



Job No: 7747/41
Our Ref: 7747/41-AA
21 November 2018

Redbank Communities
P O Box 1918
PENRITH NSW 2750

Attention: Mr R Pillay

Dear Sir

re: **Proposed Development- Yeomans Entry
Grose Vale Road, North Richmond
Site Classification Report**

Please find herewith the results of a geotechnical investigation for the classification of proposed lots at the above site. A total of fifty-two (52) lots are covered in this report (Lots 501 to 552).

This report contains information on surface and sub-surface conditions encountered at the site, together with the assessment of the site classifications in accordance with Australian Standard AS2870-2011 "Residential Slabs & Footings".

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 read "Ziauddin Ahmed", is written over a horizontal line.

ZIAUDDIN AHMED
Associate Geotechnical Engineer

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1.0 INTRODUCTION

This report provides results of a geotechnical investigation for the classification of proposed lots at Yeomans Entry development. The investigation was commissioned by Mr Ravi Pillay of Redbank Communities in an email dated 23 October 2018. A total of fifty-two (52) lots are covered in this report (Lots 501 to 552).

Site classification in accordance with AS2870-2011 is only applicable for design of footing systems 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 site investigation was carried out on 31 October 2018, under the supervision of a Field Engineer from the company and consisted of excavation of eighteen (TP1 to TP18), using an excavator. The approximate test pit locations are indicated on the attached Drawing No 7747/41-AA1. The test pits were terminated at depth of 1.5m or prior refusal on bedrock. The brief descriptions of materials encountered in the test pits are provided in the attached Table A.

3.0 SITE CONDITIONS

3.1 Site Description

At the time of investigation, earthworks for the lots had been completed and the construction of internal roads was underway. The topography of the site is undulating with a general slope towards north / north-east direction and the ground surface was generally void of vegetation.

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.

Fill	Silty Clay, low to medium plasticity, brown
Natural	Shaley CLAY, high plasticity, grey, trace of ironstone Silty CLAY, medium to high plasticity, orange
Bedrock	SHALE, pale grey to grey, distinctly weathered, low strength

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.

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Yeomans Entry - Grose Vale Road, North Richmond

4.0 LABORATORY TESTING

During the site investigation, five (5) undisturbed samples (U_{50}) samples were recovered for shrink/swell index tests aimed at assessing soil reactivity due to moisture changes. The tests were conducted as per relevant Australian Standard and the results are summarised below and detailed in the attached certificates.

Test Pit	Sample Depth (m)	Material Description	I_{ss} (%/pF)
6	0.4 – 0.9	(CH) Gravelly CLAY, high plasticity, grey	2.7
10	0.4 – 0.9	FILL : Silty Clay, low plasticity, brown	1.3
13	0.3 – 0.9	(CL) Silty CLAY, low plasticity, grey	1.4
16	0.4 – 0.9	(CI) Silty CLAY, medium plasticity, grey	2.0
17	0.3 – 0.8	(CL-CI) Silty CLAY, low to medium plasticity	1.5

I_{ss} : Shrink/Swell 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 7747/37.

5.2 Site Classifications

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 31 October 2018 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.

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.

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APPENDIX A

TABLE A
(Summary of Test Pits)

TEST PIT LOCATION PLAN
(Drawing No 7747/41-AA1)

TABLE A

Job No: 7747/41

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Our Ref: 7747/41-AA (Yoemans Entry, Redbank Development, North Richmond)

TEST PIT NUMBER	DEPTH (m)	SAMPLE DEPTH (m)	MATERIAL DESCRIPTION
TP1	0-0.1		FILL: Silty Clay, low to medium plasticity, brown
	0.1-0.2		SHALE, grey, distinctly weathered, medium strength
	0.2		Refusal on Bedrock
TP2	0-0.1		FILL: Silty Clay, low to medium plasticity, brown
	0.1-0.2		SHALE, grey, distinctly weathered, medium strength
	0.2		Refusal on Bedrock
TP3	0-0.2		FILL: Silty Clay, low to medium plasticity, brown
	0.2-0.6		SHALE, pale grey to grey, distinctly weathered, low strength
	0.6		Refusal on Bedrock
TP4	0-0.6		SHALE, pale grey to grey, distinctly weathered, low strength
	0.6		Refusal on Bedrock
TP5	0-0.4		SHALE, pale grey to grey, distinctly weathered, low strength
	0.4		Refusal on Bedrock
TP6	0-0.3		FILL: Silty Clay, medium plasticity, brown to grey
	0.3-1.5	0.4-0.9 (U ₅₀)	(CH) Shaley CLAY, high plasticity, grey, trace of ironstone
TP7	0-0.3		FILL: Silty Clay, low to medium plasticity, brown
	0.3-1.5		(CH) Shaley CLAY, high plasticity, grey trace of ironstone

TABLE A

Job No: 7747/41

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Our Ref: 7747/41-AA (Yoemans Entry, Redbank Development, North Richmond)

TEST PIT NUMBER	DEPTH (m)	SAMPLE DEPTH (m)	MATERIAL DESCRIPTION
TP8	0-0.3		FILL: Silty Clay, low to medium plasticity, brown
	0.3-0.5		(CH) Shaley CLAY, high plasticity, grey, trace of ironstone
	0.5		Refusal on Bedrock
TP9	0-1.5		FILL: Silty Clay, low to medium plasticity, brown
TP10	0-0.4	0.4-0.9 (U ₅₀)	FILL: Silty Clay, low to medium plasticity, brown
	0.4-1.5		(CI-CH) Silty CLAY, medium to high plasticity, orange
TP11	0-0.5		FILL: Silty Clay, low to medium plasticity, brown
	0.5-1.5		(CH) Shaley CLAY, high plasticity, grey, trace of ironstone
TP12	0-0.4		FILL: Silty Clay, low to medium plasticity, brown
	0.4-1.5		(CH) Shaley CLAY, high plasticity, grey, trace of ironstone
TP13	0-0.2	0.3-0.8 (U ₅₀)	FILL: Silty Clay, low to medium plasticity, brown
	0.2-1.5		(CH) Shaley CLAY, high plasticity, grey, trace of ironstone
TP14	0-0.3		FILL: Silty Clay, low to medium plasticity, brown
	0.3-1.5		(CH) Shaley CLAY, high plasticity, grey, trace of ironstone

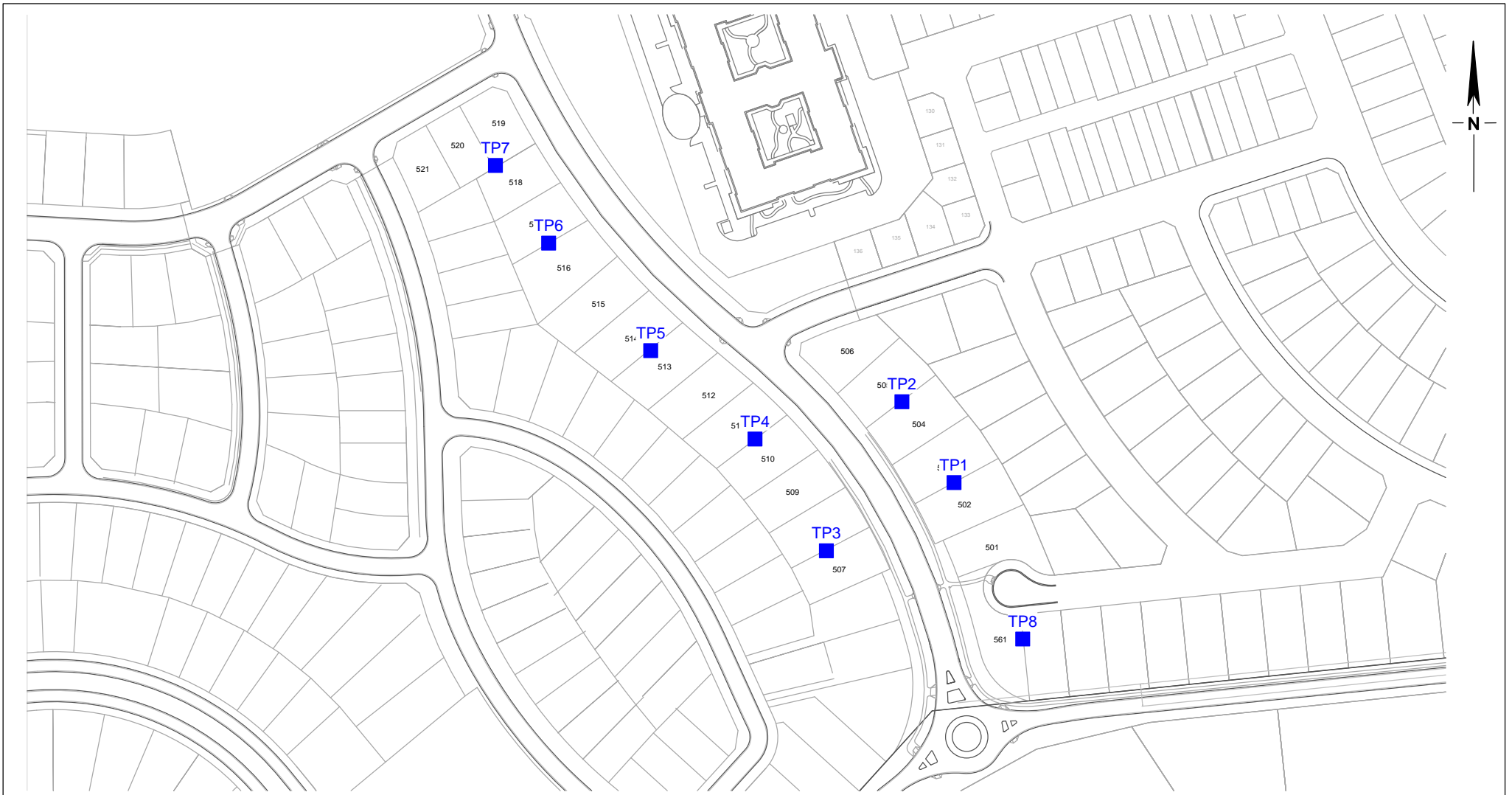
TABLE A

Job No: 7747/41

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Our Ref: 7747/41-AA (Yeomans Entry, Redbank Development, North Richmond)

TEST PIT NUMBER	DEPTH (m)	SAMPLE DEPTH (m)	MATERIAL DESCRIPTION
TP15	0-0.2		FILL: Silty Clay, low to medium plasticity, brown
	0.2-0.4		(CH) Shaley CLAY, high plasticity, grey, trace of ironstone
	0.4-0.6		SHALE, grey, distinctly weathered, medium strength
TP16	0-0.2		FILL: Silty Clay, low to medium plasticity, brown
	0.2-1.5	0.4-0.9	(CH) Shaley CLAY, high plasticity, grey, trace of ironstone
TP17	0-0.2		FILL: Silty Clay, low to medium plasticity, brown
	0.2-1.5	0.3-0.9	(CH) Shaley CLAY, high plasticity, grey, trace of ironstone
TP18	0-0.2		FILL: Silty Clay, low to medium plasticity, brown
	0.2-1.5		(CH) Shaley CLAY, high plasticity, grey, trace of ironstone



LEGEND

■ Test Pit



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NOTES

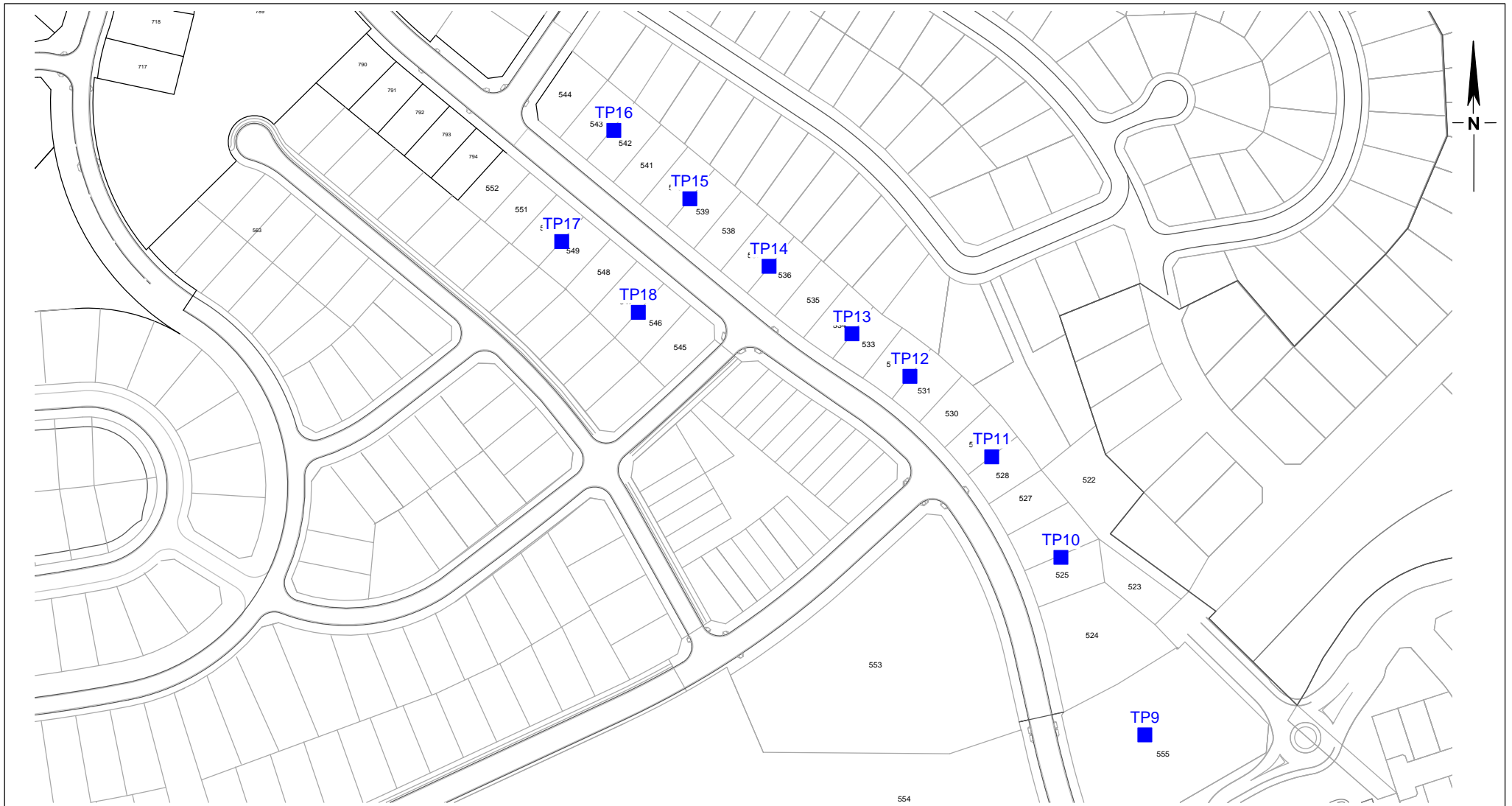
1. Site features are indicative and are not to scale.
2. This drawing has been produced using a base plan provided by others to which additional information e.g test pits, borehole locations or notes have been added. Some or all of the plan may not be relevant at the time of producing this drawing

Redbank Communities
Proposed Development
Yeomans Entry
Grose Vale Road, North Richmond

Test Pit Locations

Drawing No: 7747/41-AA1
Job No: 7747/41
Drawn By: MH
Date: 1 November 2018
Checked By: JH/ZA

File No: 7747-41
Layers: 0, AA1



LEGEND

■ Test Pit



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 NSW 2750
 ABN 71 076 676 321

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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
 Yeomans Entry
 Grose Vale Road, North Richmond

Test Pit Locations

Drawing No: 7747/41-AA2
 Job No: 7747/41
 Drawn By: MH
 Date: 1 November 2018
 Checked By: JH/ZA

File No: 7747-41
 Layers: 0, AA2

APPENDIX B

**TABLE B
SUMMARY OF SITE CLASSIFICATIONS**

Job No: 7747/41
 Our Ref: 7747/41-AA

SUMMARY OF SITE CLASSIFICATIONS

**Proposed Development- Yeomans Entry
 Grose Vale Road, North Richmond**

Site Classification Report

Lot	Site Classification	Lot	Site Classification
501	Class "S"	527	Class "M"
502	Class "S"	528	Class "M"
503	Class "S"	529	Class "M"
504	Class "S"	530	Class "M"
505	Class "S"	531	Class "M"
506	Class "S"	532	Class "M"
507	Class "S"	533	Class "M"
508	Class "S"	534	Class "M"
509	Class "S"	535	Class "M"
510	Class "S"	536	Class "M"
511	Class "S"	537	Class "M"
512	Class "S"	538	Class "M"
513	Class "S"	539	Class "S"
514	Class "S"	540	Class "S"
515	Class "M"	541	Class "M"
516	Class "H1"	542	Class "M"
517	Class "H1"	543	Class "M"
518	Class "H1"	544	Class "M"
519	Class "H1"	545	Class "M"
520	Class "H1"	546	Class "M"
521	Class "H1"	547	Class "M"
522	Class "M"	548	Class "M"
523	Class "M"	549	Class "M"
524	Class "M"	550	Class "M"
525	Class "M"	551	Class "M"
526	Class "M"	552	Class "M"

*S : Slightly Reactive; M : Moderately Reactive; H1 Highly Reactive
 (AS2870-2011 "Residential slabs & footings")*

APPENDIX C

LABORATORY TEST RESULTS

REDBANK COMMUNITIES
PO BOX 1918
PENRITH NSW 2750

Job No: 7747/41
Tested By: HW
Checked By: AK
Date Tested: 16/11/2018
Laboratory: Penrith

SITE CLASSIFICATION
PROPOSED DEVELOPMENT, GROSE VALE ROAD, NORTH RICHMOND, STAGE YEOMANS ENTRY

TEST RESULTS - SHRINK / SWELL INDEX

Page 1 of 2

Test Procedure: AS 1289 7.1.1				
Sample Identification	Test Pit 6	Test Pit 10	Test Pit 13	Test Pit 16
Depth (m)	0.4 - 0.9	0.4 - 0.9	0.3 - 0.8	0.4 - 0.9
Laboratory Number	7747/41-1	7747/41-2	7747/41-3	7747/41-4
Test Description				
Moisture Content				
Initial %	11.5	16.7	14.4	17.3
Final %	18.8	28.5	17.9	25.7
Swell %	5.6	0.4	2.5	3.3
Shrinkage %	2.0	2.1	1.3	1.9
Shrink/Swell Index % _p F	2.7	1.3	1.4	2.0
Material Description	(CH) Gravelly CLAY, high plasticity, grey	FILL: Silty Clay, low plasticity, brown	(CL) Silty CLAY, low plasticity, grey	(CI) Silty CLAY, medium plasticity, grey

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 21/11/2018
Approved Signatory

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REDBANK COMMUNITIES
 PO BOX 1918
 PENRITH NSW 2750

Job No: 7747/41
 Tested By: HW
 Checked By: AK
 Date Tested: 16/11/2018
 Laboratory: Penrith

SITE CLASSIFICATION
 PROPOSED DEVELOPMENT, GROSE VALE ROAD, NORTH RICHMOND, STAGE YEOMANS ENTRY

TEST RESULTS - SHRINK / SWELL INDEX

Test Procedure: AS 1289 7.1.1				
Sample Identification	Test Pit 17			
Depth (m)	0.3 - 0.9			
Laboratory Number	7747/41-5			
Test Description				
Moisture Content				
Initial %	23.1			
Final %	26.0			
Swell %	1.5			
Shrinkage %	2.0			
Shrink/Swell Index %/pF	1.5			
Material Description	(CL-CI) Silty CLAY, low to medium plasticity			

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 21/11/2018
Approved Signatory

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