

White Constructions Pty Ltd
C/- Unicomb Development Services Pty Ltd
11 Fantail Court
BLACKBUTT NSW 2529

Project 38319.08
7 May 2012
RLG:rlg

Attention: Mr Trevor Unicomb

Email: uds@aapt.net.au

Dear Sirs

Report on Geotechnical Investigation – Rock Survey
Proposed Residential Subdivision
Lots 1 – 4 Section 67 DP758563, Lots 1 and 2 DP797732 Jamberoo Road, Kiama

1. Introduction

This report presents the results of a geotechnical investigation undertaken for a proposed residential subdivision within Lots 1 – 4 Section 67, DP758563 and Lots 1 and 2 DP797732 Jamberoo Road, Kiama. The work was requested by Mr Trevor Unicomb of Unicomb Development Services Pty Ltd (UDS) project managers acting on behalf of White Constructions Pty Ltd, developers.

Site investigation was undertaken to provide information on subsurface conditions to support a planning proposal to Kiama Council for the rezoning of the site.

The investigation comprised test pit excavation followed by analysis and reporting. Details of the work undertaken and the results obtained are summarised within this report.

A survey plan was provided by the client for the investigation. A draft report was forwarded to UDS in an email transmission dated 30 April 2012. This report supersedes all previous verbal advice and written correspondence.

2. Site Description and Geology

The site which is known as Lots 1 – 4 Section 67, DP758563 and Lots 1 and 2 DP797732 Jamberoo Road, Kiama, comprises a irregular shaped area of some 9 ha. The site is centred on the crest of a north to south trending ridge. Site levels fall away from the ridge crest at grades of 1 in 5 to 1 in 20 with an overall difference in level estimated to be about 25 m from the highest to the lowest parts of the site. The site is bounded to the north by Lilly Pilly Way, to the east by medium dense bushland, to the south by an existing residential dwelling and to the west by existing farmland.

At the time of the investigation, the site was lightly grassed and used for grazing purposes. Some latite outcrops were noted on the site.

The site mapped on the Kiama 1:50,000 Geological Series Sheet is underlain as being on the Bumbo Latite and close to a boundary with the Budgong Sandstone, Both formations belong to the Shoalhaven Group of Permian Age. The field work results were consistent with the mapping with latite encountered in all of the test pits.

3. Fieldwork

3.1 Methods

The field investigation comprised the excavation of 17 test pits (Pits 1 – 17) to refusal or near-refusal at depths in the range of 0.2 – 2.0 m with a New Holland excavator fitted with a 600 mm wide bucket. Dynamic cone penetrometer tests (DCP, AS 1289 6.3.2) were undertaken adjacent to the pit locations to assess the consistency of the upper 1.2 m of the subsurface strata.

The pits were logged on site by a geotechnical engineer who collected disturbed samples to assist in strata identification and for possible laboratory testing.

The approximate locations of the test pits are shown on Drawing 1 attached. The surface levels to Australian Height Datum (AHD) given on the test pit logs were provided by Scarratt & Associates, registered surveyors.

3.2 Results

The subsurface conditions encountered during the field work are given on the attached test pit logs which should be read in conjunction with the accompanying notes defining classification methods and descriptive terms.

Relatively uniform conditions were encountered underlying the site, with topsoil to depths in the range 0.7 – 0.8 m overlying silty clayey cobbles and boulders/silty gravel and cobbles/gravel and cobbles to immediate refusal on high strength latite at depths in the range of 0.6 – 1.4 m (Pits 1, 3 – 5, 9 – 10 and 12 – 14). Clay was encountered at depths in the range of 0.7 – 1.2 m (Pits 7 and 15 – 17). Weathered latite was intersected at depths in the range of 0.9 – 2.0 m (Pits 2, 6 – 8 and 15 – 17). The latite was initially of extremely low to very low strength becoming medium to high strength at refusal or near refusal of the excavator bucket.

No free groundwater was observed within the test pit excavations. The test pits were immediately backfilled upon completion of the field work which precluded longer-term monitoring of groundwater levels.

4. Comments

The results of the site investigation have indicated that the subsurface conditions generally comprised topsoil overlying clay, gravelly clay, bouldery overburden and latite bedrock. A summary of the depths and reduced levels at which the various grades of rock were encountered in the test pits is presented in Table 1.

Table 1: Depth/Level of Rock Strata

Pit No.	Surface RL (m AHD)	Top of ELS – ELS Rock		Top of MS – HS Rock		Pit No.	Surface RL (m AHD)	Top of ELS – VLS Rock		Top of MS – HS Rock	
		Depth (m)	RL (m)	Depth (m)	RL (m)			Depth (m)	RL (m)	Depth (m)	RL (m)
1	64.2	-	-	1.1	63.1	10	54.1	-	-	0.7	53.4
2	66.1	0.9	65.2	1.3	64.8	11	55.7	-	-	0.9	54.8
3	69.5	-	-	0.6	68.9	12	64.2	-	-	0.8	63.4
4	65.4	-	-	1.4	64.0	13	58.0	-	-	0.6	57.4
5	66.8	-	-	0.2	66.6	14	63.0	-	-	0.7	62.3
6	70.1	0.8	70.3	1.7	68.4	15	67.4	1.2	66.2	1.7	65.7
7	68.6	-	-	0.9	67.7	16	59.0	1.0	58.0	2.0	57.0
8	64.3	-	-	1.1	63.2	17	60.3	0.7	59.6	1.9	58.4
9	49.9	-	-	0.4	49.5						

ELS = Extremely low strength

VLS = Very low strength

LS = Low strength

MS = Medium strength

HS = High Strength

NE = Not Encountered

5. Summary

DP has undertaken a geotechnical investigation to determine rock depths across the site. Details of the work undertaken and the results obtained are given in the report. In summary, rock depths across the site range from the surface (at rock outcrop) to 1.2 m.

6. Limitations

Douglas Partners Pty Ltd (DP) has prepared this report for this project at Lots 1 – 4 Section 67 DP758563 and Lots 1 & 2 DP797732 Jamberoo Road, Kiama in accordance with DP's proposal dated 9 February 2012 and acceptance received from Mr Trevor Unicomb acting on behalf of White Constructions Pty Ltd dated 6 March 2012. The work was carried out under DP's Conditions of Engagement. This report is provided for the exclusive use of White Constructions Pty Ltd for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

Yours faithfully
Douglas Partners Pty Ltd


for **R L Goodspeed**
Geotechnical Engineer

Reviewed by


G W McIntosh
Principal

Attachments: About this Report
 Drawing 1
 Test Pit Logs

About this Report

Douglas Partners



Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

This report is the property of Douglas Partners Pty Ltd. The report may only be used for the purpose for which it was commissioned and in accordance with the Conditions of Engagement for the commission supplied at the time of proposal. Unauthorised use of this report in any form whatsoever is prohibited.

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;

- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

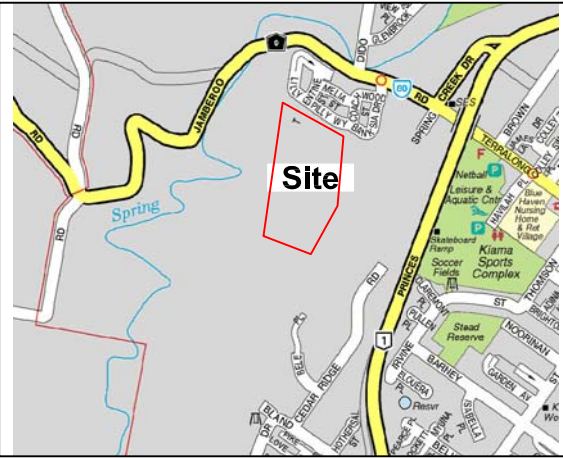
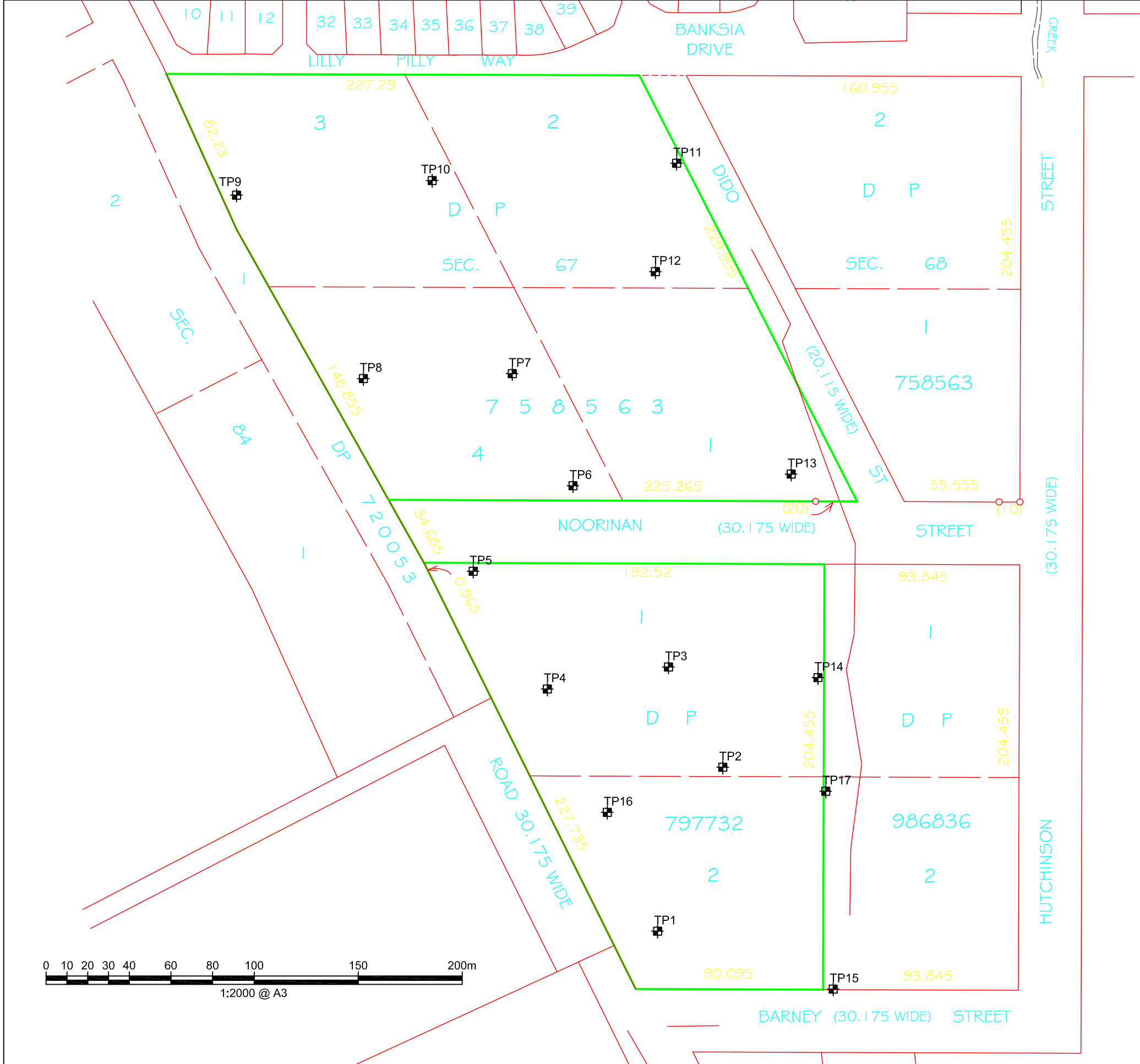
In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.



Locality Plan

NOTE: Base drawing from Scarratt & Associates
(Drawing 26068.PRELIM265/2, dated 12 April
2012)

LEGEND

Test Pit Location



TEST PIT LOG

CLIENT: White Constructions Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Lots 1 - 4 DP758563 and Lots 1 & 2 DP797732
 Jamberoo Road, Kiama

SURFACE LEVEL: 64.2 AHD
EASTING: 302031
NORTHING: 6161619
DIP/AZIMUTH: 90°/-

PIT No: 1
PROJECT No: 38319.08
DATE: 23/3/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
64		TOPSOIL - dark black brown, silty clay with some gravel (latite), cobbles (latite), roots and rootlets, damp										
		- becoming slightly gravelly (latite) silty clay below 0.4m		D	0.4							
					0.5							
	0.6	SILTY CLAYEY COBBLES AND BOULDERS - mid brown, silty clayey cobbles and boulders (latite) with some gravel, damp										
1					1.0							
	1.1	Pit discontinued at 1.1m Refusal on high strength latite		D	1.1							
62												
	2											

RIG: New Holland 115B - 600mm bucket

LOGGED: RLG

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

☐ Sand Penetrometer AS1289.6.3.3

REMARKS:

☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: White Constructions Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Lots 1 - 4 DP758563 and Lots 1 & 2 DP797732
 Jamberoo Road, Kiama

SURFACE LEVEL: 66.1 AHD
EASTING: 302102
NORTHING: 6161665
DIP/AZIMUTH: 90°/--

PIT No: 2
PROJECT No: 38319.08
DATE: 23/3/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
68		COBBLES AND BOULDERS - dark brown, cobbles and boulders (latite) with some silty clay (topsoil) gravel, roots and rootlets between joints, humid to damp										
				D	0.4							
					0.5							
	0.6	SILTY CLAYEY COBBLES AND BOULDERS - mid brown, silty clayey cobbles and boulders (latite), humid to damp										
69												
	0.9	LATITE - extremely low to high strength, extremely weathered to fresh stained, light brown and grey latite										
70												
	1.2			D	1.2							
71												
	1.3	Pit discontinued at 1.3m Refusal on high strength latite			1.3							
72												
	2											

RIG: New Holland 115B - 600mm bucket

LOGGED: RLG

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

☐ Sand Penetrometer AS1289.6.3.3

REMARKS:

☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	sp	Standard penetration test
E	Environmental sample	W	Water level	S	Shear vane (kPa)

TEST PIT LOG

CLIENT: White Constructions Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Lots 1 - 4 DP758563 and Lots 1 & 2 DP797732
 Jamberoo Road, Kiama

SURFACE LEVEL: 69.5 AHD
EASTING: 302109
NORTHING: 6161719
DIP/AZIMUTH: 90°/--

PIT No: 3
PROJECT No: 38319.08
DATE: 23/3/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
69.5	0.55	GRAVEL AND COBBLES - dark brown, gravel and cobbles (latite) with some silty clay (topsoil), roots and rootlets between joints, humid to damp Pit discontinued at 0.55m Refusal on high strength latite		D	0.4							
					0.5							
68	1											
68	2											

RIG: New Holland 115B - 600mm bucket

LOGGED: RLG

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

☐ Sand Penetrometer AS1289.6.3.3

REMARKS:

☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: White Constructions Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Lots 1 - 4 DP758563 and Lots 1 & 2 DP797732
 Jamberoo Road, Kiama

SURFACE LEVEL: 65.4 AHD
EASTING: 302055
NORTHING: 6161744
DIP/AZIMUTH: 90°/--

PIT No: 4
PROJECT No: 38319.08
DATE: 23/3/2012
SHEET 1 OF 1

[illegible]

RIG: New Holland 115B - 600mm bucket

LOGGED: RLG

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3

☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Core drilling	T	Tube sample (x mm dia.)
C	Core sample	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test ls(50) (MPa)
		PL(D)	Point load diametral test ls(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



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TEST PIT LOG

CLIENT: White Constructions Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Lots 1 - 4 DP758563 and Lots 1 & 2 DP797732
 Jamberoo Road, Kiama

SURFACE LEVEL: 66.8 AHD
EASTING: 302058
NORTHING: 6161811
DIP/AZIMUTH: 90°/--

PIT No: 5
PROJECT No: 38319.08
DATE: 23/3/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
		GRAVEL AND COBBLES - dark brown, gravel and cobbles (latite) with some silty clay (topsoil), roots and rootlets between joints, humid to damp			0.1							
	0.2	Pit discontinued at 0.2m Refusal on high strength latite		D	0.2							
66												
1												
65												
2												

RIG: New Holland 115B - 600mm bucket

LOGGED: RLG

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

☐ Sand Penetrometer AS1289.6.3.3

REMARKS:

☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	sp	Standard penetration test
E	Environmental sample	≡	Water level	S	Shear vane (kPa)
				V	Shear vane (kPa)

TEST PIT LOG

CLIENT: White Constructions Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Lots 1 - 4 DP758563 and Lots 1 & 2 DP797732
 Jamberoo Road, Kiama

SURFACE LEVEL: 70.1 AHD
EASTING: 302122
NORTHING: 6161817
DIP/AZIMUTH: 90°/--

PIT No: 6
PROJECT No: 38319.08
DATE: 23/3/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
70.0		TOPSOIL - mid brown, clay with some silt, roots and rootlets, humid to damp										
	0.2	CLAY - red brown, clay with trace rootlets, humid to damp										
				D	0.4		pp = 280-320					
					0.5							
	0.8	LATITE - extremely low to very low, extremely to highly weathered, orange brown latite										
1.0					1.0			1				
				D	1.1							
					1.4							
		- becoming extremely low to medium, extremely to highly weathered below 1.4m		D	1.5							
	1.6	LATITE - low to medium, highly to moderately weathered, orange brown, latite		D	1.6							
	1.7	Pit discontinued at 1.7m Refusal on medium to high strength latite			1.7							
2.0												

RIG: New Holland 115B - 600mm bucket

LOGGED: RLG

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: White Constructions Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Lots 1 - 4 DP758563 and Lots 1 & 2 DP797732
 Jamberoo Road, Kiama

SURFACE LEVEL: 68.6 AHD
EASTING: 302129
NORTHING: 6161877
DIP/AZIMUTH: 90°/--

PIT No: 7
PROJECT No: 38319.08
DATE: 23/3/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
68		TOPSOIL - dark mid brown, clay with some silt, roots and rootlets, humid to damp										
	0.2	CLAY - mid brown clay with trace rootlets, humid to damp										
				D	0.4							
					0.5							
	0.65	LATITE - low to medium strength, highly to moderately weathered orange brown latite										
67	0.85	Pit discontinued at 0.85m Refusal on high strength latite		D	0.8							
					0.85							
1												
2												

RIG: New Holland 115B - 600mm bucket

LOGGED: RLG

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

☐ Sand Penetrometer AS1289.6.3.3

REMARKS:

☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	sp	Standard penetration test
E	Environmental sample	W	Water level	S	Shear vane (kPa)

TEST PIT LOG

CLIENT: White Constructions Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Lots 1 - 4 DP758563 and Lots 1 & 2 DP797732
 Jamberoo Road, Kiama

SURFACE LEVEL: 64.3 AHD
EASTING: 302069
NORTHING: 6161917
DIP/AZIMUTH: 90°/--

PIT No: 8
PROJECT No: 38319.08
DATE: 23/3/2012
SHEET 1 OF 1

[illegible]

RIG: New Holland 115B - 600mm bucket

LOGGED: RLG

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



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TEST PIT LOG

CLIENT: White Constructions Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Lots 1 - 4 DP758563 and Lots 1 & 2 DP797732
 Jamberoo Road, Kiama

SURFACE LEVEL: 49.9 AHD
EASTING: 302071
NORTHING: 6161024
DIP/AZIMUTH: 90°/--

PIT No: 9
PROJECT No: 38319.08
DATE: 23/3/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
		TOPSOIL - dark brown, silty clay with some roots, rootlets and fine to coarse gravel (latite), damp										
	0.4	Pit discontinued at 0.4m Refusal on high strength latite		D	0.3							
					0.4							
49	1											
48	2											

RIG: New Holland 115B - 600mm bucket

LOGGED: RLG

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

☐ Sand Penetrometer AS1289.6.3.3

REMARKS:

☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	sp	Standard penetration test
E	Environmental sample	≡	Water level	S	Shear vane (kPa)
				V	Shear vane (kPa)

TEST PIT LOG

CLIENT: White Constructions Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Lots 1 - 4 DP758563 and Lots 1 & 2 DP797732
 Jamberoo Road, Kiama

SURFACE LEVEL: 54.1 AHD
EASTING: 302151
NORTHING: 6161975
DIP/AZIMUTH: 90°/--

PIT No: 10
PROJECT No: 38319.08
DATE: 23/3/2012
SHEET 1 OF 1

[illegible]

RIG: New Holland 115B - 600mm bucket

LOGGED: RLG

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3

☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test ls(50) (MPa)
		PL(D)	Point load diametral test ls(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



Douglas Partners
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TEST PIT LOG

CLIENT: White Constructions Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Lots 1 - 4 DP758563 and Lots 1 & 2 DP797732
 Jamberoo Road, Kiama

SURFACE LEVEL: 55.7 AHD
EASTING: 302252
NORTHING: 6161914
DIP/AZIMUTH: 90°/--

PIT No: 11
PROJECT No: 38319.08
DATE: 23/3/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
		TOPSOIL - dark brown, silty clay with some gravel (latite), with some roots and rootlets, humid to damp										
	0.3	GRAVEL AND COBBLES - brown, silty clayey, gravel and cobbles (latite), with trace rootlets, humid to damp		D	0.4							
					0.5							
	0.8	LATITE - low to high strength, highly to slightly weathered, light grey and orange brown, latite		D	0.8							
	0.9	Pit discontinued at 0.9m Refusal on high strength latite			0.9							
55												
1												
54												
2												

RIG: New Holland 115B - 600mm bucket

LOGGED: RLG

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

☐ Sand Penetrometer AS1289.6.3.3

REMARKS:

☒ Cone Penetrometer AS1289.6.3.2

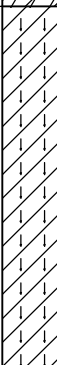
SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
BLK	Block sample	P	Piston sample
C	Core drilling	U	Tube sample (x mm dia.)
D	Disturbed sample	W	Water sample
E	Environmental sample	W	Water seep
		W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: White Constructions Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Lots 1 - 4 DP758563 and Lots 1 & 2 DP797732
 Jamberoo Road, Kiama

SURFACE LEVEL: 64.2 AHD
EASTING: 302214
NORTHING: 6161878
DIP/AZIMUTH: 90°/--

PIT No: 12
PROJECT No: 38319.08
DATE: 23/3/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)				
				Type	Depth	Sample	Results & Comments		5	10	15	20	
64	0.2	TOPSOIL - dark brown, silty clay with some fine to medium gravel (latite) roots and rootlets, humid to damp											
		SILTY CLAY AND GRAVEL AND COBBLES - dark mid brown silty clay gravel and cobbles (latite), humid to damp			0.4								
				D	0.5								
	0.8	Pit discontinued at 0.8m Refusal on high strength latite		D	0.8								
63													

RIG: New Holland 115B - 600mm bucket

LOGGED: RLG

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3

☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	WS	Water seep
E	Environmental sample	WL	Water level
		PID	Photo ionisation detector (ppm)
		PLA	Point load axial test (s(50) (MPa)
		PLD	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



TEST PIT LOG

CLIENT: White Constructions Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Lots 1 - 4 DP758563 and Lots 1 & 2 DP797732
 Jamberoo Road, Kiama

SURFACE LEVEL: 58.0 AHD
EASTING: 302210
NORTHING: 6161760
DIP/AZIMUTH: 90°/--

PIT No: 13
PROJECT No: 38319.08
DATE: 23/3/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
58.0		TOPSOIL - dark brown, silty clay with some gravel (latite), roots and rootlets, damp to moist										
	0.25	GRAVEL AND COBBLES - mid brown, slightly clayey silty, gravel and cobbles (latite), damp to moist										
				D	0.4							
					0.5							
	0.55	Pit discontinued at 0.55m Refusal on high strength latite										
57.0	1											
56.0	2											

RIG: New Holland 115B - 600mm bucket

LOGGED: RLG

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

☐ Sand Penetrometer AS1289.6.3.3

REMARKS:

☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

TEST PIT LOG

CLIENT: White Constructions Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Lots 1 - 4 DP758563 and Lots 1 & 2 DP797732
 Jamberoo Road, Kiama

SURFACE LEVEL: 63.0 AHD
EASTING: 302164
NORTHING: 6161673
DIP/AZIMUTH: 90°/--

PIT No: 14
PROJECT No: 38319.08
DATE: 23/3/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
63.0		COBBLES AND BOULDERS - dark brown and grey cobbles and boulders with some gravel (latite), damp to moist										
				D	0.4							
					0.5							
	0.7	Pit discontinued at 0.7m Refusal on high strength latite										
62.1	-1											
61.2	-2											

RIG: New Holland 115B - 600mm bucket

LOGGED: RLG

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

☐ Sand Penetrometer AS1289.6.3.3

REMARKS:

☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

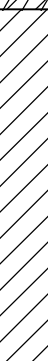
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	sp	Standard penetration test
E	Environmental sample	≡	Water level	S	Shear vane (kPa)
		V		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: White Constructions Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Lots 1 - 4 DP758563 and Lots 1 & 2 DP797732
 Jamberoo Road, Kiama

SURFACE LEVEL: 67.4 AHD
EASTING: 302083
NORTHING: 6161547
DIP/AZIMUTH: 90°/--

PIT No: 15
PROJECT No: 38319.08
DATE: 23/3/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
67		TOPSOIL - dark brown, silty clay with some roots, rootlets and gravel, humid to damp										
	0.4			D	0.4							
	0.5				0.5							
	0.6	CLAY - stiff, dark mid red brown, clay with trace fine to medium gravel (latite), humid to damp										
	1.0			D	1.0		pp = 290-380					
	1.1				1.1							
	1.2	LATITE - extremely low to low strength, extremely to highly weathered, orange brown and light grey, latite										
	1.4			D	1.4							
	1.5				1.5							
	1.7	Pit discontinued at 1.7m Refusal on high strength latite		D	1.7							
	2.0											
	2.5											

RIG: New Holland 115B - 600mm bucket

LOGGED: RLG

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

☐ Sand Penetrometer AS1289.6.3.3

REMARKS:

☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	sp	Standard penetration test
E	Environmental sample	≡	Water level	S	Shear vane (kPa)

TEST PIT LOG

CLIENT: White Constructions Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Lots 1 - 4 DP758563 and Lots 1 & 2 DP797732
 Jamberoo Road, Kiama

SURFACE LEVEL: 59.0 AHD
EASTING: 302044
NORTHING: 6161678
DIP/AZIMUTH: 90°/--

PIT No: 16
PROJECT No: 38319.08
DATE: 23/3/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
88		TOPSOIL - dark brown, silty clay with some gravel (latite) roots and rootlets, damp										
	0.25	CLAY - grey brown clay with trace rootlets, damp										
				D	0.4							
					0.5							
88					0.9		pp = 200-240					
				D	1.0							
	1.0	LATITE - extremely low to very low strength, extremely to highly weathered, light brown, latite										
88					1.4							
		- becoming very low strength, highly weathered below 1.4m		D	1.5							
87					1.9							
		- becoming low to high strength, highly to moderately weathered, below 1.9m		D	2.0							
87	2.0	Pit discontinued at 2.0m Very slow progress in low to high strength latite										

RIG: New Holland 115B - 600mm bucket

LOGGED: RLG

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

☐ Sand Penetrometer AS1289.6.3.3

REMARKS:

☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: White Constructions Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Lots 1 - 4 DP758563 and Lots 1 & 2 DP797732
 Jamberoo Road, Kiama

SURFACE LEVEL: 60.3 AHD
EASTING: 302136
NORTHING: 6161627
DIP/AZIMUTH: 90°/--

PIT No: 17
PROJECT No: 38319.08
DATE: 23/3/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
		TOPSOIL - dark brown, silty clay with some roots, rootlets and trace gravel, damp to moist										
	0.2	CLAY - brown mottled orange brown, clay with some gravel (latite), damp										
				D	0.4		pp = 220-290					
					0.5							
	0.7	LATITE - extremely low to low strength, extremely to highly weathered, light brown, latite										
					1.0							
				D	1.1							
					1.4							
				D	1.5							
		- becoming very low to medium highly weathered below 1.5m										
	1.9	Pit discontinued at 1.9m Refusal on medium to high strength latite		D	1.9							
	2											

RIG: New Holland 115B - 600mm bucket

LOGGED: RLG

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

☐ Sand Penetrometer AS1289.6.3.3

REMARKS:

☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)