WHITE OAK BAYOU

SUMMARY OF CONSOLIDATED-DRAINED (S) DIRECT SHEAR TEST DATA

Boring No.	Depth Ft.	Density Data MC %	Density Data UDW p.c.f	SHEAR DATA Actual φ	SHEAR DATA Actual C, psf	SHEAR DATA Revised φ	SHEAR DATA Revised C, psf	Atterberg Limits L.L.	Atterberg Limits P.L.	Gradation Gr.	Gradation Sa.	Gradation Fines	Classification
					(CH)								
6ST-29	32-33	24	102	18.1	.5	27.5	0	62.3	22.5	0	0	100	Red Clay (CH)
					CL								
6ST-27	22-24	16	110	28.8	.20	31.5	0	31.5	15.2	0	12	88	Tan Clay (CL)
6ST-28	10-12	21	103	20.0	.25	24.5	0	34.2	13.2	0	20	80	Rust Clay (CL)
6ST-31	37.5-39	25	100	34.5	.05	35.7	0	35.0	14.8	0	15	85	Rust Clay (CL)
					SM								
6ST-31	14-16	3	109	34.2	0.0	34.2	0	NP	NP	0	59	41	Gray Silty Sand (SM)
6ST-113	32-34	—	101	35.0	0.0	35.0	0	—	—				Tan Silty Sand (SM-SP)
					CH								
6ST-123	42-43.5	24	100	20.6	0.5	28.0	0	57	23	0	0	100	Red Clay (CH)
6ST-157	39-40	32	89	17.6	0.4	25.0	0	68	27	0	0	100	Brown Clay (CH)
					CL								
6ST-117	6-8	21	106	17.5	0.6	26.0	0	48	19	2	16	82	Tan Sandy Clay (CL)
6ST-117	14-16	19	108	29.2	0.6	35.5	0	39	13	0	21	79	Red Sandy Clay (CL)
6ST-123	0-2	15	109	22.0	0.6	28.5	0	45	18	0	21	79	Gray Sandy Clay (CL)
6ST-156	30-32	17	106	27.9	0.1	30.6	0	33	19	0	0	100	Red Clay (CL)
6ST-159	10-12	12	113	22.5	0.3	28.0	0	27	13	0	30	70	Tan Sandy Clay (CL)
					CL-ML								
6ST-117	24-26	21	104	33.1	0.1	33.0	0	—	—	0	11	89	Red Clayey Silt (CL-ML)
					ML								
6ST-154	20-22	23	100	32.4	0.1	33.5	0	—	—	8	19	73	Red Sandy Silt (ML)

SUBJECT
COMPUTATION
COMPUTED BY
DATE
CHECKED BY
DATE
FILE NO.
Page ___ of ___

SWD FORM 521-J
8 Jan 65

STA.	Y	X	ELEV.	DESCRIPTION
B-1	721,311.87	3,155,008.92	35.730	R.R. SPIKE
B-2	721,228.31	3,154,923.28	34.720	R.R. SPIKE
B-3	721,763.62	3,154,378.93	32.976	R.R. SPIKE
B-175	721,772.07	3,153,709.31	26.387	
B-176	721,418.27	3,153,680.90	40.329	R.R. SPIKE
B-177	721,325.12	3,154,102.72	35.397	
B-178	721,185.90	3,154,411.23	34.105	IRON PIN
B-179	721,164.46	3,154,591.31	33.359	
B-180	720,978.39	3,154,749.06		R.R. SPIKE
B-181	720,952.73	3,154,889.72	33.346	
B-182	721,049.47	3,155,027.90	33.749	IRON PIN
B-183	720,554.89	3,155,302.19	37.317	"X" ON CONC. BLK.
B-184	720,369.26	3,155,479.57	39.171	
B-185	720,874.21	3,155,497.56		
B-186	720,981.41	3,155,478.96		
B-187	721,034.10	3,155,285.11		R.R. SPIKE
B-188	721,169.13	3,155,248.43		R.R. SPIKE
STA-131	720,361.75	3,155,357.84		

Galveston Dist. Lab. Report No. 1013

BUFFALO BAYOU, TEXAS

WHITE OAK BAYOU PROPOSED ALIGNMENT

SCALE 100' 0' 100'

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS APRIL 1963

TO ACCOMPANY GENERAL DESIGN MEMORANDUM NO. 1 BUFFALO AND WHITE OAK BAYOUS AND WHITE OAK BAYOU FEATURE DESIGN MEMORANDUM NO. 2, MILE 1.07 TO YALE STREET. DATED: APRIL 1963

FILE: HSC 402-133

Sheet 6 of 7

PLATE 45

CORE BORINGS
WHITE OAK BAYOU, HOUSTON

Core Hole No.	Coordinates X	Coordinates Y	M.S.L. Elev.
6 St 26	3,155,165	720,440	37.60
27	3,155,450	720,370	39.3
28	3,155,275	720,465 ?	36.2
29	3,155,325	720,950	28.2
30	3,155,000	720,930	33.8
31	3,154,495	721,145	33.4
* 32	3,153,575	722,170	21.0
* 33	3,153,240	722,540	22.0
** 34	Never	drilled	
* 35	3,152,640	723,275	21.5
* 36	3,152,510	723,625	13.0
37	3,151,210	724,895	14.1
** 38			
39	3,150,300	725,020	31.6
** 40			
41	3,149,115	725,590	21.3
** 42			
** 43			
44	3,147,545	725,075	35.2
45	3,147,700	724,925	37.9
** 46	3,147,280	724,730	12.0
47	3,146,780	724,755	31.4
48	3,146,405	724,485	22.1
49	3,145,305	724,905	24.3
** 50	3,144,990	724,180	24.5
** 51	3,144,870	723,910	17.0
** 52			
** 53			
54	3,143,480	723,365	32.1
55	3,142,790	723,450	44.0
56	3,142,755	723,735	43.8
57	3,142,515	723,515	47.0
58	3,142,420	723,840	37.5
59	3,142,325	723,500	48.8
* 60			
61	3,141,890	724,290	43.8
62	3,141,750	724,970	47.9
63	3,140,570	725,070	51.0
64	3,140,200	725,465	50.5
65	3,138,940	725,205	49.0
66	3,137,960	726,015	50.5
67	3,137,385	726,500	46.2
68	3,130,375	734,185	61.5
69	3,126,995	738,435	69.9

* Core Holes covered up by fill material
** Core Holes not drilled

HOLE NO. 6ST-27

DEPARTMENT OF THE ARMY
DIVISION Southwestern
INSTALLATION Galv Dist, Eng Div

DRILLING LOG

1. PROJECT: White Oak Bayou
SHEET OF
2. LOCATION (Coordinates or Station): Pasadena, Texas (3,155,450 - 720,370)
3. DRILLING AGENCY: U. S. Army Corps of Engineers 85' L
4. HOLE NO. (As shown on drawing title and file No.): 6ST-27
5. NAME OF DRILLER: K. D. West
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED; DEGREES WITH VERTICAL
7. THICKNESS OF OVER-BURDEN
8. DEPTH DRILLED INTO ROCK
9. TOTAL DEPTH OF HOLE: 75.00
10. SIZE AND TYPE OF BIT: Shelby Tube-6"
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 8 Jars; UNDISTURBED 35 Cont
14. TOTAL NO. CORE BOXES
15. ELEV. GROUND WATER: 8.8 ?
16. DATE HOLE: STARTED 6/7/60; COMPLETED 6/9/60
17. ELEV. TOP OF HOLE: 39.3
18. TOTAL CORE RECOVERY FOR BORING (%)
19. SIGNATURE OF INSPECTOR: Bo # Elev. -35.7

ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)	
0.0	2.0	CH	Black, clayey sand, fill	100		Jar 1	
2.0	4.0		Dark gray clay, sand	SM	w=15	Fines=29 Jar 2 35.3	
4.0	5.0	CL	Tan clay, sand, stiff	CL	w=15 γ=113	Sandy LL=26 Cont. 1 34.3	1.50
5.0	6.0		Tan-gray clayey sand, stiff			Cont. 2	2.00
6.0	8.0		Tan-gray clayey sand, loose			Jar 3	
8.0	9.0	SC	Tan-gray clayey sand, stiff	ML	w=15 γ=111	Cont 3 Fines=68	1.50
9.0	10.0		Tan-gray clayey sand, stiff			Cont. 4 Sandy	1.75
10.0	12.0		Tan-gray clayey sand, v/stiff			Cont. 5	3.00
12.0	14.0	CL	Gray, sandy clay, v/stiff			Cont. 6	2.00
14.0	16.5	ML	Gray fine sand, soft			Jar 4 22.8	
16.5	18.0	CL	Red-gray sandy clay, v/stiff		w=21	Cont. 7	3.50
18.0	19.5		Gray-red beaumont clay, hard		γ=105	Cont. 8 LL=42	4.50+
19.5	21.0	CH	Gray-red beaumont clay, v/stiff	CL		Cont. 9	3.50
21.0	22.0		Gray-red, beaumont clay, hard		w=16	Cont. 10	4.50+
22.0	24.0		Gray-red sandy clay, hard		γ=112	LL=34 Cont. 1 15.3	4.25
24.0	25.0	CL	Gray-red sandy clay, stiff		w=19	Cont. 12	2.00
25.0	26.5		Gray-red sandy clay, stiff	ML	γ=108	LL=24 Fines=91 Cont. 13 12.8	2.00
26.5	28.0		Gray-red, sandy clay, stiff	ML	w=23 γ=103	Cont. 14 Fines=85	1.25
28.0	31.0	SM	Gray-red, sand, wet			Jar 5 8.3	
31.0	32.0	CH	Gray-red beaumont clay, v/stiff	CH	w=23 γ=116	LL=58 Cont. 15 7.3	3.00
32.0	34.0		Red sandy clay, plastic, stiff	CL	w=19 γ=105	LL=27 Cont. 16 5.3	0.75
34.0	35.5		Red, silty sand, soft	ML	w=22 γ=103	Cont. 17 Fines=99	0.50
35.5	37.0		Red silty sand, soft, lost			No sample 2.3	
37.0	38.5		Red clayey sand, plastic, stiff	CL	w=22 γ=104	LL=26 Cont. 18 0.8	0.75
38.5	40.0	SM	Red silty sand, plastic stiff	ML	w=21 γ=105	Sandy Cont. 19 Fines=72 -0.7	1.00
40.0	42.0		Red, clayey silty sand, stiff	CL	w=25 γ=101	Cont. 20 LL=31	1.25
42.0	44.0		Red, sandy silty soft			Jar 6 -4.7	
44.0	44.4		Red, sand, rock	SM		-5.1	
44.4	45.5	CH	Red beaumont clay, hard	CH	w=25 γ=100	Cont. 21 LL=57	4.50+

HOLE NO. 6ST-27

DEPARTMENT OF THE ARMY

DIVISION _____

INSTALLATION _____

DRILLING LOG

1. PROJECT: White Oak Bayou	SHEET OF
2. LOCATION (Coordinates or Station)	
3. DRILLING AGENCY	
4. HOLE NO. (As shown on drawing title and file No.)	5. NAME OF DRILLER
6. DIRECTION OF HOLE: ☐ VERTICAL ☐ INCLINED; DEGREES WITH VERTICAL	7. THICKNESS OF OVER-BURDEN / 8. DEPTH DRILLED INTO ROCK / 9. TOTAL DEPTH OF HOLE
10. SIZE AND TYPE OF BIT	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) / 12. MANUFACTURER'S DESIGNATION OF DRILL
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED	14. TOTAL NO. CORE BOXES / 15. ELEV. GROUND WATER / 16. DATE HOLE: STARTED 6/7/60, COMPLETED 6/9/60
17. ELEV. TOP OF HOLE	18. TOTAL CORE RECOVERY FOR BORING (%) / 19. SIGNATURE OF INSPECTOR

ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)	
45.5	47.0	CH	Red beaumont clay, hard	CH		Cont. 22	4.25
						-7.7	
47.0	48.5	CL	Red silty clay, stiff			Sandy Cont. 23	1.25
48.5	50.0		Red silty sand, soft		w=21	Cont. 24 (Fines = 83)	0.50
50.0	52.0	SM	Red silty clay, sand, soft	ML	γ=106	Cont. 25	0.25
52.0	58.5		Red silty sand, soft			Jar 7 Sandy (Fines=51)	
58.5	60.0		Red silty clay, sand, plastic, stiff			Cont. 26	1.00
						-20.7	
60.0	62.0		Red, silty clay, v/stiff			Cont. 27	3.50
62.0	63.5	CL	Red-brown silty clay, v/stiff	CH	w=31	Cont. 28	2.50
63.5	65.0		Red-brown sandy clay, stiff		γ=91	LL=66 Cont. 29	2.00
65.0	66.5		Gray-red sandy clay, v/stiff			Cont. 30	2.50
						-27.2	
66.5	68.0		Blue, silty clay, v/stiff		w=19	Sandy LL=28 Cont. 31	3.75
68.0	70.0		Blue, sandy clay, v/stiff	CL	γ=107	Cont. 32	3.00
70.0	72.0	CH	Gray-brown sandy clay, hard			LL=41 Cont. 33	4.50
						-32.7	
72.0	73.5		Gray-red beaumont clay, hard		w=22	Cont. 34	4.00
73.5	75.0		Red beaumont clay, w/caliche gravel hard	CH	γ=105	LL=56 Cont. 35	4.50
						-35.7	
			Bottomed at 75.0 in above. Traces of water at 30.5				

White Oak Bayou
Channel Rectification
Houston, Texas

TEST DATA SUMMARY

FEATURE Log of Soil Borings

BORING NO.	SAMPLE NO.	DEPTH OR ELEV. OF SAMPLE	MECHANICAL ANALYSIS GRAVEL %	SAND %	FINES %	D/S	ATTERBERG LIMITS LL	PL	BAR L.S. %	NATURAL WATER CONTENT %	NATURAL DRY DENSITY LBS./CU.FT.	LABORATORY CLASSIFICATION
60-ST-27	-60-	0.0	~~0-8~~ 19	~~5-243~~ 55	26	—			0.0	12.2 (15)	—	B, Gr Si Sa (SM), w/roots
	2187	2.0										
	2188		12	~~2-53~~ 56	32	—			0.0	18.5	—	G, Si Sa (SM), w/roots
		4.0										
	2189		0	38	62	2.75	26.3		5.0	15.4	112.6	T, Sa Cl (CL), v/st
		5.0										
	2190		0	45	55	3.0			1.0	11.7	110.3	T, Sa Si (ML),
		6.0										
	2191		Same as 60-2192			—				12.9	—	T-Bu, Sa Si (ML)
		8.0										
	2192		0	37	63	1.75			1.0	~~16.4~~ (15)	109.4	T-Bu, Sa Si (ML)
		9.0										
	2193		Same as 60-2192			2.25				16.1	113.1	T-Bu, Sa Si (ML)
		10.0										
	2194		Same as 60-2195			2.75				16.6	112.6	Bu, Si (ML)
		12.0										
	2195		0	19	81	2.0			3.0	17.1	109.7	Bu, St (ML)
		14.0										
	2196		0	28	72	—			3.0	16.6	—	Bu, Sa Si (ML)
		16.5										
	2197		Same as 60-2198			2.25				21.6	104.8	T-R, Cl (CL) v/st.
		18.0										
	2198		0	3	97	3.75	41.8		14.0	21.0 (19)	107.1	T-R, Cl (CL) v/st, Calc.
		19.5										
	2199		Same as 60-2198			2.25				20.6	105.4	R-T, Cl (CL) v/st. Calc.
		21.0										
	2200		2	18	80	3.75	38.5		12.0	14.9	110.3	R-T, Cl (CL), v/st. w/calc layers
		22.0										
	2201		0	12	88	4.25	28.8		7.0	16.3	114.3	R-T, Cl (CL); Hd.
		24.0										
	2202		0	9	91	2.75	24.2		4.0	19.1 (19)	107.9	Ru-R, Cl (CL-ML), v/st.
		25.0										
	2203		Same as 60-2202			2.50				18.3	107.8	Ru-R, Cl (CL-ML) v/st. Calc.
		26.5										
	2204		0	15	85	0.75			1.0	21.6 (22)	102.5	R-Bu, Si (ML)
		28.0										
	2205		Same as 60-2204			—				23.8	—	R-Bu, Si (ML)
		31.0										
	2206		0	0	100	4.5*	58.2		17.0	23.1	115.8	R, Cl (CH), Hd.
		32.0										
	2207		7	7	86	1.75	26.5		7.0	19.4	105.3	R, Cl (CL), St.
		34.0										
	2208		0	1	99	2.75	.		2.0	22.4 (22)	103.3	R, Si (ML)
		35.5										

* Laboratory Penetrometer Reading

DLR-853

White Oak Bayou
Channel Rectification
Houston, Texas

TEST DATA SUMMARY

FEATURE Log of Soil Borings

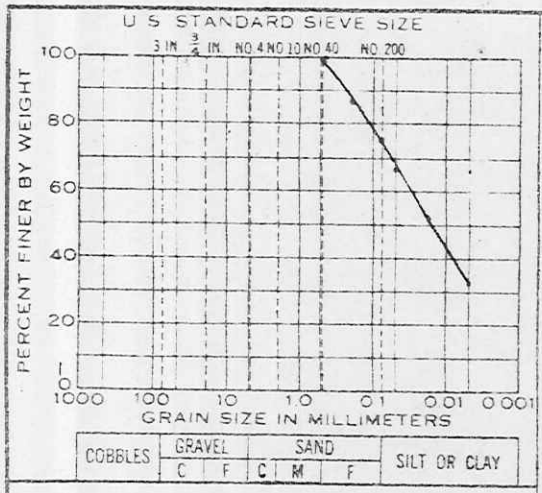
BORING NO.	SAMPLE NO.	DEPTH OR ELEV. OF SAMPLE	MECHANICAL ANALYSIS GRAVEL %	SAND %	FINES %	D/S	ATTERBERG LIMITS LL	PL	BAR L.S. %	NATURAL WATER CONTENT %	NATURAL DRY DENSITY LBS./CU.FT.	LABORATORY CLASSIFICATION
65T-27-60-		35.5										
Cont.	—		No Sample			—	Drillers Classification					R, Si Sa [sm]
		37.0										
	2209		0	5	95	1.75	25.6		5.0	21.8	104.4	R, Cl(CL-ML), St. w/Calc. layers
		38.5										
	2210		0	28	72	1.75			0.0	21.4	104.9	R, SaSi(ML)
		40.0										
	2211		0	1	99	1.50	33.3		7.0	23.7	100.7	R, Cl(CL), St.
		42.0										
	2212		0	0	100	—	28.6		4.0	26.0	—	R, Cl(CL-ML),
		44.0										
	—		No Sample			—	Drillers Classification					R, Cemented Sand.
		44.4										
	2213		Same as 60-2214			3.50				26.2	98.9	R, Cl(CH), v/st.
		45.5								(25)		
	2214		0	2	98	4.5	57.3		18.0	23.8	100.5	R, Cl(CH), Hd.
		47.0										
	2215		0	21	79	1.75			3.0	18.5	109.3	R, SaSi (ML)
		48.5										
	2216		0	6	94	2.75			2.0	21.1	107.1	R, Si (ML)
		50.0								(21)		
	2217		0	23	77	2.25			0.0	21.0	105.4	R, SaSi (ML)
		52.0										
	2218		0	49	51	—			1.0	~~79~~	—	R, SaSi (ML)
		58.5										
	2219		Same as 60-2218			0.75				23.0	102.1	R, SaSi (ML)
		60.0										
	2220		0	1	96	4.25	59.5		19.0	27.8	95.4	R, Cl(CH), Hd.
		62.0										
	2221		Same as 60-2222			2.75				31.3	90.5	R-Ru, Cl(CH), v/st w/SaSi lenses
		63.5								(31)		
	2222		0	2	98	2.75	67.2		18.0	30.9	89.7	Ru-G, Cl(CH), v/st, w/Sa Packs
		65.0										
	2223		0	1	99	3.75	71.4		20.0	33.4	86.9	R, Cl(CH), v/st.
		66.5										
	2224		0	30	70	3.75	28.1		6.0	18.3	109.6	G, SaCl(CL), v/st.
		68.0								(19)		
	2225		2	10	88	3.50	42.3		16.0	19.8	107.3	G, Cl(CL), v/st
		70.0										
	2226		0	17	83	4.5+	39.5		13.0	19.7	109.3	Ru-G, Cl(CL), Hd.
		72.0										
	2227		Same as 60-2228			4.5+				21.5	107.2	R, Cl(CH) Hd
		73.5								(22)		
	2228		0	17	83	4.5+	55.6		19.0	22.8	102.3	R, Cl(CH) Hd, Calc
		75.0										

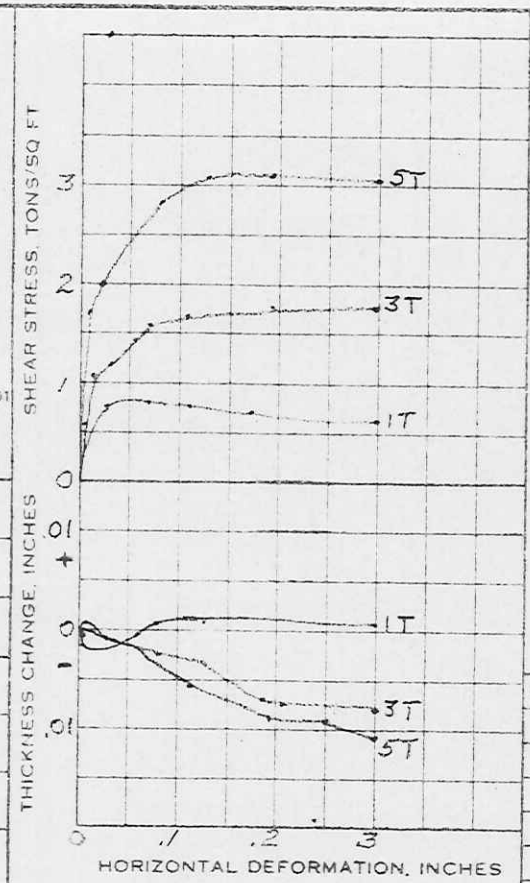
Bottomed @ 75.0' in R, Cl(CH), Hd, Calc.
Water seepage @ 30.5'

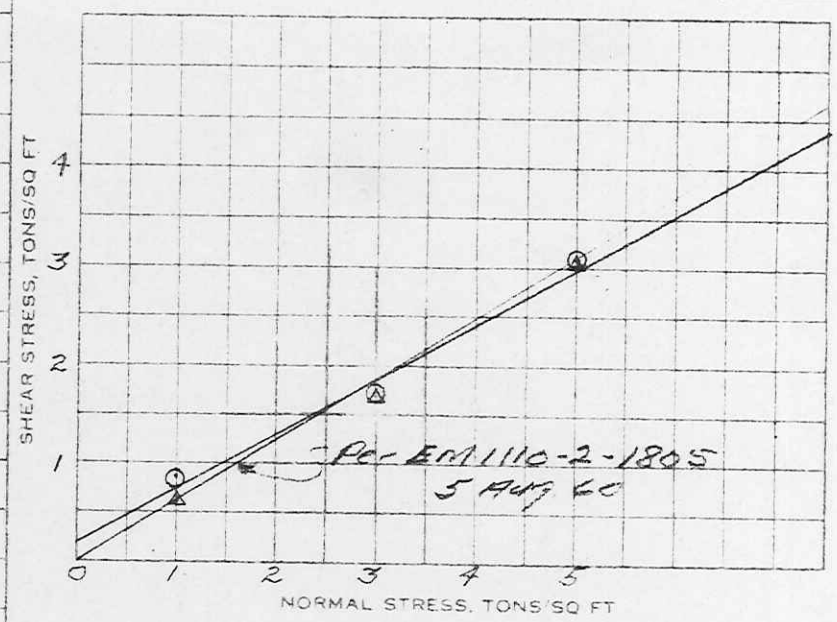
* Laboratory Penetrometer Reading

DLR-853

6D FORM 23 AUG. 56 053-R







Classification R, T, CI (CL)

LL 31.5	G			
PL 15.2	D_{10}			
Test No	1	2	3	
Initial Water Content, W_0 %	16.3	16.3	16.3	
Dry Density Lbs/Cu Ft	109.4	111.0	111.1	
Void Ratio, e_0				
Saturation, S_0 %				
Duration of Test hrs	6 3/4	7	6 3/4	
WC after Test, W_f %	19.9	18.7	16.3	
Normal Stress, σ T/Sq Ft	1	3	5	
Max. Shear Stress, τ T/Sq Ft	.84	1.74	3.06	

Type of Test
.001"/min approx — Control
✓ Consolidated
✓ Drained

Type of Specimen
undisturbed
3 in. square
3/4 in. thickness

SHEAR VALUES	Ø	TAN Ø	C, T/SQ FT
Maximum	31.5	.612	
Ultimate			

Remarks:

Project White Oak Bayou Channel Rectification

Area Houston, Texas

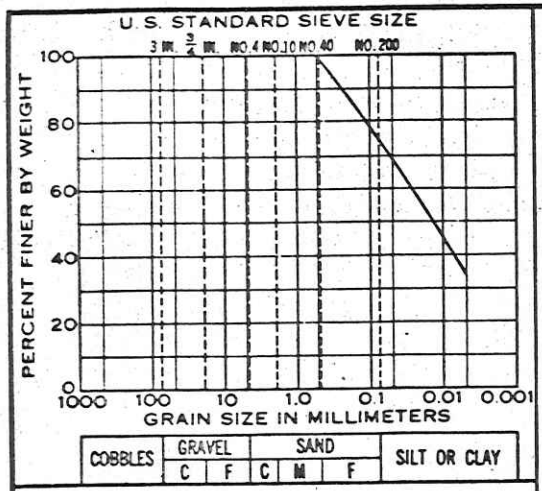
Boring No. 65T-27 Sample No. 60-2201

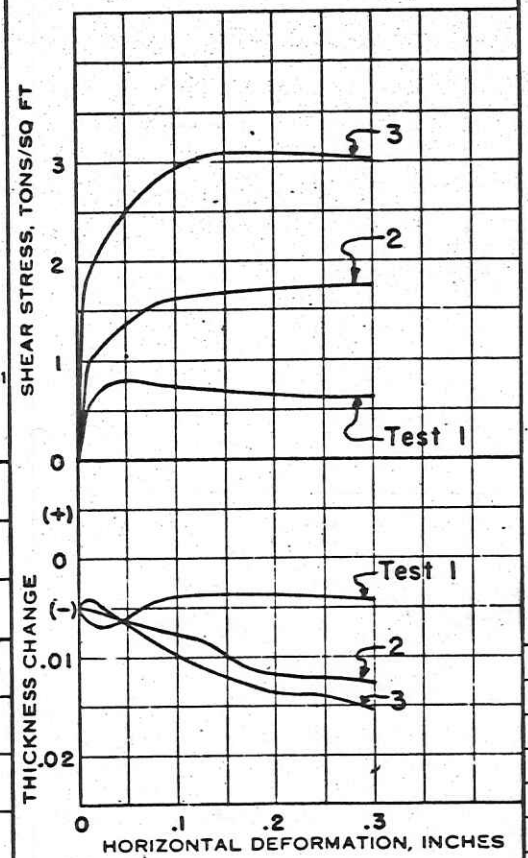
Elev or Depth 22.0-24.0 Date

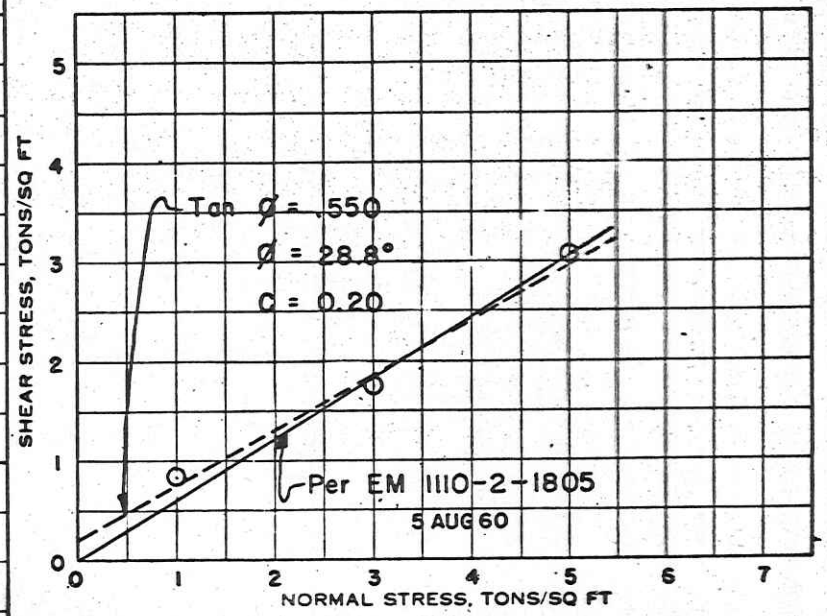
DIRECT SHEAR TEST REPORT

ENG FORM 2082

Plate 1







Classification	Rust-Tan Clay (CL)		
LL 31.5	G		
PL 15.2	D_{10}		
Test No.	1	2	3
Initial Water Content, W_0 %	16.3	16.3	16.3
Dry Density Lbs/Cu Ft	109.4	111.0	111.1
Void Ratio, e_0			
Saturation, S_0 %			
Duration of Test (to τ)	405'	420'	405'
WC after Test, W_F %	19.9	18.7	16.3
Normal Stress, σ T/Sq Ft	1	3	5
Max. Shear Stress, τ T/Sq Ft	.84	1.74	3.06

Type of Test
Strain - Control
Rate, 0.001 in/min
x Consolidated
x Drained

Type of Specimen
Undisturbed
3.0 in. square
0.75 in. thickness

SHEAR VALUES	ø	TAN ø	C, T/SQ FT
Maximum	31.5°	.612	0.0

Remarks:
S Test

Project WHITE OAK BAYOU
Foundation Materials
Area Galveston District
Boring No. 6ST-27 | Sample No. 60-2201
Elev or Depth 22.0-24.0 | Date 1961

DIRECT SHEAR TEST REPORT

~~SHEET 1 of 5~~ FILE NO. H.S.C. 402-133

APPENDIX B ~~EXHIBIT 8~~

PLATE 17