



Job No: 7747/39
Our Ref: 7747/39-AA (Final)
29 August 2018

North Richmond Joint Venture
P O Box 1918
PENRITH NSW 2750

Attention: Mr R Pillay

Dear Sir

re: **Redbank Development - Yeomans Precinct
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 one hundred and eighty two (182) lots (Lots 601 to 696, Lots 720 to 787, Lots 800 to 817) are covered in this report.

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 be "Kartik Singh", is written over a horizontal line.

pp KARTIK SINGH
Geotechnical Engineer

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1.0 INTRODUCTION

This report provides results of a geotechnical investigation for the classification of proposed lots at Yoemans Precinct. A total of one hundred and eighty two (182) lots (Lots 601 to 696, Lots 720 to 787, Lots 800 to 817) are covered in this report.

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 11, 13, 19 July 2018, under the supervision of a Geotechnical Engineer from the company and consisted of excavating seventy seven test pits (TP1 to TP77), using an excavator. The approximate test pit locations are indicated on the attached Drawing No 7747/39-AA1. 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

The site is bounded by Archer Road to east and land under development on all other adjacent. At the time of the investigation the site was devoid of vegetation with the lots covered with spray grass and services installed. The topography of the site generally slopes towards the northeast/north. Construction of internal roads was complete.

3.2 Sub-Surface Conditions

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

Fill	Silty Clay, low to medium plasticity, grey, with some concrete pieces Silty Clay, low to medium plasticity, grey brown, with some shale fragments Silty Clay, medium plasticity, red brown to grey, with some gravel and shale Silty Clay, medium plasticity, red/brown, with some sandstone
Natural	(CL-CH) CLAY, low to medium plasticity, red brown mottled grey, with traces of shale (CL) CLAY, low plasticity, brown, traces of ironstone/shale
Bedrock	SHALE, grey/brown, extremely weathered, low to medium 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.

4.0 LABORATORY TESTING

During the course of the investigation, ten (10) undisturbed (U_{50}) samples was recovered from the test pits for laboratory testing, aimed at determining the reactivity of the material to variations in moisture changes. The test conducted was Shrink/Swell Index Determination (I_{ss}), in accordance with Australian Standard AS1289 7.1.1. The samples recovered from TP13, 28, 33 and 58 were not suitable for shrink/swell testing, thus the sample was tested for Atterberg Limits (Plasticity Index) tests to determine the plasticity properties of the clay. Test results are detailed in the attached certificate and summarised below.

TP	Depth (m)	Material Description	Shrink/Swell Index (%)	Plasticity Index (%)
13	0.3-0.55	FILL: Silty Gravelly Clay, low plasticity, red-brown & grey	-	10
22	0.2-0.5	(CL) CLAY, low plasticity, brown, trace of fine to medium gravel	1.7	-
28	0.35-0.5	(CI) Silty CLAY, medium plasticity, brown, trace of fine to medium gravel	-	24
33	0.4-0.6	FILL: Silty Clay, high plasticity, grey-brown with some fine to medium gravel	-	39
38	0.5-0.7	FILL: Silty Clay, low plasticity, red-brown & grey, trace of fine to medium gravel	1.1	-
48	0.6-0.8	FILL: Silty Clay, low plasticity, red-brown & grey, trace of fine to medium gravel	0.7	-
58	0.5-0.7	FILL: Silty Gravelly Clay, low plasticity, red-brown & grey	-	24
61	0.3-0.5	FILL: Silty Clay, low to medium plasticity, red-brown, some fine to medium gravel	0.8	-
67	0.45-0.65	FILL: Silty Clay, medium to high plasticity, red-brown, some fine to medium gravel	2.2	-
73	0.7-0.9	FILL: Silty Clay, low plasticity, red-brown, some fine to medium gravel	0.9	-

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 our report 7747/37-AA.

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.

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The classifications presented in Appendix B of this report are applicable to the Lots at the date of conducting the investigation, being 19 July 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 7747/39-AA1)

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TEST PIT NUMBER	DEPTH (m)	SAMPLE DEPTH (m)	MATERIAL DESCRIPTION
TP1	0.0-0.1		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.1-0.2		FILL: Silty Clay, low to medium plasticity, grey, with some concrete pieces
	0.3-1.5		FILL: Silty Clay, low to medium plasticity, grey brown, with some shale fragments
TP2	0.0-0.1		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.1-1.5		FILL: Silty Clay, low to medium plasticity, grey brown, with some shale fragments
TP3	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-1.5		FILL: Silty Clay, low to medium plasticity, grey brown, with some shale fragments
TP4	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-1.0		FILL: Silty Clay, low to medium plasticity, grey brown, with some shale fragments
	1.0-1.5		FILL: Silty Clay, medium plasticity, red brown to grey, with some gravel and shale
TP5	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-1.5		FILL: Silty Clay, low to medium plasticity, grey brown, with some shale fragments
TP6	0.0-0.1		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.1-1.5		FILL: Silty Clay, low to medium plasticity, grey brown, with some shale fragments
TP7	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-1.5		FILL: Silty Clay, low to medium plasticity, grey brown, with some shale fragments

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TEST PIT NUMBER	DEPTH (m)	SAMPLE DEPTH (m)	MATERIAL DESCRIPTION
TP8	0.0-0.2	0.3-0.55 (U ₅₀)	TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-1.5		FILL: Silty Clay, low to medium plasticity, grey brown, with some shale fragments
TP9	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-1.5		FILL: Silty Clay, low to medium plasticity, grey brown, with some shale fragments
TP10	0.0-0.1		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.1-1.5		FILL: Silty Clay, low to medium plasticity, grey brown, with some shale fragments
TP11	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-1.5		FILL: Silty Clay, low to medium plasticity, grey brown, with some shale fragments
TP12	0.0-0.1		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.1-1.5		FILL: Silty Clay, low to medium plasticity, grey brown, with some shale fragments
TP13	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-0.4		FILL: Silty Clay, medium plasticity, red brown to grey, with some gravel and shale
	0.4-1.5		(CL-CI) CLAY, low to medium plasticity, red brown mottled grey, with traces of shale
TP14	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-0.5	FILL: Silty Clay, medium plasticity, red brown to grey, with some gravel and shale	
	0.5-1.5	(CL-CI) CLAY, low to medium plasticity, red brown mottled grey, with traces of shale	

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TEST PIT NUMBER	DEPTH (m)	SAMPLE DEPTH (m)	MATERIAL DESCRIPTION
TP15	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-0.5		FILL: Silty Clay, medium plasticity, red/brown, with some sandstones
	0.5-1.5		(CL-CI) CLAY, low to medium plasticity, red brown mottled grey, with traces of shale
TP16	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-0.4		FILL: Silty Clay, medium plasticity, red brown to grey, with some gravel and shale
	0.4-1.5		(CL-CI) CLAY, low to medium plasticity, red brown mottled grey, with traces of shale
TP17	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-0.7		FILL: Silty Clay, medium plasticity, red brown to grey, with some gravel and shale
	0.7-1.5		(CL) CLAY, low plasticity, brown, with traces of ironstone/shale
TP18	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-0.4		(CL) CLAY, low plasticity, brown, with traces of ironstone/shale
	0.4-0.6		SHALE, grey/brown
TP19	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-0.4		(CL) CLAY, low plasticity, brown, with traces of ironstone/shale
	0.4-0.6		SHALE, grey/brown

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TEST PIT NUMBER	DEPTH (m)	SAMPLE DEPTH (m)	MATERIAL DESCRIPTION
TP20	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-0.5		(CL) CLAY, low plasticity, brown, with traces of ironstone/shale
	0.5-0.8		SHALE, grey/brown
TP21	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-0.8		(CL-CI) CLAY, low to medium plasticity, red brown mottled grey, with traces of shale
	0.8-1.0		(CL) CLAY, low plasticity, brown, with traces of ironstone/shale
	1.0-1.1		SHALE, grey/brown
TP22	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-1.0	0.2-0.5 (U ₅₀)	(CL) CLAY, low plasticity, brown, with traces of ironstone/shale
	1.0-1.1		SHALE, grey/brown
TP23	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-0.4		FILL: Silty Clay, medium plasticity, red brown to grey, with some gravel and shale
	0.4-1.5		(CL-CI) CLAY, low to medium plasticity, red brown mottled grey, with traces of shale
TP24	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-0.8		FILL: Silty Clay, medium plasticity, red brown to grey, with some gravel and shale
	0.8-1.5		(CL-CI) CLAY, low to medium plasticity, red brown mottled grey, with traces of shale

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TEST PIT NUMBER	DEPTH (m)	SAMPLE DEPTH (m)	MATERIAL DESCRIPTION
TP25	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-0.7		FILL: Silty Clay, medium plasticity, red brown to grey, with some gravel and shale
	0.7-1.5		(CL-CI) CLAY, low to medium plasticity, red brown mottled grey, with traces of shale
TP26	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-0.5		FILL: Silty Clay, medium plasticity, red brown to grey, with some gravel and shale
	0.5-1.5		(CL) CLAY, low plasticity, brown, with traces of ironstone/shale
TP27	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-0.4		(CL) CLAY, low plasticity, brown, with traces of ironstone/shale
	0.4-1.5		(CL-CI) CLAY, low to medium plasticity, red brown mottled grey, with traces of shale
TP28	0.0-0.25		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.25-1.5	0.35-0.5 (U ₅₀)	(CL) CLAY, low plasticity, brown, with traces of ironstone/shale
TP29	0.0-0.25		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.25-0.6		FILL: Silty Clay, medium plasticity, red brown to grey, with some gravel and shale
	0.6-1.5		(CL) CLAY, low plasticity, brown, with traces of ironstone/shale

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TEST PIT NUMBER	DEPTH (m)	SAMPLE DEPTH (m)	MATERIAL DESCRIPTION
TP30	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-0.5		FILL: Silty Clay, low to medium plasticity, grey brown, with some shale fragments
	0.5-1.5		FILL: Silty Clay, medium plasticity, red brown to grey, with some gravel and shale
TP31	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-0.65		FILL: Silty Clay, low to medium plasticity, grey brown, with some shale fragments
	0.65-1.5		FILL: Silty Clay, medium plasticity, red brown to grey, with some gravel and shale
TP32	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-0.7		FILL: Silty Clay, low to medium plasticity, grey brown, with some shale fragments
	0.7-1.5		FILL: Silty Clay, medium plasticity, red brown to grey, with some gravel and shale
TP33	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-0.7	0.4-0.6 (U ₅₀)	FILL: Silty Clay, low to medium plasticity, grey brown, with some shale fragments
	0.7-1.5		FILL: Silty Clay, medium plasticity, red brown to grey, with some gravel and shale
TP34	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-0.8		FILL: Silty Clay, low to medium plasticity, grey brown, with some shale fragments
	0.8-1.5		FILL: Silty Clay, medium plasticity, red brown to grey, with some gravel and shale

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TEST PIT NUMBER	DEPTH (m)	SAMPLE DEPTH (m)	MATERIAL DESCRIPTION
TP35	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-0.5		FILL: Silty Clay, medium plasticity, red brown to grey, with some gravel and shale
	0.5-1.5		FILL: Silty Clay, low to medium plasticity, grey brown, with some shale fragments
TP36	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-0.4		FILL: Silty Clay, medium plasticity, red brown to grey, with some gravel and shale
	0.4-1.5		FILL: Silty Clay, low to medium plasticity, grey brown, with some shale fragments
TP37	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-0.35		FILL: Silty Clay, medium plasticity, red brown to grey, with some gravel and shale
	0.35-1.5		FILL: Silty Clay, low to medium plasticity, grey brown, with some shale fragments
TP38	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-0.75	0.4-0.7 (U ₅₀)	FILL: Silty Clay, medium plasticity, red brown to grey, with some gravel and shale
	0.75-1.5		FILL: Silty Clay, low to medium plasticity, grey brown, with some shale fragments
TP39	0.0-0.15		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.15-1.1		FILL: Silty Clay, medium plasticity, red brown to grey, with some gravel and shale
	1.1-1.5		(CL) CLAY, low plasticity, brown, with traces of ironstone/shale

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TEST PIT NUMBER	DEPTH (m)	SAMPLE DEPTH (m)	MATERIAL DESCRIPTION
TP40	0.0-0.15		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.15-0.85		(CL-CI) CLAY, low to medium plasticity, red brown mottled grey, with traces of shale
	0.85		Refusal
TP41	0.0-0.15		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.15		Refusal
TP42	0.0-0.15		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.15-1.3		(CL-CI) CLAY, low to medium plasticity, red brown mottled grey, with traces of shale
	1.3-1.4		SHALE, grey/brown
	1.4		Refusal
TP43	0.0-0.15		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.15-0.6		(CL-CI) CLAY, low to medium plasticity, red brown mottled grey, with traces of shale
	0.6-0.7		SHALE, grey/brown
	0.7		Refusal
TP44	0.0-0.15		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.15-0.4		(CL-CI) CLAY, low to medium plasticity, red brown mottled grey, with traces of shale
	0.4-0.5		SHALE, grey/brown
	0.5		Refusal

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TEST PIT NUMBER	DEPTH (m)	SAMPLE DEPTH (m)	MATERIAL DESCRIPTION
TP45	0.0-0.15		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.15-0.4		(CL-CI) CLAY, low to medium plasticity, red brown mottled grey, with traces of shale
	0.4-0.5		SHALE, grey/brown
	0.5		Refusal
TP46	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-0.4		FILL: Silty Clay, medium plasticity, red brown to grey, with some gravel and shale
	0.4-0.5		SHALE, grey/brown
	0.5		Refusal
TP47	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-1.0		(CL-CI) CLAY, low to medium plasticity, red brown mottled grey, with traces of shale
	1.0-1.1		SHALE, grey/brown
	1.1		Refusal
TP48	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-1.5	0.6-0.8 (U ₅₀)	FILL: Silty Clay, medium plasticity, red brown to grey, with some gravel and shale
TP49	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-1.5		(CL) CLAY, low plasticity, brown, with traces of ironstone/shale

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TEST PIT NUMBER	DEPTH (m)	SAMPLE DEPTH (m)	MATERIAL DESCRIPTION
TP50	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-0.6		FILL: Silty Clay, low to medium plasticity, grey brown, with some shale fragments
	0.6-0.7		SHALE, grey/brown
	0.7		Refusal
TP51	0.0-0.15		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.15-1.5		FILL: Silty Clay, medium plasticity, red brown to grey, with some gravel and shale
TP52	0.0-0.15		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.15-1.5		FILL: Silty Clay, medium plasticity, red brown to grey, with some gravel and shale
TP53	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-0.7		FILL: Silty Clay, medium plasticity, red brown to grey, with some gravel and shale
	0.7-1.5		FILL: Silty Clay, low to medium plasticity, grey brown, with some shale fragments
TP54	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-0.8		FILL: Silty Clay, medium plasticity, red brown to grey, with some gravel and shale
	0.8-1.5		FILL: Silty Clay, low to medium plasticity, grey brown, with some shale fragments
TP55	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-1.5		FILL: Silty Clay, low to medium plasticity, grey brown, with some shale fragments

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TEST PIT NUMBER	DEPTH (m)	SAMPLE DEPTH (m)	MATERIAL DESCRIPTION
TP56	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-1.5		FILL: Silty Clay, low to medium plasticity, grey brown, with some shale fragments
TP57	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-1.5		FILL: Silty Clay, low to medium plasticity, grey brown, with some shale fragments
TP58	0.0-0.2	0.5-0.7 (U ₅₀)	TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-0.8		FILL: Silty Clay, medium plasticity, red brown to grey, with some gravel and shale
	0.8-1.5		FILL: Silty Clay, low to medium plasticity, grey brown, with some shale fragments
TP59	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-1.2		FILL: Silty Clay, medium plasticity, red/brown, with some sandstones
	1.2-1.5		FILL: Silty Clay, medium plasticity, red brown to grey, with some gravel and shale
TP60	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-1.0		FILL: Silty Clay, medium plasticity, red/brown, with some sandstones
	1.0-1.5		(CL-CI) CLAY, low to medium plasticity, red brown mottled grey, with traces of shale
TP61	0.0-0.2	0.3-0.5 (U ₅₀)	TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-0.8		FILL: Silty Clay, medium plasticity, red/brown, with some sandstones
	0.8-1.5		(CL-CI) CLAY, low to medium plasticity, red brown mottled grey, with traces of shale

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TEST PIT NUMBER	DEPTH (m)	SAMPLE DEPTH (m)	MATERIAL DESCRIPTION
TP62	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-1.5		FILL: Silty Clay, medium plasticity, red/brown, with some sandstones
TP63	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-0.65		FILL: Silty Clay, medium plasticity, red/brown, with some sandstones
	0.65		FILL: Silty Clay, medium plasticity, red brown to grey, with some gravel and shale, with oversize sandstone
TP64	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-0.3		SHALE, grey/brown
	0.3		Refusal
TP65	0.0-0.3		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.3-0.5		FILL: Silty Clay, medium plasticity, red/brown, with some sandstones
	0.5-0.65		SHALE, grey/brown
	0.65		Refusal
TP66	0.0-0.25		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.25-1.5		FILL: Silty Clay, medium plasticity, red/brown, with some sandstones, with oversize sandstone
TP67	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-0.4	0.45-0.65 (U ₅₀)	FILL: Silty Clay, medium plasticity, red/brown, with some sandstones
	0.4-1.5		(CI-CH) CLAY, medium to high plasticity, red

TABLE A

Job No: 7747/39
Our Ref: 7747/39-AA

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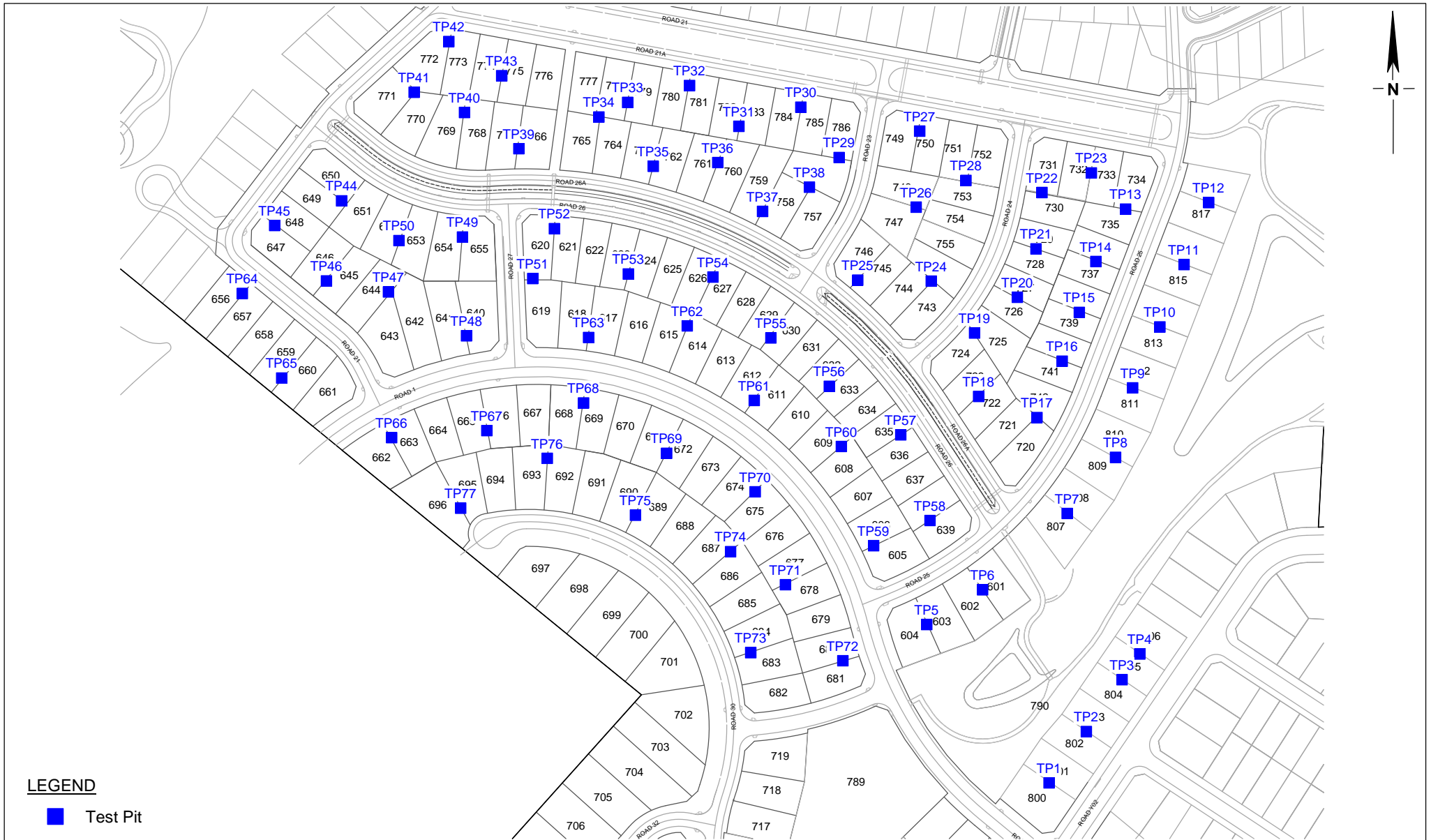
TEST PIT NUMBER	DEPTH (m)	SAMPLE DEPTH (m)	MATERIAL DESCRIPTION
TP68	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-0.9		FILL: Silty Clay, medium plasticity, red/brown, with some sandstones
	0.9-1.5		FILL: Silty Clay, medium plasticity, red brown to grey, with some gravel and shale
TP69	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-1.0		FILL: Silty Clay, medium plasticity, red/brown, with some sandstones
	1.0-1.5		FILL: Silty Clay, medium plasticity, red brown to grey, with some gravel and shale
TP70	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-1.05		FILL: Silty Clay, medium plasticity, red/brown, with some sandstones
	1.05-1.5		FILL: Silty Clay, low to medium plasticity, grey brown, with some shale fragments
TP71	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-1.3		FILL: Silty Clay, medium plasticity, red/brown, with some sandstones
	1.3-1.5		FILL: Silty Clay, low to medium plasticity, grey brown, with some shale fragments
TP72	0.0-0.2		TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.2-1.3		FILL: Silty Clay, medium plasticity, red/brown, with some sandstones
	1.3-1.5		FILL: Silty Clay, low to medium plasticity, grey brown, with some shale fragments

TABLE A

Job No: 7747/39
Our Ref: 7747/39-AA

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TEST PIT NUMBER	DEPTH (m)	SAMPLE DEPTH (m)	MATERIAL DESCRIPTION
TP73	0.0-0.25	0.7-0.9 (U ₅₀)	TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.25-1.5		FILL: Silty Clay, medium plasticity, red/brown, with some sandstones
TP74	0.0-0.3	0.7-0.9 (U ₅₀)	TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.3-1.3		FILL: Silty Clay, medium plasticity, red/brown, with some sandstones
	1.3-1.5		FILL: Silty Clay, medium plasticity, red brown to grey, with some gravel and shale
TP75	0.0-0.3	0.7-0.9 (U ₅₀)	TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.3-1.5		FILL: Silty Clay, medium plasticity, red/brown, with some sandstones
TP76	0.0-0.25	0.7-0.9 (U ₅₀)	TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.25-1.5		FILL: Silty Clay, medium plasticity, red/brown, with some sandstones
TP77	0.0-0.3	0.7-0.9 (U ₅₀)	TOPSOIL: Clayey Silt, low plasticity, brown, with some roots
	0.3-0.65		FILL: Silty Clay, medium plasticity, red/brown, with some sandstones
	0.65-1.5		FILL: Silty Clay, medium plasticity, red brown to grey, with some gravel and shale



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 Precinct
Grose Vale Road, North Richmond

Test Pit Locations

Drawing No: 7747/39-AA1
Job No: 7747/39
Drawn By: MH
Date: 24 August 2018
Checked By: KS

File No: 7747-39
Layers: 0, AA1

APPENDIX B

**TABLE B
SUMMARY OF SITE CLASSIFICATIONS**

Job No: 7747/39
Our Ref: 7747/39-AA

SUMMARY OF SITE CLASSIFICATIONS

**Redbank Residential Development - Yoemans Precinct
Grose Vale Road, North Richmond**

Site Classification Report

Lot	Site Classification	Lot	Site Classification	Lot	Site Classification
601	M	631	M	661	S
602	M	632	M	662	M
603	M	633	M	663	M
604	M	634	M	664	M
605	M	635	M	665	M
606	M	636	M	666	M
607	M	637	M	667	M
608	M	638	M	668	M
609	M	639	M	669	M
610	M	640	M	670	M
611	M	641	M	671	M
612	M	642	M	672	M
613	M	643	M	673	M
614	M	644	S	674	M
615	M	645	S	675	M
616	M	646	S	676	M
617	M	647	S	677	M
618	M	648	S	678	M
619	M	649	S	679	M
620	M	650	S	680	M
621	M	651	M	681	M
622	M	652	M	682	M
623	M	653	M	683	M
624	M	654	M	684	M
625	M	655	M	685	M
626	M	656	S	686	M
627	M	657	S	687	M
628	M	658	S	688	M
629	M	659	S	689	M
630	M	660	S	690	M

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

Job No: 7747/39
Our Ref: 7747/39-AA

SUMMARY OF SITE CLASSIFICATIONS (Continued)
Redbank Residential Development - Yoemans Precinct
Grose Vale Road, North Richmond

Site Classification Report

Lot	Site Classification	Lot	Site Classification	Lot	Site Classification
691	M	745	M	776	S
692	M	746	M	777	M
693	M	747	M	778	M
694	M	748	M	779	M
695	M	749	S	780	M
696	M	750	S	781	M
720	M	751	S	783	M
721	M	752	S	784	M
722	S	753	M	785	M
723	S	754	M	786	M
724	S	755	M	787	M
725	S	756	M	800	M
726	S	757	M	801	M
727	S	758	M	802	M
728	S	759	M	803	M
729	S	760	M	804	M
730	S	761	M	805	M
731	S	762	M	806	M
732	M	763	M	807	M
733	M	764	M	808	M
734	M	765	M	809	M
735	M	766	M	810	M
736	M	767	M	811	M
737	M	768	S	812	M
738	M	769	S	813	M
739	M	770	S	814	M
740	M	771	S	815	M
741	M	772	S	816	M
742	M	773	S	817	M
743	M	774	S		
744	M	775	S		

S:Slightly reactive (Free Surface Movement : 0-20mm), M: Moderately reactive (20-40mm)

APPENDIX C

LABORATORY TEST RESULTS

REDBANK COMMUNITIES
PO BOX 1918
PENRITH NSW 2750

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

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

Page 1 of 2

Job No:	7747/39	Tested By:	BC & TS
Laboratory	Penrith	Checked By:	AK
Date Tested	02/08/2018		
Sample Identification	Test Pit 13	Test Pit 28	Test Pit 33
Laboratory Number	7747/39-1	7747/39-3	7747/39-4
Depth (m)	0.3 - 0.55	0.35 - 0.5	0.4 - 0.6
Test Description			
Liquid Limit (W _L)	29%	43%	63%
Plastic Limit (W _P)	19%	24%	24%
Plastic Index (I _P)	10%	19%	39%
Linear Shrinkage (LS)	7.0%	10.5%	16.5%
Mould Length (mm)	125	127	127
Sample History	Oven Dried Dry Sieved	Oven Dried Dry Sieved	Oven Dried Dry Sieved
Material Description	FILL: Silty gravelly Clay, low plasticity, red-brown & grey	(Cl) Silty CLAY, medium plasticity, brown, trace of fine to medium gravel	FILL: Silty Clay, high plasticity, grey-brown with msome fine to medium gravel

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



Nata Accreditation Number 2734
Corporate Site Number 2727

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Accredited for compliance with ISO/IEC 17025 - Testing.

A Kench

29/08/2018

Approved Signatory

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REDBANK COMMUNITIES
 PO BOX 1918
 PENRITH NSW 2750

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

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

Page 2 of 2

Job No:	7747/39	Tested By:	BC & TS
Laboratory	Penrith	Checked By:	AK
Date Tested	02/08/2018		
Sample Identification	Test Pit 58		
Laboratory Number	7747/39-7		
Depth (m)	0.5 - 0.7		
Test Description			
Liquid Limit (W _L)	43%		
Plastic Limit (W _P)	24%		
Plastic Index (I _P)	19%		
Linear Shrinkage (LS)	6.5%		
Mould Length (mm)	127		
Sample History			
	Oven Dried Dry Sieved		
Material Description			
	FILL: Silty gravelly Clay, low plasticity, red-brown & grey		

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REDBANK COMMUNITIES
PO BOX 1918
PENRITH NSW 2750

Job No: 7747/39
Tested By: HW
Checked By: AK
Date Tested: 17/07/2018
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 22	Test Pit 38	Test Pit 48	Test Pit 61
Depth (m)	0.2 - 0.5	0.5 - 0.7	0.6 - 0.8	0.3 - 0.5
Laboratory Number	7747/39-2	7747/39-5	7747/39-6	7747/39-8
Test Description				
Moisture Content				
Initial %	22.5	14.2	11.6	20.3
Final %	29.0	20.2	20.2	27.9
Swell %	2.7	1.9	0.9	1.1
Shrinkage %	1.8	0.9	0.8	0.8
Shrink/Swell Index % _p F	1.7	1.1	0.7	0.8
Material Description	(CL) CLAY, low plasticity, brown, trace of fine to medium gravel	FILL: Silty Clay, low plasticity, red-brown & grey, trace of fine to medium gravel	FILL: Silty Clay, low plasticity, red-brown & grey, trace of fine to medium gravel	FILL: Silty Clay, low to medium plasticity, red-brown, some fine to medium gravel

Form No R007 Version 12 06/13



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REDBANK COMMUNITIES
 PO BOX 1918
 PENRITH NSW 2750

Job No: 7747/39
 Tested By: HW
 Checked By: AK
 Date Tested: 17/07/2018
 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 67	Test Pit 73		
Depth (m)	0.45 - 0.65	0.7 - 0.9		
Laboratory Number	7747/39-9	7747/39-10		
Test Description				
Moisture Content				
Initial %	6.9	13.6		
Final %	32.3	20.4		
Swell %	3.3	1.0		
Shrinkage %	2.4	1.2		
Shrink/Swell Index % _{pF}	2.2	0.9		
Material Description	FILL: Silty Clay, medium to high plasticity, red-brown, some fine to medium gravel	FILL: Silty Clay, low plasticity, red-brown, some fine to medium gravel		

Form No R007 Version 12 06/13



NATA Accreditation Number 2734
 Corporate Site Number 2727

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07/08/2018

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