

U.S. ARMY CORPS OF ENGINEERS
GEOTECHNICAL BORING DATA

PROJECT NAME Colorado River lock

LOG OF BORING NO. 94-139

LOCATION/STATION 462+600

DATE/TIME STARTED 9-24-94 1:00 PM

DATE/TIME COMPLETED 9-24-94 4:00 PM

TIDE ELEVATION +3' MLT DATUM, TIME _____ LOCATION LT. BKN.# _____

WATER DEPTH 13' - 3' (Deck) = 10'

DEPTH FROM WATER SURFACE
TO BOTTOM OF BORING 63

WEATHER Sunny

DRILL RIG MANUFACTURE
MODEL NO. _____

DRILLER Dempsey Gcarner

LOGGER H. Patel

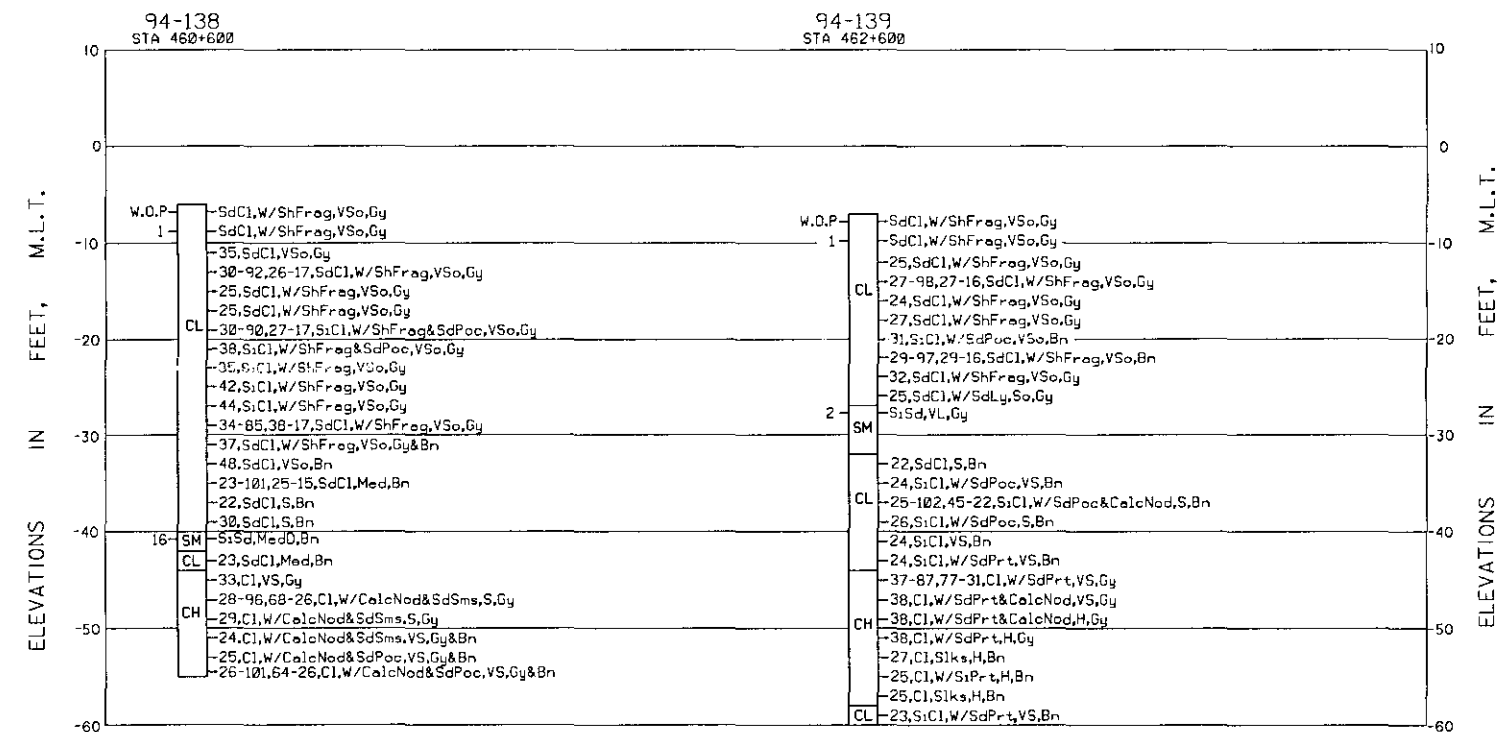
DRILLER'S/LOGGER'S COMMENTS _____

U.S. ARMY CORPS OF ENGINEERS

DEPTH, FEET		SAMPLE NO.	PEN./TORVANE	SPT.-BLOW COUNT	BORING NO. <u>94-139</u> DATE: BEGIN <u>9-24-94</u> PAGE <u>1 / 1</u> JOB NO. <u>94 G790</u> COMPLETE <u>9-24-94</u> Thin Walled Tube PROJECT <u>Colorado River lock</u> ☒ 3" ☐ 6" LOCATION <u>Sta. NO. 462+600</u> ELEVATION OF HOLE <u>-7'</u> MANUFACTURER'S DESIGNATION OF DRILL RIG <u>Failing 3600</u> GROUNDWATER: DEPTH _____ ft., ELEV. _____ ft., at end of Drilling WEATHER <u>Sunny</u> DRILLER <u>Dempsey Greaney</u> LOGGER <u>H. Patel</u>				
					COLOR	MATERIAL TYPE	CONSISTENCY	SECONDARY CONSTITUENTS	STRUCTURAL FEATURES AND COMMENTS
0	☒	1	weight of pipe		Gray	clay	very soft	Sandy	Attempt was made to push Shelby tube, but no recovery. Spirt spoon used for sample with shell (0.4')
	☒	2	0/0/1		Gray	clay	very soft	Sandy	
5		3	0		Gray	clay	Very soft	Sandy	with shell fragments
		4	0		Gray	clay	very soft	Sandy	with shell fragments
		5	0		Gray	clay	very soft	Sandy	with shell fragments
10		6	0		Gray & Brown	clay	very soft	Silty	
		7	0		Brown	clay	very soft	Silty	with sand partings
15		8	0		Brown	clay	very soft	Silty	with sand pocket
		9	0		Gray	clay	Very soft	Sandy	with shell
		10	0		Gray	clay	Very soft	Sandy	with sand layer
20	☒	11	0/1/1		Gray	Sand	Very Loose	clayey	
25		12	1.0		Brown	clay	Stiff	Silty	with sand layer on surface
		13	1.25		Brown	clay	Stiff	Silty	with sand partings
30		14	2.5		Brown	clay	very stiff	Silty	with sand partings
		15	1.5		Brown	clay	Stiff	Silty	with sand layer (damaged sample)
		16	1.5		Brown	clay	Stiff	Silty	with sand partings
35									

U.S. ARMY CORPS OF ENGINEERS

DEPTH, FEET	SAMPLE NO.	PEN./TORVANE SPT.-BLOW COUNT	BORING NO. <u>94-139</u> DATE: BEGIN <u>9-24-94</u> PAGE <u>2 / 2</u> JOB NO. <u>94 G790</u> COMPLETE <u>9-24-94</u> Thin Walled Tube PROJECT <u>Colorado River lock</u> ☒ 3" ☐ 6" LOCATION <u>Sta. No. 462+600</u> ELEVATION OF HOLE <u>-7'</u> MANUFACTURER'S DESIGNATION OF DRILL RIG <u>Failing 3600</u> GROUNDWATER: DEPTH _____ ft., ELEV. _____ ft., at end of Drilling WEATHER <u>Sunny</u> DRILLER <u>Dempsey Gearing</u> LOGGER <u>H. Patel</u>				
			COLOR	MATERIAL TYPE	CONSIS- TENCY	SECONDARY CONSTITUENTS	STRUCTURAL FEATURES AND COMMENTS
-35-	17	1.75	Brown	clay	stiff	Silty	with sand partings
	18	2.5	Gray	clay	very stiff		With sand partings
-40-	19	3.0	Gray	clay	Very stiff		With sand partings
	20	3.5	Gray	clay	very stiff		with sand partings
	21	3.5	Gray	clay	Very stiff		with sand partings
-45-	22	3.5	Gray & Brown	clay	very stiff		With sand partings
	23	3.5	Brown	clay	very stiff		with silt partings
-50-	24	4.0	Brown	clay	very stiff		With silt partings
	25	2.5	Brown	clay	very stiff	Silty	with sand partings
-55-							
-60-							
-65-							
-70-							



Bn Brown(ish)	H Hard	O Olive	S Silty
Cac Calcareous	L Loose	Part Particle(s)	Slks Slicken Sides
Cl(ay) Clay	Ly Layer(s)	Poc Pocket(s)	Sms Seams
D Dense	Lt Light	Prt Parting(s)	So Soft
Dcn Decomposed	Mat Material	R Red(dish)	Sta Stains
Dr Dark	Med Medium	S Stiff	V Very
Fe ⁺ Ferrous	Nod Nodules	Sd Sandy	W With
Gy Gray(ish)	Org Organic	Sh Shelly	Y Yellow(ish)

CH INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS.
CL INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, LEAN CLAYS.
SC CLAYEY SANDS, SAND-CLAY MIXTURES.
SM SILTY SANDS, SAND-SILT MIXTURES.

1. SOILS HAVE BEEN CLASSIFIED IN ACCORDANCE WITH MILITARY STANDARD 6198 'UNIFIED SOIL CLASSIFICATION SYSTEM FOR ROADS, AIRFIELDS, EMBANKMENTS, AND FOUNDATIONS.' CONSISTENCY OF SOILS SUCH AS SOFT, MEDIUM, HARD, LOOSE, DENSE, ETC., ARE RELATIVE TERMS BASED ON ESTIMATED UNDISTURBED SHEAR STRENGTH OF THE MATERIAL AS DETERMINED BY VISUAL CLASSIFICATION POCKET PENETROMETER TESTS AND PENETRATION RESISTANCE DURING SAMPLING.
2. FIGURES TO THE RIGHT OF BORING LOGS ARE WATER CONTENTS IN PERCENT OF THE DRY WEIGHT, DRY DENSITY, LIQUID LIMIT, PLASTIC LIMIT, AND BAR LINEAR SHRINKAGE. (MC-UDW,ILL-PL,ILL,S.) FIGURES TO THE LEFT OF BORING LOGS ARE BLOWS PER FOOT OF PENETRATION FROM STANDARD PENETRATION TESTING.
3. BORINGS WERE DRILLED USING WET ROTARY DRILLING TECHNIQUES AND UNDISTURBED SAMPLES WERE RECOVERED WITH A 3-INCH DIAMETER THIN WALL SAMPLER WHERE COHESIVE MATERIALS WERE ENCOUNTERED. WHERE COHESIVE MATERIALS WERE ENCOUNTERED, DISTURBED SAMPLES WERE TAKEN WITH A SPLIT SPOON SAMPLER DURING PERFORMANCE OF STANDARD PENETRATION TESTING.
4. WATER TABLE LEVELS SHOWN ON BORING LOGS WERE DETERMINED AFTER DRILLING BORINGS BY MEASURING THE TOP OF FLUID LEVELS IN THE BORINGS. INASMUCH AS WET ROTARY DRILLING TECHNIQUES AND DRILLING MUD WERE USED TO DRILL THE HOLES, THE LEVEL OF DRILLING FLUIDS IN THE BORE HOLES MAY NOT HAVE STABILIZED TO THE LEVEL OF THE ACTUAL WATER TABLE. ADDITIONALLY, WATER TABLES IN THE FIELD ARE LIKELY TO FLUCTUATE DEPENDING ON WEATHER CONDITIONS. THEREFORE, SOME VARIATION SHOULD BE ANTICIPATED BETWEEN WATER TABLES INDICATED AND WATER TABLES ENCOUNTERED IN THE FIELD.

REVISION	DATE	DESCRIPTION	BY

OFFICE OF THE DISTRICT ENGINEER
 U.S. ARMY ENGINEER DISTRICT, GALVESTON
 CORPS OF ENGINEERS
 GALVESTON, TEXAS

DRAWN BY: *

J.G.

DESIGNED BY: *

X

CHECKED BY: *

L.A.A.

SUBMITTED BY: *

Colorado River Locks

Boring logs

CHIEF: *

APPROVED: *

CHIEF: *

AS REQUIRED BY ENGINEER (REGULAR NO. 1110-1718)

DATE: *

X

Prepared under the direction of
 Robert B. Gatlin, Col., C.E.,
 District Engineer

SCALE: AS SHOWN SPEC. DATA:

DRAWING NUMBER

X

SHEET 1 OF 1 FILE NO. X

Project: Colorado River Locks

SUMMARY OF LABORATORY TEST RESULTS

Contract No. DACW64-94-M-0880

Boring No. 94-139

S #	Depth (ft)	P P (tsf)	SPT Blows per Foot	Visual Classification	U S C	Mc (%)	Dry Unit Wt (pcf)	Wet Unit Wt (pcf)	L L (%)	PL (%)	Mechanical Analysis % Passing					Torvane Shear Strength (tsf)	q u (tsf)
											#4	#10	#40	#100	#200		
1	0-1.5	0.00	W.O.P VS ₆	Gray, Clay, Very soft, Sandy, w/shell fragments	C L												
2	2-3.5	0.00	VS ₆ 1	Gray, Clay, Very soft, Sandy, w/shell fragments	C L												
3	4 - 6	0.00	VS ₆	Gray, Clay, Very soft, Sandy, w/shell fragments	C L	25.4										0.05	
4	6 - 8	0.00	VS ₆	Gray, Clay, Very soft, Sandy, w/shell fragments	C L	27.2	98.4	125.2	27.0	16.0	99.6	97.7	95.6	80.4	59.7		0.12
5	8 - 10	0.00	VS ₆	Gray, Clay, Very soft, Sandy, w/shell fragments	C L	24.3										0.06	
6	10 - 12	0.00	VS ₆	Gray, Clay, Very soft, Sandy, w/shell fragments	C L	26.6											
7	12 - 14	0.00	VS ₆	Brown, Clay, Very soft, Silty, w/sand pockets	C L	31.2										0.04	
8	14 - 16	0.00	VS ₆	Brown, Clay, Very soft, Sandy, w/shell fragments	C L	28.8	97.0	124.9	29.0	16.0	92.1*	91.2*	90.6	79.3	60.6	0.06	0.10
9	16 - 18	0.00	VS ₆	Gray, Clay, Very soft, Sandy, w/shell fragments	C L	32.4											
10	18 - 20	0.25	S ₆	Gray, Clay, Soft, Sandy, w/sand layer	C L	25.0										0.14	
11	20-21.5	VL	2	Gray, Sand, Very loose, Silty	S M						93.7*	92.9*	92.3	80.3	27.5		
12	25-27	1.00	S	Brown, Clay, Stiff, Sandy	C L	22.3											
13	27-29	2.00	VS	Brown, Clay, Very stiff, Silty, w/sand pockets	C L	24.2											
14	29-31	1.75	S	Brown, Clay, Stiff, Silty, w/sand pockets and calcareous nodules	C L	24.6	101.9	127.0	45.0	22.0	99.2	99.0	98.7	94.5	77.9		1.92
15	31-33	1.00	S	Brown, Clay, Stiff, Silty, w/sand pockets	C L	25.5											
16	33-35	2.00	VS	Brown, Clay, Very stiff, Silty	C L	23.7											
17	35-37	2.50	VS	Brown, Clay, Very stiff, Silty, w/sand partings	C L	24.1											
18	37-39	3.50	VS	Gray, Clay, Very stiff, w/sand partings	C H	36.9	86.7	118.8	77.0	31.0	100.0	100.0	99.9	98.9	97.8		
19	39-41	4.00	VS	Gray, Clay, Very stiff, w/sand partings and calcareous nodules	C H	37.8											
20	41-43	4.25	H	Gray, Clay, Hard, w/sand partings and calcareous nodules	C H	38.3											

S # : Sample Number, P P : Pocket Penetrometer Reading, U S C : Unified Soil Classification, M c : Moisture Content

q u : Uncogined Compressive Strength, W O H : Weight of hammer, W O P : Weight of Pipe

* : Material Retained are shell fragments

Project: Colorado River Locks

SUMMARY OF LABORATORY TEST RESULTS

Contract No. DACW64-94-M-0880

Boring No. 94-139

[illegible]

S #: Sample Number, P P : Pocket Penetrometer Reading, U S C : Unified Soil Classification, M c : Moisture Content
q u : Uncogined Compressive Strength, W O H : Weight of hammer, W O P : Weight of Pipe

JOB NO. 14G790

DATE 10/17/94

PROJECT Colorado River Locks

AREA GIWW at Colorado River, Texas

BORING NO. 94-139

SAMPLE NO. 4

DEPTH 6-8 ft.

SPECIMEN NO. 1

CLASSIFICATION

Gray, Clay, Very soft, Sandy, w/shell fragments

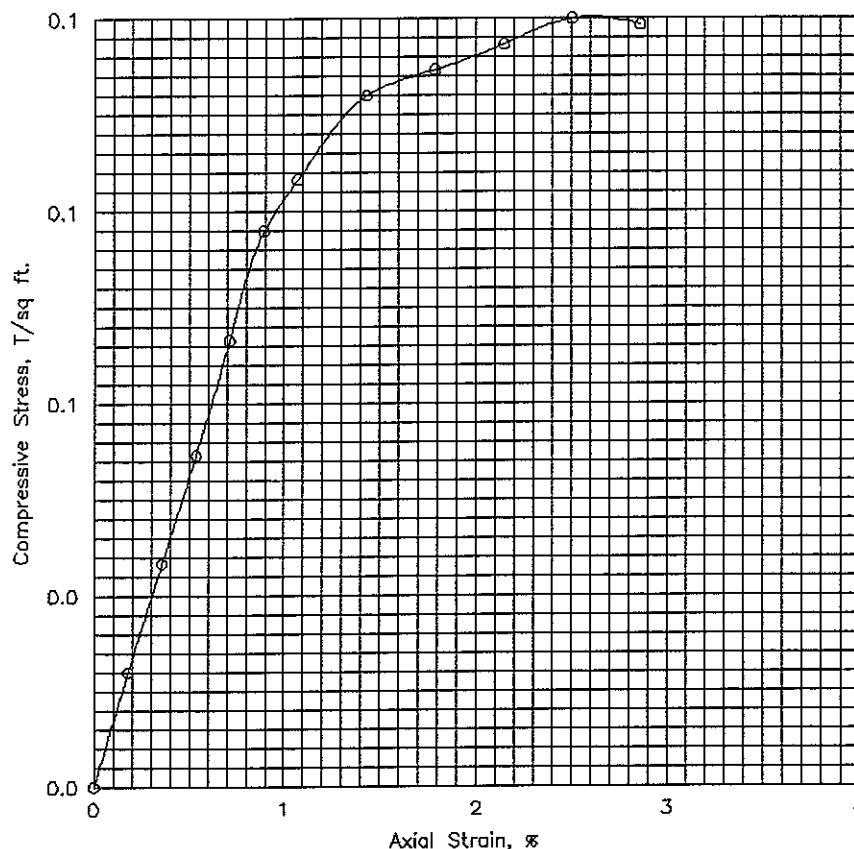
Tare No.	KL-24	Height	5.595 in.
Tare plus Wet Specimen	435.80 gm	Average Diameter	2.830 in.
Tare plus Dry Specimen	351.65 gm	Initial Area	6.290 sq in.
Water Weight	84.15 gm	Volume	35.194 cu in.
Tare Weight	42.56 gm	Volume of Solids	cu in.
Wet Specimen	1156.02 gm	Void Ratio	
Dry Specimen	908.64 gm	Saturation	%
Water Content	27.23 %	Dry Density	98.4 lb/cu ft
Specific Gravity of Solids			
LL = 27	PL = 16	PI = 11	

Proving Ring No. 10170

Proving Ring Constant, K = .766 lbs/div.

Elapsed Time min.	Dial Reading 0.001"	Cumulative Change in.	Proving Ring Dial Reading	Axial Load lb	Axial Strain	Area Corr. sq in.	Compr. Stress tsf
.0	0.	.000	.0	.0	.000	6.29	.000
.2	10.	.010	2.0	1.5	.002	6.30	.018
.3	20.	.020	4.0	3.1	.004	6.31	.035
.5	30.	.030	6.0	4.6	.005	6.32	.052
.7	40.	.040	8.0	6.1	.007	6.34	.070
.9	50.	.050	10.0	7.7	.009	6.35	.087
1.0	60.	.060	11.0	8.4	.011	6.36	.095
1.4	80.	.080	12.5	9.6	.014	6.38	.108
1.7	100.	.100	13.0	10.0	.018	6.40	.112
2.0	120.	.120	13.5	10.3	.021	6.43	.116
2.3	140.	.140	14.0	10.7	.025	6.45	.120
2.7	160.	.160	14.0	10.7	.029	6.48	.119

Failure Sketches



☐ Controlled stress
☒ Controlled strain

Test No.		1			
Type of Specimen		Undisturbed			
Initial	Water content	w_o	27.2 %	%	%
	Void ratio	e_o			
	Saturation	S_o	%	%	%
	Dry density, lb/cu ft	γ_d	98.4		
Time to failure, min		t_f	2.33		
Unconfined compressive strength, T/sq ft		q_u	.12		
Undrained shear strength, T/sq ft		S_u	.06		
Sensitivity ratio		S_t			
Initial specimen diameter, in.		D_o	2.830		
Initial specimen height, in.		H_o	5.595		
Classification Gray, Clay, Very soft, Sandy, w/shell fragments					
LL	27	PL	16	PI	11
Remarks		Project Colorado River Locks Area GIWW at Colorado River, Texas Boring No. 94-139 Sample No. 4 Depth 6-8 ft. Date 10/17/94 El			

UNCONFINED COMPRESSION TEST REPORT

JOB NO. 14G790

DATE 10/17/94

PROJECT Colorado River Locks

AREA GIWW at Colorado River, Texas

BORING NO. 94-139

SAMPLE NO. 8

DEPTH 14-16 ft.

SPECIMEN NO. 1

CLASSIFICATION

Gray, Clay, Very soft, Sandy, w/shell fragments

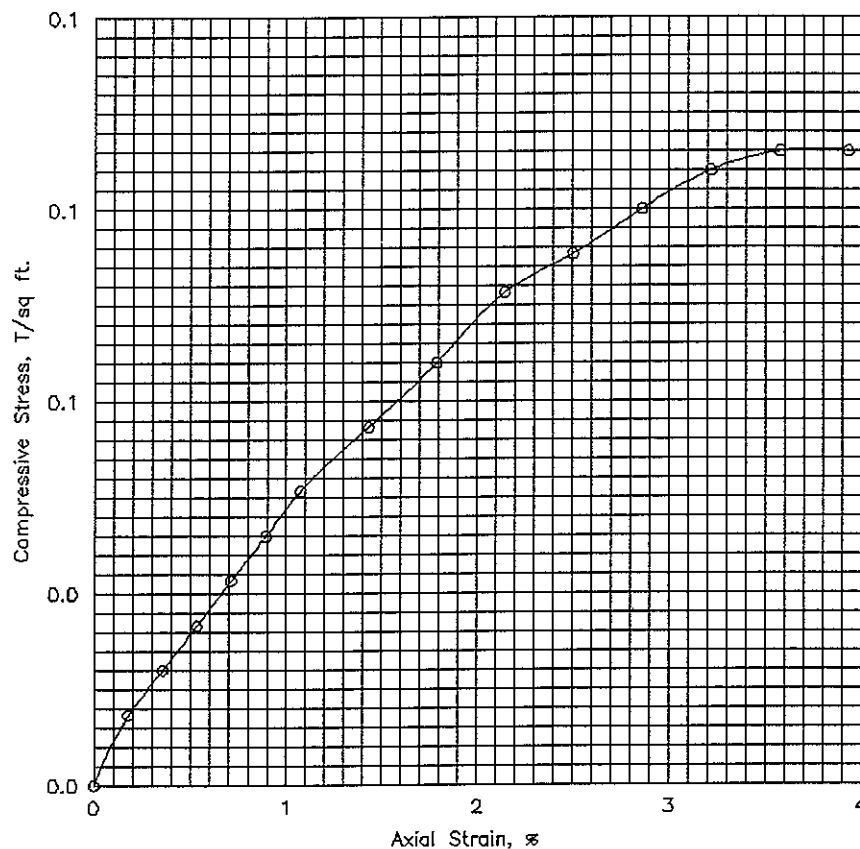
Tare No.	W-22	Height	5.595 in.
Tare plus Wet Specimen	384.23 gm	Average Diameter	2.830 in.
Tare plus Dry Specimen	307.78 gm	Initial Area	6.290 sq in.
Water Weight	76.45 gm	Volume	35.194 cu in.
Tare Weight	42.30 gm	Volume of Solids	cu in.
Wet Specimen	1153.93 gm	Void Ratio	
Dry Specimen	895.93 gm	Saturation	%
Water Content	28.80 %	Dry Density	97.0 lb/cu ft
Specific Gravity of Solids			
LL = 29	PL = 16	PI = 13	

Proving Ring No. 17015

Proving Ring Constant, K = .311 lbs/div.

Elapsed Time min.	Dial Reading 0.001"	Cumulative Change in.	Proving Ring Dial Reading	Axial Load lb	Axial Strain	Area Corr. sq in.	Compr. Stress tsf
.0	0.	.000	.0	.0	.000	6.29	.000
.2	10.	.010	3.0	.9	.002	6.30	.011
.4	20.	.020	5.0	1.6	.004	6.31	.018
.6	30.	.030	7.0	2.2	.005	6.32	.025
.7	40.	.040	9.0	2.8	.007	6.34	.032
.9	50.	.050	11.0	3.4	.009	6.35	.039
1.1	60.	.060	13.0	4.0	.011	6.36	.046
1.4	80.	.080	16.0	5.0	.014	6.38	.056
1.7	100.	.100	19.0	5.9	.018	6.40	.066
2.0	120.	.120	22.0	6.8	.021	6.43	.077
2.3	140.	.140	24.0	7.5	.025	6.45	.083
2.7	160.	.160	26.0	8.1	.029	6.48	.090
3.0	180.	.180	28.0	8.7	.032	6.50	.096
3.3	200.	.200	29.0	9.0	.036	6.52	.099
3.7	220.	.220	29.0	9.0	.039	6.55	.099

Failure Sketches



☐ Controlled stress
☒ Controlled strain

Test No.		1			
Type of Specimen		Undisturbed			
Initial	Water content	w_0	28.8 %	%	%
	Void ratio	e_0			
	Saturation	S_0	%	%	%
	Dry density, lb/cu ft	γ_d	97.0		
Time to failure, min		t_f	3.33		
Unconfined compressive strength, T/sq ft		q_u	.10		
Undrained shear strength, T/sq ft		S_u	.05		
Sensitivity ratio		S_t			
Initial specimen diameter, in.		D_0	2.830		
Initial specimen height, in.		H_0	5.595		
Classification Gray, Clay, Very soft, Sandy, w/shell fragments					
LL	29	PL	16	PI	13
Remarks		Project Colorado River Locks Area GIWW at Colorado River, Texas Boring No. 94-139 Sample No. 8 Depth 14-16 ft. Date 10/17/94 El			
UNCONFINED COMPRESSION TEST REPORT					

JOB NO. 14G790

DATE 10/17/94

PROJECT Colorado River Locks

AREA GIWW at Colorado River, Texas

BORING NO. 94-139

SAMPLE NO. 14

DEPTH 29-31 ft.

SPECIMEN NO. 1

CLASSIFICATION

Reddish brown, Clay, Very stiff, Silty, w/sand pockets & calc nod

Tare No.	KL-5	Height	5.595 in.
Tare plus Wet Specimen	425.98 gm	Average Diameter	2.830 in.
Tare plus Dry Specimen	350.31 gm	Initial Area	6.290 sq in.
Water Weight	75.67 gm	Volume	35.194 cu in.
Tare Weight	42.52 gm	Volume of Solids	cu in.
Wet Specimen	1172.98 gm	Void Ratio	
Dry Specimen	941.51 gm	Saturation	%
Water Content	24.58 %	Dry Density	101.9 lb/cu ft
Specific Gravity of Solids			
LL = 45	PL = 22	PI = 23	

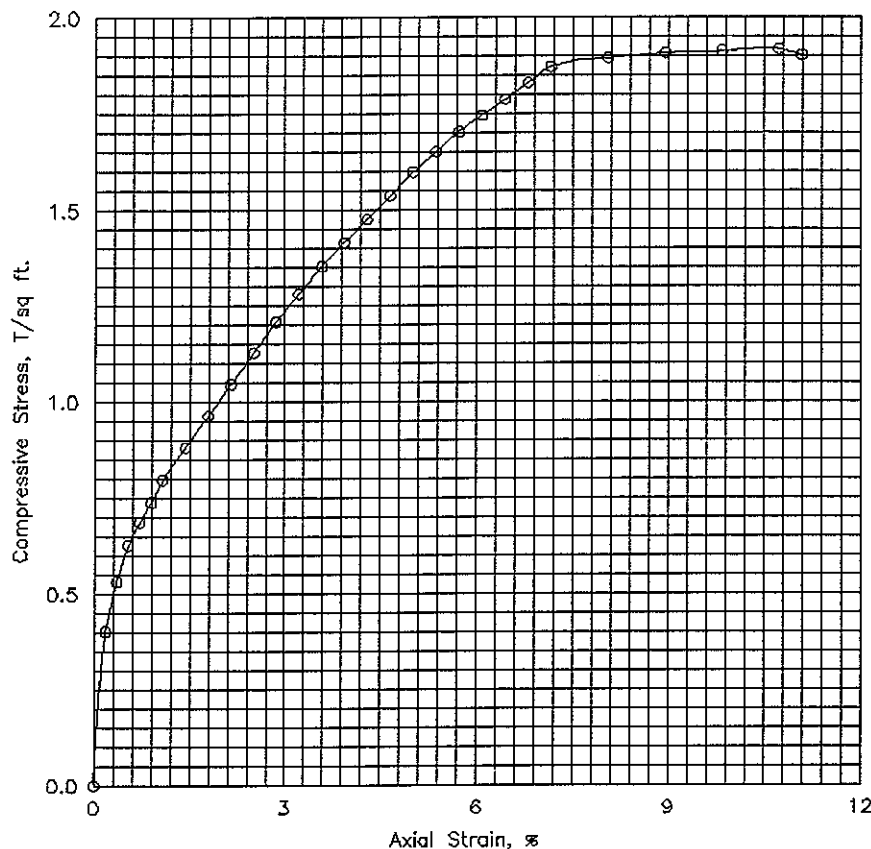
Proving Ring No. 10170

Proving Ring Constant, K = .766 lbs/div.

Elapsed Time min.	Dial Reading 0.001"	Cumulative Change in.	Proving Ring Dial Reading	Axial Load lb	Axial Strain	Area Corr. sq in.	Compr. Stress tsf
.0	0.	.000	.0	.0	.000	6.29	.000
.2	10.	.010	46.0	35.2	.002	6.30	.403
.4	20.	.020	61.0	46.7	.004	6.31	.533
.6	30.	.030	72.0	55.2	.005	6.32	.628
.8	40.	.040	79.0	60.5	.007	6.34	.688
.9	50.	.050	85.0	65.1	.009	6.35	.739
1.1	60.	.060	92.0	70.5	.011	6.36	.798
1.4	80.	.080	102.0	78.1	.014	6.38	.882
1.8	100.	.100	112.0	85.8	.018	6.40	.964
2.1	120.	.120	122.0	93.5	.021	6.43	1.047
2.4	140.	.140	132.0	101.1	.025	6.45	1.128
2.8	160.	.160	142.0	108.8	.029	6.48	1.209
3.1	180.	.180	151.0	115.7	.032	6.50	1.281
3.5	200.	.200	160.0	122.6	.036	6.52	1.353
3.8	220.	.220	168.0	128.7	.039	6.55	1.415
4.1	240.	.240	176.0	134.8	.043	6.57	1.477
4.4	260.	.260	184.0	140.9	.046	6.60	1.538
4.8	280.	.280	192.0	147.1	.050	6.62	1.599
5.1	300.	.300	199.0	152.4	.054	6.65	1.651
5.5	320.	.320	206.0	157.8	.057	6.67	1.703
5.8	340.	.340	212.0	162.4	.061	6.70	1.746
6.1	360.	.360	218.0	167.0	.064	6.72	1.788
6.4	380.	.380	224.0	171.6	.068	6.75	1.831
6.8	400.	.400	230.0	176.2	.071	6.77	1.872
7.5	450.	.450	235.0	180.0	.080	6.84	1.895
8.4	500.	.500	239.0	183.1	.089	6.91	1.908
8.8	550.	.550	242.0	185.4	.098	6.98	1.913

9.1	600.	.600	245.0	187.7	.107	7.05	1.918
9.5	620.	.620	244.0	186.9	.111	7.07	1.902

Failure Sketches



☐ Controlled stress
☒ Controlled strain

Test No.		1			
Type of Specimen		Undisturbed			
Initial	Water content	w_0	24.6 %	%	%
	Void ratio	e_0			
	Saturation	S_0	%	%	%
	Dry density, lb/cu ft	γ_d	101.9		
Time to failure, min		t_f	9.15		
Unconfined compressive strength, T/sq ft		q_u	1.92		
Undrained shear strength, T/sq ft		S_u	.96		
Sensitivity ratio		S_t			
Initial specimen diameter, in.		D_0	2.830		
Initial specimen height, in.		H_0	5.595		

Classification Reddish brown, Clay, Very stiff, Silty, w/sand pockets & calc nod

LL	45	PL	22	PI	23	G _s
Remarks			Project Colorado River Locks			
			Area GIWW at Colorado River, Texas			
			Boring No. 94-139		Sample No. 14	
			Depth 29-31 ft.		Date 10/17/94	
			El			
UNCONFINED COMPRESSION TEST REPORT						