



Job No: 7747/57
Our Ref: 7747/57-AB-R1
8 February 2022

Redbank Communities
PO Box 262
NORTH RICHMOND NSW 2754
Email: ravipillay@redbankcommunities.com.au

Attention: Mr R Pillay

Dear Sir

re: **Redbank Development – Southern Heights
Grose Vale Road, North Richmond
Site Classification Report**

Please find herewith the results of a geotechnical investigation at the above site. The purpose of the investigation was to determine existing subsurface conditions, collect representative soil samples for laboratory testing and classify the proposed lots as per Australia Standard AS2870-2011 "Residential slabs & footings". A total of forty-nine (49) lots (Lots 1601 to 1636 and 1702 to 1714) are covered in this report.

This report contains information on surface and sub-surface conditions encountered at the site together with site classification of the above lots.

If you have any questions, please do not hesitate to contact the undersigned.

Yours faithfully
GEOTECH TESTING PTY LTD

A handwritten signature in black ink, appearing to be "Ziauddin Ahmed", is written over a horizontal line.

ZIAUDDIN AHMED
Senior Associate

TABLE OF CONTENTS

	page
1.0 INTRODUCTION -----	1
2.0 FIELD WORK-----	1
3.0 SITE CONDITIONS -----	1
3.1 SITE DESCRIPTION -----	1
3.2 Sub-Surface Conditions-----	1
4.0 LABORATORY TESTING -----	2
5.0 DISCUSSION & RECOMMENDATIONS -----	2
5.1 Assessment of Fill -----	2
5.2 Site Classification -----	2

APPENDICES

APPENDIX A	<i>Table A (Summary of Test Pits) Test Pits Location Plan (Drawing No 7747/57-AB1 & 7747/57-AC1)</i>
APPENDIX B	<i>Summary of Site Classifications</i>
APPENDIX C	<i>Laboratory Test Results</i>

7747/57-AB-R1
 Redbank Development – Southern Heights
 Grose Vale Road, North Richmond

1.0 INTRODUCTION

This report provides results of a geotechnical investigation at the subject site. The purpose of the investigation was to determine existing subsurface conditions and classify the proposed lots as per AS2870-2011. A total of forty-nine (49) lots (Lots 1601 to 1636 and 1702 to 1714) are covered in this report.

Site classification in accordance with AS2870-2011 is only applicable for the design of footing system for a single dwelling, house, townhouse or similar structure that would be detached or separated by a party wall or common wall including buildings classified as Class 1 and Class 10a in the Building Code of Australia (BCA). AS2870 is not suitable for dwellings situated vertically above or below another dwelling. Therefore, a geotechnical investigation would be required for other dwellings to be classified in accordance with the BCA.

It is understood that the proposed dwellings are to be of brick veneer construction and that wall loadings are expected to be in the range of 15kN/m to 50kN/m. The maximum working load (safe bearing pressure) would be in the order of 50kPa for ground supported floor slabs and 100kPa for strip and pad footings (AS2870-2011).

2.0 FIELD WORK

The investigation work was conducted on and 15 December 2021 and 28 January 2022, under the supervision of Geotechnical Engineers from the company and consisted of excavation of twenty-two (TP101 to TP122), using an excavator. The approximate test pit locations are indicated on Drawings 7747/57-AB1 and 7747/57-AC1. The test pits were terminated at a depth of 1.5m from existing ground level. Description of subsurface materials encountered in the test pits is provided in the attached Table A.

3.0 SITE CONDITIONS

3.1 Site Description

At the time of investigation, earthworks and construction of internal roads were completed.

3.2 Sub-Surface Conditions

The following table summarises the prevailing subsurface conditions at the site, more details are given in the test pits logs in the attached Table A.

Topsoil	Silty Clay, low plasticity, brown
Fill	Silty Clay, medium to high plasticity, dark brown, grey, orange
Natural	Silty CLAY, low to high plasticity, brown to mottled grey, traces of shale fragments Silty CLAY/Clayey SILT, low plasticity, red-brown
Bedrock	SHALE/SILTSTONE, grey, very low to low strength, extremely to distinctly weathered, with ironstone bands

Groundwater was not observed in the test pits during the short time that they remained open. It must be noted that fluctuations in the level of groundwater might occur due to variations in rainfall, temperature, and/or other factors not evident during investigation.

7747/57-AB-R1
 Redbank Development – Southern Heights
 Grose Vale Road, North Richmond

4.0 LABORATORY TESTING

During the site investigation, two (2) undisturbed samples (U_{50}) and two (2) disturbed samples were recovered to conduct shrink/swell and Atterberg limit tests. The purpose of the testing was to assess soil reactivity and soil plasticity. The tests were conducted as per relevant Australian Standards and the results are summarised below and detailed in the attached certificates.

Test Pit	Sample Depth (m)	Material Description	I _{ss} (%/pF)	W _L (%)	W _P (%)	I _P (%)
101	0.5 – 0.95	FILL : Silty Clay, medium plasticity, grey to dark grey, with shale fragments	0.1	-	-	-
105	0.5 – 0.95	(CI-CH) Silty CLAY, medium to high plasticity, brown to mottled grey, traces of shale fragments	1.4	-	-	-
108	0.3 – 0.6	FILL : Silty Clay, medium plasticity, grey, orange, brown, trace of fine to medium gravel	-	45	18	27
116	0.2 – 0.5	FILL : Silty Clay, medium to high plasticity, dark brown, some fine to medium gravel	-	57	20	37

I_{ss}: Shrink/Swell Index; W_L : Liquid Limit; W_P : Plastic Limit; I_P : Plasticity Index

5.0 DISCUSSION & RECOMMENDATIONS

5.1 Assessment of Fill

Based on the inspection of the test pits and previous field density tests, the fill placed at the site was assessed as “Controlled” fill. Results of the field density tests carried out at the site were provided in a number of certificates under our job 7747/54.

5.2 Site Classification

Based on the above information, site classifications to AS2870-2011 are summarised in Appendix B. It should be noted that lots containing more than 400mm of clay fill (assessed as controlled fill) would originally be classified as Class P in accordance with AS2870-2011. However, based on the results of this investigation, including laboratory testing, the lots would be re-classified as detailed in Appendix B.

It is recommended that footings for the proposed dwellings are founded on the same stratum, below any topsoil, loose or deleterious material, to minimise the potential for differential movement. In the event that bedrock is encountered in any portion of the footing excavations, the remainder of the foundations must be supported on bedrock to ensure even bearing.

The classifications presented in Appendix B of this report are applicable to the Lots at the date of conducting the investigation, being 15 December 2021 and 28 January 2022 and are made on the following assumptions:

- The design and construction requirements of AS2870 must be followed.
- The recommendations for foundation performance and site maintenance set out in Appendix B of AS2870 must be followed.
- The proposed dwellings must be in accordance with AS2870. A detailed geotechnical investigation will be required for other dwellings to be classified in accordance with the BCA.

7747/57-AB-R1
Redbank Development – Southern Heights
Grose Vale Road, North Richmond

It is recommended that house owners are made aware of recommendations in the CSIRO publication, "Guide to Home Owners on Foundation Maintenance and Footing Performance" and AS2870 Appendix H of AS2871-2011.

GEOTECH TESTING PTY LTD

A handwritten signature in black ink, consisting of a stylized 'G' followed by a series of loops and a final flourish.

APPENDIX A

TABLE A
(Summary of Test Pits)

TEST PIT LOCATION PLAN
(Drawing No 7747/57-AB1 & 7747/57-AC1)

TABLE A

Job No: 7747/57

Page 1 of 3

Our Ref: 7747/57-AB Southern Heights, Redbank Development, North Richmond

TEST PIT	DEPTH (m)	SAMPLE DEPTH (m)	MATERIAL DESCRIPTION
TP101	0.0 – 0.2	0.5 – 0.95 (U50)	TOPSOIL : Silty Clay, low to medium plasticity, brown
	0.2 – 1.5		FILL : Silty Clay, medium plasticity, grey to dark grey, with shale fragments
TP102	0.0 – 0.2		TOPSOIL : Silty Clay, low to medium plasticity, brown
	0.2 – 1.5		FILL : Silty Clay, medium plasticity, brown to grey, trace of gravel
TP103	0.0 – 0.4		FILL : Silty Clay, medium plasticity, brown to grey, trace of gravel
	0.4 – 0.8		SHALE, grey, distinctly weathered, low to medium strength
TP104	0.0 – 0.2		TOPSOIL : Silty Clay, low to medium plasticity, brown (T1)
	0.2 – 0.4		FILL : Silty Clay, medium plasticity, brown to grey, trace of gravel (F1)
	0.4 – 0.7		SHALE, grey, distinctly weathered, low to medium strength (B1)
TP105	0.0 – 0.2	0.5 – 0.95 (U50)	TOPSOIL : Silty Clay, low to medium plasticity, brown (T1)
	0.2 – 0.4		FILL : Silty Clay, medium plasticity, brown to grey, trace of gravel (F1)
	0.4 – 1.5		(CI-CH) Silty CLAY, medium to high plasticity, brown to mottled grey, traces of shale fragments
TP106	0.0 – 0.1		TOPSOIL: Silty Clay, low plasticity, brown, trace of gravels
	0.1 – 0.3		FILL: Silty Clay, medium plasticity, dark brown, with gravels, trace of cobbles, well compacted, M<OMC
	0.3 – 1.5		FILL: Silty Clay, medium plasticity, dark brown, trace of gravels, well compacted, M<OMC
TP107	0.0 – 0.1		TOPSOIL: Silty Clay, low plasticity, brown
	0.1 – 1.5		FILL: Silty Clay, medium plasticity, dark brown, trace of gravels, well compacted, M<OMC

TABLE A

Job No: 7747/57

Page 2 of 3

Our Ref: 7747/57-AB Southern Heights, Redbank Development, North Richmond

TEST PIT	DEPTH (m)	SAMPLE DEPTH (m)	MATERIAL DESCRIPTION
TP108	0.0 – 0.1	0.3 – 0.6 (DS)	TOPSOIL: Silty Clay, low plasticity, brown
	0.1 – 1.5		FILL: Silty Clay, medium plasticity, grey mottled orange-brown, trace of gravels, well compacted, M<OMC
TP109	0.0 – 0.1		TOPSOIL: Silty Clay, low plasticity, brown
	0.1 – 0.7		(Cl) Silty CLAY, medium plasticity, red-brown, stiff to very stiff, M<PL
	0.7 – 1.0		SHALE, grey, low strength, distinctly weathered
TP110	0.0 – 0.1		TOPSOIL: Silty Clay, low plasticity, brown
	0.1 – 0.4		(CL) Silty CLAY/Clayey SILT, low plasticity, red-brown, firm, M<PL
	0.4 – 0.6		SHALE, grey, low strength, distinctly weathered
TP111	0.0 – 0.1		TOPSOIL: Silty Clay, low plasticity, brown
	0.1 – 1.5		FILL: Silty Clay, medium plasticity, dark brown, with gravels, well compacted, M<OMC
TP112	0.0 – 0.2		TOPSOIL: Silty Clay, low plasticity, brown
	0.2 – 0.3		SHALE, grey, medium strength, distinctly weathered
TP113	0.0 – 0.2		TOPSOIL: Silty Clay, low plasticity, brown
	0.2 – 0.3		SHALE, grey, low strength, distinctly weathered
TP114	0.0 – 0.2		TOPSOIL: Silty Clay, low plasticity, brown
	0.2 – 0.3		SHALE, grey, low strength, distinctly weathered
TP115	0.0 – 0.1		TOPSOIL: Silty Clay, low plasticity, brown
	0.1 – 2.5		FILL: Silty Clay, medium plasticity, dark brown, with gravels, well compacted, M<PL
TP116	0.0 – 0.2	0.2 – 0.5 (DS)	TOPSOIL: Silty Clay, low plasticity, brown
	0.2 – 2.0		FILL: Silty Clay, medium plasticity, dark brown, with gravels, well compacted, M<PL

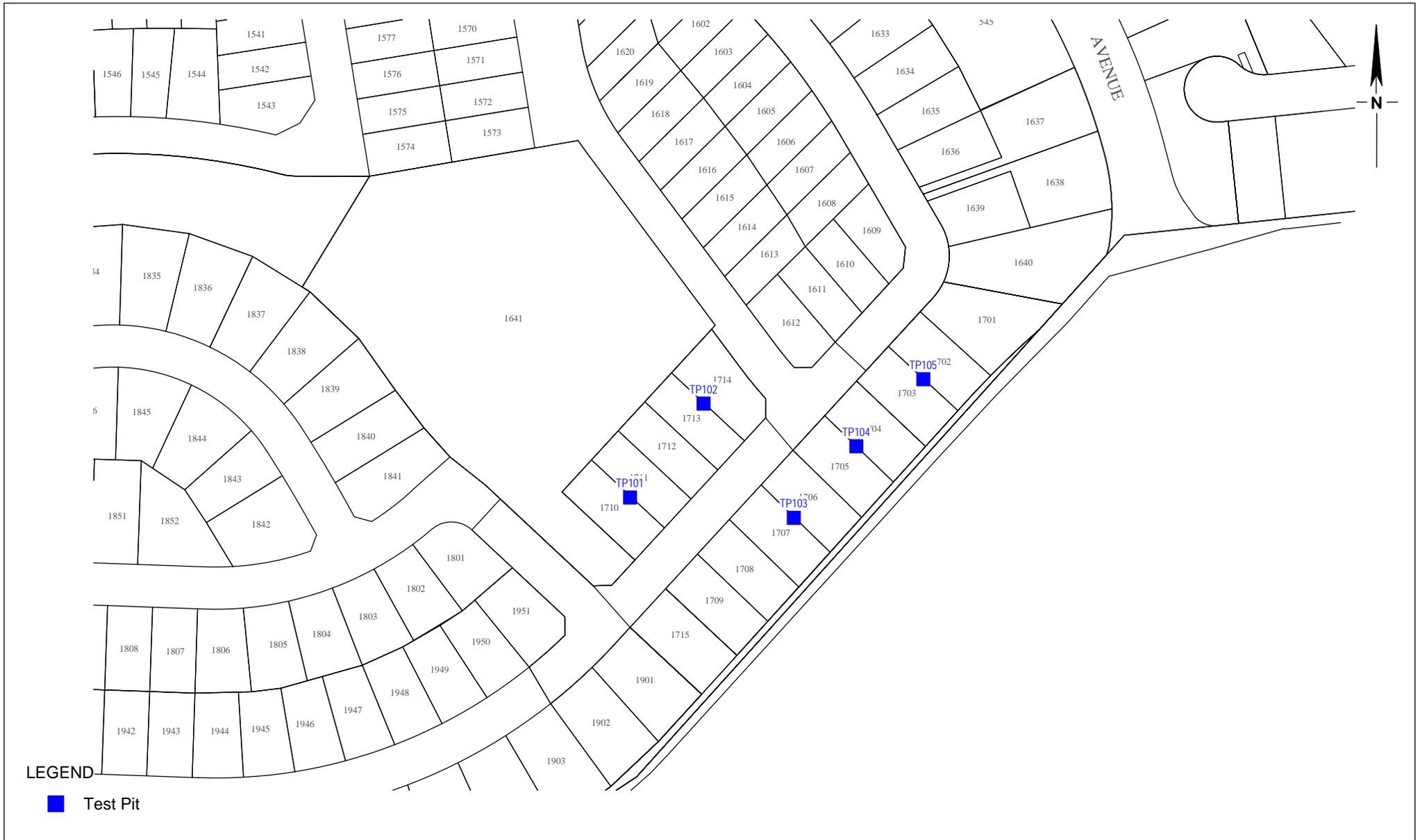
TABLE A

Job No: 7747/57

Page 3 of 3

Our Ref: 7747/57-AB Southern Heights, Redbank Development, North Richmond

TEST PIT	DEPTH (m)	SAMPLE DEPTH (m)	MATERIAL DESCRIPTION
TP117	0.0 – 0.1		TOPSOIL: Silty Clay, low plasticity, brown
	0.1 – 1.0		FILL: Silty Clay, medium plasticity, dark brown, with gravels, well compacted, M<OMC
	1.0 – 2.5		SHALE/SILTSTONE, grey, very low to low strength, extremely weathered
TP118	0.0 – 0.1		TOPSOIL: Silty Clay, low plasticity, brown
	0.1 – 0.3		FILL: Silty Clay, medium plasticity, dark brown, with gravels, well compacted, M<OMC
	0.3 – 0.35		SHALE/IRONSTONE, red-brown, medium strength, distinctly weathered
TP119	0.0 – 0.3		TOPSOIL: Silty Clay, low plasticity, brown
	0.3 – 0.35		SHALE, grey, medium strength, distinctly weathered
TP120	0.0 – 0.3		TOPSOIL: Silty Clay, low plasticity, brown
	0.3 – 0.35		SHALE/IRONSTONE, red-brown, medium strength, distinctly weathered
TP121	0.0 – 0.1		TOPSOIL: Silty Clay, low plasticity, brown
	0.1 – 0.15		SHALE, grey, medium strength, distinctly weathered
TP122	0.0 – 0.1		TOPSOIL: Silty Clay, low plasticity, brown
	0.1 – 0.15		SHALE, grey, medium strength, distinctly weathered



34 Borec Road
 Penrith
 NSW 2750
 ABN 71 076 676 321

Ph: 02 4722 2744
 Fx: 02 4722 2777
 www.geotech.com.au
 e-mail: info@geotech.com.au

NOTES

1. Site features are indicative and are not to scale.
2. This drawing has been produced using a base plan provided by others to which additional information e.g test pits, borehole locations or notes have been added. Some or all of the plan may not be relevant at the time of producing this drawing

Redbank Communities
 Proposed Development
 Southern Heights
 Grose Vale Road, North Richmond

Test Pit Locations

Drawing No: 7747/57-AB1
 Job No: 7747/57
 Drawn By: MH
 Date: 13 January 2022
 Checked By: ZA

File No: 7747-54
 Layers: 0, AB1



LEGEND

■ Test Pit

NOTES

1. Site features are indicative and are not to scale.
2. This drawing has been produced using a base plan provided by others to which additional information e.g test pits, borehole locations or notes have been added. Some or all of the plan may not be relevant at the time of producing this drawing

Redbank Communities
Proposed Development
Southern Heights
Grose Vale Road, North Richmond

Test Pit Locations

Drawing No: 7747/57-AC1
Job No: 7747/57
Drawn By: MH
Date: 2 February 2022
Checked By: ZA

File No: 7747-54
Layers: 0, AC1



34 Borec Road
Penrith
NSW 2750
ABN 71 076 676 321

Ph: 02 4722 2744
Fx: 02 4722 2777
www.geotech.com.au
e-mail: info@geotech.com.au

APPENDIX B

**TABLE B
SUMMARY OF SITE CLASSIFICATIONS**

Job No: 7747/57
 Our Ref: 7747/57-AB-R1

SUMMARY OF SITE CLASSIFICATIONS

**Redbank Development – Southern Heights
 Grose Vale Road, North Richmond**

Site Classification

Lot	Site Classification	Lot	Site Classification
1601	Class "M"	1626	Class "M"
1602	Class "S"	1627	Class "M"
1603	Class "S"	1628	Class "S"
1604	Class "S"	1629	Class "S"
1605	Class "M"	1630	Class "S"
1606	Class "M"	1631	Class "S"
1607	Class "M"	1632	Class "S"
1608	Class "M"	1633	Class "S"
1609	Class "M"	1634	Class "S"
1610	Class "M"	1635	Class "S"
1611	Class "M"	1636	Class "S"
1612	Class "M"	1702	Class "M"
1613	Class "M"	1703	Class "M"
1614	Class "M"	1704	Class "M"
1615	Class "M"	1705	Class "M"
1616	Class "M"	1706	Class "M"
1617	Class "M"	1707	Class "M"
1618	Class "M"	1708	Class "M"
1619	Class "M"	1709	Class "M"
1620	Class "M"	1710	Class "M"
1621	Class "M"	1711	Class "M"
1622	Class "M"	1712	Class "M"
1623	Class "M"	1713	Class "M"
1624	Class "M"	1714	Class "M"
1625	Class "M"		

*S : Slightly Reactive; M : Moderately Reactive
 (AS2870-2011 "Residential slabs & footings")*

APPENDIX C

LABORATORY TEST RESULTS

REDBANK COMMUNITIES
 PO BOX 1918
 PENRITH NSW 2750

Job No: 7747/57
 Tested By: JC
 Checked By: AK
 Date Tested: 21/12/2021
 Laboratory: Penrith

SITE CLASSIFICATION
 PROPOSED DEVELOPMENT, GROSE VALE ROAD, NORTH RICHMOND, STAGE SOUTHERN HEIGHTS

TEST RESULTS - SHRINK / SWELL INDEX

Test Procedure: AS 1289 7.1.1				
Sample Identification	Test Pit 101	Test Pit 105		
Depth (m)	0.5 - 0.95	0.5 - 0.95		
Laboratory Number	7747/57-17	7747/57-18		
Test Description				
Moisture Content				
Initial %	12.4	10.2		
Final %	19.7	14.3		
Swell %	0.4	Nil		
Shrinkage %	Nil	2.5		
Shrink/Swell Index %/pF	0.1	1.4		
Material Description	FILL: Silty Clay, medium plasticity, grey to dark grey, with shale fragments	(CI-CH) Silty CLAY, medium to high plasticity, brown to mottled grey, traces of shale fragments		

Form No R007 Version 12 06/13



NATA Accreditation Number 2734
 Corporate Site Number 2727

Accredited for compliance with
 ISO/IEC 17025 - Testing.

A Kench 18/01/2022
 Approved Signatory

REDBANK COMMUNITIES
PO BOX 1918
PENRITH NSW 2750

SITE CLASSIFICATION
PROPOSED DEVELOPMENT, GROSE VALE ROAD, NORTH RICHMOND, STAGE SOUTHERN HEIGHTS

TEST RESULTS - ATTERBERG LIMITS
Test Procedure AS1289 3.1.1, 3.2.1, 3.3.1, 3.4.1

Page 1 of 1

Job No:	7747/57	Tested By:	BG
Laboratory	Penrith	Checked By:	AK
Date Tested	01/02/2022		
Sample Identification	Test Pit 108	Test Pit 116	
Laboratory Number	7747/57-19	7757/57-20	
Depth (m)	0.3 - 0.6	0.2 - 0.5	
Test Description			
Liquid Limit (W _L)	45%	57%	
Plastic Limit (W _P)	18%	20%	
Plastic Index (I _P)	27%	37%	
Linear Shrinkage (LS)	15.0%	13.0%	
Mould Length (mm)	127	125	
Sample History	Oven Dried Dry Sieved	Oven Dried Dry Sieved	
Material Description	FILL: Silty Clay, medium plasticity, grey & orange-brown, trace of fine to medium gravel	FILL: Silty Clay, medium to high plasticity, dark brown, some fine to medium gravel	

Form No R004 Version 12 - 06/13 - Issued by ER



Nata Accreditation Number 2734
Corporate Site Number 2727

Accredited for compliance with ISO/IEC 17025 - Testing.

A Kench

7/02/2022
Approved Signatory

34 Borec Road, Penrith NSW 2750
Telephone: (02) 4722 2744

Unit 4, 18-20 Whyalla Place, Prestons NSW 2170
Telephone: (02) 9607 6111

email: info@geotech.com.au www.geotech.com.au