

Land Dynamics Australia

Geotechnical Site Classification

Proposed Residential Subdivision

Stage 3, The Sanctuary, 344 John Oxley Drive, Thrumster

Report No. RGS21087-AS

26 September 2024



**REGIONAL
GEOTECHNICAL
SOLUTIONS**

RGS21087-AS

26 September 2024

Land Dynamics Australia
77 Lord Street
PORT MACQUARIE NSW 2444

Attention: Jodie Chapman

Dear Jodie,

RE: Proposed Residential Subdivision – Stage 3, The Sanctuary, 344 John Oxley Drive, Thrumster
Geotechnical Site Classification

As requested, Regional Geotechnical Solutions Pty Ltd (RGS) has undertaken a geotechnical site classification in accordance with AS2870-2011 *Residential Slabs and Footings* for the proposed residential lots located in Stage 3 of The Sanctuary Estate, 344 John Oxley Drive (Lot 200 DP 1306921) Thrumster.

Stage 3 comprises Lots 301 – 332 as shown on the supplied plan titled “Plan of Subdivision of Lot 200 DP 1306921”.

Based on the existing profiles encountered at the time of the field investigations and on the basis that all fill present in the fill platform was placed under Level One Inspection and Testing as defined in AS3798-2007, the building areas within the lots present are classified in accordance with AS2870-2011 *Residential Slabs and Footings* as detailed in the attached report.

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

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

Prepared by



Chris Oviawe

Geotechnical Engineer

Reviewed by



Grant Colliar

Senior Engineering Geologist



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1 INTRODUCTION

Regional Geotechnical Solutions Pty Ltd (RGS) has undertaken a geotechnical site classification in accordance with AS2870-2011 *Residential Slabs and Footings* for the proposed residential lots located in Stage 3 of The Sanctuary Estate, 344 John Oxley Drive (Lot 200 DP 1306921) Thrumster.

Stage 3 comprises Lots 301 – 332 as shown on the supplied plan titled “Plan of Subdivision of Lot 200 DP 1306921”.

Some of the lots have been modified by site regrading works and placing up to approximately 2.5m of clay fill. Filling works were undertaken by Kazac Civil Pty Ltd, with Level One Inspection and Testing of the works undertaken by Douglas Partners Pty Ltd. A copy of the Level One reports have been provided to RGS.

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

- Subsurface profile, including the presence of fill and the depth to weathered rock and groundwater (if encountered);
- Site classification to AS2870-2011 ‘*Residential slabs and footings*’; and
- Foundation design parameters.

2 METHODOLOGY

Field work for the assessment was undertaken on 21 August 2024 and was based on the supplied drawing titled “Plan of Subdivision of Lot 200 DP 1306921”. Fieldwork was undertaken by an Engineering Geologist from RGS and included:

- Observation of site features and surrounding features relevant to the geotechnical conditions of the site;
- 16 boreholes undertaken by a 4WD mounted drilling rig to depths of between 1.5m and 2.5m, logged and sampled by an Engineering Geologist; and
- Collection of U50 tube samples collected from soil horizons considered representative of cohesive soil profiles. Laboratory shrink-swell testing was undertaken on eight samples by a NATA-accredited laboratory.

3 SITE CONDITIONS

3.1 Surface Conditions

Stage 3 is located to the north of John Oxley Drive in an area of gently to moderately undulating topography where it is situated on the north east facing upper to lower slopes of a low hill. Surface elevations across the site range from approximately 15m AHD on the upper slopes to approximately 10m AHD along the northern boundary.

A satellite image of the site that shows the location of the site and the site setting is reproduced below.



Surface slopes have been modified by cut and fill and range from approximately 2° – 8°. Some lots have been terraced and are separated by concrete block retaining walls that are up to 2m high.

Lots 310 – 312, 314, and 321 -332 have been modified by earthworks comprising placement of more than 0.4m of clay fill that was placed under Level One inspection and monitoring as defined in AS3798-2007 'Guidelines on Earthworks for Commercial and Residential Developments' by Douglas Partners refer Level 1 Geotechnical Certifications and Reports, by Douglas - Project 209310, dated 10 November 2022 and Project 209310 dated 10 November 2022. The approximate extent of the fill areas is shown in Figures 1.

Drainage of the site would be via a combination of overland flow and surface infiltration.

3.2 Subsurface Conditions

The site is situated in an area underlain by deeply weathered geological units of the Port Macquarie Block which includes weathered slate and dolerite.

The materials encountered during the investigation are summarised in Tables 1 and 2. Further details are presented in the engineering logs in Appendix A.



Table 1: Summary of Geotechnical Units

Unit	Material	Material Description
UNIT 1A	TOPSOIL/FILL	Sandy Gravelly CLAY, medium plasticity, grey, brown
UNIT 1B	FILL – CLAY (CONTROLLED)	Sandy CLAY to Sandy Gravelly CLAY to Silty Sandy CLAY, low to high plasticity, red, brown, pale brown
UNIT 2A	RESIDUAL A	Sandy CLAY, medium to high plasticity, red/brown/orange, very stiff to hard
UNIT 2B	RESIDUAL B	Sandy CLAY, medium to high plasticity, pale brown/yellow, stiff to very stiff
UNIT 3A	EW SLATE	Extremely Weathered SLATE, recovered as Sandy CLAY to Sandy Gravelly CLAY, medium to high plasticity, brown/yellow/pale brown, very stiff, trace rock fabric
UNIT 3B	EW DOLERITE	Extremely Weathered DOLERITE, recovered as Sandy CLAY to Silty Gravelly CLAY, medium to high plasticity, yellow/pale brown, very stiff, trace rock fabric

Table 2: Summary of Subsurface Profiles - Depth to Base of Material Layer (m)

BH	Lot	Unit 1A – Fill/Topsoil	Unit 1B - Controlled Fill	Unit 2A – Residual A	Unit 2B – Residual B	Unit 3A – EW Slate	Unit 3B – EW Dolerite
BH401	301/302	0.15	--	--	1.5	--	≥2
BH402	303/304	0.2	--	--	--	--	≥2
BH403	305/306	0.25	--	--	--	--	≥1.5
BH404	307/308	0.15	0.25	--	--	--	≥2
BH405	316/317	0.2	--	≥2	--	--	--
BH406	314/315	0.2	--	1.2	--	≥2.2	--
BH407	312/313	0.25	0.95	--	--	≥1.5	--
BH408	310/311	0.2	--	≥2	--	--	--
BH409	319	0.2	--	≥1.5	--	--	--
BH410	320	0.2	0.4	--	1.0	--	≥1.5
BH411	321/322	0.2	1.5	≥2.0	--	--	--
BH412	323/324	0.2	1.4	2.1	--	≥2.5	--
BH413	325/326	0.2	--	≥1.5	--	--	--
BH414	327/328	0.2	--	≥1.5	--	--	--
BH415	329/330	0.25	0.8	1.7	--	≥2.5	--
BH416	331/332	0.25	1.3	--	--	--	≥1.7

Note: ≥ Indicates that base of material layer was not encountered
 -- Indicates that the material was not encountered at the test location



Groundwater was not encountered during the investigation. It should be noted that fluctuations in groundwater levels can occur because of seasonal variations, temperature, rainfall and other similar factors, the influence of which may not have been apparent at the time of the assessment.

A summary of the laboratory test results is presented in Table 3. Test result sheets are presented in Appendix B.

Table 3: Laboratory Testing Summary

Location	Depth (m)	Lot	Material	Shrink Swell Index (%)
BH401	0.5 – 1	301/302	Unit 2B - Residual CLAY	0.8
BH403	0.5 – 0.8	305/306	Unit 3B - EW Dolerite	1.3
BH405	0.5 – 1	316/317	Unit 2A - Residual CLAY	2
BH407	0.3 – 0.7	312/313	Unit 1B - Fill CLAY	2.8
BH409	0.5 – 1	319	Unit 2A - Residual CLAY	2.1
BH410	0.5 – 0.9	320	Unit 2B - Residual CLAY	4.8
BH411	0.4 – 0.8	321/322	Unit 1B - Fill CLAY	3.5
BH414	0.4 - 0.8	327/328	Unit 2A - Residual CLAY	1.2

4 SITE CLASSIFICATION

For structures or components that are similar in construction, performance expectation, and loading to a typical domestic structure, the guidance provided in AS2870-2011 “*Residential Slabs and Footings*” would be appropriate.

In assessing the estimated characteristic surface movement (y_s) values the following has been adopted:

- All clay fill of > 0.4m thickness was placed under Level 1 Inspection and Testing as defined in AS3798-2007, and can therefore be considered as Controlled Fill with respect to AS2870-2011;
- Where there was cut undertaken the depth of cracked zone was reduced by the depth of cut;
- 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} for Controlled clay fill of between 2.8 and 3.5%, based on a combination of previous experience in the area and the laboratory test results;
- Characteristic I_{ss} for red residual clay of between 1.2 and 2.1%, based on a combination of previous experience in the area and the laboratory test results;
- Characteristic I_{ss} for yellow residual clay of between 0.8 and 4.8%, based on a combination of previous experience in the area and the laboratory test results;
- Characteristic I_{ss} for extremely weathered dolerite of 1.3%, based on a combination of previous experience in the area and the laboratory test result;



- Adopted characteristic I_{ss} for extremely weathered slate of 2%, based on previous experience in the area;
- The existing retaining walls that are located between some of the lots have either been designed to support residential footing loads behind the walls, or the structures are setback a distance of at least the height of the wall from the retaining wall; and
- Trees of up to 25m height are present within approximately 20m of Lot No's 301, 302 and 310.

Potential surface movements for proposed building areas that are located within the influence distance of group of trees must take into account the potential drying effects of trees and be calculated in accordance with the methodology outlined in AS2870-2011 (Appendix H). Actual building areas within the lots and the distance between the proposed dwelling footprints and existing large trees are not yet known, so calculations were made based on the parameters outlined below:

- Distance of trees (D_t) to the potential building areas in Lot No's 301, 302 and 310 is approximately 20m;
- Typical tree height is (HT) 15m and, $D_i = 1.0 \times HT = 25m$;
- Maximum design drying depth for Port Macquarie (H_t) = 3.0m where a group of trees is present within the influence distance; and
- Maximum extra suction change of $pf = 0.38$ where a group of trees is present within the influence distance.

The proposed building areas for Lots 310 – 312, 314, and 321 -332 have been modified by the placement of controlled fill to depths of greater than 0.4m and are therefore classified as Class P in accordance with AS2870-2011, Clause 2.5.3(a). In accordance with Section 2.5.3(c), the above mentioned lots have been reclassified in accordance with engineering principles.

The reclassified site classifications and expected shrink-swell related characteristic free surface movements (y_s) estimated, including tree effects (y_t), for the profiles encountered during the field investigation in the building areas in each lot are summarised in Table 4.

Table 4: Site Classification Summary

Lots	Site Re-classification	Characteristic Surface Movement, y_s (mm)
303, 304, 305, 306, 307, 308, 309, 315, 316, 317, 318, 319	Class M	30 – 40mm
301, 302, 310, 311, 312, 313, 314, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332	Class H1	40 - 60mm

5 CONSTRUCTION AND SITE MAINTENANCE CONSIDERATIONS

All structural footings should be founded as follows:

- All footings should be founded in Controlled Fill or natural soils below all topsoil, uncontrolled fill materials and disturbed soil;
- Footings can be designed based on a maximum allowable base bearing pressure of **100kPa** for footings founded within the Controlled Fill, residual clay or extremely weathered rock 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, retaining walls, downslope batters, and other subsurface structures;
- The engineering design for the retaining walls present allows for any surcharge affecting the walls such as footing loads (where the structures are located closer than the height of the wall from the structure), structures or sloping surfaces;
- The soils in the Port Macquarie area are prone to fretting and softening on exposure to air and water. It is therefore recommended that concrete be poured as soon as possible after footing excavation. In the event that wet weather occurs prior to pouring of concrete, the base of footing excavations should be checked for the presence of loose or softened material, which should be removed prior to pouring concrete; 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.

Where lot filling works are proposed, all fill for the support of structures should be placed and compacted in accordance with the recommendations outlined in AS3798-2007 *Guidelines on Earthworks for Residential and Commercial Developments*, under Level 1 supervision, for it to be considered Controlled Fill as defined in AS2870-2011. The founding of structures on fill that is not placed in accordance with Level 1 requirements is not recommended.

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 which is available from the CSIRO website <http://www.publish.csiro.au/pid/7076.htm>

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 should be considered when selecting design values for differential movement across the building.

6 LIMITATIONS

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

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

The recommended depth and properties of any soil, rock, groundwater, or other material referred to in this report is an engineering estimate based on the information available at the time of its writing. The estimate is influenced and limited by the fieldwork method and testing carried out in the site investigation, and other relevant information as has been made available. In cases where information has been provided to Regional Geotechnical Solutions for the purposes of preparing



this report it has been assumed that the information is accurate and appropriate for such use. No responsibility is accepted by Regional Geotechnical Solutions for inaccuracies within any data supplied by others.

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

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

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

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

Prepared by

Chris Oviawe

Geotechnical Engineer

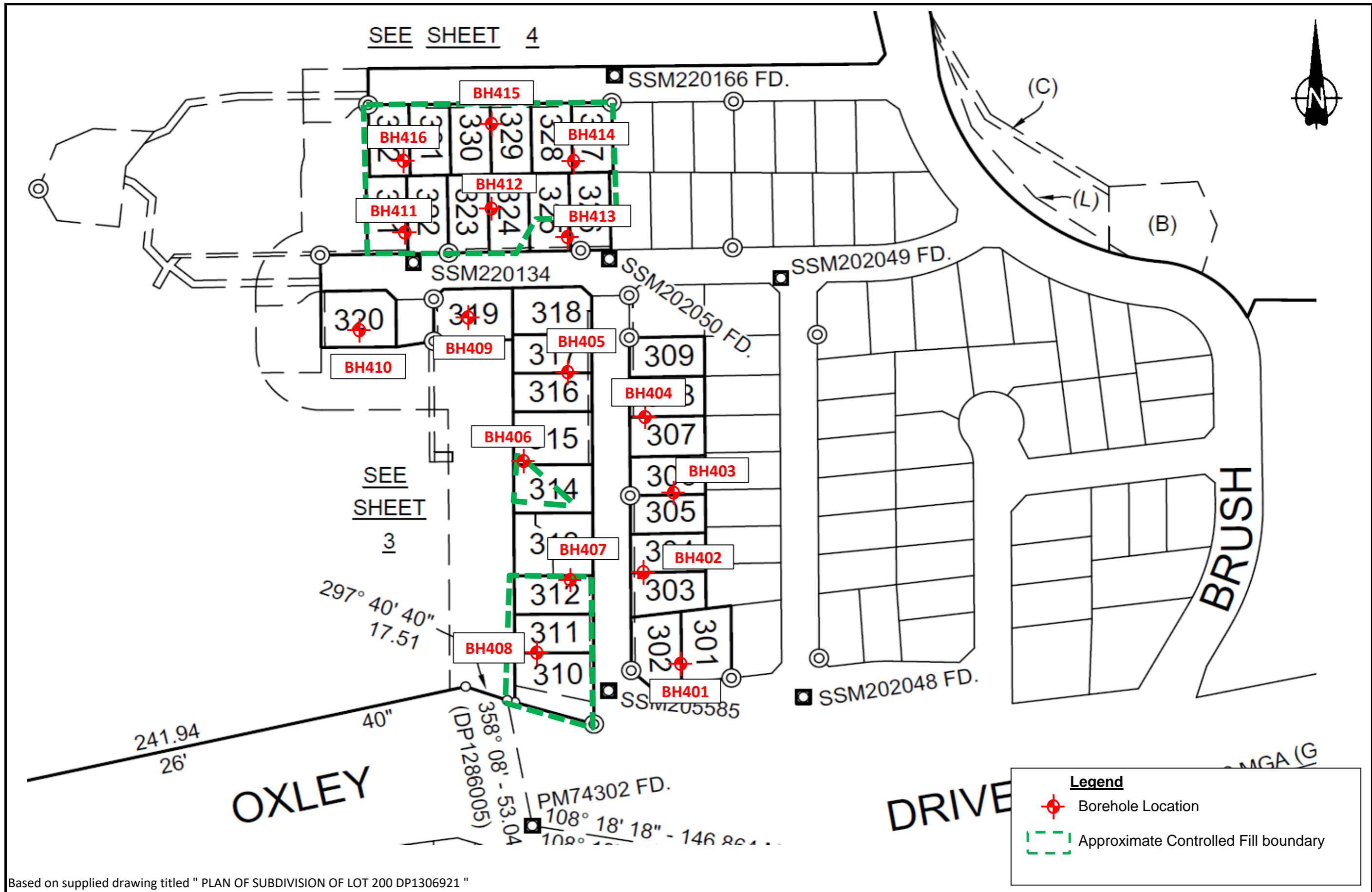
Reviewed by

Grant Colliar

Senior Engineering Geologist



Figures



Based on supplied drawing titled " PLAN OF SUBDIVISION OF LOT 200 DP1306921 "

<p>REGIONAL GEOTECHNICAL SOLUTIONS</p>	Client:	LAND DYNAMICS AUSTRALIA	Job No.	RGS21087.1-AS
	Project:	THE SANCTUARY, STAGE 3	Drawn By:	CO
	Title:	344 JOHN OXLEY DRIVE, PORT MACQUARIE	Scale:	NTS
		INVESTIGATION LOCATION PLAN	Date:	20-Sep-24
			Figure No.	1



Appendix A

Results of Field Investigations



ENGINEERING LOG - BOREHOLE

BOREHOLE NO: **BH401**

CLIENT: Land Dynamics Australia
PROJECT NAME: The Sanctuary Stage 3
SITE LOCATION: John Oxley Drive, Port Macquarie
TEST LOCATION: Lot 301/302

PAGE: 1 of 1
JOB NO: RGS21087.1
LOGGED BY: HM
DATE: 26/8/24

DRILL TYPE: 4x4 Mounted Rig EASTING: 485311 m SURFACE RL:
BOREHOLE DIAMETER: 50 mm INCLINATION: 90° NORTHING: 6519681 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	U50		0.0		CI	Sandy Gravelly CLAY: Medium plasticity, grey, brown, sand, brown, fint to coarse grained, gravel, brown, fine to medium grained, subangular to subrounded.	M < WP	F	HP	350	TOPSOIL FILL	
				0.15		CH						Sandy CLAY: Medium to high plasticity, yellow brown, sand, brown, fine to medium grained, traces of gravel, fine to medium grained, subangular to subrounded.	VSt
				0.2			HP						360
				0.4			HP						360
				0.5			HP						350
				0.6		0.50m	CH					Sandy CLAY: Medium to high plasticity, yellow, mottled red, brown, sand, brown, fine to medium grained.	HP
0.8		HP	330										
1.0	1.00m		HP	300									
1.2		HP	360										
1.4			HP	330									
1.6			CL	Sandy CLAY: Medium to high plasticity, yellow brown, sand, fine to medium grained, traces of rock fabric.							EXTREMELY WEATHERED DOLERITE		
1.8													
2.0				2.00m			Hole Terminated at 2.00 m						
				2.2									
				2.4									

RG 2.00.3.LIB.GLB_Log RG NON-CORED BOREHOLE - TEST P/T RGS21087.1 BH401 SERIES LOGS.GPJ --DrawingFile-- 26/8/2024 13:46 10.03.00.09 D:\git\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

- 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	VD Very Dense	Density Index 35 - 65%
		Density Index 65 - 85%
		Density Index 85 - 100%



ENGINEERING LOG - BOREHOLE

BOREHOLE NO: **BH402**

CLIENT: Land Dynamics Australia

PAGE: 1 of 1

PROJECT NAME: The Sanctuary Stage 3

JOB NO: RGS21087.1

SITE LOCATION: John Oxley Drive, Port Macquarie

LOGGED BY: HM

TEST LOCATION: Lot 303/304

DATE: 26/8/24

DRILL TYPE: 4x4 Mounted Rig

EASTING: 485301 m

SURFACE RL:

BOREHOLE DIAMETER: 50 mm

INCLINATION: 90°

NORTHING: 6519723 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			0.2		CI	Sandy Gravelly CLAY: Medium plasticity, grey, brown, sand, fine to coarse grained, gravel, fine to medium grained, subangular to subrounded.	M < WP	Fr			TOPSOIL FILL
				0.20m		CH	Sandy CLAY: Medium to high plasticity, pale brown, mottled orange brown, sand, fine to coarse grained, traces of gravel, fine to medium grained, subangular to subrounded.		H	HP	450	EXTREMELY WEATHERED DOLERITE
				0.4						HP	450	
				0.6						HP	470	
				0.8								
				1.0								
				1.2								
				1.4								
				1.6								
				1.8								
				2.0								
				2.00m			Hole Terminated at 2.00 m					
				2.2								
				2.4								

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 RGS21087.1 BH 402 SERIES LOGS.GPJ --DrawingFile-- 26/8/2024 13:46 10.03.00.09 D:\git\Lab and In Situ Tool - DGD | Lib: RG 2.00.3 2022-03-03 P/T: RG 2.00.0 2021-06-30



ENGINEERING LOG - BOREHOLE

BOREHOLE NO: **BH403**

CLIENT: Land Dynamics Australia
 PROJECT NAME: The Sanctuary Stage 3
 SITE LOCATION: John Oxley Drive, Port Macquarie
 TEST LOCATION: Lot 305/306

PAGE: 1 of 1
 JOB NO: RGS21087.1
 LOGGED BY: HM
 DATE: 26/8/24

DRILL TYPE: 4x4 Mounted Rig EASTING: 485330 m SURFACE RL:
 BOREHOLE DIAMETER: 50 mm INCLINATION: 90° NORTHING: 6519759 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			0.2		CI	Sandy Gravelly CLAY: Medium plasticity, brown, sand, brown, fine to coarse grained, gravel, brown, fine to medium grained, subangular to subrounded.	M < WP	Fr			TOPSOIL FILL
				0.4		CH	Sandy CLAY: Medium to high plasticity, yellow brown, sand, fine to coarse grained.					VSt
				0.6						HP	250	
				0.8								
				1.0						HP	280	
				1.2								
				1.4								
				1.50m			Hole Terminated at 1.50 m					
				1.6								
				1.8								
				2.0								
				2.2								
				2.4								

RG 2.00.3.LIB.GLB_Log - RG NON-CORED BOREHOLE - TEST P/T - RGS21087.1 BH 403 SERIES LOGS.GPJ --DrawingFile-- 26/8/2024 13:46 10.03.00.09 DatagLabs 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

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%



ENGINEERING LOG - BOREHOLE

BOREHOLE NO: **BH404**

CLIENT: Land Dynamics Australia
PROJECT NAME: The Sanctuary Stage 3
SITE LOCATION: John Oxley Drive, Port Macquarie
TEST LOCATION: Lot 307/308

PAGE: 1 of 1
JOB NO: RGS21087.1
LOGGED BY: HM
DATE: 26/8/24

DRILL TYPE: 4x4 Mounted Rig EASTING: 485315 m SURFACE RL:
BOREHOLE DIAMETER: 50 mm INCLINATION: 90° NORTHING: 6519808 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			0.2		CI	Sandy Gravelly CLAY: Medium plasticity, brown, sand, fine to medium grained, gravel, fine to medium grained, subangular to subrounded.	M < WP	Fr	HP	180	TOPSOIL FILL		
						CL	Sandy CLAY: Low plasticity, redish brown, sand, fine to coarse grained.					St	FILL CLAY	
						CH	Sandy CLAY: Medium to high plasticity, yellow brown, sand, fine to coarse grained, traces of rock fabric.					HP	180	EXTREMELY WEATHERED DOLERITE
												HP	190	
				2.0			Hole Terminated at 2.00 m							

RG 2.00.3.LIB.GLB_Log RG NON-CORED BOREHOLE - TEST P/T RGS21087.1 BH 404 SERIES LOGS.GPJ --DrawingFile-- 26/8/2024 13:46 10.03.00.09 DatagLabs 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

- 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: **BH405**

CLIENT: Land Dynamics Australia
PROJECT NAME: The Sanctuary Stage 3
SITE LOCATION: John Oxley Drive, Port Macquarie
TEST LOCATION: Lot 316/317

PAGE: 1 of 1
JOB NO: RGS21087.1
LOGGED BY: HM
DATE: 26/8/24

DRILL TYPE: 4x4 Mounted Rig EASTING: 485296 m SURFACE RL:
BOREHOLE DIAMETER: 50 mm INCLINATION: 90° NORTHING: 6519829 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	U50		0.2		CI	Sandy Gravelly CLAY: Medium plasticity, brown, sand, fine to medium grained, gravel, fine to medium grained, subangular to subrounded.	M < WP	Fr	HP	450	TOPSOIL FILL
				0.4		CH	Sandy CLAY: Medium to high plasticity, red brown, fine to medium grained.					H
		0.50m		0.6						HP	450	
		1.00m		0.8								
				1.0								
				1.2								
				1.4								
				1.6								
				1.8								
				2.0			Hole Terminated at 2.00 m					
				2.2								
				2.4								

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 PLOT RGS21087.1 BH405 SERIES LOGS.GPJ --DrawingFile-- 26/8/2024 13:46 10.03.00.09 D:\git\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: **BH406**

CLIENT: Land Dynamics Australia

PAGE: 1 of 1

PROJECT NAME: The Sanctuary Stage 3

JOB NO: RGS21087.1

SITE LOCATION: John Oxley Drive, Port Macquarie

LOGGED BY: HM

TEST LOCATION: Lot 314/315

DATE: 26/8/24

DRILL TYPE: 4x4 Mounted Rig

EASTING: 485261 m

SURFACE RL:

BOREHOLE DIAMETER:

INCLINATION: 90°

NORTHING: 6519786 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
Not Encountered				0.2		CI	Sandy Gravelly CLAY: Medium plasticity, brown, sand, fine to medium grained, gravel, fine to medium grained, subangular to subrounded.	M < WP	Fr	HP	430	TOPSOIL FILL
				0.4		CH	Sandy CLAY: Medium to high plasticity, red, sand, fine to medium grained.				H	HP
				0.6						HP	400	
				1.2		CH	Sandy Gravelly CLAY: Medium to high plasticity, yellow brown, sand, fine to medium grained, gravel, fine to medium grained, subangular to subrounded.	St	HP	320	EXTREMELY WEATHERED SLATE	
1.4						HP	300					
1.6						HP	290					
				2.2			Hole Terminated at 2.20 m					
				2.4								

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 RGS21087.1 BH 406 SERIES LOGS.GPJ --DrawingFile-- 26/8/2024 13:46 10.03.00.09 DatagLabs and In Situ Tool - DGD | Lib: RG 2.00.3.2022-03-03 P/T: RG 2.00.0 2021-06-30



ENGINEERING LOG - BOREHOLE

BOREHOLE NO: **BH407**

CLIENT: Land Dynamics Australia
PROJECT NAME: The Sanctuary Stage 3
SITE LOCATION: John Oxley Drive, Port Macquarie
TEST LOCATION: Lot 312/313

PAGE: 1 of 1
JOB NO: RGS21087.1
LOGGED BY: HM
DATE: 26/8/24

DRILL TYPE: 4x4 Mounted Rig EASTING: 485272 m SURFACE RL:
BOREHOLE DIAMETER: 50 mm INCLINATION: 90° NORTHING: 6519733 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	U50		0.2		CI	Sandy Gravelly CLAY: Medium plasticity, brown, sand, fine to coarse grained, gravel, fine to medium grained, subangular to subrounded.	M < WP	Fr	HP	190	TOPSOIL FILL	
				0.25m		CH	Sandy Gravelly CLAY: Medium to high plasticity, red, sand, fine to medium grained, gravel, fine to medium grained, subangular to subrounded.					St	FILL CLAY
				0.4		CL	Sandy CLAY: Low plasticity, yellow brown, sand, fine to coarse grained, traces of gravel, fine to medium grained, subangular to subrounded.		HP			200	EXTREMELY WEATHERED SLATE
				0.6									
1.0	1.2	1.4	1.50m	Hole Terminated at 1.50 m									
				1.6									
				1.8									
				2.0									
				2.2									
				2.4									

RG 2.00.3.LIB.GLB_Log RG NON-CORED BOREHOLE - TEST P/T RGS21087.1 BH 407 SERIES LOGS.GPJ --DrawingFile-- 26/8/2024 13:46 10.03.00.09 Datagel Lnh 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

- 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	VD Very Dense	Density Index 35 - 65%
		Density Index 65 - 85%
		Density Index 85 - 100%



ENGINEERING LOG - BOREHOLE

BOREHOLE NO: **BH408**

CLIENT: Land Dynamics Australia
PROJECT NAME: The Sanctuary Stage 3
SITE LOCATION: John Oxley Drive, Port Macquarie
TEST LOCATION: Lot 310/311

PAGE: 1 of 1
JOB NO: RGS21087.1
LOGGED BY: HM
DATE: 26/8/24

DRILL TYPE: 4x4 Mounted Rig EASTING: 485247 m SURFACE RL:
BOREHOLE DIAMETER: 50 mm INCLINATION: 90° NORTHING: 6519692 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			0.2		CL	Sandy Gravelly CLAY: Low plasticity, brown, sand, fine to coarse grained, gravel, fine to medium grained, subangular to subrounded.	M < WP	Fr			TOPSOIL FILL
				0.20m		CI	Sandy CLAY: Medium plasticity, red, sand, fine to coarse grained, trace of gravel, fine to medium grained, subangular to subrounded.	VSt		HP	350	RESIDUAL
				0.4						HP	300	
				0.6								
				0.8								
				1.0								
				1.2								
				1.4								
				1.6								
				1.8								
				2.0			Hole Terminated at 2.00 m					
				2.2								
				2.4								

RG 2.00.3.LIB.GLB_Log RG NON-CORED BOREHOLE - TEST P/T RGS21087.1 BH 408 SERIES LOGS.GPJ --DrawingFile-- 26/8/2024 13:46 10.03.00.09 DatagLabs 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: **BH409**

CLIENT: Land Dynamics Australia
 PROJECT NAME: The Sanctuary Stage 3
 SITE LOCATION: John Oxley Drive, Port Macquarie
 TEST LOCATION: Lot 319

PAGE: 1 of 1
 JOB NO: RGS21087.1
 LOGGED BY: HM
 DATE: 26/8/24

DRILL TYPE: 4x4 Mounted Rig EASTING: 485248 m SURFACE RL:
 BOREHOLE DIAMETER: 50 mm INCLINATION: 90° NORTHING: 6519829 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	0.30m		0.2		CL	Sandy Gravelly CLAY: Low plasticity, brown, sand, fine to coarse grained, gravel, fine to medium grained, subangular to subrounded.	M < WP	Fr			TOPSOIL FILL
		1.00m		0.4		CI	Sandy CLAY: Medium plasticity, red, sand, fine to coarse grained, gravel, fine to medium grained, subangular to subrounded.	VSt		HP	350	RESIDUAL
				1.2						HP	300	
				1.4			Hole Terminated at 1.50 m					
				1.6								
				1.8								
				2.0								
				2.2								
				2.4								

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 RGS21087.1 BH 409 SERIES LOGS.GPJ --DrawingFile-- 26/8/2024 13:46 10.03.00.09 D:\git\Lab and In Situ Tool - DGD | Lib: RG 2.00.3 2022-03-03 P/T: RG 2.00.0 2021-06-30



ENGINEERING LOG - BOREHOLE

BOREHOLE NO: **BH410**

CLIENT: Land Dynamics Australia
PROJECT NAME: The Sanctuary Stage 3
SITE LOCATION: John Oxley Drive, Port Macquarie
TEST LOCATION: Lot 320

PAGE: 1 of 1
JOB NO: RGS21087.1
LOGGED BY: HM
DATE: 26/8/24

DRILL TYPE: 4x4 Mounted Rig EASTING: 485202 m SURFACE RL:
BOREHOLE DIAMETER: INCLINATION: 90° NORTHING: 6519837 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		
Not Encountered		U50		0.2		CI	Sandy Gravelly CLAY: Medium plasticity, brown, sand, fine to coarse grained, gravel, fine to medium grained, subangular to subrounded.	M < WP	Fr			TOPSOIL FILL		
				0.4		CL	Sandy Gravelly CLAY: Medium plasticity, red brown, sand, fine to coarse grained, gravel, fine to medium grained, subangular to subrounded.					VSt	HP 300 HP 280 HP 290	FILL CLAY
				0.6		CH	Sandy CLAY: High plasticity, pale brown, sand, fine to medium plasticity.						HP 200 HP 200 HP 180	RESIDUAL
				1.0										
				1.50		Hole Terminated at 1.50 m								

RG 2.00.3.LIB.GLB_Log RG NON-CORED BOREHOLE - TEST P/T RGS21087.1 BH 410 SERIES LOGS.GPJ --DrawingFile-- 26/8/2024 13:46 10.03.00.09 D:\git\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

- 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: **BH411**

CLIENT: Land Dynamics Australia
PROJECT NAME: The Sanctuary Stage 3
SITE LOCATION: John Oxley Drive, Port Macquarie
TEST LOCATION: Lot 321/322

PAGE: 1 of 1
JOB NO: RGS21087.1
LOGGED BY: HM
DATE: 26/8/24

DRILL TYPE: 4x4 Mounted Rig **EASTING:** 485230 m **SURFACE RL:**
BOREHOLE DIAMETER: 50 mm **INCLINATION:** 90° **NORTHING:** 6519860 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	U50		0.2		CI	Sandy Gravelly CLAY: Medium plasticity, brown, sand, fine to coarse grained, gravel, fine to medium grained, subangular to subrounded.	M < WP	Fr			TOPSOIL FILL
				0.4		CI	FILL: Sandy CLAY, medium plasticity, red, sand, fine to coarse grained, gravel, fine to medium grained, subangular to subrounded.					VSt
				0.6		HP	350	HP	350		HP	320
				0.8			HP		200			
				1.0			HP		300			
				1.2		HP	300					
				1.4		HP	300					
1.6	HP	200										
1.8	HP	180										
2.0	HP	200										
				2.2								
				2.4			Hole Terminated at 2.00 m					

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
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

Density
V Very Loose
L Loose
MD Medium Dense
D Dense
VD Very Dense

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

Density Index <15%
Density Index 15 - 35%
Density Index 35 - 65%
Density Index 65 - 85%
Density Index 85 - 100%



ENGINEERING LOG - BOREHOLE

BOREHOLE NO: **BH412**

CLIENT: Land Dynamics Australia
 PROJECT NAME: The Sanctuary Stage 3
 SITE LOCATION: John Oxley Drive, Port Macquarie
 TEST LOCATION: Lot 323/324

PAGE: 1 of 1
 JOB NO: RGS21087.1
 LOGGED BY: HM
 DATE: 26/8/24

DRILL TYPE: 4x4 Mounted Rig EASTING: 485263 m SURFACE RL:
 BOREHOLE DIAMETER: 50 mm INCLINATION: 90° NORTHING: 6519826 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			0.2		CI	Sandy Gravelly CLAY: Medium plasticity, brown, sand, fine to coarse grained, gravel, fine to medium grained, subangular to subrounded.	M < WP	Fr			TOPSOIL FILL
				0.4		CI	Sandy CLAY: Medium plasticity, red, sand, fine to coarse grained, traces of gravel, fine to medium grained, subangular to subrounded.		H	HP	440	FILL CLAY
				0.4		CH	Sandy CLAY: High plasticity, pale brown, sand, fine to medium grained.		VSt	HP	400	
				0.6						HP	300	
				0.8						HP	320	
				0.8		CL	Sandy CLAY: Medium plasticity, red, sand, fine to coarse grained, traces of gravel, fine to medium grained, subangular to subrounded.		H	HP	410	
				1.0						HP	400	
				1.2						HP	410	
				1.4		CH	Sandy CLAY: Medium to high plasticity, red, sand, fine to coarse grained.			HP	500	RESIDUAL
				1.6						HP	500	
				1.8						HP	500	
				2.0								
				2.2		CI	Sandy Gravelly CLAY: Medium plasticity, pale brown, sand, fine to medium grained, gravel, fine to medium grained, subangular to subrounded.			HP	400	EXTEMELY WEATHERED SLATE
				2.4						HP	420	
				2.4						HP	440	
				2.50								

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 Hole Terminated at 2.50 m

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 P/T RGS21087.1 BH 412 SERIES LOGS.GPJ --DrawingFile-- 26/8/2024 13:46 10.03.00.09 D:\git\Lab and In Situ Tool - DGD | Lib: RG 2.00.3 2022-03-03 P/T: RG 2.00.0 2021-06-30



ENGINEERING LOG - BOREHOLE

BOREHOLE NO: **BH413**

CLIENT: Land Dynamics Australia
 PROJECT NAME: The Sanctuary Stage 3
 SITE LOCATION: John Oxley Drive, Port Macquarie
 TEST LOCATION: Lot 325/326

PAGE: 1 of 1
 JOB NO: RGS21087.1
 LOGGED BY: HM
 DATE: 26/8/24

DRILL TYPE: 4x4 Mounted Rig EASTING: 485289 m SURFACE RL:
 BOREHOLE DIAMETER: 50 mm INCLINATION: 90° NORTHING: 6519054 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			0.2		CI	Sandy Gravelly CLAY: Medium plasticity, brown, sand, fine to coarse grained, gravel, fine to medium grained, subangular to subrounded.	M < WP	Fr			TOPSOIL FILL	
				0.4		CI	Sandy CLAY: Medium plasticity, red, sand, fine to coarse grained.		VSt		HP	350	RESIDUAL
				0.6						HP	350		
				0.8						HP	340		
				1.0									
				1.2									
				1.4									
				1.50m			Hole Terminated at 1.50 m						
				1.6									
				1.8									
				2.0									
				2.2									
				2.4									

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 RGS21087.1 BH 403 SERIES LOGS.GPJ --DrawingFile-- 26/8/2024 13:46 10.03.00.09 DdghLub and In Situ Tool - DGD | Lib: RG 2.00.3 2022-03-03 P/T: RG 2.00.0 2021-06-30



ENGINEERING LOG - BOREHOLE

BOREHOLE NO: **BH414**

CLIENT: Land Dynamics Australia
 PROJECT NAME: The Sanctuary Stage 3
 SITE LOCATION: John Oxley Drive, Port Macquarie
 TEST LOCATION: Lot 327/328

PAGE: 1 of 1
 JOB NO: RGS21087.1
 LOGGED BY: HM
 DATE: 26/8/24

DRILL TYPE: 4x4 Mounted Rig EASTING: 485301 m SURFACE RL:
 BOREHOLE DIAMETER: 50 mm INCLINATION: 90° NORTHING: 6519892 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	U50		0.2		CI	Sandy Gravelly CLAY: Medium plasticity, brown, sand, fine to coarse grained, gravel, fine to medium grained, subangular to subrounded.	M < WP	F			TOPSOIL FILL
				0.40m		CI	Sandy CLAY: Medium plasticity, orange brown, fine to coarse grained, traces of gravel, fine to medium grained, subangular to subrounded.					H
		0.80m		0.6						HP	540	
				0.8						HP	530	
				1.0								
				1.2								
				1.4								
				1.50m			Hole Terminated at 1.50 m					
				1.6								
				1.8								
				2.0								
				2.2								
				2.4								

RG 2.00.3.LIB.GLB_Log - RG NON-CORED BOREHOLE - TEST P/T - RGS21087.1 BH 400 SERIES LOGS.GPJ --DrawingFile-- 26/8/2024 13:46 10.03.00.09 DatagLabs 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		Density Index	
V	Very Loose	<15%	
L	Loose	15 - 35%	
MD	Medium Dense	35 - 65%	
D	Dense	65 - 85%	
VD	Very Dense	85 - 100%	



ENGINEERING LOG - BOREHOLE

BOREHOLE NO: BH415**CLIENT:** Land Dynamics Australia**PAGE:** 1 of 1**PROJECT NAME:** The Sanctuary Stage 3**JOB NO:** RGS21087.1**SITE LOCATION:** John Oxley Drive, Port Macquarie**LOGGED BY:** HM**TEST LOCATION:** Lot 329/330**DATE:** 26/8/24**DRILL TYPE:** 4x4 Mounted Rig**EASTING:** 485267 m**SURFACE RL:****BOREHOLE DIAMETER:****INCLINATION:** 90°**NORTHING:** 6519908 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		
Not Encountered				0.2		CI	Sandy Gravelly CLAY: Medium plasticity, brown, sand, fine to coarse grained, gravel, fine to medium grained, subangular to subrounded.	M < WP	F			TOPSOIL FILL		
				0.25m										
				0.4		CI	Sandy CLAY: Medium plasticity, red/ dark red, sand, fine to medium grained.	VSt	HP HP HP	300 240 200	FILL CLAY			
				0.6										
				0.8										
				1.0		CL	Sandy CLAY: Low plasticity, dark red, sand, fine to medium grained.	St	HP HP HP	300 310 320	RESIDUAL			
1.2														
1.4														
1.6	CH	Sandy CLAY: Medium to high plasticity, orange, red, sand, fine to medium grained.	St	HP	280	RESIDUAL								
1.70m														
1.8	CH	Sandy Gravelly CLAY: Medium to high plasticity, orange/ brown, sand, fine to medium grained, gravel, fine to medium grained, subangular to subrounded.	St	HP HP HP HP	260 300 310 320	EXTREMELY WEATHERED SLATE								
2.0														
2.2														
2.4														
				2.50m										

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 Hole Terminated at 2.50 m

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: RGS21087.1 BH 403 SERIES LOGS.GPJ --DrawingFile-- 26/8/2024 13:47 10.03.00.09 Ddgel.Lab and In Situ Tool - DGD | Lib: RG 2.00.3 2022-03-03 P/T: RG 2.00.0 2021-06-30



ENGINEERING LOG - BOREHOLE

BOREHOLE NO: **BH416**

CLIENT: Land Dynamics Australia
 PROJECT NAME: The Sanctuary Stage 3
 SITE LOCATION: John Oxley Drive, Port Macquarie
 TEST LOCATION: Lot 331/332

PAGE: 1 of 1
 JOB NO: RGS21087.1
 LOGGED BY: HM
 DATE: 26/8/24

DRILL TYPE: 4x4 Mounted Rig EASTING: 485232 m SURFACE RL:
 BOREHOLE DIAMETER: INCLINATION: 90° NORTHING: 6519902 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			
Not Encountered				0.2		CI	Sandy Gravelly CLAY: Medium plasticity, brown, sand, fine to coarse grained, gravel, fine to medium grained, subangular to subrounded.	M < WP	Fr			TOPSOIL FILL			
				0.25m		CL	Sandy CLAY: Low plasticity, red, sand, fine to medium grained, traces of sand, fine to medium grained, subangular to subrounded.					H	HP	450	FILL CLAY
				0.4								HP	440		
				0.6								HP	450		
				0.8											
				1.0						HP	550				
				1.2						HP	560				
				1.4						HP	540				
				1.30m		CI	Silty Gravelly CLAY: Medium plasticity, pale brown, sand, fine to medium grained, traces of rock facie	F				EXTREMELY WEATHERED DOLERITE			
				1.6			HP					150			
				1.70m			HP					200			
							Hole Terminated at 1.70 m								
				1.8											
				2.0											
				2.2											
				2.4											

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 RGS21087.1 BH 400 SERIES LOGS.GPJ --DrawingFile-- 26/8/2024 13:47 10.03.00.09 DatagLabs and In Situ Tool_DGD | Lib: RG 2.00.3 2022-03-03 P/T: RG 2.00.0 2021-06-30



Appendix B

Laboratory Test Result Sheets

Material Test Report



Report Number: MNC16P-0001-134
Issue Number: 1
Date Issued: 11/09/2024
Client: Regional Geotechnical Solutions Pty Ltd
 44 Bent Street, Wingham NSW 2429
Project Number: MNC16P-0001
Project Name: Various Testing
Project Location: 344 John Oxley Drive
Client Reference: RGS21087.1
Work Request: 5968
Sample Number: NEW24S-5968A
Date Sampled: 27/08/2024
Dates Tested: 30/08/2024 - 04/09/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: BH401 - (0.5 - 1.0m)
Material: Insitu
Material Source: On-Site

Newcastle Laboratory
 2 Murray Dwyer Circuit Mayfield West NSW 2304
 Phone: (02) 4968 4468

Email: brentcullen@qualtest.com.au

Accredited for compliance with ISO/IEC 17025 - Testing



B. Cullen

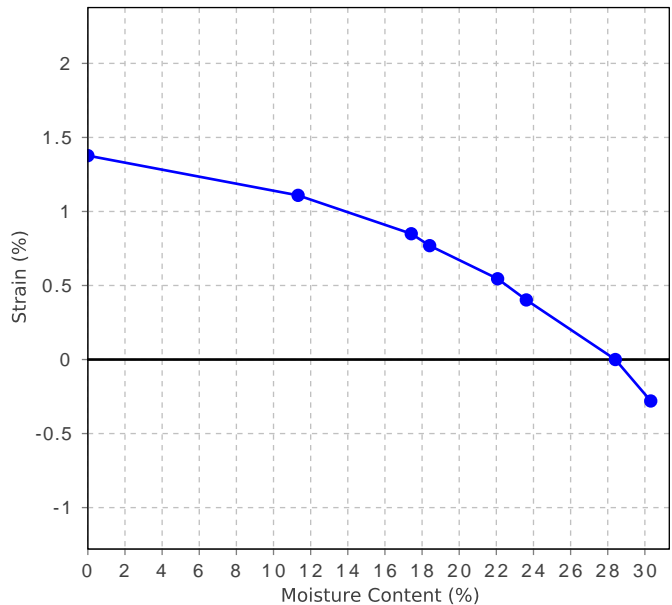
Approved Signatory: Brent Cullen

Engineering Geologist

NATA Accredited Laboratory Number: 18686

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	0.8
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	
Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	1.4
Estimated % by volume of significant inert inclusions	2
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	28.4
Swell Test	
Initial Pocket Penetrometer (kPa)	>600
Final Pocket Penetrometer (kPa)	>600
Initial Moisture Content (%)	28.6
Final Moisture Content (%)	30.3
Swell (%)	0.3
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	

Shrink Swell



Material Test Report

Report Number: MNC16P-0001-134
Issue Number: 1
Date Issued: 11/09/2024
Client: Regional Geotechnical Solutions Pty Ltd
 44 Bent Street, Wingham NSW 2429
Project Number: MNC16P-0001
Project Name: Various Testing
Project Location: 344 John Oxley Drive
Client Reference: RGS21087.1
Work Request: 5968
Sample Number: NEW24S-5968B
Date Sampled: 27/08/2024
Dates Tested: 30/08/2024 - 04/09/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: BH403 - (0.5 - 0.8m)
Material: Insitu
Material Source: On-Site



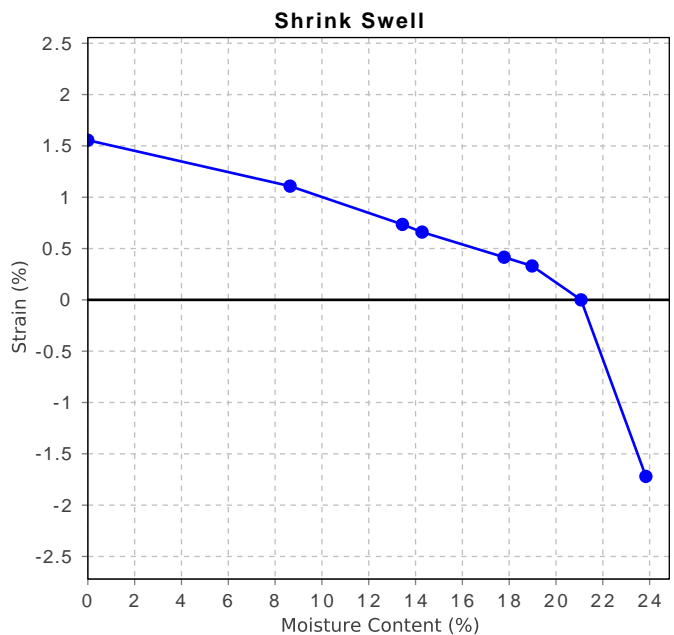
Newcastle Laboratory
 2 Murray Dwyer Circuit Mayfield West NSW 2304
 Phone: (02) 4968 4468
 Email: brentcullen@qualtest.com.au

Accredited for compliance with ISO/IEC 17025 - Testing



Approved Signatory: Brent Cullen
 Engineering Geologist
 NATA Accredited Laboratory Number: 18686

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	1.3
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	
Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	1.6
Estimated % by volume of significant inert inclusions	2
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	21.1
Swell Test	
Initial Pocket Penetrometer (kPa)	>600
Final Pocket Penetrometer (kPa)	>600
Initial Moisture Content (%)	20.7
Final Moisture Content (%)	23.8
Swell (%)	1.7
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	



Material Test Report

Report Number: MNC16P-0001-134
Issue Number: 1
Date Issued: 11/09/2024
Client: Regional Geotechnical Solutions Pty Ltd
 44 Bent Street, Wingham NSW 2429
Project Number: MNC16P-0001
Project Name: Various Testing
Project Location: 344 John Oxley Drive
Client Reference: RGS21087.1
Work Request: 5968
Sample Number: NEW24S-5968C
Date Sampled: 27/08/2024
Dates Tested: 30/08/2024 - 04/09/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: BH405 - (0.5 - 1.0m)
Material: Insitu
Material Source: On-Site



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 2 Murray Dwyer Circuit Mayfield West NSW 2304
 Phone: (02) 4968 4468
 Email: brentcullen@qualtest.com.au

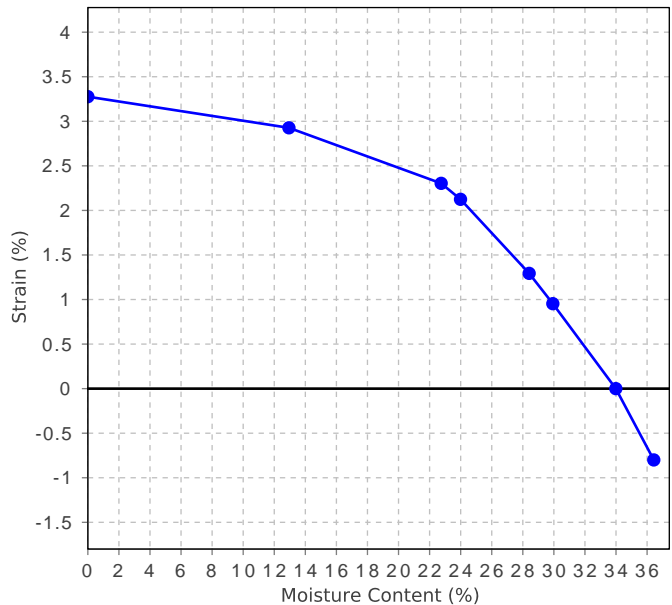
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Approved Signatory: Brent Cullen
 Engineering Geologist
 NATA Accredited Laboratory Number: 18686

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	2.0
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	
Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	3.3
Estimated % by volume of significant inert inclusions	2
Cracking	Moderately Cracked
Crumbling	No
Moisture Content (%)	34.0
Swell Test	
Initial Pocket Penetrometer (kPa)	>600
Final Pocket Penetrometer (kPa)	500
Initial Moisture Content (%)	33.7
Final Moisture Content (%)	36.4
Swell (%)	0.8
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	

Shrink Swell



Material Test Report

Report Number: MNC16P-0001-134
Issue Number: 1
Date Issued: 11/09/2024
Client: Regional Geotechnical Solutions Pty Ltd
 44 Bent Street, Wingham NSW 2429
Project Number: MNC16P-0001
Project Name: Various Testing
Project Location: 344 John Oxley Drive
Client Reference: RGS21087.1
Work Request: 5968
Sample Number: NEW24S-5968D
Date Sampled: 27/08/2024
Dates Tested: 30/08/2024 - 05/09/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: BH407 - (0.3 - 0.7m)
Material: Insitu
Material Source: On-Site



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 2 Murray Dwyer Circuit Mayfield West NSW 2304
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Approved Signatory: Brent Cullen

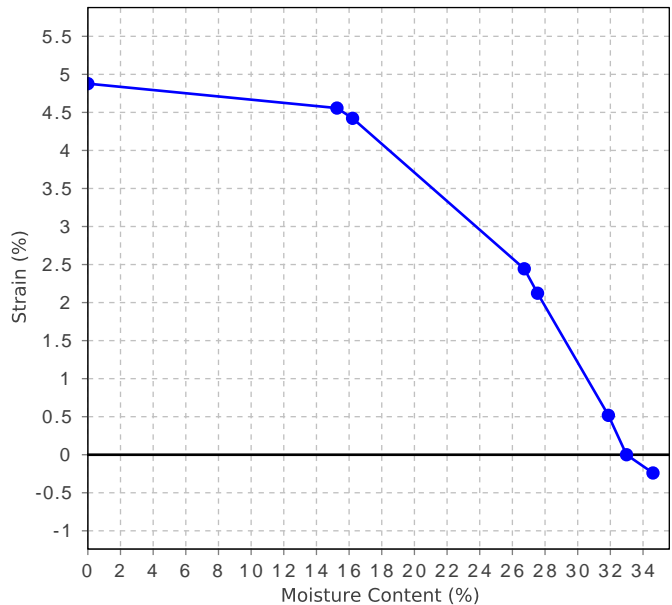
Engineering Geologist

NATA Accredited Laboratory Number: 18686

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Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	2.8
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	
Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	4.9
Estimated % by volume of significant inert inclusions	1
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	33.0
Swell Test	
Initial Pocket Penetrometer (kPa)	>600
Final Pocket Penetrometer (kPa)	550
Initial Moisture Content (%)	32.6
Final Moisture Content (%)	34.6
Swell (%)	0.2
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	

Shrink Swell



Material Test Report

Report Number: MNC16P-0001-134
Issue Number: 1
Date Issued: 11/09/2024
Client: Regional Geotechnical Solutions Pty Ltd
 44 Bent Street, Wingham NSW 2429
Project Number: MNC16P-0001
Project Name: Various Testing
Project Location: 344 John Oxley Drive
Client Reference: RGS21087.1
Work Request: 5968
Sample Number: NEW24S-5968E
Date Sampled: 27/08/2024
Dates Tested: 30/08/2024 - 05/09/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: BH409 - (0.5 - 1.0m)
Material: Insitu
Material Source: On-Site



Newcastle Laboratory
 2 Murray Dwyer Circuit Mayfield West NSW 2304
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Approved Signatory: Brent Cullen

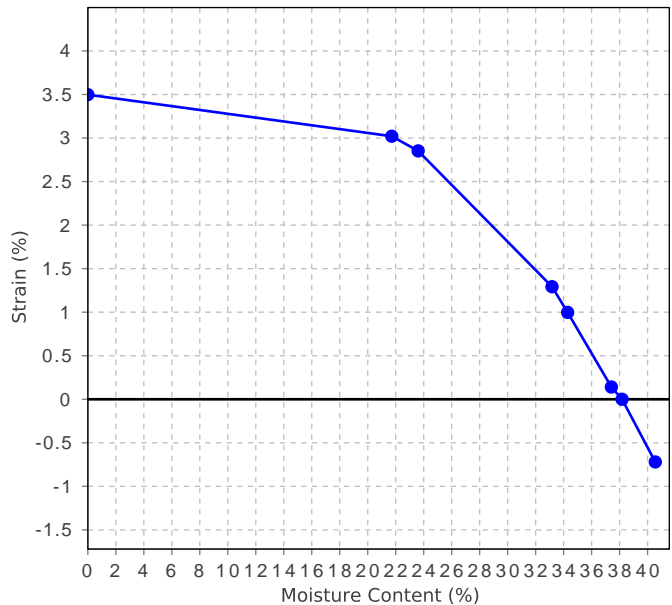
Engineering Geologist

NATA Accredited Laboratory Number: 18686

B. Cullen

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	2.1
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	
Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	3.5
Estimated % by volume of significant inert inclusions	1
Cracking	Slightly Cracked
Crumbling	Yes / No
Moisture Content (%)	38.2
Swell Test	
Initial Pocket Penetrometer (kPa)	530
Final Pocket Penetrometer (kPa)	450
Initial Moisture Content (%)	38.2
Final Moisture Content (%)	40.6
Swell (%)	0.7
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	

Shrink Swell



Material Test Report

Report Number: MNC16P-0001-134
Issue Number: 1
Date Issued: 11/09/2024
Client: Regional Geotechnical Solutions Pty Ltd
 44 Bent Street, Wingham NSW 2429
Project Number: MNC16P-0001
Project Name: Various Testing
Project Location: 344 John Oxley Drive
Client Reference: RGS21087.1
Work Request: 5968
Sample Number: NEW24S-5968F
Date Sampled: 27/08/2024
Dates Tested: 30/08/2024 - 05/09/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: BH410 - (0.5 - 0.9m)
Material: Insitu
Material Source: On-Site



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 2 Murray Dwyer Circuit Mayfield West NSW 2304
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Approved Signatory: Brent Cullen

Engineering Geologist

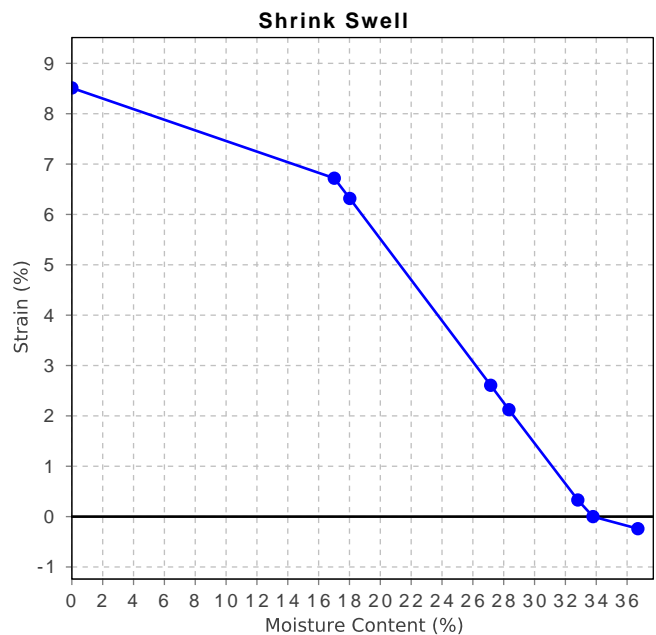
NATA Accredited Laboratory Number: 18686

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	4.8
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	8.5
Estimated % by volume of significant inert inclusions	1
Cracking	Uncracked
Crumbling	Yes / No
Moisture Content (%)	33.8

Swell Test	
Initial Pocket Penetrometer (kPa)	150
Final Pocket Penetrometer (kPa)	140
Initial Moisture Content (%)	34.5
Final Moisture Content (%)	36.7
Swell (%)	0.2

* NATA Accreditation does not cover the performance of pocket penetrometer readings.



Material Test Report

Report Number: MNC16P-0001-134
Issue Number: 1
Date Issued: 11/09/2024
Client: Regional Geotechnical Solutions Pty Ltd
 44 Bent Street, Wingham NSW 2429
Project Number: MNC16P-0001
Project Name: Various Testing
Project Location: 344 John Oxley Drive
Client Reference: RGS21087.1
Work Request: 5968
Sample Number: NEW24S-5968G
Date Sampled: 27/08/2024
Dates Tested: 30/08/2024 - 05/09/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: BH411 - (0.4 - 0.8m)
Material: Insitu
Material Source: On-Site



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 2 Murray Dwyer Circuit Mayfield West NSW 2304
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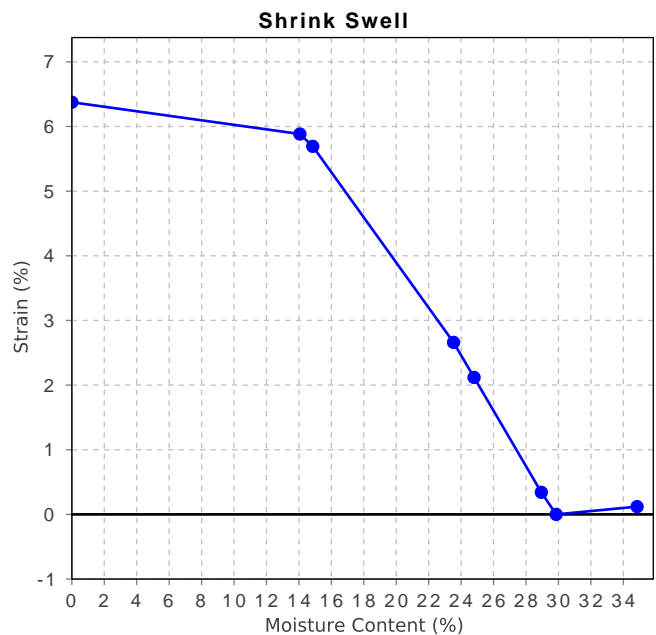


Approved Signatory: Brent Cullen

Engineering Geologist

NATA Accredited Laboratory Number: 18686

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	3.5
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	
Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	6.4
Estimated % by volume of significant inert inclusions	1
Cracking	Uncracked
Crumbling	No
Moisture Content (%)	29.9
Swell Test	
Initial Pocket Penetrometer (kPa)	270
Final Pocket Penetrometer (kPa)	250
Initial Moisture Content (%)	29.3
Final Moisture Content (%)	34.9
Swell (%)	-0.1
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	



Material Test Report

Report Number: MNC16P-0001-134
Issue Number: 1
Date Issued: 11/09/2024
Client: Regional Geotechnical Solutions Pty Ltd
 44 Bent Street, Wingham NSW 2429
Project Number: MNC16P-0001
Project Name: Various Testing
Project Location: 344 John Oxley Drive
Client Reference: RGS21087.1
Work Request: 5968
Sample Number: NEW24S-5968H
Date Sampled: 27/08/2024
Dates Tested: 30/08/2024 - 05/09/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: BH414 - (0.4 - 0.8m)
Material: Insitu
Material Source: On-Site



Newcastle Laboratory
 2 Murray Dwyer Circuit Mayfield West NSW 2304
 Phone: (02) 4968 4468
 Email: brentcullen@qualtest.com.au

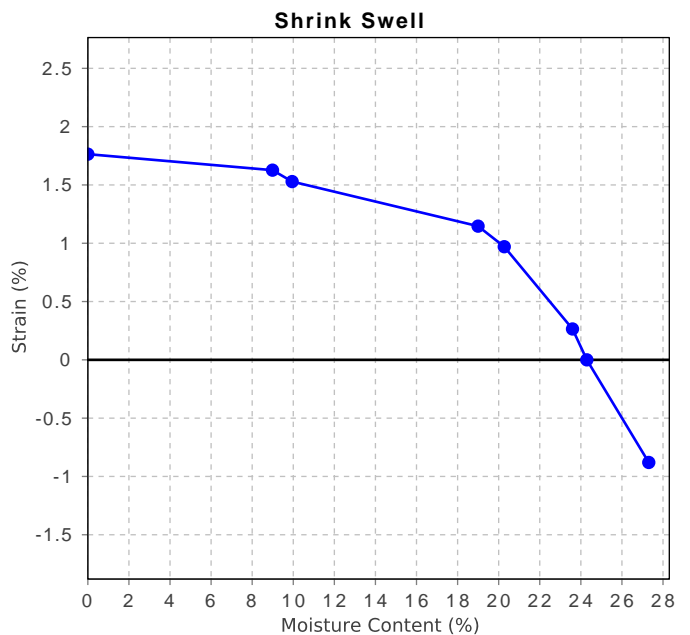
Accredited for compliance with ISO/IEC 17025 - Testing



Approved Signatory: Brent Cullen
 Engineering Geologist
 NATA Accredited Laboratory Number: 18686

B. Cullen

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	1.2
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	
Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	1.8
Estimated % by volume of significant inert inclusions	3
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	24.3
Swell Test	
Initial Pocket Penetrometer (kPa)	>600
Final Pocket Penetrometer (kPa)	600
Initial Moisture Content (%)	25.2
Final Moisture Content (%)	27.3
Swell (%)	0.9
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Approved Signatory: Brent Cullen
 Engineering Geologist
 NATA Accredited Laboratory Number: 18686

Shrink Swell Index AS 1289 7.1.1 & 2.1.1					
Sample Number	NEW24S-5968A	NEW24S-5968B	NEW24S-5968C	NEW24S-5968D	NEW24S-5968E
Date Sampled	27/08/2024	27/08/2024	27/08/2024	27/08/2024	27/08/2024
Date Tested	04/09/2024	04/09/2024	04/09/2024	05/09/2024	05/09/2024
Material Source	On-Site Insitu	On-Site Insitu	On-Site Insitu	On-Site Insitu	On-Site Insitu
Sample Location	BH401 - (0.5 - 1.0m)	BH403 - (0.5 - 0.8m)	BH405 - (0.5 - 1.0m)	BH407 - (0.3 - 0.7m)	BH409 - (0.5 - 1.0m)
Inert Material Estimate (%)	2	2	2	1	1
Pocket Penetrometer before (kPa)	>600	>600	>600	>600	530
Pocket Penetrometer after (kPa)	>600	>600	500	550	450
Shrinkage Moisture Content (%)	28.4	21.1	34.0	33.0	38.2
Shrinkage (%)	1.4	1.6	3.3	4.9	3.5
Swell Moisture Content Before (%)	28.6	20.7	33.7	32.6	38.2
Swell Moisture Content After (%)	30.3	23.8	36.4	34.6	40.6
Swell (%)	0.3	1.7	0.8	0.2	0.7
Shrink Swell Index Iss (%)	0.8	1.3	2.0	2.8	2.1
Visual Description	Clay	Clay	Clay	Clay	Clay
Cracking	SC	SC	MC	SC	SC
Crumbling	No	No	No	No	**
Remarks	**	**	**	**	**

Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.

Cracking Terminology: UC Uncracked, SC Slightly Cracked, MC Moderately Cracked, HC Highly Cracked, FR Fragmented.

NATA Accreditation does not cover the performance of pocket penetrometer readings.

Material Test Report

Report Number: MNC16P-0001-134
Issue Number: 1
Date Issued: 11/09/2024
Client: Regional Geotechnical Solutions Pty Ltd
 44 Bent Street, Wingham NSW 2429
Project Number: MNC16P-0001
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Client Reference: RGS21087.1
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Dates Tested: 30/08/2024 - 05/09/2024



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Approved Signatory: Brent Cullen

Engineering Geologist

NATA Accredited Laboratory Number: 18686

Shrink Swell Index AS 1289 7.1.1 & 2.1.1					
Sample Number	NEW24S-5968F	NEW24S-5968G	NEW24S-5968H		
Date Sampled	27/08/2024	27/08/2024	27/08/2024		
Date Tested	05/09/2024	05/09/2024	05/09/2024		
Material Source	On-Site Insitu	On-Site Insitu	On-Site Insitu		
Sample Location	BH410 - (0.5 - 0.9m)	BH411 - (0.4 - 0.8m)	BH414 - (0.4 - 0.8m)		
Inert Material Estimate (%)	1	1	3		
Pocket Penetrometer before (kPa)	150	270	>600		
Pocket Penetrometer after (kPa)	140	250	600		
Shrinkage Moisture Content (%)	33.8	29.9	24.3		
Shrinkage (%)	8.5	6.4	1.8		
Swell Moisture Content Before (%)	34.5	29.3	25.2		
Swell Moisture Content After (%)	36.7	34.9	27.3		
Swell (%)	0.2	-0.1	0.9		
Shrink Swell Index Iss (%)	4.8	3.5	1.2		
Visual Description	Clay	Clay	Clay		
Cracking	UC	UC	SC		
Crumbling	**	No	No		
Remarks	**	**	**		

Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.

Cracking Terminology: UC Uncracked, SC Slightly Cracked, MC Moderately Cracked, HC Highly Cracked, FR Fragmented.

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