

TIERRA

January 20, 2005

PBS&J, Inc.
5300 West Cypress Street, Suite 300
Tampa, Florida 33607

Attn: Mr. Amir Kangari, P.E.

**RE: Cover Letter Report of Geotechnical Engineering Services
SR 679 (Pinellas Bayway) at Intracoastal Waterway
Pinellas County, Florida
FPN: 410755-1-52-01
Tierra Proposal Number: 65-05-028**

Mr. Kangari:

Tierra has completed the analysis of the proposed deep foundation systems associated with the above referenced project. The analysis was performed in general accordance with Florida Department Transportation (FDOT) guidelines. This cover letter report presents the findings of our foundation analysis regarding the chosen foundation alternatives for the proposed project.

Results of Analysis

Based on the information provided by PBS&J, the proposed foundation system selected to support the project improvements will consist of pre-cast, concrete, cylinder piles. For comparison purposes, Pre-cast, Pre-stressed, Square, Concrete (PPSC) piles were analyzed.

Axial capacities for the proposed project were determined utilizing LRFD methods. Davisson axial capacities for the concrete and steel cylinder piling as well as PPSC piles were computed using the FDOT program SPT-97. The capacities were calculated anticipating both end bearing and skin friction for the piling. The davisson capacities for concrete and steel cylinder piles were similar.

The complete results of these analyses are presented in the Appendix. The results indicate that capacities are generated uniformly as the pile penetrates the substrata. When piles penetrate into stiff clay/silt or rock layers, refusal may be achieved and reach the design capacities at penetrations less than those indicated from the SPT-97 analyses during actual pile installation.

The following table shows the pile capacities generated as a comparison between the concrete cylinder piles as well as the PPSC piles with similar diameters noted in the parenthesis ().

Comparison of Axial Capacity Between Cylinder Piles and PPSC Piles			
Pile Type	Pile Diameter (in)	Depth	Estimated Davisson Axial Capacity (tons)
*Concrete/Steel Cylinder	24	100	490
	30 (24X24)	100	645
	36	100	803
	38 (30X30)	100	858
	54	100	952
	66	100	1160
PPSC	24X24	100	624
	30X30	100	821
	36X36	100	1023

Note – Axial capacities are based on a scour of 12 feet.

*Note – A 2 to 5 inch wall thickness was used in the analysis for the concrete cylinder piles.

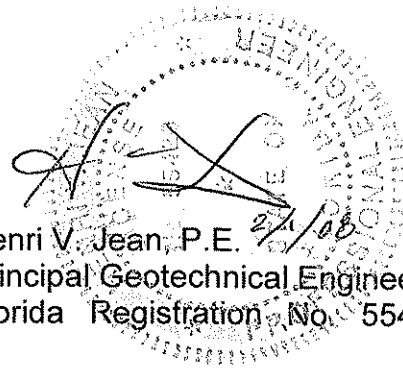
Tierra, Inc. appreciates the opportunity to provide our services on this project and looks forward to a successful completion. Please contact our office should you have any questions or desire additional information.

Sincerely,

Tierra, Inc.



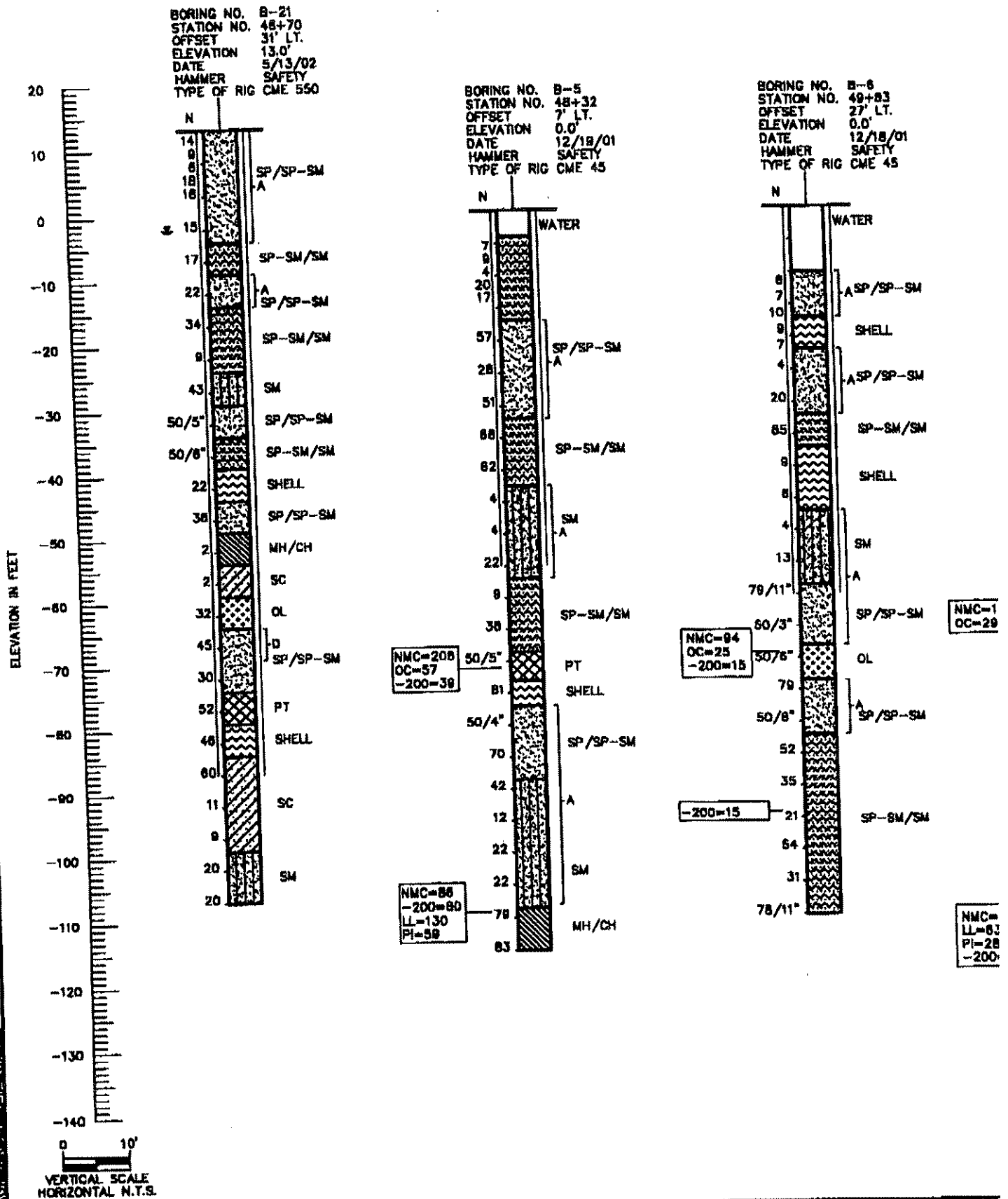
Erick M. Frederick, E.I.
 Geotechnical Engineer Intern



Henri V. Jean, P.E.
 Principal Geotechnical Engineer
 Florida Registration No. 55420

Appendix A

Boring Profile Information From Area



LEGEND

- (SP/SP-SM), GRAY BROWN CLEAN TO SLIGHTLY SILTY SAND
- (SP-SM/SM), GRAY BROWN SLIGHTLY SILTY TO SILTY SAND WITH SHELL
- (SM), DARK GRAY BROWN TO GREEN GRAY SILTY SAND WITH SOME CLAY
- (OL), DARK BROWN ORGANIC SILTY SAND
- (MH/CH), GREEN GRAY SILTY CLAY
- (ML/CL), GREEN GRAY INDURATED CLAY
- (SHELL), GREEN GRAY TO BROWN SANDY SHELL
- (PT), DARK BROWN SILTY PEAT
- (SC), GRAY CLAYEY SAND

- A INDICATES WITH TRACE SHELL
- B INDICATES WITH LIMESTONE FRAGMENTS
- C INDICATES WITH CEMENTED SAND LENSES
- D INDICATES WITH WOOD AND FIBROUS ORGANIC MATERIAL

NOTES:

- WATER TABLE
- NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12" PENETRATION. (UNLESS OTHERWISE NOTED.)
- CASING USED
- 200 FINES PASSING NO. 200 SIEVE (%)
- NMC NATURAL MOISTURE CONTENT (%)
- LL LIQUID LIMIT (%)
- OC ORGANIC CONTENT (%)
- PI PLASTICITY INDEX (%)
- NP NON PLASTIC
- ENVIRONMENTAL CLASSIFICATION**
- SUBSTRUCTURE: EXTREMELY AGGRESSIVE (RESISTIVITY 21-1,200) (CHLORIDES 6,600-142,000)
- SUPERSTRUCTURE: EXTREMELY AGGRESSIVE (CHLORIDE 6,800-142,000)

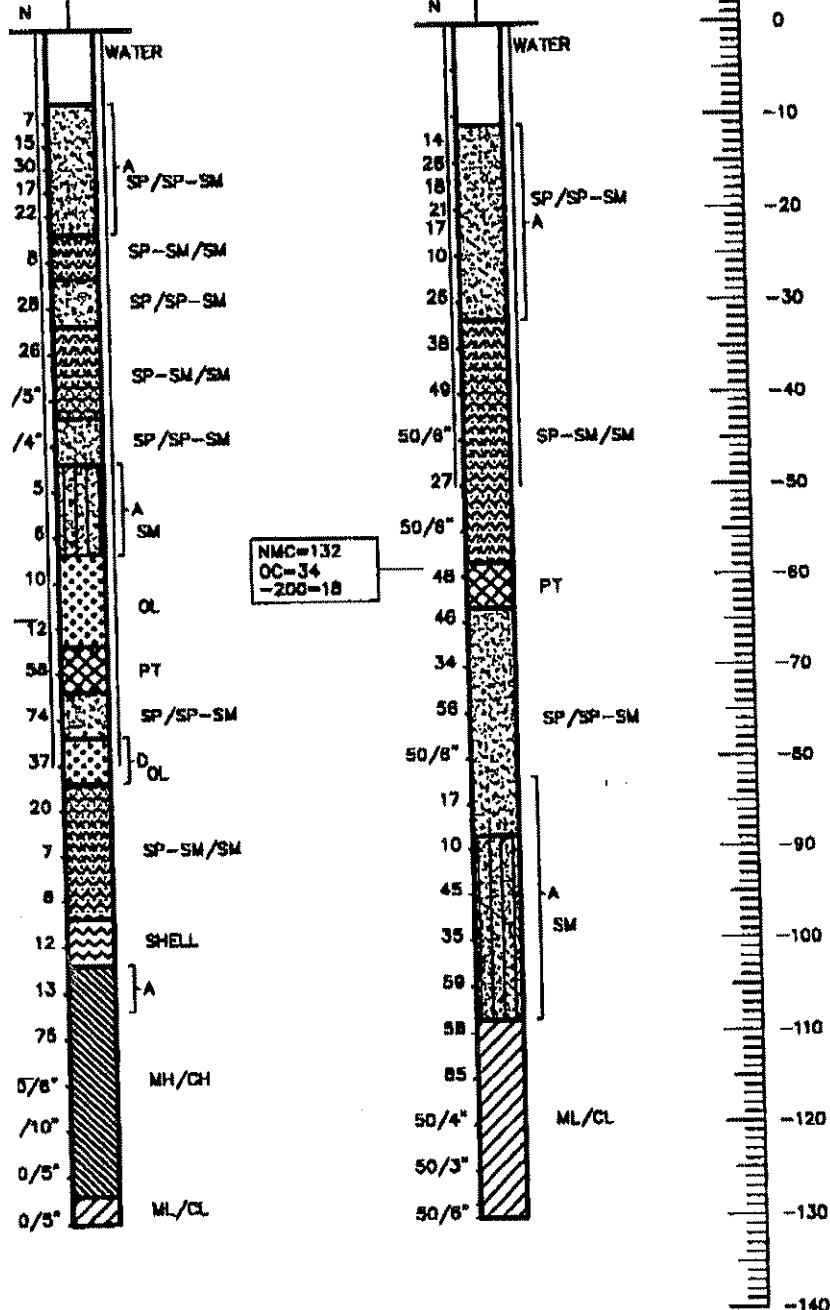
SOIL

RESISTIVITY: 21-1,200 OHMS-CM
 CHLORIDES: 6,600-142,000 PPM
 SULFATES: 675-2,370 PPM
 PH: 8.26-8.89

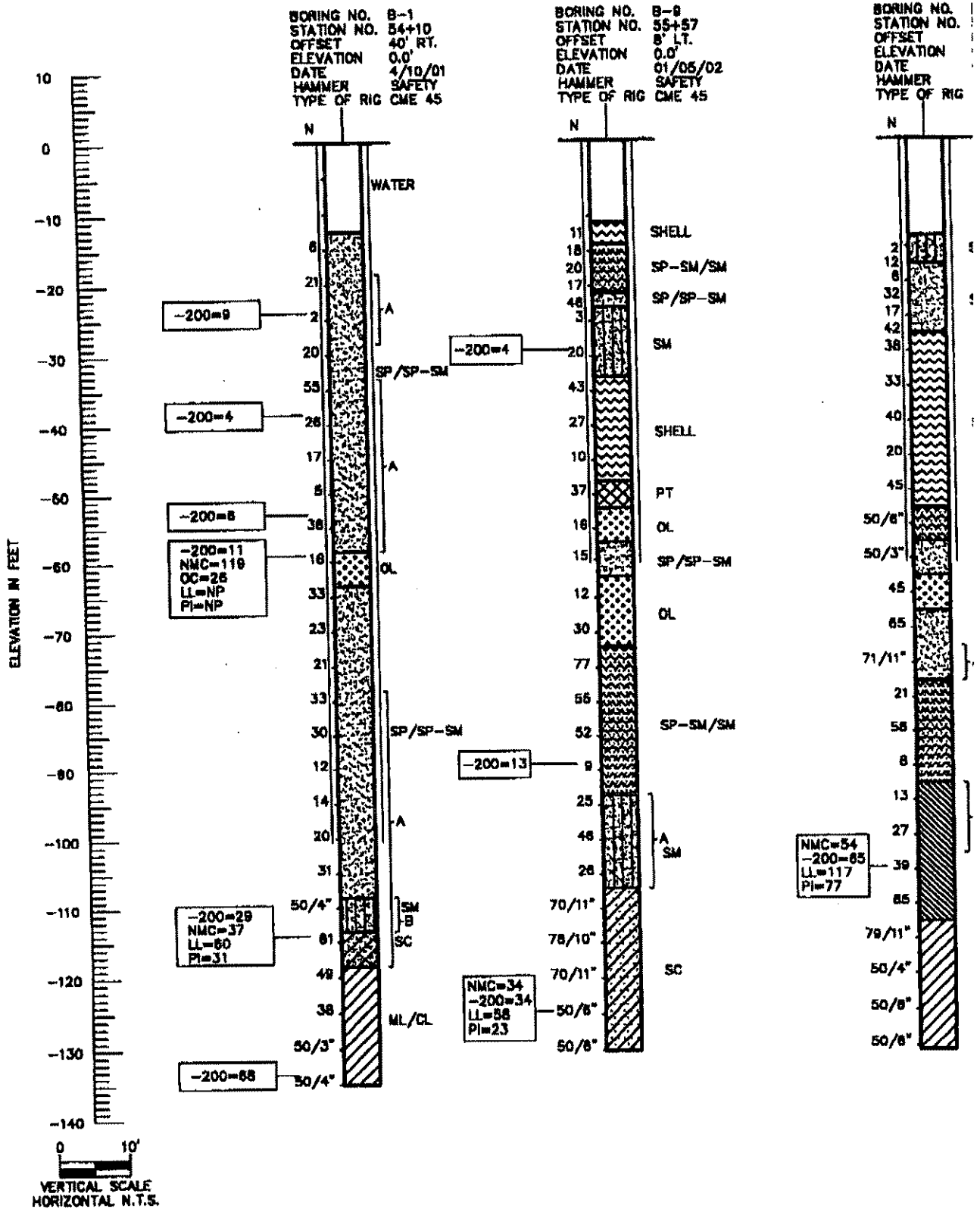
GRANULAR MATERIALS RELATIVE DENSITY	SPT (BLOWS/FT.)
VERY LOOSE	LESS THAN 4
LOOSE	5-10
MEDIUM	11-30
DENSE	31-50
VERY DENSE	GREATER THAN 50
SILTS AND CLAYS CONSISTENCY	SPT (BLOWS/FT.)
VERY SOFT	LESS THAN 2
SOFT	3-4
FIRM	5-8
STIFF	9-15
VERY STIFF	16-30
HARD	GREATER THAN 30

BORING NO. B-7
 STATION NO. 51+29
 OFFSET 84' L.T.
 ELEVATION 0.0'
 DATE 01/19/02
 HAMMER SAFETY
 TYPE OF RIG CME 45

BORING NO. B-8
 STATION NO. 52+89
 OFFSET 8' L.T.
 ELEVATION 0.0'
 DATE 12/21/01
 HAMMER SAFETY
 TYPE OF RIG CME 45



INDUSTRIES, INC. ER DR., SUITE 112 35834 1-1878 INC CERTIFICATE TDN No. 3884	FLORIDA DEPARTMENT OF TRANSPORTATION STRUCTURES DESIGN OFFICE		SHEET NO. REPORT OF CORE BORINGS - 1 PROJECT NAME S.R. 882 (PINELLAS BAYWAY)	SHEET NO. B-13	
	ROAD NO.	COUNTY			FINANCIAL PROJECT NO.
	RD. 882	PINELLAS			28903-1-02-02
P&J PROJECT No. 778-0533 SHEET					












REVISIONS					Name		Date	
Date	By	Description	Date	By	Description	Date	By	

PROFESSIONAL SEAL
 6601 BENJAMIN I
 TAMP.
 (815)
 FLORIDA ENG'G
 OF AUTHORITY



PSI

Drawn by: DMB 11/02
 Checked by: LL 11/02
 Designed by: LL 11/02
 Checked by: DLK 11/02
 Approved by: CHAS L. WOOD, P.E. 11/02
 P.A. REG. No. 3711

LEGEND

-  (SP/SP-SM), GRAY BROWN CLEAN TO SLIGHTLY SILTY SAND
 -  (SP-SM/SM), GRAY BROWN SLIGHTLY SILTY TO SILTY SAND WITH SHELL
 -  (SM), DARK GRAY BROWN TO GREEN GRAY SILTY SAND WITH SOME CLAY
 -  (OL), DARK BROWN ORGANIC SILTY SAND
 -  (MH/CH), GREEN GRAY SILTY CLAY
 -  (ML/CL), GREEN GRAY INDURATED CLAY
 -  (SHELL), GREEN GRAY TO BROWN SANDY SHELL
 -  (PT), DARK BROWN SILTY PEAT
 -  (SC), GRAY CLAYEY SAND
- A INDICATES WITH TRACE SHELL
 B INDICATES WITH LIMESTONE FRAGMENTS
 C INDICATES WITH CEMENTED SAND LENSES
 D INDICATES WITH WOOD AND FIBROUS ORGANIC MATERIAL

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- OC ORGANIC CONTENT (%)
- PI PLASTICITY INDEX (%)
- NP NON PLASTIC

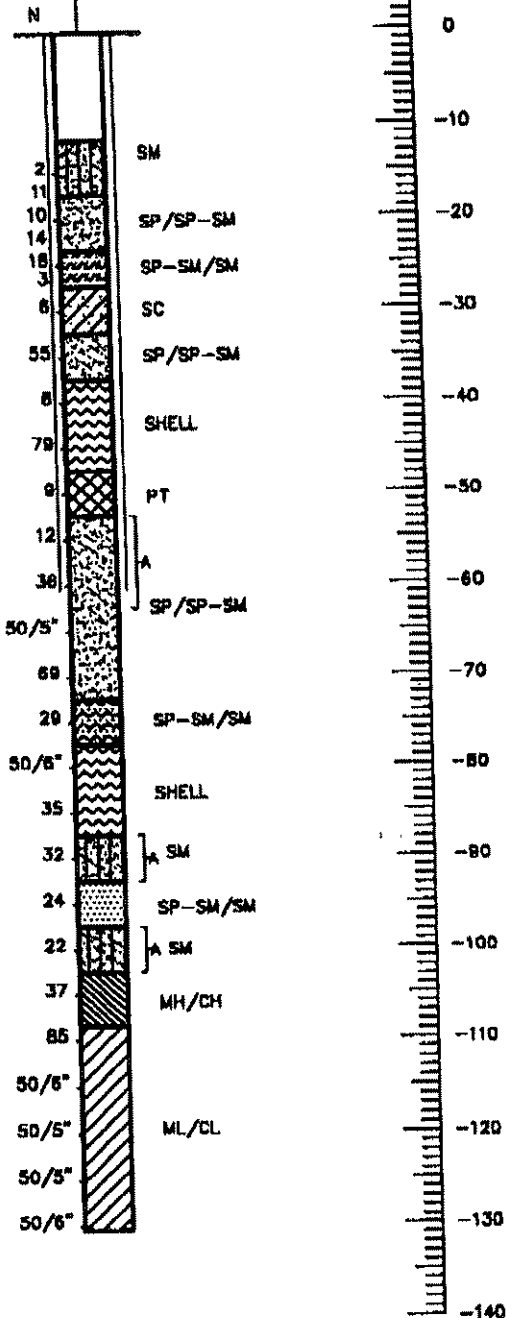
ENVIRONMENTAL CLASSIFICATION

SUBSTRUCTURE: EXTREMELY AGGRESSIVE (RESISTIVITY 21-1,200) (CHLORIDES 6,600-142,000)
 SUPERSTRUCTURE: EXTREMELY AGGRESSIVE (CHLORIDE 6,600-142,000)

SOIL
 RESISTIVITY: 21-1,200 OHMS-CM
 CHLORIDES: 6,600-142,000 PPM
 SULFATES: 675-2,370 PPM
 PH: 6.26-8.69

GRANULAR MATERIALS RELATIVE DENSITY	SPT (BLOWS/FT.)
VERY LOOSE	LESS THAN 4
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SOFT	3-4
FIRM	5-8
STIFF	9-15
VERY STIFF	16-30
HARD	GREATER THAN 30

BORING NO. B-11
 STATION NO. 58+45
 OFFSET 8' L.T.
 ELEVATION 0.0'
 DATE 01/09/02
 HAMMER SAFETY
 TYPE OF RIG CME 45



INDUSTRIES, INC.
 700 N. SUITE 118
 TAMPA, FL 33604
 8-1675

INC CERTIFICATE
 FOR No. 3684

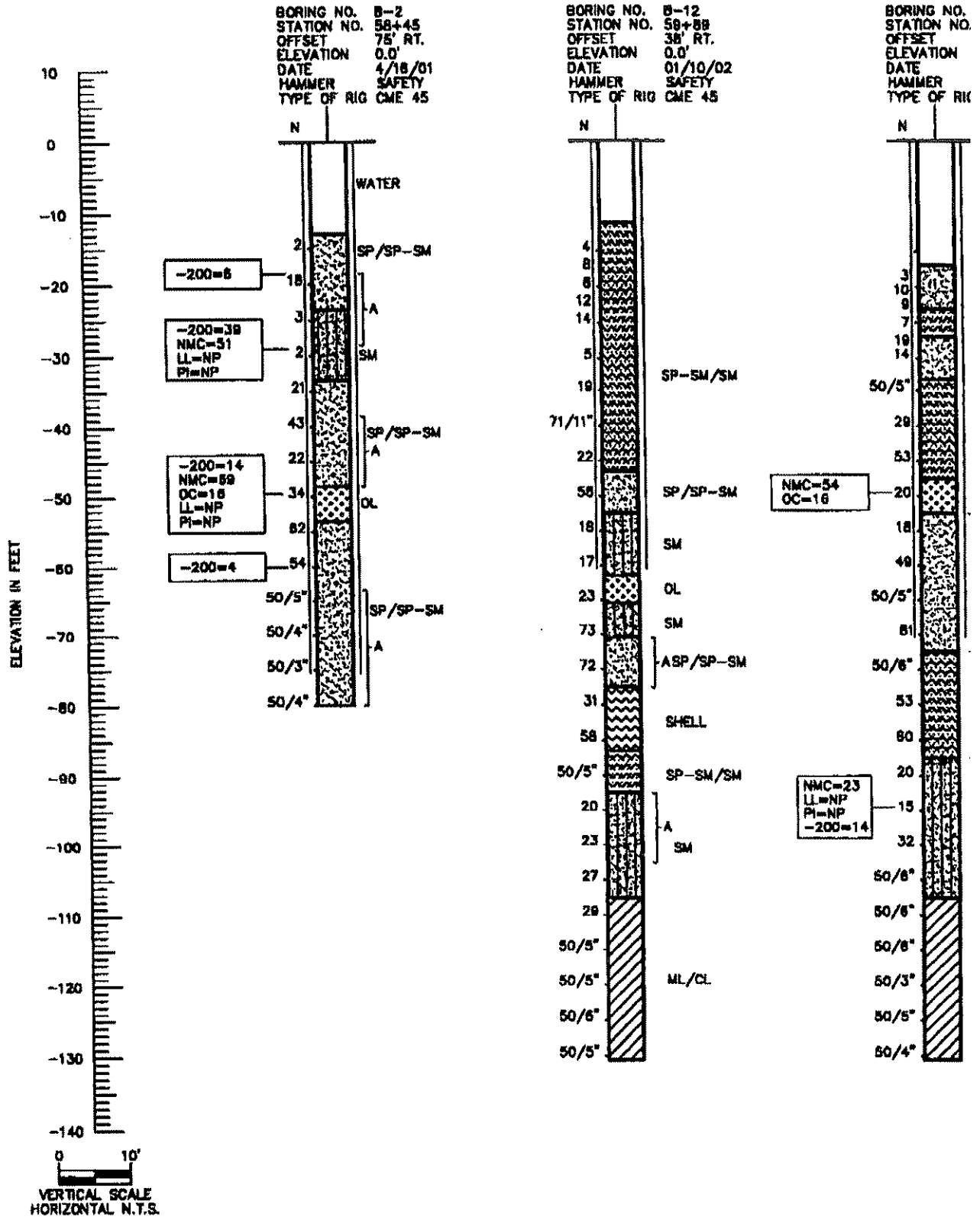


FLORIDA DEPARTMENT OF TRANSPORTATION
 STRUCTURES DESIGN OFFICE

ROAD NO.	COUNTY	FINANCIAL PROJECT NO.
S.R. 682	PINELLAS	20000-1-02-02

REPORT OF CORE BORINGS - 2

PROJECT NAME: S.R. 682 (PINELLAS BAYWAY) SHEET NO.: B-14



REVISIONS						Name		
Date	By	Description	Date	By	Description	Drawn by	Checked by	Designed by
						Drawn by	LL	11/02
						Checked by	LL	11/02
						Designed by	LL	11/02
						Checked by	CLM	11/02
						Approved by	DRIVE L. BUC. PROJ. P.L.	P.A. REP. No. 3011

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PROFESSIONAL SE
5801 BENJAMIN
TAMM
ORL
FLORIDA ENGI
OR. AUTH.

LEGEND

- (SP/SP-SM), GRAY BROWN CLEAN TO SLIGHTLY SILTY SAND
- (SP-SM/SM), GRAY BROWN SLIGHTLY SILTY TO SILTY SAND WITH SHELL
- (SM), DARK GRAY BROWN TO GREEN GRAY SILTY SAND WITH SOME CLAY
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NOTES:

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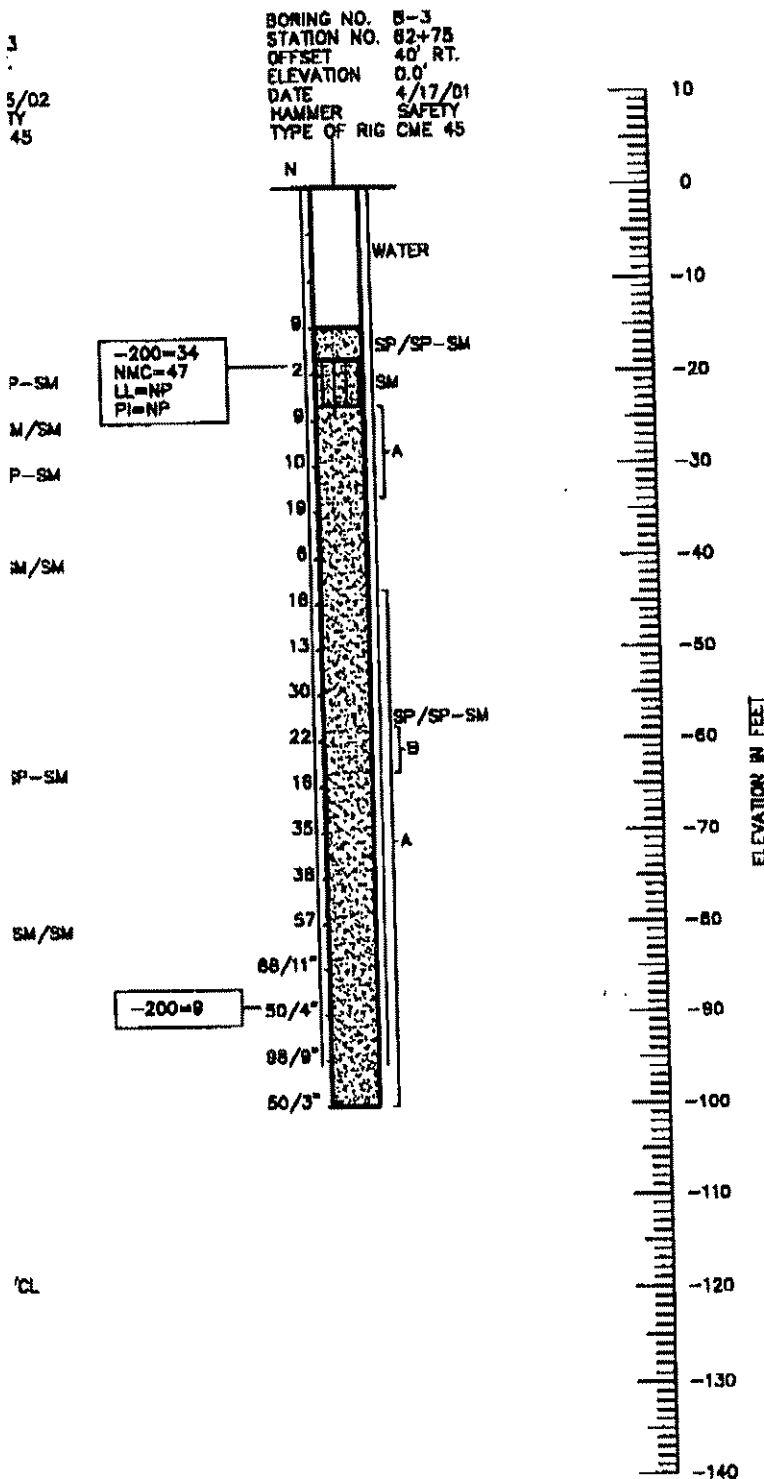
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SOIL
 RESISTIVITY: 21-1,200 OHMS-CM
 CHLORIDES: 6,600-142,000 PPM
 SULFATES: 875-2,370 PPM
 pH: 8.26-8.89

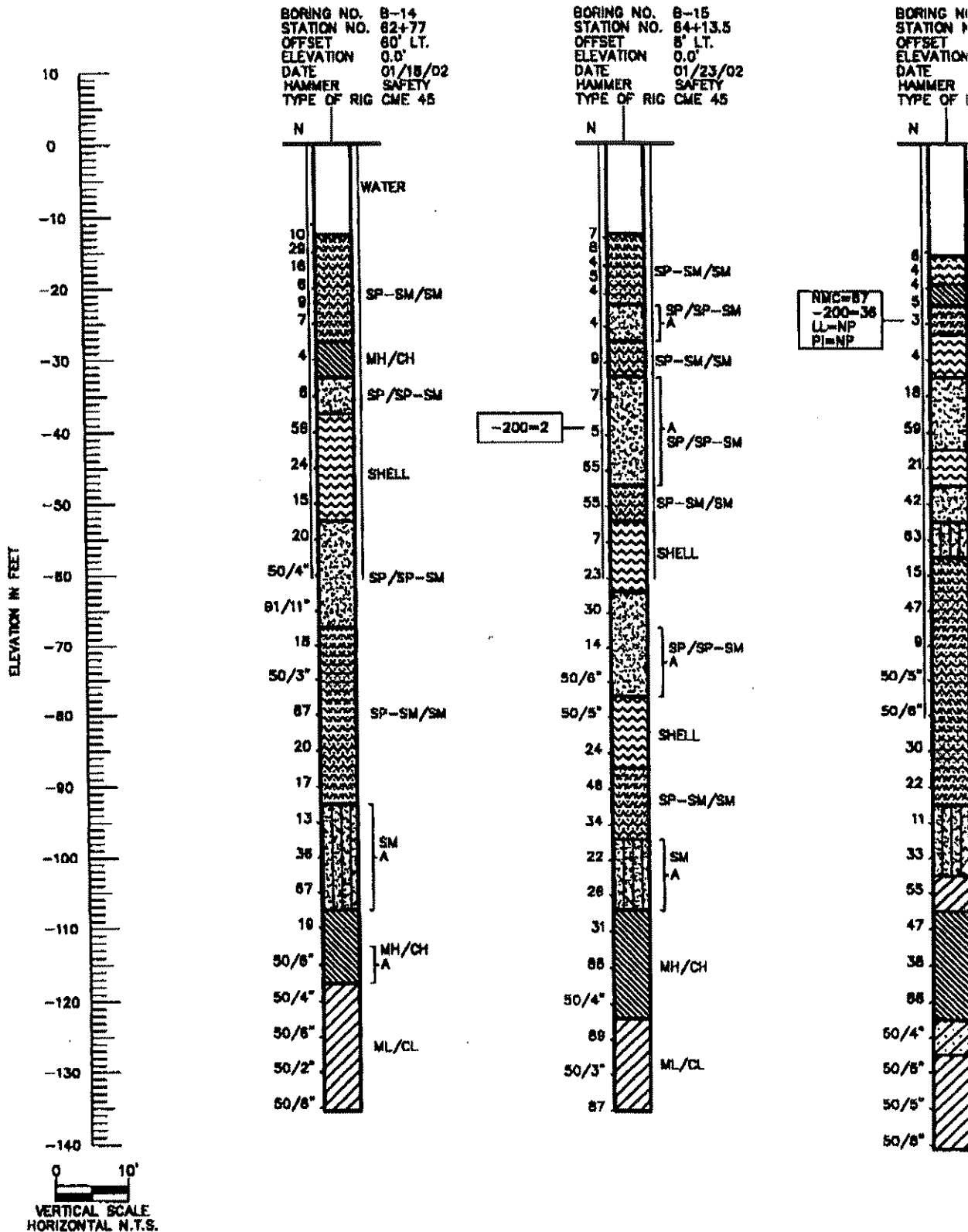
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HARD	GREATER THAN 30



INDUSTRIES, INC.
 PER DR., SUITE 112
 L. 33834
 16-1075
 LIC CERTIFICATE
 ION No. 3884

FLORIDA DEPARTMENT OF TRANSPORTATION STRUCTURES DESIGN OFFICE			
ROAD NO.	COUNTY	FINANCIAL PROJECT ID.	
S.R. 682	PINELLAS	28803-1-02-02	




SHEET TITLE REPORT OF CORE BORINGS - 3	SHEET NO. B-15
PROJECT NAME S.R. 682 (PINELLAS BAYWAY)	PSI PROJECT No. 778-081 SHEET



REVISIONS						Name		Date	
Date	By	Description	Date	By	Description	Drawn by	Checked by	Designed by	Checked by
						DLB	LL	LL	GN
						LL	GN	GN	GN
						GN	GN	GN	GN
						GN	GN	GN	GN

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5801 BENJAMIN
TAB
(S)
FLORIDA ENR
OF AUTH

LEGEND

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 -  (SP-SM/SM), GRAY BROWN SLIGHTLY SILTY TO SILTY SAND WITH SHELL
 -  (SM), DARK GRAY BROWN TO GREEN GRAY SILTY SAND WITH SOME CLAY
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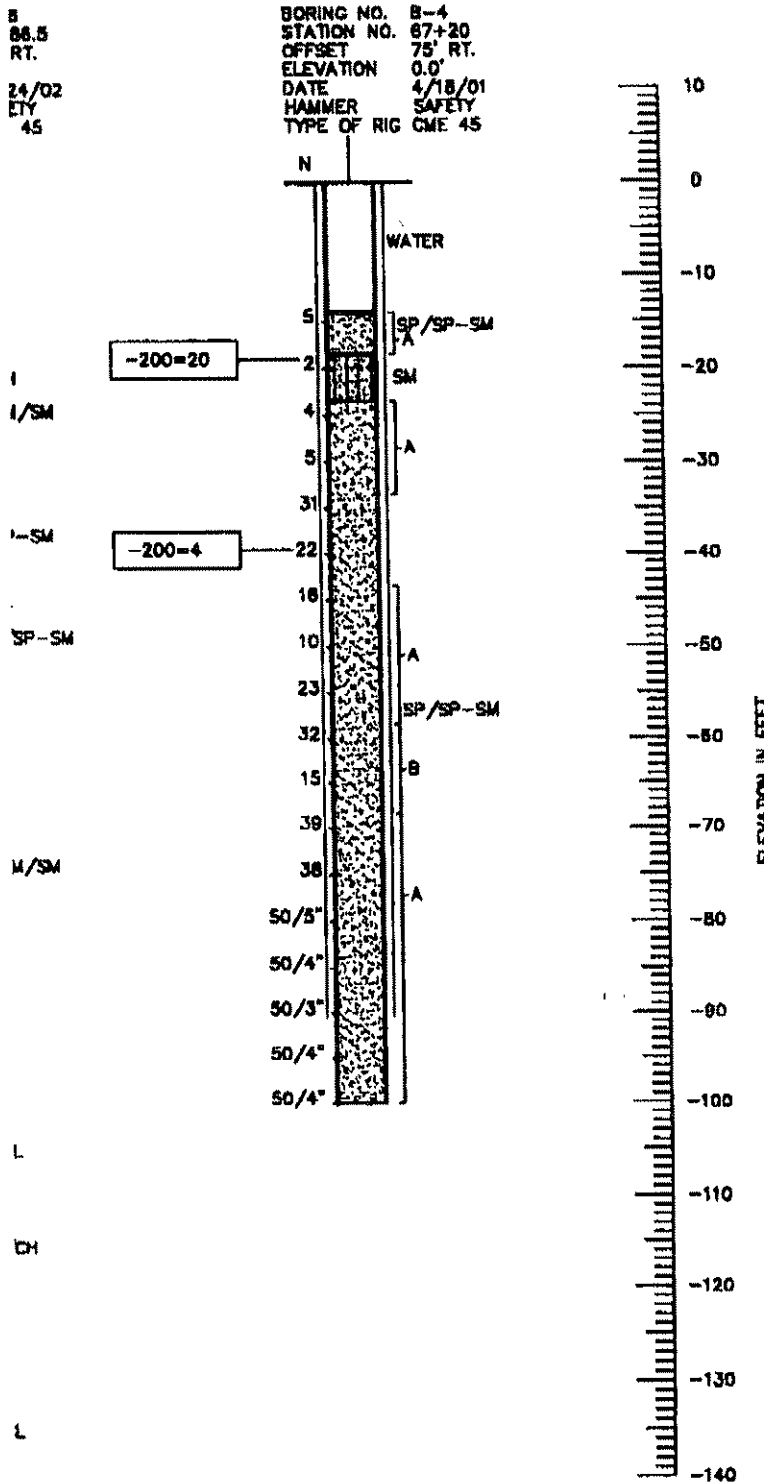
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 RESISTIVITY: 21-1,200 OHMS-CM
 CHLORIDES: 6,600-142,000 PPM
 SULFATES: 675-2,370 PPM
 pH: 6.26-6.89

GRANULAR MATERIALS RELATIVE DENSITY	SPT (BLOWS/FT.)
VERY LOOSE	LESS THAN 4
LOOSE	5-10
MEDIUM DENSE	11-30
DENSE	31-50
VERY DENSE	GREATER THAN 50
SILTS AND CLAYS CONSISTENCY	SPT (BLOWS/FT.)
VERY SOFT	LESS THAN 2
SOFT	3-4
FIRM	5-8
STIFF	9-15
VERY STIFF	16-30
HARD	GREATER THAN 30



I INDUSTRIES, INC.
 7800 N. W. 11th ST., SUITE 118
 MIAMI, FL 33184
 305-551-1075
INC CERTIFICATE
 ION No. 3884

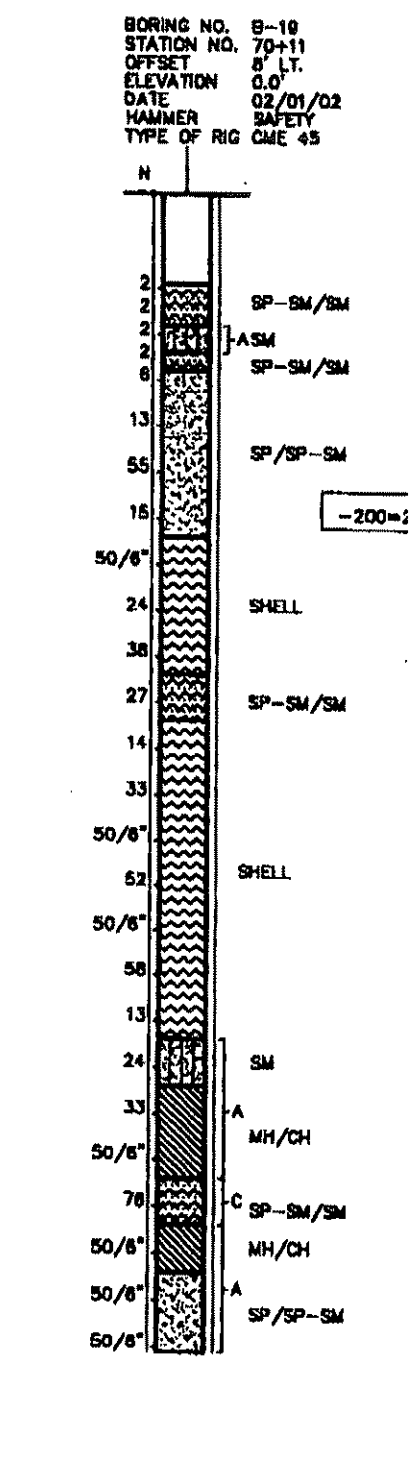
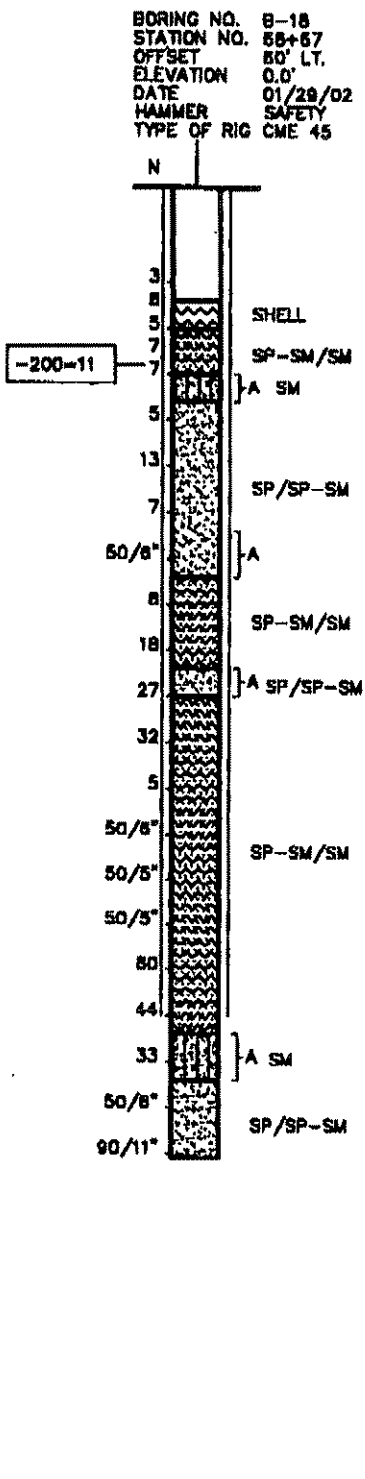
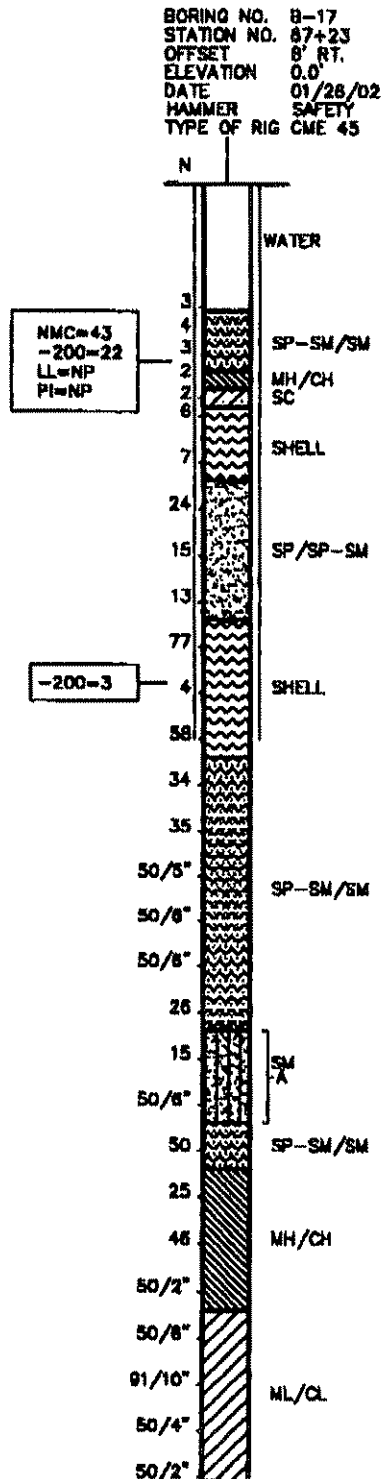
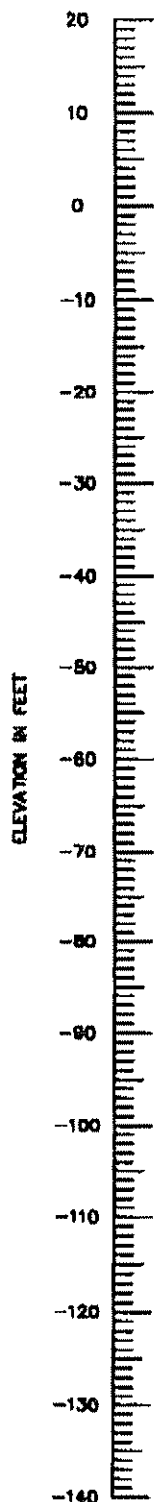
FLORIDA DEPARTMENT OF TRANSPORTATION
STRUCTURES DESIGN OFFICE

ROAD NO.	COUNTY	FINANCIAL PROJECT ID.
S.R. 682	PINELLAS	RD903-1-32-02

REPORT OF CORE BORINGS - 4

PROJECT NAME: **S.R. 682 (PINELLAS BAYWAY)**

SHEET NO. **B-18**

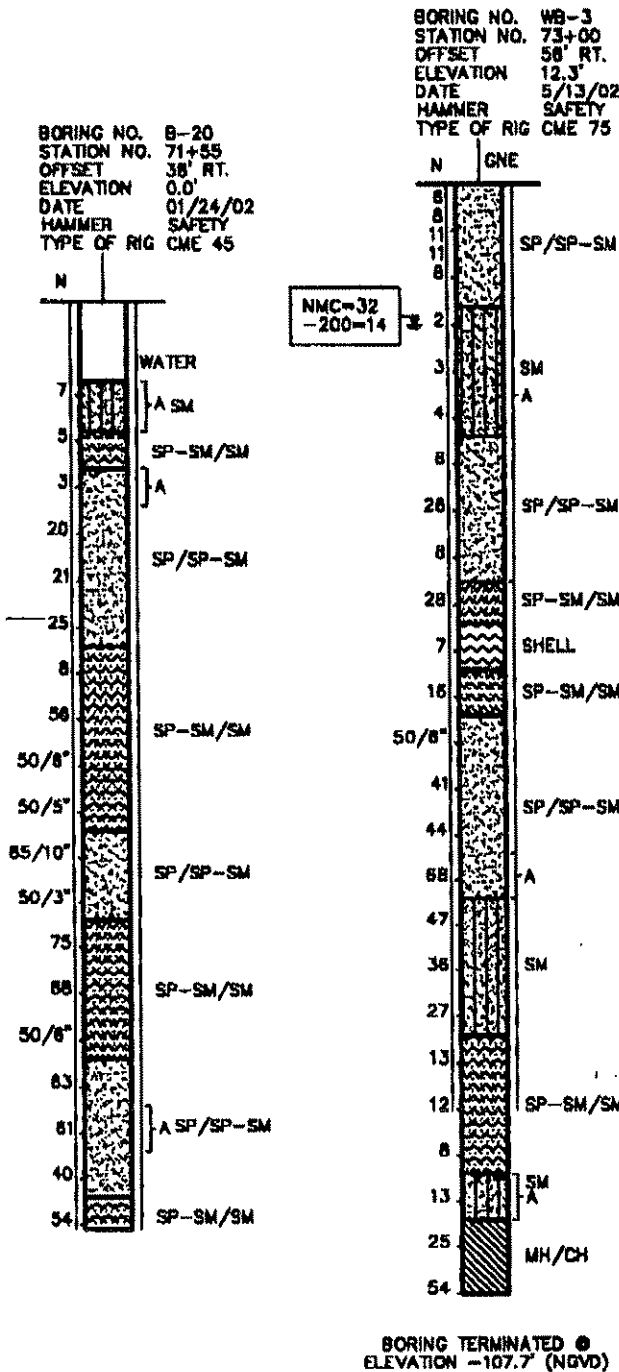


0 10'
 VERTICAL SCALE
 HORIZONTAL N.T.S.

REVISIONS						Name		
Date	By	Description	Date	By	Description	Drawn by	Date	Scale
						Checked by	LL	11/00
						Designed by	LL	11/00
						Checked by	GLX	11/00
						Approved by	GREG L. NIX, P.E., P.E.	11/00

PSI

PROFESSIONAL S&P
 6801 BENJAMIN C.
 TAMPA,
 (813)
 FLORIDA ENGINEER
 OF AUTHORITY



LEGEND

- (SP/SP-SM), GRAY BROWN CLEAN TO SLIGHTLY SILTY SAND
 - (SP-SM/SM), GRAY BROWN SLIGHTLY SILTY TO SILTY SAND WITH SHELL
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 - (MH/CH), GREEN GRAY SILTY CLAY
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NOTES:

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ENVIRONMENTAL CLASSIFICATION

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 (RESISTIVITY 21-1,200)
 (CHLORIDES 8,600-142,000)

SUPERSTRUCTURE: EXTREMELY AGGRESSIVE
 (CHLORIDE 8,600-142,000)

SOIL

RESISTIVITY: 21-1,200 OHMS-CM
CHLORIDES: 8,600-142,000 PPM
SULFATES: 675-2,370 PPM
pH: 8.26-8.69

GRANULAR MATERIALS RELATIVE DENSITY	SPT (BLOWS/FT.)
VERY LOOSE	LESS THAN 4
LOOSE	5-10
MEDIUM	11-30
DENSE	31-50
VERY DENSE	GREATER THAN 50
SILTS AND CLAYS CONSISTENCY	SPT (BLOWS/FT.)
VERY SOFT	LESS THAN 2
SOFT	3-4
FIRM	5-8
STIFF	9-15
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HARD	GREATER THAN 30

INDUSTRIES, INC. IN DA., SUITE 112 88634 -1075 NC CERTIFICATE DN No. 3884	FLORIDA DEPARTMENT OF TRANSPORTATION STRUCTURES DESIGN OFFICE		SHEET NO.: REPORT OF CORE BORINGS - 5	SHEET NO.: B-17
	ROAD NO.: COUNTY: PINELLAS	FINANCIAL PROJECT ID: 200003-1-02-02	PROJECT NAME: S.R. 682 (PINELLAS BAYWAY)	

S

LES WILL BE DETERMINED FROM
ILE, THE ENGINEER AT HIS OPTION
OR THE INSTALLATION OF PRODUCTION

ATIONS OF ALL UTILITIES AND
WIES PRIOR TO EXCAVATION,
D) SHALL BE RESPONSIBLE FOR
Y AVOID DAMAGE. ANY REQUIRED
: SHALL BE DONE BY OTHERS. THE
ACTIVE UTILITIES ARE PROPERLY

SENTED IN THE TABLE BELOW ARE
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E END BENT OR PIER DIMENSIONS AND

BE DRIVEN INSIDE TO OUT.

LED PRIOR TO CONSTRUCTION OF THE

11. DO NOT ADVANCE JETS OR PREFORMED PILE HOLES DEEPER THAN THE JETTING OR PREFORMED ELEVATIONS SHOWN ON THE TABLE WITHOUT THE PRIOR APPROVAL OF THE DISTRICT GEOTECHNICAL ENGINEER. IF ACTUAL JETTING OR PREFORMING ELEVATIONS DIFFER FROM THOSE SHOWN ON THE TABLE, THE DISTRICT GEOTECHNICAL ENGINEER SHALL BE RESPONSIBLE FOR DETERMINATION OF THE REQUIRED DRIVING RESISTANCE.

12. THE PILES SHALL BE DRIVEN A MINIMUM OF 10 FEET BELOW THE JETTED OR PREFORMED ELEVATION. ALL PILES WITHIN A GROUP SHALL BE JETTED OR PREFORMED TO THE ELEVATION SHOWN ON THE TABLE PRIOR TO INITIATING DRIVING BEYOND THAT POINT.

13. NOISE RESTRICTIONS: THE CONTRACTOR SHALL STRICTLY ADHERE TO ALL LOCAL NOISE ORDINANCES. ALL PILE DRIVING OPERATIONS SHALL BE LIMITED TO THE HOURS OF 8:00 AM TO 6:00 PM. METHODS OF MAINTAINING CONSTRUCTION NOISE LEVELS MAY INCLUDE BUT NOT BE LIMITED TO TEMPORARY NOISE BARRIERS, ENCLOSURES FOR EQUIPMENT, MUFFLERS, ALTERNATNE POWERED HAMMERS, ETC. THERE WILL BE NO SEPARATE PAYMENT FOR ANY OF THESE MEASURES.

14. VIBRATION: THE CONTRACTOR SHALL PROVIDE SURVEYS AND SETTLEMENT/VIBRATION MONITORING OF THE FOLLOWING STRUCTURES, AS PER FDOT STANDARD SPECIFICATION. 5701 BAHIA DEL MAR CIRCLE; 6287 SUN BOULEVARD; 3131, 3141, 3151, 3162, 3152 AND 3142 VINA DEL MAR BOULEVARD; 3031, 3050, 3040, 3030 AND 3020 ALTON DRIVE; 3220, 3198, 3200 AND 3204 MARTINA DRIVE; AND 3606, 3604, 3600, 3590, 3586 AND 3580 BELLE VISTA DRIVE. THE COST OF ALL VIBRATION MONITORING AS REQUIRED HERE AND SPECIFIED IN SECTION 455 SHALL BE PAID FOR UNDER PAY ITEM NO. 455-18, PROTECTION OF EXISTING STRUCTURES.

15. TOTAL SCOUR RESISTANCE - AN ESTIMATE OF THE ULTIMATE STATIC SIDE FRICTION RESISTANCE PROVIDED BY THE SCOURABLE SOIL.

16. NET SCOUR RESISTANCE - AN ESTIMATE OF THE ULTIMATE STATIC SIDE FRICTION RESISTANCE PROVIDED BY THE SOIL FROM THE REQUIRED PREFORMED OR JETTING ELEVATION TO THE SCOUR ELEVATION.

DESIGN CRITERIA					
NO. OF PILES (S)	TOTAL SCOUR RESIST. (TONS)	NET SCOUR RESIST. (TONS)	LONG TERM SCOUR ELEV. (FT)	100 YR. SCOUR ELEV. (FT)	\$
	N/A	N/A	N/A	N/A	
17	12		-1.5	-18.11	0.65
13	9		-5.6	-21.75	
39	27		-9.5	-25.34	
26	19		-9.6	-24.04	
12	9		-13.0	-28.16	
45	32		-15.0	-29.35	
38	27		-14.7	-29.02	
19	13		-13.0	-28.06	
7	5		-13.0	-27.80	
13	9		-13.0	-29.26	
14	10		-12.5	-29.19	
4	3		-14.5	-29.57	
7	5		-13.8	-29.61	
3	2		-14.4	-30.09	
10	7		-12.5	-28.26	
20	14		-11.0	-28.40	
25	17		-10.8	-28.22	
	N/A	N/A	N/A	N/A	

B PILES ONLY

BRIDGE NO. 150223

ENGINEER OF RECORD: URS CORPORATION SOUTHERN NEWY COURTHY CAMPBELL CALIFORNIA A. P. 28885-1488 PHONE OF AUTHORIZATION NO. 0000000 THROUGH GWP/P, P.E. NO. 1183	FLORIDA DEPARTMENT OF TRANSPORTATION			SHEET TITLE: FOUNDATION INSTALLATION TABLE AND NOTES	
	ROAD NO. SR 682	COUNTY PINELLAS	FINANCIAL PROJECT ID 256903-1-32-02	PROJECT NAME: S.R. 682 (PINELLAS BAYWAY)	SHEET NO. B-18

1. ALL PILES ARE TO BE 24" SQUARE PRESTRESSED CONCRETE. PILES SHALL BE DRIVEN TO THE ULTIMATE BEARING CAPACITY (AS SHOWN IN THE TABLE) IN ACCORDANCE WITH SECTION 455 OF THE SPECIFICATIONS.

2. LEGEND:

- DENOTES PLUMB PILE
- ◀ □ DENOTES BATTERED PILE 2#2 AT END BENT 19
- DENOTES TEST PILE
- DENOTES EXISTING PILE
- ⊙ DENOTES APPROXIMATE LOCATION OF SPT BORING. SEE "REPORT OF CORE BORINGS", SHEETS B-12 THRU B-17.

3. PILE SPACINGS ARE MEASURED HORIZONTALLY ALONG FFBW AT BOTTOM OF THE END BENT CAP AND ALONG PIER AT BOTTOM OF PILE CAP.

4. TEST PILES SHALL BE DRIVEN IN THE POSITION OF PERMANENT PILES AND SHALL BE DYNAMICALLY LOAD TESTED AS PER THE SPECIFICATION. IN THE EVENT THE CONTRACTOR HAS DRIVEN THE PILE TO 5 FEET ABOVE CUT-OFF WITHOUT REACHING THE REQUIRED RESISTANCE, THE ENGINEER MAY REQUIRE THE CONTRACTOR TO INTERRUPT DRIVING TO PERFORM A SET-CHECK. THE INITIAL SET-CHECK SHALL BE PERFORMED WITHIN 24 HOURS OF THE END OF INITIAL DRIVE. IN THE EVENT THE INITIAL SET-CHECK IS NOT SATISFACTORY, THE DISTRICT GEOTECHNICAL ENGINEER SHALL BE NOTIFIED AND MAY DIRECT ADDITIONAL SET-CHECKS AT THREE (3), FIVE (5) AND SEVEN (7) DAYS AS NECESSARY.

5. THE BEARING CAPACITY OF THE DYNAMIC TESTING OF THE TEST PILES MAY CHOOSE TO DYNAMICALLY TEST PILES.

6. THE CONTRACTOR SHALL VERIFY AND NOTIFY ALL INVOLVED UTILITY (PILE DRIVING OR CONSTRUCTION) MAKING ITS OWN DETERMINATION. RELOCATION OF EXISTING UTIL. CONTRACTOR SHALL ASSURE IT MAINTAINED DURING CONSTRUCTION.

7. THE MINIMUM TIP ELEVATIONS RECOMMENDED FOR LATERAL S

8. FOR PILE CUT-OFF ELEVATION. ELEVATIONS SHEETS.

9. PILES WITHIN A PILE GROUP S

10. END BENT PILES SHALL BE IN WALLS.

PILE DATA TABLE

INSTALLATION CRITERIA										
LOCATION	PILE SIZE (IN)	ULTIMATE BEARING CAPACITY (TONS) **	TENSION CAPACITY (TONS)	MIN. TIP ELEV. (FT) *	TEST PILE		REQ'D JET ELEV. (FT)	REQ'D PREFORM ELEV. (FT)	FACTORED DESIGN LOAD (TONS)	
					NUMBER	LENGTH (FT)				
END BENT 1	24	369	0	-40	8	80	N/A	-30	240	
PIER 2	24	388	SI	-55	11 RIGHT	85	-45	N/A	240	
PIER 3	24	383		-55		85	-45		240	
PIER 4	24	426		-55		125	-45		250	
PIER 5	24	414		-55		85	-45		250	
PIER 6	24	398		-55		120	-45		250	
PIER 7	24	434		-55		115	-45		250	
PIER 8	24	426		-75		115	-65		250	
PIER 9	24	422		-75		115	-65		261	
PIER 10	24	409		-75		120	-65		261	
PIER 11	24	415		-75		115	-65		261	
PIER 12	24	442		-70		120	-60		277	
PIER 13	24	431		-70		26	130		-30	277
PIER 14	24	434		-70		26	125		-30	277
PIER 15	24	429		-70		11 RIGHT	130		-60	277
PIER 16	24	383		-55		11 RIGHT	90		-45	242
PIER 17	24	394		-55		11 RIGHT	115		-45	242
PIER 18	24	398		-55		11 RIGHT	75		-45	242
END BENT 19	24	372		2		-40	30		75	N/A

* MINIMUM TIP ELEVATION SHALL BE IN ACCORDANCE WITH SECTION 455-5.B OF THE SPECIFICATIONS. †

** ULTIMATE BEARING CAPACITY = $\frac{\text{FACTORED DESIGN LOAD} + \text{NET SCOUR} + \text{DOWNDRAW}}{\phi}$

THE REQUIRED DRIVING RESISTANCE (RDR) EQUALS THE ULTIMATE BEARING CAPACITY.

*** ϕ IS BASED ON THE USE OF DYNAMIC LOAD TEST.

REVISIONS				DATE		DATE	
NO.	BY	DESCRIPTION		DATE	DATE	DATE	DATE

DRAWN BY	JBH	DATE	5/02
CHECKED BY	KS	DATE	5/02
DESIGNED BY	KS	DATE	5/02
CHECKED BY	TMM	DATE	10/02
APPROVED BY	DAVID W. GRAFF	DATE	

Appendix B

Cylinder Piles Without Scour


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+-----+
| STATIC PILE BEARING CAPACITY ANALYSIS   - SPT97                               Page 1 |
+-----+
| Project No: 410755                       Structure E                          |
| Boring No:  b-17                          |
+-----+
  
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FLORIDA DEPARTMENT OF TRANSPORTATION
 STRUCTURES DESIGN OFFICE
 STATIC PILE BEARING CAPACITY ANALYSIS PROGRAM
 SPT97 - VERSION 1.2 FEBRUARY, 1997
 BASED ON RESEARCH BULLETIN RB-121
 "GUIDELINES FOR USE IN THE SOILS INVESTIGATION
 AND DESIGN OF FOUNDATIONS FOR
 BRIDGE STRUCTURES IN THE STATE OF FLORIDA" AND
 RESEARCH STUDY REPORT BY UNIVERSITY OF FLORIDA
 "DESIGN OF STEEL PIPE AND H PILES"

NOTE - THIS PROGRAM IS EXPANDED FROM SPT91
 IS ALSO KNOWN AS SPT94
 TO INCLUDE STEEL H AND PIPE PILES

A. GENERAL INFORMATION

```

INPUT FILE NAME      cylindernorms.in
RUN DATE             01/10/05
RUN TIME             13:56:09

PROJECT NUMBER       410755
JOB NAME             Structure E

SUBMITTING ENGINEER HVJ
BORING NO.           b-17
DRILLING DATE        1/1/02
STATION NO.
GROUND SURFACE ELEVATION -10.00 FEET
TYPE OF ANALYSIS     2 - DETERMINATION OF STATIC
                       PILE BEARING CAPACITIES
                       FOR A RANGE OF PILE LENGTHS
                       (CAPACITY VS. TIP ELEVATION)
  
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+-----+
| STATIC PILE BEARING CAPACITY ANALYSIS   - SPT97                               Page 2 |
+-----+
| Project No: 410755                       Structure E                          |
| Boring No:  b-17                          |
+-----+
  
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B. BORING LOG

ENTRY NO.	DEPTH (FT) D(I)	ELEVATION (FT)	SPT BLOWS/FT N(I)	SOIL TYPE ST(I)
-----	-----	-----	-----	-----

		cylindernorms.out		
1	2.0	-12.0	0.0	5
2	4.0	-14.0	0.0	5
3	6.0	-16.0	0.0	5
4	8.0	-18.0	0.0	5
5	10.0	-20.0	0.0	2
6	12.0	-22.0	0.0	2
7	14.0	-24.0	0.0	2
8	16.0	-26.0	0.0	2
9	18.0	-28.0	0.0	2
10	20.0	-30.0	0.0	2
11	25.0	-35.0	0.0	2
12	30.0	-40.0	0.0	2
13	35.0	-45.0	15.0	2
14	40.0	-50.0	13.0	2
15	45.0	-55.0	77.0	4
16	50.0	-60.0	4.0	2
17	55.0	-65.0	58.0	2
18	60.0	-70.0	40.0	2
19	65.0	-75.0	34.0	2
20	70.0	-80.0	50.0	4
21	75.0	-85.0	100.0	2
22	80.0	-90.0	100.0	2
23	85.0	-95.0	100.0	2
24	90.0	-100.0	26.0	3
25	95.0	-105.0	15.0	3
26	100.0	-110.0	100.0	4
27	105.0	-115.0	50.0	4
28	110.0	-120.0	25.0	2
29	115.0	-125.0	45.0	2
30	120.0	-130.0	100.0	4
31	125.0	-135.0	100.0	1
32	130.0	-140.0	100.0	1
33	135.0	-145.0	100.0	1
34	140.0	-150.0	100.0	1

STATIC PILE BEARING CAPACITY ANALYSIS - SPT97		Page 3
Project No: 410755	Structure E	
Boring No: b-17		

SOIL TYPE LEGEND

- 0 - BOTTOM OF BORING
- 1 - PLASTIC CLAYS
- 2 - CLAY/SILT SAND MIXTURES, SILTS & MARLS
- 3 - CLEAN SAND
- 4 - SOFT LIMESTONE, VERY SHELLY SANDS
- 5 - VOID (NO CAPACITY)

STATIC PILE BEARING CAPACITY ANALYSIS - SPT97		Page 4
Project No: 410755	Structure E	
Boring No: b-17		

cylindernorms.out

TEST PILE SECTION
 DIAMETER OF PILE
 THICKNESS OF PILE

ISECT = 5
 {CONCRETE CYLINDER PILE}
 WP = 36.00 INCHES
 THICK = 5.00 INCHES

D. PILE CAPACITY VS. PENETRATION

TEST PILE LENGTH (FT)	PILE TIP ELEV (FT)	ULTIMATE SIDE FRICTION (TONS)	MOBILIZED END BEARING (TONS)	ESTIMATED DAVISSON CAPACITY (TONS)	ALLOWABLE PILE CAPACITY (TONS)	ULTIMATE PILE CAPACITY (TONS)
50.0	-60.0	83.51	70.40	153.90	76.95	294.70
55.0	-65.0	114.52	77.12	191.63	95.82	345.86
60.0	-70.0	164.09	104.12	268.21	134.11	476.46
65.0	-75.0	213.57	142.13	355.70	177.85	639.97
70.0	-80.0	268.02	130.75	398.78	199.39	660.28
75.0	-85.0	310.65	108.18	418.82	209.41	635.18
80.0	-90.0	372.34	221.79	594.12	297.06	1037.70
85.0	-95.0	434.03	203.33	637.36	318.68	1044.01
90.0	-100.0	476.51	251.33	727.85	363.92	1230.51
95.0	-105.0	491.84	258.86	750.69	375.35	1268.41
100.0	-110.0	515.72	288.02	803.74	401.87	1379.79
105.0	-115.0	541.64	235.50	777.14	388.57	1248.15
110.0	-120.0	575.27	247.66	822.93	411.46	1318.24
115.0	-125.0	627.19	221.48	848.67	424.34	1291.64
120.0	-130.0	671.40	252.19	923.59	461.79	1427.96

*** ERROR *** PILE TIP TOO NEAR END OF BORING LOG FOR LENGTH = 125.00 FT

NOTES

1. MOBILIZED END BEARING IS 1/3 OF THE ORIGINAL RB-121 VALUES.
2. DAVISSON PILE CAPACITY IS AN ESTIMATE BASED ON FAILURE CRITERIA, AND EQUALS ULTIMATE SIDE FRICTION PLUS MOBILIZED END BEARING.
3. ALLOWABLE PILE CAPACITY IS 1/2 THE DAVISSON PILE CAPACITY.
4. ULTIMATE PILE CAPACITY IS ULTIMATE SIDE FRICTION PLUS 3 x THE MOBILIZED END BEARING.

PROBLEM COMPLETED

ANALYSIS NO. 1

STATIC PILE BEARING CAPACITY ANALYSIS - SPT97		Page 5
Project No: 410755	Structure E	
Boring No: b-17		

C. PILE INFORMATION

cylindernorms.out

TEST PILE SECTION
 DIAMETER OF PILE
 THICKNESS OF PILE

ISECT = 5
 {CONCRETE CYLINDER PILE}
 WP = 54.00 INCHES
 THICK = 5.00 INCHES

D. PILE CAPACITY VS. PENETRATION

TEST PILE LENGTH (FT)	PILE TIP ELEV (FT)	ULTIMATE SIDE FRICTION (TONS)	MOBILIZED END BEARING (TONS)	ESTIMATED DAVISSON CAPACITY (TONS)	ALLOWABLE PILE CAPACITY (TONS)	ULTIMATE PILE CAPACITY (TONS)
50.0	-60.0	125.26	109.49	234.75	117.37	453.73
55.0	-65.0	168.04	158.86	326.89	163.45	644.61
60.0	-70.0	235.59	185.97	421.57	210.78	793.52
65.0	-75.0	305.22	206.79	512.01	256.01	925.59
70.0	-80.0	402.03	194.72	596.75	298.37	986.18
75.0	-85.0	465.97	166.11	632.08	316.04	964.31
80.0	-90.0	558.51	147.22	705.73	352.86	1000.18
85.0	-95.0	643.68	510.27	1153.95	576.98	2174.49
90.0	-100.0	714.77	238.14	952.91	476.45	1429.18
95.0	-105.0	741.65	252.47	994.12	497.06	1499.06
100.0	-110.0	773.58	591.21	1364.79	682.39	2547.20
105.0	-115.0	812.00	592.64	1404.64	702.32	2589.91
110.0	-120.0	862.90	564.31	1427.21	713.60	2555.83
115.0	-125.0	940.78	418.81	1359.60	679.80	2197.23

*** ERROR *** PILE TIP TOO NEAR END OF BORING LOG FOR LENGTH = 120.00 FT

NOTES

1. MOBILIZED END BEARING IS 1/3 OF THE ORIGINAL RB-121 VALUES.
2. DAVISSON PILE CAPACITY IS AN ESTIMATE BASED ON FAILURE CRITERIA, AND EQUALS ULTIMATE SIDE FRICTION PLUS MOBILIZED END BEARING.
3. ALLOWABLE PILE CAPACITY IS 1/2 THE DAVISSON PILE CAPACITY.
4. ULTIMATE PILE CAPACITY IS ULTIMATE SIDE FRICTION PLUS 3 X THE MOBILIZED END BEARING.

PROBLEM COMPLETED

ANALYSIS NO. 2

D

STATIC PILE BEARING CAPACITY ANALYSIS - SPT97	Page 6
Project No: 410755	Structure E
Boring No: b-17	

C. PILE INFORMATION

TEST PILE SECTION

ISECT = 5

cylindernorms.out

{CONCRETE CYLINDER PILE}
DIAMETER OF PILE WP = 66.00 INCHES
THICKNESS OF PILE THICK = 5.00 INCHES

D. PILE CAPACITY VS. PENETRATION

TEST PILE LENGTH (FT)	PILE TIP ELEV (FT)	ULTIMATE SIDE FRICTION (TONS)	MOBILIZED END BEARING (TONS)	ESTIMATED DAVISSON CAPACITY (TONS)	ALLOWABLE PILE CAPACITY (TONS)	ULTIMATE PILE CAPACITY (TONS)
50.0	-60.0	153.10	158.78	311.88	155.94	629.45
55.0	-65.0	209.51	217.46	426.96	213.48	861.87
60.0	-70.0	302.39	228.14	530.53	265.26	986.81
65.0	-75.0	389.99	249.34	639.33	319.66	1138.01
70.0	-80.0	491.37	234.46	725.83	362.92	1194.76
75.0	-85.0	569.52	195.65	765.17	382.58	1156.47
80.0	-90.0	676.64	203.19	879.83	439.91	1286.20
85.0	-95.0	764.41	263.74	1028.15	514.08	1555.63
90.0	-100.0	873.60	286.92	1160.52	580.26	1734.36
95.0	-105.0	907.25	279.74	1186.99	593.50	1746.46
100.0	-110.0	945.48	274.93	1220.42	610.21	1770.28
105.0	-115.0	992.58	248.16	1240.74	620.37	1737.05
110.0	-120.0	1054.66	750.19	1804.84	902.42	3305.22
115.0	-125.0	1149.85	582.44	1732.29	866.14	2897.16

*** ERROR *** PILE TIP TOO NEAR END OF BORING LOG FOR LENGTH = 120.00 FT

NOTES

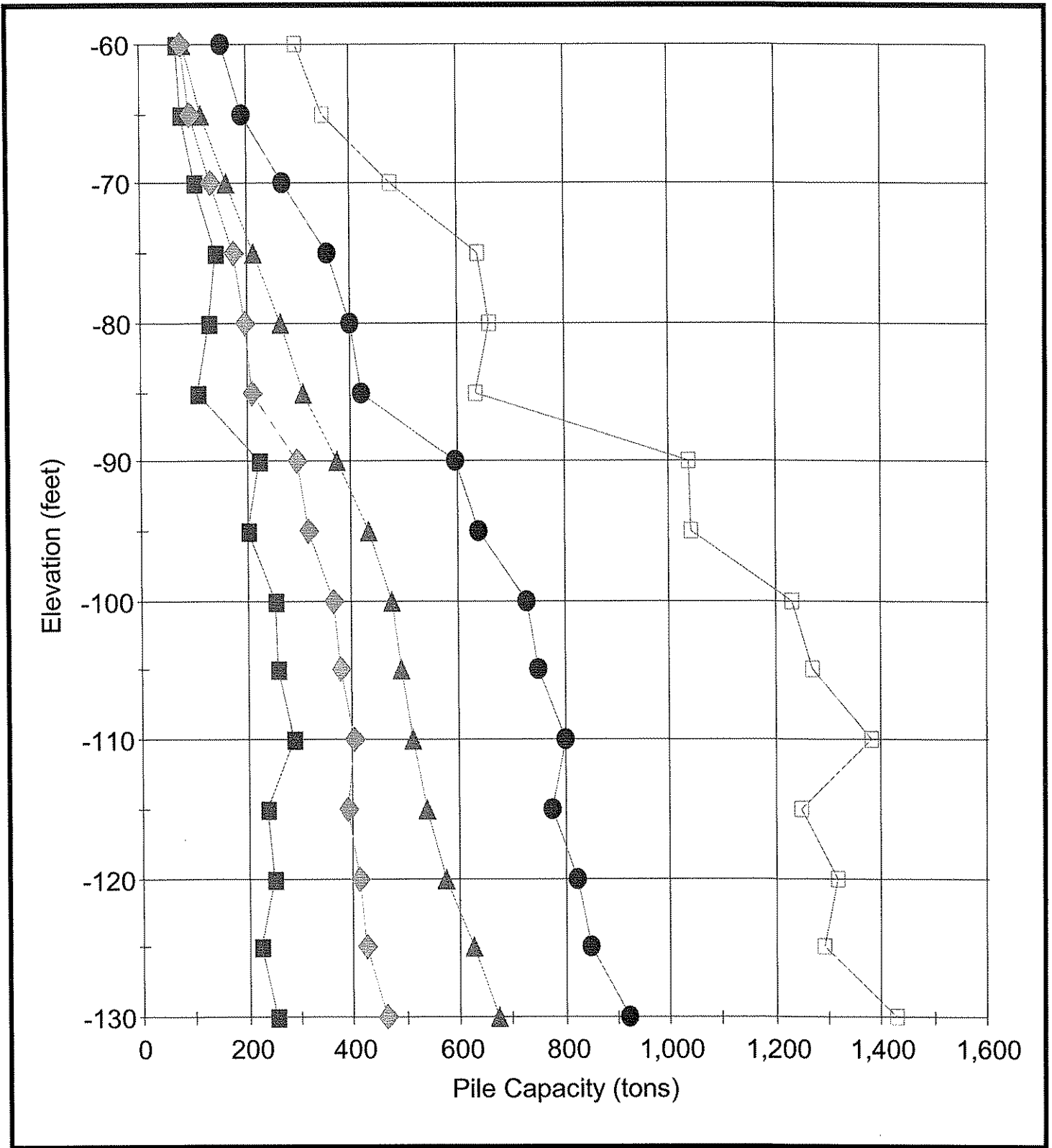
1. MOBILIZED END BEARING IS 1/3 OF THE ORIGINAL RB-121 VALUES.
2. DAVISSON PILE CAPACITY IS AN ESTIMATE BASED ON FAILURE CRITERIA, AND EQUALS ULTIMATE SIDE FRICTION PLUS MOBILIZED END BEARING.
3. ALLOWABLE PILE CAPACITY IS 1/2 THE DAVISSON PILE CAPACITY.
4. ULTIMATE PILE CAPACITY IS ULTIMATE SIDE FRICTION PLUS 3 X THE MOBILIZED END BEARING.

PROBLEM COMPLETED

ANALYSIS NO. 3

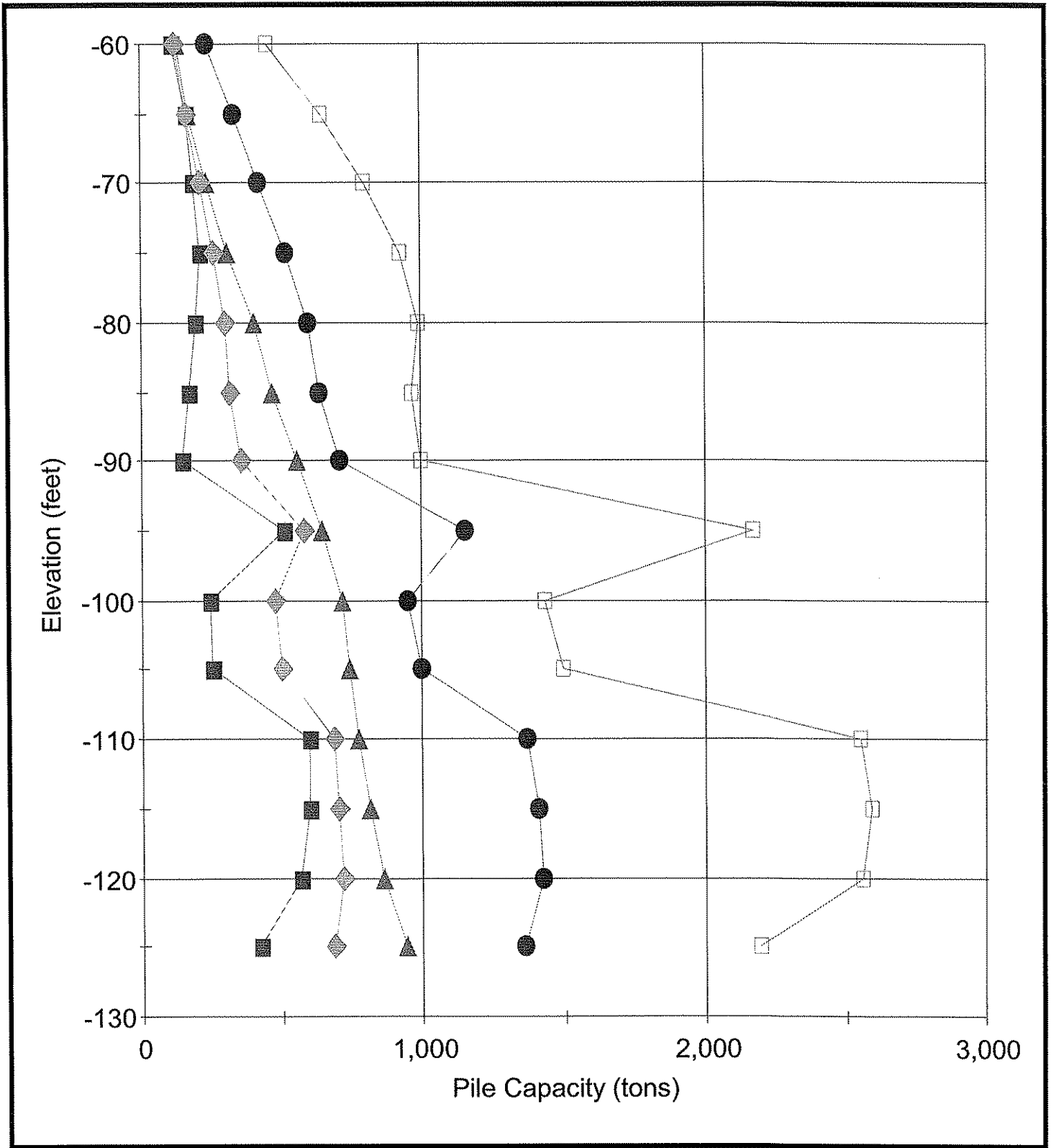
□

Pile Capacities for Pile Width of: 36.00 in



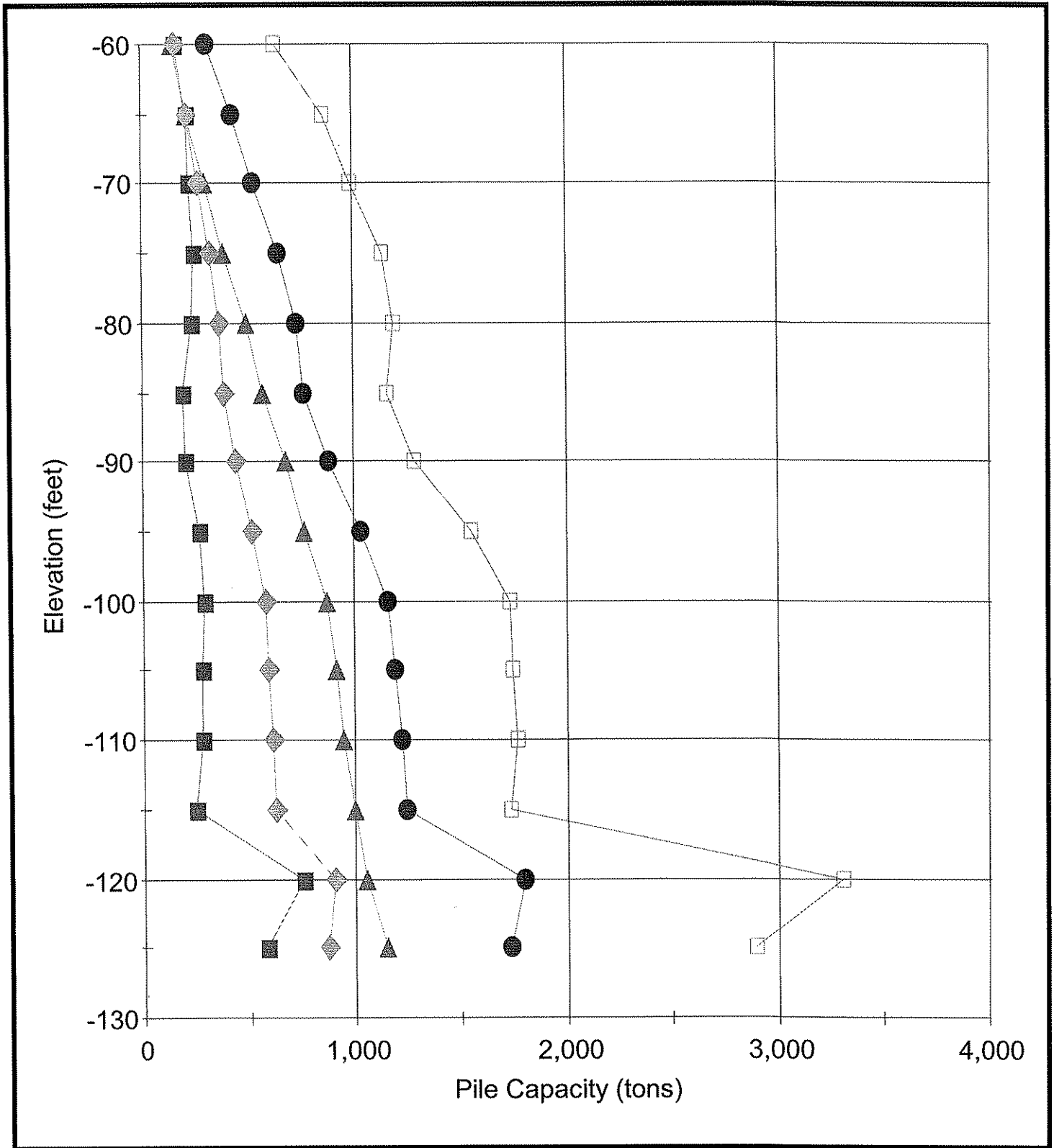
- ▲ Ultimate Side Friction
- Mobilized End Bearing
- Estimated Davison Capacity
- ◆ Allowable Pile Capacity
- Ultimate Pile Capacity

Pile Capacities for Pile Width of: 54.00 in



- ▲ Ultimate Side Friction
- Mobilized End Bearing
- Estimated Davison Capacity
- ◆ Allowable Pile Capacity
- Ultimate Pile Capacity

Pile Capacities for Pile Width of: 66.00 in



- ▲ Ultimate Side Friction
- Mobilized End Bearing
- Estimated Davisson Capacity
- ◆ Allowable Pile Capacity
- ◻ Ultimate Pile Capacity

Appendix C

Cylinder Piles With Scour – Comparable Sizes to Driven Piles

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+-----+
| STATIC PILE BEARING CAPACITY ANALYSIS   - SPT97                               Page 1 |
+-----+
| Project No: 410755                       Structure E                          |
| Boring No:  b-17                         |
+-----+
  
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FLORIDA DEPARTMENT OF TRANSPORTATION
 STRUCTURES DESIGN OFFICE
 STATIC PILE BEARING CAPACITY ANALYSIS PROGRAM
 SPT97 - VERSION 1.2 FEBRUARY, 1997
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 RESEARCH STUDY REPORT BY UNIVERSITY OF FLORIDA
 "DESIGN OF STEEL PIPE AND H PILES"

NOTE - THIS PROGRAM IS EXPANDED FROM SPT91
 IS ALSO KNOWN AS SPT94
 TO INCLUDE STEEL H AND PIPE PILES

A. GENERAL INFORMATION

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=====
INPUT FILE NAME      channelewscour.in
RUN DATE             01/10/05
RUN TIME             11:01:13

PROJECT NUMBER       410755
JOB NAME             Structure E

SUBMITTING ENGINEER HVJ
BORING NO.           b-17
DRILLING DATE        1/1/02
STATION NO.
GROUND SURFACE ELEVATION -10.00 FEET
TYPE OF ANALYSIS     2 - DETERMINATION OF STATIC
                       PILE BEARING CAPACITIES
                       FOR A RANGE OF PILE LENGTHS
                       (CAPACITY VS. TIP ELEVATION)
  
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+-----+
| STATIC PILE BEARING CAPACITY ANALYSIS   - SPT97                               Page 2 |
+-----+
| Project No: 410755                       Structure E                          |
| Boring No:  b-17                         |
+-----+
  
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B. BORING LOG

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=====
ENTRY NO.    DEPTH (FT)    ELEVATION    SPT BLOWS/FT    SOIL TYPE
             D(I)         (FT)         N(I)           ST(I)
-----
  
```

channelwscour.out

1	2.0	-12.0	0.0	5
2	4.0	-14.0	0.0	5
3	6.0	-16.0	0.0	5
4	8.0	-18.0	0.0	5
5	10.0	-20.0	0.0	2
6	12.0	-22.0	0.0	2
7	14.0	-24.0	0.0	2
8	16.0	-26.0	0.0	2
9	18.0	-28.0	0.0	2
10	20.0	-30.0	0.0	2
11	25.0	-35.0	0.0	2
12	30.0	-40.0	0.0	2
13	35.0	-45.0	15.0	2
14	40.0	-50.0	13.0	2
15	45.0	-55.0	77.0	4
16	50.0	-60.0	4.0	2
17	55.0	-65.0	58.0	2
18	60.0	-70.0	40.0	2
19	65.0	-75.0	34.0	2
20	70.0	-80.0	50.0	4
21	75.0	-85.0	100.0	2
22	80.0	-90.0	100.0	2
23	85.0	-95.0	100.0	2
24	90.0	-100.0	26.0	3
25	95.0	-105.0	15.0	3
26	100.0	-110.0	100.0	4
27	105.0	-115.0	50.0	4
28	110.0	-120.0	25.0	2
29	115.0	-125.0	45.0	2
30	120.0	-130.0	100.0	4
31	125.0	-135.0	100.0	1
32	130.0	-140.0	100.0	1
33	135.0	-145.0	100.0	1
34	140.0	-150.0	100.0	1

+-----+-----+-----+-----+			
STATIC PILE BEARING CAPACITY ANALYSIS - SPT97			Page 3
+-----+-----+-----+-----+			
Project No: 410755		Structure E	
Boring No: b-17			
+-----+-----+-----+-----+			

SOIL TYPE LEGEND

- 0 - BOTTOM OF BORING
- 1 - PLASTIC CLAYS
- 2 - CLAY/SILT SAND MIXTURES, SILTS & MARLS
- 3 - CLEAN SAND
- 4 - SOFT LIMESTONE, VERY SHELLY SANDS
- 5 - VOID (NO CAPACITY)

+-----+-----+-----+-----+			
STATIC PILE BEARING CAPACITY ANALYSIS - SPT97			Page 4
+-----+-----+-----+-----+			
Project No: 410755		Structure E	
Boring No: b-17			
+-----+-----+-----+-----+			

TEST PILE SECTION

DIAMETER OF PILE
THICKNESS OF PILE

I SECT = 5
{CONCRETE CYLINDER PILE}
WP = 38.00 INCHES
THICK = 2.00 INCHES

D. PILE CAPACITY VS. PENETRATION

TEST PILE LENGTH (FT)	PILE TIP ELEV (FT)	ULTIMATE SIDE FRICTION (TONS)	MOBILIZED END BEARING (TONS)	ESTIMATED DAVISSON CAPACITY (TONS)	ALLOWABLE PILE CAPACITY (TONS)	ULTIMATE PILE CAPACITY (TONS)
50.0	-60.0	88.15	32.70	120.85	60.42	186.25
55.0	-65.0	120.88	35.98	156.86	78.43	228.83
60.0	-70.0	171.65	50.41	222.07	111.03	322.89
65.0	-75.0	223.20	65.19	288.39	144.20	418.78
70.0	-80.0	282.91	60.19	343.10	171.55	463.47
75.0	-85.0	327.90	251.67	579.58	289.79	1082.92
80.0	-90.0	393.02	246.10	639.13	319.56	1131.34
85.0	-95.0	458.14	226.41	684.55	342.28	1137.37
90.0	-100.0	502.98	284.24	787.22	393.61	1355.71
95.0	-105.0	519.16	292.28	811.43	405.72	1395.98
100.0	-110.0	544.37	313.82	858.19	429.09	1485.82
105.0	-115.0	571.73	261.77	833.50	416.75	1357.04
110.0	-120.0	607.23	287.46	894.68	447.34	1469.59
115.0	-125.0	662.03	240.56	902.59	451.30	1383.71
120.0	-130.0	708.70	273.31	982.01	491.00	1528.62

*** ERROR *** PILE TIP TOO NEAR END OF BORING LOG FOR LENGTH = 125.00 FT

NOTES

1. MOBILIZED END BEARING IS 1/3 OF THE ORIGINAL RB-121 VALUES.
2. DAVISSON PILE CAPACITY IS AN ESTIMATE BASED ON FAILURE CRITERIA, AND EQUALS ULTIMATE SIDE FRICTION PLUS MOBILIZED END BEARING.
3. ALLOWABLE PILE CAPACITY IS 1/2 THE DAVISSON PILE CAPACITY.
4. ULTIMATE PILE CAPACITY IS ULTIMATE SIDE FRICTION PLUS 3 X THE MOBILIZED END BEARING.

PROBLEM COMPLETED

ANALYSIS NO. 1

□

STATIC PILE BEARING CAPACITY ANALYSIS - SPT97	Page 5
Project No: 410755	Structure E
Boring No: b-17	

C. PILE INFORMATION

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TEST PILE SECTION
 DIAMETER OF PILE
 THICKNESS OF PILE

I SECT = 5
 {CONCRETE CYLINDER PILE}
 WP = 36.00 INCHES
 THICK = 2.00 INCHES

D. PILE CAPACITY VS. PENETRATION

TEST PILE LENGTH (FT)	PILE TIP ELEV (FT)	ULTIMATE SIDE FRICTION (TONS)	MOBILIZED END BEARING (TONS)	ESTIMATED DAVISSON CAPACITY (TONS)	ALLOWABLE PILE CAPACITY (TONS)	ULTIMATE PILE CAPACITY (TONS)
50.0	-60.0	83.51	30.88	114.39	57.20	176.16
55.0	-65.0	114.52	33.83	148.35	74.17	216.01
60.0	-70.0	164.09	45.68	209.77	104.89	301.13
65.0	-75.0	213.57	62.36	275.93	137.96	400.64
70.0	-80.0	268.02	227.55	495.57	247.79	950.67
75.0	-85.0	310.65	226.12	536.77	268.39	989.02
80.0	-90.0	372.34	221.79	594.12	297.06	1037.70
85.0	-95.0	434.03	203.33	637.36	318.68	1044.01
90.0	-100.0	476.51	251.33	727.85	363.92	1230.51
95.0	-105.0	491.84	258.86	750.69	375.35	1268.41
100.0	-110.0	515.72	288.02	803.74	401.87	1379.79
105.0	-115.0	541.64	235.50	777.14	388.57	1248.15
110.0	-120.0	575.27	247.66	822.93	411.46	1318.24
115.0	-125.0	627.19	221.48	848.67	424.34	1291.64
120.0	-130.0	671.40	252.19	923.59	461.79	1427.96

*** ERROR *** PILE TIP TOO NEAR END OF BORING LOG FOR LENGTH = 125.00 FT

NOTES

1. MOBILIZED END BEARING IS 1/3 OF THE ORIGINAL RB-121 VALUES.
2. DAVISSON PILE CAPACITY IS AN ESTIMATE BASED ON FAILURE CRITERIA, AND EQUALS ULTIMATE SIDE FRICTION PLUS MOBILIZED END BEARING.
3. ALLOWABLE PILE CAPACITY IS 1/2 THE DAVISSON PILE CAPACITY.
4. ULTIMATE PILE CAPACITY IS ULTIMATE SIDE FRICTION PLUS 3 x THE MOBILIZED END BEARING.

PROBLEM COMPLETED

ANALYSIS NO. 2

STATIC PILE BEARING CAPACITY ANALYSIS - SPT97		Page 6
Project No: 410755	Structure E	
Boring No: b-17		

C. PILE INFORMATION

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TEST PILE SECTION

I SECT = 5
{ CONCRETE CYLINDER PILE }
WP = 30.00 INCHES
THICK = 2.00 INCHES

DIAMETER OF PILE
THICKNESS OF PILE

D. PILE CAPACITY VS. PENETRATION

=====

TEST PILE LENGTH (FT)	PILE TIP ELEV (FT)	ULTIMATE SIDE FRICTION (TONS)	MOBILIZED END BEARING (TONS)	ESTIMATED DAVISSON CAPACITY (TONS)	ALLOWABLE PILE CAPACITY (TONS)	ULTIMATE PILE CAPACITY (TONS)
50.0	-60.0	69.59	25.11	94.70	47.35	144.92
55.0	-65.0	95.43	28.79	124.22	62.11	181.79
60.0	-70.0	140.82	114.32	255.13	127.57	483.76
65.0	-75.0	186.62	157.04	343.66	171.83	657.74
70.0	-80.0	223.35	159.78	383.13	191.57	702.69
75.0	-85.0	258.87	157.08	415.95	207.98	730.11
80.0	-90.0	310.28	155.40	465.68	232.84	776.47
85.0	-95.0	361.69	144.97	506.66	253.33	796.60
90.0	-100.0	397.09	155.41	552.50	276.25	863.32
95.0	-105.0	409.06	163.46	572.52	286.26	899.45
100.0	-110.0	429.77	215.65	645.41	322.71	1076.70
105.0	-115.0	451.36	168.90	620.26	310.13	958.05
110.0	-120.0	479.39	140.72	620.11	310.05	901.54
115.0	-125.0	517.72	153.35	671.07	335.54	977.78
120.0	-130.0	559.50	178.94	738.44	369.22	1096.31
125.0	-135.0	600.68	68.72	669.41	334.70	806.85

*** ERROR *** PILE TIP TOO NEAR END OF BORING LOG FOR LENGTH = 130.00 FT

NOTES

1. MOBILIZED END BEARING IS 1/3 OF THE ORIGINAL RB-121 VALUES.
2. DAVISSON PILE CAPACITY IS AN ESTIMATE BASED ON FAILURE CRITERIA, AND EQUALS ULTIMATE SIDE FRICTION PLUS MOBILIZED END BEARING.
3. ALLOWABLE PILE CAPACITY IS 1/2 THE DAVISSON PILE CAPACITY.
4. ULTIMATE PILE CAPACITY IS ULTIMATE SIDE FRICTION PLUS 3 x THE MOBILIZED END BEARING.

PROBLEM COMPLETED

ANALYSIS NO. 3

+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+			
STATIC PILE BEARING CAPACITY ANALYSIS	- SPT97	Page	7
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+			
Project No: 410755	Structure E		
Boring No: b-17			
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+			

C. PILE INFORMATION

=====

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TEST PILE SECTION
DIAMETER OF PILE
THICKNESS OF PILE

I SECT = 5
{ CONCRETE CYLINDER PILE }
WP = 24.00 INCHES
THICK = 2.00 INCHES

D. PILE CAPACITY VS. PENETRATION

=====

TEST PILE LENGTH (FT)	PILE TIP ELEV (FT)	ULTIMATE SIDE FRICTION (TONS)	MOBILIZED END BEARING (TONS)	ESTIMATED DAVISSON CAPACITY (TONS)	ALLOWABLE PILE CAPACITY (TONS)	ULTIMATE PILE CAPACITY (TONS)
50.0	-60.0	55.67	18.56	74.23	37.12	111.36
55.0	-65.0	75.86	62.10	137.95	68.98	262.15
60.0	-70.0	114.88	66.71	181.59	90.79	315.01
65.0	-75.0	151.69	100.36	252.05	126.02	452.77
70.0	-80.0	178.68	110.40	289.08	144.54	509.88
75.0	-85.0	207.10	100.53	307.63	153.81	508.69
80.0	-90.0	248.22	100.15	348.37	174.19	548.67
85.0	-95.0	289.35	95.17	384.52	192.26	574.86
90.0	-100.0	317.67	86.24	403.91	201.95	576.38
95.0	-105.0	326.52	94.28	420.80	210.40	609.36
100.0	-110.0	343.81	146.93	490.74	245.37	784.59
105.0	-115.0	361.09	115.58	476.67	238.33	707.82
110.0	-120.0	383.51	72.05	455.56	227.78	599.65
115.0	-125.0	409.87	95.95	505.82	252.91	697.71
120.0	-130.0	447.60	111.26	558.86	279.43	781.38
125.0	-135.0	480.55	43.98	524.53	262.27	612.50

*** ERROR *** PILE TIP TOO NEAR END OF BORING LOG FOR LENGTH = 130.00 FT

NOTES

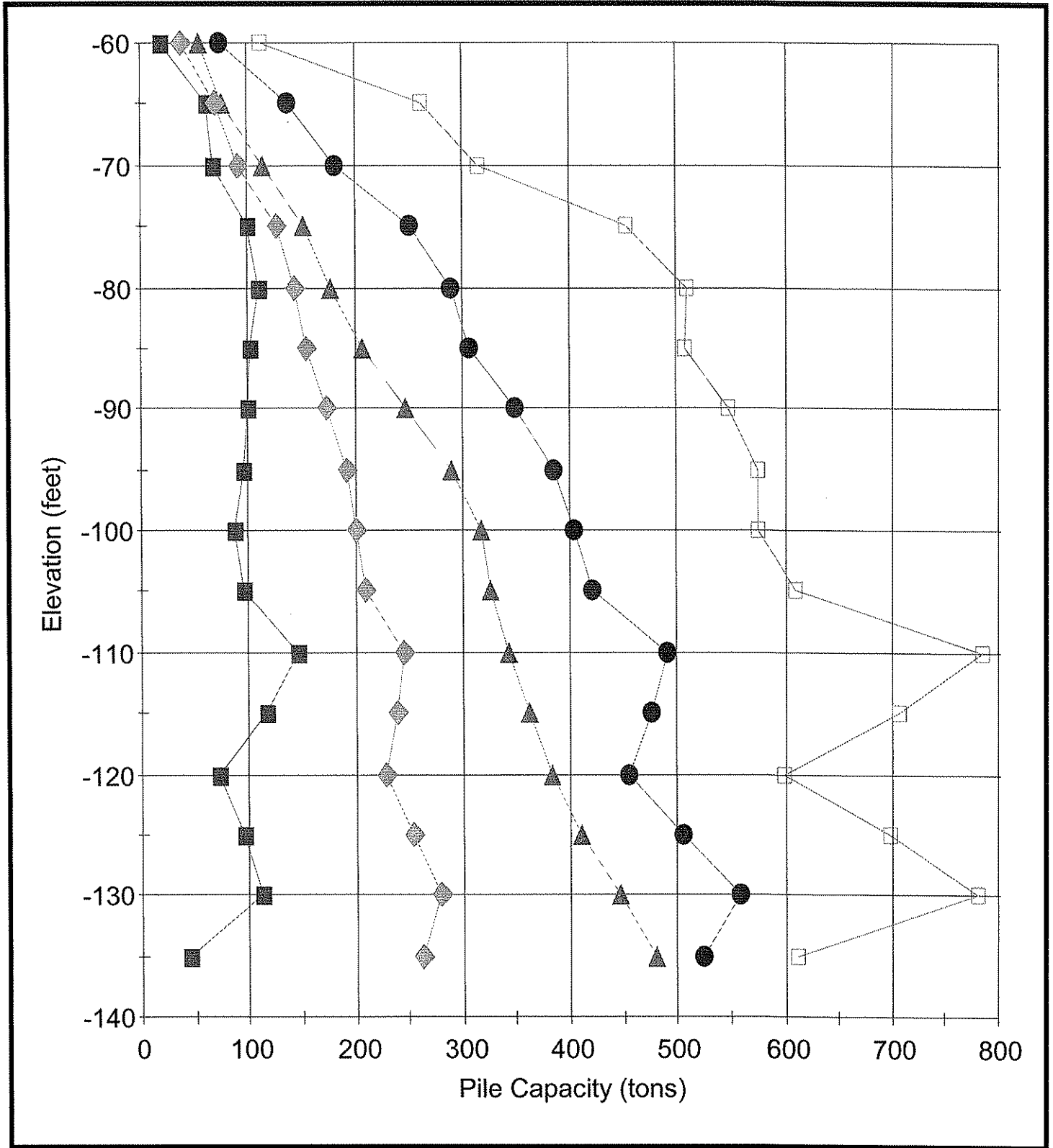
1. MOBILIZED END BEARING IS 1/3 OF THE ORIGINAL RB-121 VALUES.
2. DAVISSON PILE CAPACITY IS AN ESTIMATE BASED ON FAILURE CRITERIA, AND EQUALS ULTIMATE SIDE FRICTION PLUS MOBILIZED END BEARING.
3. ALLOWABLE PILE CAPACITY IS 1/2 THE DAVISSON PILE CAPACITY.
4. ULTIMATE PILE CAPACITY IS ULTIMATE SIDE FRICTION PLUS 3 X THE MOBILIZED END BEARING.

PROBLEM COMPLETED

ANALYSIS NO. 4

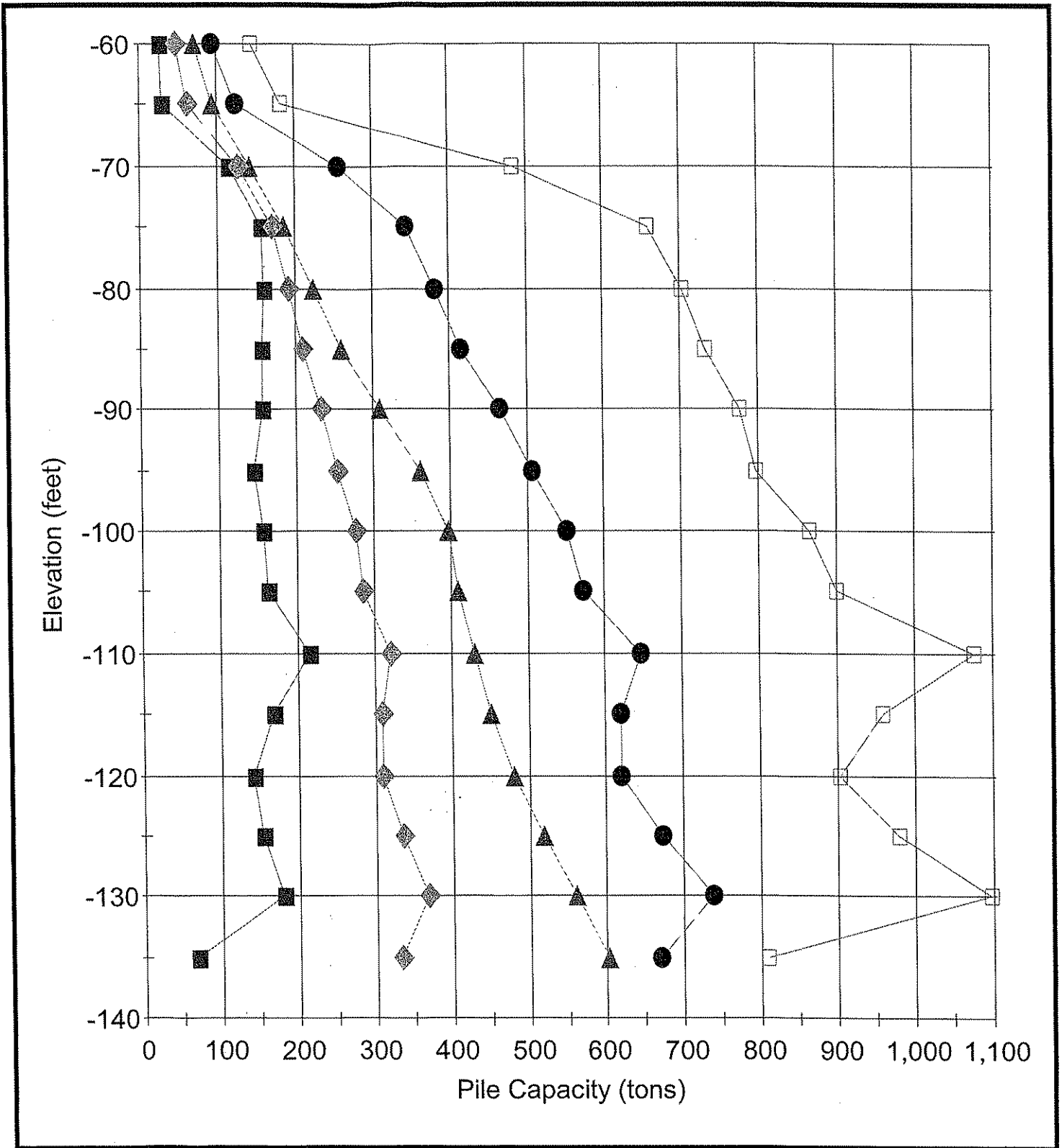
□

Pile Capacities for Pile Width of: 24.00 in



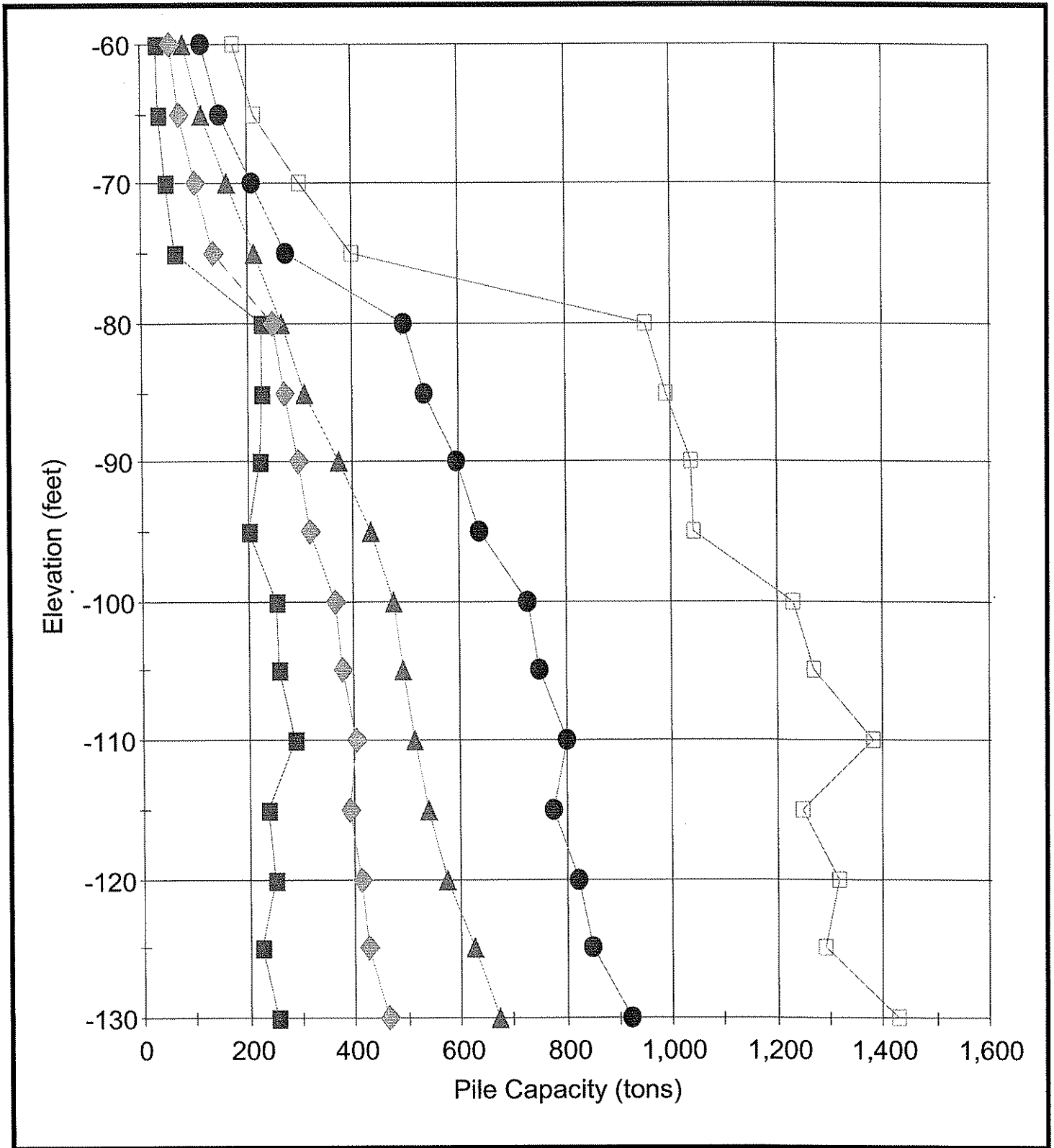
- ▲ Ultimate Side Friction
- Mobilized End Bearing
- Estimated Davisson Capacity
- ◆ Allowable Pile Capacity
- Ultimate Pile Capacity

Pile Capacities for Pile Width of: 30.00 in



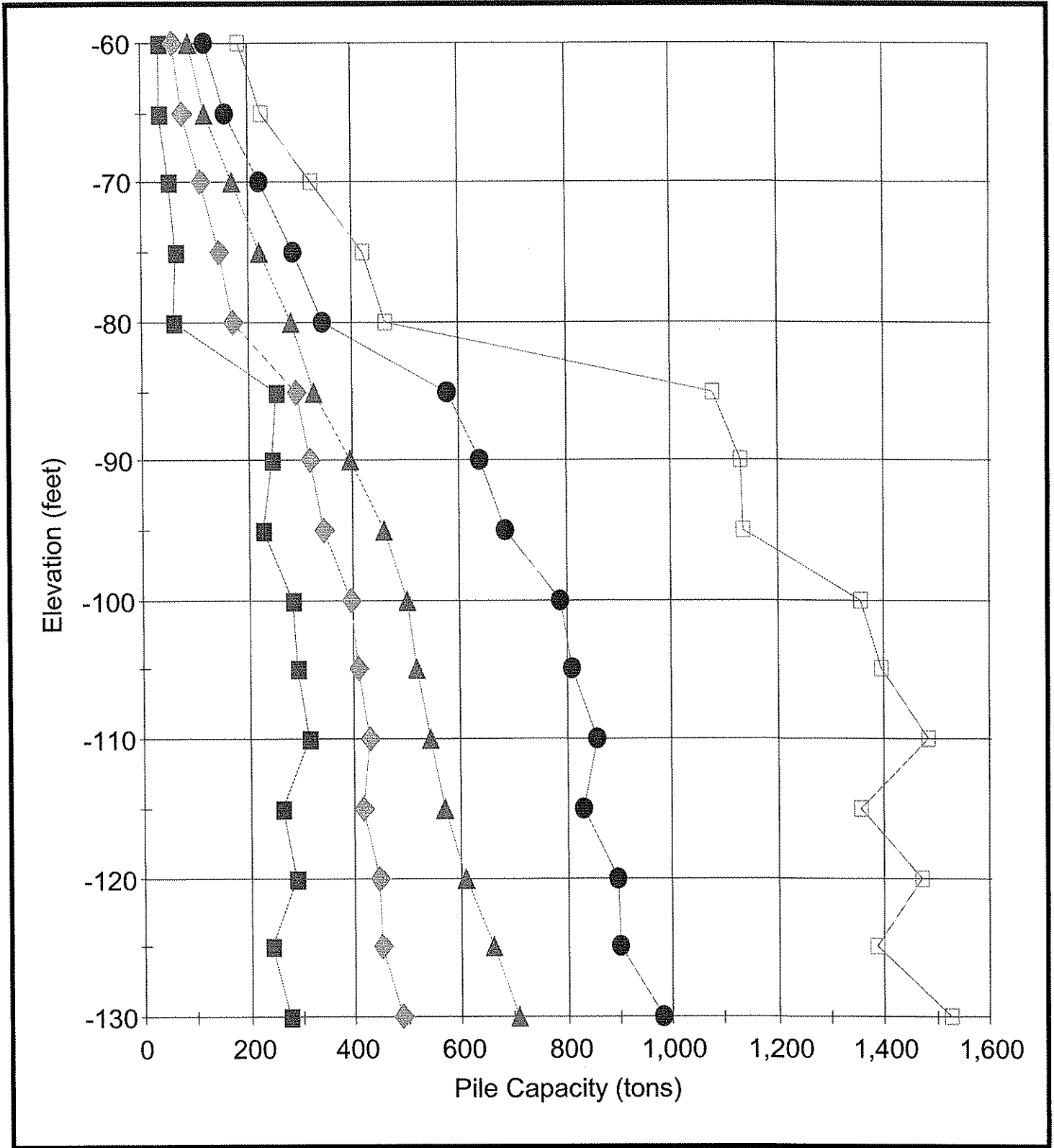
- ▲ Ultimate Side Friction
- Mobilized End Bearing
- Estimated Davison Capacity
- ◆ Allowable Pile Capacity
- Ultimate Pile Capacity

Pile Capacities for Pile Width of: 36.00 in



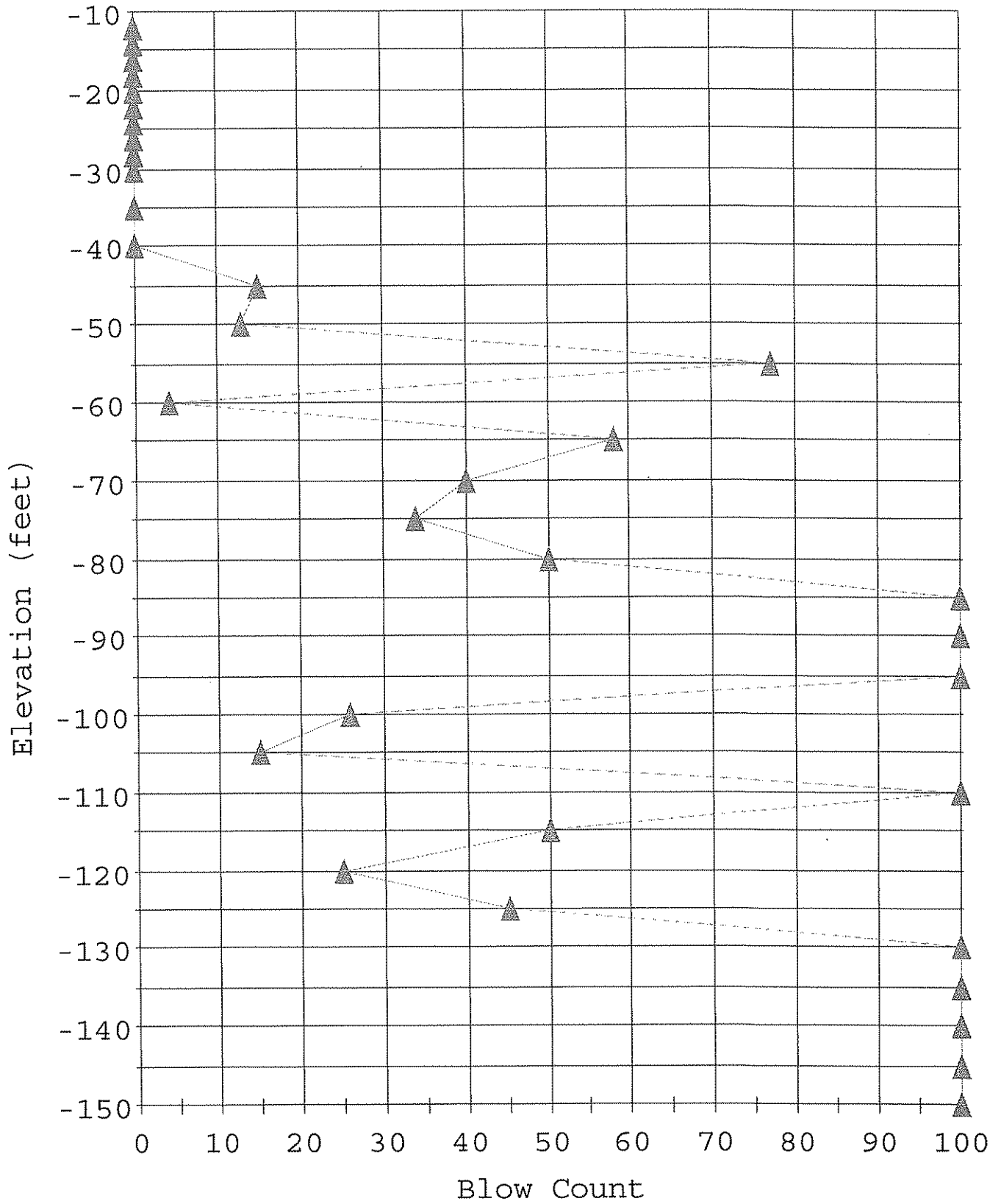
- ▲ Ultimate Side Friction
- Mobilized End Bearing
- Estimated Davison Capacity
- ◆ Allowable Pile Capacity
- Ultimate Pile Capacity

Pile Capacities for Pile Width of: 38.00 in



- ▲ Ultimate Side Friction
- Mobilized End Bearing
- Estimated Davison Capacity
- ◆ Allowable Pile Capacity
- Ultimate Pile Capacity

SPT N-Value vs. Elevation



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0
+-----+
| STATIC PILE BEARING CAPACITY ANALYSIS - SPT97 Page 1 |
+-----+
| Project No: 410755 Structure E |
| Boring No: b-17 |
+-----+

FLORIDA DEPARTMENT OF TRANSPORTATION
STRUCTURES DESIGN OFFICE
STATIC PILE BEARING CAPACITY ANALYSIS PROGRAM
SPT97 - VERSION 1.2 FEBRUARY, 1997
BASED ON RESEARCH BULLETIN RB-121
"GUIDELINES FOR USE IN THE SOILS INVESTIGATION
AND DESIGN OF FOUNDATIONS FOR
BRIDGE STRUCTURES IN THE STATE OF FLORIDA" AND
RESEARCH STUDY REPORT BY UNIVERSITY OF FLORIDA
"DESIGN OF STEEL PIPE AND H PILES"

NOTE - THIS PROGRAM IS EXPANDED FROM SPT91
IS ALSO KNOWN AS SPT94
TO INCLUDE STEEL H AND PIPE PILES

A. GENERAL INFORMATION

=====
INPUT FILE NAME channelewscour.in
RUN DATE 01/20/05
RUN TIME 09:28:10

PROJECT NUMBER 410755
JOB NAME Structure E

SUBMITTING ENGINEER HVJ
BORING NO. b-17
DRILLING DATE 1/1/02
STATION NO.
GROUND SURFACE ELEVATION -10.00 FEET
TYPE OF ANALYSIS 2 - DETERMINATION OF STATIC
 PILE BEARING CAPACITIES
 FOR A RANGE OF PILE LENGTHS
 (CAPACITY VS. TIP ELEVATION)

0
+-----+
| STATIC PILE BEARING CAPACITY ANALYSIS - SPT97 Page 2 |
+-----+
| Project No: 410755 Structure E |
| Boring No: b-17 |
+-----+

B. BORING LOG

=====
ENTRY NO. DEPTH (FT) ELEVATION SPT BLOWS/FT SOIL TYPE
 D(I) (FT) N(I) ST(I)

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1	2.0	-12.0	0.0	5
2	4.0	-14.0	0.0	5
3	6.0	-16.0	0.0	5
4	8.0	-18.0	0.0	5
5	10.0	-20.0	0.0	2
6	12.0	-22.0	0.0	2
7	14.0	-24.0	0.0	2
8	16.0	-26.0	0.0	2
9	18.0	-28.0	0.0	2
10	20.0	-30.0	0.0	2
11	25.0	-35.0	0.0	2
12	30.0	-40.0	0.0	2
13	35.0	-45.0	15.0	2
14	40.0	-50.0	13.0	2
15	45.0	-55.0	77.0	4
16	50.0	-60.0	4.0	2
17	55.0	-65.0	58.0	2
18	60.0	-70.0	40.0	2
19	65.0	-75.0	34.0	2
20	70.0	-80.0	50.0	4
21	75.0	-85.0	100.0	2
22	80.0	-90.0	100.0	2
23	85.0	-95.0	100.0	2
24	90.0	-100.0	26.0	3
25	95.0	-105.0	15.0	3
26	100.0	-110.0	100.0	4
27	105.0	-115.0	50.0	4
28	110.0	-120.0	25.0	2
29	115.0	-125.0	45.0	2
30	120.0	-130.0	100.0	4
31	125.0	-135.0	100.0	1
32	130.0	-140.0	100.0	1
33	135.0	-145.0	100.0	1
34	140.0	-150.0	100.0	1

STATIC PILE BEARING CAPACITY ANALYSIS - SPT97		Page	3
Project No:	410755	Structure	E
Boring No:	b-17		

SOIL TYPE LEGEND

- 0 - BOTTOM OF BORING
- 1 - PLASTIC CLAYS
- 2 - CLAY/SILT SAND MIXTURES, SILTS & MARLS
- 3 - CLEAN SAND
- 4 - SOFT LIMESTONE, VERY SHELLY SANDS
- 5 - VOID (NO CAPACITY)

STATIC PILE BEARING CAPACITY ANALYSIS - SPT97		Page	4
Project No:	410755	Structure	E
Boring No:	b-17		

TEST PILE SECTION

ISECT = 1
 {concrete pile, square section}
 WP = 24.00 INCHES

WIDTH OF PILE

D. PILE CAPACITY VS. PENETRATION

TEST PILE LENGTH (FT)	PILE TIP ELEV (FT)	ULTIMATE SIDE FRICTION (TONS)	MOBILIZED END BEARING (TONS)	ESTIMATED DAVISSON CAPACITY (TONS)	ALLOWABLE PILE CAPACITY (TONS)	ULTIMATE PILE CAPACITY (TONS)
50.0	-60.0	70.88	77.35	148.23	74.12	302.93
55.0	-65.0	96.59	79.06	175.65	87.82	333.77
60.0	-70.0	146.27	84.94	231.20	115.60	401.08
65.0	-75.0	193.13	127.78	320.92	160.46	576.48
70.0	-80.0	227.50	140.56	368.07	184.03	649.19
75.0	-85.0	263.68	128.00	391.68	195.84	647.68
80.0	-90.0	316.05	127.51	443.56	221.78	698.59
85.0	-95.0	368.41	121.17	489.59	244.79	731.93
90.0	-100.0	404.47	109.80	514.27	257.14	733.87
95.0	-105.0	415.74	120.04	535.78	267.89	775.86
100.0	-110.0	437.75	187.07	624.83	312.41	998.97
105.0	-115.0	459.75	147.16	606.91	303.46	901.22
110.0	-120.0	488.30	91.73	580.03	290.02	763.50
115.0	-125.0	521.87	122.16	644.03	322.01	888.35
120.0	-130.0	569.90	141.66	711.56	355.78	994.89
125.0	-135.0	611.85	56.00	667.85	333.93	779.85

*** ERROR *** PILE TIP TOO NEAR END OF BORING LOG FOR LENGTH = 130.00 FT

NOTES

1. MOBILIZED END BEARING IS 1/3 OF THE ORIGINAL RB-121 VALUES.
2. DAVISSON PILE CAPACITY IS AN ESTIMATE BASED ON FAILURE CRITERIA, AND EQUALS ULTIMATE SIDE FRICTION PLUS MOBILIZED END BEARING.
3. ALLOWABLE PILE CAPACITY IS 1/2 THE DAVISSON PILE CAPACITY.
4. ULTIMATE PILE CAPACITY IS ULTIMATE SIDE FRICTION PLUS 3 x THE MOBILIZED END BEARING.

PROBLEM COMPLETED

ANALYSIS NO. 4

STATIC PILE BEARING CAPACITY ANALYSIS - SPT97		Page	5
Project No: 410755	Structure E		
Boring No: b-17			

C. PILE INFORMATION

TEST PILE SECTION ISECT = 1
 {concrete pile, square section}
 WIDTH OF PILE WP = 30.00 INCHES

D. PILE CAPACITY VS. PENETRATION

TEST PILE LENGTH (FT)	PILE TIP ELEV (FT)	ULTIMATE SIDE FRICTION (TONS)	MOBILIZED END BEARING (TONS)	ESTIMATED DAVISSON CAPACITY (TONS)	ALLOWABLE PILE CAPACITY (TONS)	ULTIMATE PILE CAPACITY (TONS)
50.0	-60.0	88.60	128.45	217.06	108.53	473.96
55.0	-65.0	121.51	121.96	243.47	121.74	487.40
60.0	-70.0	179.29	145.55	324.85	162.42	615.95
65.0	-75.0	237.62	199.95	437.56	218.78	837.45
70.0	-80.0	284.38	203.44	487.82	243.91	894.69
75.0	-85.0	329.61	200.00	529.61	264.80	929.61
80.0	-90.0	395.06	197.86	592.92	296.46	988.63
85.0	-95.0	460.52	184.58	645.10	322.55	1014.27
90.0	-100.0	505.59	197.87	703.47	351.73	1099.21
95.0	-105.0	520.83	208.13	728.96	364.48	1145.21
100.0	-110.0	547.19	274.57	821.76	410.88	1370.90
105.0	-115.0	574.69	215.04	789.74	394.87	1219.83
110.0	-120.0	610.38	179.17	789.54	394.77	1147.88
115.0	-125.0	659.18	195.26	854.43	427.22	1244.95
120.0	-130.0	712.38	227.83	940.20	470.10	1395.86
125.0	-135.0	764.81	87.50	852.31	426.16	1027.31

*** ERROR *** PILE TIP TOO NEAR END OF BORING LOG FOR LENGTH = 130.00 FT

NOTES

1. MOBILIZED END BEARING IS 1/3 OF THE ORIGINAL RB-121 VALUES.
2. DAVISSON PILE CAPACITY IS AN ESTIMATE BASED ON FAILURE CRITERIA, AND EQUALS ULTIMATE SIDE FRICTION PLUS MOBILIZED END BEARING.
3. ALLOWABLE PILE CAPACITY IS 1/2 THE DAVISSON PILE CAPACITY.
4. ULTIMATE PILE CAPACITY IS ULTIMATE SIDE FRICTION PLUS 3 x THE MOBILIZED END BEARING.

PROBLEM COMPLETED

ANALYSIS NO. 5

D	
STATIC PILE BEARING CAPACITY ANALYSIS - SPT97	Page 6
Project No: 410755	Structure E
Boring No: b-17	

C. PILE INFORMATION

channelwscour.out
 TEST PILE SECTION ISECT = 1
 {concrete pile, square section}
 WIDTH OF PILE WP = 36.00 INCHES

D. PILE CAPACITY VS. PENETRATION

TEST PILE LENGTH (FT)	PILE TIP ELEV (FT)	ULTIMATE SIDE FRICTION (TONS)	MOBILIZED END BEARING (TONS)	ESTIMATED DAVISSON CAPACITY (TONS)	ALLOWABLE PILE CAPACITY (TONS)	ULTIMATE PILE CAPACITY (TONS)
50.0	-60.0	106.32	187.36	293.68	146.84	668.40
55.0	-65.0	145.81	172.22	318.03	159.01	662.47
60.0	-70.0	208.93	224.69	433.62	216.81	883.00
65.0	-75.0	271.93	281.14	553.07	276.53	1115.35
70.0	-80.0	341.25	289.72	630.98	315.49	1210.43
75.0	-85.0	395.53	287.91	683.44	341.72	1259.25
80.0	-90.0	474.07	282.39	756.46	378.23	1321.24
85.0	-95.0	552.62	258.89	811.50	405.75	1329.28
90.0	-100.0	606.71	320.01	926.72	463.36	1566.74
95.0	-105.0	626.23	329.59	955.81	477.91	1614.98
100.0	-110.0	656.63	366.72	1023.35	511.68	1756.80
105.0	-115.0	689.63	299.85	989.49	494.74	1589.19
110.0	-120.0	732.45	315.33	1047.78	523.89	1678.44
115.0	-125.0	798.56	282.00	1080.56	540.28	1644.56
120.0	-130.0	854.85	321.09	1175.94	587.97	1818.13

*** ERROR *** PILE TIP TOO NEAR END OF BORING LOG FOR LENGTH = 125.00 FT

NOTES

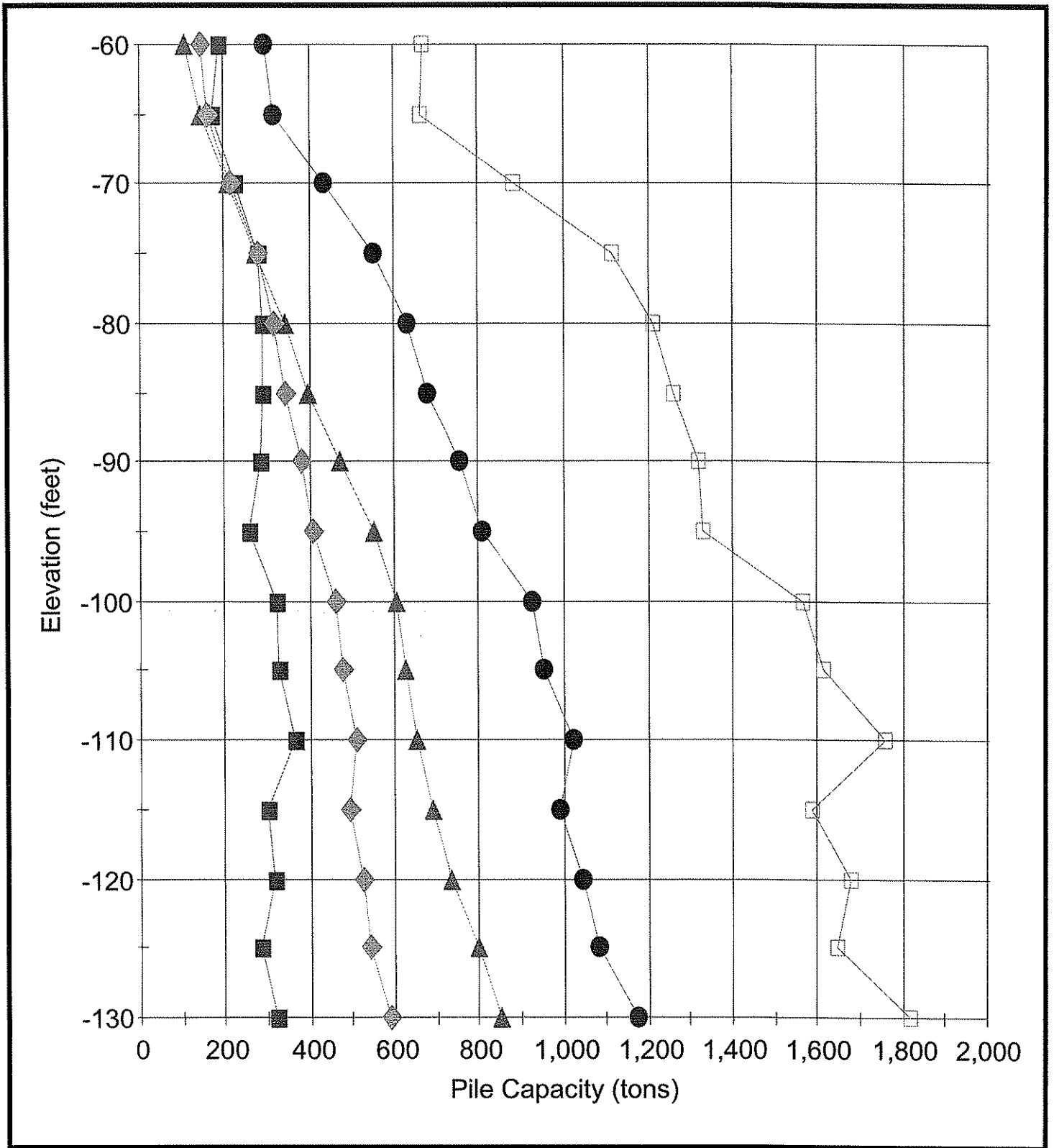
1. MOBILIZED END BEARING IS 1/3 OF THE ORIGINAL RB-121 VALUES.
2. DAVISSON PILE CAPACITY IS AN ESTIMATE BASED ON FAILURE CRITERIA, AND EQUALS ULTIMATE SIDE FRICTION PLUS MOBILIZED END BEARING.
3. ALLOWABLE PILE CAPACITY IS 1/2 THE DAVISSON PILE CAPACITY.
4. ULTIMATE PILE CAPACITY IS ULTIMATE SIDE FRICTION PLUS 3 x THE MOBILIZED END BEARING.

PROBLEM COMPLETED

ANALYSIS NO. 6

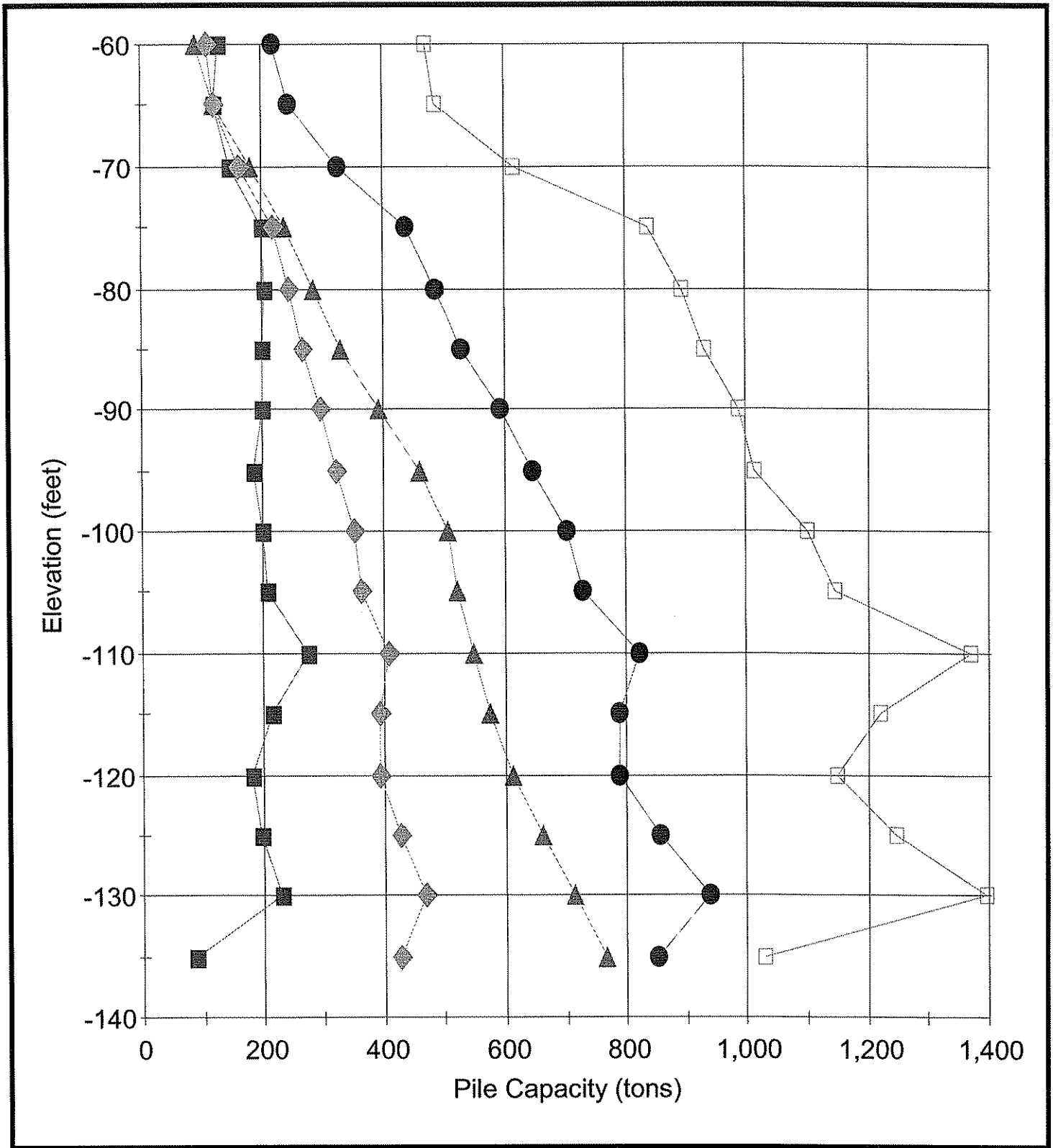
□

Pile Capacities for Pile Width of: 36.00 in



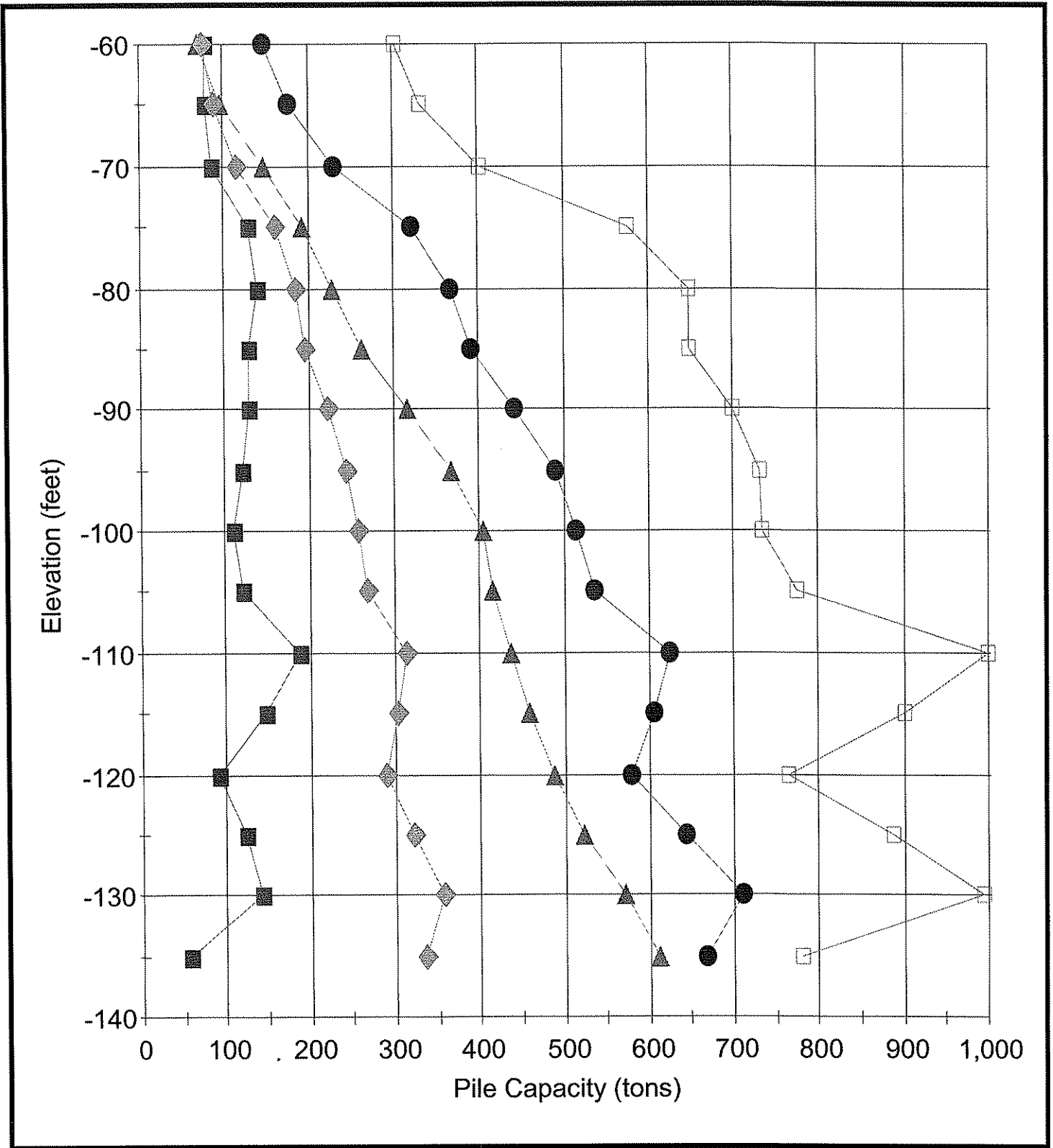
- ▲ Ultimate Side Friction
- Mobilized End Bearing
- Estimated Davisson Capacity
- ◆ Allowable Pile Capacity
- Ultimate Pile Capacity

Pile Capacities for Pile Width of: 30.00 in



- ▲ Ultimate Side Friction
- Mobilized End Bearing
- Estimated Davison Capacity
- ◆ Allowable Pile Capacity
- Ultimate Pile Capacity

Pile Capacities for Pile Width of: 24.00 in



- ▲ Ultimate Side Friction
- Mobilized End Bearing
- Estimated Davison Capacity
- ◆ Allowable Pile Capacity
- Ultimate Pile Capacity

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| STATIC PILE BEARING CAPACITY ANALYSIS - SPT97 | Page | 1 |
+-----+-----+-----+
| Project No: 410755 | Structure E |
| Boring No: b-17 |
+-----+-----+-----+

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FLORIDA DEPARTMENT OF TRANSPORTATION
STRUCTURES DESIGN OFFICE
STATIC PILE BEARING CAPACITY ANALYSIS PROGRAM
SPT97 - VERSION 1.2 FEBRUARY, 1997
BASED ON RESEARCH BULLETIN RB-121
"GUIDELINES FOR USE IN THE SOILS INVESTIGATION
AND DESIGN OF FOUNDATIONS FOR
BRIDGE STRUCTURES IN THE STATE OF FLORIDA"
RESEARCH STUDY REPORT BY UNIVERSITY OF FLORIDA
"DESIGN OF STEEL PIPE AND H PILES"

NOTE - THIS PROGRAM IS EXPANDED FROM SPT91
IS ALSO KNOWN AS SPT94
TO INCLUDE STEEL H AND PIPE PILES

A. GENERAL INFORMATION

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INPUT FILE NAME      channele.in
RUN DATE             01/10/05
RUN TIME             10:24:43

PROJECT NUMBER       410755
JOB NAME             Structure E

SUBMITTING ENGINEER HVJ
BORING NO.           b-17
DRILLING DATE        1/1/02
STATION NO.
GROUND SURFACE ELEVATION -10.00 FEET
TYPE OF ANALYSIS     2 - DETERMINATION OF STAT
PILE BEARING CAPACIT
FOR A RANGE OF PILE LGTHS
(CAPACITY VS. TIP ELEVATION)

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| STATIC PILE BEARING CAPACITY ANALYSIS - SPT97 | Page | 2 |
+-----+-----+-----+
| Project No: 410755 | Structure E |
| Boring No: b-17 |
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B. BORING LOG

ENTRY NO.	DEPTH (FT) D(I)	ELEVATION (FT)	SPT BLOWS/FT N(I)	SOIL TYPE ST(I)
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		channel	le.out	
1	2.0	-12.0	0.0	5
2	4.0	-14.0	0.0	5
3	6.0	-16.0	0.0	5
4	8.0	-18.0	0.0	5
5	10.0	-20.0	3.0	2
6	12.0	-22.0	4.0	2
7	14.0	-24.0	3.0	2
8	16.0	-26.0	2.0	2
9	18.0	-28.0	6.0	2
10	20.0	-30.0	2.0	2
11	25.0	-35.0	7.0	2
12	30.0	-40.0	24.0	2
13	35.0	-45.0	15.0	2
14	40.0	-50.0	13.0	2
15	45.0	-55.0	77.0	4
16	50.0	-60.0	4.0	2
17	55.0	-65.0	58.0	2
18	60.0	-70.0	40.0	2
19	65.0	-75.0	34.0	2
20	70.0	-80.0	50.0	4
21	75.0	-85.0	100.0	2
22	80.0	-90.0	100.0	2
23	85.0	-95.0	100.0	2
24	90.0	-100.0	26.0	3
25	95.0	-105.0	15.0	3
26	100.0	-110.0	100.0	4
27	105.0	-115.0	50.0	4
28	110.0	-120.0	25.0	2
29	115.0	-125.0	45.0	2
30	120.0	-130.0	100.0	4
31	125.0	-135.0	100.0	1
32	130.0	-140.0	100.0	1
33	135.0	-145.0	100.0	1
34	140.0	-150.0	100.0	1

STATIC PILE BEARING CAPACITY ANALYSIS - SPT97		Page 3
Project No: 410755	Structure E	
Boring No: b-17		

SOIL TYPE LEGEND

- 0 - BOTTOM OF BORING
- 1 - PLASTIC CLAYS
- 2 - CLAY/SILT SAND MIXTURES, SILTS & MARLS
- 3 - CLEAN SAND
- 4 - SOFT LIMESTONE, VERY SHELLY SANDS
- 5 - VOID (NO CAPACITY)

STATIC PILE BEARING CAPACITY ANALYSIS - SPT97		Page 4
Project No: 410755	Structure E	
Boring No: b-17		

TEST PILE SECTION
 DIAMETER OF PILE
 THICKNESS OF PILE

ISECT = 5
 {CONCRETE CYLINDER PILE}
 WP = 38.00 INCHES
 THICK = 2.00 INCHES

D. PILE CAPACITY VS. PENETRATION

TEST PILE LENGTH (FT)	PILE TIP ELEV (FT)	ULTIMATE SIDE FRICTION (TONS)	MOBILIZED END BEARING (TONS)	ESTIMATED DAVISSON CAPACITY (TONS)	ALLOWABLE PILE CAPACITY (TONS)	ULTIMATE PILE CAPACITY (TONS)
50.0	-60.0	154.02	32.70	186.72	93.36	252.12
55.0	-65.0	186.75	151.11	337.86	168.93	640.09
60.0	-70.0	237.52	198.96	436.48	218.24	834.40
65.0	-75.0	289.07	243.95	533.01	266.51	1020.91
70.0	-80.0	348.78	260.51	609.29	304.65	1130.32
75.0	-85.0	393.77	251.67	645.44	322.72	1148.78
80.0	-90.0	458.89	246.10	705.00	352.50	1197.20
85.0	-95.0	524.01	226.41	750.42	375.21	1203.24
90.0	-100.0	568.85	284.24	853.09	426.55	1421.57
95.0	-105.0	585.03	292.28	877.30	438.65	1461.85
100.0	-110.0	610.24	313.82	924.06	462.03	1551.69
105.0	-115.0	637.60	261.77	899.37	449.68	1422.91
110.0	-120.0	673.09	287.46	960.55	480.28	1535.46
115.0	-125.0	727.90	240.56	968.46	484.23	1449.57
120.0	-130.0	774.57	273.31	1047.87	523.94	1594.48

*** ERROR *** PILE TIP TOO NEAR END OF BORING LOG FOR LENGTH = 125.00 FT

NOTES

1. MOBILIZED END BEARING IS 1/3 OF THE ORIGINAL RB-121 VALUES.
2. DAVISSON PILE CAPACITY IS AN ESTIMATE BASED ON FAILURE CRITERIA, AND EQUALS ULTIMATE SIDE FRICTION PLUS MOBILIZED END BEARING.
3. ALLOWABLE PILE CAPACITY IS 1/2 THE DAVISSON PILE CAPACITY.
4. ULTIMATE PILE CAPACITY IS ULTIMATE SIDE FRICTION PLUS 3 X THE MOBILIZED END BEARING.

PROBLEM COMPLETED

ANALYSIS NO. 1

STATIC PILE BEARING CAPACITY ANALYSIS - SPT97		Page	5
Project No: 410755	Structure E		
Boring No: b-17			

C. PILE INFORMATION

channel.out

TEST PILE SECTION
DIAMETER OF PILE
THICKNESS OF PILE

I SECT = 5
{ CONCRETE CYLINDER PILE }
WP = 36.00 INCHES
THICK = 2.00 INCHES

D. PILE CAPACITY VS. PENETRATION

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TEST PILE LENGTH (FT)	PILE TIP ELEV (FT)	ULTIMATE SIDE FRICTION (TONS)	MOBILIZED END BEARING (TONS)	ESTIMATED DAVISSON CAPACITY (TONS)	ALLOWABLE PILE CAPACITY (TONS)	ULTIMATE PILE CAPACITY (TONS)
50.0	-60.0	145.91	30.88	176.79	88.40	238.56
55.0	-65.0	176.92	135.26	312.18	156.09	582.70
60.0	-70.0	226.50	176.47	402.97	201.48	755.91
65.0	-75.0	275.97	220.81	496.78	248.39	938.40
70.0	-80.0	330.42	227.55	557.97	278.99	1013.07
75.0	-85.0	373.05	226.12	599.17	299.59	1051.42
80.0	-90.0	434.74	221.79	656.53	328.26	1100.10
85.0	-95.0	496.43	203.33	699.76	349.88	1106.41
90.0	-100.0	538.91	251.33	790.25	395.12	1292.92
95.0	-105.0	554.24	258.86	813.10	406.55	1330.81
100.0	-110.0	578.12	288.02	866.14	433.07	1442.19
105.0	-115.0	604.04	235.50	839.54	419.77	1310.55
110.0	-120.0	637.67	247.66	885.33	442.66	1380.65
115.0	-125.0	689.59	221.48	911.07	455.54	1354.04
120.0	-130.0	733.80	252.19	985.99	492.99	1490.36

*** ERROR *** PILE TIP TOO NEAR END OF BORING LOG FOR LENGTH = 125.00 FT

NOTES

1. MOBILIZED END BEARING IS 1/3 OF THE ORIGINAL RB-121 VALUES.
2. DAVISSON PILE CAPACITY IS AN ESTIMATE BASED ON FAILURE CRITERIA, AND EQUALS ULTIMATE SIDE FRICTION PLUS MOBILIZED END BEARING.
3. ALLOWABLE PILE CAPACITY IS 1/2 THE DAVISSON PILE CAPACITY.
4. ULTIMATE PILE CAPACITY IS ULTIMATE SIDE FRICTION PLUS 3 x THE MOBILIZED END BEARING.

PROBLEM COMPLETED

ANALYSIS NO. 2

+-----+-----+-----+-----+-----+-----+	
STATIC PILE BEARING CAPACITY ANALYSIS - SPT97	Page 6
+-----+-----+-----+-----+-----+-----+	
Project No: 410755	Structure E
+-----+-----+-----+-----+-----+-----+	
Boring No: b-17	
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C. PILE INFORMATION

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channel.e.out

TEST PILE SECTION

ISECT = 5
{CONCRETE CYLINDER PILE}
WP = 30.00 INCHES
THICK = 2.00 INCHES

DIAMETER OF PILE
THICKNESS OF PILE

D. PILE CAPACITY VS. PENETRATION

=====

TEST PILE LENGTH (FT)	PILE TIP ELEV (FT)	ULTIMATE SIDE FRICTION (TONS)	MOBILIZED END BEARING (TONS)	ESTIMATED DAVISSON CAPACITY (TONS)	ALLOWABLE PILE CAPACITY (TONS)	ULTIMATE PILE CAPACITY (TONS)
50.0	-60.0	121.59	100.89	222.48	111.24	424.25
55.0	-65.0	147.43	95.79	243.22	121.61	434.80
60.0	-70.0	192.82	114.32	307.13	153.57	535.77
65.0	-75.0	238.62	157.04	395.66	197.83	709.74
70.0	-80.0	275.35	159.78	435.13	217.57	754.69
75.0	-85.0	310.87	157.08	467.95	233.98	782.11
80.0	-90.0	362.28	155.40	517.68	258.84	828.47
85.0	-95.0	413.69	144.97	558.66	279.33	848.61
90.0	-100.0	449.09	155.41	604.50	302.25	915.32
95.0	-105.0	461.06	163.46	624.53	312.26	951.45
100.0	-110.0	481.77	215.65	697.41	348.71	1128.71
105.0	-115.0	503.37	168.90	672.26	336.13	1010.05
110.0	-120.0	531.39	140.72	672.11	336.05	953.54
115.0	-125.0	569.72	153.35	723.07	361.54	1029.78
120.0	-130.0	611.50	178.94	790.44	395.22	1148.31
125.0	-135.0	652.69	68.72	721.41	360.70	858.85

*** ERROR *** PILE TIP TOO NEAR END OF BORING LOG FOR LENGTH = 130.00 FT

NOTES

1. MOBILIZED END BEARING IS 1/3 OF THE ORIGINAL RB-121 VALUES.
2. DAVISSON PILE CAPACITY IS AN ESTIMATE BASED ON FAILURE CRITERIA, AND EQUALS ULTIMATE SIDE FRICTION PLUS MOBILIZED END BEARING.
3. ALLOWABLE PILE CAPACITY IS 1/2 THE DAVISSON PILE CAPACITY.
4. ULTIMATE PILE CAPACITY IS ULTIMATE SIDE FRICTION PLUS 3 X THE MOBILIZED END BEARING.

PROBLEM COMPLETED

ANALYSIS NO. 3

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+-----+-----+-----+	
STATIC PILE BEARING CAPACITY ANALYSIS - SPT97	Page 7
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Project No: 410755	Structure E
Boring No: b-17	
+-----+-----+-----+	

C. PILE INFORMATION

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channele.out

TEST PILE SECTION
DIAMETER OF PILE
THICKNESS OF PILE

ISECT = 5
{CONCRETE CYLINDER PILE}
WP = 24.00 INCHES
THICK = 2.00 INCHES

D. PILE CAPACITY VS. PENETRATION

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TEST PILE LENGTH (FT)	PILE TIP ELEV (FT)	ULTIMATE SIDE FRICTION (TONS)	MOBILIZED END BEARING (TONS)	ESTIMATED DAVISSON CAPACITY (TONS)	ALLOWABLE PILE CAPACITY (TONS)	ULTIMATE PILE CAPACITY (TONS)
50.0	-60.0	97.27	60.75	158.02	79.01	279.52
55.0	-65.0	117.46	62.10	179.55	89.78	303.75
60.0	-70.0	156.48	66.71	223.19	111.59	356.61
65.0	-75.0	193.29	100.36	293.65	146.82	494.37
70.0	-80.0	220.28	110.40	330.68	165.34	551.48
75.0	-85.0	248.70	100.53	349.23	174.62	550.29
80.0	-90.0	289.83	100.15	389.97	194.99	590.27
85.0	-95.0	330.95	95.17	426.12	213.06	616.46
90.0	-100.0	359.28	86.24	445.51	222.76	617.98
95.0	-105.0	368.12	94.28	462.40	231.20	650.96
100.0	-110.0	385.41	146.93	532.34	266.17	826.19
105.0	-115.0	402.69	115.58	518.27	259.13	749.42
110.0	-120.0	425.11	72.05	497.16	248.58	641.25
115.0	-125.0	451.48	95.95	547.42	273.71	739.31
120.0	-130.0	489.20	111.26	600.46	300.23	822.98
125.0	-135.0	522.15	43.98	566.13	283.07	654.10

*** ERROR *** PILE TIP TOO NEAR END OF BORING LOG FOR LENGTH = 130.00 FT

NOTES

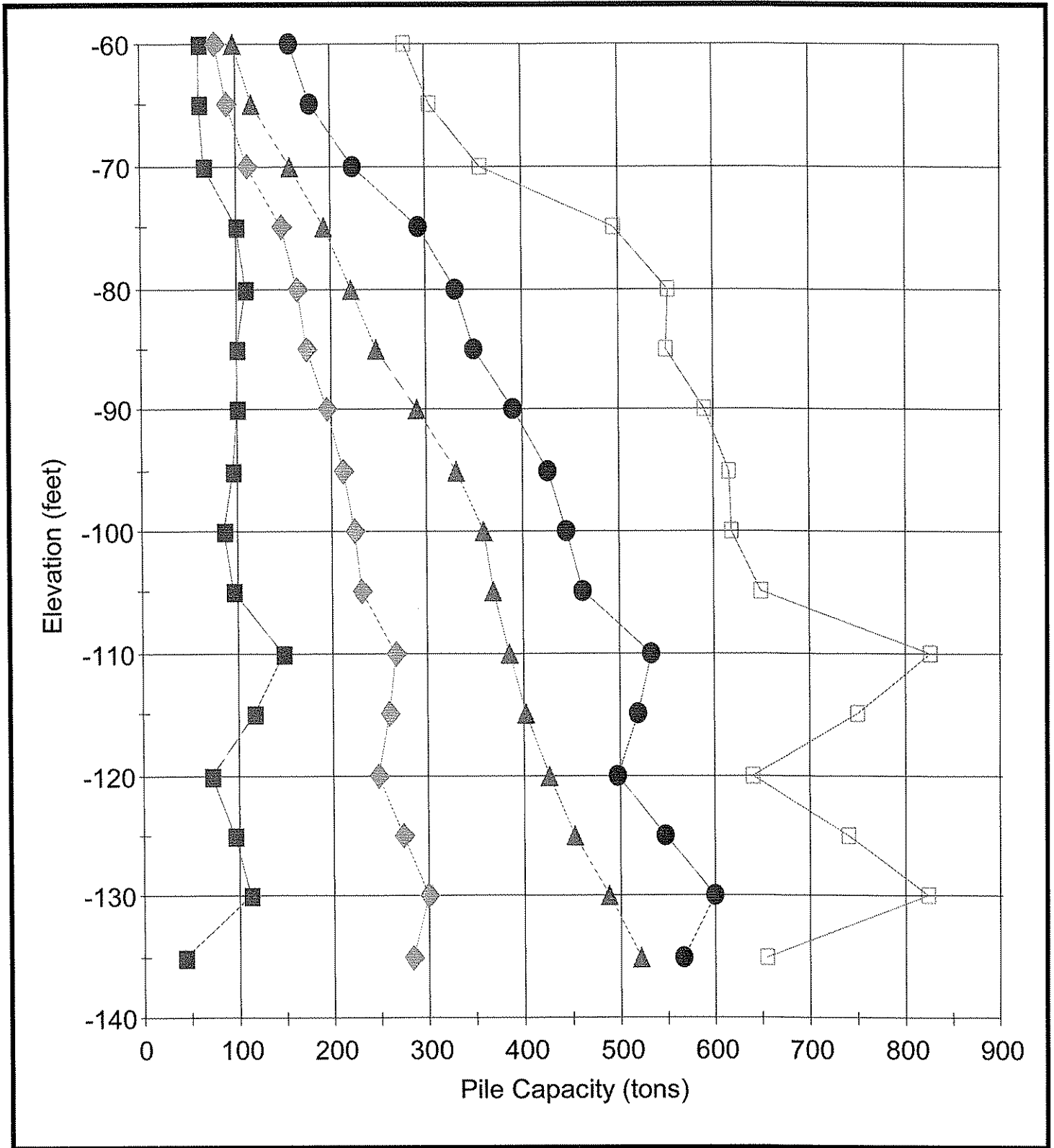
1. MOBILIZED END BEARING IS 1/3 OF THE ORIGINAL RB-121 VALUES.
2. DAVISSON PILE CAPACITY IS AN ESTIMATE BASED ON FAILURE CRITERIA, AND EQUALS ULTIMATE SIDE FRICTION PLUS MOBILIZED END BEARING.
3. ALLOWABLE PILE CAPACITY IS 1/2 THE DAVISSON PILE CAPACITY.
4. ULTIMATE PILE CAPACITY IS ULTIMATE SIDE FRICTION PLUS 3 x THE MOBILIZED END BEARING.

PROBLEM COMPLETED

ANALYSIS NO. 4

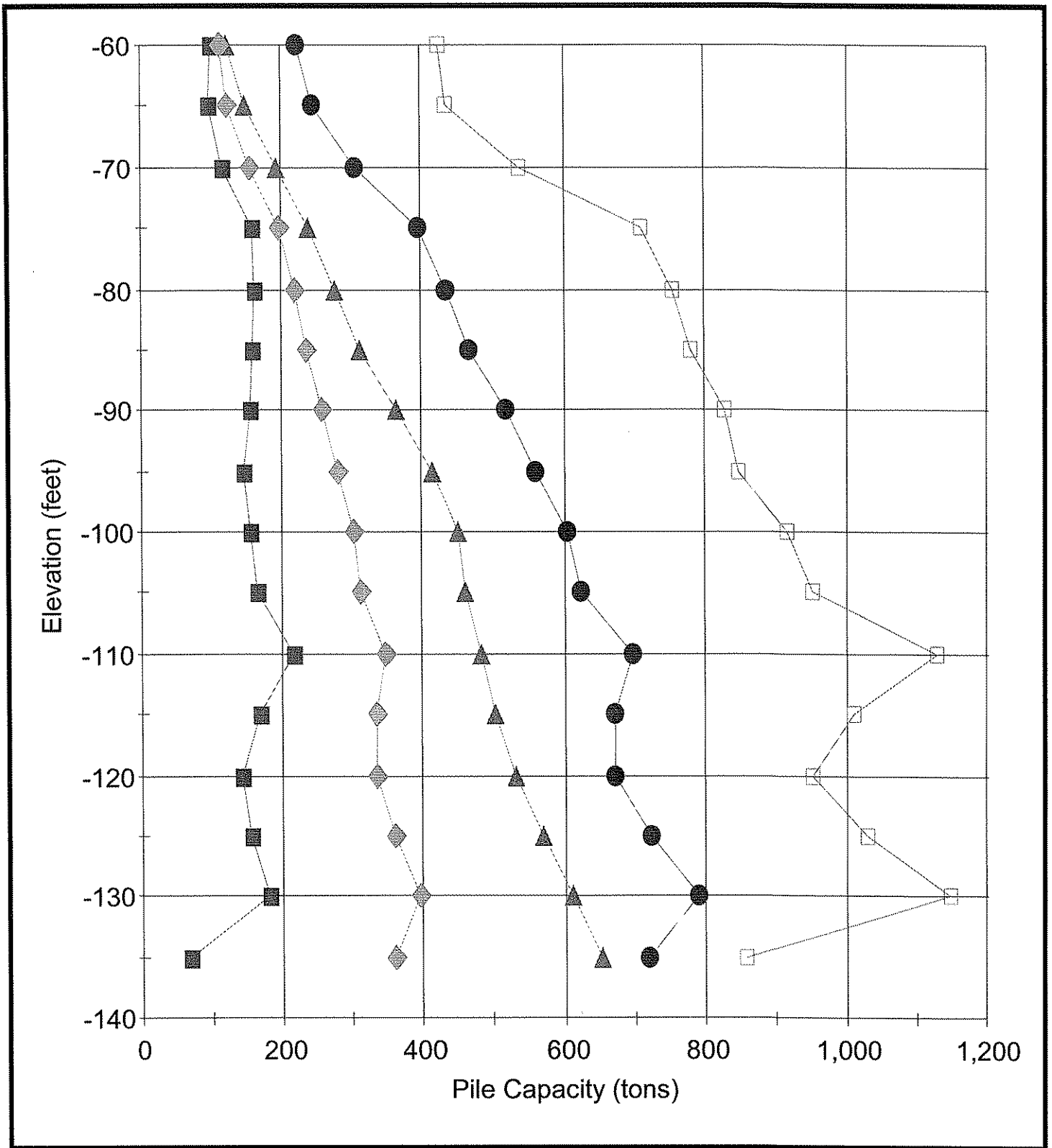
0

Pile Capacities for Pile Width of: 24.00 in



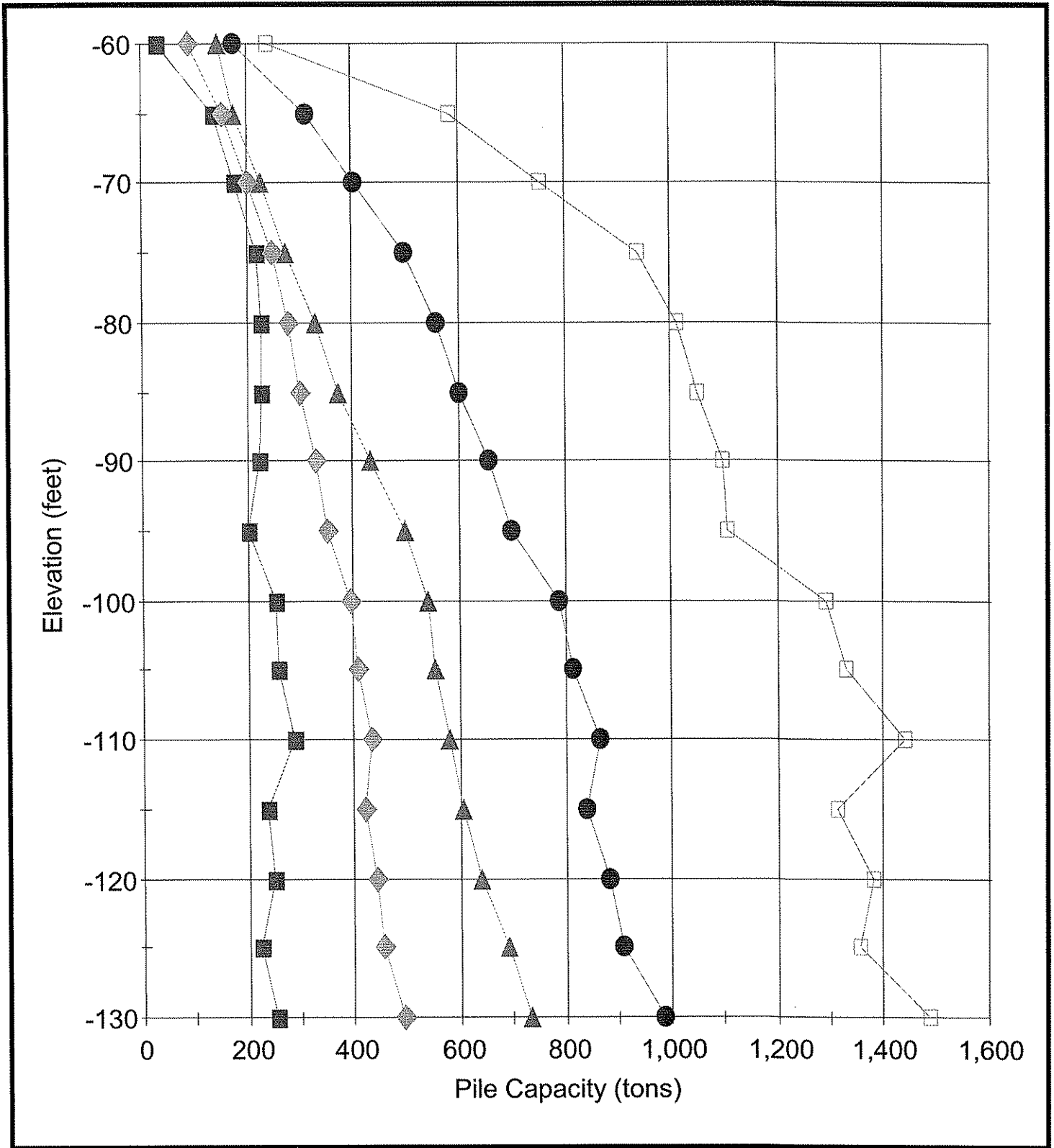
- ▲ Ultimate Side Friction
- Mobilized End Bearing
- Estimated Davisson Capacity
- ◆ Allowable Pile Capacity
- Ultimate Pile Capacity

Pile Capacities for Pile Width of: 30.00 in



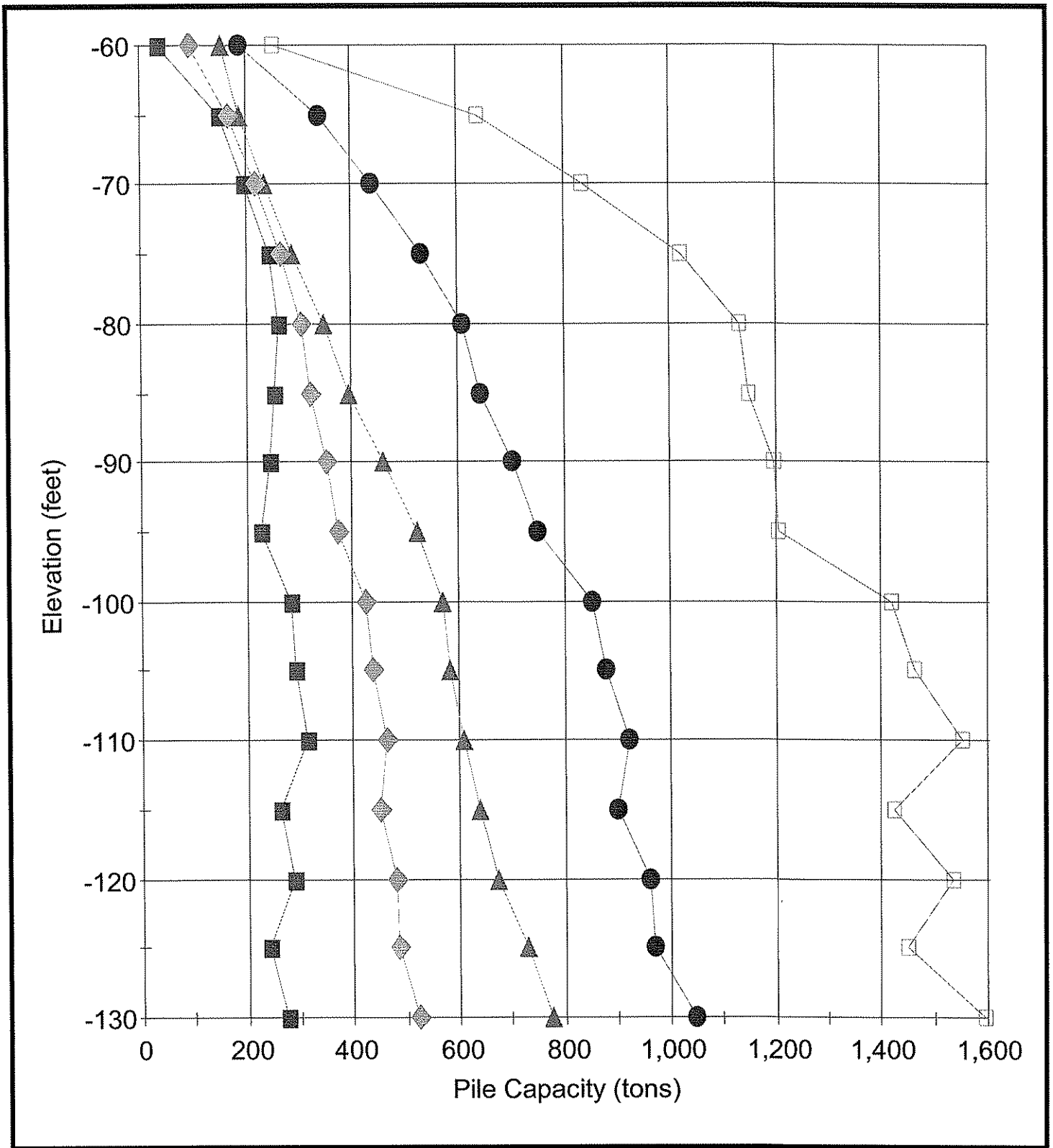
- ▲ Ultimate Side Friction
- Mobilized End Bearing
- Estimated Davisson Capacity
- ◆ Allowable Pile Capacity
- Ultimate Pile Capacity

Pile Capacities for Pile Width of: 36.00 in



- ▲ Ultimate Side Friction
- Mobilized End Bearing
- Estimated Davisson Capacity
- ◆ Allowable Pile Capacity
- Ultimate Pile Capacity

Pile Capacities for Pile Width of: 38.00 in



- ▲ Ultimate Side Friction
- Mobilized End Bearing
- Estimated Davisson Capacity
- ◆ Allowable Pile Capacity
- Ultimate Pile Capacity

Steel

cylindernorms.out

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| STATIC PILE BEARING CAPACITY ANALYSIS   - SPT97                               Page   1 |
+-----+
| Project No: 410755                       Structure E                          |
| Boring No:  b-17                         |
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FLORIDA DEPARTMENT OF TRANSPORTATION
STRUCTURES DESIGN OFFICE
STATIC PILE BEARING CAPACITY ANALYSIS PROGRAM
SPT97 - VERSION 1.2 FEBRUARY, 1997
BASED ON RESEARCH BULLETIN RB-121
"GUIDELINES FOR USE IN THE SOILS INVESTIGATION
AND DESIGN OF FOUNDATIONS FOR
BRIDGE STRUCTURES IN THE STATE OF FLORIDA" AND
RESEARCH STUDY REPORT BY UNIVERSITY OF FLORIDA
"DESIGN OF STEEL PIPE AND H PILES"

NOTE - THIS PROGRAM IS EXPANDED FROM SPT91
IS ALSO KNOWN AS SPT94
TO INCLUDE STEEL H AND PIPE PILES

A. GENERAL INFORMATION

```
INPUT FILE NAME      cylindernorms.in
RUN DATE             01/10/05
RUN TIME             15:55:13

PROJECT NUMBER       410755
JOB NAME             Structure E

SUBMITTING ENGINEER HVJ
BORING NO.           b-17
DRILLING DATE        1/1/02
STATION NO.
GROUND SURFACE ELEVATION -10.00 FEET
TYPE OF ANALYSIS     2 - DETERMINATION OF STATIC
                     PILE BEARING CAPACITIES
                     FOR A RANGE OF PILE LENGTHS
                     (CAPACITY VS. TIP ELEVATION)
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| STATIC PILE BEARING CAPACITY ANALYSIS   - SPT97                               Page   2 |
+-----+
| Project No: 410755                       Structure E                          |
| Boring No:  b-17                         |
+-----+
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B. BORING LOG

ENTRY NO.	DEPTH (FT) D(I)	ELEVATION (FT)	SPT BLOWS/FT N(I)	SOIL TYPE ST(I)
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cylindernorms.out				
1	2.0	-12.0	0.0	5
2	4.0	-14.0	0.0	5
3	6.0	-16.0	0.0	5
4	8.0	-18.0	0.0	5
5	10.0	-20.0	0.0	2
6	12.0	-22.0	0.0	2
7	14.0	-24.0	0.0	2
8	16.0	-26.0	0.0	2
9	18.0	-28.0	0.0	2
10	20.0	-30.0	0.0	2
11	25.0	-35.0	0.0	2
12	30.0	-40.0	0.0	2
13	35.0	-45.0	15.0	2
14	40.0	-50.0	13.0	2
15	45.0	-55.0	77.0	4
16	50.0	-60.0	4.0	2
17	55.0	-65.0	58.0	2
18	60.0	-70.0	40.0	2
19	65.0	-75.0	34.0	2
20	70.0	-80.0	50.0	4
21	75.0	-85.0	100.0	2
22	80.0	-90.0	100.0	2
23	85.0	-95.0	100.0	2
24	90.0	-100.0	26.0	3
25	95.0	-105.0	15.0	3
26	100.0	-110.0	100.0	4
27	105.0	-115.0	50.0	4
28	110.0	-120.0	25.0	2
29	115.0	-125.0	45.0	2
30	120.0	-130.0	100.0	4
31	125.0	-135.0	100.0	1
32	130.0	-140.0	100.0	1
33	135.0	-145.0	100.0	1
34	140.0	-150.0	100.0	1

STATIC PILE BEARING CAPACITY ANALYSIS - SPT97		Page 3
Project No: 410755	Structure E	
Boring No: b-17		

SOIL TYPE LEGEND

- 0 - BOTTOM OF BORING
- 1 - PLASTIC CLAYS
- 2 - CLAY/SILT SAND MIXTURES, SILTS & MARLS
- 3 - CLEAN SAND
- 4 - SOFT LIMESTONE, VERY SHELLY SANDS
- 5 - VOID (NO CAPACITY)

STATIC PILE BEARING CAPACITY ANALYSIS - SPT97		Page 4
Project No: 410755	Structure E	
Boring No: b-17		

C. PILE INFORMATION

TEST PILE SECTION

DIAMETER OF PILE
THICKNESS OF PILE

I SECT = 5
{CONCRETE CYLINDER PILE}
WP = 36.00 INCHES
THICK = 1.00 INCHES

D. PILE CAPACITY VS. PENETRATION

TEST PILE LENGTH (FT)	PILE TIP ELEV (FT)	ULTIMATE SIDE FRICTION (TONS)	MOBILIZED END BEARING (TONS)	ESTIMATED DAVISSON CAPACITY (TONS)	ALLOWABLE PILE CAPACITY (TONS)	ULTIMATE PILE CAPACITY (TONS)
50.0	-60.0	83.51	15.90	99.40	49.70	131.20
51.0	-61.0	84.75	17.18	101.92	50.96	136.28
52.0	-62.0	88.47	17.96	106.43	53.21	142.35
53.0	-63.0	94.67	18.25	112.92	56.46	149.41
54.0	-64.0	103.35	18.04	121.39	60.70	157.46
55.0	-65.0	114.52	17.41	131.93	65.97	166.76
56.0	-66.0	126.83	17.16	143.99	72.00	178.32
57.0	-67.0	138.21	17.66	155.86	77.93	191.18
58.0	-68.0	147.62	18.90	166.52	83.26	204.33
59.0	-69.0	156.15	20.90	177.04	88.52	218.84
60.0	-70.0	164.09	23.51	187.61	93.80	234.63
61.0	-71.0	172.45	25.94	198.39	99.19	250.26
62.0	-72.0	181.36	28.01	209.37	104.69	265.38
63.0	-73.0	192.23	29.71	221.94	110.97	281.37
64.0	-74.0	202.97	31.06	234.03	117.01	296.15
65.0	-75.0	213.57	32.09	245.67	122.83	309.85
66.0	-76.0	223.58	32.80	256.37	128.19	321.97
67.0	-77.0	232.52	32.89	265.41	132.71	331.20
68.0	-78.0	240.37	32.38	272.75	136.38	337.51
69.0	-79.0	247.13	227.67	474.80	237.40	930.15
70.0	-80.0	268.02	227.55	495.57	247.79	950.67
71.0	-81.0	273.50	220.07	493.56	246.78	933.70
72.0	-82.0	280.50	215.77	496.26	248.13	927.80
73.0	-83.0	289.02	214.65	503.67	251.84	932.97
74.0	-84.0	299.07	216.71	515.78	257.89	949.21
75.0	-85.0	310.65	226.12	536.77	268.39	989.02
76.0	-86.0	322.98	225.87	548.86	274.43	1000.60
77.0	-87.0	335.32	225.30	560.62	280.31	1011.22
78.0	-88.0	347.66	224.44	572.10	286.05	1020.97
79.0	-89.0	360.00	223.29	583.29	291.64	1029.86
80.0	-90.0	372.34	221.79	594.12	297.06	1037.70
81.0	-91.0	384.67	219.56	604.24	302.12	1043.36
82.0	-92.0	397.01	216.55	613.56	306.78	1046.65
83.0	-93.0	409.35	212.74	622.09	311.05	1047.57

STATIC PILE BEARING CAPACITY ANALYSIS - SPT97		Page	5
Project No: 410755		Structure E	
Boring No: b-17			

D. PILE CAPACITY VS. PENETRATION (CONTINUED)

(FT)	(FT)	(TONS)	cylindernorms.out		(TONS)	(TONS)	(TONS)
			(TONS)	(TONS)	(TONS)		
84.0	-94.0	421.69	208.14	629.83	314.92	1046.12	
85.0	-95.0	434.03	203.33	637.36	318.68	1044.01	
86.0	-96.0	445.60	201.72	647.32	323.66	1050.76	
87.0	-97.0	455.63	203.94	659.57	329.78	1067.45	
88.0	-98.0	464.13	210.04	674.17	337.08	1094.25	
89.0	-99.0	471.09	220.06	691.15	345.57	1131.27	
90.0	-100.0	476.51	251.33	727.85	363.92	1230.51	
91.0	-101.0	480.74	251.72	732.46	366.23	1235.90	
92.0	-102.0	484.25	252.79	737.04	368.52	1242.62	
93.0	-103.0	487.21	254.40	741.62	370.81	1250.43	
94.0	-104.0	489.73	256.44	746.16	373.08	1259.04	
95.0	-105.0	491.84	258.86	750.69	375.35	1268.41	
96.0	-106.0	494.10	261.26	755.36	377.68	1277.87	
97.0	-107.0	497.06	263.09	760.15	380.08	1286.33	
98.0	-108.0	500.82	263.99	764.81	382.41	1292.79	
99.0	-109.0	505.53	263.58	769.11	384.56	1296.28	
100.0	-110.0	515.72	288.02	803.74	401.87	1379.79	
101.0	-111.0	521.28	275.11	796.39	398.20	1346.61	
102.0	-112.0	526.65	263.37	790.02	395.01	1316.77	
103.0	-113.0	531.84	252.81	784.64	392.32	1290.25	
104.0	-114.0	536.83	243.41	780.24	390.12	1267.07	
105.0	-115.0	541.64	235.50	777.14	388.57	1248.15	
106.0	-116.0	546.75	231.63	778.38	389.19	1241.63	
107.0	-117.0	552.67	232.74	785.42	392.71	1250.91	
108.0	-118.0	559.40	238.86	798.26	399.13	1275.99	
109.0	-119.0	566.93	249.98	816.91	408.45	1316.87	
110.0	-120.0	575.27	247.66	822.93	411.46	1318.24	
111.0	-121.0	584.33	190.21	774.54	387.27	1154.96	
112.0	-122.0	594.06	204.84	798.90	399.45	1208.58	
113.0	-123.0	604.45	214.85	819.29	409.65	1248.98	
114.0	-124.0	615.49	220.23	835.72	417.86	1276.18	
115.0	-125.0	627.19	221.48	848.67	424.34	1291.64	
116.0	-126.0	638.58	222.47	861.05	430.53	1305.99	
117.0	-127.0	648.70	223.37	872.07	436.03	1318.80	
118.0	-128.0	657.54	223.00	880.54	440.27	1326.53	
119.0	-129.0	665.11	220.70	885.81	442.91	1327.22	
120.0	-130.0	671.40	252.19	923.59	461.79	1427.96	
121.0	-131.0	677.90	239.53	917.44	458.72	1396.50	
122.0	-132.0	686.09	227.43	913.52	456.76	1368.38	
123.0	-133.0	695.98	215.87	911.85	455.92	1343.59	
124.0	-134.0	707.55	204.86	912.41	456.21	1322.14	

*** ERROR *** PILE TIP TOO NEAR END OF BORING LOG FOR LENGTH = 125.00 FT

STATIC PILE BEARING CAPACITY ANALYSIS - SPT97		Page	6
Project No:	410755	Structure	E
Boring No:	b-17		

D. PILE CAPACITY VS. PENETRATION (CONTINUED)

NOTES

1. MOBILIZED END BEARING IS 1/3 OF THE ORIGINAL RB-121 VALUES.

cylindernorms.out

2. DAVISSON PILE CAPACITY IS AN ESTIMATE BASED ON FAILURE CRITERIA, AND EQUALS ULTIMATE SIDE FRICTION PLUS MOBILIZED END BEARING.
3. ALLOWABLE PILE CAPACITY IS 1/2 THE DAVISSON PILE CAPACITY.
4. ULTIMATE PILE CAPACITY IS ULTIMATE SIDE FRICTION PLUS 3 X THE MOBILIZED END BEARING.

PROBLEM COMPLETED

ANALYSIS NO. 7

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+-----+
| STATIC PILE BEARING CAPACITY ANALYSIS - SPT97                               Page 7 |
+-----+
| Project No: 410755                               Structure E                    |
| Boring No: b-17                                   |
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C. PILE INFORMATION

TEST PILE SECTION

DIAMETER OF PILE
THICKNESS OF PILE

ISECT = 5
{CONCRETE CYLINDER PILE}
WP = 54.00 INCHES
THICK = 1.00 INCHES

D. PILE CAPACITY VS. PENETRATION

TEST PILE LENGTH (FT)	PILE TIP ELEV (FT)	ULTIMATE SIDE FRICTION (TONS)	MOBILIZED END BEARING (TONS)	ESTIMATED DAVISSON CAPACITY (TONS)	ALLOWABLE PILE CAPACITY (TONS)	ULTIMATE PILE CAPACITY (TONS)
50.0	-60.0	125.26	23.69	148.95	74.47	196.32
51.0	-61.0	127.12	25.56	152.68	76.34	203.80
52.0	-62.0	132.70	27.59	160.29	80.15	215.48
53.0	-63.0	142.01	29.78	171.79	85.90	231.36
54.0	-64.0	155.03	32.14	187.17	93.58	251.45
55.0	-65.0	168.04	34.36	202.40	101.20	271.13
56.0	-66.0	181.31	36.06	217.36	108.68	289.48
57.0	-67.0	194.49	37.48	231.97	115.98	306.92
58.0	-68.0	207.86	38.63	246.49	123.25	323.74
59.0	-69.0	221.58	39.51	261.08	130.54	340.09
60.0	-70.0	235.59	40.23	275.82	137.91	356.29
61.0	-71.0	249.60	41.04	290.63	145.32	372.71
62.0	-72.0	263.55	41.89	305.44	152.72	389.23
63.0	-73.0	277.46	42.79	320.26	160.13	405.84
64.0	-74.0	291.35	43.74	335.09	167.55	422.57
65.0	-75.0	305.22	44.73	349.96	174.98	439.42
66.0	-76.0	318.47	45.44	363.92	181.96	454.81
67.0	-77.0	330.59	45.54	376.13	188.07	467.21
68.0	-78.0	341.68	45.02	386.70	193.35	476.74
69.0	-79.0	352.13	43.89	396.02	198.01	483.80
70.0	-80.0	402.03	42.12	444.15	222.08	528.40
71.0	-81.0	410.24	40.19	450.44	225.22	530.83
72.0	-82.0	420.74	38.61	459.36	229.68	536.59

cylindernorms.out

73.0	-83.0	433.53	37.38	470.91	235.46	545.68
74.0	-84.0	448.61	36.50	485.11	242.55	558.11
75.0	-85.0	465.97	35.93	501.90	250.95	573.77
76.0	-86.0	484.34	35.41	519.75	259.87	590.56
77.0	-87.0	502.98	34.71	537.69	268.84	607.10
78.0	-88.0	521.49	487.14	1008.64	504.32	1982.92
79.0	-89.0	540.00	479.95	1019.95	509.98	1979.86
80.0	-90.0	558.51	473.50	1032.01	516.00	1979.02
81.0	-91.0	577.01	472.49	1049.51	524.75	1994.49
82.0	-92.0	595.52	477.14	1072.66	536.33	2026.94
83.0	-93.0	614.03	487.44	1101.47	550.73	2076.34

STATIC PILE BEARING CAPACITY ANALYSIS		- SPT97	Page	8
Project No: 410755		Structure E		
Boring No: b-17				

D. PILE CAPACITY VS. PENETRATION (CONTINUED)

(FT)	(FT)	(TONS)	(TONS)	(TONS)	(TONS)	(TONS)	(TONS)
84.0	-94.0	630.27	498.83	1129.10	564.55	2126.76	
85.0	-95.0	643.68	510.27	1153.95	576.98	2174.49	
86.0	-96.0	656.10	523.23	1179.33	589.66	2225.79	
87.0	-97.0	666.67	537.39	1204.06	602.03	2278.84	
88.0	-98.0	675.52	552.63	1228.15	614.08	2333.40	
89.0	-99.0	682.75	568.80	1251.55	625.77	2389.15	
90.0	-100.0	714.77	608.73	1323.49	661.75	2540.95	
91.0	-101.0	721.34	608.93	1330.27	665.13	2548.12	
92.0	-102.0	727.21	609.35	1336.57	668.28	2555.27	
93.0	-103.0	732.51	609.81	1342.32	671.16	2561.93	
94.0	-104.0	737.32	610.09	1347.41	673.70	2567.59	
95.0	-105.0	741.65	610.15	1351.80	675.90	2572.11	
96.0	-106.0	746.17	610.10	1356.27	678.14	2576.48	
97.0	-107.0	751.71	609.71	1361.42	680.71	2580.84	
98.0	-108.0	758.34	608.85	1367.19	683.59	2584.89	
99.0	-109.0	765.54	600.84	1366.38	683.19	2568.05	
100.0	-110.0	773.58	591.21	1364.79	682.39	2547.20	
101.0	-111.0	781.92	585.20	1367.12	683.56	2537.52	
102.0	-112.0	789.98	583.87	1373.84	686.92	2541.58	
103.0	-113.0	797.75	586.21	1383.97	691.98	2556.39	
104.0	-114.0	805.19	591.36	1396.55	698.28	2579.28	
105.0	-115.0	812.00	592.64	1404.64	702.32	2589.91	
106.0	-116.0	819.53	593.14	1412.67	706.34	2598.96	
107.0	-117.0	828.51	592.81	1421.32	710.66	2606.94	
108.0	-118.0	838.94	591.71	1430.65	715.32	2614.07	
109.0	-119.0	850.39	586.44	1436.83	718.42	2609.71	
110.0	-120.0	862.90	564.31	1427.21	713.60	2555.83	
111.0	-121.0	876.50	396.46	1272.97	636.48	2065.90	
112.0	-122.0	891.09	403.67	1294.76	647.38	2102.09	
113.0	-123.0	906.67	409.79	1316.46	658.23	2136.05	
114.0	-124.0	923.23	414.84	1338.08	669.04	2167.76	
115.0	-125.0	940.78	418.81	1359.60	679.80	2197.23	
116.0	-126.0	957.87	424.77	1382.64	691.32	2232.19	
117.0	-127.0	973.05	432.95	1406.00	703.00	2271.90	
118.0	-128.0	986.31	440.70	1427.01	713.51	2308.42	
119.0	-129.0	997.66	446.55	1444.21	722.11	2337.31	

cylindernorms.out

*** ERROR *** PILE TIP TOO NEAR END OF BORING LOG FOR LENGTH = 120.00 FT

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| STATIC PILE BEARING CAPACITY ANALYSIS - SPT97 Page 9 |
+-----+
| Project No: 410755 Structure E |
| Boring No: b-17 |
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D. PILE CAPACITY VS. PENETRATION (CONTINUED)

NOTES

1. MOBILIZED END BEARING IS 1/3 OF THE ORIGINAL RB-121 VALUES.
2. DAVISSON PILE CAPACITY IS AN ESTIMATE BASED ON FAILURE CRITERIA, AND EQUALS ULTIMATE SIDE FRICTION PLUS MOBILIZED END BEARING.
3. ALLOWABLE PILE CAPACITY IS 1/2 THE DAVISSON PILE CAPACITY.
4. ULTIMATE PILE CAPACITY IS ULTIMATE SIDE FRICTION PLUS 3 X THE MOBILIZED END BEARING.

PROBLEM COMPLETED

ANALYSIS NO. 8

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| STATIC PILE BEARING CAPACITY ANALYSIS - SPT97 Page 10 |
+-----+
| Project No: 410755 Structure E |
| Boring No: b-17 |
+-----+

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C. PILE INFORMATION

TEST PILE SECTION

I SECT = 5
 {CONCRETE CYLINDER PILE}
 WP = 66.00 INCHES
 THICK = 1.00 INCHES

DIAMETER OF PILE
THICKNESS OF PILE

D. PILE CAPACITY VS. PENETRATION

TEST PILE LENGTH (FT)	PILE TIP ELEV (FT)	ULTIMATE SIDE FRICTION (TONS)	MOBILIZED END BEARING (TONS)	ESTIMATED DAVISSON CAPACITY (TONS)	ALLOWABLE PILE CAPACITY (TONS)	ULTIMATE PILE CAPACITY (TONS)
50.0	-60.0	153.10	33.84	186.94	93.47	254.61
51.0	-61.0	155.37	37.84	193.22	96.61	268.91
52.0	-62.0	162.19	41.27	203.47	101.73	286.01
53.0	-63.0	173.56	43.83	217.39	108.70	305.06
54.0	-64.0	189.48	45.52	235.00	117.50	326.04

cylindernorms.out

55.0	-65.0	209.51	46.34	255.85	127.92	348.54
56.0	-66.0	228.43	46.61	275.04	137.52	368.26
57.0	-67.0	247.14	46.90	294.03	147.02	387.83
58.0	-68.0	265.68	47.33	313.01	156.51	407.67
59.0	-69.0	284.10	47.90	332.01	166.00	427.82
60.0	-70.0	302.39	48.62	351.01	175.50	448.25
61.0	-71.0	320.45	49.43	369.88	184.94	468.74
62.0	-72.0	338.24	50.29	388.52	194.26	489.09
63.0	-73.0	355.75	51.19	406.93	203.47	509.31
64.0	-74.0	372.99	52.14	425.13	212.57	529.41
65.0	-75.0	389.99	53.14	443.13	221.56	549.40
66.0	-76.0	405.81	53.85	459.66	229.83	567.36
67.0	-77.0	419.79	53.90	473.69	236.84	581.48
68.0	-78.0	432.18	53.27	485.45	242.73	591.99
69.0	-79.0	443.15	51.96	495.11	247.56	599.03
70.0	-80.0	491.37	49.97	541.34	270.67	641.27
71.0	-81.0	501.41	47.81	549.22	274.61	644.84
72.0	-82.0	514.24	45.92	560.16	280.08	652.01
73.0	-83.0	529.87	44.27	574.14	287.07	662.69
74.0	-84.0	548.30	42.86	591.16	295.58	676.89
75.0	-85.0	569.52	41.70	611.21	305.61	694.61
76.0	-86.0	591.48	40.59	632.07	316.03	713.25
77.0	-87.0	613.74	40.03	653.77	326.88	733.83
78.0	-88.0	635.69	40.30	675.99	337.99	756.58
79.0	-89.0	656.80	41.39	698.19	349.09	780.96
80.0	-90.0	676.64	43.30	719.94	359.97	806.55
81.0	-91.0	694.98	46.01	740.99	370.50	833.01
82.0	-92.0	712.57	48.83	761.40	380.70	859.05
83.0	-93.0	729.91	51.46	781.38	390.69	884.30

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STATIC PILE BEARING CAPACITY ANALYSIS - SPT97			
+-----+-----+-----+-----+-----+-----+-----+-----+			
Project No: 410755		Structure E	
Boring No: b-17			
+-----+-----+-----+-----+-----+-----+-----+-----+			

D. PILE CAPACITY VS. PENETRATION (CONTINUED)

(FT)	(FT)	(TONS)	(TONS)	(TONS)	(TONS)	(TONS)	(TONS)
84.0	-94.0	747.15	53.92	801.07	400.54	908.92	
85.0	-95.0	764.41	56.21	820.62	410.31	933.03	
86.0	-96.0	780.66	58.33	838.99	419.49	955.64	
87.0	-97.0	795.32	59.97	855.29	427.65	975.24	
88.0	-98.0	808.69	60.99	869.68	434.84	991.66	
89.0	-99.0	820.79	61.38	882.17	441.08	1004.92	
90.0	-100.0	873.60	61.15	934.75	467.38	1057.04	
91.0	-101.0	881.78	854.72	1736.50	868.25	3445.94	
92.0	-102.0	889.23	845.81	1735.04	867.52	3426.67	
93.0	-103.0	895.96	842.92	1738.88	869.44	3424.73	
94.0	-104.0	901.97	846.05	1748.02	874.01	3440.12	
95.0	-105.0	907.25	852.42	1759.67	879.84	3464.51	
96.0	-106.0	912.72	857.04	1769.76	884.88	3483.85	
97.0	-107.0	919.28	860.73	1780.01	890.01	3501.48	
98.0	-108.0	926.93	864.79	1791.72	895.86	3521.30	
99.0	-109.0	935.56	867.87	1803.43	901.71	3539.17	
100.0	-110.0	945.48	875.10	1820.59	910.29	3570.79	
101.0	-111.0	955.56	875.42	1830.98	915.49	3581.81	
102.0	-112.0	965.12	876.23	1841.35	920.68	3593.82	

cylindernorms.out						
103.0	-113.0	974.37	877.02	1851.39	925.69	3605.43
104.0	-114.0	983.47	877.25	1860.72	930.36	3615.23
105.0	-115.0	992.58	876.38	1868.96	934.48	3621.72
106.0	-116.0	1002.38	869.48	1871.86	935.93	3610.82
107.0	-117.0	1013.23	856.82	1870.06	935.03	3583.70
108.0	-118.0	1025.56	847.58	1873.14	936.57	3568.31
109.0	-119.0	1039.37	841.75	1881.12	940.56	3564.62
110.0	-120.0	1054.66	750.19	1804.84	902.42	3305.22
111.0	-121.0	1071.28	545.91	1617.19	808.59	2709.00
112.0	-122.0	1089.11	557.02	1646.13	823.06	2760.16
113.0	-123.0	1108.15	566.81	1674.96	837.48	2808.57
114.0	-124.0	1128.40	575.28	1703.68	851.84	2854.24
115.0	-125.0	1149.85	582.44	1732.29	866.14	2897.16

*** ERROR *** PILE TIP TOO NEAR END OF BORING LOG FOR LENGTH = 116.00 FT

NOTES

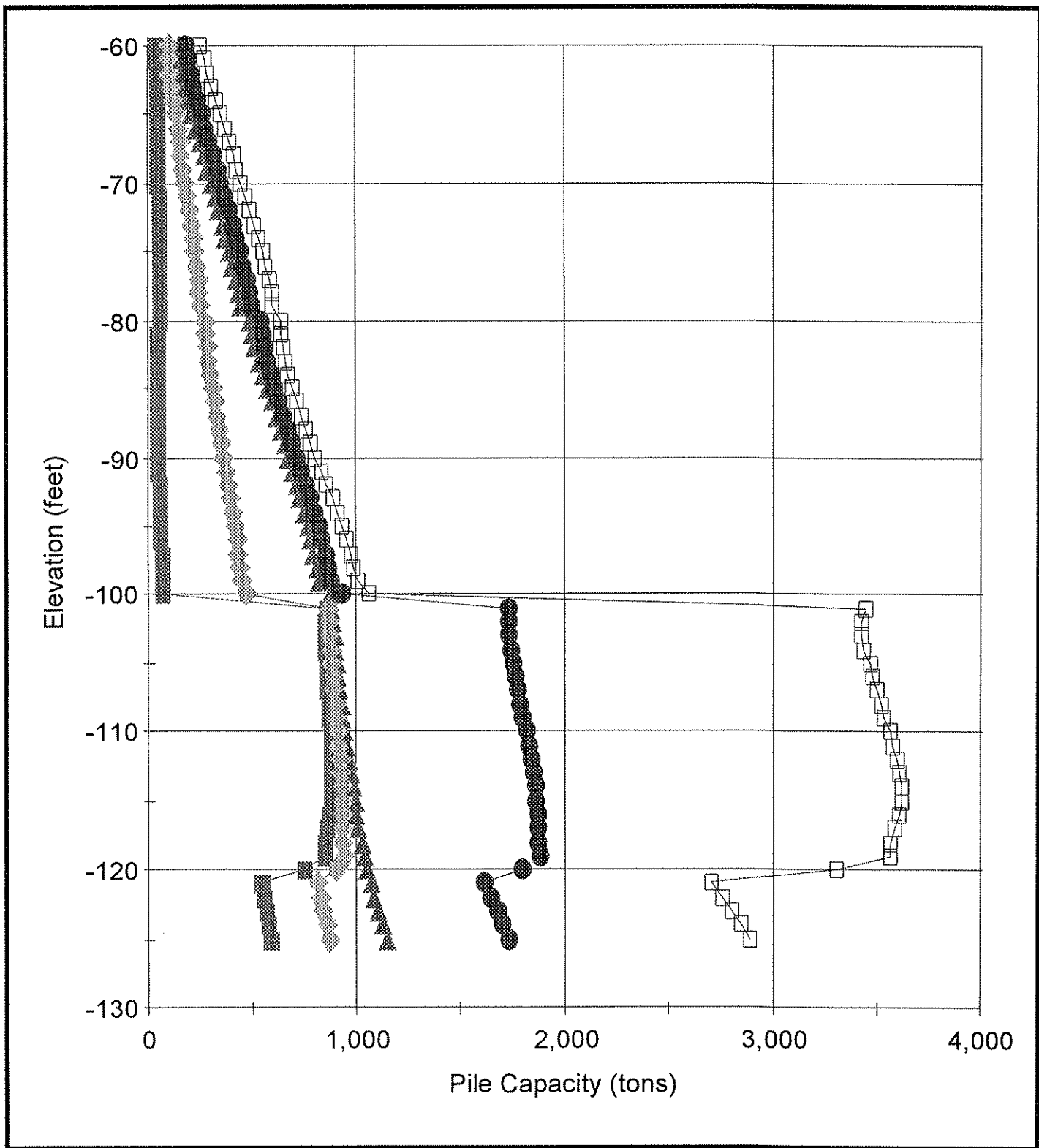
1. MOBILIZED END BEARING IS 1/3 OF THE ORIGINAL RB-121 VALUES.
2. DAVISSON PILE CAPACITY IS AN ESTIMATE BASED ON FAILURE CRITERIA, AND EQUALS ULTIMATE SIDE FRICTION PLUS MOBILIZED END BEARING.
3. ALLOWABLE PILE CAPACITY IS 1/2 THE DAVISSON PILE CAPACITY.
4. ULTIMATE PILE CAPACITY IS ULTIMATE SIDE FRICTION PLUS 3 X THE MOBILIZED END BEARING.

PROBLEM COMPLETED

ANALYSIS NO. 9

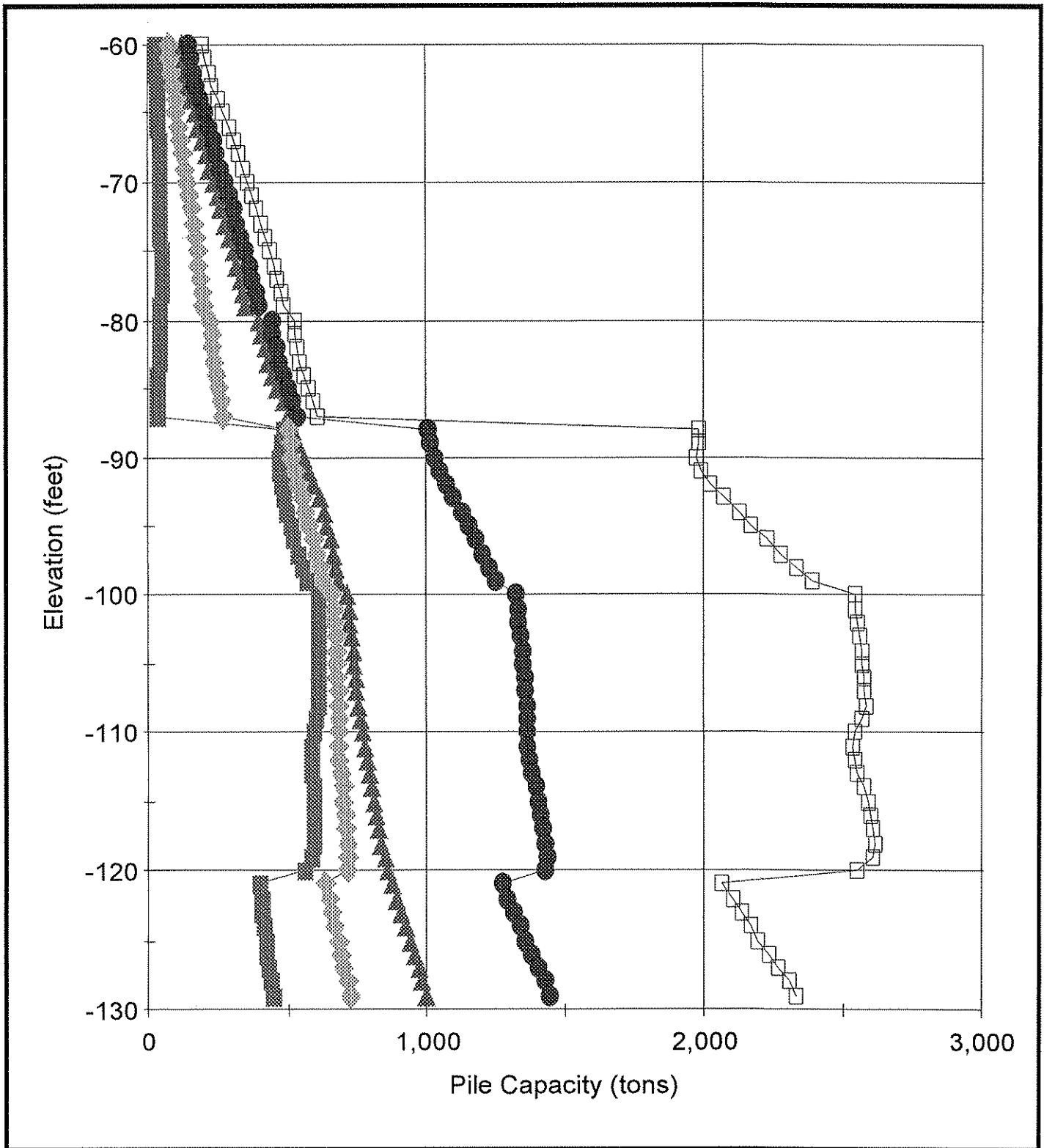
0

Pile Capacities for Pile Width of: 66.00 in



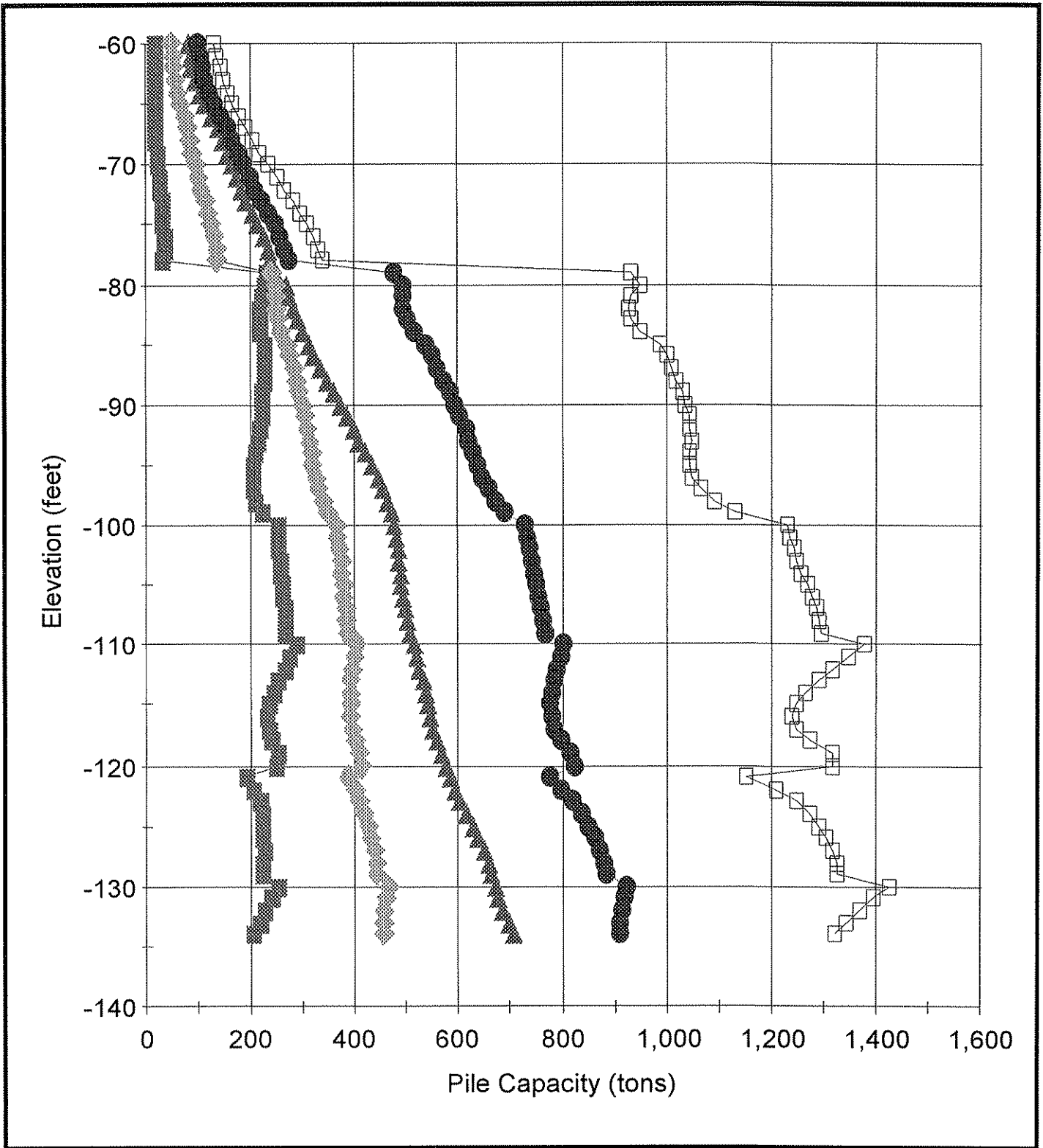
- ▲— Ultimate Side Friction
- Mobilized End Bearing
- Estimated Davison Capacity
- ◆— Allowable Pile Capacity
- Ultimate Pile Capacity

Pile Capacities for Pile Width of: 54.00 in



- ▲— Ultimate Side Friction
- Mobilized End Bearing
- Estimated Davisson Capacity
- ◆— Allowable Pile Capacity
- Ultimate Pile Capacity

Pile Capacities for Pile Width of: 36.00 in



- ▲— Ultimate Side Friction
- Mobilized End Bearing
- Estimated Davisson Capacity
- ◆— Allowable Pile Capacity
- Ultimate Pile Capacity