

**Naidu Consulting
N2 - 21X - Harding to
Izingolweni**

SOILCO MATERIALS INVESTIGATIONS (PTY) LTD

CIVIL ENGINEERING MATERIALS TESTING LABORATORIES



Reg. No.: 1965 / 009585 / 07

25 WESTMEAD RD WESTMEAD P.O. BOX 15318 WESTMEAD 3608 KWAZULU-NATAL

☎ 031 700 4325 📠 031 700 1909 email : info@soilco.co.za www.soilco.co.za

Date : 2023-07-07
For the Attention of : Sivan Naidoo

Naidu Consulting
P.O Box 2796
Westway Office Park
3635

Project Details : N2 - 21X - Harding to Izingolweni
Job Card Number : 243352
Sample Numbers : 10501 to 10508

1. Test Pit Profiles
2. Dynamic Cone Penetrometer
3. Sand Patch & Ball Penetration
4. Cores
5. Materials Report & MODs
6. UCS-ITS



Test Pit Profiles

SOILCO MATERIALS INVESTIGATIONS (PTY) LTD


CIVIL ENGINEERING MATERIALS TESTING LABORATORY



Reg. No. : 1965/09585/07

25 WESTMEAD ROAD - WESTMEAD P.O.BOX 15318 WESTMEAD 3608 KWAZULU - NATAL

TELEPHONE : 031 7004325 TELEFAX : 031 7001909 email : soilslab@mweb.co.za

Client	Naidu Consulting	
Project	N2 - 21X - Harding to Izingolweni	
Job Card No.	243352	
Date of Test	2023-06-07	
Field Technician	M.N	
Position	SBC S/C	
Test Pit Number	TP 1	
Chainage	71+500	
Co - Ordinates	S 30°50'51.6" E 030°22'40.1"	

FIELD SOIL SURVEY TEST REPORT

Water Table	Soil Legend	Depth (mm)	DESCRIPTION
			Moisture ; Colour ; Consistency ; Structure ; Soil Type ; Origin; Sampling ; Laboratory Testing : - (I = Indicator ; M = MOD AASHTO ; C = CBR)
		10	Single seal. 2L
		50	Aged brittle ASPHALT. 2L
		95	Aged brittle ASPHALT. 2L
		150	Aged brittle ASPHALT. 2L
	▽+▽	300	Slightly moist, light grey, dense, uniform, crushed rock (Top 20mm PHEN -) DOLERITE. (strongly cemented) PHEN + HCL + Lab No. 10501 - IMC
	▽.▽.▽.	460	Slightly moist, dusky black light yellow brown, very dense, uniform, CRUSHED DOLERITE. (strongly cemented) PHEN + HCL + Lab No. 10502 - IMC
	++++	630	Slightly moist to moist, dark yellow brown, medium dense, uniform, weathered sugar DOLERITE. PHEN - HCL + Lab No. 10503 - IMC
	○	1000	Slightly moist, dusky blue dark yellow brown, dense, intact, TILLITE gravel + boulder, residual. Lab No. 10504 - IMC

The above test report is pertinent only to the area tested. This report shall not be reproduced, except in full, without the prior consent of Soilco Materials Investigations (Pty) Ltd

Remarks :

Type of Excavation

Hand

X

TLB

Excavator

Excavation Stopped

X

Refusal

Struggling to Excavate

X

Photo No :

7676-7677 / 7680-7693

For Soilco :  (Technical Signatory).

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CIVIL ENGINEERING MATERIALS TESTING LABORATORY





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Client	Naidu Consulting	
Project	N2 - 21X - Harding to Izingolweni	
Job Card No.	243352	
Date of Test	2023-06-08	
Field Technician	M.N	
Position	SBC	
Test Pit Number	TP 2	
Chainage	94+900	
Co - Ordinates	S 30°44'39.1" E 030°06'315"	

FIELD SOIL SURVEY TEST REPORT

Water Table	Soil Legend	Depth (mm)	DESCRIPTION
			Moisture ; Colour ; Consistency ; Structure ; Soil Type ; Origin; Sampling ; Laboratory Testing : - (I = Indicator ; M = MOD AASHTO ; C = CBR)
		50	Aged, slightly tacky, continuously graded ASPHALT. 2L
		120	Aged, slightly tacky, continuously graded ASPHALT. 6L
		380	Slightly moist, light brown dusky black speckled black, dense, uniform, crushed rock weathered DOLERITE + asphalt PHEN + HCL + Lab No. 10505 - IMC /UCS/ITS Core
	++++	550	Slightly moist, light yellow brown, medium dense, uniform, sugar DOLERITE. PHEN + HCL + Lab No. 10506 - IMC
	++++	780	Slightly moist, dark yellow brown, medium dense, uniform, weathered DOLERITE. Lab No. 10507 - IMC
		1000	Moist, dark yellow brown, medium dense, uniform, silty CLAY + sugar dolerite, cut to fill. Lab No. 10508 - IMC

The above test report is pertinent only to the area tested. This report shall not be reproduced, except in full, without the prior consent of Soilco Materials Investigations (Pty) Ltd

Remarks :

Type of Excavation

Hand

X

TLB

Excavator

Excavation Stopped

X

Refusal

Struggling to Excavate

Photo No :

7678-7679 / 7694-7704 / 7705-7708

For Soilco: (Technical Signatory).



Dynamic Cone Penetrometer



SOILCO MATERIALS INVESTIGATIONS (PTY) LTD

Dynamic Cone Penetrometer - Field Worksheet

TMH 6 Method ST 6

PTO --- Page 1 of 1

Client : Naidu Consulting

Job Card No. : 243352

Project : N2 - 21X - Harding to Izingolweni

Date of Test : 2023-06-08

Km / Position : Km 71+500 - SBC S/C

Technician : M.N

Remarks : Removed Asphalt + Stabilised

No. of Blows / Reading : 5

DCP No. : 1

Normal

Structural X

Layers Removed	Asphalt	Basecourse	Subbase	Other
Layer Thickness	120	260		

Initial Reading : 95 DCP Refused : X DCP Stopped :

No. of Blows	Readings (mm)	No. of Blows	Readings (mm)	No. of Blows	Readings (mm)	No. of Blows	Readings (mm)
5	140	155		305		455	
10	150	160		310		460	
15	160	165		315		465	
20	170	170		320		470	
25	175	175		325		475	
30	180	180		330		480	
35	185	185		335		485	
40	190	190		340		490	
45	195	195		345		495	
50	195	200		350		500	
55	200	205		355		505	
60	200	210		360		510	
65	205	215		365		515	
70	205	220		370		520	
75	210	225		375		525	
80	210	230		380		530	
85	215	235		385		535	
90	215	240		390		540	
95	215	245		395		545	
100	Refusal	250		400		550	
105		255		405		555	
110		260		410		560	
115		265		415		565	
120		270		420		570	
125		275		425		575	
130		280		430		580	
135		285		435		585	
140		290		440		590	
145		295		445		595	
150		300		450		600	

Road Category

A	B	C
X		

Road Condition

Severe	Warning	X	Good
--------	---------	---	------

Base Type

Granular	X	Cemented
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Moisture Conditions

Dry	OMC	X	Wet	Soaked
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Horizon Depths

	to	
	to	
	to	
	to	
	to	
	to	

Distress Conditions

Rutting	Heavy Traffic	X
Pumping	Medium Traffic	
Longitudinal Cracks	Light Traffic	
Crocodile Cracks	User Defined 1	
Deformation	User Defined 2	
Other Cracks	Other	



SOILCO MATERIALS INVESTIGATIONS (PTY) LTD

Dynamic Cone Penetrometer - Field Worksheet

TMH 6 Method ST 6

PTO --- Page 1 of 1

Client : Naidu Consulting

Job Card No. :

Project : N2 - 21X - Harding to Izingolweni

Date of Test : 2023-06-08

Km / Position : Km 94+900 SBC

Technician : M.N

Remarks : Removed Asphalt + Stabilised

No. of Blows / Reading : 5

DCP No. : 2

Normal

Structural X

Layers Removed : Asphalt Basecourse Subbase Other

Layer Thickness : 120 260

Initial Reading : 130

DCP Refused :

DCP Stopped : X

No. of Blows	Readings (mm)	No. of Blows	Readings (mm)	No. of Blows	Readings (mm)	No. of Blows	Readings (mm)
5	180	155		305		455	
10	205	160		310		460	
15	230	165		315		465	
20	250	170		320		470	
25	280	175		325		475	
30	300	180		330		480	
35	315	185		335		485	
40	325	190		340		490	
45	335	195		345		495	
50	350	200		350		500	
55	360	205		355		505	
60	380	210		360		510	
65	405	215		365		515	
70	440	220		370		520	
75	490	225		375		525	
80	520	230		380		530	
85	540	235		385		535	
90	560	240		390		540	
95	575	245		395		545	
100	600	250		400		550	
105	630	255		405		555	
110	710	260		410		560	
115	760	265		415		565	
120	820	270		420		570	
125	900	275		425		575	
130	1000	280		430		580	
135	1060	285		435		585	
140	1110	290		440		590	
145		295		445		595	
150		300		450		600	

Road Category

A	B	C
X		

Road Condition

Severe	Warning	X	Good
--------	---------	---	------

Base Type

Granular	X	Cemented
----------	---	----------

Moisture Conditions

Dry	OMC	X	Wet	Soaked
-----	-----	---	-----	--------

Horizon Depths

	to	
	to	
	to	
	to	
	to	
	to	

Distress Conditions	DCP Design Curves
Rutting	Heavy Traffic X
Pumping	Medium Traffic
Longitudinal Cracks	Light Traffic
Crocodile Cracks	User Defined 1
Deformation	User Defined 2
Other Cracks	Other



Sand Patch & Ball Penetration



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T0213

Client : Naidu Consulting
Project : N2 - 21X - Harding to Izingsolweni

Job Card No. : 243352

Date Received / Sampled : 2023-06-15

Date Tested : 2023-06-07

Tested by : Malibongwe Ndevu

Environmental Condition : Sunny

Date Reported : 2023-07-07

Kilometer	Position	Texture Depth SANS 3001 - BT 11					Ball Penetration SANS 3001 - BT 10												Road Temperature (°C)	Remarks / Condition of Road
		Volume of Sand (ml)	Average Diameter of the Patch (mm)	Texture Depth (mm)	Average Texture Depth (mm)	Standard Deviation n Texture Depth	Actual Initial Reading (mm) (D ₁)	Actual 1 st Reading (mm) (D ₂)	Actual 2 nd Reading (mm) (D ₃)	Ball Penetration after 1 st Hammer Blow	Ball Penetration after 2 nd Hammer Blow	Average (mm)	Standard Deviation	One Blow Ball Penetration (mm)	Two Blow Ball Penetration (mm)	Average (mm)	Standard Deviation			
										E ₁ = D ₂ - D ₁	E ₂ = D ₃ - D ₁			B _{p1} = E ₁	B _{p2} = E ₂ - E ₁					
60 + 300	NBC	56	280	1.055	1.270	0.155	22.0	22.5	23.0	0.5	1.0	E ₁	E ₁	0.5	0.5	B _{p1}	B _{p1}	32.9	Chip & Spray	
			22.5	25.0			23.5	2.5	1.0	2.5	-1.5									
			22.0	23.0			23.5	1.0	1.5	1.0	0.5									
			240	1.238			22.5	23.0	23.5	0.5	1.0	0.800	0.632	0.5	0.5	0.800	0.632			
			21.5	22.5			23.0	1.0	1.5	1.0	0.5									
			22.0	22.5			23.0	0.5	1.0	0.5	0.5									
			230	1.348			21.5	22.0	23.0	0.5	1.5	E ₂	E ₂	0.5	1.0	B _{p2}	B _{p2}			
			22.0	22.5			23.0	0.5	1.0	0.5	0.5									
			240	1.238			23.0	23.5	24.0	0.5	1.0			0.5	0.5					0.350
			21.5	22.0			22.5	0.5	1.0	1.150	0.242	0.5	0.5	0.5	0.5					
60 + 800	SBC	56	220	1.473	1.836	0.219	22.0	23.0	23.0	1.0	1.0	E ₁	E ₁	1.0	0.0	B _{p1}	B _{p1}	27.9	Chip & Spray	
			23.0	24.0			25.0	1.0	2.0	1.0	1.0									
			23.5	24.0			25.5	0.5	2.0	0.5	1.5									
			190	1.975			22.5	23.5	24.5	1.0	2.0	0.850	0.474	1.0	1.0	0.850	0.474			
			23.0	24.0			25.0	1.0	2.0	1.0	1.0									
			22.0	24.0			25.5	2.0	3.5	2.0	1.5									
			190	1.975			23.0	23.5	24.5	0.5	1.5	E ₂	E ₂	0.5	1.0	B _{p2}	B _{p2}			
			22.5	23.0			23.5	0.5	1.0	0.5	0.5									
			200	1.782			23.0	23.5	24.0	0.5	1.0			0.5	0.5					0.950
			22.5	23.0			24.5	0.5	2.0	1.800	0.753	0.5	1.5	0.5	1.5					
61 + 300	NBC	56	210	1.617	1.788	0.127	22.0	23.0	24.0	1.0	2.0	E ₁	E ₁	1.0	1.0	B _{p1}	B _{p1}	27.6	Chip & Spray	
			21.5	22.0			23.0	0.5	1.5	0.5	1.0									
			23.0	24.0			25.0	1.0	2.0	1.0	1.0									
			200	1.782			23.5	24.0	24.5	0.5	1.0	0.800	0.258	0.5	0.5	0.800	0.258			
			22.5	23.0			24.5	0.5	2.0	0.5	1.5									
			22.0	23.0			24.0	1.0	2.0	1.0	1.0									
			200	1.782			23.0	24.0	25.0	1.0	2.0	E ₂	E ₂	1.0	1.0	B _{p2}	B _{p2}			
			22.5	23.5			24.0	1.0	1.5	1.0	0.5									
			190	1.975			23.0	24.0	25.0	1.0	2.0			1.0	1.0					0.900
			23.0	23.5			24.0	0.5	1.0	1.700	0.422	0.5	0.5	0.5	0.5					
61 + 800	SBC	56	220	1.473	1.559	0.079	23.0	24.0	24.5	1.0	1.5	E ₁	E ₁	1.0	0.5	B _{p1}	B _{p1}	29.3	Chip & Spray	
			24.0	25.0			26.5	1.0	2.5	1.0	1.5									
			23.5	24.0			24.5	0.5	1.0	0.5	0.5									
			210	1.617			21.0	23.0	24.5	2.0	3.5	1.050	0.599	2.0	1.5	1.050	0.599			
			24.5	25.5			26.0	1.0	1.5	1.0	0.5									
			23.0	24.5			25.0	1.5	2.0	1.5	0.5									
			210	1.617			24.0	24.5	25.5	0.5	1.5	E ₂	E ₂	0.5	1.0	B _{p2}	B _{p2}			
			21.0	23.0			24.0	2.0	3.0	2.0	1.0									
			22.5	23.0			24.0	0.5	1.5	0.5	1.0			0.900	0.394					
			24.0	24.5			25.5	0.5	1.5	1.950	0.798	0.5	1.0	0.5	1.0					
24.0	24.5	25.5	0.5	1.5	0.5	1.0														
62 + 300	NBC	56	200	1.782	1.821	0.086	22.5	24.0	25.0	1.5	2.5	E ₁	E ₁	1.5	1.0	B _{p1}	B _{p1}	30.1	Chip & Spray	
			22.0	23.0			24.0	1.0	2.0	1.0	1.0									
			22.5	23.5			24.5	1.0	2.0	1.0	1.0									
			190	1.975			22.0	23.0	23.5	1.0	1.5	1.100	0.394	1.0	0.5	1.100	0.394			
			23.0	24.0			25.0	1.0	2.0	1.0	1.0									
			22.5	23.5			24.5	1.0	2.0	1.0	1.0									
			200	1.782			24.0	25.0	25.5	1.0	1.5	E ₂	E ₂	1.0	0.5	B _{p2}	B _{p2}			
			23.5	24.0			24.5	0.5	1.0	0.5	0.5									
			24.0	26.0			26.5	2.0	2.5	2.0	0.5			0.800	0.258					
			23.0	24.0			25.0	1.0	2.0	1.900	0.459	1.0	1.0	1.0	1.0					
62 + 800	SBC	56	240	1.238	1.312	0.152	22.5	24.0	25.5	1.5	3.0	E ₁	E ₁	1.5	1.5	B _{p1}	B _{p1}	32.2	Chip & Spray	
			23.0	24.5			25.0	1.5	2.0	1.5	0.5									
			22.0	23.0			24.0	1.0	2.0	1.0	1.0									
			240	1.238			23.0	24.5	25.0	1.5	2.0	1.250	0.486	1.5	0.5	1.250	0.486			
			23.0	24.5			25.5	1.5	2.5	1.5	1.0									
			21.5	22.0			24.0	0.5	2.5	0.5	2.0									
			220	1.473			21.5	22.5	24.0	1.0	2.5	E ₂	E ₂	1.0	1.5	B _{p2}	B _{p2}			
			22.0	24.0			24.5	2.0	2.5	2.0	0.5									
			20.5	22.0			23.0	1.5	2.5	1.5	1.0			1.100	0.516					
			21.5	22.0			23.5	0.5	2.0	2.350	0.337	0.5	1.5	0.5	1.5					

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†sanas

T0213

Date Reported : 2023-07-07

Soilco SF 87

SOILCO MATERIALS INVESTIGATIONS (PTY) LTD

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T0213

Client : Naidu Consulting
Project : N2 - 21X - Harding to Izingsolweni

Job Card No. : 243352
Date Received / Sampled : 2023-06-15
Date Tested : 2023-06-09
Date Reported : 2023-07-07

Tested by : Malibongwe Ndevu Environmental Condition : Sunny

Kilometer	Position	Texture Depth SANS 3001 - BT 11					Ball Penetration SANS 3001 - BT 10											Road Temperature (°C)	Remarks / Condition of Road	
		Volume of Sand (ml)	Average Diameter of the Patch (mm)	Texture Depth (mm)	Average Texture Depth (mm)	Standard Deviation Texture Depth	Actual Initial Reading (mm) (D ₁)	Actual 1 st Reading (mm) (D ₂)	Actual 2 nd Reading (mm) (D ₃)	Ball Penetration after 1 st Hammer Blow E ₁ = D ₂ - D ₁	Ball Penetration after 2 nd Hammer Blow E ₂ = D ₃ - D ₁	Average (mm)	Standard Deviation	One Blow Ball Penetration (mm) B _{p1} = E ₁	Two Blow Ball Penetration (mm) B _{p2} = E ₂ - E ₁	Average (mm)	Standard Deviation			
66 + 300	NBC S/L	56	300	0.792	0.793	0.037	21.0	22.0	23.0	1.0	2.0	1.000	0.408	1.0	1.0	1.000	0.408	8.3	Bleeding	
				22.0			22.5	23.0	0.5	1.0	1.0			1.5						
				21.5			22.0	23.5	0.5	2.0	1.0			1.0						
				300			0.792	23.0	24.0	25.0	1.0	2.0	1.800	0.483	1.5	0.5	0.800			0.422
				22.0			23.5	24.0	1.5	2.0	1.5	0.5								
				21.0			22.5	23.0	1.5	2.0	1.5	0.5								
				310			0.742	22.5	23.5	24.0	1.0	1.5			1.5	0.5				
				22.0			23.5	24.0	1.5	2.0	1.5	0.5								
				290			0.848	22.5	23.0	23.5	0.5	1.0			0.5	0.5				
				66 + 800			SBC	56	240	1.238	1.152	0.068	22.0	22.5	23.0	0.5	1.0			1.000
21.5	23.0	24.0	1.5		2.5	1.5				1.0										
24.0	25.0	25.5	1.0		1.5	1.0				0.5										
250	1.141	22.5	23.5		24.0	1.0				1.5			1.900	0.568	1.5	1.0	0.900	0.394		
250	1.141	20.0	21.5		22.5	1.5				2.5					1.5	1.0				
245	1.188	22.5	23.0		24.5	0.5				2.0					0.5	1.5				
245	1.188	23.5	24.5		25.0	1.0				1.5					1.0	0.5				
260	1.055	23.0	24.5		25.5	1.5				2.5					1.5	1.0				
260	1.055	21.0	22.0		23.5	1.0				2.5					1.0	1.5				
67 + 300	NBC S/L	56	300		0.792	0.782				0.022			22.0	24.0	24.5	2.0	2.5	0.750	0.486	2.0
				21.0	21.5		22.0	0.5	1.0		0.5	0.5								
				22.5	23.0		24.0	0.5	1.5		0.5	1.0								
				300	0.792		21.0	22.0	23.5		1.0	2.5	1.400	0.615	1.0	0.5	0.650	0.337		
				22.0	23.0		23.5	1.0	1.5		1.0	0.5								
				21.5	22.0		22.5	0.5	1.0		0.5	0.5								
				300	0.792		22.0	22.5	23.0		0.5	1.0			0.5	0.5				
				21.5	22.0		22.5	0.5	1.0		0.5	0.5								
				22.5	23.0		23.5	0.5	1.0		0.5	0.5								
				67 + 800	SBC		56	250	1.141		1.198	0.041	22.0	23.5	24.5	1.5	2.5	0.850	0.474	1.5
23.5	24.5	25.5	1.0			2.0			1.0	1.0										
21.0	22.5	23.0	1.5			2.0			0.5	0.5										
240	1.238	22.0	22.5			23.0			0.5	1.0			1.700	0.422	0.5	0.5	0.850	0.242		
240	1.238	24.0	24.5			25.5			0.5	1.5					0.5	1.0				
245	1.188	23.0	23.5			24.5			0.5	1.5					0.5	1.0				
245	1.188	24.5	25.0			26.0			0.5	1.5					0.5	1.0				
245	1.188	22.0	23.5			24.0			1.5	2.0					1.5	0.5				
245	1.188	22.0	22.5			23.5			0.5	1.5					0.5	1.0				
68 + 300	NBC S/L	56	270			0.978			1.056	0.058			24.0	24.5	25.0	0.5	1.0	0.800	0.350	0.5
				22.0	23.0	23.5	1.0	1.5			1.0	0.5								
				22.5	23.0	23.5	0.5	1.0			0.5	0.5								
				250	1.141	23.0	23.5	24.0			0.5	1.0	1.350	0.412	0.5	0.5	0.550	0.158		
				260	1.055	22.0	23.5	24.0			1.5	2.0			1.5	0.5				
				260	1.055	23.0	23.5	24.0			0.5	1.0			0.5	0.5				
				260	1.055	23.0	24.0	25.0			1.0	2.0			1.0	1.0				
				260	1.055	22.0	22.5	23.0			0.5	1.0			0.5	0.5				
				260	1.055	22.0	23.0	23.5			1.0	1.5			1.0	0.5				
				68 + 800	SBC S/L	56	235	1.291			1.271	0.061	22.0	23.0	24.0	1.0	2.0	0.850	0.474	1.0
23.0	23.5	24.0	0.5					1.0	0.5	0.5										
22.0	23.0	24.0	1.0					2.0	1.0	1.0										
230	1.348	21.0	22.0					23.0	1.0	2.0			1.650	0.474	1.0	1.0	0.800	0.258		
235	1.291	20.5	21.0					22.0	0.5	1.5					0.5	1.0				
240	1.238	23.5	24.5					25.0	1.0	1.5					1.0	0.5				
245	1.188	24.0	24.5					25.5	0.5	1.5					0.5	1.0				
245	1.188	21.0	23.0					23.5	2.0	2.5					2.0	0.5				
245	1.188	23.0	23.5					24.5	0.5	1.5					0.5	1.0				

SOILCO MATERIALS INVESTIGATIONS (PTY) LTD

CIVIL ENGINEERING MATERIALS TESTING LABORATORY

Reg. No. : 1965 / 009585 / 07

25 WESTMEAD ROAD - WESTMEAD P.O.BOX 15318 WESTMEAD 3608 KWAZULU - NATAL

TELEPHONE : 031 7004325 TELEFAX : 031 7001909 email : info@soilco.co.za



T0213

Client : Naidu Consulting
Project : N2 - 21X - Harding to Izingsolweni

Job Card No. : 243352
Date Received / Sampled : 2023-06-15

Date Tested : 2023-06-09

Tested by : Malibongwe Ndevu

Environmental Condition : Sunny

Date Reported : 2023-07-07

Kilometer	Position	Texture Depth SANS 3001 - BT 11						Ball Penetration SANS 3001 - BT 10										Road Temperature (°C)	Remarks / Condition of Road							
		Volume of Sand (ml)	Average Diameter of the Patch (mm)	Texture Depth (mm)	Average Texture Depth (mm)	Standard Deviation n Texture Depth	Actual Initial Reading (mm) (D ₁)	Actual 1 st Reading (mm) (D ₂)	Actual 2 nd Reading (mm) (D ₃)	Ball Penetration after 1 st Hammer Blow	Ball Penetration after 2 nd Hammer Blow	Average (mm)	Standard Deviation	One Blow Ball Penetration (mm)	Two Blow Ball Penetration (mm)	Average (mm)	Standard Deviation									
										E ₁ = D ₂ - D ₁	E ₂ = D ₃ - D ₁									B _{p1} = E ₁	B _{p2} = E ₂ - E ₁					
69 + 300	NBC	56	200	1.782	1.859	0.105	23.0	24.0	24.5	1.0	1.5	E ₁	E ₁	1.0	0.5	B _{p1}	B _{p1}	15.6	Chip & Spray							
			22.0	22.5			23.0	0.5	1.0	0.5	0.5															
			23.0	24.0			25.0	1.0	2.0	1.0	1.0			1.200	0.422											
			200	1.782			22.0	23.5	24.5	1.5	2.5	E ₂	E ₂	1.5	1.0	B _{p2}	B _{p2}									
			21.0	22.5			23.0	1.5	2.0	1.5	0.5															
			24.0	25.5			26.5	1.5	2.5	1.5	1.0			0.750	0.264											
			190	1.975			23.0	24.0	25.0	1.0	2.0	E ₁	E ₁	1.0	0.5	B _{p1}	B _{p1}									
			22.0	23.0			23.5	1.0	1.5	0.5	0.5															
			23.5	24.5			25.0	1.0	1.5	0.5	0.5															
			200	1.782			24.0	25.5	26.5	1.5	2.5	E ₂	E ₂	1.5	1.0	B _{p2}	B _{p2}									
			23.0	24.0			25.0	1.0	2.0	1.0	1.0															
			22.0	23.0			23.5	1.0	1.5	0.5	0.5															
69 + 800	SBC S/L	56	260	1.055	1.097	0.030	22.0	23.0	24.0	1.0	2.0	E ₁	E ₁	1.0	1.0	B _{p1}	B _{p1}	22.3	Chip & Spray + Bleeding							
			23.5	24.5			25.0	1.0	1.5	1.0	0.5															
			22.0	22.5			23.0	0.5	1.0	0.5	0.5															
			255	1.096			21.5	22.0	23.0	0.5	1.5	E ₂	E ₂	0.5	1.0	B _{p2}	B _{p2}									
			255	1.096			22.0	22.5	23.5	0.5	1.5			0.5	1.0											
			255	1.096			20.0	20.5	21.0	0.5	1.0			0.5	0.5											
			255	1.096			22.0	23.5	24.5	1.5	2.5	E ₁	E ₁	1.5	1.0	B _{p1}	B _{p1}									
			24.5	25.0			25.5	0.5	1.0	0.5	0.5															
			23.5	24.0			24.5	0.5	1.0	0.5	0.5															
			70 + 300	NBC			56	210	1.617	1.621	0.110	23.0	24.0	24.5	1.0	1.5	E ₁			E ₁	1.0	0.5	B _{p1}	B _{p1}	18.7	Chip & Spray
								24.0	25.0			26.0	1.0	2.0	1.0	1.0										
								21.5	22.0			22.5	0.5	1.0	0.5	0.5										
220	1.473	22.0			22.5	23.5		0.5	1.5			E ₂	E ₂	0.5	1.0	B _{p2}	B _{p2}									
22.5	24.0	24.5			1.5	2.0		1.5	0.5																	
23.0	23.5	24.0			0.5	1.0		0.5	0.5																	
210	1.617	21.5			22.0	22.5		0.5	1.0			E ₁	E ₁	0.5	0.5	B _{p1}	B _{p1}									
200	1.782	22.5			23.0	23.5		0.5	1.0					0.5	0.5											
210	1.617	22.5			23.5	24.0		1.0	1.5					1.0	0.5											
210	1.617	24.0			25.0	25.5		1.0	1.5			E ₂	E ₂	1.0	0.5	B _{p2}	B _{p2}									
210	1.617	24.0			25.0	25.5		1.0	1.5					1.0	0.5											
210	1.617	24.0			25.0	25.5		1.0	1.5					1.0	0.5											
70 + 800	SBC S/L	56	210	1.617	1.587	0.041	23.0	24.0	25.0	1.0	2.0	E ₁	E ₁	1.0	1.0	B _{p1}	B _{p1}	23.6	Chip & Spray							
			22.5	24.0			24.5	1.5	2.0	1.5	0.5															
			21.5	22.5			23.0	1.0	1.5	1.0	0.5															
			210	1.617			22.0	23.0	23.5	1.0	1.5	E ₂	E ₂	1.0	0.5	B _{p2}	B _{p2}									
			215	1.542			23.0	24.5	25.5	1.5	2.5			1.5	1.0											
			215	1.542			20.0	21.0	22.0	1.0	2.0			1.0	1.0											
			215	1.542			24.5	25.0	26.0	0.5	1.5	E ₁	E ₁	0.5	1.0	B _{p1}	B _{p1}									
			215	1.542			25.5	26.0	26.5	0.5	1.0			0.5	0.5											
			210	1.617			22.0	23.5	24.0	1.5	2.0			1.5	0.5											
			210	1.617			22.5	23.0	23.5	0.5	1.0	E ₂	E ₂	0.5	0.5	B _{p2}	B _{p2}									
			210	1.617			22.5	23.0	23.5	0.5	1.0			0.5	0.5											
			210	1.617			22.5	23.0	23.5	0.5	1.0			0.5	0.5											
71 + 300	NBC	56	190	1.975	2.110	0.124	22.5	24.0	24.5	1.5	2.0	E ₁	E ₁	1.5	0.5	B _{p1}	B _{p1}	23.0	Chip & Spray							
			24.0	24.5			25.0	0.5	1.0	0.5	0.5															
			24.0	25.5			26.0	1.5	2.0	1.5	0.5															
			180	2.200			21.0	22.5	23.0	1.5	2.0	E ₂	E ₂	1.5	0.5	B _{p2}	B _{p2}									
			190	1.975			22.0	22.5	23.0	0.5	1.0			0.5	0.5											
			180	2.200			23.0	24.5	25.5	1.5	2.5			1.5	1.0											
			180	2.200			23.0	24.5	25.0	1.5	2.0	E ₁	E ₁	1.5	0.5	B _{p1}	B _{p1}									
			180	2.200			22.0	23.0	23.5	1.0	1.5			1.0	0.5											
			180	2.200			22.0	24.0	25.0	2.0	3.0			2.0	1.0											
			180	2.200			21.5	22.0	23.5	0.5	2.0	E ₂	E ₂	0.5	1.5	B _{p2}	B _{p2}									
			180	2.200			21.5	22.0	23.5	0.5	2.0			0.5	1.5											
			180	2.200			21.5	22.0	23.5	0.5	2.0			0.5	1.5											
71 + 800	SBC	56	220	1.473	1.591	0.118	22.0	22.5	23.0	0.5	1.0	E ₁	E ₁	0.5	0.5	B _{p1}	B _{p1}	15.1	Chip & Spray							
			21.5	22.0			23.0	0.5	1.5	0.5	1.0															
			22.5	23.5			24.0	1.0	1.5	1.0	0.5															
			200	1.782			23.5	24.0	25.0	0.5	1.5	E ₂	E ₂	0.5	1.0	B _{p2}	B _{p2}									
			210	1.617			22.0	23.0	24.0	1.0	2.0			1.0	1.0											
			210	1.617			22.0	23.0	23.5	1.0	1.5			1.0	0.5											
			215	1.542			21.0	22.0	23.0	1.0	2.0	E ₁	E ₁	1.0	1.0	B _{p1}	B _{p1}									
			215	1.542			20.0	20.5	21.5	0.5	1.5			0.5	1.0											
			215	1.542			23.5	24.0	25.5	0.5	2.0			0.5	1.5											
			215	1.542			24.0	24.5	25.0	0.5	1.0	E ₂	E ₂	0.5	0.5	B _{p2}	B _{p2}									
			215	1.542			24.0	24.5	25.0	0.5	1.0			0.5	0.5											
			215	1.542			24.0	24.5	25.0	0.5	1.0			0.5	0.5											

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T0213

Client : Naidu Consulting
Project : N2 - 21X - Harding to Izingsolweni

Job Card No. : 243352
Date Received / Sampled : 2023-06-15

Date Tested : 2023-06-09

Tested by : Malibongwe Ndevu

Environmental Condition : Sunny

Date Reported : 2023-07-07

Kilometer	Position	Texture Depth SANS 3001 - BT 11					Ball Penetration SANS 3001 - BT 10												Road Temperature (°C)	Remarks / Condition of Road
		Volume of Sand (ml)	Average Diameter of the Patch (mm)	Texture Depth (mm)	Average Texture Depth (mm)	Standard Deviation Texture Depth	Actual Initial Reading (D ₁)	Actual 1 st Reading (D ₂)	Actual 2 nd Reading (D ₃)	Ball Penetration after 1 st Hammer Blow E ₁ = D ₂ - D ₁	Ball Penetration after 2 nd Hammer Blow E ₂ = D ₃ - D ₁	Average (mm)	Standard Deviation	One Blow Ball Penetration (mm) B _{p1} = E ₁	Two Blow Ball Penetration (mm) B _{p2} = E ₂ - E ₁	Average (mm)	Standard Deviation			
72 + 300	NBC	56	260	1.055	1.056	0.058	22.0	23.0	24.0	1.0	2.0	1.150	E ₁	E ₁	1.0	1.0	B _{p1}	B _{p1}	24.8	Chip & Spray
			22.5	24.5			25.0	1.5	2.0	1.5	0.5									
			270	0.978			22.0	23.0	24.0	1.0	2.0			1.0	1.0					
			250	1.141			21.5	22.0	23.0	0.5	1.5			0.5	1.0					
			260	1.055			21.5	23.0	24.0	1.5	2.5	1.5	1.0	B _{p2}	B _{p2}					
			260	1.055			22.0	22.5	23.5	0.5	1.5	0.5	1.0							
			260	1.055			22.0	23.0	24.0	1.0	2.0	1.0	1.0							
			260	1.055			21.0	22.0	22.5	1.0	1.5	1.0	0.5							
72 + 800	SBC S/L	56	200	1.782	1.839	0.086	24.0	25.0	25.5	1.0	1.5	0.900	E ₁	E ₁	1.0	0.5	B _{p1}	B _{p1}	22.7	Chip & Spray + Longitudinal cracks
			22.5	23.0			23.5	0.5	1.0	0.5	0.5									
			200	1.782			21.5	22.5	23.0	1.0	1.5			1.0	0.5					
			190	1.975			22.0	22.5	23.5	0.5	1.5			0.5	1.0					
			195	1.875			23.5	24.0	24.5	0.5	1.0	0.5	0.5	B _{p2}	B _{p2}					
			200	1.782			23.0	23.5	24.0	0.5	1.0	0.5	0.5							
			200	1.782			22.5	23.5	24.0	1.0	1.5	1.0	0.5							
			200	1.782			21.5	22.5	23.5	1.0	2.0	1.0	1.0							
73 + 300	NBC	56	220	1.473	1.639	0.140	23.0	23.5	24.0	0.5	1.0	0.900	E ₁	E ₁	0.5	0.5	B _{p1}	B _{p1}	23.5	Chip & Spray
			22.5	23.0			24.0	0.5	1.5	0.5	1.0									
			210	1.617			23.5	24.0	25.0	0.5	1.5			0.5	1.0					
			215	1.542			21.5	22.0	22.5	0.5	1.0			0.5	0.5					
			200	1.782			23.5	25.5	26.0	2.0	2.5	2.0	0.5	B _{p2}	B _{p2}					
			200	1.782			22.0	23.0	23.5	1.0	1.5	1.0	1.0							
			200	1.782			23.0	24.0	25.0	1.0	2.0	1.0	1.0							
			200	1.782			22.0	23.5	23.5	1.5	1.5	1.5	0.0							
73 + 800	SBC	56	200	1.782	2.003	0.155	23.0	24.0	25.0	1.0	2.0	1.150	E ₁	E ₁	1.0	1.0	B _{p1}	B _{p1}	24.0	Chip & Spray + Bleeding + Patching
			180	2.200			22.0	22.5	23.5	0.5	1.5			0.5	1.0					
			190	1.975			21.5	22.5	23.5	1.0	2.0			1.0	1.0					
			185	2.083			23.5	24.5	25.5	1.0	2.0			1.0	1.0					
			190	1.975			24.0	25.0	26.0	1.0	2.0	1.0	1.0	B _{p2}	B _{p2}					
			190	1.975			20.0	21.5	22.0	1.5	2.0	1.5	0.5							
			190	1.975			22.0	23.5	25.0	1.5	3.0	1.5	1.5							
			190	1.975			23.0	24.5	25.0	1.5	2.0	1.5	0.5							
74 + 300	NBC	56	220	1.473	1.658	0.169	21.5	22.0	23.0	0.5	1.5	0.850	E ₁	E ₁	0.5	1.0	B _{p1}	B _{p1}	16.1	Chip & Spray
			22.0	22.5			23.0	0.5	1.0	0.5	0.5									
			200	1.782			22.0	23.0	24.0	1.0	2.0			1.0	1.0					
			200	1.782			23.0	23.5	24.0	0.5	1.0			0.5	0.5					
			200	1.782			23.0	24.5	25.0	1.5	2.0	1.5	0.5	B _{p2}	B _{p2}					
			200	1.782			21.5	22.5	23.0	1.0	1.5	1.0	0.5							
			220	1.473			21.0	21.5	22.5	0.5	1.5	0.5	1.0							
			220	1.473			22.0	22.5	23.0	0.5	1.0	0.5	0.5							
74 + 800	SBC	56	210	1.617	1.716	0.091	21.5	23.0	23.5	1.5	2.0	1.200	E ₁	E ₁	1.5	0.5	B _{p1}	B _{p1}	20.7	Chip & Spray
			24.5	25.0			25.5	0.5	1.0	0.5	0.5									
			200	1.782			23.0	23.5	24.0	0.5	1.0			0.5	0.5					
			22.5	24.0			25.0	1.5	2.5	1.5	1.0									
			210	1.617			21.0	22.0	22.5	1.0	1.5	1.0	0.5	B _{p2}	B _{p2}					
			200	1.782			24.0	25.0	26.0	1.0	2.0	1.0	1.0							
			200	1.782			23.0	25.0	26.0	2.0	3.0	2.0	1.0							
			200	1.782			23.0	24.5	25.0	1.5	2.0	1.5	0.5							
200	1.782	22.0	23.5	24.5	1.5	2.5	1.5	1.0	B _{p2}	B _{p2}										
200	1.782	20.5	21.5	22.0	1.0	1.5	1.0	0.5												

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Date Tested : 2023-06-09

Tested by : Malibongwe Ndevu

Environmental Condition : Sunny

Date Reported : 2023-07-07

Kilometer	Position	Texture Depth SANS 3001 - BT 11					Ball Penetration SANS 3001 - BT 10										Road Temperature (°C)	Remarks / Condition of Road	
		Volume of Sand (ml)	Average Diameter of the Patch (mm)	Texture Depth (mm)	Average Texture Depth (mm)	Standard Deviation n Texture Depth	Actual Initial Reading (mm) (D ₁)	Actual 1 st Reading (mm) (D ₂)	Actual 2 nd Reading (mm) (D ₃)	Ball Penetration after 1 st Hammer Blow	Ball Penetration after 2 nd Hammer Blow	Average (mm)	Standard Deviation	One Blow Ball Penetration (mm)	Two Blow Ball Penetration (mm)	Average (mm)			Standard Deviation
75 + 300	NBC	56	220	1.473	1.591	0.118	22.0	23.5	24.0	1.5	2.0	E ₁	E ₁	1.5	0.5	B _{p1}	B _{p1}	28.6	Chip & Spray
			215	1.542			21.0	23.5	24.5	2.5	3.5			2.5	1.0				
			200	1.782			22.5	23.5	24.0	1.0	1.5			1.0	0.5				
			215	1.542			22.0	24.0	25.0	2.0	3.0	E ₂	E ₂	2.0	1.0	B _{p2}	B _{p2}		
			210	1.617			23.5	24.0	24.5	0.5	1.0			0.5	0.5				
			210	1.617			21.5	22.5	23.5	1.0	2.0			1.0	1.0				
			230	1.348			22.0	23.5	24.5	1.5	2.5	E ₁	E ₁	1.5	0.5	B _{p1}	B _{p1}		
			230	1.348			23.0	24.0	24.5	1.0	1.5			1.0	0.5				
			240	1.238			21.5	23.0	24.0	1.5	2.5			1.5	1.0				
			240	1.238			24.0	25.0	26.0	1.0	2.0	E ₂	E ₂	1.0	1.0	B _{p2}	B _{p2}		
75 + 800	SBC	56	230	1.348	1.338	0.062	23.0	24.0	25.0	1.0	2.0	E ₁	E ₁	1.0	1.0	B _{p1}	B _{p1}	27.5	Chip & Spray
			230	1.348			23.0	24.5	25.0	1.5	2.0			1.5	0.5				
			225	1.408			22.5	23.5	24.0	1.0	1.5			1.0	0.5				
			230	1.348			22.0	22.5	23.0	0.5	1.0	E ₂	E ₂	0.5	0.5	B _{p2}	B _{p2}		
			225	1.408			21.0	22.0	22.5	1.0	1.5			1.0	0.5				
			240	1.238			24.5	25.5	26.5	1.0	2.0			1.0	1.0				
			230	1.348			23.5	24.5	25.5	1.0	2.0	E ₁	E ₁	1.0	1.0	B _{p1}	B _{p1}		
			225	1.408			22.0	23.5	24.5	1.5	2.5			1.5	1.0				
			240	1.238			20.0	21.0	22.0	1.0	2.0			1.0	1.0				
			240	1.238			23.5	24.5	25.5	1.0	2.0	E ₂	E ₂	1.0	1.0	B _{p2}	B _{p2}		
76 + 300	NBC	56	200	1.782	1.988	0.209	23.0	24.5	25.0	1.5	2.0	E ₁	E ₁	1.5	0.5	B _{p1}	B _{p1}	21.5	Chip & Spray
			180	2.200			21.5	23.0	23.5	1.5	2.0			1.5	0.5				
			190	1.975			22.0	23.0	23.5	1.0	1.5			1.0	0.5				
			200	1.782			24.0	25.0	26.5	1.0	2.5	E ₂	E ₂	1.0	1.5	B _{p2}	B _{p2}		
			180	2.200			22.5	23.5	24.0	1.0	1.5			1.0	0.5				
			200	1.782			22.0	23.0	24.0	1.0	2.0			1.0	1.0				
			200	1.782			21.0	22.0	22.5	1.0	1.5	E ₁	E ₁	1.0	0.5	B _{p1}	B _{p1}		
			180	2.200			21.0	22.5	23.5	1.5	2.5			1.5	1.0				
			200	1.782			23.0	24.0	25.0	1.0	2.0			1.0	1.0				
			180	2.200			23.5	24.0	25.0	0.5	1.5	E ₂	E ₂	0.5	1.0	B _{p2}	B _{p2}		
76 + 800	SBC	56	230	1.348	1.534	0.121	21.5	23.5	25.0	2.0	3.5	E ₁	E ₁	2.0	1.5	B _{p1}	B _{p1}	26.5	Chip & Spray + Bleeding
			210	1.617			23.5	24.5	25.0	1.0	1.5			1.0	0.5				
			210	1.617			21.0	22.0	22.5	1.0	1.5			1.0	0.5				
			210	1.617			22.5	24.0	25.0	1.5	2.5	E ₂	E ₂	1.5	1.0	B _{p2}	B _{p2}		
			220	1.473			22.0	24.5	25.5	2.5	3.5			2.5	1.0				
			210	1.617			23.0	24.0	25.0	1.0	2.0			1.0	1.0				
			220	1.473			24.5	25.0	25.5	0.5	1.0	E ₁	E ₁	0.5	0.5	B _{p1}	B _{p1}		
			210	1.617			22.5	23.0	24.5	0.5	2.0			0.5	1.5				
			210	1.617			20.0	24.5	25.5	1.5	2.5			1.5	1.0				
			210	1.617			23.5	24.0	25.0	0.5	1.5	E ₂	E ₂	0.5	1.0	B _{p2}	B _{p2}		
77 + 300	NBC	56	210	1.617	1.654	0.131	22.0	24.0	25.5	2.0	3.5	E ₁	E ₁	2.0	1.5	B _{p1}	B _{p1}	27.6	Chip & Spray
			200	1.782			22.0	23.0	24.0	1.0	2.0			1.0	1.0				
			215	1.542			21.5	22.0	23.0	0.5	1.5			0.5	1.0				
			220	1.473			21.5	22.5	23.5	1.0	2.0	E ₂	E ₂	1.0	1.0	B _{p2}	B _{p2}		
			200	1.782			23.0	23.5	24.5	0.5	1.5			0.5	1.0				
			200	1.782			22.0	23.0	24.0	1.0	2.0			1.0	1.0				
			210	1.617			21.5	22.5	24.0	1.0	2.5	E ₁	E ₁	1.0	1.5	B _{p1}	B _{p1}		
			210	1.617			22.5	23.0	24.0	0.5	1.5			0.5	1.0				
			210	1.617			21.0	22.0	23.0	1.0	2.0			1.0	1.0				
			210	1.617			22.5	24.0	25.0	1.5	2.5	E ₂	E ₂	1.5	1.0	B _{p2}	B _{p2}		
77 + 800	SBC	56	200	1.782	1.687	0.140	24.0	26.0	26.5	2.0	2.5	E ₁	E ₁	2.0	0.5	B _{p1}	B _{p1}	25.5	Chip & Spray
			200	1.782			23.0	24.0	24.5	1.0	1.5			1.0	0.5				
			200	1.782			22.5	24.5	25.0	2.0	2.5			2.0	0.5				
			200	1.782			21.0	22.5	23.5	1.5	2.5	E ₂	E ₂	1.5	1.0	B _{p2}	B _{p2}		
			210	1.617			22.0	23.0	23.5	1.0	1.5			1.0	0.5				
			220	1.473			24.5	25.5	26.0	1.0	1.5			1.0	0.5				
			210	1.617			20.0	21.5	22.0	1.5	2.0	E ₁	E ₁	1.5	0.5	B _{p1}	B _{p1}		
			220	1.473			22.5	23.5	25.0	1.0	2.5			1.5	0.5				
			220	1.473			23.5	24.5	25.0	1.0	1.5			1.0	0.5				
			220	1.473			23.5	24.5	25.0	1.0	1.5	E ₂	E ₂	1.0	0.5	B _{p2}	B _{p2}		

SOILCO MATERIALS INVESTIGATIONS (PTY) LTD

CIVIL ENGINEERING MATERIALS TESTING LABORATORY

Reg. No. : 1965 / 009585 / 07

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T0213

Client : Naidu Consulting
Project : N2 - 21X - Harding to Izingolweni

Job Card No. : 243352

Date Received / Sampled : 2023-06-15

Date Tested : 2023-06-09

Tested by : - Malibongwe Ndevu

Environmental Condition : Sunny

Date Reported : 2023-07-07

Kilometer	Position	Texture Depth SANS 3001 - BT 11					Ball Penetration SANS 3001 - BT 10											Road Temperature (° C)	Remarks / Condition of Road
		Volume of Sand (ml)	Average Diameter of the Patch (mm)	Texture Depth (mm)	Average Texture Depth (mm)	Standard Deviation Texture Depth	Actual Initial Reading (D ₁)	Actual 1 st Reading (mm) (D ₂)	Actual 2 nd Reading (mm) (D ₃)	Ball Penetration after 1 st Hammer Blow E ₁ = D ₂ - D ₁	Ball Penetration after 2 nd Hammer Blow E ₂ = D ₃ - D ₁	Average (mm)	Standard Deviation	One Blow Ball Penetration (mm) B _{p1} = E ₁	Two Blow Ball Penetration (mm) B _{p2} = E ₂ - E ₁	Average (mm)	Standard Deviation		
78 + 300	NBC	56	220	1.473	1.625	0.155	21.0	22.5	23.5	1.5	2.5	E ₁	E ₁	1.5	1.0	B _{p1}	B _{p1}	28.6	Chip & Spray
			24.0	26.0			27.5	2.0	3.5	2.0	1.5								
			23.0	24.0			25.0	1.0	2.0	1.0	1.0								
			200	1.782			22.5	23.0	24.0	0.5	1.5	E ₂	E ₂	0.5	1.0	B _{p2}	B _{p2}		
			210	1.617			21.5	23.0	24.5	1.5	3.0			1.0	1.0				
			220	1.473			22.0	23.0	24.0	1.0	2.0			1.0	1.0				
			200	1.782			23.5	24.0	25.0	0.5	1.5	E ₁	E ₁	0.5	1.0	B _{p1}	B _{p1}		
			210	1.617			24.0	25.0	26.0	1.0	2.0			1.0	1.0				
			220	1.473			22.5	23.5	24.5	1.0	2.0			1.0	1.0				
			200	1.782			22.0	23.0	24.0	1.0	2.0	E ₂	E ₂	1.0	1.0	B _{p2}	B _{p2}		
210	1.617	22.5	23.5	24.5	1.0	2.0	1.0	1.0											
220	1.473	22.0	23.0	24.0	1.0	2.0	1.0	1.0											
78 + 800	SBC	56	200	1.782	1.821	0.086	23.0	24.0	25.0	1.0	2.0	E ₁	E ₁	1.0	1.0	B _{p1}	B _{p1}	30.9	Chip & Spray
			23.5	24.5			25.5	1.0	2.0	1.0	1.0								
			22.5	24.0			25.5	1.5	3.0	1.5	1.5								
			190	1.975			24.0	26.0	27.5	2.0	3.5	E ₂	E ₂	2.0	1.5	B _{p2}	B _{p2}		
			200	1.782			22.5	23.0	24.5	0.5	2.0			0.5	1.5				
			200	1.782			21.0	22.0	23.0	1.0	2.0			1.0	1.0				
			200	1.782			21.5	24.0	27.5	2.5	6.0	E ₁	E ₁	2.5	3.5	B _{p1}	B _{p1}		
			200	1.782			20.5	22.5	24.0	2.0	3.5			2.0	1.5				
			200	1.782			22.0	24.0	25.5	2.0	3.5			2.0	1.5				
			200	1.782			22.5	23.5	25.5	1.0	3.0	E ₂	E ₂	1.0	2.0	B _{p2}	B _{p2}		
200	1.782	22.5	23.5	25.5	1.0	3.0	1.0	2.0											
200	1.782	22.5	23.5	25.5	1.0	3.0	1.0	2.0											
79 + 300	NBC	56	300	0.792	0.850	0.059	22.0	23.0	23.5	1.0	1.5	E ₁	E ₁	1.0	0.5	B _{p1}	B _{p1}	24.4	Chip & Spray
			23.0	24.0			25.0	1.0	2.0	1.0	1.0								
			22.5	23.0			24.0	0.5	1.5	0.5	1.0								
			280	0.909			23.0	24.0	24.5	1.0	1.5	E ₂	E ₂	1.0	0.5	B _{p2}	B _{p2}		
			300	0.792			21.0	22.0	23.0	1.0	2.0			1.0	1.0				
			290	0.848			23.0	24.0	25.0	1.0	2.0			1.0	1.0				
			280	0.909			22.0	23.0	24.0	1.0	2.0	E ₁	E ₁	1.0	1.0	B _{p1}	B _{p1}		
			280	0.909			23.5	24.5	25.5	1.0	2.0			1.0	1.0				
			280	0.909			22.5	23.0	24.0	0.5	1.5			0.5	1.0				
			280	0.909			24.0	25.0	26.0	1.0	2.0	E ₂	E ₂	1.0	1.0	B _{p2}	B _{p2}		
280	0.909	22.5	23.0	24.0	0.5	1.5	0.5	1.0											
280	0.909	24.0	25.0	26.0	1.0	2.0	1.0	1.0											
79 + 800	SBC	56	220	1.473	1.401	0.106	23.0	24.0	25.0	1.0	2.0	E ₁	E ₁	1.0	1.0	B _{p1}	B _{p1}	28.3	Chip & Spray + Bleeding
			23.5	24.5			25.5	1.0	2.0	1.0	1.0								
			22.0	22.5			23.0	0.5	1.0	0.5	0.5								
			240	1.238			23.0	23.5	24.0	0.5	1.0	E ₂	E ₂	0.5	0.5	B _{p2}	B _{p2}		
			220	1.473			22.0	23.0	24.0	1.0	2.0			1.0	1.0				
			220	1.473			21.5	22.5	23.5	1.0	2.0			1.0	1.0				
			220	1.473			24.0	25.0	26.0	1.0	2.0	E ₁	E ₁	1.0	1.0	B _{p1}	B _{p1}		
			230	1.348			20.5	21.5	22.5	1.0	2.0			1.0	1.0				
			230	1.348			22.5	23.0	24.0	0.5	1.5			0.5	1.0				
			230	1.348			23.0	24.5	25.0	1.5	2.0	E ₂	E ₂	1.5	0.5	B _{p2}	B _{p2}		
230	1.348	22.5	23.0	24.0	0.5	1.5	0.5	1.0											
230	1.348	23.5	24.0	24.5	0.5	1.0	0.5	0.5											
80 + 300	NBC	56	230	1.348	1.410	0.063	24.0	25.0	26.0	1.0	2.0	E ₁	E ₁	1.0	1.0	B _{p1}	B _{p1}	26.2	Chip & Spray
			24.0	24.5			25.5	0.5	1.5	0.5	1.0								
			22.0	22.5			23.5	0.5	1.5	0.5	1.0								
			220	1.473			23.0	24.0	25.0	1.0	2.0	E ₂	E ₂	1.0	1.0	B _{p2}	B _{p2}		
			230	1.348			22.5	23.0	24.0	0.5	1.5			0.5	1.0				
			225	1.408			23.5	24.0	24.5	0.5	1.0			0.5	0.5				
			220	1.473			23.0	24.0	25.0	1.0	2.0	E ₁	E ₁	1.0	1.0	B _{p1}	B _{p1}		
			220	1.473			22.0	23.0	24.0	1.0	2.0			1.0	1.0				
			220	1.473			24.0	24.5	25.0	0.5	1.0			0.5	0.5				
			80 + 800	SBC			56	250	1.141	1.080	0.038	21.0	22.0	23.5	1.0	2.5	E ₁		
22.0	23.5	24.5			1.5	2.5		1.5	1.0										
23.5	24.5	25.0			1.0	1.5		1.0	0.5										
260	1.055	21.5			22.5	23.0		1.0	1.5			E ₂	E ₂	1.0	0.5	B _{p2}	B _{p2}		
260	1.055	22.0			24.0	25.5		2.0	3.5					1.0	0.5				
255	1.096	24.0			24.5	25.5		0.5	1.5					0.5	1.0				
260	1.055	22.0			22.5	23.0		0.5	1.0			E ₁	E ₁	0.5	0.5	B _{p1}	B _{p1}		
260	1.055	23.0			24.0	25.5		1.0	2.5					1.0	1.5				
260	1.055	22.0			23.0	24.0		1.0	2.0					1.0	1.0				
260	1.055	20.0			21.5	22.5		1.5	2.5			E ₂	E ₂	1.5	1.0	B _{p2}	B _{p2}		
260	1.055	21.0	22.0	23.0	1.0	1.5	0.5	0.5											
260	1.055	22.0	23.0	24.0	1.0	2.0	1.0	1.0											



SOILCO MATERIALS INVESTIGATIONS (PTY) LTD

CIVIL ENGINEERING MATERIALS TESTING LABORATORY

Reg. No. : 1965 / 009585 / 07

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T0213

Client : Naidu Consulting

Project : N2 - 21X - Harding to Izingolweni

Job Card No. : 243352

Date Received / Sampled : 2023-06-15

Date Tested : 2023-06-09

Tested by : Malibongwe Ndevu

Environmental Condition : Sunny

Date Reported : 2023-07-07

Kilometer	Position	Texture Depth SANS 3001 - BT 11					Ball Penetration SANS 3001 - BT 10												Road Temperature (°C)	Remarks / Condition of Road						
		Volume of Sand (ml)	Average Diameter of the Patch (mm)	Texture Depth (mm)	Average Texture Depth (mm)	Standard Deviation Texture Depth	Actual Initial Reading (D ₁)	Actual 1 st Reading (D ₂)	Actual 2 nd Reading (D ₃)	Ball Penetration after 1 st Hammer Blow E ₁ = D ₂ - D ₁	Ball Penetration after 2 nd Hammer Blow E ₂ = D ₃ - D ₁	Average (mm)	Standard Deviation	One Blow Ball Penetration (mm) B _{p1} = E ₁	Two Blow Ball Penetration (mm) B _{p2} = E ₂ - E ₁	Average (mm)	Standard Deviation									
81 + 300	NBC	56	240	1.238	1.229	0.054	21.0	22.0	22.5	1.0	1.5	E ₁	E ₁	1.0	0.5	B _{p1}	B _{p1}	27.0	Chip & Spray							
							22.0	22.5	23.0	0.5	1.0			0.5	0.5											
							23.0	25.0	26.0	2.0	3.0			2.0	1.0											
							235	1.291	1.229	0.054	23.0	24.0	25.0	1.0	2.0	1.150	0.474			1.0	1.0	1.150	0.474			
							22.5				24.0	25.0	1.5	2.5	1.5					1.0						
							22.0				23.0	24.5	1.0	2.5	1.0					1.5						
							240				1.238	1.229	0.054	22.5	24.0	25.0	1.5			2.5	E ₂	E ₂	1.5	1.0	B _{p2}	B _{p2}
							23.0							23.5	24.0	0.5	1.0			0.5			0.5			
							22.0							23.0	24.0	1.0	2.0			1.0			1.0			
							240							1.238	1.229	0.054	23.5			25.0	25.5	1.5	2.0	2.000	0.667	1.5
81 + 800	SBC	56	250	1.141	1.179	0.040	23.0										24.0	25.0	1.0	2.0	E ₁	E ₁	1.0	1.0	B _{p1}	B _{p1}
							23.5	24.5	25.5	1.0							2.0	1.0	1.0							
							22.0	22.5	23.5	0.5							1.5	0.5	1.0							
							245	1.188	1.179	0.040							21.5	22.0	22.5	0.5	1.0	0.950	0.369	0.5	0.5	0.950
							20.0				21.5	22.5	1.5				2.5	1.5	1.0							
							24.5				25.5	26.5	1.0				2.0	1.0	1.0							
							245				1.188	1.179	0.040				21.0	21.5	22.0	0.5	1.0	E ₂	E ₂	0.5	0.5	B _{p2}
							22.0							23.0	24.5	1.0	2.5	1.0	1.5							
							22.5							23.5	24.0	1.0	1.5	1.0	0.5							
							245							1.188	1.179	0.040	22.0	23.5	24.0	1.5	2.0	1.800	0.537	1.5	0.5	0.850
82 + 300	NBC	56	220	1.473	1.501	0.038	22.0										23.5	24.5	1.5	2.5	E ₁	E ₁	1.5	1.0	B _{p1}	B _{p1}
							21.0	23.0	23.5	1.0							1.5	1.0	0.5							
							21.0	22.0	23.0	1.0							2.0	1.0	1.0							
							220	1.473	1.501	0.038							23.0	23.5	24.5	0.5	1.5	0.900	0.316	0.5	1.0	0.900
							22.5				23.0	24.0	0.5				1.5	0.5	1.0							
							22.5				23.5	24.5	1.0				2.0	1.0	1.0							
							220				1.473	1.501	0.038				22.0	23.0	23.5	1.0	1.5	E ₂	E ₂	1.0	0.5	B _{p2}
							21.5							22.0	23.0	0.5	1.5	0.5	1.0							
							23.0							24.0	25.0	1.0	2.0	1.0	1.0							
							215							1.542	1.501	0.038	25.0	26.0	27.0	1.0	2.0	1.800	0.350	1.0	1.0	0.900
82 + 800	SBC	56	200	1.782	1.821	0.086	24.0										25.0	25.5	1.0	1.5	E ₁	E ₁	1.0	0.5	B _{p1}	B _{p1}
							23.0	25.0	26.5	2.0							3.5	2.0	1.5							
							22.0	22.5	23.0	0.5							1.0	0.5	0.5							
							200	1.782	1.821	0.086							22.5	24.0	26.0	1.5	3.5	1.100	0.516	1.5	2.0	1.100
							24.0				25.0	26.0	1.0				2.0	1.0	1.0							
							23.5				24.5	25.5	1.0				2.0	1.0	1.0							
							190				1.975	1.821	0.086				20.5	22.0	24.5	1.5	4.0	E ₂	E ₂	1.5	2.5	B _{p2}
							24.0							24.5	25.0	0.5	1.0	0.5	0.5							
							24.5							26.0	26.5	1.5	2.0	1.5	0.5							
							200							1.782	1.821	0.086	21.0	21.5	22.0	0.5	1.0	2.150	1.132	0.5	0.5	1.050
83 + 300	NBC	56	200	1.782	1.898	0.105	22.0										23.0	24.0	1.0	2.0	E ₁	E ₁	1.0	1.0	B _{p1}	B _{p1}
							23.0	25.0	25.5	2.0							2.5	2.0	0.5							
							22.0	23.0	24.0	1.0							2.0	1.0	1.0							
							190	1.975	1.898	0.105							21.0	22.0	23.0	1.0	2.0	1.100	0.316	1.0	1.0	1.100
							23.0				24.0	25.0	1.0				2.0	1.0	1.0							
							22.5				23.5	24.5	1.0				2.0	1.0	1.0							
							200				1.782	1.898	0.105				23.0	24.0	25.0	1.0	2.0	E ₂	E ₂	1.0	1.0	B _{p2}
							23.0							24.0	25.0	1.0	2.0	1.0	1.0							
							21.0							22.0	23.0	1.0	2.0	1.0	1.0							
							190							1.975	1.898	0.105	23.5	24.5	25.0	1.0	1.5	2.000	0.236	1.0	0.5	0.900
22.0	23.0	24.0	1.0	2.0	1.0	1.0																				

Remarks :

For Soilco : 
K. Govender (Technical Signatory)



SOILCO MATERIALS INVESTIGATIONS (PTY) LTD

CIVIL ENGINEERING MATERIALS TESTING LABORATORY

Reg No : 1965 / 009585 / 07

25 WESTMEAD ROAD - WESTMEAD P.O.BOX 15318 WESTMEAD 3608 KWAZULU - NATAL

TELEPHONE : 031 7004325 TELEFAX : 031 7001909 email : info@soilco.co.za



T0213

Client : Naidu Consulting
Project : N2 - 21X - Harding to Izingolweni

Job Card No. : 243352

Date Received / Sampled : 2023-06-15

Date Tested : 2023-06-09

Date Reported : 2023-07-07

Tested by : Malibongwe Ndevu

Environmental Condition : Sunny

Kilometer	Position	Texture Depth SANS 3001 - BT 11					Ball Penetration SANS 3001 - BT 10												Road Temperature (°C)	Remarks / Condition of Road										
		Volume of Sand (ml)	Average Diameter of the Patch (mm)	Texture Depth (mm)	Average Texture Depth (mm)	Standard Deviation n Texture Depth	Actual Initial Reading (mm) (D ₁)	Actual 1 st Reading (mm) (D ₂)	Actual 2 nd Reading (mm) (D ₃)	Ball Penetration after 1 st Hammer Blow	Ball Penetration after 2 nd Hammer Blow	Average (mm)	Standard Deviation	One Blow Ball Penetration (mm)	Two Blow Ball Penetration (mm)	Average (mm)	Standard Deviation													
84 + 300	NBC	56	245	1.188	1.230	0.077	23.0	24.0	25.0	1.0	2.0	1.000	0.333	1.0	1.0	B _{p1}	B _{p1}	26.1	Chip & Spray											
			22.5	24.0			24.5	1.5	2.0	1.5	0.5																			
			21.0	22.0			23.0	1.0	2.0	1.0	1.0			1.000	0.333															
			24.0	25.0			26.0	1.0	2.0	1.0	1.0																			
			22.5	23.5			24.5	1.0	2.0	E ₂	E ₂									1.0	1.0	B _{p2}	B _{p2}							
			23.0	24.5			25.5	1.5	2.5											1.5	1.0									
			23.0	24.0			25.0	1.0	2.0	1.950	0.369									1.0	1.0	0.950	0.284							
			22.5	23.0			24.5	0.5	2.0											0.5	1.5									
			22.0	23.0			24.0	1.0	2.0	E ₁	E ₁									1.0	1.0	B _{p1}	B _{p1}							
			23.0	23.5			24.0	0.5	1.0											0.5	0.5									
84 + 800	SBC	56	180	2.200	2.370	0.259	20.0	22.0	23.0	2.0	3.0	1.450	0.497	2.0	1.0	B _{p1}	B _{p1}	25.6	Chip & Spray											
			22.5	23.5			25.0	1.0	2.5	1.0	1.5																			
			22.0	22.5			24.0	0.5	2.0	E ₂	E ₂			0.5	1.5					B _{p2}	B _{p2}									
			21.0	22.5			23.5	1.5	2.5					1.5	1.0															
			180	2.200			23.0	24.0	25.0	1.0	2.0			2.550	0.497					1.0	1.0	1.100	0.516							
			23.5	25.5			26.0	2.0	2.5	2.0	0.5																			
			180	2.200			23.5	25.0	27.0	1.5	3.5			E ₁	E ₁					1.5	2.0	B _{p1}	B _{p1}							
			23.0	24.5			25.0	1.5	2.0	1.5	0.5																			
			160	2.785			24.5	26.0	27.5	1.5	3.0			E ₂	E ₂					1.5	1.5	B _{p2}	B _{p2}							
			20.5	22.5			23.0	2.0	2.5	2.0	0.5																			
85 + 300	NBC	56	220	1.473	1.563	0.137	25.0	26.0	27.0	1.0	2.0	3.100	6.822	1.0	1.0	B _{p1}	B _{p1}	29.5	Chip & Spray											
			23.0	24.0			25.0	1.0	2.0	1.0	1.0																			
			23.5	25.0			25.5	1.5	2.0	E ₂	E ₂			1.5	0.5					B _{p2}	B _{p2}									
			22.0	23.0			24.0	1.0	2.0					1.0	1.0															
			220	1.473			23.0	24.0	24.5	1.0	1.5			3.800	6.767					1.0	0.5	0.700	0.350							
			2.0	24.5			25.0	22.5	23.0	22.5	0.5																			
			210	1.617			23.0	24.0	25.0	1.0	2.0			E ₁	E ₁					1.0	1.0	B _{p1}	B _{p1}							
			23.0	23.5			24.0	0.5	1.0	0.5	0.5																			
			220	1.473			24.5	25.0	25.0	0.5	0.5			E ₂	E ₂					0.5	0.0	B _{p2}	B _{p2}							
			23.0	24.0			25.0	1.0	2.0	1.0	1.0																			
85 + 800	SBC	56	210	1.617	1.504	0.106	23.5	24.5	25.0	1.0	1.5	1.050	0.284	1.0	0.5	B _{p1}	B _{p1}	25.5	Chip & Spray											
			21.0	22.0			22.5	1.0	1.5	1.0	1.0																			
			22.0	23.0			24.5	1.0	2.5	E ₂	E ₂			1.0	0.5					B _{p2}	B _{p2}									
			21.5	22.5			23.0	1.0	1.5					1.0	1.5															
			225	1.408			22.0	23.5	25.0	1.5	3.0			1.950	0.550					1.5	1.5	0.900	0.394							
			22.5	23.0			24.0	0.5	1.5	0.5	1.0																			
			220	1.473			23.0	24.0	25.0	1.0	2.0			E ₁	E ₁					1.0	1.0	B _{p1}	B _{p1}							
			24.5	25.5			26.0	1.0	1.5	1.0	0.5																			
			86 + 300	NBC			56	210	1.617	1.558	0.060			22.0	24.0					25.0	2.0	3.0	1.150	0.626	2.0	1.0	B _{p1}	B _{p1}	30.9	Chip & Spray
								23.0	24.0					25.0	1.0					2.0	1.0	1.0								
22.0	23.0	24.0			1.0	2.0		E ₂	E ₂			1.0	1.0	B _{p2}	B _{p2}															
22.5	23.0	24.0			0.5	1.5						0.5	1.0																	
215	1.542	24.0			24.5	25.0		0.5	1.0			2.200	0.769	0.5	0.5	1.050	0.284													
22.0	23.0	24.5			1.0	2.5		1.0	1.5																					
210	1.617	24.0			26.0	27.0		2.0	3.0			E ₁	E ₁	2.0	1.0	B _{p1}	B _{p1}													
22.0	24.0	25.5			2.0	3.5		2.0	1.5																					
220	1.473	23.0			24.0	25.0		1.0	2.0			E ₂	E ₂	1.0	1.0	B _{p2}	B _{p2}													
21.5	22.0	23.0			0.5	1.5		0.5	0.5																					
86 + 800	SBC	56	180	2.200	2.110	0.124	21.0	22.5	24.0	1.5	3.0	1.430	0.903	1.5	1.5	B _{p1}	B _{p1}	29.1	Chip & Spray											
			25.0	26.5			27.5	1.5	2.5	1.5	1.0																			
			23.5	24.5			25.0	1.0	1.5	E ₂	E ₂			1.0	0.5					B _{p2}	B _{p2}									
			24.0	24.5			25.0	0.5	1.0					0.5	0.5															
			190	1.975			22.0	24.3	26.5	2.3	4.5			2.700	1.295					2.3	2.2	1.270	0.704							
			22.5	23.5			26.0	1.0	3.5	1.0	2.5																			
			190	1.975			21.0	24.0	25.0	3.0	4.0			E ₁	E ₁					3.0	1.0	B _{p1}	B _{p1}							
			180	2.200			20.0	22.5	24.0	2.5	4.0									2.5	1.5									
			180	2.200			21.5	22.0	23.5	0.5	2.0			E ₂	E ₂					0.5	1.5	B _{p2}	B _{p2}							
			22.0	22.5			23.0	0.5	1.0	0.5	0.5																			

SOILCO MATERIALS INVESTIGATIONS (PTY) LTD

CIVIL ENGINEERING MATERIALS TESTING LABORATORY

Reg. No. : 1965 / 009585 / 07

25 WESTMEAD ROAD - WESTMEAD P.O.BOX 15318 WESTMEAD 3608 KWAZULU - NATAL

TELEPHONE : 031 7004325 TELEFAX : 031 7001909 email : info@soilco.co.za



T0213

Client : Naidu Consulting
Project : N2 - 21X - Harding to Izingolweni

Job Card No. : 243352

Date Received / Sampled : 2023-06-15

Date Tested : 2023-06-09

Tested by : Malibongwe Ndevu

Environmental Condition : Sunny

Date Reported : 2023-07-07

Kilometer	Position	Texture Depth SANS 3001 - BT 11						Ball Penetration SANS 3001 - BT 10										Road Temperature (°C)	Remarks / Condition of Road												
		Volume of Sand (ml)	Average Diameter of the Patch (mm)	Texture Depth (mm)	Average Texture Depth (mm)	Standard Deviation Texture Depth	Actual Initial Reading (mm) (D ₁)	Actual 1 st Reading (mm) (D ₂)	Actual 2 nd Reading (mm) (D ₃)	Ball Penetration after 1 st Hammer Blow E ₁ = D ₂ - D ₁	Ball Penetration after 2 nd Hammer Blow E ₂ = D ₃ - D ₁	Average (mm)	Standard Deviation	One Blow Ball Penetration (mm) B _{p1} = E ₁	Two Blow Ball Penetration (mm) B _{p2} = E ₂ - E ₁	Average (mm)	Standard Deviation														
87 + 300	NBC S/L	56	215	1.542	1.638	0.131	21.0	22.0	23.0	1.0	2.0	E ₁	E ₁	1.0	1.0	B _{p1}	B _{p1}	30.0	Chip & Spray												
							21.5	22.0	23.5	0.5	2.0			0.5	1.5																
							23.0	24.0	25.0	1.0	2.0			1.0	1.0																
							200	1.782	1.638	0.131	22.0	23.0	24.0	1.0	2.0	1.000	0.333			1.0	1.0	1.000	0.333								
							23.0				24.5	25.5	1.5	2.5	1.5					1.0											
							22.5				23.5	24.5	1.0	2.0	1.0					1.0											
							215				1.542	24.5	25.0	25.5	0.5	1.0	E ₂			E ₂	0.5	0.5	B _{p2}	B _{p2}							
							21.0				22.5	24.0	1.5	3.0	1.5	1.5															
							22.0				23.0	24.5	1.0	2.5	1.0	1.5					1.100	0.316									
							215				1.542	23.0	24.0	25.0	1.0	2.0	2.100			0.516					1.0	1.0					
																									1.0	1.0					
87 + 800	SBC	56	240	1.238	1.248	0.024	21.5				23.0	24.0	1.5	2.5	E ₁	E ₁	1.5	1.0	B _{p1}	B _{p1}	27.4	Chip & Spray									
							22.0				24.0	25.0	2.0	3.0			2.0	1.0													
							21.0				22.0	22.5	1.0	1.5			1.0	0.5													
							240	1.238	1.248	0.024	22.0	23.0	25.5	1.0	3.5	1.450	0.550	1.0	2.5	1.450			0.550								
							23.0				25.0	26.5	2.0	3.5	2.0			1.5													
							21.5				23.0	23.5	1.5	2.0	1.5			0.5													
							240				1.238	1.248	0.024	24.0	25.0	26.0	1.0	2.0	E ₂	E ₂			1.0	1.0	B _{p2}	B _{p2}					
							24.5							25.5	26.5	1.0	2.0	1.0					1.0								
							20.5							23.0	23.5	2.5	3.0	2.5					0.5	1.000			0.624				
							23.0							24.0	24.5	1.0	1.5	1.0	0.5												
88 + 300	NBC S/L	56	320	0.696	0.668	0.024	21.5							23.0	24.0	1.5	2.5	E ₁	E ₁	1.5	1.0	B _{p1}	B _{p1}	31.2	Chip & Spray + Bleeding						
							22.0							23.0	24.0	1.0	2.0			1.0	1.0										
							22.0							24.0	25.0	2.0	3.0			2.0	1.0										
							330	0.655	0.668	0.024				21.0	22.0	23.0	1.0	2.0	1.200	0.350	1.0	1.0	1.200			0.350					
							22.5							23.5	25.0	1.0	2.5	1.0			1.5										
							23.0							24.5	26.0	1.5	3.0	1.5			1.5										
							315				0.718	0.668	0.024	21.0	22.0	23.0	1.0	2.0	E ₂	E ₂	1.0	1.0	B _{p2}			B _{p2}					
							23.0							24.0	25.0	1.0	2.0	1.0			1.0										
							22.0							23.0	24.0	1.0	2.0	1.0			1.0	1.200					0.350				
							215							0.696	0.668	0.024	22.5	23.5	25.5	1.0	3.0							2.400	0.459	1.0	2.0
88 + 800	SBC	56	240	1.238	1.260	0.049	22.5										23.5	24.5	1.0	2.0	E ₁	E ₁	1.0	1.0	B _{p1}	B _{p1}	26.7	Chip & Spray + Bleeding			
							22.0										23.0	24.0	1.0	2.0			1.0	1.0							
							23.0										24.0	25.0	1.0	2.0			1.0	1.0							
							230	1.348	1.260	0.049							22.0	23.0	24.0	1.0	2.0	1.100	0.394	1.0	1.0	1.100			0.394		
							21.5										22.5	23.5	1.0	2.0	1.0			1.0							
							22.5										23.0	23.5	0.5	1.0	0.5			0.5							
							240				1.238	1.260	0.049				23.0	24.5	25.0	1.5	2.0	E ₂	E ₂	1.5	0.5	B _{p2}			B _{p2}		
							24.0										25.0	26.0	1.0	2.0	1.0			1.0							
							22.5										24.5	26.0	2.0	3.5	2.0			1.5	0.950					0.284	
							20.0							21.0	22.0	1.0	2.0	1.0	1.0												
89 + 300	NBC	56	200	1.782	1.749	0.074	22.0							23.0	24.0	1.0	2.0	E ₁	E ₁	1.0	1.0	B _{p1}	B _{p1}	25.2	Chip & Spray						
							23.0							24.0	25.0	1.0	2.0			1.0	1.0										
							22.5							23.5	24.5	1.0	2.0			1.0	1.0										
							210	1.617	1.749	0.074				21.5	22.5	23.0	1.0	1.5	0.800	0.258	1.0	0.5	0.800			0.258					
							21.0							22.0	23.0	1.0	2.0	1.0			1.0										
							22.5							23.0	24.0	0.5	1.5	0.5			1.0										
							200				1.782	1.749	0.074	23.5	24.0	25.0	0.5	1.5	E ₂	E ₂	0.5	1.0	B _{p2}			B _{p2}					
							23.5							24.5	25.0	1.0	1.5	1.0			0.5										
							22.0							22.5	23.5	0.5	1.5	0.5			1.0	0.900					0.211				
							23.5							24.0	25.0	0.5	1.5	0.5	1.0												
89 + 800	SBC	56	235	1.291	1.303	0.046	21.5							22.5	23.0	1.0	1.5	E ₁	E ₁	1.0	0.5	B _{p1}	B _{p1}	28.9	Chip & Spray						
							23.0							23.5	24.5	0.5	1.5			0.5	1.0										
							23.5							24.0	25.5	0.5	2.0			0.5	1.5										
							230	1.348	1.303	0.046				22.0	23.0	24.5	1.0	2.5	0.900	0.316	1.0	1.5	0.900			0.316					
							21.0							21.5	22.0	0.5	1.0	0.5			0.5										
							20.0							21.5	22.5	1.5	2.5	1.5			1.0										
							230				1.348	1.303	0.046	24.5	25.5	26.5	1.0	2.0	E ₂	E ₂	1.0	1.0	B _{p2}			B _{p2}					
							23.5							24.5	25.5	1.0	2.0	1.0			1.0										
							22.5							23.5	24.0	1.0	1.5	1.0			0.5	0.950					0.369				
							21.5							22.5	23.5	1.0	2.0	1.0	1.0												



SOILCO MATERIALS INVESTIGATIONS (PTY) LTD

CIVIL ENGINEERING MATERIALS TESTING LABORATORY

Reg. No. : 1965 / 009585 / 07

25 WESTMEAD ROAD - WESTMEAD P.O.BOX 15318 WESTMEAD 3608 KWAZULU - NATAL

TELEPHONE : 031 7004325 TELEFAX : 031 7001909 email : info@soilco.co.za



T0213

Client : Naidu Consulting
Project : N2 - 21X - Harding to Izingsolweni

Job Card No. : 243352

Date Received / Sampled : 2023-06-15

Date Tested : 2023-06-09

Tested by : Malibongwe Ndevu

Environmental Condition : Sunny

Date Reported : 2023-07-07

Kilometer	Position	Texture Depth SANS 3001 - BT 11					Ball Penetration SANS 3001 - BT 10										Road Temperature (°C)	Remarks / Condition of Road					
		Volume of Sand (ml)	Average Diameter of the Patch (mm)	Texture Depth (mm)	Average Texture Depth (mm)	Standard Deviation Texture Depth	Actual Initial Reading (mm) (D ₁)	Actual 1 st Reading (mm) (D ₂)	Actual 2 nd Reading (mm) (D ₃)	Ball Penetration after 1 st Hammer Blow E ₁ = D ₁ - D ₂	Ball Penetration after 2 nd Hammer Blow E ₂ = D ₂ - D ₃	Average (mm)	Standard Deviation	One Blow Ball Penetration (mm) B _{p1} = E ₁	Two Blow Ball Penetration (mm) B _{p2} = E ₂ - E ₁	Average (mm)			Standard Deviation				
90 + 300	NBC	56	230	1.348	1.304	0.060	21.0	22.0	23.0	1.0	2.0	E ₁	E ₁	1.0	1.0	B _{p1}	B _{p1}	32.0	Chip & Spray				
			24.0	25.0			26.0	1.0	2.0	1.0	1.0												
			22.5	23.0			24.5	0.5	2.0	1.0	0.5												
			230	1.348			22.5	23.5	24.0	1.0	1.5	1.050	0.438	1.0	0.5	1.050	0.438						
			240	1.238			23.0	24.0	24.5	1.0	1.5			1.0	0.5								
			240	1.238			22.0	24.0	25.0	2.0	3.0			2.0	1.0								
			230	1.348			22.5	23.5	24.5	1.0	2.0	1.0	1.0	1.900	0.516	1.0	1.0			0.850	0.337		
			22.0	22.5			23.0	0.5	1.0	0.5	0.5												
			21.5	22.5			23.5	1.0	2.0	1.0	1.0												
			90 + 800	SBC			56	200	1.782	1.584	0.183	21.0	22.5	23.5	1.5	2.5	E ₁			E ₁	1.5	1.0	B _{p1}
21.5	23.0	23.5			1.5	2.0		1.5	0.5														
22.5	23.5	24.0			1.0	1.5		1.0	0.5														
220	1.473	21.5			22.0	23.0		0.5	1.5			1.200	0.350	0.5	1.0	1.200	0.350						
20.5	21.5	22.5			1.0	2.0		1.0	1.0														
22.0	23.5	24.5			1.5	2.5		1.5	1.0														
225	1.408	22.0			23.0	24.0		1.0	2.0			E ₂	E ₂	1.0	1.0	B _{p2}	B _{p2}						
23.0	24.5	25.5			1.5	2.5		1.5	1.0														
20.5	21.5	22.0			1.0	1.5		1.0	0.5														
220	1.473	24.0			25.5	26.5		1.5	2.5			2.050	0.438	1.5	1.0	0.850	0.242						
91 + 300	NBC	56	200	1.782	1.981	0.148	24.0	26.0	27.0	2.0	3.0	E ₁	E ₁	2.0	1.0	B _{p1}	B _{p1}	25.2	Chip & Spray				
			23.0	24.0			25.5	1.0	2.5	1.0	1.5												
			22.5	23.0			24.0	0.5	1.5	0.5	1.0												
			180	2.200			23.0	24.5	25.5	1.5	2.5	1.150	0.474	1.5	1.0	1.150	0.474						
			190	1.975			23.0	24.0	25.0	1.0	2.0			1.0	1.0								
			190	1.975			22.0	23.5	24.5	1.5	2.5			1.5	1.0								
			190	1.975			24.0	25.5	26.5	1.5	2.5	2.200	0.483	1.5	1.0	1.050	0.158						
			23.5	24.0			25.0	0.5	1.5	0.5	1.0												
			22.0	23.0			24.0	1.0	2.0	1.0	1.0												
			91 + 800	SBC			56	250	1.141	1.106	0.047	22.0	23.0	24.0	1.0	2.0	E ₁			E ₁	1.0	1.0	B _{p1}
23.0	24.0	25.0			1.0	2.0		1.0	1.0														
21.5	22.5	23.5			1.0	2.0		1.0	1.0														
260	1.055	21.0			22.0	23.0		1.0	2.0			1.000	0.236	1.0	1.0	1.000	0.236						
24.0	25.0	26.0			1.0	2.0		1.0	1.0														
22.0	22.5	23.5			0.5	1.5		0.5	1.0														
250	1.141	20.0			21.0	22.0		1.0	2.0			E ₂	E ₂	1.0	1.0	B _{p2}	B _{p2}						
260	1.055	23.5			24.5	25.5		1.0	2.0					1.0	1.0								
22.0	23.0	23.5			1.0	1.5		1.0	0.5														
260	1.055	22.0			23.0	23.5		1.0	1.5			1.950	0.284	1.0	0.5	0.950	0.158						
92 + 300	NBC	56	210	1.617	1.650	0.074	23.0	24.0	24.5	1.0	1.5	E ₁	E ₁	1.0	0.5	B _{p1}	B _{p1}	25.7	Chip & Spray				
			22.0	23.0			24.0	1.0	2.0	1.0	1.0												
			23.0	24.5			25.0	1.5	2.0	1.5	0.5												
			210	1.617			21.5	22.5	23.5	1.0	2.0	1.000	0.471	1.0	1.0	1.000	0.471						
			22.5	23.5			24.5	1.0	2.0	1.0	1.0												
			23.5	24.5			25.0	1.0	1.5	1.0	0.5												
			200	1.782			22.0	22.5	23.0	0.5	1.0	E ₂	E ₂	0.5	0.5	B _{p2}	B _{p2}						
			210	1.617			22.5	23.0	24.0	0.5	1.5			0.5	1.0								
			210	1.617			22.0	24.0	25.0	2.0	3.0			2.0	1.0								
			210	1.617			24.0	24.5	25.0	0.5	1.0	1.750	0.589	0.5	0.5	0.750	0.264						
92 + 800	SBC S/L	56	260	1.055	1.055	0.029	22.5	23.0	23.5	0.5	1.0	E ₁	E ₁	0.5	0.5	B _{p1}	B _{p1}	27.7	Chip & Spray				
			21.5	22.5			23.0	1.0	1.5	1.0	1.5												
			265	1.015		22.5	23.5	24.0	1.0	1.5	0.900	0.211	1.0	0.5	0.900	0.211							
			260	1.055		23.0	23.5	24.0	0.5	1.0			0.5	0.5									
			260	1.055		22.0	23.0	24.0	1.0	2.0	E ₂	E ₂	1.0	1.0	B _{p2}	B _{p2}							
			260	1.055		21.0	22.0	22.5	1.0	1.5			1.0	0.5									
			260	1.055		22.5	23.5	24.0	1.0	1.5	1.600	0.459	1.0	0.5	0.700	0.350							
			260	1.055		24.5	25.5	26.0	1.0	1.5			1.0	0.5									
			260	1.055		20.5	21.5	22.5	1.0	2.0	1.0	1.0											



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T0213

Client : Naidu Consulting
Project : N2 - 21X - Harding to Izingolweni

Job Card No. : 243352

Date Received / Sampled : 2023-06-15

Date Tested : 2023-06-09

Tested by : Malibongwe Ndevu

Environmental Condition : Sunny

Date Reported : 2023-07-07

Kilometer	Position	Texture Depth SANS 3001 - BT 11					Ball Penetration SANS 3001 - BT 10												Road Temperature (° C)	Remarks / Condition of Road								
		Volume of Sand (ml)	Average Diameter of the Patch (mm)	Texture Depth (mm)	Average Texture Depth (mm)	Standard Deviation n Texture Depth	Actual Initial Reading (D ₁)	Actual 1 st Reading (D ₂)	Actual 2 nd Reading (D ₃)	Ball Penetration after 1 st Hammer Blow	Ball Penetration after 2 nd Hammer Blow	Average (mm)	Standard Deviation	One Blow Ball Penetration (mm)	Two Blow Ball Penetration (mm)	Average (mm)	Standard Deviation											
93 + 300	NBC	56	250	1.141	1.159	0.026	23.0	25.0	26.5	2.0	3.5	E ₁	E ₁	2.0	1.5	B _{p1}	B _{p1}	27.9	Chip & Spray									
							25.0	26.0	27.0	1.0	2.0			1.0	1.0													
							23.5	24.5	25.5	1.0	2.0			1.0	1.0													
							245	1.188	22.0	23.0	24.5	1.0	2.5	1.350	0.580	1.0	1.5			1.350	0.580							
									22.0	23.5	24.0	1.5	2.0			1.5	0.5											
									21.0	23.5	24.5	2.5	3.5			2.5	1.0					B _{p2}	B _{p2}					
									250	1.141	24.0	25.5	26.0	1.5	2.0	1.5	0.5			B _{p2}	B _{p2}							
											23.0	24.5	25.0	1.5	2.0	1.5	0.5											
											22.0	23.0	24.0	1.0	2.0	1.0	1.0					0.900	0.394					
							21.5	22.0	22.5	0.5	1.0	2.250	0.755	1.0	1.0	0.900	0.394											
							21.5	22.0	22.5	0.5	1.0	2.250	0.755	1.0	1.0	0.900	0.394											
							93 + 800	SBC	56	200	1.782	1.926	0.201	24.0	25.5	26.5	1.5			2.5	E ₁	E ₁	1.5	1.0	B _{p1}	B _{p1}	29.0	Chip & Spray
22.0	23.5	24.5	1.5	2.5	1.5	1.0																						
21.5	22.5	23.5	1.0	2.0	1.0	1.0																						
185	2.083	21.5	22.0	23.0	0.5	1.5								1.100	0.316	0.5	1.0	1.100	0.316									
		22.5	23.5	24.5	1.0	2.0										1.0	1.0											
		23.5	24.5	25.5	1.0	2.0										1.0	1.0											
		200	1.782	23.0	24.0	25.0								1.0	2.0	E ₂	E ₂	1.0	1.0	B _{p2}	B _{p2}							
				23.0	24.5	25.5								1.5	2.5			1.5	1.0									
				20.5	21.5	22.0								1.0	1.5			1.0	0.5			0.950	0.158					
180	2.200	24.5	25.5	26.5	1.0	2.0								2.050	0.369	1.0	1.0	0.950	0.158									
94 + 300	NBC S/L	56	310	0.742	0.747	0.027								22.0	23.0	23.5	1.0	1.5	E ₁	E ₁	1.0	0.5	B _{p1}	B _{p1}	34.3	Chip & Spray + Bleeding		
														22.5	23.5	24.5	1.0	2.0			1.0	1.0						
							23.0	23.5	24.0	0.5	1.0	0.5	0.5	0.850	0.242													
							310	0.742	22.5	23.0	24.5	0.5	2.0	0.850	0.242	0.5	1.5	0.850	0.242									
									22.0	23.0	23.5	1.0	1.5			1.0	0.5											
									23.5	24.5	25.5	1.0	2.0			1.0	1.0											
									310	0.742	22.5	23.0	23.5	0.5	1.0	E ₂	E ₂	0.5	0.5	B _{p2}	B _{p2}							
											23.0	24.0	24.5	1.0	1.5			1.0	0.5									
											22.0	23.0	23.5	1.0	1.5			1.0	0.5			0.700	0.350					
							315	0.718	22.5	23.5	24.0	1.0	1.5	1.550	0.369	1.0	0.5	0.700	0.350									
							22.5	23.5	24.0	1.0	1.5	1.550	0.369	1.0	0.5	0.700	0.350											
							94 + 800	SBC S/L	56	250	1.141	1.179	0.053	22.0	23.0	24.0	1.0	2.0	E ₁	E ₁	1.0	1.0	B _{p1}	B _{p1}			26.6	Chip & Spray + Bleeding
20.0	21.0	22.0	1.0	2.0	1.0	1.0																						
22.0	23.5	24.0	1.5	2.0	1.5	0.5																						
240	1.238	23.0	24.0	25.0	1.0	2.0								1.000	0.236	1.0	1.0	1.000	0.236									
		23.5	24.5	25.0	1.0	1.5										1.0	0.5											
		21.5	22.5	23.0	1.0	1.5										1.0	0.5											
		250	1.141	22.5	23.0	24.0								0.5	1.5	E ₂	E ₂	0.5	1.0	B _{p2}	B _{p2}							
				24.5	25.5	26.0								1.0	1.5			1.0	0.5									
				22.0	23.0	23.5								1.0	1.5			1.0	0.5			0.750	0.264					
22.5	23.5	24.5	1.0	2.0	1.750	0.264								1.0	1.0	0.750	0.264											
22.5	23.5	24.5	1.0	2.0	1.750	0.264								1.0	1.0	0.750	0.264											
95 + 300	NBC S/L	56	250	1.141	1.179	0.053								21.0	22.0	23.0	1.0	2.0	E ₁	E ₁	1.0	1.0	B _{p1}	B _{p1}	33.4	Chip & Spray + Bleeding		
							24.0	25.0	25.5	1.0	1.5	1.0	0.5															
							22.5	23.0	23.5	0.5	1.0	0.5	0.5	0.950	0.438													
							240	1.238	23.5	24.0	25.0	0.5	1.5	0.950	0.438	0.5	1.0	0.950	0.438									
									22.0	23.5	24.0	1.5	2.0			1.5	0.5											
									22.0	23.0	23.5	1.0	1.5			1.0	0.5											
									250	1.141	23.0	23.5	24.5	0.5	1.5	E ₂	E ₂	0.5	1.0	B _{p2}	B _{p2}							
											22.0	23.5	24.0	1.5	2.0			1.5	0.5									
											22.0	23.5	24.0	1.5	2.0			1.5	0.5			0.650	0.242					
							24.0	1.238	24.0	24.5	25.0	0.5	1.0	1.600	0.394	1.5	0.5	0.650	0.242									
							24.0	1.238	24.0	24.5	25.0	0.5	1.0	1.600	0.394	1.5	0.5	0.650	0.242									
							95 + 800	SBC	56	200	1.782	1.716	0.091	22.5	23.5	24.5	1.0	2.0	E ₁	E ₁	1.0	1.0	B _{p1}	B _{p1}			26.2	Chip & Spray
22.5	23.0	24.0	0.5	1.5	0.5	1.0																						
23.0	24.0	25.0	1.0	2.0	1.0	1.0																						
210	1.617	22.0	23.5	24.5	1.5	2.5								0.950	0.369	1.5	1.0	0.950	0.369									
		21.5	22.5	23.5	1.0	2.0										1.0	1.0											
		24.5	25.5	26.5	1.0	2.0										1.0	1.0											
		210	1.617	23.5	25.0	26.0								1.5	2.5	E ₂	E ₂	1.0	1.0	B _{p2}	B _{p2}							
				23.5	25.0	26.0								1.5	2.5			1.5	1.0									
				22.0	22.5	23.5								0.5	1.5			0.5	1.0			1.000	0.000					
200	1.782	22.0	23.0	24.0	1.0	2.0								1.950	0.369	1.0	1.0	1.000	0.000									
21.0	21.5	22.5	0.5	1.5	1.950	0.369								1.0	1.0	1.000	0.000											

Remarks :

For Soilco :

K. Govender (Technical Signatory)

2005-06-01

Revision 1

Soilco SF 87

SOILCO MATERIALS INVESTIGATIONS (PTY) LTD

CIVIL ENGINEERING MATERIALS TESTING LABORATORY

Reg. No. : 1965 / 009585 / 07

25 WESTMEAD ROAD - WESTMEAD P.O.BOX 15318 WESTMEAD 3608 KWAZULU - NATAL

TELEPHONE : 031 7004325 TELEFAX : 031 7001909 email : info@soilco.co.za



T0213

Client : Naidu Consulting
Project : N2 - 21X - Harding to Izingolweni

Job Card No. : 243352

Date Received / Sampled : 2023-06-15

Date Tested : 2023-06-09

Tested by : Malibongwe Ndevu

Environmental Condition : Sunny

Date Reported : 2023-07-07

Kilometer	Position	Texture Depth SANS 3001 - BT 11					Ball Penetration SANS 3001 - BT 10										Road Temperature (°C)	Remarks / Condition of Road			
		Volume of Sand (ml)	Average Diameter of the Patch (mm)	Texture Depth (mm)	Average Texture Depth (mm)	Standard Deviation n Texture Depth	Actual Initial Reading (D ₁)	Actual 1 st Reading (D ₂)	Actual 2 nd Reading (D ₃)	Ball Penetration after 1 st Hammer Blow	Ball Penetration after 2 nd Hammer Blow	Average (mm)	Standard Deviation	One Blow Ball Penetration (mm)	Two Blow Ball Penetration (mm)	Average (mm)			Standard Deviation		
									$E_1 = D_2 - D_1$	$E_2 = D_3 - D_1$			$B_{p1} = E_1$	$B_{p2} = E_2 - E_1$							
96 + 300	NBC	56	210	1.617	1.716	0.091	23.0	23.5	24.0	0.5	1.0	E ₁	E ₁	0.5	0.5	B _{p1}	B _{p1}	29.3	Chip & Spray		
				23.0			24.5	25.5	1.5	2.5	1.5			1.0							
			200	1.782			22.5	23.0	24.0	0.5	1.5	1.000	0.408	0.5	1.0	1.000	0.408				
				23.5			24.5	26.0	1.0	2.5	1.0			1.5							
			200	1.782			22.5	23.0	24.5	0.5	2.0	E ₂	E ₂	0.5	1.5	B _{p2}	B _{p2}				
				22.0			23.5	24.0	1.5	2.0	1.5			0.5							
			210	1.617			21.5	22.5	23.0	1.0	1.5	2.000	0.577	1.0	1.0	1.000	0.527				
				23.5			24.5	25.5	1.0	2.0	1.0			2.0							
			200	1.782			22.5	23.5	25.5	1.0	3.0	E ₁	E ₁	1.0	3.0	B _{p1}	B _{p1}				
				23.0			24.5	25.0	1.5	2.0	1.5			0.5							
96 + 800	SBC	56	190	1.975	1.996	0.048	22.0	23.0	24.0	1.0	2.0	E ₁	E ₁	1.0	1.0	B _{p1}	B _{p1}	22.7	Chip & Spray		
				20.0			21.0	23.0	1.0	3.0	1.0			2.0							
			185	2.083			23.0	24.0	25.0	1.0	2.0	1.000	0.000	1.0	1.0	1.000	0.000				
				24.0			25.0	26.0	1.0	2.0	1.0			1.0							
			190	1.975			22.5	23.5	24.5	1.0	2.0	E ₂	E ₂	1.0	1.0	B _{p2}	B _{p2}				
				23.5			24.5	25.0	1.0	1.5	1.0			0.5							
			190	1.975			21.5	22.5	23.0	1.0	1.5	1.850	0.474	1.0	0.5	0.850	0.474				
				22.0			23.0	23.5	1.0	1.5	1.0			0.5							
			190	1.975			24.0	25.0	25.5	1.0	1.5	E ₁	E ₁	1.0	1.5	B _{p1}	B _{p1}				
				21.0			22.0	22.5	1.0	1.5	1.0			0.5							
97 + 300	NBC	56	280	0.909	0.952	0.065	22.0	23.0	25.0	1.0	3.0	E ₁	E ₁	1.0	2.0	B _{p1}	B _{p1}	27.8	Chip & Spray + Bleeding		
				22.0			23.0	24.0	1.0	2.0	1.0			1.0							
			270	0.978			23.5	24.5	25.0	1.0	1.5	1.050	0.369	1.0	0.5	1.050	0.369				
				22.5			24.0	24.5	1.5	2.0	1.5			0.5							
			280	0.909			23.0	24.0	24.5	1.0	1.5	E ₂	E ₂	1.0	0.5	B _{p2}	B _{p2}				
				1.055			22.5	23.0	24.5	0.5	2.0			0.5	1.5						
			260	1.055			23.0	24.5	26.0	1.5	3.0	2.100	0.658	1.5	1.5	1.050	0.550				
				0.909			22.0	22.5	23.5	0.5	1.5			0.5	1.0						
			280	0.909			21.5	23.0	24.5	1.5	3.0	E ₁	E ₁	1.5	3.0	B _{p1}	B _{p1}				
				0.909			22.0	22.5	23.0	0.5	1.0			0.5	0.5						
97 + 800	SBC	56	270	0.978	1.091	0.073	21.5	22.0	23.5	0.5	2.0	E ₁	E ₁	0.5	1.5	B _{p1}	B _{p1}	23.1	Chip & Spray + Bleeding		
				21.0			22.5	23.0	1.5	2.0	1.5			0.5							
			250	1.141			23.5	24.0	25.5	0.5	2.0	0.850	0.412	0.5	1.5	0.850	0.412				
				22.0			23.0	24.5	1.0	2.5	1.0			1.5							
			250	1.141			20.5	21.5	22.0	1.0	1.5	E ₂	E ₂	1.0	0.5	B _{p2}	B _{p2}				
				1.055			22.0	22.5	23.5	0.5	1.5			0.5	1.0						
			260	1.055			24.0	25.5	26.5	1.5	2.5	1.850	0.474	1.5	1.0	1.000	0.408				
				1.141			21.5	22.5	23.5	1.0	2.0			1.0	1.0						
			250	1.141			23.5	24.0	25.0	0.5	1.5	E ₁	E ₁	0.5	1.5	B _{p1}	B _{p1}				
				1.141			22.5	23.0	24.0	0.5	1.5			1.0	0.5						
98 + 300	NBC	56	230	1.348	1.422	0.053	22.5	23.0	24.0	0.5	1.5	E ₁	E ₁	0.5	1.0	B _{p1}	B _{p1}	26.8	Chip & Spray		
				22.0			23.0	23.5	1.0	1.5	1.0			0.5							
			220	1.473			24.0	24.5	25.5	0.5	1.5	0.950	0.369	0.5	1.0	0.950	0.369				
				23.0			24.0	24.5	1.0	1.5	1.0			0.5							
			225	1.408			22.5	24.0	25.0	1.5	2.5	E ₂	E ₂	1.5	1.0	B _{p2}	B _{p2}				
				21.0			22.0	23.5	1.0	2.5	1.0			1.5							
			220	1.473			22.0	22.5	23.5	0.5	1.5	1.800	0.483	0.5	1.0	0.850	0.337				
				22.5			23.5	24.0	1.0	1.5	1.0			0.5							
			225	1.408			23.5	24.5	25.0	1.0	1.5	E ₁	E ₁	1.0	1.5	B _{p1}	B _{p1}				
				22.0			23.5	24.5	1.5	2.5	1.5			1.0							
98 + 800	SBC	56	200	1.782	1.749	0.074	22.0	23.5	24.0	1.5	2.0	E ₁	E ₁	1.5	0.5	B _{p1}	B _{p1}	20.9	Chip & Spray		
				21.5			22.5	23.0	1.0	1.5	1.0			0.5							
			210	1.617			23.0	24.0	25.5	1.0	2.5	1.030	0.254	1.0	1.5	1.030	0.254				
				22.0			23.0	23.5	1.0	1.5	1.0			0.5							
			200	1.782			24.0	25.0	25.5	1.0	1.5	E ₂	E ₂	1.0	0.5	B _{p2}	B _{p2}				
				21.0			22.0	23.0	1.0	2.0	1.0			1.0							
			200	1.782			23.0	24.0	25.0	1.0	2.0	1.880	0.316	1.0	1.0	0.850	0.412				
				20.0			21.0	22.0	1.0	2.0	1.0			1.0							
			200	1.782			22.2	23.5	24.0	1.3	1.8	E ₁	E ₁	1.3	1.8	B _{p1}	B _{p1}				
				1.782			21.5	22.5	23.0	1.0	1.5			1.0	0.5						



SOILCO MATERIALS INVESTIGATIONS (PTY) LTD

CIVIL ENGINEERING MATERIALS TESTING LABORATORY

Reg. No. : 1965 / 009585 / 07

25 WESTMEAD ROAD - WESTMEAD P.O.BOX 15318 WESTMEAD 3608 KWAZULU - NATAL

TELEPHONE : 031 7004325 TELEFAX : 031 7001909 email : info@soilco.co.za



T0213

Client : Naidu Consulting
Project : N2 - 21X - Harding to Izingolweni

Job Card No. : 243352
Date Received / Sampled : 2023-06-15

Tested by : Malibongwe Ndevu

Environmental Condition : Sunny

Date Tested : 2023-06-09
Date Reported : 2023-07-07

Kilometer	Position	Texture Depth SANS 3001 - BT 11					Ball Penetration SANS 3001 - BT 10												Road Temperature (°C)	Remarks / Condition of Road	
		Volume of Sand (ml)	Average Diameter of the Patch (mm)	Texture Depth (mm)	Average Texture Depth (mm)	Standard Deviation n Texture Depth	Actual Initial Reading (mm) (D ₁)	Actual 1 st Reading (mm) (D ₂)	Actual 2 nd Reading (mm) (D ₃)	Ball Penetration after 1 st Hammer Blow	Ball Penetration after 2 nd Hammer Blow	Average (mm)	Standard Deviation	One Blow Ball Penetration (mm)	Two Blow Ball Penetration (mm)	Average (mm)	Standard Deviation				
										E ₁ = D ₃ - D ₁	E ₂ = D ₃ - D ₂			B _{p1} = E ₁	B _{p2} = E ₂ - E ₁						
99 + 300	NBC	56	220	1.473	1.530	0.079	23.0	24.5	25.0	1.5	2.0	E ₁	E ₁	1.5	0.5	B _{p1}	B _{p1}	21.2	Chip & Spray		
							21.0	22.5	23.0	1.0	1.5			1.0	0.5						
							21.0	22.5	23.0	1.5	2.0			1.5	0.5						
							210	1.617	22.0	23.0	24.5	1.0	2.5	1.150	0.337	1.0	1.5			1.150	0.337
							210	1.617	23.5	24.5	25.0	1.0	1.5			1.0	0.5				
							220	1.473	24.0	25.0	26.0	1.0	2.0			1.0	1.0				
							220	1.473	22.0	23.0	24.0	1.0	2.0	E ₂	E ₂	1.0	1.0			B _{p2}	B _{p2}
							220	1.473	22.0	22.5	23.5	0.5	1.5			0.5	1.0				
							220	1.473	20.5	22.0	22.5	1.5	2.0			1.5	0.5				
							220	1.473	21.0	22.5	23.5	1.5	2.5	1.5	1.0	1.950	0.369			1.5	0.5
220	1.473	21.0	22.5	23.5	1.5	2.5	1.5	1.0													
220	1.473	21.0	22.5	23.5	1.5	2.5	1.5	1.0													
99 + 800	SBC	56	260	1.055	1.216	0.130	23.0	24.0	24.5	1.0	1.5	E ₁	E ₁	1.0	0.5	B _{p1}	B _{p1}	21.6	Chip & Spray		
							22.0	23.5	24.5	1.0	2.0			1.0	1.0						
							22.0	23.0	23.5	1.0	1.5			1.0	0.5						
							230	1.348	21.0	22.0	22.5	1.0	1.5	1.050	0.284	1.0	0.5			1.050	0.284
							245	1.188	22.0	23.5	24.0	1.5	2.0			1.5	0.5				
							230	1.348	23.5	24.5	25.0	1.0	1.5			1.0	0.5				
							230	1.348	23.5	24.0	25.5	0.5	2.0	E ₂	E ₂	0.5	1.5			B _{p2}	B _{p2}
							250	1.141	22.0	23.5	24.0	1.5	2.0			1.5	0.5				
							250	1.141	24.0	25.0	25.5	1.0	1.5			1.0	0.5				
							250	1.141	20.5	21.5	22.0	1.0	1.5	1.0	0.5	1.700	0.258			1.0	0.5
250	1.141	20.5	21.5	22.0	1.0	1.5	1.0	0.5													
250	1.141	20.5	21.5	22.0	1.0	1.5	1.0	0.5													
100 + 300	NBC	56	200	1.782	1.821	0.086	22.5	23.5	24.0	1.0	1.5	E ₁	E ₁	1.0	0.5	B _{p1}	B _{p1}	26.0	Chip & Spray		
							23.0	24.5	25.0	1.5	2.0			1.5	0.5						
							21.5	22.5	23.5	1.0	2.0			1.0	1.0						
							200	1.782	22.0	23.0	24.0	1.0	2.0	1.000	0.236	1.0	1.0			1.000	0.236
							190	1.975	22.5	23.5	24.5	1.0	2.0			1.0	1.0				
							200	1.782	23.5	24.0	24.5	0.5	1.0			0.5	0.5				
							200	1.782	21.0	22.0	23.0	1.0	2.0	E ₂	E ₂	1.0	1.0			B _{p2}	B _{p2}
							200	1.782	23.0	24.0	25.0	1.0	2.0			1.0	1.0				
							200	1.782	23.5	24.5	25.5	1.0	2.0			1.0	1.0				
							200	1.782	21.0	22.0	23.0	1.0	2.0	1.0	1.0	1.850	0.337			1.0	1.0
200	1.782	21.0	22.0	23.0	1.0	2.0	1.0	1.0													
200	1.782	21.0	22.0	23.0	1.0	2.0	1.0	1.0													
100 + 800	SBC	56	200	1.782	1.716	0.091	22.5	23.5	24.0	1.0	1.5	E ₁	E ₁	1.0	0.5	B _{p1}	B _{p1}	20.4	Chip & Spray		
							23.0	24.0	25.0	1.0	2.0			1.0	1.0						
							23.0	24.0	25.0	1.0	2.0			1.0	1.0						
							210	1.617	23.5	24.0	24.5	0.5	1.0	0.850	0.337	0.5	0.5			0.850	0.337
							210	1.617	24.0	24.5	25.0	0.5	1.0			0.5	0.5				
							200	1.782	23.0	23.5	24.0	0.5	1.0			0.5	0.5				
							200	1.782	22.5	23.5	24.5	1.0	2.0	E ₂	E ₂	1.0	1.0			B _{p2}	B _{p2}
							200	1.782	22.5	24.0	24.5	1.5	2.0			1.5	0.5				
							200	1.782	23.5	24.0	24.5	0.5	1.0			0.5	0.5				
							200	1.782	23.5	24.5	25.0	1.0	1.5	1.0	0.5	1.500	0.471			0.5	0.5
200	1.782	23.5	24.5	25.0	1.0	1.5	1.0	0.5													
200	1.782	23.5	24.5	25.0	1.0	1.5	1.0	0.5													
101 + 300	NBC	56	180	2.200	2.283	0.174	22.0	23.0	24.0	1.0	2.0	E ₁	E ₁	1.0	1.0	B _{p1}	B _{p1}	21.8	Chip & Spray		
							22.5	23.5	24.0	1.0	1.5			1.0	0.5						
							21.0	22.5	23.0	1.5	2.0			1.5	0.5						
							170	2.467	23.0	23.5	24.0	0.5	1.0	1.050	0.369	0.5	0.5			1.050	0.369
							180	2.200	22.0	23.5	24.5	1.5	2.5			1.5	1.0				
							185	2.083	23.0	24.0	24.5	1.0	1.5			1.0	0.5				
							170	2.467	23.0	24.5	25.0	1.5	2.0	E ₂	E ₂	1.5	0.5			B _{p2}	B _{p2}
							185	2.083	23.5	24.0	24.5	0.5	1.0			0.5	0.5				
							170	2.467	21.0	22.0	23.0	1.0	2.0			1.0	1.0				
							170	2.467	22.5	23.5	24.0	1.0	1.5	1.0	0.5	1.700	0.483			1.0	1.0
170	2.467	22.5	23.5	24.0	1.0	1.5	1.0	0.5													
170	2.467	22.5	23.5	24.0	1.0	1.5	1.0	0.5													
101 + 800	SBC	56	340	0.617	0.617	0.013	22.0	23.0	23.5	1.0	1.5	E ₁	E ₁	1.0	0.5	B _{p1}	B _{p1}	23.0	New Asphalt		
							22.5	23.0	23.5	0.5	1.0			0.5	0.5						
							20.5	21.5	22.0	1.0	1.5			1.0	0.5						
							345	0.599	21.0	23.0	23.5	2.0	2.5	0.950	0.497	2.0	0.5			0.950	0.497
							340	0.617	22.5	23.0	23.5	0.5	1.0			0.5	0.5				
							335	0.635	21.0	22.0	23.0	1.0	2.0			1.0	1.0				
							340	0.617	22.0	23.5	24.0	1.5	2.0	E ₂	E ₂	1.5	0.5			B _{p2}	B _{p2}
							340	0.617	22.0	22.5	23.5	0.5	1.5			0.5	1.0				
							340	0.617	21.5	22.5	23.5	1.0	2.0			1.0	1.0				
							340	0.617	23.0	23.5	24.0	0.5	1.0	0.5	0.5	1.600	0.516			1.0	1.0
340	0.617	23.0	23.5	24.0	0.5	1.0	0.5	0.5													
340	0.617	23.0	23.5	24.0	0.5	1.0	0.5	0.5													



SOILCO MATERIALS INVESTIGATIONS (PTY) LTD

CIVIL ENGINEERING MATERIALS TESTING LABORATORY

Reg. No. : 1965 / 009585 / 07

25 WESTMEAD ROAD - WESTMEAD P.O.BOX 15318 WESTMEAD 3608 KWAZULU - NATAL

TELEPHONE : 031 7004325 TELEFAX : 031 7001909 email : info@soilco.co.za



T0213

Client : Naidu Consulting
Project : N2 - 21X - Harding to Izingolweni

Job Card No. : 243352
Date Received / Sampled : 2023-06-15

Date Tested : 2023-06-09

Tested by : Malibongwe Ndevu

Environmental Condition : Sunny

Date Reported : 2023-07-07

Kilometer	Position	Texture Depth SANS 3001 - BT 11					Ball Penetration SANS 3001 - BT 10												Road Temperature (°C)	Remarks / Condition of Road			
		Volume of Sand (ml)	Average Diameter of the Patch (mm)	Texture Depth (mm)	Average Texture Depth (mm)	Standard Deviation n Texture Depth	Actual Initial Reading (mm) (D ₁)	Actual 1 st Reading (mm) (D ₂)	Actual 2 nd Reading (mm) (D ₃)	Ball Penetration after 1 st Hammer Blow	Ball Penetration after 2 nd Hammer Blow	Average (mm)	Standard Deviation	One Blow Ball Penetration (mm)	Two Blow Ball Penetration (mm)	Average (mm)	Standard Deviation						
										E ₁ = D ₃ - D ₁	E ₂ = D ₃ - D ₂			B _{p1} = E ₁	B _{p2} = E ₂ - E ₁								
102 + 300	NBC	56	170	2.467	2.210	0.195	22.0	22.5	23.5	0.5	1.5	E ₁	E ₁	0.5	1.0	B _{p1}	B _{p1}	14.1	Chip & Spray + Slurry				
							21.5	22.0	23.5	0.5	2.0			0.5	1.5								
							22.5	23.5	24.0	1.0	1.5			1.0	0.5								
							185	2.083	21.0	23.0	23.5	2.0	2.5	0.900	0.459	2.0	0.5			0.900	0.459		
							20.5		21.5	22.5	1.0	2.0	1.0			1.0							
							22.5		23.0	23.5	0.5	1.0	0.5			0.5							
							175	2.328	22.0	22.5	23.0	0.5	1.0	E ₂	E ₂	0.5	0.5			B _{p2}	B _{p2}		
							190		1.975	23.5	24.5	25.0	1.0			1.5	0.5					0.5	
							180			2.200	22.5	23.5	24.5			1.0	2.0					1.0	1.0
							21.5	22.5			23.5	1.0	2.0	1.0	1.0								
102 + 800	SBC	56	190	1.975	2.206	0.144	21.5	22.5	23.0		1.0	1.5	E ₁	E ₁	1.0	0.5	B _{p1}	B _{p1}	13.9	Chip & Spray + Slurry			
							22.0	23.0	24.5	1.0	2.5	1.0			1.5								
							21.0	23.0	24.0	2.0	3.0	2.0			1.0								
							175	2.328	21.5	22.5	23.0	1.0	1.5	1.200	0.422	1.0	0.5	1.200			0.422		
							180		2.200	22.0	23.0	23.5	1.0			1.5	1.0					0.5	
							20.5			22.0	22.5	1.5	2.0			1.5	0.5						
							175	2.328		21.0	22.5	23.5	1.5	2.5	E ₂	E ₂	1.5	1.0			B _{p2}	B _{p2}	
							180		2.200	20.0	21.5	22.0	1.5	2.0			1.5	0.5					
							21.5			22.5	23.0	1.0	1.5	1.0			0.5	0.700					0.350
							20.5	21.0		21.5	0.5	1.0	0.5	0.5									

Remarks :

For Soilco :


K. Govender (Technical Signatory)

2005-06-01

Revision 1

Soilco SF 87

Cores



SOILCO MATERIALS INVESTIGATIONS (PTY) LTD

Concrete / Asphalt Core Thickness Report

Test Method - TMH 5 - MC 2

Client : Naidu Consulting

Date Received :

2023-06-07

Date Tested :

2023-07-05

Job Card No. : 243352

Project : N2- 21X - Harding to Izingsolweni

Date Reported :

2023-07-07

Field Technician : M.N

Laboratory No.	10658	10658
Core No.	A	B
Test Pit Name	TP 1 SBC S/C	TP 1 SBC S/C
Kilometre / Chainage	Km: 71+500	Km: 71+500
Position on Road		
Recovered Depth of Core (mm)	270mm	230mm
No. of Layers		
Photo No.	7843 - 7845	7843 - 7845

Thickenss of Core	270mm	230mm
Description		
Thickenss of Core		
Description		

Photos

For Soilco :

Technical Signatory - K. Govender



SOILCO MATERIALS INVESTIGATIONS (PTY) LTD

Concrete / Asphalt Core Thickness Report

Test Method - TMH 5 - MC 2

Client : Naidu Consulting

Date Received :

2023-06-07

Date Tested :

2023-07-05

Job Card No. : 243352

Project : N2- 21X - Harding to Izingolweni

Date Reported :



2023-07-07

Field Technician : M.N

Laboratory No.	10655	10655	
Core No.	A	B	
Test Pit Name	TP 2 SBC	TP 2 SBC	
Kilometre / Chainage	Km: 94+900 @ 3.3	Km: 94+900 @ 3.3	
Position on Road	North Slow Lane	North Slow Lane	
Recovered Depth of Core (mm)	340mm	360mm	
No. of Layers			
Photo No.	7836 - 7842	7836 - 7842	

Thickness of Core	340mm	360mm	
Description			
Thickness of Core			
Description			

Photos



For Soilco :

Technical Signatory - K. Govender



Materials Reports & MODs

SOILCO MATERIALS INVESTIGATIONS (PTY) LTD



CIVIL ENGINEERING MATERIALS TESTING LABORATORY

Reg. No. : 1965 / 009585 / 07

25 WESTMEAD ROAD - WESTMEAD P.O.BOX 15318 WESTMEAD 3608 KWAZULU - NATAL

TELEPHONE : 031 7004325 TELEFAX : 031 7001909 email : info@soilco.co.za



T 0213

Customer : Naidu Consulting
Project : N2 - 21X - Harding to Izingolweni

Job Card No. : 243352
Date Received : 2023-06-08
Date Tested : 2023-06-27 to 2023-07-07
Date Reported : 2023-07-07
Date Sampled : 2023-06-08

Condition of Sample : Slightly Moist / Moist

Environmental Conditions : Sunny

Sampling Process : Sampled By - Malibongwe Ndevu - TMH 5 MA 2

MATERIALS TEST REPORT

Laboratory Number	10501	10502	10503	10504
Field Number	TP 1			
Position in field / Location	Ch: 71+500 SBC S/L			
Depth (mm)	150 - 330	300 - 460	460 - 630	630 - 1000
Sample Description	Lt.Y.G.C/Rock Dolerite	Du.B.Lt.Y.Br.C/Rock Dolerite	Dk.Y.Br.Wth.Sugar Dolerite	Du.B.Dk.Y.Br.Tillite Gravel + Boulders
Stabilising Agent	Natural	Natural	Natural	Natural

Sieve Analysis (Wet Preparation) SANS 3001 - GR 1

100.0 mm	Percentage Passing			88
75.0 mm				77
63.0 mm			100	71
50.0 mm			95	64
37.5 mm			94	58
28.0 mm		100	92	52
20.0 mm		98	91	44
14.0 mm		81	86	40
5.0 mm		39	72	28
2.0 mm		22	52	22
0.425 mm		9	23	14
0.075 mm		3	11	9
Grading Modulus	SANS 3001 PR 5	2.67	2.51	2.13
				2.55

Mechanical Analysis - SANS 3001 - GR 1

Coarse Sand (%)	60	52	56	36
Coarse - Fine Sand (%)	13	12	8	8
Medium - Fine Sand (%)	8	9	7	7
Fine - Fine Sand (%)	7	9	8	8
Silt and Clay (%)	12	18	21	40

Atterberg Limits - SANS 3001 - GR 10 and GR 12

Liquid Limit (%)	CBD	CBD	19	28
Plasticity Index (%)	NP	NP	3	12
Linear Shrinkage (%)	0.0	0.0	2.0	6.0

Materials Classification

Classification Group Index	#	A-1-a(0)	A-1-a(0)	A-1-b(0)	A-2-6(4)
COTO (Draft)	#	G4B	G6	G7	G6
COLTO Classification	#	G7	G6	G7	G6
TRH 14 Classification (1985)	#	G5	G6	G7	G6

Maximum Dry Density and Optimum Moisture Content - SANS 3001 - GR 30

Maximum Dry Density (kg/m ³)	2171	2154	2243	2252
Optimum Moisture Content (%)	6.4	5.8	9.8	8.7

California Bearing Ratio - SANS 3001 - GR 40

CBR @ 100 % Compaction	111	92	36	30
CBR @ 98 % Compaction	84	63	30	29
CBR @ 95 % Compaction	55	36	22	27
CBR @ 93 % Compaction	42	25	19	26
CBR @ 90 % Compaction	27	14	14	25
Swell @ 100 % Compaction	0.00	0.00	0.55	0.00

Remarks : The Colto / TRH 14 Classifications are only based on the above results. Further testing may be required.

For Soilco - K. Govender (Technical Signatory)

2015-05-12

Revision 1

Soilco SF 33

SOILCO MATERIALS INVESTIGATIONS (PTY) LTD

CIVIL ENGINEERING MATERIALS TESTING LABORATORY



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T 0213

Customer : Naidu Consulting
Project : N2 - 21X - Harding to Izingsolweni

Job Card No. : 243352
Date Received : 2023-06-08
Date Tested : 2023-06-27 to 2023-07-07
Date Reported : 2023-07-07
Date Sampled : 2023-06-08

Condition of Sample : Slightly Moist / Moist

Environmental Conditions : Sunny

Sampling Process : Sampled By - Malibongwe Ndevu - TMH 5 MA 2

MATERIALS TEST REPORT

Laboratory Number	10505	10506	10507	10508	
Field Number	TP 2				
Position in field / Location	Ch: 94+900 SBC				
Depth (mm)	120 - 380	380 - 550	550 - 780	780 - 1000	
Sample Description	Lt.Br.Du.B.Spec.BI, C/Rock Wth.Dolerite + RA	Lt.Y.Br.Sugar Dolerite	Dk.Y.Br.Wth.Dolerite	Dk.Y.Br.Slightly Clayey Sugar Dolerite	
Stabilising Agent	Natural	Natural	Natural	Natural	

Sieve Analysis (Wet Preparation) SANS 3001 - GR 1

100.0 mm	Percentage Passing			100	
75.0 mm				98	
63.0 mm				96	
50.0 mm				91	
37.5 mm		100		89	
28.0 mm		95		86	
20.0 mm		88		83	
14.0 mm		77	100	76	100
5.0 mm		48	92	54	96
2.0 mm		32	71	27	74
0.425 mm		12	25	12	31
0.075 mm		3	8	12	14
Grading Modulus	SANS 3001 PR 5	2.53	1.96	2.07	1.81

Mechanical Analysis - SANS 3001 - GR 1

Coarse Sand (%)	63	65	51	58	
Coarse - Fine Sand (%)	11	10	11	8	
Medium - Fine Sand (%)	8	7	8	8	
Fine - Fine Sand (%)	8	7	9	8	
Silt and Clay (%)	10	12	22	19	

Atterberg Limits - SANS 3001 - GR 10 and GR 12

Liquid Limit (%)	CBD	CBD	20	17	
Plasticity Index (%)	NP	NP	6	4	
Linear Shrinkage (%)	0.0	0.0	3.0	2.0	

Materials Classification

Classification Group Index	#	A-1-b(0)	A-1-b(0)	A-1-b(0)	A-1-b(0)	
COTO (Draft)	#	G6	G8	G6	G6	
COLTO Classification	#	G6	G8	G7	G6	
TRH 14 Classification (1985)	#	G6	G8	G7	G6	

Maximum Dry Density and Optimum Moisture Content - SANS 3001 - GR 30

Maximum Dry Density (kg/m ³)	2089	2040	2186	2202	
Optimum Moisture Content (%)	11.3	10.7	8.1	8.4	

California Bearing Ratio - SANS 3001 - GR 40

CBR @ 100 % Compaction	74	59	54	69	
CBR @ 98 % Compaction	56	40	40	52	
CBR @ 95 % Compaction	36	22	25	34	
CBR @ 93 % Compaction	27	14	19	26	
CBR @ 90 % Compaction	18	8	12	17	
Swell @ 100 % Compaction	0.00	0.03	0.04	0.06	

Remarks :

The Colto / TRH 14 Classifications are only based on the above results. Further testing may be required.

For Soilco - K. Govender (Technical Signatory)

SOILCO MATERIALS INVESTIGATIONS (PTY) LTD

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Client : Naidu Consulting
Project : N2 - 21X - Harding to Izingolweni

Job Card No. : 243352
Date Received : 2023-06-08
Date Tested : 2023-07-03
Date Reported : 2023-07-07
Date Sampled : 2023-06-08

Environmental Conditions : Sunny

Sampling Process : Sampled By - Malibongwe Ndevu - TMH 5 MA 2

Laboratory Number : 10501

Field Reference No. : TP 1

Position in field / Location : Ch: 71+500 SBC S/L

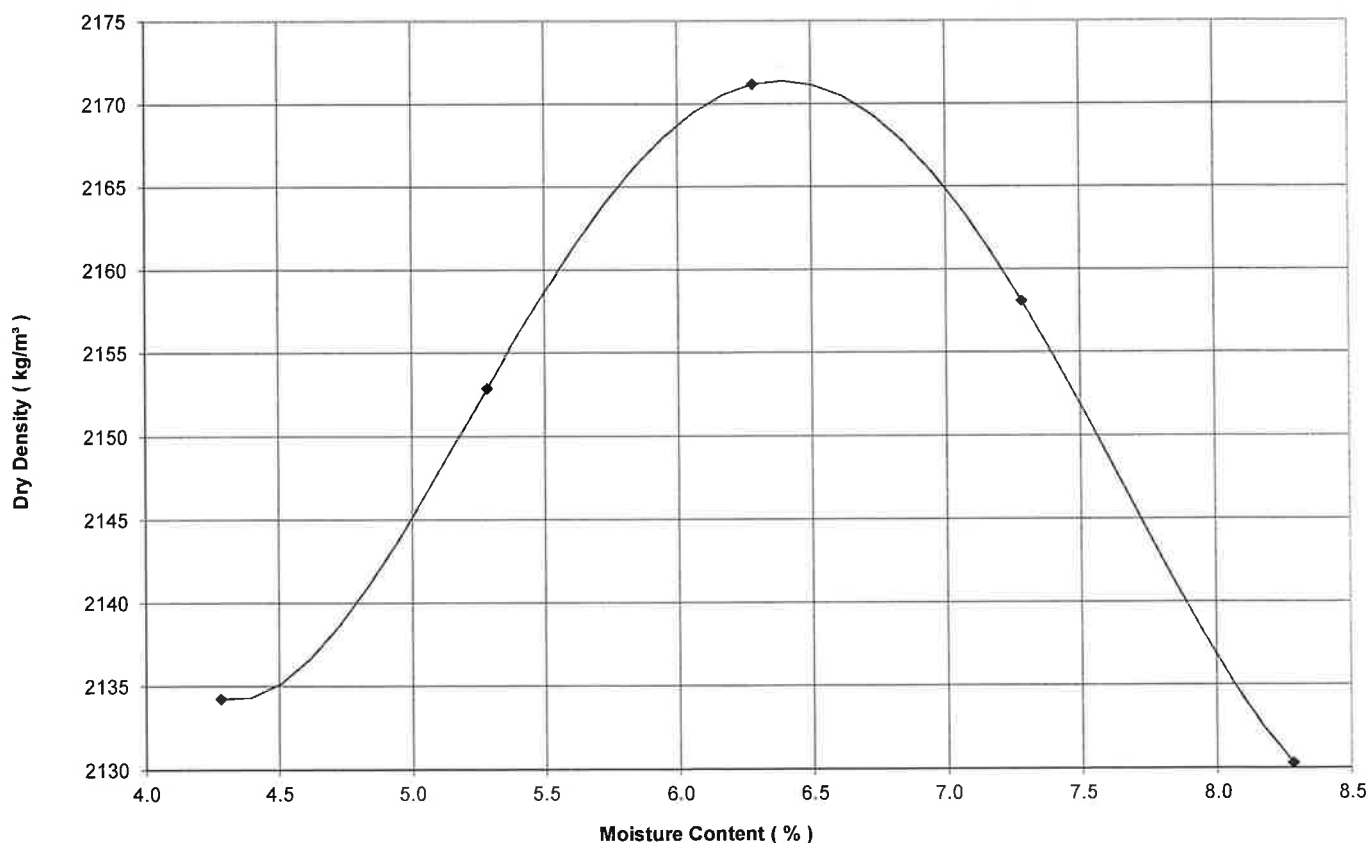
Depth (mm) : 150 - 330

Material Description : Lt.Y.G.C/Rock Dolerite

Condition of Sample : Slightly Moist

MOISTURE / DENSITY RELATIONSHIP - SANS 3001 - GR 30

Moisture Content; (%)	5.3	6.3	7.3	8.3	4.3	Maximum Dry Density	2171 kg/m ³
Dry Density (kg/m ³)	2153	2171	2158	2130	2134	Optimum Moisture Content	6.4 %



Remarks :

For Soilco :

Method of Preparation : Scalping Process

K. Govender (Technical Signatory)

SOILCO MATERIALS INVESTIGATIONS (PTY) LTD

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T 0213

Client : Naidu Consulting
Project : N2 - 21X - Harding to Izingolweni

Job Card No. : 243352
Date Received : 2023-06-08
Date Tested : 2023-07-03
Date Reported : 2023-07-07
Date Sampled : 2023-06-08

Environmental Conditions : Sunny

Sampling Process : Sampled By - Malibongwe Ndevu - TMH 5 MA 2

Laboratory Number : 10502

Field Reference No. : TP 1

Position in field / Location : Ch: 71+500 SBC S/L

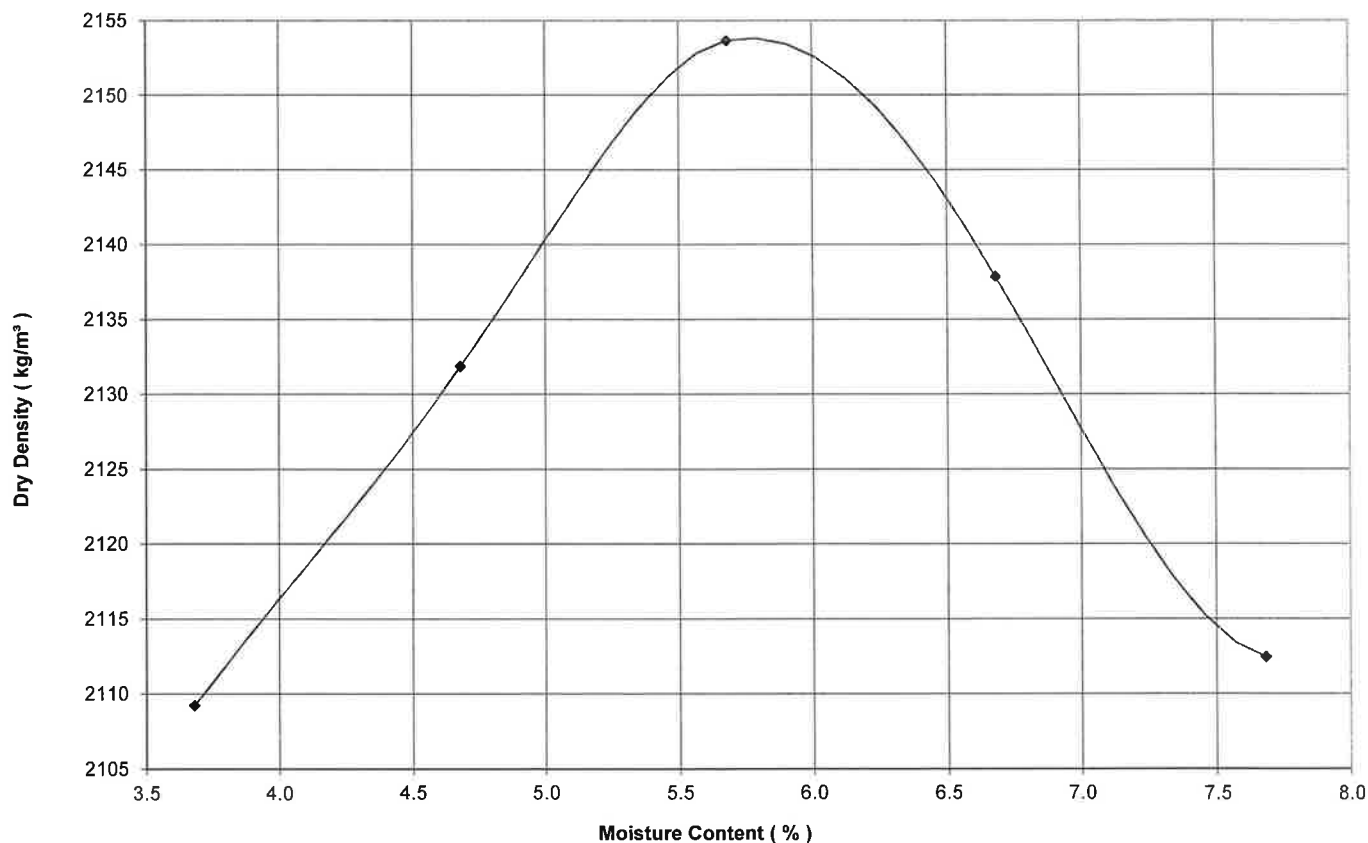
Depth (mm) : 300 - 460

Material Description : Du.B.Lt.Y.Br.C/Rock Dolerite

Condition of Sample : Slightly Moist

MOISTURE / DENSITY RELATIONSHIP - SANS 3001 - GR 30

Moisture Content; (%)	5.7	6.7	4.7	3.7	7.7	Maximum Dry Density	2154 kg/m ³
Dry Density (kg/m ³)	2154	2138	2132	2109	2112	Optimum Moisture Content	5.8 %



Remarks :

Method of Preparation : Scalping Process

For Soilco :

K. Govender (Technical Signatory)

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T 0213

Client : Naidu Consulting
Project : N2 - 21X - Harding to Izingolweni

Job Card No. : 243352
Date Received : 2023-06-08

Environmental Conditions : Sunny

Date Tested : 2023-07-03

Date Reported : 2023-07-07

Sampling Process : Sampled By - Malibongwe Ndevu - TMH 5 MA 2

Date Sampled : 2023-06-08

Laboratory Number : 10503

Field Reference No. :

Position in field / Location : Ch: 71+500 SBC S/L

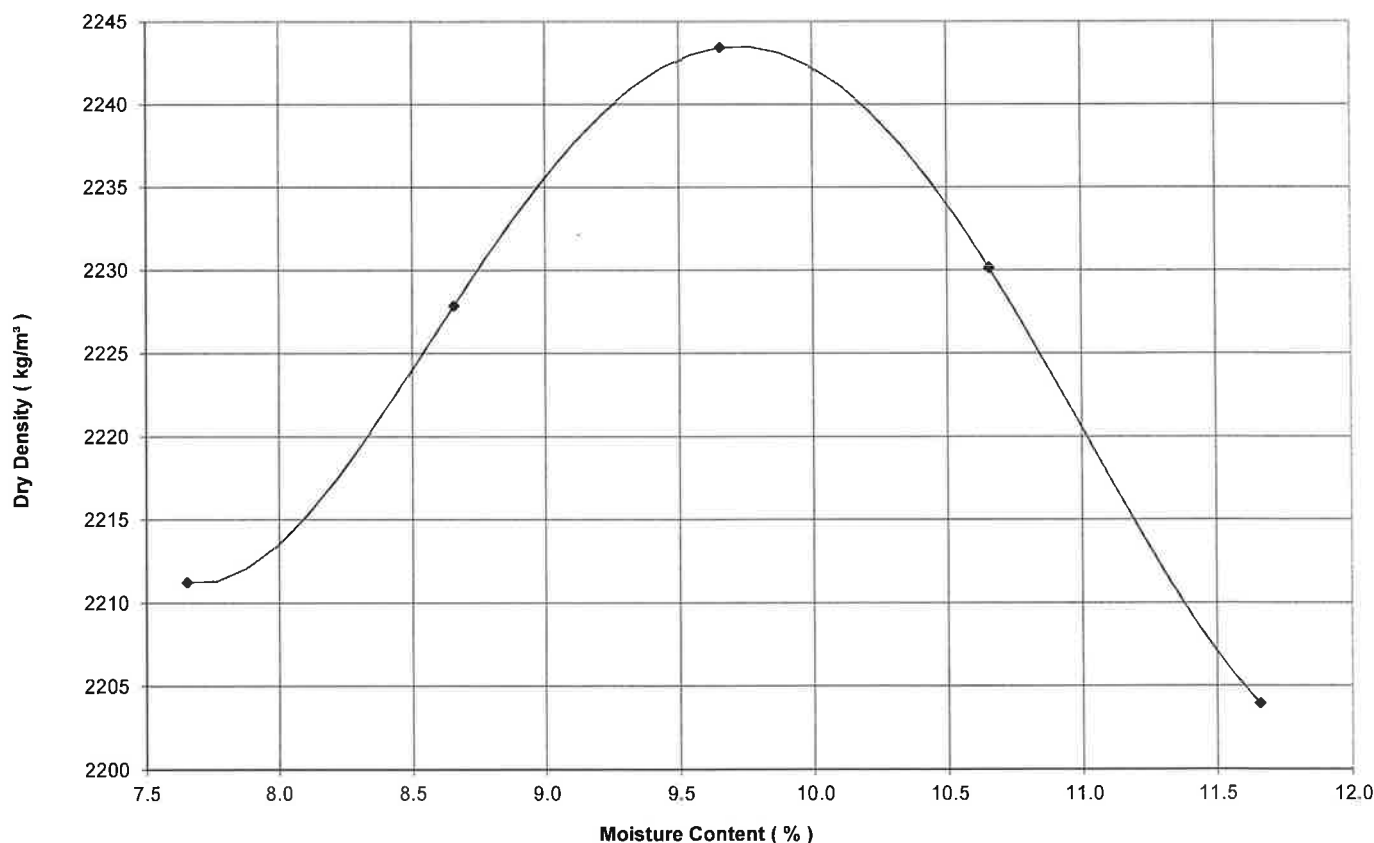
Depth (mm) :

Material Description : Dk.Y.Br.Wth.Sugar Dolerite

Condition of Sample : Slightly Moist

MOISTURE / DENSITY RELATIONSHIP - SANS 3001 - GR 30

Moisture Content; (%)	8.7	9.7	10.7	11.7	7.7	Maximum Dry Density	2243 kg/m³
Dry Density (kg/m ³)	2228	2243	2230	2204	2211	Optimum Moisture Content	9.8 %



Remarks :

Method of Preparation : Scalping Process

For Soilco :

K. Govender (Technical Signatory)

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T 0213

Client : Naidu Consulting
Project : N2 - 21X - Harding to Izingolweni

Job Card No. : 243352
Date Received : 2023-06-08
Date Tested : 2023-07-03
Date Reported : 2023-07-07
Date Sampled : 2023-06-08

Environmental Conditions : Sunny

Sampling Process : Sampled By - Malibongwe Ndevu - TMH 5 MA 2

Laboratory Number : 10504

Field Reference No. : TP 1

Position in field / Location : Ch: 71+500 SBC S/L

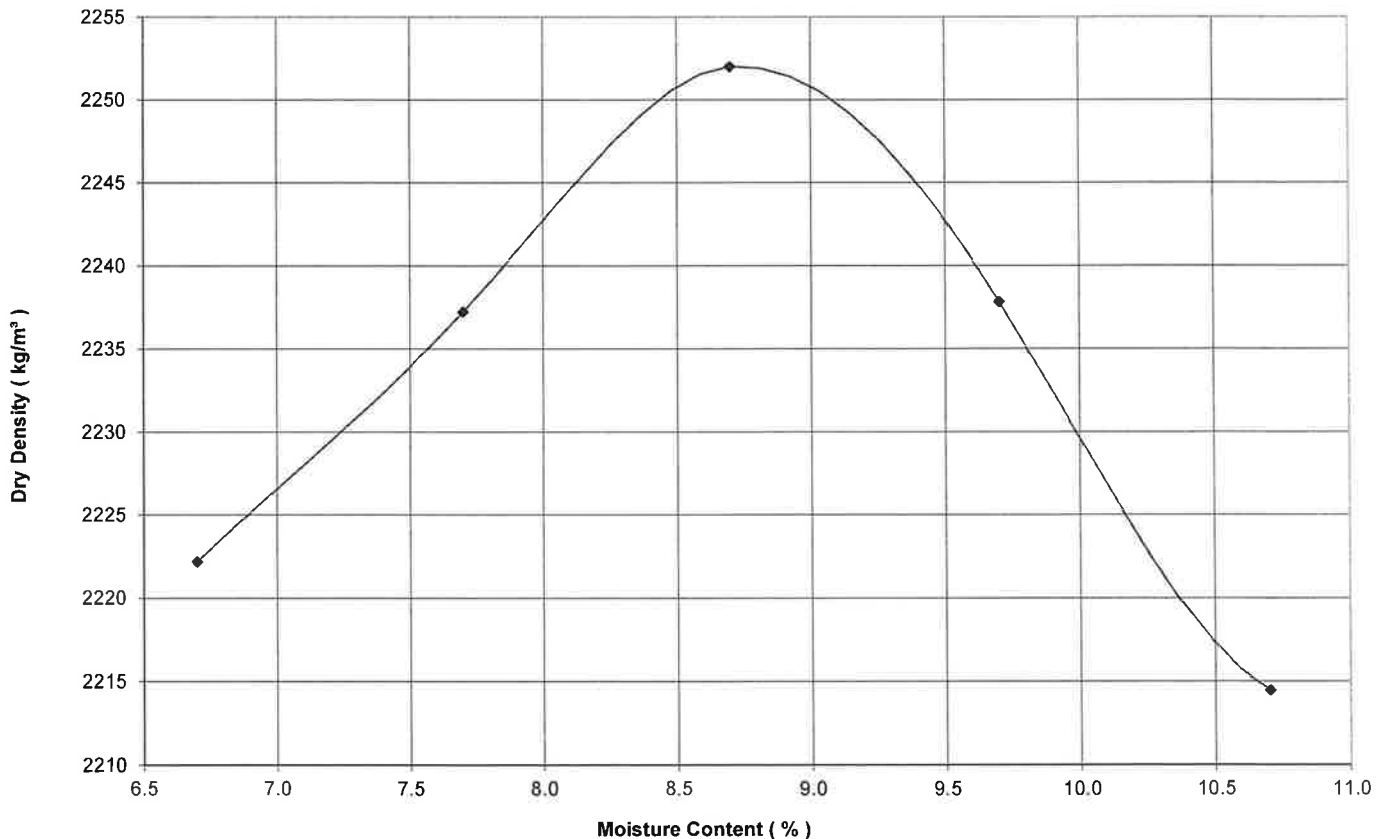
Depth (mm) : 630 - 1000

Material Description : Du.B.Dk.Y.Br.Tillite Gravel + Boulders

Condition of Sample : Slightly Moist

MOISTURE / DENSITY RELATIONSHIP - SANS 3001 - GR 30

Moisture Content; (%)	7.7	8.7	9.7	10.7	6.7	Maximum Dry Density	2252 kg/m ³
Dry Density (kg/m ³)	2237	2252	2238	2214	2222	Optimum Moisture Content	8.7 %



Remarks :

For Soilco:
K. Govender (Technical Signatory)

Method of Preparation : Scalping Process

SOILCO MATERIALS INVESTIGATIONS (PTY) LTD

CIVIL ENGINEERING MATERIALS TESTING LABORATORY



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T 0213

Client : Naidu Consulting
Project : N2 - 21X - Harding to Izingolweni

Job Card No. : 243352
Date Received : 2023-06-08
Date Tested : 2023-07-03
Date Reported : 2023-07-07
Date Sampled : 2023-06-08

Environmental Conditions : Sunny

Sampling Process : Sampled By - Malibongwe Ndevu - TMH 5 MA 2

Laboratory Number : 10505

Field Reference No. : TP 2

Position in field / Location : Ch: 94+900 SBC

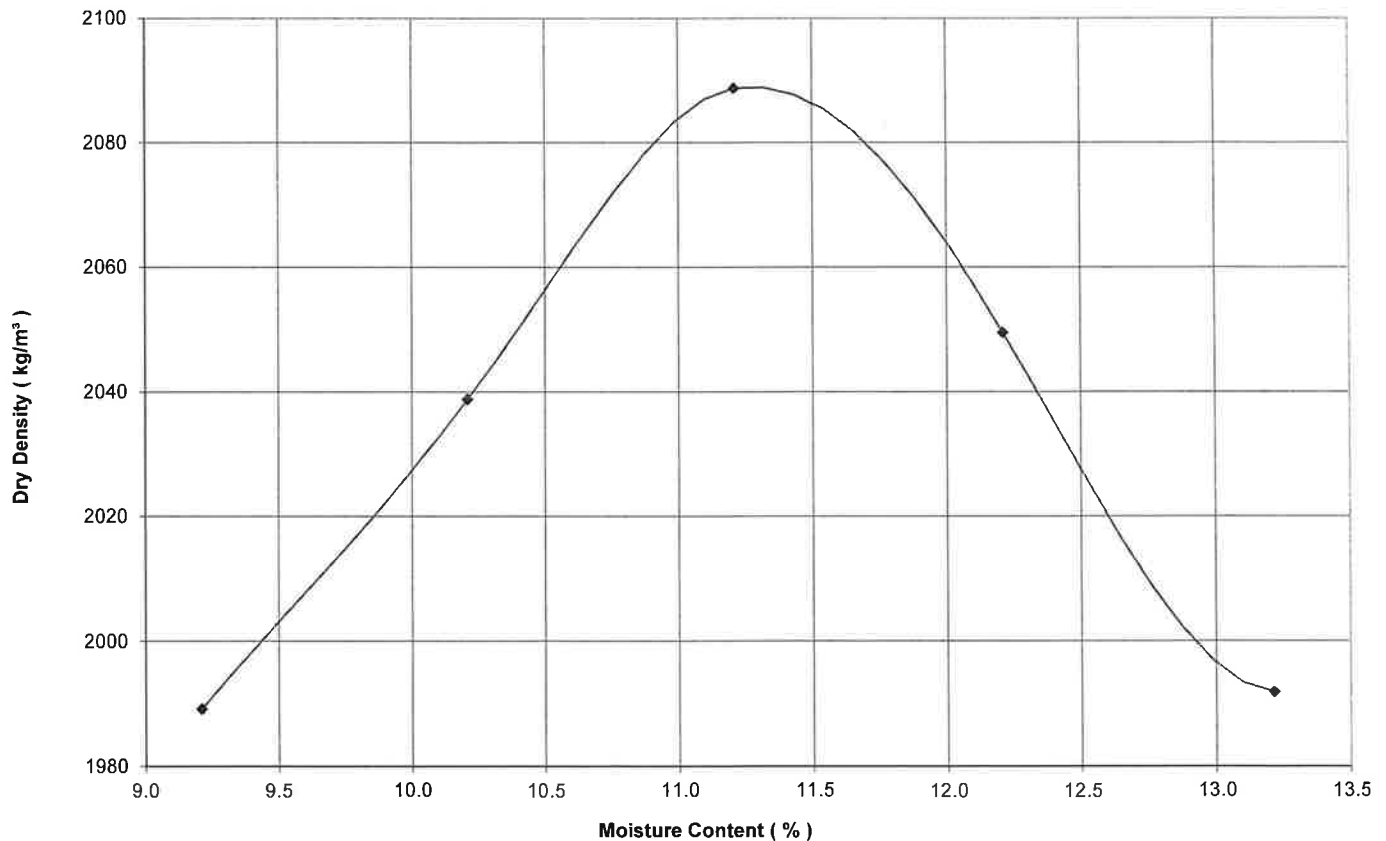
Depth (mm) : 120 - 380

Material Description : Lt.Br.Du.B.Spec.Bl. C/Rock Wth.Dolerite
+ RA

Condition of Sample : Slightly Moist

MOISTURE / DENSITY RELATIONSHIP - SANS 3001 - GR 30

Moisture Content; (%)	9.2	10.2	11.2	12.2	13.2	Maximum Dry Density	2089 kg/m³
Dry Density (kg/m ³)	1989	2039	2089	2049	1992	Optimum Moisture Content	11.3 %



Remarks :

Method of Preparation : Scalping Process

For Soilco :

K. Govender (Technical Signatory)

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Project : N2 - 21X - Harding to Izingolweni

Job Card No. : 243352
Date Received : 2023-06-08
Date Tested : 2023-07-03
Date Reported : 2023-07-07
Date Sampled : 2023-06-08

Environmental Conditions : Sunny

Sampling Process : Sampled By - Malibongwe Ndevu - TMH 5 MA 2

Laboratory Number : 10506

Field Reference No. : TP 2

Position in field / Location : Ch: 94+900 SBC

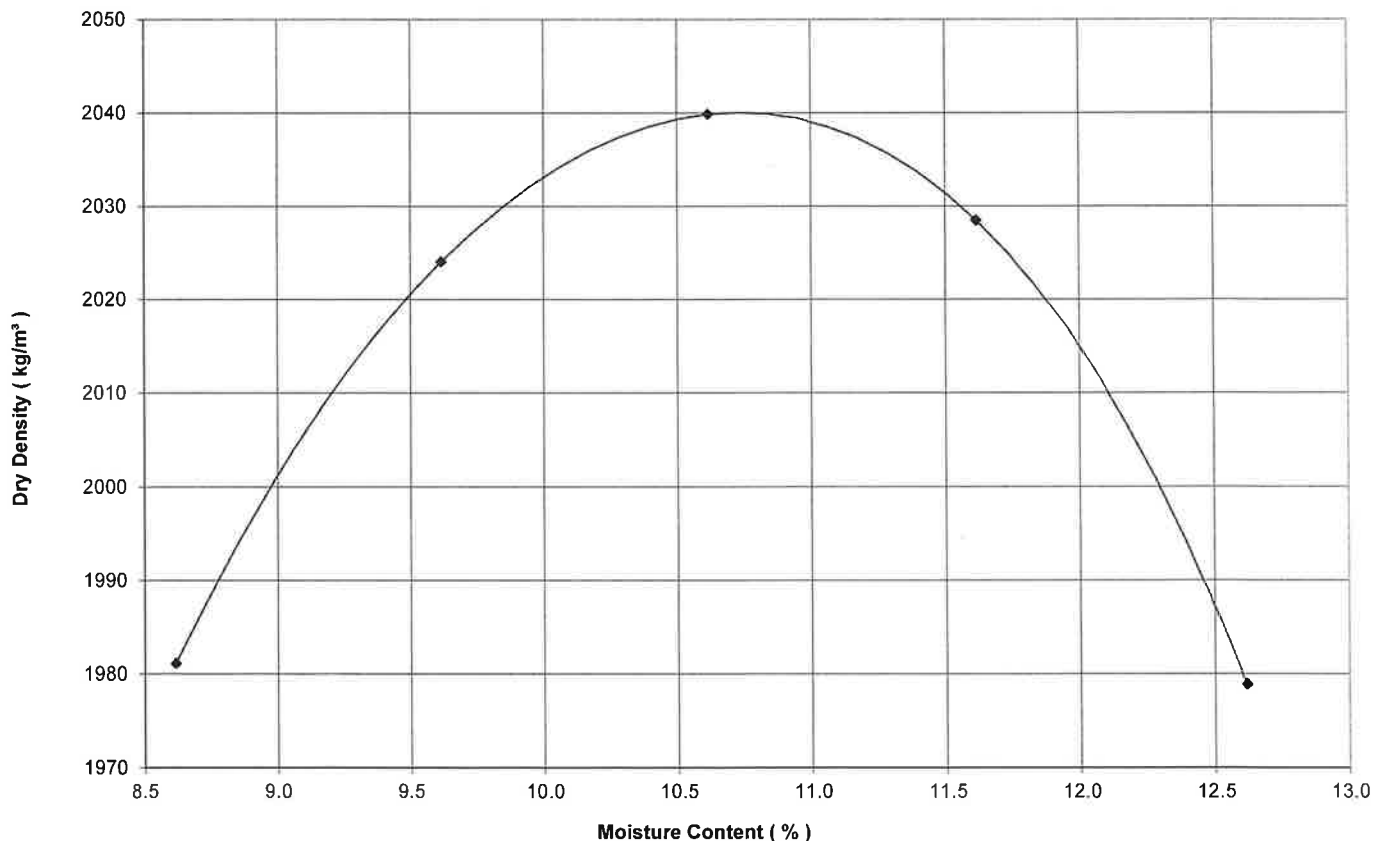
Depth (mm) : 380 - 550

Material Description : Lt.Y.Br.Sugar Dolerite

Condition of Sample : Slightly Moist

MOISTURE / DENSITY RELATIONSHIP - SANS 3001 - GR 30

Moisture Content; (%)	9.6	10.6	11.6	12.6	8.6	Maximum Dry Density	2040 kg/m³
Dry Density (kg/m ³)	2024	2040	2029	1979	1981	Optimum Moisture Content	10.7 %



Remarks :

Method of Preparation : All Material passed the 20mm Sieve

For Soilco :

K. Govender (Technical Signatory)

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T 0213

Client : Naidu Consulting
Project : N2 - 21X - Harding to Izingolweni

Job Card No. : 243352
Date Received : 2023-06-08
Date Tested : 2023-06-27
Date Reported : 2023-07-07
Date Sampled : 2023-06-08

Environmental Conditions : Sunny

Sampling Process : Sampled By - Malibongwe Ndevu - TMH 5 MA 2

Laboratory Number : 10507

Field Reference No. : TP 2

Position in field / Location : Ch: 94+900 SBC

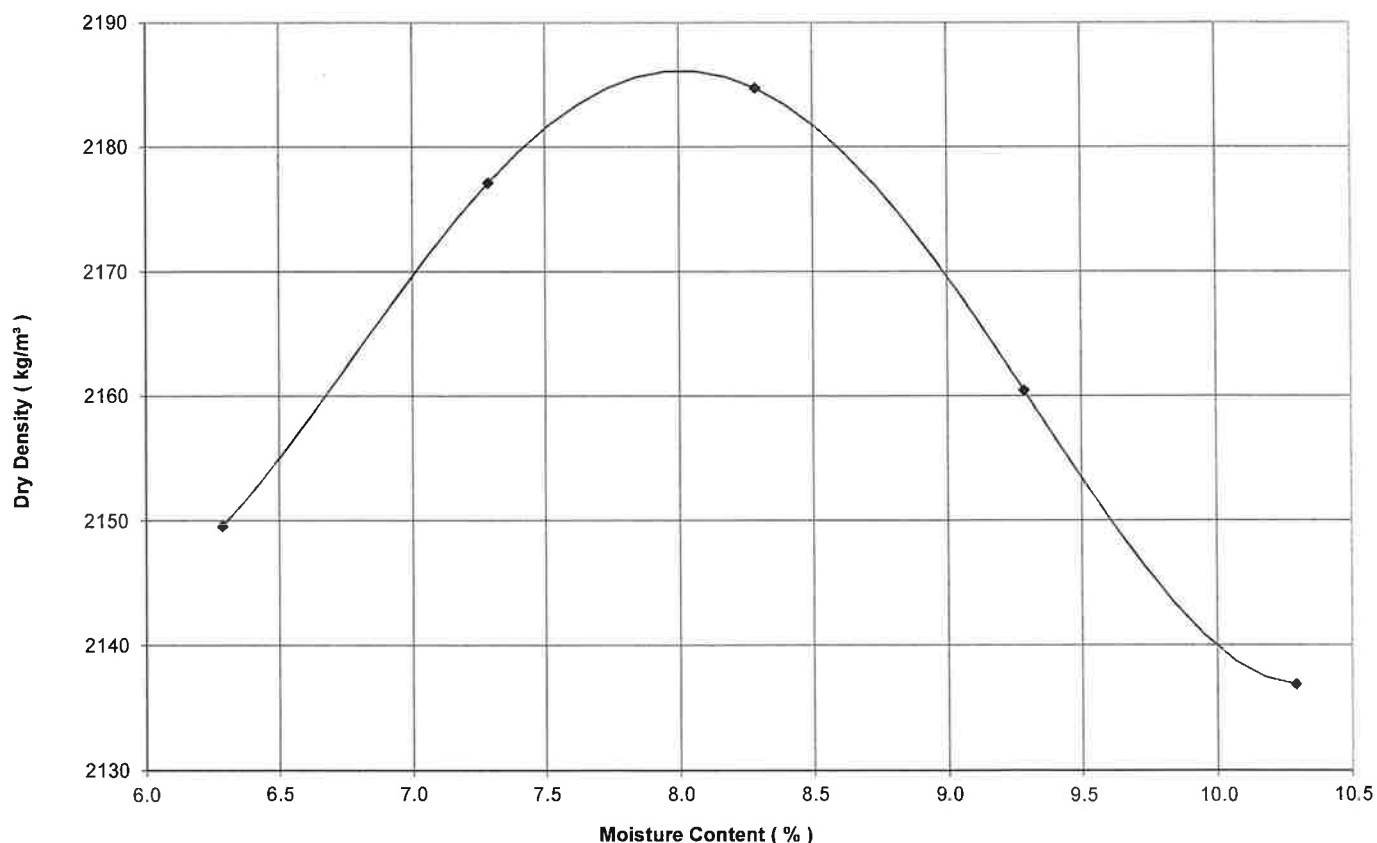
Depth (mm) : 550 - 780

Material Description : Dk.Y.Br.Wth.Dolerite

Condition of Sample : Slightly Moist

MOISTURE / DENSITY RELATIONSHIP - SANS 3001 - GR 30

Moisture Content; (%)	6.3	7.3	8.3	9.3	10.3	Maximum Dry Density	2186 kg/m³
Dry Density (kg/m ³)	2150	2177	2185	2160	2137	Optimum Moisture Content	8.1 %



Remarks :

Method of Preparation : Scalping Process

For Soilco:

K. Govender (Technical Signatory)

SOILCO MATERIALS INVESTIGATIONS (PTY) LTD

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T 0213

Client : Naidu Consulting
Project : N2 - 21X - Harding to Izingolweni

Job Card No. : 243352
Date Received : 2023-06-08

Environmental Conditions : Sunny

Date Tested : 2023-07-03

Date Reported : 2023-07-07

Sampling Process : Sampled By - Malibongwe Ndevu - TMH 5 MA 2

Date Sampled : 2023-06-08

Laboratory Number : 10508

Field Reference No. : TP 2

Position in field / Location : Ch: 94+900 SBC

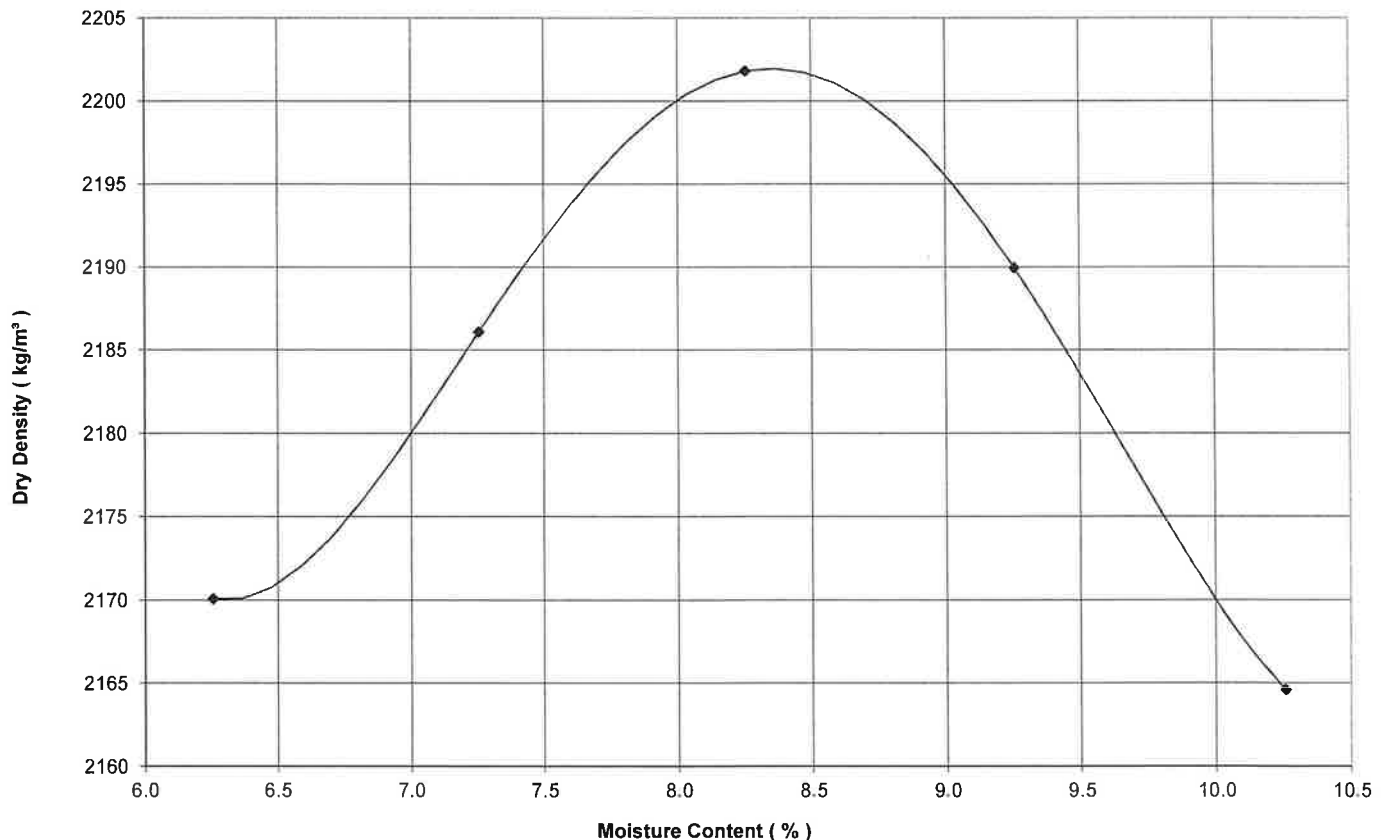
Depth (mm) : 780 - 1000

Material Description : Dk.Y.Br.Slightly Clayey Sugar Dolerite

Condition of Sample : Moist

MOISTURE / DENSITY RELATIONSHIP - SANS 3001 - GR 30

Moisture Content; (%)	8.3	9.3	7.3	6.3	10.3	Maximum Dry Density	2202 kg/m ³
Dry Density (kg/m ³)	2202	2190	2186	2170	2165	Optimum Moisture Content	8.4 %



Remarks :

Method of Preparation : Scalping Process

For Soilco :

K. Govender (Technical Signatory)



UCS-ITS

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a SANAS Accredited Testing Laboratory, No. T0213

T0213

Customer : Naidu Consulting

Job Card No. : 243352

Project : N2 - 21X Harding to Izingolweni

Date Received : 2023-06-07

Date Tested : 2023-07-05

Condition of Sample : Dry

Date Reported : 2023-07-07

Environmental Conditions : Sample Collected by Technician

Date Sampled : 2023-06-07

Sampling Process : Sample Collected by Technician

UNCONFINED COMPRESSIVE STRENGTH TEST REPORT

Laboratory Number	10655		
Pit / Field Number	TP 2 SBC		
Kilometre / Position / Location	Km:94+900		
Source	-		
Sample Description	Core		
Stabilising Agent	-		
% Stabiliser	-		
Curing Procedure			
Date Moulded	-		

Maximum Dry Density and Optimum Moisture Content - SANS 3001 - GR 51

Maximum Dry Density (kg / m ³)			
Optimum Moisture Content (%)			

Unconfined Compressive Strength - SANS 3001 - GR 53

Dry Density (kg / m ³)	% Compaction 1					
Dry Density (kg / m ³)	% Compaction 2					
Dry Density (kg / m ³)	% Compaction 3					
Moulding Moisture Content (%)						
UCS (MPa)	(1)	6.288				
UCS (MPa)	(2)					
UCS (MPa)	(3)					
UCS (MPa)	(Average)	6.288				

The Sampling Preparation, Compaction and Curing of the above Field Mixed Freshly Cementitious Stabilized Mixed Specimens were in accordance with SANS 3001 - GR 51.

Remarks :


For Soilco, K. Govender (Technical Signatory)
2022-05-19

Revision 3

Soilco SF 34

SOILCO MATERIALS INVESTIGATIONS (PTY) LTD

CIVIL ENGINEERING MATERIALS TESTING LABORATORY



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a SANAS Accredited Testing Laboratory, No. T0213



T0213

Customer : Naidu Consulting

Job Card No. : 243352

Project : N2 - 21X Harding to Izingolweni

Date Received : 2023-06-07

Date Tested : 2023-07-05

Condition of Sample : Dry

Date Reported : 2023-07-07

Environmental Conditions : Sample Collected by Technician

Date Sampled : 2023-06-07

Sampling Process : Sample Collected by Technician

INDIRECT TENSILE STRENGTH TEST REPORT

Laboratory Number	10655		
Pit / Field Number	TP 2 SBC		
Kilometre / Position / Location	Km:94+900		
Source	-		
Sample Description	Core		
Stabilising Agent	-		
% Stabiliser	-		
Curing Procedure			
Date Moulded	-		

Maximum Dry Density and Optimum Moisture Content - SANS 3001 - GR 51

Maximum Dry Density (kg / m ³)			
Optimum Moisture Content (%)			

Indirect Tensile Strength - SANS 3001 - GR 54

Dry Density (kg / m ³)	% Compaction 1						
Dry Density (kg / m ³)	% Compaction 2						
Dry Density (kg / m ³)	% Compaction 3						
Moulding Moisture Content (%)							
ITS (KPa)	(1)	126					
ITS (KPa)	(2)						
ITS (KPa)	(3)						
ITS (KPa)	(Average)	126					
MODE OF FAILURE	Clean Break						

The Sampling Preparation, Compaction and Curing of the above Field Mixed Freshly Cementitious Stabilized Mixed Specimens were in accordance with SANS 3001 - GR 51.

Remarks :

For Soilco - K. Govender (Technical Signatory)