BORING LOG NO. 09-B114

CLIENT:	USACE Galveston District Galveston, Texas	PROJECT:	TO-0012 Pipeline Dredging, Cedar Bayou & Anahuac Channel, Volume II
BORING LOCATION:	N: 689066.353 E: 3280557.203	SITE:	Atkinson Island PA16 Texas

Approx. Surface Elevation: 8.1 feet

Graphic Log	DESCRIPTION			DEPTH, FEET	USCS SYMBOL	SAMPLES: TYPE	RECOVERY, IN	SPT, BLOWS/FT	CALIBRATED HAND PENETROM., TSF	TORVANE, TSF	TESTS: MOISTURE CONTENT, %	DRY DENSITY, PCF	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX	MINUS #200 SIEVE, %	COMPRESSIVE STRENGTH, TSF	FAILURE STRAIN, %	CONFINING PRESSURE, PSI
	FILL: FAT CLAY dark gray, medium stiff, with roots, dry, very high plasticity	6.1	▼ 2.0	1	CH	SS	8	5			32		103	30	73	95			
	FILL: LEAN CLAY w/SAND light brown, medium stiff to stiff, with sand pockets, moist, medium to high plasticity - with roots 2 to 4 feet	2.1	6.0	2	CL														
				3		SS	10	9			30								
				4															
				5		SS	7	5			43					85			
	FILL: SILTY SAND brown and gray, medium dense, fine grain, wet, none to slight plasticity	0.1	8.0	6	SM														
				7		SS	11	17			22								
	FILL: FAT CLAY w/SAND brown and gray stiff to very stiff, with sand pockets, moist, very high plasticity	-1.9	10.0	8	CH														
				9		SS	10	15			44		65	22	43	85			
	Boring terminated at 10 feet.			10															

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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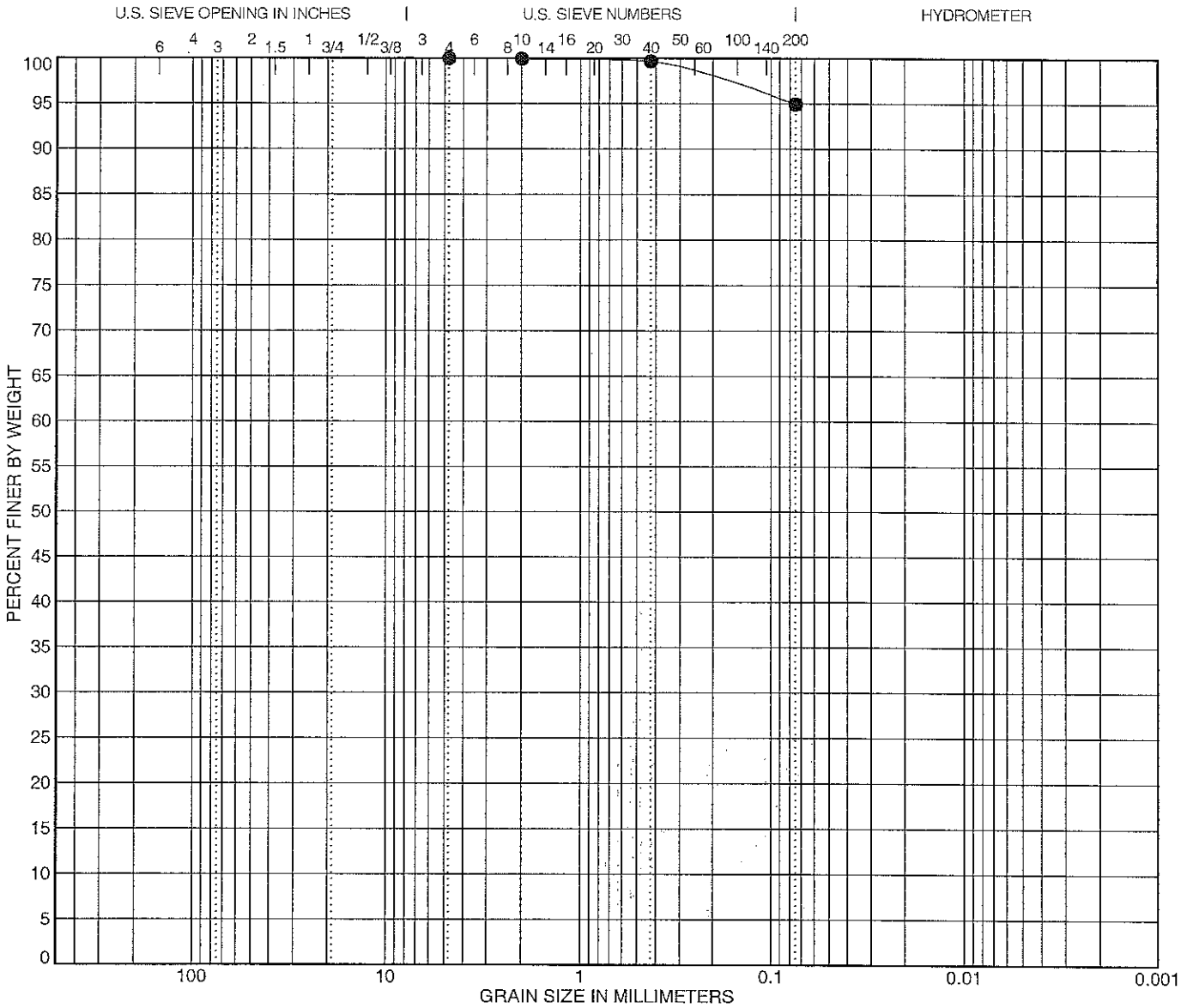
DATE DRILLED	Page 1 of 1
4/8/2010	09-B114
PROJECT NUMBER 92105186-B	EXHIBIT A-



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification			Classification	LL	PL	PI	Cc	Cu
●	**09-B114**	**0.5**	**FAT CLAY(CH)**	**103**	**30**	**73**		

D100	D50	D30	D10	%Gravel	%Sand	%Silt	%Clay
4.75				**0.0**	**5.1**	**94.9**	

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		**99.9**				**99.7**					**94.9**

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
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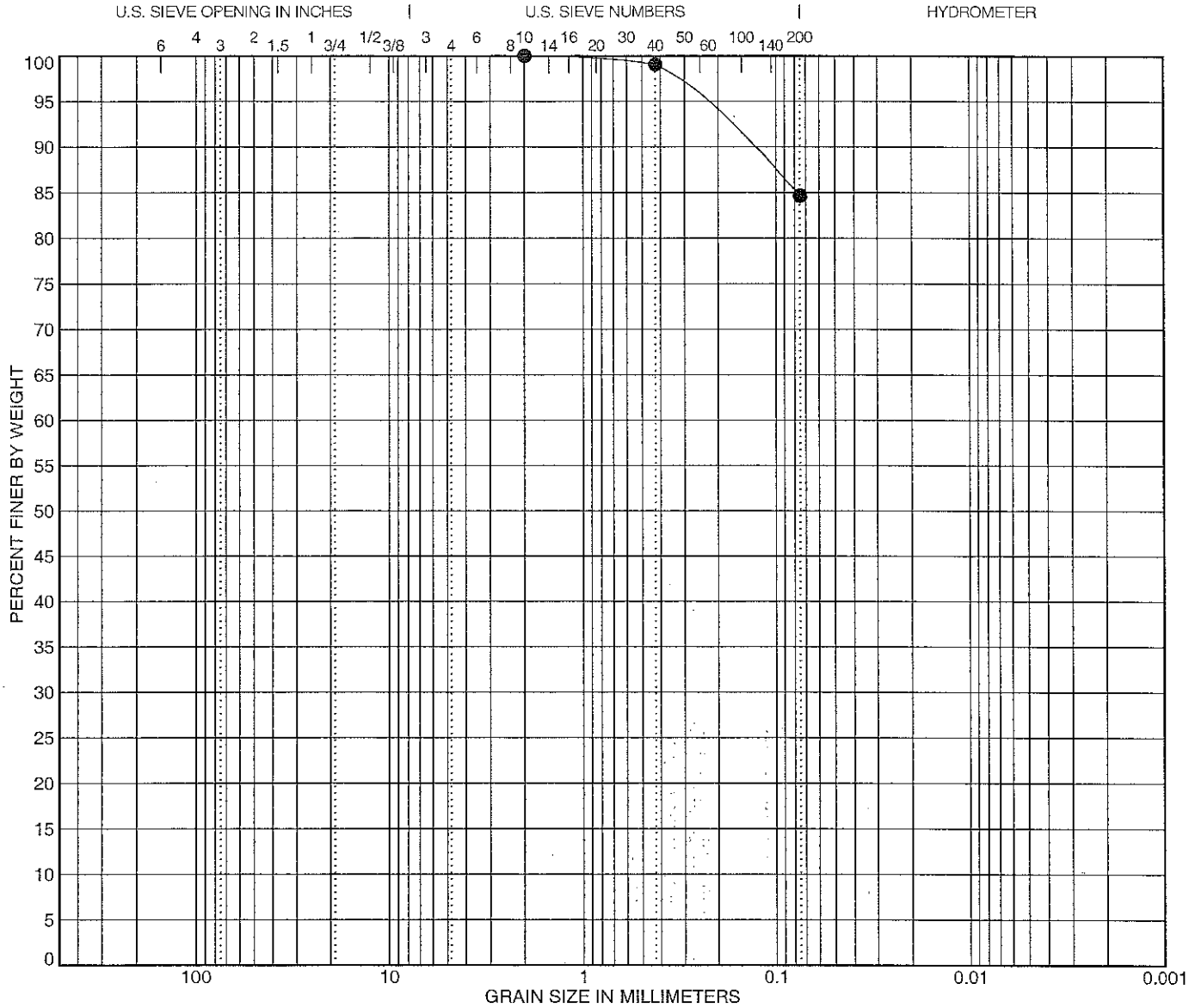

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification	LL	PL	PI	Cc	Cu
● **09-B114**	**4.5**						

D100	D50	D30	D10	%Gravel	%Sand	%Silt	%Clay
2				**0.0**	**15.4**	**84.6**	

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**					**84.6**

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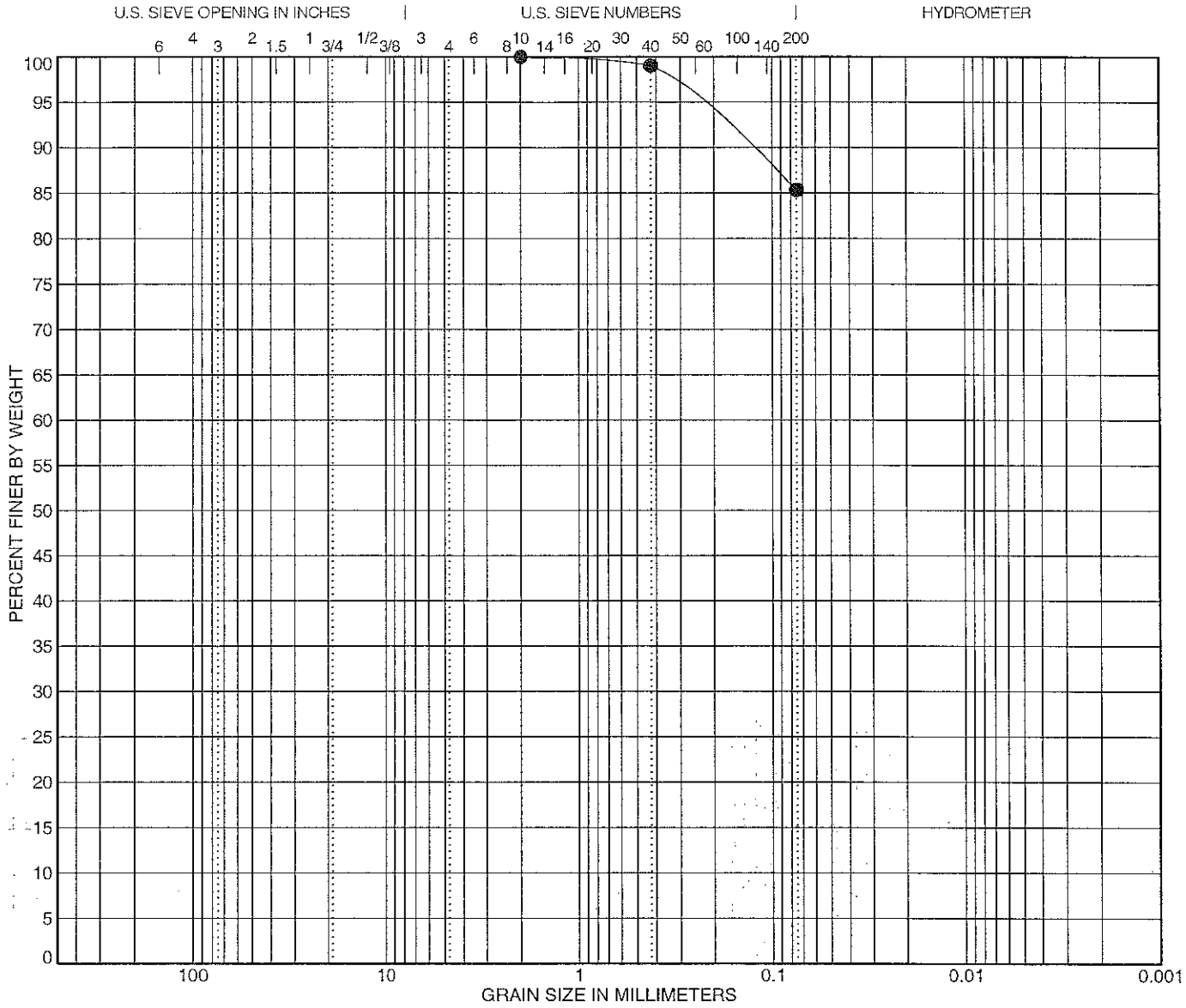

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	**09-B114**	**8.5**	**FAT CLAY(CH)**	**65**	**22**	**43**		

D100	D50	D30	D10	%Gravel	%Sand	%Silt	%Clay
2				**0.0**	**14.7**	**85.3**	

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**					**85.3**

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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	γd	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	γd	Symbol	C	Wc	γd	Symbol	C	Wc	γd	Symbol	C	φ	c'	φ'	Wc	γd	Symbol
	ft	tsf	tsf	bl/ft	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%		%	pcf	ksf	°	%	pcf		ksf	%	pcf		ksf	%	pcf		ksf	°	ksf	°	%	pcf	
09-B111	0-2			0																		CH**	70																						
	2-4			8	29	15	14					100				95					44	SC	27																					
	4-6			30																		SC**	31																						
	6-8			6	57	19	38		100	66		63				59					31	SC	22																					
	8-10			14																		SM	26																						
	10-12			5	58	20	38			100	100	99	99	98	98	96	95	91	87	84	84	CH	45																						
	12-14			5																		CH**	51																						
	14-16			6																		CH**	74																						
09-B112	0-2			0	116	32	84					100				100					99	CH	108																					
	2-4			0																		CH**	94																						
	4-6			9				99	81	73	68	67	65	63	61	58	53	50	47	43	43	SM*	20																						
	6-8			9																		SM**	24																						
	8-10			9	NP	NP	NP		100	98		98				92					20	SM	24																					
09-B113	0-2			5						100		100				89					16	SM*	19																					
	2-4			20																		SM*	18																						
	4-6			21						100	100	100	100	100	99	98	92	86	80	52	49	SM*	28																						
	6-8			23																		SM*	26																						
	8-10			24																		SM*	36																						
	10-12			21																		SM*	23																						
	12-14			39	67	22	45			100		100				100					80	CH	56																					
	14-16			28																		CH**	90																						
09-B114	0-2			5	103	30	73			100		100				100					95	CH	32																					
	2-4			9																		CL**	30																						
	4-6			5								100				99					85	CL*	43																						
	6-8			17																		SM**	22																						
	8-10			15	65	22	43					100				99					85	CH	44																					
09-B115	0-2			0																		CH**	107																						
	2-4			0																		CH**	100																						
	4-6			0	91	26	65															CH*	69																						
	6-8			3																		CH**	52																						
	8-10			2																		CH**	42																						
	10-12			4																		CH**	63																						
	12-14			0																		CH**	55																						
	14-16			0	64	21	43					100				99					74	CH	43																					
09-B116	0-2			0	94	28	66		100			96				94					82	CH	39																					
	2-4			6																		CH**	42																						
	4-6			8																		CH**	42																						
	6-8			4																		CH**	45																						
	8-10			4					100			100				100					97	CH*	44																					
09-B117	0-2			0																		CH**	54																						
	2-4			2	62	26	36		100	100		99				99					97	CH	57																					
	4-6			0																		CH**	46																						
	6-8			0																		CH**	35																						
	8-10			2	63	26	37															CH**	62																						
	10-12			3																		CH**	68																						
	12-14			8																		CH**	74																						
	14-16			6						100		100				100					96	CH*	80																					
09-B118	0-2			2	38	16	22			100		100				98					59	CL	29																					
	2-4			5																		CL**	35																						
	4-6			4						100	100	100	100	100	99	97	87	77	58	24	23	SM*	21																						
	6-8			8																		SM**	21																						
	8-10			6	43	16	27															CL*	36																						

NOTES:

USCS Symbol - Classification based on laboratory test results.

USCS Symbol* - Classification based partially on laboratory test results together with visual description.

USCS Symbol** - Classification based only on visual descriptions.