APENDICE A

Estudio Preliminar de Recomendaciones Geotécnicas

Noviembre 2010

Declaración de Impacto Ambiental – Preliminar

Planta de Generación de Energía Renovable
y Recuperación de Recursos

BARRIO CAMBALACHE DE ARECIBO

EnergyAnswers
Arecibo

GEOCONSULT

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PRELIMINARY GEOTECHNICAL RECOMMENDATIONS FOR RESOURCE RECOVERY PLANT

RECOVERY SOLUTIONS INC.

ARECIBO, PUERTO RICO

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1. Introduction

This report presents preliminary geotechnical recommendations for the resource recovery plant that is being considered by Recovery Solutions Inc. The plant will consist of boilers, shredders, warehouse structures, water tanks and administration buildings. The site is located at Cambalache sector in the town of Arecibo in the north-central portion of the island of Puerto Rico. **Figure 1** shows the general location of the project. The structures will be founded at a higher elevation than the original ground surface elevation as dictated by the hydrologic/hydraulic study. This issue will be referred to further in this report.

The soil investigation performed at the site consists of 15 borings drilled throughout the lot. Borings labeled RCS-1, RCS-6 through RCS-10 and RCS-14 through RCS-15 were drilled to a depth of 100, whereas borings labeled RCS-2 through RCS-5 and RCS-11 through RCS-13 were drilled to a depth of 150 feet.

Continuous sampling was performed in the first 15 feet of every boring. Surveying was provided by Recovery Solutions Inc. to locate borings where we indicated. Elevations and coordinates of the borings are indicated in the boring logs presented in **Appendix A** of this report.

2. Subsoil Conditions and Engineering Analysis

The geology of the area, shown in **Figure 1**, is controlled mostly by the presence of the Rio Grande of Arecibo. Referring to the geologic map of the area by Briggs, 1968 it can be noticed that the area comprehends only alluvium deposits dated as quaternary. This deposit (Qa) most likely is composed of quartz, feldspars and plutonic-rock fragments sand grains. Some areas have been described to contain large boulder-sized limestone fragments. According to Briggs' estimate the approximate thickness in the area ranges from 0-70 meters. Quaternary swamp deposits have been identified in some areas running parallel to the river main channel and tributaries. The lithology of these deposits has been described as clay, sandy clay and silty clay, grayish to bluish-gray. Peat is present in some areas in the swamp deposits.

The rock basement for these deposits is the Middle Tertiary limestone of the Aymamón and Camuy Formations. These are well exposed southwest of the project site. In this limestone formations typical karst landforms can be identified.

The topography in this area is mostly controlled by mogote hills and dissolution valleys.

From the information provided by the 15 borings, which location is shown in **Figure 2,** it can be inferred that the subsoil in the area is an alluvial deposit as mentioned in the geologic description. The material varies between fat clays and clayey sands, where the content of sand is a variable, which depends on the level of energy of the active deposition environment when the material was deposited. This variation is not gradual along the boring; it is rather heterogeneous, where thin layers of sandy silt can be found between thicker layers of fat clay. This situation was observed in all 15 borings drilled, with the peculiarity that no two borings were found to be alike. This fact indicates also the heterogeneity found in the deposits in the aerial extension, which will impact the type and characteristics of the foundation solution for the different projected structures, as they are located on the site. In general, the alluvial material found indicates the presence of a desiccated crust with a thickness of about 20 feet. This assumption can be made mainly after examining the results obtained in the consolidation tests performed on undisturbed samples at different depths, where overconsolidation of the desiccated material is high. The clay found within this desiccated crust is generally stiff to very stiff, while the coarser material is poorly cemented with relative densities qualifying as very loose to loose. Material found deeper than 20 feet generally represent the opposite. Clays tend to be soft and medium, whereas sands tend to become denser. Five profiles shown in **Figures 3 through 7** have been prepared, showing the results of the subsurface investigation.

In addition to the subsurface investigation described previously, several Shelby tube samples were retrieved from different depths at different locations. Consolidation tests, direct shear tests and unconfined compression tests were run on specimens cut from such samples. Results of all the laboratory tests performed in this study are presented in **Appendix B**.

Depths of water (while drilling, or one day after) varied approximately from -4 feet to 7 feet in elevation; no pattern in the water levels was evident in this borings.

The alluvial deposit is not competent to bear the proposed loads imposed by the projected structures. Using the values for the expected loads provided to this office, and assuming an allowable bearing capacity of 3,000 pounds per square foot, settlement calculations were run considering a subsurface profile with parameters of compressibility that follow the model presented in **Figure 8,** which was inferred from the consolidation tests run on undisturbed samples as described earlier. Settlements as much as 6 inches are to be expected, with the disadvantage that due to the aerial heterogeneity of the sand content of the different layers composing the subsurface, the time for this value of settlement to be achieved would vary over short distances, therefore causing large differential settlements to the structure. These differential settlements tend to be temporary since over time (years) total settlements would be similar, but still would cause damage to structural elements. For these reasons, deep foundations are required for these structures. Use of piles is the most viable foundation solution, since drilled piers are rarely used on the island (however, a drilled pier solution can be analyzed if a contractor becomes available for this work). Taking into account the variability of the soil conditions within the area, a static analysis was performed for every boring in order to establish the required lengths of piles to be used at different zones. Also, thirteen types of piles were analyzed for each boring. The different piles and their corresponding working loads are summarized in **Table 1**. The results of the static analysis can be found on **Table 2,** where the variation in pile lengths for the same type of pile located at different positions is due to the heterogeneity, which was preliminarily referred. This analysis was performed considering a factor of safety of 2.5 for this preliminary geotechnical report, this factor of safety can be reduced as more data is obtained and further analysis of the same type are performed. Moreover, fill will cause negative skin friction loads, which will produce lengths similar to those presented herein. Since the extent and depth of fill is still uncertain, this will have to be defined in the final report. **Figures 9 through 21** show contour maps for each type of pile, where the contours indicate the estimated lengths required to achieve the stated working loads.

Table 1. Allowable Compressive Capacity of Piles

Pile Type	Allowable Compressive Load (tons)
10" Fuentes precast concrete circular pile	60
12" Fuentes precast concrete circular pile	100
10" Unfilled steel pipe pile (0.188" wall)	50
12" Unfilled steel pipe pile (0.250" wall)	80
18" Unfilled steel pipe pile (0.312" wall)	140
24" Unfilled steel pipe pile (0.375" wall)	200
30" Unfilled steel pipe pile (0.500" wall)	250
10" Filled steel pipe pile (0.188" wall)	80
12" Filled steel pipe pile (0.250" wall)	120
18" Filled steel pipe pile (0.312" wall)	200
24" Filled steel pipe pile (0.375" wall)	250
30" Filled steel pipe pile (0.500" wall)	300
14x73 Steel H pile	150

Note: Steel pipe piles were considered in two ways; a) driven without any type of fill (unfilled section) and b) using a concrete core along the pile, driven with a steel plug at the toe (filled section).

Graphs of compressive resistance against pile length for each analyzed option are found in **Appendix C.**

Lateral load capacities were also analyzed for each type of pile using conditions found at boring RCS-3, which was chosen based on the results of the

Table 2
Recovery Solutions
Arecibo, Puerto Rico
Pile length required to achieve design compressive loads

Pile Type	*Design Load*	*Required Length*, ft*														
	tons	*RCS-1*	*RCS-2*	*RCS-3*	*RCS-4*	*RCS-5*	*RCS-6*	*RCS-7*	*RCS-8*	*RCS-9*	*RCS-10*	*RCS-11*	*RCS-12*	*RCS-13*	*RCS-14*	*RCS-15*
10" Circular Concrete Pile (Fuentes)	60	115	125	115	115	105	110	115	115	145	115	110	120	110	110	105
12" Circular Concrete Pile (Fuentes)	100	145	155	150	180	140	135	150	145	190	145	140	150	145	140	145
10" Steel Pipe Pile Open-ended	50	105	120	110	105	100	110	110	110	125	105	105	110	105	105	105
12" Steel Pipe Pile Open-ended	80	130	140	130	135	125	125	135	130	155	130	125	135	125	125	125
18" Steel Pipe Pile Open-ended	140	145	155	150	160	135	140	150	145	175	145	140	150	135	140	140
24" Steel Pipe Pile Open-ended	200	150	165	155	175	150	145	160	155	185	150	150	155	145	150	150
30" Steel Pipe Pile Open-ended	250	150	165	155	175	175	145	160	155	185	150	150	160	145	150	150
10" Steel Pipe Pile Close-ended	80	135	150	140	165	135	130	145	140	180	135	135	145	140	135	135
12" Steel Pipe Pile Close-ended	120	165	175	170	225	160	150	170	165	225	165	160	170	160	160	165
18" Steel Pipe Pile Close-ended	200	175	185	180	235	170	160	180	180	230	175	170	180	165	170	170
24" Steel Pipe Pile Close-ended	250	160	165	165	220	175	140	170	160	220	160	155	165	160	160	160
30" Steel Pipe Pile Close-ended	300	125	135	130	175	120	110	105	105	155	125	145	130	135	125	125
14x73 Steel H Pile	150	150	165	155	180	150	145	160	155	190	155	150	155	145	150	150

***Notes:** Required length to obtain indicated loads not accounting for negative skin friction
Factor of Safety = 2.5

static compressive load analysis as the boring representing average conditions in terms of resistance. The lateral load analysis was performed using the length previously found to mobilize the compressive resistance in boring RCS-3 also. This analysis is governed by the amount of lateral displacement that occurs at the pile head when submitted to certain load. Our analysis presents lateral load resistance for every type of pile at four different values of lateral deflection, in order to provide different criteria in this preliminary report to the structural engineer to choose the type or types of piles to be analyzed in more detail in further studies. The results of such analysis are shown in **Tables 3 through 6.** Lateral deflection curves along the piles analyzed can be found in **Appendix D**.

We have been informed that previous hydraulic studies performed for the site under study conclude that the minimum elevation for the location of the structures should be 12 feet above mean sea level in order to avoid flooding during severe storms. This implies the placing of fill in most of the site since its elevation is mainly under the indicated minimum elevation. If the fill were placed, it would cause settlements, which in time would generate negative skin friction on the piles, making the indicated lengths to be longer than would normally be required with a safety factor of 2 to achieve the working loads. Settlements of the entire site and the effects of negative skin friction can be minimized with the construction of a dike that surrounds the site and prevents the flooding to reach the structures of the plant. Settlement analyses were performed for different

Table 3
Recovery Solutions
Arecibo, Puerto Rico
Allowable lateral load (1/4" deflection)

Pile Type	*Allowable Lateral Load tons*
10" Circular Concrete Pile (Fuentes)	2.3
12" Circular Concrete Pile (Fuentes)	2.9
10" Steel Pipe Pile Unfilled	2.3
12" Steel Pipe Pile Unfilled	3.2
18" Steel Pipe Pile Unfilled	5.5
24" Steel Pipe Pile Unfilled	8.4
30" Steel Pipe Pile Unfilled	12.0
10" Steel Pipe Pile Filled	3.9
12" Steel Pipe Pile Filled	5.0
18" Steel Pipe Pile Filled	9.4
24" Steel Pipe Pile Filled	15.4
30" Steel Pipe Pile Filled	22.8
14x73 Steel H Pile	3.8

Table 4
Recovery Solutions
Arecibo, Puerto Rico
Allowable lateral load (3/8" deflection)

Pile Type	*Allowable Lateral Load tons*
10" Circular Concrete Pile (Fuentes)	2.7
12" Circular Concrete Pile (Fuentes)	3.5
10" Steel Pipe Pile Unfilled	2.8
12" Steel Pipe Pile Unfilled	3.8
18" Steel Pipe Pile Unfilled	6.5
24" Steel Pipe Pile Unfilled	10.0
30" Steel Pipe Pile Unfilled	14.3
10" Steel Pipe Pile Filled	4.6
12" Steel Pipe Pile Filled	6.0
18" Steel Pipe Pile Filled	11.3
24" Steel Pipe Pile Filled	19.3
30" Steel Pipe Pile Filled	30.2
14x73 Steel H Pile	4.5

Table 5
Recovery Solutions
Arecibo, Puerto Rico
Allowable lateral load (1/2" deflection)

Pile Type	*Allowable Lateral Load tons*
10" Circular Concrete Pile (Fuentes)	3.0
12" Circular Concrete Pile (Fuentes)	3.9
10" Steel Pipe Pile Unfilled	3.2
12" Steel Pipe Pile Unfilled	4.3
18" Steel Pipe Pile Unfilled	7.3
24" Steel Pipe Pile Unfilled	11.2
30" Steel Pipe Pile Unfilled	16.3
10" Steel Pipe Pile Filled	5.2
12" Steel Pipe Pile Filled	6.7
18" Steel Pipe Pile Filled	13.1
24" Steel Pipe Pile Filled	22.9
30" Steel Pipe Pile Filled	36.5
14x73 Steel H Pile	5.0

Table 6
Recovery Solutions
Arecibo, Puerto Rico
Allowable lateral load (3/4" deflection)

Pile Type	*Allowable Lateral Load tons*
10" Circular Concrete Pile (Fuentes)	3.5
12" Circular Concrete Pile (Fuentes)	4.6
10" Steel Pipe Pile Unfilled	3.7
12" Steel Pipe Pile Unfilled	5.0
18" Steel Pipe Pile Unfilled	8.7
24" Steel Pipe Pile Unfilled	13.4
30" Steel Pipe Pile Unfilled	19.5
10" Steel Pipe Pile Filled	6.1
12" Steel Pipe Pile Filled	7.9
18" Steel Pipe Pile Filled	16.3
24" Steel Pipe Pile Filled	29.8
30" Steel Pipe Pile Filled	48.5
14x73 Steel H Pile	5.9

arrangements in the case that the final grade elevation is taken to 12 feet above mean sea level by means of a compacted fill. This was done considering a fill with a wedge-shaped cross section due to the sloping ground on which it would be placed. Results indicate that cross sections with long wedges (about 1,000 feet) would induce a settlement of approximately 3 inches at its highest station, which decreases to zero towards the ends. Shorter wedges (20 feet) induce 1.2 inches of settlement at their highest section, also decreasing to zero towards the ends. If a dike is used to avoid filling the entire site, considering a cross section using two on one slopes, a crown length of 10 feet, and a height of 6 feet, the settlements induced on the ground would be about 2 inches at the center of the crown, decreasing to 1.8 inches towards the corners of the cross section, and finally diminishing to zero at the toes. Consideration of the type of alternative to use for the flooding protection alternative should be considered from the point of view of the settlements induced by the necessary structures, and also by the effect that they can have on the length of the piles.

3. Recommendations

- The proposed structures should be founded on piles designed using the allowable compressive load values previously stated. The length of these piles is estimated to vary, depending of the type of pile and its location within the lot. **Table 2** summarizes the estimated lengths needed to achieve compressive resistances at different locations for different types of pile. These lengths will vary, depending on variations in the subsoil profile.

- Allowable lateral loads also change depending on the criteria used for the maximum allowable lateral deflection and pile type. **Tables 3 through 6** give the maximum allowable lateral loads for different combinations of pile type and deflection values. Assuming that one-half inch of deflection is permissible, the allowable lateral loads are:

Table 7. Allowable Lateral Load (½" deflection)

Pile Type	Lateral Load (tons)
10" Fuentes precast concrete circular pile	3.0
12" Fuentes precast concrete circular pile	3.9
10" Unfilled steel pipe pile (0.188" wall)	3.1
12" Unfilled steel pipe pile (0.250" wall)	4.2
18" Unfilled steel pipe pile (0.312" wall)	7.3
24" Unfilled steel pipe pile (0.375" wall)	11.2
30" Unfilled steel pipe pile (0.500" wall)	16.2
10" Filled steel pipe pile (0.188" wall)	5.1
12" Filled steel pipe pile (0.250" wall)	6.7
18" Filled steel pipe pile (0.312" wall)	13.0
24" Filled steel pipe pile (0.375" wall)	22.9

30" Filled steel pipe pile (0.500" wall)	36.5
14x73 Steel H pile	5.0

These loads should be reduced to take account for the effects of piles installed in groups. The reduction factors depend on the spacing between piles in the direction of the application of the load. Their values are expressed in terms of the diameter or side length of the pile (b) as indicated in **Table 8**.

Table 8. Reduction factors for allowable lateral load

Pile spacing	Reduction Factor
8b	1.0
6b	0.8
4b	0.5
3b	0.4

- Allowable tension loads per pile are one-third of the mobilized skin friction, depending on the reinforcement and splicing. Any splices must be designed to transmit necessary tension loads and lateral stresses.

- For seismic loads, the allowable compressive load may be increased by 30%; for wind loads, the allowable compressive load may be increased by 20%.

- The number of static and dynamic load tests to be performed depends on the type of pile chosen for the project. This will be addressed in the final report for this project. The geotechnical engineer should prepare a test program including test penetration piles for revision of the driving criteria. Once the structural design is finished, and the number of piles is known, a special revision can be prepared stating a work plan for this purpose.

- We recommend that dynamic tests consist of initial driving, restrike in one hour, and restrike at 24 hours. The dynamic test should also include a CAPWAP analysis. For static load tests, the quick load test is recommended. All tests must comply with applicable ASTM specifications.
- A geotechnical engineer should prepare the pile driving criteria and should review all pile driving activities.

- These recommendations should be revised depending on the decision made regarding the flood protection works. If additional fill is to be placed, negative skin friction should be considered and therefore, the pile lengths indicated in this report will most probably increase.

- Due to the expected lengths, splices will be required. The geotechnical and structural engineers must previously approve splices. We will not approve splices that do not include mechanical connections, and we will not approve splices that solely consist of steel plates welded together.

- Before driving any piles, the piling contractor should submit wave equation analyses to confirm that the pile and hammer are properly matched for the required length and loads.

- All precast piles must be tested after installation using the Pile Driver Analyzer (PDA by Pile Dynamics, Inc.) or similar equipment. The geotechnical engineer shall perform all testing.

4. Limitations of this Report

This preliminary report is based on all design concepts, parameters and constraints that have been made known to us. Any subsequent design changes will require revision of these recommendations in order to confirm their applicability to the new design.

In order to confirm that these conclusions and recommendations apply, it is recommended that we be allowed to review the plans as they are developed.

The reader is referred to **Appendix E** for additional information regarding this report.

This document has been prepared specifically for the client and the project addressed herein. Therefore, it should not be used for a different project at this site without the written approval of GeoConsult.

CA. Regalado

Carlos A. Regalado
Geotechnical Engineer

August 27, 1999
San Juan, P.R.
File No. 2182-99

for/ CA. Regalado

Alan R. Crumley
Geotechnical Engineer
License No. 5828

FIGURES

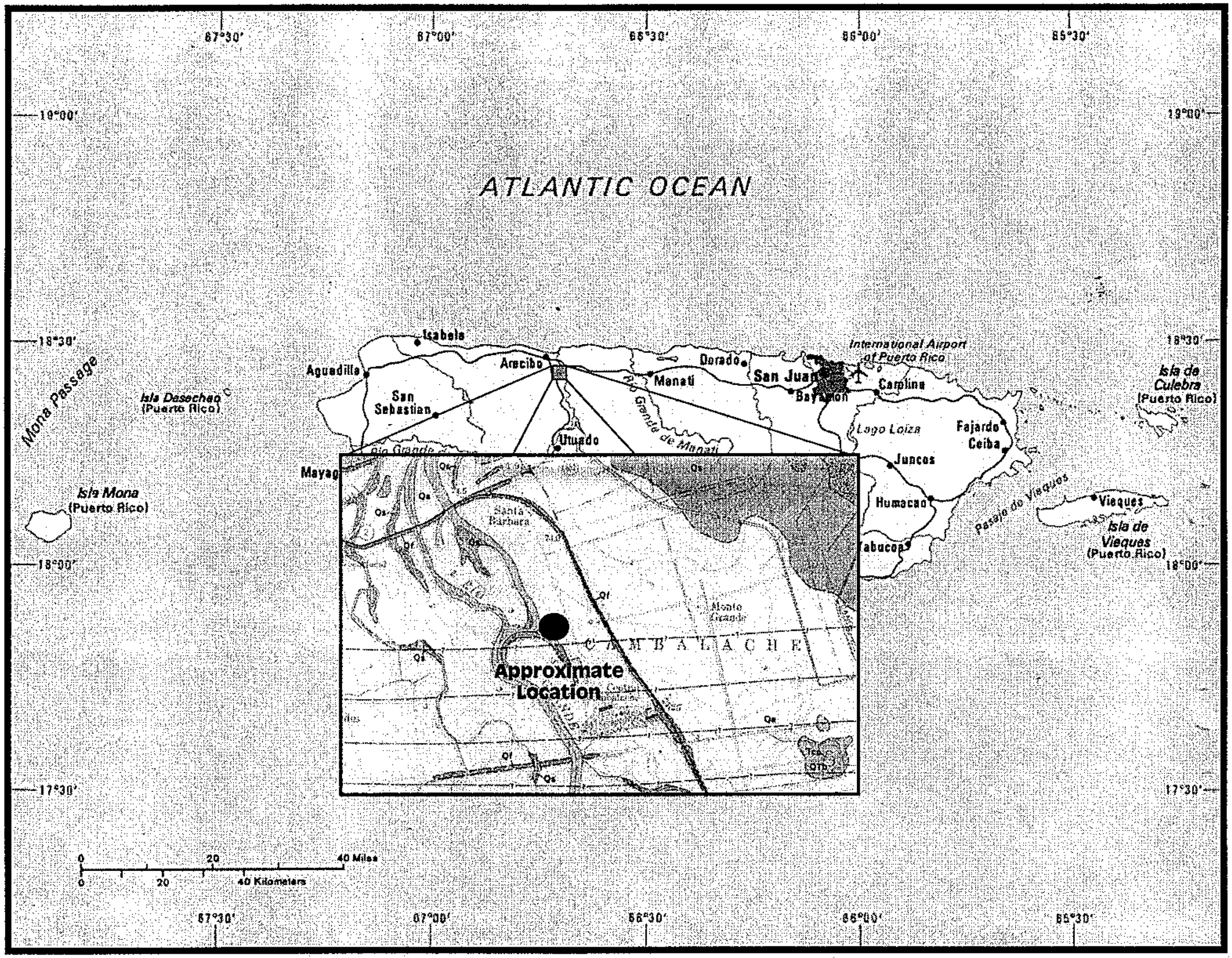
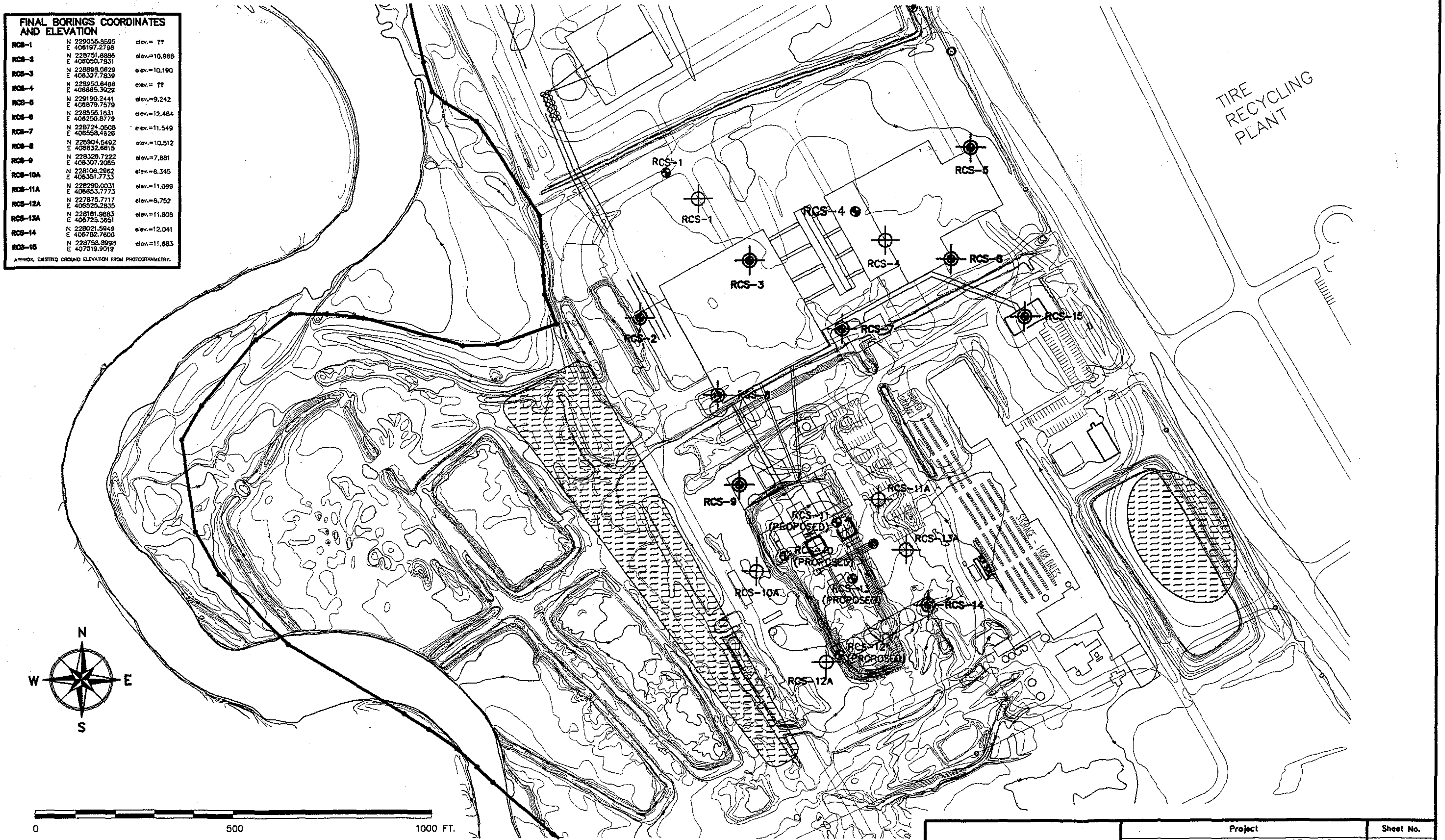


Figure 1. Location and generalized geology of the area.

FINAL BORINGS COORDINATES AND ELEVATION

RCS-1	N 229055.8595 E 406197.2798	elev.= ??
RCS-2	N 228751.6886 E 406050.7831	elev.=10.968
RCS-3	N 228698.0629 E 406327.7839	elev.=10.190
RCS-4	N 228950.6486 E 406685.3929	elev.= ??
RCS-5	N 229190.2441 E 406879.7579	elev.=9.242
RCS-6	N 228555.1631 E 406250.8779	elev.=12.484
RCS-7	N 228724.0508 E 406558.4826	elev.=11.549
RCS-8	N 228904.5492 E 406832.6815	elev.=10.512
RCS-9	N 228328.7222 E 406307.2065	elev.=7.881
RCS-10A	N 228106.2962 E 406351.7733	elev.=6.345
RCS-11A	N 228290.0031 E 406653.7773	elev.=11.099
RCS-12A	N 227875.7717 E 406525.2835	elev.=6.752
RCS-13A	N 228161.9883 E 406725.3651	elev.=11.808
RCS-14	N 228021.5949 E 406782.7600	elev.=12.041
RCS-15	N 228758.8998 E 407019.9019	elev.=11.683

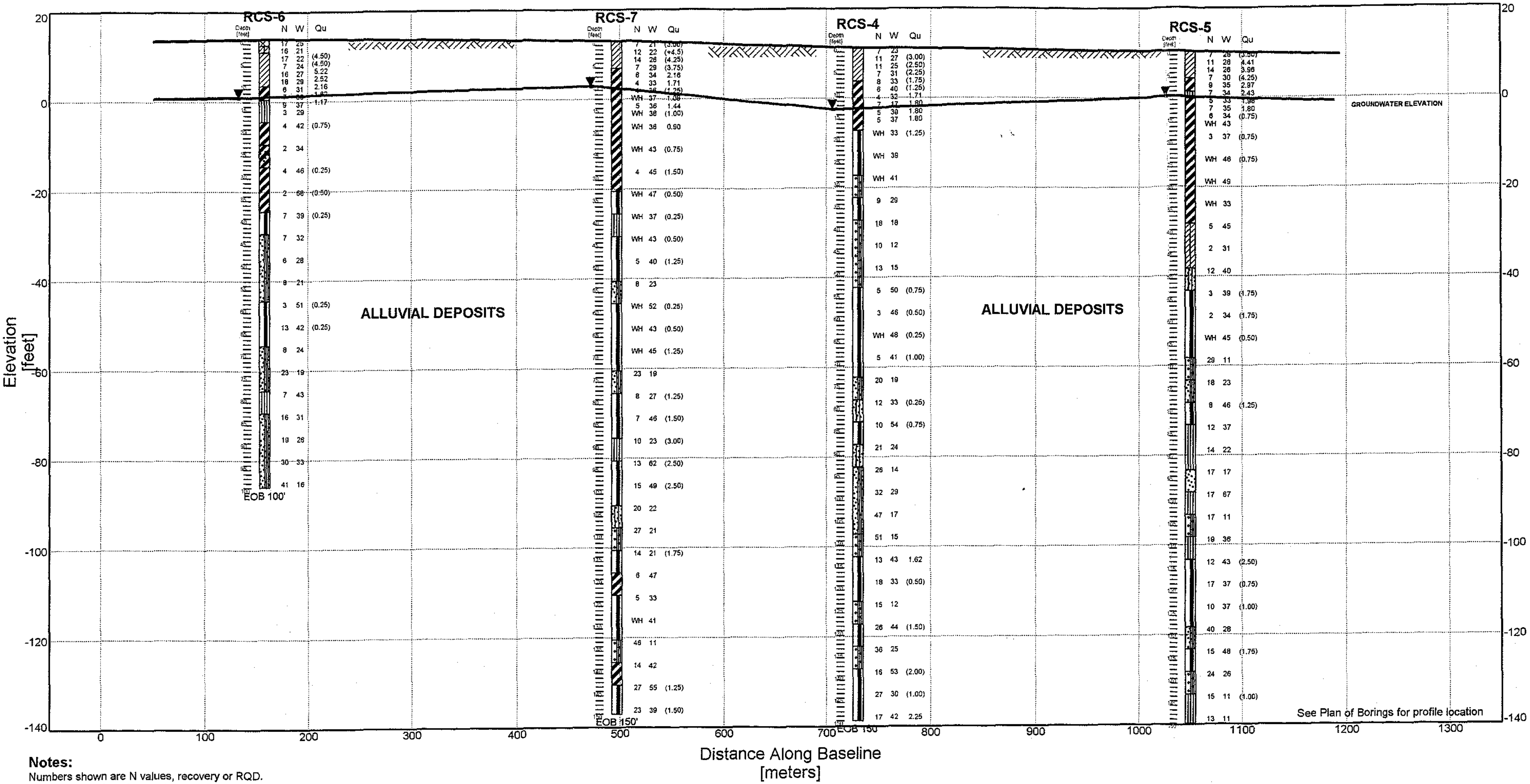
APPROX. EXISTING GROUND ELEVATION FROM PHOTOGRAMMETRY.



LEYEND:

- ● PROPOSED BORING LOCATION
- ⊕ ACTUAL DRILLING LOCATION
- ⊕ PROPOSED AND ACTUAL BORING LOCATION

GEOCONSULT Geotechnical Engineers P.O. Box 362040, San Juan Puerto Rico 00936 Telephones (787) 782-3554 / 783-3585 Fax (787) 793-0410 / 783-6320	Project RECOVERY SOLUTIONS, INC. ARECIBO, PUERTO RICO	Sheet No. FIGURE 2
Reference Scale : 1" = 250' Date : 07/14/99 By : E.J.A.H. Revised :	Description BORING LOCATION PLAN	Code No. . Project No. 2182-99



Notes:

Numbers shown are N values, recovery or RQD.
Refer to boring logs for exact descriptions.
Subsurface conditions were determined at boring locations only.
Subsurface conditions may vary from the generalized subsurface profile shown here.

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GENERALIZED SUBSURFACE PROFILE

Project: RECOVERY SOLUTIONS, INC.
Location: Arecibo, P.R.
Project No: 2182-99

FIGURE 3

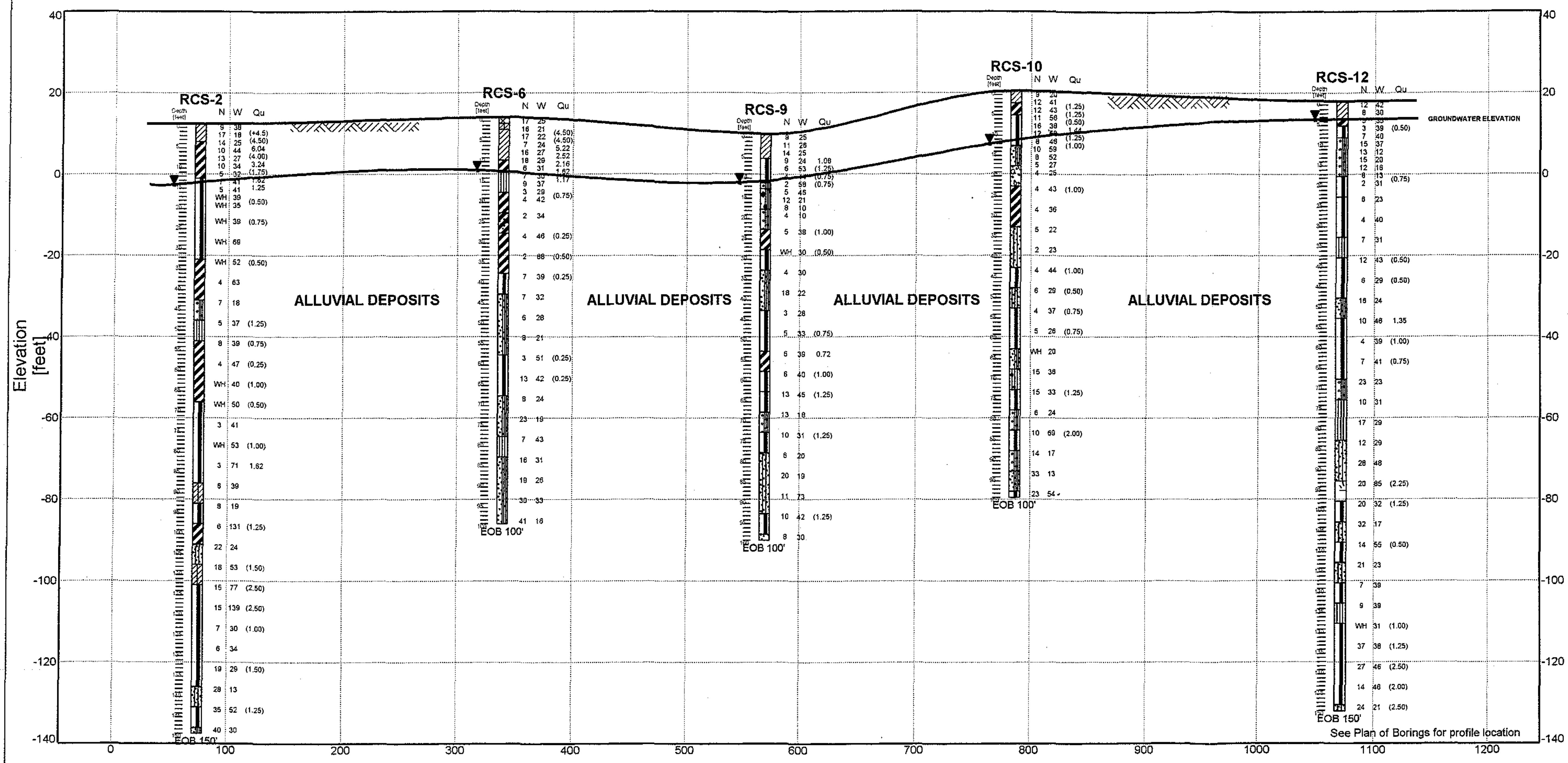

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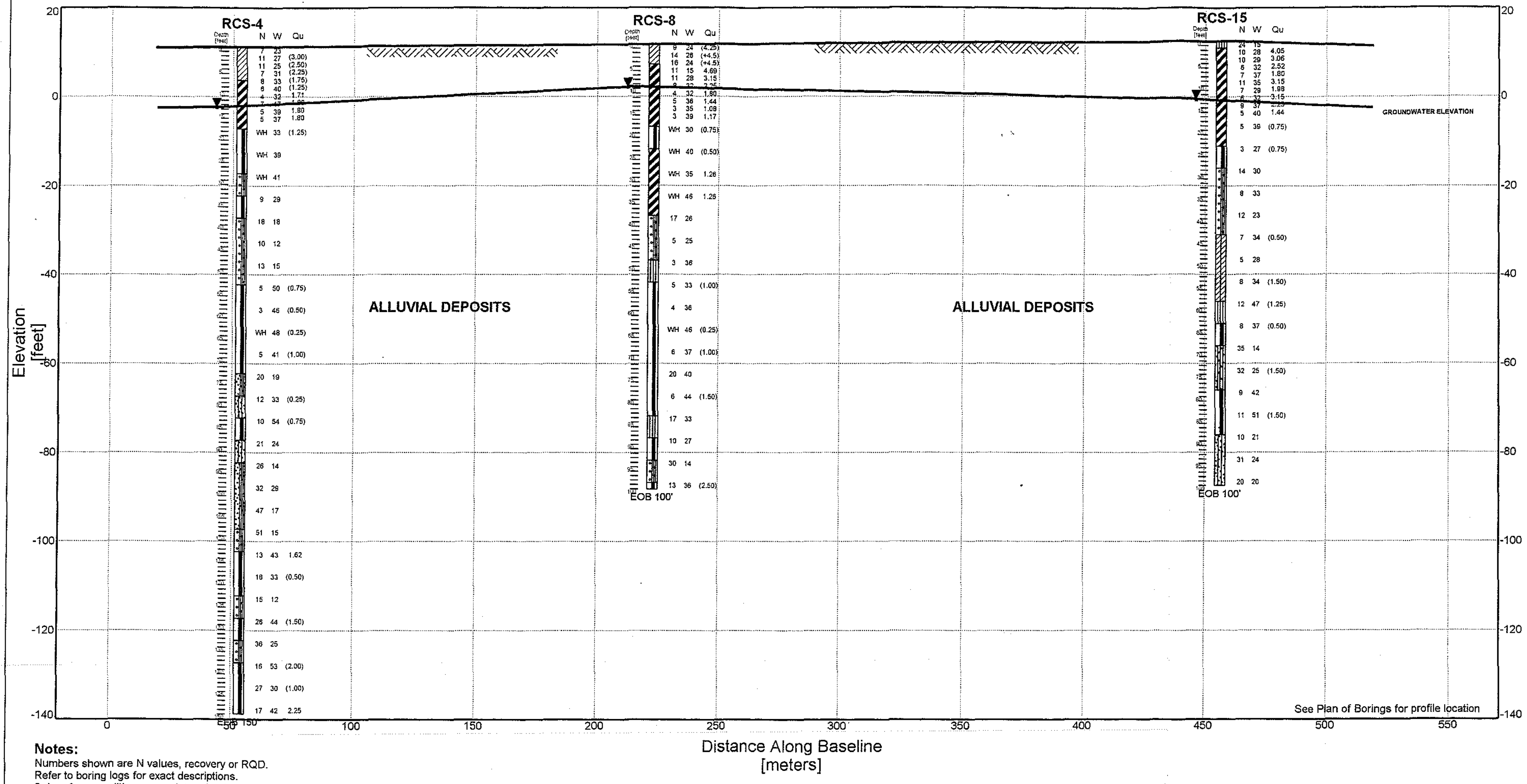
FIGURE 4



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Location: Arecibo, P.R.
Project No: 2182-99

FIGURE 5

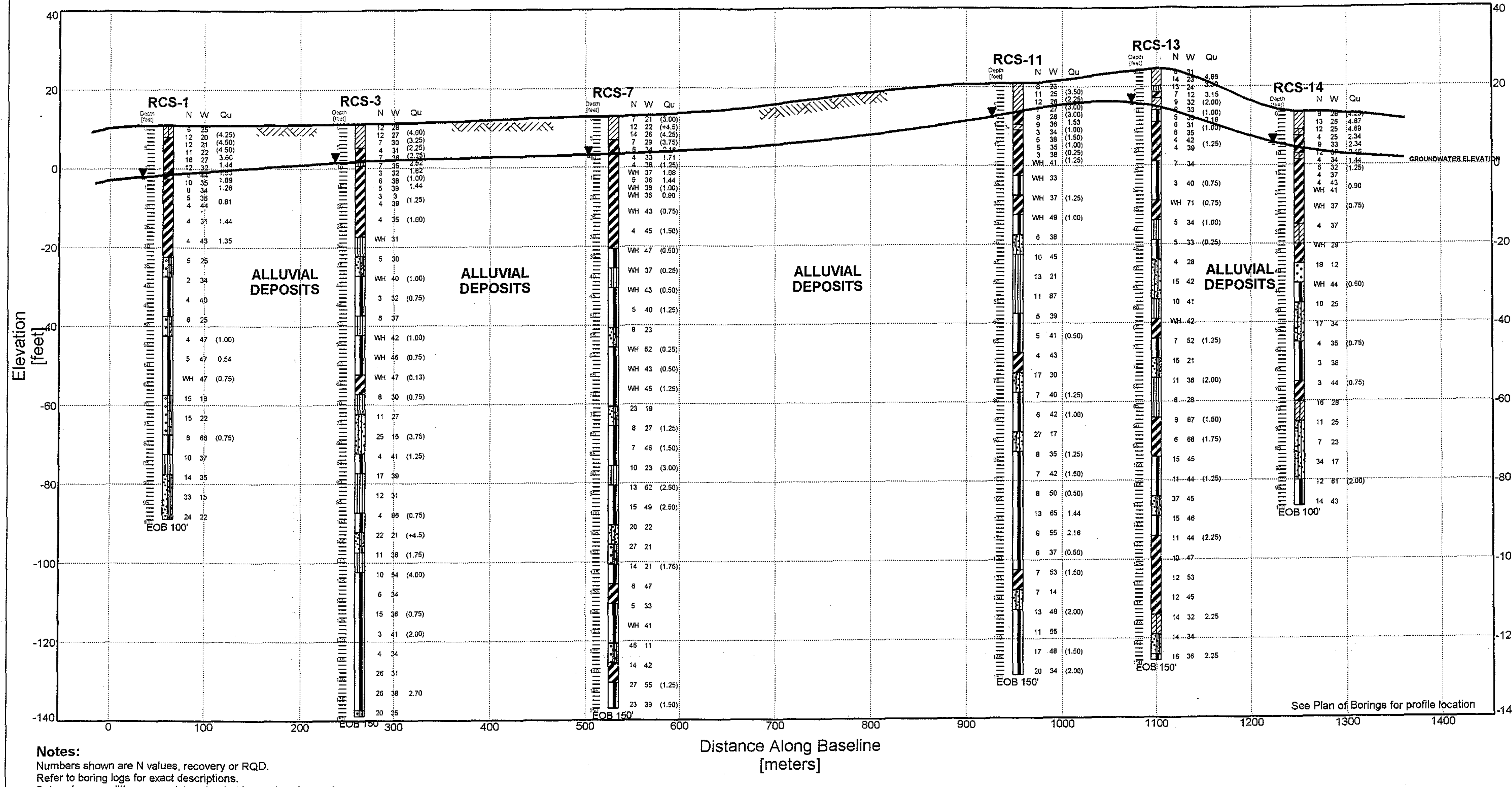

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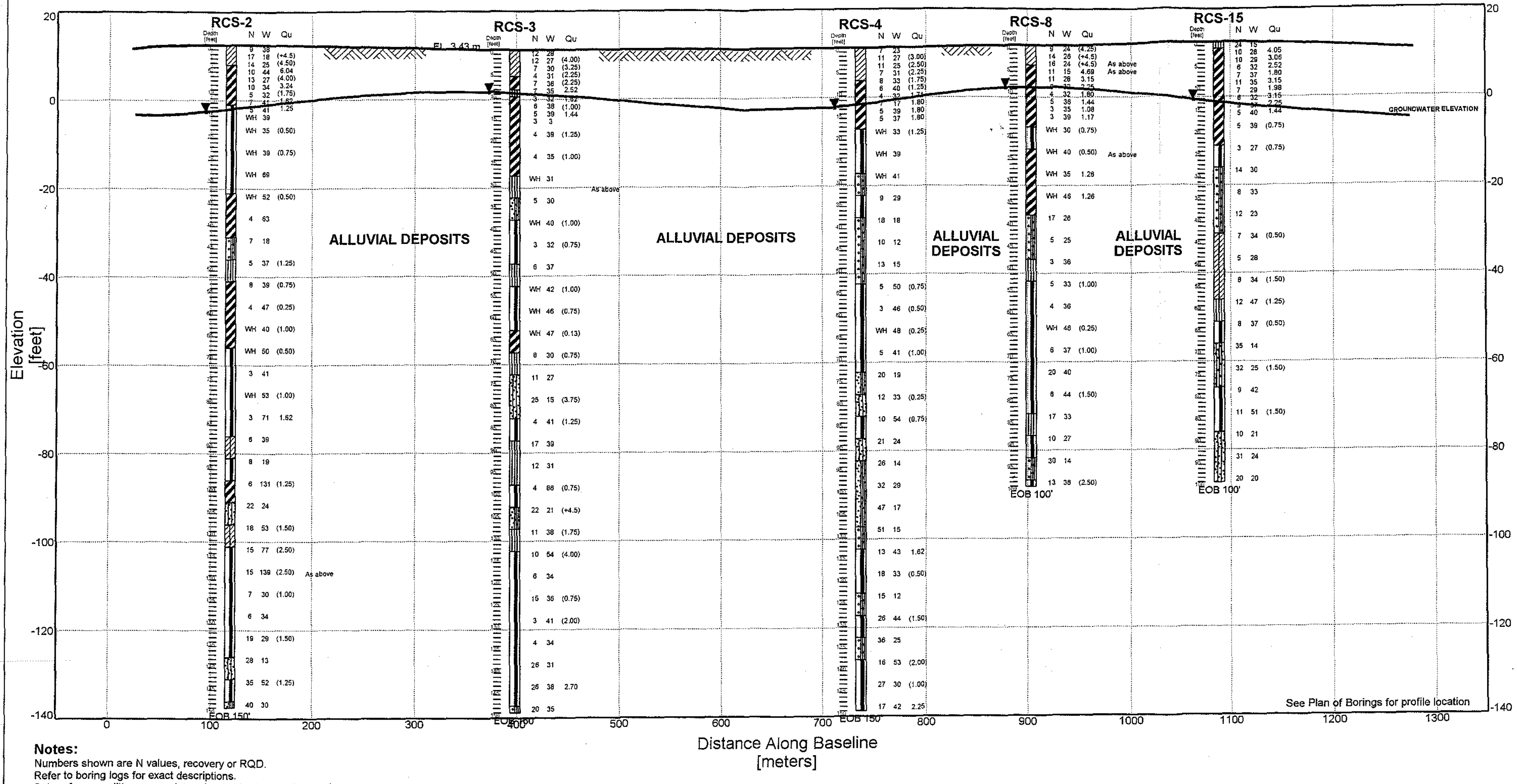
FIGURE 6



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GENERALIZED SUBSURFACE PROFILE

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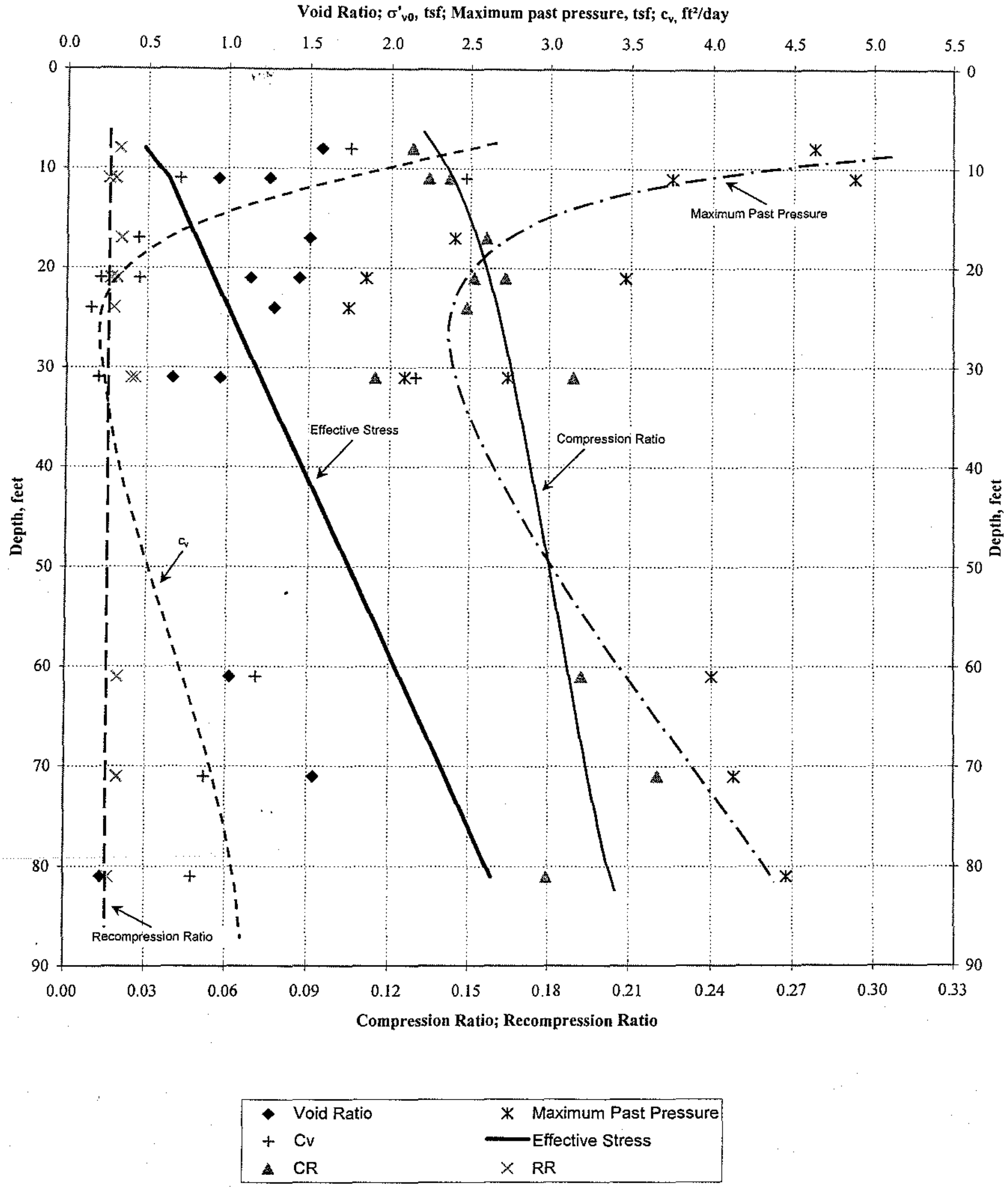
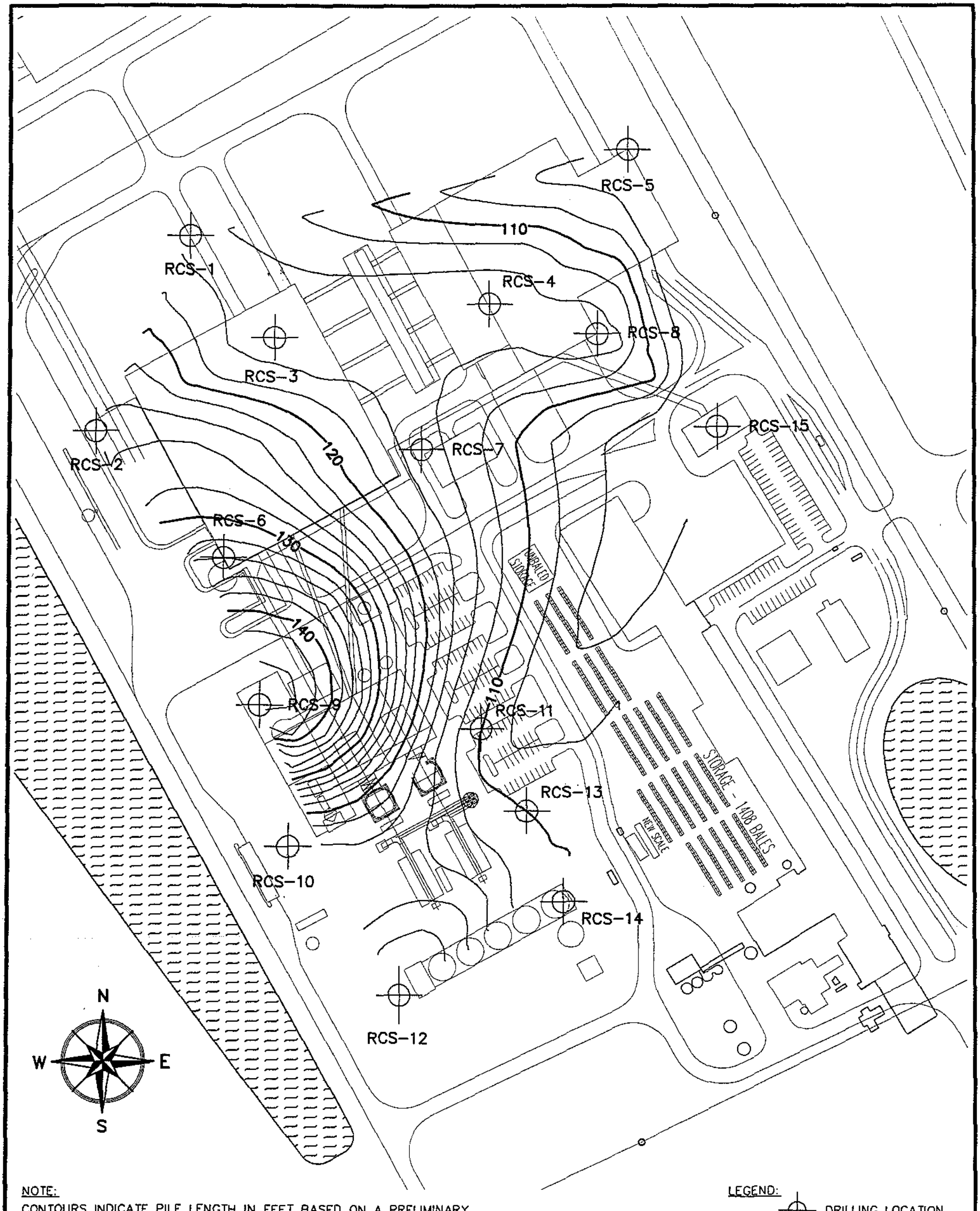
FIGURE 7

Figure 8
Recovery Solutions
Consolidation Test Resutls

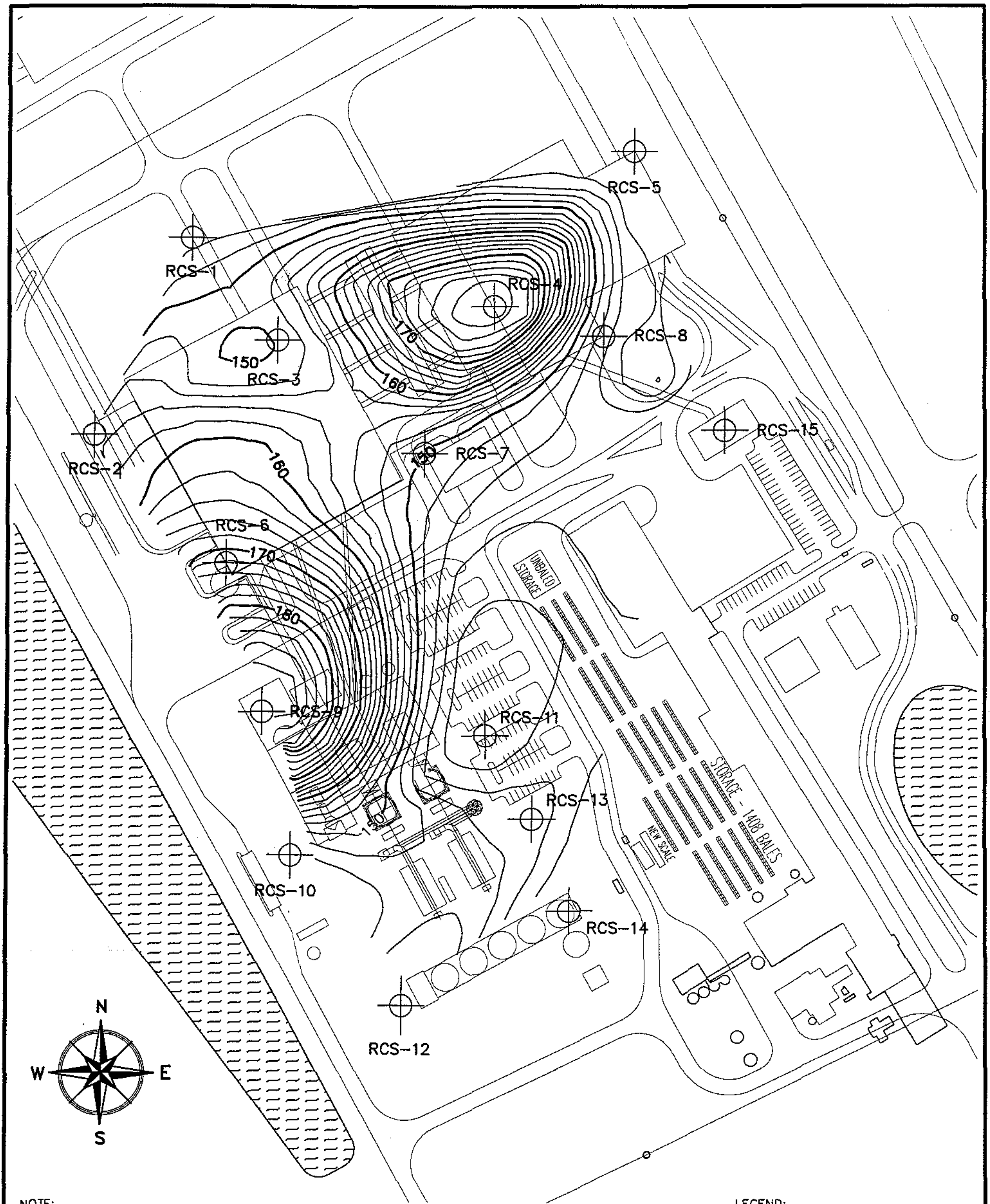




NOTE:
CONTOURS INDICATE PILE LENGTH IN FEET BASED ON A PRELIMINARY ANALYSIS USING F.O.S. OF 2.5

LEGEND:
⊕ DRILLING LOCATION

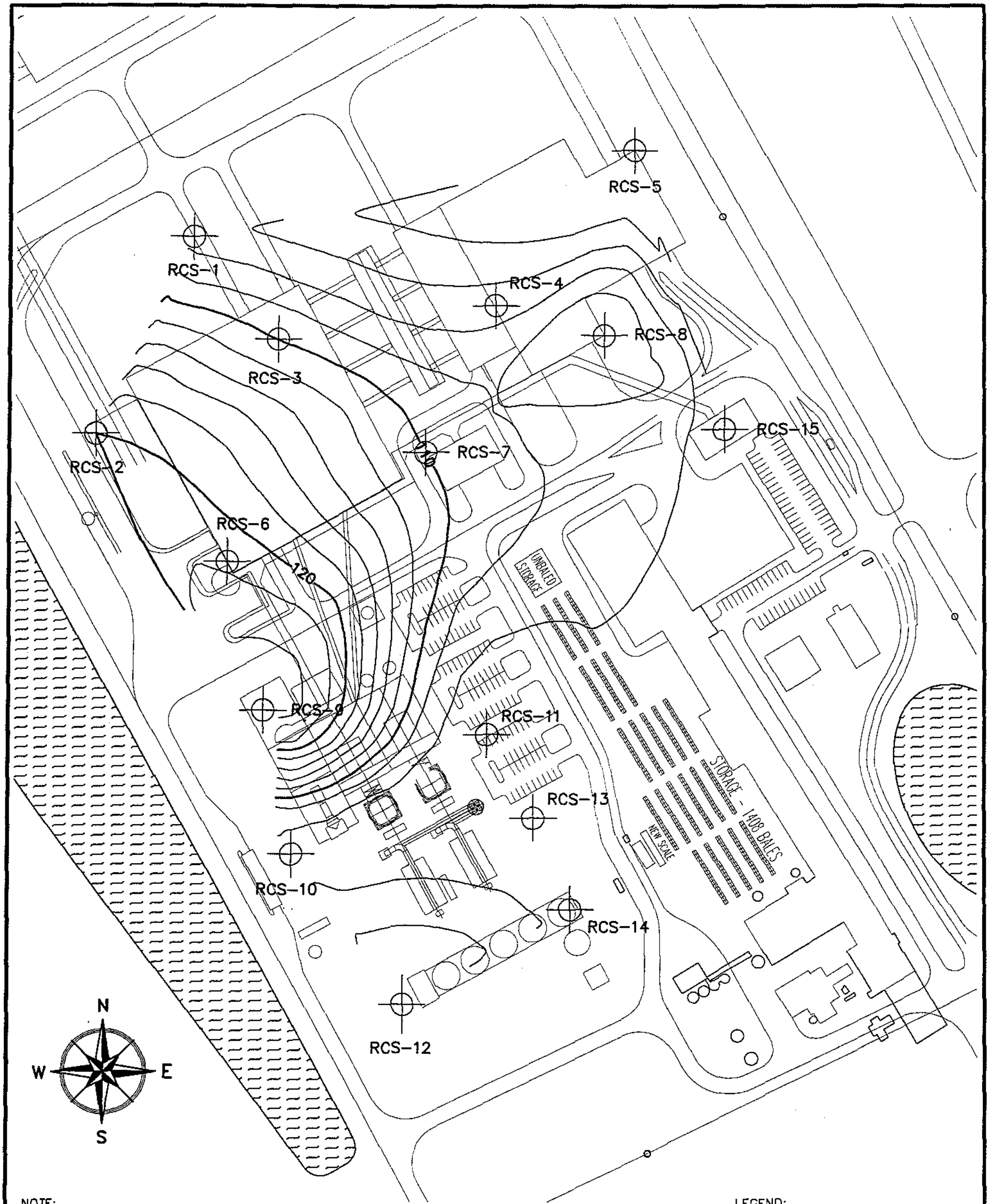
GEOCONSULT Geotechnical Engineers P.O. Box 362040, San Juan Puerto Rico 00936 Telephones (787) 782-3554 / 783-3585 Fax (787) 793-0410 / 783-6320	Project	Reference	Description	Code No.	Sheet No.
	RECOVERY SOLUTION, INC.	Scale : 1"=200' Date : 8/23/99 By : C.O. Revised :	ESTIMATED PILE LENGTH PILE TYPE: Circular reinforced concrete fuentes pile. Diameter: 10"	- Project No. 2182-99	FIGURE 9



NOTE:
CONTOURS INDICATE PILE LENGTH IN FEET BASED ON A PRELIMINARY ANALYSIS USING F.O.S. OF 2.5

LEGEND:
⊕ DRILLING LOCATION

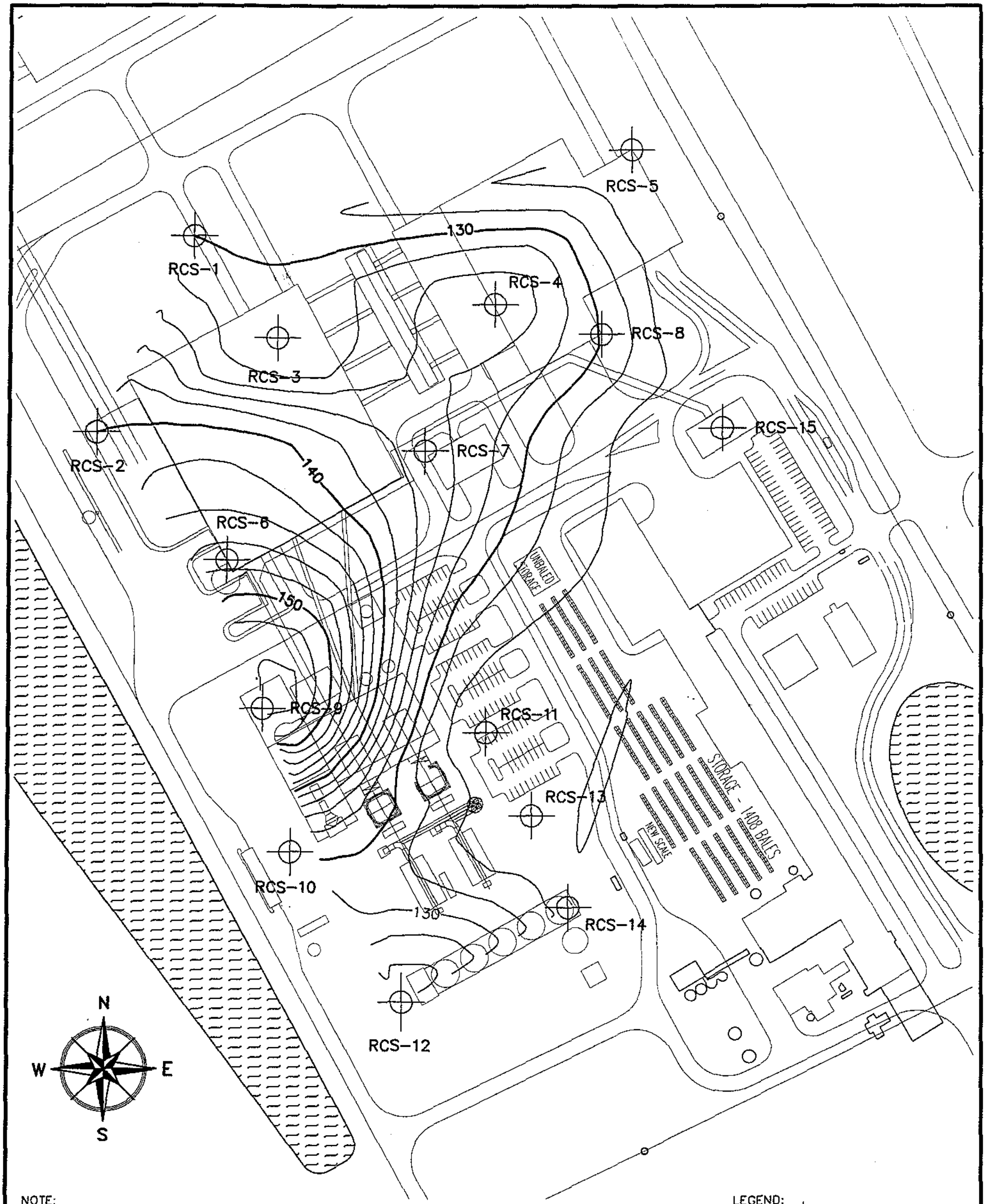
GEOCONSULT Geotechnical Engineers	Project	Reference	Description	Code No.	Sheet No.
P.O. Box 362040, San Juan Puerto Rico 00936 Telephones (787) 782-3554 / 783-3585 Fax (787) 793-0410 / 783-6320	RECOVERY SOLUTION, INC.	Scale : 1"=200' Date : 8/23/99 By : C.O. Revised :	ESTIMATED PILE LENGTH PILE TYPE: Circular reinforced concrete fuentes pile. Diameter: 12"	- Project No. 2182-99	FIGURE 10



NOTE:
CONTOURS INDICATE PILE LENGTH IN FEET BASED ON A PRELIMINARY ANALYSIS USING F.O.S. OF 2.5

LEGEND:
⌖ DRILLING LOCATION

GEOCONSULT Geotechnical Engineers P.O. Box 362040, San Juan Puerto Rico 00936 Telephones (787) 782-3554 / 783-3585 Fax (787) 793-0410 / 783-6320	Project RECOVERY SOLUTION, INC.	Reference Scale : 1"=200' Date : 8/23/99 By : C.O. Revised :	Description ESTIMATED PILE LENGTH PILE TYPE: Unfilled steel pipe pile. Diameter: 10"	Code No. - Project No. 2182-99	Sheet No. FIGURE 11



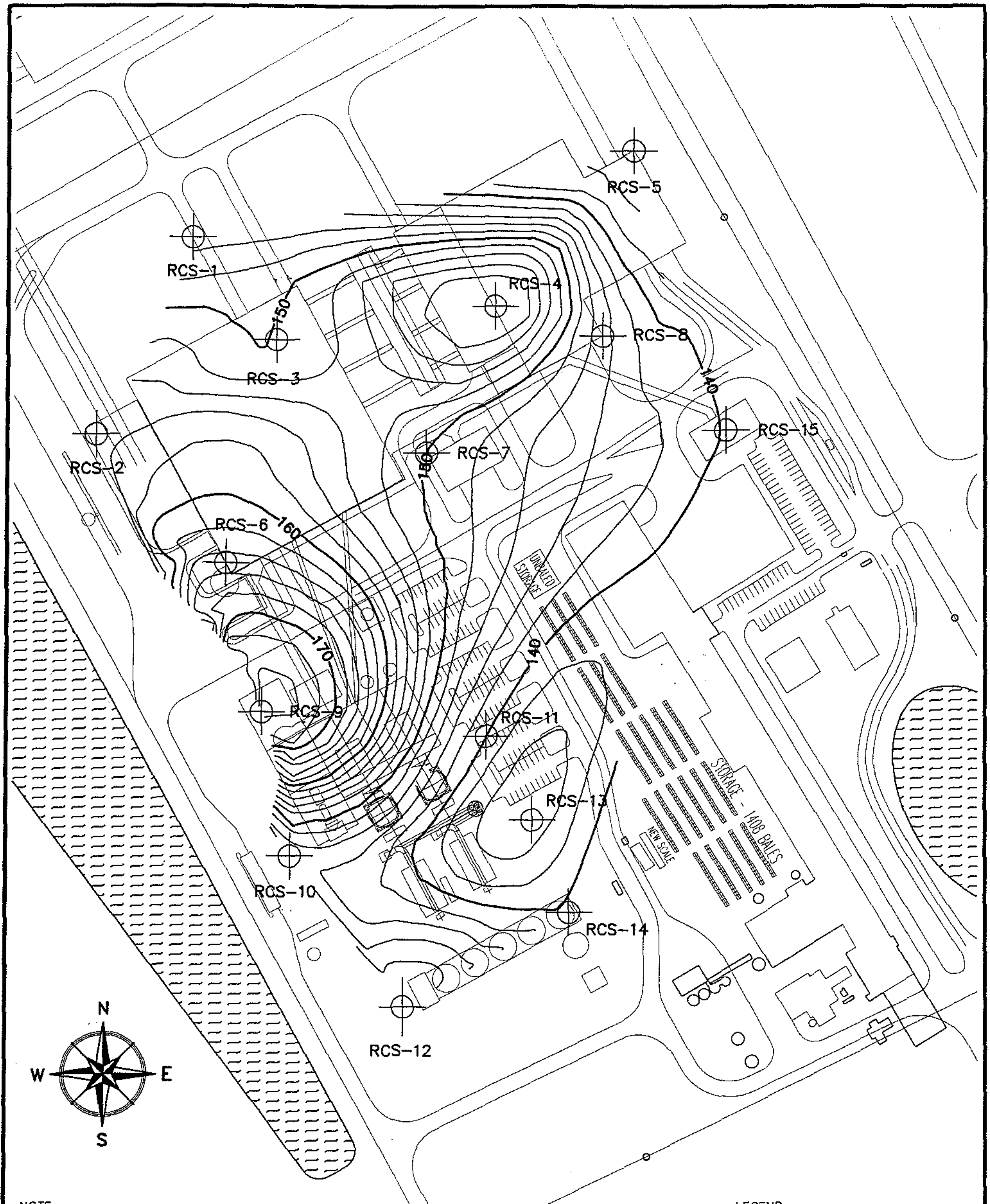
NOTE:

CONTOURS INDICATE PILE LENGTH IN FEET BASED ON A PRELIMINARY ANALYSIS USING F.O.S. OF 2.5

LEGEND:

⌖ DRILLING LOCATION

GEOCONSULT Geotechnical Engineers P.O. Box 362040, San Juan Puerto Rico 00936 Telephones (787) 782-3554 / 783-3585 Fax (787) 793-0410 / 783-6320	Project RECOVERY SOLUTION, INC.	Reference Scale : 1"=200' Date : 8/23/99 By : C.O. Revised :	Description ESTIMATED PILE LENGTH PILE TYPE: Unfilled steel pipe pile. Diameter: 12"	Code No. - Project No. 2182-99	Sheet No. FIGURE 12



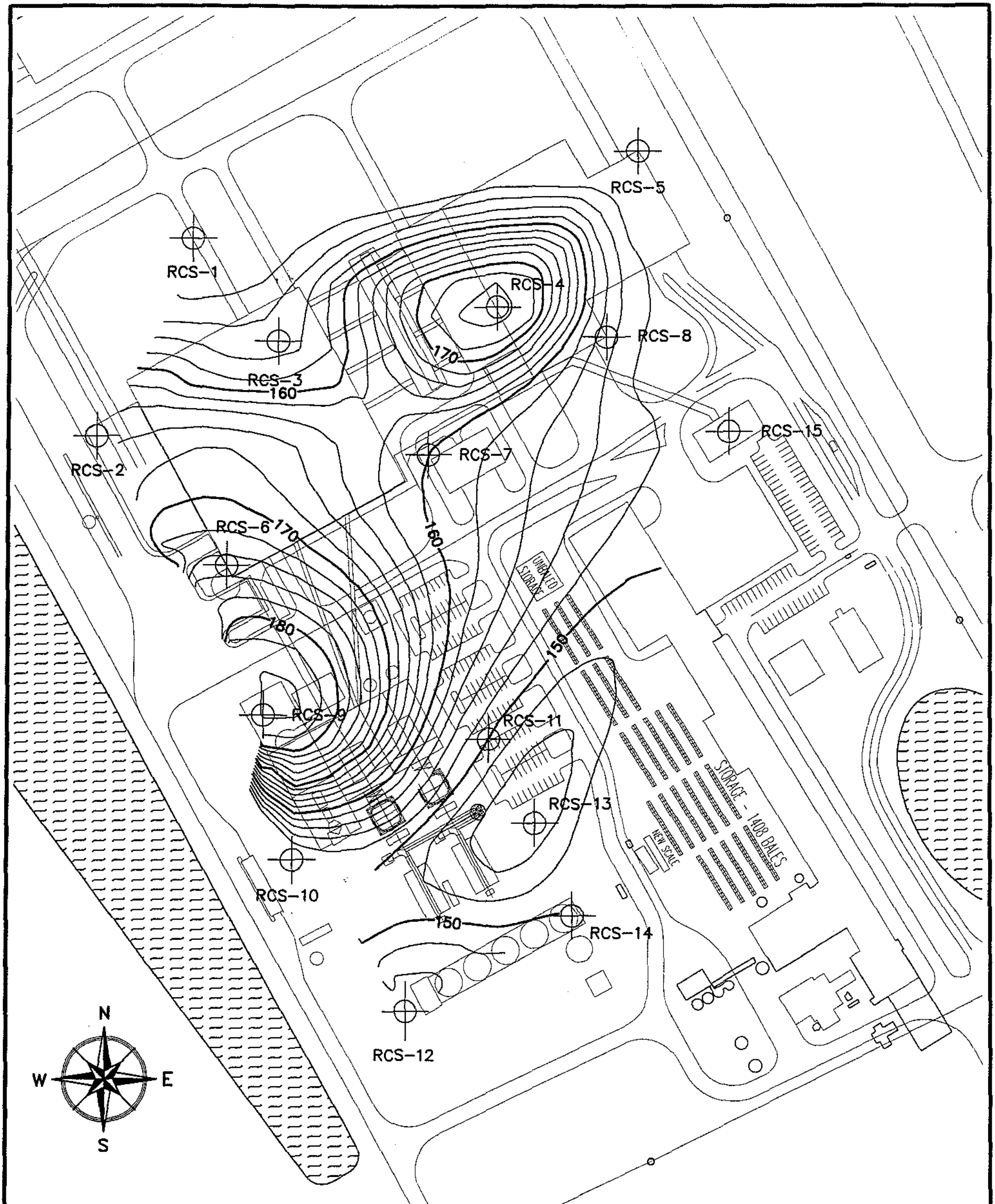
NOTE:

CONTOURS INDICATE PILE LENGTH IN FEET BASED ON A PRELIMINARY ANALYSIS USING F.O.S. OF 2.5

LEGEND:

⊕ DRILLING LOCATION

	Project	Reference	Description	Code No.	Sheet No.
GEOCONSULT Geotechnical Engineers P.O. Box 362040, San Juan Puerto Rico 00936 Telephones (787) 782-3554 / 783-3585 Fax (787) 793-0410 / 783-6320	RECOVERY SOLUTION, INC.	Scale : 1"=200' Date : 8/23/99 By : C.O. Revised :	ESTIMATED PILE LENGTH PILE TYPE: Unfilled steel pipe pile. Diameter: 18"	- Project No. 2182-99	FIGURE 13



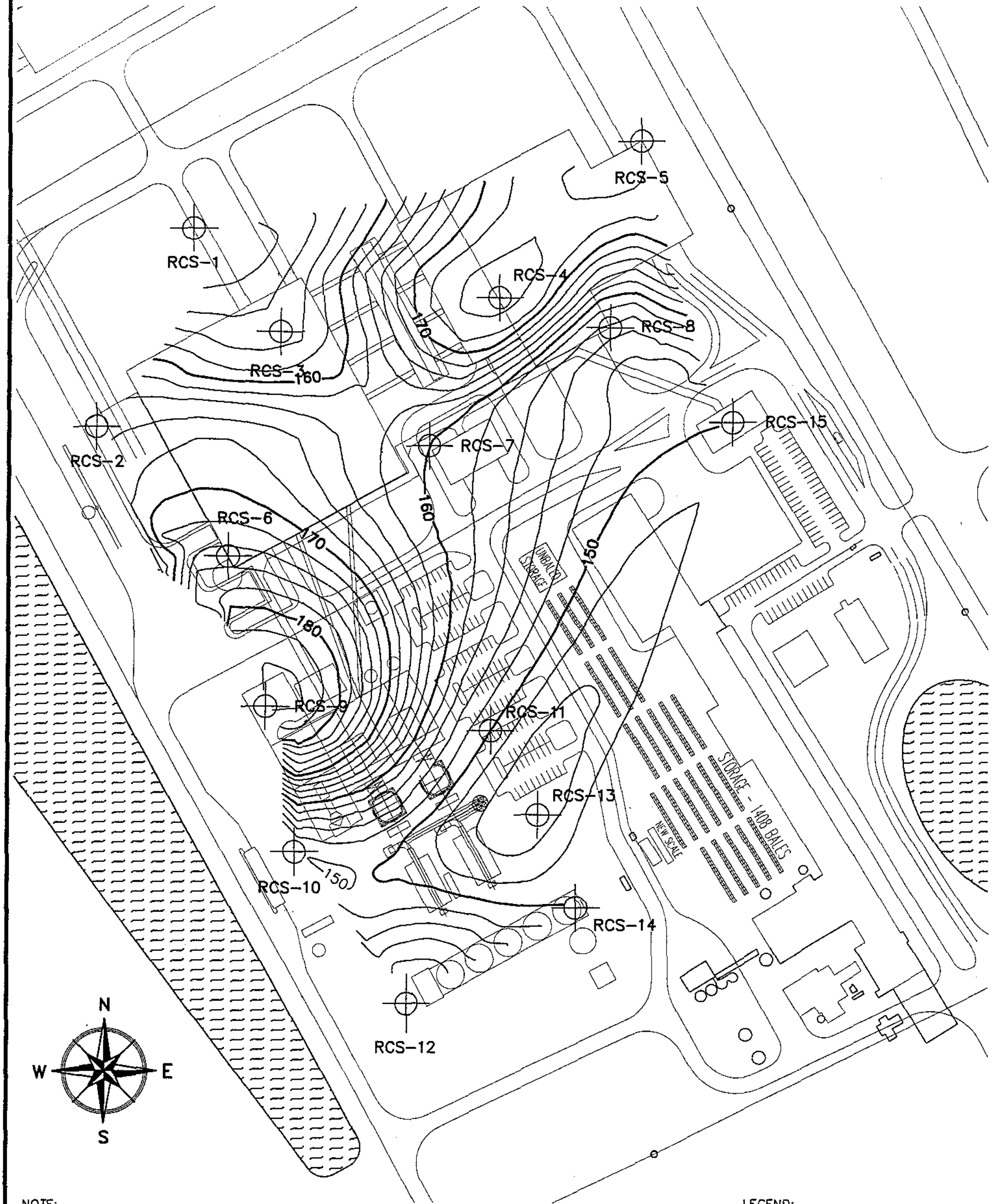
NOTE:

CONTOURS INDICATE PILE LENGTH IN FEET BASED ON A PRELIMINARY ANALYSIS USING F.O.S. OF 2.5

LEGEND:

⊕ DRILLING LOCATION

	Project	Reference	Description	Code No.	Sheet No.
GEOCONSULT Geotechnical Engineers P.O. Box 362040, San Juan Puerto Rico 00936 Telephones (787) 782-3554 / 783-3585 Fax (787) 793-0410 / 783-6320	RECOVERY SOLUTION, INC.	Scale : 1"=200' Date : 8/23/99 By : C.O. Revised :	ESTIMATED PILE LENGTH PILE TYPE: Unfilled steel pipe pile. Diameter: 24"	- Project No. 2182-99	FIGURE 14



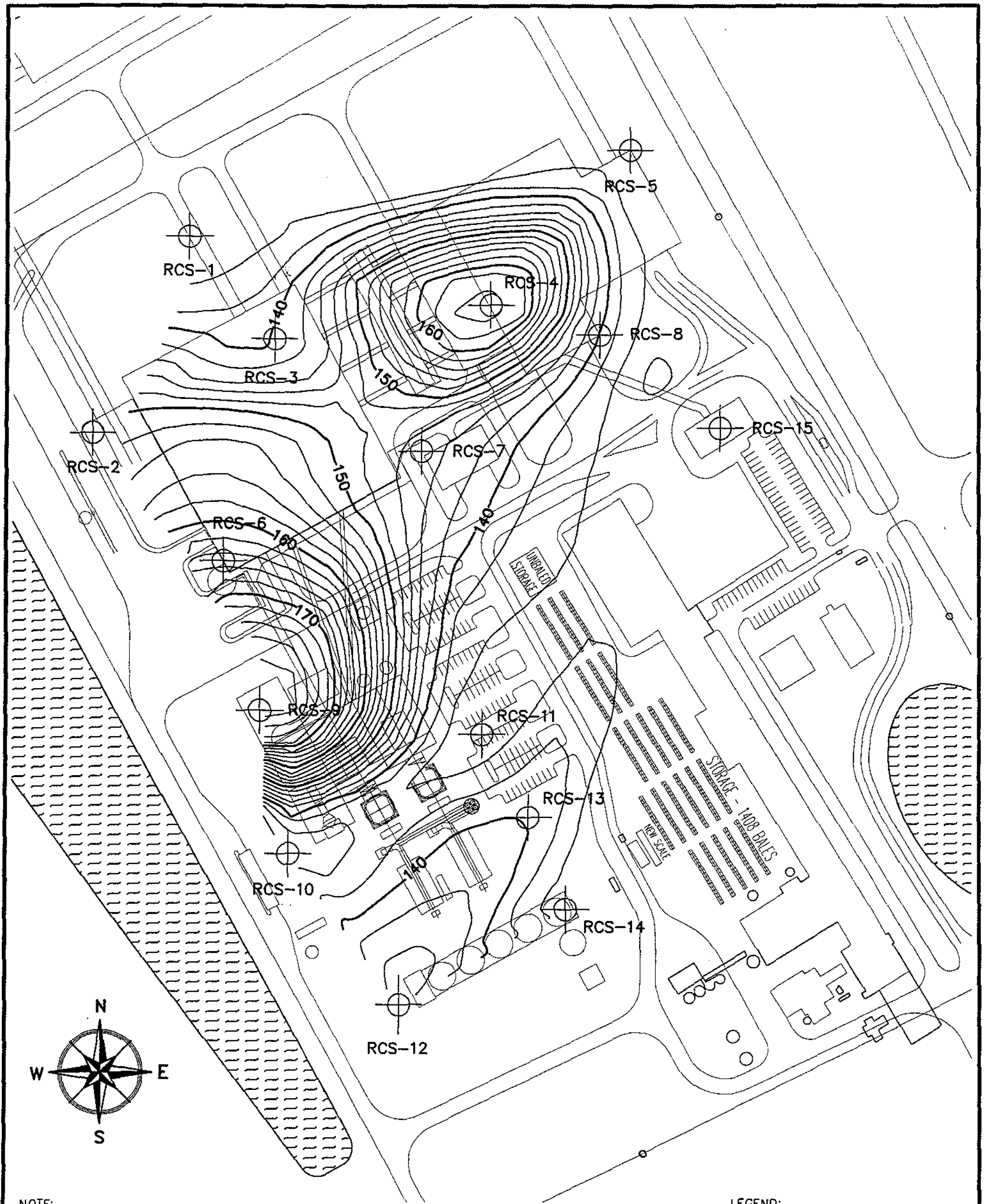
NOTE:

CONTOURS INDICATE PILE LENGTH IN FEET BASED ON A PRELIMINARY ANALYSIS USING F.O.S. OF 2.5

LEGEND:

⊕ DRILLING LOCATION

GEOCONSULT Geotechnical Engineers P.O. Box 362040, San Juan Puerto Rico 00936 Telephones (787) 782-3554 / 783-3585 Fax (787) 793-0410 / 783-6320	Project RECOVERY SOLUTION, INC.	Reference Scale : 1"=200' Date : 8/23/99 By : C.O. Revised :	Description ESTIMATED PILE LENGTH PILE TYPE: Unfilled steel pipe pile. Diameter: 30"	Code No. - Project No. 2182-99	Sheet No. FIGURE 15



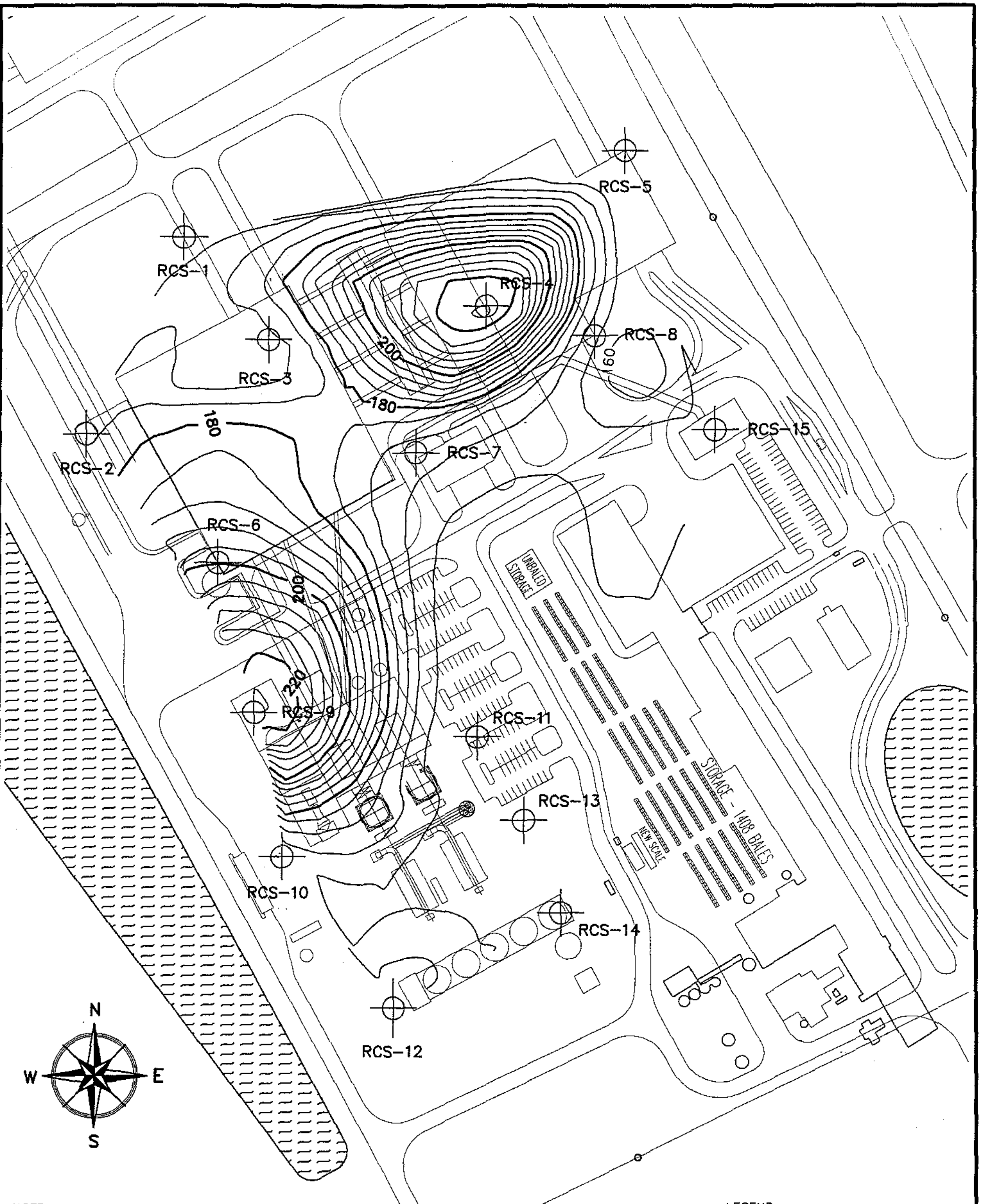
NOTE:

CONTOURS INDICATE PILE LENGTH IN FEET BASED ON A PRELIMINARY ANALYSIS USING F.O.S. OF 2.5

LEGEND:

⊕ DRILLING LOCATION

	Project	Reference	Description	Code No.	Sheet No.
GEOCONSULT Geotechnical Engineers P.O. Box 362040, San Juan Puerto Rico 00936 Telephones (787) 782-3554 / 783-3585 Fax (787) 793-0410 / 783-6320	RECOVERY SOLUTION, INC.	Scale : 1"=200' Date : 8/23/99 By : C.O. Revised :	ESTIMATED PILE LENGTH PILE TYPE: Concrete filled steel pipe pile. Diameter: 10"	- Project No. 2182-99	FIGURE 16



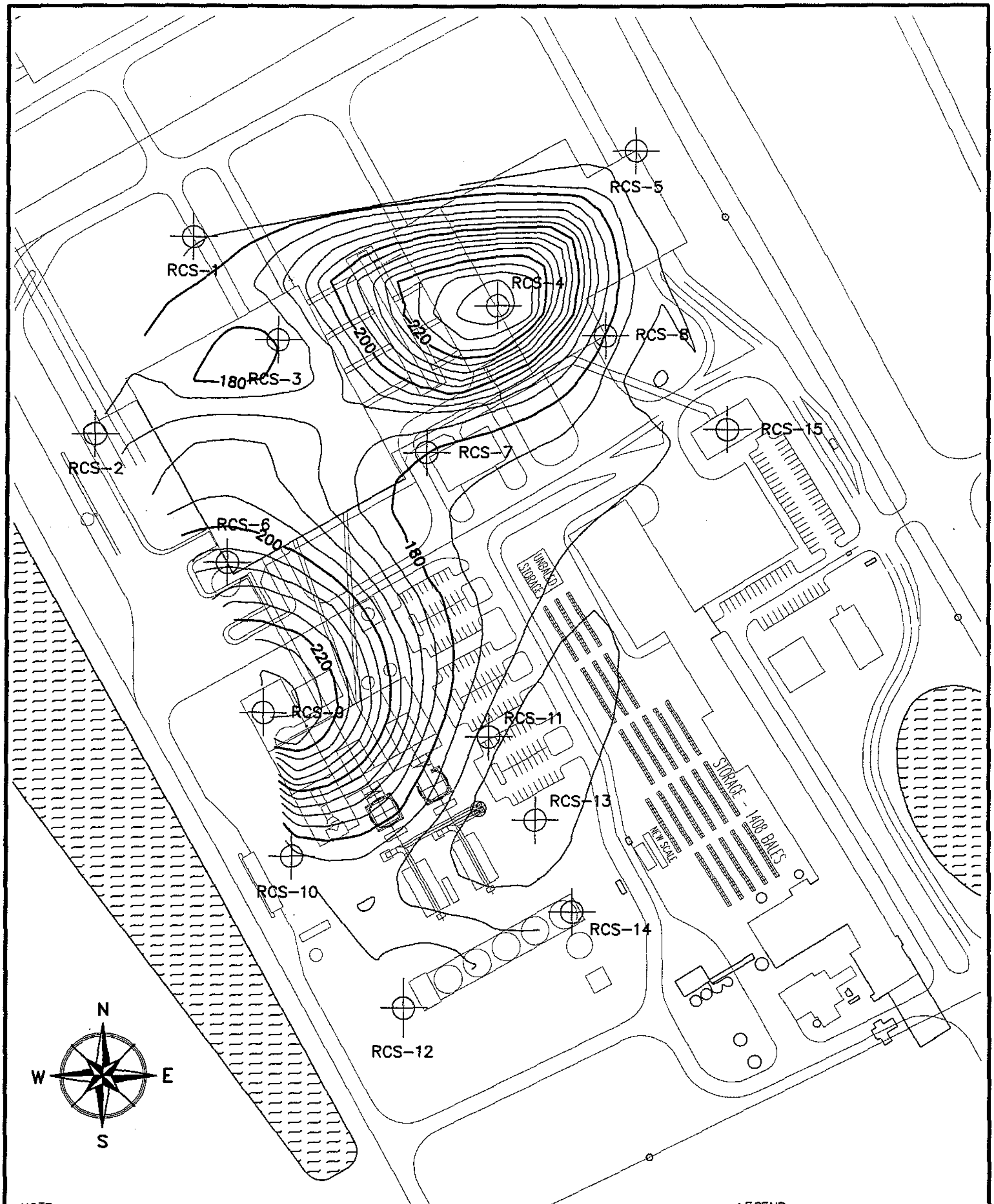
NOTE:

CONTOURS INDICATE PILE LENGTH IN FEET BASED ON A PRELIMINARY ANALYSIS USING F.O.S. OF 2.5

LEGEND:

⌖ DRILLING LOCATION

	Project	Reference	Description	Code No.	Sheet No.
GEOCONSULT Geotechnical Engineers P.O. Box 362040, San Juan Puerto Rico 00936 Telephones (787) 782-3554 / 783-3585 Fax (787) 793-0410 / 783-6320	RECOVERY SOLUTION, INC.	Scale : 1"=200' Date : 8/23/99 By : C.O. Revised :	ESTIMATED PILE LENGTH PILE TYPE: Concrete filled steel pipe pile. Diameter: 12"	- Project No. 2182-99	FIGURE 17

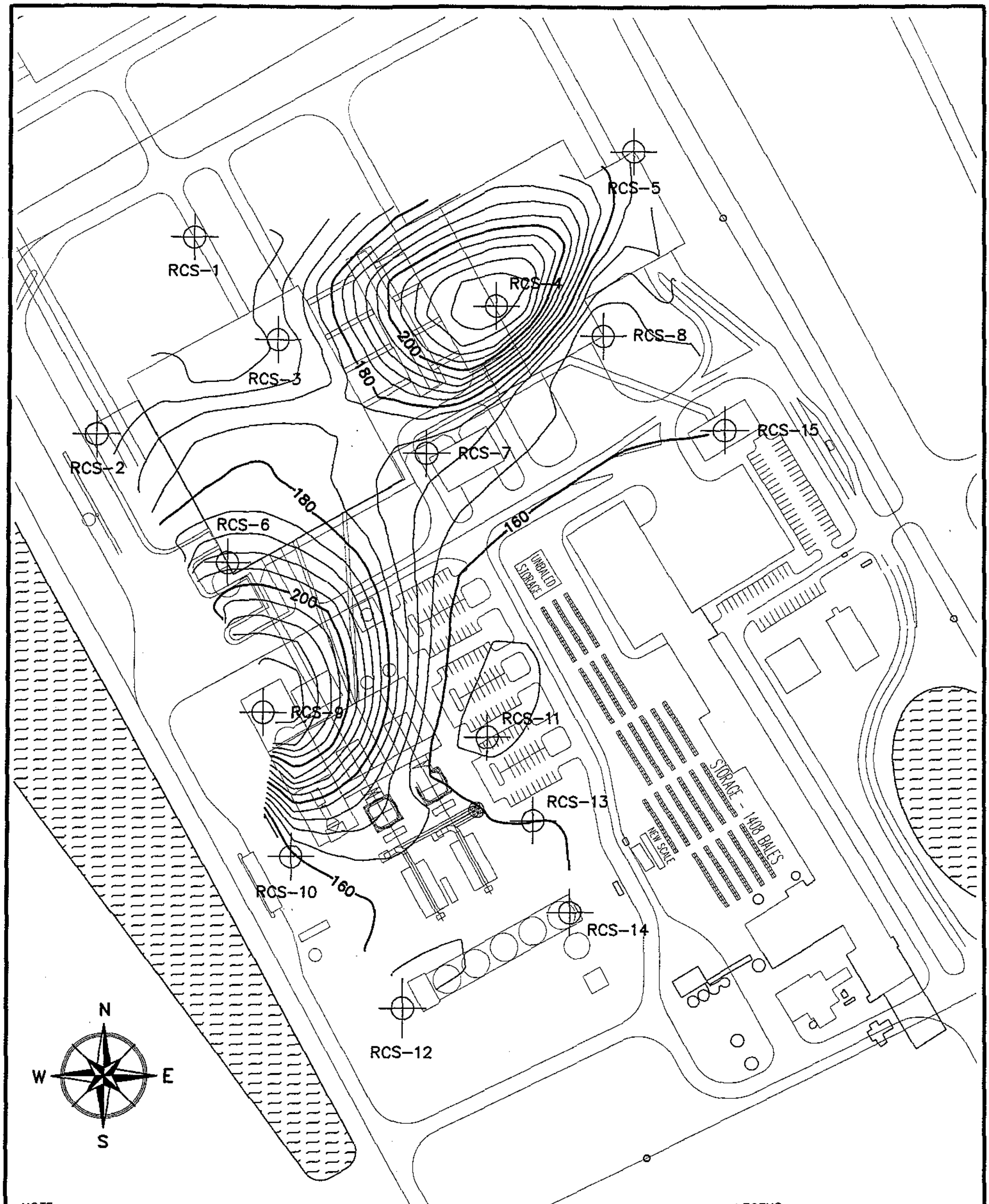


NOTE:
CONTOURS INDICATE PILE LENGTH IN FEET BASED ON A PRELIMINARY ANALYSIS USING F.O.S. OF 2.5

LEGEND:
⊕ DRILLING LOCATION

GEOCONSULT
Geotechnical Engineers
P.O. Box 362040, San Juan Puerto Rico 00936
Telephones (787) 782-3554 / 783-3585
Fax (787) 793-0410 / 783-6320

Project	Reference	Description	Code No.	Sheet No.
RECOVERY SOLUTION, INC.	Scale : 1"=200' Date : 8/23/99 By : C.O. Revised :	ESTIMATED PILE LENGTH PILE TYPE: Concrete filled steel pipe pile. Diameter: 18"	- Project No. 2182-99	FIGURE 18



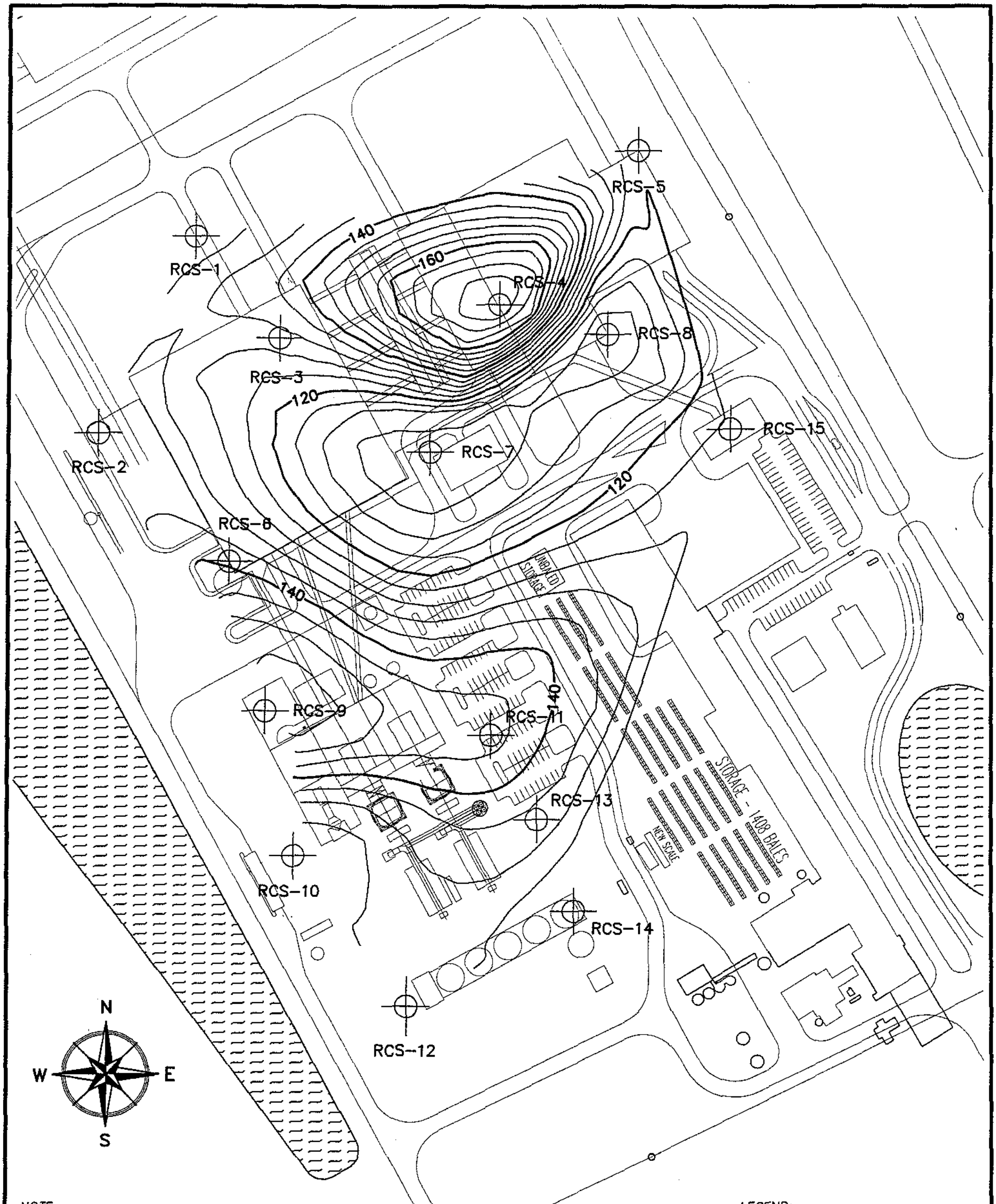
NOTE:

CONTOURS INDICATE PILE LENGTH IN FEET BASED ON A PRELIMINARY ANALYSIS USING F.O.S. OF 2.5

LEGEND:

⌖ DRILLING LOCATION

	Project	Reference	Description	Code No.	Sheet No.
GEOCONSULT Geotechnical Engineers P.O. Box 362040, San Juan Puerto Rico 00936 Telephones (787) 782-3554 / 783-3585 Fax (787) 793-0410 / 783-6320	RECOVERY SOLUTION, INC.	Scale : 1"=200' Date : 8/23/99 By : C.O. Revised :	ESTIMATED PILE LENGTH PILE TYPE: Concrete filled steel pipe pile. Diameter: 24"	· Project No. 2182-99	FIGURE 19



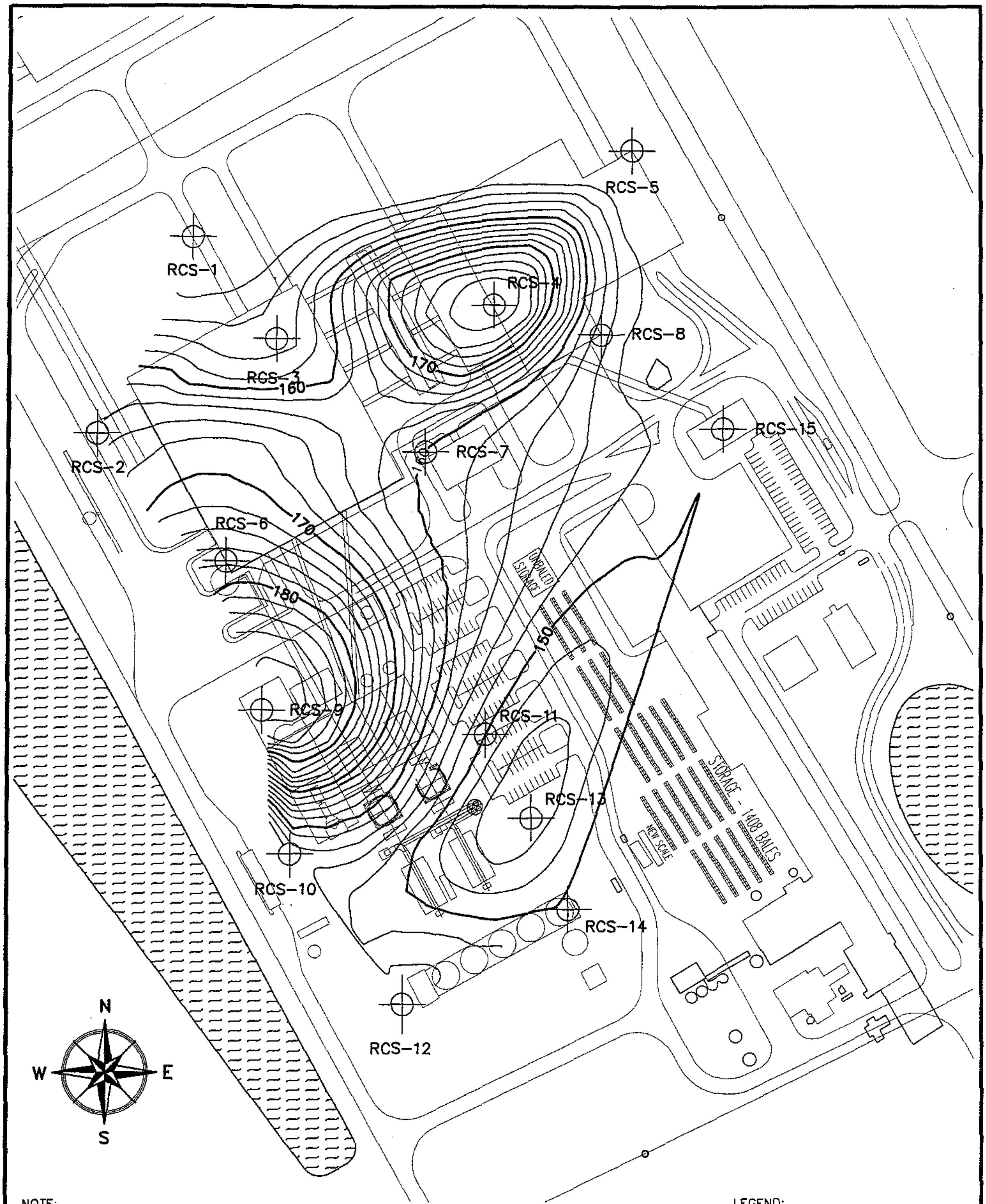
NOTE:

CONTOURS INDICATE PILE LENGTH IN FEET BASED ON A PRELIMINARY ANALYSIS USING F.O.S. OF 2.5

LEGEND:

⌖ DRILLING LOCATION

GEOCONSULT	Project	Reference	Description	Code No.	Sheet No.
Geotechnical Engineers P.O. Box 362040, San Juan Puerto Rico 00936 Telephones (787) 782-3554 / 783-3585 Fax (787) 793-0410 / 783-6320	RECOVERY SOLUTION, INC.	Scale : 1"=200' Date : 8/23/99 By : C.O. Revised :	ESTIMATED PILE LENGTH PILE TYPE: Concrete filled steel pipe pile. Diameter: 30"	· Project No. 2182-99	FIGURE 20



NOTE:

CONTOURS INDICATE PILE LENGTH IN FEET BASED ON A PRELIMINARY ANALYSIS USING F.O.S. OF 2.5

LEGEND:

⌖ DRILLING LOCATION

GEOCONSULT
Geotechnical Engineers
P.O. Box 362040, San Juan Puerto Rico 00936
Telephones (787) 782-3554 / 783-3585
Fax (787) 793-0410 / 783-6320

Project	Reference	Description	Code No.	Sheet No.
RECOVERY SOLUTION, INC.	Scale : 1"=200' Date : 8/23/99 By : C.O. Revised :	ESTIMATED PILE LENGTH PILE TYPE: Steel pipe. HP 14 x 73	. Project No. 2182-99	FIGURE 21

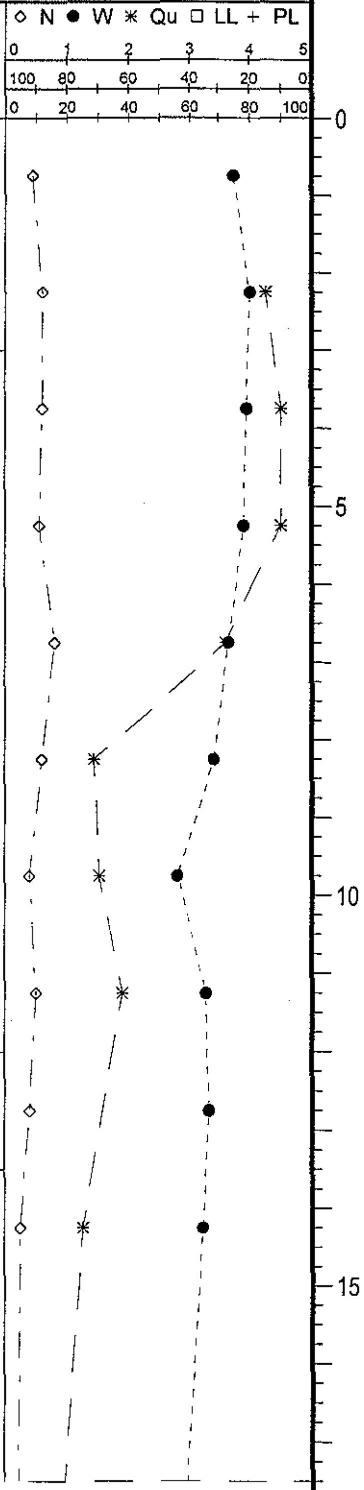
Appendix A

Boring Logs

DRILLING LOG

PROJECT RECOVERY SOLUTIONS, INC.	SHEET 1 OF 6
LOCATION Arecibo, P.R.	DRILLER / DRILL DESIGNATION Steven Perez / CME-45C
DESCRIPTION BY Jorge I. Wichy	DATE HOLE STARTED 06/02/1999 COMPLETED 06/08/1999
GROUNDWATER 13 feet	ELEVATION TOP OF HOLE 11.00 feet
TOTAL DEPTH OF HOLE 100 feet	INSPECTOR Alan R. Crumley

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
11.0	0.0								
				1	3 4 5	9	25		Silty CLAY, no reaction with HCL, dry, medium, low plasticity, dark brown
				2	5 6 6	12	20	(4.25)	As above, hard
10.1	3.0								
				3	6 6 6	12	21	(4.50)	Fat CLAY, no reaction with HCl, dry, hard, high plasticity, dark brown
				4	5 5 6	11	22	(4.50)	As above
				5	8 7 9	16	27	(3.25) 3.60	As above, moist, very stiff
				6	6 7 5	12	32	(1.50) 1.44	As above, moist, stiff, black mottled
				7	3 4 4	8	44	(1.50) 1.53	Fat CLAY, lensed with very dark grayish brown silty clay, no reaction with HCl, moist, stiff, high plasticity, dark brown
				8	6 5 5	10	35	(1.75) 1.89	Fat CLAY, no reaction with HCl, moist, stiff, high plasticity, brownish yellow mottled, gray
7.3	12.0								
	▼			9	5 4 4	8	34		Sandy fat CLAY, subangular fine sand, no reaction with HCl, moist, soft, high plasticity, brownish yellow
6.9	13.5								
				10	2 3 2	5	36	(1.00) 1.26	Fat CLAY, no reaction with HCl, moist, medium, high plasticity, olive brown mottled, gray



Continued Next Page

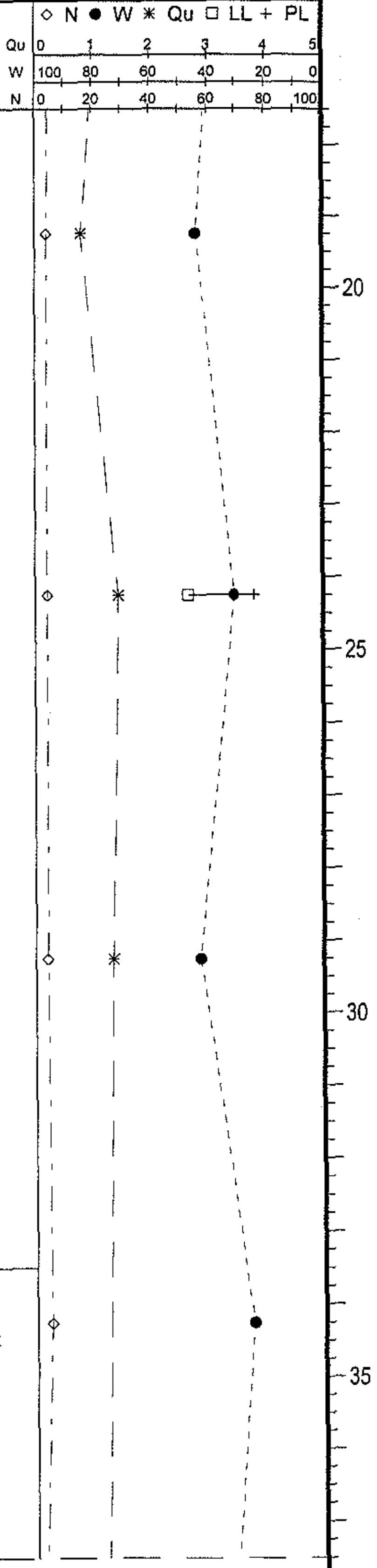
GEOCON1 2182-99.GPJ GEOCON1.GDT 8/27/99

HOLE NO. RCS-1

DRILLING LOG (Cont. Sheet)	ELEVATION TOP OF HOLE 11.00 feet	SHEET 2 OF 6

PROJECT	LOCATION
RECOVERY SOLUTIONS, INC.	Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
5.7	17.5	▨							
		▨		11	1 2 2	4	44	(0.75) 0.81	Fat CLAY, no reaction with HCl, moist, medium, high plasticity, dark gray
		▨		12	WH 2 2	4	31	(1.25) 1.44	As above, gray LL=47, PL=24, PI=23
		▨		13	1 2 2	4	43	(1.00) 1.35	As above
0.8	33.5	░							
		░		14	2 3 2	5	25		Well graded SAND with silt, loose, subangular lithic sand, weak reaction with HCl, wet, weak cementation, dark gray



Continued Next Page

DRILLING LOG (Cont. Sheet)

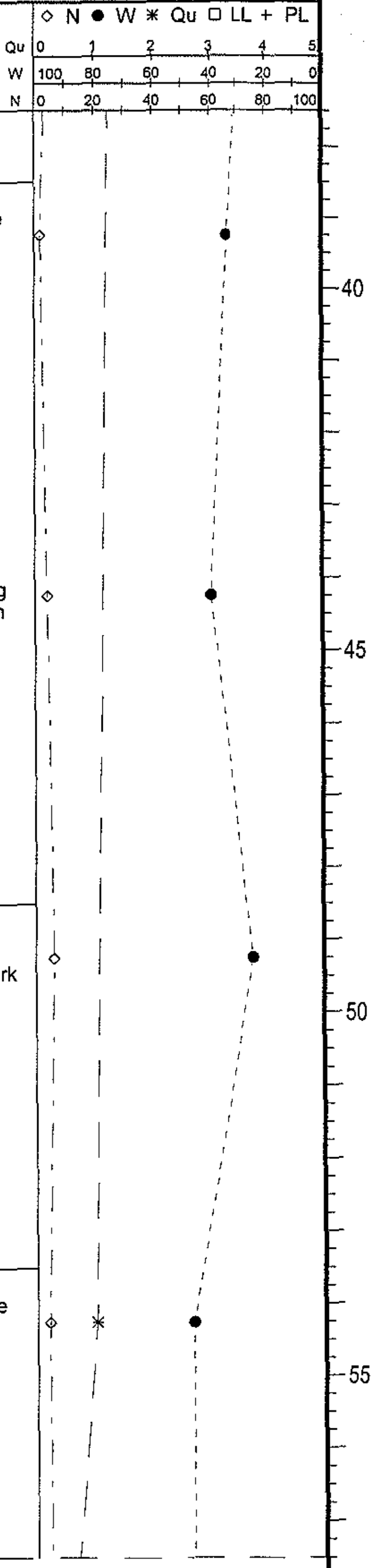
ELEVATION TOP OF HOLE
11.00 feet

SHEET 3 OF 6

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-0.4	37.5								
-0.7	38.5			15	2 1 1	2	34		Elastic SILT with sand, subangular fine sand, no reaction with HCl, moist, soft, medium plasticity, dark gray
				16	2 2 2	4	40		Sandy elastic SILT, subangular fine sand, about 9% shell fragments, strong reaction with HCl, moist, very soft, high plasticity, dark gray
-3.8	48.5			17	3 2 4	6	25		Well graded SAND with silt, loose, subangular lithic sand, strong reaction with HCl, moist, weak cementation, dark gray
-5.3	53.5			18	2 1 3	4	47	(1.00)	Elastic SILT with sand, subangular fine sand, strong reaction with HCl, moist, stiff, high plasticity, dark gray



Continued Next Page

DRILLING LOG (Cont. Sheet)

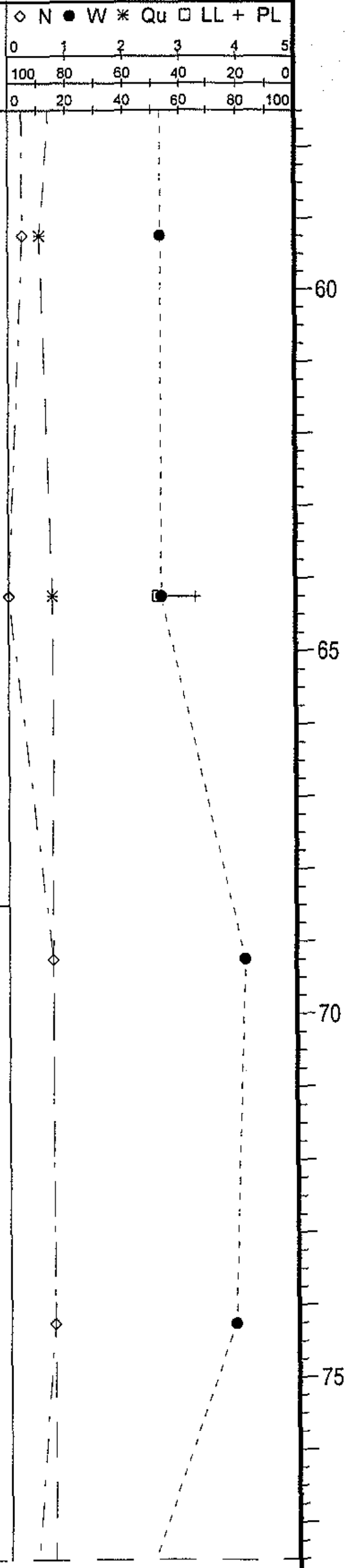
ELEVATION TOP OF HOLE
11.00 feet

SHEET 4 OF 6

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-6.5	57.5								
				19	3 2 3	5	47	(0.25) 0.54	Elastic SILT, weak reaction with HCl, moist, soft, high plasticity, gray
				20	WH WH WH	WH	47	(0.75)	As above, medium, about 4% subangular fine gravel LL=48, PL=35, PI=13
-9.9	68.5								
				21	6 9 6	15	18		Well graded SAND with silt, medium, subangular lithic sand, strong reaction with HCl, wet, weak cementation, dark gray
				22	3 6 9	15	22		As above, moist



Continued Next Page

GEOCON1 2182-99.GPJ GEOCON1.GDT 8/27/99

DRILLING LOG (Cont. Sheet)

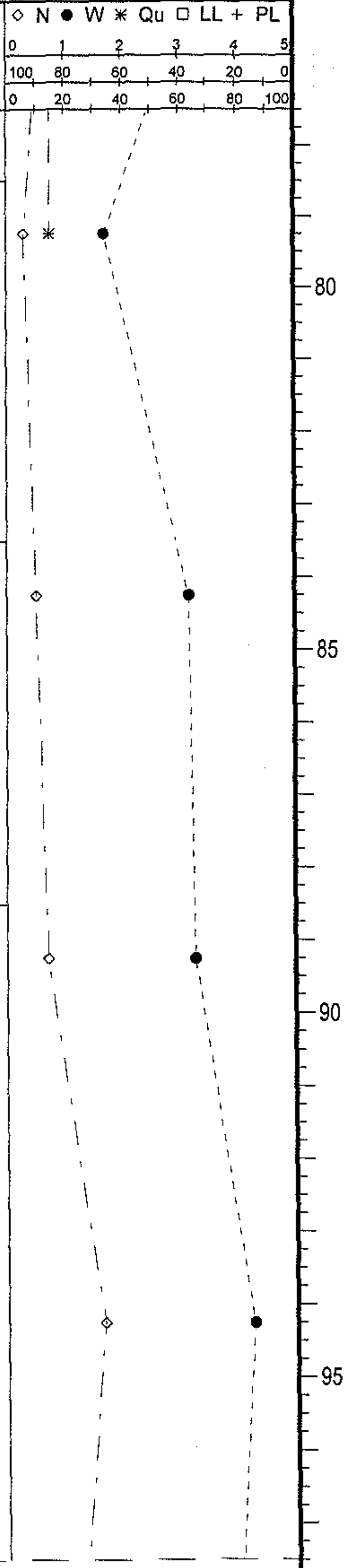
ELEVATION TOP OF HOLE 11.00 feet

SHEET 5 OF 6

PROJECT RECOVERY SOLUTIONS, INC.

LOCATION Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-12.6	77.5								
-12.9	78.5								
				23	3 3 3	6	66	(0.75)	Elastic SILT, medium, about 7% shell fragments, strong reaction with HCl, moist, high plasticity, dark gray
-14.5	83.5								
				24	4 5 5	10	37		SILT with sand, subangular fine sand, about 6% shell fragments, strong reaction with HCl, moist, soft, non plastic, dark gray
-16.0	88.5								
				25	2 4 10	14	35		Poorly graded SAND with silt, medium, subangular fine sand, strong reaction with HCl, moist, weak cementation, dark gray
				26	15 16 17	33	15		As above, dense, subangular medium medium sand



Continued Next Page

DRILLING LOG (Cont. Sheet)

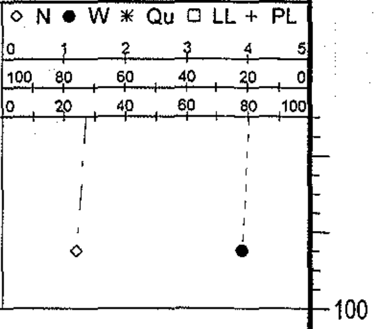
ELEVATION TOP OF HOLE: 11.00 feet

SHEET 6 OF 6

PROJECT: RECOVERY SOLUTIONS, INC.

LOCATION: Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-18.7	97.5	▨							
		▨		27	9 11 12	24	22		As above, subangular medium medium sand
-19.5	100.0								



NOTE: 1) ( ) penetrometer value
2) Qu in tons per square foot
3) N - values obtained from Standard Penetration Test, ASTM D 1586
4) The stratification lines represent approximate boundaries between soil types and the transition may be gradual.
5) These logs were prepared for a specific project and specific purpose. They should not be separated from the geotechnical engineering report.
6) Groundwater levels reported in this log were measured during drilling and may differ from the true location of groundwater table.

STATION
COORDINATES (m): x = 406197.2798 y = 229055.8595 z = 11.00

HOLE NO. RCS-2

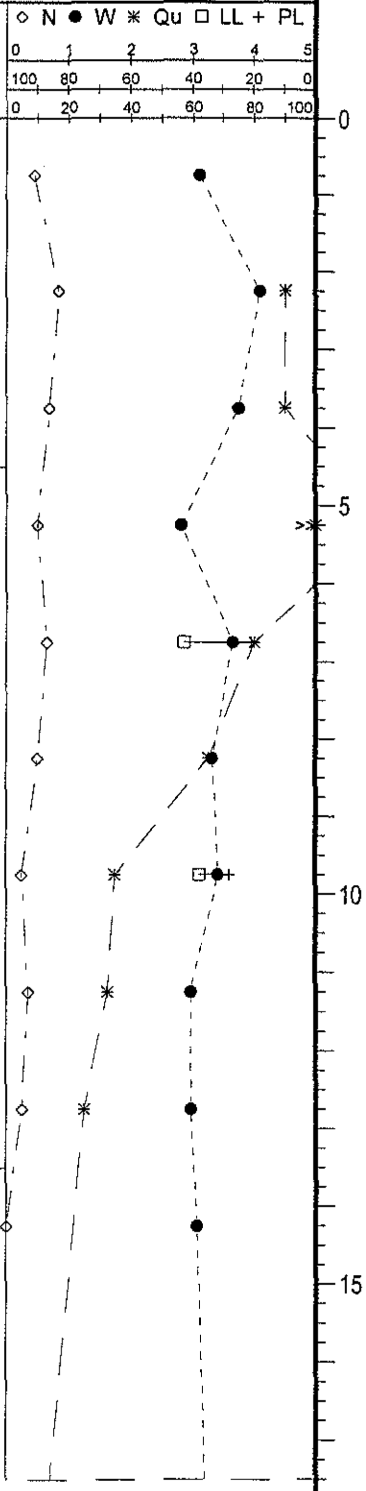
DRILLING LOG

PROJECT
RECOVERY SOLUTIONS, INC.

SHEET 1
OF 8

LOCATION Arecibo, P.R.	DRILLER / DRILL DESIGNATION Angel Ferrer / CME-55 Truck Mounted
DESCRIPTION BY Jorge I. Wichy	DATE HOLE STARTED 06/09/1999 COMPLETED 06/10/1999
GROUNDWATER 15 feet	ELEVATION TOP OF HOLE 12.50 feet
TOTAL DEPTH OF HOLE 150 feet	INSPECTOR Alan R. Crumley

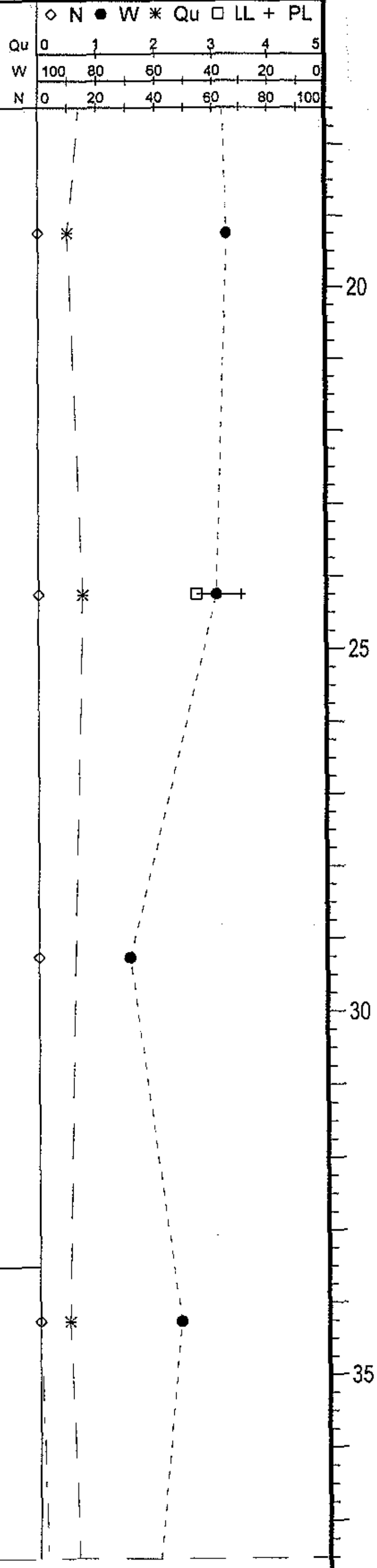
ELEV. [m] 12.5	DEPTH [feet] 0.0	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
				1	2 3 6	9	38		Lean CLAY, about 6% roots, no reaction with HCl,moist, stiff, medium plasticity, yellowish brown
				2	7 10 7	17	18	(+4.5)	As above, dry, hard
11.1	4.5			3	6 7 7	14	25	(4.50)	As above, dry, hard
				4	4 5 5	10	44	(4.50) 6.04	Fat CLAY, no reaction with HCL, dry, hard, high plasticity, dark yellowish brown
				5	5 6 7	13	27	(4.00)	As above, moist, very stiff, yellowish brown LL=43, PL=21, PI=22
				6	5 6 4	10	34	(3.25) 3.24	Fat CLAY, no reaction with HCl, moist, very stiff, high plasticity, dark brown mottled, yellowish brown
				7	2 2 3	5	32	(1.75)	As above, stiff LL=38, PL=28, PI=10
				8	3 4 3	7	41	(1.75) 1.62	As above, stiff
8.4	13.5			9	3 2 3	5	41	(1.00) 1.25	As above, stiff
				10	WH WH 2	WH	39		Elastic SILT, no reaction with HCl, moist, soft, high plasticity, brownish yellow



Continued Next Page

DRILLING LOG (Cont. Sheet)	ELEVATION TOP OF HOLE 12.50 feet	SHEET 2 OF 8
PROJECT RECOVERY SOLUTIONS, INC.	LOCATION Arecibo, P.R.	

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
7.2	17.5								
				11	WH WH 2	WH	35	(0.50)	As above, soft, dark gray
				12	WH WH WH	WH	39	(0.75)	As above, medium, dark gray LL=46, PL=30, PI=16
				13	2 WH WH	WH	69		As above, soft, dark gray
2.3	33.5								
				14	WH WH WH	WH	52	(0.50)	Fat CLAY, about 1% wood fragments, no reaction with HCl, moist, soft, high plasticity, dark gray



Continued Next Page

DRILLING LOG (Cont. Sheet)

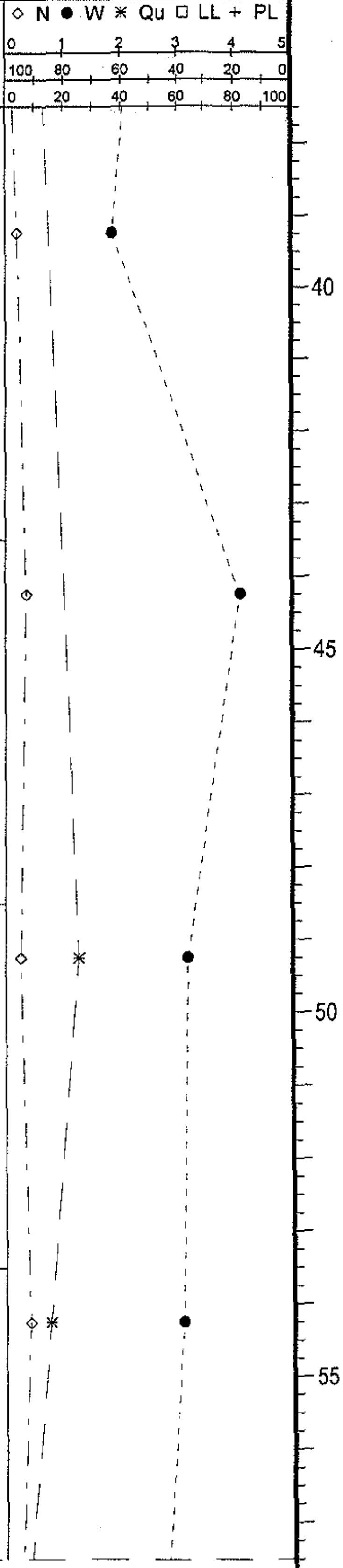
ELEVATION TOP OF HOLE
12.50 feet

SHEET 3
OF 8

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
1.1	37.5	▨							
		▨		15	WH ↑ 3	4	63		As above, at bottom (2.0 in.) dark gray sandy silt, subangular fine lithic sand
-0.8	43.5	░							
		░		16	3 3 4	7	18		Well graded SAND with silt, loose, subangular lithic sand, no reaction with HCl, moist, weak cementation, gray
-2.3	48.5	▥							
		▥		17	1 2 3	5	37	(1.25)	Silty with sand, subangular fine sand, about 10% shell fragments, strong reaction with HCl, moist, stiff, non plastic, very dark gray
-3.8	53.5	▨							
		▨		18	2 4 4	8	39	(0.75)	Fat CLAY, no reaction with HCl, medium, high plasticity, dark gray



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DRILLING LOG (Cont. Sheet)

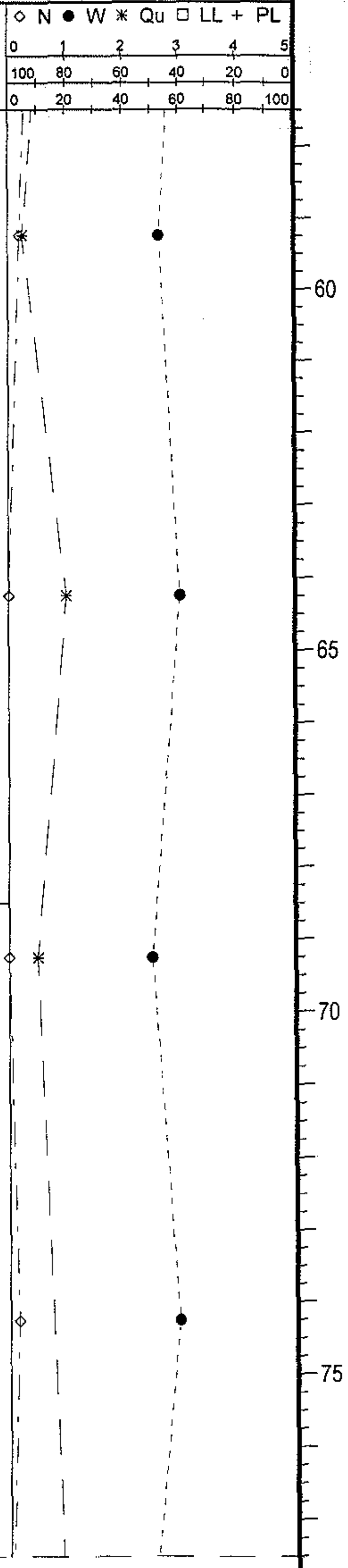
ELEVATION TOP OF HOLE 12.50 feet

SHEET 4 OF 8

PROJECT RECOVERY SOLUTIONS, INC.

LOCATION Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-5.0	57.5						
		19	WH 2 2	4	47	(0.25)	As above, soft, olive gray
		20	WH WH 2	WH	40	(1.00)	As above, olive gray
-8.4	68.5						
		21	2 WH 1	WH	50	(0.50)	Elastic SILT, about 9% shell fragments, strong reaction with HCl, moist, soft, high plasticity, dark gray
		22	2 2 1	3	41		Elastic SILT with sand, subangular fine sand, weak reaction with HCl, moist, medium, high plasticity, dark gray



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DRILLING LOG (Cont. Sheet)

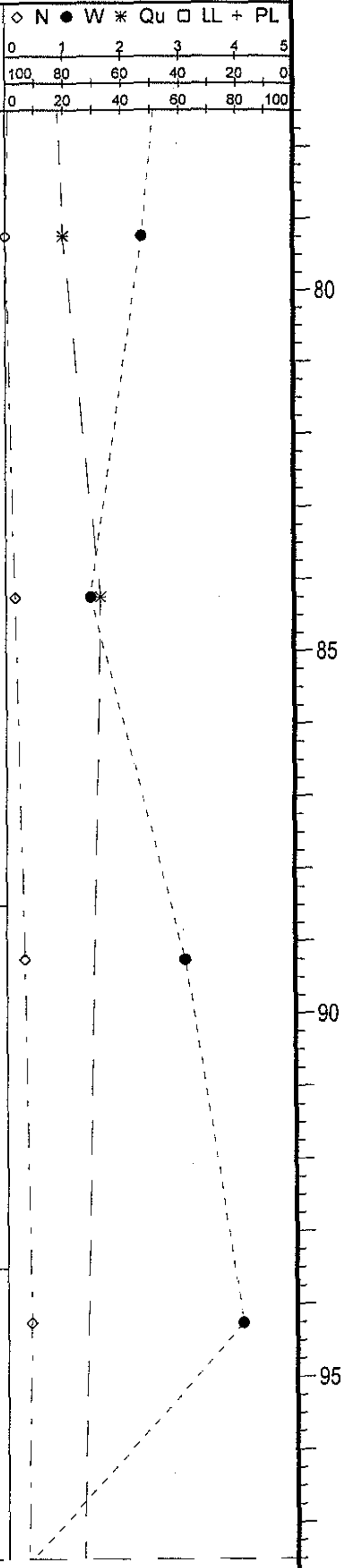
ELEVATION TOP OF HOLE
12.50 feet

SHEET 5
OF 8

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-11.1	77.5								
				23	WH WH 1	WH	53	(1.00)	Elastic SILT, about 1% shell and coral fragments, strong reaction with HCl, moist, stiff, high plasticity, dark gray
				24	WH 2 1	3	71	(1.25) 1.62	As above, about 3% shell fragments
-14.5	88.5								
				25	WH 5 1	6	39		Sandy silty CLAY, subangular fine sand, about 10% shell fragments, strong reaction with HCl, wet, very soft, very dark brown
-16.0	93.5								
				26	5 4 4	8	19		Elastic SILT, no reaction with HCl, moist, stiff, high plasticity, very dark gray



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GEOCON2 2182-99.GPJ GEOCON1.GDT 8/27/99

DRILLING LOG (Cont. Sheet)

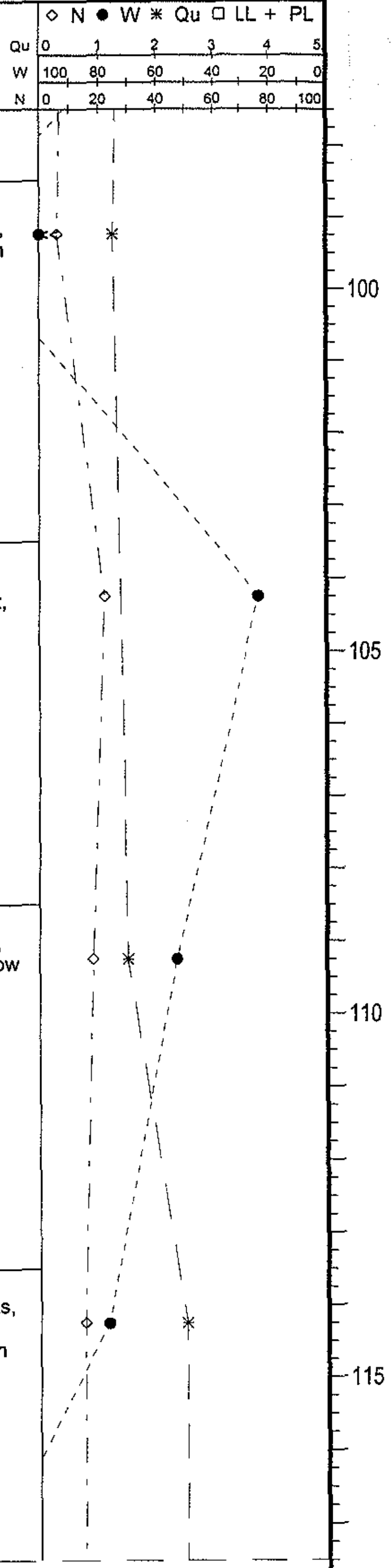
ELEVATION TOP OF HOLE
12.50 feet

SHEET 6 OF 8

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-17.2	97.5								
		▥							
-17.5	98.5								
		▨	☒	27	2 2 4	6	131	(1.25)	Fat CLAY, no reaction with HCl, moist, stiff, high plasticity, dark grayish brown
-19.0	103.5								
		░	☒	28	8 8 14	22	24		Silty SAND, medium, subangular fine lithic sand, no reaction with HCl, moist, weak cementation, dark gray
-20.6	108.5								
		▨	☒	29	3 7 11	18	53	(1.50)	Silty CLAY, about 7% shell fragments, strong reaction with HCl, moist, stiff, low plasticity, very dark gray
-22.1	113.5								
		▥	☒	30	5 6 9	15	77	(2.50)	Elastic SILT, about 2% shell fragments, weak reaction with HCl, moist, very stiff, high plasticity, dark grayish brown



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GEOCON2 2182-99.GPJ GEOCON1.GDT 8/27/99

DRILLING LOG (Cont. Sheet)

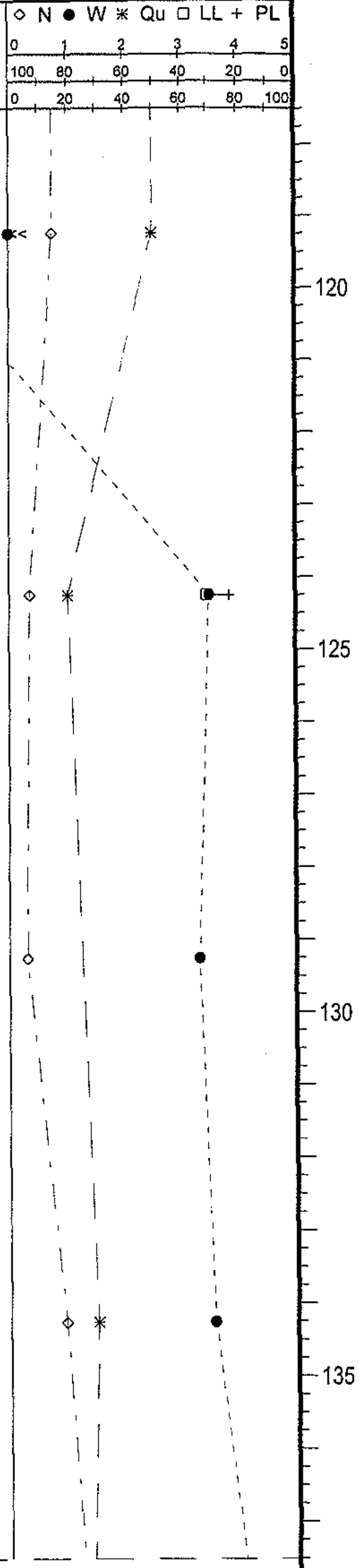
ELEVATION TOP OF HOLE
12.50 feet

SHEET 7 OF 8

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-23.3	117.5								
				31	5 7 8	15	139	(2.50)	As above
				32	WH 2 5	7	30	(1.00)	As above, dark gray LL=31, PL=23, PI=8
				33	WH 2 4	6	34		As above, strong reaction with HCl, dark gray.
				34	7 9 10	19	29	(1.50)	Elastic SILT, weak reaction with HCl, moist, stiff, high plasticity, dark gray



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DRILLING LOG (Cont. Sheet)

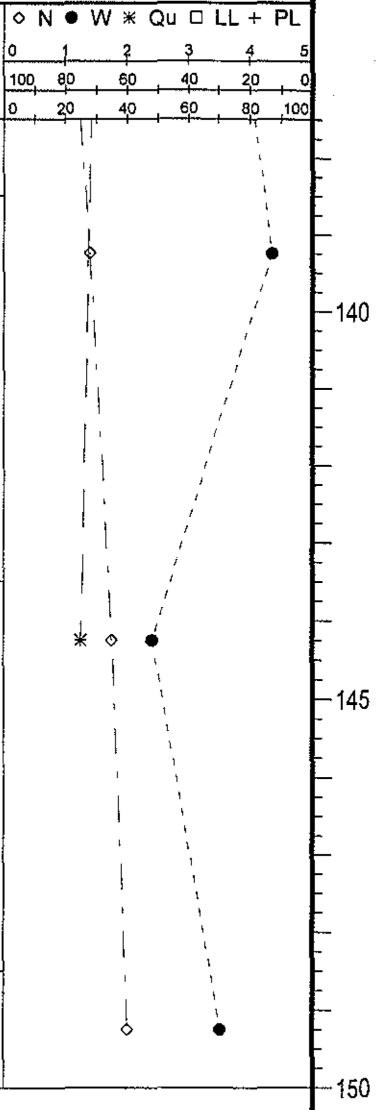
ELEVATION TOP OF HOLE
12.50 feet

SHEET 8 OF 8

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-29.4	137.5								
-29.7	138.5								
				35	12 10 18	28	13		Silty SAND, medium, subangular medium lithic sand, no reaction with HCl, moist, weak cementation, gray
-31.2	143.5								
				36	6 13 22	35	52	(1.25)	Elastic SILT, about 15% shell fragments, strong reaction with HCl, moist, stiff, high plasticity, very dark gray
-32.8	148.5								
				37	10 18 22	40	30		Poorly graded SAND with silt, very dense, subangular medium sand, weak reaction with HCl, moist, weak cementation, gray
-33.2	150.0								



NOTE:
1) ( ) penetrometer value
2) Qu in tons per square foot
3) N - values obtained from Standard Penetration Test, ASTM D 1586
4) The stratification lines represent approximate boundaries between soil types and the transition may be gradual.
5) These logs were prepared for a specific project and specific purpose. They should not be separated from the geotechnical engineering report.
6) Groundwater levels reported in this log were measured during drilling and may differ from the true location of groundwater table.
7) Boreholes drilled with automatic SPT.

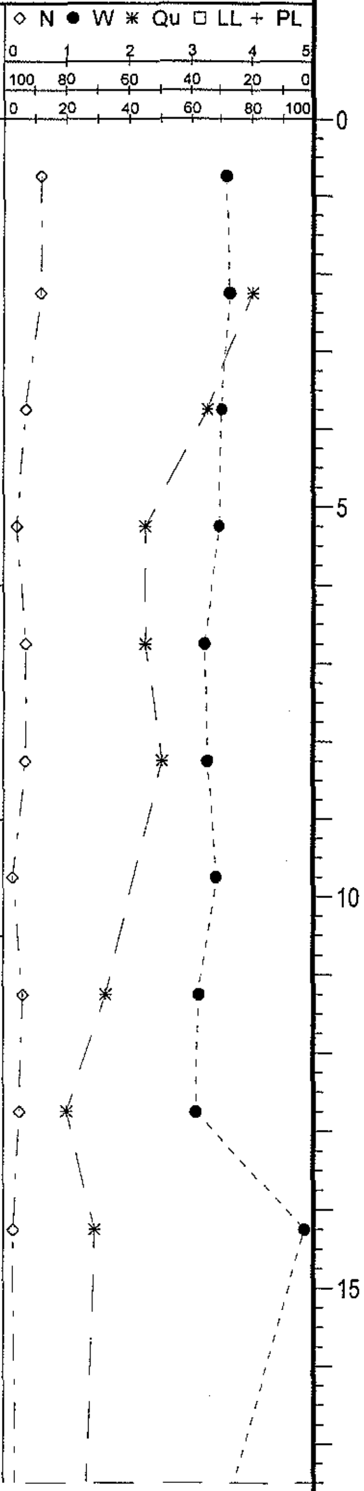
STATION
COORDINATES (m): x = 406050.7831 y = 228751.6886 z = 12.50

HOLE NO. RCS-3

DRILLING LOG	PROJECT RECOVERY SOLUTIONS, INC.	*SHEET 1 OF 8*

LOCATION Arecibo, P.R.	DRILLER / DRILL DESIGNATION Steven Perez / CME-45C
DESCRIPTION BY Jorge I. Wichy	DATE HOLE STARTED 06/11/1999 COMPLETED 06/15/1999
GROUNDWATER 9.5 feet	ELEVATION TOP OF HOLE 11.25 feet
TOTAL DEPTH OF HOLE 150 feet	INSPECTOR Alan R. Crumley

ELEV. [m] 11.3	DEPTH [feet] 0.0	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
		▨		1	3 6 6	12	28		Lean CLAY, dry, hard, medium plasticity, no reaction with HCl, dark yellowish brown
		▨		2	4 5 7	12	27	(4.00)	As above, moist, very stiff
		▨		3	4 4 3	7	30	(3.25)	As above, moist, very stiff
9.4	6.0	▨		4	1 2 2	4	31	(2.25)	As above, moist, very stiff, yellowish brown
		▨		5	2 3 4	7	36	(2.25)	Fat CLAY, moist, very stiff, high plasticity, lensed with yellowish brown lean clay, no reaction with HCl, dark yellowish brown
8.5	9.0	▨		6	2 4 3	7	35	(2.00) 2.52	As above, brownish yellow
8.0	▼ 10.5	▥		7	WH 1 2	3	32		SILT, moist, soft, non plastic, oxidation stains, no reaction with HCl, brownish yellow
		▨		8	2 3 3	6	38	(1.50) 1.62	Fat CLAY, moist, stiff, high plasticity, dark brown and gray mottled, no reaction with HCl, yellowish brown
		▨		9	2 3 2	5	39	(1.00)	As above, dark brown mottled, dark gray
		▨		10	1 1 2	3	3	(0.75) 1.44	Fat CLAY, moist, medium, high plasticity, black mottled, no reaction with HCl, brownish yellow



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DRILLING LOG (Cont. Sheet)

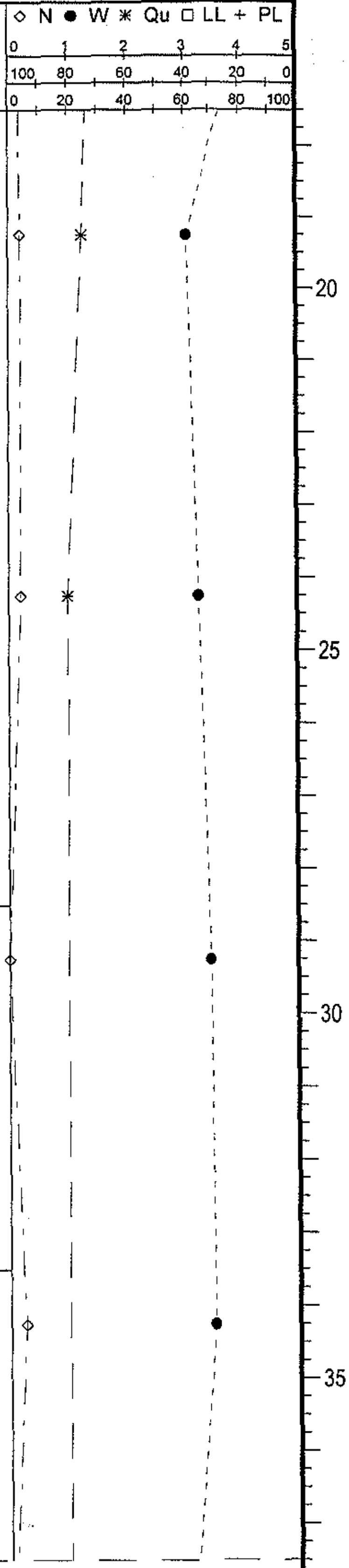
ELEVATION TOP OF HOLE
11.25 feet

SHEET 2 OF 8

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
5.9	17.5								
				11	1 2 2	4	39	(1.25)	Fat CLAY, moist, stiff, high plasticity, no reaction with HCl, dark gray
				12	WH 2 2	4	35	(1.00)	As above
2.6	28.5								
				13	WH WH 2	WH	31		SILT with sand, moist, very soft, non plastic, subangular fine lithic sand, no reaction with HCl, dark gray
1.0	33.5								
				14	2 2 3	5	30		Poorly graded SAND with silt, moist, weak cementation, loose, subangular medium lithic sand, no reaction with HCl, dark gray



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DRILLING LOG (Cont. Sheet)

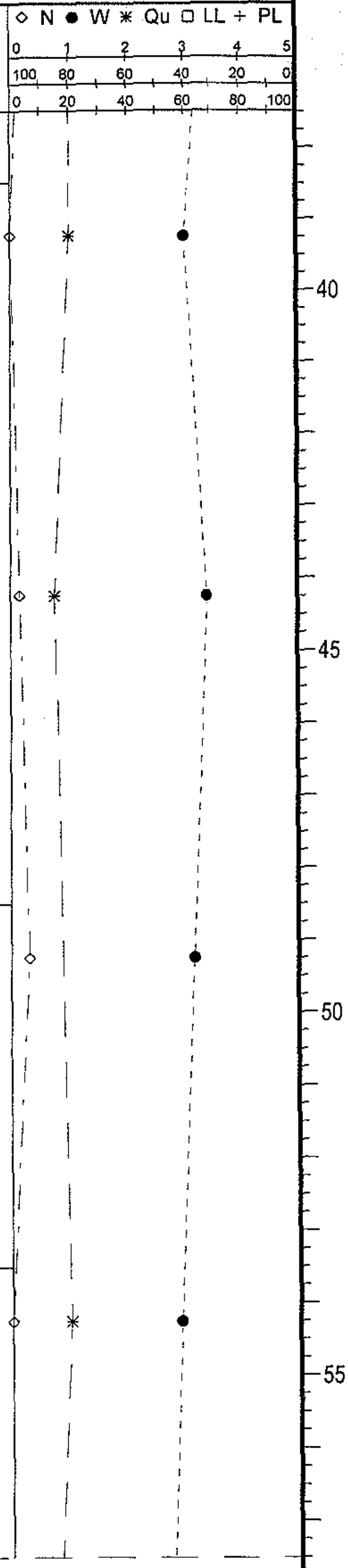
ELEVATION TOP OF HOLE
11.25 feet

SHEET 3 OF 8

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-0.2	37.5								
-0.5	38.5								
				15	WH WH 1	WH	40	(1.00)	Elastic SILT, moist, medium, high plasticity, no reaction with HCl, dark gray
				16	WH 1 2	3	32	(0.75)	As above
-3.5	48.5								
				17	1 3 3	6	37		SILT with sand, moist, non plastic, subangular fine lithic sand, about 3% shell fragments, no reaction with HCl, dark gray
-5.1	53.5								
				18	WH WH 2	WH	42	(1.00)	Elastic SILT, moist, medium, high plasticity, weak reaction with HCl, dark gray



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GEOCON1 2182-99.GPJ GEOCON1.GDT 8/27/99

DRILLING LOG (Cont. Sheet)

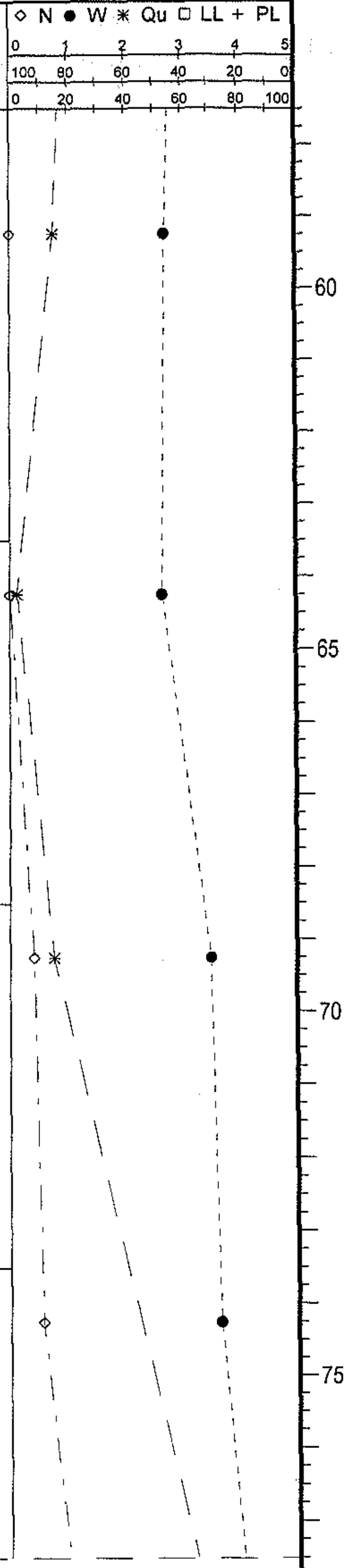
ELEVATION TOP OF HOLE
11.25 feet

SHEET 4
OF 8

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-6.3	57.5								
				19	WH WH WH	WH	46	(0.75)	As above, gray
-8.1	63.5								
				20	WH WH 6	WH	47	(0.13)	Fat CLAY, moist, very soft, high plasticity, no reaction with HCl, gray
-9.6	68.5								
				21	3 3 5	8	30	(0.75)	SILT with sand, moist, medium, non plastic, subangular fine lithic sand, about 6% shell fragments, strong reaction with HCl, very dark gray
-11.2	73.5								
				22	5 5 6	11	27		Silty SAND, moist, weak cementation, medium, subangular fine lithic sand, about 7% shell fragments, strong reaction with HCl, dark gray



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DRILLING LOG (Cont. Sheet)

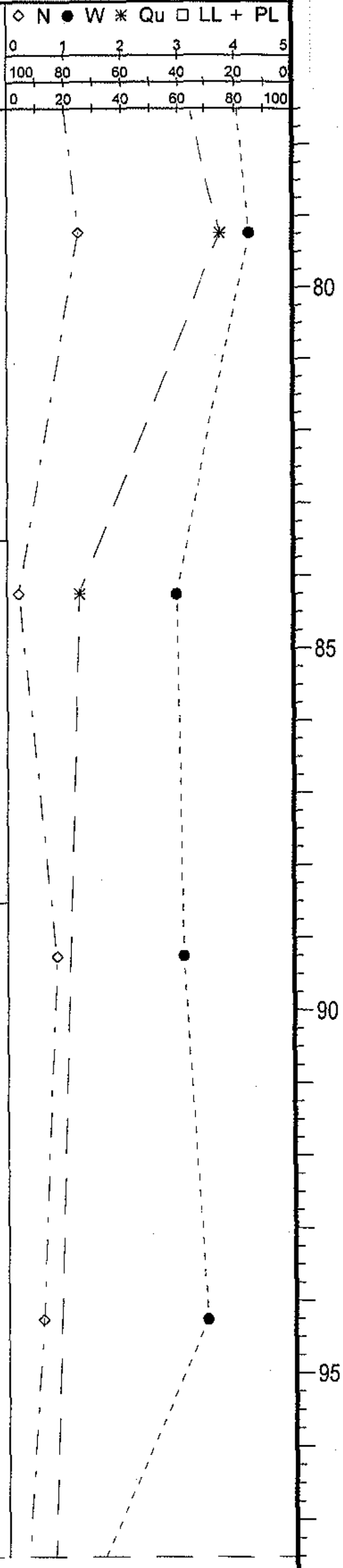
ELEVATION TOP OF HOLE 11.25 feet

SHEET 5 OF 8

PROJECT RECOVERY SOLUTIONS, INC.

LOCATION Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-12.4	77.5								
				23	8 11 14	25	15	(3.75)	As above, moderate cementation, subangular medium lithic sand, gray
-14.2	83.5								
				24	2 2 2	4	41	(1.25)	Elastic SILT, stiff, high plasticity, about 6% shell fragments, strong reaction with HCl, very dark gray
-15.7	88.5								
				25	6 7 10	17	39		Sandy SILT, moist, soft, non plastic, subangular fine lithic sand, strong reaction with HCl, very dark gray
				26	5 6 6	12	31		As above, no reaction with HCl, dark gray



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DRILLING LOG (Cont. Sheet)

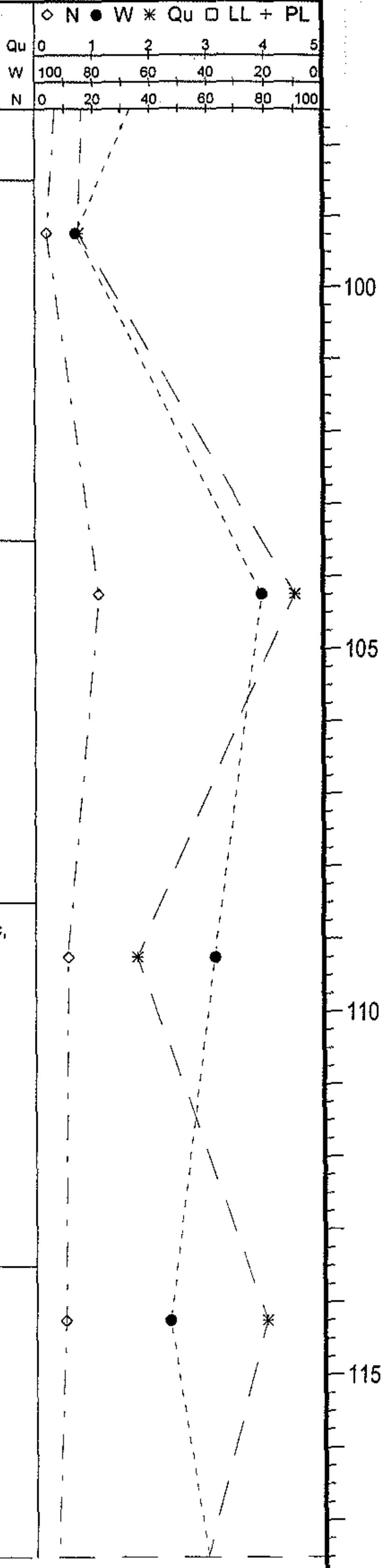
ELEVATION TOP OF HOLE
11.25 feet

SHEET 6
OF 8

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-18.5	97.5								
-18.8	98.5			27	2 2 2	4	86	(0.75)	Elastic SILT, moist, medium, high plasticity, no reaction with HCl, dark grayish brown
-20.3	103.5			28	9 10 12	22	21	(+4.5)	Poorly graded SAND with silt, moist, moderate cementation, medium, subangular fine lithic sand, no reaction with HCl, gray
-21.8	108.5			29	6 5 6	11	38	(1.75)	SILT with sand, moist, stiff, non plastic, subangular fine lithic sand, about 9% shell fragments, strong reaction with HCl, very dark gray
-23.3	113.5			30	6 5 5	10	54	(4.00)	Elastic SILT, moist, very stiff, high plasticity, no reaction with HCl, dark gray



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GEOCON1 2182-99.GPJ GEOCON1.GDT 8/27/99

DRILLING LOG (Cont. Sheet)

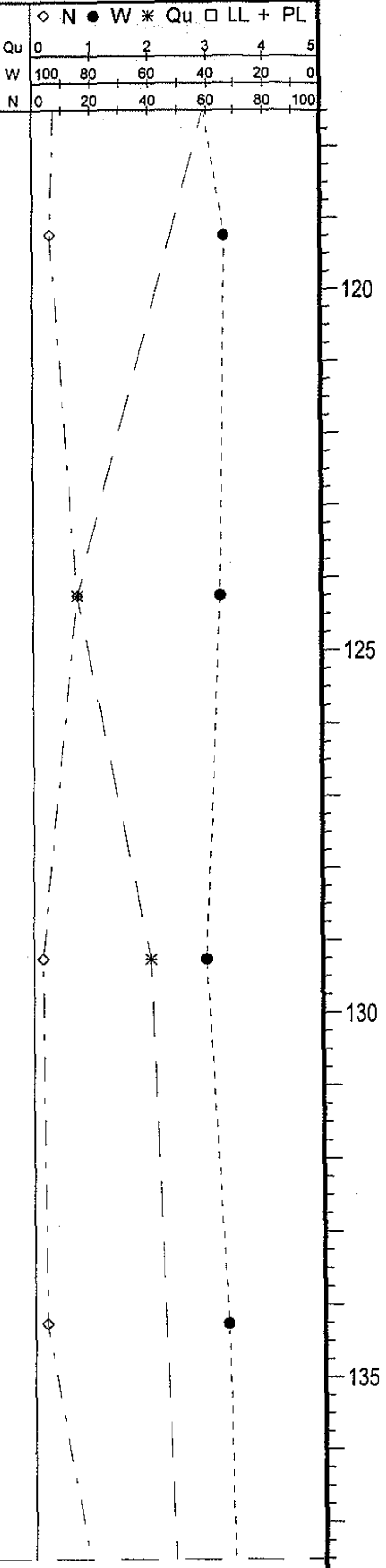
ELEVATION TOP OF HOLE 11.25 feet

SHEET 7 OF 8

PROJECT RECOVERY SOLUTIONS, INC.

LOCATION Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-24.6	117.5								
				31	WH 1 5	6	34		As above, stiff
				32	3 6 9	15	36	(0.75)	As above, medium, gray
				33	WH 1 2	3	41	(2.00)	As above
				34	WH 1 3	4	34		As above



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GEOCON1 2182-99.GPJ GEOCON1.GDT 8/27/99

DRILLING LOG (Cont. Sheet)

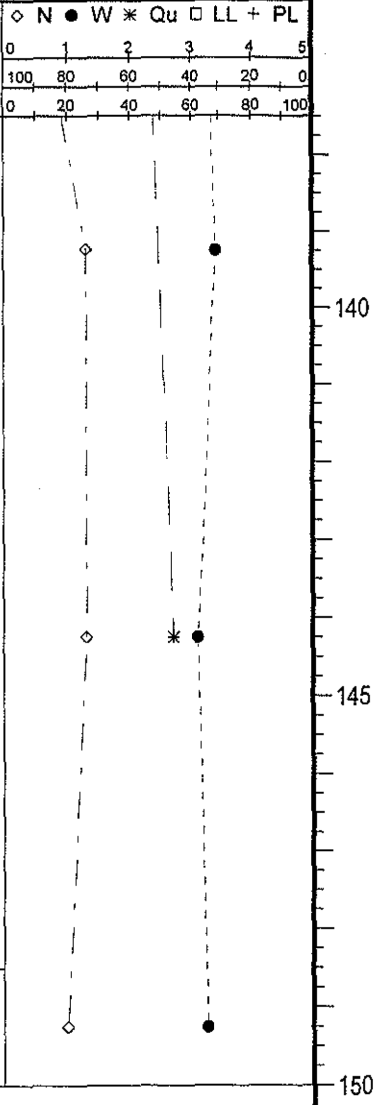
ELEVATION TOP OF HOLE
11.25 feet

SHEET 8
OF 8

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-30.7	137.5								
				35	3 11 15	26	31		As above, soft, about 14% subangular coarse lithic sand
				36	9 13 13	26	38	(2.75) 2.70	As above
-34.0	148.5								
				37	6 8 12	20	35		Well graded SAND with silt, moist, weak cementation, medium, subangular lithic sand, no reaction with HCl, dark gray
-34.5	150.0								



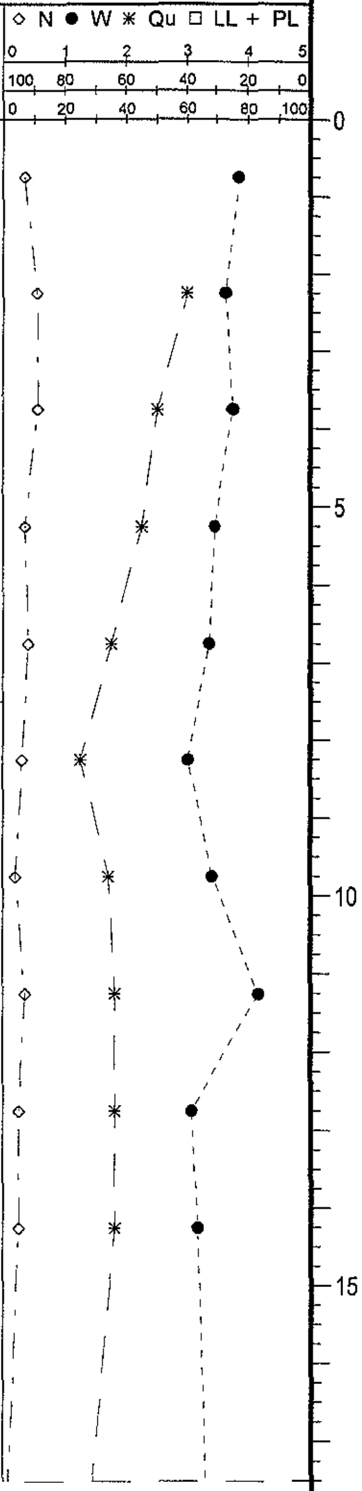
NOTE: 1) ( ) penetrometer value
2) Qu in tons per square foot
3) N - values obtained from Standard Penetration Test, ASTM D 1586
4) The stratification lines represent approximate boundaries between soil types and the transition may be gradual.
5) These logs were prepared for a specific project and specific purpose. They should not be separated from the geotechnical engineering report.
6) Groundwater levels reported in this log were measured during drilling and may differ from the true location of groundwater table.

STATION
COORDINATES (m): x = 406327.7839 y = 228898.0629 z = 11.25

DRILLING LOG	PROJECT RECOVERY SOLUTIONS, INC.	*SHEET 1 OF 8*

LOCATION Arecibo, P.R.	DRILLER / DRILL DESIGNATION Angel Ferrer / CME-55 Truck Mounted
DESCRIPTION BY Jorge I. Wichy	DATE HOLE STARTED 06/02/1999 COMPLETED 06/08/1999
GROUNDWATER 13.5 feet	ELEVATION TOP OF HOLE 11.25 feet
TOTAL DEPTH OF HOLE 150 feet	INSPECTOR Alan R. Crumley

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
11.3	0.0								
		▨	☒	1	3 3 4	7	23		Lean CLAY, no reaction with HCl, stiff, medium plasticity, dark brown
		▨	☒	2	4 5 6	11	27	(3.00)	As above, very stiff
		▨	☒	3	5 6 5	11	25	(2.50)	As above, very stiff
		▨	☒	4	3 3 4	7	31	(2.25)	As above, very stiff
9.0	7.5	▨	☒	5	3 4 4	8	33	(1.75)	As above
		▨	☒	6	3 2 4	6	40	(1.25)	Fat CLAY, no reaction with HCl, moist, stiff, high plasticity, brown
		▨	☒	7	2 2 2	4	32	(1.50) 1.71	As above, lensed with dark yellowish brown silty clay
		▨	☒	8	2 3 4	7	17	(1.50) 1.80	As above, lensed with dark yellowish brown silty clay, gray
	▼	▨	☒	9	3 3 2	5	39	(1.50) 1.80	As above, lensed with dark yellowish brown silty clay, light gray mottled
		▨	☒	10	1 2 3	5	37	(1.25) 1.80	As above



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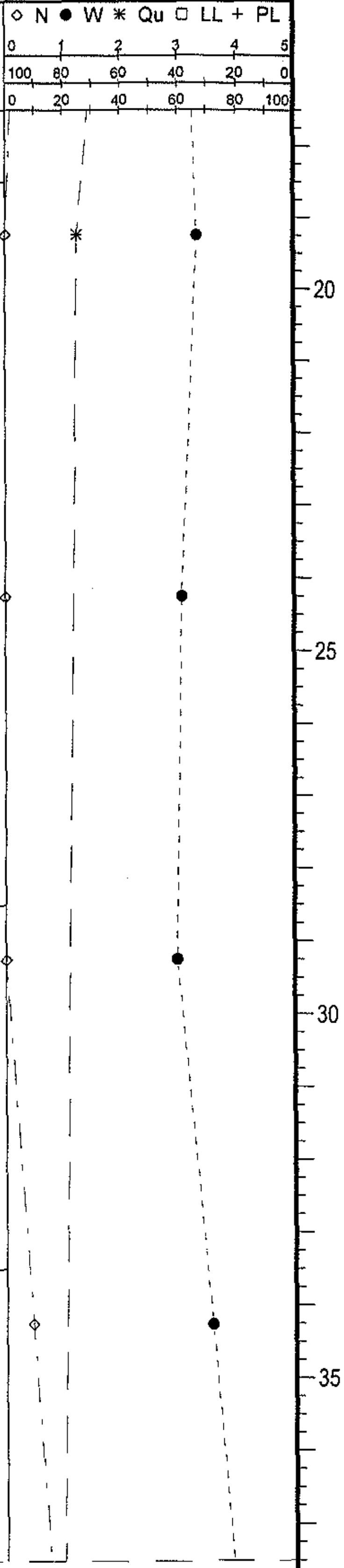
GEOCON2 2182-99.GPJ GEOCON1.GDT 8/27/99

DRILLING LOG (Cont. Sheet)	ELEVATION TOP OF HOLE 11.25 feet	SHEET 2 OF 8
PROJECT RECOVERY SOLUTIONS, INC.	LOCATION Arecibo, P.R.	

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
5.9	17.5								
5.6	18.5	▨							
		▥	☒	11	WH WH WH	WH	33	(1.25)	Elastic SILT, about 6% subangular fine sand, no reaction with HCl, moist, very soft, high plasticity, dark gray
		▥	☒	12	WH WH WH	WH	39		As above
2.6	28.5	▥							
		░	☒	13	WH WH 1	WH	41		Well graded SAND with silt, very loose, subangular lithic sand, no reaction with HCl, moist, weak cementation, dark gray
1.0	33.5	░							
		▥	☒	14	WH 3 6	9	29		Sandy elastic silt, subangular fine lithic sand, no reaction with HCl, moist, very soft, high plasticity, dark gray



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DRILLING LOG (Cont. Sheet)

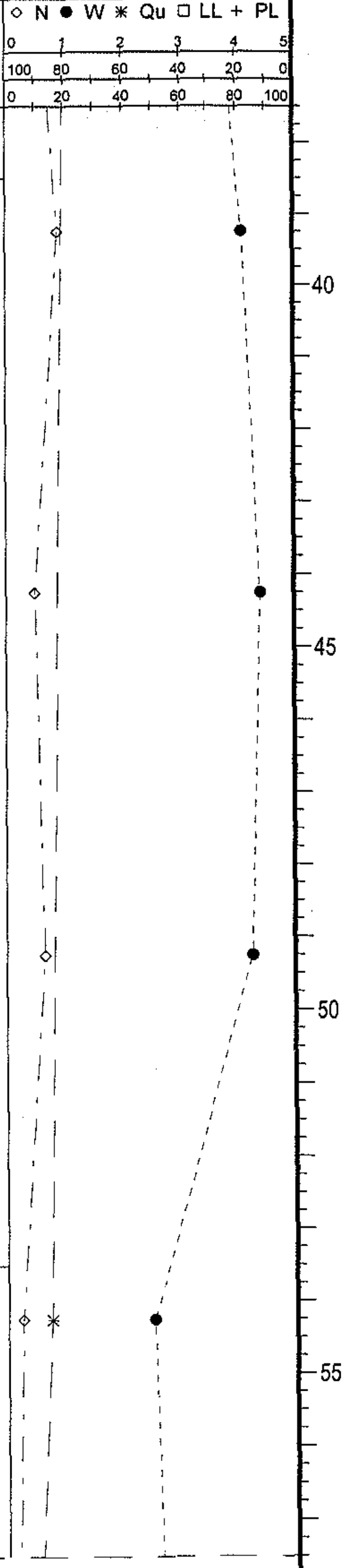
ELEVATION TOP OF HOLE
11.25 feet

SHEET 3
OF 8

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-0.2	37.5								
-0.5	38.5								
				15	6 9 9	18	18		Well graded SAND with silt, medium, subangular lithic sand, weak reaction with HCl, moist, weak cementation, dark gray
				16	6 6 4	10	12		As above
				17	6 7 6	13	15		As above
-5.1	53.5								
				18	1 2 3	5	50	(0.75)	Elastic SILT, weak reaction with HCl, moist, medium, high plasticity, dark gray



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DRILLING LOG (Cont. Sheet)

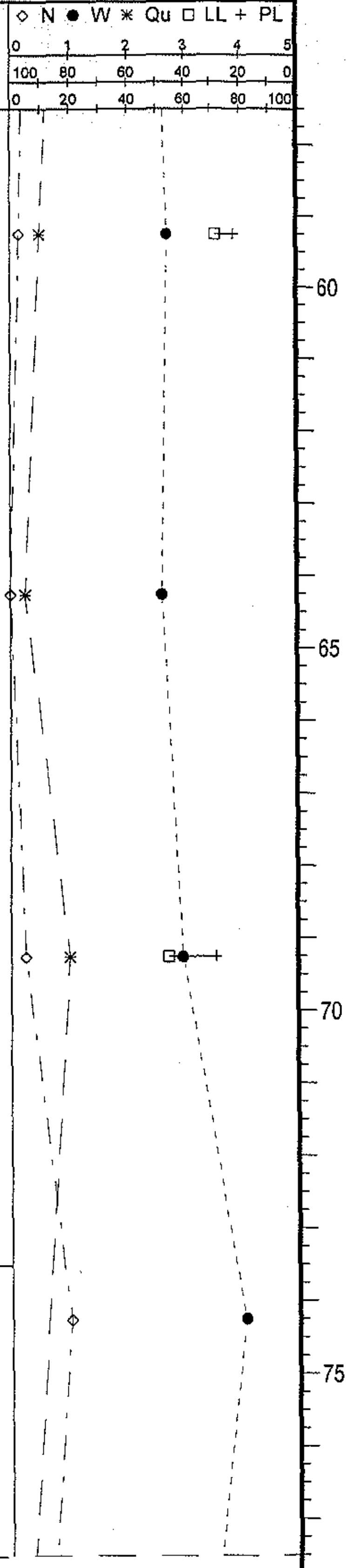
ELEVATION TOP OF HOLE 11.25 feet

SHEET 4 OF 8

PROJECT RECOVERY SOLUTIONS, INC.

LOCATION Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-6.3	57.5								
				19	1 1 2	3	46	(0.50)	As above LL=28, PL=22, PI=6
				20	WH WH 2	WH	48	(0.25)	As above, soft, olive
				21	WH 2 3	5	41	(1.00)	As above, about 5% shell fragments, strong reaction with HCl LL=46, PL=29, PI=17
-11.2	73.5								
				22	9 10 10	20	19		Poorly graded SAND with silt, medium, subangular fine lithic sand, weak reaction with HCl, moist, weak cementation, dark gray



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DRILLING LOG (Cont. Sheet)

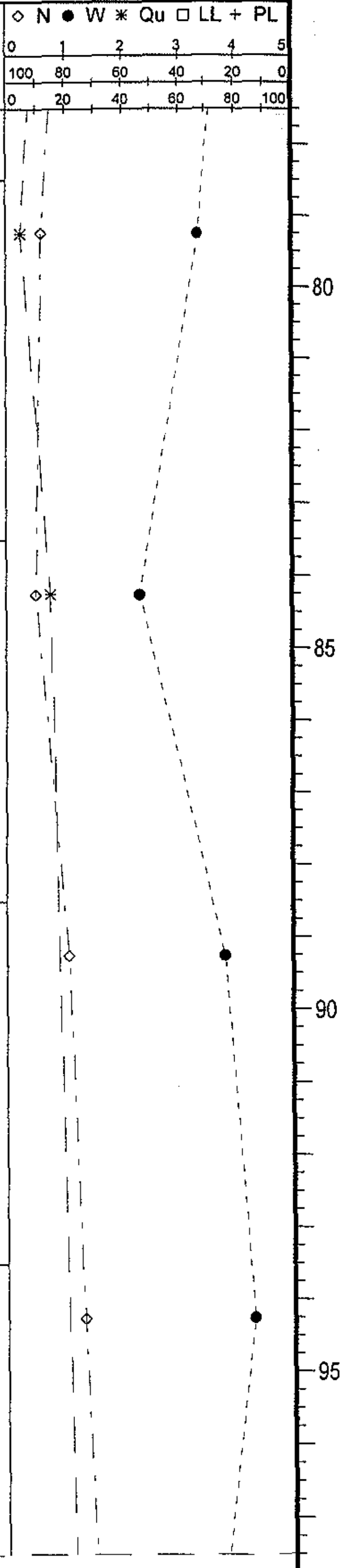
ELEVATION TOP OF HOLE
11.25 feet

SHEET 5
OF 8

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-12.4	77.5								
-12.7	78.5			23	8 7 5	12	33	(0.25)	Silty SAND, medium, subangular fine lithic sand, about 4% shell fragments, strong reaction with HCl, moist, weak cementation, dark gray
-14.2	83.5			24	3 5 5	10	54	(0.75)	Elastic SILT, about 15% shell fragments, strong reaction with HCl, moist, medium, high plasticity, dark gray
-15.7	88.5			25	4 9 12	21	24		Silty SAND, medium, subangular fine lithic sand, weak reaction with HCl, moist, weak cementation, dark gray
-17.2	93.5			26	8 12 14	26	14		Poorly graded SAND with silt, medium, subangular medium lithic sand, weak reaction with HCl, moist, weak cementation, gray



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DRILLING LOG (Cont. Sheet)

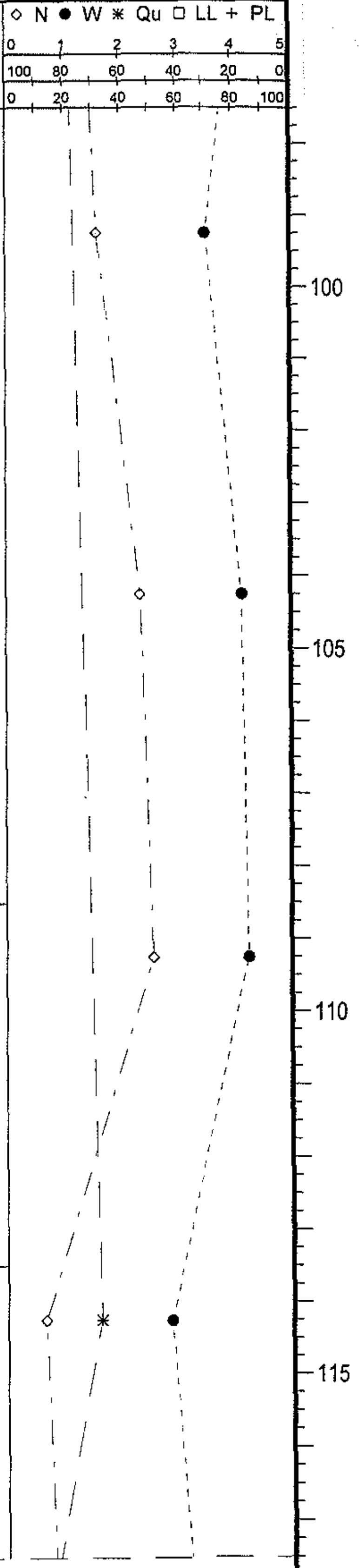
ELEVATION TOP OF HOLE
11.25 feet

SHEET 6
OF 8

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-18.5	97.5								
				27	13 16 16	32	29		As above, dense
				28	13 22 25	47	17		As above, dense
-21.8	108.5								
				29	16 26 25	51	15		Well graded SAND with silt, very dense, subangular lithic sand, weak reaction with HCl, moist, weak cementation, dark gray
-23.3	113.5								
				30	6 6 7	13	43	(2.00) 1.62	Elastic SILT, about 12% shell fragments, strong reaction with HCl, moist, stiff, high plasticity, dark gray



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DRILLING LOG (Cont. Sheet)

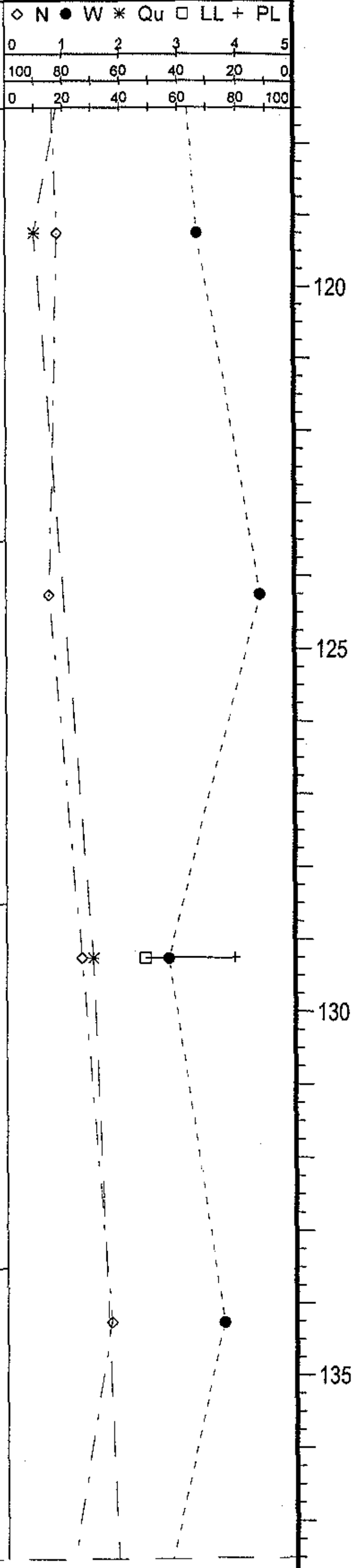
ELEVATION TOP OF HOLE
11.25 feet

SHEET 7
OF 8

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-24.6	117.5								
				31	6 7 11	18	33	(0.50)	As above, about 5% shell fragments, medium, at bottom (2.5 in.) gray well graded sand with silt
-26.4	123.5								
				32	14 9 6	15	12		Well graded SAND with silt, medium, subangular lithic sand, weak reaction with HCl, moist, weak cementation, dark gray
-27.9	128.5								
				33	10 14 12	26	44	(1.50)	Elastic SILT, no reaction with HCl, moist, stiff, high plasticity, dark gray LL=52, PL=21, PI=31
-29.4	133.5								
				34	12 16 20	36	25		Well graded SAND with silt, dense, subangular lithic sand, weak reaction with HCl, moist, weak cementation, dark gray



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DRILLING LOG (Cont. Sheet)

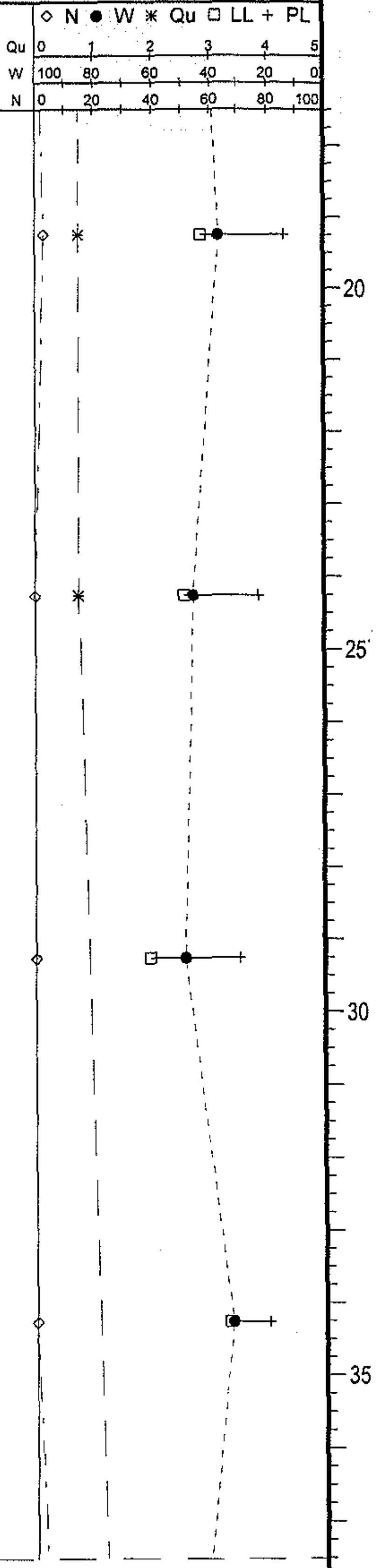
ELEVATION TOP OF HOLE
10.25 feet

SHEET 2
OF 8

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
4.9	17.5								
				11	WH 1 2	3	37	(0.75)	As above, medium, dark gray LL=43, PL=14, PI=29
				12	WH WH 2	WH	46	(0.75)	Fat CLAY, no reaction with HCl, moist, medium, high plasticity, dark gray LL=49, PL=23, PI=26
				13	WH WH 2	WH	49		As above, soft, about 16% wood fragments LL=61, PL=30, PI=31
				14	WH WH WH	WH	33		As above, soft, about 3% wood fragments LL=34, PL=20, PI=14



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DRILLING LOG (Cont. Sheet)

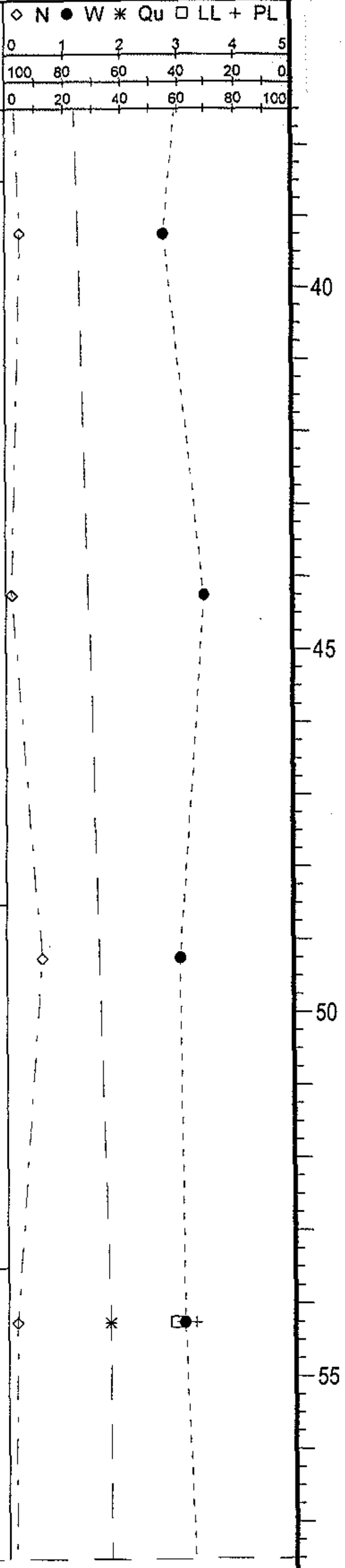
ELEVATION TOP OF HOLE 10.25 feet

SHEET 3 OF 8

PROJECT RECOVERY SOLUTIONS, INC.

LOCATION Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-1.2	37.5								
-1.5	38.5								
				15	2 2 3	5	45		Sandy silty CLAY, subangular fine sand, weak reaction with HCl, moist, soft, low plasticity, dark gray
				16	2 1 1	2	31		As above, about 11% shell fragments, about 5% wood fragments, strong reaction with HCl
-4.5	48.5								
				17	5 7 5	12	40		Silty SAND, medium, subangular medium lithic sand, weak reaction with HCl, wet, weak cementation, dark gray
-6.1	53.5								
				18	2 1 2	3	39	(1.75)	Elastic SILT, lensed with dark gray silty sand (as above), about 4% shell fragments, strong reaction with HCl, moist, stiff, high plasticity, dark gray LL=42, PL=35, PI=7



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GEOCON2 2182-99.GPJ GEOCON1.GDT 8/27/99

HOLE NO. RCS-5

DRILLING LOG (Cont. Sheet)

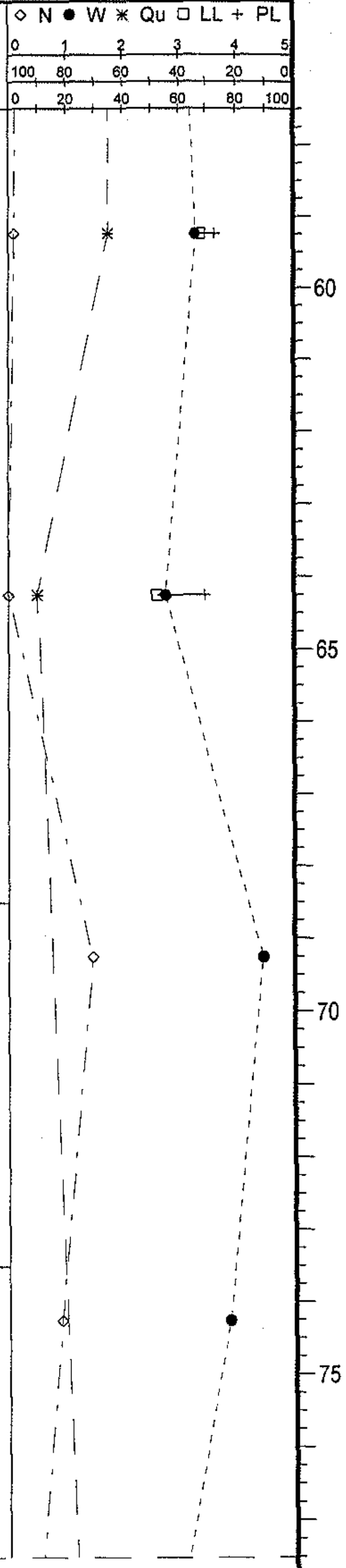
ELEVATION TOP OF HOLE 10.25 feet

SHEET 4 OF 8

PROJECT RECOVERY SOLUTIONS, INC.

LOCATION Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-7.3	57.5								
				19	2 1 1	2	34	(1.75)	Elastic SILT, about 3% shell fragments, weak reaction with HCl, moist, stiff, high plasticity, dark gray LL=32, PL=27, PI=5
				20	WH WH WH	WH	45	(0.50)	As above, medium, olive gray LL=48, PL=31, PI=17
-10.6	68.5								
				21	8 13 16	29	11		Well graded SAND with silt, medium, subangular lithic sand, weak reaction with HCl, moist, weak cementation, dark gray
-12.2	73.5								
				22	8 8 10	18	23		Poorly graded SAND with silt, medium, subangular fine lithic sand, weak reaction with HCl, moist, weak cementation, dark gray



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DRILLING LOG (Cont. Sheet)

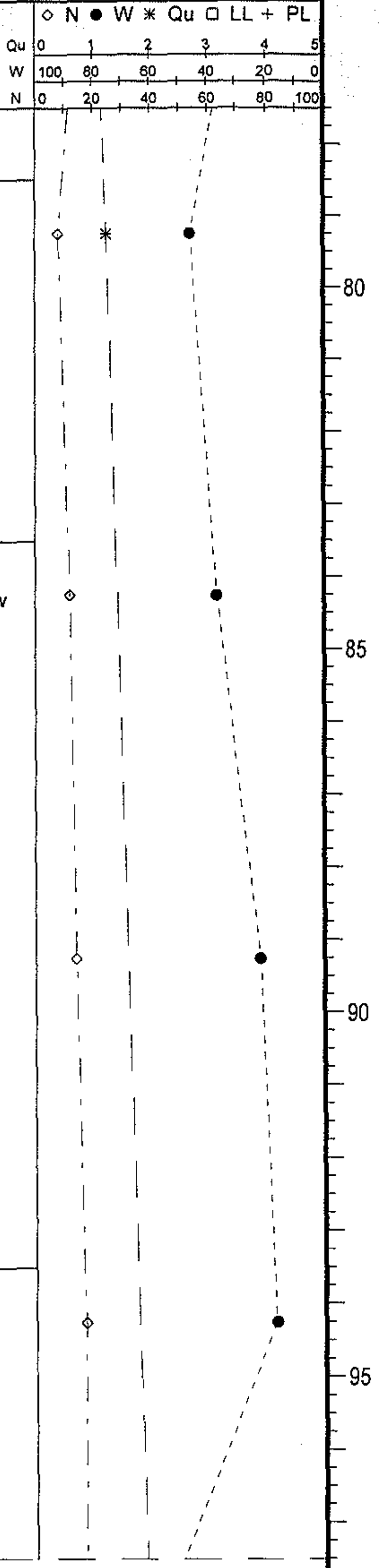
ELEVATION TOP OF HOLE
10.25 feet

SHEET 5 OF 8

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-13.4	77.5								
-13.7	78.5								
				23	2 3 5	8	46	(1.25)	Elastic SILT, weak reaction with HCl, moist, stiff, high plasticity, dark gray
-15.2	83.5								
				24	3 5 7	12	37		Sandy SILT, subangular fine sand, weak reaction with HCl, moist, soft, low plasticity, dark gray
				25	5 5 9	14	22		As above
-18.2	93.5								
				26	8 8 9	17	17		Poorly graded SAND, medium, subangular medium lithic sand, weak reaction with HCl, moist, weak cementation, dark gray



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DRILLING LOG (Cont. Sheet)

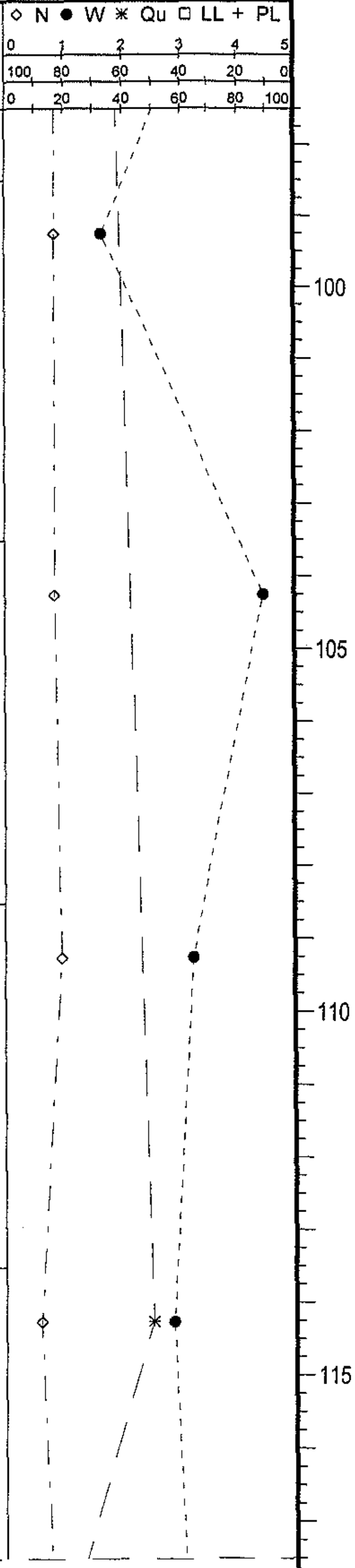
ELEVATION TOP OF HOLE 10.25 feet

SHEET 6 OF 8

PROJECT RECOVERY SOLUTIONS, INC.

LOCATION Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-19.5	97.5								
-19.8	98.5			27	3 6 11	17	67		Sandy SILT, subangular fine lithic sand, weak reaction with HCl, about 3% wood fragments, moist, stiff, low plasticity, dark gray
-21.3	103.5			28	7 7 10	17	11		Well graded SAND with silt, medium, subangular lithic sand, weak reaction with HCl, moist, weak cementation, dark gray
-22.8	108.5			29	4 7 12	19	36		Sandy SILT, subangular medium lithic sand, strong reaction with HCl, about 6% wood fragments, moist, very stiff, high plasticity, dark gray
-24.3	113.5			30	5 6 6	12	43	(2.50)	Elastic SILT with sand, subangular fine lithic sand, about 6% shell fragments, strong reaction with HCl, moist, very stiff, high plasticity, dark gray



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DRILLING LOG (Cont. Sheet)

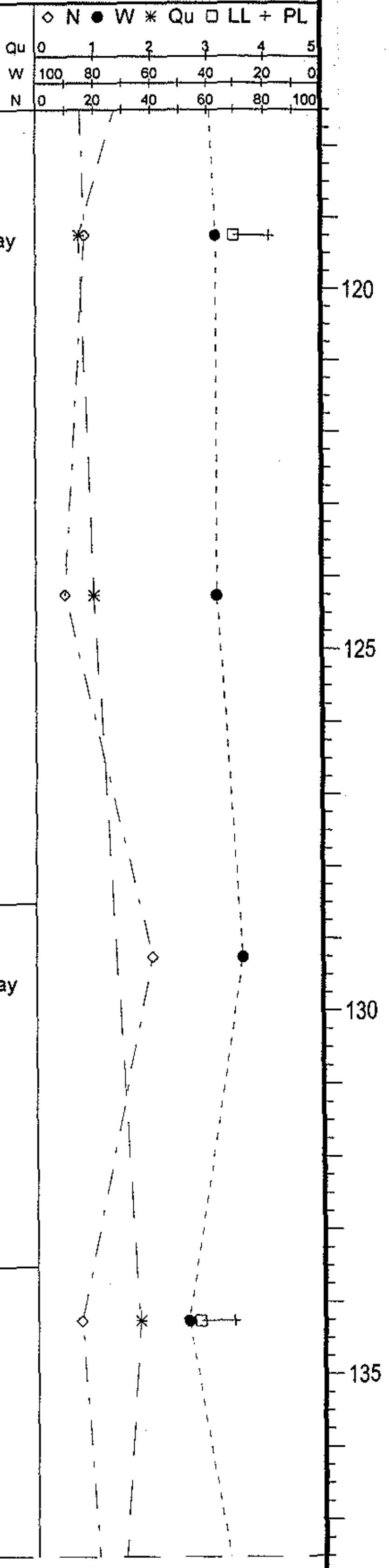
ELEVATION TOP OF HOLE
10.25 feet

SHEET 7
OF 8

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-25.6	117.5								
				31	2 5 12	17	37	(0.75)	Elastic SILT, weak reaction with HCl, moist, medium, high plasticity, dark gray LL=30, PL=18, PI=12
				32	6 5 5	10	37	(1.00)	As above
-28.9	128.5								
				33	12 19 21	40	28		Poorly graded SAND with silt, dense, subangular fine sand, weak reaction with HCl, moist, weak cementation, gray
-30.4	133.5								
				34	5 7 8	15	48	(1.75)	Elastic SILT, weak reaction with HCl, moist, stiff, high plasticity, dark gray LL=44, PL=32, PI=12



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DRILLING LOG (Cont. Sheet)

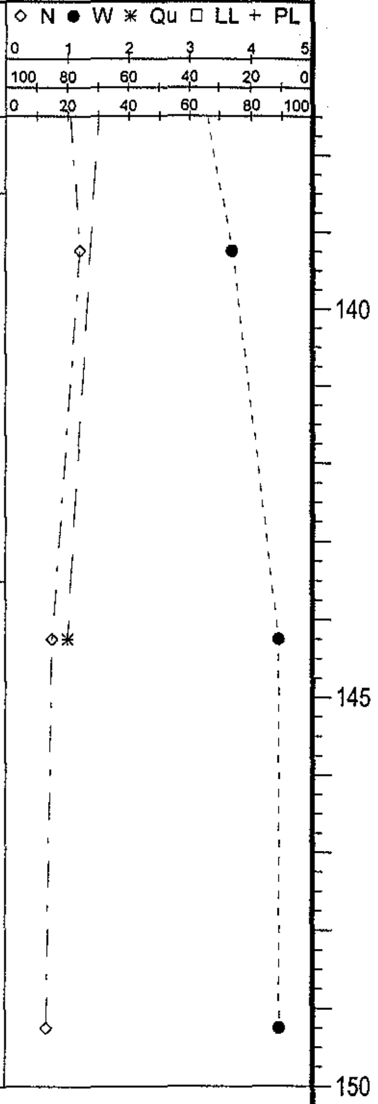
ELEVATION TOP OF HOLE
10.25 feet

SHEET 8 OF 8

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-31.7	137.5								
-32.0	138.5								
				35	11 10 14	24	26		Well graded SAND with silt, medium, subangular lithic sand, weak reaction with HCl, moist, weak cementation, dark gray
-33.5	143.5								
				36	4 6 9	15	11	(1.00)	Sandy SILT, subangular fine sand, weak reaction with HCl, moist, stiff, non plastic, dark gray
				37	5 7 6	13	11		As above, subangular medium sand
-35.5	150.0								



NOTE: 1) ( ) penetrometer value
2) Qu in tons per square foot
3) N - values obtained from Standard Penetration Test, ASTM D 1586
4) The stratification lines represent approximate boundaries between soil types and the transition may be gradual.
5) These logs were prepared for a specific project and specific purpose. They should not be separated from the geotechnical engineering report.
6) Groundwater levels reported in this log were measured during drilling and may differ from the true location of groundwater table.
7) Boreholes drilled with automatic SPT.

STATION
COORDINATES (m): x = 406879.7579 y = 229190.2441 z = 10.25

GEOCON2 2182-99.GPJ GEOCON1.GDT 8/27/99

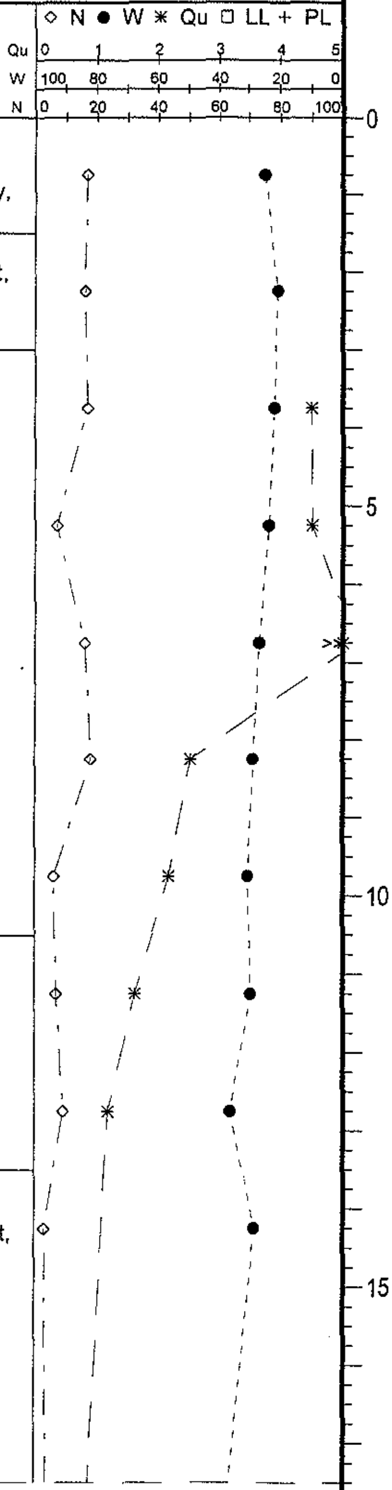
DRILLING LOG

PROJECT
RECOVERY SOLUTIONS, INC.

SHEET 1 OF 6

LOCATION Arecibo, P.R.	DRILLER / DRILL DESIGNATION Steven Perez / CME-45C
DESCRIPTION BY Jorge I. Wichy	DATE HOLE STARTED 06/09/1999 COMPLETED 06/10/1999
GROUNDWATER 13 feet	ELEVATION TOP OF HOLE 14.00 feet
TOTAL DEPTH OF HOLE 100 feet	INSPECTOR Alan R. Crumley

ELEV. [m] 14.0	DEPTH [feet] 0.0	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
13.5	1.5			1	10 9 8	17	25		FILL: silty CLAY, about 6% angular calcareous fine gravel, strong reaction with HCL, moist, medium, low plasticity, dark brown
13.1	3.0			2	9 8 8	16	21		Silty CLAY, no reaction with HCl, moist, medium, low plasticity, dark grayish brown
				3	9 9 8	17	22	(4.50)	Lean CLAY, no reaction with HCl, dry, hard, medium plasticity, dark grayish brown
				4	2 2 5	7	24	(4.50)	As above
				5	5 7 9	16	27	(4.50) 5.22	As above
				6	9 10 8	18	29	(2.50) 2.52	As above, moist, very stiff
10.8	10.5			7	3 3 3	6	31	(1.75) 2.16	As above, lensed with dark brown silty clay, no reaction with HCl, moist, stiff, high plasticity, yellowish brown
				8	3 3 4	7	30	(1.25) 1.62	Fat CLAY, lensed with dark brown silty clay, no reaction with HCl, moist, stiff, high plasticity, yellowish brown
9.9	▼ 13.5			9	4 4 5	9	37	(1.25) 1.17	Fat CLAY, no reaction with HCl, moist, stiff, high plasticity, dark gray
				10	WH 2 1	3	29		Sandy SILT, subangular fine sand, weak reaction with HCl, moist, very soft, non plastic, dark gray



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DRILLING LOG (Cont. Sheet)

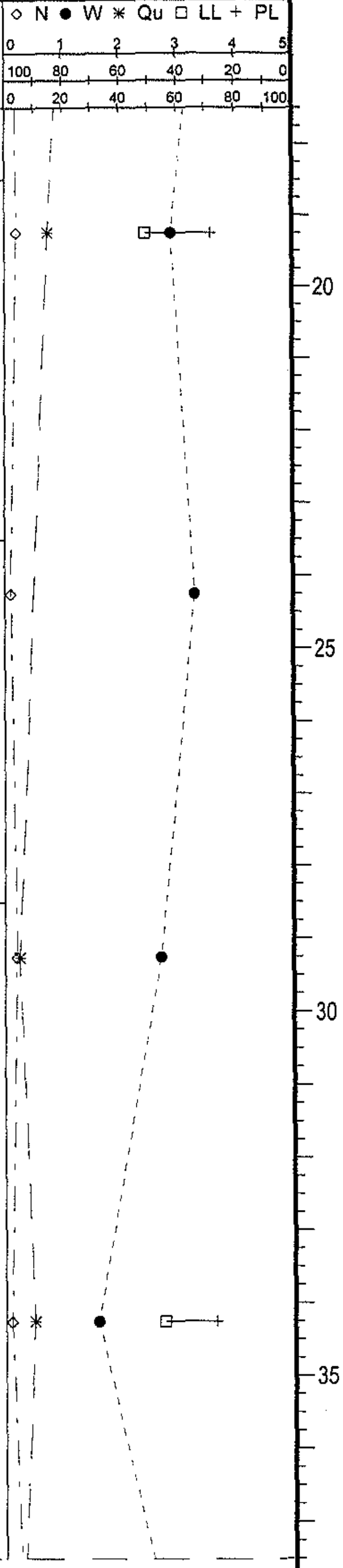
ELEVATION TOP OF HOLE
14.00 feet

SHEET 2
OF 6

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
8.7	17.5								
8.4	18.5	▨		11	1 2 2	4	42	(0.75)	Fat CLAY, no reaction with HCl, moist, medium, high plasticity, dark gray LL=51, PL=28, PI=23
6.8	23.5	▨		12	1 1 1	2	34		Sandy fat CLAY, subangular fine sand, weak reaction with HCl, moist, very soft, high plasticity, dark gray
5.3	28.5	▨		13	1 2 2	4	46	(0.25)	Fat CLAY, no reaction with HCl, moist, soft, high plasticity, dark gray
		▨		14	2 1 1	2	68	(0.50)	As above LL=45, PL=27, PI=18



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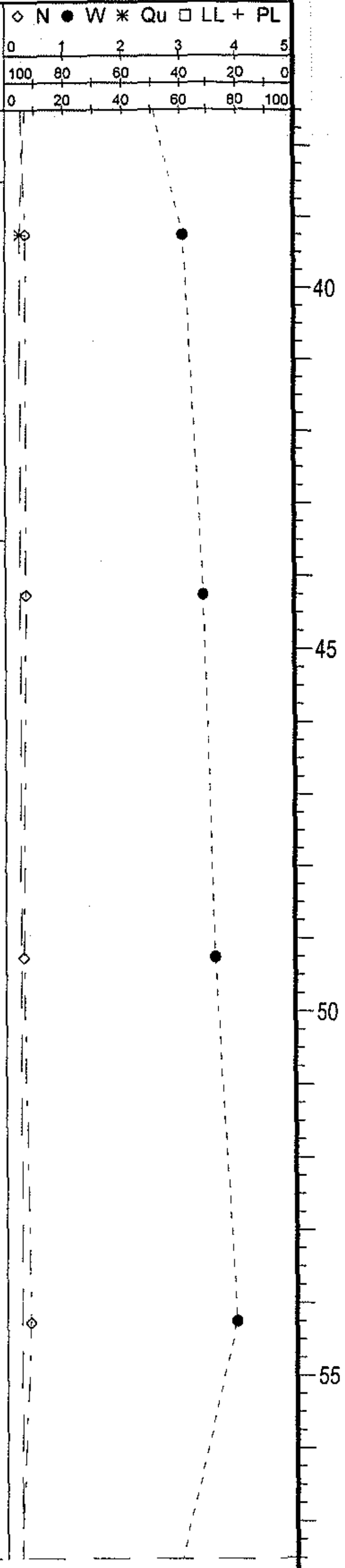
DRILLING LOG (Cont. Sheet)	ELEVATION TOP OF HOLE 14.00 feet	SHEET 3 OF 6
PROJECT RECOVERY SOLUTIONS, INC.	LOCATION Arecibo, P.R.	

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
2.6	37.5	▨							
2.3	38.5								
				15	2 4 3	7	39	(0.25)	Elastic SILT, no reaction with HCl, moist, soft, high plasticity, dark gray
0.7	43.5								
				16	2 3 4	7	32		Poorly graded SAND with silt, loose, subangular fine lithic sand, weak reaction with HCl, moist, weak cementation, dark gray
				17	3 3 3	6	28		As above
				18	4 4 4	8	21		As above, about 16% coarse sand shell fragments, strong reaction with HCl



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DRILLING LOG (Cont. Sheet)

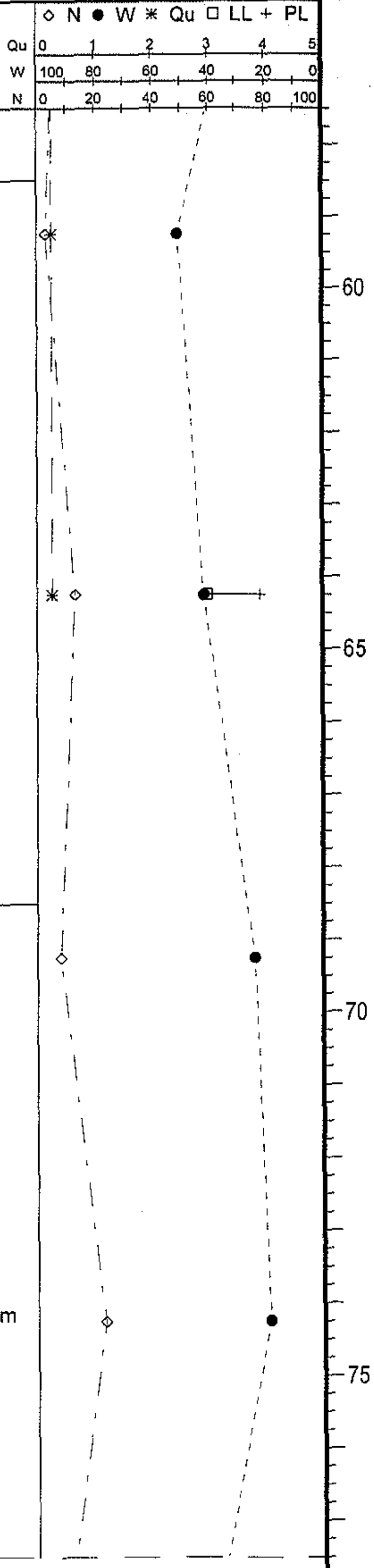
ELEVATION TOP OF HOLE
14.00 feet

SHEET 4
OF 6

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-3.5	57.5								
-3.8	58.5								
				19	3 2 1	3	51	(0.25)	Elastic SILT, weak reaction with HCl, moist, soft, high plasticity, dark gray
				20	2 5 8	13	42	(0.25)	As above LL=41, PL=22, PI=19
-6.9	68.5								
				21	5 3 5	8	24		Poorly graded SAND with silt, loose, subangular fine lithic sand, about 18% coarse sand size, shell fragments, strong reaction with HCl, moist, weak cementation, dark gray
				22	11 12 11	23	19		As above, medium, subangular medium lithic sand



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DRILLING LOG (Cont. Sheet)

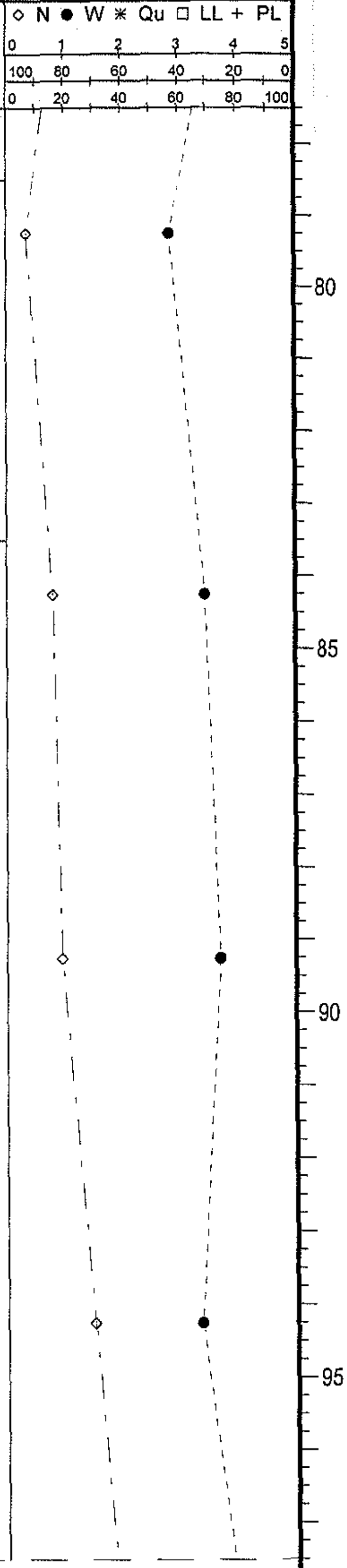
ELEVATION TOP OF HOLE
14.00 feet

SHEET 5 OF 6

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-9.6	77.5								
-9.9	78.5								
				23	4 3 4	7	43		SILT, about 20% shell fragments, strong reaction with HCl, moist, very soft, non plastic, dark gray
-11.5	83.5								
				24	10 6 10	16	31		Poorly graded SAND with silt, medium, subangular fine lithic sand, about 16% shell fragments, strong reaction with HCl, moist, weak cementation, very dark gray
				25	9 8 11	19	26		As above
				26	16 17 13	30	33		As above, dense, subangular medium lithic sand



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DRILLING LOG (Cont. Sheet)

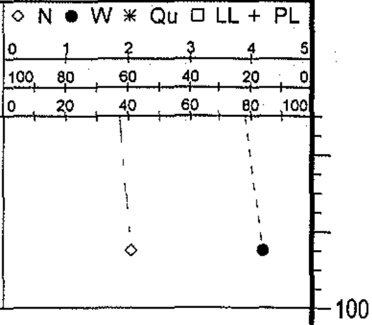
ELEVATION TOP OF HOLE
14.00 feet

SHEET 6
OF 6

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-15.7	97.5								
				27	16 19 22	41	16		As above, dense, subangular medium lithic sand
-16.5	100.0								



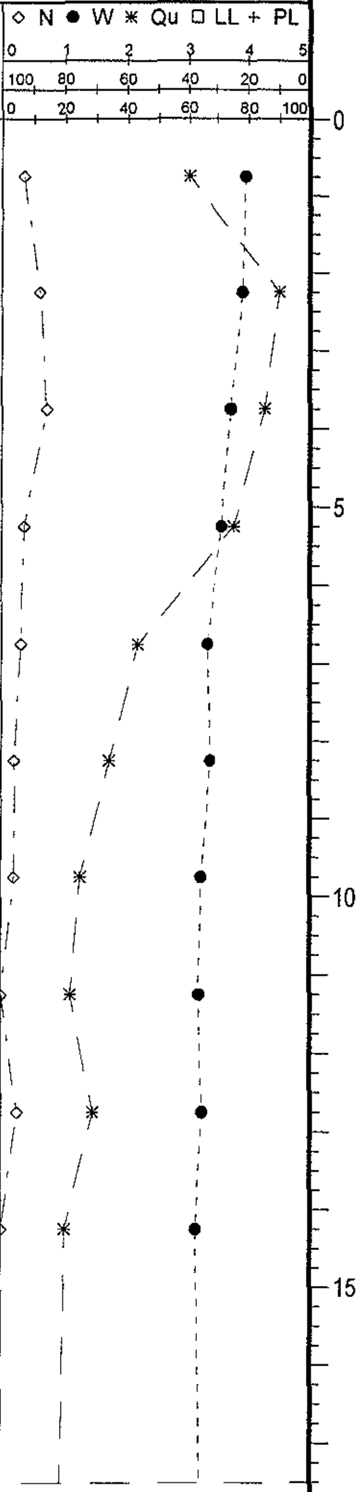
NOTE:
1) ( ) penetrometer value
2) Qu in tons per square foot
3) N - values obtained from Standard Penetration Test, ASTM D 1586
4) The stratification lines represent approximate boundaries between soil types and the transition may be gradual.
5) These logs were prepared for a specific project and specific purpose. They should not be separated from the geotechnical engineering report.
6) Groundwater levels reported in this log were measured during drilling and may differ from the true location of groundwater table.

STATION
COORDINATES (m): x = 406250.8779 y = 228555.1831 z = 14.00

DRILLING LOG

PROJECT RECOVERY SOLUTIONS, INC.		*SHEET 1 OF 8*
LOCATION Arecibo, P.R.	DRILLER / DRILL DESIGNATION Steven Perez / CME-45C	
DESCRIPTION BY Jorge I. Wichy	DATE HOLE STARTED 06/16/1999	COMPLETED 06/18/1999
GROUNDWATER 10 feet	ELEVATION TOP OF HOLE 13.00 feet	
TOTAL DEPTH OF HOLE 150 feet	INSPECTOR Alan R. Crumley	

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
13.0	0.0								
		▨		1	3 2 5	7	21	(3.00)	Lean CLAY, dry, very stiff, medium plasticity, strong reaction with HCl, dark yellowish brown
		▨		2	5 6 6	12	22	(+4.5)	As above, hard, yellowish brown
		▨		3	5 6 8	14	26	(4.25)	As above, hard, no reaction with HCl, yellowish brown
11.2	6.0	▨		4	3 3 4	7	29	(3.75)	As above, moist, very stiff, no reaction with HCl, yellowish brown
		▨		5	3 3 3	6	34	(2.50) 2.16	Fat CLAY, moist, very stiff, high plasticity, lensed with yellowish brown lean clay, no reaction with HCl, dark yellowish brown
		▨		6	1 2 2	4	33	(2.00) 1.71	Fat CLAY, moist, stiff, high plasticity, dark brown mottled, lensed with brownish yellow silty clay, no reaction with HCl, yellowish brown
	▼	▨		7	1 2 2	4	36	(1.25)	As above, brownish yellow
		▨		8	WH WH 1	WH	37	(1.00) 1.08	As above, dark yellowish brown
		▨		9	1 2 3	5	36	(1.25) 1.44	As above
		▨		10	WH WH WH	WH	38	(1.00)	Fat CLAY, moist, stiff, high plasticity, about 0.5% roots, lensed with brownish yellow silty clay, no reaction with HCl, gray



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DRILLING LOG (Cont. Sheet)

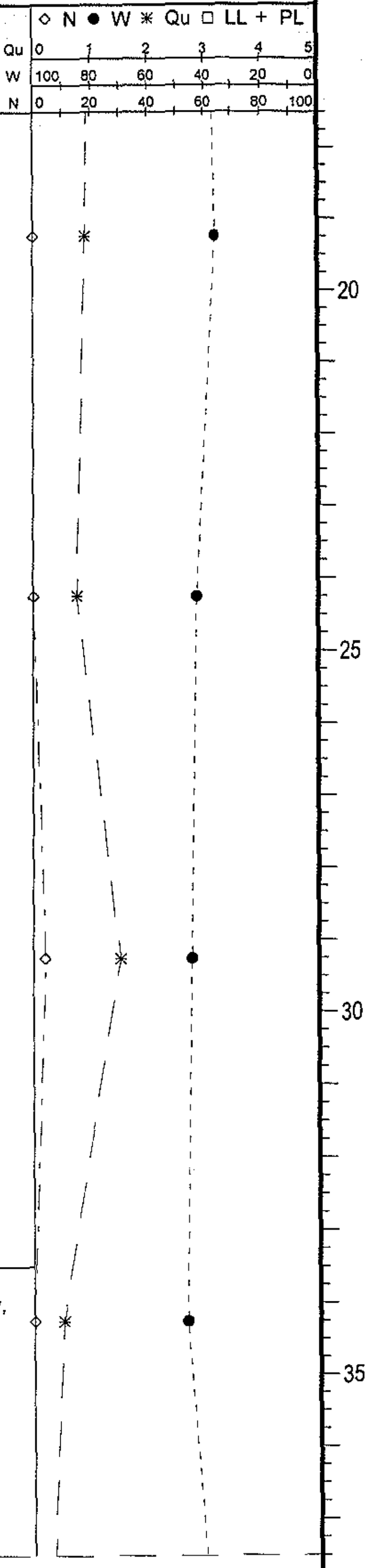
ELEVATION TOP OF HOLE
13.00 feet

SHEET 2
OF 8

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
7.7	17.5								
				11	WH WH 2	WH	36	(1.00) 0.90	Fat CLAY, moist, stiff, high plasticity, about 1% subangular medium sand, gray
				12	WH WH 1	WH	43	(0.75)	As above, medium
				13	WH 2 2	4	45	(1.50)	As above
2.8	33.5								
				14	1 WH WH	WH	47	(0.50)	Elastic SILT, moist, soft, high plasticity, about 16% wood fragments, strong reaction with HCl, gray



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DRILLING LOG (Cont. Sheet)

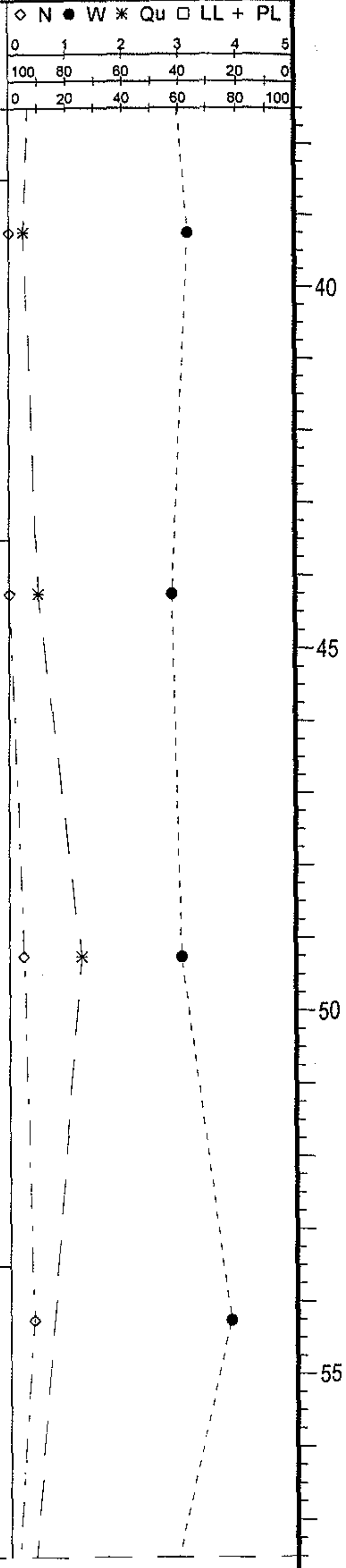
ELEVATION TOP OF HOLE
13.00 feet

SHEET 3
OF 8

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
1.6	37.5								
1.3	38.5								
				15	WH WH WH	WH	37	(0.25)	SILT, moist, very soft, non plastic, about 2% wood fragments, no reaction with HCl, gray
-0.3	43.5								
				16	1 WH 1	WH	43	(0.50)	Elastic SILT, moist, soft, high plasticity, no reaction with HCl, gray
				17	WH 2 3	5	40	(1.25)	As above, stiff, about 10% shell fragments, strong reaction with HCl
-3.3	53.5								
				18	3 3 5	8	23		Poorly graded SAND with silt, moist, weak cementation, loose, about 10% shell fragments, subangular medium lithic sand, weak reaction with HCl, dark gray



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DRILLING LOG (Cont. Sheet)

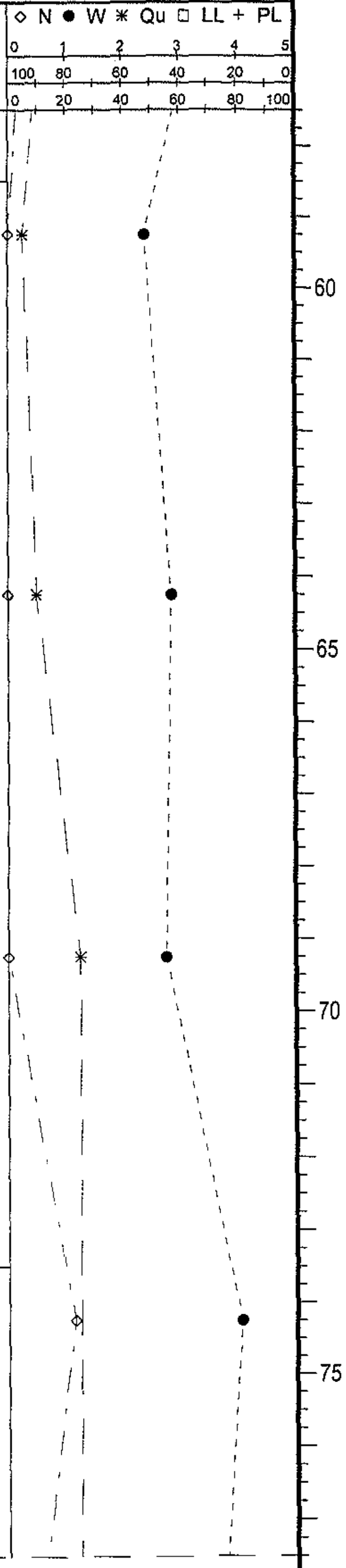
ELEVATION TOP OF HOLE
13.00 feet

SHEET 4
OF 8

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-4.5	57.5								
-4.8	58.5								
				19	WH WH WH	WH	52	(0.25)	Elastic SILT, moist, soft, high plasticity, no reaction with HCl, gray
				20	WH WH WH	WH	43	(0.50)	As above
				21	WH WH 1	WH	45	(1.25)	Elastic SILT with sand, moist, stiff, high plasticity, about 16% shell fragments, subangular fine sand, strong reaction with HCl,very dark gray
-9.4	73.5								
				22	8 10 13	23	19		Poorly graded SAND with silt, moist, weak cementation, medium, subangular fine lithic sand, no reaction with HCl, gray



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DRILLING LOG (Cont. Sheet)

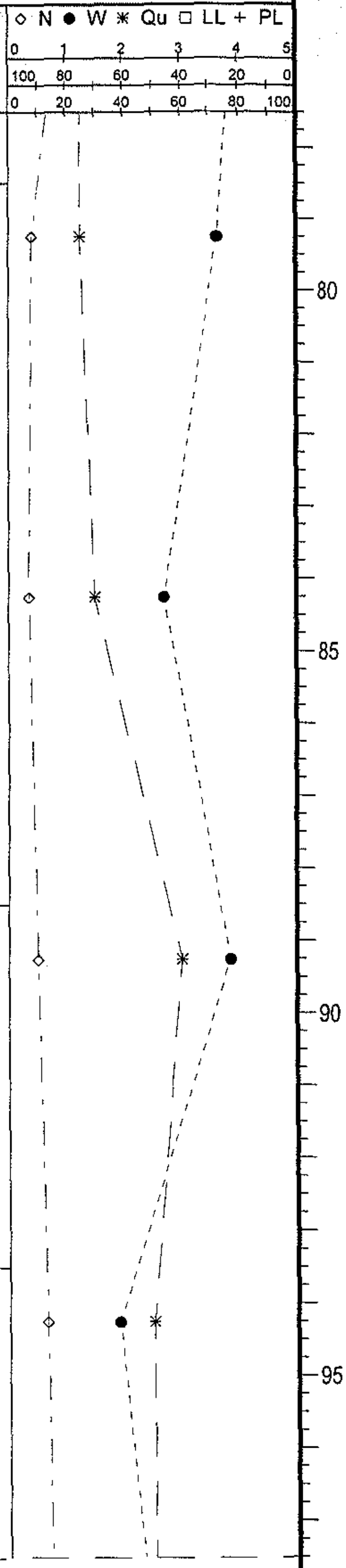
ELEVATION TOP OF HOLE
13.00 feet

SHEET 5
OF 8

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-10.6	77.5								
-10.9	78.5								
				23	6 4 4	8	27	(1.25)	Elastic SILT, moist, stiff, high plasticity, weak reaction with HCl, dark gray
				24	3 3 4	7	46	(1.50)	As above, about 13% shell fragments, strong reaction with HCl
-14.0	88.5								
				25	3 4 6	10	23	(3.00)	Sandy SILT, moist, very stiff, non plastic, about 3% shell fragments, subangular fine sand, weak reaction with HCl, very dark gray
-15.5	93.5								
				26	3 5 8	13	62	(2.50)	Elastic SILT, moist, very stiff, high plasticity, about 1% wood fragments, no reaction with HCl, dark grayish brown



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DRILLING LOG (Cont. Sheet)

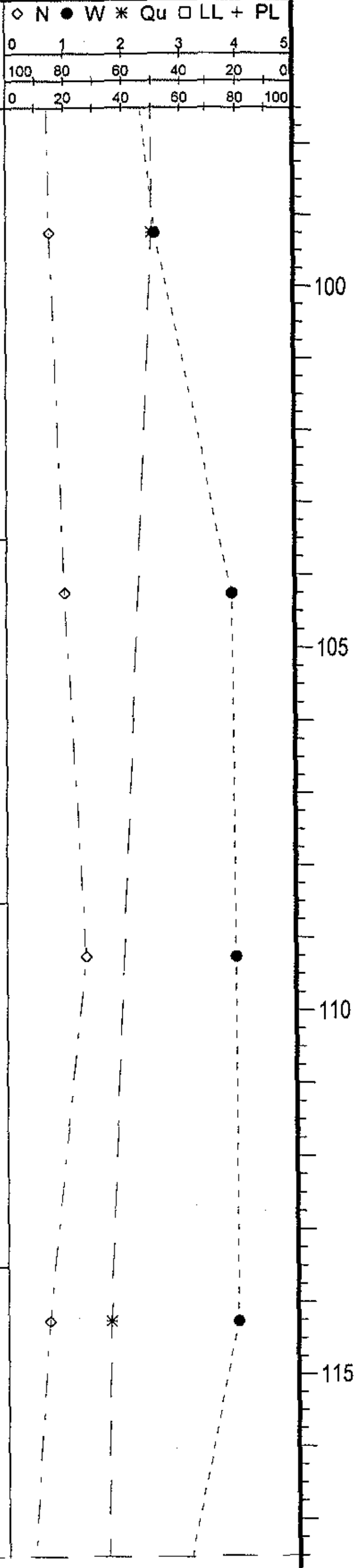
ELEVATION TOP OF HOLE 13.00 feet

SHEET 6 OF 8

PROJECT RECOVERY SOLUTIONS, INC.

LOCATION Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-16.7	97.5			27	5 7 8	15	49	(2.50)	As above, lensed with very dark gray silty clay with sand, subangular medium sand
-18.5	103.5			28	6 7 13	20	22		Silty SAND, moist, weak cementation, medium, subangular fine sand, no reaction with HCl, gray
-20.1	108.5			29	9 13 14	27	21		Well graded SAND with silt, moist, weak cementation, medium, subangular lithic sand, no reaction with HCl, gray
-21.6	113.5			30	3 7 7	14	21	(1.75)	Elastic SILT, moist, stiff, high plasticity, about 5% subangular medium sand, weak reaction with HCl, dark gray



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DRILLING LOG (Cont. Sheet)

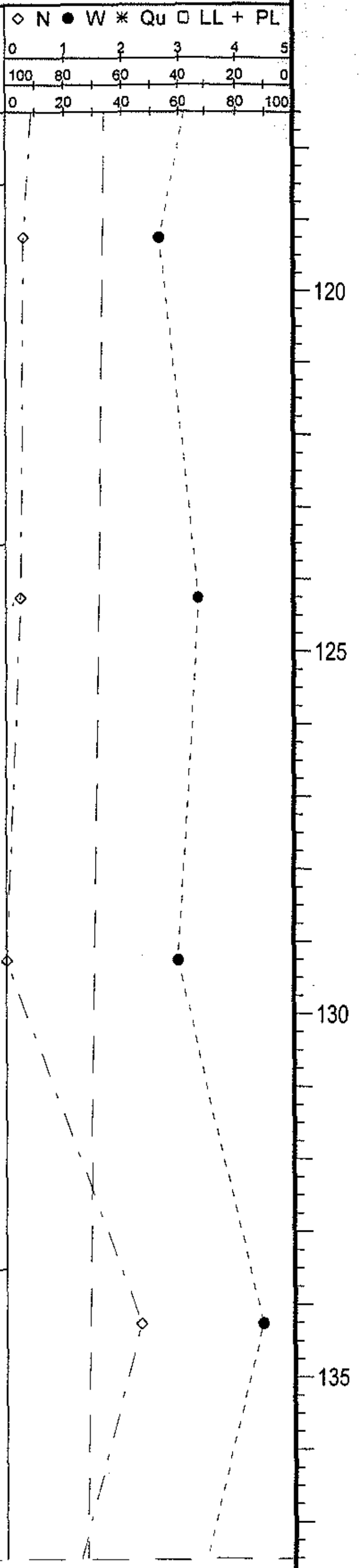
ELEVATION TOP OF HOLE
13.00 feet

SHEET 7
OF 8

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-22.8	117.5	▥							
-23.1	118.5	▨	☒	31	WH 4 2	6	47		Fat CLAY, moist, soft, high plasticity, no reaction with HCl, gray
-24.6	123.5	▥	☒	32	WH 3 2	5	33		Elastic SILT, moist, stiff, high plasticity, no reaction with HCl, gray
			☒	33	WH WH 4	WH	41		As above
-27.7	133.5	░	☒	34	13 21 25	46	11		Well graded SAND with silt, moist, weak cementation, dense, subangular lithic sand, no reaction with HCl, gray



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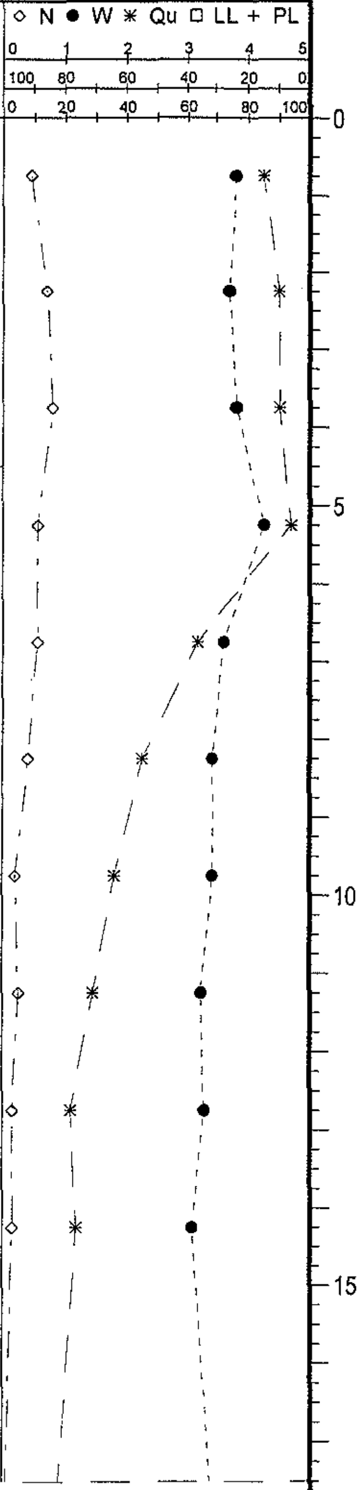
HOLE NO. RCS-8

DRILLING LOG	PROJECT RECOVERY SOLUTIONS, INC.	SHEET 1 OF 6

LOCATION Arecibo, P.R.	DRILLER / DRILL DESIGNATION Angel Ferrer / CME-55 Truck Mounted
DESCRIPTION BY Jorge I. Wichy	DATE HOLE STARTED 06/22/1999 COMPLETED 06/22/1999
GROUNDWATER 9.5 feet	ELEVATION TOP OF HOLE 11.75 feet
TOTAL DEPTH OF HOLE 100 feet	INSPECTOR Alan R. Crumley

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
11.8	0.0								
				1	3 4 5	9	24	(4.25)	Lean CLAY, no reaction with HCl, dry, hard, medium plasticity, yellowish brown
				2	4 6 8	14	26	(+4.5)	As above
				3	6 8 8	16	24	(+4.5)	As above
10.4	4.5								
				4	4 4 7	11	15	(+4.5) 4.69	Fat CLAY, no reaction with HCl, moist, hard, high plasticity, dark yellowish brown
				5	5 5 6	11	28	(2.50) 3.15	As above, very stiff, dark brown mottled, yellowish brown
				6	5 4 4	8	32	(1.75) 2.25	Fat CLAY, no reaction with HCl, moist, stiff, high plasticity, dark brown mottled, yellowish brown
	▼			7	2 2 2	4	32	(1.50) 1.80	As above, brownish yellow
				8	2 3 2	5	36	(1.00) 1.44	As above, dark brown and brownish yellow mottled, grayish brown
				9	WH 1 2	3	35	(0.75) 1.08	Fat CLAY, no reaction with HCl, moist, medium, high plasticity, brownish yellow mottled, gray
				10	WH 1 2	3	39	(0.75) 1.17	As above



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DRILLING LOG (Cont. Sheet)

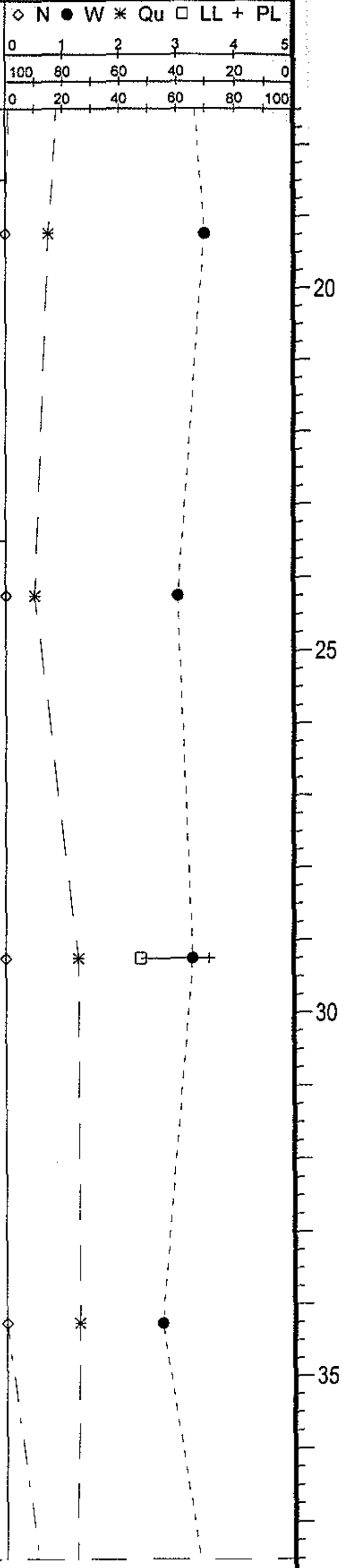
ELEVATION TOP OF HOLE
11.75 feet

SHEET 2 OF 6

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
6.4	17.5								
6.1	18.5								
				11	WH WH 2	WH	30	(0.75)	Elastic SILT, no reaction with HCl, moist, medium, high plasticity, dark gray
4.6	23.5								
				12	WH WH WH	WH	40	(0.50)	Fat CLAY, no reaction with HCl, moist, soft, high plasticity, gray
				13	WH WH WH	WH	35	(1.00) 1.26	As above, stiff LL=53, PL=29, PI=24
				14	WH WH 2	WH	46	(1.00) 1.26	As above, stiff, black mottled



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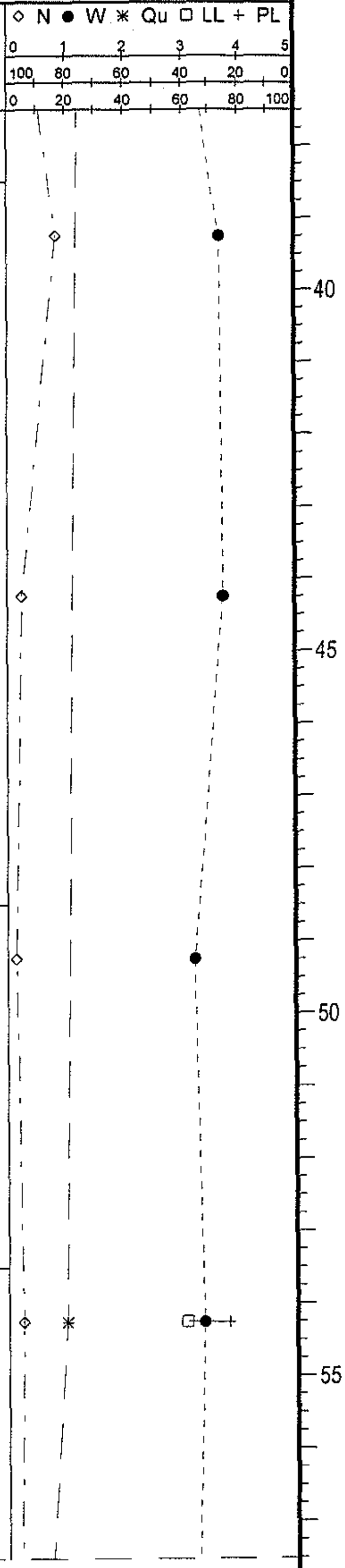
HOLE NO. RCS-8

DRILLING LOG (Cont. Sheet)	ELEVATION TOP OF HOLE 11.75 feet	SHEET 3 OF 6
PROJECT RECOVERY SOLUTIONS, INC.	LOCATION Arecibo, P.R.	

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
0.3	37.5								
0.0	38.5								
				15	8 8 9	17	26		Well graded SAND with silt, medium, subangular lithic sand, weak reaction with HCl, moist, weak cementation, gray
				16	3 3 2	5	25		As above, loose, about 6% shell fragments, strong reaction with HCl
-3.0	48.5								
				17	2 1 2	3	36		SILT with sand, subangular fine sand, weak reaction with HCl, moist, stiff, non plastic, dark gray
-4.6	53.5								
				18	1 2 3	5	33	(1.00)	Elastic SILT, lensed with dark gray silt with sand (as above), about 4% shell fragments, strong reaction with HCl, moist, stiff, high plasticity, dark gray LL=39, PL=24, PI=15



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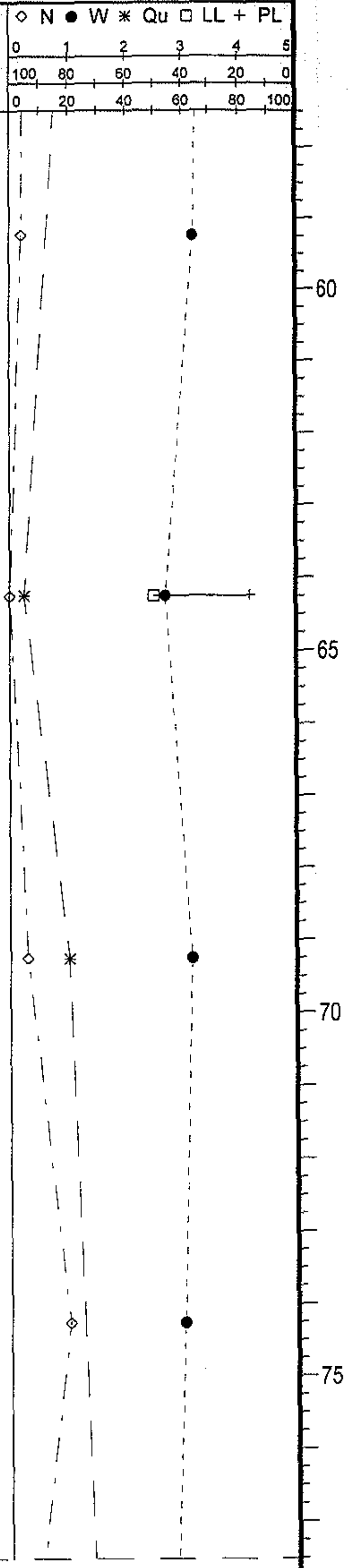
DRILLING LOG (Cont. Sheet)	ELEVATION TOP OF HOLE 11.75 feet	SHEET 4 OF 6
PROJECT RECOVERY SOLUTIONS, INC.	LOCATION Arecibo, P.R.	

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-5.8	57.5								
				19	1 1 3	4	36		Elastic SILT, no reaction with HCl, moist, stiff, high plasticity, gray
				20	WH WH WH	WH	46	(0.25)	As above, about 6% angular coarse sand, soft LL=50, PL=16, PI=34
				21	WH 2 4	6	37	(1.00)	As above, lensed with dark gray silt
				22	4 8 12	20	40		Sandy elastic SILT, subangular medium lithic sand, about 8% shell fragments, strong reaction with HCl, moist, stiff, high plasticity, dark gray



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DRILLING LOG (Cont. Sheet)

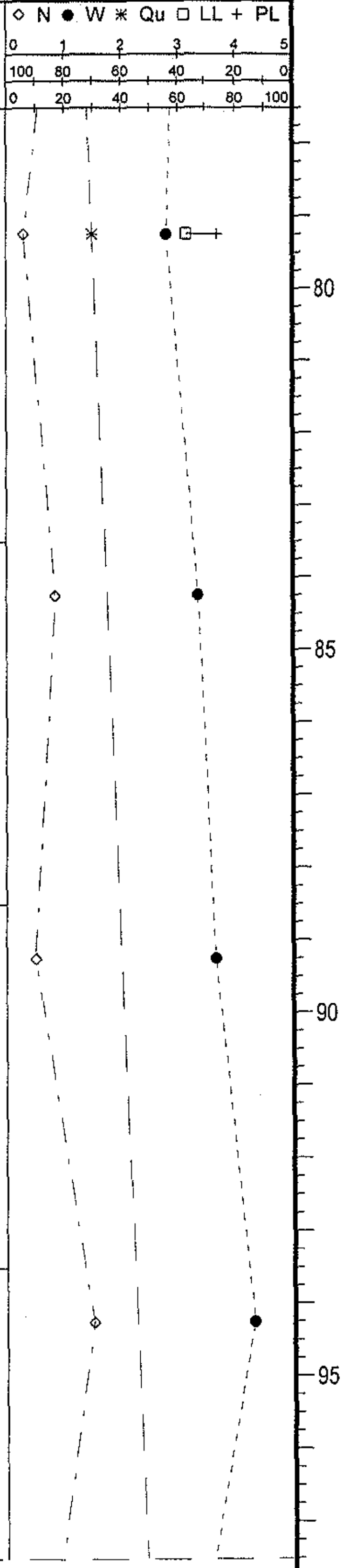
ELEVATION TOP OF HOLE
11.75 feet

SHEET 5 OF 6

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-11.9	77.5								
				23	2 2 4	6	44	(1.50)	Elastic SILT, about 6% shell fragments, strong reaction with HCl, moist, stiff, high plasticity, dark gray LL=37, PL=26, PI=11
-13.7	83.5								
				24	4 8 9	17	33		Sandy SILT, subangular fine lithic sand, about 4% shell fragments, strong reaction with HCl, moist, medium, non plastic, dark gray
-15.2	88.5								
				25	2 5 5	10	27		Elastic SILT, about 19% shell fragments, strong reaction with HCl, moist, medium, high plasticity, very dark gray
-16.7	93.5								
				26	15 16 14	30	14		Well graded SAND with silt, dense, subangular lithic sand, no reaction with HCl, moist, weak cementation, dark gray



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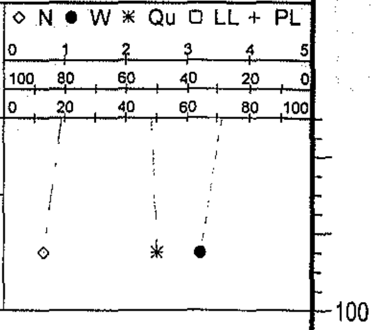
DRILLING LOG (Cont. Sheet)	ELEVATION TOP OF HOLE 11.75 feet	SHEET 6 OF 6
PROJECT RECOVERY SOLUTIONS, INC.	LOCATION Arecibo, P.R.	

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-18.0	97.5								
-18.3	98.5								
-18.7	100.0			27	5 6 7	13	36	(2.50)	Elastic SILT, about 8% wood fragments, no reaction with HCl, moist, very stiff, high plasticity, dark grayish brown



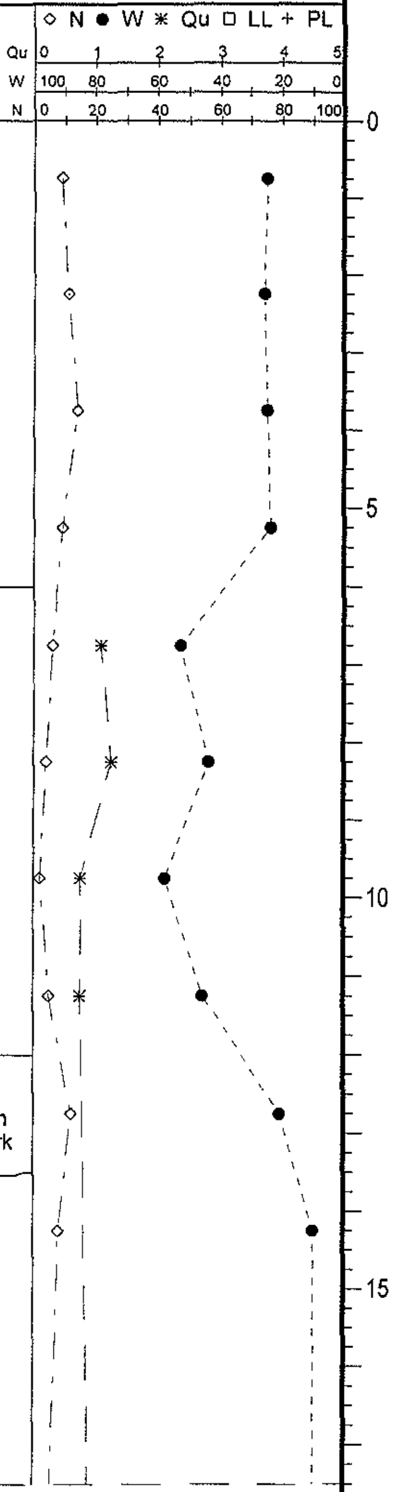
NOTE:
1) ( ) penetrometer value
2) Qu in tons per square foot
3) N - values obtained from Standard Penetration Test, ASTM D 1586
4) The stratification lines represent approximate boundaries between soil types and the transition may be gradual.
5) These logs were prepared for a specific project and specific purpose. They should not be separated from the geotechnical engineering report.
6) Groundwater levels reported in this log were measured during drilling and may differ from the true location of groundwater table.
7) Boreholes drilled with automatic SPT.

STATION
COORDINATES (m): x = 406832.6615 y = 228904.5492 z = 11.75

DRILLING LOG	PROJECT RECOVERY SOLUTIONS, INC.	*SHEET 1 OF 6*

LOCATION Arecibo, P.R.	DRILLER / DRILL DESIGNATION Steven Perez / CME-45C
DESCRIPTION BY Jorge I. Wichy	DATE HOLE STARTED 07/01/1999 COMPLETED 07/06/1999
GROUNDWATER 12 feet	ELEVATION TOP OF HOLE 10.00 feet
TOTAL DEPTH OF HOLE 100 feet	INSPECTOR Alan R. Crumley

ELEV. [m] 10.0	DEPTH [feet] 0.0	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
				1	4 4 5	9	25		Lean CLAY with gravel, subangular calcareous fine gravel, strong reaction with HCl, moist, very stiff, medium plasticity, dark yellowish brown
				2	5 5 6	11	26		Lean CLAY, about 4% subangular calcareous fine gravel, strong reaction with HCl, moist, very stiff, medium plasticity, dark yellowish brown
				3	6 7 7	14	25		As above
8.2	6.0			4	4 5 4	9	24		As above
				5	4 4 2	6	53	(1.25) 1.08	Elastic SILT, no reaction with HCl, moist, stiff, high plasticity, dark gray
				6	2 2 2	4	44	(1.25)	As above
				7	1 1 1	2	58	(0.75)	As above
6.3	▼12.0			8	2 1 4	5	46	(0.75)	As above
5.9	13.5			9	5 6 6	12	21		Well graded SAND with silt, medium, subangular lithic sand, about 10% subangular fine lithic gravel, no reaction with HCl, moist, weak cementation, dark gray
				10	6 4 4	8	10		Well graded GRAVEL with silt and sand, loose, subrounded lithic gravel, subangular coarse lithic sand, no reaction with HCl, moist, weak cementation, dark gray



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DRILLING LOG (Cont. Sheet)

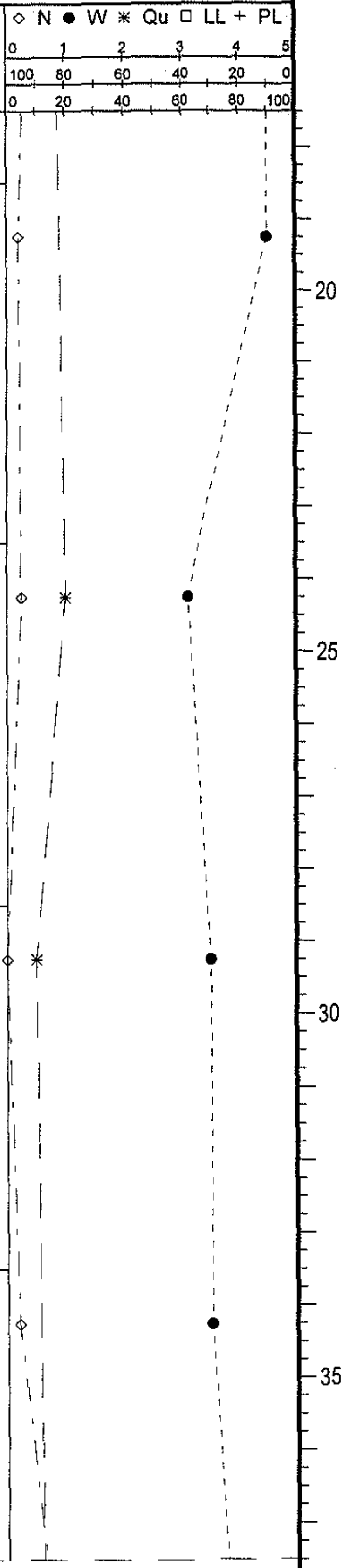
ELEVATION TOP OF HOLE 10.00 feet

SHEET 2 OF 6

PROJECT RECOVERY SOLUTIONS, INC.

LOCATION Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
4.7	17.5								
4.4	18.5								
				11	2 3 1	4	10		Well graded sand with silt, very loose, subangular lithic sand, about 8% subrounded fine lithic gravel, no reaction with HCl, wet, weak cementation, gray
2.8	23.5								
				12	2 2 3	5	38	(1.00)	Fat CLAY, no reaction with HCl, moist, stiff, high plasticity, gray
1.3	28.5								
				13	WH WH WH	WH	30	(0.50)	Elastic silt with sand, subangular fine sand, weak reaction with HCl, moist, medium, high plasticity, dark gray
-0.2	33.5								
				14	1 1 3	4	30		Poorly graded SAND with silt, loose, subangular medium lithic sand, no reaction with HCl, moist, weak cementation, dark gray



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DRILLING LOG (Cont. Sheet)

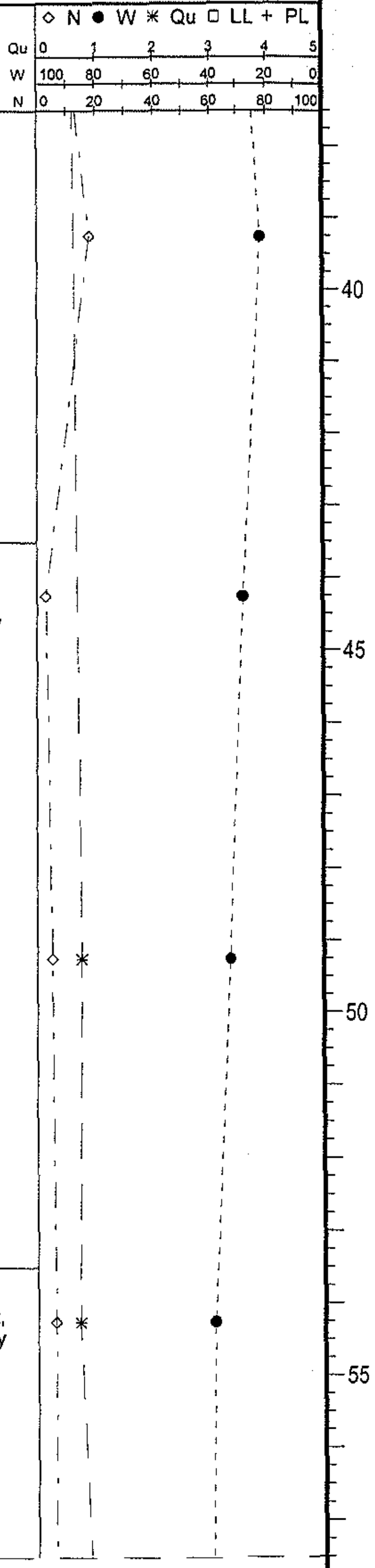
ELEVATION TOP OF HOLE
10.00 feet

SHEET 3
OF 6

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-1.4	37.5								
				15	3 9 9	18	22		As above, medium
-3.3	43.5								
				16	1 1 2	3	28		Sandy elastic SILT, subangular fine sand, strong reaction with HCl, moist, medium, high plasticity, very dark gray
				17	3 3 2	5	33	(0.75)	As above, lensed with dark gray silty sand, subangular fine sand
-6.3	53.5								
				18	2 3 3	6	39	(0.50) 0.72	Fat CLAY, no reaction with HCl, moist, soft, high plasticity, black mottled, gray



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DRILLING LOG (Cont. Sheet)

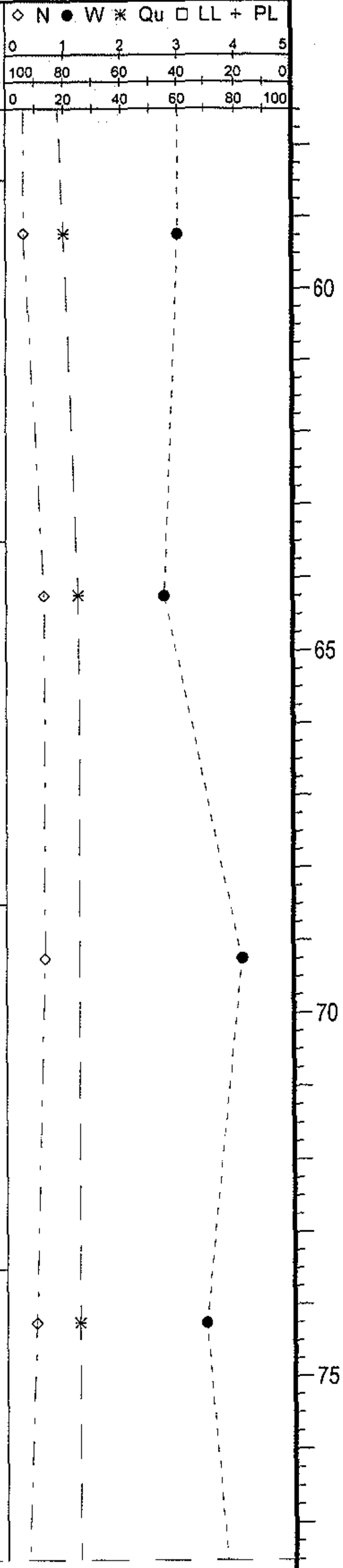
ELEVATION TOP OF HOLE 10.00 feet

SHEET 4 OF 6

PROJECT RECOVERY SOLUTIONS, INC.

LOCATION Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-7.5	57.5	▨							
-7.8	58.5	▥	☒	19	3 3 3	6	40	(1.00)	Elastic silt, no reaction with HCl, moist, stiff, high plasticity, dark gray
-9.4	63.5	▥	☒	20	3 2 11	13	45	(1.25)	Sandy elastic SILT, subangular fine sand, at top (2.0 in.) dark gray elastic silt (as above), about 10% shell fragments, strong reaction with HCl, moist, stiff, high plasticity, very dark gray
-10.9	68.5	░	☒	21	5 7 6	13	18		Well graded SAND with silt, medium, subangular lithic sand, strong reaction with HCl, moist, weak cementation, dark gray
-12.4	73.5	▥	☒	22	4 6 4	10	31	(1.25)	Elastic SILT with sand, subangular fine sand, no reaction with HCl, moist, stiff, high plasticity, dark gray



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DRILLING LOG (Cont. Sheet)

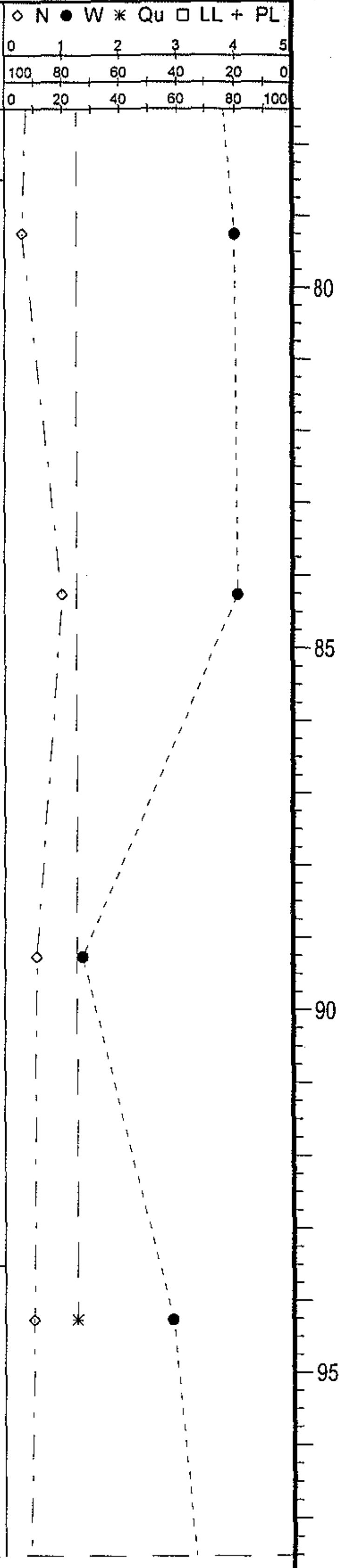
ELEVATION TOP OF HOLE
10.00 feet

SHEET 5
OF 6

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-13.6	77.5								
-13.9	78.5								
				23	4 3 3	6	20		Silty SAND, loose, subangular medium lithic sand, about 15% shell fragments, strong reaction with HCl, moist, weak cementation, very dark gray
				24	8 9 11	20	19		As above, medium
				25	3 5 6	11	73		As above, medium, subangular fine sand, about 1% shall fragments, no reaction with HCl
-18.5	93.5								
				26	4 4 6	10	42	(1.25)	Elastic silt, lensed with very dark gray silty sand, subangular medium sand, no reaction with HCl, moist, stiff, high plasticity, very dark grayish brown



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DRILLING LOG (Cont. Sheet)

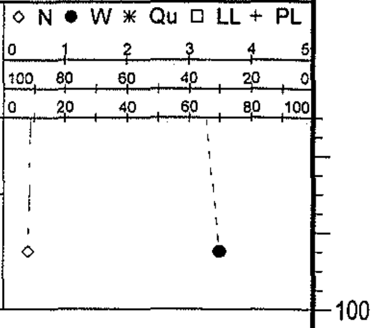
ELEVATION TOP OF HOLE 10.00 feet

SHEET 6 OF 6

PROJECT RECOVERY SOLUTIONS, INC.

LOCATION Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-19.7	97.5								
-20.0	98.5	▥							
-20.5	100.0	░	☒	27	4 4 4	8	30		Poorly graded SAND, loose, subangular fine quartz sand, no reaction with HCl, moist, weak cementation, gray



NOTE: 1) ( ) penetrometer value
2) Qu in tons per square foot
3) N - values obtained from Standard Penetration Test, ASTM D 1586
4) The stratification lines represent approximate boundaries between soil types and the transition may be gradual.
5) These logs were prepared for a specific project and specific purpose. They should not be separated from the geotechnical engineering report.
6) Groundwater levels reported in this log were measured during drilling and may differ from the true location of groundwater table.

STATION
COORDINATES (m): x = 406307.2065 y = 228326.7222 z = 10.00

HOLE NO. RCS-10

DRILLING LOG

PROJECT: RECOVERY SOLUTIONS, INC.

SHEET 1 OF 6

LOCATION: Arecibo, P.R.

DRILLER / DRILL DESIGNATION: Steven Perez / CME-45C

DESCRIPTION BY: Jorge I. Wichy

DATE HOLE STARTED: 06/29/1999 COMPLETED: 06/30/1999

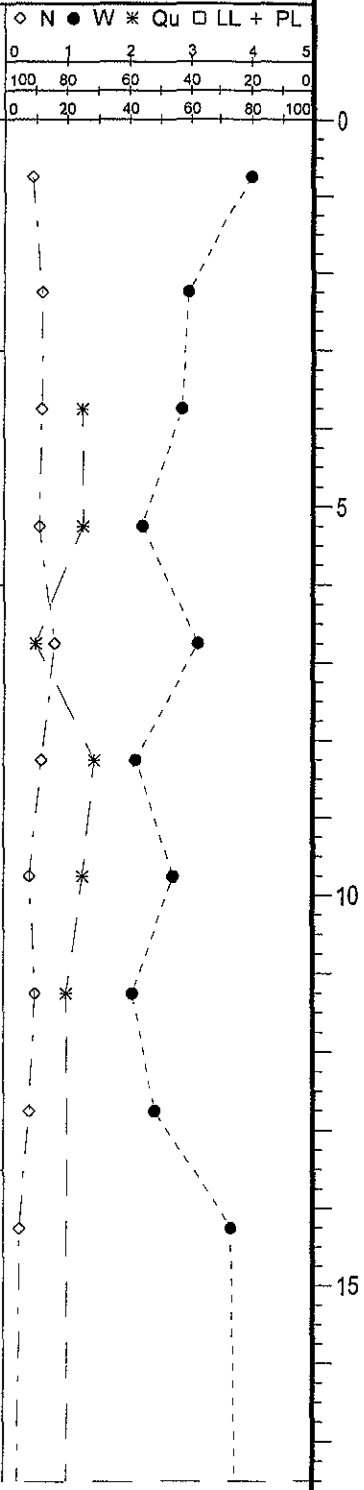
GROUNDWATER: 13 feet

ELEVATION TOP OF HOLE: 20.50 feet

TOTAL DEPTH OF HOLE: 100 feet

INSPECTOR: Alan R. Crumley

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
20.5	0.0								
		▨		1	3 4 5	9	20		Lean CLAY with gravel, soft, dry, medium plasticity, subangular calcareous fine gravel, strong reaction with HCL, dark brown
19.6	3.0	▨		2	5 6 6	12	41		Lean CLAY, soft, medium plasticity, dry, about 2% roots, weak reaction with HCL, dark brown
		▨		3	6 6 6	12	43	(1.25)	Fat CLAY, stiff, high plasticity, moist, no reaction with HCL, gray
18.7	6.0	▨		4	5 5 6	11	56	(1.25)	As above
		▥		5	8 7 9	16	38	(0.50)	Elastic SILT, soft, high plasticity, moist, about 2% shell fragments, weak reaction with HCL, dark gray
		▥		6	6 7 5	12	58	(1.25) 1.44	As above, about 1% shell fragments
		▥		7	3 4 4	8	46	(1.25)	As above, stiff, high plasticity, grayish brown mottled, dark gray
		▥		8	6 5 5	10	59	(1.00)	As above
16.4	▼ 13.5	▥		9	5 4 4	8	52		Elastic SILT with sand, soft, high plasticity, moist, subangular fine sand, no reaction with HCL, dark gray
		░		10	2 3 2	5	27		Poorly graded SAND with silt, medium, subangular medium lithic sand, weak cementation, dark gray



Continued Next Page

DRILLING LOG (Cont. Sheet)

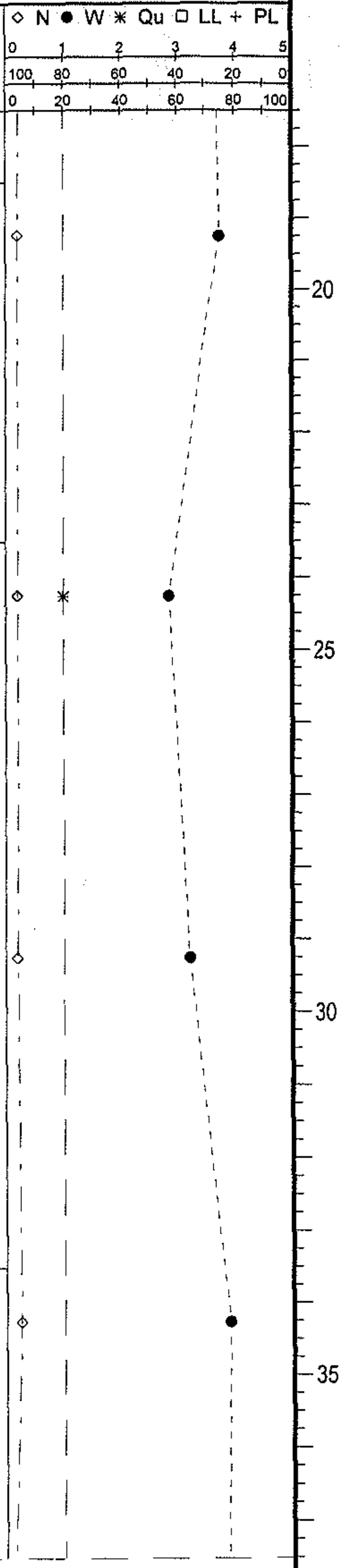
ELEVATION TOP OF HOLE
20.50 feet

SHEET 2
OF 6

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
15.2	17.5								
14.9	18.5								
				11	1 2 2	4	25		Well graded GRAVEL with sand, medium, subrounded lithic gravel, subrounded medium sand lithic sand, weak cementation, weak reaction with HCL, gray
13.3	23.5								
				12	WH 2 2	4	43	(1.00)	Fat CLAY, stiff, high plasticity, moist, no reaction with HCL, gray
				13	1 2 2	4	36		As above, soft, about 15% wood fragments
10.3	33.5								
				14	2 3 2	5	22		Silty SAND, very loose, weak cementation, subangular medium lithic sand, weak reaction with HCL, dark gray



Continued Next Page

DRILLING LOG (Cont. Sheet)

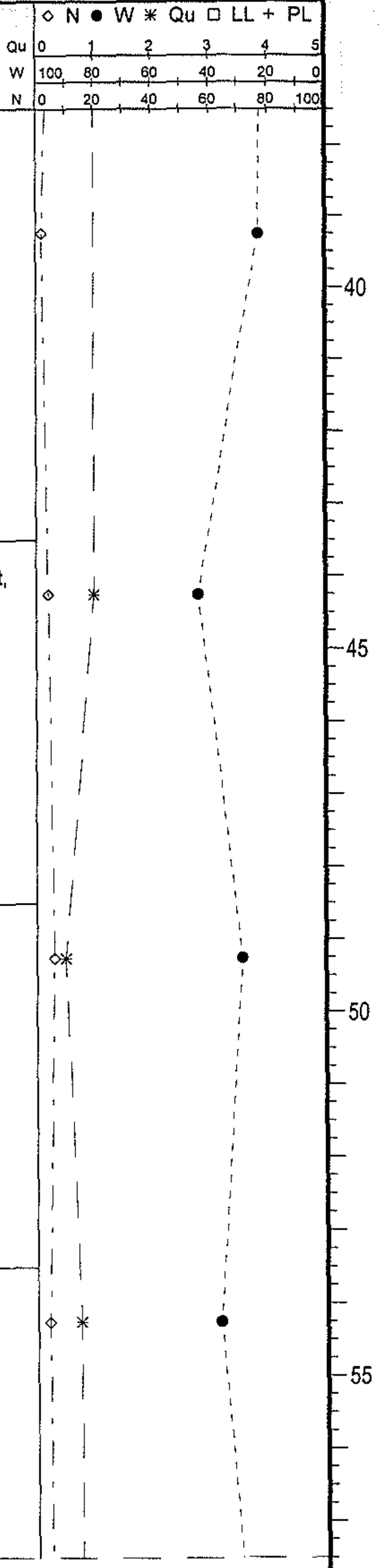
ELEVATION TOP OF HOLE
20.50 feet

SHEET 3 OF 6

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
9.1	37.5								
				15	2 1 1	2	23		As above, loose, wet
7.2	43.5								
				16	2 2 2	4	44	(1.00)	Elastic SILT, stiff, high plasticity, moist, about 20% shell fragments, strong reaction with HCL, very dark gray
5.7	48.5								
				17	3 2 4	6	29	(0.50)	Sandy SILT, soft, nonplastic, subangular fine sand, about 4% shell fragments, strong reaction with HCL, very dark gray
4.2	53.5								
				18	2 1 3	4	37	(0.75)	Elastic SILT,



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DRILLING LOG (Cont. Sheet)

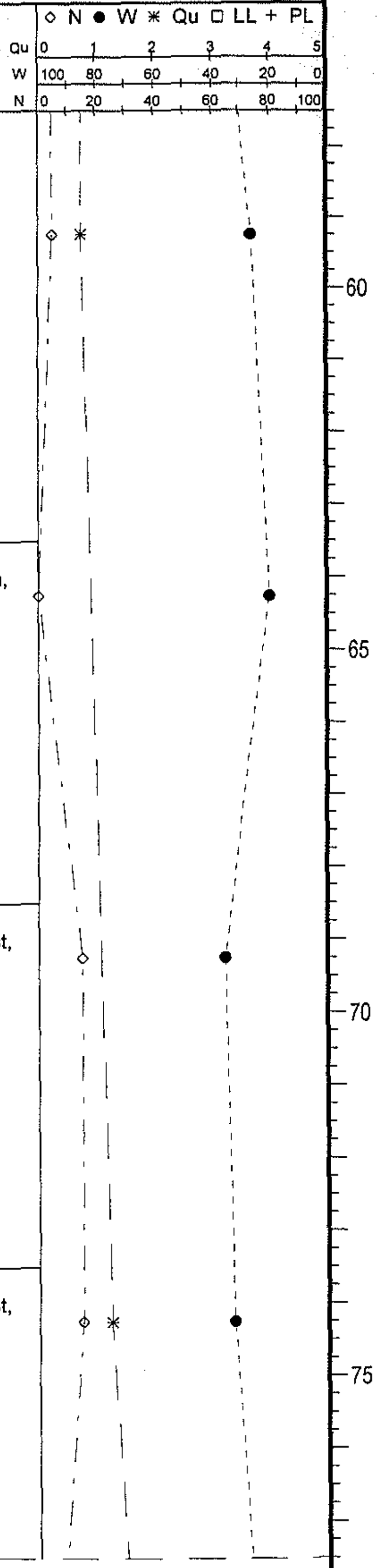
ELEVATION TOP OF HOLE
20.50 feet

SHEET 4 OF 6

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
3.0	57.5								
				19	3 2 3	5	26	(0.75)	As above, dark gray
1.1	63.5								
				20	WH WH WH	WH	20		Poorly graded SAND with silt, medium, weak cementation, subangular lithic sand, dark gray
-0.4	68.5								
				21	6 9 6	15	36		SILT with sand, soft, nonplastic, moist, subangular fine sand, strong reaction with HCL, dark gray
-1.9	73.5								
				22	3 6 9	15	33	(1.25)	Elastic SILT, stiff, high plasticity, moist, about 3% shell fragments, strong reaction with HCL, dark gray



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DRILLING LOG (Cont. Sheet)

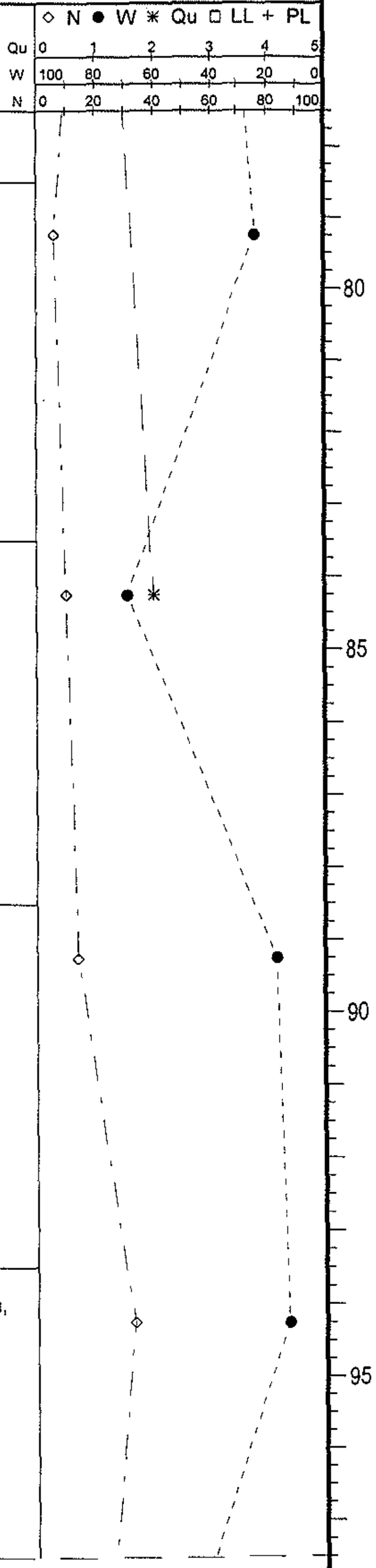
ELEVATION TOP OF HOLE 20.50 feet

SHEET 5 OF 6

PROJECT RECOVERY SOLUTIONS, INC.

LOCATION Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-3.1	77.5						
-3.4	78.5						
		23	3 3 3	6	24		Well graded SAND with silt, medium, weak cementation, subangular lithic sand, dark gray
-5.0	83.5						
		24	4 5 5	10	69	(2.00)	Elastic SILT, very stiff, high plasticity, moist, weak reaction with HCL, dark grayish brown
-6.5	88.5						
		25	2 4 10	14	17		Well graded SAND with silt, medium, weak cementation, subangular lithic sand, no reaction with HCL, dark gray
-8.0	93.5						
		26	15 16 17	33	13		Poorly graded SAND with silt, medium, weak cementation, subangular lithic sand, dark gray



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DRILLING LOG (Cont. Sheet)

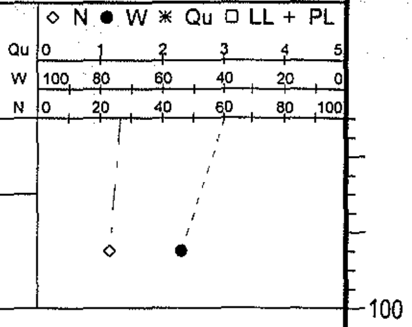
ELEVATION TOP OF HOLE
20.50 feet

SHEET 6
OF 6

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-9.2	97.5								
-9.5	98.5								
-10.0	100.0			27	9 11 12	23	54		Elastic SILT, soft, high plasticity, no reaction with HCL, dark gray



NOTE:
1) ( ) penetrometer value
2) Qu in tons per square foot
3) N - values obtained from Standard Penetration Test, ASTM D 1586
4) The stratification lines represent approximate boundaries between soil types and the transition may be gradual.
5) These logs were prepared for a specific project and specific purpose. They should not be separated from the geotechnical engineering report.
6) Groundwater levels reported in this log were measured during drilling and may differ from the true location of groundwater table.

STATION
COORDINATES (m): x = 406351.7733 y = 228106.2962 z = 20.50

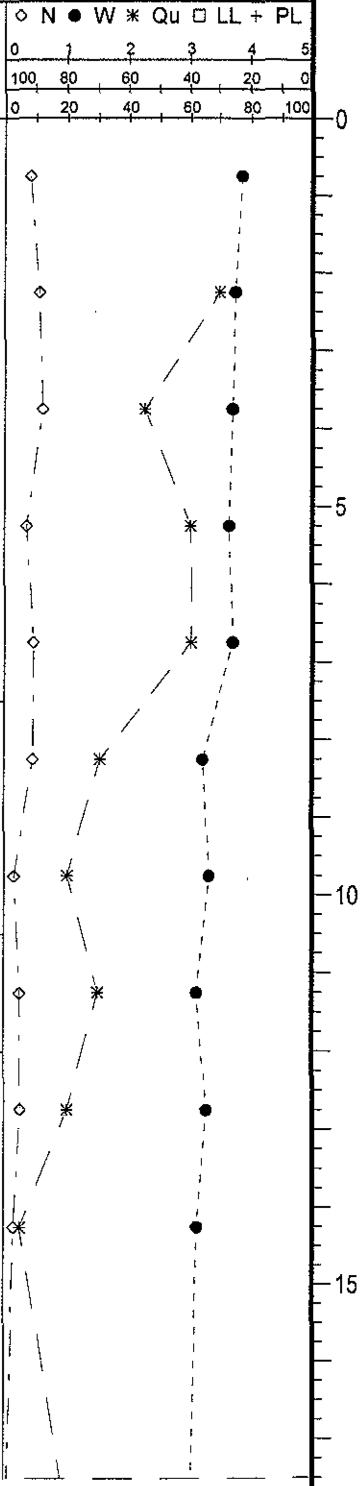
DRILLING LOG

PROJECT
RECOVERY SOLUTIONS, INC.

SHEET 1 OF 8

LOCATION Arecibo, P.R.	DRILLER / DRILL DESIGNATION Angel Ferrer / CME-55 Truck Mounted
DESCRIPTION BY Jorge I. Wichy	DATE HOLE STARTED 07/01/1999 COMPLETED 07/06/1999
GROUNDWATER 8.5 feet	ELEVATION TOP OF HOLE 21.00 feet
TOTAL DEPTH OF HOLE 150 feet	INSPECTOR Alan R. Crumley

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
21.0	0.0								
		▨		1	4 3 5	8	23		Lean CLAY, strong reaction with HCl, moist, hard, medium plasticity, yellowish brown
		▨		2	4 5 6	11	25	(3.50)	As above, very stiff
		▨		3	5 6 6	12	26	(2.25)	As above, very stiff, no reaction with HCl
		▨		4	3 3 4	7	27	(3.00)	As above, very stiff, no reaction with HCl
18.7	7.5	▨		5	4 5 4	9	26	(3.00)	As above, very stiff, no reaction with HCl, dark yellowish
	▼	▨		6	4 4 5	9	36	(1.25) 1.53	Fat CLAY, no reaction with HCl, moist, stiff, high plasticity, dark brown mottled, yellowish brown
17.8	10.5	▨		7	2 2 1	3	34	(1.00)	Fat CLAY, lensed with brownish yellow silty clay, no reaction with HCl, moist, stiff, high plasticity, yellowish brown
17.3	12.0	▨		8	3 2 3	5	38	(1.50)	Lean CLAY, no reaction with HCl, moist, stiff, medium plasticity, dark brown mottled, brownish yellow
		▨		9	2 3 2	5	35	(1.00)	Fat CLAY, lensed with brownish yellow silty clay, no reaction with HCl, moist, stiff, high plasticity, dark brown mottled, yellowish brown
		▨		10	1 2 1	3	38	(0.25)	As above, lensed with yellowish brown silty clay, dark yellowish brown



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DRILLING LOG (Cont. Sheet)

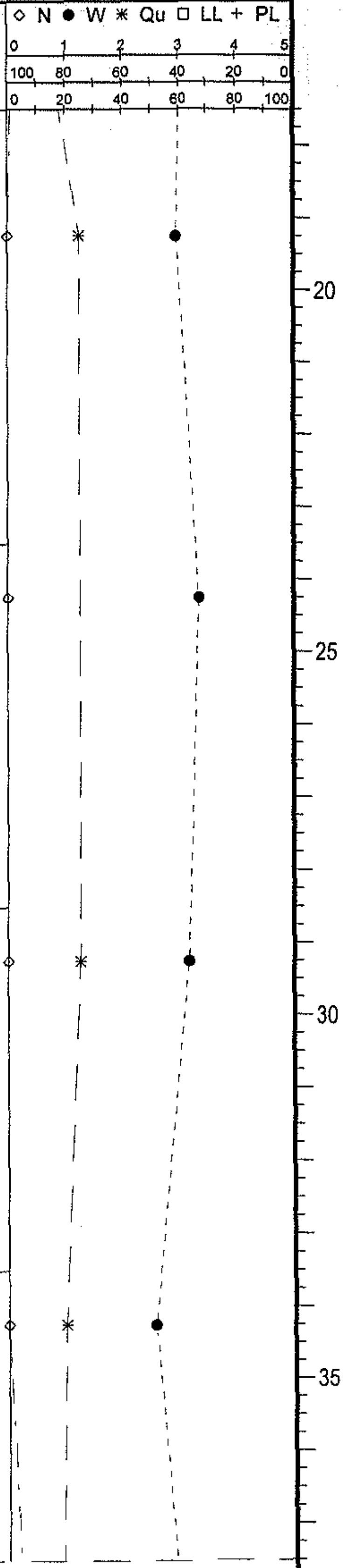
ELEVATION TOP OF HOLE
21.00 feet

SHEET 2
OF 8

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
15.7	17.5								
		▨		11	WH WH WH	WH	41	(1.25)	Fat CLAY, no reaction with HCl, moist, stiff, high plasticity, brownish yellow mottled, olive gray
13.8	23.5								
		▥		12	WH WH 2	WH	33		Elastic SILT, no reaction with HCl, moist, stiff, high plasticity, dark gray
12.3	28.5								
		▨		13	WH WH 1	WH	37	(1.25)	Fat CLAY, about 2% wood fragments, no reaction with HCl, moist, stiff, high plasticity, dark gray
10.8	33.5								
		▥		14	WH WH WH	WH	49	(1.00)	Elastic SILT, no reaction with HCl, moist, stiff, high plasticity, dark gray



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GEOCON2 2182-99.GPJ GEOCON1.GDT 8/27/99

DRILLING LOG (Cont. Sheet)

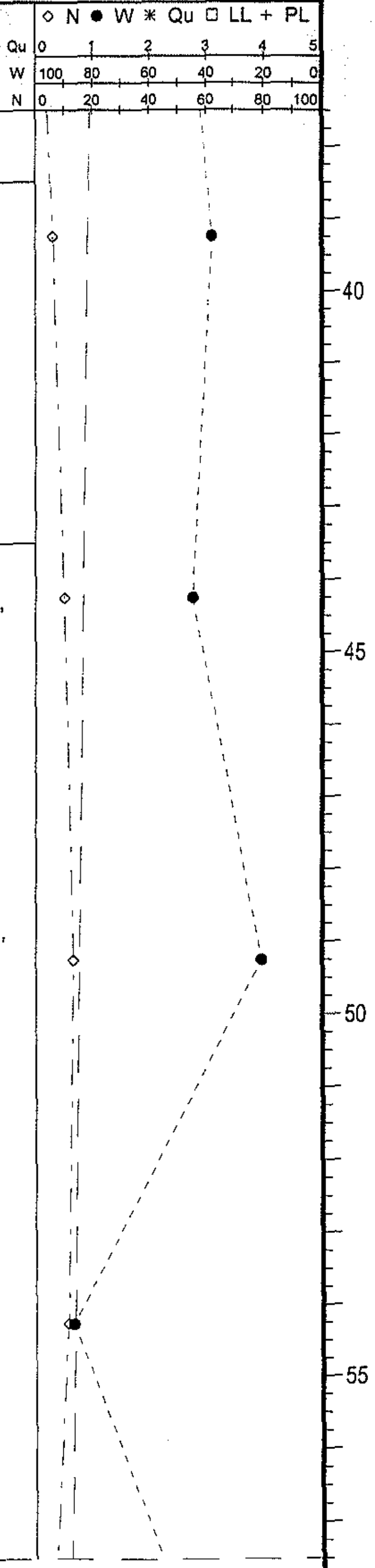
ELEVATION TOP OF HOLE 21.00 feet

SHEET 3 OF 8

PROJECT RECOVERY SOLUTIONS, INC.

LOCATION Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
9.6	37.5								
9.3	38.5								
				15	2 3 3	6	38		Silty SAND, subangular fine sand, no reaction with HCl, moist, weak cementation, dark gray
7.7	43.5								
				16	2 3 7	10	45		Sandy SILT, subangular fine sand, no reaction with HCl, wet, soft, nonplastic, dark gray
				17	4 5 8	13	21		Sandy SILT, subangular medium sand, about 14% shell fragments, strong reaction with HCl, moist, soft, nonplastic, very dark gray
				18	6 5 6	11	87		As above, subangular fine sand



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DRILLING LOG (Cont. Sheet)

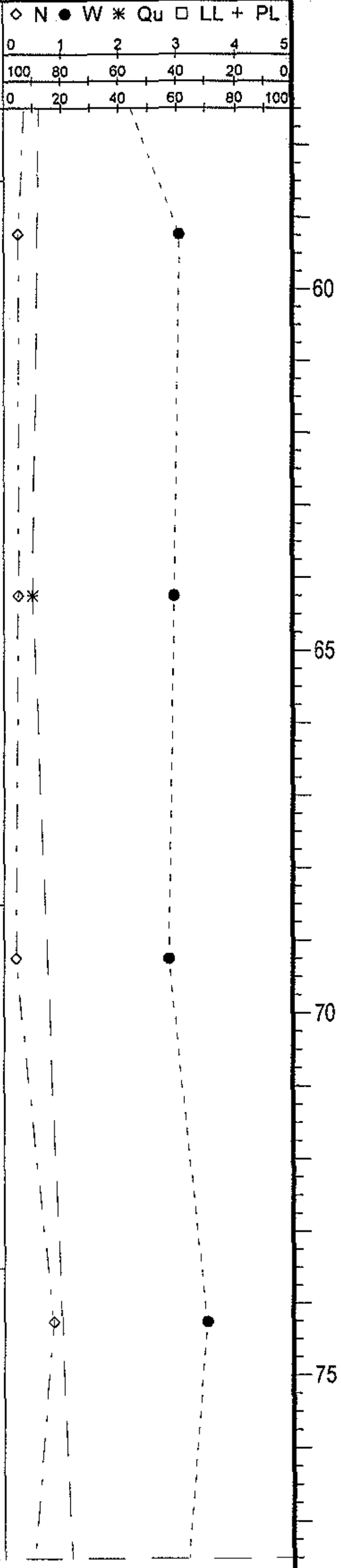
ELEVATION TOP OF HOLE
21.00 feet

SHEET 4
OF 8

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
3.5	57.5								
3.2	58.5								
		▥	☒	19	2 2 3	5	39		Elastic SILT, weak reaction with HCl, moist, stiff, high plasticity, dark gray
		▥	☒	20	2 3 2	5	41	(0.50)	As above, lensed with gray silt, medium
0.1	68.5								
		▨	☒	21	WH 1 3	4	43		Fat CLAY, no reaction with HCl, moist, stiff, high plasticity, gray
-1.4	73.5								
		░	☒	22	7 7 10	17	30		Silty SAND, medium, subangular fine sand, no reaction with HCl, moist, weak cementation, dark gray



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GEOCON2 2182-99.GPJ GEOCON1.GDT 8/27/99

DRILLING LOG (Cont. Sheet)

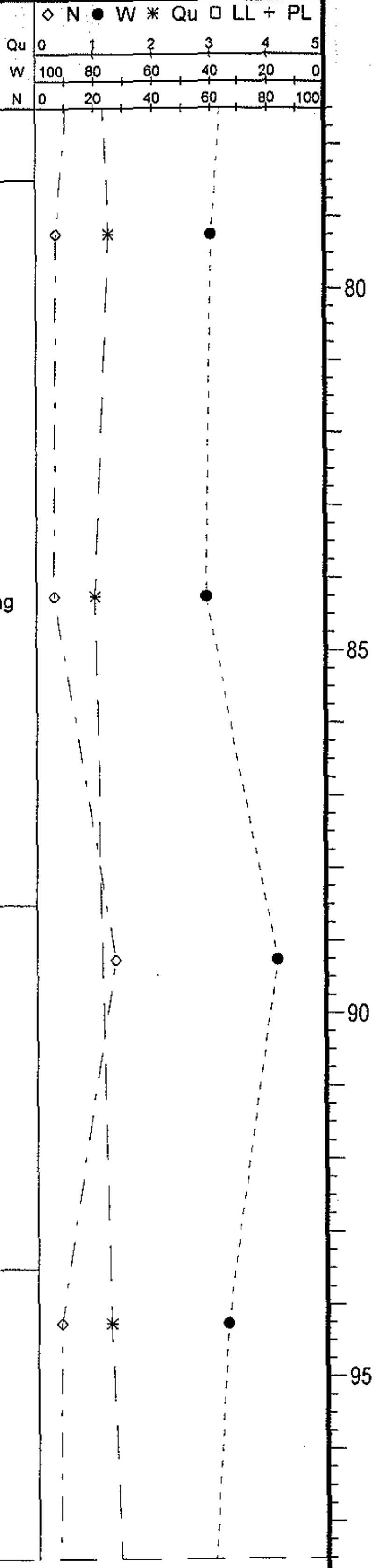
ELEVATION TOP OF HOLE
21.00 feet

SHEET 5 OF 8

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-2.6	77.5								
-2.9	78.5								
				23	2 3 4	7	40	(1.25)	Elastic SILT, no reaction with HCl, moist, stiff, high plasticity, dark gray
				24	2 3 3	6	42	(1.00)	As above, about 7% shell fragments, about 10% subangular fine sand, strong reaction with HCl
-6.0	88.5								
				25	6 12 15	27	17		Silty SAND, medium, subangular fine sand, weak reaction with HCl, moist, weak cementation, dark gray
-7.5	93.5								
				26	4 4 4	8	35	(1.25)	Elastic SILT, about 16% shell fragments, strong reaction with HCl, moist, stiff, high plasticity, very dark gray



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DRILLING LOG (Cont. Sheet)

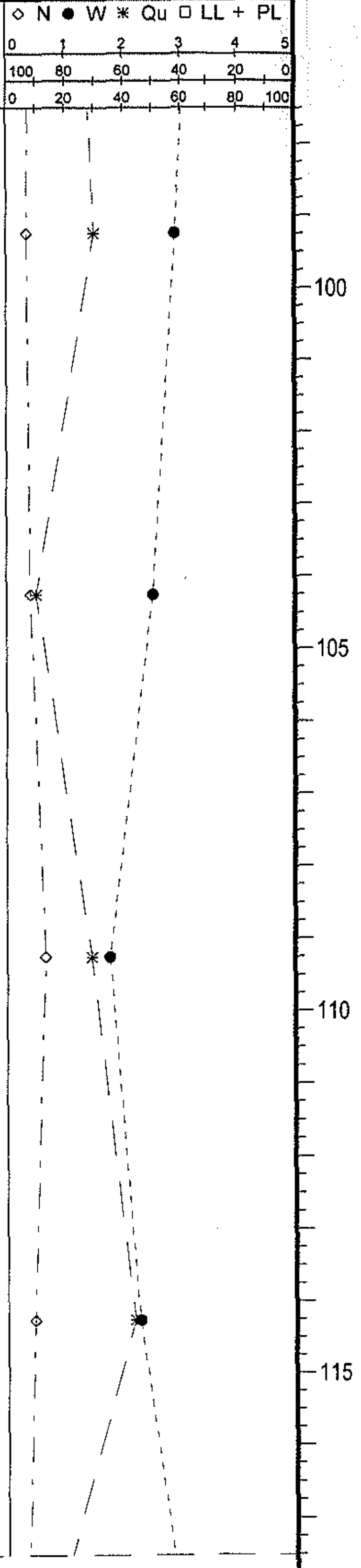
ELEVATION TOP OF HOLE
21.00 feet

SHEET 6
OF 8

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-8.7	97.5								
				27	3 3 4	7	42	(1.50)	Elastic SILT, lensed with very dark gray sandy silty, subangular fine sand, no reaction with HCl, moist, stiff, high plasticity, very dark grayish brown
				28	3 4 4	8	50	(0.50)	As above, medium, very dark gray
				29	4 6 7	13	65	(1.50) 1.44	Elastic SILT, no reaction with HCl, moist, stiff, high plasticity, very dark gray
				30	4 5 4	9	55	(2.00) 2.16	As above



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DRILLING LOG (Cont. Sheet)

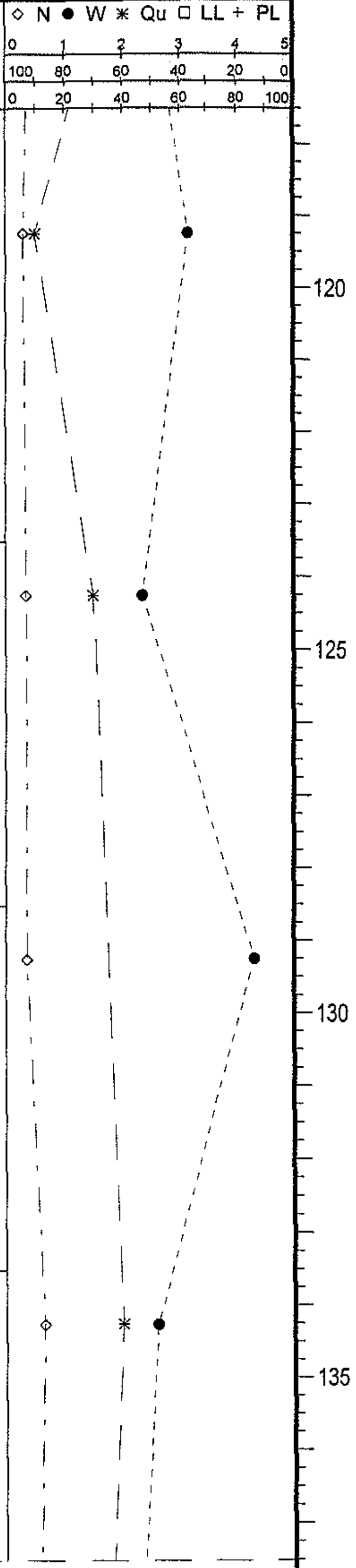
ELEVATION TOP OF HOLE
21.00 feet

SHEET 7
OF 8

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-14.8	117.5	▥							
		▥		31	3 1 5	6	37	(0.50)	As above, soft, dark gray
-16.6	123.5	▨		32	1 4 3	7	53	(1.50)	Fat CLAY, lensed with gray silty sand, subangular fine sand, about 2% wood fragments, no reaction with HCl, moist, stiff, high plasticity, dark gray
-18.2	128.5	░		33	3 3 4	7	14		Silty SAND, loose, subangular fine sand, no reaction with HCl, moist, weak cementation, gray
-19.7	133.5	▥		34	4 6 7	13	48	(2.00)	Elastic SILT, no reaction with HCl, moist, stiff, high plasticity, dark gray



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DRILLING LOG (Cont. Sheet)

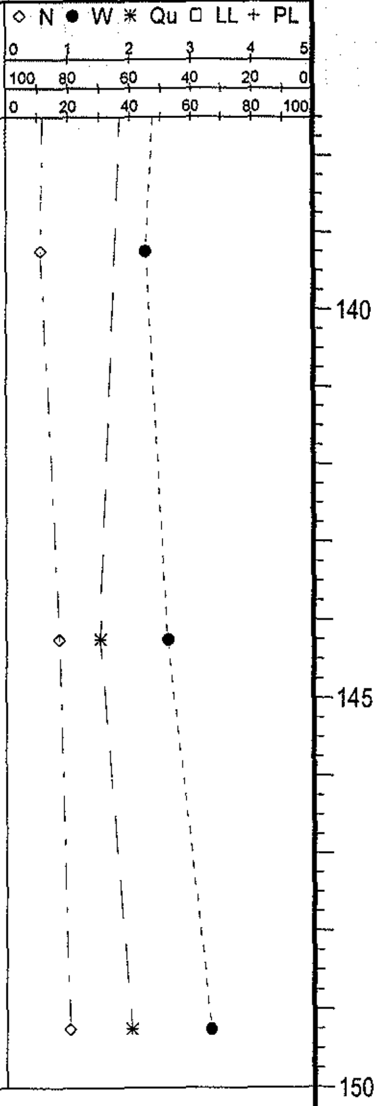
ELEVATION TOP OF HOLE 21.00 feet

SHEET 8 OF 8

PROJECT RECOVERY SOLUTIONS, INC.

LOCATION Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-20.9	137.5								
				35	7 6 5	11	55		As above, about 4% wood fragments, soft
				36	5 7 10	17	48	(1.50)	As above
				37	7 12 8	20	34	(2.00)	As above
-24.7	150.0								



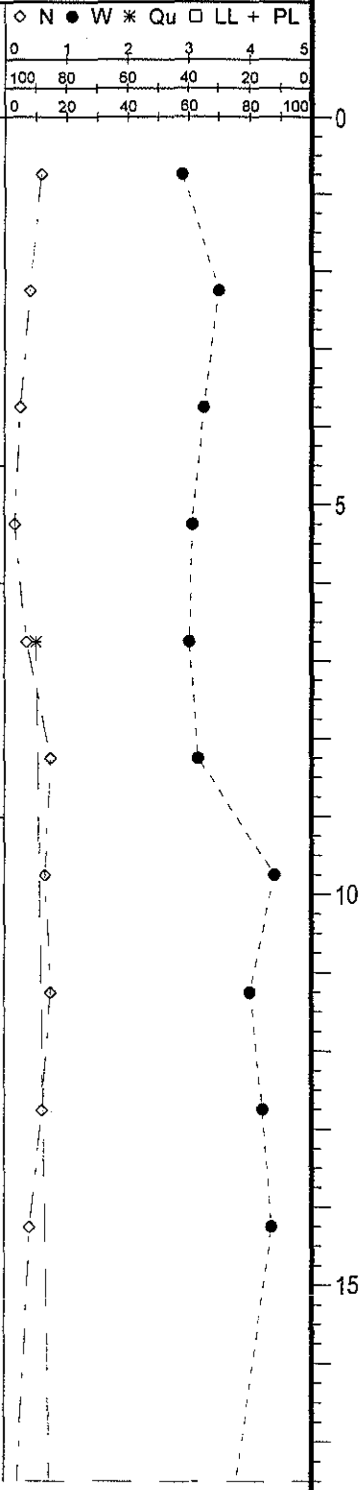
NOTE: 1) ( ) penetrometer value
2) Qu in tons per square foot
3) N - values obtained from Standard Penetration Test, ASTM D 1586
4) The stratification lines represent approximate boundaries between soil types and the transition may be gradual.
5) These logs were prepared for a specific project and specific purpose. They should not be separated from the geotechnical engineering report.
6) Groundwater levels reported in this log were measured during drilling and may differ from the true location of groundwater table.
7) Boreholes drilled with automatic SPT.

STATION
COORDINATES (m): x = 406653.7773 y = 228290.0031 z = 21.00

DRILLING LOG

PROJECT RECOVERY SOLUTIONS, INC.	SHEET 1 OF 8
LOCATION Arecibo, P.R.	DRILLER / DRILL DESIGNATION Steven Perez / CME-45C
DESCRIPTION BY Jorge I. Wichy	DATE HOLE STARTED 07/07/1999 COMPLETED 07/10/1999
GROUNDWATER 4.5 feet	ELEVATION TOP OF HOLE 10.00 feet
TOTAL DEPTH OF HOLE 150 feet	INSPECTOR Alan R. Crumley

ELEV. [m] 10.0	DEPTH [feet] 0.0	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
		▨		1	5 8 4	12	42		Lean CLAY, about 2% subangular fine quartz sand, strong reaction with HCl, dry, soft, medium plasticity, dark yellowish brown
		▨		2	4 5 3	8	30		As above
8.6	▼4.5	▨		3	3 3 2	5	35		As above, no reaction with HCl
8.2	6.0	▨		4	2 1 2	3	39		Fat CLAY, no reaction with HCl, moist, stiff, high plasticity, gray
		▥		5	4 4 3	7	40	(0.50)	Elastic SILT, no reaction with HCl, moist, soft, high plasticity, dark gray
7.3	9.0	▥		6	4 3 12	15	37		As above, lensed with dark gray sandy silt, subangular fine sand
		░		7	7 7 6	13	12		Well graded SAND with silt, medium, subangular lithic sand, no reaction with HCl, wet, weak cementation, dark gray
		░		8	5 7 8	15	20		As above
		░		9	8 6 6	12	16		As above, moist
		░		10	7 4 4	8	13		Well graded SAND with silt and gravel, loose, subrounded lithic sand, subrounded fine lithic gravel, no reaction with HCl, wet, weak cementation, dark gray



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DRILLING LOG (Cont. Sheet)

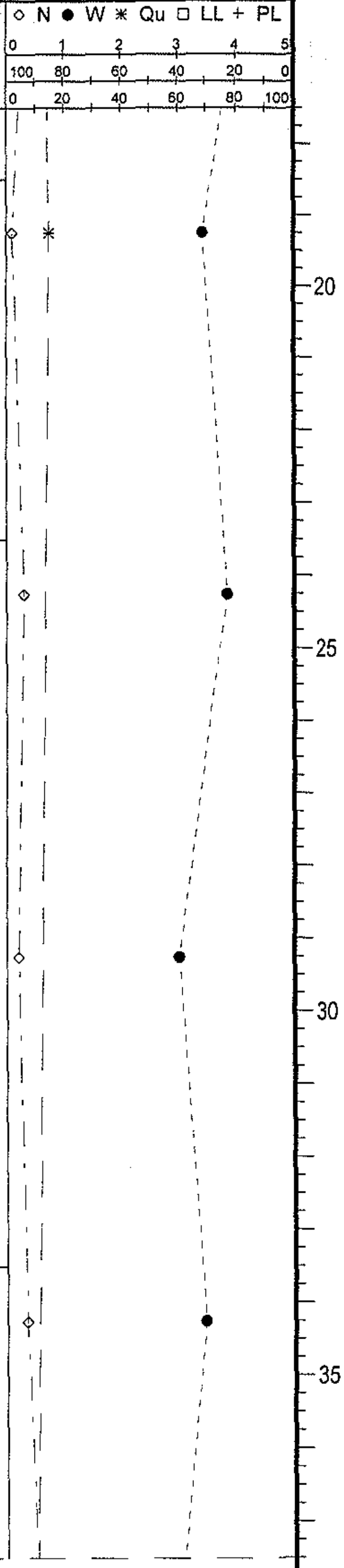
ELEVATION TOP OF HOLE
10.00 feet

SHEET 2 OF 8

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
4.7	17.5								
4.4	18.5								
				11	2 1 1	2	31	(0.75)	Elastic SILT, no reaction with HCl, moist, medium, non plasticity, gray
2.8	23.5								
				12	2 1 5	6	23		Well graded SAND with silt, loose, subangular lithic sand, no reaction with HCl, wet, weak cementation, dark gray
				13	1 2 2	4	40		Elastic SILT, no reaction with HCl, moist, stiff, high plasticity, gray
-0.2	33.5								
				14	3 4 3	7	31		SILT with sand, subangular sand, no reaction with HCl, moist, soft, nonplastic, dark gray



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DRILLING LOG (Cont. Sheet)

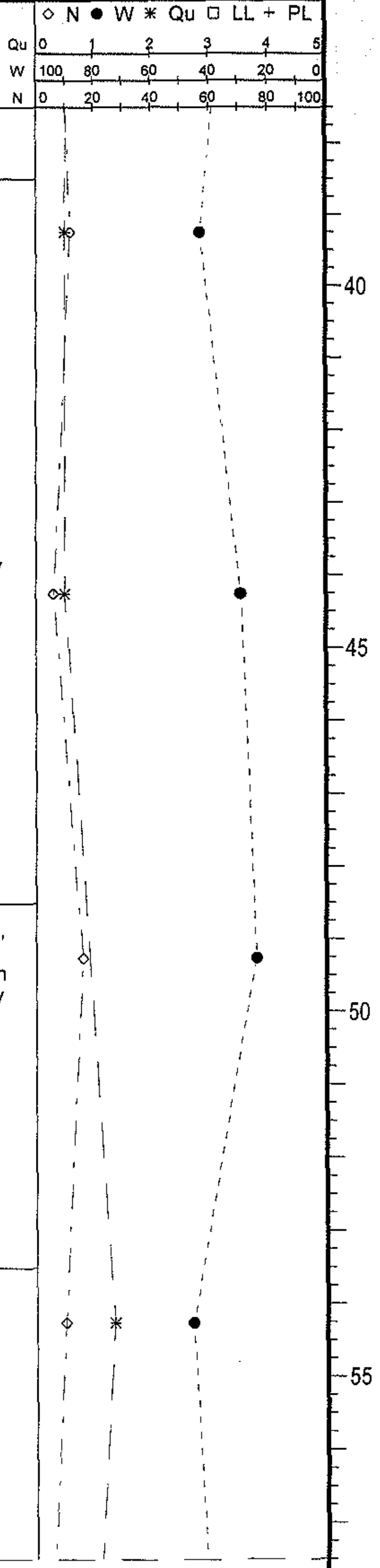
ELEVATION TOP OF HOLE
10.00 feet

SHEET 3
OF 8

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-1.4	37.5								
-1.7	38.5								
				15	2 3 9	12	43	(0.50)	Elastic SILT, no reaction with HCl, moist, soft, high plasticity, gray
				16	5 3 3	6	29	(0.50)	As above, lensed with dark gray sandy elastic silt, subangular medium sand, about 7% shell fragments, strong reaction with HCl
-4.8	48.5								
				17	5 8 8	16	24		Poorly graded SAND with silt, medium, subangular medium lithic sand, about 3% shell fragments, weak reaction with HCl, wet, weak cementation, dark gray
-6.3	53.5								
				18	4 5 5	10	46	(0.50) 1.35	Elastic SILT, no reaction with HCl, moist, soft, high plasticity, gray



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GEOCON1 2182-99.GPJ GEOCON1.GDT 8/27/99

DRILLING LOG (Cont. Sheet)

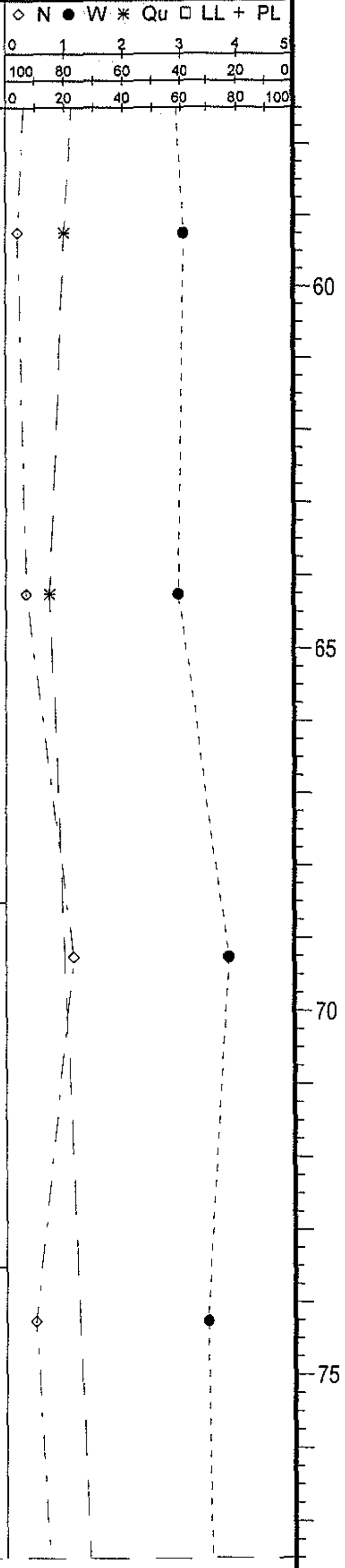
ELEVATION TOP OF HOLE
10.00 feet

SHEET 4
OF 8

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-7.5	57.5								
				19	1 2 2	4	39	(1.00)	As above, stiff
				20	WH 2 5	7	41	(0.75)	As above, about 10% shell fragments, strong reaction with HCl, medium, dark gray
-10.9	68.5			21	5 11 12	23	23		Well graded SAND with silt, medium, subangular lithic sand, about 7% shell fragments, weak reaction with HCl, moist, weak cementation, dark gray
-12.4	73.5			22	3 4 6	10	31		Sandy SILT, subangular fine sand, about 5% shell fragments, strong reaction with HCl, moist, stiff, non plastic, very dark gray



Continued Next Page

DRILLING LOG (Cont. Sheet)

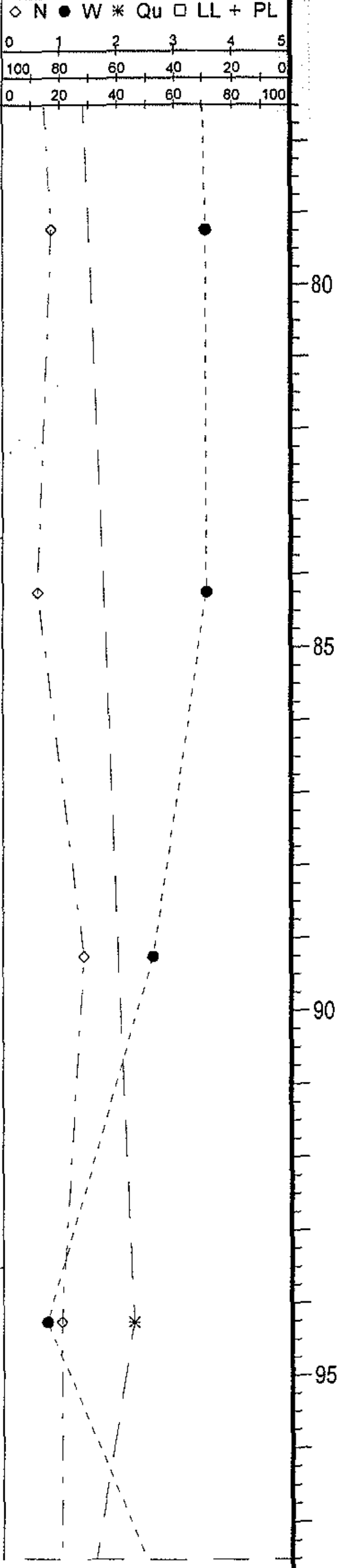
ELEVATION TOP OF HOLE 10.00 feet

SHEET 5 OF 8

PROJECT RECOVERY SOLUTIONS, INC.

LOCATION Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-13.6	77.5								
				23	5 9 8	17	29		As above
-15.5	83.5								
				24	5 6 6	12	29		Silty SAND, medium, subangular medium lithic sand, about 1% shell fragments, weak reaction with HCl, moist, weak cementation, dark gray
				25	10 15 13	28	48		Silty SAND, subangular fine sand, at top (2.25 in.) dark grayish brown elastic silt, no reaction with HCl, moist, weak cementation, very dark gray
-18.5	93.5								
				26	7 9 11	20	85	(2.25)	Peat, no reaction with HCl, moist, very stiff, low plasticity, fibrous texture, very dark grayish brown



Continued Next Page

DRILLING LOG (Cont. Sheet)

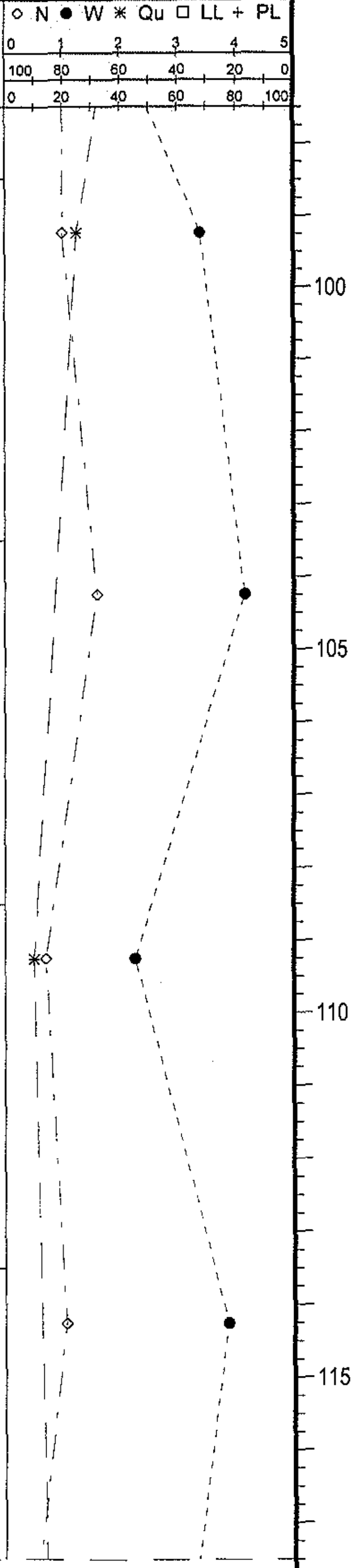
ELEVATION TOP OF HOLE
10.00 feet

SHEET 6
OF 8

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-19.7	97.5								
-20.0	98.5								
				27	6 10 10	20	32	(1.25)	Elastic SILT, no reaction with HCl, moist, stiff, high plasticity, dark gray
-21.5	103.5								
				28	13 16 16	32	17		Silty SAND, dense, subangular fine lithic sand, no reaction with HCl, moist, weak cementation, dark gray
-23.1	108.5								
				29	5 7 7	14	55	(0.50)	Elastic SILT, no reaction with HCl, moist, soft, high plasticity, dark gray
-24.6	113.5								
				30	4 8 13	21	23		Silty SAND, medium, subangular fine lithic sand, no reaction with HCl, moist, weak cementation, dark gray



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DRILLING LOG (Cont. Sheet)

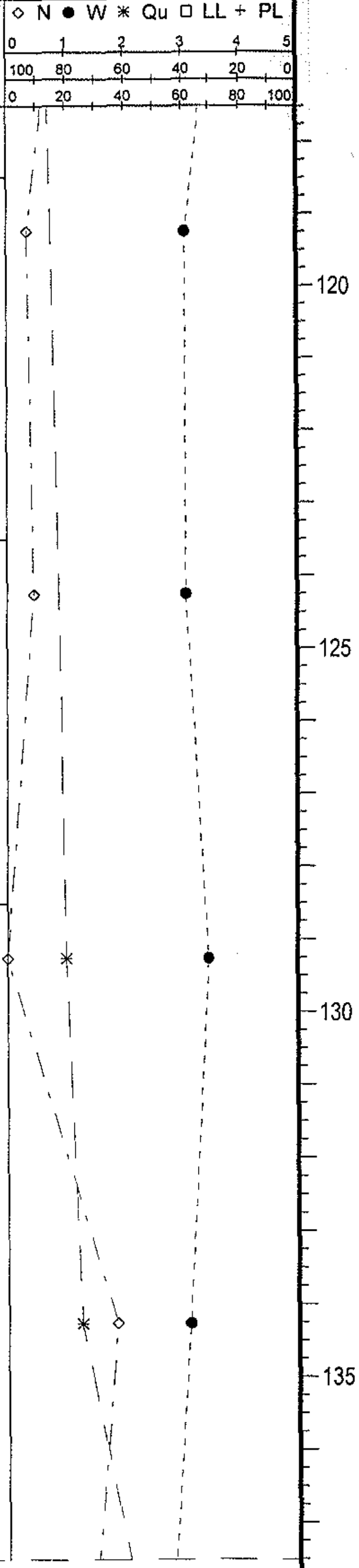
ELEVATION TOP OF HOLE 10.00 feet

SHEET 7 OF 8

PROJECT RECOVERY SOLUTIONS, INC.

LOCATION Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-25.8	117.5								
-26.1	118.5			31	WH 2 5	7	39		Elastic SILT, no reaction with HCl, moist, stiff, high plasticity, dark gray
-27.6	123.5			32	2 2 7	9	39		SILT with sand, subangular fine sand, weak reaction with HCl, moist, stiff, nonplastic, dark gray
-29.2	128.5			33	WH WH 3	WH	31	(1.00)	Elastic SILT, no reaction with HCl, moist, stiff, high plasticity, dark gray
				34	9 17 20	37	38	(1.25)	Elastic SILT with sand, subangular fine sand, at top (2.0 in.) black peat, no reaction with HCl, moist, stiff, high plasticity, dark gray



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HOLE NO. RCS-12

DRILLING LOG (Cont. Sheet)

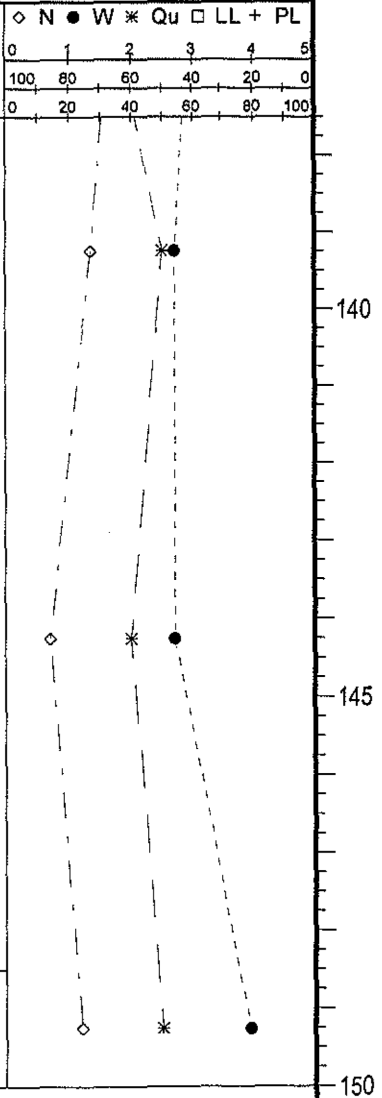
ELEVATION TOP OF HOLE
10.00 feet

SHEET 8 OF 8

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-31.9	137.5								
				35	9 11 16	27	46	(2.50)	Sandy elastic SILT, subangular medium sand, no reaction with HCl, moist, very stiff, high plasticity, very dark gray
				36	4 6 8	14	46	(2.00)	Elastic SILT, lensed with gray silt, about 2% wood, no reaction with HCl, moist, very stiff, high plasticity, dark gray
-35.3	148.5								
				37	7 9 15	24	21	(2.50)	Silty SAND, medium, subangular fine lithic sand, weak reaction with HCl, moist, weak cementation, dark gray
-35.7	150.0								



NOTE: 1) ( ) penetrometer value
2) Qu in tons per square foot
3) N - values obtained from Standard Penetration Test, ASTM D 1586
4) The stratification lines represent approximate boundaries between soil types and the transition may be gradual.
5) These logs were prepared for a specific project and specific purpose. They should not be separated from the geotechnical engineering report.
6) Groundwater levels reported in this log were measured during drilling and may differ from the true location of groundwater table.

STATION
COORDINATES (m): x = 406525.2835 y = 227875.7717 z = 10.00

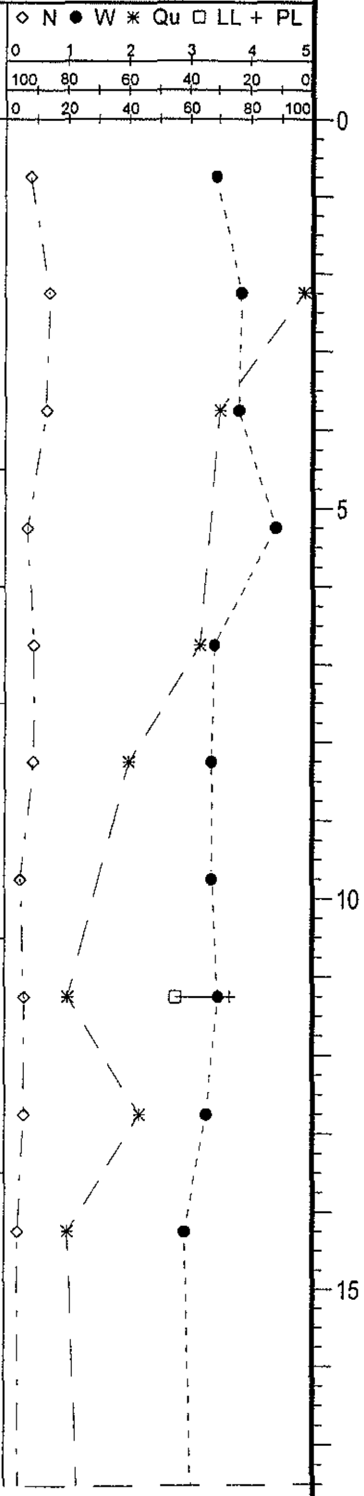
GEOCON1 2182-99.GPJ GEOCON1.GDT 8/27/99

HOLE NO. RCS-13

DRILLING LOG	PROJECT RECOVERY SOLUTIONS, INC.	SHEET 1 OF 8

LOCATION Arecibo, P.R.	DRILLER / DRILL DESIGNATION Angel Ferrer / CME-55 Truck Mounted
DESCRIPTION BY Jorge I. Wichy	DATE HOLE STARTED 06/29/1999 COMPLETED 07/01/1999
GROUNDWATER 8.5 feet	ELEVATION TOP OF HOLE 24.50 feet
TOTAL DEPTH OF HOLE 150 feet	INSPECTOR Alan R. Crumley

ELEV. [m] 24.5	DEPTH [feet] 0.0	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
				1	3 3 5	8	31		Lean CLAY, about 1% subangular calcareous fine gravel, strong reaction with HCL, moist, very stiff, medium plasticity, dark yellowish brown
				2	5 6 8	14	23	(4.00) 4.86	Lean CLAY, no reaction with HCL, moist, very stiff, medium plasticity, dark yellowish brown
23.1	4.5			3	5 6 7	13	24	(4.00) 3.50	As above, about 5% roots
22.7	6.0			4	3 3 4	7	12		SILT, no reaction with HCL, dry, soft, nonplastic, strong brown
22.2	7.5			5	4 4 5	9	32	(3.25) 3.15	Fat CLAY, no reaction with HCL, moist, very stiff, high plasticity, dark brown mottled, dark yellowish brown
	▼			6	5 5 4	9	33	(2.00)	Lean CLAY, no reaction with HCL, moist, stiff, medium plasticity, dark yellowish brown
21.3	10.5			7	2 3 2	5	33		As above, wet, medium, brownish yellow
				8	2 3 3	6	31	(1.00)	Elastic SILT, no reaction with HCl, moist, stiff, high plasticity, dark brown mottled, brownish yellow LL=45, PL=27, PI=18
20.4	13.5			9	3 3 3	6	35	(1.75) 2.16	As above, dark brown and gray mottled, yellowish brown
				10	1 2 2	4	42	(1.00)	Fat CLAY, lensed with brownish yellow silty clay, no reaction with HCl, moist, stiff, high plasticity, dark brown mottled, dark gray



Continued Next Page

DRILLING LOG (Cont. Sheet)

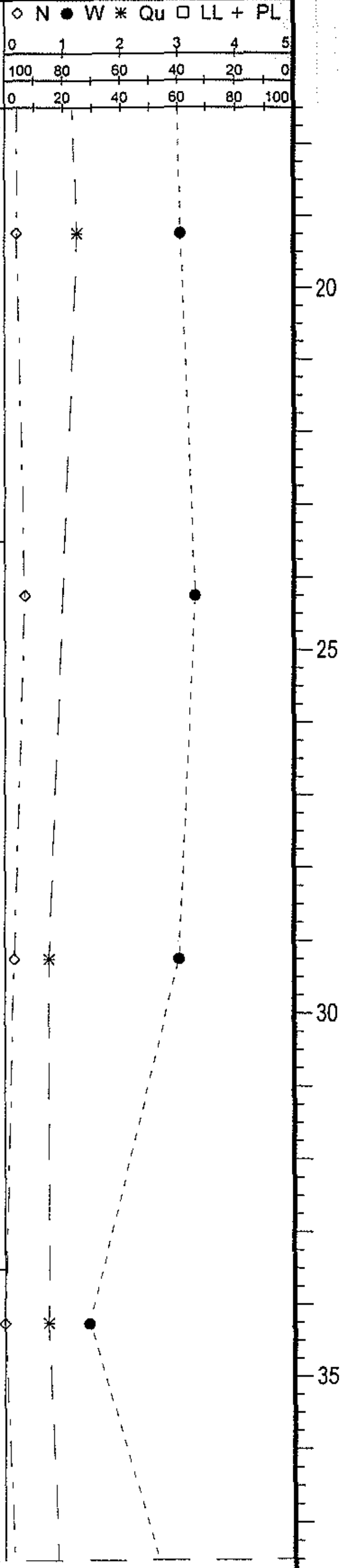
ELEVATION TOP OF HOLE
24.50 feet

SHEET 2
OF 8

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
19.2	17.5	▨							
		▨	☒	11	1 3 1	4	39	(1.25)	As above, reddish brown mottled, olive gray
17.3	23.5	▥							
		▥	☒	12	WH 4 3	7	34		Elastic SILT, lensed with gray sandy elastic silt, subangular coarse lithic sand, no reaction with HCl, moist, soft, high plasticity, dark gray
		▥	☒	13	2 2 1	3	40	(0.75)	As above, medium
14.3	33.5	▨							
		▨	☒	14	WH WH WH	WH	71	(0.75)	Fat CLAY, about 14% wood fragments, no reaction with HCl, moist, medium, high plasticity, dark gray



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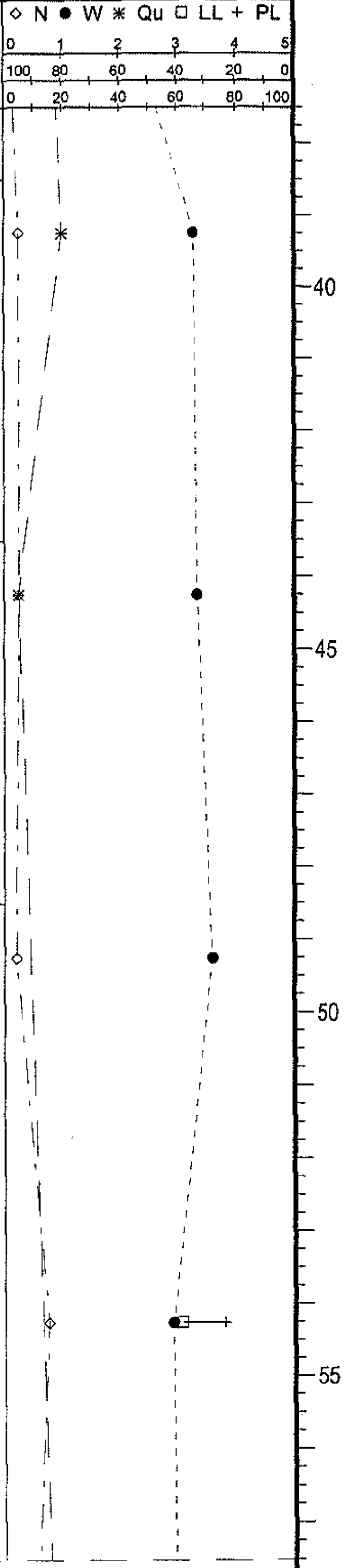
DRILLING LOG (Cont. Sheet)	ELEVATION TOP OF HOLE 24.50 feet	SHEET 3 OF 8
PROJECT RECOVERY SOLUTIONS, INC.	LOCATION Arecibo, P.R.	

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
13.1	37.5								
12.8	38.5								
				15	2 2 3	5	34	(1.00)	Sandy SILT, subangular fine sand, lensed with dark grayish brown elastic silt, no reaction with HCl, moist, stiff, nonplastic, dark gray
11.2	43.5								
				16	WH 1 4	5	33	(0.25)	Elastic SILT with sand, subangular fine sand, no reaction with HCl, moist, soft, high plasticity, dark gray
9.7	48.5								
				17	2 2 2	4	28		Silty SAND, loose, subangular medium sand, about 5% shall fragments, weak reaction with HCl, moist, weak cementation, very dark gray
				18	7 7 8	15	42		Silty SAND, medium, subangular fine lithic sand, about 16% leaf fragments, no reaction with HCl, moist, weak cementation, dark gray LL=39, PL=24, PI=15



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DRILLING LOG (Cont. Sheet)

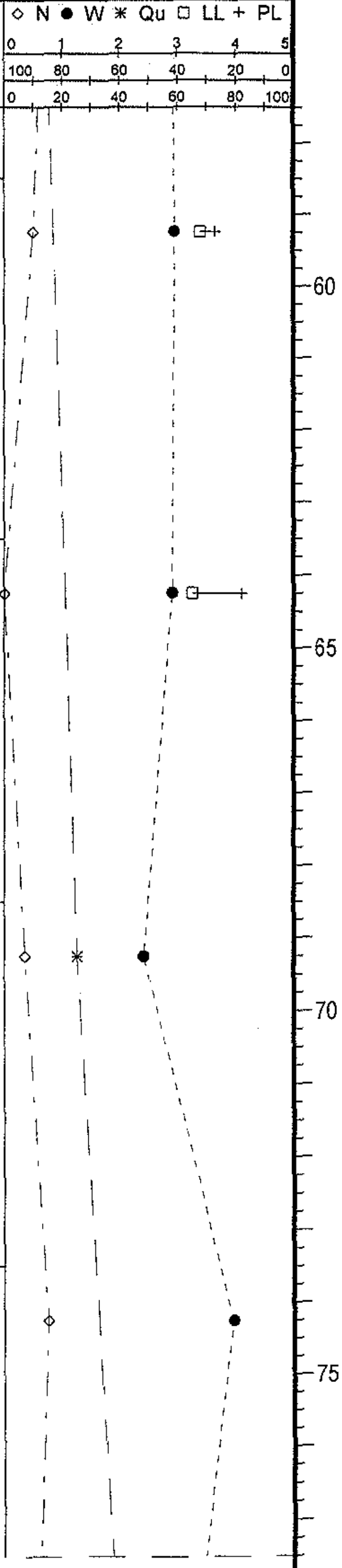
ELEVATION TOP OF HOLE
24.50 feet

SHEET 4
OF 8

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
7.0	57.5								
6.7	58.5			19	3 4 6	10	41		SILT, no reaction with HCl, moist, stiff, nonplastic, dark gray LL=32, PL=27, PI=5
5.1	63.5			20	WH WH 2	WH	42		Fat CLAY, no reaction with HCl, moist, soft, high plasticity, gray LL=35, PL=18, PI=17
3.6	68.5			21	WH 1 6	7	52	(1.25)	Elastic SILT, about 15% shell fragments, strong reaction with HCl, moist, stiff, high plasticity, dark gray
2.1	73.5			22	7 9 6	15	21		Poorly graded SAND with silt, medium, subangular medium lithic sand, weak reaction with HCl, moist, weak cementation, dark gray



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DRILLING LOG (Cont. Sheet)

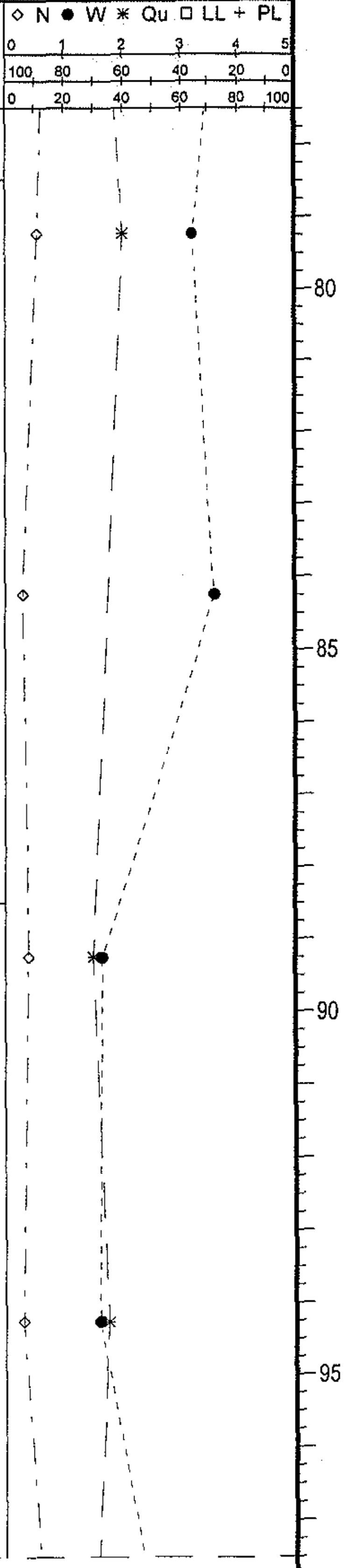
ELEVATION TOP OF HOLE
24.50 feet

SHEET 5
OF 8

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
0.9	77.5								
0.6	78.5								
				23	3 4 7	11	36	(2.00)	Sandy SILT, subangular fine sand, strong reaction with HCl, moist, very stiff, nonplastic, dark gray
				24	3 2 4	6	28		As above, medium, about 16% shell fragments
-2.5	88.5								
				25	3 5;3	8	67	(1.50)	Fat CLAY, about 15% shell fragments, strong reaction with HCl, moist, stiff, high plasticity, very dark grayish brown
				26	2 3 3	6	68	(1.75)	As above, about 10% shell fragments, about 1% wood fragments, weak reaction with HCl



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DRILLING LOG (Cont. Sheet)

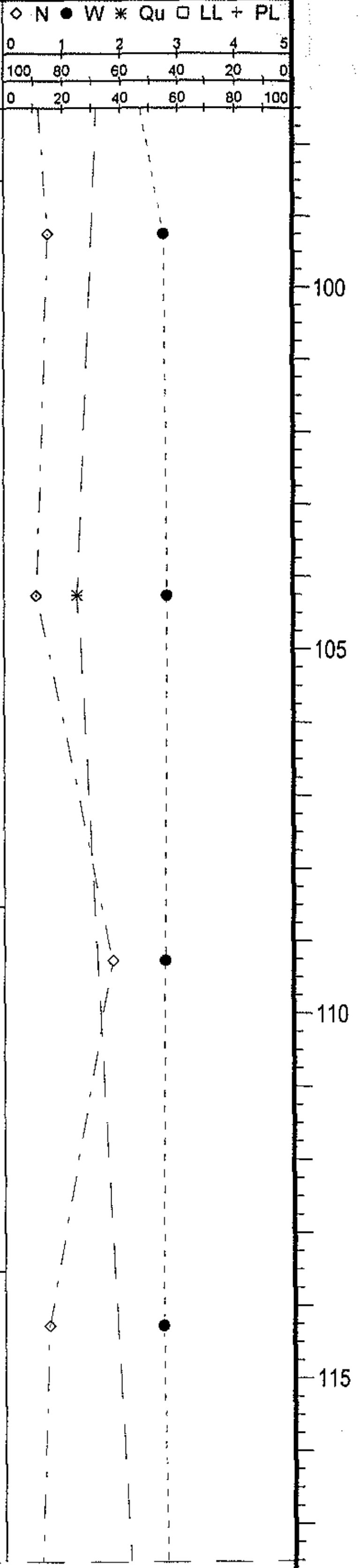
ELEVATION TOP OF HOLE 24.50 feet

SHEET 6 OF 8

PROJECT RECOVERY SOLUTIONS, INC.

LOCATION Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-5.2	97.5	▨							
-5.5	98.5								
			☒	27	5 3 12	15	45		Elastic SILT, no reaction with HCl, moist, stiff, high plasticity, gray
			☒	28	5 5 6	11	44	(1.25)	As above
-8.6	108.5								
			☒	29	13 15 22	37	45		Poorly graded SAND with silt, dense, subangular fine lithic sand, no reaction with HCl, moist, moderate cementation, dark gray
-10.1	113.5								
			☒	30	5 7 8	15	46		Elastic SILT, weak reaction with HCl, moist, very stiff, high plasticity, very dark gray



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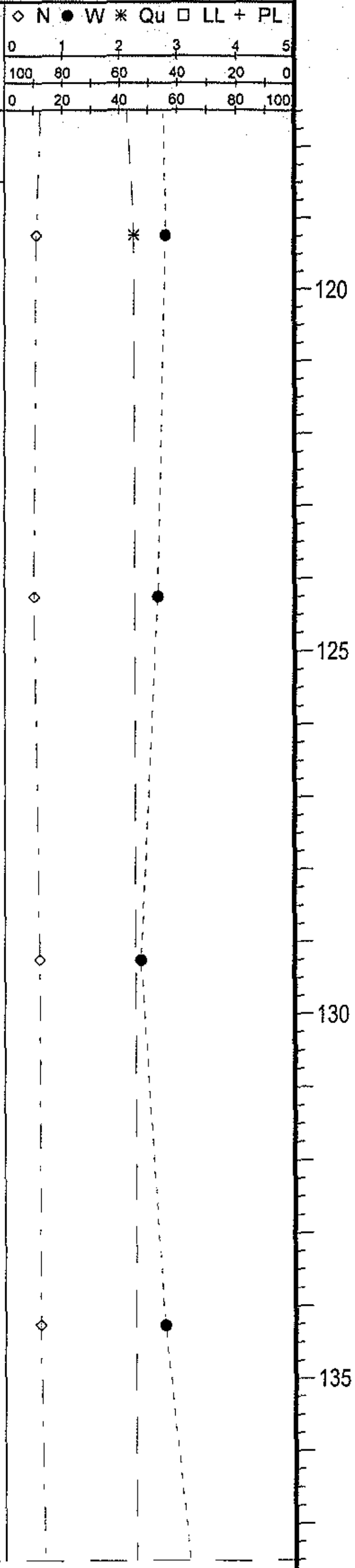
DRILLING LOG (Cont. Sheet)

ELEVATION TOP OF HOLE	24.50 feet
SHEET 7 OF 8	
PROJECT	RECOVERY SOLUTIONS, INC.
LOCATION	Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-11.3	117.5								
-11.6	118.5								
				31	5 5 6	11	44	(2.25)	Fat CLAY, no reaction with HCl, very stiff, high plasticity, dark gray
				32	3 4 6	10	47		As above
				33	2 5 7	12	53		As above
				34	4 6 6	12	45		As above, lensed with gray poorly graded sand, subangular fine quartz sand



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DRILLING LOG (Cont. Sheet)

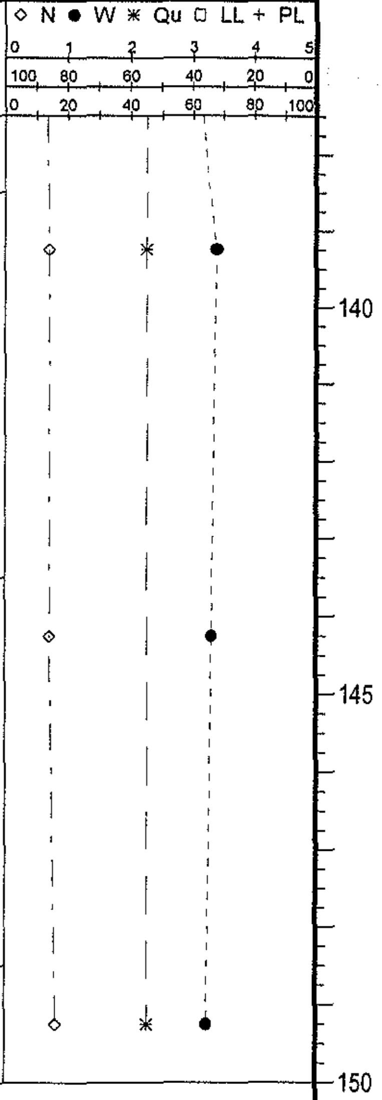
ELEVATION TOP OF HOLE 24.50 feet

SHEET 8 OF 8

PROJECT RECOVERY SOLUTIONS, INC.

LOCATION Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-17.4	137.5								
-17.7	138.5								
				35	7 8 6	14	32	(2.25) 2.25	Silty CLAY, no reaction with HCl, moist, very stiff, low plasticity, dark gray
-19.2	143.5								
				36	5 6 8	14	34		Poorly graded SAND with silt, medium, subangular medium lithic sand, no reaction with HCl, moist, weak cementation, gray
-20.8	148.5								
				37	5 7 9	16	36	(2.25) 2.25	Elastic SILT, no reaction with HCl, moist, very stiff, high plasticity, dark gray
-21.2	150.0								



NOTE: 1) ( ) penetrometer value
2) Qu in tons per square foot
3) N - values obtained from Standard Penetration Test, ASTM D 1586
4) The stratification lines represent approximate boundaries between soil types and the transition may be gradual.
5) These logs were prepared for a specific project and specific purpose. They should not be separated from the geotechnical engineering report.
6) Groundwater levels reported in this log were measured during drilling and may differ from the true location of groundwater table.
7) Boreholes drilled with automatic SPT.

STATION
COORDINATES (m): x = 406725.3651 y = 228161.9883 z = 24.50

DRILLING LOG

PROJECT
RECOVERY SOLUTIONS, INC.

SHEET 1 OF 6

LOCATION
Arecibo, P.R.

DRILLER / DRILL DESIGNATION
Angel Ferrer / CME-55 Truck Mounted

DESCRIPTION BY
Jorge I. Wichy

DATE HOLE STARTED 06/28/1999 COMPLETED 06/28/1999

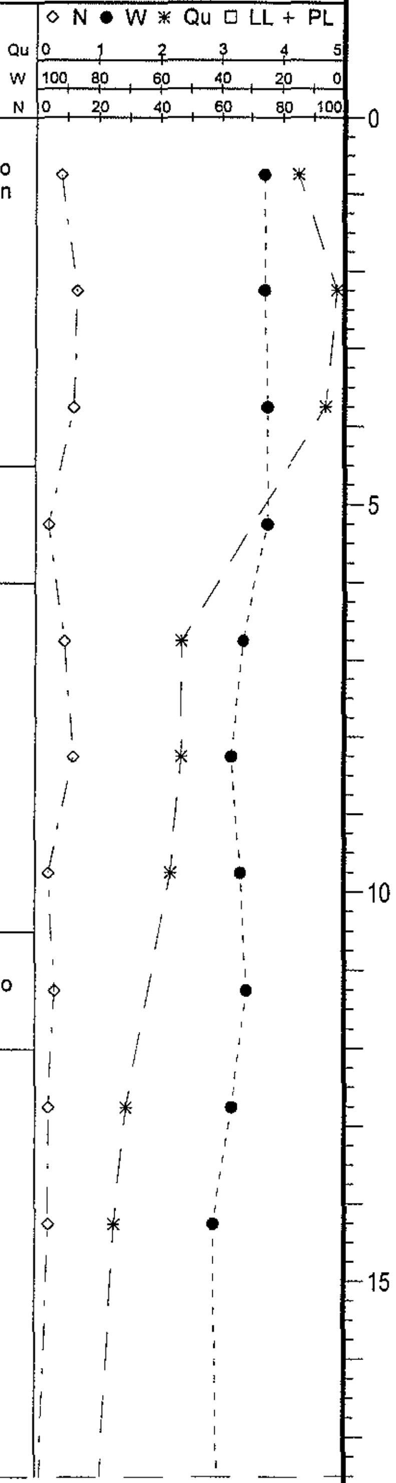
GROUNDWATER
8 feet

ELEVATION TOP OF HOLE
13.50 feet

TOTAL DEPTH OF HOLE
100 feet

INSPECTOR
Alan R. Crumley

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
13.5	0.0								
		▨		1	3 4 4	8	26	(4.25)	Lean CLAY, hard, medium plasticity, no reaction with HCL, dark yellowish brown
		▨		2	4 6 7	13	26	(+4.5) 4.87	As above
12.1	4.5	▨		3	5 7 5	12	25	(+4.5) 4.69	As above
11.7	6.0	▥		4	3 2 2	4	25		Silty CLAY with sand, moist, soft, low plasticity, subangular fine sand, no reaction with HCl, yellowish brown
		▨		5	3 4 5	9	33	(2.50) 2.34	Fat CLAY, moist, very stiff, high plasticity, no reaction with HCl, yellowish brown
	▼	▨		6	4 6 6	12	37	(2.25) 2.34	As above, dark brown mottled
10.3	10.5	▨		7	2 2 2	4	34	(2.00) 2.16	As above, dark brown mottled
9.8	12.0	▥		8	2 3 3	6	32		Silty CLAY, moist, stiff, low plasticity, no reaction with HCl, brown
		▨		9	1 2 2	4	37	(1.25) 1.44	Fat CLAY, moist, stiff, high plasticity, gray mottled, no reaction with HCl, yellowish brown
		▨		10	1 2 2	4	43	(1.25)	As above, lensed with dark brown silty clay



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DRILLING LOG (Cont. Sheet)

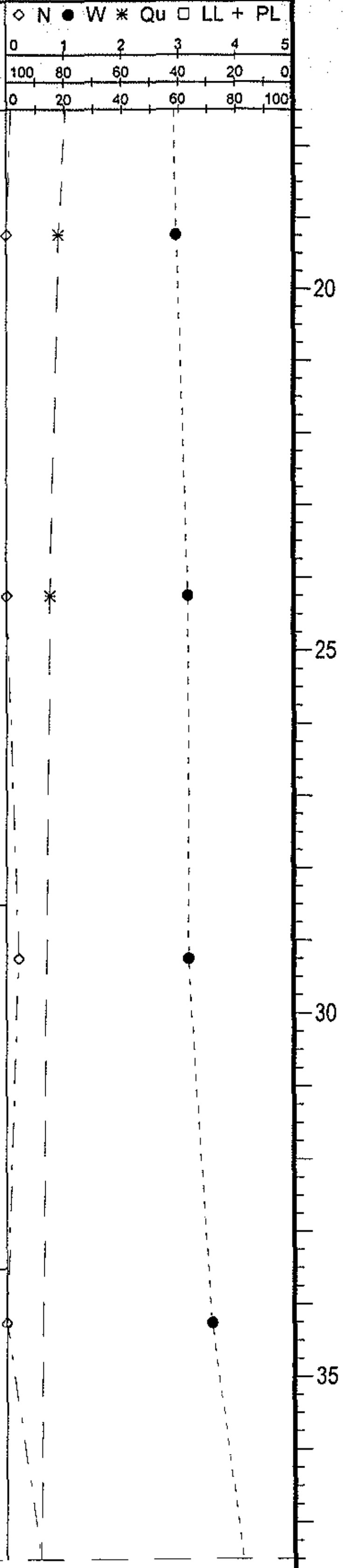
ELEVATION TOP OF HOLE
13.50 feet

SHEET 2
OF 6

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
8.2	17.5	▨							
		▨		11	WH WH 1	WH	41	(0.75) 0.90	Fat CLAY, moist, medium , high plasticity, olive gray mottled, no reaction with HCl, dark gray
		▨		12	WH WH WH	WH	37	(0.75)	As above
4.8	28.5	▨		13	2 2 2	4	37		Sandy silty CLAY, moist, soft, low plasticity, at top (1.5 in.) dark gray fat clay, subangular fine sand, no reaction with HCl, dark gray
3.3	33.5	▨		14	WH WH WH	WH	29		Fat CLAY, moist, soft, high plasticity, about 16% wood fragments, no reaction with HCl, dark gray



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DRILLING LOG (Cont. Sheet)

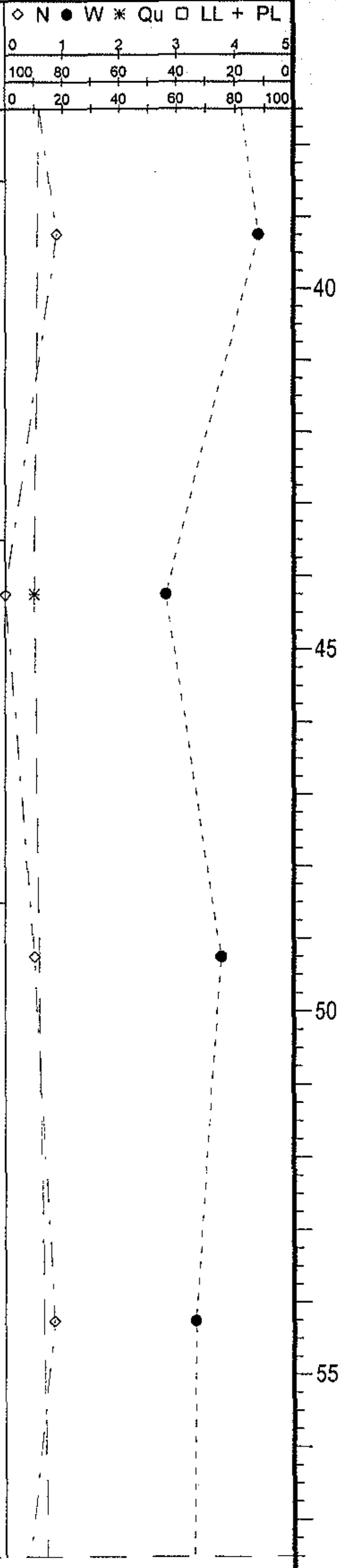
ELEVATION TOP OF HOLE
13.50 feet

SHEET 3 OF 6

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
2.1	37.5	▨							
1.8	38.5	░		15	10 9 9	18	12		Well graded SAND, moist, weak cementation, medium, subangular lithic sand, weak reaction with HCl, dark gray
0.2	43.5	▥		16	WH WH 3	WH	44	(0.50)	Elastic SILT, moist, soft, high plasticity, no reaction with HCl, dark gray
-1.3	48.5	░		17	3 2 8	10	25		Silty SAND, moist, weak cementation, subangular medium lithic sand, about 17% shell fragments, dark gray
				18	5 7 10	17	34		As above, subangular fine lithic sand



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DRILLING LOG (Cont. Sheet)

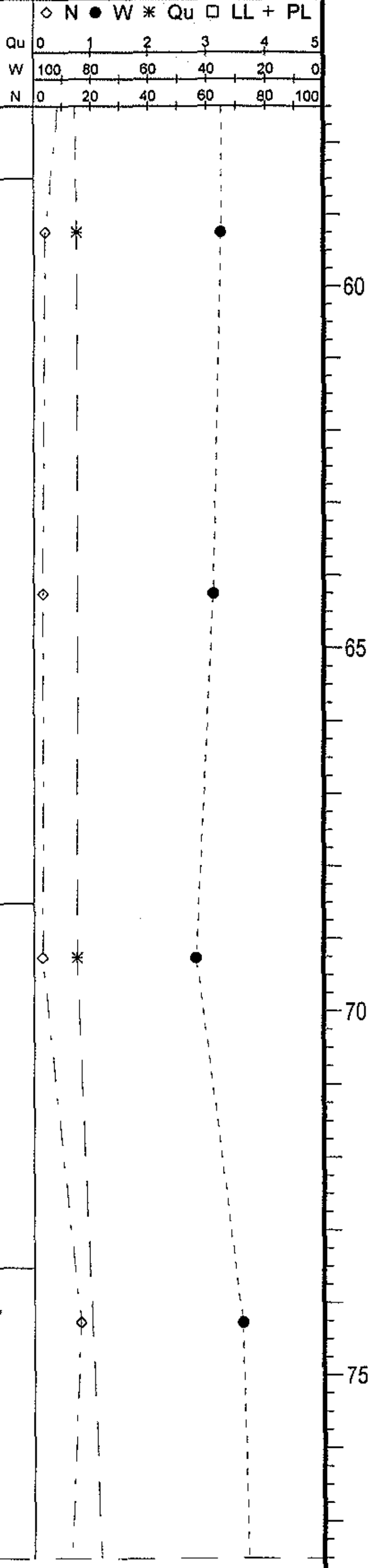
ELEVATION TOP OF HOLE
13.50 feet

SHEET 4
OF 6

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-4.0	57.5								
-4.3	58.5								
				19	2 2 2	4	35	(0.75)	Elastic SILT, moist, high plasticity, medium, no reaction with HCl, gray
				20	2 2 1	3	38		As above
-7.4	68.5								
				21	1 2 1	3	44	(0.75)	Fat CLAY, moist, high plasticity, medium, no reaction with HCl, gray
-8.9	73.5								
				22	4 4 12	16	28		Sandy silty CLAY, moist, low plasticity, subangular fine lithic sand, weak reaction with HCl, dark gray



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DRILLING LOG (Cont. Sheet)

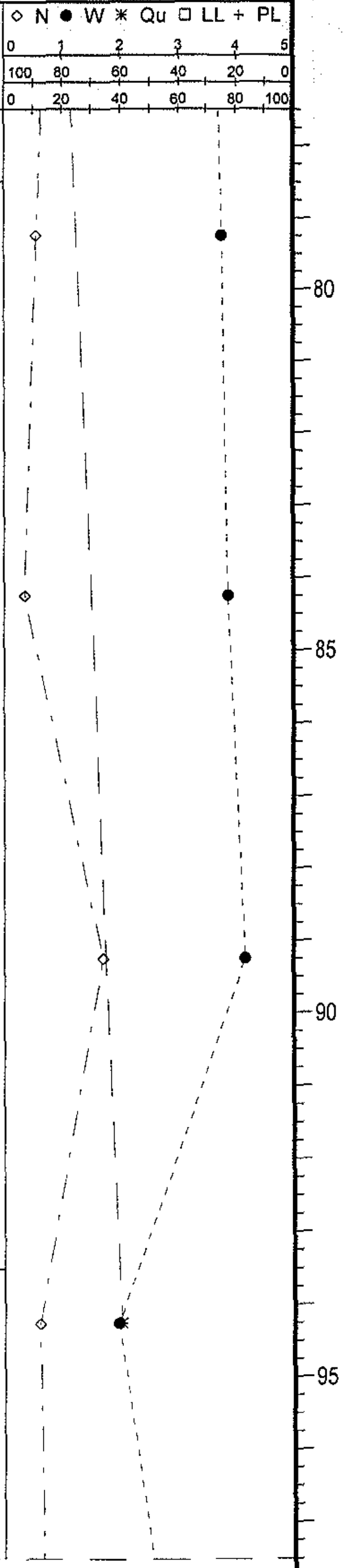
ELEVATION TOP OF HOLE 13.50 feet

SHEET 5 OF 6

PROJECT RECOVERY SOLUTIONS, INC.

LOCATION Arecibo, P.R.

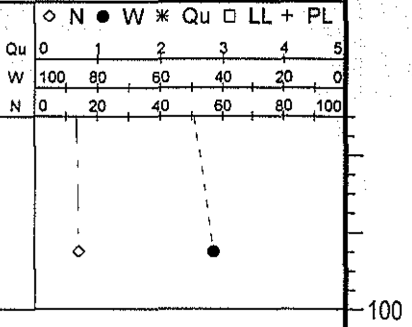
ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-10.1	77.5								
-10.4	78.5								
				23	3 4 7	11	25		Silty SAND, moist, weak cementation, medium, subangular fine lithic sand, weak reaction with HCl, dark gray
				24	4 3 4	7	23		As above, about 16% shell fragments, loose, subangular medium lithic sand, strong reaction with HCl
				25	9 16 18	34	17		As above, dense, subangular medium lithic sand, gray
-15.0	93.5								
				26	5 6 6	12	61	(2.00)	Elastic SILT, moist, very stiff, high plasticity, about 10% shell fragments, strong reaction with HCl, very dark grayish brown



Continued Next Page

DRILLING LOG (Cont. Sheet)	ELEVATION TOP OF HOLE 13.50 feet	SHEET 6 OF 6
PROJECT RECOVERY SOLUTIONS, INC.	LOCATION Arecibo, P.R.	

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-16.2	97.5								
-17.0	100.0			27	3 5 9	14	43		As above, about 4% subangular fine sand, dark gray



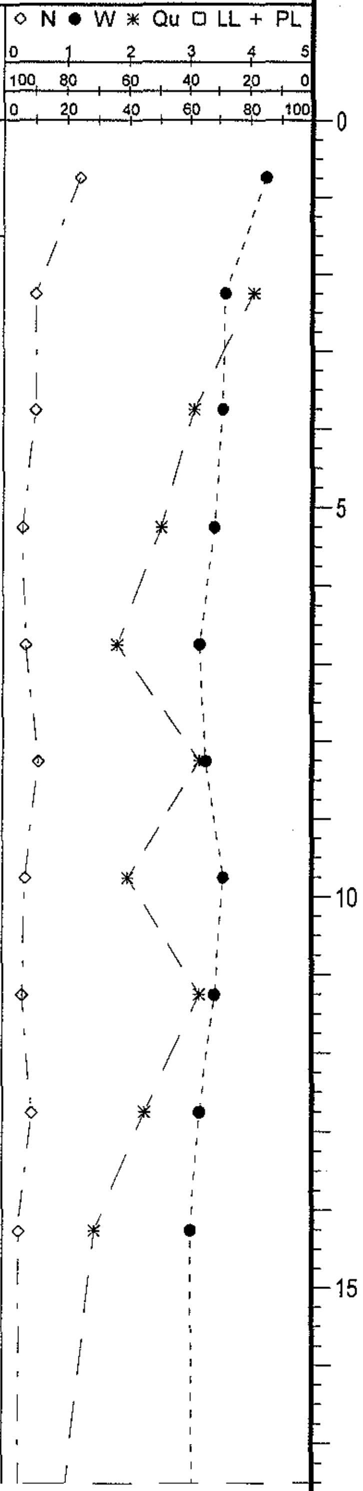
NOTE:
1) ( ) penetrometer value
2) Qu in tons per square foot
3) N - values obtained from Standard Penetration Test, ASTM D 1586
4) The stratification lines represent approximate boundaries between soil types and the transition may be gradual.
5) These logs were prepared for a specific project and specific purpose. They should not be separated from the geotechnical engineering report.
6) Groundwater levels reported in this log were measured during drilling and may differ from the true location of groundwater table.
7) Boreholes drilled with automatic SPT.

STATION
COORDINATES (m): x = 406782.76 y = 228021.5949 z = 13.50

DRILLING LOG

PROJECT RECOVERY SOLUTIONS, INC.	*SHEET 1 OF 6*
LOCATION Arecibo, P.R.	DRILLER / DRILL DESIGNATION Steven Perez / CME-45C
DESCRIPTION BY Jorge I. Wichy	DATE HOLE STARTED 06/11/1999 COMPLETED 06/15/1999
GROUNDWATER 13 feet	ELEVATION TOP OF HOLE 12.50 feet
TOTAL DEPTH OF HOLE 100 feet	INSPECTOR Alan R. Crumley

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
12.5	0.0								
12.0	1.5	▥		1	13 12 12	24	15		SILT (calcareous), strong reaction with HCl, dry, medium, nonplastic, very pale brown
		▨		2	9 5 5	10	28	(3.75) 4.05	Fat CLAY, no reaction with HCl, dry, very stiff, high plasticity, very dark grayish brown
		▨		3	5 5 5	10	29	(3.00) 3.06	As above, dark gray
		▨		4	2 3 3	6	32	(2.50) 2.52	As above, dark brown
		▨		5	2 4 3	7	37	(1.75) 1.80	Fat CLAY, lensed with yellowish brown, silty clay, no reaction with HCl, moist, stiff, high plasticity, dark gray
		▨		6	4 5 6	11	35	(2.75) 3.15	Fat CLAY, no reaction with HCl, moist, very stiff, high plasticity, dark brown mottled, dark yellowish brown
		▨		7	3 3 4	7	29	(1.75) 1.98	As above, stiff, brownish yellow
		▨		8	3 3 3	6	32	(3.25) 3.15	As above
	▼	▨		9	4 4 5	9	37	(2.00) 2.25	As above, stiff, dark brown and gray mottled, yellowish brown
		▨		10	3 2 3	5	40	(1.00) 1.44	As above, stiff, dark brownish gray mottled, yellowish brown



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DRILLING LOG (Cont. Sheet)

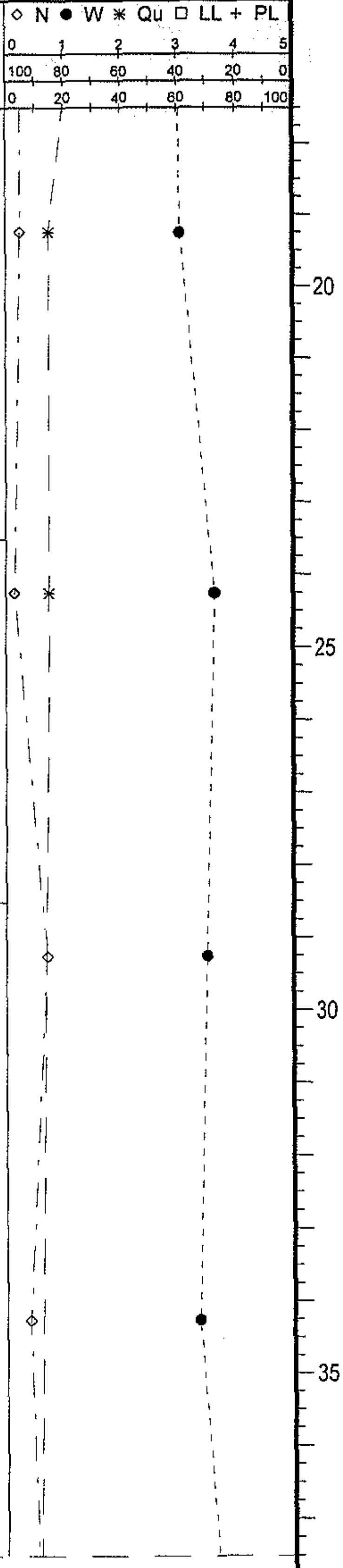
ELEVATION TOP OF HOLE
12.50 feet

SHEET 2
OF 6

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
7.2	17.5	▨							
		▨		11	3 2 3	5	39	(0.75)	Fat CLAY, no reaction with HCl, moist, medium, high plasticity, gray
5.3	23.5	▥							
		▥		12	1 1 2	3	27	(0.75)	Elastic SILT, about 9% subangular fine sand, no reaction with HCl, moist, medium, high plasticity, gray
3.8	28.5	░							
		░		13	4 6 8	14	30		Well graded SAND with silt, medium, subangular lithic sand, weak reaction with HCl, wet, weak cementation, light gray
		░		14	6 5 3	8	33		Poorly graded SAND with silt, loose, subangular lithic sand, weak reaction with HCl, wet, weak cementation, gray



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DRILLING LOG (Cont. Sheet)

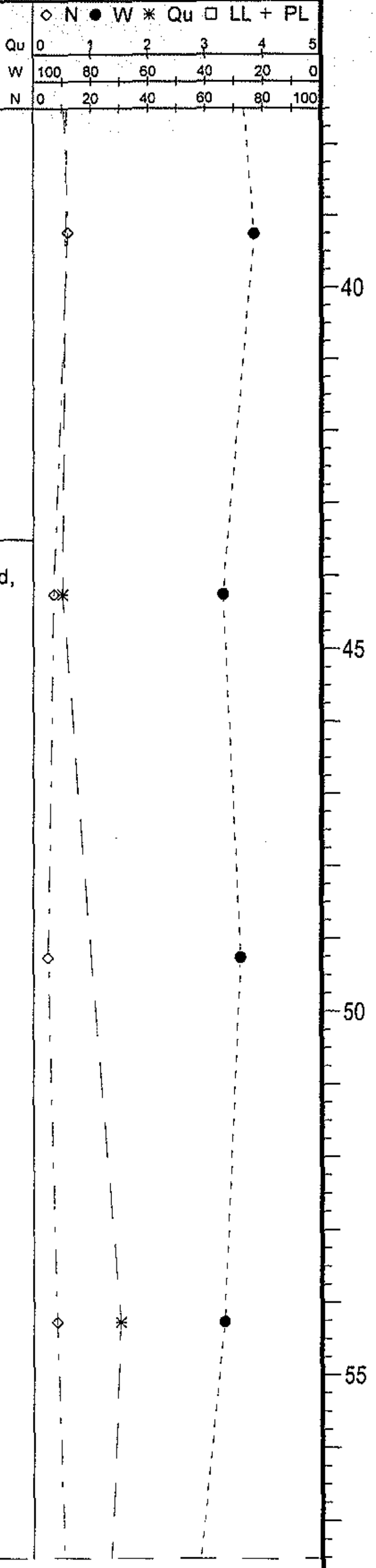
ELEVATION TOP OF HOLE
12.50 feet

SHEET 3
OF 6

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
1.1	37.5								
				15	3 7 5	12	23		Well graded SAND with silt, medium, subangular lithic sand, weak reaction with HCl, weak cementation, gray
-0.8	43.5								
				16	WH 2 5	7	34	(0.50)	Sandy silty CLAY, subangular fine sand, no reaction with HCl, moist, soft, low plasticity, dark gray
				17	1 2 3	5	28		As above, weak reaction with HCl
				18	3 4 4	8	34	(1.50)	As above, about 13% shell fragments, strong reaction with HCl, stiff, black



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DRILLING LOG (Cont. Sheet)

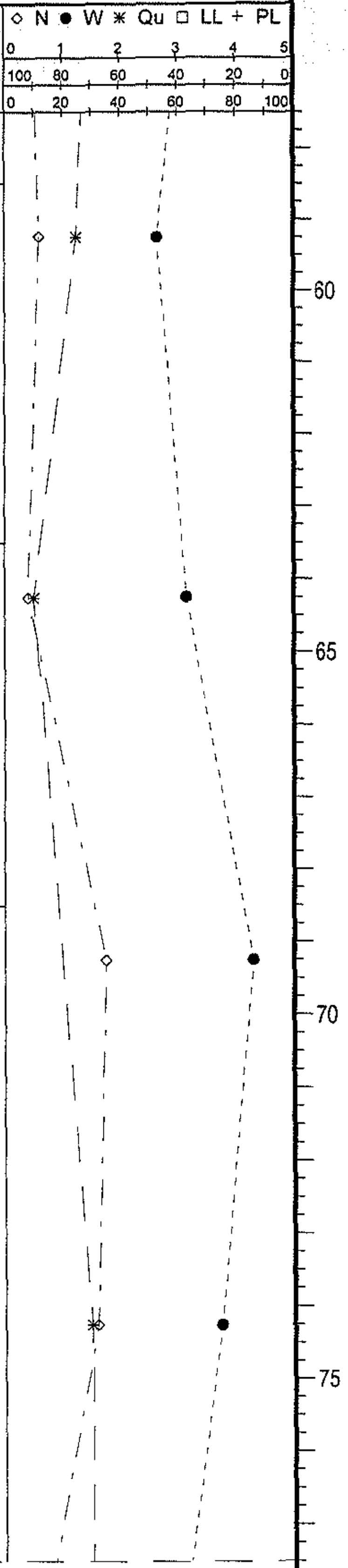
ELEVATION TOP OF HOLE
12.50 feet

SHEET 4
OF 6

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-5.0	57.5								
-5.3	58.5								
				19	4 5 7	12	47	(1.25)	SILT, about 4% shell fragments, strong reaction with HCl, moist, stiff, nonplastic, dark gray
-6.9	63.5								
				20	3 3 5	8	37	(0.50)	Elastic SILT, weak reaction with HCl, moist, soft, high plasticity, gray
-8.4	68.5								
				21	10 12 23	35	14		Sandy SILT, subangular fine sand, weak reaction with HCl, moist, soft, nonplastic, dark gray
				22	10 15 17	32	25	(1.50)	As above



Continued Next Page

DRILLING LOG (Cont. Sheet)

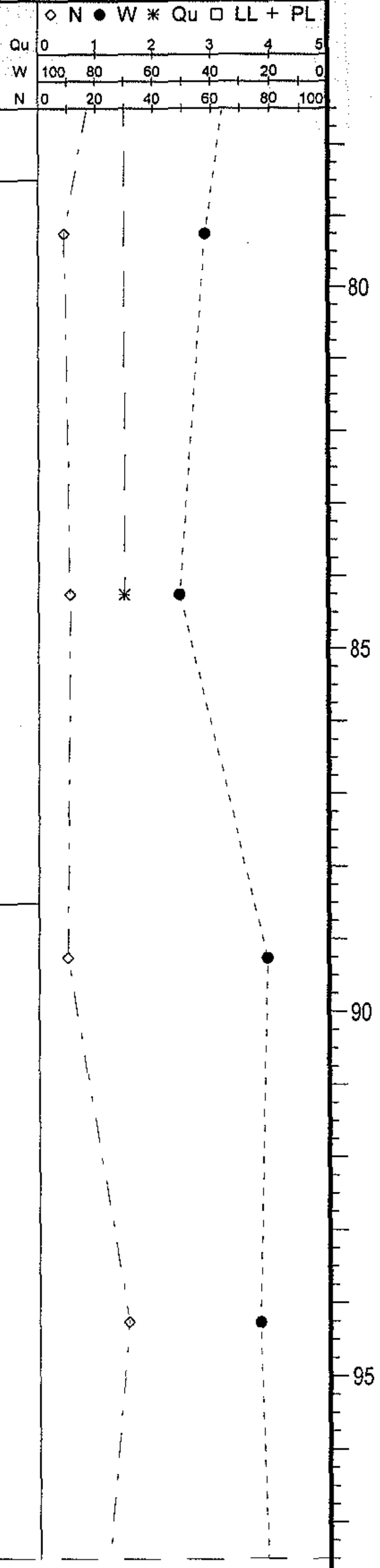
ELEVATION TOP OF HOLE
12.50 feet

SHEET 5
OF 6

PROJECT
RECOVERY SOLUTIONS, INC.

LOCATION
Arecibo, P.R.

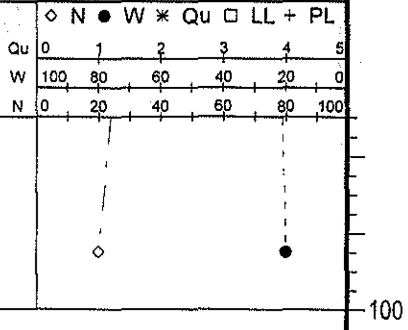
ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-11.1	77.5								
-11.4	78.5								
				23	3 4 5	9	42		Elastic SILT, weak reaction with HCl, moist, soft, high plasticity, dark gray
				24	6 5 6	11	51	(1.50)	As above, about 16% shell fragments, strong reaction with HCl
-14.5	88.5								
				25	4 5 5	10	21		Silty SAND, medium, subangular fine sand, weak reaction with HCl, moist, weak cementation, gray
				26	10 16 15	31	24		As above



Continued Next Page

DRILLING LOG (Cont. Sheet)	ELEVATION TOP OF HOLE 12.50 feet	SHEET 6 OF 6
PROJECT RECOVERY SOLUTIONS, INC.	LOCATION Arecibo, P.R.	

ELEV. [m]	DEPTH [feet]	LEGEND	TYPE	SAMPLE OR RUN	BLOWS OR CORE DATA	SPT N	W	Qu	DESCRIPTION AND CLASSIFICATION
-17.2	97.5								
				27	9 10 10	20	20		As above, subangular medium sand
-18.0	100.0								

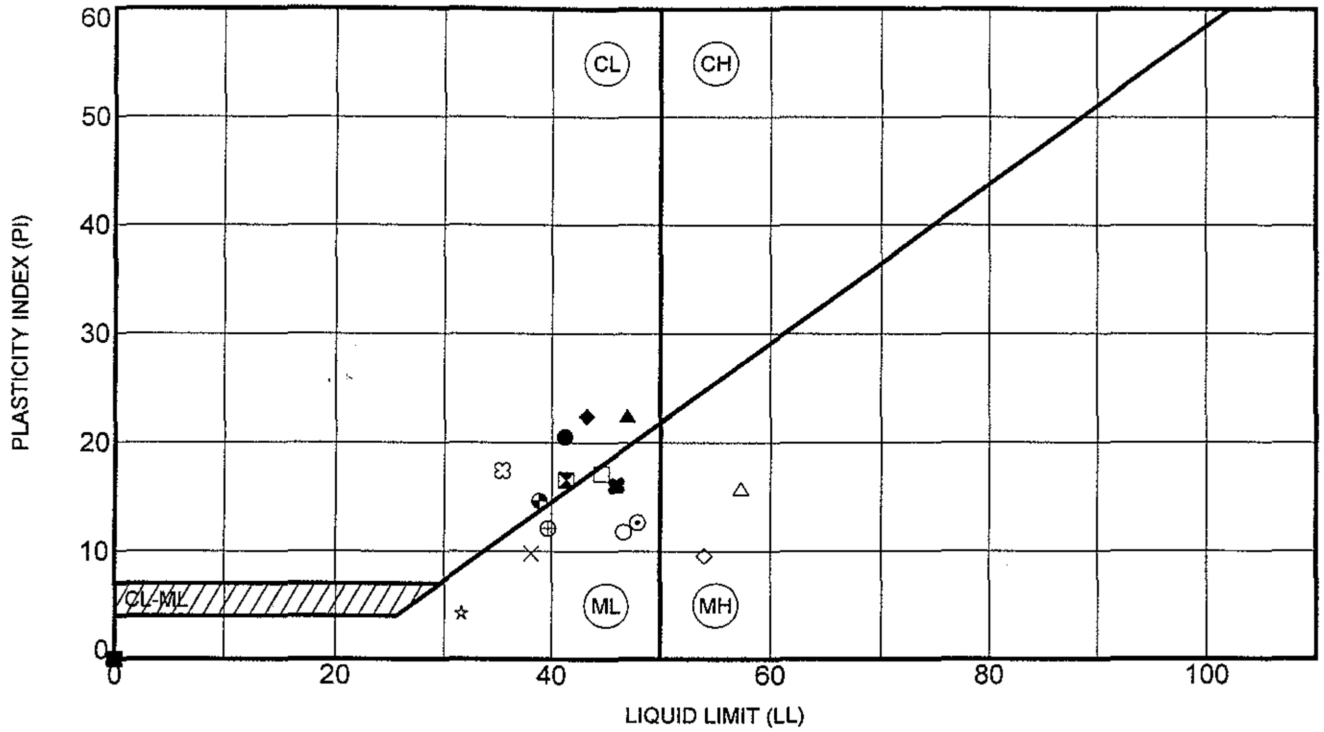


NOTE: 1) ( ) penetrometer value
2) Qu in tons per square foot
3) N - values obtained from Standard Penetration Test, ASTM D 1586
4) The stratification lines represent approximate boundaries between soil types and the transition may be gradual.
5) These logs were prepared for a specific project and specific purpose. They should not be separated from the geotechnical engineering report.
6) Groundwater levels reported in this log were measured during drilling and may differ from the true location of groundwater table.

STATION
COORDINATES (m): x = 407019.9019 y = 228758.8998 z = 12.50

Appendix B

Laboratory Test Results



	Specimen Identification		LL	PL	PI	Fines	Classification
●	RCS-1	10.0 to 12.0 ft	41	21	20		
⊠	RCS-1	20.0 to 22.0 ft	41	25	16		
▲	RCS-1	23.5 to 25.0 ft	47	24	23		
★	RCS-1	43.5 to 45.0 ft	NP	NP	NP	92	SILT ML
⊙	RCS-1	63.5 to 65.0 ft	48	35	13	98	SILT ML
✪	RCS-11	60.0 to 62.0 ft	NP	NP	NP		
○	RCS-11	70.0 to 72.0 ft	47	35	12	92	SILT ML
△	RCS-11	80.0 to 82.0 ft	57	42	15		
⊗	RCS-13	4.5 to 6.0 ft	NP	NP	NP	40	SILTY SAND SM
⊕	RCS-13	7.5 to 9.0 ft	40	28	12	92	SILT ML
□	RCS-13	10.5 to 12.0 ft	45	27	18	90	SILT ML
⊖	RCS-13	23.5 to 25.0 ft	NP	NP	NP	68	SANDY SILT ML
⊕	RCS-13	53.5 to 55.0 ft	39	24	15		
☆	RCS-13	58.5 to 60.0 ft	32	27	5	89	SILT ML
✿	RCS-13	63.5 to 65.0 ft	35	18	17		
■	RCS-13	83.5 to 85.0 ft	NP	NP	NP	32	SILTY SAND SM
◆	RCS-2	6.0 to 7.5 ft	43	21	22	95	LEAN CLAY CL
◇	RCS-2	7.0 to 9.0 ft	54	44	10	99	ELASTIC SILT MH
×	RCS-2	9.0 to 10.5 ft	38	28	10	93	SILT ML
✖	RCS-2	12.0 to 13.5 ft	46	30	16	98	SILT ML

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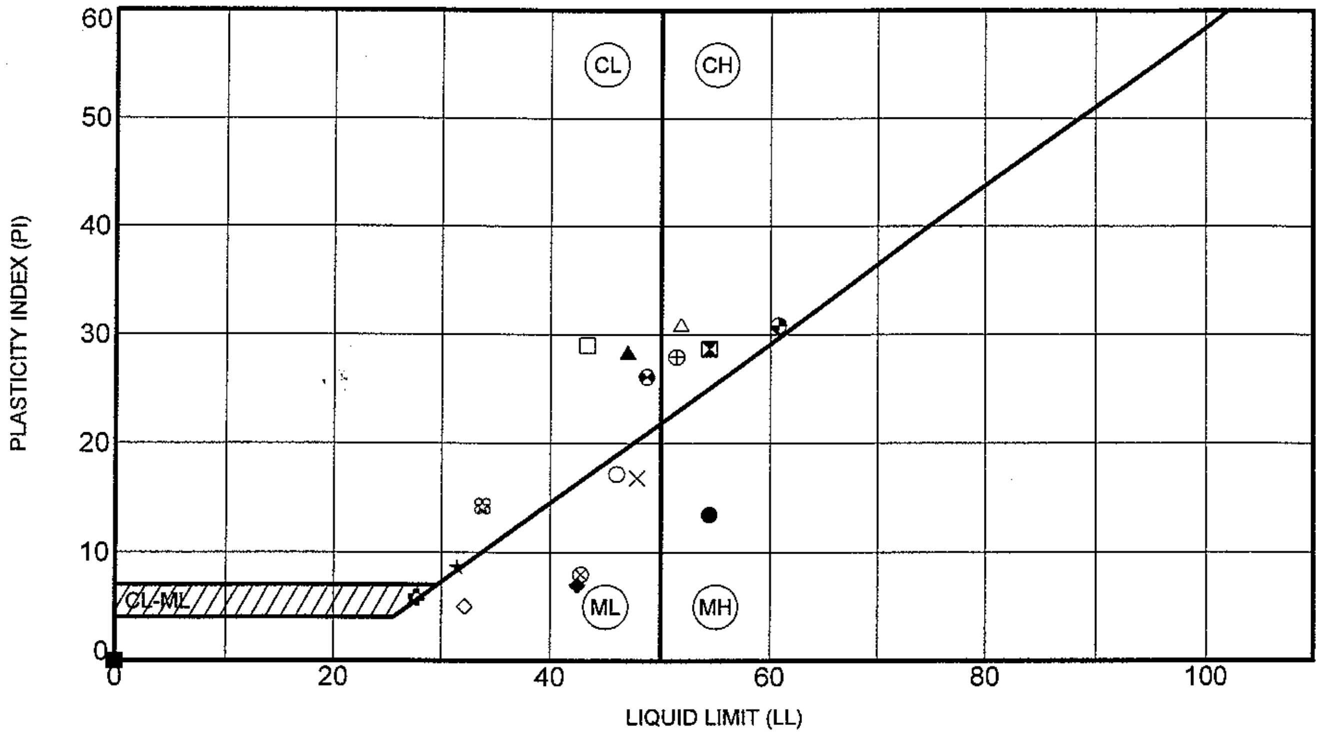
ATTERBERG LIMITS' RESULTS

Project: RECOVERY SOLUTIONS, INC.
Location: Arecibo, P.R.
Project No: 2182-99

US ATTERBERG LIMITS 2182-99.GPJ US LAB.GDT 8/27/99



	Specimen Identification		LL	PL	PI	Fines	Classification
●	**RCS-2**	**16.0 to 18.0 ft**	**54**	**41**	**13**	**100**	**ELASTIC SILT MH**
⊠	**RCS-2**	**18.0 to 20.0 ft**	**54**	**26**	**28**		
▲	**RCS-2**	**23.0 to 25.0 ft**	**47**	**19**	**28**	**96**	**LEAN CLAY CL**
★	**RCS-2**	**123.5 to 125.0 ft**	**31**	**23**	**8**	**69**	**SANDY SILT ML**
⊙	**RCS-2**	**128.5 to 130.0 ft**	**NP**	**NP**	**NP**	**66**	**SANDY SILT ML**
✪	**RCS-4**	**58.5 to 60.0 ft**	**28**	**22**	**6**	**84**	**SILTY CLAY with SAND CL-ML**
○	**RCS-4**	**68.5 to 70.0 ft**	**46**	**29**	**17**	**86**	**SILT ML**
△	**RCS-4**	**128.5 to 130.0 ft**	**52**	**21**	**31**	**92**	**FAT CLAY CH**
⊗	**RCS-5**	**12.0 to 13.5 ft**	**43**	**35**	**8**	**94**	**SILT ML**
⊕	**RCS-5**	**13.5 to 15.0 ft**	**51**	**23**	**28**	**99**	**FAT CLAY CH**
☐	**RCS-5**	**18.5 to 20.0 ft**	**43**	**14**	**29**	**95**	**LEAN CLAY CL**
⊖	**RCS-5**	**23.5 to 25.0 ft**	**49**	**23**	**26**	**99**	**LEAN CLAY CL**
◐	**RCS-5**	**28.5 to 30.0 ft**	**61**	**30**	**31**	**89**	**FAT CLAY CH**
☆	**RCS-5**	**33.5 to 35.0 ft**	**34**	**20**	**14**	**79**	**LEAN CLAY with SAND CL**
✿	**RCS-5**	**38.5 to 40.0 ft**	**34**	**20**	**14**	**34**	**CLAYEY SAND SC**
■	**RCS-5**	**43.5 to 45.0 ft**	**NP**	**NP**	**NP**	**40**	**SILTY SAND SM**
◆	**RCS-5**	**53.5 to 55.0 ft**	**42**	**35**	**7**	**82**	**SILT with SAND ML**
◇	**RCS-5**	**58.5 to 60.0 ft**	**32**	**27**	**5**	**98**	**SILT ML**
×	**RCS-5**	**63.5 to 65.0 ft**	**48**	**31**	**17**	**99**	**SILT ML**
✖	**RCS-5**	**78.5 to 80.0 ft**	**NP**	**NP**	**NP**	**78**	**SILT with SAND ML**

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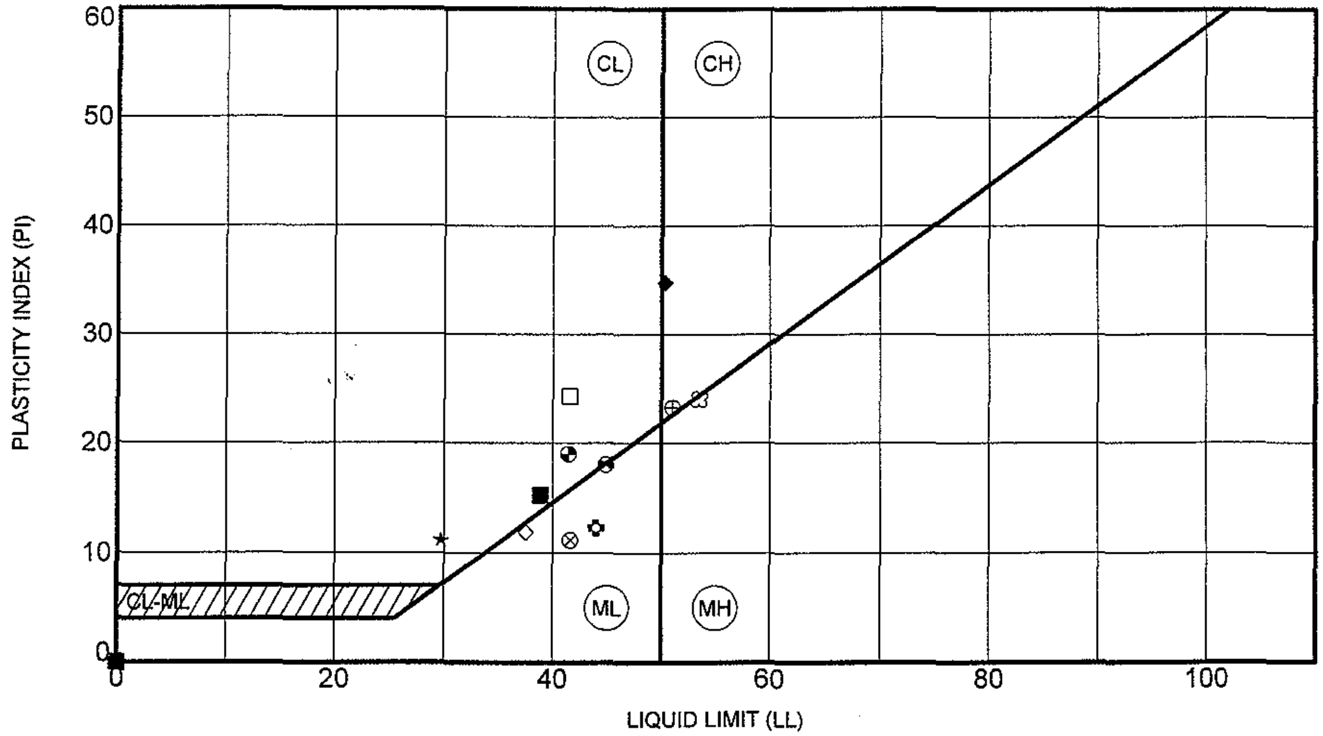
ATTERBERG LIMITS' RESULTS

Project: RECOVERY SOLUTIONS, INC.
Location: Arecibo, P.R.
Project No: 2182-99



	Specimen Identification		LL	PL	PI	Fines	Classification
●	RCS-5	83.5 to 85.0 ft	NP	NP	NP	61	SANDY SILT ML
⧗	RCS-5	88.5 to 90.0 ft	NP	NP	NP	18	SILTY SAND SM
▲	RCS-5	98.5 to 100.0 ft	NP	NP	NP	54	SANDY SILT ML
★	RCS-5	118.5 to 120.0 ft	30	18	12	56	SANDY LEAN CLAY CL
⊙	RCS-5	123.5 to 125.0 ft	NP	NP	NP		
✿	RCS-5	133.5 to 135.0 ft	44	32	12	94	SILT ML
○	RCS-5	143.5 to 145.0 ft	NP	NP	NP	40	SILTY SAND SM
△	RCS-5	148.5 to 150.0 ft	NP	NP	NP	35	SILTY SAND SM
⊗	RCS-6	10.0 to 12.0 ft	42	30	12	99	SILT ML
⊕	RCS-6	18.5 to 20.0 ft	51	28	23		
□	RCS-6	20.0 to 22.0 ft	41	17	24		
⊖	RCS-6	33.5 to 35.0 ft	45	27	18	97	SILT ML
◕	RCS-6	63.5 to 65.0 ft	41	22	19		
☆	RCS-6	78.5 to 80.0 ft	NP	NP	NP	81	SILT with SAND ML
ʊ	RCS-8	28.5 to 30.0 ft	53	29	24		
■	RCS-8	53.5 to 55.0 ft	39	24	15	85	LEAN CLAY with SAND CL
◆	RCS-8	63.5 to 65.0 ft	50	16	34	92	FAT CLAY CH
◇	RCS-8	78.5 to 80.0 ft	37	26	11	82	SILT with SAND ML

US_ATTERBERG_LIMITS 2182-99.GPJ US_LAB.GDT 8/27/99

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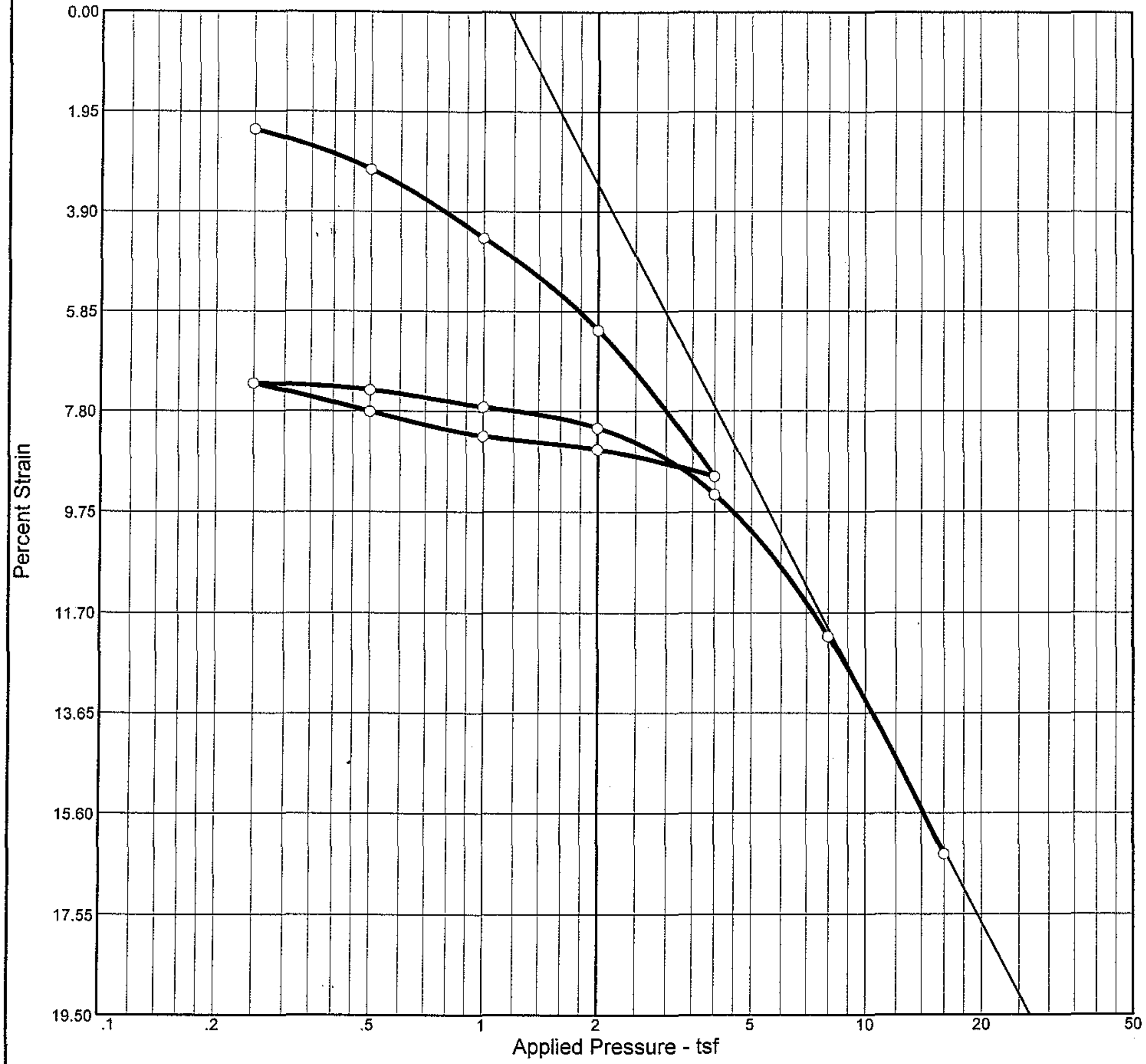
ATTERBERG LIMITS' RESULTS

Project: RECOVERY SOLUTIONS, INC.
Location: Arecibo, P.R.
Project No: 2182-99

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (tsf)	P_c (tsf)	C_c	C_r	Swell Press. (tsf)	Heave %	e_o
Sat.	Moist.											
75.6 %	35.1 %	74.8	41	21	2.7	0.61	3.75	0.32	0.04			1.253

MATERIAL DESCRIPTION	USCS	AASHTO
(CH) Fat clay, no reaction with HCl, about 6% roots (upper 4.0 in), moist, very stiff, high plasticity, dark yellowish brown		

Project No. 2182-99 **Client:**

Project: Recovery Solution

Location: Arecibo, Puerto Rico

Remarks:

Tested by:GMC
RCS-1 Sample 1
Depth:10-12 feet

CONSOLIDATION TEST REPORT

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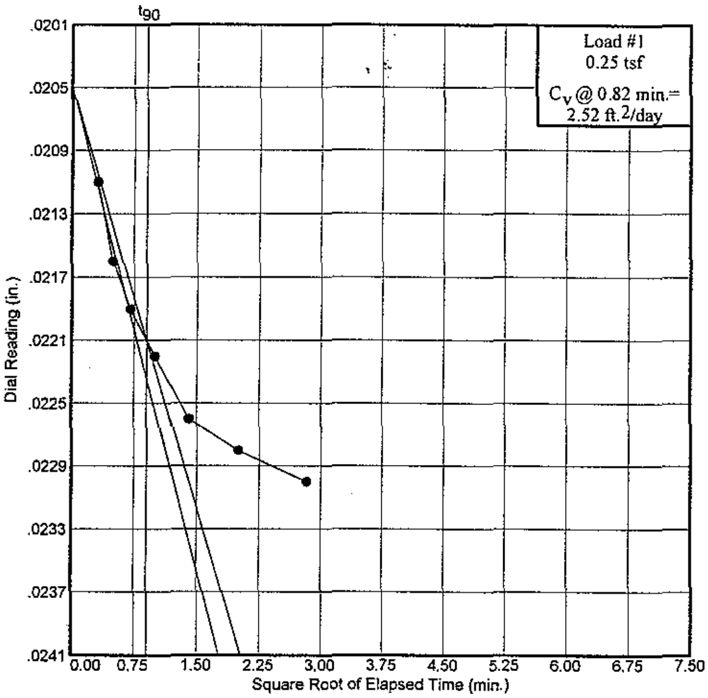
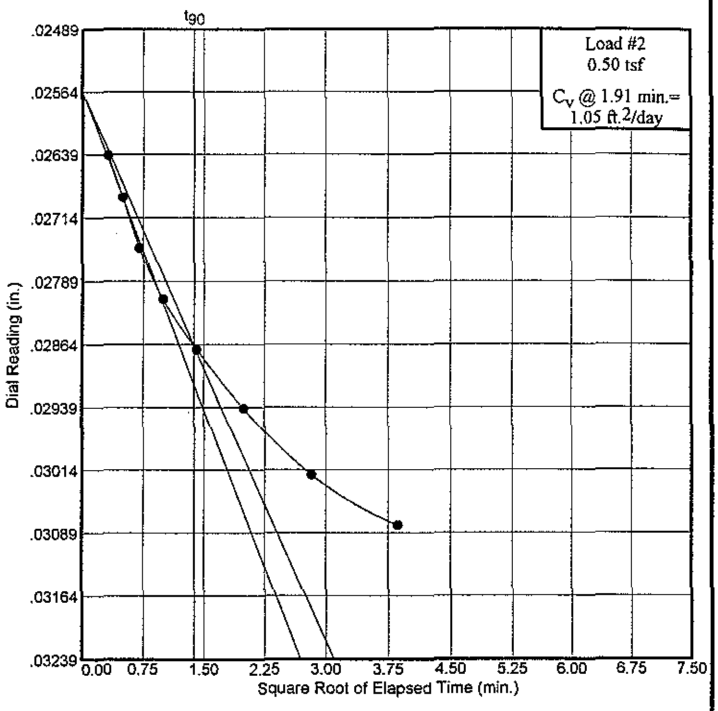
Plate 10' - 12'

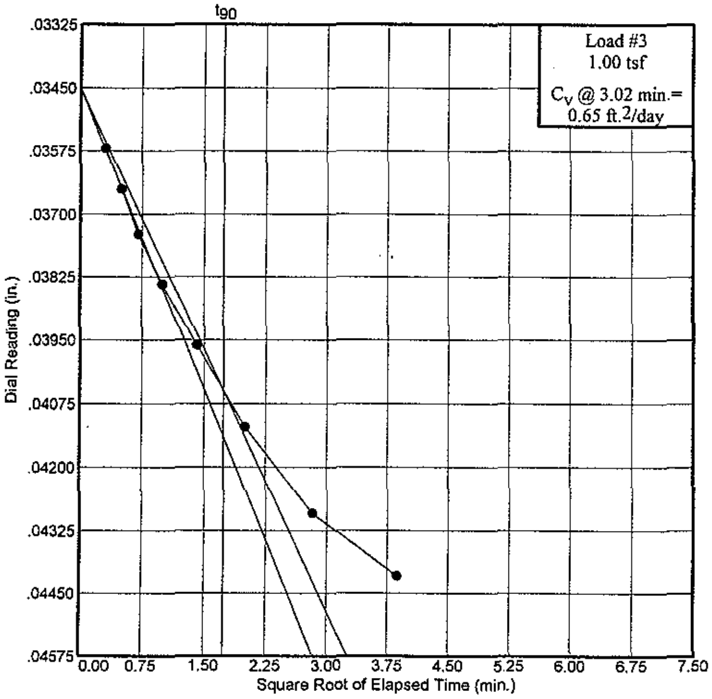
Dial Reading vs. Time

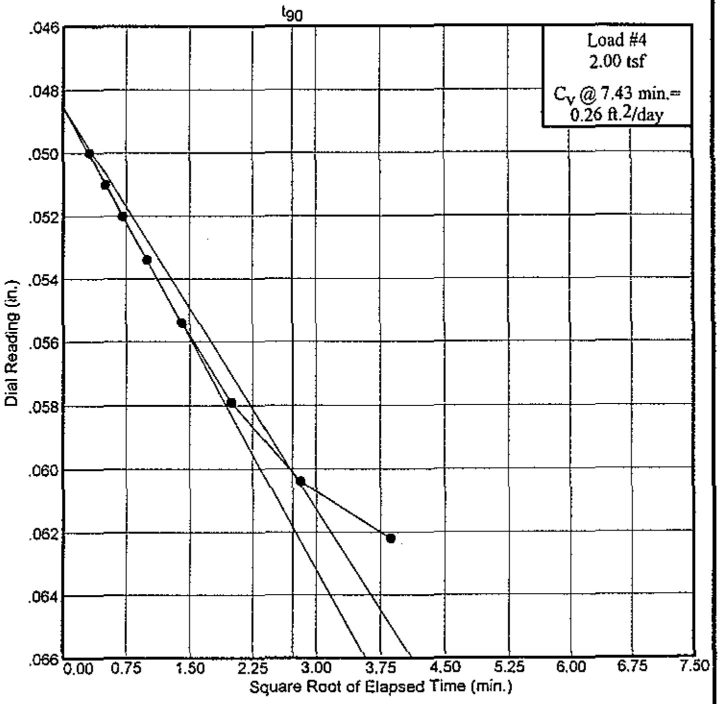
Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo, Puerto Rico









Dial Reading vs. Time

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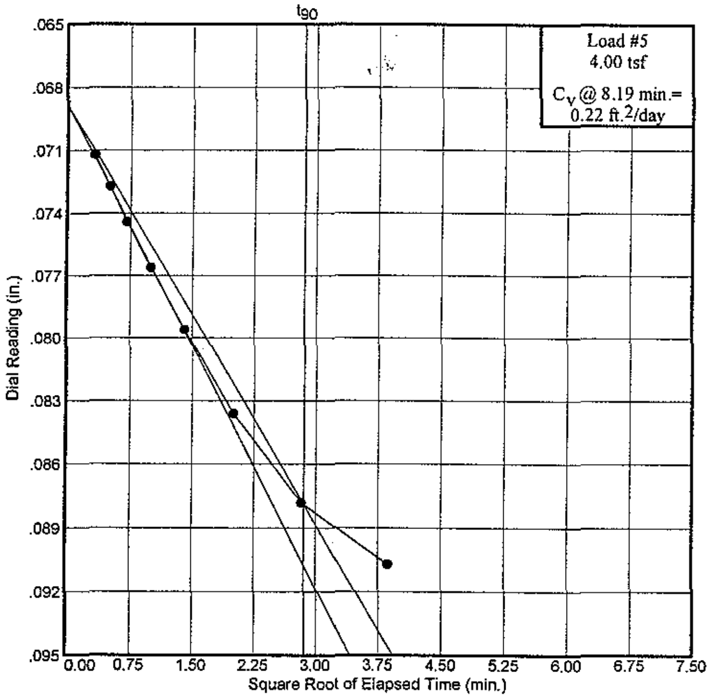
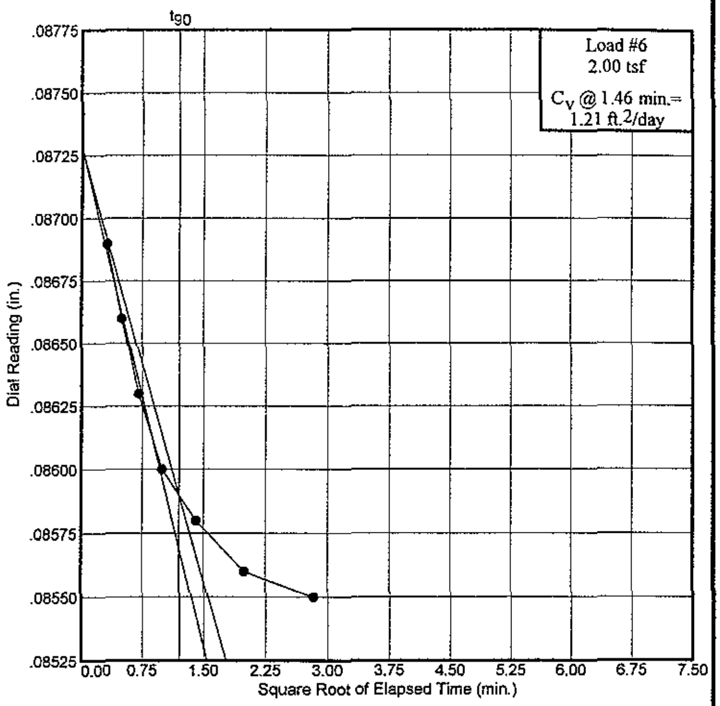
Plate 10' - 12'

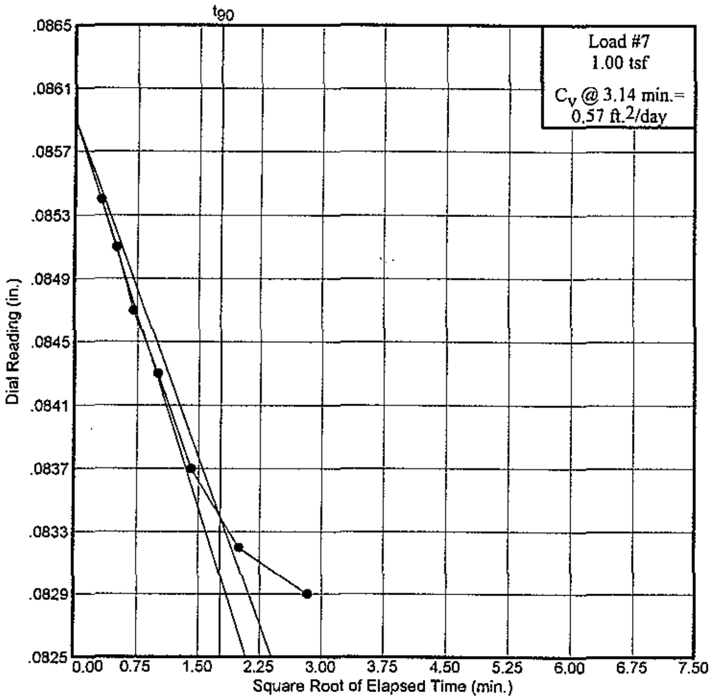
Dial Reading vs. Time

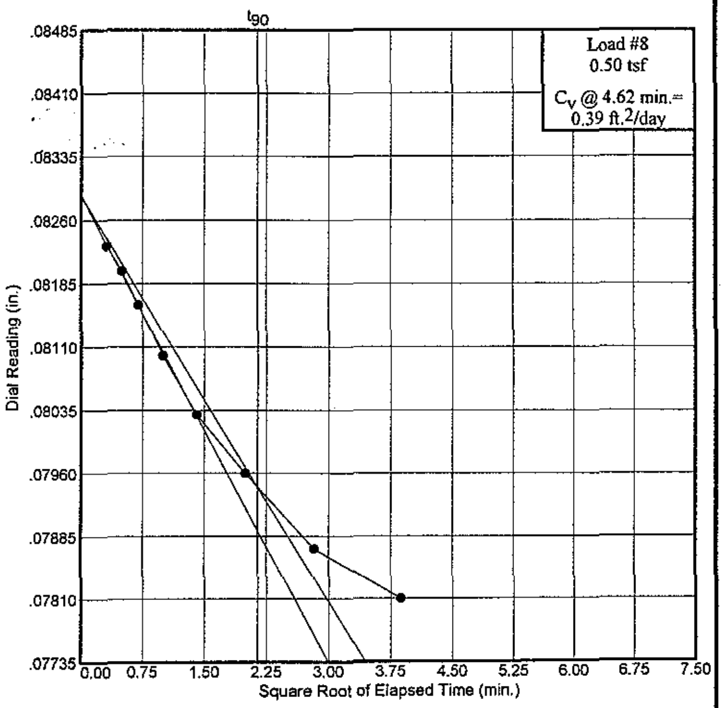
Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo, Puerto Rico









Dial Reading vs. Time

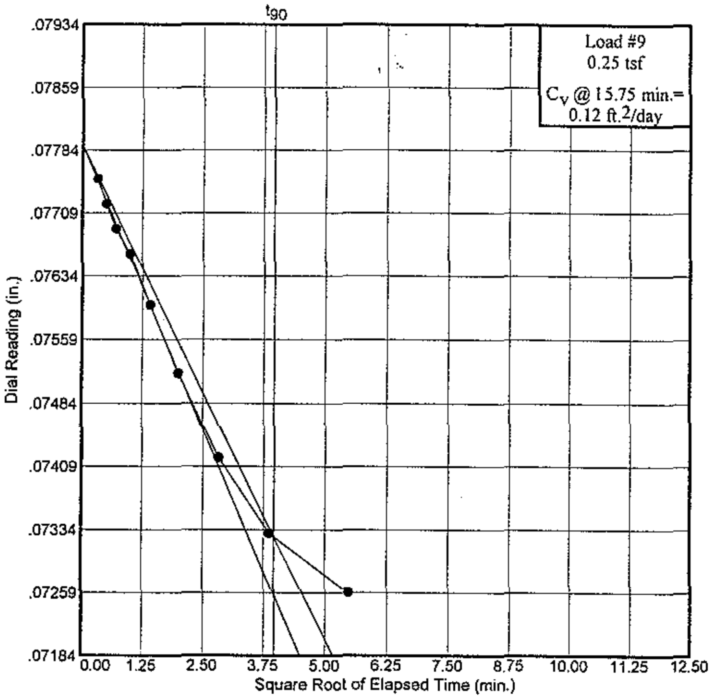
GEOCONSULT

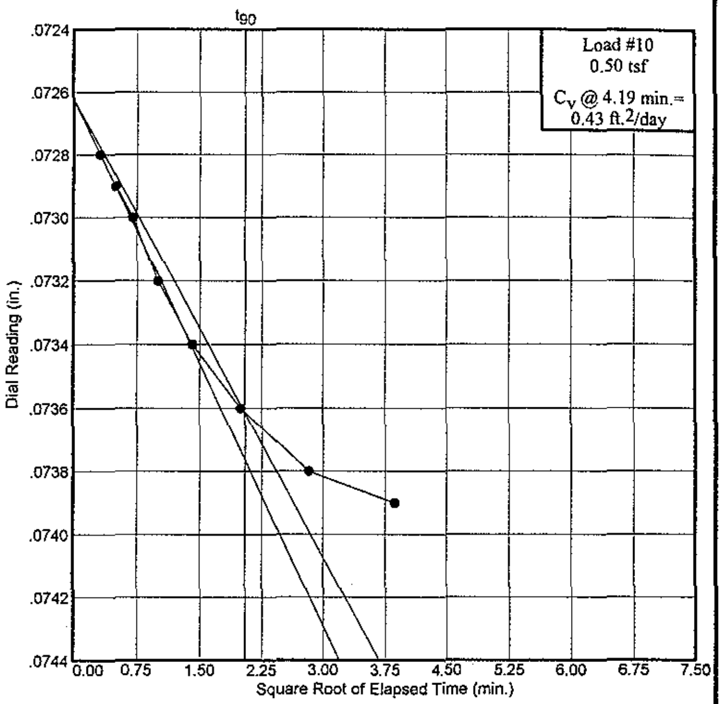
Plate 10' - 12

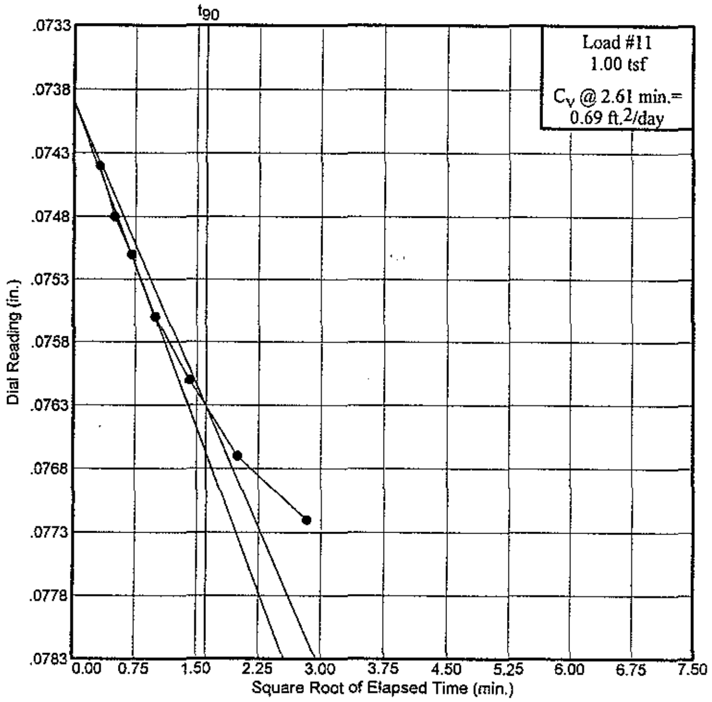
Dial Reading vs. Time

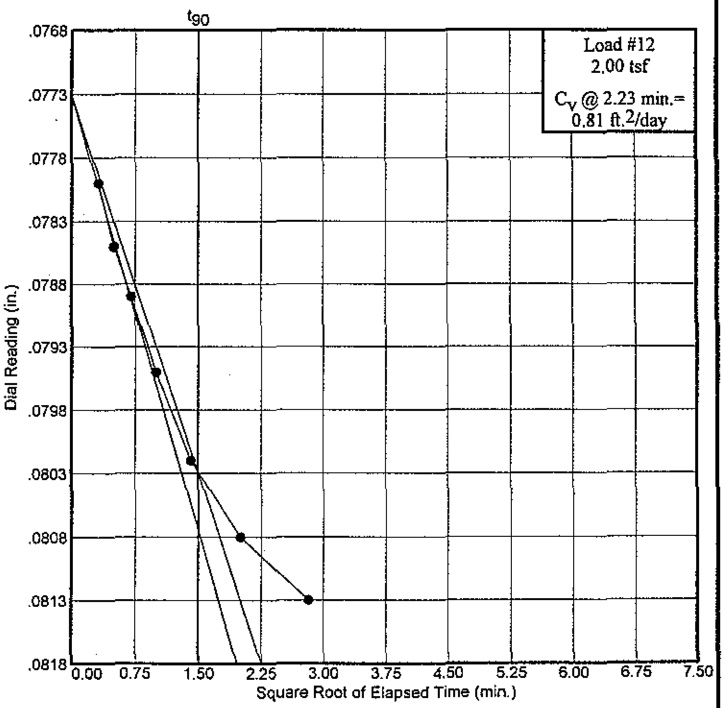
Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo, Puerto Rico









Dial Reading vs. Time

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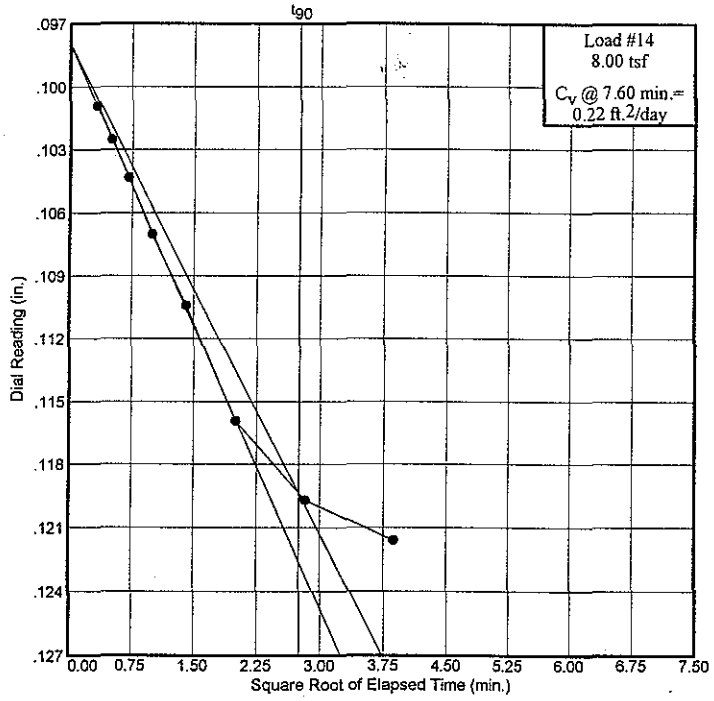
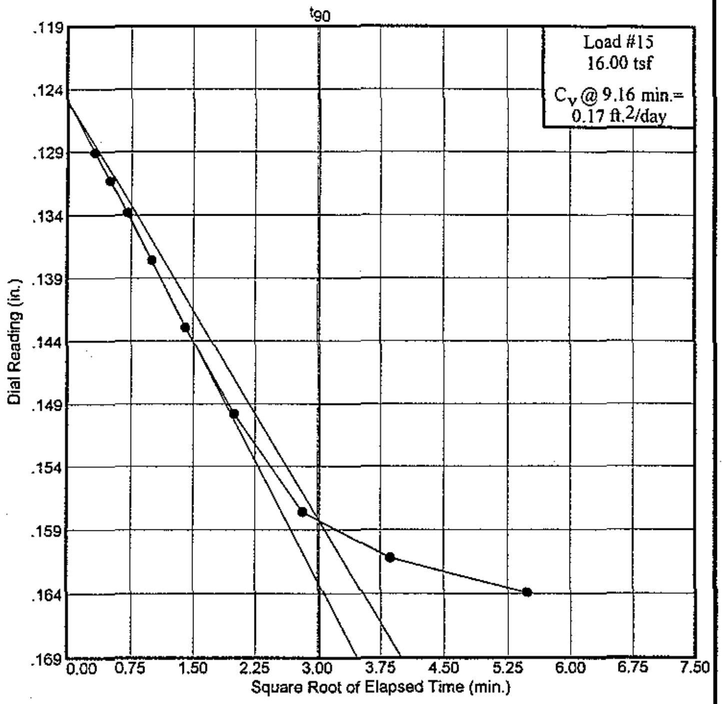
Plate 10' - 12'

Dial Reading vs. Time

Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo, Puerto Rico

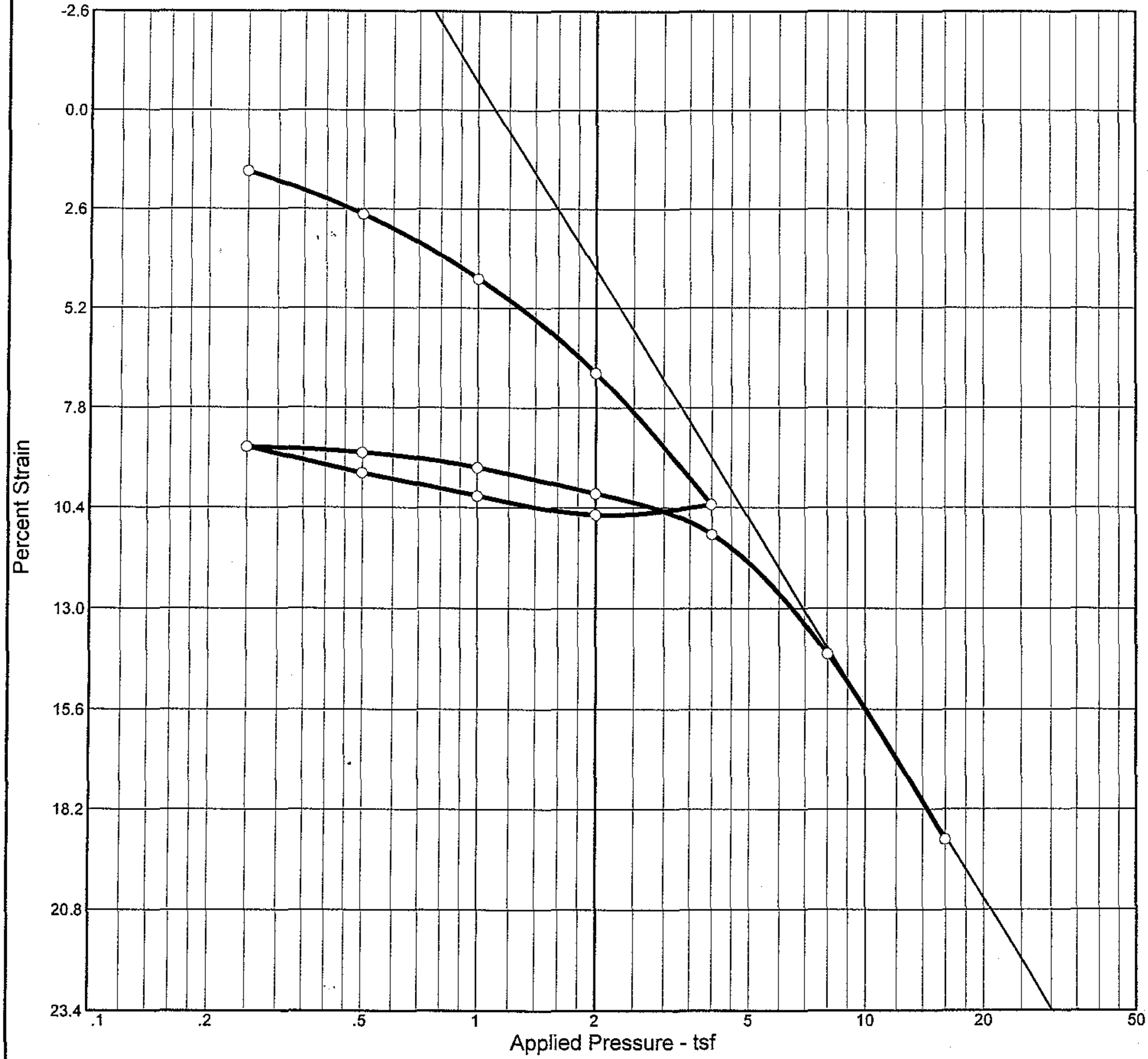




Dial Reading vs. Time

GEOCONSULT

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (tsf)	P_c (tsf)	C_c	C_r	Swell Press. (tsf)	Heave %	e_o
Sat.	Moist.											
91.8 %	38.9 %	78.7	41	17	2.7	0.91	3.47	0.35	0.04			1.143

MATERIAL DESCRIPTION	USCS	AASHTO
(CH) Fat clay, at bottom(12.75 in)lensed withdark gray-sandy fat clay, subangular mediumsand, no reaction with HCl, moist, stiff, high plasticity		

Project No. 2182-99 **Client:**

Project: Recovery Solution

Location: Arecibo, Puerto Rico

CONSOLIDATION TEST REPORT

GEOCONSULT

Remarks:

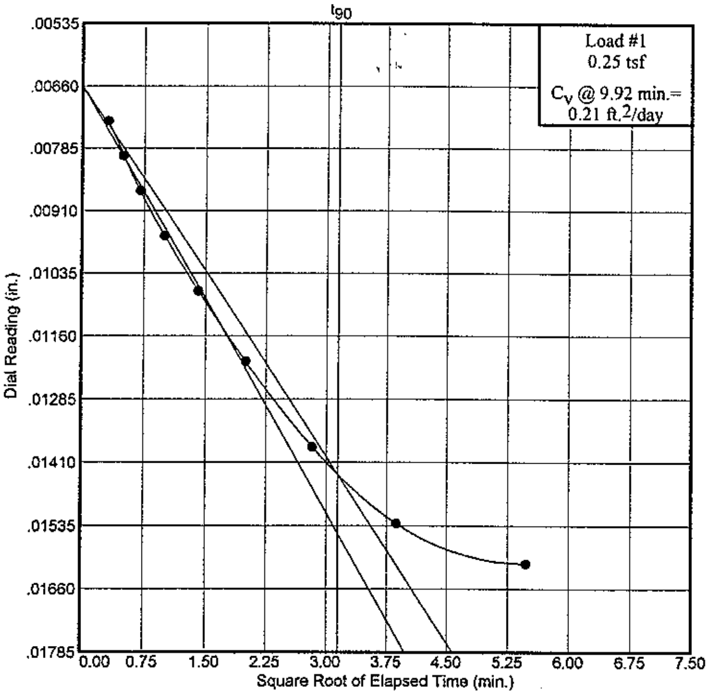
Tested by:GMC
RCS-1 Sample 2
Depth:20-22 feet
Specific Gravity-Inferred

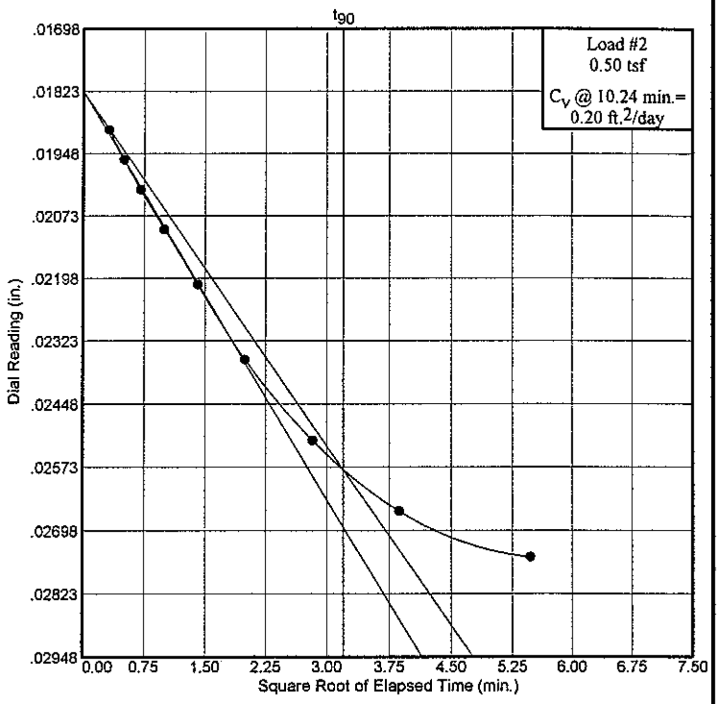
Plate 20'- 22'

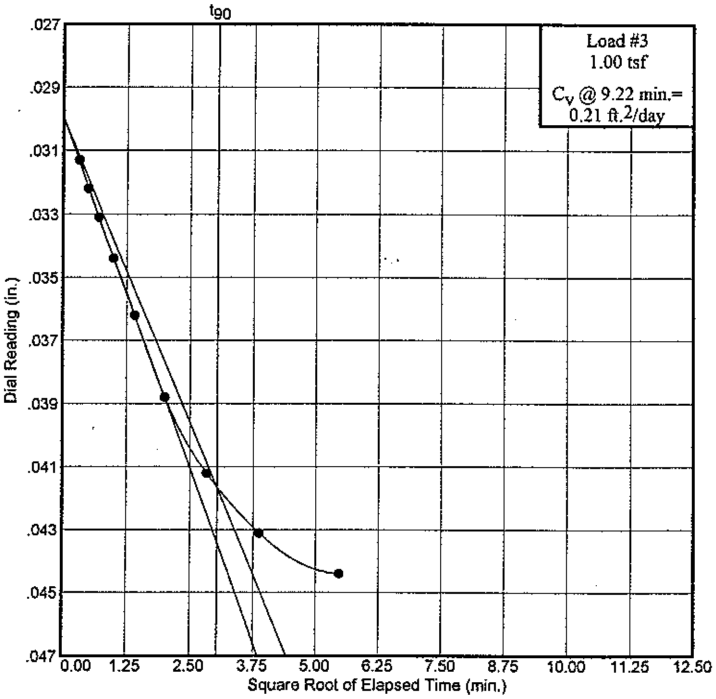
Dial Reading vs. Time

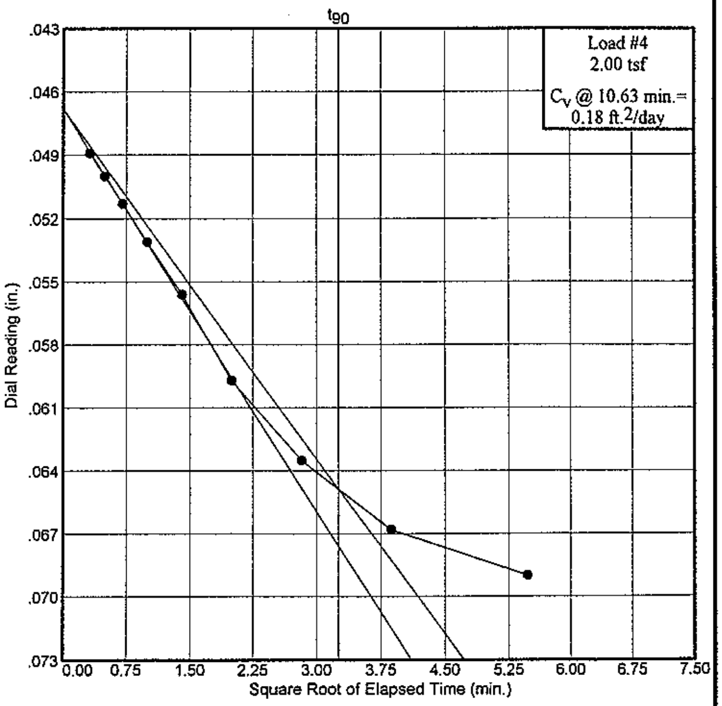
Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo, Puerto Rico









Dial Reading vs. Time

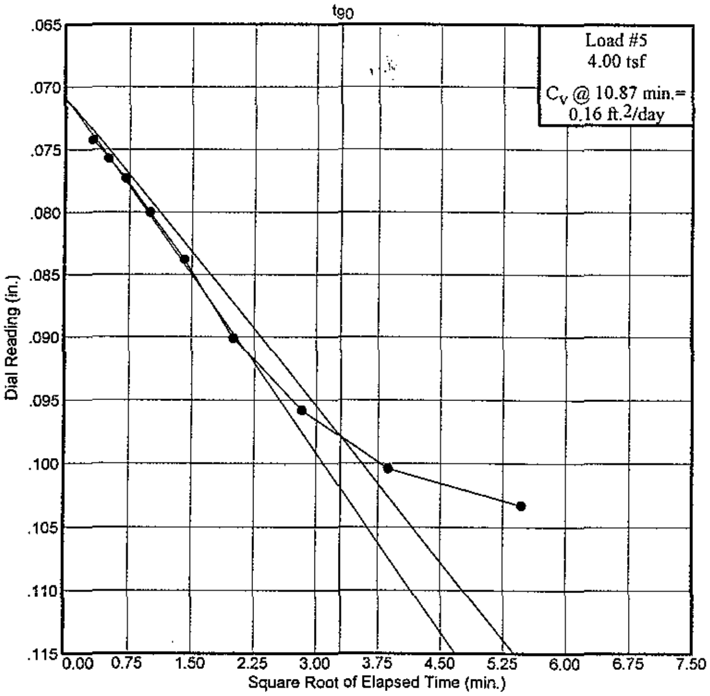
GEOCONSULT

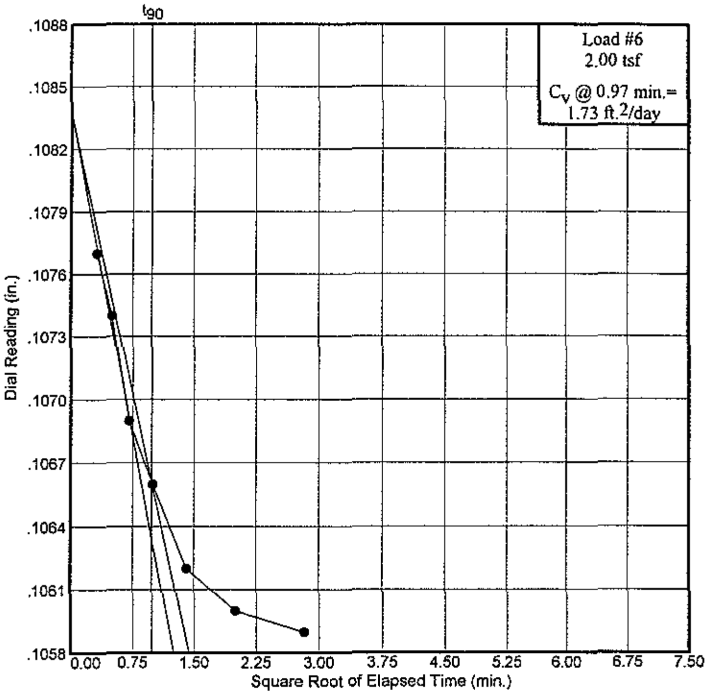
Plate 20'- 22'

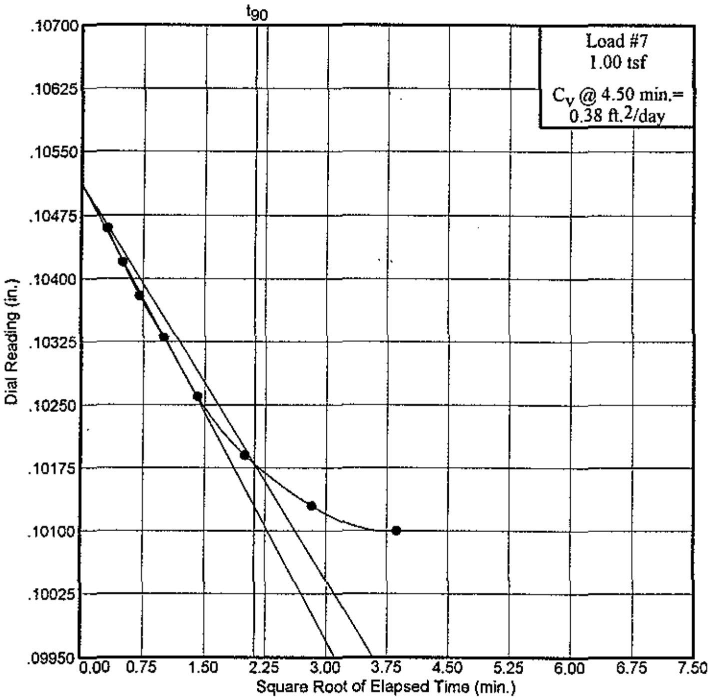
Dial Reading vs. Time

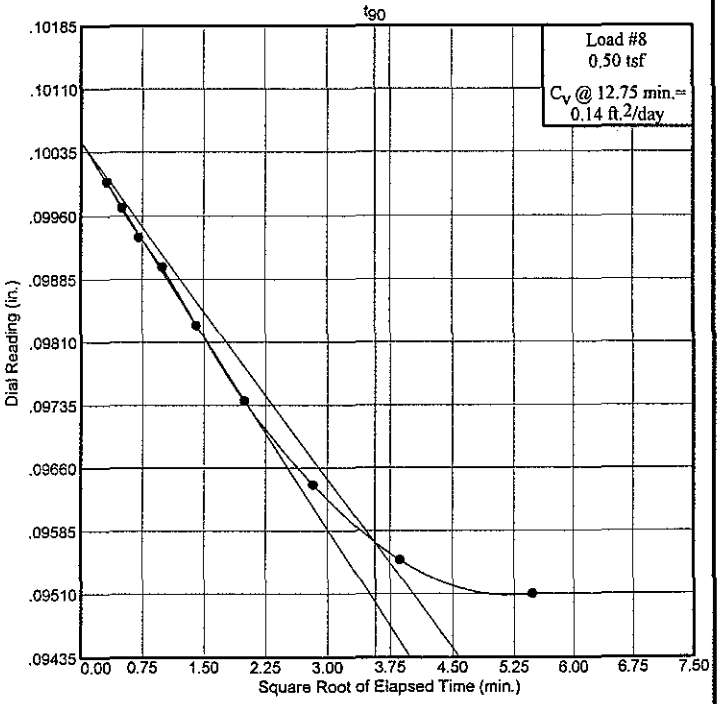
Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo, Puerto Rico









Dial Reading vs. Time

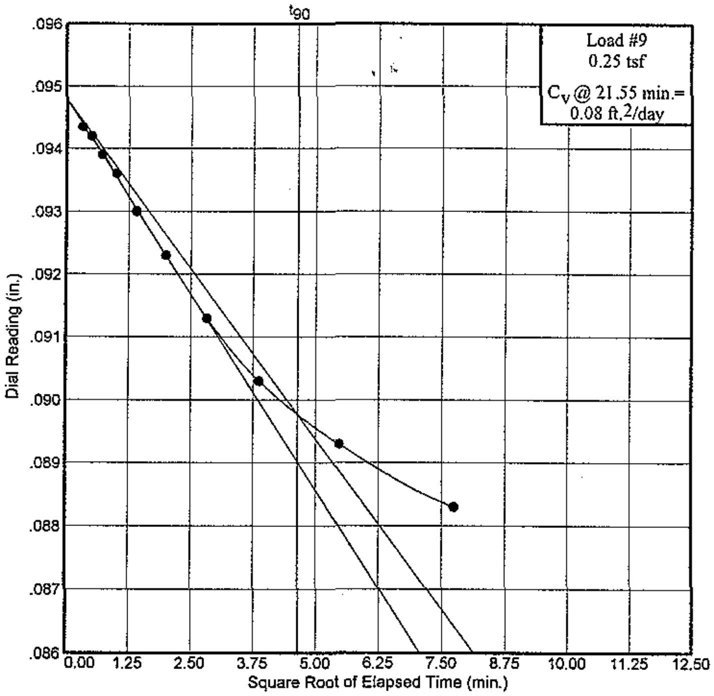
GEOCONSULT

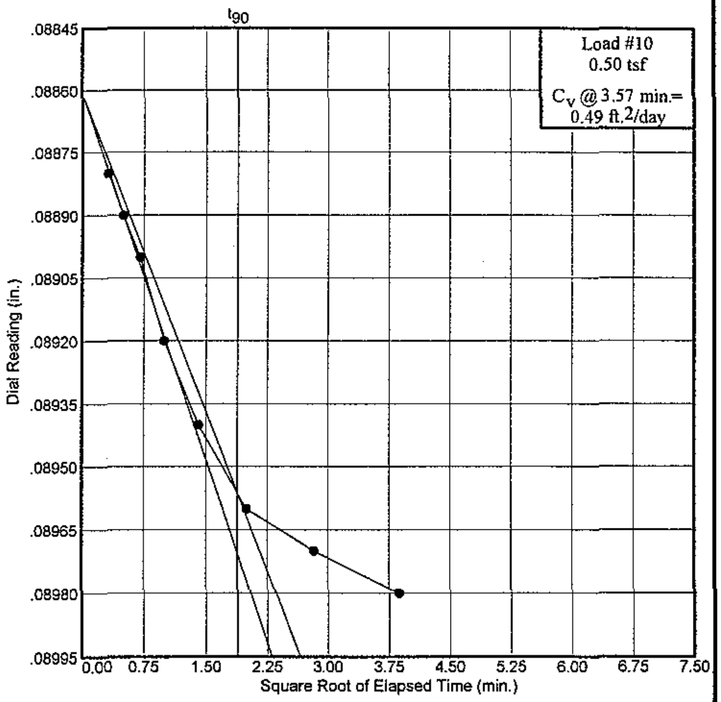
Plate 20'- 22'

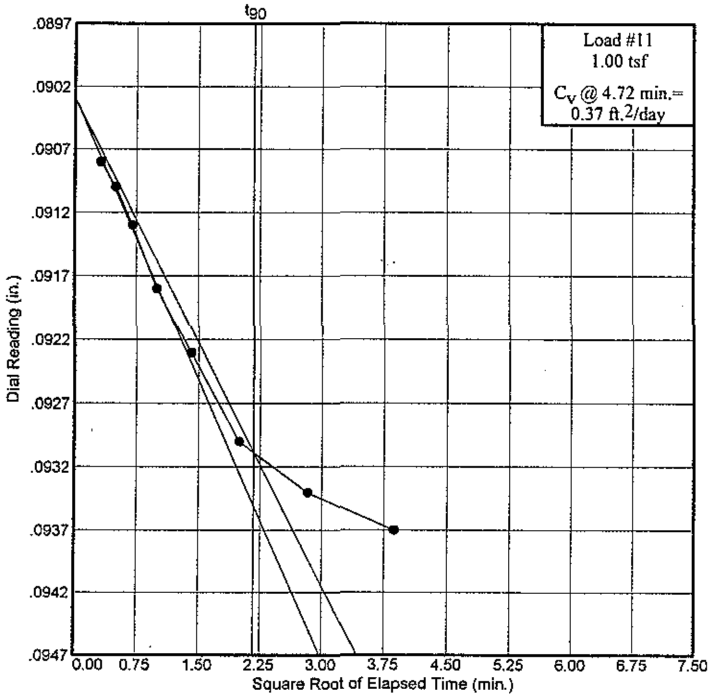
Dial Reading vs. Time

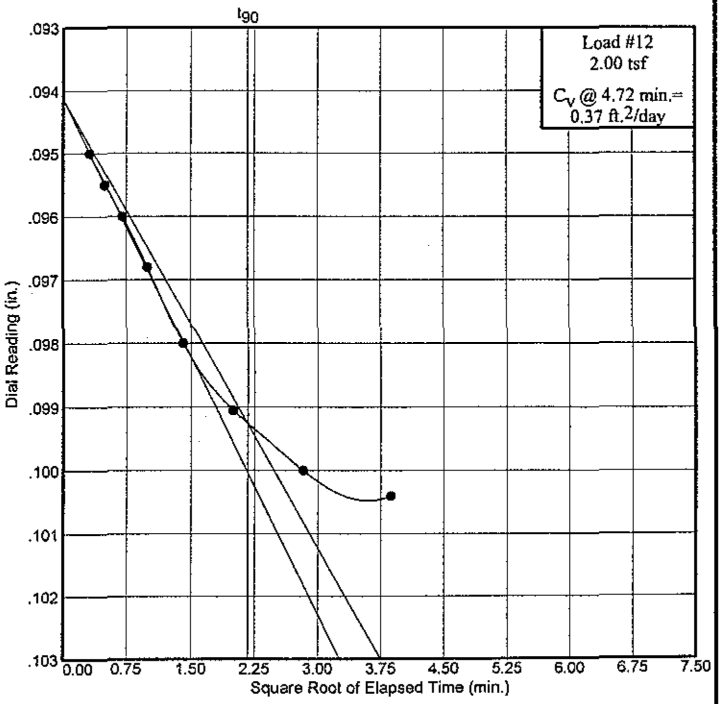
Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo, Puerto Rico









Dial Reading vs. Time

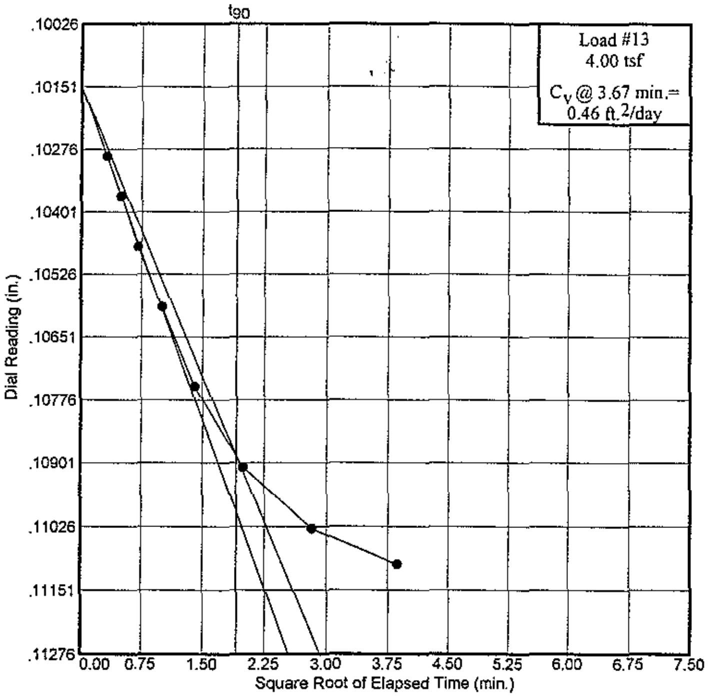
GEOCONSULT

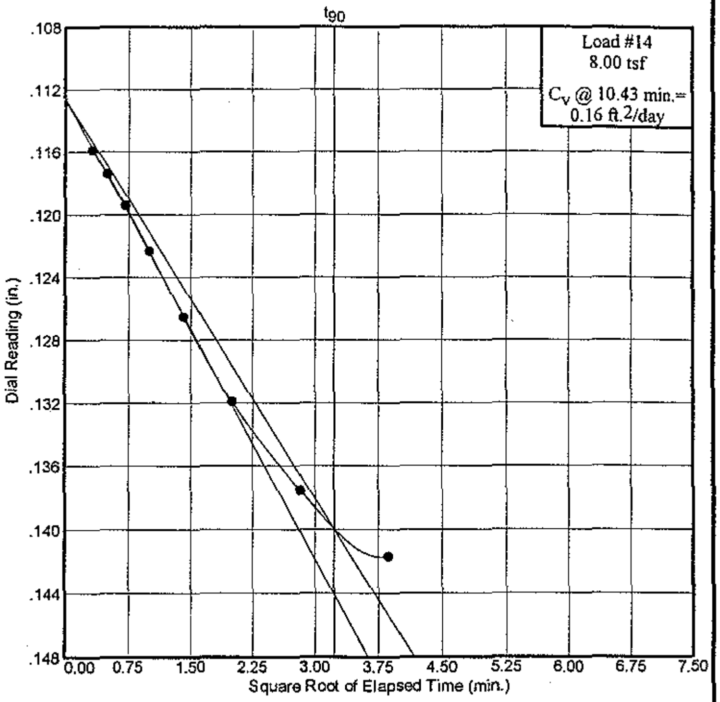
Plate 20'- 22'

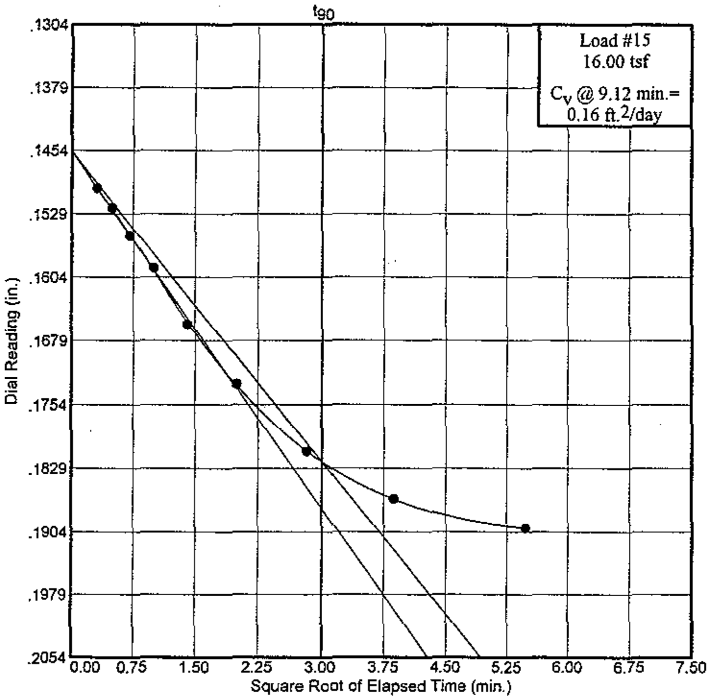
Dial Reading vs. Time

Project No.: 2182-99
Project: Recovery Solution

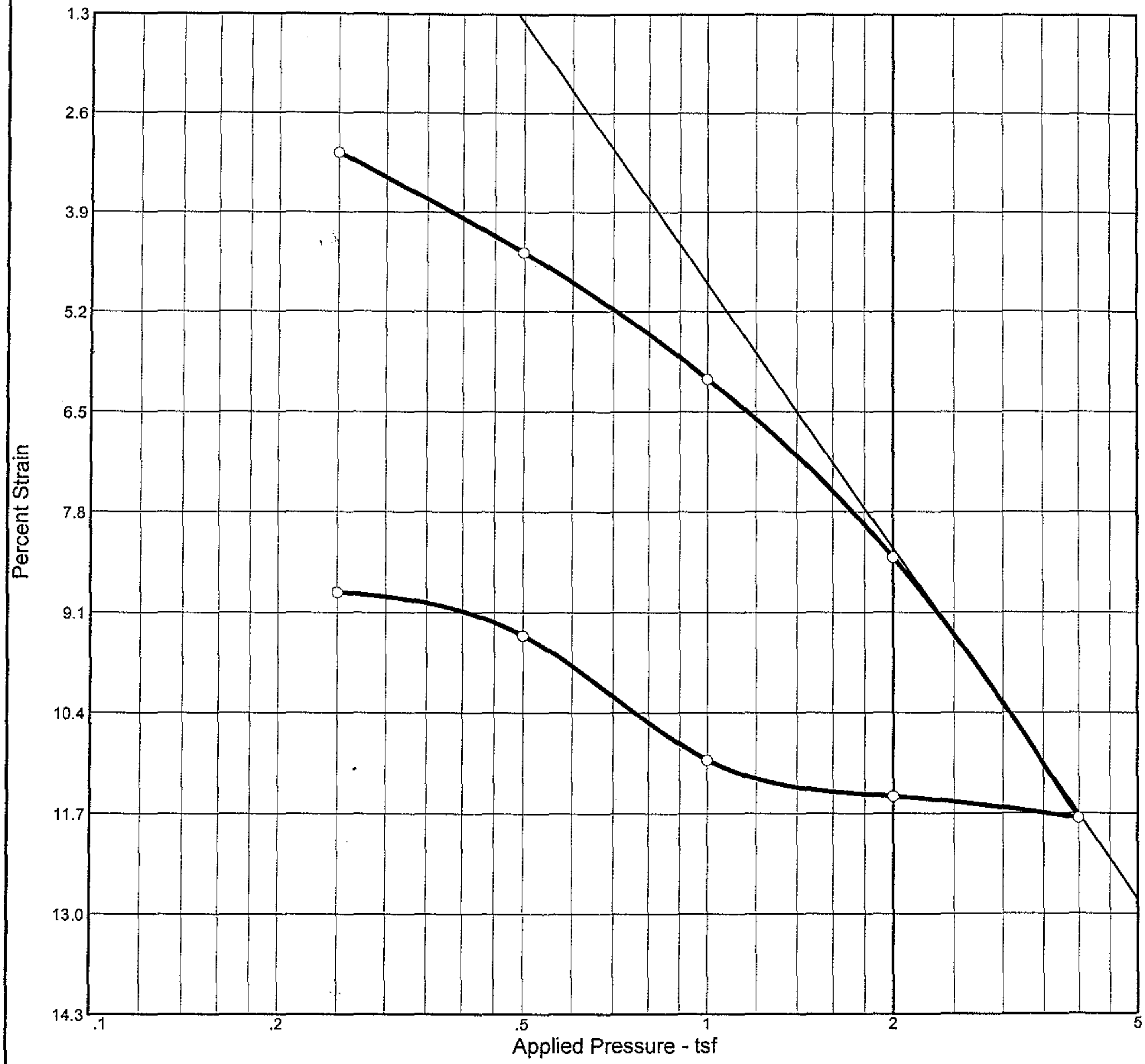
Location: Arecibo, Puerto Rico







CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (tsf)	P$_c$ (tsf)	C$_c$	C$_r$	Swell Press. (tsf)	Heave %	e$_o$
Sat.	Moist.											
100.0 %	34.7 %	101.5			2.7	1.14	2.09	0.19	0.04			0.661

MATERIAL DESCRIPTION	USCS	AASHTO
(MH) Elastic silt with sand, at the top (5.0in) dark gray sandy-elastic silty, subangular sand, none reaction with HCl, moist, stiff, high plasticity, dark gray		

Project No. 2182-99 **Client:**

Project: Recovery Solution

Location: Arecibo, Puerto Rico

Remarks:
Tested by:GMC
RCS-1 Sample 3
Depth:30-32 feet
Specific Gravity Inferred

CONSOLIDATION TEST REPORT

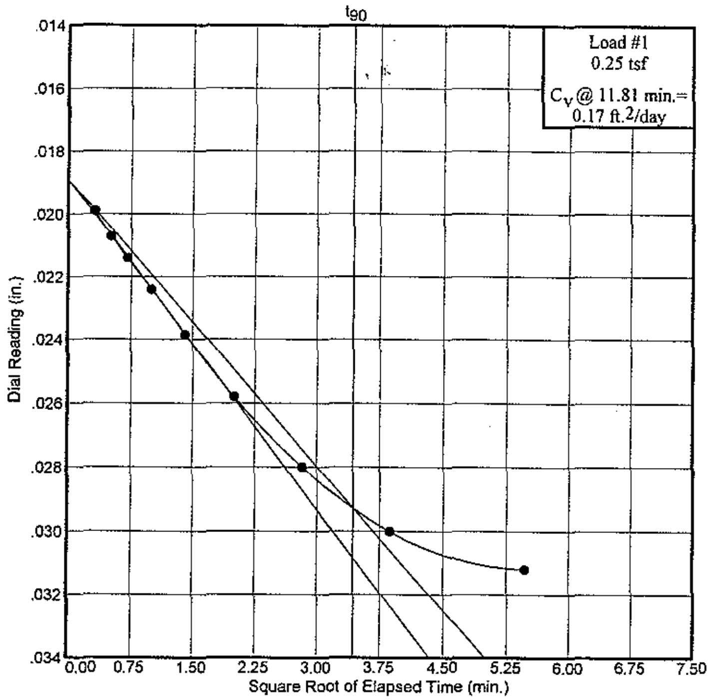
GEOCONSULT

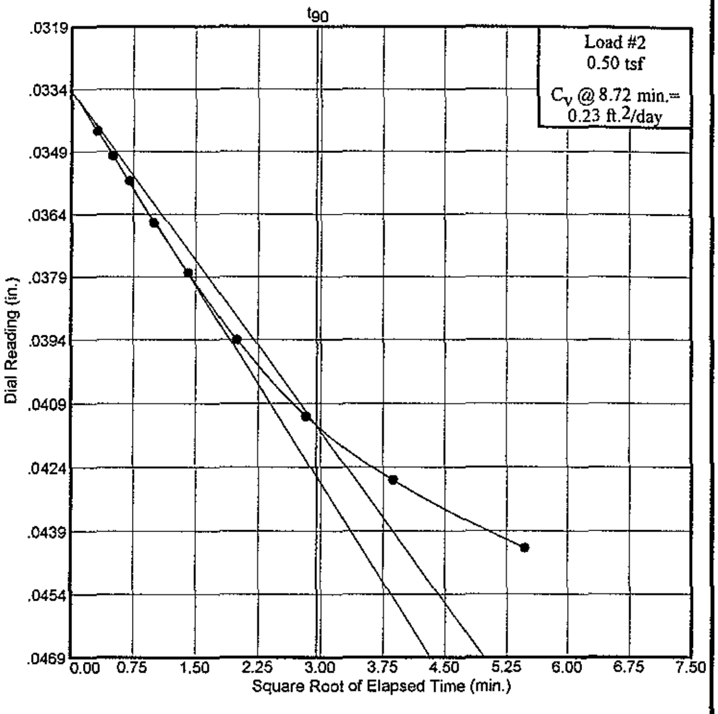
Plate 30' - 32'

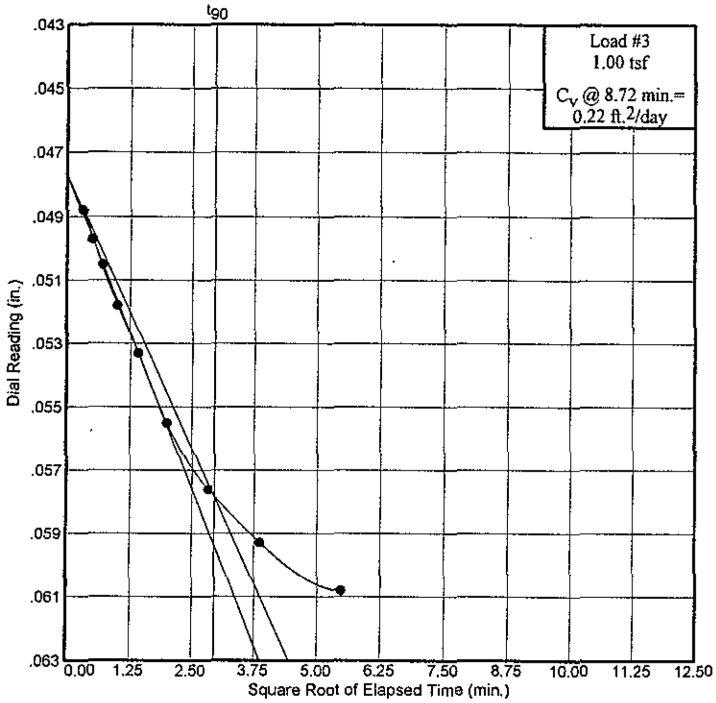
Dial Reading vs. Time

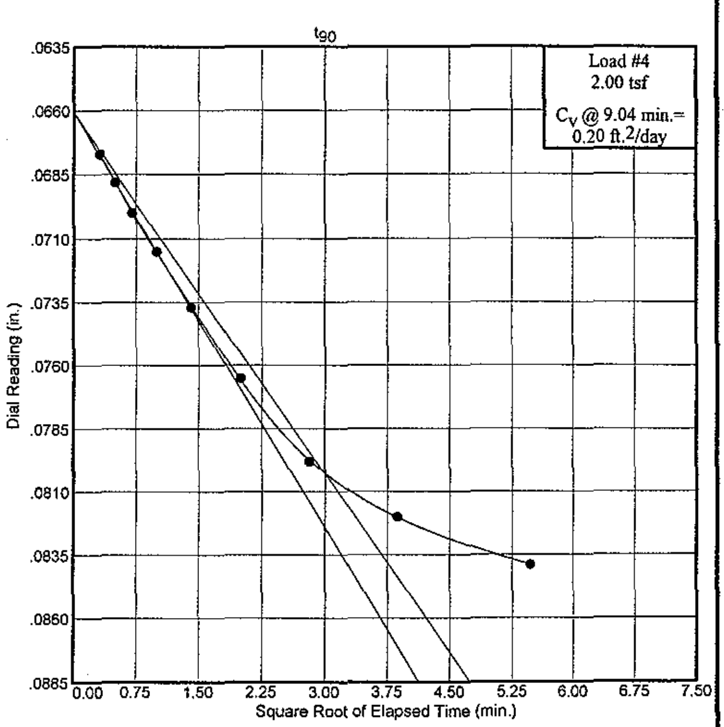
Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo,Puerto Rico









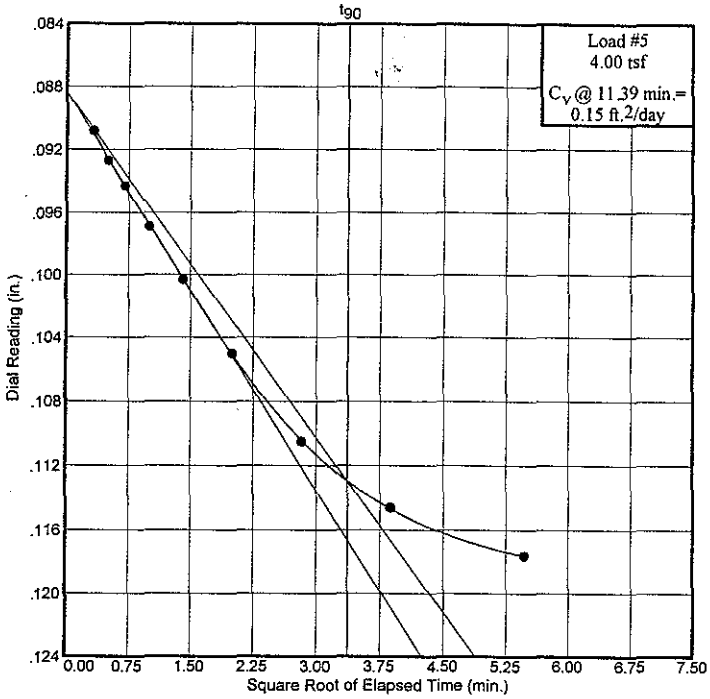
Dial Reading vs. Time

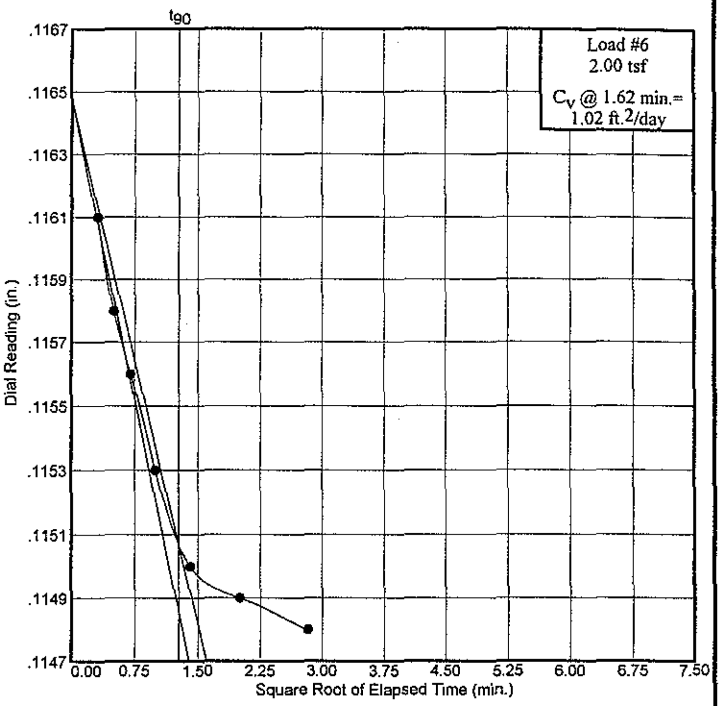
GEOCONSULT

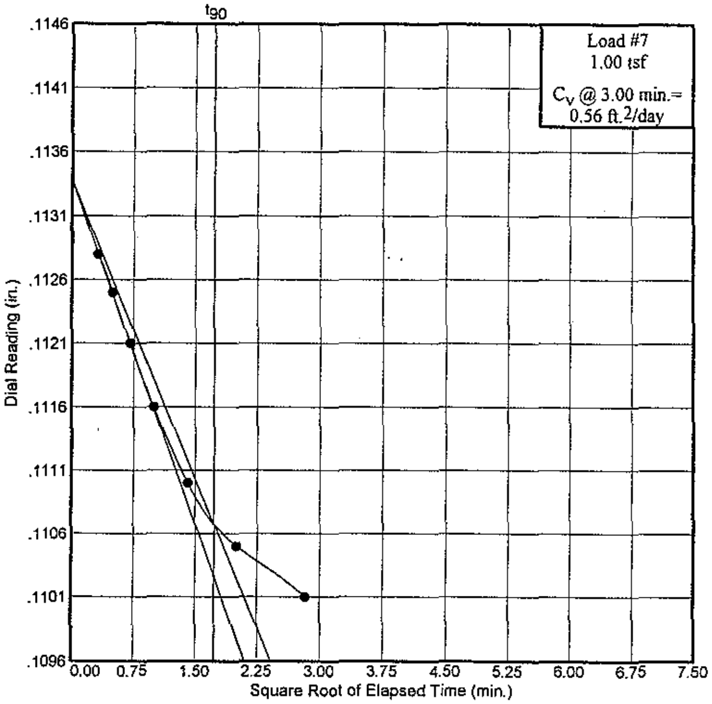
Dial Reading vs. Time

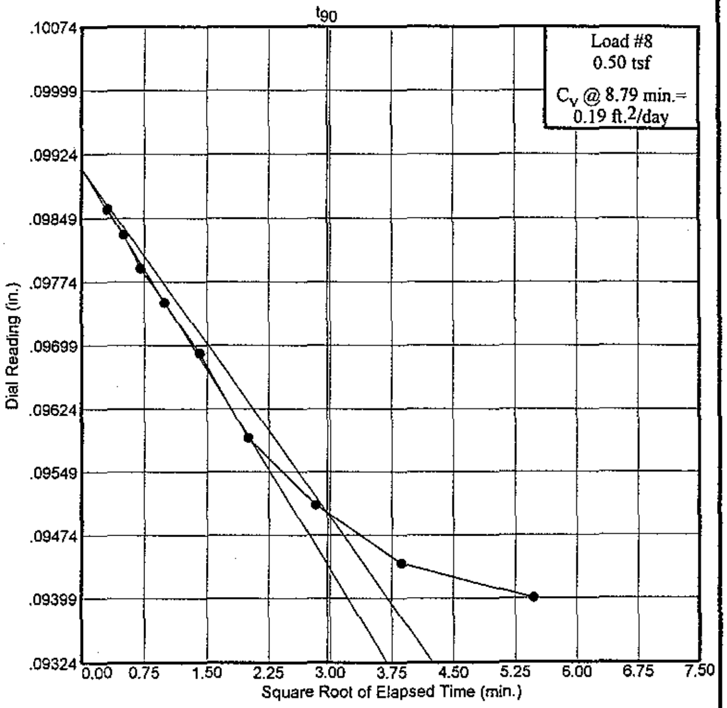
Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo,Puerto Rico









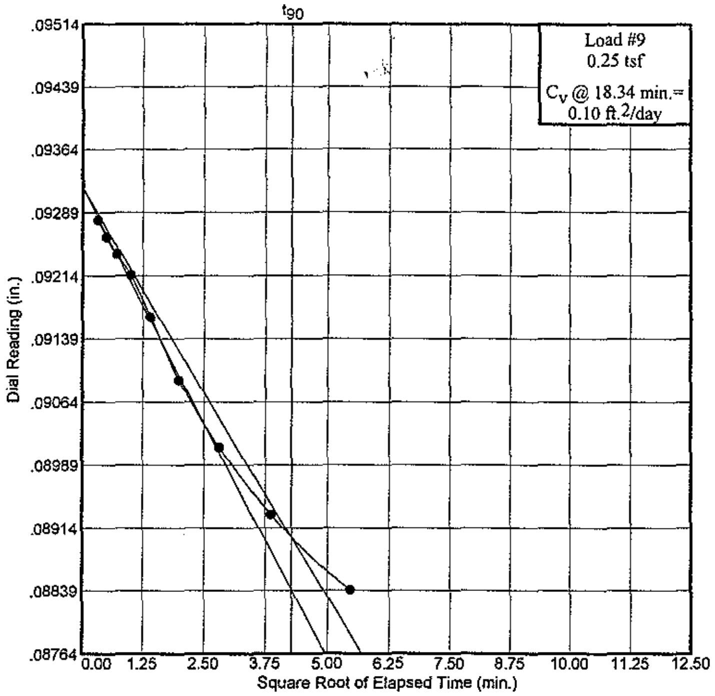
Dial Reading vs. Time

GEOCONSULT

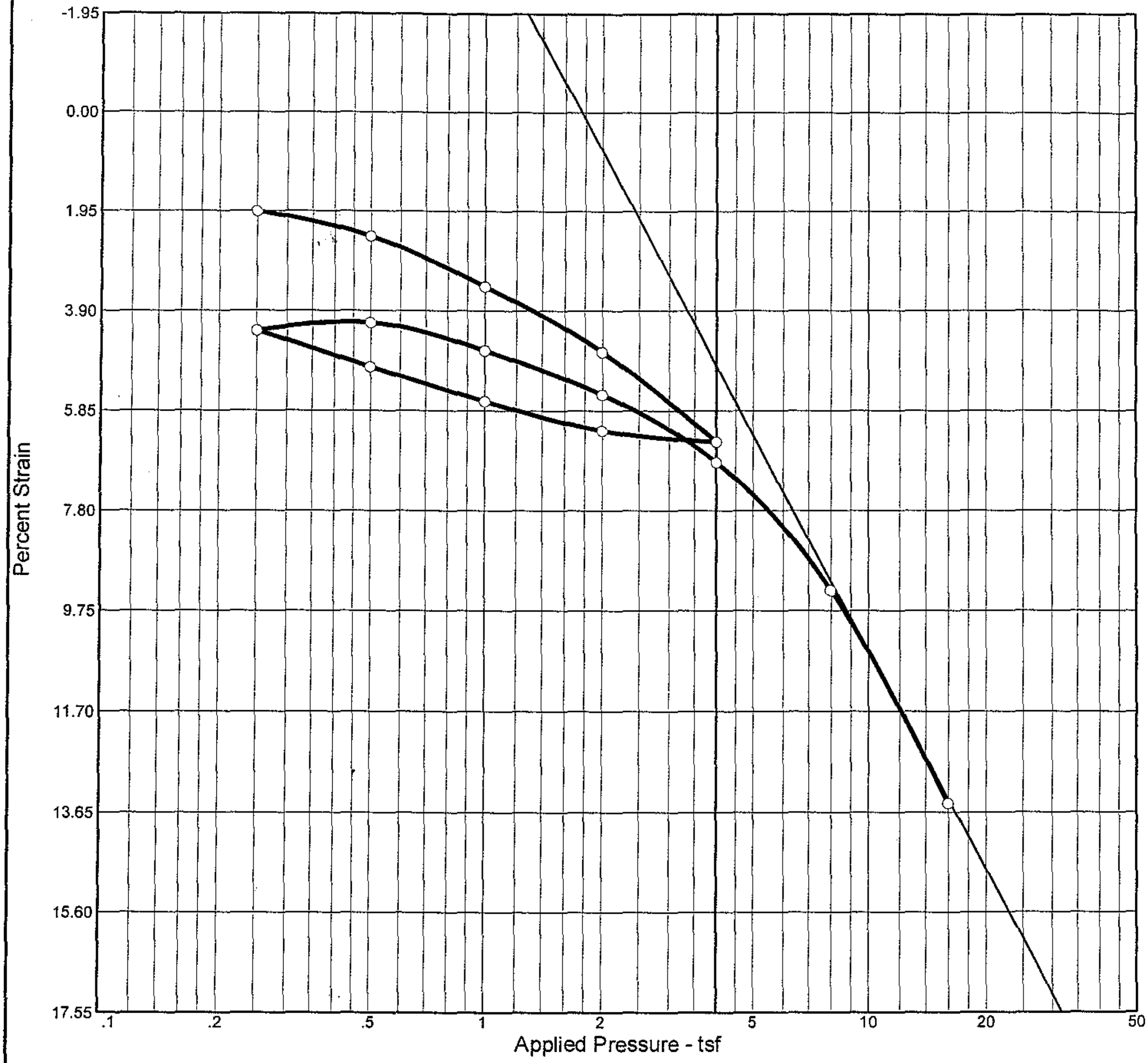
Dial Reading vs. Time

Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo,Puerto Rico



CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (tsf)	P_c (tsf)	C_c	C_r	Swell Press. (tsf)	Heave %	e_o
Sat.	Moist.											
42.9 %	25.5 %	64.2	54	12	2.65	0.44	5.58	0.36	0.05			1.576

MATERIAL DESCRIPTION	USCS	AASHTO
(CL)Lean clay, no reaction with HCl, moist, very stiff, medium plasticity, dark brown mottled, yellowish brown		

Project No. 2182-99 **Client:**

Project: Recovery Solution

Location: Arecibo, Puerto Rico

CONSOLIDATION TEST REPORT

GEOCONSULT

Remarks:

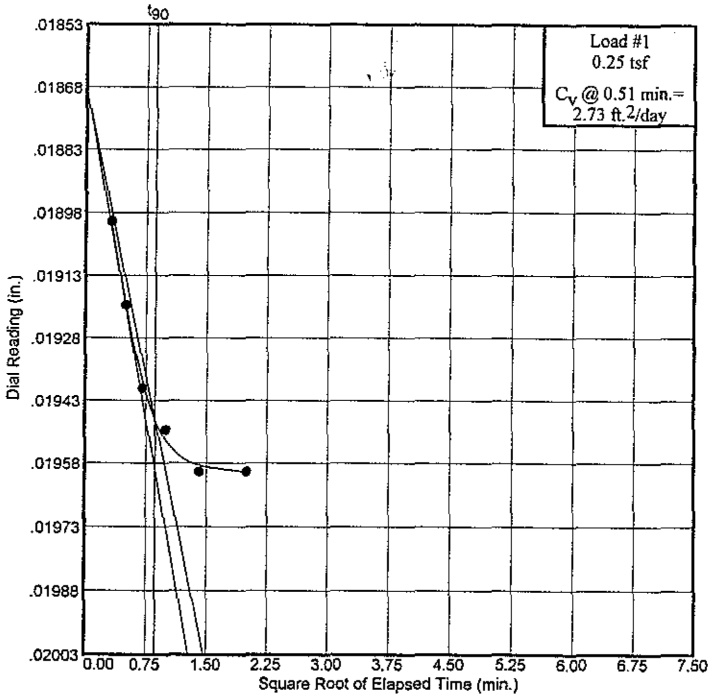
Tested by:GMC
RCS-2 Sample 1
Depth:7-9 feet
Specific Gravity Inferred

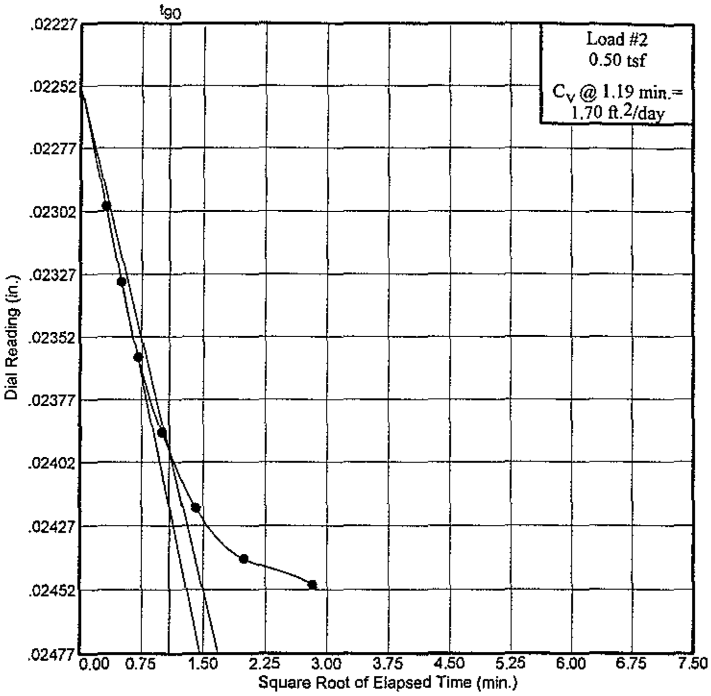
Plate 7'- 9'

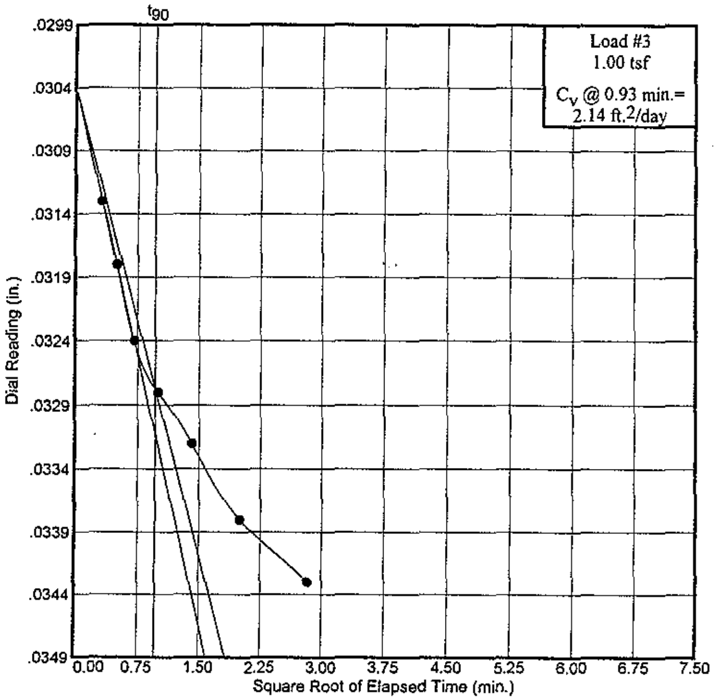
Dial Reading vs. Time

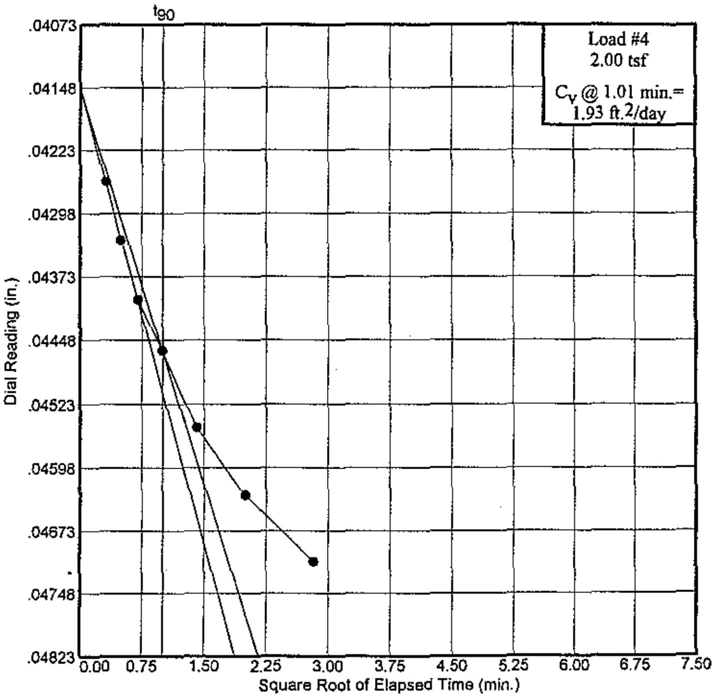
Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo,Puerto Rico









Dial Reading vs. Time

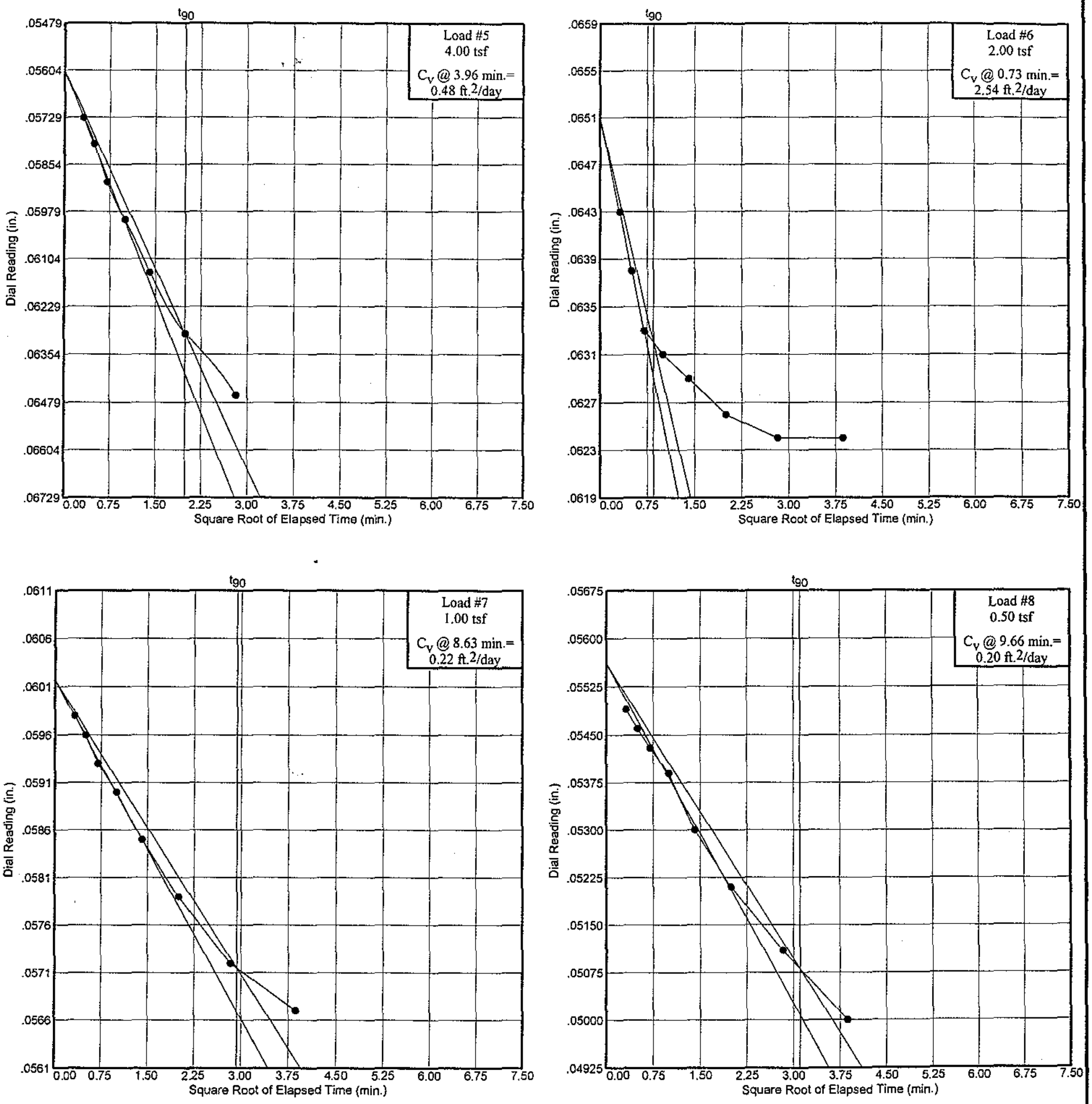
GEOCONSULT

Plate 7'- 9'

Dial Reading vs. Time

Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo,Puerto Rico



Dial Reading vs. Time

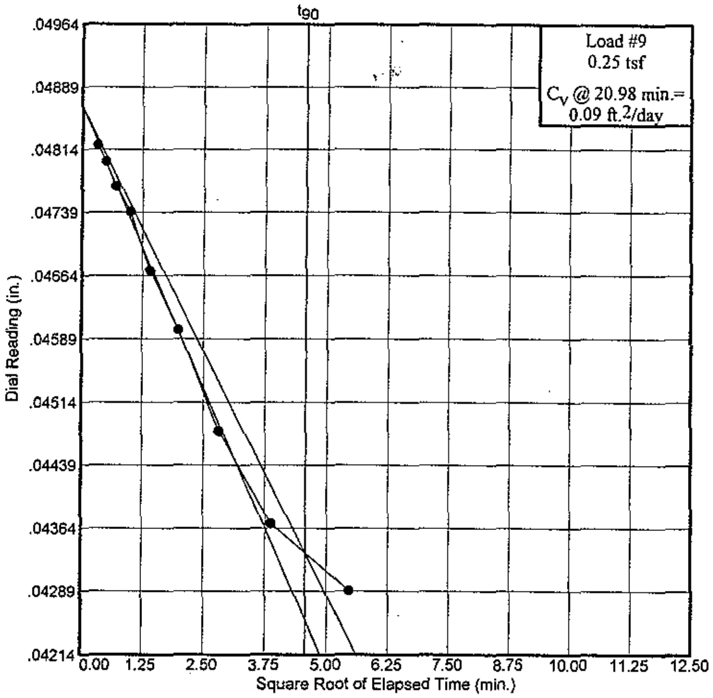
GEOCONSULT

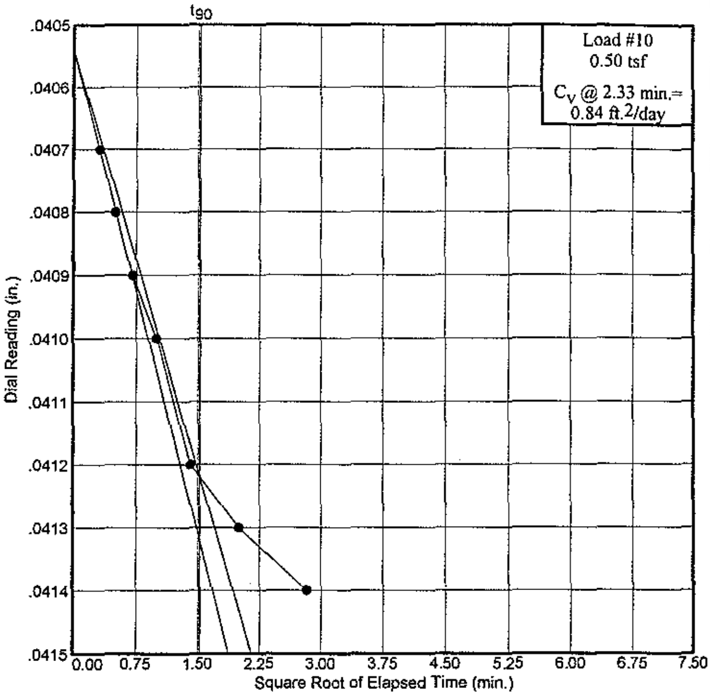
Plate 7'- 9'

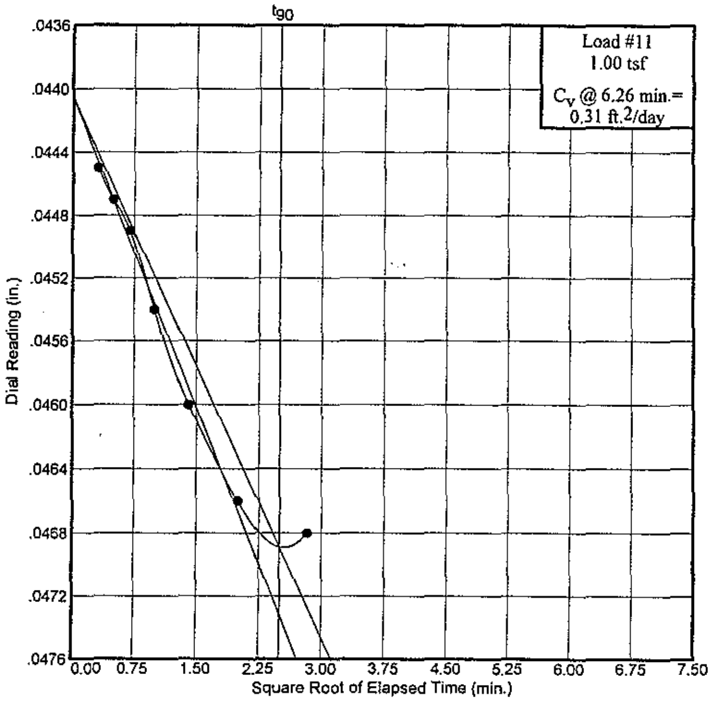
Dial Reading vs. Time

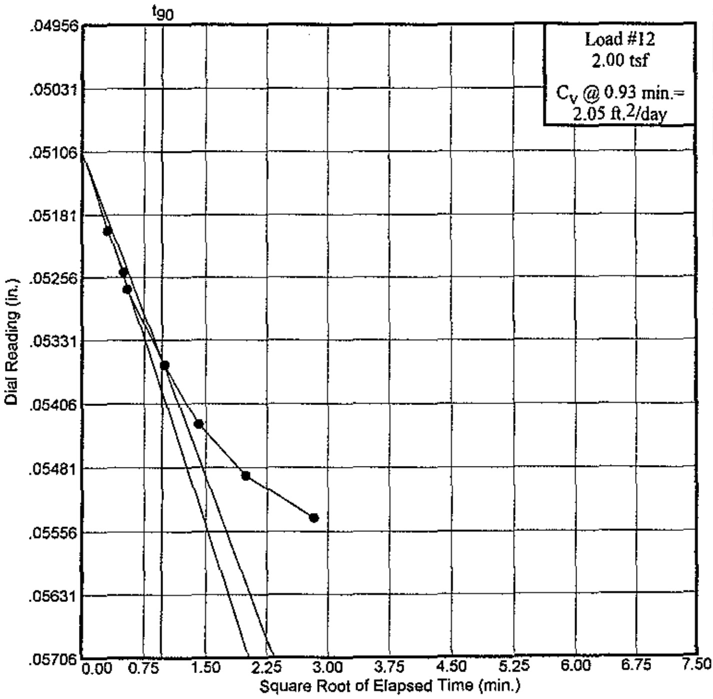
Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo,Puerto Rico









Dial Reading vs. Time

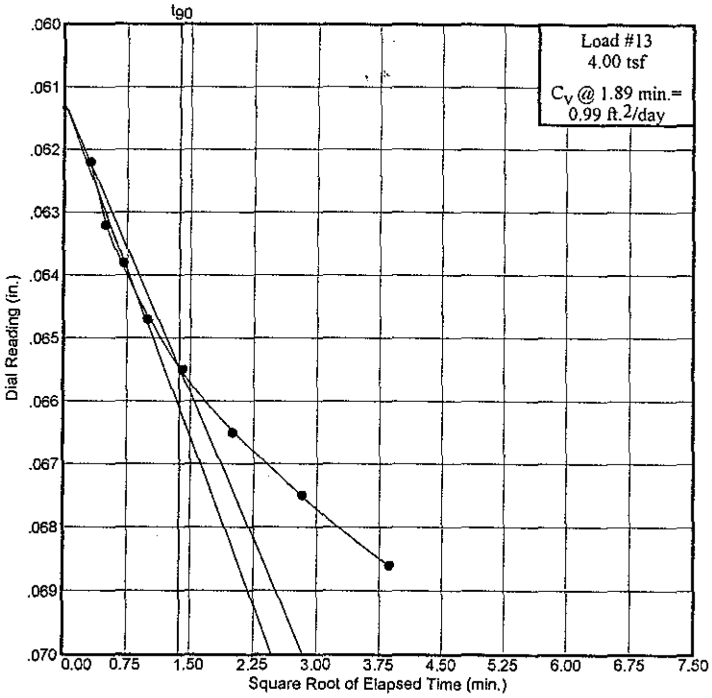
GEOCONSULT

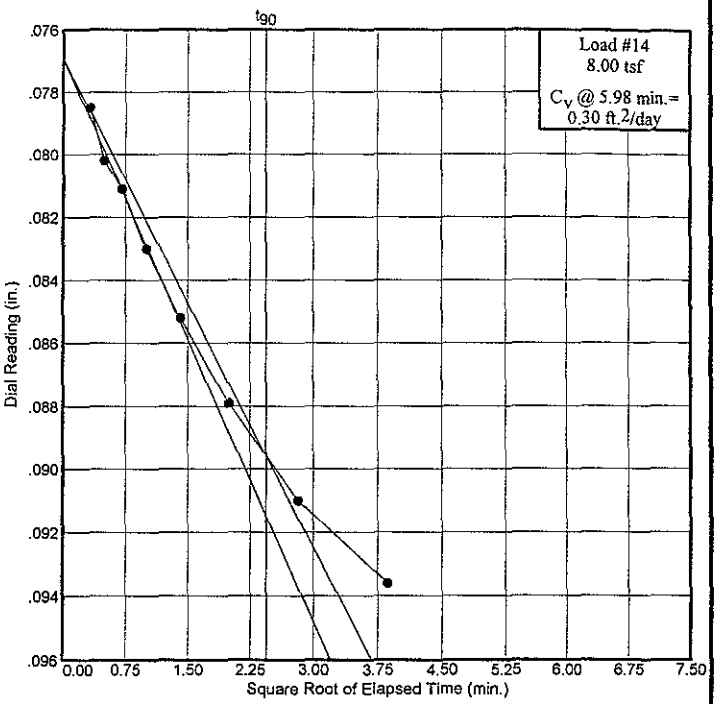
Plate 7'- 9'

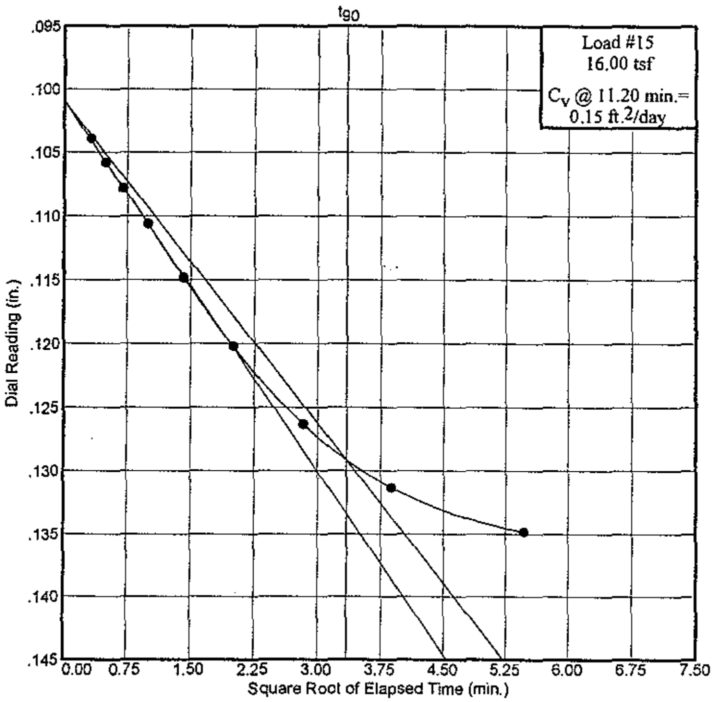
Dial Reading vs. Time

Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo,Puerto Rico





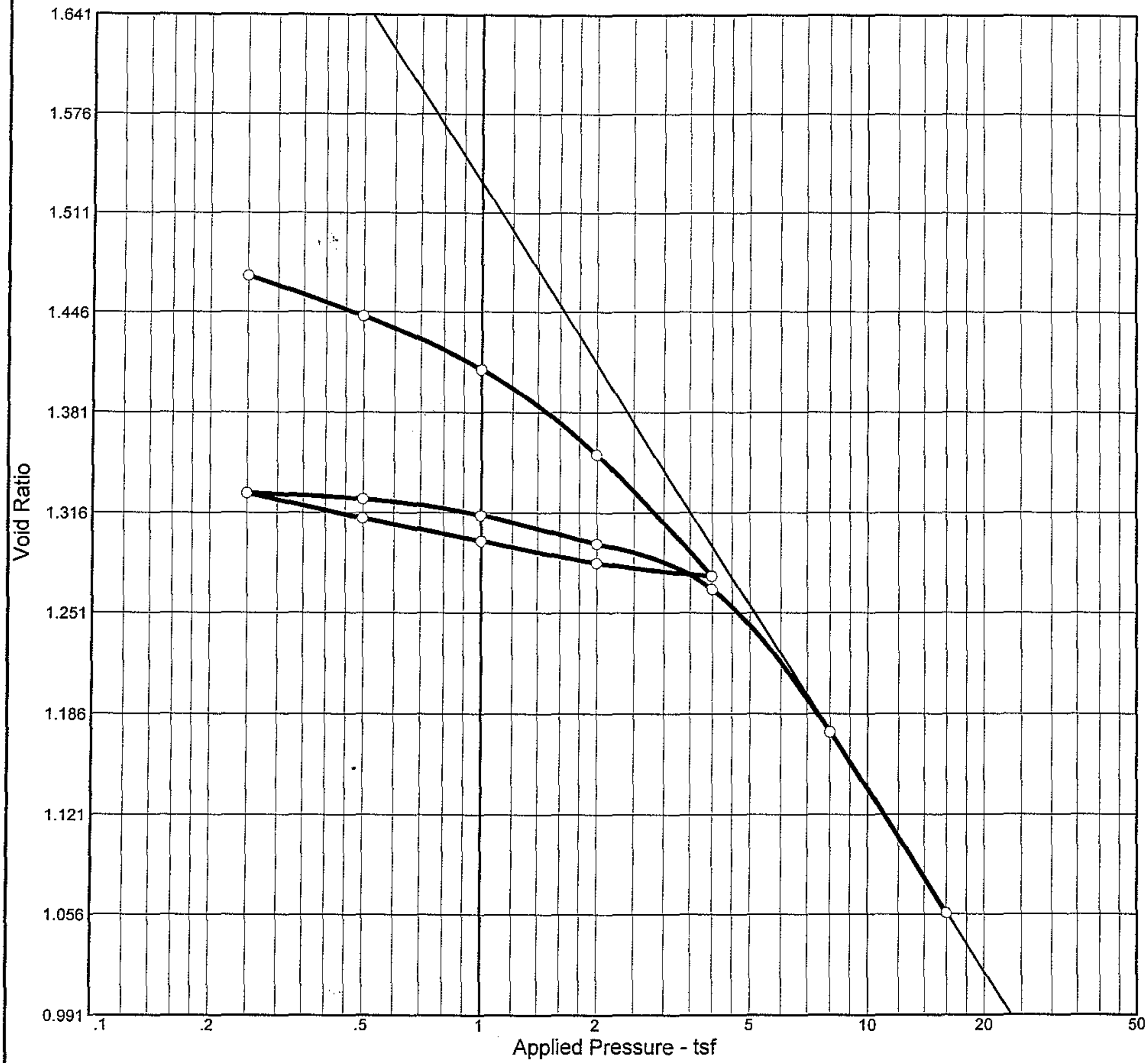


Dial Reading vs. Time

GEOCONSULT

Plate 7'- 9'

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (tsf)	P_c (tsf)	C_c	C_r	Swell Press. (tsf)	Heave %	e_o
Sat.	Moist.											
52.5 %	29.7 %	66.2	54	29	2.65	0.87	2.40	0.39	0.06			1.500

MATERIAL DESCRIPTION	USCS	AASHTO
(CH)Fat clay, no reaction with HCl, moist, very stiff, high plasticity, dark gray		

Project No. 2182-99 **Client:**

Project: Recovery Solution

Location: Arecibo, Puerto Rico

CONSOLIDATION TEST REPORT

GEOCONSULT

Remarks:

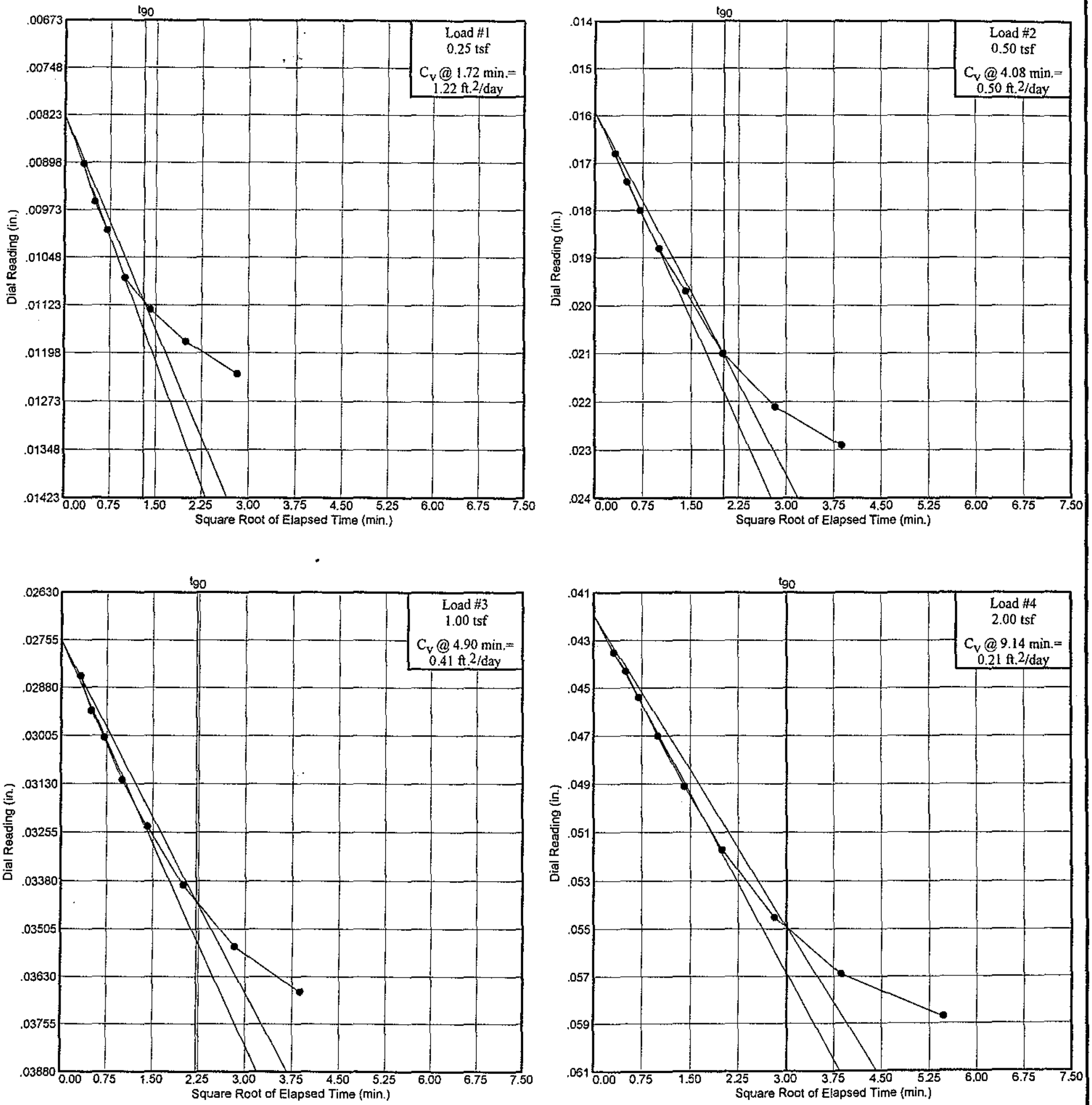
Tested by:GMC
RCS-2 Sample 2
Depth:16-18 feet
Specific Gravity Inferred

Plate 16'- 18'

Dial Reading vs. Time

Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo, Puerto Rico



Dial Reading vs. Time

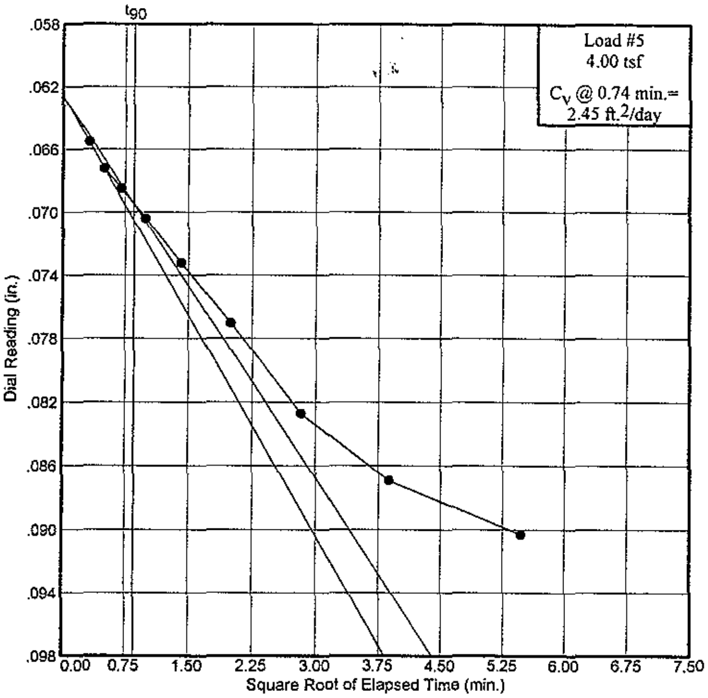
GEOCONSULT

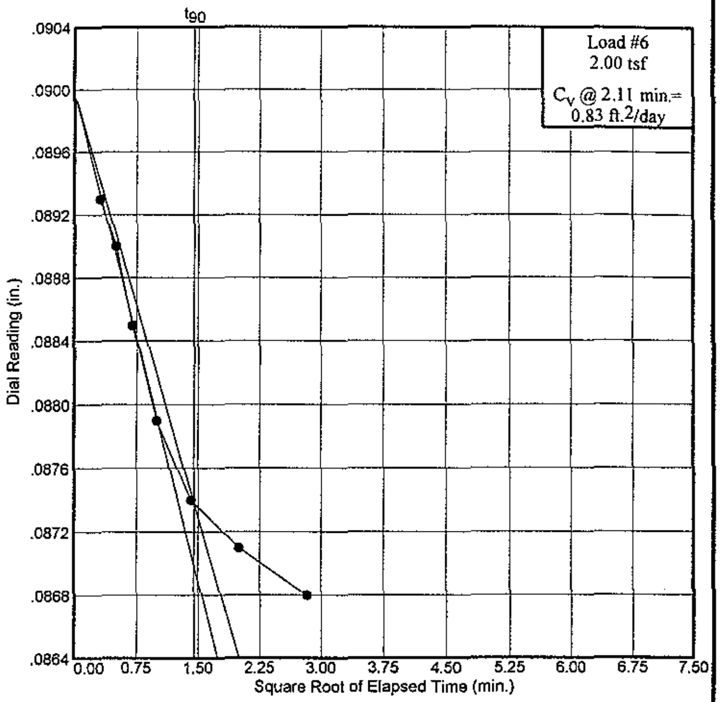
Plate 16'- 18'

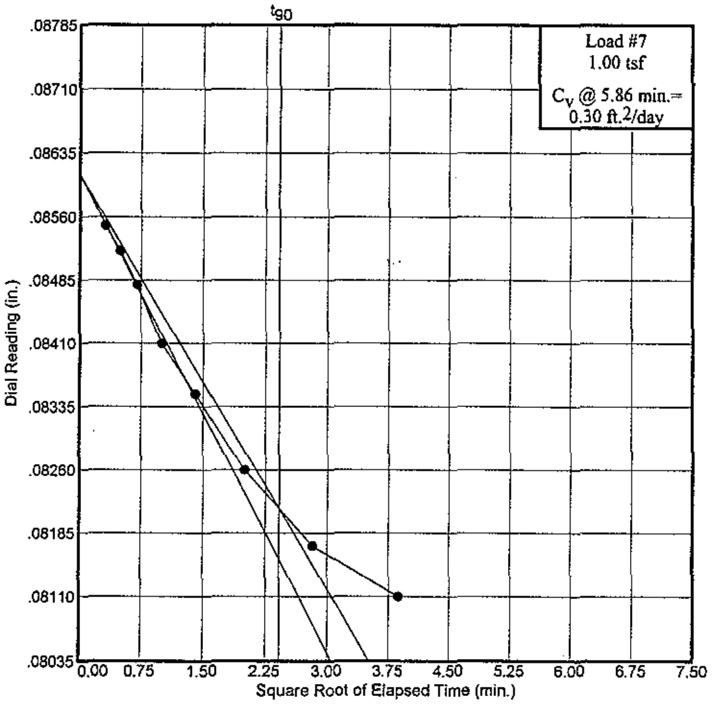
Dial Reading vs. Time

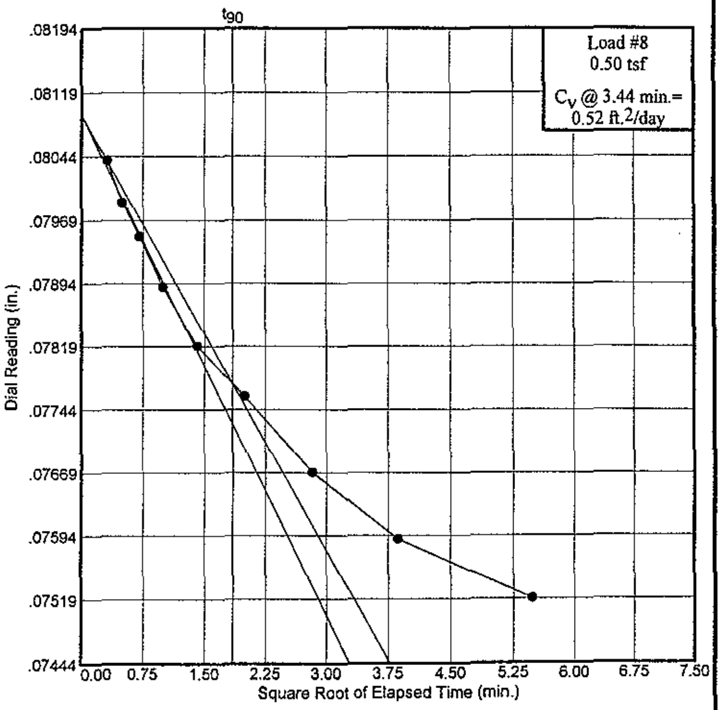
Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo, Puerto Rico









Dial Reading vs. Time

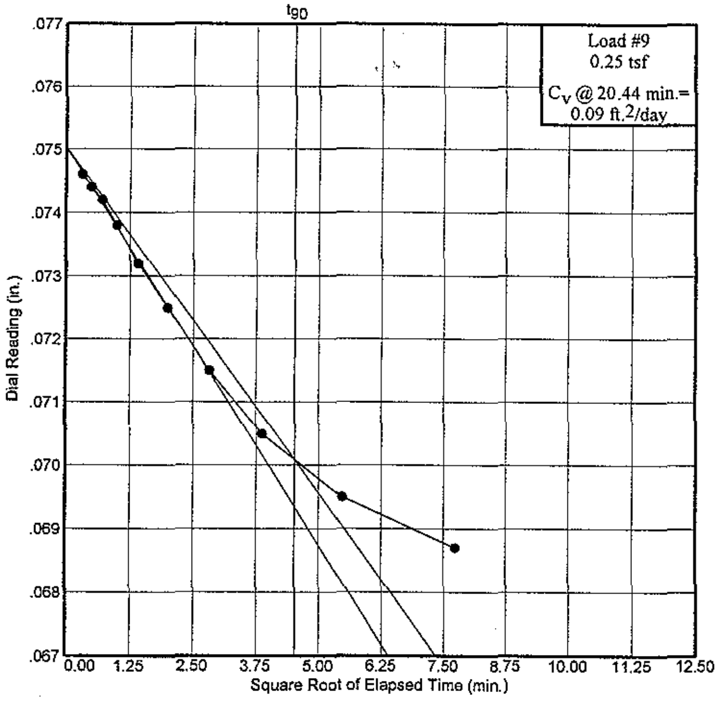
GEOCONSULT

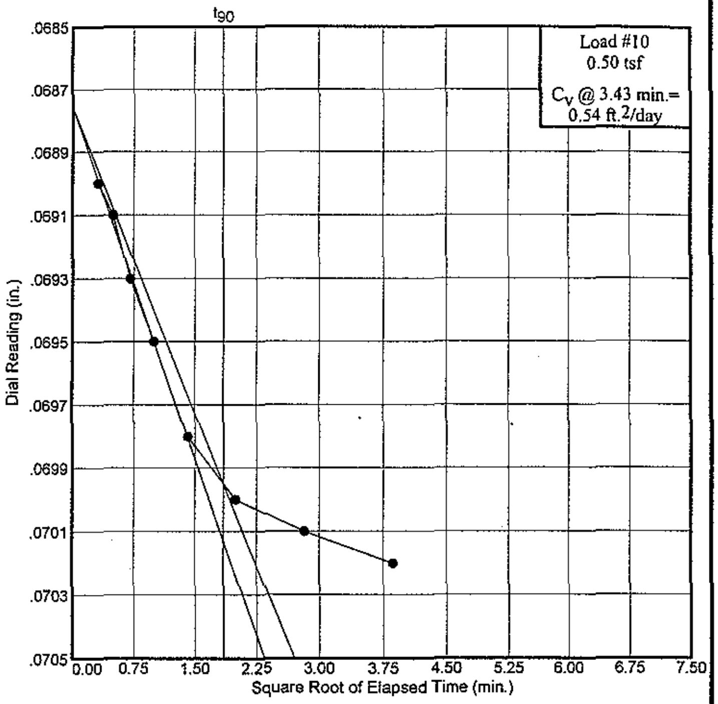
Plate 16'- 18'

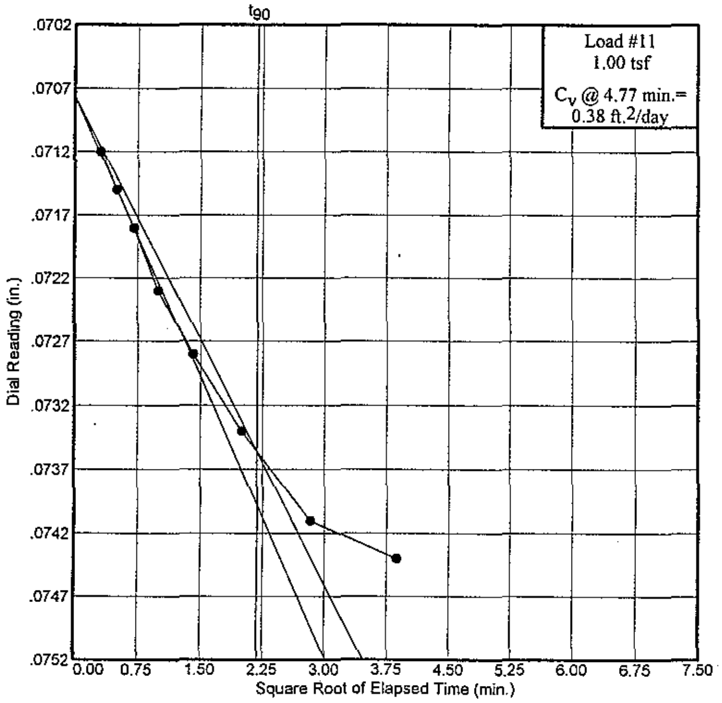
Dial Reading vs. Time

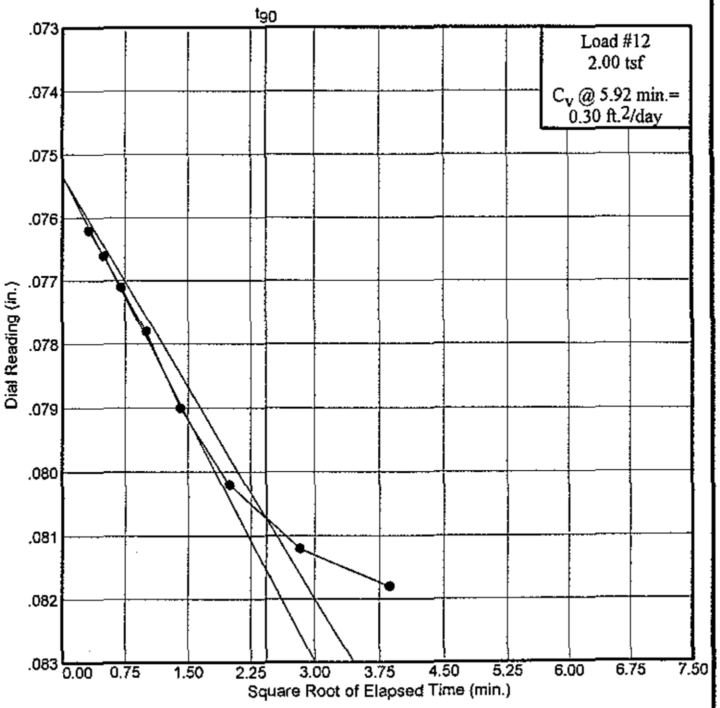
Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo, Puerto Rico









Dial Reading vs. Time

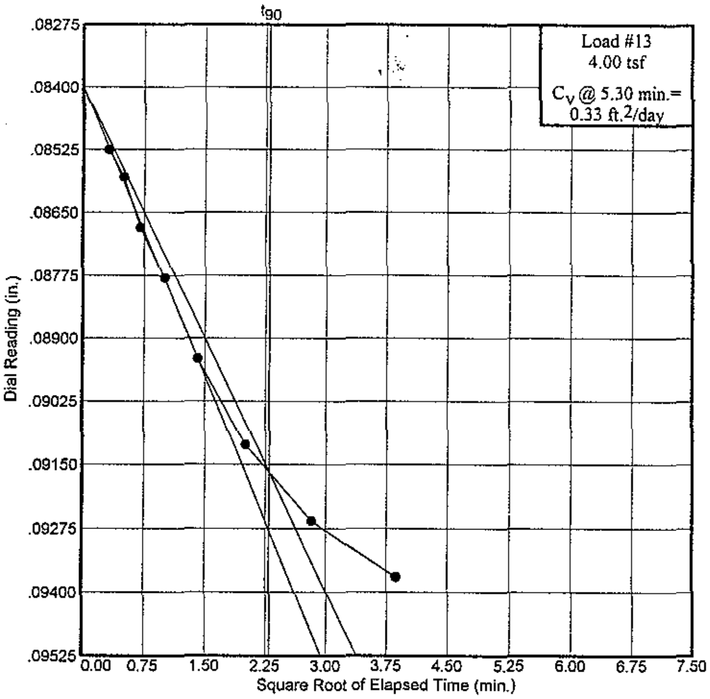
GEOCONSULT

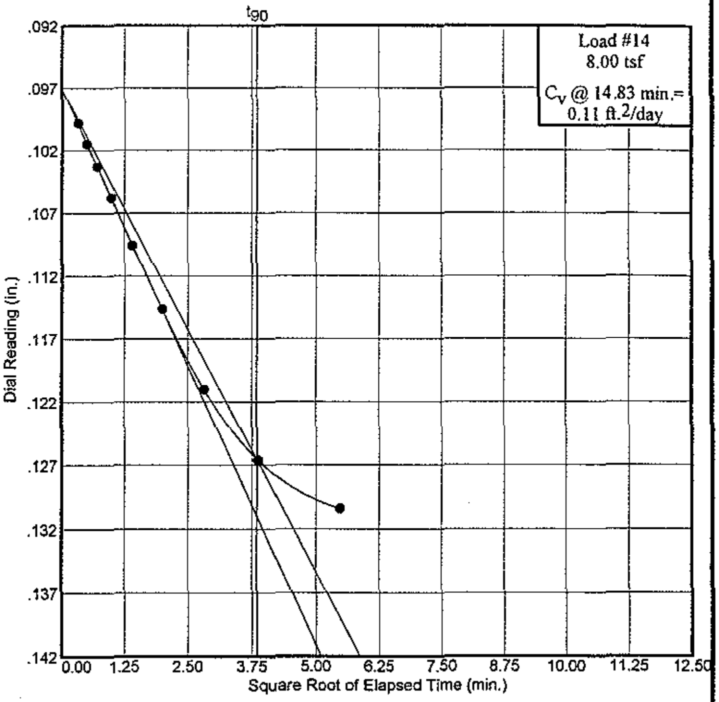
Plate 16'- 18'

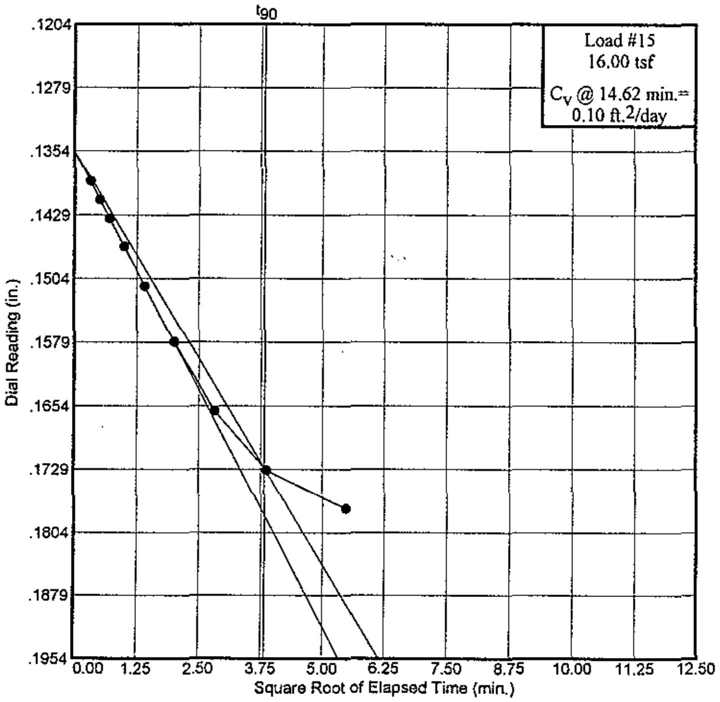
Dial Reading vs. Time

Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo, Puerto Rico





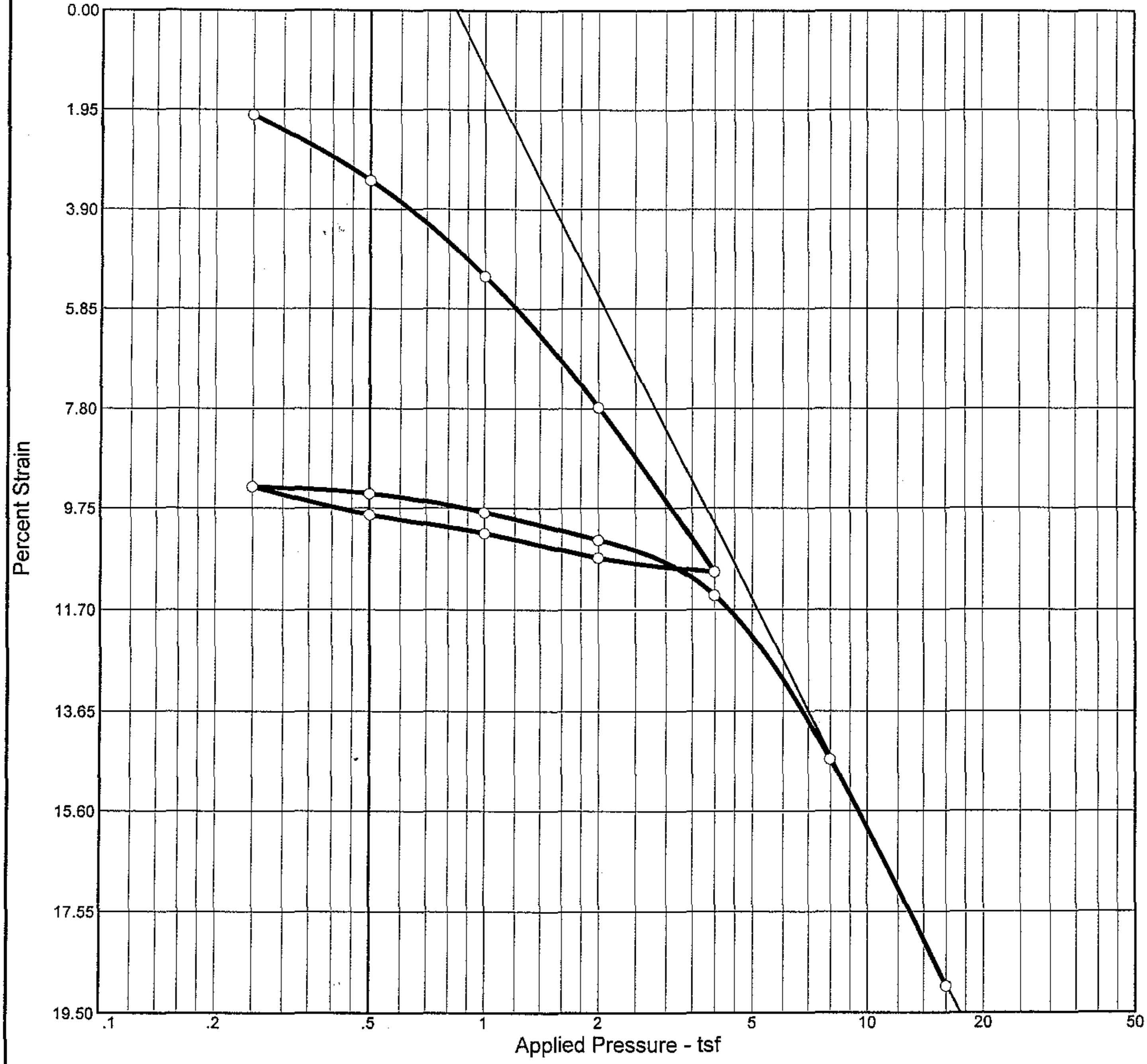


Dial Reading vs. Time

GEOCONSULT

Plate 16'- 18'

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (tsf)	P_c (tsf)	C_c	C_r	Swell Press. (tsf)	Heave %	e_o
Sat.	Moist.											
77.8 %	37.1 %	73.7	47	29	2.7	1.04	1.74	0.34	0.04			1.287

MATERIAL DESCRIPTION	USCS	AASHTO
(MH) Elastic silt, weak reaction, moist, stiff, high plasticity, dark gray		

Project No. 2182-99 **Client:**

Project: Recovery Solution

Location: Arecibo, Puerto Rico

CONSOLIDATION TEST REPORT

GEOCONSULT

Remarks:

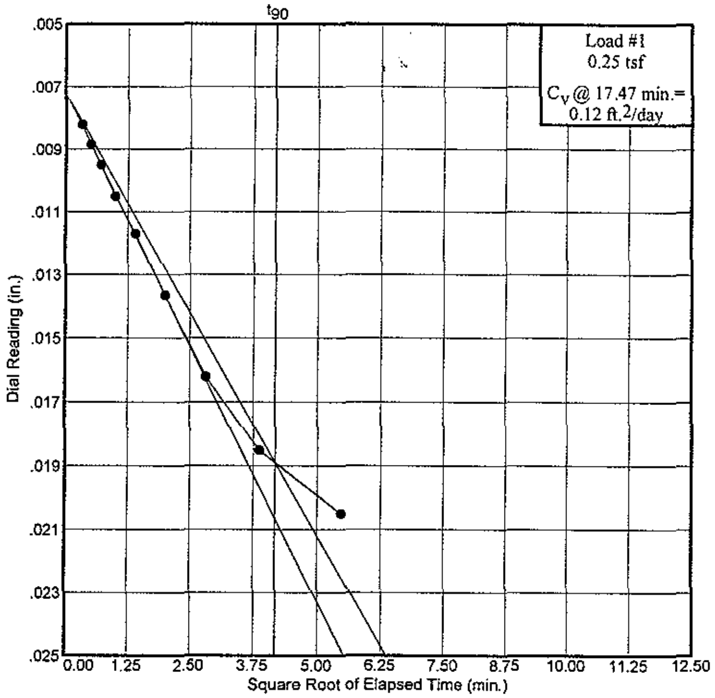
Tested by:JIT
RCS-2 Sample 3
Depth:23-25 feet
Specific Gravity Inferred

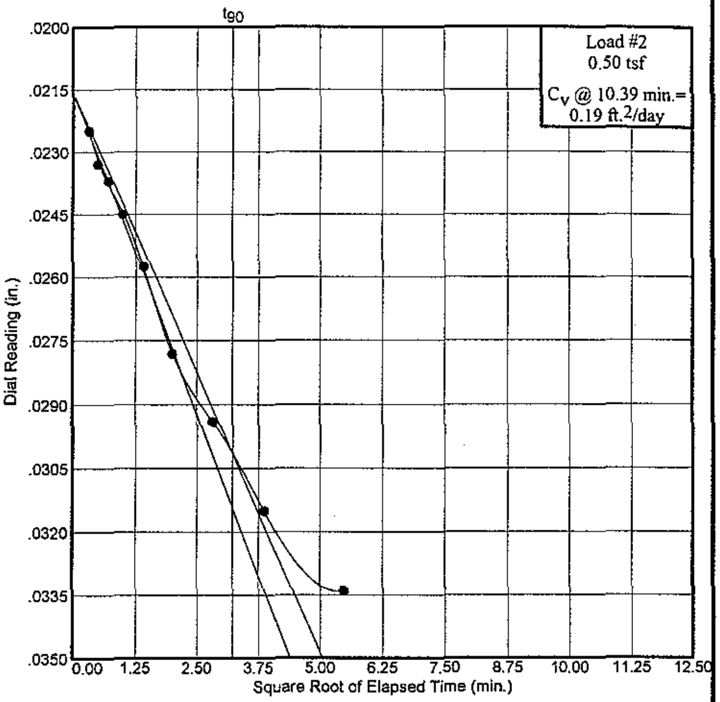
Plate 23'- 25'

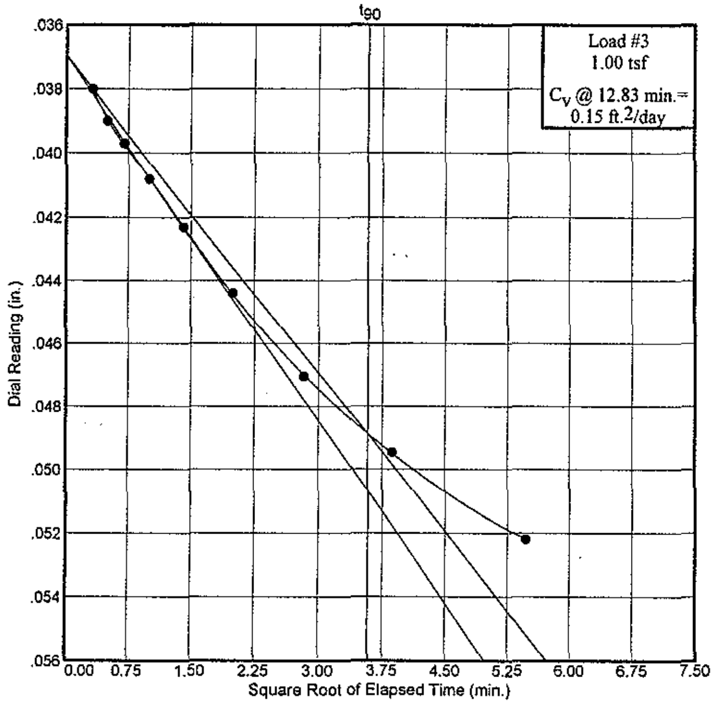
Dial Reading vs. Time

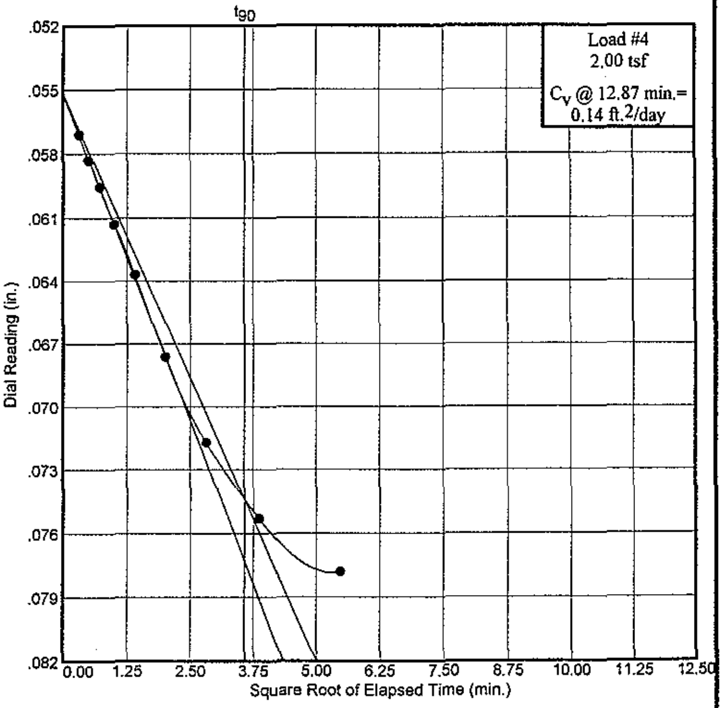
Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo, Puerto Rico









Dial Reading vs. Time

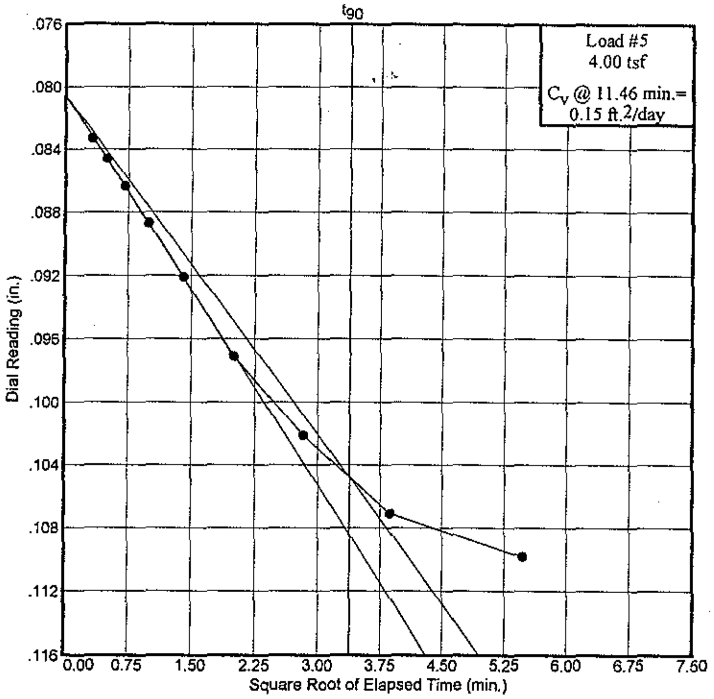
GEOCONSULT

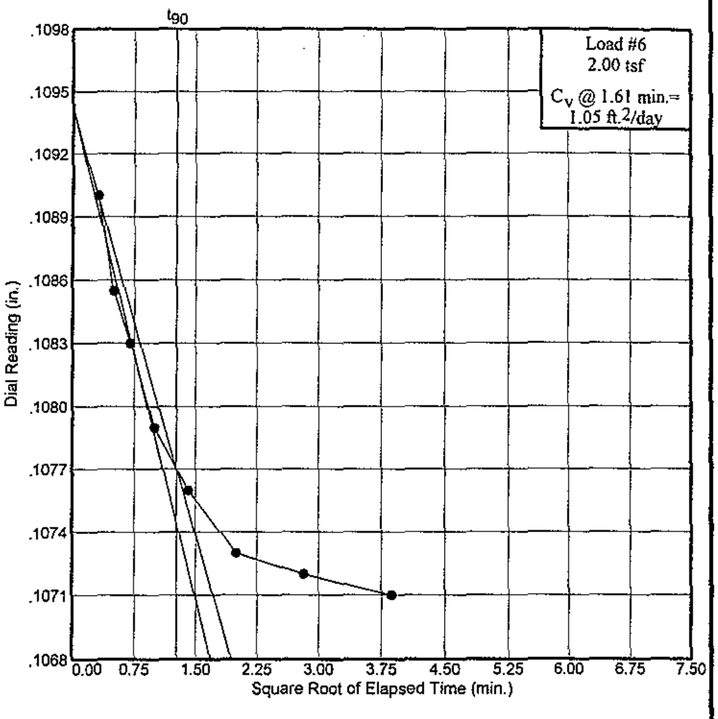
Plate 23'- 25'

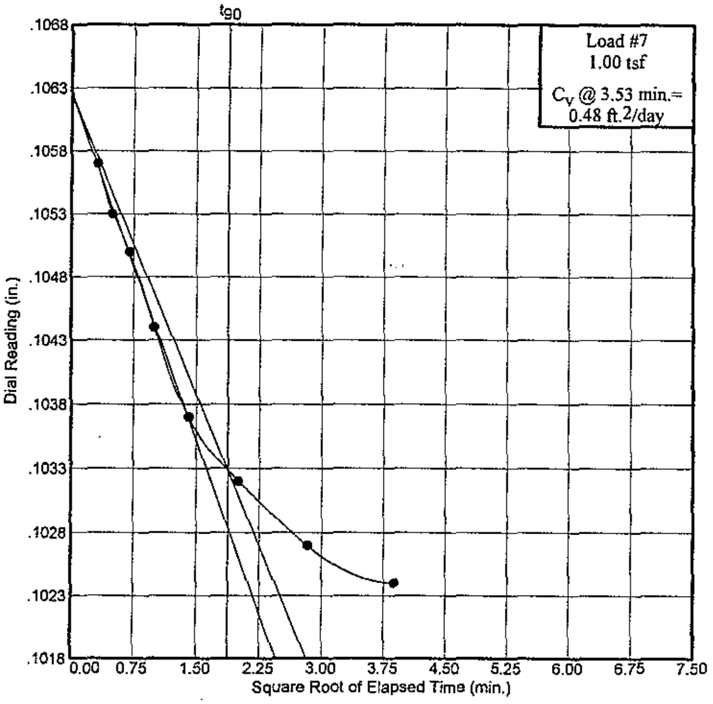
Dial Reading vs. Time

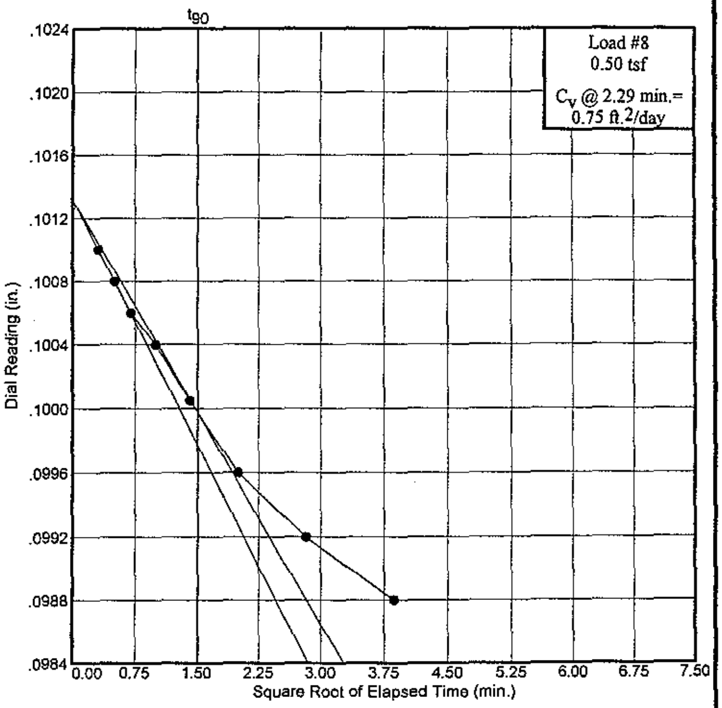
Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo, Puerto Rico









Dial Reading vs. Time

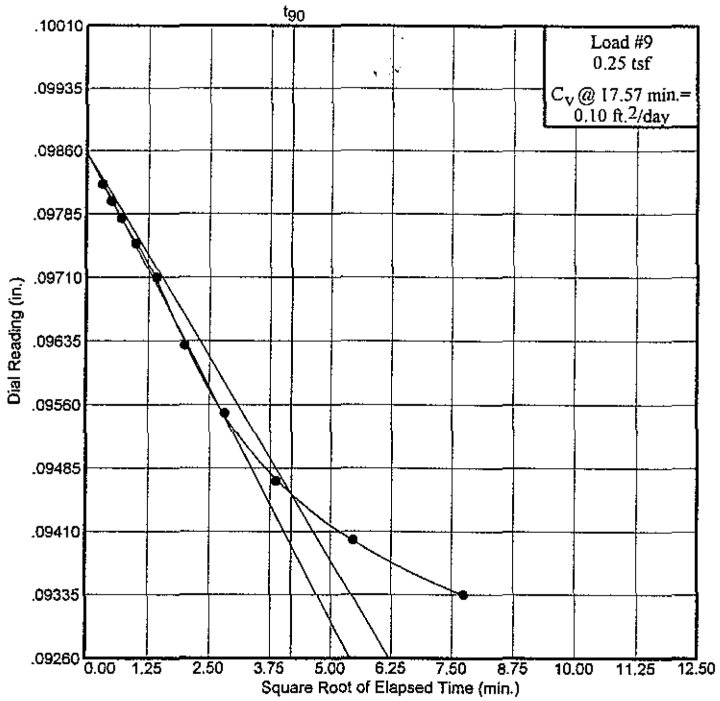
GEOCONSULT

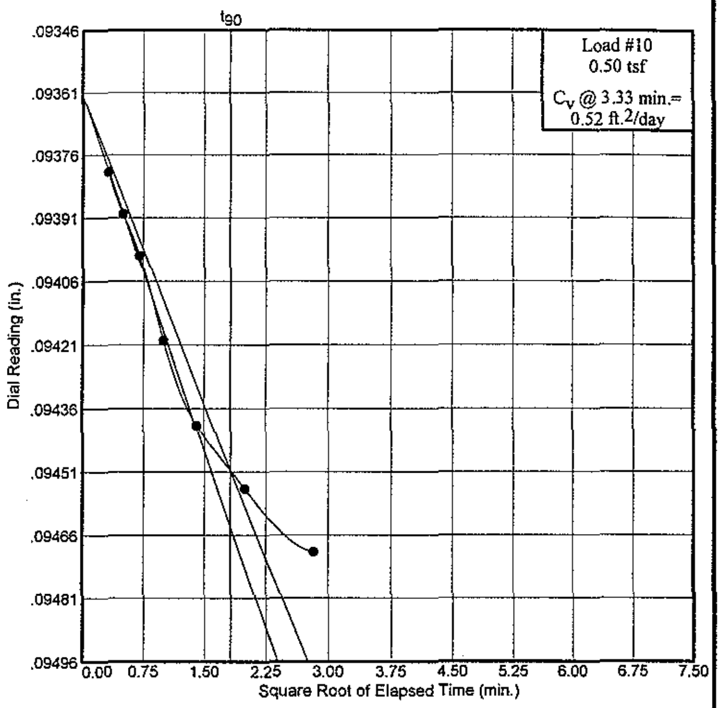
Plate 23'- 25'

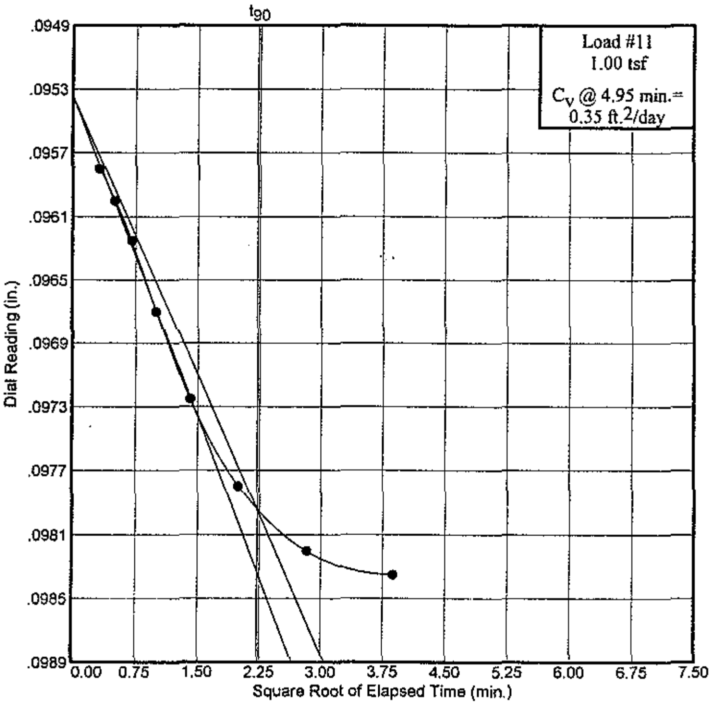
Dial Reading vs. Time

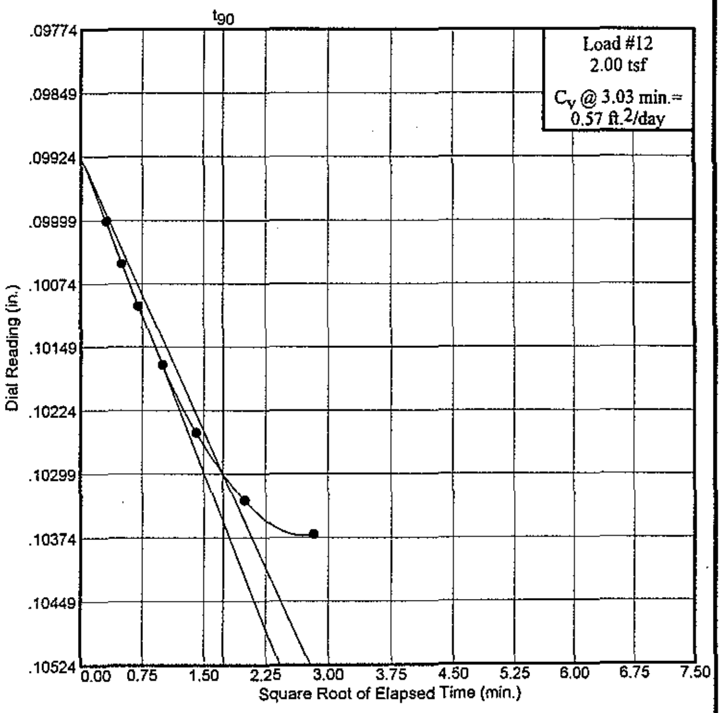
Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo, Puerto Rico









Dial Reading vs. Time

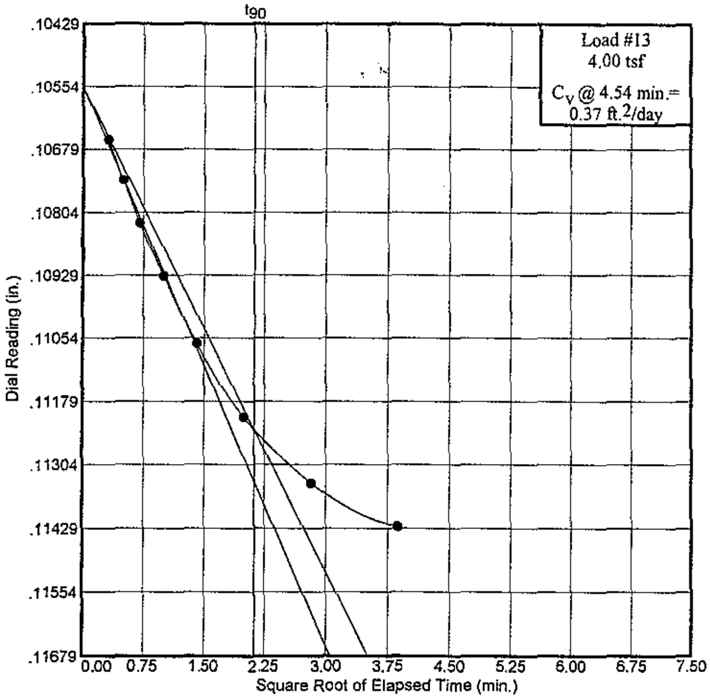
GEOCONSULT

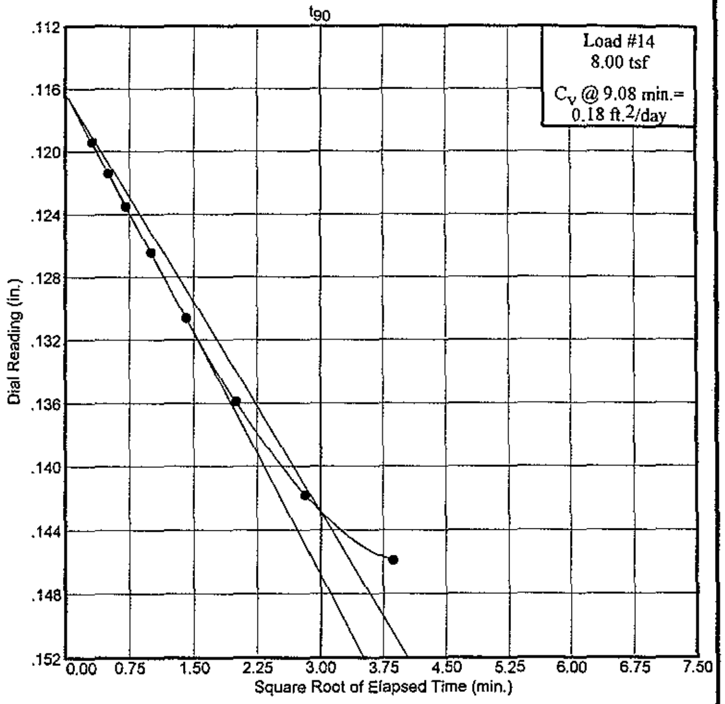
Plate 23'- 25'

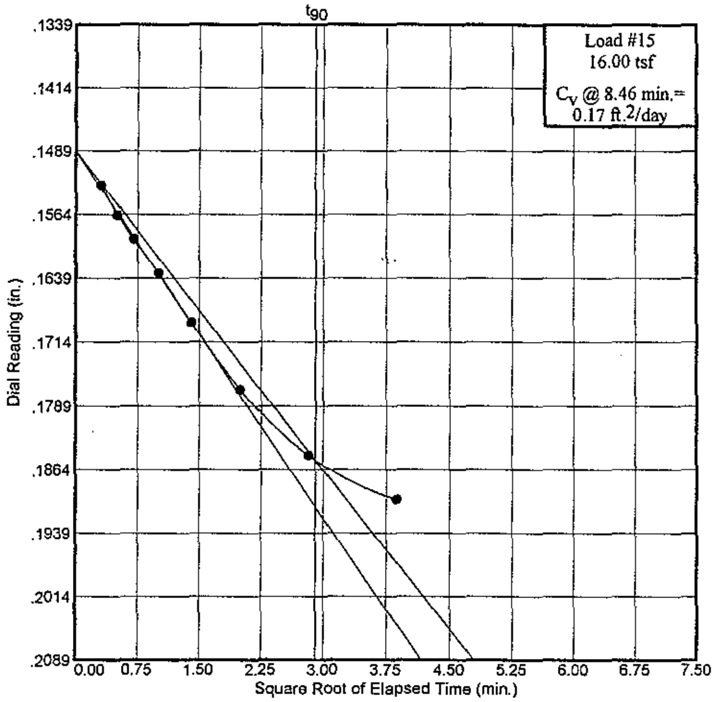
Dial Reading vs. Time

Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo, Puerto Rico





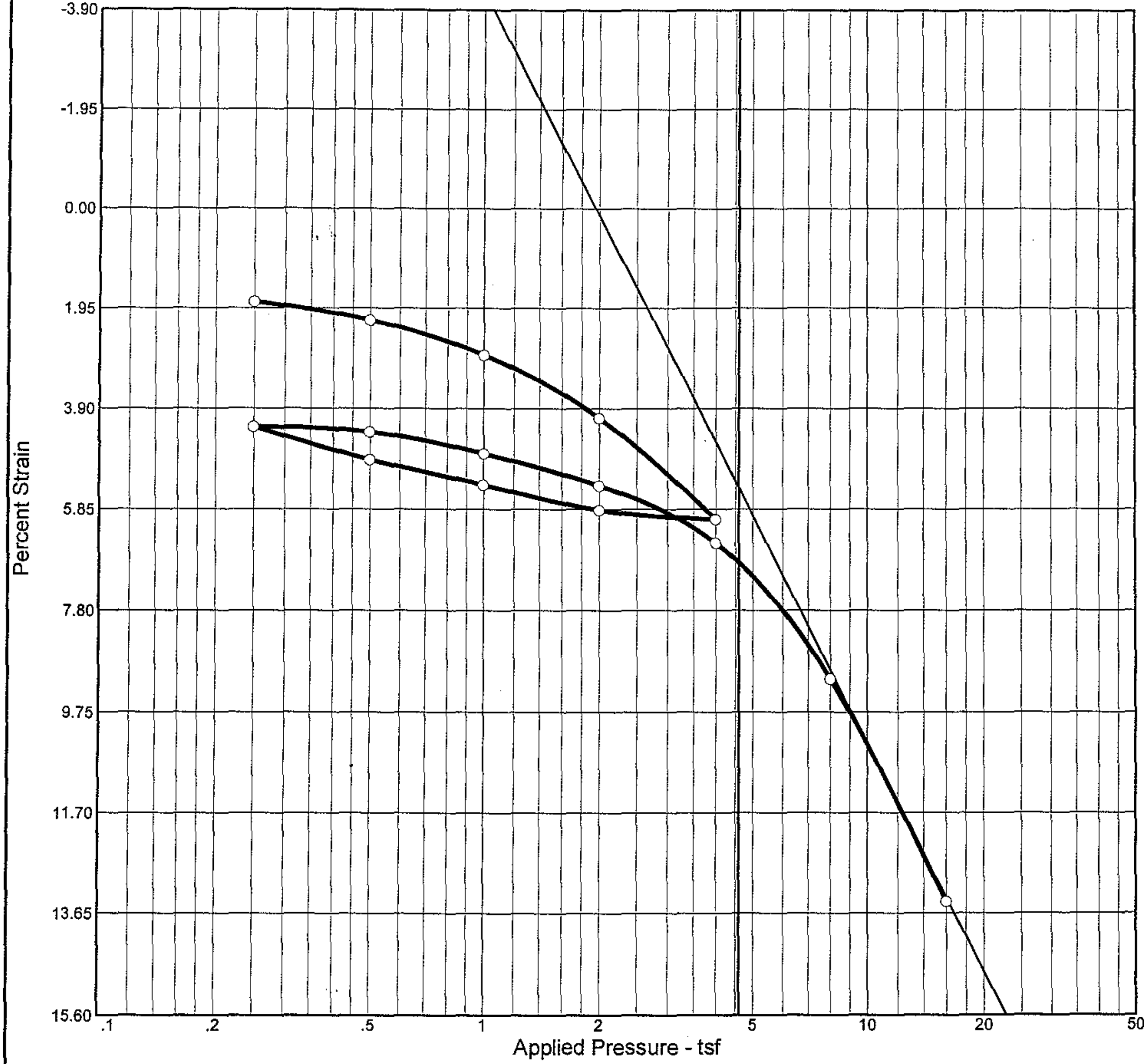


Dial Reading vs. Time

GEOCONSULT

Plate 23'- 25'

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (tsf)	P_c (tsf)	C_c	C_r	Swell Press. (tsf)	Heave %	e_o
Sat.	Moist.											
100.0 %	40.1 %	86.9	42	11	2.7	0.61	5.95	0.28	0.03			0.940

MATERIAL DESCRIPTION	USCS	AASHTO
(MH) Elastic silt, no reaction with HCl, moist, stiff, high plasticity, dark gray		

Project No. 2182-99 **Client:**

Project: Recovery Solution

Location: Arecibo, Puerto Rico

CONSOLIDATION TEST REPORT

GEOCONSULT

Remarks:

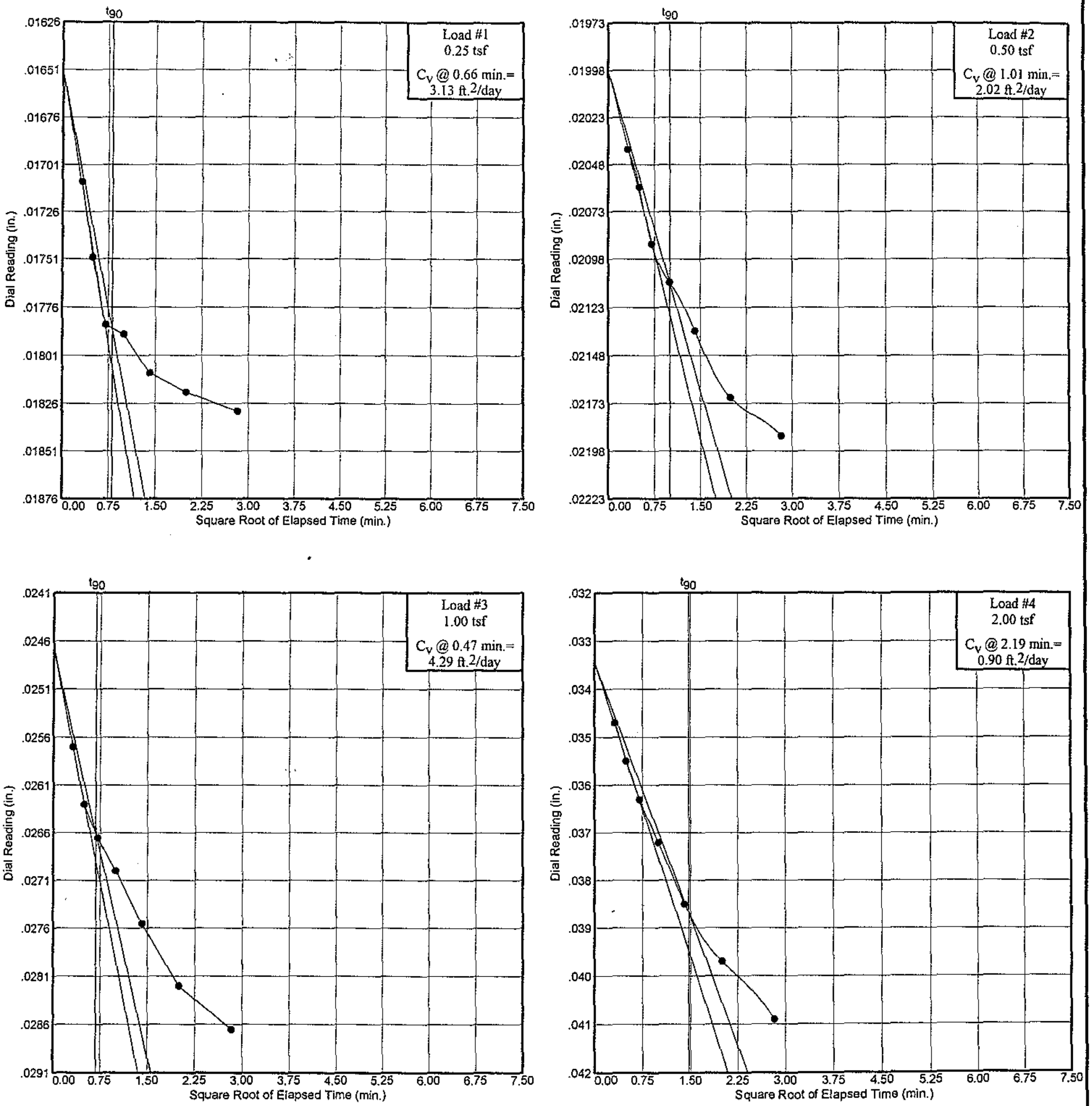
Tested by GMC
RCS-6 Sample 1
Depth:10-12 feet
Specific Gravity Inferred

Plate 10' - 12'

Dial Reading vs. Time

Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo, Puerto Rico



Dial Reading vs. Time

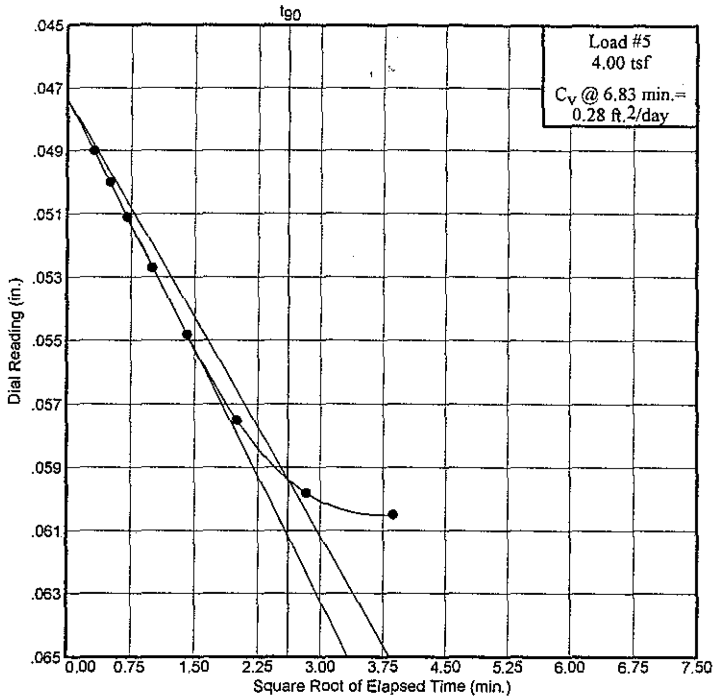
GEOCONSULT

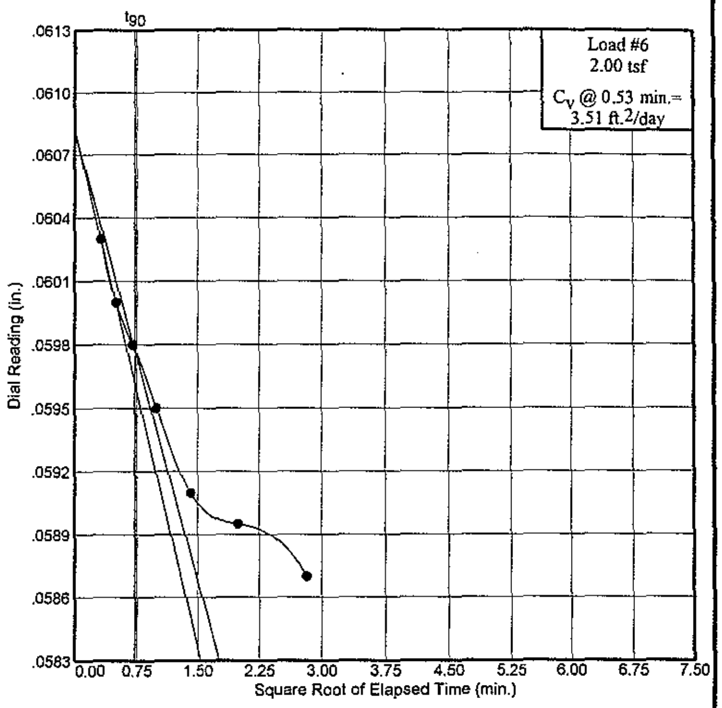
Plate 10' - 12'

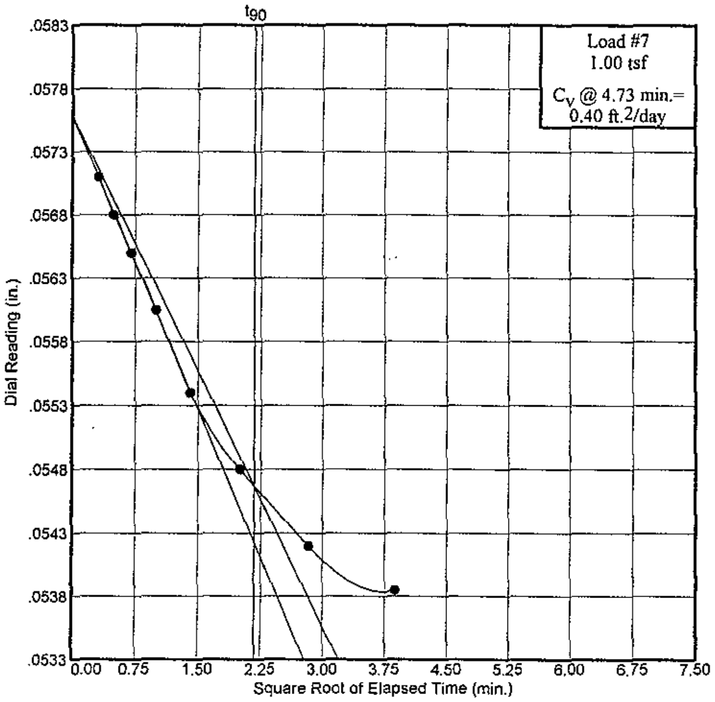
Dial Reading vs. Time

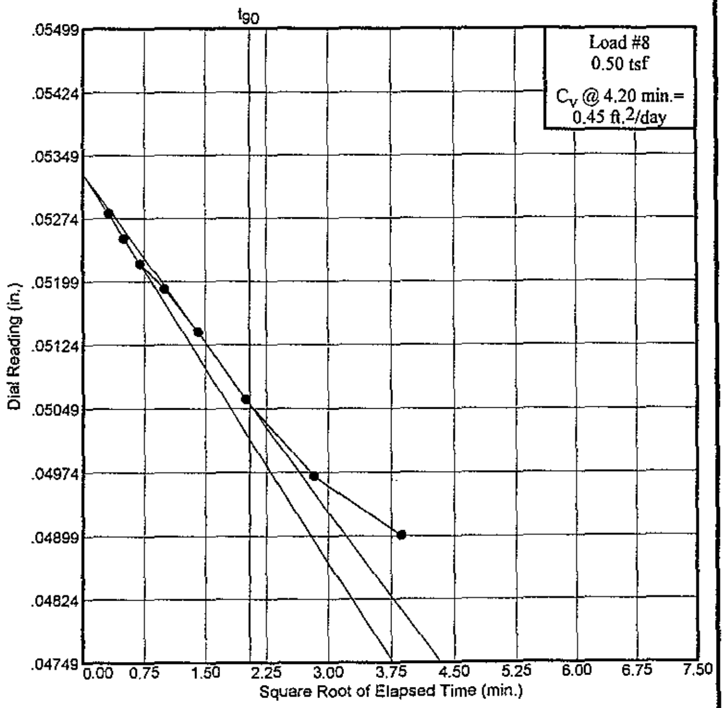
Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo, Puerto Rico









Dial Reading vs. Time

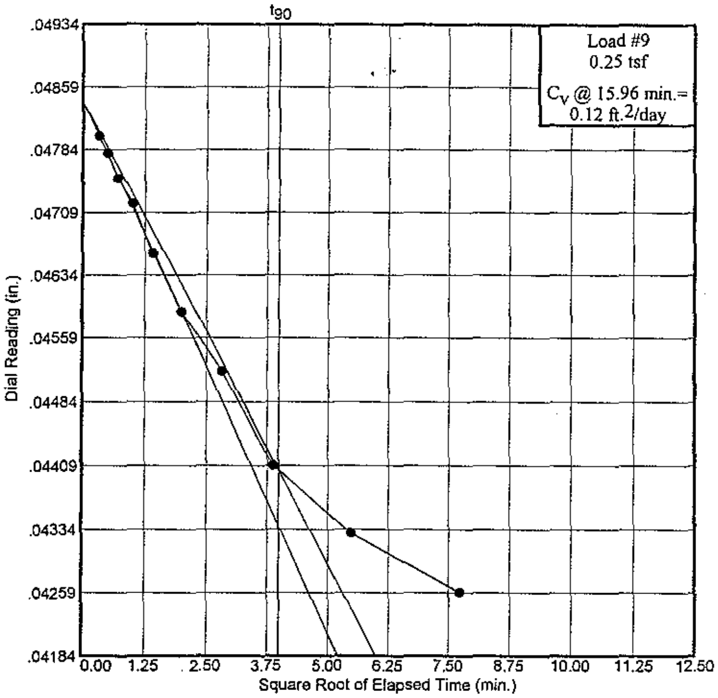
GEOCONSULT

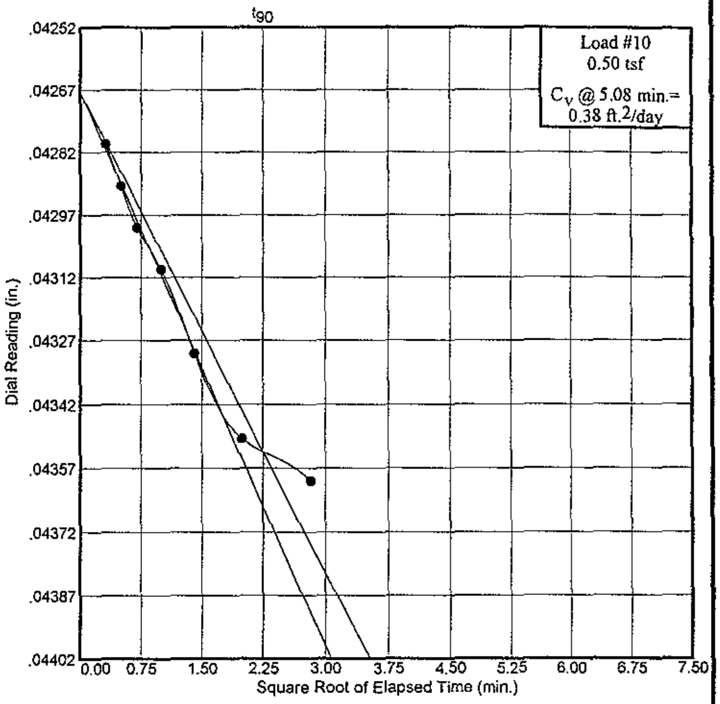
Plate 10' - 12'

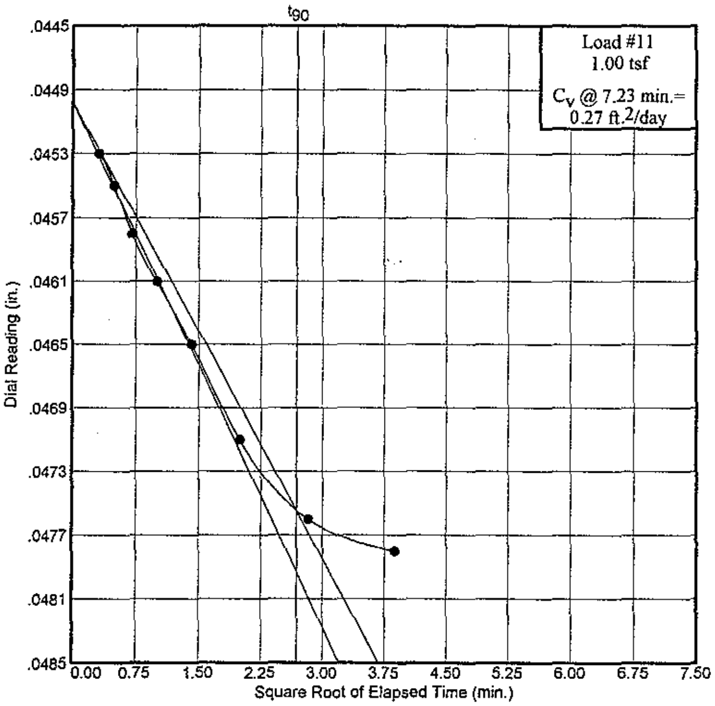
Dial Reading vs. Time

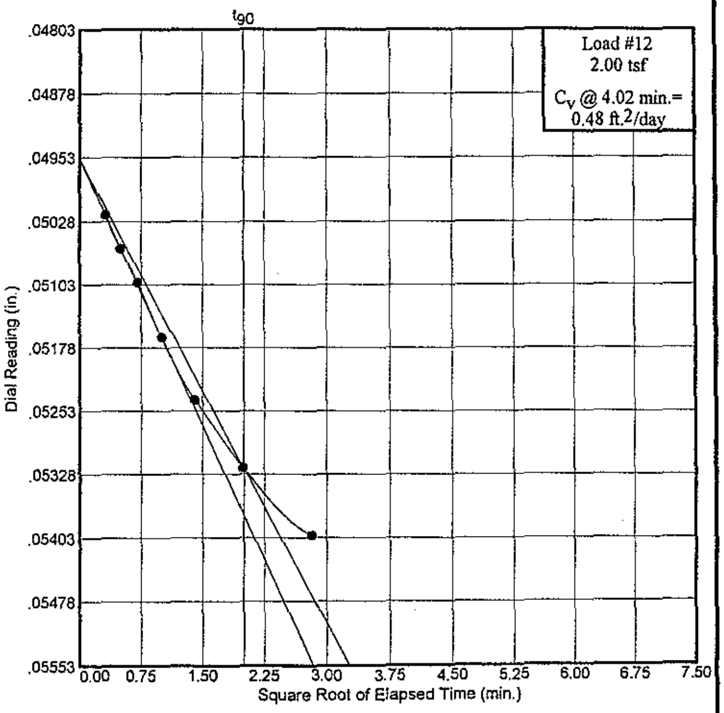
Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo, Puerto Rico









Dial Reading vs. Time

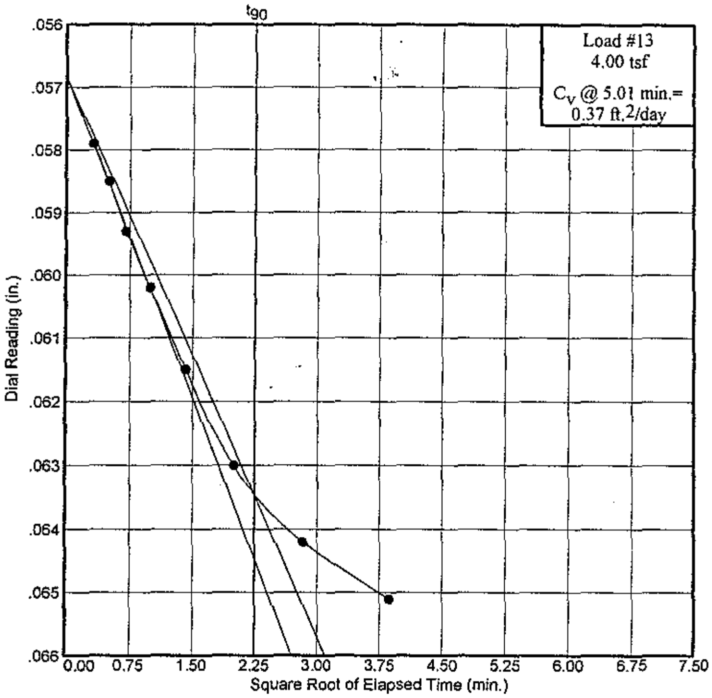
GEOCONSULT

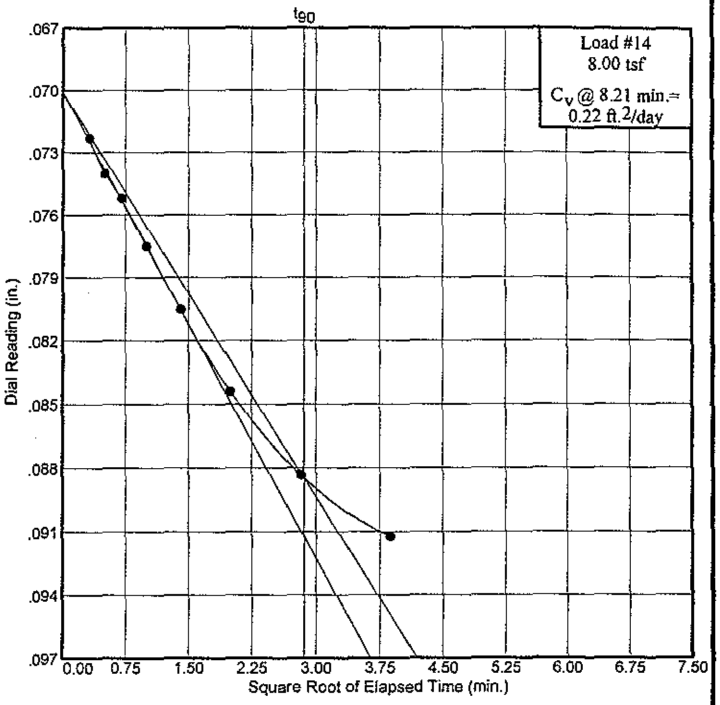
Plate 10' - 12

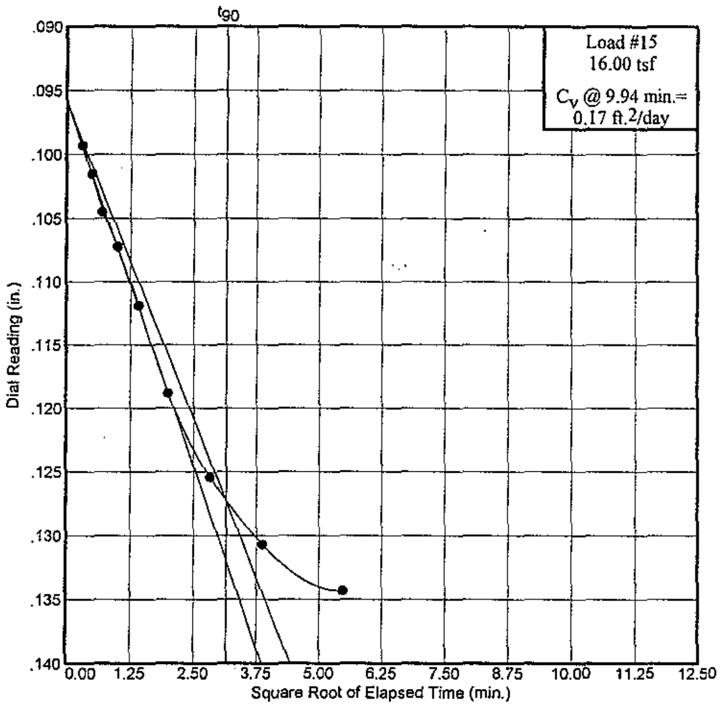
Dial Reading vs. Time

Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo, Puerto Rico





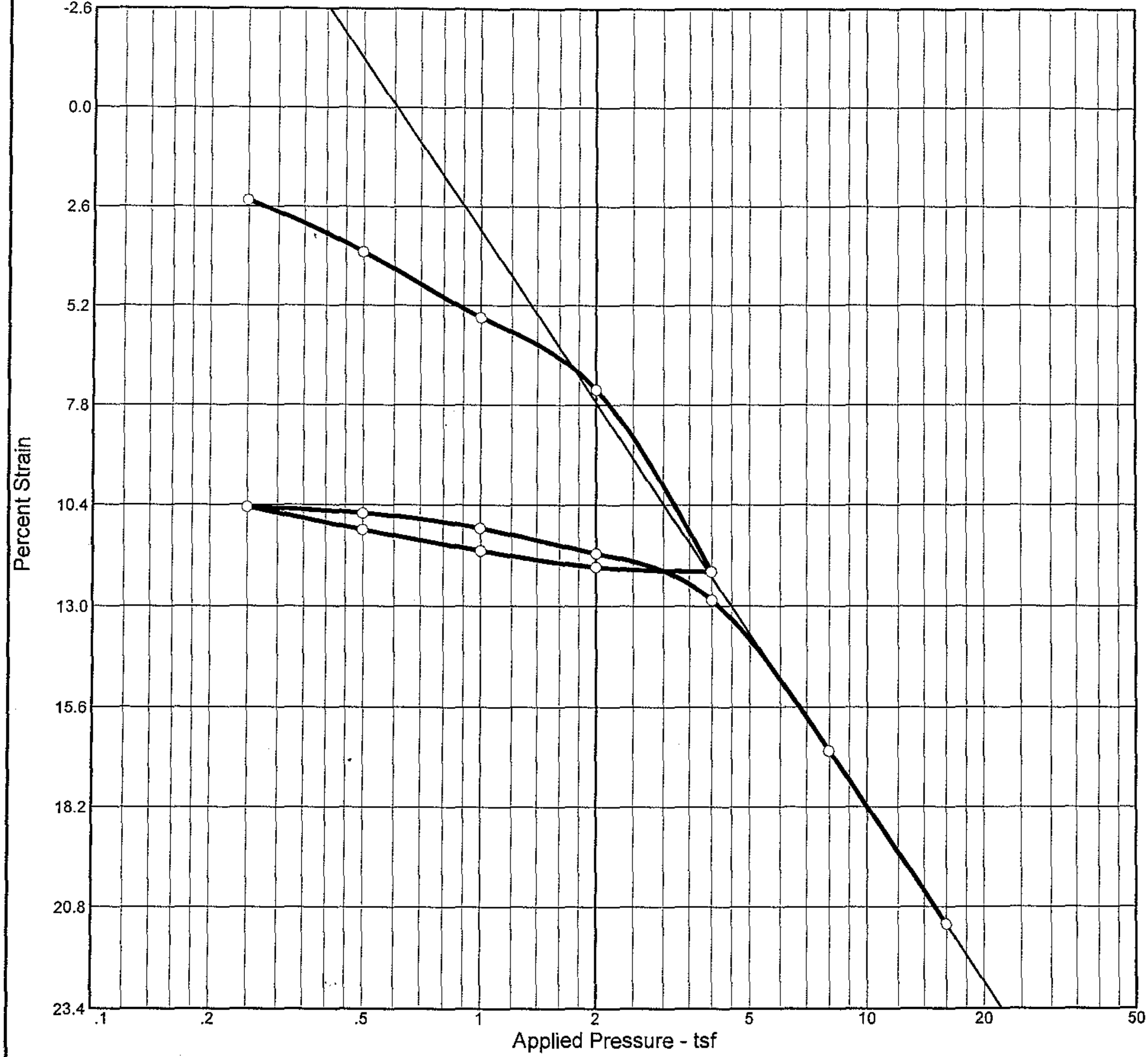


Dial Reading vs. Time

GEOCONSULT

Plate 10' - 12'

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (tsf)	P_c (tsf)	C_c	C_r	Swell Press. (tsf)	Heave %	e_o
Sat.	Moist.											
68.3 %	36.5 %	69.1	42	24	2.7	0.91	1.85	0.37	0.04			1.441

MATERIAL DESCRIPTION	USCS	AASHTO
(CL) Lean clay, none reaction with HCl, dry, hard, medium plasticity, dark brown mottled, yellowish brown		

Project No. 2182-99 **Client:**

Project: Recovery Solution

Location: Arecibo, Puerto Rico

CONSOLIDATION TEST REPORT

GEOCONSULT

Remarks:

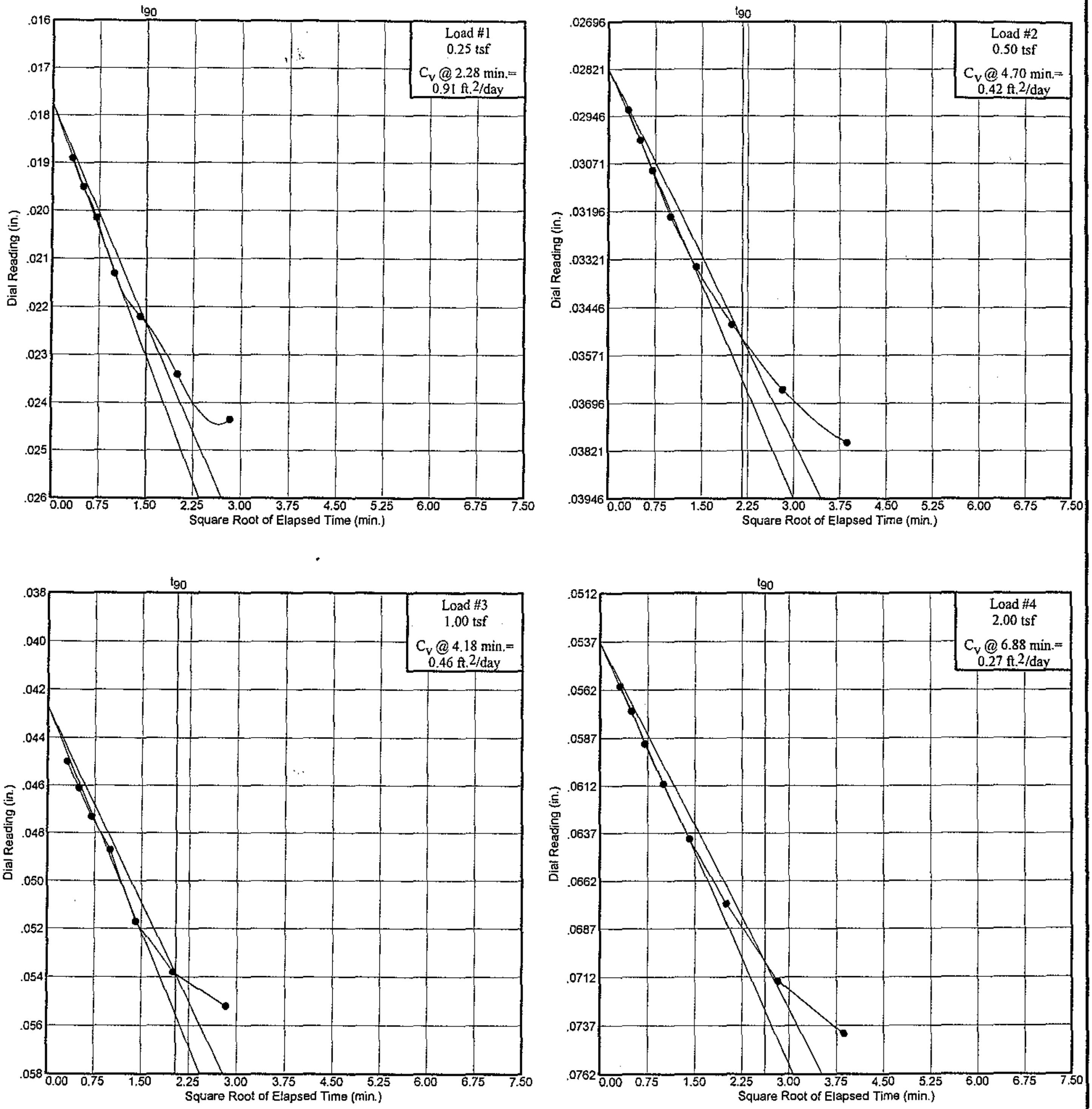
Tested by GMC
RCS-6 Sample 2
Depth:20-22 feet
Specific Gravity Inferred

Plate 20' - 22'

Dial Reading vs. Time

Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo, Puerto Rico



Dial Reading vs. Time

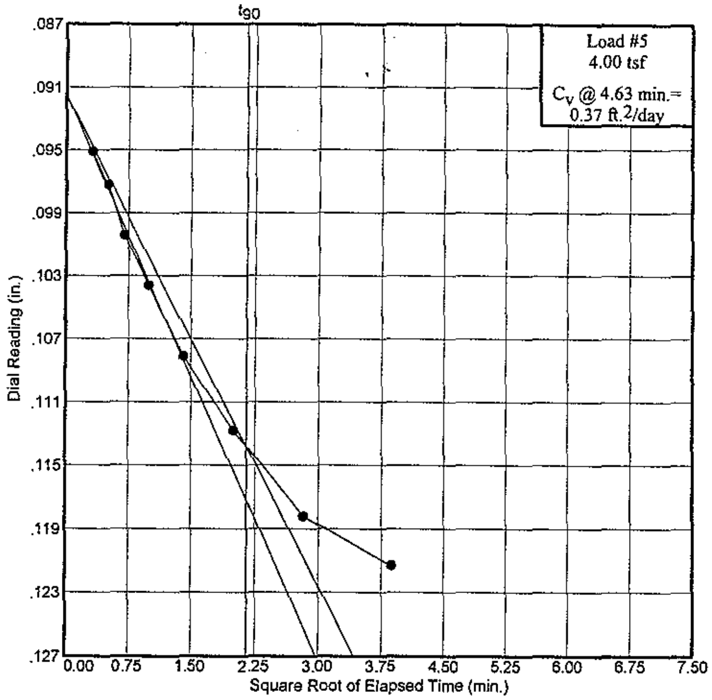
GEOCONSULT

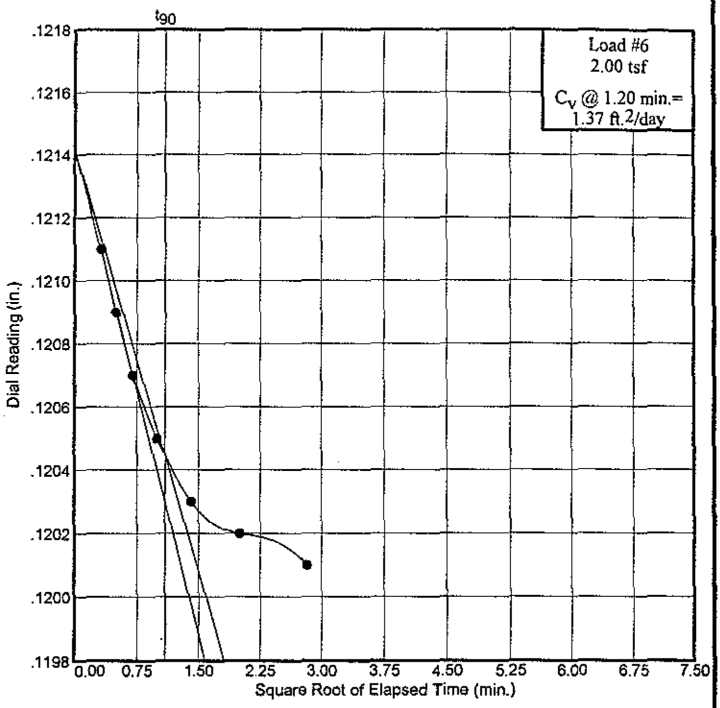
Plate 20' - 22'

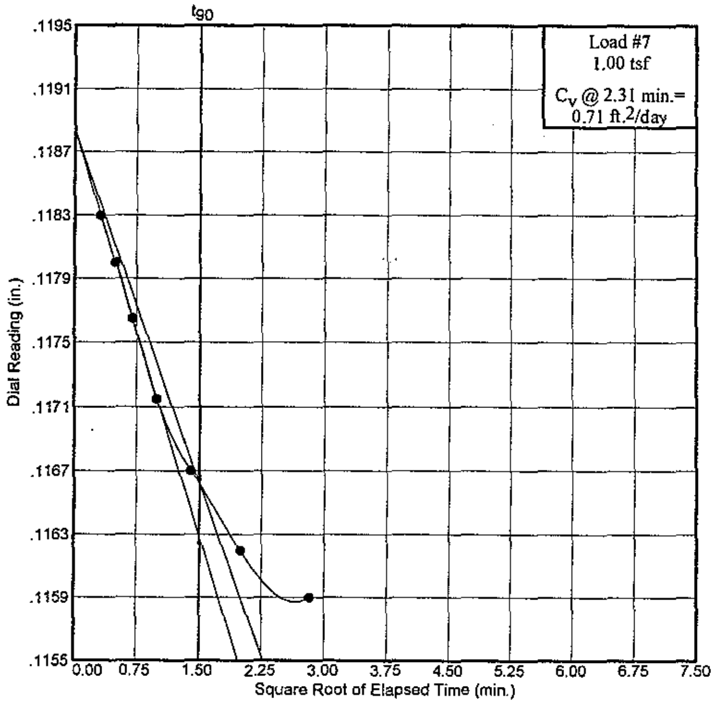
Dial Reading vs. Time

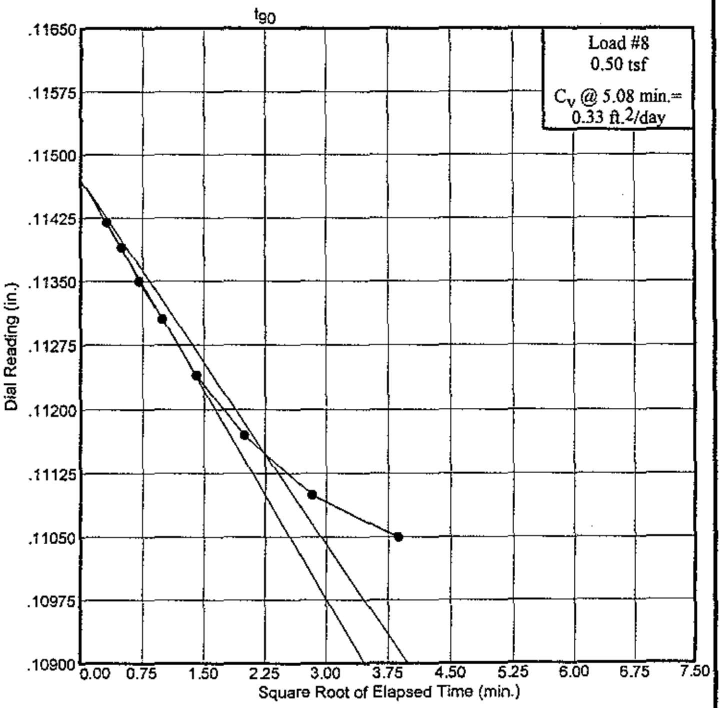
Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo, Puerto Rico









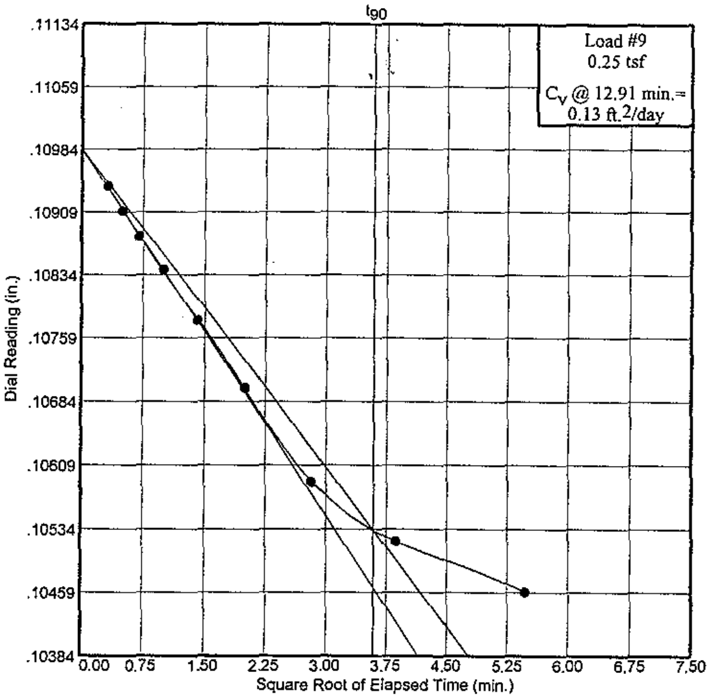
Dial Reading vs. Time

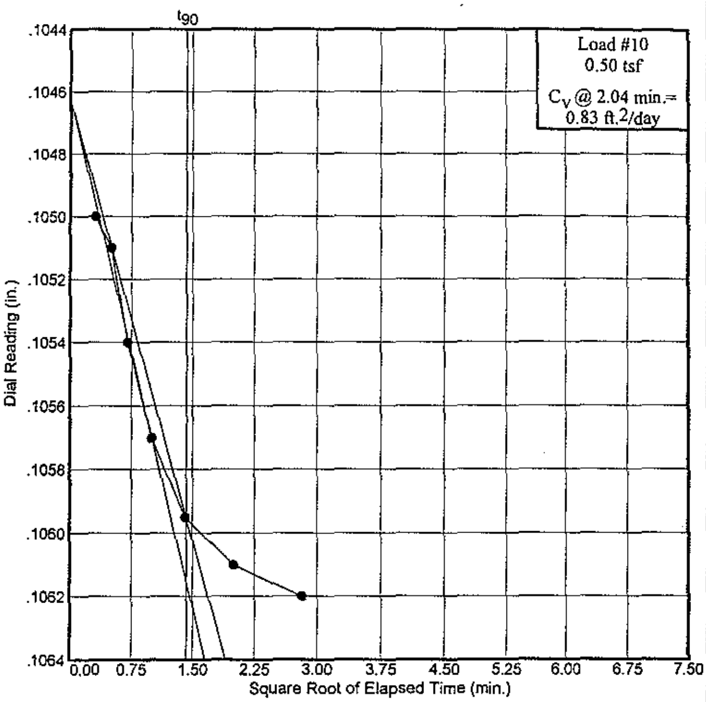
GEOCONSULT

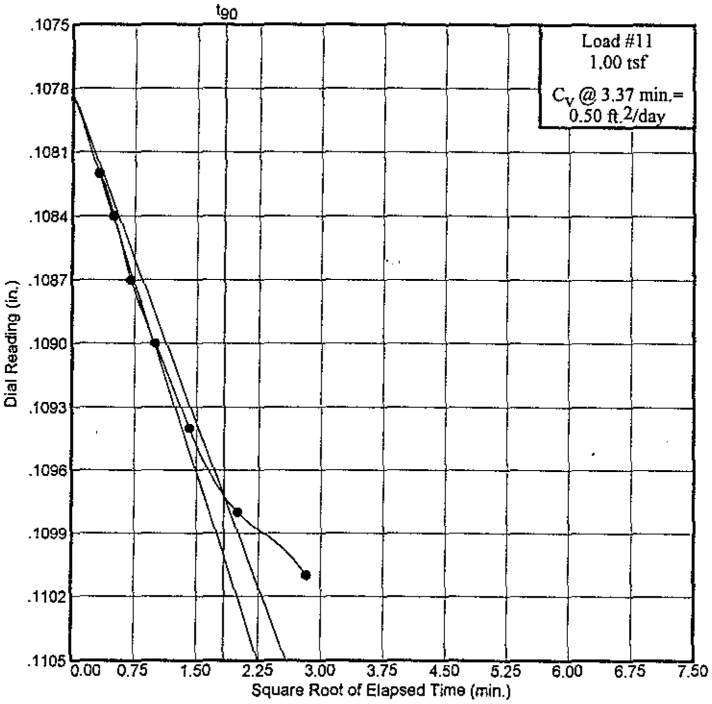
Dial Reading vs. Time

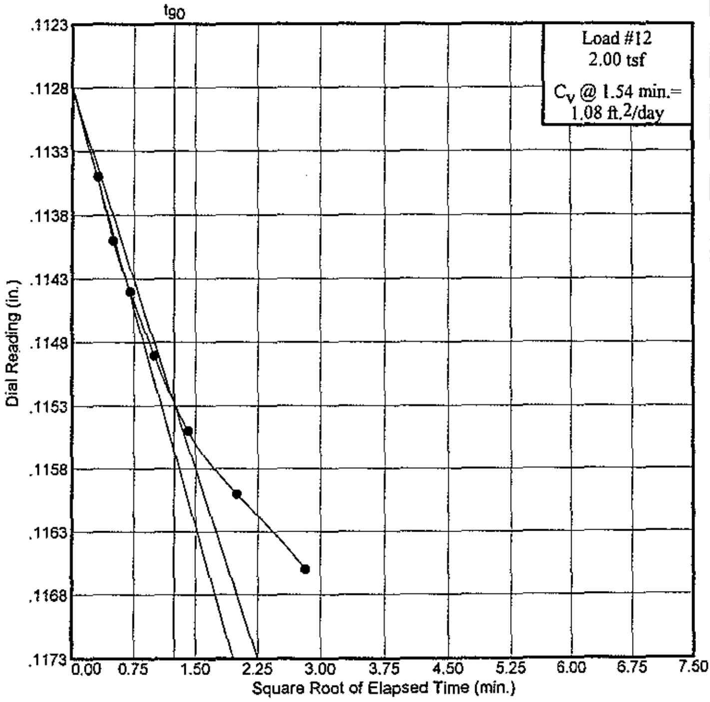
Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo, Puerto Rico









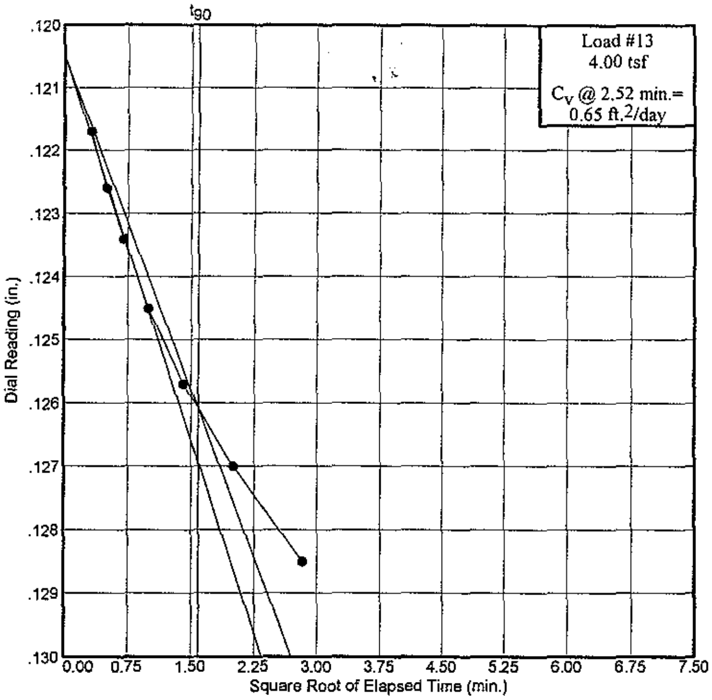
Dial Reading vs. Time

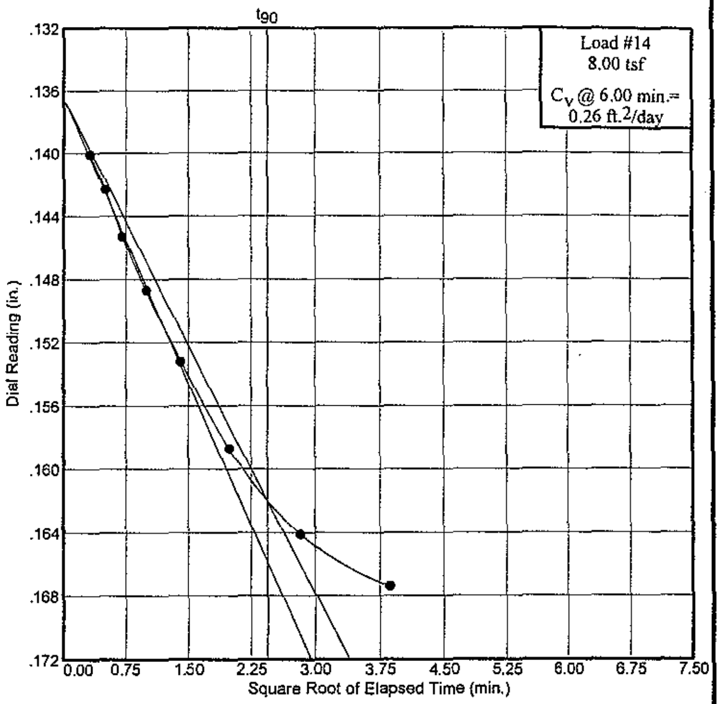
GEOCONSULT

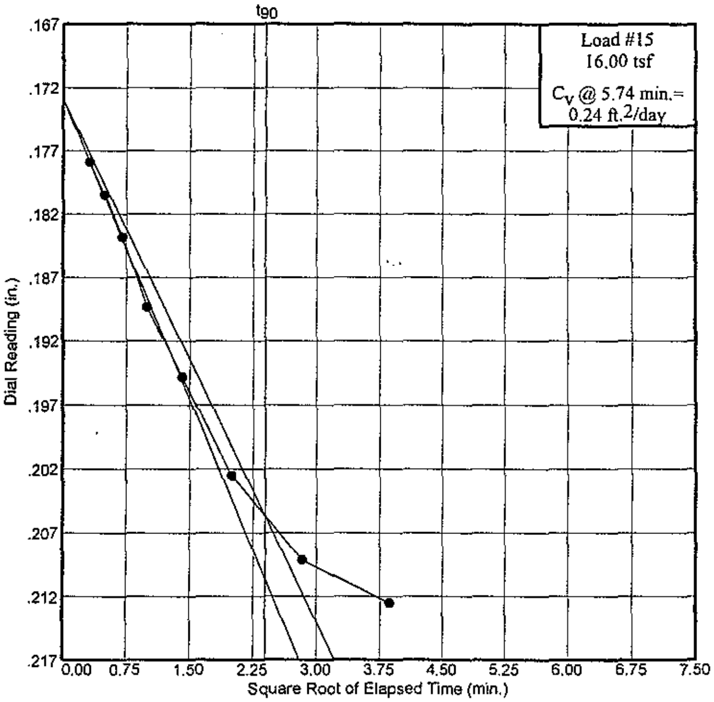
Dial Reading vs. Time

Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo, Puerto Rico



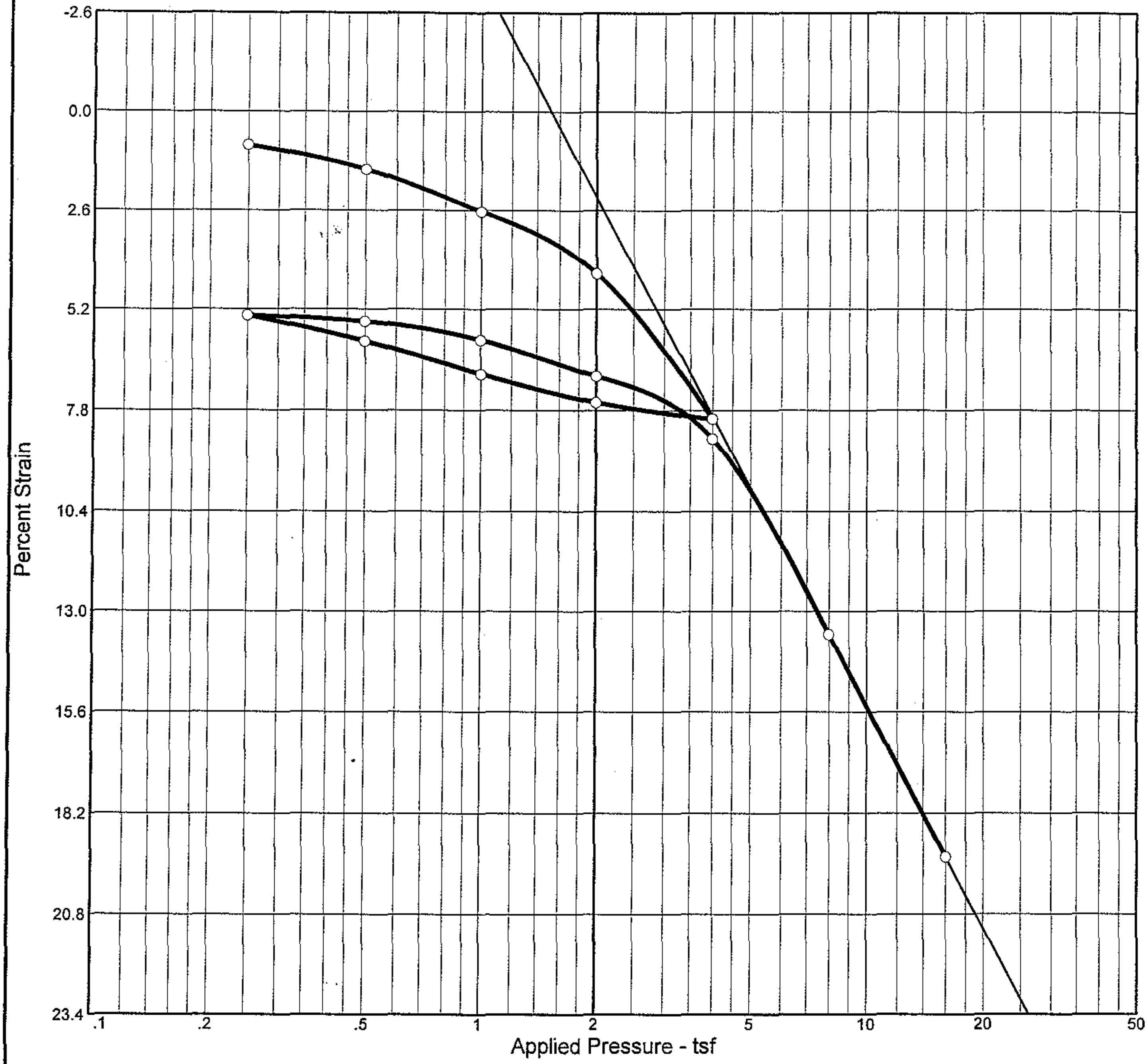




Dial Reading vs. Time

GEOCONSULT

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (tsf)	P_c (tsf)	C_c	C_r	Swell Press. (tsf)	Heave %	e_o
Sat.	Moist.											
100.0 %	49.6 %	86.1	58	16	2.7	1.00	2.74	0.37	0.05			0.957

MATERIAL DESCRIPTION	USCS	AASHTO
(CH)Fat clay, consistance texture, high plasticity, no reaction with HCl, firm, moist, light olive gray		

Project No. 2182-99 **Client:**

Project: Recovery Solution

Location: Arecibo, Puerto Rico

CONSOLIDATION TEST REPORT

GEOCONSULT

Remarks:

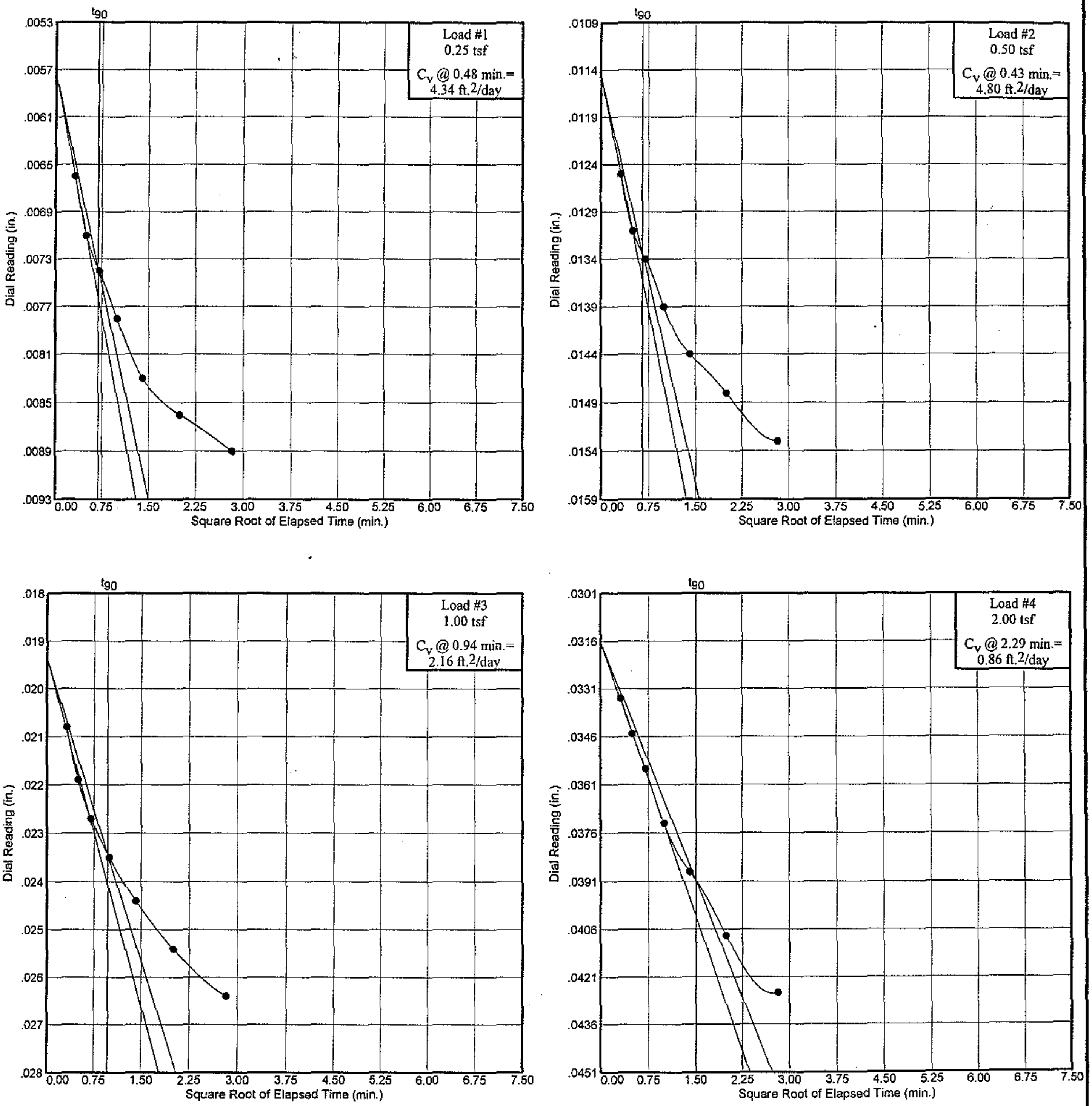
Tested by:GMC
RCS-11B Sample 1
Depth:30-32 feet
Specific Gravity Inferred

Plate 30' - 32'

Dial Reading vs. Time

Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo, Puerto Rico



Dial Reading vs. Time

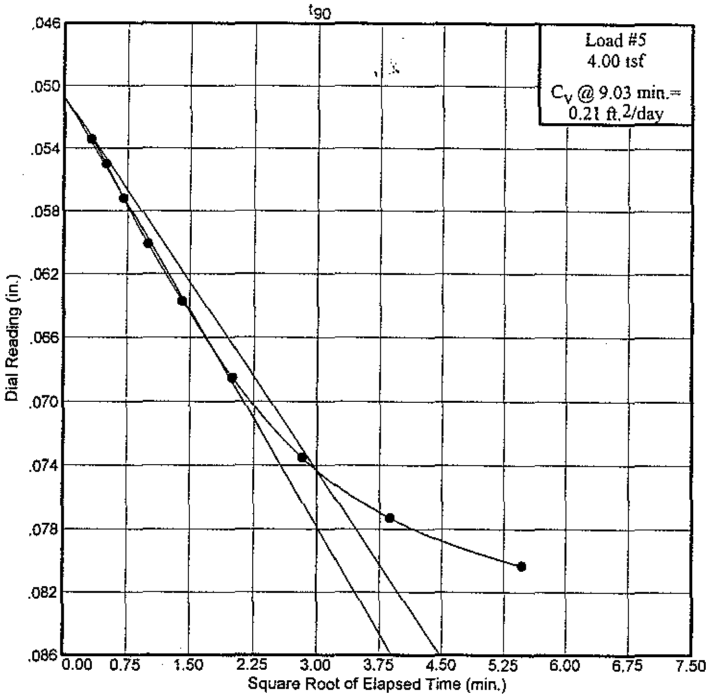
GEOCONSULT

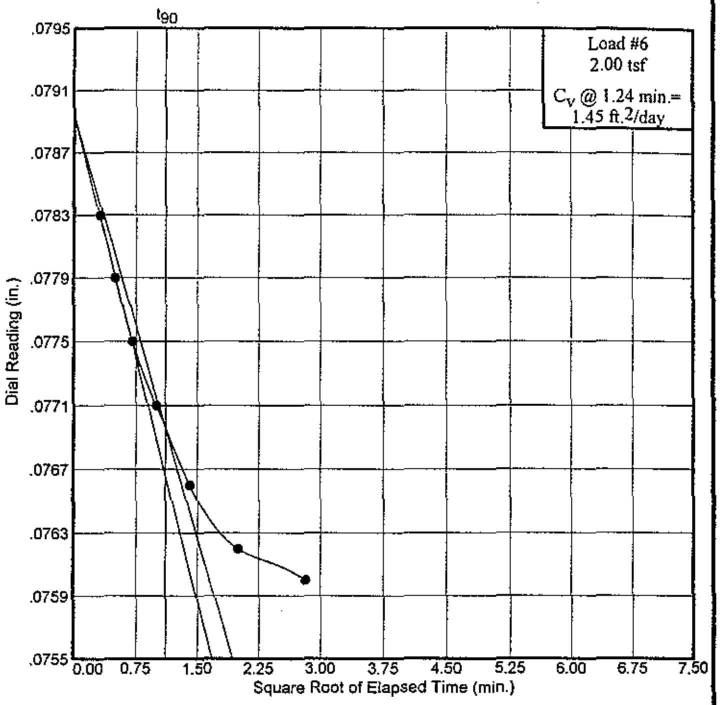
Plate 30' - 32'

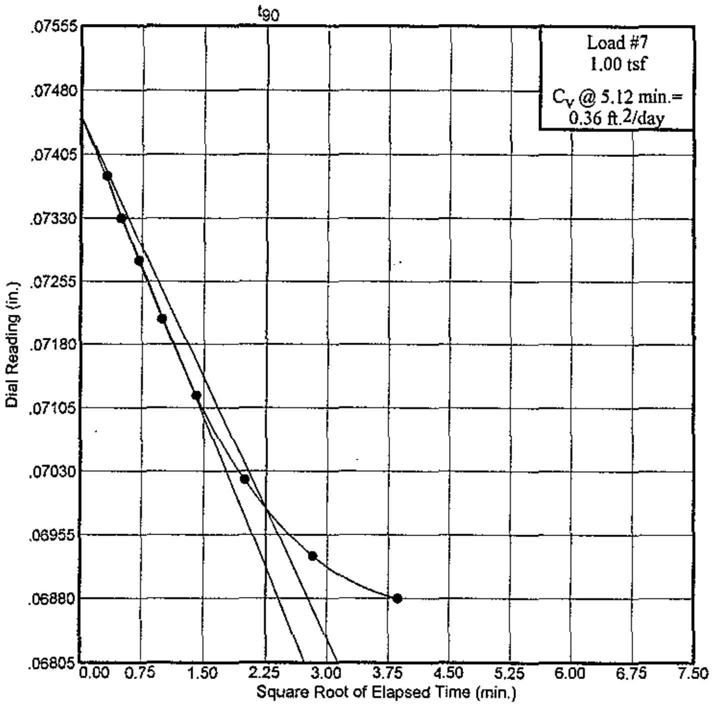
Dial Reading vs. Time

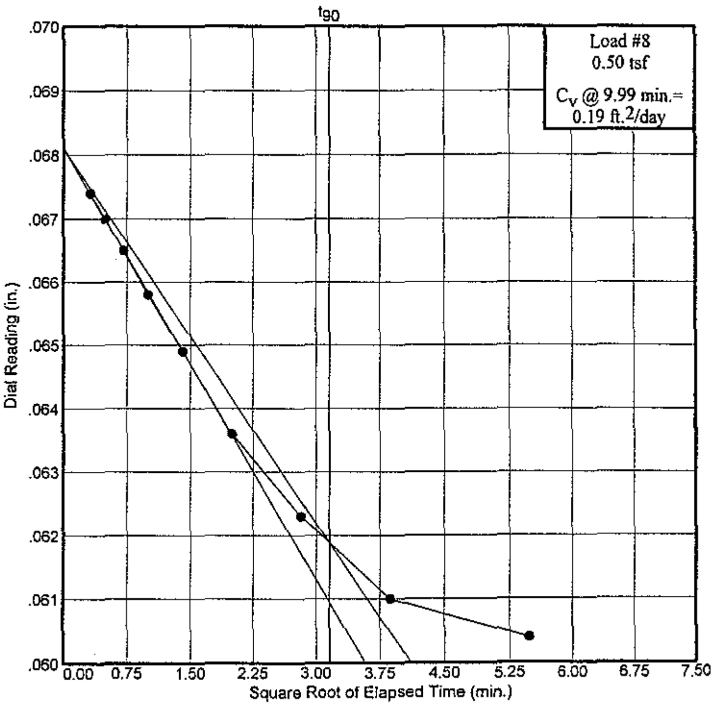
Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo, Puerto Rico









Dial Reading vs. Time

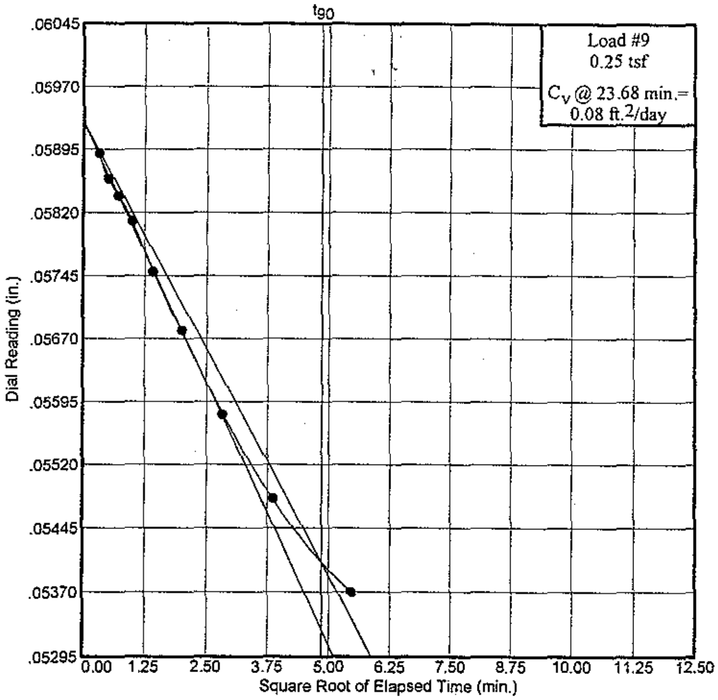
GEOCONSULT

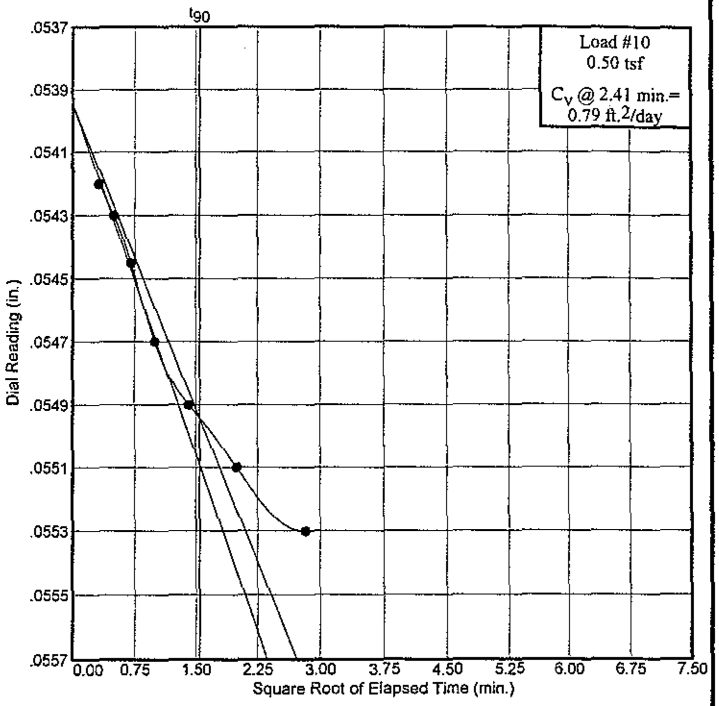
Plate 30' - 32'

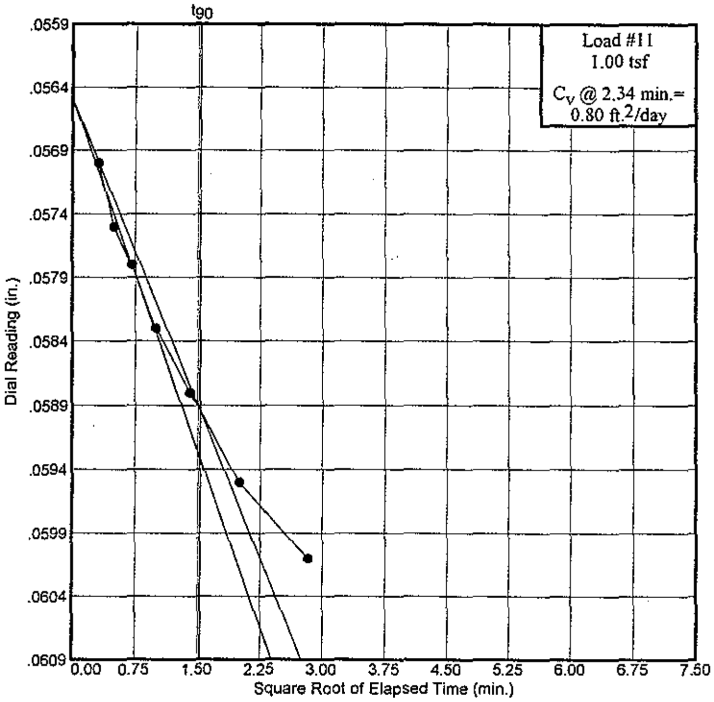
Dial Reading vs. Time

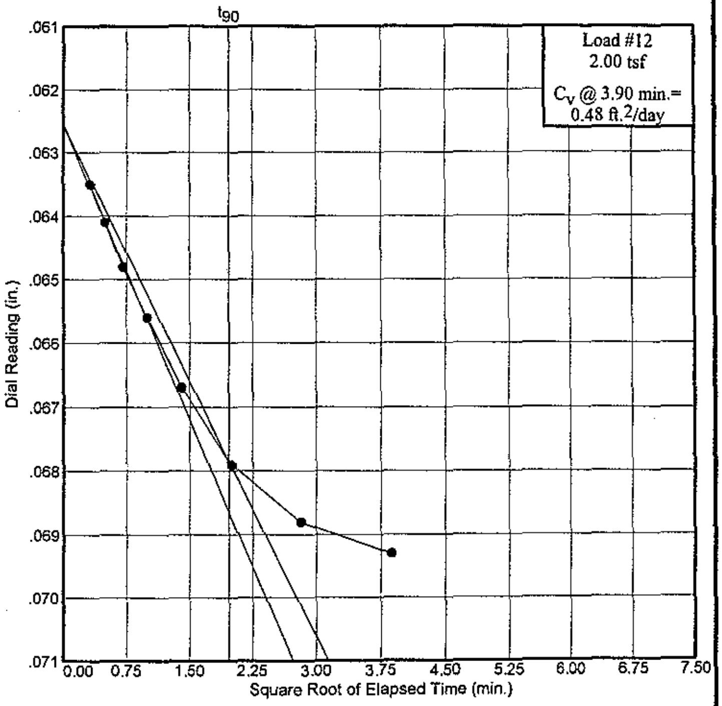
Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo, Puerto Rico









Dial Reading vs. Time

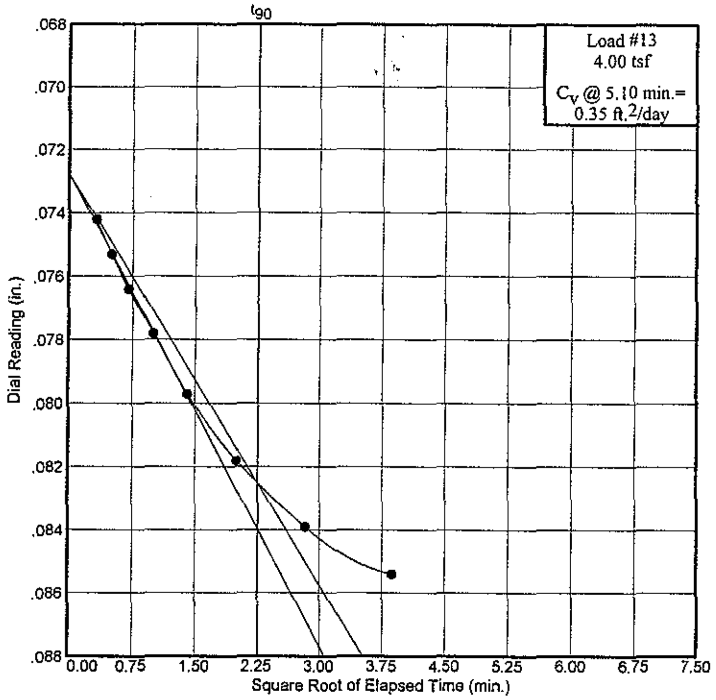
GEOCONSULT

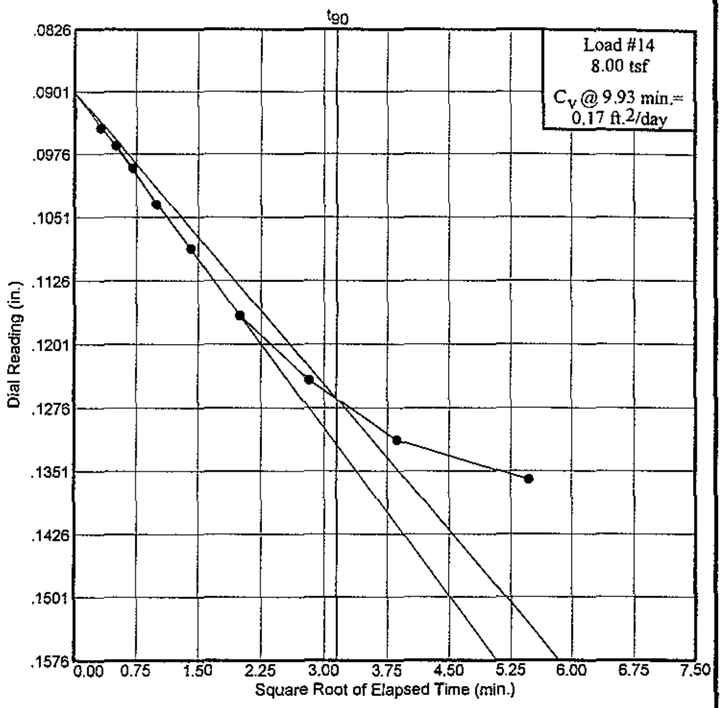
Plate 30' - 32

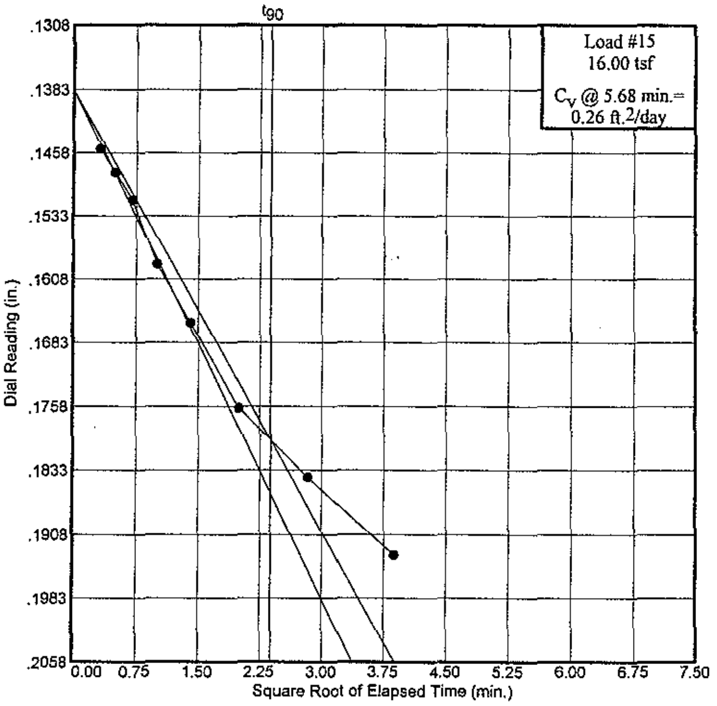
Dial Reading vs. Time

Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo, Puerto Rico



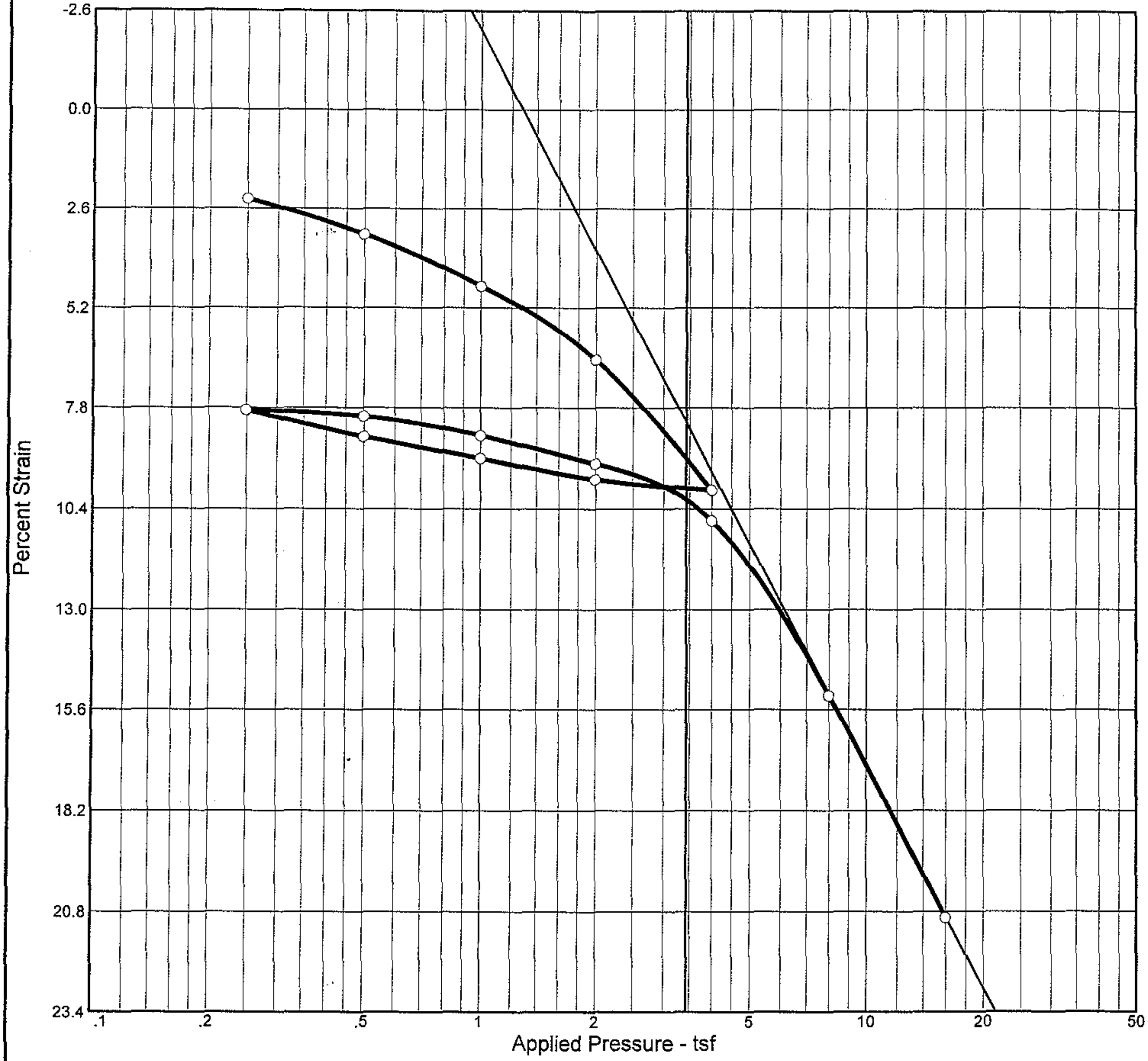




Dial Reading vs. Time

GEOCONSULT

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (tsf)	P_c (tsf)	C_c	C_r	Swell Press. (tsf)	Heave %	e_o
Sat.	Moist.											
100.0 %	39.5 %	83.1	NP	NP	2.7	1.72	4.00	0.39	0.04			1.028

MATERIAL DESCRIPTION	USCS	AASHTO
(ML)Sandy silt with silty sand on the upper 4" of section layer soil, low plasticity, none reaction with HCl, firm, moist, light olive gray		

Project No. 2182-99 **Client:**

Project: Recovery Solution

Location: Arecibo, Puerto Rico

CONSOLIDATION TEST REPORT

GEOCONSULT

Remarks:

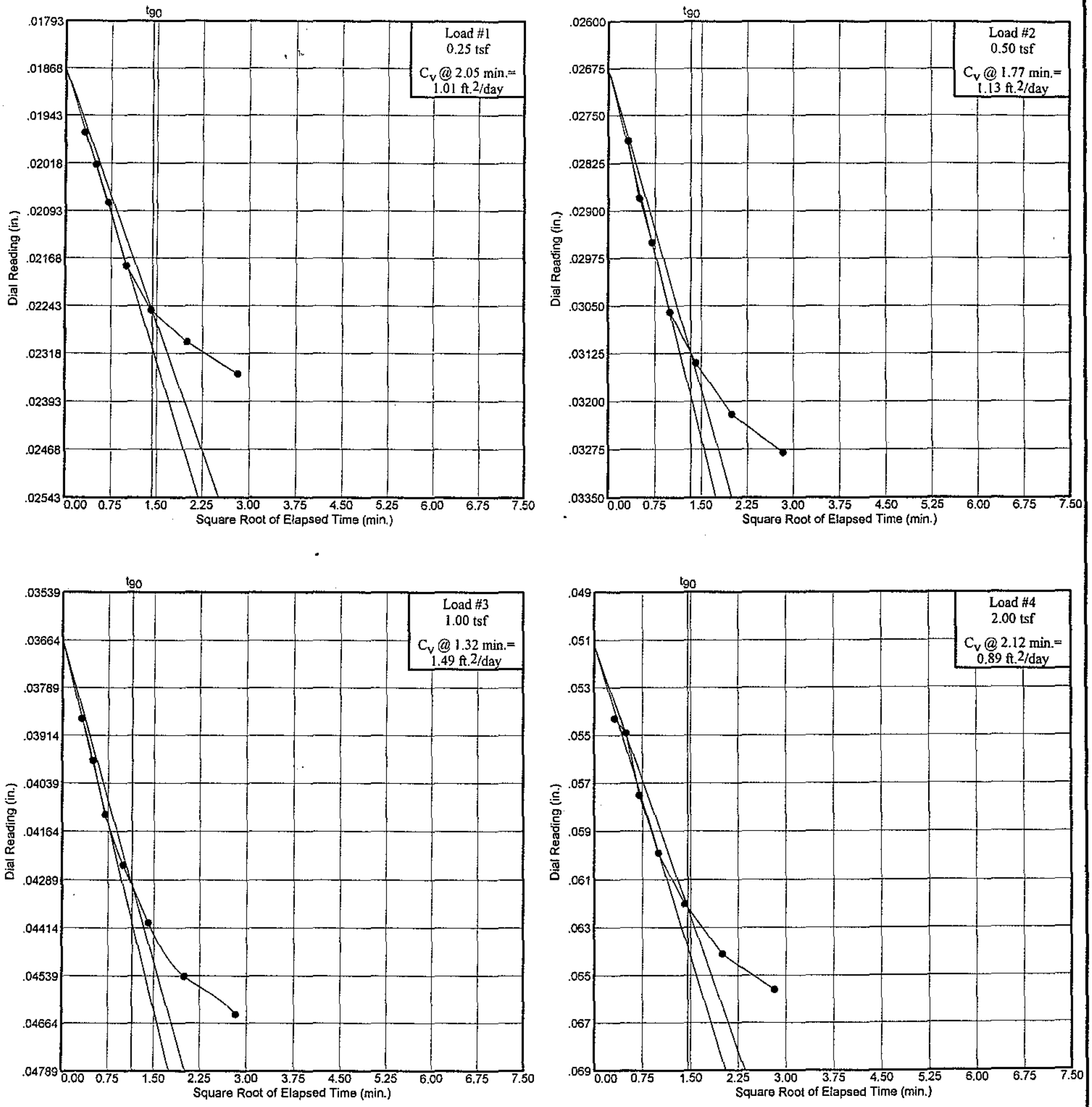
Tested by:GMC
RCS-11B Sample 2
Depth:60-62 feet
Specific Gravity Inferred

Plate 60' - 62'

Dial Reading vs. Time

Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo, Puerto Rico



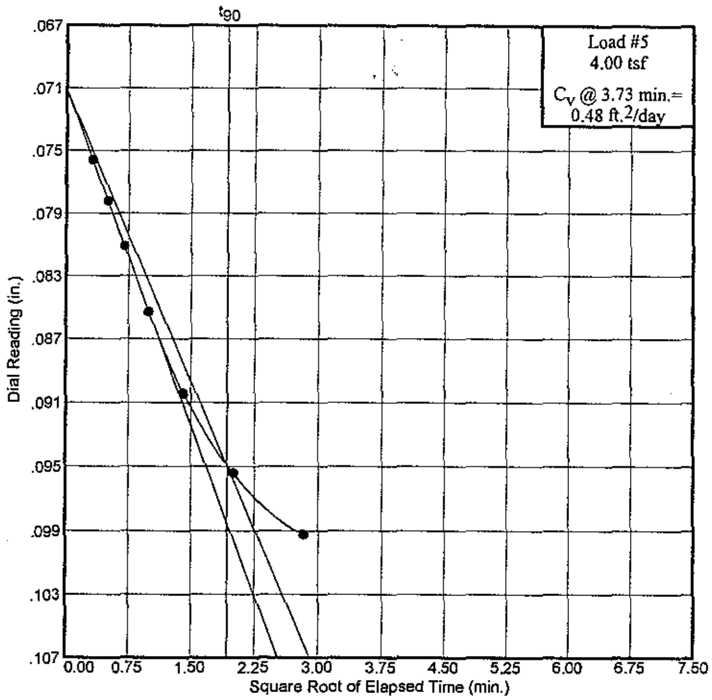
Dial Reading vs. Time

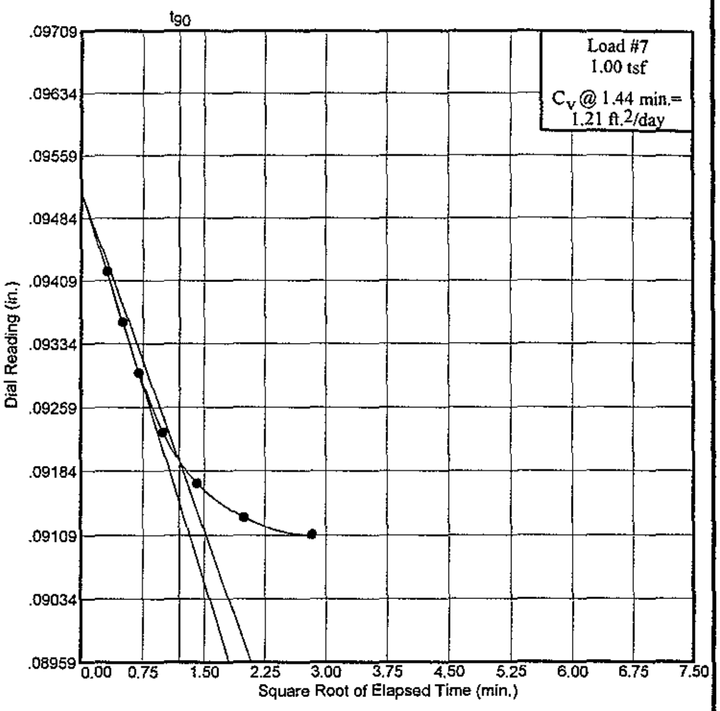
GEOCONSULT

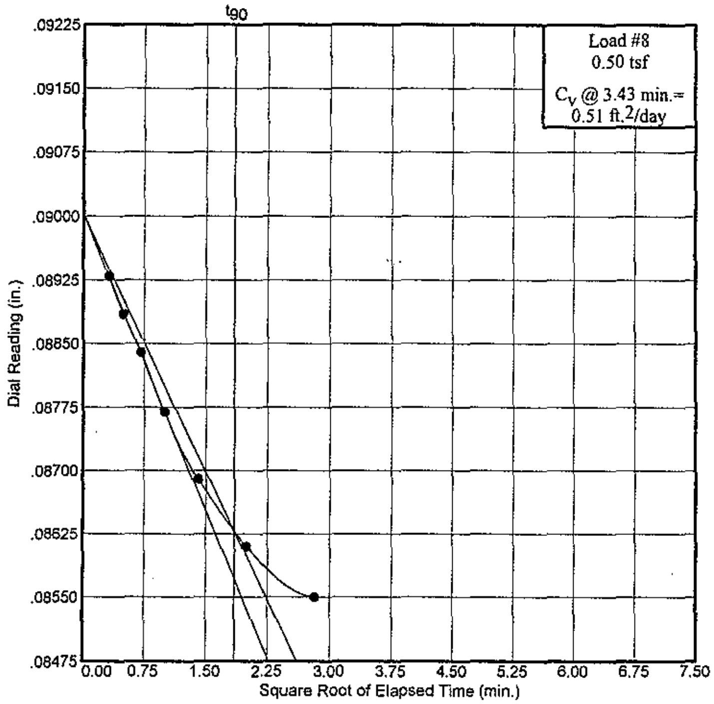
Dial Reading vs. Time

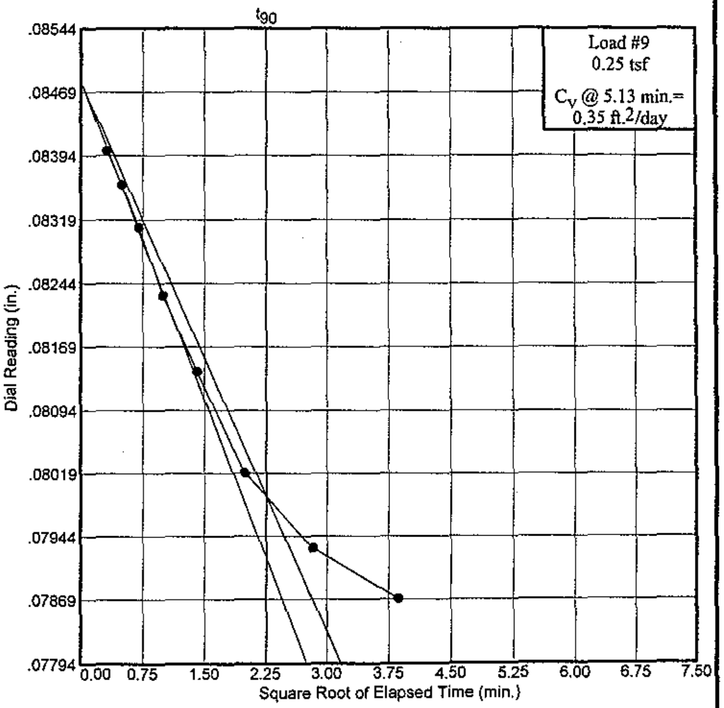
Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo, Puerto Rico









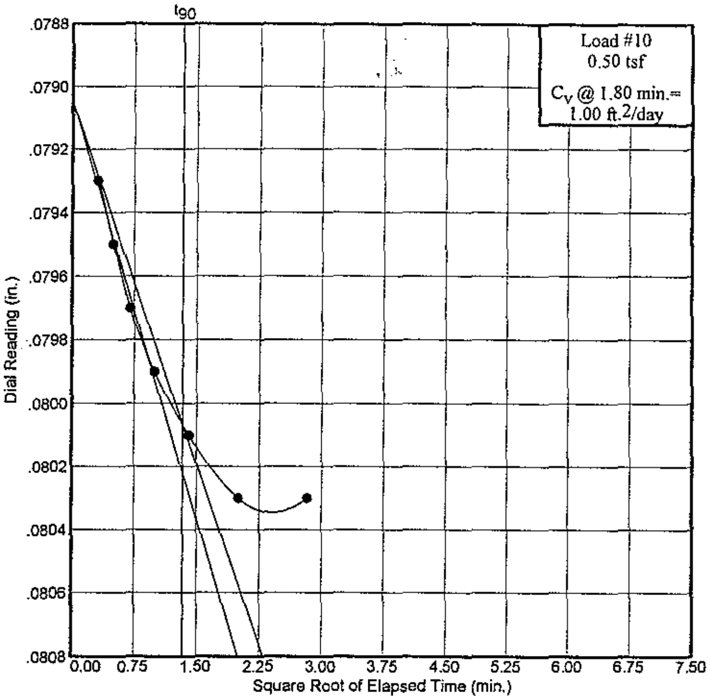
Dial Reading vs. Time

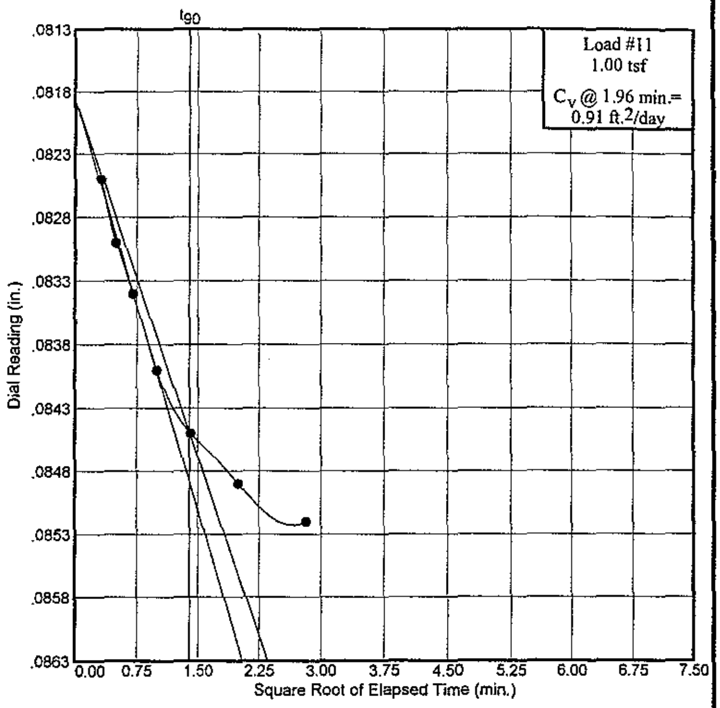
GEOCONSULT

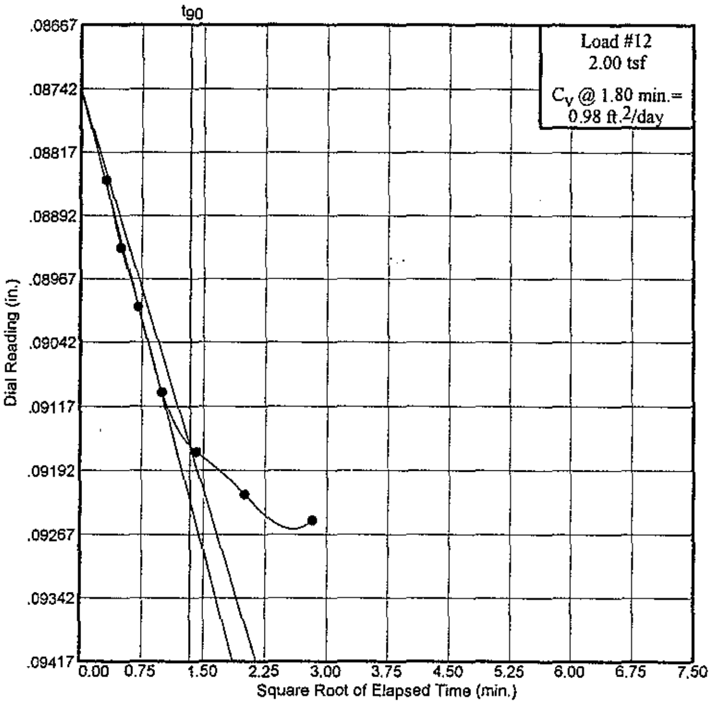
Dial Reading vs. Time

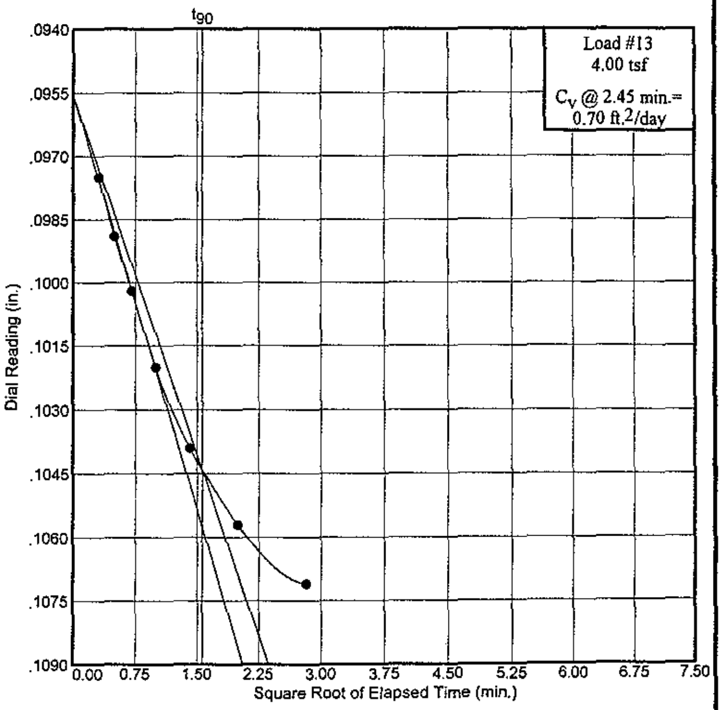
Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo, Puerto Rico









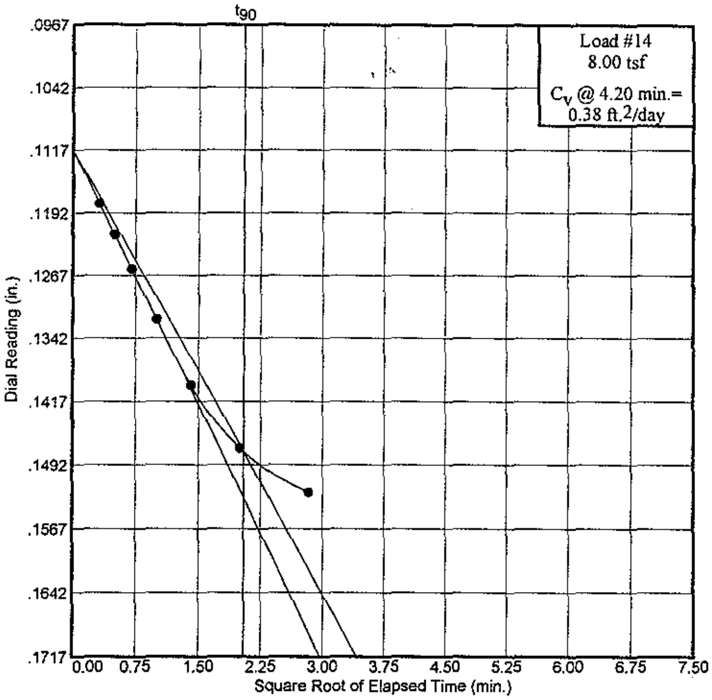
Dial Reading vs. Time

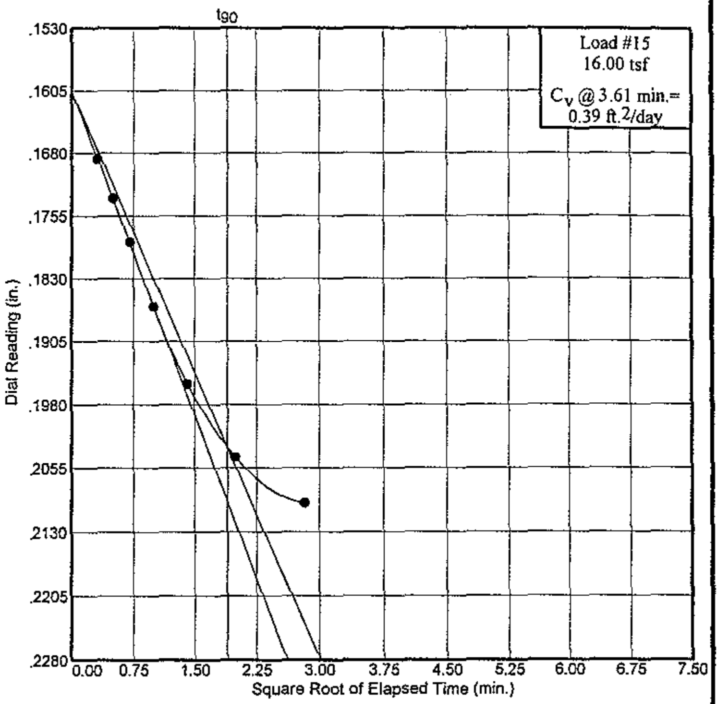
GEOCONSULT

Dial Reading vs. Time

Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo, Puerto Rico



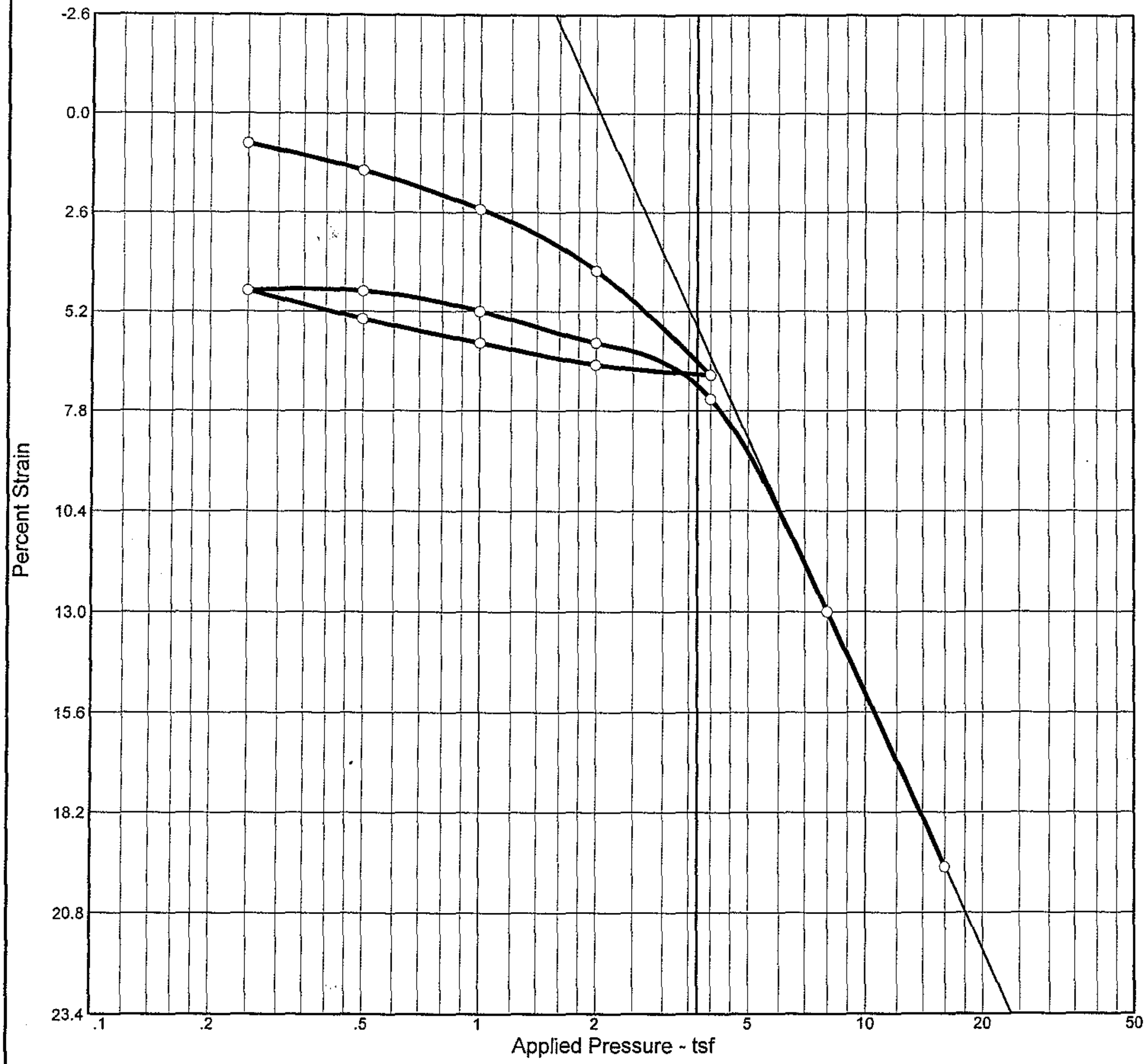


Dial Reading vs. Time

GEOCONSULT

Plate 60' - 62'

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (tsf)	P_c (tsf)	C_c	C_r	Swell Press. (tsf)	Heave %	e_o
Sat.	Moist.											
43.8 %	25.0 %	66.4	47	12	2.7	1.96	4.14	0.56	0.05			1.540

MATERIAL DESCRIPTION	USCS	AASHTO
(MH)Elastic silt, at the bottom (5.75 in)dark gray silty sand, subangular fine sand, about 7% shell fragment, dark gray		

Project No. 2182-99 **Client:**

Project: Recovery Solution

Location: Arecibo, Puerto Rico

CONSOLIDATION TEST REPORT

GEOCONSULT

Remarks:

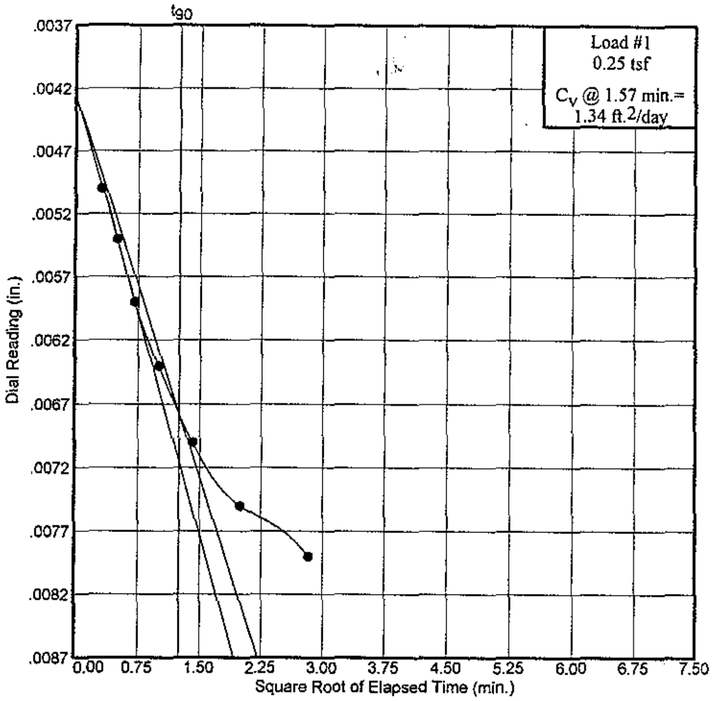
Tested by:GMC
RCS-11B Sample 3
Depth:70-72 feet
Specific Gravity Inferred

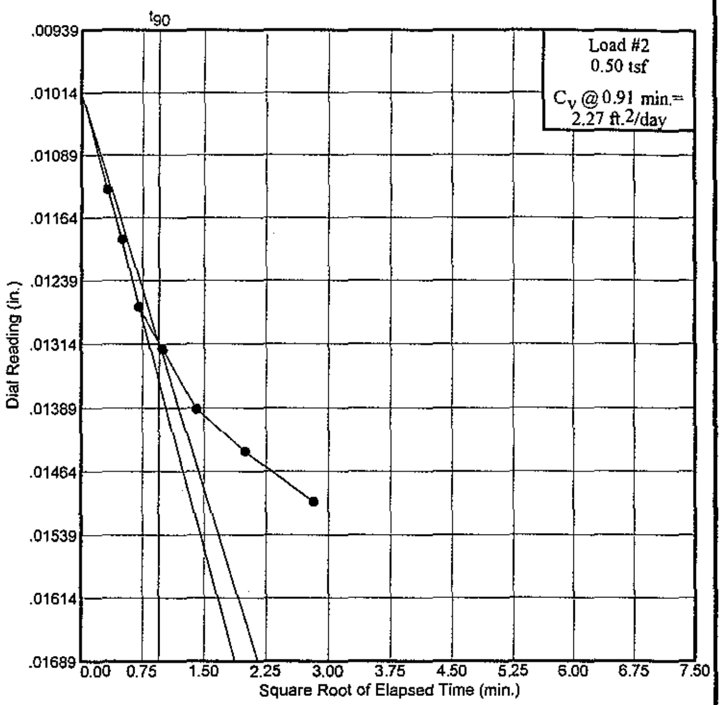
Plate 70' - 72'

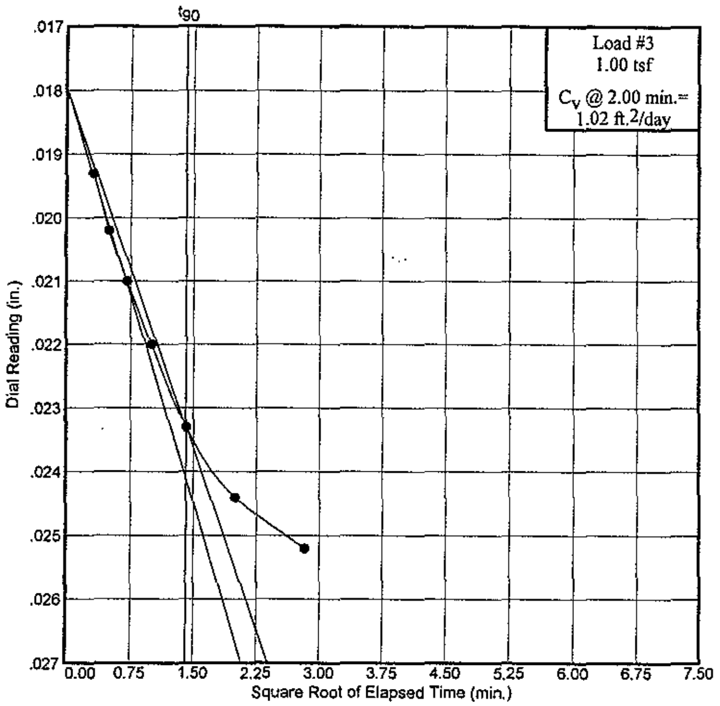
Dial Reading vs. Time

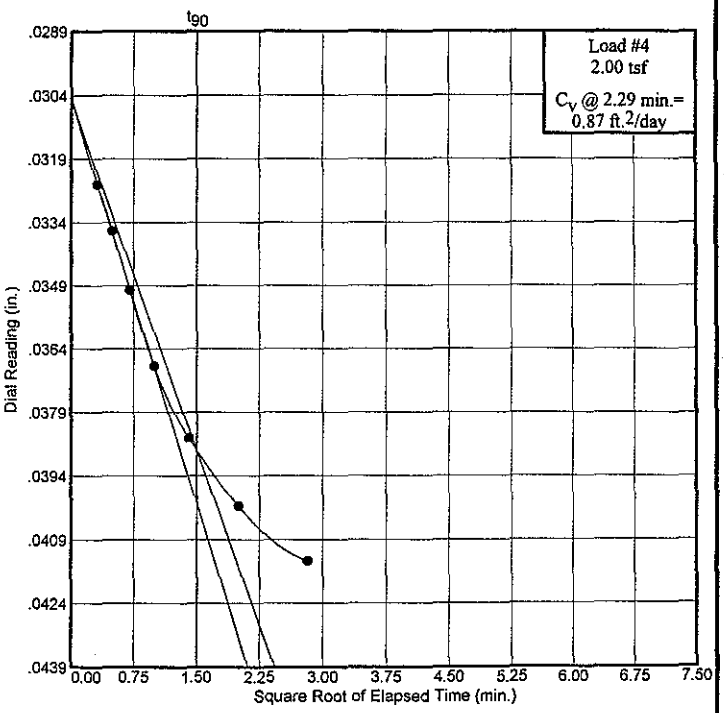
Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo, Puerto Rico









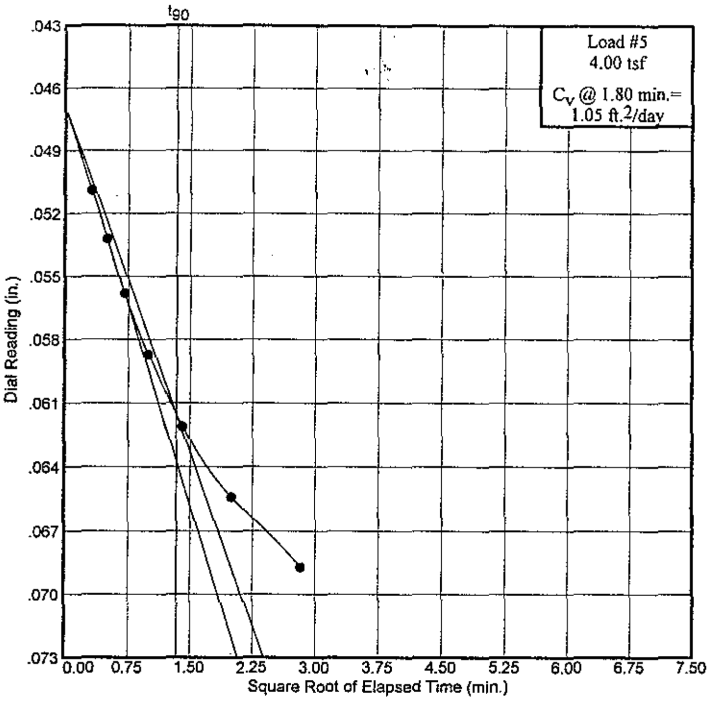
Dial Reading vs. Time

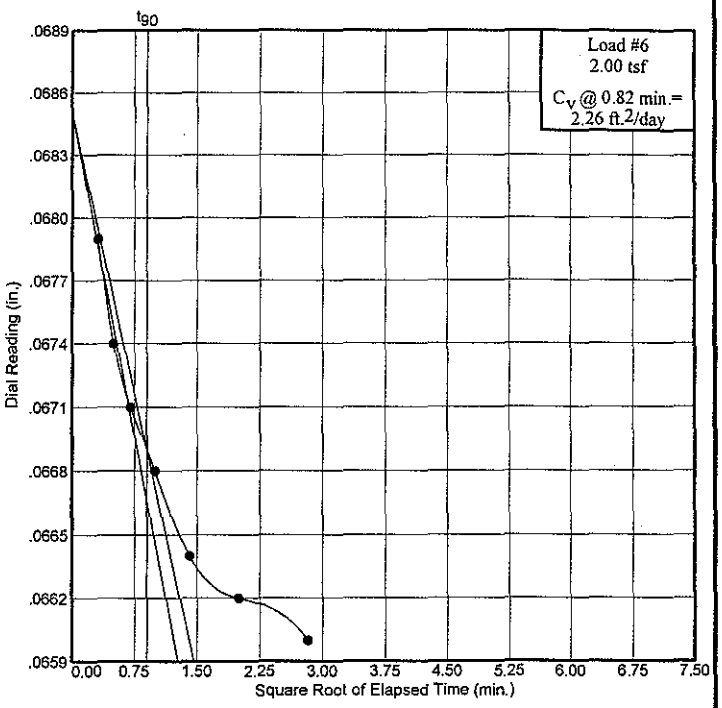
GEOCONSULT

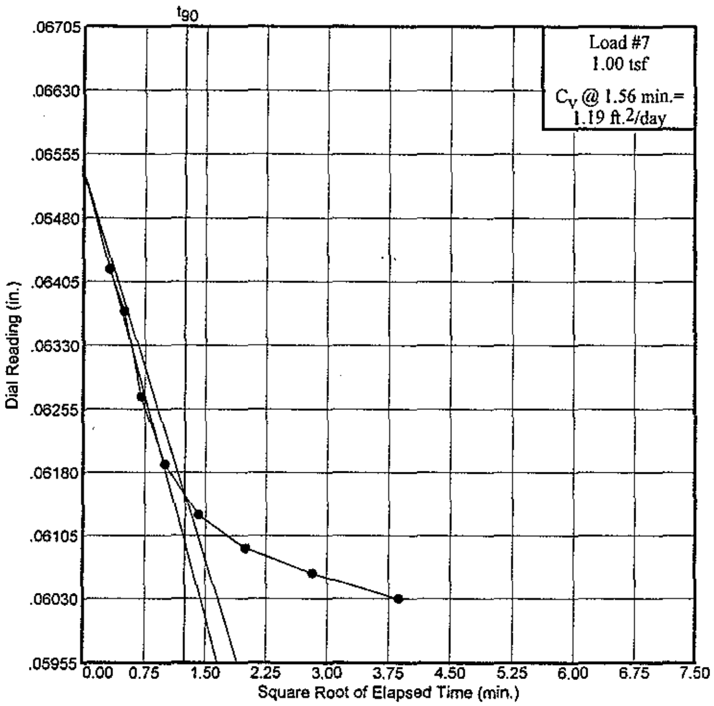
Dial Reading vs. Time

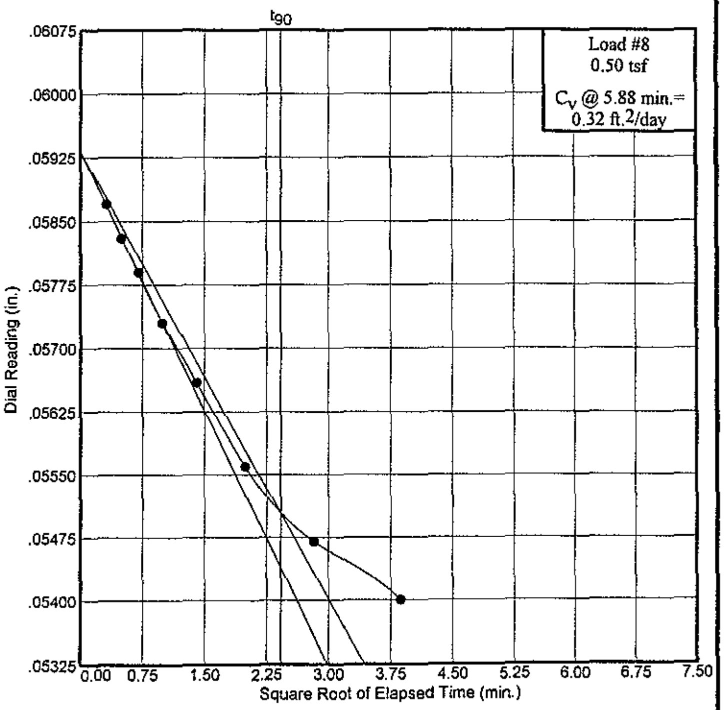
Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo, Puerto Rico









Dial Reading vs. Time

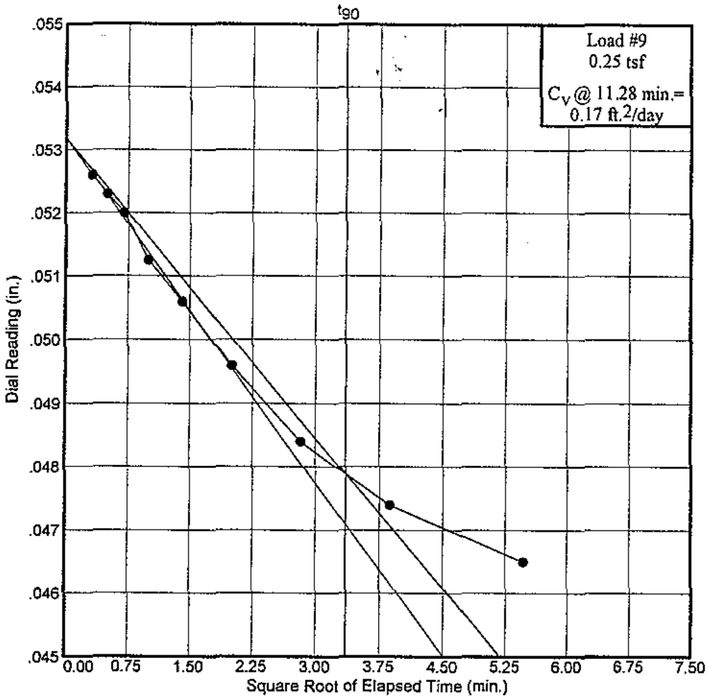
GEOCONSULT

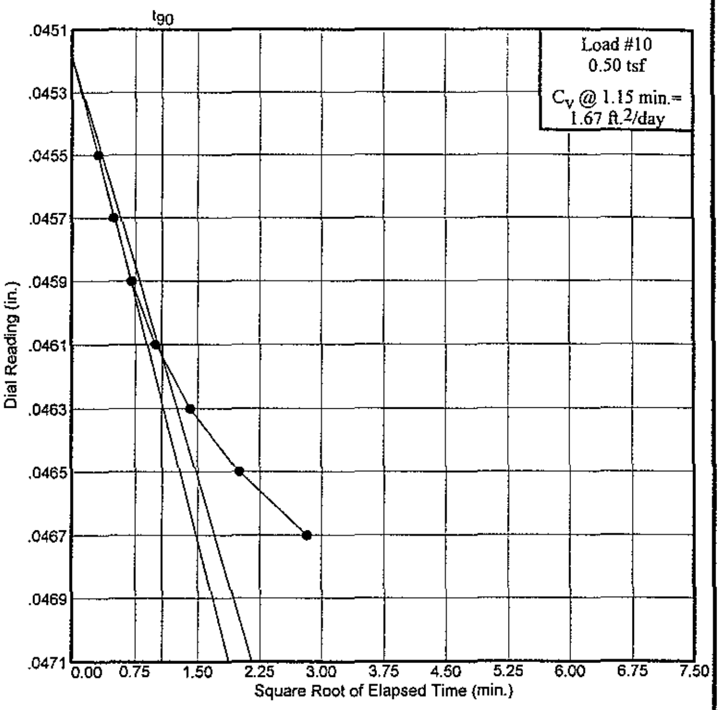
Plate 70' - 72'

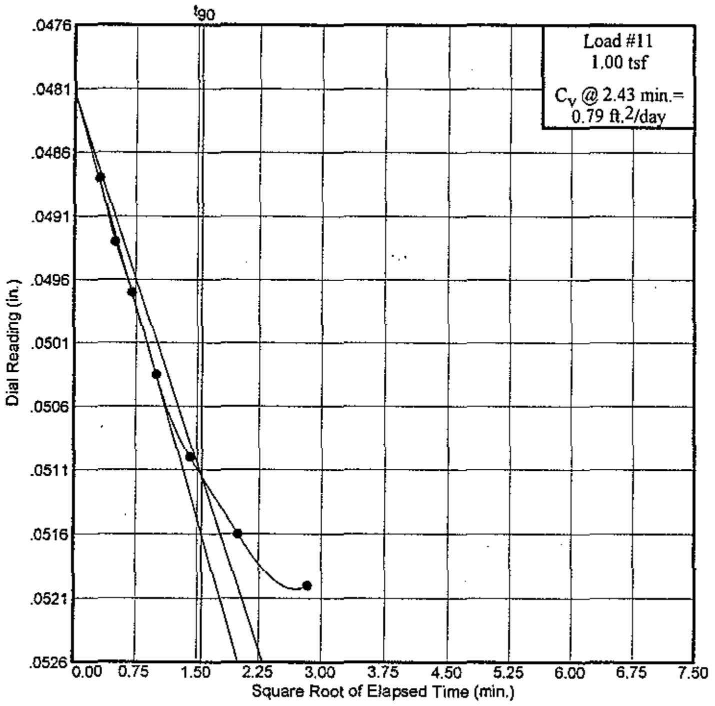
Dial Reading vs. Time

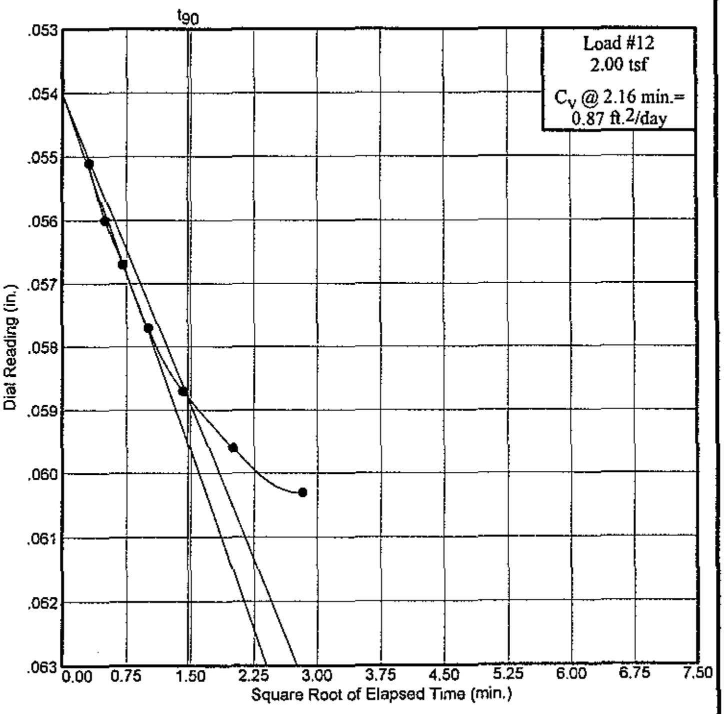
Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo, Puerto Rico









Dial Reading vs. Time

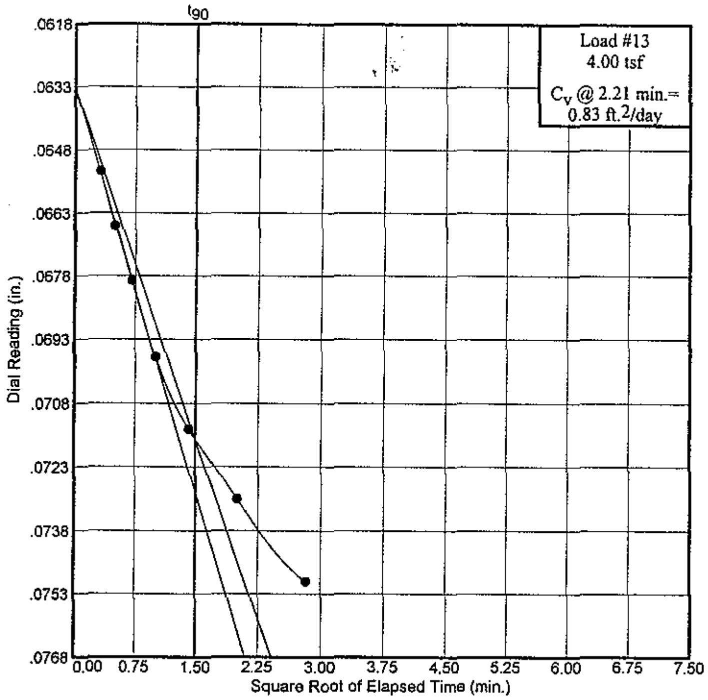
GEOCONSULT

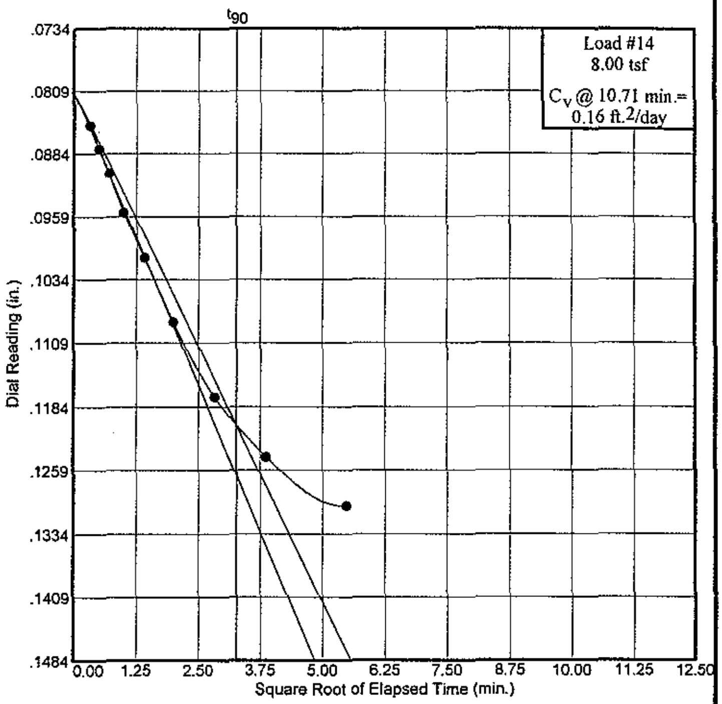
Plate 70' - 72

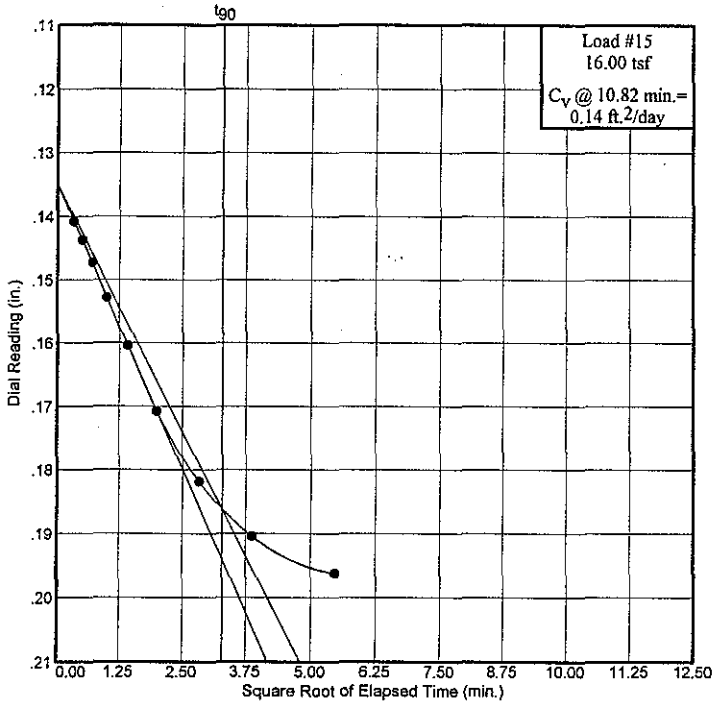
Dial Reading vs. Time

Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo, Puerto Rico





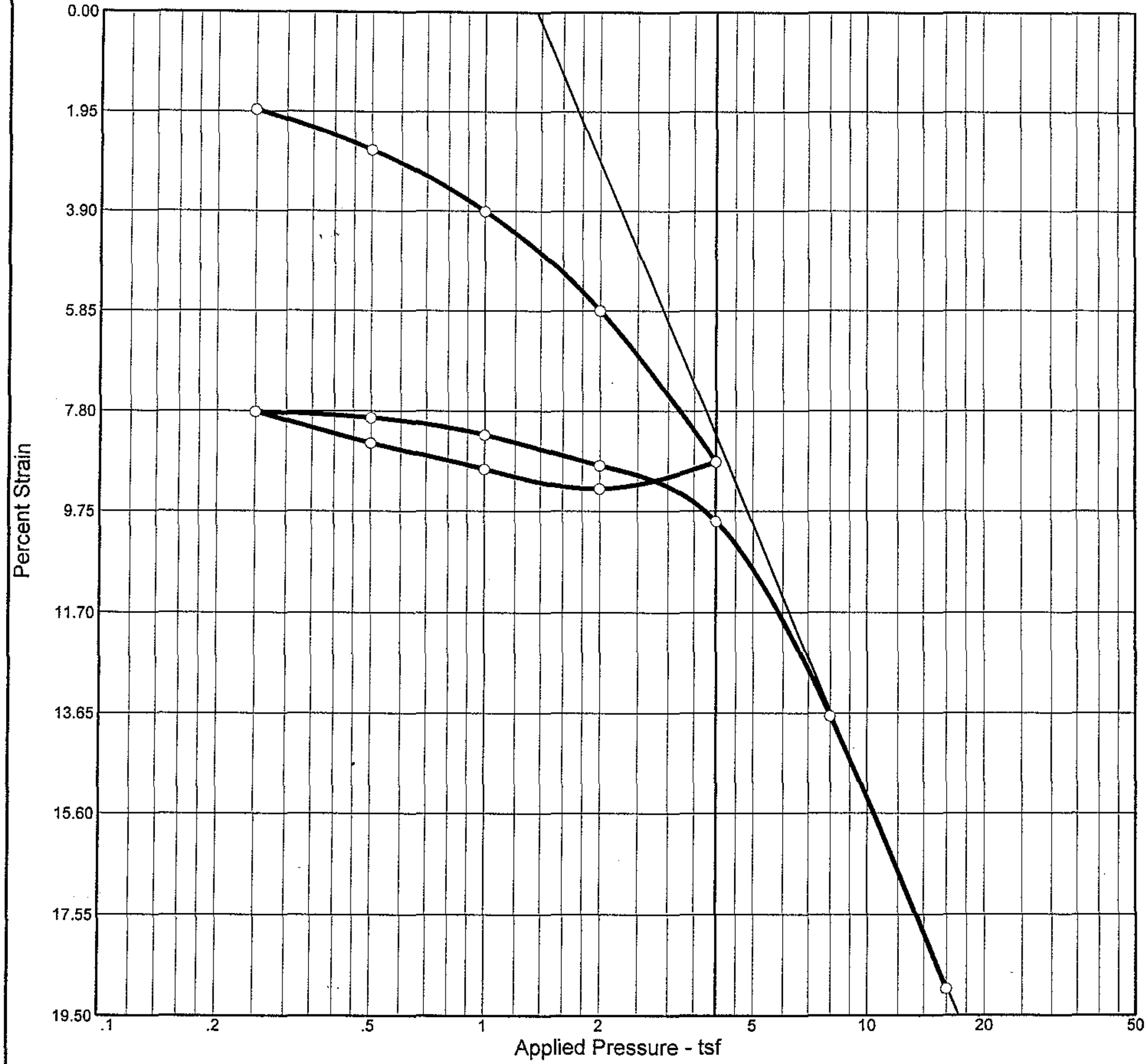


Dial Reading vs. Time

GEOCONSULT

Plate 70' - 72'

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (tsf)	P_c (tsf)	C_c	C_r	Swell Press. (tsf)	Heave %	e_o
Sat.	Moist.											
100.0 %	52.7 %	137.5	58	26	2.7	2.19	4.46	0.22	0.02			0.226

MATERIAL DESCRIPTION	USCS	AASHTO
Silty sand with traces of sand size shell fragments (angular), strong reaction on shell fragments only, trace roots. Coarse sand with silt on upper 4 in. of section, higher concentration of calcium carbonate.		

Project No. 2182-99 **Client:**

Project: Recovery Solution

Location: Arecibo, Puerto Rico

CONSOLIDATION TEST REPORT

GEOCONSULT

Remarks:

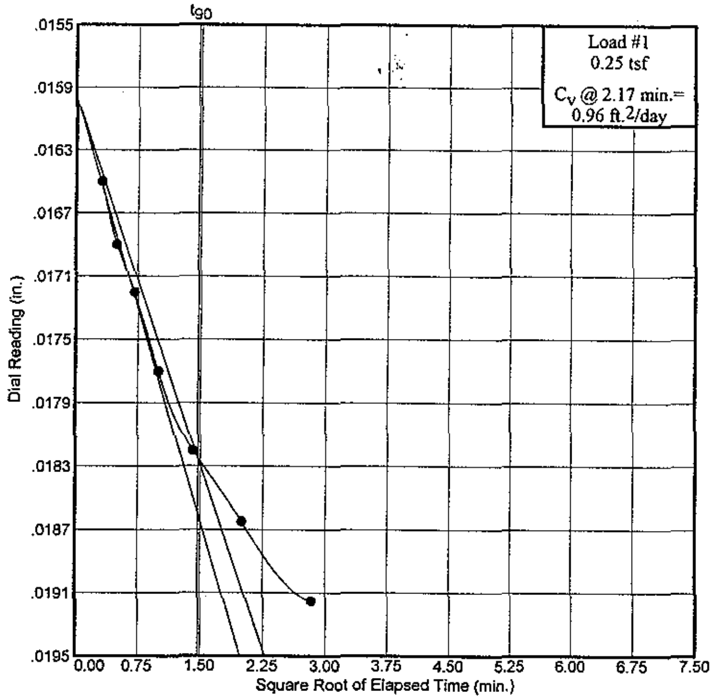
Tested by:IMR
RCS 11-B Sample 4
Depth: 80-82 feet
Specific Gravity Inferred

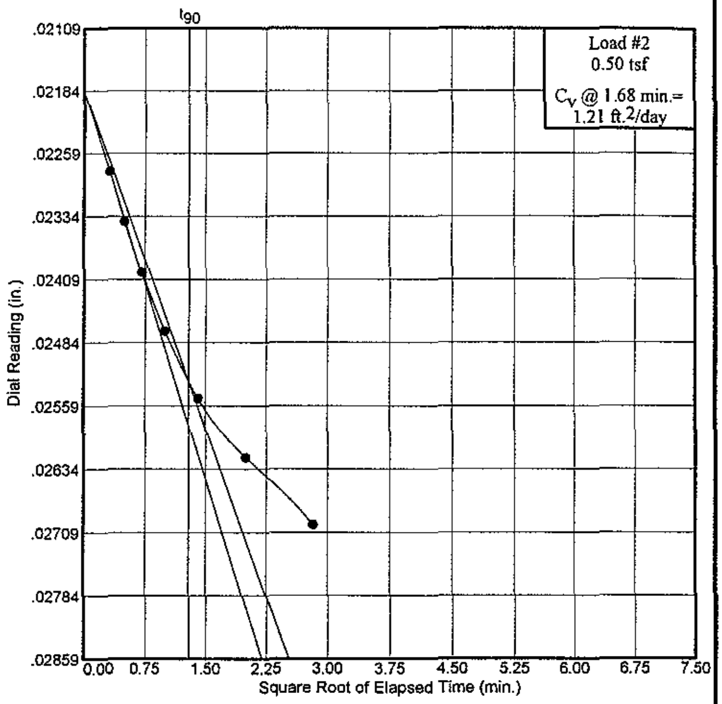
Plate 80'- 82'

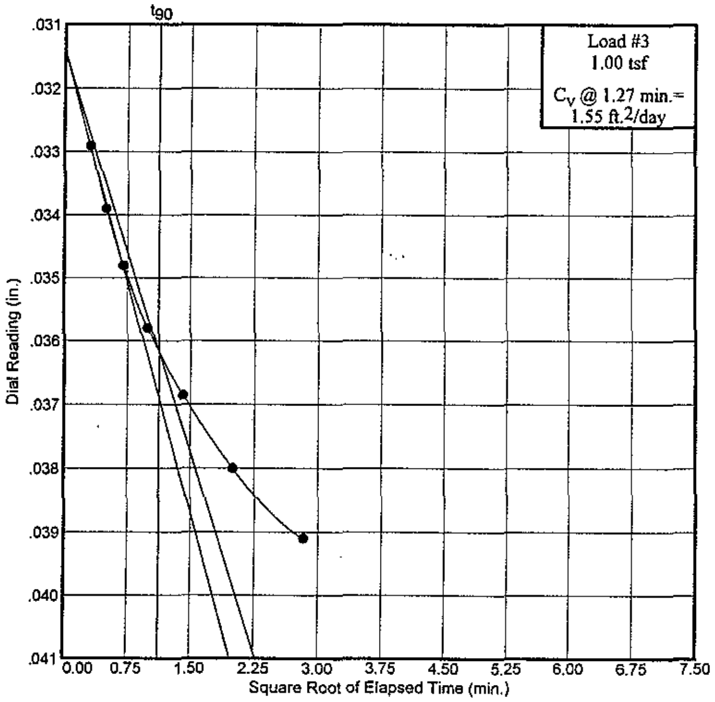
Dial Reading vs. Time

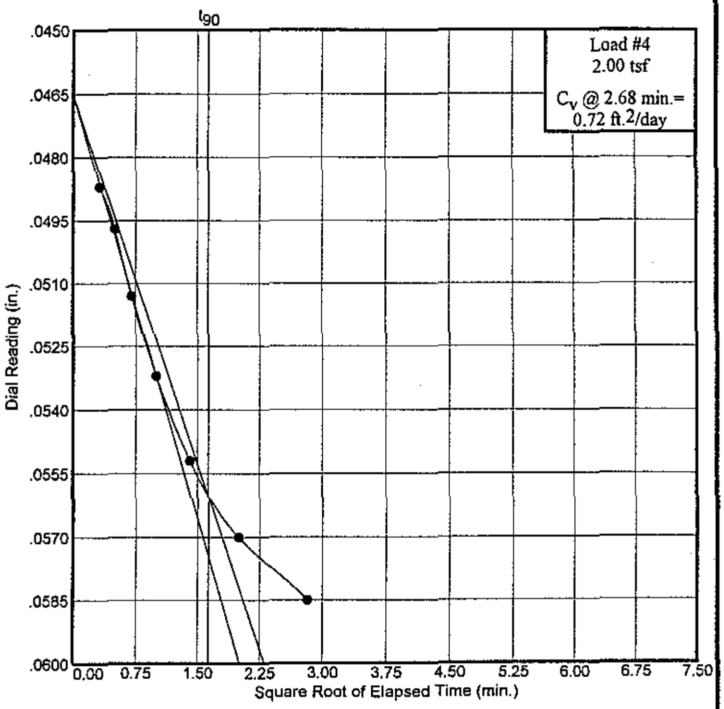
Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo, Puerto Rico









Dial Reading vs. Time

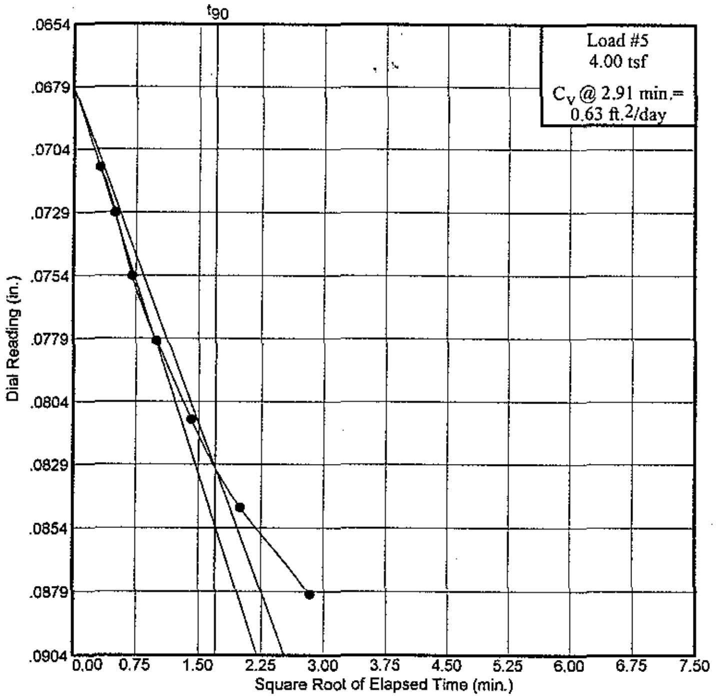
GEOCONSULT

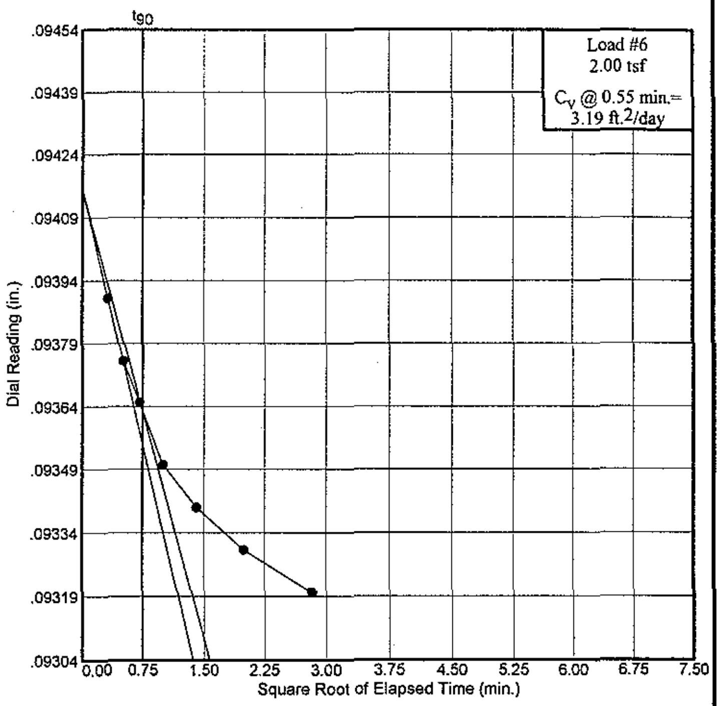
Plate 80'- 82'

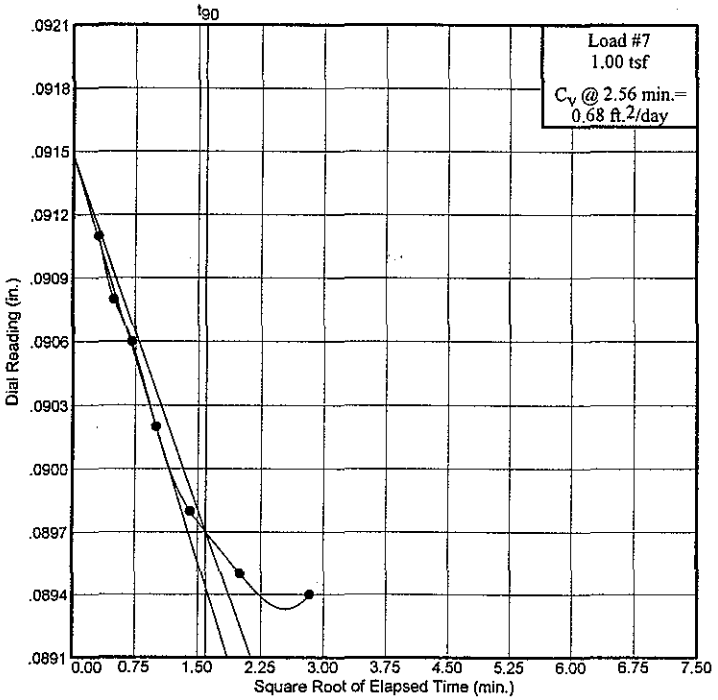
Dial Reading vs. Time

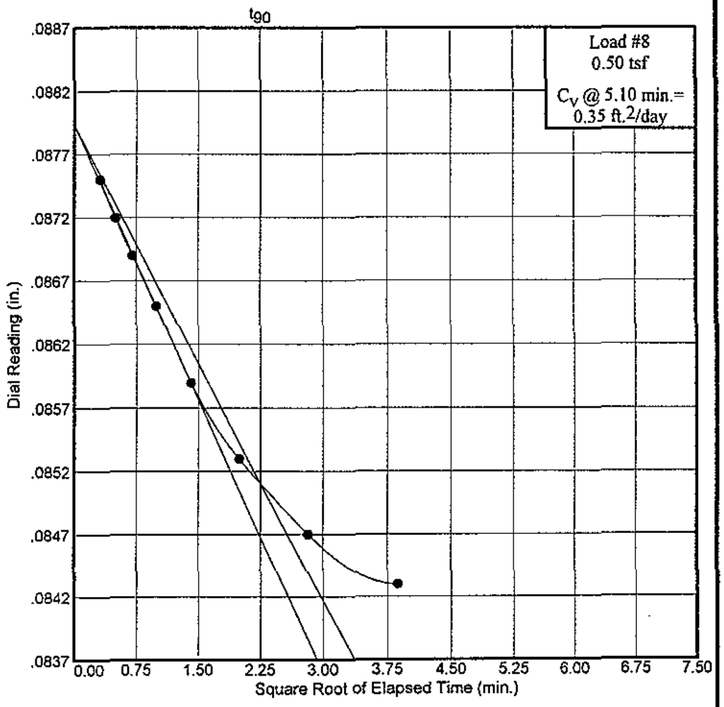
Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo, Puerto Rico









Dial Reading vs. Time

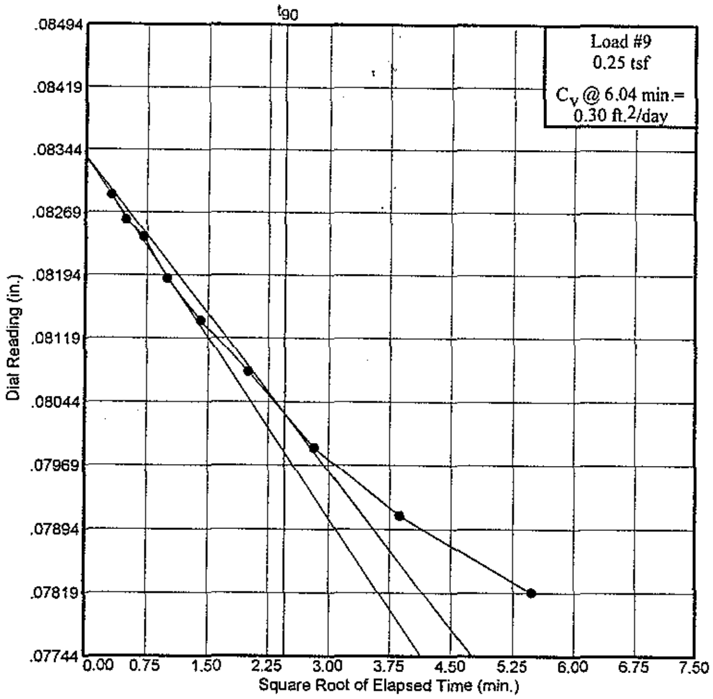
GEOCONSULT

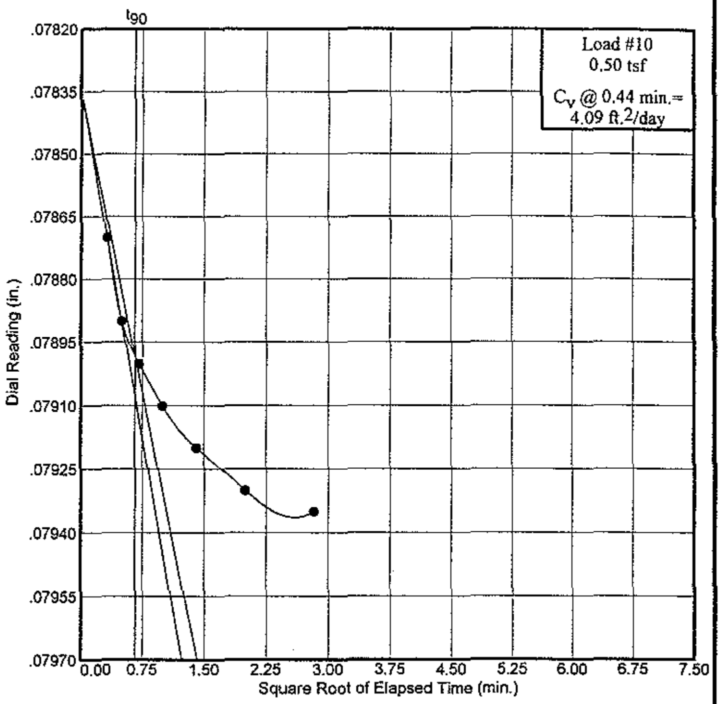
Plate 80'- 82'

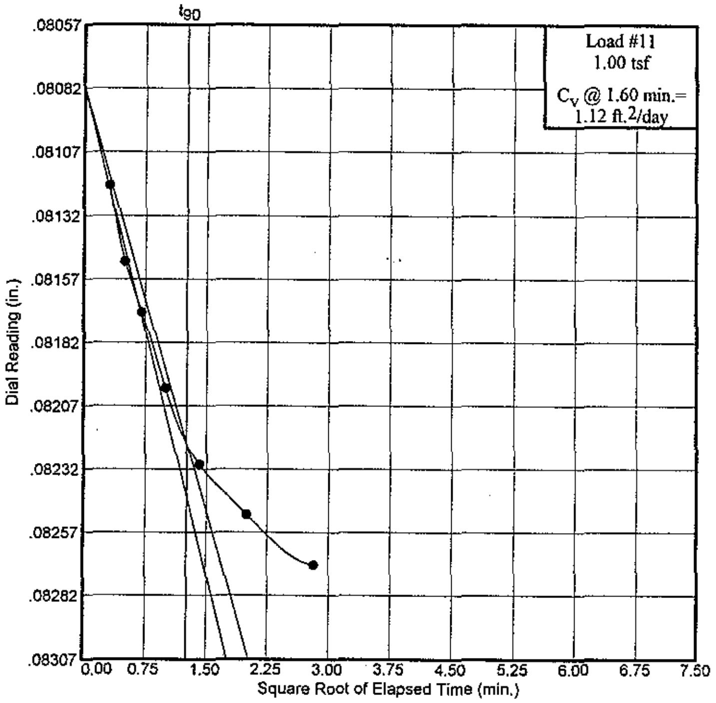
Dial Reading vs. Time

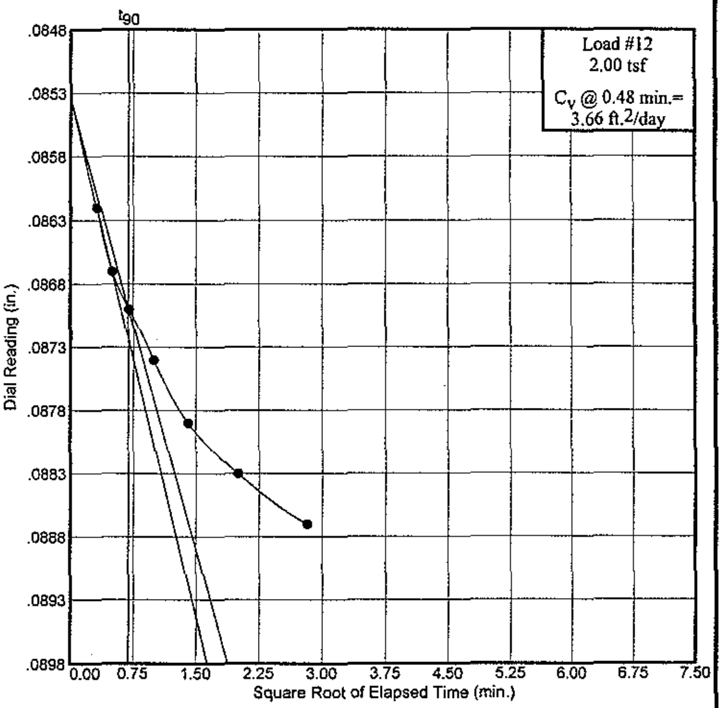
Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo, Puerto Rico









Dial Reading vs. Time

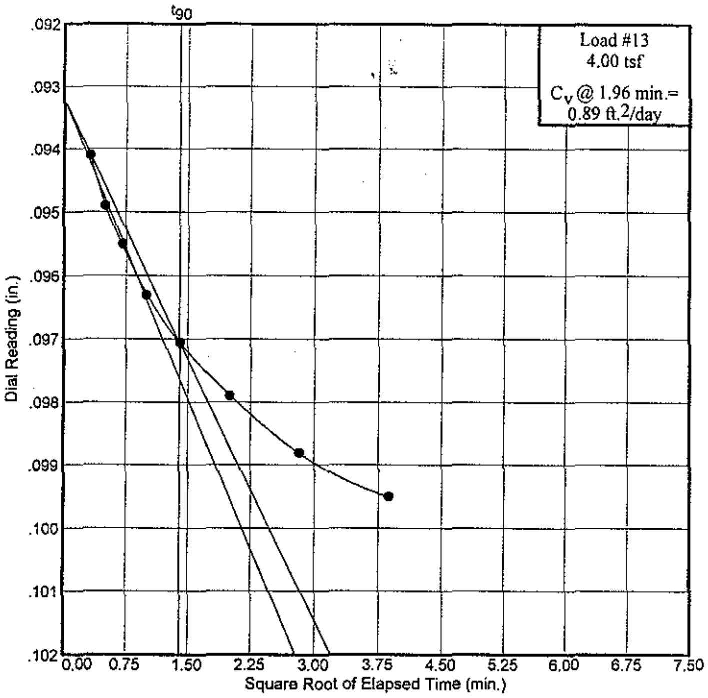
GEOCONSULT

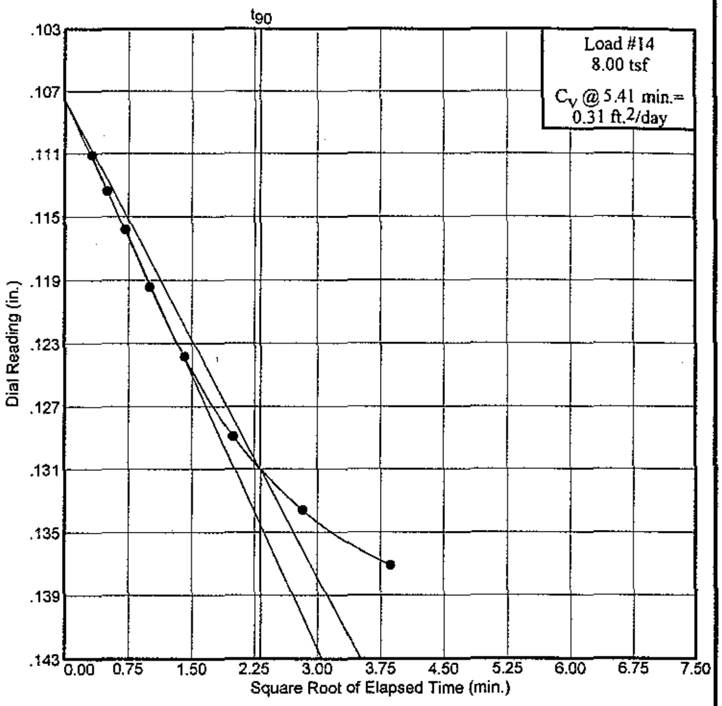
Plate 80'- 82'

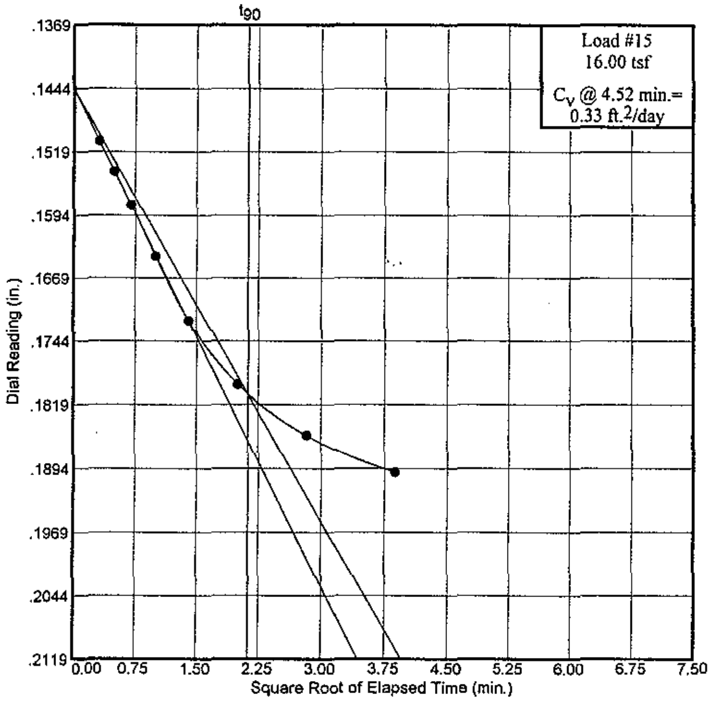
Dial Reading vs. Time

Project No.: 2182-99
Project: Recovery Solution

Location: Arecibo, Puerto Rico







Dial Reading vs. Time

GEOCONSULT

Plate 80'- 82'

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Unconfined Compression Test

Project: Recovery Solution
File Number: 2138-98 Date: 7/30/99

Boring #	Depth [ft]	Sampling Device	Sample Preparation	Diameter_0 [in]	Area_0 [in^2]	Height_0 [in]	Volume_0 [in^3]
RCS-11B	80' - 82'	'SHELBY	Undisturbed	3	7.0686	6	42.41

w%:

Description: (CH) Fat clay, consistance texture, high plasticit, no Rx with HCL, firm, moist, light olive gray

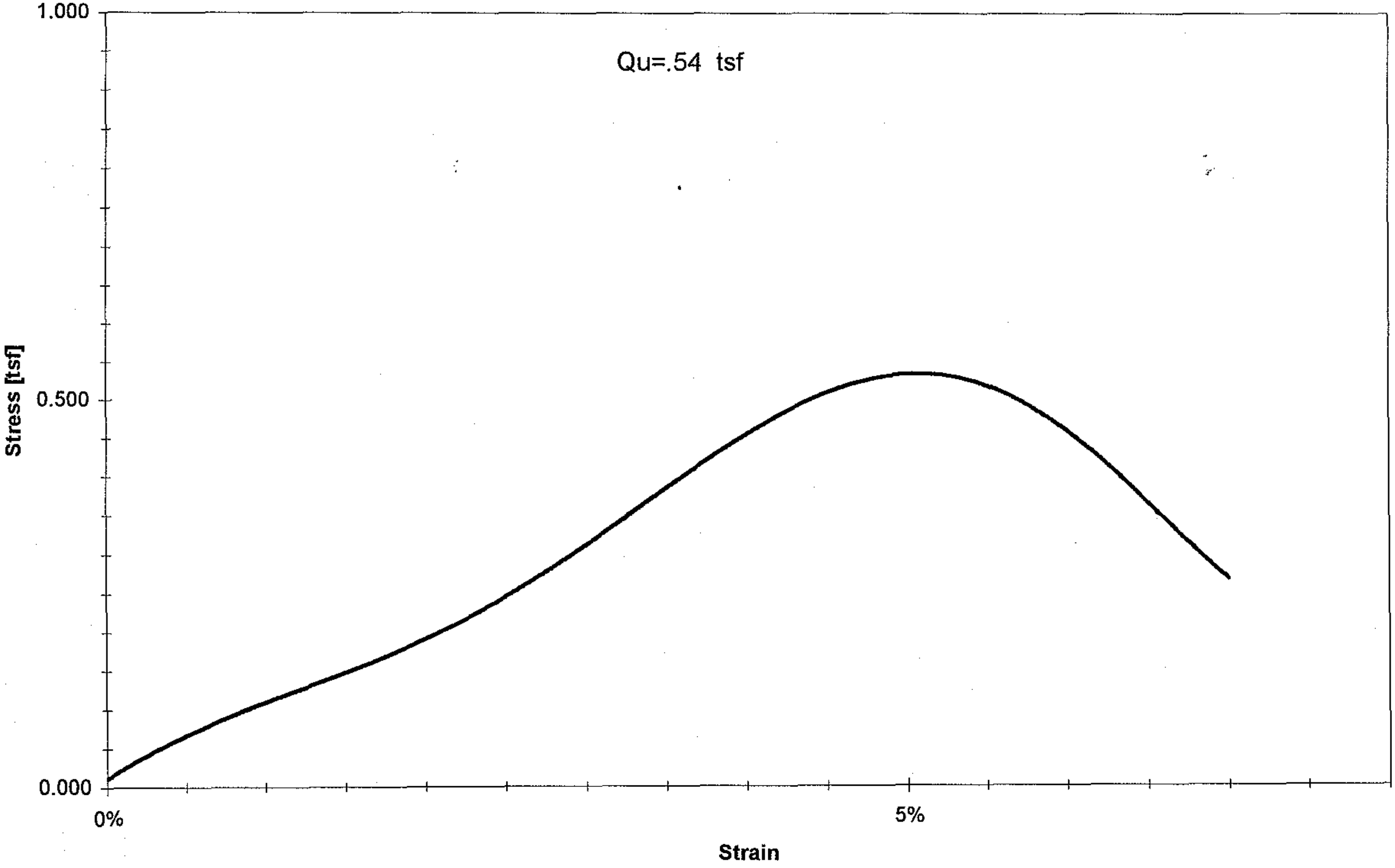
Time [min]	Displacement Dial [div] [$x10^{-3}$ in]	Load Dial [div] [$x10^{-4}$ in]	δv [in]	Load [lbs]	Strain	Corrected area [in^2]	Stress [tsf]
0.00	0	0	0.000	0.000	0.000	7.069	0.000
0.03	10	3	0.010	4.150	0.002	7.080	0.042
0.07	20	4	0.020	5.065	0.003	7.092	0.051
0.10	30	6	0.030	6.893	0.005	7.104	0.070
0.13	40	8	0.040	8.722	0.007	7.116	0.088
0.17	50	9	0.050	9.636	0.008	7.128	0.097
0.20	60	10	0.060	10.551	0.010	7.140	0.106
0.23	70	11	0.070	11.465	0.012	7.152	0.115
0.27	80	12	0.080	12.379	0.013	7.164	0.124
0.30	90	14	0.090	14.208	0.015	7.176	0.143
0.33	100	15	0.100	15.122	0.017	7.188	0.151
0.37	110	18	0.110	17.865	0.018	7.201	0.179
0.40	120	20	0.120	19.694	0.020	7.213	0.197
0.43	130	22	0.130	21.522	0.022	7.225	0.214
0.47	140	24	0.140	23.351	0.023	7.237	0.232
0.50	150	26	0.150	25.180	0.025	7.250	0.250
0.53	160	28	0.160	27.008	0.027	7.262	0.268
0.57	170	30	0.170	28.837	0.028	7.275	0.285
0.60	180	33	0.180	31.580	0.030	7.287	0.312
0.63	190	35	0.190	33.409	0.032	7.300	0.330
0.67	200	39	0.200	37.066	0.033	7.312	0.365
0.70	210	41	0.210	38.895	0.035	7.325	0.382
0.73	220	44	0.220	41.638	0.037	7.338	0.409
0.77	230	47	0.230	44.381	0.038	7.350	0.435
0.80	240	49	0.240	46.209	0.040	7.363	0.452
0.83	250	52	0.250	48.952	0.042	7.376	0.478
0.87	260	54	0.260	50.781	0.043	7.389	0.495
0.90	270	55	0.270	51.695	0.045	7.402	0.503
0.94	280	56	0.280	52.610	0.047	7.415	0.511
0.97	290	57	0.290	53.524	0.048	7.428	0.519
1.00	300	59	0.300	55.353	0.050	7.441	0.536
1.04	310	59	0.310	55.353	0.052	7.454	0.535
1.07	320	59	0.320	55.353	0.053	7.467	0.534
1.10	330	58	0.330	54.438	0.055	7.480	0.524
1.14	340	56	0.340	52.610	0.057	7.493	0.506
1.17	350	54	0.350	50.781	0.058	7.506	0.487
1.20	360	52	0.360	48.952	0.060	7.520	0.469

Strain Rate: 0.5%/min

Proving Ring: PR -15

Time [min]	Displacement Dial [div] [x10^{-3} in]	Load Dial [div] [x10^{-4} in]	δv [in]	Load [lbs]	Strain	Corrected area [in^2]	Stress [tsf]
1.24	370	47	0.370	44.381	0.062	7.533	0.424
1.27	380	43	0.380	40.723	0.063	7.547	0.389
1.30	390	40	0.390	37.980	0.065	7.560	0.362
1.34	400	36	0.400	34.323	0.067	7.573	0.326
1.37	410	33	0.410	31.580	0.068	7.587	0.300
1.40	420	30	0.420	28.837	0.070	7.601	0.273

Stress vs. Strain



GEOCONSULT

Direct Shear Test ASTM 3080-90

Project: Recovery Solution

File No. 2138-98

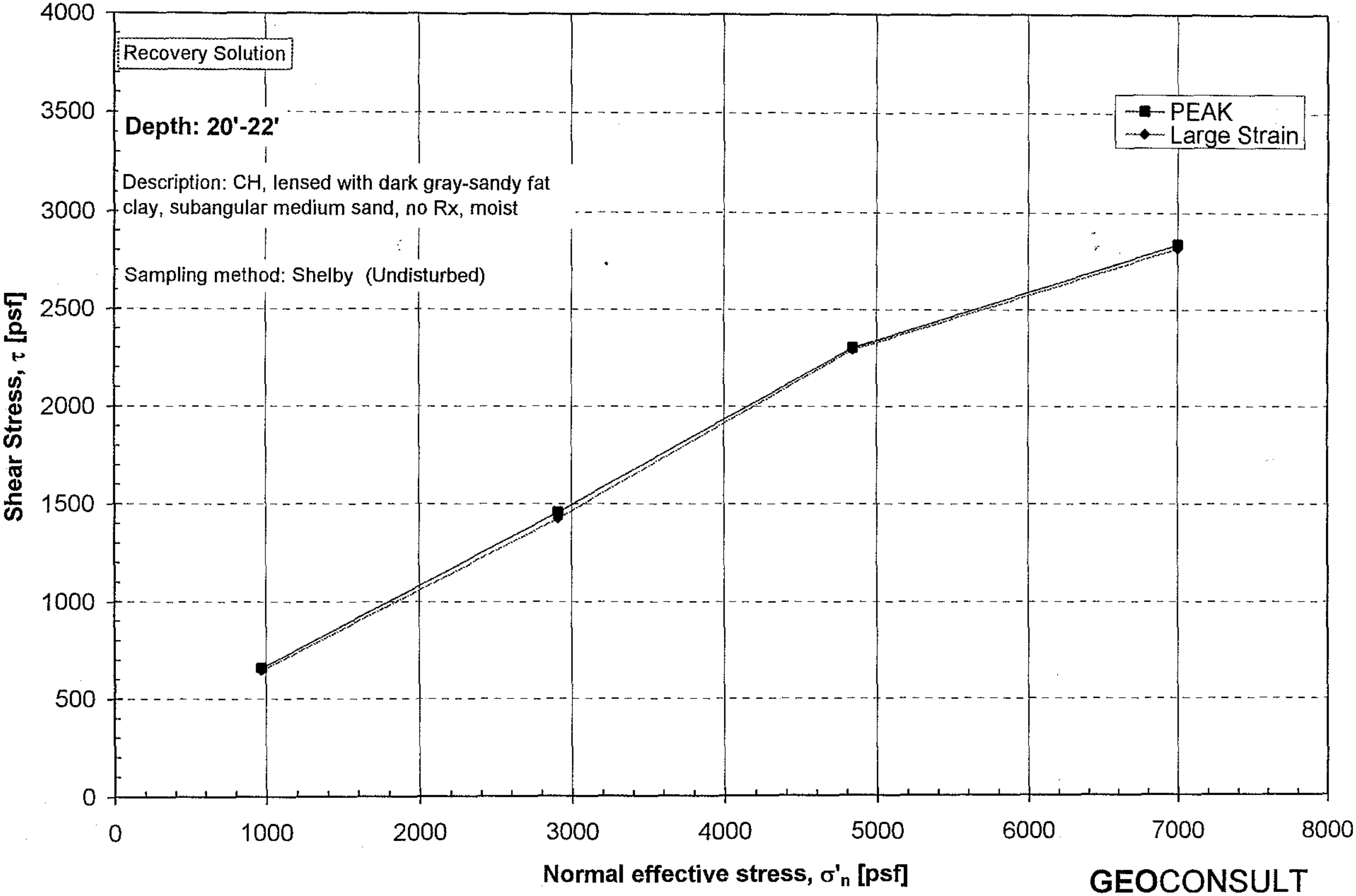
Date 8/3/99

Description: CH, lensed with dark gray-sandy fat clay, subangular medium sand, no Rx, moist

RCS-1	**Depth [ft]**	Sampling Device	Sample Preparation	diameter [in]	height [in]	weight [lb]	w%	Area [in^2]
1st point	20'-22'	Shelby	Undisturbed	2.5	0.75	0.24516	35.5	4.91

Atterberg Limits			dry mass	γ_d	γ
LL	PL	PI	[lb]	[pcf]	[pcf]
41	25	17	0.17	79.65	115.04

σ'_n [psf]	τ_{peak} [psf]	τ_{ls} [psf]
0	0	0
971	658	647
2909	1456	1425
4839	2300	2290
7000	2838	2817



Recovery Solution

Depth: 20'-22'

Description: CH, lensed with dark gray-sandy fat clay, subangular medium sand, no Rx, moist

Sampling method: Shelby (Undisturbed)

GEOCONSULT

GEOCONSULT Direct Shear Test ASTM 3080-90

Project: Recovery Solution

File No. 2138-98 Date: 8/3/99

Description: CH, lensed with dark gray-sandy fat clay, subangular medium sand, no Rx, moist

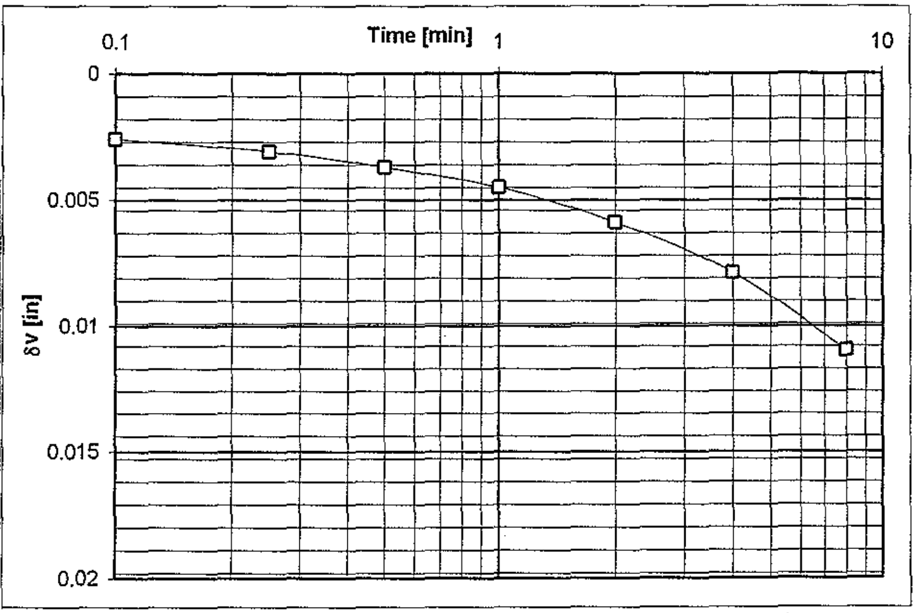
RCS-1	**Depth** **[ft]**	Sampling Device	Sample Preparation	diameter [in]	height [in]	weight [lb]	w%	Area [in^2]
2nd point	20'-22'	Shelby	Undisturbed	2.5	0.75	0.25	12	4.91

Atterberg Limits			dry mass	γ_d	γ
LL	PL	PI	[lb]	[pcf]	[pcf]
41	25	17	0.22	102.71	115.04

NORMAL LOAD

Fv [lb] :	**3.31**
Lever factor	10
σ'_n [psf] :	**970.8**

Clock Time	Elapsed Time	δv [in]
	0.1	0.0026
	0.25	0.0031
	0.5	0.0037
	1	0.0045
	2	0.0059
	4	0.0079
	8	0.0110
	15	0.0146
	30	0.0185
	60	0.0210
	120	0.0220



Clock Time	Elapsed Time	δv [in]

Clock Time	Elapsed Time	δv [in]

Rate of Shear Estimate:

t_{50} = 0.012 min

$t_f = 50t_{50}$ = 0.615 min

Horizontal displacement to failure

δ_{hf} = 1.000 mm

Rate = 1.626 mm/min

GEOCONSULT Direct Shear Test ASTM 3080-90

Project: Recovery Solution

File No. 2138-98 Date 8/3/99

RCS-1	Depth [ft]	Sampling Device	Sample Preparation	diameter [in]	height [in]	weight [lb]	w %	Area [in^2]	γ_d [pcf]
	20'-22'	Shelby	Undisturbed	2.5	0.75	0.24516	12	4.91	102.7127

Description: CH, lensed with dark gray-sandy fat clay, subangular medium sand, no Rx, moist

NORMAL LOAD

Fv [lb] : 3.31

Lever factor 10

σ'_n [psf] : 971

Rate = 1.626 mm/min

							Shear Stress	
Clock Time	δh [$x10^{-3}$in]	Load Ring Gage reading [div]	Vertical gage reading [$x10^{-4}$in]	δv [$x10^{-4}$in]	Cn [lb/div]	Fh [lb]	Fh/A τ [psf]	Normalized τ/σ'_n [-]
	0	0.0	222.0	0.0	0.7020	0.0	0.0	0.0000
	10	11.0	225.0	-3.0	0.7015	7.7	226.3	0.2331
	20	14.0	230.0	-8.0	0.7014	9.8	288.0	0.2967
	30	14.0	232.0	-10.0	0.7014	9.8	288.0	0.2967
	40	14.5	235.0	-13.0	0.7014	10.2	298.3	0.3073
	50	15.0	236.0	-14.0	0.7014	10.5	308.5	0.3178
	60	15.5	237.0	-15.0	0.7013	10.9	318.8	0.3284
	70	20.0	234.0	-12.0	0.7012	14.0	411.3	0.4237
	80	23.0	231.0	-9.0	0.7010	16.1	472.9	0.4871
	90	26.0	225.0	-3.0	0.7009	18.2	534.5	0.5506
	100	28.0	220.0	2.0	0.7008	19.6	575.5	0.5928
	110	30.0	215.0	7.0	0.7007	21.0	616.5	0.6351
	120	31.0	212.0	10.0	0.7007	21.7	637.0	0.6562
	130	32.0	209.0	13.0	0.7006	22.4	657.5	0.6774
	140	32.0	207.0	15.0	0.7006	22.4	657.5	0.6774
	150	32.0	206.0	16.0	0.7006	22.4	657.5	0.6774
	160	32.0	206.0	16.0	0.7006	22.4	657.5	0.6774
	170	32.0	205.0	17.0	0.7006	22.4	657.5	0.6774
	180	32.5	206.0	16.0	0.7006	22.8	667.8	0.6879
	190	32.5	206.0	16.0	0.7006	22.8	667.8	0.6879
	200	32.0	206.0	16.0	0.7006	22.4	657.5	0.6774
	210	32.0	206.0	16.0	0.7006	22.4	657.5	0.6774
	220	32.0	207.0	15.0	0.7006	22.4	657.5	0.6774
	230	32.0	207.0	15.0	0.7006	22.4	657.5	0.6774
	240	32.0	207.0	15.0	0.7006	22.4	657.5	0.6774
	250	32.0	207.0	15.0	0.7006	22.4	657.5	0.6774
	260	32.5	208.0	14.0	0.7006	22.8	667.8	0.6879
	270	32.0	208.0	14.0	0.7006	22.4	657.5	0.6774
	280	32.0	209.0	13.0	0.7006	22.4	657.5	0.6774
	290	32.0	209.0	13.0	0.7006	22.4	657.5	0.6774
	300	32.0	209.0	13.0	0.7006	22.4	657.5	0.6774
	310	32.0	210.0	12.0	0.7006	22.4	657.5	0.6774
	320	32.0	210.0	12.0	0.7006	22.4	657.5	0.6774
	330	32.0	211.0	11.0	0.7006	22.4	657.5	0.6774
	340	31.5	211.0	11.0	0.7007	22.1	647.3	0.6668
	350	31.5	212.0	10.0	0.7007	22.1	647.3	0.6668

360	31.5	212.0	10.0	0.7007	22.1	647.3	0.6668
370	31.0	213.0	9.0	0.7007	21.7	637.0	0.6562
380	31.0	214.0	8.0	0.7007	21.7	637.0	0.6562
390	31.0	214.0	8.0	0.7007	21.7	637.0	0.6562
400	31.0	215.0	7.0	0.7007	21.7	637.0	0.6562
410	31.0	215.0	7.0	0.7007	21.7	637.0	0.6562
420	30.5	215.0	7.0	0.7007	21.4	626.8	0.6457
430	30.5	216.0	6.0	0.7007	21.4	626.8	0.6457
440	30.5	216.0	6.0	0.7007	21.4	626.8	0.6457
450	30.0	216.5	5.5	0.7007	21.0	616.5	0.6351
460	30.0	218.0	4.0	0.7007	21.0	616.5	0.6351
470	30.0	218.0	4.0	0.7007	21.0	616.5	0.6351
480	30.0	219.0	3.0	0.7007	21.0	616.5	0.6351
490	30.0	219.0	3.0	0.7007	21.0	616.5	0.6351
500	30.0	219.0	3.0	0.7007	21.0	616.5	0.6351
510	30.0	219.0	3.0	0.7007	21.0	616.5	0.6351
520	29.5	219.0	3.0	0.7007	20.7	606.3	0.6245
530	29.0	219.5	2.5	0.7008	20.3	596.0	0.6140

GEOCONSULT

Direct Shear Test ASTM 3080-90

Project: Recovery Solution

File No. 2138-98 Date: 8/3/99

Description: CH, lensed with dark gray-sandy fat clay, subangular medium sand, no Rx, moist

RCS-1	**Depth** [ft]	Sampling Device	Sample Preparation	diameter [in]	height [in]	weight [lb]	w%	Area [in^2]
1st point	20'-22'	Shelby	Undisturbed	2.5	0.75	0.25	12.0	4.91

Atterberg Limits			dry mass	γ_d	γ
LL	PL	PI	[lb]	[pcf]	[pcf]
41	25	17	0.22	102.71	115.04

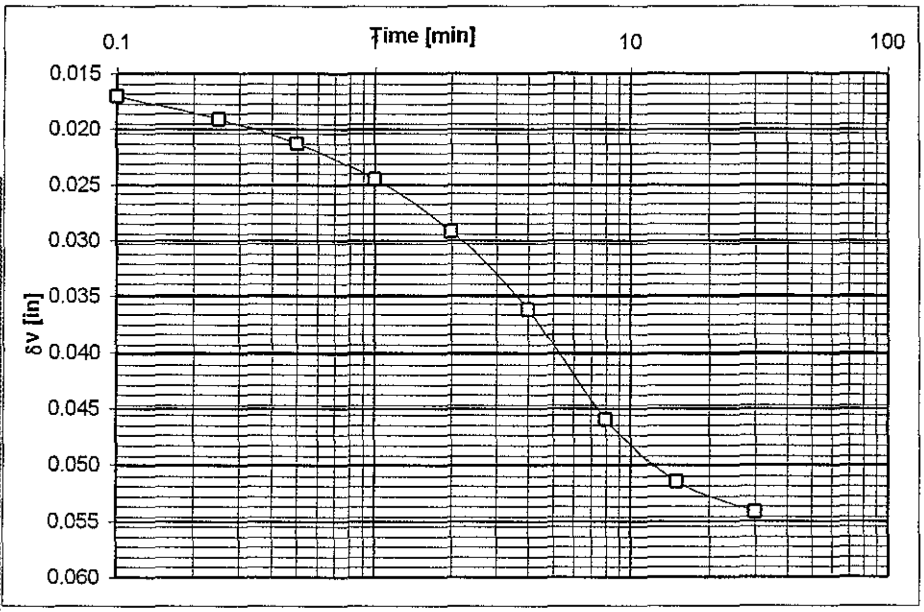
NORMAL LOAD

Fv [lb] : **9.92**

Lever factor 10

σ'_n [psf] : **2909.3**

Clock Time	Elapsed Time	δv [in]
	0	0.0000
	0.1	0.0170
	0.25	0.0191
	0.5	0.0213
	1	0.0245
	2	0.0292
	4	0.0362
	8	0.0460
	15	0.0515
	30	0.0542



Clock Time	Elapsed Time	δv [in]

Clock Time	Elapsed Time	δv [in]

Rate of Shear Estimate:

t_{50} = **0.0343 min**

$t_f = 50t_{50}$ = 1.715 min

Horizontal displacement to failure

δ_{hf} = 1 mm

Rate = 0.5831 mm/min

Consolidation Stage

GEOCONSULT Direct Shear Test ASTM 3080-90

Project: Recovery Solution

File No. 2138-98 Date 8/3/99

RCS-1	Depth [ft]	Sampling Device	Sample Preparation	diameter [in]	height [in]	weight [lb]	w %	Area [in^2]	γ_d [pcf]
	20'-22'	Shelby	Undisturbed	2.5	0.75	0.24516	12	4.91	102.7127

Description: CH, lensed with dark gray-sandy fat clay, subangular medium sand, no Rx, moist

NORMAL LOAD

Fv [lb] : 9.92

Lever factor 10

σ'_n [psf] : **2909** Rate = 0.583 mm/min Shear Stress

Clock Time	δh [$x10^{-3}$in]	Load Ring Gage reading [div]	Vertical gage reading [$x10^{-4}$in]	δv [$x10^{-4}$in]	Cn [lb/div]	Fh [lb]	Fh/A τ [psf]	Normalized τ/σ'_n [-]
	0	0.0	555.0	0.0	0.7020	0.0	0.0	0.0000
	10	22.0	563.0	-8.0	0.7011	15.4	452.3	0.1555
	20	34.0	575.0	-20.0	0.7006	23.8	698.6	0.2401
	30	36.0	583.0	-28.0	0.7005	25.2	739.6	0.2542
	40	42.0	590.0	-35.0	0.7002	29.4	862.5	0.2965
	50	45.0	603.0	-48.0	0.7001	31.5	923.9	0.3176
	60	51.0	602.0	-47.0	0.6998	35.7	1046.8	0.3598
	70	58.0	604.0	-49.0	0.6995	40.6	1189.9	0.4090
	80	63.0	607.0	-52.0	0.6993	44.1	1292.1	0.4441
	90	87.0	609.0	-54.0	0.6983	60.8	1781.7	0.6124
	100	70.0	610.0	-55.0	0.6990	48.9	1435.1	0.4933
	110	70.0	613.0	-58.0	0.6990	48.9	1435.1	0.4933
	120	71.0	615.0	-60.0	0.6990	49.6	1455.5	0.5003
	130	71.0	619.0	-64.0	0.6990	49.6	1455.5	0.5003
	140	71.0	621.0	-66.0	0.6990	49.6	1455.5	0.5003
	150	71.0	625.0	-70.0	0.6990	49.6	1455.5	0.5003
	160	71.0	628.0	-73.0	0.6990	49.6	1455.5	0.5003
	170	71.0	630.0	-75.0	0.6990	49.6	1455.5	0.5003
	180	70.5	634.0	-79.0	0.6990	49.3	1445.3	0.4968
	190	70.0	637.0	-82.0	0.6990	48.9	1435.1	0.4933
	200	70.0	640.0	-85.0	0.6990	48.9	1435.1	0.4933
	210	69.5	642.0	-87.0	0.6990	48.6	1424.9	0.4898
	220	69.5	645.0	-90.0	0.6990	48.6	1424.9	0.4898
	230	69.5	648.0	-93.0	0.6990	48.6	1424.9	0.4898
	240	69.5	650.0	-95.0	0.6990	48.6	1424.9	0.4898
	250	69.5	652.0	-97.0	0.6990	48.6	1424.9	0.4898
	260	69.0	654.0	-99.0	0.6991	48.2	1414.7	0.4862
	270	69.0	656.0	-101.0	0.6991	48.2	1414.7	0.4862
	280	69.0	658.0	-103.0	0.6991	48.2	1414.7	0.4862
	290	69.0	659.0	-104.0	0.6991	48.2	1414.7	0.4862
	300	69.0	661.0	-106.0	0.6991	48.2	1414.7	0.4862
	310	69.0	662.0	-107.0	0.6991	48.2	1414.7	0.4862
	320	68.5	664.0	-109.0	0.6991	47.9	1404.4	0.4827
	330	68.5	665.0	-110.0	0.6991	47.9	1404.4	0.4827
	340	68.5	667.0	-112.0	0.6991	47.9	1404.4	0.4827
	350	68.0	668.0	-113.0	0.6991	47.5	1394.2	0.4792

360	68.0	670.0	-115.0	0.6991	47.5	1394.2	0.4792
370	68.0	671.0	-116.0	0.6991	47.5	1394.2	0.4792
380	68.0	672.0	-117.0	0.6991	47.5	1394.2	0.4792
390	68.0	674.0	-119.0	0.6991	47.5	1394.2	0.4792
400	67.5	675.0	-120.0	0.6991	47.2	1384.0	0.4757
410	67.5	676.0	-121.0	0.6991	47.2	1384.0	0.4757
420	67.5	677.0	-122.0	0.6991	47.2	1384.0	0.4757
430	67.0	678.0	-123.0	0.6992	46.8	1373.8	0.4722
440	67.0	679.0	-124.0	0.6992	46.8	1373.8	0.4722
450	67.0	680.0	-125.0	0.6992	46.8	1373.8	0.4722
460	66.5	681.0	-126.0	0.6992	46.5	1363.6	0.4687
470	66.0	683.0	-128.0	0.6992	46.1	1353.4	0.4652
480	66.0	686.0	-131.0	0.6992	46.1	1353.4	0.4652
490	66.0	686.0	-131.0	0.6992	46.1	1353.4	0.4652
500	66.0	686.5	-131.5	0.6992	46.1	1353.4	0.4652
510	66.0	687.0	-132.0	0.6992	46.1	1353.4	0.4652
520	66.0	688.0	-133.0	0.6992	46.1	1353.4	0.4652
530	66.0	689.0	-134.0	0.6992	46.1	1353.4	0.4652
540	65.5	690.0	-135.0	0.6992	45.8	1343.2	0.4617
550	65.5	690.0	-135.0	0.6992	45.8	1343.2	0.4617
560	65.0	691.0	-136.0	0.6992	45.5	1333.0	0.4582
570	65.0	692.0	-137.0	0.6992	45.5	1333.0	0.4582
580	65.0	692.0	-137.0	0.6992	45.5	1333.0	0.4582
590	65.0	693.0	-138.0	0.6992	45.5	1333.0	0.4582
600	64.0	694.0	-139.0	0.6993	44.8	1312.5	0.4511

GEOCONSULT

Direct Shear Test ASTM 3080-90

Project: Recovery Solution

File No. 2138-98

Date: 8/3/99

Description: CH, lensed with dark gray-sandy fat clay, subangular medium sand, no Rx, moist

RCS-1	**Depth** [ft]	Sampling Device	Sample Preparation	diameter [in]	height [in]	weight [lb]	w%	Area [in²]
3rd point	20'-22'	Shelby	Undisturbed	2.5	0.75	0.25	12	4.91

Atterberg Limits			dry mass	γ_d	γ
LL	PL	PI	[lb]	[pcf]	[pcf]
41	25	17	0.22	102.71	115.04

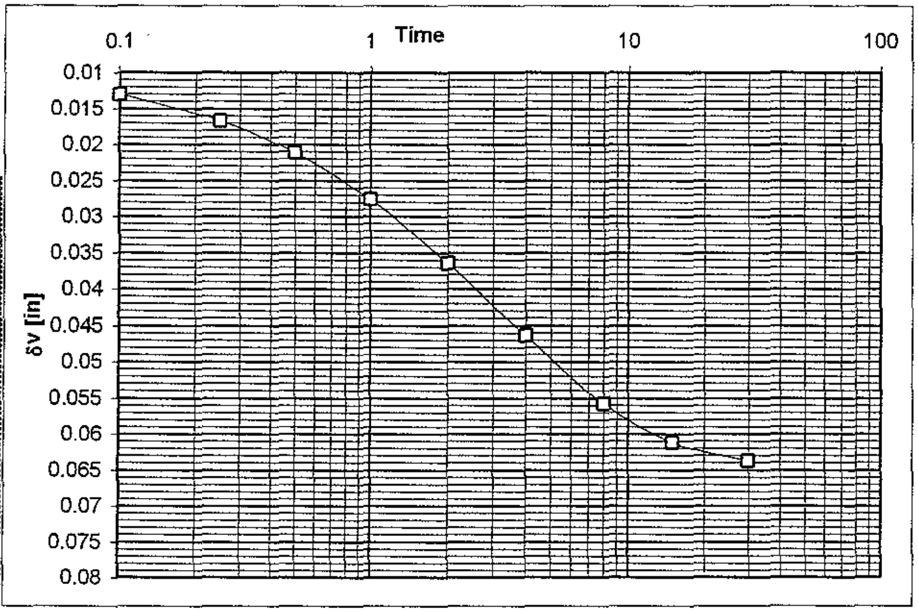
NORMAL LOAD

Fv [lb] : **16.5**

Lever factor 10

σ'_n [psf] : **4839.1**

Clock Time	Elapsed Time	δv [in]
	0.1	0.0131
	0.25	0.0168
	0.5	0.0212
	1	0.0277
	2	0.0365
	4	0.0464
	8	0.0559
	15	0.0613
	30	0.0638



Clock Time	Elapsed Time	δv [in]

Clock Time	Elapsed Time	δv [in]

Rate of Shear Estimate:

t_{50} = **0.033 min**

$t_f = 50t_{50}$ = 1.665 min

Horizontal displacement to failure

δ_{hf} = 1 mm

Rate = 0.601 mm/min

GEOCONSULT Direct Shear Test ASTM 3080-90

Project: Recovery Solution

File No. 2138-98 Date 8/3/99

RCS-1	Depth [ft]	Sampling Device	Sample Preparation	diameter [in]	height [in]	weight [lb]	w %	Area [in^2]	γ_d [pcf]
	20'-22'	Shelby	Undisturbed	2.5	0.75	0.24516	12	4.91	102.7127

escription: CH, lensed with dark gray-sandy fat clay, subangular medium sand, no Rx, moist

NORMAL LOAD

Fv [lb] :	**16.5**
Lever factor	10
σ'_n [psf] :	**4839**

Rate = 0.601 mm/min

							Shear Stress	
Clock Time	δh [$x10^{-3}in$]	Load Ring Gage reading [div]	Vertical gage reading [$x10^{-4}in$]	δv [$x10^{-4}in$]	Cn [lb/div]	Fh [lb]	Fh/A τ [psf]	Normalized τ/σ'_n [-]
	0	0.0	646.0	0.0	0.7020	0.0	0.0	0.0000
	10	45.0	657.0	-11.0	0.7001	31.5	923.9	0.1909
	20	67.0	658.0	-12.0	0.6992	46.8	1373.8	0.2839
	30	78.0	676.0	-30.0	0.6987	54.5	1598.3	0.3303
	40	85.0	681.0	-35.0	0.6984	59.4	1741.0	0.3598
	50	90.0	690.0	-44.0	0.6982	62.8	1842.8	0.3808
	60	96.0	697.0	-51.0	0.6979	67.0	1965.0	0.4061
	70	98.0	704.0	-58.0	0.6978	68.4	2005.7	0.4145
	80	100.0	710.0	-64.0	0.6978	69.8	2046.4	0.4229
	90	101.0	715.0	-69.0	0.6977	70.5	2066.7	0.4271
	100	102.0	720.0	-74.0	0.6977	71.2	2087.0	0.4313
	110	103.0	724.0	-78.0	0.6976	71.9	2107.4	0.4355
	120	103.0	728.0	-82.0	0.6976	71.9	2107.4	0.4355
	130	103.0	733.0	-87.0	0.6976	71.9	2107.4	0.4355
	140	103.0	739.0	-93.0	0.6976	71.9	2107.4	0.4355
	150	103.5	742.0	-96.0	0.6976	72.2	2117.5	0.4376
	160	104.0	746.0	-100.0	0.6976	72.5	2127.7	0.4397
	170	104.5	750.0	-104.0	0.6976	72.9	2137.9	0.4418
	180	105.0	752.0	-106.0	0.6975	73.2	2148.0	0.4439
	190	106.0	756.0	-110.0	0.6975	73.9	2168.3	0.4481
	200	106.5	760.0	-114.0	0.6975	74.3	2178.5	0.4502
	210	107.0	762.0	-116.0	0.6975	74.6	2188.7	0.4523
	220	108.0	765.0	-119.0	0.6974	75.3	2209.0	0.4565
	230	109.0	768.0	-122.0	0.6974	76.0	2229.3	0.4607
	240	109.0	770.0	-124.0	0.6974	76.0	2229.3	0.4607
	250	109.5	772.0	-126.0	0.6973	76.4	2239.5	0.4628
	260	110.0	775.0	-129.0	0.6973	76.7	2249.6	0.4649
	270	110.0	777.0	-131.0	0.6973	76.7	2249.6	0.4649
	280	110.5	780.0	-134.0	0.6973	77.1	2259.8	0.4670
	290	111.0	784.0	-138.0	0.6973	77.4	2269.9	0.4691
	300	111.0	786.0	-140.0	0.6973	77.4	2269.9	0.4691
	310	111.0	788.0	-142.0	0.6973	77.4	2269.9	0.4691
	320	111.0	789.0	-143.0	0.6973	77.4	2269.9	0.4691
	330	111.5	791.0	-145.0	0.6973	77.7	2280.1	0.4712
	340	112.0	793.0	-147.0	0.6972	78.1	2290.2	0.4733
	350	112.0	794.0	-148.0	0.6972	78.1	2290.2	0.4733

Shearing Stage

360	112.0	795.0	-149.0	0.6972	78.1	2290.2	0.4733
370	112.0	797.0	-151.0	0.6972	78.1	2290.2	0.4733
380	112.0	798.5	-152.5	0.6972	78.1	2290.2	0.4733
390	112.0	799.0	-153.0	0.6972	78.1	2290.2	0.4733
400	112.5	800.0	-154.0	0.6972	78.4	2300.4	0.4754
410	112.5	801.0	-155.0	0.6972	78.4	2300.4	0.4754
420	112.5	803.0	-157.0	0.6972	78.4	2300.4	0.4754
430	112.5	803.5	-157.5	0.6972	78.4	2300.4	0.4754
440	112.5	804.5	-158.5	0.6972	78.4	2300.4	0.4754
450	112.5	805.0	-159.0	0.6972	78.4	2300.4	0.4754
460	112.5	806.5	-160.5	0.6972	78.4	2300.4	0.4754
470	112.5	807.0	-161.0	0.6972	78.4	2300.4	0.4754
480	112.5	808.0	-162.0	0.6972	78.4	2300.4	0.4754
490	112.0	809.0	-163.0	0.6972	78.1	2290.2	0.4733
500	112.0	810.0	-164.0	0.6972	78.1	2290.2	0.4733
510	111.5	811.0	-165.0	0.6973	77.7	2280.1	0.4712
520	112.0	811.5	-165.5	0.6972	78.1	2290.2	0.4733
530	112.0	812.0	-166.0	0.6972	78.1	2290.2	0.4733
540	110.5	815.0	-169.0	0.6973	77.1	2259.8	0.4670
550	110.0	815.0	-169.0	0.6973	76.7	2249.6	0.4649
560	110.0	816.0	-170.0	0.6973	76.7	2249.6	0.4649
570	110.0	816.5	-170.5	0.6973	76.7	2249.6	0.4649
580	109.5	818.0	-172.0	0.6973	76.4	2239.5	0.4628
590	109.0	819.0	-173.0	0.6974	76.0	2229.3	0.4607
600	109.0	819.0	-173.0	0.6974	76.0	2229.3	0.4607
610	108.5	820.0	-174.0	0.6974	75.7	2219.1	0.4586
620	108.0	821.0	-175.0	0.6974	75.3	2209.0	0.4565
630	108.0	822.0	-176.0	0.6974	75.3	2209.0	0.4565
640	107.5	823.0	-177.0	0.6974	75.0	2198.8	0.4544
650	107.0	823.5	-177.5	0.6975	74.6	2188.7	0.4523
660	107.0	824.5	-178.5	0.6975	74.6	2188.7	0.4523

GEOCONSULT Direct Shear Test ASTM 3080-90

Project: Recovery Solution

File No. 2138-98 Date: 8/3/99

Descriptior CH, lensed with dark gray-sandy fat clay, subangular medium sand, no Rx, moist

RCS-1	**Depth** [ft]	Sampling Device	Sample Preparation	diameter [in]	height [in]	weight [lb]	w%	Area [in^2]
4th point	20'-22'	Shelby	Undisturbed	2.5	0.75	0.25	12	4.91

Atterberg Limits			dry mass	γ_d	γ
LL	PL	PI	[lb]	[pcf]	[pcf]
41	25	17	0.22	102.71	115.04

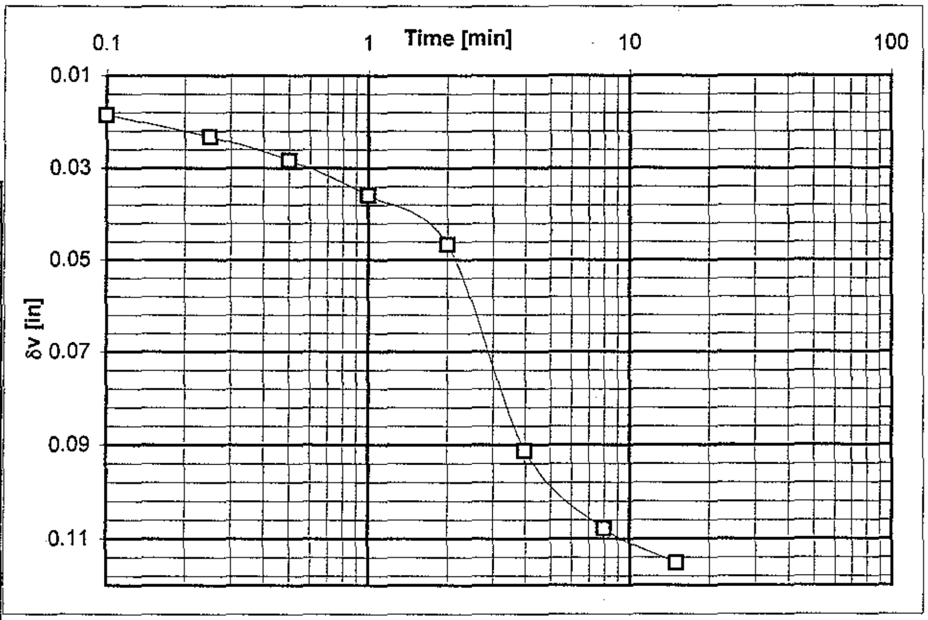
NORMAL LOAD

Fv [lb] : **23.15**

Lever factor 10

σ'_n [psf] : **6789.4**

Clock Time	Elapsed Time [min]	δv [in]
	0.1	0.0185
	0.25	0.0233
	0.5	0.0283
	1	0.0359
	2	0.0467
	4	0.0913
	8	0.1079
	15	0.1153



Clock Time	Elapsed Time	δv [in]

Clock Time	Elapsed Time	δv [in]

Rate of Shear Estimate:

t_{50} = **0.0666 min**

$t_f = 50t_{50}$ = 3.33 min

Horizontal displacement to failure

δ_{hf} = 1 mm

Rate = 0.300 mm/min

GEOCONSULT

Direct Shear Test ASTM 3080-90

Project: Recovery Solution
File No. 2138-98 Date 8/3/99

RCS-1	Depth [ft]	Sampling Device	Sample Preparation	diameter [in]	height [in]	weight [lb]	w %	Area [in^2]	γ_d [pcf]
	20'-22'	Shelby	Undisturbed	2.5	0.75	0.24516	12	4.91	102.7127308

Description: CH, lensed with dark gray-sandy fat clay, subangular medium sand, no Rx, moist

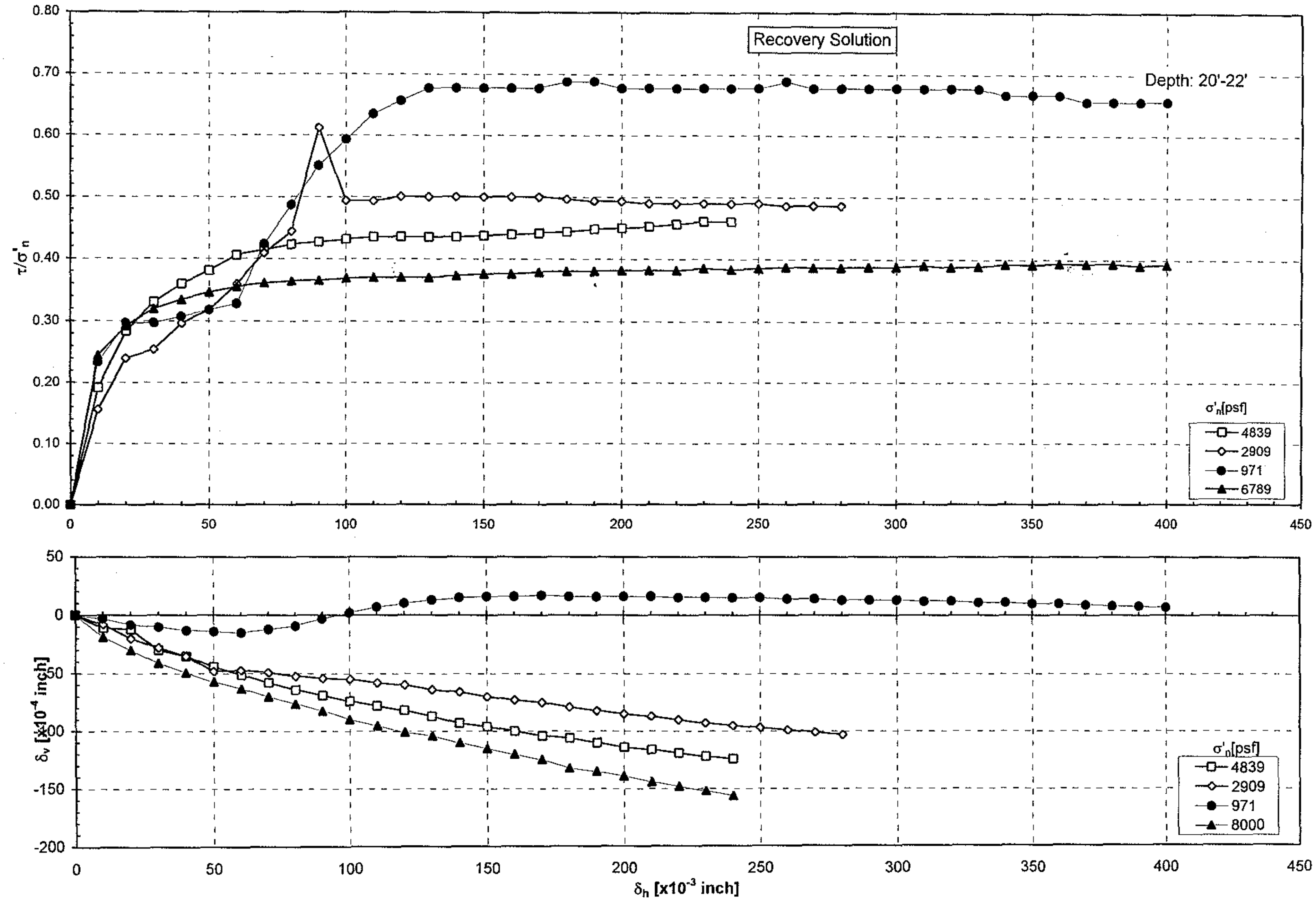
NORMAL LOAD

Fv [lb] :	**23.15**
Lever factor	10
σ'_n [psf] :	**6789**

Rate = 0.300 mm/min

Clock Time	δh [x10^{-3}in]	Load Ring Gage reading [div]	Vertical gage reading [x10^{-4}in]	δv [x10^{-4}in]	Cn [lb/div]	Fh [lb]	Shear Stress Fh/A τ [psf]	Normalized τ/σ'$_n$ [-]
	0	0.0	1164.0	0.0	0.7020	0.0	0.0	0.0000
	10	81.0	1183.0	-19.0	0.6986	56.6	1659.5	0.2444
	20	97.0	1194.0	-30.0	0.6979	67.7	1985.3	0.2924
	30	106.0	1205.0	-41.0	0.6975	73.9	2168.3	0.3194
	40	111.0	1213.0	-49.0	0.6973	77.4	2269.9	0.3343
	50	115.0	1221.0	-57.0	0.6971	80.2	2351.2	0.3463
	60	118.0	1227.0	-63.0	0.6970	82.2	2412.1	0.3553
	70	120.0	1234.0	-70.0	0.6969	83.6	2452.6	0.3612
	80	121.0	1240.0	-76.0	0.6969	84.3	2472.9	0.3642
	90	121.5	1246.5	-82.5	0.6968	84.7	2483.1	0.3657
	100	122.5	1254.0	-90.0	0.6968	85.4	2503.3	0.3687
	110	123.0	1259.0	-95.0	0.6968	85.7	2513.5	0.3702
	120	123.0	1265.0	-101.0	0.6968	85.7	2513.5	0.3702
	130	123.0	1268.0	-104.0	0.6968	85.7	2513.5	0.3702
	140	124.0	1274.0	-110.0	0.6967	86.4	2533.8	0.3732
	150	125.0	1279.0	-115.0	0.6967	87.1	2554.0	0.3762
	160	125.0	1284.0	-120.0	0.6967	87.1	2554.0	0.3762
	170	126.0	1289.0	-125.0	0.6966	87.8	2574.3	0.3792
	180	126.5	1296.0	-132.0	0.6966	88.1	2584.5	0.3807
	190	126.5	1299.0	-135.0	0.6966	88.1	2584.5	0.3807
	200	127.0	1303.0	-139.0	0.6966	88.5	2594.6	0.3822
	210	127.0	1308.0	-144.0	0.6966	88.5	2594.6	0.3822
	220	127.0	1312.0	-148.0	0.6966	88.5	2594.6	0.3822
	230	128.0	1316.0	-152.0	0.6966	89.2	2614.9	0.3851
	240	127.5	1320.0	-156.0	0.6966	88.8	2604.7	0.3836
	250	128.0	1323.0	-159.0	0.6966	89.2	2614.9	0.3851
	260	129.0	1326.0	-162.0	0.6965	89.9	2635.1	0.3881
	270	128.5	1331.0	-167.0	0.6965	89.5	2625.0	0.3866
	280	128.5	1334.0	-170.0	0.6965	89.5	2625.0	0.3866
	290	129.0	1338.0	-174.0	0.6965	89.9	2635.1	0.3881
	300	129.0	1341.0	-177.0	0.6965	89.9	2635.1	0.3881
	310	130.0	1344.0	-180.0	0.6965	90.5	2655.4	0.3911

320	129.0	1348.0	-184.0	0.6965	89.9	2635.1	0.3881
330	129.5	1351.0	-187.0	0.6965	90.2	2645.3	0.3896
340	130.5	1355.0	-191.0	0.6965	90.9	2665.5	0.3926
350	130.5	1358.0	-194.0	0.6965	90.9	2665.5	0.3926
360	131.0	1360.0	-196.0	0.6964	91.2	2675.7	0.3941
370	131.0	1363.0	-199.0	0.6964	91.2	2675.7	0.3941
380	131.0	1364.0	-200.0	0.6964	91.2	2675.7	0.3941
390	130.0	1369.0	-205.0	0.6965	90.5	2655.4	0.3911
400	130.5	1371.0	-207.0	0.6965	90.9	2665.5	0.3926
410	131.0	1375.0	-211.0	0.6964	91.2	2675.7	0.3941
420	132.0	1378.0	-214.0	0.6964	91.9	2695.9	0.3971
430	131.5	1380.0	-216.0	0.6964	91.6	2685.8	0.3956
440	133.0	1383.0	-219.0	0.6963	92.6	2716.2	0.4001
450	134.0	1386.0	-222.0	0.6963	93.3	2736.4	0.4030
460	135.0	1388.0	-224.0	0.6963	94.0	2756.7	0.4060
470	136.0	1390.0	-226.0	0.6962	94.7	2776.9	0.4090
480	136.0	1392.5	-228.5	0.6962	94.7	2776.9	0.4090
490	136.0	1395.0	-231.0	0.6962	94.7	2776.9	0.4090
500	134.5	1399.0	-235.0	0.6963	93.7	2746.6	0.4045
510	135.0	1401.5	-237.5	0.6963	94.0	2756.7	0.4060
520	136.5	1404.0	-240.0	0.6962	95.0	2787.1	0.4105
530	135.0	1407.0	-243.0	0.6963	94.0	2756.7	0.4060
540	136.0	1410.0	-246.0	0.6962	94.7	2776.9	0.4090
550	136.0	1411.0	-247.0	0.6962	94.7	2776.9	0.4090
560	137.0	1414.0	-250.0	0.6962	95.4	2797.2	0.4120
570	137.0	1417.0	-253.0	0.6962	95.4	2797.2	0.4120
580	136.0	1419.0	-255.0	0.6962	94.7	2776.9	0.4090
590	137.0	1422.0	-258.0	0.6962	95.4	2797.2	0.4120
600	136.0	1425.0	-261.0	0.6962	94.7	2776.9	0.4090
610	136.0	1432.0	-268.0	0.6962	94.7	2776.9	0.4090
620	138.0	1430.0	-266.0	0.6961	96.1	2817.4	0.4150
630	138.0	1434.0	-270.0	0.6961	96.1	2817.4	0.4150
640	138.0	1435.0	-271.0	0.6961	96.1	2817.4	0.4150
650	139.0	1437.0	-273.0	0.6961	96.8	2837.7	0.4180
660	138.0	1440.0	-276.0	0.6961	96.1	2817.4	0.4150
670	136.0	1443.0	-279.0	0.6962	94.7	2776.9	0.4090


Recovery Solution
Depth: 20'-22'
τ/σ'_n
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
0
50
100
150
200
250
300
350
400
450
σ'_n[psf]
4839
2909
971
6789
50
0
-50
-100
-150
-200
δ_v [x10^{-4} inch]
δ_h [x10^{-3} inch]
σ'_n[psf]
4839
2909
971
8000

GEOCONSULT Direct Shear Test ASTM 3080-90

Project: Recovery Solution

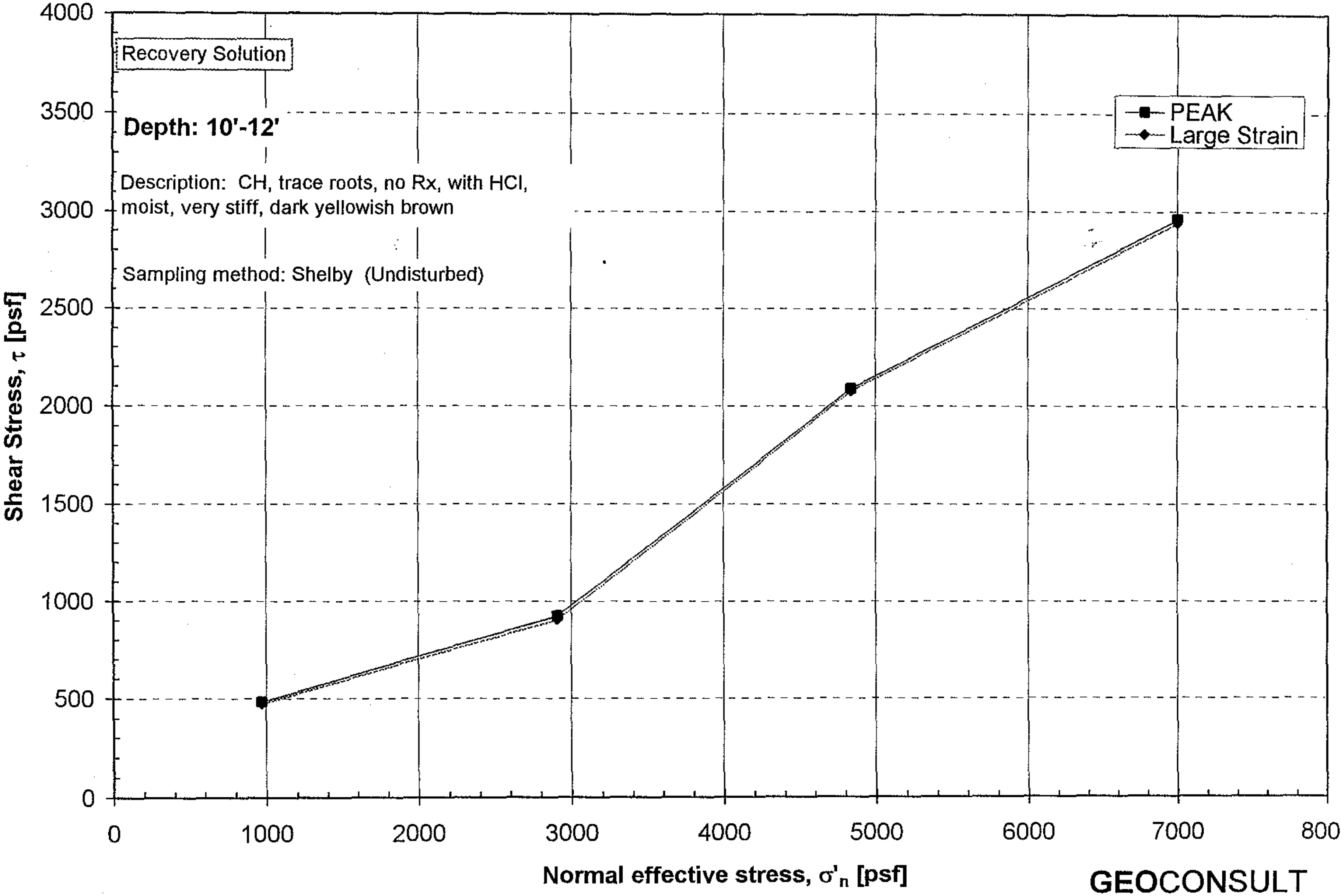
File No. 2138-98 Date 8/3/99

Description: CH, trace roots, no Rx, with HCl, moist, very stiff, dark yellowish brown

RCS-1	Depth [ft]	Sampling Device	Sample Preparation	diameter [in]	height [in]	weight [lb]	w%	Area [in^2]
1st point	10'-12'	Shelby	Undisturbed	2.5	0.75	0.24516	35.5	4.91

Atterberg Limits			dry mass	γ_d	γ
LL	PL	PI	[lb]	[pcf]	[pcf]
41	20	21	0.17	79.65	115.04

σ'_n [psf]	τ_{peak} [psf]	τ_{ls} [psf]
0	0	0
971	483	473
2909	924	904
4839	2087	2077
7000	2959	2939


Recovery Solution
Depth: 10'-12'
Description: CH, trace roots, no Rx, with HCl, moist, very stiff, dark yellowish brown
Sampling method: Shelby (Undisturbed)
■ PEAK
◆ Large Strain
Shear Stress, τ [psf]
4000
3500
3000
2500
2000
1500
1000
500
0
0
1000
2000
3000
4000
5000
6000
7000
8000
Normal effective stress, σ'n [psf]

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GEOCONSULT Direct Shear Test ASTM 3080-90

Project: Recovery Solution

File No. 2138-98 Date: 8/3/99

Description: CH, trace roots, no Rx, with HCl, moist, very stiff, dark yellowish brown

RCS-1	**Depth** [ft]	Sampling Device	Sample Preparation	diameter [in]	height [in]	weight [lb]	w%	Area [in²]
2nd point	10'-12'	Shelby	Undisturbed	2.5	0.75	0.25	12	4.91

Atterberg Limits LL	PL	PI	dry mass [lb]	γ_d [pcf]	γ [pcf]
41	20	21	0.22	102.71	115.04

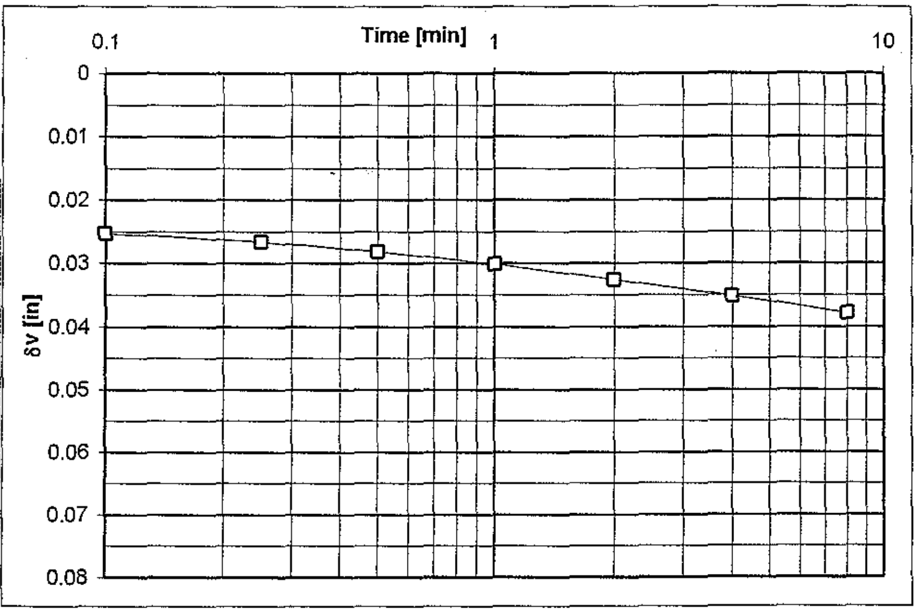
NORMAL LOAD

Fv [lb] : **3.31**

Lever factor 10

σ'_n [psf] : **970.8**

Clock Time	Elapsed Time	δv [in]
	0.1	0.0253
	0.25	0.0267
	0.5	0.0282
	1	0.0302
	2	0.0326
	4	0.0353
	8	0.0379
	15	0.0403



Clock Time	Elapsed Time	δv [in]

Clock Time	Elapsed Time	δv [in]

Rate of Shear Estimate:

t_{50} = **0.029 min**

$t_f = 50t_{50}$ = 1.440 min

Horizontal displacement to failure

δ_{hf} = 1.000 mm

Rate = 0.694 mm/min

GEOCONSULT Direct Shear Test ASTM 3080-90

Project: Recovery Solution

File No. 2138-98 Date 8/3/99

RCS-1	**Depth [ft]**	Sampling Device	Sample Preparation	diameter [in]	height [in]	weight [lb]	w %	Area [in^2]	γ_d [pcf]
	10'-12'	Shelby	Undisturbed	2.5	0.75	0.24516	12	4.91	102.7127

NORMAL LOAD **Description:** CH, trace roots, no Rx, with HCl, moist, very stiff, dark yellowish brown

Fv [lb] : 3.31

Lever factor 10

σ'_n [psf] : **971**

Rate = 0.694 mm/min

Clock Time	δh [x10^{-3}in]	Load Ring Gage reading [div]	Vertical gage reading [x10^{-4}in]	δv [x10^{-4}in]	Cn [lb/div]	Fh [lb]	Shear Stress Fh/A τ [psf]	Normalized τ/σ'_n [-]
	0	0.0	441.0	0.0	0.7020	0.0	0.0	0.0000
	10	10.0	446.0	-5.0	0.7016	7.0	205.8	0.2120
	20	16.0	448.0	-7.0	0.7013	11.2	329.1	0.3390
	30	18.0	451.0	-10.0	0.7012	12.6	370.2	0.3813
	40	20.0	452.0	-11.0	0.7012	14.0	411.3	0.4237
	50	21.0	453.0	-12.0	0.7011	14.7	431.8	0.4448
	60	22.0	454.0	-13.0	0.7011	15.4	452.3	0.4660
	70	22.0	456.0	-15.0	0.7011	15.4	452.3	0.4660
	80	23.0	458.0	-17.0	0.7010	16.1	472.9	0.4871
	90	23.0	459.0	-18.0	0.7010	16.1	472.9	0.4871
	100	23.0	460.0	-19.0	0.7010	16.1	472.9	0.4871
	110	23.0	461.0	-20.0	0.7010	16.1	472.9	0.4871
	120	23.0	462.0	-21.0	0.7010	16.1	472.9	0.4871
	130	23.5	463.0	-22.0	0.7010	16.5	483.1	0.4977
	140	23.5	464.0	-23.0	0.7010	16.5	483.1	0.4977
	150	23.5	465.0	-24.0	0.7010	16.5	483.1	0.4977
	160	23.5	466.0	-25.0	0.7010	16.5	483.1	0.4977
	170	23.5	466.0	-25.0	0.7010	16.5	483.1	0.4977
	180	23.5	466.0	-25.0	0.7010	16.5	483.1	0.4977
	190	23.5	467.0	-26.0	0.7010	16.5	483.1	0.4977
	200	23.5	467.0	-26.0	0.7010	16.5	483.1	0.4977
	210	23.5	468.0	-27.0	0.7010	16.5	483.1	0.4977
	220	23.5	468.0	-27.0	0.7010	16.5	483.1	0.4977
	230	23.5	469.0	-28.0	0.7010	16.5	483.1	0.4977
	240	23.5	469.0	-28.0	0.7010	16.5	483.1	0.4977
	250	23.5	469.0	-28.0	0.7010	16.5	483.1	0.4977
	260	23.5	469.0	-28.0	0.7010	16.5	483.1	0.4977
	270	23.5	470.0	-29.0	0.7010	16.5	483.1	0.4977
	280	23.5	470.0	-29.0	0.7010	16.5	483.1	0.4977
	290	23.5	470.0	-29.0	0.7010	16.5	483.1	0.4977
	300	23.0	471.0	-30.0	0.7010	16.1	472.9	0.4871
	310	23.0	471.0	-30.0	0.7010	16.1	472.9	0.4871
	320	23.0	472.0	-31.0	0.7010	16.1	472.9	0.4871
	330	23.0	472.0	-31.0	0.7010	16.1	472.9	0.4871
	340	23.0	473.0	-32.0	0.7010	16.1	472.9	0.4871
	350	23.0	473.0	-32.0	0.7010	16.1	472.9	0.4871
	360	23.0	473.0	-32.0	0.7010	16.1	472.9	0.4871

370	22.5	473.0	-32.0	0.7010	15.8	462.6	0.4765
380	22.5	474.0	-33.0	0.7010	15.8	462.6	0.4765
390	22.5	474.0	-33.0	0.7010	15.8	462.6	0.4765
400	22.5	475.0	-34.0	0.7010	15.8	462.6	0.4765
410	22.5	475.0	-34.0	0.7010	15.8	462.6	0.4765
420	22.0	475.0	-34.0	0.7011	15.4	452.3	0.4660
430	22.0	475.0	-34.0	0.7011	15.4	452.3	0.4660
440	22.0	476.0	-35.0	0.7011	15.4	452.3	0.4660
450	22.0	476.0	-35.0	0.7011	15.4	452.3	0.4660
460	22.0	477.0	-36.0	0.7011	15.4	452.3	0.4660
470	21.5	477.0	-36.0	0.7011	15.1	442.1	0.4554

GEOCONSULT

Direct Shear Test ASTM 3080-90

Project: Recovery Solution

File No. 2138-98

Date: 8/3/99

Description: CH, trace roots, no Rx, with HCl, moist, very stiff, dark yellowish brown

RCS-1	**Depth** [ft]	Sampling Device	Sample Preparation	diameter [in]	height [in]	weight [lb]	w%	Area [in²]
1st point	10'-12'	Shelby	Undisturbed	2.5	0.75	0.25	12.0	4.91

Atterberg Limits			dry mass	γ_d	γ
LL	PL	PI	[lb]	[pcf]	[pcf]
41	20	21	0.22	102.71	115.04

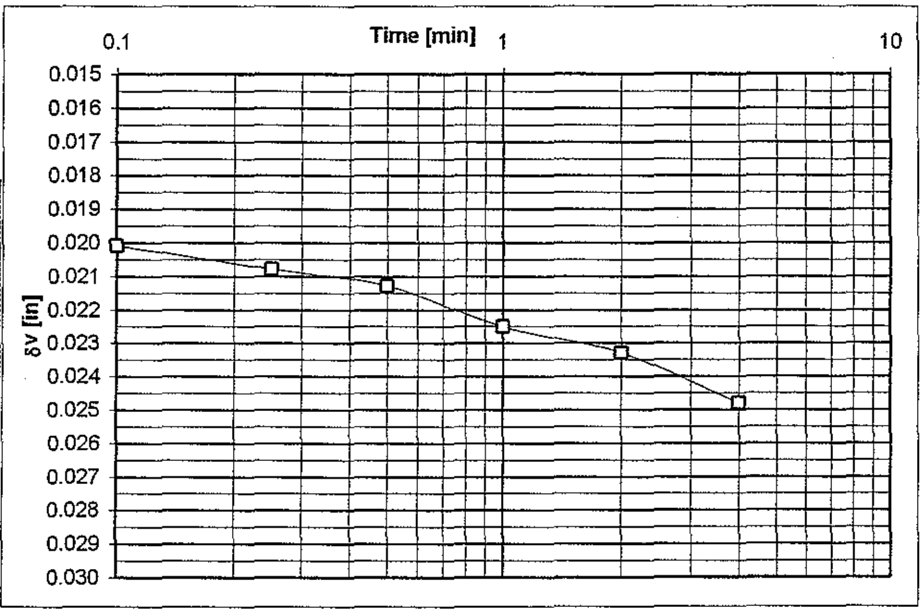
NORMAL LOAD

Fv [lb] : **9.92**

Lever factor 10

σ'_n [psf] : **2909.3**

Clock Time	Elapsed Time	δv [in]
	0	0.0000
	0.1	0.0201
	0.25	0.0208
	0.5	0.0213
	1	0.0225
	2	0.0233
	4	0.0248



Clock Time	Elapsed Time	δv [in]

Clock Time	Elapsed Time	δv [in]

Rate of Shear Estimate:

t_{50} = 0.0212 min

$t_f = 50t_{50}$ = 1.06 min

Horizontal displacement to failure

δ_{hf} = 1 mm

Rate = 0.9434 mm/min

GEOCONSULT Direct Shear Test ASTM 3080-90

Project: Recovery Solution

File No. 2138-98 Date 8/3/99

RCS-1	Depth [ft]	Sampling Device	Sample Preparation	diameter [in]	height [in]	weight [lb]	w %	Area [in^2]	γ_d [pcf]
	10'-12'	Shelby	Undisturbed	2.5	0.75	0.24516	12	4.91	102.7127

NORMAL LOAD **Description:** CH, trace roots, no Rx, with HCl, moist, very stiff, dark yellowish brown

Fv [lb] : **9.92**

Lever factor 10

σ'_n [psf] : **2909**

Rate = 0.943 mm/min

Shear Stress

Clock Time	δh [x10^{-3}in]	Load Ring Gage reading [div]	Vertical gage reading [x10^{-4}in]	δv [x10^{-4}in]	Cn [lb/div]	Fh [lb]	Fh/A τ [psf]	Normalized τ/σ'_n [-]
	0	0.0	254.0	0.0	0.7020	0.0	0.0	0.0000
	10	7.0	370.0	-116.0	0.7017	4.9	144.1	0.0495
	20	7.0	372.0	-118.0	0.7017	4.9	144.1	0.0495
	30	7.0	380.0	-126.0	0.7017	4.9	144.1	0.0495
	40	12.0	392.0	-138.0	0.7015	8.4	246.9	0.0849
	50	15.0	398.0	-144.0	0.7014	10.5	308.5	0.1061
	60	19.0	400.0	-146.0	0.7012	13.3	390.7	0.1343
	70	23.0	401.0	-147.0	0.7010	16.1	472.9	0.1625
	80	27.0	401.0	-147.0	0.7009	18.9	555.0	0.1908
	90	30.0	401.0	-147.0	0.7007	21.0	616.5	0.2119
	100	33.0	405.0	-151.0	0.7006	23.1	678.1	0.2331
	110	35.0	406.0	-152.0	0.7005	24.5	719.1	0.2472
	120	37.0	408.0	-154.0	0.7004	25.9	760.1	0.2612
	130	38.0	407.0	-153.0	0.7004	26.6	780.6	0.2683
	140	39.0	406.0	-152.0	0.7003	27.3	801.0	0.2753
	150	40.0	406.0	-152.0	0.7003	28.0	821.5	0.2824
	160	41.0	406.0	-152.0	0.7003	28.7	842.0	0.2894
	170	41.0	406.0	-152.0	0.7003	28.7	842.0	0.2894
	180	42.0	410.0	-156.0	0.7002	29.4	862.5	0.2965
	190	42.0	411.0	-157.0	0.7002	29.4	862.5	0.2965
	200	42.0	412.0	-158.0	0.7002	29.4	862.5	0.2965
	210	42.0	414.0	-160.0	0.7002	29.4	862.5	0.2965
	220	42.5	417.0	-163.0	0.7002	29.8	872.7	0.3000
	230	42.5	420.0	-166.0	0.7002	29.8	872.7	0.3000
	240	42.5	423.0	-169.0	0.7002	29.8	872.7	0.3000
	250	43.0	426.0	-172.0	0.7002	30.1	883.0	0.3035
	260	44.0	427.0	-173.0	0.7001	30.8	903.5	0.3105
	270	44.0	428.0	-174.0	0.7001	30.8	903.5	0.3105
	280	44.0	429.0	-175.0	0.7001	30.8	903.5	0.3105
	290	44.5	429.0	-175.0	0.7001	31.2	913.7	0.3141
	300	44.5	429.0	-175.0	0.7001	31.2	913.7	0.3141
	310	44.5	429.0	-175.0	0.7001	31.2	913.7	0.3141
	320	45.0	429.0	-175.0	0.7001	31.5	923.9	0.3176
	330	45.0	429.0	-175.0	0.7001	31.5	923.9	0.3176
	340	45.0	429.0	-175.0	0.7001	31.5	923.9	0.3176
	350	45.0	429.0	-175.0	0.7001	31.5	923.9	0.3176
	360	45.0	429.0	-175.0	0.7001	31.5	923.9	0.3176

370	45.0	429.0	-175.0	0.7001	31.5	923.9	0.3176
380	45.0	428.0	-174.0	0.7001	31.5	923.9	0.3176
390	45.0	428.0	-174.0	0.7001	31.5	923.9	0.3176
400	45.0	428.0	-174.0	0.7001	31.5	923.9	0.3176
410	44.0	427.0	-173.0	0.7001	30.8	903.5	0.3105
420	44.0	427.0	-173.0	0.7001	30.8	903.5	0.3105
430	44.0	427.0	-173.0	0.7001	30.8	903.5	0.3105
440	44.0	427.0	-173.0	0.7001	30.8	903.5	0.3105
450	44.0	427.0	-173.0	0.7001	30.8	903.5	0.3105
460	44.0	427.0	-173.0	0.7001	30.8	903.5	0.3105
470	44.0	427.0	-173.0	0.7001	30.8	903.5	0.3105
480	44.0	428.0	-174.0	0.7001	30.8	903.5	0.3105
490	43.5	428.0	-174.0	0.7002	30.5	893.2	0.3070
500	43.5	429.0	-175.0	0.7002	30.5	893.2	0.3070
510	43.5	429.0	-175.0	0.7002	30.5	893.2	0.3070
520	43.5	429.0	-175.0	0.7002	30.5	893.2	0.3070
530	43.0	430.0	-176.0	0.7002	30.1	883.0	0.3035
540	43.0	429.0	-175.0	0.7002	30.1	883.0	0.3035
550	43.0	431.0	-177.0	0.7002	30.1	883.0	0.3035
560	43.0	431.0	-177.0	0.7002	30.1	883.0	0.3035
570	43.0	432.0	-178.0	0.7002	30.1	883.0	0.3035
580	42.5	432.0	-178.0	0.7002	29.8	872.7	0.3000
590	42.0	433.0	-179.0	0.7002	29.4	862.5	0.2965
600	42.0	433.0	-179.0	0.7002	29.4	862.5	0.2965
610	42.0	434.0	-180.0	0.7002	29.4	862.5	0.2965
620	42.0	435.0	-181.0	0.7002	29.4	862.5	0.2965
630	42.0	436.0	-182.0	0.7002	29.4	862.5	0.2965
640	42.0	436.0	-182.0	0.7002	29.4	862.5	0.2965
650	41.5	437.0	-183.0	0.7002	29.1	852.3	0.2929
660	41.5	438.0	-184.0	0.7002	29.1	852.3	0.2929
670	41.0	439.0	-185.0	0.7003	28.7	842.0	0.2894
680	41.0	439.0	-185.0	0.7003	28.7	842.0	0.2894
690	41.0	440.0	-186.0	0.7003	28.7	842.0	0.2894
700	41.0	441.0	-187.0	0.7003	28.7	842.0	0.2894
710	40.5	441.0	-187.0	0.7003	28.4	831.8	0.2859
720	40.5	442.0	-188.0	0.7003	28.4	831.8	0.2859
730	40.5	443.0	-189.0	0.7003	28.4	831.8	0.2859

GEOCONSULT

Direct Shear Test ASTM 3080-90

Project: Recovery Solution

File No. 2138-98

Date: 8/3/99

Description: CH, trace roots, no Rx, with HCl, moist, very stiff, dark yellowish brown

RCS-1	**Depth** [ft]	Sampling Device	Sample Preparation	diameter [in]	height [in]	weight [lb]	w%	Area [in²]
3rd point	10'-12'	Shelby	Undisturbed	2.5	0.75	0.25	12	4.91

Atterberg Limits			dry mass	γ_d	γ
LL	PL	PI	[lb]	[pcf]	[pcf]
41	20	21	0.22	102.71	115.04

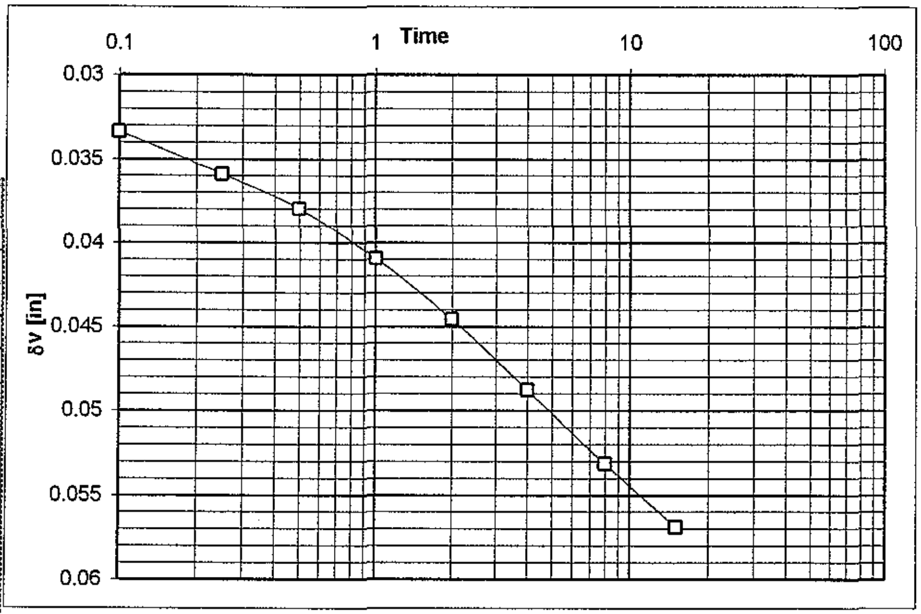
NORMAL LOAD

Fv [lb] : **16.5**

Lever factor 10

σ'_n [psf] : **4839.1**

Clock Time	Elapsed Time	δv [in]
	0.1	0.0334
	0.25	0.0359
	0.5	0.0380
	1	0.0410
	2	0.0446
	4	0.0488
	8	0.0532
	15	0.0569



Clock Time	Elapsed Time	δv [in]

Clock Time	Elapsed Time	δv [in]

Rate of Shear Estimate:

t_{50} = **0.036 min**

$t_f = 50t_{50}$ = 1.78 min

Horizontal displacement to failure

δ_{hf} = 1 mm

Rate = 0.562 mm/min

GEOCONSULT Direct Shear Test ASTM 3080-90

Project: Recovery Solution

File No. 2138-98 Date 8/3/99

RCS-1	**Depth [ft]**	Sampling Device	Sample Preparation	diameter [in]	height [in]	weight [lb]	w %	Area [in^2]	γ_d [pcf]
	10'-12'	Shelby	Undisturbed	2.5	0.75	0.24516	12	4.91	102.7127

NORMAL LOAD **Description:** CH, trace roots, no Rx, with HCl, moist, very stiff, dark yellowish brown

Fv [lb] : **16.5**

Lever factor 10

σ'_n [psf] : **4839**

Rate = 0.562 mm/min

Shear Stress

Clock Time	δh [x10^{-3}in]	Load Ring Gage reading [div]	Vertical gage reading [x10^{-4}in]	δv [x10^{-4}in]	Cn [lb/div]	Fh [lb]	Fh/A τ [psf]	Normalized τ/σ'_n [-]
	0	0.0	614.0	0.0	0.7020	0.0	0.0	0.0000
	10	45.0	621.0	-7.0	0.7001	31.5	923.9	0.1909
	20	64.0	629.0	-15.0	0.6993	44.8	1312.5	0.2712
	30	74.0	635.0	-21.0	0.6989	51.7	1516.7	0.3134
	40	82.0	639.0	-25.0	0.6985	57.3	1679.9	0.3471
	50	89.0	645.0	-31.0	0.6982	62.1	1822.5	0.3766
	60	92.0	648.0	-34.0	0.6981	64.2	1883.6	0.3892
	70	92.0	652.0	-38.0	0.6981	64.2	1883.6	0.3892
	80	88.0	655.0	-41.0	0.6983	61.4	1802.1	0.3724
	90	90.0	656.0	-42.0	0.6982	62.8	1842.8	0.3808
	100	98.0	660.0	-46.0	0.6978	68.4	2005.7	0.4145
	110	101.0	672.0	-58.0	0.6977	70.5	2066.7	0.4271
	120	102.0	673.0	-59.0	0.6977	71.2	2087.0	0.4313
	130	102.0	674.0	-60.0	0.6977	71.2	2087.0	0.4313
	140	102.0	679.0	-65.0	0.6977	71.2	2087.0	0.4313
	150	102.0	680.0	-66.0	0.6977	71.2	2087.0	0.4313
	160	102.0	682.0	-68.0	0.6977	71.2	2087.0	0.4313
	170	101.5	685.0	-71.0	0.6977	70.8	2076.9	0.4292
	180	101.5	688.0	-74.0	0.6977	70.8	2076.9	0.4292
	190	101.0	689.0	-75.0	0.6977	70.5	2066.7	0.4271
	200	101.0	691.0	-77.0	0.6977	70.5	2066.7	0.4271
	210	101.0	693.0	-79.0	0.6977	70.5	2066.7	0.4271
	220	100.5	695.0	-81.0	0.6977	70.1	2056.5	0.4250
	230	100.0	697.0	-83.0	0.6978	69.8	2046.4	0.4229
	240	100.0	699.0	-85.0	0.6978	69.8	2046.4	0.4229
	250	100.0	700.0	-86.0	0.6978	69.8	2046.4	0.4229
	260	99.0	702.0	-88.0	0.6978	69.1	2026.0	0.4187

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Direct Shear Test ASTM 3080-90

Project: Recovery Solution

File No. 2138-98 Date: 8/3/99

Descriptior CH, trace roots, no Rx, with HCl, moist, very stiff, dark yellowish brown

RCS-1	**Depth** [ft]	Sampling Device	Sample Preparation	diameter [in]	height [in]	weight [lb]	w%	Area [in^2]
4th point	10'-12'	Shelby	Undisturbed	2.5	0.75	0.25	12	4.91

Atterberg Limits			dry mass	γ_d	γ
LL	PL	PI	[lb]	[pcf]	[pcf]
41	20	21	0.22	102.71	115.04

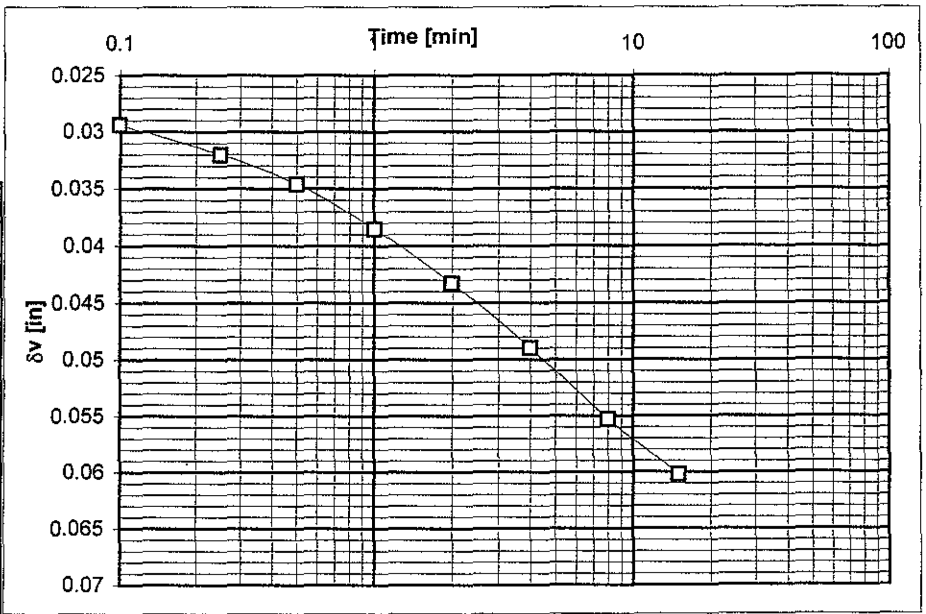
NORMAL LOAD

Fv [lb] : **23.15**

Lever factor 10

σ'_n [psf] : **6789.4**

Clock Time	Elapsed Time [min]	δv [in]
	0.1	0.0294
	0.25	0.0320
	0.5	0.0346
	1	0.0385
	2	0.0433
	4	0.0490
	8	0.0553
	15	0.0602



Clock Time	Elapsed Time	δv [in]

Clock Time	Elapsed Time	δv [in]

Rate of Shear Estimate:

t_{50} = 0.0373 min

$t_f = 50t_{50}$ = 1.865 min

Horizontal displacement to failure

δ_{hf} = 1 mm

Rate = 0.536 mm/min

GEOCONSULT Direct Shear Test ASTM 3080-90

Project: Recovery Solution

File No. 2138-98 Date 8/3/99

RCS-1	**Depth [ft]**	Sampling Device	Sample Preparation	diameter [in]	height [in]	weight [lb]	w %	Area [in^2]	γ_d [pcf]
	10'-12'	Shelby	Undisturbed	2.5	0.75	0.24516	12	4.91	102.7127

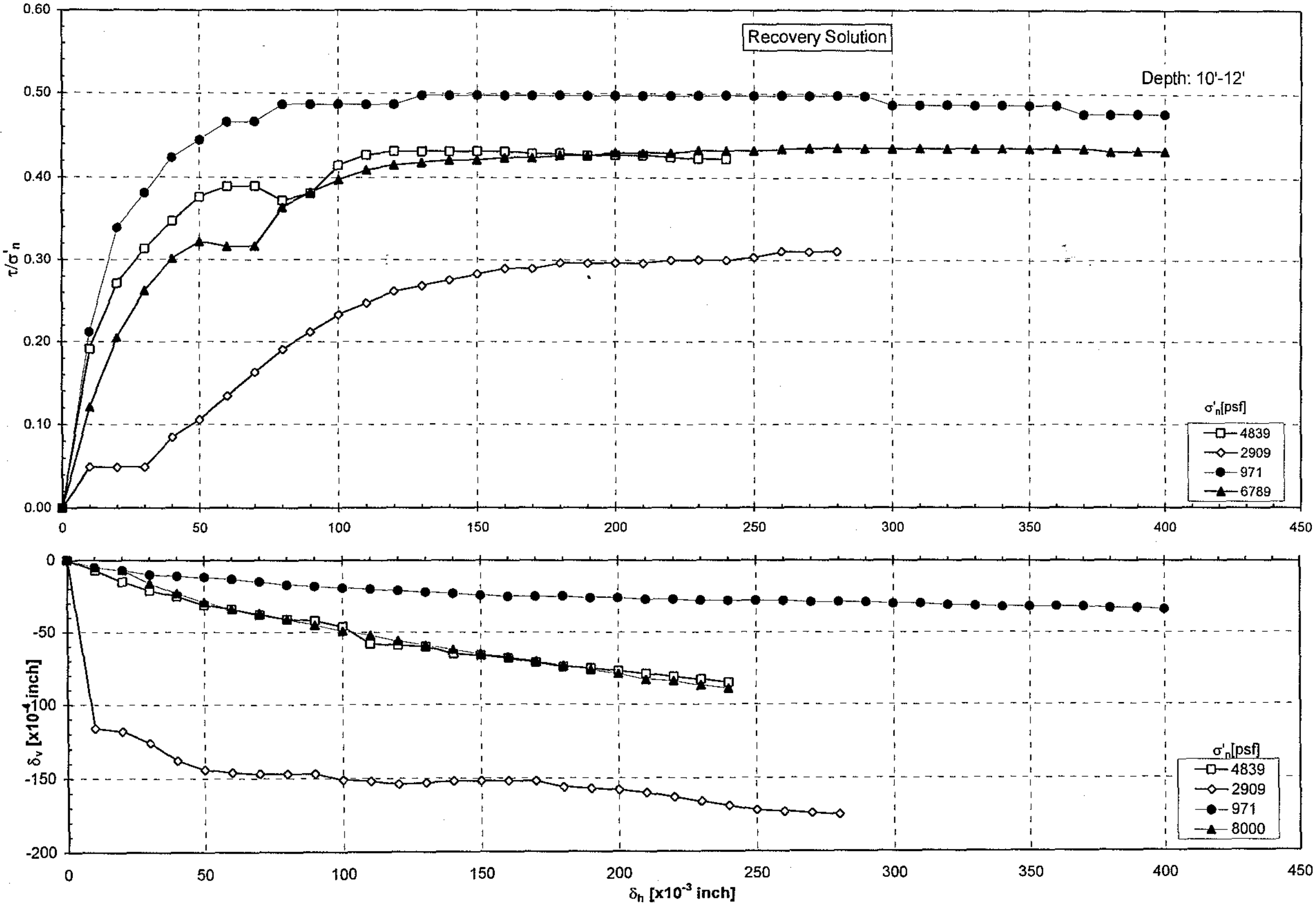
NORMAL LOAD **Description:** CH, trace roots, no Rx, with HCl, moist, very stiff, dark yellowish brown

Fv [lb] :	**23.15**
Lever factor	10
σ'_n [psf] :	**6789**

Rate = 0.536 mm/min

							Shear Stress	
Clock Time	δh [x10^{-3}in]	Load Ring Gage reading [div]	Vertical gage reading [x10^{-4}in]	δv [x10^{-4}in]	Cn [lb/div]	Fh [lb]	Fh/A τ [psf]	Normalized τ/σ'_n [-]
	0	0.0	666.0	0.0	0.7020	0.0	0.0	0.0000
	10	40.0	671.0	-5.0	0.7003	28.0	821.5	0.1210
	20	68.0	673.0	-7.0	0.6991	47.5	1394.2	0.2054
	30	87.0	682.0	-16.0	0.6983	60.8	1781.7	0.2624
	40	100.0	689.0	-23.0	0.6978	69.8	2046.4	0.3014
	50	107.0	695.0	-29.0	0.6975	74.6	2188.7	0.3224
	60	105.0	700.0	-34.0	0.6975	73.2	2148.0	0.3164
	70	105.0	703.0	-37.0	0.6975	73.2	2148.0	0.3164
	80	121.0	707.0	-41.0	0.6969	84.3	2472.9	0.3642
	90	127.0	711.0	-45.0	0.6966	88.5	2594.6	0.3822
	100	132.0	715.0	-49.0	0.6964	91.9	2695.9	0.3971
	110	136.0	718.0	-52.0	0.6962	94.7	2776.9	0.4090
	120	138.0	722.0	-56.0	0.6961	96.1	2817.4	0.4150
	130	139.0	725.0	-59.0	0.6961	96.8	2837.7	0.4180
	140	140.0	728.0	-62.0	0.6961	97.4	2857.9	0.4209
	150	140.0	731.0	-65.0	0.6961	97.4	2857.9	0.4209
	160	141.0	733.0	-67.0	0.6960	98.1	2878.2	0.4239
	170	141.0	736.0	-70.0	0.6960	98.1	2878.2	0.4239
	180	142.0	739.0	-73.0	0.6960	98.8	2898.4	0.4269
	190	142.0	742.0	-76.0	0.6960	98.8	2898.4	0.4269
	200	143.0	745.0	-79.0	0.6959	99.5	2918.6	0.4299
	210	143.0	749.0	-83.0	0.6959	99.5	2918.6	0.4299
	220	143.0	750.0	-84.0	0.6959	99.5	2918.6	0.4299
	230	144.0	753.0	-87.0	0.6959	100.2	2938.9	0.4329
	240	144.0	755.0	-89.0	0.6959	100.2	2938.9	0.4329
	250	144.0	757.0	-91.0	0.6959	100.2	2938.9	0.4329
	260	144.5	759.0	-93.0	0.6959	100.6	2949.0	0.4343
	270	145.0	761.0	-95.0	0.6958	100.9	2959.1	0.4358
	280	145.0	763.0	-97.0	0.6958	100.9	2959.1	0.4358
	290	145.0	765.0	-99.0	0.6958	100.9	2959.1	0.4358
	300	145.0	767.0	-101.0	0.6958	100.9	2959.1	0.4358
	310	145.0	769.0	-103.0	0.6958	100.9	2959.1	0.4358
	320	145.0	770.0	-104.0	0.6958	100.9	2959.1	0.4358

330	145.0	772.0	-106.0	0.6958	100.9	2959.1	0.4358
340	145.0	773.0	-107.0	0.6958	100.9	2959.1	0.4358
350	145.0	775.0	-109.0	0.6958	100.9	2959.1	0.4358
360	145.0	776.0	-110.0	0.6958	100.9	2959.1	0.4358
370	145.0	777.0	-111.0	0.6958	100.9	2959.1	0.4358
380	144.0	778.0	-112.0	0.6959	100.2	2938.9	0.4329
390	144.0	780.0	-114.0	0.6959	100.2	2938.9	0.4329
400	144.0	781.0	-115.0	0.6959	100.2	2938.9	0.4329
410	143.0	782.0	-116.0	0.6959	99.5	2918.6	0.4299
420	143.0	782.5	-116.5	0.6959	99.5	2918.6	0.4299
430	143.0	783.0	-117.0	0.6959	99.5	2918.6	0.4299


Recovery Solution
Depth: 10'-12'
τ/σ'_n
0.60
0.50
0.40
0.30
0.20
0.10
0.00
0
50
100
150
200
250
300
350
400
450
σ'_n[psf]
4839
2909
971
6789
δ_v [x10^{-4} inch]
0
-50
-100
-150
-200
δ_h [x10^{-3} inch]
σ'_n[psf]
4839
2909
971
8000

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Direct Shear Test ASTM 3080-90

Project: Recovery Solution

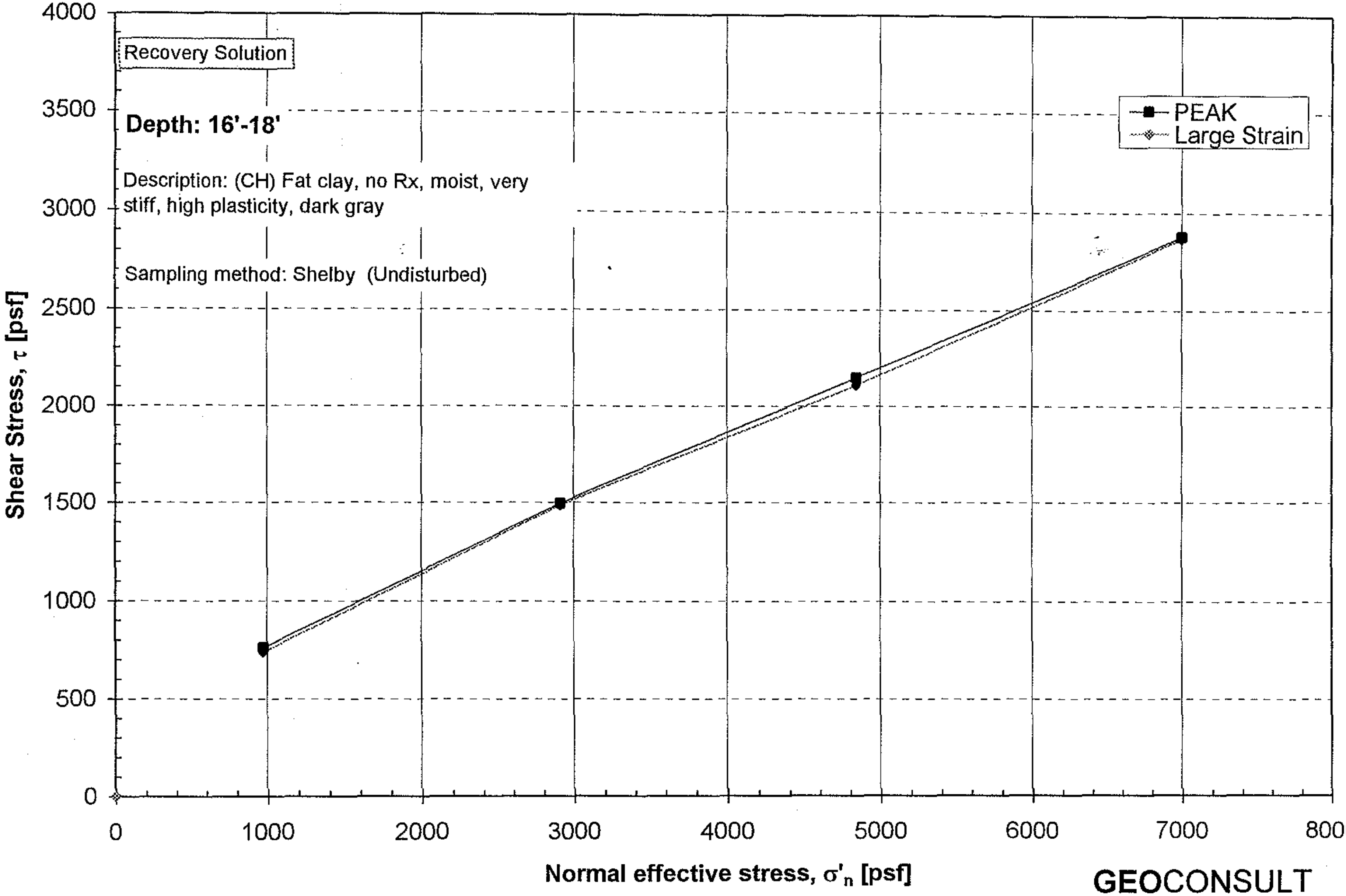
File No. 2138-98 Date 8/3/99

Description: (CH) Fat clay, no Rx, moist, very stiff, high plasticity, dark gray

RCS-2	**Depth** [ft]	Sampling Device	Sample Preparation	diameter [in]	height [in]	weight [lb]	w%	Area [in^2]
1st point	16'-18'	Shelby	Undisturbed	2.5	0.75	0.24516	35.5	4.91

Atterberg Limits			dry mass	γ_d	γ
LL	PL	PI	[lb]	[pcf]	[pcf]
54	42	12	0.17	79.65	115.04

σ'_n [psf]	τ_{peak} [psf]	τ_{ls} [psf]
0	0	0
971	760	740
2909	1496	1486
4839	2148	2107
7000	2878	2868



Recovery Solution

Depth: 16'-18'

Description: (CH) Fat clay, no Rx, moist, very stiff, high plasticity, dark gray

Sampling method: Shelby (Undisturbed)

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Direct Shear Test ASTM 3080-90

Project: Recovery Solution

File No. 2138-98 Date: 8/3/99

Description: (CH) Fat clay, no Rx, moist, very stiff, high plasticity, dark gray

RCS-2	**Depth** [ft]	Sampling Device	Sample Preparation	diameter [in]	height [in]	weight [lb]	w%	Area [in^2]
1st point	16'-18'	Shelby	Undisturbed	2.5	0.75	0.25	12.0	4.91

Atterberg Limits			dry mass	γ_d	γ
LL	PL	PI	[lb]	[pcf]	[pcf]
54	42	12	0.22	102.71	115.04

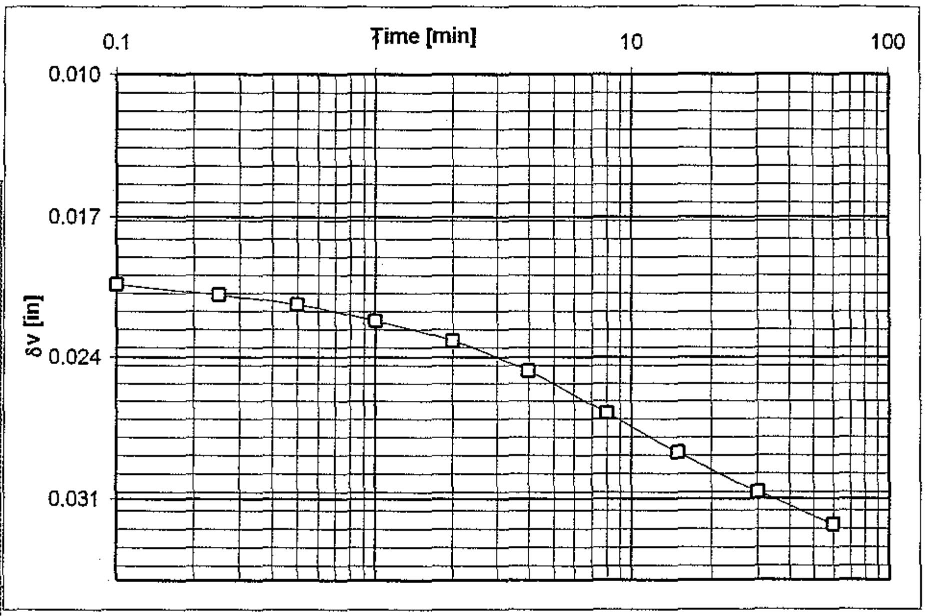
NORMAL LOAD

Fv [lb] : **3.31**

Lever factor 10

σ'_n [psf] : **970.8**

Clock Time	Elapsed Time	δv [in]
	0	0.0000
	0.1	0.0204
	0.25	0.0209
	0.5	0.0214
	1	0.0222
	2	0.0232
	4	0.0247
	8	0.0268
	15	0.0288
	30	0.0307
	60	0.0323



Clock Time	Elapsed Time	δv [in]

Clock Time	Elapsed Time	δv [in]

Rate of Shear Estimate:

t_{50} = 0.0246 min

$t_f = 50t_{50}$ = 1.23 min

Horizontal displacement to failure

δ_{hf} = 1 mm

Rate = 0.8130 mm/min

Consolidation Stage

GEOCONSULT

Direct Shear Test ASTM 3080-90

Project: Recovery Solution

File No. 2138-98 Date 8/3/99

RCS-2	Depth [ft]	Sampling Device	Sample Preparation	diameter [in]	height [in]	weight [lb]	w %	Area $[in^2]$	γ_d [pcf]
	16'-18'	Shelby	Undisturbed	2.5	0.75	0.24516	12	4.91	102.7127

NORMAL LOAD **Description:** (CH) Fat clay, no Rx, moist, very stiff, high plasticity, dark gray

Fv [lb] :	**3.31**
Lever factor	10
σ'_n [psf] :	**971**

Rate = 0.813 mm/min

							Shear Stress	
Clock Time	δh $[x10^{-3}in]$	Load Ring Gage reading [div]	Vertical gage reading $[x10^{-4}in]$	δv $[x10^{-4}in]$	Cn [lb/div]	Fh [lb]	Fh/A τ [psf]	Normalized τ/σ'_n [-]
	0	0.0	331.0	0.0	0.7020	0.0	0.0	0.0000
	10	10.0	339.5	-8.5	0.7016	7.0	205.8	0.2120
	20	14.0	342.0	-11.0	0.7014	9.8	288.0	0.2967
	30	16.0	345.0	-14.0	0.7013	11.2	329.1	0.3390
	40	18.0	346.0	-15.0	0.7012	12.6	370.2	0.3813
	50	23.0	344.0	-13.0	0.7010	16.1	472.9	0.4871
	60	27.0	343.0	-12.0	0.7009	18.9	555.0	0.5717
	70	29.0	341.0	-10.0	0.7008	20.3	596.0	0.6140
	80	32.0	337.0	-6.0	0.7006	22.4	657.5	0.6774
	90	33.0	337.0	-6.0	0.7006	23.1	678.1	0.6985
	100	34.0	337.0	-6.0	0.7006	23.8	698.6	0.7196
	110	35.0	337.0	-6.0	0.7005	24.5	719.1	0.7407
	120	36.0	337.0	-6.0	0.7005	25.2	739.6	0.7618
	130	37.0	337.0	-6.0	0.7004	25.9	760.1	0.7830
	140	36.0	337.5	-6.5	0.7005	25.2	739.6	0.7618
	150	36.0	339.0	-8.0	0.7005	25.2	739.6	0.7618
	160	36.0	340.0	-9.0	0.7005	25.2	739.6	0.7618
	170	36.0	341.0	-10.0	0.7005	25.2	739.6	0.7618
	180	36.0	342.0	-11.0	0.7005	25.2	739.6	0.7618
	190	36.0	343.0	-12.0	0.7005	25.2	739.6	0.7618
	200	36.0	344.0	-13.0	0.7005	25.2	739.6	0.7618
	210	36.0	345.0	-14.0	0.7005	25.2	739.6	0.7618
	220	36.0	346.0	-15.0	0.7005	25.2	739.6	0.7618
	230	36.0	346.0	-15.0	0.7005	25.2	739.6	0.7618
	240	36.0	347.0	-16.0	0.7005	25.2	739.6	0.7618
	250	36.0	348.0	-17.0	0.7005	25.2	739.6	0.7618
	260	36.0	349.0	-18.0	0.7005	25.2	739.6	0.7618
	270	36.0	349.0	-18.0	0.7005	25.2	739.6	0.7618
	280	36.0	349.0	-18.0	0.7005	25.2	739.6	0.7618
	290	36.0	350.0	-19.0	0.7005	25.2	739.6	0.7618
	300	36.0	350.0	-19.0	0.7005	25.2	739.6	0.7618
	310	36.0	350.0	-19.0	0.7005	25.2	739.6	0.7618
	320	36.0	351.0	-20.0	0.7005	25.2	739.6	0.7618
	330	36.0	351.0	-20.0	0.7005	25.2	739.6	0.7618
	340	36.0	351.0	-20.0	0.7005	25.2	739.6	0.7618
	350	36.0	351.5	-20.5	0.7005	25.2	739.6	0.7618
	360	36.0	352.0	-21.0	0.7005	25.2	739.6	0.7618

370	35.5	353.0	-22.0	0.7005	24.9	729.3	0.7513
380	35.5	353.0	-22.0	0.7005	24.9	729.3	0.7513
390	35.5	353.5	-22.5	0.7005	24.9	729.3	0.7513
400	35.5	354.0	-23.0	0.7005	24.9	729.3	0.7513
410	35.0	354.0	-23.0	0.7005	24.5	719.1	0.7407
420	35.0	354.0	-23.0	0.7005	24.5	719.1	0.7407
430	35.0	354.0	-23.0	0.7005	24.5	719.1	0.7407
440	35.0	354.5	-23.5	0.7005	24.5	719.1	0.7407
450	35.0	355.0	-24.0	0.7005	24.5	719.1	0.7407
460	35.0	355.0	-24.0	0.7005	24.5	719.1	0.7407
470	35.0	355.0	-24.0	0.7005	24.5	719.1	0.7407
480	35.0	355.0	-24.0	0.7005	24.5	719.1	0.7407
490	35.0	355.5	-24.5	0.7005	24.5	719.1	0.7407
500	34.5	355.5	-24.5	0.7005	24.2	708.8	0.7302
510	34.0	356.5	-25.5	0.7006	23.8	698.6	0.7196
520	34.0	357.0	-26.0	0.7006	23.8	698.6	0.7196
530	34.0	357.0	-26.0	0.7006	23.8	698.6	0.7196
540	34.0	357.0	-26.0	0.7006	23.8	698.6	0.7196
550	34.0	357.0	-26.0	0.7006	23.8	698.6	0.7196
560	34.0	357.5	-26.5	0.7006	23.8	698.6	0.7196
570	33.5	358.0	-27.0	0.7006	23.5	688.3	0.7090
580	33.0	358.0	-27.0	0.7006	23.1	678.1	0.6985
590	33.0	358.5	-27.5	0.7006	23.1	678.1	0.6985
600	33.0	359.0	-28.0	0.7006	23.1	678.1	0.6985
610	32.0	360.0	-29.0	0.7006	22.4	657.5	0.6774
620	33.0	360.0	-29.0	0.7006	23.1	678.1	0.6985
630	32.0	361.0	-30.0	0.7006	22.4	657.5	0.6774

GEOCONSULT Direct Shear Test ASTM 3080-90

Project: Recovery Solution

File No. 2138-98 Date: 8/3/99

Description: (CH) Fat clay, no Rx, moist, very stiff, high plasticity, dark gray

RCS-2	**Depth** [ft]	Sampling Device	Sample Preparation	diameter [in]	height [in]	weight [lb]	w%	Area [in^2]
2nd point	11'-18'	Shelby	Undisturbed	2.5	0.75	0.25	12	4.91

Atterberg Limits			dry mass	γ_d	γ
LL	PL	PI	[lb]	[pcf]	[pcf]
54	42	12	0.22	102.71	115.04

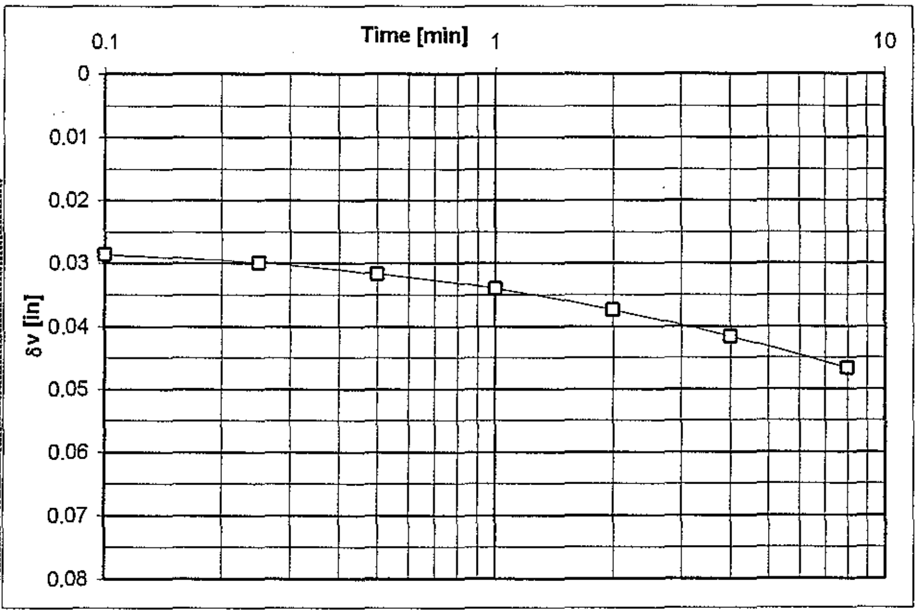
NORMAL LOAD

Fv [lb] : **9.92**

Lever factor 10

σ'_n [psf] : **2909.3**

Clock Time	Elapsed Time	δv [in]
	0.1	0.0286
	0.25	0.0300
	0.5	0.0317
	1	0.0341
	2	0.0375
	4	0.0418
	8	0.0467
	15	0.0494
	30	0.0513



Clock Time	Elapsed Time	δv [in]

Clock Time	Elapsed Time	δv [in]

Rate of Shear Estimate:

t_{50} = **0.038 min**

$t_f = 50t_{50}$ = 1.910 min

Horizontal displacement to failure

δ_{hf} = 1.000 mm

Rate = 0.524 mm/min

GEOCONSULT Direct Shear Test ASTM 3080-90

Project: Recovery Solution

File No. 2138-98 Date 8/3/99

RCS-2	Depth [ft]	Sampling Device	Sample Preparation	diameter [in]	height [in]	weight [lb]	w %	Area [in^2]	γ_d [pcf]
	16'-18'	Shelby	Undisturbed	2.5	0.75	0.24516	12	4.91	102.7127

NORMAL LOAD **Description:** (CH) Fat clay, no Rx, moist, very stiff, high plasticity, dark gray

Fv [lb] : **9.92**

Lever factor 10

σ'_n [psf] : **2909**

Rate = 0.524 mm/min

							Shear Stress	
Clock Time	δh [$x10^{-3}$in]	Load Ring Gage reading [div]	Vertical gage reading [$x10^{-4}$in]	δv [$x10^{-4}$in]	Cn [lb/div]	Fh [lb]	Fh/A τ [psf]	Normalized τ/σ'_n [-]
	0	0.0	517.0	0.0	0.7020	0.0	0.0	0.0000
	10	26.0	520.0	-3.0	0.7009	18.2	534.5	0.1837
	20	40.0	524.0	-7.0	0.7003	28.0	821.5	0.2824
	30	44.5	528.5	-11.5	0.7001	31.2	913.7	0.3141
	40	49.0	530.0	-13.0	0.6999	34.3	1005.8	0.3457
	50	54.0	531.0	-14.0	0.6997	37.8	1108.1	0.3809
	60	54.0	532.0	-15.0	0.6997	37.8	1108.1	0.3809
	70	60.0	533.0	-16.0	0.6995	42.0	1230.8	0.4231
	80	64.0	534.0	-17.0	0.6993	44.8	1312.5	0.4511
	90	66.0	536.0	-19.0	0.6992	46.1	1353.4	0.4652
	100	67.0	539.0	-22.0	0.6992	46.8	1373.8	0.4722
	110	68.0	540.0	-23.0	0.6991	47.5	1394.2	0.4792
	120	69.0	542.0	-25.0	0.6991	48.2	1414.7	0.4862
	130	69.0	544.0	-27.0	0.6991	48.2	1414.7	0.4862
	140	70.0	546.0	-29.0	0.6990	48.9	1435.1	0.4933
	150	70.0	549.0	-32.0	0.6990	48.9	1435.1	0.4933
	160	70.0	552.0	-35.0	0.6990	48.9	1435.1	0.4933
	170	70.0	555.0	-38.0	0.6990	48.9	1435.1	0.4933
	180	70.0	557.0	-40.0	0.6990	48.9	1435.1	0.4933
	190	71.0	560.0	-43.0	0.6990	49.6	1455.5	0.5003
	200	71.0	562.0	-45.0	0.6990	49.6	1455.5	0.5003
	210	71.5	564.0	-47.0	0.6990	50.0	1465.7	0.5038
	220	72.0	566.0	-49.0	0.6989	50.3	1475.9	0.5073
	230	72.0	568.0	-51.0	0.6989	50.3	1475.9	0.5073
	240	72.0	570.0	-53.0	0.6989	50.3	1475.9	0.5073
	250	72.0	571.0	-54.0	0.6989	50.3	1475.9	0.5073
	260	72.0	572.0	-55.0	0.6989	50.3	1475.9	0.5073
	270	72.0	574.0	-57.0	0.6989	50.3	1475.9	0.5073
	280	72.0	575.0	-58.0	0.6989	50.3	1475.9	0.5073
	290	72.0	576.0	-59.0	0.6989	50.3	1475.9	0.5073
	300	72.0	577.0	-60.0	0.6989	50.3	1475.9	0.5073
	310	72.0	578.0	-61.0	0.6989	50.3	1475.9	0.5073
	320	72.0	579.0	-62.0	0.6989	50.3	1475.9	0.5073
	330	72.0	580.0	-63.0	0.6989	50.3	1475.9	0.5073
	340	72.5	581.5	-64.5	0.6989	50.7	1486.1	0.5108
	350	72.5	582.5	-65.5	0.6989	50.7	1486.1	0.5108
	360	72.5	584.0	-67.0	0.6989	50.7	1486.1	0.5108

370	72.5	585.0	-68.0	0.6989	50.7	1486.1	0.5108
380	72.5	586.0	-69.0	0.6989	50.7	1486.1	0.5108
390	72.5	586.5	-69.5	0.6989	50.7	1486.1	0.5108
400	73.0	588.0	-71.0	0.6989	51.0	1496.3	0.5143
410	73.0	589.0	-72.0	0.6989	51.0	1496.3	0.5143
420	72.5	590.0	-73.0	0.6989	50.7	1486.1	0.5108
430	72.5	591.0	-74.0	0.6989	50.7	1486.1	0.5108
440	72.0	592.0	-75.0	0.6989	50.3	1475.9	0.5073
450	72.0	593.0	-76.0	0.6989	50.3	1475.9	0.5073
460	72.0	593.0	-76.0	0.6989	50.3	1475.9	0.5073
470	72.0	594.0	-77.0	0.6989	50.3	1475.9	0.5073
480	72.0	595.0	-78.0	0.6989	50.3	1475.9	0.5073
490	72.0	595.0	-78.0	0.6989	50.3	1475.9	0.5073
500	72.0	596.0	-79.0	0.6989	50.3	1475.9	0.5073
510	71.5	596.0	-79.0	0.6990	50.0	1465.7	0.5038
520	71.5	597.0	-80.0	0.6990	50.0	1465.7	0.5038
530	71.5	598.0	-81.0	0.6990	50.0	1465.7	0.5038
540	71.0	598.0	-81.0	0.6990	49.6	1455.5	0.5003
550	71.0	599.0	-82.0	0.6990	49.6	1455.5	0.5003
560	71.0	599.0	-82.0	0.6990	49.6	1455.5	0.5003
570	71.0	600.0	-83.0	0.6990	49.6	1455.5	0.5003
580	71.0	600.5	-83.5	0.6990	49.6	1455.5	0.5003
590	70.5	601.0	-84.0	0.6990	49.3	1445.3	0.4968
600	70.5	602.0	-85.0	0.6990	49.3	1445.3	0.4968
610	70.0	603.0	-86.0	0.6990	48.9	1435.1	0.4933
620	70.0	603.0	-86.0	0.6990	48.9	1435.1	0.4933
630	70.0	604.0	-87.0	0.6990	48.9	1435.1	0.4933
640	70.0	605.0	-88.0	0.6990	48.9	1435.1	0.4933
650	70.0	605.0	-88.0	0.6990	48.9	1435.1	0.4933
660	69.5	606.0	-89.0	0.6990	48.6	1424.9	0.4898
670	69.5	606.5	-89.5	0.6990	48.6	1424.9	0.4898
680	69.0	608.0	-91.0	0.6991	48.2	1414.7	0.4862
690	69.0	608.0	-91.0	0.6991	48.2	1414.7	0.4862

GEOCONSULT Direct Shear Test ASTM 3080-90

Project: Recovery Solution

File No. 2138-98 Date: 8/3/99

Description: (CH) Fat clay, no Rx, moist, very stiff, high plasticity, dark gray

RCS-2	**Depth** [ft]	Sampling Device	Sample Preparation	diameter [in]	height [in]	weight [lb]	w%	Area [in^2]
3rd point	11'-18'	Shelby	Undisturbed	2.5	0.75	0.25	12	4.91

Atterberg Limits			dry mass	γ_d	γ
LL	PL	PI	[lb]	[pcf]	[pcf]
54	42	12	0.22	102.71	115.04

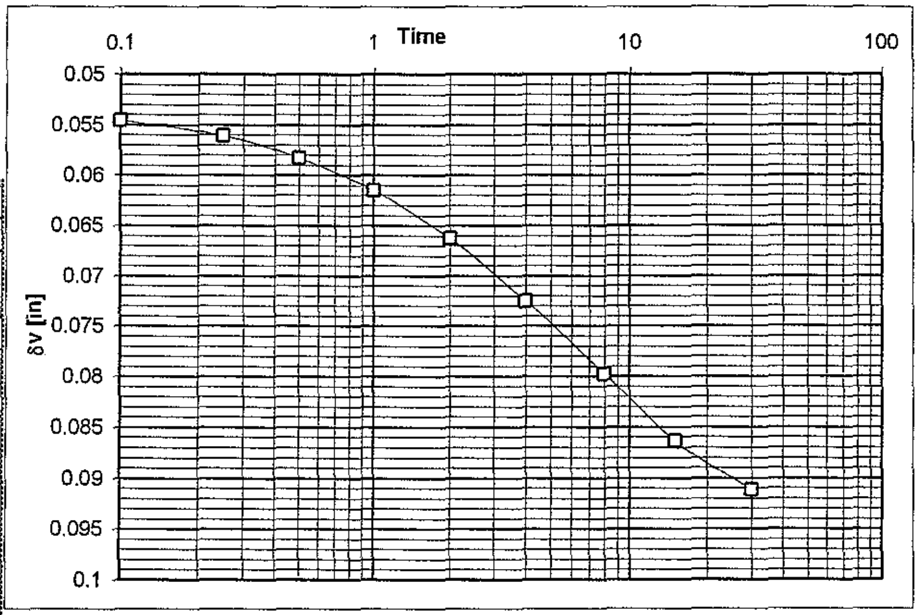
NORMAL LOAD

Fv [lb] : **16.5**

Lever factor 10

σ'_n [psf] : **4839.1**

Clock Time	Elapsed Time	δv [in]
	0.1	0.0546
	0.25	0.0561
	0.5	0.0583
	1	0.0615
	2	0.0663
	4	0.0725
	8	0.0798
	15	0.0864
	30	0.0912



Clock Time	Elapsed Time	δv [in]

Clock Time	Elapsed Time	δv [in]

Rate of Shear Estimate:

t_{50} = 0.074 min

$t_f = 50t_{50}$ = 3.69 min

Horizontal displacement to failure

δ_{hf} = 1 mm

Rate = 0.271 mm/min

GEOCONSULT Direct Shear Test ASTM 3080-90

Project: Recovery Solution

File No. 2138-98 Date 8/3/99

RCS-2	Depth [ft]	Sampling Device	Sample Preparation	diameter [in]	height [in]	weight [lb]	w %	Area [in^2]	γ_d [pcf]
	16'-18'	Shelby	Undisturbed	2.5	0.75	0.24516	12	4.91	102.7127

NORMAL LOAD **Description:** (CH) Fat clay, no Rx, moist, very stiff, high plasticity, dark gray

Fv [lb] :	**16.5**
Lever factor	10
σ'_n [psf] :	**4839**

Rate = 0.271 mm/min

Shear Stress

Clock Time	δh [$x10^{-3}$in]	Load Ring Gage reading [div]	Vertical gage reading [$x10^{-4}$in]	δv [$x10^{-4}$in]	Cn [lb/div]	Fh [lb]	Fh/A τ [psf]	Normalized τ/σ'_n [-]
	0	0.0	944.0	0.0	0.7020	0.0	0.0	0.0000
	10	77.0	955.0	-11.0	0.6987	53.8	1577.9	0.3261
	20	77.0	965.0	-21.0	0.6987	53.8	1577.9	0.3261
	30	77.0	974.0	-30.0	0.6987	53.8	1577.9	0.3261
	40	87.0	978.0	-34.0	0.6983	60.8	1781.7	0.3682
	50	92.0	981.0	-37.0	0.6981	64.2	1883.6	0.3892
	60	96.0	985.0	-41.0	0.6979	67.0	1965.0	0.4061
	70	98.0	987.0	-43.0	0.6978	68.4	2005.7	0.4145
	80	99.0	991.0	-47.0	0.6978	69.1	2026.0	0.4187
	90	100.0	994.0	-50.0	0.6978	69.8	2046.4	0.4229
	100	101.0	997.0	-53.0	0.6977	70.5	2066.7	0.4271
	110	102.0	1000.0	-56.0	0.6977	71.2	2087.0	0.4313
	120	103.0	1002.0	-58.0	0.6976	71.9	2107.4	0.4355
	130	104.0	1005.0	-61.0	0.6976	72.5	2127.7	0.4397
	140	104.0	1007.0	-63.0	0.6976	72.5	2127.7	0.4397
	150	104.0	1009.0	-65.0	0.6976	72.5	2127.7	0.4397
	160	104.0	1010.0	-66.0	0.6976	72.5	2127.7	0.4397
	170	104.0	1012.0	-68.0	0.6976	72.5	2127.7	0.4397
	180	104.5	1013.0	-69.0	0.6976	72.9	2137.9	0.4418
	190	105.0	1014.0	-70.0	0.6975	73.2	2148.0	0.4439
	200	105.0	1016.0	-72.0	0.6975	73.2	2148.0	0.4439
	210	105.0	1016.0	-72.0	0.6975	73.2	2148.0	0.4439
	220	105.0	1017.0	-73.0	0.6975	73.2	2148.0	0.4439
	230	105.0	1018.0	-74.0	0.6975	73.2	2148.0	0.4439
	240	105.0	1018.0	-74.0	0.6975	73.2	2148.0	0.4439
	250	105.0	1019.0	-75.0	0.6975	73.2	2148.0	0.4439
	260	105.0	1019.0	-75.0	0.6975	73.2	2148.0	0.4439
	270	103.0	1025.0	-81.0	0.6976	71.9	2107.4	0.4355
	280	103.0	1025.0	-81.0	0.6976	71.9	2107.4	0.4355
	290	103.0	1025.0	-81.0	0.6976	71.9	2107.4	0.4355
	300	103.0	1026.0	-82.0	0.6976	71.9	2107.4	0.4355
	310	103.0	1027.0	-83.0	0.6976	71.9	2107.4	0.4355
	320	103.0	1028.0	-84.0	0.6976	71.9	2107.4	0.4355
	330	102.0	1033.0	-89.0	0.6977	71.2	2087.0	0.4313
	340	102.0	1037.0	-93.0	0.6977	71.2	2087.0	0.4313
	350	102.0	1038.0	-94.0	0.6977	71.2	2087.0	0.4313
	360	102.0	1040.0	-96.0	0.6977	71.2	2087.0	0.4313

370	102.0	1040.0	-96.0	0.6977	71.2	2087.0	0.4313
380	102.0	1040.0	-96.0	0.6977	71.2	2087.0	0.4313
390	102.0	1040.0	-96.0	0.6977	71.2	2087.0	0.4313
400	102.0	1040.0	-96.0	0.6977	71.2	2087.0	0.4313
410	102.0	1040.0	-96.0	0.6977	71.2	2087.0	0.4313
420	102.0	1041.0	-97.0	0.6977	71.2	2087.0	0.4313
430	102.0	1043.0	-99.0	0.6977	71.2	2087.0	0.4313
440	104.0	1049.0	-105.0	0.6976	72.5	2127.7	0.4397
450	116.0	1052.0	-108.0	0.6971	80.9	2371.5	0.4901
460	116.0	1054.0	-110.0	0.6971	80.9	2371.5	0.4901
470	116.0	1055.0	-111.0	0.6971	80.9	2371.5	0.4901
480	116.0	1056.0	-112.0	0.6971	80.9	2371.5	0.4901
490	116.0	1057.0	-113.0	0.6971	80.9	2371.5	0.4901
500	116.0	1058.0	-114.0	0.6971	80.9	2371.5	0.4901
510	116.0	1059.0	-115.0	0.6971	80.9	2371.5	0.4901
520	101.5	1060.0	-116.0	0.6977	70.8	2076.9	0.4292
530	102.0	1060.0	-116.0	0.6977	71.2	2087.0	0.4313
540	102.0	1061.0	-117.0	0.6977	71.2	2087.0	0.4313
550	102.0	1062.0	-118.0	0.6977	71.2	2087.0	0.4313
560	102.0	1064.0	-120.0	0.6977	71.2	2087.0	0.4313
570	102.0	1065.0	-121.0	0.6977	71.2	2087.0	0.4313
580	102.0	1065.0	-121.0	0.6977	71.2	2087.0	0.4313
590	102.0	1066.0	-122.0	0.6977	71.2	2087.0	0.4313
600	102.0	1067.0	-123.0	0.6977	71.2	2087.0	0.4313
610	102.0	1068.0	-124.0	0.6977	71.2	2087.0	0.4313
620	102.0	1069.0	-125.0	0.6977	71.2	2087.0	0.4313
630	102.0	1070.0	-126.0	0.6977	71.2	2087.0	0.4313
640	102.0	1071.0	-127.0	0.6977	71.2	2087.0	0.4313
650	102.0	1071.0	-127.0	0.6977	71.2	2087.0	0.4313
660	102.0	1072.0	-128.0	0.6977	71.2	2087.0	0.4313
670	102.0	1073.0	-129.0	0.6977	71.2	2087.0	0.4313

GEOCONSULT Direct Shear Test ASTM 3080-90

Project: Recovery Solution

File No. 2138-98 Date: 8/3/99

Descriptior (CH) Fat clay, no Rx, moist, very stiff, high plasticity, dark gray

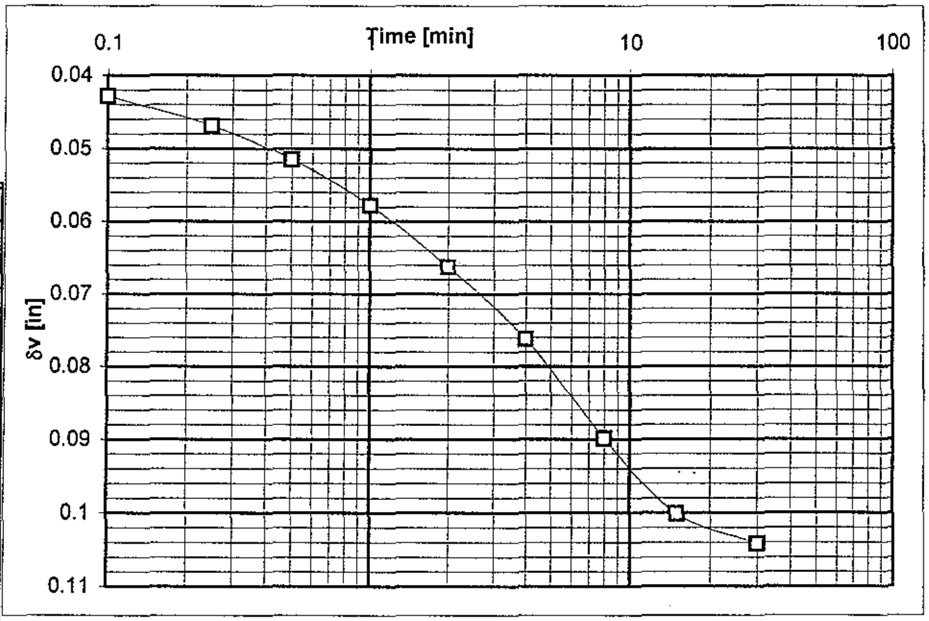
RCS-2	**Depth** [ft]	Sampling Device	Sample Preparation	diameter [in]	height [in]	weight [lb]	w%	Area [in^2]
4th point	11'-18'	Shelby	Undisturbed	2.5	0.75	0.25	12	4.91

Atterberg Limits			dry mass	γ_d	γ
LL	PL	PI	[lb]	[pcf]	[pcf]
54	42	12	0.22	102.71	115.04

NORMAL LOAD

Fv [lb] :	**23.15**
Lever factor	10
σ'_n [psf] :	**6789.4**

Clock Time	Elapsed Time [min]	δv [in]
	0.1	0.0428
	0.25	0.0469
	0.5	0.0515
	1	0.0578
	2	0.0663
	4	0.0762
	8	0.0899
	15	0.1001
	30	0.1042



Clock Time	Elapsed Time	δv [in]

Clock Time	Elapsed Time	δv [in]

Rate of Shear Estimate:

t_{50} = 0.0650 min

$t_f = 50t_{50}$ = 3.21 min

Horizontal displacement to failure

δ_{hf} = 1 mm

Rate = 0.308 mm/min

GEOCONSULT Direct Shear Test ASTM 3080-90

Project: Recovery Solution

File No. 2138-98 Date 8/3/99

RCS-2	**Depth [ft]**	Sampling Device	Sample Preparation	diameter [in]	height [in]	weight [lb]	w %	Area [in^2]	γ_d [pcf]
	16'-18'	Shelby	Undisturbed	2.5	0.75	0.24516	12	4.91	102.7127

NORMAL LOAD **Description:** (CH) Fat clay, no Rx, moist, very stiff, high plasticity, dark gray

Fv [lb] :	**23.15**

Lever factor 10

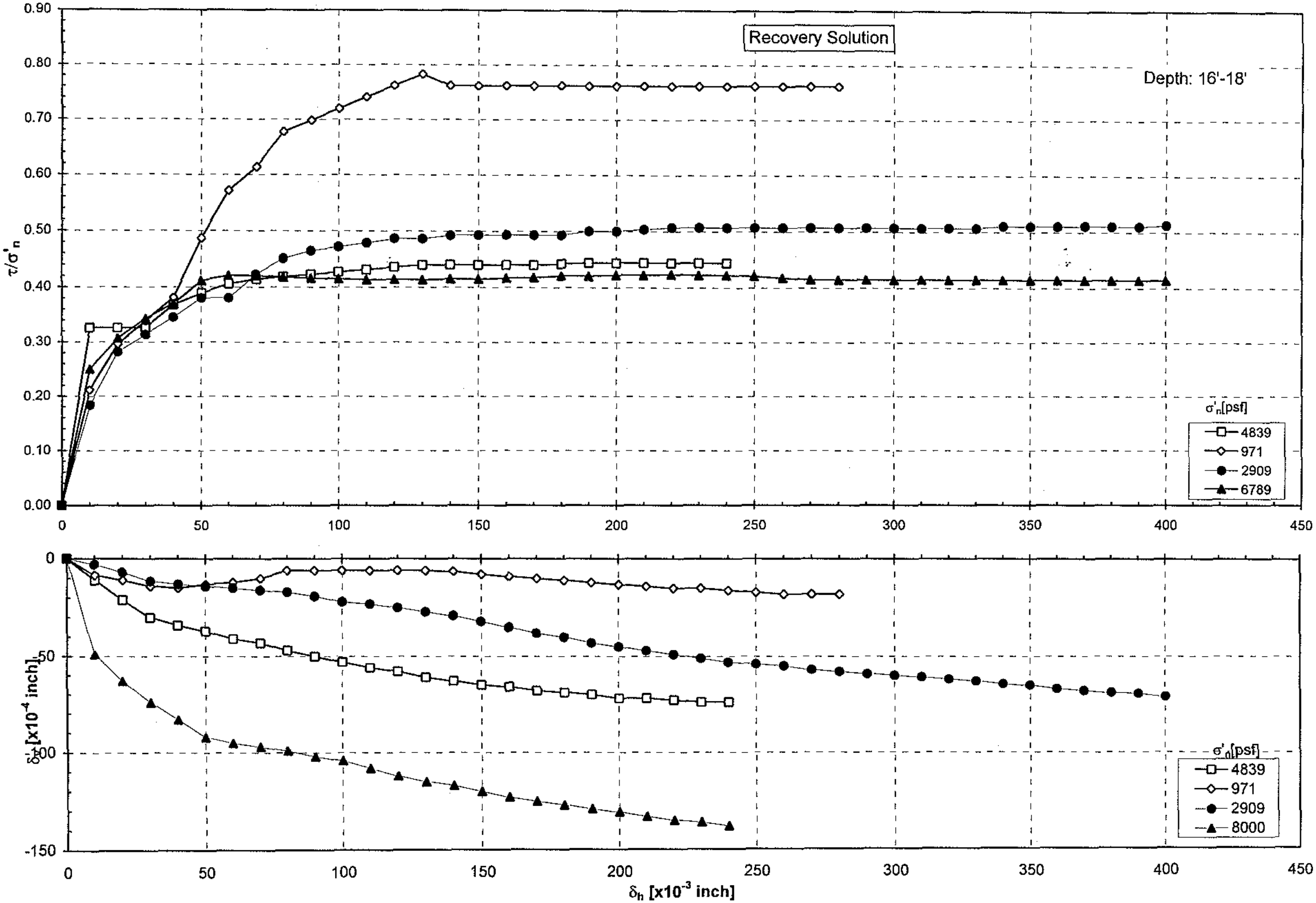
σ'_n [psf] : **6789**

Rate = 0.308 mm/min

Shear Stress

Clock Time	δh [x10^{-3}in]	Load Ring Gage reading [div]	Vertical gage reading [x10^{-4}in]	δv [x10^{-4}in]	Cn [lb/div]	Fh [lb]	Fh/A τ [psf]	Normalized τ/σ'_n [-]
	0	0.0	1050.0	0.0	0.7020	0.0	0.0	0.0000
	10	83.0	1099.0	-49.0	0.6985	58.0	1700.2	0.2504
	20	102.0	1113.0	-63.0	0.6977	71.2	2087.0	0.3074
	30	114.0	1124.0	-74.0	0.6972	79.5	2330.9	0.3433
	40	123.0	1133.0	-83.0	0.6968	85.7	2513.5	0.3702
	50	137.0	1142.0	-92.0	0.6962	95.4	2797.2	0.4120
	60	140.0	1145.0	-95.0	0.6961	97.4	2857.9	0.4209
	70	140.0	1147.0	-97.0	0.6961	97.4	2857.9	0.4209
	80	139.0	1149.0	-99.0	0.6961	96.8	2837.7	0.4180
	90	138.5	1152.0	-102.0	0.6961	96.4	2827.6	0.4165
	100	138.0	1154.0	-104.0	0.6961	96.1	2817.4	0.4150
	110	137.5	1158.0	-108.0	0.6962	95.7	2807.3	0.4135
	120	137.5	1162.0	-112.0	0.6962	95.7	2807.3	0.4135
	130	137.5	1165.0	-115.0	0.6962	95.7	2807.3	0.4135
	140	138.0	1167.0	-117.0	0.6961	96.1	2817.4	0.4150
	150	138.0	1170.0	-120.0	0.6961	96.1	2817.4	0.4150
	160	138.5	1173.0	-123.0	0.6961	96.4	2827.6	0.4165
	170	139.0	1175.0	-125.0	0.6961	96.8	2837.7	0.4180
	180	140.0	1177.0	-127.0	0.6961	97.4	2857.9	0.4209
	190	140.0	1179.0	-129.0	0.6961	97.4	2857.9	0.4209
	200	140.5	1181.0	-131.0	0.6960	97.8	2868.0	0.4224
	210	140.5	1183.0	-133.0	0.6960	97.8	2868.0	0.4224
	220	141.0	1185.0	-135.0	0.6960	98.1	2878.2	0.4239
	230	140.5	1186.0	-136.0	0.6960	97.8	2868.0	0.4224
	240	140.5	1188.0	-138.0	0.6960	97.8	2868.0	0.4224
	250	140.0	1189.0	-139.0	0.6961	97.4	2857.9	0.4209
	260	139.0	1190.0	-140.0	0.6961	96.8	2837.7	0.4180
	270	138.0	1191.0	-141.0	0.6961	96.1	2817.4	0.4150
	280	138.0	1192.0	-142.0	0.6961	96.1	2817.4	0.4150
	290	138.0	1193.0	-143.0	0.6961	96.1	2817.4	0.4150
	300	138.0	1194.0	-144.0	0.6961	96.1	2817.4	0.4150
	310	138.0	1195.0	-145.0	0.6961	96.1	2817.4	0.4150
	320	138.0	1196.0	-146.0	0.6961	96.1	2817.4	0.4150

330	138.0	1197.0	-147.0	0.6961	96.1	2817.4	0.4150
340	138.0	1198.0	-148.0	0.6961	96.1	2817.4	0.4150
350	138.0	1199.0	-149.0	0.6961	96.1	2817.4	0.4150
360	138.0	1200.0	-150.0	0.6961	96.1	2817.4	0.4150
370	138.0	1200.0	-150.0	0.6961	96.1	2817.4	0.4150
380	138.0	1201.0	-151.0	0.6961	96.1	2817.4	0.4150
390	138.0	1201.0	-151.0	0.6961	96.1	2817.4	0.4150
400	138.0	1202.0	-152.0	0.6961	96.1	2817.4	0.4150
410	138.0	1203.0	-153.0	0.6961	96.1	2817.4	0.4150
420	138.0	1204.0	-154.0	0.6961	96.1	2817.4	0.4150
430	136.0	1204.0	-154.0	0.6962	94.7	2776.9	0.4090
440	135.5	1205.0	-155.0	0.6962	94.3	2766.8	0.4075
450	135.0	1206.0	-156.0	0.6963	94.0	2756.7	0.4060
460	135.0	1206.0	-156.0	0.6963	94.0	2756.7	0.4060
470	135.0	1207.0	-157.0	0.6963	94.0	2756.7	0.4060
480	135.0	1208.0	-158.0	0.6963	94.0	2756.7	0.4060
490	135.0	1208.0	-158.0	0.6963	94.0	2756.7	0.4060
500	134.5	1209.0	-159.0	0.6963	93.7	2746.6	0.4045
510	134.5	1210.0	-160.0	0.6963	93.7	2746.6	0.4045
520	134.0	1210.0	-160.0	0.6963	93.3	2736.4	0.4030
530	134.0	1210.0	-160.0	0.6963	93.3	2736.4	0.4030
540	135.0	1211.0	-161.0	0.6963	94.0	2756.7	0.4060
550	135.0	1211.0	-161.0	0.6963	94.0	2756.7	0.4060
560	135.0	1212.0	-162.0	0.6963	94.0	2756.7	0.4060
570	135.0	1212.0	-162.0	0.6963	94.0	2756.7	0.4060
580	135.5	1213.0	-163.0	0.6962	94.3	2766.8	0.4075
590	136.0	1213.0	-163.0	0.6962	94.7	2776.9	0.4090
600	135.0	1214.0	-164.0	0.6963	94.0	2756.7	0.4060
610	135.0	1214.0	-164.0	0.6963	94.0	2756.7	0.4060
620	134.5	1215.0	-165.0	0.6963	93.7	2746.6	0.4045
630	133.5	1215.0	-165.0	0.6963	93.0	2726.3	0.4016
640	133.5	1216.0	-166.0	0.6963	93.0	2726.3	0.4016
650	132.0	1216.0	-166.0	0.6964	91.9	2695.9	0.3971
660	132.0	1217.0	-167.0	0.6964	91.9	2695.9	0.3971
670	132.0	1217.0	-167.0	0.6964	91.9	2695.9	0.3971



Recovery Solution
Depth: 16'-18'
τ/σ'n
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
0
50
100
150
200
250
300
350
400
450
σ'n[psf]
4839
971
2909
6789
δv [x10^-4 inch]
0
-50
-100
-150
σ'0[psf]
4839
971
2909
8000
δh [x10^-3 inch]

GEOCONSULT Direct Shear Test ASTM 3080-90

Project: Recovery Solution

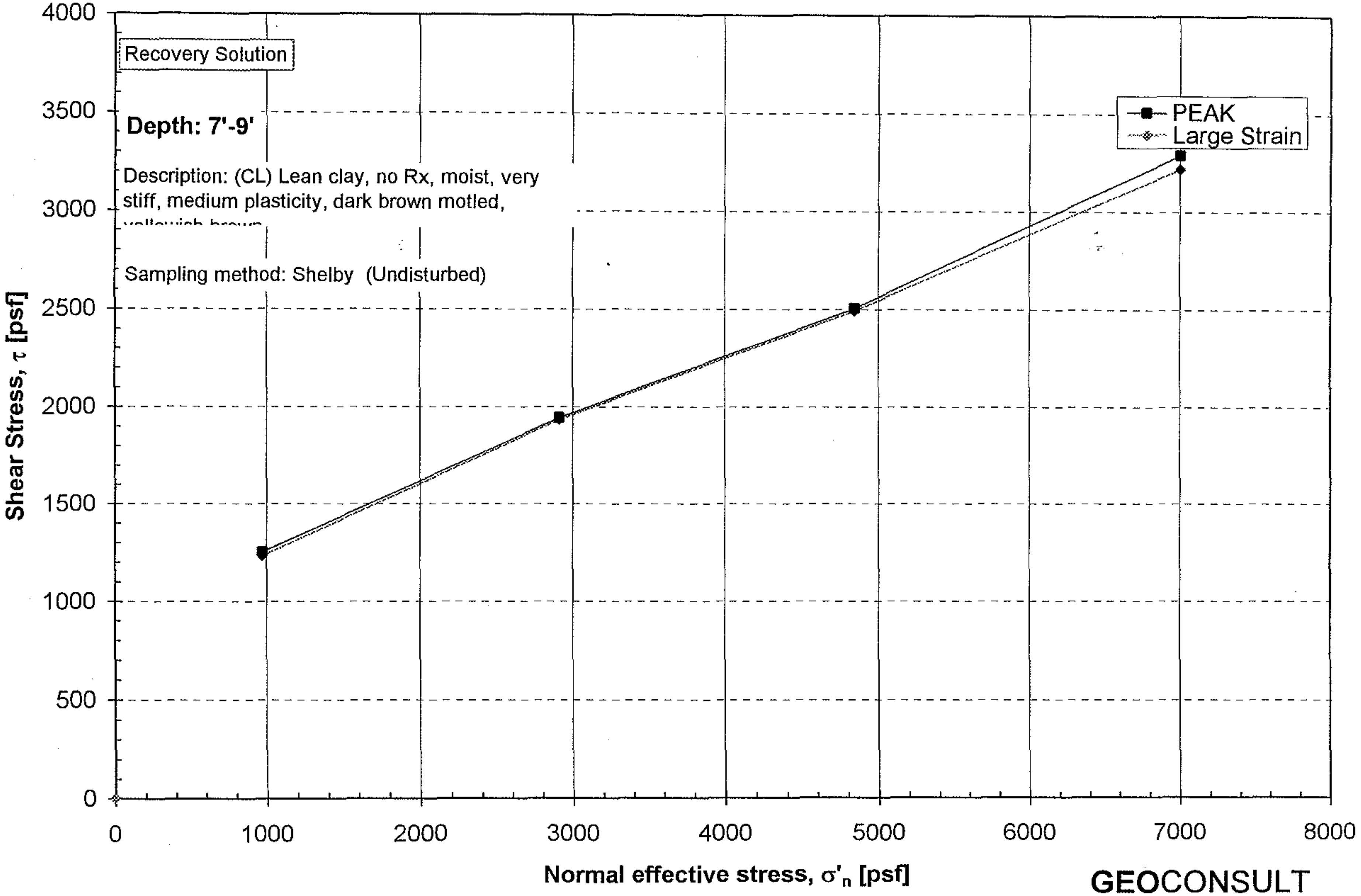
File No. 2182-99 Date 8/3/99

Description: (CL) Lean clay, no Rx, moist, very stiff, medium plasticity, dark brown motled, yellowish brown

RCS-2	**Depth** **[ft]**	Sampling Device	Sample Preparation	diameter [in]	height [in]	weight [lb]	w%	Area [in^2]
1st point	7'-9'	Shelby	Undisturbed	2.5	0.75	0.24516	35.5	4.91

Atterberg Limits			dry mass	γ_d	γ
LL	PL	PI	[lb]	[pcf]	[pcf]
54	42	12	0.17	79.65	115.04

σ'_n [psf]	τ_{peak} [psf]	τ_{ls} [psf]
0	0	0
971	1251	1231
2909	1945	1935
4839	2503	2493
7000	3293	3222


Recovery Solution
Depth: 7'-9'
Description: (CL) Lean clay, no Rx, moist, very stiff, medium plasticity, dark brown motled,
Sampling method: Shelby (Undisturbed)
PEAK
Large Strain
Shear Stress, τ [psf]
4000
3500
3000
2500
2000
1500
1000
500
0
0
1000
2000
3000
4000
5000
6000
7000
8000
Normal effective stress, σ'_n [psf]

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Direct Shear Test ASTM 3080-90

Project: Recovery Solution

File No. 2182-99 Date: 8/3/99

Description: (CL) Lean clay, no Rx, moist, very stiff, medium plasticity, dark brown motled, yellowish brown

RCS-2	**Depth** [ft]	Sampling Device	Sample Preparation	diameter [in]	height [in]	weight [lb]	w%	Area [in^2]
1st point	7'-9'	Shelby	Undisturbed	2.5	0.75	0.25	12.0	4.91

Atterberg Limits			dry mass	γ_d	γ
LL	PL	PI	[lb]	[pcf]	[pcf]
54	42	12	0.22	102.71	115.04

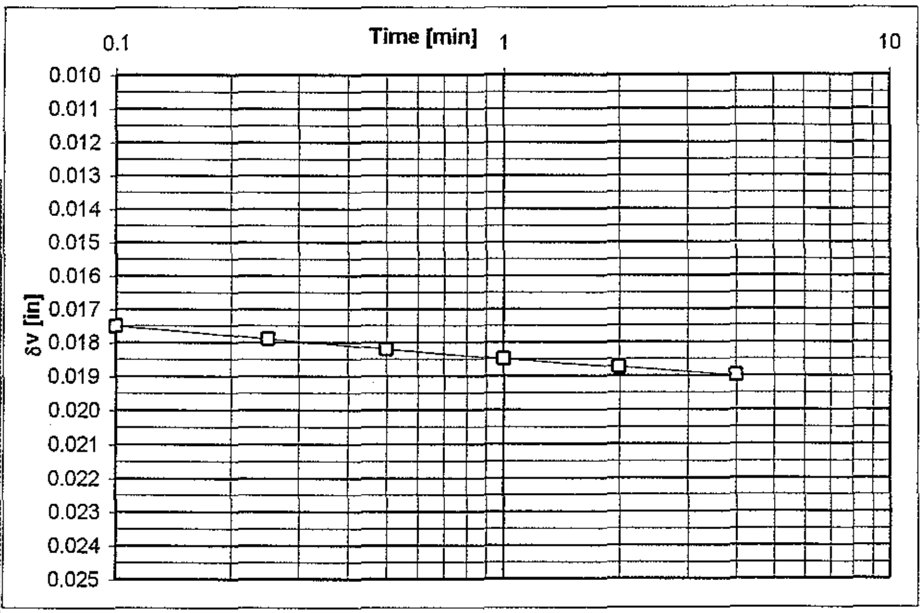
NORMAL LOAD

Fv [lb] : **3.31**

Lever factor 10

σ'_n [psf] : **970.8**

Clock Time	Elapsed Time	δv [in]
	0	0.0000
	0.1	0.0175
	0.25	0.0179
	0.5	0.0182
	1	0.0185
	2	0.0188
	4	0.0190



Clock Time	Elapsed Time	δv [in]

Clock Time	Elapsed Time	δv [in]

Rate of Shear Estimate:

t_{50} = 0.0176 min

$t_f = 50t_{50}$ = 0.88 min

Horizontal displacement to failure

δ_{hf} = 1 mm

Rate = 1.1364 mm/min

Consolidation Stage

GEOCONSULT Direct Shear Test ASTM 3080-90

Project: Recovery Solution

File No. 2182-99 Date 8/3/99

RCS-2	Depth [ft]	Sampling Device	Sample Preparation	diameter [in]	height [in]	weight [lb]	w %	Area [in^2]	γ_d [pcf]
	7'-9'	Shelby	Undisturbed	2.5	0.75	0.24516	12	4.91	102.7127

Description: (CL) Lean clay, no Rx, moist, very stiff, medium plasticity, dark brown motled, yellowish brown

NORMAL LOAD

Fv [lb] : 3.31

Lever factor 10

σ'_n [psf] : **971** Rate = 1.136 mm/min Shear Stress

Clock Time	δh [x10^{-3}in]	Load Ring Gage reading [div]	Vertical gage reading [x10^{-4}in]	δv [x10^{-4}in]	Cn [lb/div]	Fh [lb]	Fh/A τ [psf]	Normalized τ/σ'_n [-]
	0	0.0	185.0	0.0	0.7020	0.0	0.0	0.0000
	10	11.0	177.0	8.0	0.7015	7.7	226.3	0.2331
	20	16.0	195.0	-10.0	0.7013	11.2	329.1	0.3390
	30	16.0	205.0	-20.0	0.7013	11.2	329.1	0.3390
	40	24.0	208.5	-23.5	0.7010	16.8	493.4	0.5083
	50	37.0	211.5	-26.5	0.7004	25.9	760.1	0.7830
	60	44.0	206.0	-21.0	0.7001	30.8	903.5	0.9307
	70	48.0	195.0	-10.0	0.7000	33.6	985.4	1.0150
	80	52.0	183.0	2.0	0.6998	36.4	1067.2	1.0994
	90	54.0	173.0	12.0	0.6997	37.8	1108.1	1.1415
	100	56.0	161.0	24.0	0.6996	39.2	1149.0	1.1836
	110	57.0	154.0	31.0	0.6996	39.9	1169.5	1.2047
	120	58.0	147.0	38.0	0.6995	40.6	1189.9	1.2258
	130	58.0	142.5	42.5	0.6995	40.6	1189.9	1.2258
	140	58.5	138.0	47.0	0.6995	40.9	1200.1	1.2363
	150	59.0	134.0	51.0	0.6995	41.3	1210.4	1.2468
	160	59.0	132.0	53.0	0.6995	41.3	1210.4	1.2468
	170	59.0	128.0	57.0	0.6995	41.3	1210.4	1.2468
	180	59.0	126.0	59.0	0.6995	41.3	1210.4	1.2468
	190	60.0	123.0	62.0	0.6995	42.0	1230.8	1.2679
	200	60.0	121.0	64.0	0.6995	42.0	1230.8	1.2679
	210	61.0	119.0	66.0	0.6994	42.7	1251.2	1.2889
	220	61.0	113.0	72.0	0.6994	42.7	1251.2	1.2889
	230	61.0	109.0	76.0	0.6994	42.7	1251.2	1.2889
	240	61.0	103.5	81.5	0.6994	42.7	1251.2	1.2889
	250	61.0	99.0	86.0	0.6994	42.7	1251.2	1.2889
	260	61.0	95.0	90.0	0.6994	42.7	1251.2	1.2889
	270	61.0	92.0	93.0	0.6994	42.7	1251.2	1.2889
	280	61.0	89.0	96.0	0.6994	42.7	1251.2	1.2889
	290	60.0	87.5	97.5	0.6995	42.0	1230.8	1.2679
	300	59.5	87.0	98.0	0.6995	41.6	1220.6	1.2574
	310	59.0	87.0	98.0	0.6995	41.3	1210.4	1.2468
	320	58.0	87.0	98.0	0.6995	40.6	1189.9	1.2258
	330	57.0	87.5	97.5	0.6996	39.9	1169.5	1.2047
	340	57.0	89.0	96.0	0.6996	39.9	1169.5	1.2047
	350	56.0	91.5	93.5	0.6996	39.2	1149.0	1.1836
	360	55.0	94.0	91.0	0.6997	38.5	1128.6	1.1626

370	55.0	98.0	87.0	0.6997	38.5	1128.6	1.1626
380	54.0	102.0	83.0	0.6997	37.8	1108.1	1.1415
390	55.0	106.0	79.0	0.6997	38.5	1128.6	1.1626
400	54.0	111.0	74.0	0.6997	37.8	1108.1	1.1415
410	53.0	115.5	69.5	0.6997	37.1	1087.7	1.1204
420	53.0	120.0	65.0	0.6997	37.1	1087.7	1.1204
430	52.0	124.0	61.0	0.6998	36.4	1067.2	1.0994
440	52.0	128.0	57.0	0.6998	36.4	1067.2	1.0994
450	52.0	132.0	53.0	0.6998	36.4	1067.2	1.0994
460	52.0	136.0	49.0	0.6998	36.4	1067.2	1.0994
470	52.0	139.0	46.0	0.6998	36.4	1067.2	1.0994
480	52.0	142.0	43.0	0.6998	36.4	1067.2	1.0994
490	51.5	146.0	39.0	0.6998	36.0	1057.0	1.0888
500	51.0	148.5	36.5	0.6998	35.7	1046.8	1.0783
510	51.0	152.0	33.0	0.6998	35.7	1046.8	1.0783
520	51.0	154.0	31.0	0.6998	35.7	1046.8	1.0783
530	50.5	156.0	29.0	0.6999	35.3	1036.5	1.0678

GEOCONSULT Direct Shear Test ASTM 3080-90

Project: Recovery Solution

File No. 2182-99 Date: 8/3/99

Description: (CL) Lean clay, no Rx, moist, very stiff, medium plasticity, dark brown motled, yellowish brown

RCS-2	Depth [ft]	Sampling Device	Sample Preparation	diameter [in]	height [in]	weight [lb]	w%	Area [in^2]
2nd point	7'-9'	Shelby	Undisturbed	2.5	0.75	0.25	12	4.91

Atterberg Limits			dry mass	γ_d	γ
LL	PL	PI	[lb]	[pcf]	[pcf]
54	42	12	0.22	102.71	115.04

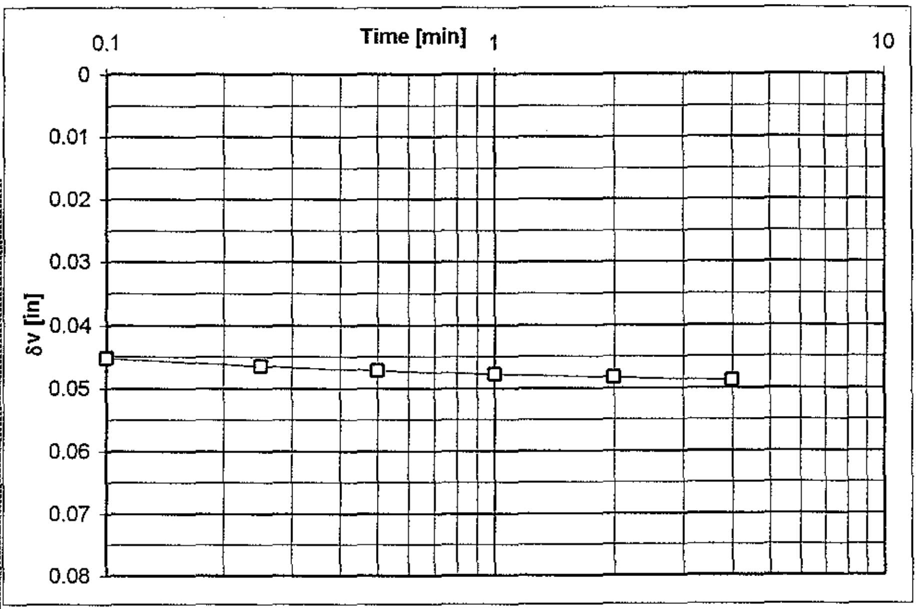
NORMAL LOAD

Fv [lb] : 9.92

Lever factor 10

σ'_n [psf] : 2909.3

Clock Time	Elapsed Time	δv [in]
	0.1	0.0453
	0.25	0.0465
	0.5	0.0473
	1	0.0479
	2	0.0484
	4	0.0489



Clock Time	Elapsed Time	δv [in]

Clock Time	Elapsed Time	δv [in]

Rate of Shear Estimate:

t_{50} = 0.046 min

$t_f = 50t_{50}$ = 2.275 min

Horizontal displacement to failure

δ_{hf} = 1.000 mm

Rate = 0.440 mm/min

GEOCONSULT

Direct Shear Test ASTM 3080-90

Project: Recovery Solution

File No. 2182-99 Date 8/3/99

RCS-2	Depth [ft]	Sampling Device	Sample Preparation	diameter [in]	height [in]	weight [lb]	w %	Area [in^2]	γ_d [pcf]
	7'-9'	Shelby	Undisturbed	2.5	0.75	0.24516	12	4.91	102.7127

Description: (CL) Lean clay, no Rx, moist, very stiff, medium plasticity, dark brown motled, yellowish brown

NORMAL LOAD

Fv [lb] : 9.92

Lever factor 10

σ'_n [psf] : **2909**

Rate = 0.440 mm/min

Clock Time	δh [$\times10^{-3}$in]	Load Ring Gage reading [div]	Vertical gage reading [$\times10^{-4}$in]	δv [$\times10^{-4}$in]	Cn [lb/div]	Fh [lb]	Shear Stress Fh/A τ [psf]	Normalized τ/σ'_n [-]
	0	0.0	496.0	0.0	0.7020	0.0	0.0	0.0000
	10	38.0	510.0	-14.0	0.7004	26.6	780.6	0.2683
	20	49.0	516.0	-20.0	0.6999	34.3	1005.8	0.3457
	30	62.0	522.0	-26.0	0.6994	43.4	1271.7	0.4371
	40	73.0	530.0	-34.0	0.6989	51.0	1496.3	0.5143
	50	82.0	535.5	-39.5	0.6985	57.3	1679.9	0.5774
	60	87.0	539.0	-43.0	0.6983	60.8	1781.7	0.6124
	70	89.5	544.0	-48.0	0.6982	62.5	1832.7	0.6299
	80	90.0	546.0	-50.0	0.6982	62.8	1842.8	0.6334
	90	91.0	550.0	-54.0	0.6981	63.5	1863.2	0.6404
	100	91.0	553.0	-57.0	0.6981	63.5	1863.2	0.6404
	110	90.0	564.0	-68.0	0.6982	62.8	1842.8	0.6334
	120	89.0	566.0	-70.0	0.6982	62.1	1822.5	0.6264
	130	89.0	570.0	-74.0	0.6982	62.1	1822.5	0.6264
	140	89.5	573.0	-77.0	0.6982	62.5	1832.7	0.6299
	150	90.0	576.0	-80.0	0.6982	62.8	1842.8	0.6334
	160	90.0	580.0	-84.0	0.6982	62.8	1842.8	0.6334
	170	92.0	586.0	-90.0	0.6981	64.2	1883.6	0.6474
	180	93.0	590.0	-94.0	0.6980	64.9	1903.9	0.6544
	190	94.0	595.0	-99.0	0.6980	65.6	1924.3	0.6614
	200	94.0	598.0	-102.0	0.6980	65.6	1924.3	0.6614
	210	94.0	602.0	-106.0	0.6980	65.6	1924.3	0.6614
	220	95.0	605.0	-109.0	0.6980	66.3	1944.6	0.6684
	230	95.0	607.0	-111.0	0.6980	66.3	1944.6	0.6684
	240	95.0	610.0	-114.0	0.6980	66.3	1944.6	0.6684
	250	95.0	612.0	-116.0	0.6980	66.3	1944.6	0.6684
	260	95.0	615.0	-119.0	0.6980	66.3	1944.6	0.6684
	270	95.0	616.0	-120.0	0.6980	66.3	1944.6	0.6684
	280	94.5	620.0	-124.0	0.6980	66.0	1934.5	0.6649
	290	94.5	621.0	-125.0	0.6980	66.0	1934.5	0.6649
	300	94.0	622.0	-126.0	0.6980	65.6	1924.3	0.6614
	310	94.0	624.0	-128.0	0.6980	65.6	1924.3	0.6614
	320	93.5	625.0	-129.0	0.6980	65.3	1914.1	0.6579
	330	93.0	627.0	-131.0	0.6980	64.9	1903.9	0.6544
	340	93.0	628.0	-132.0	0.6980	64.9	1903.9	0.6544
	350	92.0	629.0	-133.0	0.6981	64.2	1883.6	0.6474
	360	92.0	631.0	-135.0	0.6981	64.2	1883.6	0.6474

370	91.5	632.0	-136.0	0.6981	63.9	1873.4	0.6439
380	91.0	634.0	-138.0	0.6981	63.5	1863.2	0.6404
390	91.0	635.0	-139.0	0.6981	63.5	1863.2	0.6404
400	90.0	636.0	-140.0	0.6982	62.8	1842.8	0.6334
410	90.0	637.0	-141.0	0.6982	62.8	1842.8	0.6334
420	90.0	639.0	-143.0	0.6982	62.8	1842.8	0.6334
430	89.0	639.0	-143.0	0.6982	62.1	1822.5	0.6264
440	89.0	640.0	-144.0	0.6982	62.1	1822.5	0.6264
450	89.0	642.0	-146.0	0.6982	62.1	1822.5	0.6264
460	88.5	642.5	-146.5	0.6982	61.8	1812.3	0.6229
470	88.0	643.0	-147.0	0.6983	61.4	1802.1	0.6194
480	88.0	644.0	-148.0	0.6983	61.4	1802.1	0.6194
490	87.0	644.5	-148.5	0.6983	60.8	1781.7	0.6124
500	87.0	645.0	-149.0	0.6983	60.8	1781.7	0.6124
510	87.0	646.0	-150.0	0.6983	60.8	1781.7	0.6124
520	86.0	647.0	-151.0	0.6983	60.1	1761.4	0.6054
530	86.0	648.0	-152.0	0.6983	60.1	1761.4	0.6054
540	85.0	648.0	-152.0	0.6984	59.4	1741.0	0.5984
550	85.0	649.0	-153.0	0.6984	59.4	1741.0	0.5984
560	85.0	650.0	-154.0	0.6984	59.4	1741.0	0.5984
570	84.0	651.0	-155.0	0.6984	58.7	1720.6	0.5914
580	84.0	652.0	-156.0	0.6984	58.7	1720.6	0.5914

GEOCONSULT Direct Shear Test ASTM 3080-90

Project: Recovery Solution

File No. 2182-99 Date: 8/3/99

Description: (CL) Lean clay, no Rx, moist, very stiff, medium plasticity, dark brown motled, yellowish brown

RCS-2	Depth [ft]	Sampling Device	Sample Preparation	diameter [in]	height [in]	weight [lb]	w%	Area [in²]
3rd point	7'-9'	Shelby	Undisturbed	2.5	0.75	0.25	12	4.91

Atterberg Limits			dry mass	γ_d	γ
LL	PL	PI	[lb]	[pcf]	[pcf]
54	42	12	0.22	102.71	115.04

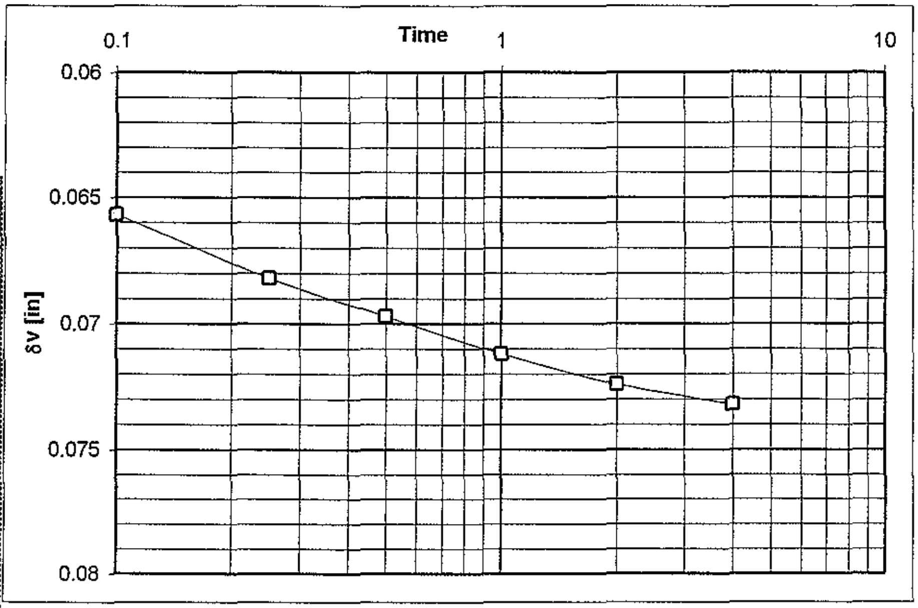
NORMAL LOAD

Fv [lb] : 16.5

Lever factor 10

σ'_n [psf] : **4839.1**

Clock Time	Elapsed Time	δv [in]
	0.1	0.0657
	0.25	0.0682
	0.5	0.0697
	1	0.0712
	2	0.0724
	4	0.0732



Clock Time	Elapsed Time	δv [in]

Clock Time	Elapsed Time	δv [in]

Rate of Shear Estimate:

t_{50} = **0.065 min**

$t_f = 50t_{50}$ = 3.27 min

Horizontal displacement to failure

δ_{hf} = 1 mm

Rate = 0.306 mm/min

GEOCONSULT Direct Shear Test ASTM 3080-90

Project: Recovery Solution

File No. 2182-99 Date 8/3/99

RCS-2	**Depth [ft]**	Sampling Device	Sample Preparation	diameter [in]	height [in]	weight [lb]	w %	Area [in^2]	γ_d [pcf]
	7'-9'	Shelby	Undisturbed	2.5	0.75	0.24516	12	4.91	102.7127

Description: (CL) Lean clay, no Rx, moist, very stiff, medium plasticity, dark brown motled, yellowish brown

NORMAL LOAD

Fv [lb] : 16.5

Lever factor 10

σ'_n [psf] : **4839**

Rate = 0.306 mm/min

Shear Stress

Clock Time	δh [x10^{-3}in]	Load Ring Gage reading [div]	Vertical gage reading [x10^{-4}in]	δv [x10^{-4}in]	Cn [lb/div]	Fh [lb]	Fh/A τ [psf]	Normalized τ/σ'_n [-]
	0	0.0	745.0	0.0	0.7020	0.0	0.0	0.0000
	10	51.0	761.0	-16.0	0.6998	35.7	1046.8	0.2163
	20	68.0	786.0	-41.0	0.6991	47.5	1394.2	0.2881
	30	83.0	801.0	-56.0	0.6985	58.0	1700.2	0.3514
	40	89.0	814.0	-69.0	0.6982	62.1	1822.5	0.3766
	50	91.0	822.0	-77.0	0.6981	63.5	1863.2	0.3850
	60	99.0	831.0	-86.0	0.6978	69.1	2026.0	0.4187
	70	103.0	840.0	-95.0	0.6976	71.9	2107.4	0.4355
	80	107.0	849.0	-104.0	0.6975	74.6	2188.7	0.4523
	90	109.0	856.5	-111.5	0.6974	76.0	2229.3	0.4607
	100	112.0	865.0	-120.0	0.6972	78.1	2290.2	0.4733
	110	113.0	873.0	-128.0	0.6972	78.8	2310.5	0.4775
	120	114.0	881.0	-136.0	0.6972	79.5	2330.9	0.4817
	130	114.0	889.0	-144.0	0.6972	79.5	2330.9	0.4817
	140	114.5	895.0	-150.0	0.6971	79.8	2341.0	0.4838
	150	115.0	902.0	-157.0	0.6971	80.2	2351.2	0.4859
	160	116.0	907.0	-162.0	0.6971	80.9	2371.5	0.4901
	170	116.5	912.5	-167.5	0.6970	81.2	2381.6	0.4922
	180	117.0	918.0	-173.0	0.6970	81.6	2391.8	0.4943
	190	117.0	923.0	-178.0	0.6970	81.6	2391.8	0.4943
	200	118.0	928.0	-183.0	0.6970	82.2	2412.1	0.4984
	210	120.0	937.0	-192.0	0.6969	83.6	2452.6	0.5068
	220	120.0	940.0	-195.0	0.6969	83.6	2452.6	0.5068
	230	122.0	946.0	-201.0	0.6968	85.0	2493.2	0.5152
	240	122.0	949.0	-204.0	0.6968	85.0	2493.2	0.5152
	250	122.5	952.0	-207.0	0.6968	85.4	2503.3	0.5173
	260	122.5	954.0	-209.0	0.6968	85.4	2503.3	0.5173
	270	122.0	956.0	-211.0	0.6968	85.0	2493.2	0.5152
	280	122.0	958.0	-213.0	0.6968	85.0	2493.2	0.5152
	290	122.0	959.0	-214.0	0.6968	85.0	2493.2	0.5152
	300	122.0	961.0	-216.0	0.6968	85.0	2493.2	0.5152
	310	122.0	963.0	-218.0	0.6968	85.0	2493.2	0.5152
	320	121.0	964.0	-219.0	0.6969	84.3	2472.9	0.5110
	330	121.0	965.0	-220.0	0.6969	84.3	2472.9	0.5110
	340	120.0	966.0	-221.0	0.6969	83.6	2452.6	0.5068
	350	120.0	968.0	-223.0	0.6969	83.6	2452.6	0.5068
	360	119.5	969.0	-224.0	0.6969	83.3	2442.5	0.5047

370	119.0	970.0	-225.0	0.6969	82.9	2432.3	0.5026
380	119.0	971.0	-226.0	0.6969	82.9	2432.3	0.5026
390	118.0	972.0	-227.0	0.6970	82.2	2412.1	0.4984
400	118.0	973.0	-228.0	0.6970	82.2	2412.1	0.4984
410	117.0	975.0	-230.0	0.6970	81.6	2391.8	0.4943
420	117.0	976.0	-231.0	0.6970	81.6	2391.8	0.4943
430	116.0	977.0	-232.0	0.6971	80.9	2371.5	0.4901
440	116.0	977.0	-232.0	0.6971	80.9	2371.5	0.4901
450	116.0	978.0	-233.0	0.6971	80.9	2371.5	0.4901
460	115.0	979.0	-234.0	0.6971	80.2	2351.2	0.4859
470	115.0	980.0	-235.0	0.6971	80.2	2351.2	0.4859

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Direct Shear Test ASTM 3080-90

Project: Recovery Solution

File No. 2182-99 Date: 8/3/99

Descriptior (CL) Lean clay, no Rx, moist, very stiff, medium plasticity, dark brown motled, yellowish brown

RCS-2	**Depth** [ft]	Sampling Device	Sample Preparation	diameter [in]	height [in]	weight [lb]	w%	Area [in^2]
4th point	7'-9'	Shelby	Undisturbed	2.5	0.75	0.25	12	4.91

Atterberg Limits			dry mass	γ_d	γ
LL	PL	PI	[lb]	[pcf]	[pcf]
54	42	12	0.22	102.71	115.04

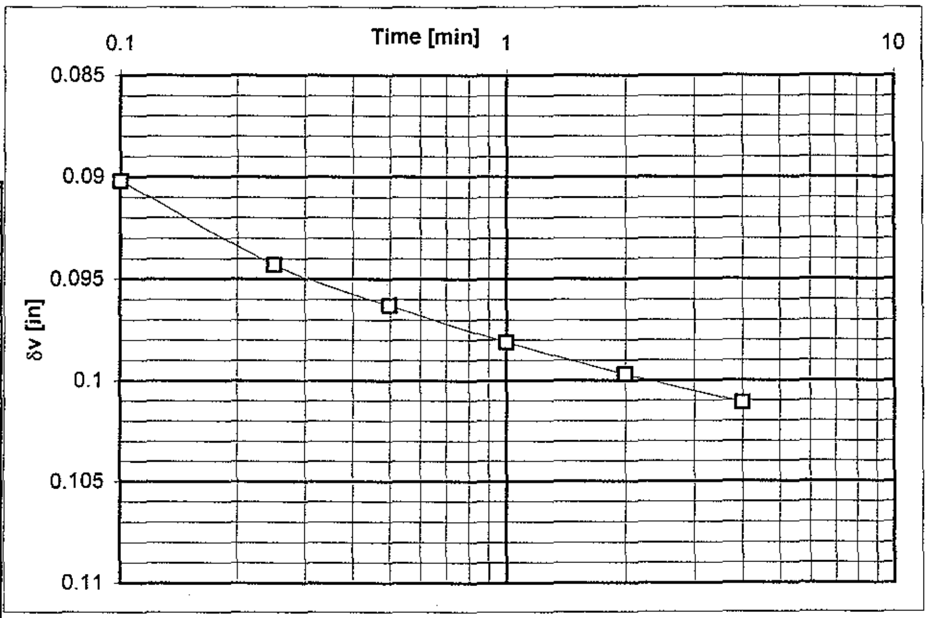
NORMAL LOAD

Fv [lb] : **23.15**

Lever factor 10

σ'_n [psf] : **6789.4**

Clock Time	Elapsed Time [min]	δv [in]
	0.1	0.0902
	0.25	0.0943
	0.5	0.0963
	1	0.0981
	2	0.0997
	4	0.1011



Clock Time	Elapsed Time	δv [in]

Clock Time	Elapsed Time	δv [in]

Rate of Shear Estimate:

t_{50} = 0.0901 min

$t_f = 50t_{50}$ = 4.505 min

Horizontal displacement to failure

δ_{hf} = 1 mm

Rate = 0.220 mm/min

GEOCONSULT Direct Shear Test ASTM 3080-90

Project: Recovery Solution

File No. 2182-99 Date 8/3/99

RCS-2	**Depth [ft]**	Sampling Device	Sample Preparation	diameter [in]	height [in]	weight [lb]	w %	Area [in^2]	γ_d [pcf]
	7'-9'	Shelby	Undisturbed	2.5	0.75	0.24516	12	4.91	102.7127

Description: (CL) Lean clay, no Rx, moist, very stiff, medium plasticity, dark brown motled, yellowish brown

NORMAL LOAD

Fv [lb] : **23.15**

Lever factor 10

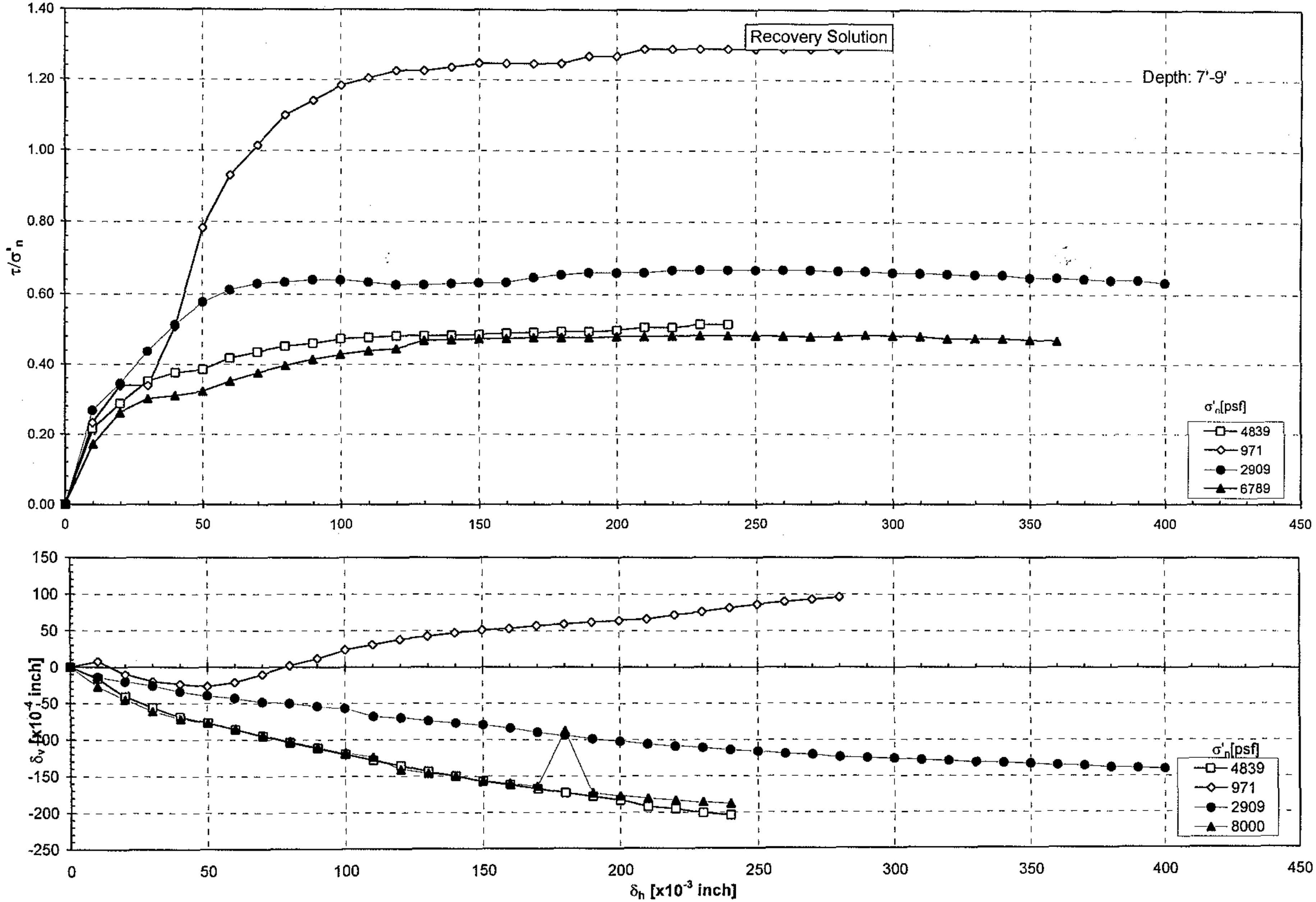
σ'_n [psf] : **6789**

Rate = 0.220 mm/min

Shear Stress

Clock Time	δh [$x10^{-3}in$]	Load Ring Gage reading [div]	Vertical gage reading [$x10^{-4}in$]	δv [$x10^{-4}in$]	Cn [lb/div]	Fh [lb]	Fh/A τ [psf]	Normalized τ/σ'_n [-]
	0	0.0	1032.0	0.0	0.7020	0.0	0.0	0.0000
	10	57.0	1059.0	-27.0	0.6996	39.9	1169.5	0.1723
	20	87.0	1077.0	-45.0	0.6983	60.8	1781.7	0.2624
	30	100.0	1093.0	-61.0	0.6978	69.8	2046.4	0.3014
	40	103.0	1103.5	-71.5	0.6976	71.9	2107.4	0.3104
	50	107.0	1109.0	-77.0	0.6975	74.6	2188.7	0.3224
	60	117.0	1117.0	-85.0	0.6970	81.6	2391.8	0.3523
	70	125.0	1126.0	-94.0	0.6967	87.1	2554.0	0.3762
	80	132.0	1134.0	-102.0	0.6964	91.9	2695.9	0.3971
	90	138.0	1142.0	-110.0	0.6961	96.1	2817.4	0.4150
	100	142.5	1150.0	-118.0	0.6959	99.2	2908.5	0.4284
	110	146.0	1156.0	-124.0	0.6958	101.6	2979.3	0.4388
	120	148.0	1173.0	-141.0	0.6957	103.0	3019.7	0.4448
	130	156.0	1178.0	-146.0	0.6954	108.5	3181.4	0.4686
	140	157.0	1182.0	-150.0	0.6953	109.2	3201.6	0.4716
	150	157.5	1188.0	-156.0	0.6953	109.5	3211.7	0.4730
	160	158.0	1192.0	-160.0	0.6953	109.9	3221.8	0.4745
	170	159.0	1196.0	-164.0	0.6952	110.5	3242.0	0.4775
	180	159.0	1120.0	-88.0	0.6952	110.5	3242.0	0.4775
	190	159.0	1205.0	-173.0	0.6952	110.5	3242.0	0.4775
	200	160.0	1209.0	-177.0	0.6952	111.2	3262.2	0.4805
	210	160.0	1212.5	-180.5	0.6952	111.2	3262.2	0.4805
	220	161.0	1215.0	-183.0	0.6952	111.9	3282.4	0.4835
	230	161.0	1218.0	-186.0	0.6952	111.9	3282.4	0.4835
	240	161.0	1220.0	-188.0	0.6952	111.9	3282.4	0.4835
	250	161.0	1222.0	-190.0	0.6952	111.9	3282.4	0.4835
	260	160.5	1224.0	-192.0	0.6952	111.6	3272.3	0.4820
	270	160.0	1225.0	-193.0	0.6952	111.2	3262.2	0.4805
	280	160.0	1226.0	-194.0	0.6952	111.2	3262.2	0.4805
	290	161.5	1228.0	-196.0	0.6951	112.3	3292.5	0.4849
	300	161.0	1229.0	-197.0	0.6952	111.9	3282.4	0.4835
	310	160.0	1230.0	-198.0	0.6952	111.2	3262.2	0.4805
	320	158.0	1231.0	-199.0	0.6953	109.9	3221.8	0.4745

330	158.0	1231.5	-199.5	0.6953	109.9	3221.8	0.4745
340	158.0	1232.0	-200.0	0.6953	109.9	3221.8	0.4745
350	157.0	1234.0	-202.0	0.6953	109.2	3201.6	0.4716
360	156.0	1048.0	-16.0	0.6954	108.5	3181.4	0.4686

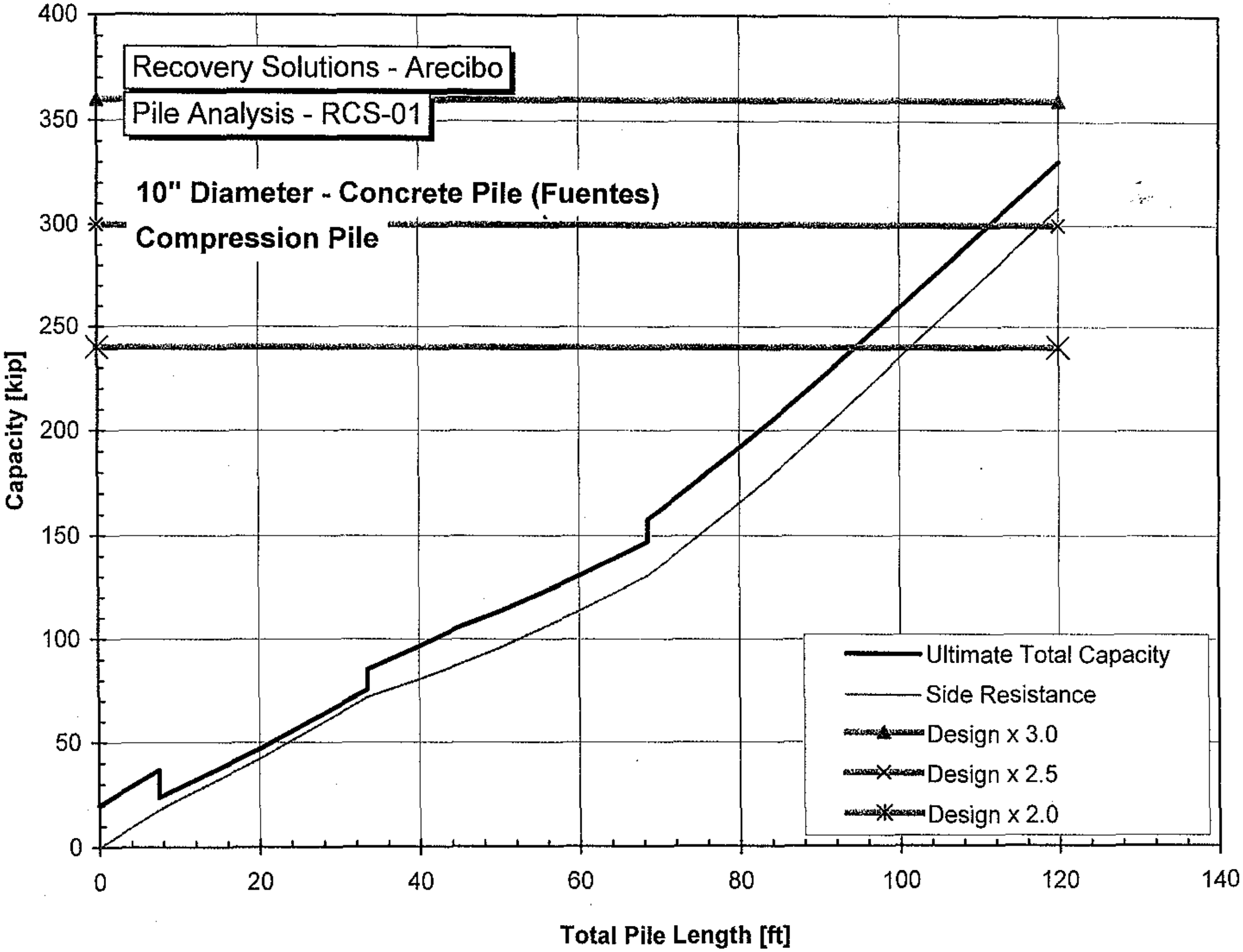


Recovery Solution
Depth: 7'-9'
τ/σ'_n
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
0
50
100
150
200
250
300
350
400
450
σ'_n[psf]
4839
971
2909
6789
150
100
50
0
-50
-100
-150
-200
-250
δ_v [x10^{-4} inch]
σ'_n[psf]
4839
971
2909
8000
δ_h [x10^{-3} inch]

Appendix C

Static Pile Analyses

Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pile 10 in. RCS-01
Assumes cohesive undrained behavior in limestone

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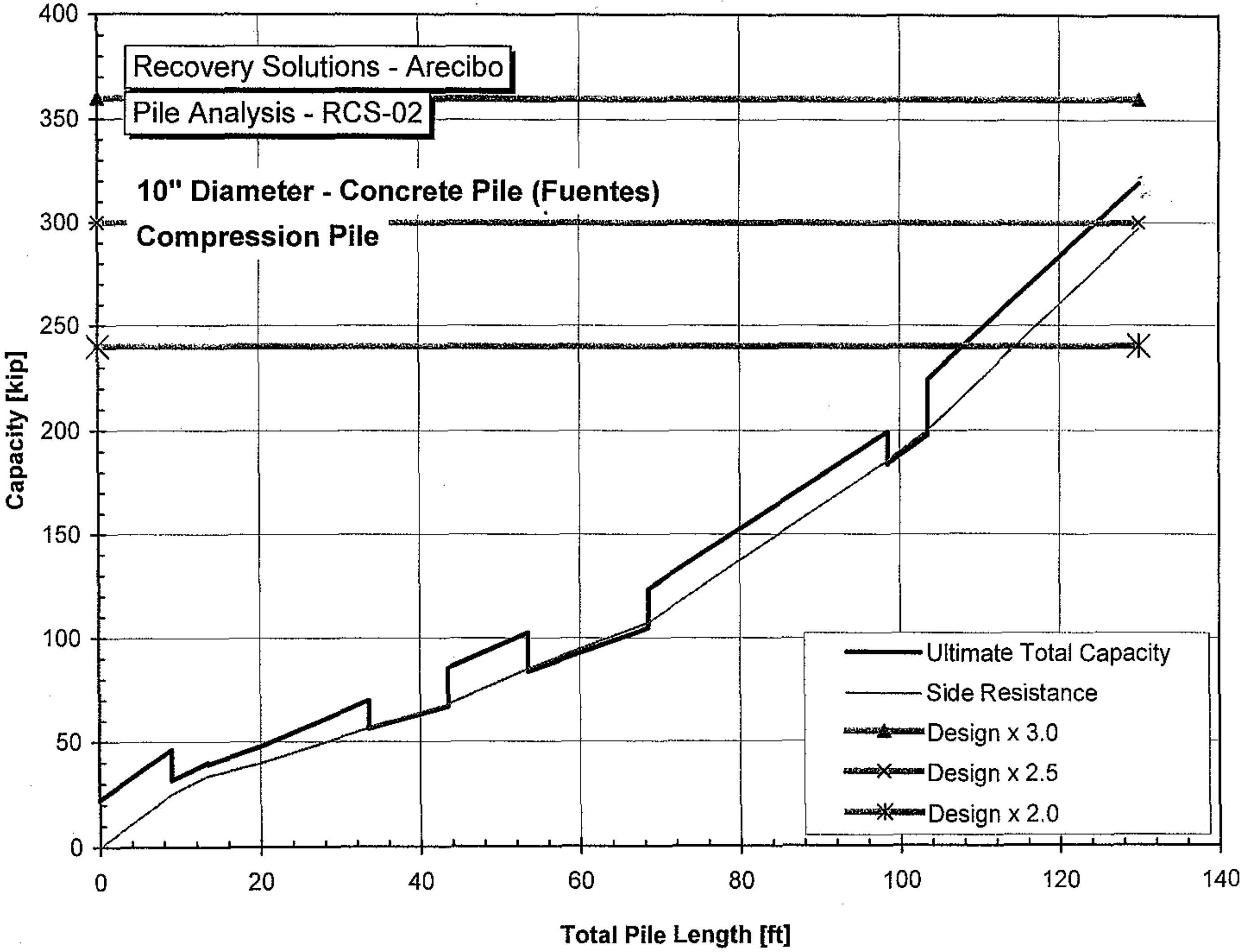
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pile 10 in. RCS-02
Assumes cohesive undrained behavior in limestone

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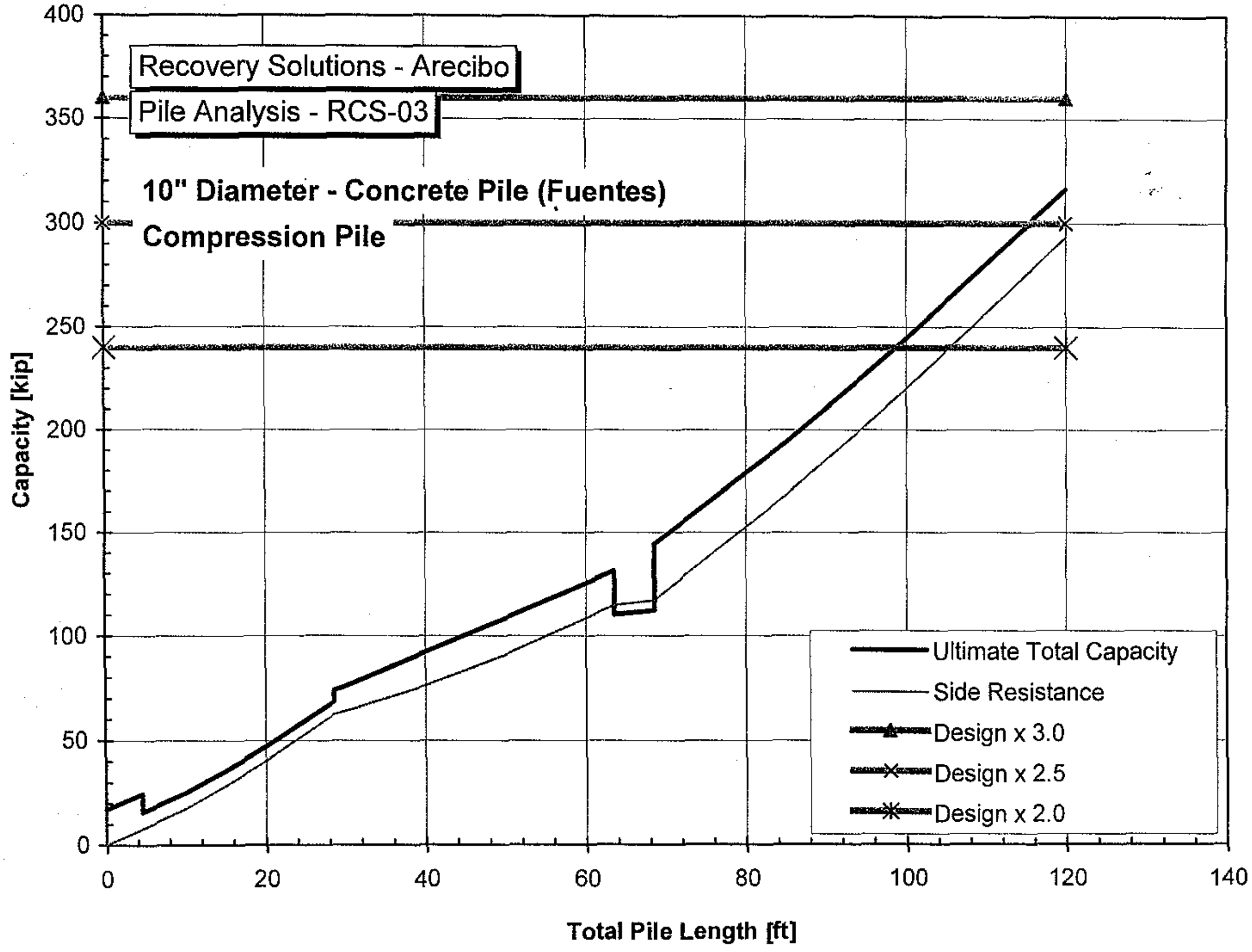
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pile 10 in. RCS-03
Assumes cohesive undrained behavior in limestone

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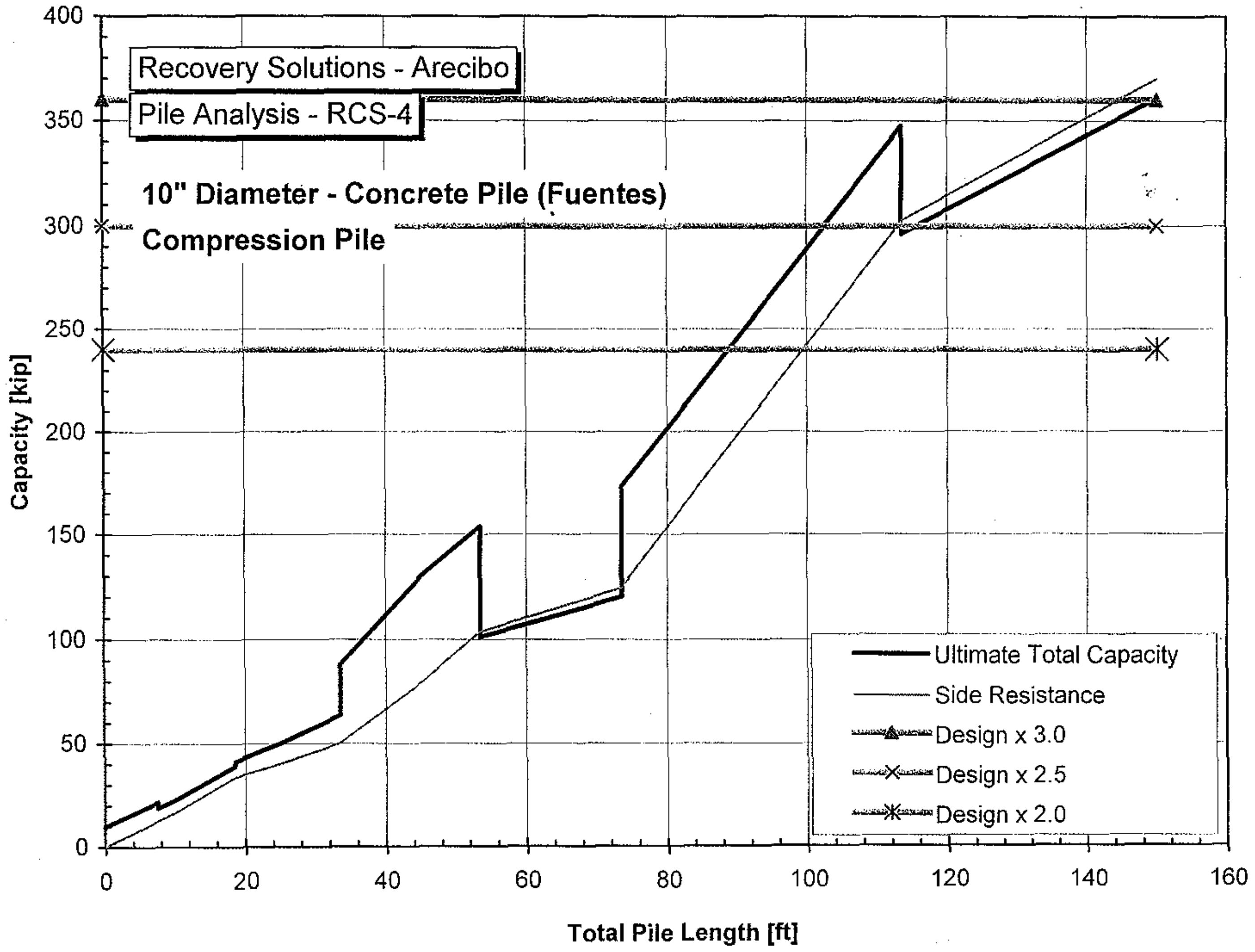
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pile 10 in. RCS-04
Assumes cohesive undrained behavior in limestone

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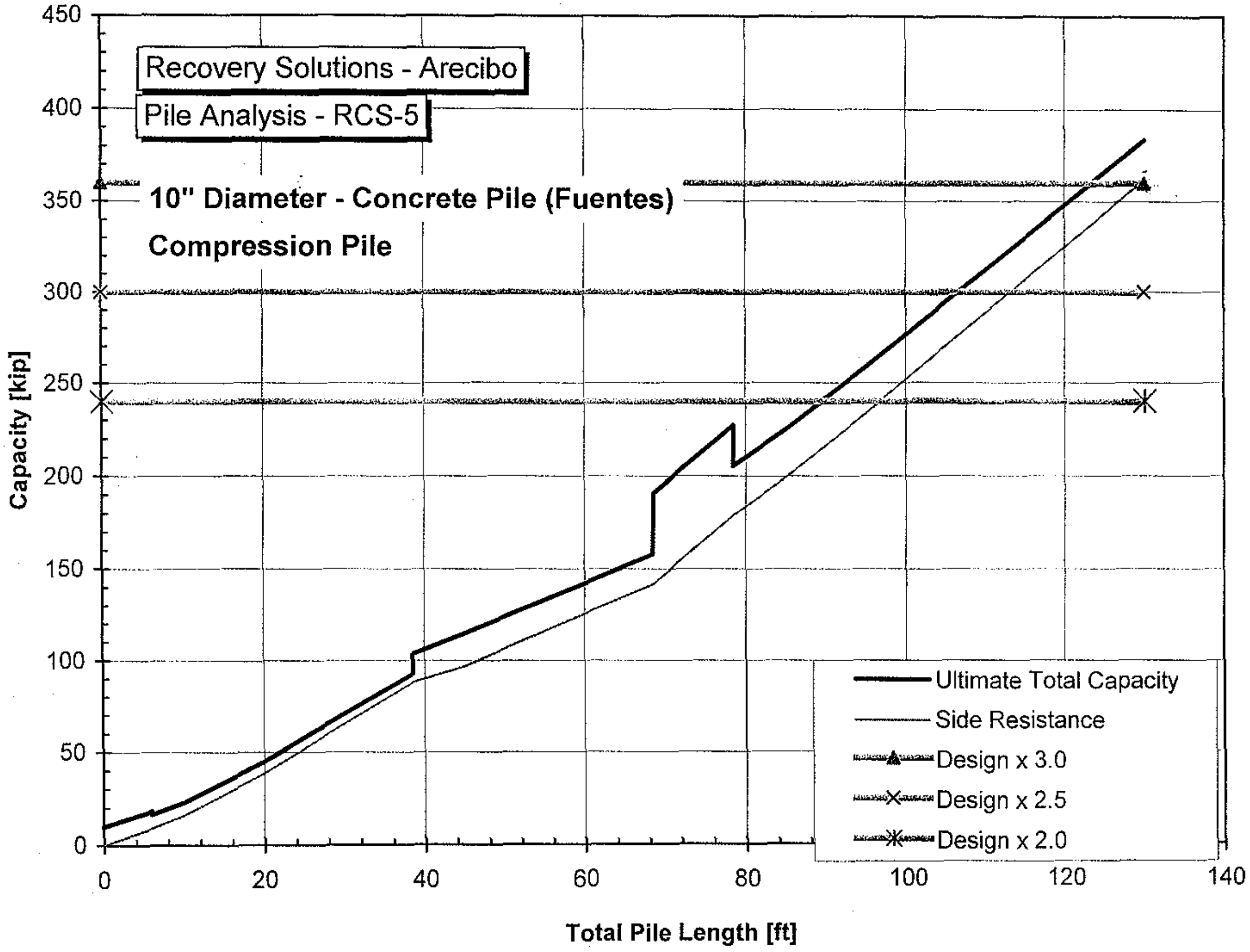
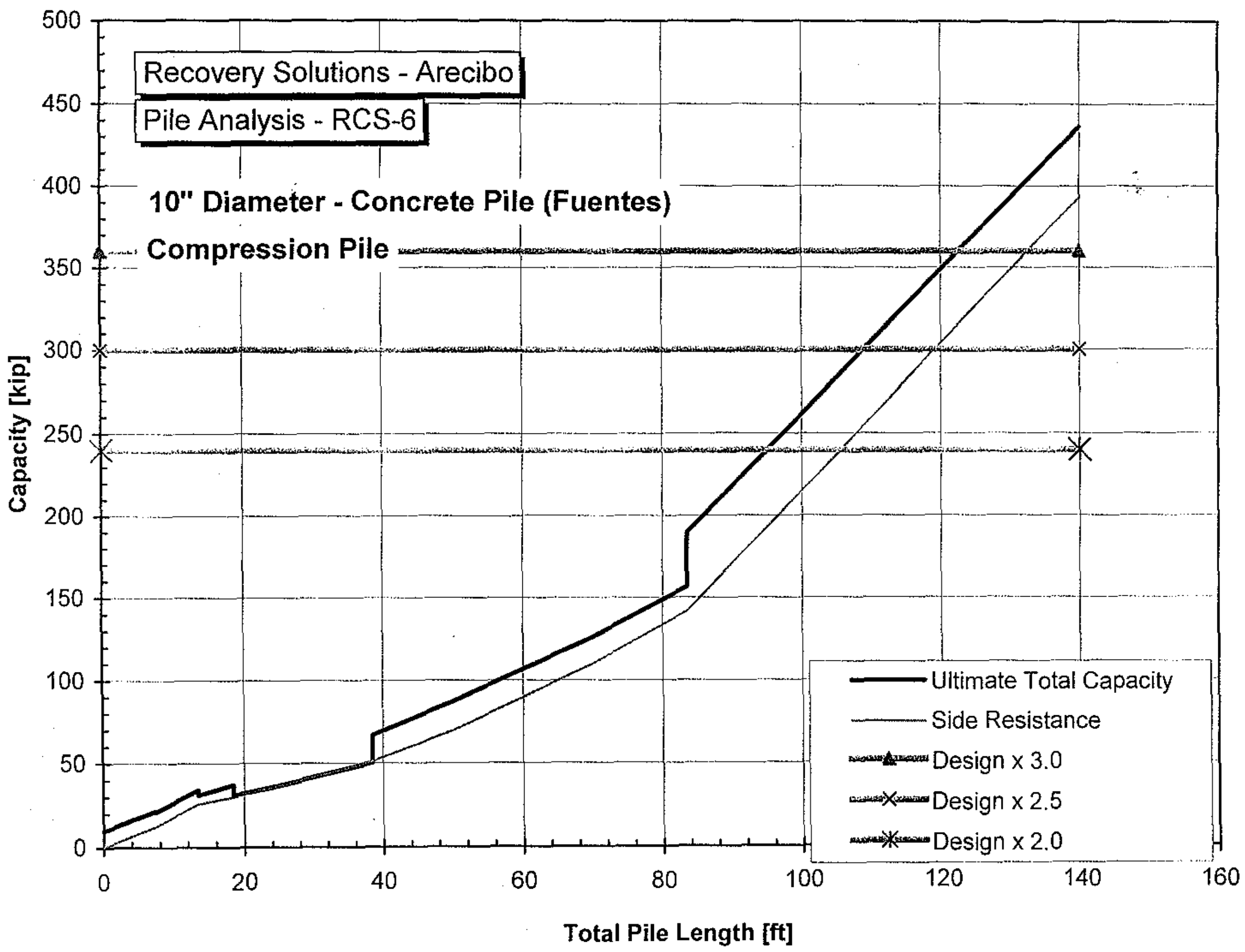
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pile 10 in. RCS-05
Assumes cohesive undrained behavior in limestone

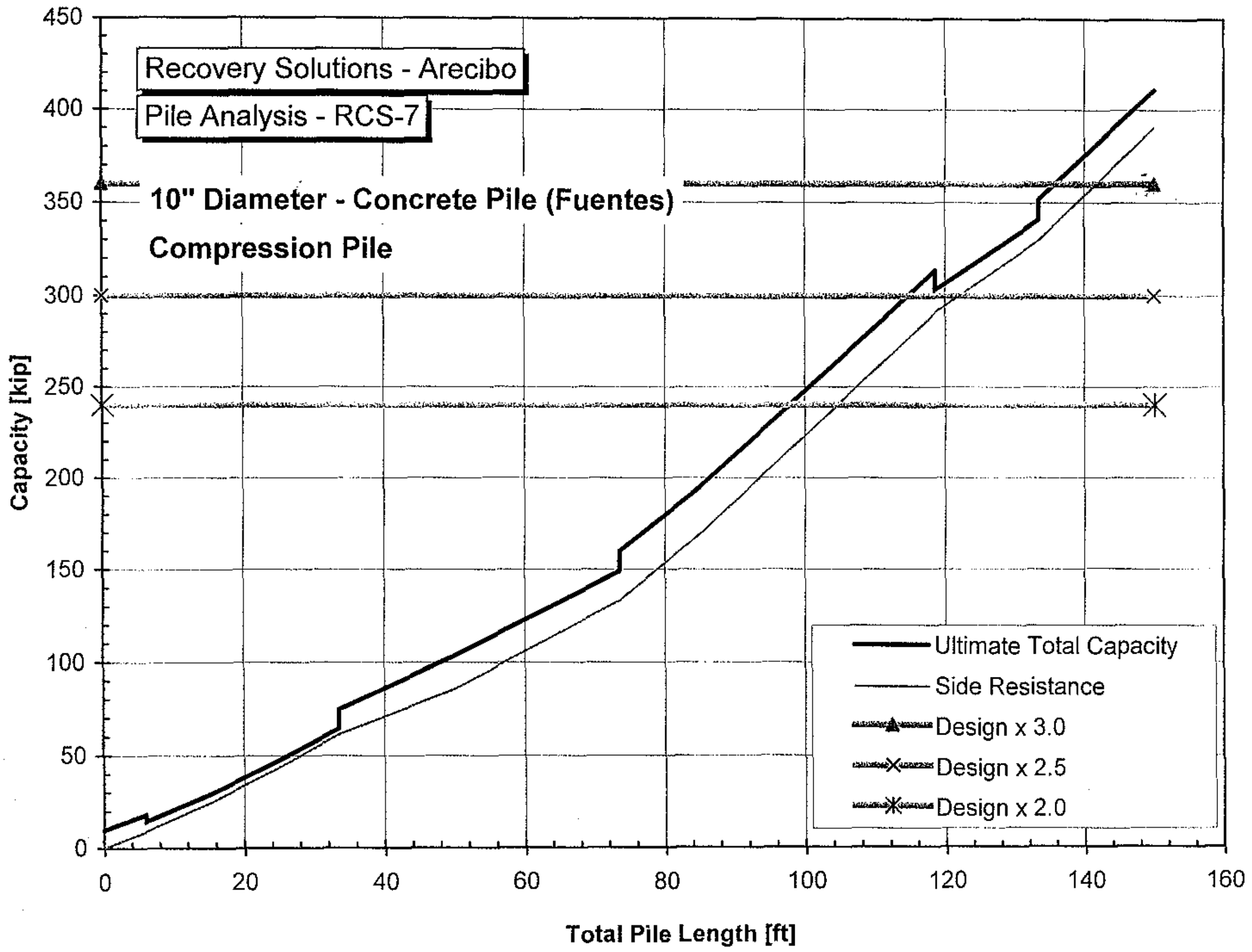
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pile 10 in. RCS-06
Assumes cohesive undrained behavior in limestone

Capacity vs Total Pile Length

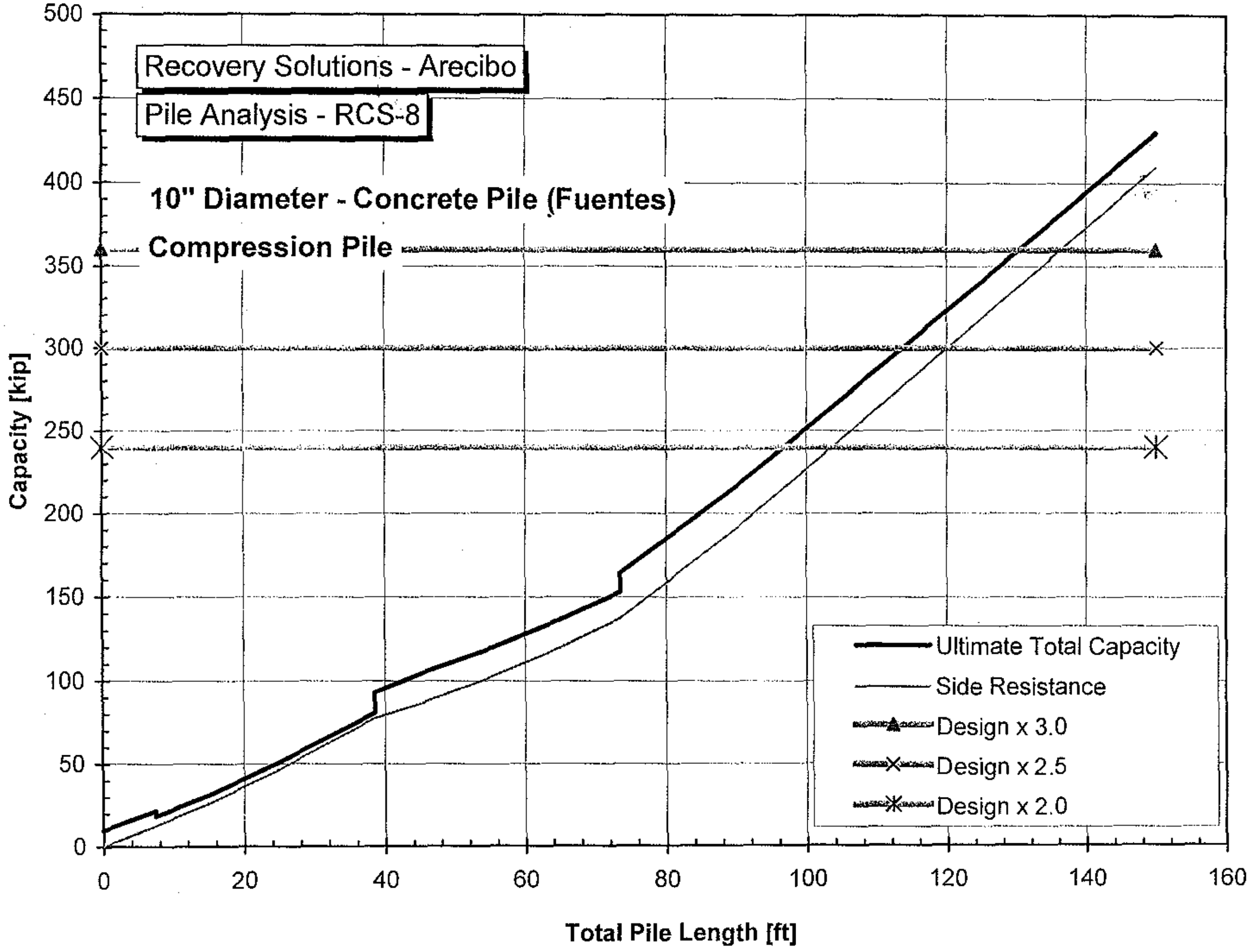


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pile 10 in. RCS-07
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

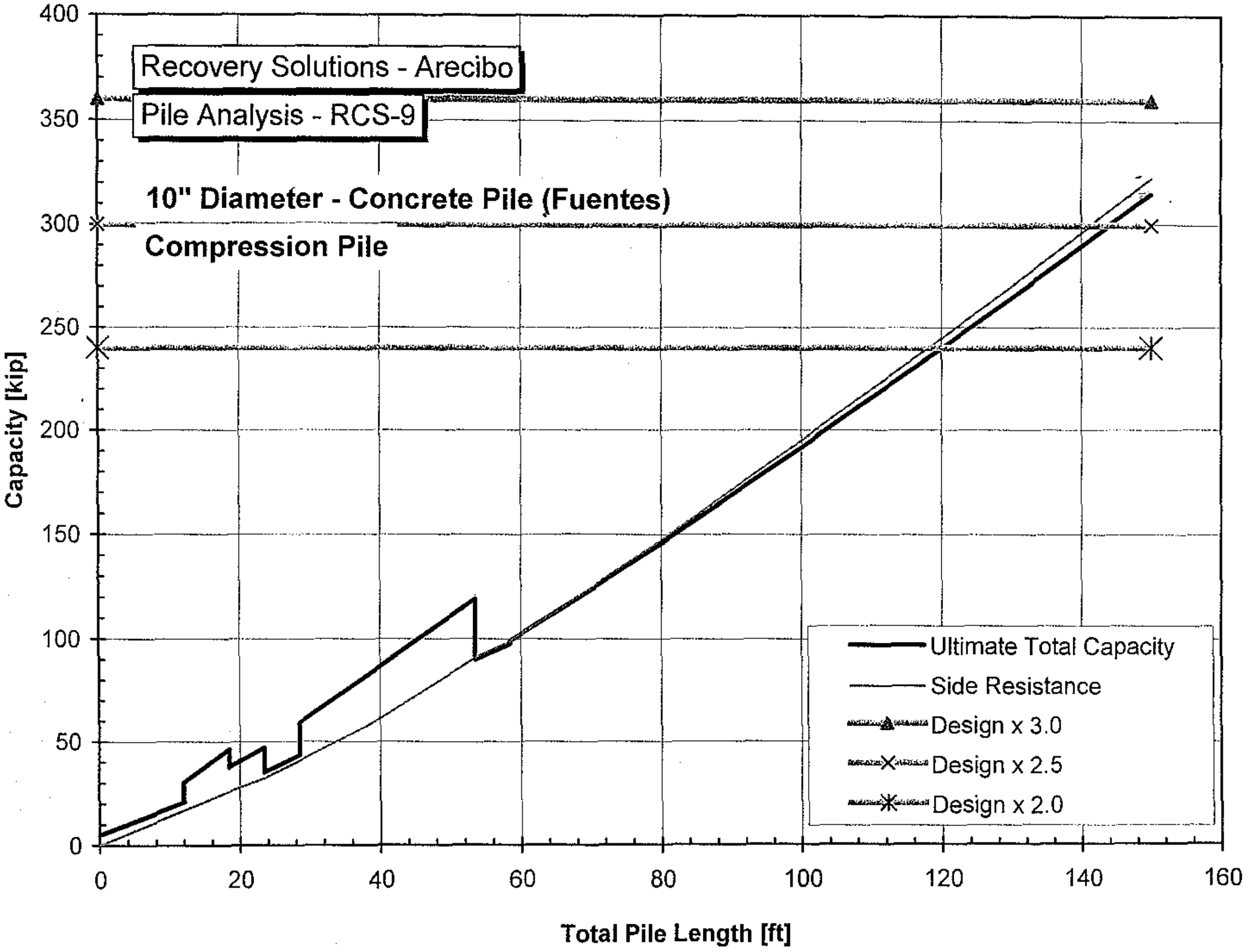


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pile 10 in. RCS-08
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

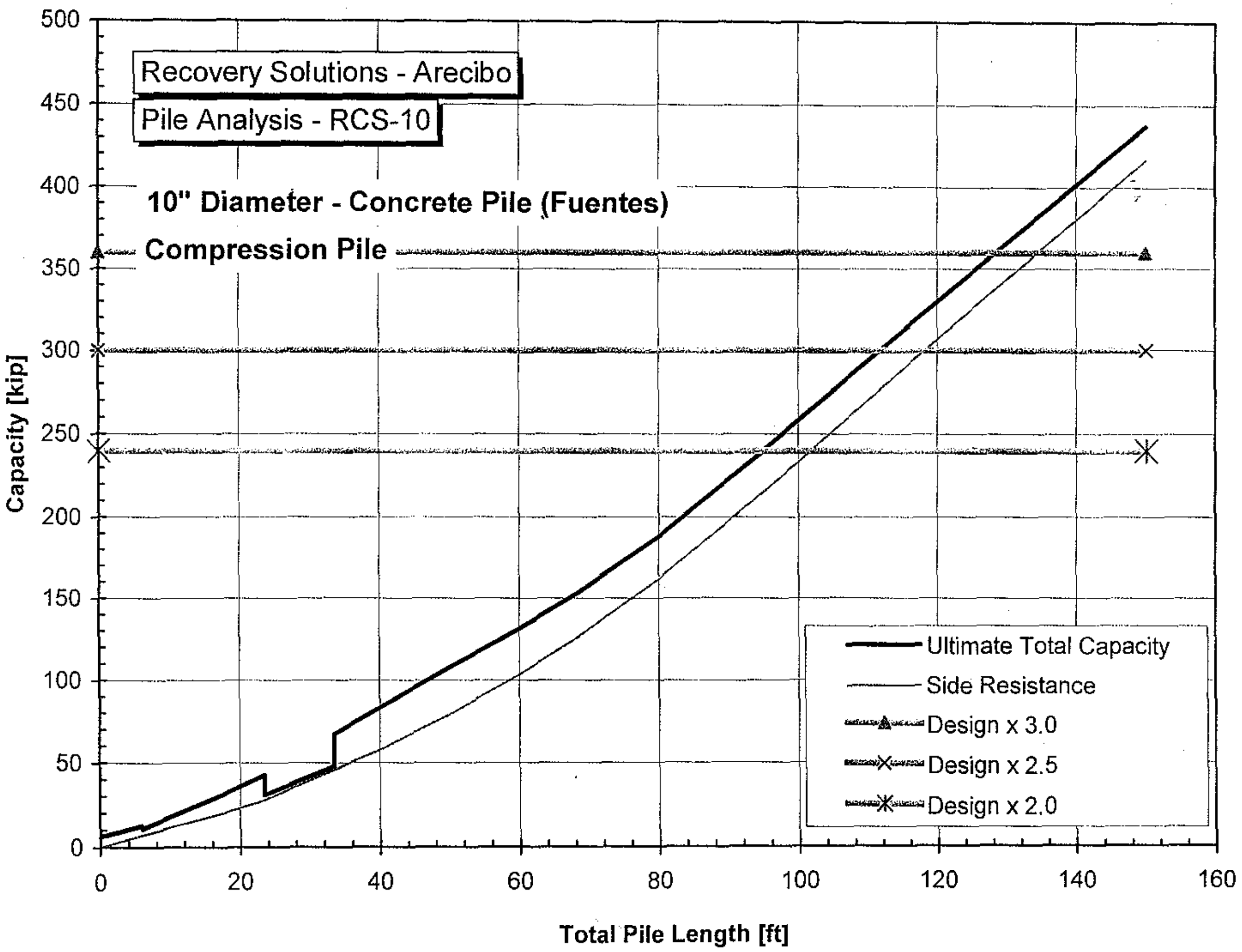


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pile 10 in. RCS-09
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

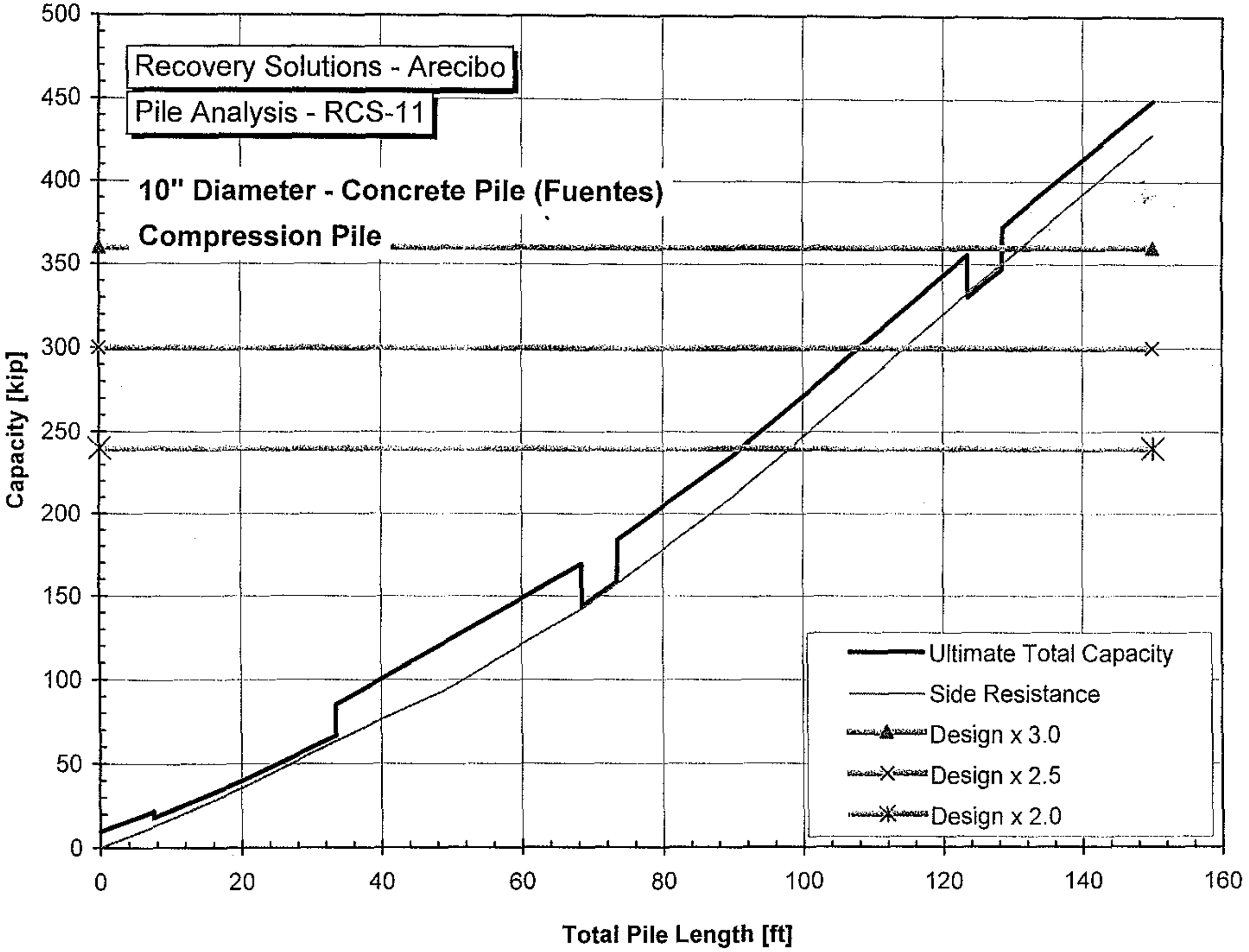


Capacity vs total pile length
Factor of safety shown

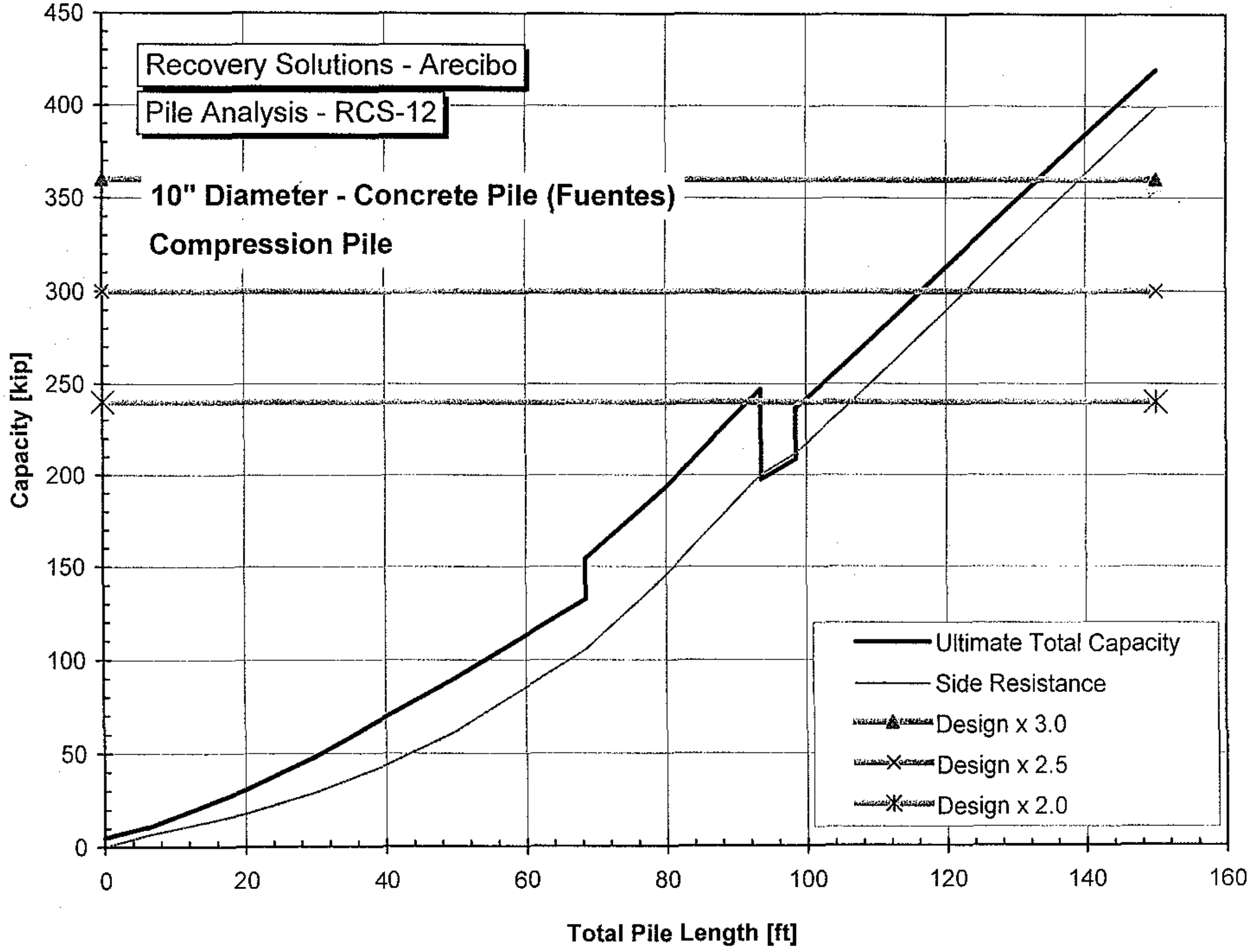
File API Analysis - Compression Pile 10 in. RCS-10
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length



Capacity vs Total Pile Length

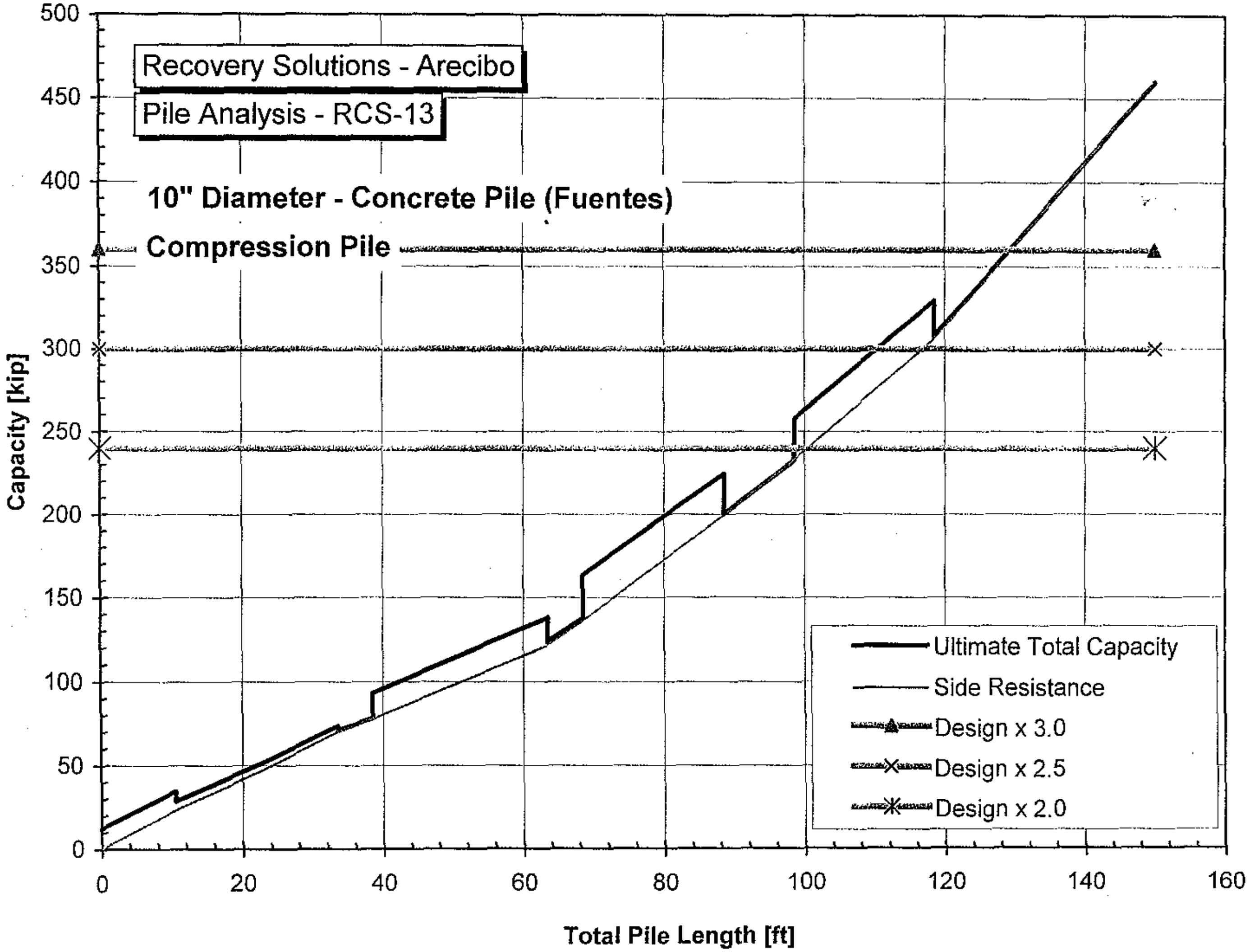


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pile 10 in. RCS-12
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

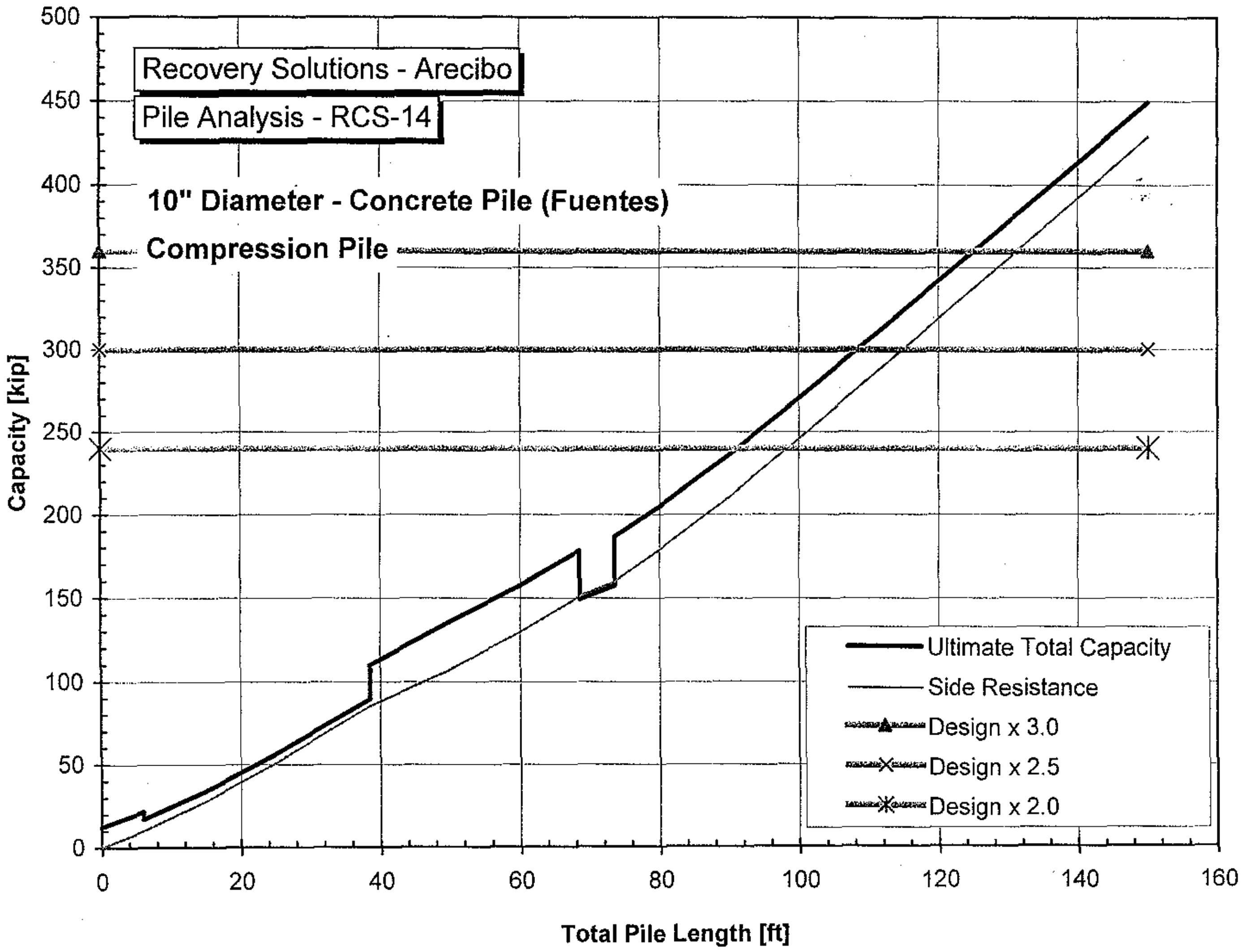


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pile 10 in. RCS-13
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

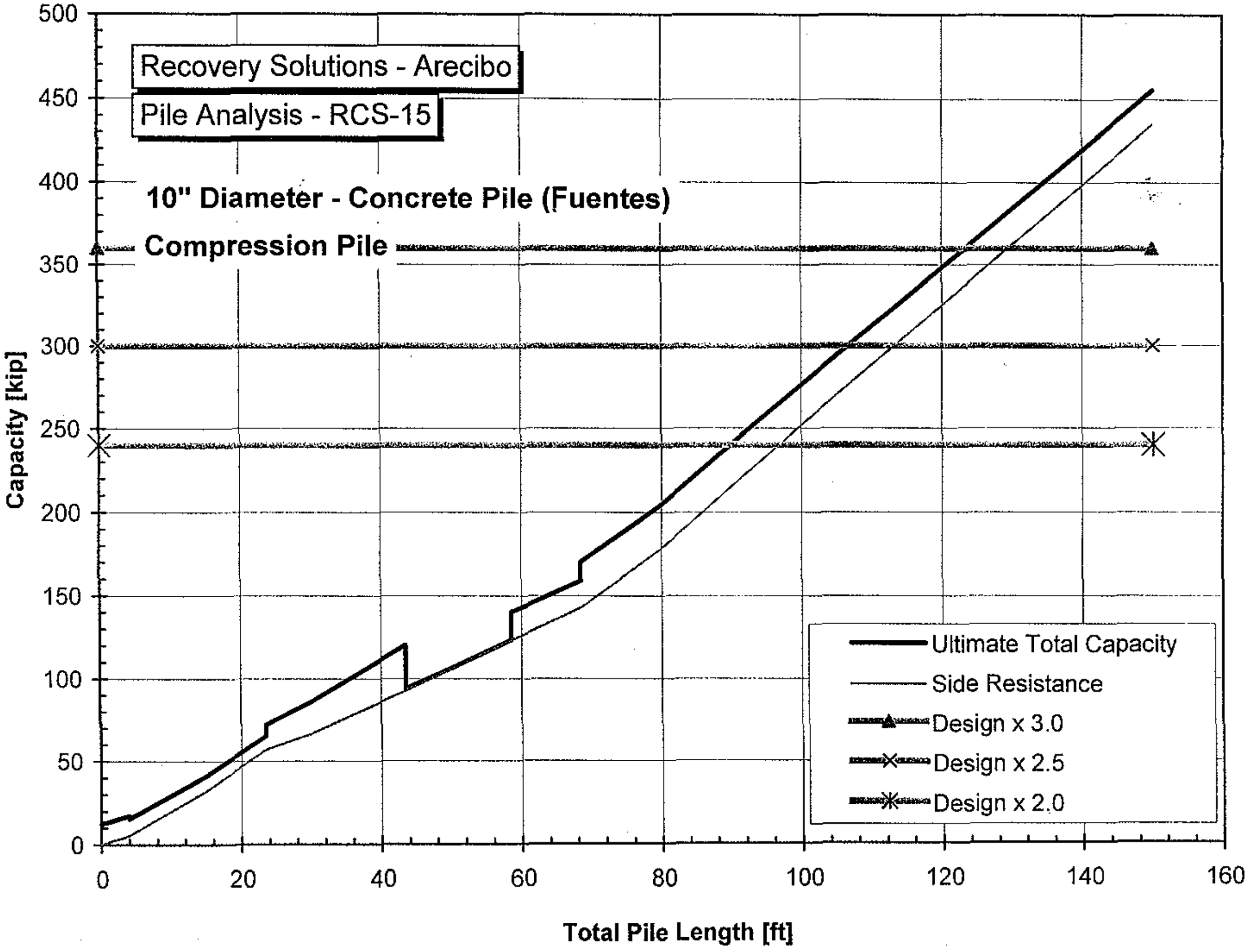


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pile 10 in. RCS-14
Assumes cohesive undrained behavior in limestone

GEOCONSULT

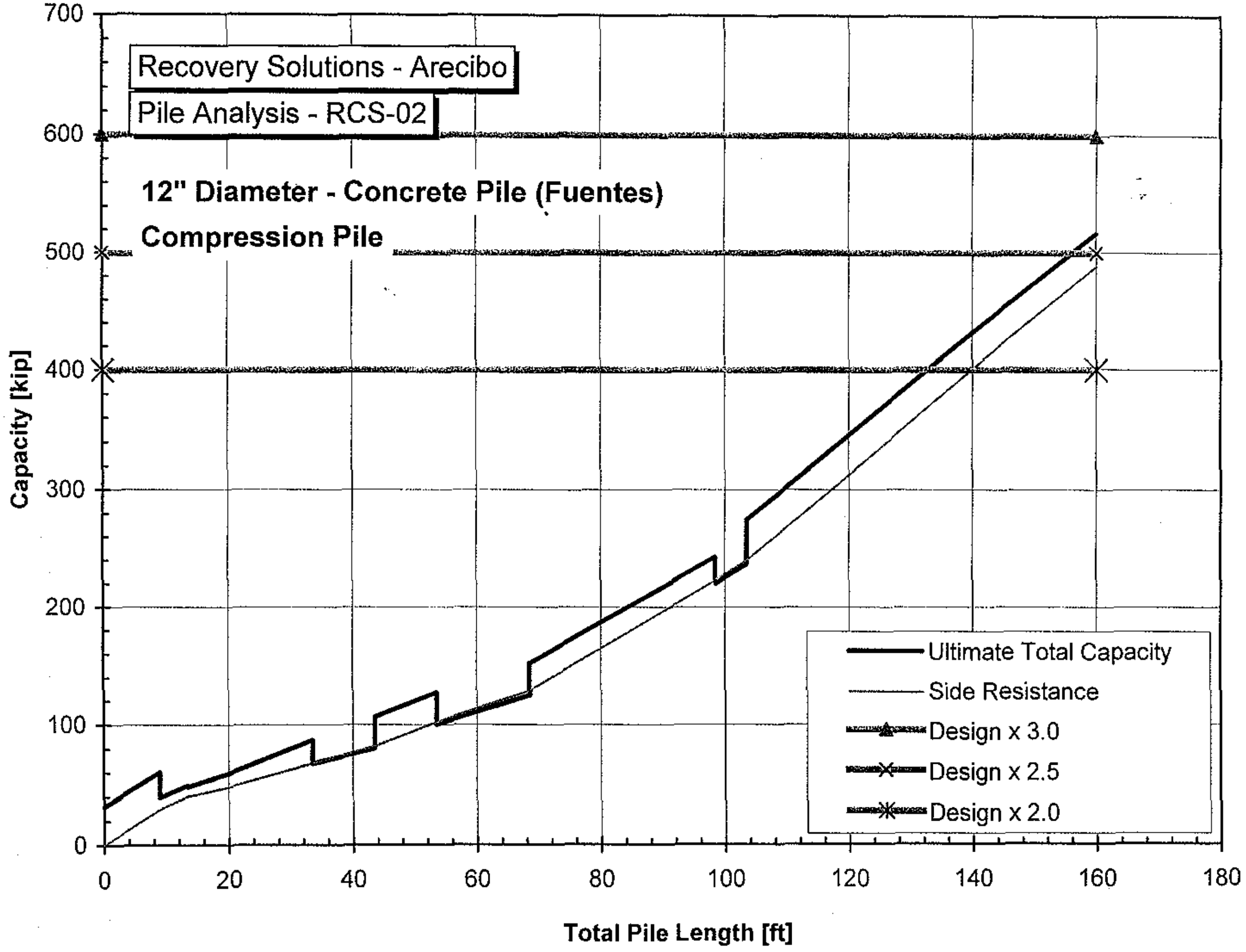
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pile 10 in. RCS-15
Assumes cohesive undrained behavior in limestone

Capacity vs Total Pile Length

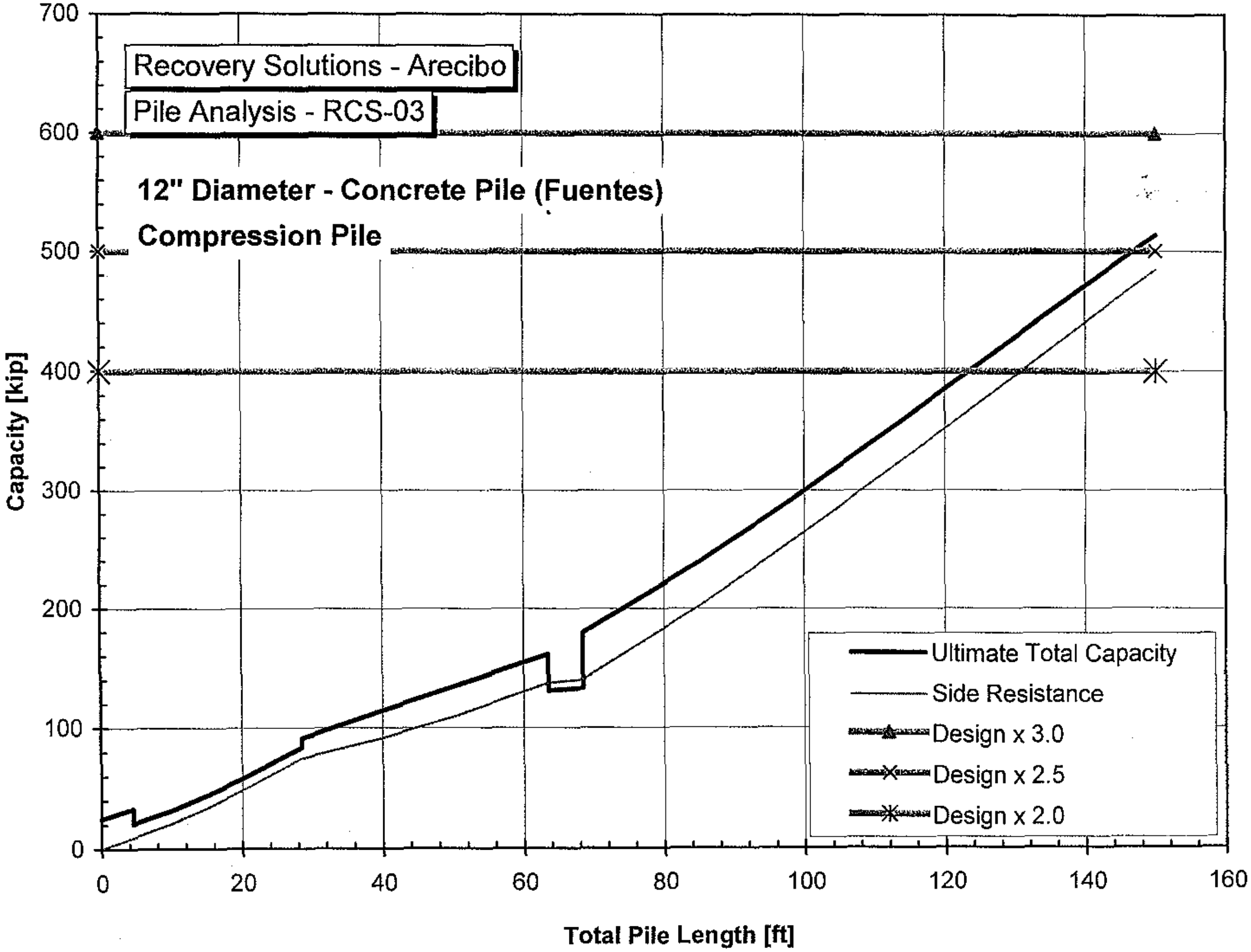


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pile 12 in. RCS-02
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

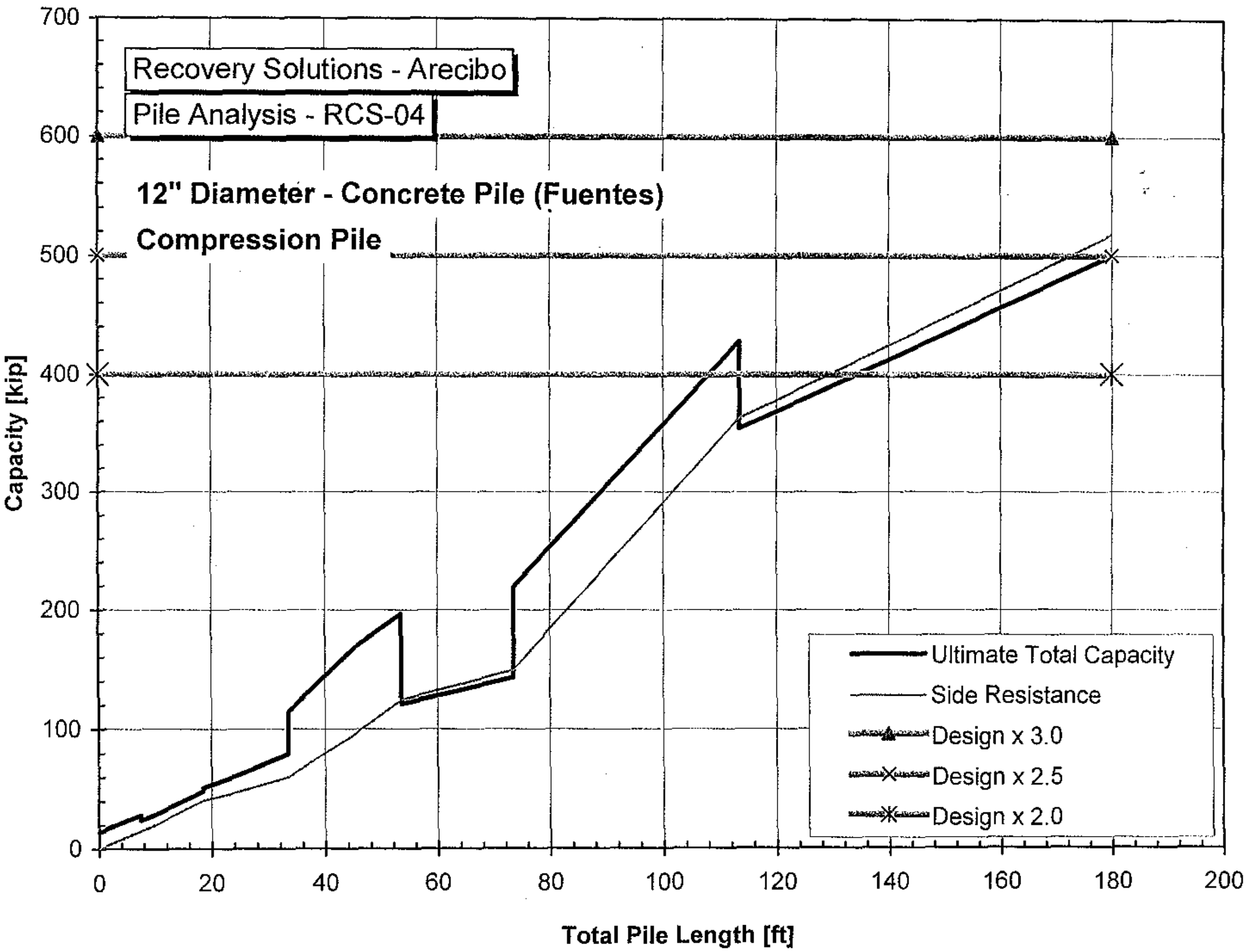


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pile 12 in. RCS-03
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

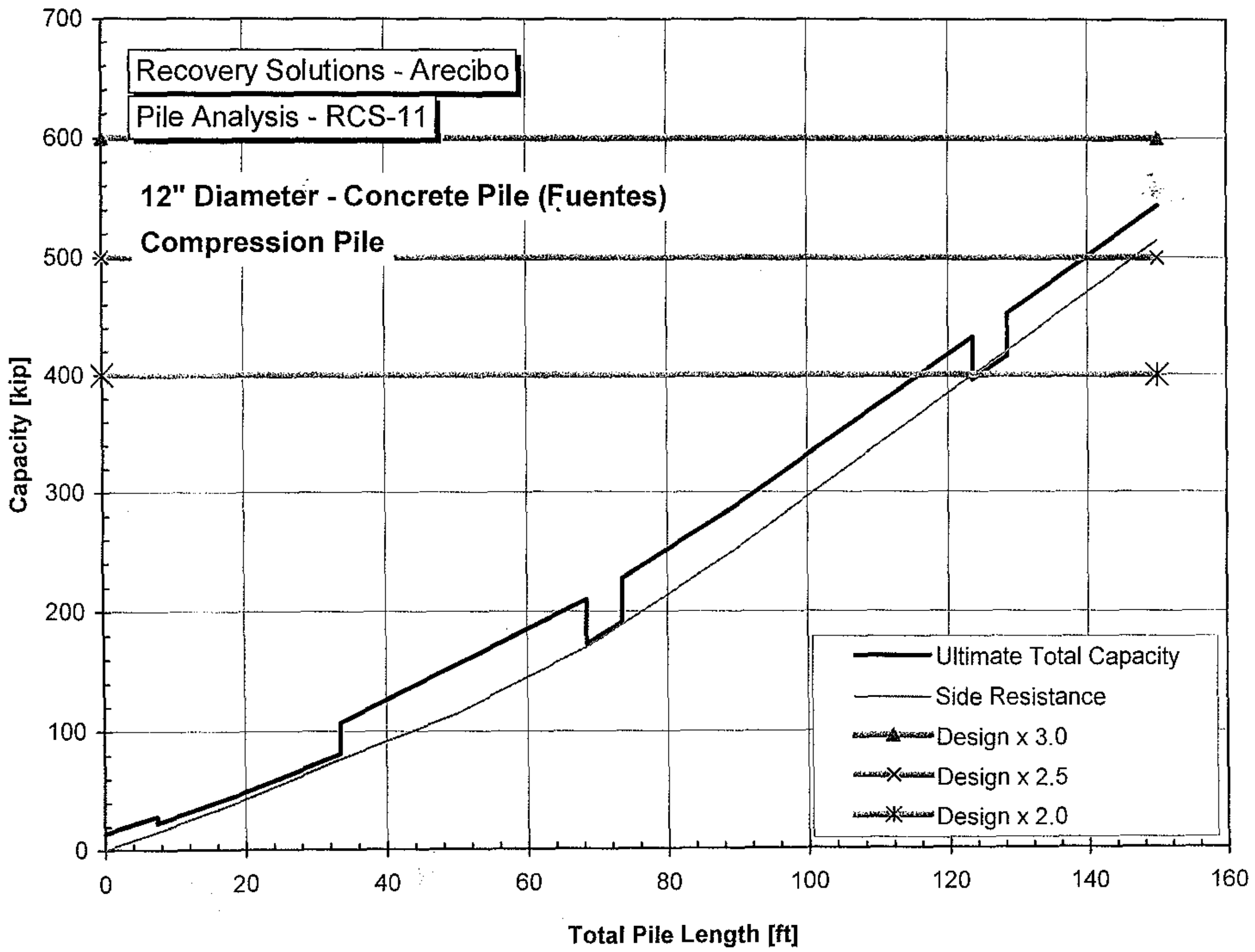


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pile 12 in. RCS-04
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

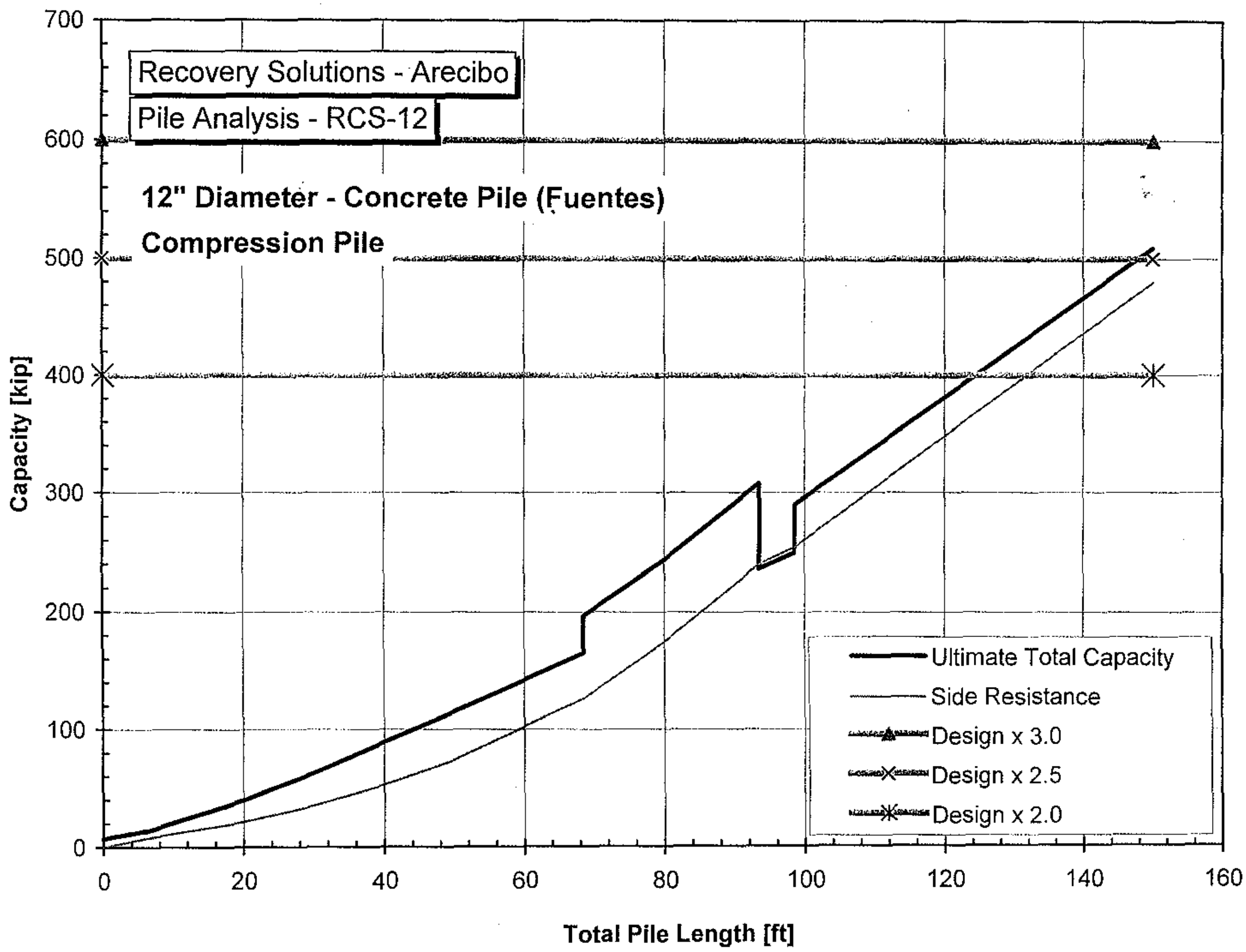


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pile 12 in. RCS-11
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

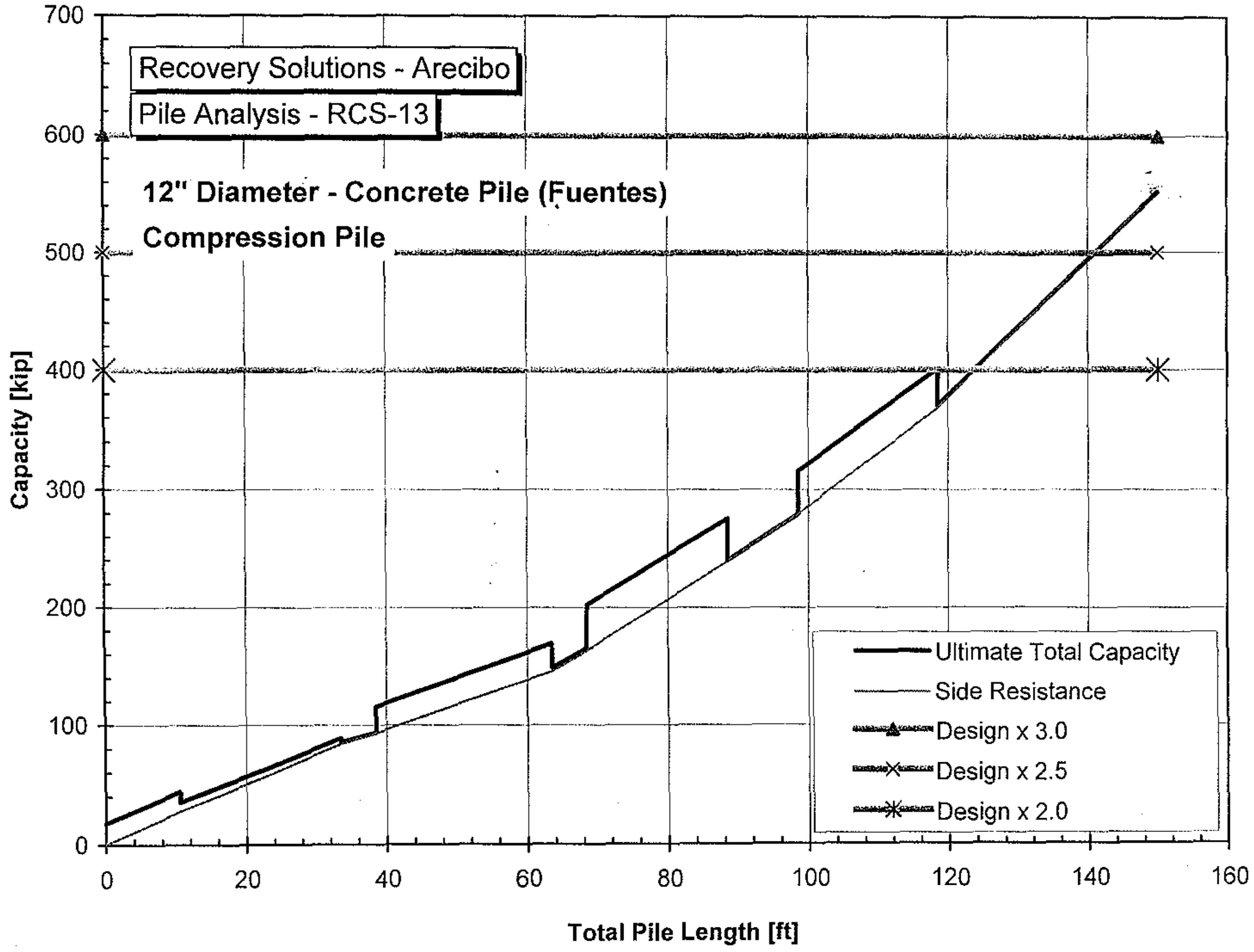


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pile 12 in. RCS-12
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

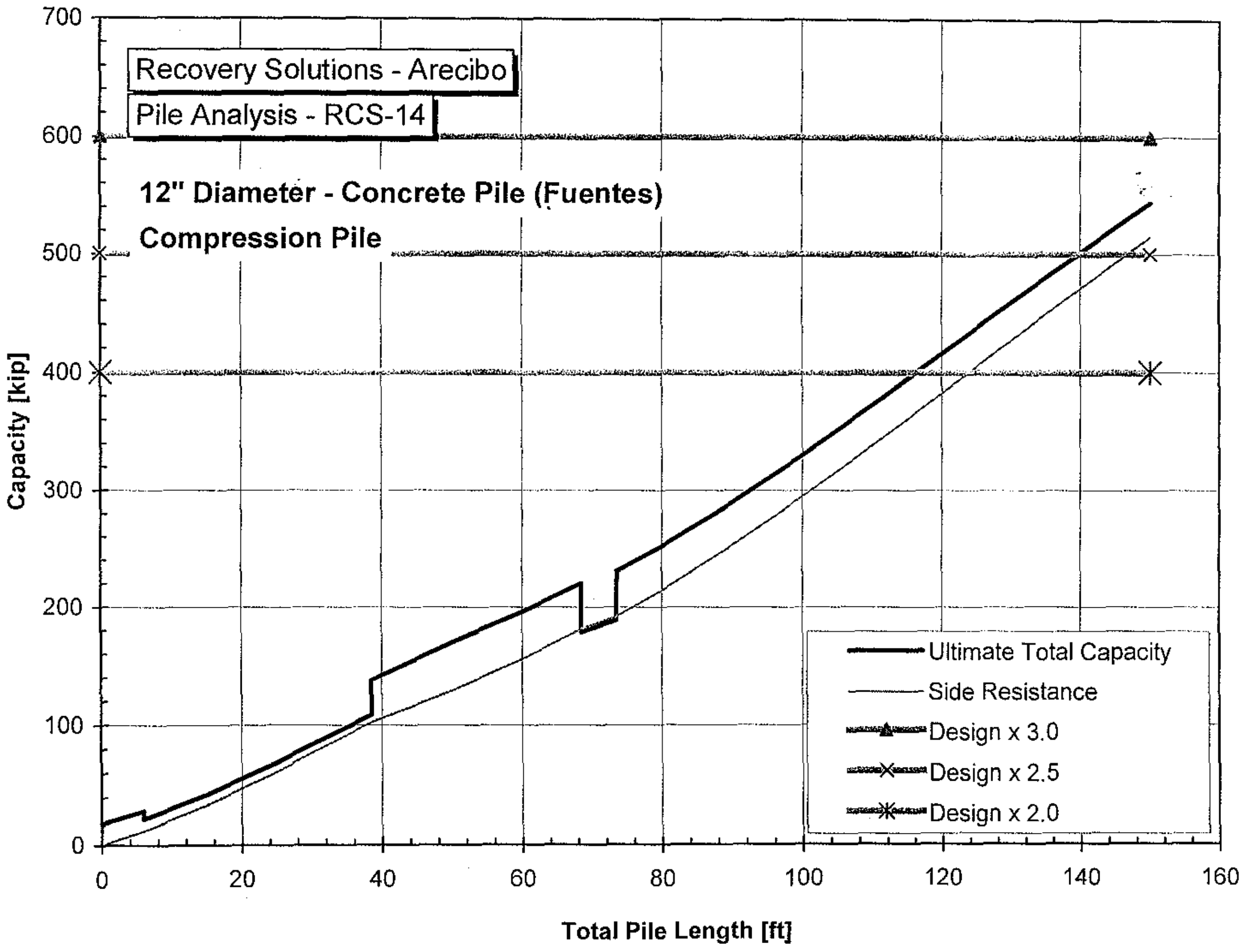


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pile 12 in. RCS-13
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

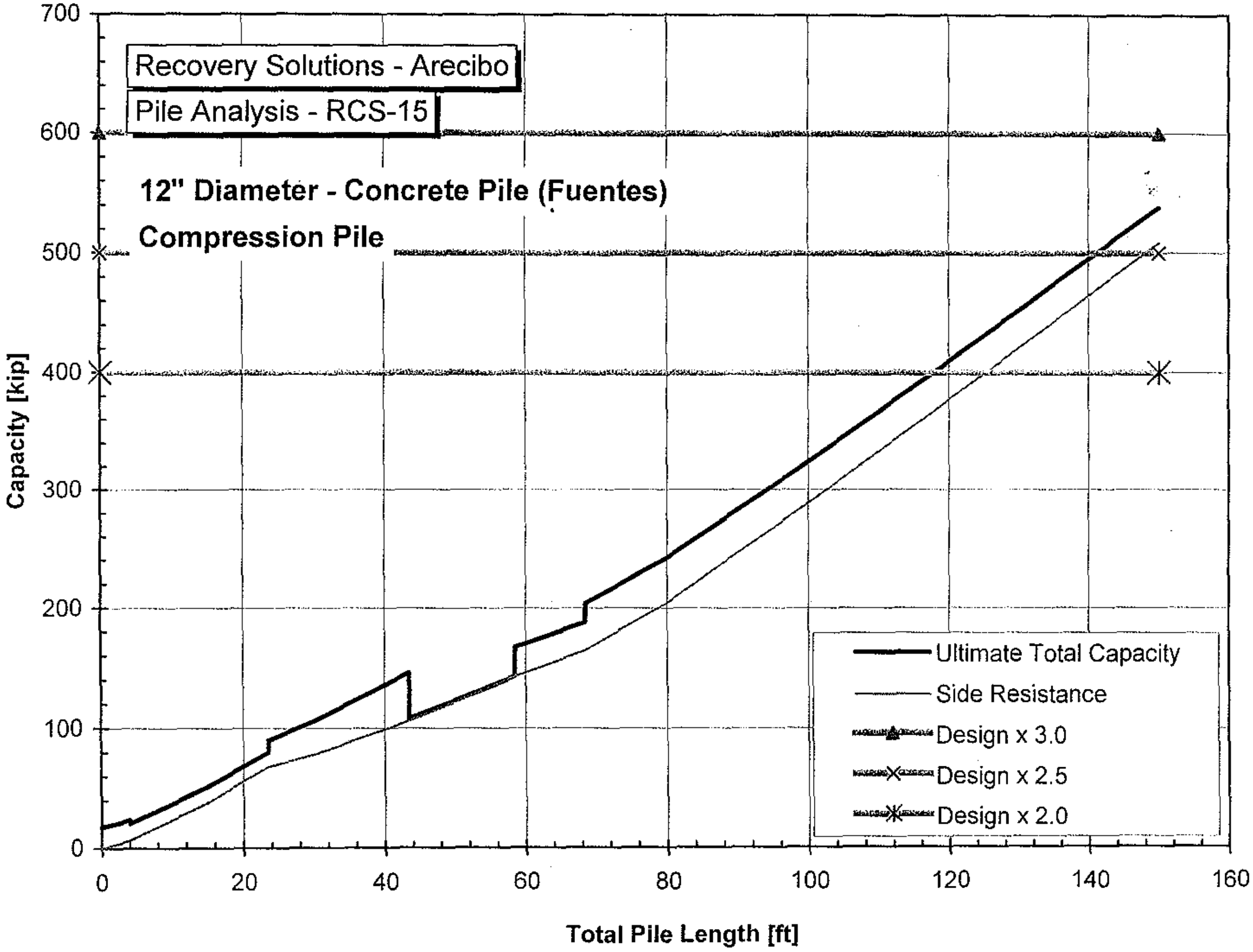


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pile 12 in. RCS-14
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

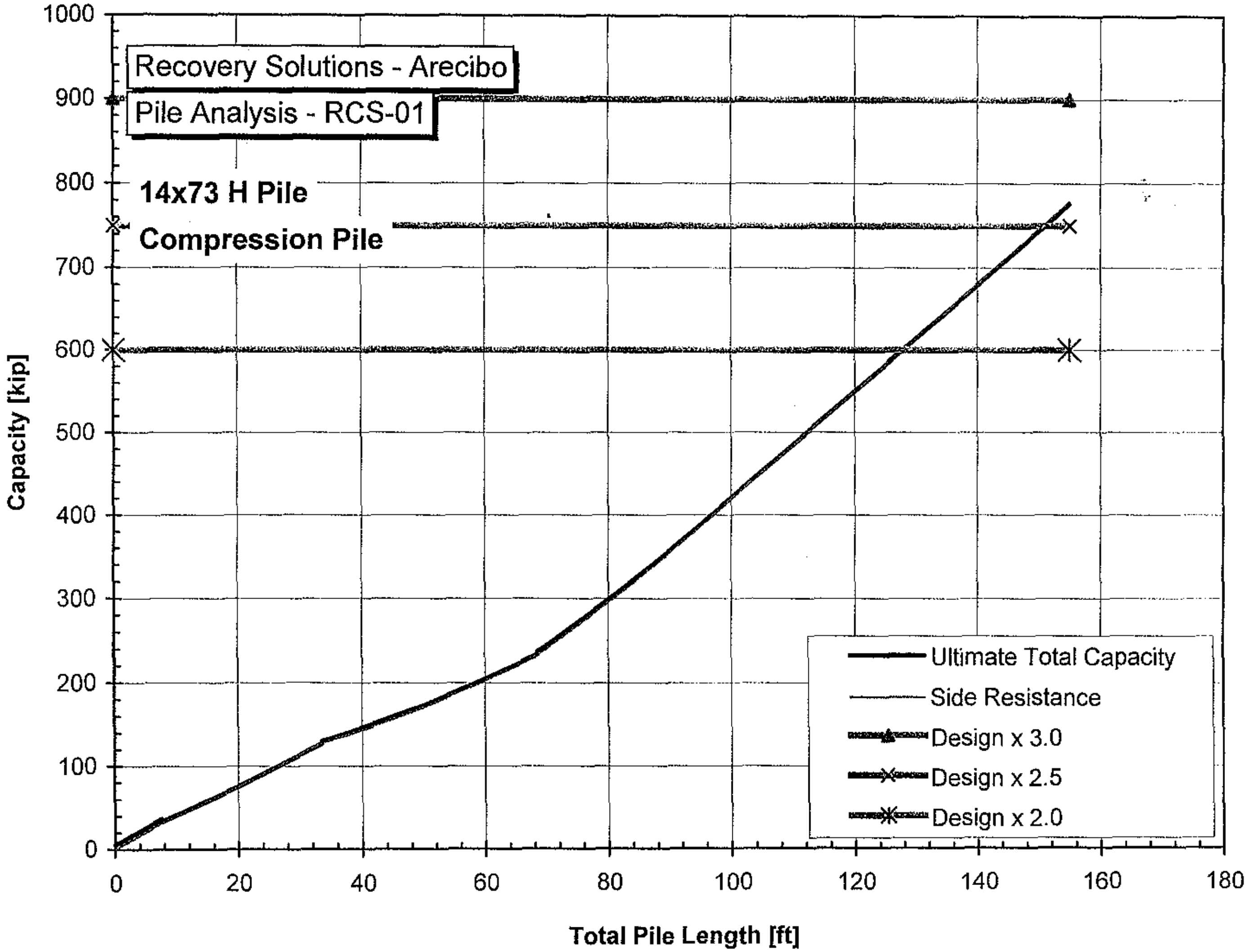


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pile 12 in. RCS-15
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

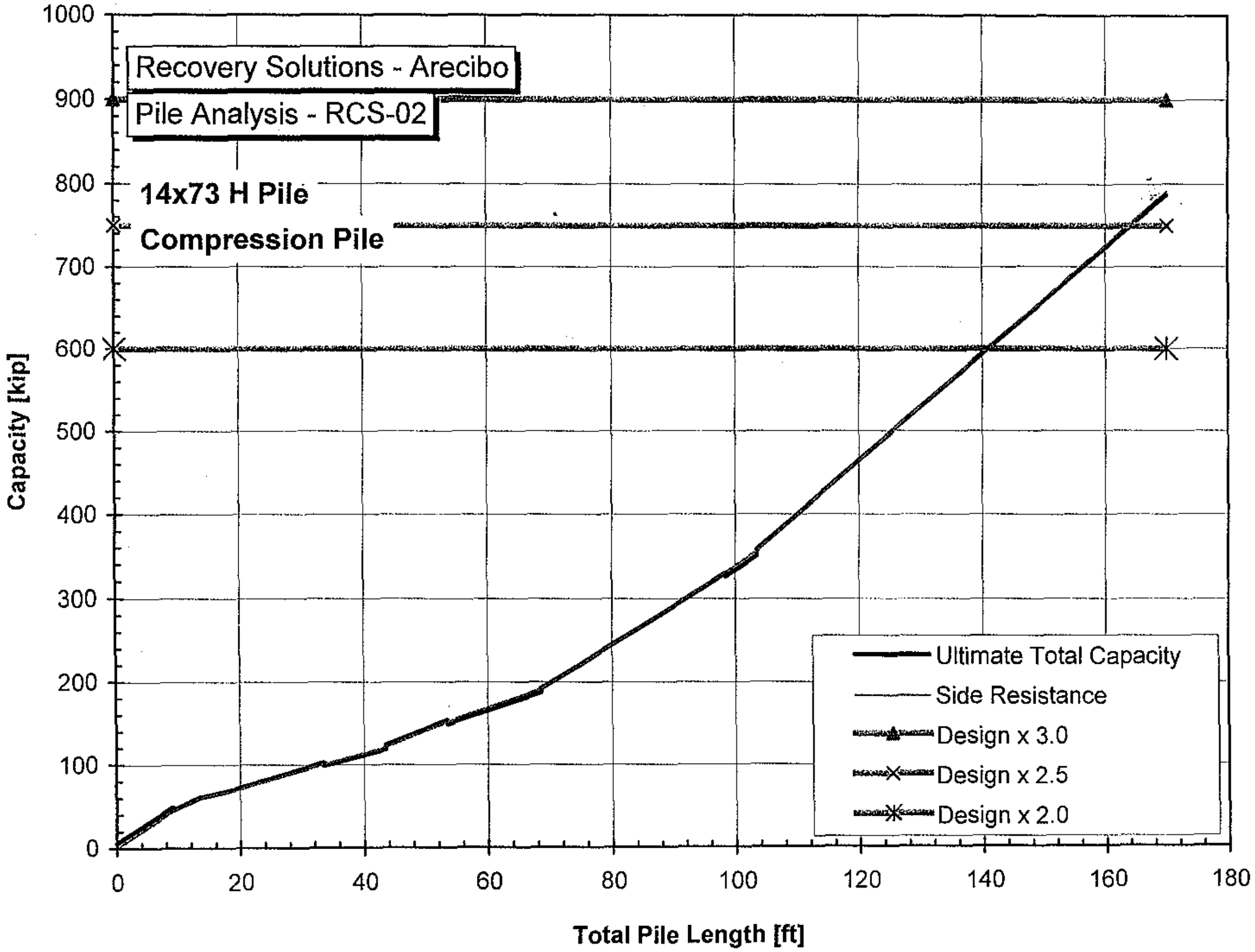


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pile 14x73 in. RCS-01
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

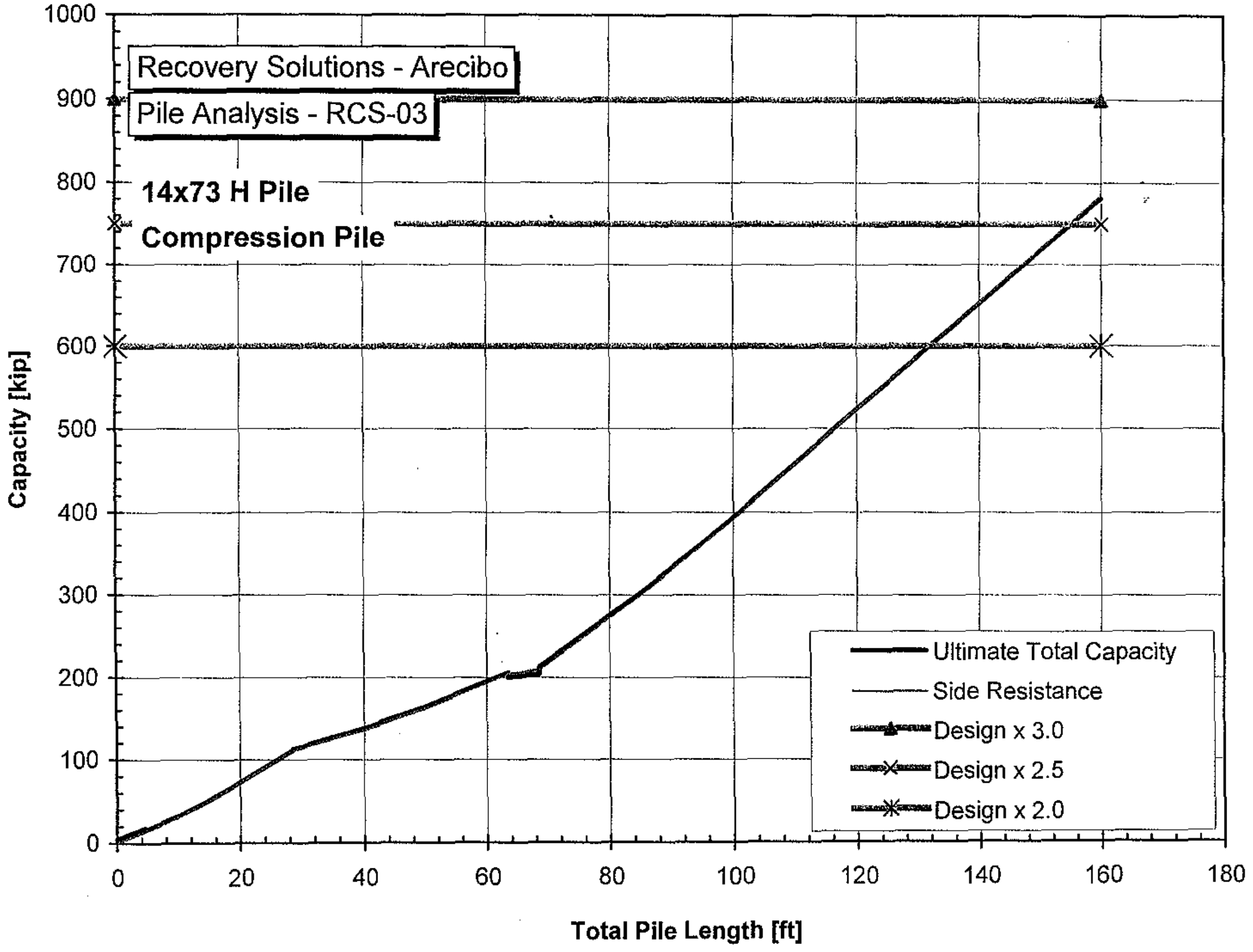


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pile 14x73 in. RCS-02
Assumes cohesive undrained behavior in limestone

GEOCONSULT

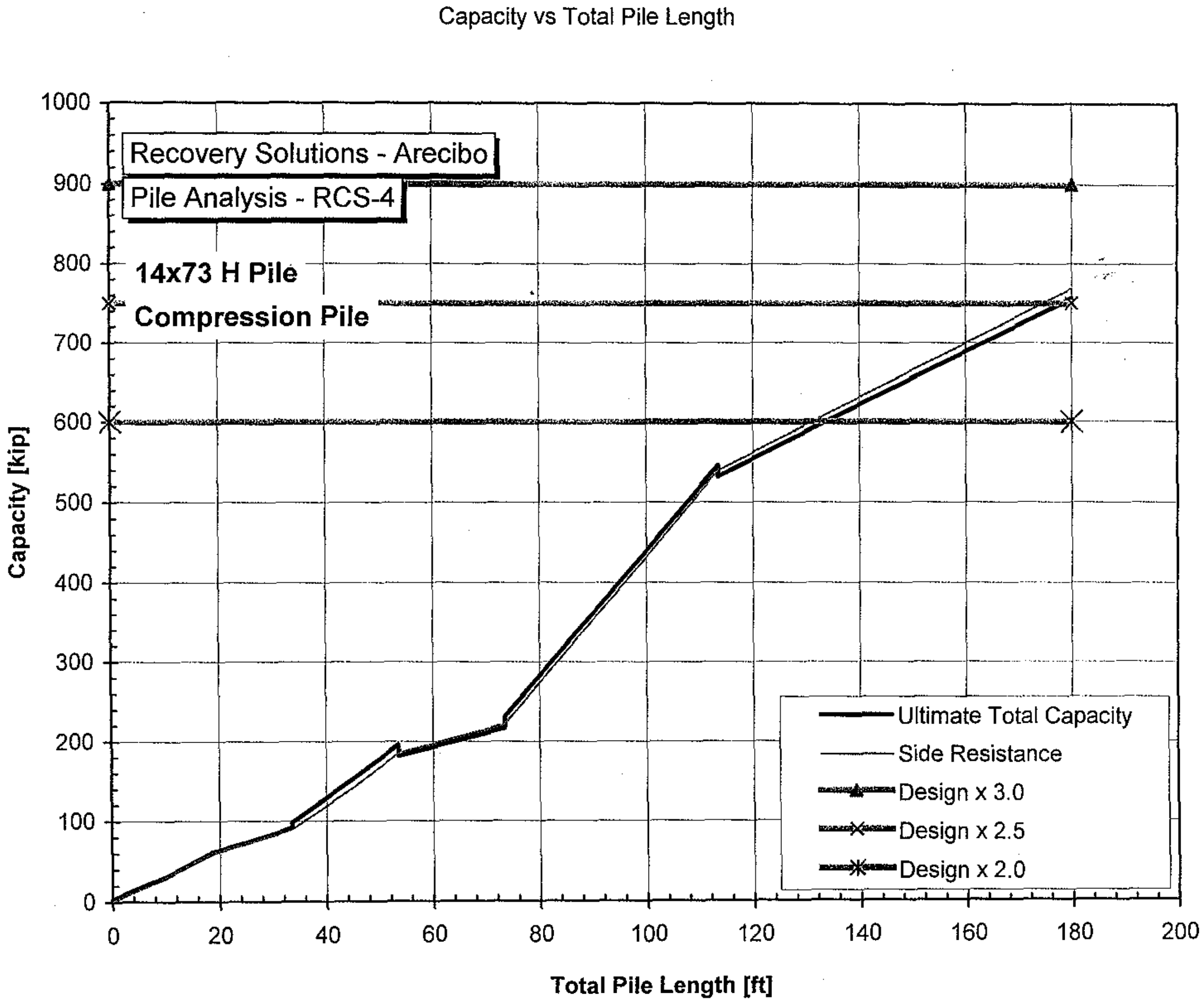
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pile 14x73 in. RCS-03
Assumes cohesive undrained behavior in limestone

GEOCONSULT

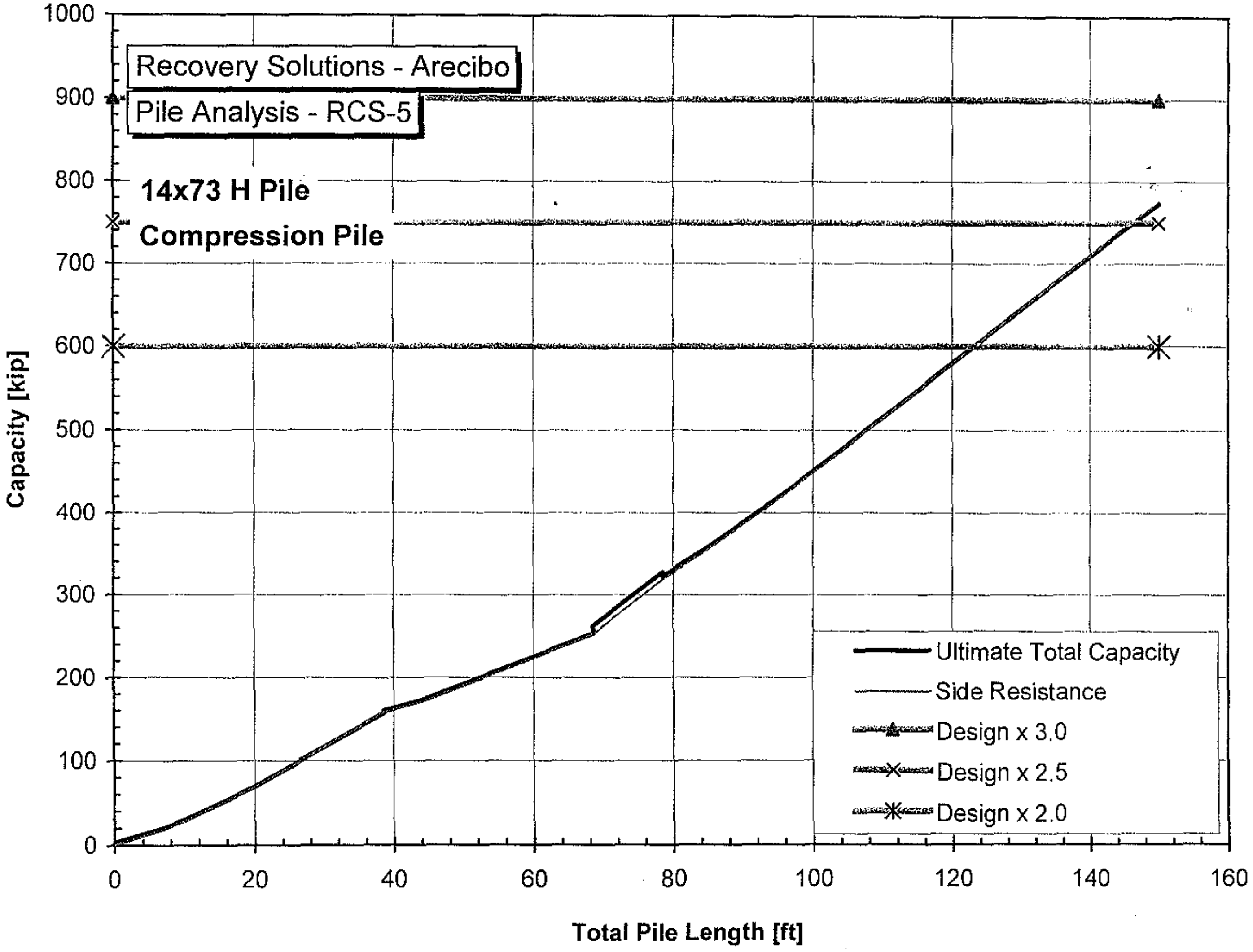


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pile 14x73 in. RCS-04
Assumes cohesive undrained behavior in limestone

GEOCONSULT

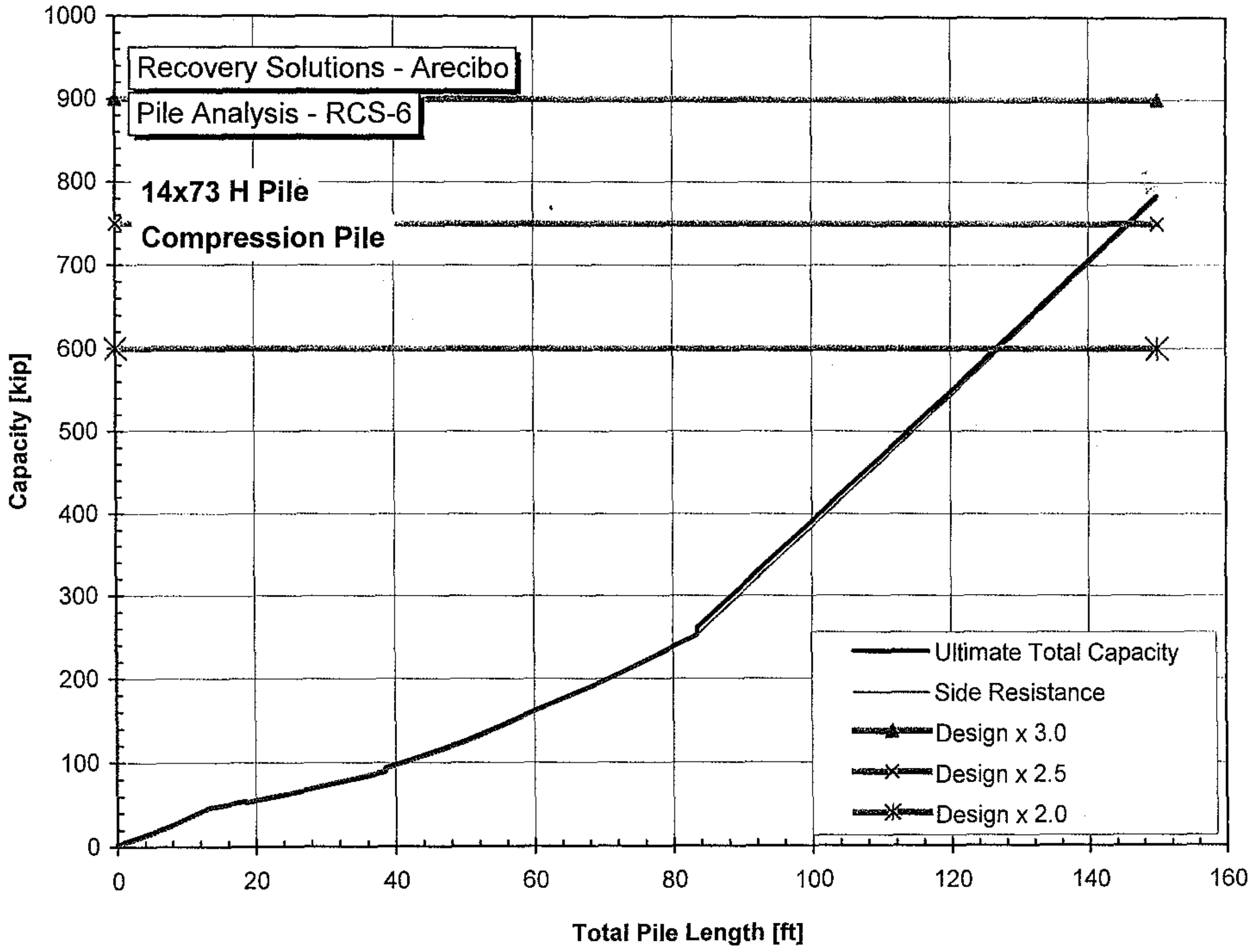
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pile 14x73 in. RCS-05
Assumes cohesive undrained behavior in limestone

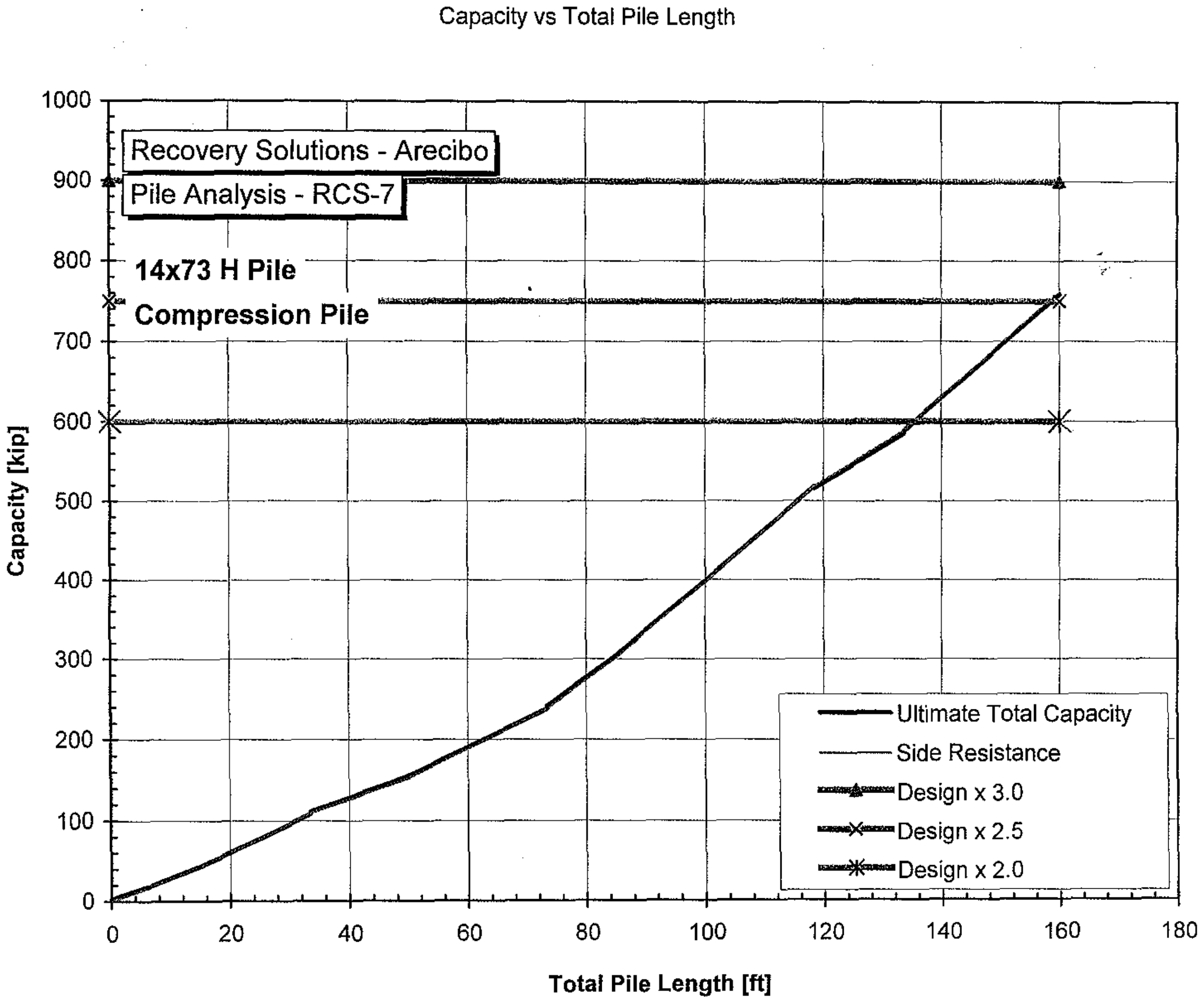
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pile 14x73 in. RCS-06
Assumes cohesive undrained behavior in limestone

GEOCONSULT

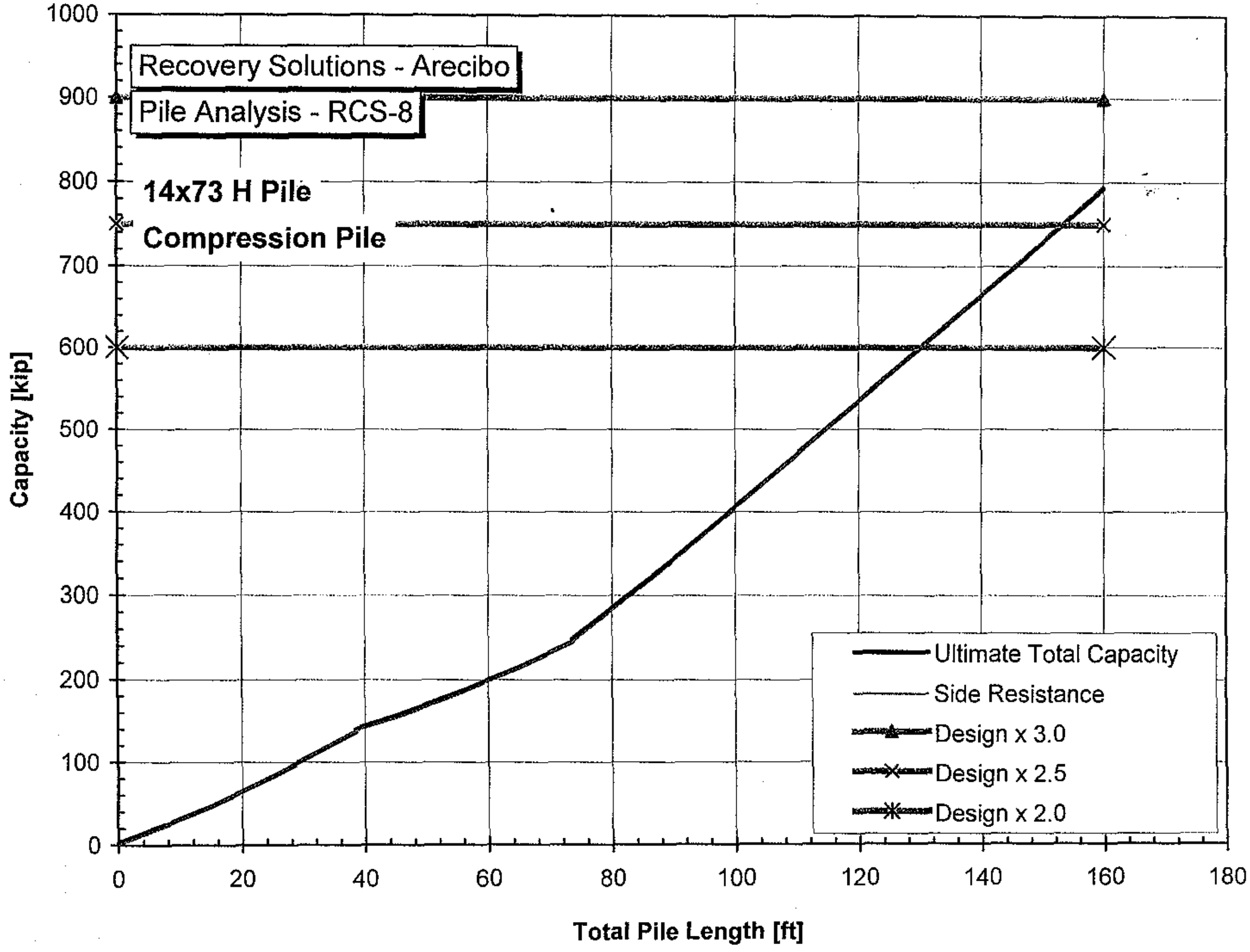


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pile 14x73 in. RCS-07
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

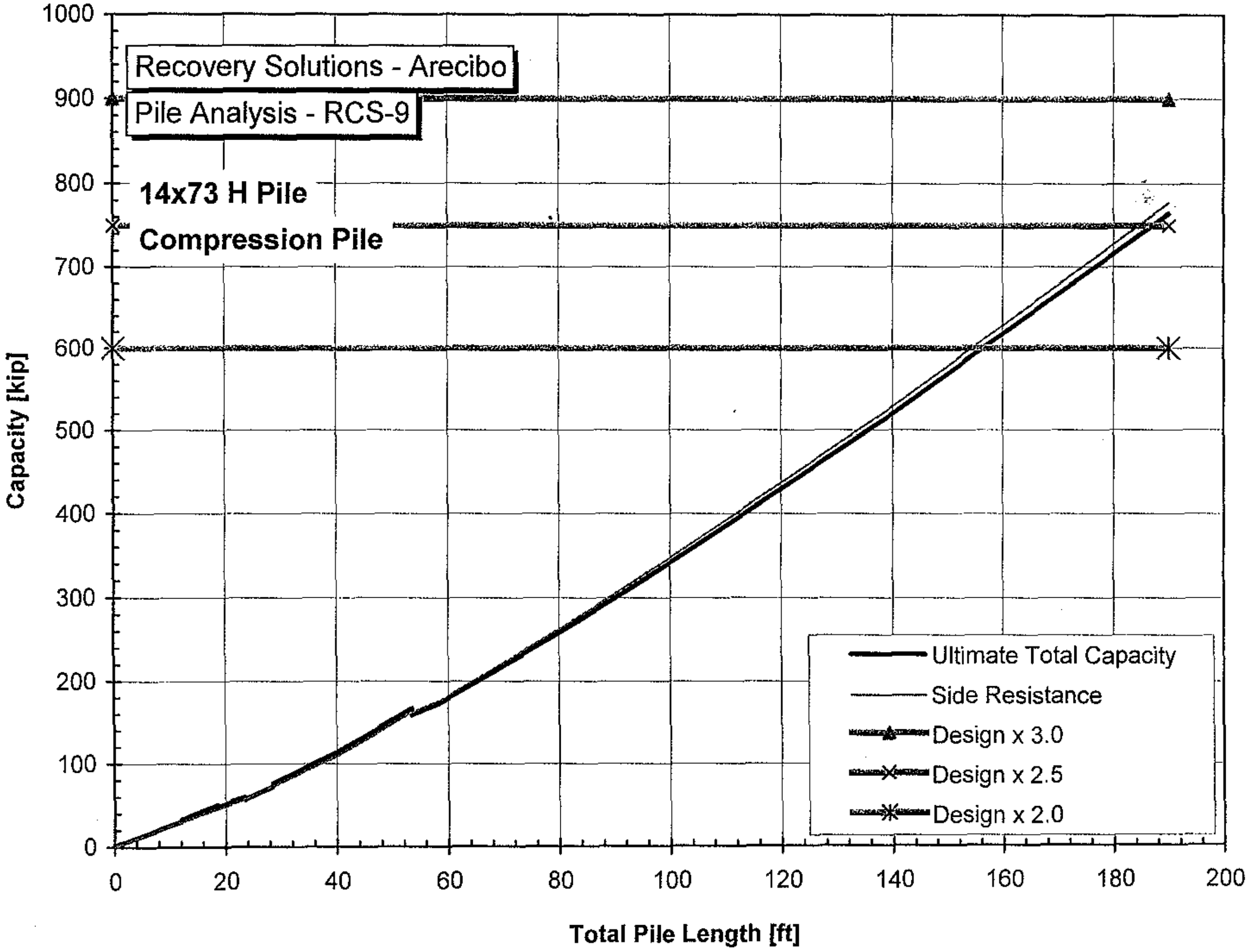


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pile 14x73 in. RCS-08
Assumes cohesive undrained behavior in limestone

GEOCONSULT

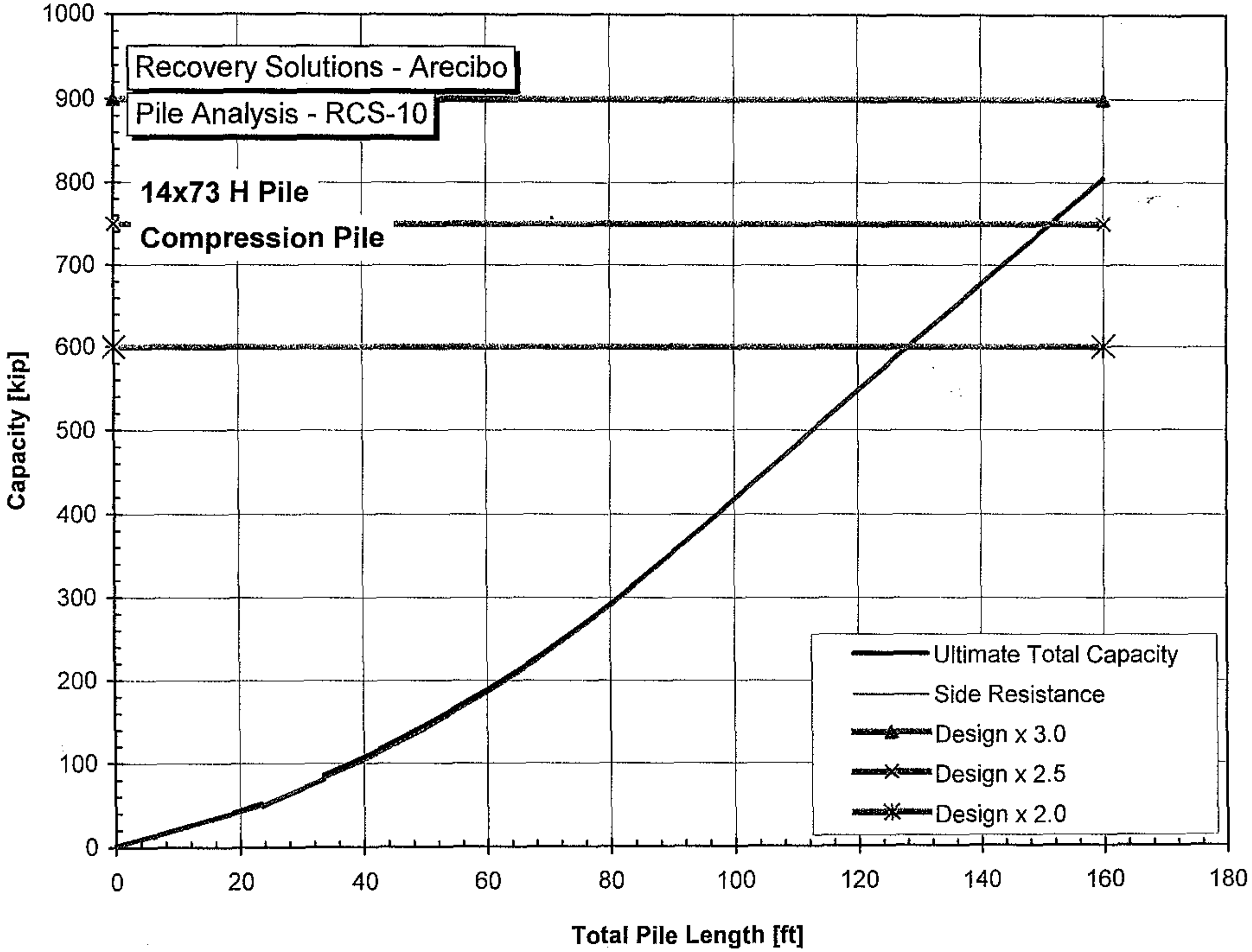
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pile 14x73 in. RCS-09
Assumes cohesive undrained behavior in limestone

Capacity vs Total Pile Length

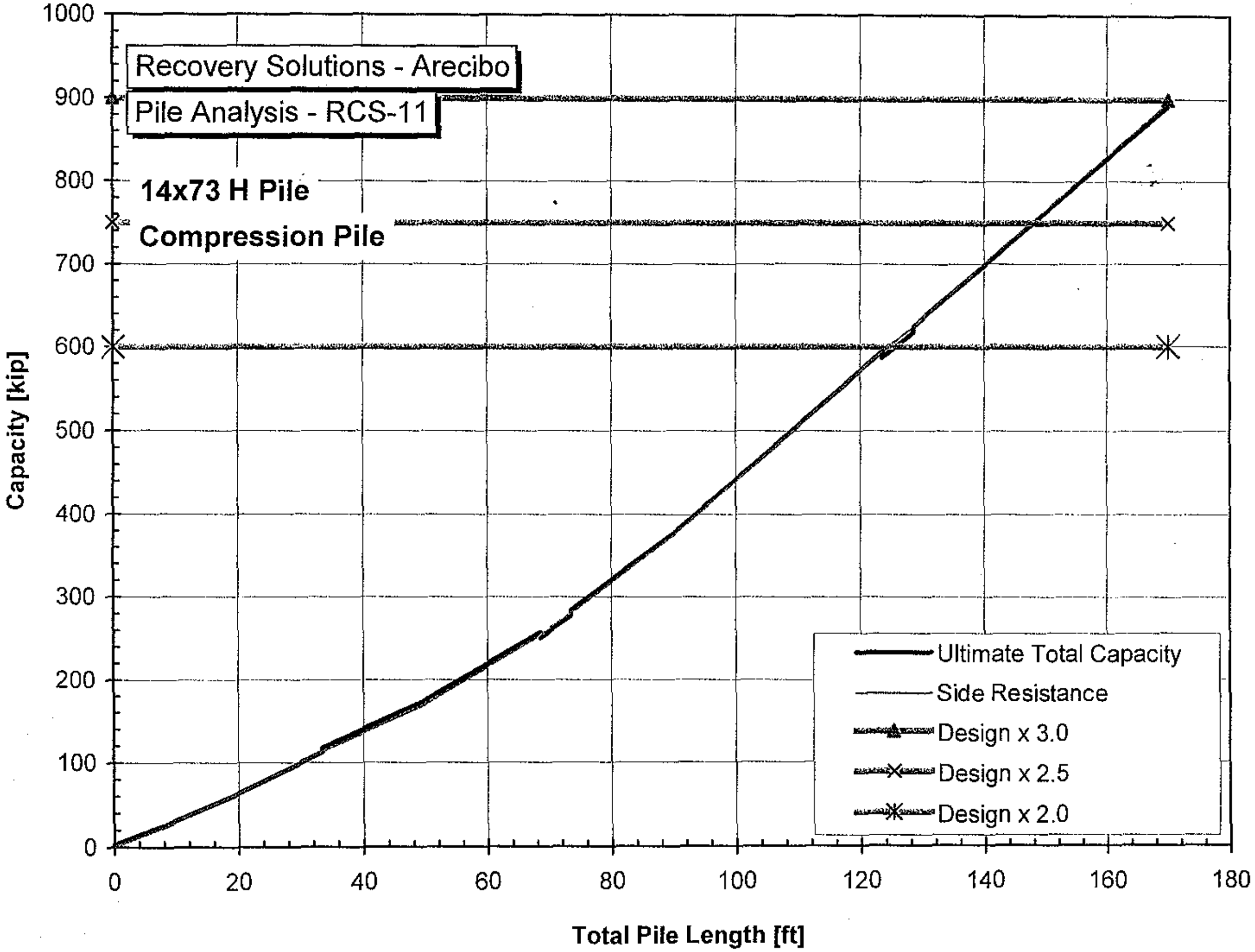


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pile 14x73 in. RCS-10
Assumes cohesive undrained behavior in limestone

GEOCONSULT

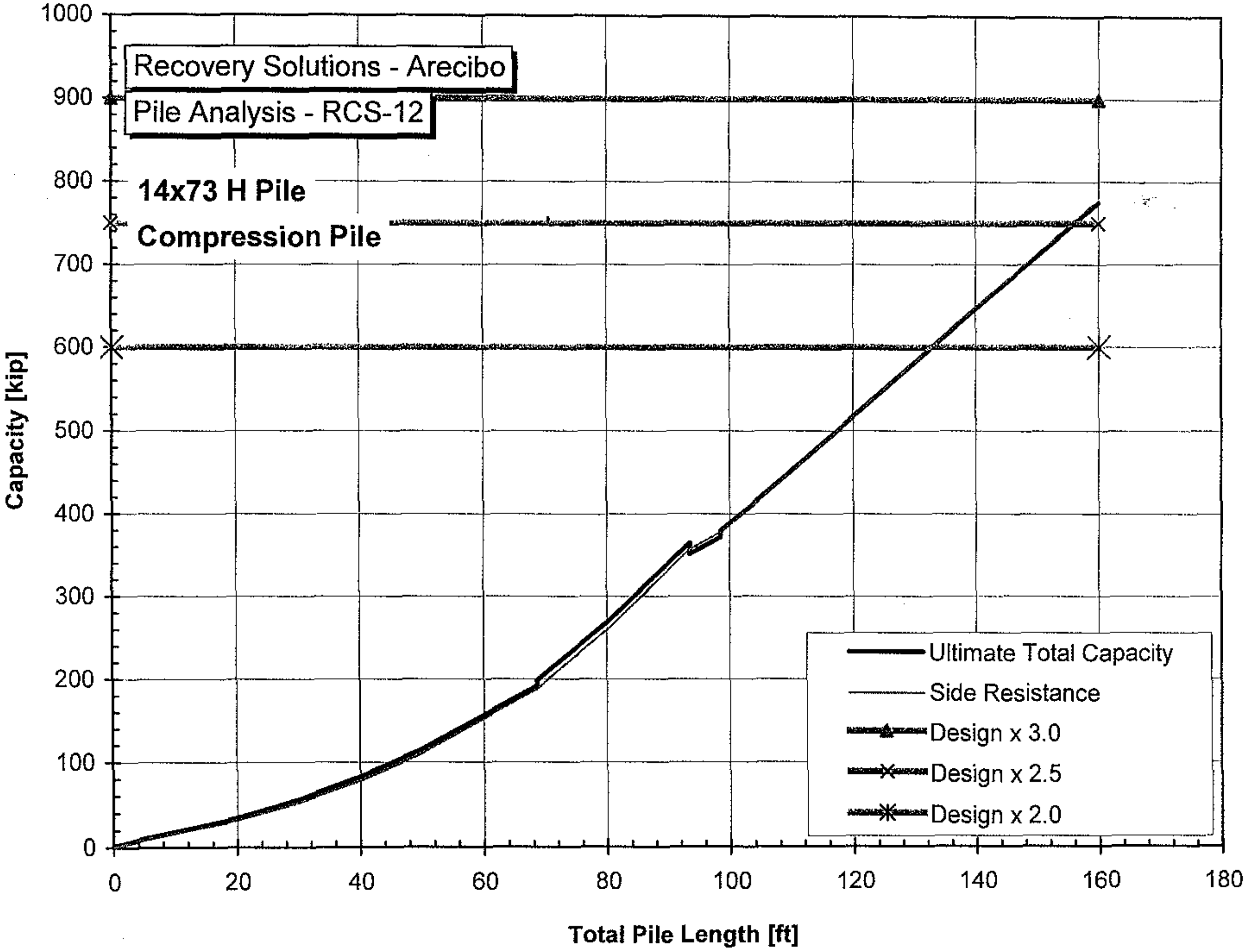
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pile 14x73 in. RCS-11
Assumes cohesive undrained behavior in limestone

Capacity vs Total Pile Length

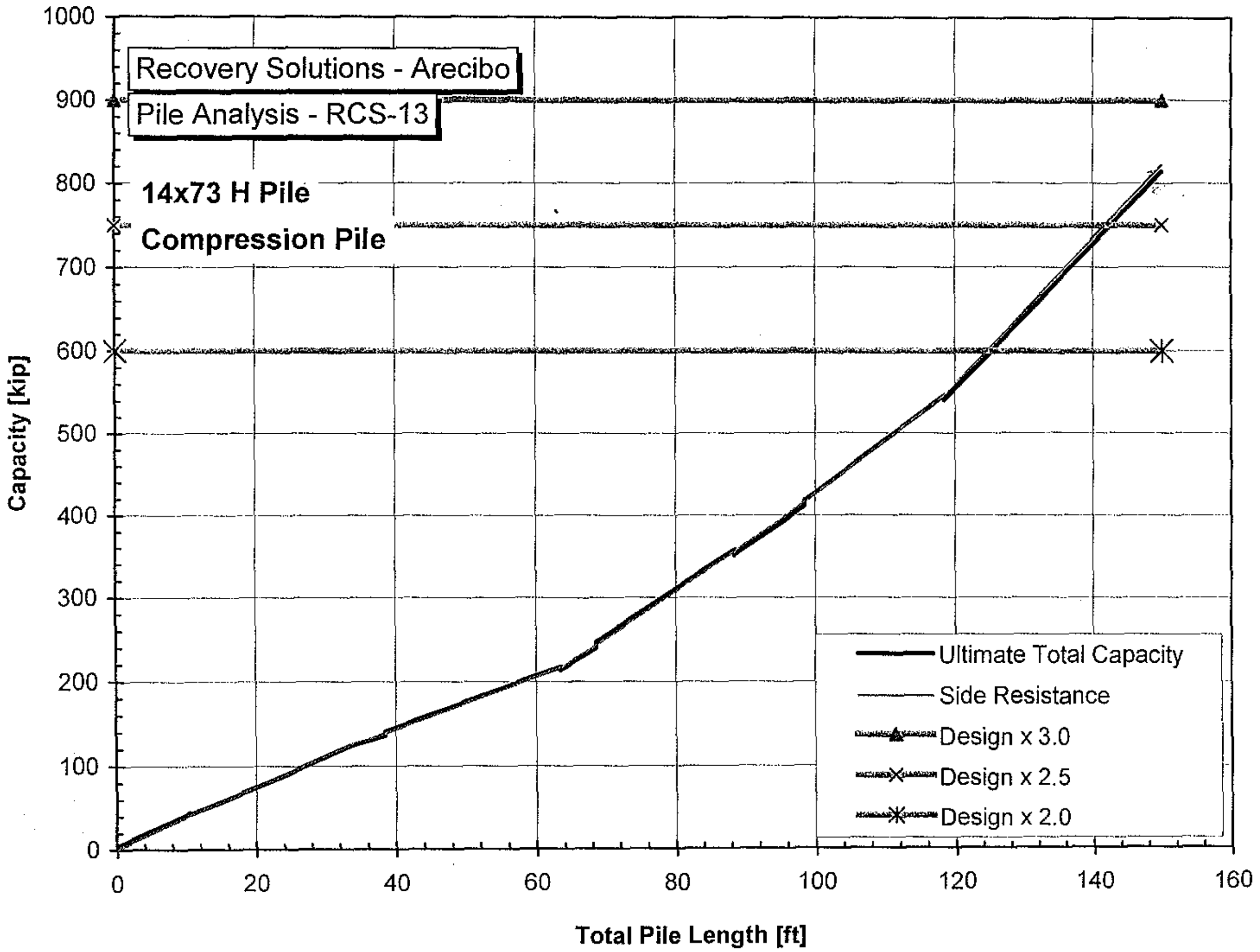


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pile 14x73 in. RCS-12
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

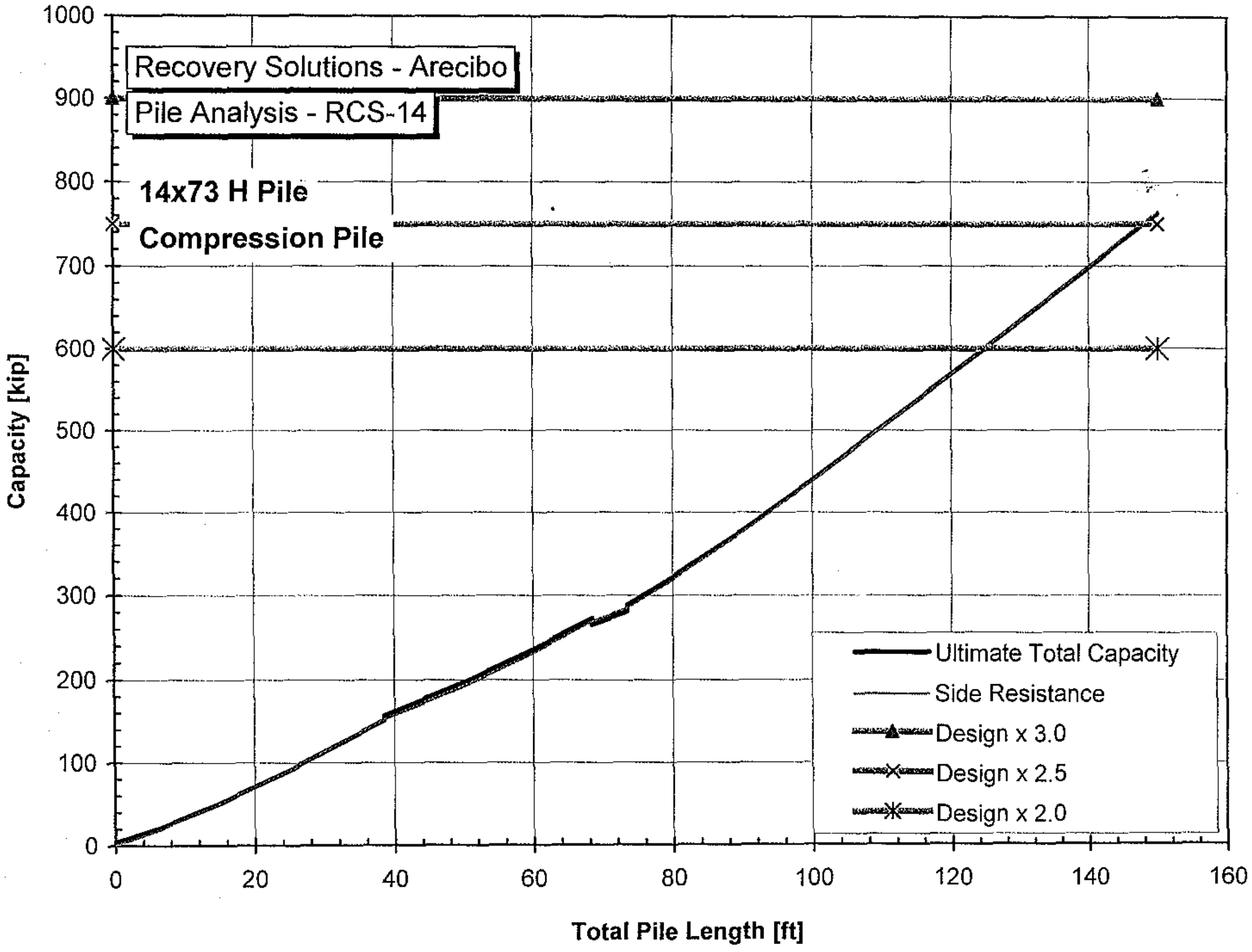


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pile 14x73 in. RCS-13
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

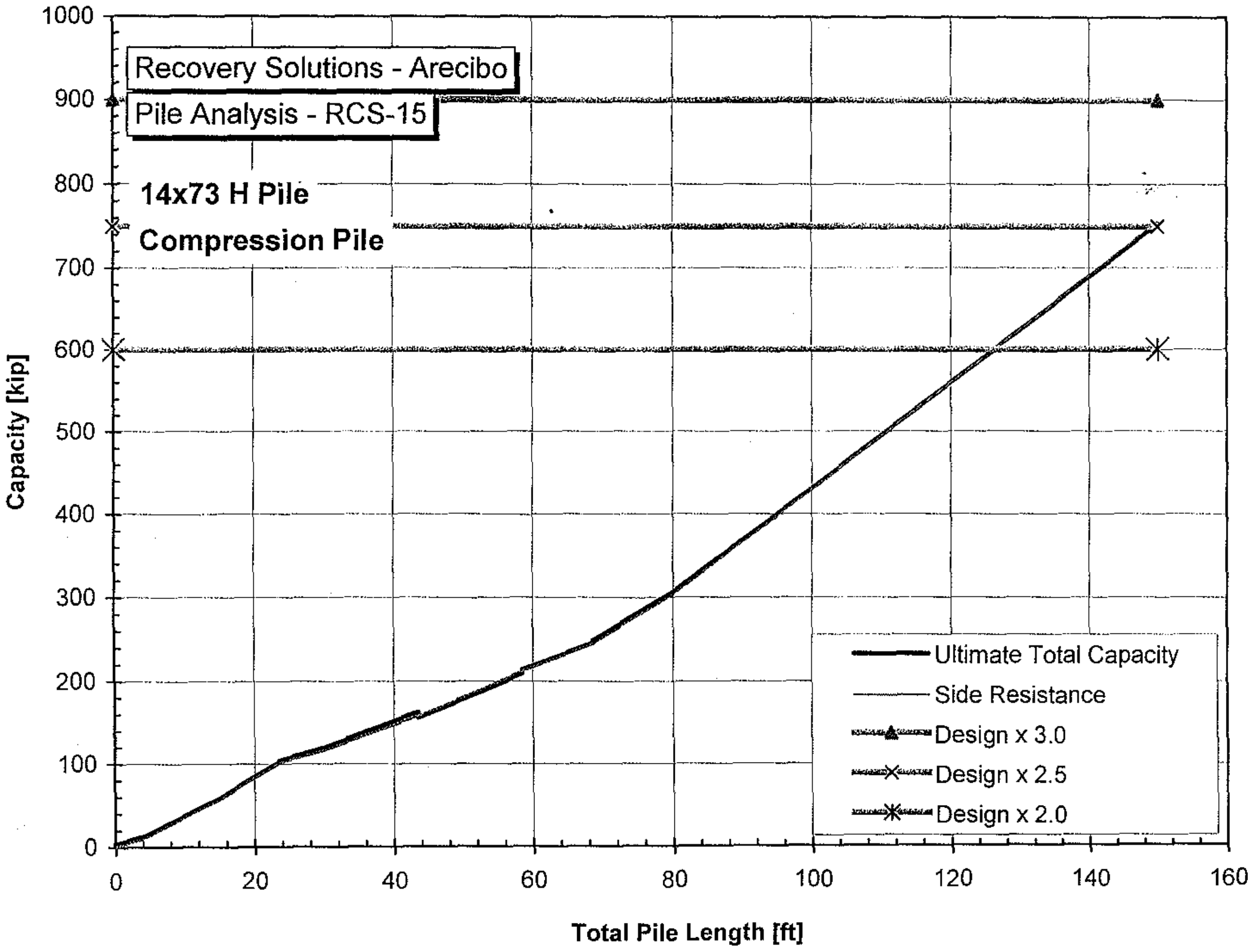


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pile 14x73 in. RCS-14
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

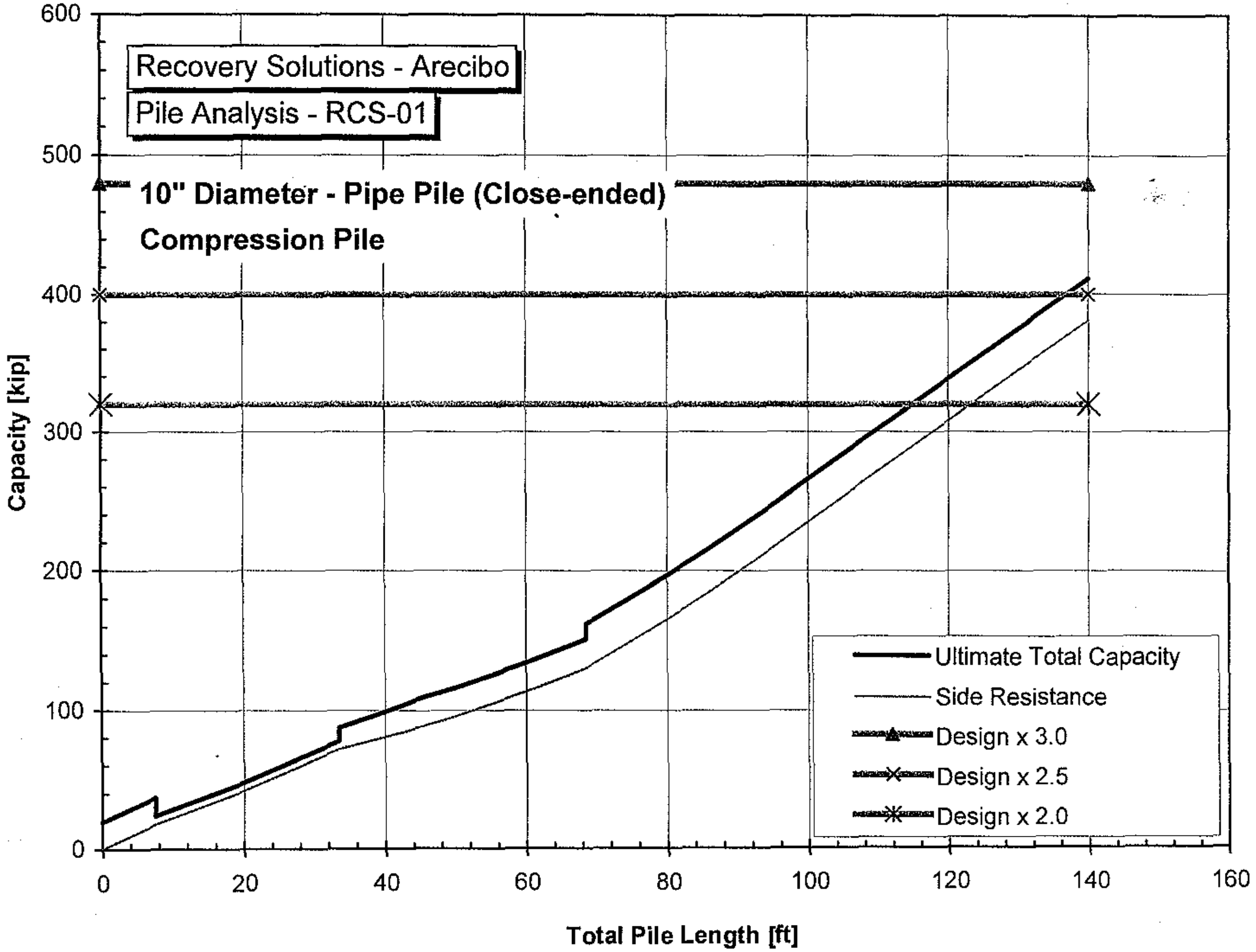


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pile 14x73 in. RCS-15
Assumes cohesive undrained behavior in limestone

GEOCONSULT

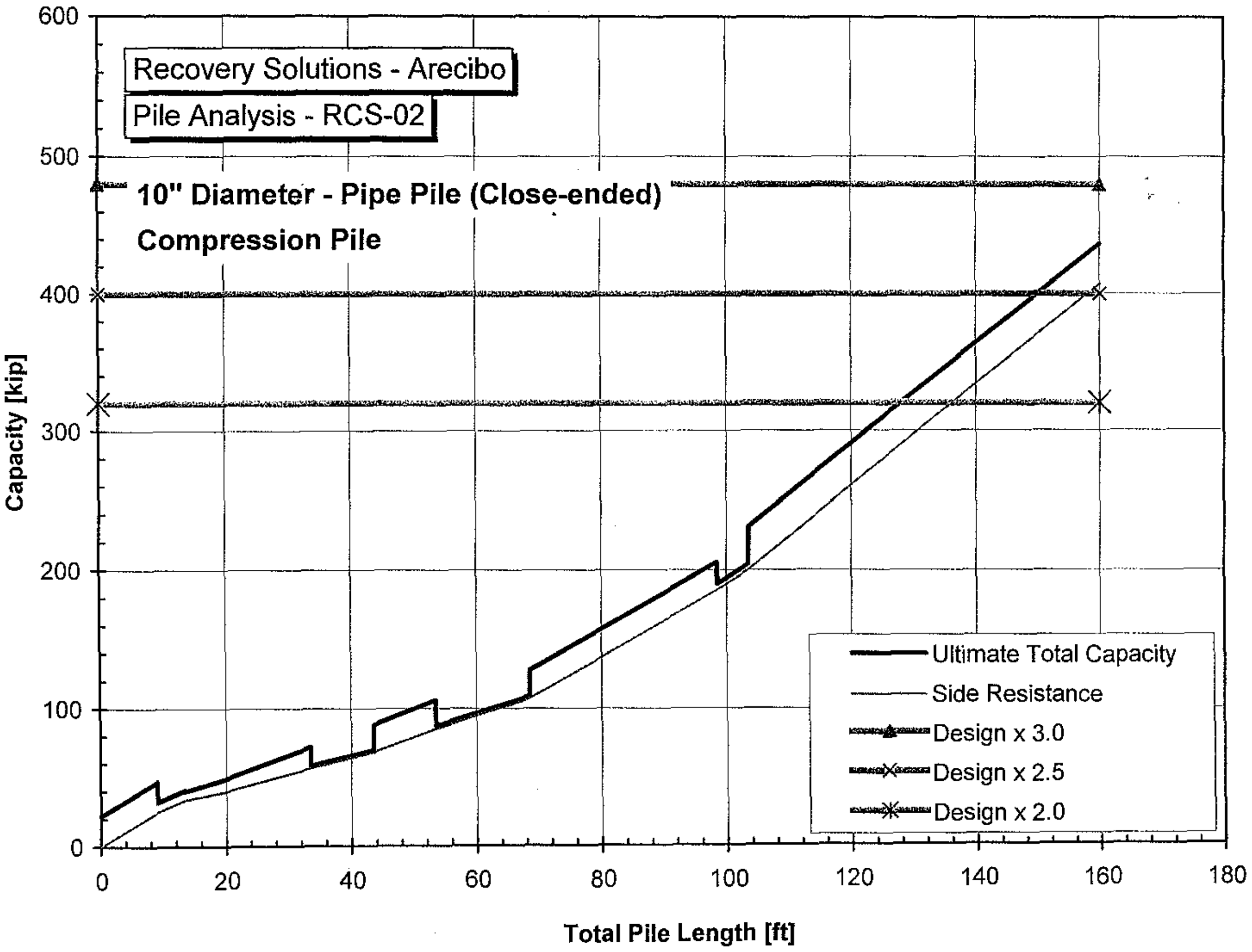
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 10 in. RCS-01 Closed
Assumes cohesive undrained behavior in limestone

Capacity vs Total Pile Length

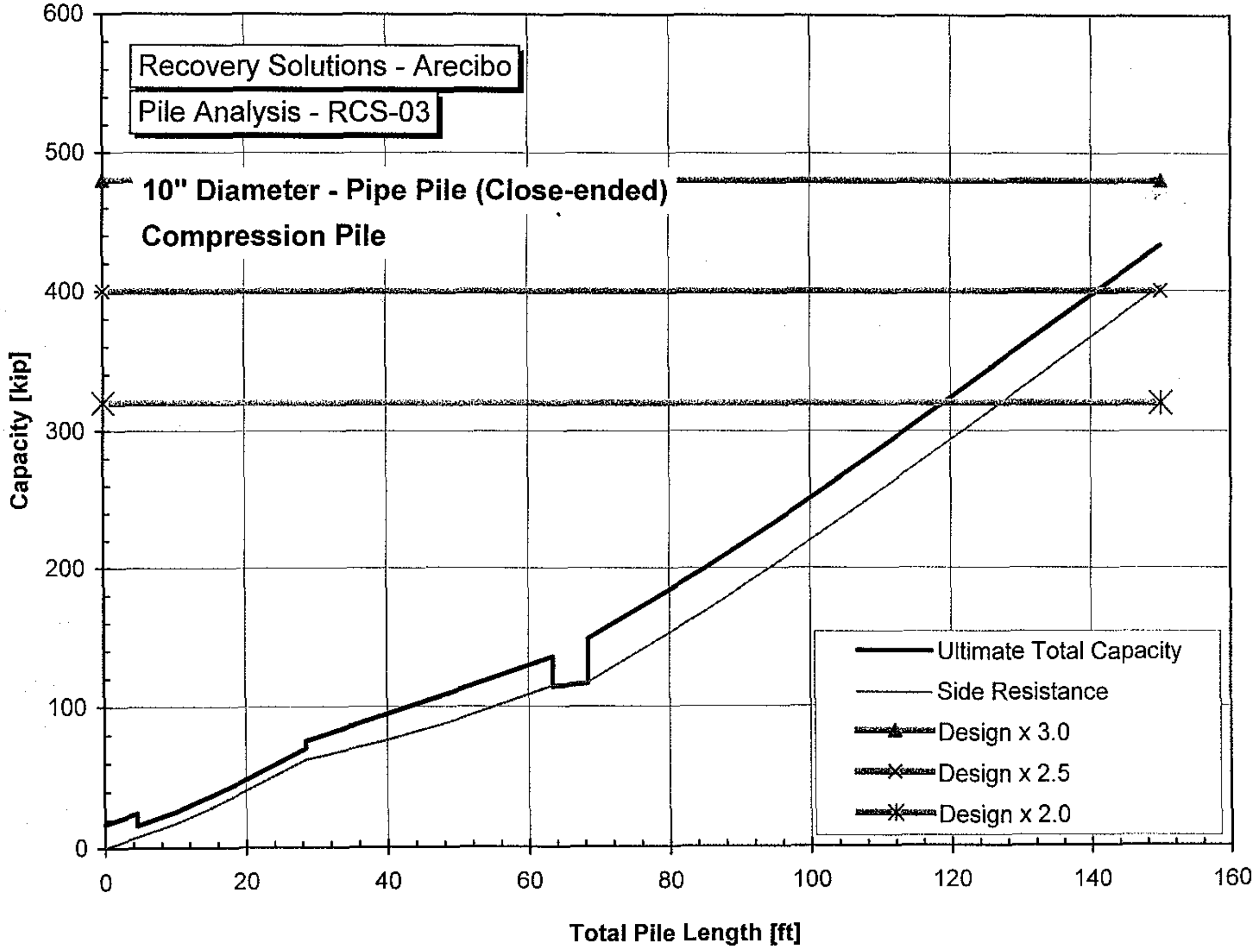


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 10 in. RCS-02 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

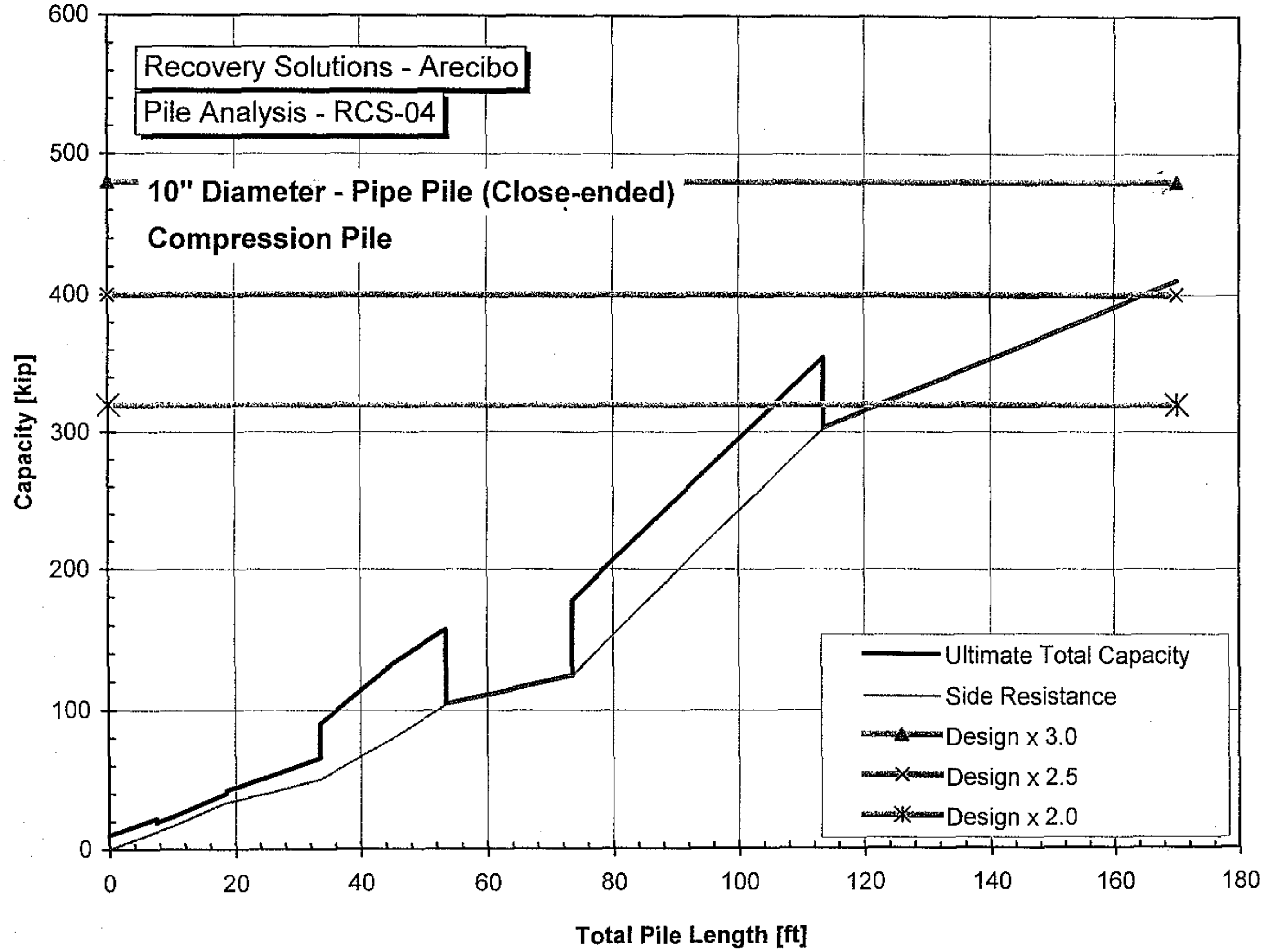


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 10 in. RCS-03 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

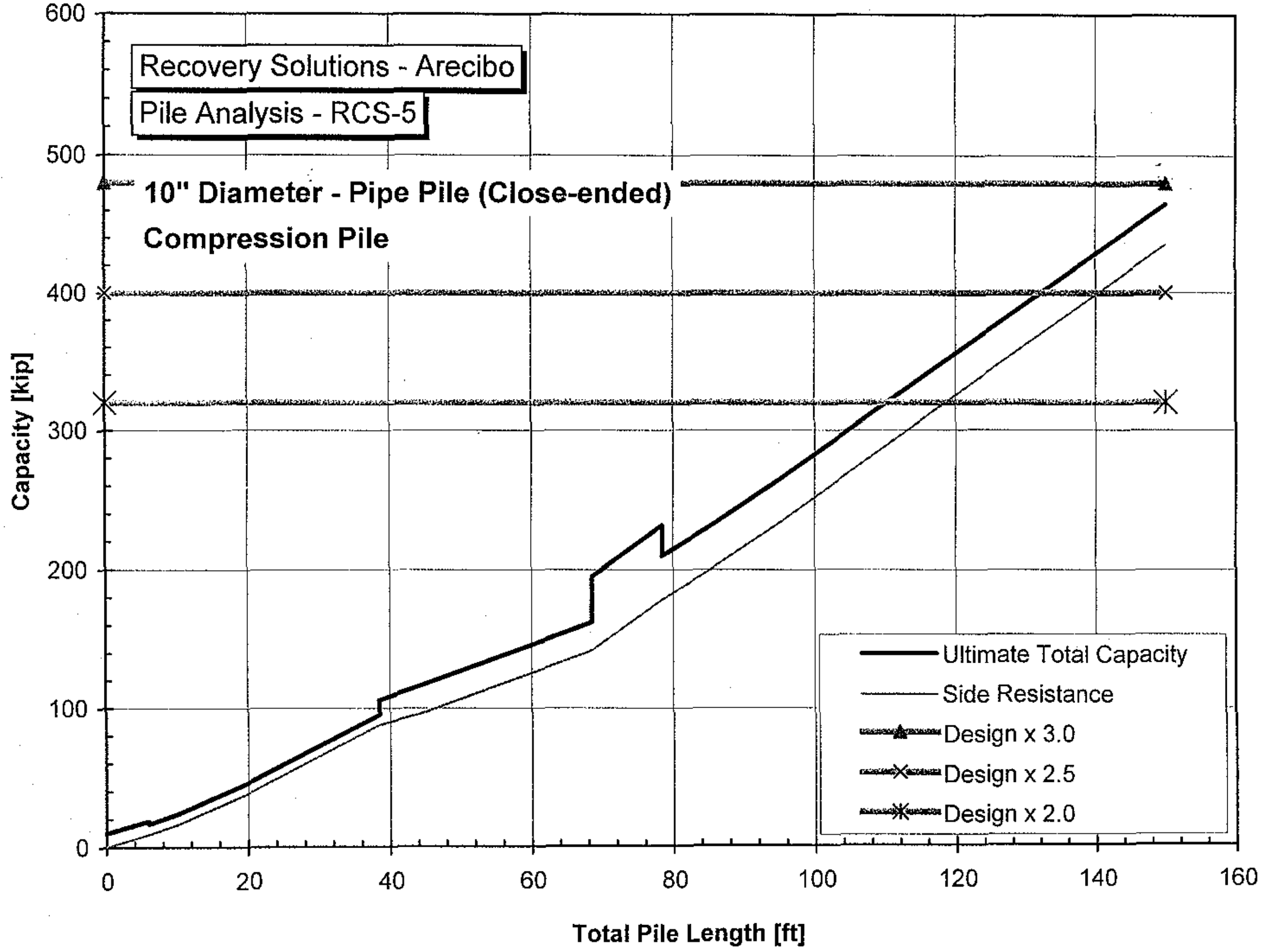


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 10 in. RCS-04 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

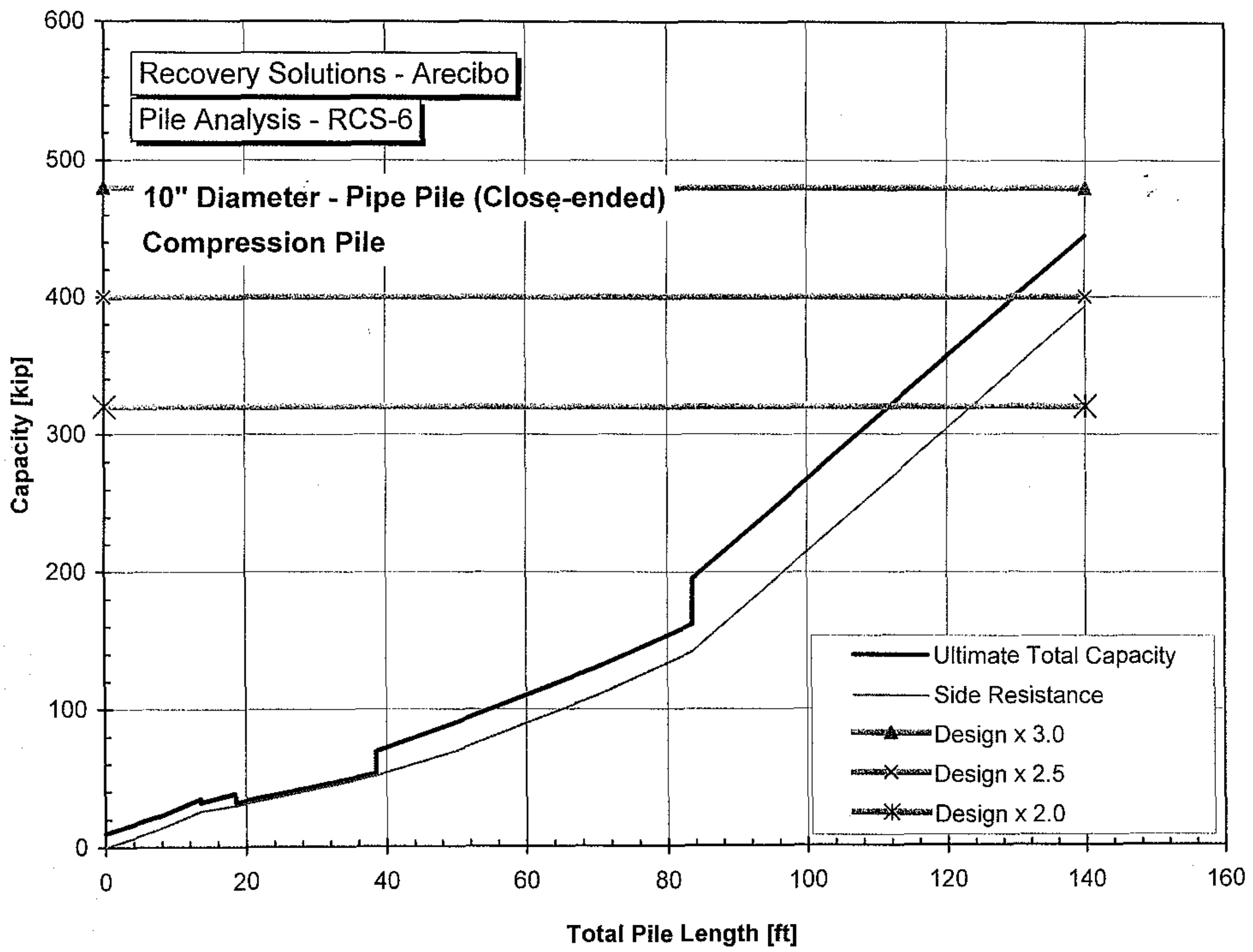


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 10 in. RCS-05 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

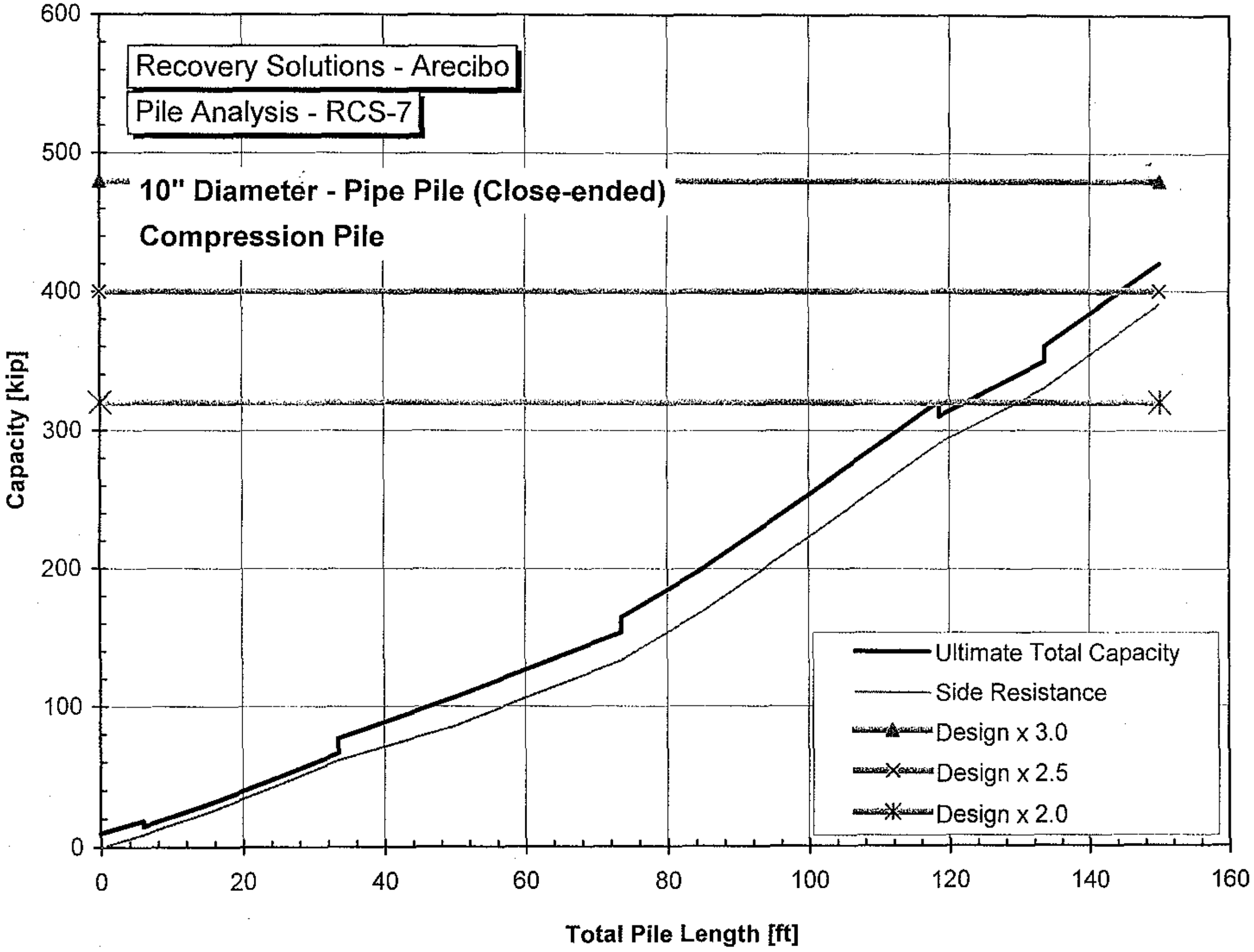


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 10 in. RCS-06 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

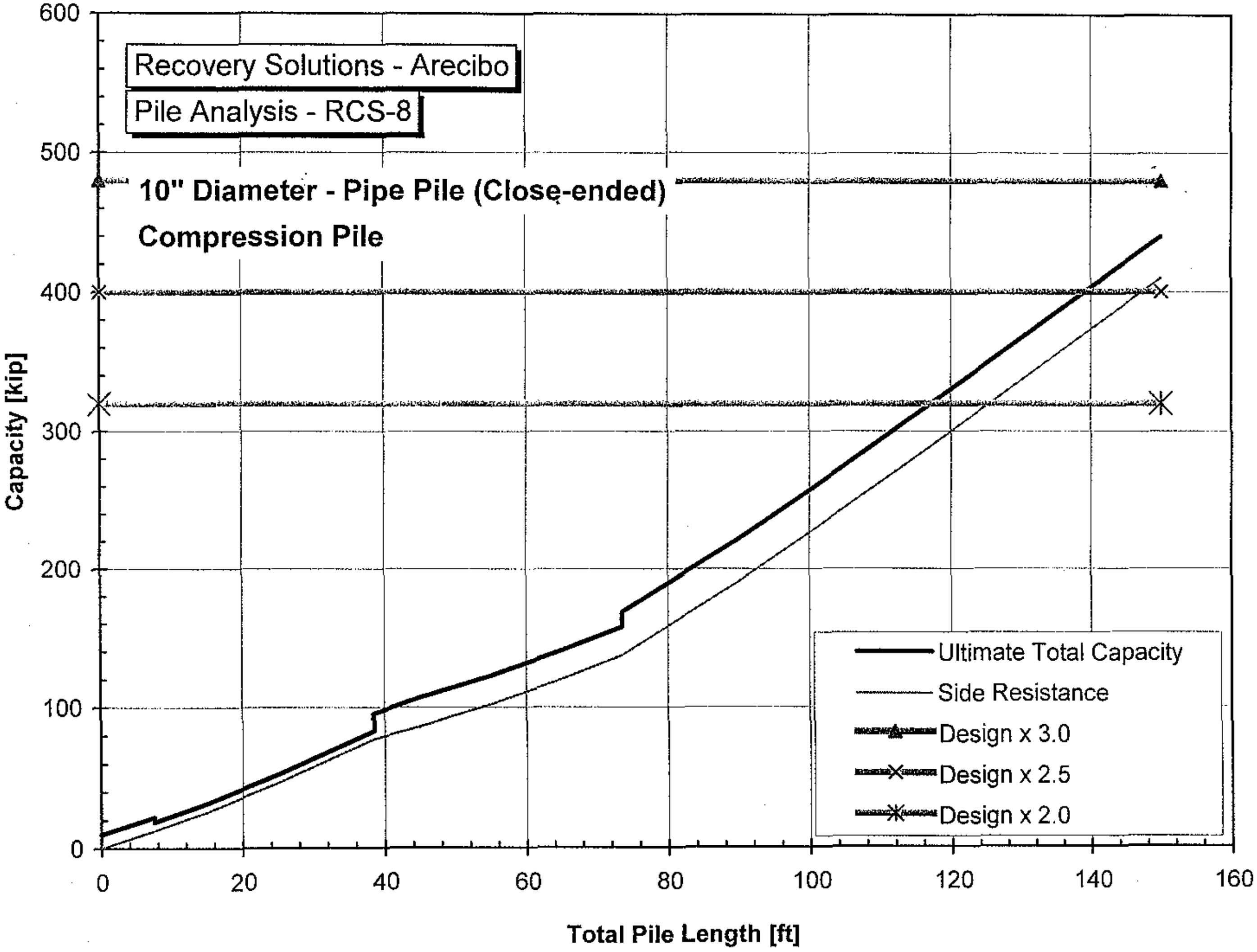
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 10 in. RCS-07 Closed
Assumes cohesive undrained behavior in limestone

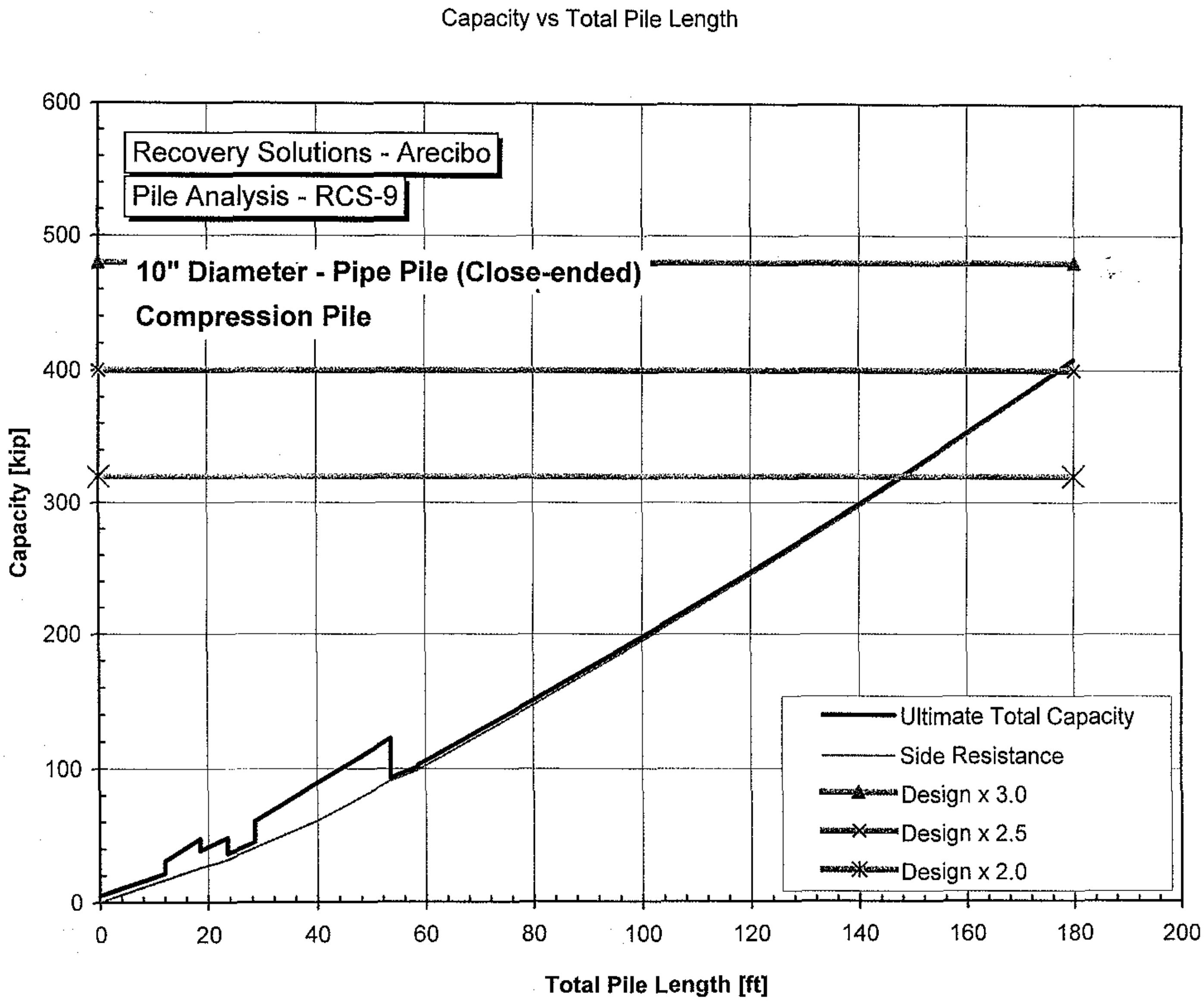
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 10 in. RCS-08 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

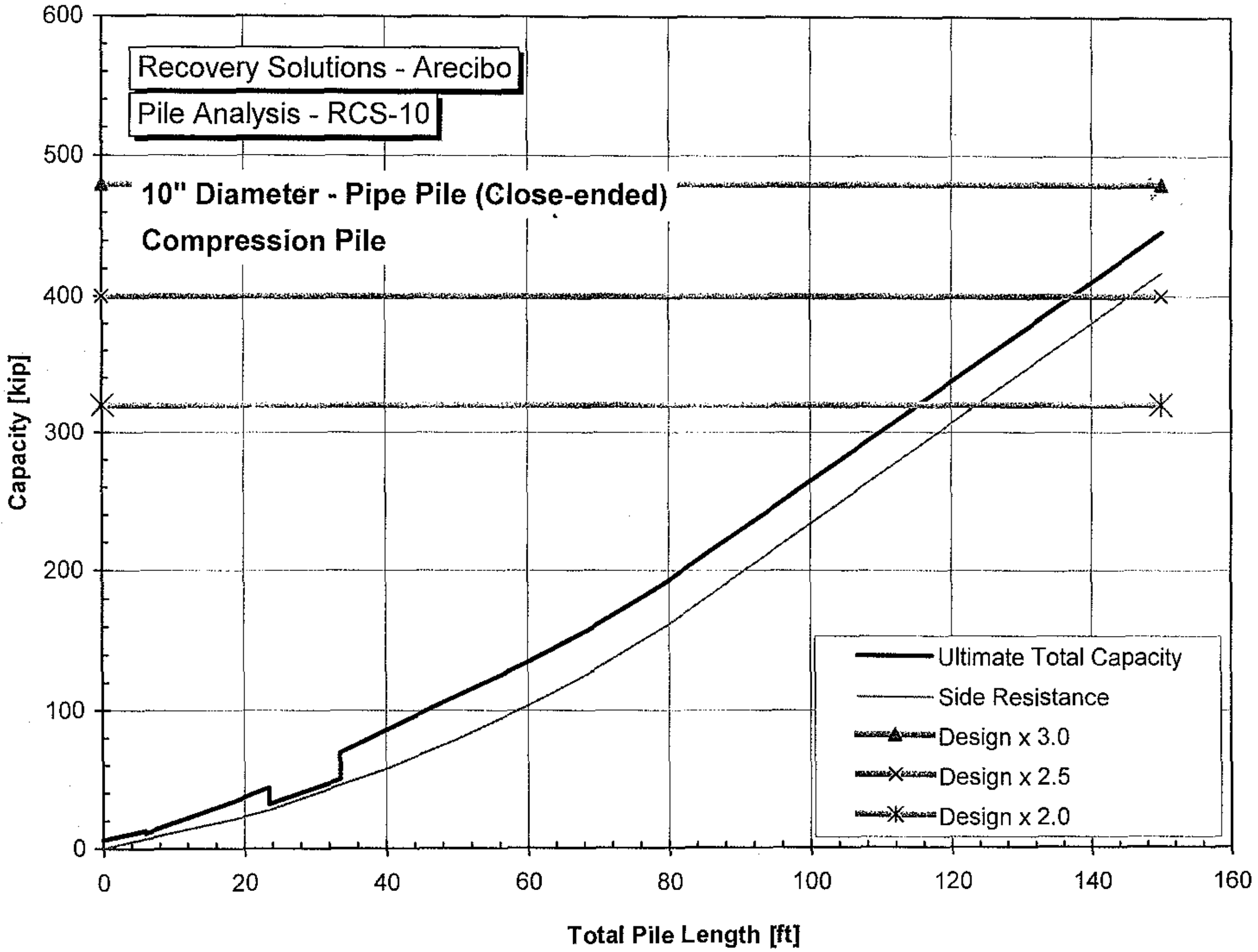


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 10 in. RCS-09 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

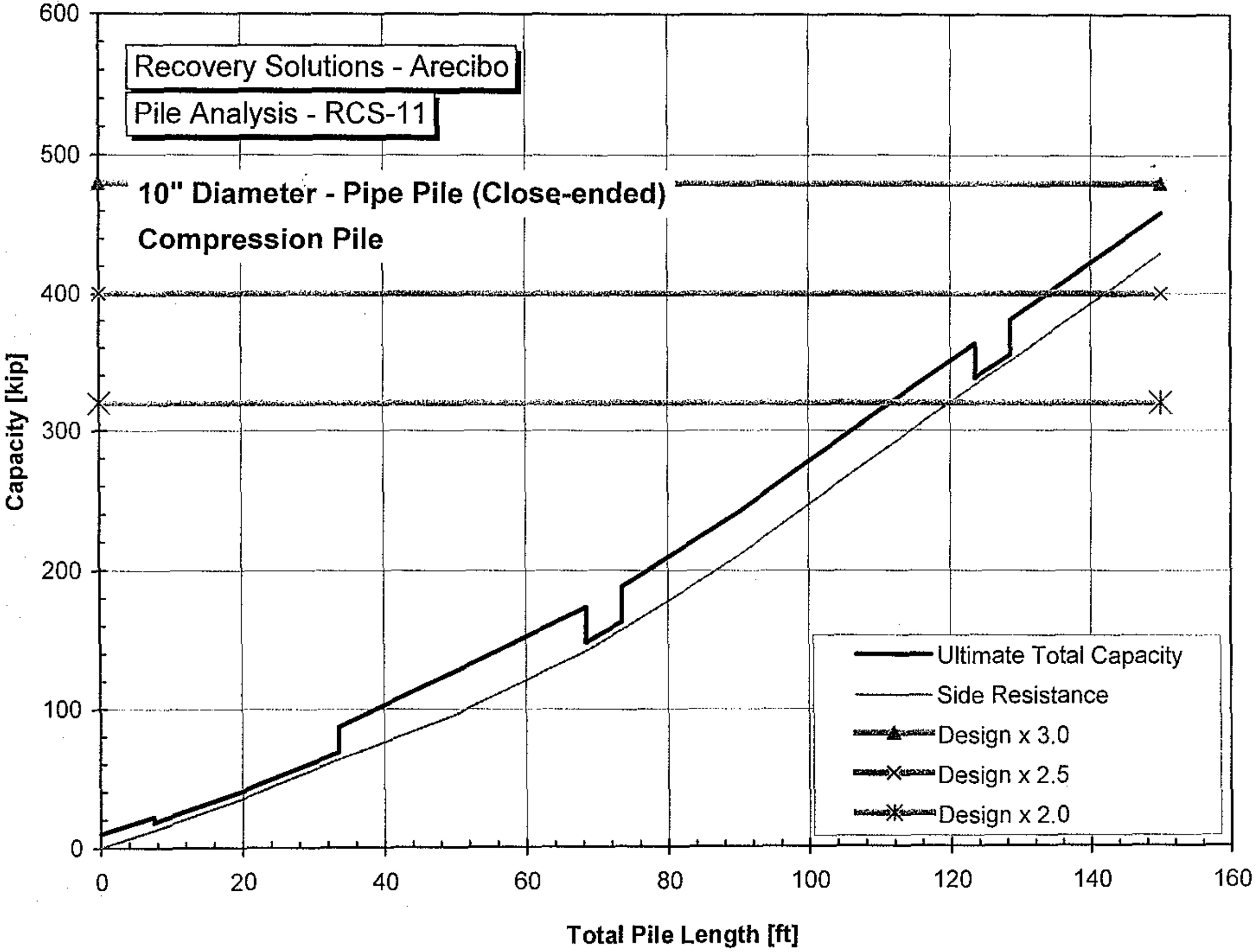
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 10 in. RCS-10 Closed
Assumes cohesive undrained behavior in limestone

Capacity vs Total Pile Length

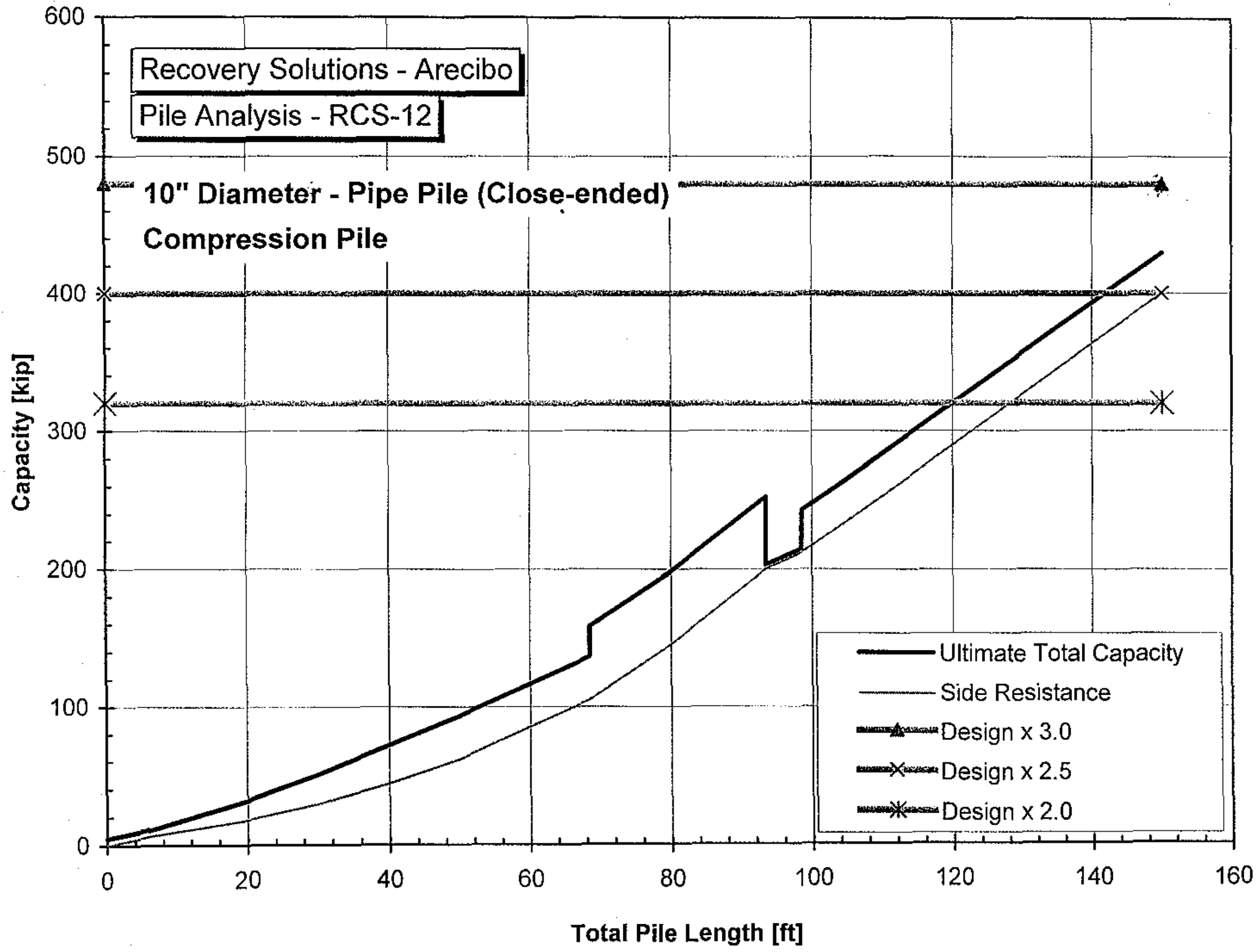


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 10 in. RCS-11 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

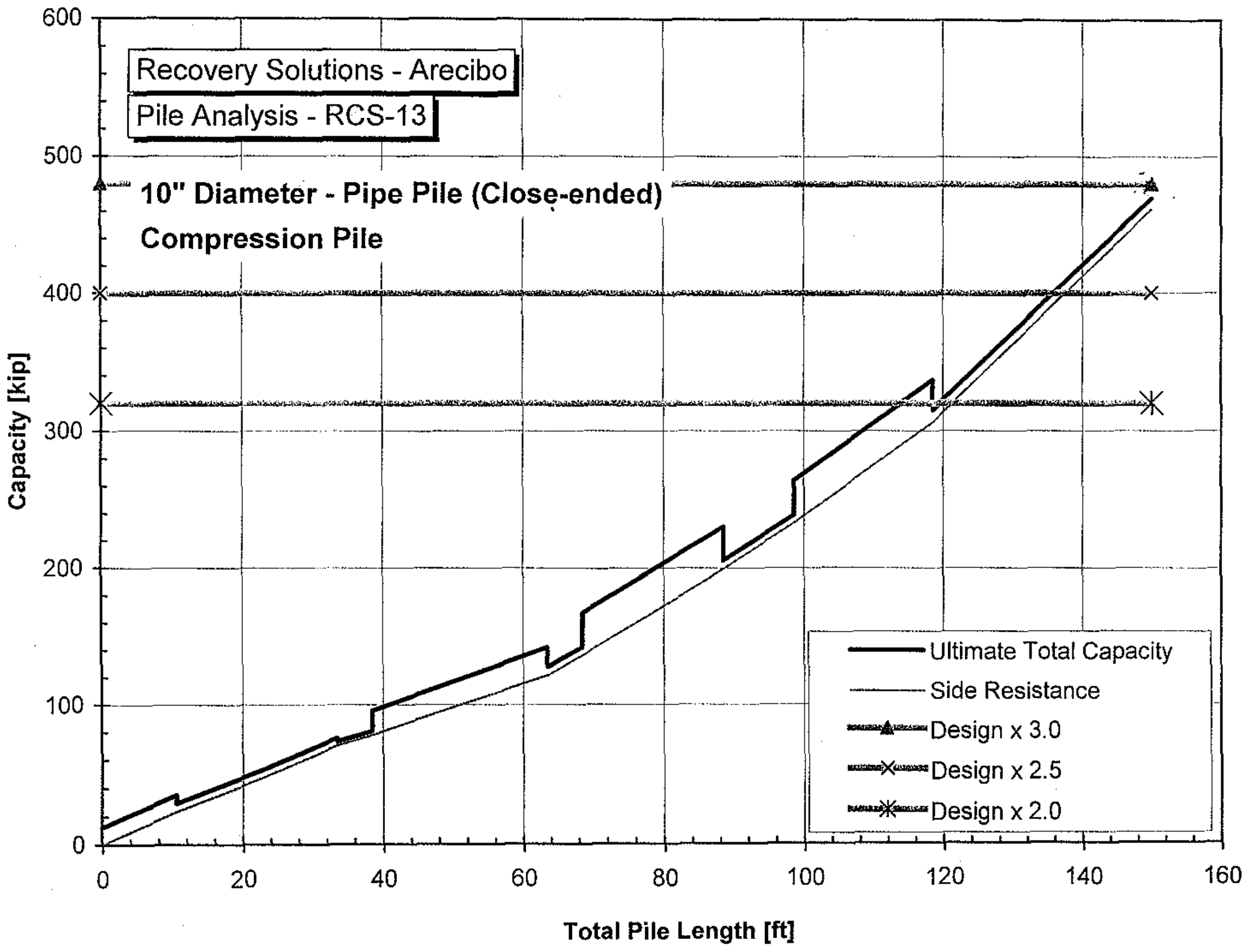


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 10 in. RCS-12 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

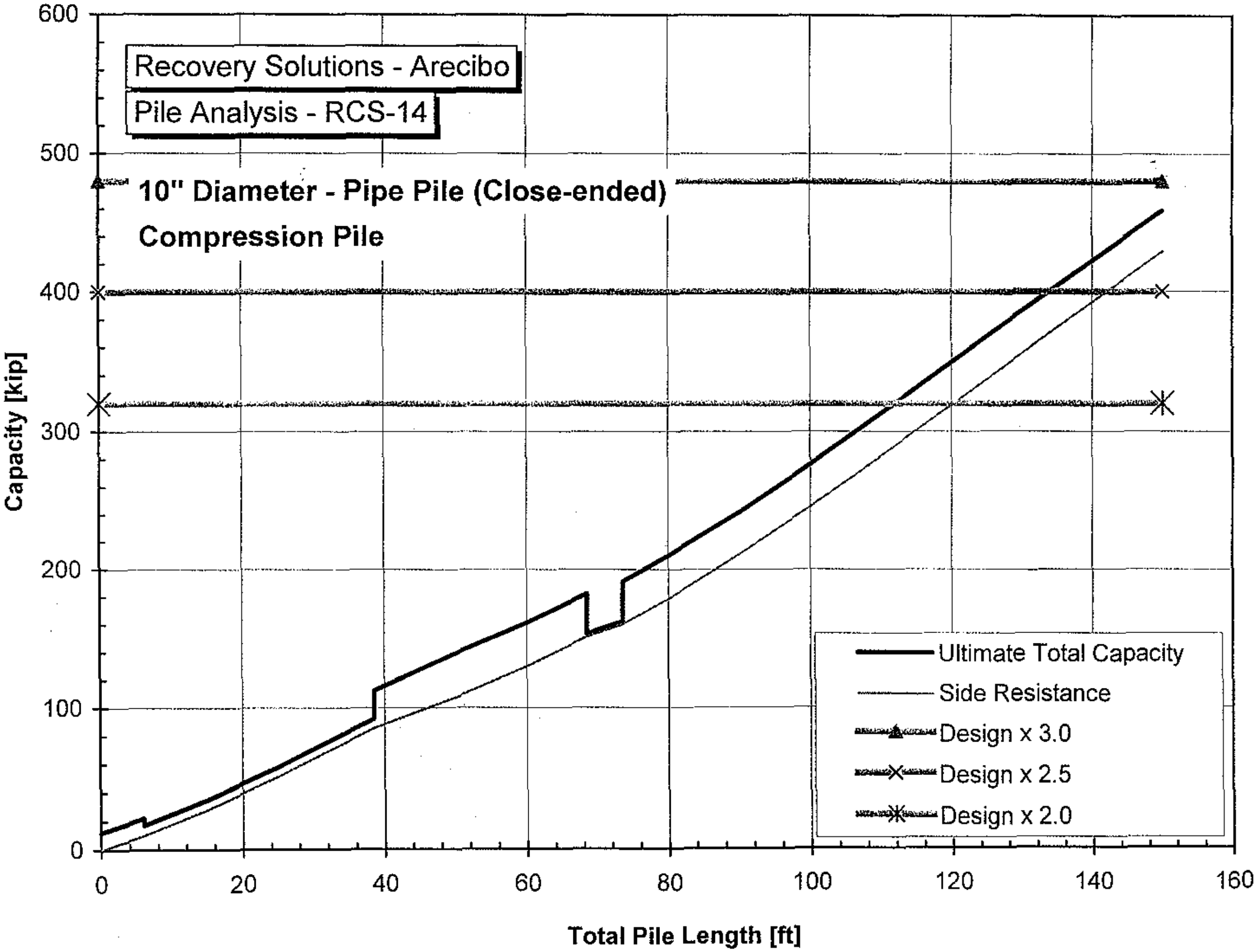


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 10 in. RCS-13 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

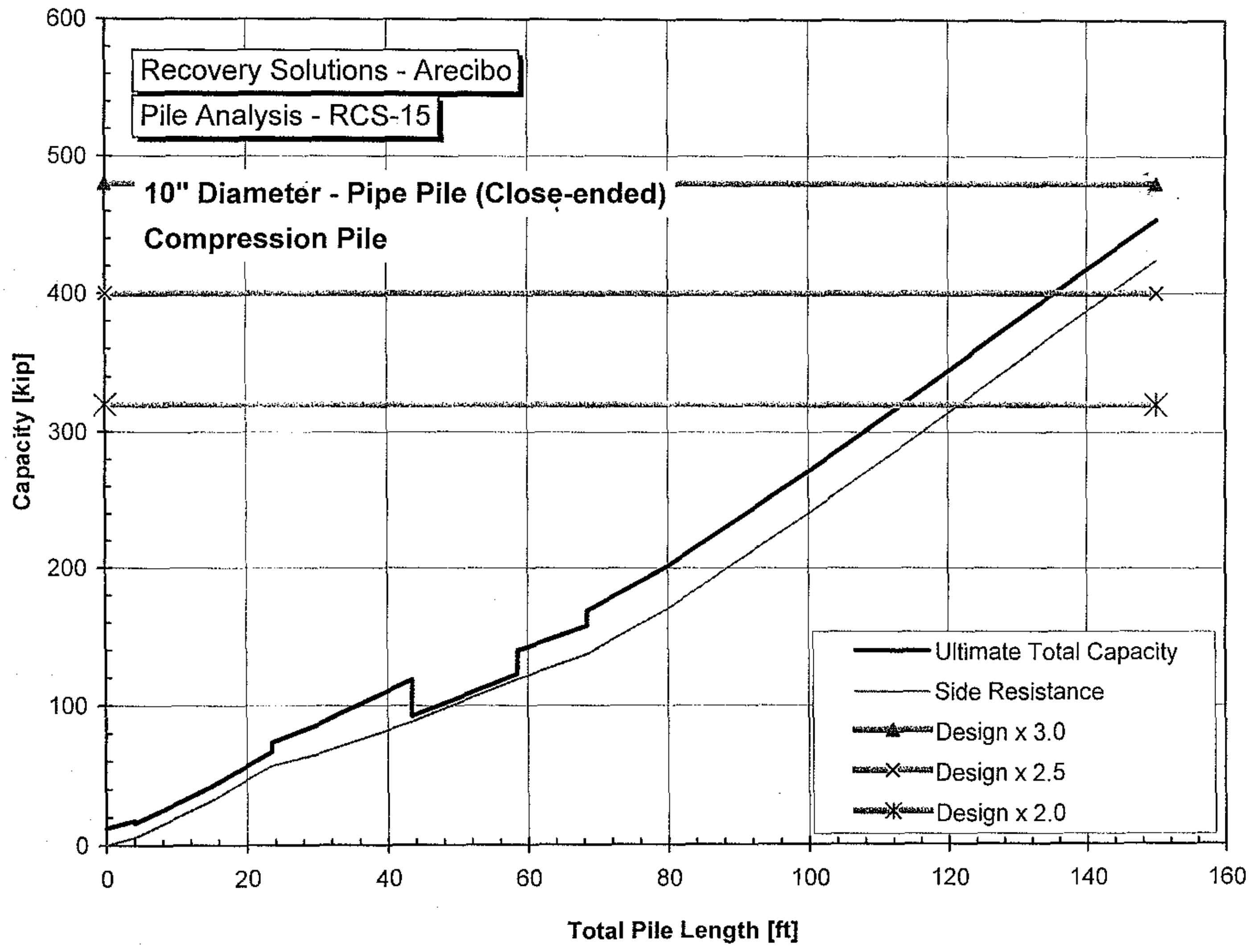
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 10 in. RCS-14 Closed
Assumes cohesive undrained behavior in limestone

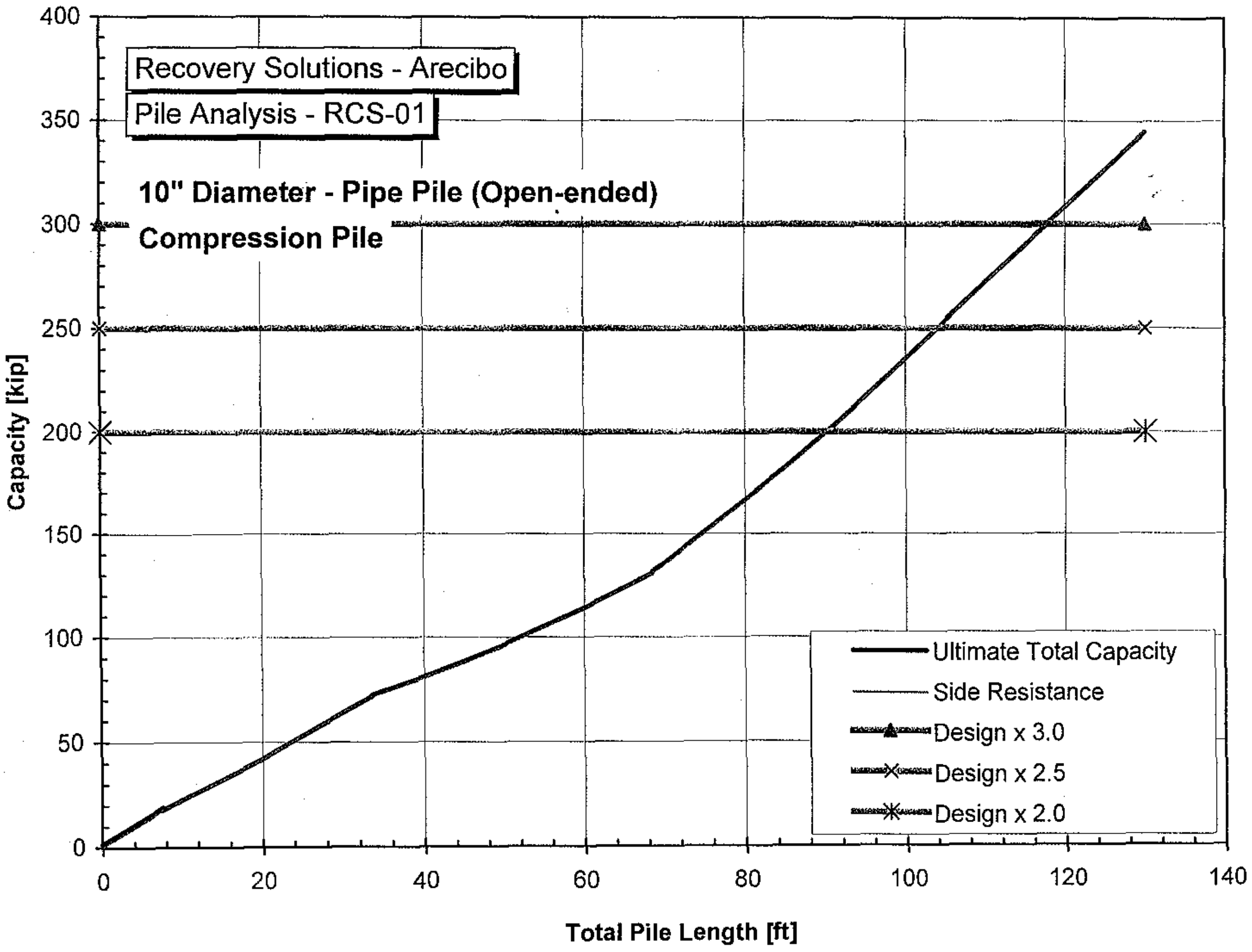
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 10 in. RCS-15 Closed
Assumes cohesive undrained behavior in limestone

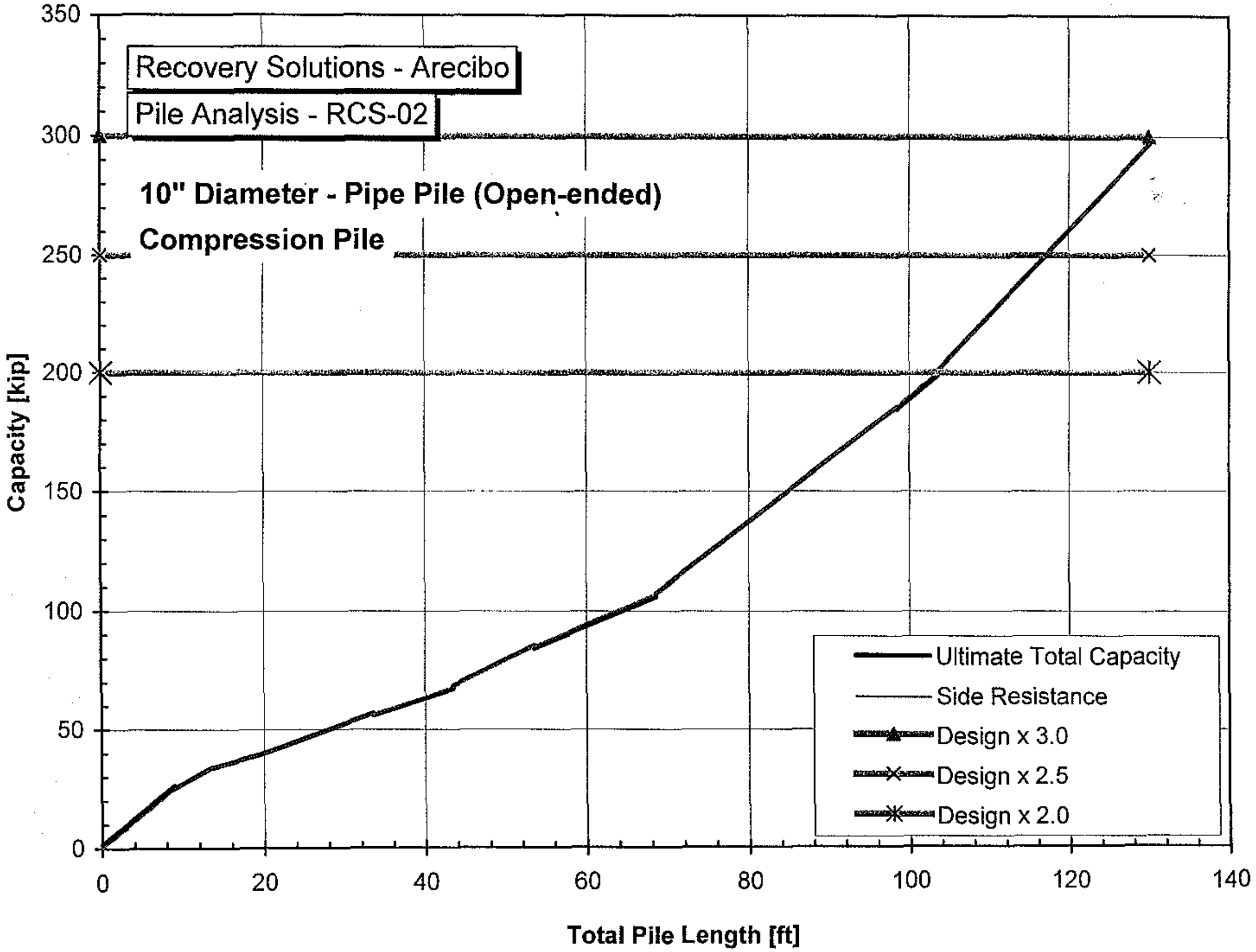
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 10 in. RCS-01
Assumes cohesive undrained behavior in limestone

Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 10 in. RCS-02
Assumes cohesive undrained behavior in limestone

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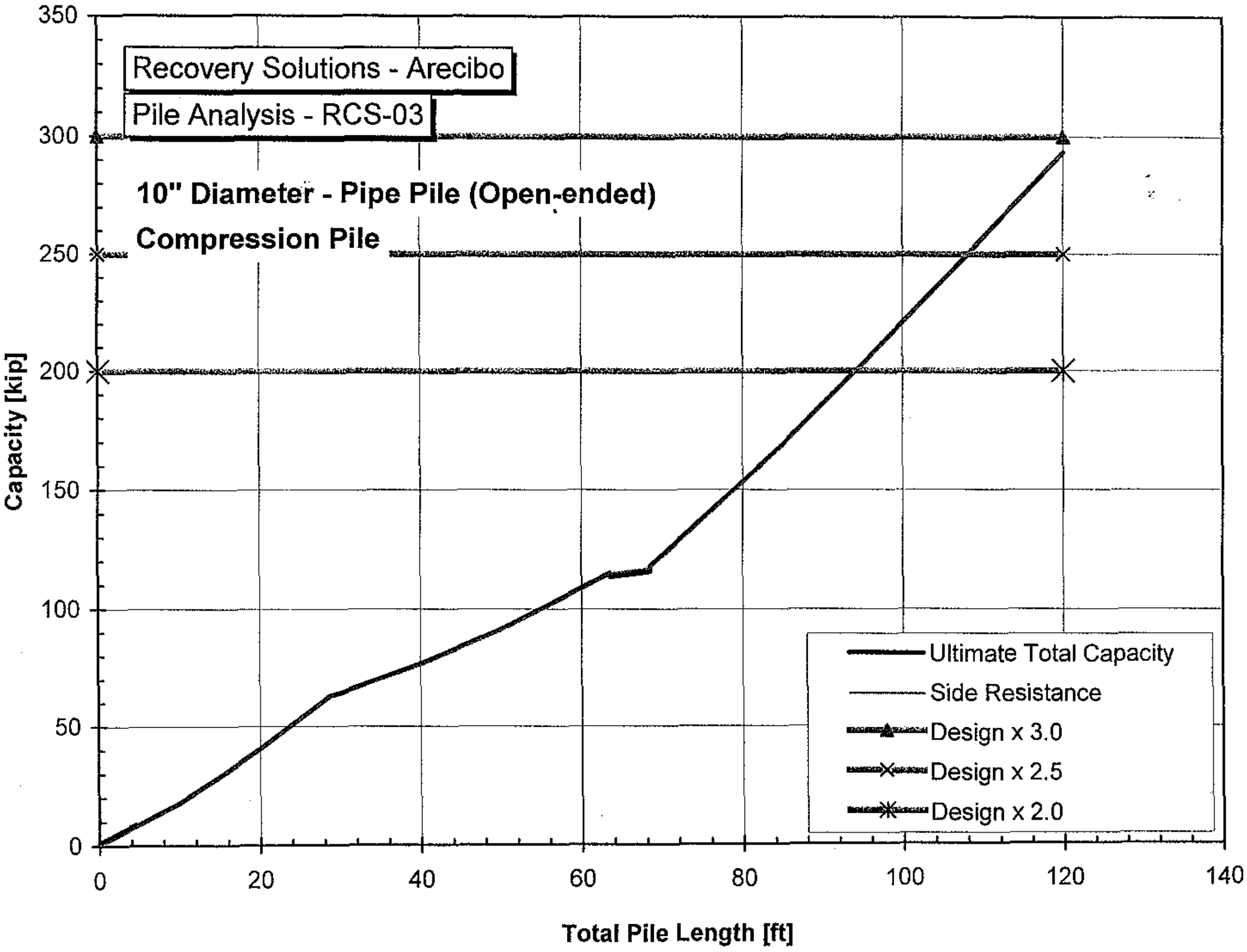
Capacity vs Total Pile Length

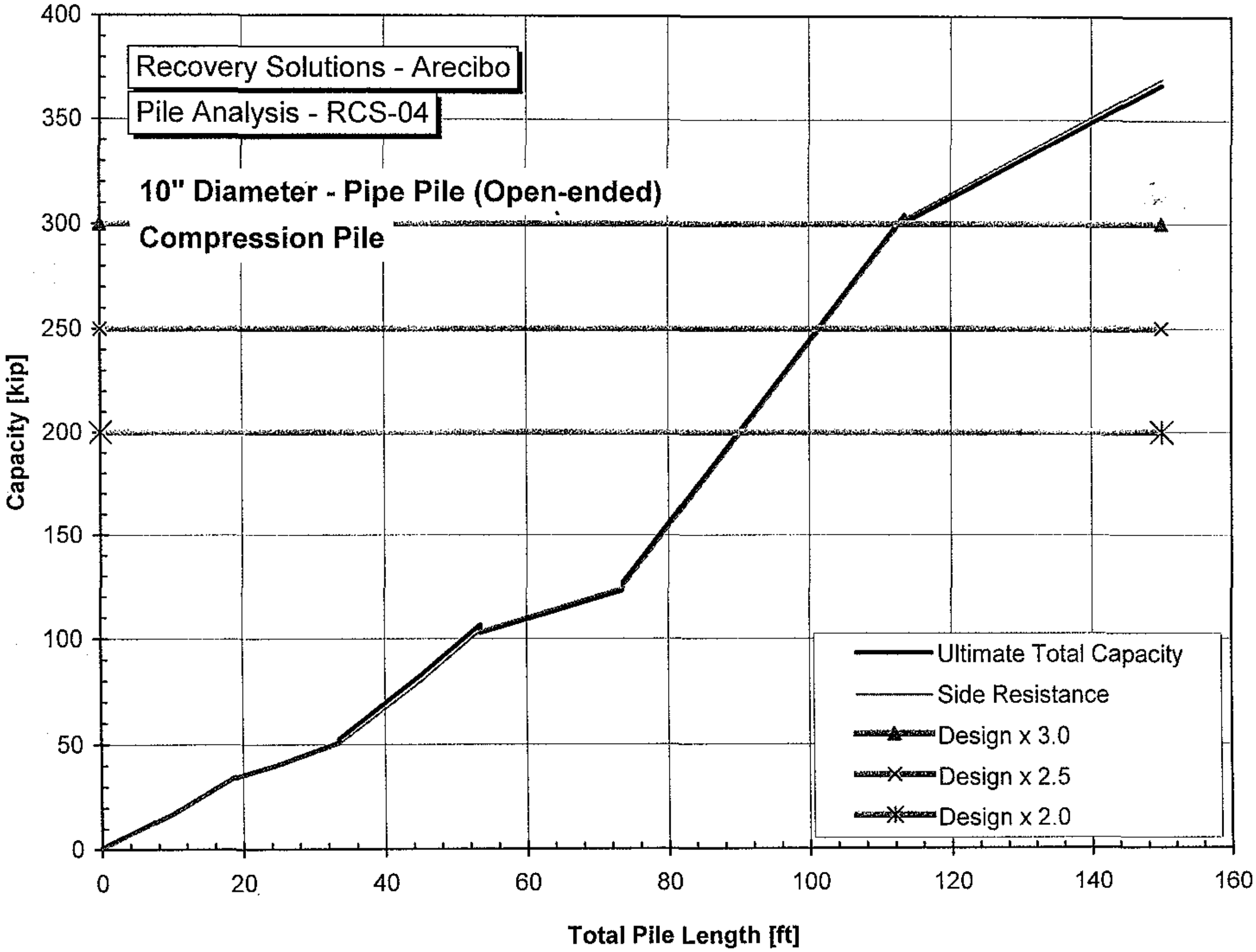


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 10 in. RCS-03
Assumes cohesive undrained behavior in limestone

GEOCONSULT

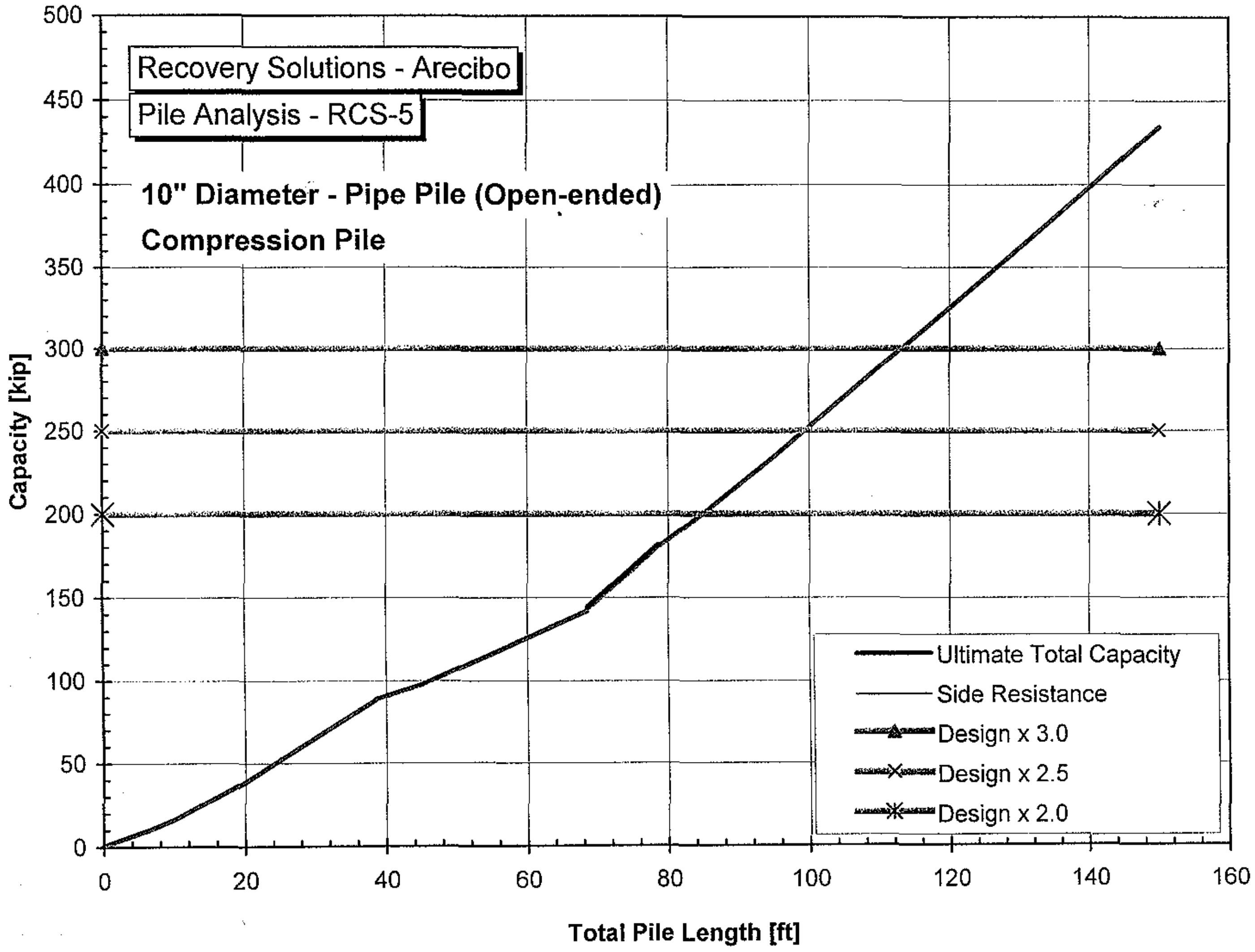
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 10 in. RCS-04
Assumes cohesive undrained behavior in limestone

Capacity vs Total Pile Length

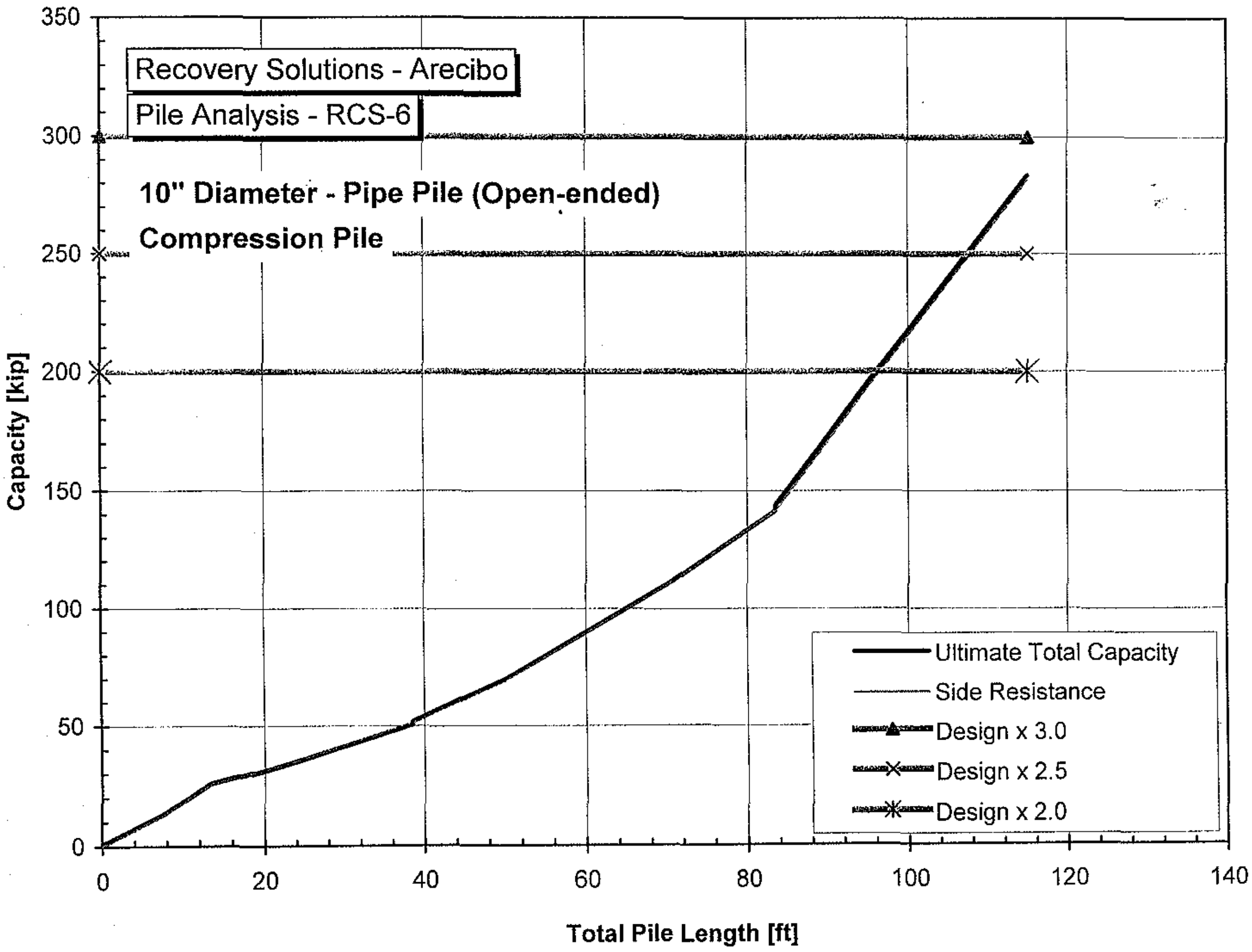


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 10 in. RCS-05
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

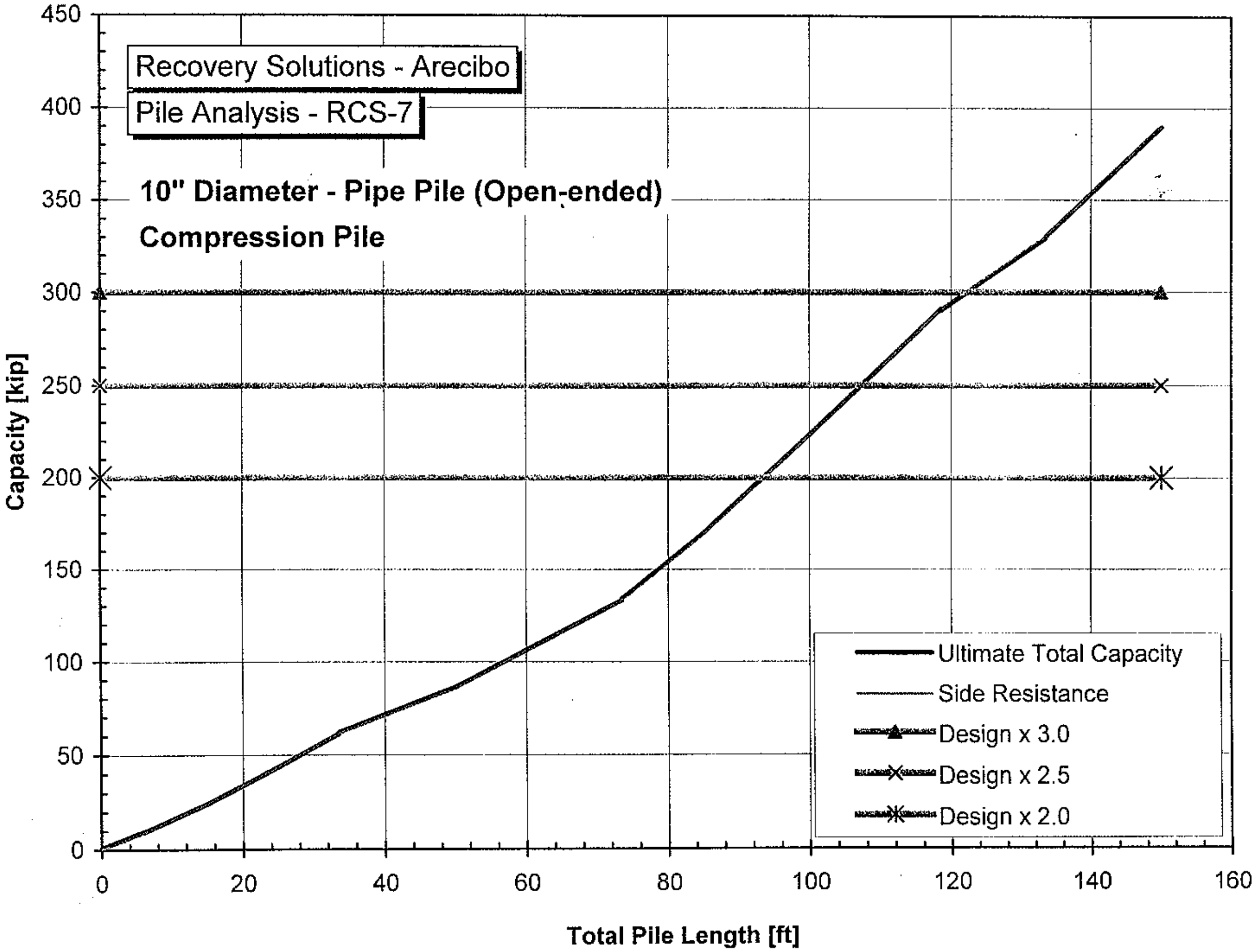


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 10 in. RCS-06
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

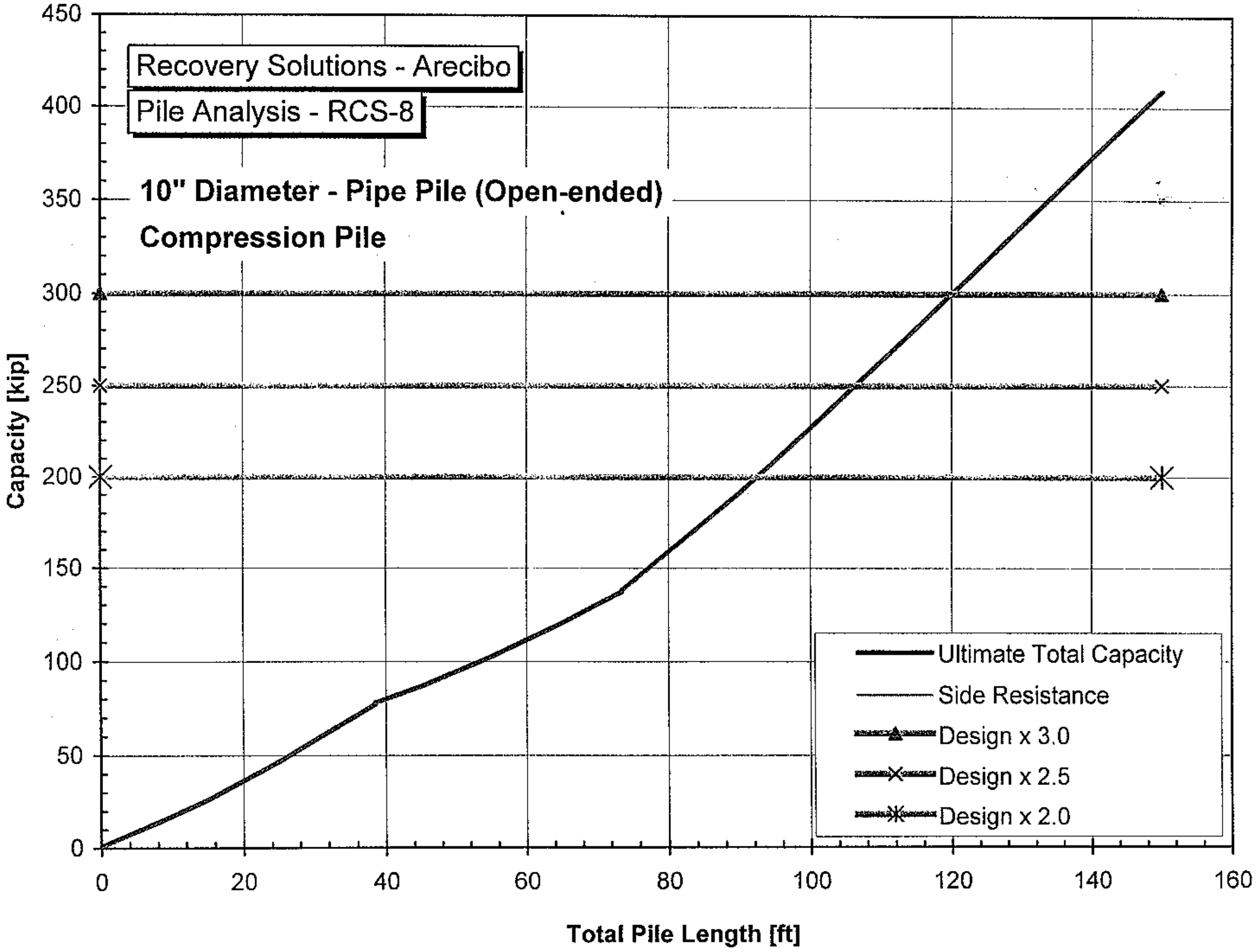


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 10 in. RCS-07
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

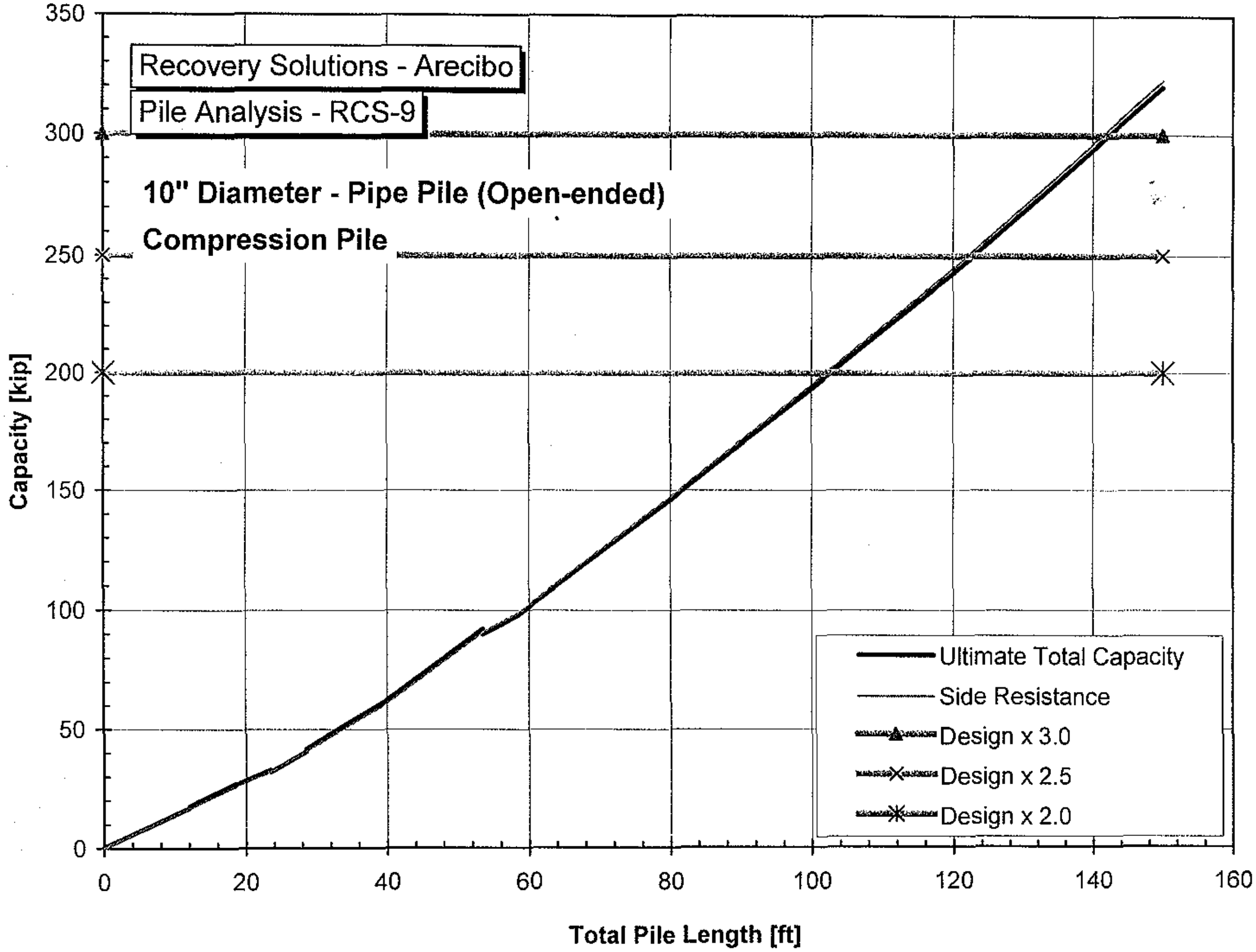


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 10 in. RCS-08
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

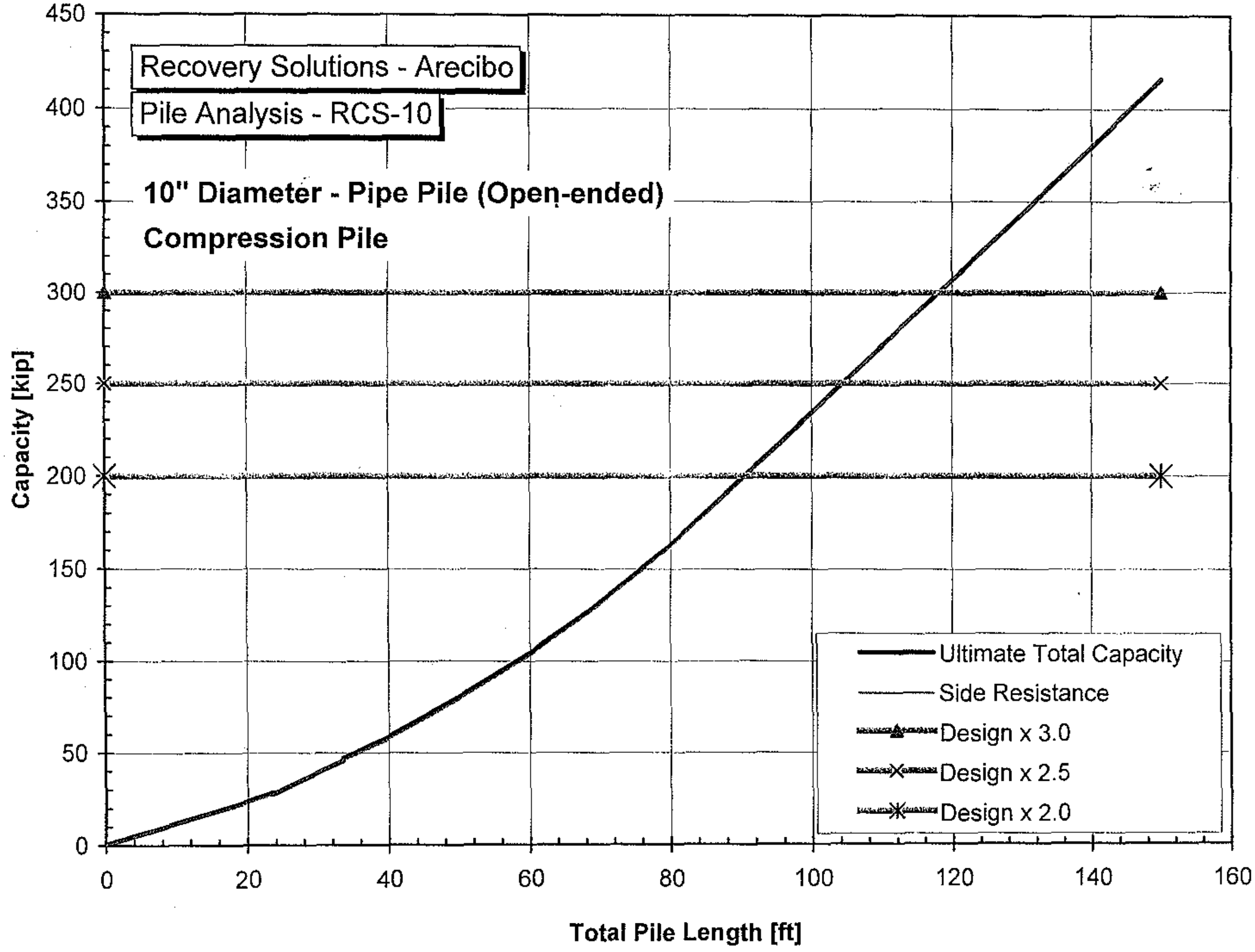


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 10 in. RCS-09
Assumes cohesive undrained behavior in limestone

GEOCONSULT

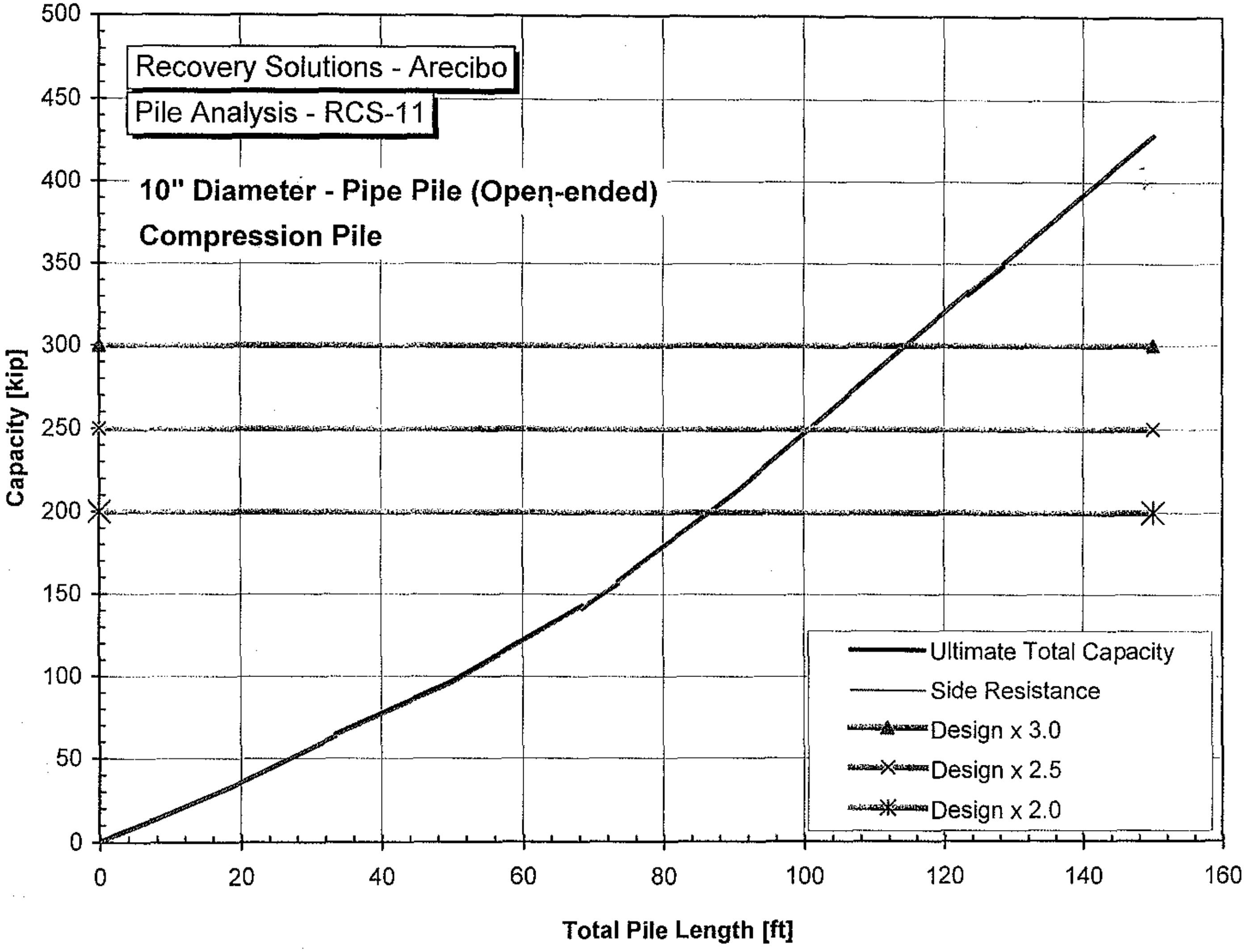
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 10 in. RCS-10
Assumes cohesive undrained behavior in limestone

Capacity vs Total Pile Length

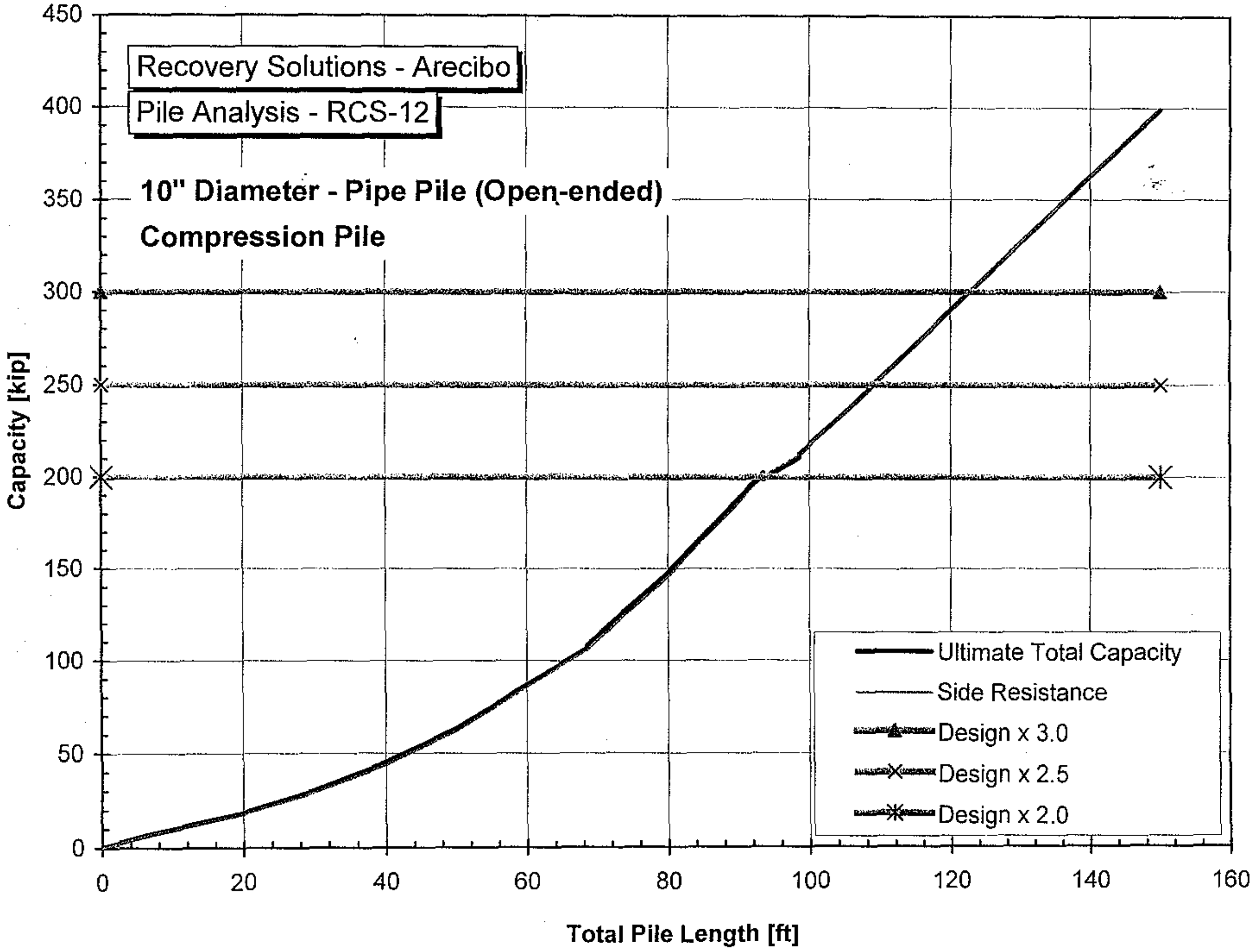


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 10 in. RCS-11
Assumes cohesive undrained behavior in limestone

GEOCONSULT

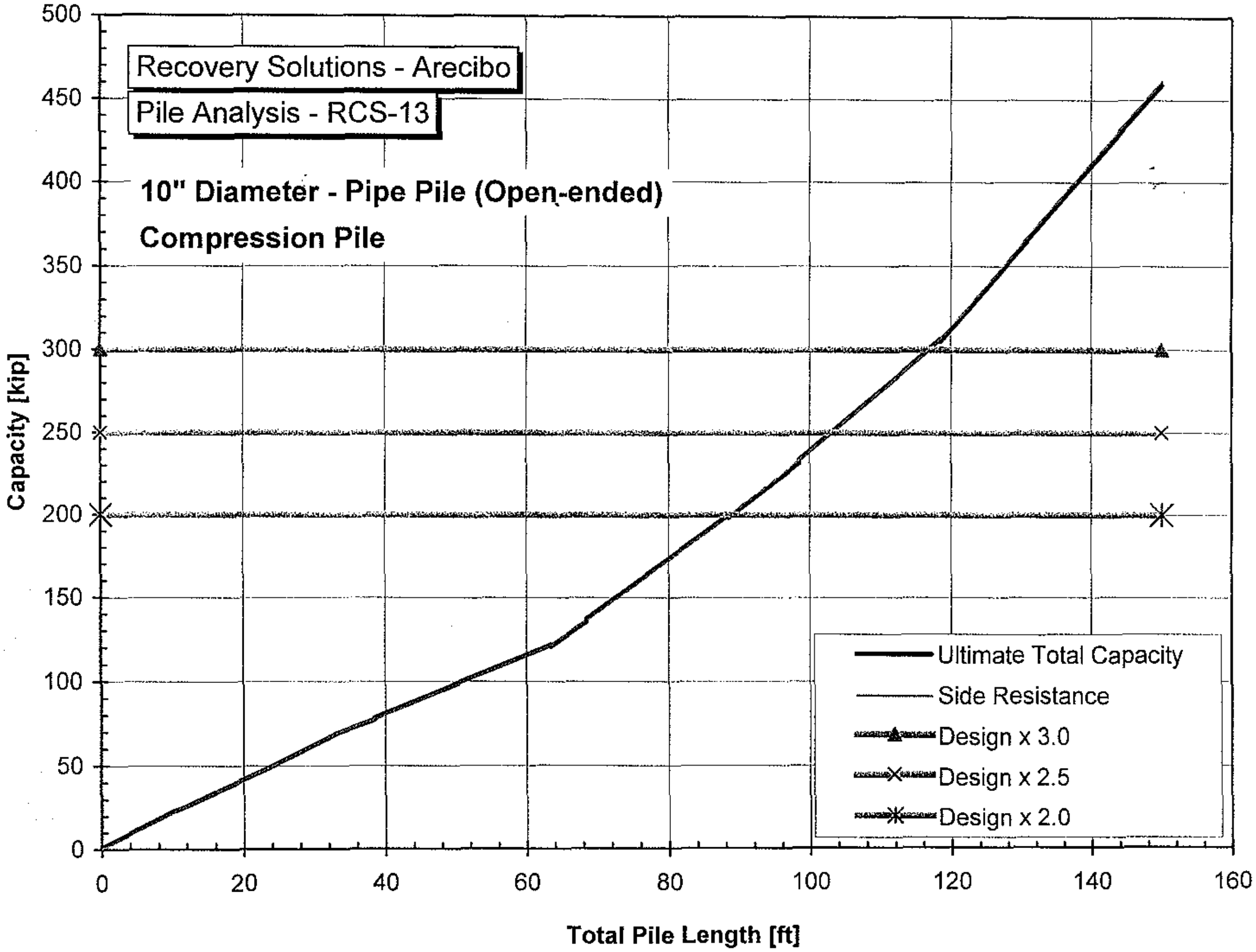
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 10 in. RCS-12
Assumes cohesive undrained behavior in limestone

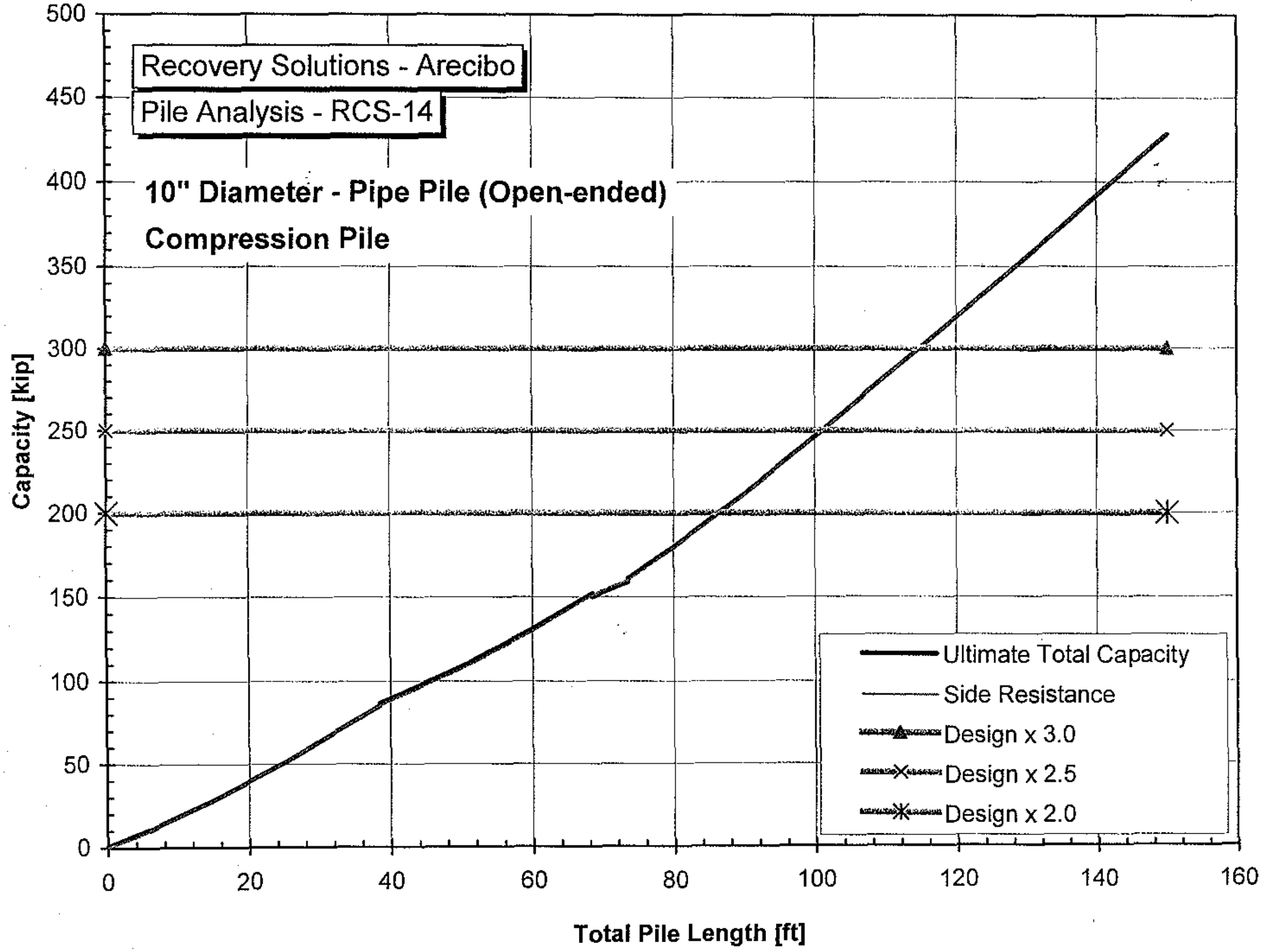
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 10 in. RCS-13
Assumes cohesive undrained behavior in limestone

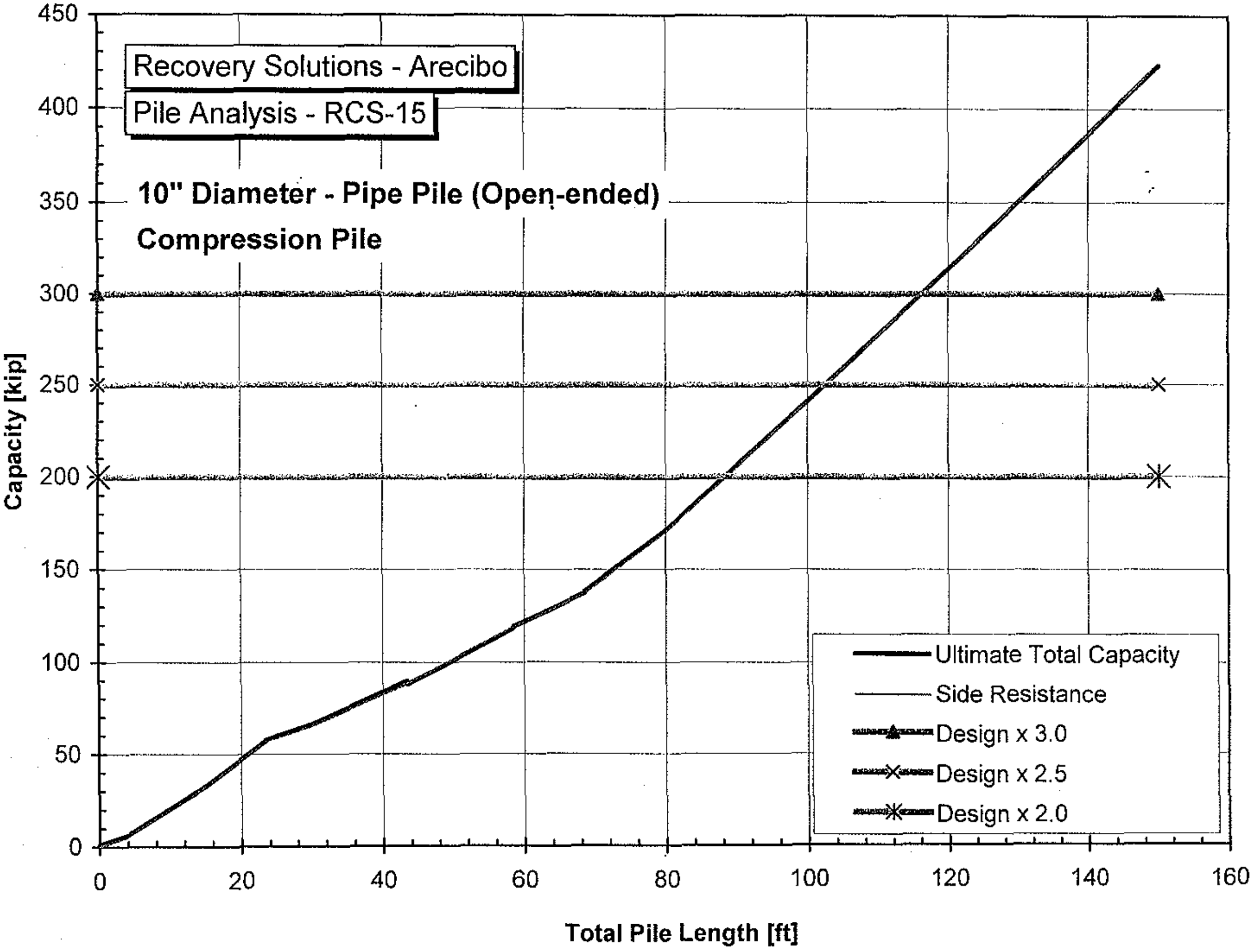
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 10 in. RCS-14
Assumes cohesive undrained behavior in limestone

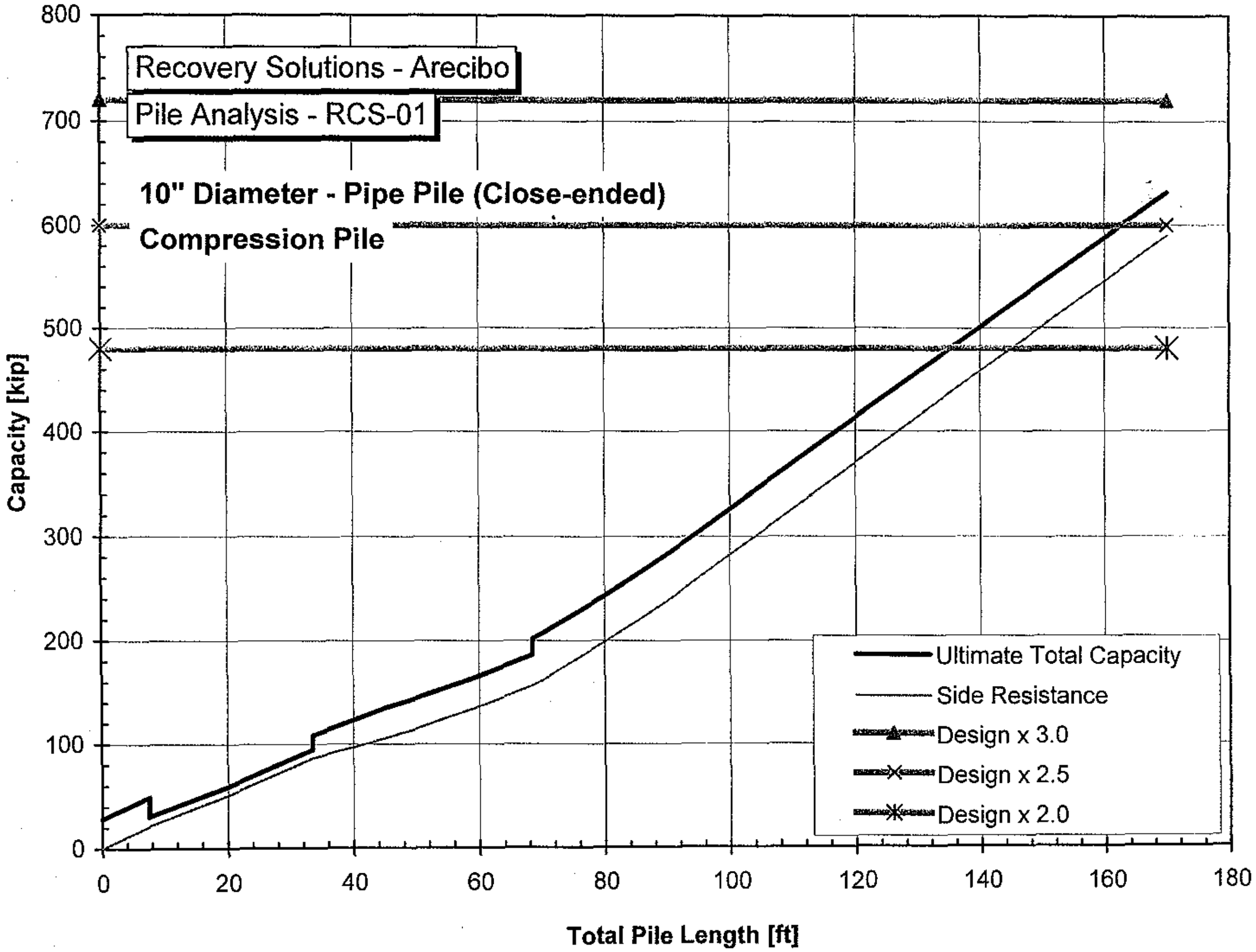
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 10 in. RCS-15
Assumes cohesive undrained behavior in limestone

Capacity vs Total Pile Length

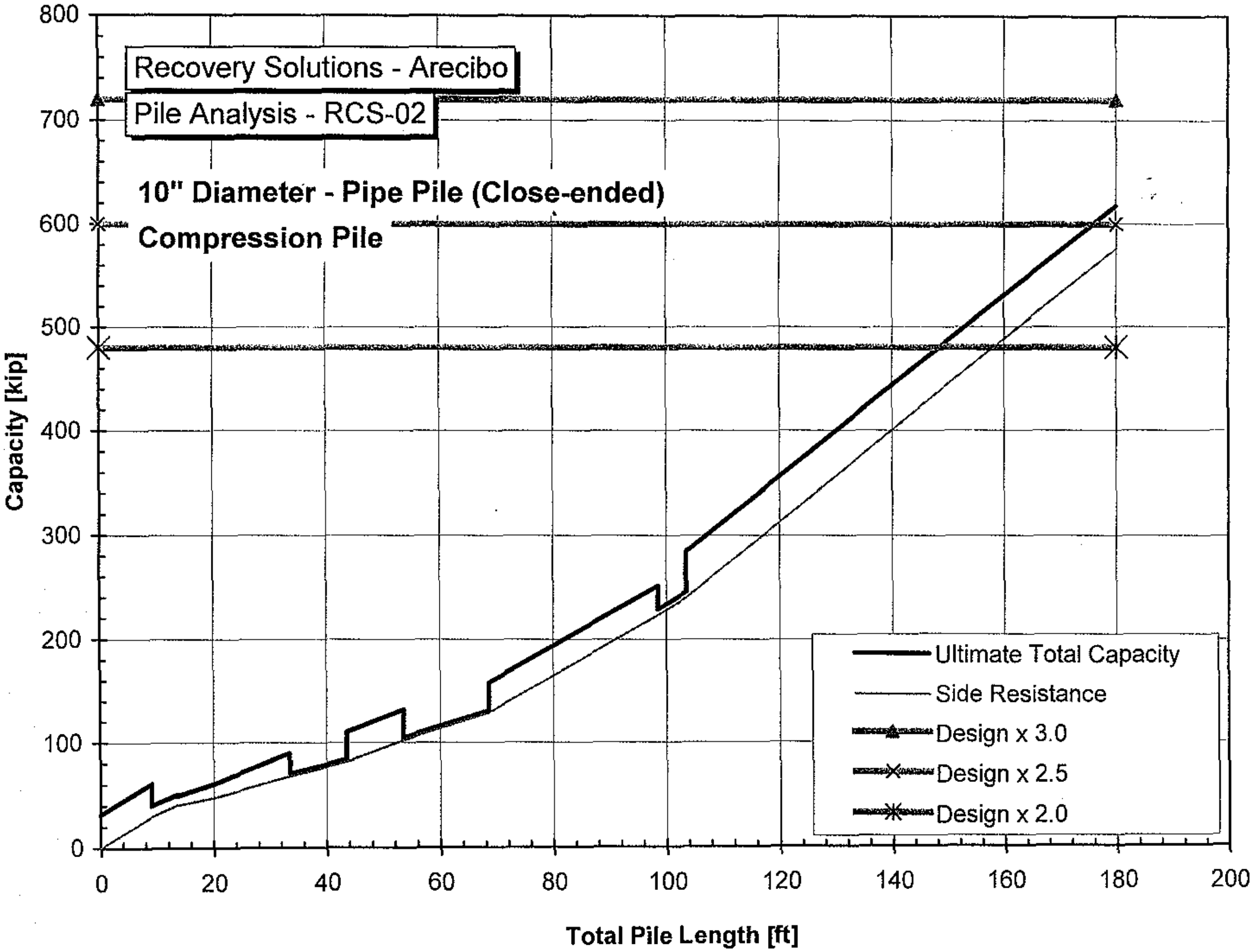


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 12 in. RCS-01 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

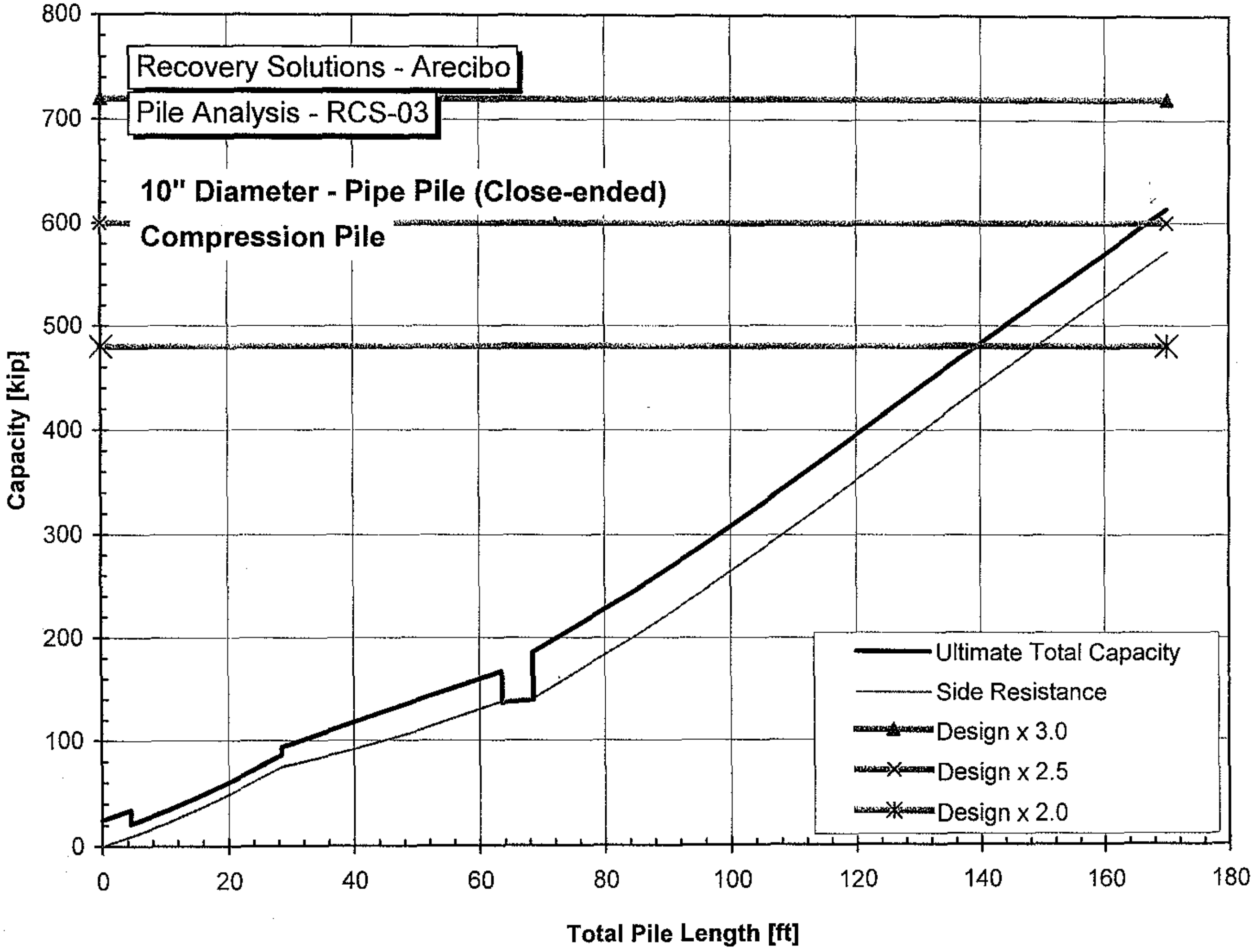
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 12 in. RCS-02 Closed
Assumes cohesive undrained behavior in limestone

Capacity vs Total Pile Length

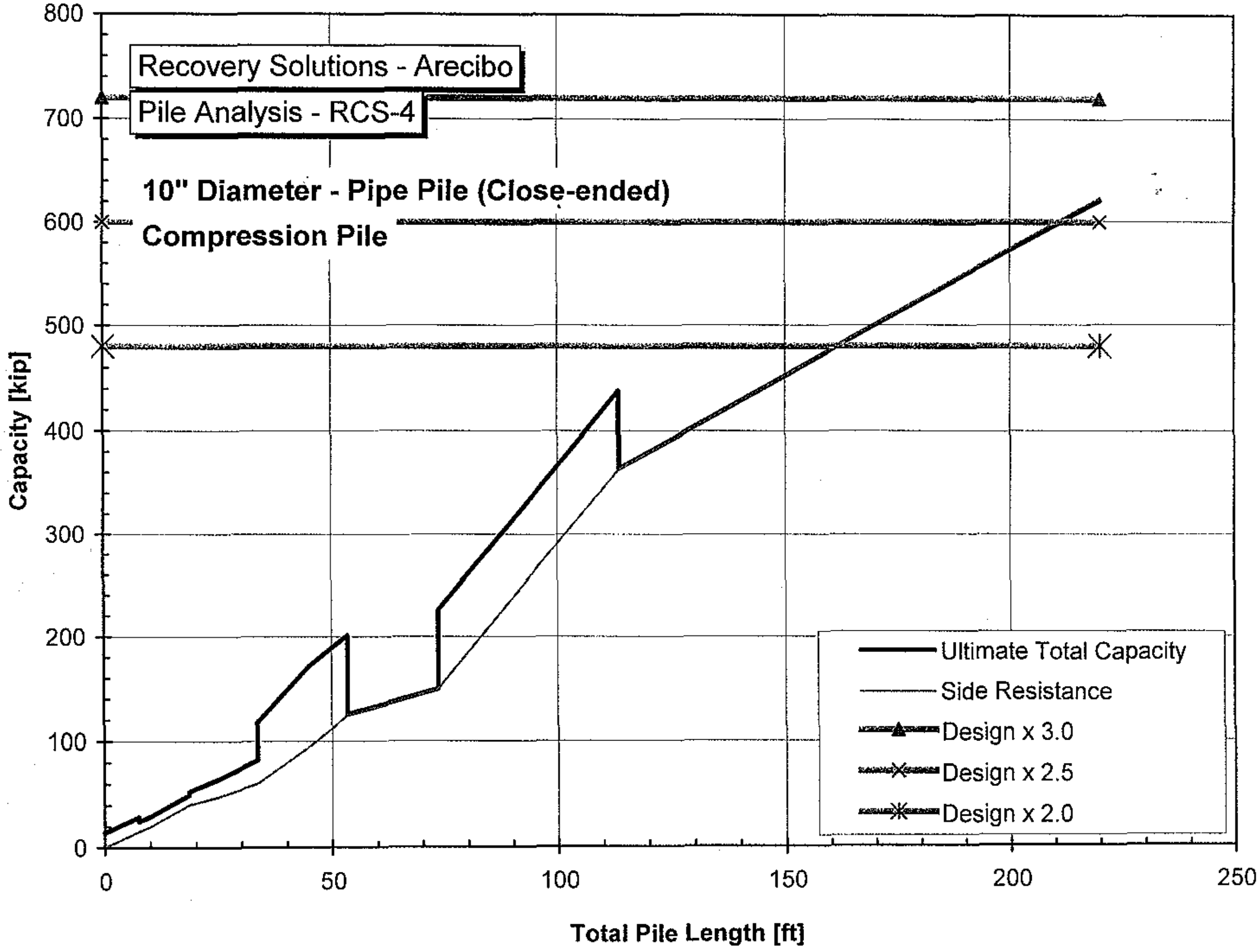


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 12 in. RCS-03 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

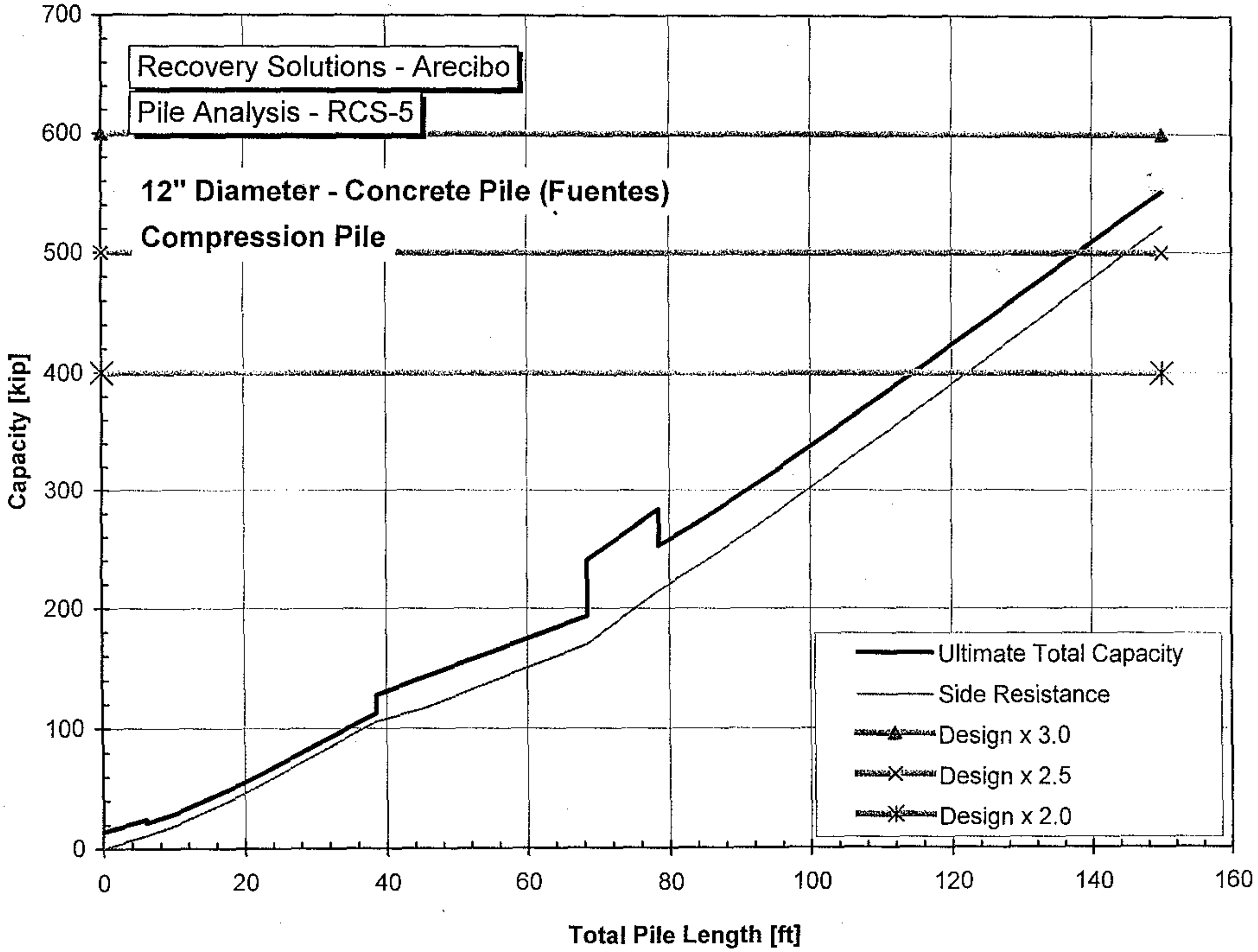


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 12 in. RCS-04 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

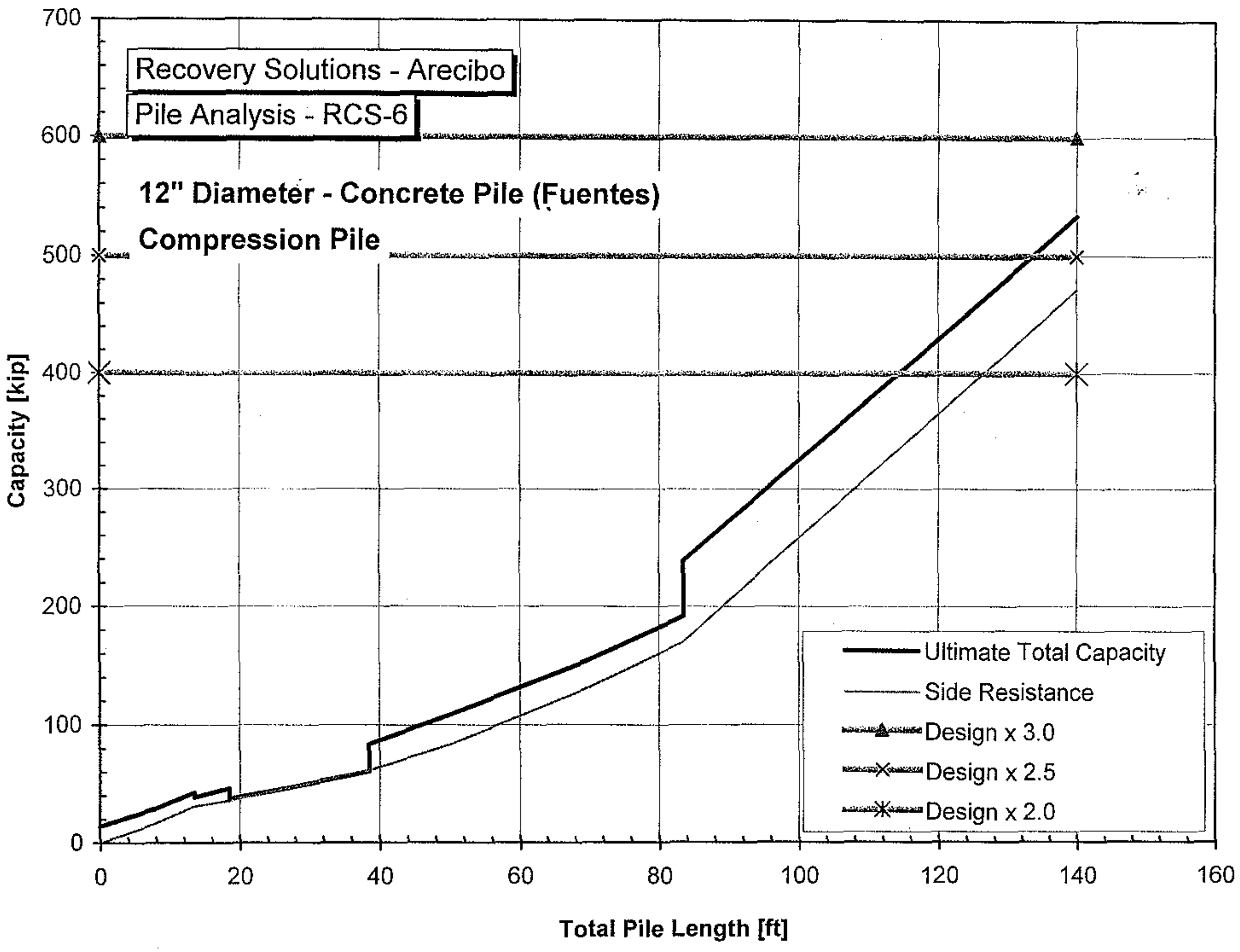


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pile 12 in. RCS-05
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

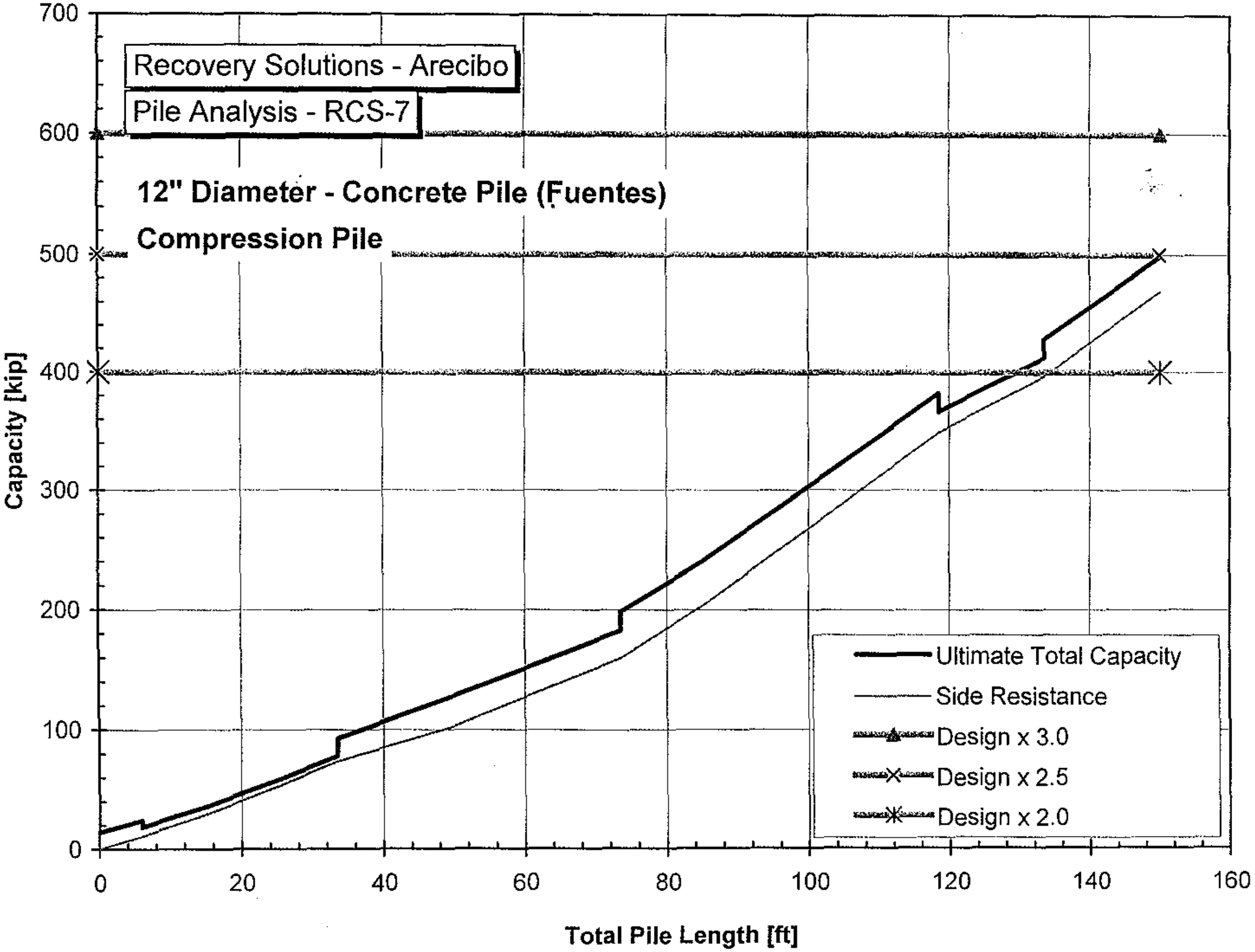


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pile 12 in. RCS-06
Assumes cohesive undrained behavior in limestone

GEOCONSULT

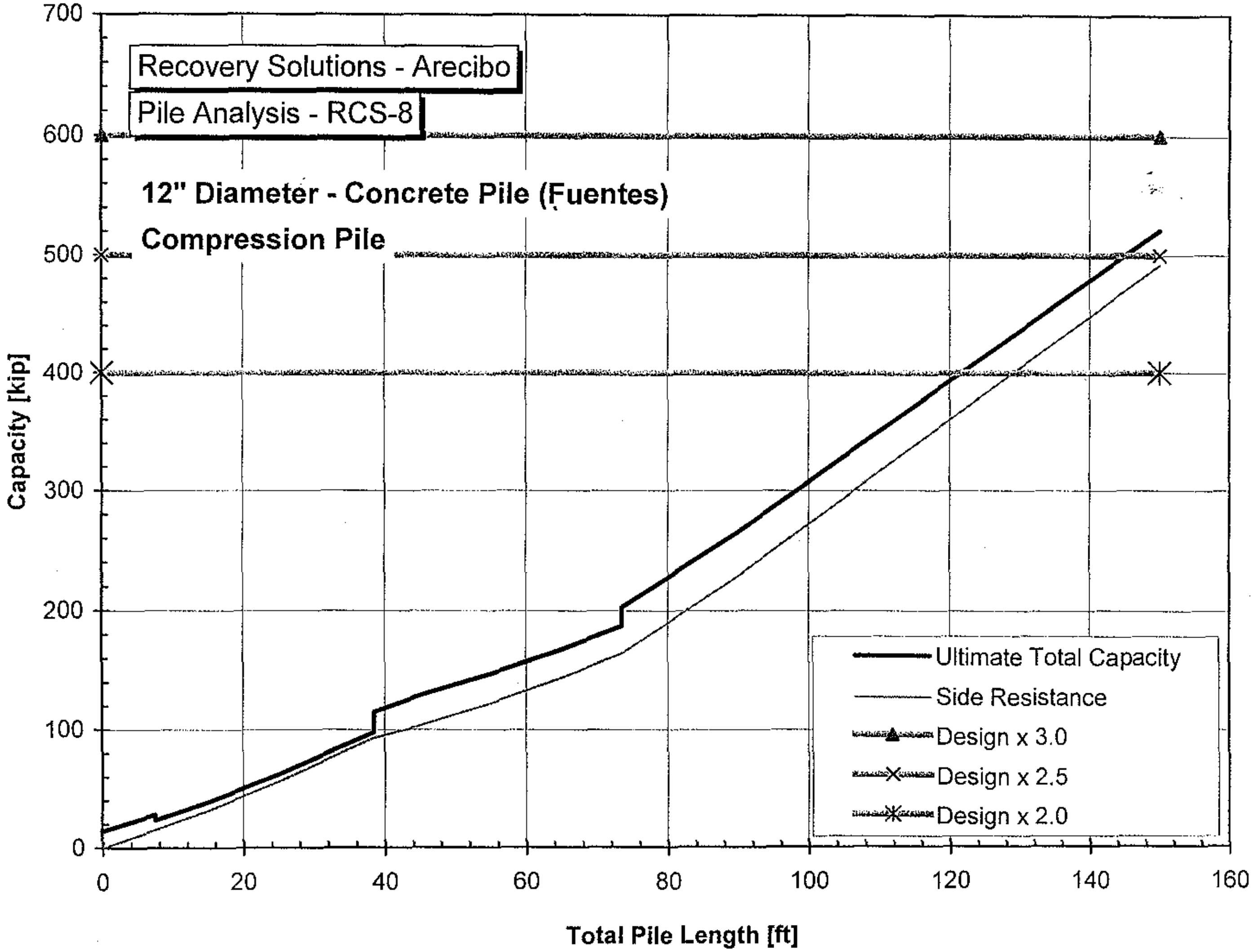
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pile 12 in. RCS-07
Assumes cohesive undrained behavior in limestone

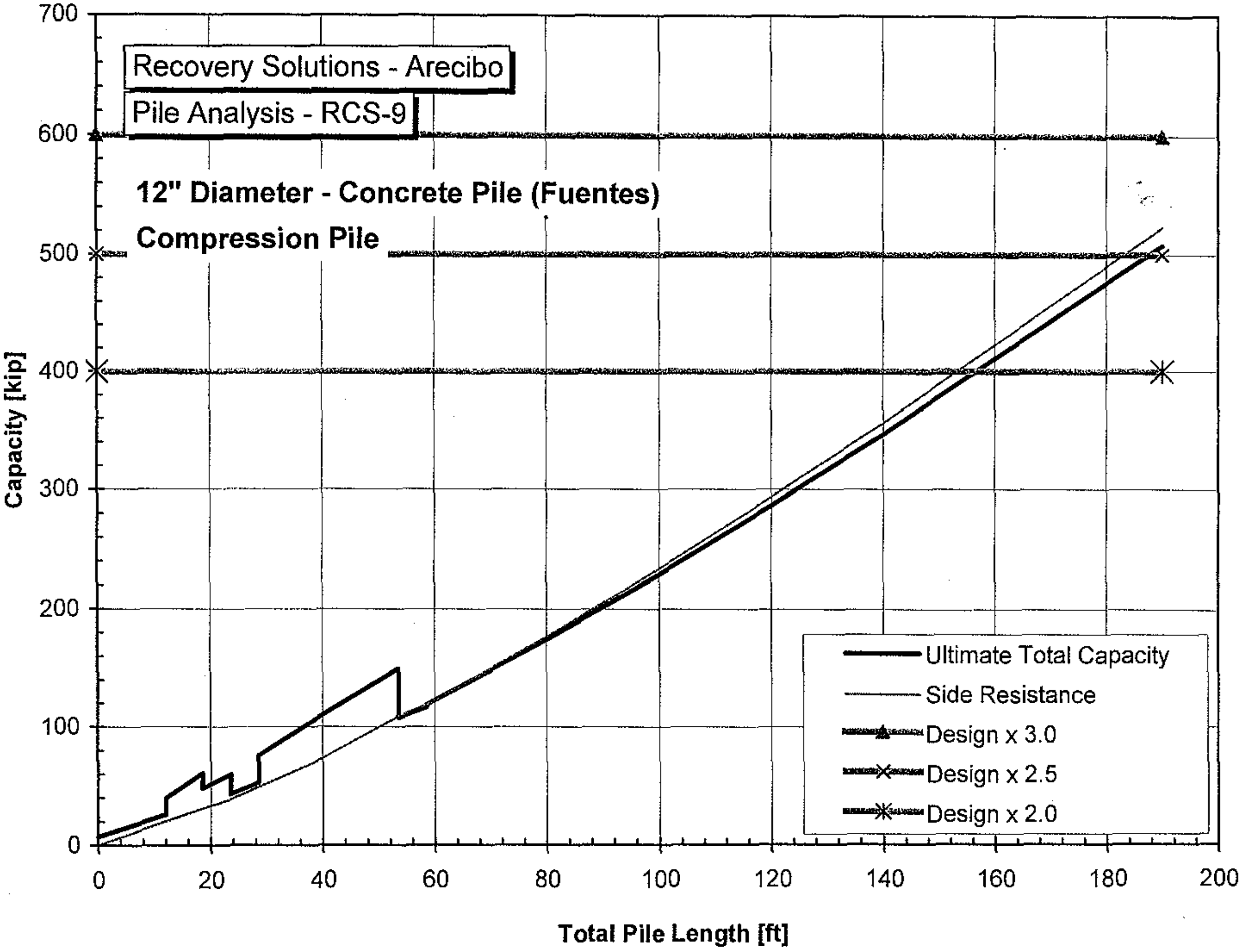
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

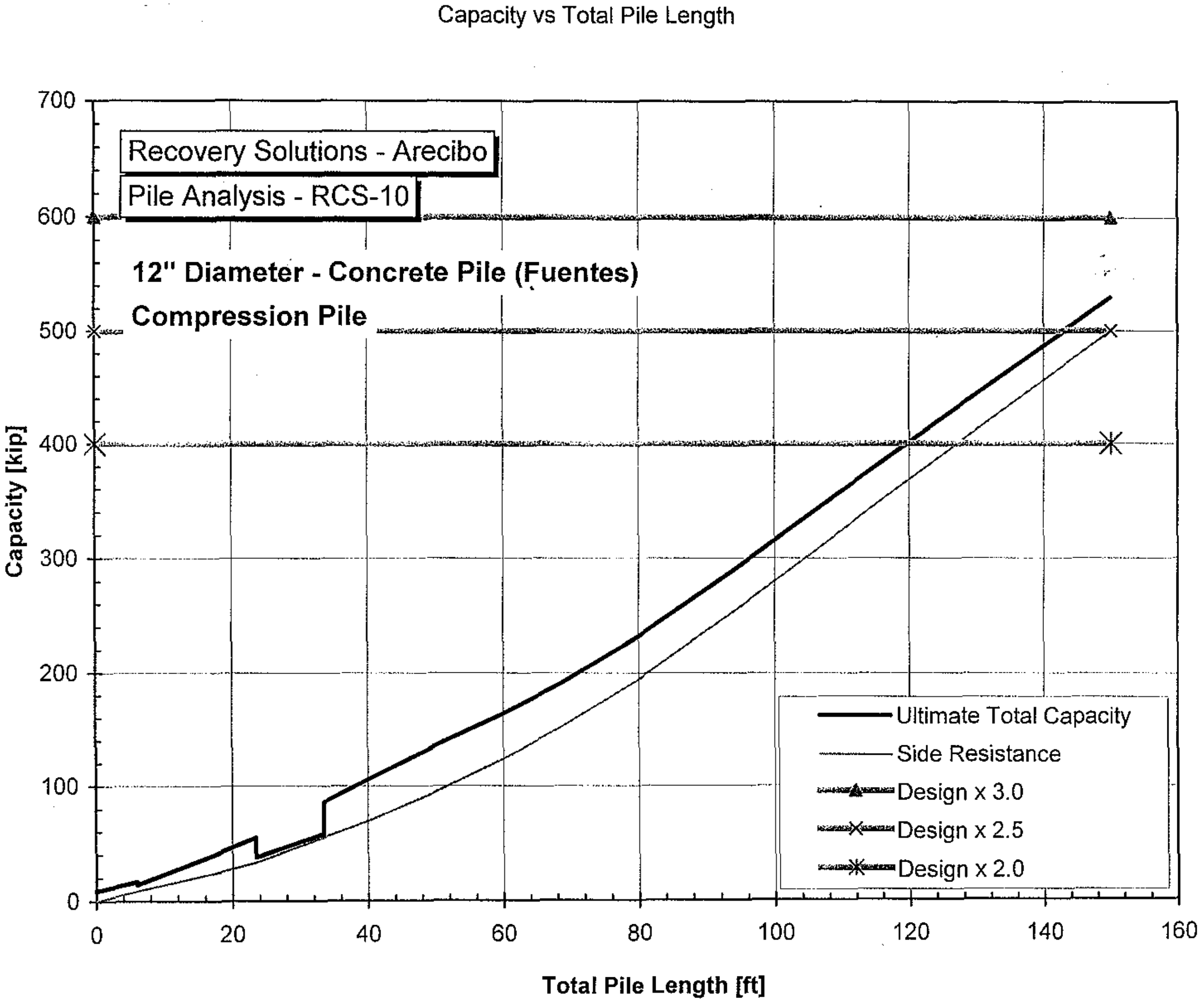
File API Analysis - Compression Pile 12 in. RCS-08
Assumes cohesive undrained behavior in limestone

Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pile 12 in. RCS-09
Assumes cohesive undrained behavior in limestone

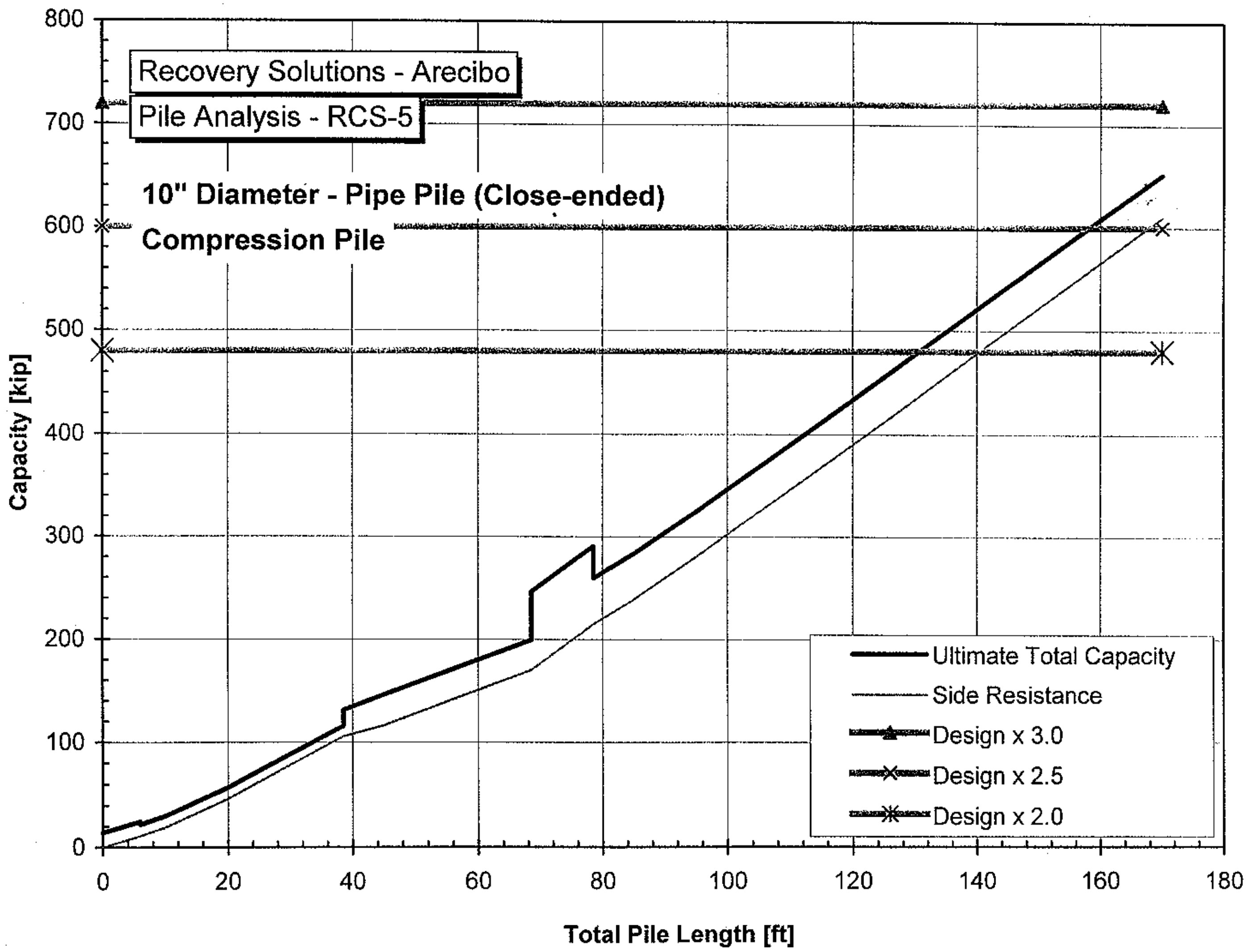


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pile 12 in. RCS-10
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

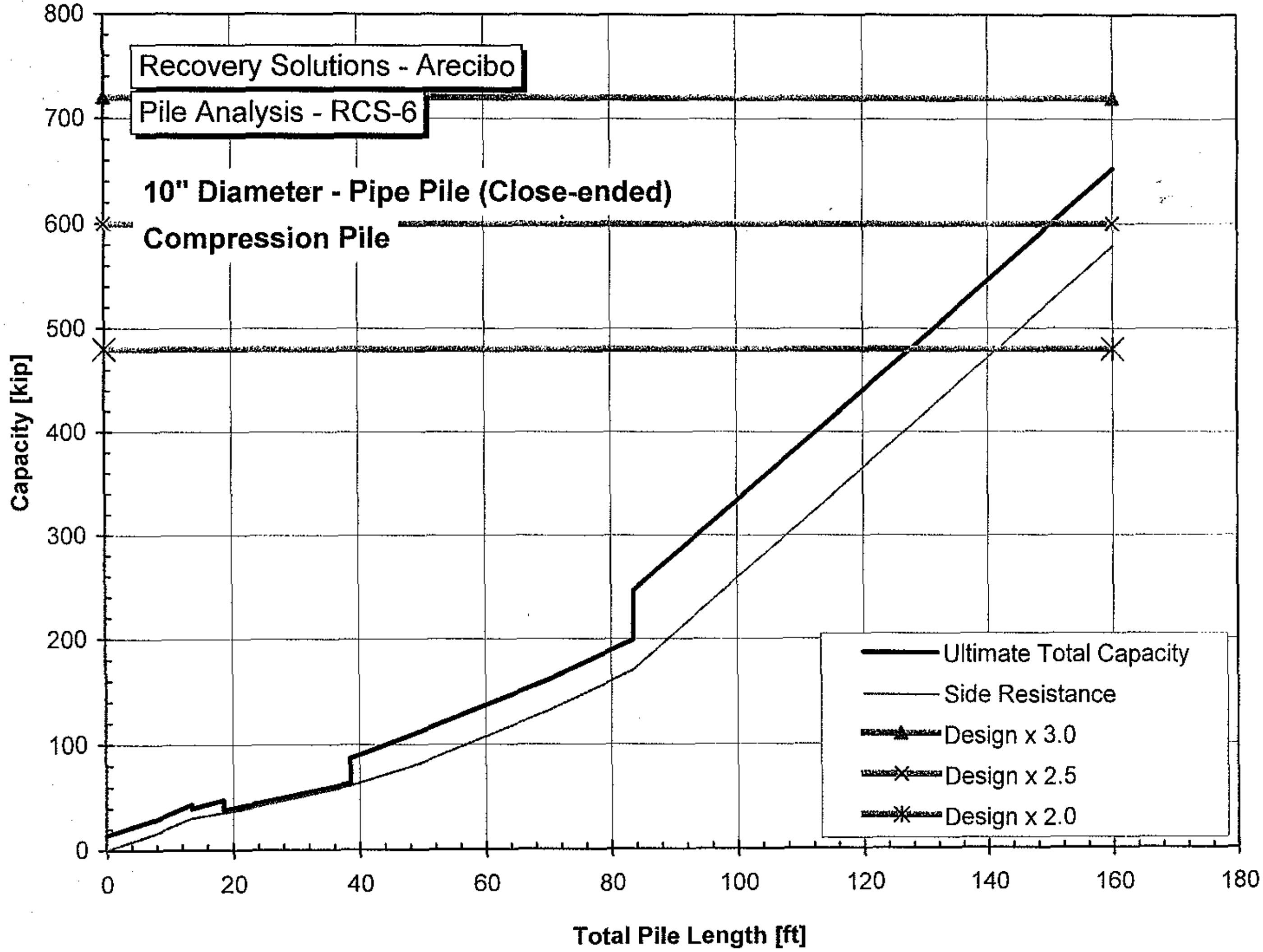


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 12 in. RCS-05 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

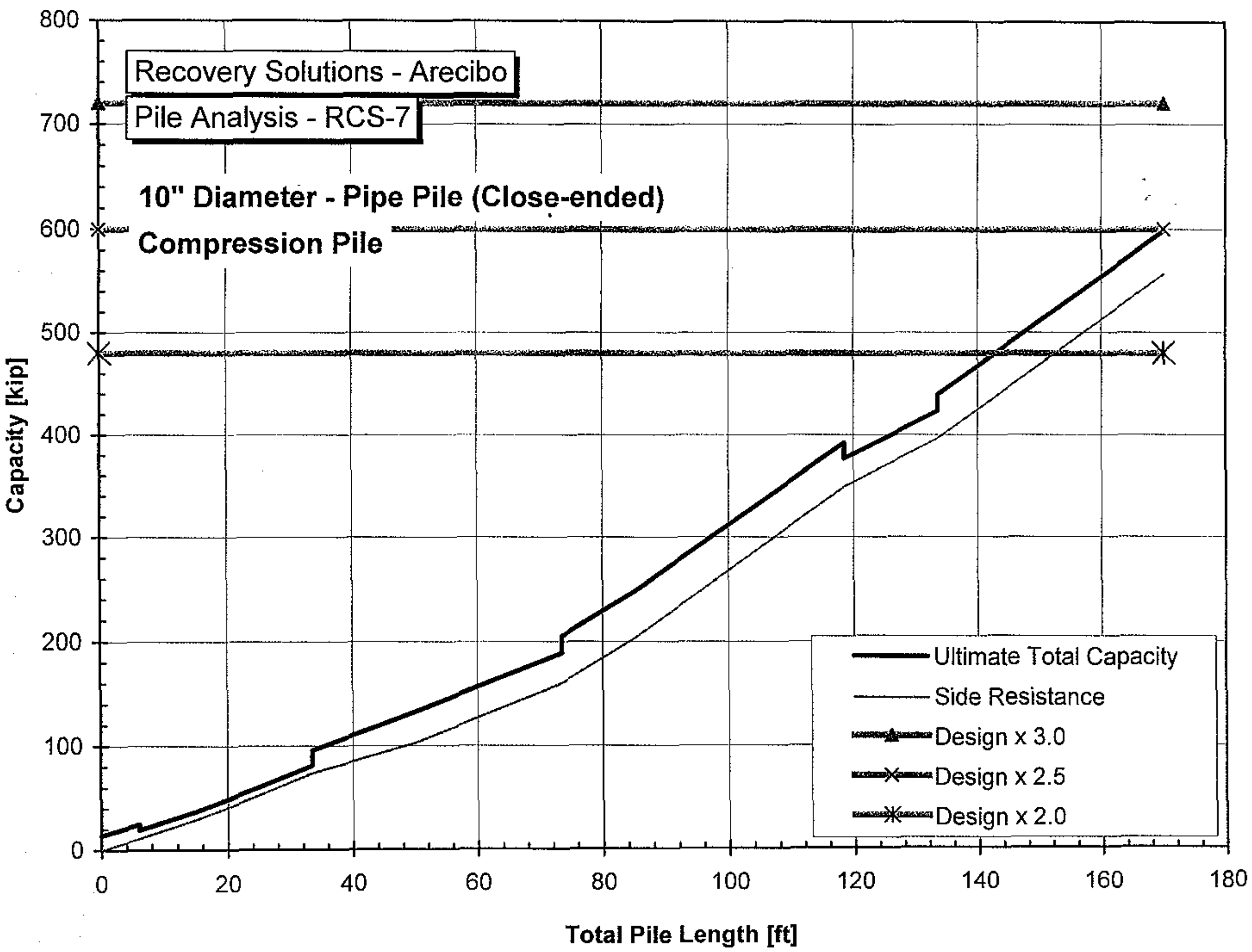


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 12 in. RCS-06 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

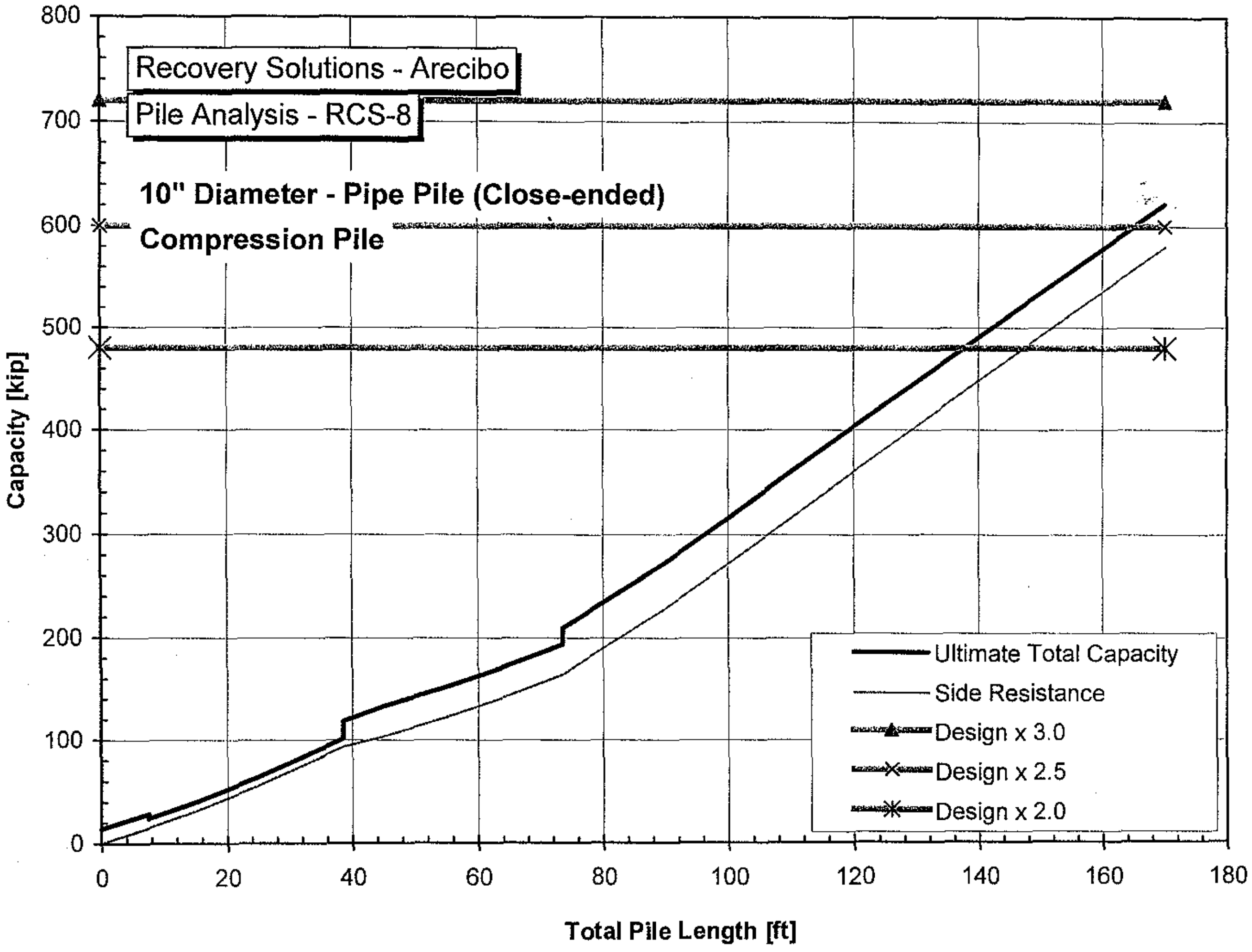


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 12 in. RCS-07 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

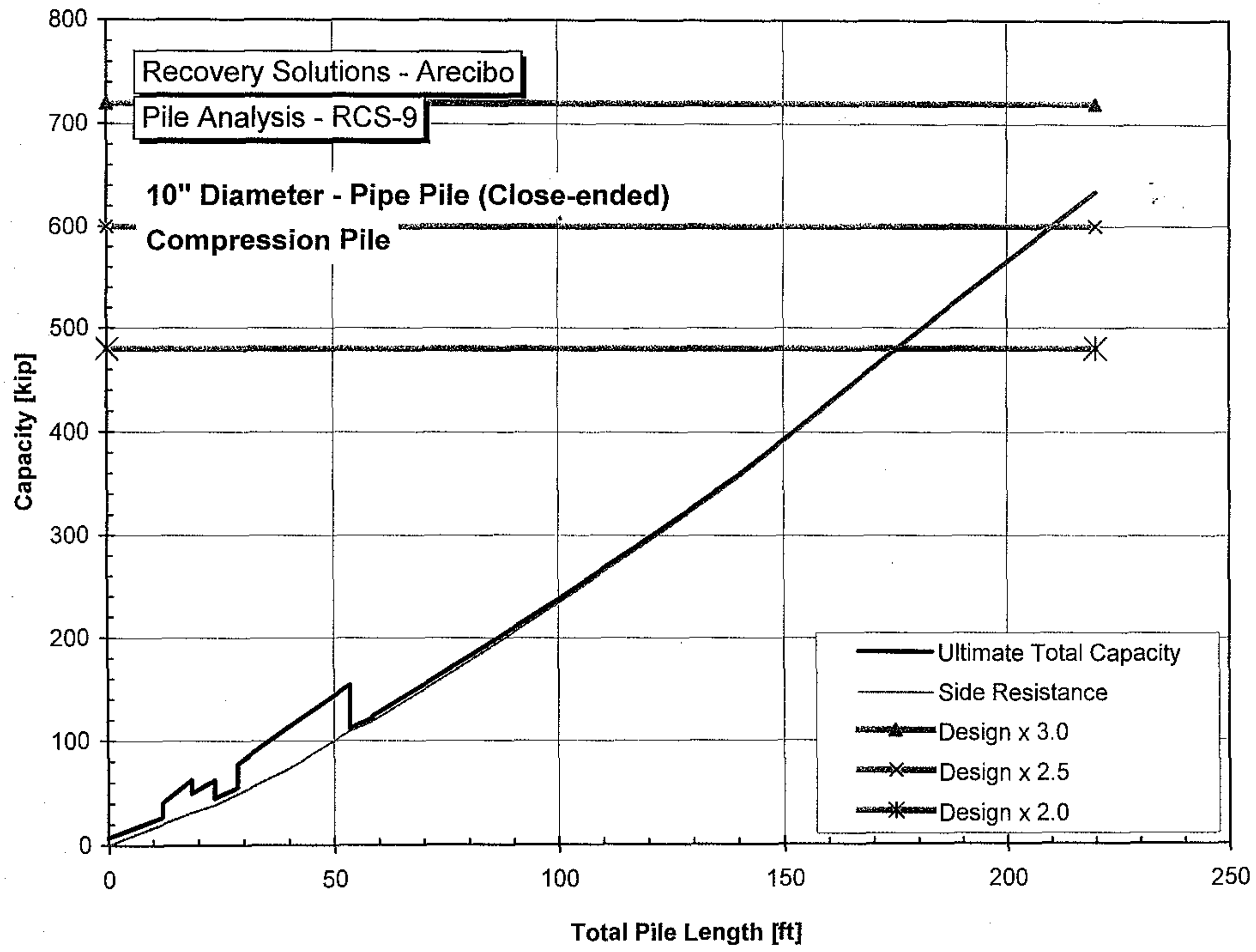
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 12 in. RCS-08 Closed
Assumes cohesive undrained behavior in limestone

Capacity vs Total Pile Length

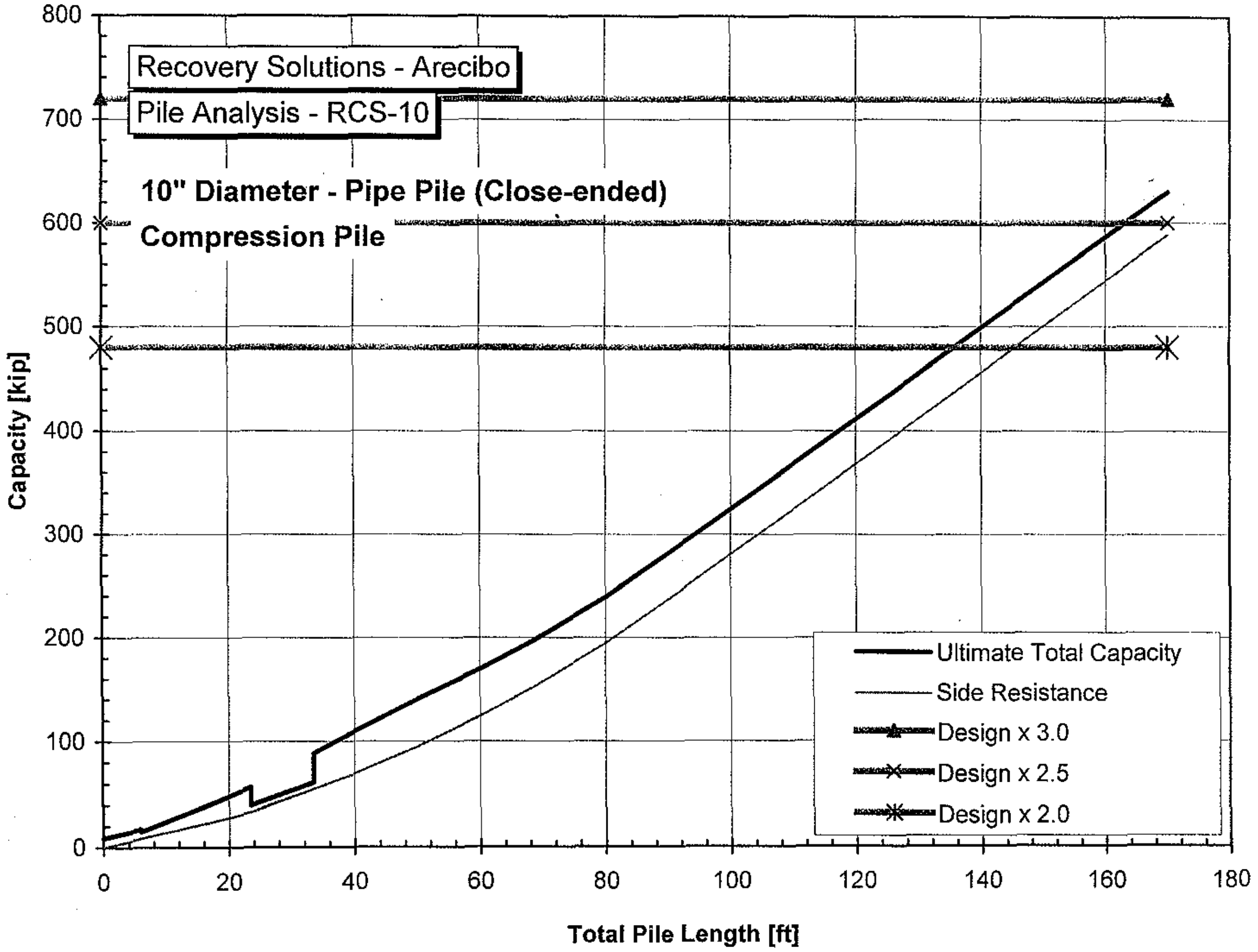


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 12 in. RCS-09 Closed
Assumes cohesive undrained behavior in limestone

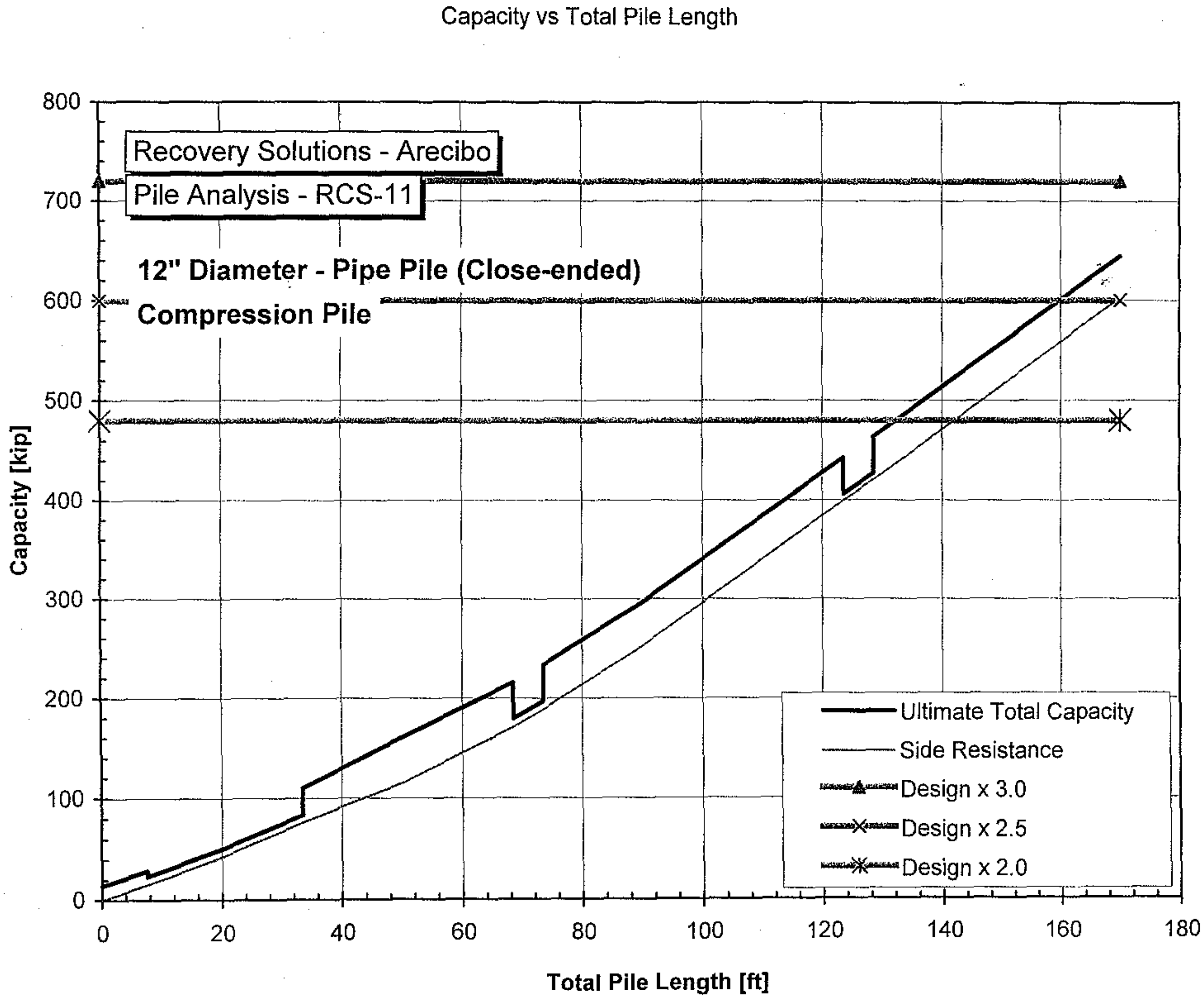
GEOCONSULT

Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 12 in. RCS-10 Closed
Assumes cohesive undrained behavior in limestone

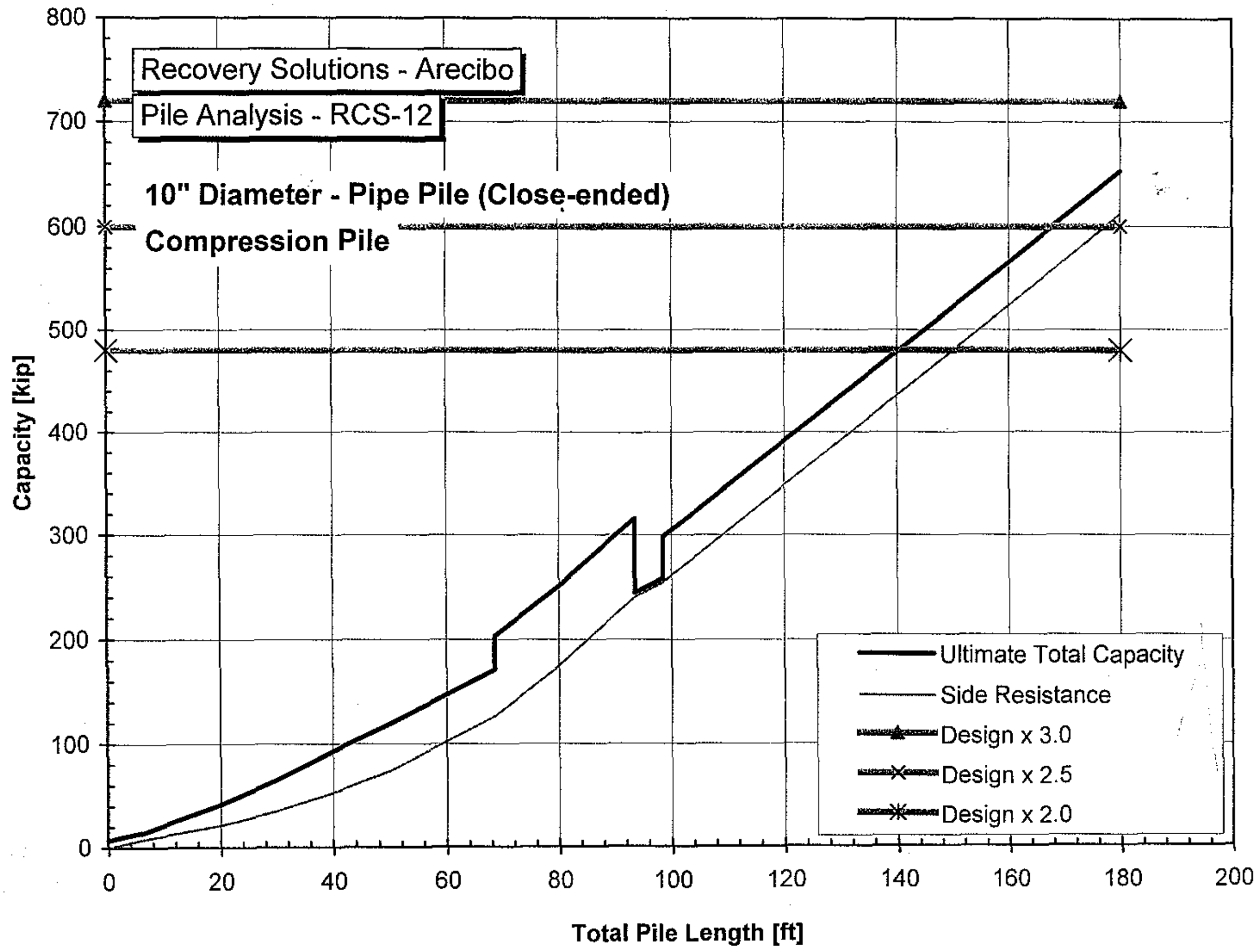


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 12 in. RCS-11 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

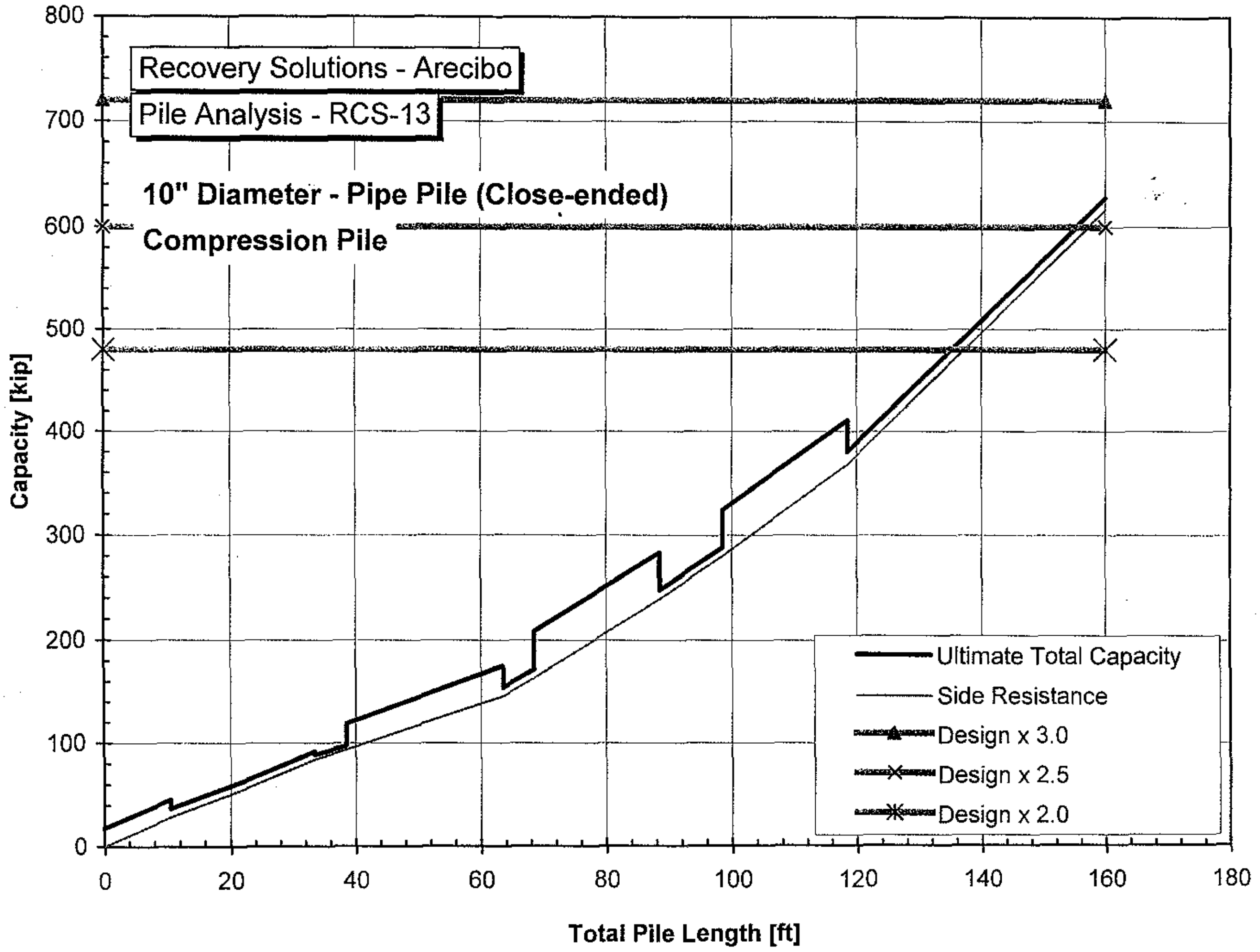


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 12 in. RCS-12 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

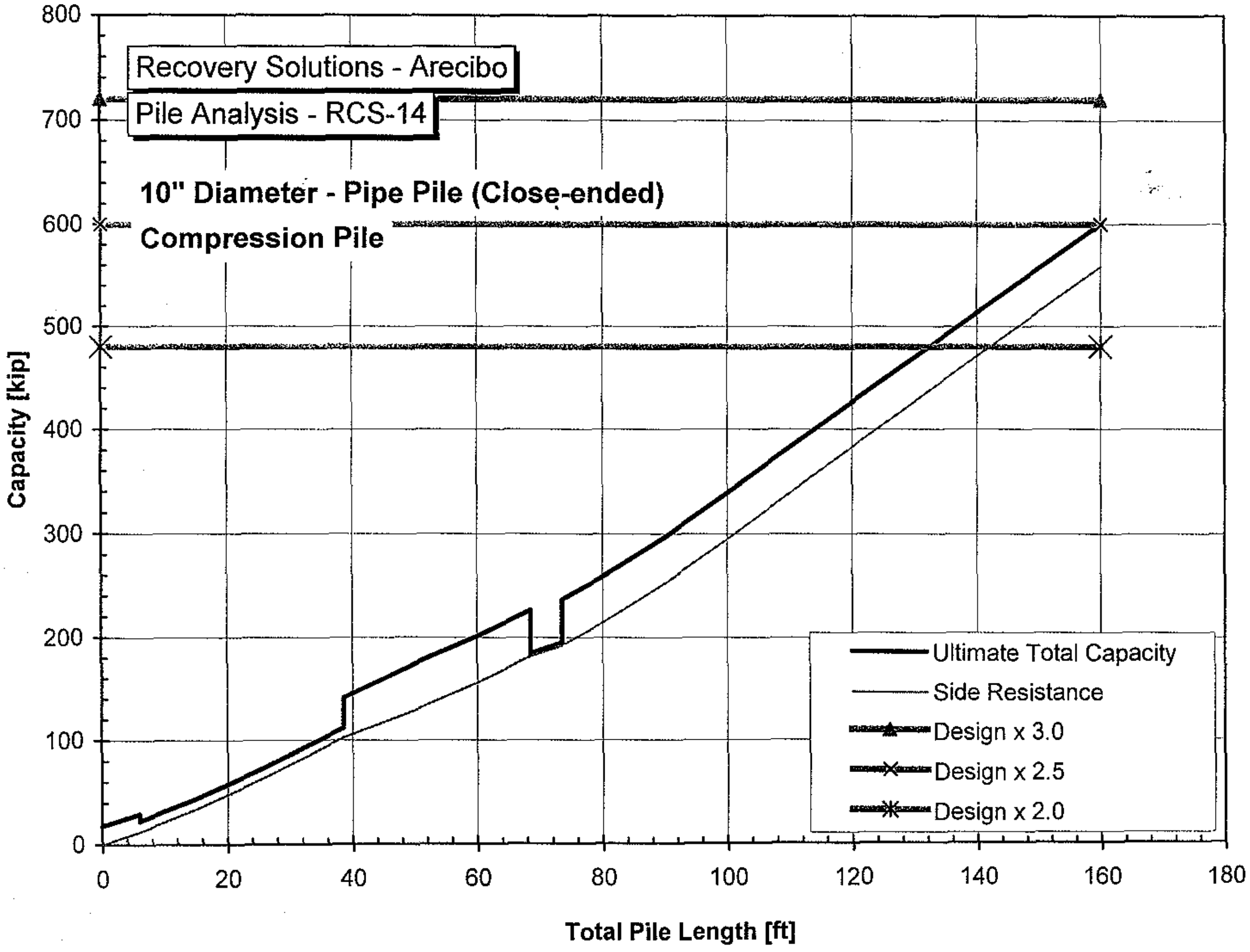


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 12 in. RCS-13 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

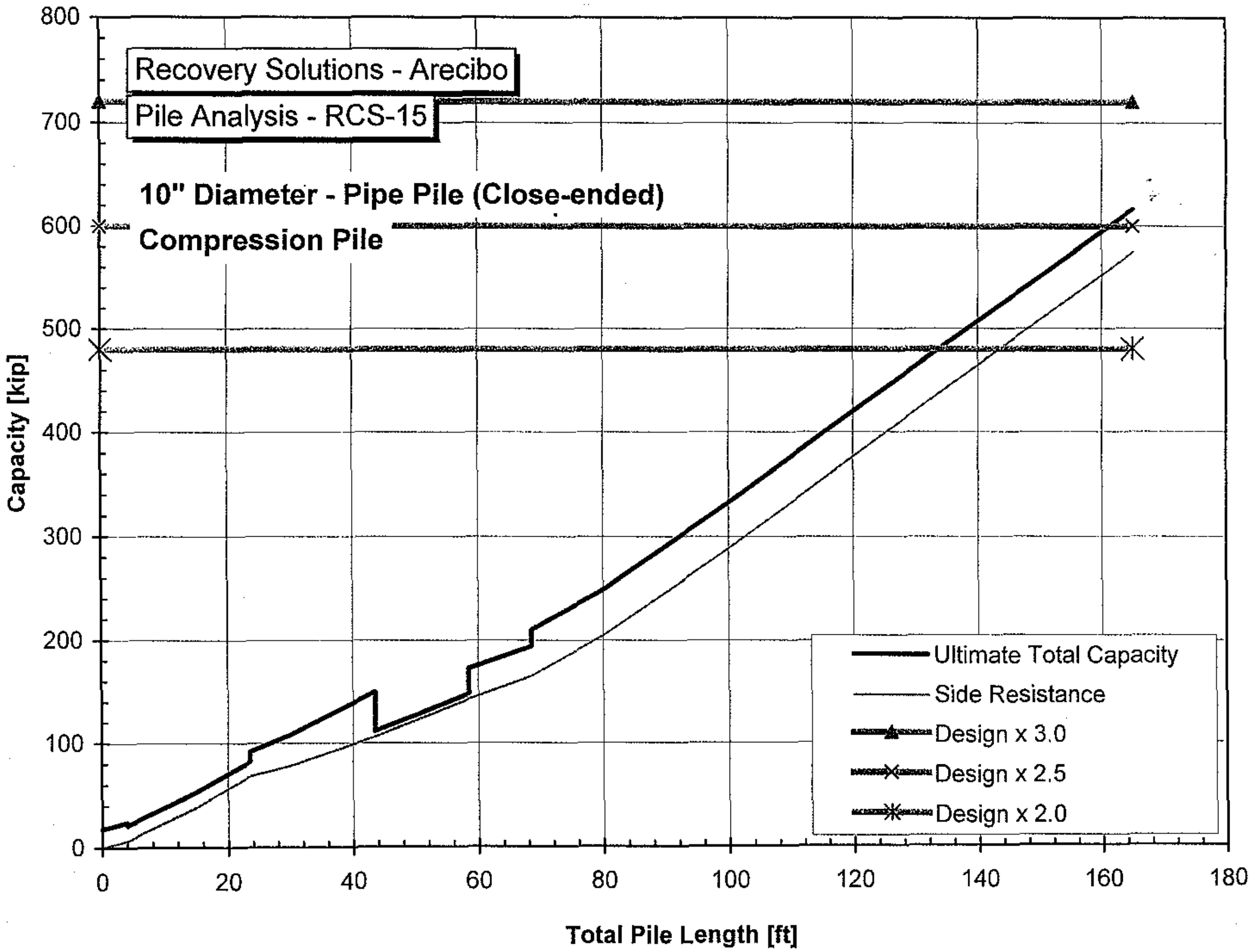
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 12 in. RCS-14 Closed
Assumes cohesive undrained behavior in limestone

Capacity vs Total Pile Length

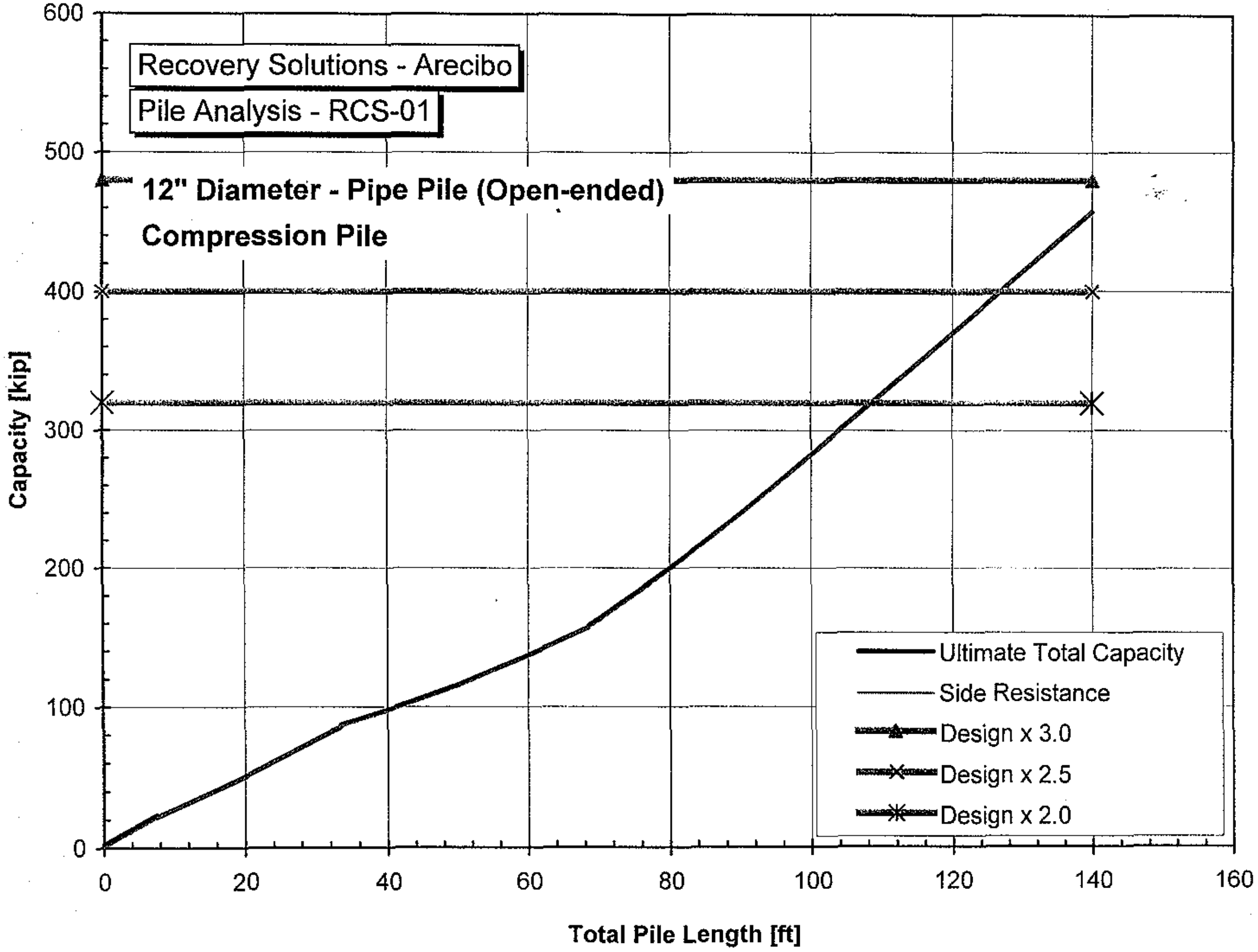


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 12 in. RCS-15 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

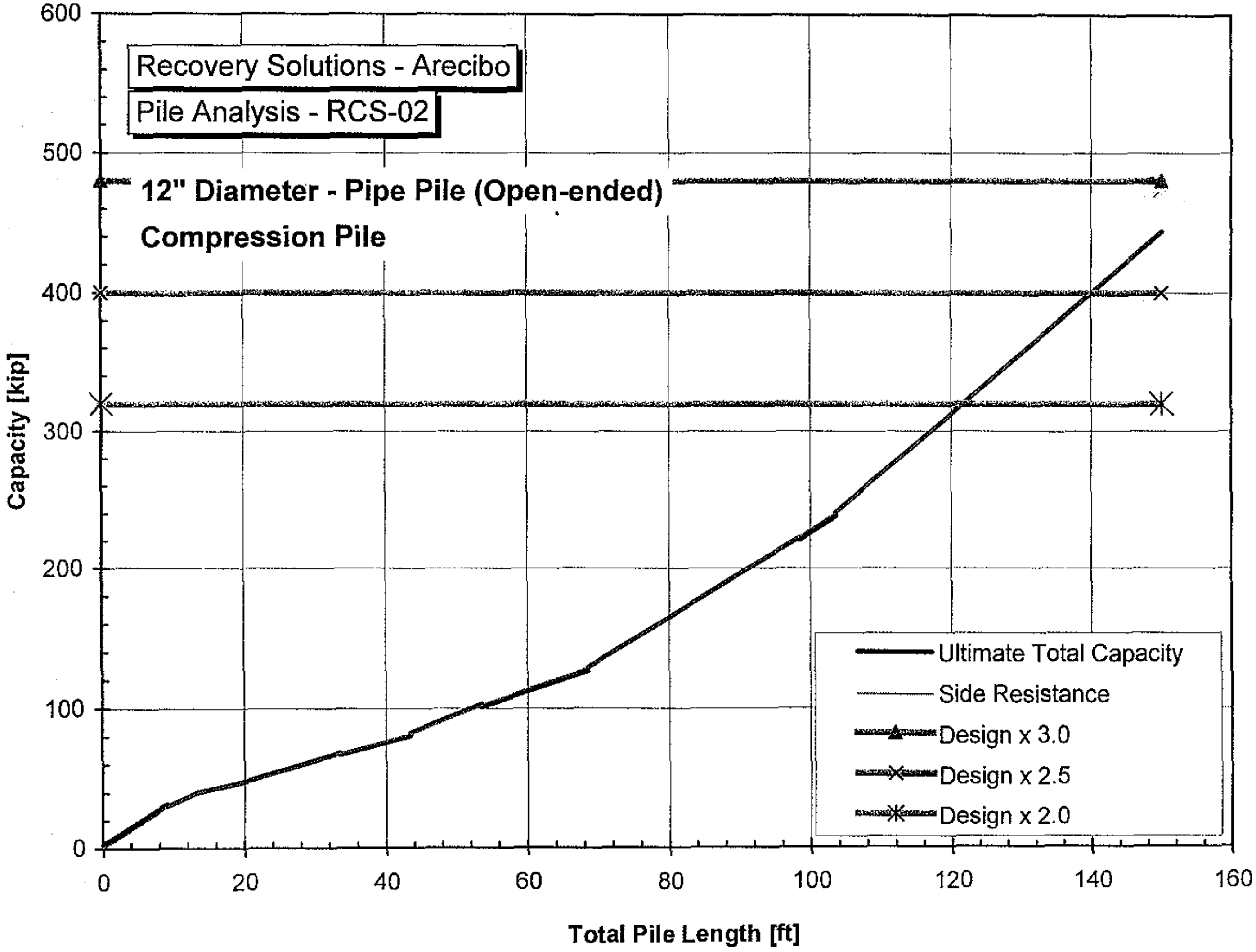


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 12 in. RCS-01
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

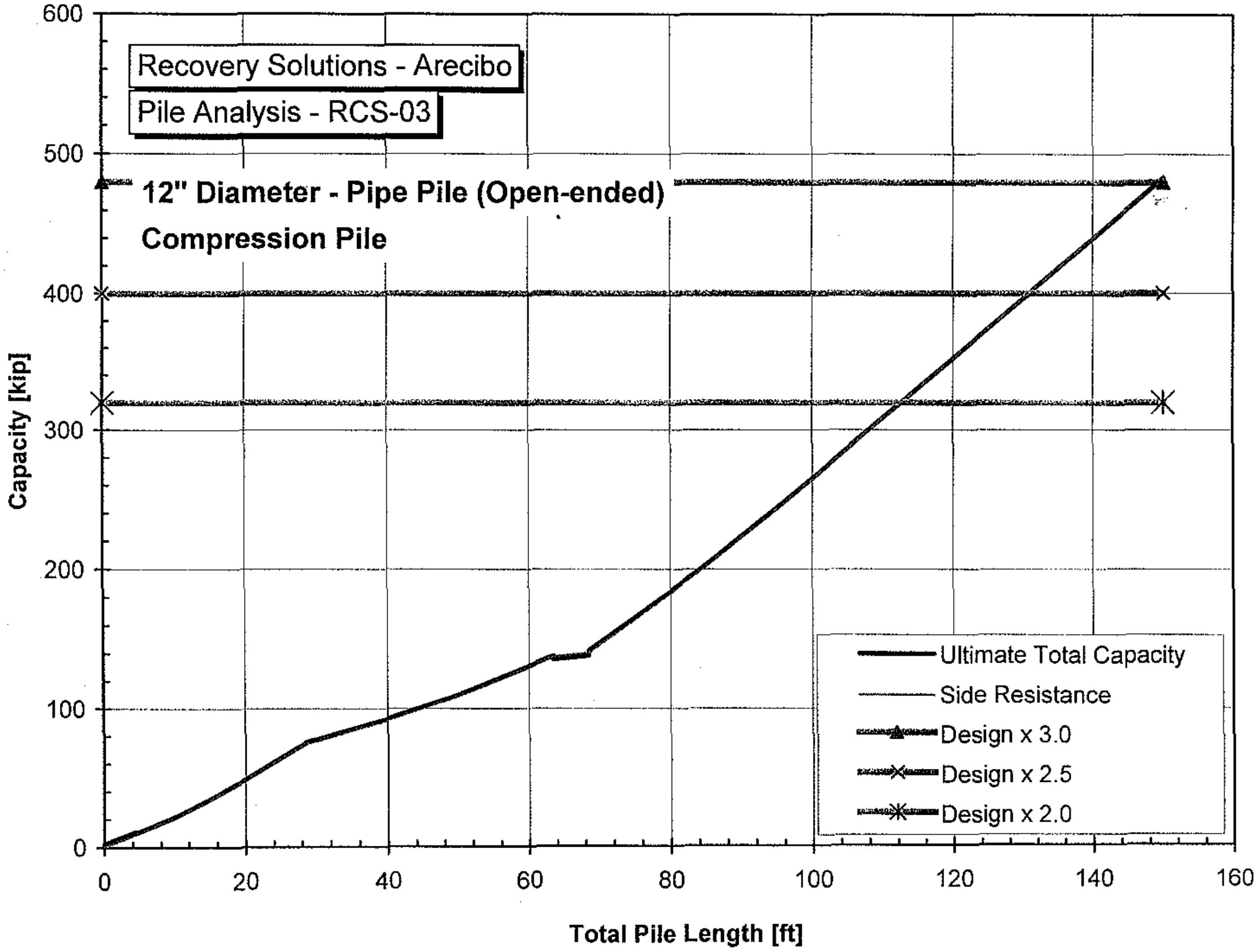


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 12 in. RCS-02
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

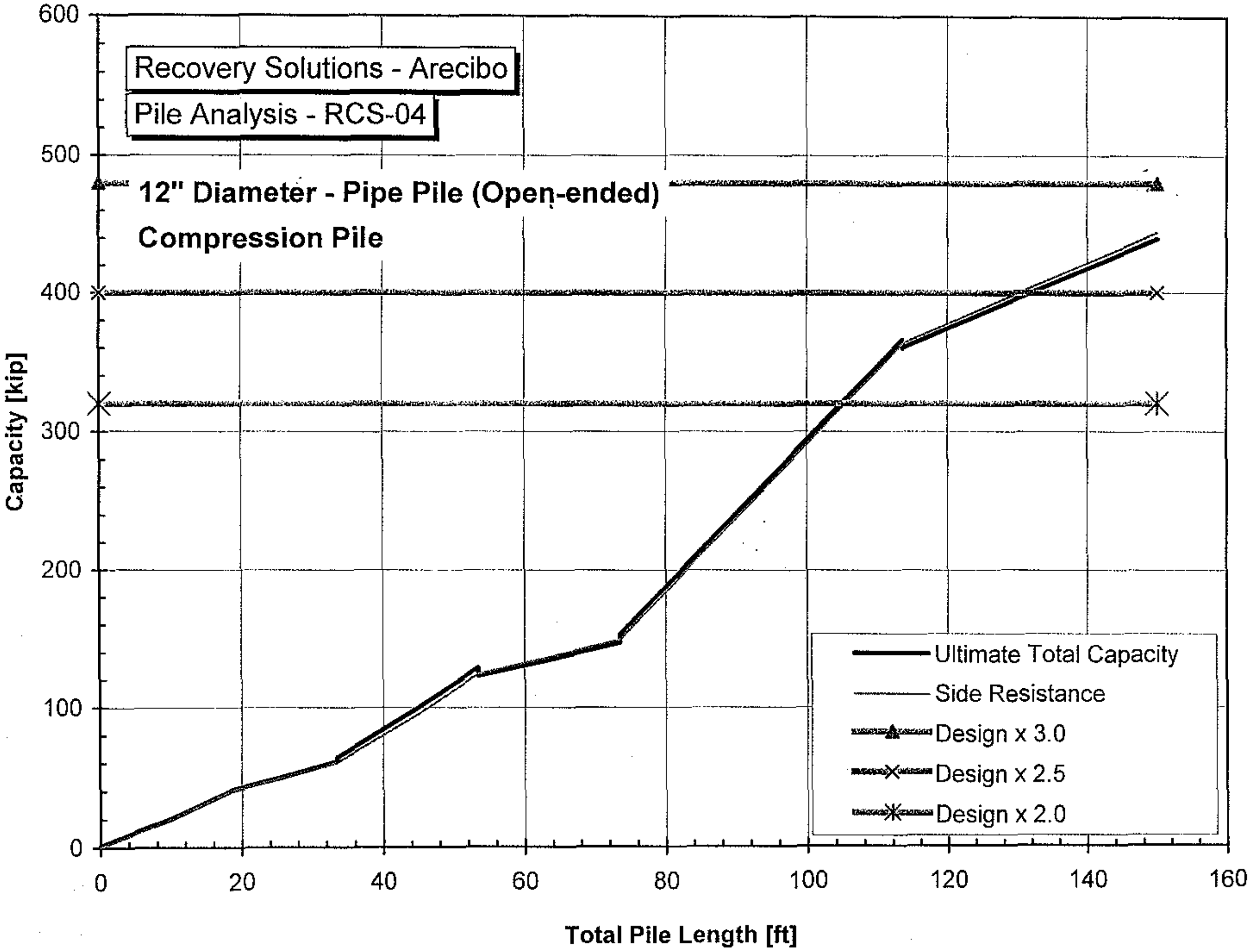


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 12 in. RCS-03
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

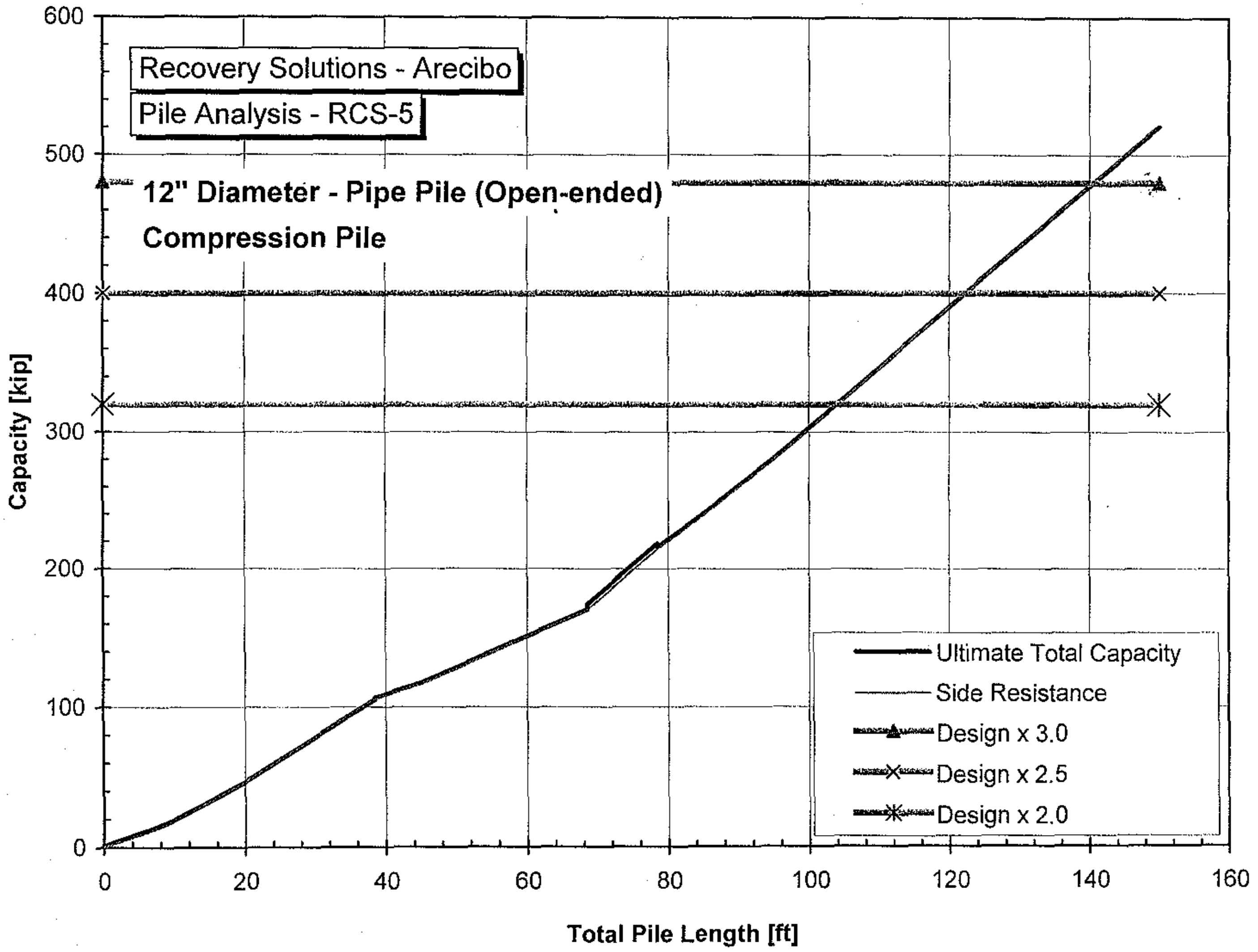


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 12 in. RCS-04
Assumes cohesive undrained behavior in limestone

GEOCONSULT

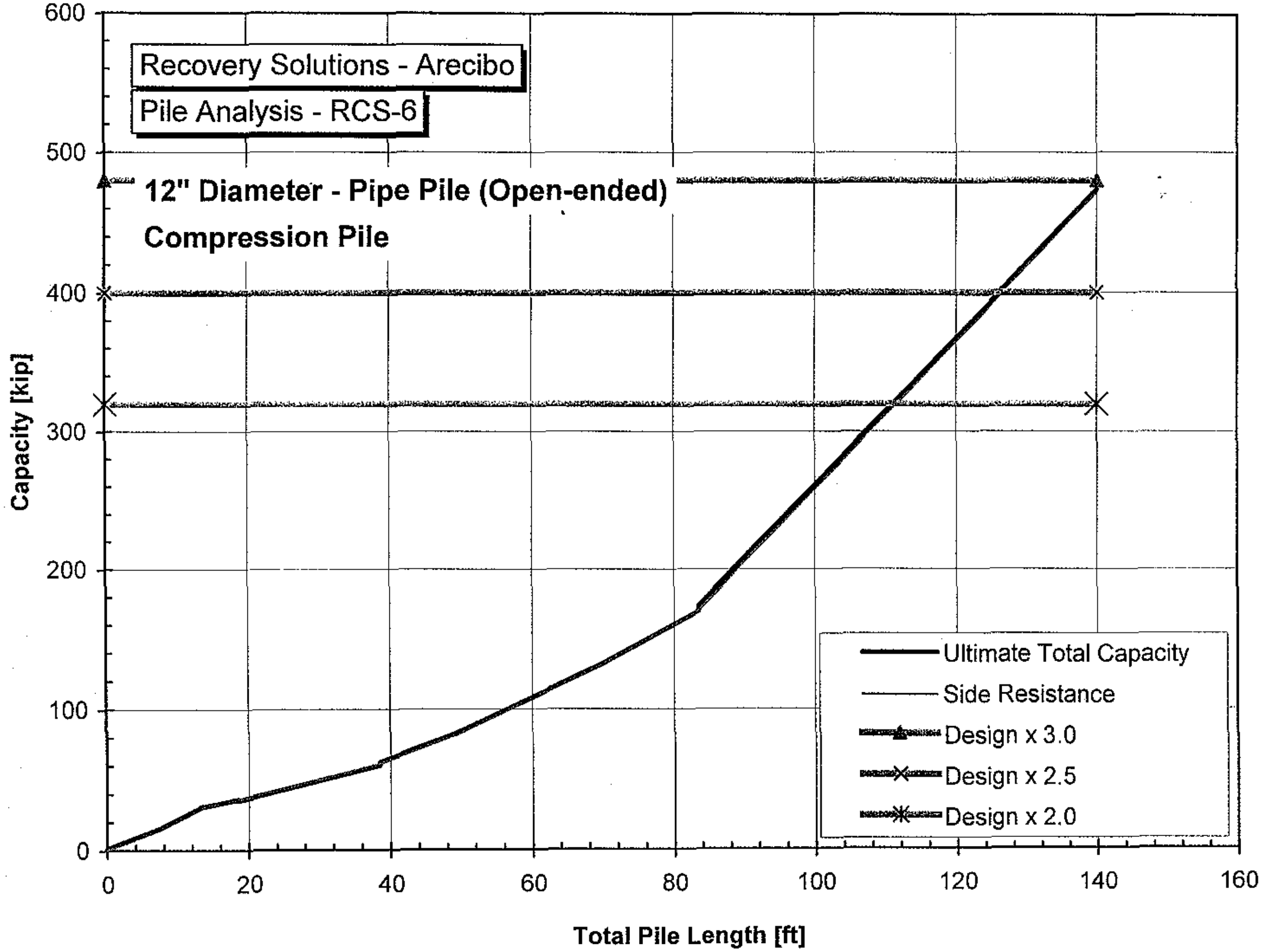
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 12 in. RCS-05
Assumes cohesive undrained behavior in limestone

Capacity vs Total Pile Length

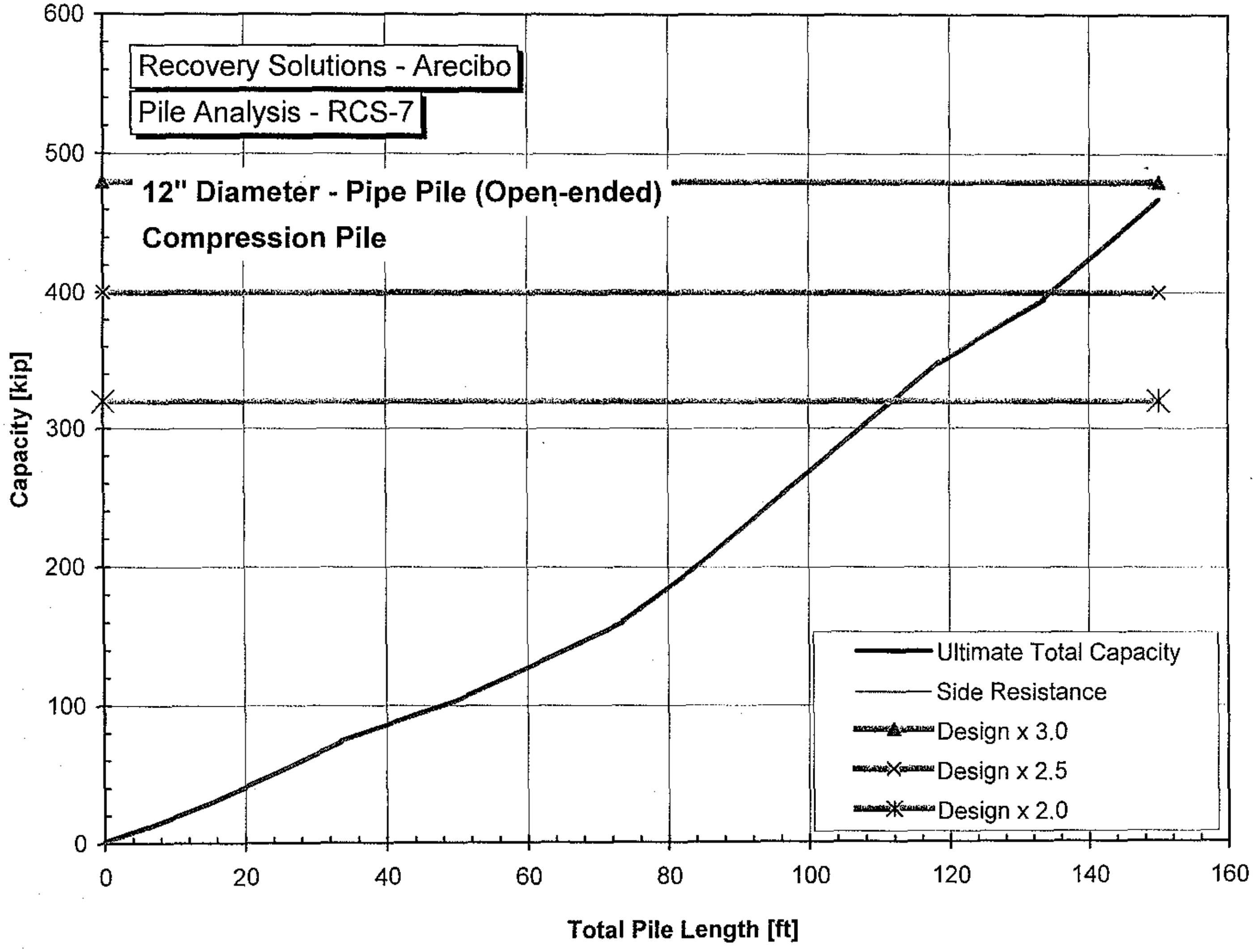


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 12 in. RCS-06
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

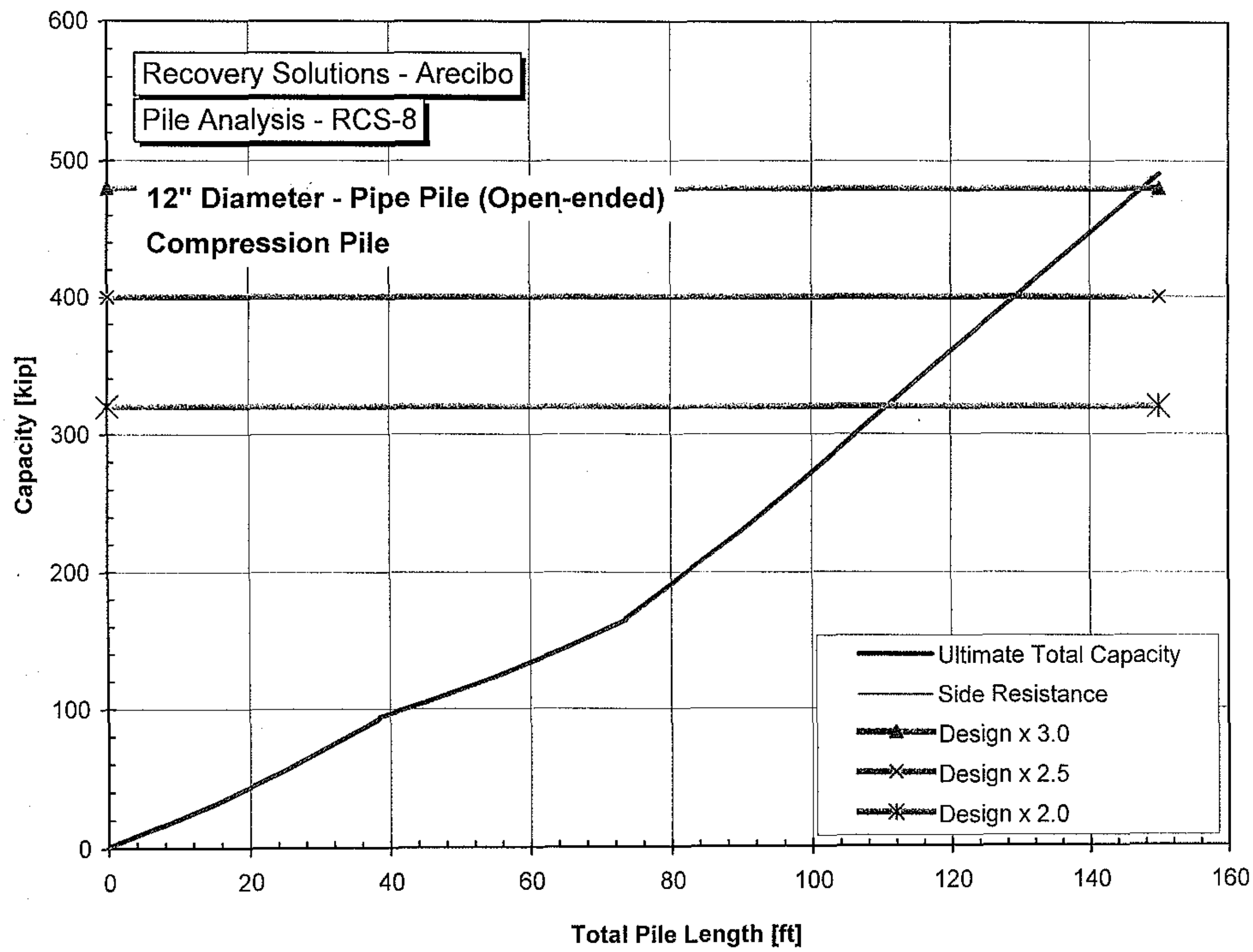


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 12 in. RCS-07
Assumes cohesive undrained behavior in limestone

GEOCONSULT

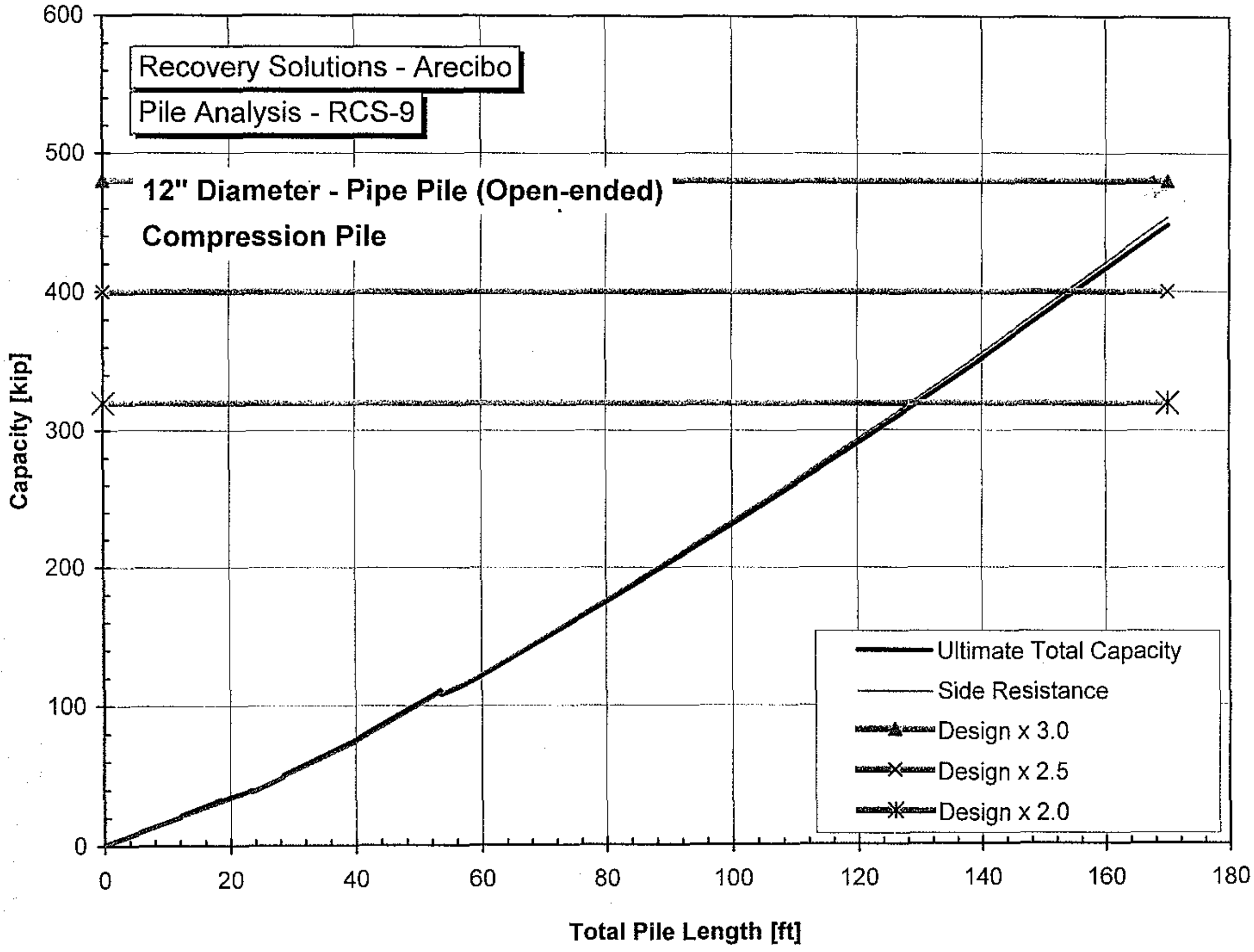
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 12 in. RCS-08
Assumes cohesive undrained behavior in limestone

Capacity vs Total Pile Length

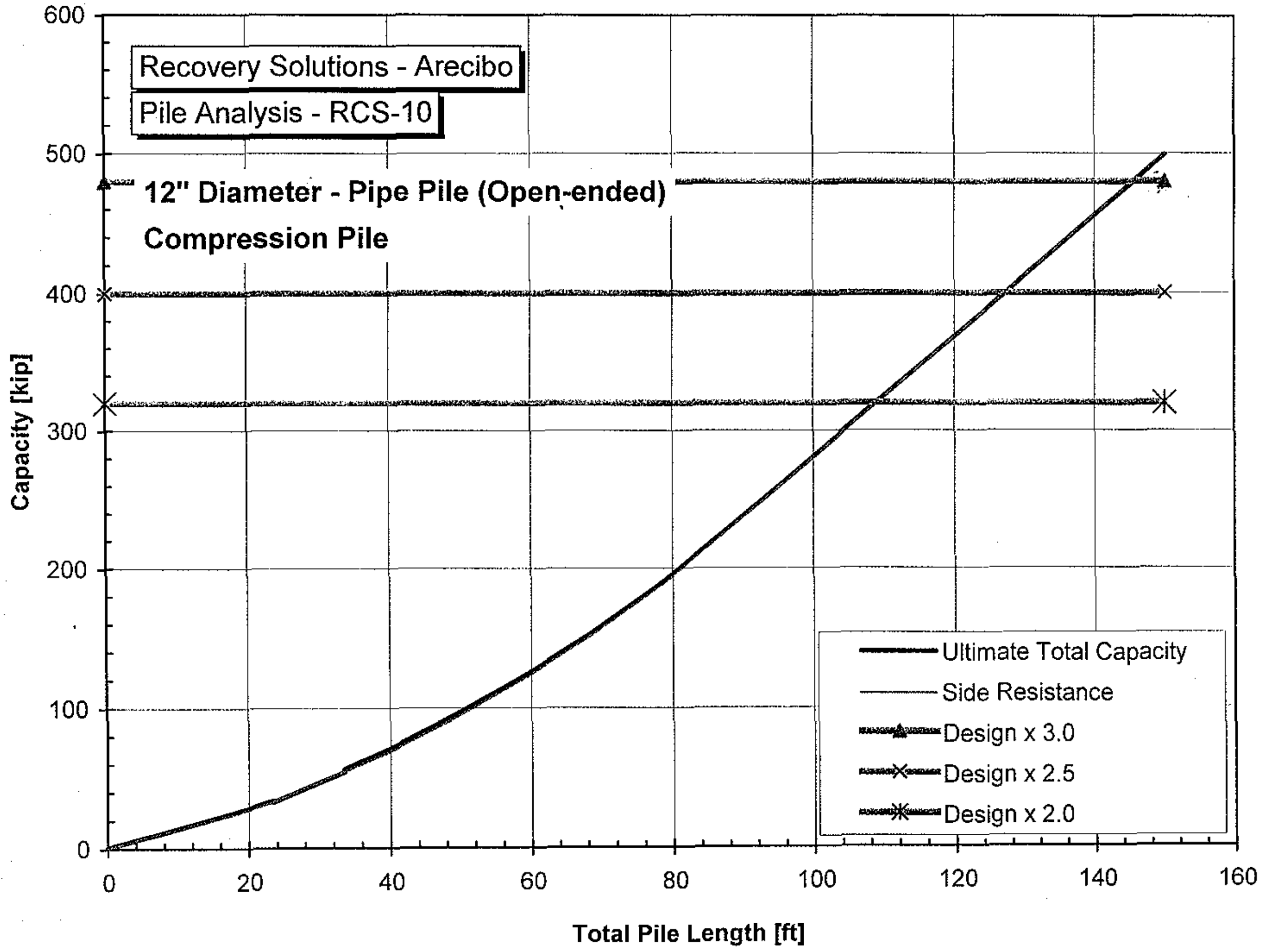


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 12 in. RCS-09
Assumes cohesive undrained behavior in limestone

GEOCONSULT

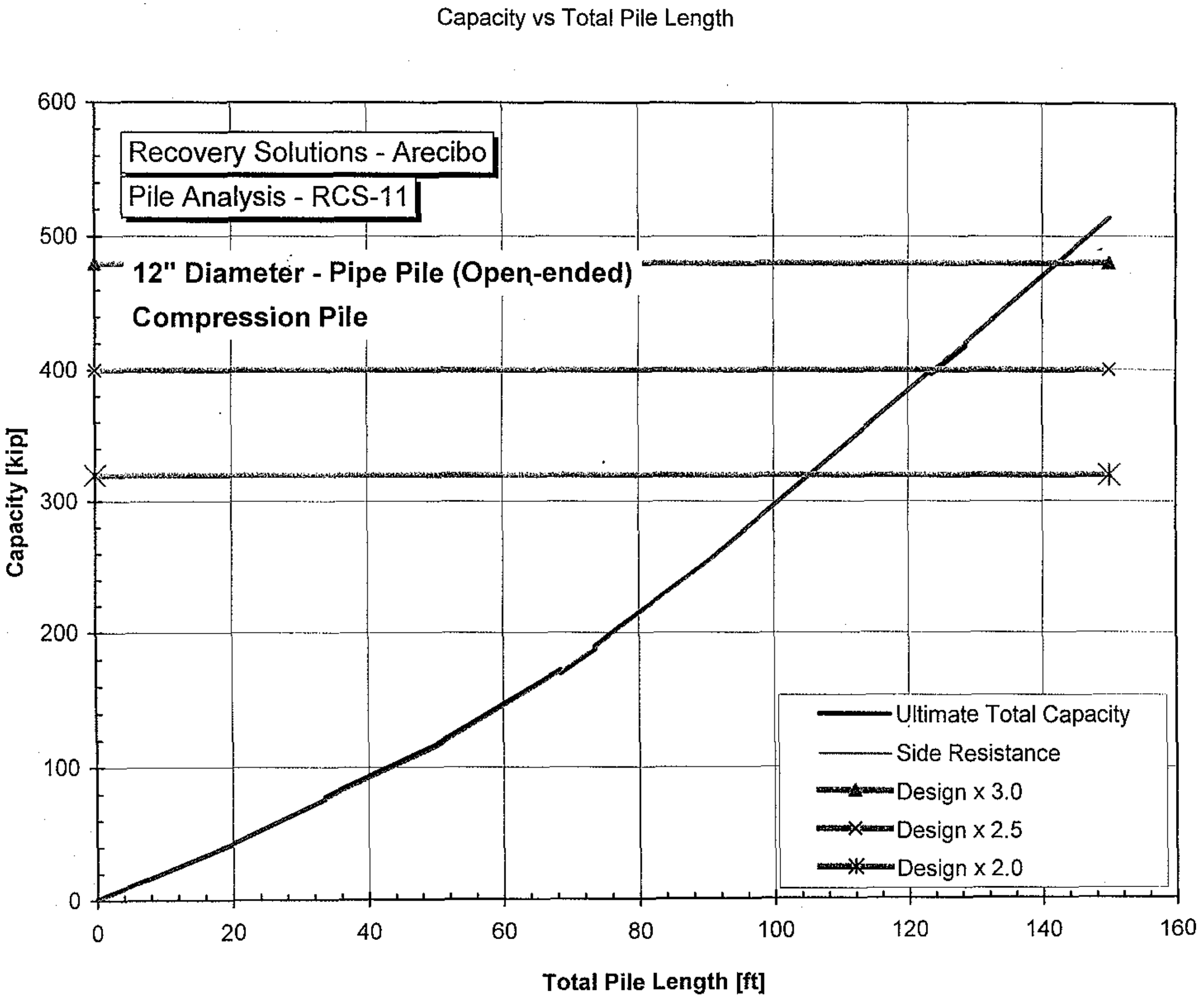
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 12 in. RCS-10
Assumes cohesive undrained behavior in limestone

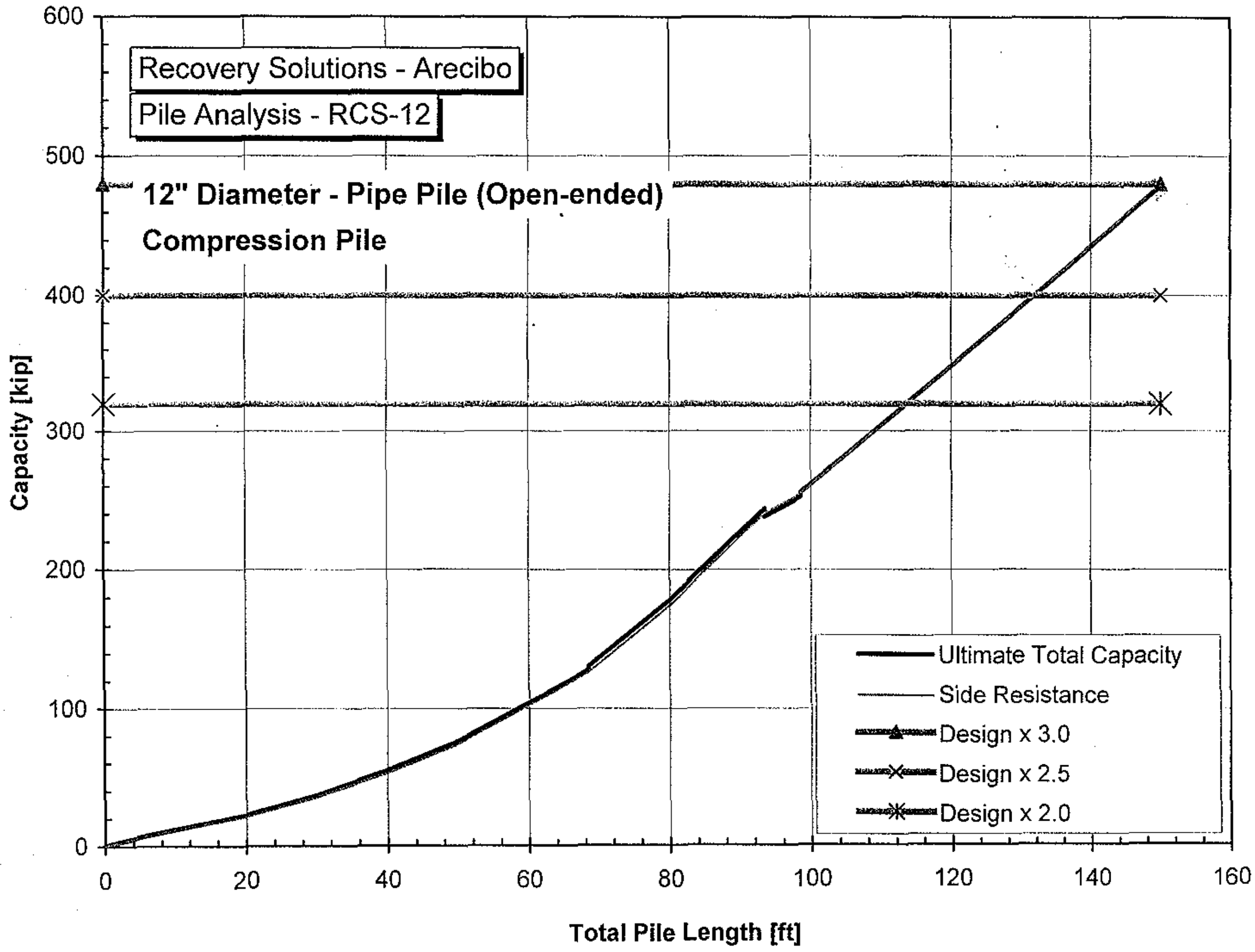
GEOCONSULT



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 12 in. RCS-11
Assumes cohesive undrained behavior in limestone

Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 12 in. RCS-12
Assumes cohesive undrained behavior in limestone

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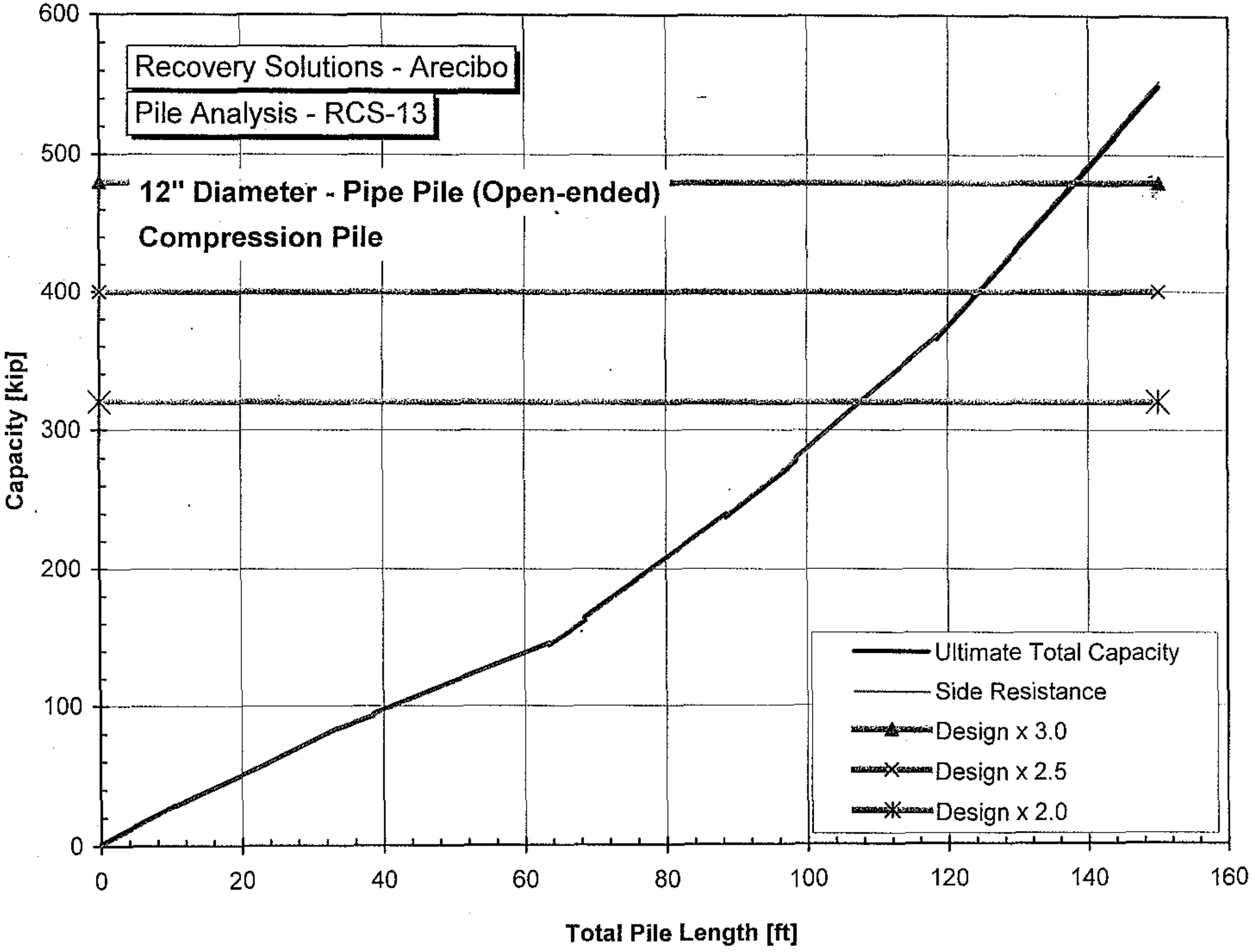
Capacity vs Total Pile Length

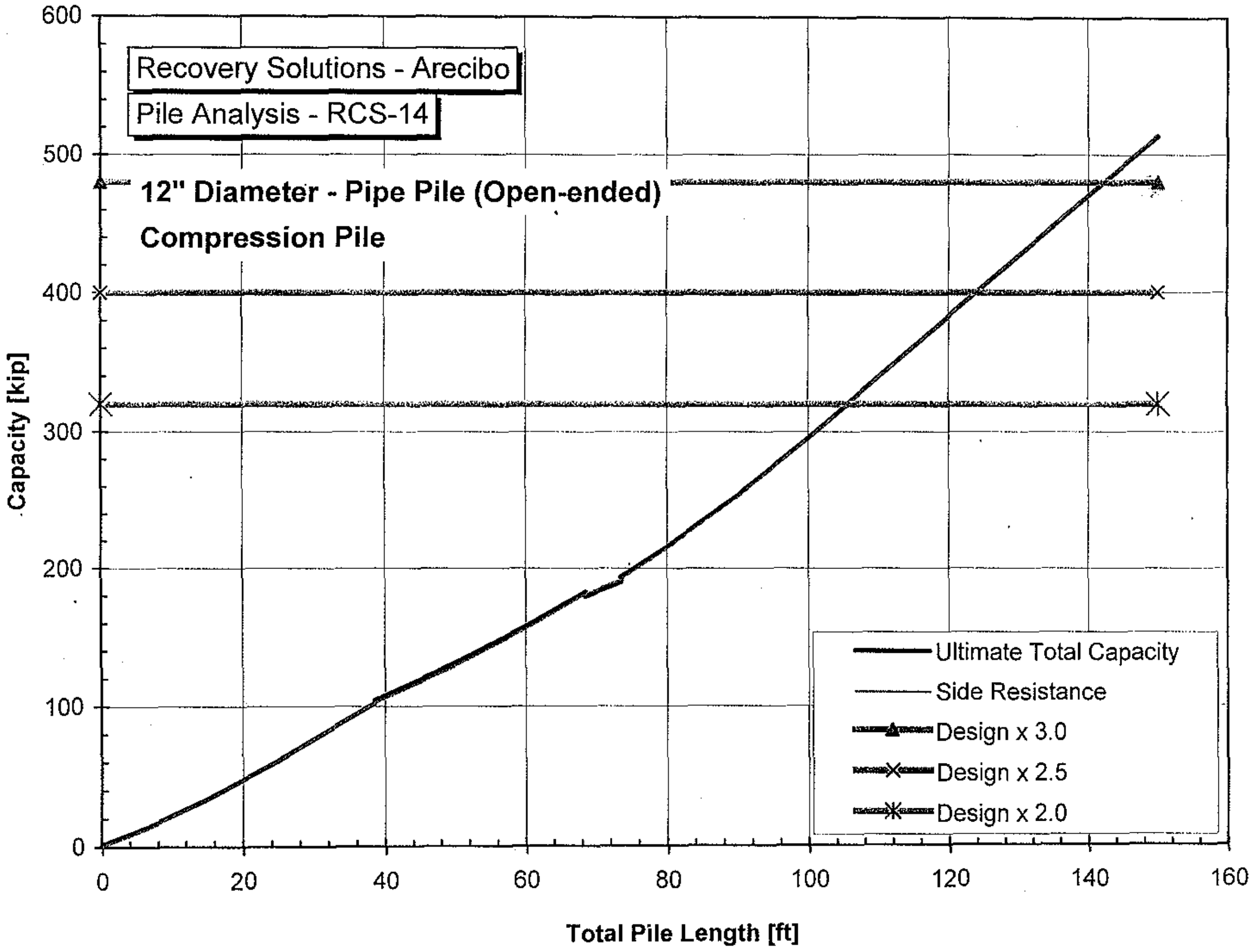


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 12 in. RCS-13
Assumes cohesive undrained behavior in limestone

GEOCONSULT

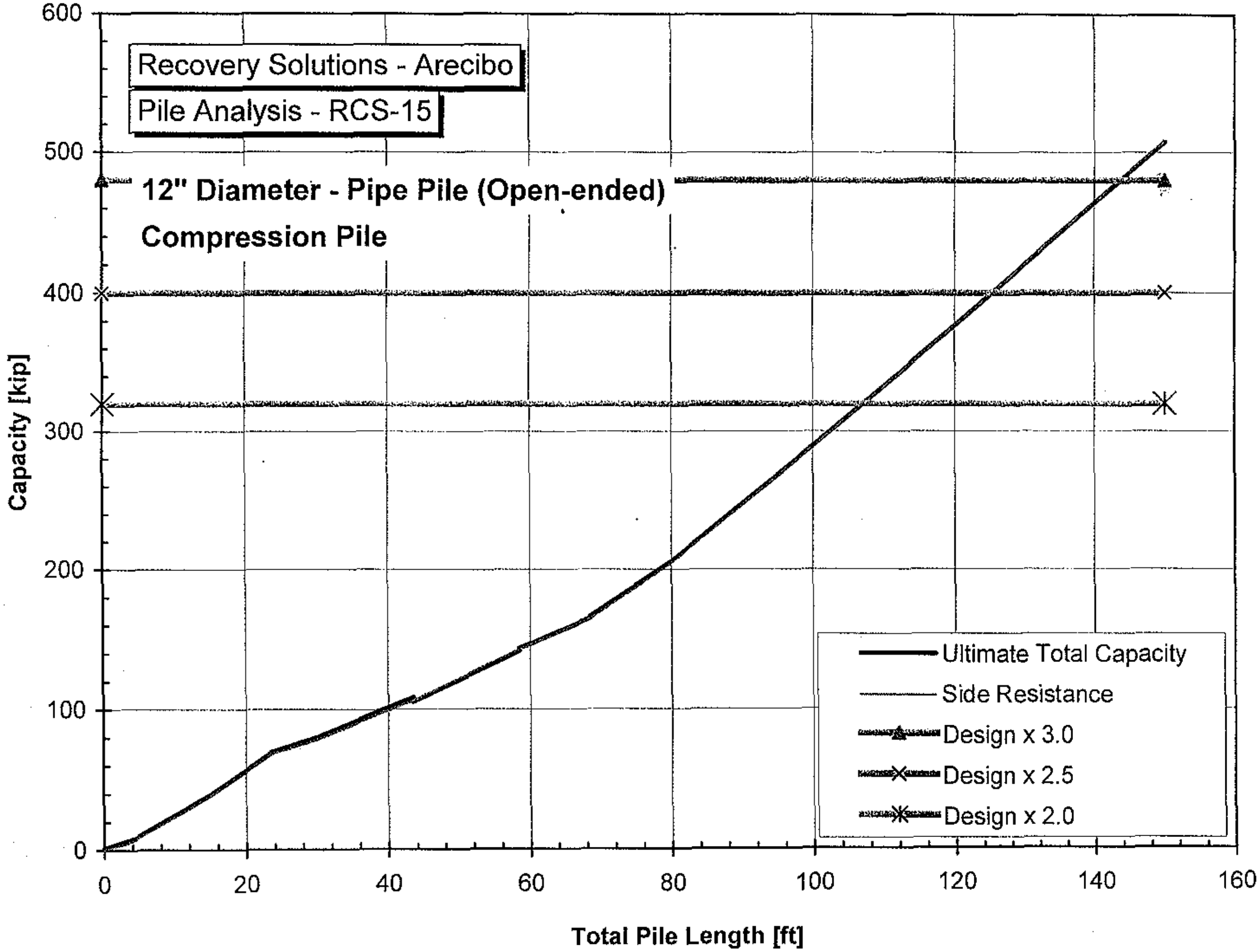
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 12 in. RCS-14
Assumes cohesive undrained behavior in limestone

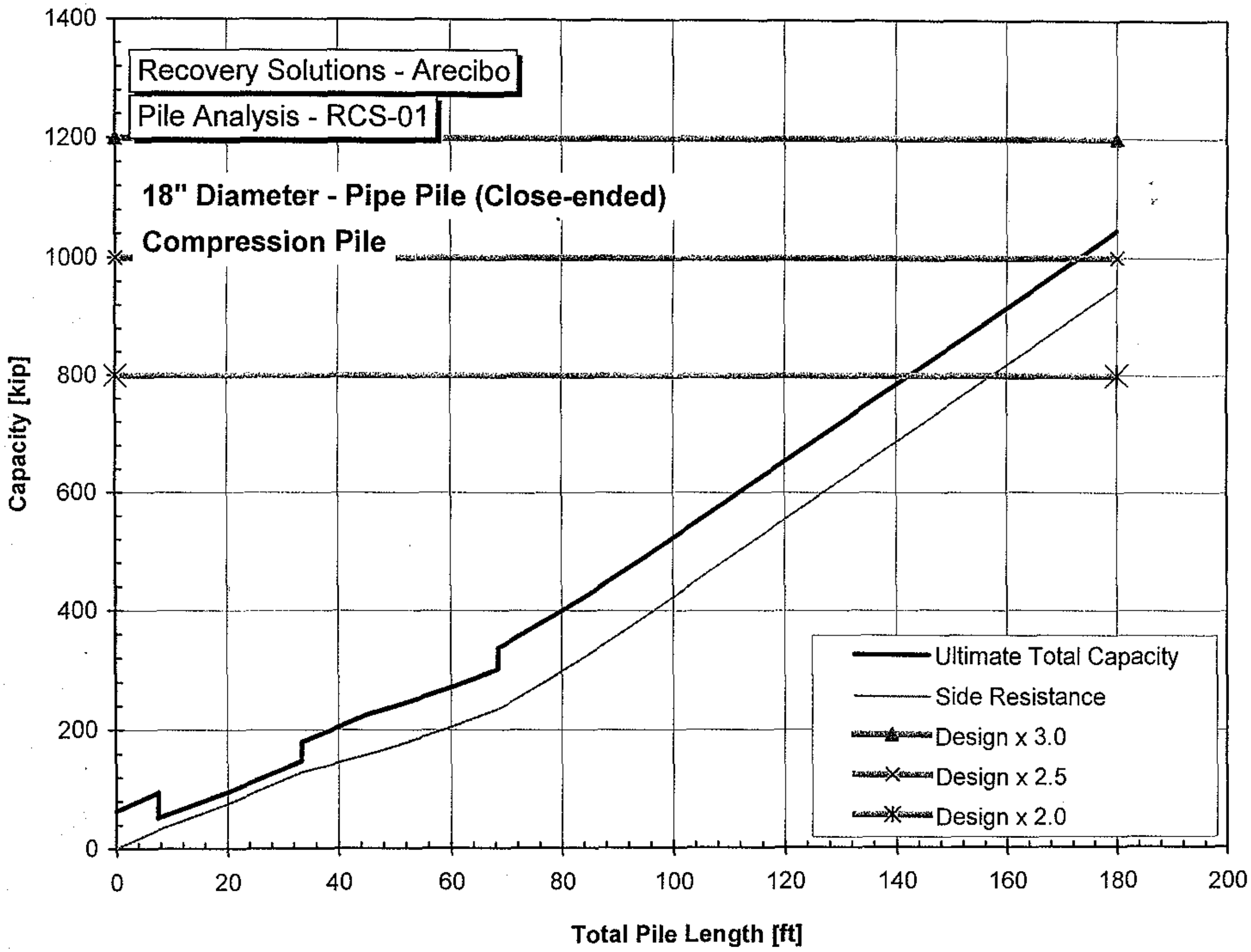
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 12 in. RCS-15
Assumes cohesive undrained behavior in limestone

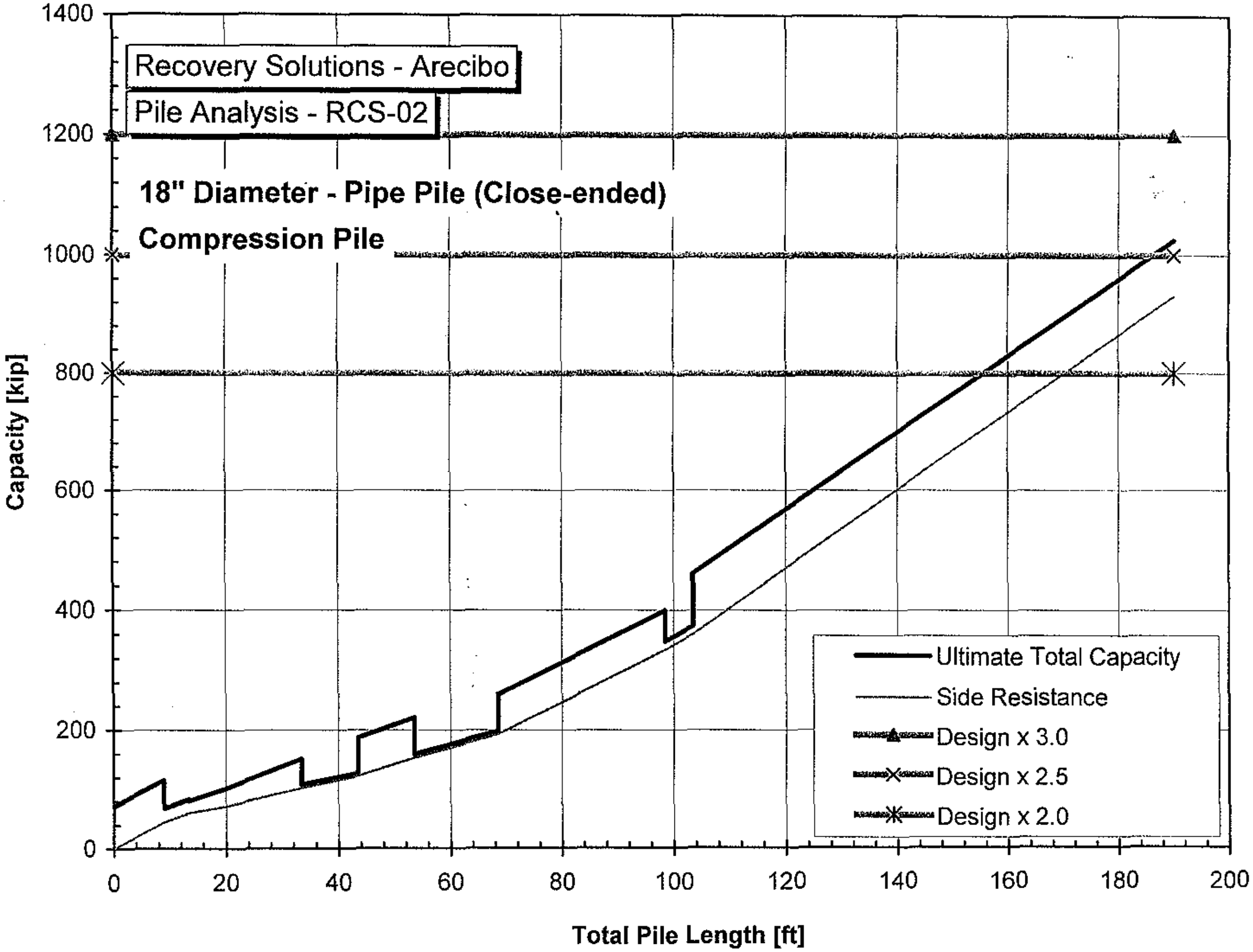
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 18 in. RCS-01 Closed
Assumes cohesive undrained behavior in limestone

Capacity vs Total Pile Length

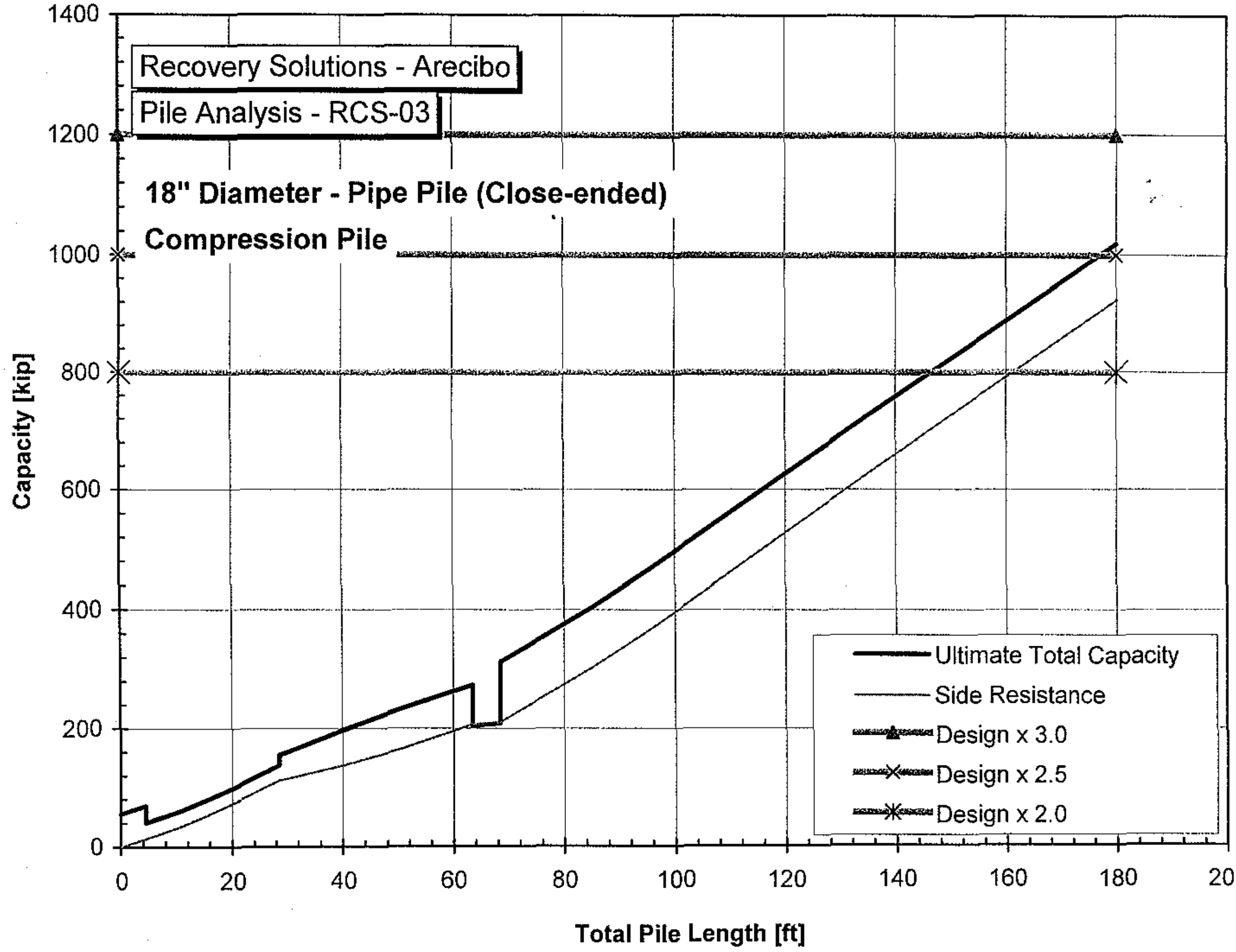


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 18 in. RCS-02 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

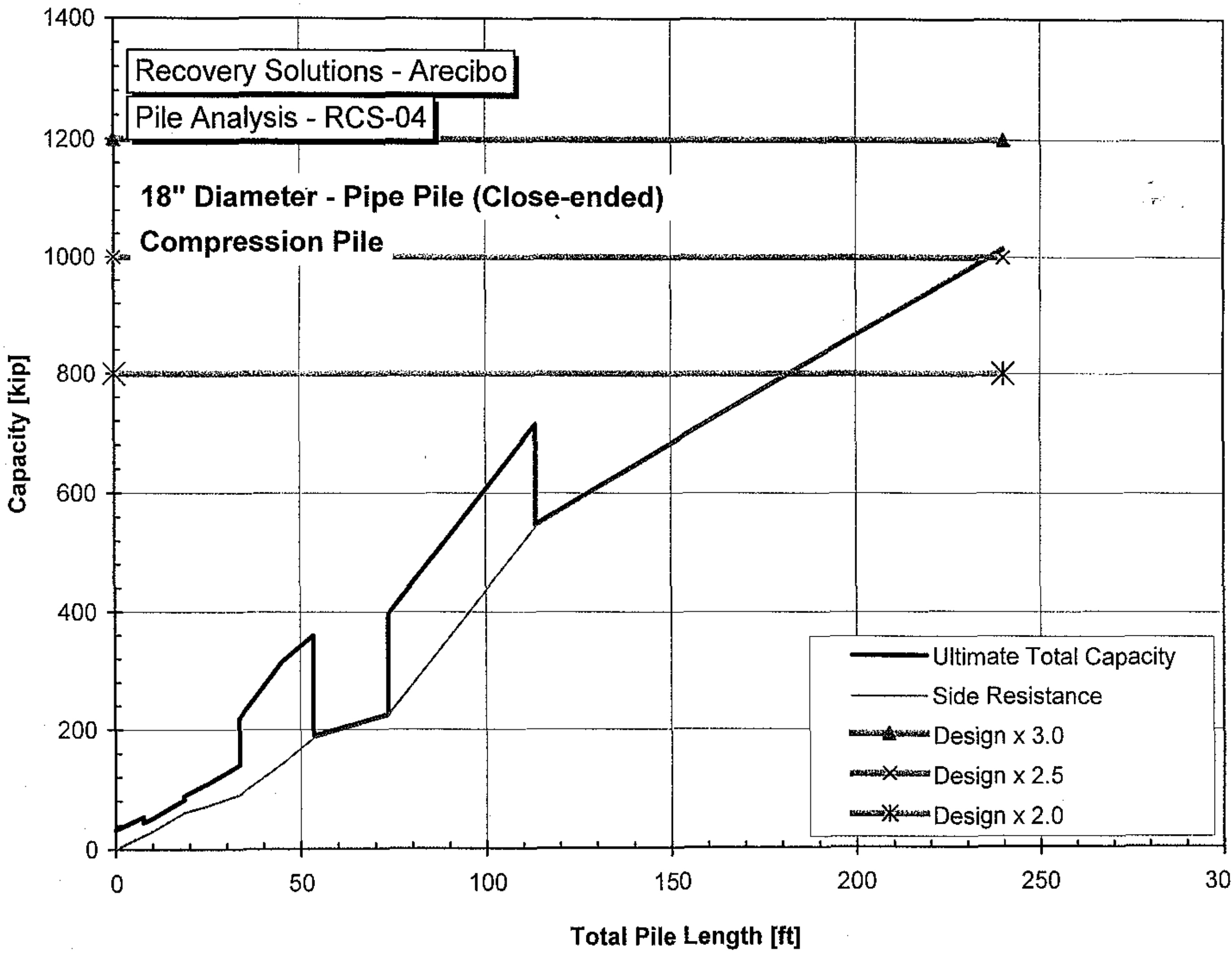


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 18 in. RCS-03 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

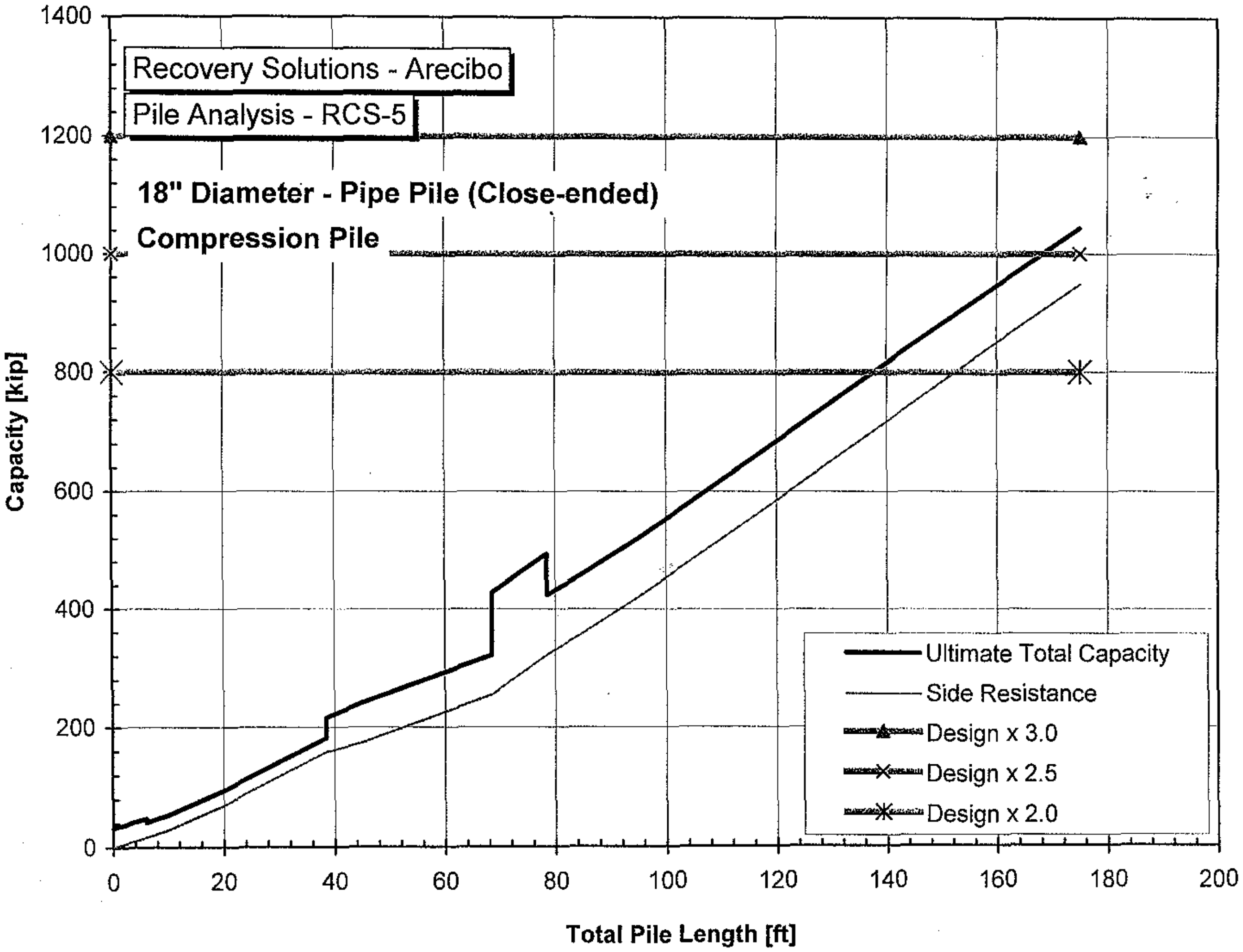


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 18 in. RCS-04 Closed
Assumes cohesive undrained behavior in limestone

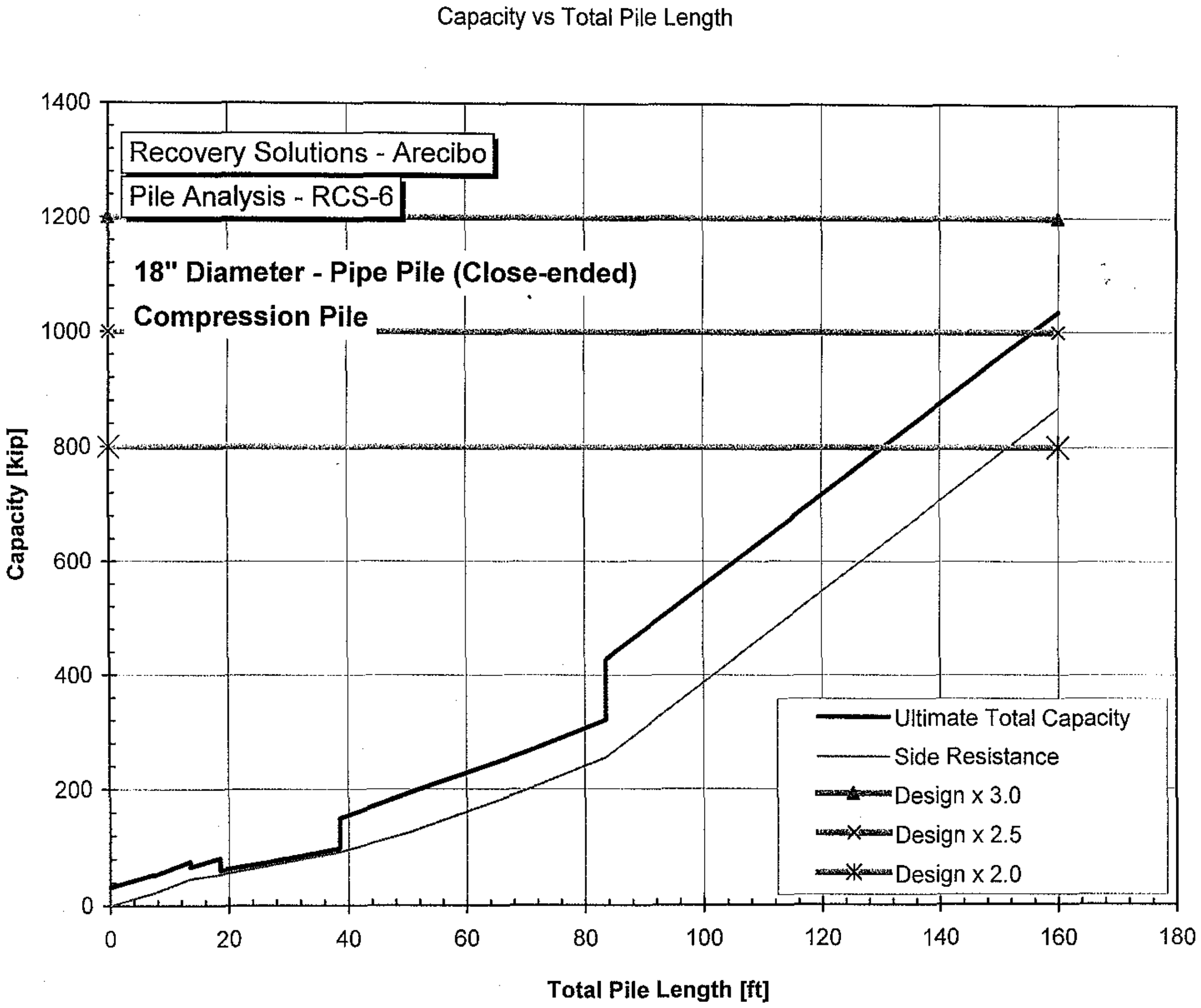
GEOCONSULT

Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 18 in. RCS-05 Closed
Assumes cohesive undrained behavior in limestone

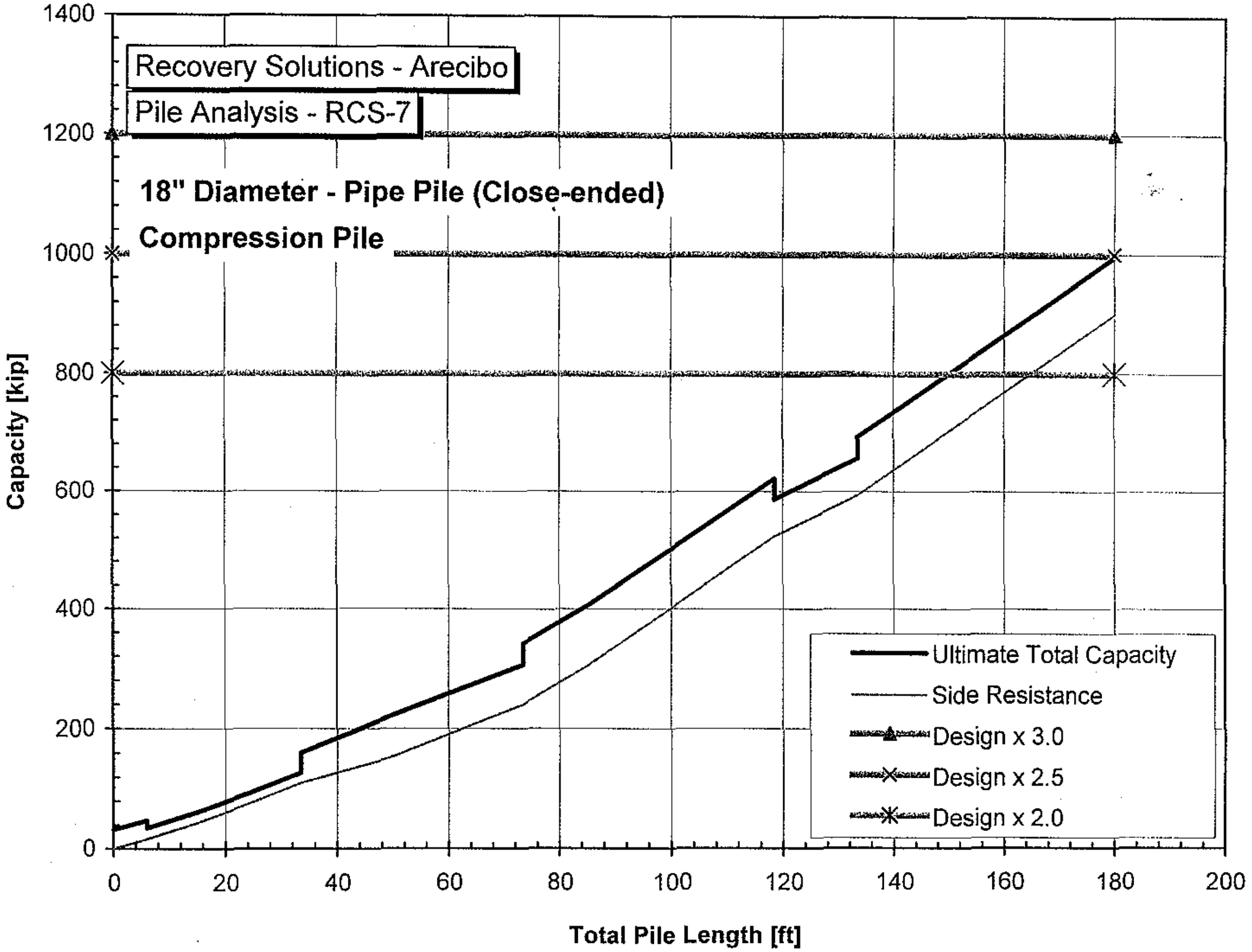


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 18 in. RCS-06 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

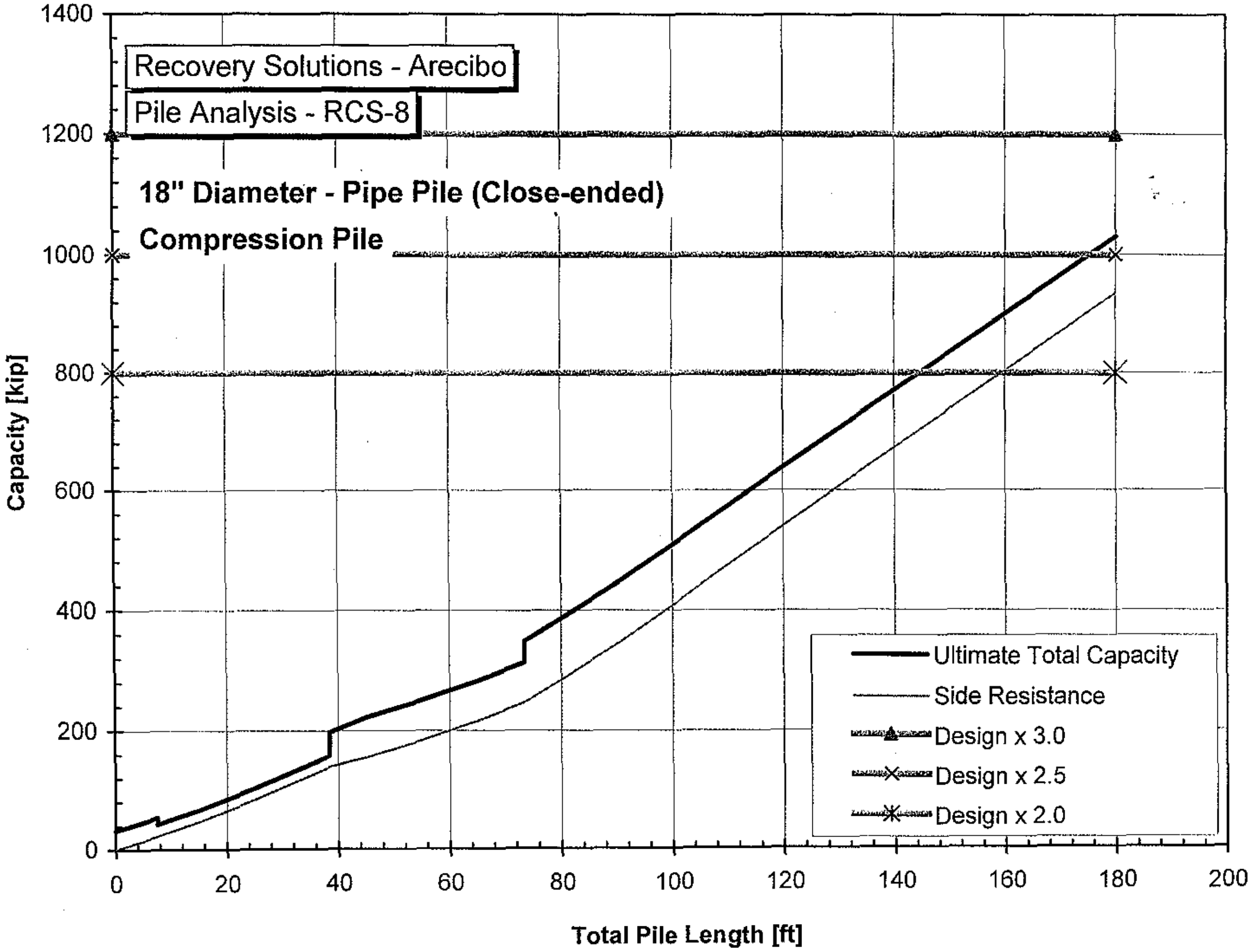
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 18 in. RCS-07 Closed
Assumes cohesive undrained behavior in limestone

Capacity vs Total Pile Length

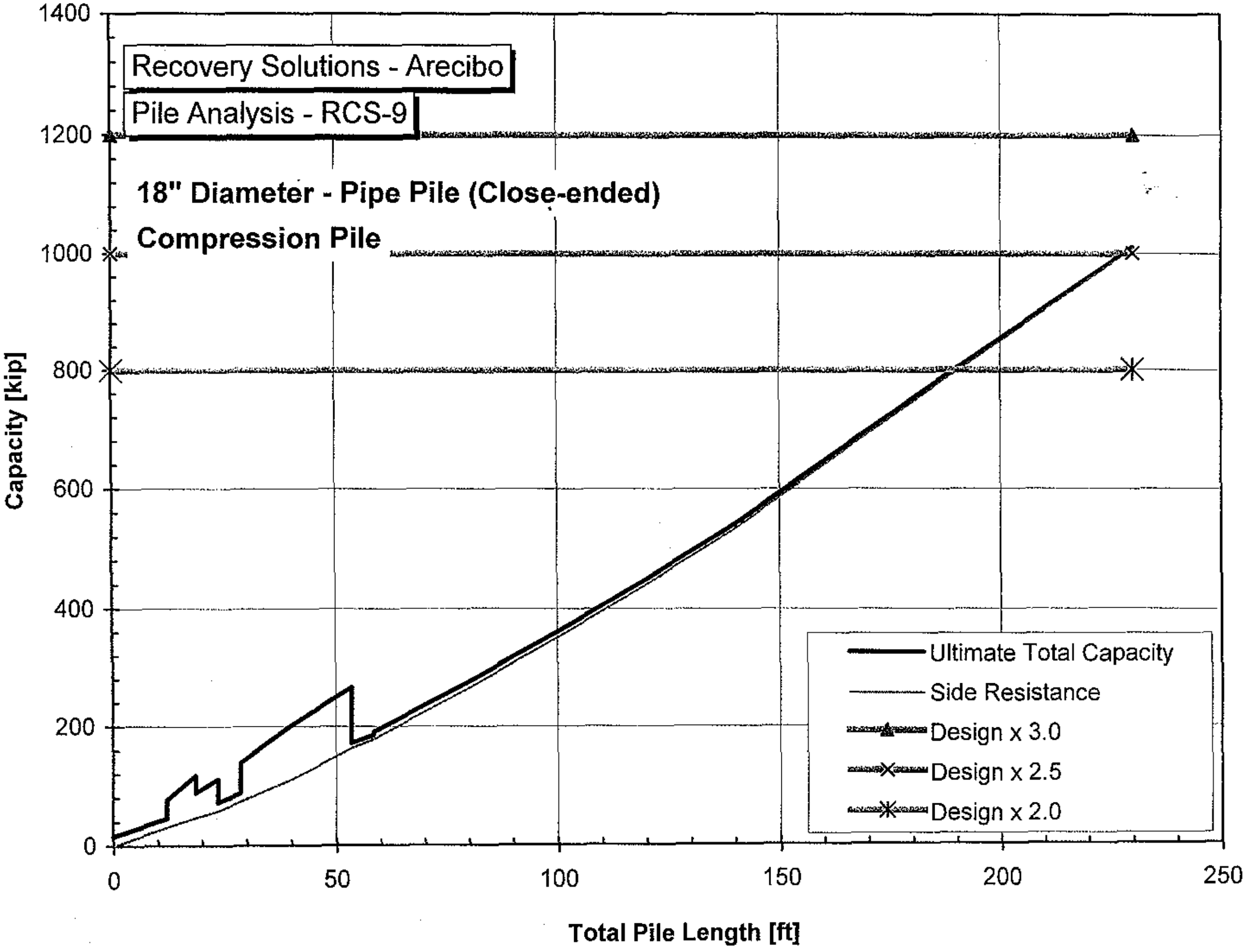


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 18 in. RCS-08 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

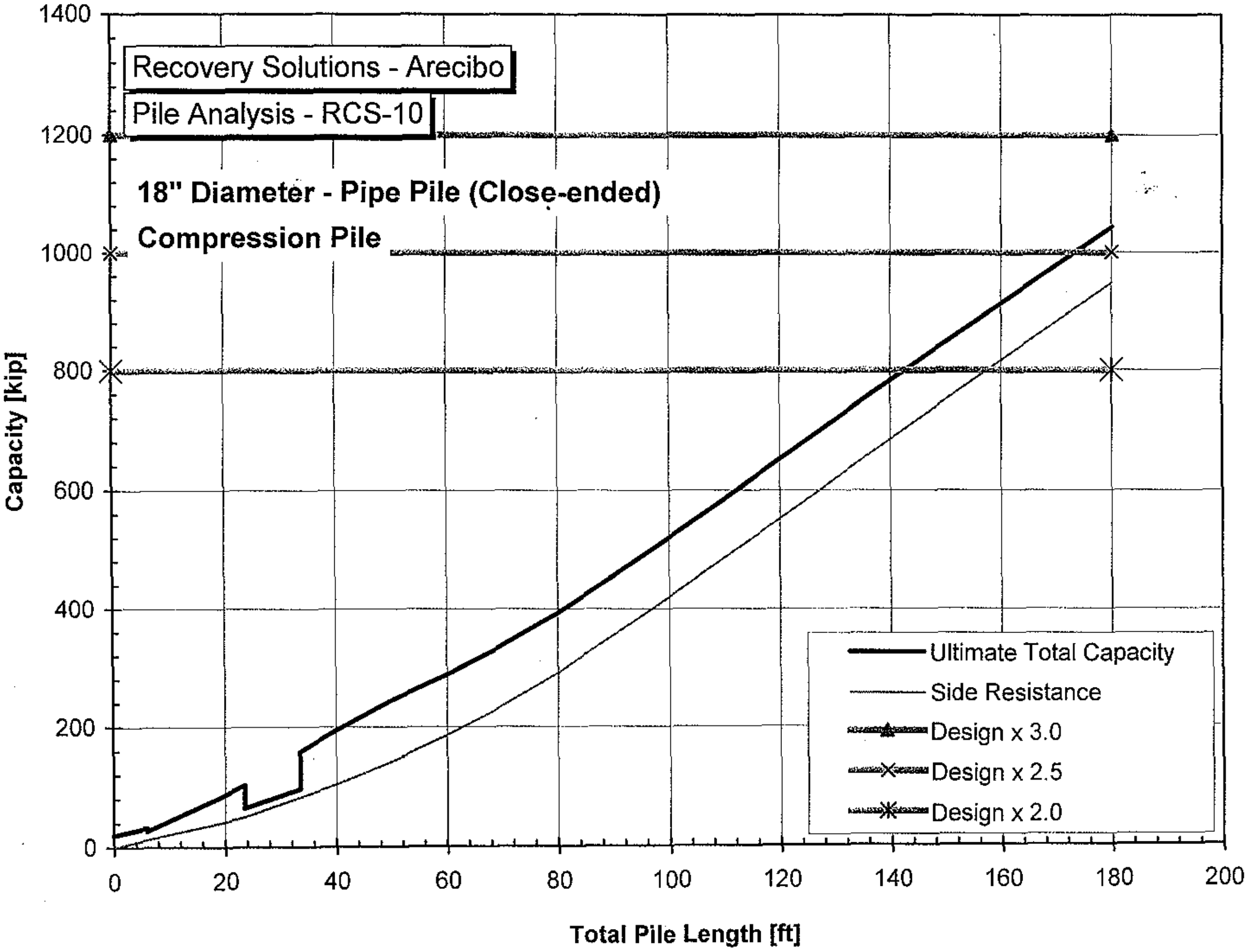


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 18 in. RCS-09 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

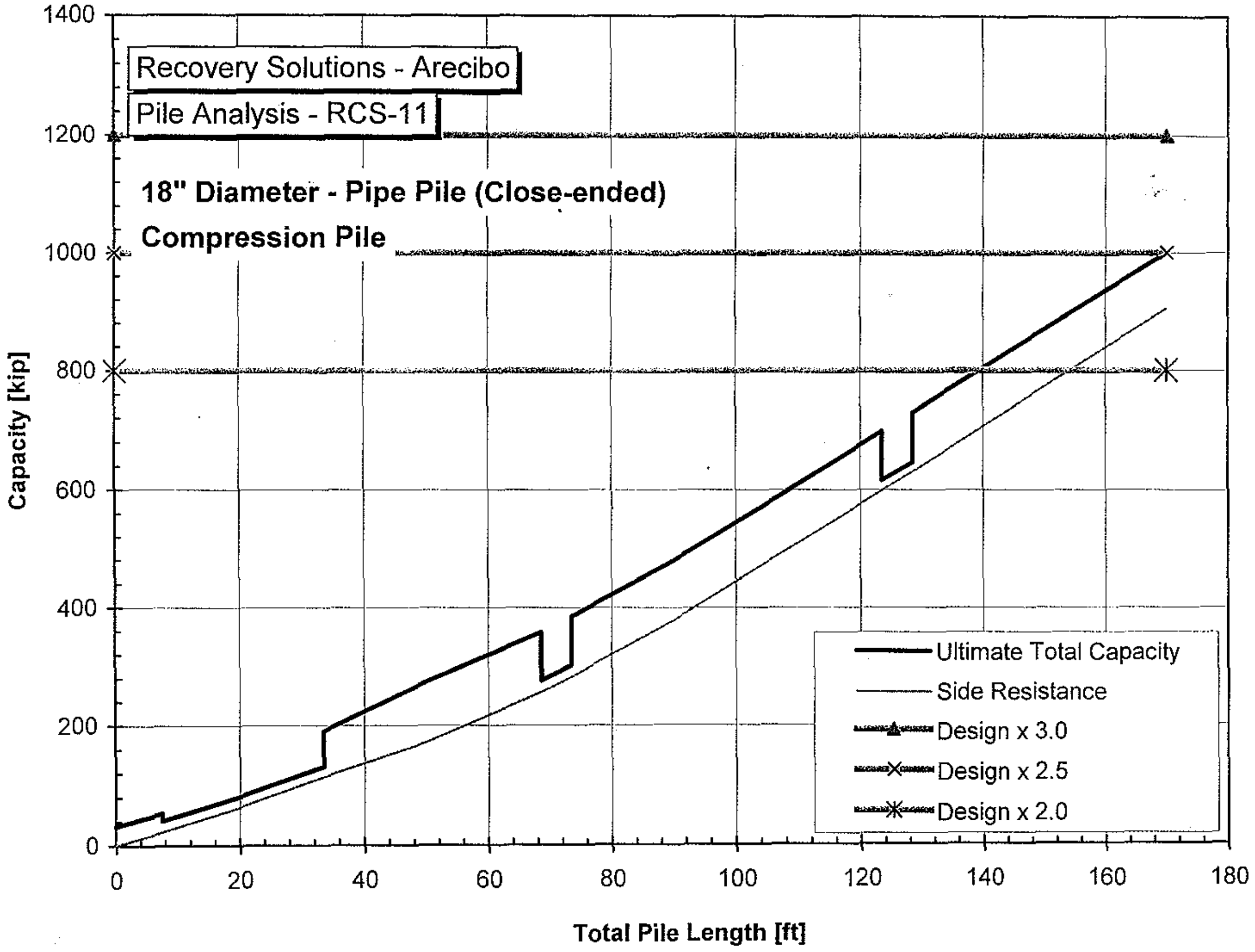


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 18 in. RCS-10 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

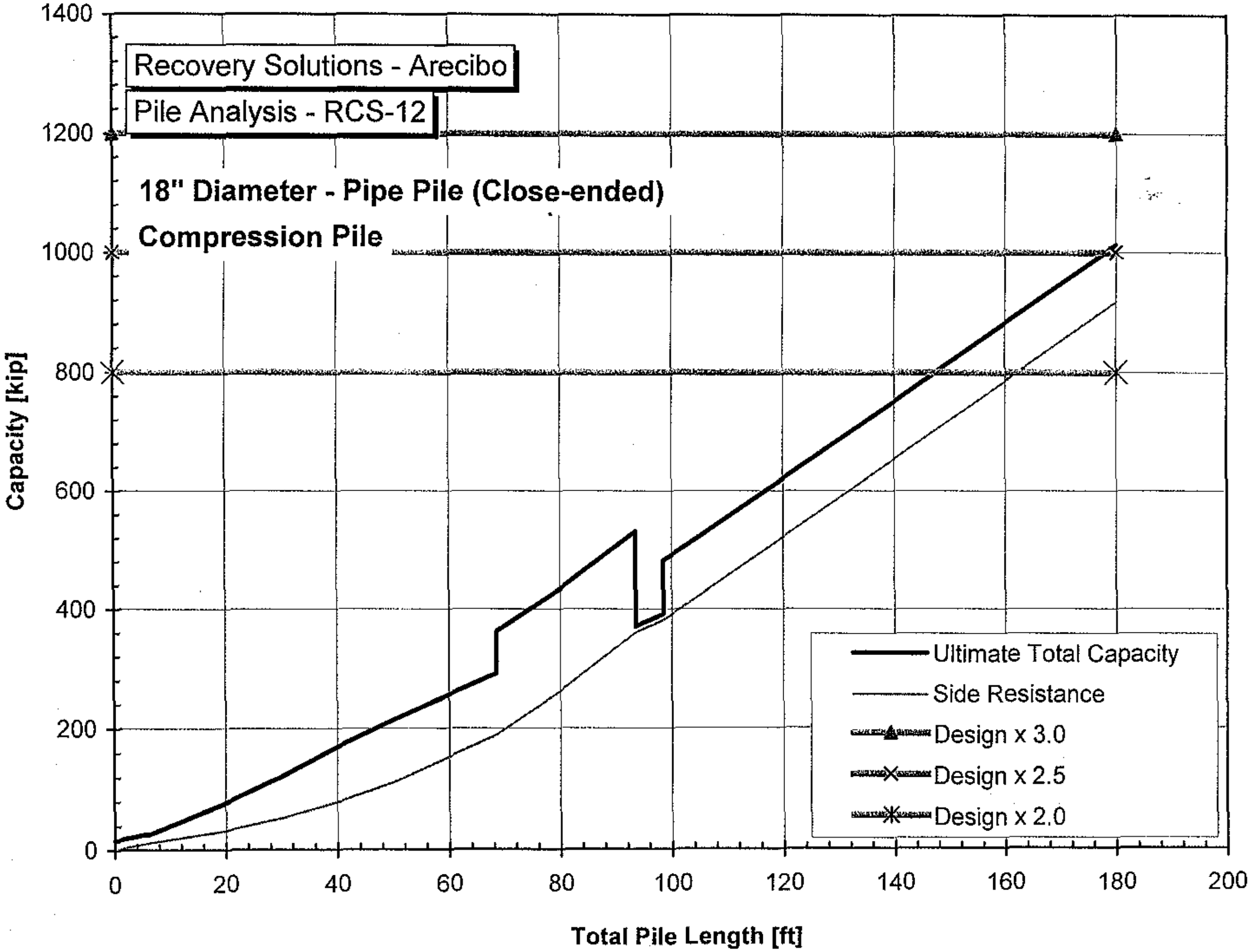
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 18 in. RCS-11 Closed
Assumes cohesive undrained behavior in limestone

Capacity vs Total Pile Length

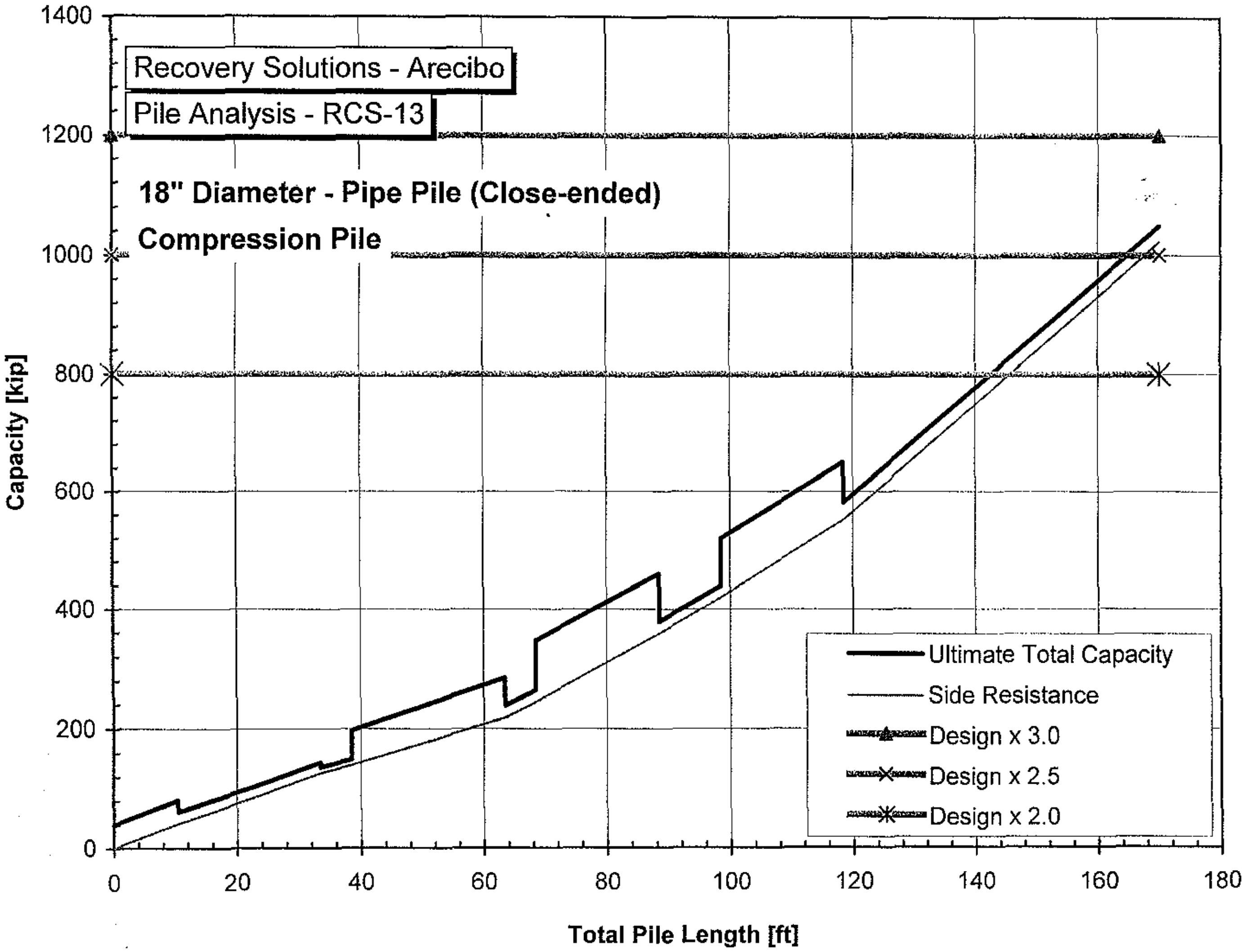


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 18 in. RCS-12 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

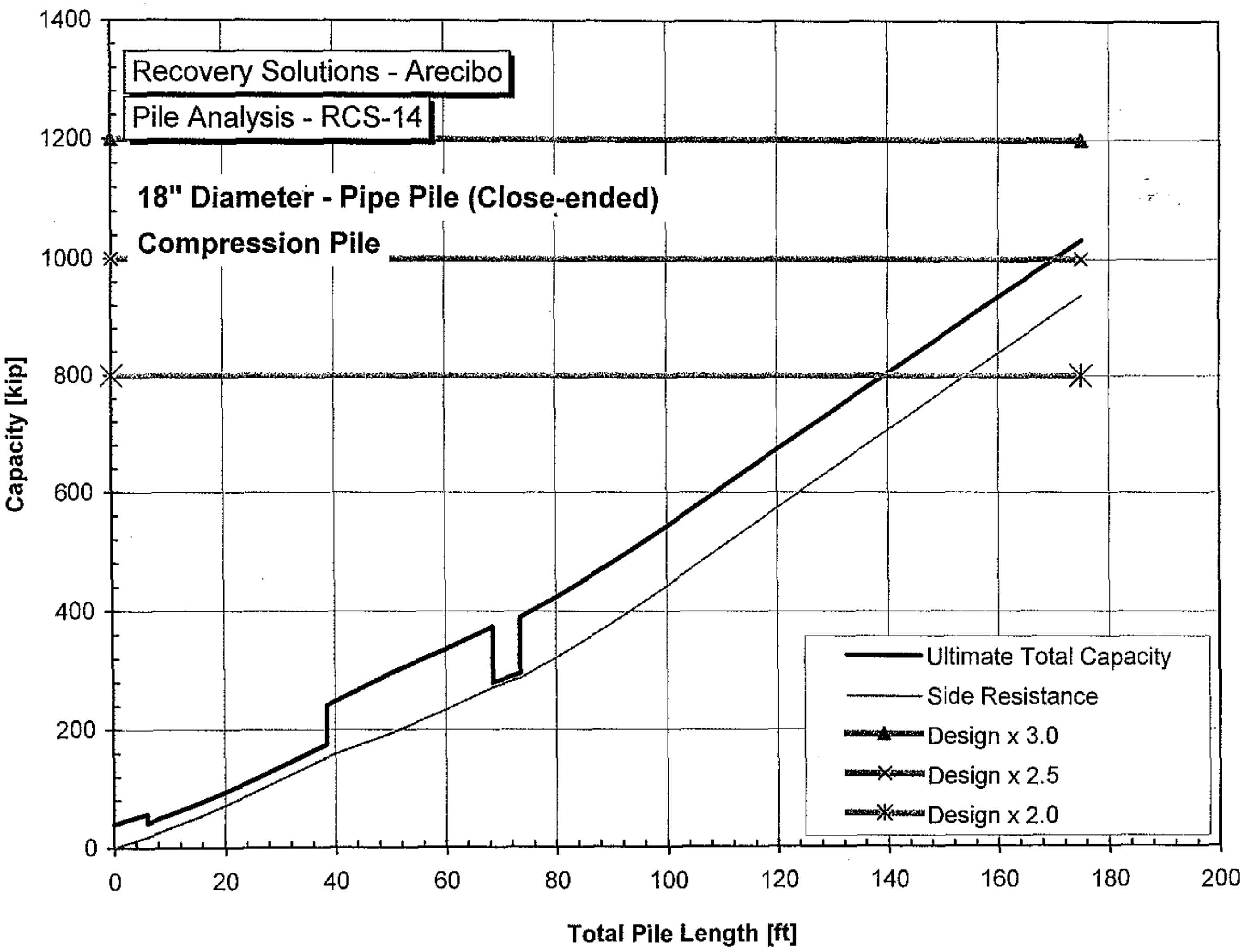


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 18 in. RCS-13 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

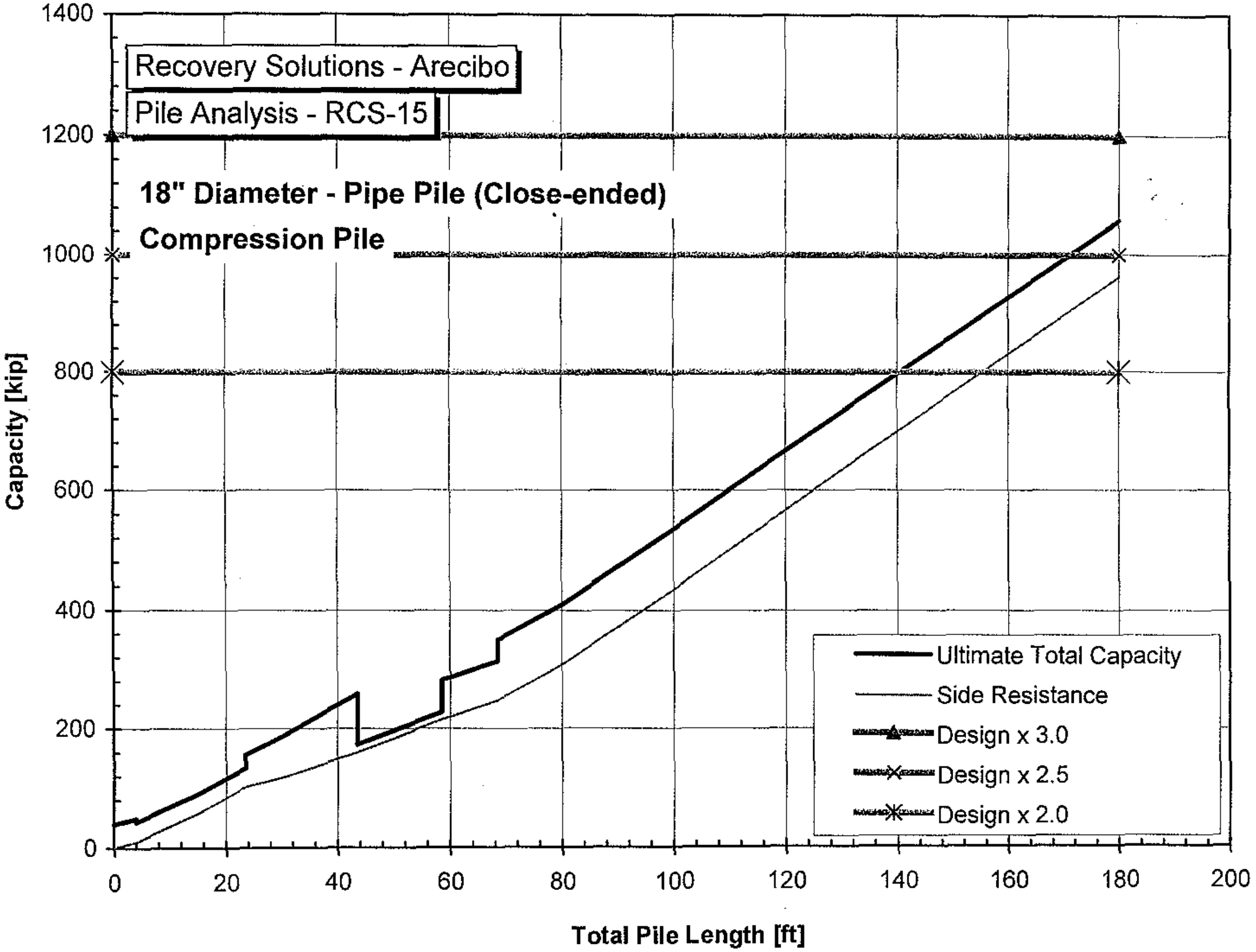


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 18 in. RCS-14 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

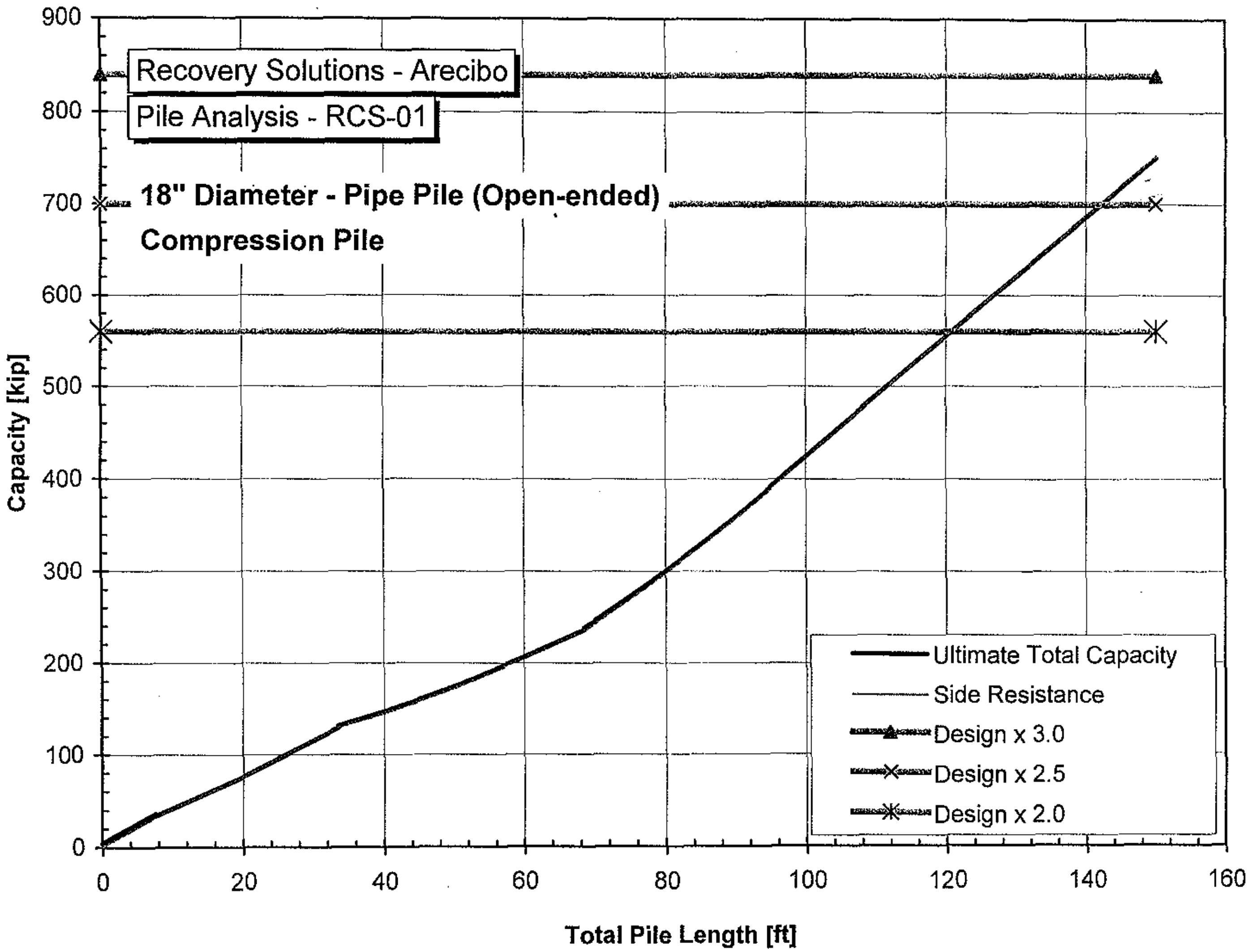


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 18 in. RCS-15 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

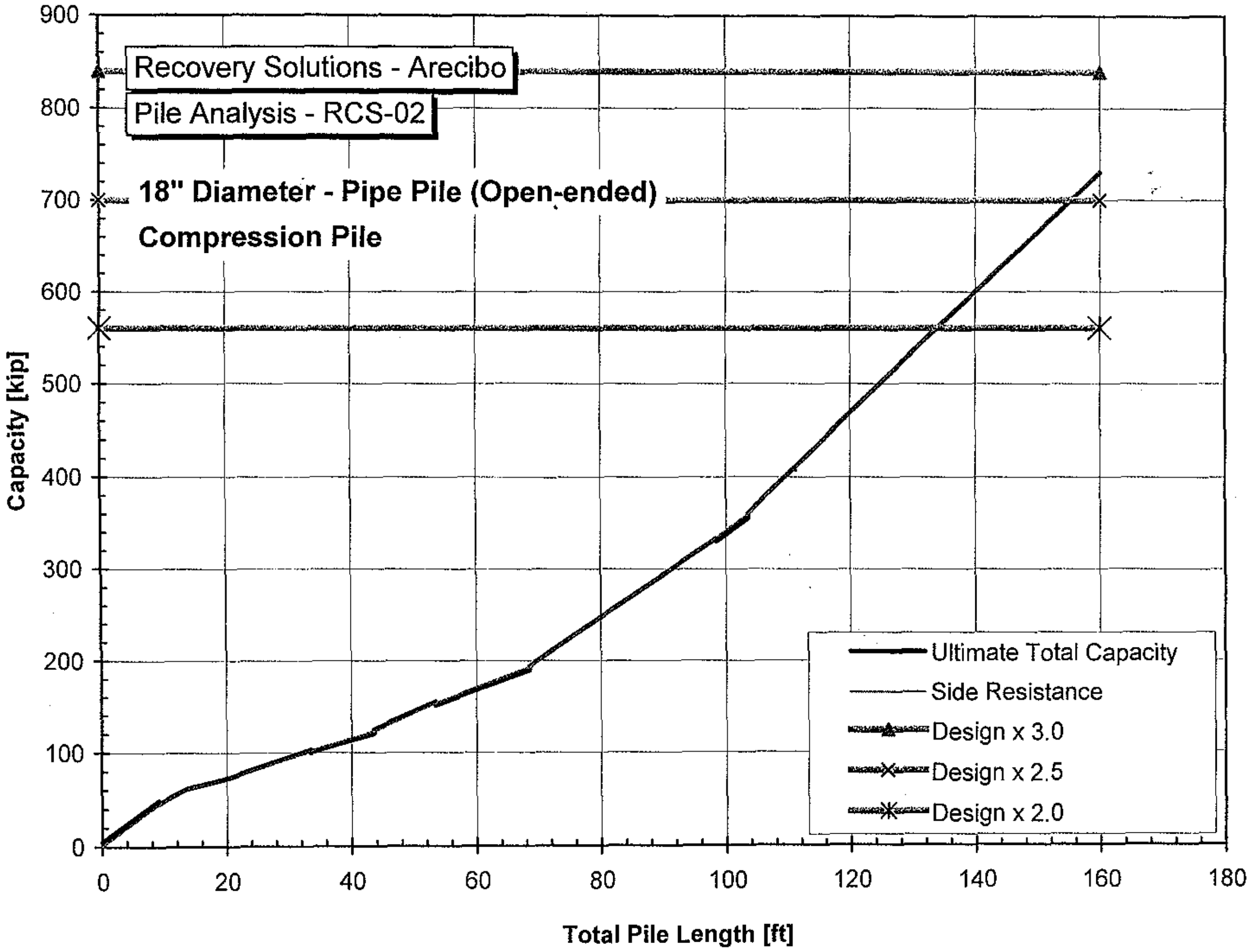


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 18 in. RCS-01
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

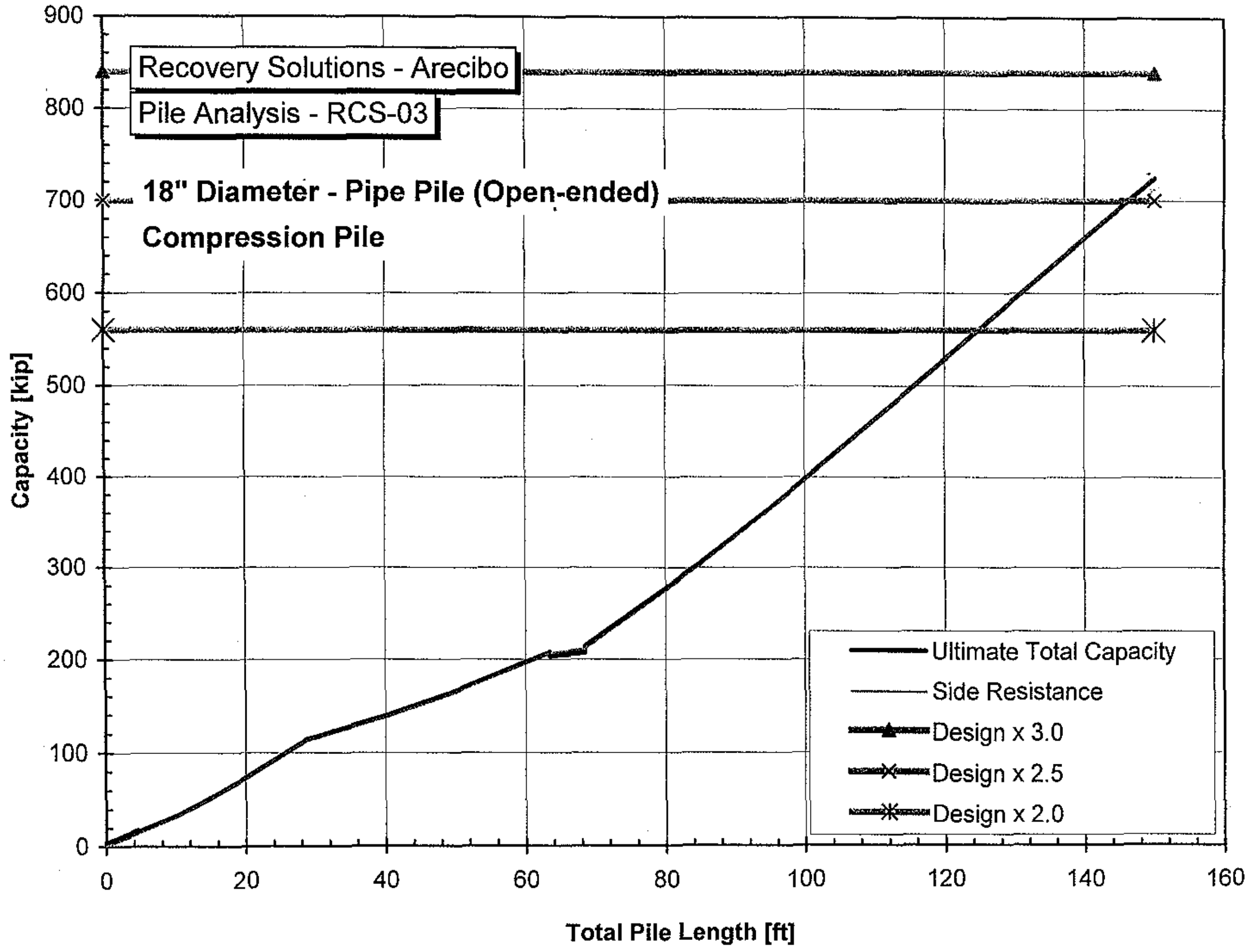


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 18 in. RCS-02
Assumes cohesive undrained behavior in limestone

GEOCONSULT

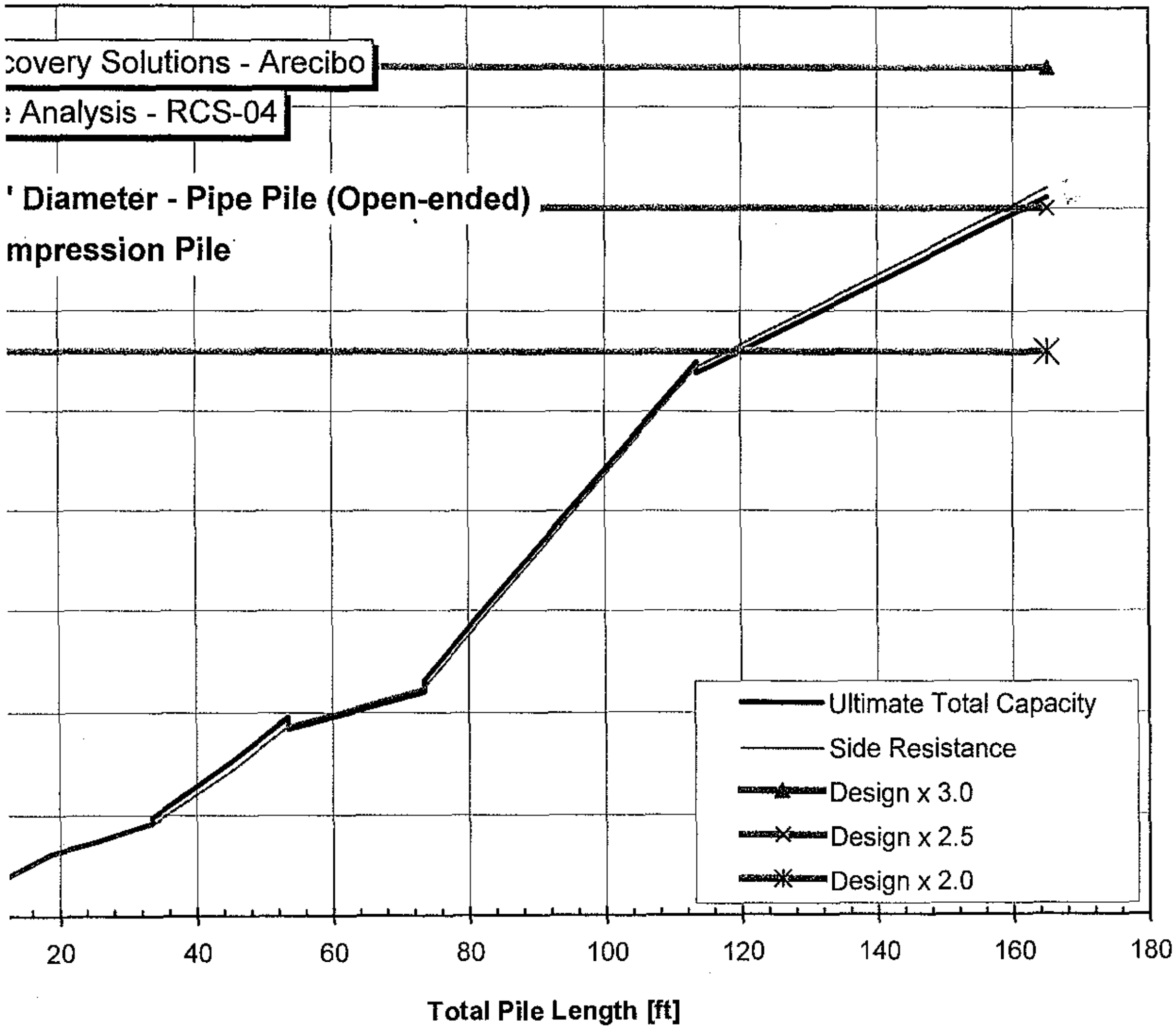
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 18 in. RCS-03
Assumes cohesive undrained behavior in limestone

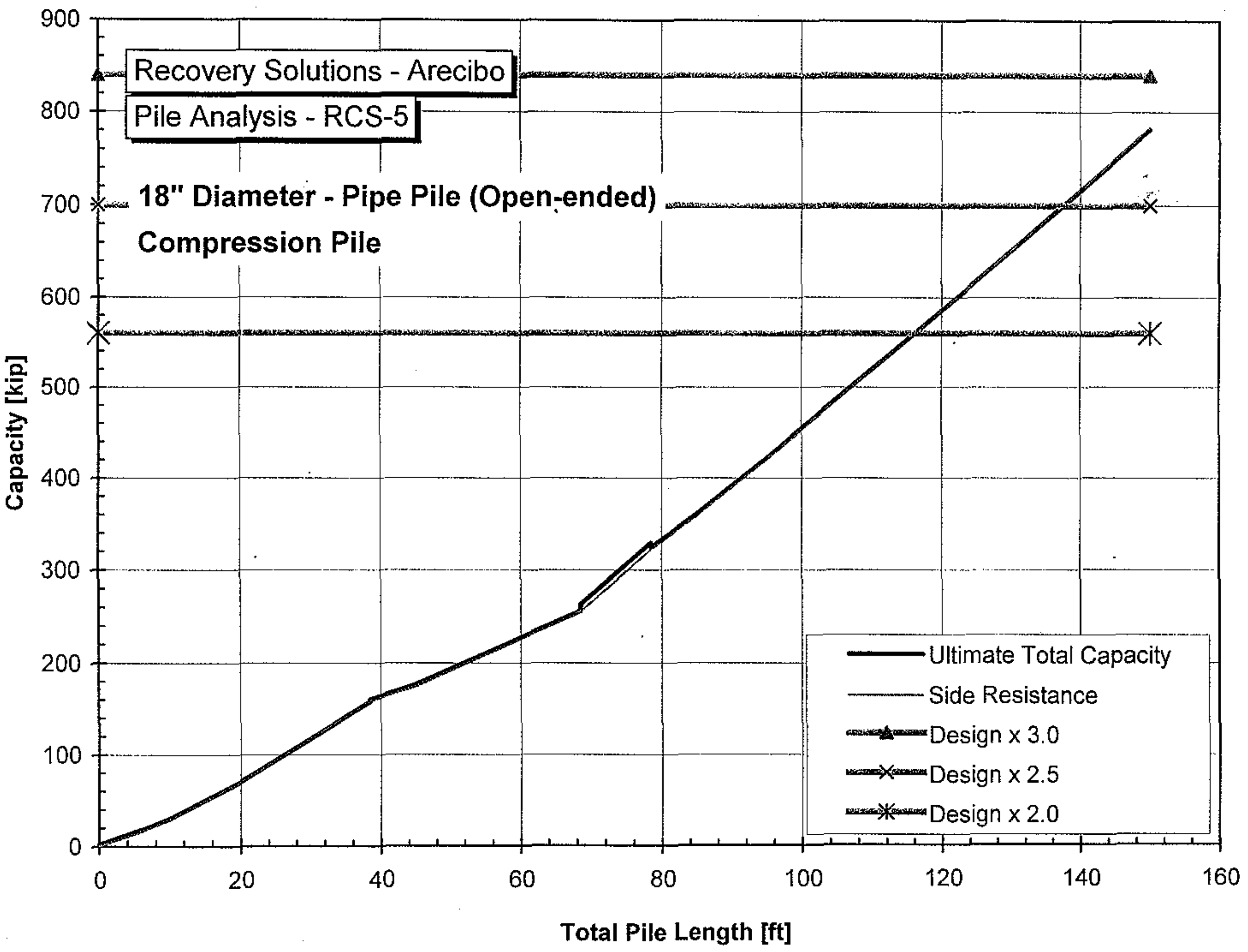
Capacity vs Total Pile Length



File API Analysis - Compression Pipe Pile 18 in. RCS-04
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

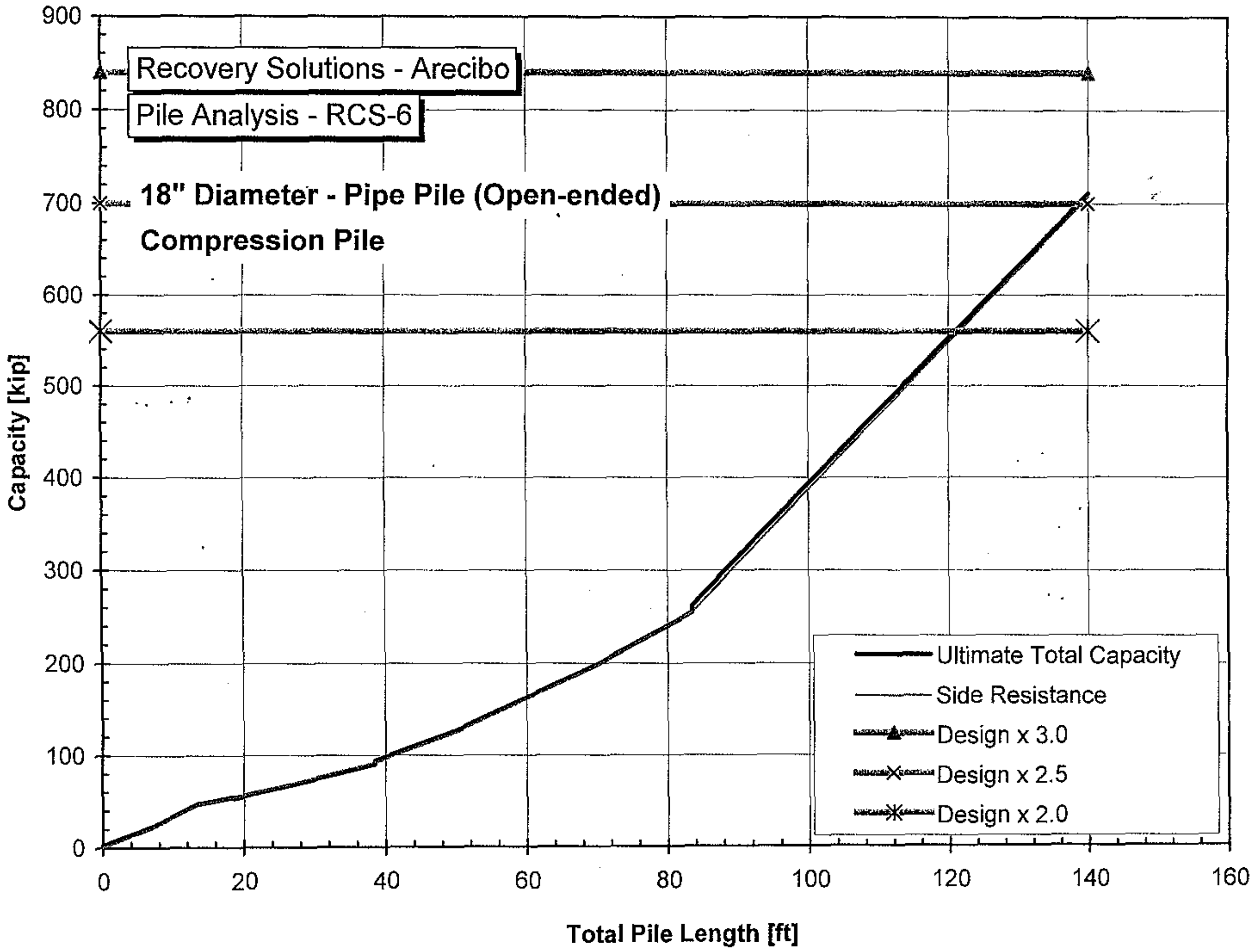


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 18 in. RCS-05
Assumes cohesive undrained behavior in limestone

GEOCONSULT

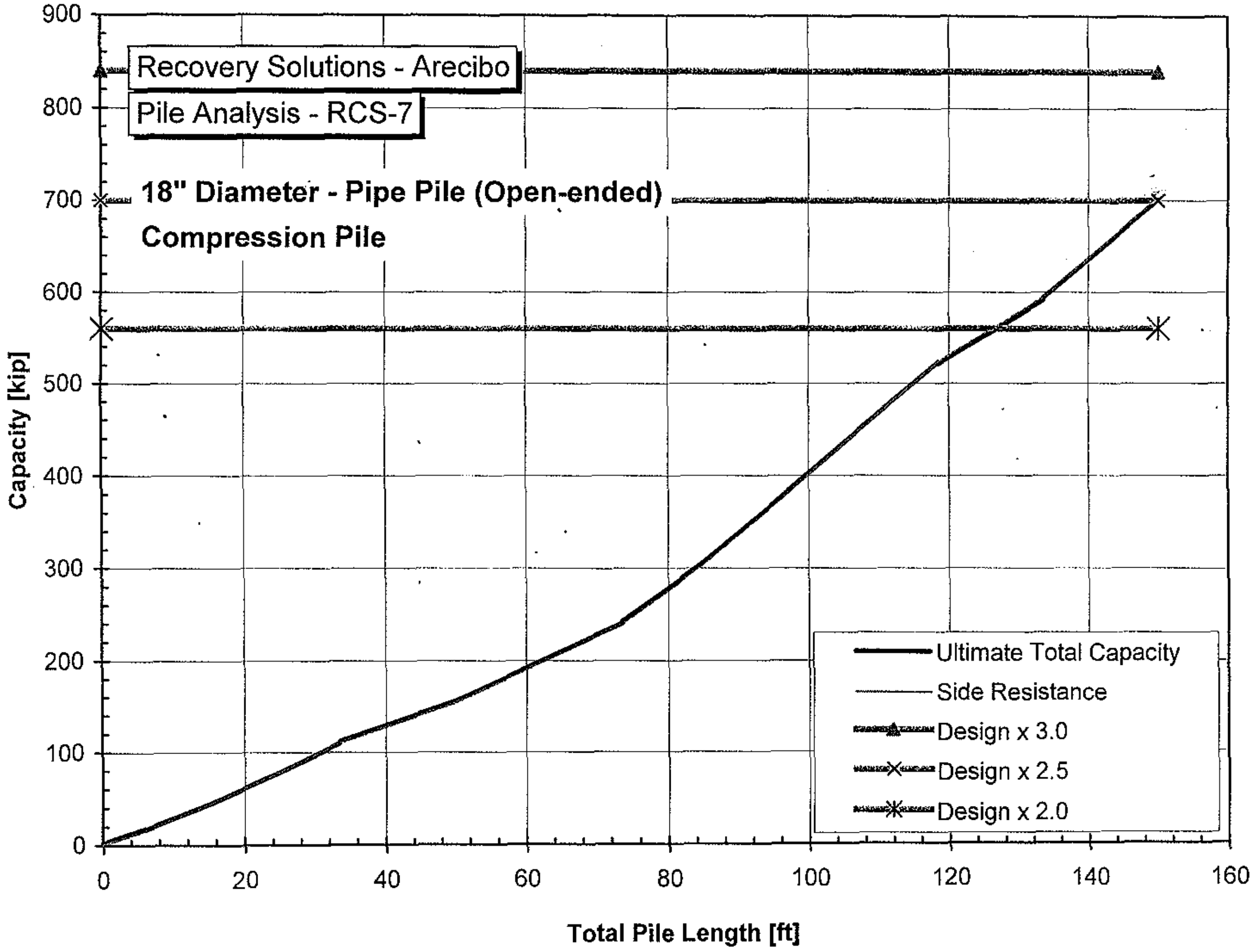
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 18 in. RCS-06
Assumes cohesive undrained behavior in limestone

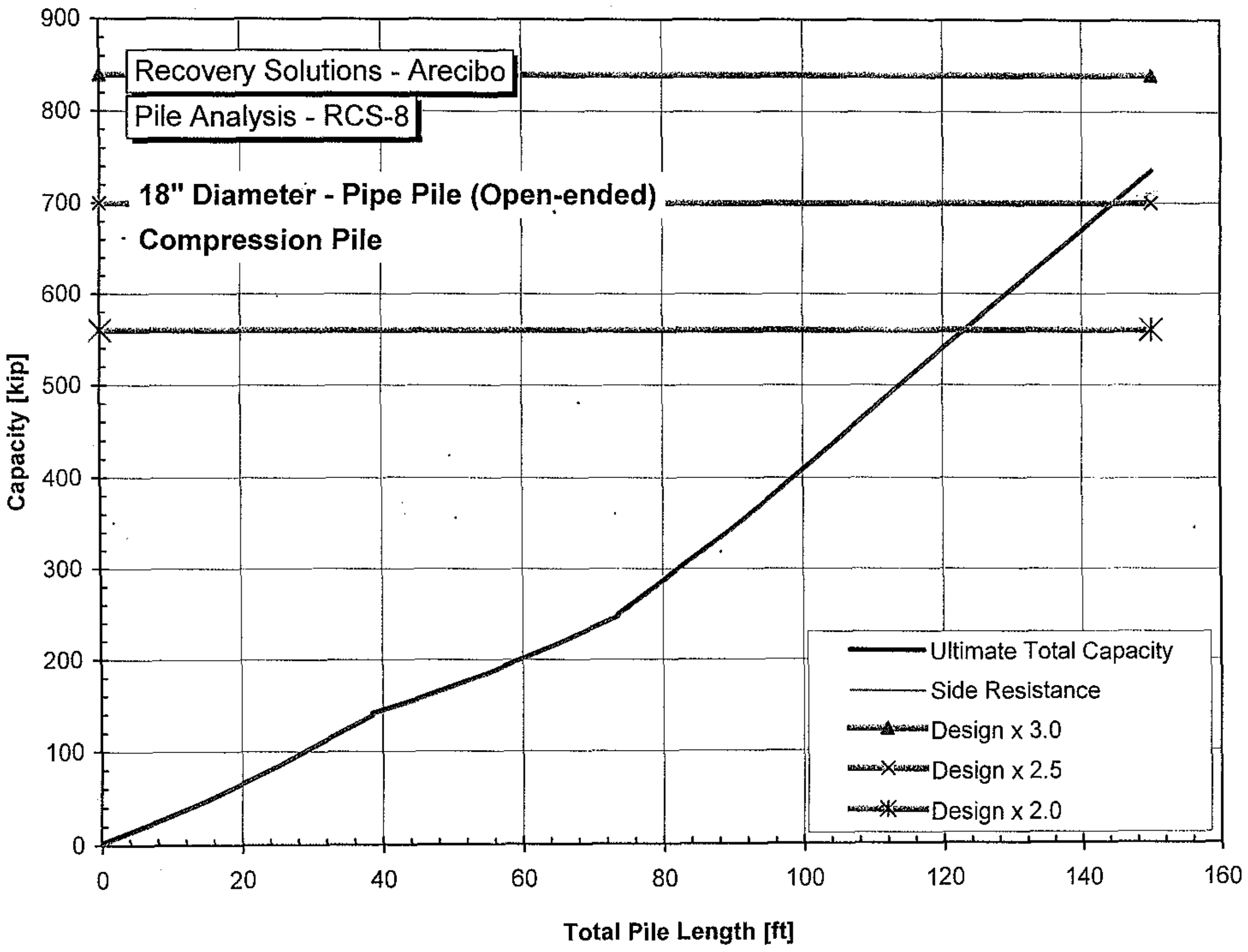
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 18 in. RCS-07
Assumes cohesive undrained behavior in limestone

Capacity vs Total Pile Length

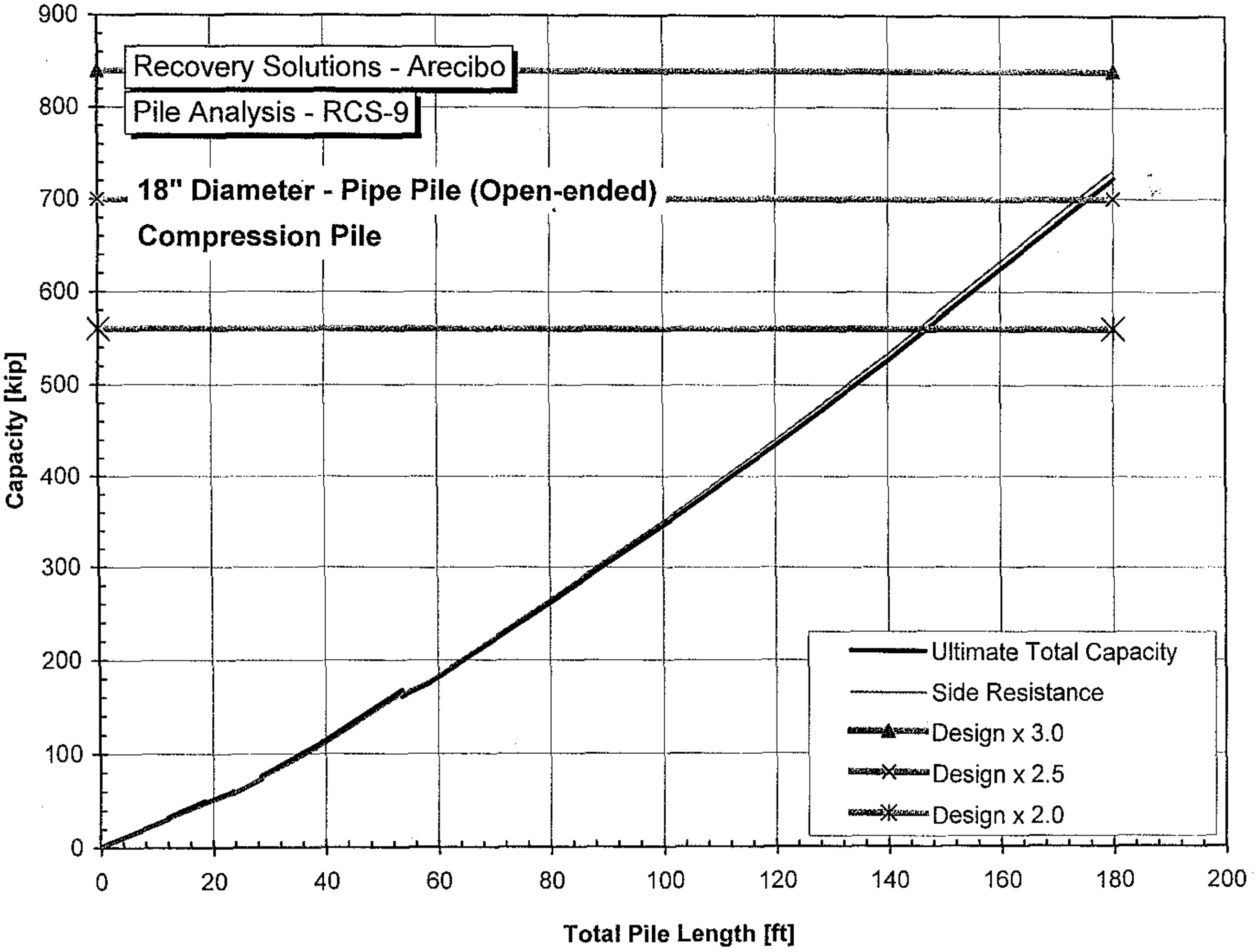


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 18 in. RCS-08
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

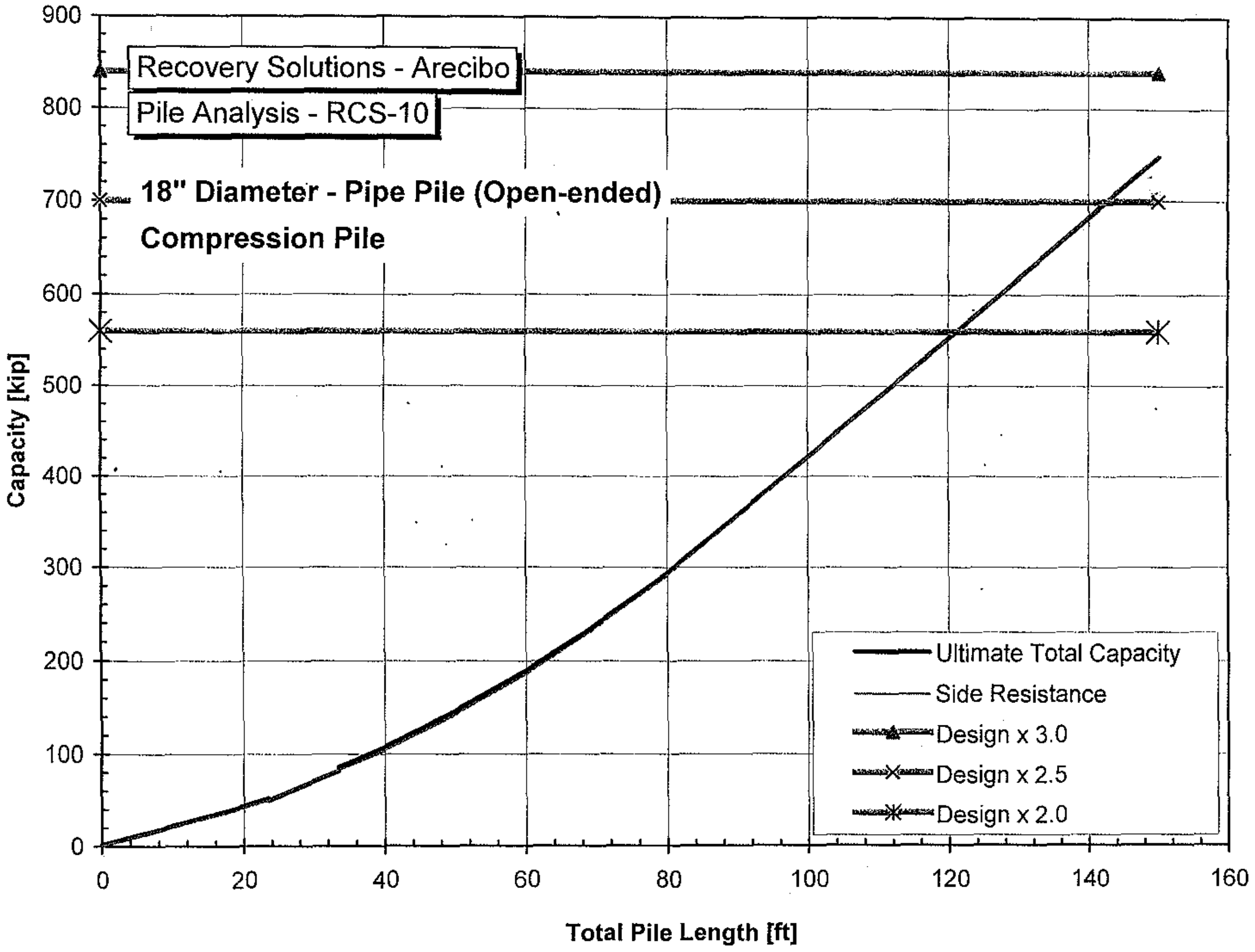


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 18 in. RCS-09
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

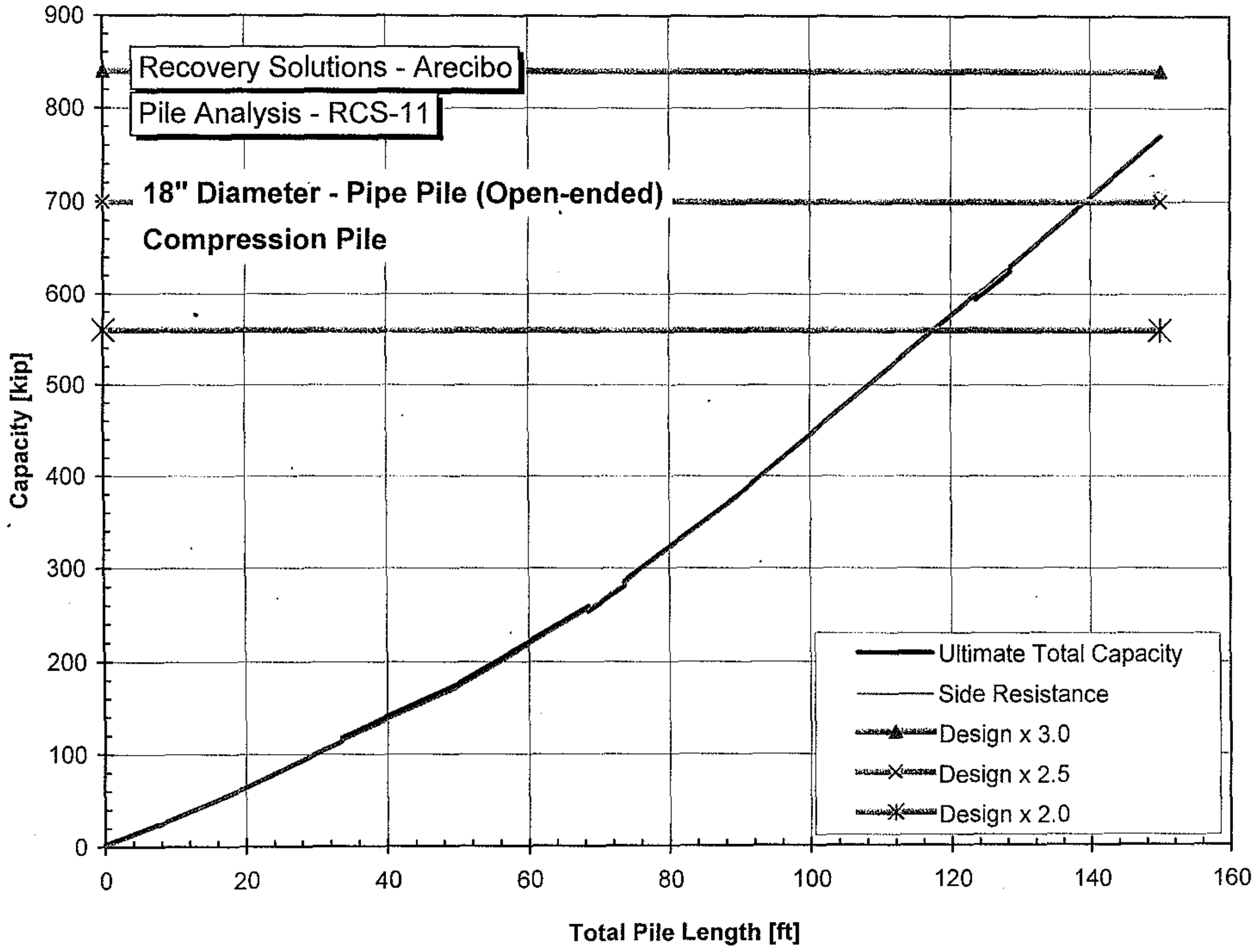


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 18 in. RCS-10
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

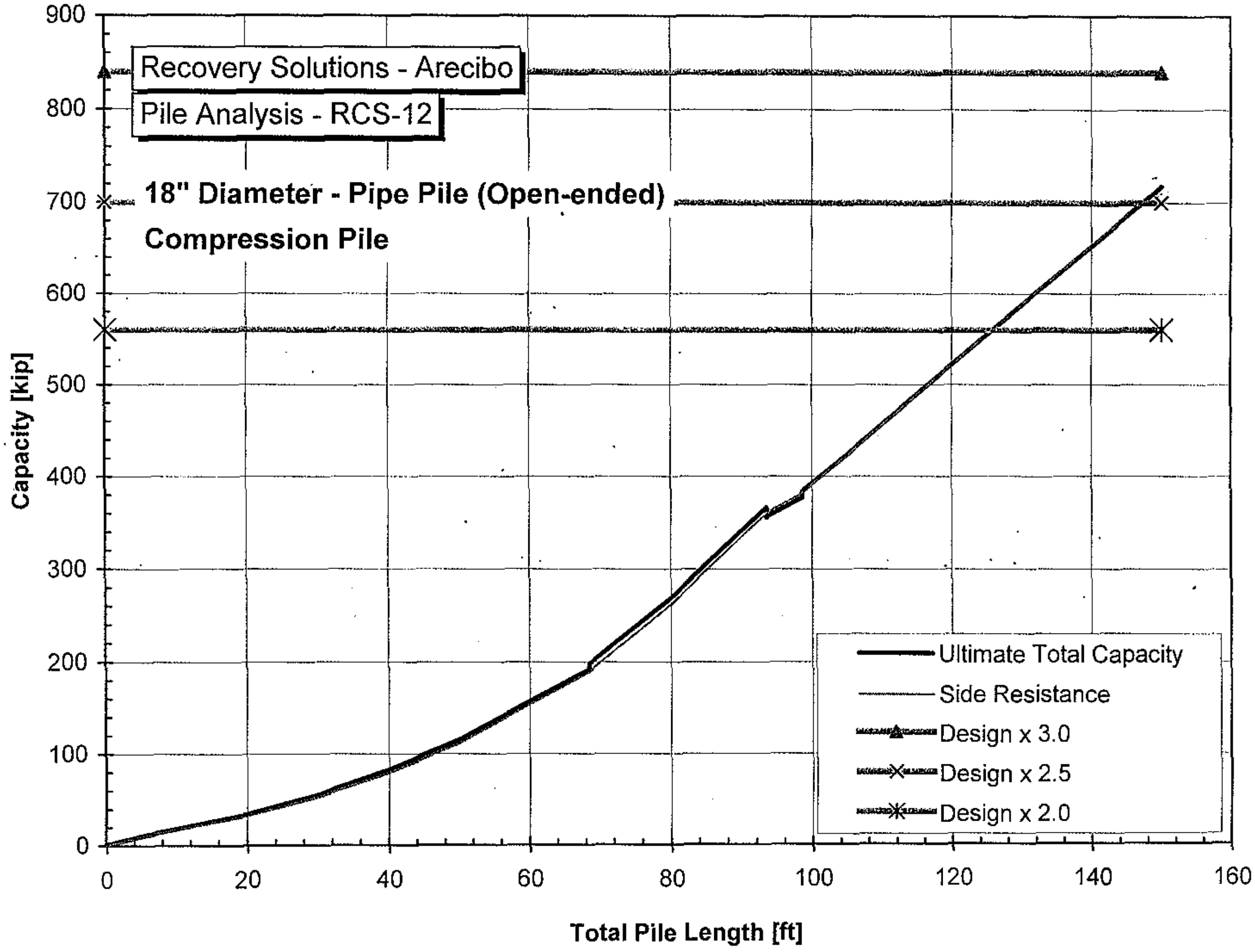


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 18 in. RCS-11
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

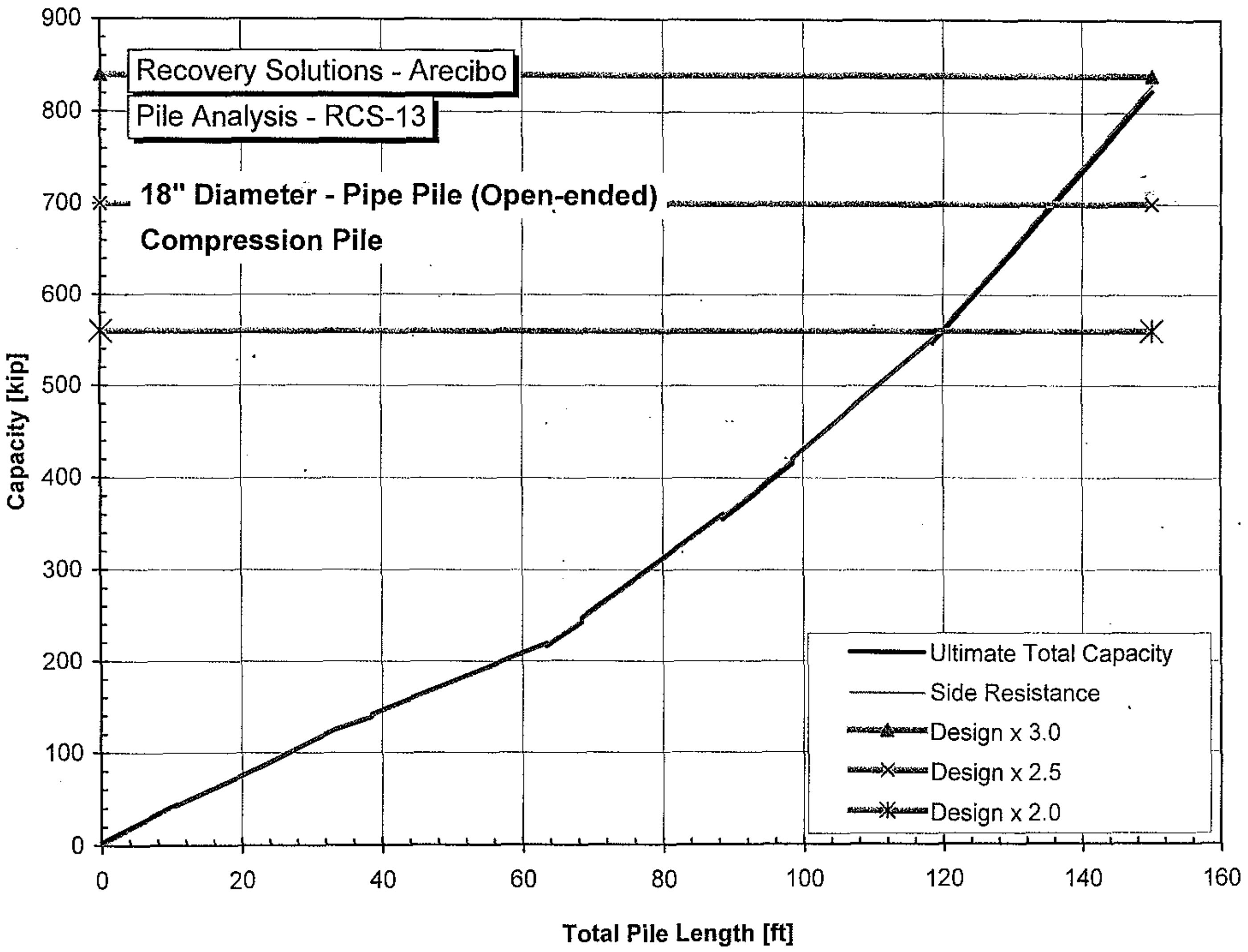


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 18 in. RCS-12
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

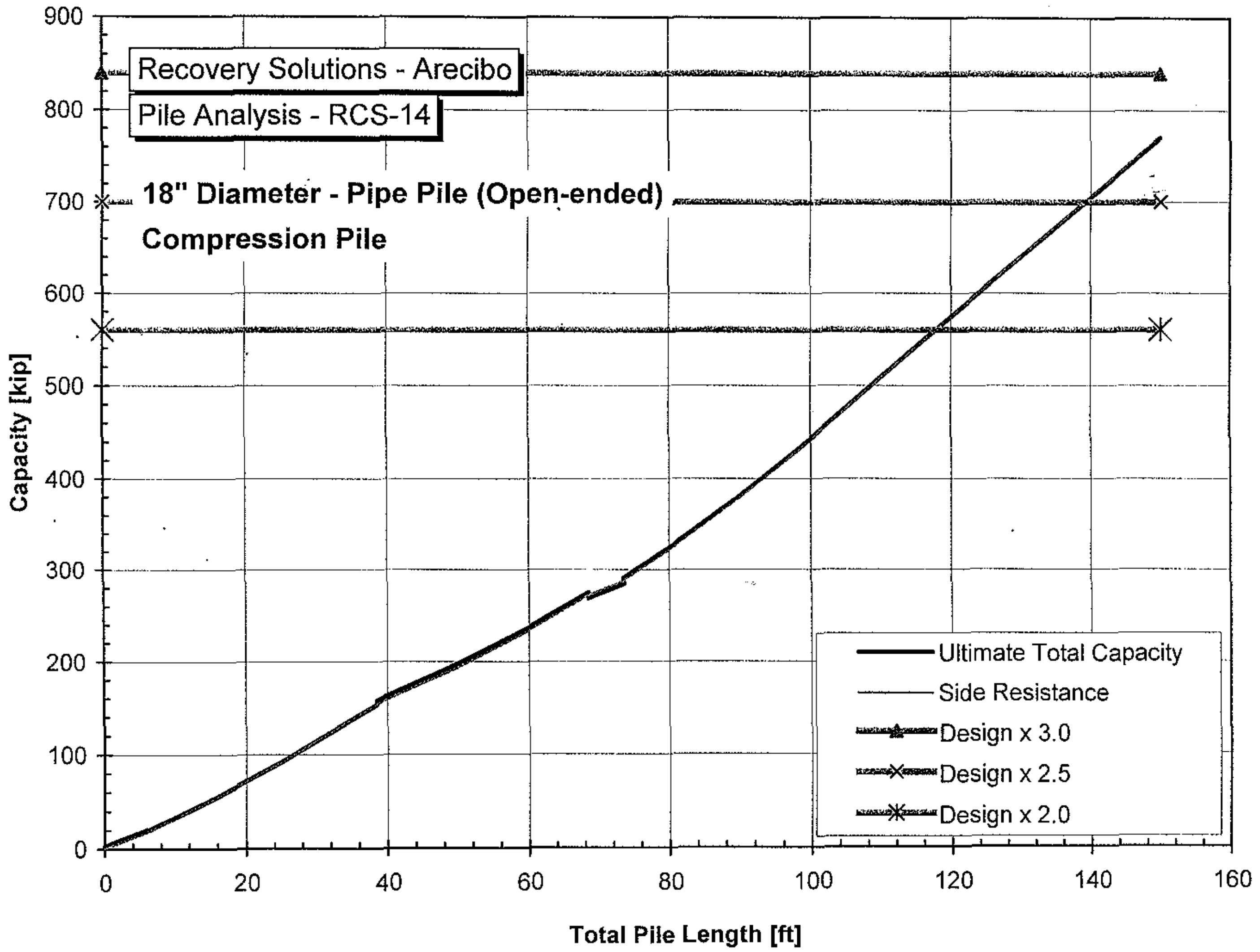


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 18 in. RCS-13
Assumes cohesive undrained behavior in limestone

GEOCONSULT

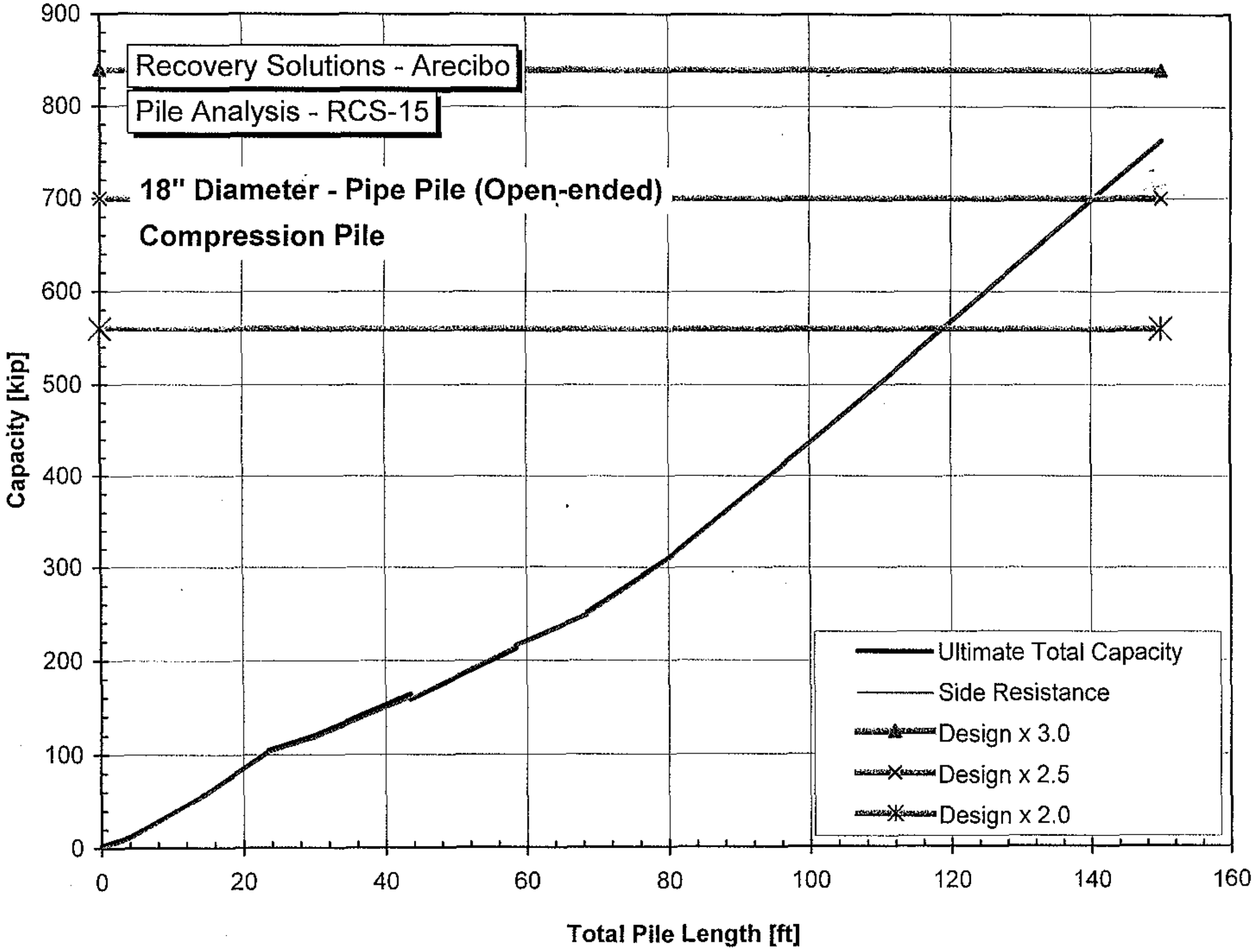
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 18 in. RCS-14
Assumes cohesive undrained behavior in limestone

Capacity vs Total Pile Length

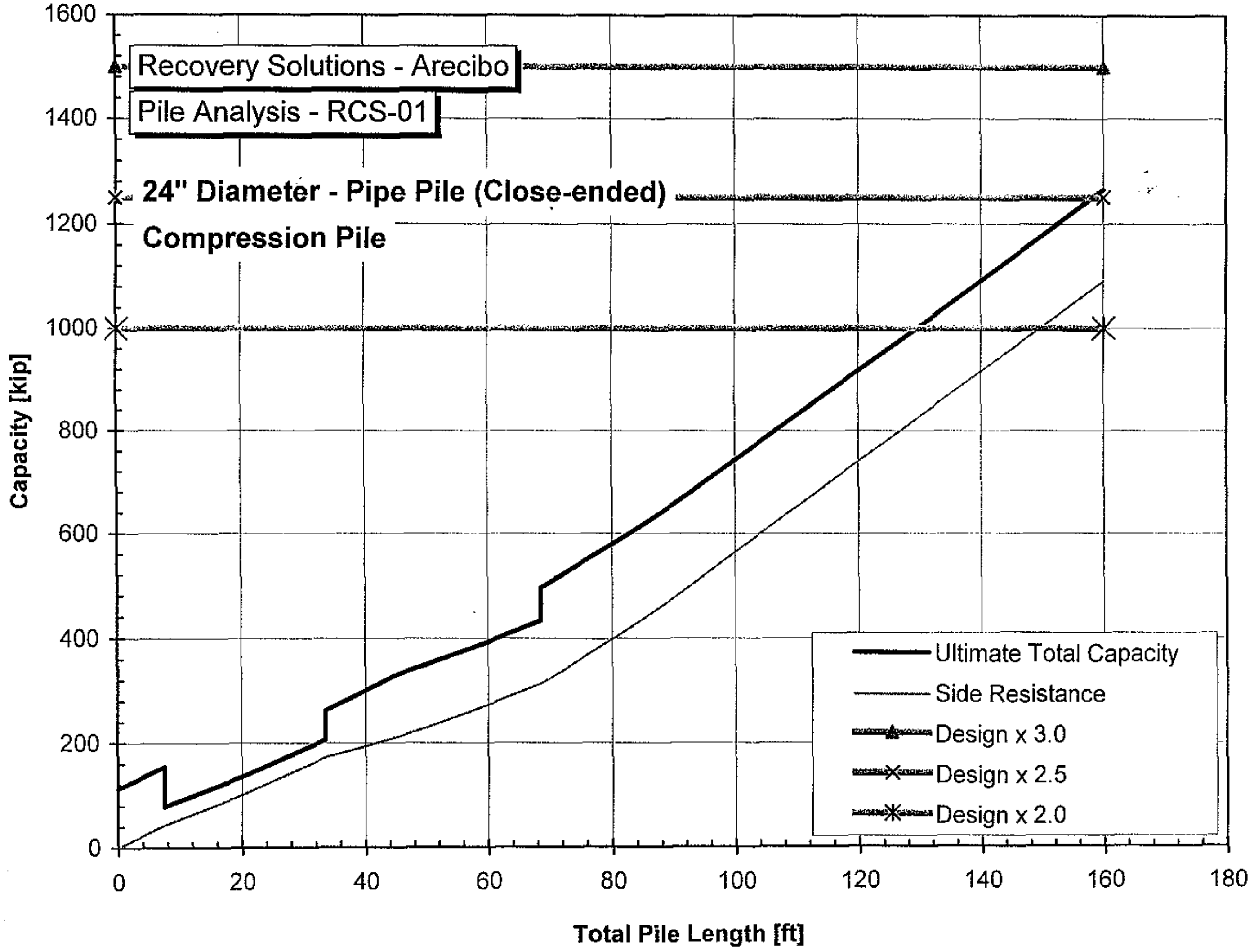


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 18 in. RCS-15
Assumes cohesive undrained behavior in limestone

GEOCONSULT

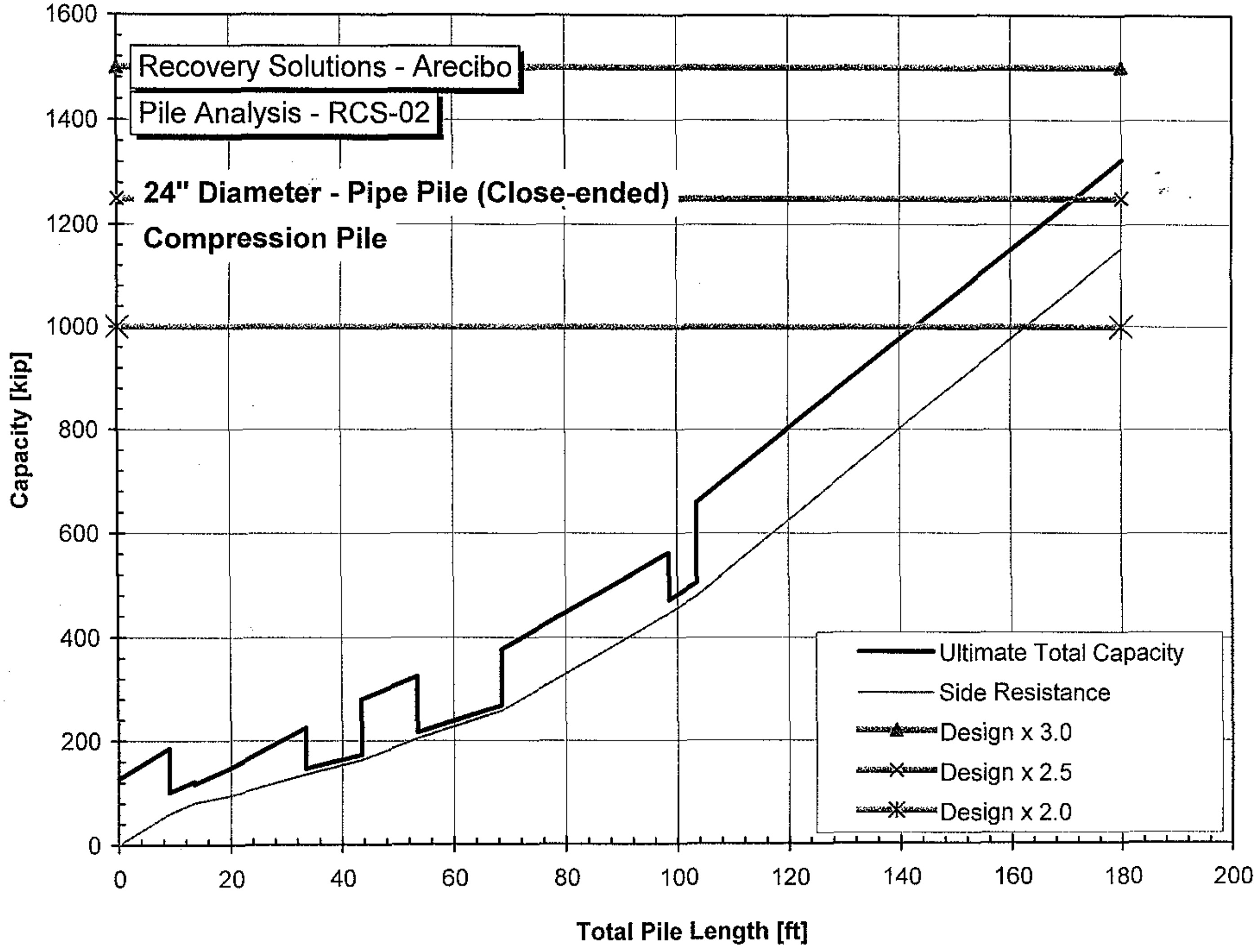
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 24 in. RCS-01 Closed
Assumes cohesive undrained behavior in limestone

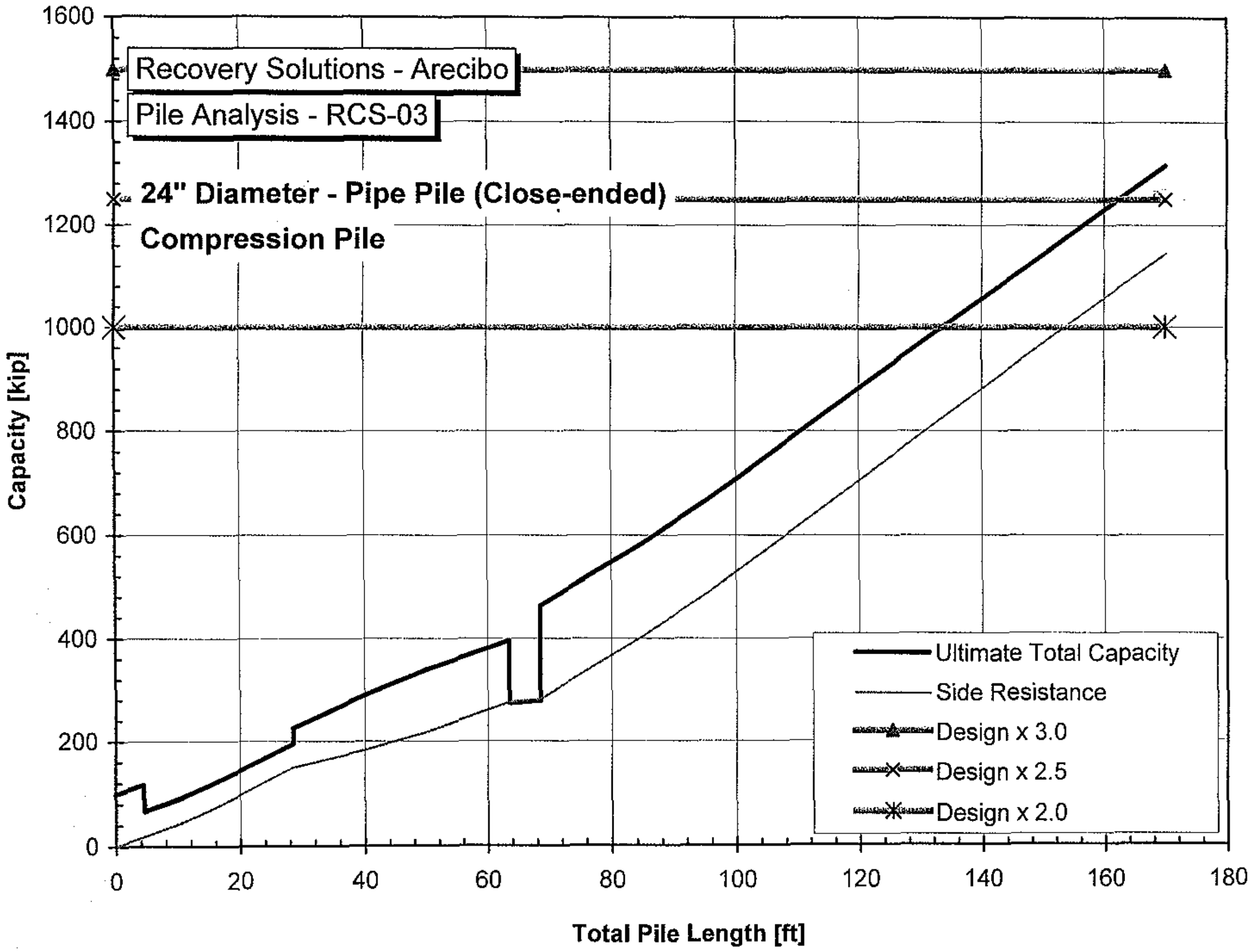
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 24 in. RCS-02 Closed
Assumes cohesive undrained behavior in limestone

Capacity vs Total Pile Length

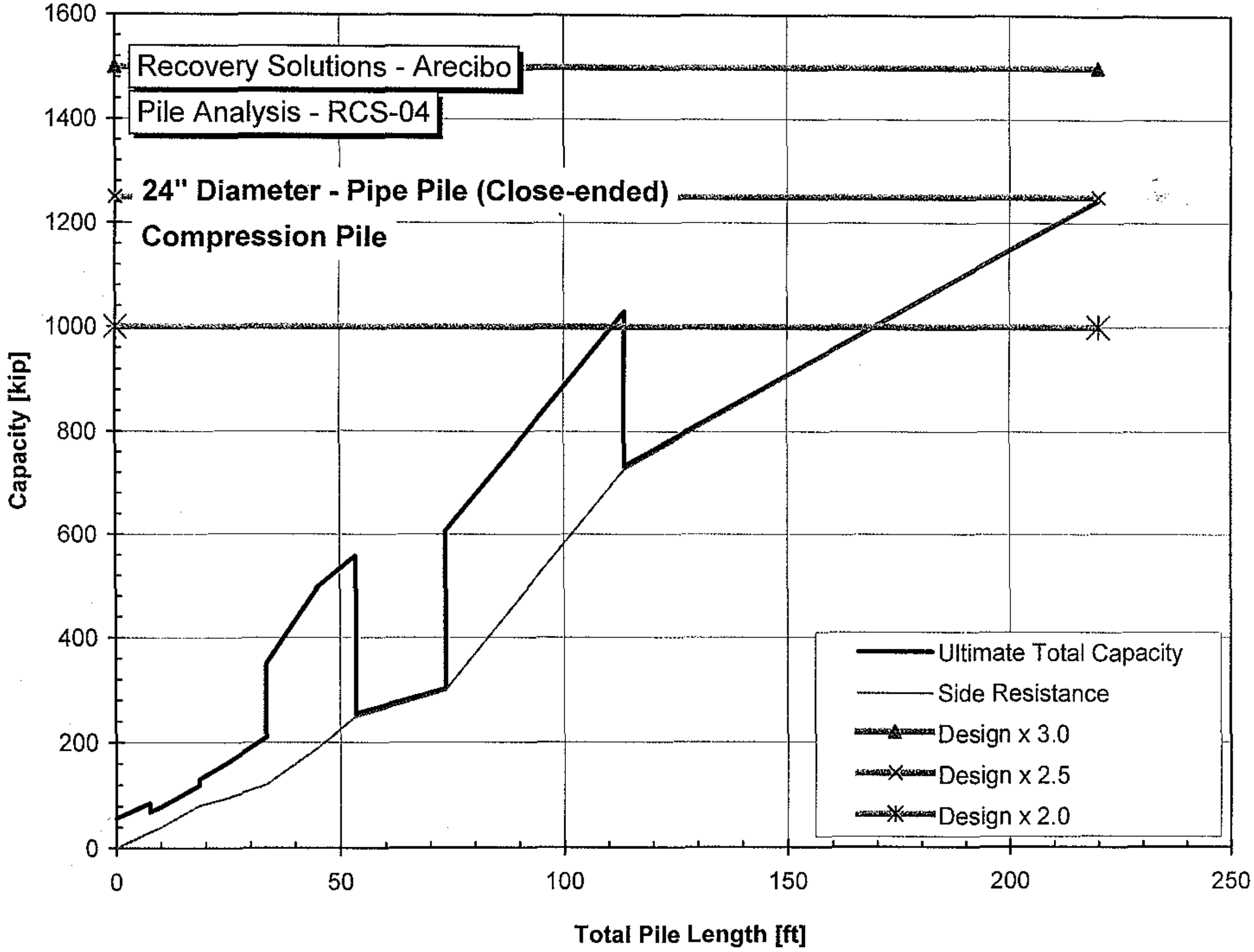


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 24 in. RCS-03 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

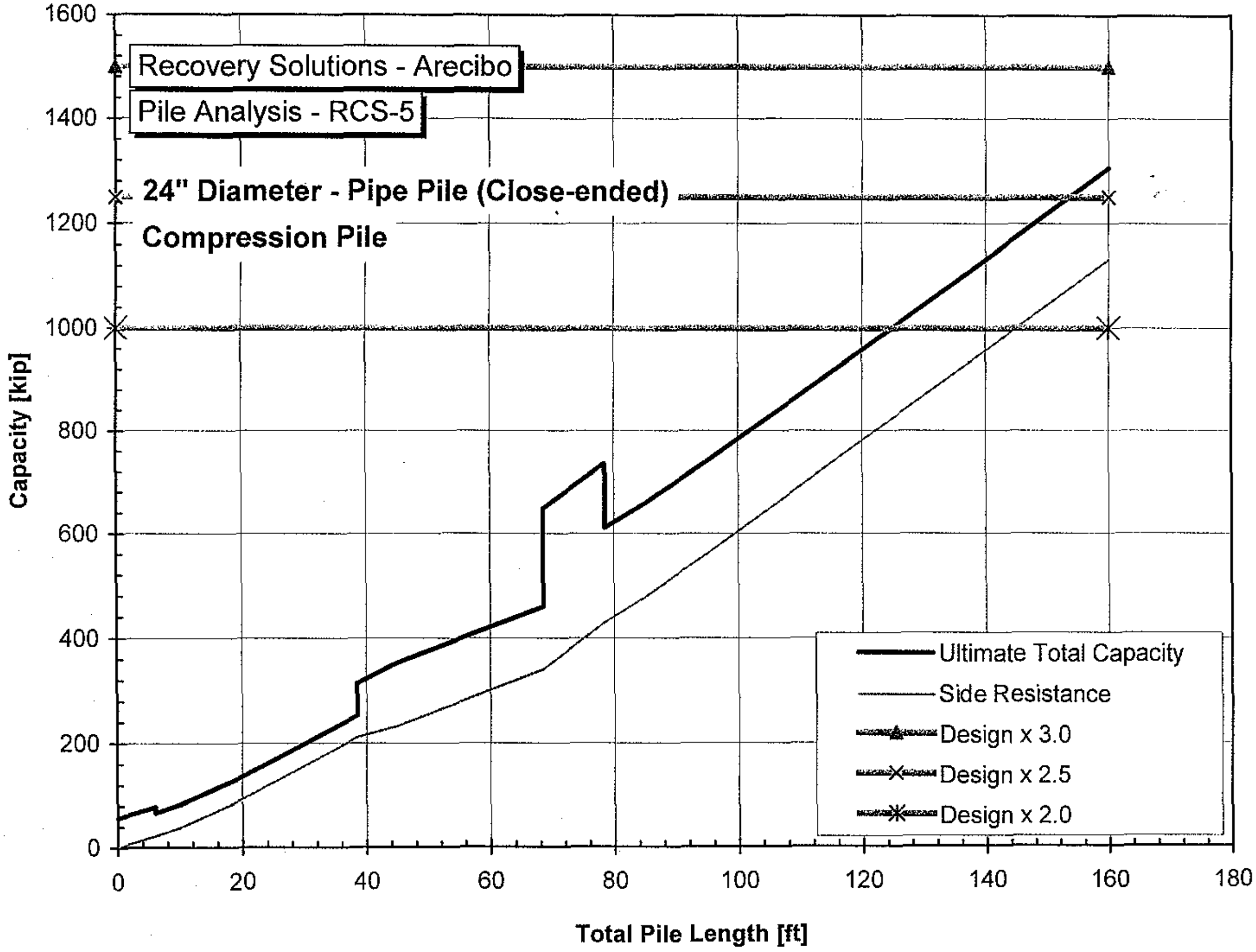


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 24 in. RCS-04 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

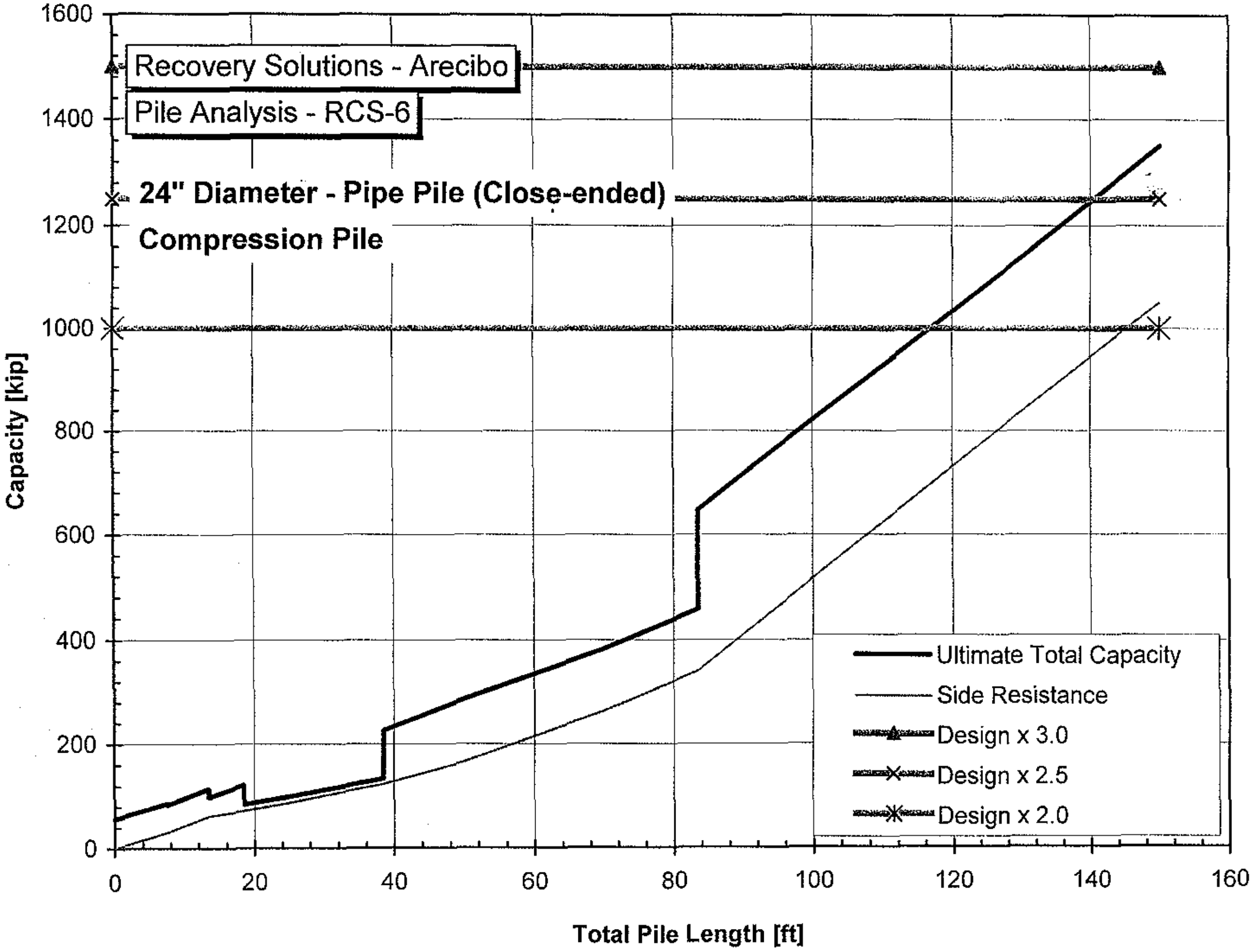
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 24 in. RCS-05 Closed
Assumes cohesive undrained behavior in limestone

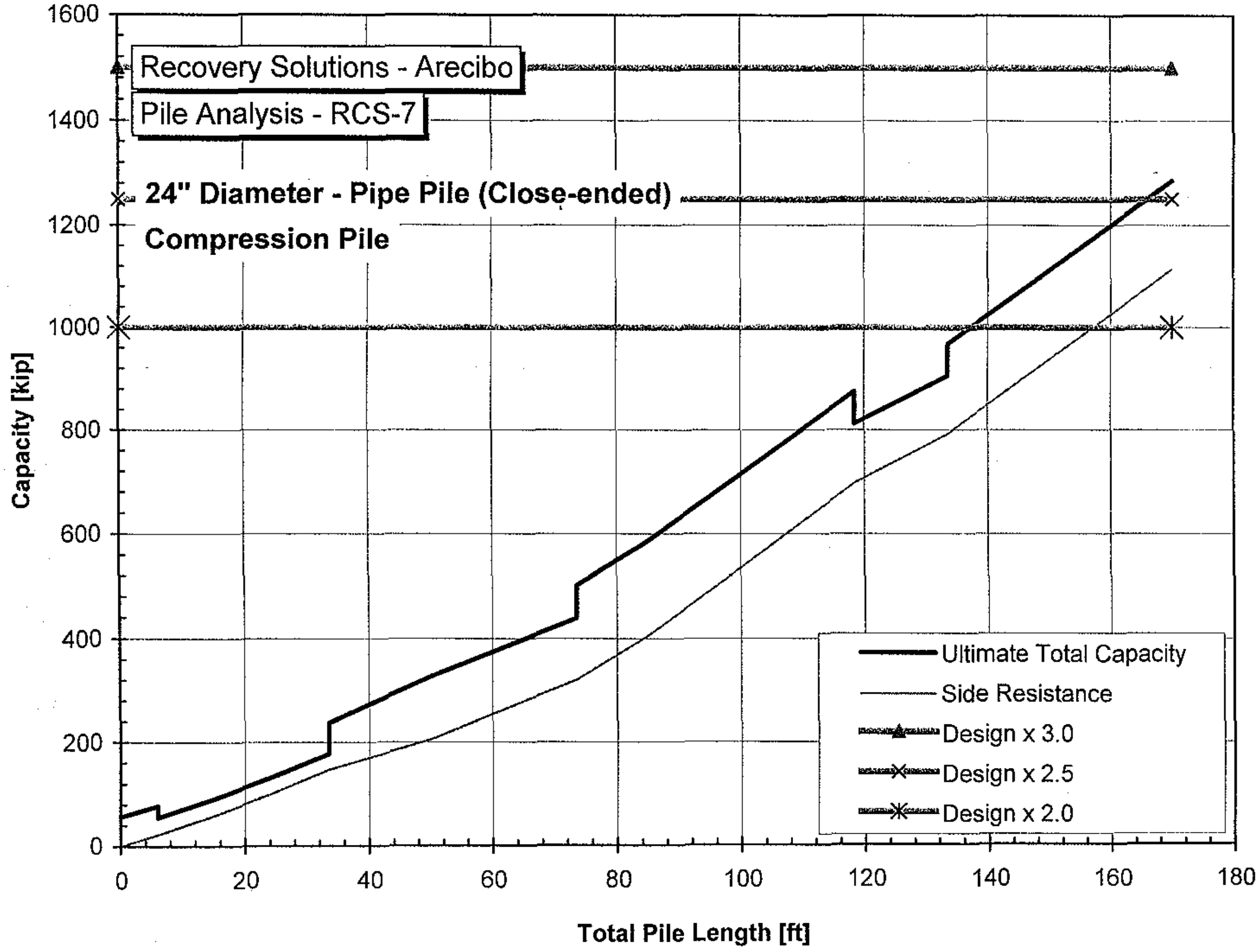
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 24 in. RCS-06 Closed
Assumes cohesive undrained behavior in limestone

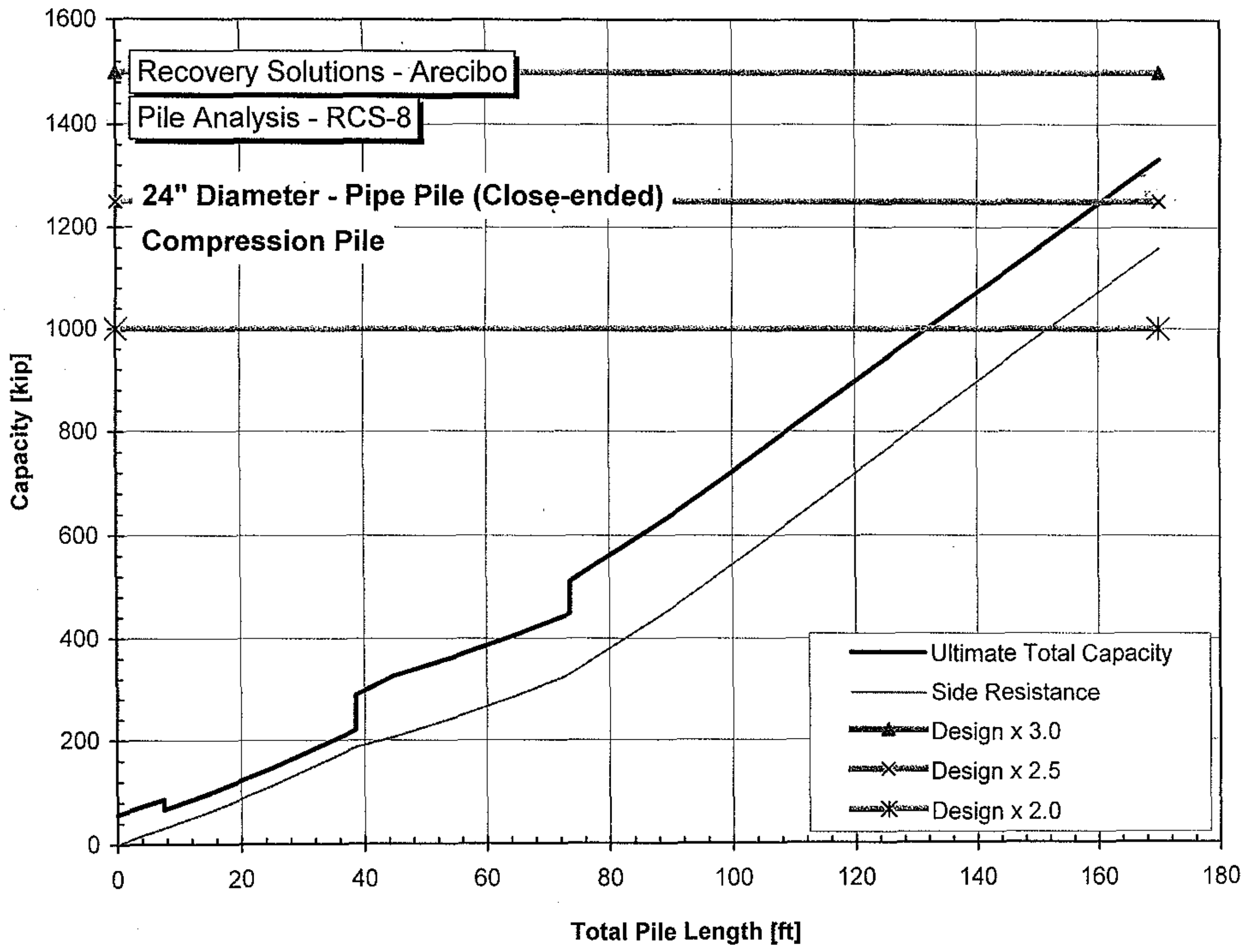
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 24 in. RCS-07 Closed
Assumes cohesive undrained behavior in limestone

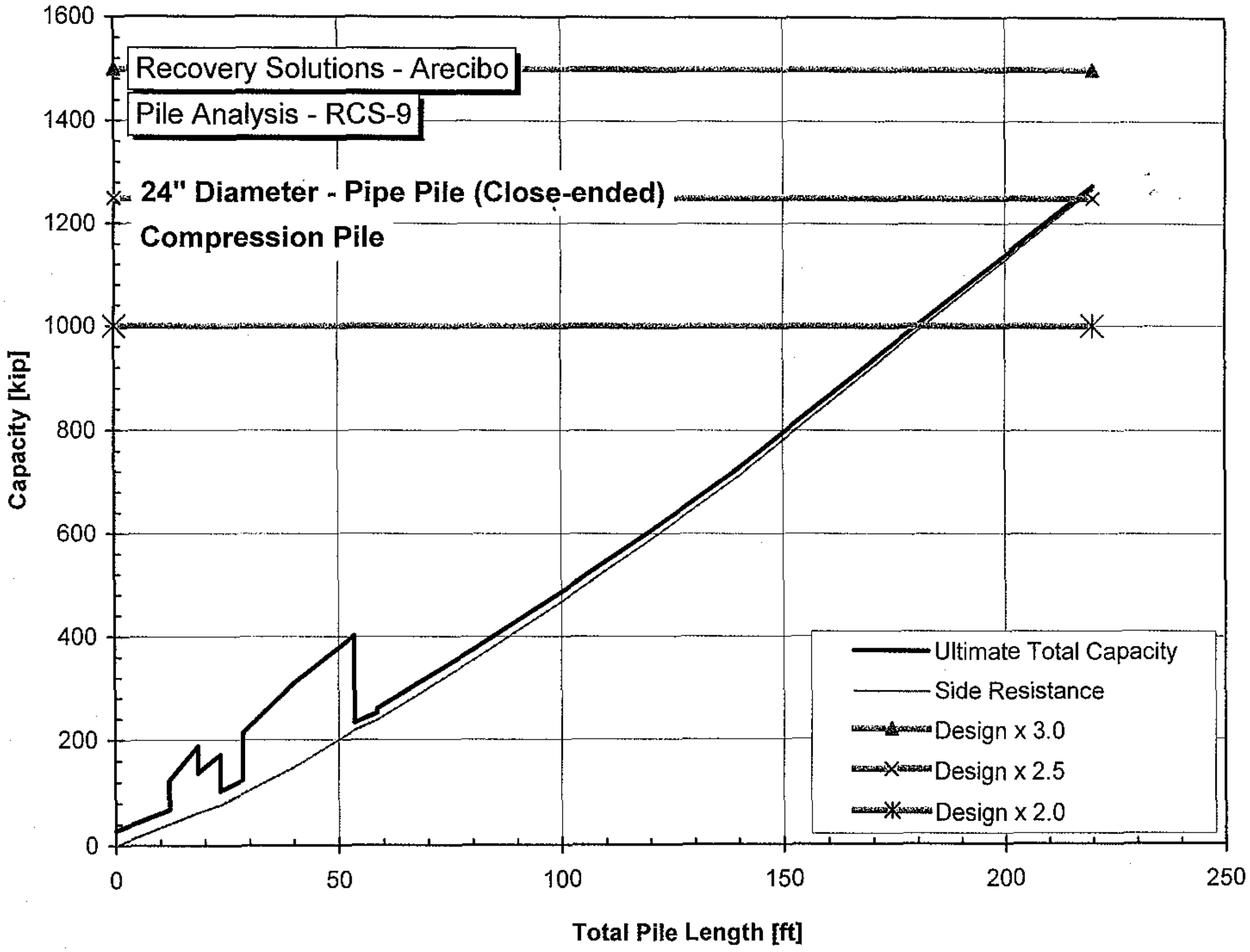
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 24 in. RCS-08 Closed
Assumes cohesive undrained behavior in limestone

Capacity vs Total Pile Length

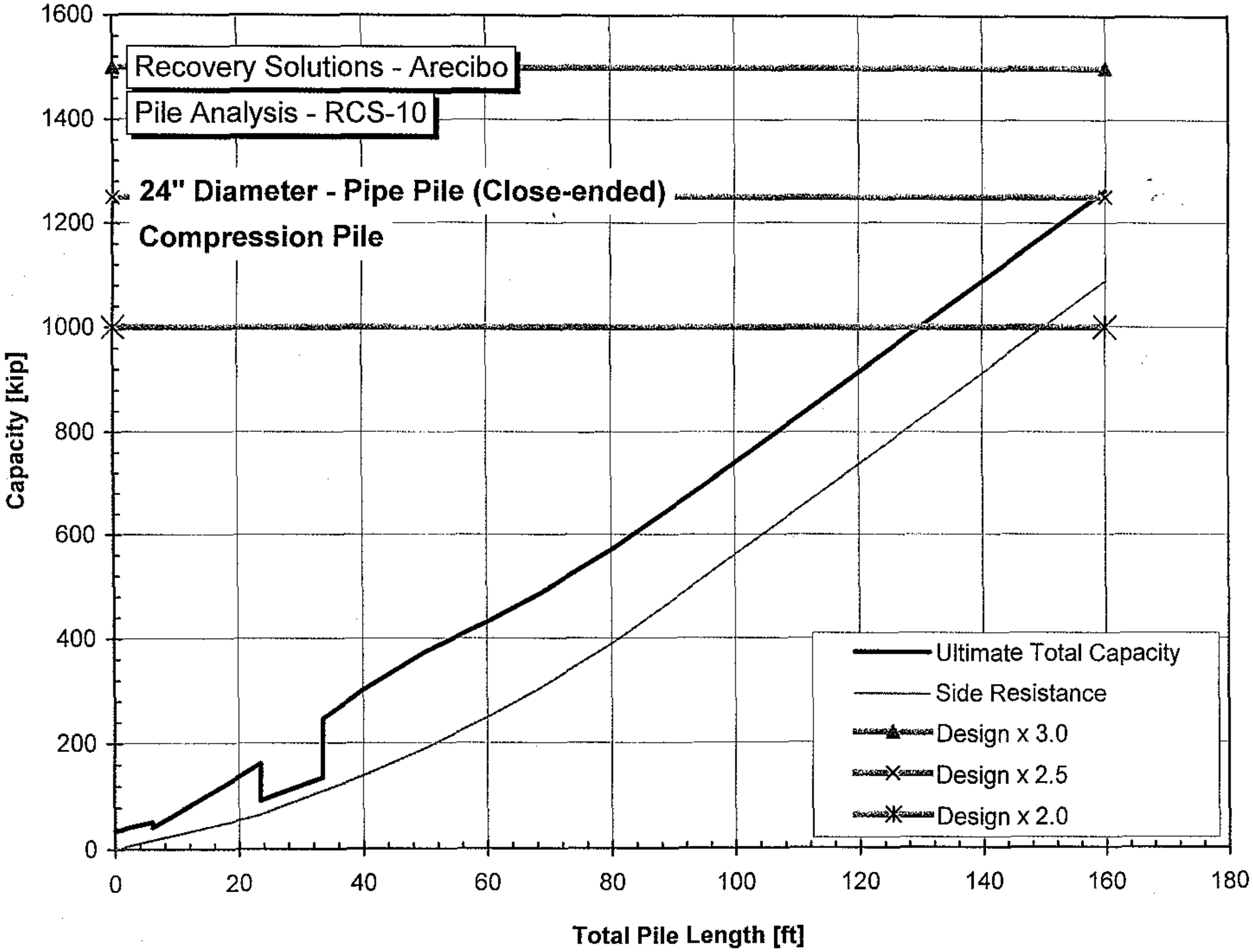


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 24 in. RCS-09 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

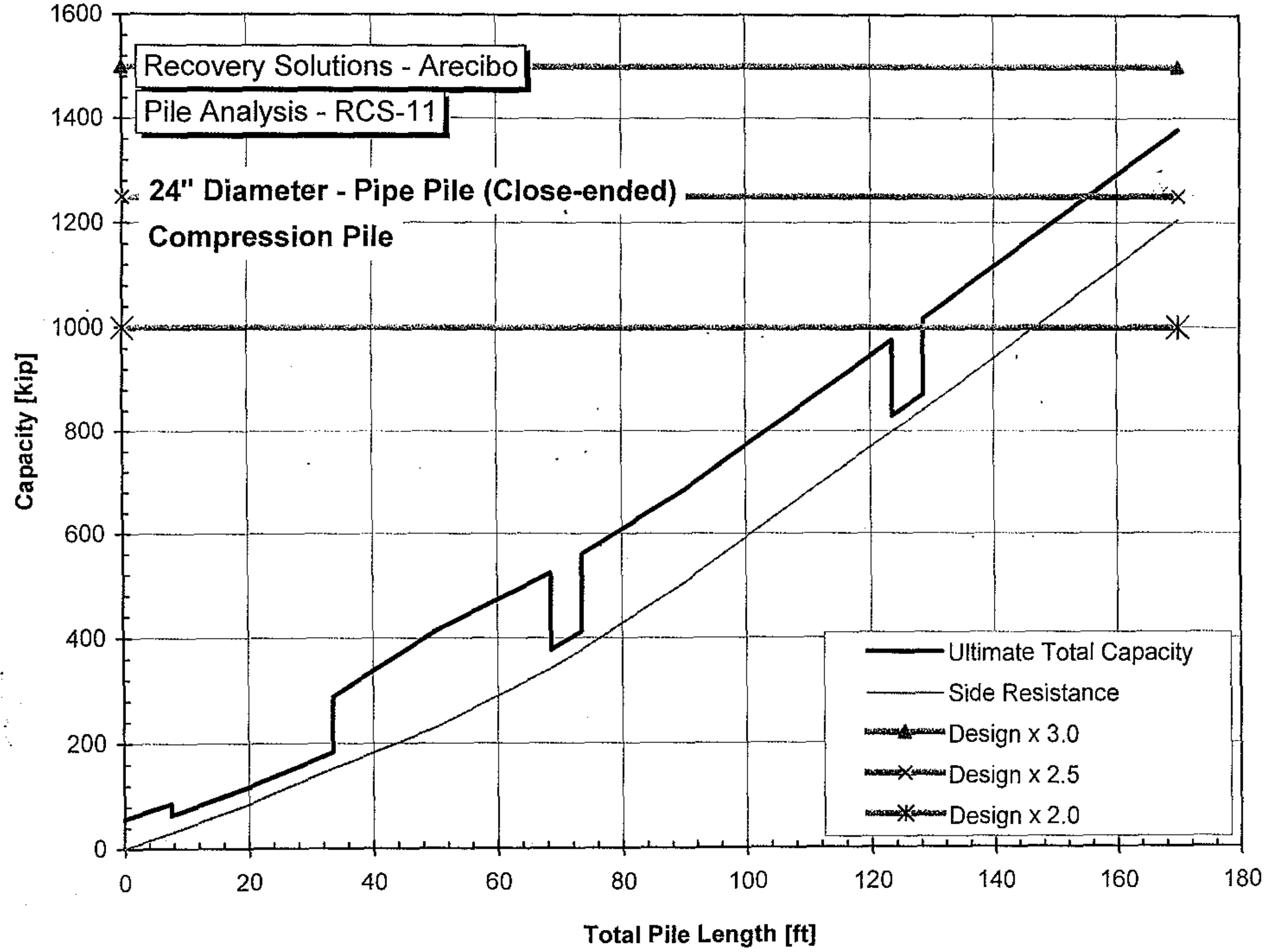
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

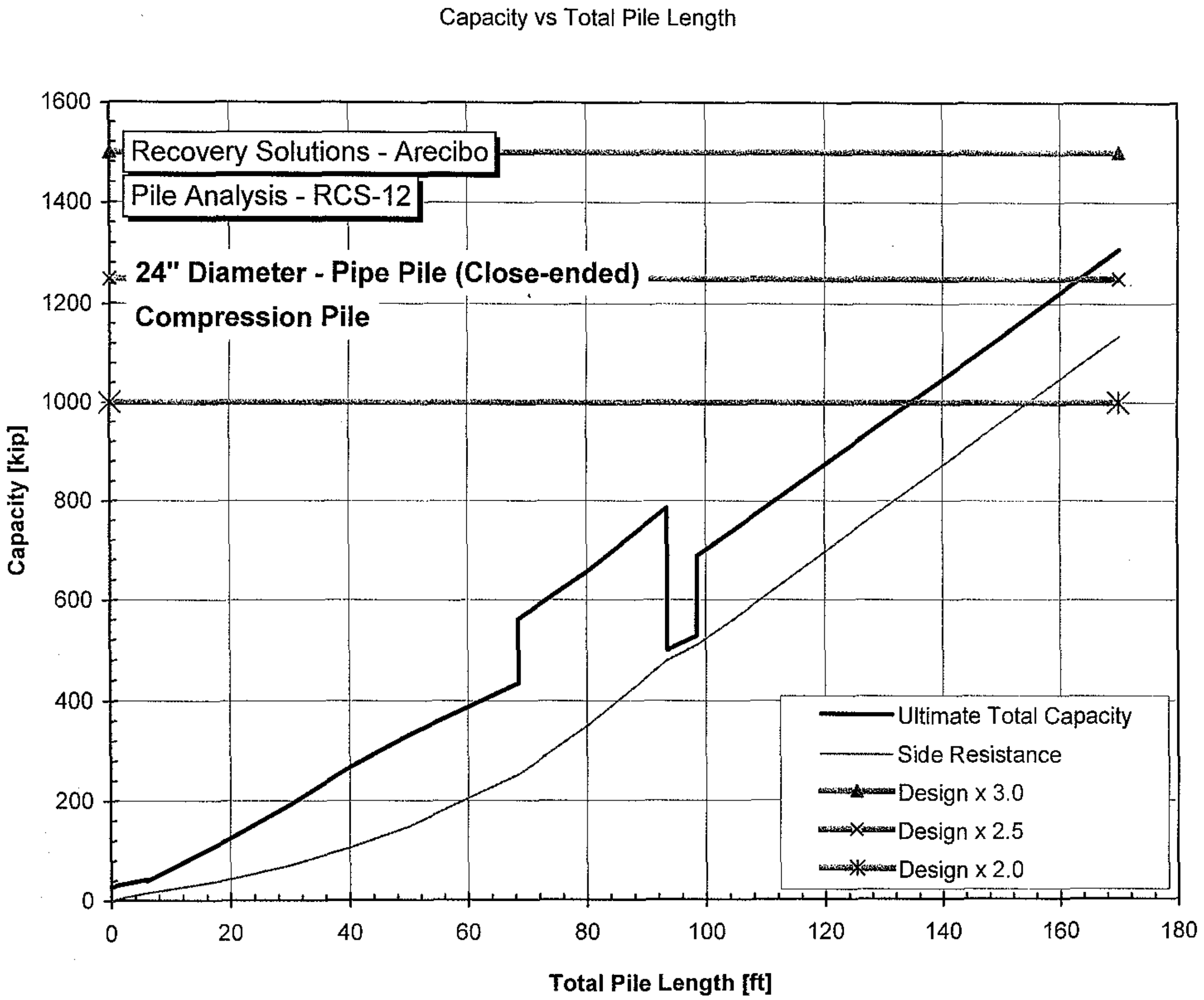
File API Analysis - Compression Pipe Pile 24 in. RCS-10 Closed
Assumes cohesive undrained behavior in limestone

Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

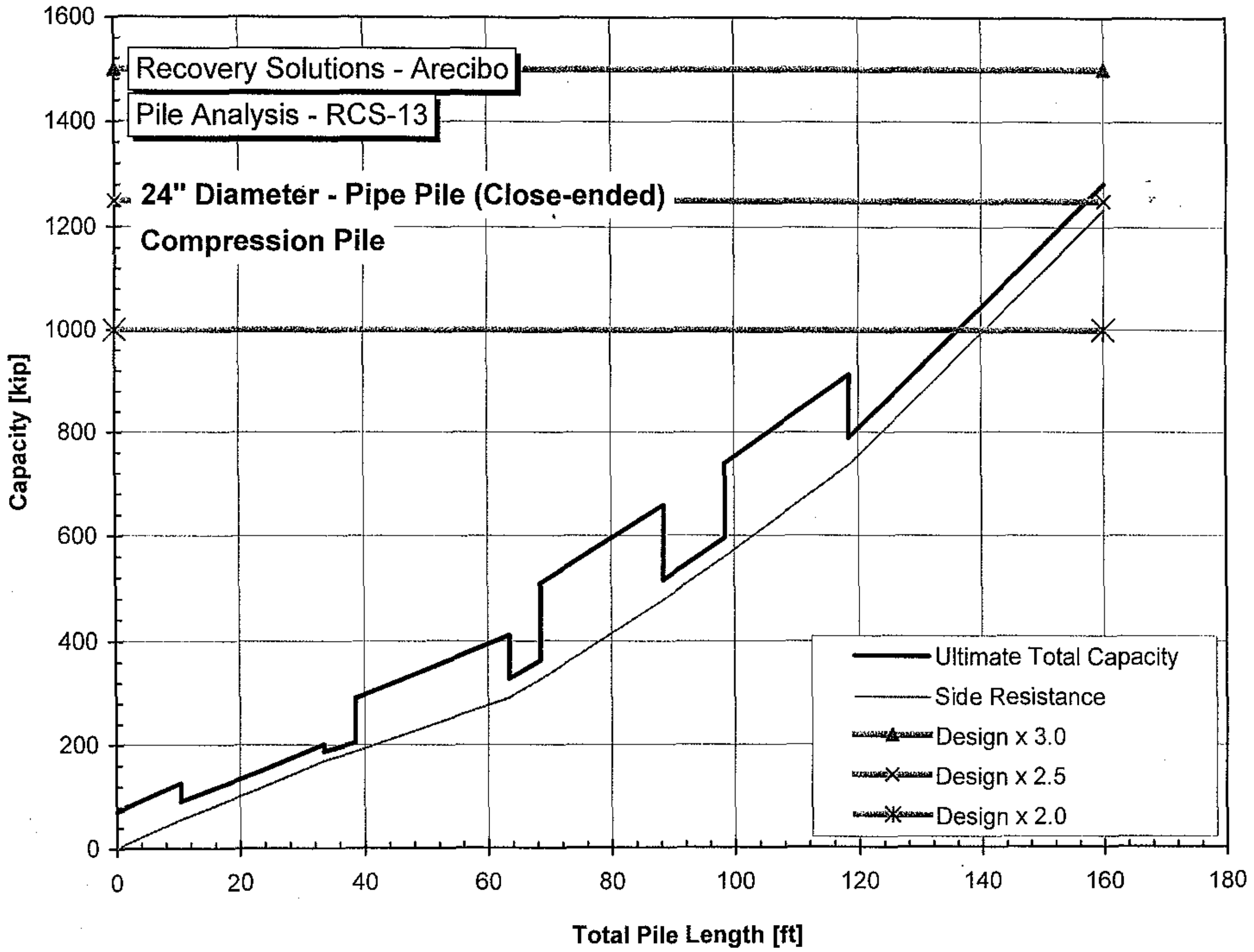
File API Analysis - Compression Pipe Pile 24 in. RCS-11 Closed
Assumes cohesive undrained behavior in limestone



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 24 in. RCS-12 Closed
Assumes cohesive undrained behavior in limestone

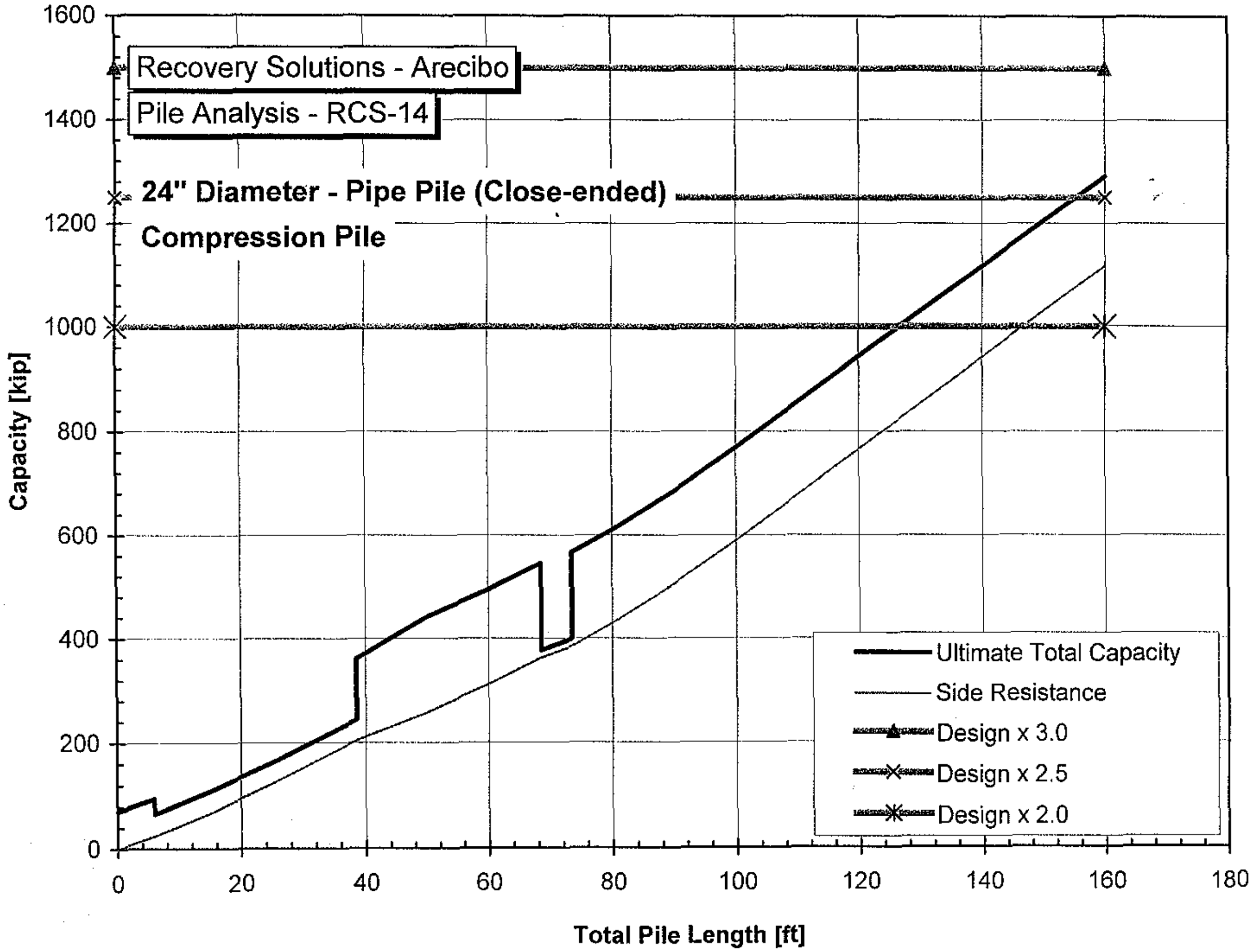
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 24 in. RCS-13 Closed
Assumes cohesive undrained behavior in limestone

Capacity vs Total Pile Length

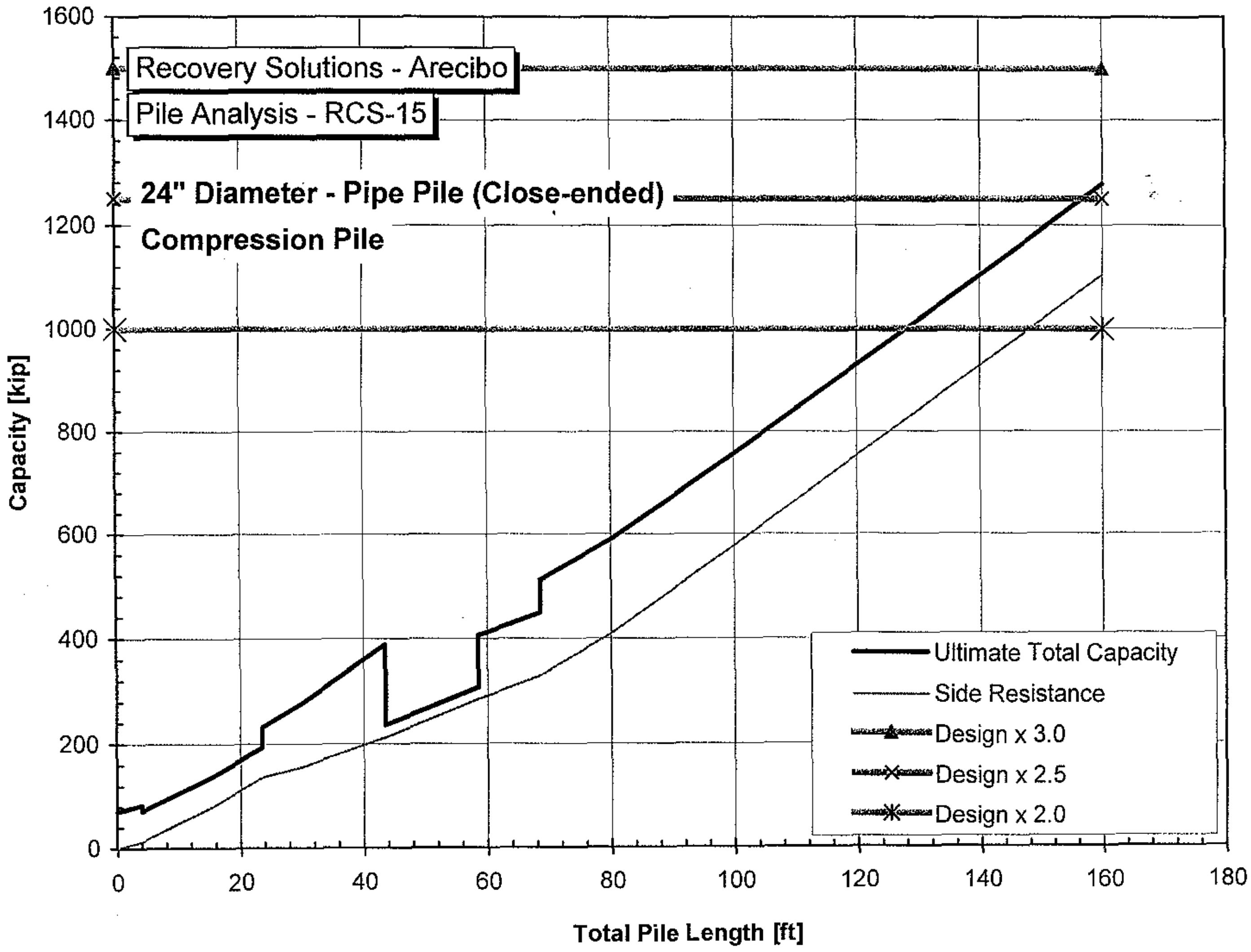


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 24 in. RCS-14 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

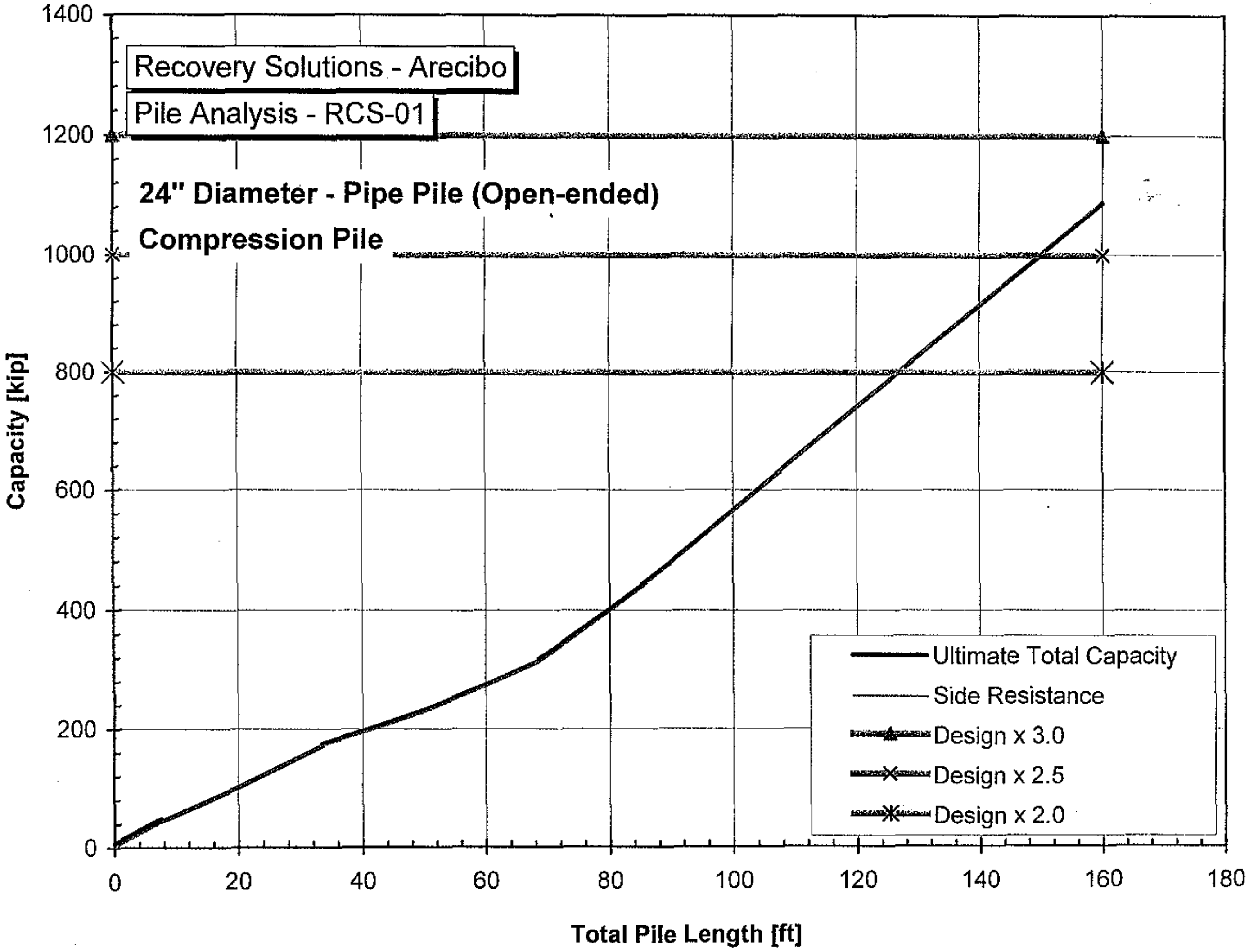
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 24 in. RCS-15 Closed
Assumes cohesive undrained behavior in limestone

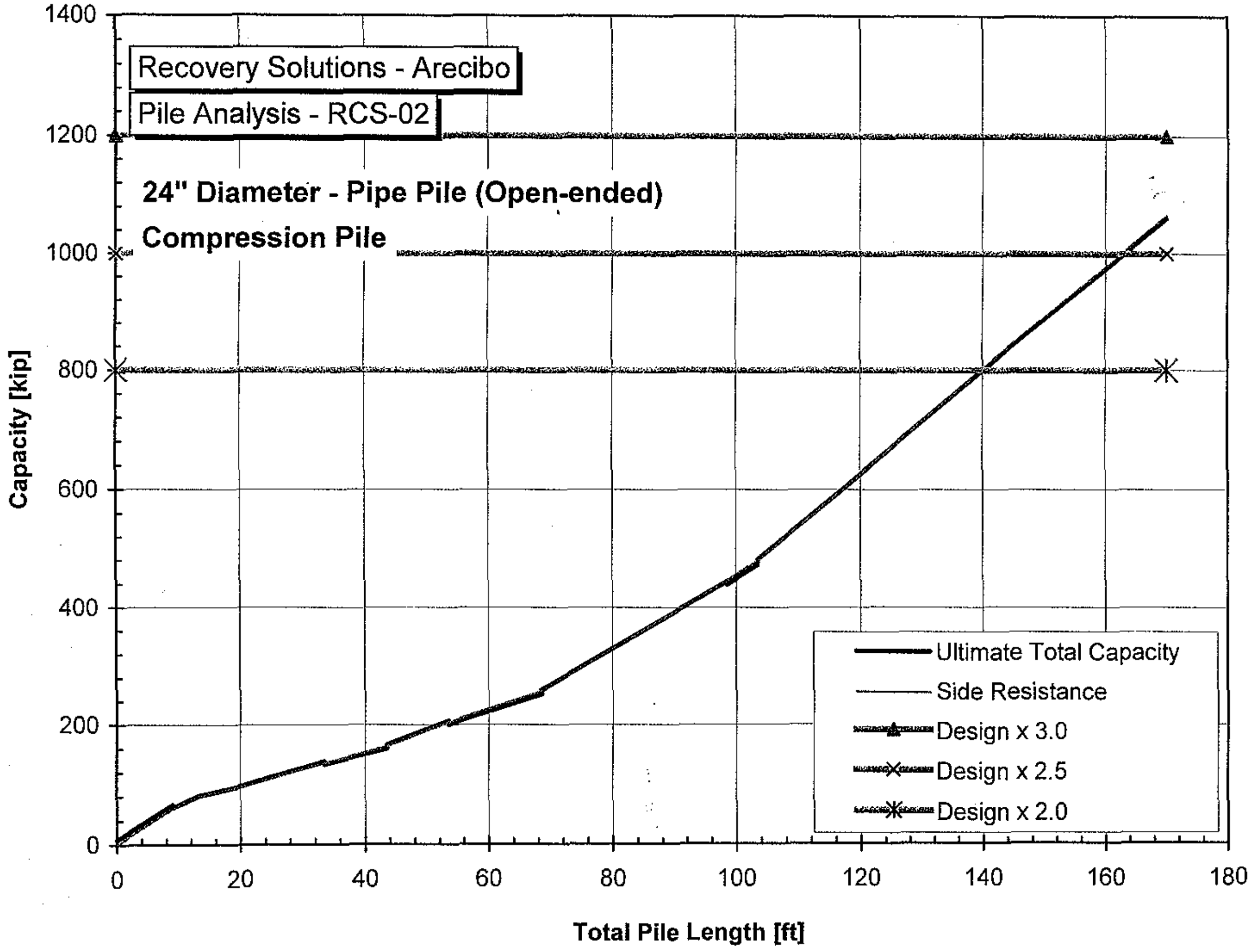
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 24 in. RCS-01
Assumes cohesive undrained behavior in limestone

Capacity vs Total Pile Length

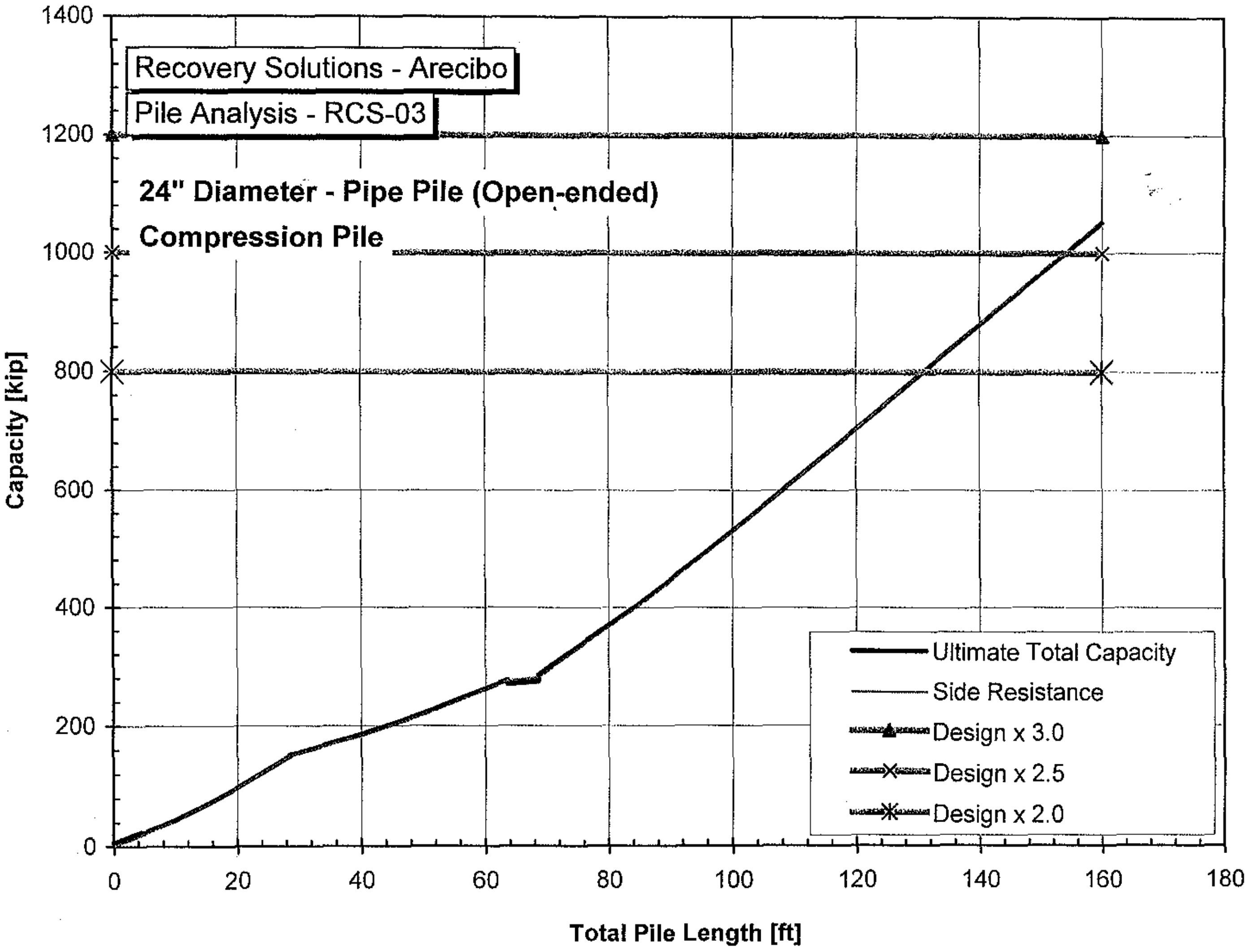


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 24 in. RCS-02
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

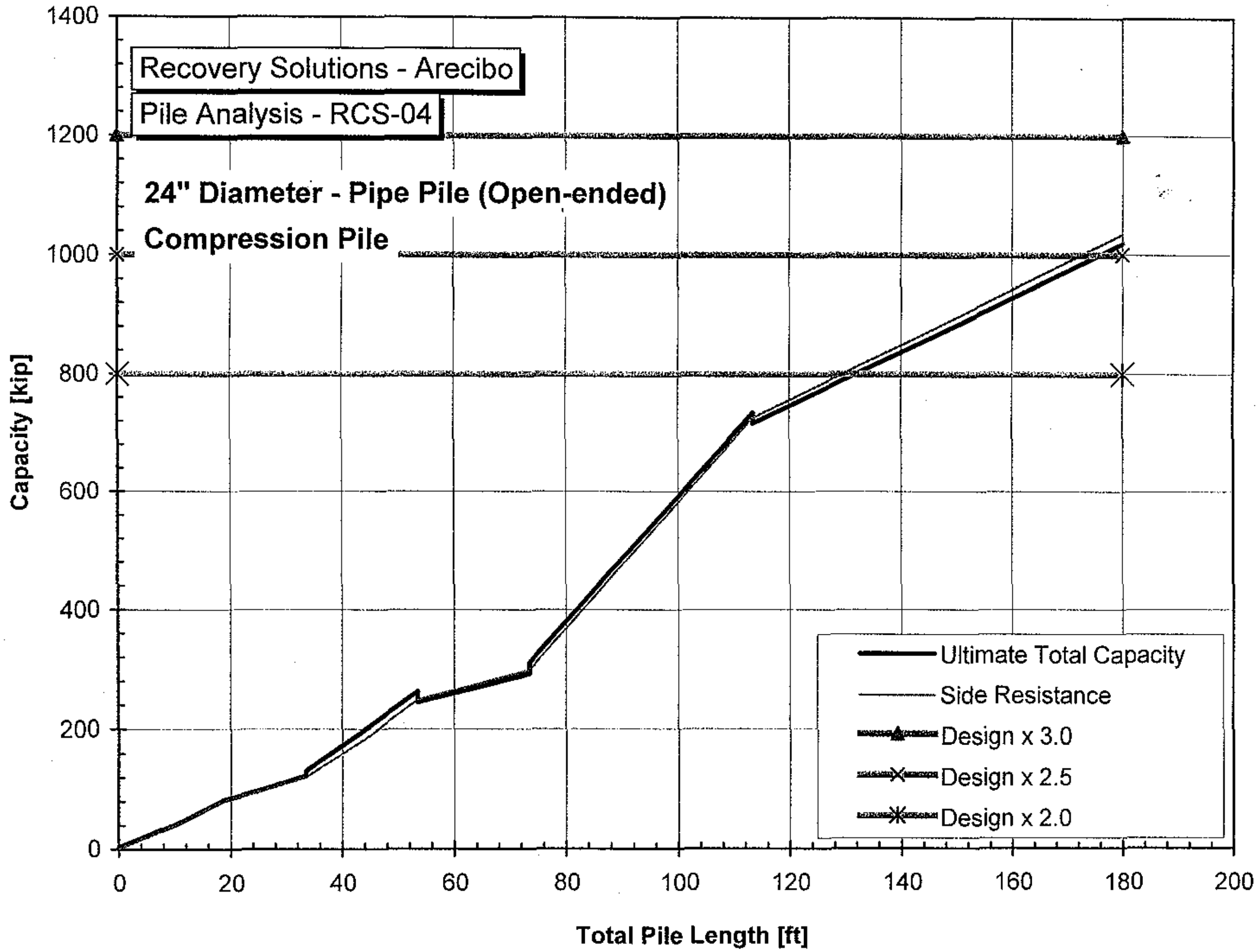


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 24 in. RCS-03
Assumes cohesive undrained behavior in limestone

GEOCONSULT

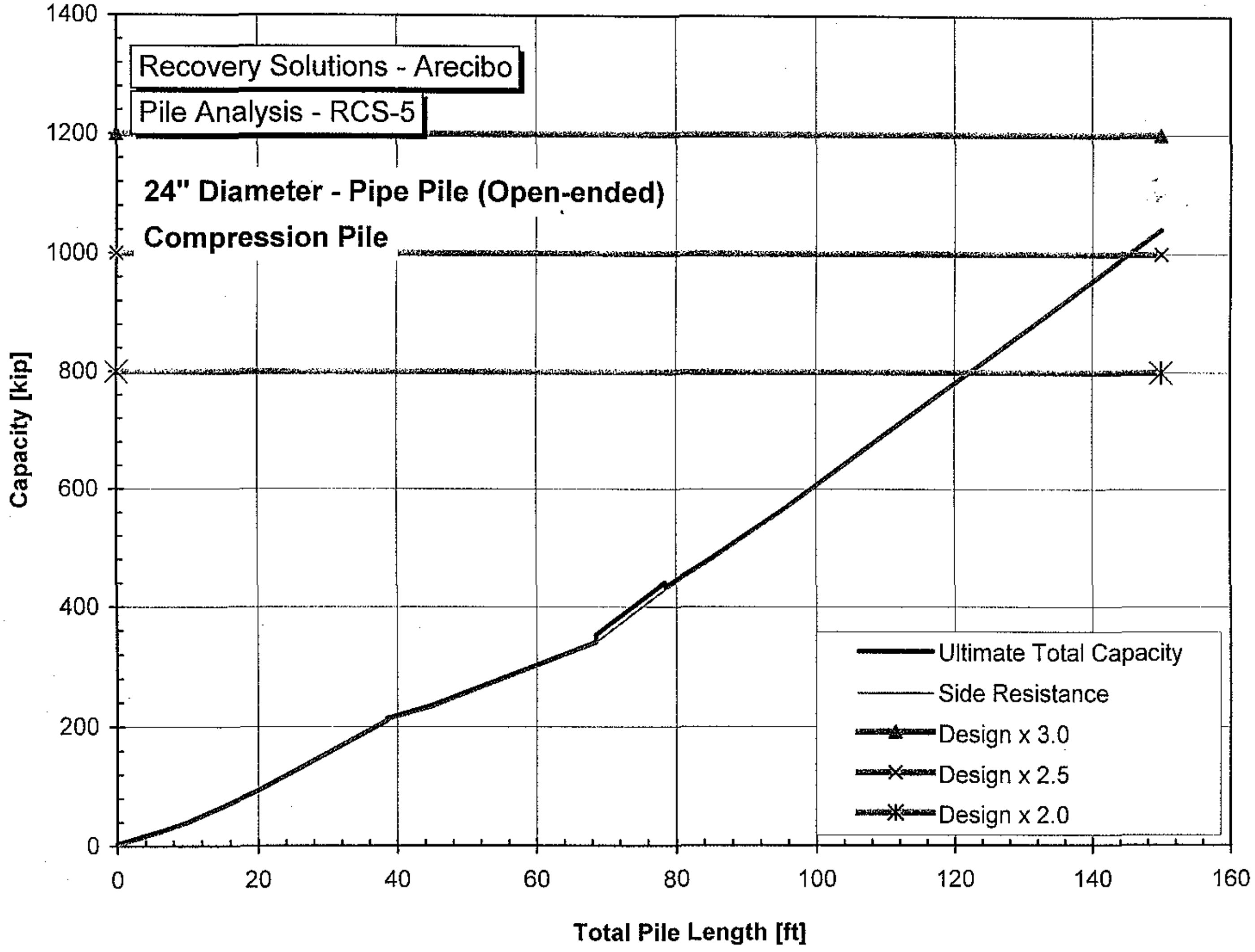
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 24 in. RCS-04
Assumes cohesive undrained behavior in limestone

Capacity vs Total Pile Length

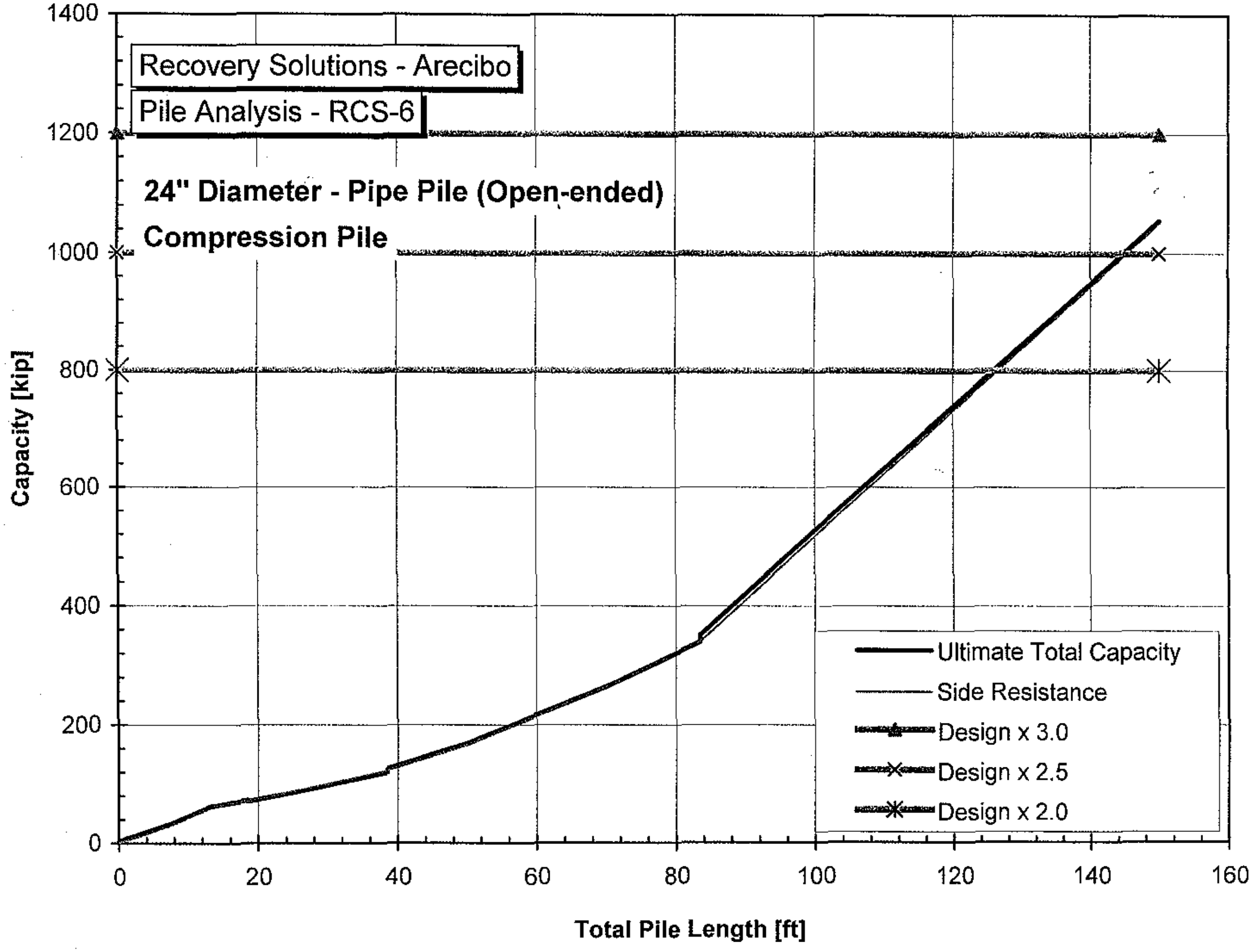


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 24 in. RCS-05
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

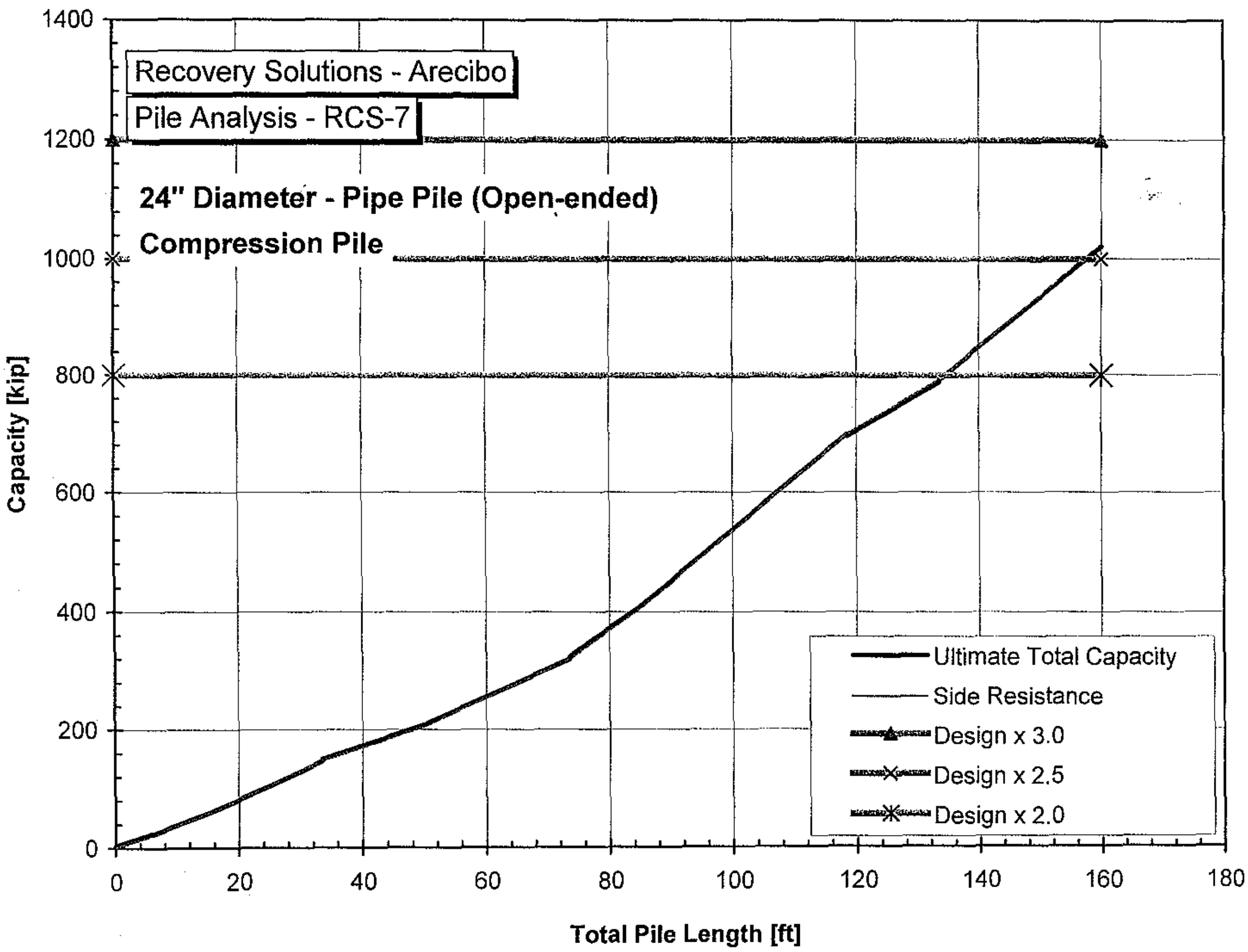


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 24 in. RCS-06
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

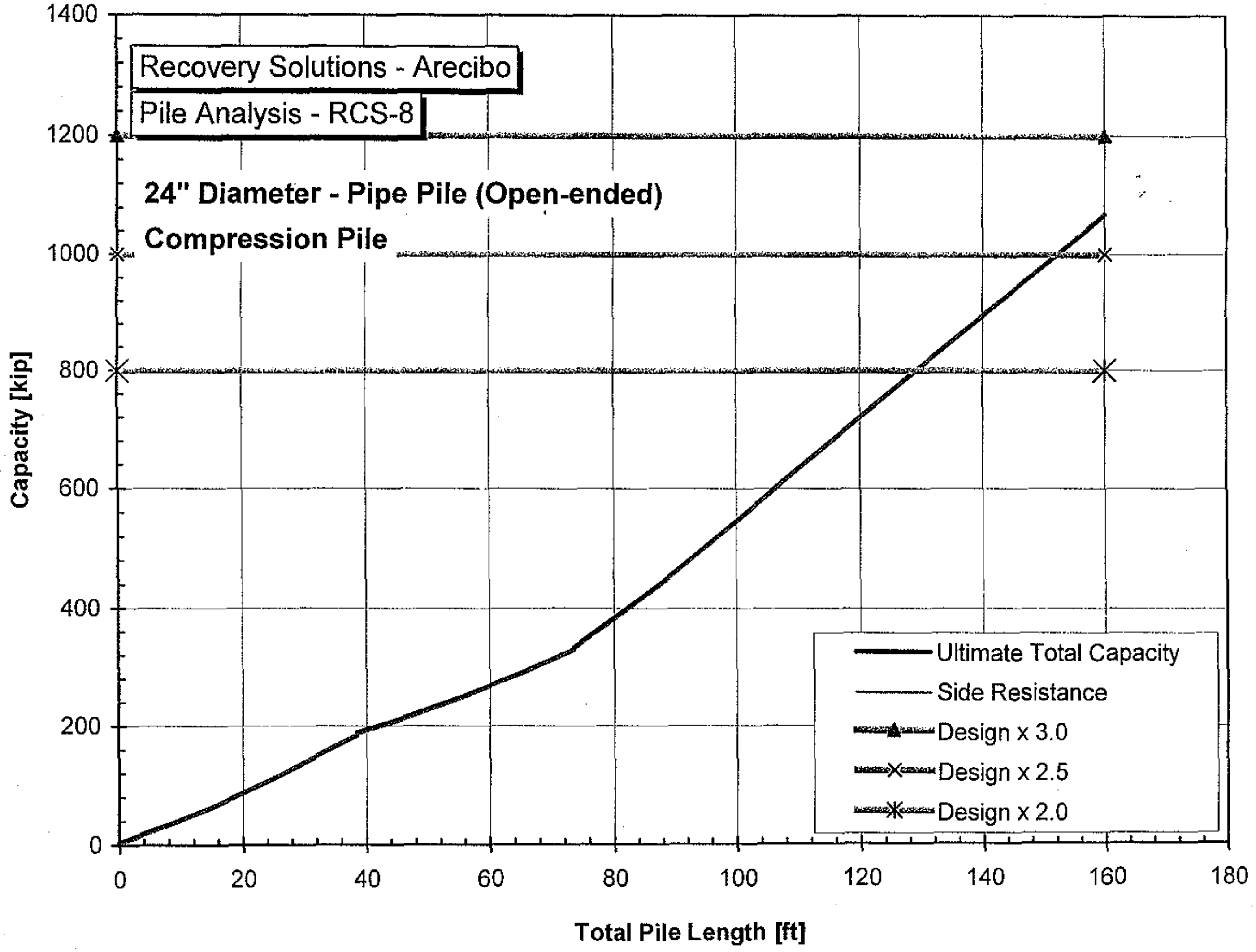


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 24 in. RCS-07
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

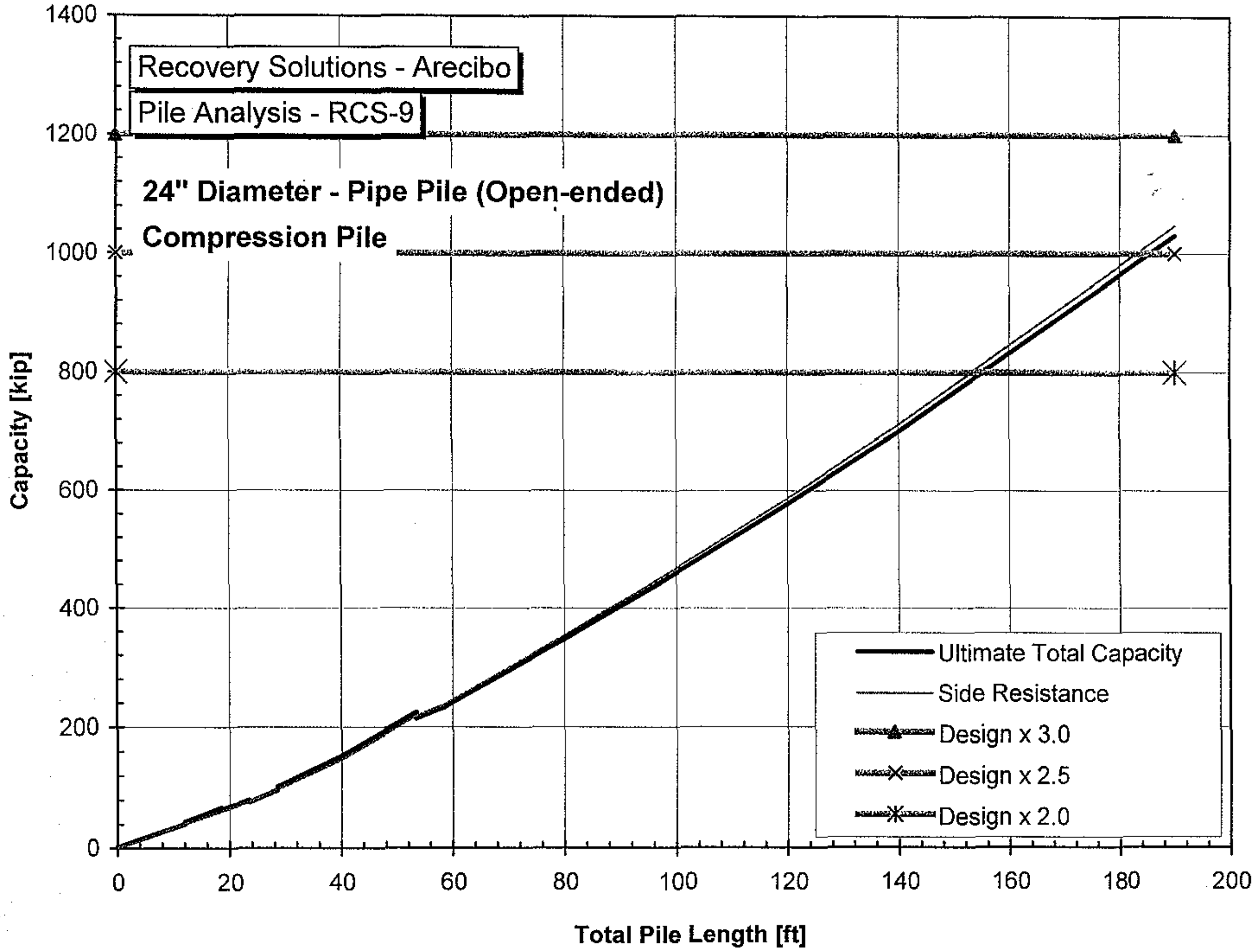


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 24 in. RCS-08
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

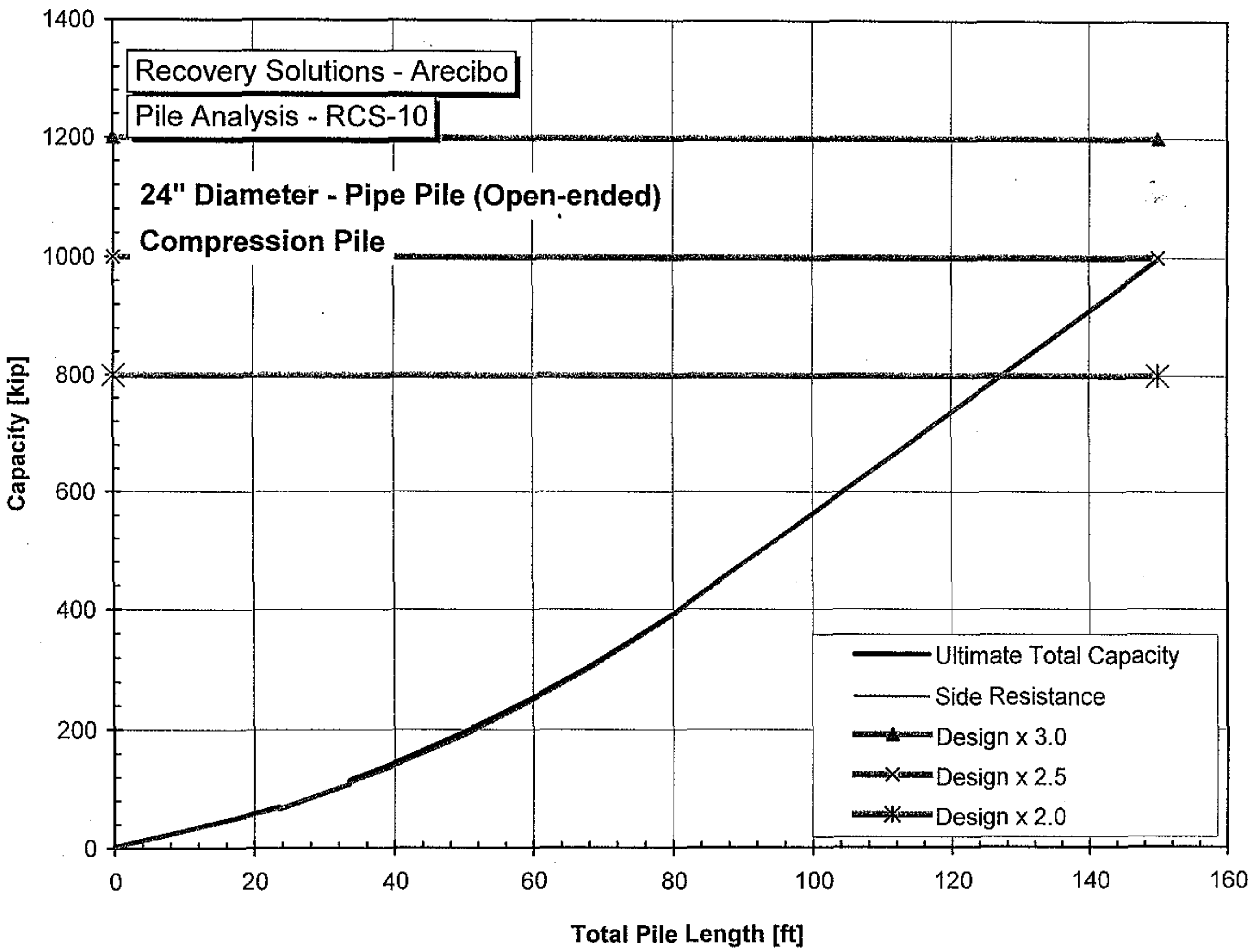


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 24 in. RCS-09
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

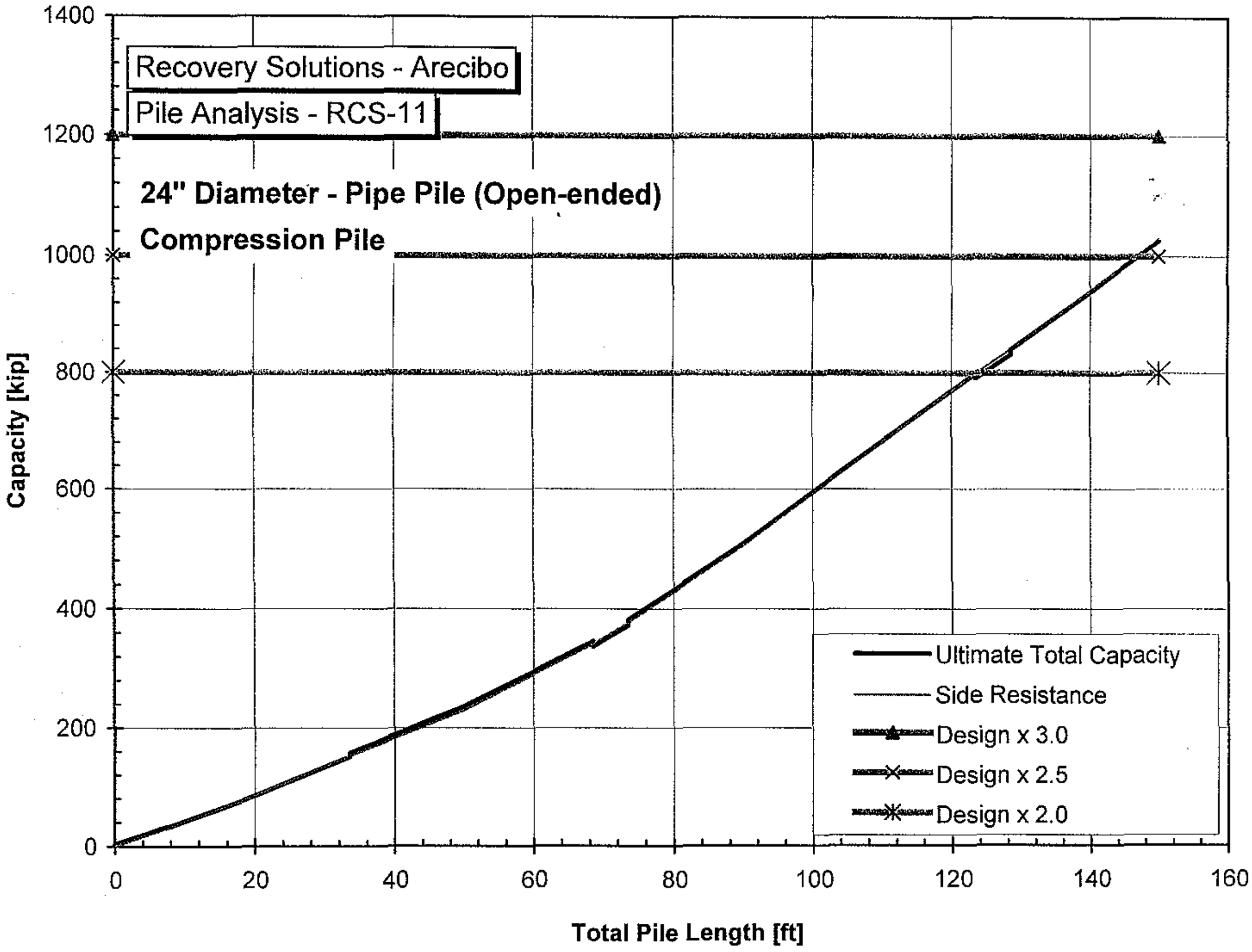


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 24 in. RCS-10
Assumes cohesive undrained behavior in limestone

GEOCONSULT

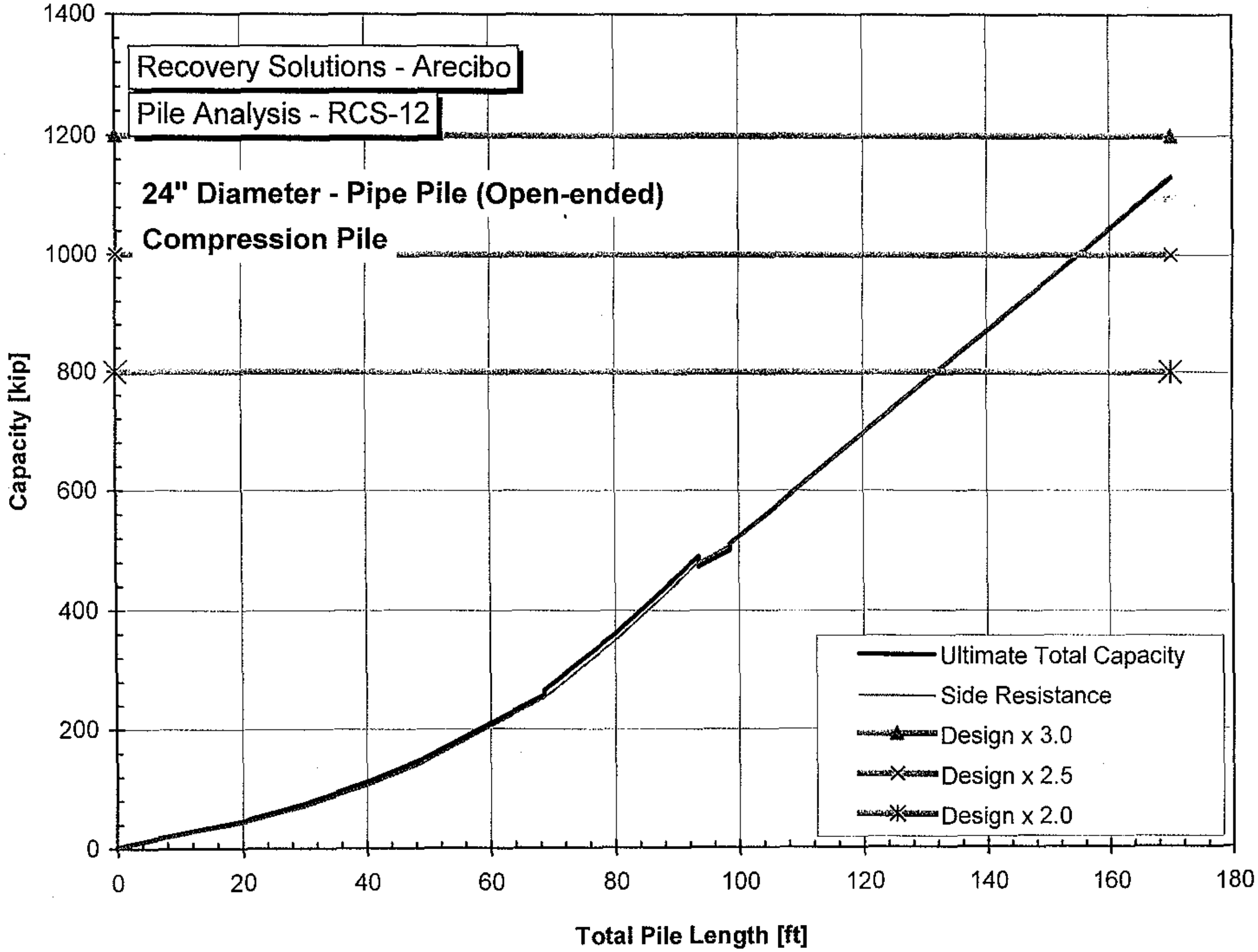
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 24 in. RCS-11
Assumes cohesive undrained behavior in limestone

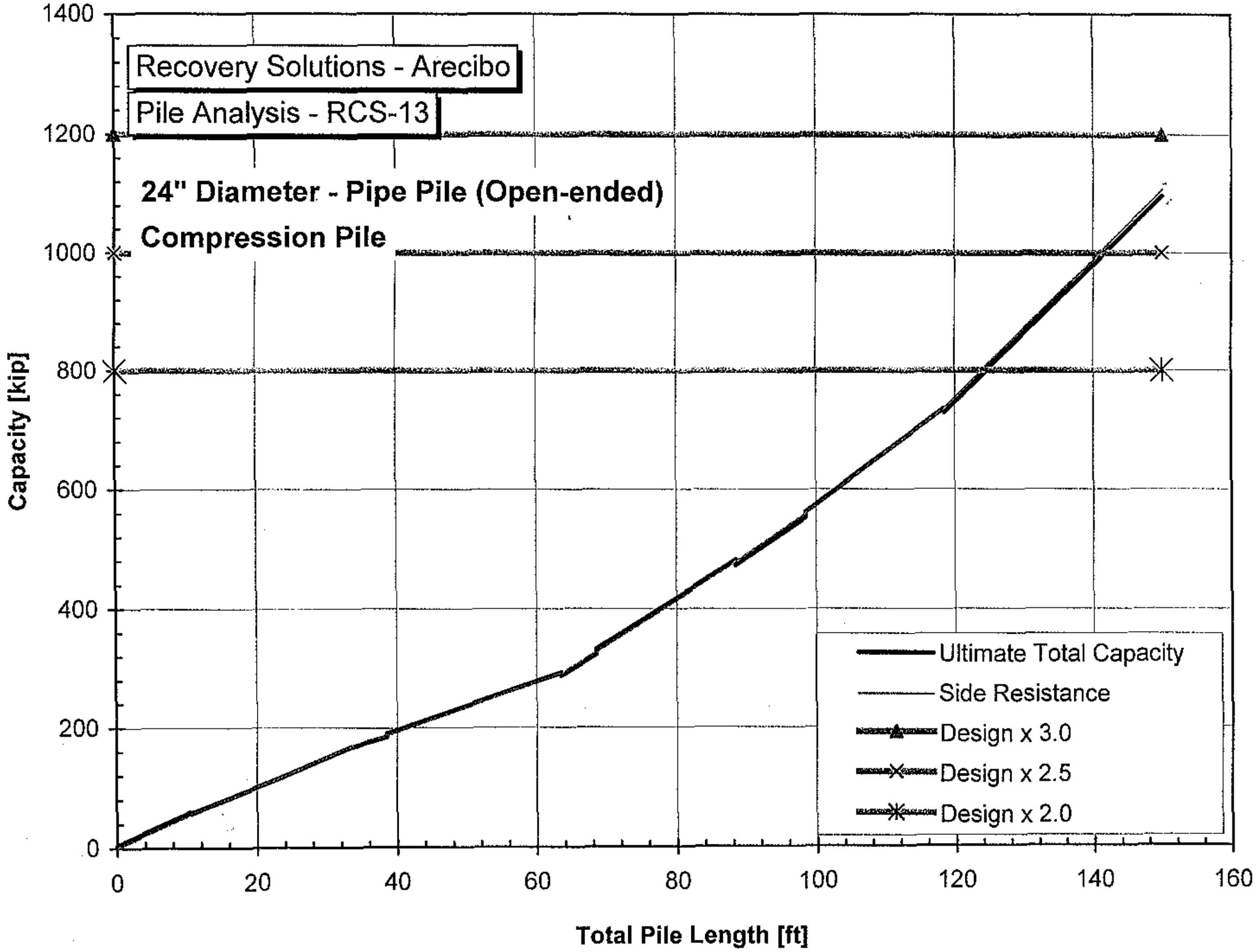
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 24 in. RCS-12
Assumes cohesive undrained behavior in limestone

Capacity vs Total Pile Length

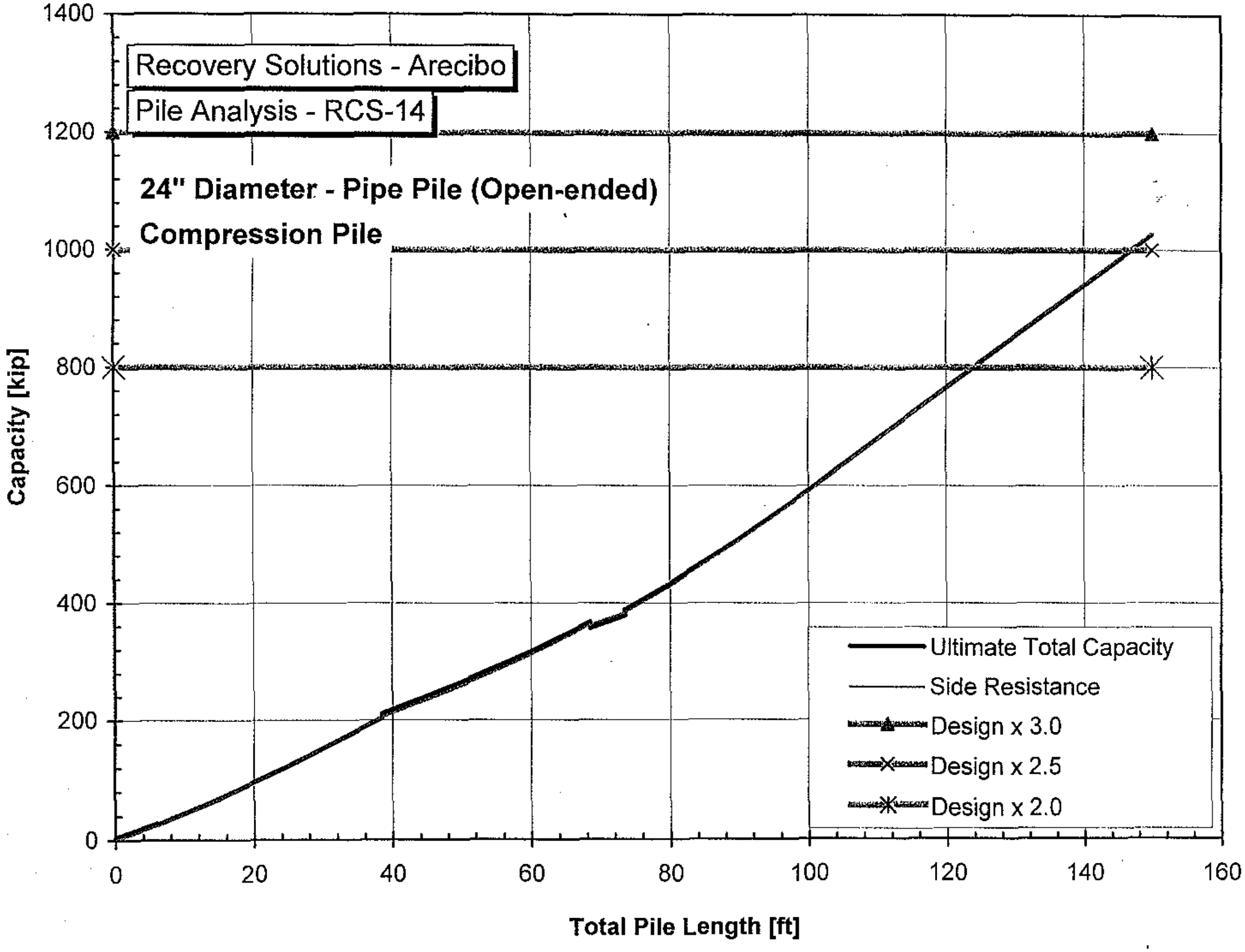


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 24 in. RCS-13
Assumes cohesive undrained behavior in limestone

GEOCONSULT

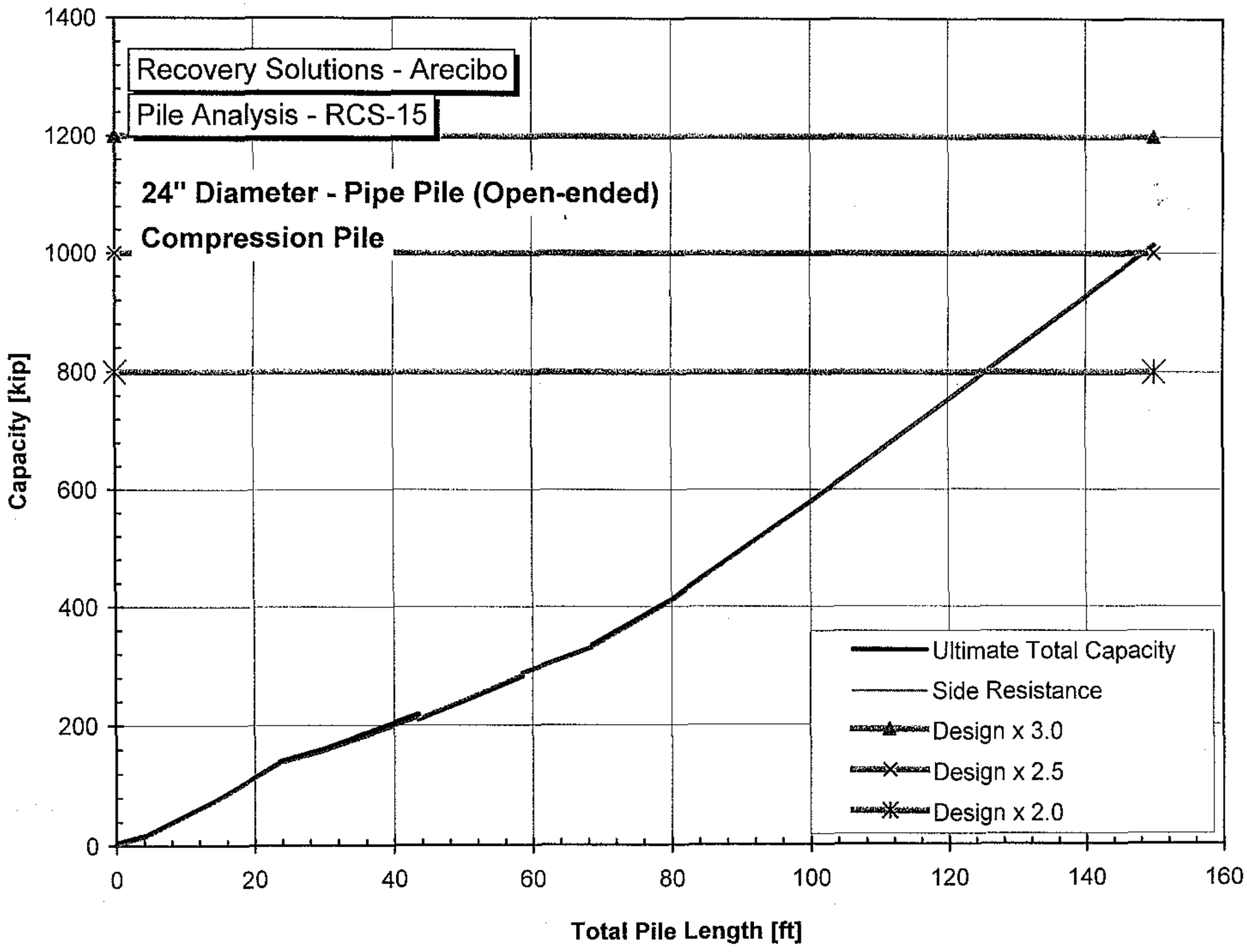
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 24 in. RCS-14
Assumes cohesive undrained behavior in limestone

Capacity vs Total Pile Length

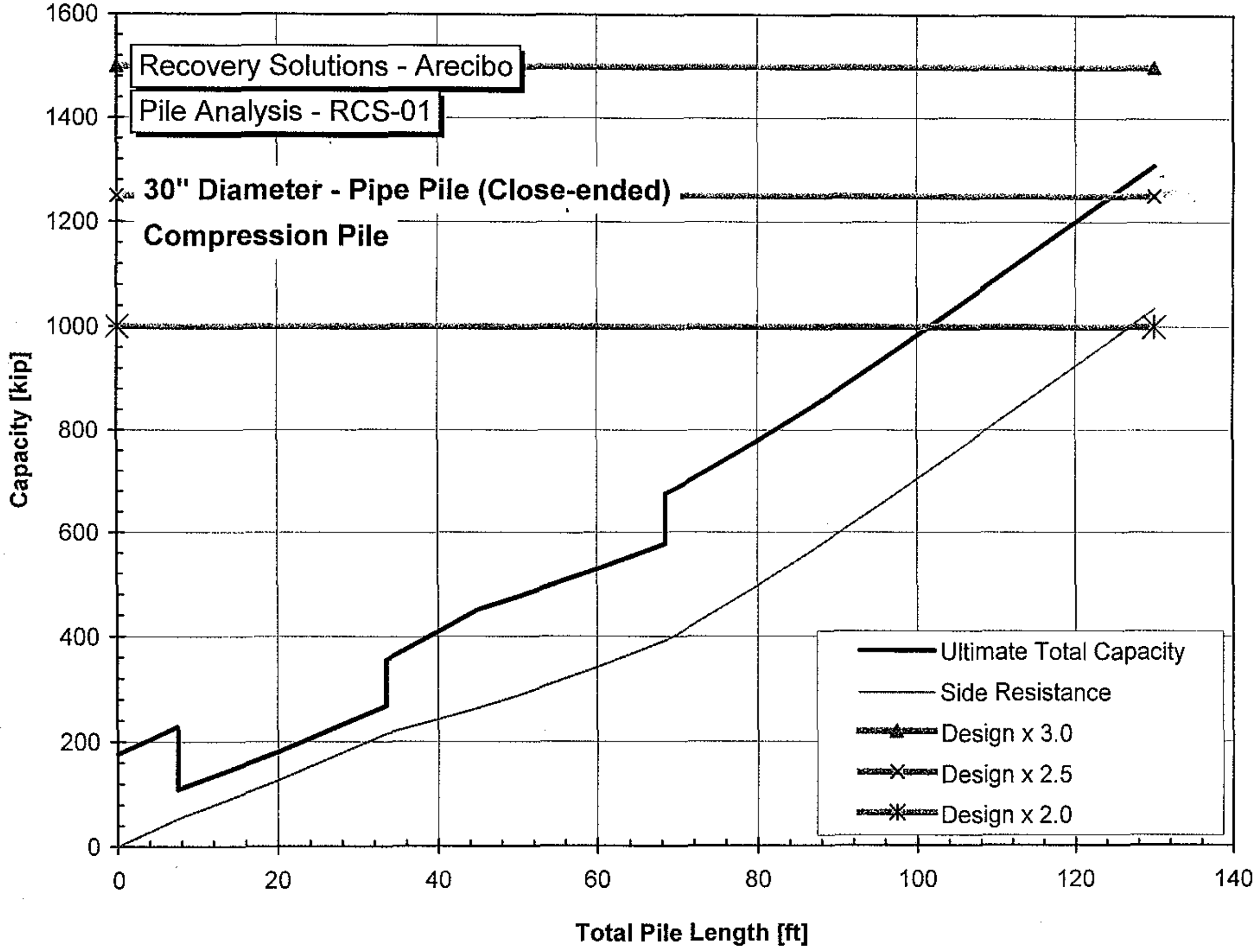


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 24 in. RCS-15
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

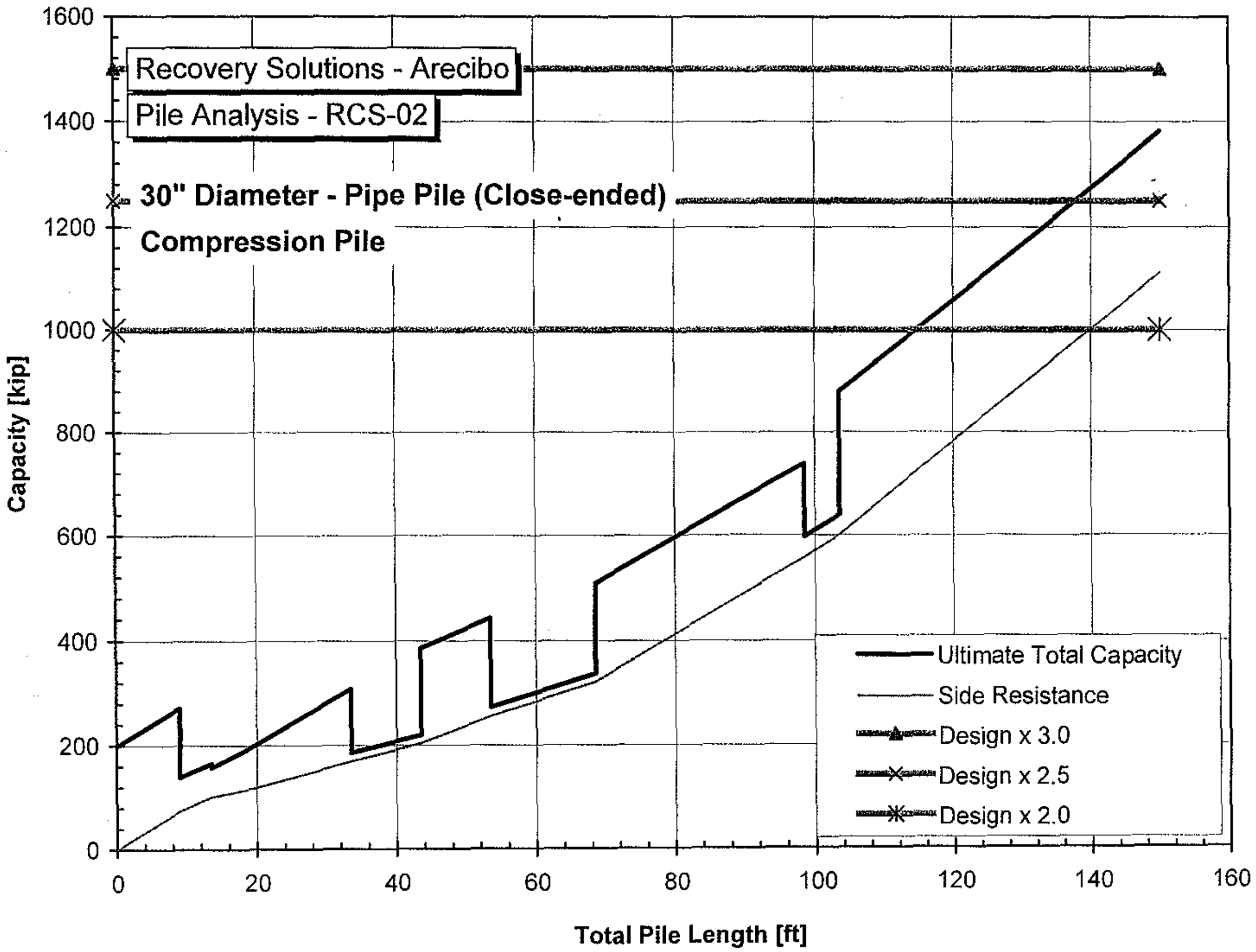


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 30 in. RCS-01 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

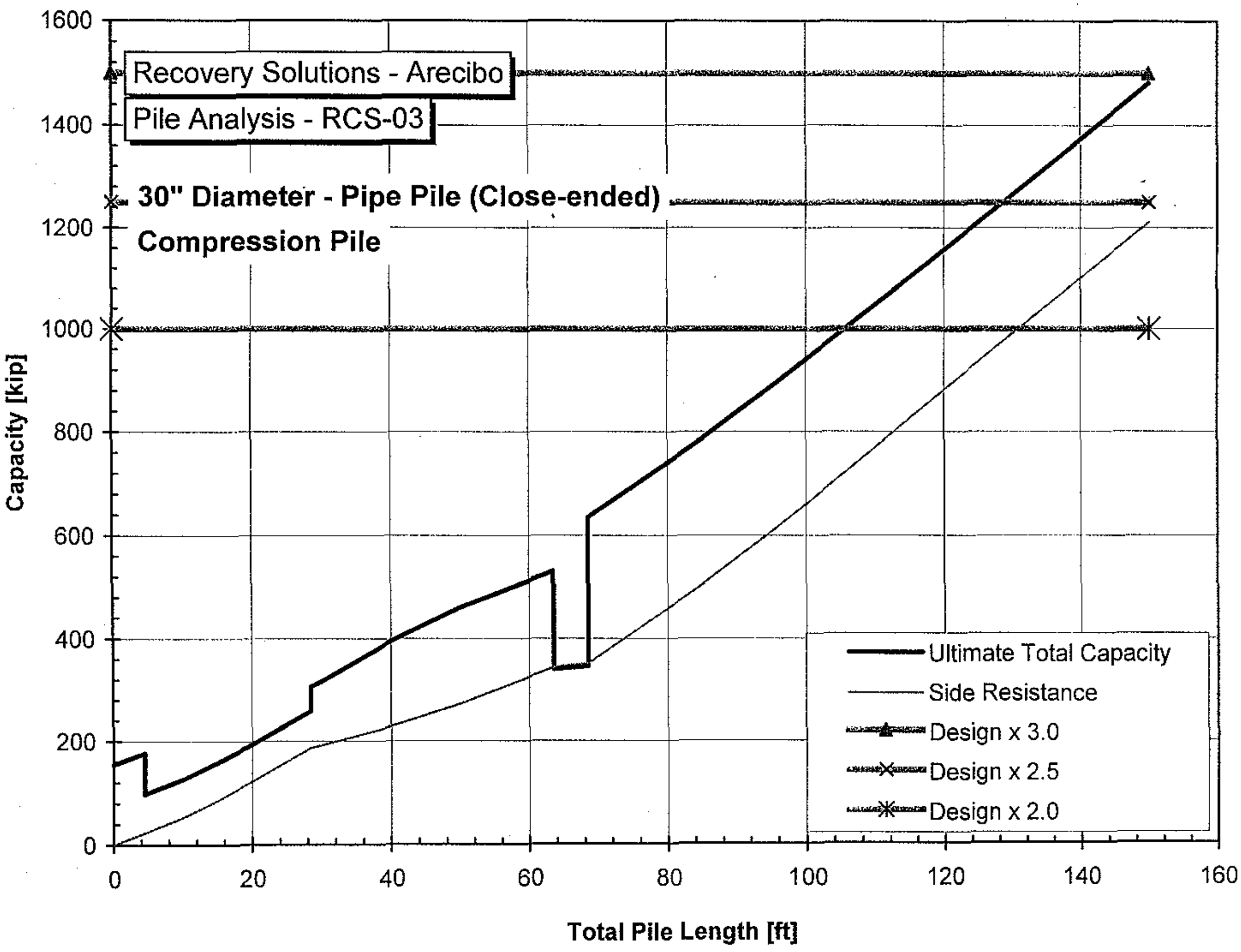


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 30 in. RCS-02 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

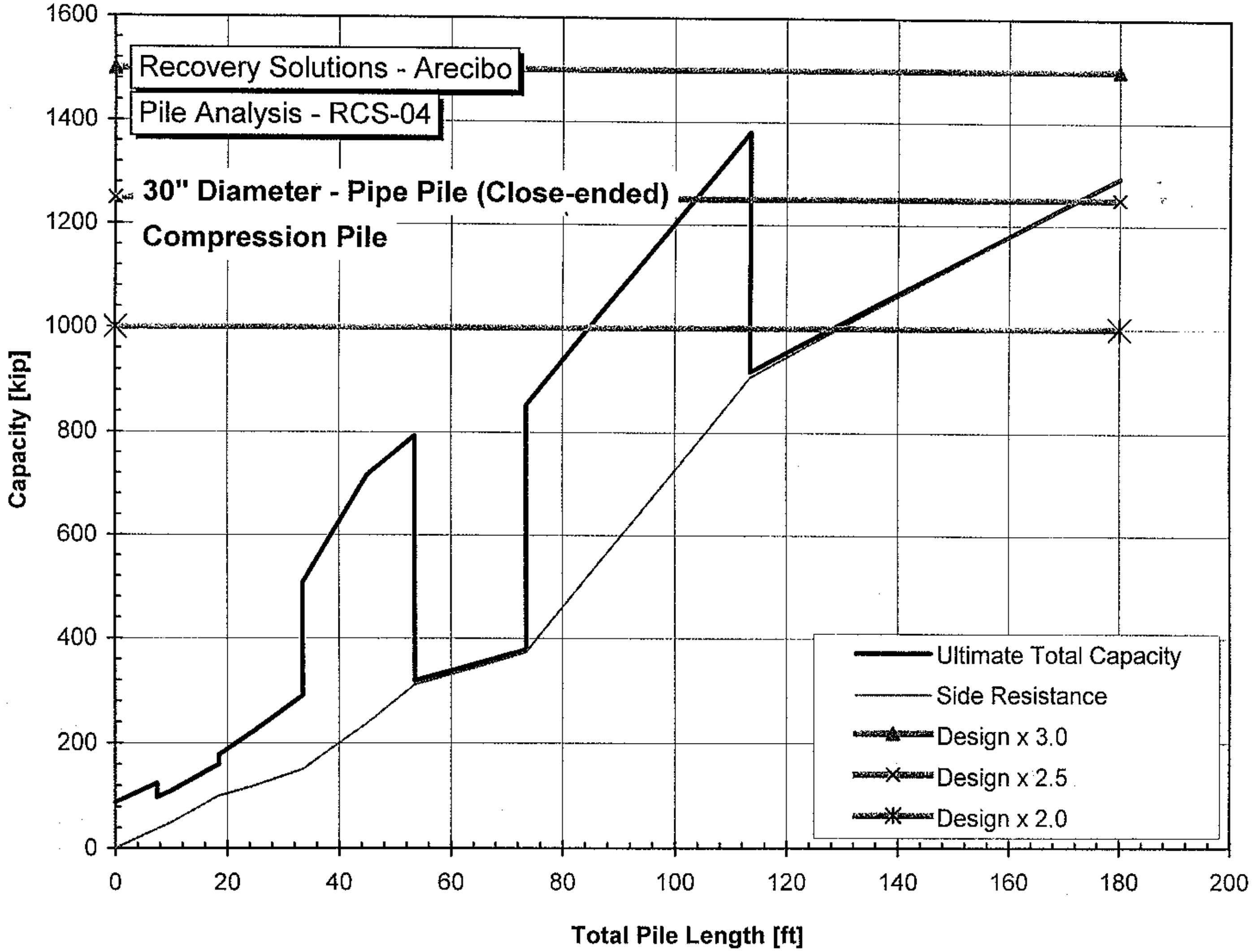


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 30 in. RCS-03 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

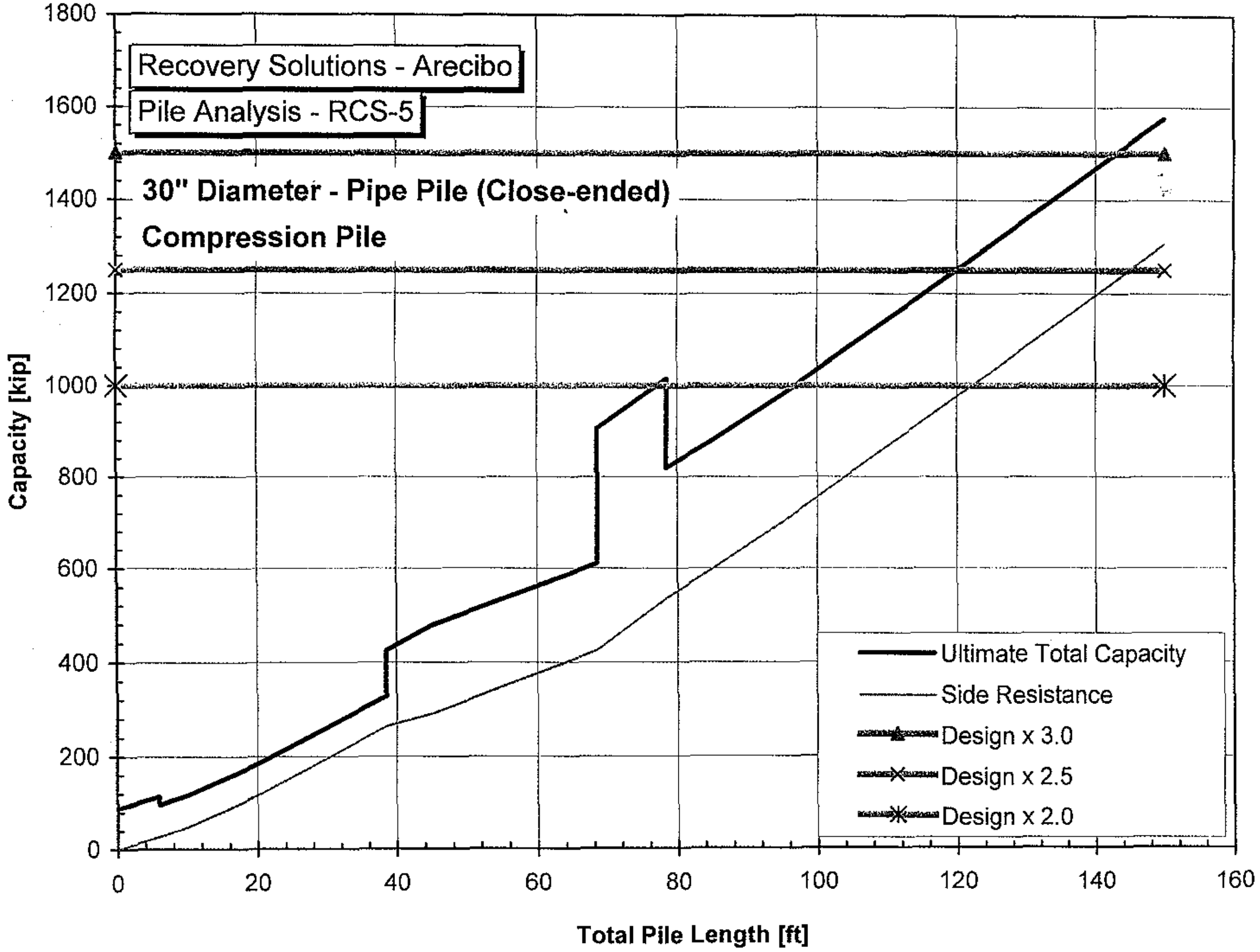


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 30 in. RCS-04 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

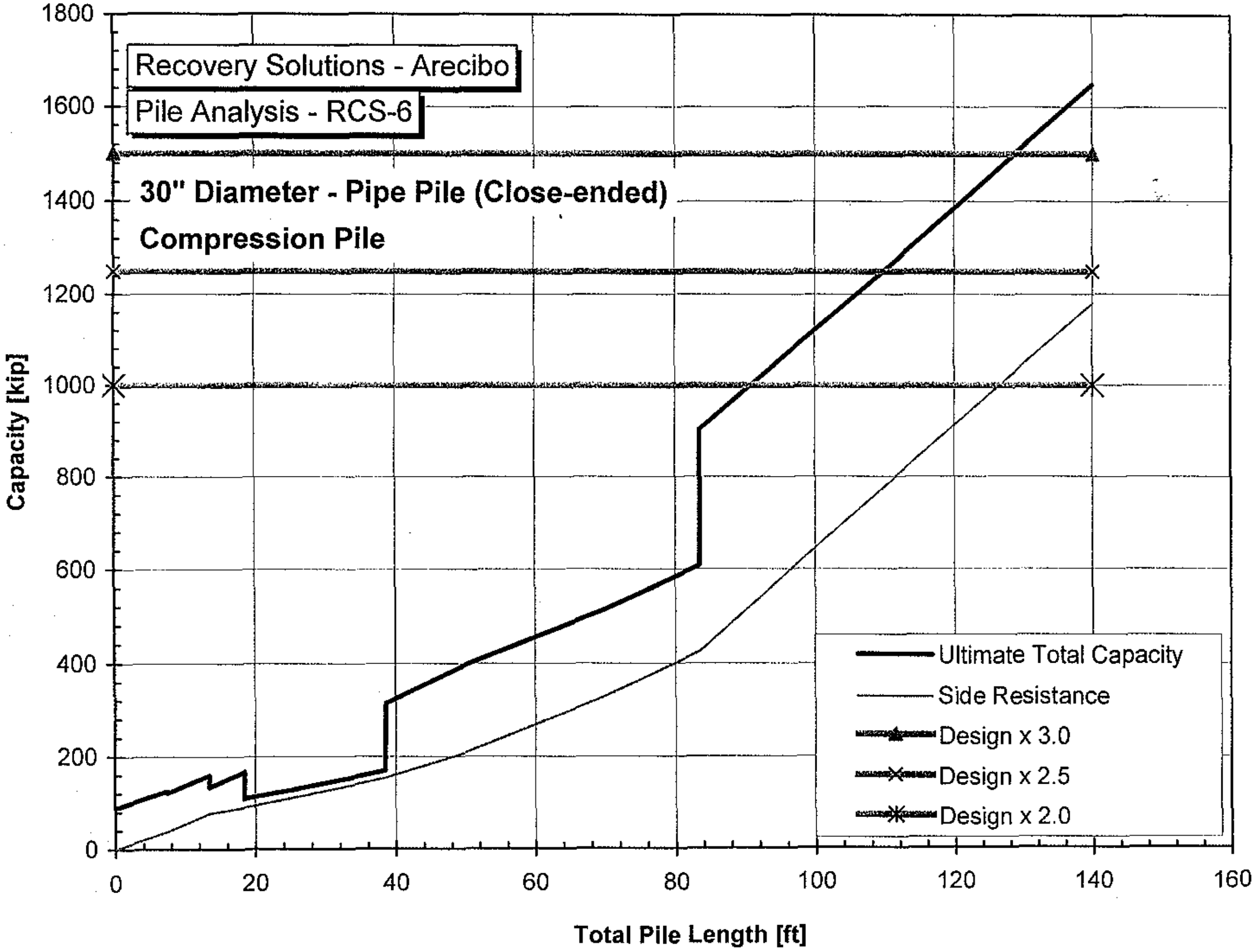


Capacity vs total pile length
Factor of safety shown

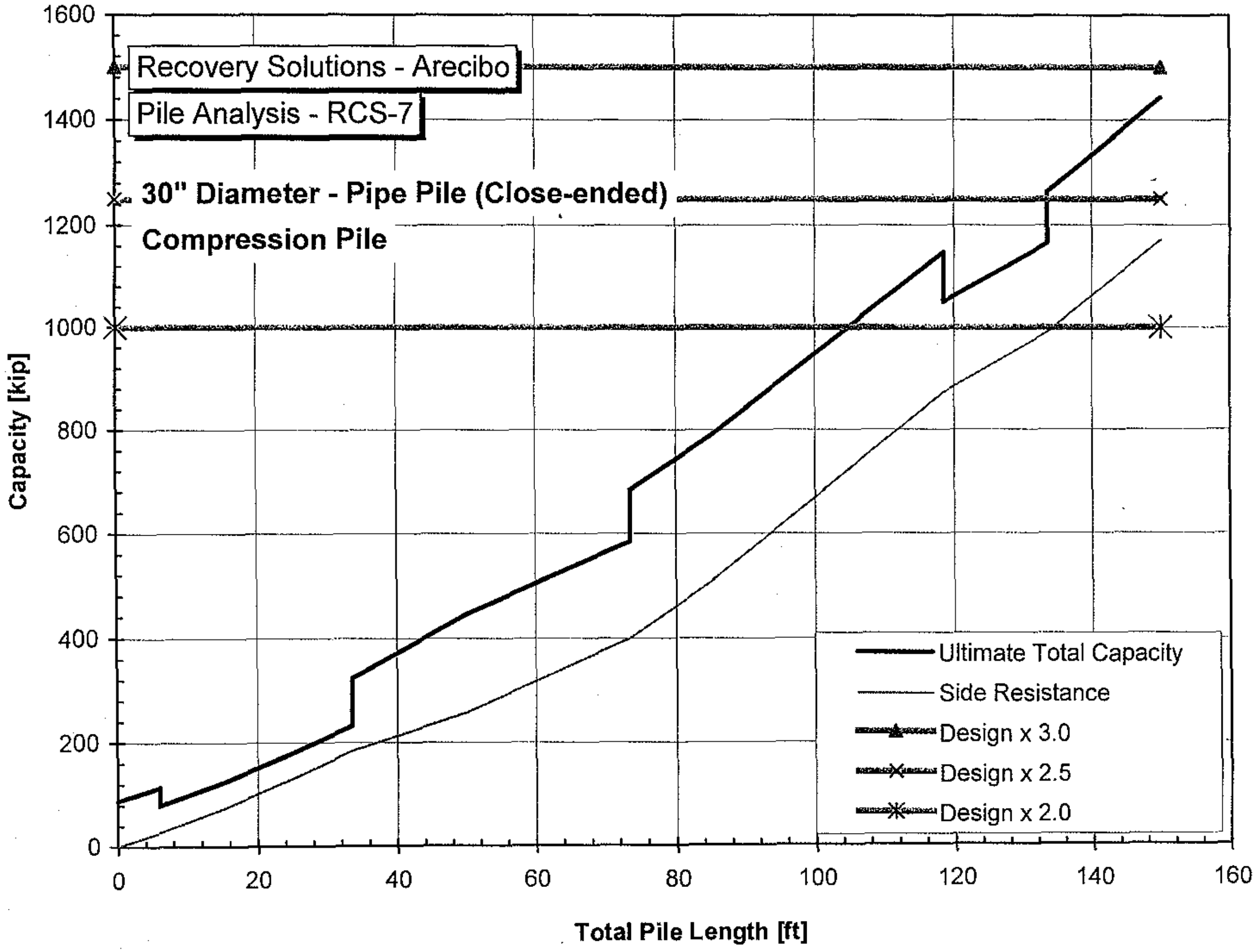
File API Analysis - Compression Pipe Pile 30 in. RCS-05 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length



Capacity vs Total Pile Length

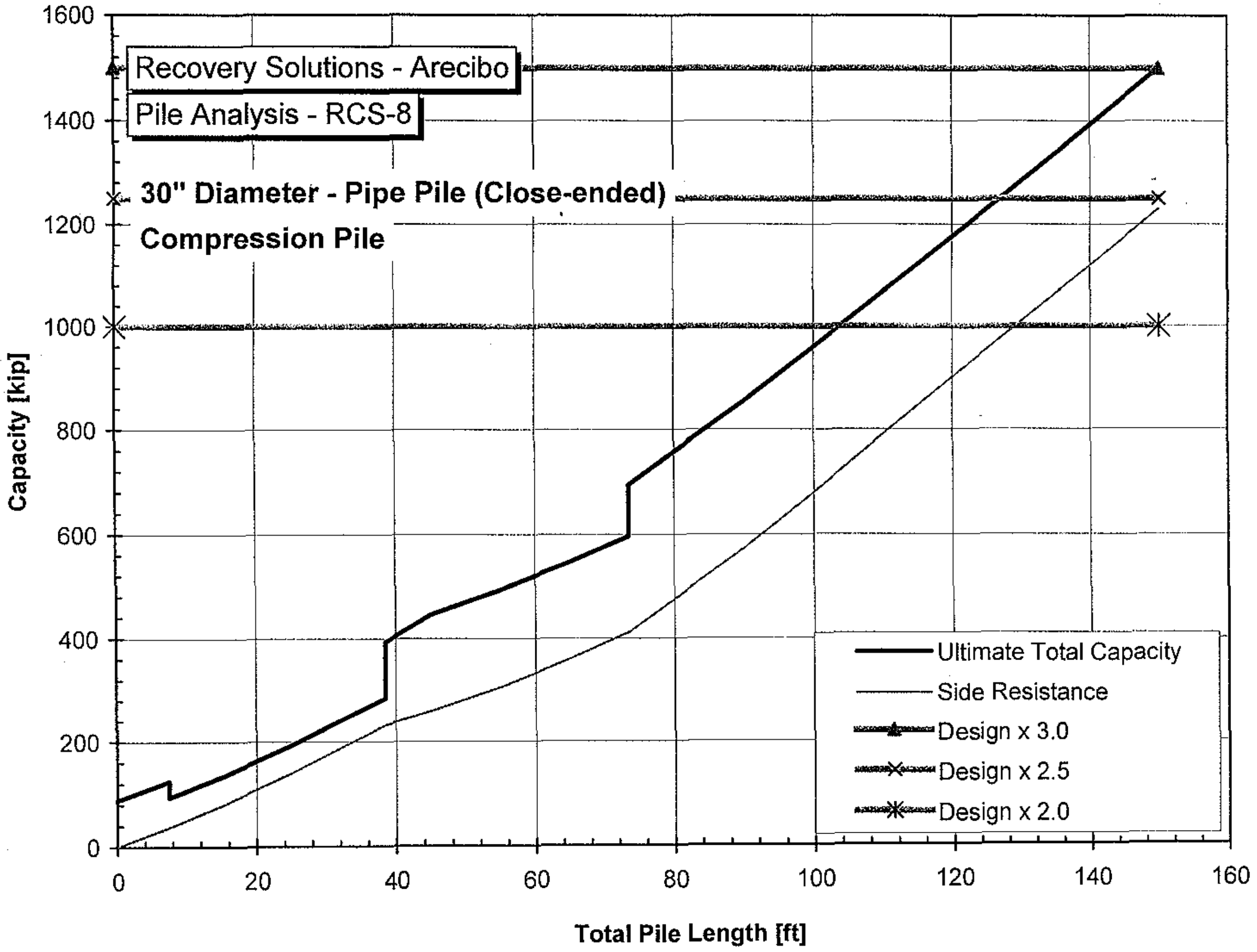


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 30 in. RCS-07 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

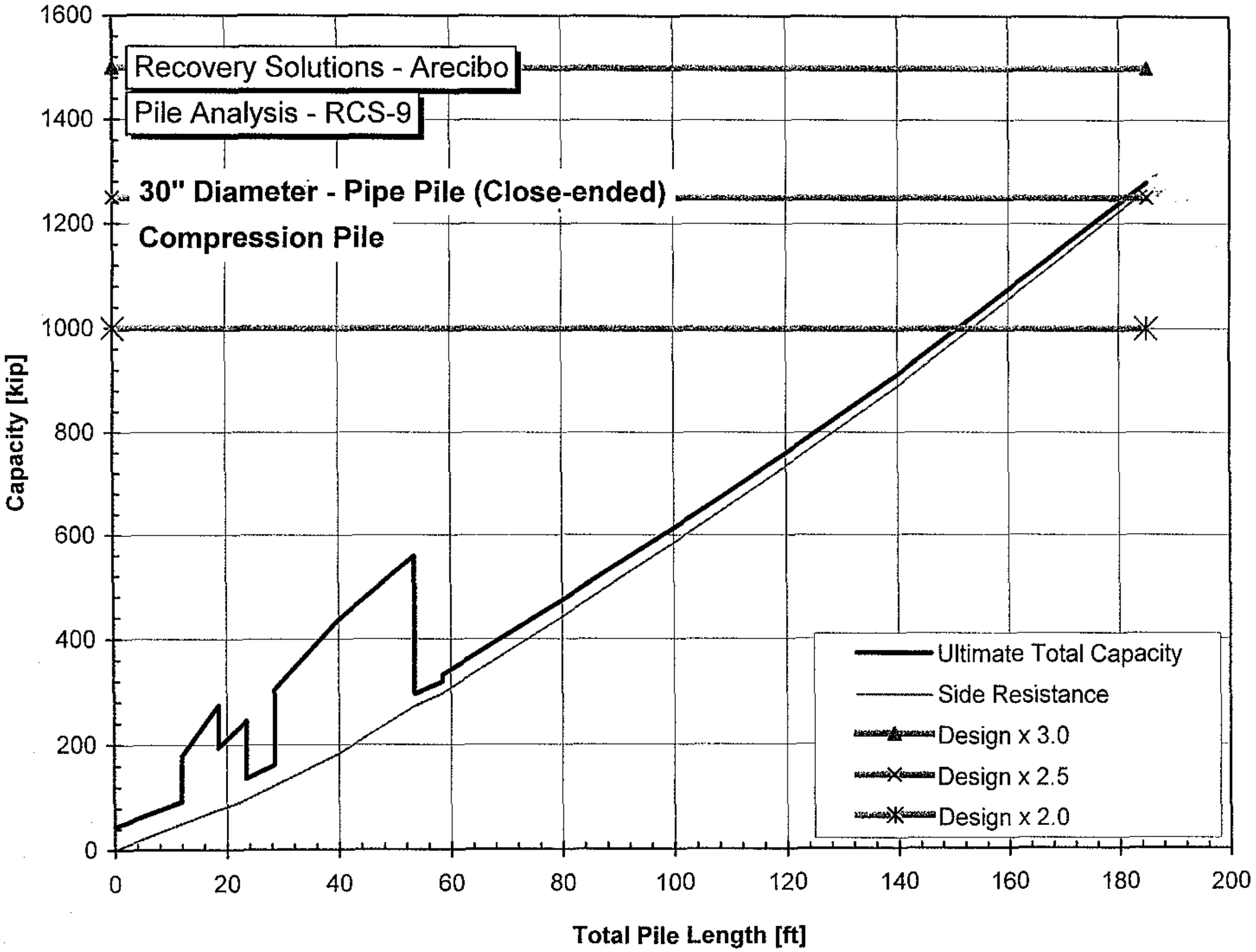


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 30 in. RCS-08 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

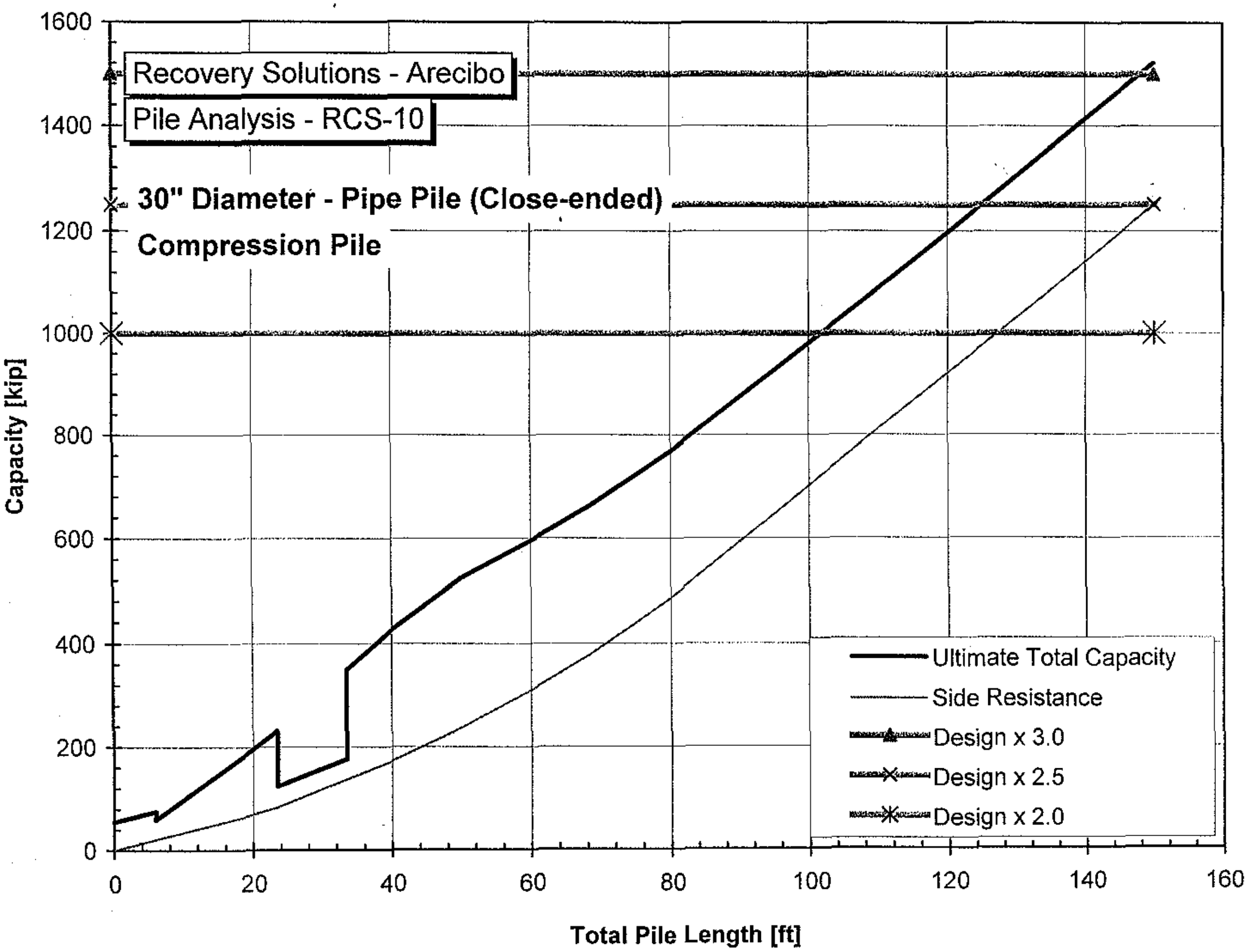


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 30 in. RCS-09 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

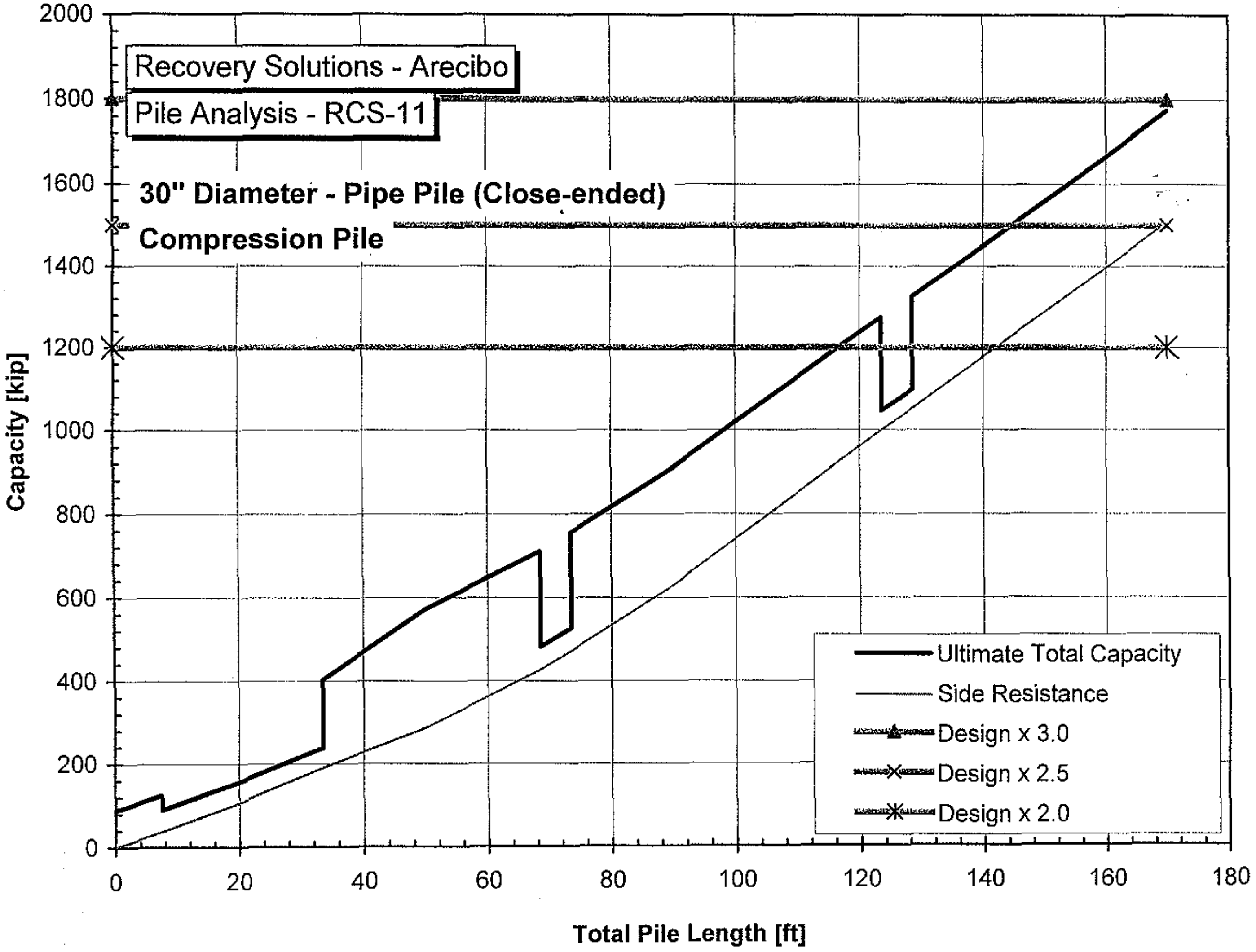


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 30 in. RCS-10 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

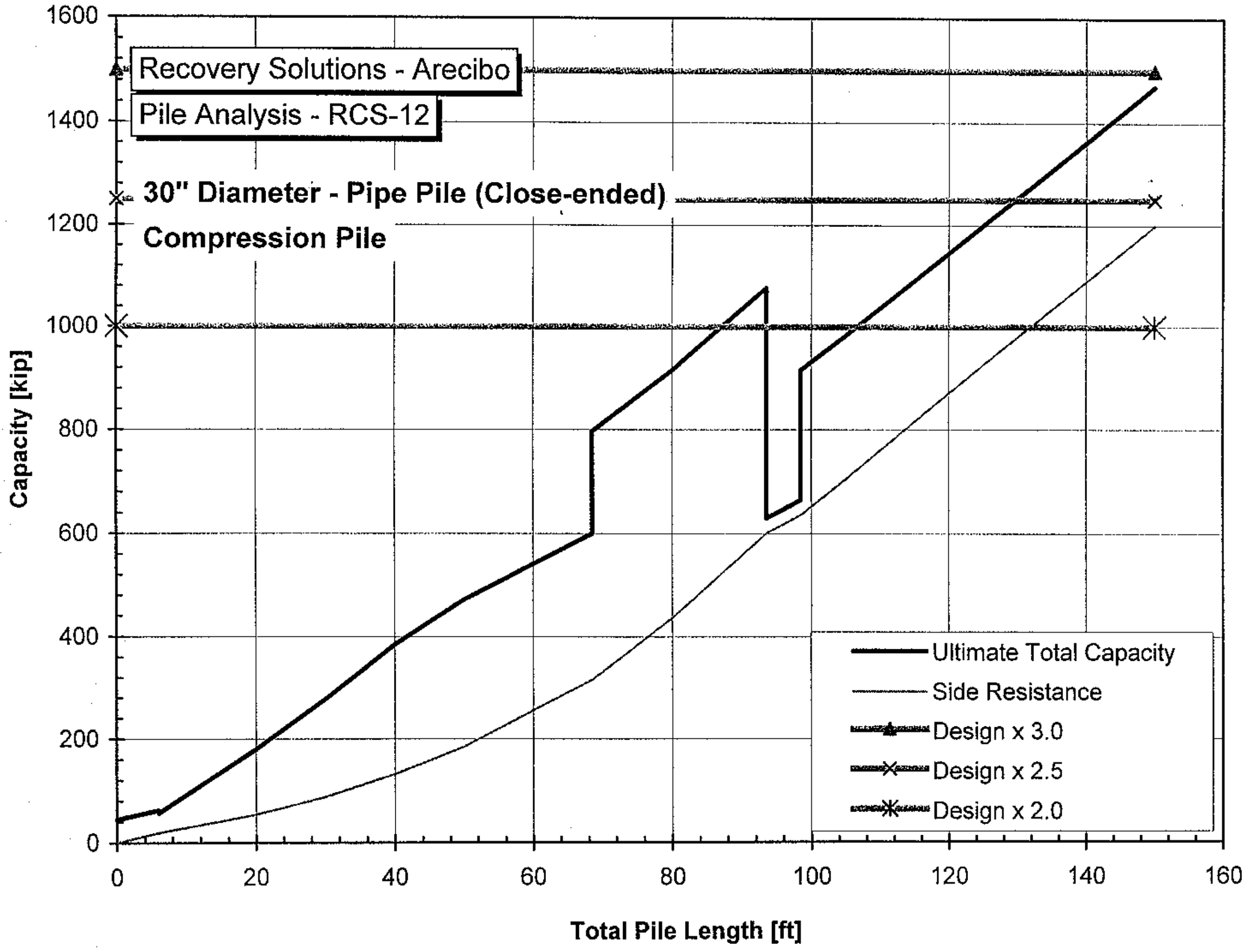


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 30 in. RCS-11 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

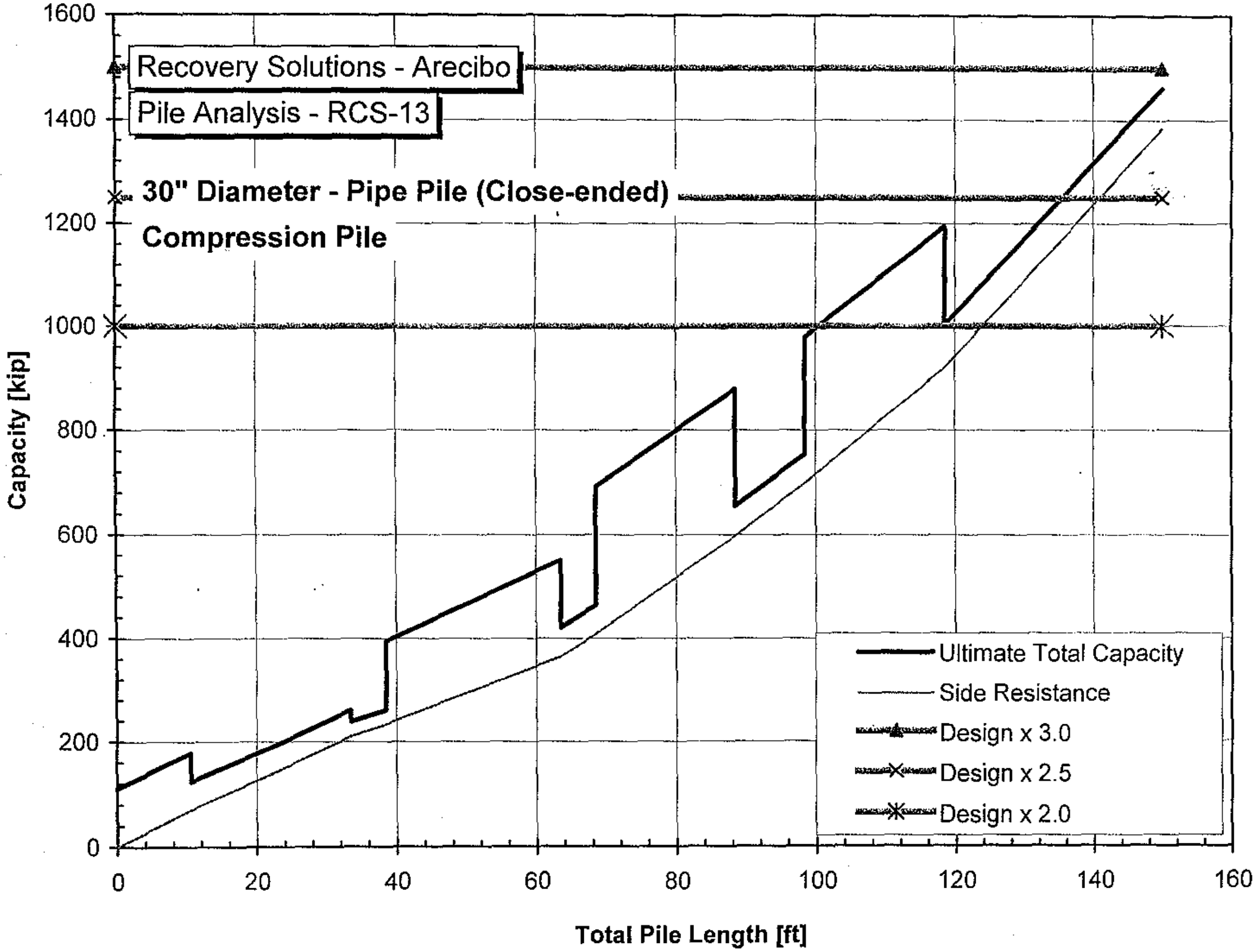


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 30 in. RCS-12 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

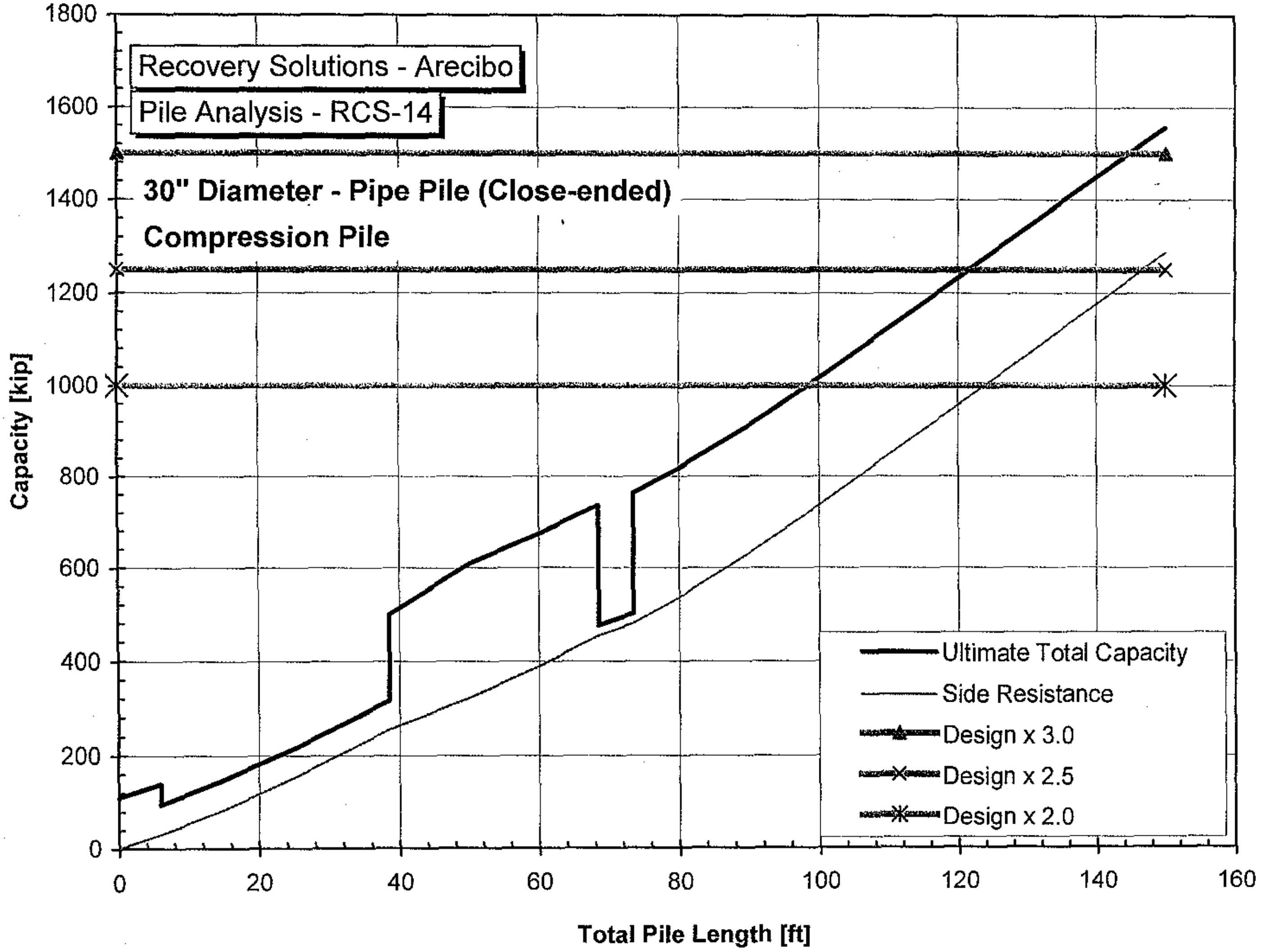


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 30 in. RCS-13 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

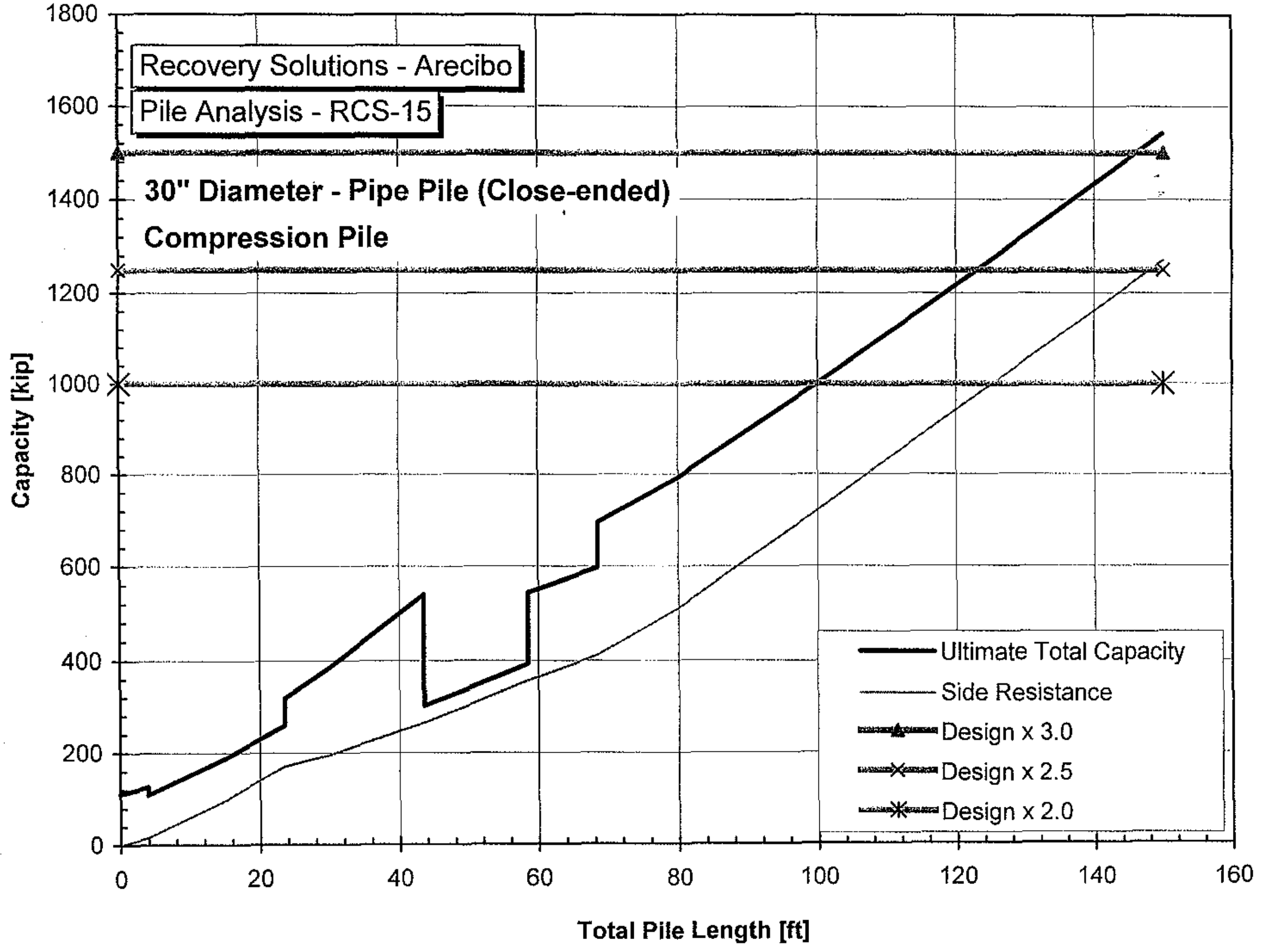


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 30 in. RCS-14 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

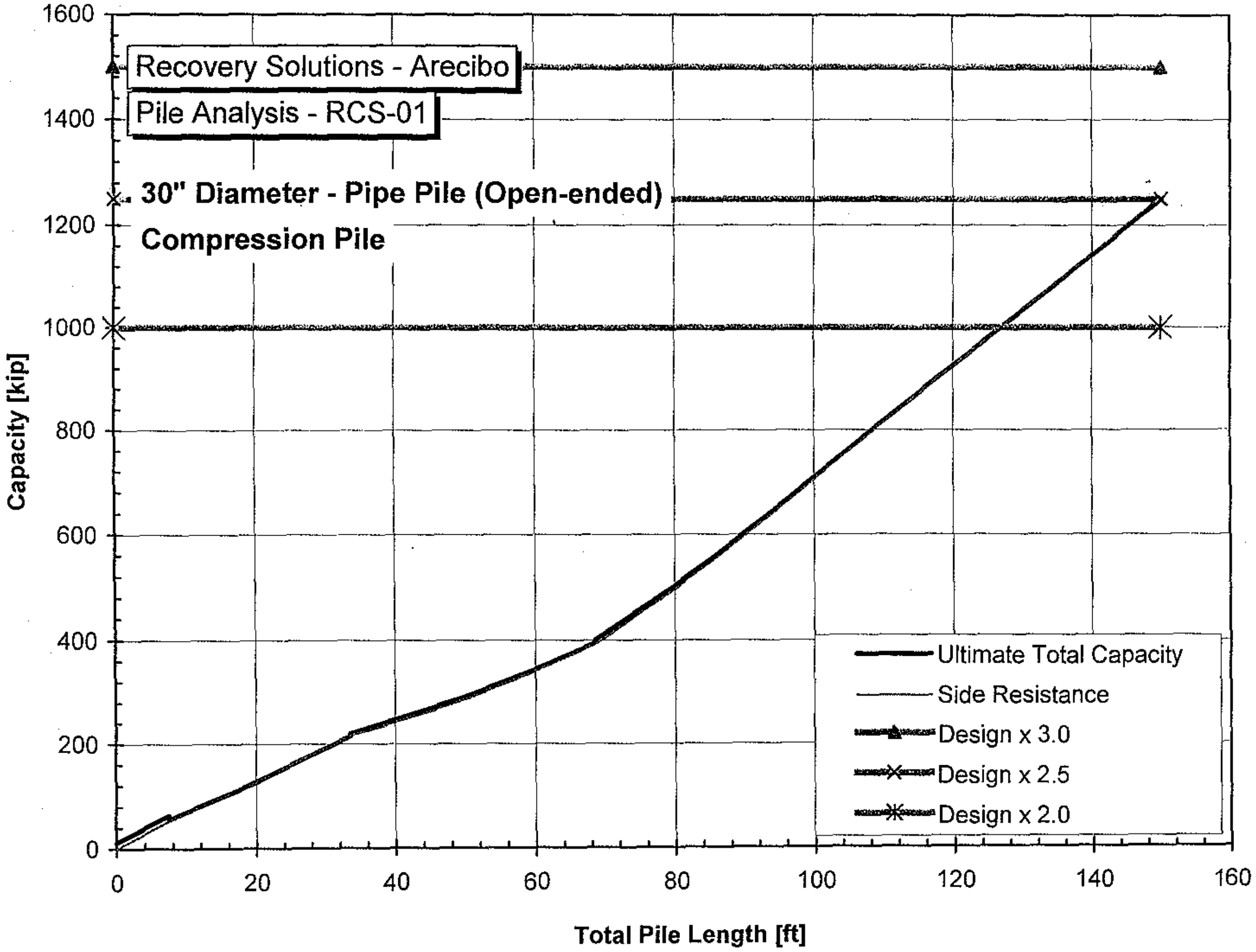


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 30 in. RCS-15 Closed
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

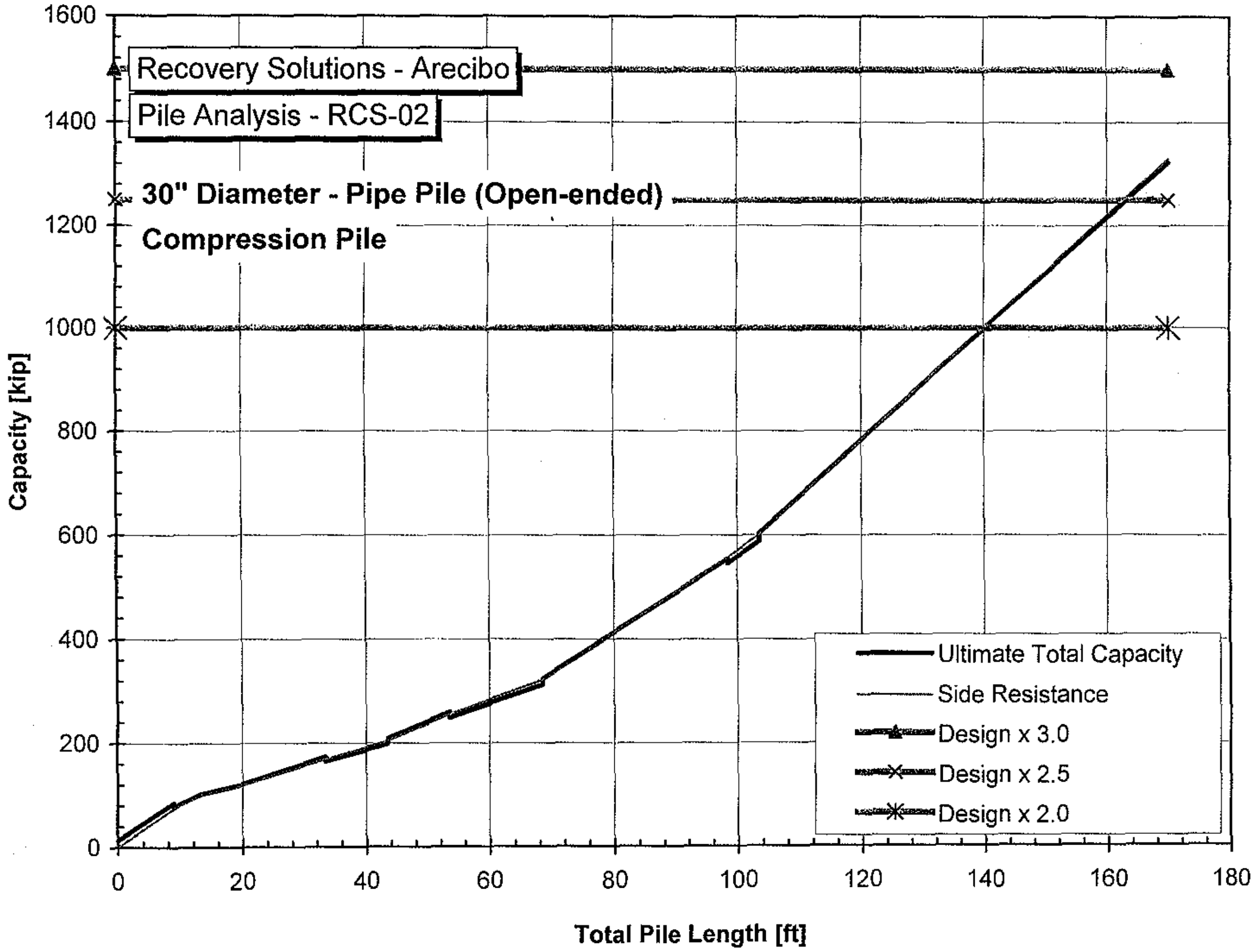


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 30 in. RCS-01
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

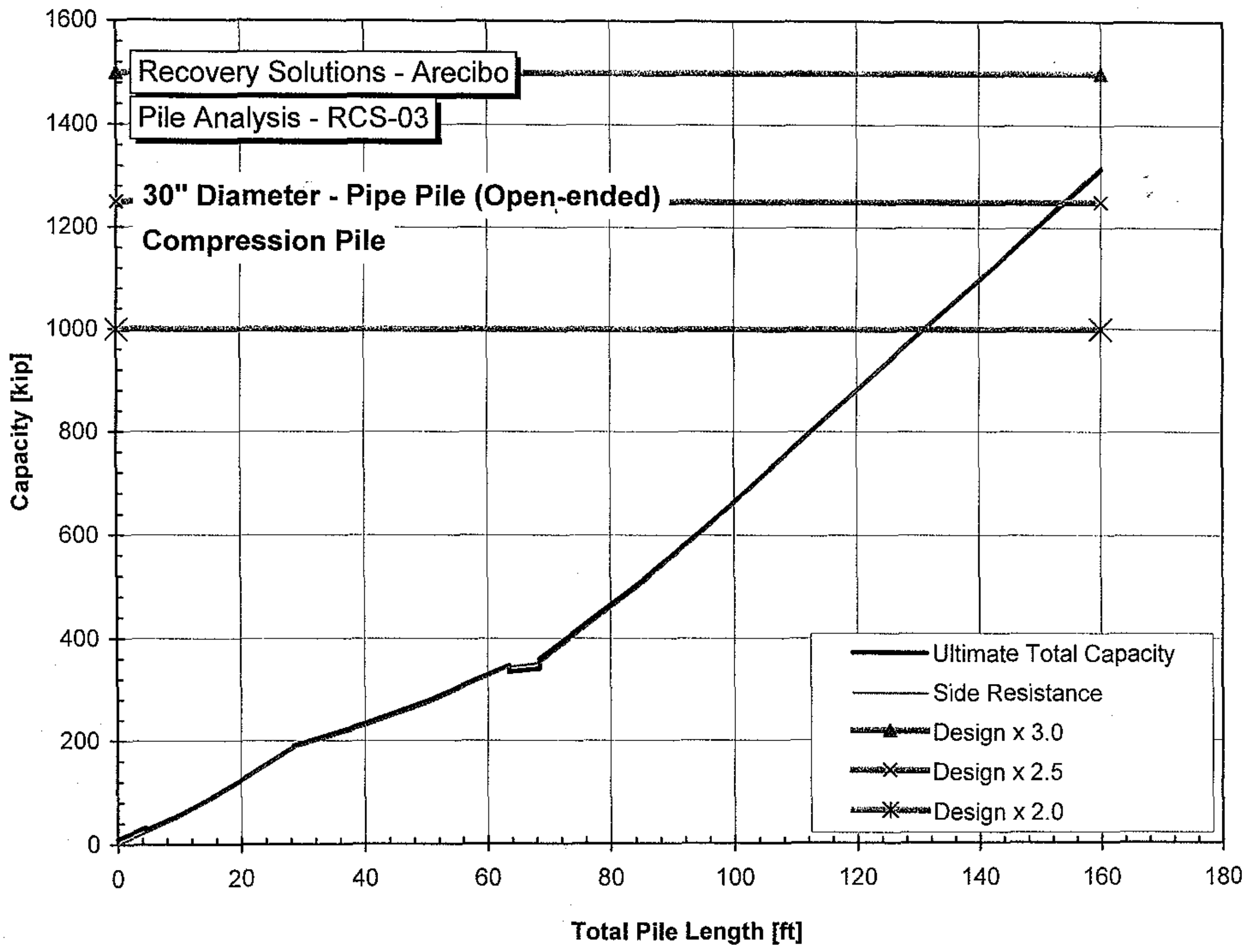


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 30 in. RCS-02
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

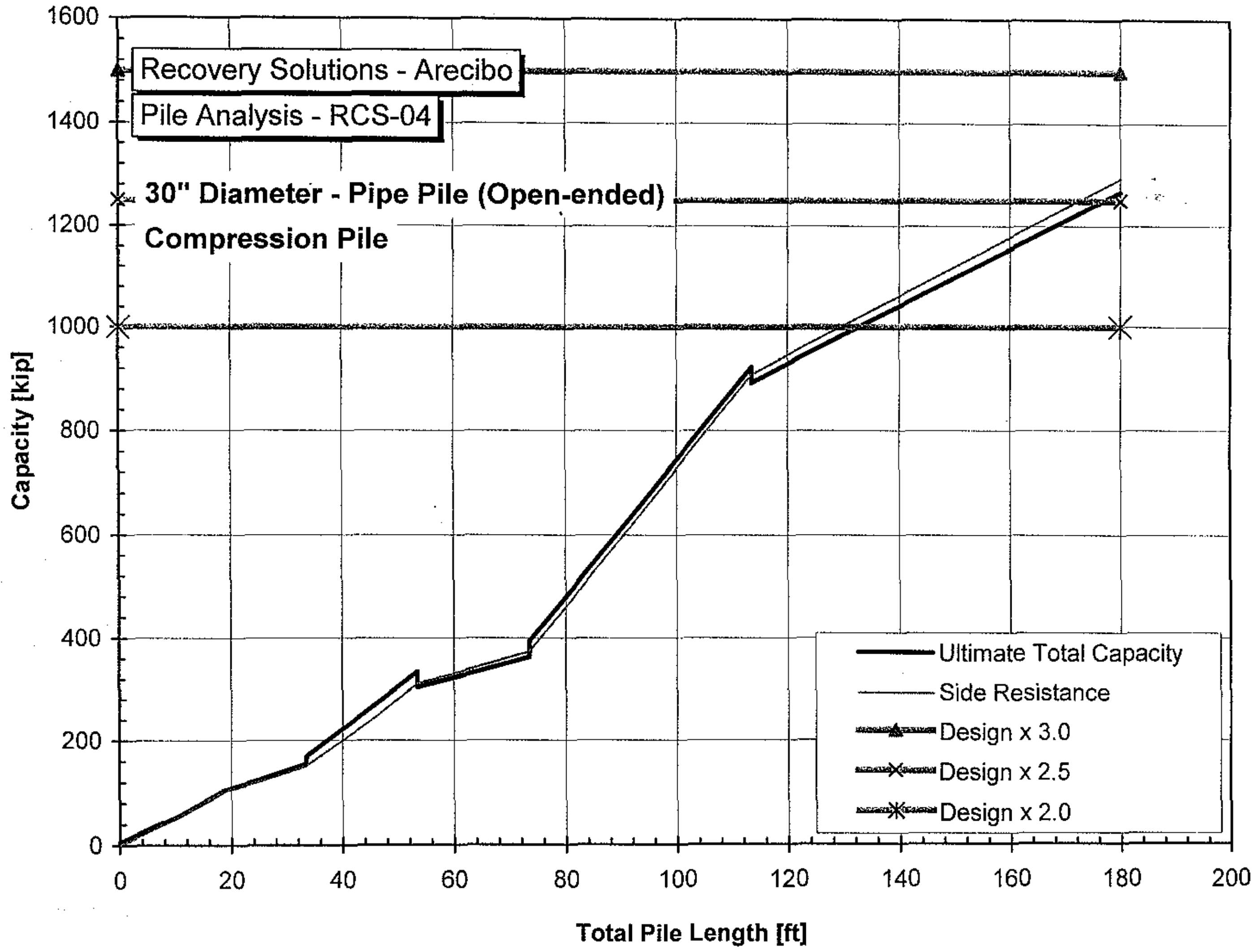


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 30 in. RCS-03
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

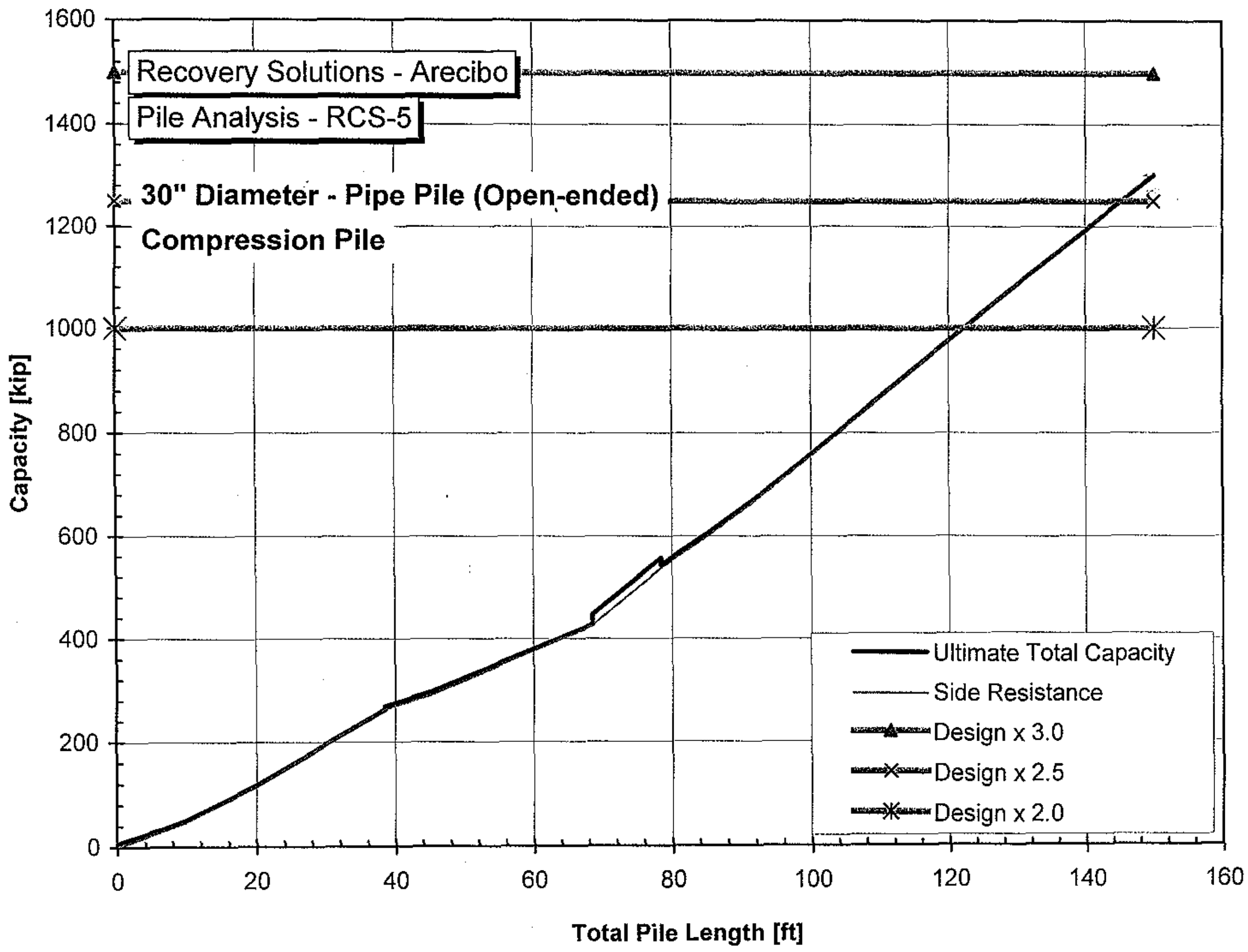


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 30 in. RCS-04
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

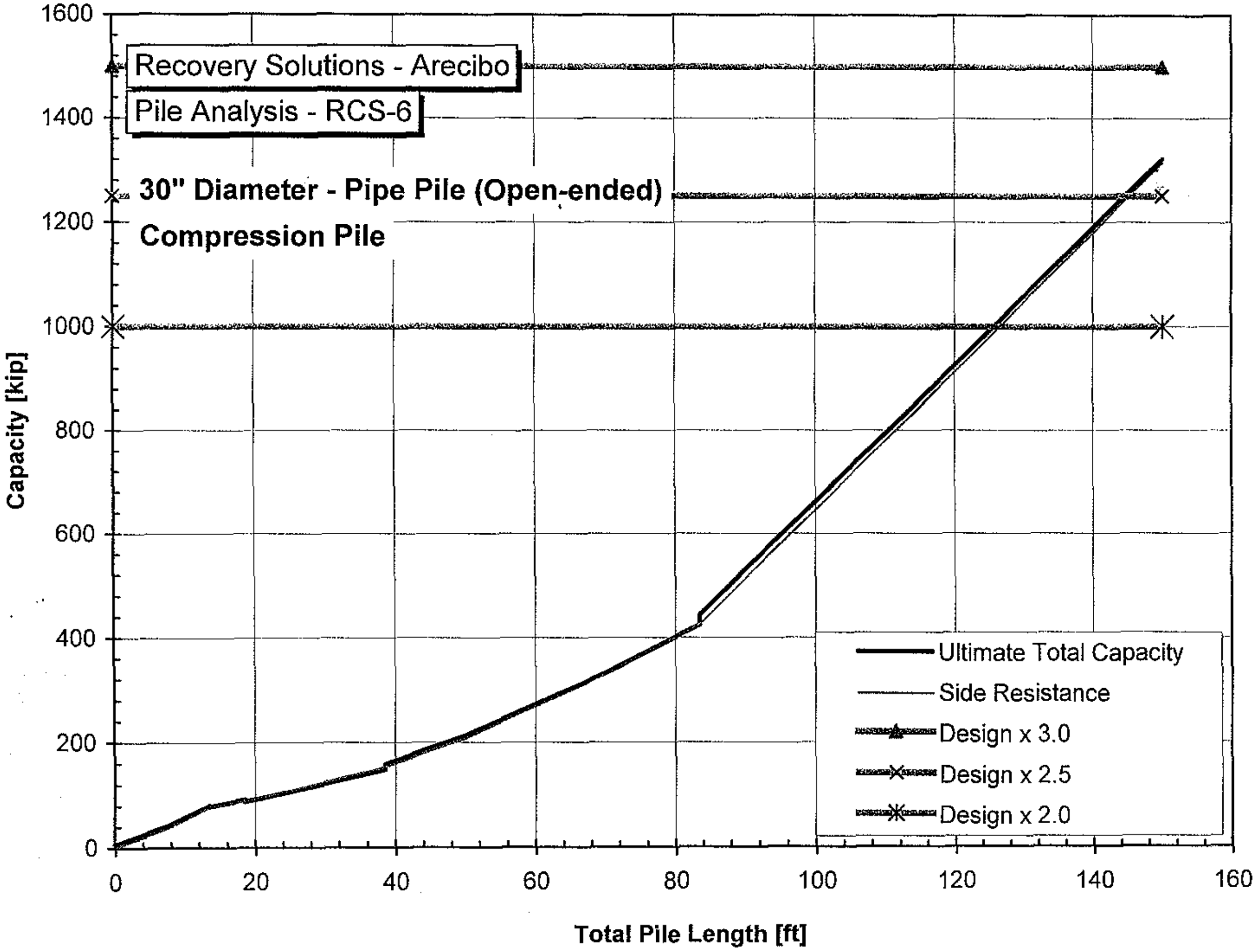


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 30 in. RCS-05
Assumes cohesive undrained behavior in limestone

GEOCONSULT

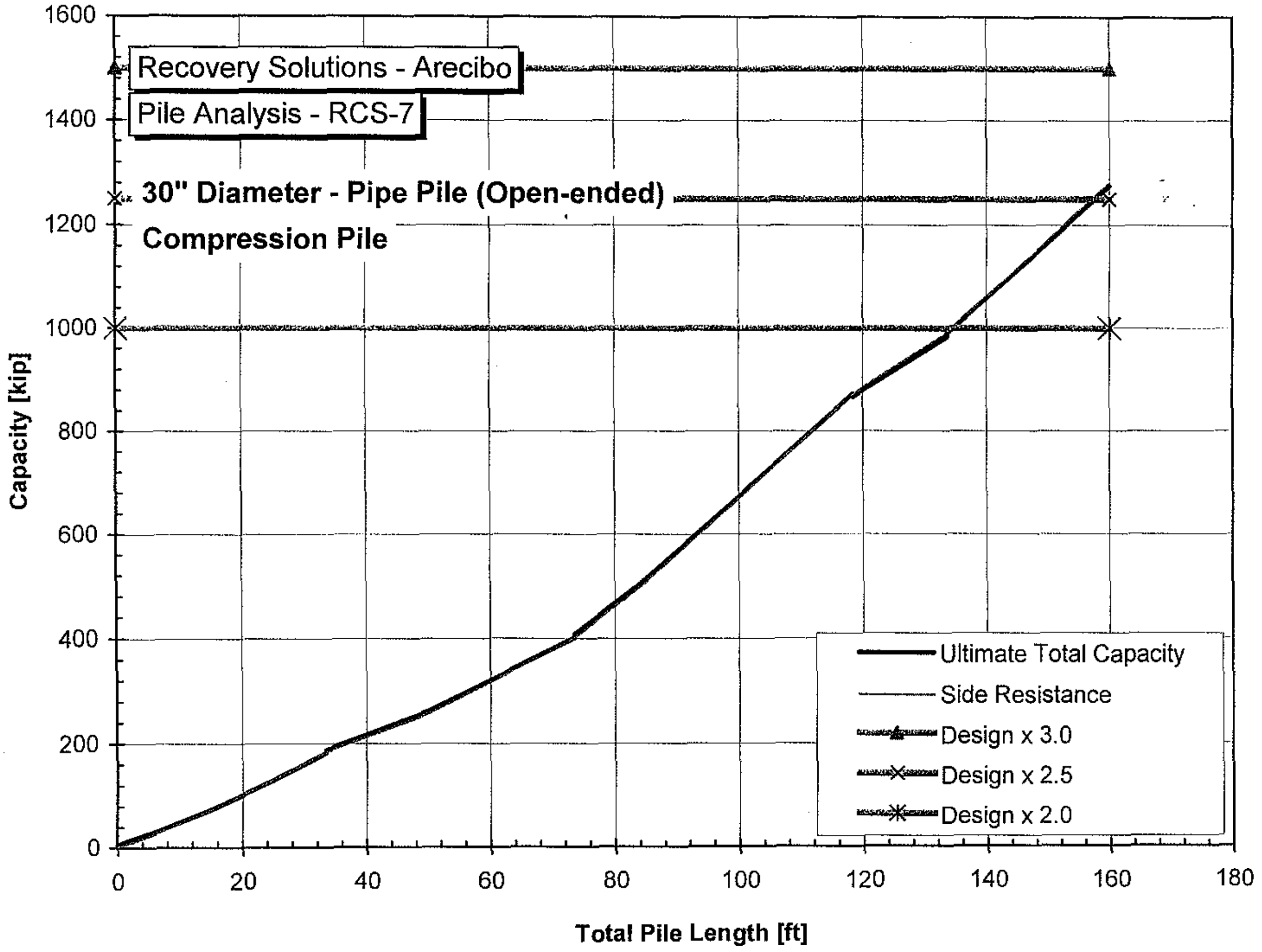
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 30 in. RCS-06
Assumes cohesive undrained behavior in limestone

Capacity vs Total Pile Length

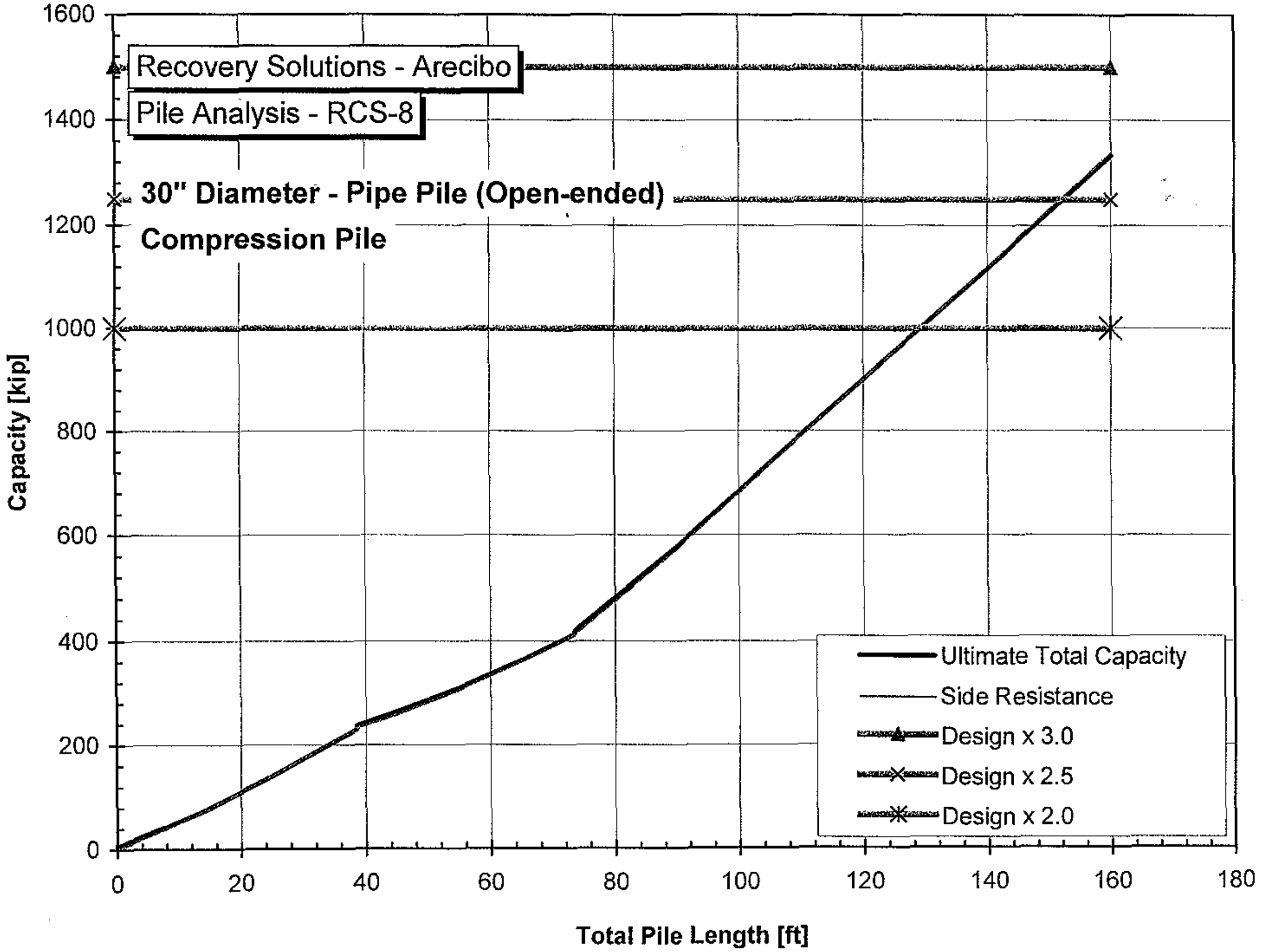


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 30 in. RCS-07
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

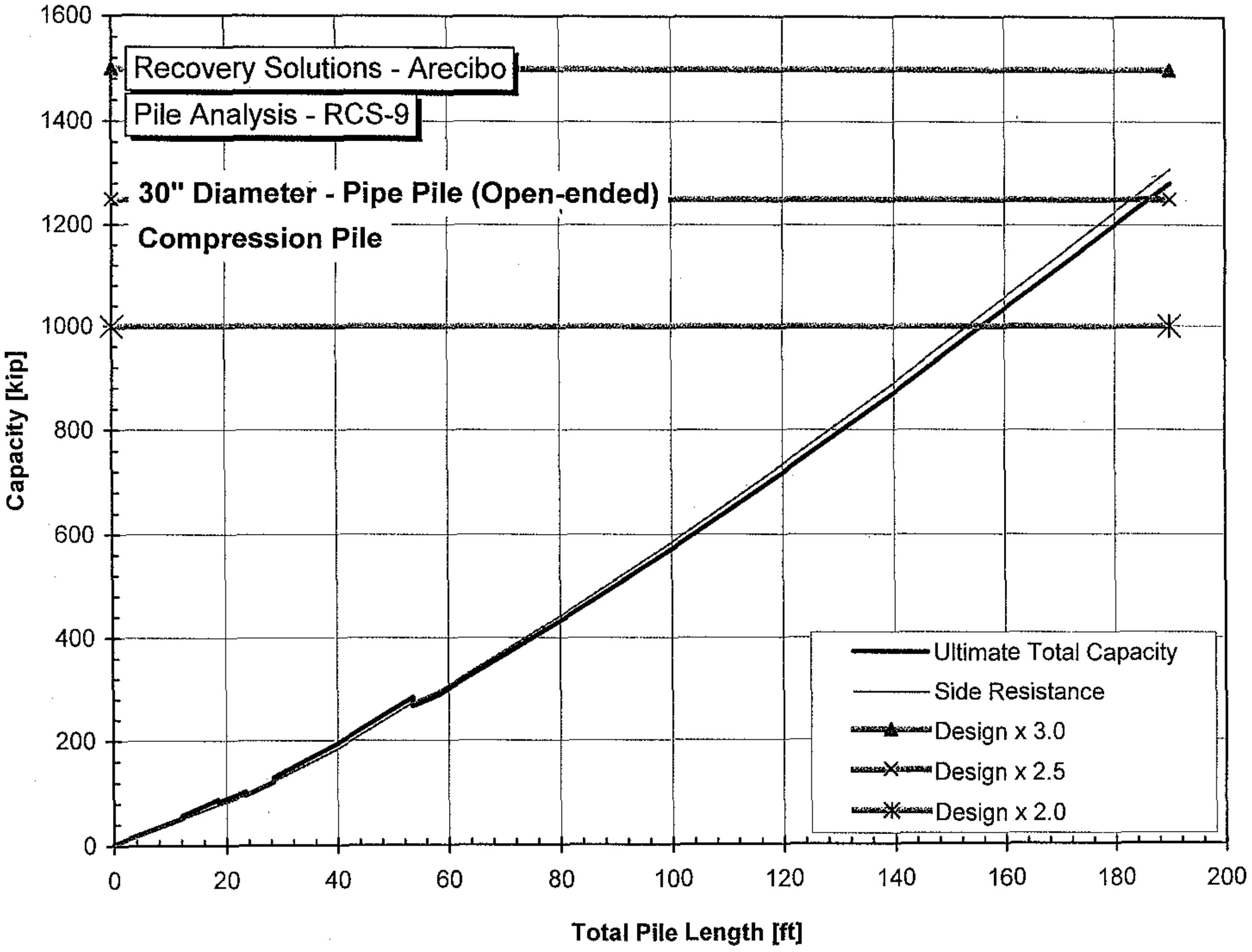


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 30 in. RCS-08
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

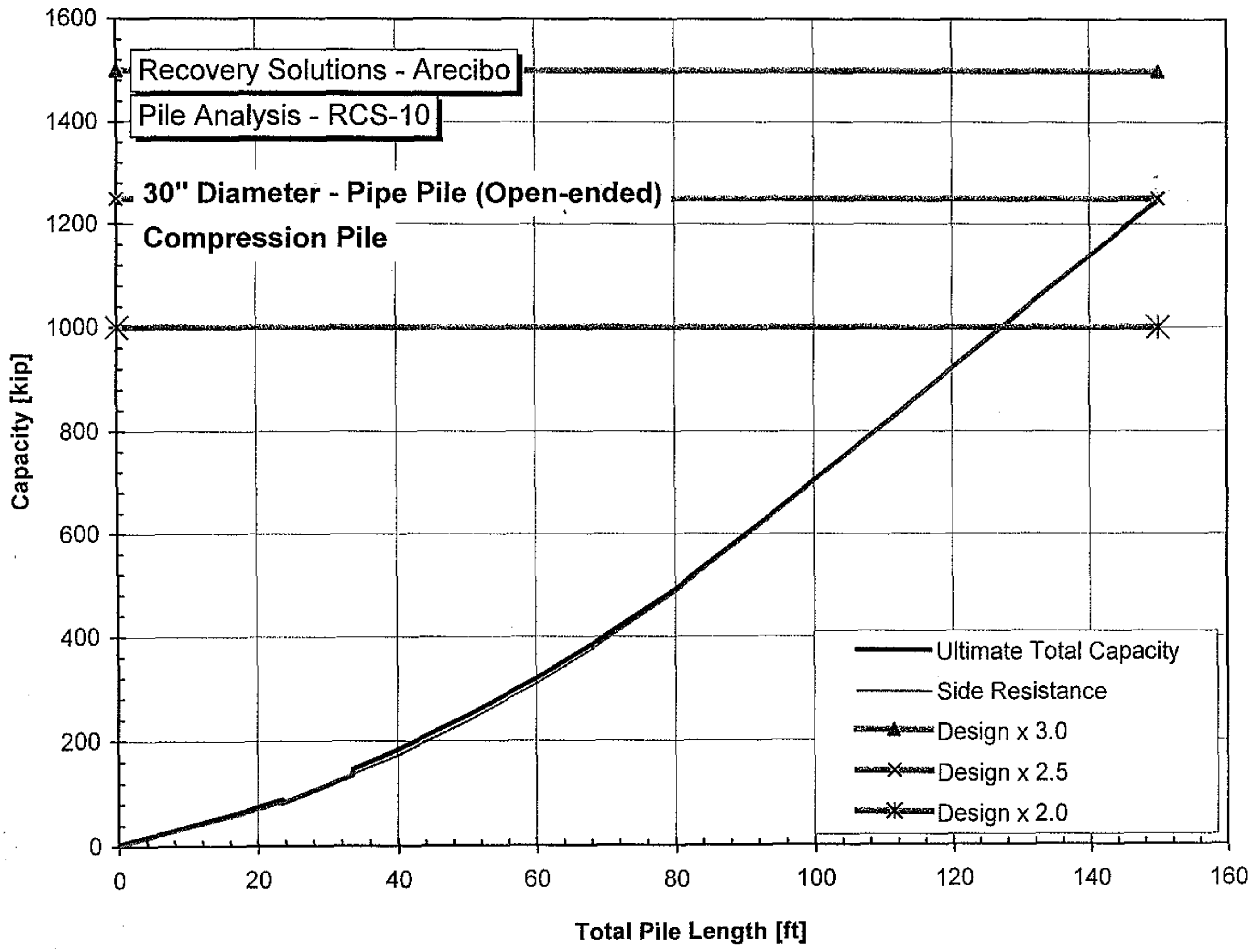


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 30 in. RCS-09
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

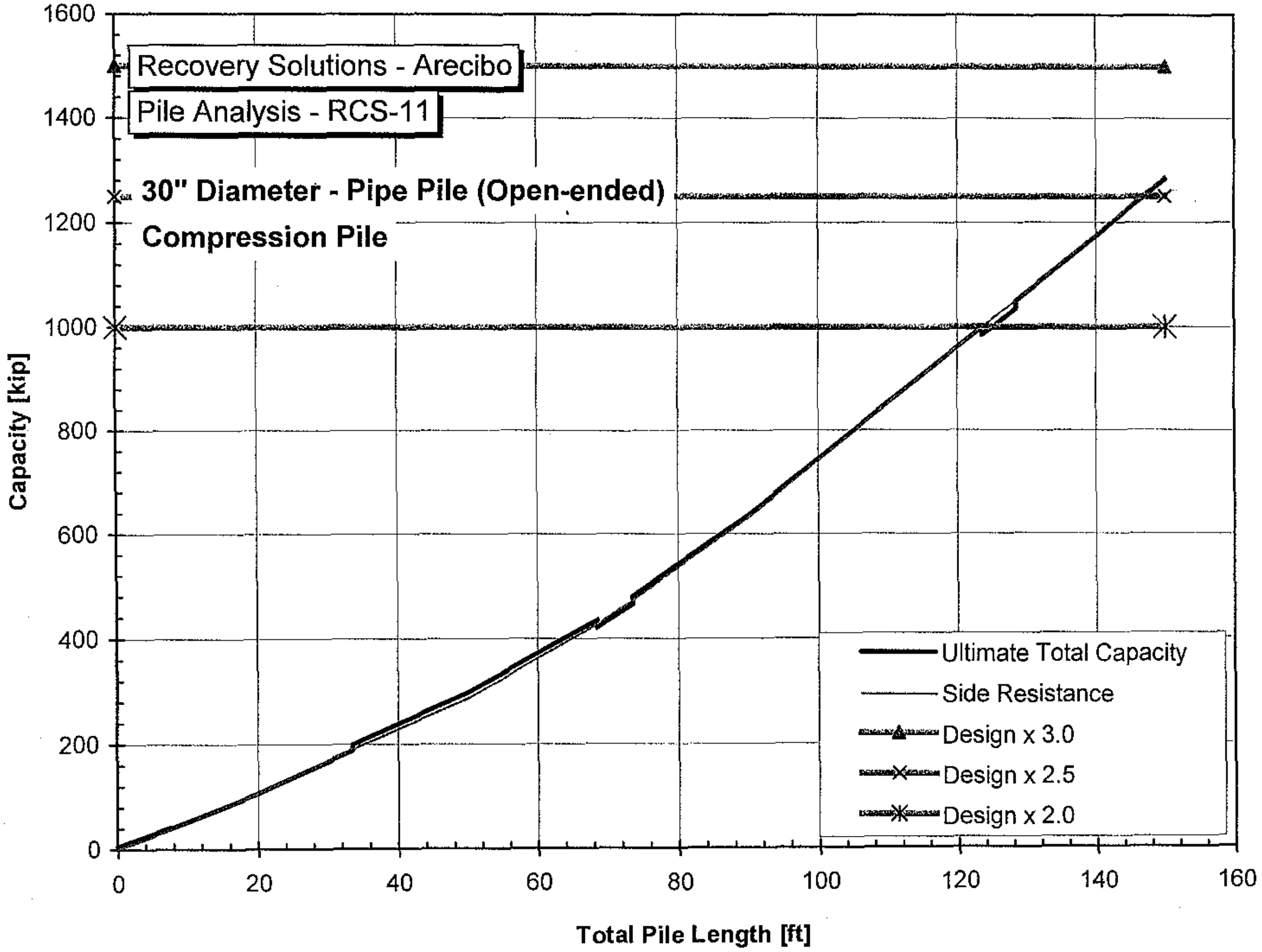


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 30 in. RCS-10
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

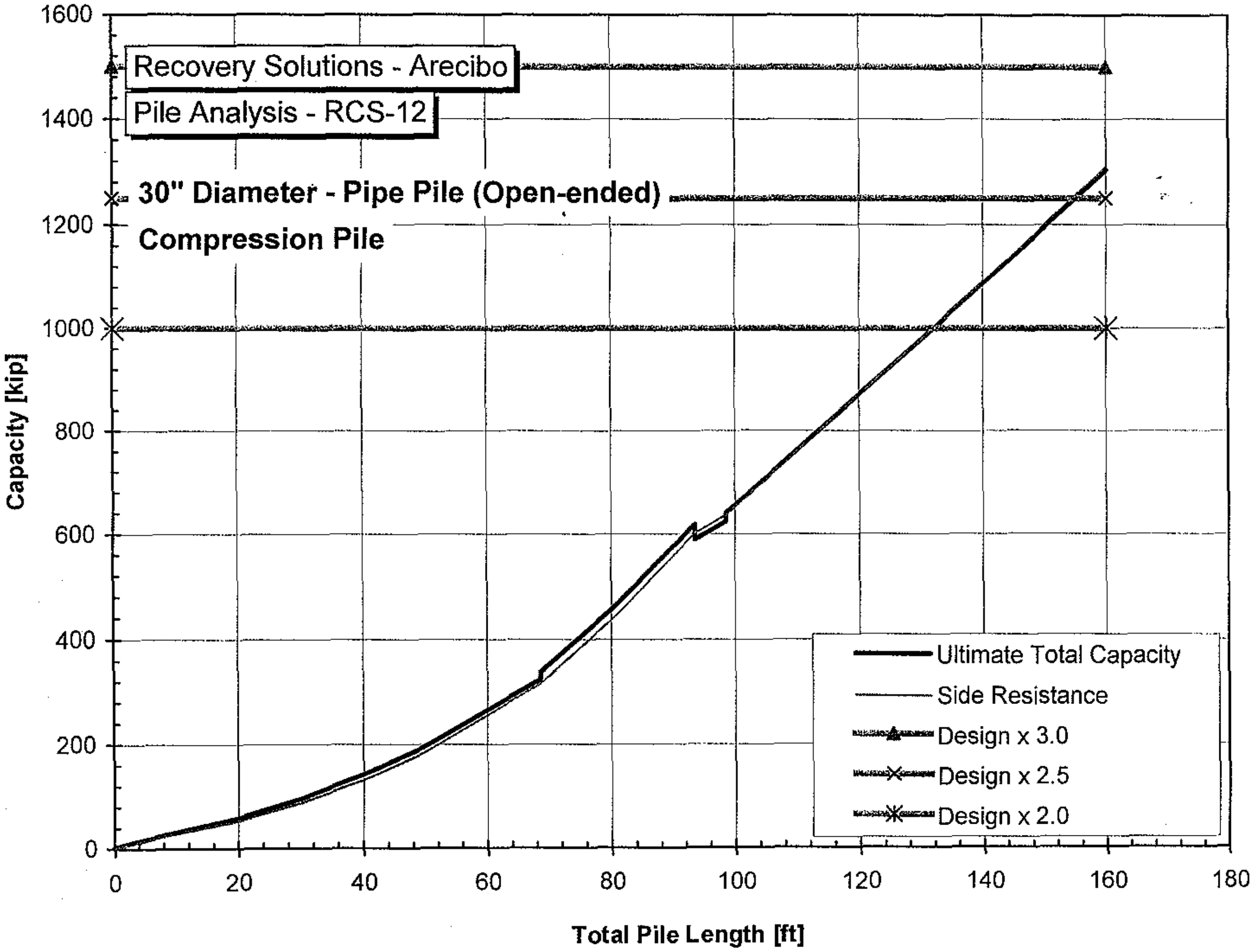


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 30 in. RCS-11
Assumes cohesive undrained behavior in limestone

GEOCONSULT

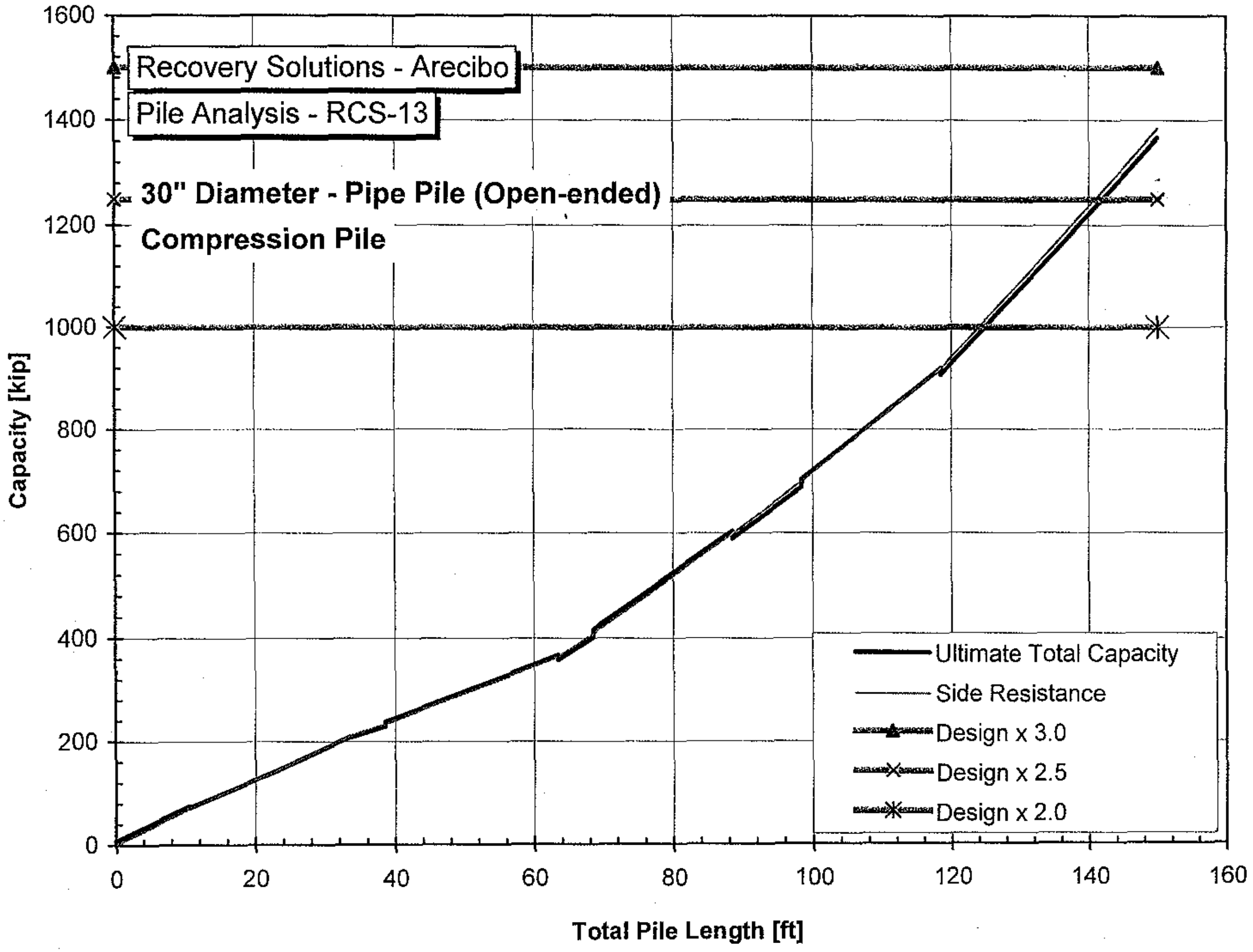
Capacity vs Total Pile Length



Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 30 in. RCS-12
Assumes cohesive undrained behavior in limestone

Capacity vs Total Pile Length

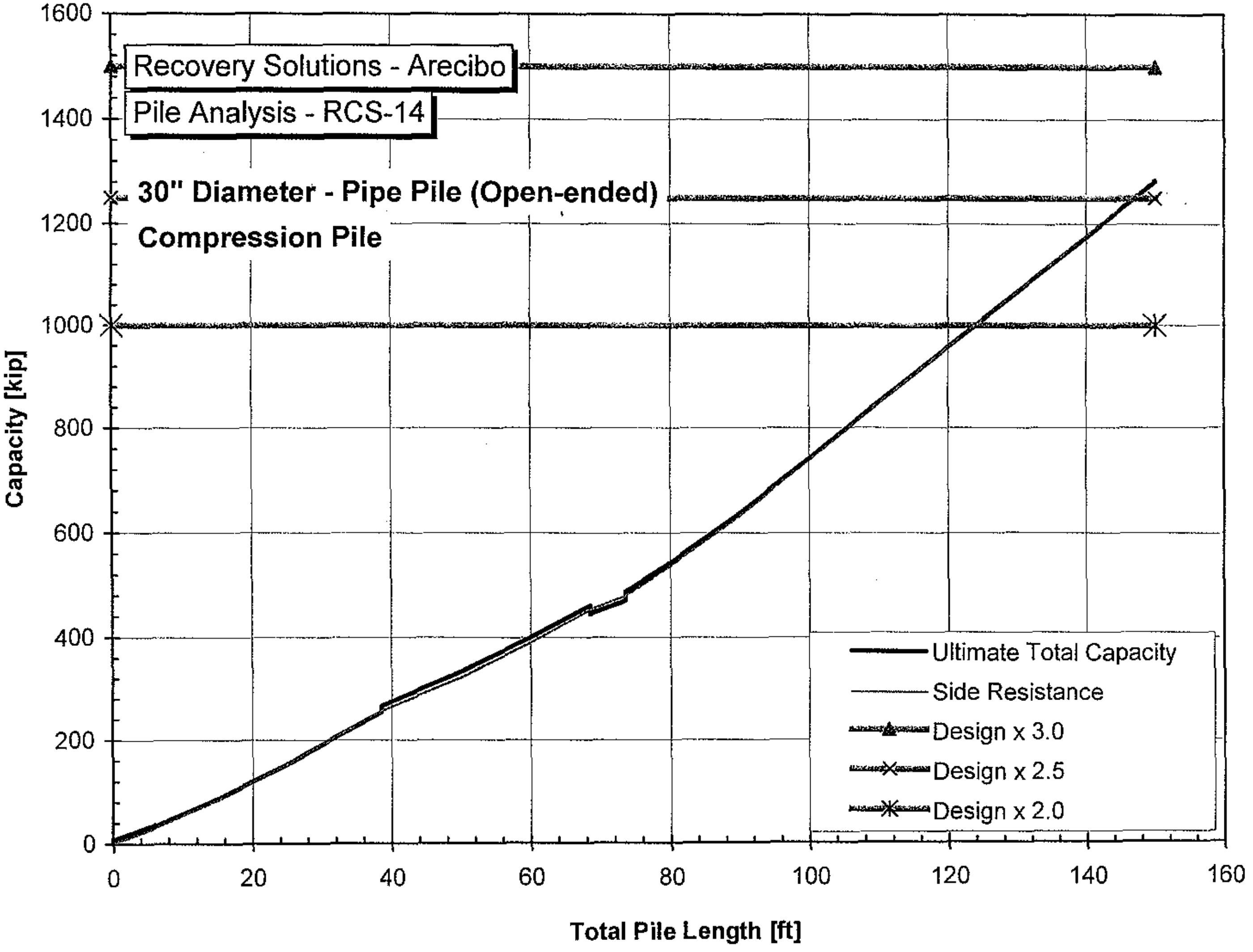


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 30 in. RCS-13
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length

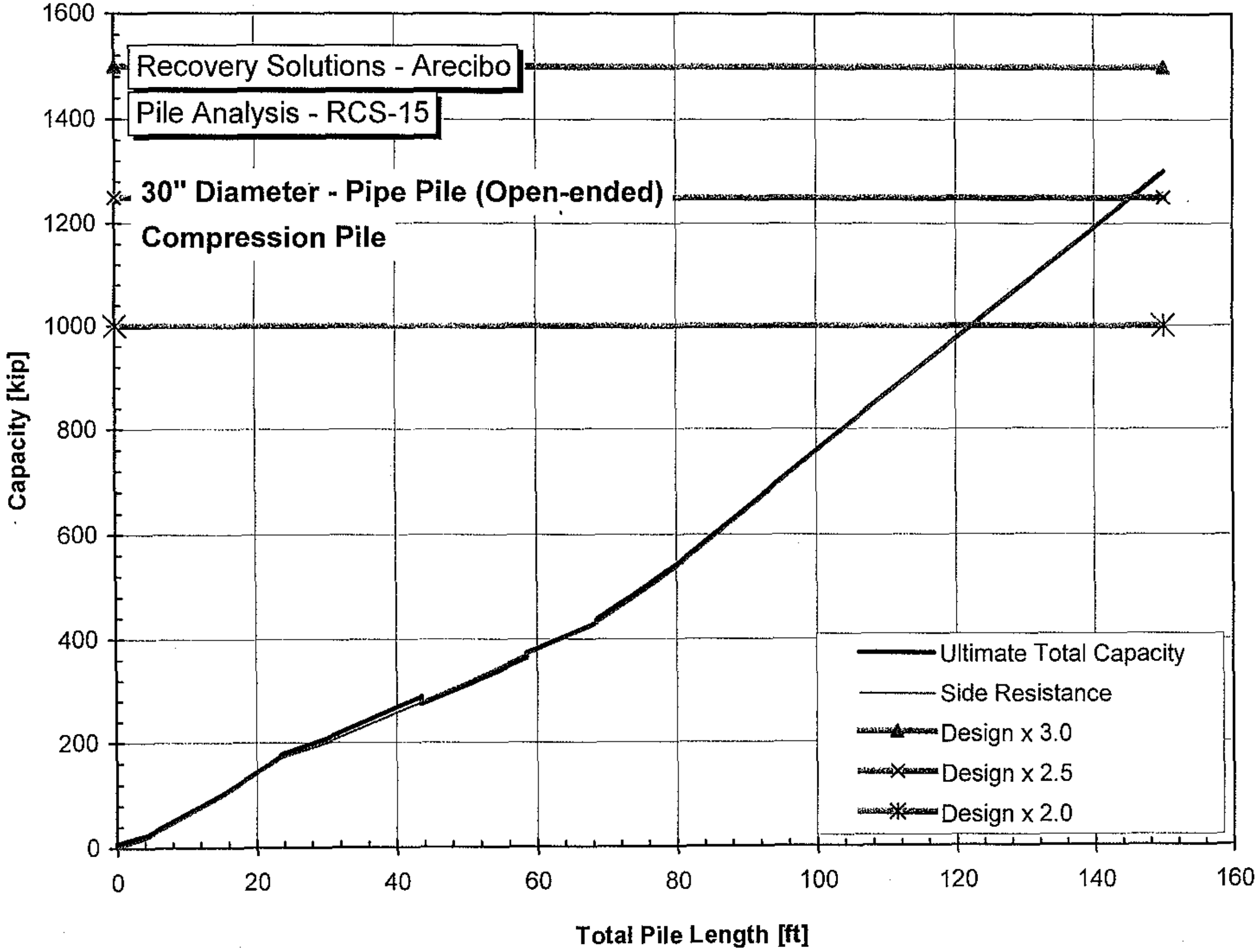


Capacity vs total pile length
Factor of safety shown

File API Analysis - Compression Pipe Pile 30 in. RCS-14
Assumes cohesive undrained behavior in limestone

GEOCONSULT

Capacity vs Total Pile Length



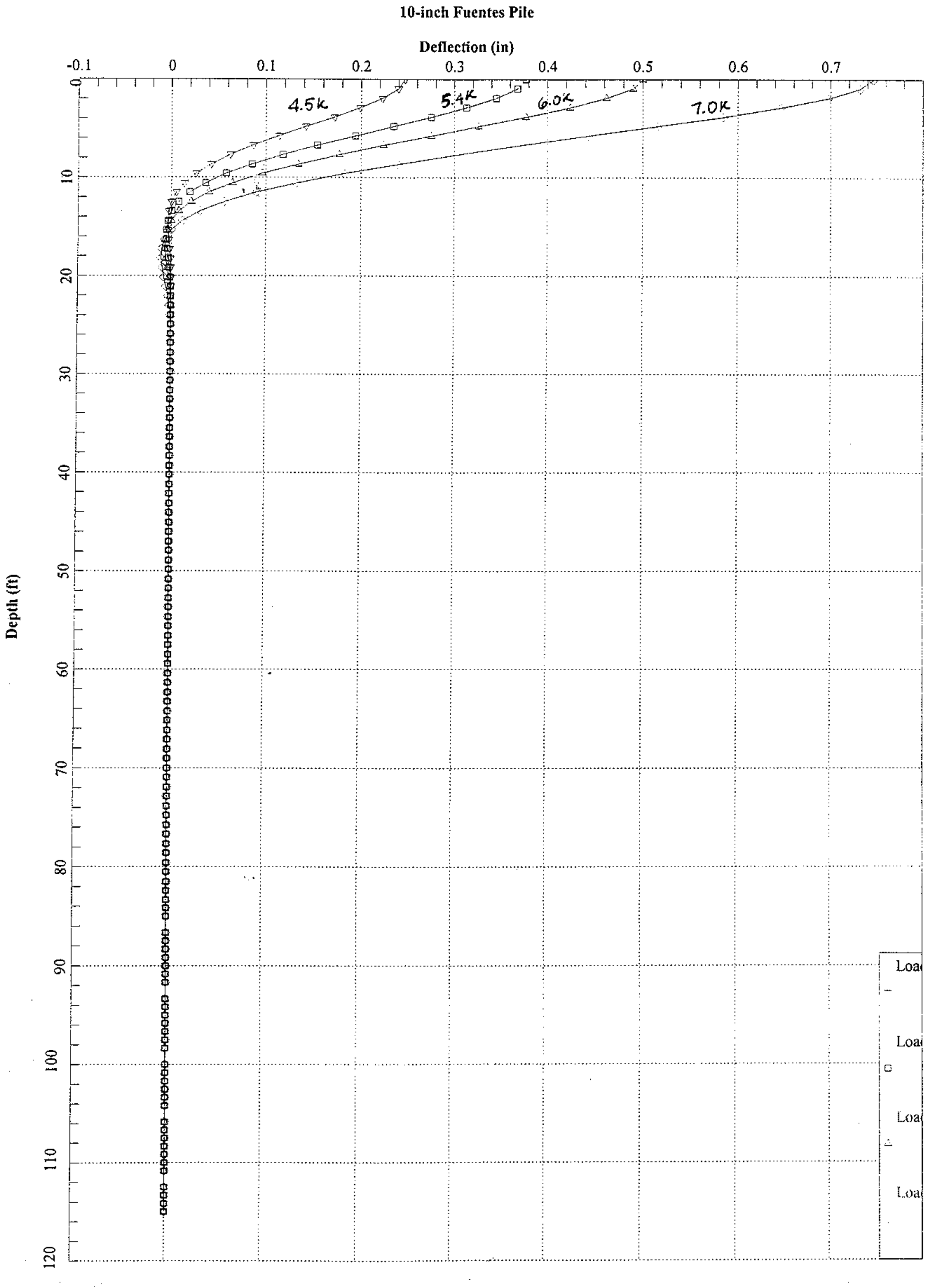
Capacity vs total pile length
Factor of safety shown

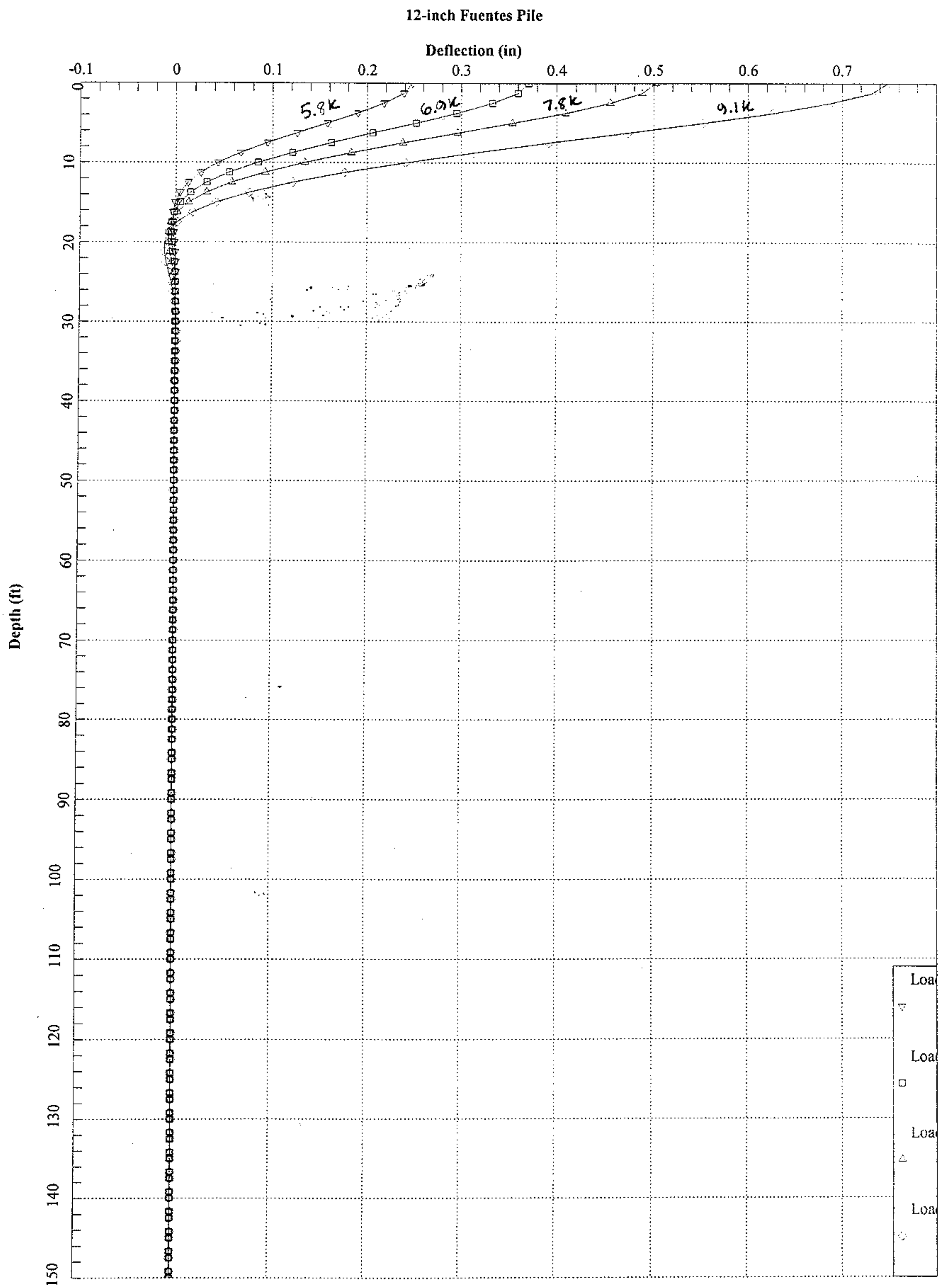
File API Analysis - Compression Pipe Pile 30 in. RCS-15
Assumes cohesive undrained behavior in limestone

GEOCONSULT

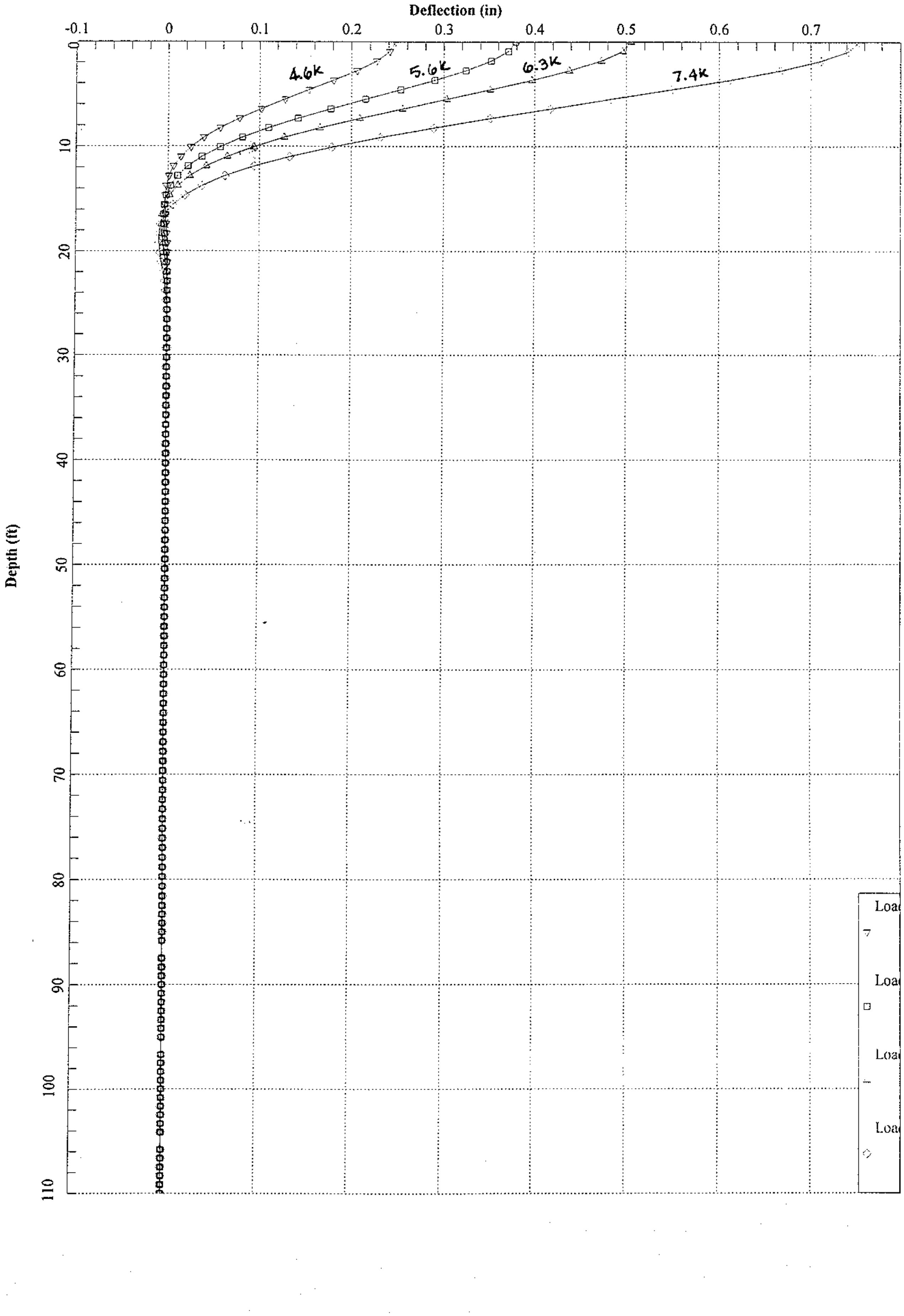
Appendix D

Lateral Deflection vs. Length Curves

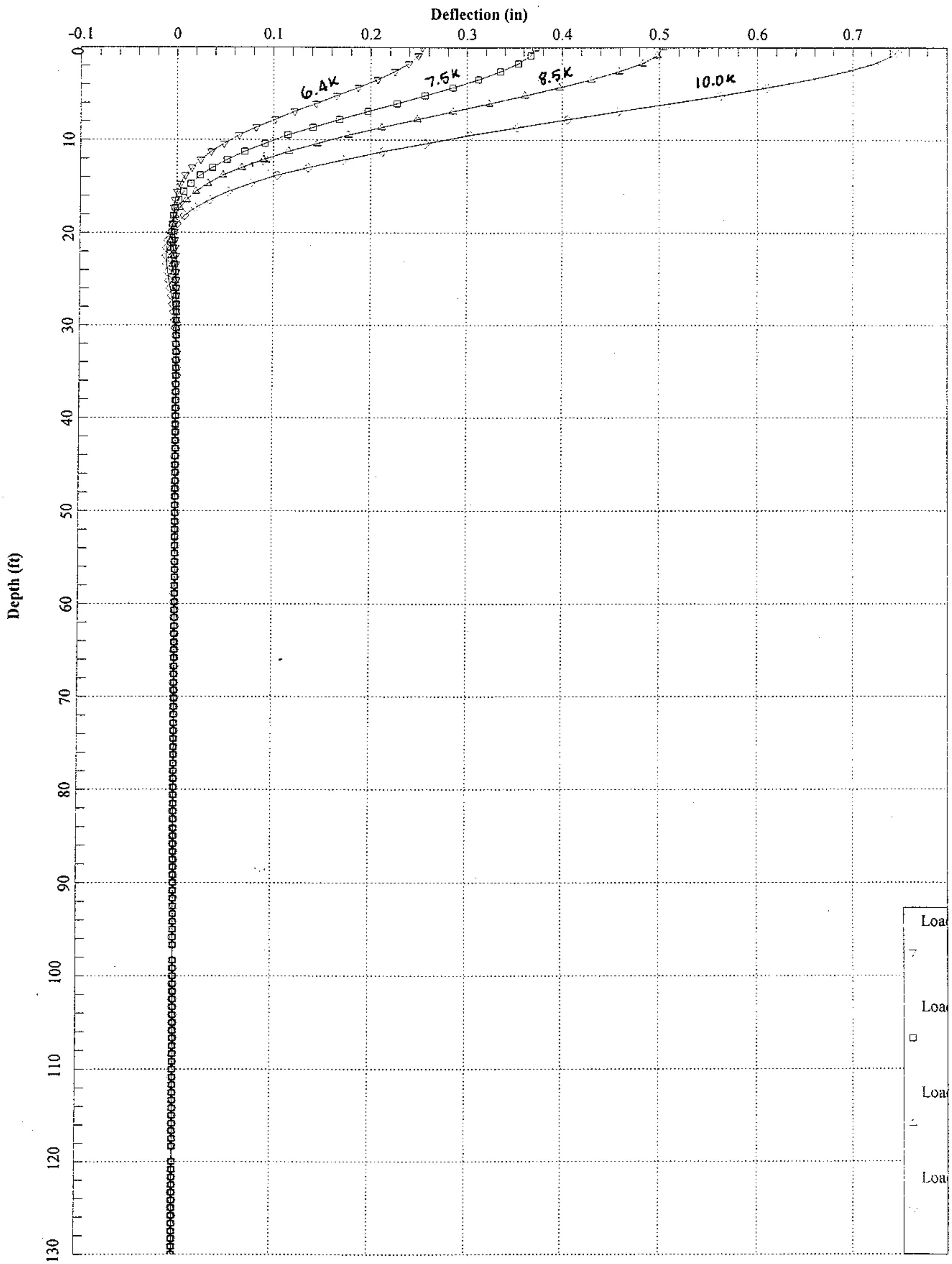

10-inch Fuentes Pile
Deflection (in)
-0.1
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
Depth (ft)
0
10
20
30
40
50
60
70
80
90
100
110
120
4.5k
5.4K
6.0K
7.0K
Loa
Loa
Loa
Loa



12-inch Fuentes Pile

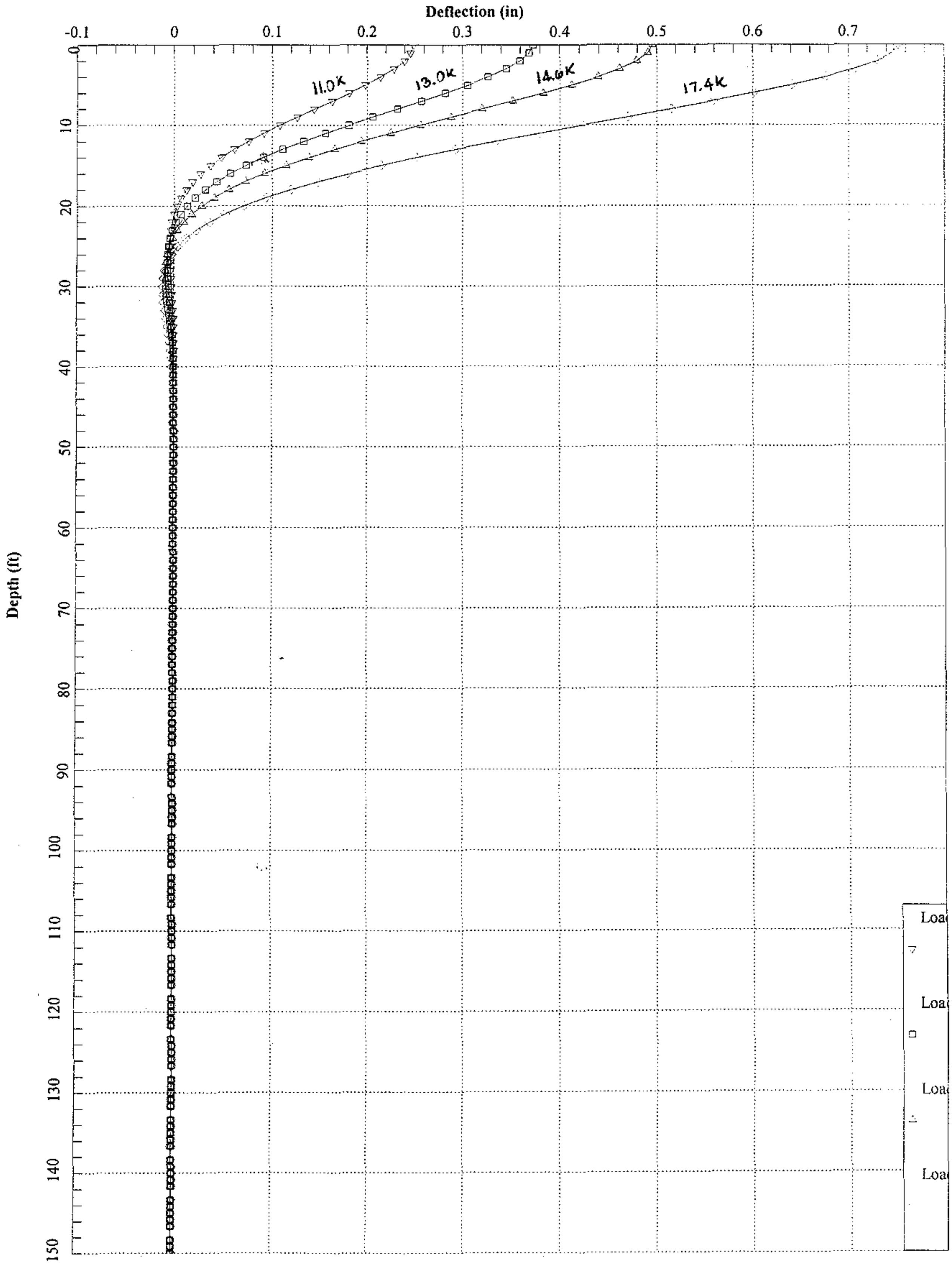


10-inch Steel Pipe Pile - Unfilled

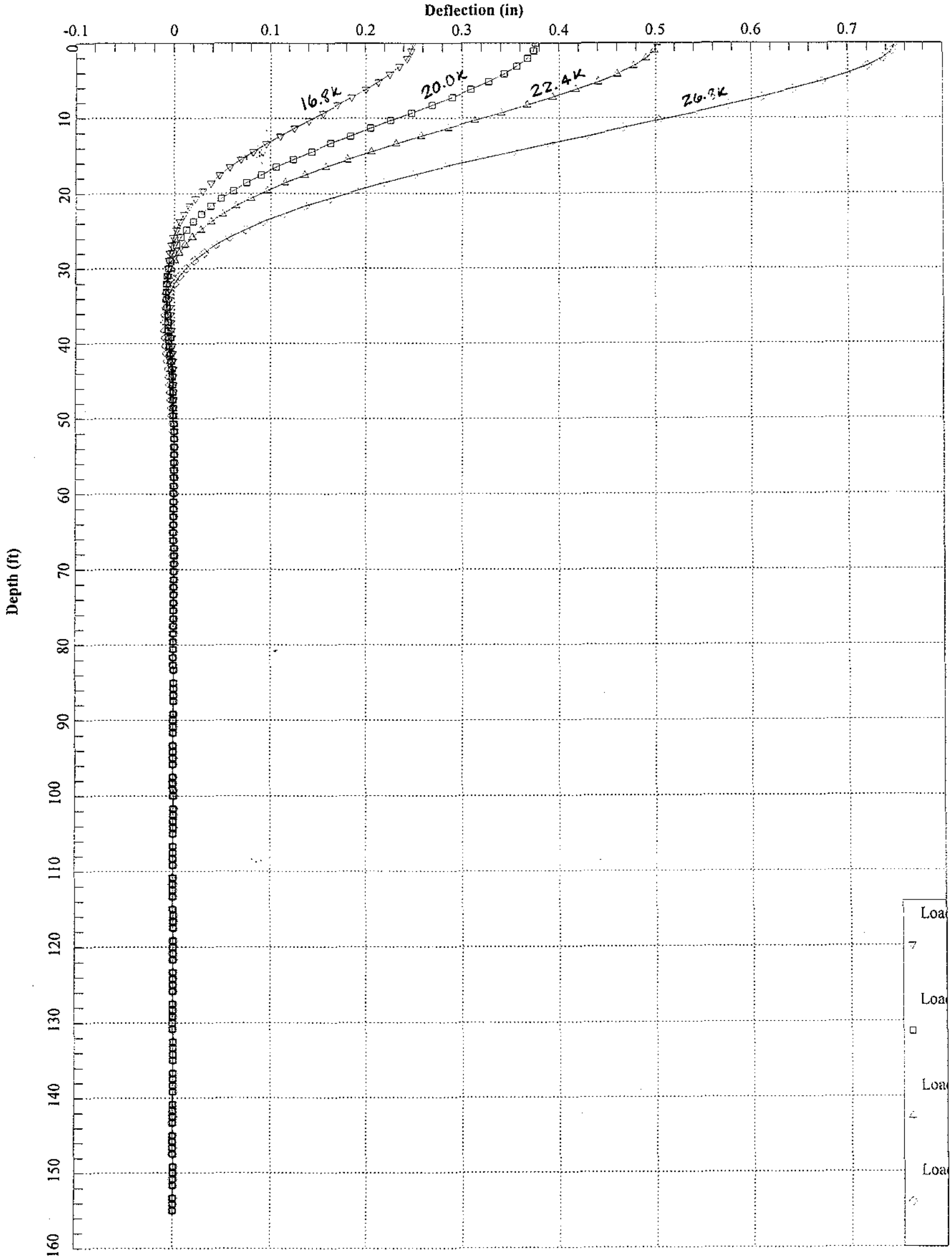


12-inch Steel Pipe Pile - Unfilled

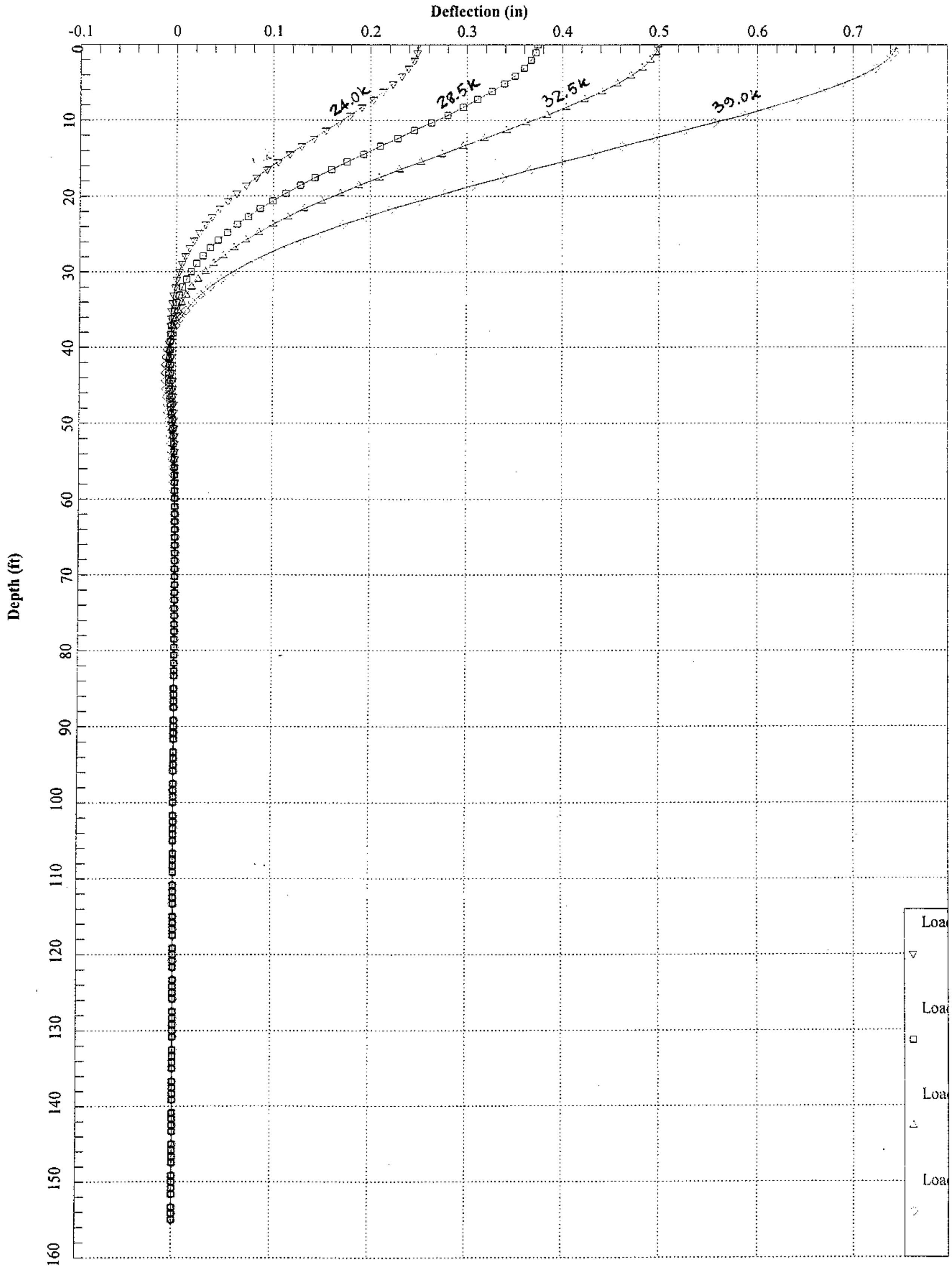
18-inch Steel Pipe Pile - Unfilled



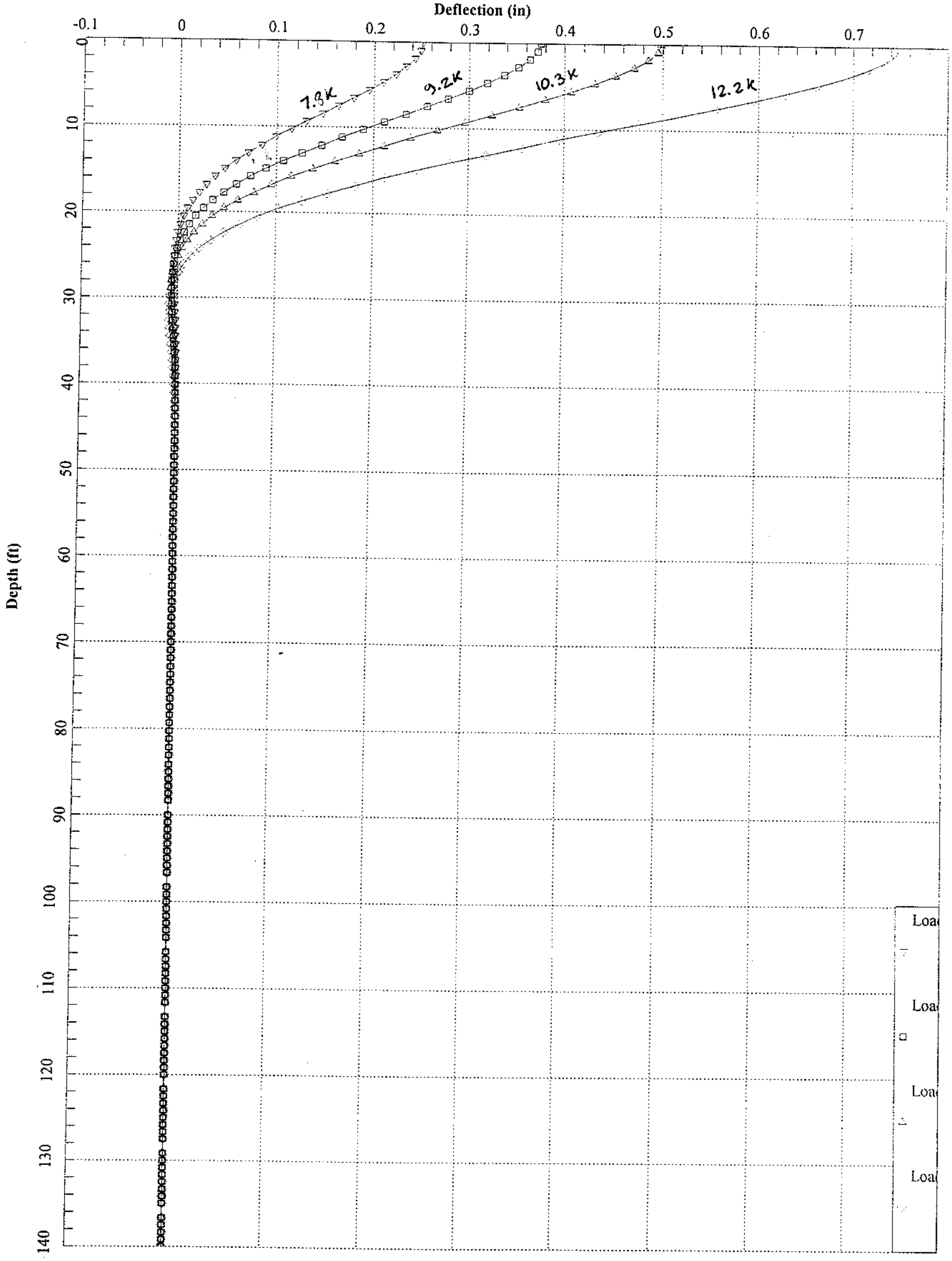
24-inch Steel Pipe Pile - Unfilled



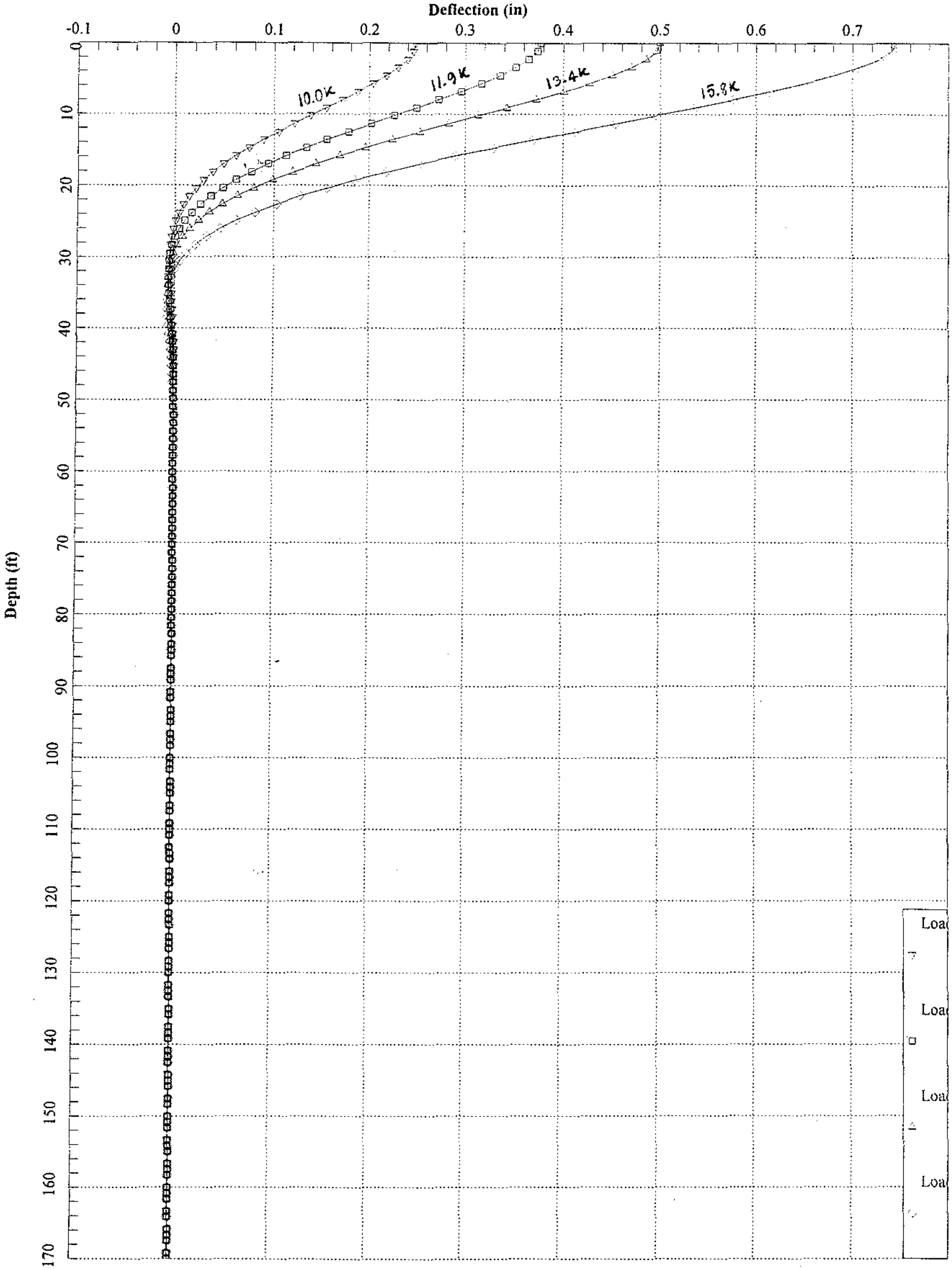
30-inch Steel Pipe Pile - Unfilled



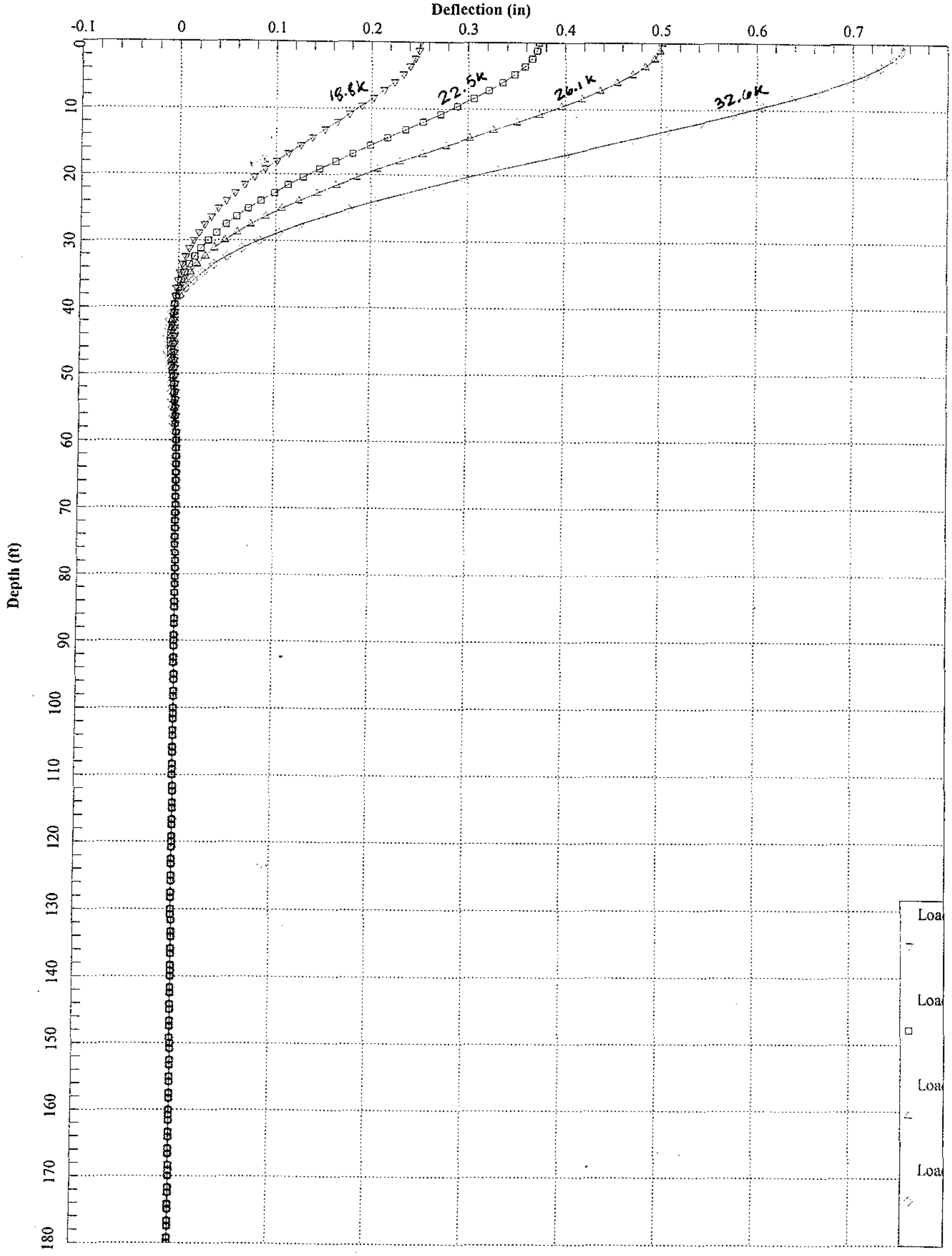
10-inch Steel Pipe Pile - Filled



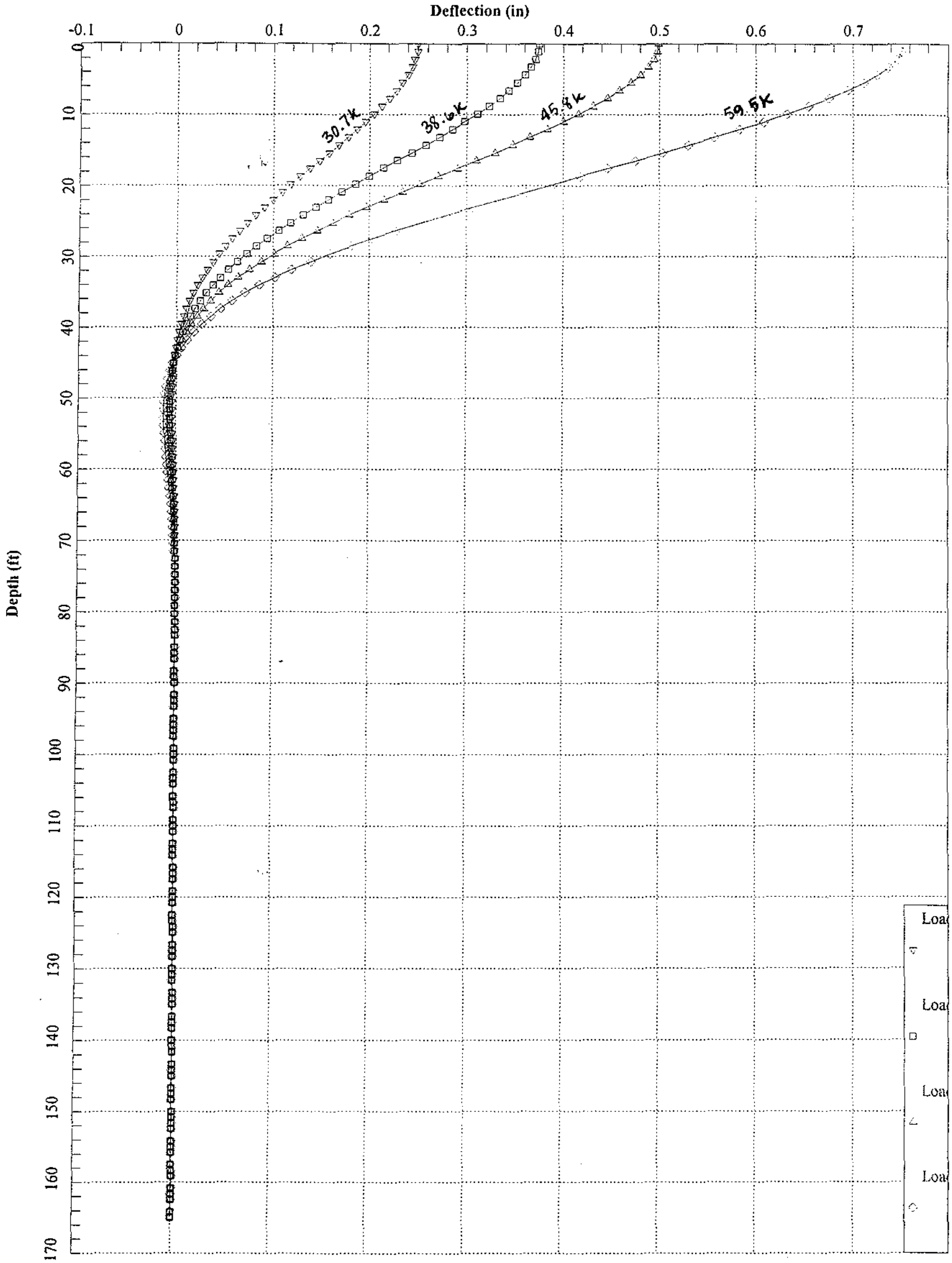
12-inch Steel Pipe Pile - Filled



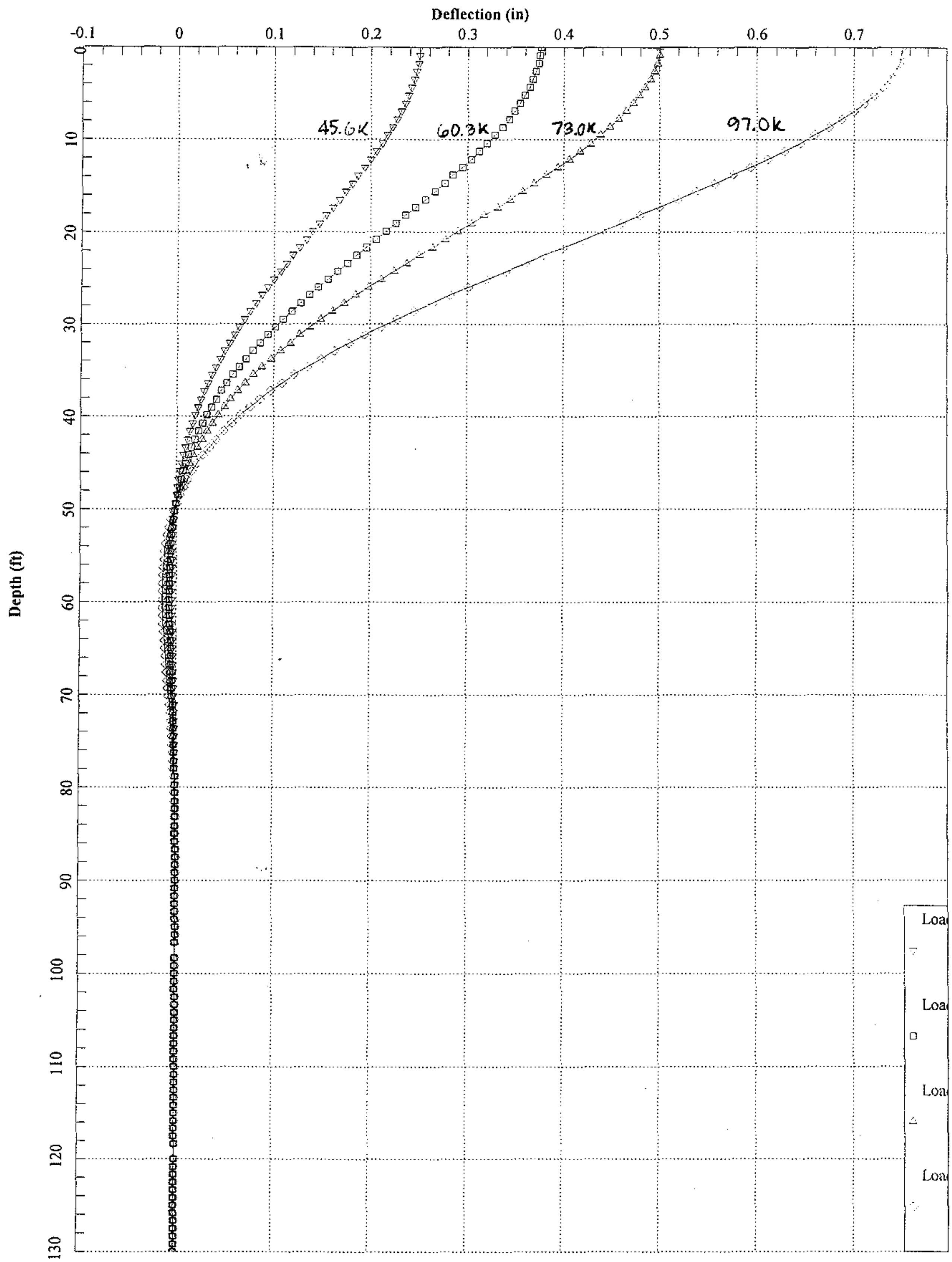
18-inch Steel Pipe Pile - Filled

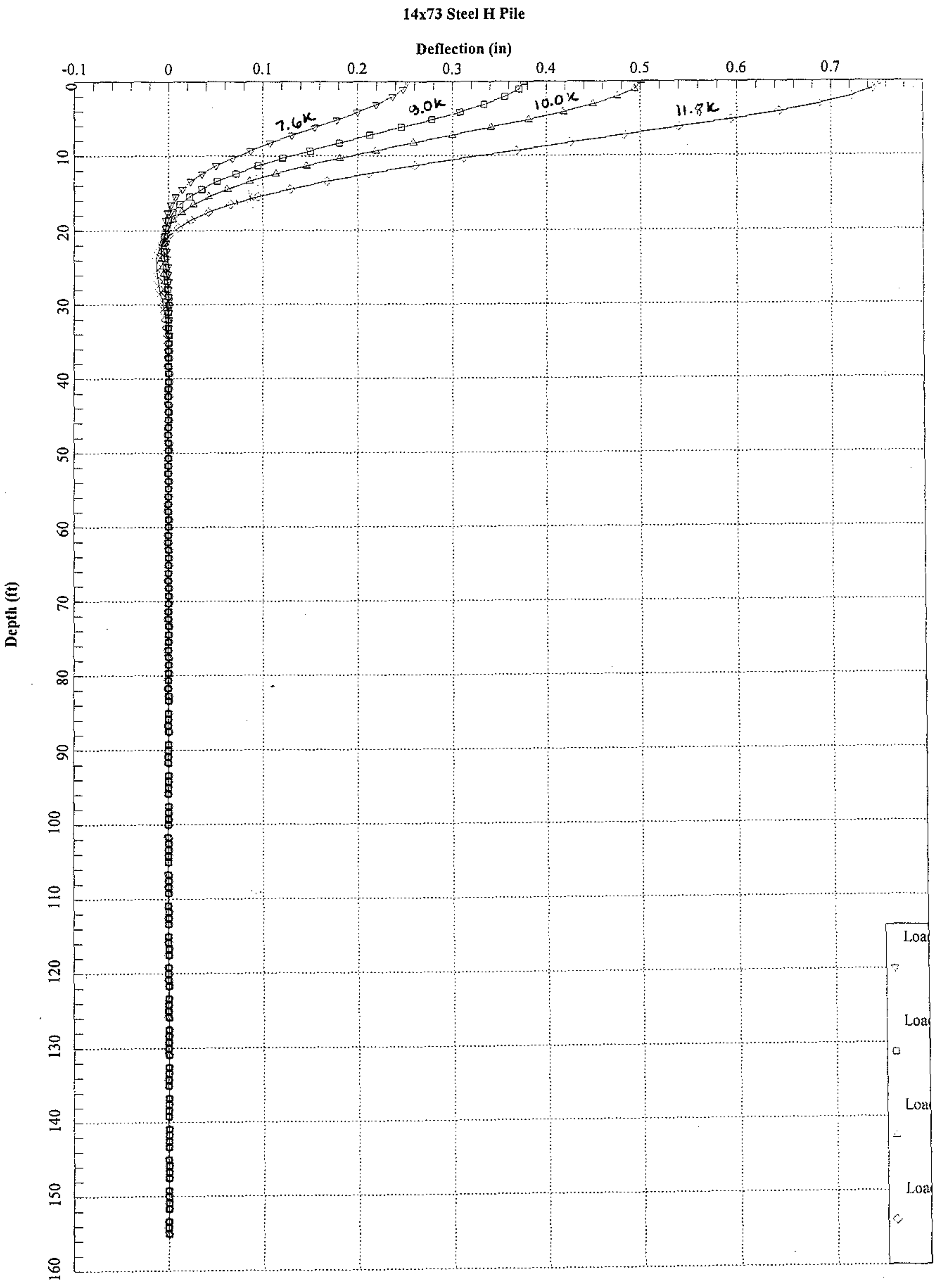


24-inch Steel Pipe Pile - Filled



30-inch Steel Pipe Pile - Filled




14x73 Steel H Pile
Deflection (in)
-0.1
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
Depth (ft)
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
7.6K
9.0K
10.0K
11.8K
Loa
Loa
Loa
Loa

Appendix E

Important Information About your Geotechnical Engineering Report

IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL ENGINEERING PROPOSAL

As the client of a consulting geotechnical engineer, you should know that site subsurface conditions cause more construction problems than any other factor. ASFE/The Association of Engineering Firms Practicing in the Geosciences offers the following suggestions and observations to help you manage your risks.

HAVE REALISTIC EXPECTATIONS

If you have not dealt with geotechnical issues before, recognize that site exploration identifies actual subsurface conditions only at those points where samples are taken, at the time they are taken. The data derived are extrapolated by consulting geotechnical engineers who then apply their judgment to render an opinion about overall subsurface conditions, how they will react to construction activity, and appropriate design of foundations, slopes, impoundments, and other construction elements. Even under optimal circumstances, actual subsurface conditions may differ from those inferred to exist, because no geotechnical engineer, no matter how qualified, and no subsurface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock, and time.

DEVELOP THE SUBSURFACE EXPLORATION PLAN WITH CARE

The nature of a subsurface exploration program — the types, quantities, and locations of procedures used — plays a large role in determining the effectiveness of a geotechnical engineering report and the design based upon it. The more comprehensive a subsurface exploration plan, the more information it provides to the geotechnical engineer, helping the engineer reduce the risk of unanticipated conditions and the attendant risk of costly delays and disputes. Even the cost of subsurface construction may be lowered.

Geotechnical design begins with development of the subsurface exploration plan, a task that should be accomplished jointly by you and/or your professional representatives and the geotechnical engineer. Mutual development helps assure that all parties involved recognize one another's concerns and the available technical options. Clients who develop a subsurface exploration plan without the involvement of their geotechnical engineers may be required to assume responsibility — and liability — for the plan's adequacy.

READ GENERAL CONDITIONS CAREFULLY

Most consulting geotechnical engineers include their standard general contract conditions in their proposals, and it is common for one of these conditions to limit the engineer's liability. Known as risk allocation or limitation of liability, this approach helps prevent problems to begin with, and establishes a fair and reasonable framework for handling them should they arise.

Various other elements of the general conditions explain the geotechnical engineer's responsibilities, in order to help prevent confusion and misunderstandings, and assist all parties in recognizing who is responsible for different tasks.

In all cases, read the geotechnical engineer's general conditions carefully. Speak with the geotechnical engineer about any questions you may have.

HAVE THE GEOTECHNICAL ENGINEER WORK WITH OTHER DESIGN PROFESSIONALS

Costly problems can occur when other design professionals develop their plans based on misinterpretations of a geotechnical engineering report. To help avoid misinterpretations, retain your geotechnical engineer to work with other project design professionals who are affected by the geotechnical report. Ask the geotechnical engineer to explain report implications to those design professionals affected by them, and to review other design professionals' plans and specifications to consider the manner in which they have incorporated geotechnical issues. Although other design professionals may be familiar with geotechnical concerns, none knows as much about them as a competent geotechnical engineer.

REALIZE THAT ENVIRONMENTAL ISSUES HAVE NOT BEEN ADDRESSED

If you have requested a geotechnical engineering proposal, it will not include services needed to evaluate the likelihood of the site being contaminated by hazardous materials or other pollutants. Given the liabilities involved, it is prudent practice always to have a site reviewed from an environmental viewpoint. A geotechnical engineer cannot be responsible for failing to detect contaminants when the services needed to perform that function are not being provided.

OBTAIN CONSTRUCTION OBSERVATION SERVICES

Most experienced clients retain their geotechnical engineers to serve throughout the project's development. Involvement during the construction phase is particularly important, because it permits the geotechnical engineer to be on hand promptly to evaluate unanticipated conditions, to conduct additional tests if required, and — when necessary — to recommend solutions to problems. In addition, the geotechnical engineer can monitor the geotechnical-related work performed by contractors. It is essential to recognize that the construction recommendations included in a geotechnical engineer's report are preliminary, because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site.

Because actual subsurface conditions can be discerned only during earthwork, geotechnical engineers need to observe those conditions in order to finalize their recommendations. Only the geotechnical engineer who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations are valid. The geotechnical engineer submitting the report cannot assume responsibility or liability for the adequacy of preliminary recommendations if another party is retained to observe construction.

RELY ON YOUR GEOTECHNICAL ENGINEER FOR ADDITIONAL ASSISTANCE

Most geotechnical engineers who are members of ASFE are familiar with a variety of techniques and approaches that can be used to help reduce risks for all parties to a construction project, from design through construction. Speak with your geotechnical engineer not only about geotechnical issues, but others as well, to learn about approaches that may be of genuine benefit. You may also wish to obtain certain ASFE publications. Contact an ASFE member or ASFE itself for a complimentary directory of ASFE publications.

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