

GEOTECHNICAL SOIL TEST REPORT

Client: Stephan Coetzee

Project: Erf 2107, Wilderness, George

Date of test: 6.5.2020

Geotechnical Constraint	Risk			NHBRC Classification
	Low	Medium	High	
Active clay	X			H
Compressible soil				
Collapsible soil	X	X		C1
Imported/uncontrolled fill	X			
Chemically aggressive soils	X			
Saturated soils/ groundwater seepage	X	X		
Shallow hard rock/ difficult excavations	X	X		
Slope stability problems	X			
Flood/erosion potential	X			
Seismicity	X			
Dolomitic land	X			

Disclaimer: The above classification is provided as a guideline and is true for the specific locations that were tested and may not be true for the entire site.

Site description:

The site is easily accessible via the existing municipal road (Fynbos Close) on the southern boundary of the site. The terrain slopes moderately (1:4) to the southwest (see Fig 1). The site is presently covered in thick fynbos vegetation and the surface conditions were generally dry with no signs of any slope instability or surface drainage problems, such as springs or marshes.

Geology & Soil profile:

According to the 1:250 000 geological map, the site is underlain by granite of the George Pluton which has intruded phyllite and sandstone of the Kaaimans Formation. The geology is generally considered macro stable for development purposes with no soluble rock formations (e.g. dolomite/limestone).

Test pits conducted on the site indicate that the soil profile is fairly consistent across the site, with the following general profile recorded:

- 0-0.65m: Moist, dark brown, loose- medium dense, SILTY FINE SAND (topsoil)
- 0.65-1.2m: Moist, dark red orange, dense, fissured, slightly gravelly CLAYEY SILTY SAND, residual
- 1.2-1.5m: Slightly moist, light yellow orange, very dense, intact, GRAVELLY SILTY SAND, residual completely weathered granite, becoming soft rock at base of pit.

Refusal of the excavator was recorded in both test pits at an average depth of 1.45m.

Groundwater seepage was not encountered in any of the test pits at the time of the investigation but may occur in the upper 0.6m in wet seasons.



Fig 1: Photo of site looking west

The residual clayey sand below the topsoil (i.e. the second horizon) has a clay content of 19%, a plasticity index of 22 and an overall medium potential expansiveness, according to the Van der Merwe method, but due to the thin nature of this horizon it will have a low heave potential (<7.5mm – H category).

DCP test results indicate that the upper 0.85m of the soil profile is loose to medium dense (potentially compressible and collapsible) with low safe bearing capacity, but all tests show dense to very dense conditions with good bearing capacity below this depth. All tests refused within 1m of NGL. The estimated safe bearing capacity at a nominal founding depth of NGL-0.85m is 250kPa. The underlying soft bedrock below 1.2m is a highly favourable medium to carry heavy structural loads with bearing capacity in the order of 350-450kPa.

Recommendations:

Earthworks: Significant bulk earthworks will be required to create a level platform due to the sloping terrain. Excavations below 1.5m will encounter soft rock (slow but just excavatable with TLB), becoming increasingly hard/difficult to excavate. Excavations beyond 2m may require a heavy excavator with rock bucket and/or hydraulic jack-hammer attachment for breaking rock (Hard excavation class).



Fig 2: Typical soil profile and weathered granite gravel excavated from test pits

Organic matter and organic-rich topsoil should be entirely stripped from the footprint of structures and stockpiled for landscaping purposes. Soil excavated from site (less any organic material) is potentially suitable for bulk filling purposes on platforms and under floors, assuming the required level of compaction can be achieved and with approval from the engineer. An allowance should be made for importation of some high-quality materials, such as G5 crushed rock, for final 150mm fill layers under floors and free-draining fill behind retaining walls. Bulk filling (from cut-to-fill operations) should be properly benched into the insitu and compacted at least 93%MDD to prevent sliding. Temporary excavation slopes less than 3m high will be generally stable at near-vertical angles for short periods of time, but the engineer should inspect deep excavations. Potentially unstable topsoil layers (upper 0.65m of profile) should be trimmed back to 45° on temporary slopes. Permanent slopes should be less than 1:2, or retained using suitable retaining methods as per the engineer's design. All fill material should be approved by the engineer.

Foundations: The recommended foundation system for single/double storey masonry structures is lightly reinforced concrete strips and/or square bases. An estimate of safe design bearing pressure is 250kPa at a minimum founding depth of 0.85m below natural ground level or 0.6m below cut platform level, whichever is deeper. The engineer should inspect trenches before casting foundations to ensure suitable conditions.

Roads: The insitu topsoil is generally poor-quality subgrade material with low CBR values in soaked conditions. The driveway layerworks design should include 250mm imported G5 subbase to support interlocking cement pavers. The roadbed must be cut to level and dry and firm before placing layerworks. V-drains are important along driveways to minimise ingress into layerworks.

Drainage: The soil permeability is generally poor/restricted due to dense cohesive residual soils and/or shallow rock, but surface drainage is generally good due to the sloping terrain. Subsoil drains are recommended behind retaining walls.

Conclusions:


The site appears to be suitable for the proposed development with generally favourable founding conditions, but there are some geotechnical constraints which require consideration from the structural engineer.

Yours faithfully


A handwritten signature in black ink, appearing to be 'Iain Paton', written in a cursive style.

Iain Paton Pr Sci Nat Pr Tech Eng



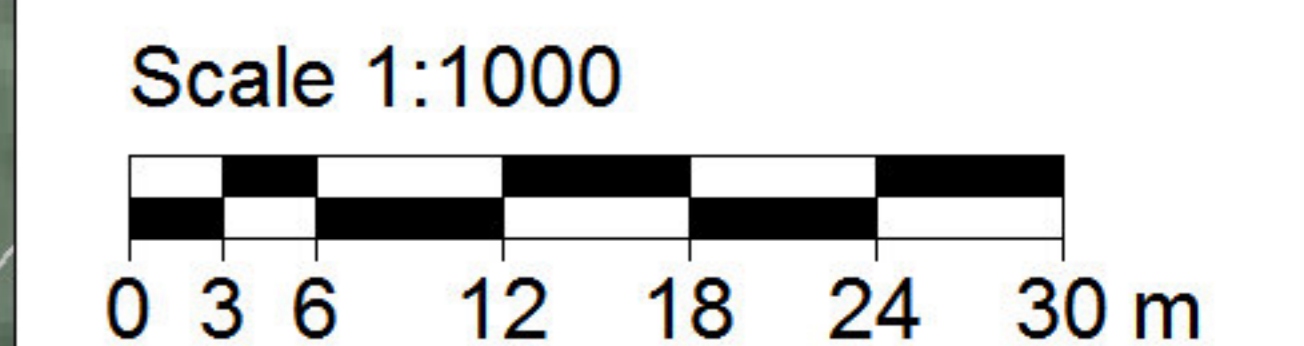


Legend

 Test Positions

Client: Stephan Coetzee
Project: New Dwelling
Site: Erf 2107 Wilderness
Area: George

Drawing Name: Geotechnical Plan
Drawing No:
Date: May 2020
Revision: 0
Drawn By: S Ngema
Checked By: I Paton



PO Box 964
Knysna
6570
044-3820502
lain@outeniqua.co.za

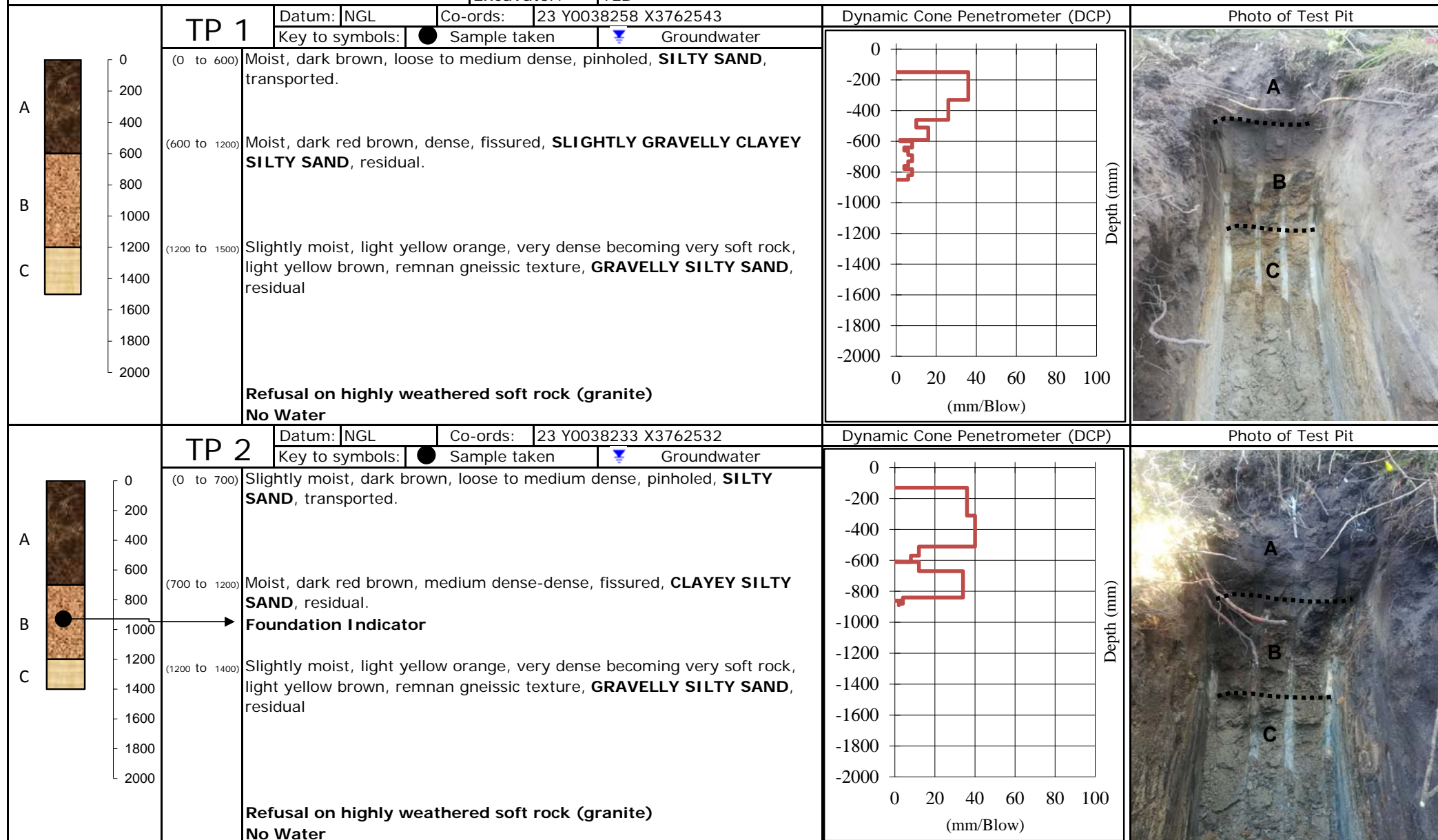


OUTENIQUA

GEOTECHNICAL SERVICES

Geotechnical Soil Profile

Client: Stephan Coetzee
 Project: Erf 2107
 Area: Wilderness
 Date: 06.05.2020
 Excavator: TLB





OUTENIQUA LAB (Pty) Ltd

Materials Testing Laboratory

Registration No. 95/07742/07

6 Mirrorball Street, George : PO Box 3186, George Industria, 6536

Tel: 044 8743274 : Fax: 044 8745779 : e-mail: llewelyn@outeniqua.co.za

R-FIND-1-5

Dec-14

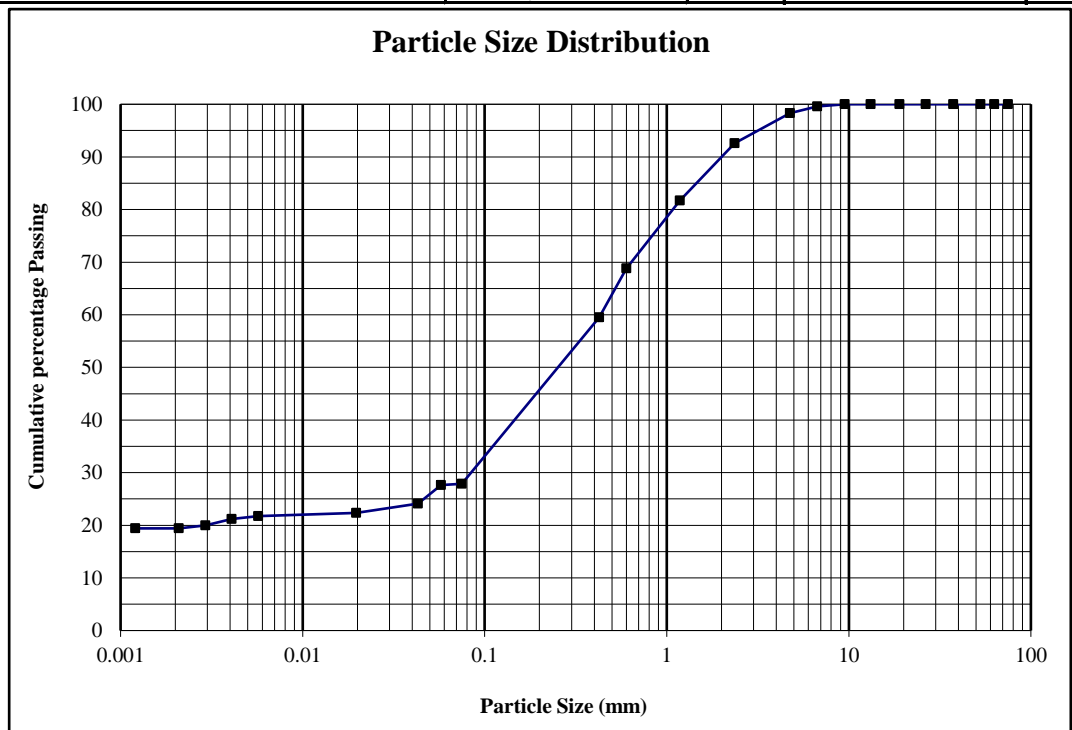
Customer :	Outeniqua Geotechnical Services	Project :	Erf 2107 - Wilderness
	P O Box 964	Date Received :	18/05/20
	Knysna	Date Reported :	04/06/20
	6570	Req. Number :	0919/20
Attention :	Iain Paton	No. of Pages :	1

TEST REPORT

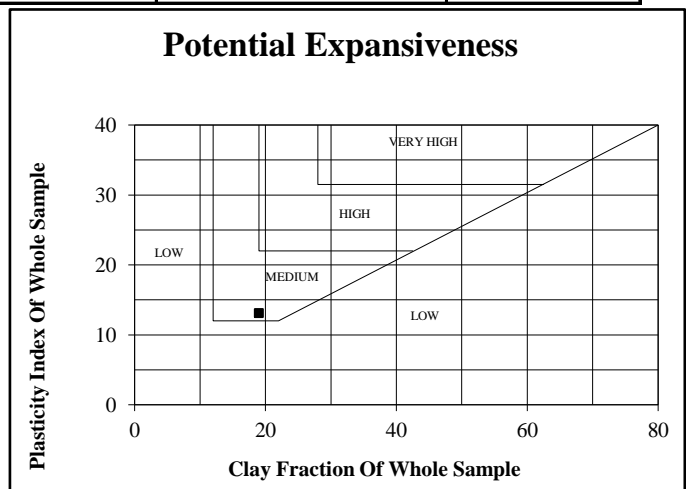
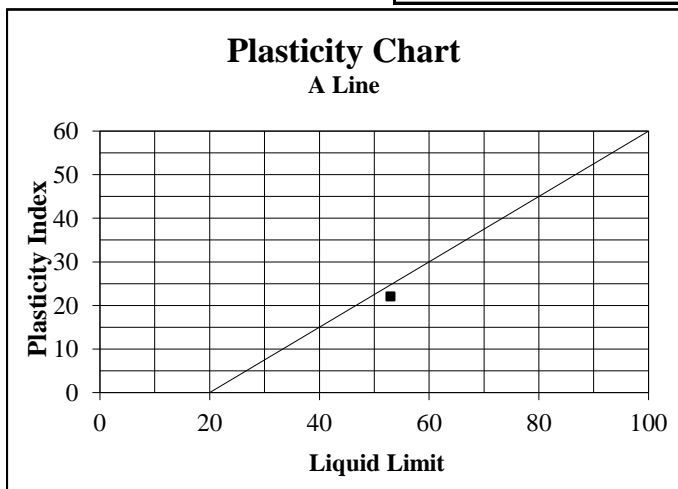
FOUNDATION INDICATOR - (TMH 1 Method A1(a),A2,A3,A4,A5) & (ASTM Method D422)

Material Description:	Light Yellowish Brown - Gravelly Clayey Sand	Sample Number:	78799		
Position:	TP2 - Layer 2	Liquid Limit	53	Linear Shrinkage	11
Depth:	700-1200	Plasticity Index	22	Insitu M/C%	12.8

Sieve Size(mm)	% Passing
75.0	100
63.0	100
53.0	100
37.5	100
26.5	100
19.0	100
13.2	100
9.5	100
6.7	100
4.75	98
2.36	93
1.18	82
0.600	69
0.425	60
0.075	28
0.0575	28
0.0429	24
0.0197	22
0.0057	22
0.0041	21
0.0029	20
0.0021	19
0.0012	19



% Clay	19	% Silt	9	% Sand	61	% Gravel	11
Unified Soil Classification		SM		PRA Soil Classification		A-2-7	



Notes:

- Specimens delivered to Outeniqua Lab in good order.

1. Sampling falls outside the scope of Outeniqua Lab's SANAS accreditation.

For Outeniqua Lab (Pty) Ltd.

2. The test results are reported with an approximate 95% level of confidence.

3. This report (with attachments) is the correct record of all measurements made, and may not be reproduced other than with full written approval from the Technical Director of Outeniqua Lab (Pty) Ltd.

4. Results reported in this Test Report relate only to the items tested and are an indication only of the sample provided and/or taken.

5. Measuring Equipment, traceable to National Standards is used where applicable.

6. While every care is taken to ensure the correctness of all tests and reports, neither Outeniqua Lab nor its employees shall be liable in any way whatever for any error made in the execution or reporting of tests or any erroneous conclusions drawn therefrom or for any consequence thereof.

Directors/Direkteure: D McDonald Reg. Eng. Tech (Managing/Bestuurende) L Heathcote B-Tech. Civil Miss A Govender



Outeniqua Geotechnical Services cc.

R-DCP-1-5

Dec-14

Geotechnical Engineering Consultants

Registration No. 1999/062743/23

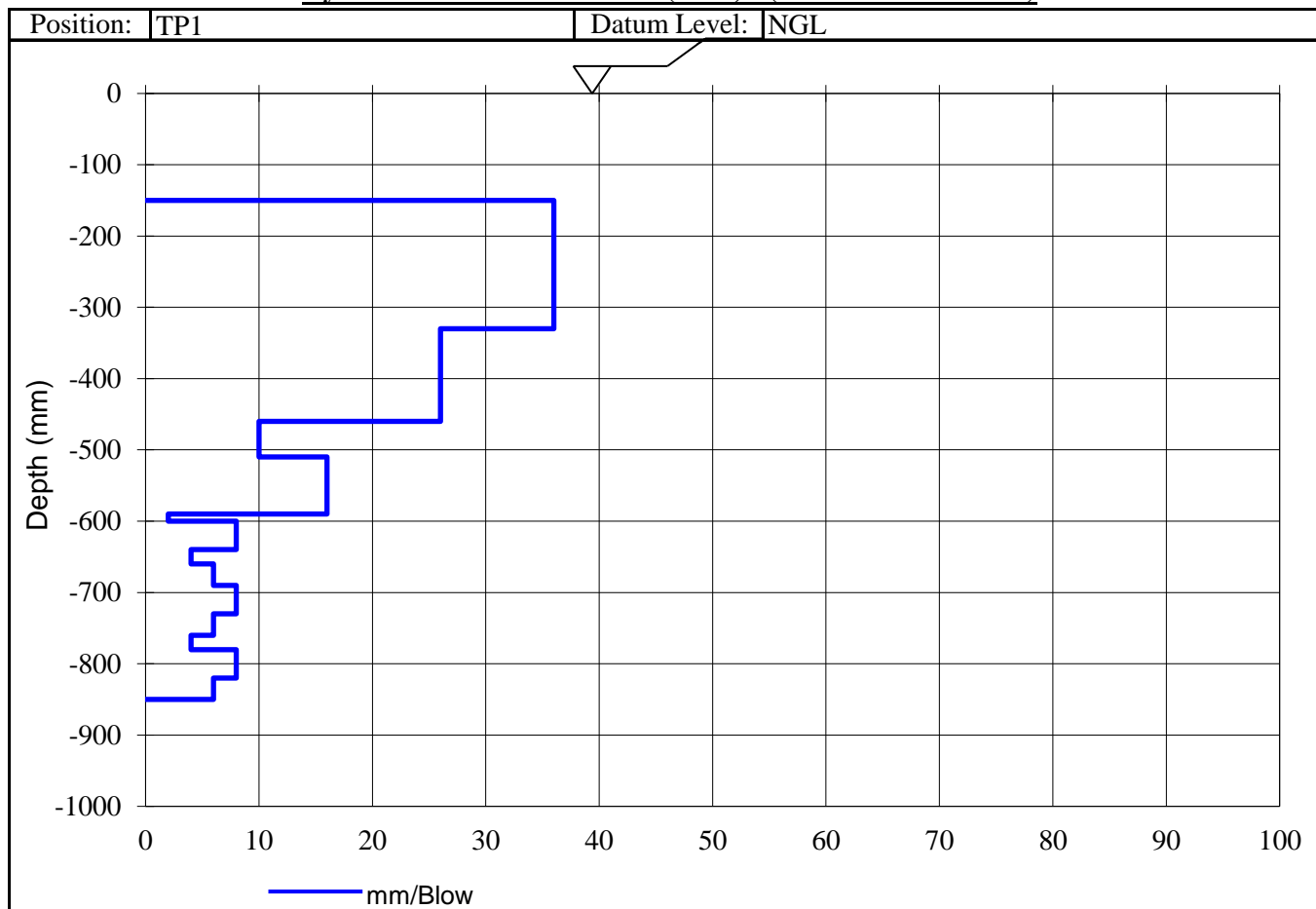
18 Clyde Street, Knysna : PO Box 964, Knysna, 6570

Tel: 044 3820502 : Fax: 044 3820503 : e-mail: iain@outeniqua.co.za

Customer :	Stephan Coetzee 0 0 0	Project :	Erf 2107, Wilderness
		Date Received :	29.04.2020
		Date Reported :	06.05.2020
		Req. Number :	
Attention :	Stephan Coetzee	No. of Pages :	1 of 5

TEST REPORT

Dynamic Cone Penetrometer (DCP) - (TMH 6 Method ST6)



I Paton (Member)
For Outeniqua Geotech. Services cc.
Technical Signatory

1. This report (with attachments) is the correct record of all measurements made, and may not be reproduced other than with full written approval from the Members of Outeniqua Geotechnical Services cc.
2. Measuring Equipment, traceable to National Standards is used where applicable. Results reported in this Test Report relate only to the items tested and are an indication only of the sample provided and/or taken.
3. While every care is taken to ensure the correctness of all tests and reports, neither Outeniqua Lab nor its employees shall be liable in any way whatever for any error made in the execution or reporting of tests or any erroneous conclusions drawn therefrom or for any consequence thereof.

Members: Iain Paton BSc Hons MEng Pr Sci Nat MSAIEG MSAICE



Outeniqua Geotechnical Services cc.

R-DCP-1-5

Dec-14

Geotechnical Engineering Consultants

Registration No. 1999/062743/23

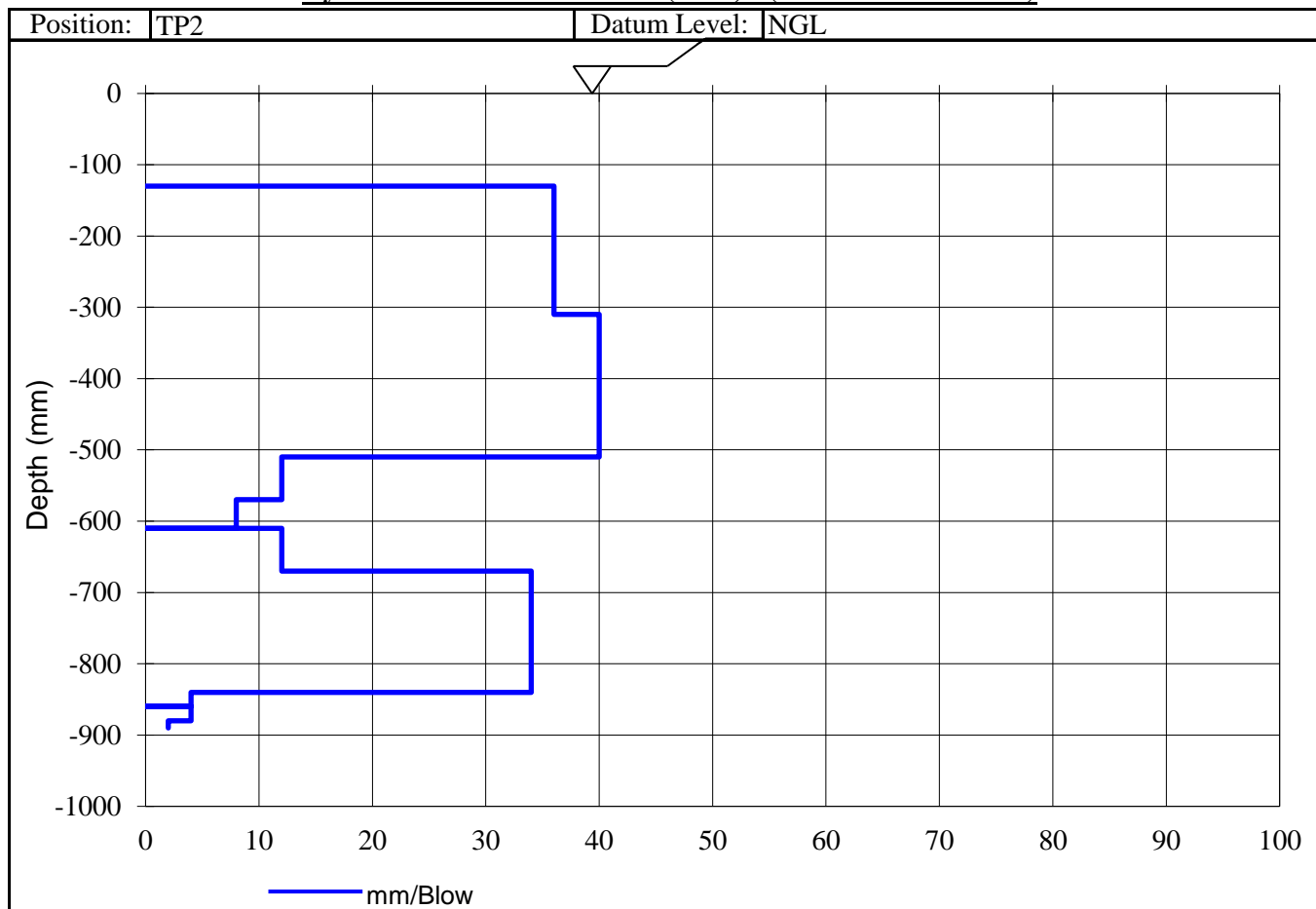
18 Clyde Street, Knysna : PO Box 964, Knysna, 6570

Tel: 044 3820502 : Fax: 044 3820503 : e-mail: iain@outeniqua.co.za

Customer :	Stephan Coetzee 0 0 0	Project :	Erf 2107, Wilderness
		Date Received :	29.04.2020
		Date Reported :	06.05.2020
		Req. Number :	
Attention :	Stephan Coetzee	No. of Pages :	2 of 5

TEST REPORT

Dynamic Cone Penetrometer (DCP) - (TMH 6 Method ST6)



I Paton (Member)
For Outeniqua Geotech. Services cc.
Technical Signatory

1. This report (with attachments) is the correct record of all measurements made, and may not be reproduced other than with full written approval from the Members of Outeniqua Geotechnical Services cc.
2. Measuring Equipment, traceable to National Standards is used where applicable. Results reported in this Test Report relate only to the items tested and are an indication only of the sample provided and/or taken.
3. While every care is taken to ensure the correctness of all tests and reports, neither Outeniqua Lab nor its employees shall be liable in any way whatever for any error made in the execution or reporting of tests or any erroneous conclusions drawn therefrom or for any consequence thereof.

Members: Iain Paton BSc Hons MEng Pr Sci Nat MSAIEG MSAICE



Outeniqua Geotechnical Services cc.

R-DCP-1-5

Dec-14

Geotechnical Engineering Consultants

Registration No. 1999/062743/23

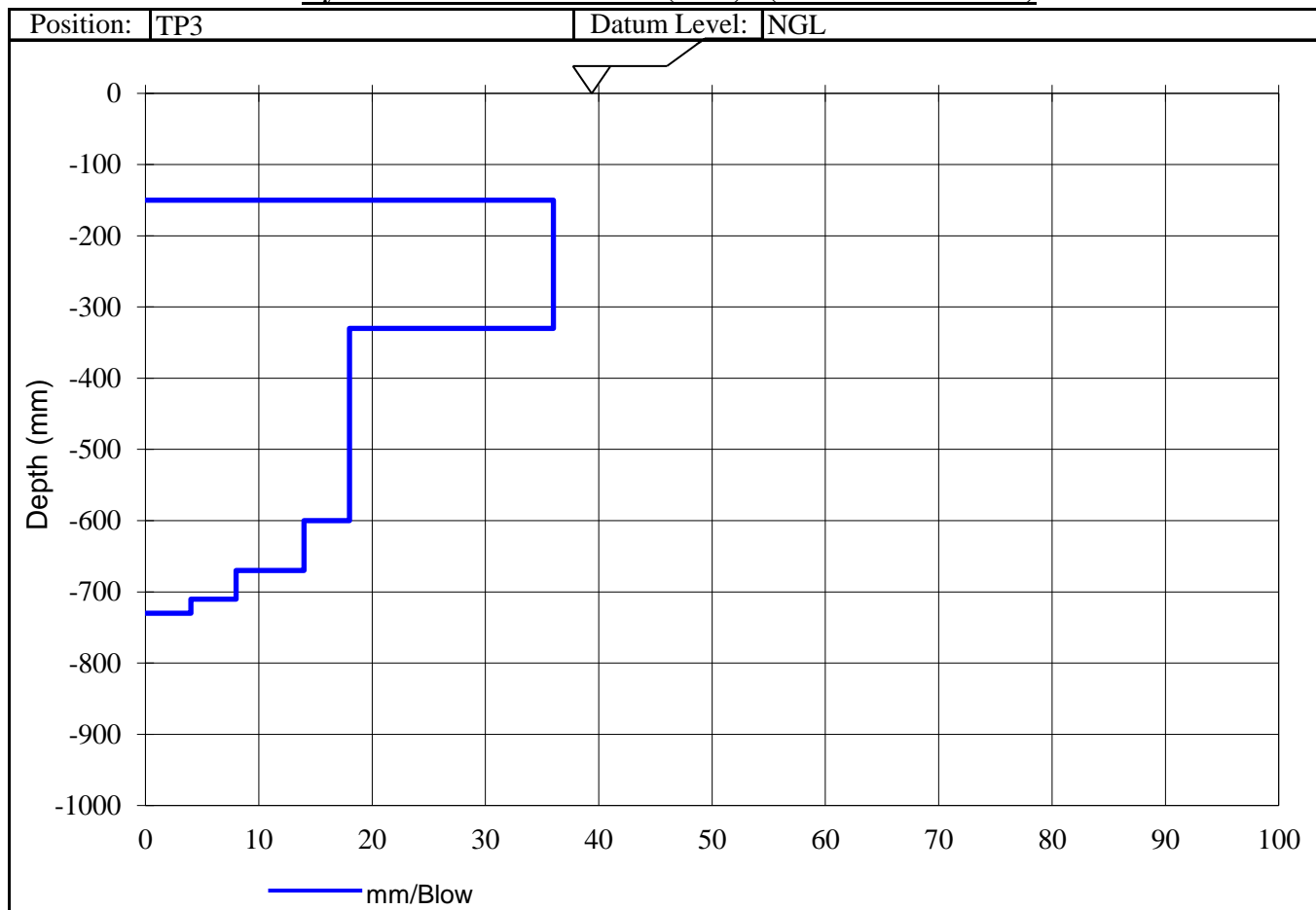
18 Clyde Street, Knysna : PO Box 964, Knysna, 6570

Tel: 044 3820502 : Fax: 044 3820503 : e-mail: iain@outeniqua.co.za

Customer :	Stephan Coetzee 0 0 0	Project :	Erf 2107, Wilderness
		Date Received :	29.04.2020
		Date Reported :	06.05.2020
		Req. Number :	
Attention :	Stephan Coetzee	No. of Pages :	3 of 5

TEST REPORT

Dynamic Cone Penetrometer (DCP) - (TMH 6 Method ST6)



I Paton (Member)
For Outeniqua Geotech. Services cc.
Technical Signatory

1. This report (with attachments) is the correct record of all measurements made, and may not be reproduced other than with full written approval from the Members of Outeniqua Geotechnical Services cc.
2. Measuring Equipment, traceable to National Standards is used where applicable. Results reported in this Test Report relate only to the items tested and are an indication only of the sample provided and/or taken.
3. While every care is taken to ensure the correctness of all tests and reports, neither Outeniqua Lab nor its employees shall be liable in any way whatever for any error made in the execution or reporting of tests or any erroneous conclusions drawn therefrom or for any consequence thereof.

Members: Iain Paton BSc Hons MEng Pr Sci Nat MSAIEG MSAICE



Outeniqua Geotechnical Services cc.

R-DCP-1-5

Dec-14

Geotechnical Engineering Consultants

Registration No. 1999/062743/23

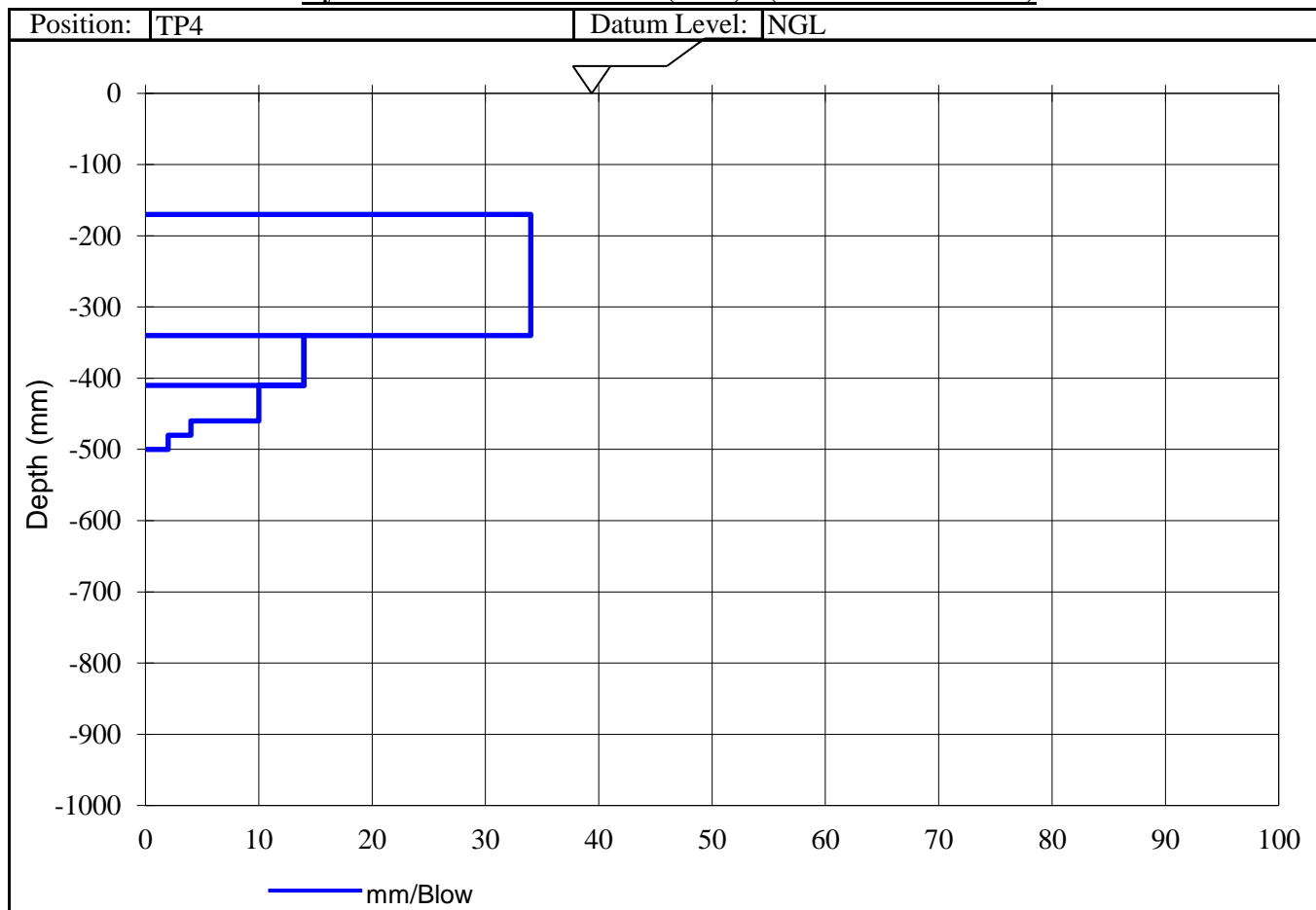
18 Clyde Street, Knysna : PO Box 964, Knysna, 6570

Tel: 044 3820502 : Fax: 044 3820503 : e-mail: iain@outeniqua.co.za

Customer :	Stephan Coetzee 0 0 0	Project :	Erf 2107, Wilderness
		Date Received :	29.04.2020
		Date Reported :	06.05.2020
		Req. Number :	
Attention :	Stephan Coetzee	No. of Pages :	4 of 5

TEST REPORT

Dynamic Cone Penetrometer (DCP) - (TMH 6 Method ST6)



I Paton (Member)
For Outeniqua Geotech. Services cc.
Technical Signatory

1. This report (with attachments) is the correct record of all measurements made, and may not be reproduced other than with full written approval from the Members of Outeniqua Geotechnical Services cc.
2. Measuring Equipment, traceable to National Standards is used where applicable. Results reported in this Test Report relate only to the items tested and are an indication only of the sample provided and/or taken.
3. While every care is taken to ensure the correctness of all tests and reports, neither Outeniqua Lab nor its employees shall be liable in any way whatever for any error made in the execution or reporting of tests or any erroneous conclusions drawn therefrom or for any consequence thereof.

Members: Iain Paton BSc Hons MEng Pr Sci Nat MSAIEG MSAICE



Outeniqua Geotechnical Services cc.

R-DCP-1-5

Dec-14

Geotechnical Engineering Consultants

Registration No. 1999/062743/23

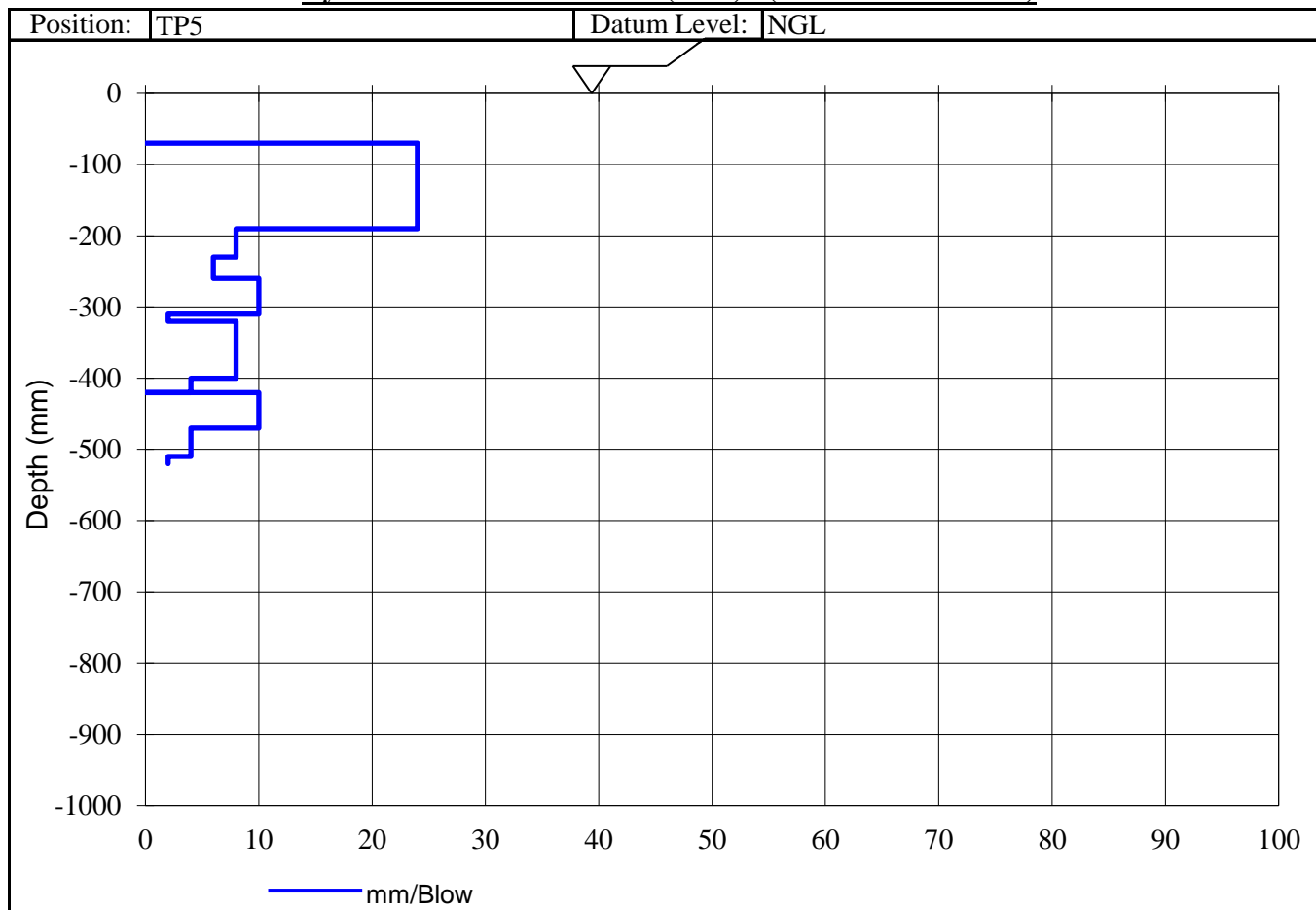
18 Clyde Street, Knysna : PO Box 964, Knysna, 6570

Tel: 044 3820502 : Fax: 044 3820503 : e-mail: iain@outeniqua.co.za

Customer :	Stephan Coetzee 0 0 0	Project :	Erf 2107, Wilderness
		Date Received :	29.04.2020
		Date Reported :	06.05.2020
		Req. Number :	
Attention :	Stephan Coetzee	No. of Pages :	5 of 5

TEST REPORT

Dynamic Cone Penetrometer (DCP) - (TMH 6 Method ST6)



I Paton (Member)
For Outeniqua Geotech. Services cc.
Technical Signatory

1. This report (with attachments) is the correct record of all measurements made, and may not be reproduced other than with full written approval from the Members of Outeniqua Geotechnical Services cc.
2. Measuring Equipment, traceable to National Standards is used where applicable. Results reported in this Test Report relate only to the items tested and are an indication only of the sample provided and/or taken.
3. While every care is taken to ensure the correctness of all tests and reports, neither Outeniqua Lab nor its employees shall be liable in any way whatever for any error made in the execution or reporting of tests or any erroneous conclusions drawn therefrom or for any consequence thereof.

Members: Iain Paton BSc Hons MEng Pr Sci Nat MSAIEG MSAICE