

GEOENGINEERING LTD

Engineering Surveys, Design, Consulting, Project Support
 15A Tamarashvili Str., 0177, Tbilisi, GEORGIA
 Tel.: +995 32 2311 784/88/89; Fax: +995 32 2311 787
 contact@geoengineering.ge; www.geoengineering.ge



One Dimensional Consolidation Properties (Oedometer)

Client	transproject	Lab Ref	
Project	samtredia	Job	1
Borehole	3	Sample	1

Initial Moisture Content*	38.3 % (trimmings: 43.3 %)	Final Moisture Content	27.3 %
Initial Bulk Density	1.84 Mg/m ³	Final Bulk Density	2.23 Mg/m ³
Initial Dry Density	1.33 Mg/m ³	Final Dry Density	1.75 Mg/m ³
Initial Void Ratio	1.0426	Final Void Ratio	0.5519
Initial Degree of Saturation	99.93%	Final Degree of Saturation	134.75 %

* Calculated from initial and dry weights of whole specimen

Pressure (Loading Stages)	Coefficient of Volume Compressibility (m_v)	Coefficient of Consolidation (c_v)
0.00		
6.0 kPa	2.50 m ² /MN	0.40 m ² /yr
12.0 kPa	1.57 m ² /MN	0.42 m ² /yr
25.0 kPa	1.46 m ² /MN	0.40 m ² /yr
50.0 kPa	0.91 m ² /MN	0.79 m ² /yr
25.0 kPa	0.15 m ² /MN	-----
12.0 kPa	0.40 m ² /MN	-----
6.0 kPa	0.54 m ² /MN	-----
12.0 kPa	0.33 m ² /MN	1.14 m ² /yr
25.0 kPa	0.33 m ² /MN	1.88 m ² /yr
50.0 kPa	0.34 m ² /MN	0.88 m ² /yr
100.0 kPa	0.36 m ² /MN	0.25 m ² /yr
200.0 kPa	0.45 m ² /MN	1.14 m ² /yr
400.0 kPa	0.20 m ² /MN	0.38 m ² /yr
800.0 kPa	0.12 m ² /MN	0.00 m ² /yr
1600.0 kPa	0.06 m ² /MN	0.00 m ² /yr

Method of Time Fitting Used	Log Time
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Tested By and Date:	22.07.2012-08.08.2012
Checked By and Date:	T. Gorgidze 24.08.2012
Approved By and Date:	R. Kavelashvili 24.08.2012

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One Dimensional Consolidation Properties (Oedometer)

Client	transproject	Lab Ref	
Project	samtredia	Job	1
Borehole	7	Sample	1

Test Details

Standard	BS 1377: Part 5 : 1990 : Clause 3	Particle Density	2.65 Mg/m ³
Sample Type	Undisturbed sample - open drive	Lab Temperature	20.0 deg.C
Sample Depth	14.4 m		
Sample Description			
Variations from Procedure	None		

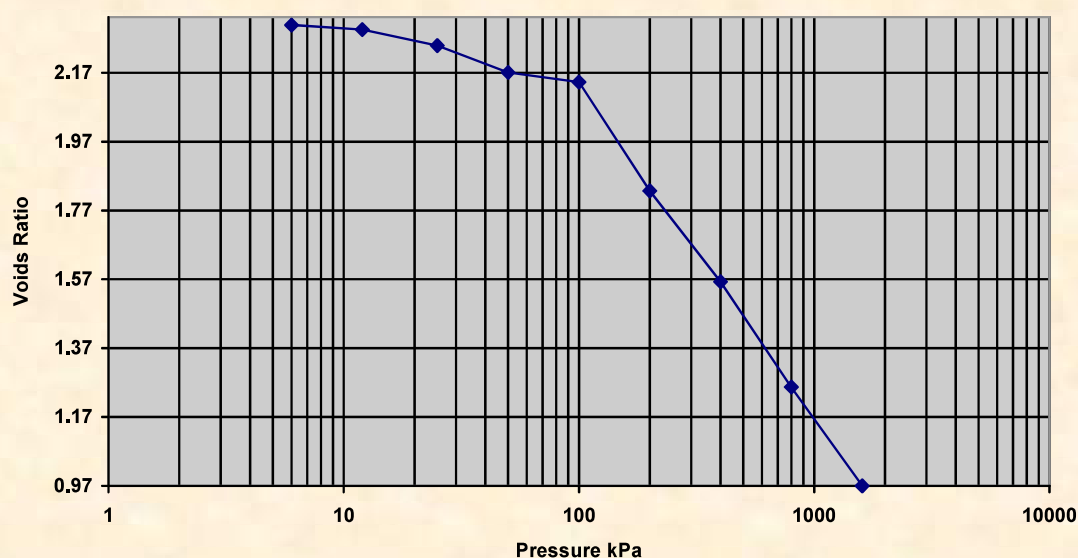
Specimen Details

Specimen Reference	A	Description	
Depth within Sample	0.00 mm	Orientation within Sample	
Specimen Mass	130.40 g	Condition	Natural Moisture
Specimen Height	20.00 mm	Preparation	
Comments			

Test Apparatus

Ring Number	13	Ring Diameter	75.00 mm
Ring Height	20.00 mm	Ring Weight	110.70 g
Lever Ratio	9.00 : 1		

Voids Ratio Vs Applied Pressure



Height of Solid Particles	6.00 mm	Swelling Pressure	0.0 kPa
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One Dimensional Consolidation Properties (Oedometer)

Client	transproject	Lab Ref	
Project	samtredia	Job	1
Borehole	7	Sample	1

Initial Moisture Content*	85.6 % (trimmings: 73.1 %)	Final Moisture Content	110.2 %
Initial Bulk Density	1.48 Mg/m3	Final Bulk Density	2.83 Mg/m3
Initial Dry Density	0.80 Mg/m3	Final Dry Density	1.35 Mg/m3
Initial Void Ratio	2.3321	Final Void Ratio	0.9701
Initial Degree of Saturation	97.23%	Final Degree of Saturation	300.93 %

* Calculated from initial and dry weights of whole specimen

[illegible]

Method of Time Fitting Used	Log Time
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Tested By and Date:	29.07.2012-15.08.2012
Checked By and Date:	T. Gorgidze 24.08.2012
Approved By and Date:	R. Kavelashvili 24.08.2012

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One Dimensional Consolidation Properties (Oedometer)

Client	transproject	Lab Ref	
Project	samtredia	Job	1
Borehole	12	Sample	1

Test Details

Standard	BS 1377: Part 5 : 1990 : Clause 3	Particle Density	2.72 Mg/m3
Sample Type	Undisturbed sample - open drive	Lab Temperature	20.0 deg.C
Sample Depth	15.70 m		
Sample Description			
Variations from Procedure	None		

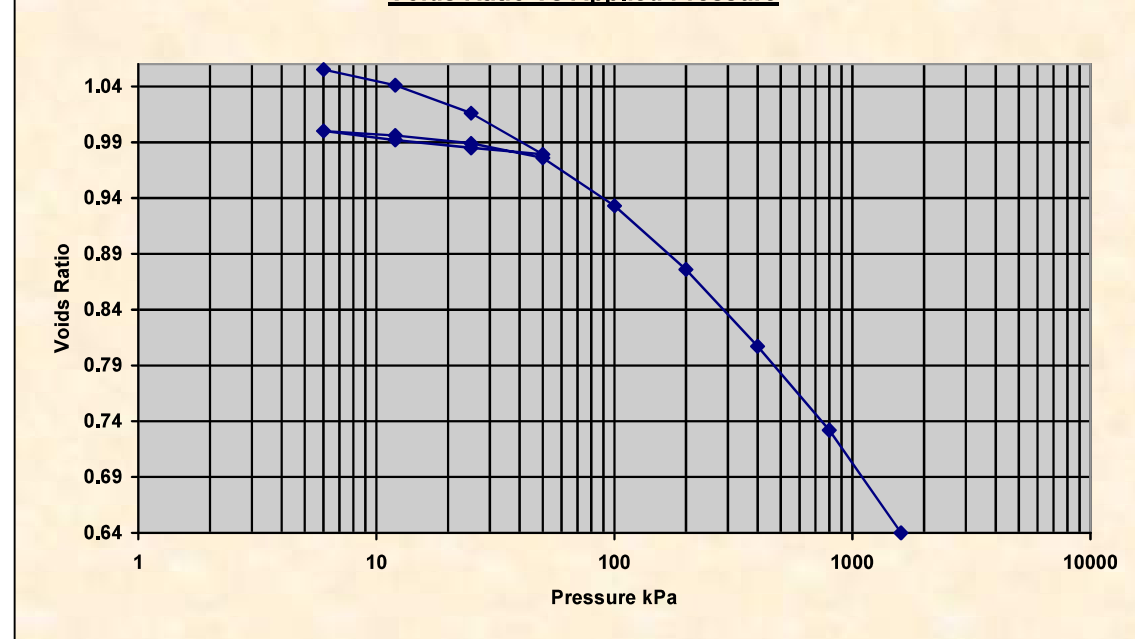
Specimen Details

Specimen Reference	A	Description	
Depth within Sample	0.00 mm	Orientation within Sample	
Specimen Mass	161.75 g	Condition	Natural Moisture
Specimen Height	20.00 mm	Preparation	
Comments			

Test Apparatus

Ring Number	15	Ring Diameter	75.00 mm
Ring Height	20.00 mm	Ring Weight	109.72 g
Lever Ratio	9.00 : 1		

Voids Ratio Vs Applied Pressure



Height of Solid Particles	9.71 mm	Swelling Pressure	0.0 kPa
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One Dimensional Consolidation Properties (Oedometer)

Client	transproject	Lab Ref	
Project	samtredia	Job	1
Borehole	9	Sample	1

Initial Moisture Content*	38.6 % (trimmings: 28.4 %)	Final Moisture Content	26.2 %
Initial Bulk Density	1.83 Mg/m ³	Final Bulk Density	2.09 Mg/m ³
Initial Dry Density	1.32 Mg/m ³	Final Dry Density	1.66 Mg/m ³
Initial Void Ratio	1.0598	Final Void Ratio	0.6397
Initial Degree of Saturation	99.14%	Final Degree of Saturation	111.52 %

* Calculated from initial and dry weights of whole specimen

Pressure (Loading Stages)	Coefficient of Volume Compressibility (m_v)	Coefficient of Consolidation (c_v)
0.00		
6.0 kPa	0.42 m ² /MN	1.66 m ² /yr
12.0 kPa	1.11 m ² /MN	1.00 m ² /yr
25.0 kPa	0.95 m ² /MN	2.25 m ² /yr
50.0 kPa	0.72 m ² /MN	3.90 m ² /yr
25.0 kPa	0.12 m ² /MN	-----
12.0 kPa	0.26 m ² /MN	-----
6.0 kPa	0.68 m ² /MN	-----
12.0 kPa	0.31 m ² /MN	3.92 m ² /yr
25.0 kPa	0.27 m ² /MN	4.05 m ² /yr
50.0 kPa	0.26 m ² /MN	11.53 m ² /yr
100.0 kPa	0.43 m ² /MN	3.29 m ² /yr
200.0 kPa	0.30 m ² /MN	4.22 m ² /yr
400.0 kPa	0.18 m ² /MN	1.17 m ² /yr
800.0 kPa	0.10 m ² /MN	0.00 m ² /yr
1600.0 kPa	0.07 m ² /MN	0.00 m ² /yr

Method of Time Fitting Used	Log Time
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Tested By and Date:	11.08.2012-27.08.2012
Checked By and Date:	T. Gorgidze 24.08.2012
Approved By and Date:	R. Kavelashvili 24.08.2012

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One Dimensional Consolidation Properties (Oedometer)

Client	transproject	Lab Ref	
Project	samtredia	Job	1
Borehole	16	Sample	1

Test Details

Standard	BS 1377: Part 5 : 1990 : Clause 3	Particle Density	2.72 Mg/m3
Sample Type	Undisturbed sample - open drive	Lab Temperature	20.0 deg.C
Sample Depth	20.20 m		
Sample Description			
Variations from Procedure	None		

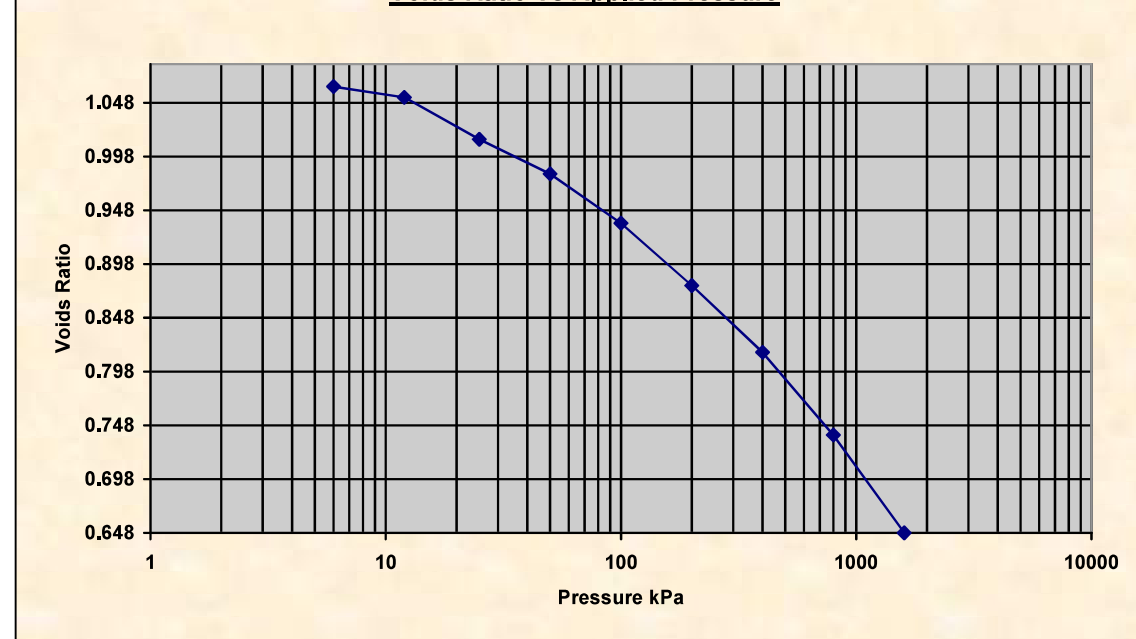
Specimen Details

Specimen Reference	A	Description	
Depth within Sample	0.00 mm	Orientation within Sample	
Specimen Mass	161.01 g	Condition	Natural Moisture
Specimen Height	20.00 mm	Preparation	
Comments			

Test Apparatus

Ring Number	12	Ring Diameter	75.00 mm
Ring Height	20.00 mm	Ring Weight	110.67 g
Lever Ratio	9.00 : 1		

Voids Ratio Vs Applied Pressure



Height of Solid Particles	9.60 mm	Swelling Pressure	0.0 kPa
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One Dimensional Consolidation Properties (Oedometer)

Client	transproject	Lab Ref	
Project	samtredia	Job	1
Borehole	7	Sample	1

Initial Moisture Content*	39.6 % (trimmings: 43.7 %)	Final Moisture Content	28.1 %
Initial Bulk Density	1.82 Mg/m3	Final Bulk Density	2.11 Mg/m3
Initial Dry Density	1.31 Mg/m3	Final Dry Density	1.65 Mg/m3
Initial Void Ratio	1.0839	Final Void Ratio	0.6480
Initial Degree of Saturation	99.40%	Final Degree of Saturation	117.85 %

* Calculated from initial and dry weights of whole specimen

[illegible]

Method of Time Fitting Used	Log Time
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Tested By and Date:	29.07.2012-15.08.2012
Checked By and Date:	T. Gorgidze 24.08.2012
Approved By and Date:	R. Kavelashvili 24.08.2012

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One Dimensional Consolidation Properties (Oedometer)

Client	transproject	Lab Ref	
Project	samtredia	Job	1
Borehole	17	Sample	1

Test Details

Standard	BS 1377: Part 5 : 1990 : Clause 3	Particle Density	2.65 Mg/m3
Sample Type	Undisturbed sample - open drive	Lab Temperature	20.0 deg.C
Sample Depth	7.30 m		
Sample Description			
Variations from Procedure	None		

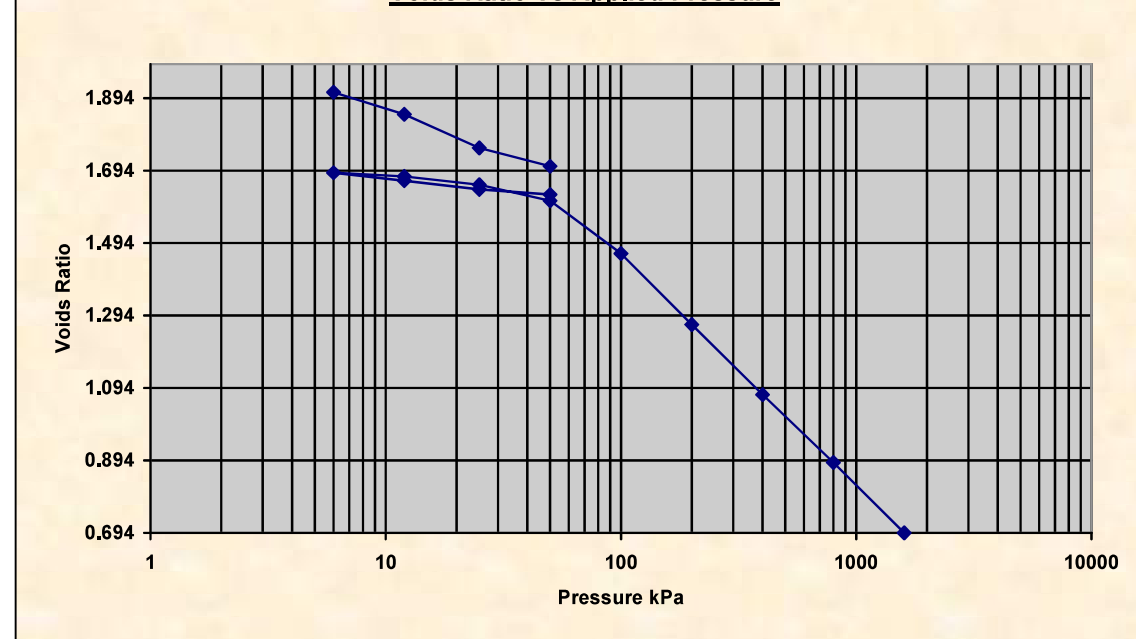
Specimen Details

Specimen Reference	A	Description	
Depth within Sample	0.00 mm	Orientation within Sample	
Specimen Mass	137.17 g	Condition	Natural Moisture
Specimen Height	20.00 mm	Preparation	
Comments			

Test Apparatus

Ring Number	11	Ring Diameter	75.00 mm
Ring Height	20.00 mm	Ring Weight	110.70 g
Lever Ratio	9.00 : 1		

Voids Ratio Vs Applied Pressure



Height of Solid Particles	6.69 mm	Swelling Pressure	0.0 kPa
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One Dimensional Consolidation Properties (Oedometer)

Client	transproject	Lab Ref	
Project	samtredia	Job	1
Borehole	11	Sample	1

Initial Moisture Content*	75.0 % (trimmings: 67.9 %)	Final Moisture Content	30.9 %
Initial Bulk Density	1.55 Mg/m ³	Final Bulk Density	2.05 Mg/m ³
Initial Dry Density	0.89 Mg/m ³	Final Dry Density	1.56 Mg/m ³
Initial Void Ratio	1.9877	Final Void Ratio	0.6941
Initial Degree of Saturation	100.03%	Final Degree of Saturation	118.08 %

* Calculated from initial and dry weights of whole specimen

Pressure (Loading Stages)	Coefficient of Volume Compressibility (m_v)	Coefficient of Consolidation (c_v)
0.00		
6.0 kPa	4.36 m ² /MN	0.95 m ² /yr
12.0 kPa	3.46 m ² /MN	0.64 m ² /yr
25.0 kPa	2.49 m ² /MN	1.15 m ² /yr
50.0 kPa	0.73 m ² /MN	13.80 m ² /yr
0.0 kPa	-0.09 m ² /MN	5.49 m ² /yr
50.0 kPa	0.49 m ² /MN	0.72 m ² /yr
25.0 kPa	0.21 m ² /MN	-----
12.0 kPa	0.69 m ² /MN	-----
6.0 kPa	1.40 m ² /MN	-----
12.0 kPa	0.62 m ² /MN	7.08 m ² /yr
25.0 kPa	0.68 m ² /MN	2.28 m ² /yr
50.0 kPa	0.65 m ² /MN	1.96 m ² /yr
100.0 kPa	1.12 m ² /MN	0.51 m ² /yr
200.0 kPa	0.80 m ² /MN	0.60 m ² /yr
400.0 kPa	0.43 m ² /MN	0.16 m ² /yr
800.0 kPa	0.23 m ² /MN	0.00 m ² /yr
1600.0 kPa	0.13 m ² /MN	0.00 m ² /yr

Method of Time Fitting Used	Log Time
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Tested By and Date:	11.08.2012-27.08.2012
Checked By and Date:	T. Gorgidze 24.08.2012
Approved By and Date:	R. Kavelashvili 24.08.2012

Consolidation Test – Specimen Details

LOCATION: Samtredia, Georgia		Job ref: GC1222	Drilling and Laboratory Works for Engineering-geological investigation of Samtredia-Lanchkhuti-Grigoleti Project Motor Road			
SOIL DESCRIPTION: Gray, soft, intermediately plastic CLAY		Borehole	3			
		Sample no.				
		Dept, m	8.5-8.8			
		Date	30.08.2012			
TEST METHOD: BS1377 : Part 5 : 1990 : 3.5, 3.6		Saturated State				
Cell no. 5 Ring no. 5		Particle density asumed 2.73 Mg/m³				
DIMENSIONS	Initial specimen	Overall change	Final specimen	Specimen preparation method		
Diameter D mm	87.50	X	87.50			
Area A mm ²	6013.20		6013.20			
Height H mm	25.00		21.084			
Volume V cm ³	150.33	23.55	126.78			
WEIGHINGS		Initial specimen		Final specimen		
		(a)	(b)	(c)		
Wet soil + ring + tray	465.10	X		444.00		
Dry soil + ring + tray	191.18			391.66		
Ring + tray	273.92			191.18		
Wet soil	273.92	273.92	252.82			
Dry soil	200.48	200.48	200.48			
Water	73.44	73.44	52.33			
Moisture content (measured)	36.63	36.63	26.10			
Moisture content (from trimmings)	36.60	X				
Density	1.82				1.82	1.99
Dry density	1.33				1.33	1.58
Voids ratio	1.047	1.047	0.726			
Degree of saturation	95.47	95.51	98.10			
Height of soils	12.22	12.21	12.21			
(a) Using moisture content from trimmings (b) Using data from (a) and (c) (c) Data from specimen after test						
Sheet	1	Operator	Checked	Approved		
Sheets	24	N. Jvaridze	T. Gorgidze	L. Gorgidze		

Consolidation Test – Settlement Readings

LOCATION:					Job ref.GC1222					Drilling and Laboratory Works for Engineering-geological investigation of Samtredia- Lanchkhuti-Grigoleti Project Motor Road									
SOIL DESCRIPTION: Gray, soft, intermediately plastic CLAY					Borehole					3									
					Sample no.														
					Dept					8.5-8.8									
					Date					30.08.2012									
TEST METHOD: BS 1377 : Part 7 : 1990 : 8																			
Machine no. 5					Spec. diam. 87.50					Height 25.00 mm									
Cell no. 5					Lever ratio 1:10					Area 6013.20 mm ²									
Ring no. 5					1kg on hanger gives pressure of					16.67 kPa									
LOADING/UNLOADING/RELOADING																			
Increment no.					1					2					3				
Date started					#VALUE!					#VALUE!					#VALUE!				
Load kg					0.36					0.72					1.50				
Pressure kPa					6.0					12.0					25.0				
Mean daily temperature 22 °C					LOADING					LOADING					LOADING				
Elapsed time					t °	Clock time	Gauge reading	Cumulative compression mm DH	Clock time	Gauge reading	Cumulative compression mm DH	Clock time	Gauge reading	Cumulative compression mm DH					
h	m	s	t min																
0	0	0	0	22	10:15	5.000	0.000	10:15	5.0800	0.0800	10:15	5.1780	0.1780						
_	_	10	0.167	22	10:15	5.0050	0.0050	10:15	5.0960	0.0960	10:15	5.2090	0.2090						
_	_	20	0.333	22	10:15	5.0080	0.0080	10:15	5.0970	0.0970	10:15	5.2110	0.2110						
_	_	30	0.500	22	10:15	5.0100	0.0100	10:15	5.0970	0.0970	10:15	5.2160	0.2160						
_	_	40	0.667	22	10:15	5.0120	0.0120	10:15	5.0980	0.0980	10:15	5.2180	0.2180						
_	_	50	0.833	22	10:15	5.0130	0.0130	10:15	5.0990	0.0990	10:15	5.2200	0.2200						
_	0:01	_	1	22	10:16	5.0150	0.0150	10:16	5.1000	0.1000	10:16	5.2220	0.2220						
_	0:02	_	2	22	10:17	5.0170	0.0170	10:17	5.1090	0.1090	10:17	5.2330	0.2330						
_	0:04	_	4	22	10:19	5.0260	0.0260	10:19	5.1180	0.1180	10:19	5.2510	0.2510						
_	0:08	_	8	22	10:23	5.0360	0.0360	10:23	5.1240	0.1240	10:23	5.2760	0.2760						
_	0:15	_	15	22	10:30	5.0440	0.0440	10:30	5.1320	0.1320	10:30	5.3140	0.3140						
_	0:30	_	30	22	10:45	5.0540	0.0540	10:45	5.1390	0.1390	10:45	5.3490	0.3490						
1:00	_	_	60	21	11:15	5.0640	0.0640	11:15	5.1480	0.1480	11:15	5.3770	0.3770						
2:00	_	_	120	21	12:15	5.0700	0.0700	12:15	5.1570	0.1570	12:15	5.4030	0.4030						
4:00	_	_	240	21	14:15	5.0760	0.0760	14:15	5.1650	0.1650	14:15	5.4160	0.4160						
8:00	_	_	480	20	18:15	5.0790	0.0790	18:15	5.1750	0.1750	18:15	5.4200	0.4200						
24:00	_	_	1440	21	10:15	5.0800	0.0800	10:15	5.1780	0.1780	10:15	5.4240	0.4240						
36:00	_	_	2160		22:15			22:15			22:15								
48:00	_	_	2880		10:15			10:15			10:15								
Cumulative correction y					0.004					0.008					0.015				
Net cumulative compression (ΔH-y)					0.076					0.170					0.409				
Sheet 2					Operator					Checked					Approved				
Sheets 24					N. Jvaridze					T. Gorgidze					L. Gorgidze				

Consolidation Test – Settlement Readings

LOCATION:	Samtredia, Georgia	Job ref.GC1222	Drilling and Laboratory Works for Engineering-geological investigation of Samtredia- Lanchkhuti-Grigoleti Project Motor Road
SOIL DESCRIPTION:	Gray, soft, intermediately plastic CLAY	Borehole	3
		Sample no.	
		Dept	8.5-8.8
		Date	30.08.2012
TEST METHOD:	BS 1377 : Part 7 : 1990 : 8		
Machine no.	5	Spec. diam.	87.50 mm
Cell no.	5	Lever ratio	1:10 Area 6013.20 mm ²
Ring no.	5	1kg on hanger gives pressure of 16.67 kПа	

LOADING/UNLOADING/RELOADING

Increment no.					4			5			6		
Date started					#VALUE!			#VALUE!			#VALUE!		
Load kg					3.000			6.000			12.000		
Pressure kPa					50.0			100.0			200.0		
Mean daily temperature 22 °C					LOADING			LOADING			LOADING		
Elapsed time				t °	Clock time	Gauge reading	Cumulative compression mm ΔH	Clock time	Gauge reading	Cumulative compression mm ΔH	Clock time	Gauge reading	Cumulative compression mm ΔH
h	m	s	t min										
0	0	0	0	22	10:15	5.4240	0.4240	10:15	5.7230	0.7230	10:15	6.0020	1.0020
—	—	10	0.167	22	10:15	5.4850	0.4850	10:15	5.8120	0.8120	10:15	5.9720	0.9720
—	—	20	0.333	22	10:15	5.4920	0.4920	10:15	5.8210	0.8210	10:15	5.9710	0.9710
—	—	30	0.500	22	10:15	5.5000	0.5000	10:15	5.8290	0.8290	10:15	5.9710	0.9710
—	—	40	0.667	22	10:15	5.5060	0.5060	10:15	5.8330	0.8330	10:15	5.9710	0.9710
—	—	50	0.833	22	10:15	5.5140	0.5140	10:15	5.8360	0.8360	10:15	5.9710	0.9710
—	0:01	—	1	22	10:16	5.5160	0.5160	10:16	5.8410	0.8410	10:16	5.9710	0.9710
—	0:02	—	2	22	10:17	5.5400	0.5400	10:17	5.8610	0.8610	10:17	5.9710	0.9710
—	0:04	—	4	22	10:19	5.5700	0.5700	10:19	5.8840	0.8840	10:19	5.9700	0.9700
—	0:08	—	8	22	10:23	5.6100	0.6100	10:23	5.9010	0.9010	10:23	5.9690	0.9690
—	0:15	—	15	22	10:30	5.6450	0.6450	10:30	5.9220	0.9220	10:30	5.9690	0.9690
—	0:30	—	30	22	10:45	5.6860	0.6860	10:45	5.9380	0.9380	10:45	5.9690	0.9690
1:00	—	—	60	21	11:15	5.7060	0.7060	11:15	5.9580	0.9580	11:15	5.9690	0.9690
2:00	—	—	120	21	12:15	5.7150	0.7150	12:15	5.9790	0.9790	12:15	5.9690	0.9690
4:00	—	—	240	21	14:15	5.7210	0.7210	14:15	5.9940	0.9940	14:15	5.9690	0.9690
8:00	—	—	480	20	18:15	5.7220	0.7220	18:15	6.0010	1.0010	18:15	5.9690	0.9690
24:00	—	—	1440	21	10:15	5.7230	0.7230	10:15	6.0020	1.0020	10:15	5.9690	0.9690
36:00	—	—	2160		22:15			22:15			22:15		
48:00	—	—	2880		10:15			10:15			10:15		
Cumulative correction y					0.030			0.047			0.075		
Net cumulative compression (ΔH-y)					0.693			0.955			0.927		
Sheet	3				Operator			Checked			Approved		
Sheets	24				N. Jvaridze			T. Gorgidze			L. Gorgidze		

Consolidation Test – Settlement Readings

LOCATION:					Job ref.GC1222					Drilling and Laboratory Works for Engineering-geological investigation of Samtredia- Lanchkhuti-Grigoleti Project Motor Road									
SOIL DESCRIPTION:					Borehole					3									
					Sample no.														
					Dept					8.5-8.8									
					Date					30.08.2012									
TEST METHOD:					BS 1377 : Part 7 : 1990 : 8														
Machine no. 5					Spec. diam. 87.50					Height 25.00 mm									
Cell no. 5					Lever ratio 1:10					Area 6013.20 mm ²									
Ring no. 5					1kg on hanger gives pressure of					16.67 кПа									
LOADING/UNLOADING/RELOADING																			
Increment no.					7					8					9				
Date started					#VALUE!					#VALUE!					#VALUE!				
Load kg					6.000					3.000					1.500				
Pressure kPa					100.0					50.0					25.0				
Mean daily temperature 22 °C					UNLOADING					UNLOADING					UNLOADING				
Elapsed time				t ^o	Clock time	Gauge reading	Cumulative compression mm ΔH	Clock time	Gauge reading	Cumulative compression mm ΔH	Clock time	Gauge reading	Cumulative compression mm ΔH						
h	m	s	t min																
0	0	0	0	22	10:15	5.9690	0.9690	10:15	5.9434	0.9434	10:15	5.9084	0.9084						
—	—	10	0.167	22	10:15	5.9650	0.9650	10:15	5.9390	0.9390	10:15	5.9040	0.9040						
—	—	20	0.333	22	10:15	5.9640	0.9640	10:15	5.9390	0.9390	10:15	5.9040	0.9040						
—	—	30	0.500	22	10:15	5.9630	0.9630	10:15	5.9390	0.9390	10:15	5.9040	0.9040						
—	—	40	0.667	22	10:15	5.9610	0.9610	10:15	5.9390	0.9390	10:15	5.9040	0.9040						
—	—	50	0.833	22	10:15	5.9600	0.9600	10:15	5.9380	0.9380	10:15	5.9040	0.9040						
—	0:01	—	1	22	10:16	5.9590	0.9590	10:16	5.9370	0.9370	10:16	5.9040	0.9040						
—	0:02	—	2	22	10:17	5.9570	0.9570	10:17	5.9330	0.9330	10:17	5.9030	0.9030						
—	0:04	—	4	22	10:19	5.9554	0.9554	10:19	5.9290	0.9290	10:19	5.9010	0.9010						
—	0:08	—	8	22	10:23	5.9530	0.9530	10:23	5.9250	0.9250	10:23	5.8990	0.8990						
—	0:15	—	15	22	10:30	5.9510	0.9510	10:30	5.9210	0.9210	10:30	5.8975	0.8975						
—	0:30	—	30	22	10:45	5.9490	0.9490	10:45	5.9170	0.9170	10:45	5.8960	0.8960						
1:00	—	—	60	21	11:15	5.9470	0.9470	11:15	5.9130	0.9130	11:15	5.8940	0.8940						
2:00	—	—	120	21	12:15	5.9460	0.9460	12:15	5.9110	0.9110	12:15	5.8920	0.8920						
4:00	—	—	240	21	14:15	5.9450	0.9450	14:15	5.9100	0.9100	14:15	5.8910	0.8910						
8:00	—	—	480	20	18:15	5.9436	0.9436	18:15	5.9090	0.9090	18:15	5.8910	0.8910						
24:00	—	—	1440	21	10:15	5.9434	0.9434	10:15	5.9084	0.9084	10:15	5.8910	0.8910						
36:00	—	—	2160		22:15			22:15			22:15								
48:00	—	—	2880		10:15			10:15			10:15								
Cumulative correction y					0.047					0.030					0.015				
Net cumulative compression (ΔH-y)					0.896					0.878					0.876				
Sheet 4					Operator					Checked					Approved				
Sheets 24					N. Jvaridze					T. Gorgidze					L. Gorgidze				

Consolidation Test – Settlement Readings

LOCATION: <i>Samtredia, Georgia</i>	Job ref.GC1222	Drilling and Laboratory Works for Engineering-geological investigation of Samtredia- Lanchkhuti-Grigoleti Project Motor Road
SOIL DESCRIPTION: <i>Gray, soft, intermediately plastic CLAY</i>	Borehole	3
	Sample no.	
	Dept	8.5-8.8
	Date	30.08.2012
TEST METHOD: <i>BS 1377 : Part 7 : 1990 : 8</i>		
Machine no. 5	Spec. diam. 87.50	Height 25.00 mm
Cell no. 5	Lever ratio 1:10	Area 6013.20 mm ²
Ring no. 5	<i>1kg</i> on hanger gives pressure of 16.67 кПа	

LOADING/UNLOADING/RELOADING

Increment no.					10			11			12		
Date started					#VALUE!			#VALUE!			#VALUE!		
Load kg					0.001			0.004			0.008		
Pressure kPa					6.0			25.0			50.0		
Mean daily temperature 22 °C					UNLOADING			RELOADING			RELOADING		
Elapsed time				t ⁰	Clock time	Gauge reading	Cumulative compression mm ΔH	Clock time	Gauge reading	Cumulative compression mm ΔH	Clock time	Gauge reading	Cumulative compression mm ΔH
h	m	s	t min										
0	0	0	0	22	10:15	5.8910	0.8910	10:15	5.8780	0.8780	10:15	5.9420	0.9420
–	–	10	0.167	22	10:15	5.8910	0.8910	10:15	5.9280	0.9280	10:15	5.9500	0.9500
–	–	20	0.333	22	10:15	5.8910	0.8910	10:15	5.9280	0.9280	10:15	5.9500	0.9500
–	–	30	0.500	22	10:15	5.8910	0.8910	10:15	5.9290	0.9290	10:15	5.9500	0.9500
–	–	40	0.667	22	10:15	5.8910	0.8910	10:15	5.9300	0.9300	10:15	5.9500	0.9500
–	–	50	0.833	22	10:15	5.8910	0.8910	10:15	5.9304	0.9304	10:15	5.9500	0.9500
–	0:01	–	1	22	10:16	5.8910	0.8910	10:16	5.9310	0.9310	10:16	5.9500	0.9500
–	0:02	–	2	22	10:17	5.8900	0.8900	10:17	5.9324	0.9324	10:17	5.9510	0.9510
–	0:04	–	4	22	10:19	5.8890	0.8890	10:19	5.9340	0.9340	10:19	5.9520	0.9520
–	0:08	–	8	22	10:23	5.8870	0.8870	10:23	5.9355	0.9355	10:23	5.9530	0.9530
–	0:15	–	15	22	10:30	5.8860	0.8860	10:30	5.9364	0.9364	10:30	5.9540	0.9540
–	0:30	–	30	22	10:45	5.8840	0.8840	10:45	5.9374	0.9374	10:45	5.9550	0.9550
1:00	–	–	60	21	11:15	5.8810	0.8810	11:15	5.9390	0.9390	11:15	5.9550	0.9550
2:00	–	–	120	21	12:15	5.8790	0.8790	12:15	5.9403	0.9403	12:15	5.9550	0.9550
4:00	–	–	240	21	14:15	5.8780	0.8780	14:15	5.9414	0.9414	14:15	5.9550	0.9550
8:00	–	–	480	20	18:15	5.8780	0.8780	18:15	5.9417	0.9417	18:15	5.9550	0.9550
24:00	–	–	1440	21	10:15	5.8780	0.8780	10:15	5.9420	0.9420	10:15	5.9550	0.9550
36:00	–	–	2160		22:15			22:15			22:15		
48:00	–	–	2880		10:15			10:15			10:15		
Cumulative correction y					0.004			0.015			0.030		
Net cumulative compression (ΔH-y)					0.874			0.927			0.925		
Sheet	5				Operator			Checked			Approved		
Sheets	24				N. Jvaridze			T. Gorgidze			L. Gorgidze		

Consolidation Test – Settlement Readings

LOCATION: <i>Samtredia, Georgia</i>		Job ref.GC1222	Drilling and Laboratory Works for Engineering-geological investigation of Samtredia- Lanchkhuti-Grigoleti Project Motor Road
SOIL DESCRIPTION: <i>Gray, soft, intermediately plastic CLAY</i>		Borehole	3
		Sample no.	
		Dept	8.5-8.8
		Date	30.08.2012
TEST METHOD: <i>BS 1377 : Part 7 : 1990 : 8</i>			
Machine no.	5	Spec. diam.	87.50 mm
Cell no.	5	Lever ratio	1:10 Area 6013.20 mm ²
Ring no.	5	<u>1kg</u> on hanger gives pressure of 16.67 кПа	

LOADING/UNLOADING/RELOADING

Increment no.					13			14			15		
Date started					#VALUE!			#VALUE!			#VALUE!		
Load kg					6.000			12.000			24.000		
Pressure kPa					100.0			200.0			400.0		
Mean daily temperature 22 ° C					RELOADING			RELOADING			LOADING		
Elapsed time				t °	Clock time	Gauge reading	Cumulative compression mm ΔH	Clock time	Gauge reading	Cumulative compression mm ΔH	Clock time	Gauge reading	Cumulative compression mm ΔH
h	m	s	t min										
0	0	0	0	22	10:15	5.9550	0.9550	10:15	6.0140	1.0140	10:15	7.0170	2.0170
—	—	10	0.167	22	10:15	5.9820	0.9820	10:15	6.2550	1.2550	10:15	7.1590	2.1590
—	—	20	0.333	22	10:15	5.9850	0.9850	10:15	6.2800	1.2800	10:15	7.1790	2.1790
—	—	30	0.500	22	10:15	5.9850	0.9850	10:15	6.2940	1.2940	10:15	7.2160	2.2160
—	—	40	0.667	22	10:15	5.9850	0.9850	10:15	6.3040	1.3040	10:15	7.2340	2.2340
—	—	50	0.833	22	10:15	5.9850	0.9850	10:15	6.3170	1.3170	10:15	7.2480	2.2480
—	0:01	—	1	22	10:16	5.9850	0.9850	10:16	6.3300	1.3300	10:16	7.3140	2.3140
—	0:02	—	2	22	10:17	5.9880	0.9880	10:17	6.3900	1.3900	10:17	7.4240	2.4240
—	0:04	—	4	22	10:19	5.9950	0.9950	10:19	6.5450	1.5450	10:19	7.4980	2.4980
—	0:08	—	8	22	10:23	5.9980	0.9980	10:23	6.6610	1.6610	10:23	7.5870	2.5870
—	0:15	—	15	22	10:30	6.0000	1.0000	10:30	6.7360	1.7360	10:30	7.6990	2.6990
—	0:30	—	30	22	10:45	6.0040	1.0040	10:45	6.8440	1.8440	10:45	7.8130	2.8130
1:00	—	—	60	21	11:15	6.0070	1.0070	11:15	6.9040	1.9040	11:15	7.8920	2.8920
2:00	—	—	120	21	12:15	6.0090	1.0090	12:15	6.9630	1.9630	12:15	7.9430	2.9430
4:00	—	—	240	21	14:15	6.0110	1.0110	14:15	6.9900	1.9900	14:15	7.9660	2.9660
8:00	—	—	480	20	18:15	6.0134	1.0134	18:15	7.0150	2.0150	18:15	7.9750	2.9750
24:00	—	—	1440	21	10:15	6.0140	1.0140	10:15	7.0170	2.0170	10:15	7.9780	2.9780
36:00	—	—	2160		22:15			22:15			22:15		
48:00	—	—	2880		10:15			10:15			10:15		
Cumulative correction y					0.047			0.075			0.121		
Net cumulative compression (ΔH-y)					0.967			1.942			2.857		
Sheet	6				Operator			Checked			Approved		
Sheets	24				N. Jvaridze			T. Gorgidze			L. Gorgidze		

Consolidation Test – Settlement Readings

LOCATION:		Job ref.GC1222		Drilling and Laboratory Works for Engineering-geological investigation of Samtredia- Lanchkhuti-Grigoleti Project Motor Road	
SOIL DESCRIPTION:		Borehole		3	
Gray, soft, intermediately plastic CLAY		Sample no.			
		Dept		8.5-8.8	
		Date		30.08.2012	
TEST METHOD: BS 1377 : Part 7 : 1990 : 8					
Machine no.	5	Spec. diam.	87.50	Height	25.00 mm
Cell no.	5	Lever ratio	1:10	Area	6013.20 mm ²
Ring no.	5	1kg on hanger gives pressure of			16.67 кПа
LOADING/UNLOADING/RELOADING					
Increment no.		16		17	
Date started		#VALUE!			
Load kg		47.999			
Pressure kPa		800.0			
Mean daily temperature 22 °C		LOADING			
Elapsed time		Clock time	Gauge reading	Cumulative compression mm ΔH	Clock time
h	m				
0	0	0	0	22	10:15
—	—	10	0.167	22	10:15
—	—	20	0.333	22	10:15
—	—	30	0.500	22	10:15
—	—	40	0.667	22	10:15
—	—	50	0.833	22	10:15
—	0:01	—	1	22	10:16
—	0:02	—	2	22	10:17
—	0:04	—	4	22	10:19
—	0:08	—	8	22	10:23
—	0:15	—	15	22	10:30
—	0:30	—	30	22	10:45
1:00	—	—	60	21	11:15
2:00	—	—	120	21	12:15
4:00	—	—	240	21	14:15
8:00	—	—	480	20	18:15
24:00	—	—	1440	21	10:15
36:00	—	—	2160		22:15
48:00	—	—	2880		10:15
Cumulative correction y		0.162			
Net cumulative compression (ΔH-y)		3.916			
Sheet	7	Operator		Checked	Approved
Sheets	24	N. Jvaridze		T. Gorgidze	L. Gorgidze

Consolidation Test – Calculations

LOCATION:					Job ref.GC1222		Drilling and Laboratory Works for Engineering-geological investigation of Samtredia-Lanchkhuti-Grigoleti Project Motor Road				
SOIL DESCRIPTION: Gray, soft, intermediately plastic CLAY					Borehole/ Pit no.		3				
					Sample no.						
					Dept		8.5-8.8				
					Date		30.08.2012				
TEST METHOD: BS 1377 : Part 7 : 1990 : 8											
Machine no.		5		Specimen diameter				87.50 mm		Height H_0 , 25.0 mm	
Cell no.		5		Height of solids H_s				12.22 mm			
Ring no.		5		Initial voids ratio e_1				1.047			
VOIDS RATIO					COMPRESSIBILITY			COEFFICIENT OF CONSOLIDATION			
Increment no.	Pressure P kPa	Cumulative compression ($\Delta H-y$) mm	Consolidated height $H=H_0-(\Delta H-y)$ mm	Voids ratio $e = \frac{H-H_s}{H_s}$	Incremental		$m = \frac{\partial H}{H} \cdot \frac{1000}{\partial p}$ m^2 / MN	t_{50} min	$\bar{H} = \frac{1}{2}(H_1 + H_2)$ mm	$c_v =$	
					height change, δH mm	pressure change δp kPa				$\frac{0.026H^2}{t_{50}}$ $m^2 / year$	$\frac{0.111H^2}{t_{90}}$ $m^2 / year$
0	0	0.000	25.00	1.047	0.00	0	—	—	—	—	
1	6.0	0.076	24.92	1.040	0.08	6.0	—	—	—	—	
2	12.0	0.170	24.83	1.033	0.09	6.0	0.63	18.85	24.88	0.85	
3	25.0	0.409	24.59	1.013	0.24	13.0	0.74	15.23	24.71	1.04	
4	50.0	0.693	24.31	0.990	0.28	25.0	0.46	3.23	24.45	4.82	
5	100.0	0.955	24.05	0.968	0.26	50.0	0.22	6.18	24.18	2.46	
6	200.0	0.927	24.07	0.971	-0.03	100.0	-0.01	0.73	24.06	20.61	
7	100.0	0.896	24.10	0.973	-0.03	-100.0	0.01	2.97	24.09	5.08	
8	50.0	0.878	24.12	0.975	-0.02	-50.0	0.01	6.48	24.11	2.33	
9	25.0	0.876	24.12	0.975	0.00	-25.0	0.00	15.49	24.12	0.98	
10	6.0	0.874	24.13	0.975	0.00	-19.0	0.00	24.07	24.13	0.63	
11	25.0	0.927	24.07	0.971	0.05	19.0	0.12	2.67	24.10	5.66	
12	50.0	0.925	24.08	0.971	0.00	25.0	0.00	1.88	24.07	8.04	
13	100.0	0.967	24.03	0.967	0.04	50.0	0.03	5.46	24.05	2.76	
14	200.0	1.942	23.06	0.888	0.98	100.0	0.41	6.85	23.55	2.10	
15	400.0	2.857	22.14	0.813	0.91	200.0	0.20	5.15	22.60	2.58	
16	800.0	3.916	21.08	0.726	1.06	400.0	0.12	9.78	21.61	1.24	
Sheet 8					Operator		Checked		Approved		
Sheets 24					N. Jvaridze		T. Gorgidze		L. Gorgidze		

Consolidation Test – Log Pressure/Voids Ratio Curve

LOCATION:		Job ref.GC1222	Drilling and Laboratory Works for Engineering-geological investigation of Samtredia- Lanchkhuti-Grigoleti Project Motor Road	
SOIL DESCRIPTION:		Borehole	3	
Gray, soft, intermediately plastic CLAY		Sample no.		
		Dept	8.5-8.8	
		Date	30.08.2012	
TEST METHOD: BS 1377 : Part 7 : 1990 : 8				
SPECIMEN INITIALLY		Pressure stage kPa	Laboratory coefficients of	
Diameter 87.50 mm	Density 1.82 Mg/m ³		Compressibility, m_v m ² /MN	Consolidation, C_v m ² /year
Height 25.00 mm	Moisture content 36.6 %	0.0	-	-
Voids ratio 1.047	Dry density 1.33 Mg/m ³	6	-	-
Saturation 95.47 %	Particle density 2.73 Mg/m ³	12	0.63	0.85
Depth below surface	m	25	0.74	1.04
Swelling pressure	0.00 kPa	50	0.46	4.82
Compression Index, C_c	0.27	100	0.22	2.46
Recompression Index, C_r	0.227	200	-0.01	20.61
Preconsolidation Pressure, P_c	kPa	100	0.01	5.08
Remarks:		50	0.01	2.33
		25	0.00	0.98
		6	0.00	0.63
		25	0.12	5.66
		50	0.00	8.04
		100	0.03	2.76
		200	0.41	2.10
		400	0.20	2.58
		800	0.12	1.24
Sheet 9	Operator	Checked	Approved	
Sheets 24	N. Jvaridze	T. Gorgidze	L. Gorgidze	

Consolidation Curve – Logarithm of Time Fitting Method

LOCATION: <i>Samtredia, Georgia</i>		Job ref.GC1222	Drilling and Laboratory Works for Engineering-geological investigation of Samtredia- Lanchkhuti-Grigoleti Project Motor Road																																	
SOIL DESCRIPTION: <i>Gray, soft, intermediately plastic CLAY</i>		Borehole	3																																	
		Sample no.																																		
		Dept	8.5-8.8																																	
		Date	30.08.2012																																	
TEST METHOD: <i>BS 1377 : Part 7 : 1990 : 8</i>		Pressure, kPa 6																																		
Time (minutes) logarithmic scale Compression gauge reading, 10^{-3} mm Time (minutes) logarithmic scale <table border="1"> <caption>Approximate data points from the consolidation curve</caption> <thead> <tr> <th>Time (minutes)</th> <th>Compression gauge reading (10^{-3} mm)</th> </tr> </thead> <tbody> <tr><td>0.1</td><td>5.0</td></tr> <tr><td>0.2</td><td>7.0</td></tr> <tr><td>0.5</td><td>10.0</td></tr> <tr><td>1.0</td><td>12.0</td></tr> <tr><td>2.0</td><td>15.0</td></tr> <tr><td>5.0</td><td>25.0</td></tr> <tr><td>10.0</td><td>35.0</td></tr> <tr><td>20.0</td><td>45.0</td></tr> <tr><td>50.0</td><td>55.0</td></tr> <tr><td>100.0</td><td>65.0</td></tr> <tr><td>200.0</td><td>70.0</td></tr> <tr><td>500.0</td><td>75.0</td></tr> <tr><td>1000.0</td><td>78.0</td></tr> <tr><td>2000.0</td><td>79.0</td></tr> <tr><td>5000.0</td><td>80.0</td></tr> </tbody> </table>					Time (minutes)	Compression gauge reading (10^{-3} mm)	0.1	5.0	0.2	7.0	0.5	10.0	1.0	12.0	2.0	15.0	5.0	25.0	10.0	35.0	20.0	45.0	50.0	55.0	100.0	65.0	200.0	70.0	500.0	75.0	1000.0	78.0	2000.0	79.0	5000.0	80.0
Time (minutes)	Compression gauge reading (10^{-3} mm)																																			
0.1	5.0																																			
0.2	7.0																																			
0.5	10.0																																			
1.0	12.0																																			
2.0	15.0																																			
5.0	25.0																																			
10.0	35.0																																			
20.0	45.0																																			
50.0	55.0																																			
100.0	65.0																																			
200.0	70.0																																			
500.0	75.0																																			
1000.0	78.0																																			
2000.0	79.0																																			
5000.0	80.0																																			
Sheet 9	Increment no. 1	Operator	Checked	Approved																																
Sheets 24	LOADING	<i>N. Jvaridze</i>	<i>T. Gorgidze</i>	<i>L. Gorgidze</i>																																

Consolidation Curve – Logarithm of Time Fitting Method

LOCATION: <i>Samtredia, Georgia</i>		Job ref.GC1222	Drilling and Laboratory Works for Engineering-geological investigation of Samtredia- Lanchkhuti-Grigoleti Project Motor Road																																					
SOIL DESCRIPTION: <i>Gray, soft, intermediately plastic CLAY</i>		Borehole	3																																					
		Sample no.																																						
		Dept	8.5-8.8																																					
		Date	30.08.2012																																					
TEST METHOD: <i>BS 1377 : Part 7 : 1990 : 8</i>		Pressure, kPa	12																																					
Time (minutes) logarithmic scale Compression gauge reading, 10^{-3} mm Time (minutes) logarithmic scale <table border="1"> <caption>Approximate data points from the consolidation curve</caption> <thead> <tr> <th>Time (minutes)</th> <th>Compression gauge reading (10^{-3} mm)</th> </tr> </thead> <tbody> <tr><td>0.1</td><td>95.0</td></tr> <tr><td>0.2</td><td>95.0</td></tr> <tr><td>0.3</td><td>95.0</td></tr> <tr><td>0.5</td><td>95.0</td></tr> <tr><td>0.7</td><td>95.0</td></tr> <tr><td>1.0</td><td>95.0</td></tr> <tr><td>2.0</td><td>105.0</td></tr> <tr><td>3.0</td><td>115.0</td></tr> <tr><td>5.0</td><td>125.0</td></tr> <tr><td>10.0</td><td>135.0</td></tr> <tr><td>20.0</td><td>145.0</td></tr> <tr><td>30.0</td><td>155.0</td></tr> <tr><td>50.0</td><td>165.0</td></tr> <tr><td>100.0</td><td>175.0</td></tr> <tr><td>200.0</td><td>180.0</td></tr> <tr><td>500.0</td><td>182.0</td></tr> <tr><td>1000.0</td><td>182.0</td></tr> </tbody> </table>					Time (minutes)	Compression gauge reading (10^{-3} mm)	0.1	95.0	0.2	95.0	0.3	95.0	0.5	95.0	0.7	95.0	1.0	95.0	2.0	105.0	3.0	115.0	5.0	125.0	10.0	135.0	20.0	145.0	30.0	155.0	50.0	165.0	100.0	175.0	200.0	180.0	500.0	182.0	1000.0	182.0
Time (minutes)	Compression gauge reading (10^{-3} mm)																																							
0.1	95.0																																							
0.2	95.0																																							
0.3	95.0																																							
0.5	95.0																																							
0.7	95.0																																							
1.0	95.0																																							
2.0	105.0																																							
3.0	115.0																																							
5.0	125.0																																							
10.0	135.0																																							
20.0	145.0																																							
30.0	155.0																																							
50.0	165.0																																							
100.0	175.0																																							
200.0	180.0																																							
500.0	182.0																																							
1000.0	182.0																																							
Sheet <i>10</i>	Increment no. <i>2</i>	Operator	Checked	Approved																																				
Sheets <i>24</i>	LOADING	<i>N. Jvaridze</i>	<i>T. Gorgidze</i>	<i>L. Gorgidze</i>																																				

Consolidation Curve – Logarithm of Time Fitting Method

LOCATION: <i>Samtredia, Georgia</i>		Job ref.GC1222	Drilling and Laboratory Works for Engineering-geological investigation of Samtredia- Lanchkhuti-Grigoleti Project Motor Road																															
SOIL DESCRIPTION: <i>Gray, soft, intermediately plastic CLAY</i>		Borehole	3																															
		Sample no.																																
		Dept	8.5-8.8																															
		Date	30.08.2012																															
TEST METHOD: <i>BS 1377 : Part 7 : 1990 : 8</i>		Pressure, kPa	25																															
Time (minutes) logarithmic scale The graph plots Compression gauge reading, 10^{-3} mm (Y-axis, 200.0 to 400.0) against Time (minutes) logarithmic scale (X-axis, 0.1 to 10000.0). The curve shows a typical consolidation behavior with an initial linear portion and a final horizontal portion. <table border="1"> <caption>Approximate data points from the consolidation curve</caption> <thead> <tr> <th>Time (minutes)</th> <th>Compression gauge reading, 10^{-3} mm</th> </tr> </thead> <tbody> <tr><td>0.1</td><td>210</td></tr> <tr><td>0.2</td><td>215</td></tr> <tr><td>0.5</td><td>220</td></tr> <tr><td>1.0</td><td>225</td></tr> <tr><td>2.0</td><td>235</td></tr> <tr><td>5.0</td><td>260</td></tr> <tr><td>10.0</td><td>280</td></tr> <tr><td>20.0</td><td>310</td></tr> <tr><td>50.0</td><td>350</td></tr> <tr><td>100.0</td><td>380</td></tr> <tr><td>200.0</td><td>400</td></tr> <tr><td>500.0</td><td>410</td></tr> <tr><td>1000.0</td><td>415</td></tr> <tr><td>10000.0</td><td>420</td></tr> </tbody> </table>					Time (minutes)	Compression gauge reading, 10^{-3} mm	0.1	210	0.2	215	0.5	220	1.0	225	2.0	235	5.0	260	10.0	280	20.0	310	50.0	350	100.0	380	200.0	400	500.0	410	1000.0	415	10000.0	420
Time (minutes)	Compression gauge reading, 10^{-3} mm																																	
0.1	210																																	
0.2	215																																	
0.5	220																																	
1.0	225																																	
2.0	235																																	
5.0	260																																	
10.0	280																																	
20.0	310																																	
50.0	350																																	
100.0	380																																	
200.0	400																																	
500.0	410																																	
1000.0	415																																	
10000.0	420																																	
Sheet 11	Increment no. 3	Operator	Checked	Approved																														
Sheets 24	LOADING	<i>N. Jvaridze</i>	<i>T. Gorgidze</i>	<i>L. Gorgidze</i>																														

Consolidation Curve — Logarithm of Time Fitting Method

LOCATION: <i>Samtredia, Georgia</i>		Job ref.GC1222	Drilling and Laboratory Works for Engineering-geological investigation of Samtredia- Lanchkhuti-Grigoleti Project Motor Road																													
SOIL DESCRIPTION: <i>Gray, soft, intermediately plastic CLAY</i>		Borehole	3																													
		Sample no.																														
		Dept	8.5-8.8																													
		Date	30.08.2012																													
TEST METHOD: <i>BS 1377 : Part 7 : 1990 : 8</i>		Pressure, kPa <i>50</i>																														
Time (minutes) logarithmic scale <table border="1"> <caption>Approximate data points from the consolidation curve</caption> <thead> <tr> <th>Time (minutes)</th> <th>Compression gauge reading, 10⁻³ mm</th> </tr> </thead> <tbody> <tr><td>0.1</td><td>480.0</td></tr> <tr><td>0.2</td><td>490.0</td></tr> <tr><td>0.5</td><td>500.0</td></tr> <tr><td>1.0</td><td>510.0</td></tr> <tr><td>2.0</td><td>530.0</td></tr> <tr><td>5.0</td><td>580.0</td></tr> <tr><td>10.0</td><td>630.0</td></tr> <tr><td>20.0</td><td>680.0</td></tr> <tr><td>50.0</td><td>720.0</td></tr> <tr><td>100.0</td><td>730.0</td></tr> <tr><td>200.0</td><td>730.0</td></tr> <tr><td>500.0</td><td>730.0</td></tr> <tr><td>1000.0</td><td>730.0</td></tr> </tbody> </table>					Time (minutes)	Compression gauge reading, 10 ⁻³ mm	0.1	480.0	0.2	490.0	0.5	500.0	1.0	510.0	2.0	530.0	5.0	580.0	10.0	630.0	20.0	680.0	50.0	720.0	100.0	730.0	200.0	730.0	500.0	730.0	1000.0	730.0
Time (minutes)	Compression gauge reading, 10 ⁻³ mm																															
0.1	480.0																															
0.2	490.0																															
0.5	500.0																															
1.0	510.0																															
2.0	530.0																															
5.0	580.0																															
10.0	630.0																															
20.0	680.0																															
50.0	720.0																															
100.0	730.0																															
200.0	730.0																															
500.0	730.0																															
1000.0	730.0																															
Sheet <i>12</i>	Increment no. <i>4</i>	Operator	Checked	Approved																												
Sheets <i>24</i>	LOADING	<i>N. Jvaridze</i>	<i>T. Gorgidze</i>	<i>L. Gorgidze</i>																												

Consolidation Curve – Logarithm of Time Fitting Method

LOCATION:		Job ref.GC1222	Drilling and Laboratory Works for Engineering-geological investigation of Samtredia- Lanchkhuti-Grigoleti Project Motor Road																													
Samtredia, Georgia																																
SOIL DESCRIPTION:		Borehole	3																													
		Sample no.																														
		Dept	8.5-8.8																													
		Date	30.08.2012																													
TEST METHOD:		BS 1377 : Part 7 : 1990 : 8	Pressure, kPa	100																												
Time (minutes) logarithmic scale Compression gauge reading, 10⁻³ mm <table><caption>Approximate data points from the consolidation curve</caption><thead><tr><th>Time (minutes)</th><th>Compression gauge reading (10⁻³ mm)</th></tr></thead><tbody><tr><td>0.1</td><td>810</td></tr><tr><td>0.2</td><td>825</td></tr><tr><td>0.5</td><td>840</td></tr><tr><td>1.0</td><td>850</td></tr><tr><td>2.0</td><td>865</td></tr><tr><td>5.0</td><td>890</td></tr><tr><td>10.0</td><td>900</td></tr><tr><td>20.0</td><td>920</td></tr><tr><td>50.0</td><td>945</td></tr><tr><td>100.0</td><td>965</td></tr><tr><td>200.0</td><td>985</td></tr><tr><td>500.0</td><td>995</td></tr><tr><td>1000.0</td><td>1000</td></tr></tbody></table>					Time (minutes)	Compression gauge reading (10 ⁻³ mm)	0.1	810	0.2	825	0.5	840	1.0	850	2.0	865	5.0	890	10.0	900	20.0	920	50.0	945	100.0	965	200.0	985	500.0	995	1000.0	1000
Time (minutes)	Compression gauge reading (10 ⁻³ mm)																															
0.1	810																															
0.2	825																															
0.5	840																															
1.0	850																															
2.0	865																															
5.0	890																															
10.0	900																															
20.0	920																															
50.0	945																															
100.0	965																															
200.0	985																															
500.0	995																															
1000.0	1000																															
Sheet	13	Increment no.	5	Operator																												
Sheets	24	LOADING		N. Jvaridze																												
			Checked	T. Gorgidze																												
			Approved	L. Gorgidze																												

Consolidation Curve – Logarithm of Time Fitting Method

LOCATION:		Job ref.GC1222	Drilling and Laboratory Works for Engineering-geological investigation of Samtredia- Lanchkhuti-Grigoleti Project Motor Road	
SOIL DESCRIPTION:		Borehole	3	
		Sample no.		
		Dept	8.5-8.8	
		Date	30.08.2012	
TEST METHOD:		BS 1377 : Part 7 : 1990 : 8	Pressure, kPa	200

Time (minutes) logarithmic scale

The graph plots Compression gauge reading (in units of 10^{-3} mm) on the y-axis against Time (in minutes) on a logarithmic x-axis. The y-axis ranges from 960.0 to 980.0 with major grid lines every 2.0 units. The x-axis ranges from 0.1 to 10000.0 with major grid lines at 0.1, 1.0, 10.0, 100.0, 1000.0, and 10000.0. The data points are connected by a blue line, showing a primary compression phase from approximately 0.2 to 1.0 minutes, followed by a secondary phase. A vertical red line is drawn at approximately 0.8 minutes, and a horizontal red line is drawn at approximately 969.0 mm. The curve levels off after about 10 minutes.

Sheet	14	Increment no.	6	Operator	Checked	Approved
Sheets	24	LOADING		N. Jvaridze	T. Gorgidze	L. Gorgidze

Consolidation Curve – Logarithm of Time Fitting Method

LOCATION: <i>Samtredia, Georgia</i>	Job ref.GC1222	<i>Drilling and Laboratory Works for Engineering-geological investigation of Samtredia- Lanchkhuti-Grigoleti Project Motor Road</i>																														
SOIL DESCRIPTION: <i>Gray, soft, intermediately plastic CLAY</i>	Borehole	3																														
	Sample no.																															
	Dept	8.5-8.8																														
	Date	30.08.2012																														
TEST METHOD:	<i>BS 1377 : Part 7 : 1990 : 8</i>	Pressure, kPa 100																														
Time (minutes) logarithmic scale <table border="1"> <caption>Approximate data points from the consolidation curve</caption> <thead> <tr> <th>Time (minutes)</th> <th>Compression gauge reading, 10^{-3} mm</th> </tr> </thead> <tbody> <tr><td>0.1</td><td>965.0</td></tr> <tr><td>0.2</td><td>964.5</td></tr> <tr><td>0.5</td><td>963.5</td></tr> <tr><td>1.0</td><td>960.0</td></tr> <tr><td>2.0</td><td>957.5</td></tr> <tr><td>3.5</td><td>956.0</td></tr> <tr><td>10.0</td><td>953.0</td></tr> <tr><td>20.0</td><td>951.0</td></tr> <tr><td>50.0</td><td>948.0</td></tr> <tr><td>100.0</td><td>946.0</td></tr> <tr><td>200.0</td><td>945.0</td></tr> <tr><td>500.0</td><td>944.0</td></tr> <tr><td>1000.0</td><td>943.5</td></tr> </tbody> </table>					Time (minutes)	Compression gauge reading, 10^{-3} mm	0.1	965.0	0.2	964.5	0.5	963.5	1.0	960.0	2.0	957.5	3.5	956.0	10.0	953.0	20.0	951.0	50.0	948.0	100.0	946.0	200.0	945.0	500.0	944.0	1000.0	943.5
Time (minutes)	Compression gauge reading, 10^{-3} mm																															
0.1	965.0																															
0.2	964.5																															
0.5	963.5																															
1.0	960.0																															
2.0	957.5																															
3.5	956.0																															
10.0	953.0																															
20.0	951.0																															
50.0	948.0																															
100.0	946.0																															
200.0	945.0																															
500.0	944.0																															
1000.0	943.5																															
Sheet 15	Increment no. 7	Operator	Checked	Approved																												
Sheets 24	UNLOADING	<i>N. Jvaridze</i>	<i>T. Gorgidze</i>	<i>L. Gorgidze</i>																												

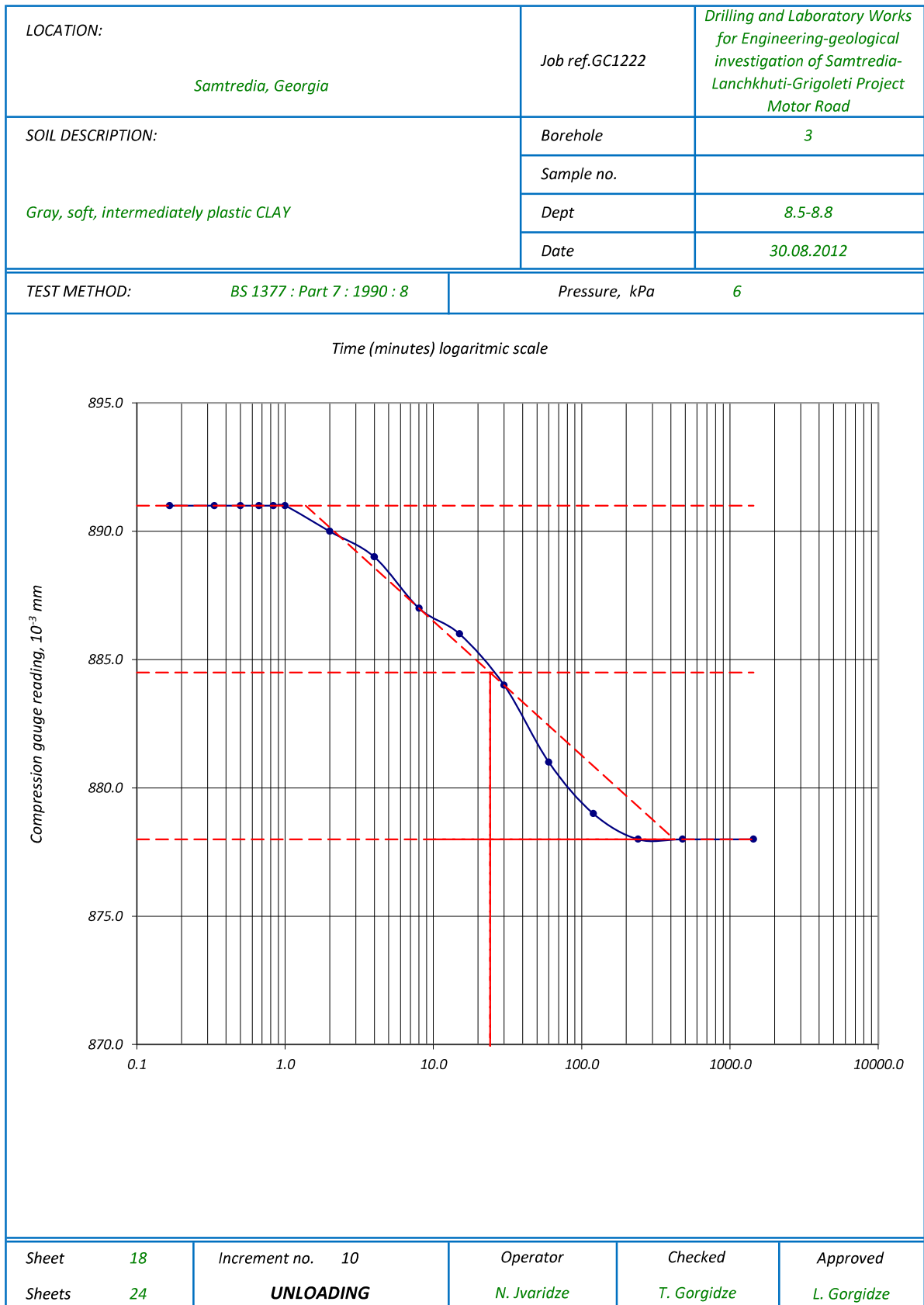
Consolidation Curve – Logarithm of Time Fitting Method

LOCATION:		Job ref.GC1222	Drilling and Laboratory Works for Engineering-geological investigation of Samtredia- Lanchkhuti-Grigoleti Project Motor Road																															
SOIL DESCRIPTION:		Borehole	3																															
Gray, soft, intermediately plastic CLAY		Sample no.																																
		Dept	8.5-8.8																															
		Date	30.08.2012																															
TEST METHOD: BS 1377 : Part 7 : 1990 : 8		Pressure, kPa	50																															
Time (minutes) logarithmic scale The graph plots 'Compression gauge reading, 10⁻³ mm' on the y-axis (ranging from 900.0 to 940.0) against 'Time (minutes) logarithmic scale' on the x-axis (ranging from 0.1 to 10000.0). The data points form a curve that starts at approximately 939.0 at 0.2 minutes, remains relatively flat until 0.8 minutes, then drops sharply to about 925.0 at 10 minutes. From 10 minutes, the curve continues to drop more gradually, reaching approximately 908.5 at 1500 minutes. A dashed red line follows the curve from 0.2 to 10 minutes, then branches off to the right, indicating the unloading path. A vertical dashed red line is drawn at 10 minutes, and a horizontal dashed red line is drawn at 925.0. <table><caption>Approximate data points from the consolidation curve</caption><tr><th>Time (minutes)</th><th>Compression gauge reading (10⁻³ mm)</th></tr><tr><td>0.2</td><td>939.0</td></tr><tr><td>0.4</td><td>939.0</td></tr><tr><td>0.6</td><td>939.0</td></tr><tr><td>0.8</td><td>938.5</td></tr><tr><td>1.0</td><td>937.0</td></tr><tr><td>2.0</td><td>933.0</td></tr><tr><td>4.0</td><td>929.0</td></tr><tr><td>10.0</td><td>925.0</td></tr><tr><td>20.0</td><td>921.0</td></tr><tr><td>40.0</td><td>917.0</td></tr><tr><td>100.0</td><td>912.0</td></tr><tr><td>200.0</td><td>910.0</td></tr><tr><td>500.0</td><td>909.0</td></tr><tr><td>1500.0</td><td>908.5</td></tr></table>					Time (minutes)	Compression gauge reading (10 ⁻³ mm)	0.2	939.0	0.4	939.0	0.6	939.0	0.8	938.5	1.0	937.0	2.0	933.0	4.0	929.0	10.0	925.0	20.0	921.0	40.0	917.0	100.0	912.0	200.0	910.0	500.0	909.0	1500.0	908.5
Time (minutes)	Compression gauge reading (10 ⁻³ mm)																																	
0.2	939.0																																	
0.4	939.0																																	
0.6	939.0																																	
0.8	938.5																																	
1.0	937.0																																	
2.0	933.0																																	
4.0	929.0																																	
10.0	925.0																																	
20.0	921.0																																	
40.0	917.0																																	
100.0	912.0																																	
200.0	910.0																																	
500.0	909.0																																	
1500.0	908.5																																	
Sheet	16	Increment no.	8	Operator																														
Sheets	24	UNLOADING		Checked																														
				Approved																														
		N. Jvaridze		L. Gorgidze																														
		T. Gorgidze																																

Consolidation Curve – Logarithm of Time Fitting Method

LOCATION:		Job ref.GC1222	Drilling and Laboratory Works for Engineering-geological investigation of Samtredia- Lanchkhuti-Grigoleti Project Motor Road																															
SOIL DESCRIPTION:		Borehole	3																															
Gray, soft, intermediately plastic CLAY		Sample no.																																
		Dept	8.5-8.8																															
		Date	30.08.2012																															
TEST METHOD: BS 1377 : Part 7 : 1990 : 8		Pressure, kPa	25																															
Time (minutes) logarithmic scale <table><caption>Approximate data points from the consolidation curve</caption><thead><tr><th>Time (minutes)</th><th>Compression gauge reading (10^{-3} mm)</th></tr></thead><tbody><tr><td>0.1</td><td>904.0</td></tr><tr><td>0.2</td><td>904.0</td></tr><tr><td>0.3</td><td>904.0</td></tr><tr><td>0.5</td><td>904.0</td></tr><tr><td>1.0</td><td>904.0</td></tr><tr><td>2.0</td><td>903.0</td></tr><tr><td>5.0</td><td>901.0</td></tr><tr><td>10.0</td><td>899.0</td></tr><tr><td>20.0</td><td>897.5</td></tr><tr><td>50.0</td><td>896.0</td></tr><tr><td>100.0</td><td>894.0</td></tr><tr><td>200.0</td><td>892.0</td></tr><tr><td>500.0</td><td>891.0</td></tr><tr><td>1000.0</td><td>891.0</td></tr></tbody></table>					Time (minutes)	Compression gauge reading (10^{-3} mm)	0.1	904.0	0.2	904.0	0.3	904.0	0.5	904.0	1.0	904.0	2.0	903.0	5.0	901.0	10.0	899.0	20.0	897.5	50.0	896.0	100.0	894.0	200.0	892.0	500.0	891.0	1000.0	891.0
Time (minutes)	Compression gauge reading (10^{-3} mm)																																	
0.1	904.0																																	
0.2	904.0																																	
0.3	904.0																																	
0.5	904.0																																	
1.0	904.0																																	
2.0	903.0																																	
5.0	901.0																																	
10.0	899.0																																	
20.0	897.5																																	
50.0	896.0																																	
100.0	894.0																																	
200.0	892.0																																	
500.0	891.0																																	
1000.0	891.0																																	
Sheet	17	Increment no.	9	Operator																														
Sheets	24	UNLOADING		N. Jvaridze																														
			Checked	T. Gorgidze																														
			Approved	L. Gorgidze																														

Consolidation Curve – Logarithm of Time Fitting Method



Consolidation Curve – Logarithm of Time Fitting Method

LOCATION: <i>Samtredia, Georgia</i>		Job ref.1222	Drilling and Laboratory Works for Engineering-geological investigation of Samtredia- Lanchkhuti-Grigoleti Project Motor Road																									
SOIL DESCRIPTION: <i>Gray, soft, intermediately plastic CLAY</i>		Borehole	3																									
		Sample no.																										
		Dept	8.5-8.8																									
		Date	30.08.2012																									
TEST METHOD: <i>BS 1377 : Part 7 : 1990 : 8</i>		Pressure, kPa 25																										
Time (minutes) logarithmic scale Compression gauge reading, 10⁻³ mm Time (minutes) logarithmic scale <table border="1"> <caption>Approximate data points from the consolidation curve</caption> <thead> <tr> <th>Time (minutes)</th> <th>Compression gauge reading (10⁻³ mm)</th> </tr> </thead> <tbody> <tr><td>0.1</td><td>928.5</td></tr> <tr><td>0.5</td><td>928.5</td></tr> <tr><td>1.0</td><td>933.5</td></tr> <tr><td>2.0</td><td>935.5</td></tr> <tr><td>5.0</td><td>937.5</td></tr> <tr><td>10.0</td><td>939.0</td></tr> <tr><td>20.0</td><td>940.5</td></tr> <tr><td>50.0</td><td>941.5</td></tr> <tr><td>100.0</td><td>942.0</td></tr> <tr><td>1000.0</td><td>942.5</td></tr> <tr><td>10000.0</td><td>942.5</td></tr> </tbody> </table>					Time (minutes)	Compression gauge reading (10 ⁻³ mm)	0.1	928.5	0.5	928.5	1.0	933.5	2.0	935.5	5.0	937.5	10.0	939.0	20.0	940.5	50.0	941.5	100.0	942.0	1000.0	942.5	10000.0	942.5
Time (minutes)	Compression gauge reading (10 ⁻³ mm)																											
0.1	928.5																											
0.5	928.5																											
1.0	933.5																											
2.0	935.5																											
5.0	937.5																											
10.0	939.0																											
20.0	940.5																											
50.0	941.5																											
100.0	942.0																											
1000.0	942.5																											
10000.0	942.5																											
Sheet 19	Increment no. 11	Operator	Checked	Approved																								
Sheets 24	RELOADING	<i>N. Jvaridze</i>	<i>T. Gorgidze</i>	<i>L. Gorgidze</i>																								

Consolidation Curve — Logarithm of Time Fitting Method

LOCATION: <i>Samtredia, Georgia</i>		Job ref.GC1222	<i>Drilling and Laboratory Works for Engineering-geological investigation of Samtredia- Lanchkhuti-Grigoleti Project Motor Road</i>																															
SOIL DESCRIPTION: <i>Gray, soft, intermediately plastic CLAY</i>		Borehole	3																															
		Sample no.																																
		Dept	8.5-8.8																															
		Date	30.08.2012																															
TEST METHOD: <i>BS 1377 : Part 7 : 1990 : 8</i>		Pressure, kPa	50																															
Time (minutes) logarithmic scale <table border="1"> <caption>Approximate data points from the consolidation curve</caption> <thead> <tr> <th>Time (minutes)</th> <th>Compression gauge reading (10⁻³ mm)</th> </tr> </thead> <tbody> <tr><td>0.1</td><td>950.0</td></tr> <tr><td>0.2</td><td>950.0</td></tr> <tr><td>0.3</td><td>950.0</td></tr> <tr><td>0.5</td><td>950.0</td></tr> <tr><td>1.0</td><td>950.0</td></tr> <tr><td>2.0</td><td>951.0</td></tr> <tr><td>5.0</td><td>952.5</td></tr> <tr><td>10.0</td><td>953.5</td></tr> <tr><td>20.0</td><td>954.5</td></tr> <tr><td>50.0</td><td>955.0</td></tr> <tr><td>100.0</td><td>955.0</td></tr> <tr><td>200.0</td><td>955.0</td></tr> <tr><td>500.0</td><td>955.0</td></tr> <tr><td>1000.0</td><td>955.0</td></tr> </tbody> </table>					Time (minutes)	Compression gauge reading (10 ⁻³ mm)	0.1	950.0	0.2	950.0	0.3	950.0	0.5	950.0	1.0	950.0	2.0	951.0	5.0	952.5	10.0	953.5	20.0	954.5	50.0	955.0	100.0	955.0	200.0	955.0	500.0	955.0	1000.0	955.0
Time (minutes)	Compression gauge reading (10 ⁻³ mm)																																	
0.1	950.0																																	
0.2	950.0																																	
0.3	950.0																																	
0.5	950.0																																	
1.0	950.0																																	
2.0	951.0																																	
5.0	952.5																																	
10.0	953.5																																	
20.0	954.5																																	
50.0	955.0																																	
100.0	955.0																																	
200.0	955.0																																	
500.0	955.0																																	
1000.0	955.0																																	
Sheet <i>20</i>	Increment no. 12	Operator	Checked	Approved																														
Sheets <i>24</i>	RELOADING	<i>N. Jvaridze</i>	<i>T. Gorgidze</i>	<i>L. Gorgidze</i>																														

Consolidation Curve – Logarithm of Time Fitting Method

LOCATION: <i>Samtredia, Georgia</i>		Job ref.GC1222	<i>Drilling and Laboratory Works for Engineering-geological investigation of Samtredia- Lanchkhuti-Grigoleti Project Motor Road</i>	
SOIL DESCRIPTION: <i>Gray, soft, intermediately plastic CLAY</i>		Borehole	3	
		Sample no.		
		Dept	8.5-8.8	
		Date	30.08.2012	
TEST METHOD: <i>BS 1377 : Part 7 : 1990 : 8</i>		Pressure, kPa	100	
Time (minutes) logarithmic scale Compression gauge reading, 10^{-3} mm Time (minutes) logarithmic scale 0.1 1.0 10.0 100.0 1000.0 10000.0 970.0 980.0 990.0 1000.0 1010.0 1020.0				
Sheet 21	Increment no. 13	Operator	Checked	Approved
Sheets 24	RELOADING	<i>N. Jvaridze</i>	<i>T. Gorgidze</i>	<i>L. Gorgidze</i>

Consolidation Curve – Logarithm of Time Fitting Method

LOCATION: <i>Samtredia, Georgia</i>		Job ref.	<i>Drilling and Laboratory Works for Engineering-geological investigation of Samtredia- Lanchkhuti-Grigoleti Project Motor Road</i>																																			
SOIL DESCRIPTION: <i>Gray, soft, intermediately plastic CLAY</i>		Borehole	<i>3</i>																																			
		Sample no.																																				
		Dept	<i>8.5-8.8</i>																																			
		Date	<i>30.08.2012</i>																																			
TEST METHOD: <i>BS 1377 : Part 7 : 1990 : 8</i>		Pressure, kPa <i>200</i>																																				
Time (minutes) logarithmic scale The graph plots compression gauge reading (in units of 10^{-3} mm) on the y-axis against time (in minutes) on a logarithmic x-axis. The y-axis ranges from 832.0 to 2032.0 with major grid lines every 200 units. The x-axis ranges from 0.1 to 10000.0 with major grid lines at 0.1, 1.0, 10.0, 100.0, 1000.0, and 10000.0. A series of data points connected by a solid blue line shows the consolidation curve. A dashed red line is drawn tangent to the initial linear portion of the curve, and a vertical dashed red line is drawn at 10.0 minutes. <table border="1"> <caption>Approximate data points from the consolidation curve</caption> <thead> <tr> <th>Time (minutes)</th> <th>Compression gauge reading (10^{-3} mm)</th> </tr> </thead> <tbody> <tr><td>0.1</td><td>1232.0</td></tr> <tr><td>0.2</td><td>1252.0</td></tr> <tr><td>0.5</td><td>1272.0</td></tr> <tr><td>1.0</td><td>1292.0</td></tr> <tr><td>2.0</td><td>1312.0</td></tr> <tr><td>5.0</td><td>1332.0</td></tr> <tr><td>10.0</td><td>1352.0</td></tr> <tr><td>20.0</td><td>1372.0</td></tr> <tr><td>50.0</td><td>1392.0</td></tr> <tr><td>100.0</td><td>1412.0</td></tr> <tr><td>200.0</td><td>1432.0</td></tr> <tr><td>500.0</td><td>1452.0</td></tr> <tr><td>1000.0</td><td>1472.0</td></tr> <tr><td>2000.0</td><td>1492.0</td></tr> <tr><td>5000.0</td><td>1512.0</td></tr> <tr><td>10000.0</td><td>1532.0</td></tr> </tbody> </table>					Time (minutes)	Compression gauge reading (10^{-3} mm)	0.1	1232.0	0.2	1252.0	0.5	1272.0	1.0	1292.0	2.0	1312.0	5.0	1332.0	10.0	1352.0	20.0	1372.0	50.0	1392.0	100.0	1412.0	200.0	1432.0	500.0	1452.0	1000.0	1472.0	2000.0	1492.0	5000.0	1512.0	10000.0	1532.0
Time (minutes)	Compression gauge reading (10^{-3} mm)																																					
0.1	1232.0																																					
0.2	1252.0																																					
0.5	1272.0																																					
1.0	1292.0																																					
2.0	1312.0																																					
5.0	1332.0																																					
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2000.0	1492.0																																					
5000.0	1512.0																																					
10000.0	1532.0																																					
Sheet <i>22</i>	Increment no. <i>14</i>	Operator	Checked	Approved																																		
Sheets <i>24</i>	RELOADING	<i>N. Jvaridze</i>	<i>T. Gorgidze</i>	<i>L. Gorgidze</i>																																		

Consolidation Curve – Logarithm of Time Fitting Method

LOCATION: <i>Samtredia, Georgia</i>		Job ref.	<i>Drilling and Laboratory Works for Engineering-geological investigation of Samtredia- Lanchkhuti-Grigoleti Project Motor Road</i>	
SOIL DESCRIPTION: <i>Gray, soft, intermediately plastic CLAY</i>		Borehole	<i>3</i>	
		Sample no.		
		Dept	<i>8.5-8.8</i>	
		Date	<i>30.08.2012</i>	
TEST METHOD: <i>BS 1377 : Part 7 : 1990 : 8</i>		Pressure, kPa <i>400</i>		
Time (minutes) logarithmic scale The graph plots compression gauge reading (in units of 10^{-3} mm) on the y-axis against time (in minutes) on a logarithmic x-axis. The y-axis ranges from 2060.0 to 3060.0 with major grid lines every 100.0 units. The x-axis ranges from 0.1 to 10000.0 with major grid lines at 0.1, 1.0, 10.0, 100.0, 1000.0, and 10000.0. A series of blue data points are connected by a solid blue line, showing a typical consolidation curve. A dashed red line is drawn tangent to the initial linear portion of the curve, starting from the y-axis at approximately 2160.0 and extending to the right. A vertical dashed red line is drawn at approximately 5 minutes, intersecting the curve and the tangent line. Horizontal dashed red lines are drawn at approximately 2160.0, 2560.0, and 2960.0 on the y-axis.				
Sheet <i>23</i>	Increment no. <i>15</i>	Operator	Checked	Approved
Sheets <i>24</i>	LOADING	<i>N. Jvaridze</i>	<i>T. Gorgidze</i>	<i>L. Gorgidze</i>

Consolidation Curve — Logarithm of Time Fitting Method

LOCATION: <i>Samtredia, Georgia</i>		Job ref.	<i>Drilling and Laboratory Works for Engineering-geological investigation of Samtredia- Lanchkhuti-Grigoleti Project Motor Road</i>																														
SOIL DESCRIPTION: <i>Gray, soft, intermediately plastic CLAY</i>		Borehole	<i>3</i>																														
		Sample no.																															
		Dept	<i>8.5-8.8</i>																														
		Date	<i>30.08.2012</i>																														
TEST METHOD: <i>BS 1377 : Part 7 : 1990 : 8</i>		Pressure, kPa		<i>800</i>																													
Time (minutes) logarithmic scale <table border="1"> <caption>Approximate data points from the consolidation curve</caption> <thead> <tr> <th>Time (minutes)</th> <th>Compression gauge reading, 10^{-3} mm</th> </tr> </thead> <tbody> <tr><td>0.1</td><td>3170.0</td></tr> <tr><td>0.2</td><td>3200.0</td></tr> <tr><td>0.5</td><td>3250.0</td></tr> <tr><td>1.0</td><td>3300.0</td></tr> <tr><td>2.0</td><td>3400.0</td></tr> <tr><td>5.0</td><td>3600.0</td></tr> <tr><td>10.0</td><td>3750.0</td></tr> <tr><td>20.0</td><td>3900.0</td></tr> <tr><td>50.0</td><td>4000.0</td></tr> <tr><td>100.0</td><td>4050.0</td></tr> <tr><td>200.0</td><td>4070.0</td></tr> <tr><td>500.0</td><td>4070.0</td></tr> <tr><td>1000.0</td><td>4070.0</td></tr> </tbody> </table>						Time (minutes)	Compression gauge reading, 10^{-3} mm	0.1	3170.0	0.2	3200.0	0.5	3250.0	1.0	3300.0	2.0	3400.0	5.0	3600.0	10.0	3750.0	20.0	3900.0	50.0	4000.0	100.0	4050.0	200.0	4070.0	500.0	4070.0	1000.0	4070.0
Time (minutes)	Compression gauge reading, 10^{-3} mm																																
0.1	3170.0																																
0.2	3200.0																																
0.5	3250.0																																
1.0	3300.0																																
2.0	3400.0																																
5.0	3600.0																																
10.0	3750.0																																
20.0	3900.0																																
50.0	4000.0																																
100.0	4050.0																																
200.0	4070.0																																
500.0	4070.0																																
1000.0	4070.0																																
Sheet <i>24</i>	Increment no. <i>16</i>	Operator	Checked	Approved																													
Sheets <i>24</i>	LOADING	<i>N. Jvaridze</i>	<i>T. Gorgidze</i>	<i>L. Gorgidze</i>																													

Consolidation Test – Specimen Details

LOCATION:		Job ref.		Drilling and Laboratory Works for Engineering-geological investigation of Samtredia-Lanchkhuti-Grigoleti Project Motor Road	
SOIL DESCRIPTION:		Borehole		4	
		Sample no.			
		Dept, m		1.2-1.5	
		Date		30.08.2012	
TEST METHOD:		BS1377 : Part 5 : 1990 : 3.5, 3.6		Saturated State	
Cell no. 5		Particle density			
Ring no. 5		asumed 2.72 Mg/m ³			
DIMENSIONS		Initial specimen		Overall change	
Diameter D mm		87.50		87.50	
Area A mm ²		6013.20		6013.20	
Height H mm		H _o 25.00		2.575 22.425	
Volume V cm ³		150.33		15.48 134.85	
WEIGHINGS		Initial specimen		Final specimen	
		(a)		(b)	
Wet soil + ring + tray g		463.43		458.12	
Dry soil + ring + tray g				398.68	
Ring + tray g		193.57		193.57	
Wet soil g		m _o 269.86		m _o 269.86 264.55	
Dry soil g				m _d 205.11 205.11	
Water g				64.75 59.44	
Moisture content (measured) %				31.57 28.98	
Moisture content (from trimmings) %		W _o 31.50			
Density Mg/m ³		1.80		1.80 1.96	
Dry density Mg/m ³		1.37		1.36 1.52	
Voids ratio		e _o 0.993		0.994 0.788	
Degree of saturation %		S _o 86.33		86.43 100.00	
Height of soils H _s mm		12.55		12.54 12.54	
(a) Using moisture content from trimmings					
(b) Using data from (a) and (c)					
(c) Data from specimen after test					
Sheet 1		Operator		Checked	
Sheets 24		N. Jvaridze		T. Gorgidze	
				Approved	
				L. Gorgidze	

Consolidation Test – Settlement Readings

LOCATION:	Samtredia, Georgia	Job ref.	Drilling and Laboratory Works for Engineering-geological investigation of Samtredia- Lanchkhuti-Grigoleti Project Motor Road		
SOIL DESCRIPTION:	Slightly moist, brown, stiff, intermediately plastic CLAY	Borehole	4		
		Sample no.			
		Dept	1.2-1.5		
		Date	30.08.2012		
TEST METHOD: BS 1377 : Part 7 : 1990 : 8					
Machine no.	5	Spec. diam.	87.50	Height	25.00 mm
Cell no.	5	Lever ratio	1:10	Area	6013.20 mm ²
Ring no.	5	<u>1kg</u> on hanger gives pressure of			16.67 kPa

LOADING/UNLOADING/RELOADING

Increment no.					1			2			3		
Date started					#VALUE!			#VALUE!			#VALUE!		
Load kg					0.36			0.72			1.50		
Pressure kPa					6.0			12.0			25.0		
Mean daily temperature 22 °C					LOADING			LOADING			LOADING		
Elapsed time					Clock time	Gauge reading	Cumulative compression mm DH	Clock time	Gauge reading	Cumulative compression mm DH	Clock time	Gauge reading	Cumulative compression mm DH
h	m	s	t min	t °									
0	0	0	0	22	10:15	5.000	0.000	10:15	5.0140	0.0140	10:15	5.1026	0.1026
—	—	10	0.167	22	10:15	5.0040	0.0040	10:15	5.0230	0.0230	10:15	5.1045	0.1045
—	—	20	0.333	22	10:15	5.0054	0.0053	10:15	5.0230	0.0230	10:15	5.1130	0.1130
—	—	30	0.500	22	10:15	5.0064	0.0064	10:15	5.0280	0.0280	10:15	5.1210	0.1210
—	—	40	0.667	22	10:15	5.0066	0.0066	10:15	5.0320	0.0320	10:15	5.1280	0.1280
—	—	50	0.833	22	10:15	5.0066	0.0066	10:15	5.0390	0.0390	10:15	5.1320	0.1320
—	0:01	—	1	22	10:16	5.0067	0.0067	10:16	5.0420	0.0420	10:16	5.1370	0.1370
—	0:02	—	2	22	10:17	5.0068	0.0068	10:17	5.0490	0.0490	10:17	5.1500	0.1500
—	0:04	—	4	22	10:19	5.0074	0.0074	10:19	5.0550	0.0550	10:19	5.1570	0.1570
—	0:08	—	8	22	10:23	5.0085	0.0085	10:23	5.0635	0.0635	10:23	5.1640	0.1640
—	0:15	—	15	22	10:30	5.0090	0.0090	10:30	5.0700	0.0700	10:30	5.1710	0.1710
—	0:30	—	30	22	10:45	5.0100	0.0100	10:45	5.0775	0.0775	10:45	5.1780	0.1780
1:00	—	—	60	21	11:15	5.0116	0.0116	11:15	5.0840	0.0840	11:15	5.1855	0.1855
2:00	—	—	120	21	12:15	5.0125	0.0125	12:15	5.0950	0.0950	12:15	5.1935	0.1935
4:00	—	—	240	21	14:15	5.0135	0.0135	14:15	5.1000	0.1000	14:15	5.1995	0.1995
8:00	—	—	480	20	18:15	5.0139	0.0139	18:15	5.1015	0.1015	18:15	5.2037	0.2037
24:00	—	—	1440	21	10:15	5.0140	0.0140	10:15	5.1026	0.1026	10:15	5.2065	0.2065
36:00	—	—	2160		22:15			22:15			22:15		
48:00	—	—	2880		10:15			10:15			10:15		
Cumulative correction y					0.004			0.008			0.015		
Net cumulative compression (ΔH-y)					0.010			0.095			0.192		
Sheet	2				Operator			Checked			Approved		
Sheets	24				N. Jvaridze			T. Gorgidze			L. Gorgidze		

Consolidation Test – Settlement Readings

LOCATION: <i>Samtredia, Georgia</i>	Job ref.	<i>Drilling and Laboratory Works for Engineering-geological investigation of Samtredia- Lanchkhuti-Grigoleti Project Motor Road</i>
SOIL DESCRIPTION: <i>Slightly moist, brown, stiff, intermediately plastic CLAY</i>	Borehole	<i>4</i>
	Sample no.	
	Dept	<i>1.2-1.5</i>
	Date	<i>30.08.2012</i>
TEST METHOD: <i>BS 1377 : Part 7 : 1990 : 8</i>		
Machine no. <i>5</i>	Spec. diam. <i>87.50</i>	Height <i>25.00 mm</i>
Cell no. <i>5</i>	Lever ratio <i>1:10</i>	Area <i>6013.20 mm²</i>
Ring no. <i>5</i>	<i>1kg on hanger gives pressure of 16.67 kPa</i>	

LOADING/UNLOADING/RELOADING

Increment no.					4			5			6		
Date started					#VALUE!			#VALUE!			#VALUE!		
Load kg					3.000			6.000			3.000		
Pressure kPa					50.0			100.0			50.0		
Mean daily temperature <i>22 °C</i>					LOADING			LOADING			UNLOADING		
Elapsed time				t °	Clock time	Gauge reading	Cumulative compression mm ΔH	Clock time	Gauge reading	Cumulative compression mm ΔH	Clock time	Gauge reading	Cumulative compression mm ΔH
h	m	s	t min										
0	0	0	0	22	10:15	5.2065	0.2065	10:15	5.5070	0.5070	10:15	5.8890	0.8890
—	—	10	0.167	22	10:15	5.3550	0.3550	10:15	5.6850	0.6850	10:15	5.8810	0.8810
—	—	20	0.333	22	10:15	5.3705	0.3705	10:15	5.7035	0.7035	10:15	5.8810	0.8810
—	—	30	0.500	22	10:15	5.3785	0.3785	10:15	5.7160	0.7160	10:15	5.8800	0.8800
—	—	40	0.667	22	10:15	5.3885	0.3885	10:15	5.7400	0.7400	10:15	5.8795	0.8795
—	—	50	0.833	22	10:15	5.3980	0.3980	10:15	5.7500	0.7500	10:15	5.8792	0.8792
—	0:01	—	1	22	10:16	5.4050	0.4050	10:16	5.7550	0.7550	10:16	5.8790	0.8790
—	0:02	—	2	22	10:17	5.4240	0.4240	10:17	5.7850	0.7850	10:17	5.8770	0.8770
—	0:04	—	4	22	10:19	5.4360	0.4360	10:19	5.7985	0.7985	10:19	5.8760	0.8760
—	0:08	—	8	22	10:23	5.4430	0.4430	10:23	5.8070	0.8070	10:23	5.8750	0.8749
—	0:15	—	15	22	10:30	5.4535	0.4535	10:30	5.8220	0.8220	10:30	5.8743	0.8743
—	0:30	—	30	22	10:45	5.4650	0.4650	10:45	5.8355	0.8355	10:45	5.8737	0.8737
1:00	—	—	60	21	11:15	5.4720	0.4720	11:15	5.8440	0.8440	11:15	5.8731	0.8731
2:00	—	—	120	21	12:15	5.4835	0.4835	12:15	5.8570	0.8570	12:15	5.8726	0.8726
4:00	—	—	240	21	14:15	5.4930	0.4930	14:15	5.8690	0.8690	14:15	5.8722	0.8722
8:00	—	—	480	20	18:15	5.5027	0.5027	18:15	5.8780	0.8780	18:15	5.8718	0.8718
24:00	—	—	1440	21	10:15	5.5070	0.5070	10:15	5.8890	0.8890	10:15	5.8716	0.8716
36:00	—	—	2160		22:15			22:15			22:15		
48:00	—	—	2880		10:15			10:15			10:15		
Cumulative correction y					0.030			0.047			0.030		
Net cumulative compression (ΔH-y)					0.477			0.842			0.842		
Sheet	3				Operator			Checked			Approved		
Sheets	24				N. Jvaridze			T. Gorgidze			L. Gorgidze		

Consolidation Test – Settlement Readings

LOCATION:	Samtredia, Georgia	Job ref.	Drilling and Laboratory Works for Engineering-geological investigation of Samtredia- Lanchkhuti-Grigoleti Project Motor Road
SOIL DESCRIPTION:	Slightly moist, brown, stiff, intermediately plastic CLAY	Borehole	4
		Sample no.	
		Dept	1.2-1.5
		Date	30.08.2012
TEST METHOD:	BS 1377 : Part 7 : 1990 : 8		
Machine no.	5	Spec. diam.	87.50
		Height	25.00 mm
Cell no.	5	Lever ratio	1:10
		Area	6013.20 mm ²
Ring no.	5	<u>1kg</u> on hanger gives pressure of	16.67 кПа

LOADING/UNLOADING/RELOADING

Increment no.					7			8			9		
Date started					#VALUE!			#VALUE!			#VALUE!		
Load kg					1.500			0.720			0.360		
Pressure kPa					25.0			12.0			6.0		
Mean daily temperature 22 ° C					UNLOADING			UNLOADING			UNLOADING		
Elapsed time				t °	Clock time	Gauge reading	Cumulative compression mm ΔH	Clock time	Gauge reading	Cumulative compression mm ΔH	Clock time	Gauge reading	Cumulative compression mm ΔH
h	m	s	t min										
0	0	0	0	22	10:15	5.8700	0.8700	10:15	5.8270	0.8270	10:15	5.7690	0.7690
—	—	10	0.167	22	10:15	5.8480	0.8480	10:15	5.8050	0.8050	10:15	5.7550	0.7550
—	—	20	0.333	22	10:15	5.8450	0.8450	10:15	5.8040	0.8040	10:15	5.7550	0.7550
—	—	30	0.500	22	10:15	5.8450	0.8450	10:15	5.8040	0.8040	10:15	5.7550	0.7550
—	—	40	0.667	22	10:15	5.8430	0.8430	10:15	5.8010	0.8010	10:15	5.7550	0.7550
—	—	50	0.833	22	10:15	5.8420	0.8420	10:15	5.7950	0.7950	10:15	5.7550	0.7550
—	0:01	—	1	22	10:16	5.8420	0.8420	10:16	5.7920	0.7920	10:16	5.7550	0.7550
—	0:02	—	2	22	10:17	5.8400	0.8400	10:17	5.7875	0.7875	10:17	5.7550	0.7550
—	0:04	—	4	22	10:19	5.8380	0.8380	10:19	5.7860	0.7860	10:19	5.7520	0.7520
—	0:08	—	8	22	10:23	5.8360	0.8360	10:23	5.7840	0.7840	10:23	5.7500	0.7500
—	0:15	—	15	22	10:30	5.8340	0.8340	10:30	5.7810	0.7810	10:30	5.7480	0.7480
—	0:30	—	30	22	10:45	5.8320	0.8320	10:45	5.7780	0.7780	10:45	5.7460	0.7460
1:00	—	—	60	21	11:15	5.8300	0.8300	11:15	5.7760	0.7760	11:15	5.7440	0.7440
2:00	—	—	120	21	12:15	5.8280	0.8280	12:15	5.7735	0.7735	12:15	5.7410	0.7410
4:00	—	—	240	21	14:15	5.8270	0.8270	14:15	5.7720	0.7720	14:15	5.7390	0.7390
8:00	—	—	480	20	18:15	5.8270	0.8270	18:15	5.7695	0.7695	18:15	5.7370	0.7370
24:00	—	—	1440	21	10:15	5.8270	0.8270	10:15	5.7690	0.7690	10:15	5.7365	0.7365
36:00	—	—	2160		22:15			22:15			22:15		
48:00	—	—	2880		10:15			10:15			10:15		
Cumulative correction y					0.015			0.008			0.004		
Net cumulative compression (ΔH-y)					0.812			0.761			0.732		
Sheet		4						Operator		Checked		Approved	
Sheets		24						N. Jvaridze		T. Gorgidze		L. Gorgidze	

Consolidation Test – Settlement Readings

LOCATION: <i>Samtredia, Georgia</i>	Job ref.	<i>Drilling and Laboratory Works for Engineering-geological investigation of Samtredia- Lanchkhuti-Grigoleti Project Motor Road</i>
SOIL DESCRIPTION: <i>Slightly moist, brown, stiff, intermediately plastic CLAY</i>	Borehole	4
	Sample no.	
	Dept	1.2-1.5
	Date	30.08.2012
TEST METHOD: <i>BS 1377 : Part 7 : 1990 : 8</i>		
Machine no. 5	Spec. diam. 87.50	Height 25.00 mm
Cell no. 5	Lever ratio 1:10	Area 6013.20 mm ²
Ring no. 5	<u>1kg</u> on hanger gives pressure of 16.67 кПа	

LOADING/UNLOADING/RELOADING

Increment no.					10			11			12		
Date started					#VALUE!			#VALUE!			#VALUE!		
Load kg					0.002			0.004			0.008		
Pressure kPa					12.0			25.0			50.0		
Mean daily temperature 22 ° C					RELOADING			RELOADING			RELOADING		
Elapsed time				t °	Clock time	Gauge reading	Cumulative compression mm ΔH	Clock time	Gauge reading	Cumulative compression mm ΔH	Clock time	Gauge reading	Cumulative compression mm ΔH
h	m	s	t min										
0	0	0	0	22	10:15	5.7365	0.7365	10:15	5.7470	0.7470	10:15	5.7582	0.7582
—	—	10	0.167	22	10:15	5.7380	0.7380	10:15	5.7500	0.7500	10:15	5.7780	0.7780
—	—	20	0.333	22	10:15	5.7380	0.7380	10:15	5.7500	0.7500	10:15	5.7820	0.7820
—	—	30	0.500	22	10:15	5.7380	0.7380	10:15	5.7500	0.7500	10:15	5.7850	0.7850
—	—	40	0.667	22	10:15	5.7380	0.7380	10:15	5.7500	0.7500	10:15	5.7890	0.7890
—	—	50	0.833	22	10:15	5.7380	0.7380	10:15	5.7500	0.7500	10:15	5.7930	0.7930
—	0:01	—	1	22	10:16	5.7380	0.7380	10:16	5.7500	0.7500	10:16	5.7960	0.7960
—	0:02	—	2	22	10:17	5.7390	0.7390	10:17	5.7500	0.7500	10:17	5.8000	0.8000
—	0:04	—	4	22	10:19	5.7400	0.7400	10:19	5.7510	0.7510	10:19	5.8020	0.8020
—	0:08	—	8	22	10:23	5.7410	0.7410	10:23	5.7520	0.7520	10:23	5.8050	0.8050
—	0:15	—	15	22	10:30	5.7420	0.7420	10:30	5.7530	0.7530	10:30	5.8060	0.8060
—	0:30	—	30	22	10:45	5.7430	0.7430	10:45	5.7540	0.7540	10:45	5.8072	0.8072
1:00	—	—	60	21	11:15	5.7440	0.7440	11:15	5.7550	0.7550	11:15	5.8090	0.8090
2:00	—	—	120	21	12:15	5.7450	0.7450	12:15	5.7560	0.7560	12:15	5.8100	0.8100
4:00	—	—	240	21	14:15	5.7460	0.7460	14:15	5.7570	0.7570	14:15	5.8120	0.8120
8:00	—	—	480	20	18:15	5.7467	0.7467	18:15	5.7580	0.7580	18:15	5.8140	0.8140
24:00	—	—	1440	21	10:15	5.7470	0.7470	10:15	5.7582	0.7582	10:15	5.8143	0.8143
36:00	—	—	2160		22:15			22:15			22:15		
48:00	—	—	2880		10:15			10:15			10:15		
Cumulative correction y					0.008			0.015			0.030		
Net cumulative compression (ΔH-y)					0.739			0.743			0.784		
Sheet		5						Operator		Checked		Approved	
Sheets		24						N. Jvaridze		T. Gorgidze		L. Gorgidze	

Consolidation Test – Settlement Readings

LOCATION: <i>Samtredia, Georgia</i>	Job ref.	<i>Drilling and Laboratory Works for Engineering-geological investigation of Samtredia- Lanchkhuti-Grigoleti Project Motor Road</i>
SOIL DESCRIPTION: <i>Slightly moist, brown, stiff, intermediately plastic CLAY</i>	Borehole	<i>4</i>
	Sample no.	
	Dept	<i>1.2-1.5</i>
	Date	<i>30.08.2012</i>
TEST METHOD: <i>BS 1377 : Part 7 : 1990 : 8</i>		
Machine no. <i>5</i>	Spec. diam. <i>87.50</i>	Height <i>25.00 mm</i>
Cell no. <i>5</i>	Lever ratio <i>1:10</i>	Area <i>6013.20 mm²</i>
Ring no. <i>5</i>	<i>1kg</i> on hanger gives pressure of <i>16.67 kPa</i>	

LOADING/UNLOADING/RELOADING

Increment no.					13			14			15		
Date started					#VALUE!			#VALUE!			#VALUE!		
Load kg					6.000			12.000			24.000		
Pressure kPa					100.0			200.0			400.0		
Mean daily temperature <i>22 ° C</i>					RELOADING			RELOADING			LOADING		
Elapsed time				t °	Clock time	Gauge reading	Cumulative compression mm ΔH	Clock time	Gauge reading	Cumulative compression mm ΔH	Clock time	Gauge reading	Cumulative compression mm ΔH
h	m	s	t min										
0	0	0	0	22	10:15	5.8143	0.8143	10:15	5.9220	0.9220	10:15	6.3600	1.3600
–	–	10	0.167	22	10:15	5.8810	0.8810	10:15	6.1200	1.1200	10:15	6.7100	1.7100
–	–	20	0.333	22	10:15	5.8840	0.8840	10:15	6.1360	1.1360	10:15	6.7320	1.7320
–	–	30	0.500	22	10:15	5.8920	0.8920	10:15	6.1460	1.1460	10:15	6.7500	1.7500
–	–	40	0.667	22	10:15	5.8940	0.8940	10:15	6.1800	1.1800	10:15	6.7740	1.7740
–	–	50	0.833	22	10:15	5.8950	0.8950	10:15	6.1940	1.1940	10:15	6.7890	1.7890
–	0:01	–	1	22	10:16	5.8950	0.8950	10:16	6.2000	1.2000	10:16	6.7940	1.7940
–	0:02	–	2	22	10:17	5.8990	0.8990	10:17	6.2250	1.2250	10:17	6.8260	1.8260
–	0:04	–	4	22	10:19	5.9014	0.9014	10:19	6.2500	1.2500	10:19	6.8470	1.8470
–	0:08	–	8	22	10:23	5.9040	0.9040	10:23	6.2690	1.2690	10:23	6.8700	1.8700
–	0:15	–	15	22	10:30	5.9070	0.9070	10:30	6.2790	1.2790	10:30	6.8850	1.8850
–	0:30	–	30	22	10:45	5.9110	0.9110	10:45	6.3020	1.3020	10:45	6.9130	1.9130
1:00	–	–	60	21	11:15	5.9140	0.9140	11:15	6.3150	1.3150	11:15	6.9340	1.9340
2:00	–	–	120	21	12:15	5.9165	0.9165	12:15	6.3310	1.3310	12:15	6.9440	1.9440
4:00	–	–	240	21	14:15	5.9190	0.9190	14:15	6.3430	1.3430	14:15	6.9580	1.9580
8:00	–	–	480	20	18:15	5.9210	0.9210	18:15	6.3590	1.3590	18:15	6.9680	1.9680
24:00	–	–	1440	21	10:15	5.9220	0.9220	10:15	6.3600	1.3600	10:15	6.9720	1.9720
36:00	–	–	2160		22:15			22:15			22:15		
48:00	–	–	2880		10:15			10:15			10:15		
Cumulative correction <i>y</i>					0.047			0.075			0.121		
Net cumulative compression (ΔH-y)					0.875			1.285			1.851		
Sheet	6				Operator			Checked			Approved		
Sheets	24				N. Jvaridze			T. Gorgidze			L. Gorgidze		

Consolidation Test – Settlement Readings

LOCATION: <i>Samtredia, Georgia</i>	Job ref.	<i>Drilling and Laboratory Works for Engineering-geological investigation of Samtredia- Lanchkhuti-Grigoleti Project Motor Road</i>
SOIL DESCRIPTION: <i>Slightly moist, brown, stiff, intermediately plastic CLAY</i>	Borehole	<i>4</i>
	Sample no.	
	Dept	<i>1.2-1.5</i>
	Date	<i>30.08.2012</i>
TEST METHOD: <i>BS 1377 : Part 7 : 1990 : 8</i>		
Machine no. <i>5</i>	Spec. diam. <i>87.50</i>	Height <i>25.00 mm</i>
Cell no. <i>5</i>	Lever ratio <i>1:10</i>	Area <i>6013.20 mm²</i>
Ring no. <i>5</i>	<i>1kg</i> on hanger gives pressure of <i>16.67 kPa</i>	

LOADING/UNLOADING/RELOADING

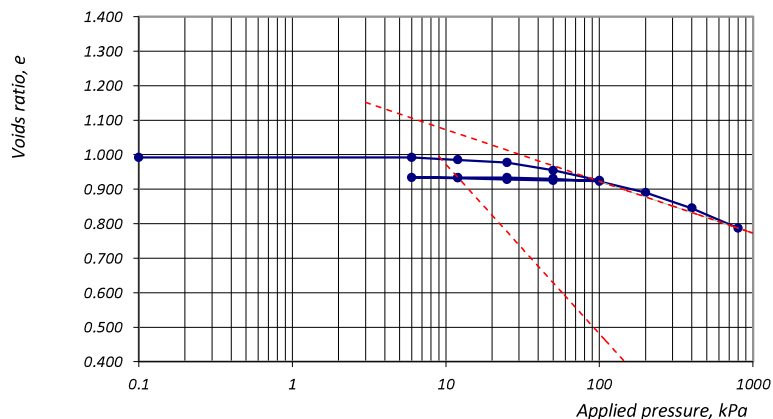
Increment no.					16			17			18		
Date started					#VALUE!								
Load kg					47.999								
Pressure kPa					800.0								
Mean daily temperature <i>22 °C</i>					LOADING								
Elapsed time				t ^o	Clock time	Gauge reading	Cumulative compression mm ΔH	Clock time	Gauge reading	Cumulative compression mm ΔH	Clock time	Gauge reading	Cumulative compression mm ΔH
h	m	s	t min										
0	0	0	0	22	10:15	6.9720	1.9720						
—	—	10	0.167	22	10:15	7.4300	2.4300						
—	—	20	0.333	22	10:15	7.4460	2.4460						
—	—	30	0.500	22	10:15	7.4610	2.4610						
—	—	40	0.667	22	10:15	7.4770	2.4770						
—	—	50	0.833	22	10:15	7.4920	2.4920						
—	0:01	—	1	22	10:16	7.5090	2.5090						
—	0:02	—	2	22	10:17	7.5610	2.5610						
—	0:04	—	4	22	10:19	7.5970	2.5970						
—	0:08	—	8	22	10:23	7.6160	2.6160						
—	0:15	—	15	22	10:30	7.6480	2.6480						
—	0:30	—	30	22	10:45	7.6750	2.6750						
1:00	—	—	60	21	11:15	7.6900	2.6900						
2:00	—	—	120	21	12:15	7.7130	2.7130						
4:00	—	—	240	21	14:15	7.7250	2.7250						
8:00	—	—	480	20	18:15	7.7360	2.7360						
24:00	—	—	1440	21	10:15	7.7370	2.7370						
36:00	—	—	2160		22:15								
48:00	—	—	2880		10:15								
Cumulative correction y					0.162								
Net cumulative compression (ΔH-y)					2.575								
Sheet	7				Operator			Checked			Approved		
Sheets	24				N. Jvaridze			T. Gorgidze			L. Gorgidze		

Consolidation Test – Calculations

LOCATION: <i>Samtredia, Georgia</i>					Job ref.		<i>Drilling and Laboratory Works for Engineering-geological investigation of Samtredia-Lanchkhuti-Grigoleti Project Motor Road</i>				
SOIL DESCRIPTION: <i>Slightly moist, brown, stiff, intermediately plastic CLAY</i>					Borehole/ Pit no.		4				
					Sample no.						
					Dept		1.2-1.5				
					Date		30.08.2012				
TEST METHOD: <i>BS 1377 : Part 7 : 1990 : 8</i>											
Machine no. 5		Specimen diameter 87.50 mm					Height H_0 , 25.0 mm				
Cell no. 5		Height of solids H_s 12.55 mm									
Ring no. 5		Initial voids ratio e_1 0.993									
VOIDS RATIO					COMPRESSIBILITY			COEFFICIENT OF CONSOLIDATION			
Increment no.	Pressure P kPa	Cumulative compression ($\Delta H-y$) mm	Consolidated height $H=H_0-(\Delta H-y)$ mm	Voids ratio $e = \frac{H-H_s}{H_s}$	Incremental		$m = \frac{\partial H}{H} \cdot \frac{1000}{\partial p}$ m^2/MN	t_{50} min	$\bar{H} = \frac{1}{2}(H_1 + H_2)$ mm	$c_v =$	
					height change, δH mm	pressure change δp kPa				$\frac{0.026H^2}{t_{50}}$ $m^2/year$	$\frac{0.111H^2}{t_{90}}$ $m^2/year$
0	0	0.000	25.00	0.993	0.00	0	—	—	—	—	
1	6.0	0.010	24.99	0.992	0.01	6.0	—	—	—	—	
2	12.0	0.095	24.91	0.985	0.08	6.0	0.56	4.76	24.95	3.40	
3	25.0	0.192	24.81	0.977	0.10	13.0	0.30	1.05	24.86	15.31	
4	50.0	0.477	24.52	0.955	0.29	25.0	0.46	0.94	24.67	16.89	
5	100.0	0.842	24.16	0.925	0.36	50.0	0.30	0.45	24.34	34.51	
6	50.0	0.842	24.16	0.925	0.00	-50.0	0.00	1.01	24.16	14.99	
7	25.0	0.812	24.19	0.928	-0.03	-25.0	0.05	2.03	24.17	7.47	
8	12.0	0.761	24.24	0.932	-0.05	-13.0	0.16	0.52	24.21	29.36	
9	6.0	0.732	24.27	0.934	-0.03	-6.0	0.20	31.91	24.25	0.48	
10	12.0	0.739	24.26	0.934	0.01	6.0	0.04	19.62	24.26	0.78	
11	25.0	0.743	24.26	0.933	0.00	13.0	0.01	31.16	24.26	0.49	
12	50.0	0.784	24.22	0.930	0.04	25.0	0.07	0.01	24.24	1197.51	
13	100.0	0.875	24.13	0.923	0.09	50.0	0.07	0.71	24.17	21.41	
14	200.0	1.285	23.72	0.890	0.41	100.0	0.17	0.75	23.92	19.94	
15	400.0	1.851	23.15	0.845	0.57	200.0	0.12	1.06	23.43	13.52	
16	800.0	2.575	22.43	0.787	0.72	400.0	0.08	1.90	22.79	7.10	
Sheet 8					Operator		Checked		Approved		
Sheets 24					N. Jvaridze		T. Gorgidze		L. Gorgidze		

Consolidation Test – Log Pressure/Voids Ratio Curve

LOCATION:		Job ref.	Drilling and Laboratory Works for Engineering-geological investigation of Samtredia- Lanchkhuti-Grigoleti Project Motor Road	
SOIL DESCRIPTION:		Borehole	4	
Slightly moist, brown, stiff, intermediately plastic CLAY		Sample no.		
		Dept	1.2-1.5	
		Date	30.08.2012	
TEST METHOD: BS 1377 : Part 7 : 1990 : 8				
SPECIMEN INITIALLY		Pressure stage kPa	Laboratory coefficients of	
Diameter 87.50 mm	Density 1.80 Mg/m ³		Compressibility, m_v m ² /MN	Consolidation, C_v m ² /year
Height 25.00 mm	Moisture content 31.5 %			
Voids ratio 0.993	Dry density 1.37 Mg/m ³	0.0	-	-
Saturation 86.33 %	Particle density 2.72 Mg/m ³			
Depth below surface m		6	-	-
Swelling pressure 0.00 kPa				
Compression Index, C_c 0.15		12	0.56	3.40
Recompression Index, C_r 0.491				
Preconsolidation Pressure, P_c kPa		25	0.30	15.31
Remarks:		50	0.46	16.89
		100	0.30	34.51
		50	0.00	14.99
		25	0.05	7.47
		12	0.16	29.36
		6	0.20	0.48
		12	0.04	0.78
		25	0.01	0.49
		50	0.07	1197.51
		100	0.07	21.41
		200	0.17	19.94
		400	0.12	13.52
800	0.08	7.10		
Sheet 9		Operator	Checked	Approved
Sheets 24		N. Jvaridze	T. Gorgidze	L. Gorgidze



Consolidation Curve – Logarithm of Time Fitting Method

LOCATION: <i>Samtredia, Georgia</i>		Job ref.	<i>Drilling and Laboratory Works for Engineering-geological investigation of Samtredia- Lanchkhuti-Grigoleti Project Motor Road</i>		
SOIL DESCRIPTION: <i>Slightly moist, brown, stiff, intermediately plastic CLAY</i>		Borehole	<i>4</i>		
		Sample no.			
		Dept	<i>1.2-1.5</i>		
		Date	<i>30.08.2012</i>		
TEST METHOD: <i>BS 1377 : Part 7 : 1990 : 8</i>		Pressure, kPa		<i>6</i>	

Time (minutes) logarithmic scale

Compression gauge reading, 10^{-3} mm

Sheet	<i>9</i>	Increment no.	<i>1</i>	Operator	<i>N. Jvaridze</i>	Checked	<i>T. Gorgidze</i>	Approved	<i>L. Gorgidze</i>
Sheets	<i>24</i>	LOADING							

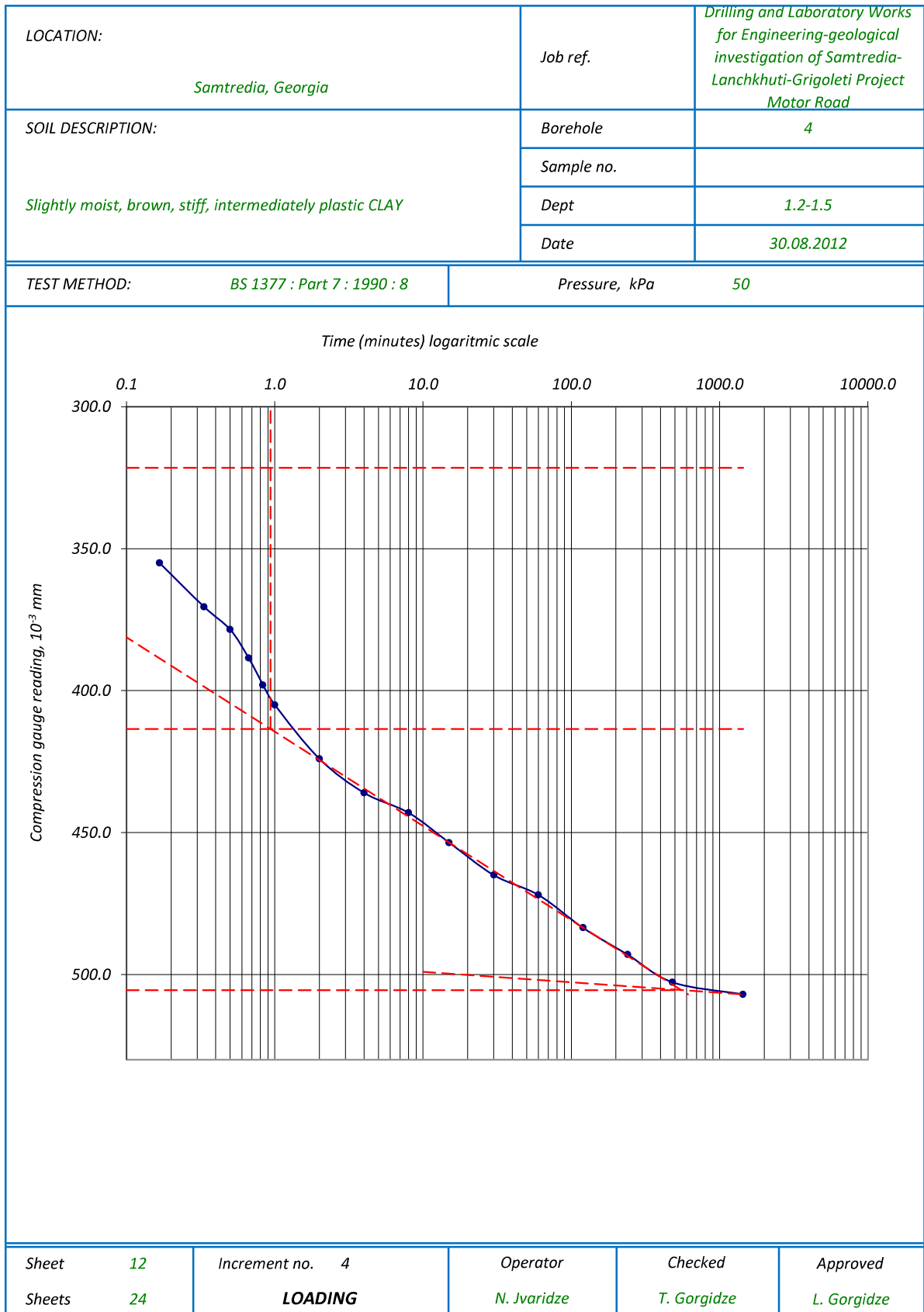
Consolidation Curve – Logarithm of Time Fitting Method

LOCATION: <i>Samtredia, Georgia</i>		Job ref.	<i>Drilling and Laboratory Works for Engineering-geological investigation of Samtredia- Lanchkhuti-Grigoleti Project Motor Road</i>																																			
SOIL DESCRIPTION: <i>Slightly moist, brown, stiff, intermediately plastic CLAY</i>		Borehole	<i>4</i>																																			
		Sample no.																																				
		Dept	<i>1.2-1.5</i>																																			
		Date	<i>30.08.2012</i>																																			
TEST METHOD: <i>BS 1377 : Part 7 : 1990 : 8</i>		Pressure, kPa <i>12</i>																																				
Time (minutes) logarithmic scale Compression gauge reading, 10^{-3} mm Time (minutes) logarithmic scale <table border="1"> <caption>Approximate data points from the consolidation curve</caption> <thead> <tr> <th>Time (minutes)</th> <th>Compression gauge reading, 10^{-3} mm</th> </tr> </thead> <tbody> <tr><td>0.1</td><td>35.0</td></tr> <tr><td>0.2</td><td>35.0</td></tr> <tr><td>0.5</td><td>38.0</td></tr> <tr><td>1.0</td><td>42.0</td></tr> <tr><td>2.0</td><td>48.0</td></tr> <tr><td>5.0</td><td>55.0</td></tr> <tr><td>10.0</td><td>60.0</td></tr> <tr><td>20.0</td><td>65.0</td></tr> <tr><td>50.0</td><td>72.0</td></tr> <tr><td>100.0</td><td>78.0</td></tr> <tr><td>200.0</td><td>85.0</td></tr> <tr><td>500.0</td><td>92.0</td></tr> <tr><td>1000.0</td><td>98.0</td></tr> <tr><td>2000.0</td><td>100.0</td></tr> <tr><td>5000.0</td><td>100.0</td></tr> <tr><td>10000.0</td><td>100.0</td></tr> </tbody> </table>					Time (minutes)	Compression gauge reading, 10^{-3} mm	0.1	35.0	0.2	35.0	0.5	38.0	1.0	42.0	2.0	48.0	5.0	55.0	10.0	60.0	20.0	65.0	50.0	72.0	100.0	78.0	200.0	85.0	500.0	92.0	1000.0	98.0	2000.0	100.0	5000.0	100.0	10000.0	100.0
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Sheet <i>10</i>	Increment no. <i>2</i>	Operator	Checked	Approved																																		
Sheets <i>24</i>	LOADING	<i>N. Jvaridze</i>	<i>T. Gorgidze</i>	<i>L. Gorgidze</i>																																		

Consolidation Curve – Logarithm of Time Fitting Method

LOCATION: <i>Samtredia, Georgia</i>		Job ref.	<i>Drilling and Laboratory Works for Engineering-geological investigation of Samtredia- Lanchkhuti-Grigoleti Project Motor Road</i>																																
SOIL DESCRIPTION: <i>Slightly moist, brown, stiff, intermediately plastic CLAY</i>		Borehole	<i>4</i>																																
		Sample no.																																	
		Dept	<i>1.2-1.5</i>																																
		Date	<i>30.08.2012</i>																																
TEST METHOD: <i>BS 1377 : Part 7 : 1990 : 8</i>		Pressure, kPa		<i>25</i>																															
Time (minutes) logarithmic scale <table border="1"> <caption>Approximate data points from the consolidation curve</caption> <thead> <tr> <th>Time (minutes)</th> <th>Compression gauge reading, 10^{-3} mm</th> </tr> </thead> <tbody> <tr><td>0.1</td><td>110.0</td></tr> <tr><td>0.2</td><td>115.0</td></tr> <tr><td>0.5</td><td>125.0</td></tr> <tr><td>1.0</td><td>135.0</td></tr> <tr><td>2.0</td><td>145.0</td></tr> <tr><td>5.0</td><td>155.0</td></tr> <tr><td>10.0</td><td>165.0</td></tr> <tr><td>20.0</td><td>175.0</td></tr> <tr><td>50.0</td><td>185.0</td></tr> <tr><td>100.0</td><td>195.0</td></tr> <tr><td>200.0</td><td>200.0</td></tr> <tr><td>500.0</td><td>205.0</td></tr> <tr><td>1000.0</td><td>205.0</td></tr> <tr><td>10000.0</td><td>205.0</td></tr> </tbody> </table>						Time (minutes)	Compression gauge reading, 10^{-3} mm	0.1	110.0	0.2	115.0	0.5	125.0	1.0	135.0	2.0	145.0	5.0	155.0	10.0	165.0	20.0	175.0	50.0	185.0	100.0	195.0	200.0	200.0	500.0	205.0	1000.0	205.0	10000.0	205.0
Time (minutes)	Compression gauge reading, 10^{-3} mm																																		
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Sheet <i>11</i>	Increment no. <i>3</i>	Operator	Checked	Approved																															
Sheets <i>24</i>	LOADING	<i>N. Jvaridze</i>	<i>T. Gorgidze</i>	<i>L. Gorgidze</i>																															

Consolidation Curve — Logarithm of Time Fitting Method



Consolidation Curve – Logarithm of Time Fitting Method

LOCATION:		Job ref.	Drilling and Laboratory Works for Engineering-geological investigation of Samtredia- Lanchkhuti-Grigoleti Project Motor Road																													
SOIL DESCRIPTION:		Borehole	4																													
		Sample no.																														
		Dept	1.2-1.5																													
		Date	30.08.2012																													
Slightly moist, brown, stiff, intermediately plastic CLAY																																
TEST METHOD:		Pressure, kPa	100																													
BS 1377 : Part 7 : 1990 : 8																																
Time (minutes) logarithmic scale Compression gauge reading, 10⁻³ mm <table><caption>Approximate data points from the consolidation curve</caption><thead><tr><th>Time (minutes)</th><th>Compression gauge reading (10⁻³ mm)</th></tr></thead><tbody><tr><td>0.1</td><td>685</td></tr><tr><td>0.2</td><td>700</td></tr><tr><td>0.5</td><td>715</td></tr><tr><td>1.0</td><td>730</td></tr><tr><td>2.0</td><td>750</td></tr><tr><td>5.0</td><td>780</td></tr><tr><td>10.0</td><td>800</td></tr><tr><td>20.0</td><td>815</td></tr><tr><td>50.0</td><td>840</td></tr><tr><td>100.0</td><td>855</td></tr><tr><td>200.0</td><td>870</td></tr><tr><td>500.0</td><td>880</td></tr><tr><td>1000.0</td><td>885</td></tr></tbody></table>					Time (minutes)	Compression gauge reading (10 ⁻³ mm)	0.1	685	0.2	700	0.5	715	1.0	730	2.0	750	5.0	780	10.0	800	20.0	815	50.0	840	100.0	855	200.0	870	500.0	880	1000.0	885
Time (minutes)	Compression gauge reading (10 ⁻³ mm)																															
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Sheet	13	Increment no.	5	Operator																												
Sheets	24	LOADING		N. Jvaridze																												
			Checked	T. Gorgidze																												
			Approved	L. Gorgidze																												

Consolidation Curve – Logarithm of Time Fitting Method

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TEST METHOD:		BS 1377 : Part 7 : 1990 : 8	Pressure, kPa	50																												
Time (minutes) logarithmic scale Compression gauge reading, 10⁻³ mm <table><caption>Approximate data points from the consolidation curve</caption><thead><tr><th>Time (minutes)</th><th>Compression gauge reading (10⁻³ mm)</th></tr></thead><tbody><tr><td>0.1</td><td>881.0</td></tr><tr><td>0.2</td><td>881.0</td></tr><tr><td>0.5</td><td>880.0</td></tr><tr><td>1.0</td><td>877.5</td></tr><tr><td>2.0</td><td>877.0</td></tr><tr><td>5.0</td><td>876.0</td></tr><tr><td>10.0</td><td>875.0</td></tr><tr><td>20.0</td><td>874.5</td></tr><tr><td>50.0</td><td>873.5</td></tr><tr><td>100.0</td><td>873.0</td></tr><tr><td>200.0</td><td>872.5</td></tr><tr><td>500.0</td><td>871.8</td></tr><tr><td>1000.0</td><td>871.5</td></tr></tbody></table>					Time (minutes)	Compression gauge reading (10 ⁻³ mm)	0.1	881.0	0.2	881.0	0.5	880.0	1.0	877.5	2.0	877.0	5.0	876.0	10.0	875.0	20.0	874.5	50.0	873.5	100.0	873.0	200.0	872.5	500.0	871.8	1000.0	871.5
Time (minutes)	Compression gauge reading (10 ⁻³ mm)																															
0.1	881.0																															
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Sheet	14	Increment no.	6	Operator																												
Sheets	24	UNLOADING		N. Jvaridze																												
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Consolidation Curve – Logarithm of Time Fitting Method

LOCATION: <i>Samtredia, Georgia</i>		Job ref.	<i>Drilling and Laboratory Works for Engineering-geological investigation of Samtredia- Lanchkhuti-Grigoleti Project Motor Road</i>																															
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Time (minutes) logarithmic scale <table border="1"> <caption>Approximate data points from the consolidation curve</caption> <thead> <tr> <th>Time (minutes)</th> <th>Compression gauge reading, 10⁻³ mm</th> </tr> </thead> <tbody> <tr><td>0.1</td><td>848.0</td></tr> <tr><td>0.2</td><td>845.0</td></tr> <tr><td>0.5</td><td>845.0</td></tr> <tr><td>0.8</td><td>843.0</td></tr> <tr><td>1.0</td><td>842.0</td></tr> <tr><td>2.0</td><td>840.0</td></tr> <tr><td>5.0</td><td>838.0</td></tr> <tr><td>10.0</td><td>836.0</td></tr> <tr><td>20.0</td><td>834.0</td></tr> <tr><td>50.0</td><td>832.0</td></tr> <tr><td>100.0</td><td>830.0</td></tr> <tr><td>200.0</td><td>828.0</td></tr> <tr><td>500.0</td><td>827.0</td></tr> <tr><td>1000.0</td><td>827.0</td></tr> </tbody> </table>					Time (minutes)	Compression gauge reading, 10 ⁻³ mm	0.1	848.0	0.2	845.0	0.5	845.0	0.8	843.0	1.0	842.0	2.0	840.0	5.0	838.0	10.0	836.0	20.0	834.0	50.0	832.0	100.0	830.0	200.0	828.0	500.0	827.0	1000.0	827.0
Time (minutes)	Compression gauge reading, 10 ⁻³ mm																																	
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500.0	827.0																																	
1000.0	827.0																																	
Sheet	15	Increment no.	7	Operator	Checked	Approved																												
Sheets	24	UNLOADING		<i>N. Jvaridze</i>	<i>T. Gorgidze</i>	<i>L. Gorgidze</i>																												

Consolidation Curve – Logarithm of Time Fitting Method

LOCATION: <i>Samtredia, Georgia</i>	Job ref.	<i>Drilling and Laboratory Works for Engineering-geological investigation of Samtredia- Lanchkhuti-Grigoleti Project Motor Road</i>		
SOIL DESCRIPTION: <i>Slightly moist, brown, stiff, intermediately plastic CLAY</i>	Borehole	4		
	Sample no.			
	Dept	1.2-1.5		
	Date	30.08.2012		
TEST METHOD:	<i>BS 1377 : Part 7 : 1990 : 8</i>		Pressure, kPa	
12				
Time (minutes) logarithmic scale The graph plots the compression gauge reading (in units of 10^{-3} mm) on the y-axis against time (in minutes) on a logarithmic x-axis. The y-axis ranges from 760.0 to 810.0 with major grid lines every 5.0 units. The x-axis ranges from 0.1 to 10000.0 with major grid lines at 0.1, 1.0, 10.0, 100.0, 1000.0, and 10000.0. The data points, connected by a solid blue line, show an initial slight increase in reading from approximately 805.0 at 0.2 minutes to a peak of about 804.0 at 0.5 minutes, followed by a sharp drop to about 792.0 at 1.0 minute. From 1.0 minute onwards, the reading decreases steadily, reaching approximately 769.0 at 1000.0 minutes. A dashed red line represents the unloading path, starting from the point at 1.0 minute and extending to the right, showing a slight increase in reading as time increases.				
Sheet	16	Increment no.	8	Operator
Sheets	24	UNLOADING		Checked
		<i>N. Jvaridze</i>	<i>T. Gorgidze</i>	Approved
				<i>L. Gorgidze</i>