTHING:** 6582443 m **DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E		E 0.15m				SM	**Silty SAND:** fine to medium grained, dark grey/dark brown, root affected.	M	MD	DCP (0-1.6m)	1	TOPSOIL
							0.15m				2	
						SP	**SAND:** fine to medium grained, pale grey/white.				2	AEOLIAN
											2	
		0.50m		0.5							1	
											2	
		B&E 0.70m									2	
											1	
											2	
				1.0							2	
											2	
	▽ 26/07/2021										3	
											2	
								W			2	COLLAPSING PIT WALLS @ 1.3M
		1.50m		1.5							2	
		B 1.70m									3	
				2.0			2.00m					
							Hole Terminated at 2.00 m					
				2.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Moisture Condition	
D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

Density		
V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP14

CLIENT: De Groot and Benson
PAGE: 1 of 1
PROJECT NAME: Proposed Development
JOB NO: RGS32813.1
SITE LOCATION: Lot 2 Phillip Drive, South West Rocks
LOGGED BY: MR
TEST LOCATION: Refer to Site Plan
DATE: 26/7/21

EQUIPMENT TYPE: 5 Tonne Excavator
EASTING: 505744 m
SURFACE RL:
TEST PIT LENGTH:
WIDTH: 0.5 m
NORTHING: 6582543 m
DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E		E&B 0.20m				SM	**Silty SAND:** fine to medium grained, grey, root affected.	M	MD	DCP (0-1.8m)	1	TOPSOIL
							0.20m				1	
						SP	**SAND:** fine to medium grained, pale grey and orange mottle.	M			1	MARINE/AEOLIAN
		0.50m		0.5							2	
	26/07/2021 ▽	B&E 0.70m									2	
											2	
											2	
								W			2	COLLAPSING PIT WALLS @ 0.7M
		1.00m		1.0							3	
		B 1.20m									2	
											3	
											3	
											3	
		1.50m		1.5							3	
		B 1.70m									3	
											3	
											4	
											3	
				2.0			2.00m					
							Hole Terminated at 2.00 m					
				2.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Moisture Condition	
D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

Density		
V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP15

CLIENT: De Groot and Benson
PAGE: 1 of 1
PROJECT NAME: Proposed Development
JOB NO: RGS32813.1
SITE LOCATION: Lot 2 Phillip Drive, South West Rocks
LOGGED BY: MR
TEST LOCATION: Refer to Site Plan
DATE: 26/7/21

EQUIPMENT TYPE: 5 Tonne Excavator
EASTING: 505687 m
SURFACE RL:
TEST PIT LENGTH:
WIDTH: 0.5 m
NORTHING: 6582521 m
DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E		E/B 0.20m				SM	**Silty SAND:** fine to medium grained, grey, root affected.	M	MD	DCP (0-1.6m)	0	TOPSOIL
							0.20m				1	
						SP	**SAND:** fine to medium grained, grey.	M			1	MARINE/AEOLIAN
		0.50m		0.5							2	
	26/07/2021										3	
		B 0.70m					0.60m				3	
						SM	**Silty SAND** fine to medium grained, brown.				5	
								W			4	SULFUR SMELL
											3	
		1.00m		1.0							3	
		B/E 1.20m									3	
											1	
											2	
		1.50m		1.5			Organics (roots etc throughout)				5	
		B 1.70m									6	
		2.00m		2.0								
		B 2.20m					2.20m					
							Hole Terminated at 2.20 m					
				2.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density		
V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition	
D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

ENGINEERING LOG - TEST PIT

REGIONAL GEOTECHNICAL SOLUTIONS

CLIENT:	De Groot and Benson	**TEST PIT NO:**	**TP16**
PROJECT NAME:	Proposed Development	**PAGE:**	1 of 1
SITE LOCATION:	Lot 2 Phillip Drive, South West Rocks	**JOB NO:**	RGS32813.1
TEST LOCATION:	Refer to Site Plan	**LOGGED BY:**	MR
		DATE:	26/7/21

EQUIPMENT TYPE: 5 Tonne Excavator **EASTING:** 505582 m **SURFACE RL:**
TEST PIT LENGTH: **WIDTH:** 0.5 m **NORTHING:** 6582510 m **DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E		E&B 0.15m				SM	**Silty SAND:** fine to medium grained, dark grey, root affected.	M	L	DCP (0-2.5m)	1	TOPSOIL
						0.15m					1	
						SP	**SAND:** fine to medium grained, pale grey/white.	M	MD		1	AEOLIAN
											2	
		0.50m		0.5							1	
		B 0.70m									2	
											2	
											2	
											2	
		1.00m		1.0					L		1	
		B 1.20m									1	
											2	
	26/07/2021						Colour change to dark grey/dark brown, some silt				1	COLLAPSING PIT WALLS @ 1.2M
											1	
		1.50m		1.5							1	
											1	SULFUR SMELL
		B&E 1.70m									1	
											2	
									MD		2	
		2.00m		2.0							2	
		B 2.20m									3	
						2.20m					5	
							Hole Terminated at 2.20 m				4	
											4	
				2.5							5	

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Moisture Condition	
D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

Density		
V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP17

CLIENT: De Groot and Benson
PAGE: 1 of 1
PROJECT NAME: Proposed Development
JOB NO: RGS32813.1
SITE LOCATION: Lot 2 Phillip Drive, South West Rocks
LOGGED BY: MR
TEST LOCATION: Refer to Site Plan
DATE: 26/7/21

EQUIPMENT TYPE: 5 Tonne Excavator
EASTING: 505620 m
SURFACE RL:
TEST PIT LENGTH:
WIDTH: 0.5 m
NORTHING: 6582476 m
DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E	Not Encountered	E&B 0.20m				SM	**Silty SAND:** fine to medium grained, dark brown/dark grey, root affected.		MD	DCP (0-1.7m)	1	TOPSOIL
							0.20m				3	
						SP	**Silty SAND:** fine to medium grained, pale grey.	M			3	AEOLIAN
		0.50m		0.5							3	
		B 0.70m									3	
											2	
		1.00m		1.0							2	
		B 1.20m									2	
											2	
											2	
		1.50m		1.5							2	
		B&E 1.70m									2	
											3	
											4	
											3	
											4	
											3	COLLAPSING PIT WALLS @ 1.5M
											4	
							1.80m					
							Due to Collapsing Pit Walls Hole Terminated at 1.80 m					
				2.0								
				2.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Moisture Condition	
D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

Density		
V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

ENGINEERING LOG - TEST PIT

REGIONAL GEOTECHNICAL SOLUTIONS

CLIENT:	De Groot and Benson	**TEST PIT NO:**	**TP18**
PROJECT NAME:	Proposed Development	**PAGE:**	1 of 1
SITE LOCATION:	Lot 2 Phillip Drive, South West Rocks	**JOB NO:**	RGS32813.1
TEST LOCATION:	Refer to Site Plan	**LOGGED BY:**	MR
		DATE:	26/7/21

EQUIPMENT TYPE: 5 Tonne Excavator **EASTING:** 505537 m **SURFACE RL:**
TEST PIT LENGTH: **WIDTH:** 0.5 m **NORTHING:** 6582495 m **DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E		E&B 0.15m				SM	**Silty SAND:** fine to medium grained, dark brown, root affected.	M	MD	DCP (0-1.6m)	2	TOPSOIL
							0.15m				2	
						SP	**SAND:** fine to medium grained, pale grey/white.	M			2	AEOLIAN
		0.50m		0.5							4	
		B 0.70m									4	
											4	
		1.00m		1.0							3	
		B 1.20m									2	
											3	
											3	
											4	
											3	
	26/07/2021										4	
											4	COLLAPSING PIT WALLS @ 1.3M
		1.50m		1.5							4	
											4	SULFUR SMELL
		B 1.70m										
		2.00m		2.0								
		B 2.20m					2.20m					
							Hole Terminated at 2.20 m					
				2.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - BOREHOLE

BOREHOLE NO: BH1

CLIENT: De Groot and Benson
PAGE: 1 of 5
PROJECT NAME: Proposed Development
JOB NO: RGS32813.1
SITE LOCATION: Lot 2 Phillip Drive, South West Rocks
LOGGED BY: MR
TEST LOCATION: See Figure
DATE: 29/7/21

DRILL TYPE: P160 **EASTING:** 505651 m **SURFACE RL:**
BOREHOLE DIAMETER: 100 mm **INCLINATION:** 90° **NORTHING:** 6582533 m **DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
AD/T				0		SM	**Silty SAND** fine to mwsium grained, grey, root affected.	M	L			TOPSOIL
							0.20m					
						SM	**Silty SAND** fine to medium grained, grey.					AEOLIAN
	▽			0.5								
		1.00m		1.0				W	MD			
		SPT 3,4,5 N=9										
		1.45m		1.5								
							1.60m					
						SP	**SAND** fine to medium grained, pale grey.					
				2.0								
WB												MARINE
		2.50m		2.5								
		SPT 2,6,7 N=13										
		2.95m		3.0								
							3.40m					
				3.5		SM	**Silty SAND** fine to medium grained, dark brown.		VD			
		4.00m SPT N=R		4.0								
				4.5								
							5.00m					

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - BOREHOLE

BOREHOLE NO: BH1

CLIENT: De Groot and Benson
PAGE: 2 of 5
PROJECT NAME: Proposed Development
JOB NO: RGS32813.1
SITE LOCATION: Lot 2 Phillip Drive, South West Rocks
LOGGED BY: MR
TEST LOCATION: See Figure
DATE: 29/7/21

DRILL TYPE: P160 **EASTING:** 505651 m **SURFACE RL:**
BOREHOLE DIAMETER: 100 mm **INCLINATION:** 90° **NORTHING:** 6582533 m **DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
WB		5.50m SPT N=R		5.5		SM	**Silty Sand** fine to medium grained, dark brown (weakly cemented)	W	VD			MARINE
		7.00m SPT N=R		7.0								
		8.50m SPT N=R		8.5								
				9.0			Becoming Silty SAND, fine to medium grained (not indurated)					
		10.00m		9.5								

RG LIB 1.05.0.GLB Log RG NON-CORED BOREHOLE - TEST PIT RGS32813.1 LOGS.GPJ <<DrawingFile>> 10/09/2021 14:17 10.02.00.04 Datgel Lab and In Situ Tool

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

ENGINEERING LOG - BOREHOLE

REGIONAL GEOTECHNICAL SOLUTIONS

BOREHOLE NO: BH1
PAGE: 3 of 5
CLIENT: De Groot and Benson
JOB NO: RGS32813.1
PROJECT NAME: Proposed Development
LOGGED BY: MR
SITE LOCATION: Lot 2 Phillip Drive, South West Rocks
DATE: 29/7/21
TEST LOCATION: See Figure

DRILL TYPE: P160 **EASTING:** 505651 m **SURFACE RL:**
BOREHOLE DIAMETER: 100 mm **INCLINATION:** 90° **NORTHING:** 6582533 m **DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
WB		SPT 20,29,15/50mm N=44/200mm		10.5		SM	**Silty Sand** fine to medium grained, dark brown (weakly cemented) *(continued)*	W	VD			MARINE
		10.35m		11.0								
							11.20m					
				11.5		SC	**Sandy Clay/Clayey SAND** interbedded, fine to medium grained, high plasticity pale grey					
		11.50m										
		SPT 9,12,11 N=23		12.0								
		11.95m										
				12.5								
								M > w_P	St			
		13.00m		13.0						HP	100	
		SPT 3,4,7 N=11										
		13.45m		13.5								
				14.0					VD			
		14.50m		14.5								
		SPT 9,14,17 N=31										

RG LIB 1.05.0.GLB Log RG NON-CORED BOREHOLE - TEST PIT RGS32813.1 LOGS.GPJ <<DrawingFile>> 10/09/2021 14:17 10.02.00.04 Datgel Lab and In Situ Tool

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - BOREHOLE

BOREHOLE NO: BH1

CLIENT: De Groot and Benson
PAGE: 4 of 5
PROJECT NAME: Proposed Development
JOB NO: RGS32813.1
SITE LOCATION: Lot 2 Phillip Drive, South West Rocks
LOGGED BY: MR
TEST LOCATION: See Figure
DATE: 29/7/21

DRILL TYPE: P160 **EASTING:** 505651 m **SURFACE RL:**
BOREHOLE DIAMETER: 100 mm **INCLINATION:** 90° **NORTHING:** 6582533 m **DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
WB		14.95m				SC	**Sandy Clay/Clayey SAND** interbedded, fine to medium grained, high plasticity pale grey *(continued)* Becoming SAND, fine to medium grained, pale grey, some silt.	M > w_P	VD			MARINE
				15.5								
		16.00m		16.0				W				
		SPT 12,20,20 N=40										
		16.45m		16.5								
				17.0			Becoming Silty SAND, dark brown.					
		17.50m		17.5								
		SPT 3,3,6 N=9										
		17.95m		18.0								
				18.5								
				19.0								
		19.50m SPT N=R		19.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density		
V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition	
D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - BOREHOLE

BOREHOLE NO: BH1

CLIENT: De Groot and Benson
PAGE: 5 of 5
PROJECT NAME: Proposed Development
JOB NO: RGS32813.1
SITE LOCATION: Lot 2 Phillip Drive, South West Rocks
LOGGED BY: MR
TEST LOCATION: See Figure
DATE: 29/7/21

DRILL TYPE: P160 **EASTING:** 505651 m **SURFACE RL:**
BOREHOLE DIAMETER: 100 mm **INCLINATION:** 90° **NORTHING:** 6582533 m **DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
WB				20.5		SC	**Sandy Clay/Clayey SAND** interbedded, fine to medium grained, high plasticity pale grey *(continued)*	W	VD			MARINE
				21.0								
				21.5								
				22.0			22.00m					
							Hole Terminated at 22.00 m					
				22.5								
				23.0								
				23.5								
				24.0								
				24.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density		
V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition	
D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - BOREHOLE

BOREHOLE NO: BH2

CLIENT: De Groot and Benson
PAGE: 1 of 6
PROJECT NAME: Proposed Development
JOB NO: RGS32813.1
SITE LOCATION: Lot 2 Phillip Drive, South West Rocks
LOGGED BY: MR
TEST LOCATION: See Figure
DATE: 29/7/21

DRILL TYPE: P160 **EASTING:** 505715 m **SURFACE RL:**
BOREHOLE DIAMETER: 100 mm **INCLINATION:** 90° **NORTHING:** 6582516 m **DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
AD/T				0		SM	0.10m **Silty SAND** fine to medium grained, grey, dark brown root affected.	M	MD			TOPSOIL
						SP	**SAND** fine to medium grained, grey, some silt.					AEOLIAN
				0.5			0.60m					
						SP	**Silty SAND** fine to medium grained, grey, orange brown.	W				
		1.00m		1.0								
		SPT 6,6,6 N=12										
		1.45m		1.5								
				2.0			2.00m					
						SM	**Silty SAND** medium to coarse grained, grey, brown, some gravel, fine grained, subrounded.		VD			MARINE
WB		2.50m		2.5								
		SPT 11,15,30 N=45										
		2.95m		3.0								
				3.5								
		4.00m		4.0			Becoming fine to medium grained, dark brown/black					
		SPT 23,33,2 N=35/225mm										
		4.38m		4.5								

RG LIB 1.05.0.GLB Log RG NON-CORED BOREHOLE - TEST PIT RGS32813.1 LOGS.GPJ <<DrawingFile>> 10/09/2021 14:17 10.02.00.04 Datgel Lab and In Situ Tool

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density		
V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition	
D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - BOREHOLE

BOREHOLE NO: BH2

CLIENT: De Groot and Benson
PAGE: 2 of 6
PROJECT NAME: Proposed Development
JOB NO: RGS32813.1
SITE LOCATION: Lot 2 Phillip Drive, South West Rocks
LOGGED BY: MR
TEST LOCATION: See Figure
DATE: 29/7/21

DRILL TYPE: P160 **EASTING:** 505715 m **SURFACE RL:**
BOREHOLE DIAMETER: 100 mm **INCLINATION:** 90° **NORTHING:** 6582516 m **DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
WB		5.50m SPT N=R		5.5		SM	**Silty SAND** medium to coarse grained, grey, brown, some gravel, fine grained, subrounded. *(continued)*	W	VD			MARINE
							Becoming indurated, weakly cemented.					
		7.00m SPT N=R		7.0								
		8.50m SPT 18,29,20 N=49/230mm		8.5			Becoming medium to coarse grained, (not indurated)					
		8.88m		9.0								
		10.00m		9.5								

RG LIB 1.05.0.GLB Log RG NON-CORED BOREHOLE - TEST PIT RGS32813.1 LOGS.GPJ <<DrawingFile>> 10/09/2021 14:17 10.02.00.04 Datgel Lab and In Situ Tool

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Moisture Condition	
D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

Density		
V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - BOREHOLE

BOREHOLE NO: BH2

CLIENT: De Groot and Benson
PAGE: 3 of 6
PROJECT NAME: Proposed Development
JOB NO: RGS32813.1
SITE LOCATION: Lot 2 Phillip Drive, South West Rocks
LOGGED BY: MR
TEST LOCATION: See Figure
DATE: 29/7/21

DRILL TYPE: P160 **EASTING:** 505715 m **SURFACE RL:**
BOREHOLE DIAMETER: 100 mm **INCLINATION:** 90° **NORTHING:** 6582516 m **DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
WB		SPT N=R				SM	**Silty SAND** medium to coarse grained, grey, brown, some gravel, fine grained, subrounded. *(continued)*	W	VD			MARINE
		10.35m		10.5								
				11.0								
		11.50m		11.5								
		SPT 7,2,2 N=4					11.60m					
		11.95m		12.0		CH	**Sandy Clay** high plasticity pale grey.	M > w_P	F	HP	70	
							12.20m					
				12.5		SP	**SAND** fine to medium grained, pale grey		VD			
		13.00m		13.0								
		SPT 17,25,29 N=54		13.5								
		13.45m										
				14.0								
				14.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - BOREHOLE

BOREHOLE NO: BH2

CLIENT: De Groot and Benson
PAGE: 4 of 6
PROJECT NAME: Proposed Development
JOB NO: RGS32813.1
SITE LOCATION: Lot 2 Phillip Drive, South West Rocks
LOGGED BY: MR
TEST LOCATION: See Figure
DATE: 29/7/21

DRILL TYPE: P160 **EASTING:** 505715 m **SURFACE RL:**
BOREHOLE DIAMETER: 100 mm **INCLINATION:** 90° **NORTHING:** 6582516 m **DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
WB				15.5		SP	**SAND** fine to medium grained, pale grey *(continued)*	M > w_P	VD			MARINE
		16.00m		16.0			Medium to coarse grained, with some to a trace of clay		MD			
		SPT 7,8,12 N=20										
		16.45m		16.5								
				17.0								
				17.5								
				18.0								
				18.5								
		19.00m		19.0			Becoming fine to medium grained		VD			
		SPT N=R										
		19.45m		19.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Moisture Condition	
D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

Density		
V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - BOREHOLE

BOREHOLE NO: BH2

CLIENT: De Groot and Benson
PAGE: 5 of 6
PROJECT NAME: Proposed Development
JOB NO: RGS32813.1
SITE LOCATION: Lot 2 Phillip Drive, South West Rocks
LOGGED BY: MR
TEST LOCATION: See Figure
DATE: 29/7/21

DRILL TYPE: P160 **EASTING:** 505715 m **SURFACE RL:**
BOREHOLE DIAMETER: 100 mm **INCLINATION:** 90° **NORTHING:** 6582516 m **DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
WB				20.5		SP	**SAND** fine to medium grained, pale grey *(continued)*	$M > w_P$	VD			MARINE
				21.0			Becoming coarse grained					
	▽	22.00m		21.5								
		SPT N=R		22.0								
		22.45m		22.5								
				23.0								
				23.5								
				24.0								
				24.5								
	▽	25.00m										

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density		
V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition	
D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - BOREHOLE

BOREHOLE NO: BH2

CLIENT: De Groot and Benson
PAGE: 6 of 6
PROJECT NAME: Proposed Development
JOB NO: RGS32813.1
SITE LOCATION: Lot 2 Phillip Drive, South West Rocks
LOGGED BY: MR
TEST LOCATION: See Figure
DATE: 29/7/21

DRILL TYPE: P160 **EASTING:** 505715 m **SURFACE RL:**
BOREHOLE DIAMETER: 100 mm **INCLINATION:** 90° **NORTHING:** 6582516 m **DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
WB		SPT N=R		25.5		SP	**SAND** fine to medium grained, pale grey *(continued)*	$M > w_P$	VD			MARINE
				26.0								
				26.5								
				27.0								
				27.5								
		28.00m		28.0			28.00m					
		D		28.5		CH	**Sandy Clay** high plasticity dark grey, some gravel lenses. fine grained.		St			ESTUARINE
		28.70m		29.0								
				29.5								
							30.00m					

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests Hole Terminated at 30.00 m

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Moisture Condition	
D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

Density		
V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - BOREHOLE

BOREHOLE NO: BH3

CLIENT: De Groot and Benson
PAGE: 1 of 4
PROJECT NAME: Proposed Development
JOB NO: RGS32813.1
SITE LOCATION: Lot 2 Phillip Drive, South West Rocks
LOGGED BY: MR
TEST LOCATION: See Figure
DATE: 29/7/21

DRILL TYPE: P160 **EASTING:** 505795 m **SURFACE RL:**
BOREHOLE DIAMETER: 100 mm **INCLINATION:** 90° **NORTHING:** 6582513 m **DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
AD/T						SM	**Silty SAND** fine to medium grained, dark brown, root affected.	M	MD			TOPSOIL
						0.20m						
						SP	**SAND** fine to medium grained, grey, some silt					AEOLIAN
				0.5								
	▽	1.00m		1.0				W				
		SPT 3,3,5 N=8										
		1.45m		1.5								
				2.0								
WB												MARINE
		2.50m		2.5								
		SPT 2,2,3 N=5										
		2.95m		3.0								
				3.5								
		4.00m		4.0								
		SPT 3,4,5 N=9										
		4.43m		4.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Moisture Condition	
D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

Density		
V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - BOREHOLE

BOREHOLE NO: BH3

CLIENT: De Groot and Benson | **PAGE:** 2 of 4

PROJECT NAME: Proposed Development | **JOB NO:** RGS32813.1

SITE LOCATION: Lot 2 Phillip Drive, South West Rocks | **LOGGED BY:** MR

TEST LOCATION: See Figure | **DATE:** 29/7/21

DRILL TYPE: P160 | **EASTING:** 505795 m | **SURFACE RL:**

BOREHOLE DIAMETER: 100 mm | **INCLINATION:** 90° | **NORTHING:** 6582513 m | **DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
WB						SP	**SAND** fine to medium grained, grey, some silt *(continued)*	W	MD			MARINE
		5.50m		5.5								
		SPT 3,5,7 N=12										
		5.90m		6.0								
				6.5			Becoming dark brown					
		7.00m		7.0					MD to VD			
		SPT 6,7,6 N=13										
		7.37m		7.5								
				8.0								
		8.50m		8.5								
		SPT 6,8,9 N=17										
		8.95m		9.0								
				9.5								
		10.00m										

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - BOREHOLE

BOREHOLE NO: BH3

CLIENT: De Groot and Benson
PAGE: 3 of 4
PROJECT NAME: Proposed Development
JOB NO: RGS32813.1
SITE LOCATION: Lot 2 Phillip Drive, South West Rocks
LOGGED BY: MR
TEST LOCATION: See Figure
DATE: 29/7/21

DRILL TYPE: P160 **EASTING:** 505795 m **SURFACE RL:**
BOREHOLE DIAMETER: 100 mm **INCLINATION:** 90° **NORTHING:** 6582513 m **DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
WB		SPT 5,5,6 N=11		10.5		SP	**SAND** fine to medium grained, grey, some silt *(continued)*	W	MD to VD			MARINE
		10.45m		11.0								
		11.50m		11.5					L			
		SPT 1,0,5 N=5		12.0								Iron Indurated
		11.95m		12.5					VD			
		13.00m		13.0						HP	100	
		SPT N=R		13.5								
		13.45m		14.0								
		14.50m		14.5			14.40m **Silty CLAY** medium plasticity, grey.	M > w_P	S - F			
		SPT 0,0,0 N=0										

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - BOREHOLE

BOREHOLE NO: BH3

CLIENT: De Groot and Benson
PAGE: 4 of 4
PROJECT NAME: Proposed Development
JOB NO: RGS32813.1
SITE LOCATION: Lot 2 Phillip Drive, South West Rocks
LOGGED BY: MR
TEST LOCATION: See Figure
DATE: 29/7/21

DRILL TYPE: P160 **EASTING:** 505795 m **SURFACE RL:**
BOREHOLE DIAMETER: 100 mm **INCLINATION:** 90° **NORTHING:** 6582513 m **DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
WB		14.95m		15.5			**Silty CLAY** medium plasticity, grey. *(continued)*	M > w_P	S - F			MARINE
		16.00m		16.0			16.00m					
		SPT 5,5,5 N=10				SC	**Sandy Clay/Clayey SAND** interbedded, fine to medium grained, medium plasticity, grey and orange brown.		St			
		16.45m		16.5								
				17.0								
		17.50m		17.5			17.50m					
		SPT 6,7,2 N=9					**SAND** fine to medium grained, brown.	W	VD			
		17.95m		18.0			17.95m Hole Terminated at 17.95 m					
				18.5								
				19.0								
				19.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - BOREHOLE

BOREHOLE NO: BH4

CLIENT: De Groot and Benson
PAGE: 1 of 3
PROJECT NAME: Proposed Development
JOB NO: RGS32813.1
SITE LOCATION: Lot 2 Phillip Drive, South West Rocks
LOGGED BY: MR
TEST LOCATION: See Figure
DATE: 2/8/21

DRILL TYPE: P160 **EASTING:** 505769 m **SURFACE RL:**
BOREHOLE DIAMETER: 100 mm **INCLINATION:** 90° **NORTHING:** 6582431 m **DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
AD/T						SM	**Silty SAND** fine to mwsium grained, grey, root affected.	M	MD			TOPSOIL
						SP	0.20m **SAND** fine to medium grained, pale grey/white					AEOLIAN
		1.00m SPT 2,3,3 N=6 1.45m		0.5, 1.0, 1.5, 2.0				W				
WB		2.50m SPT 30/40mm N>50 2.94m		2.5, 3.0		SM	2.40m **Silty SAND** fine to medium grained, dark brown, indurated (weakly cemented).	M	VD			Perched water above indurated sand
				3.5		SM	3.50m **Silty SAND** fine to medium grained, dark brown.					MARINE
		4.00m SPT 17 30,30/100mm N>50 4.38m		4.0, 4.5		SM	**Silty SAND** medium to coarse grained, dark brown, some gravel, fine grained, white. 5.00m					

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

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WB		5.50m SPT 17,30/140mm N>50 5.85m		5.5 6.0 6.5		SM	**Silty SAND** medium to coarse grained, dark brown, some gravel, fine grained, white. *(continued)*	M	VD			MARINE
		7.00m SPT 14,30/130mm N>50 7.40m		7.0 7.5 8.0								
		8.50m SPT 30/140mm N>50 8.94m		8.5 9.0 9.5		8.50m SM	**Silty SAND** fine to medium grained, dark orange/dark brown.					
		10.00m										

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WB		SPT 30,30/110mm N>50				SM	**Silty SAND** fine to medium grained, dark orange/dark brown. *(continued)*	M	VD			MARINE
		10.31m					10.26m Hole Terminated at 10.26 m					
				10.5								
				11.0								
				11.5								
				12.0								
				12.5								
				13.0						HP	100	
				13.5								
				14.0								
				14.5								

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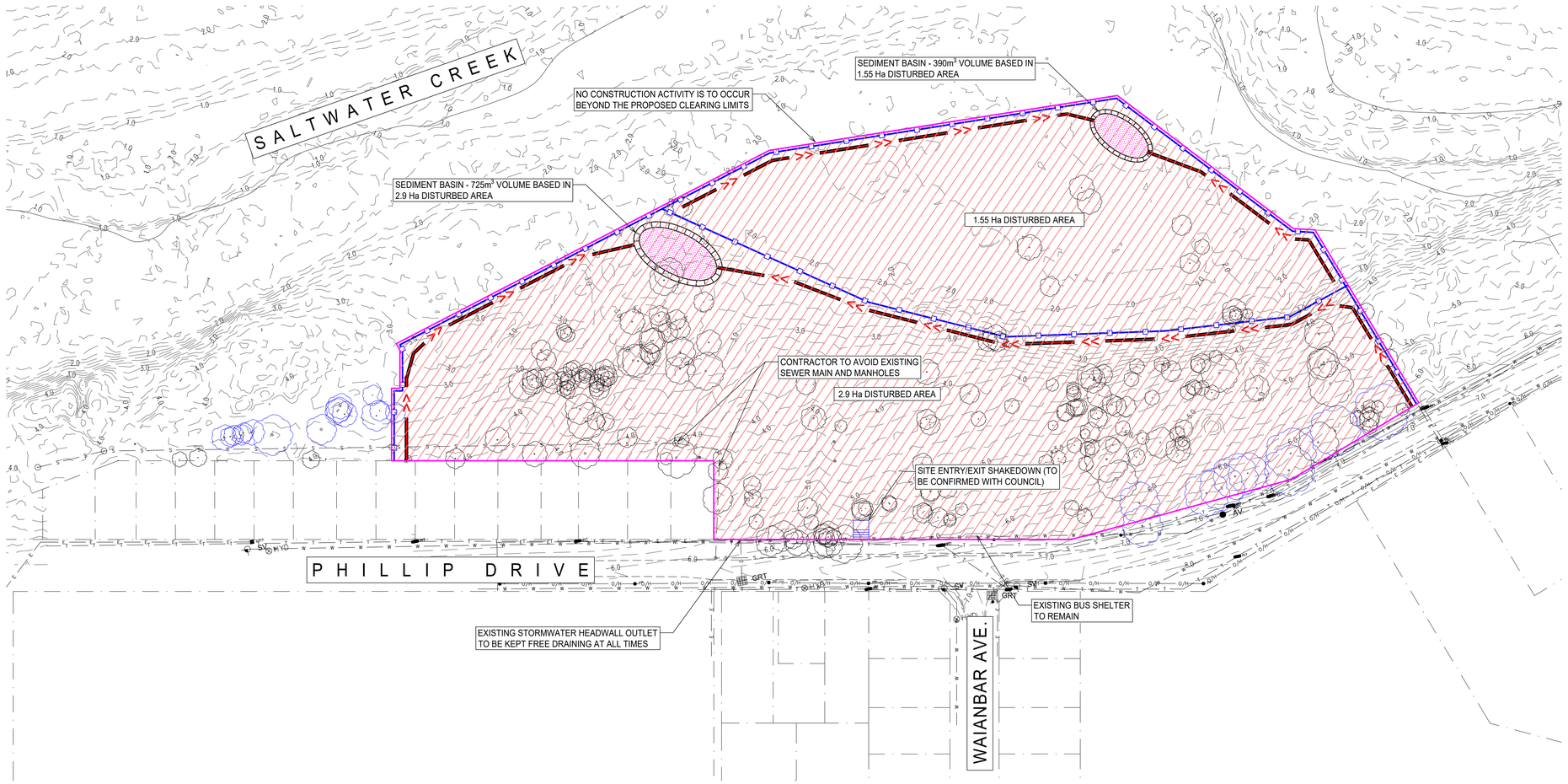

LEGEND

- PROPOSED CLEARING AREA
- EXISTING TREES TO REMAIN
- EXISTING TREES TO BE REMOVED
- PROPOSED SEDIMENT FENCE
- PROPOSED PERIMETER BANK
- PROPOSED SEDIMENT BASIN
- PROPOSED SITE ENTRY/EXIT
- EXISTING PROPERTY BOUNDARY
- EXISTING WATER
- EXISTING COMMS
- EXISTING OVERHEAD POWER
- EXISTING STORM DRAINAGE
- EXISTING SEWER
- EXISTING ELECTRICAL

FOR APPROVAL

Rev	Description	Eng	Draft	Date
A	ISSUE FOR APPROVAL	AA	AA	03.12.2021

Architect
RISE PROJECTS
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North

Project
SITE CLEARING WORKS
LOT 2 PHILLIP DRIVE, SOUTH WEST ROCKS

Sheet Subject
SITE CLEARING AND EROSION AND SEDIMENT CONTROL PLAN

Scale at A1	Drawn	Approved
1:1000	AA	SS
Job No	**Drawing No**	**Revision**
211107	C020	A