BORING LOG NO. 09-B109

CLIENT:	USACE Galveston District Galveston, Texas	PROJECT:	TO-0012 Pipeline Dredging, Cedar Bayou & Anahuac Channel, Volume II
BORING LOCATION:	N: 689720.439 E: 3279876.09	SITE:	Atkinson Island PA16 Texas

Approx. Surface Elevation: 8.4 feet

Graphic Log	DESCRIPTION	DEPTH, FEET	USCS SYMBOL	TYPE	RECOVERY, IN	SPT, BLOWS/FT	CALIBRATED HAND PENETROM., TSF	TORVANE, TSF	MOISTURE CONTENT, %	DRY DENSITY, PCF	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX	MINUS #200 SIEVE, %	COMPRESSIVE STRENGTH, TSF	FAILURE STRAIN, %	CONFINING PRESSURE, PSI
	FILL: CLAYEY SAND dark gray, very loose, fine grain, with roots, dry, very high plasticity (6.4; ▼ 2.0)	1	SC	SS	4	0			24		86	27	59	34			
	FILL: SANDY SILT light gray and dark gray, very soft to stiff, with scattered broken shell, wood and clay pockets, wet, none to slight plasticity	2	ML														
		3		SS	7	2			34								
		4															
		5		SS	6	10			24				NP	60			
		6															
		7		SS	5	2			41								
		8															
		9		SS	12	3			30								
	(-1.6; 10.0)	10															
	FILL: FAT CLAY w/SAND dark gray, stiff, moist, very high plasticity	11	CH	SS	12	7			45								
		12															
		13		SS	12	0			49								
		14															
	(-6.6; 15.0) - with sand pockets and layers below 14 feet	15		SS	12	5			41		61	19	42	73			
	Boring terminated at 15 feet.																

STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES. IN SITU, THE TRANSITION BETWEEN STRATA MAY BE MORE GRADUAL.

REMARKS: Dry augered to 2 feet; wet rotary thereafter.

WATER LEVEL OBSERVATIONS			
▽ 2 ft	WS	▼ 2 ft	at 5 min
▼ 2 ft	at 10 min	▼ 2 ft	at 5 min

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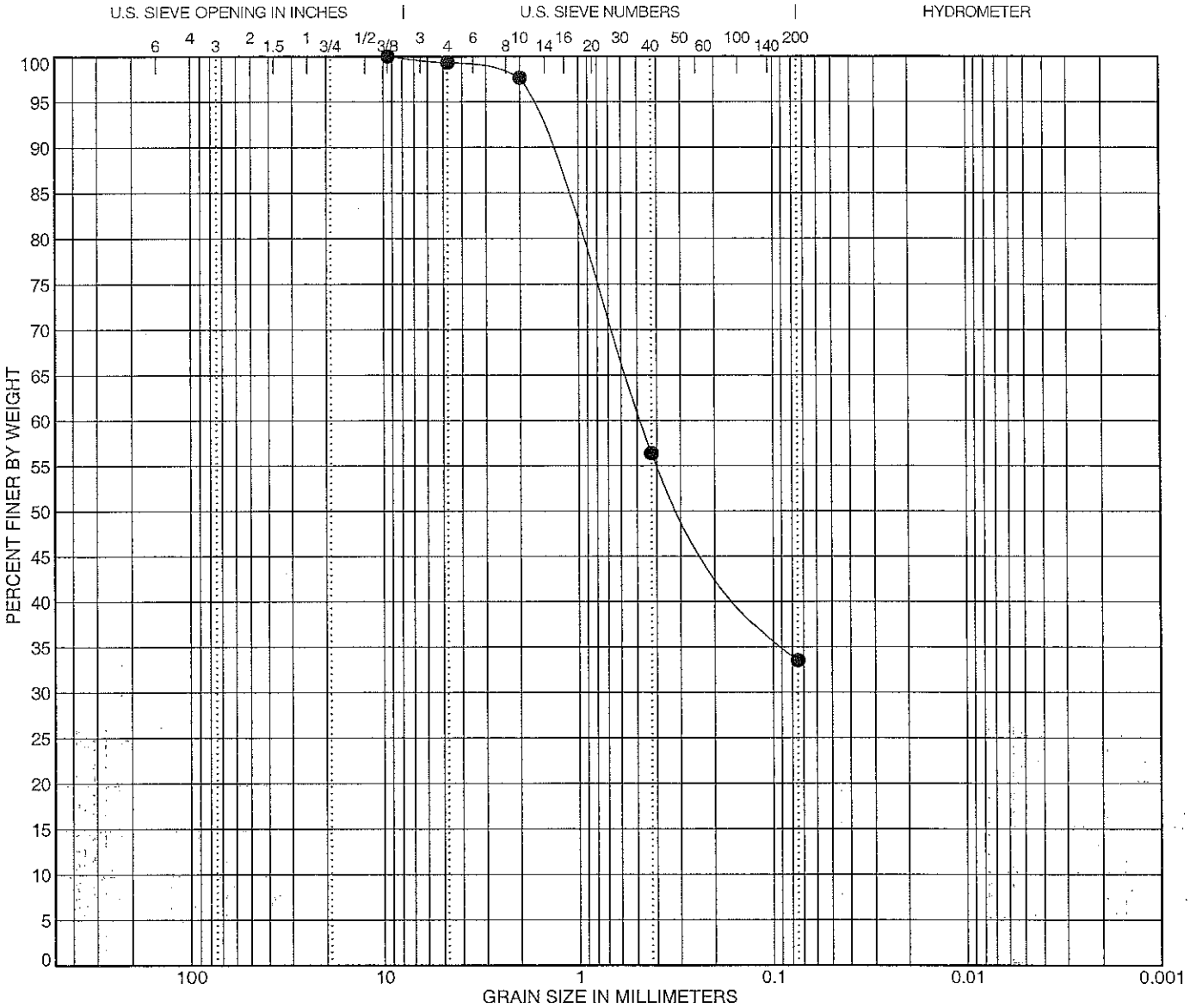
DATE DRILLED	Page 1 of 1
4/12/2010	09-B109
PROJECT NUMBER 92105186-B	EXHIBIT A-



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	**09-B109**	**0.5**	**CLAYEY SAND(SC)**	**86**	**27**	**59**		

D100	D50	D30	D10	%Gravel	%Sand	%Silt	%Clay
9.5	**0.262**			**0.6**	**65.9**	**33.5**	

Percent Passing the Indicated Sieve

2"	1-1/2"	1"	3/4"	3/8"	#4	#8	#10	#16	#20	#30	#40	#50	#70	#100	#140	#200
				100	**99.4**		**97.6**				**56.4**					**33.5**

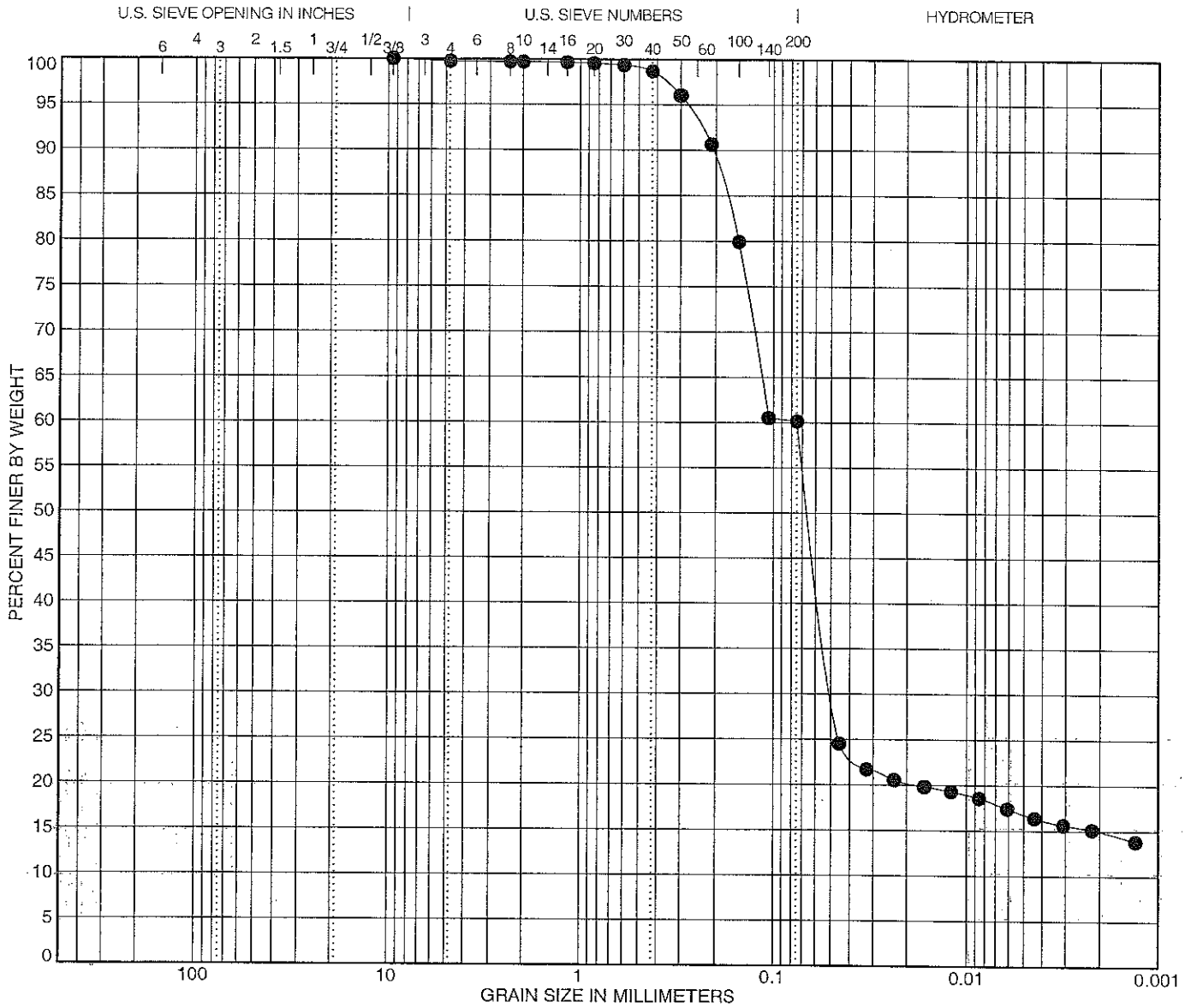
GRAIN SIZE DISTRIBUTION

TO-0012 Pipeline Dredging, Cedar Bayou & Anahuac Channel, Volume II
, Texas
Project Number 92105186-B

Terracon

Terracon Consultants, Inc.
11555 Clay Road, Suite 100
Houston, Texas 77043
Telephone: 713-690-8989
Fax: 713-690-8787

EXHIBIT ?



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	**09-B109**	**4.5**						

D100	D50	D30	D10	%Gravel	%Sand	%Silt	%Clay
9.5	**0.065**	**0.049**		**0.2**	**39.6**	**45.3**	**14.9**

Percent Passing the Indicated Sieve

2"	1-1/2"	1"	3/4"	3/8"	#4	#8	#10	#16	#20	#30	#40	#50	#70	#100	#140	#200
				100	**99.8**	**99.7**	**99.7**	**99.6**	**99.6**	**99.4**	**98.7**	**96**	**90.6**	**79.9**	**60.5**	**60.1**

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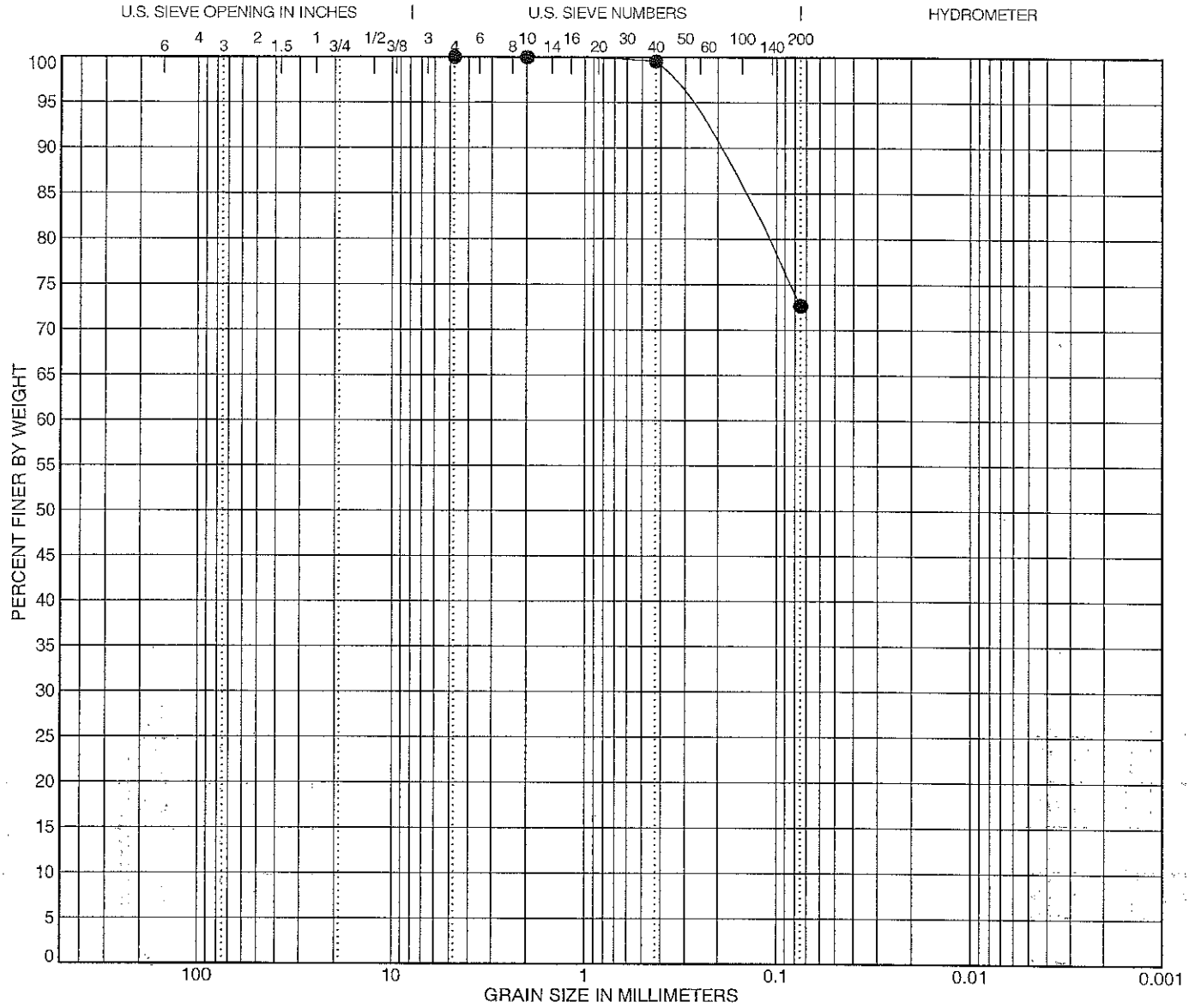

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification	LL	PL	PI	Cc	Cu
● 09-B109	14.5	**FAT CLAY with SAND(CH)**	**61**	**19**	**42**		

D100	D50	D30	D10	%Gravel	%Sand	%Silt	%Clay
4.75				**0.0**	**27.3**	**72.7**	

Percent Passing the Indicated Sieve

2"	1-1/2"	1"	3/4"	3/8"	#4	#8	#10	#16	#20	#30	#40	#50	#70	#100	#140	#200
					100		**100**				**99.5**					**72.7**

GRAIN SIZE DISTRIBUTION

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EXHIBIT

Project name: TO-0012 Pipeline Dredging, Volume II, Atkinson Island, PA 16 | Client: USACE, Galveston District | Terracon Project # : 92105186-B

Boring	Depth	Field tests			Atterberg Limits			Grain Size Analysis														USCS Symbol (ASTM 2487)	Wc	γ_d	Strength tests																					
								Percent Pasing Sieve																	Direct Shear Test					Unconfined Compression				UU Triaxial Test				CU Triaxial Test						
		PP	TV	SPTn	LL	PL	PI	3/4"	3/8"	4	8	10	16	20	30	40	50	70	100	140	200				C	φ	Wc	γ_d	Symbol	C	Wc	γ_d	Symbol	C	Wc	γ_d	Symbol	C	φ	c'	φ'	Wc	γ_d	Symbol
	ft	tsf	tsf	bl/ft	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%		%	pcf	ksf	°	%	pcf		ksf	%	pcf		ksf	%	pcf		ksf	°	ksf	°	%	pcf	
09-B106	0-2			16																		SC**	5																						
	2-4			13	24	16	8		100	99	99	99	98	98	98	95	89	78	64	33	31	SC	7																					
	4-6			10																		SC**	19																					
	6-8			12																		SC**	27																					
	8-10			10																		SC**	24																					
	10-12			10						100	100	100	100	100	99	92	91	80	66	35	35	SC*	23																					
	12-14			7																		CH**	34																					
	14-16			6	54	18	36		100	100		100				99					98	CH	76																					
	16-18			6																		CH**	52																					
	18-20			7																		CH**	61																					
	20-22			3																		CH**	64																					
	22-24			5	107	20	87															CH*	58																					
	24-26			10																		CH**	73																					
	26-28			10																		CH**	32																					
	28-30			11																		CH**	24																					
	30-32			12	76	25	51			100		100				99					73	CH	55																					
	32-34			5																		CH**	27																					
	34-36			4																		CH**	21																					
	36-38			5																		CH**	57																					
	38-40			4																		CH**	25																					
	40-42			8																		CH**	30																					
	42-44			6																		CH**	43																					
	44-46			14																		CH**	33																					
	46-48			12	35	14	21															CL*	22																					
	48-50			13																		CL**	27																					
09-B107	0-2			14	NP	NP	NP		100	83		80				74					43	SM	11																					
	2-4			20																		SM**	21																					
	4-6			18					100	100	100	100	100	99	99	97	91	80	66	40	40	SM*	24																					
	6-8			14																		SM**	18																					
	8-10			12																		SM**	15																					
	10-12			4																		SM**	21																					
	12-14			5	38	15	23			100		100				99					50	CL	21																					
	14-16			3																		SM**	25																					
09-B108	0-2			5							100	100	100	100	100	99	98	94	66	50	49	SM*	8																					
	2-4			23																		SM**	9																					
	4-6			4	90	27	63					100				99					92	CH	48																					
	6-8			6																		CH**	43																					
	8-10			9																		CH**	42																					
09-B109	0-2			0	86	27	59		100	99		98				56					34	SC	24																					
	2-4			2																		ML**	34																					
	4-6			10	NP	NP	NP		100	100	100	100	100	100	99	99	96	91	80	61	60	ML	24																					
	6-8			2																		ML**	41																					
	8-10			3																		ML**	30																					
	10-12			7																		CH**	45																					
	12-14			0																		CH**	49																					
	14-16			5	61	19	42			100		100				100					73	CH	41																					
09-B110	0-2	3.00			89	30	59					100				99					90	CH	55																					
	2-4	1.00	1.25									100	100	100	99	97	87	75	58	35	34	SM*	22																					
	4-6		2.00																			CL**	25																					
	6-8		1.50		49	18	31					100				100					61	CL	28																					
	8-10			21																		CL**	45																					