

U.S. ARMY CORPS OF ENGINEERS
GEOTECHNICAL BORING DATA

PROJECT NAME Colorado River lock

LOG OF BORING NO. 94-138

LOCATION/STATION Sta. NO. 460+600

DATE/TIME STARTED 9-24-94 9:00 AM.

DATE/TIME COMPLETED 9-24-94 12:00 AM

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

WATER DEPTH 12' - 3' (deck) = 9'

DEPTH FROM WATER SURFACE
TO BOTTOM OF BORING 58'

WEATHER Sunny

DRILL RIG MANUFACTURE
MODEL NO. Failing 3600

DRILLER Dempsey Gearner
LOGGER H. Patel

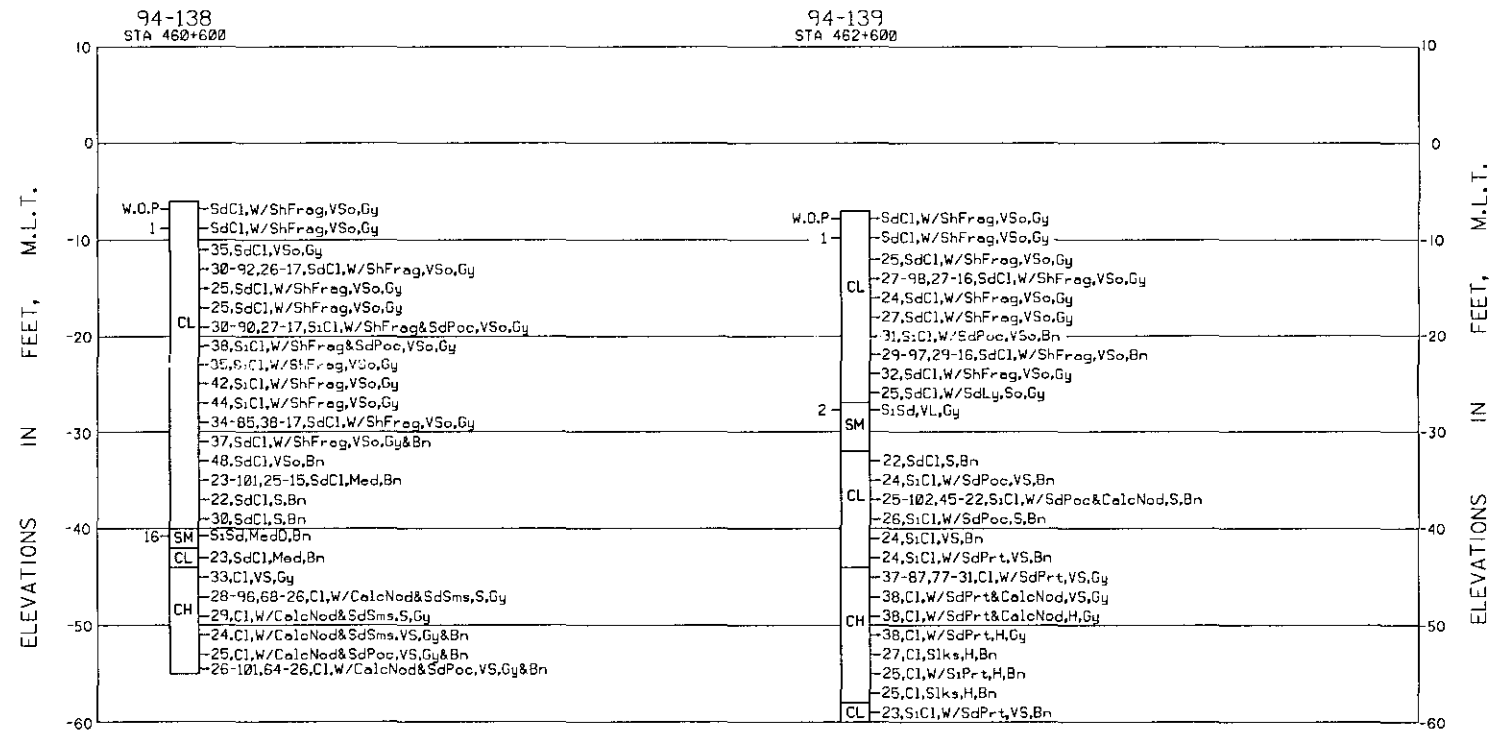
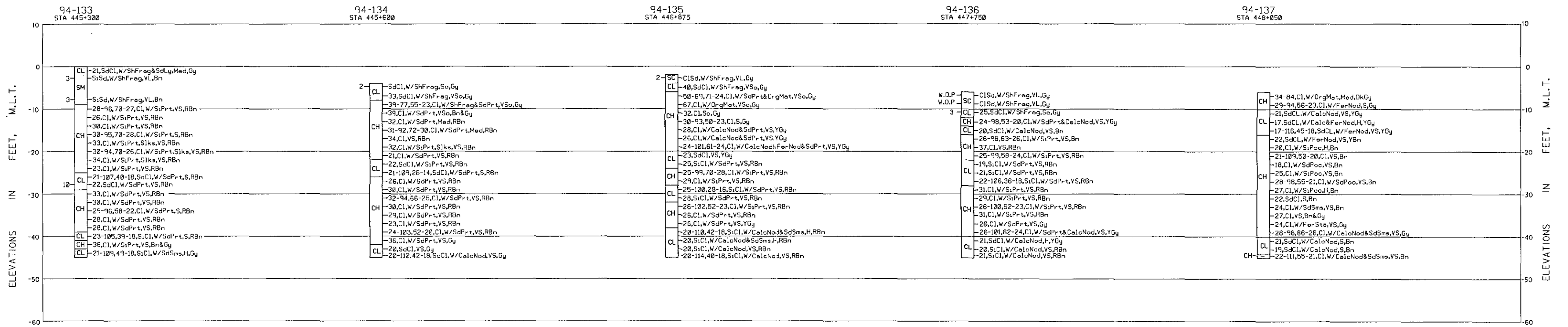
DRILLER'S/LOGGER'S COMMENTS _____

U.S. ARMY CORPS OF ENGINEERS

DEPTH, FEET		SAMPLE NO.	PEN./TORVANE	SPT.-BLOW COUNT	BORING NO.	DATE: BEGIN	PAGE	JOB NO.	COMPLETE	Thin Walled Tube	PROJECT	LOCATION	ELEVATION OF HOLE	MANUFACTURER'S DESIGNATION OF DRILL RIG	GROUNDWATER: DEPTH	ELEV.	ft., at end of Drilling	WEATHER	DRILLER	LOGGER
					94-138	9-24-94	111	94 G 790	9-24-94		Colorado River lock	Sta. No. 460 + 600	-6'	Fa 3600				Sunny	Dempsey	H. Patel
					COLOR	MATERIAL TYPE	CONSISTENCY	SECONDARY CONSTITUENTS	STRUCTURAL FEATURES AND COMMENTS											
0	X	1	Weight of pipe		Gray	clay	Very soft	Sandy	Attempt was made to push Shelby tube, but no recovery. Split spoon used for sampling.											
	X	2	0/0/1		Gray	clay	Very soft	Sandy	With shell fragments & sand (0'-4')											
5		3	0		Gray	clay	Very soft	Sandy	with shell fragments											
		4	0		Gray	clay	Very soft	Sandy	With sand layer & shell fragments											
		5	0		Gray	clay	Very soft	Sandy	With silt & sand layer & shell											
10		6	0		Gray	clay	Very soft	Sandy	With sand layer & shell											
		7	0		Gray	clay	Very soft	Sandy	With sand layer											
15		8	0		Gray	clay	Very soft	Silty	with sand											
		9	0		Brown & Gray	clay	Very soft	Silty	With sand											
		10	0		Brown	clay	Very soft	Silty	With sand partings											
20		11	0		Brown	clay	Very soft	Silty												
		12	0		Gray	clay	Very soft	Silty	With sand layer & shell											
25		13	0		Gray	clay	Very soft	Sandy	With silt partings											
		14	0		Brown	clay	Very soft	Sandy	With silty clay (damaged sample)											
		15	0.75		Brown	clay	Medium stiff	Sandy	with sand layer											
30		16	1.0		Brown	clay	Stiff	Sandy	With sand layer											
		17	2.5		Brown	clay	Very stiff	Sandy	With silt partings & cal. nodules											
35	X	18	5/8/8		Brown	Sand	Medium dense	Silty	With silty sand layer											

U.S. ARMY CORPS OF ENGINEERS

DEPTH, FEET	SAMPLE NO.	PEN./TORVANE SPT.-BLOW COUNT	BORING NO. <u>94-138</u> DATE: BEGIN <u>9-24-94</u> PAGE <u>2/2</u> JOB NO. <u>946790</u> COMPLETE <u>9-24-94</u> Thin Walled Tube PROJECT <u>Colorado River lock</u> ☒ 3" ☐ 6" LOCATION <u>Sta. No. 460+600</u> ELEVATION OF HOLE <u>-6'</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 Gearner</u> LOGGER <u>H. Patel</u>				
			COLOR	MATERIAL TYPE	CONSISTENCY	SECONDARY CONSTITUENTS	STRUCTURAL FEATURES AND COMMENTS
-35							
	19	1-0	Brown	clay	Stiff	Silty	with sand layer
	20	2-5	Gray	clay	Very Stiff	Sandy	With cal. Nodul. & silt partings
-40	21	3-0	Gray	clay	Very Stiff	Sandy	with cal. Nodules
	22	1-5	Gray & Brown	clay	Stiff	Silty	With cal. Nodules
-45	23	2-0	Gray & Brown	clay	Very Stiff	Silty	With cal. Nodules &
	24	3-0	Gray	clay	Very Stiff		With silt partings
	25	3-5	Gray	clay	Very Stiff		With silt partings
-50							
-55							
-60							
-65							
-70							



VISUAL CLASSIFICATIONS:

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

LABORATORY CLASSIFICATIONS:

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.

NOTES:

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), (LL-PL), (JBLS), 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.		Colorado River Locks Boring logs	
DESIGNED BY: X			
CHECKED BY: L.A.A.			
SUBMITTED BY: X			
APPROVED: X		DATE: X	
CHIEF, X		CHIEF, ENGINEERING DIVISION	
1 - AS REQUIRED BY ENGINEER CIRCULAR NO. 1110-170		SCALE: AS SHOWN SPEC. DATE: X	
Prepared under the direction of Robert B. Gatlin, Col., C.E., District Engineer			
SHEET 1 OF 1		FILE NO. X	

Project: Colorado River Locks

SUMMARY OF LABORATORY TEST RESULTS

Contract No. DACW64-94-M-0880

Boring No. 94-138

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 ₀	Gray, Clay, Very soft, Sandy, w/shell fragments	C L												
2	2-3.5	0.00	1 VS ₀	Gray, Clay, Very soft, Sandy, w/shell fragments	C L												
3	4 - 6	0.00	VS ₀	Gray, Clay, Very soft, Sandy	C L	35.2										0.08	
4	6 - 8	0.00	VS ₀	Gray, Clay, Very soft, Sandy, w/shell fragments	C L	29.8	91.9	119.3	26.0	17.0	99.7	99.4	98.3	92.8	51.9		
5	8 - 10	0.00	VS ₀	Gray, Clay, Very soft, Sandy, w/shell fragments	C L	24.8										0.08	
6	10 - 12	0.00	VS ₀	Gray, Clay, Very soft, Sandy, w/shell fragments	C L	24.8											
7	12 - 14	0.00	VS ₀	Gray, Clay, Very soft, Silty, w/shell fragments and sand pockets	C L	29.8	90.1	117.0	27.0	17.0	100.0	100.0	99.9	98.4	75.5	0.04	0.06
8	14 - 16	0.00	VS ₀	Gray, Clay, Very soft, Silty, w/shell fragments and sand pockets	C L	37.6											
9	16 - 18	0.00	VS ₀	Gray, Clay, Very soft, Silty, w/shell fragments	C L	35.0										0.08	
10	18 - 20	0.00	VS ₀	Gray, Clay, Very soft, Silty, w/shell fragments	C L	42.3											
11	20 - 22	0.00	VS ₀	Gray, Clay, Very soft, Silty, w/shell fragments	C L	43.8										0.10	
12	22 - 24	0.00	VS ₀	Gray, Clay, Very soft, Sandy, w/shell fragments	C L	34.2	84.5	113.3	38.0	17.0	98.5	98.1	97.4	93.9	71.2		
13	24 - 26	0.00	VS ₀	Gray & brown, Clay, Very soft, Sandy, w/shell fragments	C L	36.8										0.08	
14	26 - 28	0.00	VS ₀	Brown, Clay, Very soft, Sandy	C L	47.9											
15	28 - 30	0.75	Med	Brown, Clay, Medium stiff, Sandy	C L	23.0	100.8	124.0	25.0	15.0	100.0	99.9	99.8	97.8	59.5	0.35	0.61
16	30 - 32	1.50	S	Brown, Clay, Stiff, Sandy	C L	22.3											
17	32 - 34	1.75	S	Brown, Clay, Stiff, Sandy	C L	30.3											
18	34-35.5	Med D	16	Brown, Sand, Medium dense, Silty	S M												
19	36 - 38	0.75	Med	Brown, Clay, Medium stiff, Sandy	C L	22.7											
20	38 - 40	3.00	VS	Gray, Clay, Very stiff	C H	32.6											

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

SUMMARY OF LABORATORY TEST RESULTS

Boring No. 94-138

[illegible]

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. 94-138

SAMPLE NO. 7

DEPTH 12-14 ft.

SPECIMEN NO. 1

CLASSIFICATION

Gray, Clay, Very soft, Silty, w/shell fragments and sand pockts

Tare No.	P-218	Height	5.595 in.
Tare plus Wet Specimen	501.09 gm	Average Diameter	2.830 in.
Tare plus Dry Specimen	395.76 gm	Initial Area	6.290 sq in.
Water Weight	105.33 gm	Volume	35.194 cu in.
Tare Weight	42.49 gm	Volume of Solids	cu in.
Wet Specimen	1081.12 gm	Void Ratio	
Dry Specimen	832.81 gm	Saturation	%
Water Content	29.82 %	Dry Density	90.1 lb/cu ft
Specific Gravity of Solids			
LL = 27	PL = 17	PI = 10	

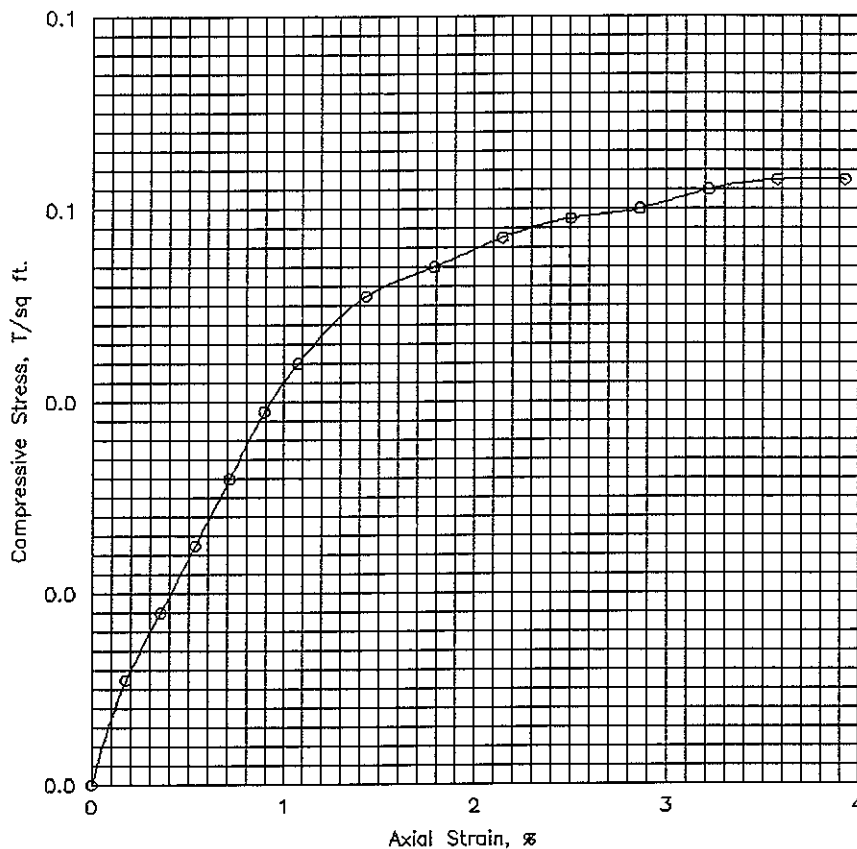
Proving Ring No. 17015

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	12.5	3.9	.011	6.36	.044
1.4	80.	.080	14.5	4.5	.014	6.38	.051
1.7	100.	.100	15.5	4.8	.018	6.40	.054
2.0	120.	.120	16.5	5.1	.021	6.43	.057
2.4	140.	.140	17.0	5.3	.025	6.45	.059
2.7	160.	.160	17.5	5.4	.029	6.48	.060
3.0	180.	.180	18.0	5.6	.032	6.50	.062
3.3	200.	.200	18.5	5.7	.036	6.52	.063
3.7	220.	.220	18.5	5.7	.039	6.55	.063

Job No. 14G790

Failure Sketches



☐ Controlled stress
☒ Controlled strain

Test No.		1			
Type of Specimen		Undisturbed			
Initial	Water content	w_0	29.8 %	%	%
	Void ratio	e_0			
	Saturation	S_0	%	%	%
	Dry density, lb/cu ft	γ_d	90.1		
Time to failure, min		t_f	3.33		
Unconfined compressive strength, T/sq ft		q_u	.06		
Undrained shear strength, T/sq ft		S_u	.03		
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, Silty, w/shell fragments and sand pockets					
LL	27	PL	17	PI	10
Remarks		Project Colorado River Locks Area GIWW at Colorado River, Texas Boring No. 94-138 Sample No. 7 Depth 12-14 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. 94-138

SAMPLE NO. 15

DEPTH 28-30 ft.

SPECIMEN NO. 1

CLASSIFICATION

Reddish brown, Clay, Medium stiff, Sandy

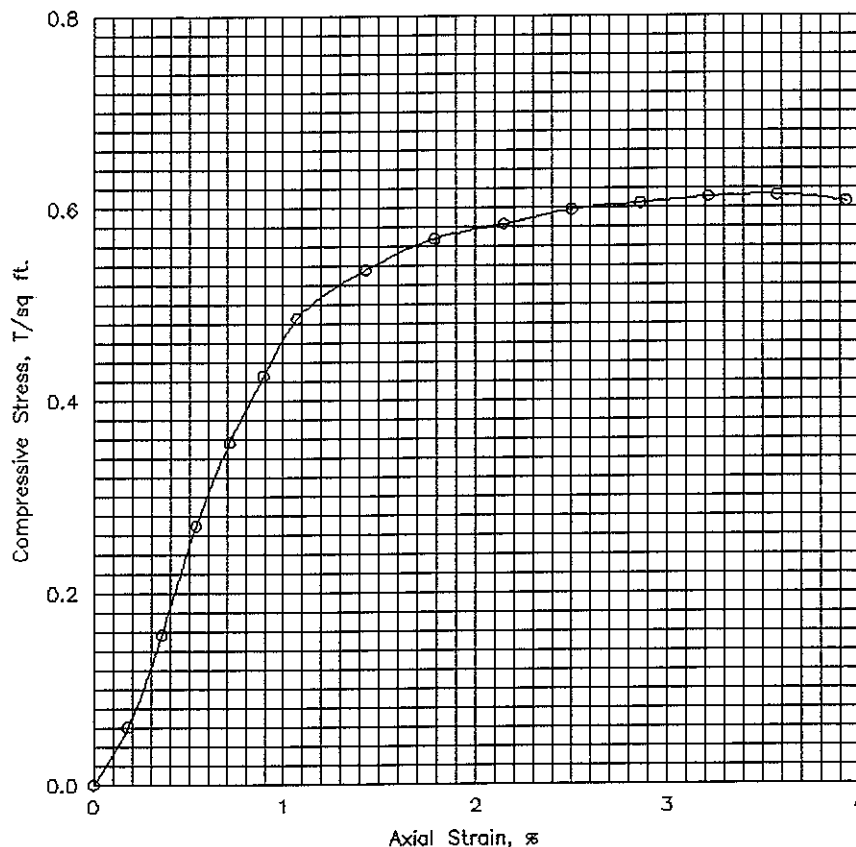
Tare No.	P-213	Height	5.595 in.
Tare plus Wet Specimen	358.68 gm	Average Diameter	2.830 in.
Tare plus Dry Specimen	299.44 gm	Initial Area	6.290 sq in.
Water Weight	59.24 gm	Volume	35.194 cu in.
Tare Weight	42.31 gm	Volume of Solids	cu in.
Wet Specimen	1145.75 gm	Void Ratio	
Dry Specimen	931.21 gm	Saturation	%
Water Content	23.04 %	Dry Density	100.8 lb/cu ft
Specific Gravity of Solids			
LL = 25	PL = 15	PI = 10	

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	7.0	5.4	.002	6.30	.061
.3	20.	.020	18.0	13.8	.004	6.31	.157
.5	30.	.030	31.0	23.7	.005	6.32	.270
.7	40.	.040	41.0	31.4	.007	6.34	.357
.9	50.	.050	49.0	37.5	.009	6.35	.426
1.0	60.	.060	56.0	42.9	.011	6.36	.486
1.4	80.	.080	62.0	47.5	.014	6.38	.536
1.7	100.	.100	66.0	50.6	.018	6.40	.568
2.0	120.	.120	68.0	52.1	.021	6.43	.583
2.4	140.	.140	70.0	53.6	.025	6.45	.598
2.7	160.	.160	71.0	54.4	.029	6.48	.605
3.0	180.	.180	72.0	55.2	.032	6.50	.611
3.4	200.	.200	72.5	55.5	.036	6.52	.613
3.7	220.	.220	72.0	55.2	.039	6.55	.606

Failure Sketches



☐ Controlled stress
☒ Controlled strain

Test No.		1			
Type of Specimen		Undisturbed			
Initial	Water content	w_0	23.0 %	%	%
	Void ratio	e_0			
	Saturation	S_0	%	%	%
	Dry density, lb/cu ft	γ_d	100.8		
Time to failure, min		t_f	3.37		
Unconfined compressive strength, $T/\text{sq ft}$		q_u	.61		
Undrained shear strength, $T/\text{sq ft}$		S_u	.31		
Sensitivity ratio		S_t			
Initial specimen diameter, in.		D_0	2.830		
Initial specimen height, in.		H_0	5.595		
Classification Reddish brown, Clay, Medium stiff, Sandy					
LL	25	PL	15	PI	10
Remarks		Project Colorado River Locks Area GIWW at Colorado River, Texas Boring No. 94-138 Sample No. 15 Depth 28-30 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. 94-138

SAMPLE NO. 21

DEPTH 40-42 ft.

SPECIMEN NO. 1

CLASSIFICATION

Gray, Clay, Stiff, w/calcareous nodules and sand seams

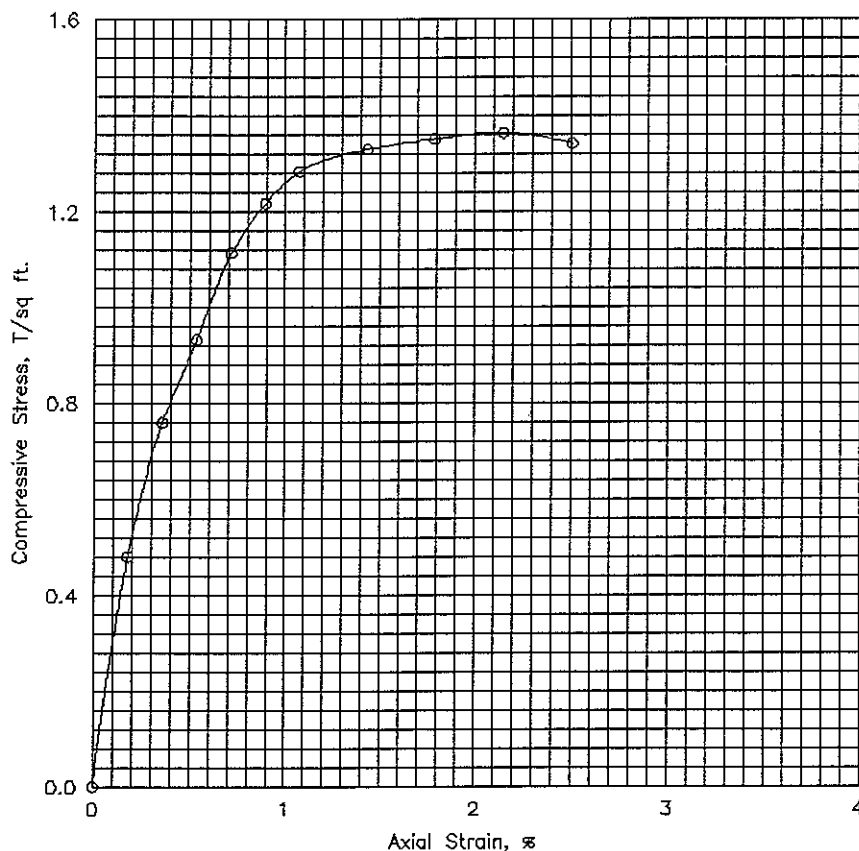
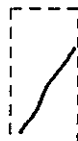
Tare No.	P-211	Height	5.595 in.
Tare plus Wet Specimen	370.38 gm	Average Diameter	2.830 in.
Tare plus Dry Specimen	299.37 gm	Initial Area	6.290 sq in.
Water Weight	71.01 gm	Volume	35.194 cu in.
Tare Weight	42.55 gm	Volume of Solids	cu in.
Wet Specimen	1128.52 gm	Void Ratio	
Dry Specimen	884.08 gm	Saturation	%
Water Content	27.65 %	Dry Density	95.7 lb/cu ft
Specific Gravity of Solids			
LL = 68	PL = 26	PI = 42	

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	55.0	42.1	.002	6.30	.481
.4	20.	.020	87.0	66.6	.004	6.31	.760
.6	30.	.030	107.0	82.0	.005	6.32	.933
.8	40.	.040	128.0	98.0	.007	6.34	1.114
1.0	50.	.050	140.0	107.2	.009	6.35	1.217
1.2	60.	.060	148.0	113.4	.011	6.36	1.284
1.5	80.	.080	154.0	118.0	.014	6.38	1.331
1.8	100.	.100	157.0	120.3	.018	6.40	1.352
2.2	120.	.120	159.0	121.8	.021	6.43	1.364
2.5	140.	.140	157.0	120.3	.025	6.45	1.342

Failure Sketches



☐ Controlled stress
☒ Controlled strain

Test No.		1			
Type of Specimen		Undisturbed			
Initial	Water content	w_0	27.6 %	%	%
	Void ratio	e_0			
	Saturation	S_0	%	%	%
	Dry density, lb/cu ft	γ_d	95.7		
Time to failure, min		t_f	2.15		
Unconfined compressive strength, T/sq ft		q_u	1.36		
Undrained shear strength, T/sq ft		S_u	.68		
Sensitivity ratio		S_t			
Initial specimen diameter, in.		D_0	2.830		
Initial specimen height, in.		H_0	5.595		
Classification Gray, Clay, Stiff, w/calcareous nodules and sand seams					
LL	68	PL	26	PI	42
Remarks		Project Colorado River Locks Area GIWW at Colorado River, Texas Boring No. 94-138 Sample No. 21 Depth 40-42 ft. Date 10/17/94			
UNCONFINED COMPRESSION TEST REPORT					