

Appendix B contains discussions of analytical procedures used in our engineering analyses. Appendix C contains a positioning report by Fugro Chance, Inc., of Lafayette, Louisiana.

For the purposes of discussion and presentation, "driven pipe pile" is used in this report to represent foundation piles, caissons and conductors, unless otherwise specified.

2.2 FIELD AND LABORATORY INVESTIGATIONS

The field investigation was performed on June 26 through 28, 2008, from the R/V *Seaprobe*. The soil conditions were determined by performing four exploratory borings, two at each SPM location with one boring at a selected anchor leg location, and one boring at the proposed PLET location. Enterprise Field Services selected the boring locations. These borings were drilled to a penetration of 131-ft below mudline. The water depths at the boring locations ranged from 110 to 113 ft. A chronological summary of field operations is presented in Appendix A.

2.2.1 Exploratory Borings

FMMG personnel drilled the soil borings with a DMX drill rig positioned over the centerwell of the R/V *Seaprobe*. The vessel was anchored at the boring location by a 4-point mooring system. Soil conditions at the site were explored by drilling a group of four soil borings to 131-ft penetration below the seafloor. The final coordinates for the boring locations are presented in Table 2-1. A plan of borings within Block A-36, of the Galveston Area is presented on Plate 2-1. Fugro Chance, Inc., of Lafayette, Louisiana, conducted surveying utilizing STARFIX and DGPS, and performed a 360-degree scanning sonar survey. The positioning report, prepared by Fugro Chance, is presented in Appendix C. The scanning sonar reports are available from Fugro Chance upon request.

Table 2-1: Final Boring Coordinates
(Texas South Central Zone Coordinates)

FMMG Boring Designation	Fugro Chance Boring Designation	Proposed Boring Coordinates	Final Boring Coordinates	Boring Termination Depth (ft)
SPM #1 PLET	Core 3	X = 3,276,605.26 ft Y = 265,296.65 ft	X = 3,276,615 ft Y = 265,270 ft	131
SPM #1 Anchor Leg #2	Core 1	X = 3,275,201.70 ft Y = 264,859.70 ft	X = 3,275,180 ft Y = 264,853 ft	131
SPM #2 PLET	Core 4	X = 3,283,609.94 ft Y = 269,139.12 ft	X = 3,283,617 ft Y = 269,118 ft	131
SPM #2 Anchor Leg #6	Core 2	X = 3,284,713.02 ft Y = 270,110.77 ft	X = 3,284,733 ft Y = 270,117 ft	131

Samples were obtained through 5.0-in.-OD, 4.5-in.-IF drill pipe at all the locations. Samples were spaced at 3-ft intervals to 20-ft penetration, at 5-ft intervals to 68-ft penetration, and at 10-ft intervals thereafter to the final boring depth at all the locations, except at the SPM #2 PLET location. Sampling intervals at the SPM #2 PLET location was completed as follows: 3-ft intervals to 23-ft penetration, 5-ft intervals to 71-ft penetration, and 10-ft intervals thereafter to the final boring depth. Additionally, a 5-ft



shallow boring, designated as Core 4A by Fugro Chance, was drilled at the SPM #2 PLET location to allow re-sampling. The drilling and sampling techniques used to complete these borings are explained in detail in Appendix A.

Two water depths were measured at each boring location using a seafloor sensor seated in the drill bit. The water depth measurements are tabulated in Table 2-2. These water depth measurements are intended for the purpose of the geotechnical investigation only, and are not corrected for tidal or other variations. If utilized for other purposes, the water depth measurement should be adjusted to account for meteorological tide and datum corrections. The water depth measuring procedures are explained in detail in Appendix A.

Table 2-2: Measured Water Depths

Boring Designation	Water Depth (ft)	Time and Date of Measurement	Supplemental Water Depth (ft)	Time and Date of Measurement
SPM #1 PLET	112	1630 hours on June 27, 2008	113	2245 hours on June 27, 2008
SPM #1 ANCHOR LEG #2	113	2400 hours on June 26, 2008	113	0605 hours on June 27, 2008
SPM #2 PLET	112	0250 hours on June 28, 2008	112	1030 hours on June 28, 2008
SPM #2 ANCHOR LEG #6	110	1450 hours on June 28, 2008	111	2105 hours on June 28, 2008

2.2.2 Field and Laboratory Tests

The soil testing program was designed to evaluate pertinent index and engineering properties of the foundation soils. During the field operation, all samples were extruded from the sampler and classified by the soil technician or field engineer. Unit weight, Torvane, pocket penetrometer, miniature vane and unconsolidated-undrained triaxial compression tests were performed in the field on selected cohesive samples. All of the samples were shipped to Fugro's Houston laboratory where Atterberg limit tests, water content tests, and grain-size analyses, as well as additional density tests, unconsolidated-undrained triaxial compression tests, and miniature vane tests, were performed.

A description of relevant laboratory procedures is provided in Appendix A. The strength and classification test results are presented graphically on the Logs of Boring and Test Results in Section 3. Grain-size distribution curves from sieve-analyses and stress-strain curves from triaxial compression tests are presented in Appendix A.

2.3 GENERAL SOIL CONDITIONS

2.3.1 Soil Stratigraphy

The soil stratigraphy at each of the boring locations disclosed by the field and laboratory investigation is presented in Section 3. The soil stratigraphy is based on the classification of soil samples



3.4 SPM #2 ANCHOR LEG #6 LOCATION

3.4.1 Introduction

The field investigation at the location designated as SPM #2 ANCHOR LEG #6 was performed on June 28, 2008. Soil sampling was performed to 131-ft penetration at Texas South Central Zone Coordinates X = 3,284,733 ft and Y = 270,117 ft. The measured water depth ranged from 110 to 111 ft.

3.4.2 Soil Stratigraphy

The soil stratigraphy disclosed by the field and laboratory investigations is presented on the boring log, Plate 3-34. The soil stratigraphy is based on the classification of soil samples recovered from the boring and observations made during drilling operations. A generalized summary of the major soil strata is tabulated below.

<u>Stratum</u>	<u>Penetration, ft</u>		<u>Description</u>
	<u>From</u>	<u>To</u>	
I	0	5	Very soft to soft lean clay
II	5	11	Firm lean clay
III	11	28	Loose to medium dense silt with sand to sandy silt
IV	28	38	Firm lean clay
V	38	58	Loose to medium dense silt
VI	58	131	Firm to very stiff clay

Detailed soil descriptions that include textural variations and inclusions are noted on the boring log. A key to the terms and symbols used on the boring log is presented on Plate 2-2. The Roman numeral representing each stratum is also shown on the boring log and on relevant plates. The variation in soil stratigraphy across this site is indicated in a comparison (integration) of the geophysical and geotechnical soil information presented on Plate 3-35.

3.4.2.1 Interpretation of Soil Properties

The shear strength and submerged unit weight profiles shown on Plates 3-36 and 3-37, respectively, best represent the assembled test results plotted on the boring log. These profiles were used in the engineering analyses.

3.4.3 Pile Design Information

The pile design information developed for this study includes ultimate axial capacities, axial load-pile movement data, and lateral soil resistance-pile deflection (p-y) characteristics. The analytical methods used to develop this information are presented briefly in Section 2.5 and in more detail in Appendix B.

3.4.3.1 Axial Pile Design

Ultimate Axial Capacity. The unit skin friction and unit end bearing values plotted on Plates 3-38 and 3-39, respectively, was calculated using the API RP 2A methods described in Appendix B. These values were used to calculate the ultimate axial compressive and tensile capacities for 42-in.-diameter pipe piles, driven to final penetration at the boring location. Capacity curves for driven pipe piles (conductors, caissons, anchor and foundation piles) are presented on Plate 3-40.



API RP 2A recommends that pile penetrations be selected using appropriate factors of safety or pile resistance factors. These factors are discussed in Section 2.5.1 of this report.

Axial Load Transfer Data. Axial load-pile movement analyses are usually performed using a computer solution based on methods developed by Reese (1964) or Matlock, et al. (1976). Plates 3-41 and 3-42 present the results as side load-side movement (t-z) and tip load-tip movement (Q-z) data for 42-in.-diameter driven pipe piles, respectively. The Q-z data should be used for foundation piles and neglected for caissons and conductor design. In developing the axial load transfer data in the cohesive soils, a post-peak adhesion ratio of 0.90 was utilized.

3.4.3.2 Lateral Pile Design Data

The soil resistance-pile deflection (p-y) characteristics of the soils at the boring location were developed for individual 42-in.-diameter driven pipe piles. These data may be used in lateral load analyses of driven piles, conductors and caissons. The p-y data for cyclic loading were developed to 100-ft penetration using procedures that have been outlined in API RP 2A and briefly explained in Appendix B. The stratigraphy and parameters used to develop the p-y data are presented on Plate 3-43. The p-y data for 42-in.-diameter driven pipe piles are presented on Plate 3-44. P-y values presented at 100-ft penetration may be used for lateral load analyses at greater depths.

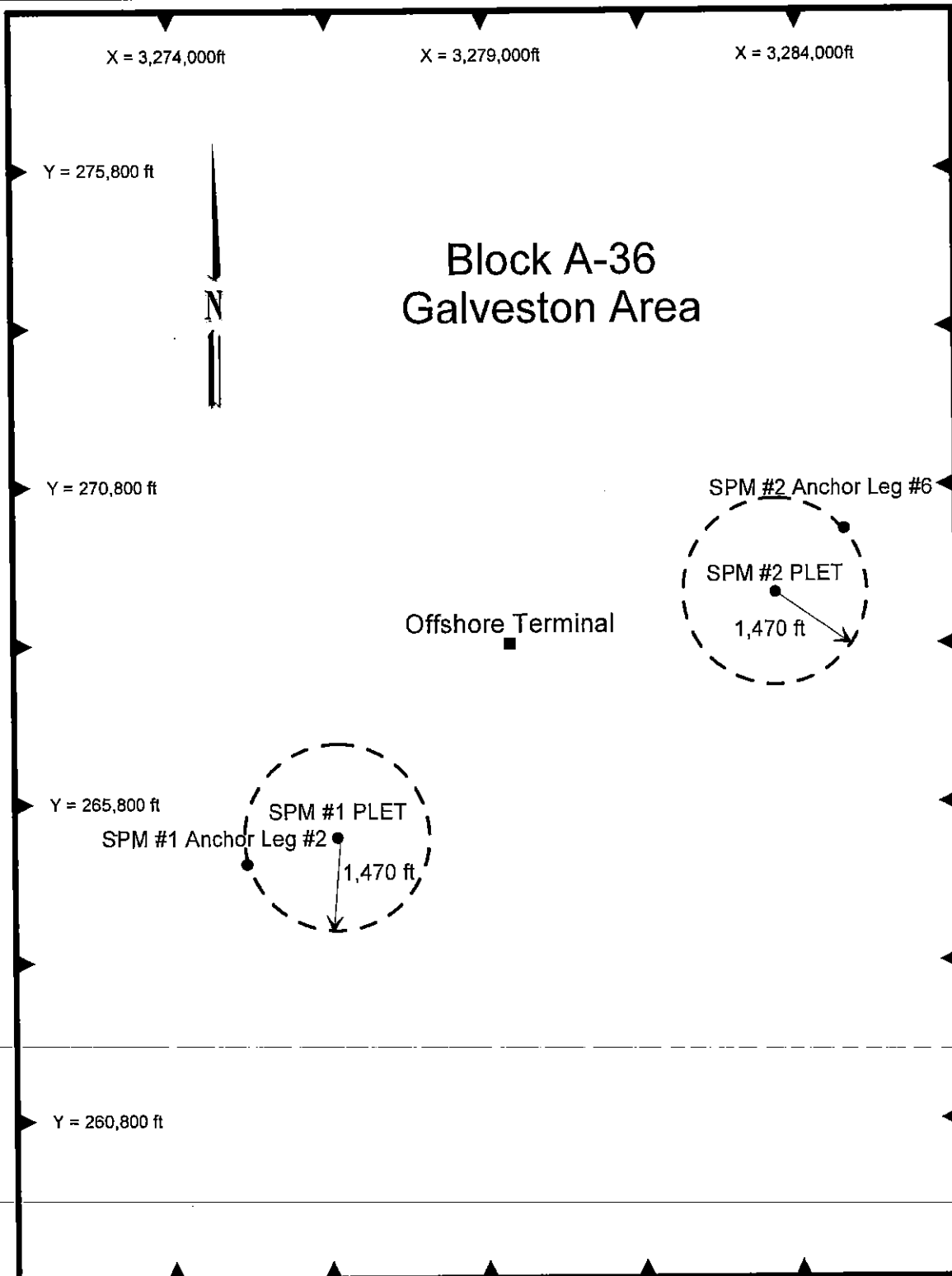


Date: 8/12/08

Drawn By: AW

Date: 8/12/08
Date: 8/25/08

Checked By: MR
Approved By: DU

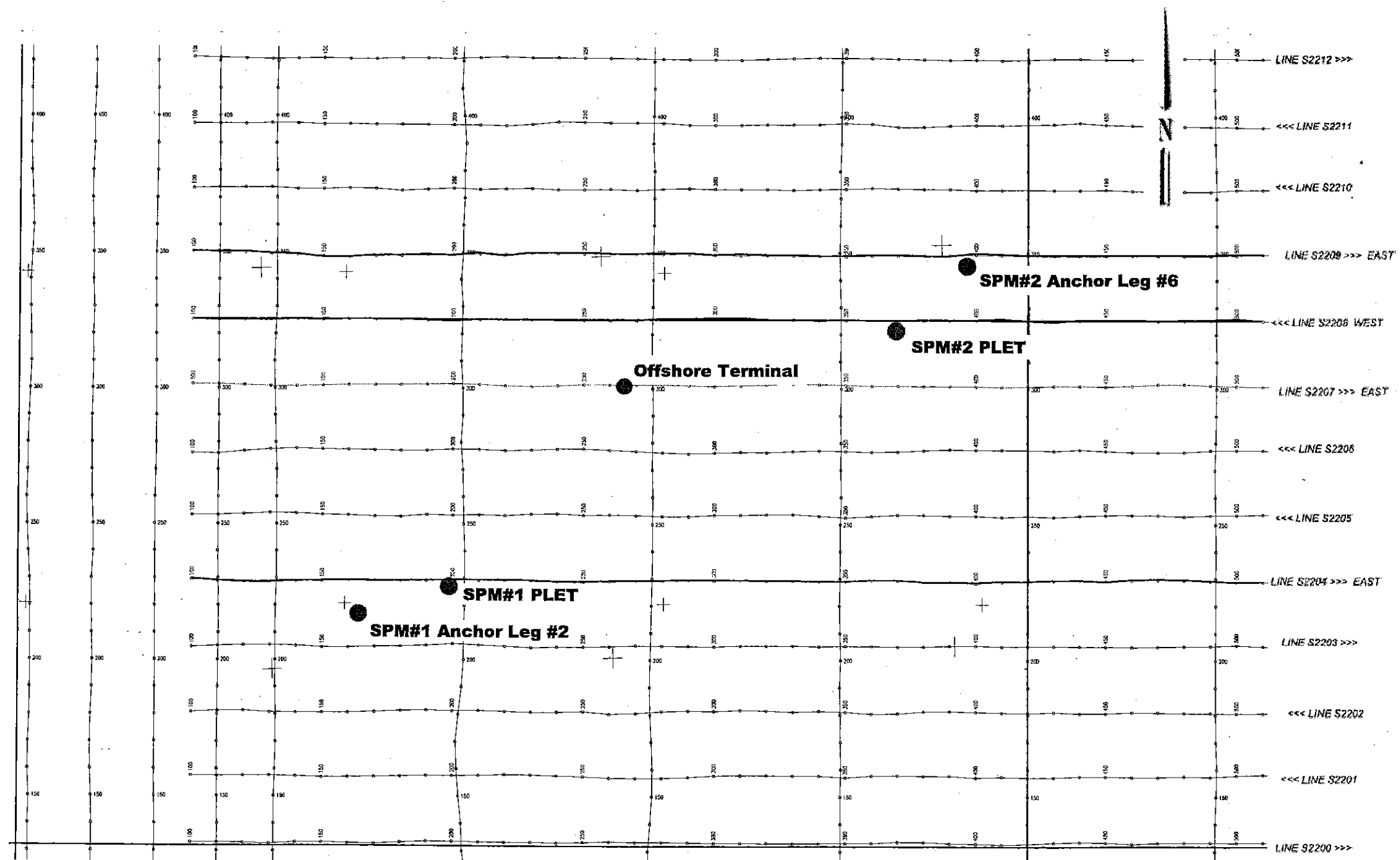


Projection: Texas South Central Zone Coordinates

PLAN OF BORINGS

Texas Offshore Port System, Offshore Terminal Location
Block A-36, Galveston Area





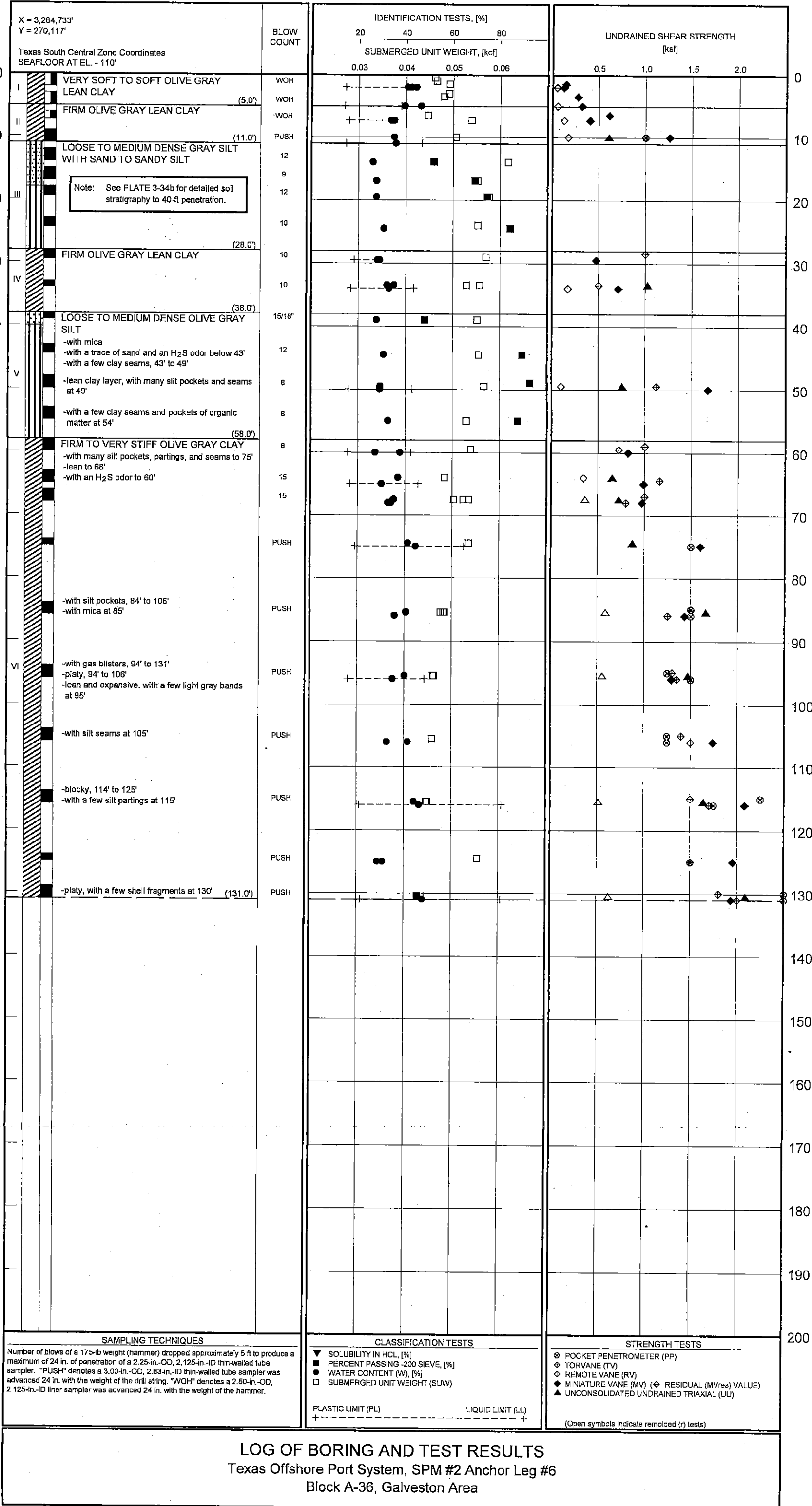
MAP OF SOIL BORINGS AND SUBBOTTOM PROFILE LINES

Texas Offshore Port System
Block A-36, Galveston Area

Report No. 0201-6501

Penetration Below Seafloor, [feet]

Penetration Below Seafloor, [feet]



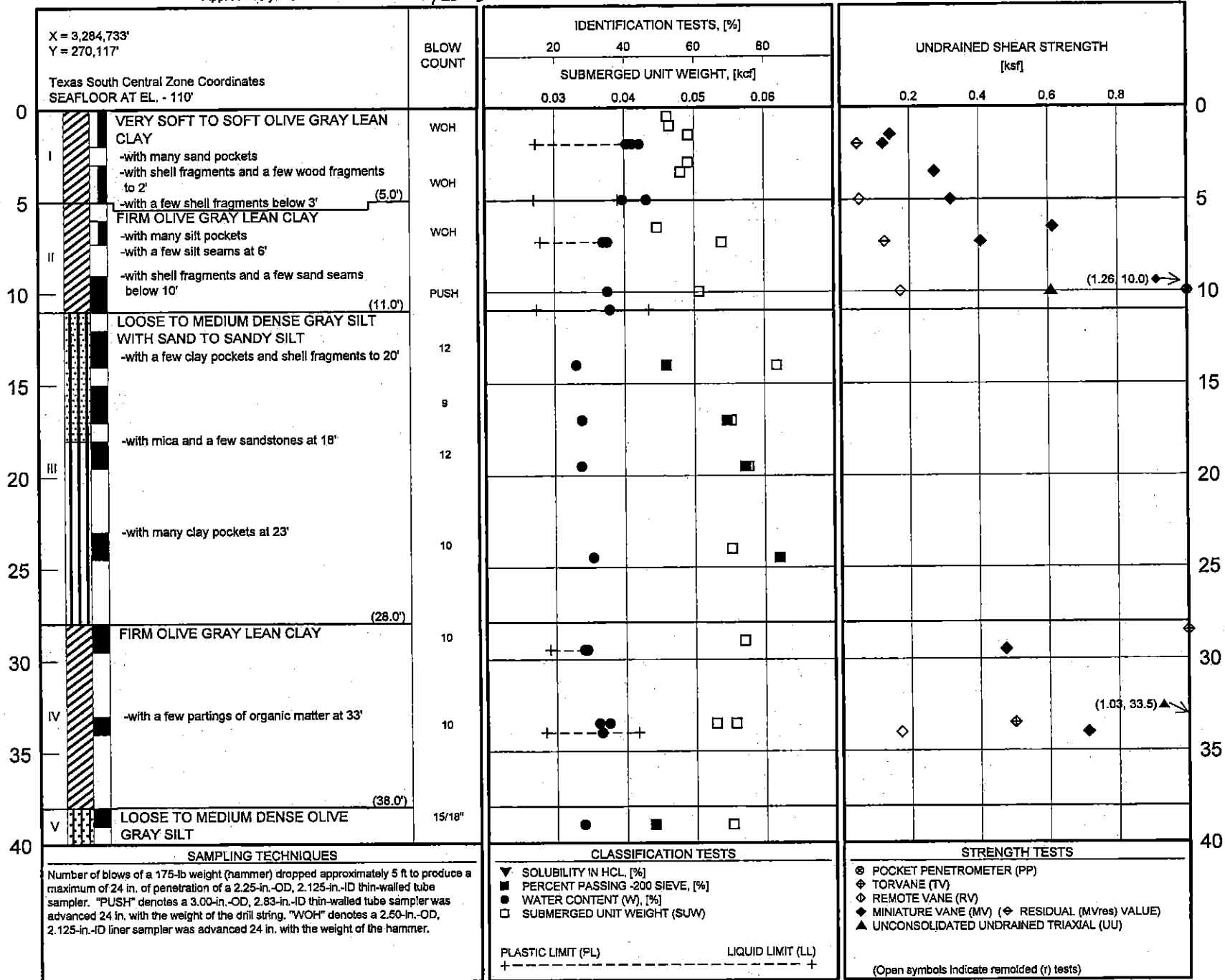
LOG OF BORING AND TEST RESULTS
Texas Offshore Port System, SPM #2 Anchor Leg #6
Block A-36, Galveston Area



Report No. 0201-6501

Penetration Below Seafloor, [feet]

PLATE 3-34b



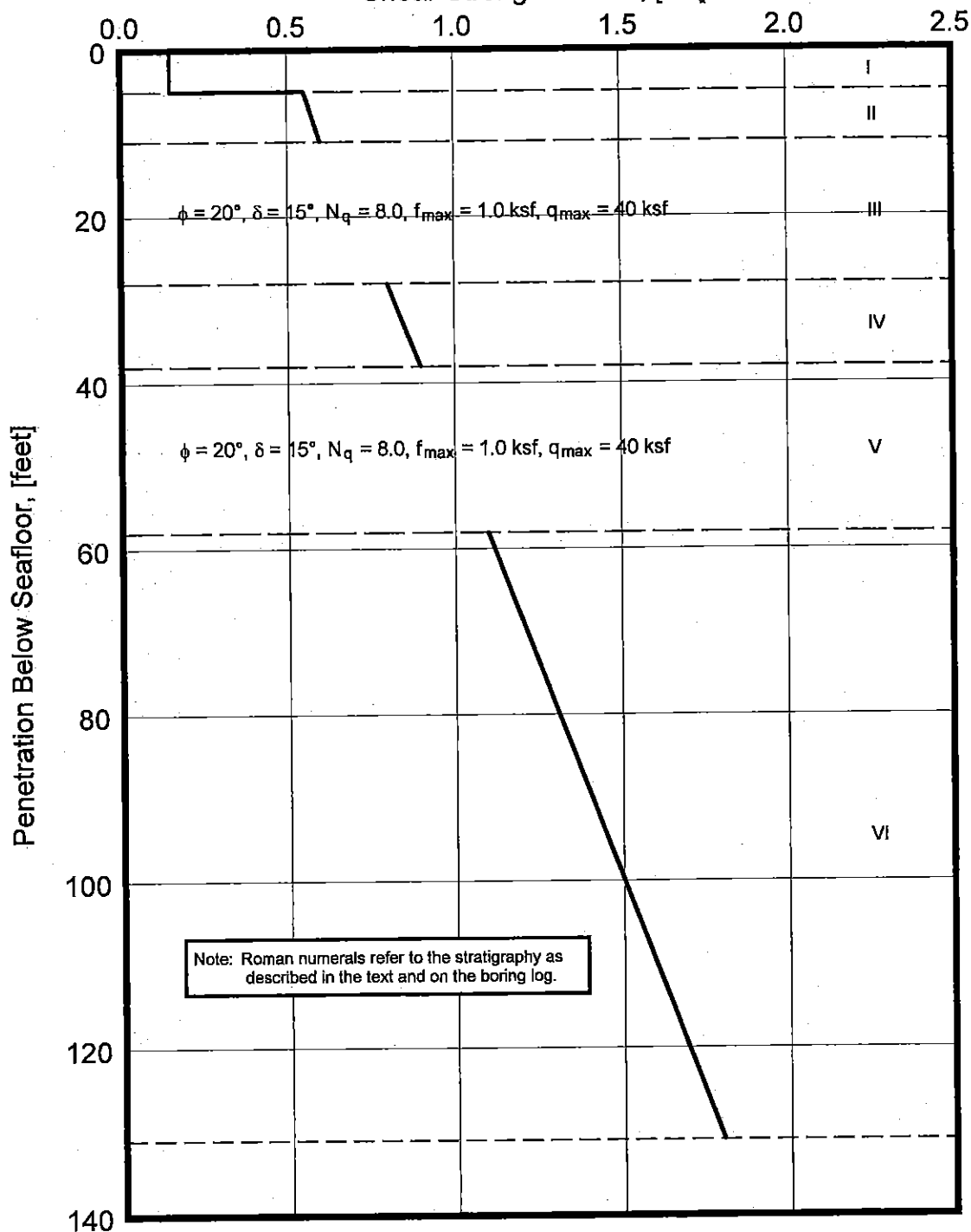
Penetration Below Seafloor, [feet]

LOG OF BORING AND TEST RESULTS
 Texas Offshore Port System, SPM #2 Anchor Leg #6
 Block A-36, Galveston Area





Shear Strength Profile, [ksf]



DESIGN STRENGTH PARAMETERS

Texas Offshore Port System, SPM #2 Anchor Leg #6
Block A-36, Galveston Area



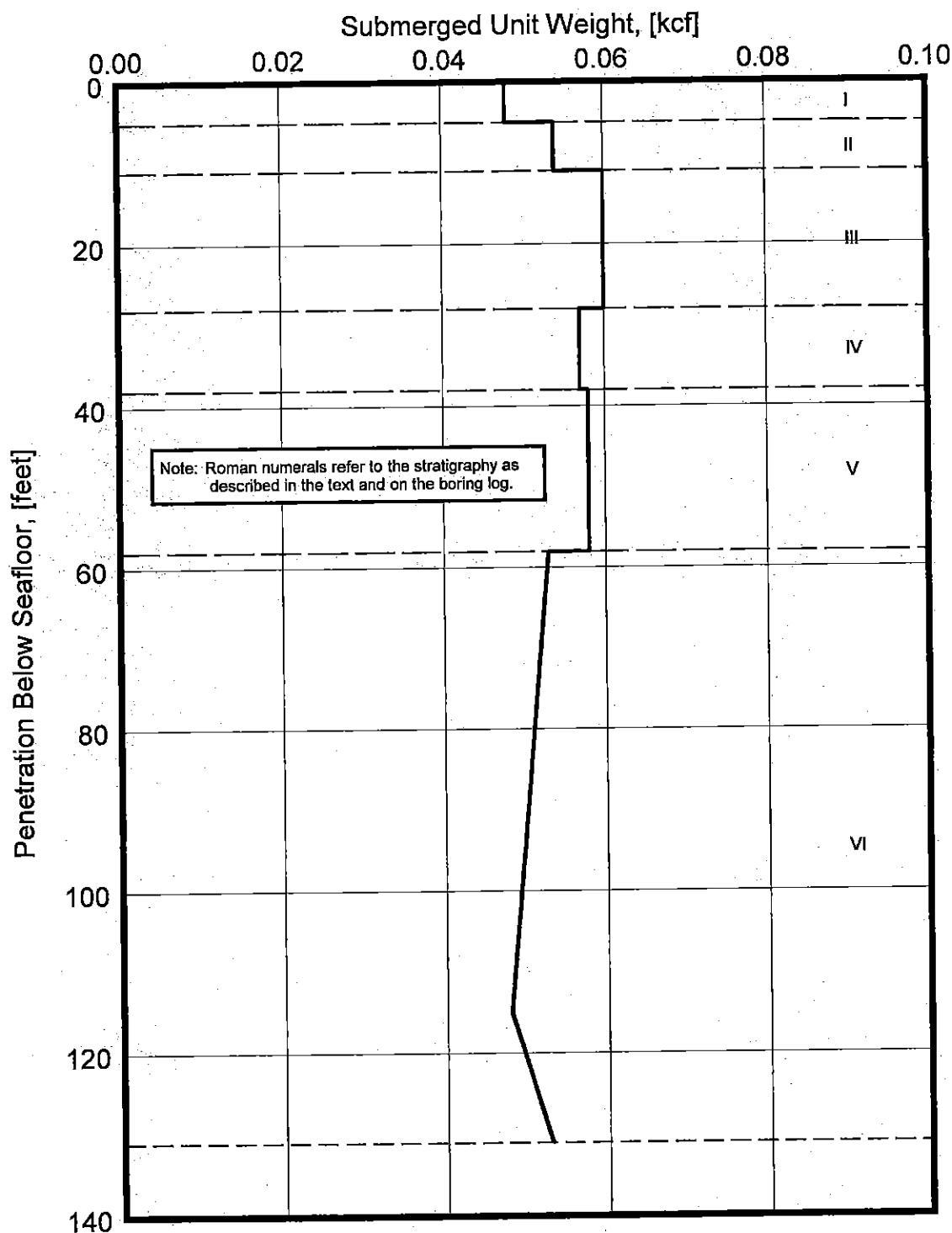
Date: 8/20/08
Drawn By: JAW
Checked By: MB
Approved By: ORZ
Date: 8/20/08
Date: 8/26/08

Date: 8/20/08

Drawn By: JW

Date: 8/20/08
Date: 8/26/08

Checked By: JB
Approved By: MZ



DESIGN SUBMERGED UNIT WEIGHT

Texas Offshore Port System, SPM #2 Anchor Leg #6
Block A-36, Galveston Area



8/20/08

Date:

AW

Drawn By:

8/20/08

Date:

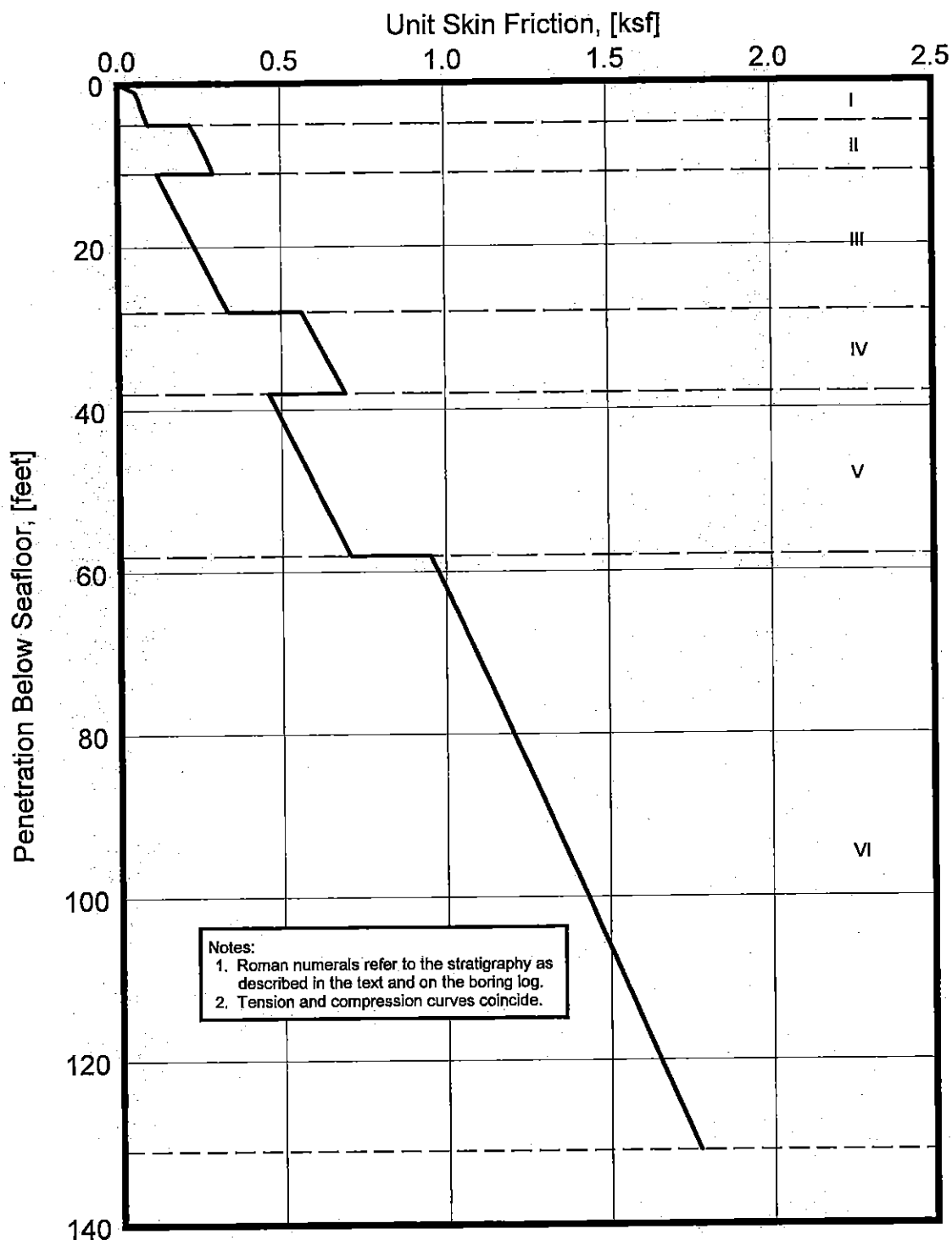
MB

Checked By:

8/26/08

Date:

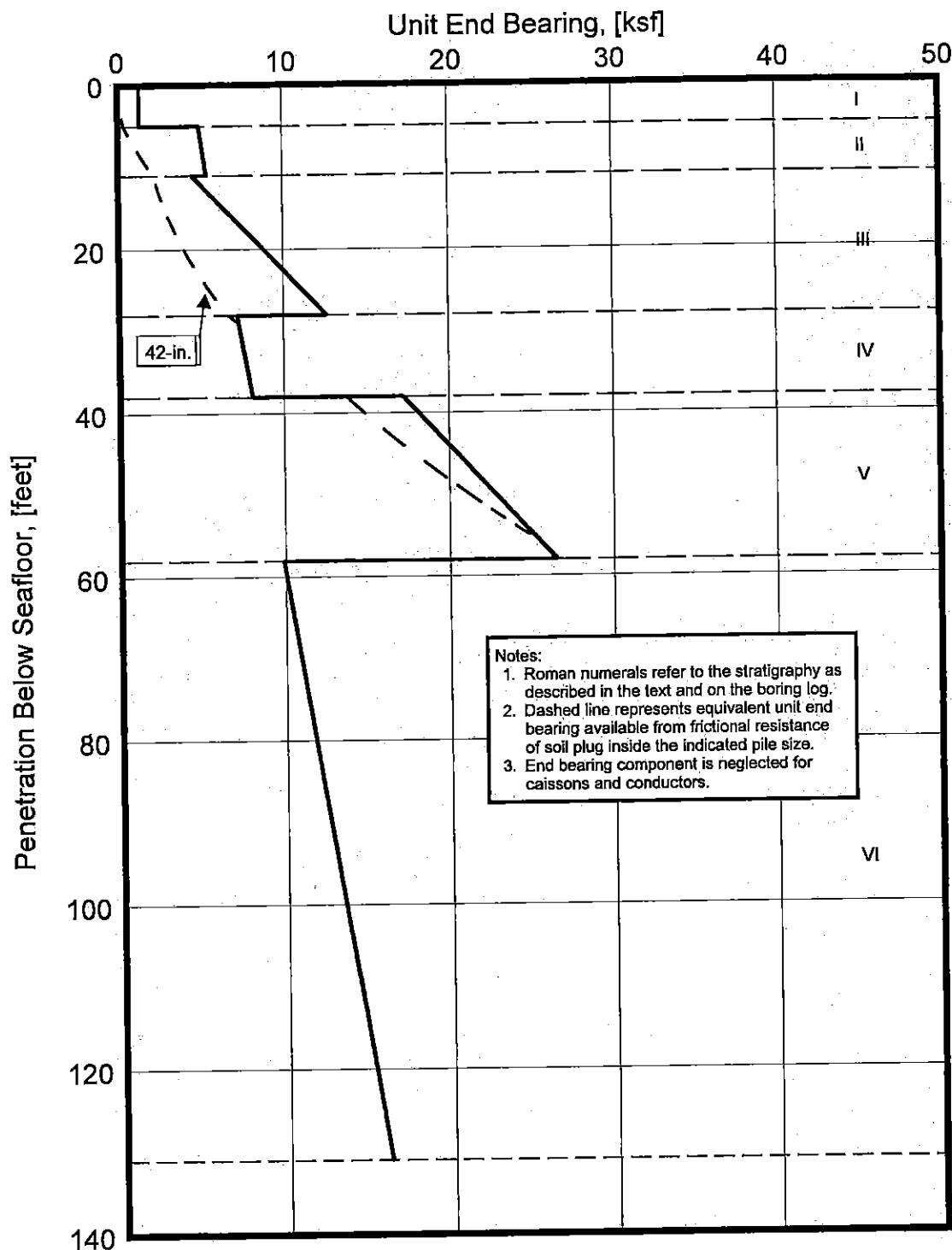
Approved By:



UNIT SKIN FRICTION
API RP 2A (2000) Method

Texas Offshore Port System, SPM #2 Anchor Leg #6
Block A-36, Galveston Area





UNIT END BEARING
API RP 2A (2000) Method

Texas Offshore Port System, SPM #2 Anchor Leg #6
Block A-36, Galveston Area



Date: 8/20/08

Drawn By: AW

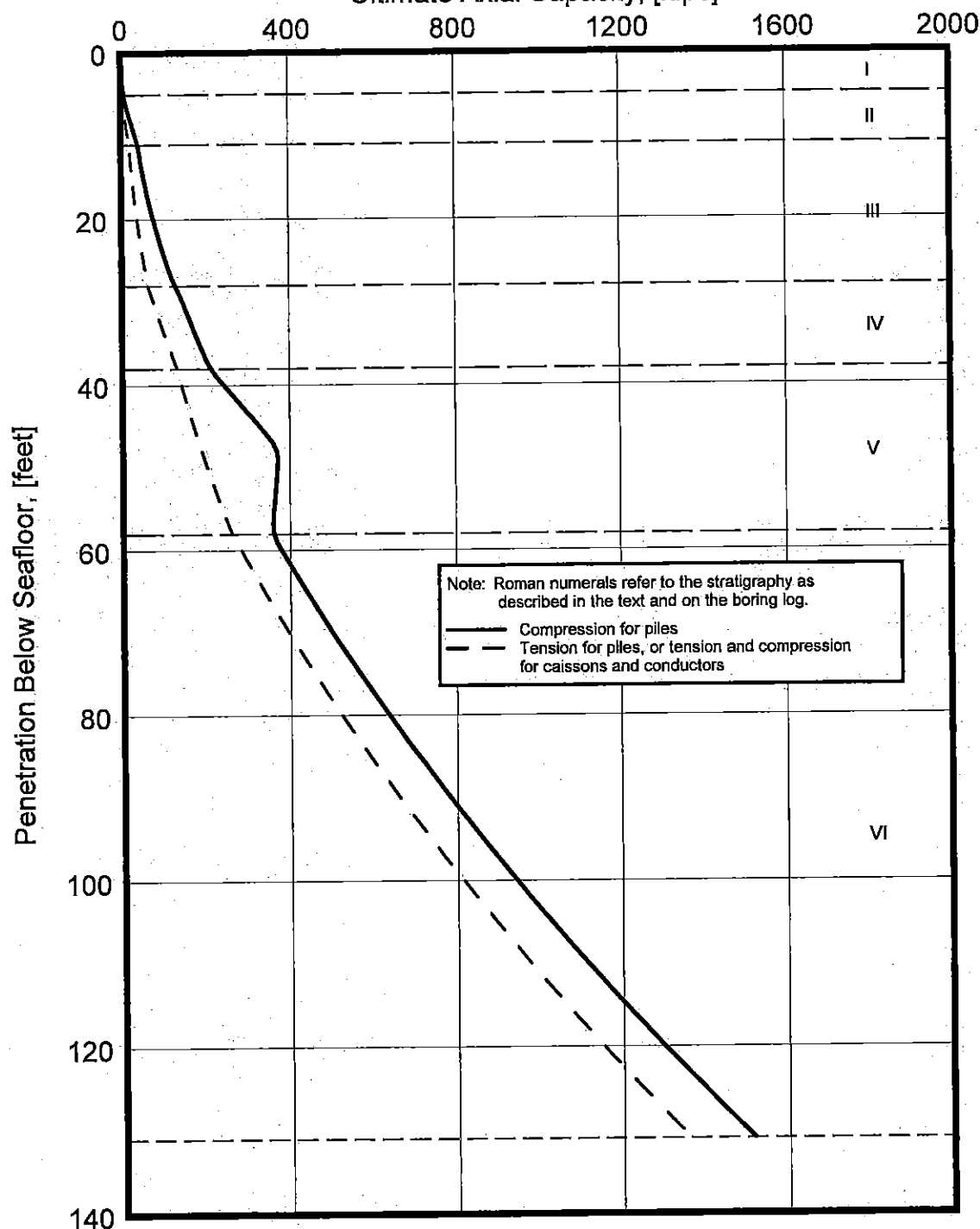
Date: 8/20/08

Checked By: HB

Date: 8/20/08

Approved By: ON

Ultimate Axial Capacity, [kips]



ULTIMATE AXIAL CAPACITY

API RP 2A (2000) Method

42-in.-Diameter Driven Pipe Piles

Texas Offshore Port System, SPM #2 Anchor Leg #6

Block A-36, Galveston Area



Date: 8/20/08

Drawn By: HJW

Date: 8/20/08

Checked By: MB

Date: 8/26/08

Approved By: HJW

PENETRATION BELOW MUDLINE (feet)	CURVE POINTS								
		1	2	3	4	5	6	7	8
0.0	t	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	z	0.00	0.07	0.13	0.24	0.34	0.42	0.84	42.00
1.0	t	0.00	0.02	0.03	0.04	0.05	0.06	0.05	0.05
	z	0.00	0.07	0.13	0.24	0.34	0.42	0.84	42.00
3.0	t	0.00	0.02	0.04	0.06	0.07	0.07	0.07	0.07
	z	0.00	0.07	0.13	0.24	0.34	0.42	0.84	42.00
5.0	t	0.00	0.03	0.05	0.07	0.09	0.09	0.09	0.09
	z	0.00	0.07	0.13	0.24	0.34	0.42	0.84	42.00
5.0	t	0.00	0.07	0.11	0.17	0.20	0.22	0.20	0.20
	z	0.00	0.07	0.13	0.24	0.34	0.42	0.84	42.00
11.0	t	0.00	0.09	0.15	0.22	0.27	0.30	0.27	0.27
	z	0.00	0.07	0.13	0.24	0.34	0.42	0.84	42.00
11.0	t	0.00	0.12	0.12					
	z	0.00	0.10	42.00					
28.0	t	0.00	0.34	0.34					
	z	0.00	0.10	42.00					
28.0	t	0.00	0.17	0.28	0.42	0.51	0.56	0.51	0.51
	z	0.00	0.07	0.13	0.24	0.34	0.42	0.84	42.00
38.0	t	0.00	0.21	0.35	0.52	0.63	0.70	0.63	0.63
	z	0.00	0.07	0.13	0.24	0.34	0.42	0.84	42.00
38.0	t	0.00	0.46	0.46					
	z	0.00	0.10	42.00					
58.0	t	0.00	0.71	0.71					
	z	0.00	0.10	42.00					
58.0	t	0.00	0.29	0.48	0.72	0.86	0.95	0.86	0.86
	z	0.00	0.07	0.13	0.24	0.34	0.42	0.84	42.00
115.0	t	0.00	0.48	0.80	1.20	1.44	1.60	1.44	1.44
	z	0.00	0.07	0.13	0.24	0.34	0.42	0.84	42.00
131.0	t	0.00	0.53	0.89	1.33	1.60	1.77	1.60	1.60
	z	0.00	0.07	0.13	0.24	0.34	0.42	0.84	42.00

Notes: 1. "t" is mobilized soil-pile adhesion, [ksf].
 2. "z" is axial pile displacement, [in.].
 3. Data for tension and compression coincide.

AXIAL LOAD TRANSFER DATA (T-Z DATA)

API RP 2A (2000) Method
 42-in.-Diameter Driven Pipe Piles
 Texas Offshore Port System, SPM #2 Anchor Leg #6
 Block A-36, Galveston Area



Drawn By: *AN* Date: *8/20/08*

Checked By: *MB* Date: *8/20/08*
 Approved By: *AN* Date: *8/26/08*



PENETRATION BELOW MUDLINE (feet)	CURVE POINTS							
		1	2	3	4	5	6	7
58.0	Q	0	24	48	71	86	95	95
	z	0.00	0.08	0.55	1.76	3.07	4.20	42.00
131.0	Q	0	39	78	117	140	156	156
	z	0.00	0.08	0.55	1.76	3.07	4.20	42.00

Notes: 1. "Q" is mobilized end bearing capacity, [kips].
2. "Z" is axial tip displacement, [in.].

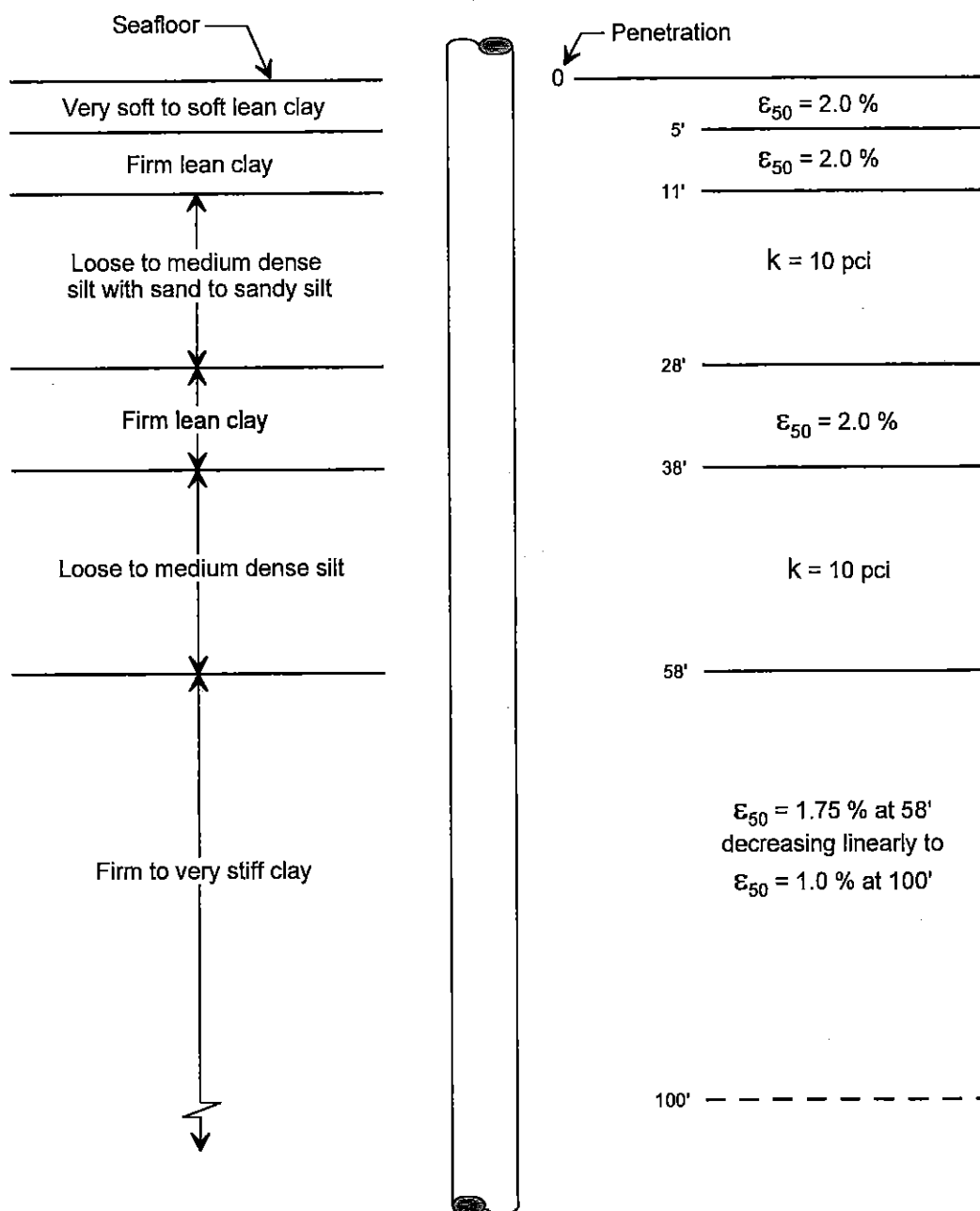
AXIAL LOAD TRANSFER DATA
(Q-Z DATA)

API RP 2A (2000) Method
42-in.-Diameter Driven Pipe Piles
Texas Offshore Port System, SPM #2 Anchor Leg #6
Block A-36, Galveston Area



Drawn By: MB Date: 9/2/08

Checked By: AW Date: 9/3/08
Approved By: [Signature] Date: 9/6/08



Notes:

1. ϵ_{50} is axial strain at half of peak deviator stress for cohesive soils.
2. Soil strength parameters are shown on Plate 3-36.
3. Submerged unit weight profile is shown on Plate 3-37.
4. k is the modulus of horizontal subgrade reaction for granular soils.

STRATIGRAPHY AND PARAMETERS FOR P-Y DATA

Texas Offshore Port System, SPM #2 Leg Anchor #6
Block A-36, Galveston Area



PENETRATION BELOW MUDLINE (feet)	CURVE POINTS								
		1	2	3	4	5	6	7	8
0.0	p y	0 0.00	20 0.06	30 0.21	45 0.63	66 2.10	94 6.30	0 31.50	0 42.00
3.0	p y	0 0.00	29 0.06	44 0.21	65 0.63	96 2.10	138 6.30	32 31.50	32 42.00
5.0	p y	0 0.00	35 0.06	53 0.21	79 0.63	116 2.10	167 6.30	65 31.50	65 42.00
5.0	p y	0 0.00	100 0.06	153 0.21	226 0.63	333 2.10	479 6.30	92 31.50	92 42.00
8.0	p y	0 0.00	122 0.06	187 0.21	276 0.63	406 2.10	585 6.30	179 31.50	179 42.00
11.0	p y	0 0.00	145 0.06	222 0.21	328 0.63	482 2.10	694 6.30	291 31.50	291 42.00
11.0	p y	0 0.00	174 0.14	291 0.24	384 0.35	482 0.52	552 0.81	575 1.17	581 42.00
15.0	p y	0 0.00	303 0.17	505 0.31	667 0.45	839 0.67	960 1.03	1001 1.49	1011 42.00
23.0	p y	0 0.00	659 0.25	1099 0.44	1450 0.63	1824 0.95	2087 1.46	2175 2.11	2197 42.00
28.0	p y	0 0.00	948 0.29	1580 0.52	2085 0.75	2622 1.12	3002 1.72	3128 2.49	3160 42.00
28.0	p y	0 0.00	314 0.06	482 0.21	712 0.63	1048 2.10	1509 6.30	1504 31.50	1504 42.00
29.0	p y	0 0.00	319 0.06	489 0.21	723 0.63	1063 2.10	1531 6.30	1531 42.00	
38.0	p y	0 0.00	354 0.06	543 0.21	803 0.63	1181 2.10	1701 6.30	1701 42.00	
38.0	p y	0 0.00	1459 0.33	2431 0.59	3209 0.85	4036 1.27	4620 1.95	4814 2.82	4863 42.00
58.0	p y	0 0.00	2244 0.33	3741 0.59	4938 0.85	6210 1.28	7107 1.97	7407 2.84	7481 42.00
58.0	p y	0 0.00	433 0.05	664 0.18	982 0.55	1444 1.84	2079 5.51	2079 42.00	
100.0 (and below)	p y	0 0.00	592 0.03	907 0.10	1341 0.31	1973 1.05	2841 3.15	2841 42.00	

Notes: 1. "p" is soil resistance, [lb/in.].
2. "y" is lateral deflection, [in.].

P-Y DATA
(CYCLIC LOADING)
API RP 2A (2000) Method
42-in.-Diameter Driven Pipe Piles
Texas Offshore Port System, SPM #2 Anchor Leg #6
Block A-36, Galveston Area



Date: 8/20/08

Drawn By: JW

Date: 8/20/08

Checked By: VR

Approved By: ML

Checked By: **MB** Date: **9/2/08**
 Approved By: **PL** Date: **9/2/08**

Drawn By: **Tomel** Date: **9/2/08**

Summary of Test Results

Job No.: 0201-6501-4

02-Sep-2008 (Ver. #6)

Boring: Texas Offshore Port System, SPM #2 Anchor Leg #6

Block: A-36

Area: Galveston

Sample No.	Depth (ft)	Identification Tests						Strength Estimate (ksf)		Miniature Vane Tests (ksf)			Compression Tests								
		Liquidity Index	Liquid Limit (%)	Plastic Limit (%)	Moisture Content (%)	Submerged Unit Weight (pcf)	Passing No. 200 Sieve (%)	Penetrometer	Torvane	Undisturbed	Remolded	Residual	Type Test	Moisture Content (%)	Confining Pressure (psi)	Undisturbed Strength (ksf)	Remolded Strength (ksf)	ϵ_{50} Strain (%)	Submerged Unit Weight (pcf)	Failure Strain (%)	Type of Failure
1	0.50					46															
2	1.00					46															
3	1.50					49				0.14											
4	2.00	1.09	40	15	42																
4	2.00				41						0.05										
4	2.00				44					0.12		0.05									
5	3.00					49															
6	3.50					48				0.27											
7	5.00										0.06										
7	5.00	1.06	38	14	39																
7	5.00				46					0.32											
8	6.50					45				0.61											
9	7.30				35	54				0.41		0.13									
9	7.30	.93	35	16	34																
10	10.00										0.17										
10	10.00							1.00	1.00	1.26			UU	35	121	0.61		2.1	51	16	A
11	10.50																				
12	11.00	.65	47	15	36																
13	14.00				26	62	52														
14	17.00				28	55	69														
15	19.50				27	58	74														
16	24.00					55															

NOTES:

TYPE OF TEST

U - Unconfined Compression
 UU- Unconsolidated-Undrained Triaxial
 CU- Consolidated-Undrained Triaxial

TYPE OF FAILURE

A - Bulge
 B - Single Shear Plane
 C - Multiple Shear Plane
 D - Vertical Fracture

Plus Signs [+] denote tests which exceeded the capacity of the measuring device.

NP = Non Plastic Material

Checked By: *MB*
Approved By: *DM*

Date: *9/2/08*
Date: *9/2/08*

Drawn By: *Tomol* Date: *9/2/08*

Summary of Test Results

Job No.: 0201-6501-4

02-Sep-2008 (Ver. #6)

Boring: Texas Offshore Port System, SPM #2 Anchor Leg #6

Block: A-36

Area: Galveston

Sample No.	Depth (ft)	Identification Tests						Strength Estimate (ksf)		Miniature Vane Tests (ksf)			Compression Tests								
		Liquidity Index	Liquid Limit (%)	Plastic Limit (%)	Moisture Content (%)	Submerged Unit Weight (pcf)	Passing No. 200 Sieve (%)	Penetrometer	Torvane	Undisturbed	Remolded	Residual	Type Test	Moisture Content (%)	Confining Pressure (psi)	Undisturbed Strength (ksf)	Remolded Strength (ksf)	ε ₅₀ Strain (%)	Submerged Unit Weight (pcf)	Failure Strain (%)	Type of Failure
17	24.50				31		84														
117	28.50								1.00												
18	29.00					57															
19	29.50				28					0.47											
19	29.50	1.00	29	18	29																
20	33.50				35	53			0.50				UU	32	120	1.03		5.6	56	20	AB
21	34.00	.61	43	17	33					0.71											
21	34.00										0.17										
22	39.00				28	55	48														
23	44.50				31	56	89														
24	49.00						93														
25	49.50										0.10										
25	49.50					57			1.12				UU	29	121	0.75		3.5	57	21	A
26	50.00	.49	43	16	29					1.67											
27	55.00				33	53	88														
28	59.00								1.00												
29	59.50					54			0.72												
30	60.00	.43	42	16	27																
30	60.00				38					0.82											
31	64.00										0.35										
31	64.00					48							UU	37	120	0.65		1.8	48	19	A
32	64.50								1.16												

NOTES:

TYPE OF TEST

U - Unconfined Compression
UU- Unconsolidated-Undrained Triaxial
CU- Consolidated-Undrained Triaxial

TYPE OF FAILURE

A - Bulge
B - Single Shear Plane
C - Multiple Shear Plane
D - Vertical Fracture

Plus Signs [+] denote tests which exceeded the capacity of the measuring device.

NP = Non Plastic Material



Checked By: *HB*
Approved By: *on*

Date: *9/2/08*
Date: *9/2/08*

Drawn By: *Thermal* Date: *9/2/08*

Report No. 0201-6501

Summary of Test Results

Job No.: 0201-6501-4

02-Sep-2008 (Ver. #6)

Boring: Texas Offshore Port System, SPM #2 Anchor Leg #6

Block: A-36

Area: Galveston

Sample No.	Depth (ft)	Identification Tests						Strength Estimate (ksf)		Miniature Vane Tests (ksf)			Compression Tests								
		Liquidity Index	Liquid Limit (%)	Plastic Limit (%)	Moisture Content (%)	Submerged Unit Weight (pcf)	Passing No. 200 Sieve (%)	Penetrometer	Torvane	Undisturbed	Remolded	Residual	Type Test	Moisture Content (%)	Confining Pressure (psi)	Undisturbed Strength (ksf)	Remolded Strength (ksf)	ϵ_{50} Strain (%)	Submerged Unit Weight (pcf)	Failure Strain (%)	Type of Failure
33	65.00	.46	46	17	30					0.99											
34	67.00								1.00												
35	67.50												UU	35	120	0.73		2.0	52	16	A
35	67.50					54							UU	35	120		0.37		50		
36	68.00				33																
36	68.00				34				0.80	0.98											
37	74.50					54							UU	41	120	0.87		2.2	54	10	A
38	75.00	.56	65	19	45			1.50	1.60	1.60											
39	85.00							1.50	1.50												
40	85.50					48							UU	41	120	1.66		1.1	49	4	AB
40	85.50												UU	41	120		0.59		48		
41	86.00				36			1.50	1.25	1.44											
42	95.00							1.25	1.30												
43	95.50												UU		121		0.55		46		
43	95.50												UU	40	121	1.47		0.9	46	4	B
44	96.00	.58	49	16	35			1.50	1.35	1.30											
45	105.00							1.25	1.40												
46	105.50					46															
47	106.00				42			1.25	1.50	1.74											
47	106.00				33																
48	115.00							2.25	1.50												
49	115.50												UU		121		0.52		45		

NOTES:

TYPE OF TEST

U - Unconfined Compression
UU- Unconsolidated-Undrained Triaxial
CU- Consolidated-Undrained Triaxial

TYPE OF FAILURE

A - Bulge
B - Single Shear Plane
C - Multiple Shear Plane
D - Vertical Fracture

Plus Signs [+] denote tests which exceeded the capacity of the measuring device.

NP = Non Plastic Material

PLATE A-8c



Checked By: *HB* Date: *9/2/08*
 Approved By: *04* Date: *9/6/08*

Drawn By: *Tomel* Date: *9/2/08*

Summary of Test Results

Job No.: 0201-6501-4 02-Sep-2008 (Ver. #6)
 Boring: Texas Offshore Port System, SPM #2 Anchor Leg #6
 Block: A-36
 Area: Galveston

Sample No.	Depth (ft)	Identification Tests						Strength Estimate (ksf)		Miniature Vane Tests (ksf)			Compression Tests								
		Liquidity Index	Liquid Limit (%)	Plastic Limit (%)	Moisture Content (%)	Submerged Unit Weight (pcf)	Passing No. 200 Sieve (%)	Penetrometer	Torvane	Undisturbed	Remolded	Residual	Type Test	Moisture Content (%)	Confining Pressure (psi)	Undisturbed Strength (ksf)	Remolded Strength (ksf)	Es Strain (%)	Submerged Unit Weight (pcf)	Failure Strain (%)	Type of Failure
49	115.50												UU	44	120	1.64		0.8	45	3	C
50	116.00	.42	81	21	46			1.75	1.70	2.08											
51	124.50					56															
52	125.00				31			1.50	1.50	1.96											
52	125.00				29																
53	130.00							2.50	1.80												
54	130.50												UU		122		0.63		44		
54	130.50												UU	46	119	2.09		1.2	43	3	B
55	131.00	.44	81	22	48			2.50	2.00	1.93											

NOTES:

TYPE OF TEST

U - Unconfined Compression
 UU- Unconsolidated-Undrained Triaxial
 CU- Consolidated-Undrained Triaxial

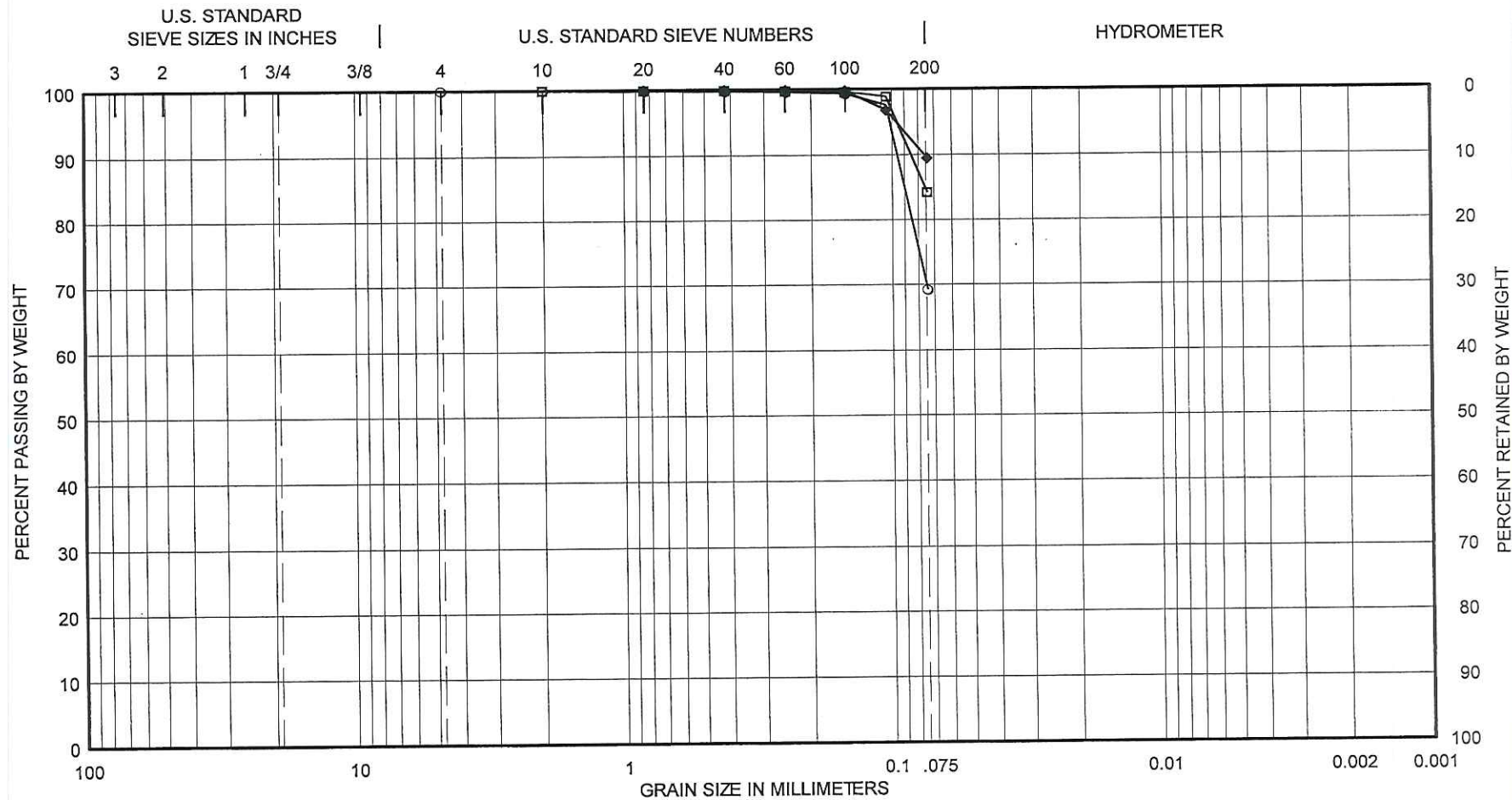
TYPE OF FAILURE

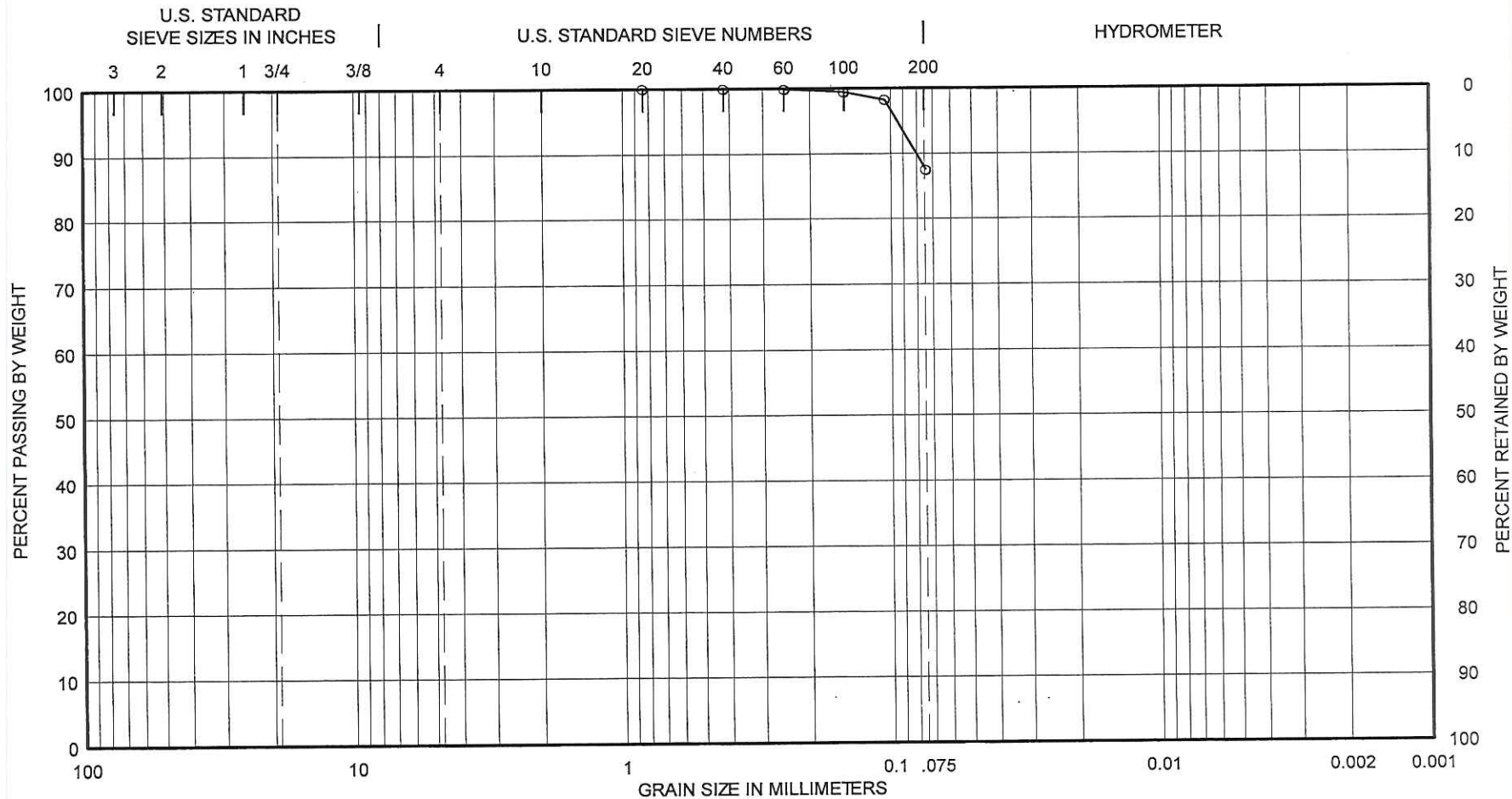
A - Bulge
 B - Single Shear Plane
 C - Multiple Shear Plane
 D - Vertical Fracture

Plus Signs [+] denote tests which exceeded the capacity of the measuring device.

NP = Non Plastic Material



Checked by: *MB*Date: *9/2/08*Drawn by: *Tomel*Date: *9/2/08*Approved by: *ow*Date: *9/2/08*

Checked by: *MB*Date: *7/2/08*Drawn by: *T.emel*Date: *9/2/08*Approved by: *DN*Date: *9/2/08*

GRAVEL		SAND			SILT or CLAY
Coarse	Fine	Coarse	Medium	Fine	

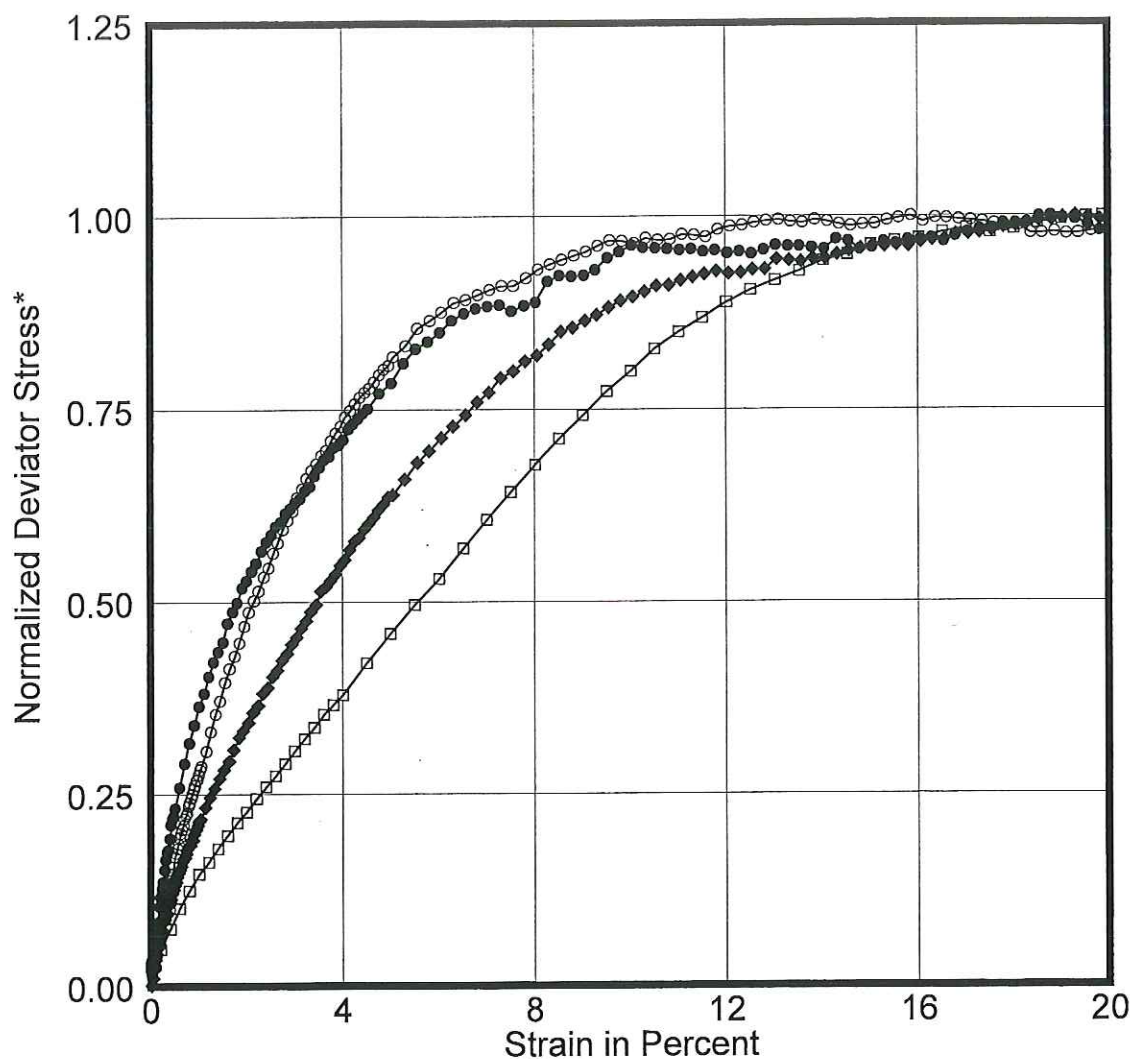
SAMPLE NO.	DEPTH, FT	SYMBOL	CLASSIFICATION
27	55.00	○	SILT (ML) with a trace of sand, an H ₂ S odor, a few clay seams and pockets of organic matter

GRAIN-SIZE DISTRIBUTION CURVES
Texas Offshore Port System, SPM #2 Anchor Leg #6
Block A-36, Galveston Area



Date: 9/2/08

Drawn By: T.m.o.



Curve	Sample No.	Depth [ft]	Test Type	Confining Pressure [psi]	Maximum Deviator Stress [ksf]	ϵ_{50} [%]
○—○	10	10.00	UU	121.1	1.22	2.1
□—□	20	33.50	UU	120.2	2.05	5.6
◆—◆	25	49.50	UU	120.6	1.51	3.5
●—●	31	64.00	UU	120.0	1.31	1.8

* Normalized with respect to maximum deviator stress.

STRESS-STRAIN CURVES

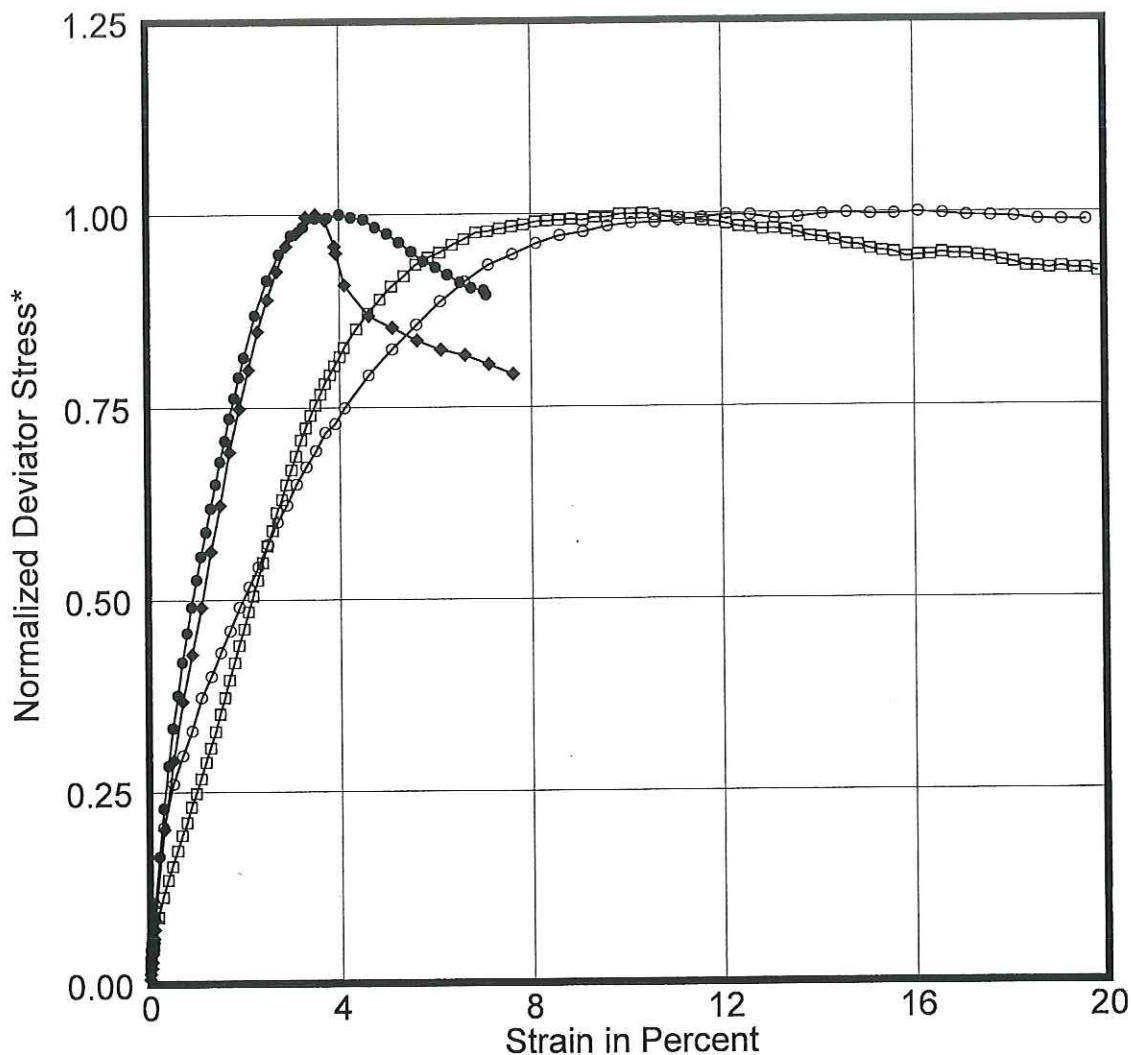
Unconsolidated-Undrained Triaxial Compression Test

Texas Offshore Port System, SPM #2 Anchor Leg #6
Block A-36, Galveston Area



Date: 9/2/08

Drawn By: Tomol



Date: 9/2/08

Checked By: MB

Date: 9/2/08

Approved By: [Signature]

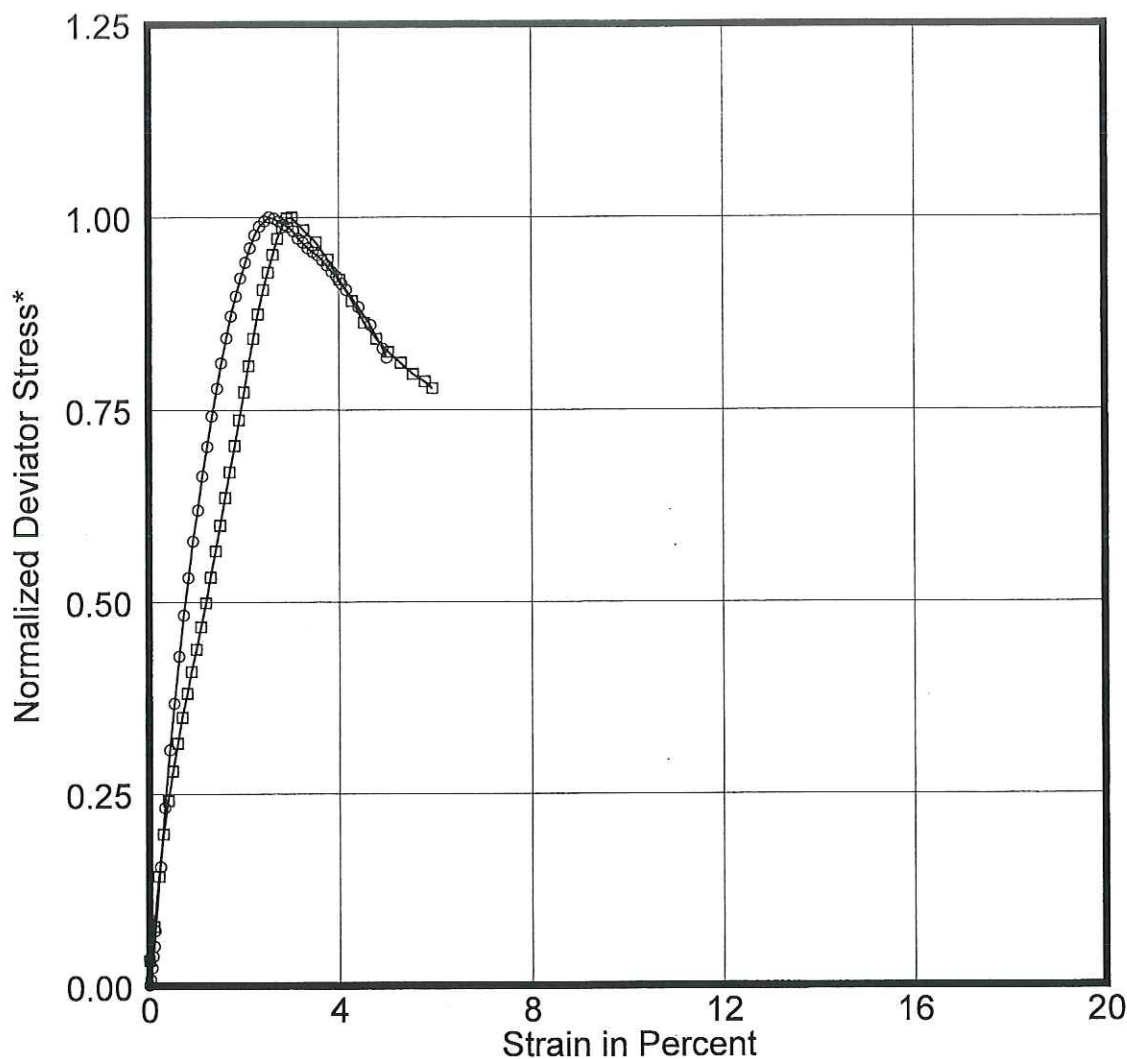
Curve	Sample No.	Depth [ft]	Test Type	Confining Pressure [psi]	Maximum Deviator Stress [ksf]	ϵ_{50} [%]
○—○	35	67.50	UU	120.3	1.45	2.0
□—□	37	74.50	UU	119.9	1.75	2.2
◆—◆	40	85.50	UU	120.2	3.32	1.1
●—●	43	95.50	UU	121.2	2.94	0.9

* Normalized with respect to maximum deviator stress.

STRESS-STRAIN CURVES Unconsolidated-Undrained Triaxial Compression Test Texas Offshore Port System, SPM #2 Anchor Leg #6 Block A-36, Galveston Area



Drawn By: Tormel Date: 9/2/08



Curve	Sample No.	Depth [ft]	Test Type	Confining Pressure [psi]	Maximum Deviator Stress [ksf]	ϵ_{50} [%]
○—○	49	115.50	UU	120.5	3.28	0.8
□—□	54	130.50	UU	119.1	4.18	1.2

* Normalized with respect to maximum deviator stress.

Checked By: NB Approved By: [Signature] Date: 9/2/08

STRESS-STRAIN CURVES Unconsolidated-Undrained Triaxial Compression Test Texas Offshore Port System, SPM #2 Anchor Leg #6 Block A-36, Galveston Area



C) **STARFIX.NAV®**

STARFIX.NAV® is an on board computer graphic system interfaced to the primary positioning system capable of displaying real time position of a vessel in relation to known hazards, fairways, proposed location, etc. **DRONE®** units when used on anchor handling vessels utilize Differential GPS transmitted to the master station via radio telemetry link to display in real time the position of that vessel.

D) Vessel orientation by Sperry SR 50 Mod 1 North Seeking Gyro or a S. G. Brown Meridian North Seeking Gyro

North seeking Gyro compass. Accuracy $\pm 2^\circ$ after 4 hours initial spin up.

E) Scanning Sonar

Simrad MS1000 High Resolution Sonar

5. **RESULTS:**

Geographic positions are based on Clarke 1866 Spheroid, North American Datum 1927. Grid coordinates are based on Texas South Central Zone Lambert, NAD 27.

Field operations were conducted from June 26, 2008 to June 28, 2008 with the following results:

A) **STARFIX®** position derived by averaging readings over a one hour period at an update rate of 750 ms. per reading.

CORE 1(Leg #2 - West)

Y = 264,853.21

X = 3,275,180.44'

Latitude: 28° 30' 07.937" N

Longitude: 95° 01' 44.907" W

This location being 3493.21' FSL and 5304.63' FWL of Block A36, Galveston Area

CORE 2 (Leg #6 - East)

Y = 270,117.00'

X = 3,284,733.18'

Latitude: 28° 30' 56.803" N

Longitude: 94° 59' 55.883" W

This location being 7083.00' FNL and 982.63' FEL of Block A36, Galveston Area

CORE 3 (PLET #1)

Y = 265,270.45'

X = 3,276,615.21'

Latitude: 28° 30' 11.583" N

Longitude: 95° 01' 28.676" W

This location being 3910.45' FSL and 6739.40' FWL of Block A36, Galveston Area

CORE 4 (PLET #2)

Y = 269,117.95'

X = 3,283,617.17'

Latitude: 28° 30' 47.295" N

Longitude: 95° 00' 08.769" W

This location being 7757.95' FSL and 2098.64' FEL of Block A36, Galveston Area

CORE 4A (PLET #2 - Amended)

Y = 269,121.01'

X = 3,283,587.30'

Latitude: 28° 30' 47.335" N

Longitude: 95° 00' 09.102" W

This location being 7761.01' FSL and 2128.51' FEL of Block A36, Galveston Area

6. CONFIRMATION:

DGPS was used for confirmation.

The results were as follows:

<u>CORE 1 (Leg #2 - West)</u>	<u>CORE 2 (Leg #6 - East)</u>	<u>CORE 3 (PLET #1)</u>
Y = 264,853'	Y = 270,117'	Y = 265,271'
X = 3,275,181'	X = 3,284,733'	X = 3,276,615'
<u>CORE 4 (PLET #2)</u>	<u>CORE 4A (PLET #2 - Amended)</u>	
Y = 269,118'	Y = 269,121'	
X = 3,283,617'	X = 3,283,588'	

7. HSE INCIDENTS:

No incidents.

<u>Date</u>	<u>From</u>	<u>Time</u>	<u>To</u>	<u>Description of Activities</u>
June 28, 2008	****		1245	Arrive in Block A-36, Galveston Area, SPM #2 Anchor Leg #6 location onboard the <i>R/V Seaprobe</i> .
			1245	Set 4-point anchor spread.
			1330	Rig up to drill and sample.
	****		1350	Estimate water depth of 106 ft using echo sounder and 109 ft using wireline technique.
			1350	Perform scanning sonar survey.
	****		1400	Conduct task change meeting.
			1405	Run drill pipe to mudline.
	****		1450	Measure water depth of 110 ft using pipe tally/bottom sensor and 109.5 ft using pressure transducer.
			1450	Drill and sample. Boring terminated at 131-ft penetration.
			2020	Pull drill pipe above mudline and reposition vessel.
	****		2105	Measure supplemental water depth of 111 ft using bottom sensor/pipe tally and 109.2 ft using pressure transducer.
			2105	Pull drill pipe to deck and secure equipment for travel.
			2140	Pull anchors.
		****	2230	Depart location.

SUMMARY OF FIELD OPERATIONS

Texas Offshore Port System, SPM #2 Leg Anchor #6
Block A-36, Galveston Area



C) **STARFIX.NAV®**

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North seeking Gyro compass. Accuracy $\pm 2^\circ$ after 4 hours initial spin up.

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<u>CORE 4 (PLET #2)</u>	<u>CORE 4A (PLET #2 - Amended)</u>	
Y = 269,118'	Y = 269,121'	
X = 3,283,617'	X = 3,283,588'	

7. HSE INCIDENTS:

No incidents.

FINAL SOIL BORINGS						
LOCATION	CALLNS	CALLEW	X COORDINATE	Y COORDINATE	LATITUDE	LONGITUDE
CORE 1	3,493.21' FSL	5,304.63' FWL	3,275,180.44'	264,853.21'	28° 30' 07.937"N	95° 01' 44.907"W
CORE 2	7,083.00' FNL	982.63' FEL	3,284,733.18'	270,117.00'	28° 30' 56.803"N	94° 59' 55.883"W
CORE 3	3,910.45' FSL	6,739.40' FWL	3,276,615.21'	265,270.45'	28° 30' 11.583"N	95° 01' 28.676"W
CORE 4	7,757.95' FSL	2,098.64' FEL	3,283,617.17'	269,117.95'	28° 30' 47.295"N	95° 00' 08.769"W
CORE 4A	7,761.01' FSL	2,128.51' FEL	3,283,587.30'	269,121.01'	28° 30' 47.335"N	95° 00' 09.102"W

⊙ CORE 2

GAA36

CORE 4A ⊙ CORE 4

⊙ CORE 3

⊙ CORE 1

GRID NORTH

I HEREBY CERTIFY THAT THE ABOVE FINAL SOIL BORING POSITIONS ARE CORRECT.



REG. PROFESSIONAL LAND SURVEYOR NO. 4903
STATE OF LOUISIANA 2-2-22

NOTES:

1) SURVEYED COORDINATES TRANSFORMED FROM NAD83 (GPS DATUM) TO NAD27 (CHART DATUM) USING NADCON VERSION 2.1.

ENTERPRISE FIELD SERVICES, LLC

**FINAL SOIL BORINGS
NO LEASE NUMBER (PROP. ANC & PLET)**

BLOCK A36
GALVESTON AREA
GULF OF MEXICO

FUGRO CHANCE INC.

200 Dulles Dr. Lafayette, Louisiana 70506-3001 (337) 237-1300

GEODETIC DATUM: NAD27
PROJECTION: TEXAS SOUTH CENTRAL
GRID UNITS: US SURVEY FEET

SCALE 0 2,000'
IN FEET

Job No.: 08-01930

Date: 7/8/08

Drwn: TCG

Chart: Of:
1 1

Printed: 7/8/08

Dwgfile: O:\WellPermit\TXsc\GA\Permit\A36_CORE_NoLease_0801930