

Lidbury Summers & Whiteman

Geotechnical Site Classification Report

Summer Green, Stages 3 and 4

The Southern Parkway, Forster

Report No. RGS01898.1-AG

20 November 2023



RGS01898.1-AG

20 November 2023

Lidbury Summers & Whiteman
PO Box 510
FORSTER NSW 2428

Attention: Phillip Lidbury

Dear Phillip

**RE: Summer Green, Stages 3 and 4 – The Southern Parkway, Forster
Geotechnical Site Classification Report**

As requested, Regional Geotechnical Solutions Pty Ltd (RGS) has undertaken a site classification in accordance with AS2870-2011 *Residential Slabs and Footings* for the residential lots within Stages 3 and 4 of Summer Green residential subdivision at The Southern Parkway, Forster.

The report provided herein provides surface and subsurface conditions encountered at the site along with comments and recommendations on foundation conditions and site classification in accordance with Australian Standard AS2870-2011.

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

For and on behalf of

Regional Geotechnical Solutions Pty Ltd

Prepared by



Champak Nag

Senior Geotechnical Engineer

Reviewed by



Steve Morton

Principal Geotechnical Engineer



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1 INTRODUCTION

Regional Geotechnical Solutions Pty Ltd (RGS) has undertaken a site classification in accordance with AS2870-2011 *Residential Slabs and Footings* for the residential lots within Stages 3 and 4 of the Summer Green subdivision at The Southern Parkway, Forster.

Some of the lots within Stages 3 and 4 have been modified by regrading works comprising up to 1.9m of fill using site won materials. The filling was undertaken under Level 1 inspection and testing as defined in AS3798-2007 (Refer report RGS01898.1-AC dated 16 September 2019). The fill meets the requirements of Controlled Fill as defined in AS2870 -2011.

During the recent site earthworks for the project, minor additional filling (up to a maximum approximately 0.4m thickness) was placed on Lots 96 to 103 inclusive. This was placed under Level One Inspection and Testing as per AS3798. Test results are presented herein.

The purpose of the assessment was to provide comments and recommendations on the following:

- Site classification for lots within Stages 3 and 4 to AS2870-2011 *Residential Slabs and Footings*; and
- Comments on foundation conditions at the site, founding strata and allowable bearing pressures.

In providing this report and site classification it has been assumed that the performance expectations of AS2870-2011 are acceptable for the proposed structures within Stages 3 and 4.

2 METHODOLOGY

Field work for the assessment was undertaken on 29 August 2023 based on the supplied drawings and included:

- Observation of site features and surrounding features relevant to the geotechnical conditions of the site;
- Drilling of Eighteen (18) boreholes (BH300 to BH317) within the proposed Stages 3 and 4 development; and
- Collection of U50 tube samples from soil horizons considered representative of cohesive soil profiles for shrink-swell testing.

Boreholes were undertaken using a 4WD mounted drill rig.

Engineering logs of the boreholes are presented in Appendix A. The locations of the boreholes are shown on Figure 1. They were obtained on site by measurement relative to lot boundaries which were pegged at the time of investigation.



3 LABORATORY TESTING

Samples considered representative of foundation soils were submitted to a NATA accredited laboratory for the measurement of soil volume change over an extreme range of moisture content (shrink / swell index). Results are presented in Appendix B and summarised in Table 1.

Table 1: Laboratory Testing Summary

Location	Depth (m)	Lot	Material	Shrinkage (%)	Swell (%)	I _{ss} (%)
BH301	0.3 – 0.8	89/90	Residual – Clay	7.1	-0.0	3.9
BH303	0.5 – 1.0	85/86	Residual – Clay	5.6	-0.7	3.3
BH306	0.5 – 1.0	108/109	Residual – Clay	8.2	-0.6	4.7
BH308	0.8 – 1.3	105	Residual – Clay	2.7	-0.4	1.5
BH309	0.7 - 1.2	103/104	Fill - Clay	1.5	-0.5	0.8
BH310	0.6 – 1.1	101/102	Fill - Clay	5.8	-0.2	3.2
BH312	0.7 - 1.2	97/98	Residual – Clay	1.8	0.1	1.1

Laboratory testing on an extremely weathered siltstone from BH317 (1.0 – 1.5m) revealed a Liquid Limit of 40%, Plasticity Index of 14% and Linear Shrinkage of 7.0%. Published correlations (Jayasekera & Mohajerani, 2003) with the liquid limit and the plasticity index indicate that a shrink-swell index of around 2.5% is appropriate for extremely weathered siltstone.

4 SITE CONDITIONS

4.1 Surface Conditions

Stages 3 and 4 are situated on the south and southeast facing slopes of a generally northeast to southwest oriented section of gently sloping ridgeline within a region of gently to moderately undulating terrain.

There is a low lying area in the south of the site. Several lots within this area have been filled by approximately 1.9m of site won clay fill, placed and compacted as Controlled Fill (AS2870-2011) under Level One supervision and testing (AS3798-2007).



Further west and north west, in the central sloping area, lots 96 to 103 have been filled with up to 0.4m of additional site won clay placed in February 2023. The work additional fill was placed and compacted under Level One inspection and testing (ref AS3798-2007) undertaken by PBM Laboratories. Test results are presented in Appendix C of this report.

The site is well drained by runoff towards the drainage reserves to the east and southeast. Drainage of the site will be via a combination of overland flow to the lot and street drainage systems, and minor infiltration into residual clay soils and lot fill.

Typical site conditions of the Stage 3 and 4 area are shown in the photographs below.



View north from Lot 105, showing gentle slopes of 3° to 5° towards south and southeast.



View north west from Lot 105, showing gentle slopes of 3° to 5° towards south and southeast.



View north east from Lot 102 showing flat to gentle slopes on this area.



View south east from Lot 96 showing flat to gentle slopes on this area which has been regraded by placement of fill.

4.2 Subsurface Conditions

Reference to the NSW surface geology on Minview website indicates the subject Stages 3 and 4 development is underlain by the Devonian aged Bundook Beds comprising sandstone, siltstone,



conglomerate, and limestone. The lower lying south eastern side of the site is underlain by alluvial fan deposits comprising fluviially-deposited sand, silt, gravel and clay.

The materials encountered during the investigation are summarised in Table 2 and Table 3. Further details are presented on the attached engineering logs.

Table 2: Summary of Geotechnical Units

Unit	Material	Material Description
UNIT 1A	Landscaping FILL	Silty CLAY, low to medium plasticity, sand fine to medium grained, gravel fine grained
UNIT 1B	FILL – CLAY	CLAY, high plasticity, trace to some sand fine to medium grained, trace to some gravel fine to medium grained, stiff.
UNIT 2	TOPSOIL	Silty CLAY, low plasticity, trace sand and gravel fine to medium grained
UNIT 3	SLOPEWASH	Silty CLAY/CLAY, medium to high plasticity, with gravel fine grained, trace sand fine to medium grained
UNIT 4	ALLUVIAL	CLAY, medium to high plasticity, stiff, trace to some sand fine to medium grained, trace gravel fine grained.
UNIT 5	RESIDUAL	CLAY, high plasticity, stiff to very stiff, trace to some sand fine to medium grained, trace to some gravel fine to medium grained.
UNIT 6	EW SILTSTONE	CLAY, medium plasticity, stiff to very stiff, with sand fine to medium grained, with some gravel fine to medium grained.
UNIT 7	HW SILTSTONE	SILTSTONE, fractured, low to medium strength, highly weathered.



Table 3: Summary of Subsurface Materials

BH	Lot(s)	Depth of Material Layer (m)							
		Unit 1A Topsoil/Fill	Unit 1B Fill – Clay	Unit 2 Topsoil	Unit 3 Slope wash	Unit 4 Alluvial - Clay, St	Unit 5 Residual - Clay, St-VSt	Unit 6 EW Siltstone	Unit 7 HW Siltstone
BH300	91/92	0.0 – 0.25	--	--	--	--	0.25 – 0.6	0.6– ≥0.8*	--
BH301	89/90	0.0 – 0.2	--	--	--	--	0.2 – 1.0	1.0– ≥1.5	--
BH302	87/88	0.0 – 0.25	--	--	--	--	0.25– ≥1.5	--	--
BH303	85/86	0.0 – 0.2	--	--	--	--	0.2– ≥1.5	--	--
BH304	83/84	0.0 – 0.25	--	--	--	--	0.25– ≥1.5	--	--
BH305	82	0.0 – 0.25	--	--	--	--	0.25 – 0.7	0.7– ≥1.5^	--
BH306	108/109	0.0 – 0.3	--	--	--	--	0.3– ≥1.5	--	--
BH307	106/107	0.0 – 0.35	--	--	--	--	0.35– ≥1.5	--	--
BH308	105	--	0.0 – 0.8	--	--	--	0.8– ≥2.5	--	--
BH309	103/104	0.0 – 0.4	0.4 – 1.9	--	--	1.9– ≥2.5	--	--	--



BH	Lot(s)	Depth of Material Layer (m)							
		Unit 1A Topsoil/Fill	Unit 1B Fill – Clay	Unit 2 Topsoil	Unit 3 Slope wash	Unit 4 Alluvial - Clay, St	Unit 5 Residual - Clay, St-VSt	Unit 6 EW Siltstone	Unit 7 HW Siltstone
BH310	101/102	0.0 – 0.5	0.5 – 1.5	--	1.5 – 1.8	--	1.8– ≥2.3	--	--
BH311	99/100	0.0 – 0.5	0.5 – 1.7	--	1.7 – 1.9	--	1.9– ≥2.2	--	--
BH312	97/98	0.0 – 0.3	--	--	0.3 – 0.6	--	0.6– ≥1.5	--	--
BH313	95/96	0.0 – 0.2	--	--	--	--	0.2– ≥1.5	--	--
BH314	93/94	0.0 – 0.25	0.25 – 0.4	--	--	--	0.4 – 0.6	0.6– ≥1.5	--
BH315	80/81	0.0 – 0.2	--	--	--	--	0.2 – 0.7	--	--
BH316	78/79	--	--	0.0 – 0.25	--	--	0.25 – 0.5	--	0.5– ≥0.6*
BH317	77	0.0 – 0.2	--	--	0.2 – 0.4	--	--	0.4– ≥1.5	--

Note: ≥ Indicates that base of material layer was not encountered
 -- Indicates that the material was not encountered at the test location
 * Indicates auger bit refusal on rock
 ^ Indicates that highly weathered siltstone, low to medium strength was encountered from 0.9 to 1.2m

Groundwater was not encountered in the boreholes drilled. Groundwater levels fluctuate as a result of seasonal variations, temperature, rainfall and other similar factors, the influence of which may not have been apparent at the time of the assessment.



5 SITE CLASSIFICATION

The site classification presented herein is provided on the basis that the performance expectations of AS2870-2011 are acceptable. In assessing the estimated characteristic surface movement (y_s) values the following has been adopted:

- Suction change at ground surface of pf 1.2;
- Depth of suction change of 1.5m;
- Crack depth multiplication factor of 0.5;
- Characteristic I_{ss} of clay fill ranges from 0.8 to 3.2;
- Characteristic I_{ss} for residual clays between 1.1 and 4.7;
- Depth to extremely weathered rock varies from 0.4m to 1.0m on the northern higher side of Stages 3 and 4.

The site classifications and expected shrink-swell related characteristic free surface movements estimated for each lot are summarised in Table 4.

Table 4: Estimated Surface Movement Summary

Lots	Site Classification	Estimated Characteristics Surface Movement
77-82, 91-94	M	30 – 40 mm
83-90, 95-98, 106-109	H1	50 – 60 mm
99 - 105	H1*	50 – 60 mm

Note : * Based on the existing profiles encountered at the time of the field investigations the lots indicated in the bottom row of Table 4 are classified as **Class P** in accordance with AS2870-2011 due to the presence of Controlled Fill of >0.4m thickness. In accordance with Clause 2.5.3 Section C of AS2870-2011, as the filling comprises Controlled Fill that was placed under Level One supervision as defined by AS3798-2007, the lots are re-classified as outlined in Table 4.

Footings founded within controlled fill or stiff to very stiff alluvial and residual clay can be designed for an allowable bearing pressure of 100 kPa. Footings founded within weathered rock can be designed for an allowable bearing pressure of 400 kPa, provided the whole structure is founded within weathered rock.

Shrink-swell related movements can be affected by alterations to the soil profile by cutting and filling, and by the suction related effects of trees close to the building area. The effects of any such cutting, filling, tree planting, or tree removal should be taken into account when selecting design values for differential movement across the building.



If further site regrading works are undertaken at the site, reclassification may be required once final cut and fill depths and fill material types are known.

6 CONSTRUCTION AND SITE MAINTENANCE CONSIDERATIONS

All structural footings should be founded as follows:

- All footings should be founded in controlled fill, or in stiff or very stiff alluvial or residual clay soils below all topsoil, landscaping fill, slopewash and uncontrolled fill materials;
- Footings can be designed on the basis of a maximum allowable base bearing pressure of **100kPa** for footings founded within alluvial and residual soils of at least very stiff strength;
- All footings, edge beams and internal beams should be entirely founded on similar material and outside or below the zones of influence resulting from existing or future service trenches and other subsurface structures;
- Site drainage associated with the proposed development should be designed to avoid concentrated flows in the vicinity of any proposed cuttings and foundations and to discharge water downslope of the development in a controlled manner that limits erosion;
- Any foundations located within areas where tree removals or earthworks have previously been carried out or will occur in the future will need to be taken through the disturbed ground to be founded on the undisturbed natural ground beneath. All organic root material should be removed from within the building footprint; and
- Prior to the placement of concrete we recommend that footings be observed and assessed by a suitably experienced geotechnical engineer to assess that the correct founding material has been achieved.

Site maintenance must comply with the recommendations and advice provided in CSIRO Sheet BTF18 "*Foundation Maintenance and Footing Performance: A Homeowners Guide*" a copy of which is available from the CSIRO website <http://www.publish.csiro.au/pid/7076.htm>

7 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 writing. The estimate is influenced and limited by the fieldwork and testing method carried out in the site investigation, and other relevant information as has been made available. In cases where information has been provided to Regional Geotechnical Solutions for the purposes of preparing this report it has been assumed that the information is accurate and appropriate for such use. No responsibility is accepted by Regional Geotechnical Solutions for inaccuracies within any data supplied by others.

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

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

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

For and on behalf of

Regional Geotechnical Solutions Pty Ltd

Prepared by

Champak Nag

Senior Geotechnical Engineer

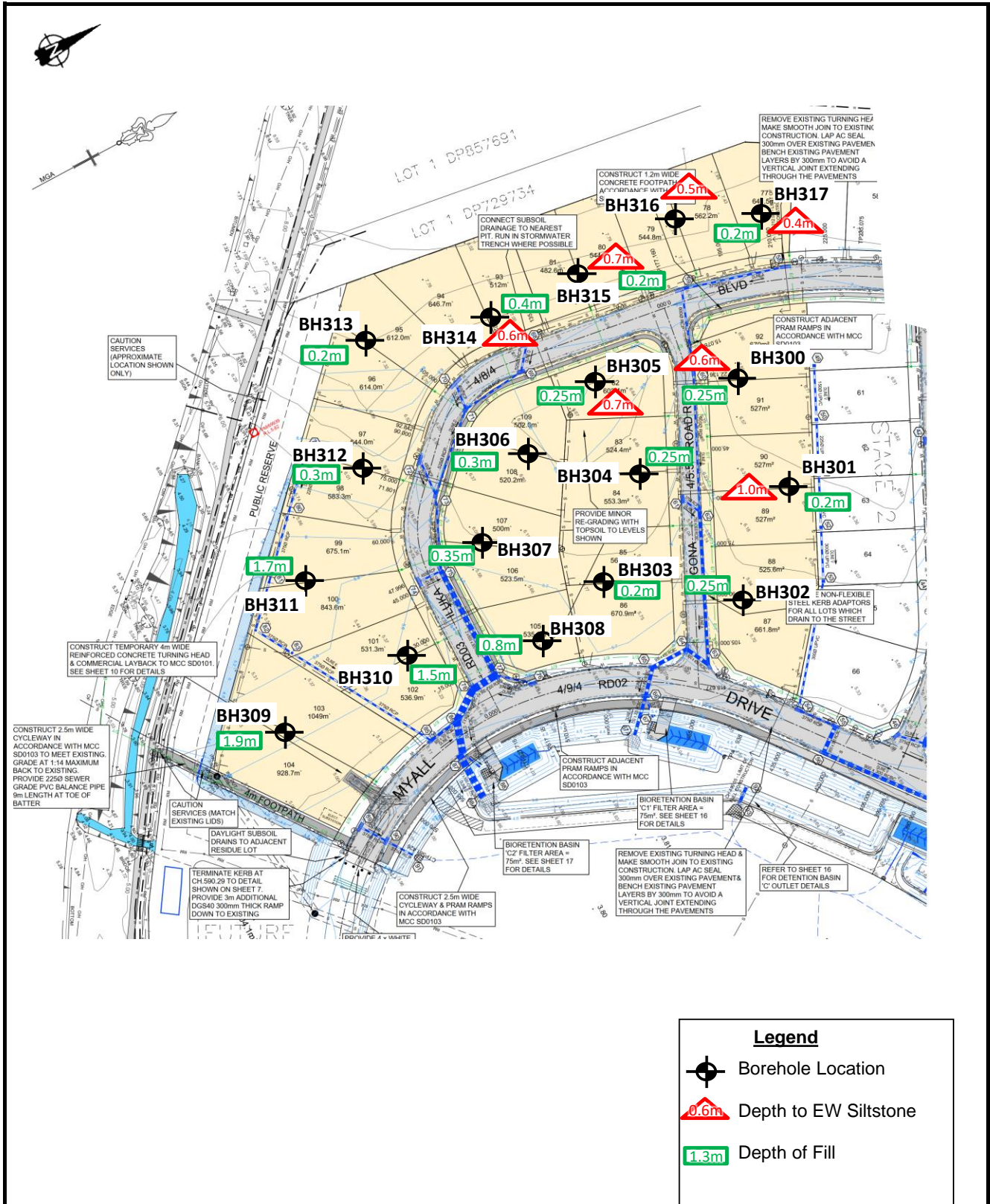
Reviewed by

Steve Morton

Principal Geotechnical Engineer



Figures



*Note: As per provided drawing titled " Road and Drainage Design for Summer Green Stages 3 and 4 Layout Plan Issue B dt 01/8/22"

	Client:	Lidbury, Summers & Whiteman	Job No.:	RGS01898.1-AG
	Project:	Summer Green Stages 3 and 4	Drawn By:	CN
		Southern Parkway Forster	Scale:	NTS
	Title:	Borehole Location Plan	Date:	29-Aug-23
			Drawing No.:	Figure 1



Appendix A

Results of Field Investigations



ENGINEERING LOG - BOREHOLE

BOREHOLE NO: **BH300**

CLIENT: LSW Surveyors
 PROJECT NAME: Summer Green Stages 3 & 4
 SITE LOCATION: Forster
 TEST LOCATION: Refer to Figure 1

PAGE: 1 of 1
 JOB NO: RGS01898.1
 LOGGED BY: RW
 DATE: 29/8/23

DRILL TYPE: RGS Ute Mounted Drill Rig EASTING: 455709 m SURFACE RL:
 BOREHOLE DIAMETER: 100 mm INCLINATION: 90° NORTHING: 6435432 m DATUM: AHD

Drilling and Sampling				Material description and profile information						Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
AD/T	Not Encountered			0.25		CL	FILL: Silty CLAY, low plasticity, dark brown, trace sand and gravel, fine to medium grained	M < w _p				FILL
						CH	CLAY: High plasticity, grey with orange and red mottling, trace sand and gravel, fine to medium grained	M > w _p	St	HP	100	RESIDUAL
										HP	130	
			0.60		SILTSTONE: Pale orange-brown/pale grey, dry, low to medium strength, highly fractured, highly weathered	D					SILTSTONE	
				0.80			Hole Terminated at 0.80 m Refusal on Rock					
				1.0								
				1.5								
				2.0								
				2.5								

LEGEND:

Water

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

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

U₅₀ 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)	Moisture Condition	
VS	Very Soft	<25	D	Dry
S	Soft	25 - 50	M	Moist
F	Firm	50 - 100	W	Wet
St	Stiff	100 - 200	W _p	Plastic Limit
VSt	Very Stiff	200 - 400	W _L	Liquid Limit
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%

RG 2.00.3.LIB.GLB_Log RG NON-CORED BOREHOLE - TEST P/T RGS01898.1 BH300 SERIES LOGS.GPJ <-DrawingFile> 25/9/2023 14:51 10.02.00.04 Datagel Lab and In Situ Tool - DGD Lib:RG 2.00.3 2022-03-03 Proj: RG 2.00.0.2021-06-30



ENGINEERING LOG - BOREHOLE

BOREHOLE NO: **BH301**

CLIENT: LSW Surveyors
 PROJECT NAME: Summer Green Stages 3 & 4
 SITE LOCATION: Forster
 TEST LOCATION: Refer to Figure 1

PAGE: 1 of 1
 JOB NO: RGS01898.1
 LOGGED BY: RW
 DATE: 29/8/23

DRILL TYPE: RGS Ute Mounted Drill Rig EASTING: 455749 m SURFACE RL:
 BOREHOLE DIAMETER: 100 mm INCLINATION: 90° NORTHING: 6435430 m DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations	
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type		Result
AD/T	Not Encountered	U		0.30m		CL	FILL: Silty CLAY, low plasticity, dark brown, trace sand and gravel, fine to medium grained	M < W _p				FILL
				0.80m		CH	CLAY: High plasticity, grey and red mottled, trace sand and gravel, fine to medium grained	M > W _p	VSt	HP 350	RESIDUAL	
										HP 350		
										HP 300		
				1.00m		CI	CLAY: Medium plasticity, orange/red with pale grey mottling, trace sand and gravel, fine to medium grained		St	HP 270	EXTREMELY WEATHERED SILTSTONE	
				1.50m			Hole Terminated at 1.50 m			HP 170		

RG 2.00.3.LIB.GLB.Log - RG NON-CORED BOREHOLE - TEST P/T - RGS01898.1 BH301 - DGD Lib - RG 2.00.3 2022-03-03 Proj - RG 2.00.0.2021-06-30
 <DrawingFile> 25/9/2023 14:51 10.02.00.04 Datagel Lab and In Situ Tool - DGD Lib - RG 2.00.3 2022-03-03 Proj - RG 2.00.0.2021-06-30

LEGEND: Water Water Level (Date and time shown) Water Inflow Water Outflow Strata Changes Gradational or transitional strata Definitive or distinct 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	Consistency 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	UCS (kPa) <25 25 - 50 50 - 100 100 - 200 200 - 400 >400	Moisture Condition D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit
	Field Tests PID Photoionisation detector reading (ppm) DCP(x-y) Dynamic penetrometer test (test depth interval shown) HP Hand Penetrometer test (UCS kPa)	Density V Very Loose L Loose MD Medium Dense D Dense VD Very Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%	



ENGINEERING LOG - BOREHOLE

BOREHOLE NO: **BH302**

CLIENT: LSW Surveyors
 PROJECT NAME: Summer Green Stages 3 & 4
 SITE LOCATION: Forster
 TEST LOCATION: Refer to Figure 1

PAGE: 1 of 1
 JOB NO: RGS01898.1
 LOGGED BY: RW
 DATE: 29/8/23

DRILL TYPE: RGS Ute Mounted Drill Rig EASTING: 455773 m SURFACE RL:
 BOREHOLE DIAMETER: 100 mm INCLINATION: 90° NORTHING: 6435404 m DATUM: AHD

Drilling and Sampling				Material description and profile information						Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
AD/T	Not Encountered			0.25		CL	FILL: Silty CLAY, low plasticity, dark brown, trace sand and gravel, fine to medium grained	M < w _p				FILL
						CH	CLAY: High plasticity, pale brown/grey with red mottling, trace sand and gravel, fine to medium grained	M > w _p	VSt	HP	300	RESIDUAL
										HP	300	
										HP	350	
CH	CLAY: High plasticity, grey and red mottled, trace sand and gravel, fine to medium grained			HP	250							
				1.50			Hole Terminated at 1.50 m					
				2.0								
				2.5								

RG 2.00.3.LIB.GLB.Log: RG NON-CORED BOREHOLE - TEST P/T: RGS01898.1 BH302 SERIES LOGS.GPJ <-DrawingFile> 25/9/2023 14:51:10.02.00.04 Datagel Lab and In Situ Tool - DGD Lib: RG 2.00.3 2022-03-03 Proj: RG 2.00.0.2021-06-30

LEGEND:

Water

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

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

U₅₀ 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)	Moisture Condition	
VS	Very Soft	<25	D	Dry
S	Soft	25 - 50	M	Moist
F	Firm	50 - 100	W	Wet
St	Stiff	100 - 200	W _p	Plastic Limit
VSt	Very Stiff	200 - 400	W _L	Liquid Limit
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%	



ENGINEERING LOG - BOREHOLE

BOREHOLE NO: **BH303**

CLIENT: LSW Surveyors
 PROJECT NAME: Summer Green Stages 3 & 4
 SITE LOCATION: Forster
 TEST LOCATION: Refer to Figure 1

PAGE: 1 of 1
 JOB NO: RGS01898.1
 LOGGED BY: RW
 DATE: 29/8/23

DRILL TYPE: RGS Ute Mounted Drill Rig EASTING: 455748 m SURFACE RL:
 BOREHOLE DIAMETER: 100 mm INCLINATION: 90° NORTHING: 6435365 m DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations		
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type		Result	
AD/T	Not Encountered	U		0.20m		CL	FILL: Silty CLAY, low plasticity, dark brown, with some sand and gravel, fine to medium grained	M < Wp				FILL	
				0.50m		CH	CLAY: High plasticity, grey and red mottled, trace sand and gravel, fine to medium grained	M > Wp	VSt		HP	350	RESIDUAL
				1.00m							HP	300	
				1.50m			Hole Terminated at 1.50 m						
				2.00m									
				2.50m									

RG 2.00.3.LIB.GLB.Log - RG NON-CORED BOREHOLE - TEST P/T - RGS01898.1 - BH303 - SERIES LOGS.GPJ - DrawingFile > 25/9/2023 14:51 - 10/02/00/04 - Datagel Lab and In Situ Tool - DGD.LIB.RG 2.00.3 2022-03-03 Proj: RG 2.00.0.2021-06-30

LEGEND:

Water

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

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₅₀ 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)	Moisture Condition	
VS	Very Soft	<25	D	Dry
S	Soft	25 - 50	M	Moist
F	Firm	50 - 100	W	Wet
St	Stiff	100 - 200	W _p	Plastic Limit
VSt	Very Stiff	200 - 400	W _L	Liquid Limit
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%	



ENGINEERING LOG - BOREHOLE

BOREHOLE NO: **BH304**

CLIENT: LSW Surveyors
 PROJECT NAME: Summer Green Stages 3 & 4
 SITE LOCATION: Forster
 TEST LOCATION: Refer to Figure 1

PAGE: 1 of 1
 JOB NO: RGS01898.1
 LOGGED BY: RW
 DATE: 29/8/23

DRILL TYPE: RGS Ute Mounted Drill Rig EASTING: 455721 m SURFACE RL:
 BOREHOLE DIAMETER: 100 mm INCLINATION: 90° NORTHING: 6435394 m DATUM: AHD

Drilling and Sampling				Material description and profile information						Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
AD/T	Not Encountered					CL	FILL: Silty CLAY, low plasticity, dark brown, with some sand and gravel, fine to medium grained	M < w _p				FILL
				0.5		CH	CLAY: High plasticity, grey and red mottled, trace sand and gravel, fine to medium grained	M > w _p	VSt	HP	250	RESIDUAL
				1.0						HP	200	
				1.5			Hole Terminated at 1.50 m			HP	200	
				2.0								
				2.5								

RG 2.00.3.LIB.GLB_Log RG NON-CORED BOREHOLE - TEST P/T RGS01898.1 BH000 SERIES LOGS.GPJ <-DrawingFile> 25/9/2023 14:51 10.02.00.04 Datagel Lab and In Situ Tool - DGD Lib.RG 2.00.3 2022-03-03 Proj RG 2.00.0.2021-06-30

LEGEND: Water Water Level (Date and time shown) Water Inflow Water Outflow Strata Changes Gradational or transitional strata Definitive or distinct 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	Consistency VS Very Soft S Soft F Firm St Stiff VSt Very Stiff H Hard Fb Friable	UCS (kPa) <25 25 - 50 50 - 100 100 - 200 200 - 400 >400	Moisture Condition D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit
	Field Tests PID Photoionisation detector reading (ppm) DCP(x-y) Dynamic penetrometer test (test depth interval shown) HP Hand Penetrometer test (UCS kPa)	Density V Very Loose L Loose MD Medium Dense D Dense VD Very Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%	



ENGINEERING LOG - BOREHOLE

BOREHOLE NO: **BH305**

CLIENT: LSW Surveyors
 PROJECT NAME: Summer Green Stages 3 & 4
 SITE LOCATION: Forster
 TEST LOCATION: Refer to Figure 1

PAGE: 1 of 1
 JOB NO: RGS01898.1
 LOGGED BY: RW
 DATE: 29/8/23

DRILL TYPE: RGS Ute Mounted Drill Rig EASTING: 455695 m SURFACE RL:
 BOREHOLE DIAMETER: 100 mm INCLINATION: 90° NORTHING: 6435402 m DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations	
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type		Result
AD/T	Not Encountered					CL	FILL: Silty CLAY, low plasticity, dark brown, with some sand and gravel, fine to medium grained	M < W _p				FILL
				0.25m		CH	CLAY: High plasticity, grey and red mottled, trace sand and gravel, fine to medium grained	M > W _p	St			RESIDUAL
				0.5		CH	CLAY: Medium to high plasticity, pale grey/pale brown with orange mottling, trace gravel, fine to medium grained			HP	120	
				0.70m		CH	CLAY: Medium to high plasticity, pale grey/pale brown with orange mottling, trace gravel, fine to medium grained			HP	150	EXTREMELY WEATHERED SILTSTONE
				0.90m			SILTSTONE: Pale grey/pale orange-brown, moist, low to medium strength, highly fractured, highly weathered	M	H			HIGHLY WEATHERED SILTSTONE
		1.0				CI	CLAY: Medium plasticity, pale grey, with some gravel, fine to medium grained	M > W _p	St - VSt	HP	200	EXTREMELY WEATHERED SILTSTONE
		1.20m										
		1.50m					Hole Terminated at 1.50 m					
				1.5								
				2.0								
				2.5								

RG 2.00.3.LIB.GLB_Log RG NON-CORED BOREHOLE - TEST P/T RGS01898.1 BH305 SERIES LOGS.GPJ <-DrawingFile> 25/9/2023 14:51 10.02.00.04 Datagel Lab and In Situ Tool - DGD Lib.RG 2.00.3 2022-03-03 Proj RG 2.00.0.2021-06-30

LEGEND: Water Water Level (Date and time shown) Water Inflow Water Outflow Strata Changes Gradational or transitional strata Definitive or distinct 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	Consistency 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	UCS (kPa) <25 25 - 50 50 - 100 100 - 200 200 - 400 >400	Moisture Condition D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit
	Field Tests PID Photoionisation detector reading (ppm) DCP(x-y) Dynamic penetrometer test (test depth interval shown) HP Hand Penetrometer test (UCS kPa)	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 - BOREHOLE

BOREHOLE NO: **BH306**

CLIENT: LSW Surveyors
 PROJECT NAME: Summer Green Stages 3 & 4
 SITE LOCATION: Forster
 TEST LOCATION: Refer to Figure 1

PAGE: 1 of 1
 JOB NO: RGS01898.1
 LOGGED BY: RW
 DATE: 29/8/23

DRILL TYPE: RGS Ute Mounted Drill Rig EASTING: 455705 m SURFACE RL:
 BOREHOLE DIAMETER: 100 mm INCLINATION: 90° NORTHING: 6435367 m DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations	
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type		Result
AD/T	Not Encountered	U		0.50m		CL	FILL: Silty CLAY, low plasticity, dark brown, with some sand and gravel, fine to medium grained	M < WP				FILL
						CH	CLAY: High plasticity, grey and red mottled, trace sand and gravel, fine to medium grained	M > WP	St - VSt	HP	250	RESIDUAL
										HP	150	
				1.00m						HP	150	
				1.50m			Hole Terminated at 1.50 m					
				2.0m								
				2.5m								

RG 2.00.3.LIB.GLB.Log - RG NON-CORED BOREHOLE - TEST P/T - RGS01898.1 BH306 SERIES LOGS.GPJ - DrawingFile > 25/9/2023 14:51 10.02.00.04 Datagel Lab and In Situ Tool - DGD Lib.RG 2.00.3 2022-03-03 Proj.RG 2.00.0.2021-06-30

LEGEND: Water Water Level (Date and time shown) Water Inflow Water Outflow Strata Changes Gradational or transitional strata Definitive or distinct 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	Consistency 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	UCS (kPa) <25 25 - 50 50 - 100 100 - 200 200 - 400 >400	Moisture Condition D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit
	Field Tests PID Photoionisation detector reading (ppm) DCP(x-y) Dynamic penetrometer test (test depth interval shown) HP Hand Penetrometer test (UCS kPa)	Density V Very Loose L Loose MD Medium Dense D Dense VD Very Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%	



ENGINEERING LOG - BOREHOLE

BOREHOLE NO: **BH307**

CLIENT: LSW Surveyors
 PROJECT NAME: Summer Green Stages 3 & 4
 SITE LOCATION: Forster
 TEST LOCATION: Refer to Figure 1

PAGE: 1 of 1
 JOB NO: RGS01898.1
 LOGGED BY: RW
 DATE: 29/8/23

DRILL TYPE: RGS Ute Mounted Drill Rig EASTING: 455721 m SURFACE RL:
 BOREHOLE DIAMETER: 100 mm INCLINATION: 90° NORTHING: 6435341 m DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations	
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type		Result
AD/T	Not Encountered			0.35m		CL	FILL: Silty CLAY, low plasticity, dark brown, with some sand and gravel, fine to medium grained	M < W _p				FILL
						CH	CLAY: High plasticity, grey and red mottled, trace sand and gravel, fine to medium grained	M > W _p	St - VSt	HP	220	RESIDUAL
				1.0m						HP	250	
				1.50m			Hole Terminated at 1.50 m			HP	220	
				2.0m								
				2.5m								

RG 2.00.3.LIB.GLB.Log - RG NON-CORED BOREHOLE - TEST P/T - RGS01898.1 BH307 - DGD Lib - RG 2.00.3 2022-03-03 P/T - RG 2.00.0.2021-06-30
 RG 2.00.3.LIB.GLB.Log - RG NON-CORED BOREHOLE - TEST P/T - RGS01898.1 BH307 SERIES LOGS.GPJ - DrawingFile - 25/9/2023 14:51 10.02.00.04 Datagel Lab and In Situ Tool - DGD Lib - RG 2.00.3 2022-03-03 P/T - RG 2.00.0.2021-06-30

LEGEND: Water Water Level (Date and time shown) Water Inflow Water Outflow Strata Changes Gradational or transitional strata Definitive or distinct 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	Consistency 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	UCS (kPa) <25 25 - 50 50 - 100 100 - 200 200 - 400 >400	Moisture Condition D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit
	Field Tests PID Photoionisation detector reading (ppm) DCP(x-y) Dynamic penetrometer test (test depth interval shown) HP Hand Penetrometer test (UCS kPa)	Density V Very Loose L Loose MD Medium Dense D Dense VD Very Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%	



ENGINEERING LOG - BOREHOLE

BOREHOLE NO: **BH308**

CLIENT: LSW Surveyors
 PROJECT NAME: Summer Green Stages 3 & 4
 SITE LOCATION: Forster
 TEST LOCATION: Refer to Figure 1

PAGE: 1 of 1
 JOB NO: RGS01898.1
 LOGGED BY: RW
 DATE: 29/8/23

DRILL TYPE: RGS Ute Mounted Drill Rig EASTING: 455750 m SURFACE RL:
 BOREHOLE DIAMETER: 100 mm INCLINATION: 90° NORTHING: 6435342 m DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations	
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type		Result
AD/T	Not Encountered	U		0.5		CL	FILL: Silty CLAY, low plasticity, dark brown, with some sand and gravel, fine to medium grained	M < Wp				FILL
				0.60m		CH	FILL: CLAY, medium to high plasticity, brown/pale orange-brown/grey, trace to some gravel, fine to medium grained, trace sand, fine to medium grained	M > Wp	VSt	HP	280	RESIDUAL
				0.80m		CH	CLAY: High plasticity, red, trace to some gravel, fine to medium grained, trace sand, fine to medium grained		VSt - H	HP	390	
				1.0					HP	380		
				1.30m						HP	450	
				2.0						HP	450	
				2.5			Hole Terminated at 2.50 m					

RG 2.00.3.LIB.GLB.Log - RG NON-CORED BOREHOLE - TEST P/T - RGS01898.1 BH308 SERIES LOGS.GPJ - DrawingFile - <DrawingFile> 25/9/2023 14:51 10.02.00.04 Datagel Lab and In Situ Tool - DGD Lib:RG 2.00.3 2022-03-03 Proj: RG 2.00.0.2021-06-30

LEGEND: Water Water Level (Date and time shown) Water Inflow Water Outflow Strata Changes Gradational or transitional strata Definitive or distinct 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	Consistency 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	UCS (kPa) <25 25 - 50 50 - 100 100 - 200 200 - 400 >400	Moisture Condition D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit
	Field Tests PID Photoionisation detector reading (ppm) DCP(x-y) Dynamic penetrometer test (test depth interval shown) HP Hand Penetrometer test (UCS kPa)	Density V Very Loose L Loose MD Medium Dense D Dense VD Very Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%	



ENGINEERING LOG - BOREHOLE

BOREHOLE NO: **BH309**

CLIENT: LSW Surveyors
 PROJECT NAME: Summer Green Stages 3 & 4
 SITE LOCATION: Forster
 TEST LOCATION: Refer to Figure 1

PAGE: 1 of 1
 JOB NO: RGS01898.1
 LOGGED BY: RW
 DATE: 29/8/23

DRILL TYPE: RGS Ute Mounted Drill Rig EASTING: 455733 m SURFACE RL:
 BOREHOLE DIAMETER: 100 mm INCLINATION: 90° NORTHING: 6435258 m DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations			
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type		Result		
AD/T	Not Encountered	U		0.70m		CL	FILL: Silty CLAY, low plasticity, brown/dark brown, with some sand and gravel, fine to coarse grained	M < W _p				FILL		
						CH	FILL: CLAY, medium to high plasticity, brown/dark brown/grey, with some gravel, fine to coarse grained, trace sand, fine to coarse grained	M > W _p	St	HP	180			
											HP	200		
												HP	150	
												HP	110	
												HP	180	
				1.20m		CL	Silty CLAY: Low to medium plasticity, brown/dark grey, trace to some sand, fine to medium grained					ALLUVIUM		
				2.10m		CH	CLAY: High plasticity, dark grey, trace of sand, fine to coarse grained		St	HP	110	ALLUVIUM		
				2.50m			Hole Terminated at 2.50 m			HP	150			

RG 2.00.3.LIB.GLB.Log - RG NON-CORED BOREHOLE - TEST P/T - RGS01898.1 - BH309 - SERIES LOGS.GPJ - <DrawingFile> 25/9/2023 14:51:10.02.00.04 - Dated Lab and In Situ Test - DGD Lib - RG 2.00.3.2022-03-03 Proj - RG 2.00.0.2021-06-30

LEGEND: Water Water Level (Date and time shown) Water Inflow Water Outflow Strata Changes Gradational or transitional strata Definitive or distinct 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	Consistency VS Very Soft S Soft F Firm St Stiff VSt Very Stiff H Hard Fb Friable	UCS (kPa) <25 25 - 50 50 - 100 100 - 200 200 - 400 >400	Moisture Condition D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit
	Field Tests PID Photoionisation detector reading (ppm) DCP(x-y) Dynamic penetrometer test (test depth interval shown) HP Hand Penetrometer test (UCS kPa)	Density V Very Loose L Loose MD Medium Dense D Dense VD Very Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%	



ENGINEERING LOG - BOREHOLE

BOREHOLE NO: **BH310**

CLIENT: LSW Surveyors
 PROJECT NAME: Summer Green Stages 3 & 4
 SITE LOCATION: Forster
 TEST LOCATION: Refer to Figure 1

PAGE: 1 of 1
 JOB NO: RGS01898.1
 LOGGED BY: RW
 DATE: 29/8/23

DRILL TYPE: RGS Ute Mounted Drill Rig EASTING: 455738 m SURFACE RL:
 BOREHOLE DIAMETER: 100 mm INCLINATION: 90° NORTHING: 6435306 m DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations			
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type		Result		
AD/T	Not Encountered	U		0.5		CL	FILL: Silty CLAY, low to medium plasticity, dark brown/brown, trace of sand and gravel, fine to medium grained	M < w _p				FILL		
				0.60m		0.50m	CH	FILL: CLAY, medium to high plasticity, pale brown/red/dark brown, trace of sand and gravel, fine to medium grained	M > w _p		HP	150		
				1.10m		1.0					HP	170		
						1.50m	CH	Gravelly CLAY: Medium to high plasticity, red-brown/brown, grey mottling, gravel, fine to medium grained, trace of sand, fine to coarse grained	M > w _p	St	HP	110		SLOPEWASH
						1.80m	CH	CLAY: High plasticity, red with grey mottling, trace to some gravel, fine to medium grained, trace of sand, fine to medium grained			HP	120		
				2.0						HP	180		RESIDUAL	
				2.30m			Hole Terminated at 2.30 m			HP	180			

LEGEND:

Water

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

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₅₀ 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)	Moisture Condition
VS Very Soft	<25	D Dry
S Soft	25 - 50	M Moist
F Firm	50 - 100	W Wet
St Stiff	100 - 200	W _p Plastic Limit
VSt Very Stiff	200 - 400	W _L Liquid Limit
H Hard	>400	
Fb Friable		
Density	V Very Loose	Density Index <15%
L Loose	MD Medium Dense	Density Index 15 - 35%
D Dense	D Dense	Density Index 35 - 65%
VD Very Dense	D Dense	Density Index 65 - 85%
		Density Index 85 - 100%

RG 2.00.3.LIB.GLB.Log RG NON-CORED BOREHOLE - TEST PLOT RGS01898.1 BH310 SERIES LOGS.GPJ <-DrawingFile> 25/9/2023 14:52 10.02.00.04 Datagel Lab and In Situ Tool - DGD Lib.RG 2.00.3 2022-03-03 Proj RG 2.00.0.2021-06-30



ENGINEERING LOG - BOREHOLE

BOREHOLE NO: **BH312**

CLIENT: LSW Surveyors
 PROJECT NAME: Summer Green Stages 3 & 4
 SITE LOCATION: Forster
 TEST LOCATION: Refer to Figure 1

PAGE: 1 of 1
 JOB NO: RGS01898.1
 LOGGED BY: RW
 DATE: 29/8/23

DRILL TYPE: RGS Ute Mounted Drill Rig EASTING: 455682 m SURFACE RL:
 BOREHOLE DIAMETER: 100 mm INCLINATION: 90° NORTHING: 6435324 m DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations	
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type		Result
AD/T	Not Encountered	U		0.70m		CL	FILL: Silty CLAY, low plasticity, dark brown, trace of sand and gravel, fine to medium grained	M < WP				FILL
						CH	CLAY: Medium to high plasticity, brown/dark brown/red, with some gravel, fine to medium grained, trace sand, fine to medium grained	M > WP	VSt	HP 350	SLOPEWASH	
						CH	CLAY: High plasticity, red with pale brown and grey mottling, trace of sand and gravel, fine to medium grained			HP 370	RESIDUAL	
									HP 380			
		1.20m		1.50m			Hole Terminated at 1.50 m					

RG 2.00.3.LIB.GLB_Log RG NON-CORED BOREHOLE - TEST P/T RGS01898.1 BH000 SERIES LOGS.GPJ <-DrawingFile> 25/9/2023 14:52 10.02.00.04 Datagel Lab and In Situ Tool - DGD Lib.RG 2.00.3 2022-03-03 Proj.RG 2.00.0.2021-06-30

LEGEND: Water Water Level (Date and time shown) Water Inflow Water Outflow Strata Changes Gradational or transitional strata Definitive or distinct 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	Consistency 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	UCS (kPa) <25 25 - 50 50 - 100 100 - 200 200 - 400 >400	Moisture Condition D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit
	Field Tests PID Photoionisation detector reading (ppm) DCP(x-y) Dynamic penetrometer test (test depth interval shown) HP Hand Penetrometer test (UCS kPa)	Density V Very Loose L Loose MD Medium Dense D Dense VD Very Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%	



ENGINEERING LOG - BOREHOLE

BOREHOLE NO: **BH313**

CLIENT: LSW Surveyors
 PROJECT NAME: Summer Green Stages 3 & 4
 SITE LOCATION: Forster
 TEST LOCATION: Refer to Figure 1

PAGE: 1 of 1
 JOB NO: RGS01898.1
 LOGGED BY: RW
 DATE: 29/8/23

DRILL TYPE: RGS Ute Mounted Drill Rig EASTING: 455649 m SURFACE RL:
 BOREHOLE DIAMETER: 100 mm INCLINATION: 90° NORTHING: 6435338 m DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations				
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type		Result			
AD/T	Not Encountered			0.20m		CL	FILL: Silty CLAY, low plasticity, dark brown/brown, trace of sand and gravel, fine to medium grained	M < Wp				FILL			
						CH	CLAY: High plasticity, grey with pale brown mottling, trace of sand and gravel, fine to medium grained	M > Wp	St	HP	150	RESIDUAL			
										CH	CLAY: High plasticity, grey with red mottling, trace of sand and gravel, fine to medium grained		VSt	HP	250
														HP	300
HP	220														
				1.50m			Hole Terminated at 1.50 m								

RG 2.00.3.LIB.GLB_Log RG NON-CORED BOREHOLE - TEST P/T RGS01898.1 BH000 SERIES LOGS.GPJ <-DrawingFile> 25/9/2023 14:52 10.02.00.04 Datagel Lab and In Situ Tool - DGD Lib.RG 2.00.3 2022-03-03 Proj RG 2.00.0.2021-06-30

LEGEND:

Water

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

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

U₅₀ 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)	Moisture Condition	
VS	Very Soft	<25	D	Dry
S	Soft	25 - 50	M	Moist
F	Firm	50 - 100	W	Wet
St	Stiff	100 - 200	W _p	Plastic Limit
VSt	Very Stiff	200 - 400	W _L	Liquid Limit
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%	



ENGINEERING LOG - BOREHOLE

BOREHOLE NO: **BH314**

CLIENT: LSW Surveyors
 PROJECT NAME: Summer Green Stages 3 & 4
 SITE LOCATION: Forster
 TEST LOCATION: Refer to Figure 1

PAGE: 1 of 1
 JOB NO: RGS01898.1
 LOGGED BY: RW
 DATE: 29/8/23

DRILL TYPE: RGS Ute Mounted Drill Rig EASTING: 455658 m SURFACE RL:
 BOREHOLE DIAMETER: 100 mm INCLINATION: 90° NORTHING: 6435377 m DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations	
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type		Result
AD/T	Not Encountered			0.5		CI	FILL: Gravelly CLAY, medium plasticity, pale orange-brown/pale grey, gravel, fine to coarse grained, trace of sand, fine to coarse grained	M < W _p	H			FILL
						CL	FILL: Silty CLAY, low to medium plasticity, brown/pale brown/dark brown, trace of sand and gravel, fine to medium grained	M > W _p	St	HP	100	RESIDUAL
						CH	CLAY: High plasticity, grey and red mottled, trace of sand and gravel, fine to medium grained	M < W _p	H / Fr	HP	120	
						CI	CLAY: Medium plasticity, grey/pale grey/pale orange, trace of sand and gravel, fine to medium grained			HP	200	EXTREMELY WEATHERED SILTSTONE
				1.5			Hole Terminated at 1.50 m					
				2.0								
				2.5								

RG 2.00.3.LIB.GLB.Log - RG NON-CORED BOREHOLE - TEST PLOT - RGS01898.1 - BH000 - SERIES LOGS.GPJ - DrawingFile > 25/9/2023 14:52 - 10.02.00.04 - Datagel Lab and In Situ Tool - DGD Lib - RG 2.00.3 2022-03-03 Proj - RG 2.00.0.2021-06-30

LEGEND:

Water

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

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

U₅₀ 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)	Moisture Condition
VS Very Soft	<25	D Dry
S Soft	25 - 50	M Moist
F Firm	50 - 100	W Wet
St Stiff	100 - 200	W _p Plastic Limit
VSt Very Stiff	200 - 400	W _L Liquid Limit
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%



ENGINEERING LOG - BOREHOLE

BOREHOLE NO: **BH315**

CLIENT: LSW Surveyors
 PROJECT NAME: Summer Green Stages 3 & 4
 SITE LOCATION: Forster
 TEST LOCATION: Refer to Figure 1

PAGE: 1 of 1
 JOB NO: RGS01898.1
 LOGGED BY: RW
 DATE: 29/8/23

DRILL TYPE: RGS Ute Mounted Drill Rig EASTING: 455654 m SURFACE RL:
 BOREHOLE DIAMETER: 100 mm INCLINATION: 90° NORTHING: 6435415 m DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations			
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type		Result		
AD/T	Not Encountered			0.20m		CL	FILL: Silty CLAY, low plasticity, dark brown, trace of sand and gravel, fine to medium grained	M > w _p				FILL		
						CH	CLAY: High plasticity, grey/pale brown with red mottling, trace of sand and gravel, fine to medium grained					St - VSt	HP 180	RESIDUAL
						CI	CLAY: Medium plasticity, pale grey/grey, pale orange-brown mottling, trace to some gravel, fine to coarse grained					VSt	HP 200	EXTREMELY WEATHERED SILTSTONE
					HP 350									
				1.50m			Hole Terminated at 1.50 m							
				2.0										
				2.5										

RG 2.00.3.LIB.GLB.Log: RG NON-CORED BOREHOLE - TEST P/T: RGS01898.1 BH000 SERIES LOGS.GPJ <-DrawingFile> 25/9/2023 14:52 10.02.00.04 Dargal Lab and In Situ Tool - DGD Lib: RG 2.00.3 2022-03-03 Proj: RG 2.00.0.2021-06-30

LEGEND:

Water

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

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₅₀ 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)	Moisture Condition	
VS	Very Soft	<25	D	Dry
S	Soft	25 - 50	M	Moist
F	Firm	50 - 100	W	Wet
St	Stiff	100 - 200	W _p	Plastic Limit
VSt	Very Stiff	200 - 400	W _L	Liquid Limit
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%	



ENGINEERING LOG - BOREHOLE

BOREHOLE NO: **BH316**

CLIENT: LSW Surveyors
 PROJECT NAME: Summer Green Stages 3 & 4
 SITE LOCATION: Forster
 TEST LOCATION: Refer to Figure 1

PAGE: 1 of 1
 JOB NO: RGS01898.1
 LOGGED BY: RW
 DATE: 29/8/23

DRILL TYPE: RGS Ute Mounted Drill Rig EASTING: 455659 m SURFACE RL:
 BOREHOLE DIAMETER: 100 mm INCLINATION: 90° NORTHING: 6435445 m DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations	
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type		Result
AD/T	Not Encountered					CL	TOPSOIL: Silty CLAY, low plasticity, brown/dark brown, trace of sand and gravel, fine to medium grained	M < WP				TOPSOIL
				0.25m		CI	CLAY: Medium plasticity, pale grey, pale orange-brown mottling, trace gravel, fine to medium grained		VSt	HP	250	RESIDUAL
				0.50m			SILTSTONE: Grey/pale grey, dry, medium strength, fractured, highly weathered					HIGHLY WEATHERED SILTSTONE
				0.60m			Hole Terminated at 0.60 m Refusal on Rock					
				1.0								
				1.5								
				2.0								
				2.5								

RG 2.00.3.LIB.GLB.Log - RG NON-CORED BOREHOLE - TEST PLOT - RGS01898.1 - BH000 - SERIES LOGS.GPJ - <DrawingFile> 25/9/2023 14:52 - 10/02/00/04 - Datagel Lab and In Situ Tool - DGD Lib: RG 2.00.3 2022-03-03 Proj: RG 2.00.0 2021-06-30

LEGEND: Water Water Level (Date and time shown) Water Inflow Water Outflow Strata Changes Gradational or transitional strata Definitive or distinct 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	Consistency 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	UCS (kPa) <25 25 - 50 50 - 100 100 - 200 200 - 400 >400	Moisture Condition D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit
	Field Tests PID Photoionisation detector reading (ppm) DCP(x-y) Dynamic penetrometer test (test depth interval shown) HP Hand Penetrometer test (UCS kPa)	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 - BOREHOLE

BOREHOLE NO: **BH317**

CLIENT: LSW Surveyors
 PROJECT NAME: Summer Green Stages 3 & 4
 SITE LOCATION: Forster
 TEST LOCATION: Refer to Figure 1

PAGE: 1 of 1
 JOB NO: RGS01898.1
 LOGGED BY: RW
 DATE: 29/8/23

DRILL TYPE: RGS Ute Mounted Drill Rig EASTING: 455671 m SURFACE RL:
 BOREHOLE DIAMETER: 100 mm INCLINATION: 90° NORTHING: 6435468 m DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations		
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type		Result	
AD/T	Not Encountered	D		0.5		CL	FILL: Silty CLAY, low plasticity, dark brown, with some gravel, trace of sand, fine to medium grained	M < WP				FILL	
						CL	Silty CLAY: Low plasticity, dark brown, trace to some gravel, fine to medium grained, trace sand, fine to medium grained					SLOPEWASH	
						CI	CLAY: Medium plasticity, pale orange/pale grey, with some gravel, fine to medium grained, trace sand, fine to medium grained					VS	HP 250
				1.0									
				1.5			Hole Terminated at 1.50 m						
				2.0									
				2.5									

RG 2.00.3.LIB.GLB.Log - RG NON-CORED BOREHOLE - TEST P/T - RGS01898.1 - BH000 - SERIES LOGS.GPJ - DrawingFile - 25/9/2023 14:52 - 10.02.00.04 - Datagel Lab and In Situ Tool - DGD - Lib - RG 2.00.3 2022-03-03 Proj - RG 2.00.0 2021-06-30

LEGEND:

Water

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

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

U₅₀ 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)	Moisture Condition	
VS	Very Soft	<25	D	Dry
S	Soft	25 - 50	M	Moist
F	Firm	50 - 100	W	Wet
St	Stiff	100 - 200	W _p	Plastic Limit
VSt	Very Stiff	200 - 400	W _L	Liquid Limit
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%	



Appendix B

Laboratory Test Result Sheets


Report No: SSI:NEW23W-4675-S01

Issue No: 1

Shrink Swell Index Report

Client: Regional Geotechnical Solutions Pty Ltd
 44 Bent Street
 Wingham NSW 2429

Project No.: MNC16P-0001
Project Name: Various Testing
Project Location: The Southern Parkway, Forster, NSW



Accredited for compliance with ISO/IEC 17025 - Testing.
 Results provided relate only to the items tested or sampled.
 This report shall not be reproduced except in full.

B. Cullen
 Approved Signatory: Brent Cullen
 (Engineering Geologist)
 NATA Accredited Laboratory Number: 18686
 Date of Issue: 12/09/2023

Sample Details

Sample ID: NEW23W-4675-S01 **Test Request No.:** RGS01898.1

Sampling Method: The results outlined below apply to the sample as received

Material: Clay **Date Sampled:** 31/08/2023

Source: On-Site Insitu **Date Submitted:** 4/09/2023

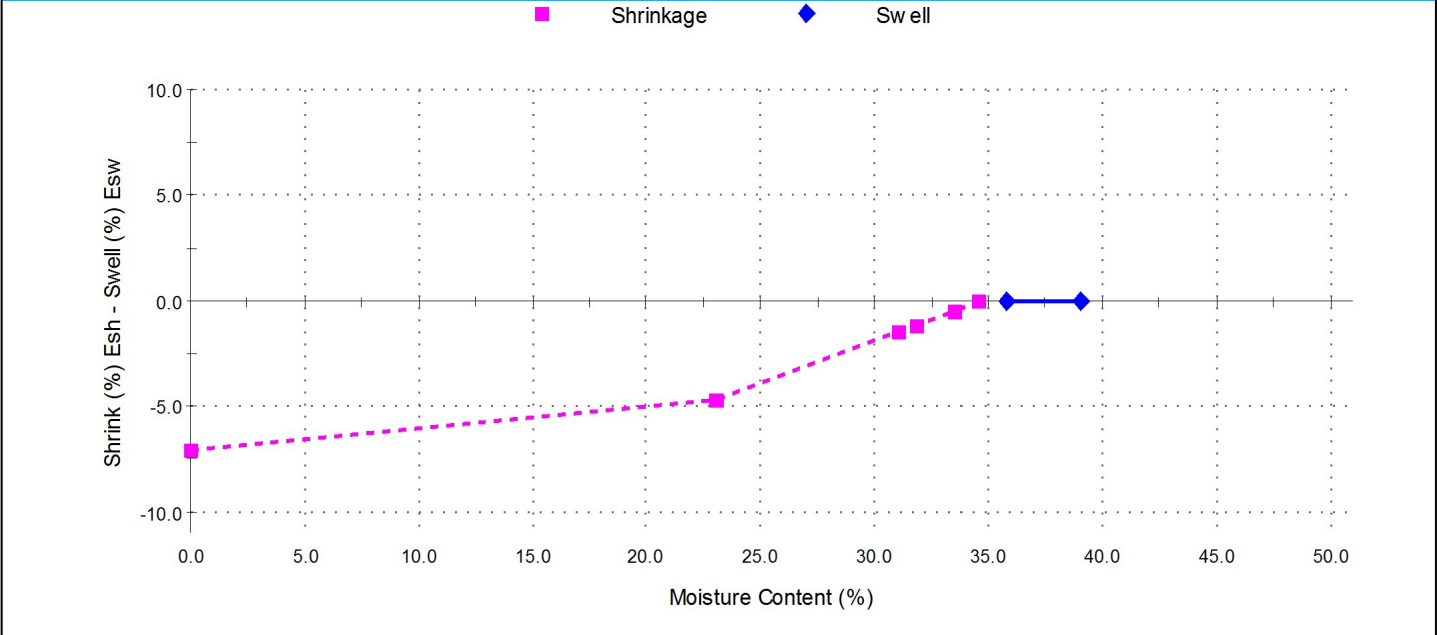
Specification: No Specification

Sample Location: BH301 - (0.3 - 0.8m)

Date Tested: 7/09/2023

Swell Test AS 1289.7.1.1		Shrink Test AS 1289.7.1.1	
Swell on Saturation (%):	0.0	Shrink on drying (%):	7.1
Moisture Content before (%):	35.8	Shrinkage Moisture Content (%):	34.5
Moisture Content after (%):	39.1	Est. inert material (%):	1%
Est. Unc. Comp. Strength before (kPa):	470	Crumbling during shrinkage:	Nil
Est. Unc. Comp. Strength after (kPa):	420	Cracking during shrinkage:	Nil

Shrink Swell



Shrink Swell Index - Iss (%): 3.9

Comments


Report No: SSI:NEW23W-4675-S02

Issue No: 1

Shrink Swell Index Report

Client: Regional Geotechnical Solutions Pty Ltd
 44 Bent Street
 Wingham NSW 2429

Project No.: MNC16P-0001
Project Name: Various Testing
Project Location: The Southern Parkway, Forster, NSW



Accredited for compliance with ISO/IEC 17025 - Testing.
 Results provided relate only to the items tested or sampled.
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B. Cullen
 Approved Signatory: Brent Cullen
 (Engineering Geologist)
 NATA Accredited Laboratory Number: 18686
 Date of Issue: 12/09/2023

Sample Details

Sample ID: NEW23W-4675-S02 **Test Request No.:** RGS01898.1

Sampling Method: The results outlined below apply to the sample as received

Material: Clay **Date Sampled:** 31/08/2023

Source: On-Site Insitu **Date Submitted:** 4/09/2023

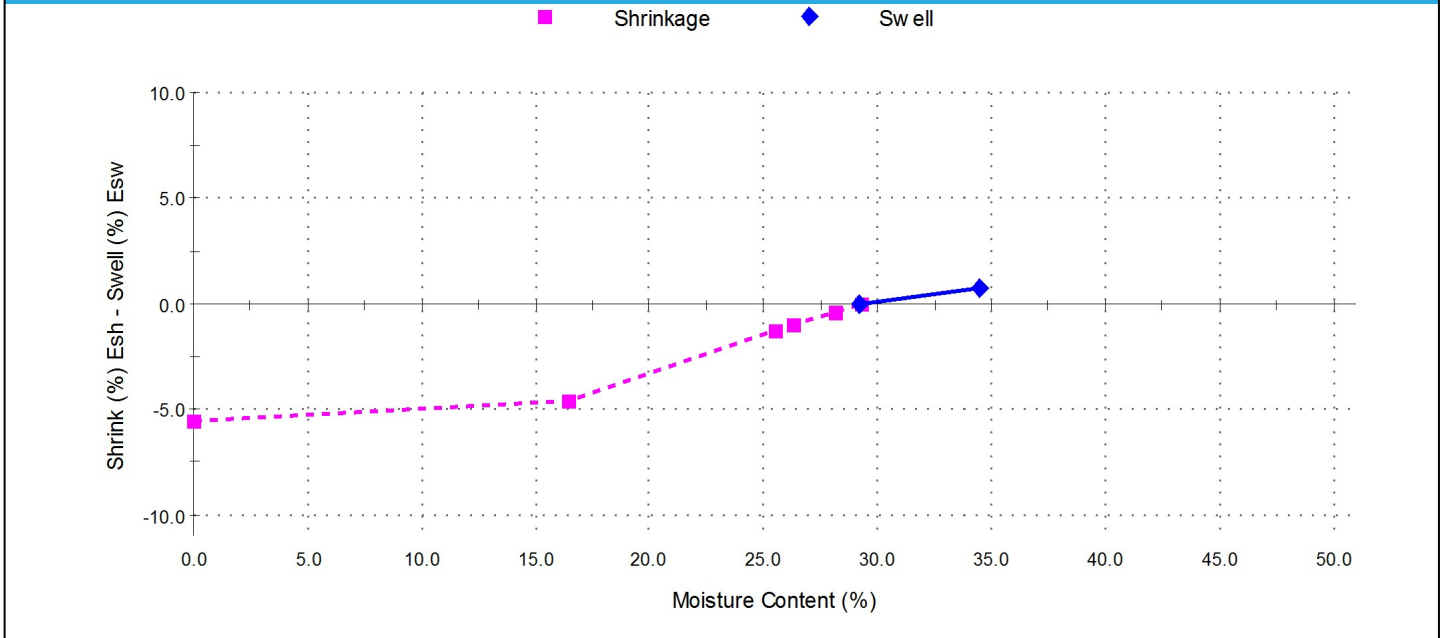
Specification: No Specification

Sample Location: BH303 - (0.5 - 1.0m)

Date Tested: 7/09/2023

Swell Test AS 1289.7.1.1		Shrink Test AS 1289.7.1.1	
Swell on Saturation (%):	0.7	Shrink on drying (%):	5.6
Moisture Content before (%):	29.2	Shrinkage Moisture Content (%):	29.3
Moisture Content after (%):	34.4	Est. inert material (%):	1%
Est. Unc. Comp. Strength before (kPa):	470	Crumbling during shrinkage:	Nil
Est. Unc. Comp. Strength after (kPa):	400	Cracking during shrinkage:	Minor

Shrink Swell



Shrink Swell Index - Iss (%): 3.3

Comments


Report No: SSI:NEW23W-4675-S03

Issue No: 1

Shrink Swell Index Report

Client: Regional Geotechnical Solutions Pty Ltd
 44 Bent Street
 Wingham NSW 2429

Project No.: MNC16P-0001
Project Name: Various Testing
Project Location: The Southern Parkway, Forster, NSW



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B. Cullen
 Approved Signatory: Brent Cullen
 (Engineering Geologist)
 NATA Accredited Laboratory Number: 18686
 Date of Issue: 12/09/2023

Sample Details

Sample ID: NEW23W-4675-S03 **Test Request No.:** RGS01898.1

Sampling Method: The results outlined below apply to the sample as received

Material: Clay **Date Sampled:** 31/08/2023

Source: On-Site Insitu **Date Submitted:** 4/09/2023

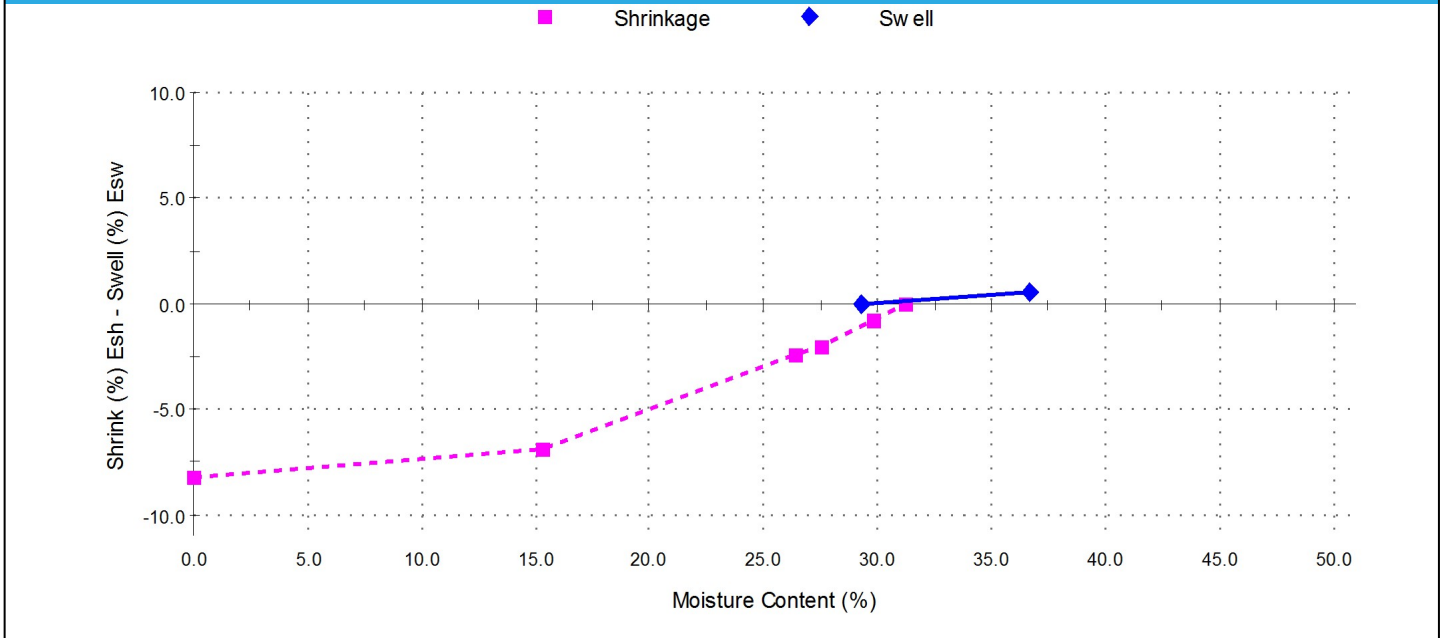
Specification: No Specification

Sample Location: BH306 - (0.5 - 1.0m)

Date Tested: 7/09/2023

Swell Test AS 1289.7.1.1		Shrink Test AS 1289.7.1.1	
Swell on Saturation (%):	0.6	Shrink on drying (%):	8.2
Moisture Content before (%):	29.3	Shrinkage Moisture Content (%):	31.2
Moisture Content after (%):	36.6	Est. inert material (%):	1%
Est. Unc. Comp. Strength before (kPa):	300	Crumbling during shrinkage:	Nil
Est. Unc. Comp. Strength after (kPa):	280	Cracking during shrinkage:	Minor

Shrink Swell



Shrink Swell Index - Iss (%): 4.7

Comments


Report No: SSI:NEW23W-4675-S04

Issue No: 1

Shrink Swell Index Report

Client: Regional Geotechnical Solutions Pty Ltd
 44 Bent Street
 Wingham NSW 2429

Project No.: MNC16P-0001
Project Name: Various Testing
Project Location: The Southern Parkway, Forster, NSW



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B. Cullen
 Approved Signatory: Brent Cullen
 (Engineering Geologist)
 NATA Accredited Laboratory Number: 18686
 Date of Issue: 12/09/2023

Sample Details

Sample ID: NEW23W-4675-S04 **Test Request No.:** RGS01898.1

Sampling Method: The results outlined below apply to the sample as received

Material: Clay **Date Sampled:** 31/08/2023

Source: On-Site Insitu **Date Submitted:** 4/09/2023

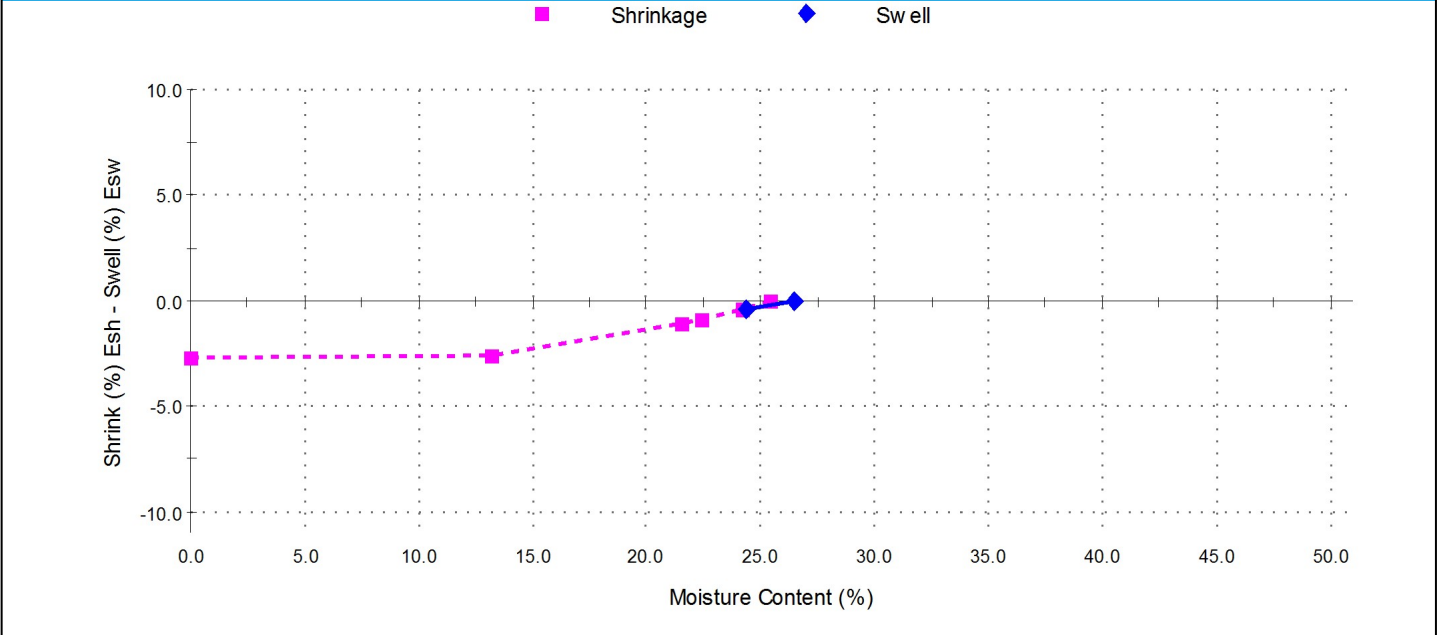
Specification: No Specification

Sample Location: BH308 - (0.8 - 1.3m)

Date Tested: 7/09/2023

Swell Test AS 1289.7.1.1		Shrink Test AS 1289.7.1.1	
Swell on Saturation (%):	-0.4	Shrink on drying (%):	2.7
Moisture Content before (%):	26.5	Shrinkage Moisture Content (%):	25.4
Moisture Content after (%):	24.3	Est. inert material (%):	4%
Est. Unc. Comp. Strength before (kPa):	580	Crumbling during shrinkage:	Nil
Est. Unc. Comp. Strength after (kPa):	560	Cracking during shrinkage:	Moderate

Shrink Swell



Shrink Swell Index - Iss (%): 1.5

Comments


Report No: SSI:NEW23W-4675-S05

Issue No: 1

Shrink Swell Index Report

Client: Regional Geotechnical Solutions Pty Ltd
 44 Bent Street
 Wingham NSW 2429

Project No.: MNC16P-0001
Project Name: Various Testing
Project Location: The Southern Parkway, Forster, NSW



Accredited for compliance with ISO/IEC 17025 - Testing.
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B. Cullen
 Approved Signatory: Brent Cullen
 (Engineering Geologist)
 NATA Accredited Laboratory Number: 18686
 Date of Issue: 12/09/2023

Sample Details

Sample ID: NEW23W-4675-S05 **Test Request No.:** RGS01898.1

Sampling Method: The results outlined below apply to the sample as received

Material: Clay **Date Sampled:** 31/08/2023

Source: On-Site Insitu **Date Submitted:** 4/09/2023

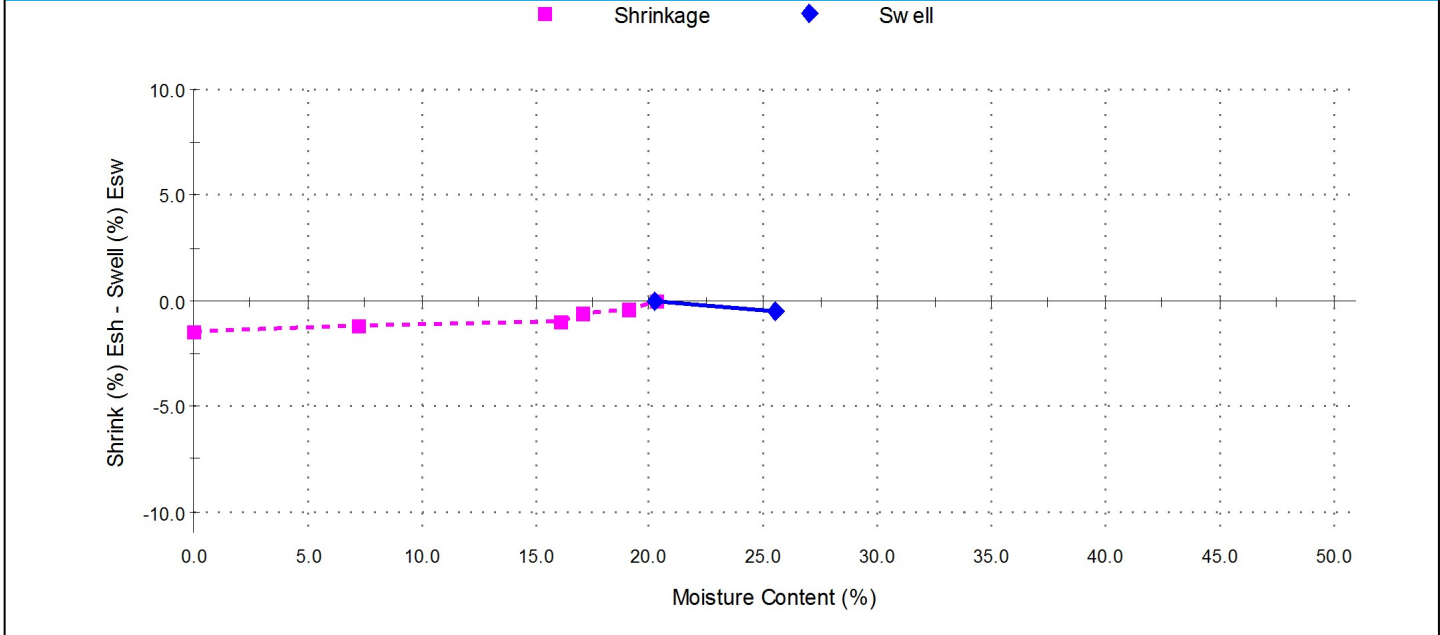
Specification: No Specification

Sample Location: BH309 - (0.7 - 1.2m)

Date Tested: 7/09/2023

Swell Test AS 1289.7.1.1		Shrink Test AS 1289.7.1.1	
Swell on Saturation (%):	-0.5	Shrink on drying (%):	1.5
Moisture Content before (%):	20.3	Shrinkage Moisture Content (%):	20.3
Moisture Content after (%):	25.5	Est. inert material (%):	5%
Est. Unc. Comp. Strength before (kPa):	420	Crumbling during shrinkage:	Nil
Est. Unc. Comp. Strength after (kPa):	450	Cracking during shrinkage:	Minor

Shrink Swell



Shrink Swell Index - Iss (%): 0.8

Comments

Report No: SSI:NEW23W-4675-S06

Issue No: 1

Shrink Swell Index Report

Client: Regional Geotechnical Solutions Pty Ltd
 44 Bent Street
 Wingham NSW 2429

Project No.: MNC16P-0001

Project Name: Various Testing

Project Location: The Southern Parkway, Forster, NSW



Accredited for compliance with ISO/IEC 17025 - Testing.
 Results provided relate only to the items tested or sampled.
 This report shall not be reproduced except in full.

B. Cullen

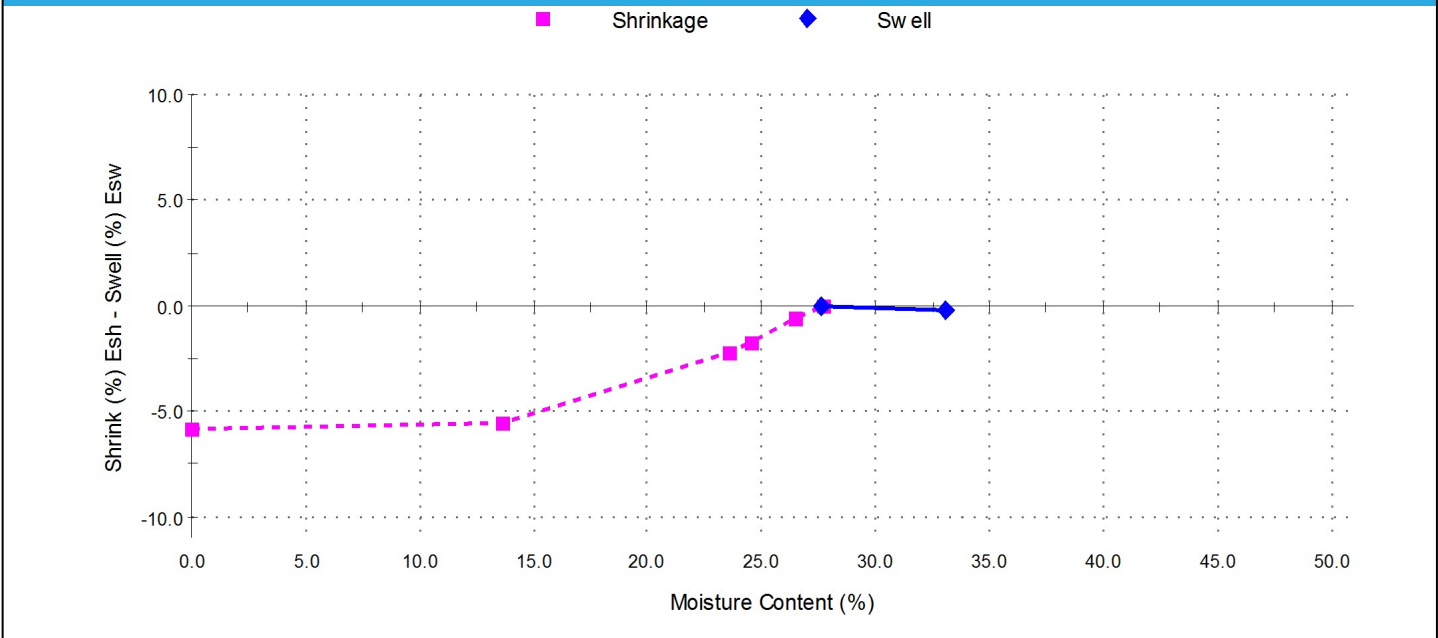
Approved Signatory: Brent Cullen
 (Engineering Geologist)
 NATA Accredited Laboratory Number: 18686
 Date of Issue: 12/09/2023

Sample Details

Sample ID: NEW23W-4675-S06 **Test Request No.:** RGS01898.1
Sampling Method: The results outlined below apply to the sample as received
Material: Clay **Date Sampled:** 31/08/2023
Source: On-Site Insitu **Date Submitted:** 4/09/2023
Specification: No Specification
Sample Location: BH310 - (0.6 - 1.1m)
Date Tested: 7/09/2023

Swell Test AS 1289.7.1.1		Shrink Test AS 1289.7.1.1	
Swell on Saturation (%):	-0.2	Shrink on drying (%):	5.8
Moisture Content before (%):	27.6	Shrinkage Moisture Content (%):	27.7
Moisture Content after (%):	33.1	Est. inert material (%):	2%
Est. Unc. Comp. Strength before (kPa):	290	Crumbling during shrinkage:	Nil
Est. Unc. Comp. Strength after (kPa):	300	Cracking during shrinkage:	Minor

Shrink Swell



Shrink Swell Index - Iss (%): 3.2

Comments


Report No: SSI:NEW23W-4675-S07

Issue No: 1

Shrink Swell Index Report

Client: Regional Geotechnical Solutions Pty Ltd
 44 Bent Street
 Wingham NSW 2429

Project No.: MNC16P-0001
Project Name: Various Testing
Project Location: The Southern Parkway, Forster, NSW



Accredited for compliance with ISO/IEC 17025 - Testing.
 Results provided relate only to the items tested or sampled.
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B. Cullen
 Approved Signatory: Brent Cullen
 (Engineering Geologist)
 NATA Accredited Laboratory Number: 18686
 Date of Issue: 12/09/2023

Sample Details

Sample ID: NEW23W-4675-S07 **Test Request No.:** RGS01898.1

Sampling Method: The results outlined below apply to the sample as received

Material: Clay **Date Sampled:** 31/08/2023

Source: On-Site Insitu **Date Submitted:** 4/09/2023

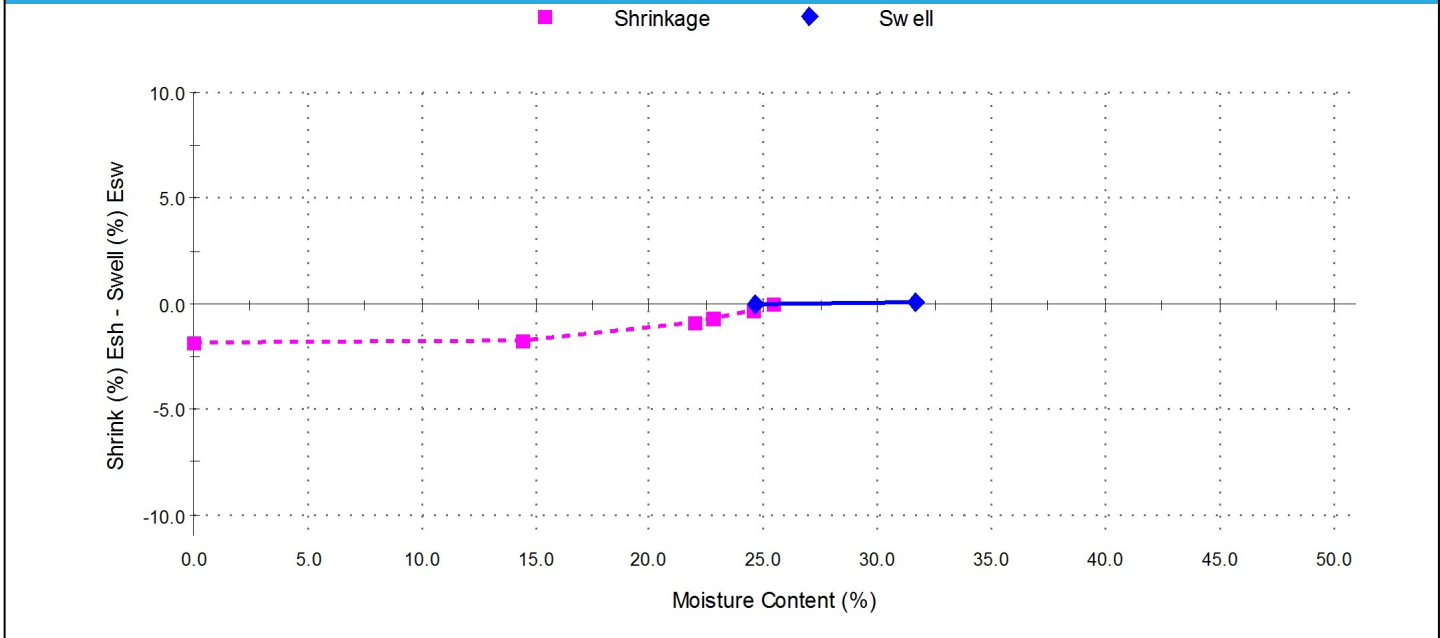
Specification: No Specification

Sample Location: BH312 - (0.7 - 1.2m)

Date Tested: 7/09/2023

Swell Test AS 1289.7.1.1		Shrink Test AS 1289.7.1.1	
Swell on Saturation (%):	0.1	Shrink on drying (%):	1.8
Moisture Content before (%):	24.6	Shrinkage Moisture Content (%):	25.5
Moisture Content after (%):	31.7	Est. inert material (%):	1%
Est. Unc. Comp. Strength before (kPa):	>600	Crumbling during shrinkage:	Nil
Est. Unc. Comp. Strength after (kPa):	>600	Cracking during shrinkage:	Moderate

Shrink Swell



Shrink Swell Index - Iss (%): 1.1

Comments

Report No: MAT:NEW23W-4675-S08

Issue No: 1


Material Test Report

Client: Regional Geotechnical Solutions Pty Ltd
44 Bent Street
Wingham NSW 2429

Project No.: MNC16P-0001

Project Name: Various Testing

Project Location: The Southern Parkway, Forster, NSW



Accredited for compliance with ISO/IEC 17025 - Testing.
Results provided relate only to the items tested or sampled.
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B. Cullen
Approved Signatory: Brent Cullen
(Engineering Geologist)
NATA Accredited Laboratory Number: 18686
Date of Issue: 14/09/2023

Sample Details

Sample ID: NEW23W-4675-S08

Date Sampled: 31/08/2023

Date Received: 04/09/2023

Source: On-Site Insitu

Material: Clay

Specification: No Specification

The results outlined below apply to the sample as received

TRN: RGS01898.1

Sample Location: BH317 - (1.0 - 1.5m)

Test Results

Description	Method	Result	Limits
Sample History	AS 1289.1.1	Oven-dried	
Preparation	AS 1289.1.1	Dry Sieved	
Linear Shrinkage (%)	AS 1289.3.4.1	7.0	
Mould Length (mm)		250	
Crumbling		No	
Curling		No	
Cracking		Yes	
Liquid Limit (%)	AS 1289.3.1.1	40	
Method		Four Point	
Plastic Limit (%)	AS 1289.3.2.1	26	
Plasticity Index (%)	AS 1289.3.3.1	14	
Date Tested		13/09/2023	

Comments

N/A



Appendix C

Additional Level One Test Result Sheets

Material Test Report



Report Number: P22529-20
Issue Number: 1
Date Issued: 16/02/2023
Client: Ditchfield Contracting
 8 Dee Crescent, Tuncurry NSW 2428
Contact: Nickolas. Hawkes
Project Number: P22529
Project Name: Summer Green 338
Project Location: Forster
Work Request: 5282
Date Sampled: 13/02/2023
Dates Tested: 13/02/2023 - 15/02/2023
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Site Selection: Selected by Client
Location: Summer Green- Forster
Material: Clay

Pacific Blue Metal Pty Ltd
 Possum Brush Laboratory
 113-116 Possum Brush Road Possum Brush NSW 2430
 Phone: (02) 6554 3206
 Fax: (02) 6554 3250
 Email: labmanager@pacificbluemetal.com.au



Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Tom Paulsen
 Senior Tech

NATA Accredited Laboratory Number: 16993

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1				
Sample Number	23-5282A	23-5282B	23-5282C	23-5282D
Date Tested	13/02/2023	13/02/2023	13/02/2023	13/02/2023
Time Tested	**	**	**	**
Test Request #/Location	South East Pad	South East Pad	South East Pad	South East Pad
Easting	640.98	642.61	676.89	693.78
Northing	1271.61	1232.90	1213.95	1226.09
Layer / Reduced Level	1st	1st	2nd	2nd
Thickness of Layer (mm)	300	300	300	300
Soil Description	Clay	Clay	Clay	Clay
Test Depth (mm)	300	300	300	300
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	8	0	7	6
Field Wet Density (FWD) t/m ³	2.03	1.96	2.09	2.08
Field Moisture Content %	18.6	29.5	16.7	18.4
Field Dry Density (FDD) t/m ³	1.71	1.51	1.79	1.75
Peak Converted Wet Density t/m ³	**	1.89	**	**
Adjusted Peak Converted Wet Density t/m ³	1.95	**	2.00	1.98
Moisture Variation (Wv) %	**	-2.0	**	**
Adjusted Moisture Variation %	3.0	**	2.5	2.0
Hilf Density Ratio (%)	104.0	103.5	104.5	105.0
Compaction Method	Standard	Standard	Standard	Standard
Report Remarks	**	**	**	**

Moisture Variation Note:

Positive values = test is dry of OMC
 Negative values = test is wet of OMC

Material Test Report

Report Number: P22529-21
Issue Number: 1
Date Issued: 16/02/2023
Client: Ditchfield Contracting
 8 Dee Crescent, Tuncurry NSW 2428
Contact: Nickolas. Hawkes
Project Number: P22529
Project Name: Summer Green 338
Project Location: Forster
Work Request: 5273
Date Sampled: 09/02/2023
Dates Tested: 09/02/2023 - 13/02/2023
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Site Selection: Selected by Client
Location: Summer Green- Forster
Material: Clay



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Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Tom Paulsen
 Senior Tech

NATA Accredited Laboratory Number: 16993

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	23-5273A	23-5273B	23-5273C
Date Tested	09/02/2023	09/02/2023	09/02/2023
Time Tested	**	**	**
Test Request #/Location	South West Pad	South West Pad	South West Pad
Easting	672.20	684.94	645.16
Northing	1214.14	1258.60	1245.76
Layer / Reduced Level	2nd	1st	1st
Thickness of Layer (mm)	300	300	300
Soil Description	Clay	Clay	Clay
Test Depth (mm)	300	300	300
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	6	7	6
Field Wet Density (FWD) t/m ³	2.06	2.07	2.08
Field Moisture Content %	11.9	18.1	12.4
Field Dry Density (FDD) t/m ³	1.84	1.75	1.85
Peak Converted Wet Density t/m ³	**	**	**
Adjusted Peak Converted Wet Density t/m ³	1.92	2.08	1.91
Moisture Variation (Wv) %	**	**	**
Adjusted Moisture Variation %	5.0	1.5	5.0
Hilf Density Ratio (%)	107.0	99.5	109.0
Compaction Method	Standard	Standard	Standard
Report Remarks	**	**	**

Moisture Variation Note:

Positive values = test is dry of OMC

Negative values = test is wet of OMC

Material Test Report



Report Number: P22529-22
Issue Number: 1
Date Issued: 16/02/2023
Client: Ditchfield Contracting
 8 Dee Crescent, Tuncurry NSW 2428
Contact: Nickolas. Hawkes
Project Number: P22529
Project Name: Summer Green 338
Project Location: Forster
Work Request: 5270
Date Sampled: 07/02/2023
Dates Tested: 09/02/2023 - 13/02/2023
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Location: Summer Green- Forster
Material: Clay

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Approved Signatory: Tom Paulsen
 Senior Tech

NATA Accredited Laboratory Number: 16993

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	23-5270A		
Date Tested	07/02/2023		
Time Tested	**		
Test Request #/Location	South West Pad		
Easting	4557516		
Northing	6435249		
Elevation (m)	5.33		
Layer / Reduced Level	1st		
Thickness of Layer (mm)	300		
Soil Description	Clay		
Test Depth (mm)	300		
Sieve used to determine oversize (mm)	19.0		
Percentage of Wet Oversize (%)	4		
Field Wet Density (FWD) t/m ³	2.02		
Field Moisture Content %	20.9		
Field Dry Density (FDD) t/m ³	1.67		
Peak Converted Wet Density t/m ³	**		
Adjusted Peak Converted Wet Density t/m ³	1.95		
Moisture Variation (Wv) %	**		
Adjusted Moisture Variation %	0.5		
Hilf Density Ratio (%)	103.5		
Compaction Method	Standard		
Report Remarks	**		

Moisture Variation Note:

Positive values = test is dry of OMC
 Negative values = test is wet of OMC