



Luhlaza Advisory and Consulting (Pty) Ltd
Blairgowrie Plaza Office Park,
Cnr Conrad & Susman Street,
Office 128 & 126, Level One,
Randburg
2194 – Tel - +27813154288

TEST REPORT: SANS 3001- GR1 - GR12

Client Name:		Luhlaza Ref:	
Area:	Khayelitsha, WC	Date Analysed:	19/11/2023
Project Name:	Makhaza Police Station	Technical Signatory	Richard Malungani
Attention:			
Sample No:		TP1A	
Depth of Sample Taken (m):		0,6-1,0	
Material Class:		Soils and Gravels	
Date Received:		22/09/2023	
Description of Sample		Light Brown to White Silty Sand	
Sieve Analysis (mm)	100.00	100.00	
	75.00	100.00	
	37.50	100.00	
	26.50	100.00	
	19.00	100.00	
	13.20	100.00	
	4.75	100.00	
	2.00	99.80	
	0.43	97.80	
	0.25	66.60	
	0.15	51.60	
	0.075	49.60	
	Hydrometer Analysis (mm)	0.060	17.26
0.050		16.36	
0.004		10.08	
0.002		9.20	
Classification		RAW	%
CLAY		16.362	17
SILT		33.238	32
SAND		50.200	50
GRAVEL		0.200	0
Atterberg Limit	LL%	22.1	
	P.I.	0.0	
	LS%	0.0	
	GM	0.53	
Classification	AASHTO	A-4 - Silty Soils	TRH14
	USCS	SM - Silty Sand	>G10

Notes: Data Reported above relates to sample tested.



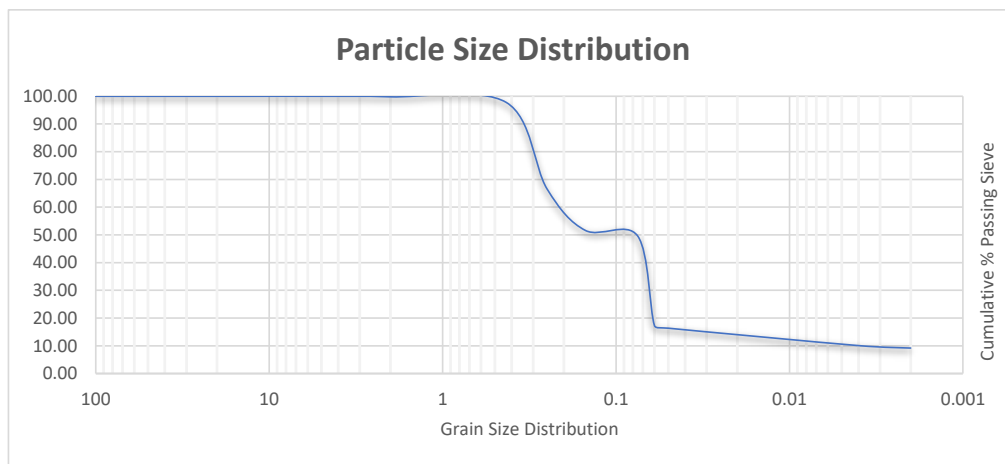
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TEST REPORT: SANS 3001- GR1 - GR12

Client Name:	0	Luhlaza Ref:	0
Client Address:	Khayelitsha, WC	Date Analysed:	19/11/2023
Project Name:	Makhaza Police Station	Technical Signatory	Richard Malungani
Attention:	0		

Excavation No.	TP1A
Depth of Sample Taken:	0,6-1,0
Material Class:	Soils and Gravels
Date Received.	22/09/2023
Description of Sample	Light Brown to White Silty Sand



Clay Activity Index (AI)

AI = $\frac{LL-PL}{40}$	0.00
Clay (%)	

Natural Moisture Content

Dry Sample: 500g	Container + Sample (Wet)	660
	Container + Sample (Dry)	622
	Moisture %	5.8

PH - EC - TDS - Temp (°C)

Potential Expansivity

pH	7.1	Low	X
EC (µS/cm)	133	Medium	
TDS (ppm)	81	High	
Temp (°C)	21.1	Organic or Waste	

Notes: Data Reported above relates to sample tested.



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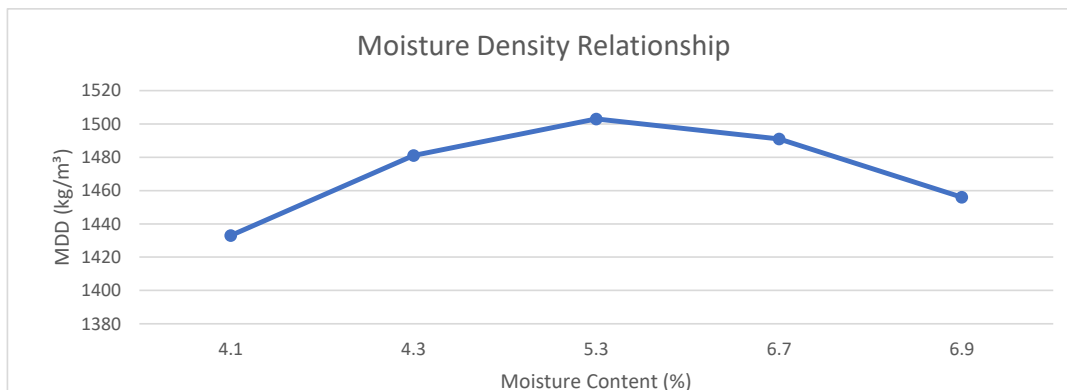
TEST REPORT: MOD AASHTO - SANS 3001 - GR31

Client Name:	0 Luhlaza Ref:	Jan-00
Client Address:	Khayelitsha, WC	Date Analysed: 19/11/2023
Project Name:	Makhaza Police Station	Technical Signatory: Richard Malungani
Attention:	0	

Excavation No.	TP1A
Depth of Sample Taken:	0,6-1,0
Material Class:	Soils and Gravels
Date Received.	22/09/2023
Description of Sample	Light Brown to White Silty Sand

TEST METHOD		MOD AASHTO
Mould No.	Moisture (%)	Dry Density (kg/m ³)
1	4.1	1433
2	4.3	1481
3	5.3	1503
4	6.7	1491
5	6.9	1456

Optimum Moisture Content (%) (OMC)	Maximum Dry density (kg/m ³) (MDD)
5.3	1503



Notes: Data Reported above relates to sample tested.

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TEST REPORT: CBR - SANS 3001 - GR40

Client Name:	0	Luhlaza Ref:	0
Client Address:	Khayelitsha, WC	Date Analysed:	8/5/2023
Project Name:	Makhaza Police Station	Technical Signatory	Richard Malungani
Attention:	0		

Excavation No.	TP1A
Depth of Sample Taken:	0,6-1,0
Material Class:	Soils and Gravels
Date Received.	22/09/2023
Description of Sample	Light Brown to White Silty Sand

Material Utilization - Earthworks Classification

Group A - Granular Soils	X
Group B - Low Plasticity Soils	
Group C - High Plasticity Soils	
Group D - Durable Rock	
Group E - Degradable Rock	
Group F - Topsoil	
Group G - Organic Soils	

CBR Final Results	CBR %
CBR @ 100% Compaction	4
CBR @ 98% Compaction	4
CBR @ 97% Compaction	3
CBR @ 95% Compaction	2
CBR @ 93% Compaction	2
CBR @ 90% Compaction	1
Swell @ 100% Compaction	0

Classification	TRH14	>G10
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Swell

$$S = \frac{(k - l)}{127} \times 100$$

Where:

S = swell expressed as a percentage of the height of the moulded material before soaking i.e. 127mm

K = dial gauge reading after four days of soaking

L = dial gauge reading before soaking

NB: The swell is reported to the nearest first decimal point.

Notes: Data Reported above relates to sample tested.



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TEST REPORT: SANS 3001- GR1 - GR12

Client Name:		Luhlaza Ref:	
Area: Khayelitsha, WC		Date Analysed: 19/11/2023	
Project Name: Makhaza Police Station		Technical Signatory Richard Malungani	
Attention:			
Sample No:		TP2B	
Depth of Sample Taken (m):		2,0-2,4	
Material Class:		Soils and Gravels	
Date Received:		22/09/2023	
Description of Sample		Light Brown to White Silty Sand	
Sieve Analysis (mm)	100.00	100.00	
	75.00	100.00	
	37.50	100.00	
	26.50	100.00	
	19.00	100.00	
	13.20	100.00	
	4.75	100.00	
	2.00	100.00	
	0.43	97.20	
	0.25	77.40	
	0.15	48.40	
	0.075	43.80	
	Hydrometer Analysis (mm)	0.060	13.49
0.050		13.49	
0.004		10.67	
0.002		9.88	
Classification		RAW	%
CLAY		13.490	13
SILT		30.310	30
SAND		56.200	56
GRAVEL		0.000	0
Atterberg Limit	LL%	23.4	
	P.I.	0.0	
	LS%	0.0	
	GM	0.59	
Classification	AASHTO	A-4 - Silty Soils	TRH14
	USCS	SM - Silty Sand	>G10

Notes: Data Reported above relates to sample tested.



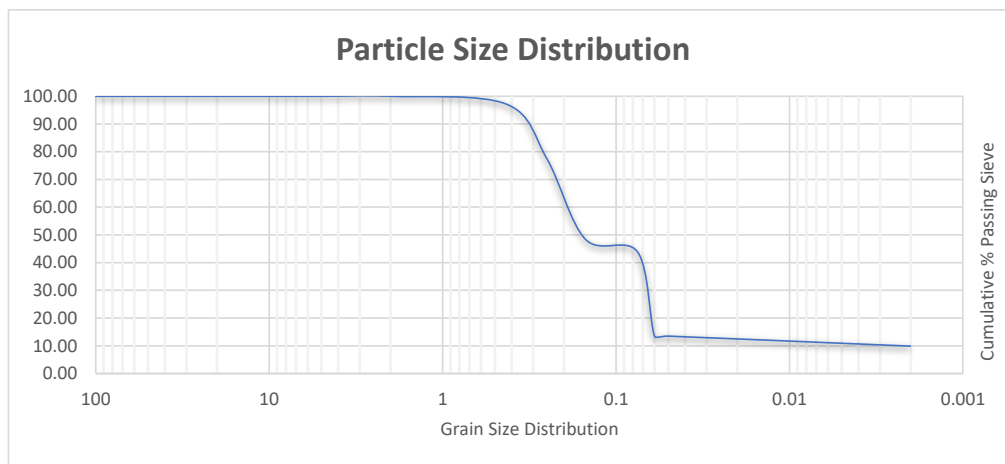
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TEST REPORT: SANS 3001- GR1 - GR12

Client Name:	0	Luhlaza Ref:	0
Client Address:	Khayelitsha, WC	Date Analysed:	19/11/2023
Project Name:	Makhaza Police Station	Technical Signatory	Richard Malungani
Attention:	0		

Excavation No.	TP2B
Depth of Sample Taken:	2,0-2,4
Material Class:	Soils and Gravels
Date Received.	22/09/2023
Description of Sample	Light Brown to White Silty Sand



Clay Activity Index (AI)

AI = $\frac{LL-PL}{40}$	
Clay (%)	0.00

Natural Moisture Content

Dry Sample: 500g	Container + Sample (Wet)	660
	Container + Sample (Dry)	630
	Moisture %	4.5

PH - EC - TDS - Temp (°C)

Potential Expansivity

pH	7.7	Low	X
EC (µS/cm)	151	Medium	
TDS (ppm)	45	High	
Temp (°C)	21.5	Organic or Waste	

Notes: Data Reported above relates to sample tested.



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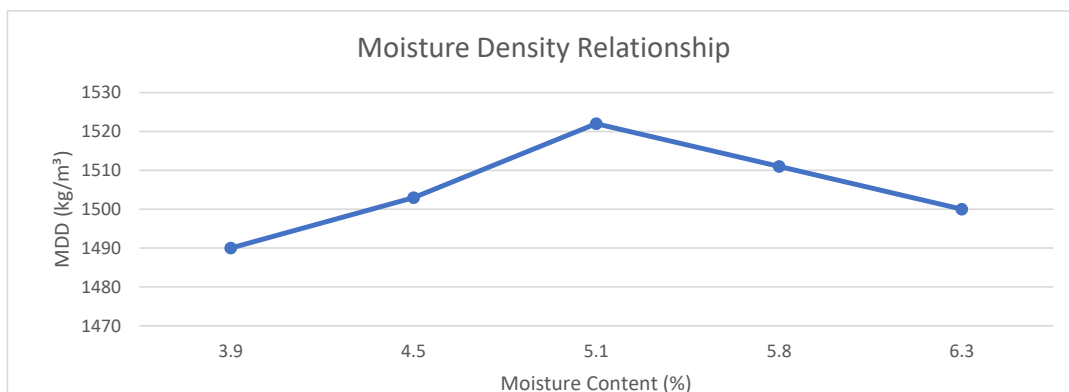
TEST REPORT: MOD AASHTO - SANS 3001 - GR31

Client Name:	0 Luhlaza Ref:	Jan-00
Client Address:	Khayelitsha, WC	Date Analysed: 19/11/2023
Project Name:	Makhaza Police Station	Technical Signatory: Richard Malungani
Attention:	0	

Excavation No.	TP2B
Depth of Sample Taken:	2,0-2,4
Material Class:	Soils and Gravels
Date Received.	22/09/2023
Description of Sample	Light Brown to White Silty Sand

TEST METHOD		MOD AASHTO
Mould No.	Moisture (%)	Dry Density (kg/m ³)
1	3.9	1490
2	4.5	1503
3	5.1	1522
4	5.8	1511
5	6.3	1500

Optimum Moisture Content (%) (OMC)	Maximum Dry density (kg/m ³) (MDD)
5.1	1522



Notes: Data Reported above relates to sample tested.



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TEST REPORT: CBR - SANS 3001 - GR40

Client Name:	0	Luhlaza Ref:	0
Client Address:	Khayelitsha, WC	Date Analysed:	8/5/2023
Project Name:	Makhaza Police Station	Technical Signatory	Richard Malungani
Attention:	0		

Excavation No.	TP2B
Depth of Sample Taken:	2,0-2,4
Material Class:	Soils and Gravels
Date Received.	22/09/2023
Description of Sample	Light Brown to White Silty Sand

Material Utilization - Earthworks Classification

Group A - Granular Soils	X
Group B - Low Plasticity Soils	
Group C - High Plasticity Soils	
Group D - Durable Rock	
Group E - Degradable Rock	
Group F - Topsoil	
Group G - Organic Soils	

CBR Final Results

CBR %

CBR @ 100% Compaction	5
CBR @ 98% Compaction	4
CBR @ 97% Compaction	4
CBR @ 95% Compaction	3
CBR @ 93% Compaction	2
CBR @ 90% Compaction	2
Swell @ 100% Compaction	0

Classification

TRH14

>G10

Swell

$$S = \frac{(k - l)}{127} \times 100$$

Where:

S = swell expressed as a percentage of the height of the moulded material before soaking i.e. 127mm

K = dial gauge reading after four days of soaking

L = dial gauge reading before soaking

NB: The swell is reported to the nearest first decimal point.

Notes: Data Reported above relates to sample tested.



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TEST REPORT: SANS 3001- GR1 - GR12

Client Name:		Luhlaza Ref:	
Area:	Khayelitsha, WC	Date Analysed:	19/11/2023
Project Name:	Makhaza Police Station	Technical Signatory	Richard Malungani
Attention:			
Sample No:		TP3C	
Depth of Sample Taken (m):		0,6-1,0	
Material Class:		Soils and Gravels	
Date Received:		22/09/2023	
Description of Sample		Light Brown to White Silty Sand	
Sieve Analysis (mm)	100.00	100.00	
	75.00	100.00	
	37.50	100.00	
	26.50	100.00	
	19.00	100.00	
	13.20	100.00	
	4.75	100.00	
	2.00	97.40	
	0.43	93.00	
	0.25	66.80	
	0.15	53.60	
	0.075	49.00	
	Hydrometer Analysis (mm)	0.060	17.05
0.050		16.16	
0.004		12.92	
0.002		12.04	
Classification		RAW	%
CLAY		16.164	17
SILT		32.836	32
SAND		48.400	48
GRAVEL		2.600	3
Atterberg Limit	LL%	21.9	
	P.I.	0.0	
	LS%	0.0	
	GM	0.61	
Classification	AASHTO	A-4 - Silty Soils	TRH14
	USCS	SM - Silty Sand	>G10

Notes: Data Reported above relates to sample tested.



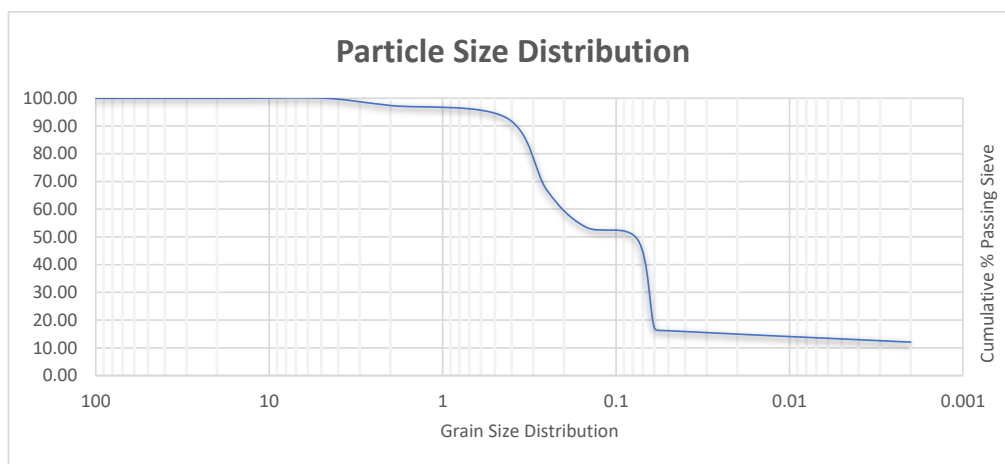
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TEST REPORT: SANS 3001- GR1 - GR12

Client Name:	0	Luhlaza Ref:	0
Client Address:	Khayelitsha, WC	Date Analysed:	19/11/2023
Project Name:	Makhaza Police Station	Technical Signatory	Richard Malungani
Attention:	0		

Excavation No.	TP3C
Depth of Sample Taken:	0,6-1,0
Material Class:	Soils and Gravels
Date Received.	22/09/2023
Description of Sample	Light Brown to White Silty Sand



Clay Activity Index (AI)

AI = $\frac{LL-PL}{Clay\ (\%)}$	0.00
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Natural Moisture Content

Dry Sample: 500g	Container + Sample (Wet)	660
	Container + Sample (Dry)	625
	Moisture %	5.3

PH - EC - TDS - Temp (°C)

Potential Expansivity

pH	8.1	Low	X
EC (µS/cm)	199	Medium	
TDS (ppm)	69	High	
Temp (°C)	22.1	Organic or Waste	

Notes: Data Reported above relates to sample tested.



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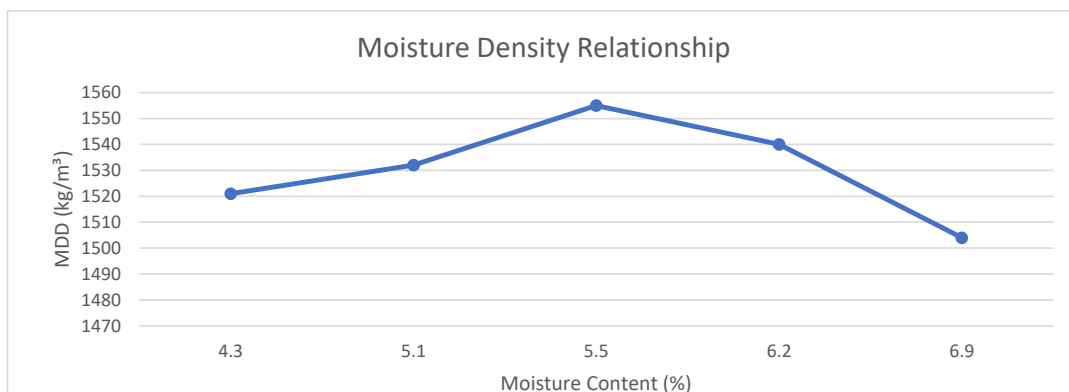
TEST REPORT: MOD AASHTO - SANS 3001 - GR31

Client Name:	0 Luhlaza Ref:	Jan-00
Client Address:	Khayelitsha, WC	Date Analysed: 19/11/2023
Project Name:	Makhaza Police Station	Technical Signatory Richard Malungani
Attention:	0	

Excavation No.	TP3C
Depth of Sample Taken:	0,6-1,0
Material Class:	Soils and Gravels
Date Received.	22/09/2023
Description of Sample	Light Brown to White Silty Sand

TEST METHOD		MOD AASHTO
Mould No.	Moisture (%)	Dry Density (kg/m ³)
1	4.3	1521
2	5.1	1532
3	5.5	1555
4	6.2	1540
5	6.9	1504

Optimum Moisture Content (%) (OMC)	Maximum Dry density (kg/m ³) (MDD)
5.5	1555



Notes: Data Reported above relates to sample tested.

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TEST REPORT: CBR - SANS 3001 - GR40

Client Name:	0	Luhlaza Ref:	0
Client Address:	Khayelitsha, WC	Date Analysed:	8/5/2023
Project Name:	Makhaza Police Station	Technical Signatory	Richard Malungani
Attention:	0		

Excavation No.	TP3C
Depth of Sample Taken:	0,6-1,0
Material Class:	Soils and Gravels
Date Received.	22/09/2023
Description of Sample	Light Brown to White Silty Sand

Material Utilization - Earthworks Classification

Group A - Granular Soils	X
Group B - Low Plasticity Soils	
Group C - High Plasticity Soils	
Group D - Durable Rock	
Group E - Degradable Rock	
Group F - Topsoil	
Group G - Organic Soils	

CBR Final Results**CBR %**

CBR @ 100% Compaction	4
CBR @ 98% Compaction	3
CBR @ 97% Compaction	3
CBR @ 95% Compaction	2
CBR @ 93% Compaction	1
CBR @ 90% Compaction	1
Swell @ 100% Compaction	0

Classification**TRH14****>G10****Swell**

$$S = \frac{(k - l)}{127} \times 100$$

Where:

S = swell expressed as a percentage of the height of the moulded material before soaking i.e. 127mm

K = dial gauge reading after four days of soaking

L = dial gauge reading before soaking

NB: The swell is reported to the nearest first decimal point.

Notes: Data Reported above relates to sample tested.



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TEST REPORT: SANS 3001- GR1 - GR12

Client Name:		Luhlaza Ref:	
Area: Khayelitsha, WC		Date Analysed: 19/11/2023	
Project Name: Makhaza Police Station		Technical Signatory Richard Malungani	
Attention:			
Sample No:		TP7D	
Depth of Sample Taken (m):		2,0-2,4	
Material Class:		Soils and Gravels	
Date Received:		22/09/2023	
Description of Sample		Light Brown to White Silty Sand	
Sieve Analysis (mm)	100.00	100.00	
	75.00	100.00	
	37.50	100.00	
	26.50	100.00	
	19.00	100.00	
	13.20	100.00	
	4.75	100.00	
	2.00	100.00	
	0.43	84.80	
	0.25	45.60	
	0.15	40.80	
	0.075	39.80	
	Hydrometer Analysis (mm)	0.060	12.26
0.050		11.51	
0.004		7.48	
0.002		7.48	
Classification		RAW	%
CLAY		11.513	12
SILT		28.287	28
SAND		60.200	60
GRAVEL		0.000	0
Atterberg Limit	LL%	20.7	
	P.I.	0.0	
	LS%	0.0	
	GM	0.75	
Classification	AASHTO	A-4 - Silty Soils	TRH14
	USCS	SM - Silty Sand	>G10

Notes: Data Reported above relates to sample tested.



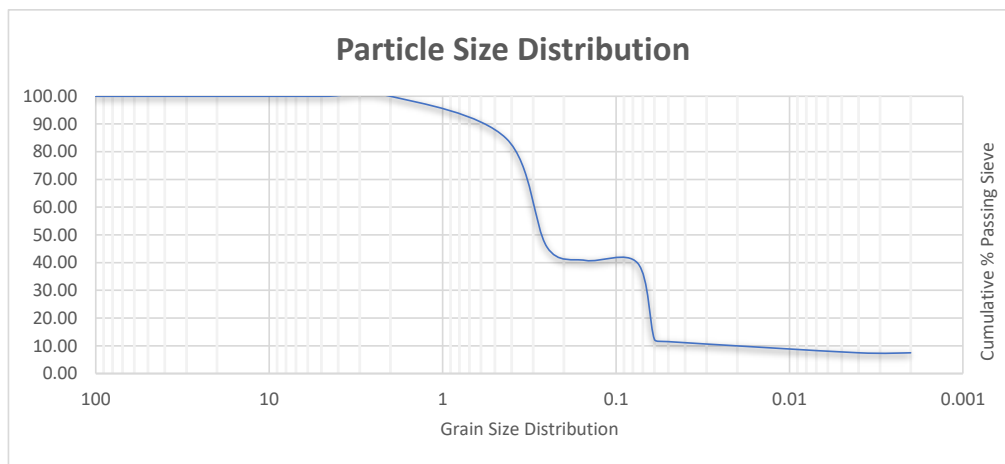
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TEST REPORT: SANS 3001- GR1 - GR12

Client Name:	0	Luhlaza Ref:	0
Client Address:	Khayelitsha, WC	Date Analysed:	19/11/2023
Project Name:	Makhaza Police Station	Technical Signatory	Richard Malungani
Attention:	0		

Excavation No.	TP7D
Depth of Sample Taken:	2,0-2,4
Material Class:	Soils and Gravels
Date Received.	22/09/2023
Description of Sample	Light Brown to White Silty Sand



Clay Activity Index (AI)

AI = $\frac{LL-PL}{40-PL}$	
Clay (%)	0.00

Natural Moisture Content

Dry Sample: 500g	Container + Sample (Wet)	660
	Container + Sample (Dry)	623
	Moisture %	5.6

PH - EC - TDS - Temp (°C)

Potential Expansivity

pH	7.3	Low	X
EC (µS/cm)	202	Medium	
TDS (ppm)	101	High	
Temp (°C)	21.8	Organic or Waste	

Notes: Data Reported above relates to sample tested.



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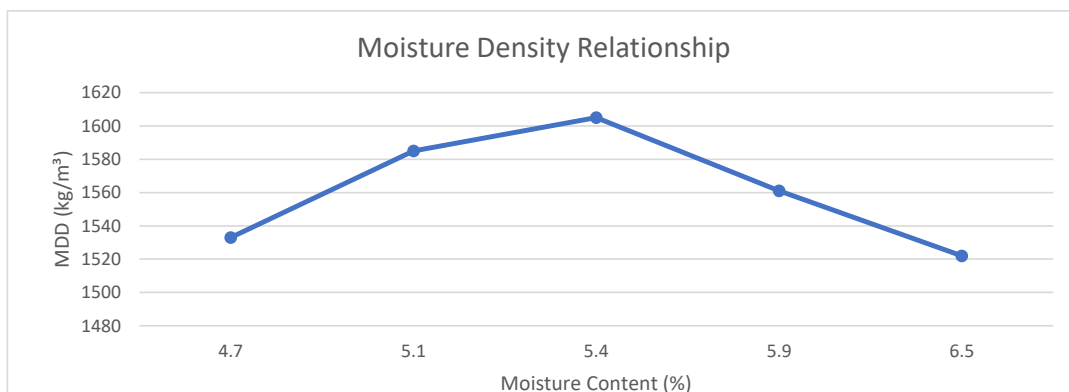
TEST REPORT: MOD AASHTO - SANS 3001 - GR31

Client Name:	0 Luhlaza Ref:	Jan-00
Client Address:	Khayelitsha, WC	Date Analysed: 19/11/2023
Project Name:	Makhaza Police Station	Technical Signatory: Richard Malungani
Attention:	0	

Excavation No.	TP7D
Depth of Sample Taken:	2,0-2,4
Material Class:	Soils and Gravels
Date Received.	22/09/2023
Description of Sample	Light Brown to White Silty Sand

TEST METHOD		MOD AASHTO
Mould No.	Moisture (%)	Dry Density (kg/m ³)
1	4.7	1533
2	5.1	1585
3	5.4	1605
4	5.9	1561
5	6.5	1522

Optimum Moisture Content (%) (OMC)	Maximum Dry density (kg/m ³) (MDD)
5.4	1605



Notes: Data Reported above relates to sample tested.

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TEST REPORT: CBR - SANS 3001 - GR40

Client Name:	0	Luhlaza Ref:	0
Client Address:	Khayelitsha, WC	Date Analysed:	8/5/2023
Project Name:	Makhaza Police Station	Technical Signatory	Richard Malungani
Attention:	0		

Excavation No.	TP7D
Depth of Sample Taken:	2,0-2,4
Material Class:	Soils and Gravels
Date Received.	22/09/2023
Description of Sample	Light Brown to White Silty Sand

Material Utilization - Earthworks Classification

Group A - Granular Soils	X
Group B - Low Plasticity Soils	
Group C - High Plasticity Soils	
Group D - Durable Rock	
Group E - Degradable Rock	
Group F - Topsoil	
Group G - Organic Soils	

CBR Final Results**CBR %**

CBR @ 100% Compaction	4
CBR @ 98% Compaction	4
CBR @ 97% Compaction	3
CBR @ 95% Compaction	2
CBR @ 93% Compaction	2
CBR @ 90% Compaction	1
Swell @ 100% Compaction	0

Classification**TRH14****>G10****Swell**

$$S = \frac{(k - l)}{127} \times 100$$

Where:

S = swell expressed as a percentage of the height of the moulded material before soaking i.e. 127mm

K = dial gauge reading after four days of soaking

L = dial gauge reading before soaking

NB: The swell is reported to the nearest first decimal point.

Notes: Data Reported above relates to sample tested.



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TEST REPORT: SANS 3001- GR1 - GR12

Client Name:		Luhlaza Ref:	
Area: Khayelitsha, WC		Date Analysed: 19/11/2023	
Project Name: Makhaza Police Station		Technical Signatory Richard Malungani	
Attention:			
Sample No:		TP8E	
Depth of Sample Taken (m):		0,5-0,9	
Material Class:		Soils and Gravels	
Date Received:		22/09/2023	
Description of Sample		Light Brown to White Silty Sand	
Sieve Analysis (mm)	100.00	100.00	
	75.00	100.00	
	37.50	100.00	
	26.50	100.00	
	19.00	100.00	
	13.20	100.00	
	4.75	100.00	
	2.00	97.80	
	0.43	86.60	
	0.25	59.40	
	0.15	48.60	
	0.075	47.40	
	Hydrometer Analysis (mm)	0.060	13.65
0.050		13.65	
0.004		10.59	
0.002		9.74	
Classification		RAW	%
CLAY		13.651	14
SILT		33.749	34
SAND		50.400	50
GRAVEL		2.200	2
Atterberg Limit	LL%	23.1	
	P.I.	0.0	
	LS%	0.0	
	GM	0.68	
Classification	AASHTO	A-4 - Silty Soils	TRH14
	USCS	SM - Silty Sand	>G10

Notes: Data Reported above relates to sample tested.



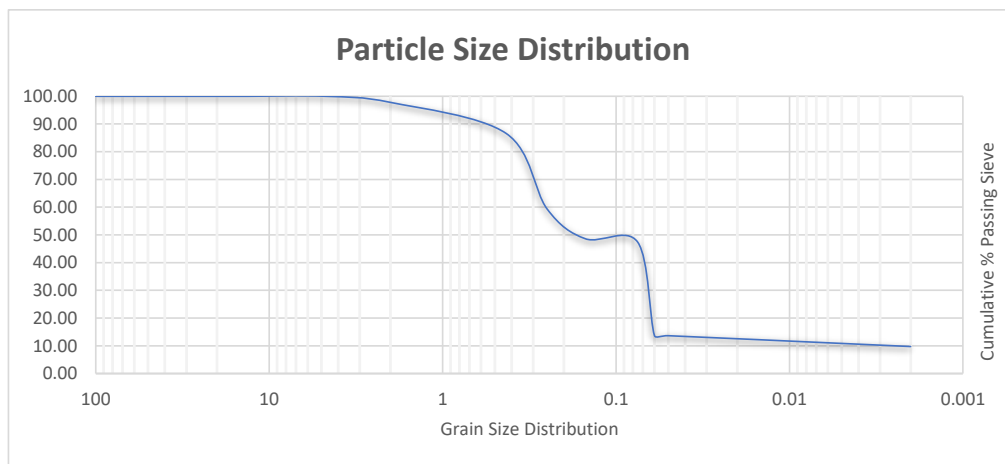
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TEST REPORT: SANS 3001- GR1 - GR12

Client Name:	0	Luhlaza Ref:	0
Client Address:	Khayelitsha, WC	Date Analysed:	19/11/2023
Project Name:	Makhaza Police Station	Technical Signatory	Richard Malungani
Attention:	0		

Excavation No.	TP8E
Depth of Sample Taken:	0,5-0,9
Material Class:	Soils and Gravels
Date Received.	22/09/2023
Description of Sample	Light Brown to White Silty Sand



Clay Activity Index (AI)

AI = $\frac{LL-PL}{40}$		
Clay (%)	0.00	

Natural Moisture Content

Dry Sample: 500g	Container + Sample (Wet)	660
	Container + Sample (Dry)	620
	Moisture %	6.1

PH - EC - TDS - Temp (°C)

Potential Expansivity

pH	6.9	Low	X
EC (µS/cm)	233	Medium	
TDS (ppm)	121	High	
Temp (°C)	22.5	Organic or Waste	

Notes: Data Reported above relates to sample tested.



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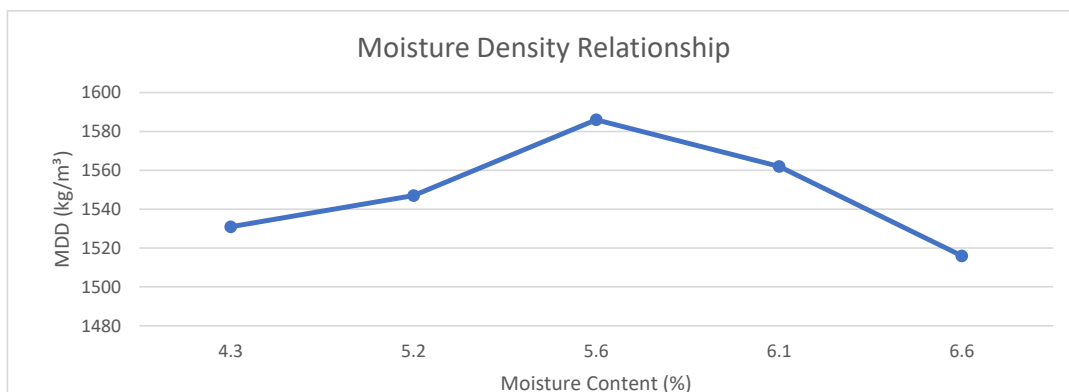
TEST REPORT: MOD AASHTO - SANS 3001 - GR31

Client Name:	0 Luhlaza Ref:	Jan-00
Client Address:	Khayelitsha, WC	Date Analysed: 19/11/2023
Project Name:	Makhaza Police Station	Technical Signatory: Richard Malungani
Attention:	0	

Excavation No.	TP8E
Depth of Sample Taken:	0,5-0,9
Material Class:	Soils and Gravels
Date Received.	22/09/2023
Description of Sample	Light Brown to White Silty Sand

TEST METHOD		MOD AASHTO
Mould No.	Moisture (%)	Dry Density (kg/m ³)
1	4.3	1531
2	5.2	1547
3	5.6	1586
4	6.1	1562
5	6.6	1516

Optimum Moisture Content (%) (OMC)	Maximum Dry density (kg/m ³) (MDD)
5.6	1586



Notes: Data Reported above relates to sample tested.

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TEST REPORT: CBR - SANS 3001 - GR40

Client Name:	0	Luhlaza Ref:	0
Client Address:	Khayelitsha, WC	Date Analysed:	8/5/2023
Project Name:	Makhaza Police Station	Technical Signatory	Richard Malungani
Attention:	0		

Excavation No.	TP8E
Depth of Sample Taken:	0,5-0,9
Material Class:	Soils and Gravels
Date Received.	22/09/2023
Description of Sample	Light Brown to White Silty Sand

Material Utilization - Earthworks Classification

Group A - Granular Soils	X
Group B - Low Plasticity Soils	
Group C - High Plasticity Soils	
Group D - Durable Rock	
Group E - Degradable Rock	
Group F - Topsoil	
Group G - Organic Soils	

CBR Final Results**CBR %**

CBR @ 100% Compaction	4
CBR @ 98% Compaction	4
CBR @ 97% Compaction	3
CBR @ 95% Compaction	2
CBR @ 93% Compaction	1
CBR @ 90% Compaction	1
Swell @ 100% Compaction	0

Classification**TRH14****>G10****Swell**

$$S = \frac{(k - l)}{127} \times 100$$

Where:

S = swell expressed as a percentage of the height of the moulded material before soaking i.e. 127mm

K = dial gauge reading after four days of soaking

L = dial gauge reading before soaking

NB: The swell is reported to the nearest first decimal point.

Notes: Data Reported above relates to sample tested.



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TEST REPORT: SANS 3001- GR1 - GR12

Client Name:		Luhlaza Ref:	
Area: Khayelitsha, WC		Date Analysed: 19/11/2023	
Project Name: Makhaza Police Station		Technical Signatory Richard Malungani	
Attention:			
Sample No:		TP10F	
Depth of Sample Taken (m):		0,5-0,9	
Material Class:		Soils and Gravels	
Date Received:		22/09/2023	
Description of Sample		Light Brown to White Silty Sand	
Sieve Analysis (mm)	100.00	100.00	
	75.00	100.00	
	37.50	100.00	
	26.50	100.00	
	19.00	100.00	
	13.20	100.00	
	4.75	100.00	
	2.00	100.00	
	0.43	95.60	
	0.25	62.20	
	0.15	54.00	
	0.075	52.40	
	Hydrometer Analysis (mm)	0.060	19.28
0.050		18.35	
0.004		14.04	
0.002		14.04	
Classification		RAW	%
CLAY		18.350	19
SILT		34.050	33
SAND		47.600	48
GRAVEL		0.000	0
Atterberg Limit	LL%	19.9	
	P.I.	0.0	
	LS%	0.0	
	GM	0.52	
Classification	AASHTO	A-4 - Silty Soils	TRH14
	USCS	SM - Silty Sand	G10

Notes: Data Reported above relates to sample tested.

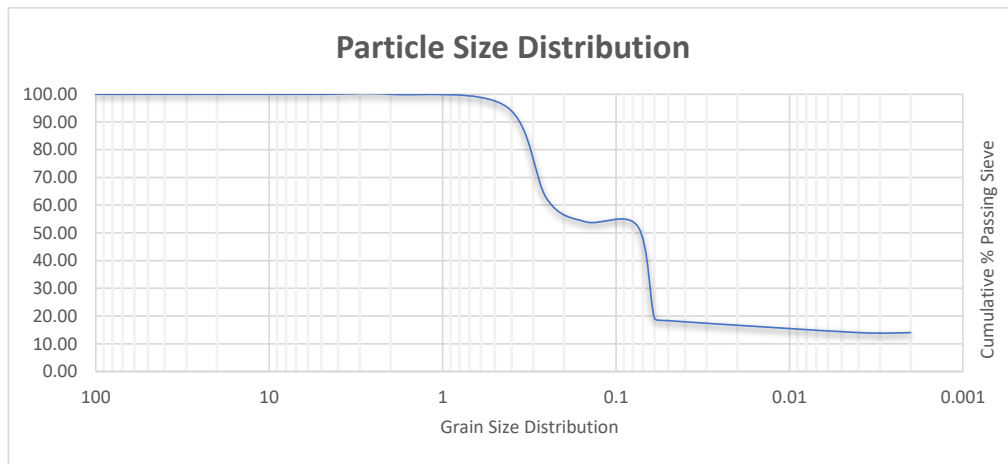


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TEST REPORT: SANS 3001- GR1 - GR12

Client Name:		0 Luhlaza Ref:	0
Client Address:	Khayelitsha, WC	Date Analysed:	19/11/2023
Project Name:	Makhaza Police Station	0 Technical Signatory	Richard Malungani
Attention:			

Excavation No.	TP10F
Depth of Sample Taken:	0,5-0,9
Material Class:	Soils and Gravels
Date Received.	22/09/2023
Description of Sample	Light Brown to White Silty Sand



Clay Activity Index (AI)

AI = $\frac{LL-PL}{100}$	
Clay (%)	0.00

Natural Moisture Content

Dry Sample: 500g	Container + Sample (Wet)	660
	Container + Sample (Dry)	618
	Moisture %	6.4

PH - EC - TDS - Temp (°C)

Potential Expansivity

pH	8.3	Low	X
EC (µS/cm)	167	Medium	
TDS (ppm)	92	High	
Temp (°C)	22.5	Organic or Waste	

Notes: Data Reported above relates to sample tested.



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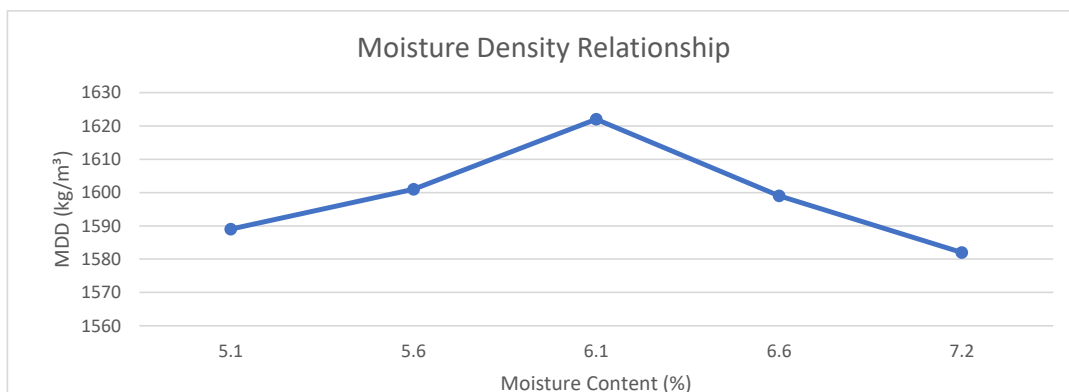
TEST REPORT: MOD AASHTO - SANS 3001 - GR31

Client Name:	0 Luhlaza Ref:	Jan-00
Client Address:	Khayelitsha, WC	Date Analysed: 19/11/2023
Project Name:	Makhaza Police Station	Technical Signatory Richard Malungani
Attention:	0	

Excavation No.	TP10F
Depth of Sample Taken:	0,5-0,9
Material Class:	Soils and Gravels
Date Received.	22/09/2023
Description of Sample	Light Brown to White Silty Sand

TEST METHOD		MOD AASHTO
Mould No.	Moisture (%)	Dry Density (kg/m ³)
1	5.1	1589
2	5.6	1601
3	6.1	1622
4	6.6	1599
5	7.2	1582

Optimum Moisture Content (%) (OMC)	Maximum Dry density (kg/m ³) (MDD)
6.1	1622



Notes: Data Reported above relates to sample tested.

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TEST REPORT: CBR - SANS 3001 - GR40

Client Name:	0	Luhlaza Ref:	0
Client Address:	Khayelitsha, WC	Date Analysed:	8/5/2023
Project Name:	Makhaza Police Station	Technical Signatory	Richard Malungani
Attention:	0		

Excavation No.	TP10F
Depth of Sample Taken:	0,5-0,9
Material Class:	Soils and Gravels
Date Received.	22/09/2023
Description of Sample	Light Brown to White Silty Sand

Material Utilization - Earthworks Classification

Group A - Granular Soils	X
Group B - Low Plasticity Soils	
Group C - High Plasticity Soils	
Group D - Durable Rock	
Group E - Degradable Rock	
Group F - Topsoil	
Group G - Organic Soils	

CBR Final Results**CBR %**

CBR @ 100% Compaction	6
CBR @ 98% Compaction	5
CBR @ 97% Compaction	5
CBR @ 95% Compaction	4
CBR @ 93% Compaction	3
CBR @ 90% Compaction	2
Swell @ 100% Compaction	0

Classification**TRH14****G10****Swell**

$$S = \frac{(k - l)}{127} \times 100$$

Where:

S = swell expressed as a percentage of the height of the moulded material before soaking i.e. 127mm

K = dial gauge reading after four days of soaking

L = dial gauge reading before soaking

NB: The swell is reported to the nearest first decimal point.

Notes: Data Reported above relates to sample tested.



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TEST REPORT: SANS 3001- GR1 - GR12

Client Name:		Luhlaza Ref:	
Area: Khayelitsha, WC		Date Analysed: 19/11/2023	
Project Name: Makhaza Police Station		Technical Signatory Richard Malungani	
Attention:			
Sample No:		TP11G	
Depth of Sample Taken (m):		1,8-2,2	
Material Class:		Soils and Gravels	
Date Received:		22/09/2023	
Description of Sample		Light Brown to White Silty Sand	
Sieve Analysis (mm)	100.00	100.00	
	75.00	100.00	
	37.50	100.00	
	26.50	100.00	
	19.00	100.00	
	13.20	100.00	
	4.75	100.00	
	2.00	99.00	
	0.43	92.80	
	0.25	32.20	
	0.15	28.60	
	0.075	27.00	
	Hydrometer Analysis (mm)	0.060	8.86
0.050		8.36	
0.004		5.62	
0.002		5.62	
Classification		RAW	%
CLAY		8.359	9
SILT		18.641	18
SAND		72.000	72
GRAVEL		1.000	1
Atterberg Limit	LL%	23.7	
	P.I.	0.0	
	LS%	0.0	
	GM	0.81	
Classification	AASHTO	A-4 - Silty Soils	TRH14
	USCS	SM - Silty Sand	>G10

Notes: Data Reported above relates to sample tested.

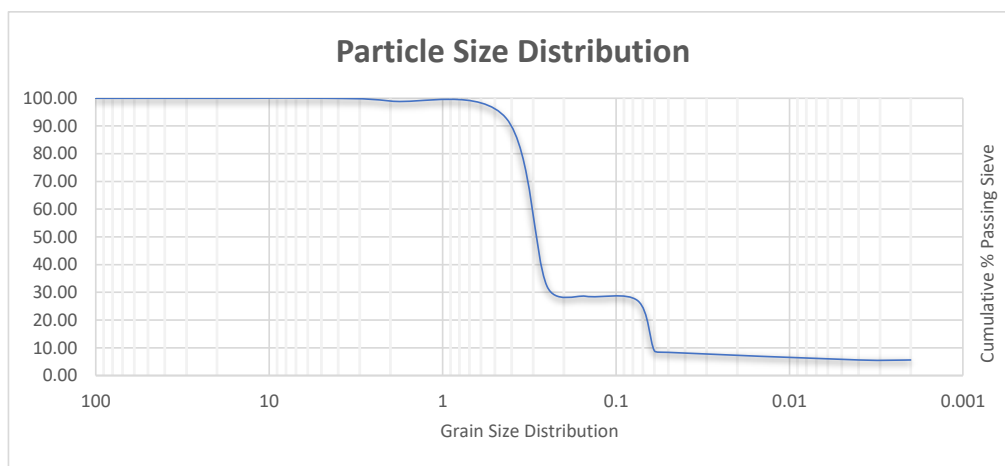


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TEST REPORT: SANS 3001- GR1 - GR12

Client Name:		0 Luhlaza Ref:	0
Client Address:	Khayelitsha, WC	Date Analysed:	19/11/2023
Project Name:	Makhaza Police Station	0 Technical Signatory	Richard Malungani
Attention:			

Excavation No.	TP11G
Depth of Sample Taken:	1,8-2,2
Material Class:	Soils and Gravels
Date Received.	22/09/2023
Description of Sample	Light Brown to White Silty Sand



Clay Activity Index (AI)

AI = $\frac{LL-PL}{100}$	
Clay (%)	0.00

Natural Moisture Content

Dry Sample: 500g	Container + Sample (Wet)	660
	Container + Sample (Dry)	621
	Moisture %	5.9

PH - EC - TDS - Temp (°C)

Potential Expansivity

pH	7.4	Low	X
EC (µS/cm)	155	Medium	
TDS (ppm)	56	High	
Temp (°C)	22.5	Organic or Waste	

Notes: Data Reported above relates to sample tested.



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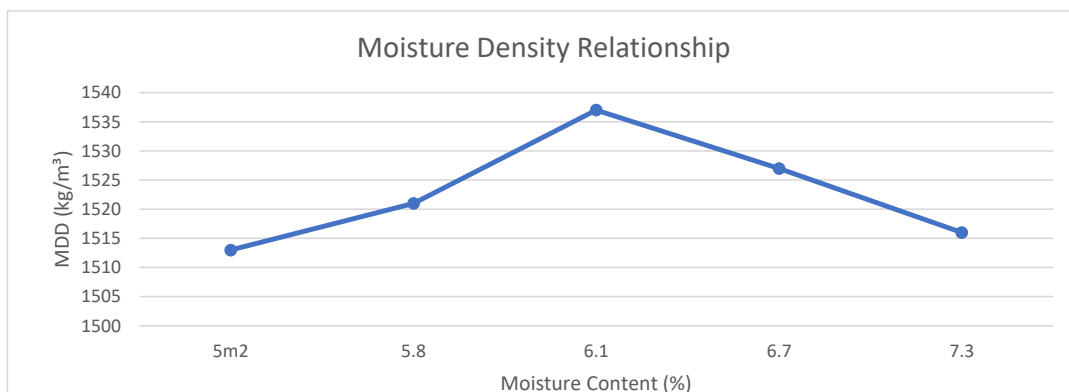
TEST REPORT: MOD AASHTO - SANS 3001 - GR31

Client Name:	0 Luhlaza Ref:	Jan-00
Client Address:	Khayelitsha, WC	Date Analysed: 19/11/2023
Project Name:	Makhaza Police Station	Technical Signatory: Richard Malungani
Attention:	0	

Excavation No.	TP11G
Depth of Sample Taken:	1,8-2,2
Material Class:	Soils and Gravels
Date Received.	22/09/2023
Description of Sample	Light Brown to White Silty Sand

TEST METHOD		MOD AASHTO
Mould No.	Moisture (%)	Dry Density (kg/m ³)
1	5m2	1513
2	5.8	1521
3	6.1	1537
4	6.7	1527
5	7.3	1516

Optimum Moisture Content (%) (OMC)	Maximum Dry density (kg/m ³) (MDD)
6.1	1537



Notes: Data Reported above relates to sample tested.



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TEST REPORT: CBR - SANS 3001 - GR40

Client Name:	0	Luhlaza Ref:	0
Client Address:	Khayelitsha, WC	Date Analysed:	8/5/2023
Project Name:	Makhaza Police Station	Technical Signatory	Richard Malungani
Attention:	0		

Excavation No.	TP11G
Depth of Sample Taken:	1,8-2,2
Material Class:	Soils and Gravels
Date Received.	22/09/2023
Description of Sample	Light Brown to White Silty Sand

Material Utilization - Earthworks Classification

Group A - Granular Soils	X
Group B - Low Plasticity Soils	
Group C - High Plasticity Soils	
Group D - Durable Rock	
Group E - Degradable Rock	
Group F - Topsoil	
Group G - Organic Soils	

CBR Final Results

CBR %

CBR @ 100% Compaction	4
CBR @ 98% Compaction	4
CBR @ 97% Compaction	3
CBR @ 95% Compaction	2
CBR @ 93% Compaction	2
CBR @ 90% Compaction	1
Swell @ 100% Compaction	0

Classification

TRH14

>G10

Swell

$$S = \frac{(k - l)}{127} \times 100$$

Where:

S = swell expressed as a percentage of the height of the moulded material before soaking i.e. 127mm

K = dial gauge reading after four days of soaking

L = dial gauge reading before soaking

NB: The swell is reported to the nearest first decimal point.

Notes: Data Reported above relates to sample tested.



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TEST REPORT: SANS 3001- GR1 - GR12

Client Name:		Luhlaza Ref:	
Area:	Khayelitsha, WC	Date Analysed:	19/11/2023
Project Name:	Makhaza Police Station	Technical Signatory	Richard Malungani
Attention:			
Sample No:		TP12H	
Depth of Sample Taken (m):		0,6-1,0	
Material Class:		Soils and Gravels	
Date Received:		22/09/2023	
Description of Sample		Light Brown to White Silty Sand	
Sieve Analysis (mm)	100.00	100.00	
	75.00	100.00	
	37.50	100.00	
	26.50	100.00	
	19.00	100.00	
	13.20	100.00	
	4.75	100.00	
	2.00	99.80	
	0.43	90.00	
	0.25	59.60	
	0.15	55.00	
	0.075	52.60	
	Hydrometer Analysis (mm)	0.060	19.36
0.050		18.42	
0.004		14.94	
0.002		13.98	
Classification		RAW	%
CLAY		18.420	19
SILT		34.180	33
SAND		47.200	47
GRAVEL		0.200	0
Atterberg Limit	LL%	22.3	
	P.I.	0.0	
	LS%	0.0	
	GM	0.58	
Classification	AASHTO	A-4 - Silty Soils	TRH14
	USCS	SM - Silty Sand	>G10

Notes: Data Reported above relates to sample tested.



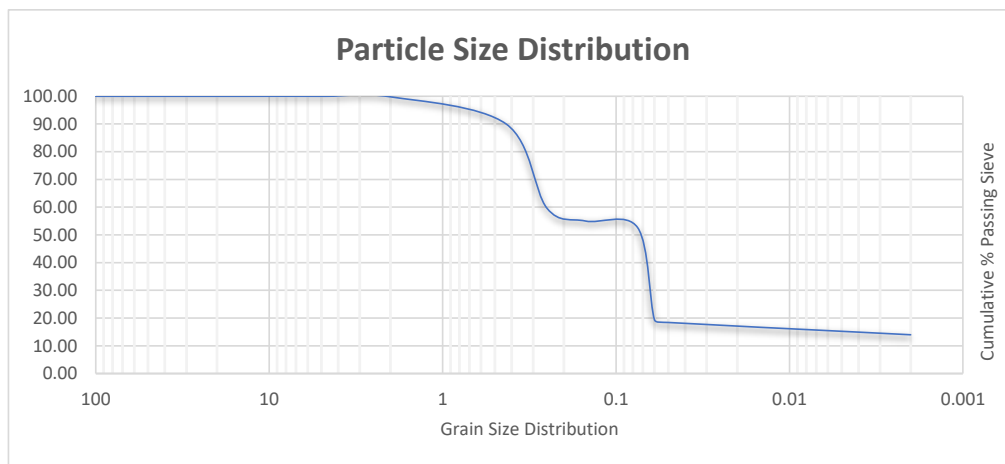
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TEST REPORT: SANS 3001- GR1 - GR12

Client Name:	0	Luhlaza Ref:	0
Client Address:	Khayelitsha, WC	Date Analysed:	19/11/2023
Project Name:	Makhaza Police Station	Technical Signatory	Richard Malungani
Attention:	0		

Excavation No.	TP12H
Depth of Sample Taken:	0,6-1,0
Material Class:	Soils and Gravels
Date Received.	22/09/2023
Description of Sample	Light Brown to White Silty Sand



Clay Activity Index (AI)

AI = $\frac{LL-PL}{40}$		
Clay (%)	0.00	

Natural Moisture Content

Dry Sample: 500g	Container + Sample (Wet)	660
	Container + Sample (Dry)	618
	Moisture %	6.4

PH - EC - TDS - Temp (°C)

Potential Expansivity

pH	8.2	Low	X
EC (µS/cm)	183	Medium	
TDS (ppm)	62	High	
Temp (°C)	22.9	Organic or Waste	

Notes: Data Reported above relates to sample tested.



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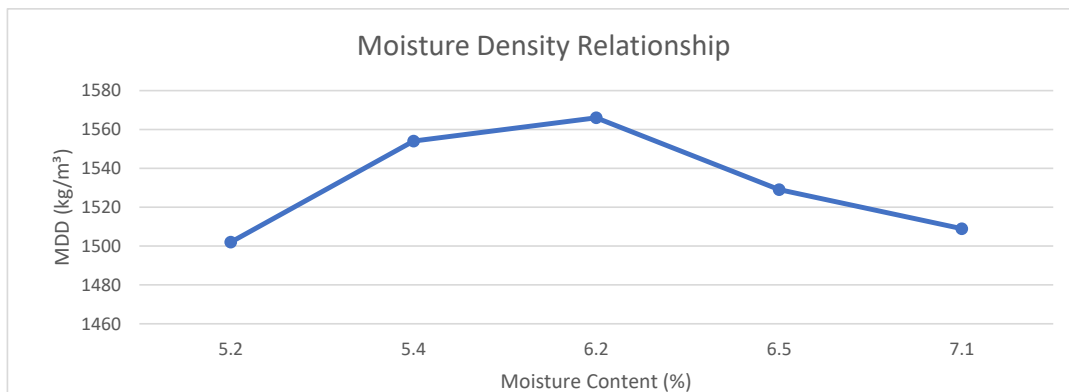
TEST REPORT: MOD AASHTO - SANS 3001 - GR31

Client Name:	0	Luhlaza Ref:	Jan-00
Client Address:	Khayelitsha, WC	Date Analysed:	19/11/2023
Project Name:	Makhaza Police Station	Technical Signatory	Richard Malungani
Attention:	0		

Excavation No.	TP12H
Depth of Sample Taken:	0,6-1,0
Material Class:	Soils and Gravels
Date Received.	22/09/2023
Description of Sample	Light Brown to White Silty Sand

TEST METHOD		MOD AASHTO
Mould No.	Moisture (%)	Dry Density (kg/m ³)
1	5.2	1502
2	5.4	1554
3	6.2	1566
4	6.5	1529
5	7.1	1509

Optimum Moisture Content (%) (OMC)	Maximum Dry density (kg/m ³) (MDD)
6.2	1566



Notes: Data Reported above relates to sample tested.



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TEST REPORT: CBR - SANS 3001 - GR40

Client Name:	0	Luhlaza Ref:	0
Client Address:	Khayelitsha, WC	Date Analysed:	8/5/2023
Project Name:	Makhaza Police Station	Technical Signatory	Richard Malungani
Attention:	0		

Excavation No.	TP12H
Depth of Sample Taken:	0,6-1,0
Material Class:	Soils and Gravels
Date Received.	22/09/2023
Description of Sample	Light Brown to White Silty Sand

Material Utilization - Earthworks Classification

Group A - Granular Soils	X
Group B - Low Plasticity Soils	
Group C - High Plasticity Soils	
Group D - Durable Rock	
Group E - Degradable Rock	
Group F - Topsoil	
Group G - Organic Soils	

CBR Final Results

CBR %

CBR @ 100% Compaction	5
CBR @ 98% Compaction	4
CBR @ 97% Compaction	3
CBR @ 95% Compaction	3
CBR @ 93% Compaction	2
CBR @ 90% Compaction	1
Swell @ 100% Compaction	0

Classification

TRH14

>G10

Swell

$$S = \frac{(k - l)}{127} \times 100$$

Where:

S = swell expressed as a percentage of the height of the moulded material before soaking i.e. 127mm

K = dial gauge reading after four days of soaking

L = dial gauge reading before soaking

NB: The swell is reported to the nearest first decimal point.

Notes: Data Reported above relates to sample tested.



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TEST REPORT: SANS 3001- GR1 - GR12

Client Name:		Luhlaza Ref:	
Area:	Khayelitsha, WC	Date Analysed:	19/11/2023
Project Name:	Makhaza Police Station	Technical Signatory	Richard Malungani
Attention:			
Sample No:		TP171	
Depth of Sample Taken (m):		1,8-2,0	
Material Class:		Soils and Gravels	
Date Received:		22/09/2023	
Description of Sample		Light Brown to White Silty Sand	
Sieve Analysis (mm)	100.00	100.00	
	75.00	100.00	
	37.50	100.00	
	26.50	100.00	
	19.00	100.00	
	13.20	100.00	
	4.75	100.00	
	2.00	99.00	
	0.43	82.80	
	0.25	51.40	
	0.15	44.60	
	0.075	42.80	
Hydrometer Analysis (mm)	0.060	14.89	
	0.050	14.12	
	0.004	10.61	
	0.002	10.61	
Classification		RAW	%
CLAY		14.119	15
SILT		28.681	28
SAND		56.200	56
GRAVEL		1.000	1
Atterberg Limit	LL%	19.9	
	P.I.	0.0	
	LS%	0.0	
	GM	0.75	
Classification	AASHTO	A-4 - Silty Soils	TRH14
	USCS	SM - Silty Sand	>G10

Notes: Data Reported above relates to sample tested.

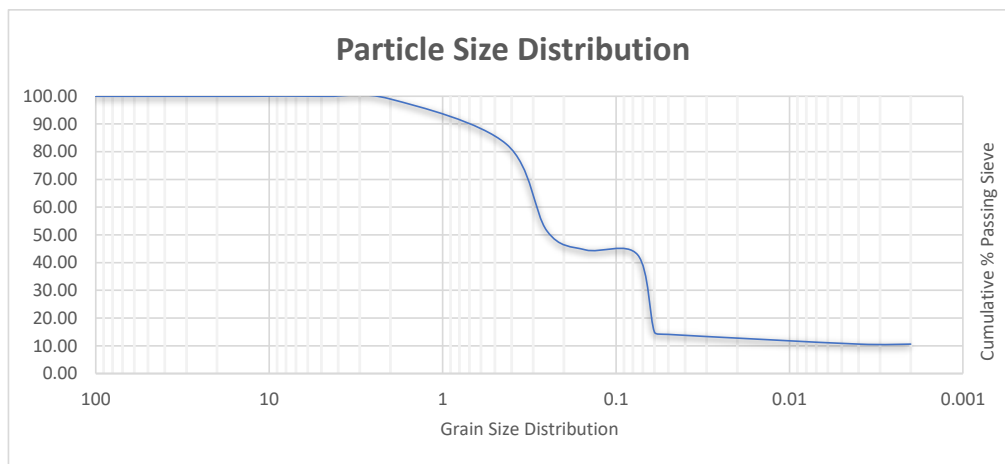


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TEST REPORT: SANS 3001- GR1 - GR12

Client Name:		0 Luhlaza Ref:	0
Client Address:	Khayelitsha, WC	Date Analysed:	19/11/2023
Project Name:	Makhaza Police Station	0 Technical Signatory	Richard Malungani
Attention:			

Excavation No.	TP17I
Depth of Sample Taken:	1,8-2,0
Material Class:	Soils and Gravels
Date Received.	22/09/2023
Description of Sample	Light Brown to White Silty Sand



Clay Activity Index (AI)

AI = $\frac{LL-PL}{100}$	
Clay (%)	0.00

Natural Moisture Content

Dry Sample: 500g	Container + Sample (Wet)	660
	Container + Sample (Dry)	628
	Moisture %	4.8

PH - EC - TDS - Temp (°C)

Potential Expansivity

pH	7.8	Low	X
EC (µS/cm)	162	Medium	
TDS (ppm)	39	High	
Temp (°C)	22.3	Organic or Waste	

Notes: Data Reported above relates to sample tested.



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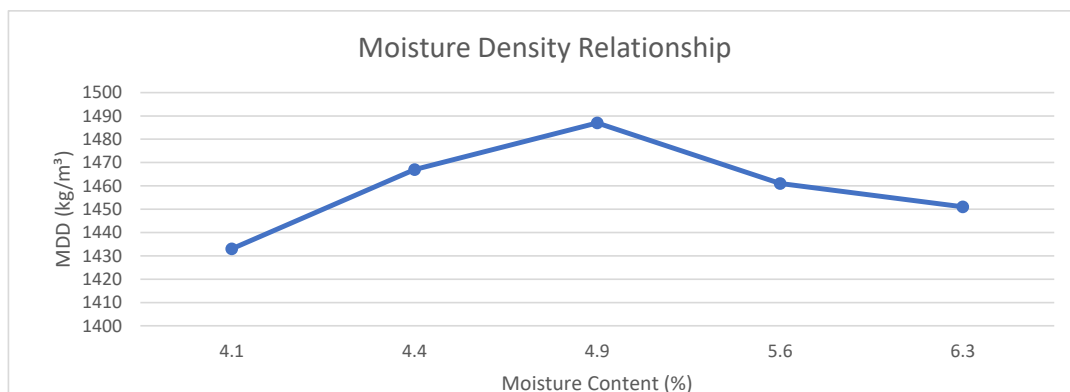
TEST REPORT: MOD AASHTO - SANS 3001 - GR31

Client Name:	0	Luhlaza Ref:	Jan-00
Client Address:	Khayelitsha, WC	Date Analysed:	19/11/2023
Project Name:	Makhaza Police Station	Technical Signatory	Richard Malungani
Attention:	0		

Excavation No.	TP171
Depth of Sample Taken:	1,8-2,0
Material Class:	Soils and Gravels
Date Received.	22/09/2023
Description of Sample	Light Brown to White Silty Sand

TEST METHOD		MOD AASHTO
Mould No.	Moisture (%)	Dry Density (kg/m ³)
1	4.1	1433
2	4.4	1467
3	4.9	1487
4	5.6	1461
5	6.3	1451

Optimum Moisture Content (%) (OMC)	Maximum Dry density (kg/m ³) (MDD)
4.9	1487



Notes: Data Reported above relates to sample tested.



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TEST REPORT: CBR - SANS 3001 - GR40

Client Name:	0	Luhlaza Ref:	0
Client Address:	Khayelitsha, WC	Date Analysed:	8/5/2023
Project Name:	Makhaza Police Station	Technical Signatory	Richard Malungani
Attention:	0		

Excavation No.	TP171
Depth of Sample Taken:	1,8-2,0
Material Class:	Soils and Gravels
Date Received.	22/09/2023
Description of Sample	Light Brown to White Silty Sand

Material Utilization - Earthworks Classification

Group A - Granular Soils	X
Group B - Low Plasticity Soils	
Group C - High Plasticity Soils	
Group D - Durable Rock	
Group E - Degradable Rock	
Group F - Topsoil	
Group G - Organic Soils	

CBR Final Results

CBR %

CBR @ 100% Compaction	4
CBR @ 98% Compaction	3
CBR @ 97% Compaction	3
CBR @ 95% Compaction	2
CBR @ 93% Compaction	1
CBR @ 90% Compaction	1
Swell @ 100% Compaction	0

Classification

TRH14

>G10

Swell

$$S = \frac{(k - l)}{127} \times 100$$

Where:

S = swell expressed as a percentage of the height of the moulded material before soaking i.e. 127mm

K = dial gauge reading after four days of soaking

L = dial gauge reading before soaking

NB: The swell is reported to the nearest first decimal point.

Notes: Data Reported above relates to sample tested.



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TEST REPORT: SANS 3001- GR1 - GR12

Client Name:		Luhlaza Ref:	
Area: Khayelitsha, WC		Date Analysed: 19/11/2023	
Project Name: Makhaza Police Station		Technical Signatory Richard Malungani	
Attention:			
Sample No:		TP18J	
Depth of Sample Taken (m):		0,6-0,9	
Material Class:		Soils and Gravels	
Date Received:		22/09/2023	
Description of Sample		Light Brown to White Silty Sand	
Sieve Analysis (mm)	100.00	100.00	
	75.00	100.00	
	37.50	100.00	
	26.50	100.00	
	19.00	100.00	
	13.20	100.00	
	4.75	100.00	
	2.00	100.00	
	0.43	95.60	
	0.25	65.40	
	0.15	59.00	
	0.075	56.80	
	Hydrometer Analysis (mm)	0.060	16.36
0.050		16.36	
0.004		10.39	
0.002		9.39	
Classification		RAW	%
CLAY		16.358	16
SILT		40.442	40
SAND		43.200	43
GRAVEL		0.000	0
Atterberg Limit	LL%	24.1	
	P.I.	0.0	
	LS%	0.0	
	GM	0.48	
Classification	AASHTO	A-4 - Silty Soils	TRH14
	USCS	SM - Silty Sand	>G10

Notes: Data Reported above relates to sample tested.

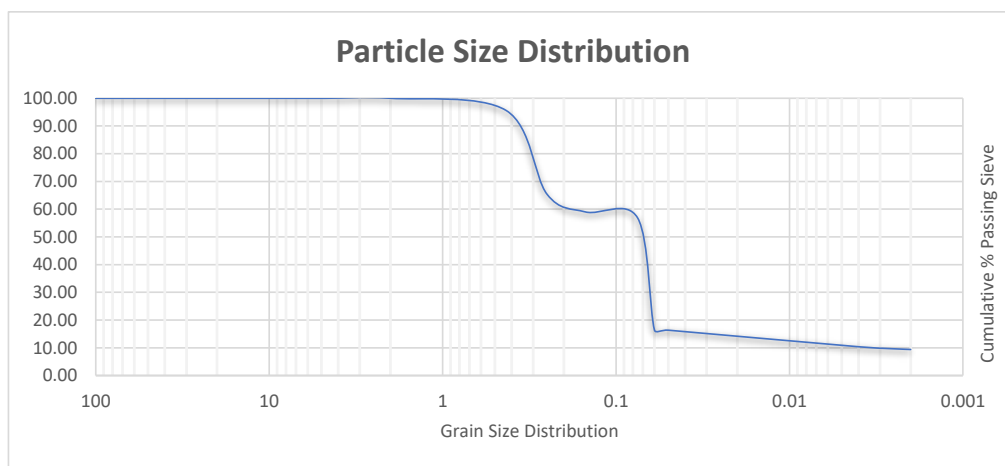


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TEST REPORT: SANS 3001- GR1 - GR12

Client Name:		0 Luhlaza Ref:	0
Client Address:	Khayelitsha, WC	Date Analysed:	19/11/2023
Project Name:	Makhaza Police Station	0 Technical Signatory	Richard Malungani
Attention:			

Excavation No.	TP18J
Depth of Sample Taken:	0,6-0,9
Material Class:	Soils and Gravels
Date Received.	22/09/2023
Description of Sample	Light Brown to White Silty Sand



Clay Activity Index (AI)

AI = $\frac{LL-PL}{100}$	
Clay (%)	0.00

Natural Moisture Content

Dry Sample: 500g	Container + Sample (Wet)	660
	Container + Sample (Dry)	627
	Moisture %	5.0

PH - EC - TDS - Temp (°C)

Potential Expansivity

pH	6.8	Low	X
EC (µS/cm)	141	Medium	
TDS (ppm)	32	High	
Temp (°C)	21.1	Organic or Waste	

Notes: Data Reported above relates to sample tested.



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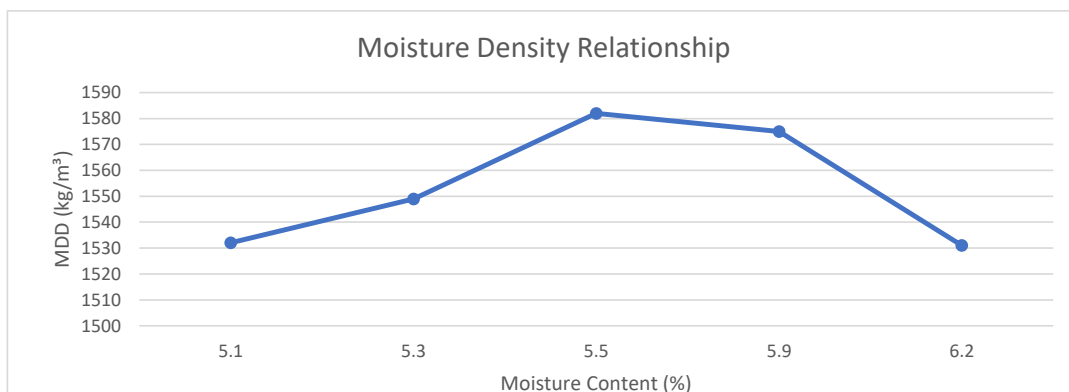
TEST REPORT: MOD AASHTO - SANS 3001 - GR31

Client Name:	0 Luhlaza Ref:	Jan-00
Client Address:	Khayelitsha, WC	Date Analysed: 19/11/2023
Project Name:	Makhaza Police Station	Technical Signatory: Richard Malungani
Attention:	0	

Excavation No.	TP18J
Depth of Sample Taken:	0,6-0,9
Material Class:	Soils and Gravels
Date Received.	22/09/2023
Description of Sample	Light Brown to White Silty Sand

TEST METHOD		MOD AASHTO
Mould No.	Moisture (%)	Dry Density (kg/m ³)
1	5.1	1532
2	5.3	1549
3	5.5	1582
4	5.9	1575
5	6.2	1531

Optimum Moisture Content (%) (OMC)	Maximum Dry density (kg/m ³) (MDD)
5.5	1582



Notes: Data Reported above relates to sample tested.

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TEST REPORT: CBR - SANS 3001 - GR40

Client Name:	0	Luhlaza Ref:	0
Client Address:	Khayelitsha, WC	Date Analysed:	8/5/2023
Project Name:	Makhaza Police Station	Technical Signatory	Richard Malungani
Attention:	0		

Excavation No.	TP18J
Depth of Sample Taken:	0,6-0,9
Material Class:	Soils and Gravels
Date Received.	22/09/2023
Description of Sample	Light Brown to White Silty Sand

Material Utilization - Earthworks Classification

Group A - Granular Soils	X
Group B - Low Plasticity Soils	
Group C - High Plasticity Soils	
Group D - Durable Rock	
Group E - Degradable Rock	
Group F - Topsoil	
Group G - Organic Soils	

CBR Final Results**CBR %**

CBR @ 100% Compaction	5
CBR @ 98% Compaction	4
CBR @ 97% Compaction	3
CBR @ 95% Compaction	2
CBR @ 93% Compaction	2
CBR @ 90% Compaction	1
Swell @ 100% Compaction	0

Classification**TRH14****>G10****Swell**

$$S = \frac{(k - l)}{127} \times 100$$

Where:

S = swell expressed as a percentage of the height of the moulded material before soaking i.e. 127mm

K = dial gauge reading after four days of soaking

L = dial gauge reading before soaking

NB: The swell is reported to the nearest first decimal point.

Notes: Data Reported above relates to sample tested.



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TEST REPORT: SANS 3001- GR1 - GR12

Client Name:		Luhlaza Ref:	
Area: Khayelitsha, WC		Date Analysed: 19/11/2023	
Project Name: Makhaza Police Station		Technical Signatory Richard Malungani	
Attention:			
Sample No:		TP19K	
Depth of Sample Taken (m):		1,6-2,0	
Material Class:		Soils and Gravels	
Date Received:		22/09/2023	
Description of Sample		Light Brown to White Silty Sand	
Sieve Analysis (mm)	100.00	100.00	
	75.00	100.00	
	37.50	100.00	
	26.50	100.00	
	19.00	100.00	
	13.20	100.00	
	4.75	100.00	
	2.00	99.40	
	0.43	95.80	
	0.25	63.00	
	0.15	47.80	
	0.075	44.00	
	Hydrometer Analysis (mm)	0.060	16.19
0.050		15.41	
0.004		9.83	
0.002		9.04	
Classification		RAW	%
CLAY		15.408	16
SILT		28.592	28
SAND		55.400	55
GRAVEL		0.600	1
Atterberg Limit	LL%	20.6	
	P.I.	0.0	
	LS%	0.0	
	GM	0.61	
Classification	AASHTO	A-4 - Silty Soils	TRH14
	USCS	SM - Silty Sand	G10

Notes: Data Reported above relates to sample tested.

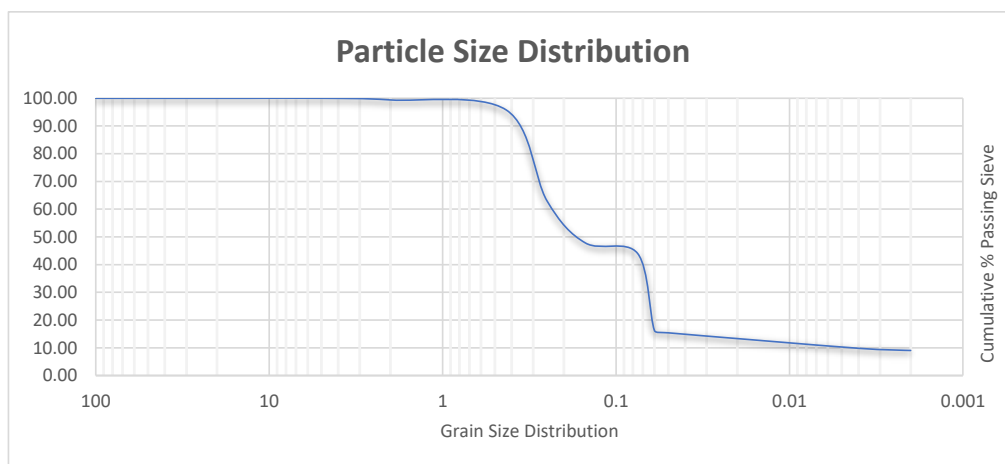


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TEST REPORT: SANS 3001- GR1 - GR12

Client Name:		0 Luhlaza Ref:	0
Client Address:	Khayelitsha, WC	Date Analysed:	19/11/2023
Project Name:	Makhaza Police Station	0 Technical Signatory	Richard Malungani
Attention:			

Excavation No.	TP19K
Depth of Sample Taken:	1,6-2,0
Material Class:	Soils and Gravels
Date Received.	22/09/2023
Description of Sample	Light Brown to White Silty Sand



Clay Activity Index (AI)

AI = $\frac{LL-PL}{100}$	
Clay (%)	0.00

Natural Moisture Content

Dry Sample: 500g	Container + Sample (Wet)	660
	Container + Sample (Dry)	613
	Moisture %	7.1

PH - EC - TDS - Temp (°C)

Potential Expansivity

pH	7.4	Low	X
EC (µS/cm)	155	Medium	
TDS (ppm)	57	High	
Temp (°C)	23.1	Organic or Waste	

Notes: Data Reported above relates to sample tested.



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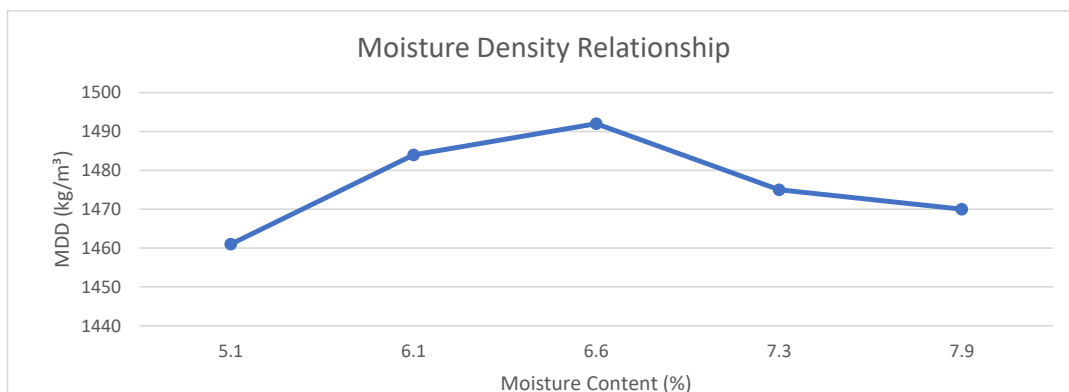
TEST REPORT: MOD AASHTO - SANS 3001 - GR31

Client Name:	0 Luhlaza Ref:	Jan-00
Client Address:	Khayelitsha, WC	Date Analysed: 19/11/2023
Project Name:	Makhaza Police Station	Technical Signatory Richard Malungani
Attention:	0	

Excavation No.	TP19K
Depth of Sample Taken:	1,6-2,0
Material Class:	Soils and Gravels
Date Received.	22/09/2023
Description of Sample	Light Brown to White Silty Sand

TEST METHOD		MOD AASHTO
Mould No.	Moisture (%)	Dry Density (kg/m ³)
1	5.1	1461
2	6.1	1484
3	6.6	1492
4	7.3	1475
5	7.9	1470

Optimum Moisture Content (%) (OMC)	Maximum Dry density (kg/m ³) (MDD)
6.6	1492



Notes: Data Reported above relates to sample tested.



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TEST REPORT: CBR - SANS 3001 - GR40

Client Name:	0	Luhlaza Ref:	0
Client Address:	Khayelitsha, WC	Date Analysed:	8/5/2023
Project Name:	Makhaza Police Station	Technical Signatory	Richard Malungani
Attention:	0		

Excavation No.	TP19K
Depth of Sample Taken:	1,6-2,0
Material Class:	Soils and Gravels
Date Received.	22/09/2023
Description of Sample	Light Brown to White Silty Sand

Material Utilization - Earthworks Classification

Group A - Granular Soils	X
Group B - Low Plasticity Soils	
Group C - High Plasticity Soils	
Group D - Durable Rock	
Group E - Degradable Rock	
Group F - Topsoil	
Group G - Organic Soils	

CBR Final Results

CBR %

CBR @ 100% Compaction	5
CBR @ 98% Compaction	5
CBR @ 97% Compaction	4
CBR @ 95% Compaction	4
CBR @ 93% Compaction	3
CBR @ 90% Compaction	2
Swell @ 100% Compaction	0

Classification

TRH14

G10

Swell

$$S = \frac{(k - l)}{127} \times 100$$

Where:

S = swell expressed as a percentage of the height of the moulded material before soaking i.e. 127mm

K = dial gauge reading after four days of soaking

L = dial gauge reading before soaking

NB: The swell is reported to the nearest first decimal point.

Notes: Data Reported above relates to sample tested.

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a SANAS Accredited Testing Laboratory, No. T0025

256 Brander Street, Jan Niemand Park, Pretoria.
P.O. Box 912387, Silverton, 0127
Tel. : (012) 800 1299
Fax :
Email : stephan.husselman@sgs.com

TEST RESULTS

LUHLAZA ADVISORY & CONSULTING (PTY)LTD
41 VREDE AVENUE
RISIDALE, RANDBURG
JOHANNESBURG 2194
Attention: Atish Keerath

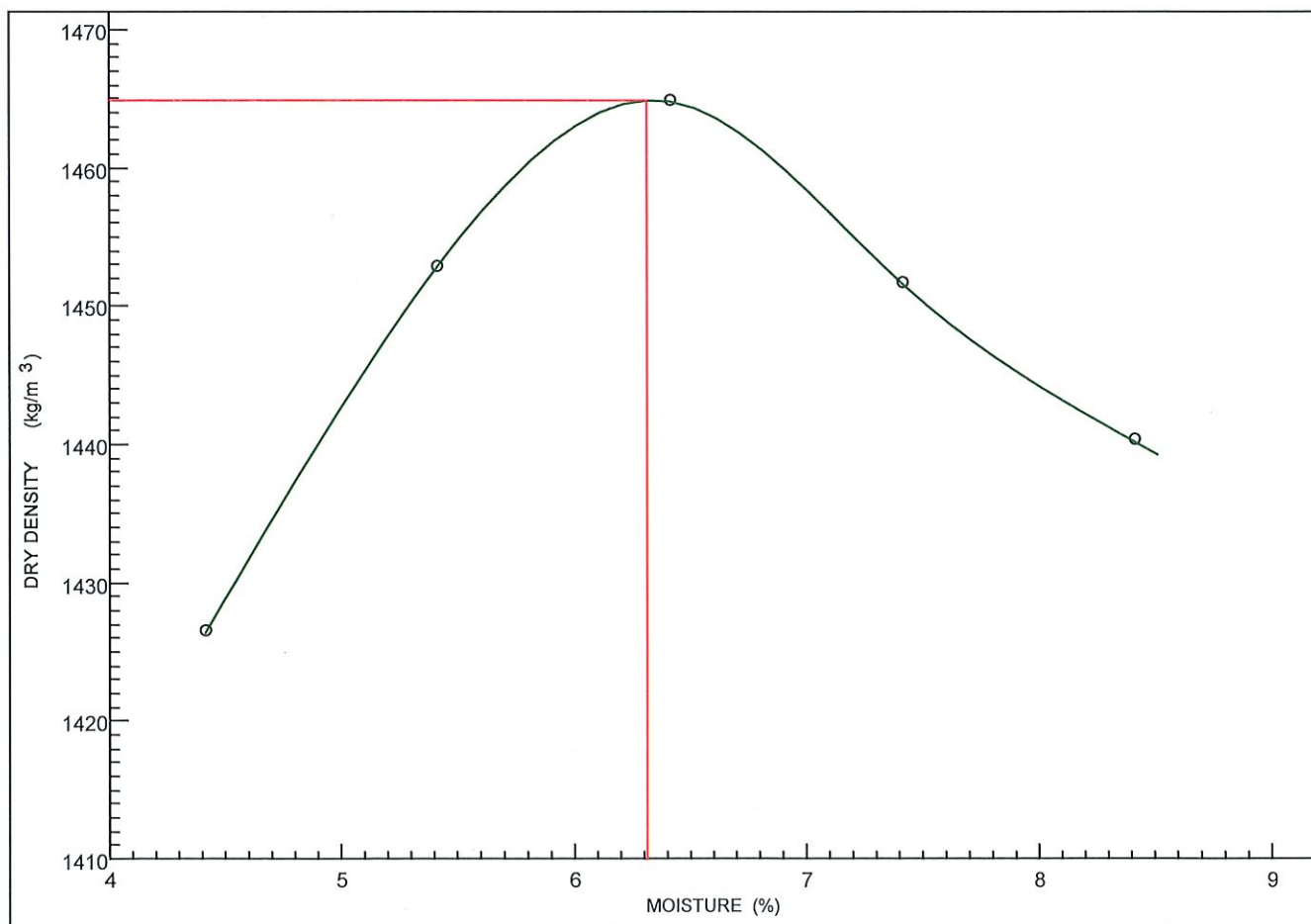
Project : Makhaza
Your Ref : G23-0750
Our Ref : PL/63932
Date Reported : 10.11.2023

MOISTURE / DENSITY RELATIONSHIP(SANS 3001: GR30)

Sample No: A23/2525	Hole No. : TP02	Depth (mm) : 1.0-1.3
Origin :	Stabilized With : Natural	Compaction Energy : PROCTOR
Material Description :		

Maximum Dry Density (kg/m^3) : 1465
Optimum Moisture Content (%) : 6.3

Point No.	1	2	3	4	5			
Moisture (%)	4.4	5.4	6.4	7.4	8.4			
Density (kg/m^3)	1426	1453	1465	1452	1440			



Remarks :

FORM: GR30

4.4.1(SGS)(2019.12.04)

Technical Signatory : Stephan Husselman

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256 Brander Street, Jan Niemand Park, Pretoria.
P.O. Box 912387, Silverton, 0127
Tel. : (012) 800 1299
Fax :
Email : stephan.husselman@sgs.com

TEST RESULTS

LUHLAZA ADVISORY & CONSULTING (PTY)LTD
41 VREDE AVENUE
RISIDALE, RANDBURG
JOHANNESBURG 2194
Attention: Atish Keerath

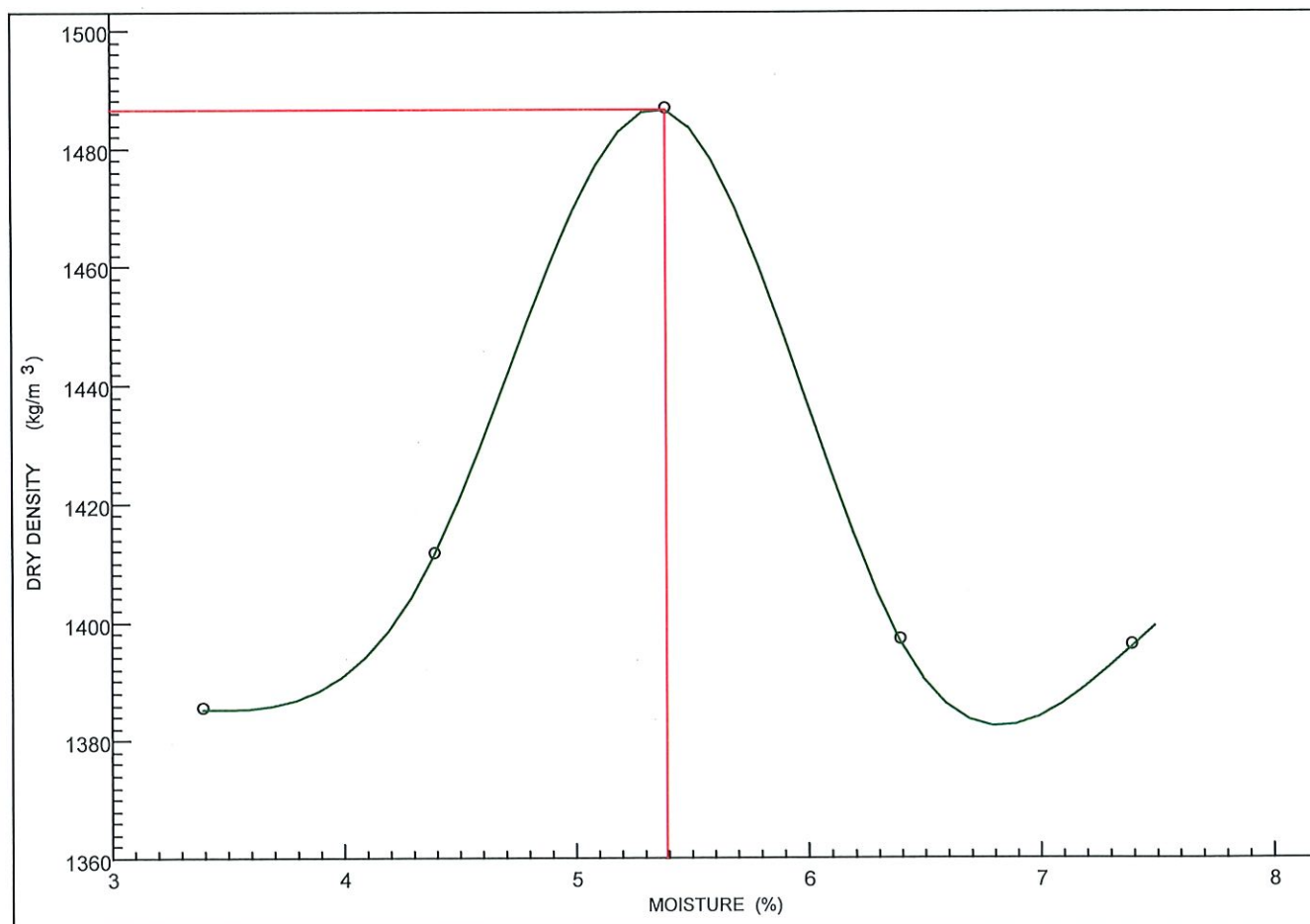
Project : Makhaza
Your Ref : G23-0749
Our Ref : PL/63932
Date Reported : 10.11.2023

MOISTURE / DENSITY RELATIONSHIP(SANS 3001: GR30)

Sample No.: A23/2524	Hole No. : TP01	Depth (mm) : 1.0-1.3
Origin :	Stabilized With : Natural	Compaction Energy : PROCTOR
Material Description :		

Maximum Dry Density (kg/m^3) : 1487
Optimum Moisture Content (%) : 5.4

Point No.	1	2	3	4	5			
Moisture (%)	3.4	4.4	5.4	6.4	7.4			
Density (kg/m^3)	1385	1411	1487	1397	1396			



Remarks :

FORM: GR30

4.4.1(SGS)(2019.12.04)

Technical Signatory: Stephan Husselman

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Client: LUHLAZA ADVISORY AND CONSULTING
Sample no: TP01
Lab no: G23-0749

Project: MAKHAZA
Depth (m): 1.0-1.3

Job no: 63775
Date: 27/11/2023

Page 1 of 2

Sample Parameters		Unit	NMC	Soaked	Remarks
Moisture Content	Before Test	%	5.8	6.8	REMOULDED SAMPLE
	After Test	%	3.0	33.3	Complete test specimen
Dry Density		kg/m³	1405	1392	
Void Ratio		-	0.877	0.894	
Degree of Saturation		%	17.5	20.1	
Initial Specimen Height		mm	24.9	25.0	
Relative Density (SG)		-	2.637		Determined

Test Parameters													
Vertical Stress	kPa	10	25	50	100	200	400	800	400	100	10		
Time Elapsed NMC	hr	20	24	24	24	22	8	24	3	3	3		
Time Elapsed Soaked	hr	20	24	24	24	24	24	8	3	3	3		
H ₁₀₀	NMC	mm	25.053	24.978	24.894	24.705	24.230	23.914	23.427	23.542	23.740	23.985	
	Soaked	mm	24.555	24.184	23.935	23.638	23.351	22.974	22.538	22.652	22.840	23.031	
Strain	NMC	%	-0.735	-0.435	-0.095	0.663	2.575	3.843	5.801	5.339	4.542	3.561	
	Soaked	%	1.937	3.419	4.415	5.600	6.746	8.252	9.994	9.537	8.788	8.024	
Void Ratio	NMC	-	0.891	0.885	0.879	0.865	0.829	0.805	0.768	0.777	0.792	0.810	
	Soaked	-	0.857	0.829	0.810	0.788	0.766	0.737	0.704	0.713	0.727	0.742	
M _v (1/Mpa)	NMC	-	-	0.198	0.135	0.151	0.192	0.065	0.051	0.012	0.028	0.114	
	Soaked	-	-	1.008	0.413	0.248	0.121	0.081	0.047	0.013	0.028	0.093	



TECHNICAL SIGNATORY : SUNIL DEWNATH

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MATROLAB

CONSOLIDATION TESTS: DOUBLE OEDOMETER

BS 1377
Part 5

Client: LUHLAZA ADVISORY AND CONSULTING

Project: MAKHAZA

Job no: 63775

Sample no: TP01

Depth (m): 1.0-1.3

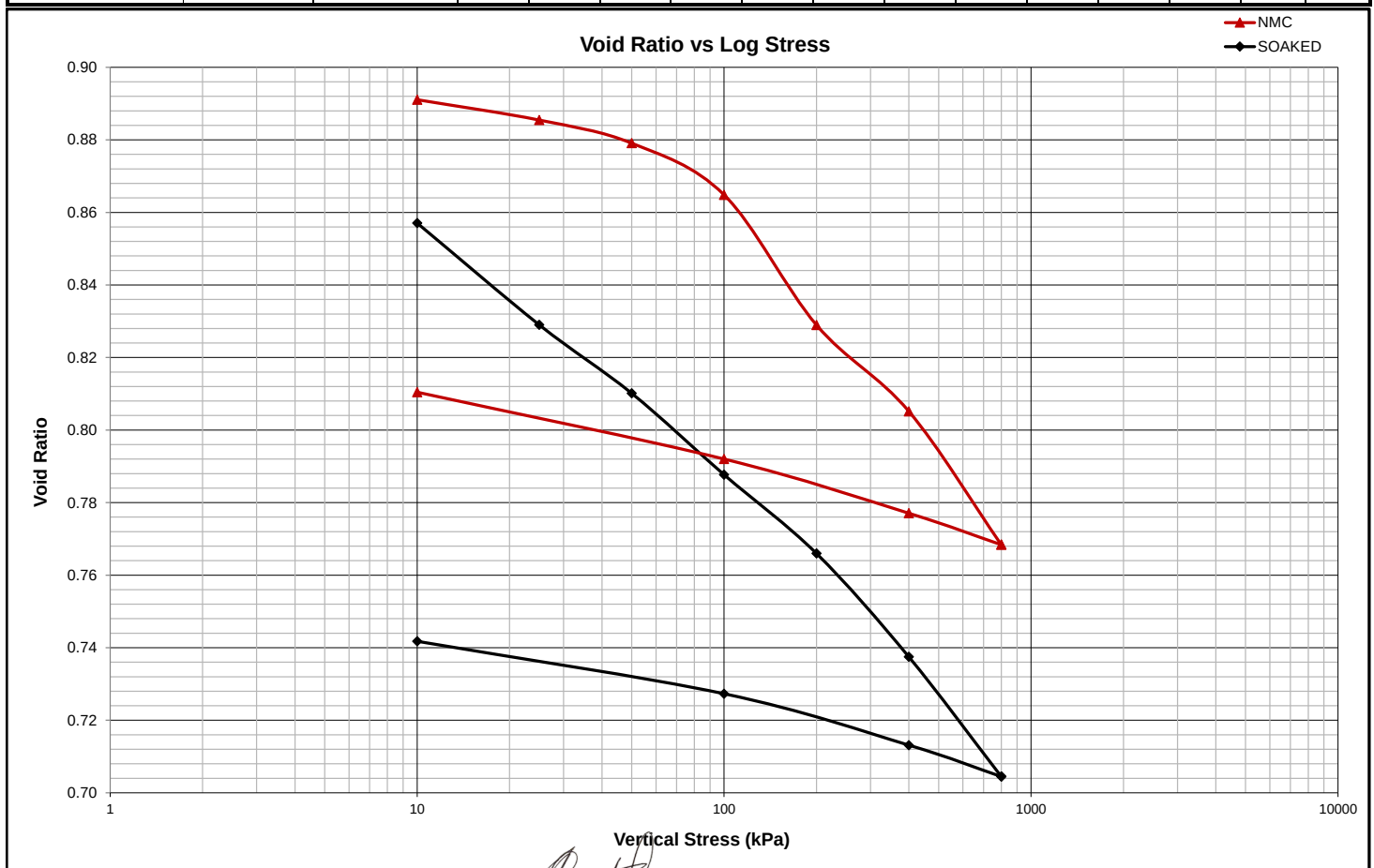
Date: 27/11/2023

Lab no: G23-0749

Page 2 of 2

Sample Parameters		Unit	NMC	Soaked	Remarks
Moisture Content	Before Test	%	5.8	6.8	REMOULDED SAMPLE
	After Test	%	3.0	33.3	Complete test specimen
Dry Density		kg/m ³	1405	1392	
Void Ratio		-	0.877	0.894	
Degree of Saturation		%	17.5	20.1	
Initial Specimen Height		mm	24.9	25.0	
Relative Density (SG)		-	2.637		Determined

Test Parameters													
Vertical Stress		kPa	10	25	50	100	200	400	800	400	100	10	
Time Elapsed NMC		hr	20	24	24	24	22	8	24	3	3	3	
Time Elapsed Soaked		hr	20	24	24	24	24	24	8	3	3	3	
H ₁₀₀	NMC	mm	25.053	24.978	24.894	24.705	24.230	23.914	23.427	23.542	23.740	23.985	
	Soaked	mm	24.555	24.184	23.935	23.638	23.351	22.974	22.538	22.652	22.840	23.031	
Strain	NMC	%	-0.735	-0.435	-0.095	0.663	2.575	3.843	5.801	5.339	4.542	3.561	
	Soaked	%	1.937	3.419	4.415	5.600	6.746	8.252	9.994	9.537	8.788	8.024	
Void Ratio	NMC	-	0.891	0.885	0.879	0.865	0.829	0.805	0.768	0.777	0.792	0.810	
	Soaked	-	0.857	0.829	0.810	0.788	0.766	0.737	0.704	0.713	0.727	0.742	
Mv	NMC	1/MPa	-	0.198	0.135	0.151	0.192	0.065	0.051	0.012	0.028	0.114	
	Soaked	1/MPa	-	1.008	0.413	0.248	0.121	0.081	0.047	0.013	0.028	0.093	



TECHNICAL SIGNATORY : SUNIL DEWNATH

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Client: LUHLAZA ADVISORY AND CONSULTING
Sample no: TP2
Lab no: G23-0750

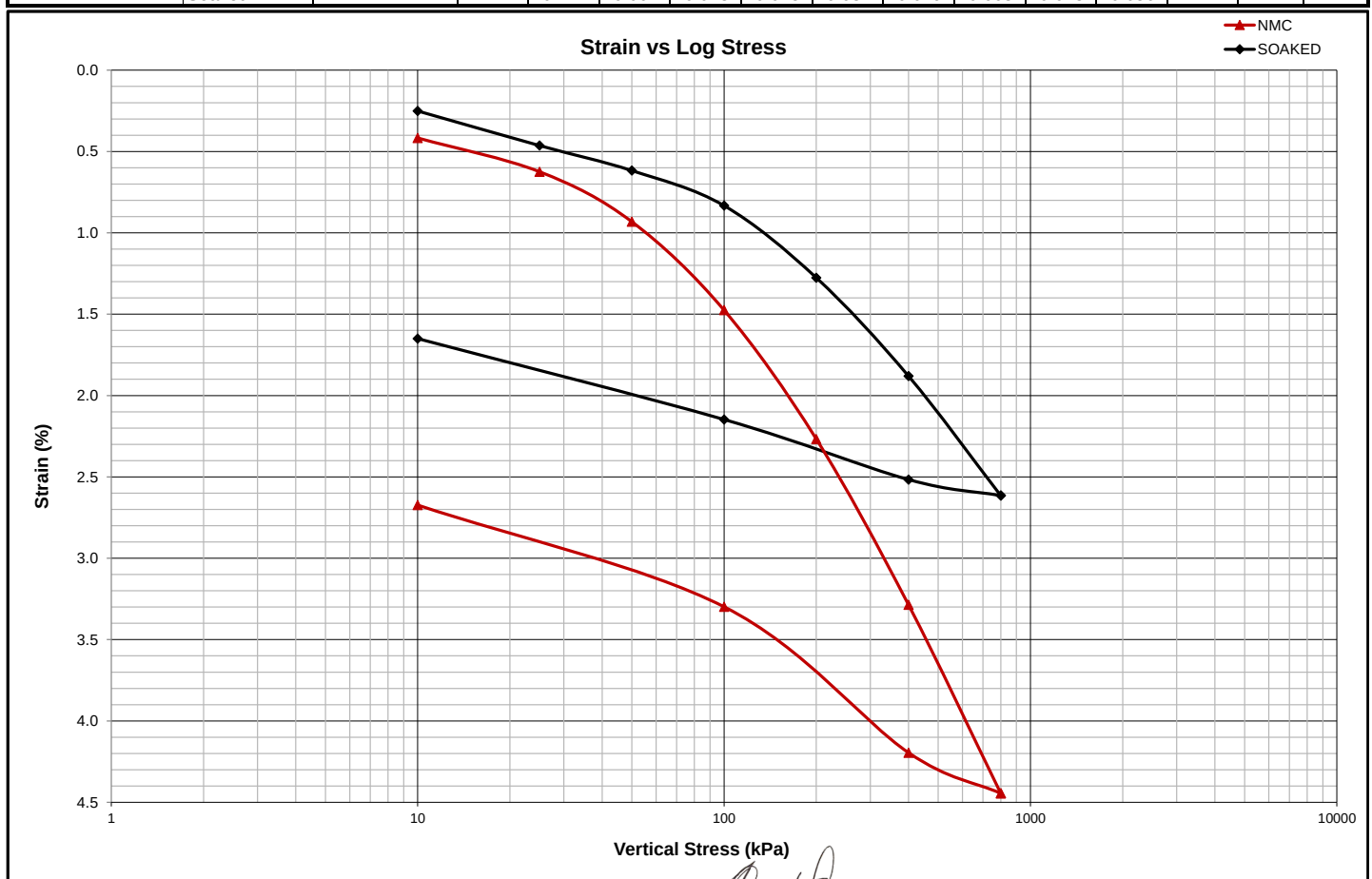
Project: MAKHAZA
Depth (m): 1.0-1.3

Job no: 63775
Date: 23/11/2023

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Sample Parameters		Unit	NMC	Soaked	Remarks
Moisture Content	Before Test	%	5.9	6.0	REMOULDED SAMPLE
	After Test	%	5.6	28.8	Complete test specimen
Dry Density		kg/m³	1392	1386	
Void Ratio		-	0.903	0.913	
Degree of Saturation		%	17.4	17.3	
Initial Specimen Height		mm	19.2	19.7	
Relative Density (SG)		-	2.650		Determined

Test Parameters													
Vertical Stress	kPa	10	25	50	100	200	400	800	400	100	10		
Time Elapsed NMC	hr	2	2	2	3	3	3	2	2	2	3		
Time Elapsed Soaked	hr	2	2	2	2	2	2	2	2	2	3		
H ₁₀₀	NMC	mm	19.070	19.030	18.972	18.867	18.716	18.521	18.299	18.347	18.518	18.638	
	Soaked	mm	19.651	19.609	19.578	19.536	19.449	19.330	19.185	19.204	19.277	19.375	
Strain	NMC	%	0.417	0.625	0.932	1.475	2.268	3.286	4.445	4.195	3.298	2.673	
	Soaked	%	0.251	0.464	0.618	0.833	1.276	1.880	2.615	2.517	2.147	1.650	
Void Ratio	NMC	-	0.895	0.891	0.886	0.875	0.860	0.841	0.819	0.824	0.841	0.852	
	Soaked	-	0.908	0.904	0.901	0.897	0.888	0.877	0.863	0.864	0.871	0.881	
Mv (1/Mpa)	NMC	-	-	0.139	0.124	0.110	0.080	0.052	0.030	0.007	0.031	0.072	
	Soaked	-	-	0.142	0.062	0.043	0.045	0.031	0.019	0.003	0.013	0.056	



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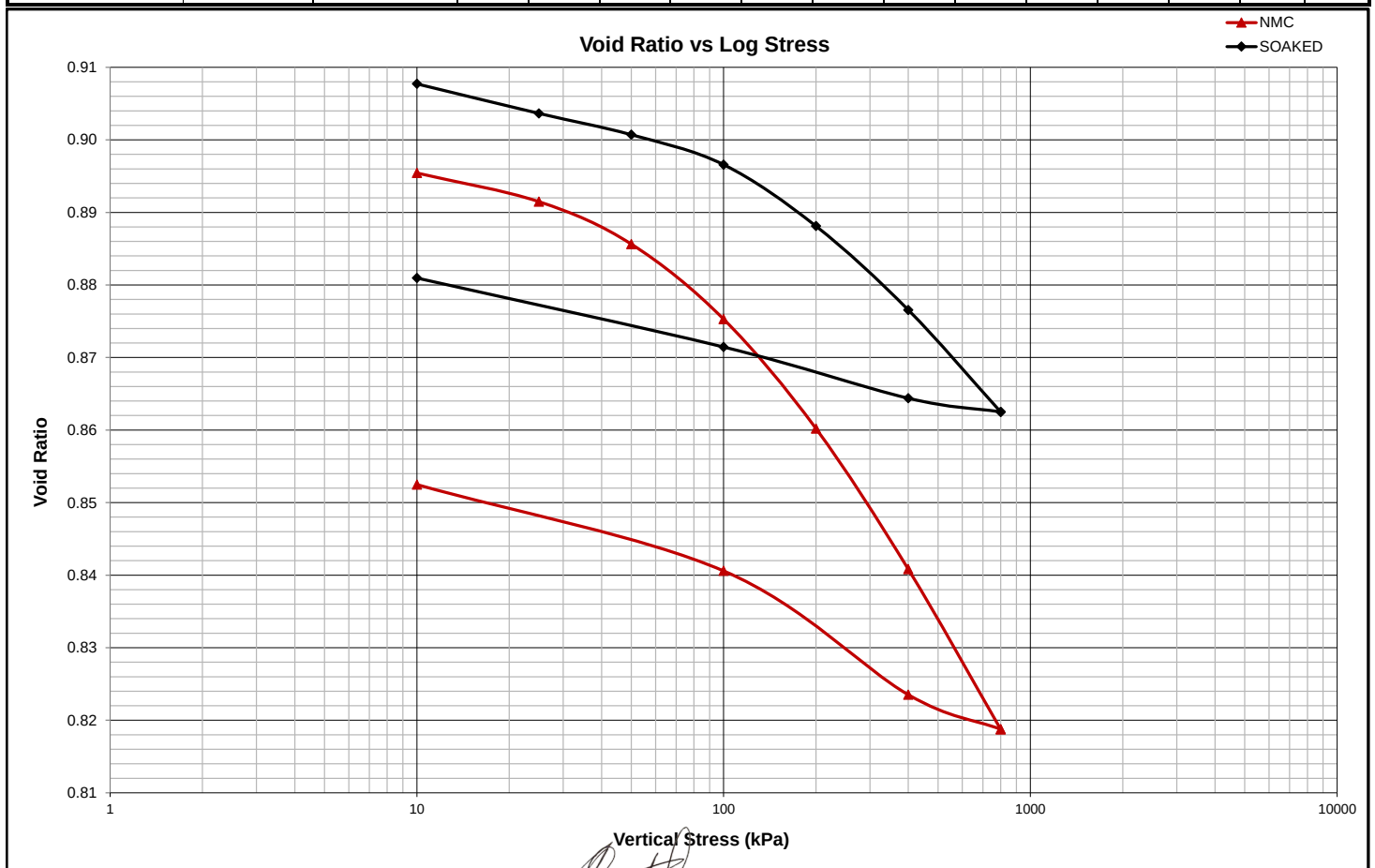
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Depth (m): 1.0-1.3

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Sample Parameters	Unit	NMC	Soaked	Remarks
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