TOLUNAY-WONG ENGINEERS, INC.

Boring No.	Sample No.	Sample Depth (feet)	Elevation (feet)	Pocket Pen. (tsf)	Soil Description	USCS	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	Finer than No. 200 (%)	Unit Dry Weight (pcf)	Dev./Compr. Stress (tsf)	Failure Strain (%)	Confining Pressure (psi)	Failure Type
07-29	N 13844820.73, E 3155536.91		44.45													
	2	2-4	40.45	3.75	Reddish-brown and gray FAT CLAY	CH	24.8									
	3	4-6	38.45	3.50	Reddish-brown and gray FAT CLAY	CH	30.7									
	4	6-8	36.45	4.50	Reddish-brown and gray FAT CLAY	CH	23.6									
	5	8-10	34.45	2.50	Reddish-brown and gray FAT CLAY	CH	30.4									
	6	10-12	32.45	3.00	Gray and reddish-brown FAT CLAY	CH	29.9					88.1	1.52	2.0		Vertical shear
	7	12-14	30.45	2.75	Reddish-brown and gray FAT CLAY	CH	32.6	94	29	65		83.4	1.12	1.3	12	Vertical shear
	8	14-16	28.45	3.25	Gray and tan FAT CLAY; calcareous nodules	CH	21.5									
	9	16-18	26.45	3.50	Gray and tan FAT CLAY; calcareous nodules	CH	19.8									
	10	18-20	24.45	4.00	Reddish-brown and gray FAT CLAY	CH	29.6									
	11	20-22	22.45	4.25	Gray and tan FAT CLAY	CH	22.8									
	12	22-24	20.45	4.25	Reddish-brown and gray FAT CLAY; calcareous nodules	CH	24.4									
	13	24-25	19.45	4.00	Gray and reddish-brown FAT CLAY	CH	23.6									
07-30	N 13844357.92, E 3155690.69		56.31													
	1	0-2	54.31	4.25	Reddish-brown and gray FAT CLAY	CH	21.2									
	2	2-4	52.31	4.50	Dark gray LEAN CLAY with SAND	CL	17.6									
	3	4-6	50.31	4.50	Gray and reddish-brown FAT CLAY; lean clay seams	CH	18.6									
	4	6-8	48.31	3.25	Reddish-brown and gray FAT CLAY	CH	33.1									
	5	8-10	46.31	4.50	Gray and tan FAT CLAY	CH	20.1									
	6	10-12	44.31	2.25	Tan and gray FAT CLAY	CH	23.3									
	7	12-14	42.31	3.50	Gray and reddish-brown FAT CLAY	CH	21.2									
	8	14-16	40.31	4.25	Gray and tan FAT CLAY Gray and tan FAT CLAY	CH	21.6									
	9	16-18	38.31	4.00	Reddish-brown and gray FAT CLAY	CH	29.9									
	10	18-20	36.31	4.25	Gray and tan FAT CLAY	CH	20.4									
	11	20-22	34.31	4.50	Reddish-brown and gray FAT CLAY	CH	18.6									
	12	22-24	32.31	3.50	Gray and tan FAT CLAY	CH	20.6									
	13	24-26	30.31	4.50	Gray and tan FAT CLAY; rotten roots	CH	20.5									
	14	26-28	28.31	2.00	Gray FAT CLAY	CH	27.6									
	15	28-30	26.31	1.75	Tan and gray FAT CLAY	CH	27.6									
	16	30-32	24.31	2.50	Tan and gray FAT CLAY; calcareous and ferrous nodules	CH	28.3	73	22	51		95.2	1.25	1.8		Slickensided
	17	32-34	22.31	2.00	Tan and gray FAT CLAY; calcareous nodules	CH	26.9									
	18	34-36	20.31	3.50	Reddish-brown and gray FAT CLAY	CH	26.2									
	19	36-38	18.31	3.50	Reddish-brown and gray FAT CLAY; silt pockets	CH	25.5									
	20	38-40	16.31	4.50	Reddish-brown and gray FAT CLAY; silt pockets	CH	24.9									
07-31	N 13843832.85, E 3155714.45		56.95													
	1	0-2	54.95	2.25	Gray and reddish-brown FAT CLAY	CH	21.8									
	2	2-4	52.95	3.50	Gray and tan SANDY LEAN CLAY	CL	18.1									
	3	4-6	50.95	2.50	Gray and tan SANDY LEAN CLAY; calcareous nodules	CL	19.4									
	4	6-8	48.95	4.50	Gray and tan FAT CLAY	CH	33.6									
	5	8-10	46.95	2.00	Reddish-brown and gray FAT CLAY	CH	35.0									
	6	10-12	44.95	4.25	Gray and reddish-brown FAT CLAY	CH	22.4									
	7	12-14	42.95	3.50	Gray and tan FAT CLAY	CH	19.9									
	8	14-16	40.95	3.00	Gray and reddish-brown FAT CLAY	CH	25.8									
	9	16-18	38.95	3.00	Gray and reddish-brown FAT CLAY	CH	26.0									
	10	18-20	36.95	3.25	Gray and tan FAT CLAY	CH	18.5									
	11	20-22	34.95	2.00	Reddish-brown and gray FAT CLAY	CH	40.1									
	12	22-24	32.95	2.50	Reddish-brown and gray FAT CLAY; calcareous nodules	CH	26.3	91	27	64		92.7	1.30	1.6		Vertical shear
	13	24-25	31.95	4.50	Gray and tan FAT CLAY	CH	19.9									
07-32	N 13843308.16, E 3155741.26		56.15													
	1	0-2	54.15	4.50	Reddish-brown and gray FAT CLAY	CH	20.6									
	2	2-4	52.15	4.50	Reddish-brown and gray FAT CLAY	CH	20.4									
	3	4-6	50.15	3.00	Gray and reddish-brown FAT CLAY; sandy lean clay seams	CH	30.3									
	4	6-8	48.15	3.25	Gray and reddish-brown FAT CLAY	CH	21.2									
	5	8-10	46.15	3.50	Reddish-brown and gray FAT CLAY; sand seams	CH	27.6									
	6	10-12	44.15	3.25	Reddish-brown and gray FAT CLAY	CH	29.6									
	7	12-14	42.15	2.75	Reddish-brown and gray FAT CLAY	CH	24.4	90	25	65		98.3	2.39	3.8		Slickensided

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Hole No. 07-30

BORING LOG	DISTRICT	INSTALLATION	SHEET 1 OF 2 SHEETS

1. PROJECT House Tract Placement Area	7. ELEVATION OF HOLE 56.37 ft
2. LOCATION (Coordinates or Station) N=13840526.21 E=3154490.32	8. DATUM FOR ELEVATION
3. DRILLING AGENCY T.R.I.	9. ELEVATION OF GROUNDWATER ▽ TOD: ▼ 24-HR: 23.57 ft
4. LABORATORY TESTING AGENCY Tolunay-Wong Engineers, Inc.	10. DRILLING DATE and TIME STARTED: 2/22/07 COMPLETED: 2/22/07
5. DEPTH OF WATER ▽ TOD: ▼ 24-HR: 32.8 ft	11. CLASSIFICATION REFERENCE
6. DEPTH OF HOLE 40 ft	12. ENGINEER

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	NUMBER	RECOVERY (%)	SPT (N)	PENETROMETER (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	FINES CONTENT (% <200)
			FAT CLAY"FILL", stiff, reddish brown & gray		1	58		1.75		21.2				
	54.4		**LEAN CLAY w/ SAND"FILL"**, very stiff-hard, gray, w/ ferrous nodules		2	33		4.50		17.6				
	52.4		**FAT CLAY"FILL"**, very stiff, gray & reddish brown, w/ ferrous nodules		3	35		3.50		18.6				
5			-w/ clay seams @ 4' - 6'											
			-w/ sand pockets below 6'		4	52		3.00		33.1				
			-very stiff-hard @ 8' - 10'		5	63		4.50		20.1				
			-tan & gray @ 8' - 34'											
10			-stiff to very stiff @ 10' - 24'		6	71		2.75		23.3				
					7	58		3.25		21.2				
15					8	67		2.50		21.6				
					9	54		4.00		29.9				
					10	58		3.25		20.4				
20					11	65		3.50		18.6				
					12	71		3.00		20.6				
	31.4		-stiff @ 24' -34'											
25			-w/ calcareous nodules @ 24' - 26'		13	63		2.50		20.5				
			-w/ roots @ 26' - 28'		14	60		1.75		27.6				
					15	67		2.00		27.6				
30			-w/ calcareous nodules @ 30' - 36'		16	31		1.50	95.2	28.3	73	22	51	
	▼		-slickensided below 32'		17	71		2.00		26.9				
			-very stiff to hard, w/ silt pockets below 34'											

SWG 1836 BOR 03.14.859-057.GPJ TOLUNAY-WONG ENGINEERS.GDT 3/4/08

ENG FORM: SWG 1836 BOR

Hole No. 07-30

BORING LOG	DISTRICT	INSTALLATION	SHEET 2 OF 2 SHEETS

1. PROJECT House Tract Placement Area	7. ELEVATION OF HOLE 56.37 ft
2. LOCATION (Coordinates or Station) N=13840526.21 E=3154490.32	8. DATUM FOR ELEVATION
3. DRILLING AGENCY T.R.I.	9. ELEVATION OF GROUNDWATER ▽ TOD: ▼ 24-HR: 23.57 ft
4. LABORATORY TESTING AGENCY Tolunay-Wong Engineers, Inc.	10. DRILLING DATE and TIME STARTED: 2/22/07 COMPLETED: 2/22/07
5. DEPTH OF WATER ▽ TOD: ▼ 24-HR: 32.8 ft	11. CLASSIFICATION REFERENCE
6. DEPTH OF HOLE 40 ft	12. ENGINEER

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	NUMBER	RECOVERY (%)	SPT (N)	PENETROMETER (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	FINES CONTENT (% <200)
					18	71		4.50		26.2				
					19	63		3.25		25.5				
					20	69		4.50		24.9				
40			Boring terminated at 40 ft.											
45														
50														
55														
60														
65														

SWG 1836 BOR 03.14.859-057.GPJ TOLUNAY-WONG ENGINEERS.GDT 3/4/08

ENG FORM: SWG 1836 BOR

07-27
N.=13,844,844.19, E.=3,154,558.51

W.T. NOT FOUND

P. P.	MC-UDW,LL-PL	
1.25	37-	CH,S,R
2.00	34-	CH,VS,R
2.00	32-	CH,VS,R&Gy
2.00	36-	CH,W/SiSms,VS,R&Gy
2.00	30-	CH,VS,Gy&R
2.25	34-	CH,VS,Gy&R
4.50	25-92, 74-21,	CH,W/RtsVS,Gy&Bl
2.50	37-85,	CH,VS,R&Gy
3.50	22-	CH,VS,Gy
3.00	25-	CH,W/CalcNod,VS,GyTn&R
2.75	23-	CH,W/CalcNod,VS,Gy&Tn
3.75	31-	CH,VS,Gy&R
2.75	23-	CH,VS,Gy&R
2.50	33-	CH,VS,R&Gy
2.50	31-	CH,VS,Gy&Tn
2.50	30-95,	CH,W/Fer&CalcNod,VS,Tn&Gy
2.25	28-96, 76-21,	CH,Slks,W/CalcNod,VS,Tn&Gy
4.50	26-	CH,H,R&Gy
4.00	23-	CH,VS,R&Gy
4.25	22-	CH,W/SdSms,VS,R&Gy

07-28
N.=13,844,870.34, E.=3,155,085.93

W.T. NOT FOUND

P. P.	MC-UDW,LL-PL	
3.75	29-	CH,VS,Gy&R
3.00	30-	CH,VS,Gy&Tn
2.75	23-96,	CH,VS,Gy&R
1.75	21-107, 79-24,	CH,Slks,S,Tn,Gy&R
2.25	26-	CH,VS,Gy&R
2.50	22-	CH,VS,Gy&R
3.00	22-	CH,VS,Gy&R
3.25	22-	CH,VS,Gy&R
2.00	21-	CH,W/CalcNod,VS,Gy&R
3.50	25-	CH,VS,Gy&R
2.50	22-	CH,W/CalcNod,VS,Gy
3.00	26-	CH,W/CalcNod,VS,Gy&RBn
4.00	27-	CH,VS,Gy&R

07-29
N.=13,844,820.73, E.=3,155,536.91

W.T. NOT FOUND

P. P.	MC-UDW,LL-PL	
1.00		CH,S,R
3.50	25-	CH,VS,R
3.25	31-	CH,VS,R&Gy
4.50	24-	CH,H,R&Gy
2.50	30-	CH,VS,R&Gy
3.00	30-88,	CH,W/CalcNod,VS,Gy&R
2.75	33-83, 94-29,	CH,W/CalcNod,VS,Gy&R
3.25	22-	CH,VS,Gy&R
3.25	20-	CH,VS,Gy&R
4.50	30-	CH,H,Gy
4.50	23-	CH,H,Gy
4.50	24-	CH,W/CalcNod,H,Gy
4.25	24-	CH,H,Gy&R

07-30
N.=13,844,357.92, E.=3,155,690.69

W.T. NOT FOUND

P. P.	MC-UDW,LL-PL	
1.75	21-	CH,S,R&Gy
4.50	18-	CI,W/Sd,H,Gy
3.50	19-	CH,W/CISms,VS,Gy
3.00	33-	CH,VS,Gy&R
4.50	20-	CH,H,Gy
2.75	23-	CH,VS,Gy
3.25	21-	CH,VS,Gy&R
2.50	22-	CH,VS,Gy&R
4.00	30-	CH,VS,Gy
3.25	20-	CH,VS,Gy
3.50	19-	CH,VS,Gy&R
3.00	21-	CH,VS,Gy
2.50	21-	CH,VS,Gy&Tn
1.75	28-	CH,W/Rts,VS,Gy
2.00	28-	CH,VS,Gy
1.50	28-95, 73-22,	CH,Slks,VS,Tn&Gy
2.00	27-	CH,W/CalcNod,S,Gy&Tn
4.50	26-	CH,Slks,H,Gy&RBn
3.25	26-	CH,W/SiPoc,VS,Gy&RBn
4.50	25-	CH,Slks,W/SiPoc,H,R&Gy

07-31
N.=13,843,832.85, E.=3,155,714.45

W.T. NOT FOUND

P. P.	MC-UDW,LL-PL	
2.50	22-	CH,VS,Gy&R
3.75	18-	CI,VS,Gy&R
2.50	19-	CI,W/CalcNod,VS,Gy&R
4.50	34-	CH,VS,Gy
3.50	35-	CH,H,Gy&R
4.25	22-	CH,VS,Gy&R
3.50	20-	CH,VS,Gy&R
3.00	26-	CH,VS,Gy&RBn
3.00	26-	CH,VS,Gy&R
2.75	19-	CH,VS,Gy&Tn
2.75	40-	CH,VS,Gy&R
2.50	26-93, 91-27,	CH,W/CalcNod,VS,Gy&R
4.50	20-	CH,VS,Gy

07-32
N.=13,843,308.16, E.=3,155,741.26

W.T. NOT FOUND

P. P.	MC-UDW,LL-PL	
4.50	21-	CH,H,R&Gy
3.50	20-	CH,VS,R&Gy
2.00	30-	CH,W/SdCISms,VS,Gy&R
3.00	21-	CH,VS,Gy&R
3.50	28-	CH,W/SdSms,VS,Gy&R
3.25	30-	CH,VS,R&Gy
1.75	24-98, 90-25,	CH,Slks,S,Gy&R
3.00	21-	CH,VS,Gy
4.50	20-	CH,H,Gy&R
2.25	23-	CH,VS,Gy&R
2.00	19-	CH,VS,R&Gy
3.75	20-	CH,VS,Gy
4.25	21-	CH,W/CalcNod,VS,Gy&R

07-33
N.=13,842,900.96, E.=3,155,618.63

W.T. NOT FOUND

P. P.	MC-UDW,LL-PL	
1.75	20-	CH,VS,R&Gy
4.50	21-	CH,H,R&Gy
3.75	27-	CH,VS,R&Gy
1.50	33-	CH,S,Gy&R
1.25	40-79, 96-29,	CH,Slks,S,R&Gy
3.00	25-	CH,VS,Gy&R
2.00	28-	CH,VS,Gy&R
3.00	20-	CH,VS,Gy
3.75	32-	CH,H,R&Gy
3.00	23-	CH,VS,R&Gy
2.50	23-	CH,S,Gy&R
3.50	20-	CH,VS,Gy&Tn
4.50	20-	CH,VS,Gy
2.75	29-	CH,VS,Gy&R
2.75	29-	CH,H,Gy&R
3.00	30-	CH,VS,Gy&R
1.50	25-98.2,80-23,	CH,VS,Gy&R
2.00	26-	CH,W/CalcDep,VS,Gy&Tn
2.00	28-	CH,W/CalcNod,VS,Gy&Tn
3.75	23-	CH,S,R&Gy

ELEVATIONS IN FEET, N.G.V.D. 88

NOTE:

FOR BORING LOG NOTES AND CLASSIFICATIONS, SEE DRAWING NO. F-46.

SOLICITATION NO. W912HY-08-B-0016

US Army Corps of Engineers
Galveston District

Rev.	Description	BY:$USER$	Date	By

TIME:$TIME$ DATE:$DATE$

Drawn by: | Date: APRIL, 2008 | Rev. --
Designed by: SK,SL,RB | Scale: AS SHOWN
Checked by: SL,RB | Approval Recommended: HARRISON T. SUTCLIFFE, P.E. Chief, Engineering Branch
Submitted by: LORI K. THOMAS, P.E. Det/Section & Structure Section
Approved by: PETE G. PEREZ, P.E. Chief, Engineering and Construction Division

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

PREPARED UNDER THE DIRECTION OF DAVID C. WESTON, COL., C.E.
DISTRICT COMMANDER

HOUSTON SHIP CHANNEL, TEXAS
HOUSE TRACT PLACEMENT AREA
INTERIOR REHABILITATION, EXTERIOR LEVEE REHABILITATION, AND DRAINAGE DITCH REPAIR

LOGS OF BORINGS

Drawing No.: F-45
Sheet 48 of 49

File No. HSC 401-515

File:$FILE$