

APPENDIX III

Pre-Construction Testing

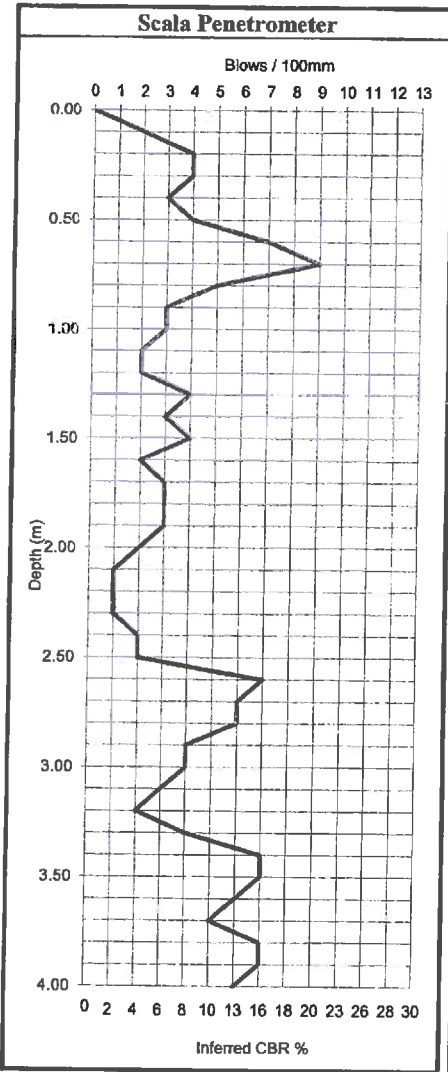
Borehole and Test Pit Data from Beca and Opus

**AUGER / SCALA PENETROMETER
TEST REPORT**



Project : Ruakura Development Stage 1 Investigations
 Client : Tainui Group Holdings Ltd
 Coordinate (NZTM) : E1802308
 N5819235
 Elevation (m) : 37.026m
 Test number : AS105
 Water level (m): 2.9m
 Tested by : T Fisher / R Warner

Project No : 2-32113.00
 Lab Ref No : 13/843/001
 Client Ref No : AS105



Test Results		
Depth (m)	Shear Strength (kPa)	Soil Description
0.00		SILT, dark brown, soft to firm, moist, non plastic. (Topsoil)
0.20		SILT, some Sand, trace Gravel, brown, firm, moist, non plastic. Sand is fine, gravel is fine, slightly weathered, subrounded.
0.40		SILT, yellow & orange mottled, firm, moist, non plastic. Becomes grey.
0.50		Becomes wet.
0.80		Becomes wet.
1.40		Becomes moist.
1.50		Becomes wet.
1.70		Some fine Sand (Pumiceous) & med to coarse Gravel (Pumice). Dilatant.
1.80		Becomes saturated.
2.30		Becomes dark greyish brown, no gravel.
2.50		Becomes Sandy SILT.
2.80		SAND, some Silt, grey, medium dense, saturated, non plastic. Water Level.
2.90		Sand is fine to medium. Water Level.
3.00		Trace Silt.
3.30		Sandy SILT, grey, soft, wet, non plastic. Sand is fine.
3.40		Becomes saturated.
3.80		Becomes dark grey.
4.00		End of Auger

Test Methods

Determination of Penetration Resistance of a Soil, NZS 4402 : 1988, Test 6.5.2
 Inferred CBR values taken from Austroads Pavement Design Manual 2004
 Field Descriptions of Soils and Rocks by NZ Geotechnical Society Dec 2005

Scala penetrometer results greater than 1.5m depth and Inferred CBR values are not IANZ accredited

Date tested : 09/04/13
 Date reported : 17/04/13

This report may only be reproduced in full

IANZ Approved Signatory

Designation : Senior Civil Engineering Technician
 Date : 24/04/13



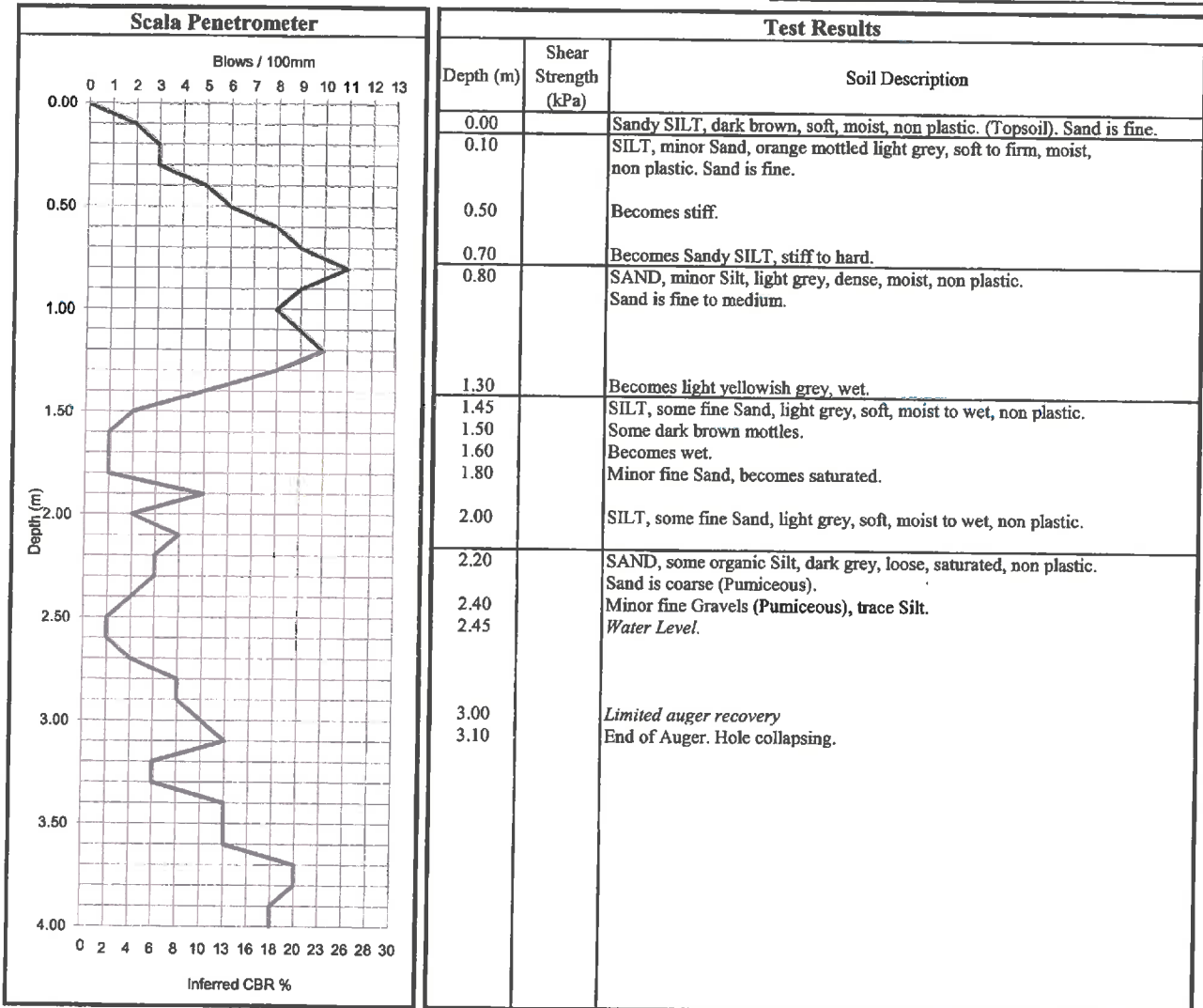
Tests indicated as not accredited are outside the scope of the laboratory's accreditation

**AUGER / SCALA PENETROMETER
TEST REPORT**



Project : **Ruakura Development Stage 1 Investigations**
 Client : **Tainui Group Holdings Ltd**
 Coordinate (NZTM) : **E1802348
N5819112**
 Elevation (m) : **37.678m**
 Test number : **AS106**
 Water level (m): **2.45m**
 Tested by : **T Fisher / R Warner**

Project No : 2-32113.00
Lab Ref No : 13/843/001
Client Ref No : AS106



Test Methods Determination of Penetration Resistance of a Soil, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004 Field Descriptions of Soils and Rocks by NZ Geotechnical Society Dec 2005	Scala penetrometer results greater than 1.5m depth and Inferred CBR values are not IANZ accredited
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Date tested : 09/04/13
 Date reported : 18/04/13

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IANZ Approved Signatory

Designation : *Senior Civil Engineering Technician*
 Date : 18/04/13



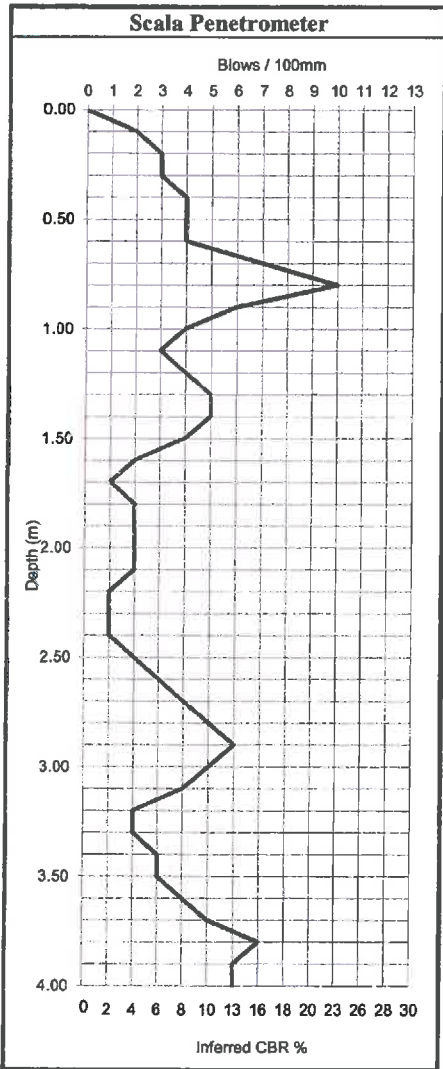
Tests indicated as not accredited are outside the scope of the laboratory's accreditation

**AUGER / SCALA PENETROMETER
TEST REPORT**



Project : Ruakura Development Stage 1 Investigations
 Client : Tainui Group Holdings Ltd
 Coordinate (NZTM) : E1802434
 N5818897
 Elevation (m) : 38.248m
 Test number : AS108
 Water level (m): 2.3m
 Tested by : T Fisher / R Warner

Project No : 2-32113.00
 Lab Ref No : 13/843/001
 Client Ref No : AS108



Test Results	
Depth (m)	Soil Description
0.00	Silty SAND, dark brown, loose, dry, non plastic. Sand is fine to medium.
0.20	Sandy SILT, brown, firm, dry, non plastic. Sand is fine.
0.65	SILT, minor Sand, orange mottled light brown, firm, moist, non plastic. Sand is fine.
0.80	becomes stiff
0.90	SAND, some Silt, yellowish brown, medium dense, moist, non plastic. Sand is medium (Pumiceous).
1.00	Trace Silt.
1.40	Some dark brown organic Silt nodules.
1.90	Becomes wet.
2.20	SAND, minor Silt, yellowish brown, loose, saturated, non plastic. Sand is fine to medium.
2.30	No Silt. <i>Water Level</i>
2.50	becomes dark brown.
2.60	Limited auger recovery
2.70	End of Auger

Test Methods

Determination of Penetration Resistance of a Soil, NZS 4402 : 1988, Test 6.5.2
 Inferred CBR values taken from Austroads Pavement Design Manual 2004
 Field Descriptions of Soils and Rocks by NZ Geotechnical Society Dec 2005

Scala penetrometer results greater than 1.5m depth and
 Inferred CBR values are not IANZ accredited

Date tested : 09/04/13
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Borehole No: 101

PROJECT Ruakura Development Stage 1 Investigations	CO-ORD. 1802301 E 5819418 N	R.L. 38.009 m	SHEET 1 of 4
LOCATION Greenhill Road	REF. GRID NZTM	DATUM Moturiki 1953	DEPTH 25.95 m

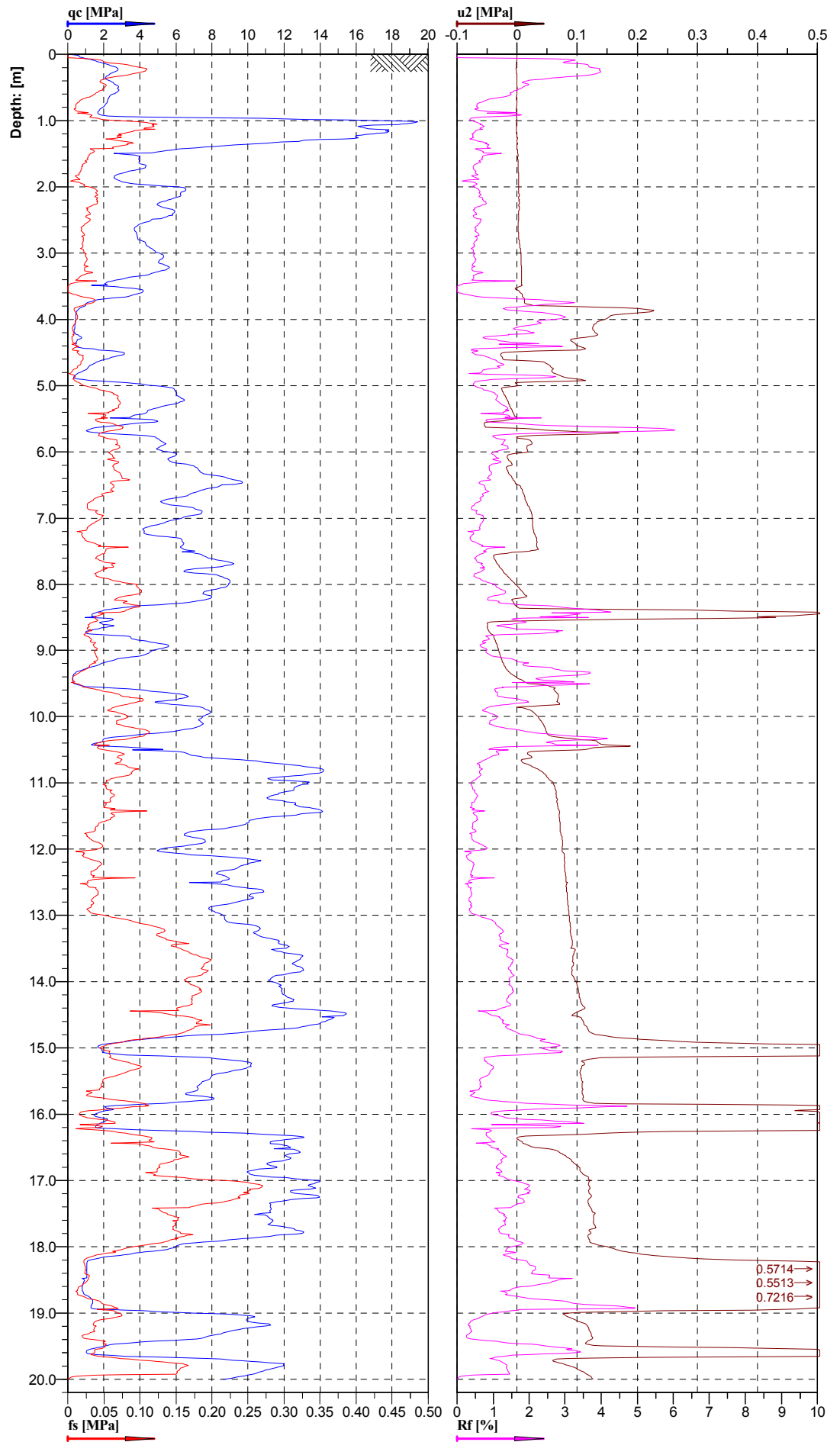
GEOLOGY/UNIT	MAIN DESCRIPTION	R.L. (m)	DEPTH (m)	GRAPHIC LOG	TESTS		CORE RECOVERY (%)	SAMPLE TYPE	DRILLING			ADDITIONAL NOTES	PIEZOMETER DETAILS	OTHER INSTRUMENTATION
					SPT 'N' VALUE	SPT BLOW COUNTS OR SHEAR VALUE			DRILLING METHOD	CASING	BASE OF HOLE & WATER LEVEL			
	SILT, minor sand, dark brown. Soft, wet-saturated, slightly plastic. Rootlets (TOPSOIL). Sand fine-medium. 0.14m wet, no rootlets. SILT, trace sand, reddish brown. Soft, wet, slightly plastic. Sand fine. 0.31m stiff. 0.42m trace fine-medium rounded-subrounded gravel. Fine-coarse SAND, some gravel, trace silt, greyish brown. Loose, saturated, well graded, non-plastic. Gravel fine-medium, subangular-subrounded, lithic.						44	HQTT			0.8m 3/04			
	1.15m no gravel.		1		4	3/4/1/1/1/1	51	SPT						
	1.55m grey. 1.70-1.73m fine-medium SAND, dark grey. Fine-coarse SAND, trace silt, brown. 'Loose', saturated, well graded, non-plastic. Fine-medium SAND, minor-some silt, light brownish white. Loose, wet, poorly graded, non-plastic. Pumice. Fine-coarse SAND, minor gravel, trace silt, grey. Loose, wet-saturated, well graded, non-plastic. Gravel fine-medium. 2.25m light brownish grey.		2		7	1/1/2/1/2/2	83	SPT			1.5m 4/04			
	2.66-2.72m no gravel. 2.82-2.90m fine-medium SAND, trace silt, grey. 'Loose', wet-saturated, poorly graded, non-plastic. 2.90m minor fine gravel, trace medium gravel.		3		6	1/1/1/2/1/2	80	SPT						
	3.85m grey.		4		1	1/2/0/0/0/1	40	SPT						
	4.45-4.50m minor coarse gravel, subangular, volcanic. 4.75-4.78m fine-medium SAND, dark grey. Silty fine-coarse SAND, brownish grey. 'Loose', saturated, well graded, non-plastic. Fine-coarse SAND, minor silt, brownish grey. 'Loose', saturated, well graded, non-plastic.		5		7	1/1/2/1/2/2	107	SPT						
	5.40m grey, trace fine-medium subrounded gravel. 5.50m trace silt. 5.80m minor silt.		6		16	2/3/3/4/4/5	133	SPT						
	Fine-coarse SAND, minor fine gravel, trace medium gravel, grey. 'Medium dense', saturated, well graded, non-plastic. Gravels subangular-subrounded, lithic.		7				52	HQTT						

NOTES	STARTED	3/04/2013	FINISHED	4/04/2013
	INCLINATION/AZIMUTH	Vertical; n/a	DRILLING Co.	Perry Geotech
	LOGGED	S Cooke	DRILLING RIG	Tractor
	CHECKED	T de Malmanche	LAB REF.	13/843/001
	CLIENT	Tainui Group Holdings Ltd	PROJECT No.	2-32113.00

SOIL LOG 2-32113.00.GPJ HMM_TEMA.GDT 26/04/13

**Classification by
Robertson 1986**

- Silty clay to clay (4)
- Sandy silt to clayey silt (6)
- Sand (9)
- Silty sand to sandy silt (7)
- Sand to silty sand (8)
- Silty sand to sandy silt (7)
- Sand to silty sand (8)
- Clay (3)
- Sensitive fine grained (1)
- Sandy silt to clayey silt (6)
- Silty sand to sandy silt (7)
- Sand to silty sand (8)
- Sandy silt to clayey silt (6)
- Clay (3)
- Silty sand to sandy silt (7)
- Sand to silty sand (8)
- Sand (9)
- Sand to silty sand (8)
- Sand (9)
- Sand to silty sand (8)
- Clayey silt to silty clay (5)
- Sand to silty sand (8)
- Sandy silt to clayey silt (6)
- Sand to silty sand (8)
- Silty sand to sandy silt (7)
- Sand to silty sand (8)
- Silty sand to sandy silt (7)
- Clayey silt to silty clay (5)
- Sand (9)
- Sand to silty sand (8)



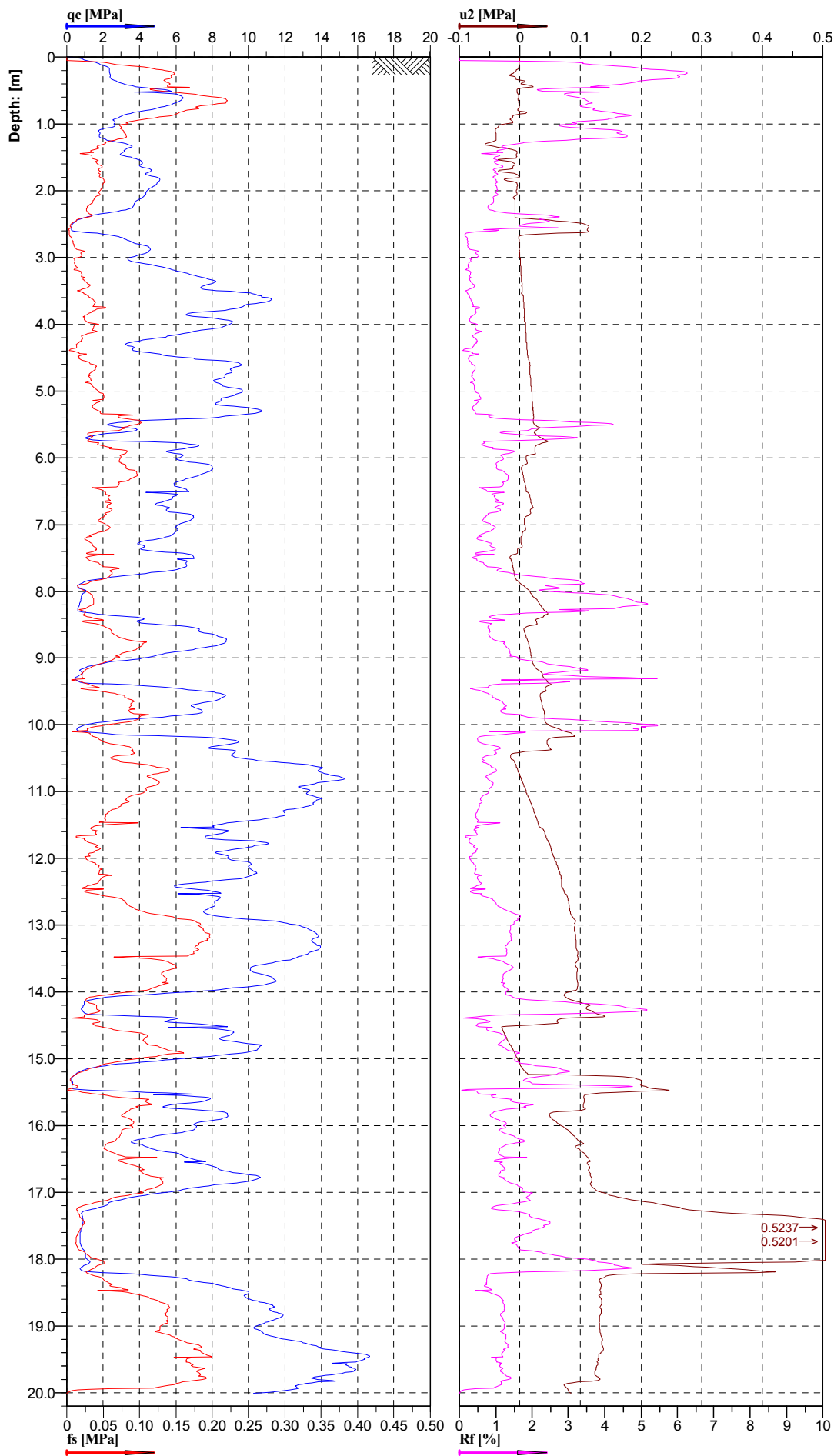
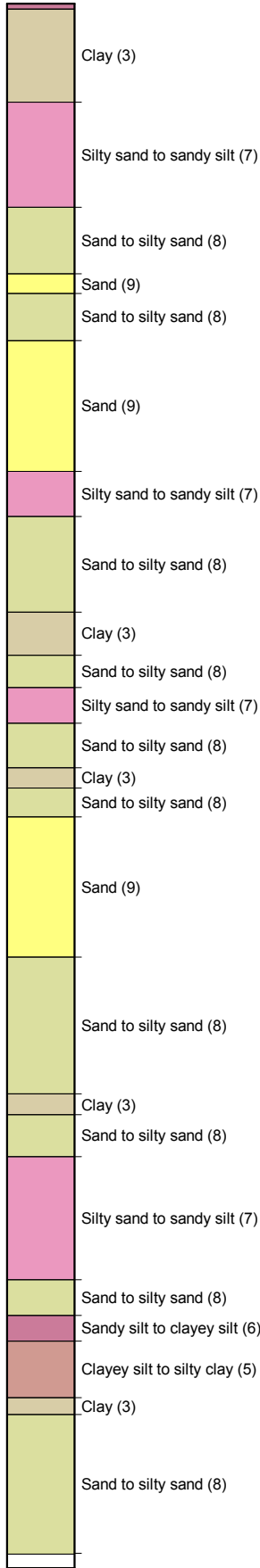
0.5714 →
0.5513 →
0.7216 →



Cone No: S10CFIIP.S15165
Tip area [cm²]: 10
Sleeve area [cm²]: 150

Location:	Gordonton	Position:	X: 0 m, Y: 0 m	Ground level:	0.000	Test No.:	CPT302
Project ID:	Gordonton	Client:	BECA	Date:	19/03/2016	Scale:	1 : 87
Project:	Greenhill Park			Page:	1/1	Fig.:	
				File:	Greenhill Park_CPT302.GEF		

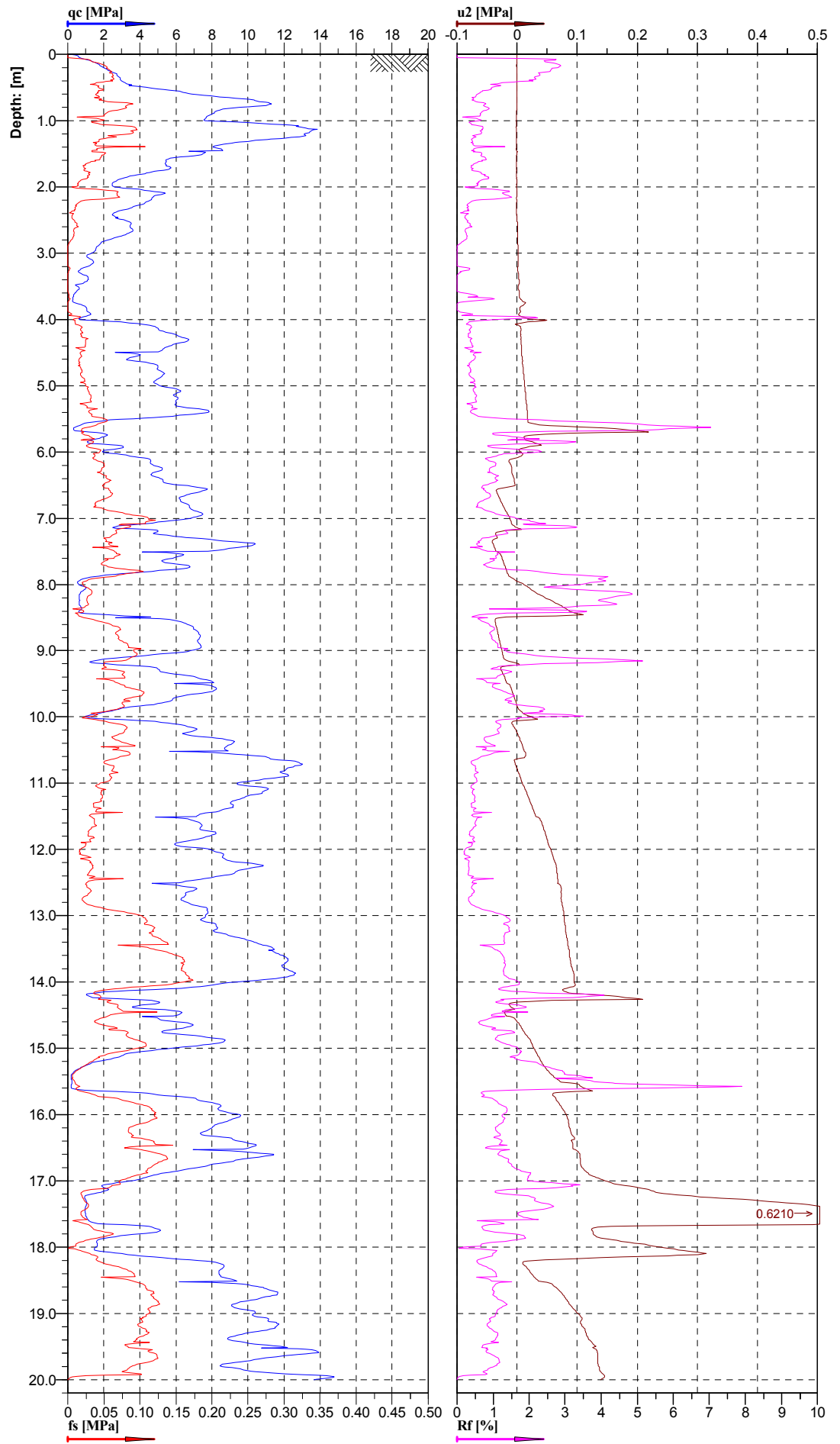
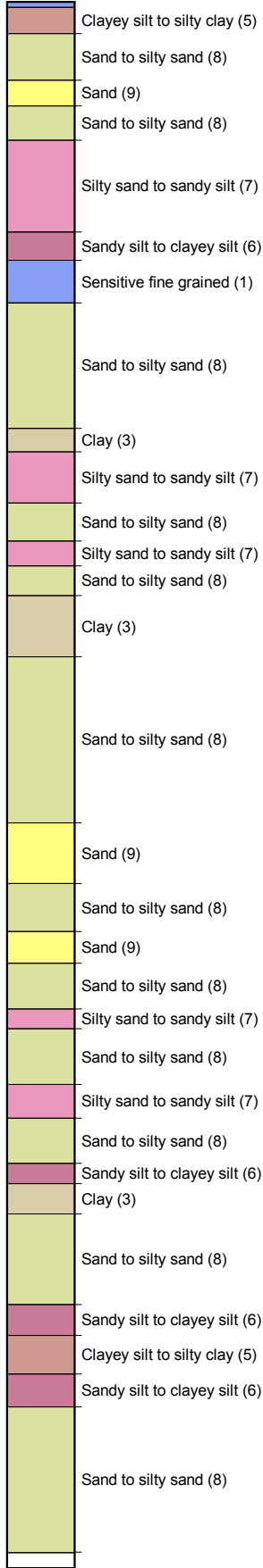
Classification by Robertson 1986



Cone No: S10CFIIP.S15165
 Tip area [cm²]: 10
 Sleeve area [cm²]: 150

Location:	Gordonton	Position:	X: 0 m, Y: 0 m	Ground level:	0.000	Test No.:	cpt303
Project ID:	Gordonton	Client:	BECA	Date:	19/03/2016	Scale:	1 : 87
Project:	Greenhill Park			Page:	1/1	Fig.:	
				File:	Greenhill Park_CPT303.GEF		

Classification by Robertson 1986



Cone No: S10CFIIP.S15165
 Tip area [cm²]: 10
 Sleeve area [cm²]: 150

Location: Gordonton	Position: X: 0 m, Y: 0 m	Ground level: 0.000	Test No.: CPT304
Project ID: Gordonton	Client: BECA	Date: 19/03/2016	Scale: 1 : 87
Project: Greenhill Park		Page: 1/1	Fig.:
		File: Greenhill Park_CPT304.GEF	

