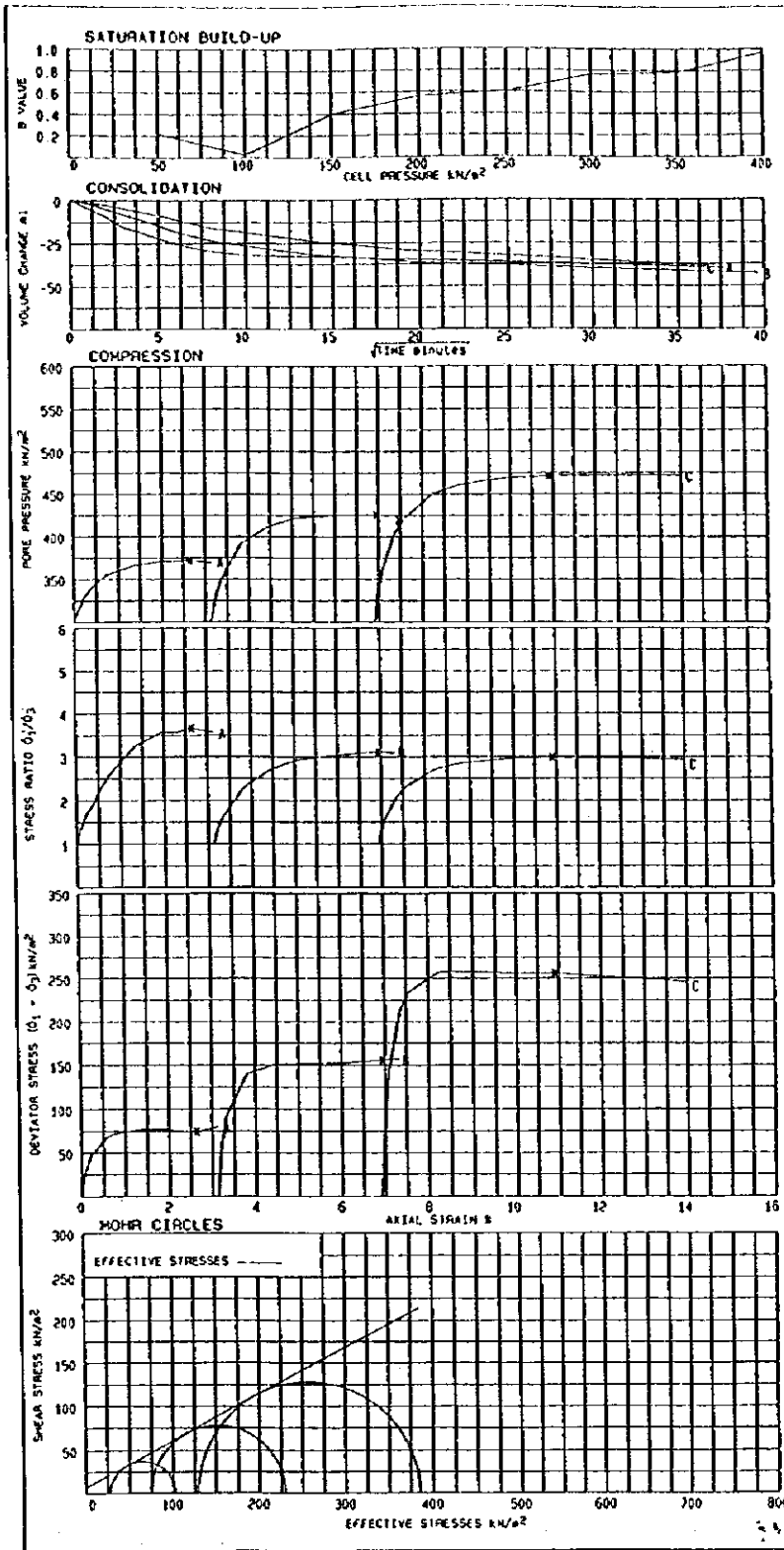


C3.3 Laboratory Test Results



SPECIMEN		A	B	C
INITIAL	Density Mg/m^3	2.03	2.14	2.20
	Mixture B	13	13	13
AFTER CONSOLIDATION	Dry Density Mg/m^3	✓ 1.85	✓ 1.99	1.95
	Density Mg/m^3	2.19	2.25	2.33
SATURATION STAGE	Mixture B	16	16	16
	Dry Density Mg/m^3	1.90	1.95	2.00
	Initial u_w	2		
	Saturated u_w	388		
CONSOLIDATION STAGE	Final cell pressure	400		
	B value	0.96		
	Cell Pressure	400	500	600
CONSOLIDATION PARAMETERS	Back Pressure	300	300	300
	Initial u_w	388	455	515
	Final u_w	300	300	300
COMPRESSION STAGE	Cell Pressure	400	500	600
	Initial u_w	300	300	300
FAILURE CONDITIONS	Initial u_w	300	200	300
	Rate of σ per strain hour	0.45	0.45	0.30
AT PEAK STRESS RATIO	Axial Strain %	2.6	6.9	10.9
	$\sigma_1 - \sigma_3$ kN/m ²	74	156	256
	u_w kN/m ²	372	426	471
	σ_3 ' kN/m ²	28	74	129
	σ_1 ' kN/m ²	102	230	385
MODE OF FAILURE at each stage	u_w kN/m ²			
	Time to failure hours	5.7	15.1	36.3

SHEAR STRENGTH PARAMETERS BY LINEAR REGRESSION	C'	ϕ'
	7 kN/m ²	28°

NOTES

Saturation by application of cell/back pressure increments of 50 kN/m² with a differential of 10 kN/m².

Drainage during consolidation to top with vertical side drains fitted.

Stress/strain curves corrected for area change, side drains and .35 mm thick membrane.

SOIL DESCRIPTION
Stiff reddish brown clay with occasional fine to coarse gravel.

TYPE OF SPECIMEN Recompacted to 98% MDD and at OMC

SPECIMEN DIMENSIONS 102.0 mm dia x 198.0 mm long

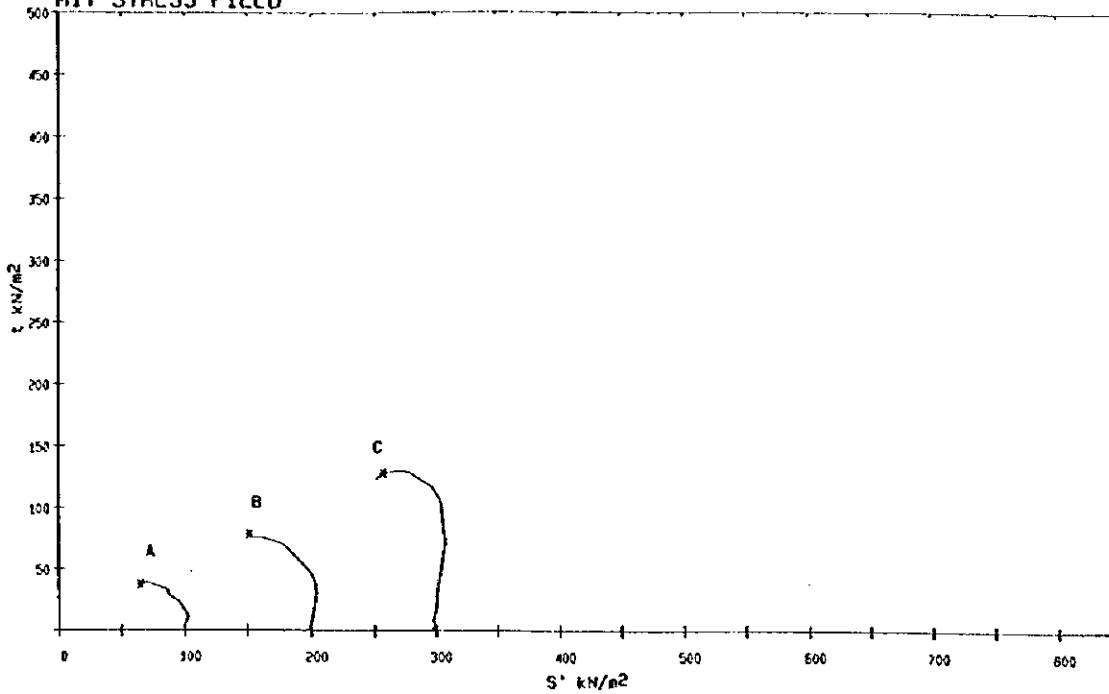
Consolidated Undrained Triaxial Compression Test with measurement of Pore Pressure - Multistage Test

Borehole No. GCI Sample No. B1 Loc. No. 7519/53 Fig. TP95-2

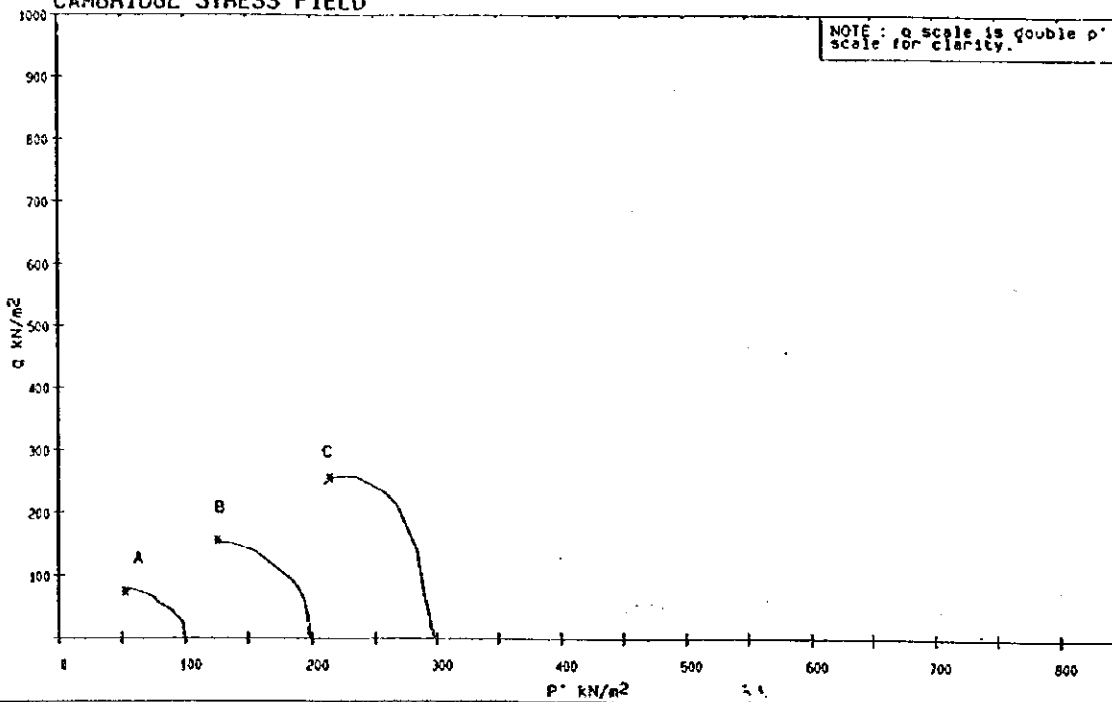
Soil Mechanics Location: MUTONGA GRAND FALLS

NOTE : Tested at rate of strain based on pore pressure equalisation at failure only.

HIT STRESS FIELD



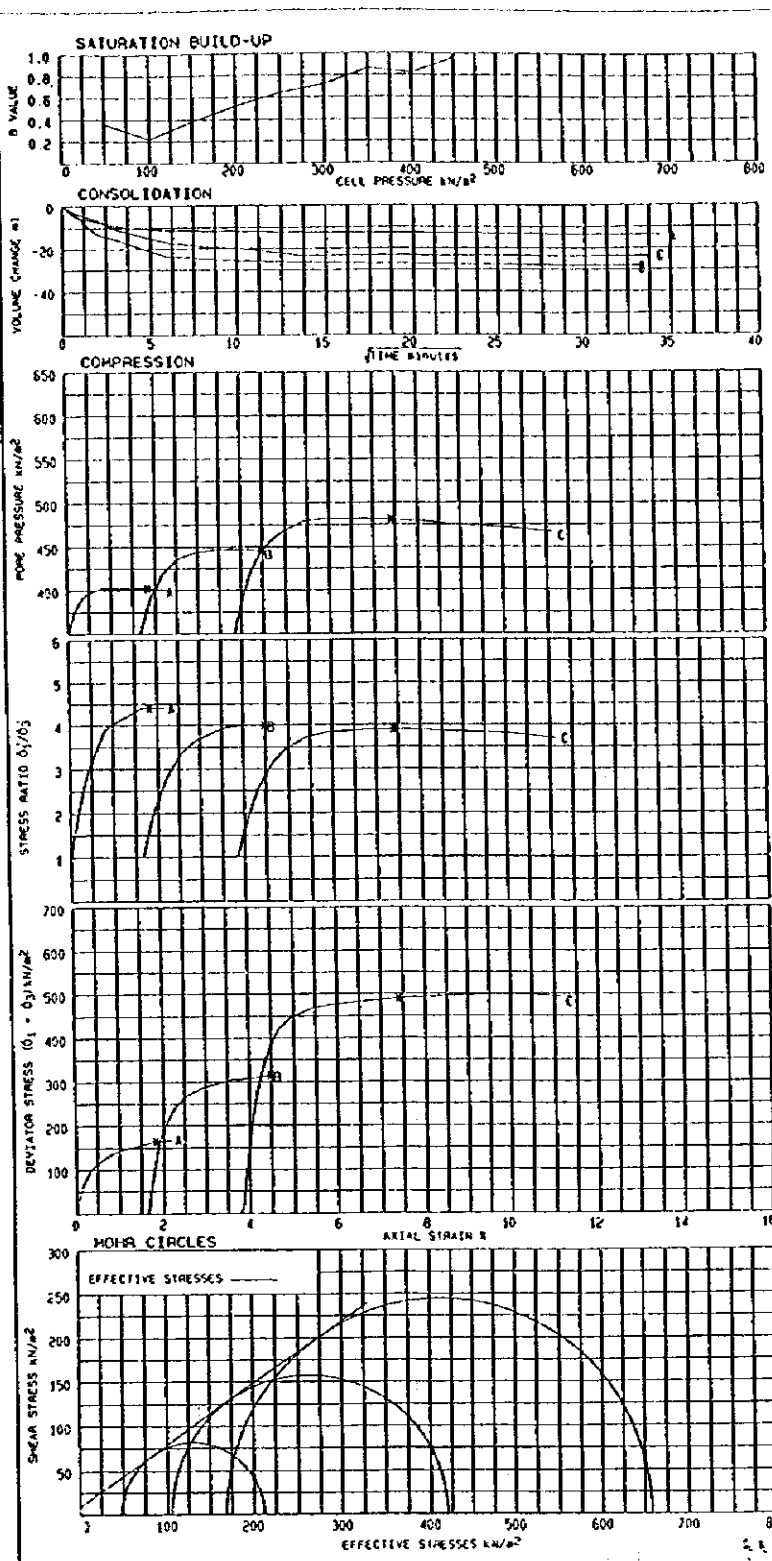
CAMBRIDGE STRESS FIELD



Consolidated Undrained Triaxial Compression Test with measurement of Pore Pressure - Multistage test

Borehole No. GC1 TP95-2
Sample No. B1

SLR 8.7B	Soil Mechanics	Location MUTONGA GRAND FALLS	Loc. No. 7519/53	Fig.
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SPECIMEN		A	B	C
INITIAL	Density (g/cc)	2.20	2.22	2.26
	Moisture %	11	11	11
	Org. Density (g/cc)	1.98	2.00	2.03
AFTER CONSOLIDATION	Density (g/cc)	2.27	2.31	2.34
	Moisture %	13	13	13
	Org. Density (g/cc)	2.00	2.03	2.07
SATURATION STAGE	Initial σ_3	0	0	0
	Saturated σ_3	420	420	420
	Final cell pressure	450	450	450
	B value	0.96	0.96	0.96
CONSOLIDATION STAGE	Cell Pressure	450	550	650
	Back Pressure	350	350	350
	Initial σ_3	423	531	573
	Final σ_3	350	350	350
CONSOLIDATION PARAMETERS	$C_{\alpha 1}$ (mm)	5.14	3.33	3.23
	$C_{\alpha 2}$ (mm)	0.12	0.10	0.07
COMPRESSION STAGE	Cell Pressure	450	550	650
	Initial σ_3	350	350	350
	Initial σ_1	100	200	300
	Rate of shear strain (1/min)	1.00	1.00	1.00
FAILURE CONDITIONS	Final strain %	1.8	4.5	7.4
	$(\sigma_1 - \sigma_3)_{max}$	164	315	489
	σ_3	402	445	481
	σ_1	49	105	169
	σ_3'	212	420	658
	σ_1'	0.32	6.30	0.27
Time to failure (hours)	1.8	4.5	7.4	
MODE OF FAILURE at each stage				

SHEAR STRENGTH PARAMETERS BY LINEAR REGRESSION	c'	ϕ'
	9 kN/m ²	35°

NOTES
 Saturation by application of cell/back pressure increments of 50 kN/m² with a differential of 10 kN/m².
 Drainage during consolidation to top with vertical side drains fitted.
 Stress/strain curves corrected for area change, side drains and .35 mm thick membrane.

SOIL DESCRIPTION
 Stiff reddish brown clay with fine to medium sandstone fragments with mica inclusions.

TYPE OF SPECIMEN: Recompacted to 98% MDD and at OMC

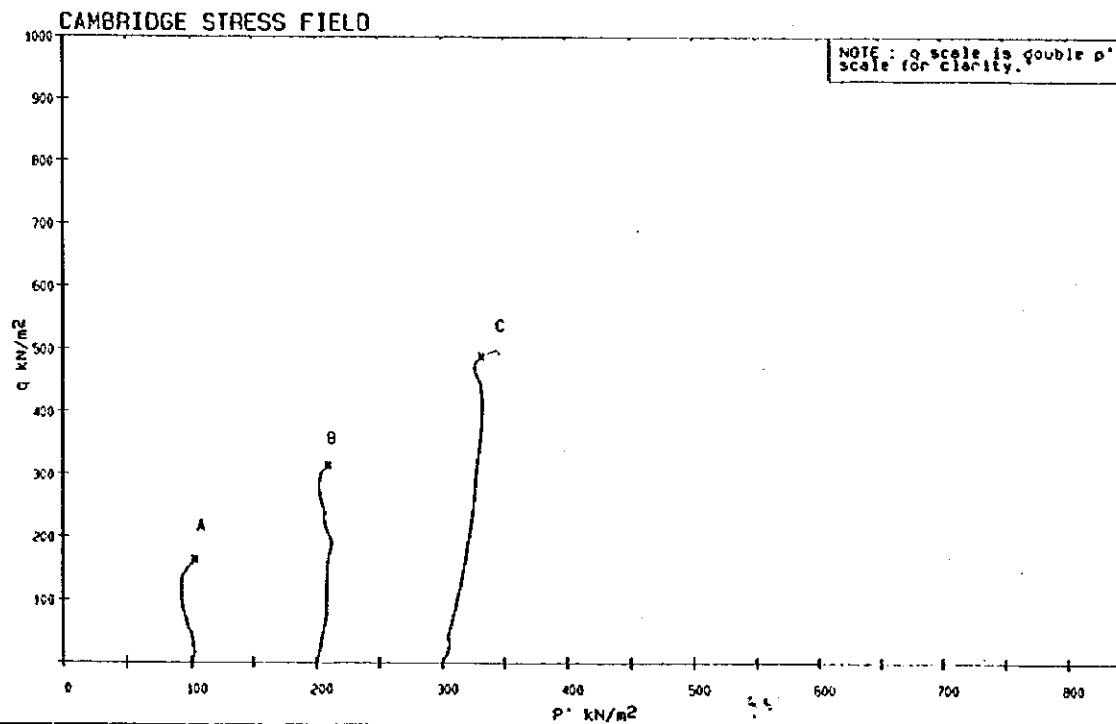
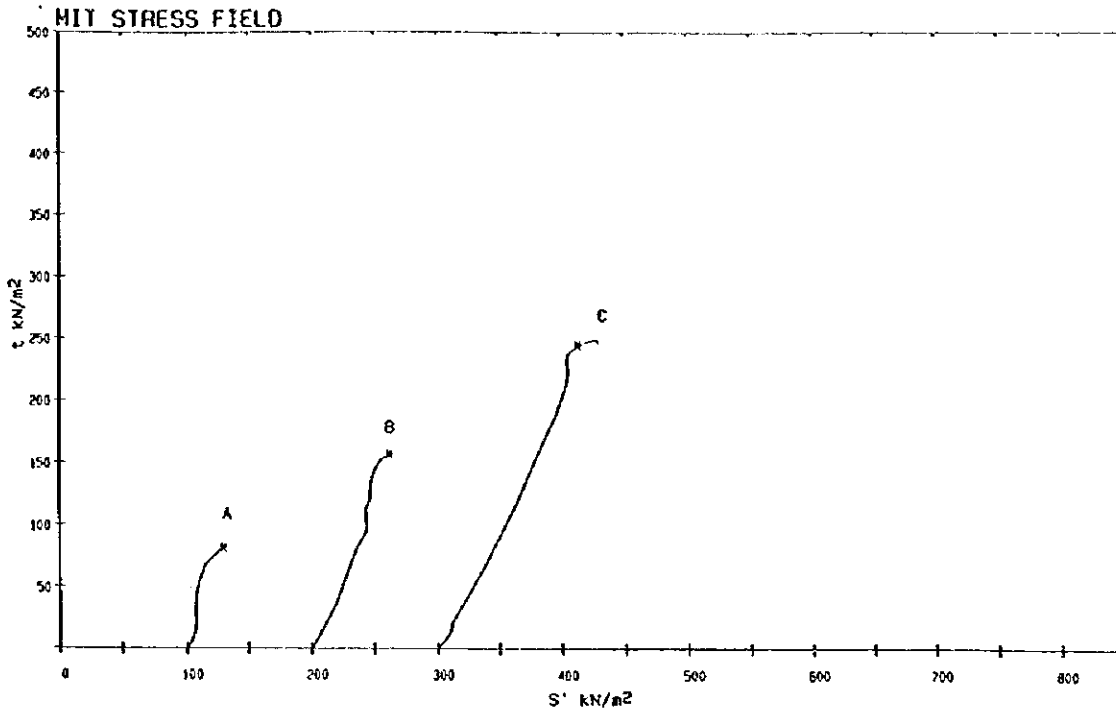
SPECIMEN DIMENSIONS: 102.5 mm dia x 196.0 mm long

Consolidated Undrained Triaxial Compression Test with measurement of Pore Pressure - Multistage Test

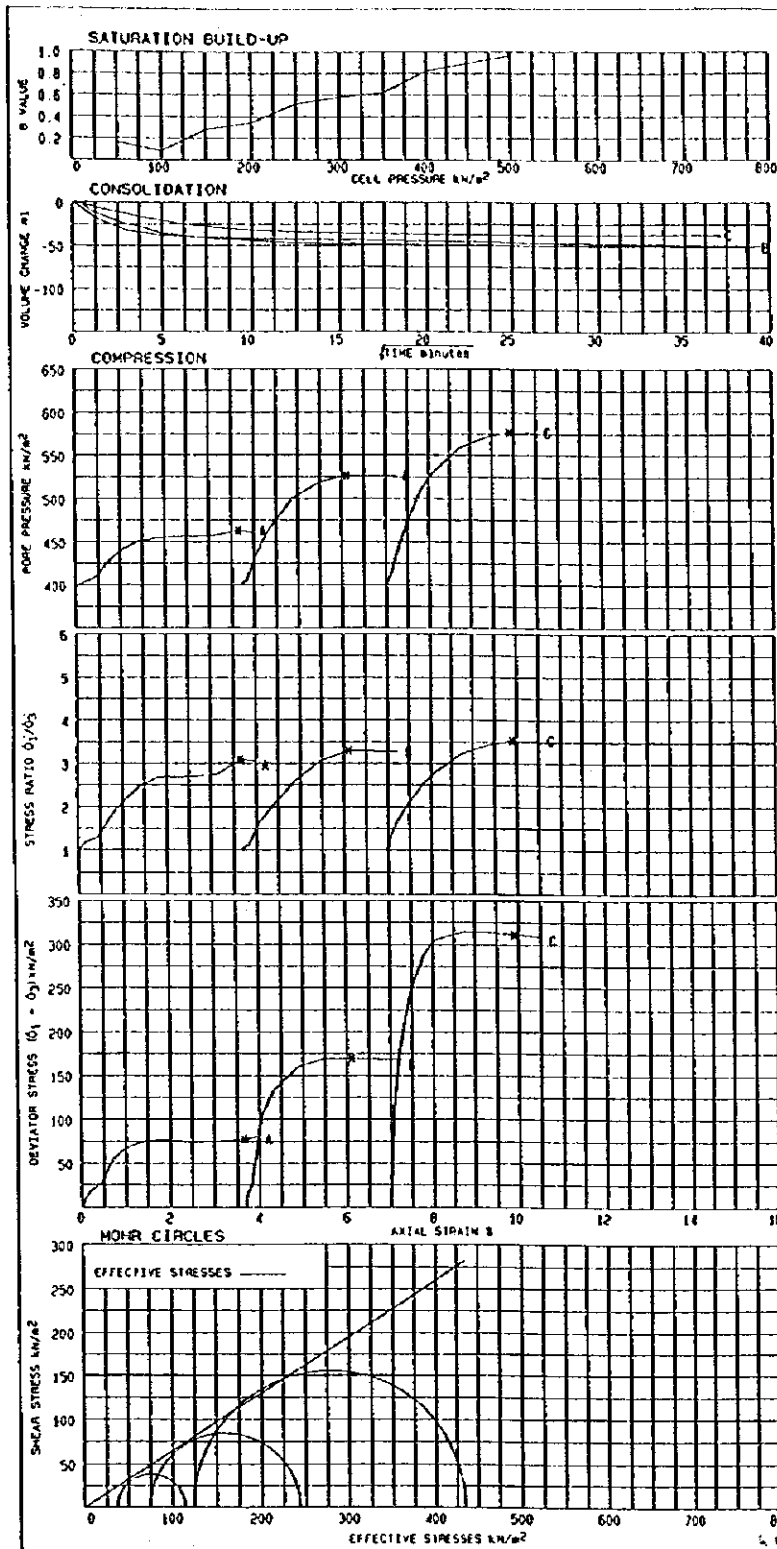
Borehole No. G01 1P95-2
 Sample No. B2

Soil Mechanics Location: MUTONGA GRAND FALLS Loc. No. 7519/53 Fig.

NOTE : Tested at rate of strain based on pore pressure equalisation at failure only.



Consolidated Undrained Triaxial Compression Test with measurement of Pore Pressure - Multistage test		Borehole No. GC1	TP95-2
		Sample No. 82	
SLR 8.7B	Soil Mechanics	Location MUTONGA GRAND FALLS	Loc. No. 7519/53
			Fig.



SPECIMEN		A	B	C
INITIAL	Density Mg/m ³	2.66	2.13	2.21
	Moisture %	12	12	12
AFTER CONSOLIDATION	Dry Density Mg/m ³	1.85	1.91	1.99
	Density Mg/m ³	2.23	2.31	2.37
SATURATION STAGE	Moisture %	17	17	17
	Dry Density Mg/m ³	1.51	1.59	2.03
	Initial u_w (kN/m ²)	2		
	Saturated u_w (kN/m ²)	490		
Final cell pressure (kN/m ²)		500		
B value		0.96		
CONSOLIDATION STAGE	Cell Pressure (kN/m ²)	500	600	700
	Back Pressure (kN/m ²)	400	400	400
	Initial u_w (kN/m ²)	488	555	622
	Final u_w (kN/m ²)	400	400	400
CONSOLIDATION PARAMETERS				
C_{α} m ² /year		13.6	5.97	3.36
k_g m ² /min		0.43	0.22	0.12
COMPRESSION STAGE	Cell Pressure (kN/m ²)	500	600	700
	Initial u_w (kN/m ²)	400	400	400
	Initial σ_3' (kN/m ²)	168	209	300
	Rate of σ_3 per strain (hour)	0.50	0.50	0.50
FAILURE CONDITIONS	axial strain %	3.7	6.1	9.5
	$(\sigma_1 - \sigma_3) / \sigma_3'$	77	169	311
	σ_1 (kN/m ²)	493	526	577
	σ_3' (kN/m ²)	37	74	123
	σ_1' (kN/m ²)	114	243	434
	σ_3 (kN/m ²)	0.82	0.74	0.57
	Time to failure (hours)	7.3	12.2	19.8
MODE OF FAILURE at each stage				

SHEAR STRENGTH (COMPUTED) PARAMETERS	$C' = -71$	$\phi' = (35.2^\circ)$
ASSESSED VALUES	0 kN/m ²	33°

NOTES
 Saturation by application of cell/back pressure increments of 50 kN/m² with a differential of 10 kN/m².
 Drainage during consolidation to top with vertical side drains filled.
 Stress/strain curves corrected for area change, side drains and .14 mm thick membrane.

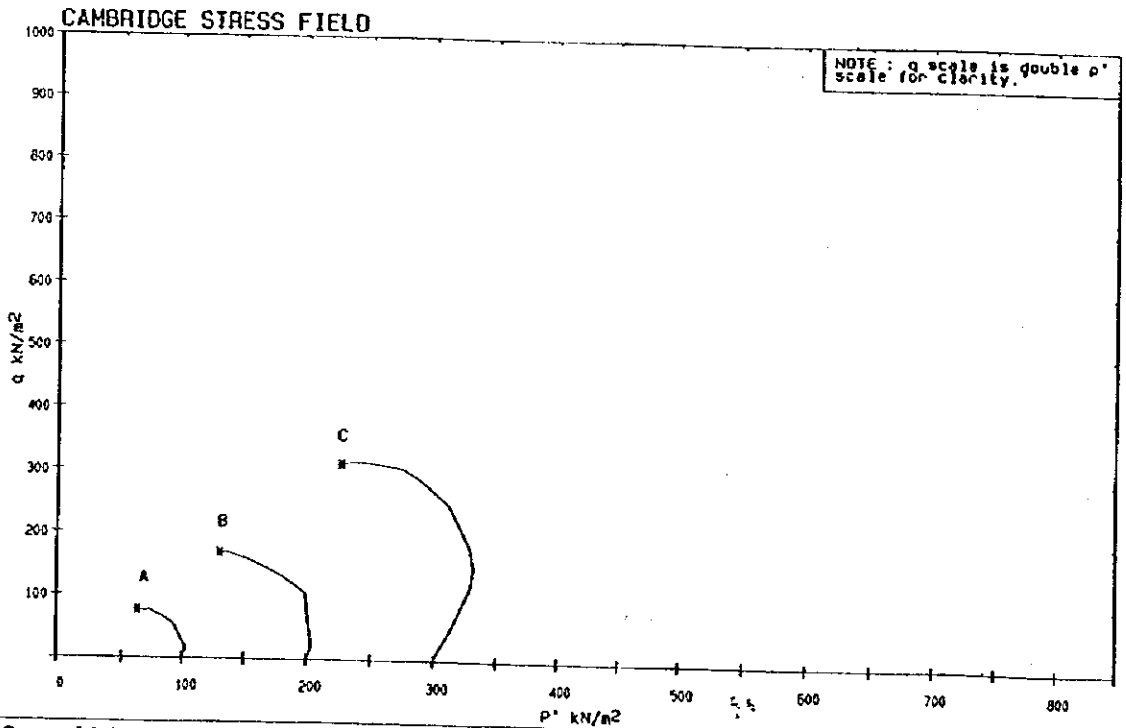
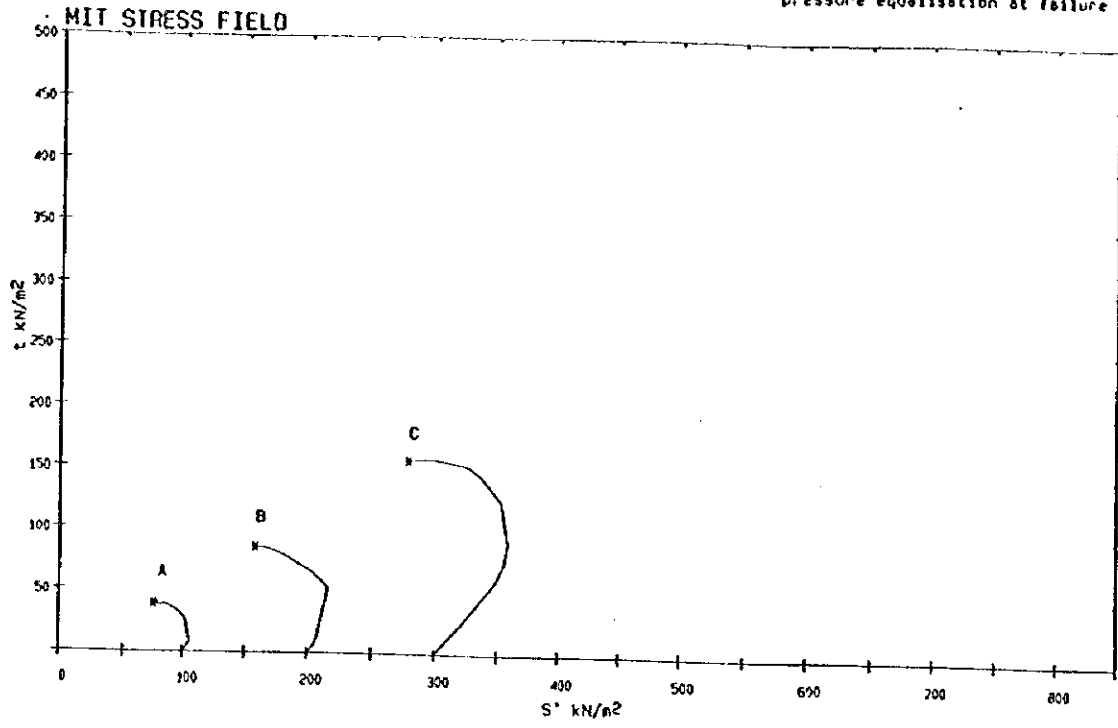
SOIL DESCRIPTION
 Very stiff reddish brown clay with fine to coarse gravel and mica fragments.

TYPE OF SPECIMEN: RECOMPACTED TO 98% MOD and at OMC

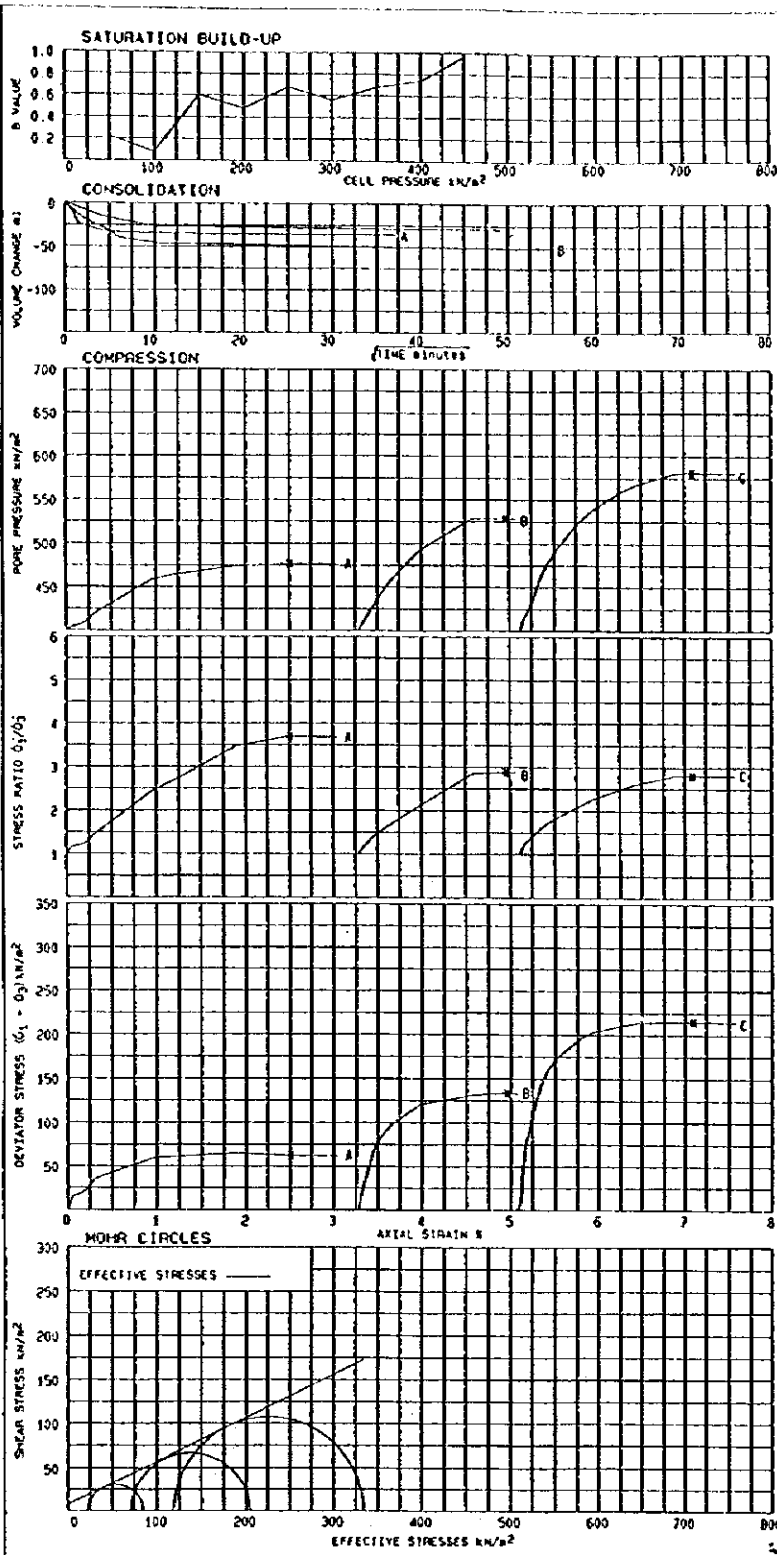
SPECIMEN DIMENSIONS: 102.0 mm dia x 192.0 mm high

Consolidated Undrained Triaxial Compression Test with measurement of Pore Pressure - Multistage Test		Borehole No. GCI	IP95-2
Soil Mechanics		Sample No. B1-82	Loc. No. 7519/53
Location: MUTONGA GRAND FALLS		Fig.	

NOTE : Tested at rate of strain based on pore pressure equalisation at failure only.



Consolidated Undrained Triaxial Compression Test with measurement of Pore Pressure - Multistage test			Borehole No. GC1	TP95-2
			Sample No. B1+B2	
SLR 8.78	Soil Mechanics	Location MUTONGA GRAND FALLS	Loc. No. 7519/53	Fig.



		SPECIMEN		
		A	B	C
INITIAL	Density kg/m ³	2.22	2.27	2.35
	Moisture %	12	12	12
	Dry Density kg/m ³	1.98	2.02	2.09
AFTER CONSOLIDATION	Density kg/m ³	2.39	2.47	2.52
	Moisture %	18	18	18
	Dry Density kg/m ³	2.02	2.09	2.13
SATURATION STAGE	Initial e ₀	3		
	Saturated e ₀	4.79		
	Final cell pressure	450		
	e value	0.96		
CONSOLIDATED STAGE	Cell Pressure	500	600	700
	Back Pressure	400	400	400
	Initial e ₀	4.87	5.52	5.99
	Final e ₀	4.00	4.00	4.00
CONSOLIDATION PARAMETERS	$C_{\alpha 3}$ %/year	8.68	3.76	2.68
	$w_{\alpha 3}$ %/mm	0.28	0.21	0.10
COMPRESSION STAGE	Cell Pressure	500	600	700
	Initial e ₀	4.00	4.00	4.00
	Initial σ_3^*	100	200	300
	Rate of $\dot{\epsilon}$ per strain hour	0.46	0.46	0.46
FAILURE CONDITIONS	Axial Strain %	2.5	5.0	7.1
	$\sigma_1 - \sigma_3$ kN/m ²	62	133	215
	σ_3^* kN/m ²	477	529	581
AT PEAK STRESS RATIO	σ_3^* kN/m ²	23	71	119
	σ_1^* kN/m ²	85	204	334
	μ_1	1.25	0.97	0.84
	Time to failure hours	5.5	10.8	15.4
MODE OF FAILURE (at each stage)				

SHEAR STRENGTH PARAMETERS BY LINEAR REGRESSION	c^*	θ^*
	7 kN/m ²	26.3°

NOTES
 Saturation by application of cell/back pressure increments of 50 kN/m² with a differential of 10 kN/m².
 Drainage during consolidation to top with vertical side drains fitted.
 Stress/strain curves corrected for area change, side drains and .35 mm thick membrane.

SOIL DESCRIPTION
 Silt reddish brown silty CL&I with occasional gravel.

TYPE OF SPECIMEN RECONSTRUCTED TO 98% P₁₀₀ and at OMC

SPECIMEN DIMENSIONS 102.5 mm dia x 195.0 mm long

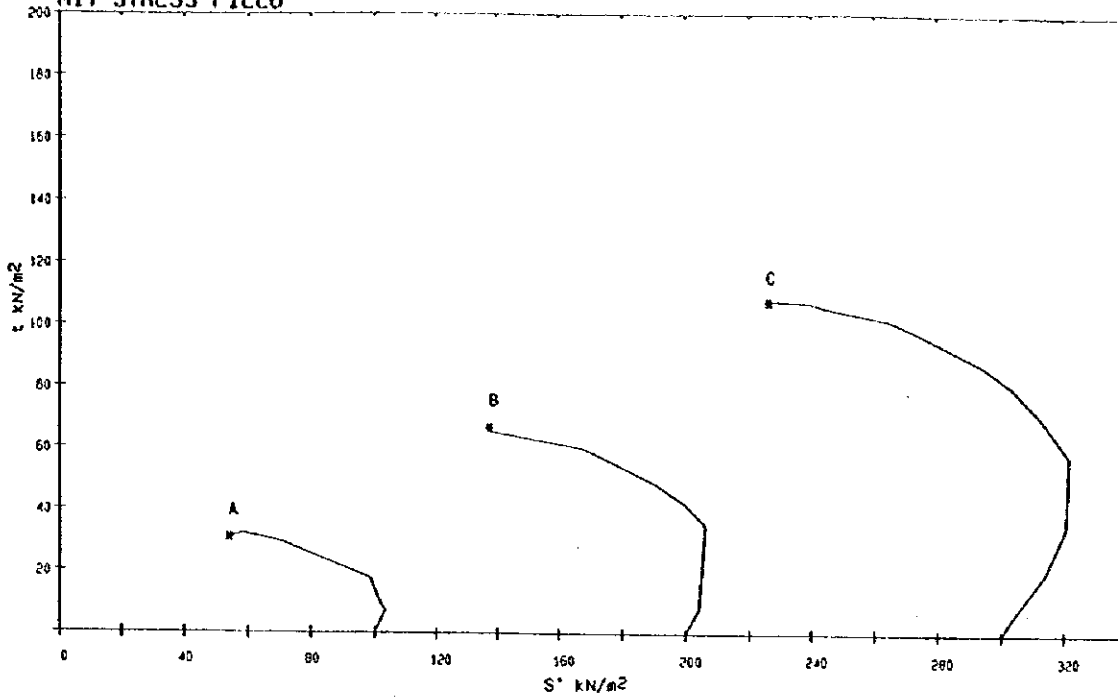
Consolidated Undrained Triaxial Compression Test with measurement of Pore Pressure - Multistage Test

Borehole No. G03 TP95-14
 Sample No. 81

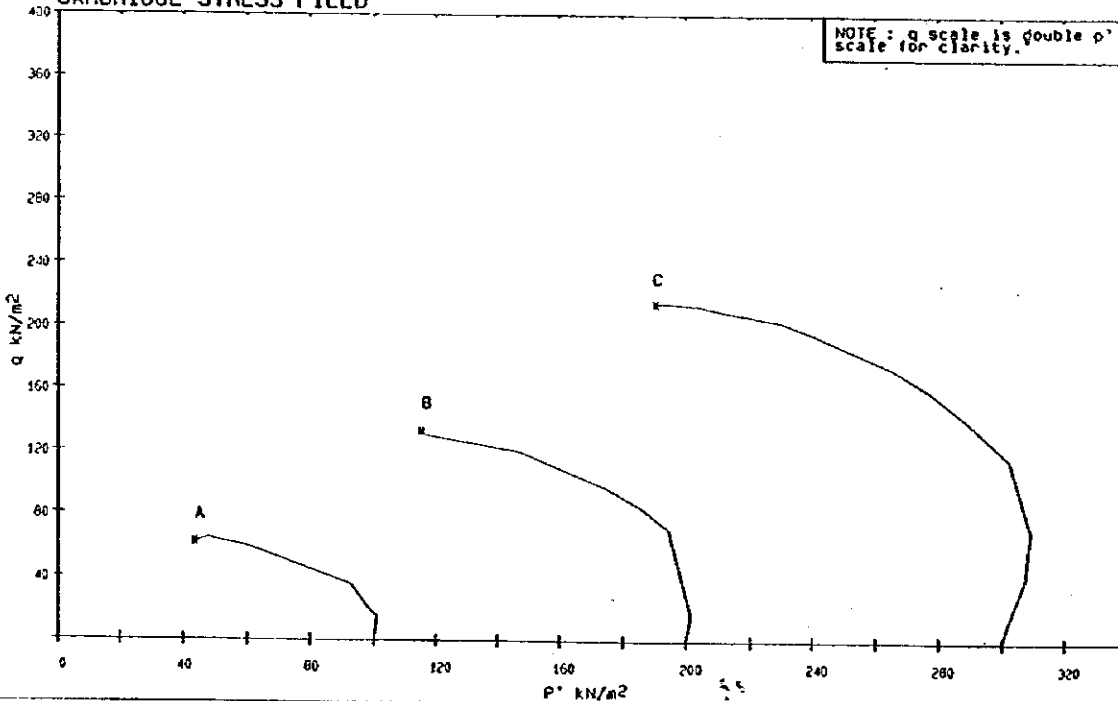
Soil Mechanics Location MUTONGA GRAND FALLS
 Loc. No. 7519/53
 Fig.

NOTE: Tested at rate of strain based on pore pressure equalisation at failure only.

MIT STRESS FIELD



CAMBRIDGE STRESS FIELD



Consolidated Undrained Triaxial Compression Test with measurement of Pore Pressure - Multistage test

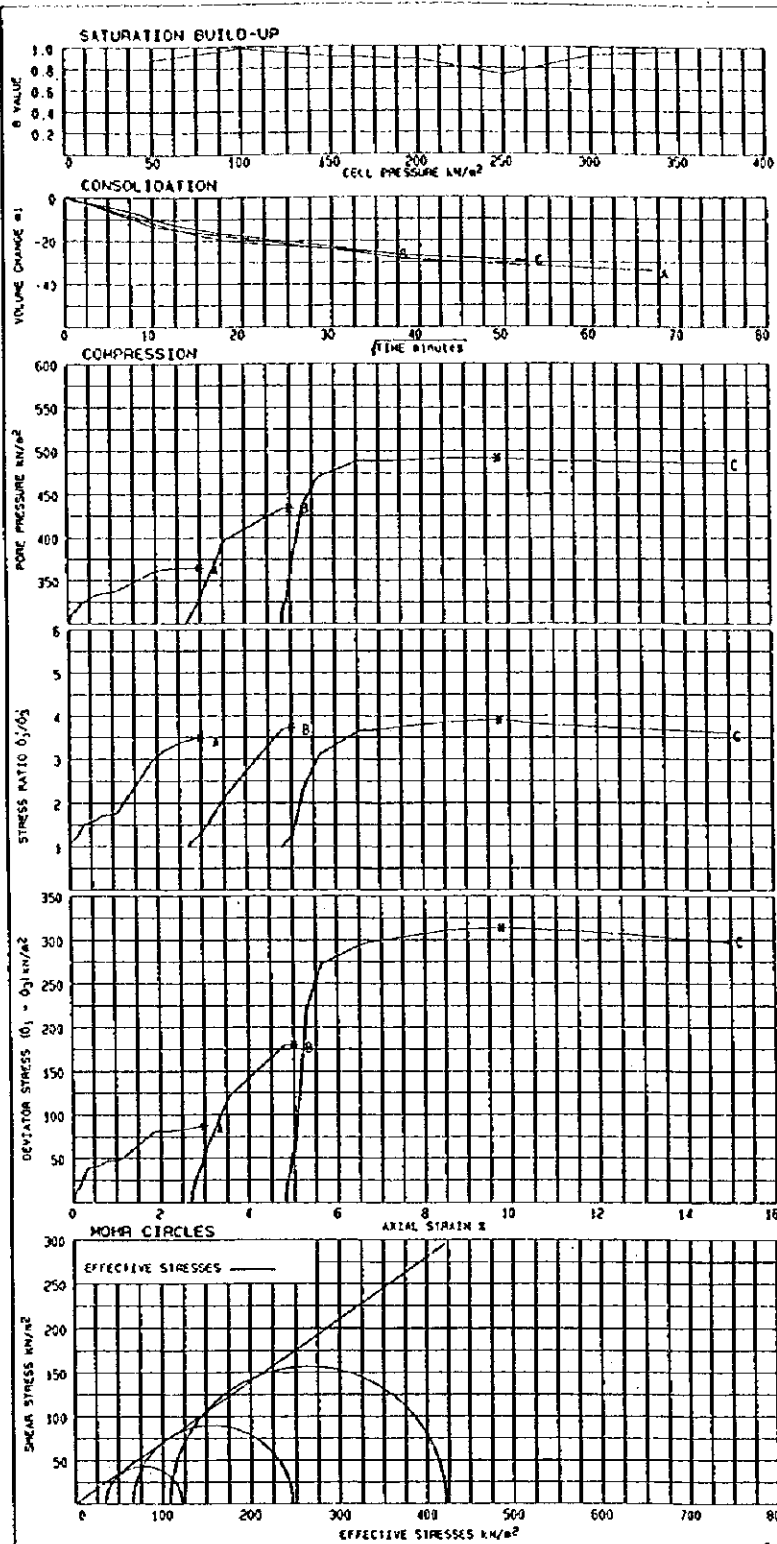
Borehole No. GC3 TP95-14
Sample No. 81

SLR 8.7B Soil Mechanics

Location MUTONGA GRAND FALLS

Loc. No. 7519/53

Fig.



		A	B	C
INITIAL	Density (mg/m³)	2.17	2.22	2.26
	Moisture %	13	13	13
	Dry Density (mg/m³)	1.92	1.96	1.99
AFTER CONSOLIDATION	Density (mg/m³)	2.22	2.31	2.35
	Moisture %	16	16	16
	Dry Density (mg/m³)	1.96	1.93	2.03
SATURATION STAGE	Initial owp (kN/m²)	2		
	Saturated owp (kN/m²)	315		
	Final cell pressure (kN/m²)	350		
	B value	0.96		
CONSOLIDATION STAGE	Cell Pressure (kN/m²)	400	500	600
	Back Pressure (kN/m²)	300	300	300
	Initial owp (kN/m²)	363	457	539
CONSOLIDATION PARAMETERS	Final pwp (kN/m²)	300	300	300
	$C_{\alpha 1}$ %/year	0.32	0.43	0.28
	$C_{\alpha 2}$ %/hr	0.33	0.11	0.08
COMPRESSION STAGE	Cell Pressure (kN/m²)	400	500	600
	Initial owp (kN/m²)	300	300	300
	Initial σ_3 (kN/m²)	100	200	300
	Rate of σ_3 per strain (hour)	0.15	0.15	0.12
FAILURE CONDITIONS AT PEAK STRESS RATIO	Strain at failure %	3.0	5.0	9.8
	$(\sigma_1 - \sigma_3) / 2$ (kN/m²)	87	180	313
	σ_1 (kN/m²)	365	434	492
	σ_3 (kN/m²)	35	66	108
	σ_1' (kN/m²)	122	246	421
	σ_3' (kN/m²)	0.75	0.74	0.61
	Time to failure (hours)	18.6	31.3	81.4
MODE OF FAILURE AT EACH STAGE				

SHEAR STRENGTH (COMPUTED) PARAMETERS	$C' = -6$	$\phi' = 37.91$
ASSESSED VALUES	$0_{kN/m^2}$	35°

NOTES
 Saturation by application of cell/back pressure increments of 50 kN/m² with a differential of 10 kN/m².
 Drainage during consolidation to top with vertical side drains fitted.
 Stress/strain curves corrected for area change, side drains and .34 mm thick membrane.

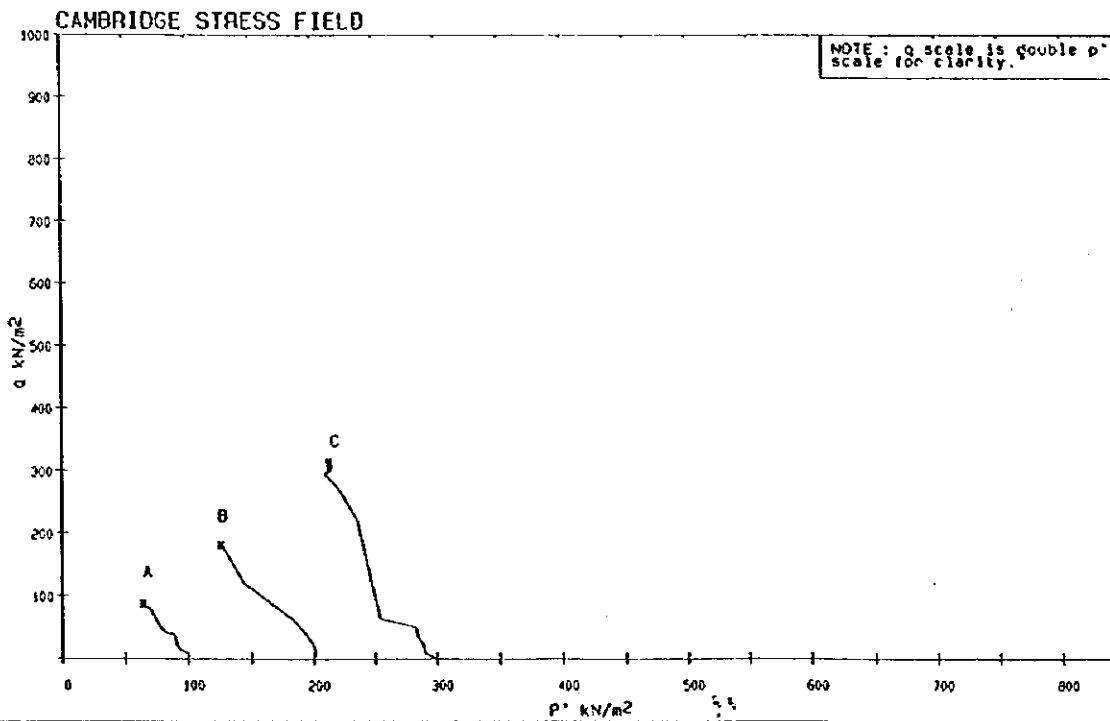
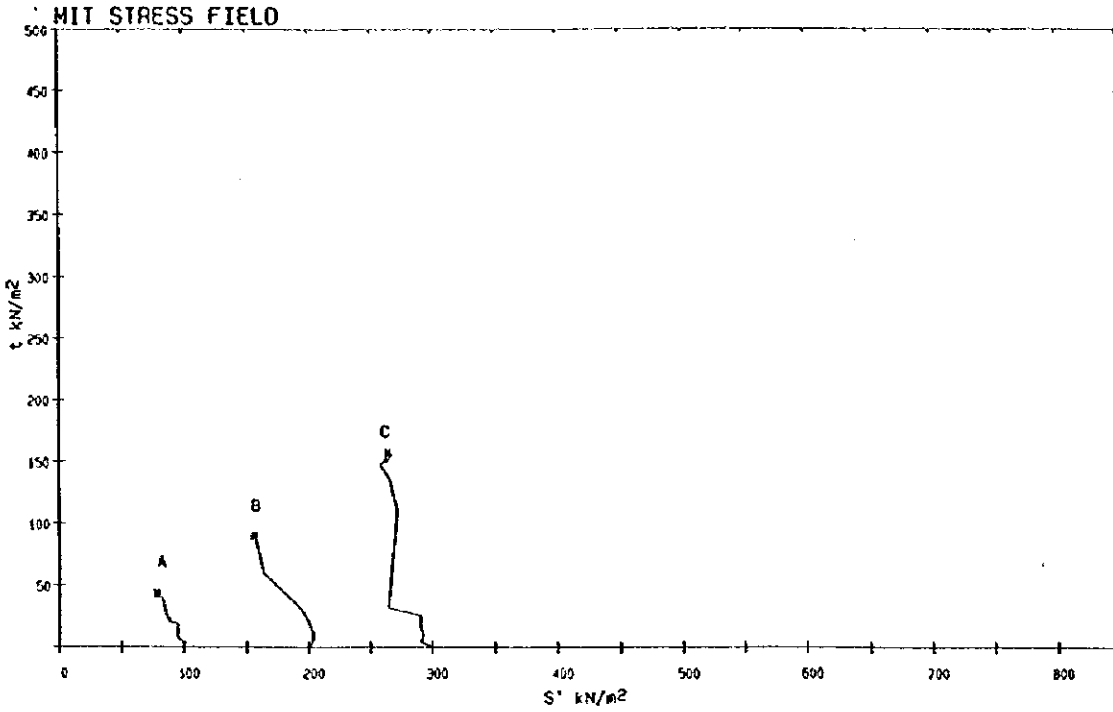
SOIL DESCRIPTION	
Firm reddish brown clay with fine to coarse gravel.	
TYPE OF SPECIMEN	Recompact to 98% RUC and at OMC
SPECIMEN DIMENSIONS	102.5 mm dia x 195.0 mm long

Consolidated Undrained Triaxial Compression Test with measurement of Pore Pressure - Multistage Test

Borehole No. GC3 IP95-14
 Sample No. 82

Soil Mechanics Location: MUTONGA GRAND FALLS Loc. No. 7519/53 Fig.

NOTE : Tested at rate of strain based on pore pressure equalisation at failure only.



Consolidated Undrained Triaxial Compression Test with measurement of Pore Pressure - Multistage test

Borehole No. GC3
Sample No. 82
IP95-14

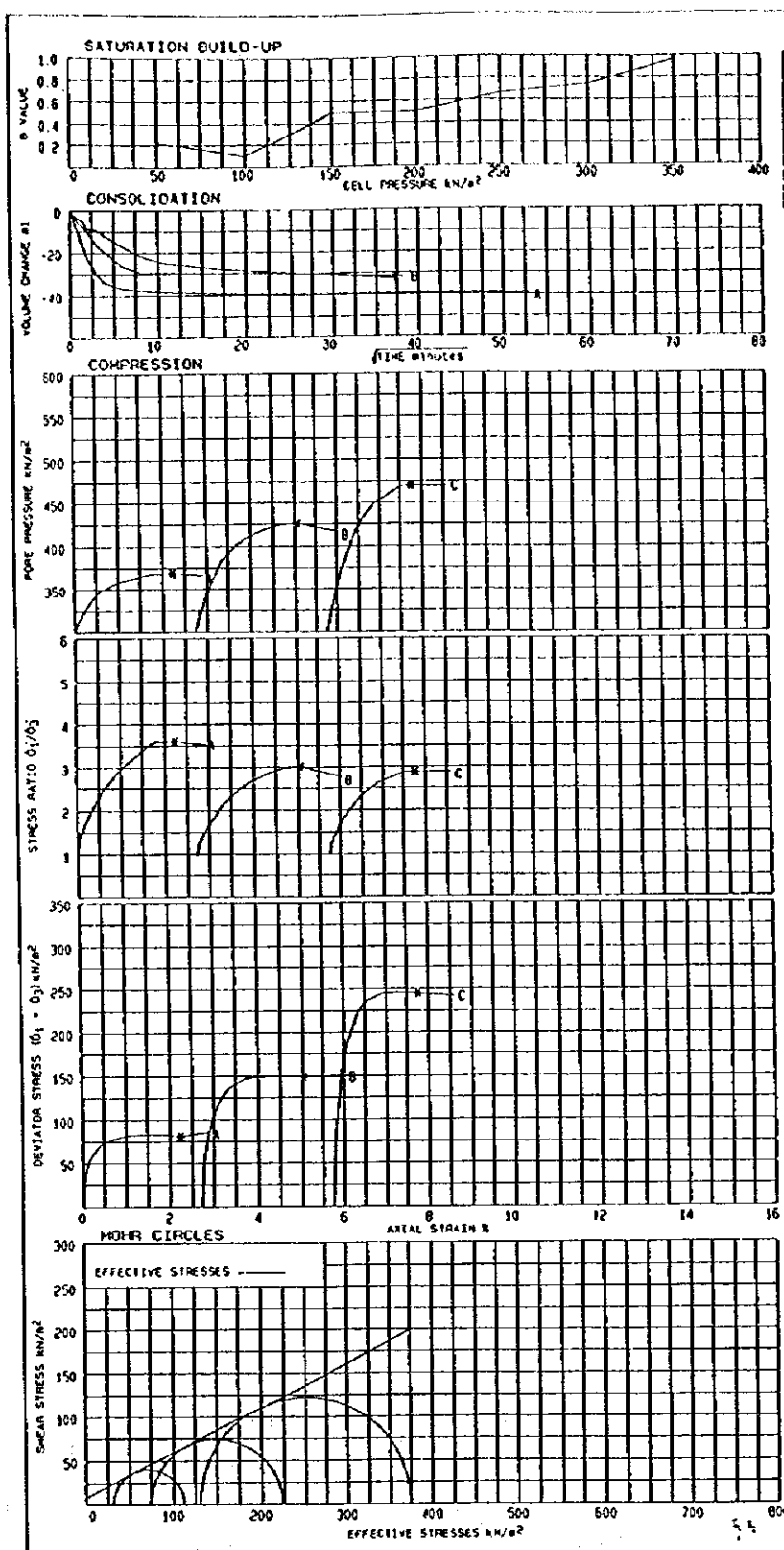
SLR 8.78 Soil Mechanics

Location

MUTONGA GRAND FALLS

Doc. No. 7519/53

Fig.



		SPECIMEN		
		A	B	C
INITIAL	Density Mg/m^3	2.30	2.36	2.41
	Moisture %	10	10	10
	Dry Density Mg/m^3	2.09	2.14	2.19
AFTER CONSOLIDATION	Density Mg/m^3	2.48	2.54	2.59
	Moisture %	15	15	15
	Dry Density Mg/m^3	2.14	2.13	2.24
SATURATION STAGE	Initial u_w	-6		
	Saturated u_w	338		
	Final cell pressure	350		
	u value	0.96		
CONSOLIDATION STAGE	Cell Pressure	400	500	600
	Back Pressure	300	300	300
	Initial u_w	386	448	502
	Final u_w	300	300	300
CONSOLIDATION PARAMETERS	$C_{\alpha 2}$ m^2/year	17.7	6.03	1.79
	$C_{\alpha 1}$ m^2/hr	0.29	0.14	0.11
COMPRESSION STAGE	Cell Pressure	400	500	600
	Initial u_w	300	300	300
	Initial u_v	100	200	300
FAILURE CONDITIONS AT PEAK STRESS RATIO	Ratio of u_w to u_v at failure	0.45	0.45	0.45
	axial strain %	2.2	5.1	7.8
	$(\sigma_1 - \sigma_3) / \sigma_3$	81	149	244
MODE OF FAILURE at each stage	σ_1	369	426	470
	σ_3'	31	74	130
	σ_1'	112	223	374
	σ_3	0.85	0.85	0.70
TIME TO FAILURE	hours	4.8	11.0	16.9
	MODE OF FAILURE at each stage			

SHEAR STRENGTH PARAMETERS BY LINEAR REGRESSION	C'	ϕ'
	9 kN/m^2	27°

NOTES
 Saturation by application of cell/back pressure increments of 50 kN/m^2 with a differential of 10 kN/m^2 .
 Drainage during consolidation to top with vertical side drains fitted.
 Stress/strain curves corrected for area change, side drains and .35 mm thick membrane.

SOIL DESCRIPTION
 Stiff reddish brown silty clay gravel and trace of fine roots.

TYPE OF SPECIMEN RECOMPACTED TO 98% MDD and at OMC

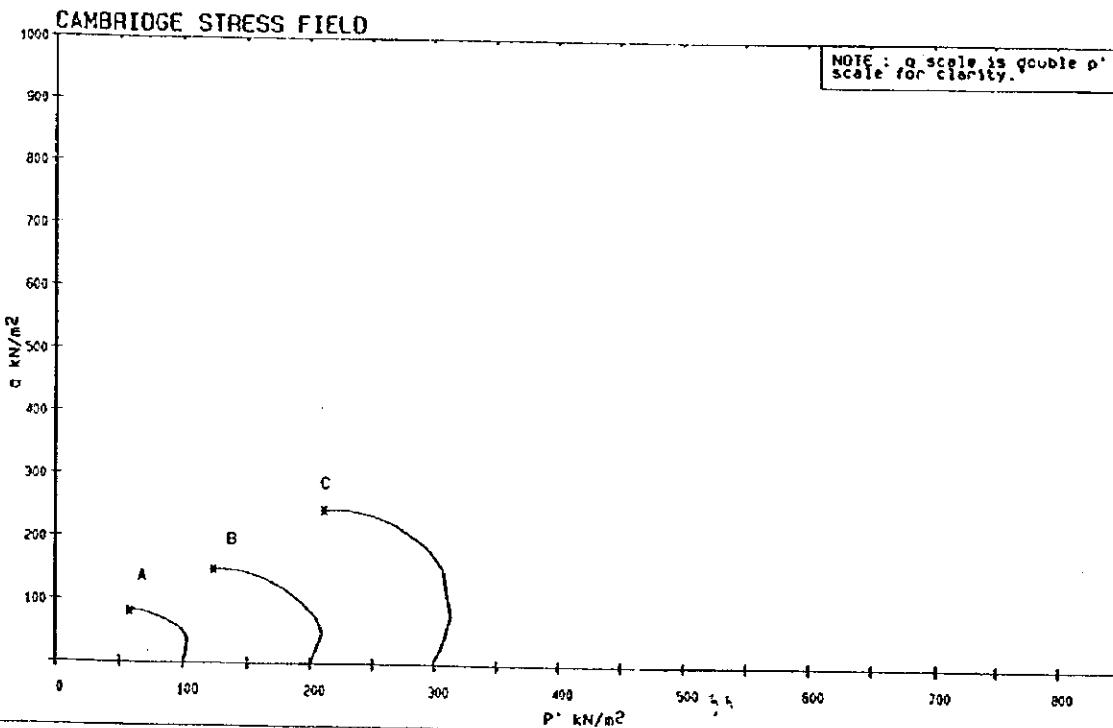
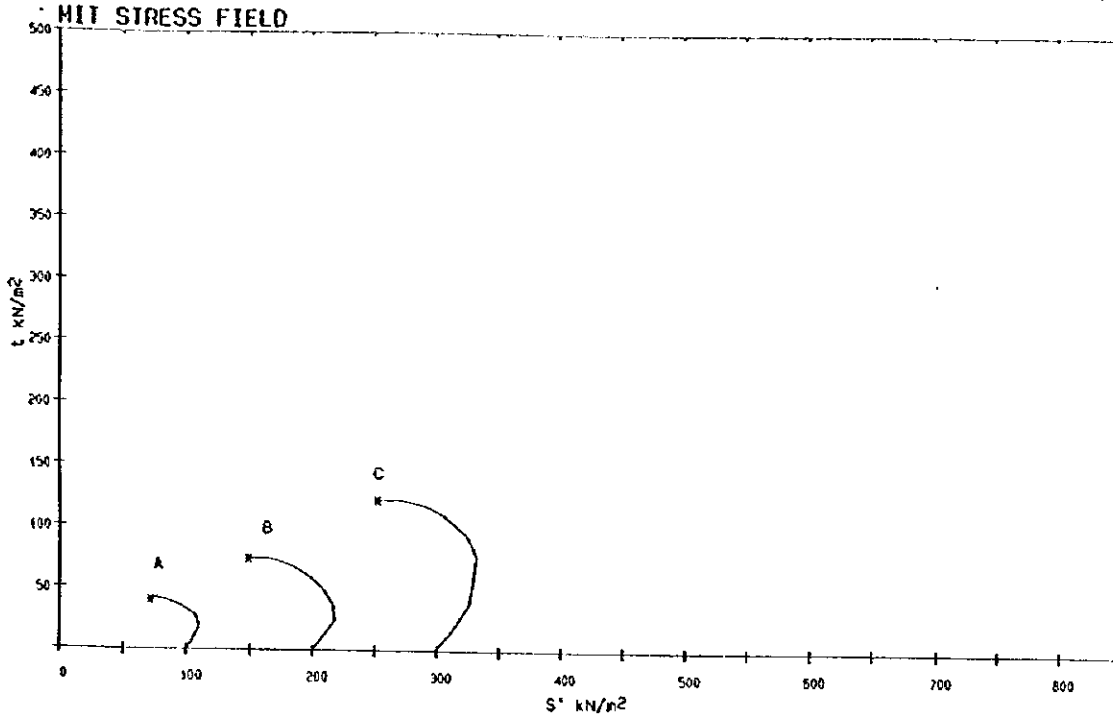
SPECIMEN DIMENSIONS 102.5 mm dia x 190.0 mm long

Consolidated Undrained Triaxial Compression Test with measurement of Pore Pressure - Multistage Test

Borehole No. GC3 TP95-14
 Sample No. 814B2

Soil Mechanics Location: MUTONGA GRAND FALLS Loc. No. 7519/53 Fig.

NOTE : Tested at rate of strain based on pore pressure equalisation at failure only.



Consolidated Undrained Triaxial Compression Test with measurement of Pore Pressure - Multistage test

Borehole No. GC3 TP95-14
Sample No. B3+B2

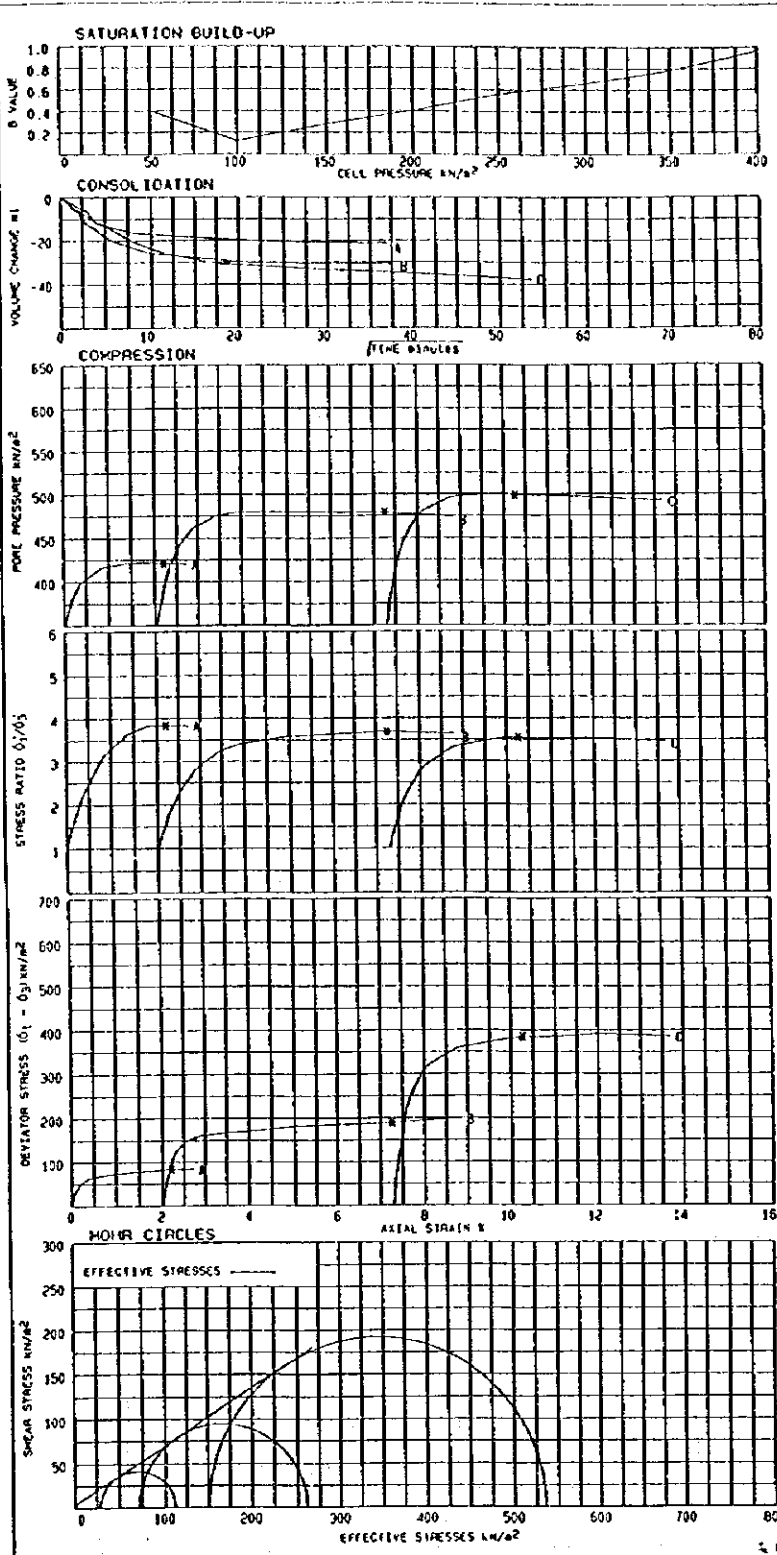
SLR 8.7B Soil Mechanics

Location

MUTONGA GRAND FALLS

Lec No 7519/53

Fig.



		A	B	C
INITIAL	Density kg/m ³	2.09	2.11	2.15
	Moisture %	11	11	11
	Dry Density kg/m ³	1.87	1.90	1.93
AFTER CONSOLIDATION	Density kg/m ³	2.14	2.18	2.23
	Moisture %	13	13	13
	Dry Density kg/m ³	1.93	1.93	1.98
SATURATION STAGE	Initial pwp	0	0	0
	Saturated pwp	388	388	388
	Final cell pressure	400	400	400
	B value	0.96	0.96	0.96
CONSOLIDATION STAGE	Cell Pressure	450	550	650
	Back Pressure	350	350	350
	Initial pwp	436	516	594
	Final pwp	350	350	350
CONSOLIDATION PARAMETERS	e_{20} at start	2.83	3.03	0.91
	e_{20} at end	0.15	0.12	0.10
COMPRESSION STAGE	Cell Pressure	450	550	650
	Initial pwp	350	350	350
	Initial σ_3'	100	200	300
	Rate of $\dot{\epsilon}$ per strain hour	0.30	0.30	0.30
FAILURE CONDITIONS AT PEAK STRESS RATIO	axial strain %	2.2	7.3	10.3
	$\sigma_1 - \sigma_3$ kN	82	190	384
	σ_1 kN	421	479	499
	σ_3' kN	29	71	151
	σ_1' kN	111	261	525
	σ_3 kN	0.86	0.68	0.39
	Time to failure hours	7.3	24.2	34.2
MODE OF FAILURE at each stage				

SHEAR STRENGTH PARAMETERS BY LINEAR REGRESSION	c'	ϕ'
	3 kN/m ²	33°

NOTES
 Saturation by application of cell/back pressure increments of 50 kN/m² with a differential of 10 kN/m².
 Drainage during consolidation to top with vertical side drains fitted.
 Stress/strain curves corrected for area change, side drains and 34 mm thick membrane.

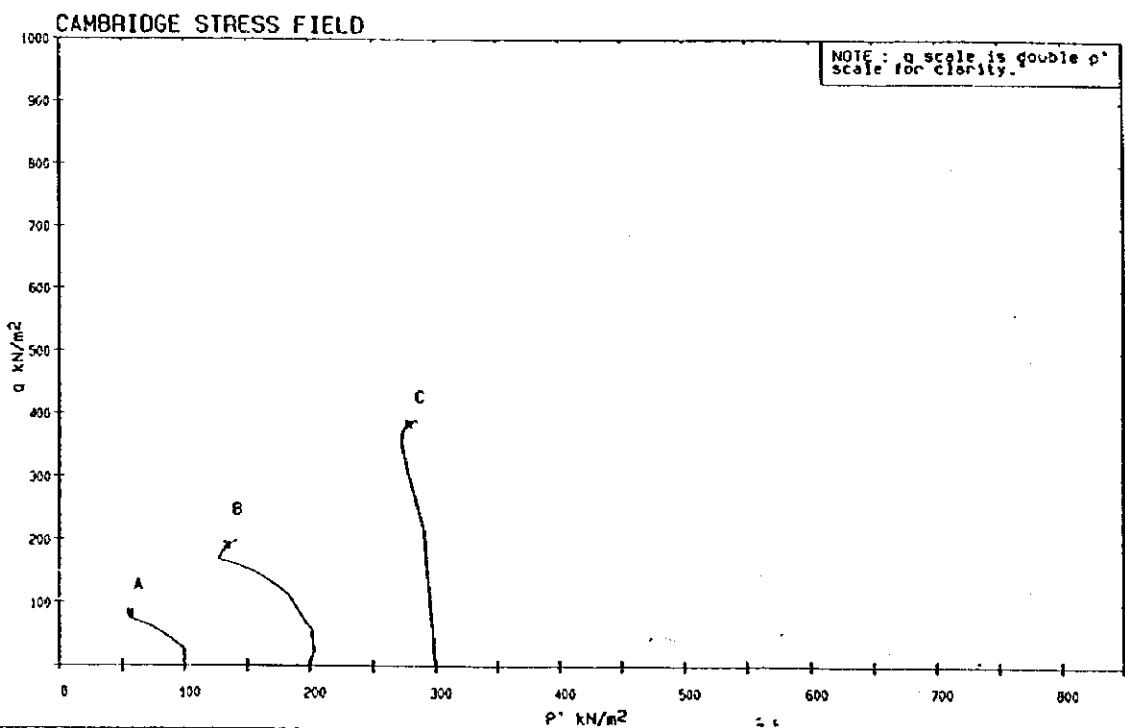
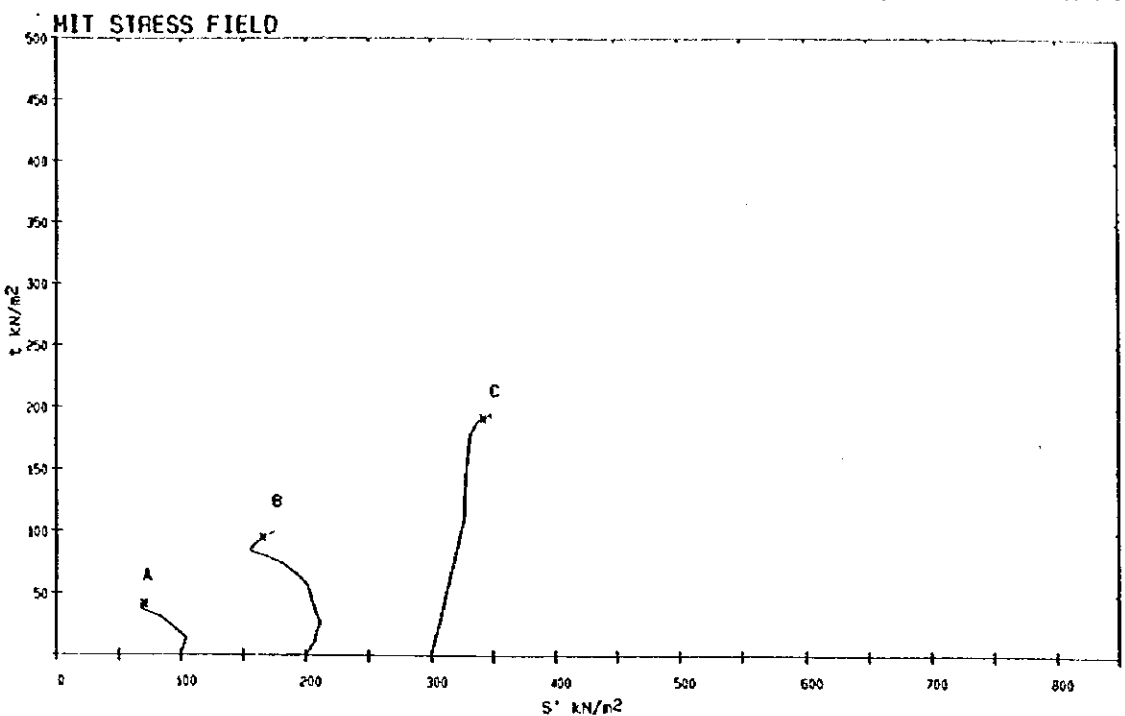
SOIL DESCRIPTION
 Very stiff reddish brown clay with occasional fine to coarse gravel and decomposed sandstone fragments.

TYPE OF SPECIMEN Reconsolidated to 96% HDD and at OMC

SPECIMEN DIMENSIONS 103.0 mm dia x 195.0 mm long

Consolidated Undrained Triaxial Compression Test with measurement of Pore Pressure - Multistage Test		Borehole No. HCl	TP95-1
		Sample No. B14B2	
Soil Mechanics	Location	MUTONGA GRAND FALLS	Loc. No. 7519/53
			Fig.

NOTE : Tested at rate of strain based on pore pressure equalisation at failure only.



Consolidated Undrained Triaxial Compression Test with measurement of Pore Pressure - Multistage test

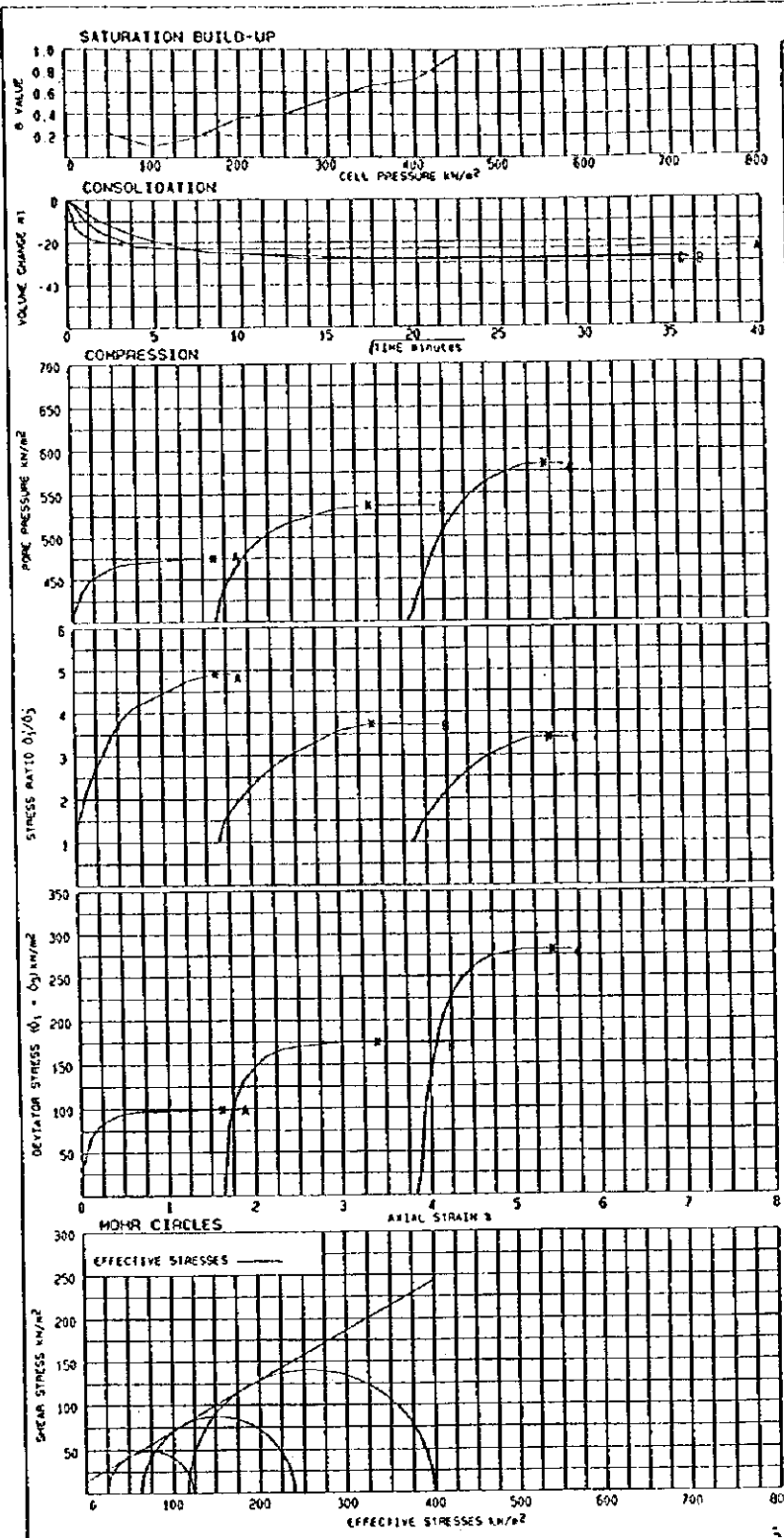
Borehole No. MC1 TP95-1
 Sample No. 81+82

SLR 8.7B Soil Mechanics

Location MUTONGA GRAND FALLS

Lab. No. 7519/53

Fig.



		SPECIMEN		
		A	B	C
INITIAL	Density kg/m ³	2.12	2.15	2.19
	Moisture %	14	14	14
	Dry Density kg/m ³	1.86	1.83	1.92
AFTER CONSOLIDATION	Density kg/m ³	2.21	2.25	2.29
	Moisture %	17	17	17
	Dry Density kg/m ³	1.83	1.92	1.96
SATURATION STAGE	Initial e _{vo}	8		
	Saturated e _{vp}	441		
	Final cell pressure	450		
	B value	0.96		
CONSOLIDATION STAGE	Cell Pressure	500	600	700
	Back Pressure	400	400	400
	Initial e _{vo}	489	572	636
	Final e _{vo}	400	400	400
CONSOLIDATION PARAMETERS	C _u m ² /year	24.3	10.8	4.47
	α _u m ² /mm	0.15	0.13	0.07
COMPRESSION STAGE	Cell Pressure	500	600	700
	Initial e _{vo}	400	400	400
	Initial σ _v	100	200	300
	Rate of σ _v per strain	1.00	1.00	1.00
FAILURE CONDITIONS AT PEAK STRESS RATIO	Initial Strain %	1.6	3.4	5.4
	σ ₁ - σ ₃ kN/m ²	98	174	261
	σ ₁ kN/m ²	475	536	583
	σ ₃ kN/m ²	25	64	117
	σ _v kN/m ²	123	238	358
	σ _h	0.76	0.78	0.65
	Time to failure hours	1.6	3.4	5.4
MODE OF FAILURE at each stage				

SHEAR STRENGTH PARAMETERS BY LINEAR REGRESSION	c'	φ'
	14 kN/m ²	30°

NOTES
 Saturation by application of cell/back pressure increments of 50 kN/m² with a differential of 10 kN/m².
 Drainage during consolidation to top with vertical side drains filled.
 Stress/strain curves corrected for area change, side drains and .35 mm thick membrane.

SOIL DESCRIPTION
 Stiff reddish brown sandy clay with occasional medium gravel.

TYPE OF SPECIMEN
 RECOMPACTED TO 98% HDD and at OMC

SPECIMEN DIMENSIONS
 103.0 mm dia x 196.0 mm long

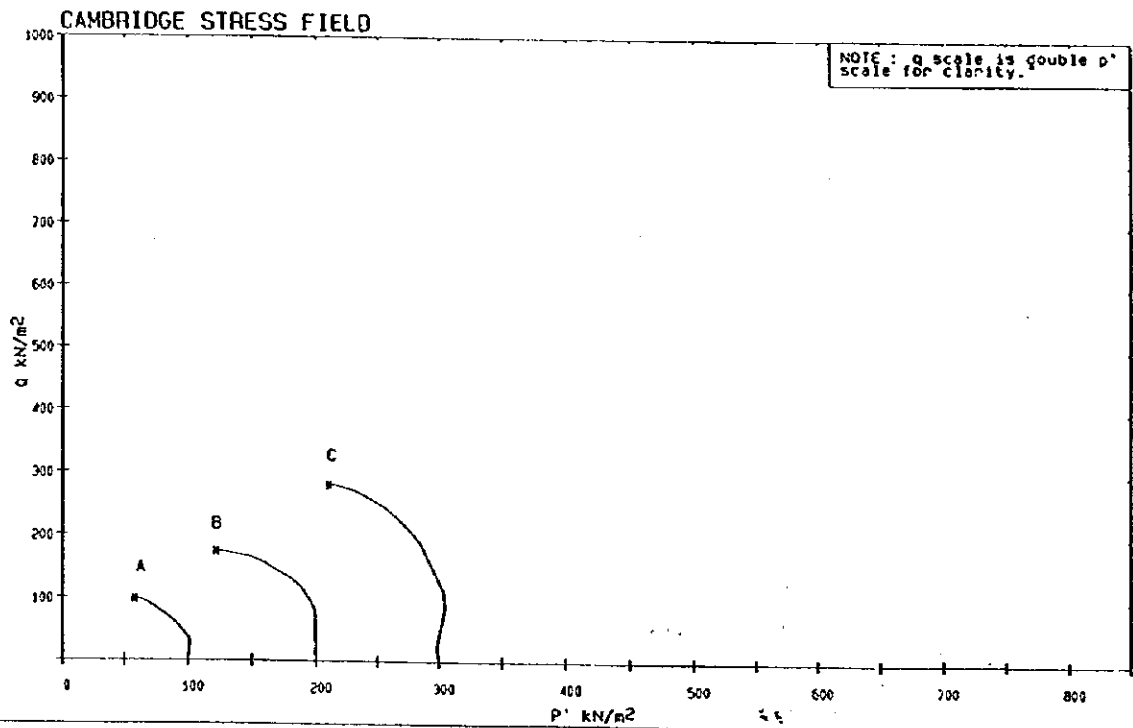
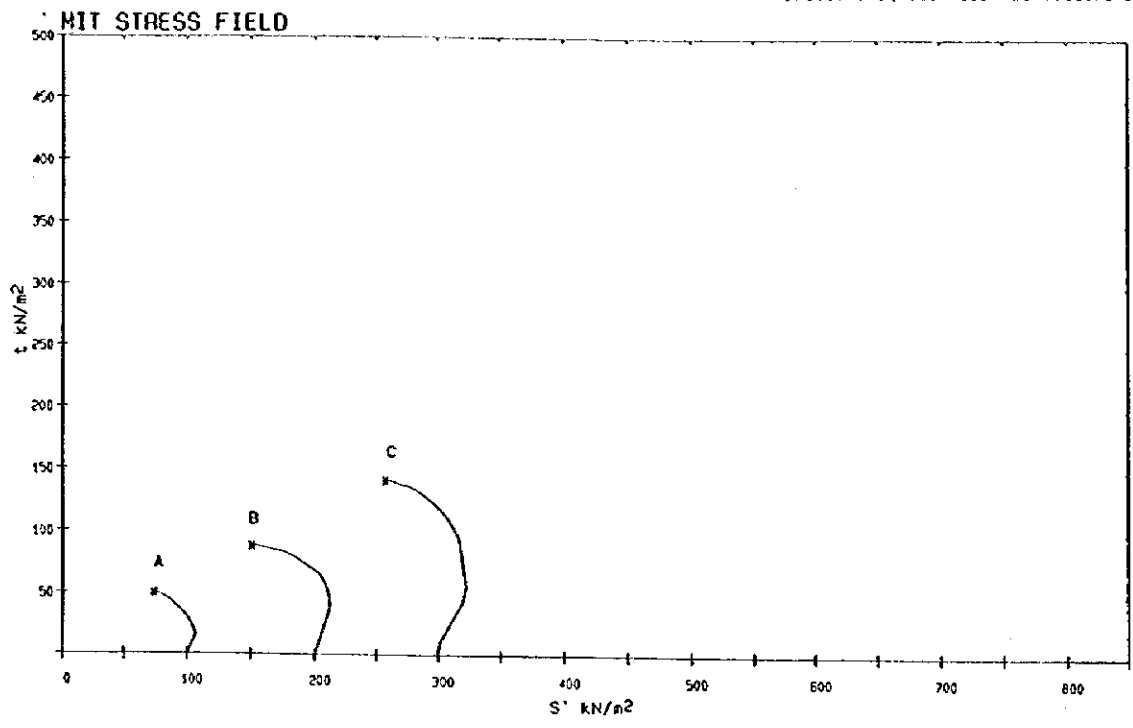
Consolidated Undrained Triaxial Compression Test with measurement of Pore Pressure - Multistage Test

Borehole No. MC2 TP95-6
 Sample No. B1+B2

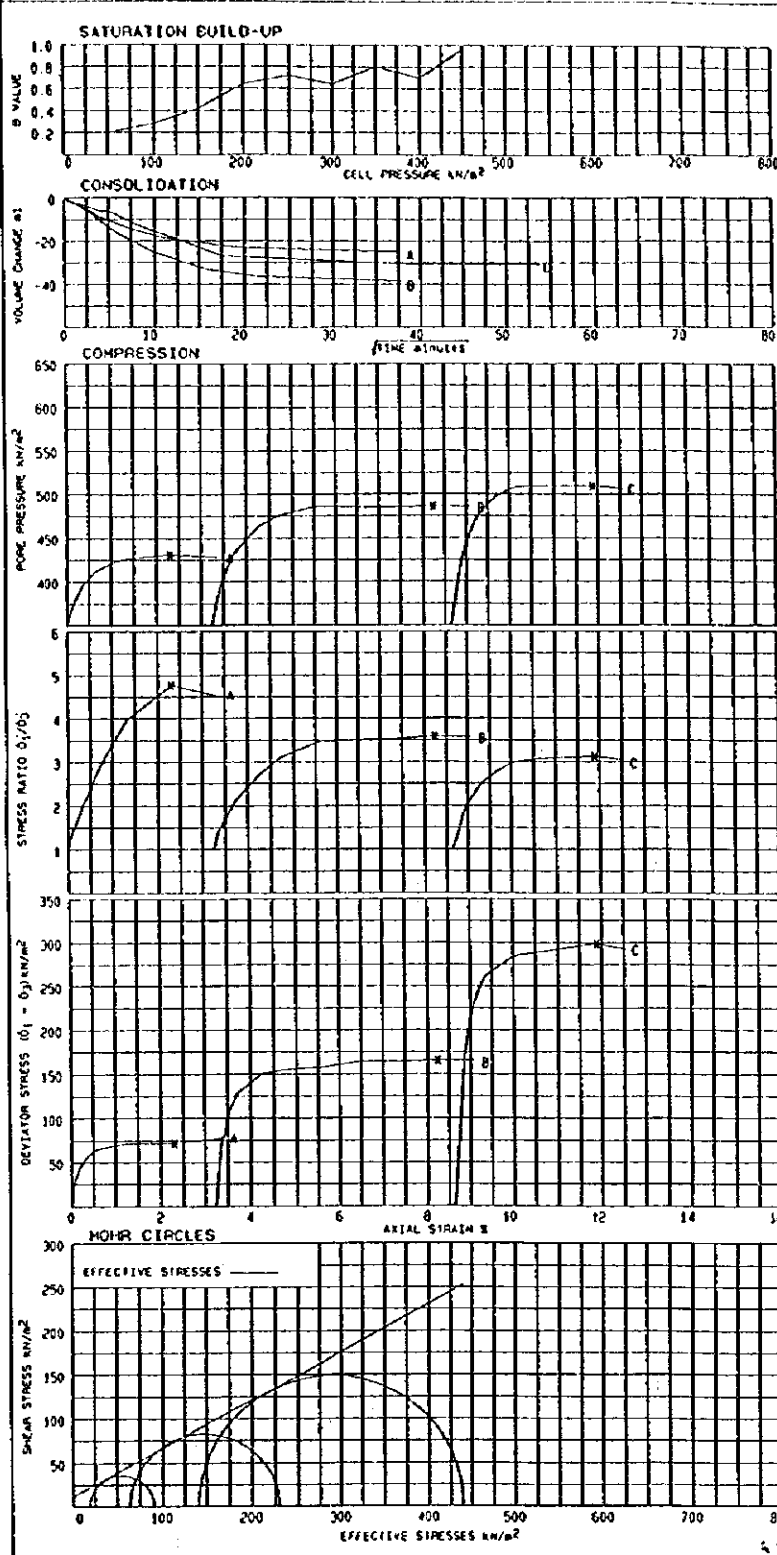
Soil Mechanics Location MUTONGA GRAND FALLS

Loc. No. 7519/53 Fig.

NOTE: Tested at rate of strain based on pore pressure equalisation at failure only.



Consolidated Undrained Triaxial Compression Test with measurement of Pore Pressure - Multistage test		Borehole No.	MCZ	TP95-5
		Sample No.	B1+B2	
SLR B.7B	Soil Mechanics	Location	MUTONGA GRAND FALLS	Loc. No. 7519/53
				Fig.



SPECIMEN		A	B	C
INITIAL	Density (Mg/m ³)	2.08	2.11	2.17
	Moisture %	14	14	14
	Dry Density (Mg/m ³)	1.82	1.85	1.89
AFTER CONSOLIDATION	Density (Mg/m ³)	2.12	2.18	2.22
	Moisture %	15	15	15
	Dry Density (Mg/m ³)	1.85	1.89	1.93
SATURATION STAGE	Initial e_w	3		
	Saturated e_w	424		
	Final cell pressure	450		
	B value	0.96		
CONSOLIDATION STAGE	Cell Pressure	450	550	650
	Back Pressure	350	350	350
	Initial e_w	424	516	577
	Final e_w	350	350	350
CONSOLIDATION PARAMETERS	C_v m ² /year	1.49	1.82	0.51
	α_v m ² /m	0.21	0.15	0.09
COMPRESSION STAGE	Cell Pressure	450	550	650
	Initial e_w	350	350	350
	Initial σ_3	150	200	300
	Rate of σ_3 per strain hour	0.31	0.31	0.20
FAILURE CONDITIONS	axial strain %	2.3	8.2	11.9
	$(\sigma_1 - \sigma_3) / \sigma_3$	71	165	298
	σ_1	431	485	508
	σ_3	19	64	141
AT PEAK STRESS RATIO	σ_1	90	223	439
	σ_3	1.83	0.82	0.53
	Time to failure hours	7.4	26.6	59.4
	MODE OF FAILURE at each stage			

SHEAR STRENGTH PARAMETERS BY LINEAR REGRESSION	C'	ϕ'
	12 kN/m ²	26°

NOTES
 Saturation by application of cell/back pressure increments of 50 kN/m² with a differential of 10 kN/m².
 Drainage during consolidation to top with vertical side drains fitted.
 Stress/strain curves corrected for area change, side drains and .34 mm thick acetate.

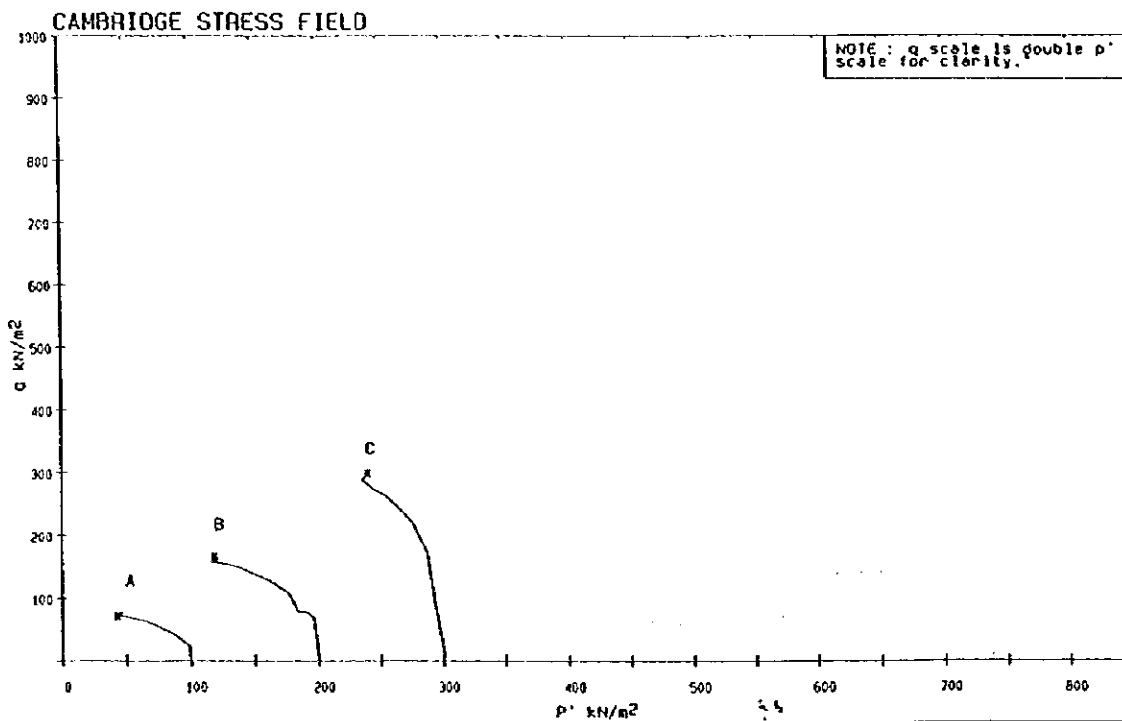
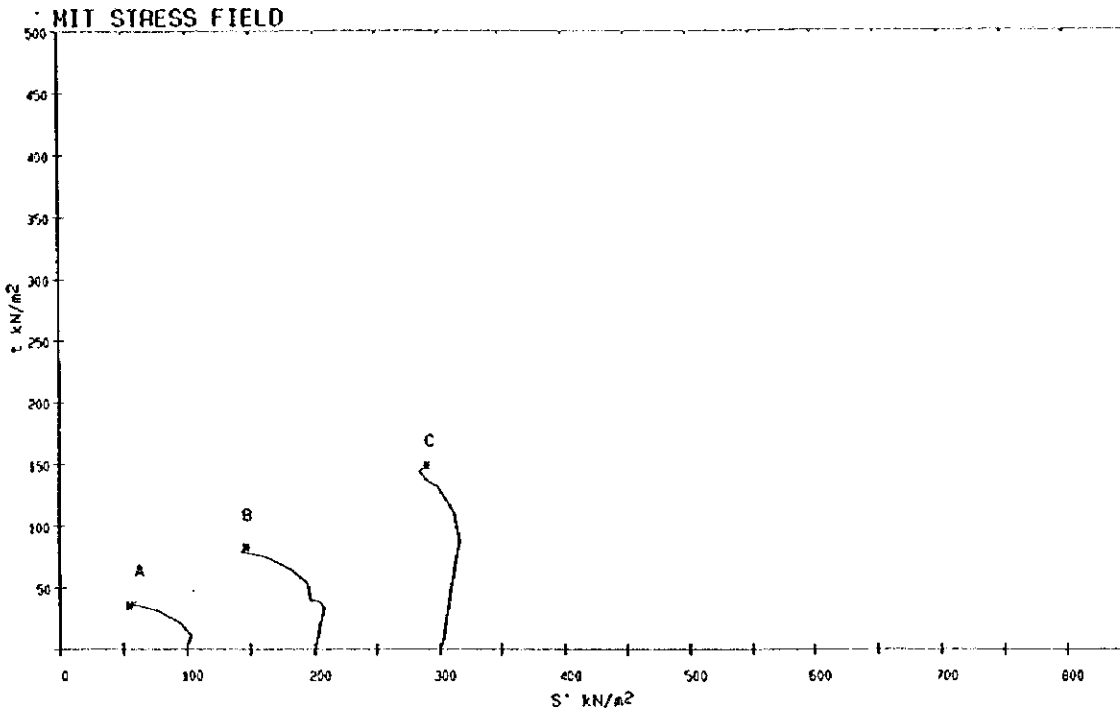
SOIL DESCRIPTION
 Stiff reddish brown silty clay with occasional coarse gravel fragments.

TYPE OF SPECIMEN Recompressed to 98% MDD, and at OMC

SPECIMEN DIMENSIONS 102.0 mm dia - 195.0 mm long

Consolidated Undrained Triaxial Compression Test with measurement of Pore Pressure - Multistage Test		Borehole No. MC3	TP95-9
		Sample No. B1482	
Soil Mechanics	LOCATION	MUTONGA GRAND FALLS	Fig.

NOTE : Tested at rate of strain based on pore pressure equalisation at failure only.



Consolidated Undrained Triaxial Compression Test with measurement of Pore Pressure - Multistage test

Borehole No. MC3 TP95-9
Sample No. B1+02

SLR 8.7B Soil Mechanics

Location MUTONGA GRAND FALLS

LOG NO 7519/53

Fig.

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M.C. 3, TP 95-9, R1482

Sample No. 1436 & 1438
B1 & B2

Job No. N/low/sem
Location MU TONGA
Date 27-10-95

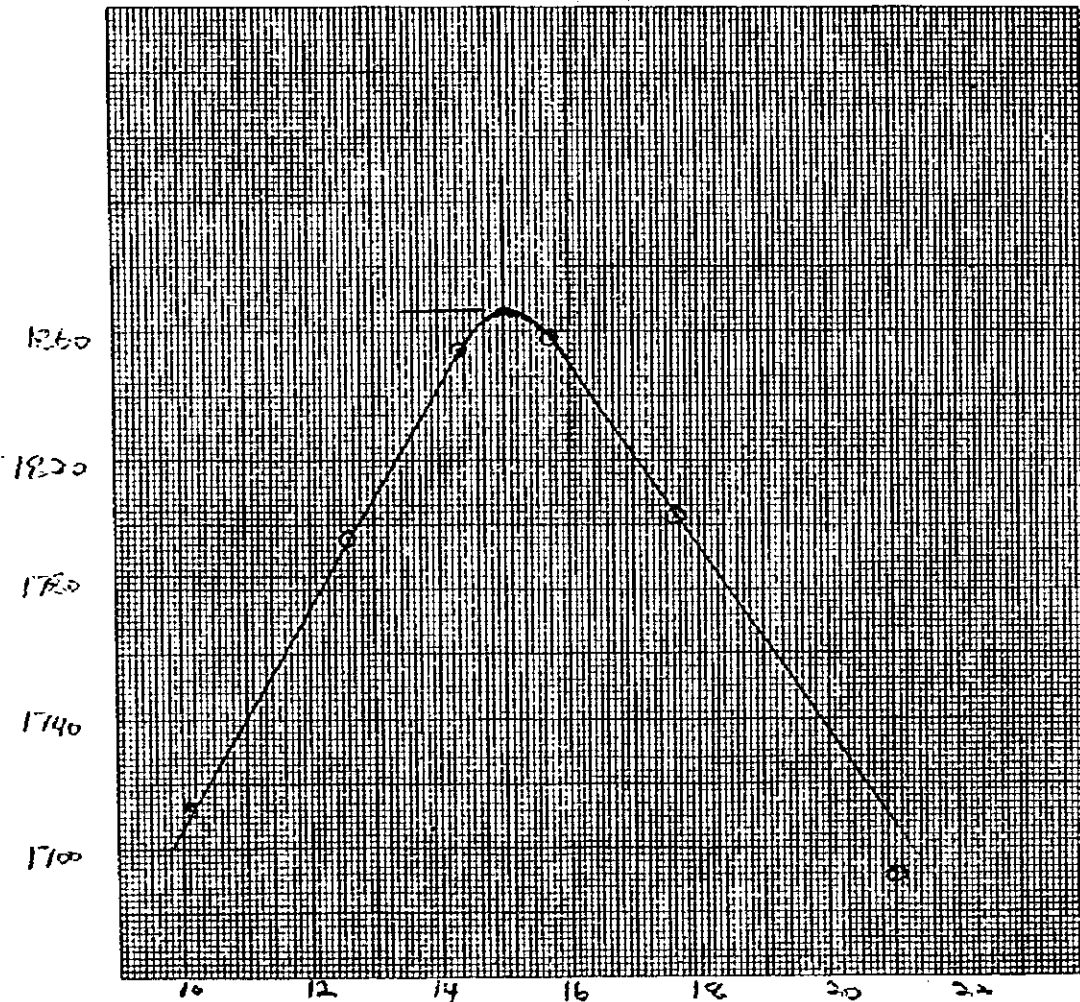
M.O.D./O.M.C. Determination for soils.

T99

M.O.D. 1868 kg/m³

O.M.C. 15.0 %

TEST No.		1	2	3	4	5	6	7	8
mould & soil g.	a	3200	3224	3411	3439	3411	3347		
mould g.	b	1500	1500	1500	1500	1500	1500		
Soil g.	c	1700	1824	1911	1939	1911	1847		
$D_w = \frac{c}{0.9239}$ kg/m ³	d	1885	2022	2119	2150	2119	2047		
Tin No.		62.	16	103.	142	479	26		
Wt. of tin & wet soil g.	e	1165	128.80	126.37	146.43	144.27	130.26		
Wt. of tin & dry soil g.	f	107.54	116.17	112.58	129.57	124.08	111.58		
Wt. of moisture g.	g	8.61	12.63	13.79	16.86	18.19	18.68		
Wt. of tin g.	h	22.32	15.91	16.18	22.15	22.71	22.62		
Wt. of dry soil g.	i	85.22	100.26	96.40	107.42	103.37	88.94		
M.C. g/j %	k	10.1	12.6	14.3	15.7	17.6	21.0		
$D_d = \frac{100d}{100-k}$ kg/m ³	l	1712	1796	1854	1858	1802	1692		



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MC3 TP95-9, B2

Sample No. 1438

Job No. Mowlem

M.D.D./O.M.C. Determination for soils.

B2

Location MUTONGA

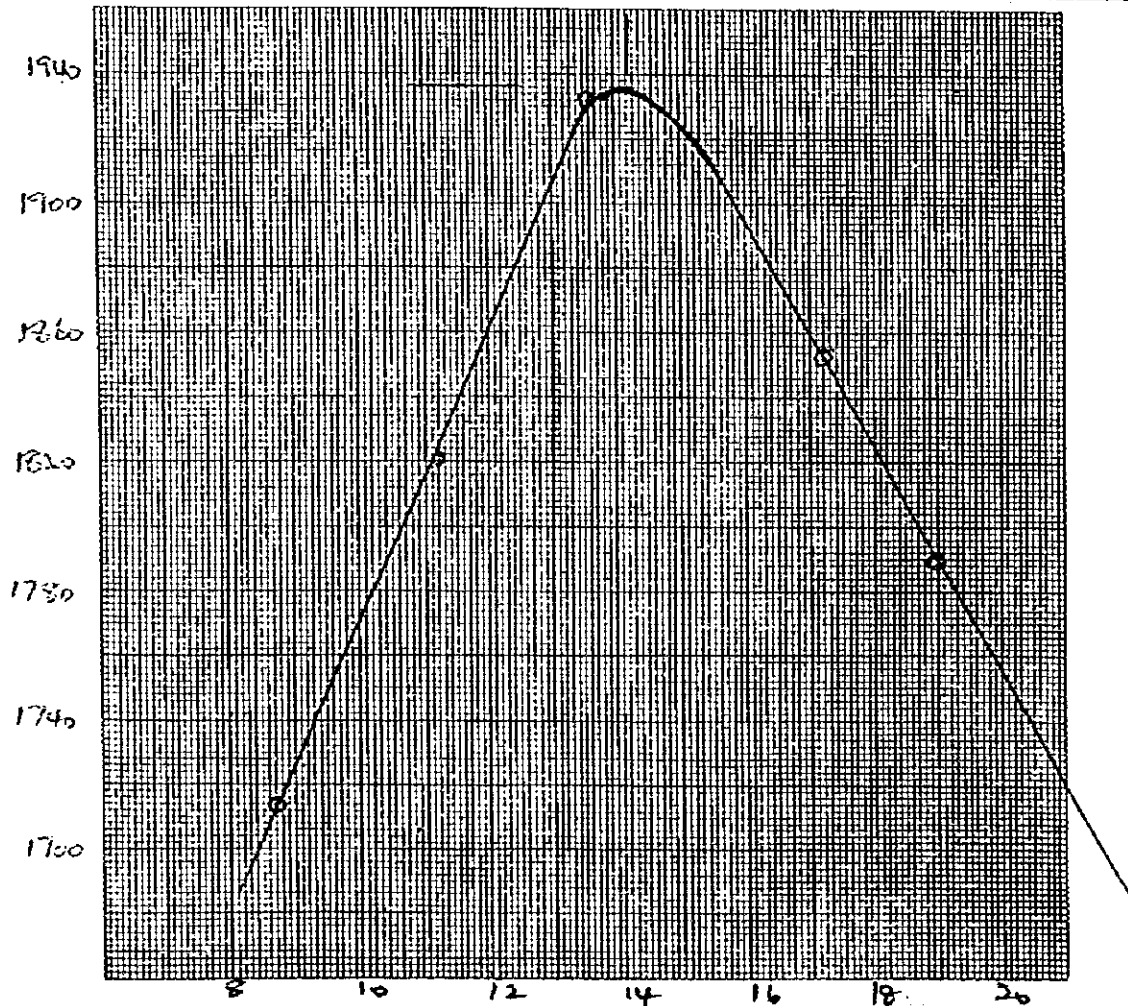
T909

M.D.D. 1926 kg/m³

Date 24-10-95

O.M.C. 14.2 %

TEST No.		1	2	3	4	5	6	7	8
mould & soil g.	a	3165	3326	3480	3458	3420			
mould g.	b	1500	1500	1500	1500	1500			
Soil g.	c	1665	1826	1980	1958	1920			
$D_w = \frac{c}{0.9433}$ kg/m ³	d	1846	2024	2195	2171	2129			
Tin No.		73	160	114	M25	A47			
Wt. of tin & wet soil g.	e	129.46	143.86	132.70	180.89	187.69			
Wt. of tin & dry soil g.	f	120.96	131.65	118.72	151.48	161.33			
Wt. of moisture g.	g	8.50	12.21	13.98	23.41	26.36			
Wt. of tin g.	h	22.22	22.60	15.92	21.36	22.65			
Wt. of dry soil g.	i	97.74	109.05	102.80	131.12	138.68			
M.C. g/l	% k	8.7	11.2	13.6	17.2	19.00			
$D_d = \frac{100d}{100+k}$ kg/m ³	l	1714	1820	1932	1852	1789			



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Mc 3, TR 5-9, 61

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Sample No. 1436

M.D.D./O.M.C. Determination for soils.

Job No. Mowlam

Location MUTONGA

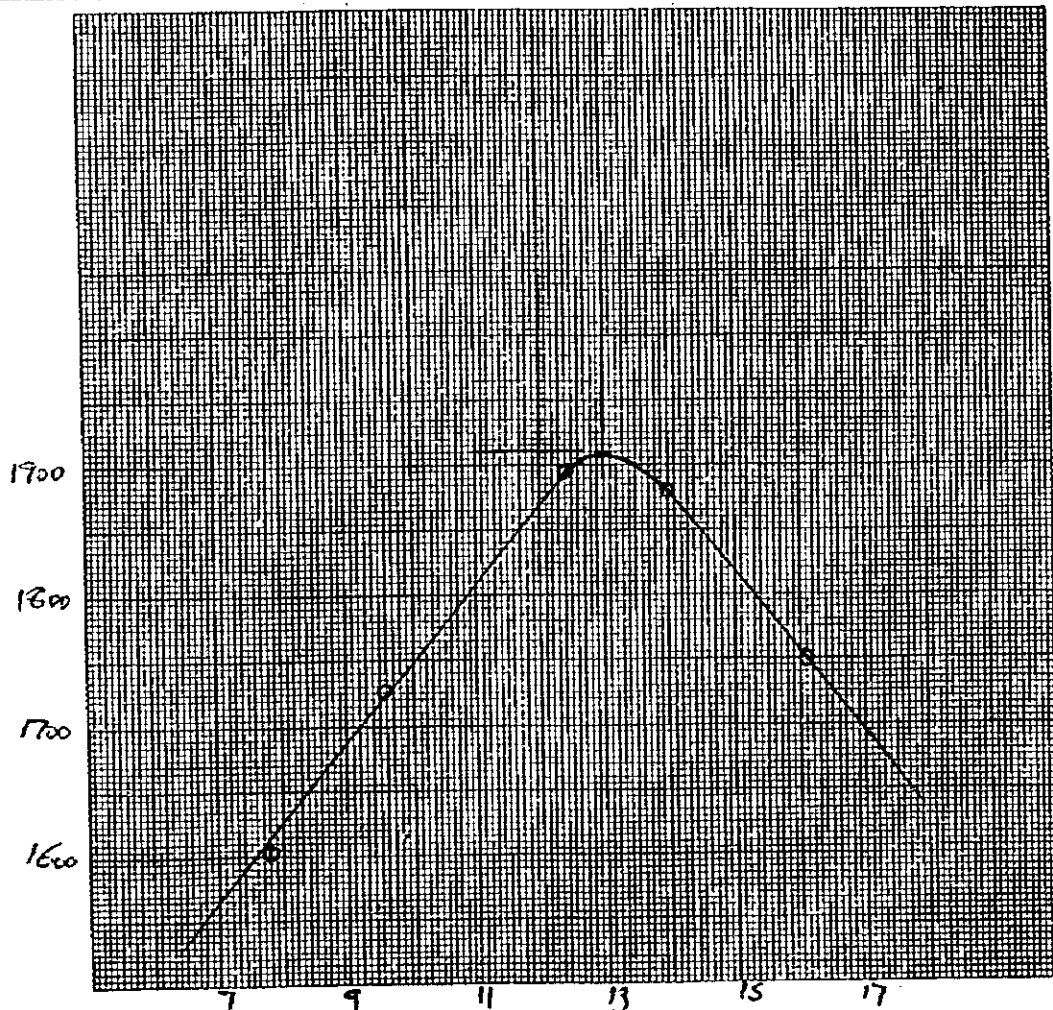
799

M.D.D. 1910 kg/m³

Date 23-10-95

O.M.C. 13.0 %

TEST No.		1	2	3	4	5	6	7	8
mould & soil g.	a	3059	3204	3421	3433	3333			
mould g.	b	1500	1500	1500	1500	1500			
Soil g.	c	1559	1704	1921	1933	1833			
Dw = $\frac{c}{0.9439}$ kg/m ³	d	1728	1890	2130	2143	2032			
Tin No.		26	24	49	419	76			
Wt. of tin & wet soil g.	e	120.62	128.02	130.46	151.24	134.65			
Wt. of tin & dry soil g.	f	113.43	118.22	118.52	135.48	119.08			
Wt. of moisture g.	g	7.19	9.80	11.94	15.76	15.57			
Wt. of tin g.	h	21.26	16.10	22.25	22.94	22.32			
Wt. of dry soil g.	i	92.17	102.12	96.27	112.54	96.70			
M.C. g/l %	k	7.8	9.6	12.4	14.0	16.1			
Dd = $\frac{100d}{100-k}$ kg/m ³	l	1603	1724	1895	1880	1750			



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Mc2, TP95-6, B2

Sample No. 1426

M.D.D./O.M.C. Determination for soils.

Job No. MOWLEM

Location MUTONGA

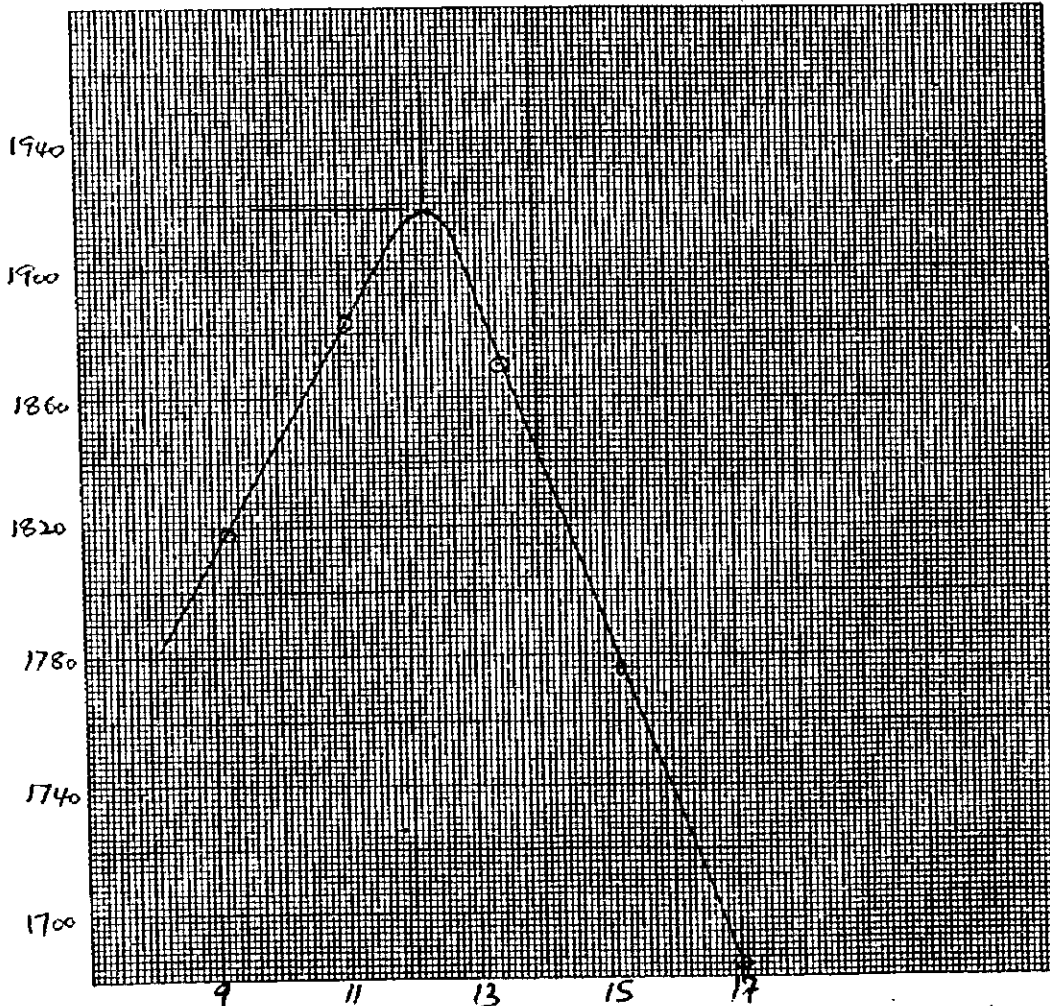
Date 23-10-95

T99

M.D.D. 1918 kg/m³

O.M.C. 12.8 %

TEST No.		1	2	3	4	5	6	7	8
mould & soil g.	a	3291	3388	3413	3345	3277			
mould g.	b	1500	1500	1500	1500	1500			
Soil g.	c	1791	1888	1913	1845	1777			
$D_w = \frac{c}{0.9439} \text{ kg/m}^3$	d	1985	2093	2121	2046	1970			
Tin No.		28	21	48	52	67			
Wt. of tin & wet soil g.	e	127.34	120.73	133.16	109.82	206.79			
Wt. of tin & dry soil g.	f	118.48	120.01	119.73	98.49	180.01			
Wt. of moisture g.	g	8.86	10.72	13.43	11.33	26.78			
Wt. of tin g.	h	22.14	23.42	19.48	23.97	22.46			
Wt. of dry soil g.	i	96.34	96.59	100.25	74.52	157.55			
M.C. g/j	% k	9.2	11.1	13.4	15.2	17.0			
$D_d = \frac{100d}{100+k} \text{ kg/m}^3$	l	1818	1884	1870	1776	1684			



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Mc2, TP95-6, A1

Sample No. 1424
B1

M.D.D./O.M.C. Determination for soils.

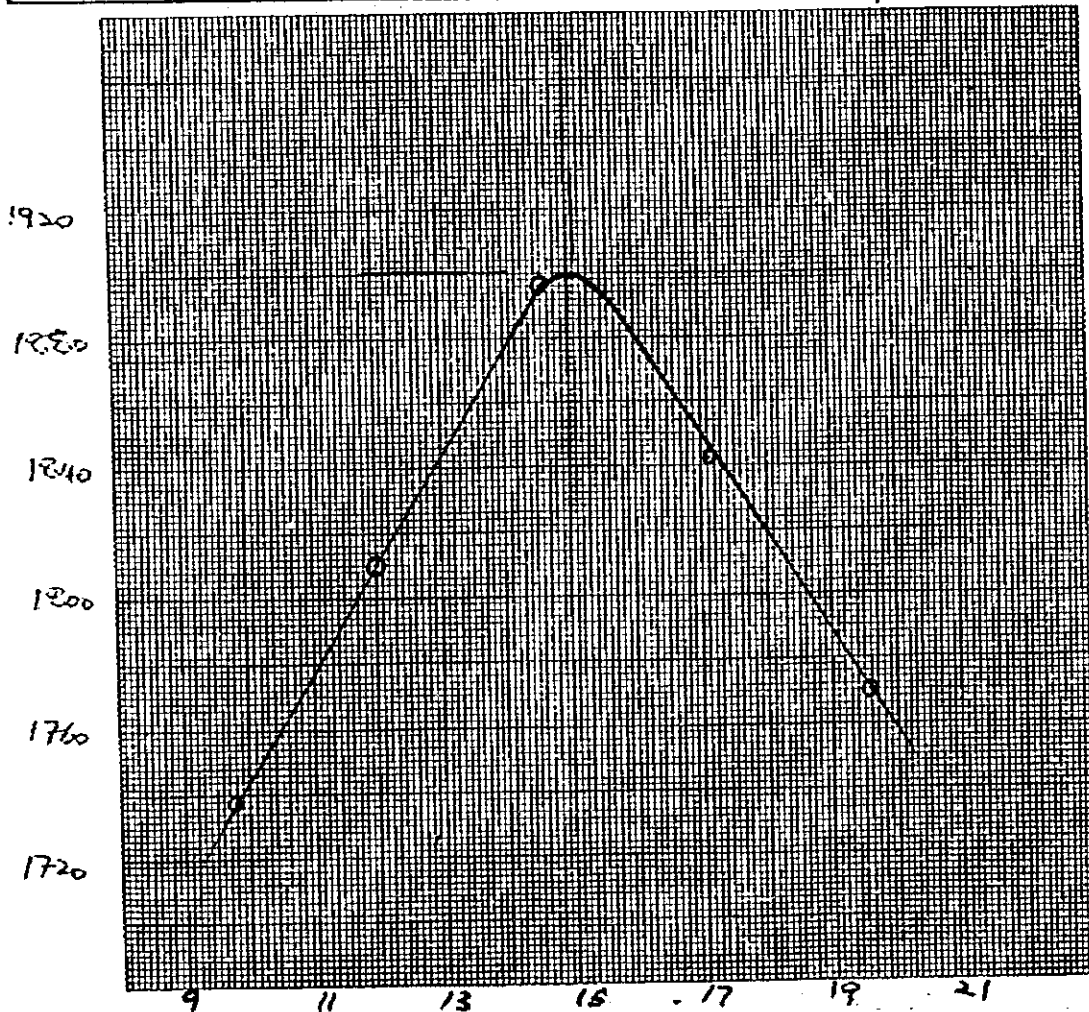
Job No. MWLEM
Location MUTONGA
Date 26-10-95

T99

M.O.D. 1900 kg/m³

O.M.C. 15.1 %

TEST No.		1	2	3	4	5	6	7	8
mould & soil g.	a	3220	3329	3458	3446	3409			
mould g.	b	1500	1500	1500	1500	1500			
Soil g.	c	1720	1829	1958	1946	1909			
Dw = $\frac{c}{0.9433}$ kg/m ³	d	1907	2027	2171	2157	2117			
Tin No.		67	160	34	19	78			
Wt. of tin & wet soil g.	e	113.69	108.04	120.39	149.69	169.15			
Wt. of tin & dry soil g.	f	105.56	92.71	103.04	120.13	145.18			
Wt. of moisture g.	g	8.13	9.33	12.35	19.56	23.97			
Wt. of tin g.	h	22.64	20.94	23.46	15.77	22.86			
Wt. of dry soil g.	i	82.92	77.77	84.58	114.36	122.32			
M.C. g/j	% k	9.8	12.0	14.6	17.1	19.6			
Od = $\frac{100d}{100-k}$ kg/m ³	l	1737	1810	1894	1812	1770			



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Mca, T₉₂₅-1, B1 & B₂
Sample No. 1404 & 1406

Job No. Mowlem

M.D.D./O.M.C. Determination for soils.

B1 x B₂

Location MUTONGA

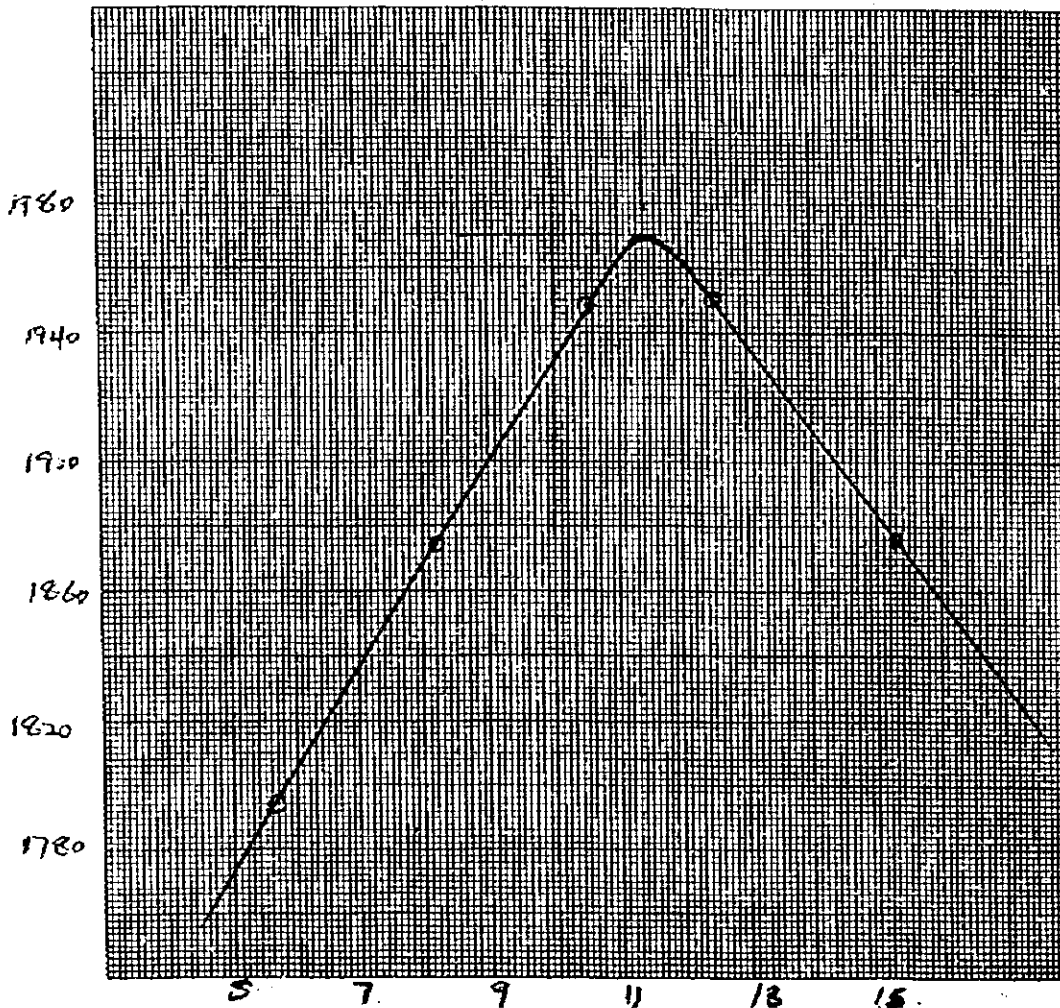
199

M.D.D. 1970 kg/m³

Date 24-10-95

O.M.C. 11.4 %

TEST No.		1	2	3	4	5	6	7	8
mould & soil g.	a	3210	3329	3442	3479	3451			
mould g.	b	1500	1500	1500	1500	1500			
Soil g.	c	1710	1829	1942	1979	1951			
Dw = $\frac{c}{0.9239}$ kg/m ³	d	1896	2030	2153	2194	2163			
Tin No.		88	160	A45	109	57			
Wt. of tin & wet soil g.	e	136.66	129.76	167.62	186.16	177.89			
Wt. of tin & dry soil g.	f	130.52	127.68	153.85	167.93	157.28			
Wt. of moisture g.	g	6.14	8.08	13.77	18.22	20.61			
Wt. of tin g.	h	22.82	23.14	22.73	22.15	22.57			
Wt. of dry soil g.	i	107.70	98.54	131.12	145.78	134.71			
M.C. g/l %	k	5.7	8.2	10.5	12.5	15.3			
Dd = $\frac{100d}{100+k}$ kg/m ³	l	1794	1874	1948	1950	1876			



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MCI, TP95-1, B2

Sample No. 1406
B2

M.D.D./O.M.C. - Determination for soils.

Job No. Mowlem

T99

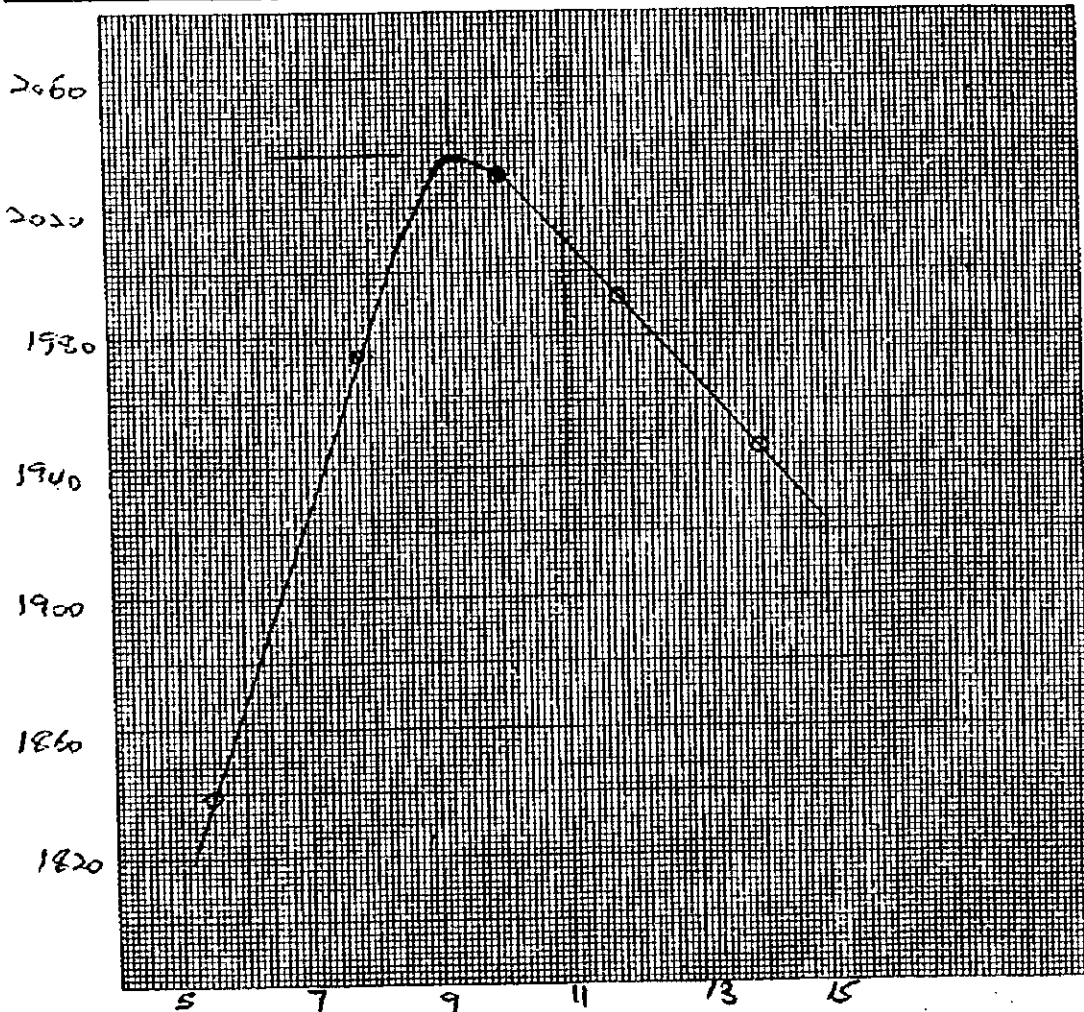
Location MUTONGA

M.O.D. 2036 kg/m³

Date 18-10-95

O.M.C. 9.3 %

TEST No.		1	2	3	4	5	6	7	8
mould & soil	g. a	2250	3419	3514	3509	3499			
mould	g. b	1500	1500	1500	1500	1500			
Soil	g. c	1750	1919	2014	2009	1999			
$D_w = \frac{c}{0.9439}$ kg/m ³	d	1940	2128	2233	2227	2216			
Tin No.		85	28	N7	K116	36			
Wt. of tin & wet soil	g. e	123.25	118.77	121.16	121.22	149.19			
Wt. of tin & dry soil	g. f	117.83	111.80	112.06	110.67	133.75			
Wt. of moisture	g. g	5.22	6.97	9.10	10.55	15.44			
Wt. of tin	g. h	22.84	22.47	21.06	21.30	22.70			
Wt. of dry soil	g. j	94.99	89.33	91.00	89.37	111.05			
M.C. g/l	% k	5.5	7.8	10.0	11.8	13.9			
$O_d = \frac{100d}{100+k}$ kg/m ³	l	1839	1974	2030	1992	1946			



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MCI TP95-1, B1

Sample No. 1404
B1

Job No. MOWLEM

M.D.D./O.M.C. Determination for soils.

Location MUTONGA

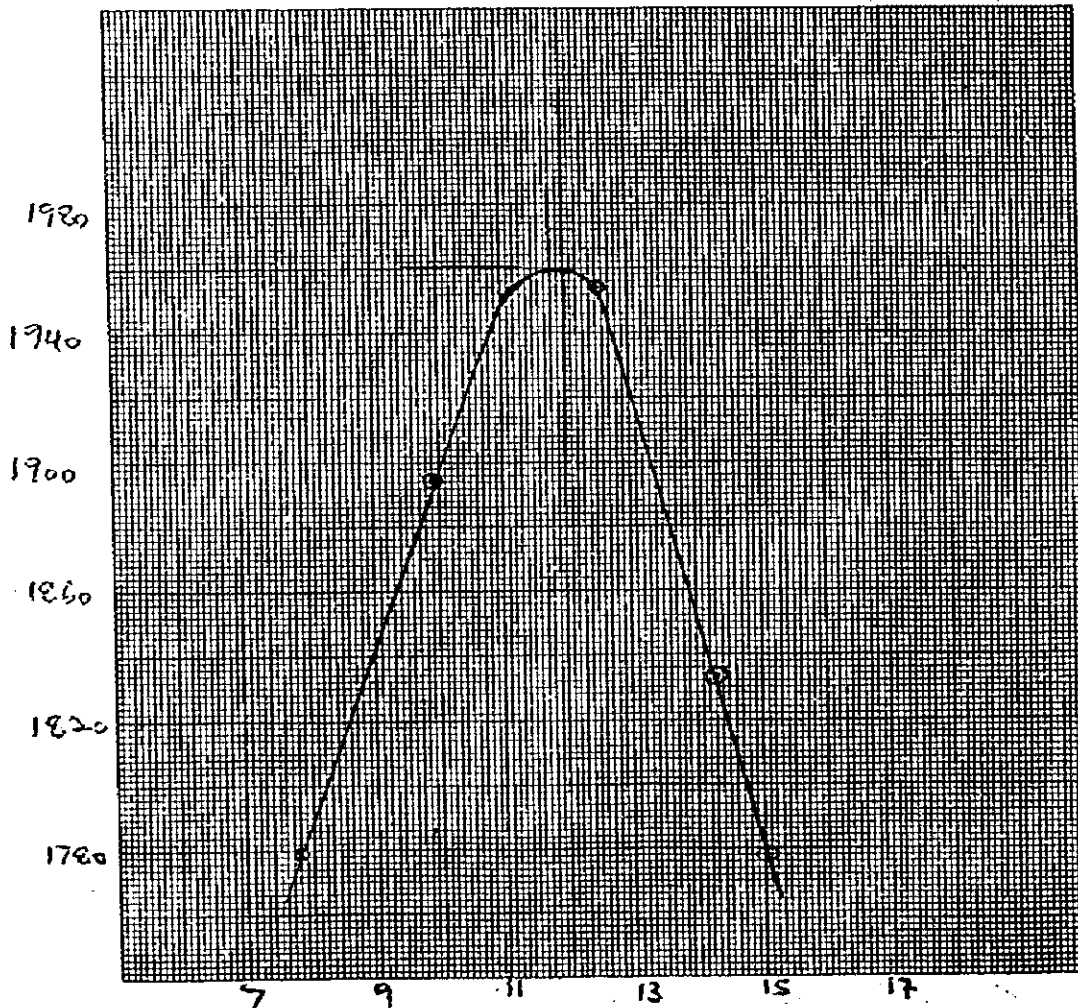
T99

M.O.D. 1960 kg/m³

Date 18-10-95

O.M.C. 11.8 %

TEST No.		1	2	3	4	5	6	7	8
mould & soil g.	a	3230	3278	3483	3390	3384			
mould g.	b	1500	1500	1500	1500	1500			
Soil g.	c	1730	1878	1983	1890	1844			
Dw = $\frac{c}{0.9439}$ kg/m ³	d	1918	2062	2198	2095	2045		Hygroscopic	
Tin No.		Y104	Y21	P28	109	Y114		A11	
Wt. of tin & wet soil g.	e	134.01	133.59	137.86	145.78	182.71		460.26	
Wt. of tin & dry soil g.	f	125.46	122.98	124.47	130.31	160.96		453.30	
Wt. of moisture g.	g	8.55	10.61	12.89	15.47	21.75		6.96	
Wt. of tin g.	h	15.87	15.80	21.87	22.10	15.98		131.05	
Wt. of dry soil g.	i	109.59	107.08	103.10	108.21	144.98		322.25	
M.C. g/l	% k	7.8	9.9	12.5	14.3	15.0		2.2	
Dd = $\frac{100d}{100-k}$ kg/m ³	l	1779	1894	1954	1833	1778			



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Gc4 TP95-16 B19B₂

Sample No. 1359 ~~1371~~
B19B₂

Job No. Mowlem M.D.D./O.M.C. Determination for soils.

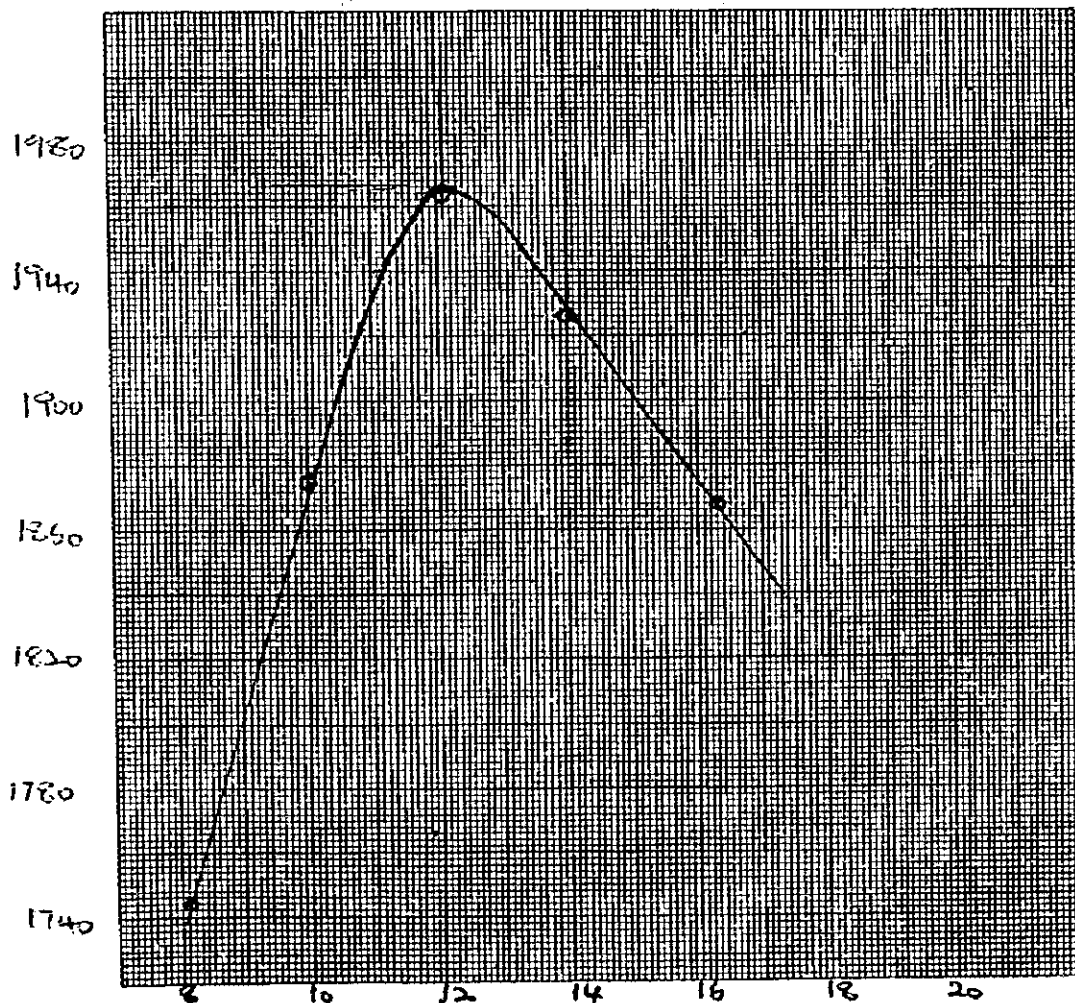
Location MUONGA T99

M.D.O. 1965 kg/m³

Date 17-10-95

O.M.C. 12.1 %

TEST No.		1	2	3	4	5	6	7	8
mould & soil g.	a	3201	3360	3486	3480	3460			
mould g.	b	1500	1500	1500	1500	1500			
Soil g.	c	1701	1860	1986	1980	1960			
$D_w = \frac{c}{0.9439} \text{ kg/m}^3$	d	1885	2063	2202	2196	2172		Hygroscopic	
Tin No.		027	323	03	M18	78		17	
Wt. of tin & wet soil g.	e	12658	11899	14433	14920	17433		410.20	
Wt. of tin & dry soil g.	f	11881	10962	13117	13273	15287		403.60	
Wt. of moisture g.	g	777	937	1316	1547	2146		710	
Wt. of tin g.	h	2287	1592	2238	2226	2124		126.90	
Wt. of dry soil g.	i	9594	9370	10879	11047	13163		276.70	
M.C. g/l %	k	8.1	10.0	12.1	14.0	16.3		21.6	
$D_d = \frac{100d}{100-k} \text{ kg/m}^3$	l	1744	1875	1964	1926	1868			



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904, TP95-16, B2

Sample No. 1371
B2

Job No. Mowlem

M.D.D./O.M.C. Determination for soils.

Location MATONGA

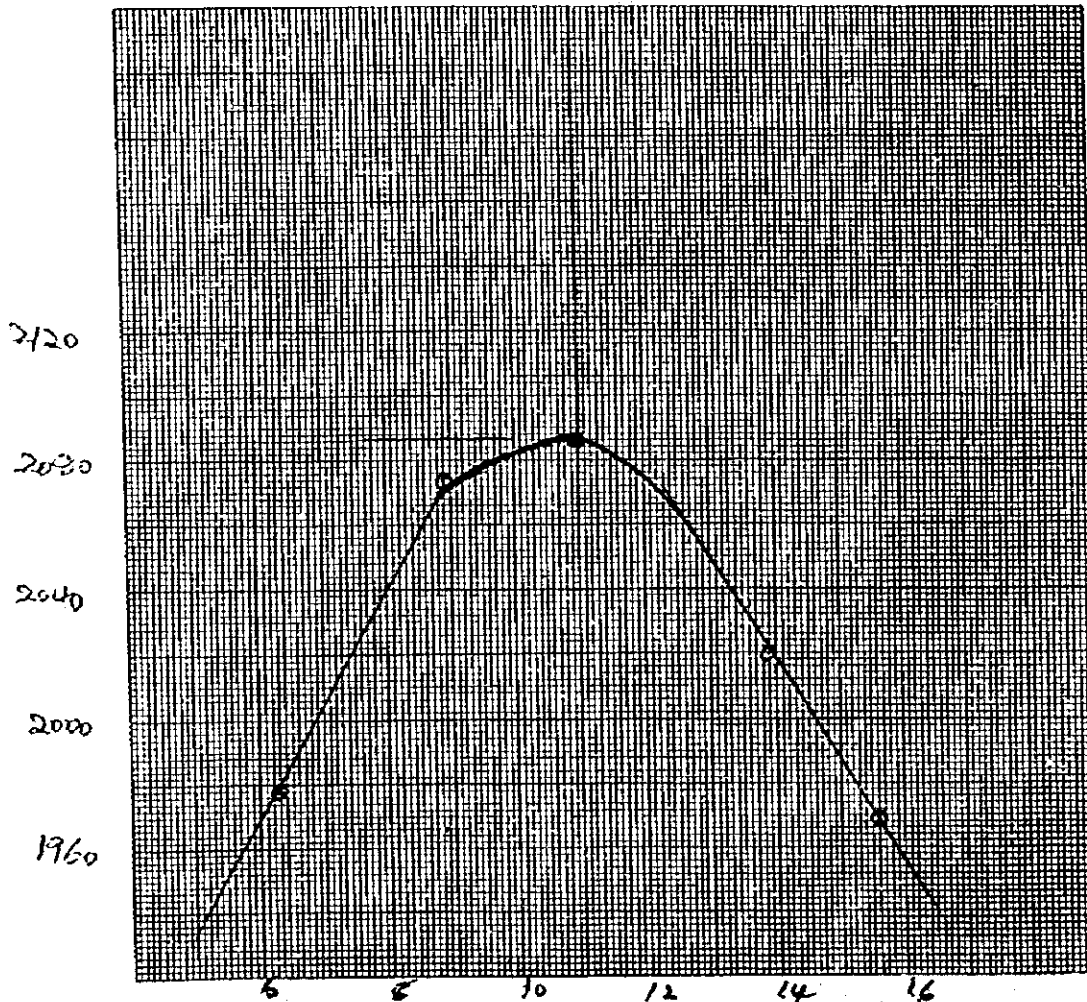
T99

M.D.D. 2086 kg/m³

Date 24-10-95

O.M.C. 11.0 %

TEST No.		1	2	3	4	5	6	7	8
mould & soil	g. a	9400	9729	9850	9821	9767			
mould	g. b	4930	4930	4930	4930	4930			
Soil	g. c	4470	4799	4920	4891	4837			
Dw = $\frac{c}{0.9439}$ kg/m ³	d	2103	2257	2314	2301	2275			
Tin No.		16	102	19	56	142			
Wt. of tin & wet soil	g. e	118.55	147.06	164.85	167.52	183.03			
Wt. of tin & dry soil	g. f	112.46	136.36	150.08	149.79	161.33			
Wt. of moisture	g. g	6.09	10.70	14.77	17.73	21.70			
Wt. of tin	g. h	15.77	16.04	15.73	22.19	22.19			
Wt. of dry soil	g. i	96.67	120.32	134.35	127.60	139.14			
M.C. g/j	% k	6.2	8.9	11.0	13.9	15.6			
Od = $\frac{100d}{100-k}$ kg/m ³	l	1978	2073	2085	2020	1968			



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GCU, TP95-16, E1

Sample No. 1359

Job No. M010LEM

M.D.D./O.M.C. Determination for soils.

Location MUYTONGA

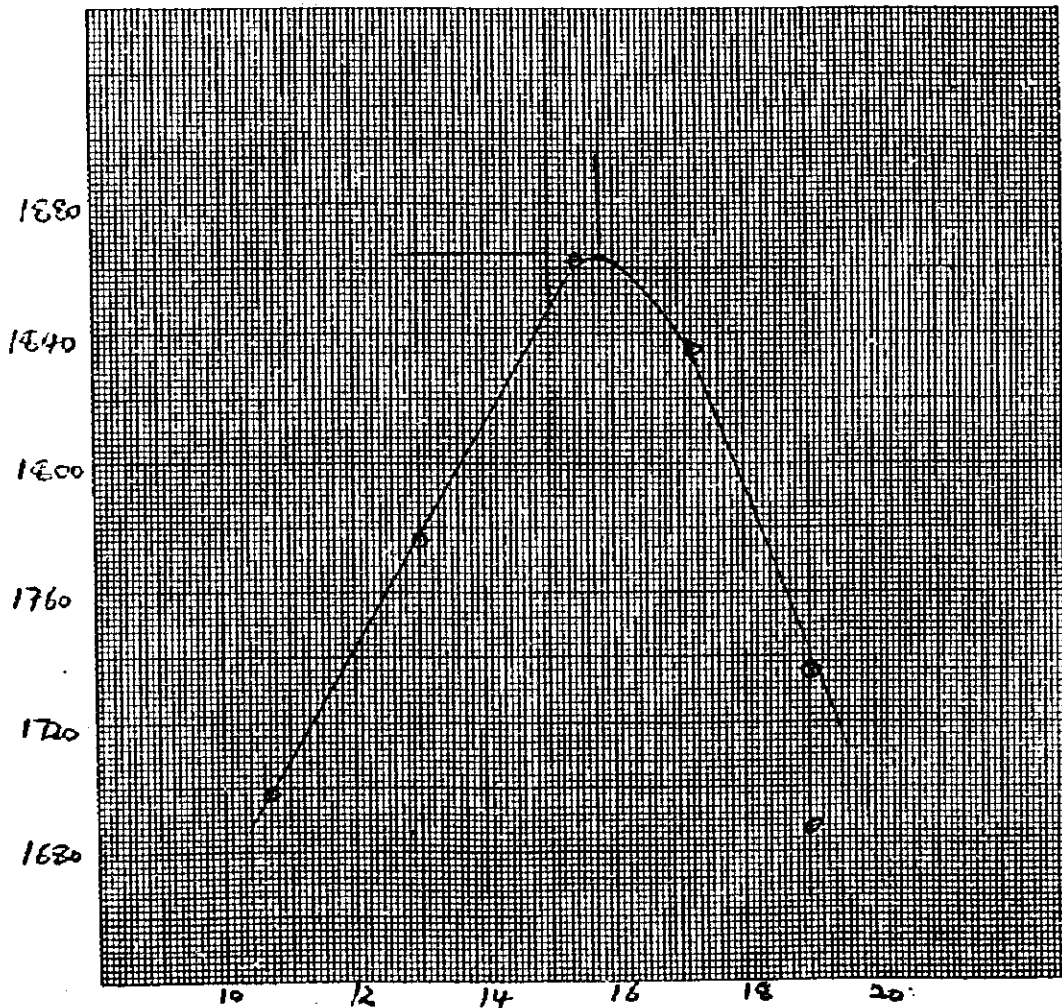
T99

M.D.D. 1864 kg/m³

Date 18-10-95

O.M.C. 15.8 %

TEST No.		1	2	3	4	5	6	7	8
mould & soil g.	a	3195	3310	3438	3440	3418			
mould g.	b	1500	1500	1500	1500	1500			
Soil g.	c	1695	1810	1938	1940	1918			
Dw = $\frac{c}{0.9639}$ kg/m ³	d	1880	2007	2149	2151	2127		Hygroscopic	
Tin No.		45	3	3111	87	101		A32	
Wt. of tin & wet soil g.	e	116.31	128.85	126.78	165.47	145.06		355.90	
Wt. of tin & dry soil g.	f	107.18	115.12	112.02	144.53	124.47		345.41	
Wt. of moisture g.	g	9.13	13.73	14.76	20.90	20.59		10.49	
Wt. of tin g.	h	21.82	9.43	16.17	22.74	16.07		120.64	
Wt. of dry soil g.	i	85.36	105.69	95.85	121.79	108.40		224.77	
M.C. g/j %	k	10.7	13.0	15.4	17.2	19.0		4.7	
Dd = $\frac{100d}{100+k}$ kg/m ³	l	1698	1776	1862	1835	1787			



G03, TP95-14 B1 B2

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Sample No. 1361/1363
B1 B2

Job No. MowLEM
Location MUTONGA
Date 24-10-95

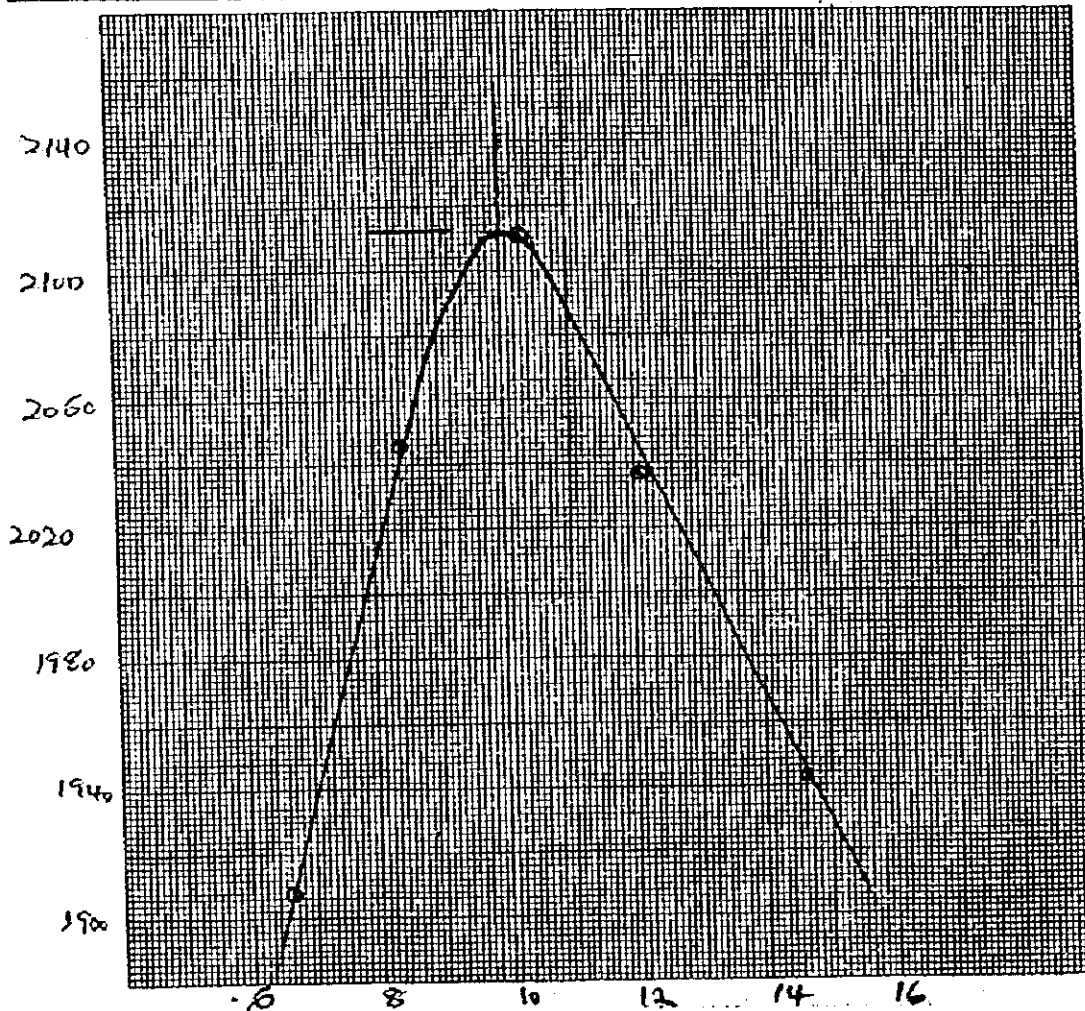
M.D.D./O.M.C. Determination for soils.

T 99

M.D.D. 2112 kg/m³

O.M.C. 10.2 %

TEST No.		1	2	3	4	5	6	7	8
mould & soil g.	a	3334	3500	3600	3560	3509			
mould g	b	1500	1500	1500	1500	1500			
Soil g.	c	1834	2000	2100	2060	2009			
$D_w = \frac{c}{0.9735} \text{ kg/m}^3$	d	2033	2217	2328	2283	2227			
Tin No.		P 63	1104	395	AB4	65			
Wt. of tin & wet soil g	e	139.97	127.31	181.59	167.33	199.82			
Wt. of tin & dry soil g	f	132.72	118.67	166.62	169.33	177.27			
Wt. of moisture g	g	7.25	8.64	15.07	18.00	22.55			
Wt. of tin g	h	22.90	15.83	20.34	20.56	22.84			
Wt. of dry soil g	i	109.82	102.84	146.28	148.77	154.43			
M.C. g/l	% k	6.6	8.4	10.3	12.1	14.6			
$O_d = \frac{100d}{100+k} \text{ kg/m}^3$	l	1907	2045	2111	2037	1943			



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G03, TP95-14, 82

Sample No. 1363

Job No. MOWLEM

M.D.D./O.M.C. Determination for soils.

81

Location MUTONGA

T 99

M.D.D. 1900 kg/m³

Date 23-10-95

O.M.C. 13.7 %

TEST No.		1	2	3	4	5	6	7	8
mould & soil g.	a	3290	3351	3430	3437	3403			
mould g.	b	1500	1500	1500	1500	1500			
Soil g.	c	1790	1851	1930	1937	1903			
Dw = $\frac{c}{0.9639}$ kg/m ³	d	1984	2052	2140	2147	2110			
Tin No.		23	101	109	114	24			
Wt. of tin & wet soil g.	e	127.59	131.90	138.65	145.77	149.79			
Wt. of tin & dry soil g.	f	117.34	120.04	124.45	131.25	129.83			
Wt. of moisture g.	g	10.25	11.86	14.20	17.52	19.96			
Wt. of tin g.	h	15.86	15.96	16.02	15.94	15.77			
Wt. of dry soil g.	i	101.49	104.08	108.43	115.31	114.06			
M.C. g/l	% k	10.1	11.4	13.1	15.2	17.5			
Dd = $\frac{100d}{100+k}$ kg/m ³	l	1802	1842	1892	1864	1796			

