APPENDIX A PROCEDURES & COMMENTARY FOR SHAFT 1-2-3

Nomenclature

%R	=	percent recovery of rock coring (%)
	=	adhesion factor applied to S_u (DIM)
	=	coefficient relating the vertical stress and the unit skin friction of a drilled shaft (DIM)
$_m$	=	SPT N corrected coefficient relating the vertical stress and the unit skin friction of a drilled shaft (DIM)
D	=	diameter of drilled shaft (FT)
D_b	=	depth of embedment of drilled shaft into a bearing stratum (FT)
D_p	=	diameter of the tip of a drilled shaft (FT)
$_f$	=	angle of internal friction of soil (DEG)
f_s, q_s	=	nominal unit shear resistance (TSF)
	=	unit weight (pcf)
k	=	empirical bearing capacity coefficient (DIM)
K	=	load transfer factor
N	=	average (uncorrected) Standard Penetration Test blow count, SPT N (Blows/FT)
N_c	=	bearing capacity factor (DIM)
N_{corr}	=	corrected SPT blow count
q_s	=	average splitting tensile strength of the rock core (TSF)
q_u	=	average unconfined compressive strength of the rock core (TSF)
S_u	=	undrained shear strength (TSF)
$'_v$	=	vertical effective stress (TSF)

Procedures	Commentary
SECURITY NOTE:	Microsoft XP users must set *Security Level* in *Macro Security* to *Medium*. This is done in *Tools - Options - Macro Security - Security Level.*
General Worksheet	
Enter *Job Name*	*Job Name* must be entered before analysis is run.
Enter *Job Location*	*Job Location* is optional.
Enter *Engineer*	*Engineer* is optional.
Enter Boring Log Information	The *Boring Log* worksheet can be displayed by clicking the *Boring Log* button or clicking on the *Boring Log* sheet tab at the bottom of Excel (see **Procedures & Commentary for *Boring Log Worksheet*** below).
Select Working *Units*	English or Metric units can be selected for entering raw data. The worksheet will convert from English units to Metric units and vice versa. The analysis will automatically use English units for the calculations.
Enter *Shaft Diameter(s)*	Up to three shaft diameters can be analyzed.
Enter *Displacement Criteria*	*Displacement Criteria* defines the mobilized end bearing in either cohesionless or cohesive soils as a function of a tip reduction multiplier based on Reese and O'Neill 1988 (see Figure A-1 & Figure A-2). End bearing in silt is dependent on the analysis method selected (sand or clay). End bearng in limestone is dependent on the unconfined compressive strength and percent recovery.
Enter *End Bearing Influence Zone*	The *End Bearing Influence Zone* defines the depth below the tip of the shaft that contributes to the end bearing capacity by finding the minimum $\mathbf{q_p}$ from the soils down to the depth defined by this parameter.

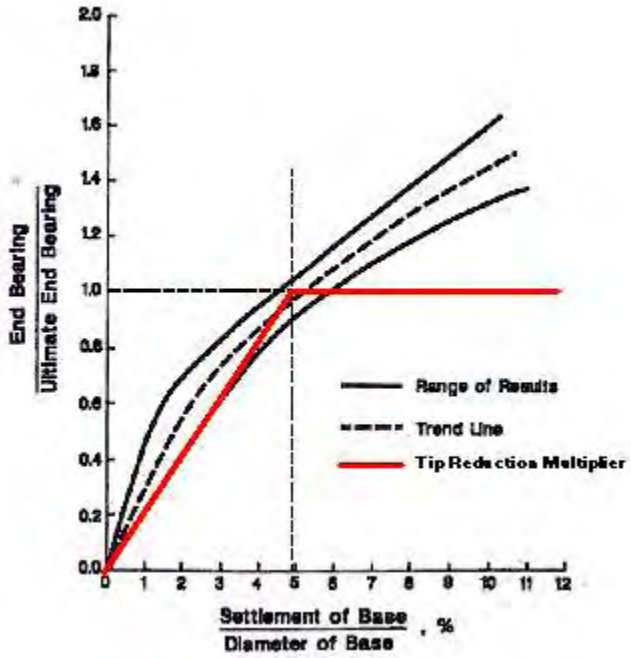

Figure A-1 Normalized load transfer in end bearing versus settlement in cohesionless soils for drilled shafts (from Reese and O'Neill 1988).

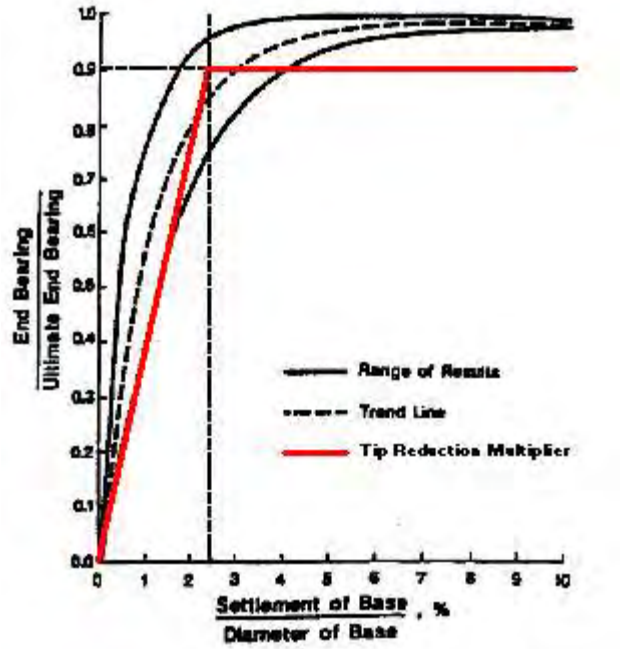

Figure A-2 Normalized load transfer in end bearing versus settlement in cohesive soils for drilled shafts (from Reese and O'Neill 1988).

Enter *Cut-off / Scour Elevation*	Default *Cut-off / Scour Elevation* is *Ground Elevation*. *Cut-off / Scour Elevation* below *Ground Elevation* will negate that soil in the effective stress calculations.
Enter *Grout Pressure Limit*	The *Grout Pressure Limit* is based on the grouting mechanism capacity (default = 750 psi).
Select Analysis Methods for Side Shear and End Bearing	(See the following Commentary)

Soil Parameters

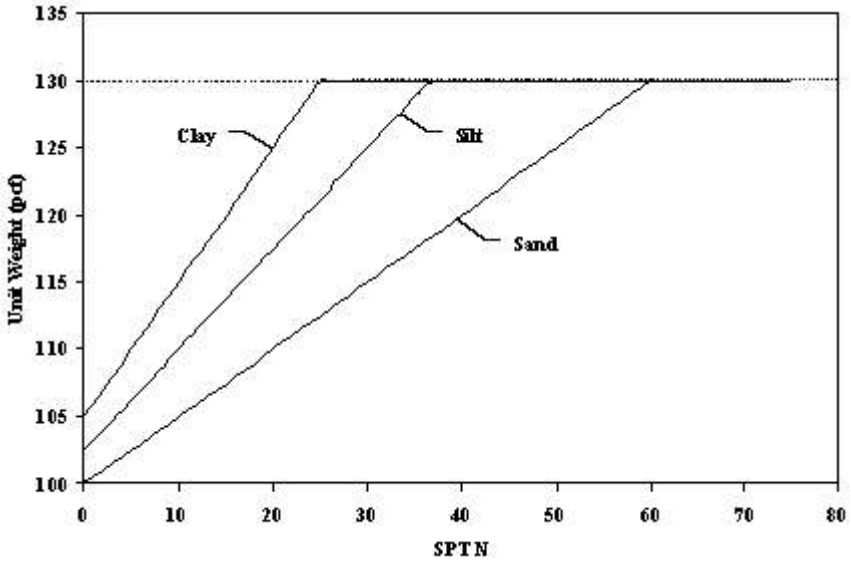

Figure A-3 Soil unit weight - standard penetration test (SPT N) relationships.

Clay	S_u = 125 * N psf (Kulhawy and Mayne, 1990), where N is the standard penetration test number.
Silt	S_u = 125 * N psf (Kulhawy and Mayne, 1990), where N is the standard penetration test number.
Sand	(See Table A-1 for values)

Table A-1 Values for based on SPT N

SPT - N	ϕ°
0 - 2	26
3 - 4	28
5 - 10	29
11 - 20	30
21 - 30	32
31 - 40	33
> 40	34

Limestone

q_u, q_s, and percent recovery are defined by the user in the *Boring Log* worksheet.

Side Shear Analysis Methods

Clay

Table A-2 AASHTO Table 10.8.3.3.1-1

S_u (TSF)	α
<2.0	0.55
2.0-3.0	0.49
3.0-4.0	0.42
4.0-5.0	0.38
5.0-6.0	0.35
6.0-7.0	0.33
7.0-8.0	0.32
8.0-9.0	0.310
>9.0	Treat as Rock

Alpha Method

(See AASHTO section 10.8.3.3.1)
$f_s =$ * S_u, where S_u is the mean undrained shear strength (TSF) and is the adhesion factor (DIM) (see AASHTO Table 10.8.3.3.1-1). The calculations account for the top five feet which is noncontributing.

Silt

O'Neill and Hassan (1994)

Also known as the Modified Beta Method.
If SPT N < 15 then
$_m$ = SPT N / 15 * (Reese and O'Neill, 1988).

Alpha Method

(See AASHTO section 10.8.3.3.1)
f_s = * S_u, where S_u is the mean undrained shear strength (TSF) and is the adhesion factor (DIM) (see AASHTO Table 10.8.3.3.1-1). The calculations account for the top five feet which is noncontributing.

Most Conservative

Most Conservative method will run through the calculations for each analysis method and use the most conservative value.

Sand

Table A-3 AASHTO Table 10.8.3.4.2-1

REFERENCE	DESCRIPTION
Touma and Reese (1974)	$q_s = K\sigma_v' \tan\varphi_f < 2.5$ TSF for which: K = 0.7 for $D_b \leq 25.0$ FT K = 0.6 for 25.0 FT < $D_b \leq 40.0$ FT K = 0.5 for $D_b > 40.0$ FT
Meyerhof (1976)	$q_s = \frac{N}{100}$
Quiros and Reese (1977)	$q_s = 0.028N < 2.0$ TSF
Reese and Wright (1977)	for N ≤ 53: $q_s = \frac{N}{34.0}$ for 53 < N ≤ 100: $q_s = \frac{N - 53}{450} + 1.6$
Reese and O'Neill (1988)	$q_s = \beta\sigma_v' \leq 2.0$ TSF for $0.25 \leq \beta \leq 1.2$ for which: $\beta = 1.5 - 0.135\sqrt{z}$

O'Neill and Hassan (1994)	Also known as the Modified Beta Method. If SPT N < 15 then $_m$ = SPT N / 15 * (Reese and O'Neill, 1988).
Reese and O'Neill (1988)	(See AASHTO Table 10.8.3.4.2-1)
Reese and Wright (1977)	(See AASHTO Table 10.8.3.4.2-1)
Quiros and Reese (1977)	(See AASHTO Table 10.8.3.4.2-1)
Meyerhof (1976)	(See AASHTO Table 10.8.3.4.2-1)
Touma and Reese (1975)	(See AASHTO Table 10.8.3.4.2-1)
Most Conservative	*Most Conservative* method will run through the calculations for each analysis method and use the most conservative value.

Limestone

McVay and Townsend (1990)	fs = 1/2 * $qu^{1/2}$ * $qs^{1/2}$ * %R where: qu is the unconfined compressive strength of the rock (TSF), qs is the splitting tensile strength of the rock (TSF), and %R is the percent recovery.
AASHTO (Limestone)	(See AASHTO section 10.8.3.5 (C10.8.3.5-4 & C10.8.3.5-5)) For q_u <= 20 TSF, $f_s = 0.15 * q_u$ and for q_u > 20 TSF, $f_s = 0.67 * q_{u0.5}$, where q_u is the unconfined compressive strength of the rock (TSF).

End Bearing Analysis Methods

Clay

AASHTO (Clay)	(See AASHTO section 10.8.3.3.2) $q_p = N_c * S_u$ <= 40.0 TSF, where $N_c = 6 [1 + 0.2 (Z / D)]$ <= 9, D is the diameter of drilled shaft (FT), Z is the penetration of shaft (FT), S_u is the undrained shear strength (TSF).

Silt

Reese and O'Neill (1988) (See AASHTO Table 10.8.3.4.3-1)**

AASHTO (Clay) (See AASHTO section 10.8.3.3.2)
$q_p = N_c * S_u <= 40.0$ TSF,
where $N_c = 6 [1 + 0.2 (Z / D)] <= 9$, D is the diameter of drilled shaft (FT), Z is the penetration of shaft (FT), S_u is the undrained shear strength (TSF).

Sand

Table A-4 AASHTO Table 10.8.3.4.3-1

REFERENCE	DESCRIPTION
Touma and Reese (1974)	Loose - q_p (TSF) = 0.0 Medium Dense - q_p (TSF) = $\frac{16}{k}$ Very Dense - q_p (TSF) = $\frac{40}{k}$ • k = 1 for D_p < 1.67 FT • k = 0.6 D_p for $D_p \geq$ 1.67 FT • Applicable only if D_p > 10D
Meyerhof (1976)	$q_p(TSF) = \frac{2N_{corr}D_p}{15D_p} < \frac{4}{3}N_{corr}$ for sand $< N_{corr}$ for nonplastic silts
Reese and Wright (1977)	q_p (TSF) = $\frac{2}{3}N$ for N ≤ 60 q_p (TSF) = 40.0 for N > 60
Reese and O'Neill (1988)	q_p (TSF) = 0.6N for N ≤ 75 q_p (TSF) = 45.0 for N > 75

Reese and O'Neill (1988) (See AASHTO Table 10.8.3.4.3-1)**

Reese and Wright (1977) (See AASHTO Table 10.8.3.4.3-1)**

Meyerhof (1976) (See AASHTO Table 10.8.3.4.3-1)**

Touma and Reese (1975) (See AASHTO Table 10.8.3.4.3-1)**

**(See AASHTO section 10.8.3.4.3) For diameters greater than 4.17 FT, qp is reduced as follows: $q_{pr} = 4.17 / D_p * q_p$, where D_p is the tip diameter of the drilled shaft (FT).

Limestone

FHWA (1998)

End Bearing, $q_p = 2.5 * q_u * \%Recovery <= 40.0$ TSF, where q_u is the unconfined compressive strength of the rock (TSF).

Click *Calculate Shaft Capacities*

Calculate Shaft Capacities will calculate shaft capacities based on the boring log. The grouted tip capacity will then be analyzed based on the applied grout pressure (Mullins, et al., 2001).

Click *Reset Workbook* (optional)

Reset Workbook will clear all sheets including the *Boring Log* worksheet.

Boring Log Worksheet

	A	B	C	D	E	F	G
1							
2			Boring Number:	WSA-8			
3			Ground Surface Elevation:	128.00	ft		
4			Water Table Elevation:	40.00	ft		
5							
6	Unprotect Sheet			Update Boring Log		Soil Type Details	
7							
8	Units / English					Access Rock Coring Information	
9							
10	Elevation	Depth	SPT-N	Soil Type	Rock Coring Information		
11					qu	qs	Recovery
12	(ft)	(ft)			(psi)	(psi)	%
13		2.00	6	2			
14		5.00	12	2			
15		9.00	21	2			
16		14.00	27	2			
17		19.00	16	2			
18		24.00	32	2			
19		29.00	29	2			
20		34.00	10	2			
21		39.00	21	2			
22		44.00	8	2			
23		49.00	61	3			
24		59.00	72	3			
25		69.00	32	3			
26		79.00	67	3			
27		89.00	80	1			
28		99.00	100	1			
29		109.00	78	2			
30		119.00	100	2			

General | Boring Log | Commentary

Figure A-4 Example boring log entry.

Select Working Units	English or Metric units can be selected for entered raw data. The worksheet will convert from English units to Metric units and vice versa. The analysis will automatically use English units for the calculations.
Enter *Boring Name*	*Boring Name* is used in the graphs for identification.
Enter *Ground Surface Elevation*	*Ground Surface Elevation* is the starting elevation of the soil boring.
Enter *Water Table Elevation*	*Water Table Elevation* is the elevation of the water table for that soil boring.
Click *Unprotect Worksheet* (Optional)	*Unprotect Worksheet* button will unlock the entire worksheet. Protecting the worksheet will aid in data entry by allowing the user to *Tab* to the next entry.
Click *Access Rock Coring Information* (Optional)	The *Access Rock Coring Information* button will allow the user to enter data for rock coring information (if applicable).
Enter Soil Boring Information	Soil Boring Information includes Depth, SPT N, Soil Type (see ***Soil Types* Commentary**), and Rock Coring Information (Compressive Strength, Splitting Tensile Strength, and Percent Recovery) (if applicable).
Soil Types	Soil Type 1: Plastic Clays Soil Type 2: Clay, Silt, Sand Mix, Silts and Marls Soil Type 3: Clean Sands Soil Type 4: Soft Limestone, Very Shelly Sands Soil Type 5: Void (No Capacity) Click *Soil Type Details* button will show a detailed soil type form (Figure A-5).

Figure A-5 Detailed soil type form.

Click *Update Boring Log*

Updating the boring log will calculate Elevations and Soil Parameters.

Capacity Worksheet(s)

Ungrouted and grouted capacities will be placed in a worksheet designated for each diameter (*Diam 1*, *Diam 2*, and *Diam 3*). The following will be included in each worksheet: Job Name, Shaft Diameter, Boring Number, Elevation, Ultimate Side Shear, Ultimate End Bearing, Ultimate Shaft Capacity (Ungrouted), Mobilized Shaft Capacity (Ungrouted and Grouted), and Grout Pressure.

Capacity Plot(s)

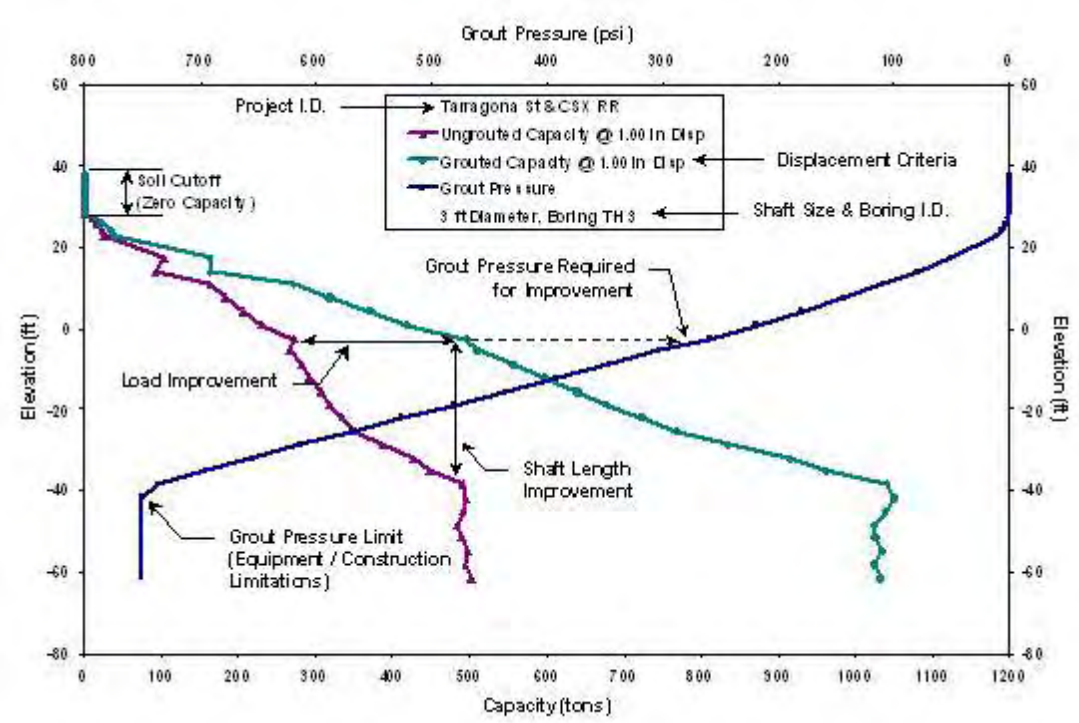

Figure A-6 Detailed shaft capacity & grout pressure plot.

The Mobilized Shaft Capacity (Ungrouted and Grouted) and Grout Pressure will be graphed versus Elevation (*Diam1 Plot*, *Diam2 Plot*, and *Diam3 Plot*). An example plot (Figure A-6) shows load improvement, length improvement, required grout pressure for improvement, and graph details.

References

AASHTO, 1998. *LRFD Bridge Design Specifications*. U.S. Units, 2nd Edition, American Association of State Highway and Transportation Officials, Washington, D.C.

Carter, J.P. and Kulhawy, F.H., 1987. "Analysis and Design of Foundations Socketed into Rock." Research Report 1493-4, Geotechnical Engineering Group, Cornell University, Ithaca, New York.

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O'Neill, M.W. and Hassan, K.M., 1994. "Drilled Shafts: Effects of Construction on Performance and Design Criteria." Proceedings of the International Conference on Design and Construction of Deep Foundations, December 1994, Vol. 1, pp. 137-187.

Reese, L.C. and O'Neill, M.W., 1988. "Drilled Shafts: Construction and Design." FHWA, Publication No. HI-88-042.

Touma, F.T. and Reese, L.C., 1974. "Behavior of Bored Piles in Sand." Journal of the Geotechnical Engineering Division, American Society of Civil Engineers, Vol. 100, No. GT7, pp. 749-761.

APPENDIX B SOIL BORING LOGS

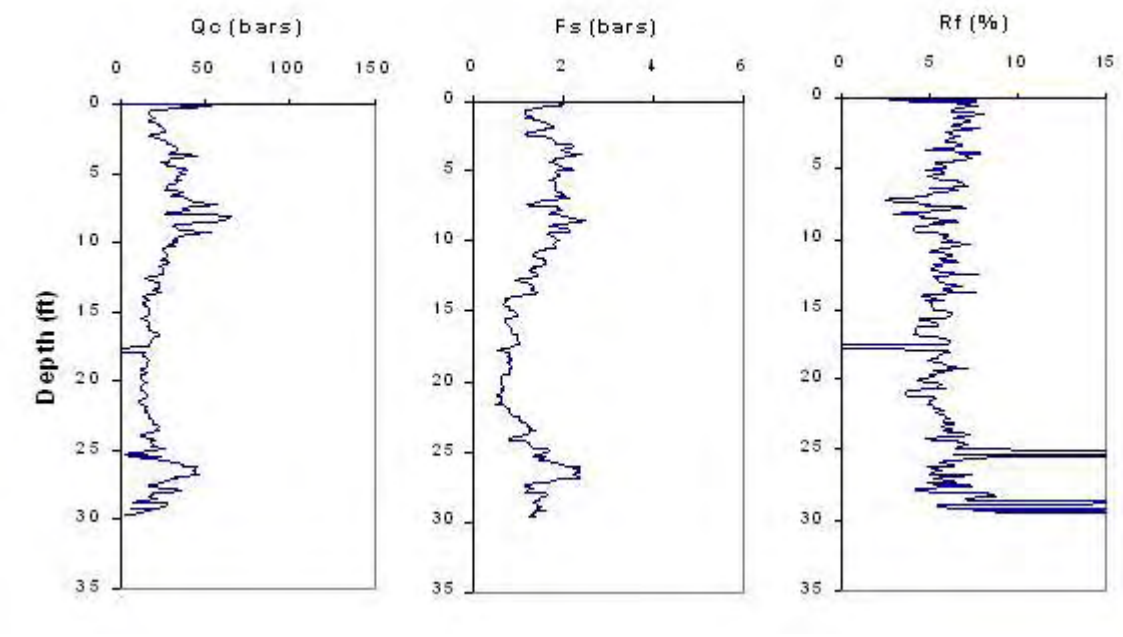


Figure B-1 NGES Auburn CPT TS-1

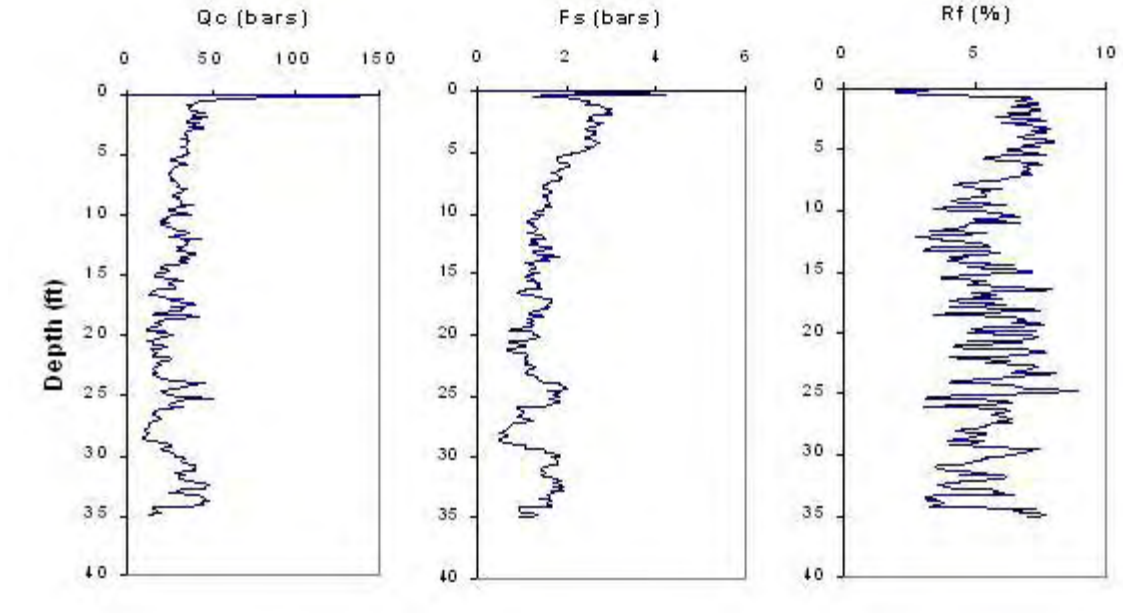


Figure B-2 NGES Auburn CPT TS-2

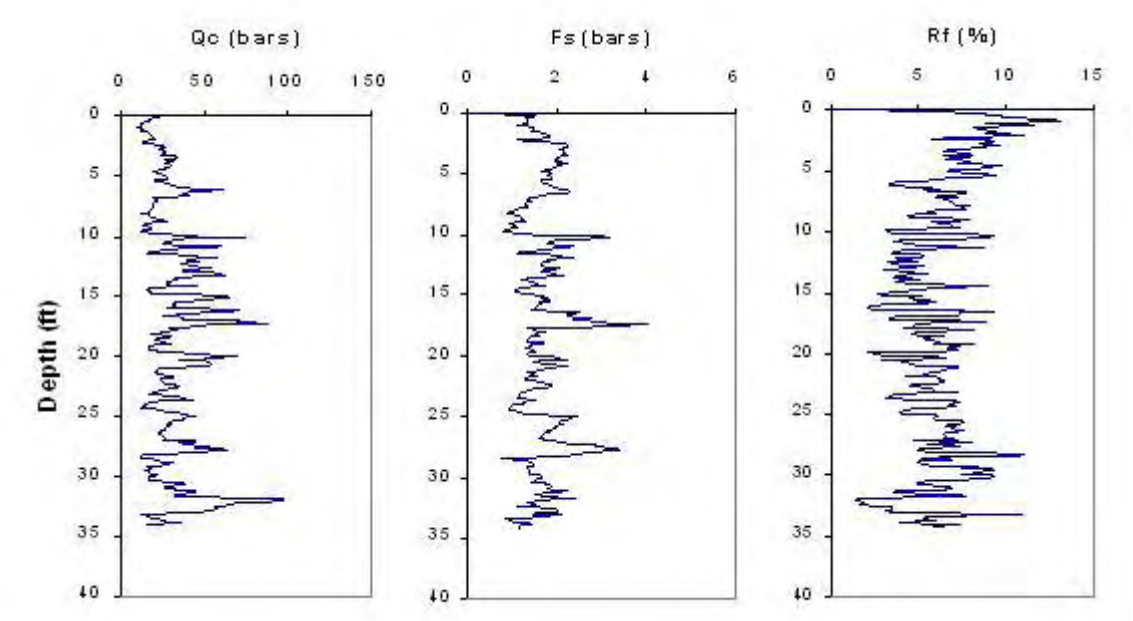


Figure B-3 NGES Auburn CPT TS-3

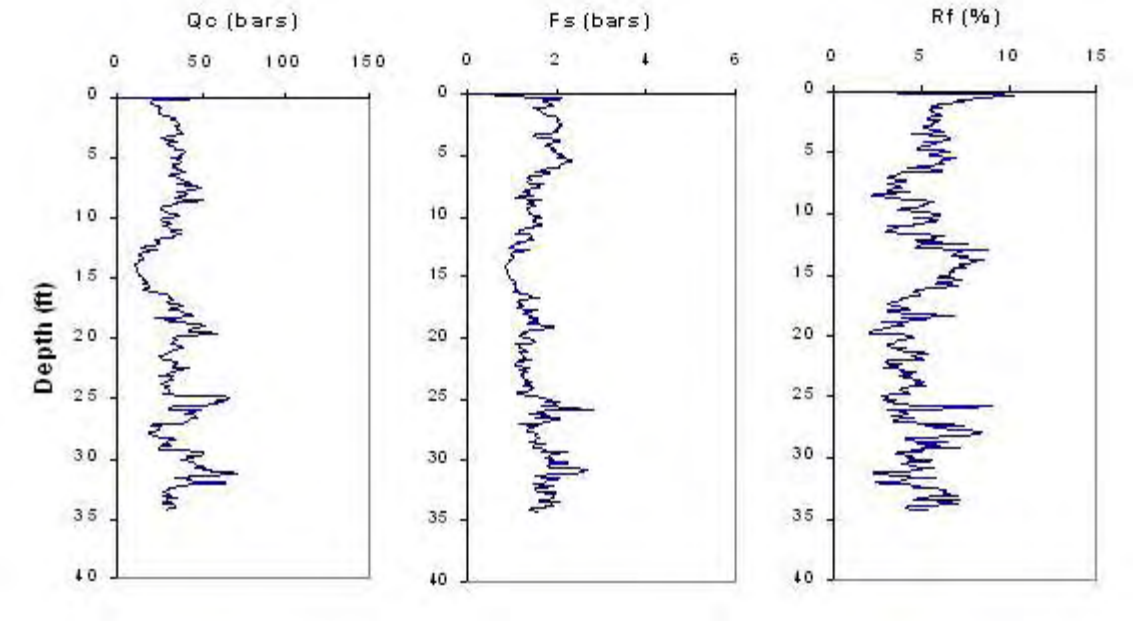


Figure B-4 NGES Auburn CPT TS-4

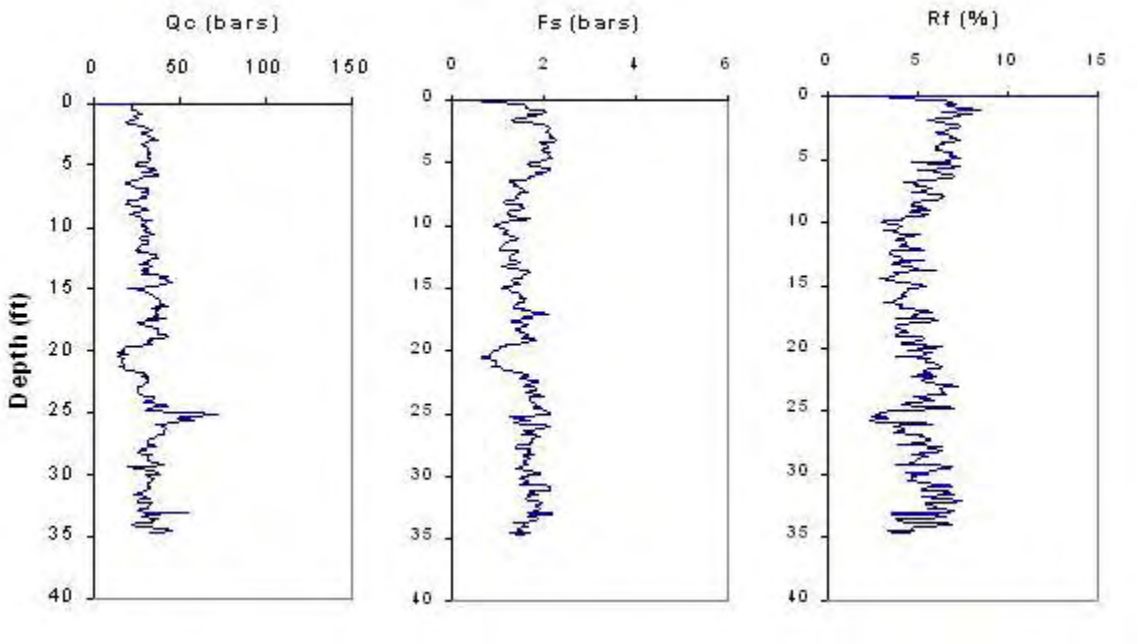


Figure B-5 NGES Auburn CPT TS-5

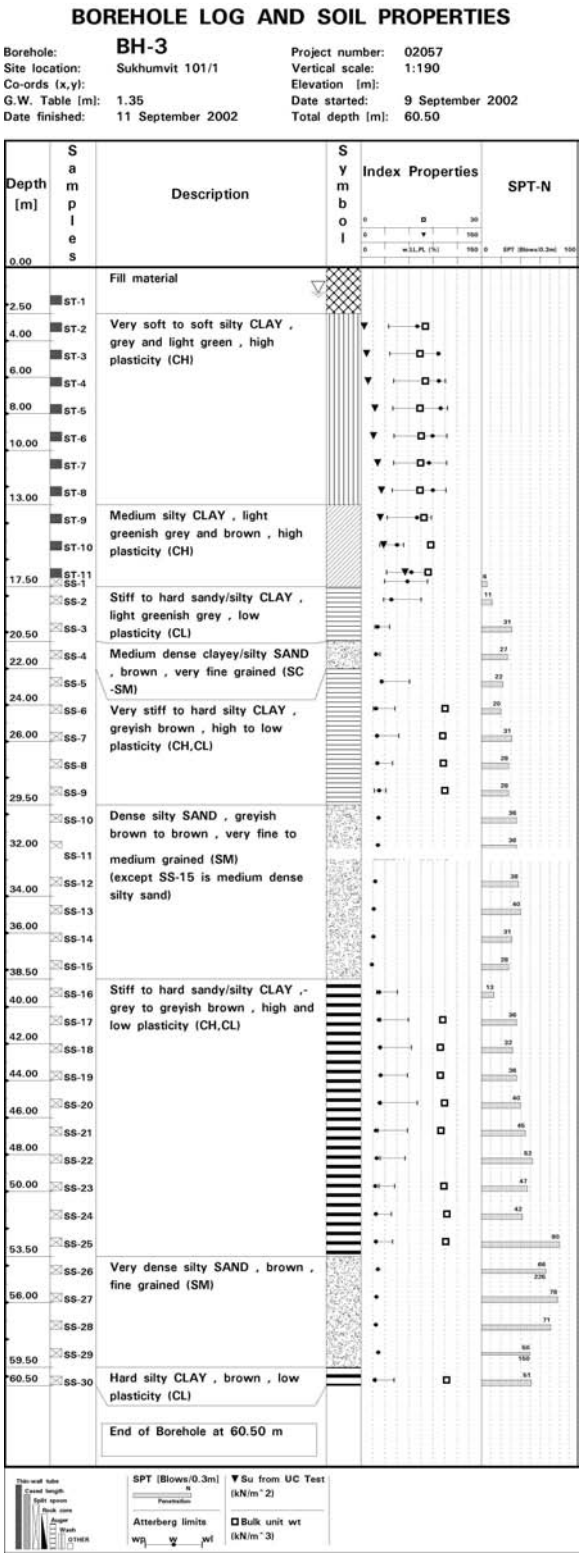


Figure B-6 Bangkok: BH 3

Boring Number: B-1
Ground Surface Elevation: 0.00 ft
Water Table Elevation: -3.00 ft

t Sheet | Update Boring Log
English

Depth (ft)	SPT-N	Soil Type
1.00	9	3
2.50	19	3
4.00	13	3
6.50	3	3
9.00	2	3
14.00	5	3
19.00	9	3
24.00	5	3
29.00	5	3
34.00	5	3
39.00	17	3
44.00	19	3
49.00	14	3
54.00	23	3
59.00	23	3
64.00	30	3
69.00	51	3
74.00	37	3
79.00	51	3
84.00	63	3
89.00	59	3
94.00	62	3
99.00	51	3

Figure B-7 Beau Rivage Condos: B-1

Boring Number: SB-1
Ground Surface Elevation: 14.76 ft
Water Table Elevation: -2.23 ft

t Sheet | Update Boring Log
English

Depth (ft)	SPT-N	Soil Type
0.98	7	3
3.28	14	3
5.74	19	3
9.19	0	2
13.94	7	2
19.03	3	3
24.11	9	3
29.20	8	3
34.28	31	3
39.37	66	3
44.46	16	1
49.54	26	1
54.63	31	1
59.71	38	1
64.80	31	1
69.88	31	1
74.97	27	1
80.05	43	1
85.14	21	1
90.22	34	1

(a)

Boring Number: B-20
Ground Surface Elevation: 25.59 ft
Water Table Elevation: 1.57 ft

t Sheet | Update Boring Log
nglish

Depth (ft)	SPT-N	Soil Type
0.98	10	3
3.28	12	3
5.74	14	3
9.19	9	3
13.94	22	3
19.03	16	2
24.11	14	3
29.20	8	3
34.28	34	3
39.37	50	3
44.46	50	2
49.54	50	2
54.63	20	1
59.71	23	1
64.80	24	1
69.88	23	1
74.97	21	1
80.05	26	1
85.14	32	1
90.22	34	1

(b)

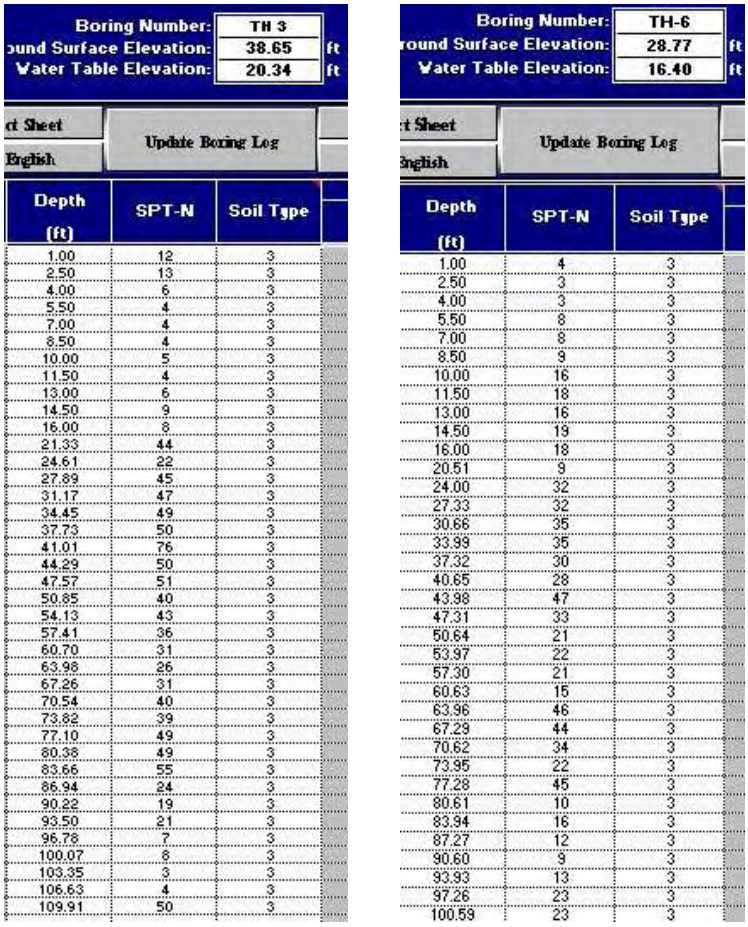
Boring Number: B-22
Ground Surface Elevation: 13.48 ft
Water Table Elevation: 5.02 ft

t Sheet | Update Boring Log
nglish

Depth (ft)	SPT-N	Soil Type
0.98	23	3
3.28	12	3
5.74	11	3
9.19	7	3
13.94	5	2
19.03	4	3
24.11	15	3
29.20	9	3
34.28	15	3
39.37	22	3
44.46	19	3
49.54	37	3
54.63	23	3
59.71	26	1
64.80	21	1
69.88	22	1
74.97	21	1
80.05	22	1
85.14	32	1
90.22	36	1

(c)

Figure B-8 Bolling Airforce Base: (a) SB-1, (b) B-20, and (c) B-22



Boring Number: TH 3
ound Surface Elevation: 38.65 ft
Water Table Elevation: 20.34 ft

ct Sheet | Update Boring Log
English

Depth (ft)	SPT-N	Soil Type
1.00	12	3
2.50	13	3
4.00	6	3
5.50	4	3
7.00	4	3
8.50	4	3
10.00	5	3
11.50	4	3
13.00	6	3
14.50	9	3
16.00	8	3
21.33	44	3
24.61	22	3
27.89	45	3
31.17	47	3
34.45	49	3
37.73	50	3
41.01	76	3
44.29	50	3
47.57	51	3
50.85	40	3
54.13	43	3
57.41	36	3
60.70	31	3
63.98	26	3
67.26	31	3
70.54	40	3
73.82	39	3
77.10	49	3
80.38	49	3
83.66	55	3
86.94	24	3
90.22	19	3
93.50	21	3
96.78	7	3
100.07	8	3
103.35	3	3
106.63	4	3
109.91	50	3

(a)

Boring Number: TH-6
round Surface Elevation: 28.77 ft
Water Table Elevation: 16.40 ft

t Sheet | Update Boring Log
nglish

Depth (ft)	SPT-N	Soil Type
1.00	4	3
2.50	3	3
4.00	3	3
5.50	8	3
7.00	8	3
8.50	9	3
10.00	16	3
11.50	18	3
13.00	16	3
14.50	19	3
16.00	18	3
20.51	9	3
24.00	32	3
27.33	32	3
30.66	35	3
33.99	35	3
37.32	30	3
40.65	28	3
43.98	47	3
47.31	33	3
50.64	21	3
53.97	22	3
57.30	21	3
60.63	15	3
63.96	46	3
67.29	44	3
70.62	34	3
73.95	22	3
77.28	45	3
80.61	10	3
83.94	16	3
87.27	12	3
90.60	9	3
93.93	13	3
97.26	23	3
100.59	23	3

(b)

Figure B-9 Cervantes Street: (a) TH-3 and (b) TH-6

B-1			B-2			B-3			B-4		
GWE:	0	ft	GWE:	93	ft	GWE:	93	ft	GWE:	93	ft
GSE:	117.1	ft	GSE:	113.5	ft	GSE:	116	ft	GSE:	137.7	ft
Depth (ft)	SPT N	ST	Depth (ft)	SPT N	ST	Depth (ft)	SPT N	ST	Depth (ft)	SPT N	ST
1	6	3	1	21	3	1	7	3	1	19	3
3	13	3	3	24	3	2.5	8	3	3	52	3
5	14	3	5	40	3	4	15	3	5	50	3
7	24	3	7	38	3	5.5	25	3	7	23	3
9	44	3	9	35	3	7	27	3	9	47	3
11	47	3	11	22	3	8.5	23	3	11	50	3
13	49	3	13	20	3	10	27	3	13	34	3
15	27	3	15	19	3	11.5	21	3	15	36	3
17	25	3	17	24	3	13	18	3	17	27	3
19.5	19	3	19.5	20	3	14.5	16	3	19.5	30	3
22	13	3	22	21	3	17	18	3	22	41	3
24.5	24	3	24.5	17	3	19.5	18	3	24.5	10	3
27	24	3	27	8	3	22	21	3	27	16	3
29.5	23	3	29.5	5	3	24.5	5	3	29.5	33	3
32	21	3	32	20	3	27	10	3	32	26	3
34.5	21	3	34.5	17	3	29.5	6	3	34.5	39	3
37	14	3	37	18	3	32	5	3	37	28	3
39.5	23	3	39.5	16	3	34.5	2	3	39.5	25	3
42	16	3	42	9	3	37	10	3	42	35	3
44.5	11	3	44.5	14	3	39.5	10	3	44.5	32	3
47	21	3	47	8	3	42	7	3	47	20	3
49.5	5	3	49.5	7	3	44.5	11	3	49.5	22	3
52	7	3	52	6	3	47	5	3	52	4	3
54.5	3	3	54.5	5	3	49.5	6	3	54.5	22	3
57	2	3	57	4	3	52	4	3	57	25	3
59.5	3	3	59.5	3	3	54.5	3	3	59.5	20	3
62	3	3	62	3	3	57	3	3	62	32	3
64.5	3	3	64.5	2	3	59.5	4	3	64.5	16	3
67	3	3	67	4	3	62	2	3	67	18	3
69.5	5	3	69.5	4	3	64.5	2	3	69.5	8	3
72	4	3	72	14	3	67	2	3	72	7	3
74.5	5	3	74.5	50	3	69.5	5	3	74.5	5	3
77	4	3	77	20	3	72	26	3	77	4	3
79.5	16	3	79.5	16	3	74.5	18	3	79.5	2	3
82	12	3	82	16	3	77	18	3	82	0	3
84.5	88	3	84.5	12	3	79.5	21	3	84.5	2	3
87	87	3	87	11	3	82	14	3	87	0	3
89.5	43	3	89.5	7	3	84.5	17	3	89.5	2	3
92	32	3	92	6	3	87	9	3	92	0	3
94.5	15	3	94.5	12	3	89.5	6	3	94.5	3	3
97	19	3	97	13	3	92	8	3	97	3	3
99.5	12	3	99.5	10	3	94.5	4	3	99.5	18	3
102	10	3	102	50	3	97	13	3	102	16	3
104.5	50	3	104.5	50	3	99.5	6	3	104.5	16	3
107	50	3	107	50	3	102	10	3	107	15	3
109.5	50	3	109.5	50	3	104.5	50	3	109.5	7	3
112	50	3	112	50	3	107	50	3	112	8	3
114.5	50	3	114.5	50	3	109.5	50	3	114.5	8	3
117	50	3	117	50	3	112	50	3	117	10	3
119.5	50	3	119.5	50	3	114.5	50	3	119.5	25	3
122	50	3				117	50	3	122	31	3

(a) (b) (c) (d)

Figure B-10 I-10 / I-110: (a) B-1, (b) B-2, (c) B-3, and (d) B-4

B-5				B-6				B-13				B-14		
GWE:	95	ft		GWE:	121.7	ft		GWE:	111	ft		GWE:	111	ft
GSE:	113.7	ft		GSE:	138.2	ft		GSE:	114.2	ft		GSE:	116	ft
Depth (ft)	SPT N	ST		Depth (ft)	SPT N	ST		Depth (ft)	SPT N	ST		Depth (ft)	SPT N	ST
1	0	3		1	60	3		1	0	3		1	11	3
2.5	0	3		3	76	3		2.5	0	3		3	13	3
4	15	3		5	22	3		4	0	3		5	16	3
5.5	18	3		7	22	3		5.5	11	3		7	18	3
7	39	3		9	24	3		7	17	3		9	21	3
8.5	51	3		11	26	3		8.5	14	3		11	22	3
10	30	3		13	19	3		10	27	3		13	25	3
11.5	14	3		15	21	3		11.5	33	3		15	35	3
13	12	3		17	23	3		13	41	3		17	34	3
15.5	7	3		19.5	58	3		14.5	35	3		19.5	34	3
18	8	3		22	37	3		17	33	3		22	23	3
20.5	7	3		24.5	29	3		19.5	29	3		24.5	29	3
23	5	3		27	56	3		22	19	3		27	12	3
25.5	5	3		29.5	24	3		24.5	17	3		29.5	12	3
28	6	3		32	26	3		27	3	3		32	12	3
30.5	12	3		34.5	25	3		29.5	17	3		34.5	19	3
33	10	3		37	26	3		32	18	3		37	9	3
35.5	2	3		39.5	25	3		34.5	17	3		39.5	8	3
38	9	3		42	19	3		37	17	3		42	11	3
40.5	9	3		44.5	18	3		39.5	11	3		44.5	10	3
43	5	3		47	11	3		42	14	3		47	10	3
45.5	4	3		49.5	10	3		44.5	3	3		49.5	12	3
48	4	3		52	19	3		47	3	3		52	11	3
50.5	2	3		54.5	16	3		49.5	4	3		54.5	16	3
53	2	3		57	11	3		52	3	3		57	4	3
55.5	0	3		59.5	9	3		54.5	3	3		59.5	4	3
58	5	3		62	11	3		57	3	3		62	3	3
60.5	0	3		64.5	16	3		59.5	3	3		64.5	3	3
63	4	3		67	11	3		62	3	3		67	3	3
65.5	6	3		69.5	8	3		64.5	4	3		69.5	4	3
68	7	3		72	11	3		67	11	3		72	4	3
70.5	50	3		74.5	8	3		69.5	9	3		74.5	4	3
73	17	3		77	6	3		72	17	3		77	4	3
75.5	18	3		79.5	5	3		74.5	18	3		79.5	5	3
78	16	3		82	5	3		77	22	3		82	3	3
80.5	17	3		84.5	5	3		79.5	23	3		84.5	4	3
83	17	3		87	3	3		82	50	3		87	5	3
85.5	9	3		89.5	4	3		84.5	50	3		89.5	10	3
88	11	3		92	4	3		87	18	3		92	21	3
90.5	7	3		94.5	3	3		89.5	23	3		94.5	15	3
93	9	3		97	5	3		92	19	3		97	12	3
95.5	10	3		99.5	8	3		94.5	23	3		99.5	10	3
98	11	3		102	9	3		97	9	3		102	7	3
100.5	50	3		104.5	13	3		99.5	10	3		104.5	7	3
103	50	3		107	16	3		102	37	3		107	8	3
105.5	50	3		109.5	17	3		104.5	34	3		109.5	36	3
108	50	3		112	18	3		107	50	3		112	58	3
110.5	50	3		114.5	12	3		109.5	50	3		114.5	60	3
113	50	3		117	10	3		112	50	3		117	50	3
115.5	50	3		119.5	11	3		114.5	50	3		119.5	50	3
118	50	3		122	12	3		117	50	3		122	50	3
120.5	50	3		124.5	8	3		119.5	50	3		124.5	50	3
				127	10	3		122	50	3		127	50	3
				129.5	6	3		124.5	50	3		129.5	50	3
				132	50	3		127	50	3		132	50	3
				134.5	50	3		129.5	50	3		134.5	50	3

(a) (b) (c) (d)

Figure B-11 I-10 / I-110: (a) B-5, (b) B-6, (c) B-13, and (d) B-14

B-15			B-16			B-17			B-18		
GWE:	110	ft	GWE:	100.6	ft	GWE:	95	ft	GWE:	109	ft
GSE:	121.7	ft	GSE:	117.1	ft	GSE:	134.9	ft	GSE:	117.7	ft
Depth (ft)	SPT N	ST	Depth (ft)	SPT N	ST	Depth (ft)	SPT N	ST	Depth (ft)	SPT N	ST
1	0	3	1	18	3	1	21	3	1	16	3
2.5	0	3	3	10	3	2.5	32	3	3	12	3
4	0	3	5	6	3	4	44	3	5	7	3
5.5	0	3	7	13	3	5.5	35	3	7	19	3
7	33	3	9	28	3	7	38	3	9	26	3
8.5	40	3	11	28	3	8.5	38	3	11	21	3
10	22	3	13	38	3	10	36	3	13	27	3
11.5	11	3	15	31	3	11.5	35	3	15	24	3
13	14	3	17	23	3	13	48	3	17	25	3
14.5	29	3	19.5	20	3	14.5	26	3	19.5	26	3
16	36	3	22	35	3	17	26	3	22	21	3
18.5	20	3	24.5	23	3	19.5	40	3	24.5	18	3
21	27	3	27	4	3	22	4	3	27	16	3
23.5	31	3	29.5	4	3	24.5	23	3	29.5	15	3
26	28	3	32	30	3	27	27	3	32	32	3
28.5	27	3	34.5	19	3	29.5	32	3	34.5	18	3
31	33	3	37	23	3	32	23	3	37	12	3
33.5	25	3	39.5	26	3	34.5	28	3	39.5	10	3
36	27	3	42	12	3	37	19	3	42	13	3
38.5	26	3	44.5	19	3	39.5	39	3	44.5	12	3
41	28	3	47	11	3	42	19	3	47	8	3
43.5	26	3	49.5	10	3	44.5	39	3	49.5	5	3
46	36	3	52	9	3	47	19	3	52	4	3
48.5	12	3	54.5	7	3	49.5	17	3	54.5	5	3
51	14	3	57	6	3	52	18	3	57	3	3
53.5	13	3	59.5	5	3	54.5	20	3	59.5	4	3
56	10	3	62	5	3	57	20	3	62	3	3
58.5	11	3	64.5	3	3	59.5	7	3	64.5	3	3
61	3	3	67	4	3	62	26	3	67	4	3
63.5	4	3	69.5	4	3	64.5	9	3	69.5	3	3
66	2	3	72	3	3	67	10	3	72	12	3
68.5	2	3	74.5	15	3	69.5	10	3	74.5	12	3
71	3	3	77	14	3	72	7	3	77	19	3
73.5	4	3	79.5	13	3	74.5	5	3	79.5	25	3
76	2	3	82	16	3	77	8	3	82	24	3
78.5	2	3	84.5	50	3	79.5	0	3	84.5	32	3
81	15	3	87	50	3	82	3	3	87	12	3
83.5	16	3	89.5	11	3	84.5	0	3	89.5	13	3
86	21	3	92	7	3	87	0	3	92	6	3
88.5	24	3	94.5	6	3	89.5	4	3	94.5	9	3
91	16	3	97	5	3	92	11	3	97	8	3
93.5	17	3	99.5	8	3	94.5	4	3	99.5	9	3
96	12	3	102	6	3	97	6	3	102	21	3
98.5	13	3	104.5	5	3	99.5	15	3	104.5	50	3
101	10	3	107	5	3	102	53	3	107	50	3
103.5	11	3	109.5	52	3	104.5	78	3	109.5	50	3
106	12	3	112	21	3	107	50	3	112	50	3
108.5	11	3	114.5	34	3	109.5	50	3	114.5	50	3
111	50	3	117	27	3	112	16	3	117	50	3
113.5	50	3	119.5	50	3	114.5	14	3	119.5	50	3
116	50	3	122	50	3	117	17	3	121	50	3
118.5	50	3	124.5	50	3	119.5	16	3	122	50	3
121	50	3	127	50	3	122	12	3			
123.5	50	3	129.5	50	3	124.5	14	3			
126	50	3	132	50	3	127	50	3			
128.5	50	3	134.5	50	3	129.5	50	3			

(a) (b) (c) (d)

Figure B-12 I-10 / I-110: (a) B-15, (b) B-16, (c) B-17, and (d) B-18

B-19			B-20			B-21			B-29		
GWE:	96	ft	GWE:	95	ft	GWE:	95	ft	GWE:	100	ft
GSE:	114.9	ft	GSE:	115.5	ft	GSE:	116.3	ft	GSE:	115.9	ft
Depth (ft)	SPT N	ST	Depth (ft)	SPT N	ST	Depth (ft)	SPT N	ST	Depth (ft)	SPT N	ST
1	23	3	1	17	3	1	17	3	1	4	3
2.5	11	3	3	11	3	2.5	22	3	3	7	3
4	26	3	5	16	3	4	11	3	5	26	3
5.5	34	3	7	31	3	5.5	16	3	7	30	3
7	19	3	9	29	3	7	26	3	9	33	3
8.5	26	3	11	19	3	8.5	24	3	11	23	3
10	28	3	13	17	3	10	33	3	13	21	3
11.5	38	3	15	17	3	11.5	39	3	15	20	3
13	26	3	17	17	3	13	15	3	17	19	3
14.5	22	3	19.5	28	3	14.5	12	3	19.5	24	3
17	23	3	22	28	3	17	24	3	22	22	3
19.5	20	3	24.5	19	3	19.5	18	3	24.5	18	3
22	14	3	27	13	3	22	18	3	27	18	3
24.5	18	3	29.5	13	3	24.5	17	3	29.5	7	3
27	15	3	32	10	3	27	12	3	32	6	3
29.5	15	3	34.5	14	3	29.5	14	3	34.5	11	3
32	12	3	37	18	3	32	14	3	37	12	3
34.5	5	3	39.5	4	3	34.5	16	3	39.5	10	3
37	10	3	42	3	3	37	8	3	42	10	3
39.5	13	3	44.5	11	3	39.5	11	3	44.5	15	3
42	11	3	47	8	3	42	18	3	47	11	3
44.5	8	3	49.5	6	3	44.5	18	3	49.5	14	3
47	7	3	52	6	3	47	7	3	52	5	3
49.5	4	3	54.5	5	3	49.5	6	3	54.5	4	3
52	4	3	57	3	3	52	5	3	57	2	3
54.5	3	3	59.5	3	3	54.5	9	3	59.5	3	3
57	4	3	62	4	3	57	123	3	62	4	3
59.5	0.1	3	64.5	3	3	59.5	10	3	64.5	3	3
62	3	3	67	3	3	62	0.1	3	67	3	3
64.5	0.1	3	69.5	3	3	64.5	4	3	69.5	0	3
67	5	3	72	3	3	67	4	3	72	3	3
69.5	12	3	74.5	3	3	69.5	4	3	74.5	10	3
72	11	3	77	23	3	72	0.1	3	77	10	3
74.5	50	3	79.5	60	3	74.5	4	3	79.5	23	3
77	23	3	82	31	3	77	0.1	3	82	22	3
79.5	20	3	84.5	50	3	79.5	12	3	84.5	20	3
82	18	3	87	50	3	82	50	3	87	10	3
84.5	17	3	89.5	50	3	84.5	44	3	89.5	14	3
87	10	3	92	50	3	87	50	3	92	14	3
89.5	6	3	94.5	20	3	89.5	50	3	94.5	12	3
92	10	3	97	21	3	92	50	3	97	13	3
94.5	6	3	99.5	21	3	94.5	31	3	99.5	7	3
97	8	3	102	37	3	97	14	3	102	8	3
99.5	8	3	104.5	38	3	99.5	16	3	104.5	50	3
102	13	3	107	50	3	102	28	3	107	50	3
104.5	50	3	109.5	50	3	104.5	25	3	109.5	50	3
107	50	3	112	50	3	107	66	3	112	50	3
109.5	50	3	114.5	30	3	109.5	92	3	114.5	50	3
112	50	3	117	50	3	112	48	3	117	50	3
114.5	50	3	119.5	50	3	114.5	50	3	119.5	50	3
117	50	3	122	50	3	117	20	3	122	50	3

(a) (b) (c) (d)

Figure B-13 I-10 / I-110: (a) B-19, (b) B-20, (c) B-21, and (d) B-29

B-30		
GWE:	97	ft
GSE:	117.2	ft
Depth (ft)	SPT N	ST
1	51	3
2.5	64	3
4	36	3
5.5	30	3
7	32	3
8.5	26	3
10	28	3
11.5	19	3
13	16	3
14.5	20	3
17	20	3
19.5	21	3
22	16	3
24.5	15	3
27	11	3
29.5	7	3
32	13	3
34.5	10	3
37	19	3
39.5	19	3
42	13	3
44.5	11	3
47	10	3
49.5	7	3
52	12	3
54.5	10	3
57	3	3
59.5	3	3
62	2	3
64.5	2	3
67	0.1	3
69.5	0.1	3
72	4	3
74.5	4	3
77	10	3
79.5	67	3
82	50	3
84.5	43	3
87	50	3
89.5	50	3
92	50	3
94.5	41	3
97	12	3
99.5	10	3
102	20	3
104.5	21	3
107	13	3
109.5	50	3
112	50	3
114.5	50	3
117	50	3

B-39		
GWE:	112.5	ft
GSE:	118.6	ft
Depth (ft)	SPT N	ST
1	32	3
3	12	3
5	6	3
7	23	3
9	24	3
11	37	3
13	38	3
17	19	3
19.5	32	3
22	28	3
24.5	18	3
27	28	3
29.5	32	3
32	5	3
34.5	6	3
37	23	3
39.5	29	3
42	28	3
44.5	38	3
47	27	3
49.5	18	3
52	17	3
54.5	16	3
57	17	3
59.5	5	3
62	4	3
64.5	3	3
67	4	3
69.5	3	3
72	3	3
74.5	10	3
77	8	3
79.5	5	3
82	3	3
84.5	14	3
87	13	3
89.5	50	3
92	50	3
94.5	50	3
97	50	3
99.5	50	3
102	50	3
104.5	50	3
107	50	3
109.5	50	3

B-41		
GWE:	111	ft
GSE:	119.4	ft
Depth (ft)	SPT N	ST
1	0	3
2.5	0	3
4	0	3
5.5	0	3
8	16	3
10.5	41	3
13	46	3
15.5	49	3
18	34	3
20.5	40	3
23	38	3
25.5	33	3
28	34	3
30.5	46	3
33	37	3
35.5	5	3
38	38	3
40.5	18	3
43	21	3
45.5	49	3
48	27	3
50.5	29	3
53	14	3
55.5	13	3
58	7	3
60.5	10	3
63	10	3
65.5	3	3
68	3	3
70.5	4	3
73	4	3
75.5	3	3
78	6	3
80.5	4	3
83	12	3
85.5	50	3
88	50	3
90.5	50	3
93	50	3
95.5	50	3
98	50	3
100.5	50	3
103	50	3
105.5	50	3

B-43		
GWE:	110	ft
GSE:	120.2	ft
Depth (ft)	SPT N	ST
1.5	13	3
3.5	13	3
5.5	15	3
7.5	28	3
9.5	40	3
11.5	32	3
13.5	31	3
16	31	3
18.5	38	3
21	38	3
23.5	31	3
26	32	3
28.5	23	3
31	26	3
33.5	22	3
36	20	3
38.5	18	3
41	31	3
43.5	34	3
46	20	3
48.5	25	3
51	10	3
53.5	10	3
56	11	3
58.5	6	3
61	5	3
63.5	4	3
66	4	3
68.5	4	3
71	7	3
73.5	6	3
76	8	3
78.5	8	3
81	6	3
83.5	20	3
86	50	3
88.5	50	3
91	50	3
93.5	50	3
96	50	3
98.5	50	3
101	50	3
103.5	50	3

(a) (b) (c) (d)

Figure B-14 I-10 / I-110: (a) B-30, (b) B-39, (c) B-41, and (d) B-43

B-51				B-58				B-66		
GWE:	91	ft		GWE:	87	ft		GWE:	92	ft
GSE:	117	ft		GSE:	118	ft		GSE:	126.8	ft
Depth (ft)	SPT N	ST		Depth (ft)	SPT N	ST		Depth (ft)	SPT N	ST
1	8	3		1	17	3		1	6	3
2.5	4	3		2.5	8	3		2.5	3	3
4	36	3		4	8	3		4	4	3
5.5	41	3		5.5	30	3		5.5	19	3
7	38	3		7	28	3		7	46	3
8.5	36	3		8.5	44	3		8.5	57	3
10	41	3		10	44	3		10	53	3
11.5	36	3		11.5	38	3		11.5	42	3
13	4	3		13	26	3		13	20	3
14.5	2	3		14.5	23	3		14.5	22	3
17	26	3		17	22	3		17	36	3
19.5	40	3		19.5	40	3		19.5	33	3
22	34	3		22	28	3		22	34	3
24.5	34	3		24.5	30	3		24.5	34	3
27	29	3		27	32	3		27	41	3
30	29	3		29.5	5	3		29.5	25	3
				32	6	3		32	19	3
				34.5	5	3		34.5	18	3
				37	4	3		40	28	3
				40	7	3				

(a) (b) (c)

Figure B-15 I-10 / I-110: (a) B-51, (b) B-58, and (c) B-66

B-70				B-75				BG-23		
GW:	Below Boring			GW:	Below Boring			GWE:	68	ft
GSE:	114	ft		GSE:	132	ft		GSE:	74	ft
Depth (ft)	SPT N	ST		Depth (ft)	SPT N	ST		Depth (ft)	SPT N	ST
1	5	3		1	10	3		2	6	3
2.5	7	3		2.5	21	3		5	7	3
4	12	3		4	7	3		8	15	3
5.5	28	3		5.5	5	3		11	10	3
7	31	3		7	15	3		14	11	3
8.5	28	3		8.5	21	3		17	11	3
10	27	3		10	30	3		20	11	3
11.5	30	3		11.5	51	3		23	4	3
13	24	3		13	73	3		26	2	3
14.5	17	3		14.5	60	3		29	2	3
17	22	3		17	25	3		32	2	3
19.5	15	3		19.5	22	3		35	2	3
22	22	3		22	24	3		38	7	3
24.5	25	3		24.5	22	3		41	50	3
27	16	3		27	25	3		44	50	3
29.5	20	3		29.5	15	3		47	50	3
32	18	3		32	9	3		50	50	3
34.5	16	3		34.5	7	3		53	50	3
37	8	3		37	32	3		56	50	3
39.5	6	3		39.5	37	3		59	50	3
42	27	3		42	22	3		60.5	50	3
44.5	30	3		44.5	7	3				
47	9	3		47	20	3				
49.5	34	3		49.5	15	3				
52	13	3		52	12	3				
54.5	8	3		54.5	5	3				
57	12	3		57	8	3				
59.5	13	3		59.5	4	3				
62	13	3		62	4	3				
64.5	23	3		64.5	6	3				
67	12	3		67	4	3				
69.5	11	3		69.5	5	3				
72	13	3		72	5	3				
74.5	19	3		74.5	11	3				
77	20	3		77	15	3				
79.5	16	3		79.5	18	3				
82	28	3		82	27	3				
84.5	31	3		84.5	50	3				
87	11	3		87	50	3				
89.5	13	3		89.5	50	3				
92	16	3		92	50	3				
94.5	16	3		94.5	50	3				
97	12	3		97	50	3				
99.5	11	3		99.5	50	3				
102	14	3								
104.5	13	3								

(a) (b) (c)

Figure B-16 I-10 / I-110: (a) B-70, (b) B-75, and (c) BG-23

Boring Number: B-5
Ground Surface Elevation: 16.31 ft
Water Table Elevation: -328.08 ft

Sheet
glish
Update Boring Log

Depth (ft)	SPT-N	Soil Type
22.97	8	3
27.89	11	3
31.17	17	3
37.73	30	3
42.65	47	2
47.57	57	2
52.49	15	2
57.41	35	2
62.34	60	2
67.26	60	2
70.54	50	2

(a)

Boring Number: B-5B
Ground Surface Elevation: 16.31 ft
Water Table Elevation: -65.62 ft

Sheet
glish
Update Boring Log

Depth (ft)	SPT-N	Soil Type
22.97	6	3
27.89	15	3
32.81	8	3
37.73	23	3
42.65	48	3
47.57	49	3
52.49	20	3
57.41	40	3
62.34	37	3
67.26	60	3
72.18	35	2

(b)

Figure B-17 I-16 over Ogeechee River: (a) B-5 and (b) B-5B

Boring Number: B-1
Ground Surface Elevation: 98.10 ft
Water Table Elevation: 0.00 ft

Sheet
glish
Update Boring Log

Depth (ft)	SPT-N	Soil Type
1.50	3	2
5.00	27	2
9.00	17	3
14.00	2	2
19.00	10	3
24.00	44	3
29.00	50	3
34.00	20	3
39.00	74	3
44.00	50	3
49.00	83	3
54.00	21	3
59.00	50	3

(a)

Boring Number: WSA-5
Ground Surface Elevation: 128.00 ft
Water Table Elevation: 90.00 ft

Sheet
glish
Update Boring Log

Depth (ft)	SPT-N	Soil Type
5.00	21	2
9.00	17	2
14.00	19	2
19.00	17	2
24.00	18	2
29.00	9	2
34.00	12	2
39.00	11	1
44.00	60	3
49.00	49	3
59.00	63	3
69.00	59	3
79.00	64	3
89.00	64	2
99.00	100	2
109.00	100	2

(b)

Boring Number: WSA-6
Ground Surface Elevation: 100.00 ft
Water Table Elevation: 88.00 ft

Sheet
nglish
Update Boring Log

Depth (ft)	SPT-N	Soil Type
2.00	2	2
5.00	5	2
9.00	3	2
14.00	10	3
19.00	16	3
24.00	27	3
29.00	30	3
34.00	63	3
39.00	51	3
44.00	66	3
49.00	50	3
59.00	66	2
69.00	68	2
79.00	62	2
89.00	89	2
99.00	70	2
109.00	72	3

(c)

Figure B-18 Natchez Trace Pkwy: (a) B-1, (b) WSA-5, and (c) WSA-6

Boring Number: WSA-7
Ground Surface Elevation: 99.00 ft
Water Table Elevation: 86.00 ft

Sheet | Update Boring Log | glish

Depth (ft)	SPT-N	Soil Type
2.00	2	2
5.00	2	2
9.00	4	2
14.00	6	2
19.00	14	3
24.00	34	3
29.00	36	3
34.00	43	3
39.00	52	3
44.00	40	3
49.00	35	3
59.00	100	2
69.00	100	2
79.00	100	2
89.00	100	2
99.00	100	2
109.00	73	3
118.50	100	3

(a)

Boring Number: WSA-8
Ground Surface Elevation: 128.00 ft
Water Table Elevation: 40.00 ft

Sheet | Update Boring Log | glish

Depth (ft)	SPT-N	Soil Type
2.00	6	2
5.00	12	2
9.00	21	2
14.00	27	2
19.00	16	2
24.00	32	2
29.00	29	2
34.00	10	2
39.00	21	2
44.00	8	2
49.00	61	3
59.00	72	3
69.00	32	3
79.00	67	3
89.00	80	1
99.00	100	1
109.00	78	2
119.00	100	2
129.00	100	2
139.00	100	1

(b)

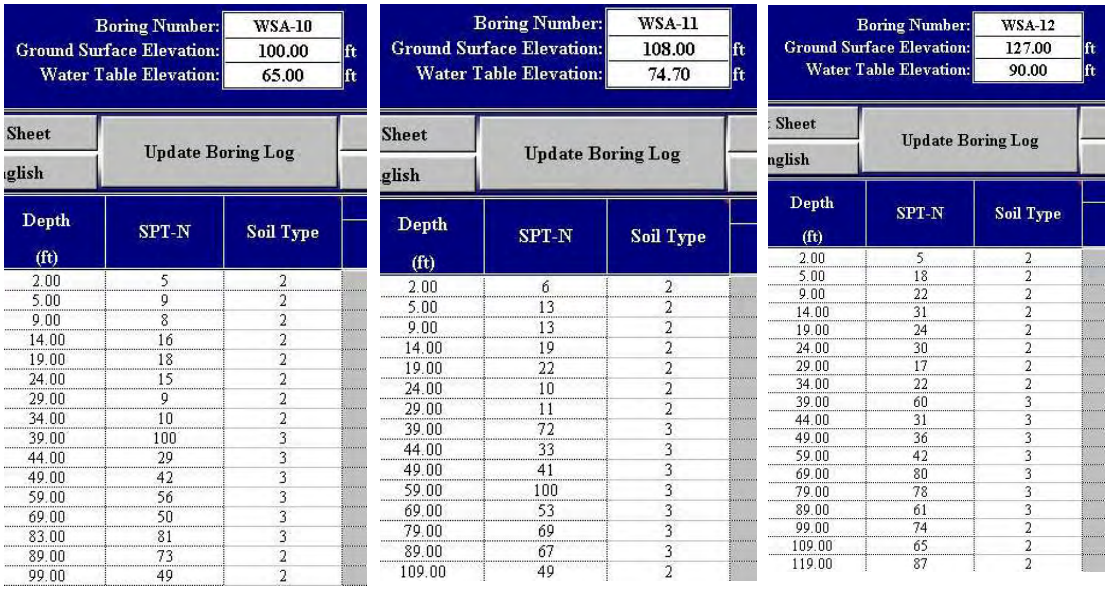
Boring Number: WSA-9
Ground Surface Elevation: 127.00 ft
Water Table Elevation: 86.00 ft

Sheet | Update Boring Log | nglish

Depth (ft)	SPT-N	Soil Type
2.00	14	2
5.00	19	2
9.00	23	2
14.00	41	2
19.00	27	2
24.00	28	2
29.00	22	2
34.00	9	2
39.00	28	2
44.00	30	3
49.00	72	3
59.00	100	3
69.00	47	3
83.00	41	3
89.00	100	1
99.00	100	1
109.00	100	1
118.50	100	2
128.00	100	2

(c)

Figure B-19 Natchez Trace Pkwy: (a) WSA-7, (b) WSA-8, and (c) WSA-9



Boring Number: WSA-10
Ground Surface Elevation: 100.00 ft
Water Table Elevation: 65.00 ft

Sheet | Update Boring Log | glish

Depth (ft)	SPT-N	Soil Type
2.00	5	2
5.00	9	2
9.00	8	2
14.00	16	2
19.00	18	2
24.00	15	2
29.00	9	2
34.00	10	2
39.00	100	3
44.00	29	3
49.00	42	3
59.00	56	3
69.00	50	3
83.00	81	3
89.00	73	2
99.00	49	2

(a)

Boring Number: WSA-11
Ground Surface Elevation: 108.00 ft
Water Table Elevation: 74.70 ft

Sheet | Update Boring Log | glish

Depth (ft)	SPT-N	Soil Type
2.00	6	2
5.00	13	2
9.00	13	2
14.00	19	2
19.00	22	2
24.00	10	2
29.00	11	2
39.00	72	3
44.00	33	3
49.00	41	3
59.00	100	3
69.00	53	3
79.00	69	3
89.00	67	3
109.00	49	2

(b)

Boring Number: WSA-12
Ground Surface Elevation: 127.00 ft
Water Table Elevation: 90.00 ft

Sheet | Update Boring Log | nglish

Depth (ft)	SPT-N	Soil Type
2.00	5	2
5.00	18	2
9.00	22	2
14.00	31	2
19.00	24	2
24.00	30	2
29.00	17	2
34.00	22	2
39.00	60	3
44.00	31	3
49.00	36	3
59.00	42	3
69.00	80	3
79.00	78	3
89.00	61	3
99.00	74	2
109.00	65	2
119.00	87	2

(c)

Figure B-20 Natchez Trace Pkwy: (a) WSA-10, (b) WSA-11, and (c) WSA-12

Boring Number:	B-1	
Ground Surface Elevation:	0.00	ft
Water Table Elevation:	-12.00	ft

heet | Update Boring Log | nglish

Depth (ft)	SPT-N	Soil Type
0.50	14	1
2.50	19	2
4.50	18	2
8.50	7	2
13.50	9	2
18.50	7	2
23.50	10	2
28.50	0	1
33.50	4	1
38.50	3	1
43.50	7	1
48.50	5	1
53.50	14	1
58.50	14	1
63.50	21	1
68.50	7	1
73.50	50	1
78.50	18	1
83.50	20	1
88.50	21	1
93.50	50	1

(a)

Boring Number:	B-5	
Ground Surface Elevation:	0.00	ft
Water Table Elevation:	-10.00	ft

Sheet | Update Boring Log | nglish

Depth (ft)	SPT-N	Soil Type
0.50	18	2
2.50	21	2
4.50	18	2
6.50	21	2
8.50	18	2
13.50	13	2
18.50	11	2
23	11	2
23.50	6	1
28.50	6	1
33.50	8	1
38.50	3	1
43.50	7	1
48.50	12	1
51	12	1
51.5	32	2
53.50	32	2
58.50	50	2
63.50	40	2
68.50	50	2
72	30	2
72.5	20	1
73.50	20	1
78.50	21	1
83.50	21	1

(b)

Figure B-21 New Bayfront Arena: (a) B-1 and (b) B-5

GSE (ft):	6.1				
GWE (ft):	0				
Depth (ft)	SPT N	Soil Type	qu (psi)	qs (psi)	Recovery (%)
1	23	3			
3	12	3			
5	4	3			
7	4	3			
9	15	3			
11	5	3			
13	16	3			
16	16	3			
19	20	3			
22	16	3			
25	14	3			
28	17	3			
31	16	3			
34	17	3			
37	15	3			
40	17	3			
43	13	3			
46	26	3			
49	25	3			
52	22	3			
55	13	3			
58	9	3			
60		4	96	136	78
65		4	96	136	78
65		4	96	136	87
70		4	96	136	87
73	15	3			
76	8	3			
79	6	3			
80		4	96	136	0
85		4	96	136	0
85		4	889	104	70
90		4	889	104	70
90		4	889	104	78
95		4	889	104	78
95	47	4	889	104	78
98	29	4	889	104	78
105		4	1514	124	32
110		4	1514	124	32
115	50	4	1514	124	32
118	75	4	1514	124	32
121	50	4	1514	124	32
124	56	4	1514	124	32
127	50	3			
130	66	3			
133	75	3			
136	48	3			
139	49	3			
142	40	3			
145	41	3			
148	39	3			

(a)

GSE (ft):	10				
GWE (ft):	6				
Depth (ft)	SPT N	Soil Type	qu (psi)	qs (psi)	Recovery (%)
2	24	3			
4	22	3			
6	6	3			
8	4	3			
10	3	3			
12	9	3			
14	15	3			
16	18	3			
19	21	3			
22	9	3			
25	21	3			
28	17	3			
31	22	3			
34	18	3			
37	16	3			
40	20	3			
43	19	3			
46	23	3			
49	17	3			
52	27	3			
55	35	3			
58	12	3			
61	28	3			
64	26	3			
67	22	3			
70	29	3			
73	20	3			
76	35	3			
79	19	3			
82	9	3			
85	19	3			
88	24	3			
89		4	400	104	15
94		4	400	104	
94		4	400	104	77
99		4	400	104	
99		4	400	104	70
104		4	400	104	
107		4	400	104	93
112		4	400	104	
112		4	400	104	28
117		4	400	104	
117		4	400	104	7
122		4	400	104	
124	29	3			
127	27	3			
130	23	3			
133	28	3			
136	32	3			
139	79	3			
142	29	3			
145	26	3			
148	39	3			
151	33	3			

(b)

Figure B-22 New River Bridge: (a) B-1 and (b) B-6

GSE (ft):	5.7				
GWE (ft):	0				
Depth (ft)	SPT N	Soil Type	qu (psi)	qs (psi)	Recovery (%)
1	34	3			
3	14	3			
5	9	3			
7	5	3			
9	4	3			
11	9	3			
13	11	3			
16	15	3			
19	33	3			
22	14	3			
25	14	3			
28	18	3			
31	16	3			
34	15	3			
37	11	3			
40	14	3			
43	9	3			
46	11	3			
49	10	3			
52	13	3			
55	21	3			
58	12	3			
61	14	3			
64	17	3			
67	35	3			
70	32	3			
70		4	496	163	42
75		4	496	163	42
79	39	3			
82	8	3			
85	13	3			
87	63	4	496	163	95
87		4	496	163	95
92		4	496	163	95
92		4	496	163	80
97		4	496	163	80
97		4	496	163	43
102		4	496	163	43
102		4	3457	324	65
107		4	3457	324	65
110		4	496	163	80
115		4	496	163	80
115	53	4	496	163	80
118	28	3			
121	34	3			
124	25	3			
127	37	3			
130	29	3			
133	29	3			
136	35	3			
139	34	3			
142	38	3			
145	30	3			
148	23	3			
151	35	3			

(a)

GSE (ft):	6.8				
GWE (ft):	1				
Depth (ft)	SPT N	Soil Type	qu (psi)	qs (psi)	Recovery (%)
1	13	3			
3	7	3			
5	4	3			
7	8	3			
9	15	3			
11	13	3			
13	14	3			
15	15	3			
18	20	3			
21	21	3			
24	27	3			
27	22	3			
30	26	3			
33	24	3			
36	46	3			
39	48	3			
42	20	3			
45	23	3			
48	32	3			
51	40	3			
54	47	3			
57	58	3			
60	61	3			
63	38	3			
66	10	3			
69	18	3			
71		4	594	210	55
76		4	594	210	55
78	19	4			
81	39	3			
84	61	4			
85		4	594	210	55
90		4	594	210	55
90		4	594	210	43
95		4	594	210	43
95		4	701	151	100
100		4	701	151	100
102	40	3			
105	21	3			
108	50	3			
110		4	594	210	48
115		4	594	210	48
115		4	594	210	23
120		4	594	210	23
123	23	3			
126	34	3			
129	35	3			
132	39	3			
135	27	3			
138	19	3			
141	22	3			
144	44	3			
147	23	3			
150	25	3			

(b)

Figure B-23 New River Bridge: (a) B-7 and (b) B-20

Ground EL	5.26	ft
Water EL	-0.24	ft

BR-1		
Depth (ft)	SPT N	Soil Type
2	0	5
3	0	5
5	2	3
7	6	3
9	2	3
11	8	3
13	10	3
15	7	3
17	14	3
19	13	3
21	9	3
23	13	3
25	12	3
27	15	3
29	23	3
31	20	3
33	21	3
35	10	3
37	19	3
39	13	3
41	19	3
43	23	3
45	17	3
47	22	3
49	16	3
51	13	3
53	4	3
55	1	3
57	41	4
58.00	100	4
62.50	100	4
67.50	100	4
72.50	100	4
77.50	100	4
81.00	16	
83.00	36	
84.00	100	
87.00	69	
88.00	75	
91.00	45	
94.00	84	

(a)

Ground EL	5.86	ft
Water EL	0.36	ft

BR-2		
Depth (ft)	SPT N	Soil Type
1	21	3
3	15	3
5	9	3
7	7	3
9	13	3
11	21	3
13	22	3
15	13	3
17	14	3
19	15	3
21	12	3
23	17	3
25	16	3
27	22	3
29	24	3
31	22	3
33	45	3
35	37	3
37	51	3
39	46	3
41	20	3
43	25	3
45	22	3
47	46	3
49	43	3
51	37	3
53	64	3
55	37	3
57	69	3
59	99	3
61	34	3
63	9	3
65	13	3
67	13	3
69	83	3
71.1		4
75.5		4
80.5		4
85.5		4
93.05		4

(b)

Ground EL	4.27	ft
Water EL	1.07	ft

W-1		
Depth (ft)	SPT N	Soil Type
1	0	3
3	7	3
5	4	3
7	5	3
9	3	3
11	4	3
13	10	3
15	4	3
18	7	3
21	34	4
24	58	4
27	32	4
30	43	4
33	27	4
36	37	4
39	43	4
42	71	4
45	25	4
48	75	4

(c)

Ground EL	8.39	ft
Water EL	-0.01	ft

W-2		
Depth (ft)	SPT N	Soil Type
1	0	5
3	14	3
5	14	3
7	15	3
9	19	3
11	6	3
13	8	3
15	2	3
18	1	3
21	1	3
24	15	3
27	34	3
30	32	3
33	33	3
36	24	3
39	16	3
42	22	3
45	29	3
48	28	3

(d)

Figure B-24 New River Bridge: (a) BR-1, (b) BR-2, (c) W-1, and (d) W-2

Ground EL	3.8	ft
Water EL	0	ft
	W-3	
Depth (ft)	SPT N	Soil Type
1	0	3
3	0	3
5	6	3
7	3	3
9	3	3
11	8	3
13	26	3
15	19	3
18	21	3
21	11	3
24	17	3
27	27	3
30	22	3
33	18	3
36	13	3
39	18	3
42	15	3
45	20	3
48	22	3
51	17	4
54	60	4
57	50	4
59	50	4
63	71	4
66	76	4
68	50	4

(a)

Ground EL	4.63	ft
Water EL	1.13	ft
	W-4	
Depth (ft)	SPT N	Soil Type
1	0	3
3	0	3
5	4	3
7	11	3
9	2	3
11	2	3
13	2	3
15	4	3
18	4	3
21	5	3
24	9	3
27	22	3
30	31	3
33	23	3
36	18	3
39	17	3
42	32	3
45	46	3
48	18	3
51	14	3
54	83	4
57	50	4
59	50	4
63	50	4
66	50	4
68	50	4

(b)

Ground EL	4.67	ft
Water EL	-0.13	ft
	W-5	
Depth (ft)	SPT N	Soil Type
1	0	3
3	8	3
5	4	3
7	6	3
9	6	3
11	10	3
13	16	3
15	8	3
18	13	3
21	13	3
24	13	3
27	17	3
30	25	3
33	13	3
36	14	3
39	17	3
42	18	3
45	17	3
48	31	3
51	19	3
54	21	4
57	49	4
59	50	4
63	62	4
66	89	4
68	50	4

(c)

Ground EL	6.76	ft
Water EL	1.06	ft
	W-6	
Depth (ft)	SPT N	Soil Type
1	12	3
3	18	3
5	5	3
7	7	3
9	9	3
11	13	3
13	23	3
15	20	3
17	21	3
19	30	3
21	24	3
23	22	3
25	25	3
27	32	3
29	30	3
31	32	3
33	38	3
35	46	3
37	35	3
39	47	3
41	25	3
43	34	3
45	21	3
47	20	3
49	39	3
51	35	3
53	28	3
55	36	3
57	47	3
59	26	3
61	17	3
63	18	3
65	25	3
67	41	3
69	31	3

(d)

Figure B-25 New River Bridge: (a) W-3, (b) W-4, (c) W-5, and (d) W-6

Ground EL	6.55	ft
Water EL	1.15	ft
W-7		
Depth (ft)	SPT N	Soil Type
1	20	3
3	15	3
5	8	3
7	15	3
9	20	3
11	14	3
13	12	3
15	13	3
17	13	3
19	23	3
21	13	3
23	14	3
25	19	3
27	29	3
29	34	3
31	32	3
33	31	3
35	28	3
37	27	3
39	30	3
41	13	3
43	18	3
45	36	3
47	30	3
49	30	3
51	39	3
53	76	3
55	39	3
57	85	3
60	59	3
62	22	3
64	7	3
66	16	3
68	9	3
70	94	4

(a)

Ground EL	5.97	ft
Water EL	0.97	ft
W-8		
Depth (ft)	SPT N	Soil Type
1	17	3
3	15	3
5	2	3
7	6	3
9	12	3
11	8	3
13	12	3
15	14	3
17	13	3
19	22	3
21	18	3
23	12	3
25	18	3
27	29	3
29	34	3
31	19	3
33	24	3
35	16	3
37	11	3
39	16	3
41	9	3
43	12	3
45	13	3
47	6	3
49	12	3
51	26	3
53	38	3
55	43	3
57	68	3
60	49	4
62	74	4
65	18	4
67	15	4
69	15	4

(b)

Ground EL	5.94	ft
Water EL	1.44	ft
W-9		
Depth (ft)	SPT N	Soil Type
1	10	3
3	2	3
5	2	3
7	2	3
9	2	3
11	5	3
13	4	3
15	12	3
17	10	3
19	15	3
21	13	3
23	14	3
25	30	3
27	40	3
29	39	3
31	9	3
33	17	3
35	9	3
37	9	3
39	22	3
41	7	3
43	24	3
45	15	3
47	62	3
49	58	3

(c)

Ground EL	6.92	ft
Water EL	0.92	ft
W-10		
Depth (ft)	SPT N	Soil Type
1	42	3
3	33	3
5	18	3
7	30	3
9	21	3
11	5	3
13	9	3
15	10	3
17	15	3
19	15	3
21	10	3
23	21	3
25	18	3
27	34	3
29	37	3
31	13	3
33	13	3
35	10	3
37	10	3
39	11	3
41	10	3
43	12	3
45	42	3
47	39	3
49	43	3

(d)

Figure B-26 New River Bridge: (a) W-7, (b) W-8, (c) W-9, and (d) W-10

Ground EL	10.59	ft
Water EL	0.99	ft

W-11		
Depth (ft)	SPT N	Soil Type
1	0	3
3	26	3
5	9	3
7	6	3
9	7	3
11	8	3
13	11	3
15	12	3
17	12	3
19	19	3
21	10	3
23	21	3
25	25	3
27	37	3
29	26	3
31	24	3
33	38	3
35	25	3
37	38	3
39	10	3
41	6	3
43	6	3
45	7	3
47	39	3
49	11	3

(a)

Ground EL	3.13	ft
Water EL	-0.37	ft

W-12		
Depth (ft)	SPT N	Soil Type
1	0	3
3	0	3
5	6	3
7	7	3
9	9	3
11	6	3
13	12	3
15	19	3
18	6	3
20	25	3
22	14	3
24	21	3
26	20	3
28	11	3
30	7	3
32	2	3
34	8	3
36	27	3
38	20	3
40	12	3
42	25	3
44	25	3
46	87	3
49	49	3

(b)

Figure B-27 New River Bridge: (a) W-11 and (b) W-12

		A-3
El. Soil Surface		8.5
Water Table Elev		7
Depth (ft)	SPT N	Soil Type
1	73	5
3	97	5
5	11	5
7	100	5
8	100	5
11	17	3
13	4	2
16	9	3
21	9	3
26	16	3
31	32	3
36	22	3
41	37	3
46	69	3
51	69	3
56	46	3
61	56	3
66	47	3
71	62	3
76	38	1
81	38	1
86	30	1
91	15	1
96	26	2
101	55	2
106	56	2
111	43	2
116	33	1
121	22	1
126	26	1
131	31	1
136	44	1
141	41	1
146	69	1
151	69	1
161	43	1
171	86	3
181	87	3
186	100	3
191	99	3
195	100	4

(a)

		A-4
El. Soil Surface		10
Water Table Elev		7
Depth (ft)	SPT N	Soil Type
1	83	5
3	36	5
5	28	5
7	19	3
9	4	3
11	9	3
13	7	3
15	2	2
17	4	2
19	4	2
21	2	2
23	2	2
25	7	2
27	3	2
29	4	2
31	20	3
36	60	3
41	67	3
46	73	3
51	47	3
56	62	3
61	24	1
66	63	1
71	47	1
76	22	1
81	40	3
86	34	3
91	38	3
96	15	2
101	15	2

(b)

Figure B-28 Newark Legal Center: (a) A-3 and (b) A-4

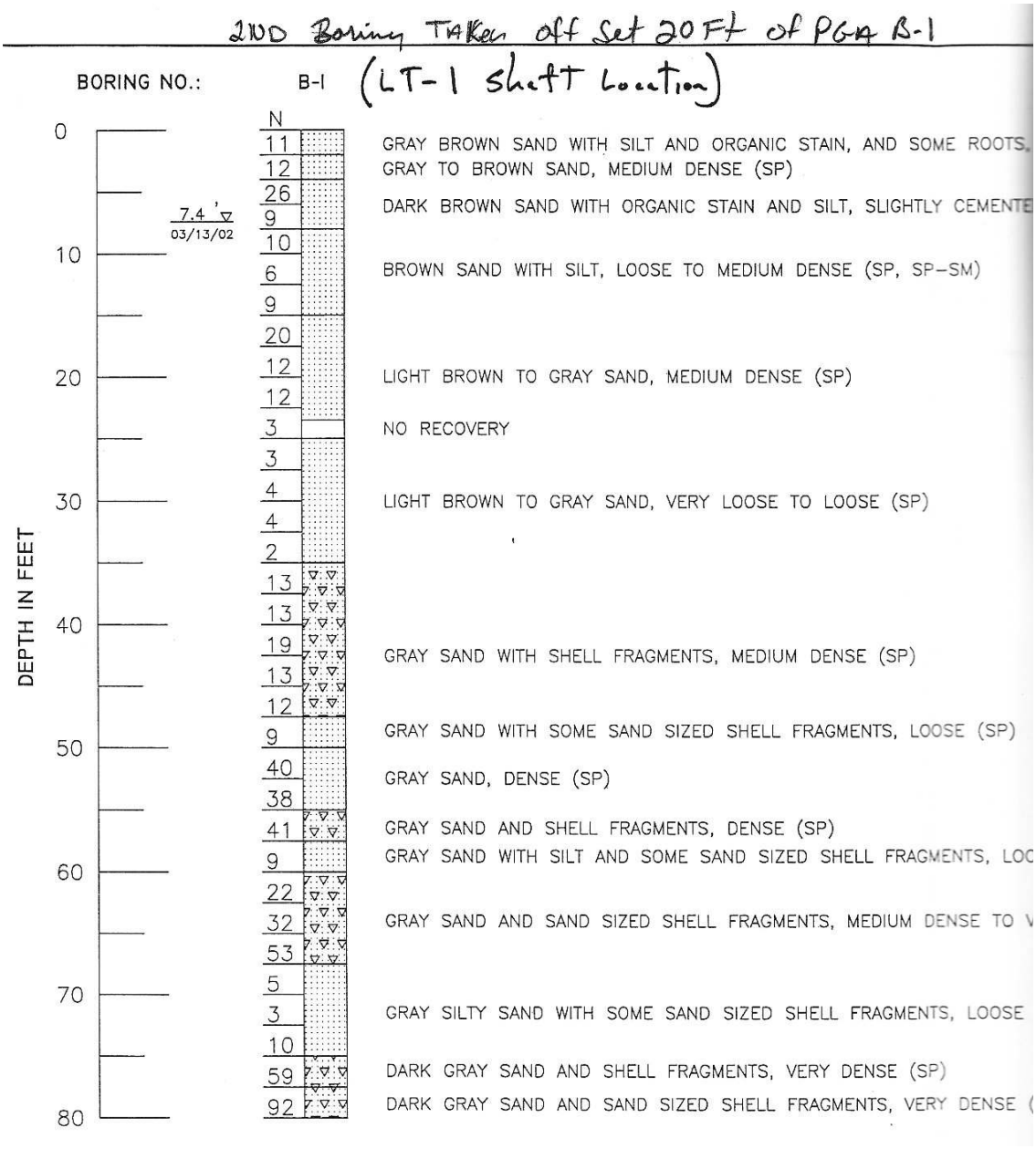


Figure B-29 PGA Blvd: B-1

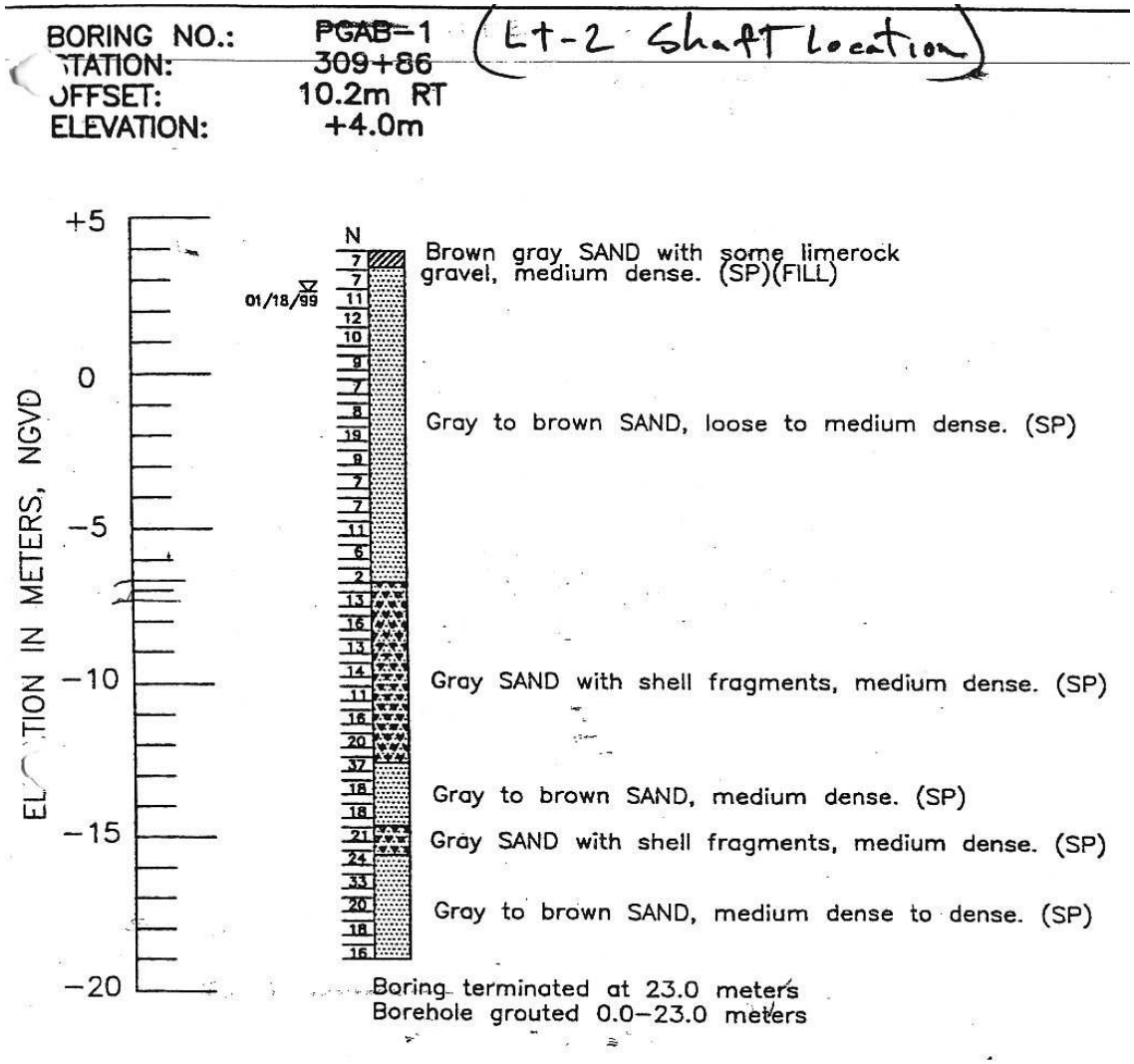


Figure B-30 PGA Blvd: PGAB-1

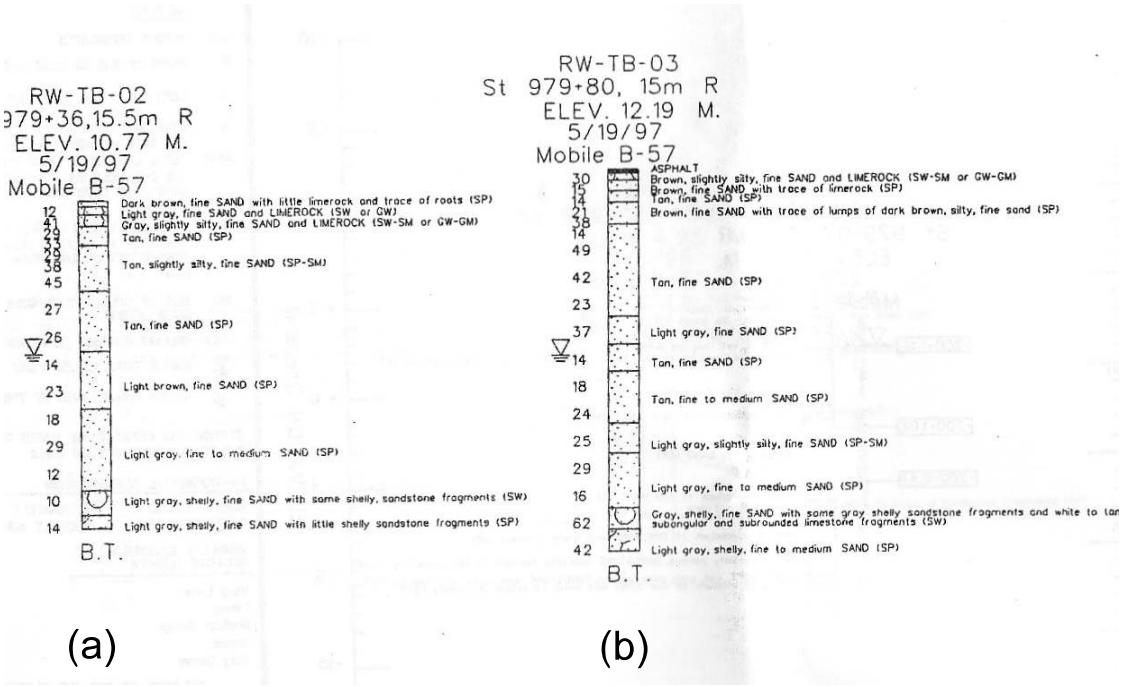
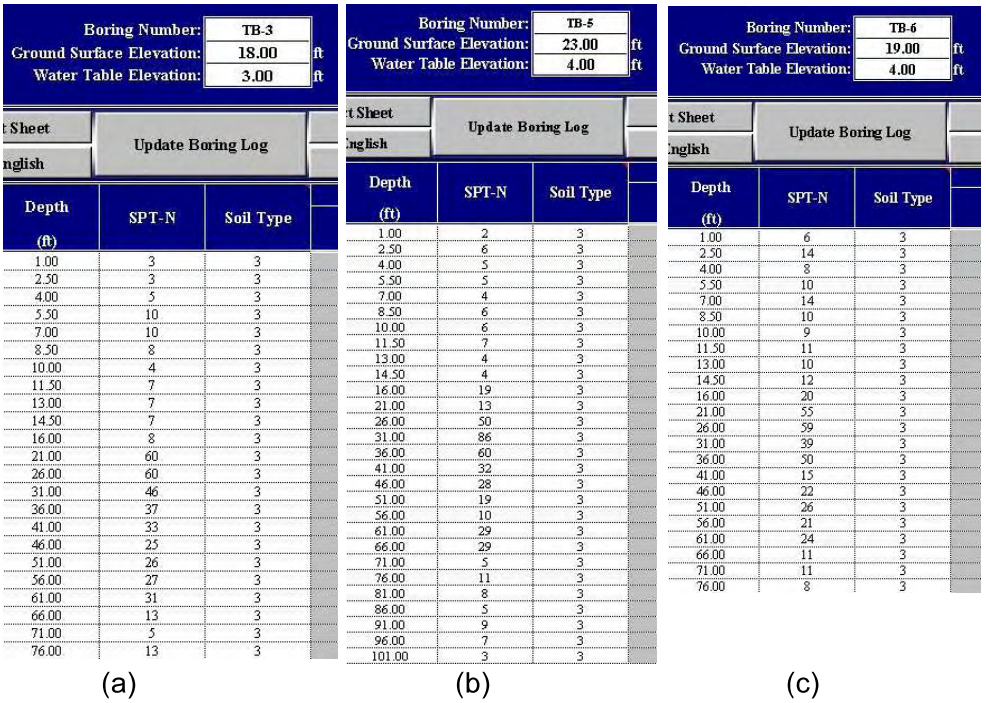


Figure B-31 SR 80 - Palm Beach County: (a) RW-TB-02 and (b) RW-TB-03



Boring Number: TB-3
Ground Surface Elevation: 18.00 ft
Water Table Elevation: 3.00 ft

Sheet | English | Update Boring Log

Depth (ft)	SPT-N	Soil Type
1.00	3	3
2.50	3	3
4.00	5	3
5.50	10	3
7.00	10	3
8.50	8	3
10.00	4	3
11.50	7	3
13.00	7	3
14.50	7	3
16.00	8	3
21.00	60	3
26.00	60	3
31.00	46	3
36.00	37	3
41.00	33	3
46.00	25	3
51.00	26	3
56.00	27	3
61.00	31	3
66.00	13	3
71.00	5	3
76.00	13	3

(a)

Boring Number: TB-5
Ground Surface Elevation: 23.00 ft
Water Table Elevation: 4.00 ft

Sheet | English | Update Boring Log

Depth (ft)	SPT-N	Soil Type
1.00	2	3
2.50	6	3
4.00	5	3
5.50	5	3
7.00	4	3
8.50	6	3
10.00	6	3
11.50	7	3
13.00	4	3
14.50	4	3
16.00	19	3
21.00	13	3
26.00	50	3
31.00	86	3
36.00	60	3
41.00	32	3
46.00	28	3
51.00	19	3
56.00	10	3
61.00	29	3
66.00	29	3
71.00	5	3
76.00	11	3
81.00	8	3
86.00	5	3
91.00	9	3
96.00	7	3
101.00	3	3

(b)

Boring Number: TB-6
Ground Surface Elevation: 19.00 ft
Water Table Elevation: 4.00 ft

Sheet | English | Update Boring Log

Depth (ft)	SPT-N	Soil Type
1.00	6	3
2.50	14	3
4.00	8	3
5.50	10	3
7.00	14	3
8.50	10	3
10.00	9	3
11.50	11	3
13.00	10	3
14.50	12	3
16.00	20	3
21.00	55	3
26.00	59	3
31.00	39	3
36.00	50	3
41.00	15	3
46.00	22	3
51.00	26	3
56.00	21	3
61.00	24	3
66.00	11	3
71.00	11	3
76.00	8	3

(c)

Figure B-32 Towers Eleven: (a) TB-3, (b) TB-5, and (c) TB-6

Boring Number: CB-3
Ground Surface Elevation: 9.90 ft
Water Table Elevation: -999.00 ft

Sheet | Update Boring Log | nglish

Depth (ft)	SPT-N	Soil Type
4.00	18	1
5.00	16	1
8.00	14	1
9.00	13	1
10.00	17	1
15	17	1
20	17	1
20.5	40	3
23.00	63	3
28.00	24	3
33.00	75	3
37	17	3
38	17	1
50.00	15	1
55.00	13	1
57.00	13	1
57.5	18	3
61	18	3
66	50	3
71	11	1
76	11	1

(a)

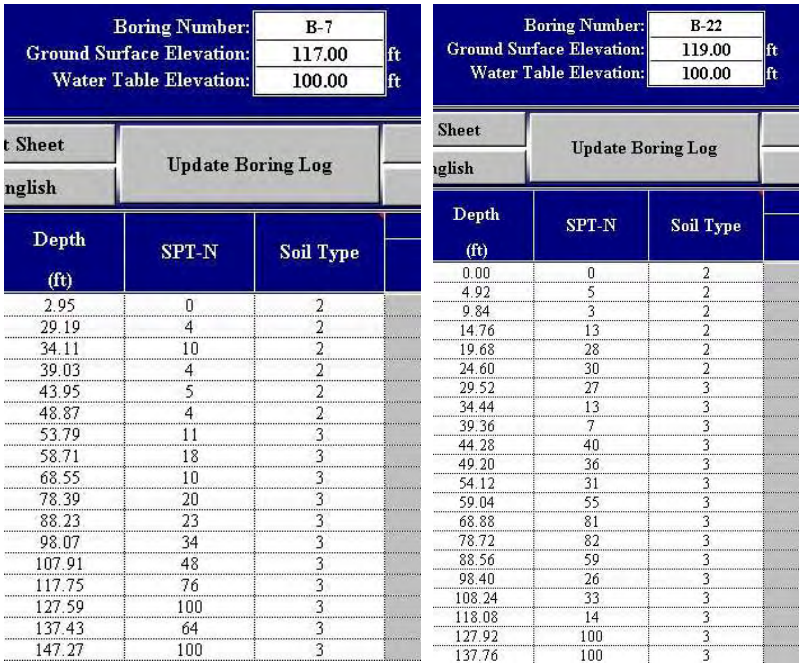
Boring Number: CB-4
Ground Surface Elevation: 8.64 ft
Water Table Elevation: -999.00 ft

Sheet | Update Boring Log | nglish

Depth (ft)	SPT-N	Soil Type
1.00	12	1
9.00	14	1
10.00	13	1
14.00	19	1
15.00	18	1
19.00	18	1
20.00	27	3
23.00	27	3
28.00	17	3
33.00	23	3
38.00	23	3
39.00	15	1
40.00	18	1
48.00	17	1
49.00	17	1
53.00	21	1
56.00	21	1
57.00	27	3
63.00	27	3
68.00	48	3

(b)

Figure B-33 Union Pacific Railroad: (a) CB-3 and (b) CB-4



Boring Number: B-7
Ground Surface Elevation: 117.00 ft
Water Table Elevation: 100.00 ft

t Sheet | Update Boring Log | nglish

Depth (ft)	SPT-N	Soil Type
2.95	0	2
29.19	4	2
34.11	10	2
39.03	4	2
43.95	5	2
48.87	4	2
53.79	11	3
58.71	18	3
68.55	10	3
78.39	20	3
88.23	23	3
98.07	34	3
107.91	48	3
117.75	76	3
127.59	100	3
137.43	64	3
147.27	100	3

(a)

Boring Number: B-22
Ground Surface Elevation: 119.00 ft
Water Table Elevation: 100.00 ft

Sheet | Update Boring Log | nglish

Depth (ft)	SPT-N	Soil Type
0.00	0	2
4.92	5	2
9.84	3	2
14.76	13	2
19.68	28	2
24.60	30	2
29.52	27	3
34.44	13	3
39.36	7	3
44.28	40	3
49.20	36	3
54.12	31	3
59.04	55	3
68.88	81	3
78.72	82	3
88.56	59	3
98.40	26	3
108.24	33	3
118.08	14	3
127.92	100	3
137.76	100	3

(b)

Figure B-34 US 82 Mississippi River Bridge: (a) B-7 and (b) B-22

Appendix B (continued)

	B-1				B-1a				B-2				B-2a	
ground el	4.237	m		ground el	4.094	m		ground el	4.291	m		ground el	4.329	m
water el	3.1	m		water el	1.9	m		water el	2	m		water el	3.1	m
Depth (m)	SPT N	ST		Depth (m)	SPT N	ST		Depth (m)	SPT N	ST		Depth (m)	SPT N	ST
0.762	13	3		1	42	3		2.591	28	3		2.591	3	3
1.524	29	3		1.762	45	3		3.353	20	3		3.353	22	3
2.286	10	3		2.524	30	3		4.115	19	3		4.115	22	3
3.048	21	3		3.286	23	3		4.877	13	3		4.877	24	3
3.81	13	3		4.048	26	3		5.639	23	3		5.639	36	3
4.572	27	3		4.81	23	3		6.401	24	3		6.401	38	3
5.334	25	3		5.572	49	3		7.163	38	3		7.163	50	3
6.096	36	3		6.334	56	3		7.925	45	3		7.925	63	3
6.858	34	3		7.096	52	3		8.687	54	3		8.687	43	3
7.62	79	3		7.858	51	3		9.449	34	3		9.449	42	3
8.382	54	3		8.62	64	3		10.211	46	3		10.211	36	3
9.144	50	3		9.382	71	3		10.973	19	3		10.973	36	3
9.906	99	3		10.144	34	3		11.735	17	3		11.735	57	3
10.668	79	3		10.906	50	3		12.497	28	3		12.497	63	3
11.43	39	3		11.668	39	3		13.259	62	3		13.259	74	3
12.192	33	3		12.43	33	3		14.021	43	3		14.021	53	3
12.954	47	3		13.192	26	3		14.783	46	3		14.783	36	3
13.716	41	3		13.954	30	3		15.545	47	3		15.545	37	3
14.478	53	3		14.716	41	3		16.307	63	3		16.307	38	3
15.24	58	3		15.478	44	3		17.069	77	3		17.069	39	3
16.002	70	3		16.24	46	3		17.831	77	3		17.831	43	3
16.764	59	3		17.002	52	3		18.593	79	3		18.593	45	3
17.526	82	3		17.764	38	3		19.355	80	3		19.355	71	3
18.288	69	3		18.526	33	3		20.117	91	3		20.117	88	3
19.05	91	3		19.288	35	3		20.879	87	3		20.879	63	3
19.812	33	3		20.05	33	3		21.641	71	3		21.641	87	3
20.574	50	3		20.812	32	3		22.403	80	3		22.403	54	3
21.336	62	3		21.574	25	3		23.165	95	3		23.165	53	3
22.098	50	3		22.336	27	3		23.927	44	3		23.927	48	3
22.86	74	3		23.098	24	3		24.689	69	3		24.689	50	3
23.622	40	3		23.86	25	3		25.451	79	3		25.451	53	3
24.384	36	3		24.622	22	3		26.213	71	3		26.213	22	3
25.146	58	3		25.384	1	3		26.975	34	3		26.975	27	3
25.908	54	3		26.146	3	3		27.737	20	3		27.737	28	3
26.67	67	3		26.908	6	3		28.499	48	3		28.499	46	3
27.432	61	3		27.67	10	3		29.261	32	3		29.261	49	3
28.194	55	3		28.432	30	3		30.023	46	3		30.023	40	3
28.956	42	3		29.194	34	3		30.785	37	3		30.785	43	3
29.718	54	3		29.956	38	3		31.547	57	3				
30.48	55	3		30.718	48	3		32.309	67	3				
31.242	49	3		31.48	57	3		33.071	60	3				
32.004	32	3		32.242	67	3		33.833	34	3				
32.766	34	3		33.004	58	3		34.595	38	3				
33.528	32	3		33.766	40	3		35.357	30	3				
34.29	39	3		34.528	28	3		36.119	36	3				
35.052	35	3		35.29	29	3		36.881	30	3				
35.814	26	3		36.052	30	3		37.643	25	3				
36.576	27	3		36.814	34	3		38.405	30	3				
37.338	26	3		37.576	47	3		39.167	22	3				
38.1	36	3		38.338	69	3		39.929	30	3				
38.862	39	3		39.1	51	3								

(a) (b) (c) (d)

Figure B-35 US 98: (a) B-1, (b) B-1A, (c) B-2, and (d) B-2A

	B-3				B-3a				B-4				B-5	
ground el	4.095	m		ground el	4.253	m		ground el	4.1	m		ground el	4.151	m
water el	1	m		water el	2.7	m		water el	2	m		water el	2.4	m
Depth (m)	SPT N	ST		Depth (m)	SPT N	ST		Depth (m)	SPT N	ST		Depth (m)	SPT N	ST
0.762	4	3		2.5	12	3		0.762	18	3		2.5	17	3
1.524	5	3		3.262	11	3		1.524	16	3		3.262	23	3
2.286	20	3		4.024	10	3		2.286	43	3		4.024	31	3
3.048	15	3		4.786	8	3		3.048	5	3		4.786	26	3
3.81	18	3		5.548	11	3		3.81	6	3		5.548	32	3
4.572	16	3		6.31	9	3		4.572	10	3		6.31	32	3
5.334	17	3		7.072	45	3		5.334	38	3		7.072	24	3
6.096	28	3		7.834	41	3		6.096	49	3		7.834	32	3
6.858	26	3		8.596	50	3		6.858	54	3		8.596	33	3
7.62	37	3		9.358	46	3		7.62	71	3		9.358	32	3
8.382	31	3		10.12	48	3		8.382	85	3		10.12	55	3
9.144	25	3		10.882	57	3		9.144	50	3		10.882	53	3
9.906	25	3		11.644	41	3		9.906	42	3		11.644	52	3
10.668	27	3		12.406	34	3		10.668	34	3		12.406	47	3
11.43	24	3		13.168	39	3		11.43	34	3		13.168	36	3
12.192	46	3		13.93	37	3		12.192	32	3		13.93	76	3
12.954	41	3		14.692	50	3		12.954	59	3		14.692	32	3
13.716	45	3		15.454	51	3		13.716	37	3		15.454	56	3
14.478	41	3		16.216	57	3		14.478	40	3		16.216	61	3
15.24	49	3		16.978	48	3		15.24	56	3		16.978	69	3
16.002	46	3		17.74	92	3		16.002	69	3		17.74	57	3
16.764	85	3		18.502	72	3		16.764	28	3		18.502	62	3
17.526	66	3		19.264	59	3		17.526	42	3		19.264	27	3
18.288	52	3		20.026	54	3		18.288	17	3		20.026	31	3
19.05	50	3		20.788	50	3		19.05	14	3		20.788	33	3
19.812	24	3		21.55	46	3		19.812	20	3		21.55	30	3
20.574	24	3		22.312	57	3		20.574	13	3		22.312	12	3
21.336	27	3		23.074	54	3		21.336	17	3		23.074	3	3
22.098	22	3		23.836	77	3		22.098	18	3		23.836	2	3
22.86	24	3		24.598	61	3		22.86	16	3		24.598	13	3
23.622	23	3		25.36	18	3		23.622	15	3		25.36	39	3
24.384	25	3		26.122	24	3		24.384	11	3		26.122	33	3
25.146	7	3		26.884	13	3		25.146	11	3		26.884	63	3
25.908	6	3		27.646	5	3		25.908	0	3		27.646	88	3
26.67	5	3		28.408	6	3		26.67	0	3		28.408	50	3
27.432	5	3		29.17	23	3		27.432	0	3		29.17	44	3
28.194	42	3		29.932	32	3		28.194	0	3		29.932	43	3
28.956	4	3						28.956	0	3		30.694	33	3
29.718	27	3						29.718	24	3		31.456	67	3
30.48	25	3						30.48	31	3		32.218	70	3
31.242	39	3						31.242	28	3		32.98	43	3
32.004	38	3						32.004	36	3		33.742	27	3
32.766	31	3						32.766	38	3		34.504	41	3
33.528	27	3						33.528	24	3		35.266	23	3
34.29	23	3						34.29	23	3		36.028	23	3
35.052	26	3						35.052	25	3		36.79	24	3
35.814	19	3						35.814	18	3		37.552	33	3
36.576	19	3						36.576	21	3		38.314	38	3
37.338	24	3						37.338	23	3		39.076	32	3
38.1	24	3						38.1	15	3		39.838	25	3
38.862	25	3						38.862	24	3				

(a) (b) (c) (d)

Figure B-36 US 98: (a) B-3, (b) B-3A, (c) B-4, and (d) B-5

	B-6			B-7			B-8a			B-8c	
ground el	4.185	m	ground el	4.27	m	ground el	4.257	m	ground el	4.21	m
water el	2.4	m	water el	2.8	m	water el	2	m	water el	1.9	m
Depth (m)	SPT N	ST	Depth (m)	SPT N	ST	Depth (m)	SPT N	ST	Depth (m)	SPT N	ST
1	16	3	1	31	3	1	20	3	2.5	6	3
1.762	29	3	1.762	34	3	1.762	22	3	3.262	19	3
2.524	36	3	2.524	28	3	2.524	20	3	4.024	20	3
3.286	18	3	3.286	21	3	3.286	15	3	4.786	24	3
4.048	22	3	4.048	18	3	4.048	8	3	5.548	21	3
4.81	27	3	4.81	24	3	4.81	5	3	6.31	21	3
5.572	43	3	5.572	17	3	5.572	12	3	7.072	22	3
6.334	33	3	6.334	30	3	6.334	17	3	7.834	27	3
7.096	38	3	7.096	41	3	7.096	20	3	8.596	27	3
7.858	13	3	7.858	29	3	7.858	26	3	9.358	26	3
8.62	24	3	8.62	38	3	8.62	29	3	10.12	29	3
9.382	21	3	9.382	40	3	9.382	34	3	10.882	31	3
10.144	42	3	10.144	29	3	10.144	43	3	11.644	26	3
10.906	44	3	10.906	32	3	10.906	40	3	12.406	30	3
11.668	44	3	11.668	20	3	11.668	43	3	13.168	44	3
12.43	46	3	12.43	33	3	12.43	39	3	13.93	41	3
13.192	48	3	13.192	33	3	13.192	36	3	14.692	44	3
13.954	37	3	13.954	39	3	13.954	37	3	15.454	26	3
14.716	31	3	14.716	40	3	14.716	36	3	16.216	17	3
15.478	27	3	15.478	52	3	15.478	43	3	16.978	30	3
16.24	14	3	16.24	53	3	16.24	55	3	17.74	25	3
17.002	23	3	17.002	42	3	17.002	43	3	18.502	24	3
17.764	26	3	17.764	28	3	17.764	34	3	19.264	24	3
18.526	21	3	18.526	37	3	18.526	42	3	20.026	26	3
19.288	15	3	19.288	35	3	19.288	57	3	20.788	24	3
20.05	14	3	20.05	26	3	20.05	57	3	21.55	22	3
20.812	14	3	20.812	30	3	20.812	44	3	22.312	12	3
21.574	12	3	21.574	24	3	21.574	41	3	23.074	12	3
22.336	3	3	22.336	26	3	22.336	42	3	23.836	12	3
23.098	0	3	23.098	37	3	23.098	46	3	24.598	9	3
23.86	0	3	23.86	24	3	23.86	34	3	25.36	38	3
24.622	50	3	24.622	27	3	24.622	25	3	26.122	48	3
25.384	20	3	25.384	35	3	25.384	20	3	26.884	41	3
26.146	36	3	26.146	31	3	26.146	21	3	27.646	36	3
26.908	60	3	26.908	22	3	26.908	22	3	28.408	52	3
27.67	77	3	27.67	0	3	27.67	22	3	29.17	54	3
28.432	50	3	28.432	0	3	28.432	27	3	29.932	66	3
29.194	27	3	29.194	0	3	29.194	15	3	30.694	76	3
29.956	54	3	29.956	30	3	29.956	20	3	31.456	48	3
30.718	45	3	30.718	27	3	30.718	24	3	32.218	27	3
31.48	47	3	31.48	37	3	31.48	36	3	32.98	43	3
32.242	53	3	32.242	49	3	32.242	59	3	33.742	50	3
33.004	51	3	33.004	39	3	33.004	35	3	34.504	44	3
33.766	25	3	33.766	29	3	33.766	24	3	35.266	41	3
34.528	42	3	34.528	41	3	34.528	20	3	36.028	36	3
35.29	27	3	35.29	27	3	35.29	20	3	36.79	30	3
36.052	31	3	36.052	25	3	36.052	22	3	37.552	32	3
36.814	27	3	36.814	20	3	36.814	19	3	38.314	34	3
37.576	29	3	37.576	30	3	37.576	22	3	39.076	35	3
38.338	29	3	38.338	24	3	38.338	23	3	39.838	34	3
39.1	21	3	39.1	26	3	39.1	25	3	40.6	35	3

(a) (b) (c) (d)

Figure B-37 US 98: (a) B-6, (b) B-7, (c) B-8A, and (d) B-8C

	B-9				B-10				B-11				B-12	
ground el	4.449	m		ground el	4.669	m		ground el	4.452	m		ground el	0	m
water el	2.3	m		water el	2.2	m		water el	2.4	m		water el	-2.1	m
Depth (m)	SPT N	ST		Depth (m)	SPT N	ST		Depth (m)	SPT N	ST		Depth (m)	SPT N	ST
1	32	3		1	17	3		1	35	3		1	32	3
1.762	41	3		1.762	10	3		1.762	27	3		1.762	29	3
2.524	12	3		2.524	24	3		2.524	23	3		2.524	37	3
3.286	11	3		3.286	41	3		3.286	2	3		3.286	18	3
4.048	22	3		4.048	5	3		4.048	2	3		4.048	15	3
4.81	17	3		4.81	10	3		4.81	0	3		4.81	21	3
5.572	17	3		5.572	17	3		5.572	20	3		5.572	30	3
6.334	31	3		6.334	16	3		6.334	33	3		6.334	34	3
7.096	39	3		7.096	32	3		7.096	33	3		7.096	45	3
7.858	42	3		7.858	35	3		7.858	42	3		7.858	58	3
8.62	39	3		8.62	40	3		8.62	27	3		8.62	56	3
9.382	38	3		9.382	34	3		9.382	35	3		9.382	55	3
10.144	46	3		10.144	35	3		10.144	36	3		10.144	64	3
10.906	40	3		10.906	34	3		10.906	31	3		10.906	89	3
11.668	37	3		11.668	36	3		11.668	42	3		11.668	87	3
12.43	39	3		12.43	45	3		12.43	47	3		12.43	73	3
13.192	42	3		13.192	38	3		13.192	87	3		13.192	71	3
13.954	34	3		13.954	45	3		13.954	55	3		13.954	77	3
14.716	37	3		14.716	39	3		14.716	48	3		14.716	90	3
15.478	30	3		15.478	46	3		15.478	63	3		15.478	61	3
16.24	35	3		16.24	47	3		16.24	35	3		16.24	60	3
17.002	26	3		17.002	56	3		17.002	53	3		17.002	51	3
17.764	44	3		17.764	32	3		17.764	83	3		17.764	39	3
18.526	45	3		18.526	36	3		18.526	89	3		18.526	46	3
19.288	38	3		19.288	27	3		19.288	77	3		19.288	37	3
20.05	27	3		20.05	31	3		20.05	87	3		20.05	42	3
20.812	24	3		20.812	46	3		20.812	56	3		20.812	46	3
21.574	26	3		21.574	57	3		21.574	53	3		21.574	72	3
22.336	34	3		22.336	46	3		22.336	65	3		22.336	69	3
23.098	40	3		23.098	58	3		23.098	41	3		23.098	41	3
23.86	16	3		23.86	60	3		23.86	37	3		23.86	46	3
24.622	18	3		24.622	66	3		24.622	69	3		24.622	29	3
25.384	8	3		25.384	55	3		25.384	57	3		25.384	27	3
26.146	9	3		26.146	56	3		26.146	75	3		26.146	23	3
26.908	15	3		26.908	46	3		26.908	89	3		26.908	26	3
27.67	20	3		27.67	16	3		27.67	79	3		27.67	24	3
28.432	40	3		28.432	15	3		28.432	82	3		28.432	28	3
29.194	60	3		29.194	15	3		29.194	61	3		29.194	11	3
29.956	40	3		29.956	14	3		29.956	63	3		29.956	10	3
30.718	32	3		30.718	10	3		30.718	50	3		30.718	1	3
31.48	57	3		31.48	29	3		31.48	19	3		31.48	0	3
32.242	63	3		32.242	34	3		32.242	19	3		32.242	73	3
33.004	58	3		33.004	44	3		33.004	20	3		33.004	52	3
33.766	63	3		33.766	44	3		33.766	29	3		33.766	52	3
34.528	54	3		34.528	39	3		34.528	25	3		34.528	40	3
35.29	46	3		35.29	43	3		35.29	33	3		35.29	47	3
36.052	49	3		36.052	46	3		36.052	29	3		36.052	24	3
36.814	44	3		36.814	33	3		36.814	46	3		36.814	26	3
37.576	46	3		37.576	37	3		37.576	44	3		37.576	19	3
				38.338	32	3		38.338	50	3		38.338	35	3
				39.1	30	3								

(a) (b) (c) (d)

Figure B-38 US 98: (a) B-9, (b) B-10, (c) B-11, and (d) B-12

	B-13				B-14				B-15				B-16	
ground el	4.049	m		ground el	4.13	m		ground el	4.133	m		ground el	4.144	m
water el	2	m		water el	1.8	m		water el	2	m		water el	1.8	m
Depth (m)	SPT N	ST		Depth (m)	SPT N	ST		Depth (m)	SPT N	ST		Depth (m)	SPT N	ST
1	25	3		1	45	3		1	35	3		1	53	3
1.762	11	3		1.762	39	3		1.762	29	3		1.762	68	3
2.524	20	3		2.524	53	3		2.524	26	3		2.524	28	3
3.286	8	3		3.286	29	3		3.286	25	3		3.286	48	3
4.048	7	3		4.048	40	3		4.048	38	3		4.048	54	3
4.81	25	3		4.81	38	3		4.81	35	3		4.81	74	3
5.572	16	3		5.572	44	3		5.572	55	3		5.572	65	3
6.334	23	3		6.334	36	3		6.334	53	3		6.334	86	3
7.096	25	3		7.096	30	3		7.096	63	3		7.096	59	3
7.858	35	3		7.858	32	3		7.858	58	3		7.858	47	3
8.62	28	3		8.62	40	3		8.62	75	3		8.62	56	3
9.382	32	3		9.382	55	3		9.382	72	3		9.382	38	3
10.144	50	3		10.144	55	3		10.144	37	3		10.144	43	3
10.906	44	3		10.906	50	3		10.906	32	3		10.906	60	3
11.668	38	3		11.668	54	3		11.668	48	3		11.668	64	3
12.43	45	3		12.43	85	3		12.43	41	3		12.43	81	3
13.192	36	3		13.192	89	3		13.192	43	3		13.192	57	3
13.954	41	3		13.954	83	3		13.954	42	3		13.954	39	3
14.716	52	3		14.716	88	3		14.716	46	3		14.716	40	3
15.478	53	3		15.478	71	3		15.478	45	3		15.478	28	3
16.24	59	3		16.24	59	3		16.24	46	3		16.24	18	3
17.002	35	3		17.002	40	3		17.002	39	3		17.002	32	3
17.764	37	3		17.764	45	3		17.764	33	3		17.764	32	3
18.526	40	3		18.526	62	3		18.526	39	3		18.526	24	3
19.288	38	3		19.288	61	3		19.288	32	3		19.288	25	3
20.05	33	3		20.05	28	3		20.05	28	3		20.05	26	3
20.812	31	3		20.812	30	3		20.812	23	3		20.812	23	3
21.574	37	3		21.574	24	3		21.574	16	3		21.574	9	3
22.336	36	3		22.336	24	3		22.336	2	3		22.336	2	3
23.098	47	3		23.098	30	3		23.098	10	3		23.098	19	3
23.86	47	3		23.86	5	3		23.86	4	3		23.86	18	3
24.622	51	3		24.622	8	3		24.622	2	3		24.622	18	3
25.384	48	3		25.384	13	3		25.384	0	3		25.384	25	3
26.146	29	3		26.146	28	3		26.146	0	3		26.146	27	3
26.908	35	3		26.908	28	3		26.908	0	3		26.908	31	3
27.67	4	3		27.67	36	3		27.67	81	3		27.67	52	3
28.432	4	3		28.432	35	3		28.432	65	3		28.432	26	3
29.194	7	3		29.194	53	3		29.194	58	3		29.194	21	3
29.956	11	3		29.956	53	3		29.956	41	3		29.956	19	3
30.718	24	3		30.718	33	3		30.718	37	3		30.718	19	3
31.48	27	3		31.48	20	3		31.48	34	3		31.48	32	3
32.242	44	3		32.242	26	3		32.242	38	3		32.242	35	3
33.004	41	3		33.004	29	3		33.004	31	3		33.004	44	3
33.766	48	3		33.766	35	3		33.766	32	3		33.766	32	3
34.528	47	3		34.528	32	3		34.528	31	3		34.528	34	3
35.29	48	3		35.29	34	3		35.29	33	3		35.29	35	3
36.052	37	3		36.052	34	3		36.052	26	3		36.052	26	3
36.814	33	3		36.814	25	3		36.814	33	3		36.814	29	3
37.576	41	3		37.576	35	3		37.576	30	3		37.576	21	3
38.338	38	3		38.338	31	3		38.338	30	3		38.338	24	3
				39.1	29	3		39.1	24	3		39.1	25	3

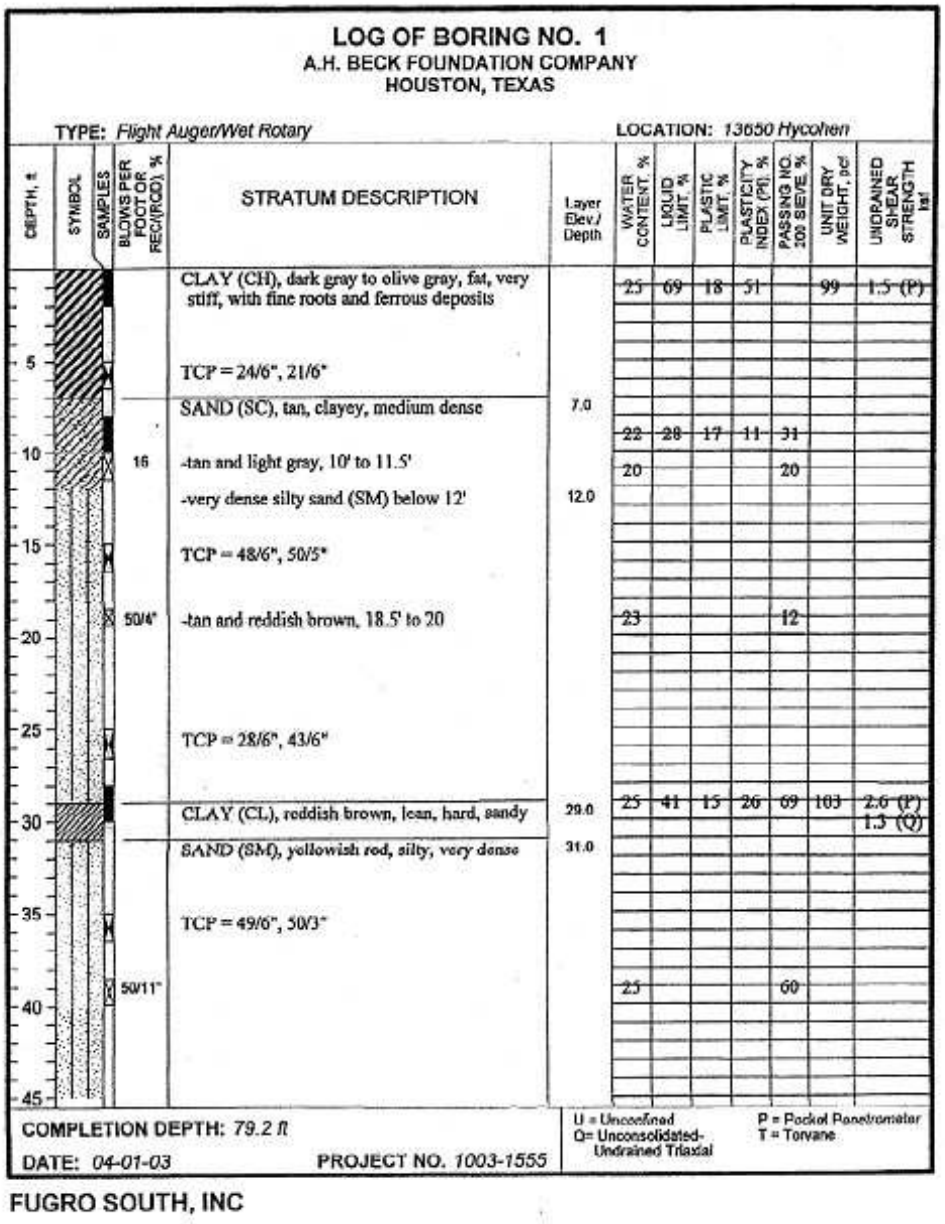
(a) (b) (c) (d)

Figure B-39 US 98: (a) B-13, (b) B-14, (c) B-15, and (d) B-16

	B-17				B-18				B-19				B-20	
ground el	4.016	m		ground el	4.039	m		ground el	4.077	m		ground el	4.122	m
water el	1.6	m		water el	1.8	m		water el	-0.5	m		water el	1.8	m
Depth (m)	SPT N	ST		Depth (m)	SPT N	ST		Depth (m)	SPT N	ST		Depth (m)	SPT N	ST
1	19	3		1	34	3		1	66	3		1	44	3
1.762	22	3		1.762	36	3		1.762	56	3		1.762	39	3
2.524	22	3		2.524	23	3		2.524	22	3		2.524	33	3
3.286	30	3		3.286	28	3		3.286	19	3		3.286	28	3
4.048	27	3		4.048	18	3		4.048	24	3		4.048	20	3
4.81	25	3		4.81	12	3		4.81	24	3		4.81	20	3
5.572	37	3		5.572	24	3		5.572	22	3		5.572	30	3
6.334	41	3		6.334	20	3		6.334	22	3		6.334	25	3
7.096	32	3		7.096	17	3		7.096	19	3		7.096	30	3
7.858	30	3		7.858	26	3		7.858	16	3		7.858	30	3
8.62	48	3		8.62	13	3		8.62	6	3		8.62	32	3
9.382	52	3		9.382	16	3		9.382	5	3		9.382	42	3
10.144	48	3		10.144	13	3		10.144	14	3		10.144	41	3
10.906	47	3		10.906	8	3		10.906	15	3		10.906	46	3
11.668	55	3		11.668	12	3		11.668	6	3		11.668	55	3
12.43	62	3		12.43	15	3		12.43	3	3		12.43	63	3
13.192	83	3		13.192	18	3		13.192	9	3		13.192	41	3
13.954	76	3		13.954	20	3		13.954	8	3		13.954	36	3
14.716	67	3		14.716	13	3		14.716	15	3		14.716	32	3
15.478	66	3		15.478	14	3		15.478	19	3		15.478	39	3
16.24	48	3		16.24	23	3		16.24	8	3		16.24	30	3
17.002	49	3		17.002	25	3		17.002	8	3		17.002	32	3
17.764	45	3		17.764	26	3		17.764	24	3		17.764	30	3
18.526	48	3		18.526	28	3		18.526	20	3		18.526	24	3
19.288	78	3		19.288	22	3		19.288	34	3		19.288	28	3
20.05	91	3		20.05	20	3		20.05	33	3		20.05	24	3
20.812	53	3		20.812	22	3		20.812	41	3		20.812	2	3
21.574	54	3		21.574	20	3		21.574	39	3		21.574	9	3
22.336	43	3		22.336	2	3		22.336	25	3		22.336	32	3
23.098	40	3		23.098	1	3		23.098	28	3		23.098	28	3
23.86	18	3		23.86	37	3		23.86	49	3		23.86	24	3
24.622	29	3		24.622	38	3		24.622	45	3		24.622	20	3
25.384	28	3		25.384	39	3		25.384	28	3		25.384	42	3
26.146	25	3		26.146	41	3		26.146	24	3		26.146	38	3
26.908	61	3		26.908	73	3		26.908	24	3		26.908	59	3
27.67	71	3		27.67	67	3		27.67	22	3		27.67	65	3
28.432	41	3		28.432	55	3		28.432	37	3		28.432	54	3
29.194	39	3		29.194	44	3		29.194	34	3		29.194	37	3
29.956	23	3		29.956	30	3		29.956	18	3		29.956	39	3
30.718	19	3		30.718	30	3		30.718	15	3		30.718	41	3
31.48	39	3		31.48	25	3		31.48	18	3		31.48	52	3
32.242	44	3		32.242	24	3		32.242	14	3		32.242	66	3
33.004	43	3		33.004	23	3		33.004	20	3		33.004	31	3
33.766	46	3		33.766	28	3		33.766	18	3		33.766	36	3
34.528	33	3		34.528	31	3		34.528	16	3		34.528	37	3
35.29	31	3		35.29	36	3		35.29	13	3		35.29	36	3
36.052	34	3		36.052	32	3		36.052	21	3		36.052	27	3
36.814	31	3		36.814	43	3		36.814	19	3		36.814	37	3
37.576	27	3		37.576	40	3		37.576	21	3		37.576	44	3
38.338	27	3		38.338	53	3		38.338	50	3		38.338	49	3
39.1	34	3		39.1	52	3		39.1	43	3		39.1	55	3

(a) (b) (c) (d)

Figure B-40 US 98: (a) B-17, (b) B-18, (c) B-19, and (d) B-20



LOG OF BORING NO. 1
A.H. BECK FOUNDATION COMPANY
HOUSTON, TEXAS

TYPE: *Flight Auger/Wet Rotary* LOCATION: *13650 Hycohen*

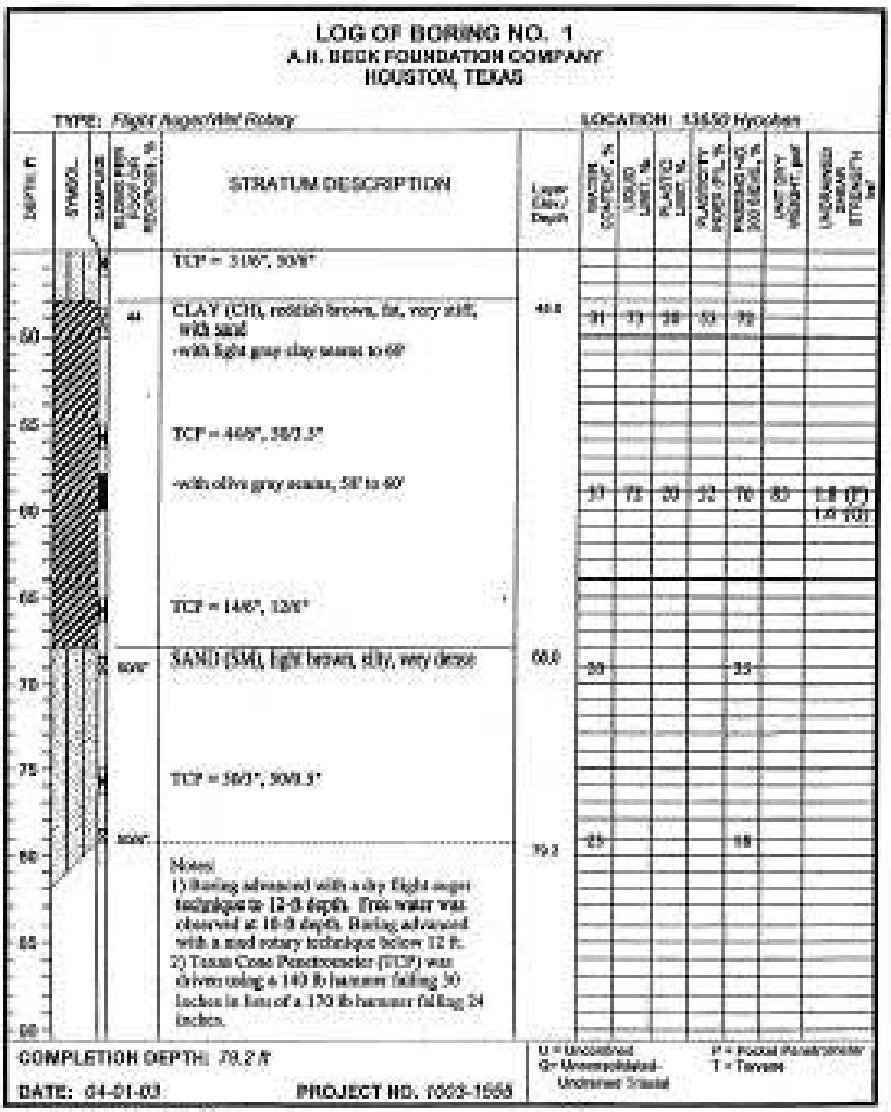
DEPTH, ft	SYMBOL	SAMPLES	BLOWS PER FOOT OR REC/(ROD), %	STRATUM DESCRIPTION	Layer Elev./ Depth	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX (PI), %	PASSING NO. 200 SIEVE, %	UNIT DRY WEIGHT, pcf	UNDRAINED SHEAR STRENGTH tsf
0				CLAY (CH), dark gray to olive gray, fat, very stiff, with fine roots and ferrous deposits		25	69	18	51		99	1.5 (P)
5				TCP = 24/6", 21/6"								
				SAND (SC), tan, clayey, medium dense	7.0	22	28	17	11	31		
10			16	-tan and light gray, 10' to 11.5'		20				20		
				-very dense silty sand (SM) below 12'	12.0							
15				TCP = 48/6", 50/5"								
20			50/4"	-tan and reddish brown, 18.5' to 20		23				12		
25				TCP = 28/6", 43/6"								
30				CLAY (CL), reddish brown, lean, hard, sandy	29.0	25	41	15	26	69	103	2.6 (P) 1.3 (Q)
				SAND (SM), yellowish red, silty, very dense	31.0							
35				TCP = 49/6", 50/3"								
40			50/11"			25				60		
45												

COMPLETION DEPTH: *79.2 ft*
DATE: *04-01-03* PROJECT NO. *1003-1555*

U = Unconfined
Q= Unconsolidated-Undrained Triaxial
P = Pocket Penetrometer
T = Torvane

FUGRO SOUTH, INC

Figure B-41 TexDOT Demo: Boring No. 1 (page 1).



LOG OF BORING NO. 1
A.H. BECK FOUNDATION COMPANY
HOUSTON, TEXAS

TYPE: Flight Auger/Wet Rotary LOCATION: 13550 Hyssop

DEPTH, ft	SYMBOL	SAMPLES	BLOWS PER FOOT OR RECOVERY, in	STRATUM DESCRIPTION	Depth (Elev.) Depth	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX (PI), %	PASSING NO. 200 SIEVE, %	UNIT DRY WEIGHT, pcf	UNCONFINED SHEAR STRENGTH, tsf
				TCP = 316", 30/6"								
60			44	CLAY (CH), reddish brown, fis, very stiff, with sand -with light gray clay seams to 60'	48.8	31	71	28	43	78		
65				TCP = 468", 30/3.5"								
				-with olive gray seams, 58' to 60'		33	72	30	42	76	83	1.8 (P) 1.0 (T)
				TCP = 1487", 12/6"								
70			60/6"	SAND (SM), light brown, silty, very dense	68.0	20				35		
75				TCP = 3803", 30/0.5"								
			60/6"		79.2	25				18		
80				Notes: 1) Boring advanced with a dry flight auger technique to 12-ft depth. Free water was observed at 10-ft depth. Boring advanced with a mud rotary technique below 12 ft. 2) Texas Cone Penetrometer (TCP) was driven using a 140 lb hammer falling 30 inches in lieu of a 170 lb hammer falling 24 inches.								

COMPLETION DEPTH: 79.2 ft
DATE: 04-01-03 PROJECT NO. 1002-1555

U = Undisturbed
Gr Unconsolidated-Undrained Triaxial

P = Pocket Penetrometer
T = Torvane

FUGRO SOUTH, INC

Figure B-42 TexDOT Demo: Boring No. 1 (page 2).

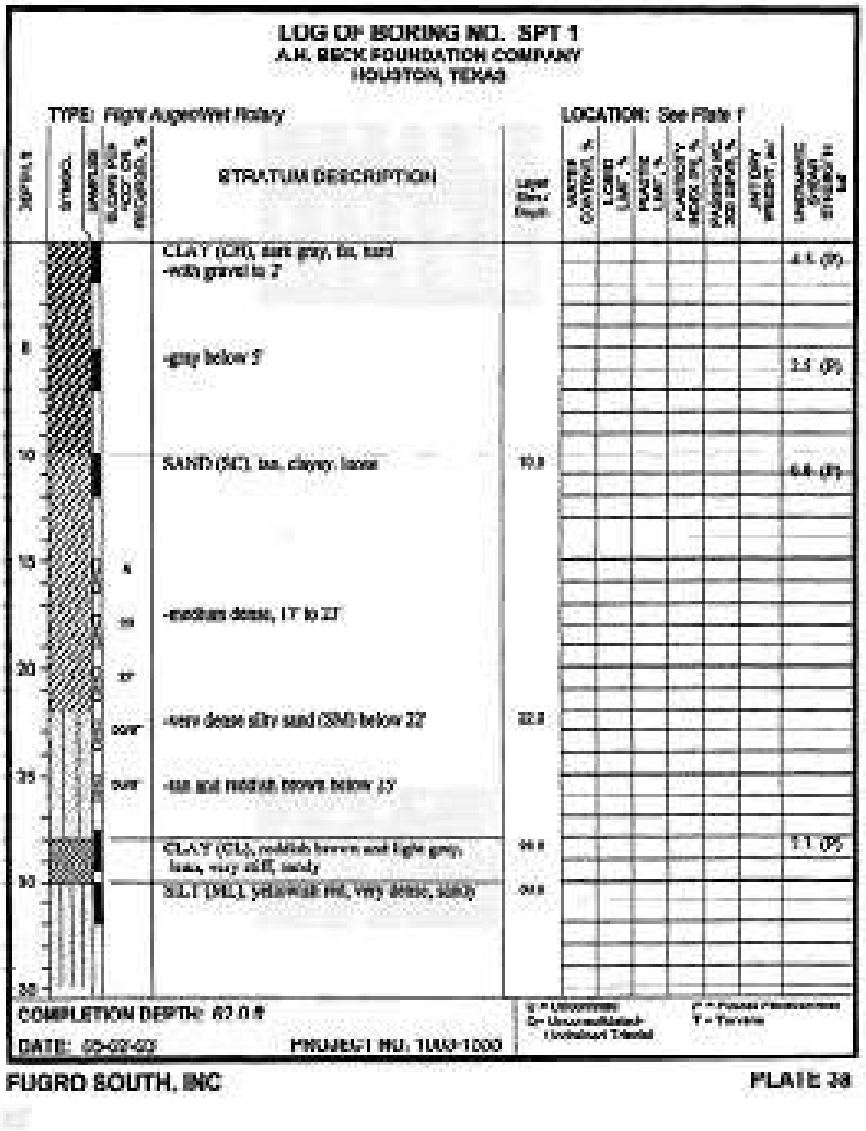


Figure B-43 TexDOT Demo: SPT 1 (page 1).

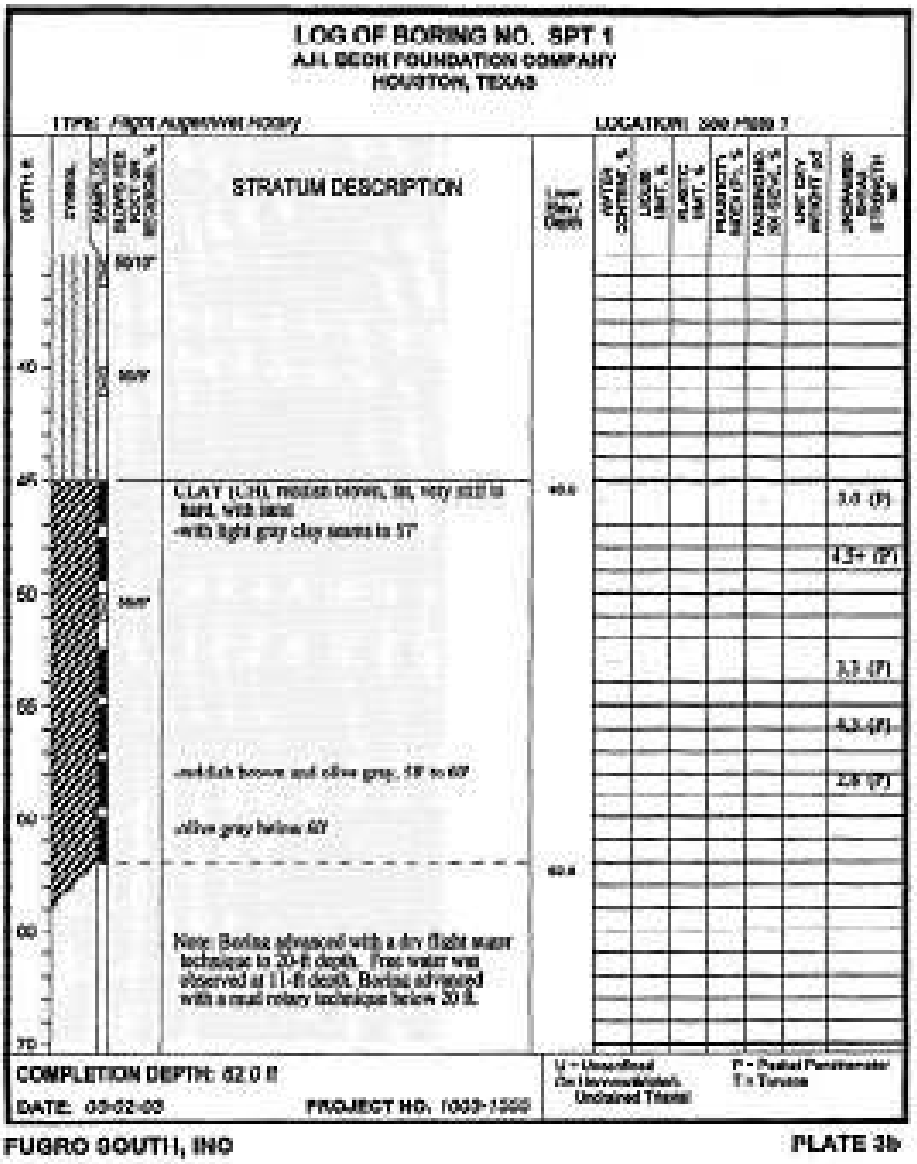


Figure B-44 TexDOT Demo: SPT 1 (page 2).

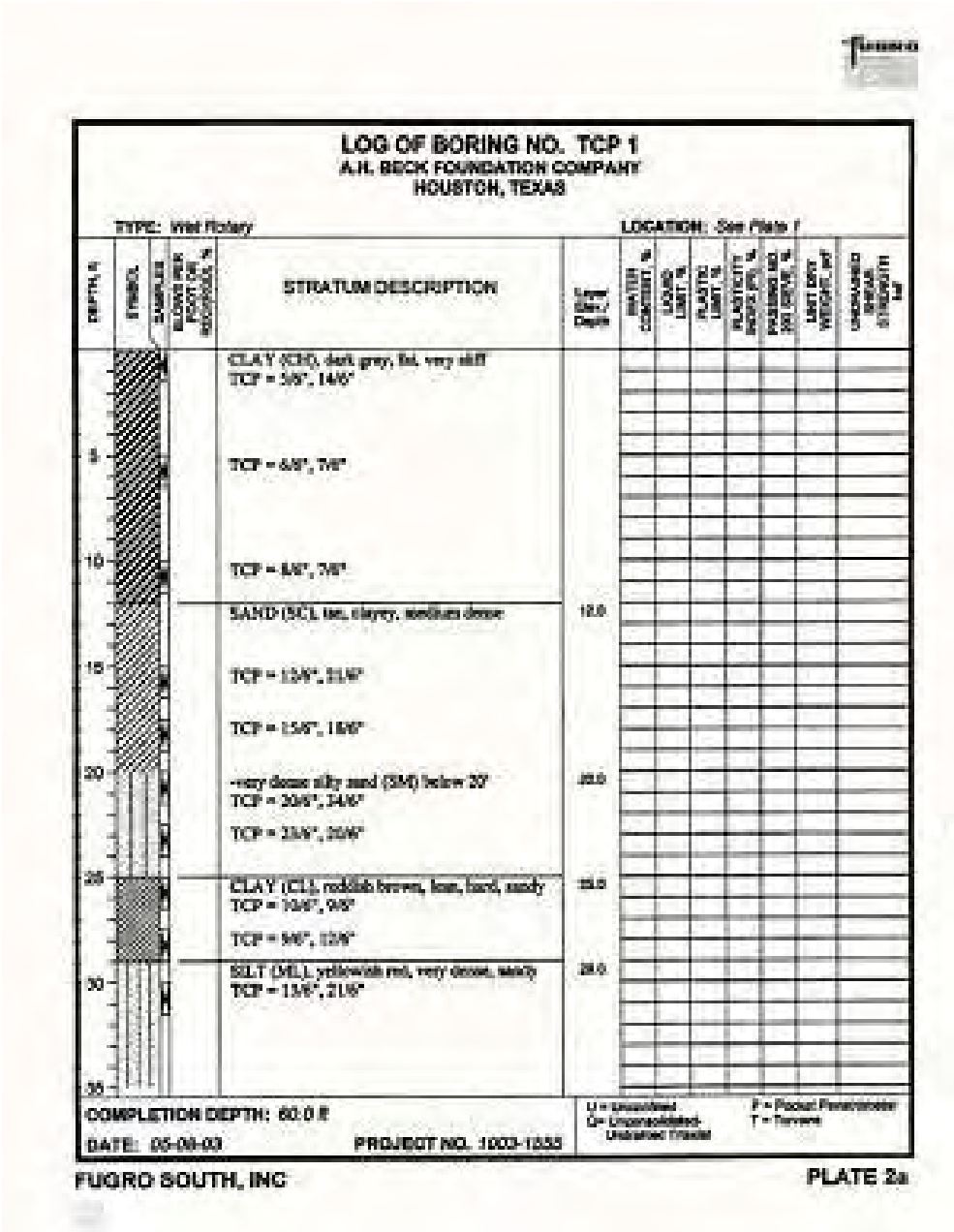


Figure B-45 TexDOT Demo: TCP 1 (page 1).

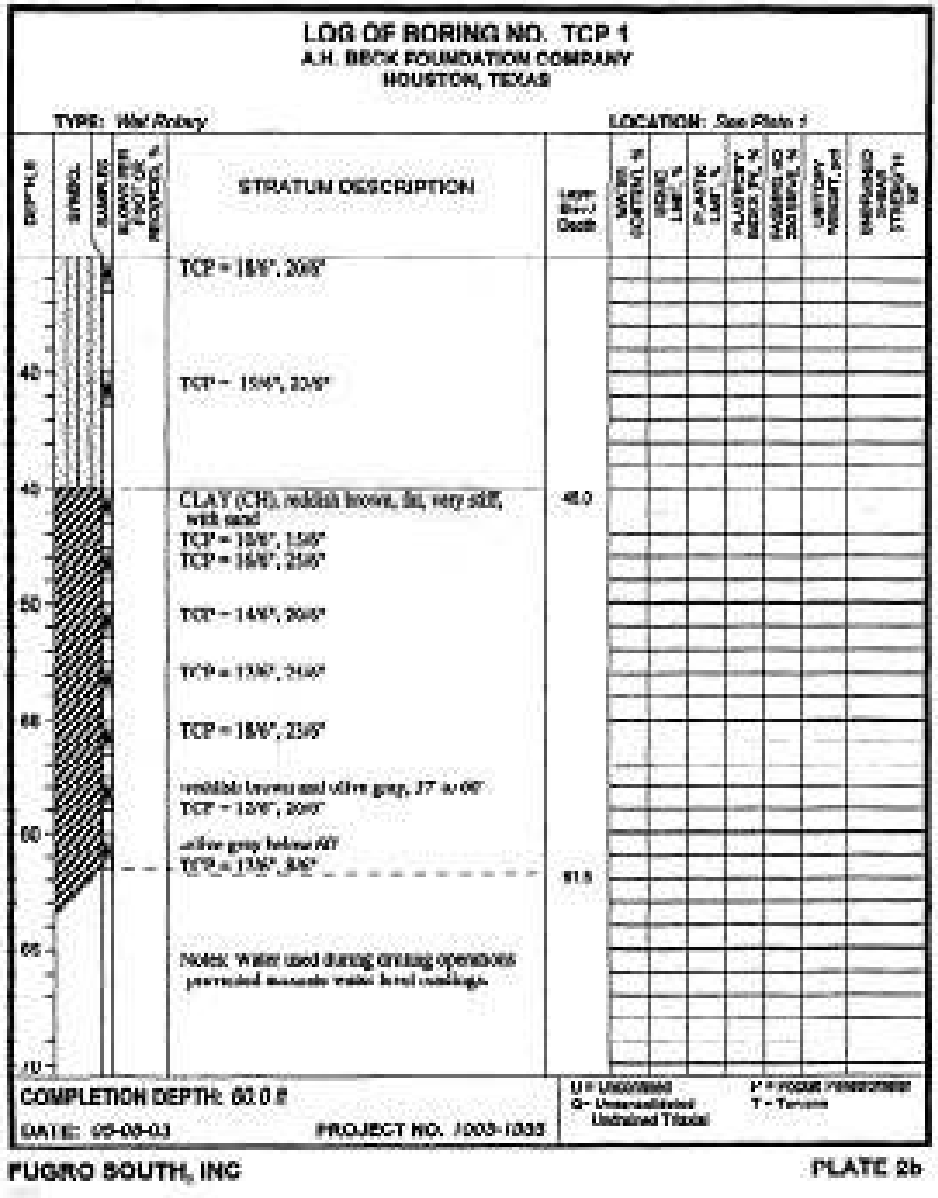


Figure B-46 TexDOT Demo: TCP 1 (page 2).

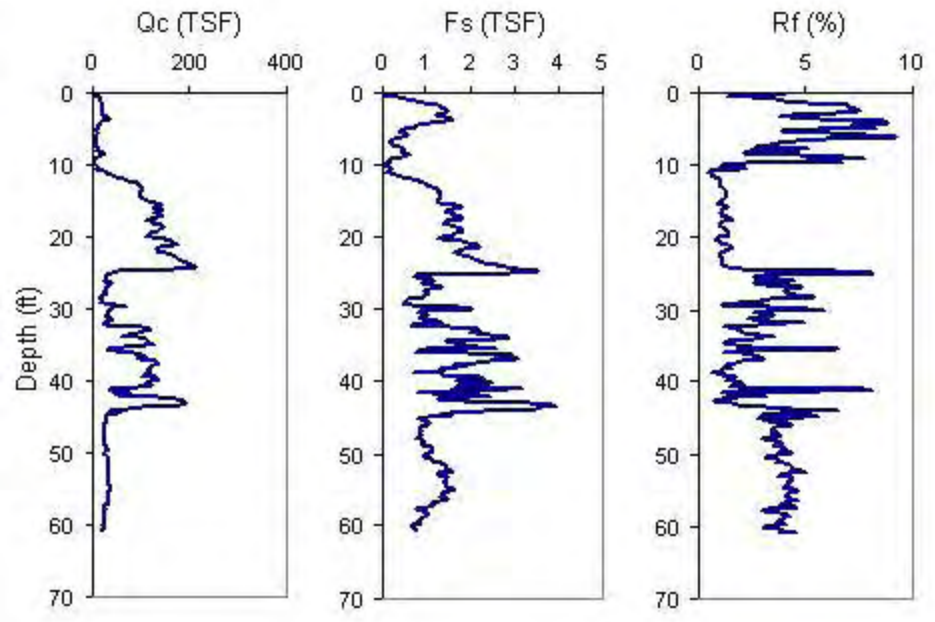


Figure B-47 TexDOT Demo: CPT 2.

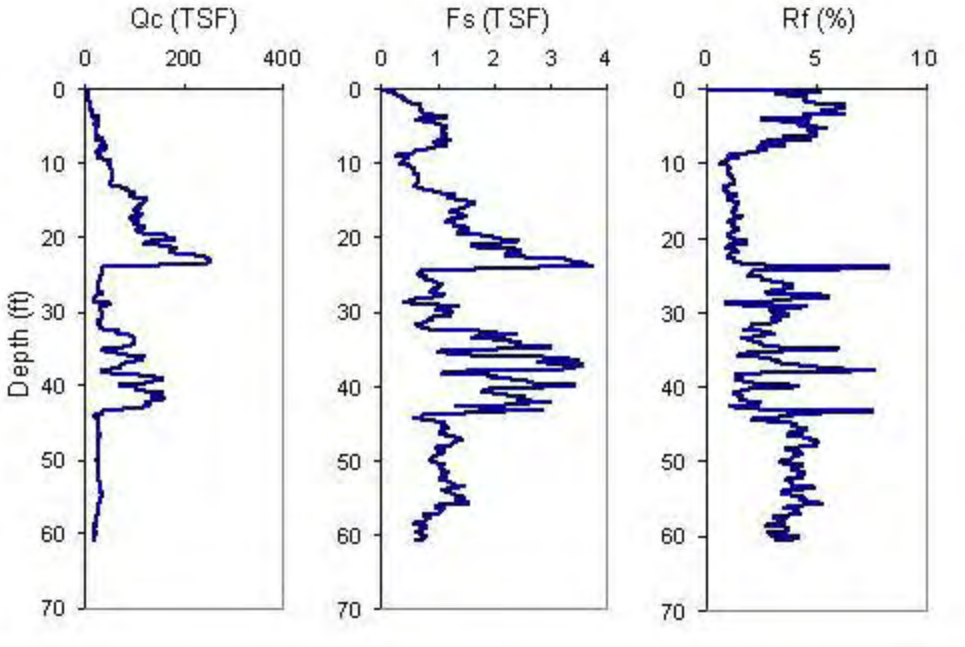


Figure B-48 TexDOT Demo: CPT 4.

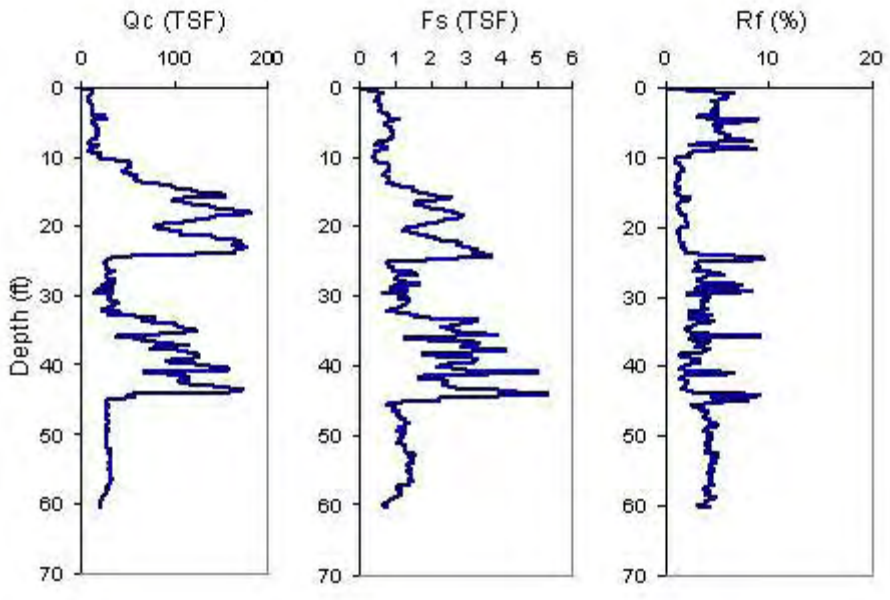


Figure B-49 TexDOT Demo: CPT 5.

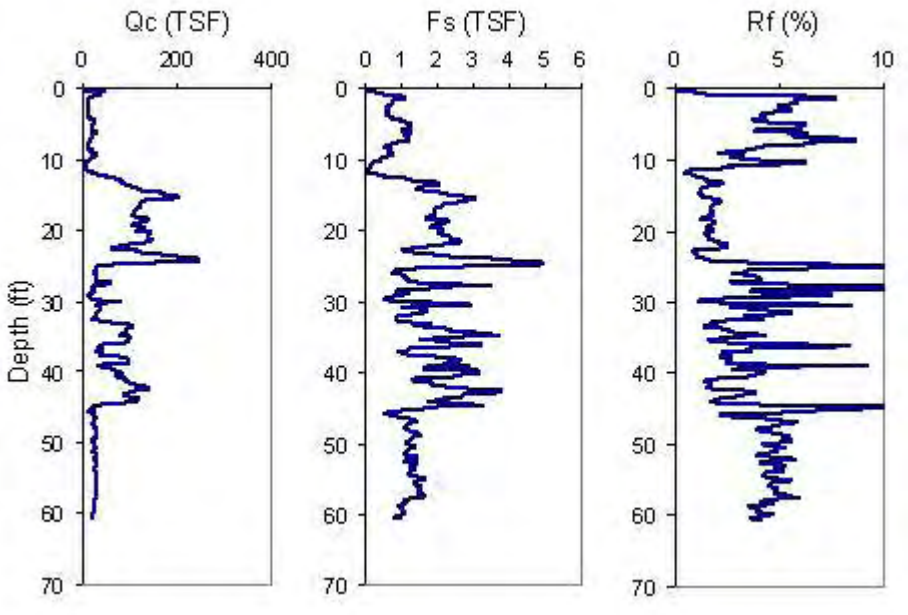
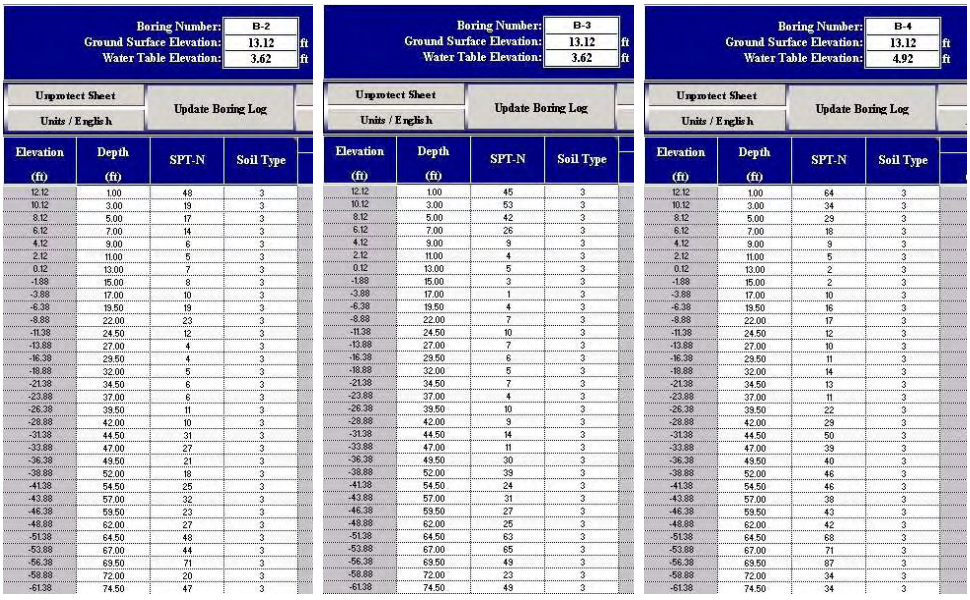


Figure B-50 TexDOT Demo: CPT 6.



Boring Number: B-2
Ground Surface Elevation: 13.12 ft
Water Table Elevation: 3.62 ft
Unprotect Sheet | Update Boring Log
Units / English

Elevation (ft)	Depth (ft)	SPT-N	Soil Type
12.12	1.00	48	3
10.12	3.00	19	3
8.12	5.00	17	3
6.12	7.00	14	3
4.12	9.00	6	3
2.12	11.00	5	3
0.12	13.00	7	3
-1.88	15.00	8	3
-3.88	17.00	10	3
-6.38	19.50	19	3
-8.88	22.00	23	3
-11.38	24.50	12	3
-13.88	27.00	4	3
-16.38	29.50	4	3
-18.88	32.00	5	3
-21.38	34.50	6	3
-23.88	37.00	6	3
-26.38	39.50	11	3
-28.88	42.00	10	3
-31.38	44.50	31	3
-33.88	47.00	27	3
-36.38	49.50	21	3
-38.88	52.00	18	3
-41.38	54.50	25	3
-43.88	57.00	32	3
-46.38	59.50	23	3
-48.88	62.00	27	3
-51.38	64.50	48	3
-53.88	67.00	44	3
-56.38	69.50	71	3
-58.88	72.00	20	3
-61.38	74.50	47	3

(a)

Boring Number: B-3
Ground Surface Elevation: 13.12 ft
Water Table Elevation: 3.62 ft
Unprotect Sheet | Update Boring Log
Units / English

Elevation (ft)	Depth (ft)	SPT-N	Soil Type
12.12	1.00	45	3
10.12	3.00	53	3
8.12	5.00	42	3
6.12	7.00	26	3
4.12	9.00	9	3
2.12	11.00	4	3
0.12	13.00	5	3
-1.88	15.00	3	3
-3.88	17.00	1	3
-6.38	19.50	4	3
-8.88	22.00	7	3
-11.38	24.50	10	3
-13.88	27.00	7	3
-16.38	29.50	6	3
-18.88	32.00	5	3
-21.38	34.50	7	3
-23.88	37.00	4	3
-26.38	39.50	10	3
-28.88	42.00	9	3
-31.38	44.50	16	3
-33.88	47.00	11	3
-36.38	49.50	30	3
-38.88	52.00	39	3
-41.38	54.50	24	3
-43.88	57.00	31	3
-46.38	59.50	27	3
-48.88	62.00	25	3
-51.38	64.50	63	3
-53.88	67.00	65	3
-56.38	69.50	49	3
-58.88	72.00	23	3
-61.38	74.50	49	3

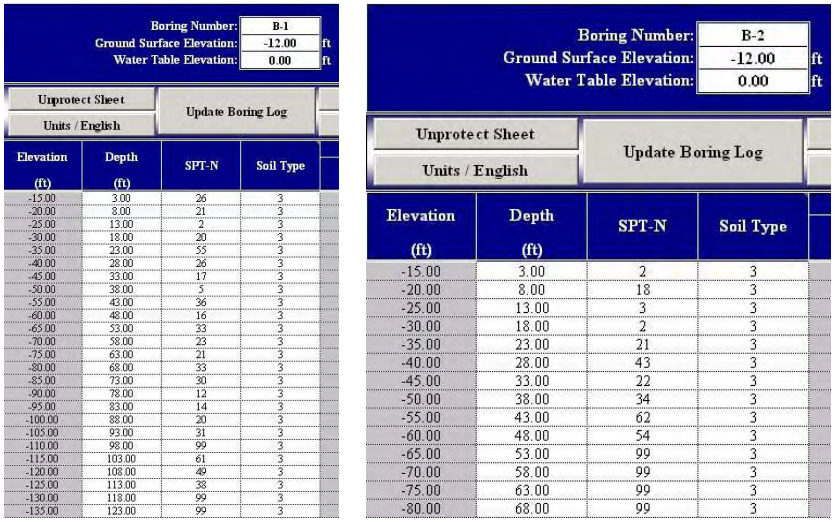
(b)

Boring Number: B-4
Ground Surface Elevation: 13.12 ft
Water Table Elevation: 4.92 ft
Unprotect Sheet | Update Boring Log
Units / English

Elevation (ft)	Depth (ft)	SPT-N	Soil Type
12.12	1.00	64	3
10.12	3.00	34	3
8.12	5.00	29	3
6.12	7.00	18	3
4.12	9.00	9	3
2.12	11.00	5	3
0.12	13.00	2	3
-1.88	15.00	2	3
-3.88	17.00	10	3
-6.38	19.50	16	3
-8.88	22.00	17	3
-11.38	24.50	12	3
-13.88	27.00	10	3
-16.38	29.50	11	3
-18.88	32.00	14	3
-21.38	34.50	13	3
-23.88	37.00	11	3
-26.38	39.50	22	3
-28.88	42.00	29	3
-31.38	44.50	50	3
-33.88	47.00	39	3
-36.38	49.50	49	3
-38.88	52.00	46	3
-41.38	54.50	46	3
-43.88	57.00	38	3
-46.38	59.50	43	3
-48.88	62.00	42	3
-51.38	64.50	68	3
-53.88	67.00	71	3
-56.38	69.50	87	3
-58.88	72.00	34	3
-61.38	74.50	34	3

(c)

Figure B-51 PGA Blvd: (a) B-2, (b) B-3, and (c) B-4.



Boring Number: B-1
Ground Surface Elevation: -12.00 ft
Water Table Elevation: 0.00 ft
Unprotect Sheet | Update Boring Log
Units / English

Elevation (ft)	Depth (ft)	SPT-N	Soil Type
-15.00	3.00	26	3
-20.00	8.00	21	3
-25.00	13.00	2	3
-30.00	18.00	20	3
-35.00	23.00	55	3
-40.00	28.00	26	3
-45.00	33.00	17	3
-50.00	38.00	5	3
-55.00	43.00	36	3
-60.00	48.00	16	3
-65.00	53.00	33	3
-70.00	58.00	23	3
-75.00	63.00	21	3
-80.00	68.00	33	3
-85.00	73.00	30	3
-90.00	78.00	12	3
-95.00	83.00	14	3
-100.00	88.00	20	3
-105.00	93.00	31	3
-110.00	98.00	99	3
-115.00	103.00	61	3
-120.00	108.00	49	3
-125.00	113.00	38	3
-130.00	118.00	99	3
-135.00	123.00	99	3

(a)

Boring Number: B-2
Ground Surface Elevation: -12.00 ft
Water Table Elevation: 0.00 ft
Unprotect Sheet | Update Boring Log
Units / English

Elevation (ft)	Depth (ft)	SPT-N	Soil Type
-15.00	3.00	2	3
-20.00	8.00	18	3
-25.00	13.00	3	3
-30.00	18.00	2	3
-35.00	23.00	21	3
-40.00	28.00	43	3
-45.00	33.00	22	3
-50.00	38.00	34	3
-55.00	43.00	62	3
-60.00	48.00	54	3
-65.00	53.00	99	3
-70.00	58.00	99	3
-75.00	63.00	99	3
-80.00	68.00	99	3

(b)

Figure B-52 Bayway Bridge: (a) B-1 and (b) B-2.

Boring Number: B-3
Ground Surface Elevation: -12.00 ft
Water Table Elevation: 0.00 ft

Unprotect Sheet | Update Boring Log
Units / English

Elevation (ft)	Depth (ft)	SPT-N	Soil Type
-15.00	3.00	9	3
-20.00	8.00	2	3
-25.00	13.00	9	3
-30.00	18.00	10	3
-35.00	23.00	19	3
-40.00	28.00	6	3
-45.00	33.00	16	3
-50.00	38.00	13	3
-55.00	43.00	30	3
-60.00	48.00	22	3
-65.00	53.00	16	3
-70.00	58.00	35	3
-75.00	63.00	38	3
-80.00	68.00	57	3
-85.00	73.00	99	3
-90.00	78.00	99	3
-95.00	83.00	99	3
-100.00	88.00	99	3

(a)

Boring Number: B-4
Ground Surface Elevation: -12.00 ft
Water Table Elevation: 0.00 ft

Unprotect Sheet | Update Boring Log
Units / English

Elevation (ft)	Depth (ft)	SPT-N	Soil Type
-15.00	3.00	5	3
-20.00	8.00	2	3
-25.00	13.00	4	3
-30.00	18.00	5	3
-35.00	23.00	31	3
-40.00	28.00	22	3
-45.00	33.00	16	3
-50.00	38.00	10	3
-55.00	43.00	23	3
-60.00	48.00	32	3
-65.00	53.00	15	3
-70.00	58.00	39	3
-75.00	63.00	38	3
-80.00	68.00	99	3
-85.00	73.00	99	3
-90.00	78.00	99	3
-95.00	83.00	99	3
-100.00	88.00	99	3

(b)

Figure B-53 Bayway Bridge: (a) B-3 and (b) B-4.

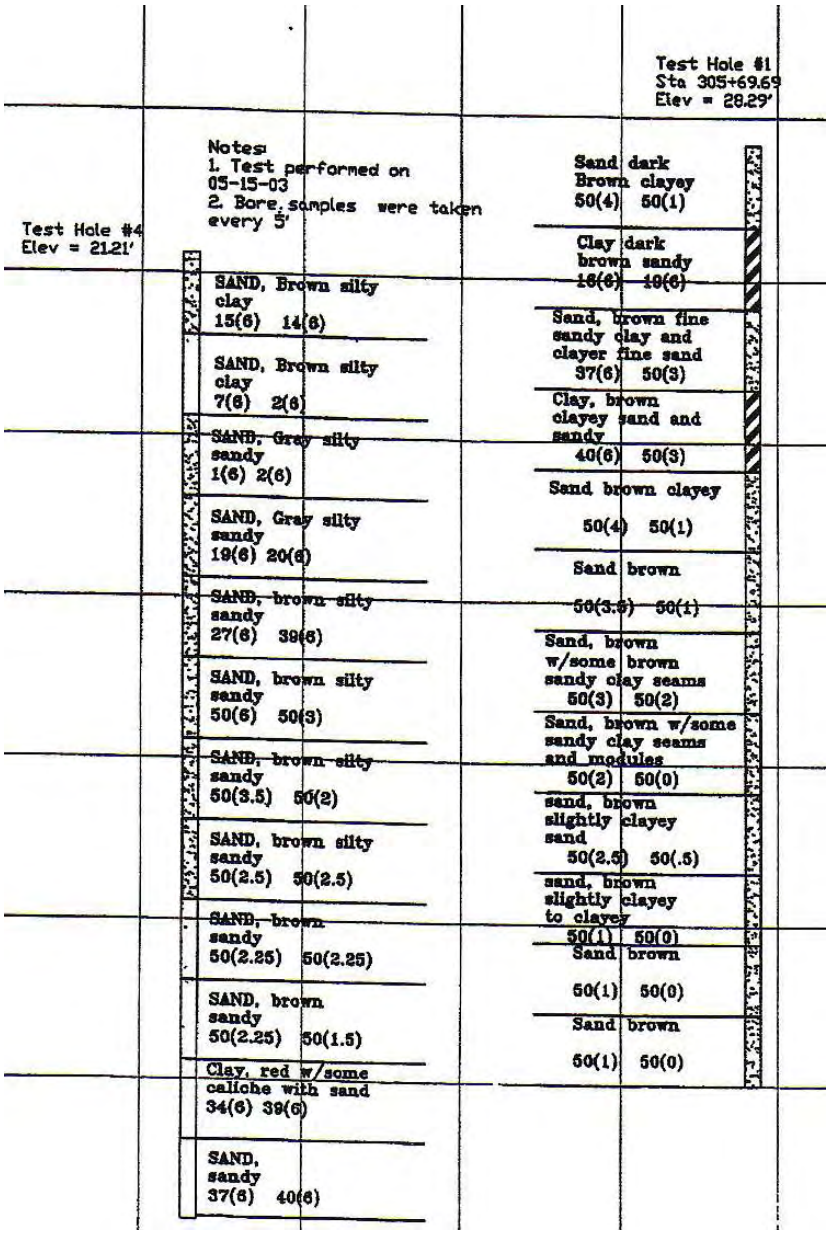
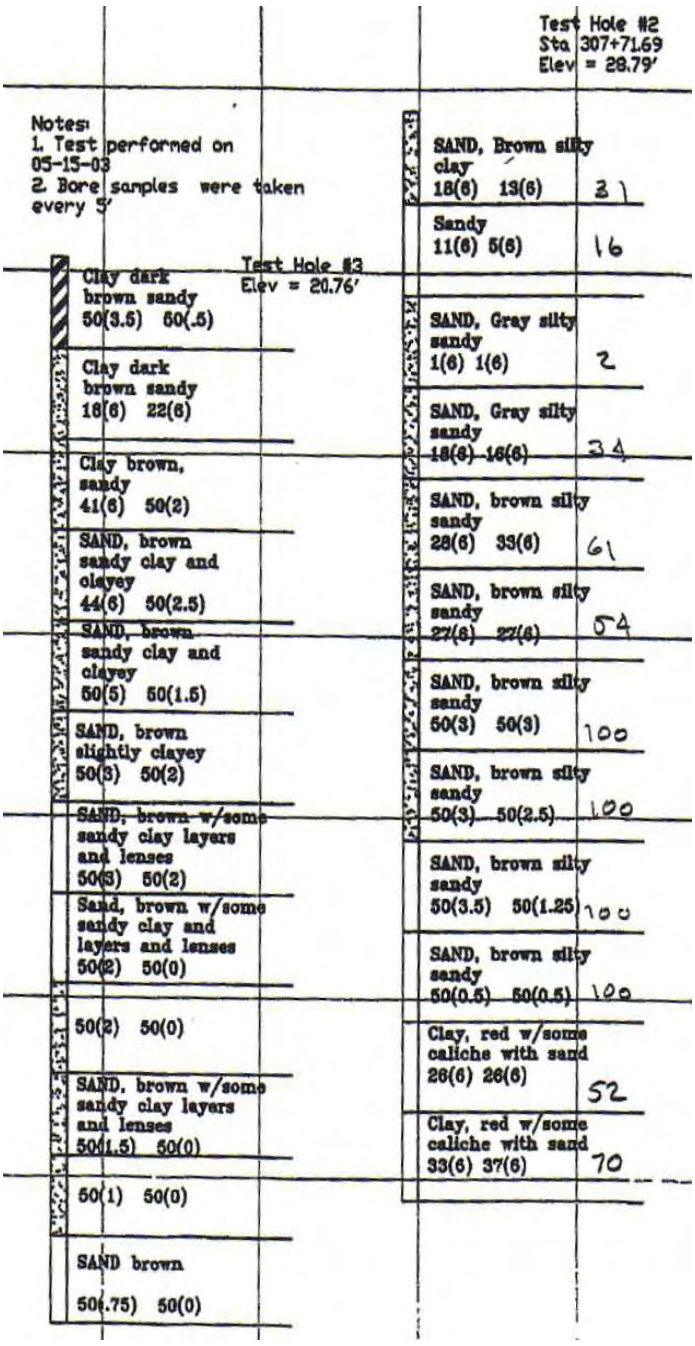


Figure B-54 FM 507: (a) Test Hole #4 and (b) Test Hole #1.



(a) (b)

Figure B-55 FM 507: (a) Test Hole #3 and (b) Test Hole #2.

APPENDIX C DESIGN CURVES

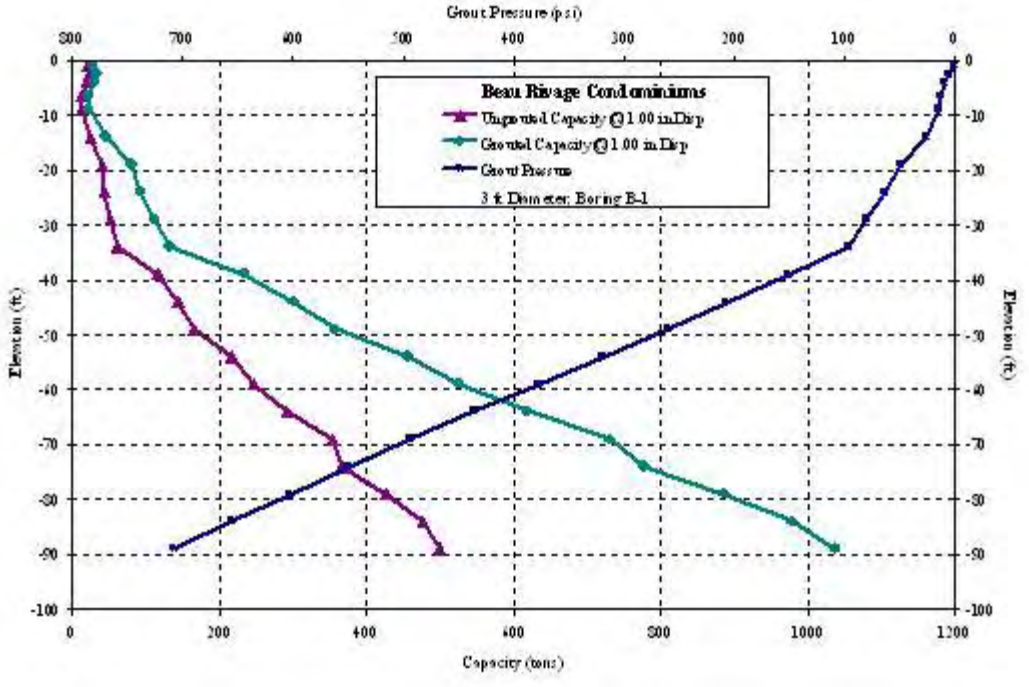


Figure C-1 Beau Rivage Condominium: B-1, 3ft Diameter

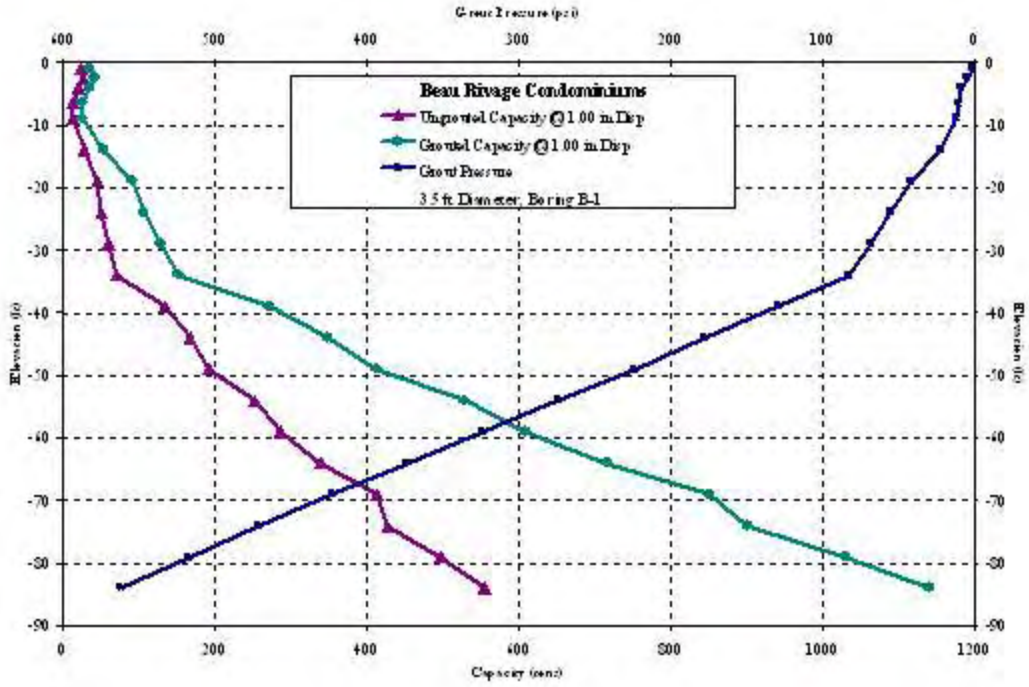


Figure C-2 Beau Rivage Condominium: B-1, 3.5ft Diameter

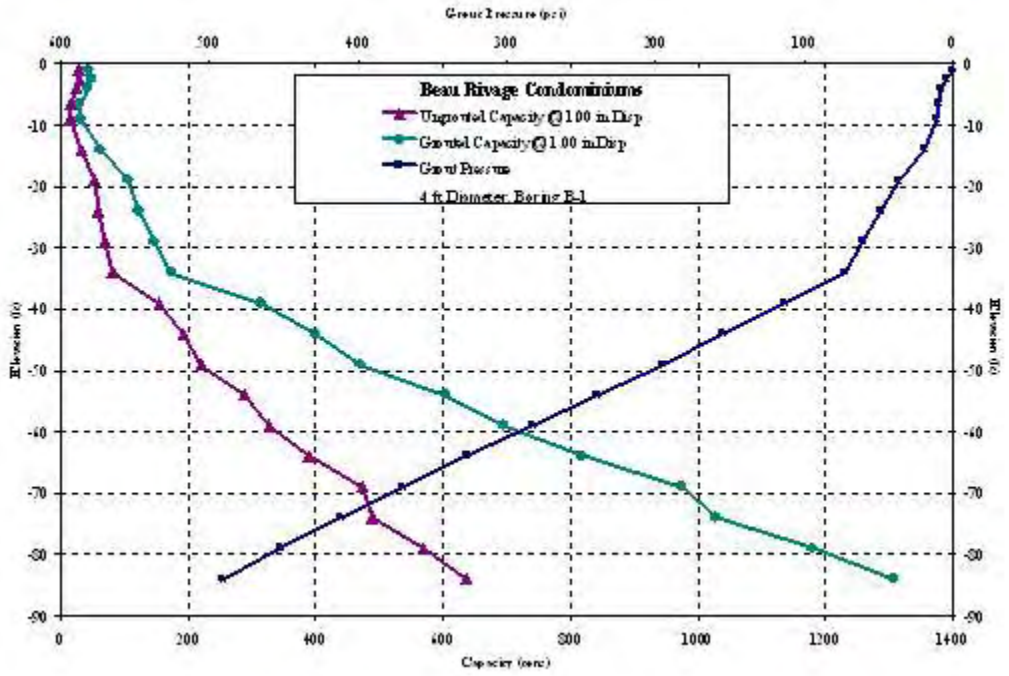


Figure C-3 Beau Rivage Condominium: B-1, 4ft Diameter

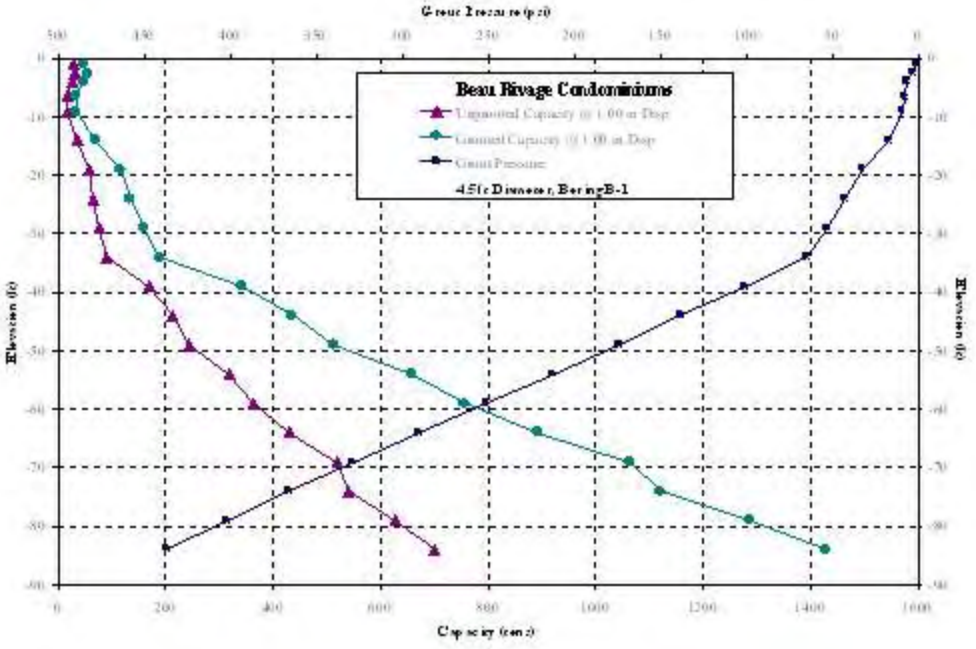


Figure C-4 Beau Rivage Condominium: B-1, 4.5ft Diameter

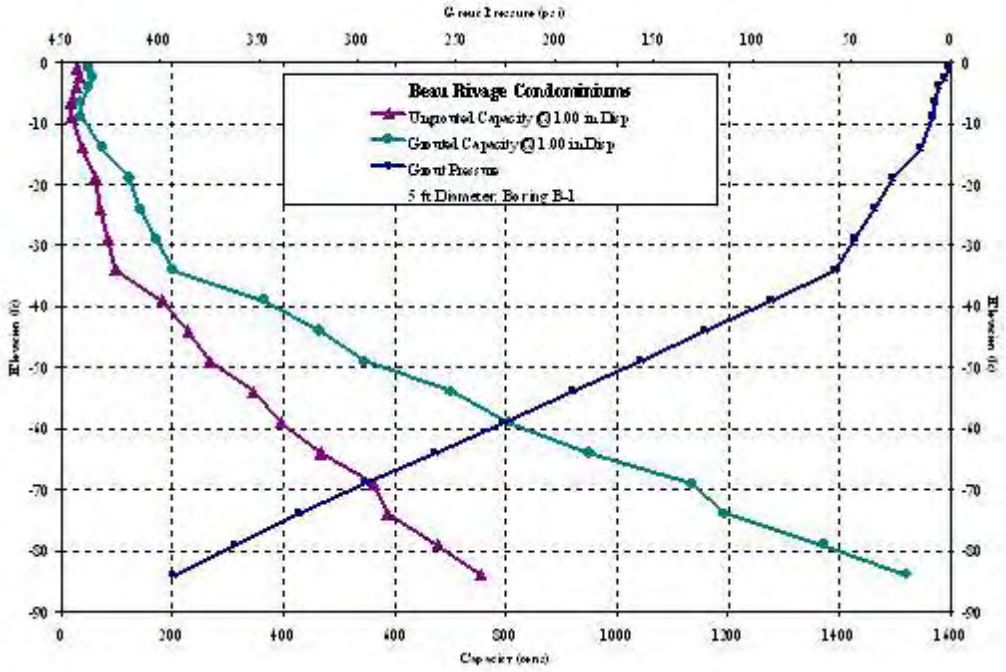


Figure C-5 Beau Rivage Condominium: B-1, 4.5ft Diameter

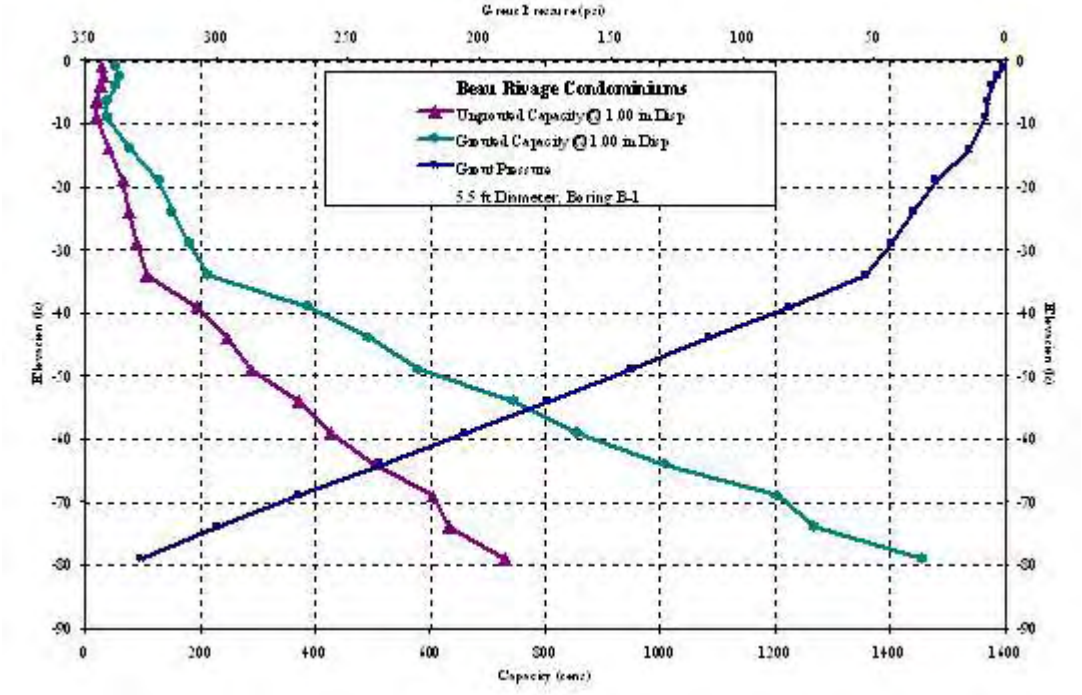


Figure C-6 Beau Rivage Condominium: B-1, 5ft Diameter

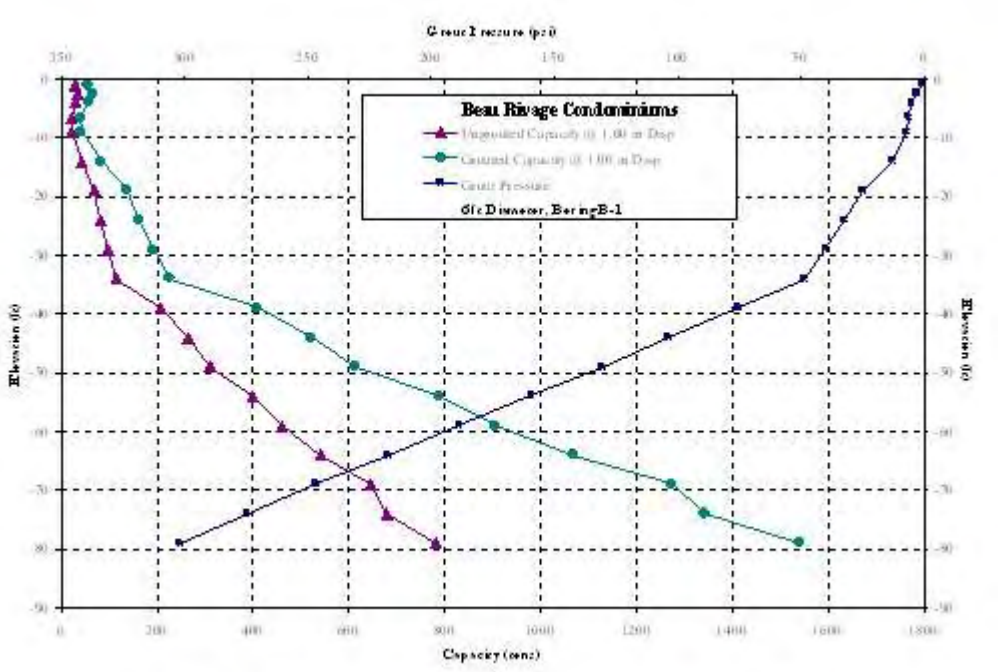


Figure C-7 Beau Rivage Condominium: B-1, 6ft Diameter

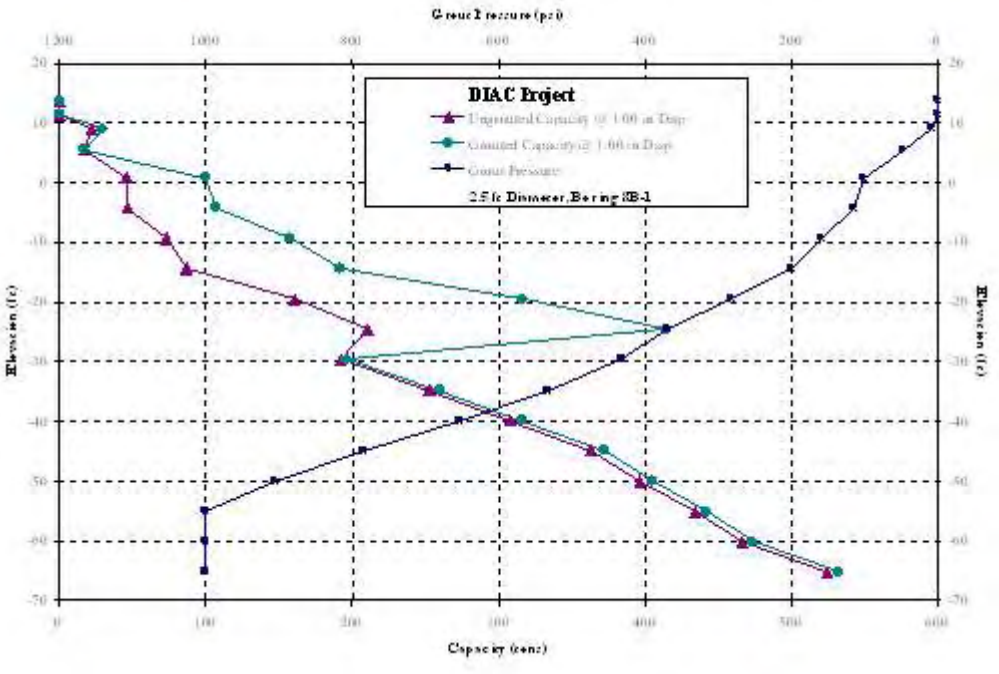


Figure C-8 Bolling Airforce Base: SB-1, 2.5ft Diameter

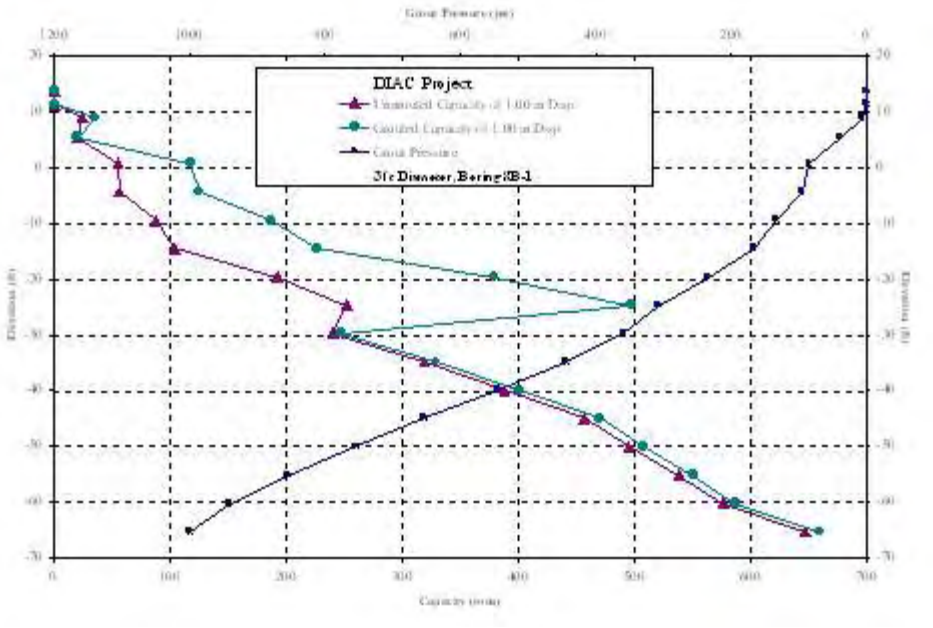


Figure C-9 Bolling Airforce Base: SB-1, 3ft Diameter

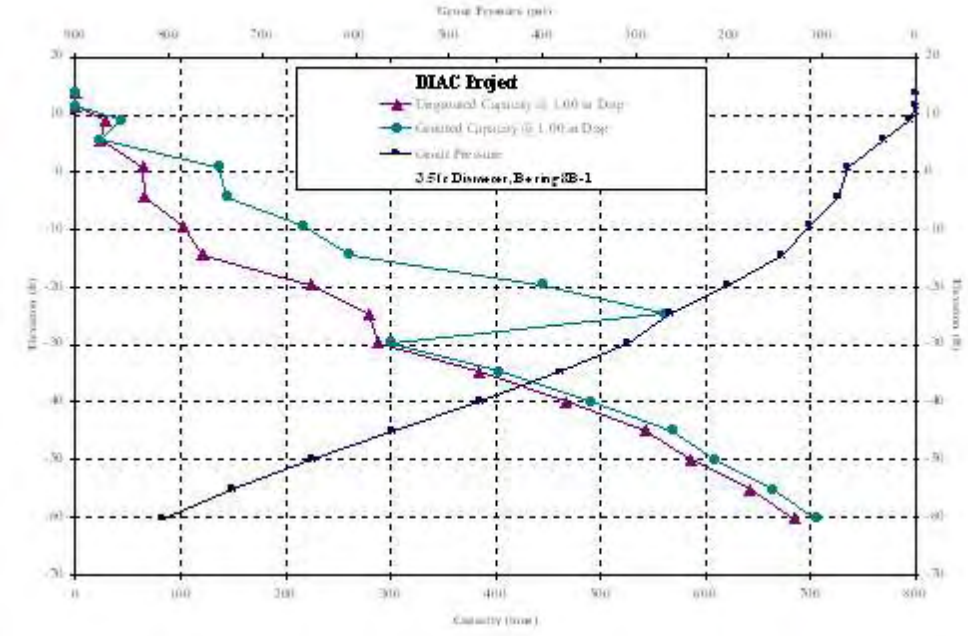


Figure C-10 Bolling Airforce Base: SB-1, 3.5ft Diameter

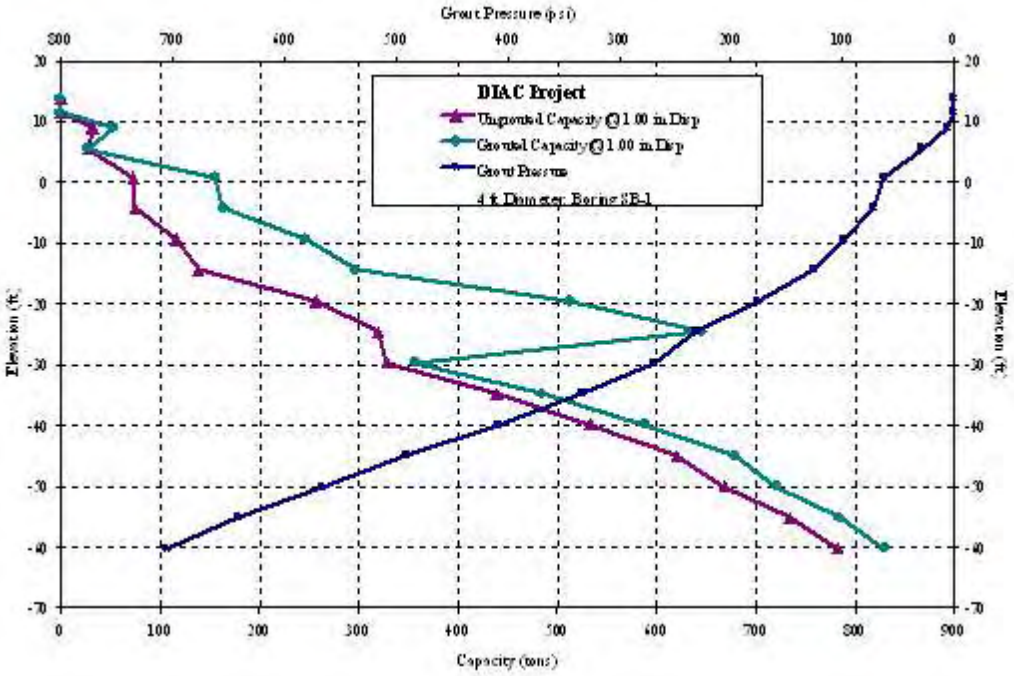


Figure C-11 Bolling Airforce Base: SB-1, 4ft Diameter

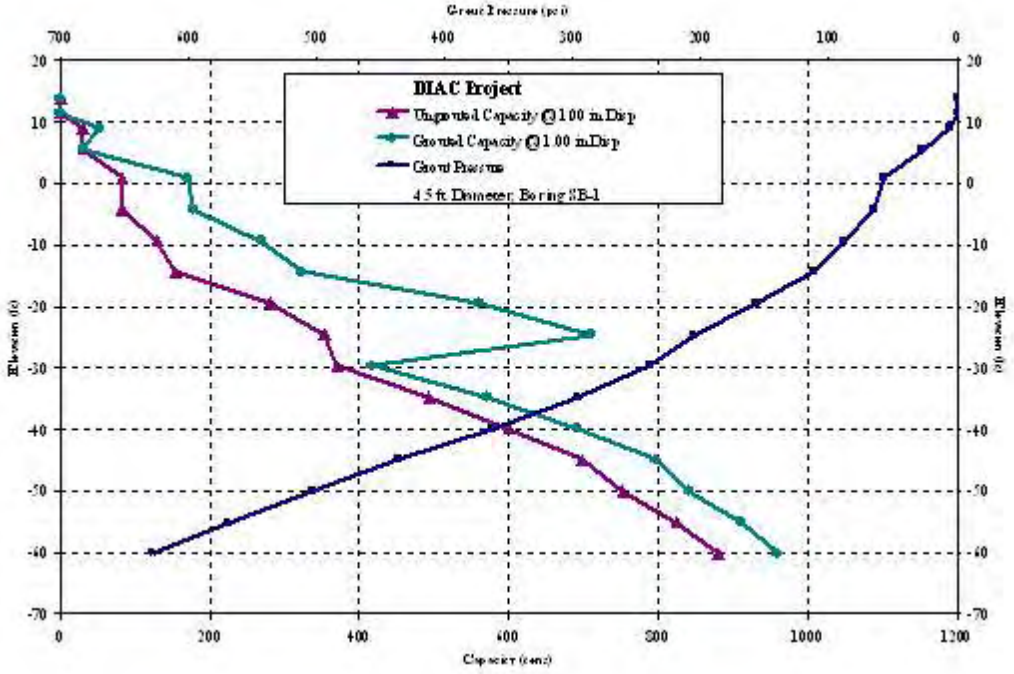


Figure C-12 Bolling Airforce Base: SB-1, 4.5ft Diameter

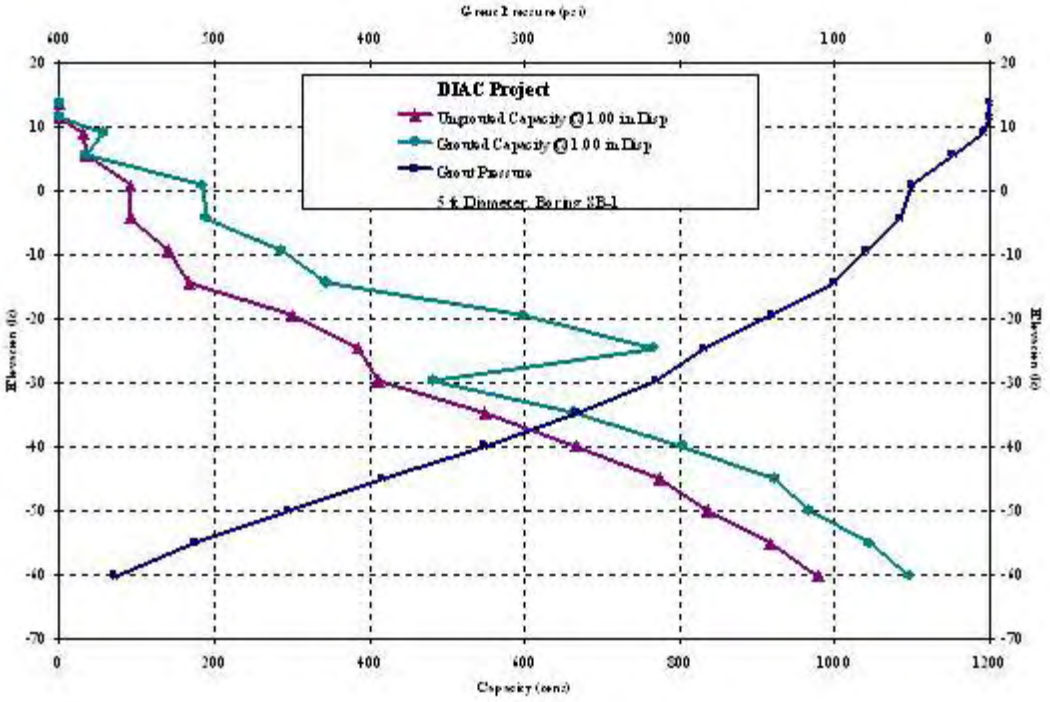


Figure C-13 Bolling Airforce Base: SB-1, 5ft Diameter

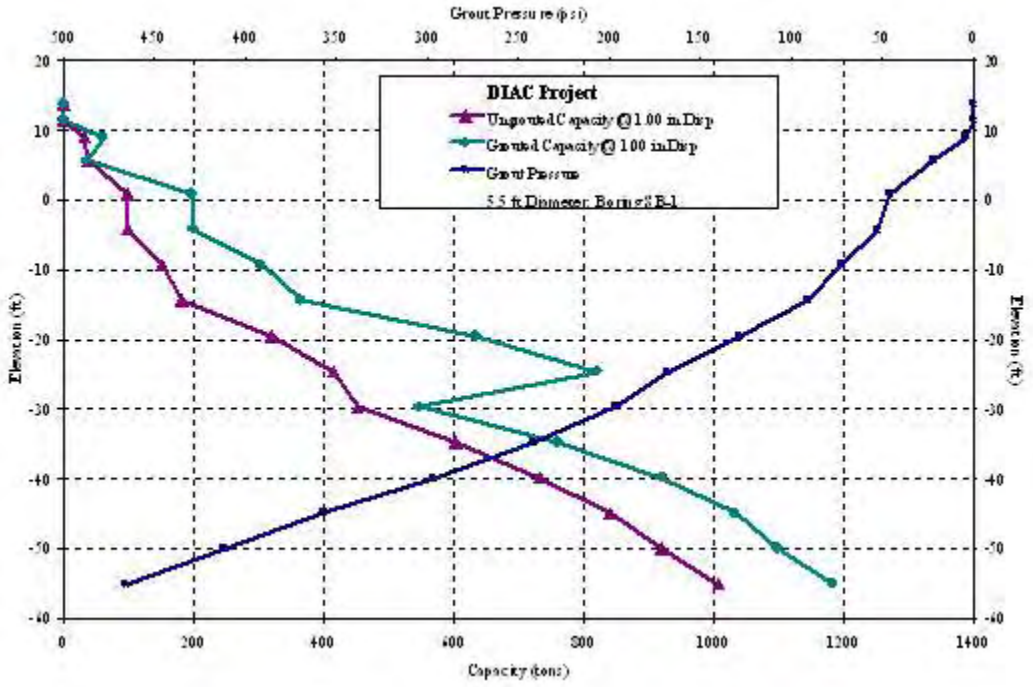


Figure C-14 Bolling Airforce Base: SB-1, 5.5ft Diameter

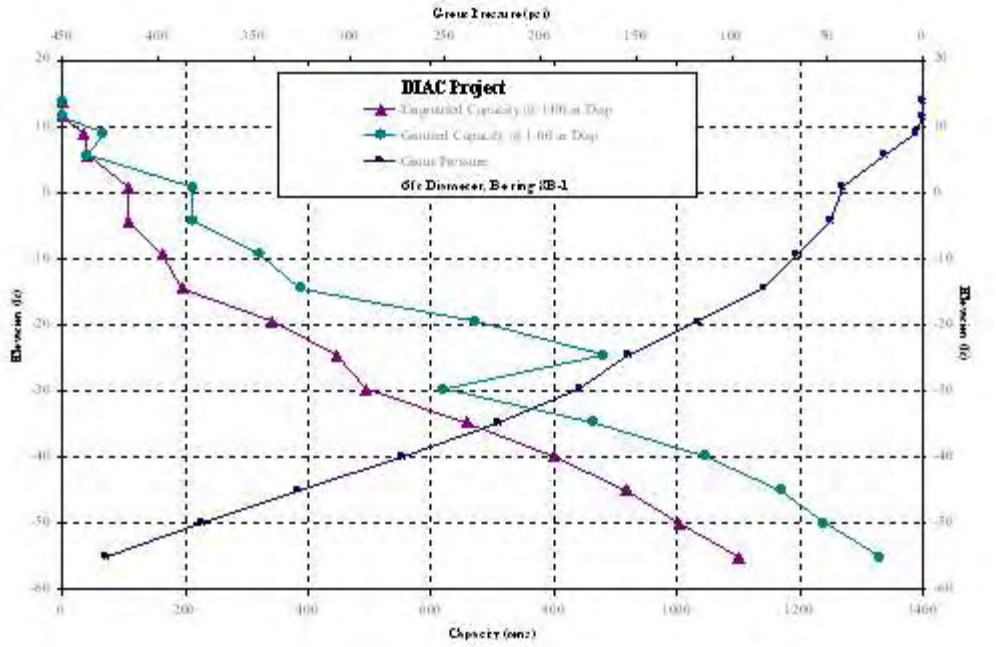


Figure C-15 Bolling Airforce Base: SB-1, 6ft Diameter

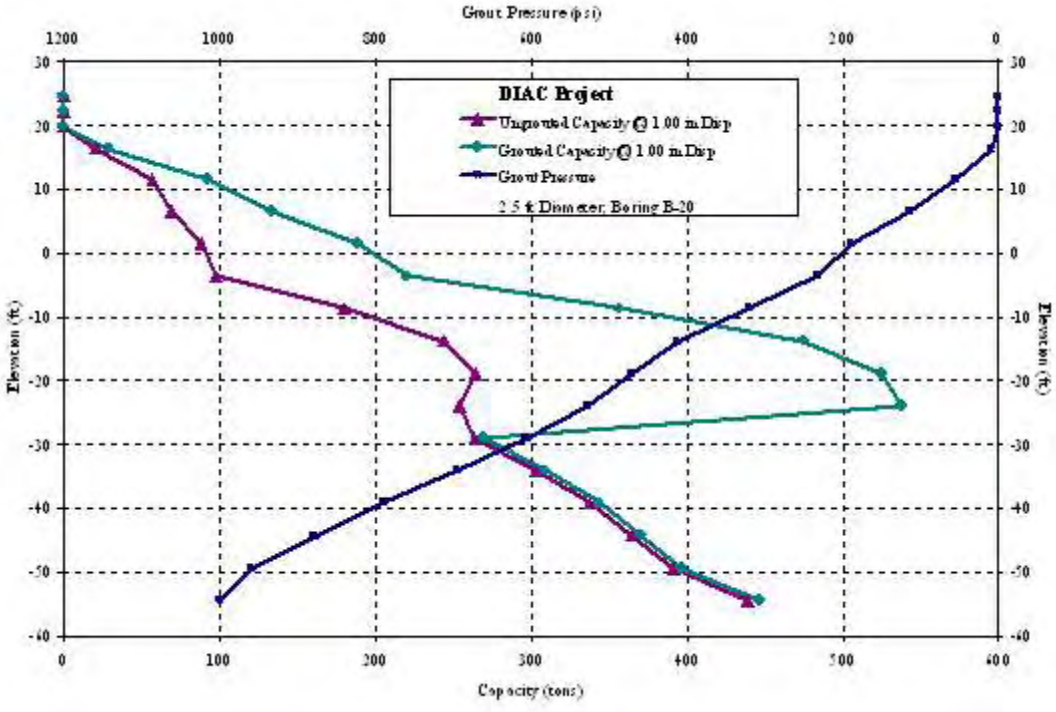


Figure C-16 Bolling Airforce Base: B-20, 2.5ft Diameter

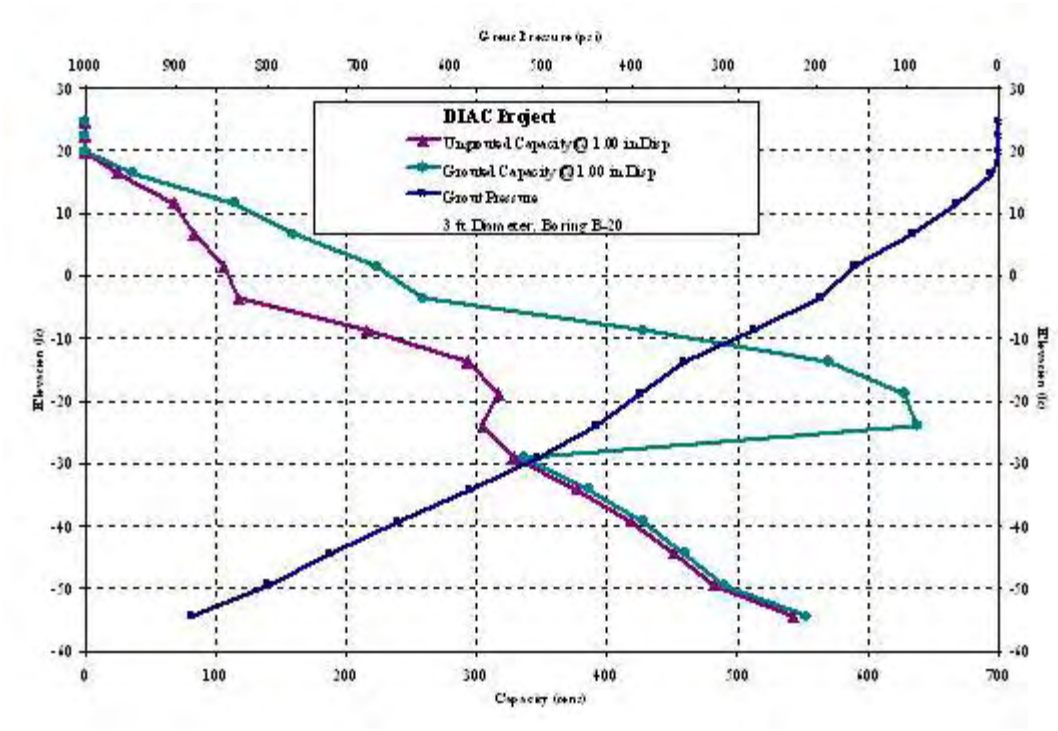


Figure C-17 Bolling Airforce Base: B-20, 3ft Diameter

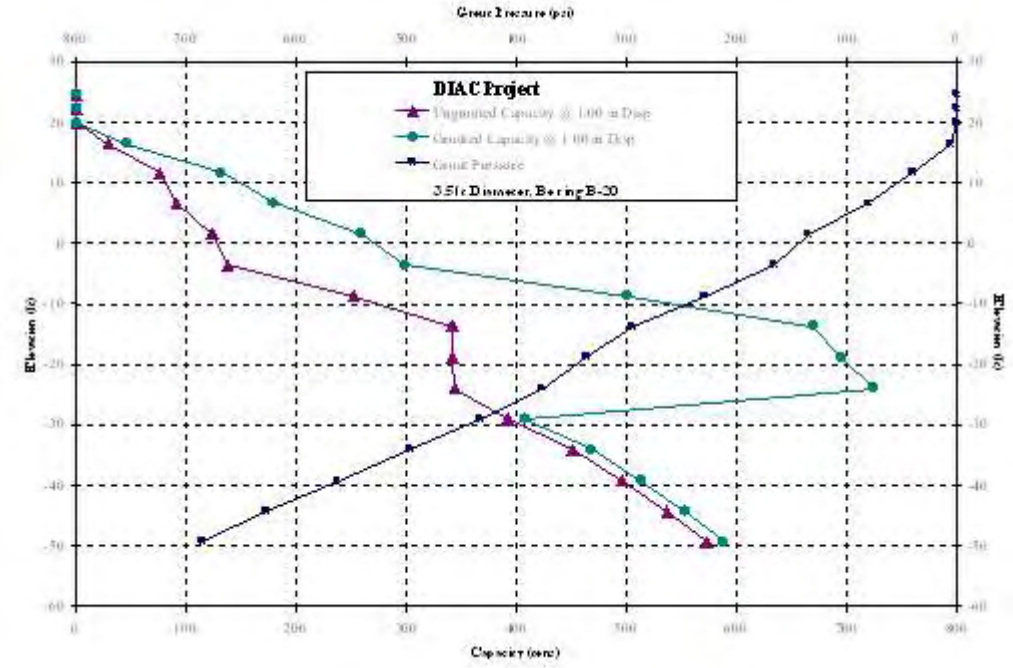


Figure C-18 Bolling Airforce Base: B-20, 3.5ft Diameter

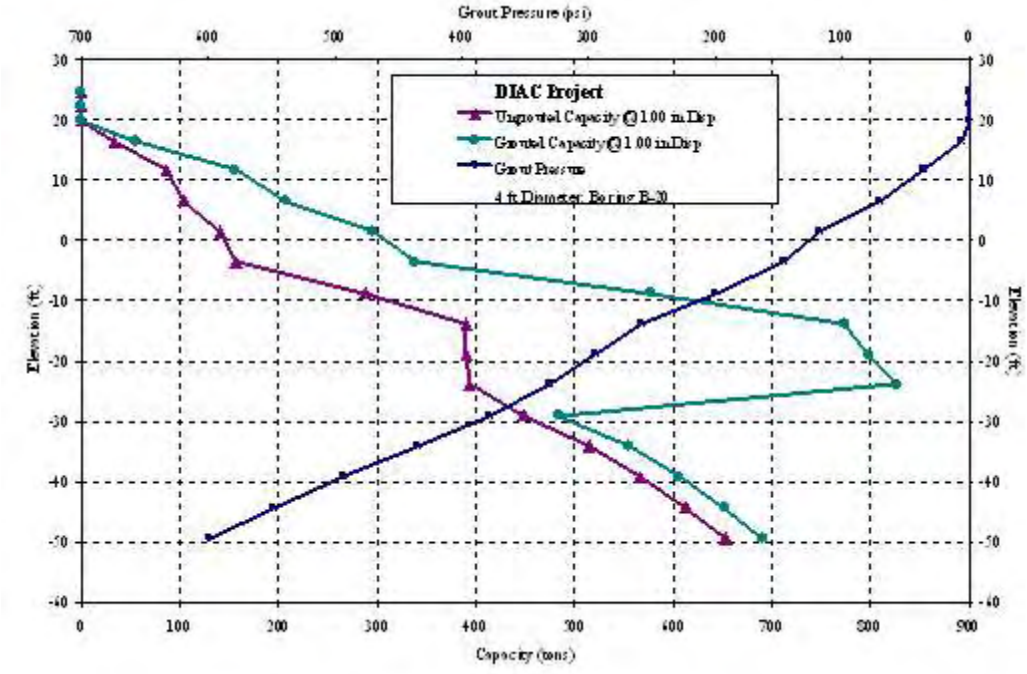


Figure C-19 Bolling Airforce Base: B-20, 4ft Diameter

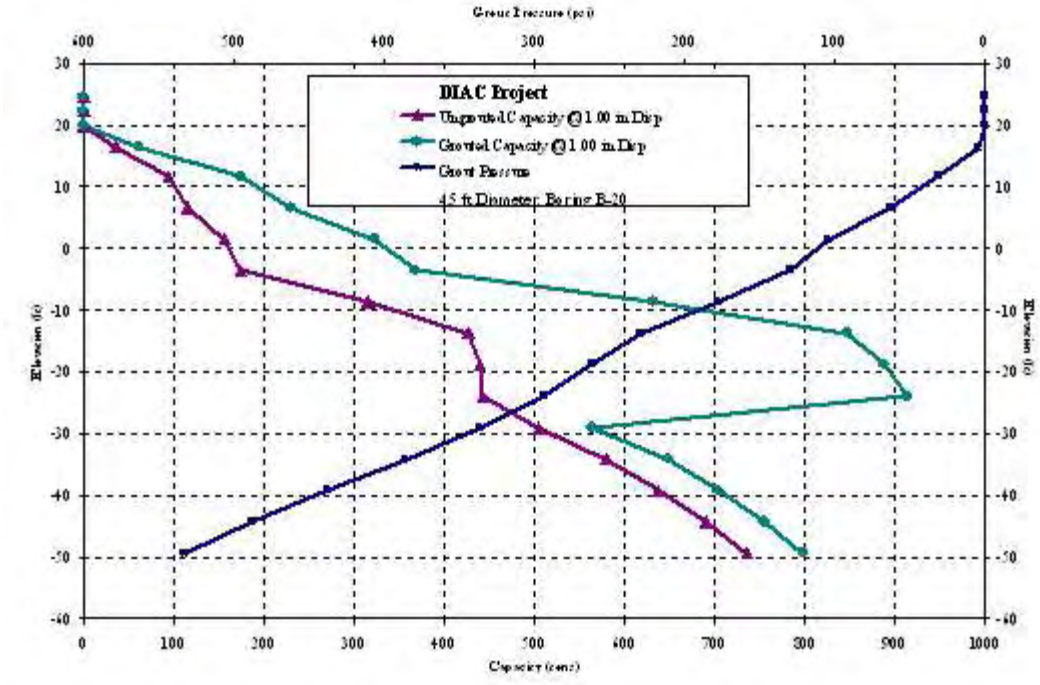


Figure C-20 Bolling Airforce Base: B-20, 4,5ft Diameter

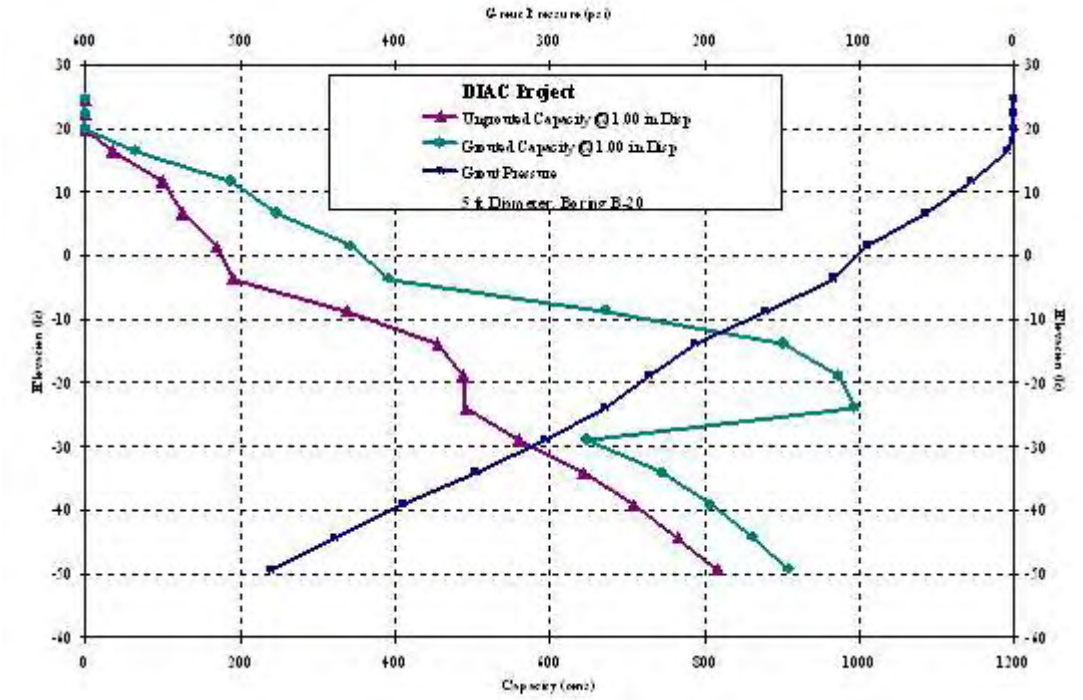


Figure C-21 Bolling Airforce Base: B-20, 5ft Diameter

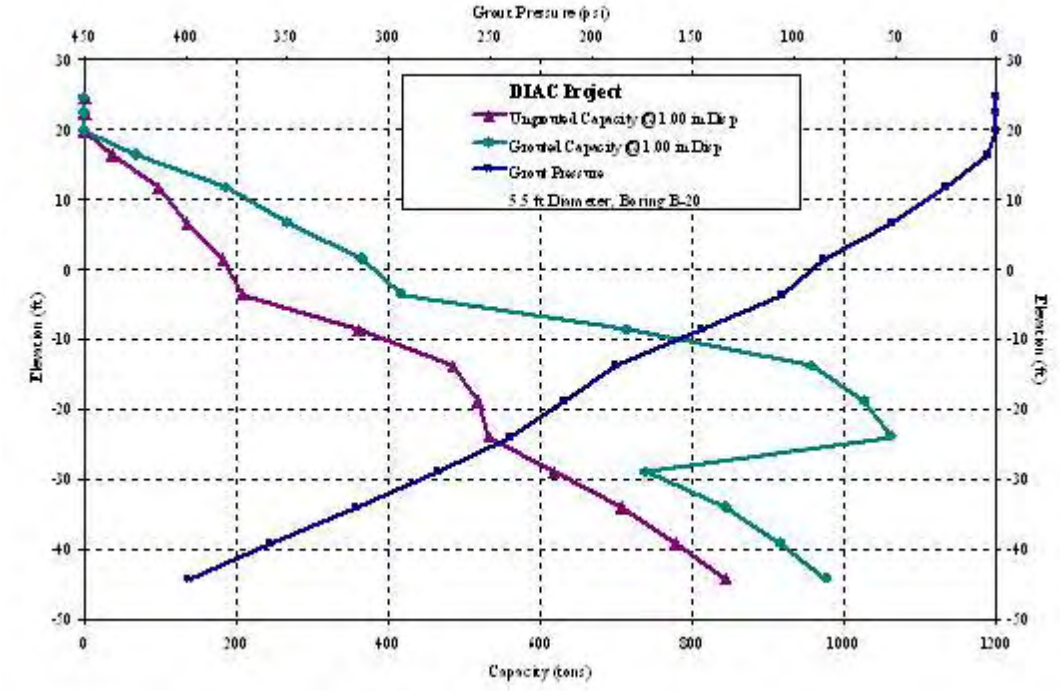


Figure C-22 Bolling Airforce Base: B-20, 5.5ft Diameter

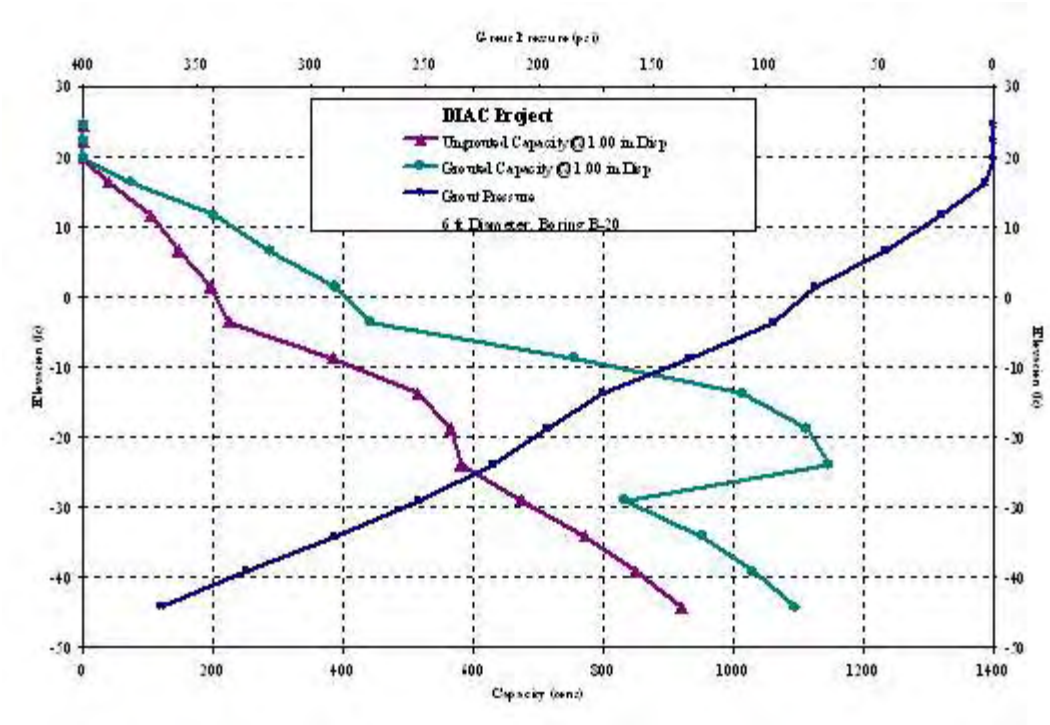


Figure C-23 Bolling Airforce Base: B-20, 6ft Diameter

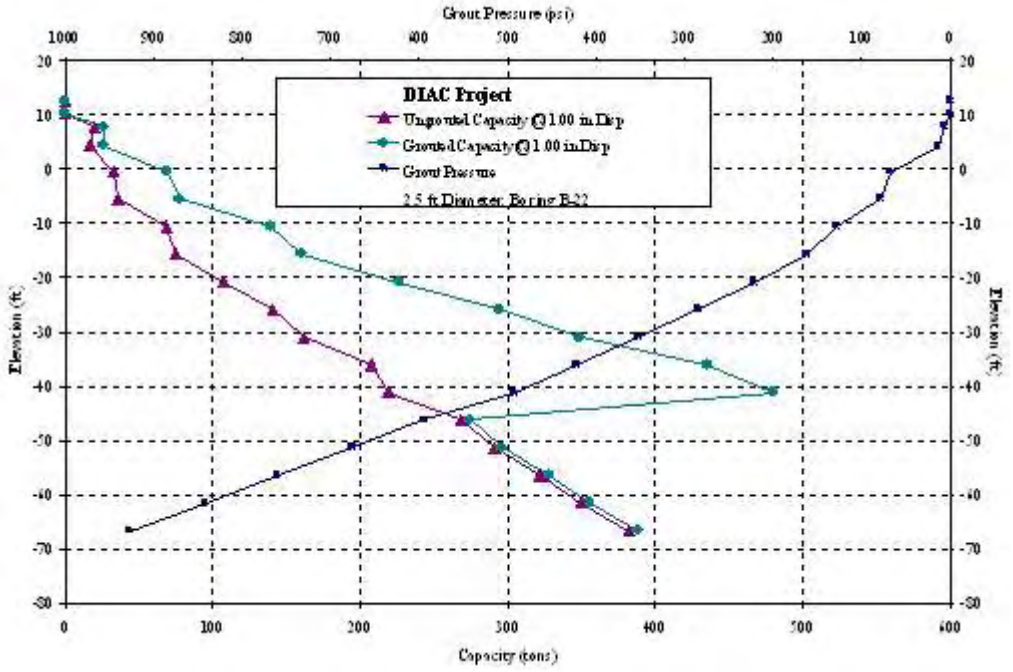


Figure C-24 Bolling Airforce Base: B-22, 2.5ft Diamter

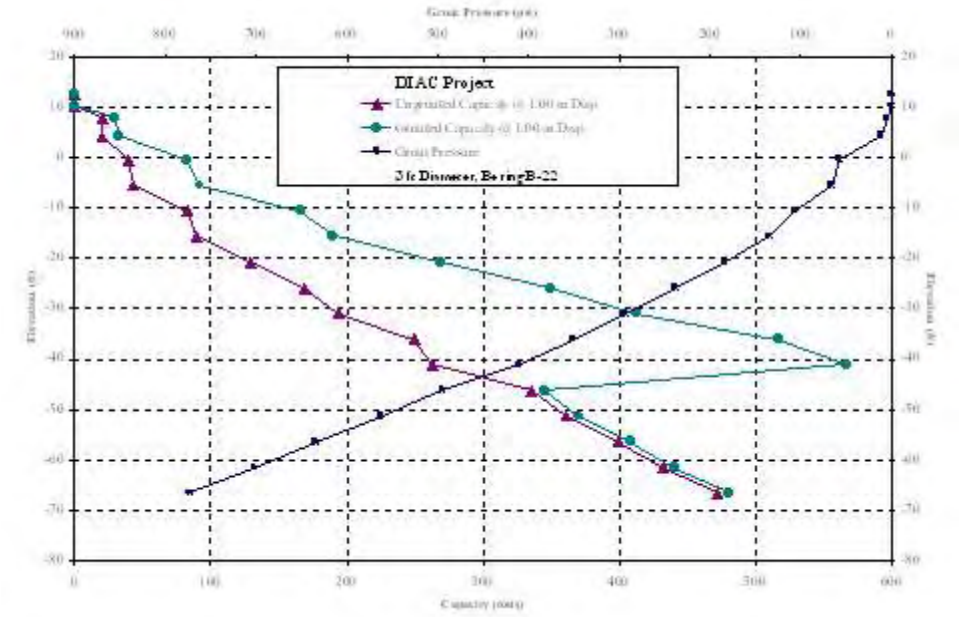


Figure C-25 Bolling Airforce Base: B-22, 3ft Diameter

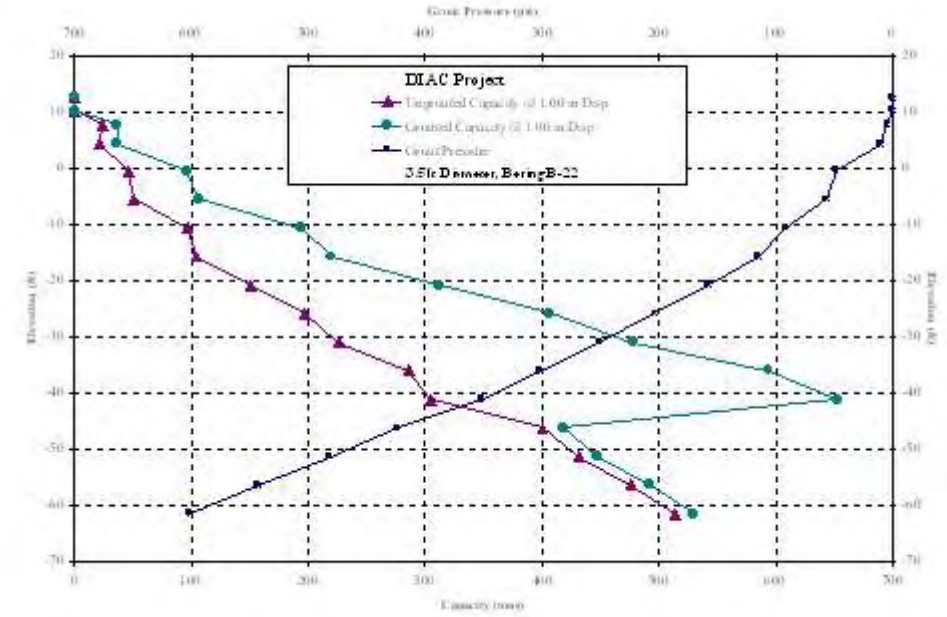


Figure C-26 Bolling Airforce Base: B-22, 3.5ft Diameter

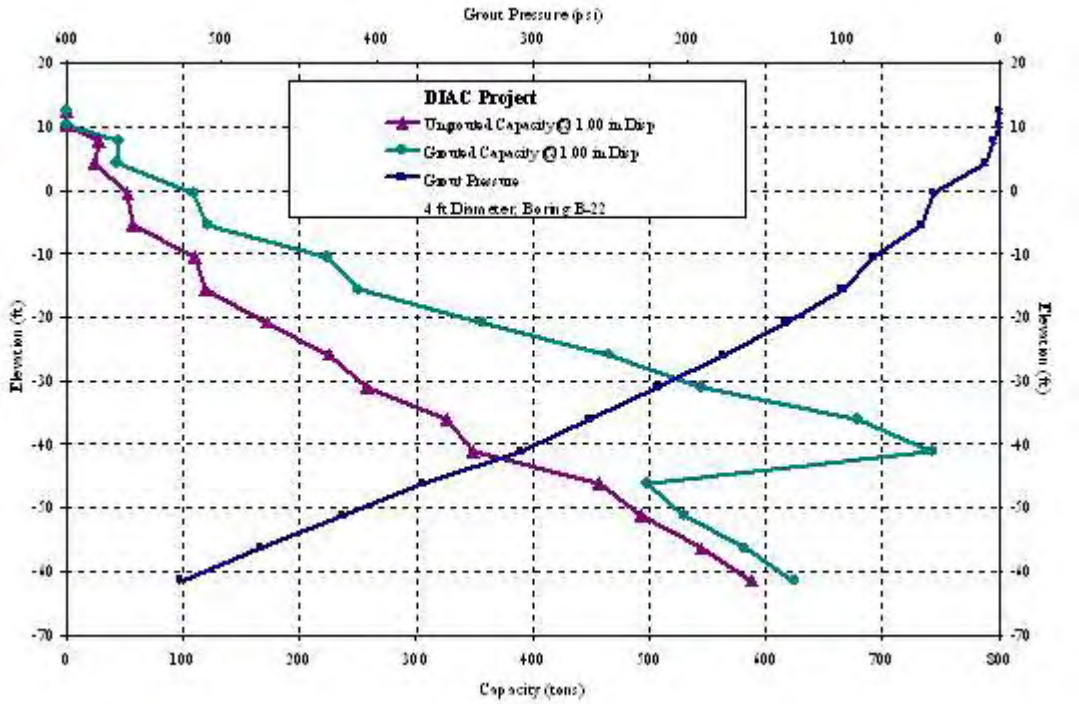


Figure C-27 Bolling Airforce Base: B-22, 4ft Diameter

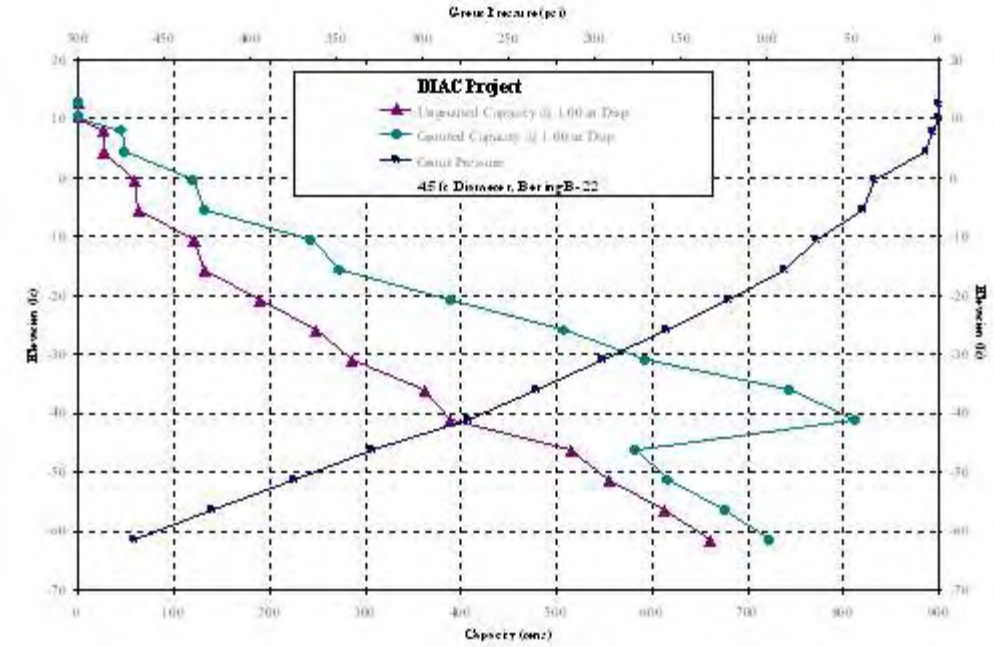


Figure C-28 Bolling Airforce Base: B-22, 4.5ft Diameter

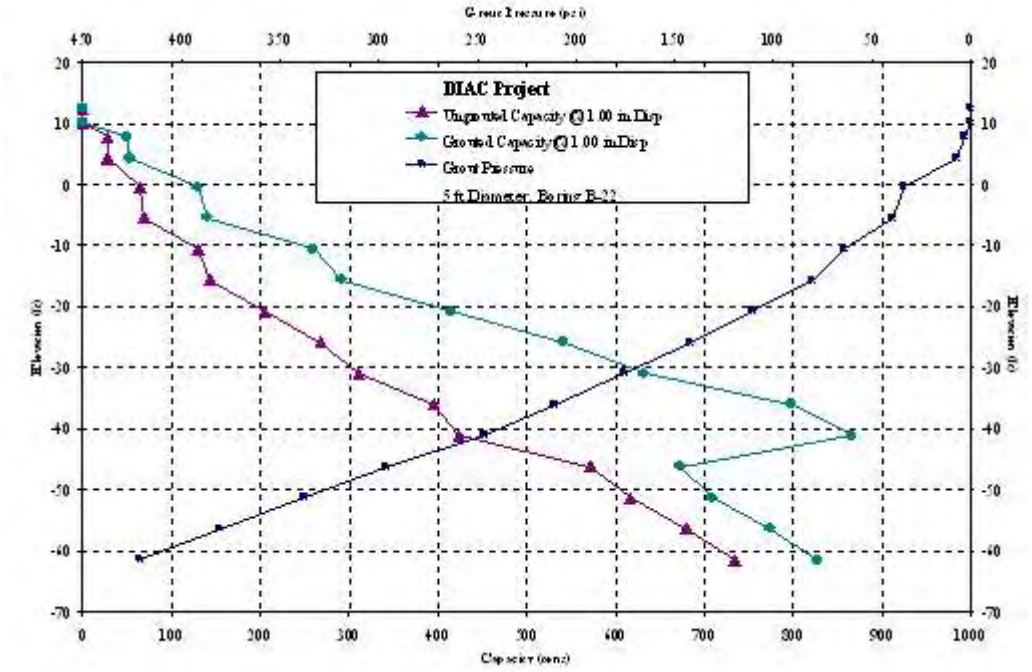


Figure C-29 Bolling Airforce Base: B-22, 5ft Diameter

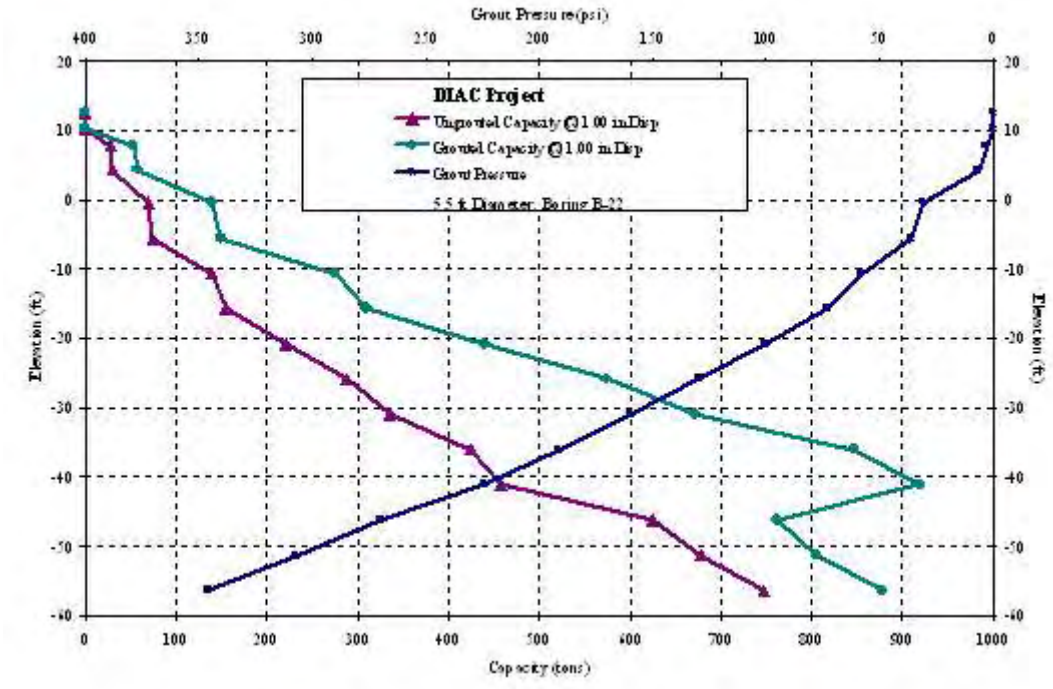


Figure C-30 Bolling Airforce Base: B-22, 5.5ft Diameter

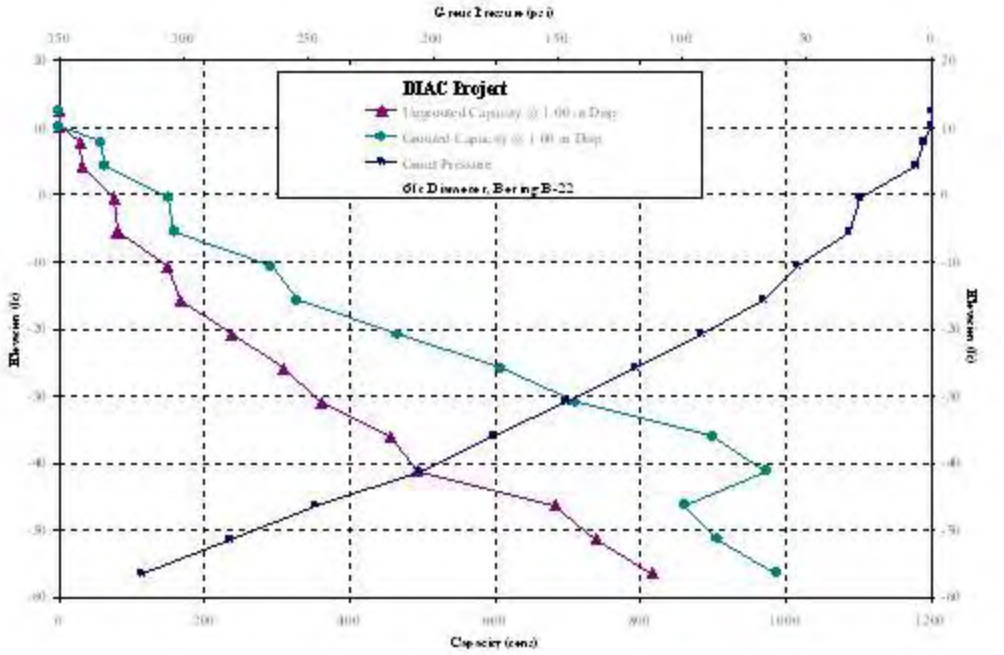


Figure C-31 Bolling Airforce Base: B-22, 6ft Diameter

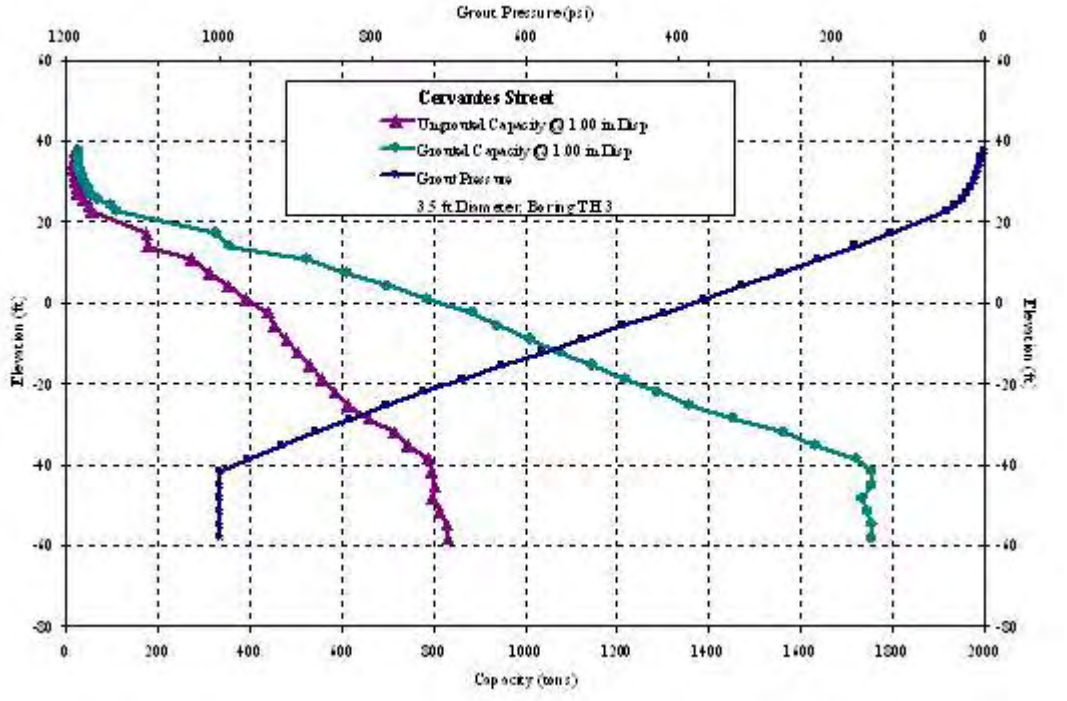


Figure C-32 Cervantes Street: TH 3, 3.5ft Diameter

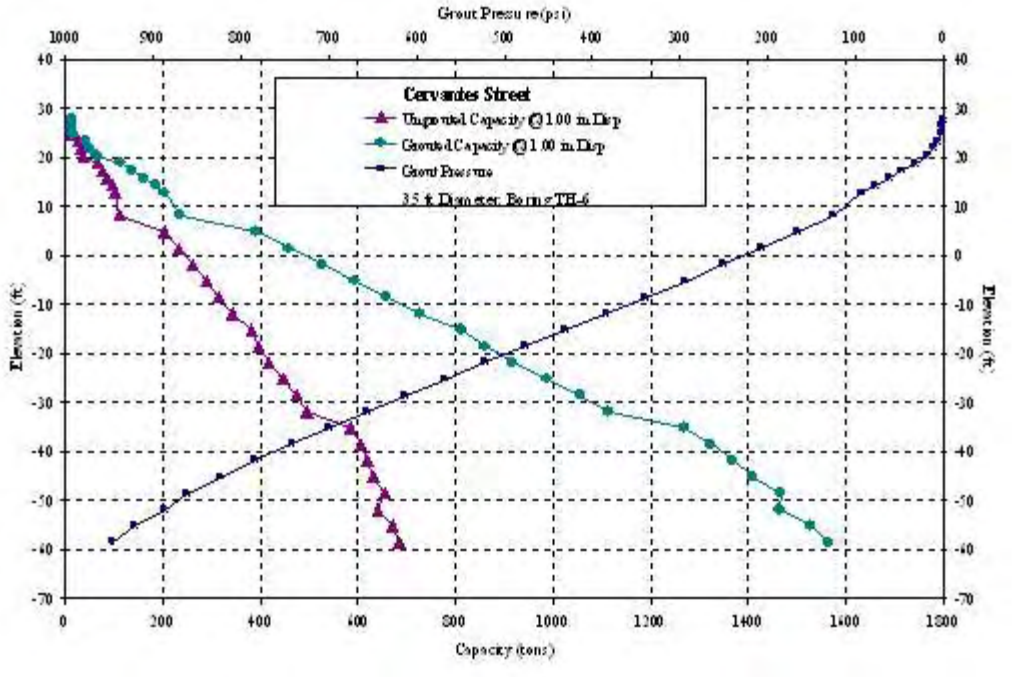


Figure C-33 Cervantes Street: TH 6, 3.5ft Diameter

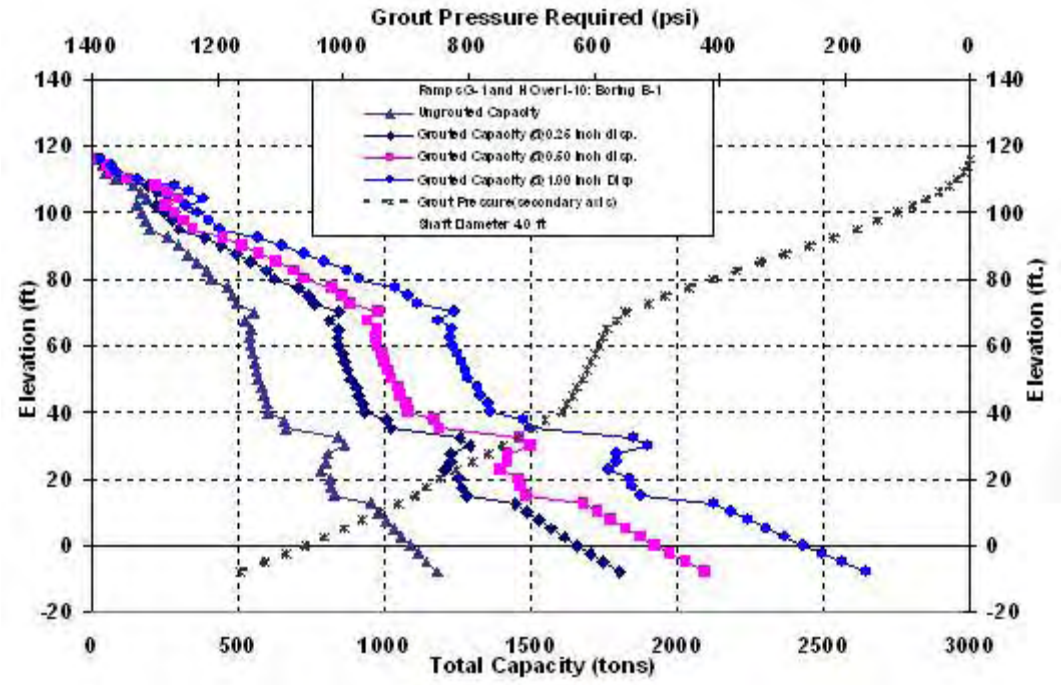


Figure C-34 I-10 / I-110: B-1, 4ft Diameter

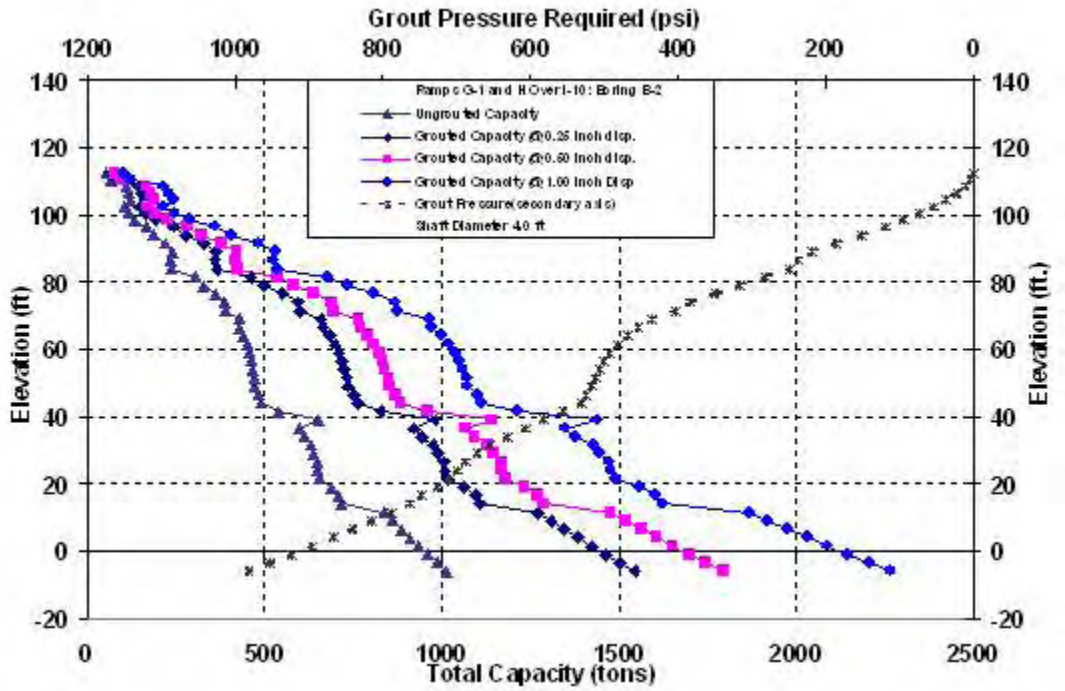


Figure C-35 I-10 / I-110: B-2, 4ft Diameter

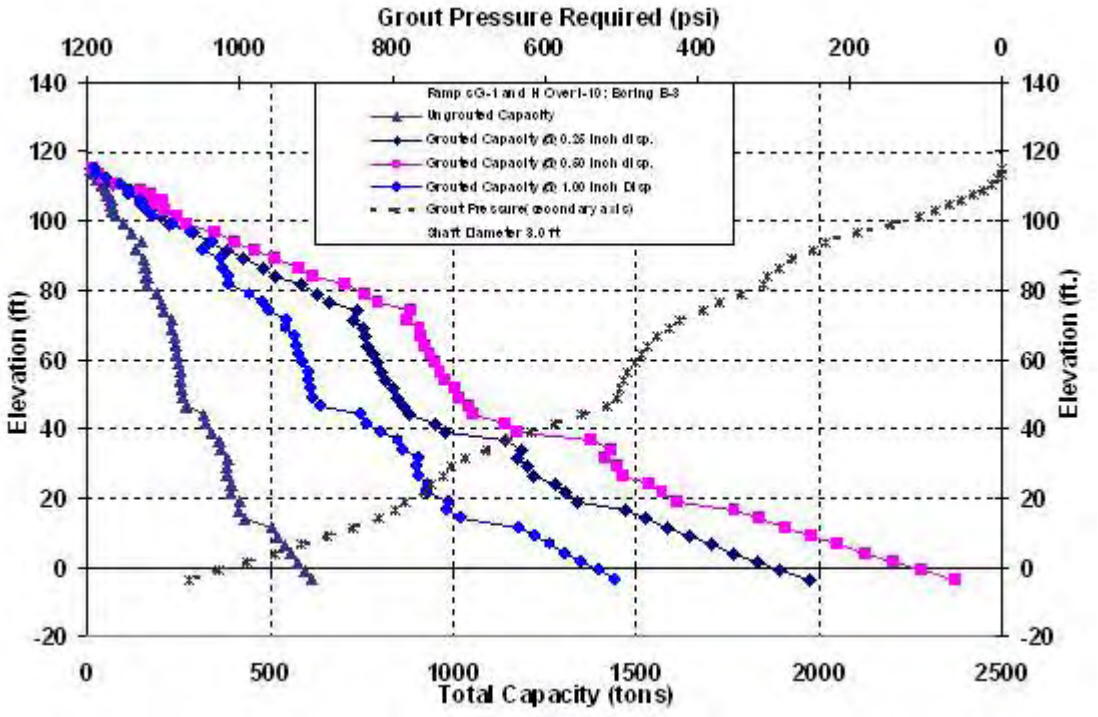


Figure C-36 I-10 / I-110: B-3, 3ft Diameter

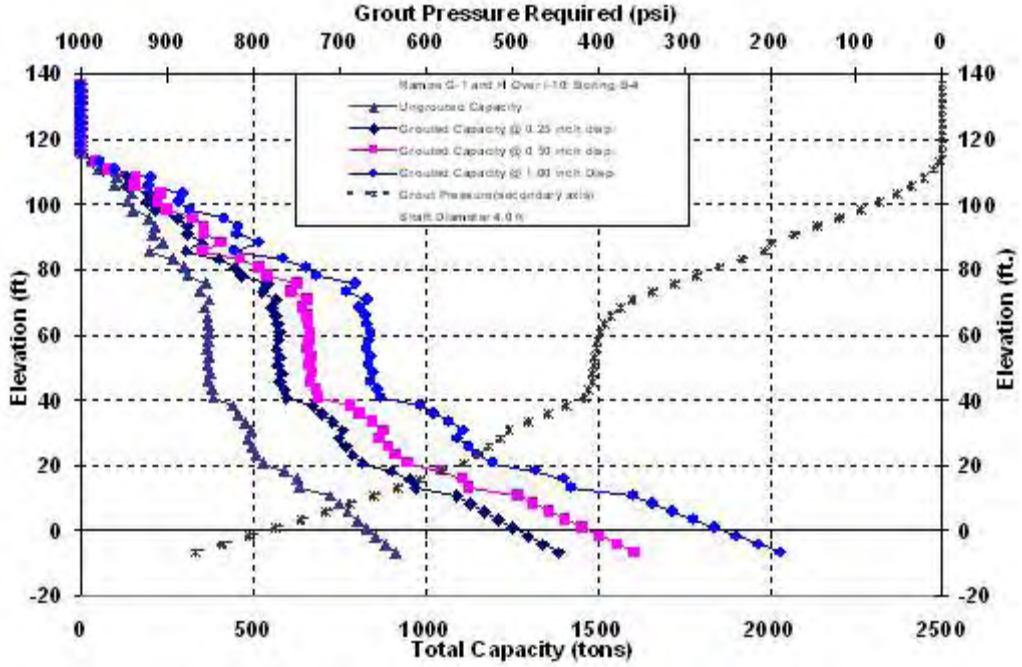


Figure C-37 I-10 / I-110: B-4, 4ft Diameter

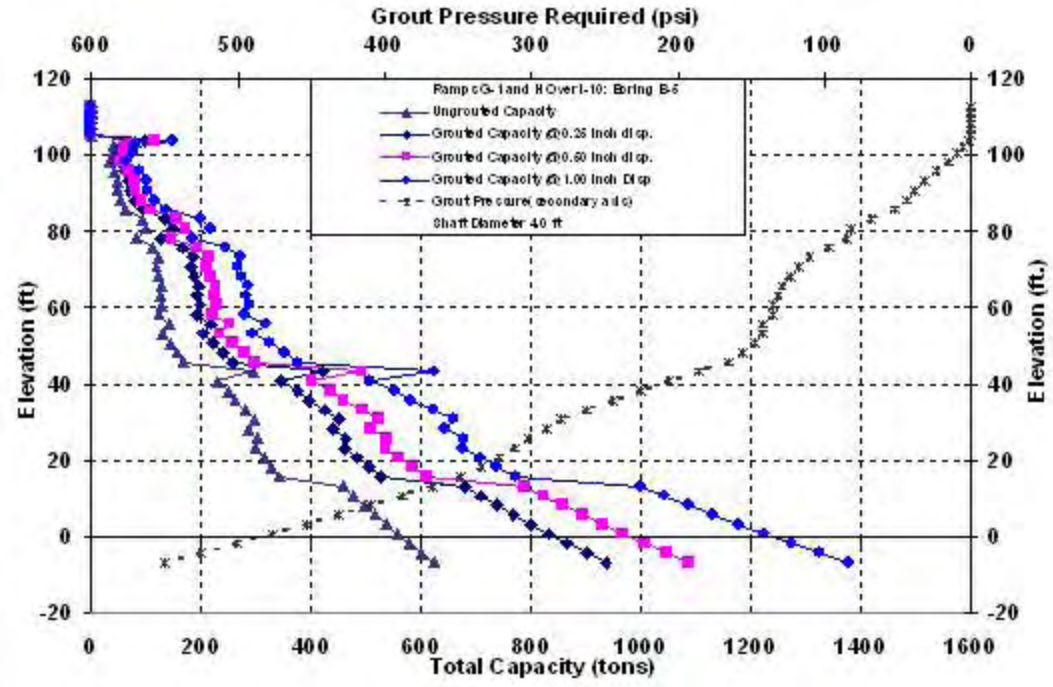


Figure C-38 I-10 / I-110: B-5, 4ft Diameter

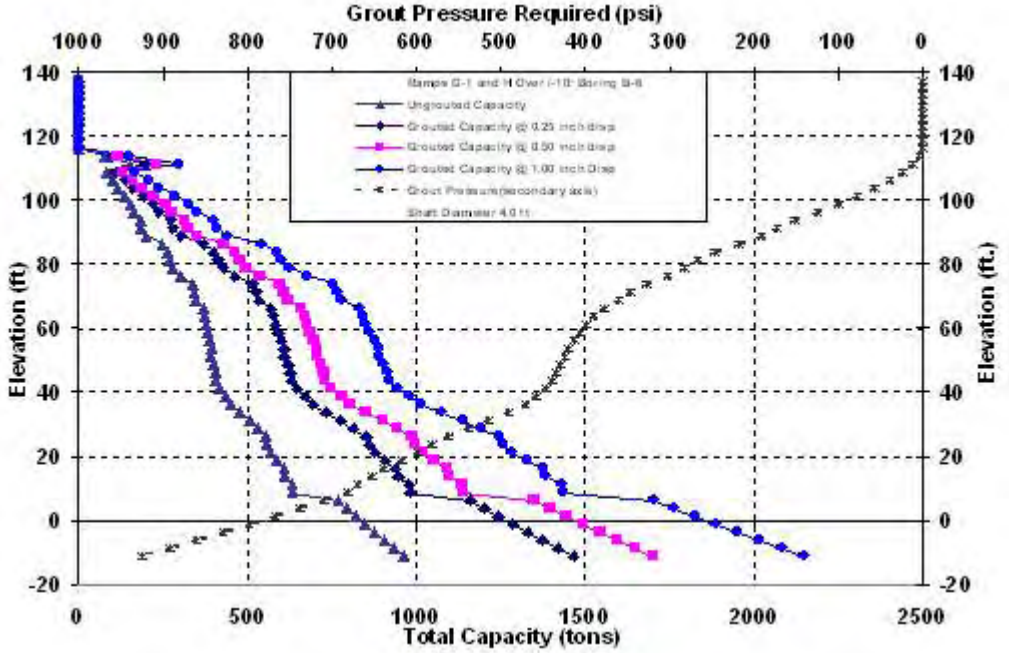


Figure C-39 I-10 / I-110: B-6, 4ft Diameter

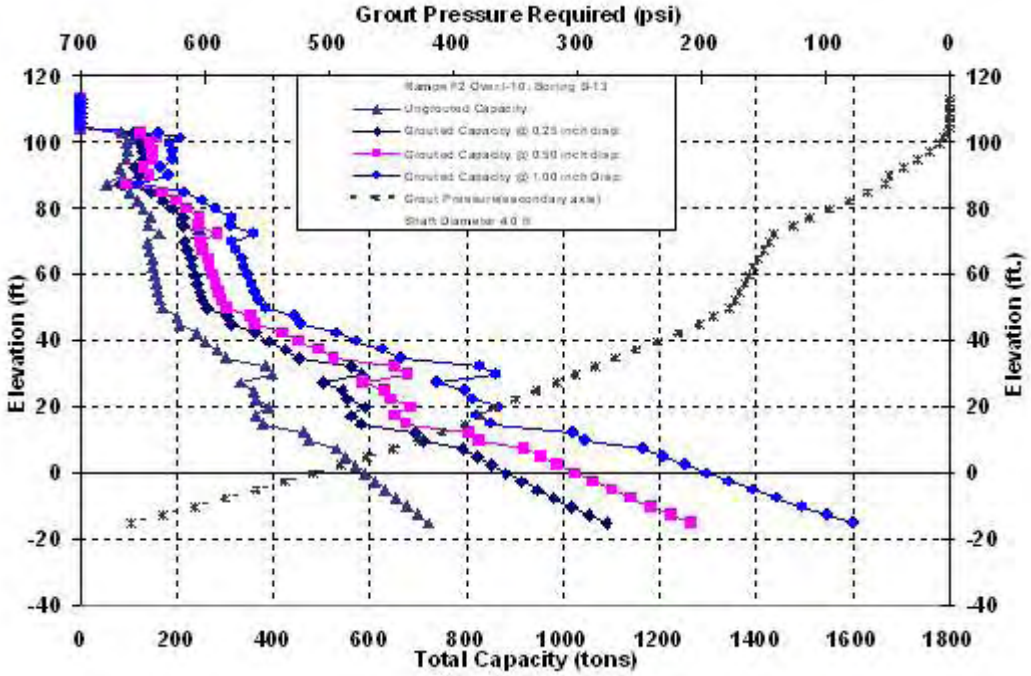


Figure C-40 I-10 / I-110: B-13, 4ft Diameter

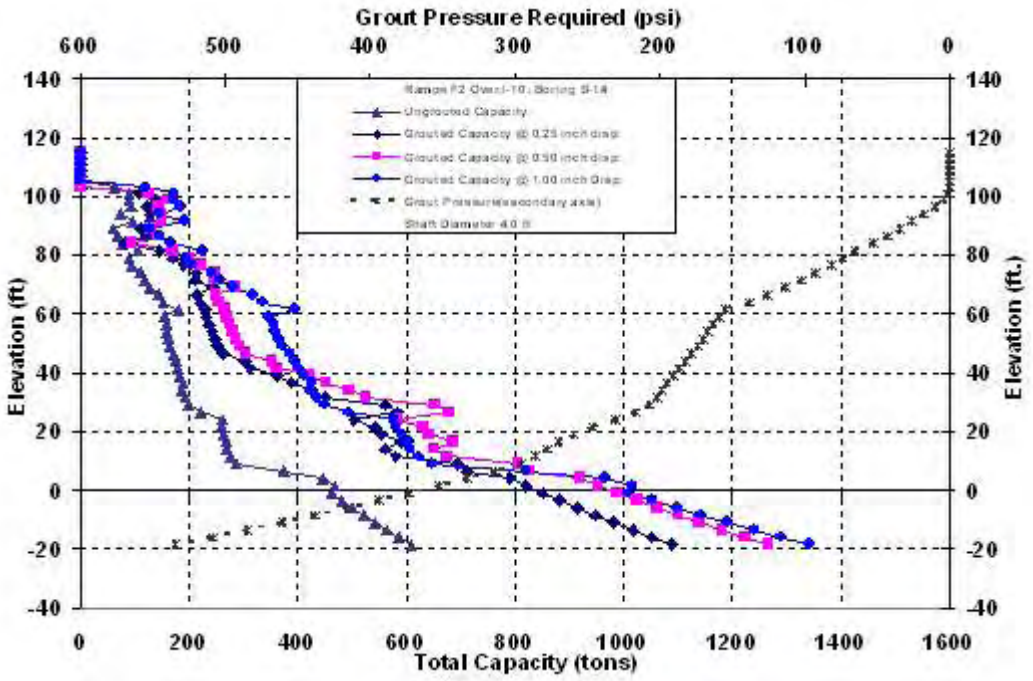


Figure C-41 I-10 / I-110: B-14, 4ft Diameter

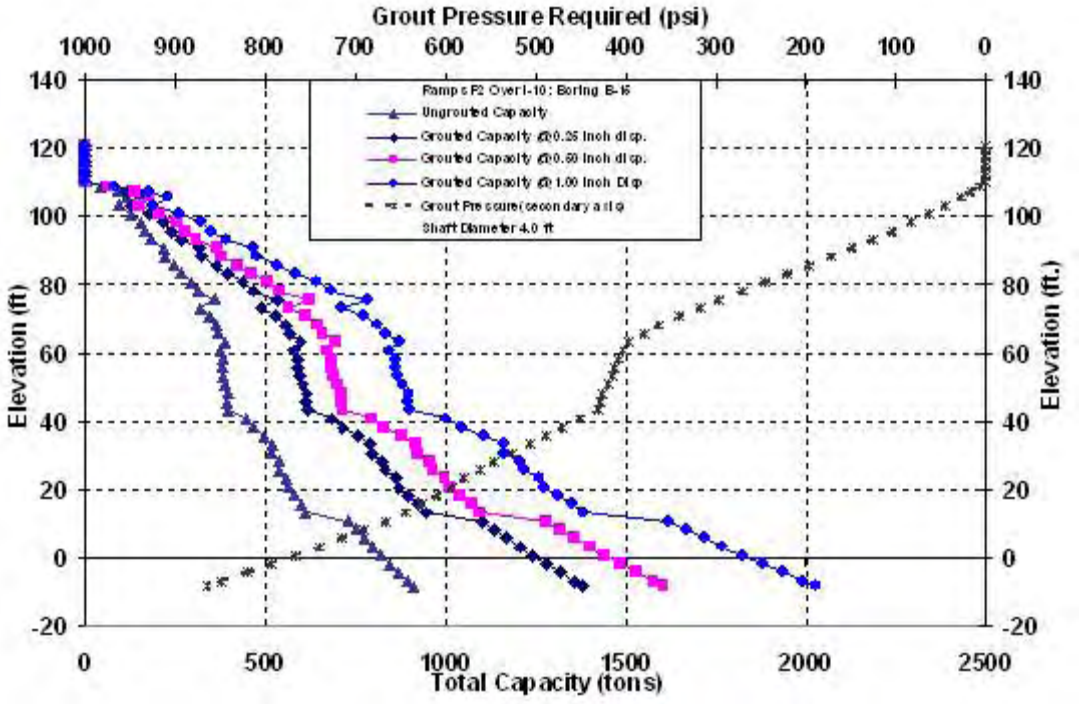


Figure C-42 I-10 / I-110: B-15, 4ft Diameter

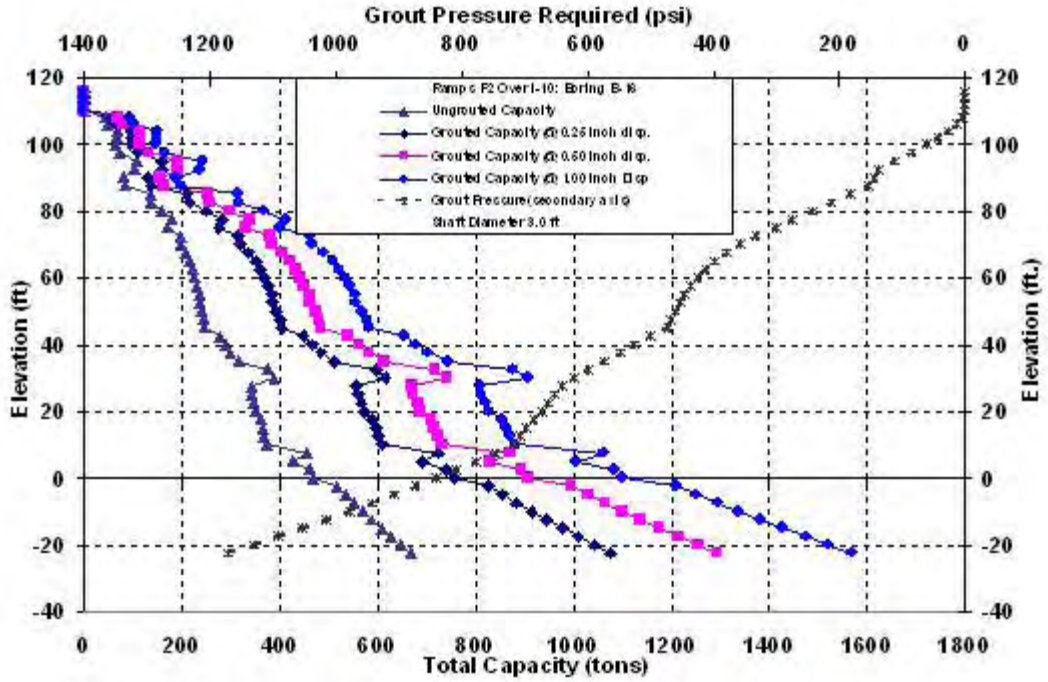


Figure C-43 I-10 / I-110: B-16, 3ft Diameter

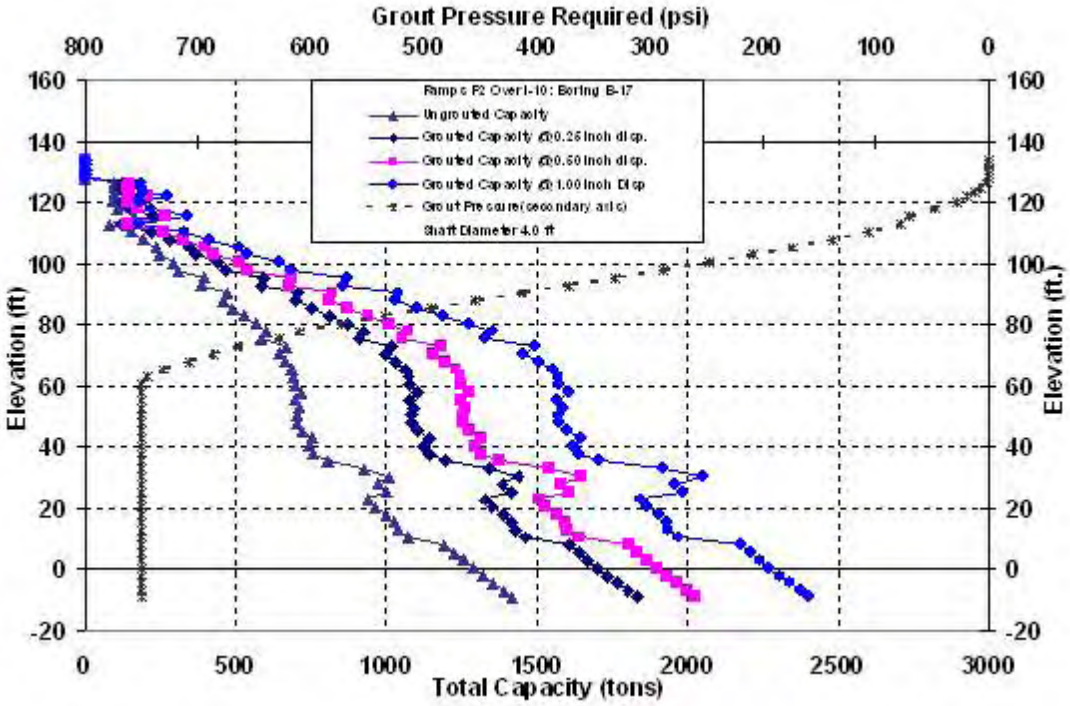


Figure C-44 I-10 / I-110: B-17, 4ft Diameter

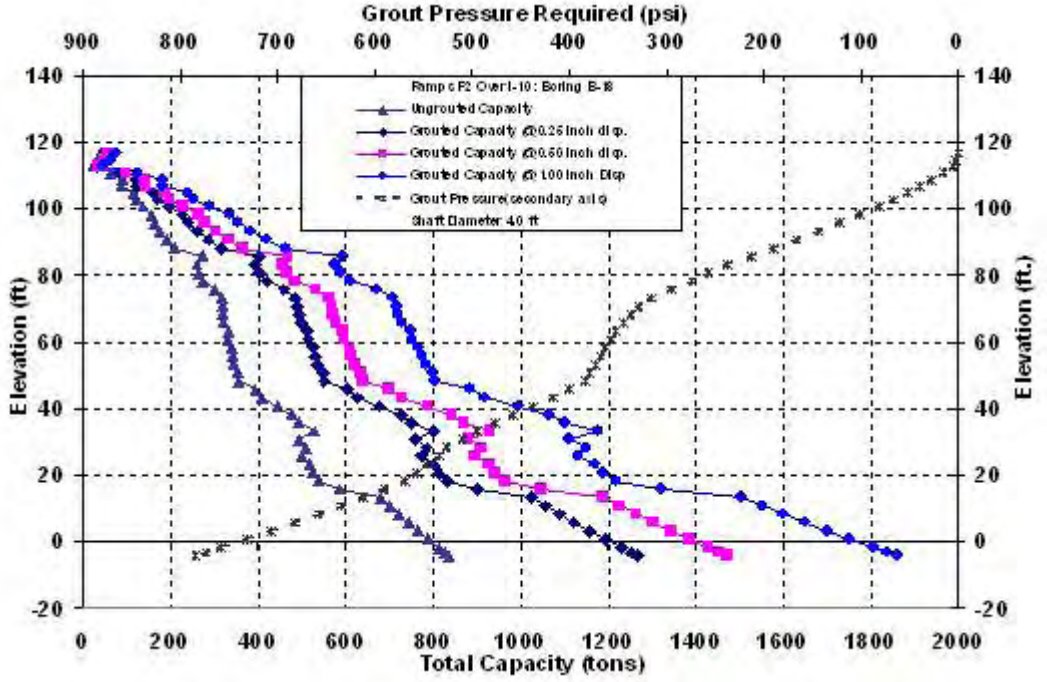


Figure C-45 I-10 / I-110: B-18, 4ft Diameter

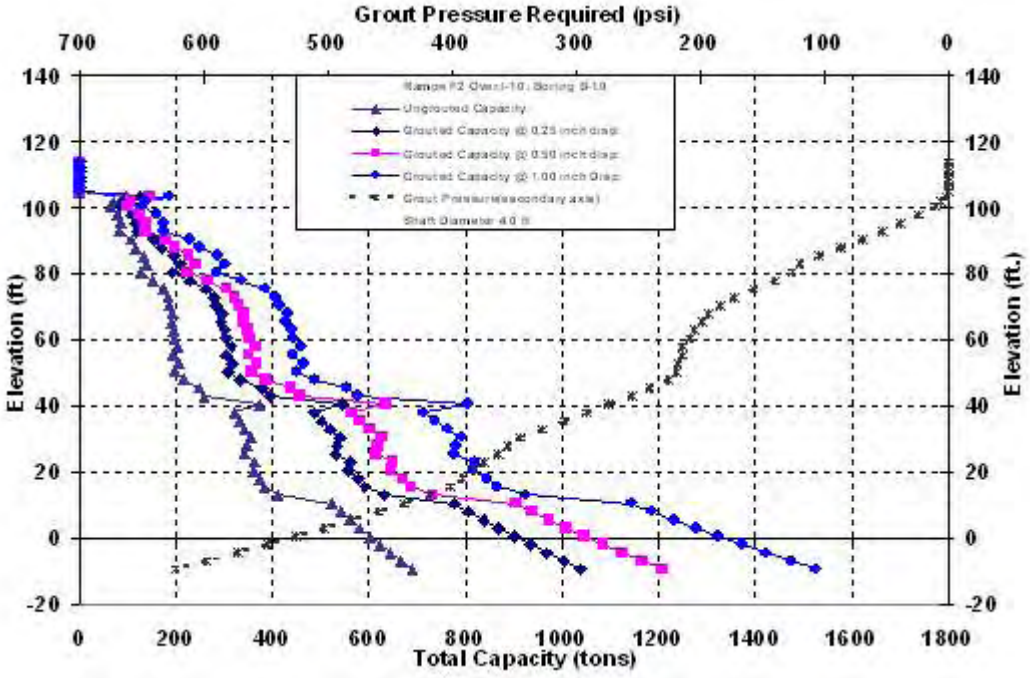


Figure C-46 I-10 / I-110: B-19, 4ft Diameter

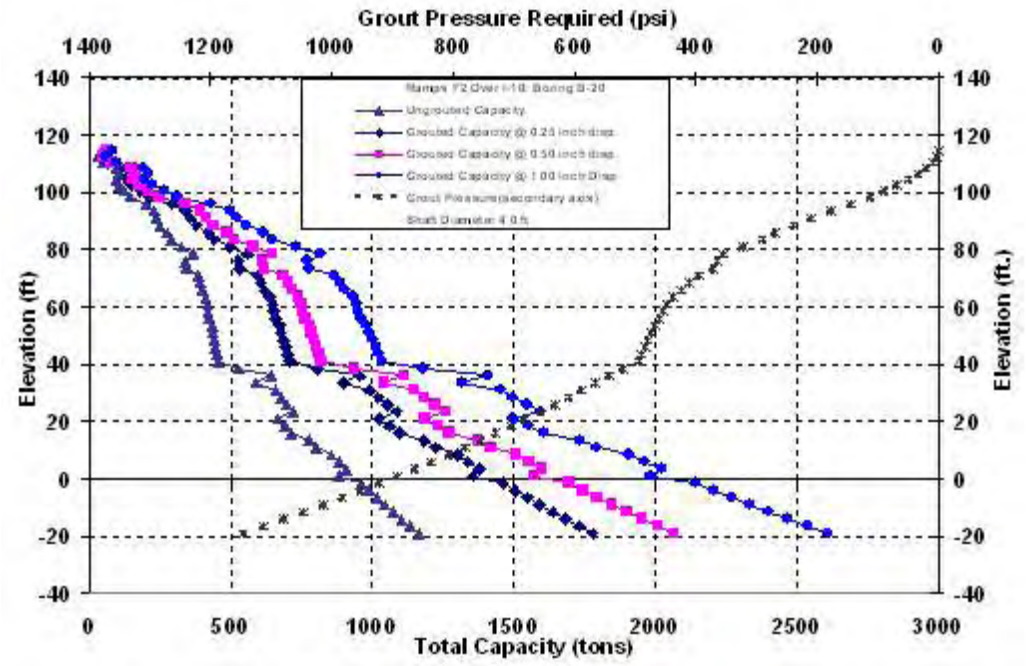


Figure C-47 I-10 / I-110: B-20, 4ft Diameter

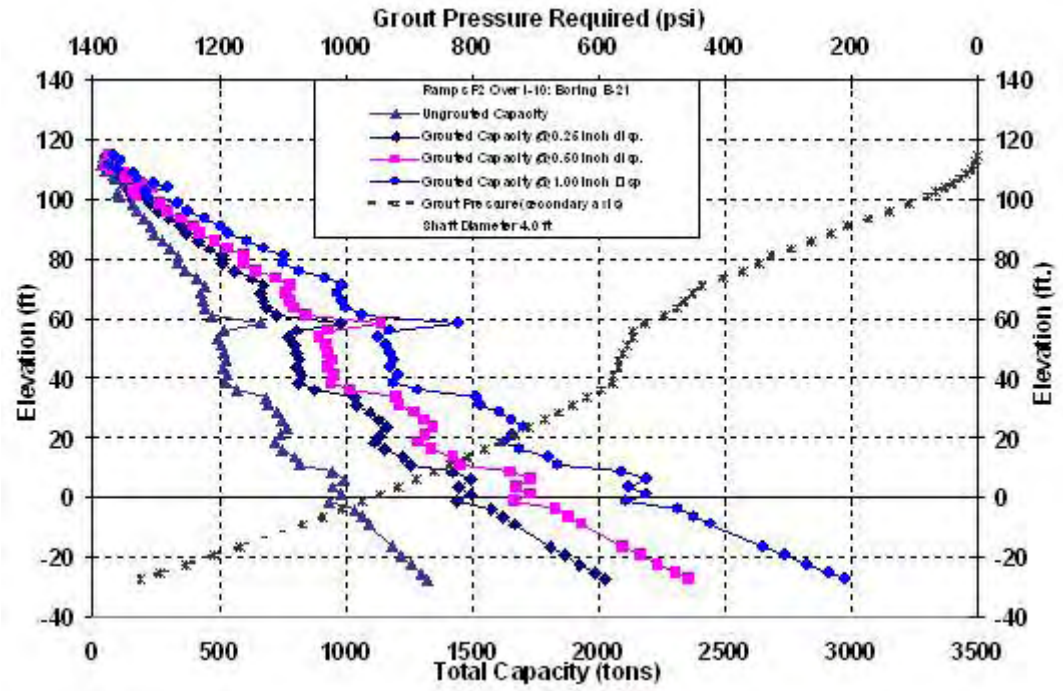


Figure C-48 I-10 / I-110: B-21, 4ft Diameter

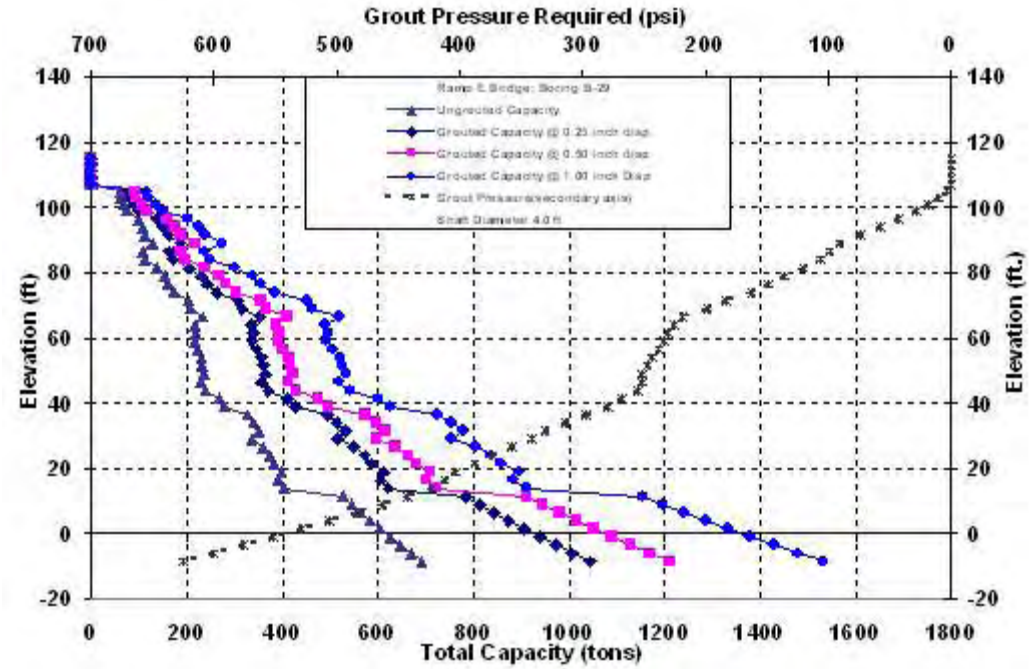


Figure C-49 I-10 / I-110: B-29, 4ft Diameter

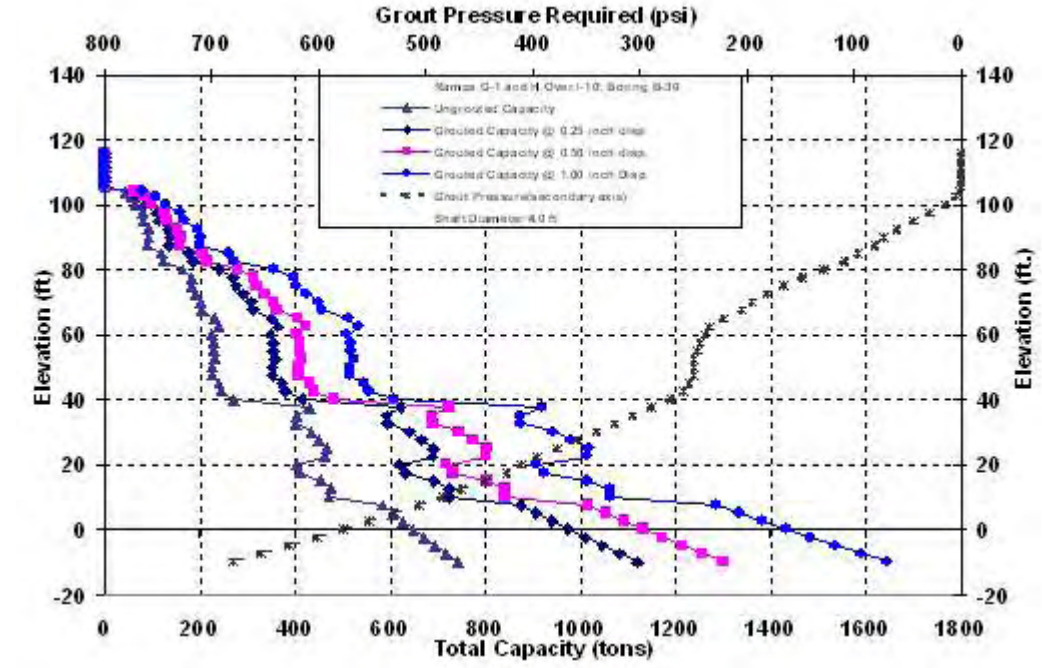


Figure C-50 I-10 / I-110: B-30, 4ft Diameter

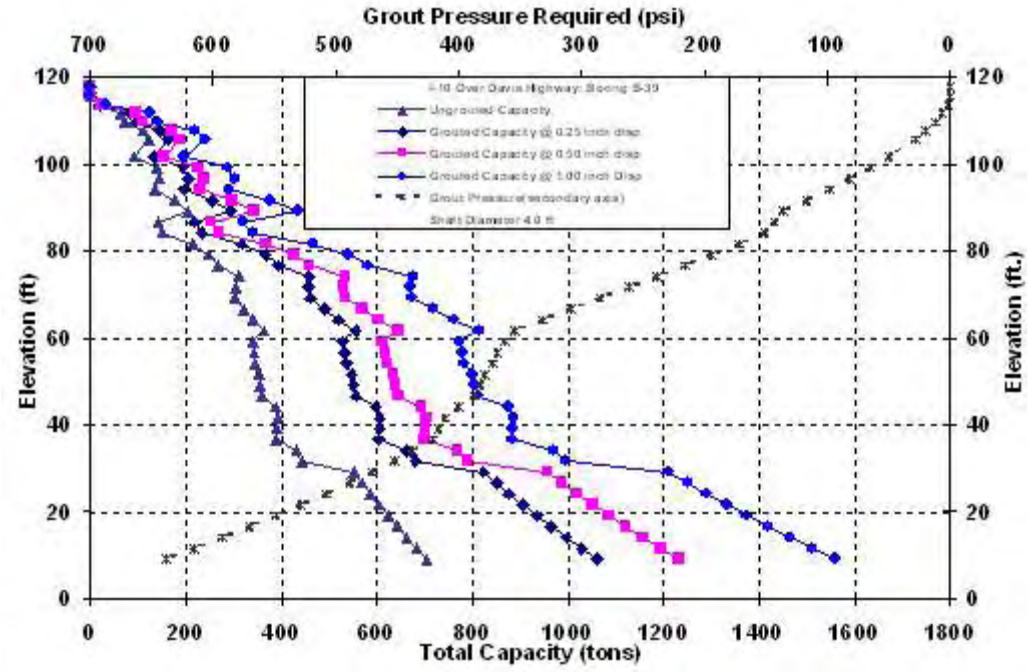


Figure C-51 I-10 / I-110: B-39, 4ft Diameter

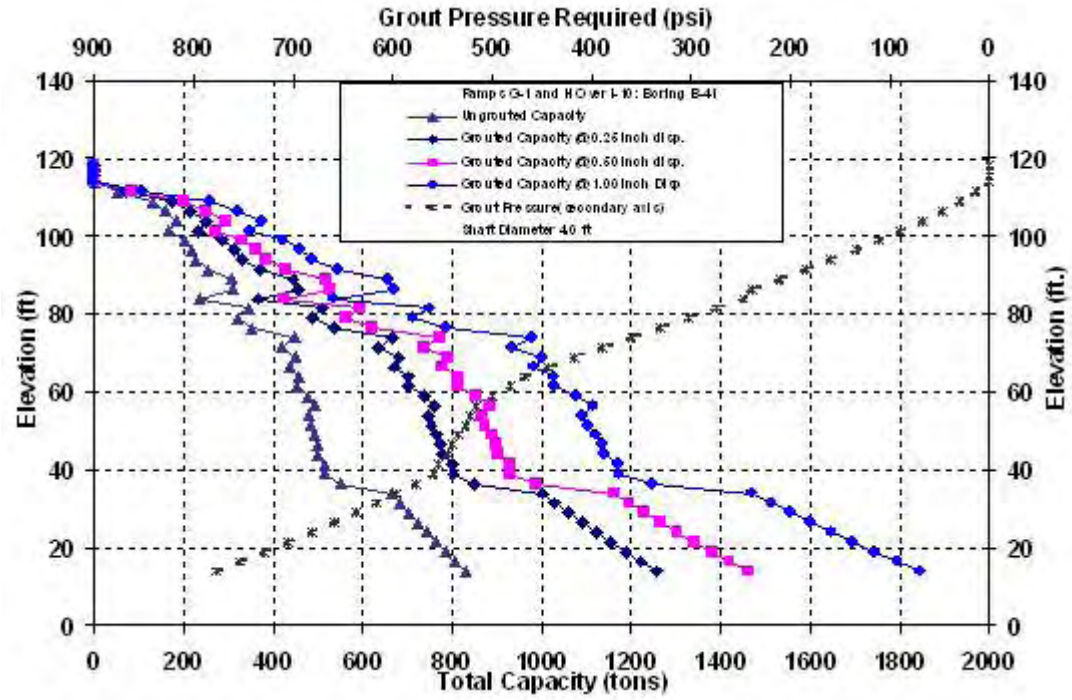


Figure C-52 I-10 / I-110: B-41, 4ft Diameter

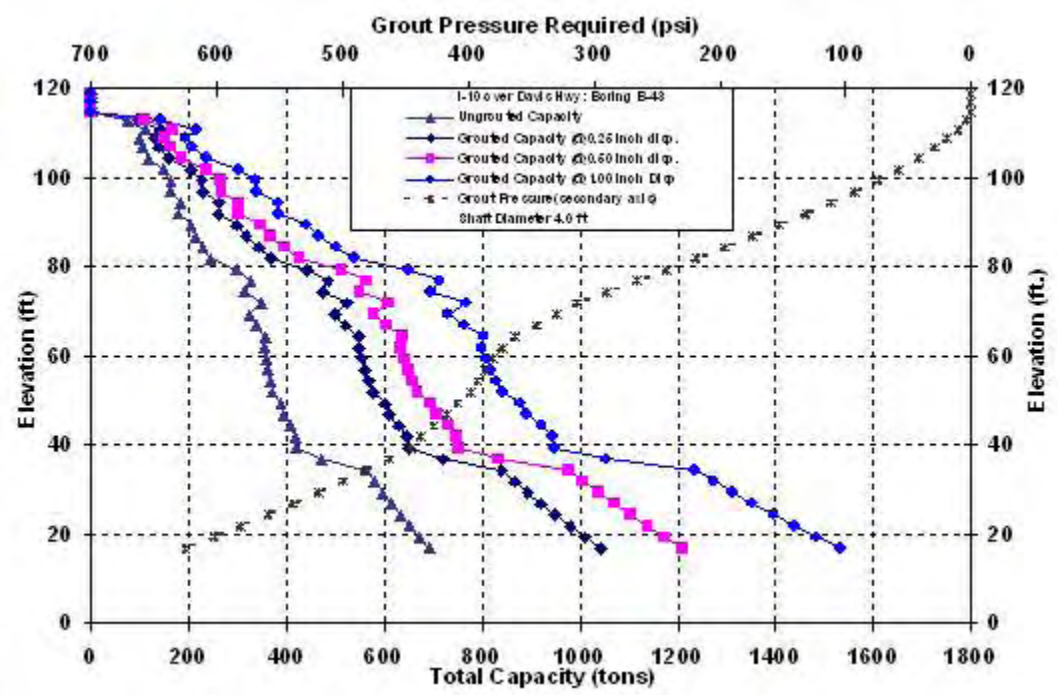


Figure C-53 I-10 / I-110: B-43, 4ft Diameter

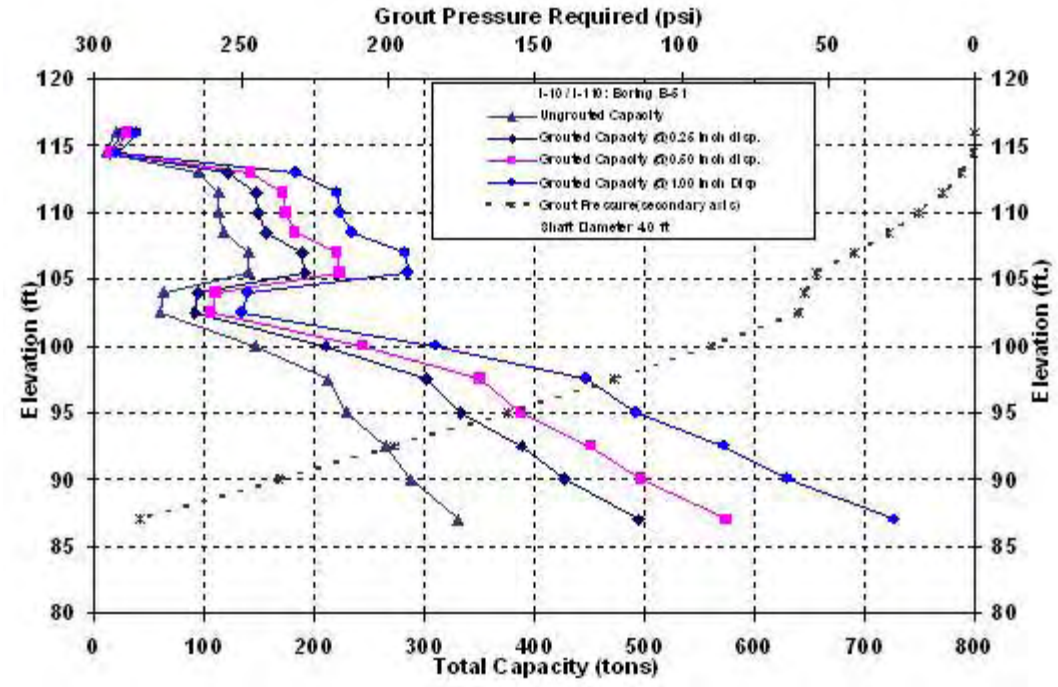


Figure C-54 I-10 / I-110: B-51, 4ft Diameter

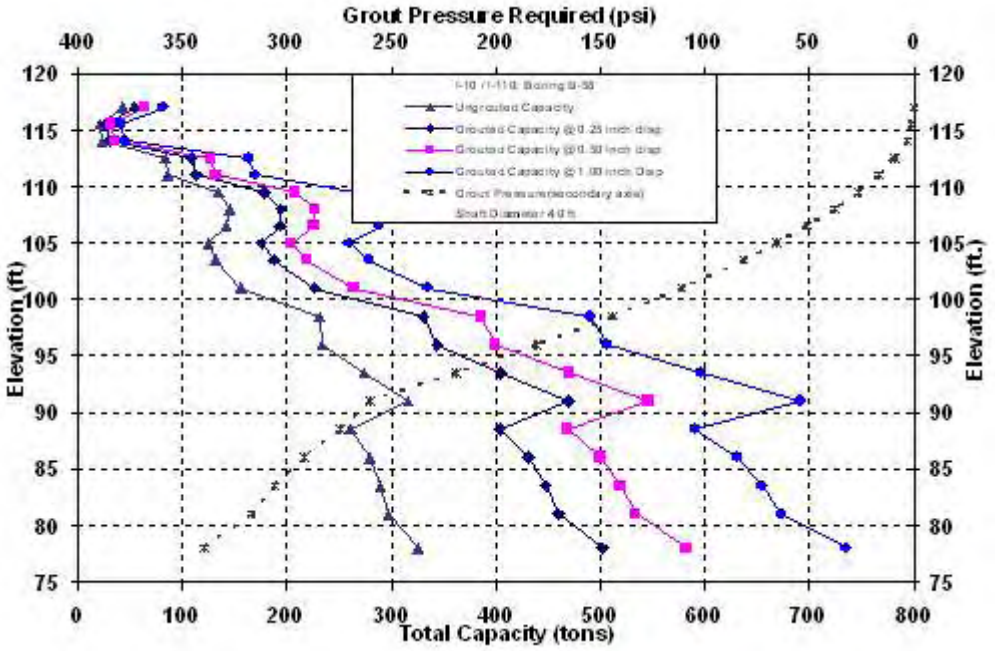


Figure C-55 I-10 / I-110: B-58, 4ft Diameter

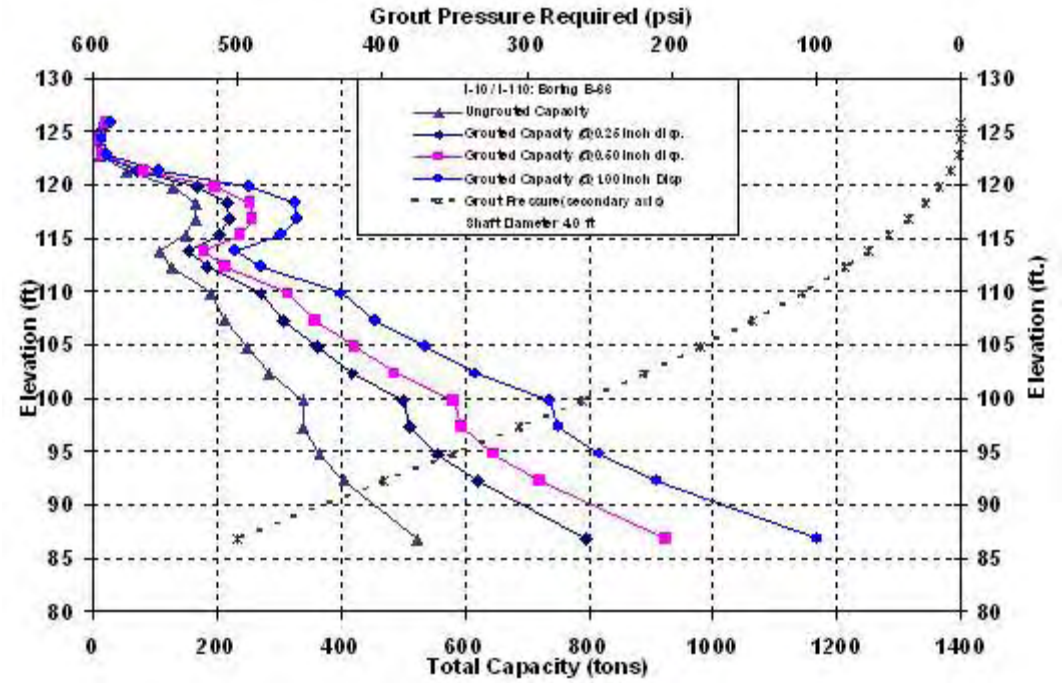


Figure C-56 I-10 / I-110: B-66, 4ft Diameter

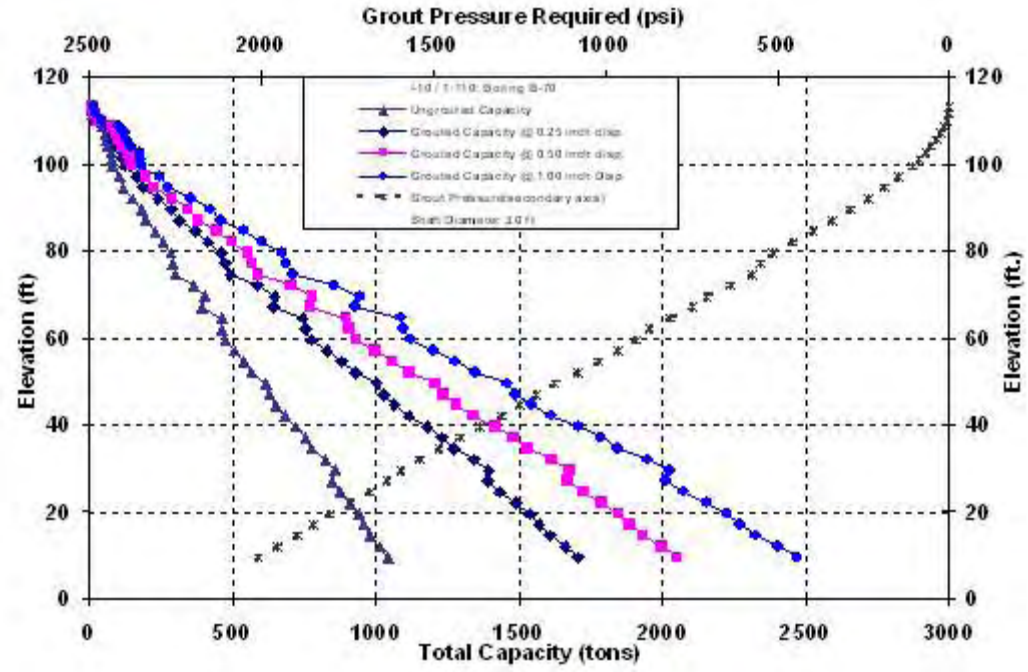


Figure C-57 I-10 / I-110: B-70, 3ft Diameter

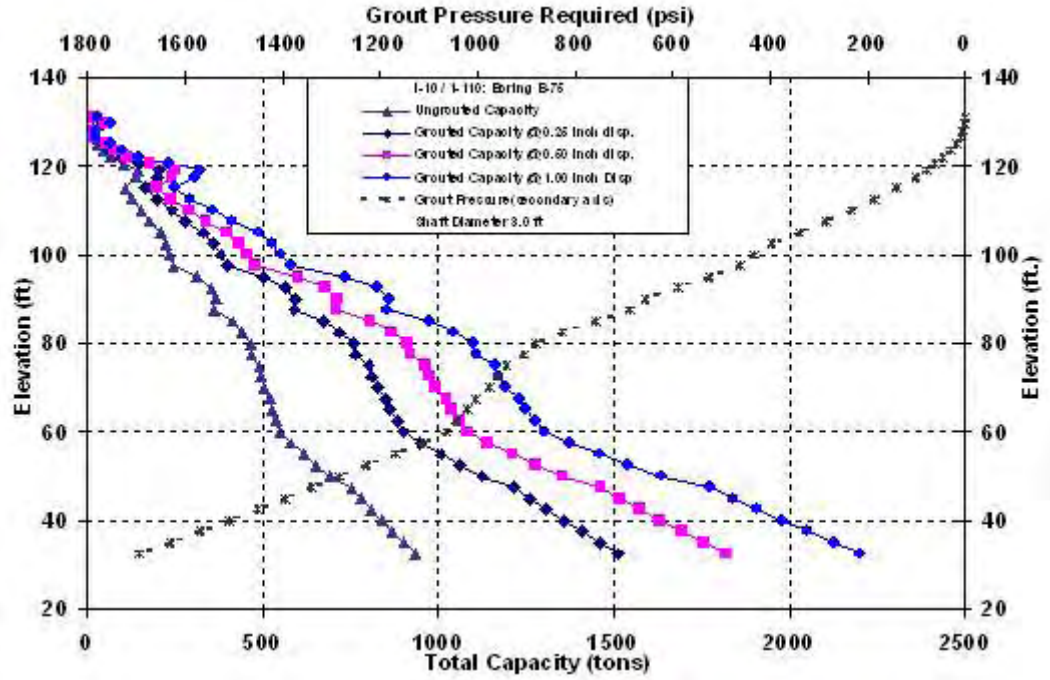


Figure C-58 I-10 / I-110: B-75, 3ft Dimaeter

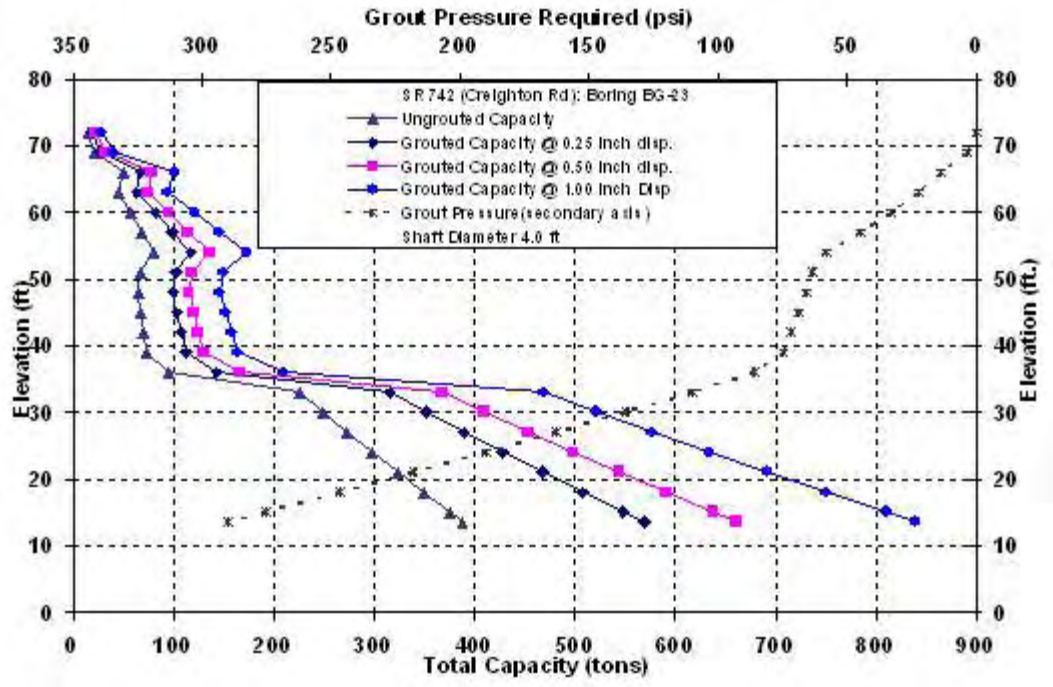


Figure C-59 I-10 / I-110: BG-23, 4ft Diameter

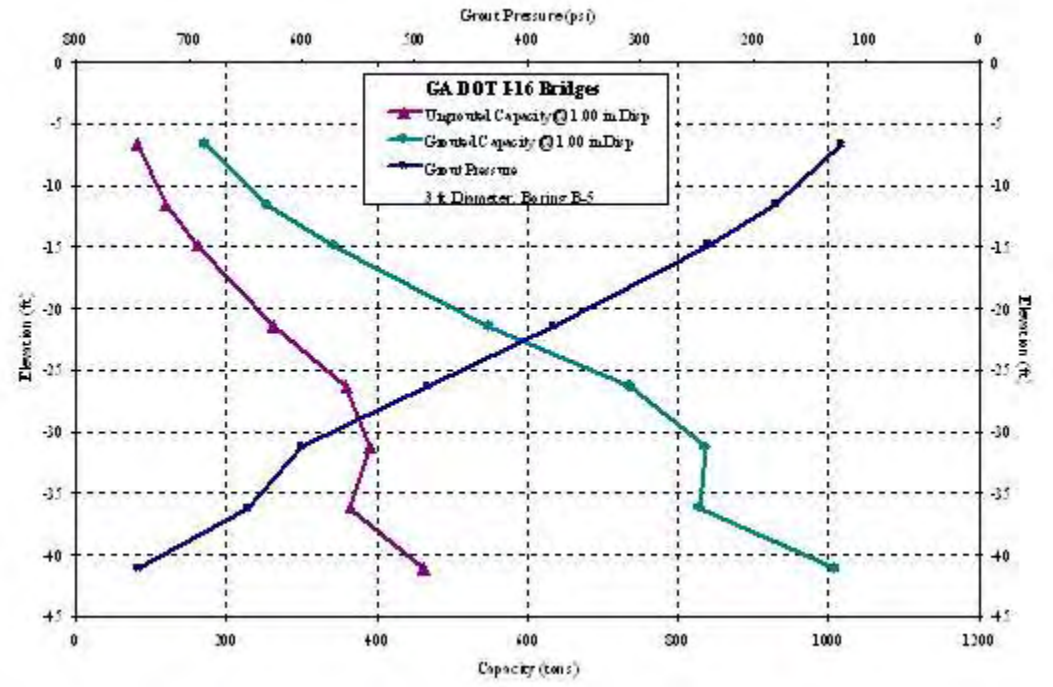


Figure C-60 I-16 over Ogeechee River: B-5, 3ft Diameter

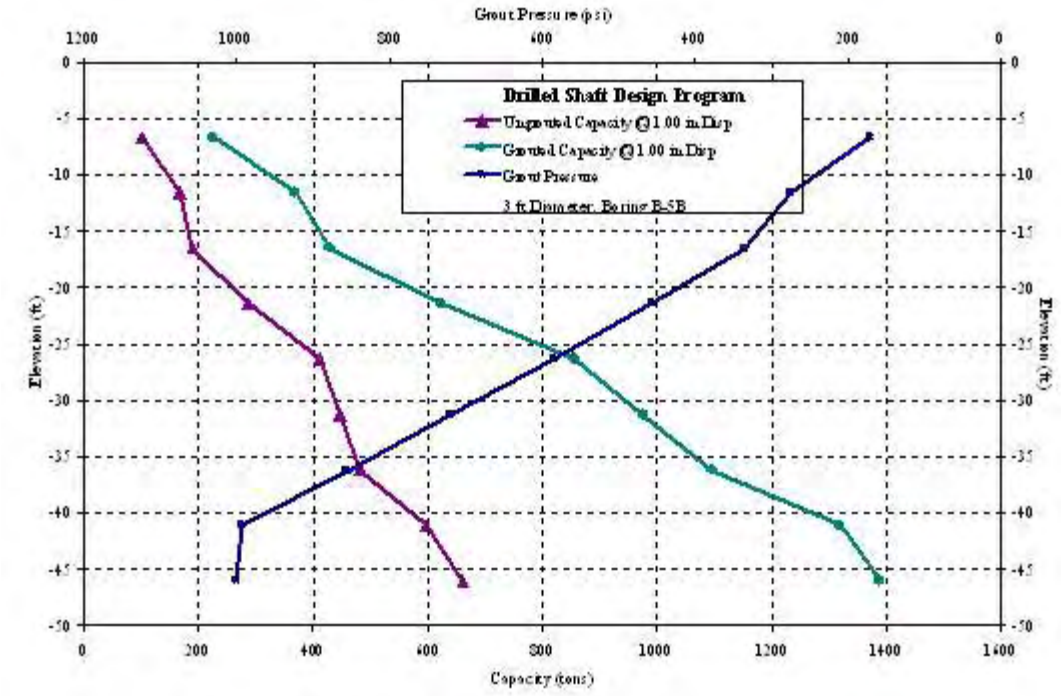


Figure C-61 I-16 over Ogeechee River: B-5B, 3ft Diameter

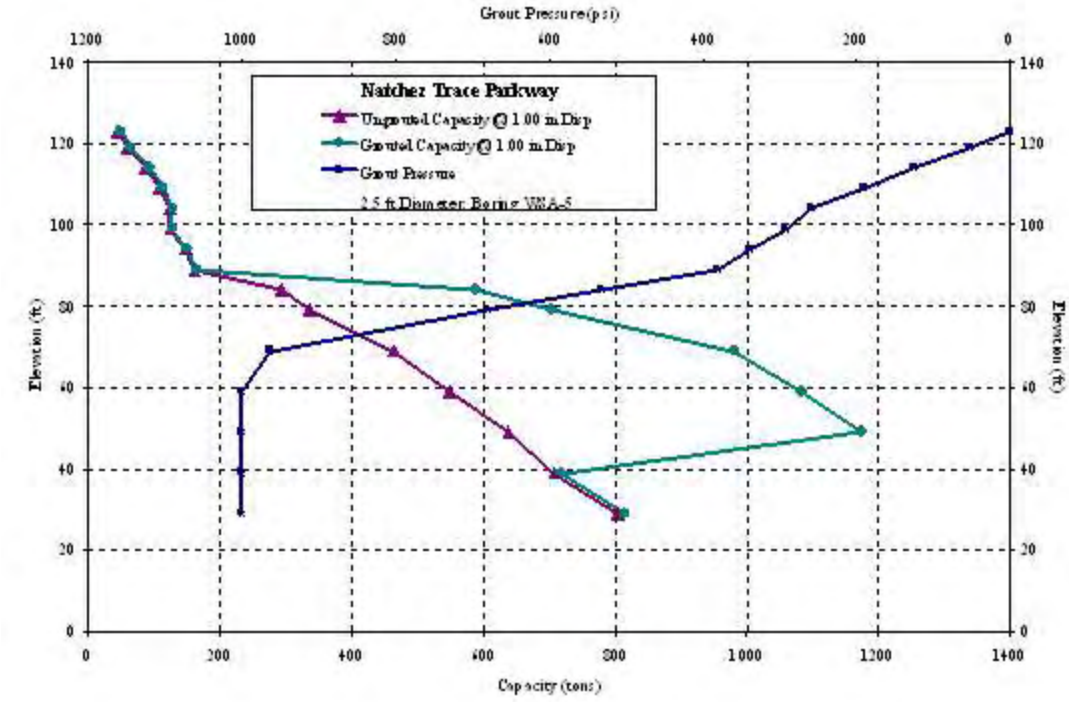


Figure C-62 Natchez Trace Pkwy: WSA-5, 2.5ft Diameter

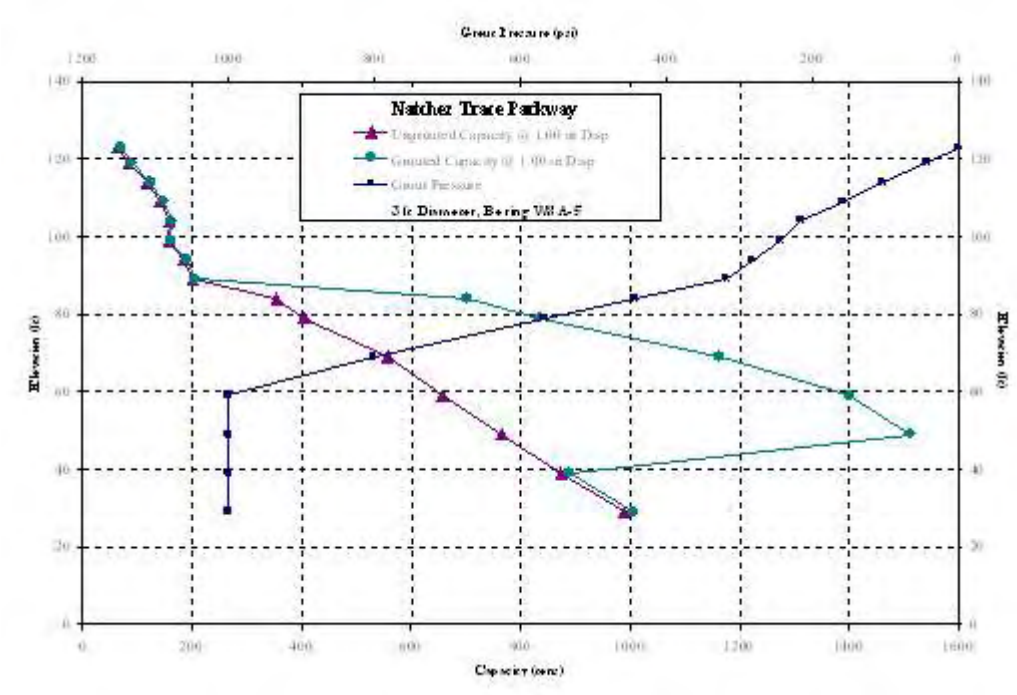


Figure C-63 Natchez Trace Pkwy: WSA-5, 3ft Diameter

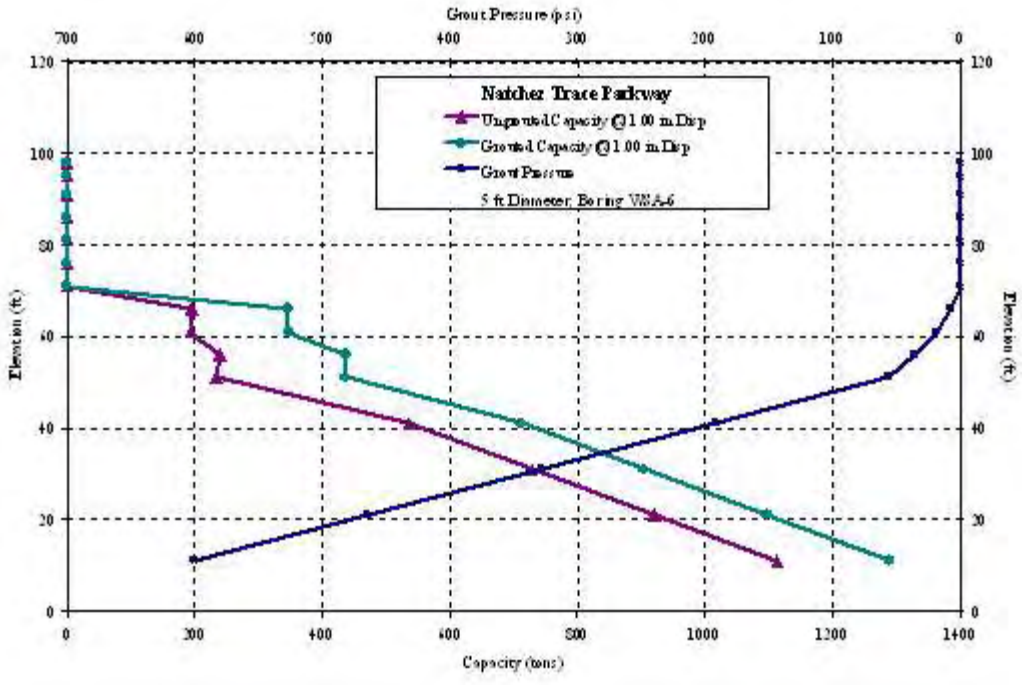


Figure C-64 Natchez Trace Pkwy: WSA-6, 5ft Diameter

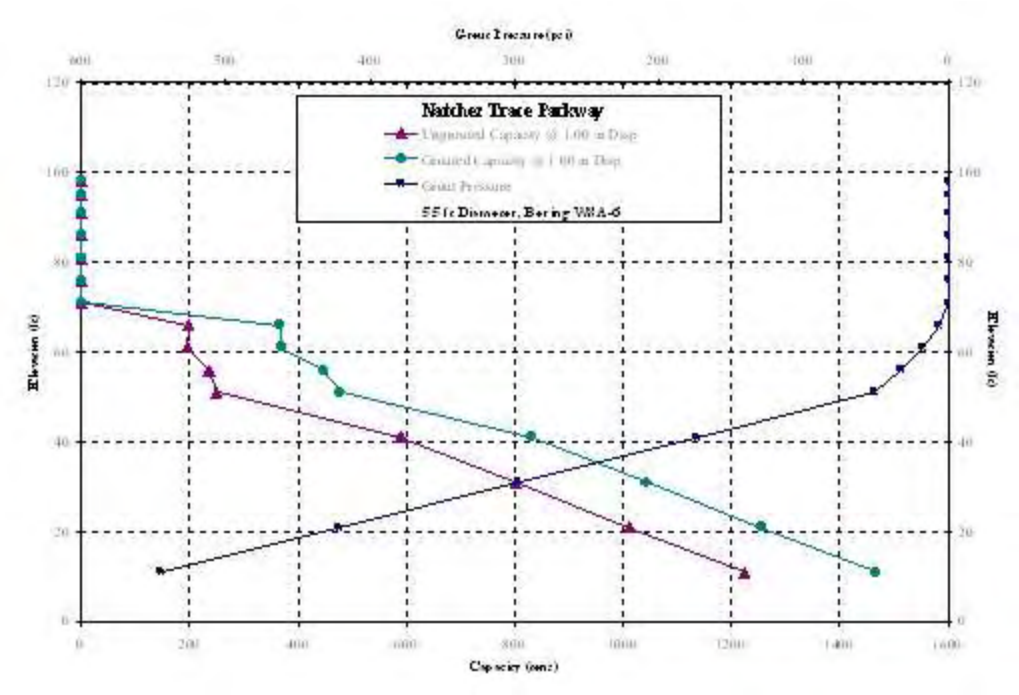


Figure C-65 Natchez Trace Pkwy: WSA-6, 5.5ft Diameter

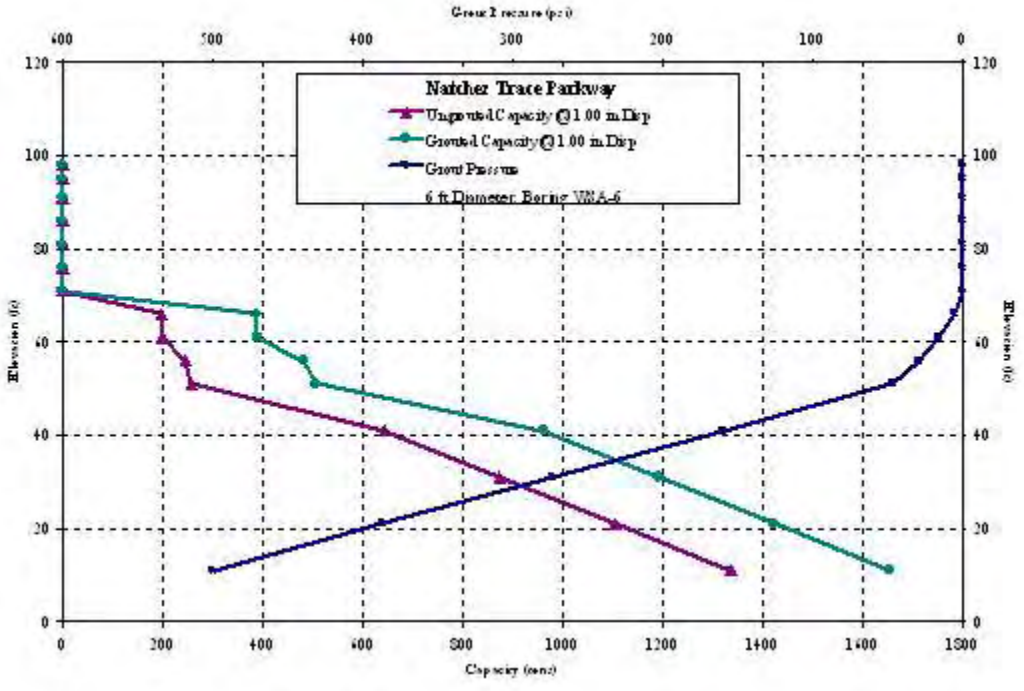


Figure C-66 Natchez Trace Pkwy: WSA-6, 6ft Diameter

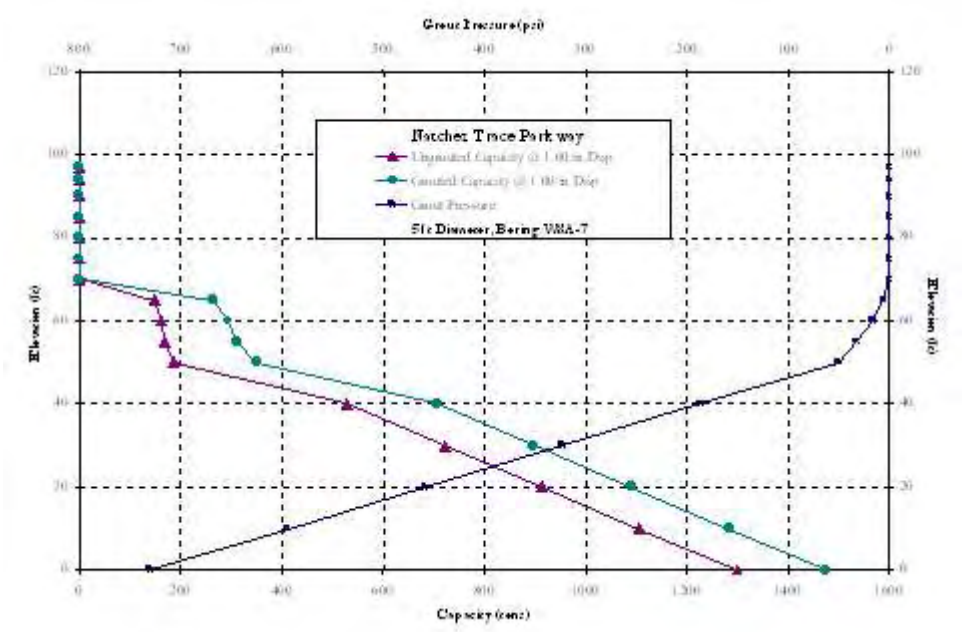


Figure C-67 Natchez Trace Pkwy: WSA-7, 5ft Diameter

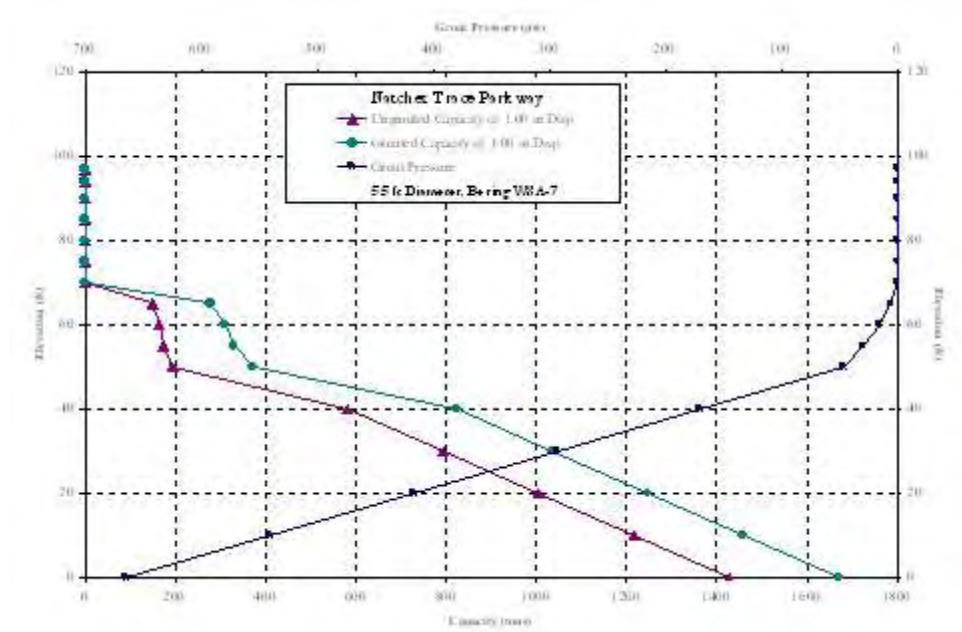


Figure C-68 Natchez Trace Pkwy: WSA-7, 5.5ft Diameter

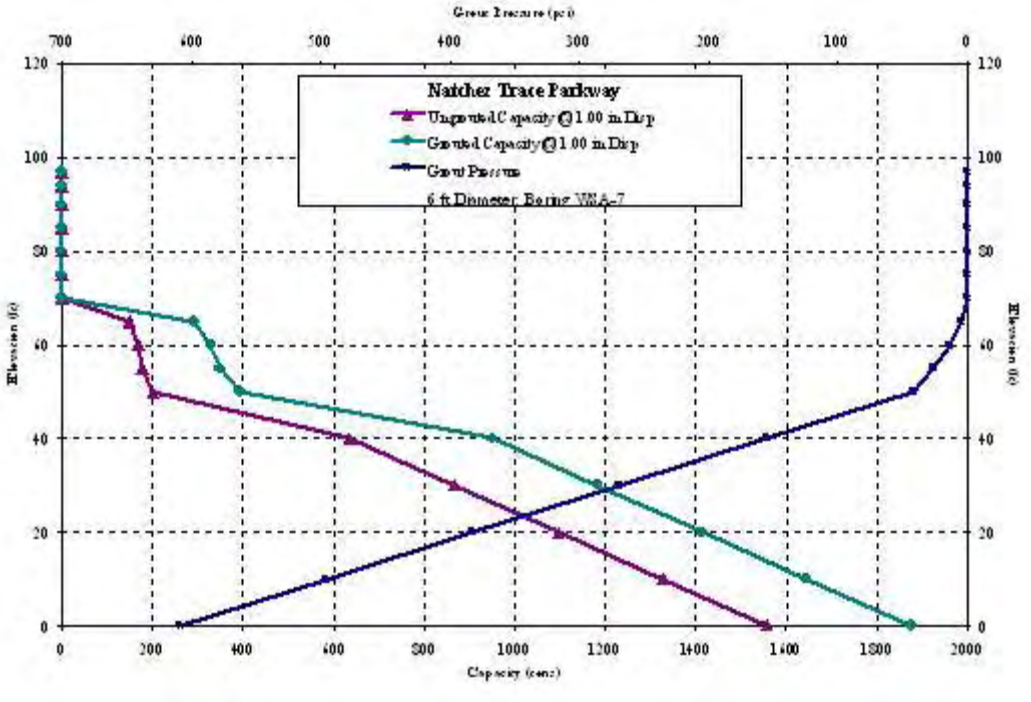


Figure C-69 Natchez Trace Pkwy: WSA-7, 6ft Diameter

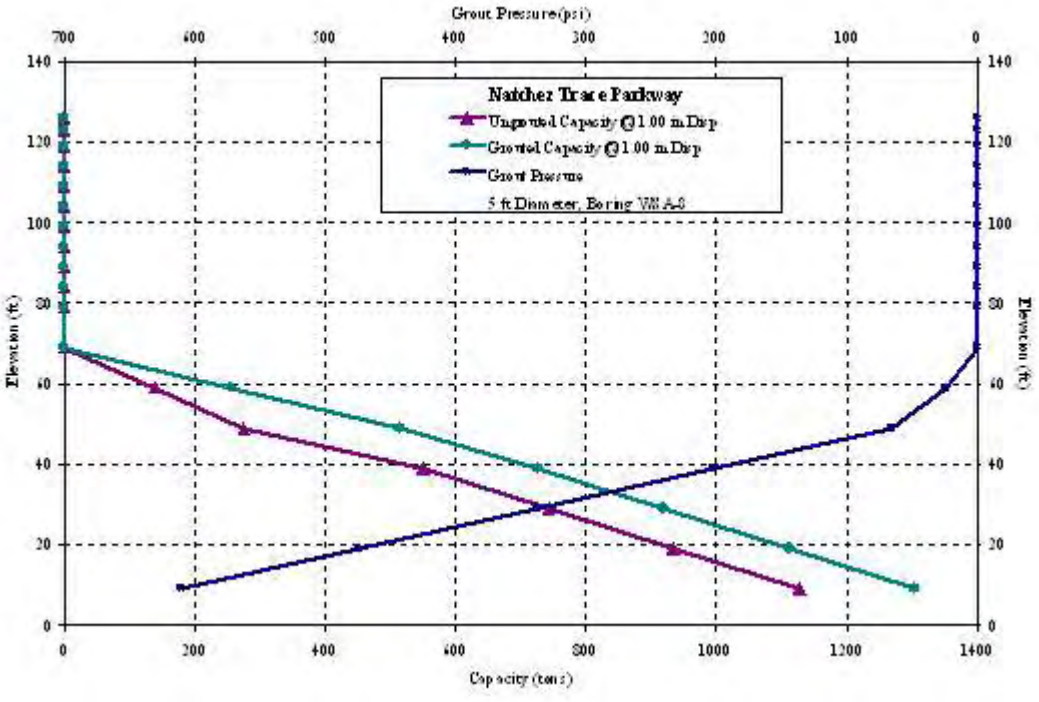


Figure C-70 Natchez Trace Pkwy: WSA-8, 5ft Diameter

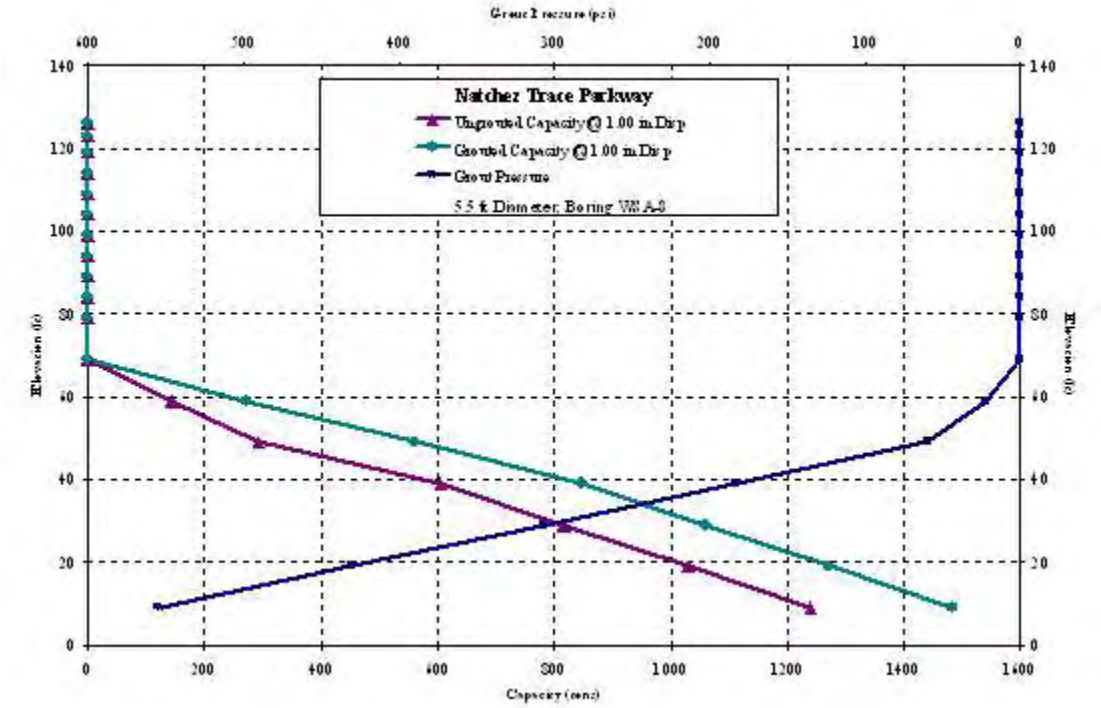


Figure C-71 Natchez Trace Pkwy: WSA-8, 5.5ft Diameter

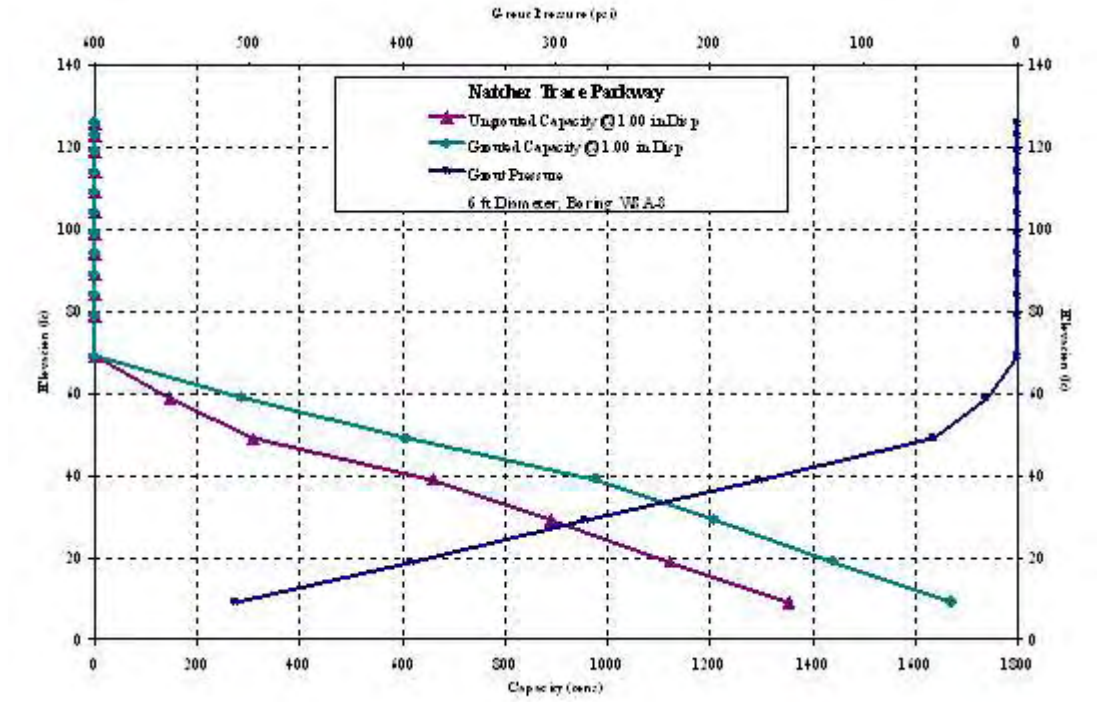


Figure C-72 Natchez Trace Pkwy: WSA-8, 6ft Diameter

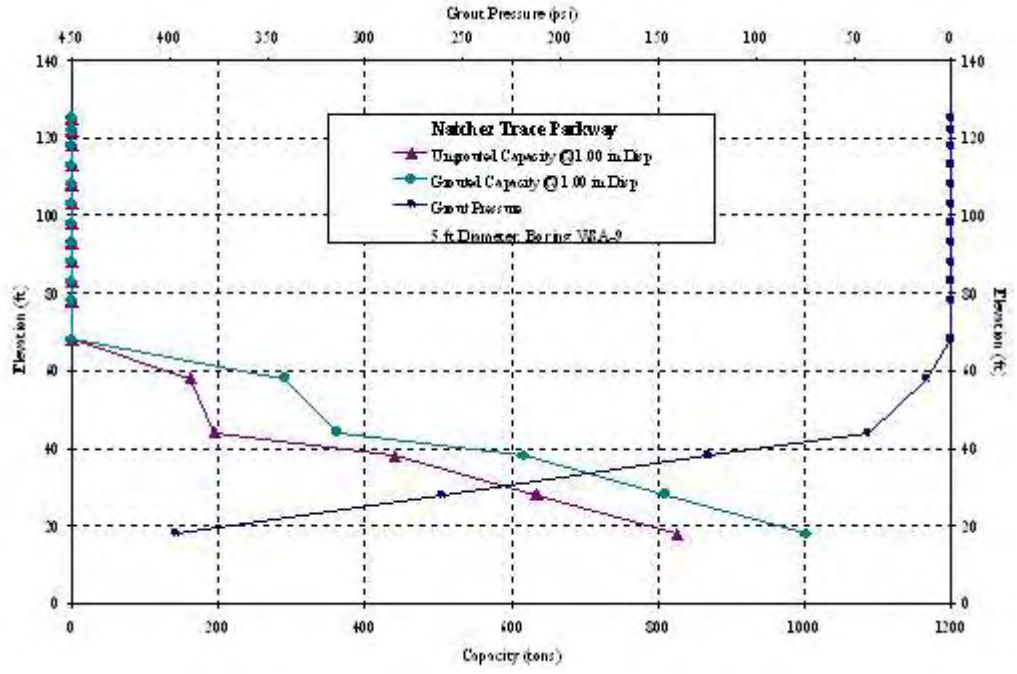


Figure C-73 Natchez Trace Pkwy: WSA-9, 5ft Diameter

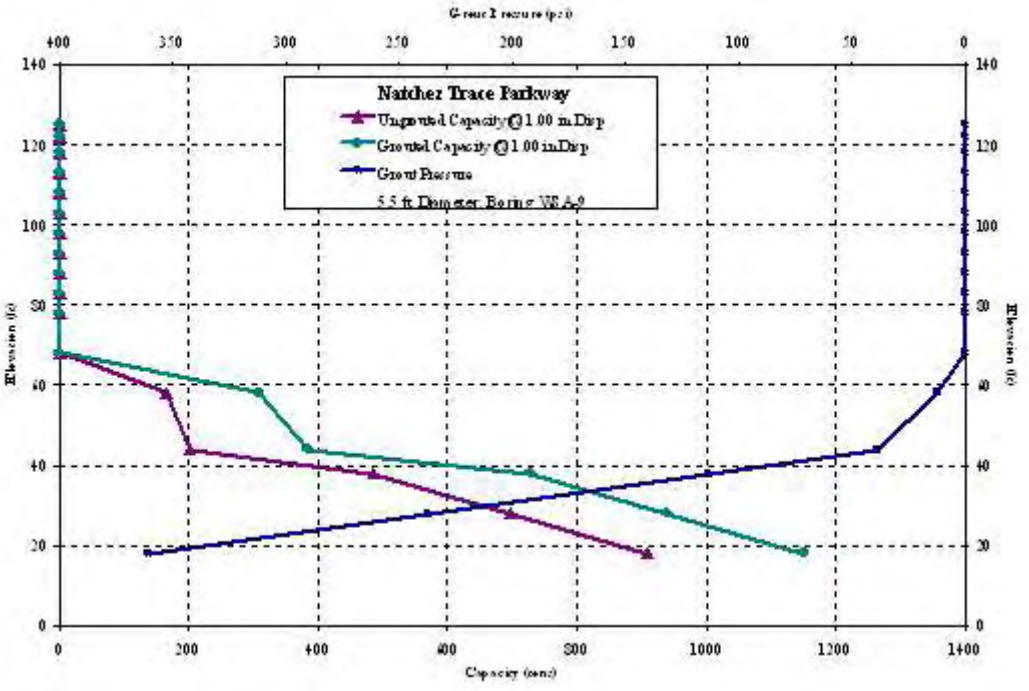


Figure C-74 Natchez Trace Pkwy: WSA-9, 5.5ft Diameter

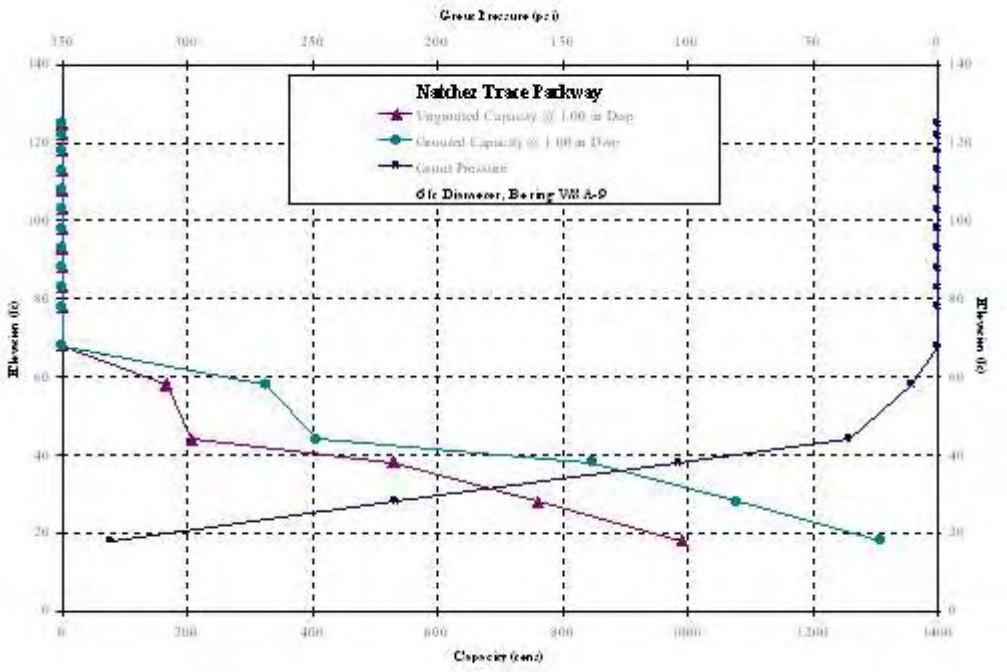


Figure C-75 Natchez Trace Pkwy: WSA-9, 6ft Diameter

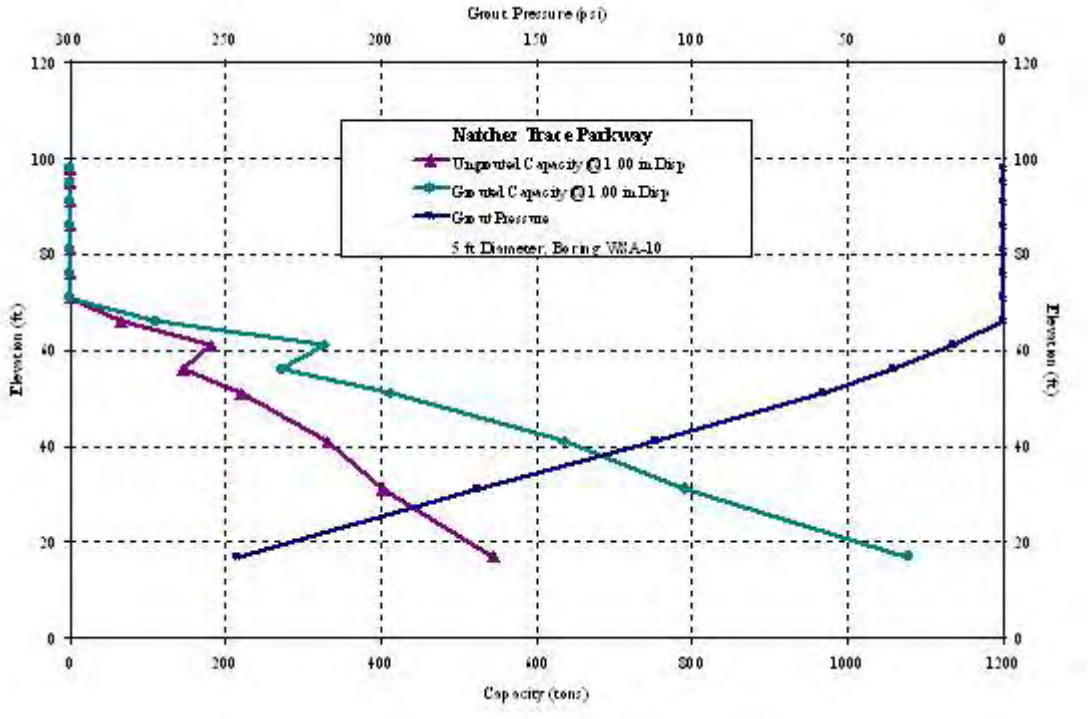


Figure C-76 Natchez Trace Pkwy: WSA-10, 5ft Diameter

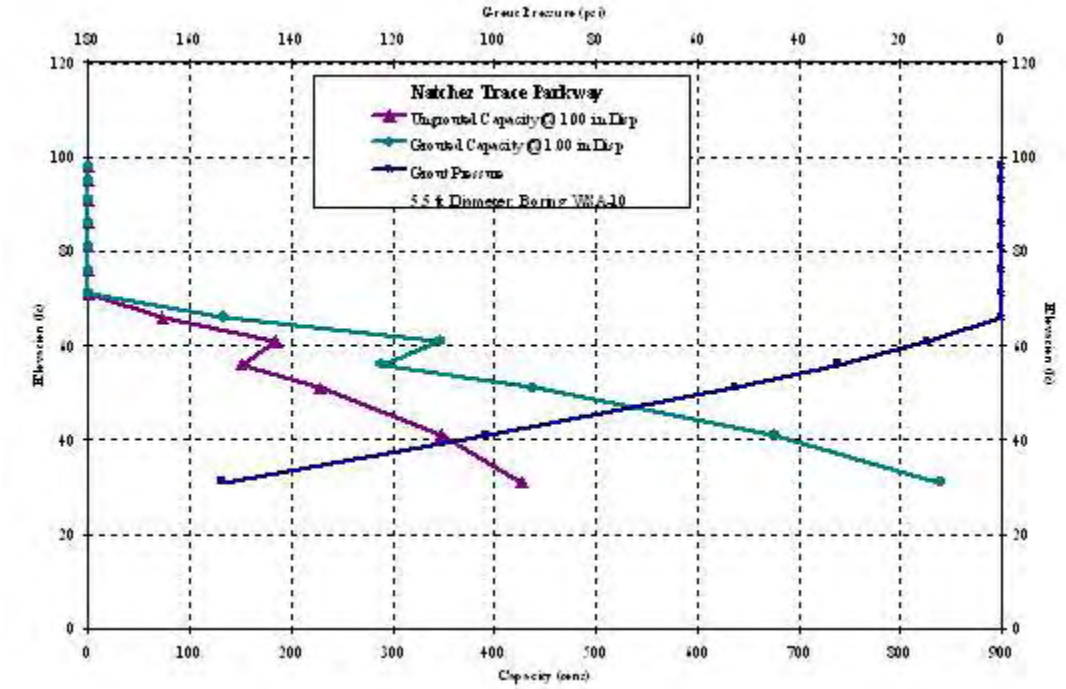


Figure C-77 Natchez Trace Pkwy: WSA-10, 5.5ft Diameter

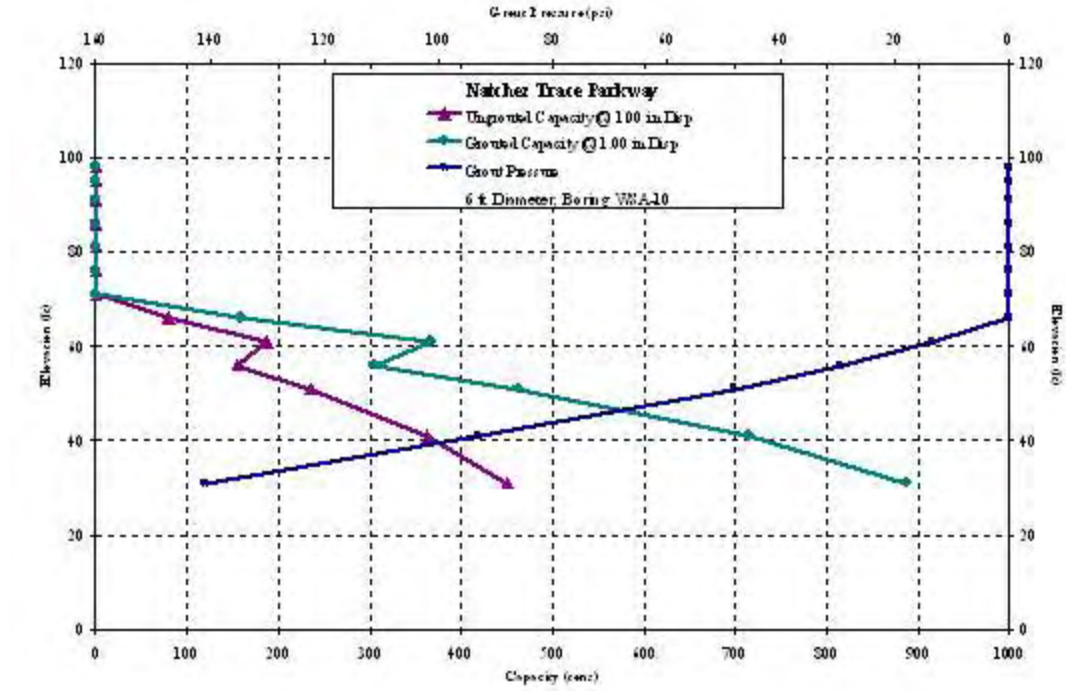


Figure C-78 Natchez Trace Pkwy: WSA-10, 6ft Diameter

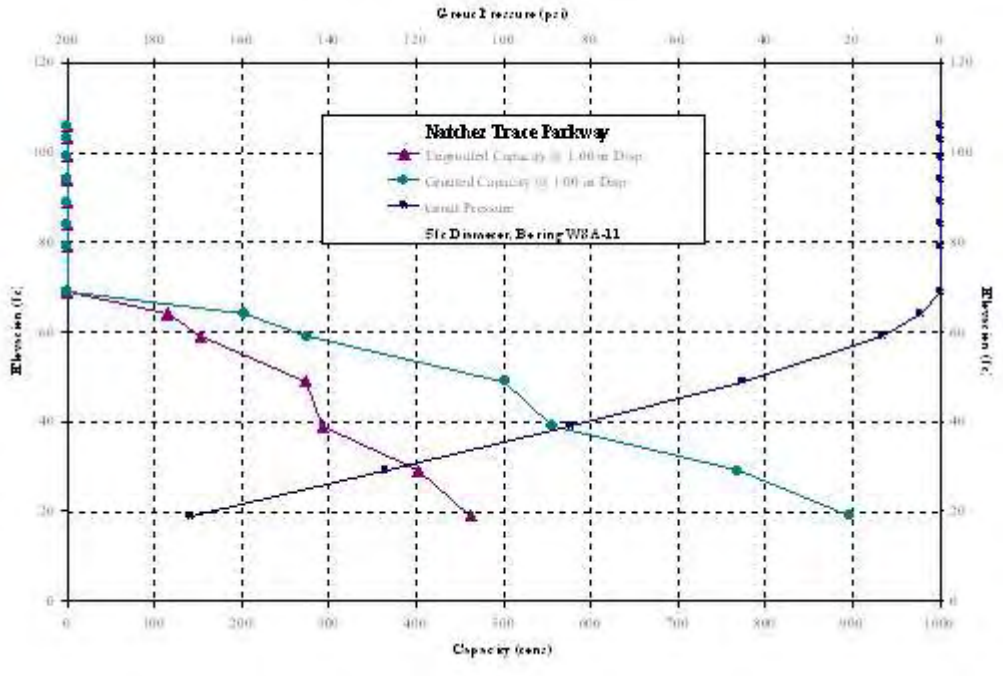


Figure C-79 Natchez Trace Pkwy: WSA-11, 5ft Diameter

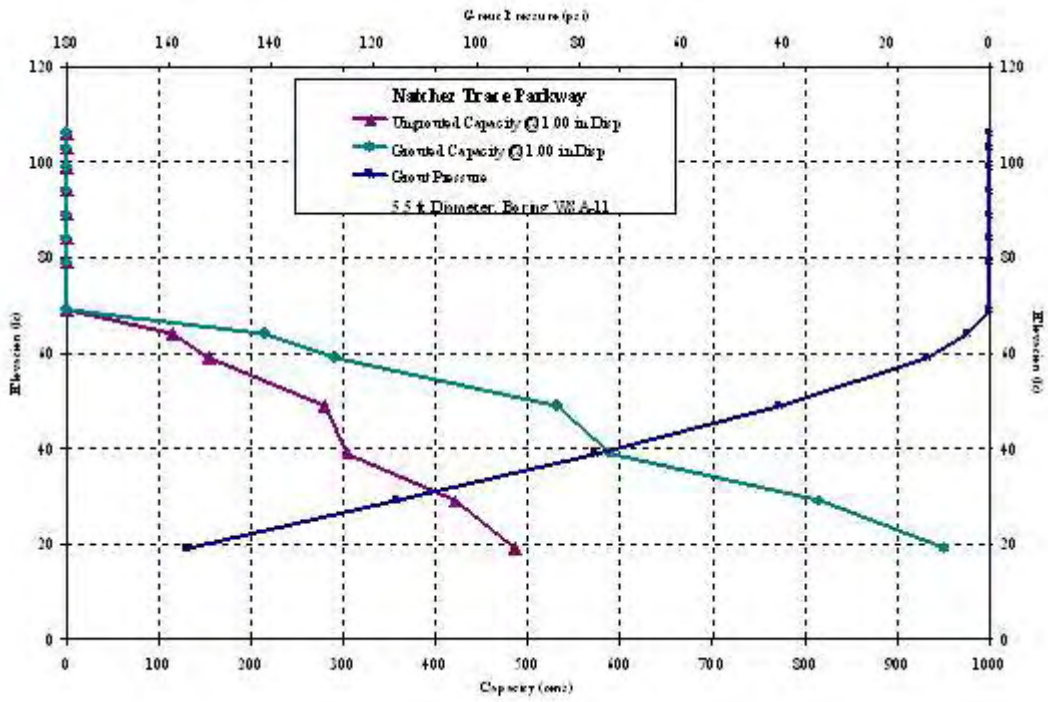


Figure C-80 Natchez Trace Pkwy: WSA-11, 5.5ft Diameter

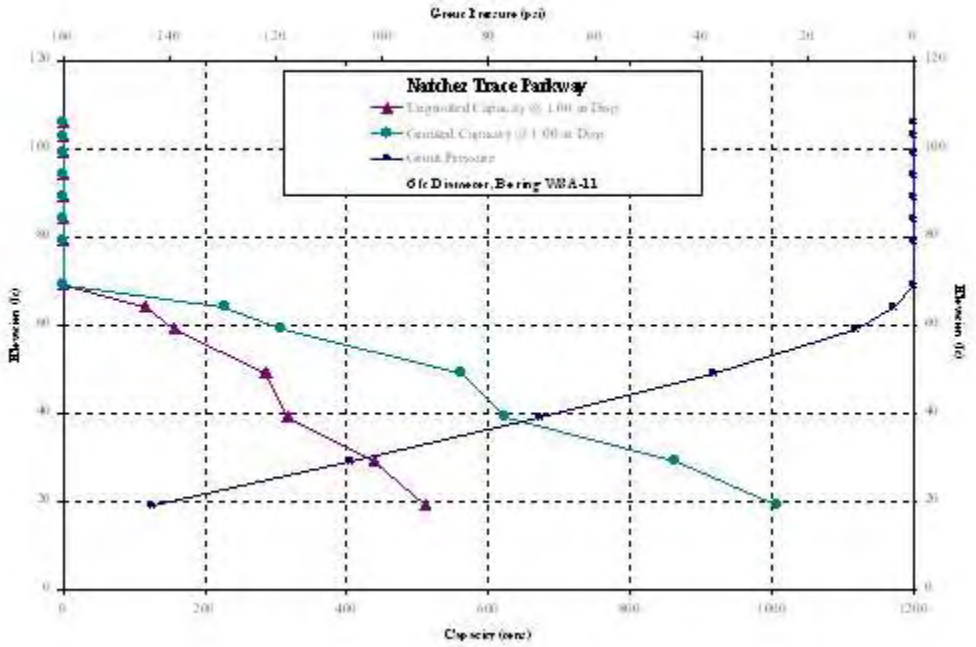


Figure C-81 Natchez Trace Pkwy: WSA-11, 6ft Diameter

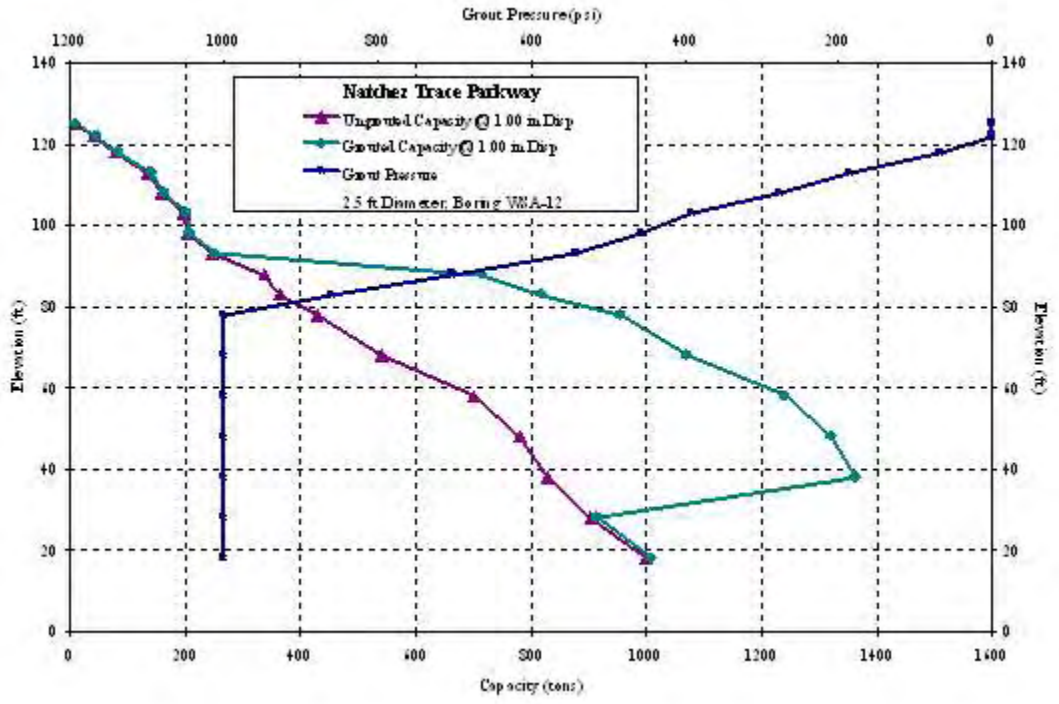


Figure C-82 Natchez Trace Pkwy: WSA-12, 2.5ft Diameter

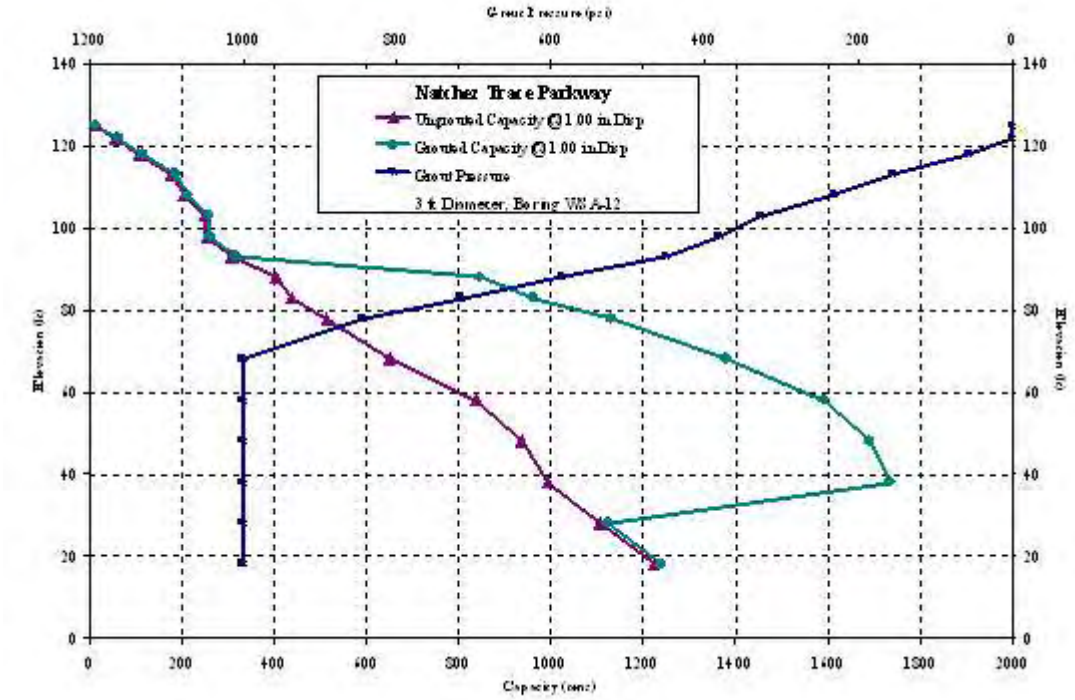


Figure C-83 Natchez Trace Pkwy: WSA-12, 3ft Diameter

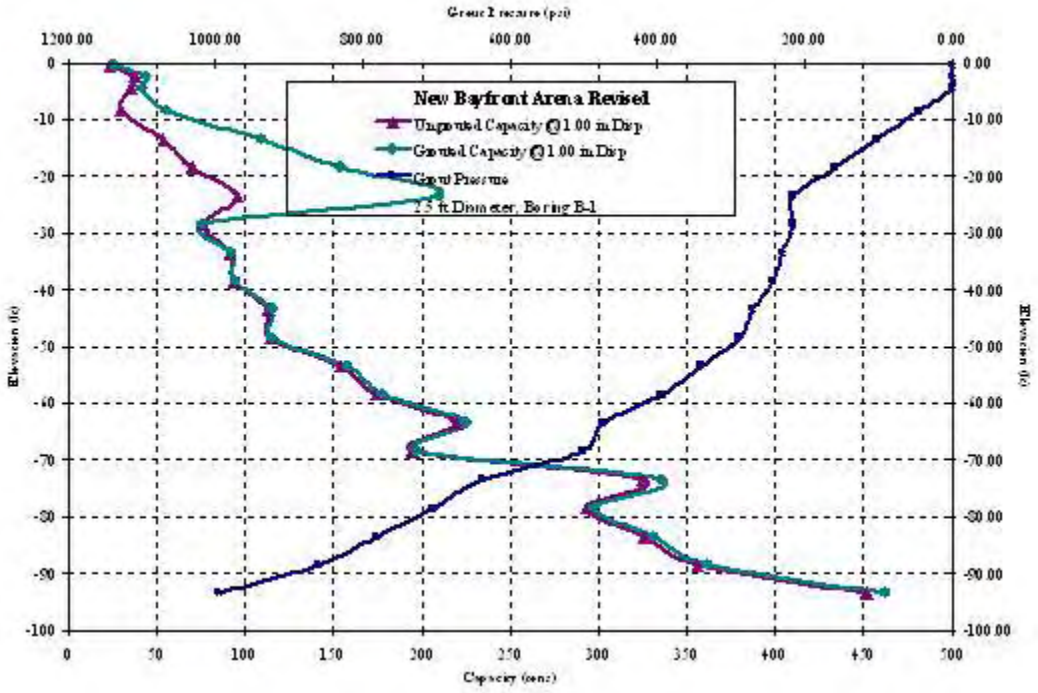


Figure C-84 New Bayfront Arena: B-1, 2.5ft Diameter

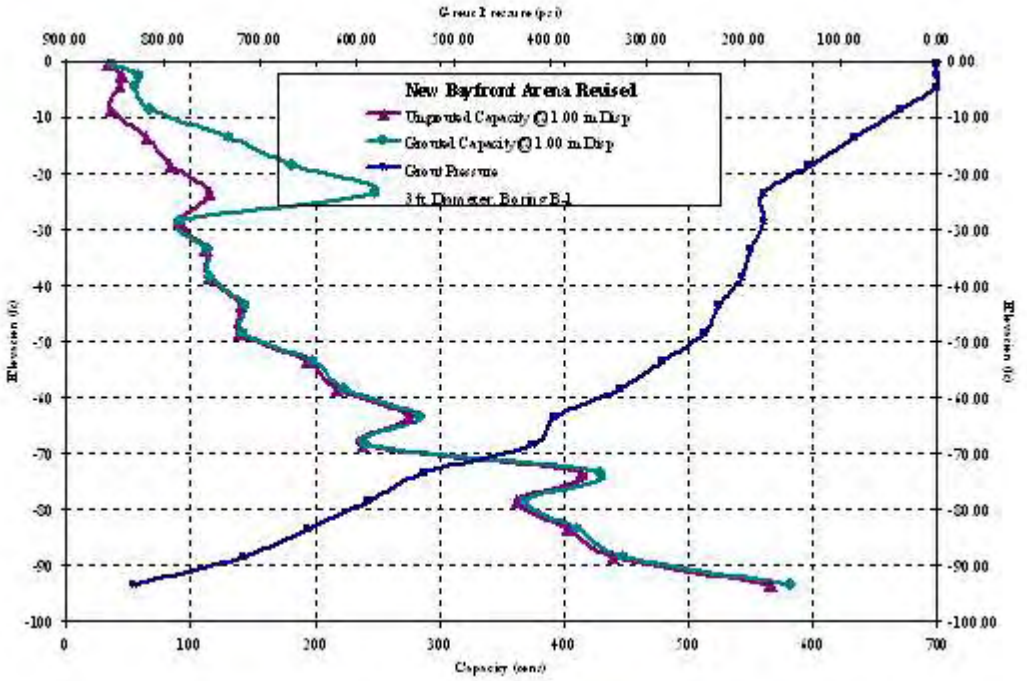


Figure C-85 New Bayfront Arena: B-1, 3ft Diameter

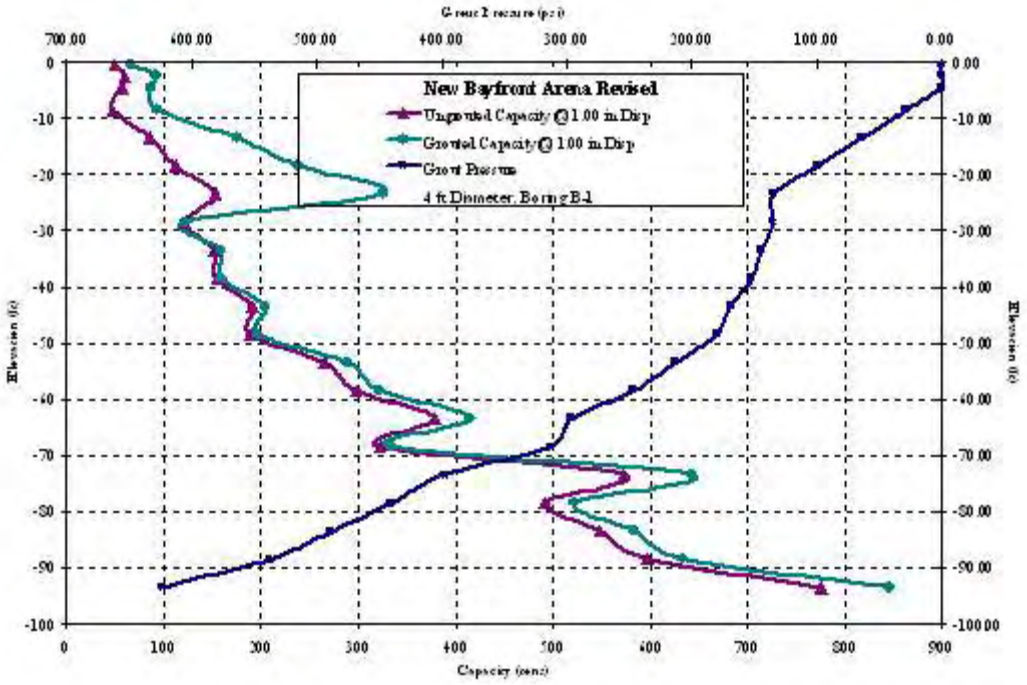


Figure C-86 New Bayfront Arena: B-1, 4ft Diameter

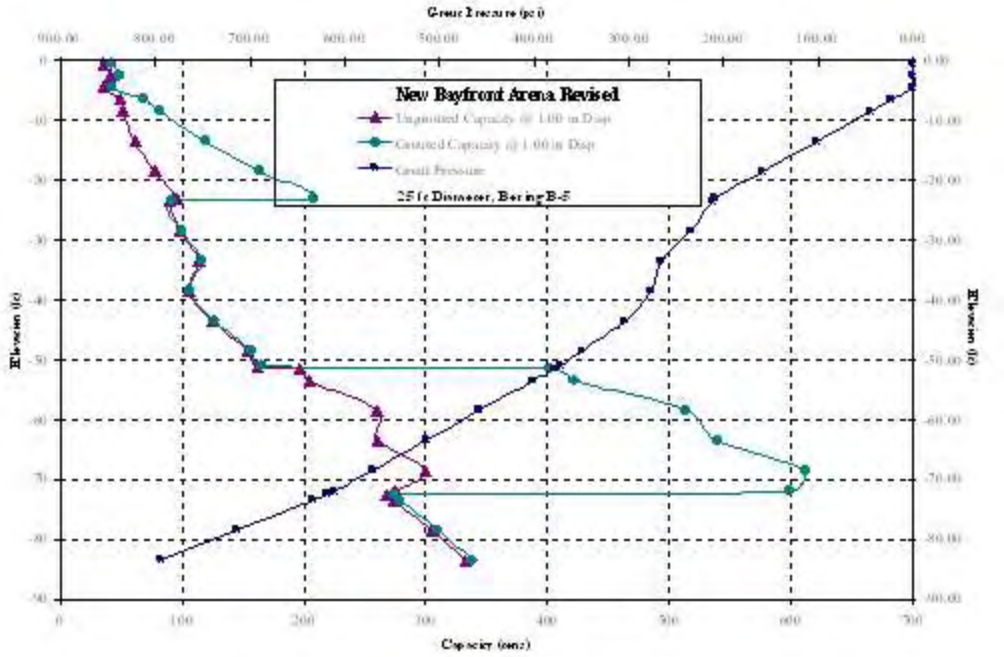


Figure C-87 New Bayfront Arena: B-5, 2.5ft Diameter

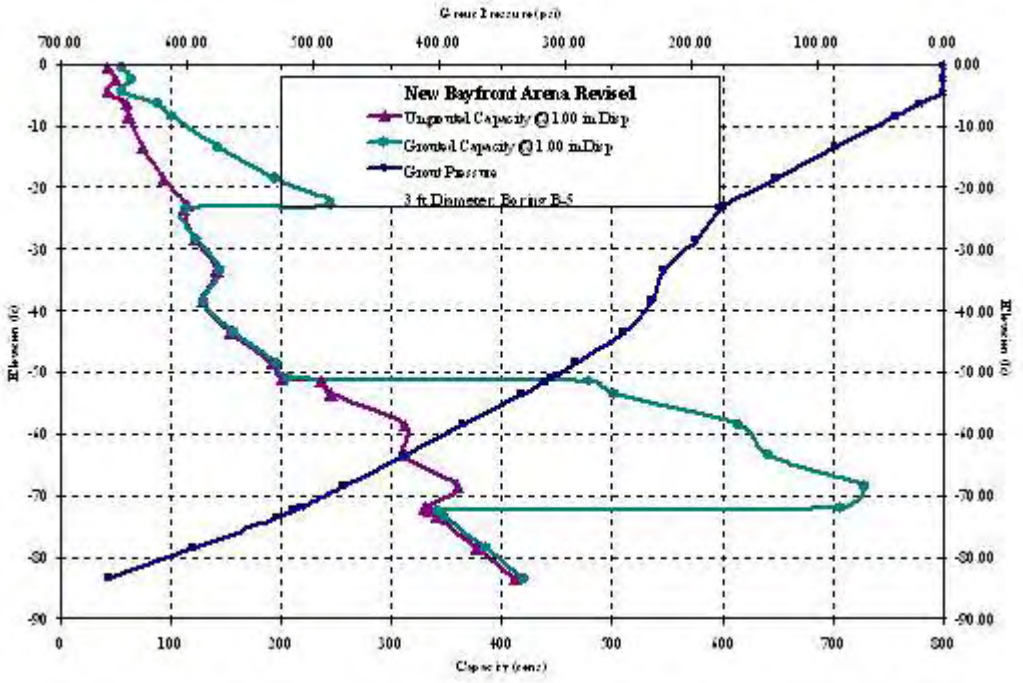


Figure C-88 New Bayfront Arena: B-5, 3ft Diameter

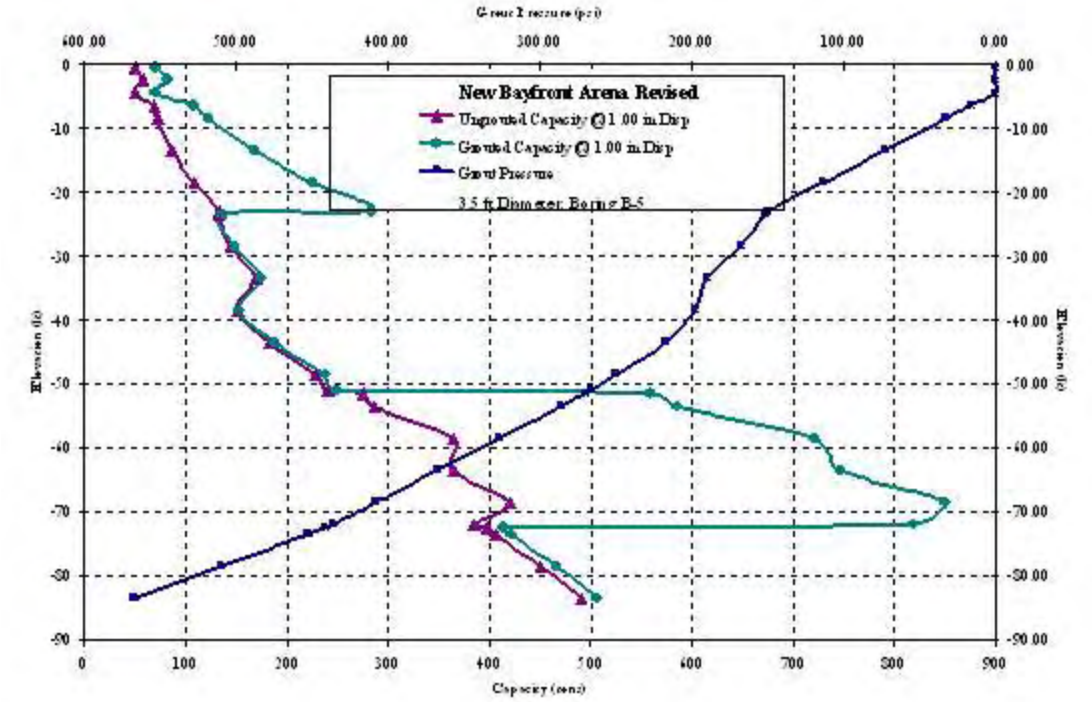


Figure C-89 New Bayfront Arena: B-5, 3.5ft Diameter

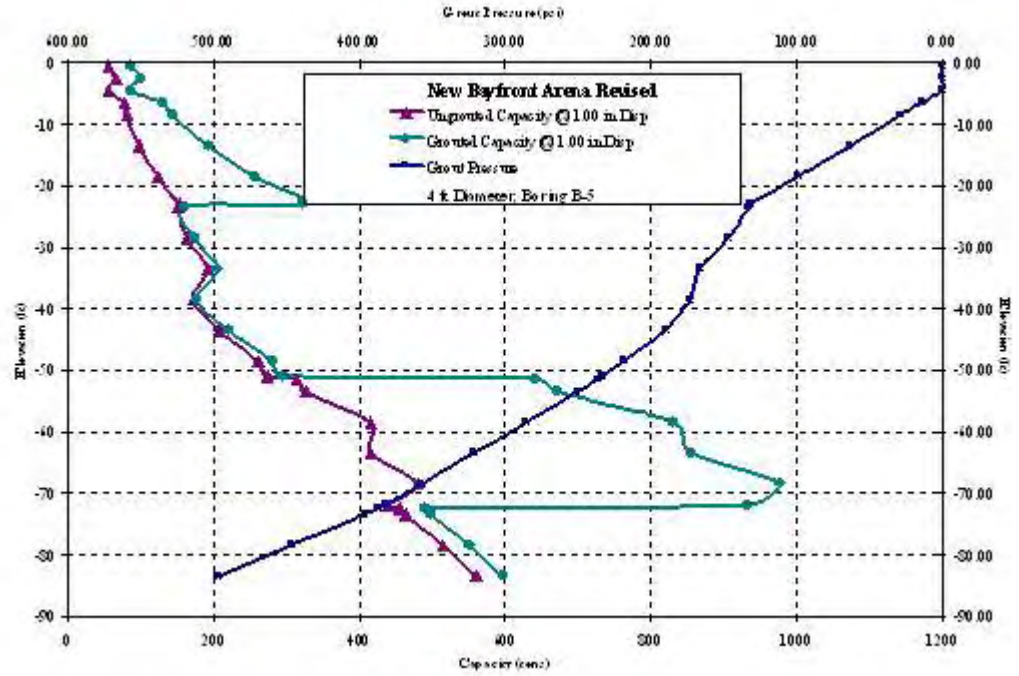


Figure C-90 New Bayfront Arena: B-5, 4ft Diameter

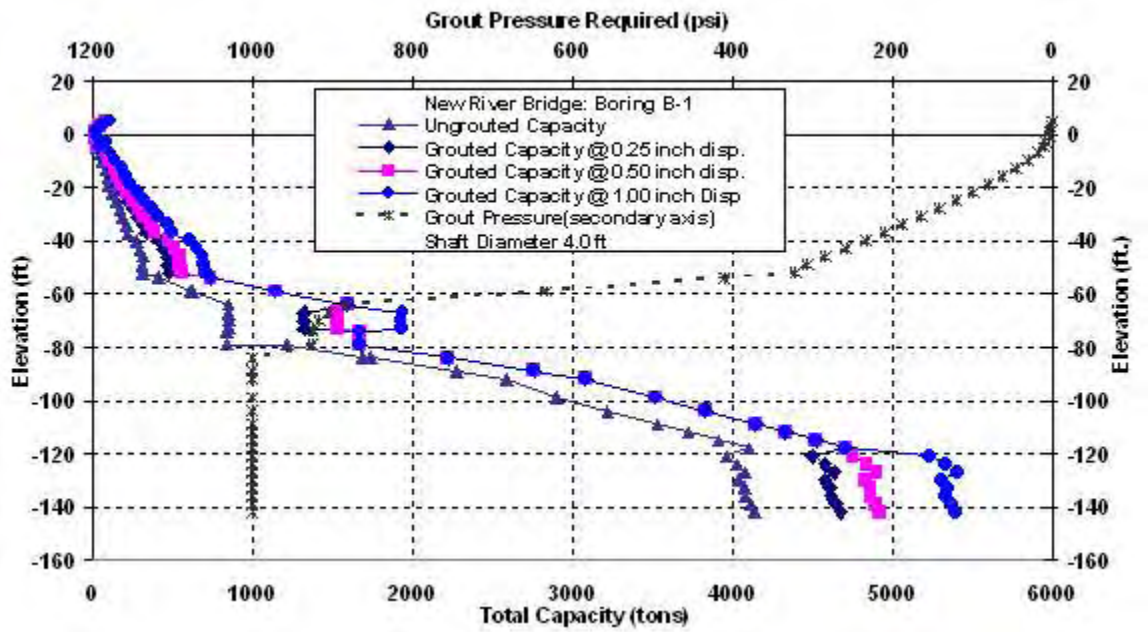


Figure C-91 New River Bridge: B-1, 4ft Diameter

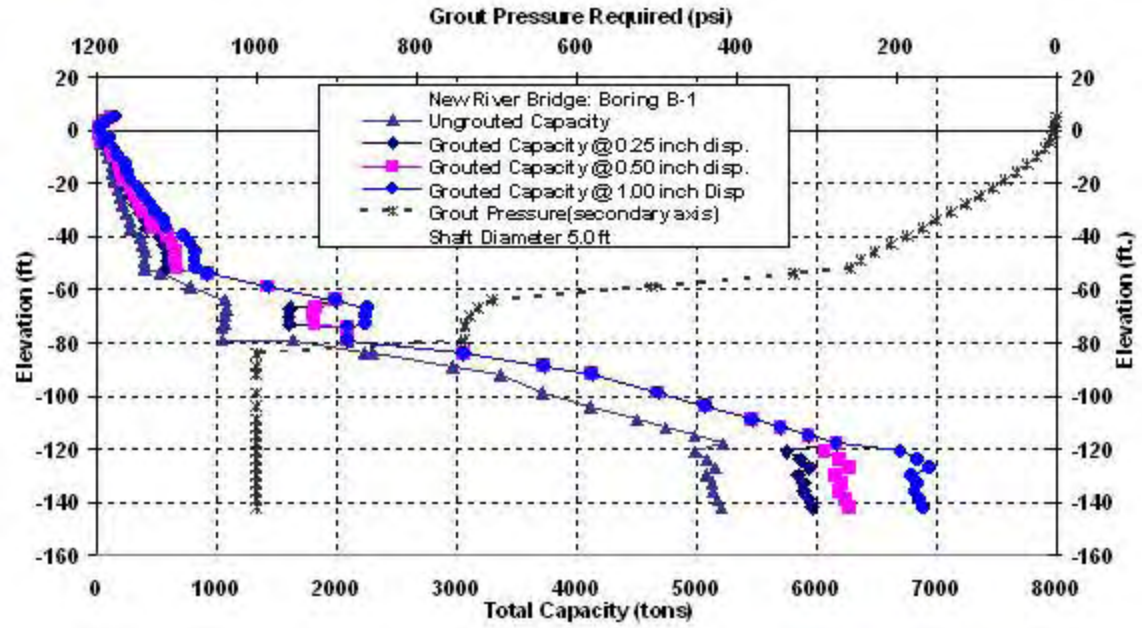


Figure C-92 New River Bridge: B-1, 5ft Diameter

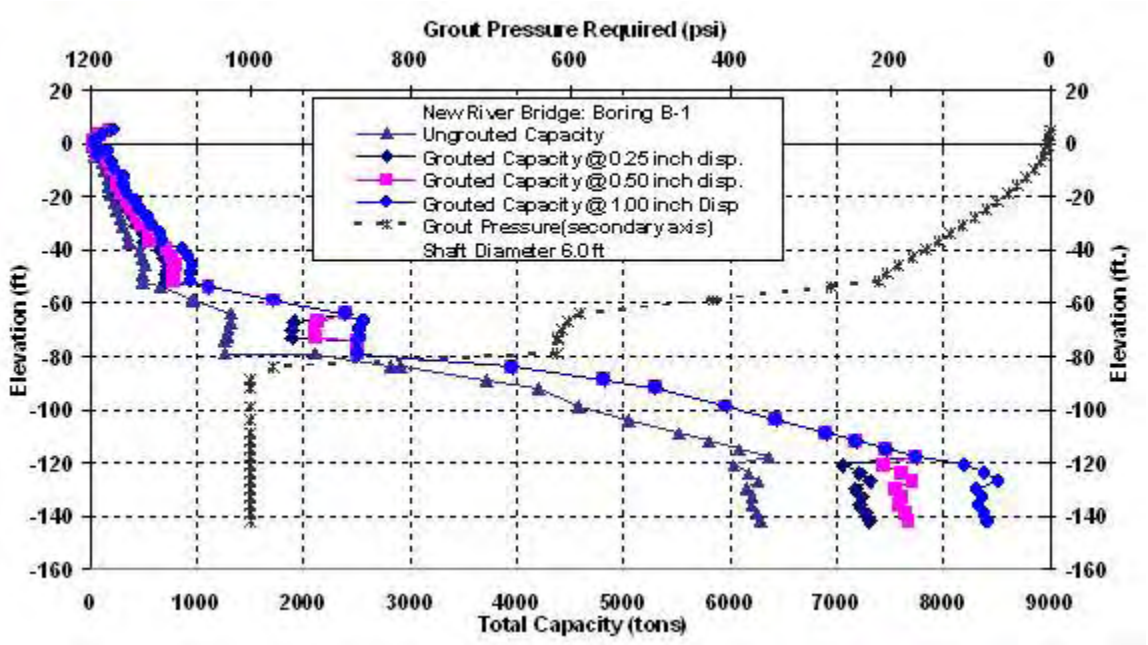


Figure C-93 New River Bridge: B-1, 6ft Diameter

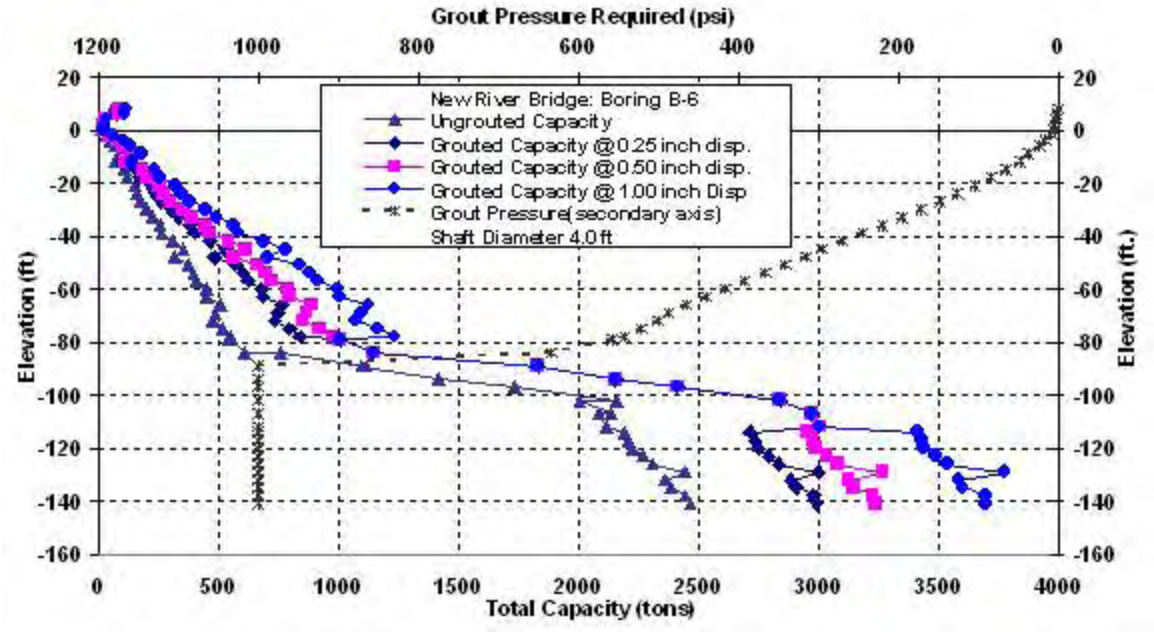


Figure C-94 New River Bridge: B-6, 4ft Diameter

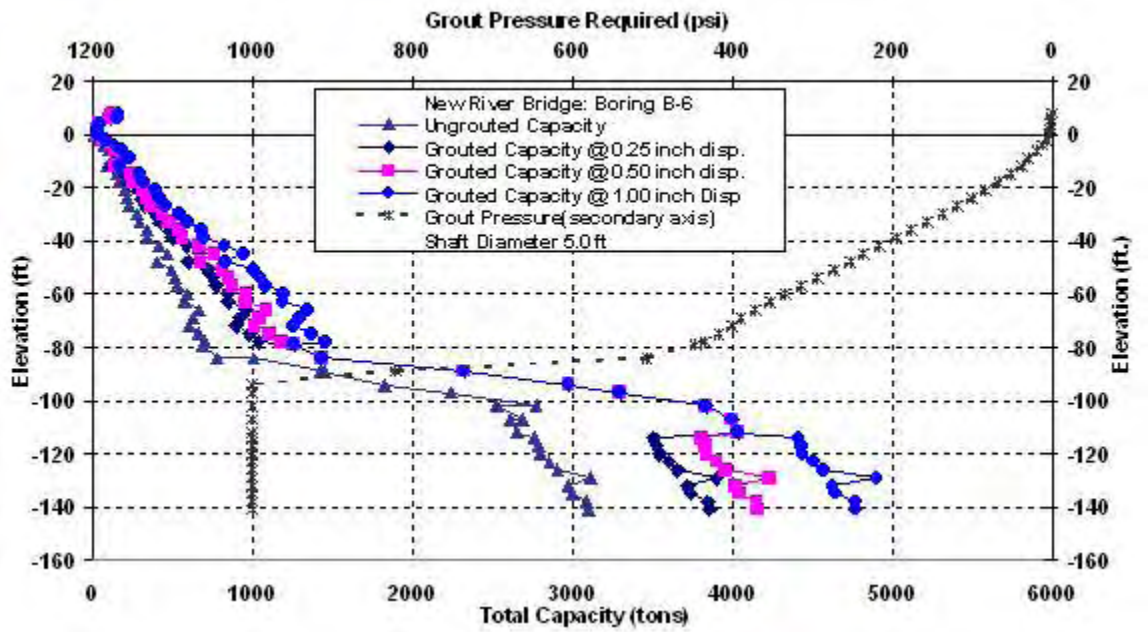


Figure C-95 New River Bridge: B-6, 5ft Diameter

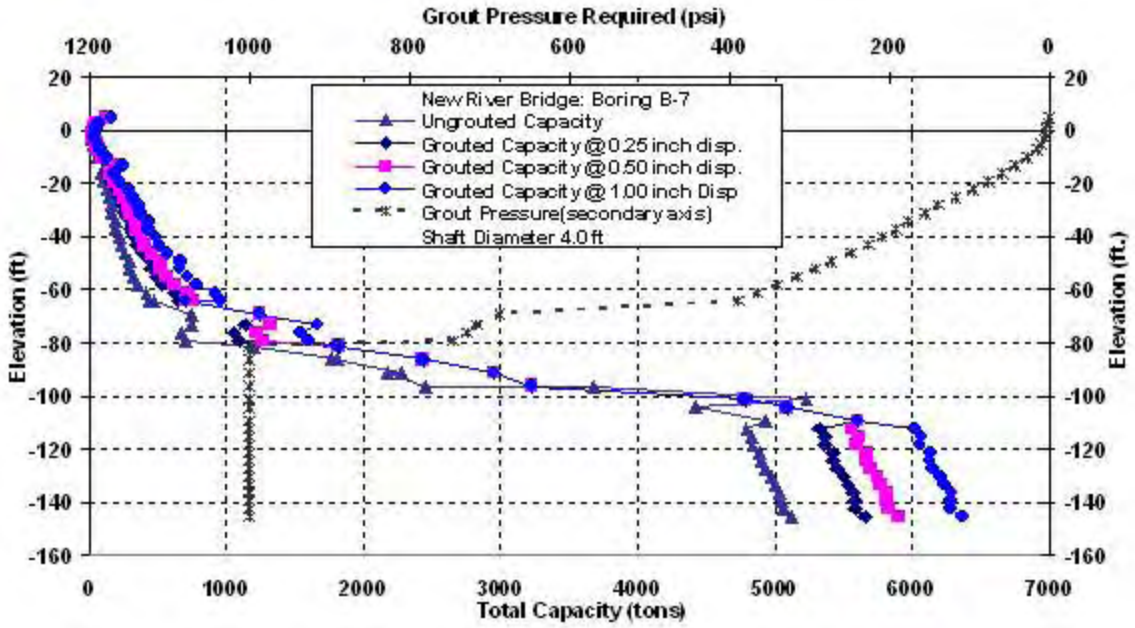


Figure C-96 New River Bridge: B-7, 4ft Diameter

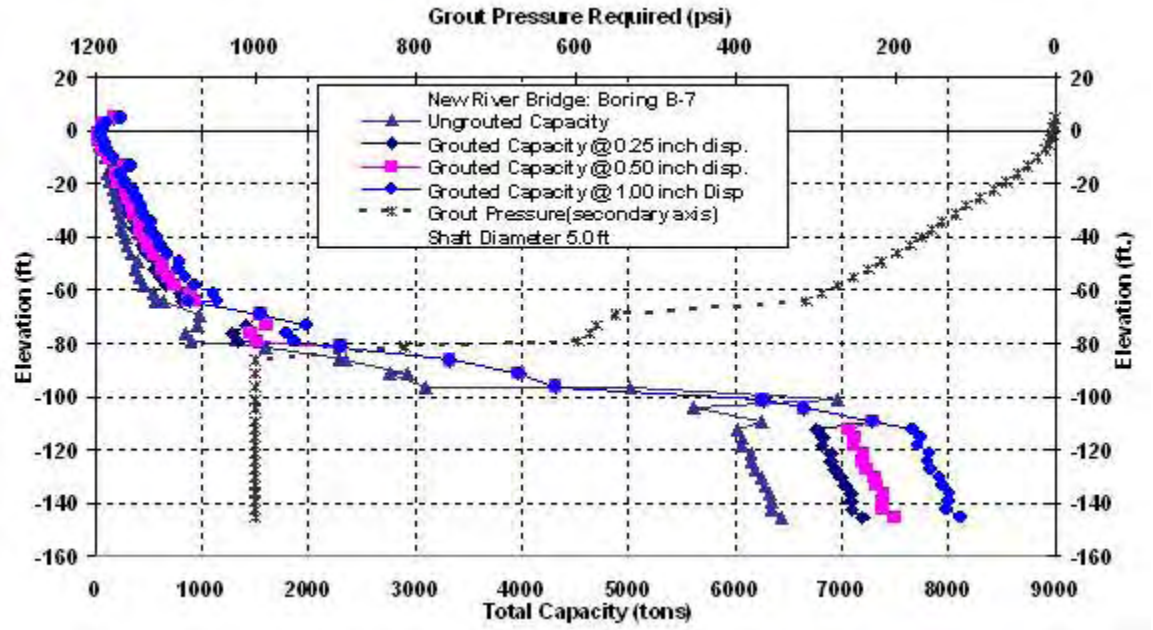


Figure C-97 New River Bridge: B-7, 5ft Diameter

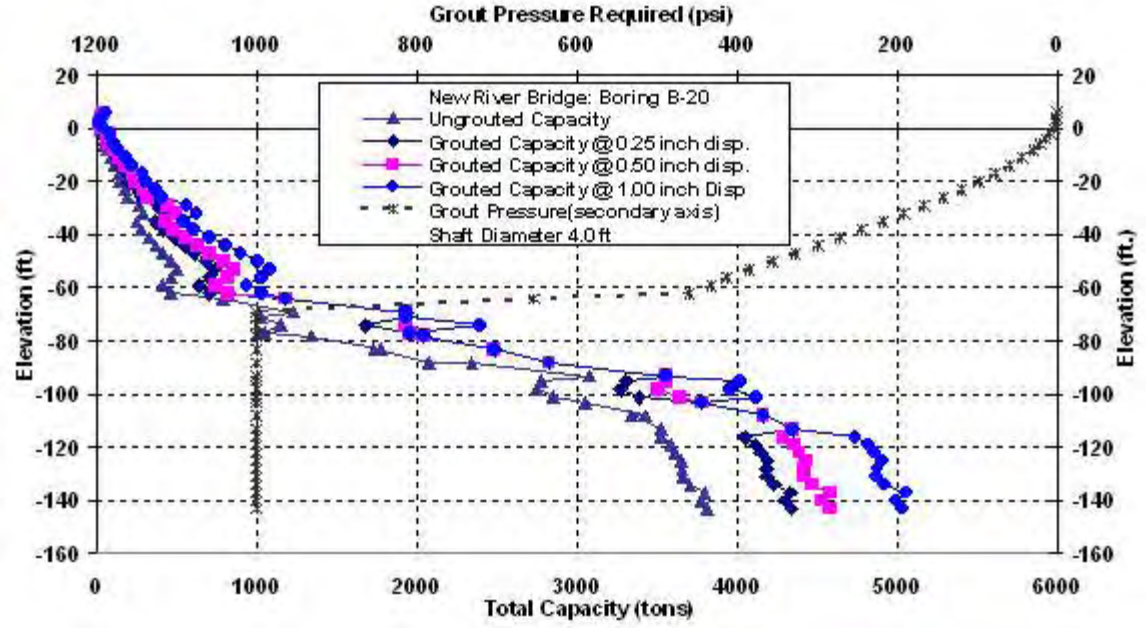


Figure C-98 New River Bridge: B-20, 4ft Diameter

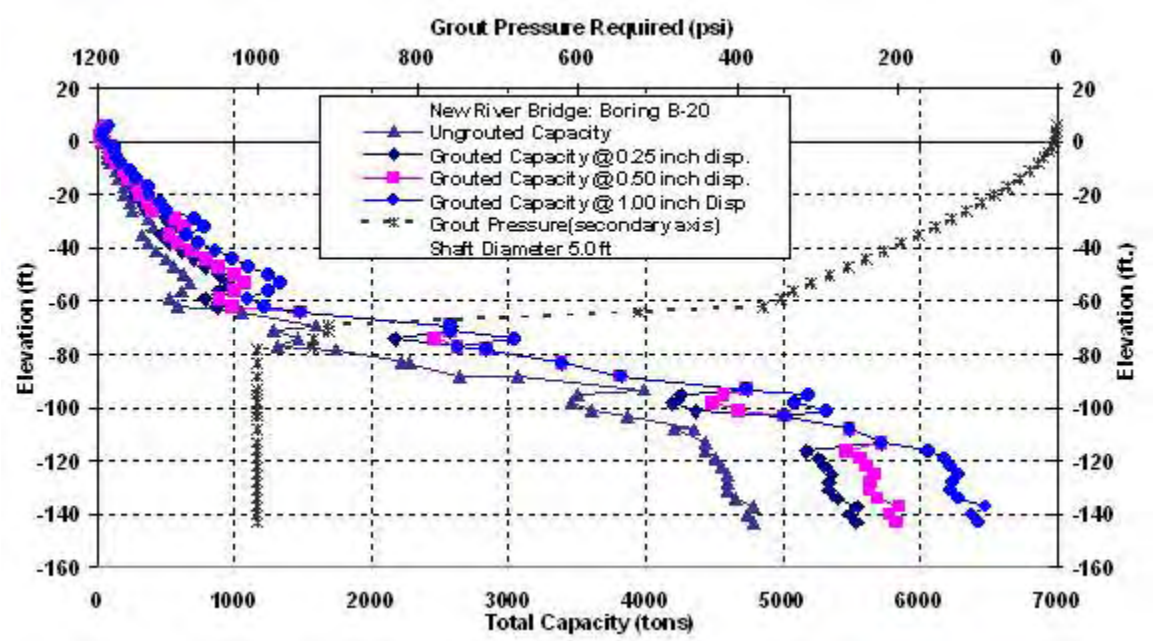


Figure C-99 New River Bridge: B-20, 5ft Diameter

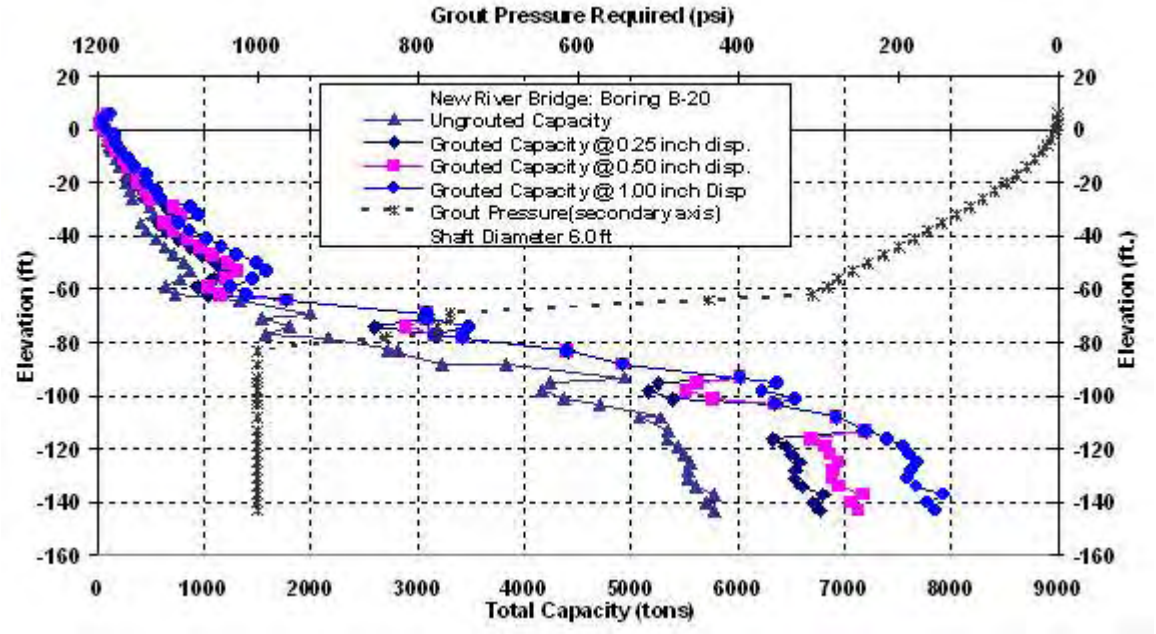


Figure C-100 New River Bridge: B-20, 6ft Diameter

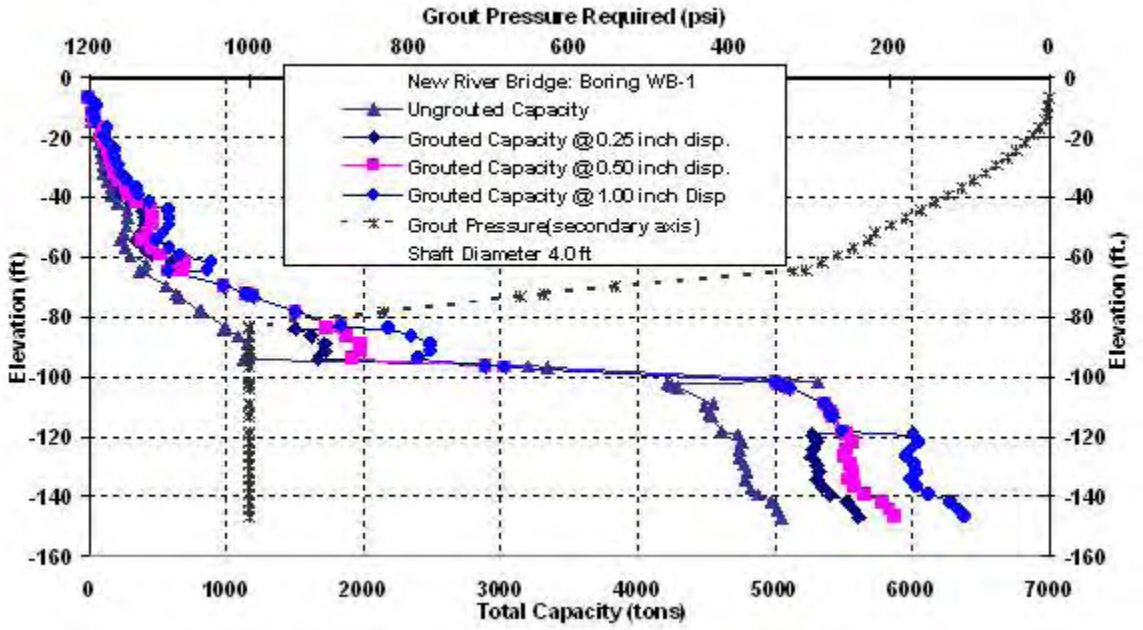


Figure C-101 New River Bridge: WB-1, 4ft Diameter

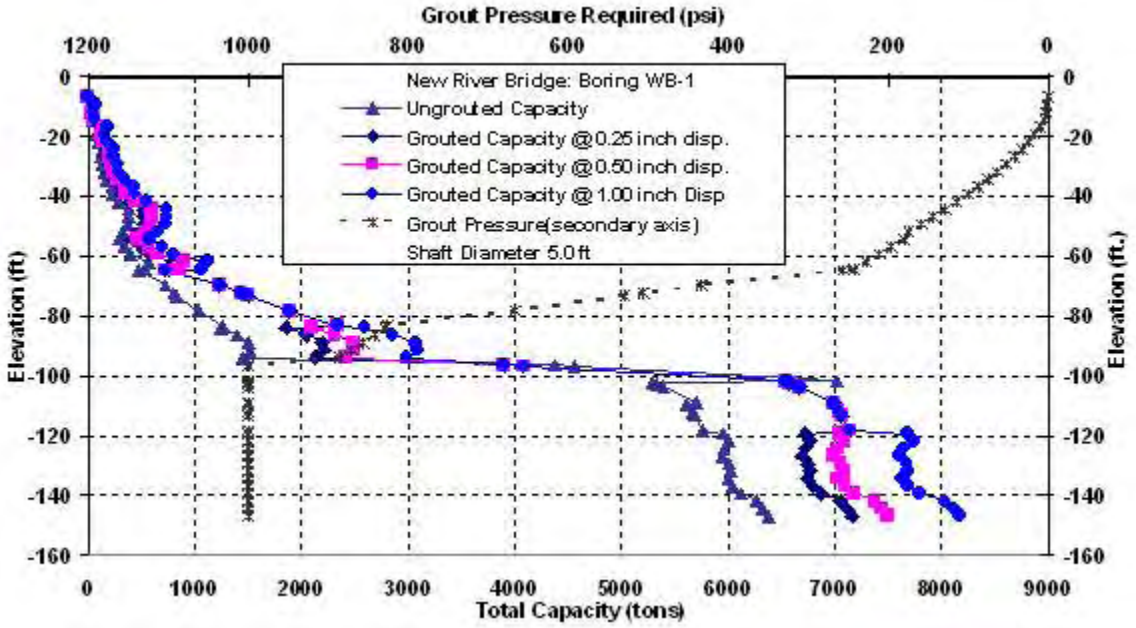


Figure C-102 New River Bridge: WB-1, 5ft Diameter

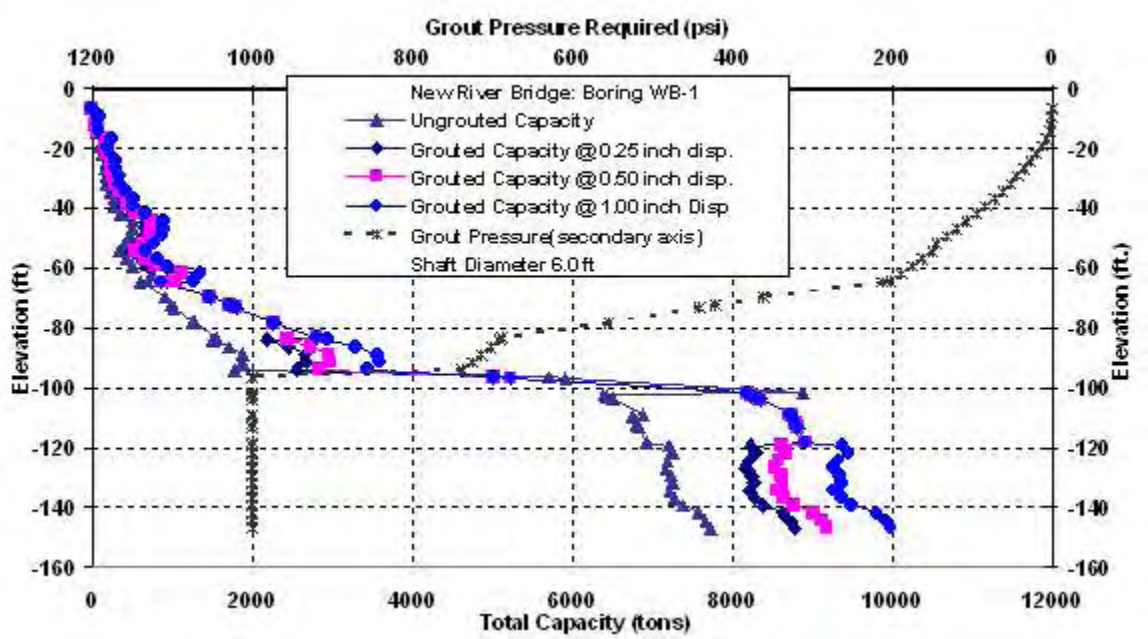


Figure C-103 New River Bridge: WB-1, 6ft Diameter

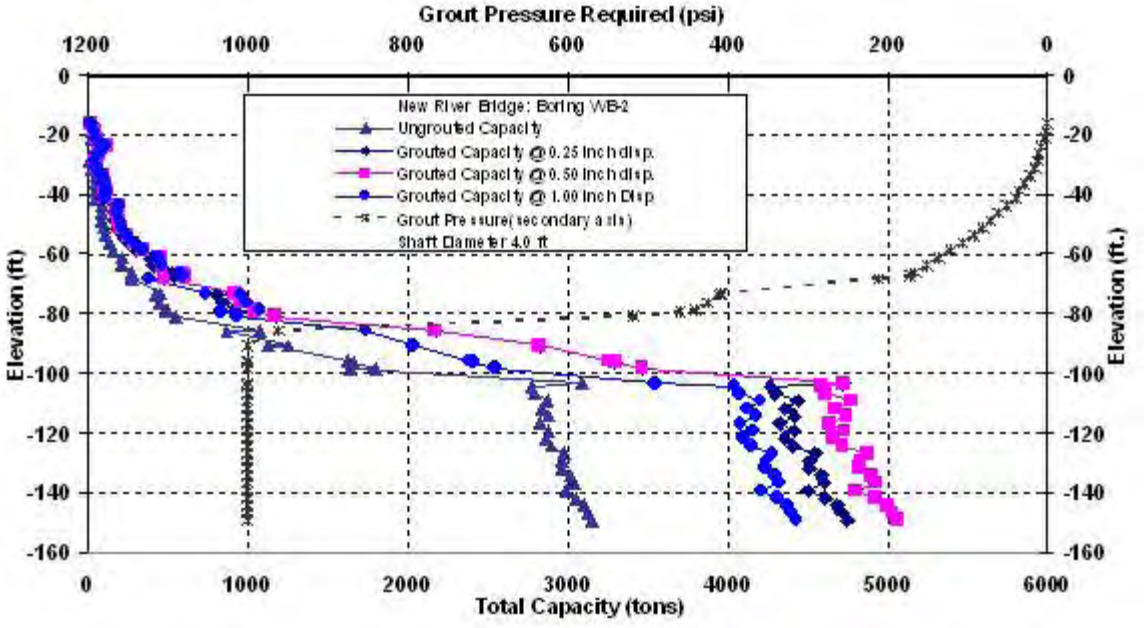


Figure C-104 New River Bridge: WB-2, 4ft Diameter

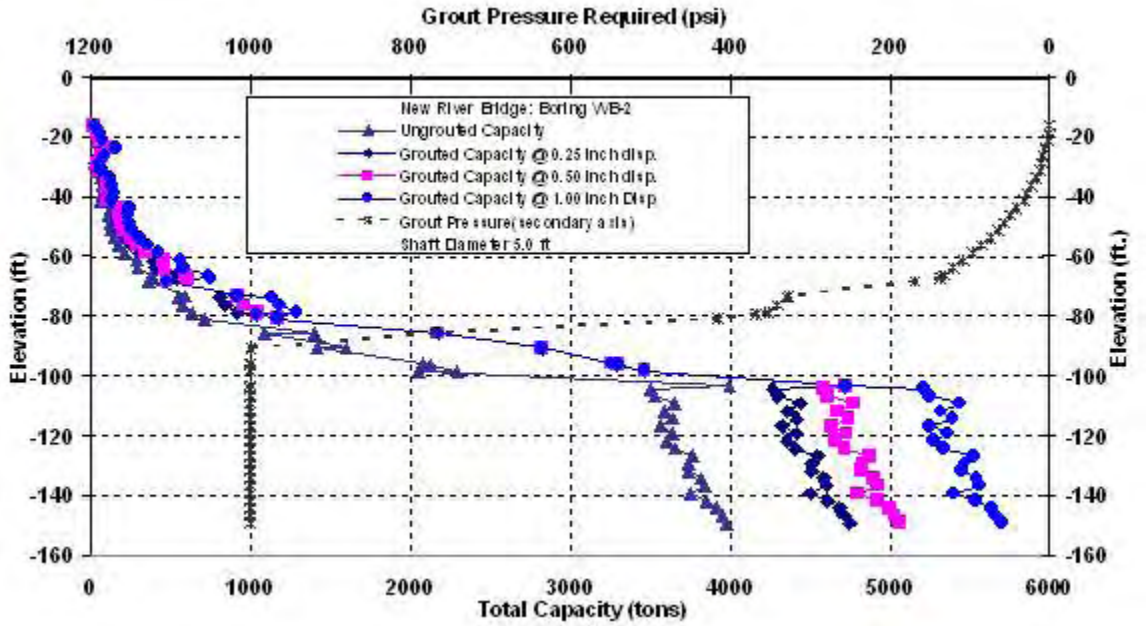


Figure C-105 New River Bridge: WB-2, 5ft Diameter

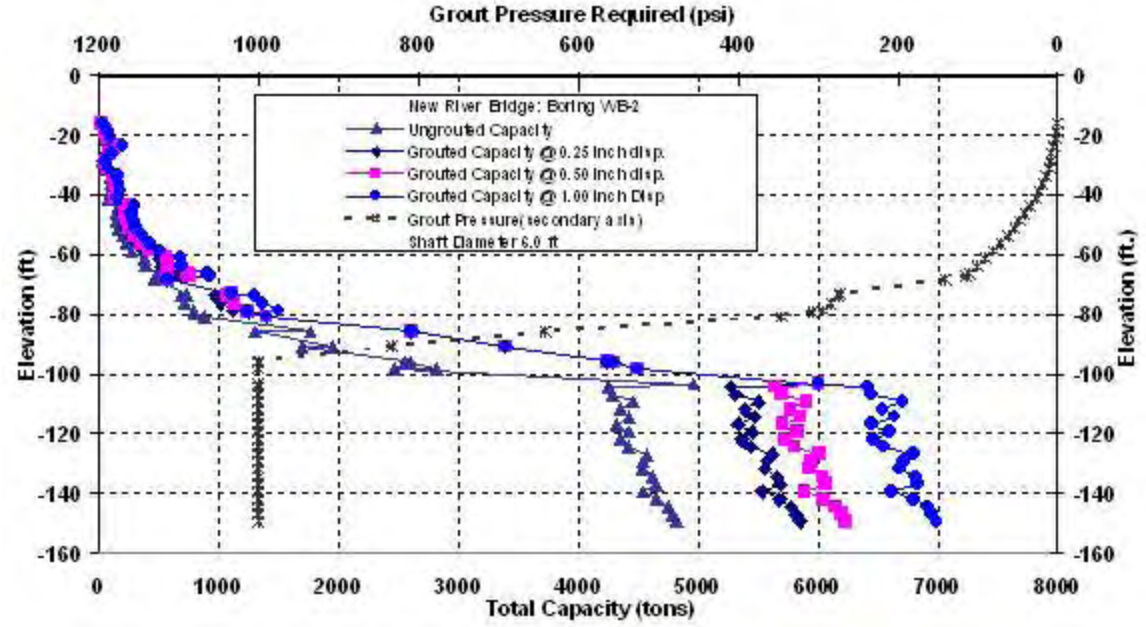


Figure C-106 New River Bridge: WB-2, 6ft Diameter

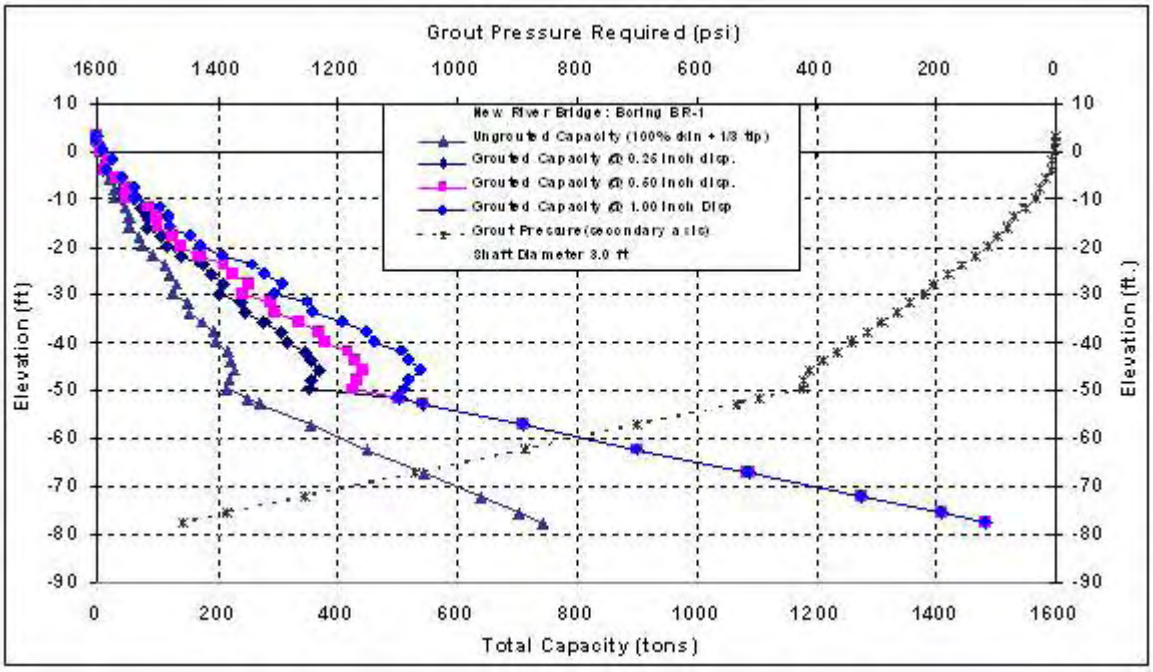


Figure C-107 New River Bridge: BR-1, 3ft Diameter

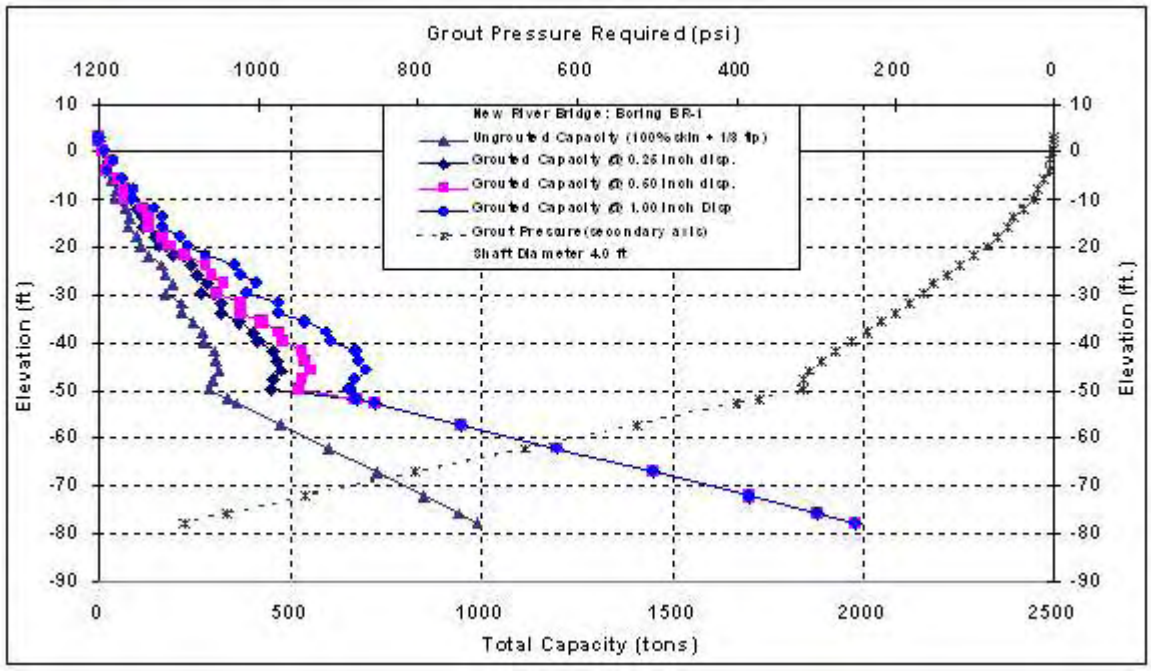


Figure C-108 New River Bridge: BR-1, 4ft Diameter

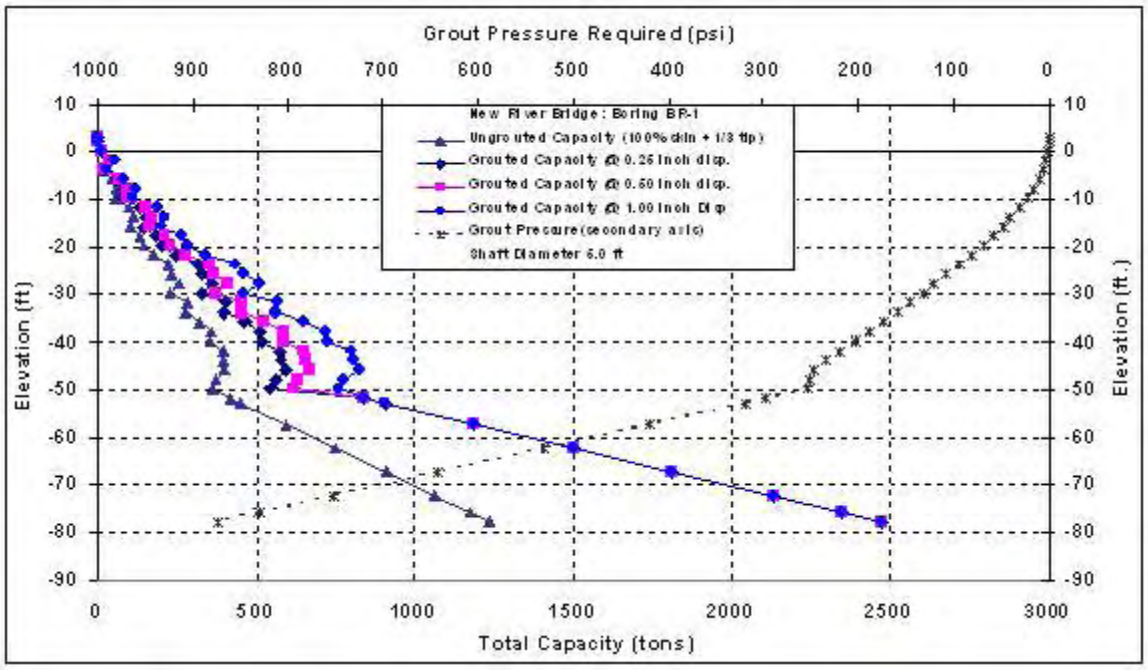


Figure C-109 New River Bridge: BR-1, 5ft Diameter

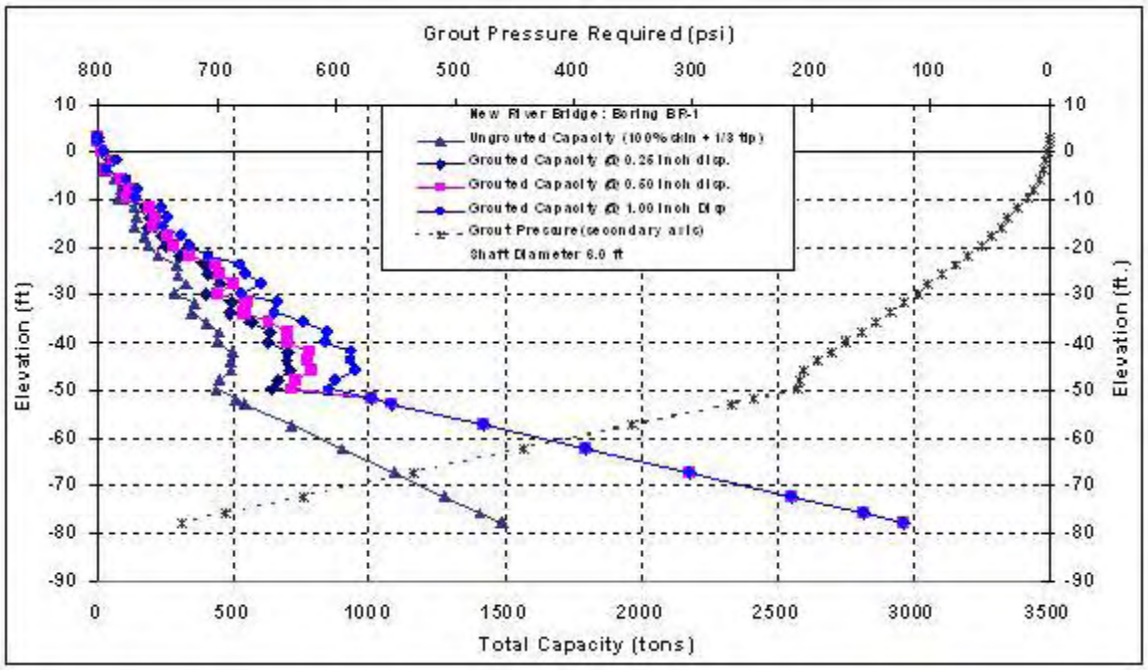


Figure C-110 New River Bridge: BR-1, 6ft Diameter

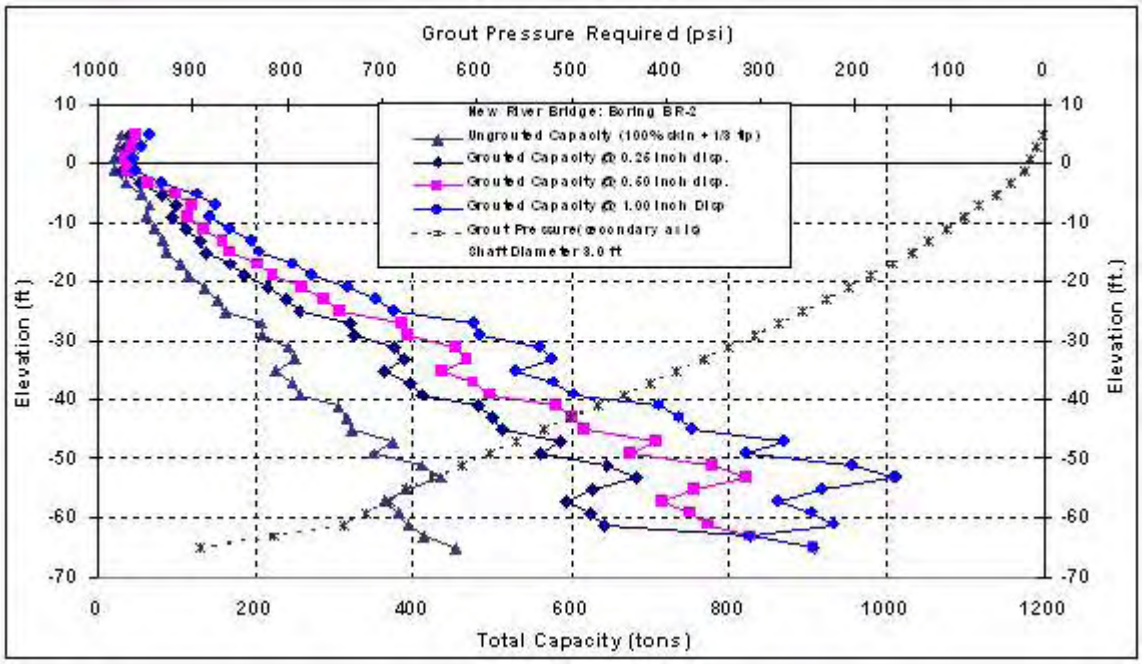


Figure C-111 New River Bridge: BR-2, 3ft Diameter

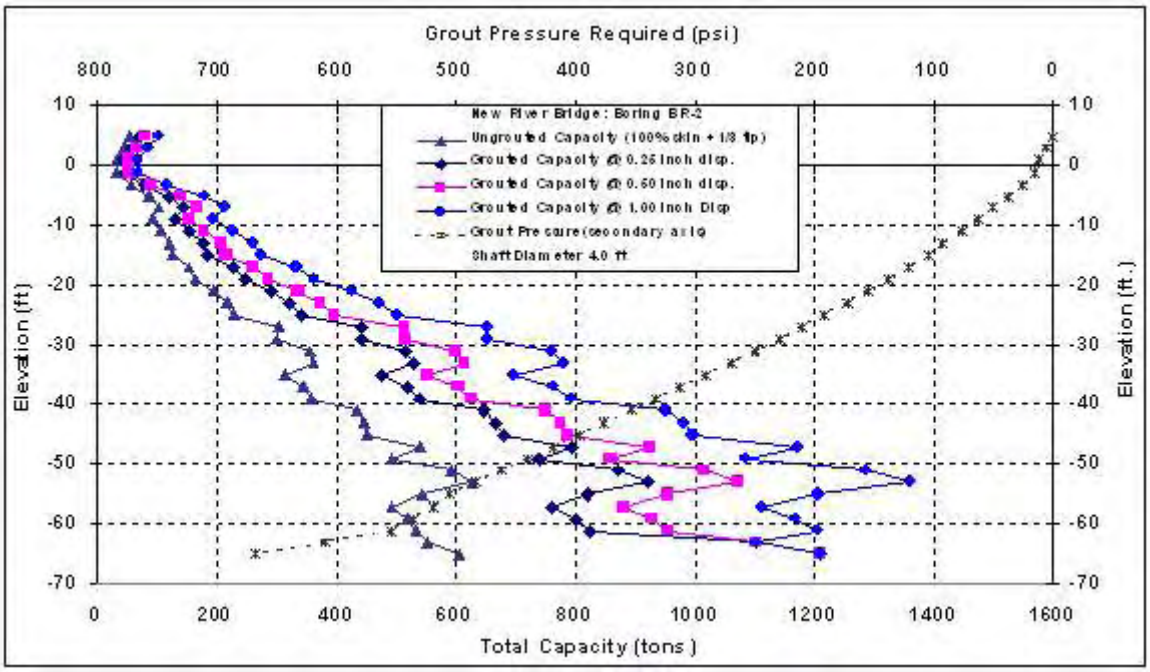


Figure C-112 New River Bridge: BR-2, 4ft Diameter

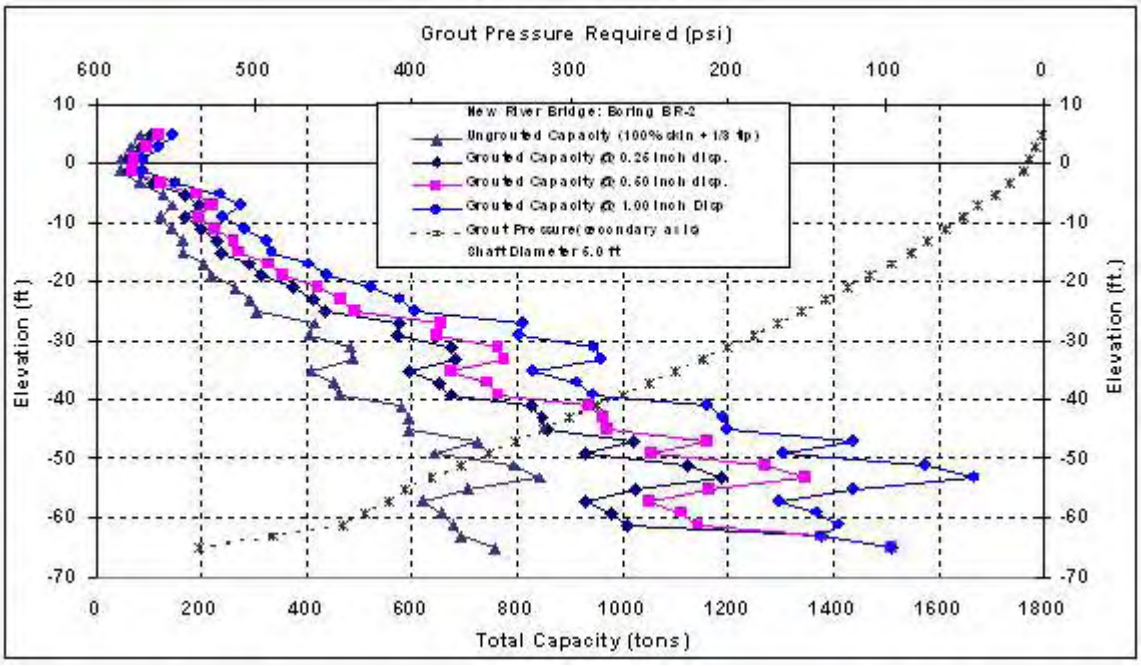


Figure C-113 New River Bridge: BR-2, 5ft Diameter

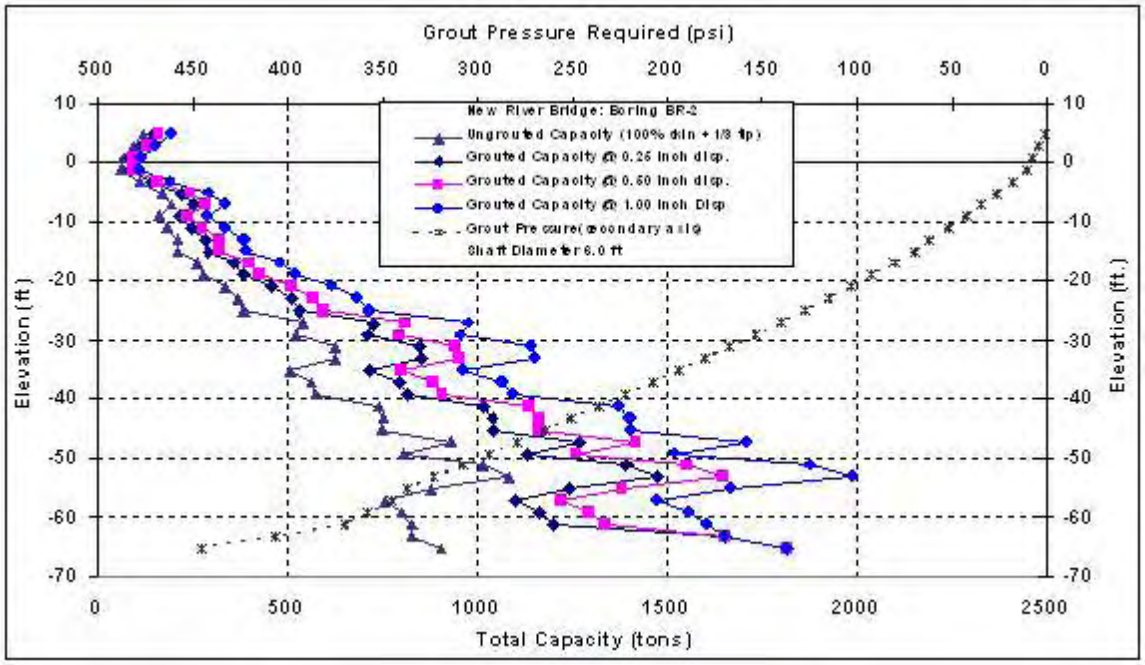


Figure C-114 New River Bridge: BR-2, 6ft Diameter

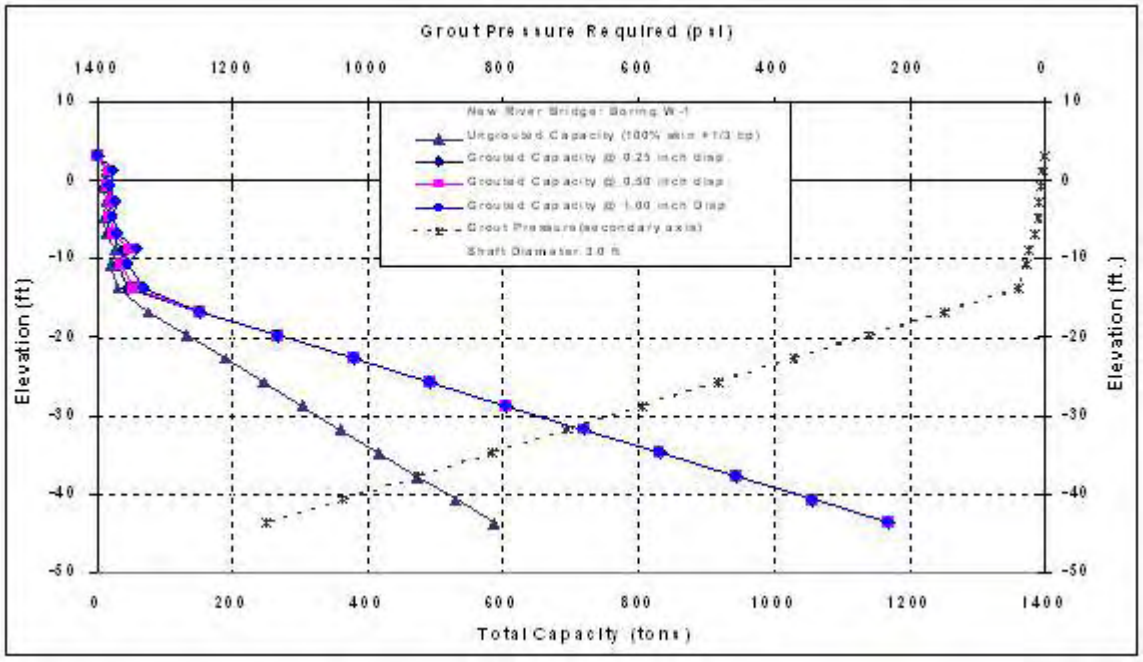


Figure C-115 New River Bridge: W-1, 3ft Diameter

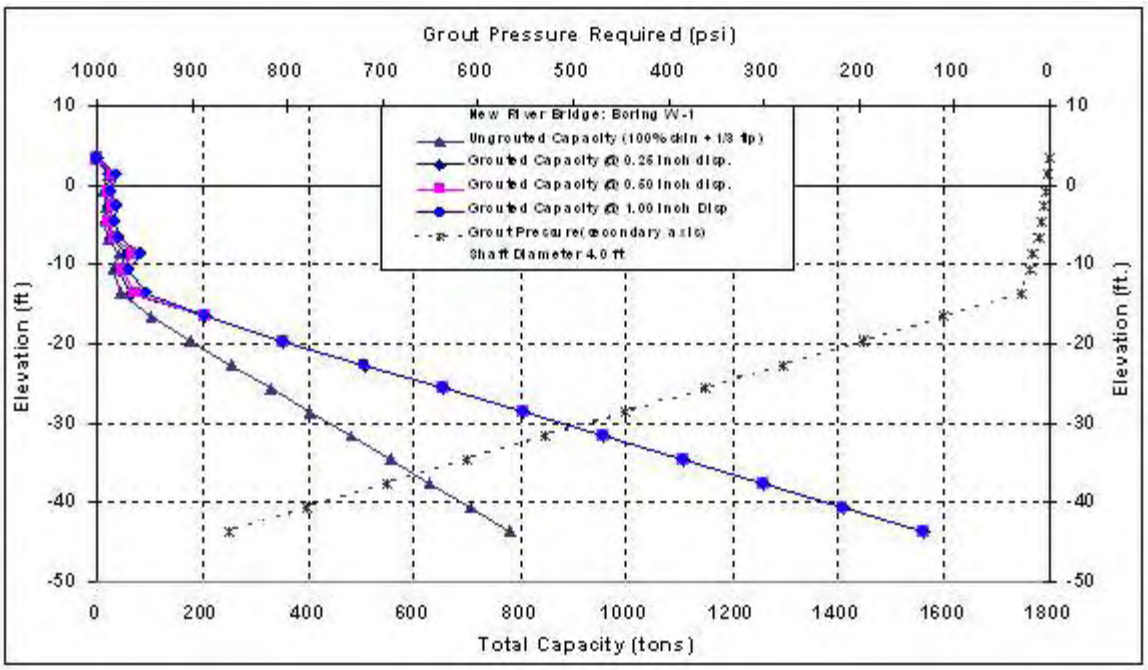


Figure C-116 New River Bridge: W-1, 4ft Diameter

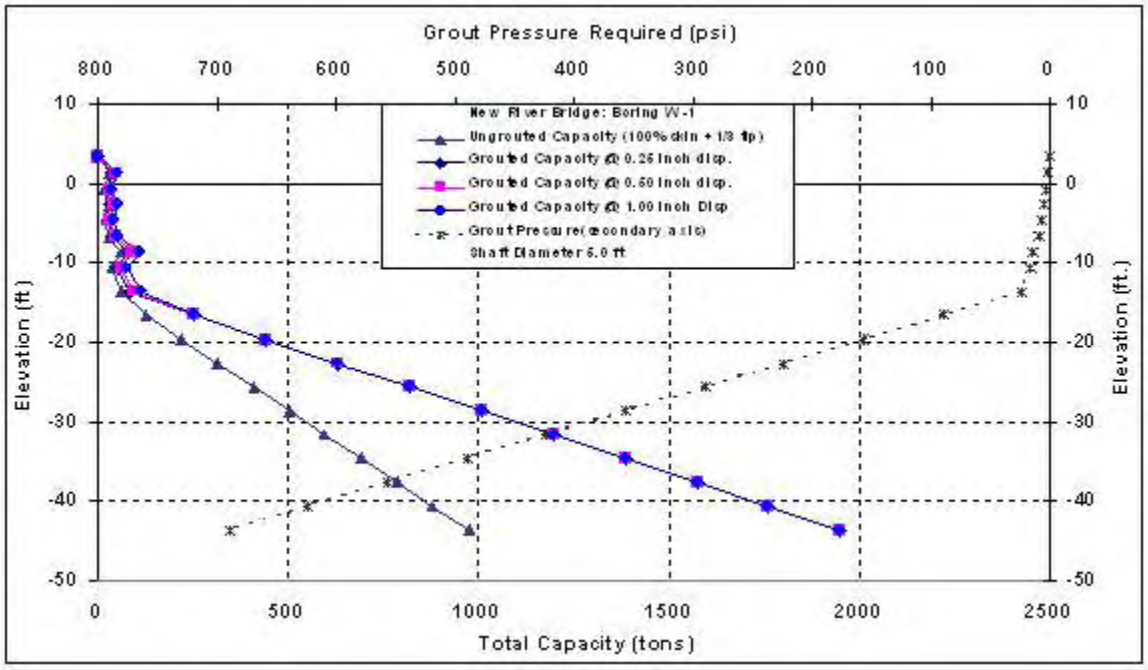


Figure C-117 New River Bridge: W-1, 5ft Diameter

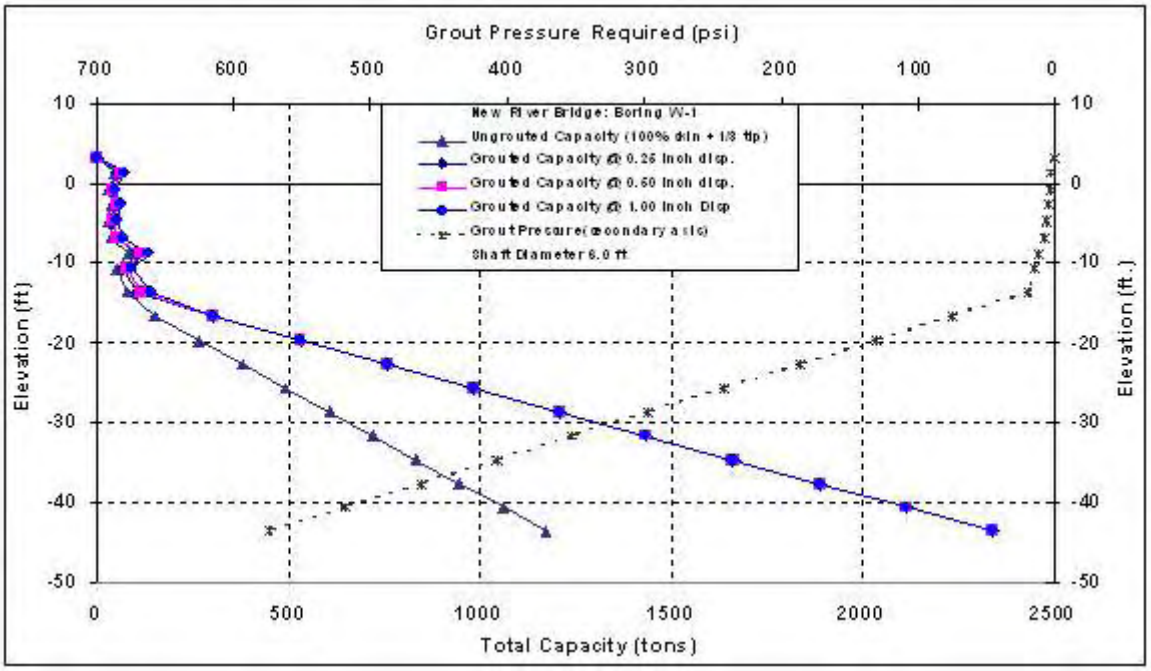


Figure C-118 New River Bridge: W-1, 6ft Diameter

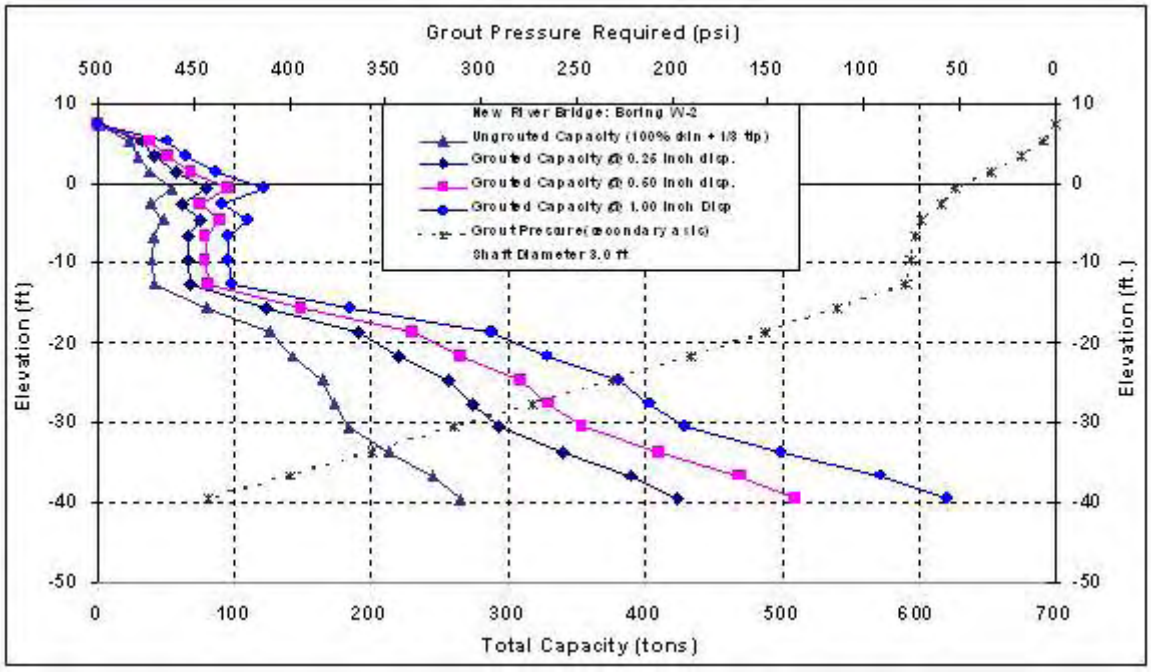


Figure C-119 New River Bridge: W-2, 3ft Diameter

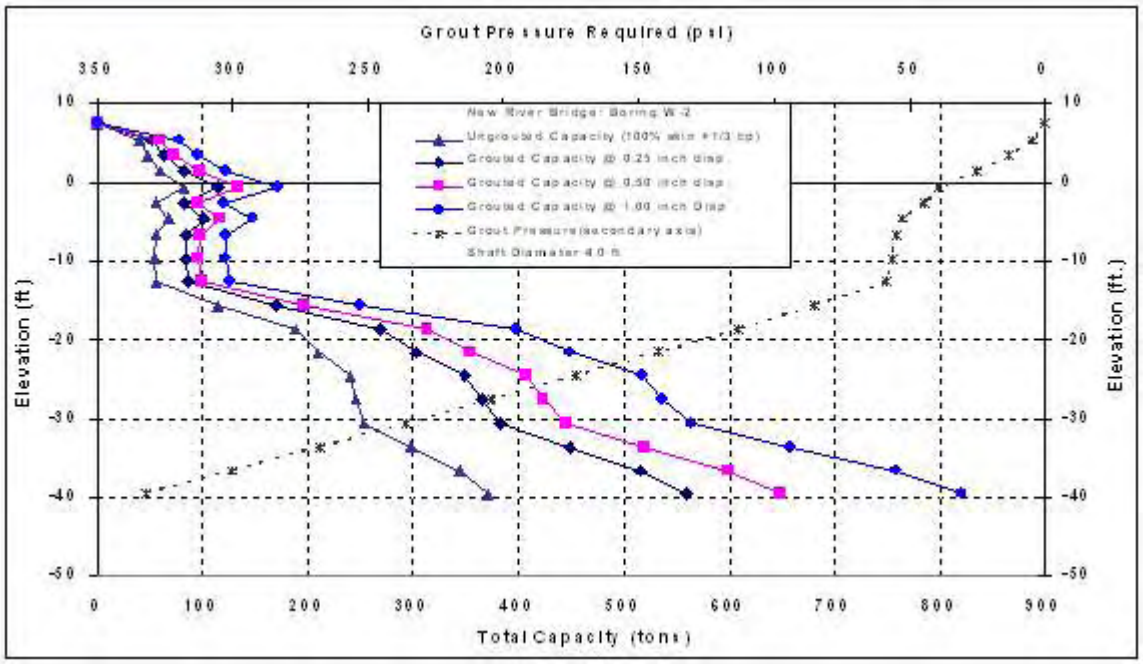


Figure C-120 New River Bridge: W-2, 4ft Diameter

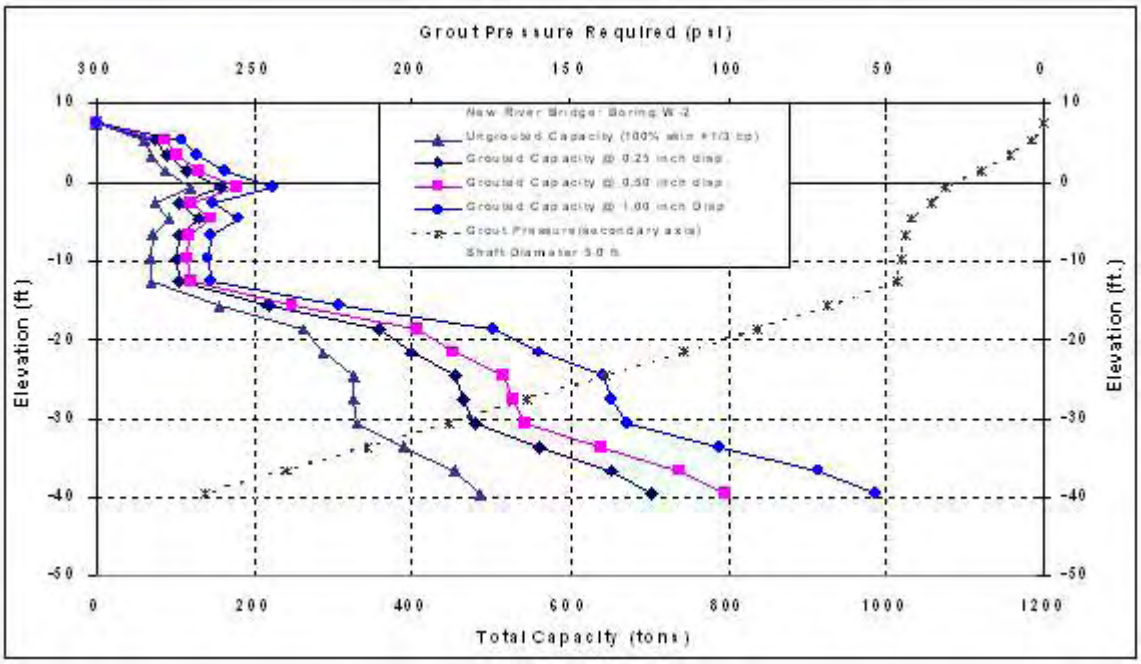


Figure C-121 New River Bridge: W-2, 5ft Diameter

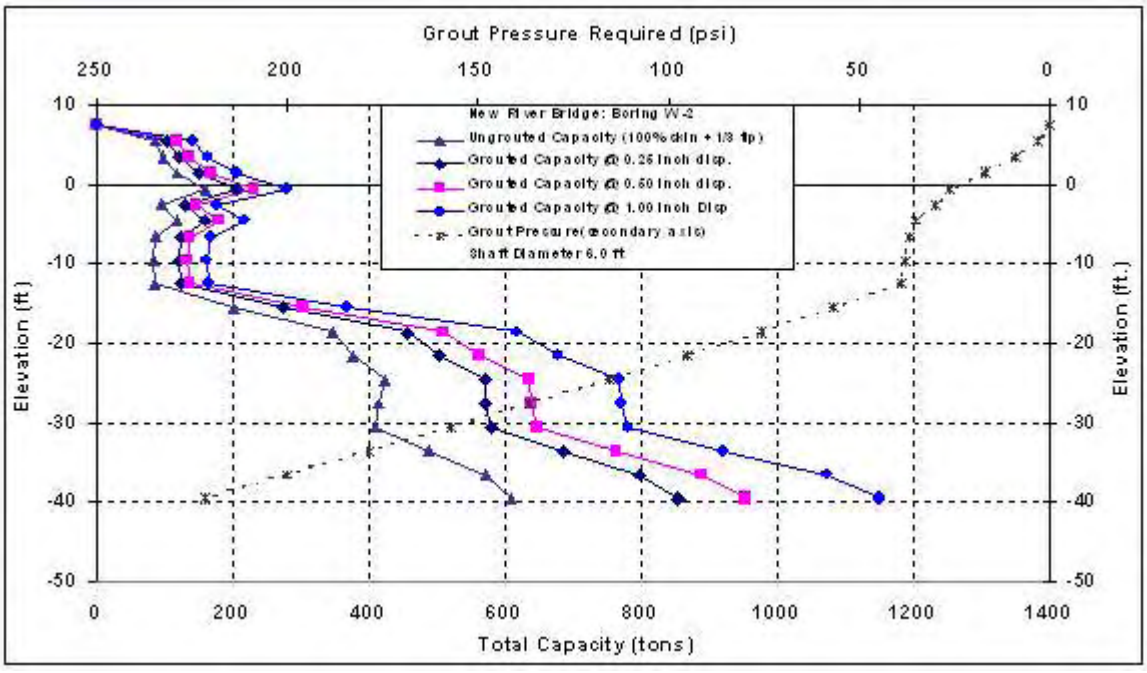


Figure C-122 New River Bridge: W-2, 6ft Diameter

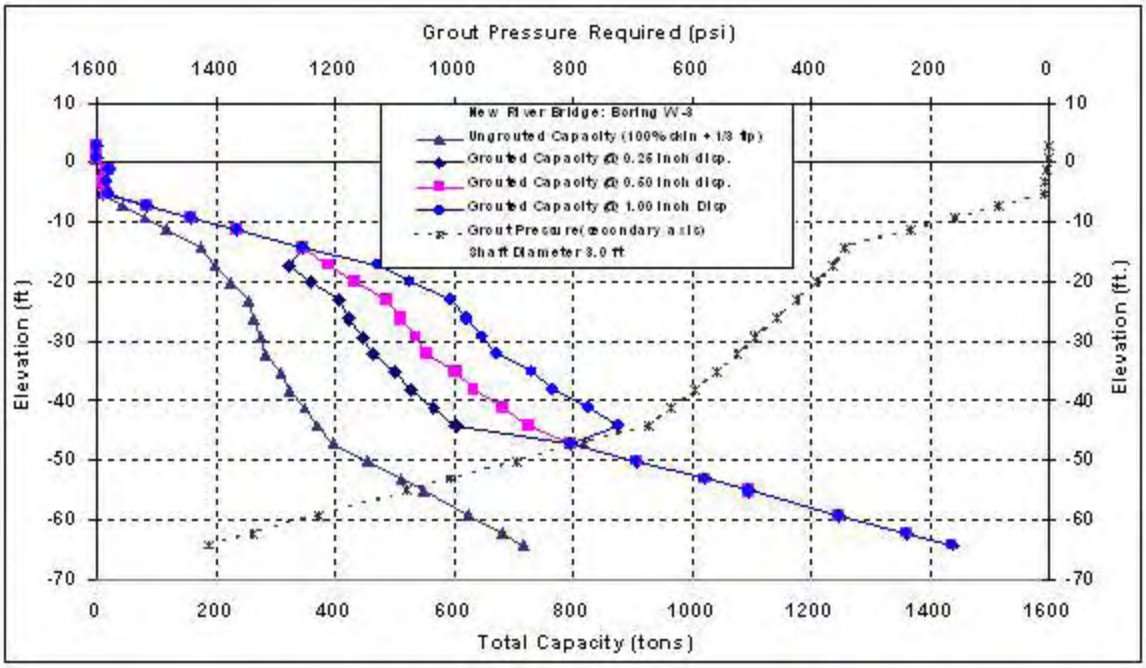


Figure C-123 New River Bridge: W-3, 3ft Diameter

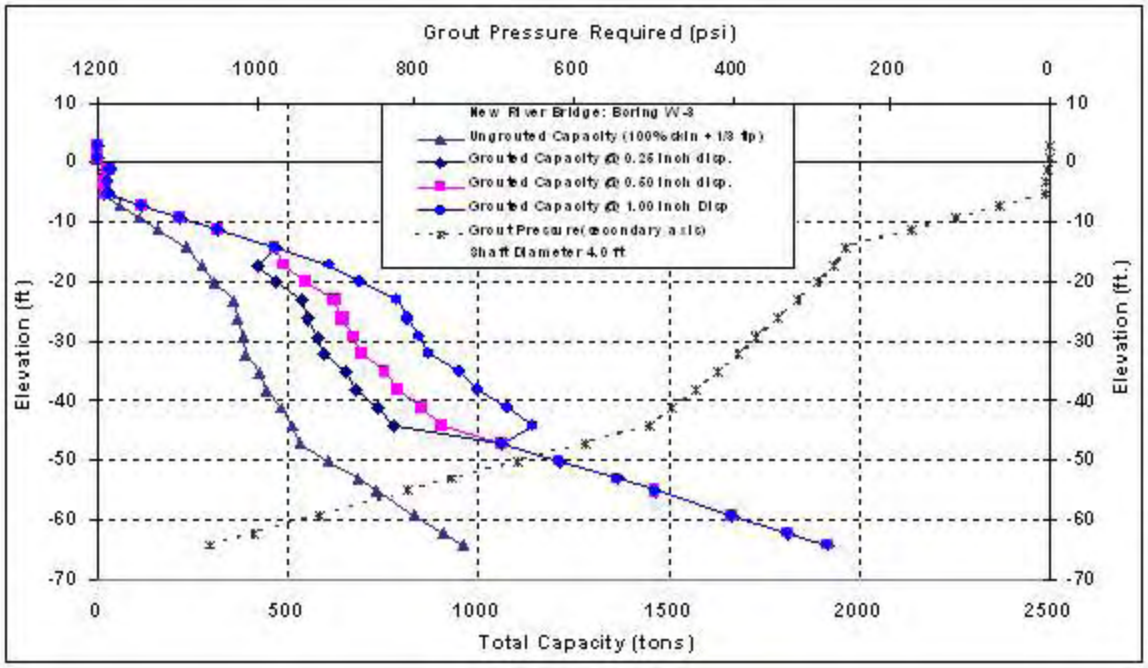


Figure C-124 New River Bridge: W-3, 4ft Diameter

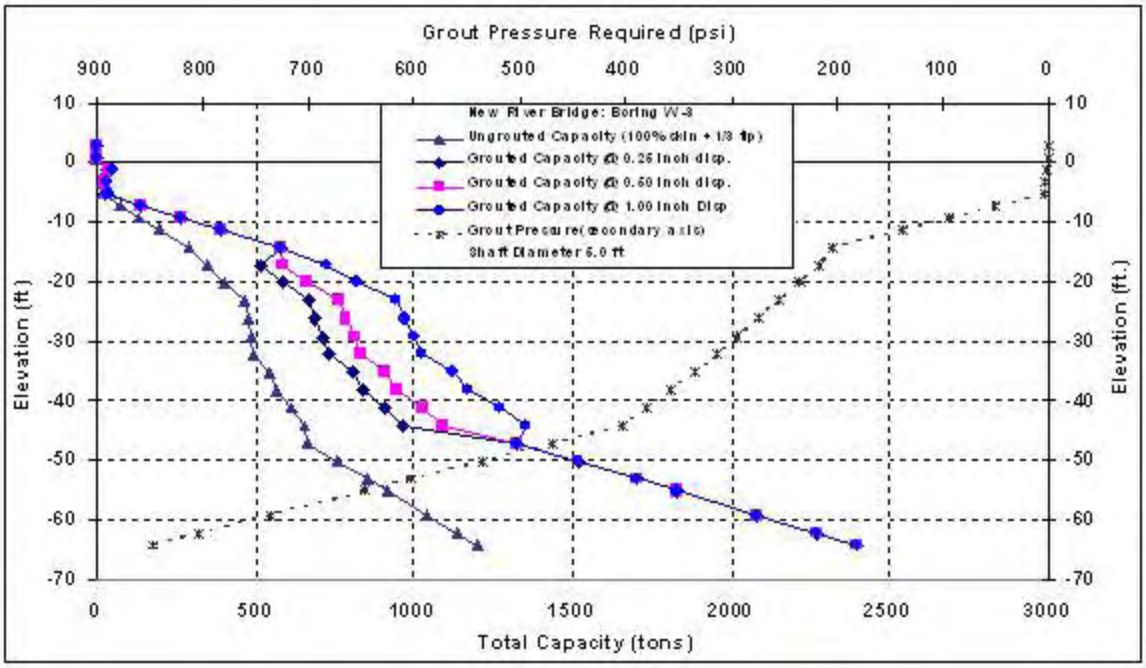


Figure C-125 New River Bridge: W-3, 5ft Diameter

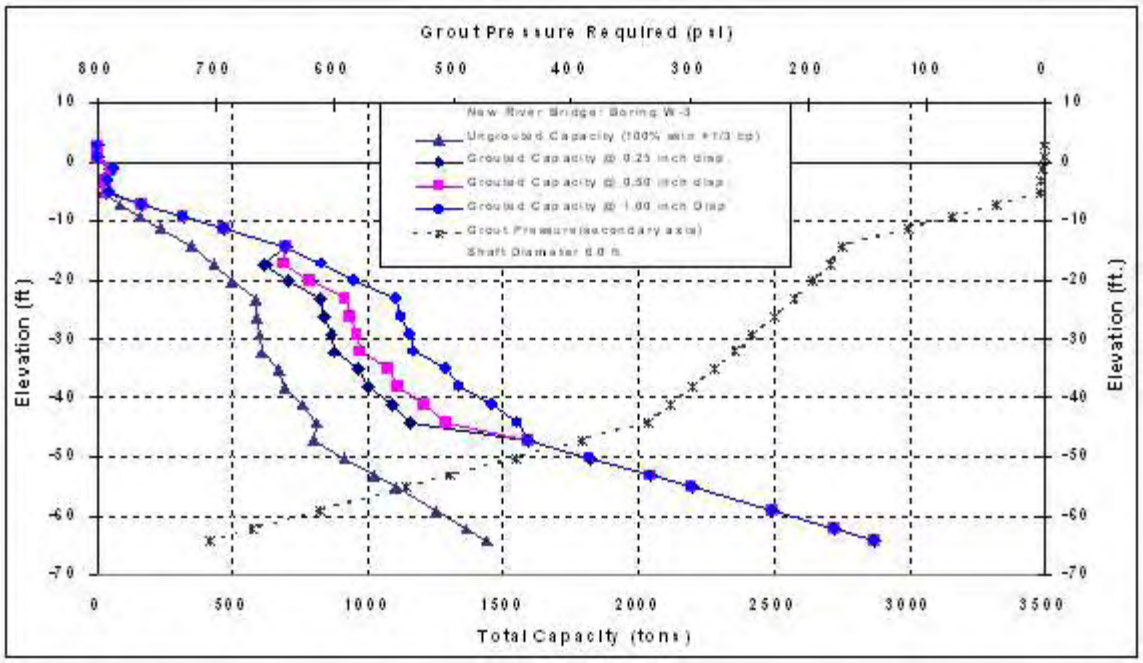


Figure C-126 New River Bridge: W-3, 6ft Diameter

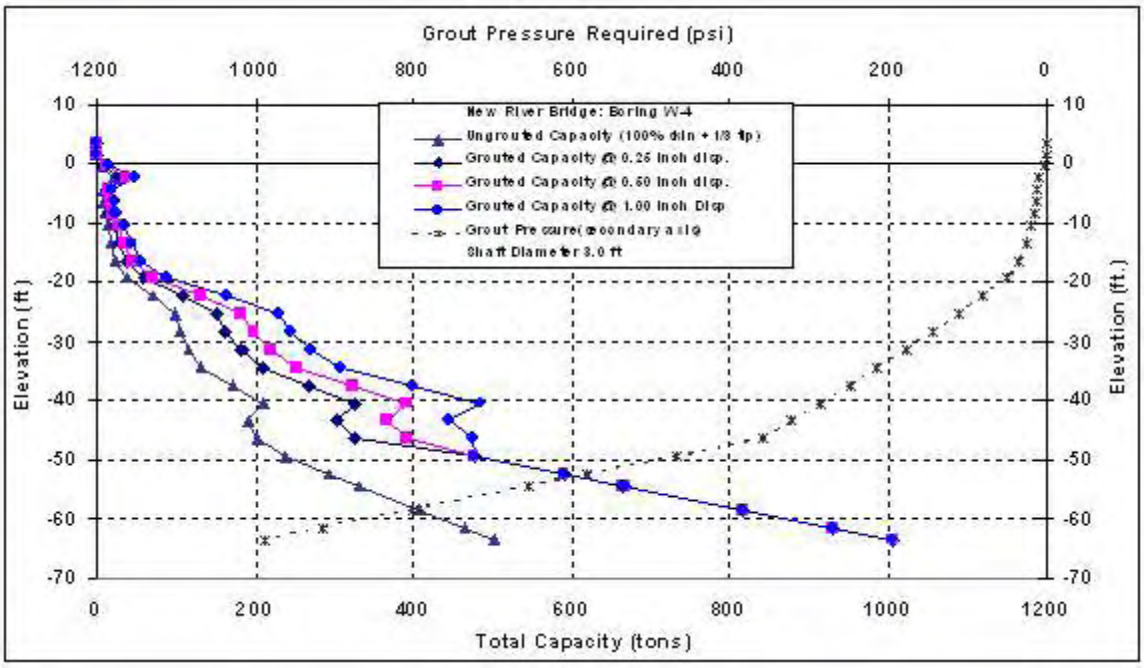


Figure C-127 New River Bridge: W-4, 3ft Diameter

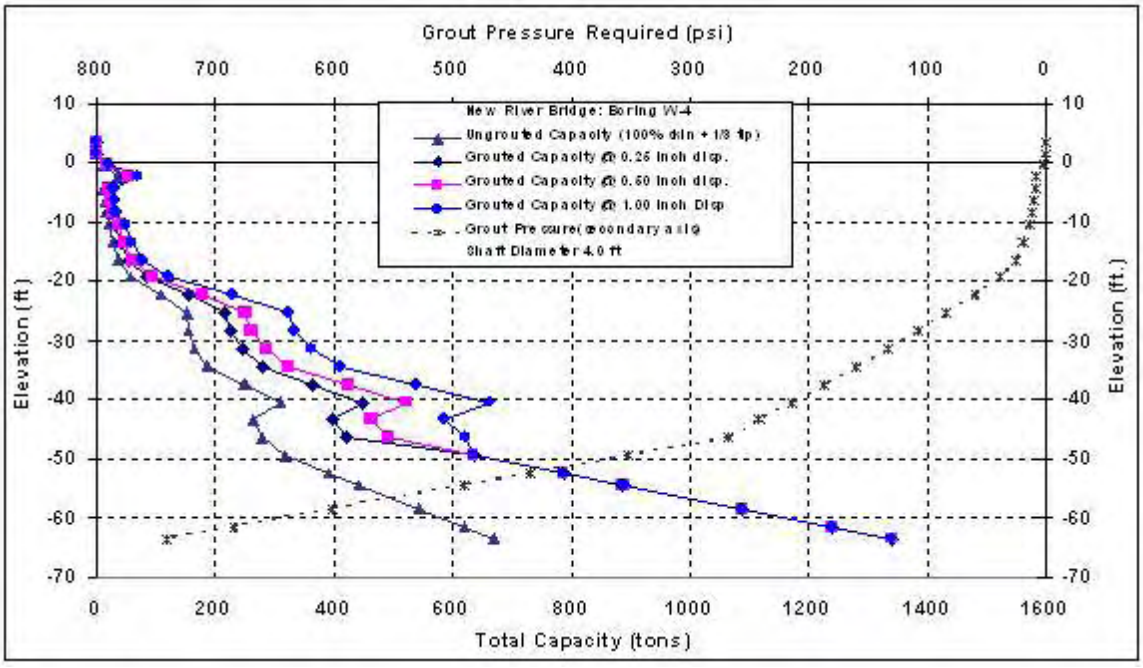


Figure C-128 New River Bridge: W-4, 4ft Diameter

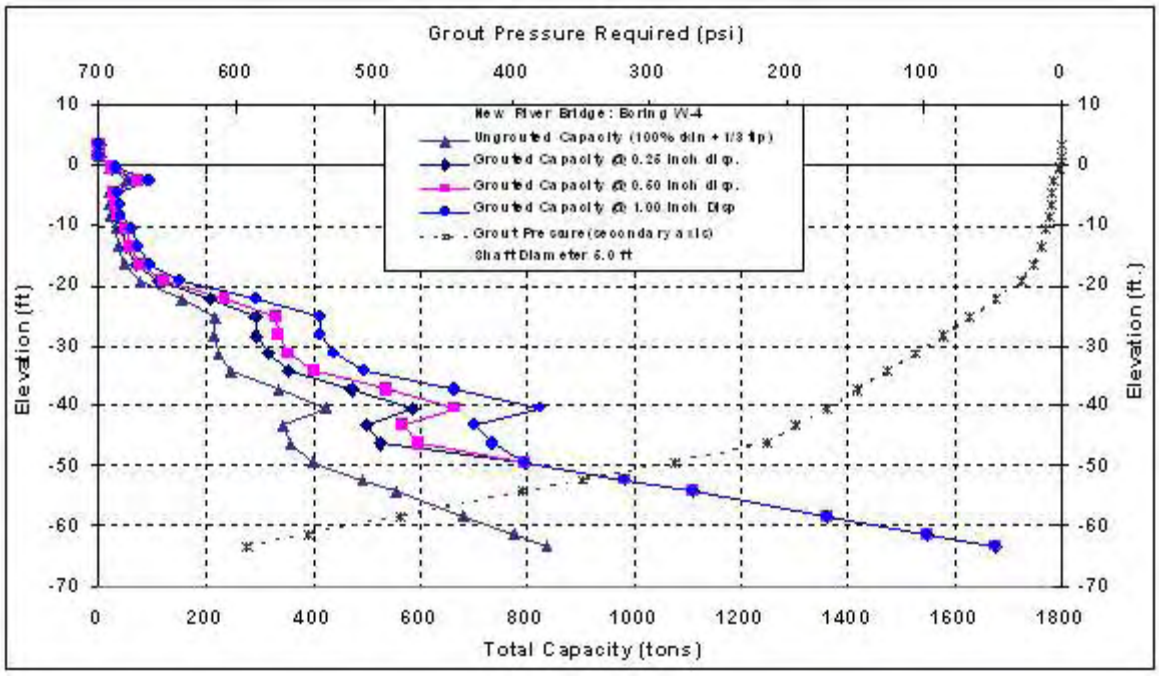


Figure C-129 New River Bridge: W-4, 5ft Diameter

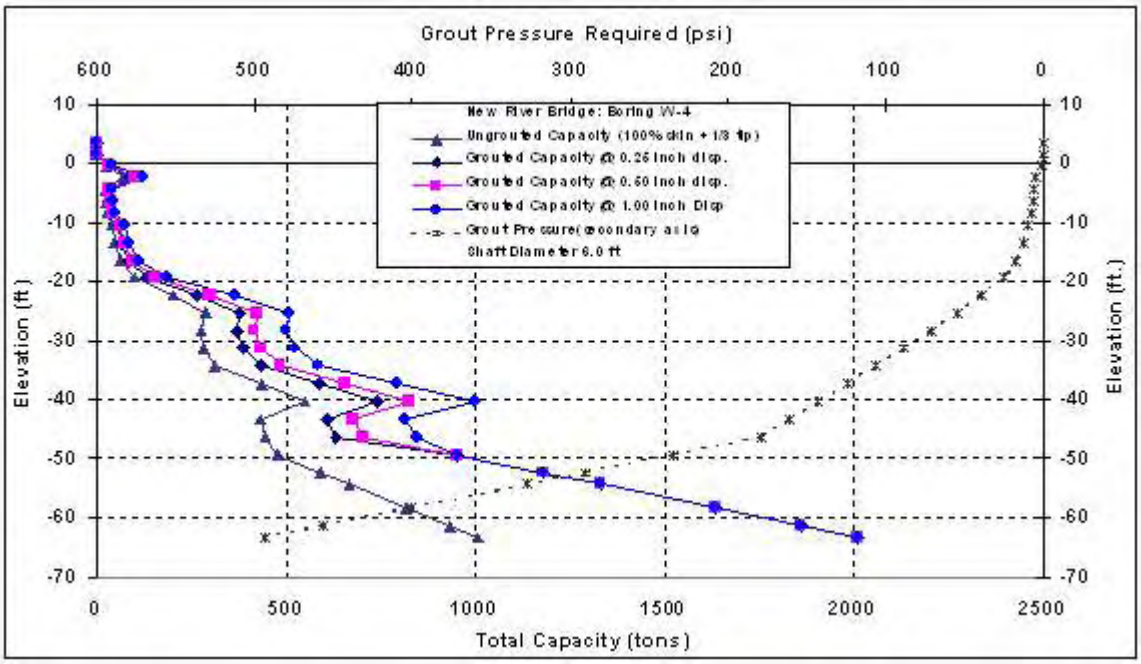


Figure C-130 New River Bridge: W-4, 6ft Diameter

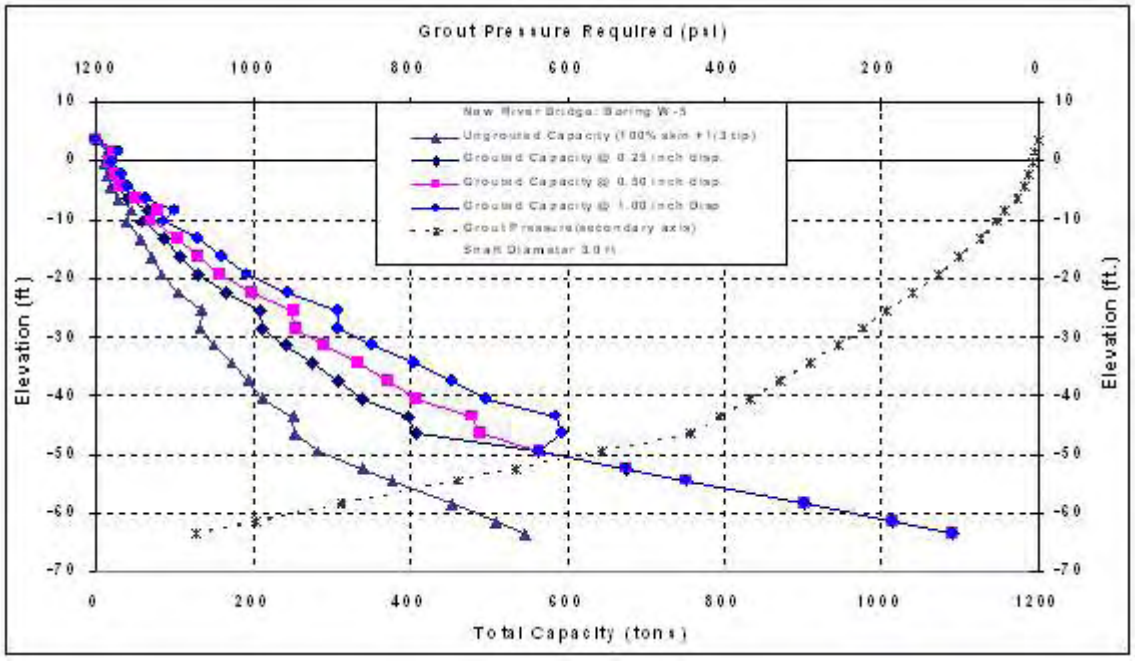


Figure C-131 New River Bridge: W-5, 3ft Diameter

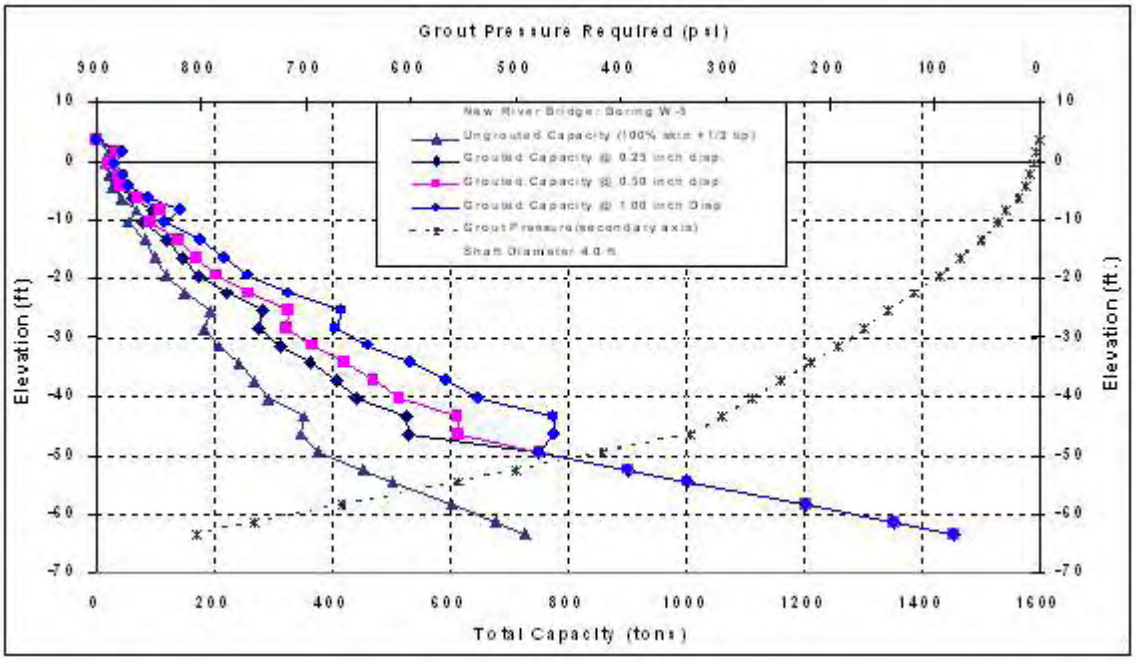


Figure C-132 New River Bridge: W-5, 4ft Diameter

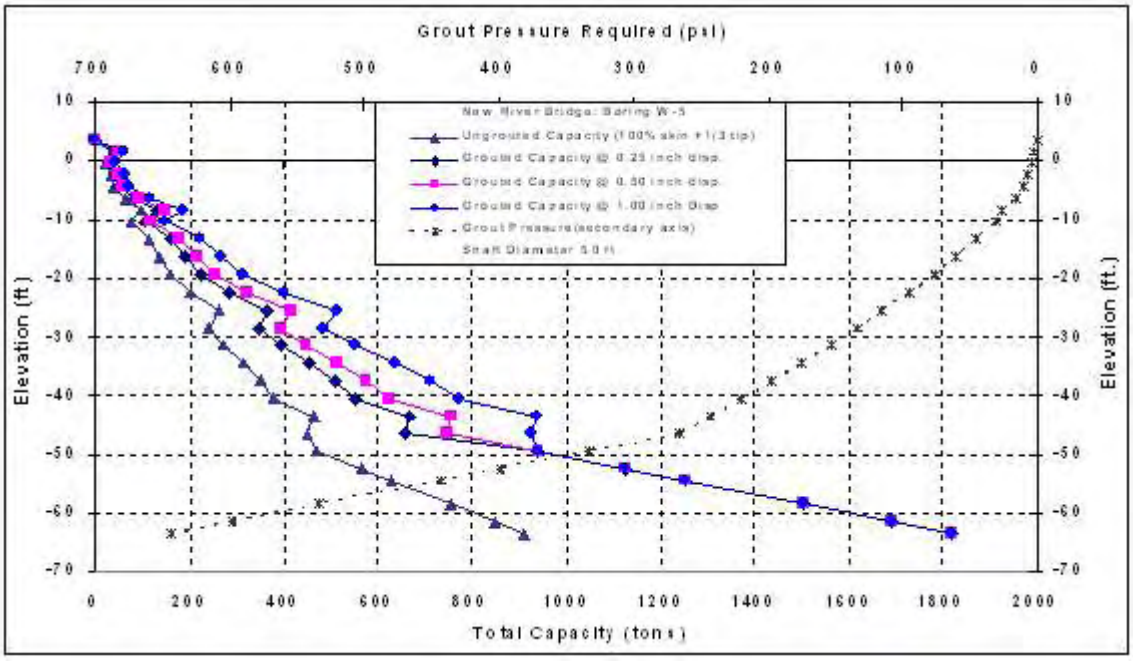


Figure C-133 New River Bridge: W-5, 5ft Diameter

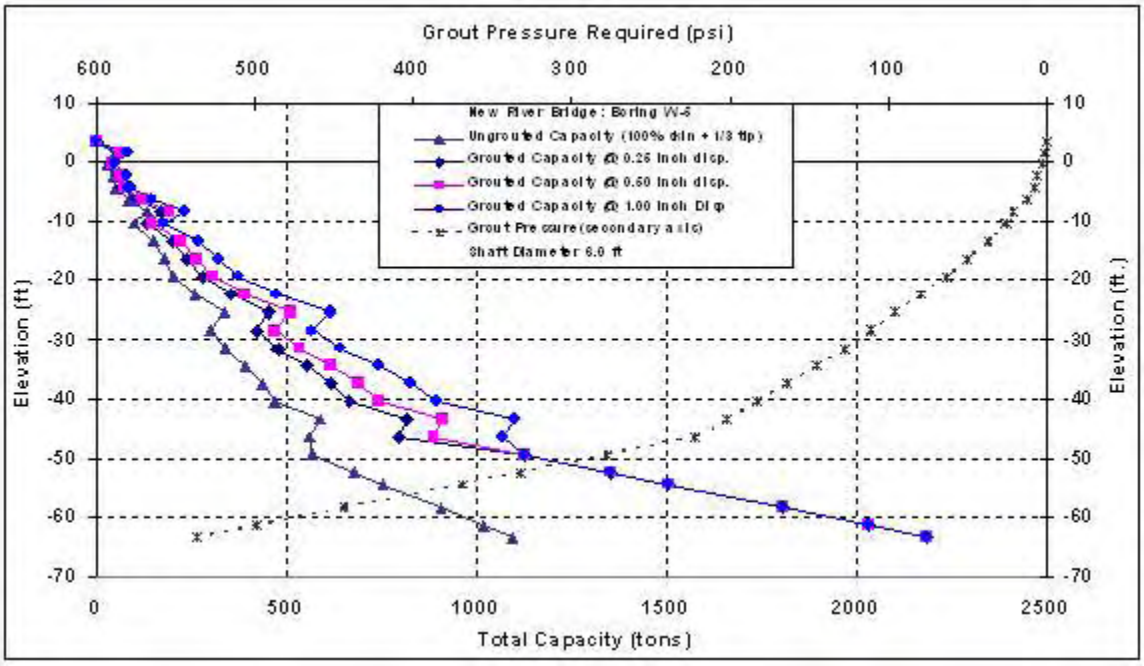


Figure C-134 New River Bridge: W-5, 6ft Diameter

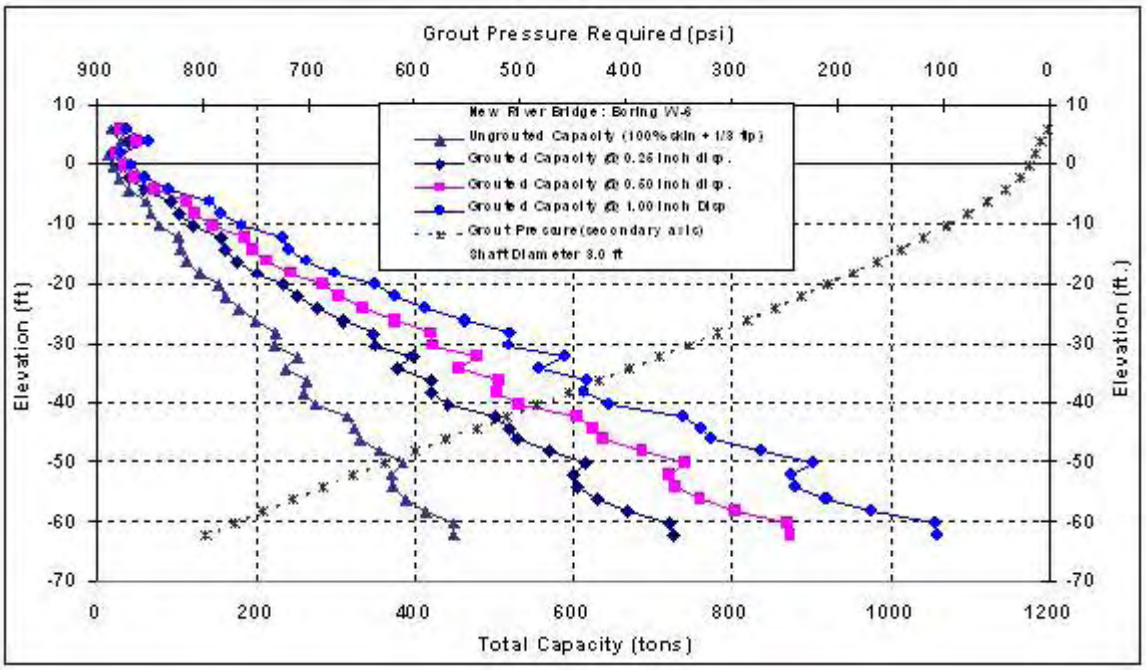


Figure C-135 New River Bridge: W-6, 3ft Diameter

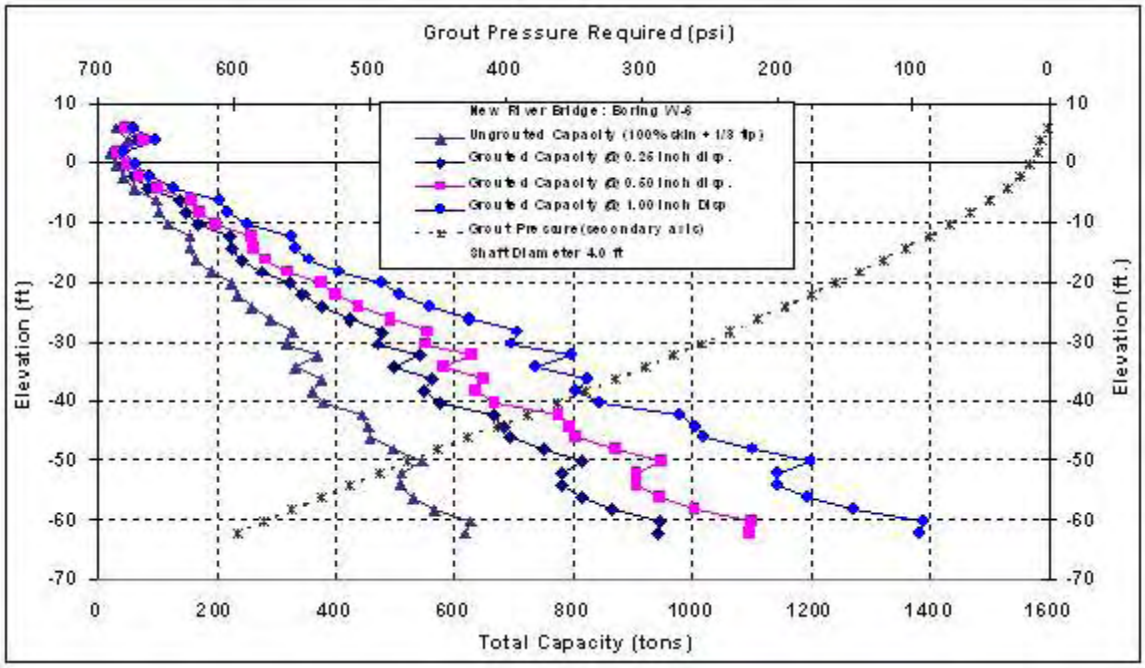


Figure C-136 New River Bridge: W-6, 4ft Diameter

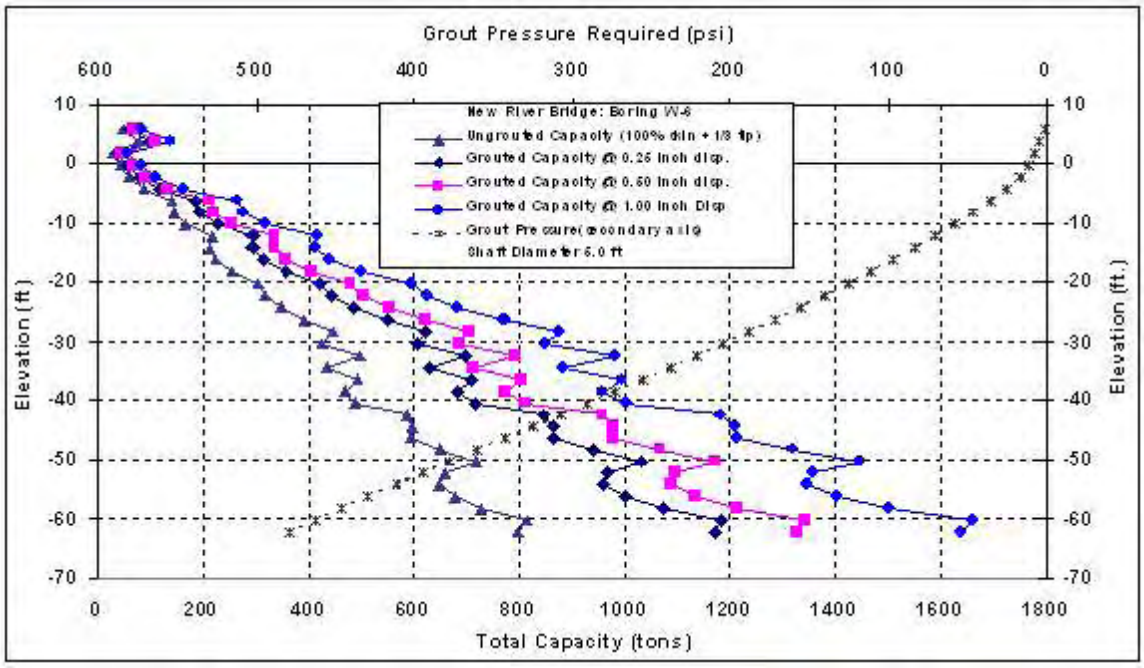


Figure C-137 New River Bridge: W-6, 5ft Diameter

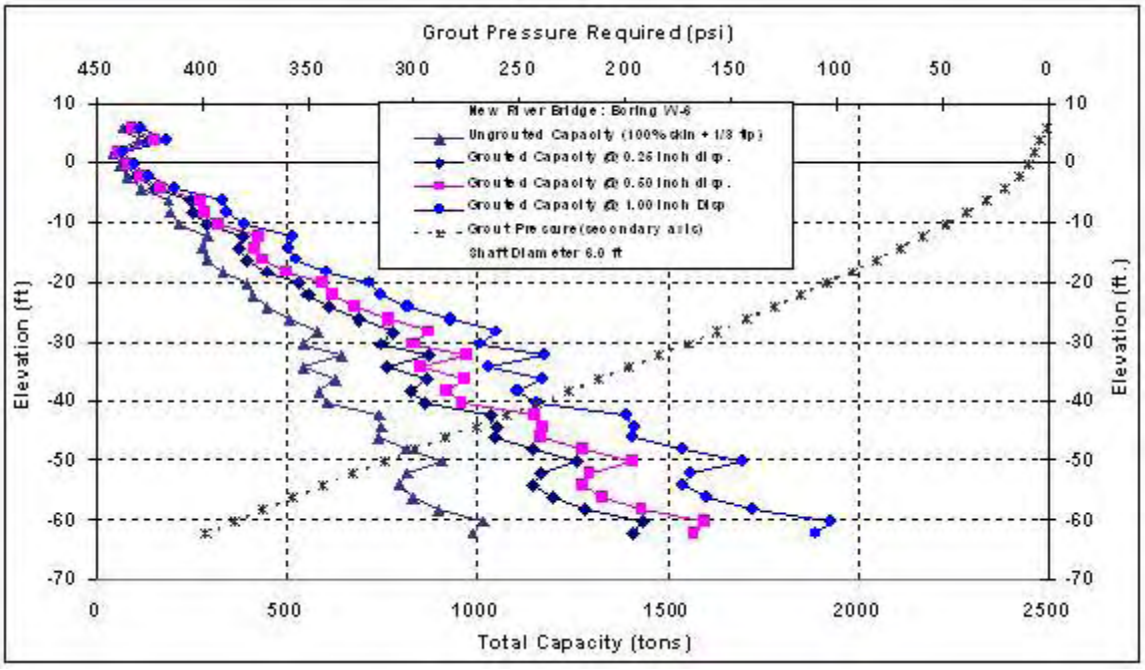


Figure C-138 New River Bridge: W-6, 6ft Diameter

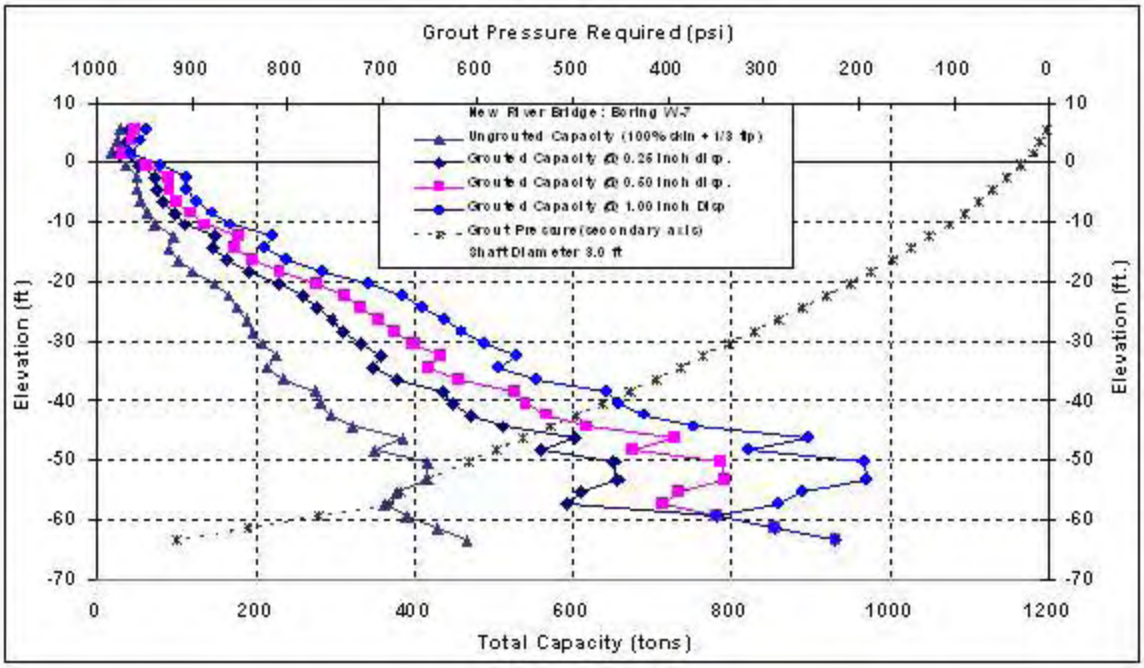


Figure C-139 New River Bridge: W-7, 3ft Diameter

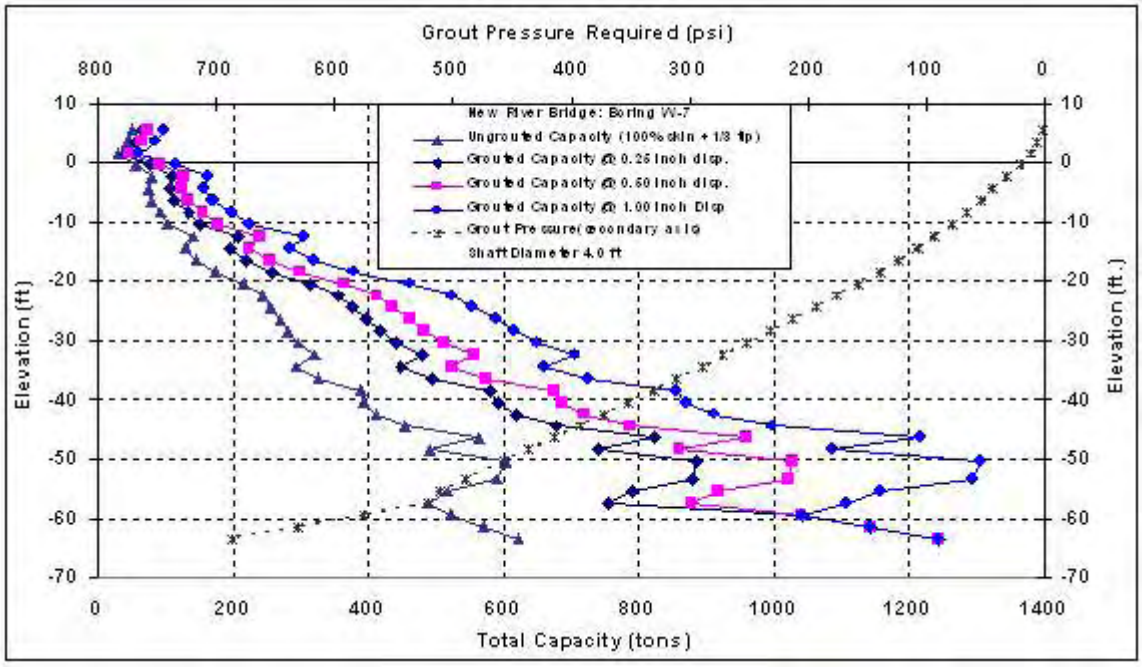


Figure C-140 New River Bridge: W-7, 4ft Diameter

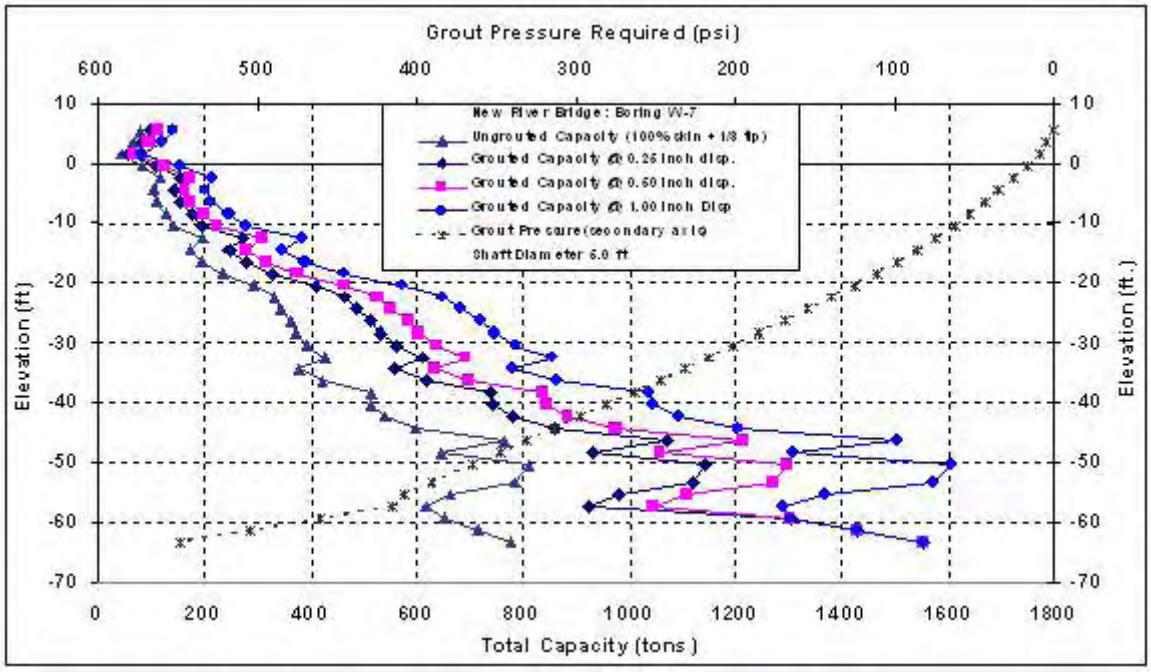


Figure C-141 New River Bridge: W-7, 5ft Diameter

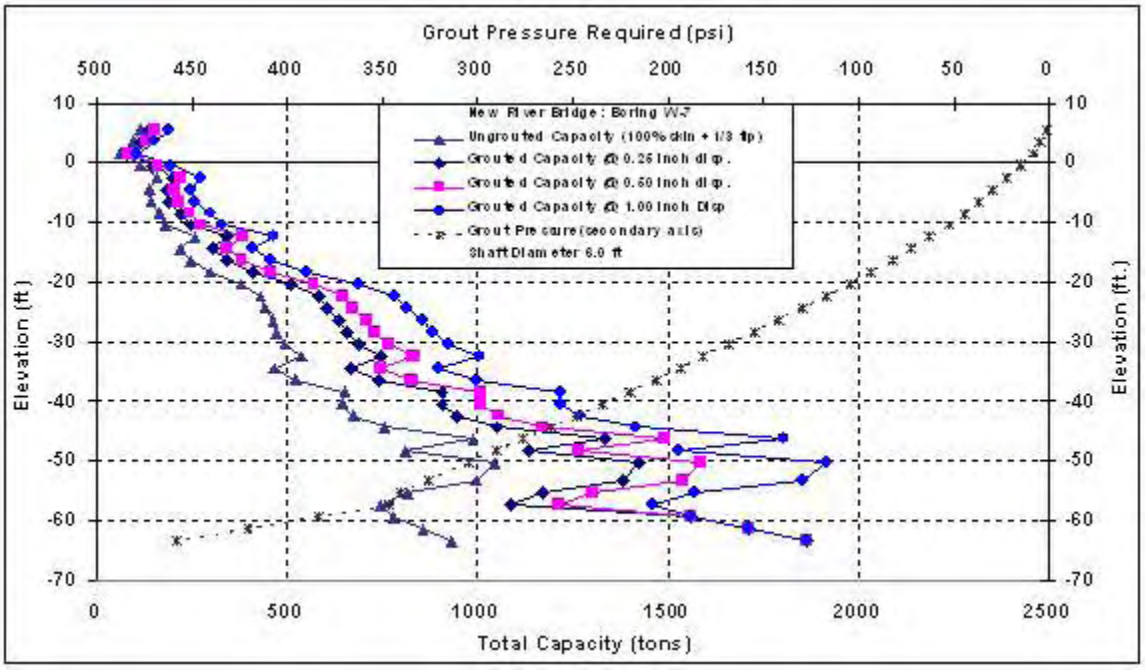


Figure C-142 New River Bridge: W-7, 6ft Diameter

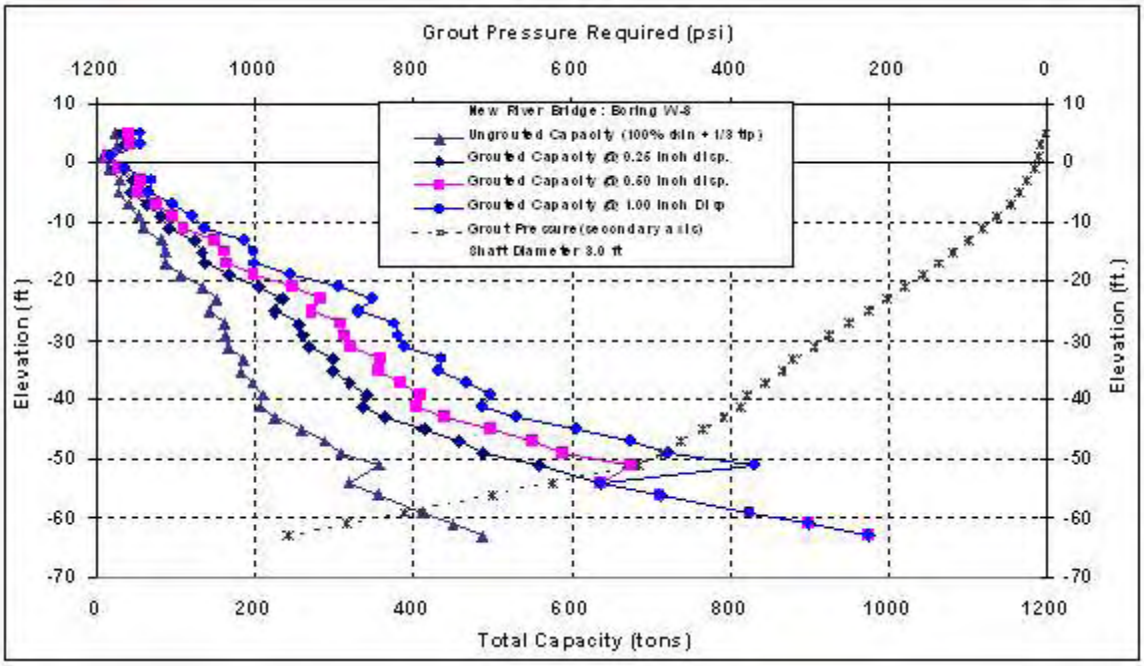


Figure C-143 New River Bridge: W-8, 3ft Diameter

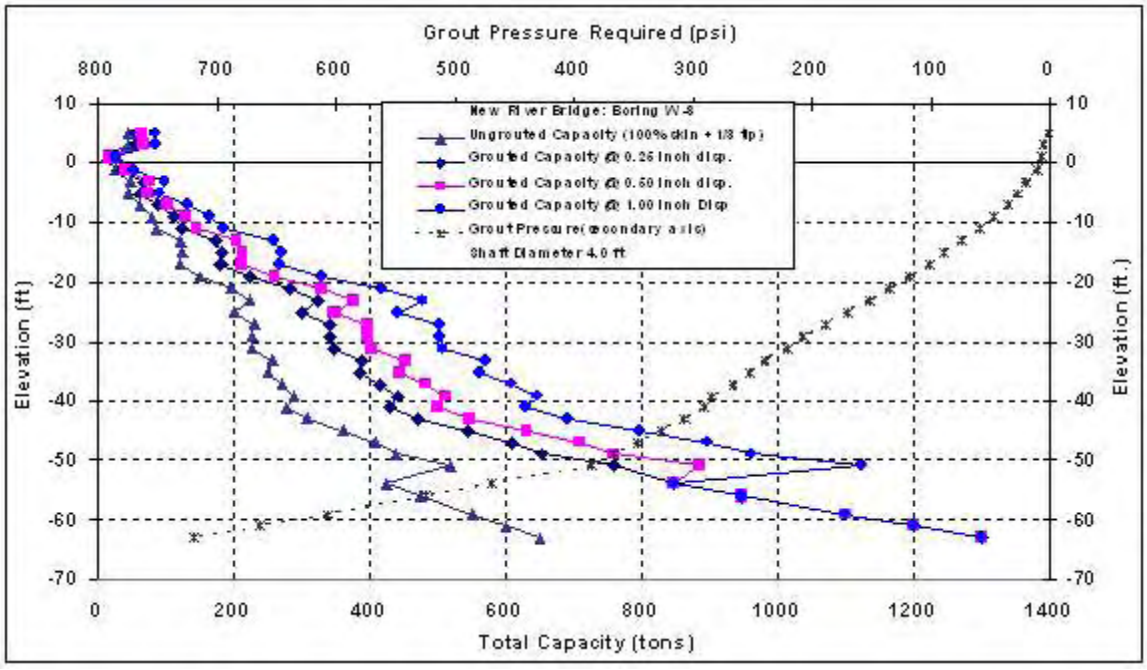


Figure C-144 New River Bridge: W-8, 4ft Diameter

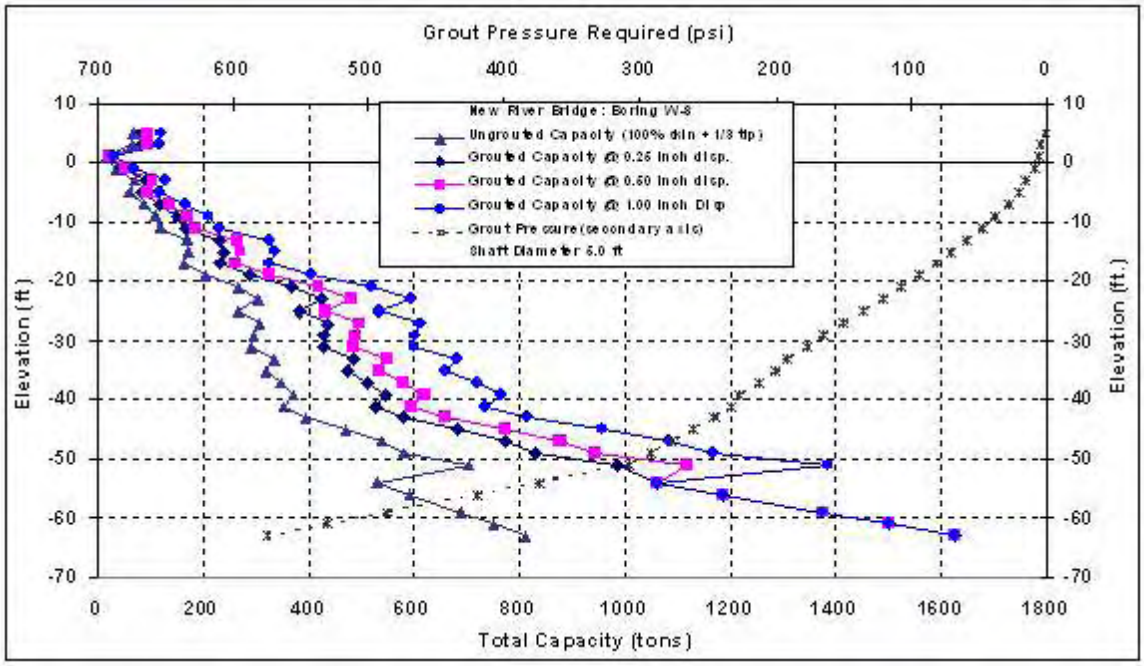


Figure C-145 New River Bridge: W-8, 5ft Diameter

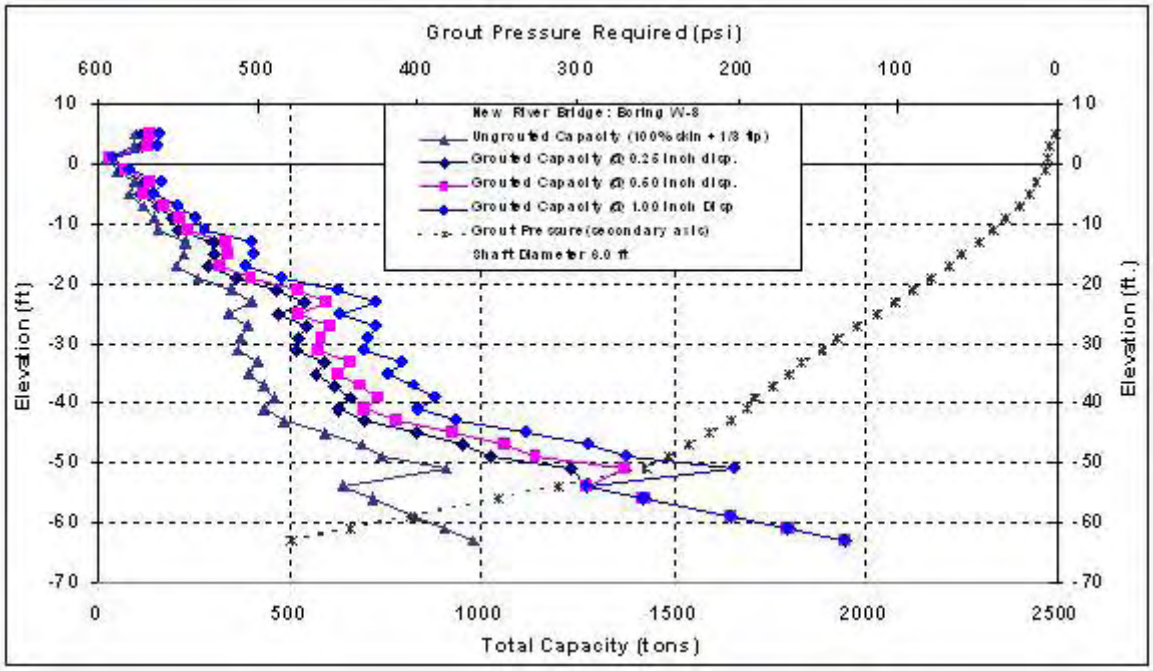


Figure C-146 New River Bridge: W-8, 6ft Diameter

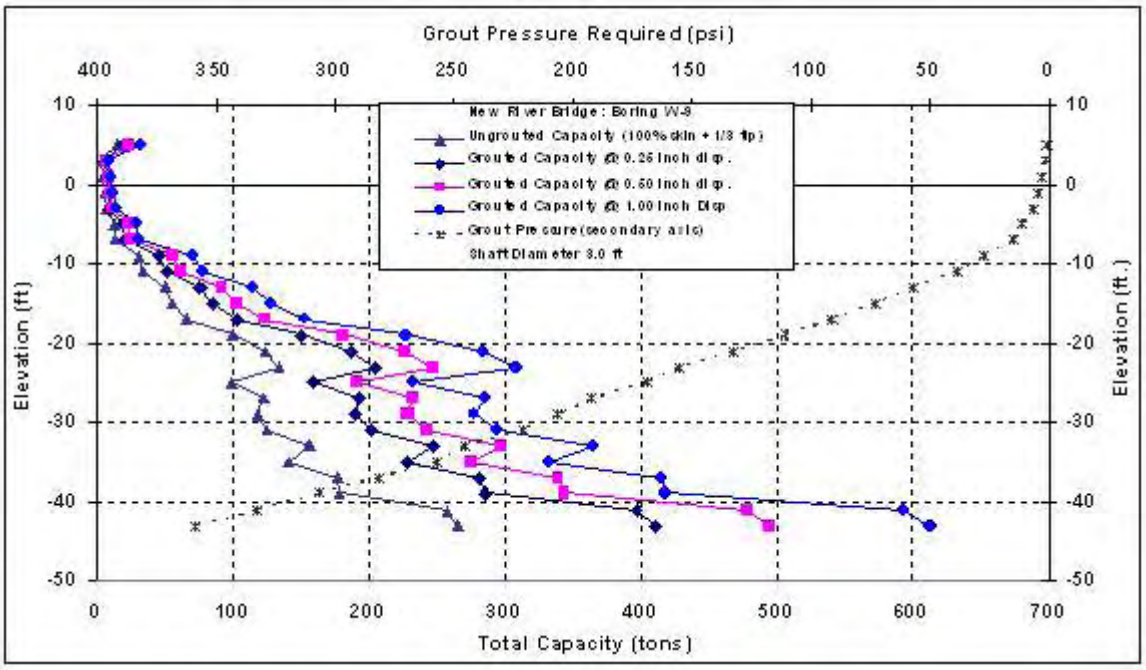


Figure C-147 New River Bridge: W-9, 3ft Diameter

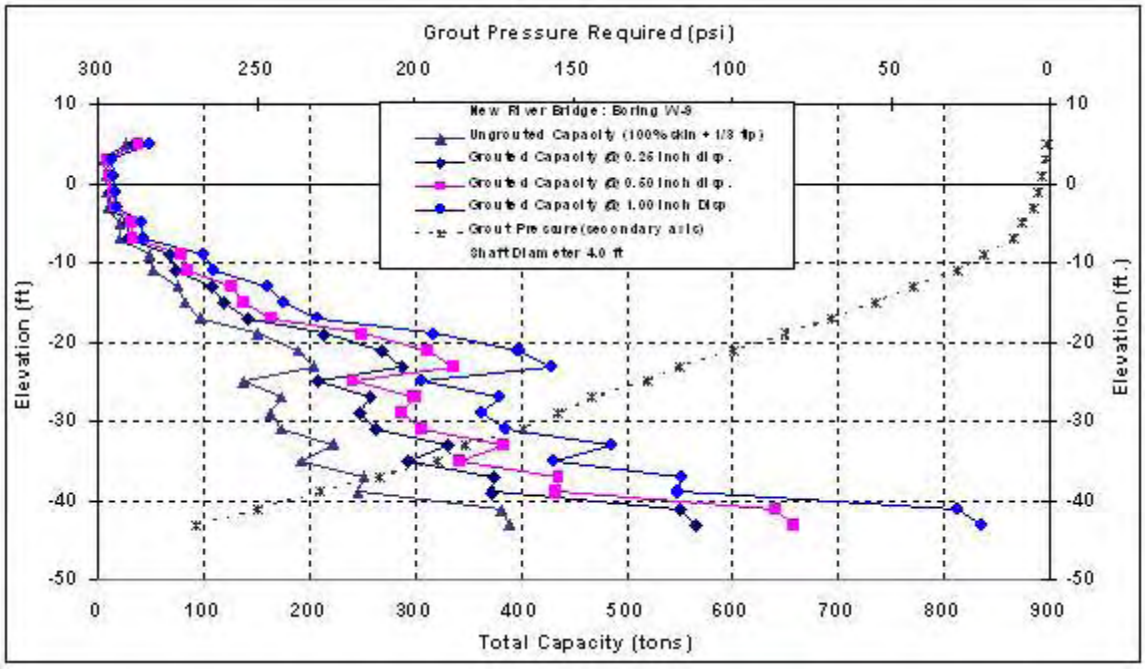


Figure C-148 New River Bridge: W-9, 4ft Diameter

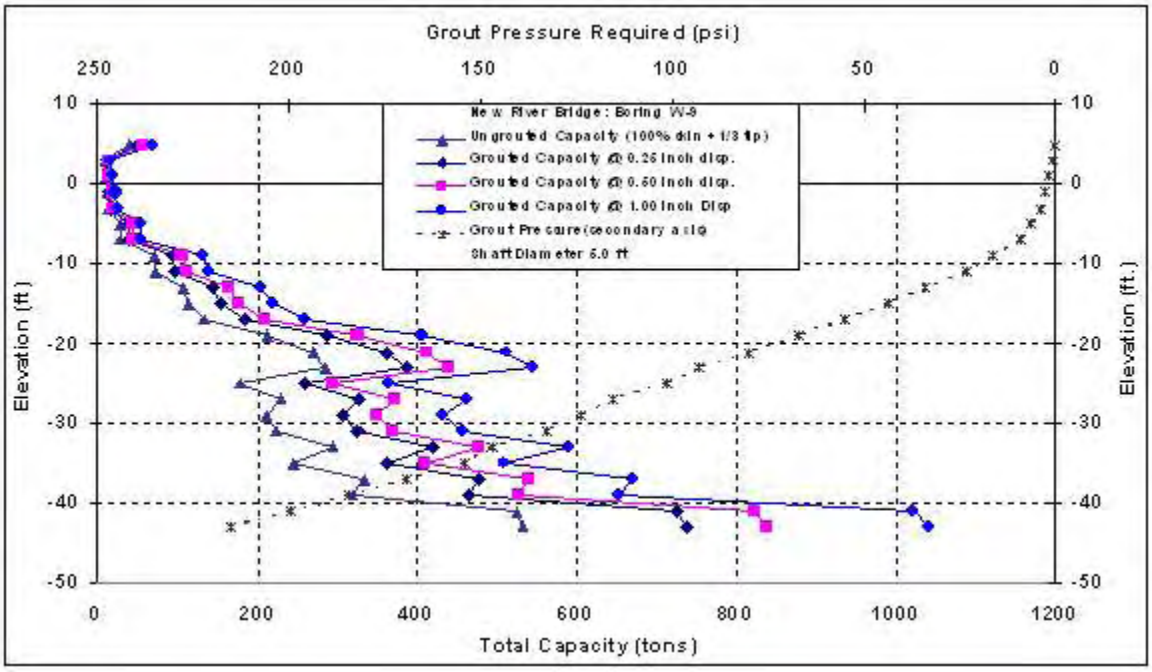


Figure C-149 New River Bridge: W-9, 5ft Diameter

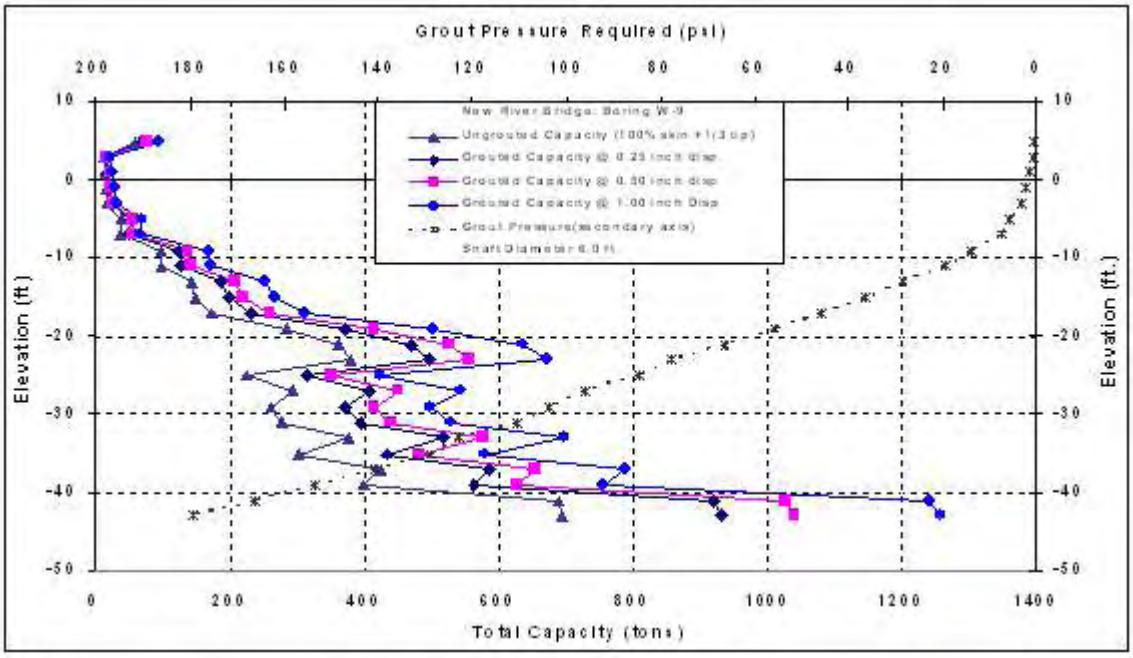


Figure C-150 New River Bridge: W-9, 6ft Diameter

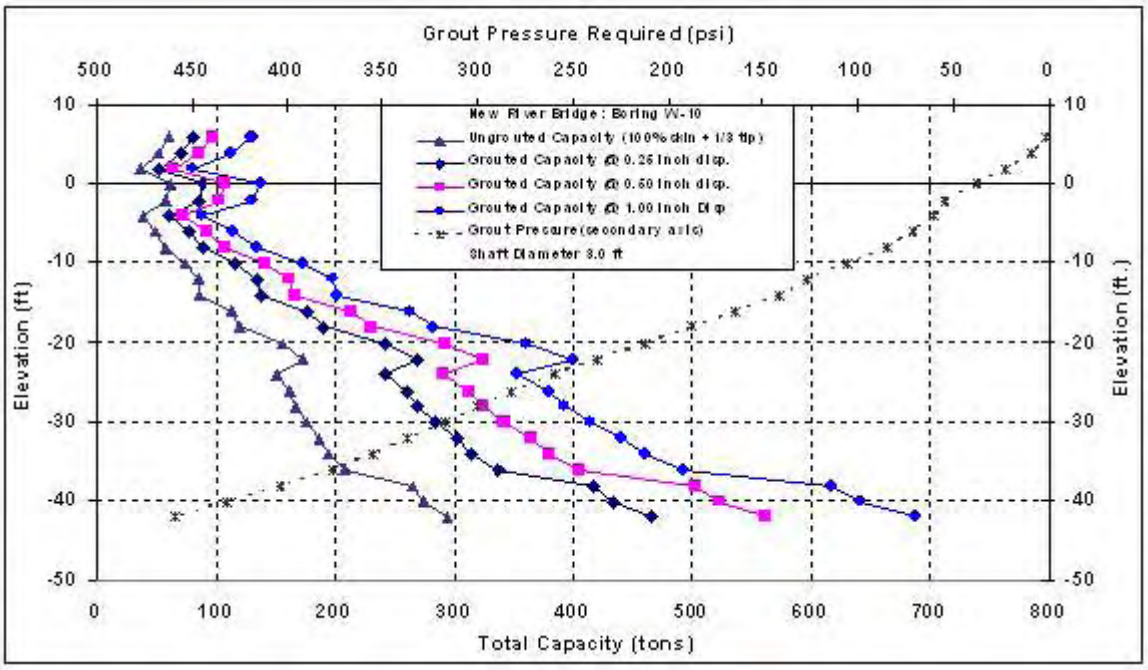


Figure C-151 New River Bridge: W-10, 3ft Diameter

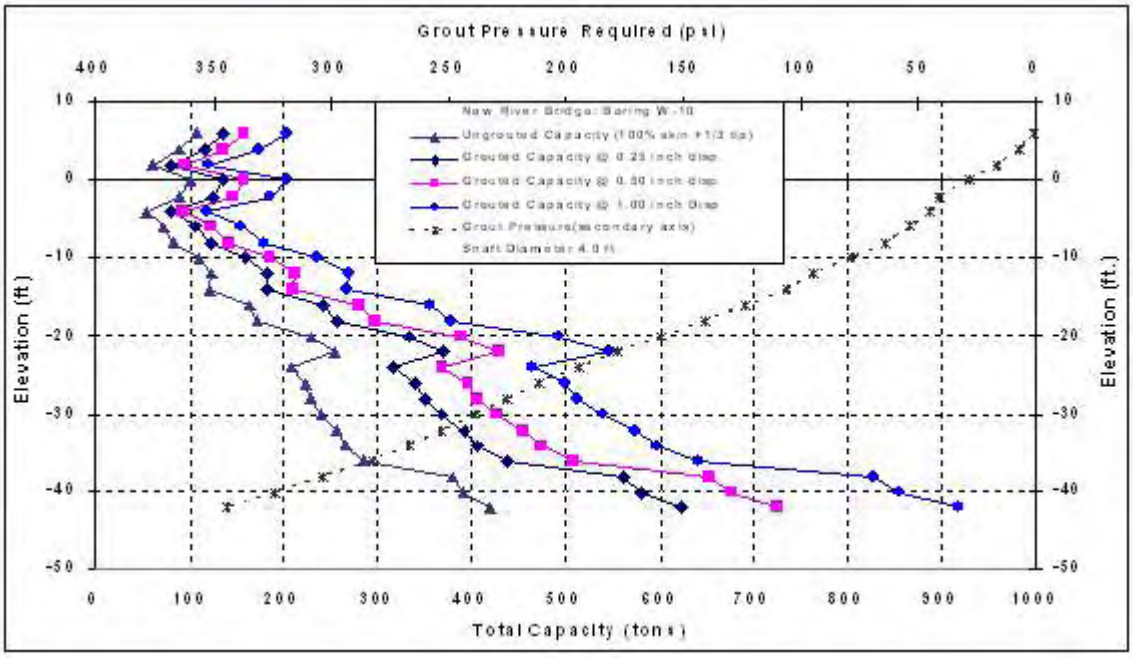


Figure C-152 New River Bridge: W-10, 4ft Diameter

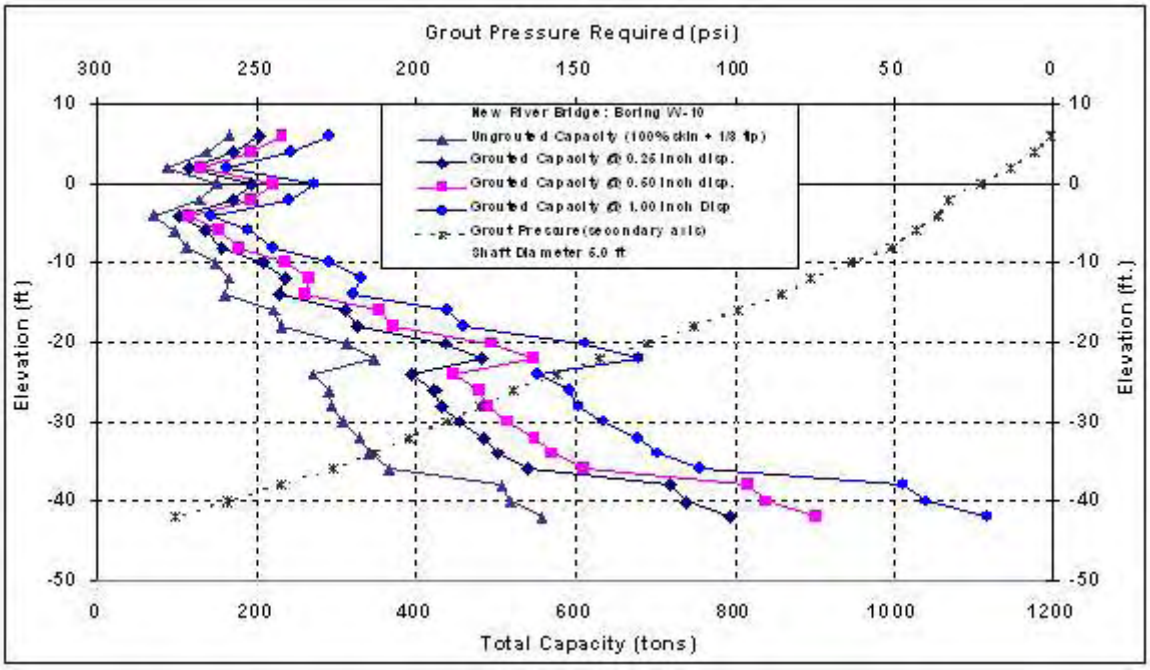


Figure C-153 New River Bridge: W-10, 5ft Diameter

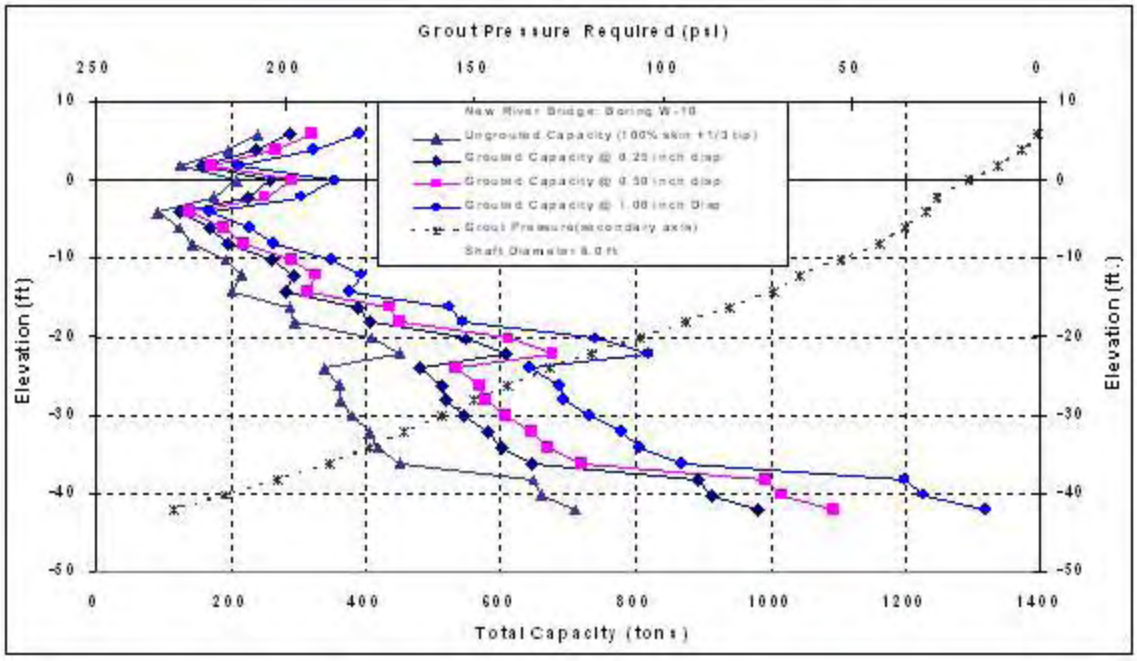


Figure C-154 New River Bridge: W-10, 6ft Diameter

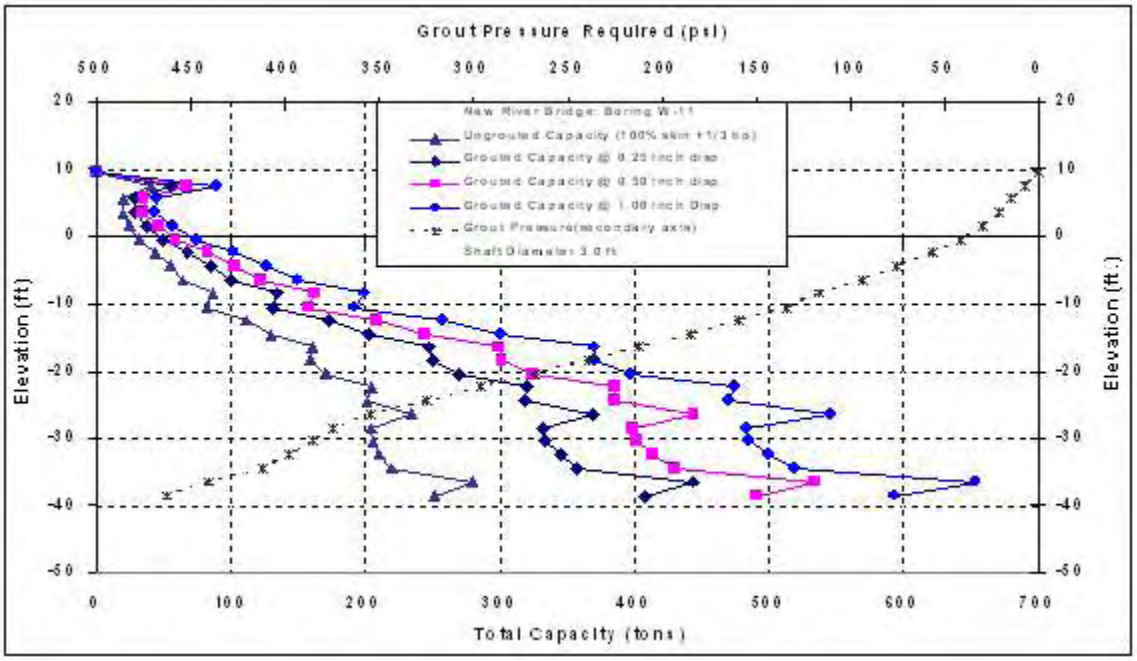


Figure C-155 New River Bridge: W-11, 3ft Diameter

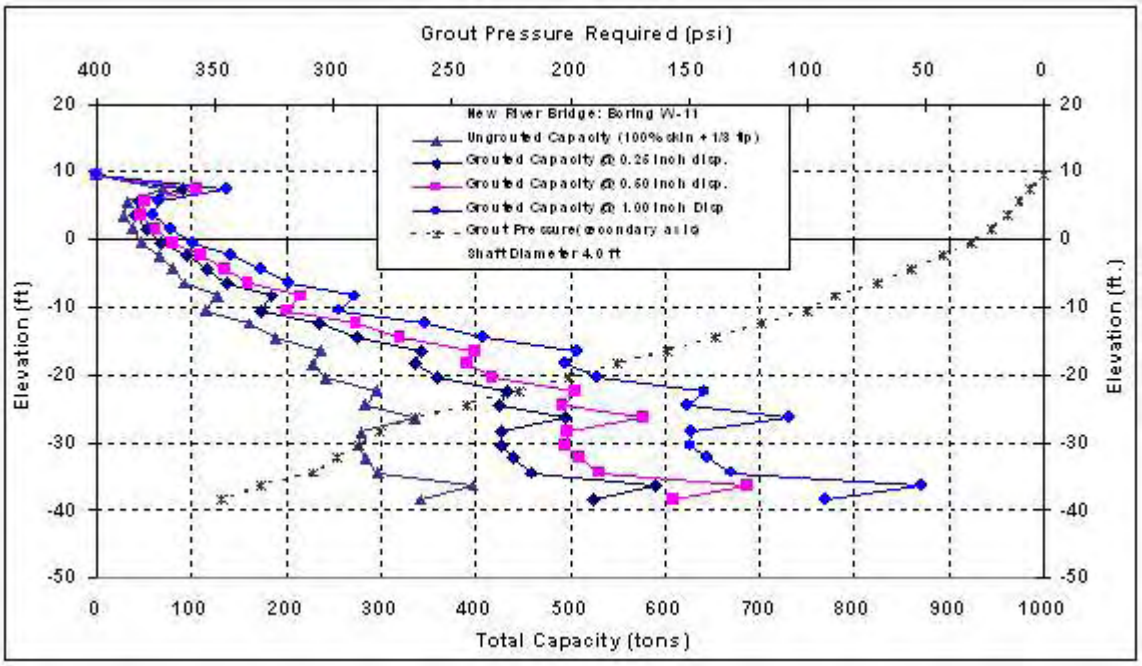


Figure C-156 New River Bridge: W-11, 4ft Diameter

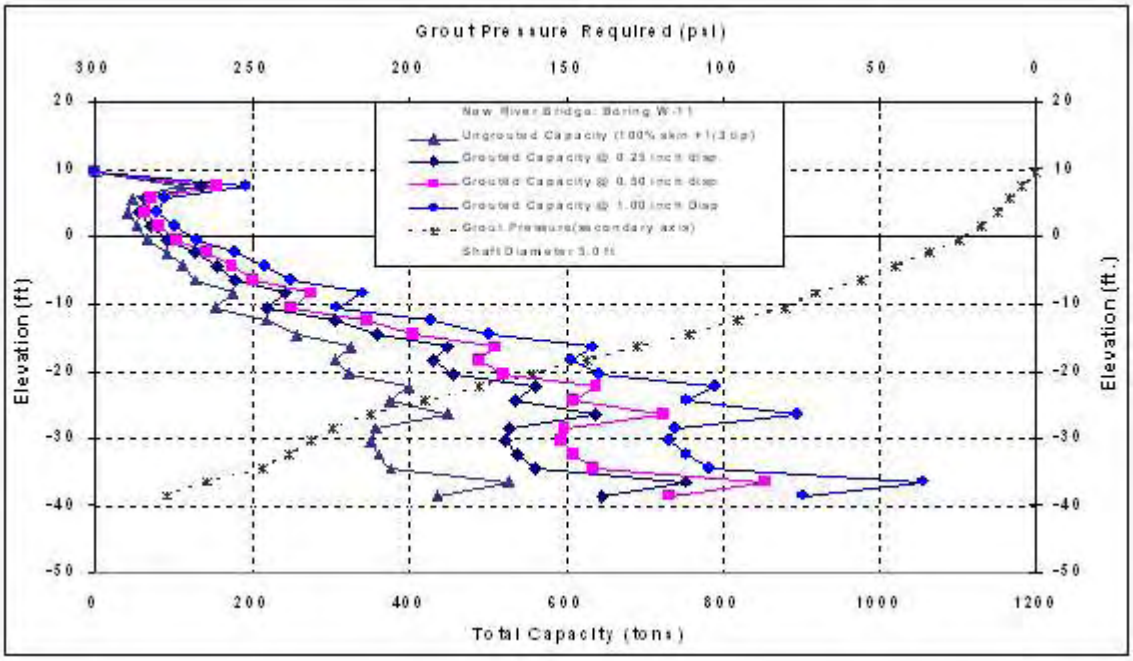


Figure C-157 New River Bridge: W-11, 5ft Diameter

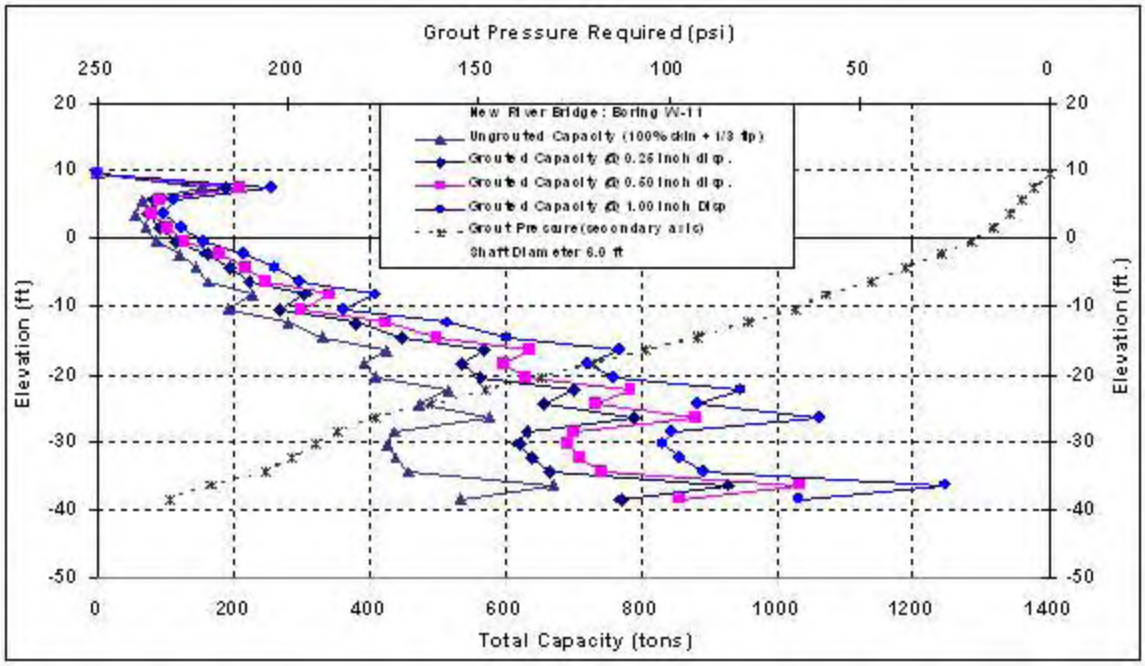


Figure C-158 New River Bridge: W-11, 6ft Diameter

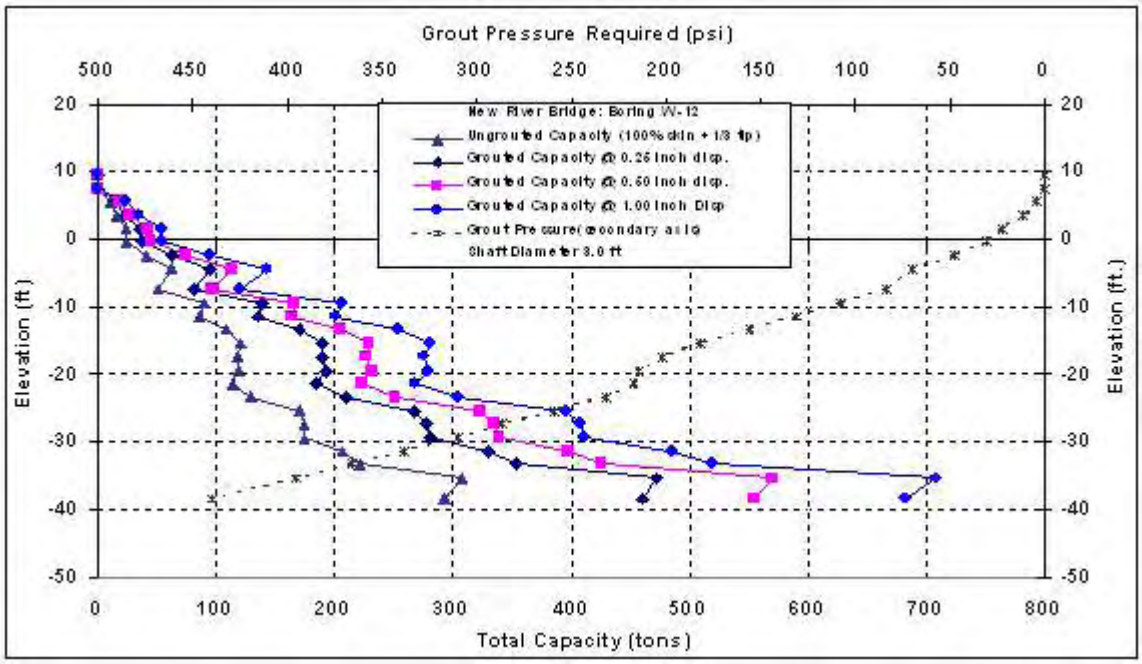


Figure C-159 New River Bridge: W-12, 3ft Diameter

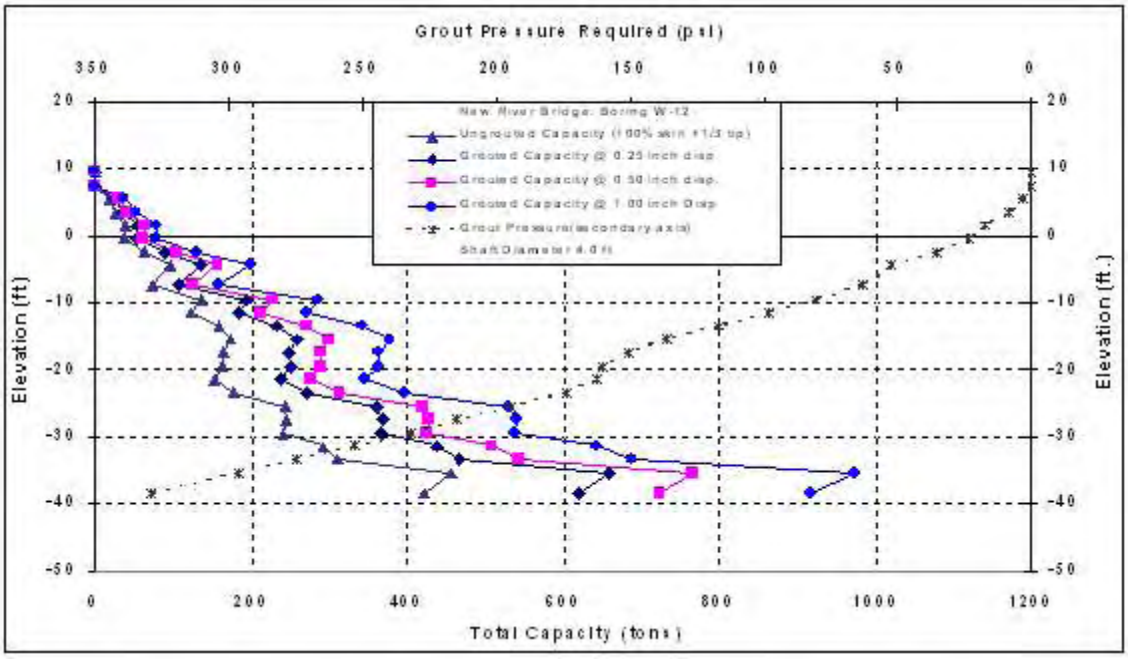


Figure C-160 New River Bridge: W-12, 4ft Diameter

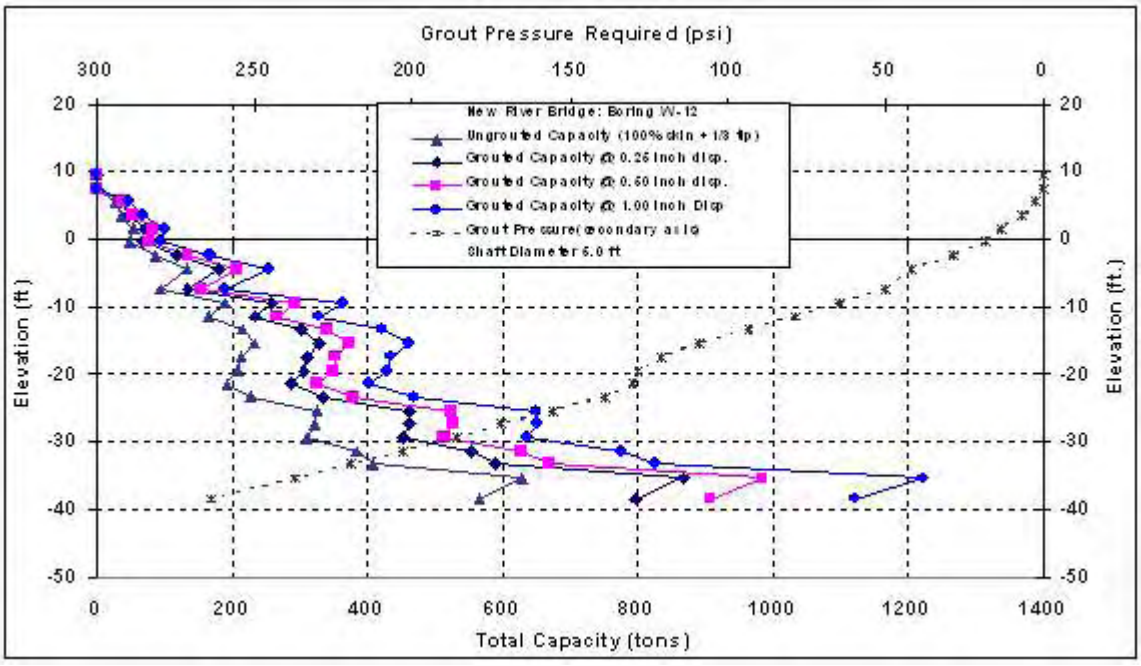


Figure C-161 New River Bridge: W-12, 5ft Diameter

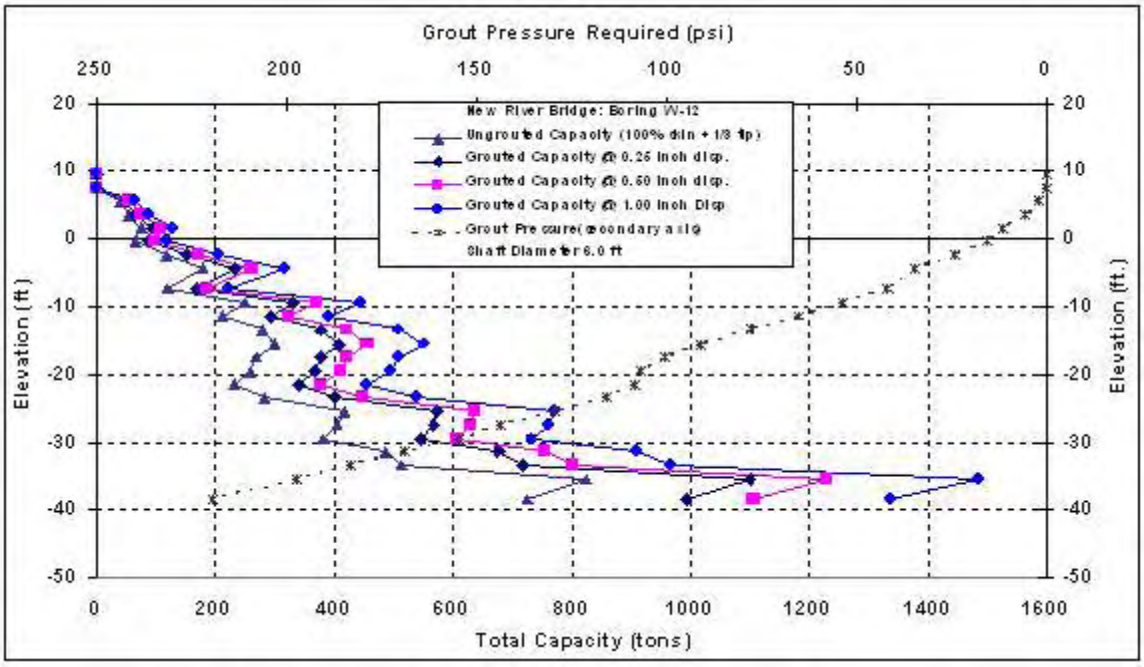


Figure C-162 New River Bridge: W-12. 6ft Diameter

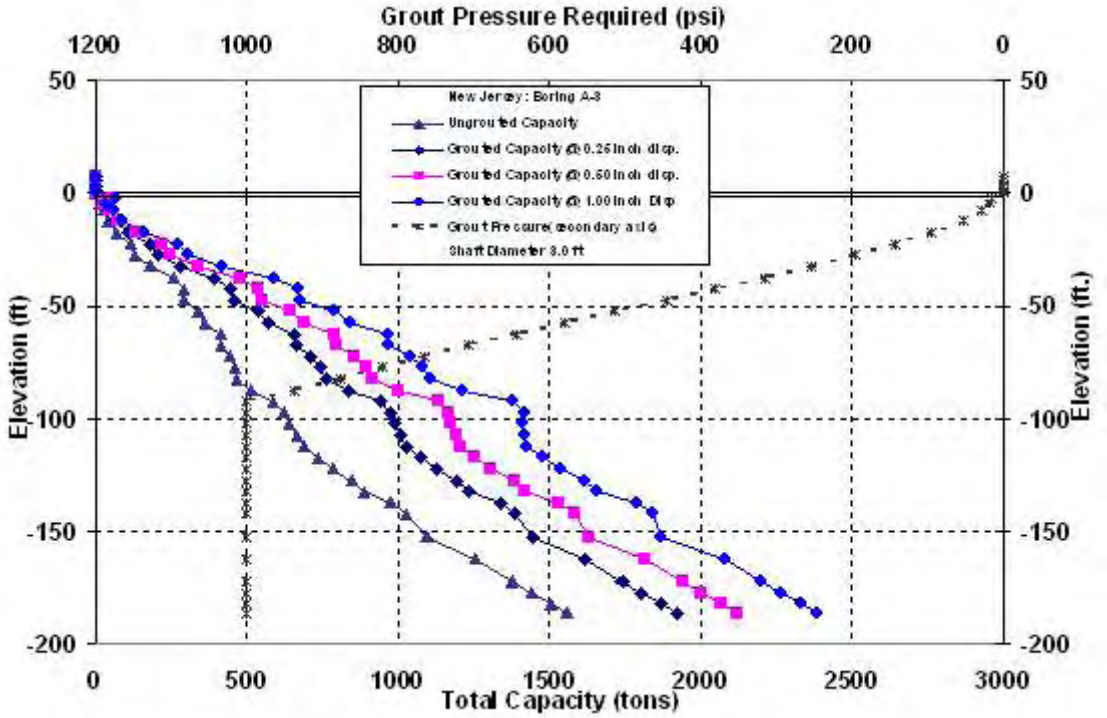


Figure C-163 Newark Legal Center: A-3, 3ft Diameter

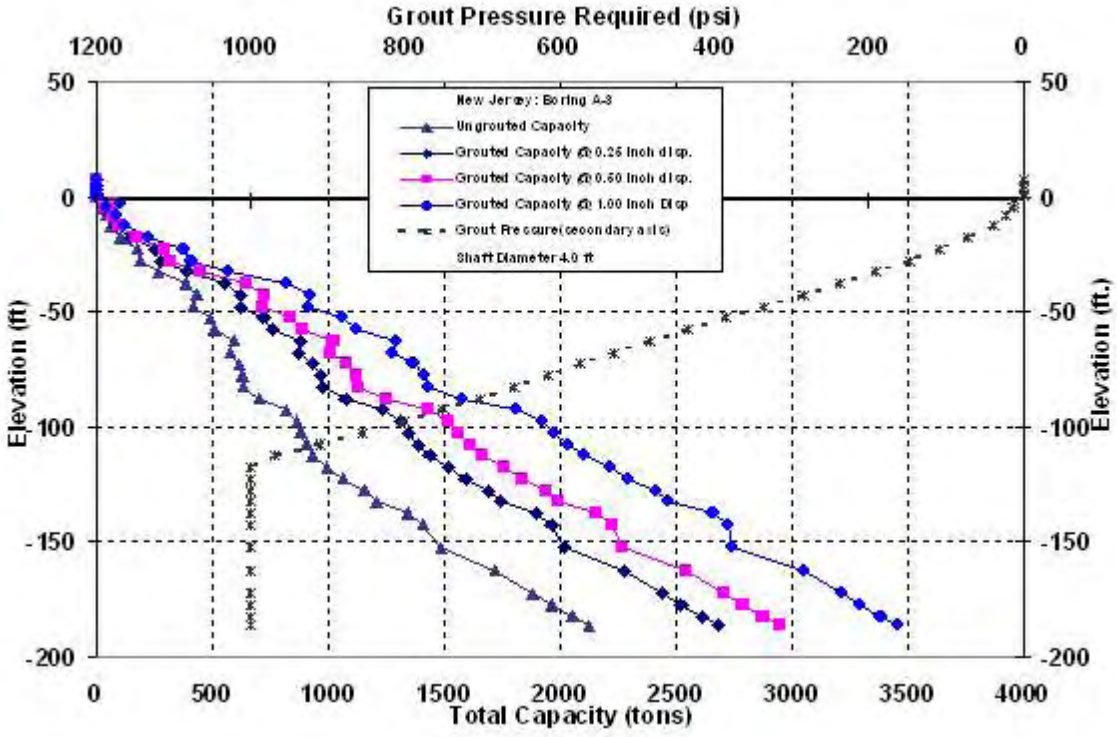


Figure C-164 Newark Legal Center: A-3, 4ft Diameter

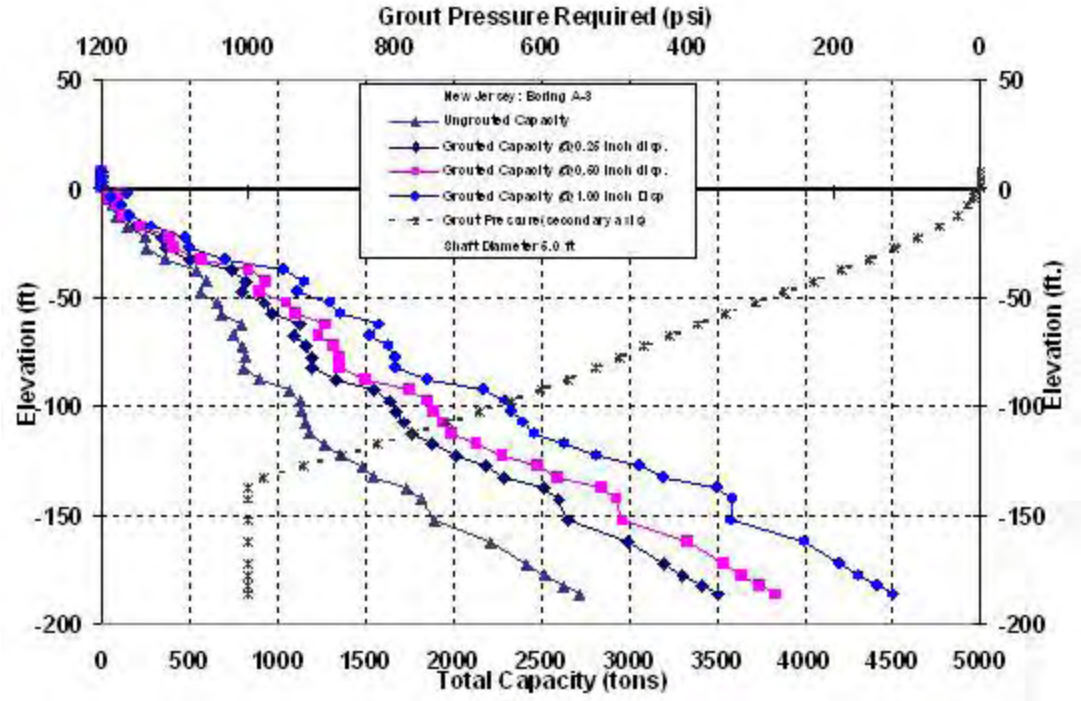


Figure C-165 Newark Legal Center: A-3, 5ft Diameter

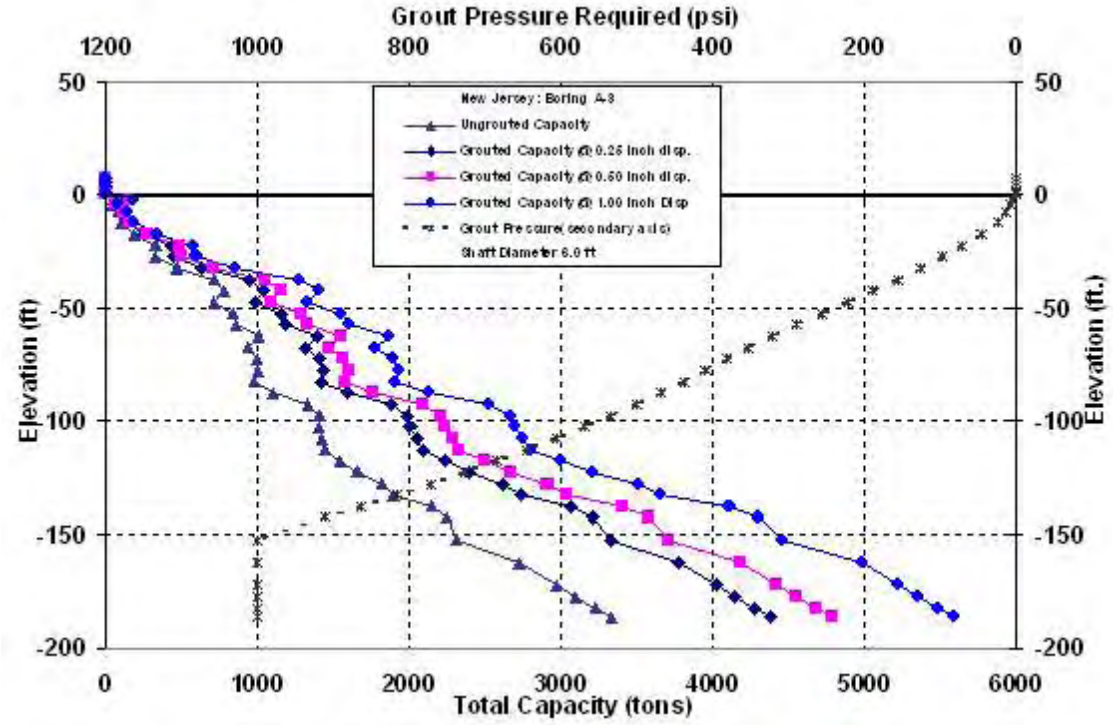


Figure C-166 Newark Legal Center: A-3, 6ft Diameter

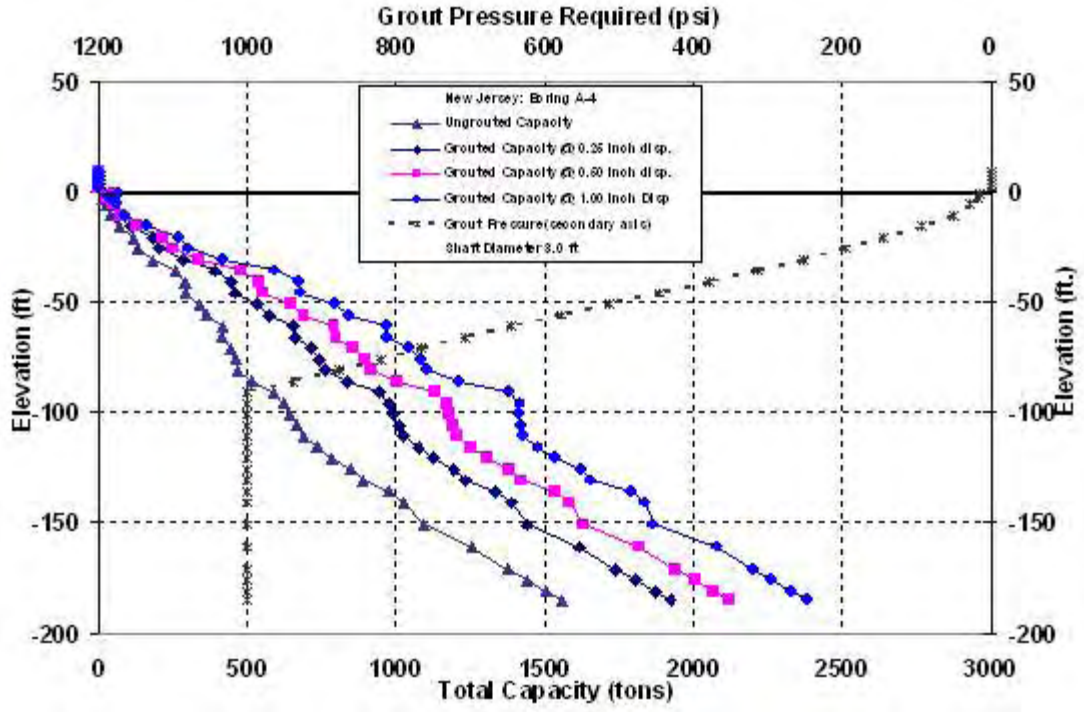


Figure C-167 Newark Legal Center: A-4, 3ft Diameter

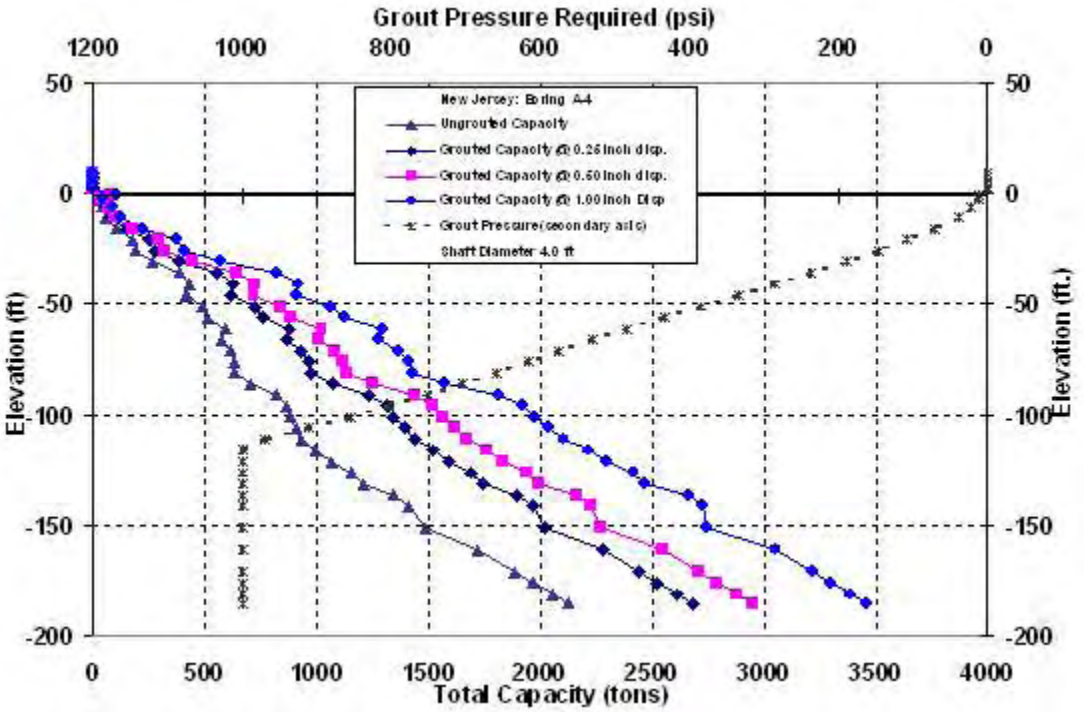


Figure C-168 Newark Legal Center: A-4, 4ft Diameter

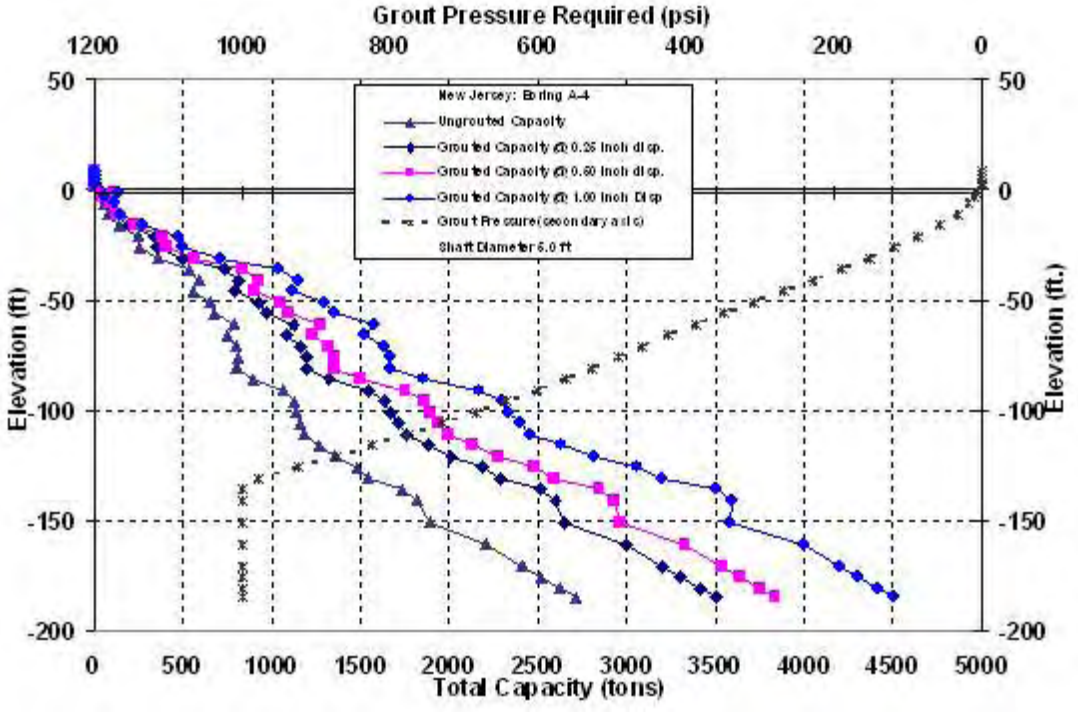


Figure C-169 Newark Legal Center: A-4, 5ft Diameter

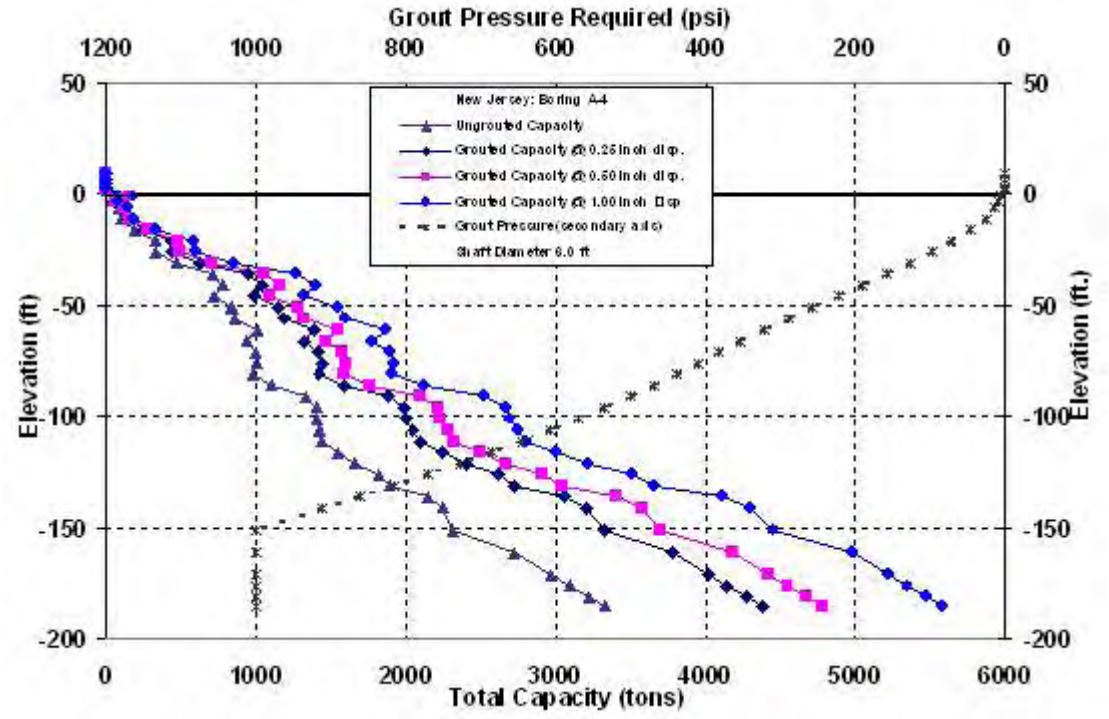


Figure C-170 Newark Legal Center: A-4, 6ft Diameter

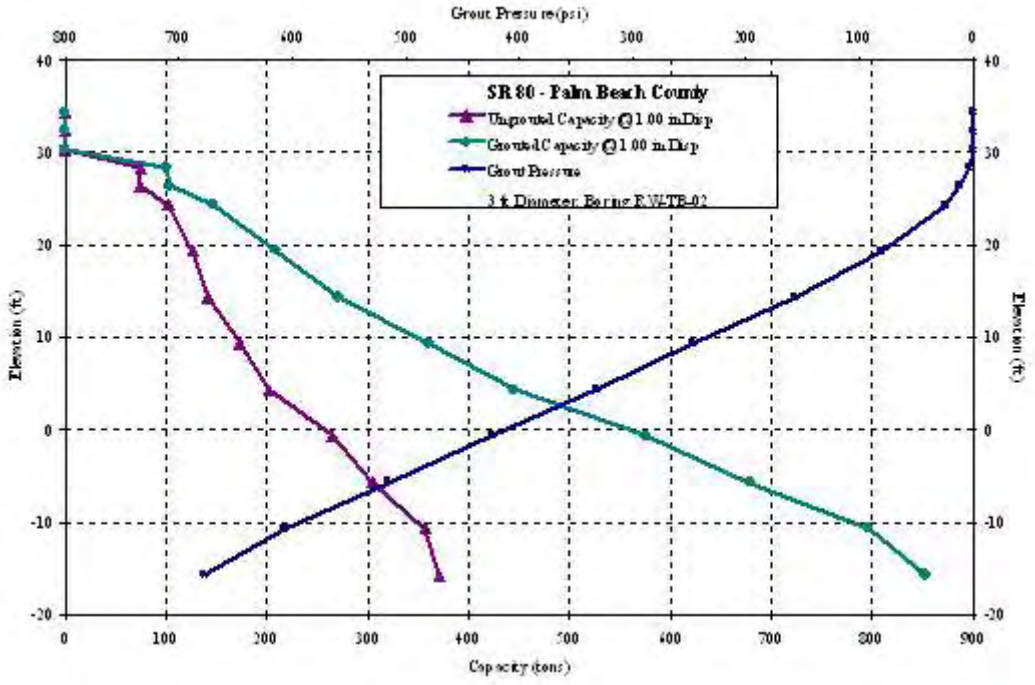


Figure C-171 SR 80 Palm Beach County: RW-TB-02, 3ft Diameter

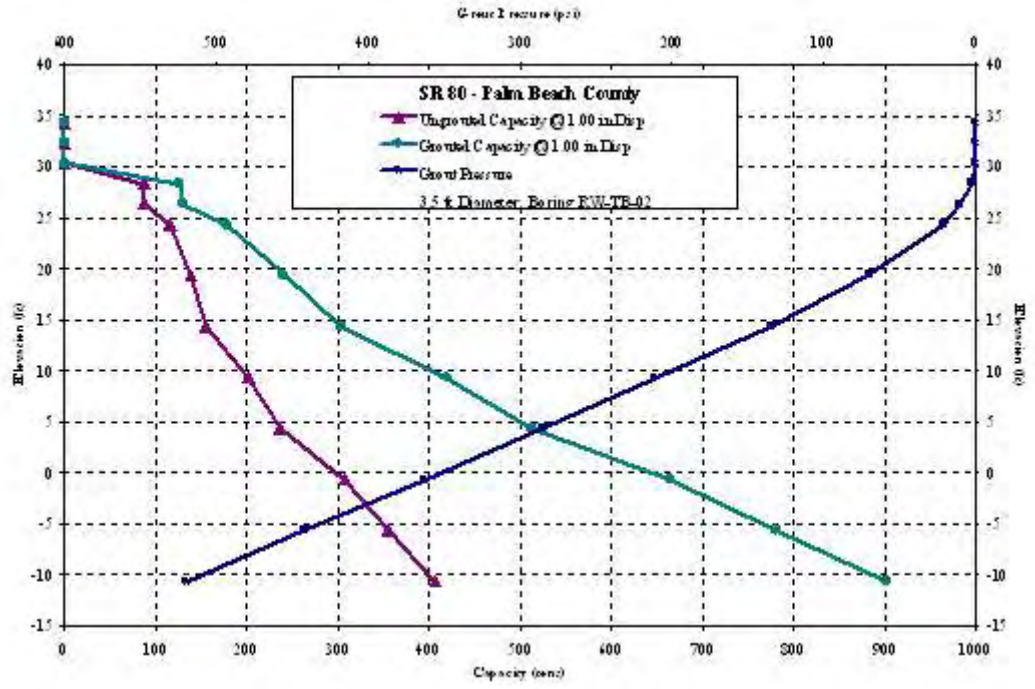


Figure C-172 SR 80 Palm Beach County: RW-TB-02, 3.5ft Diameter

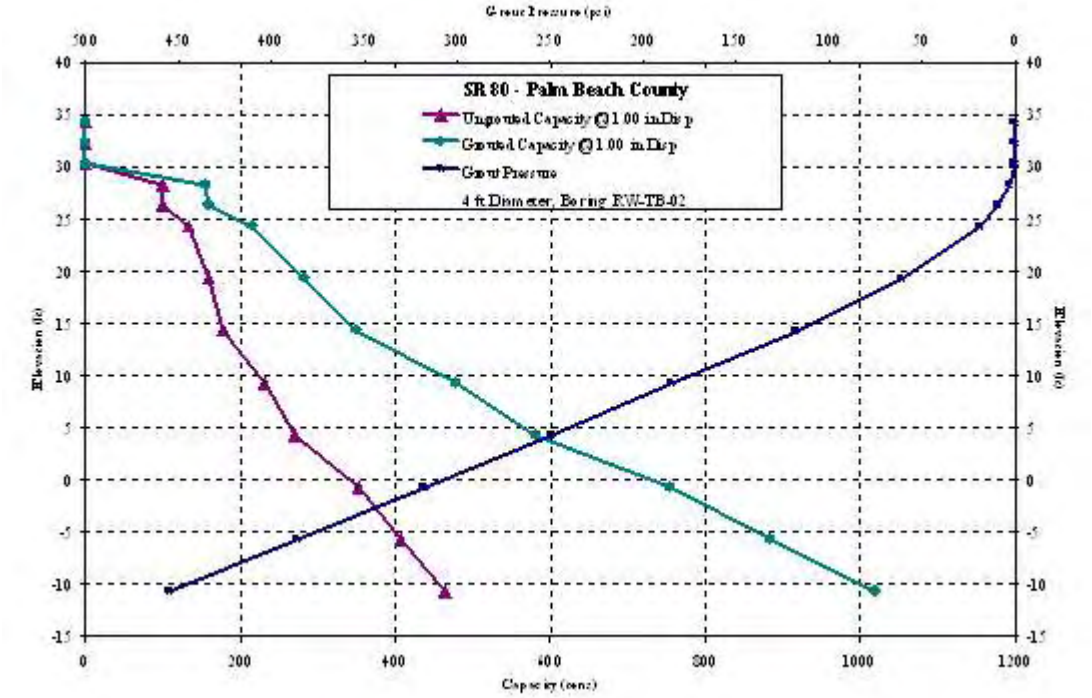


Figure C-173 SR 80 Palm Beach County: RW-TB-02, 4ft Diameter

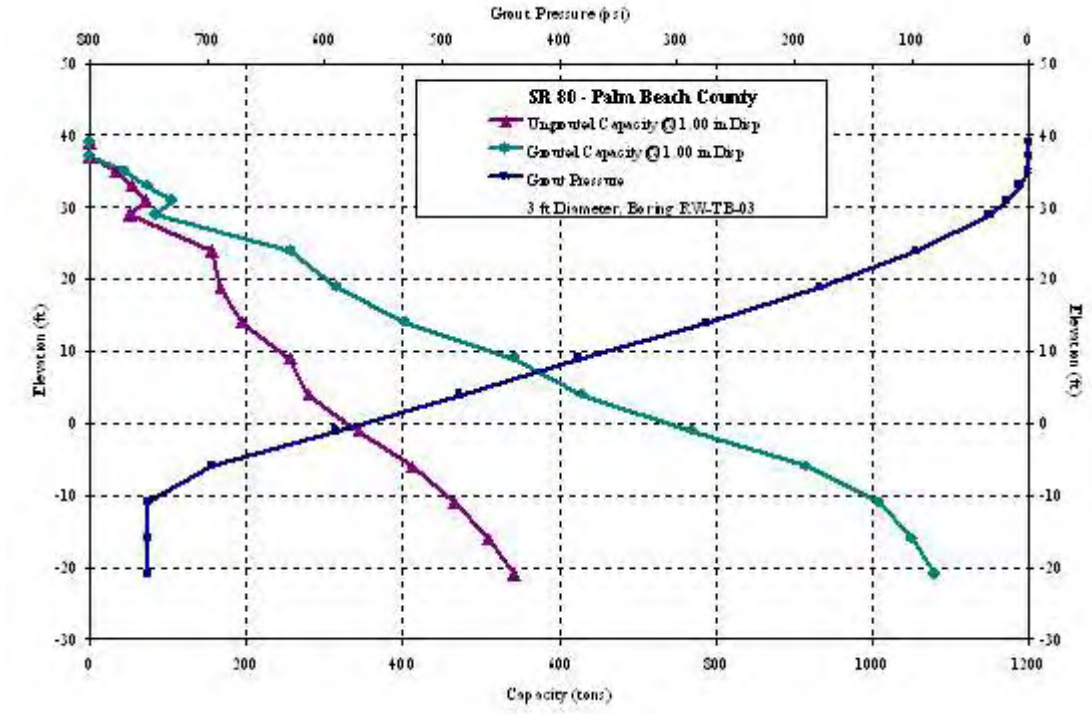


Figure C-174 SR 80 Palm Beach County: RW-TB-03, 3ft Diameter

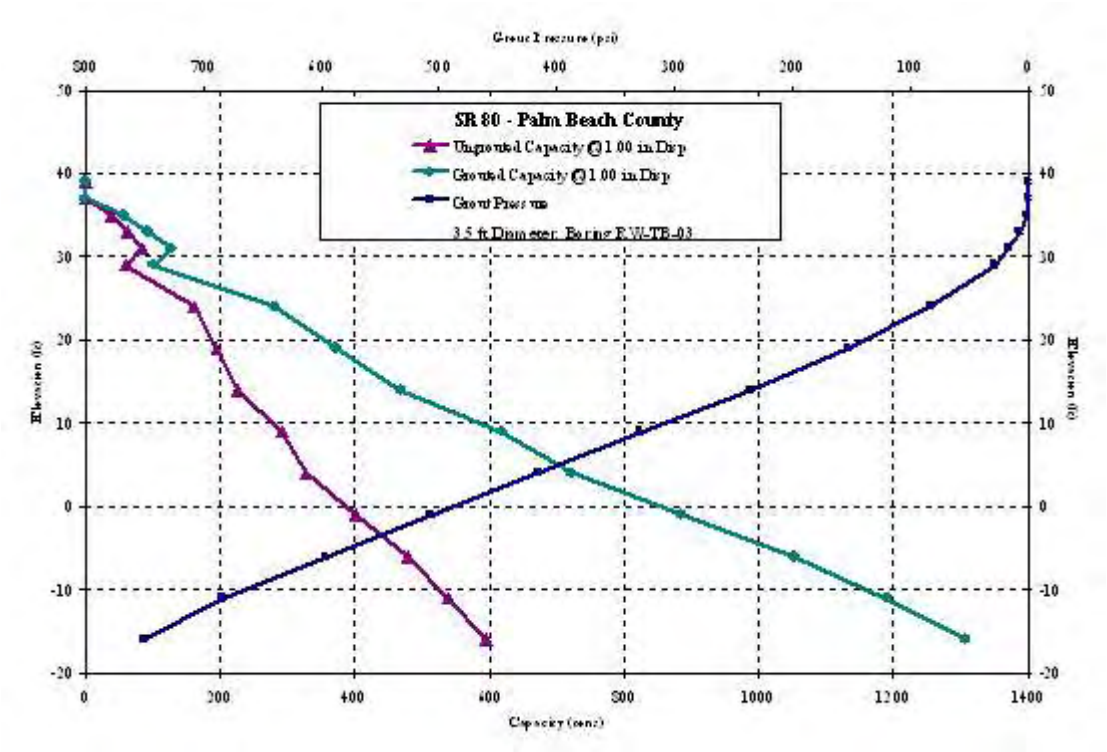


Figure C-175 SR 80 Palm Beach County: RW-TB-03, 3.5ft Diameter

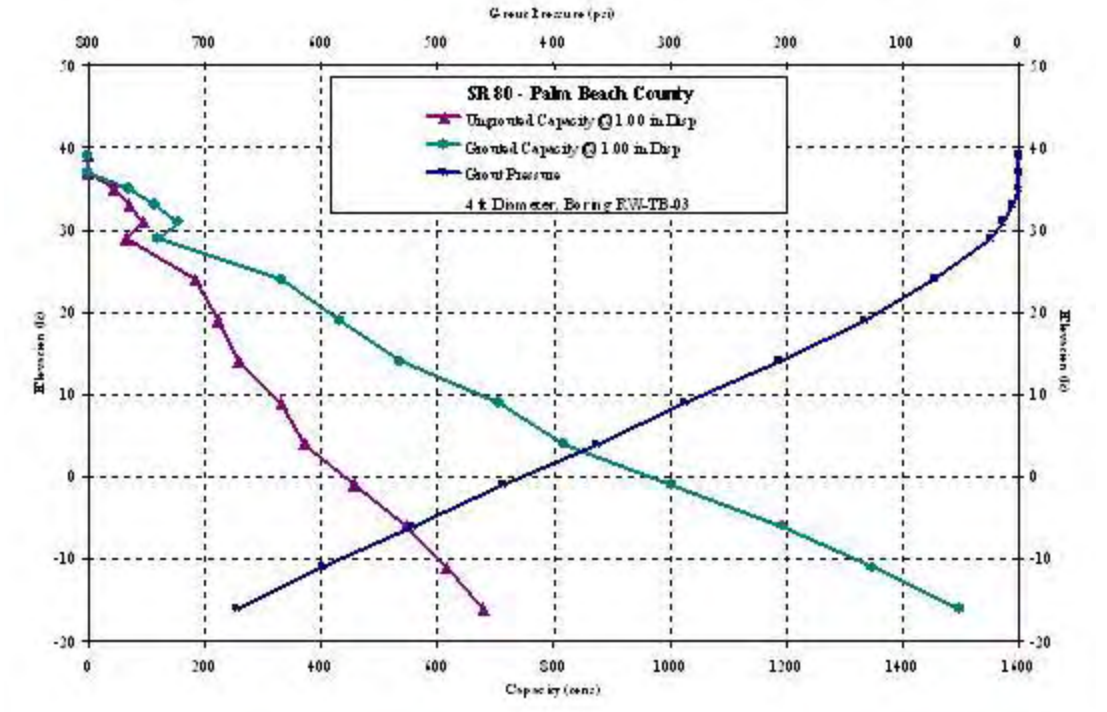


Figure C-176 SR 80 Palm Beach County: RW-TB-03, 4ft Diameter

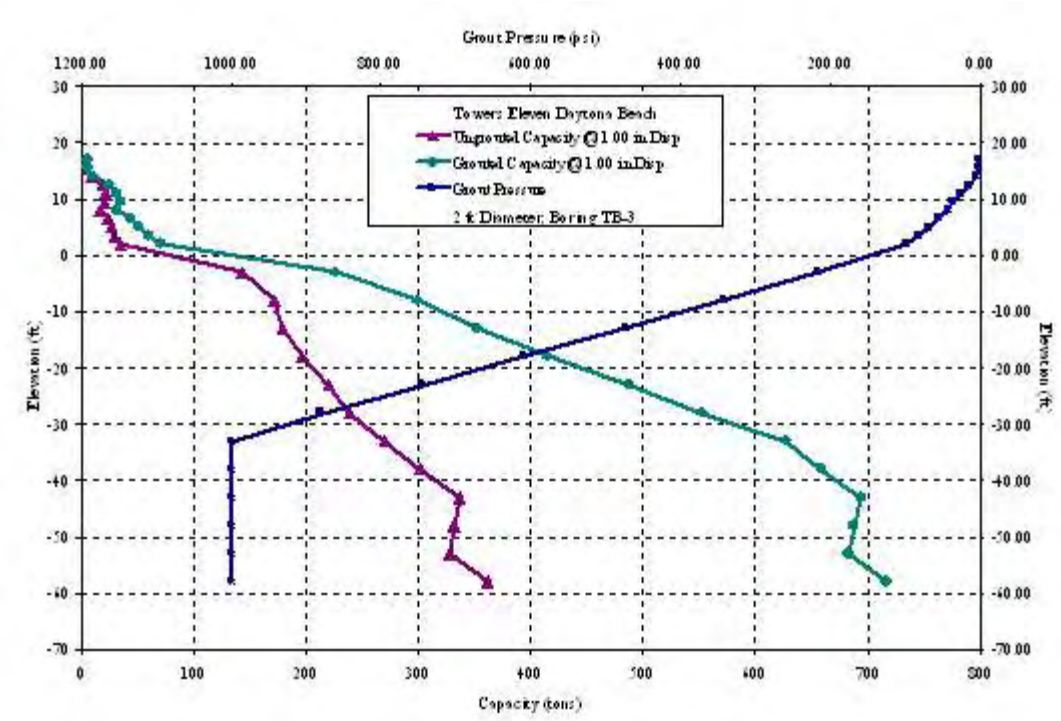


Figure C-177 Towers Eleven Condos: TB-03, 2ft Diameter

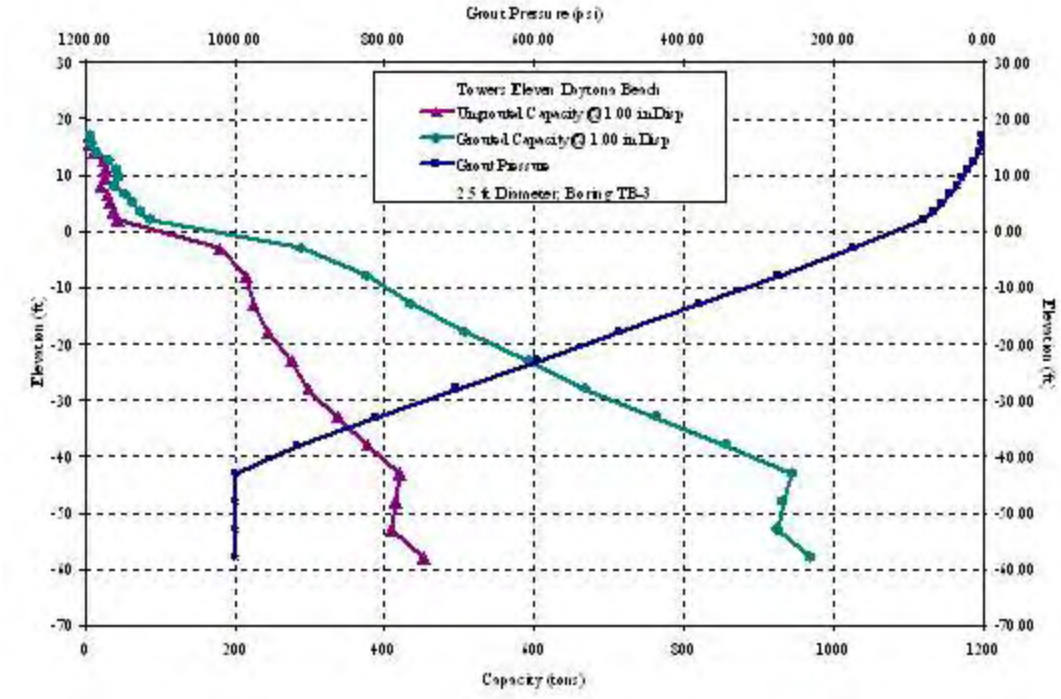


Figure C-178 Towers Eleven Condos: TB-03, 2.5ft Diameter

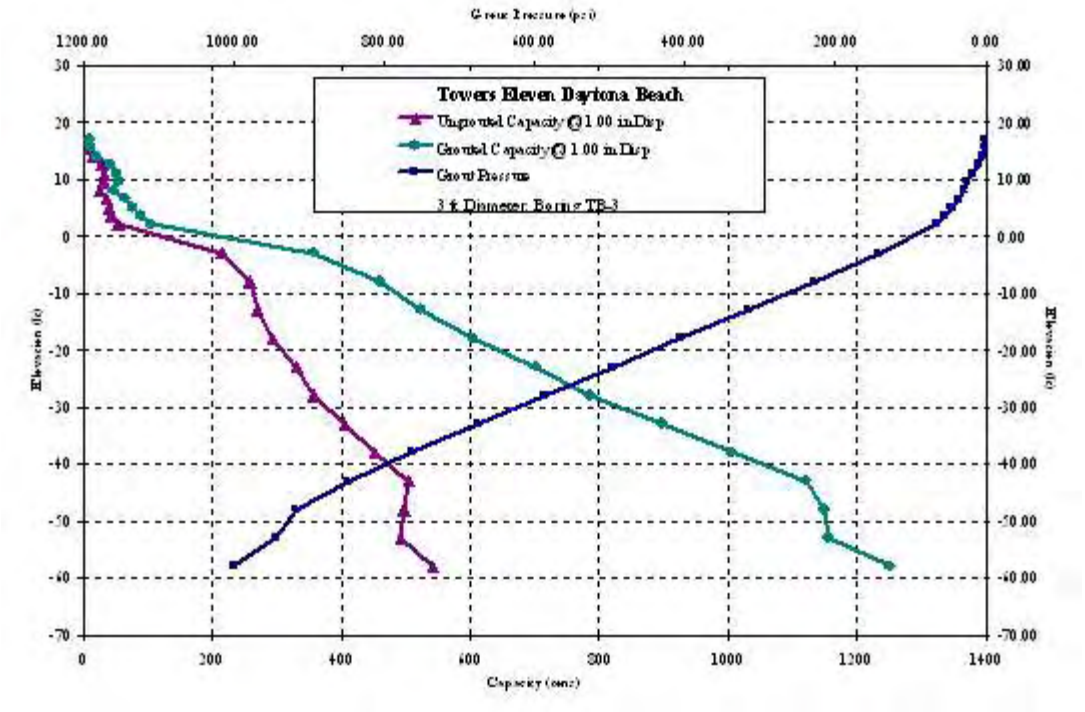


Figure C-179 Towers Eleven Condos: TB-03, 3ft Diameter

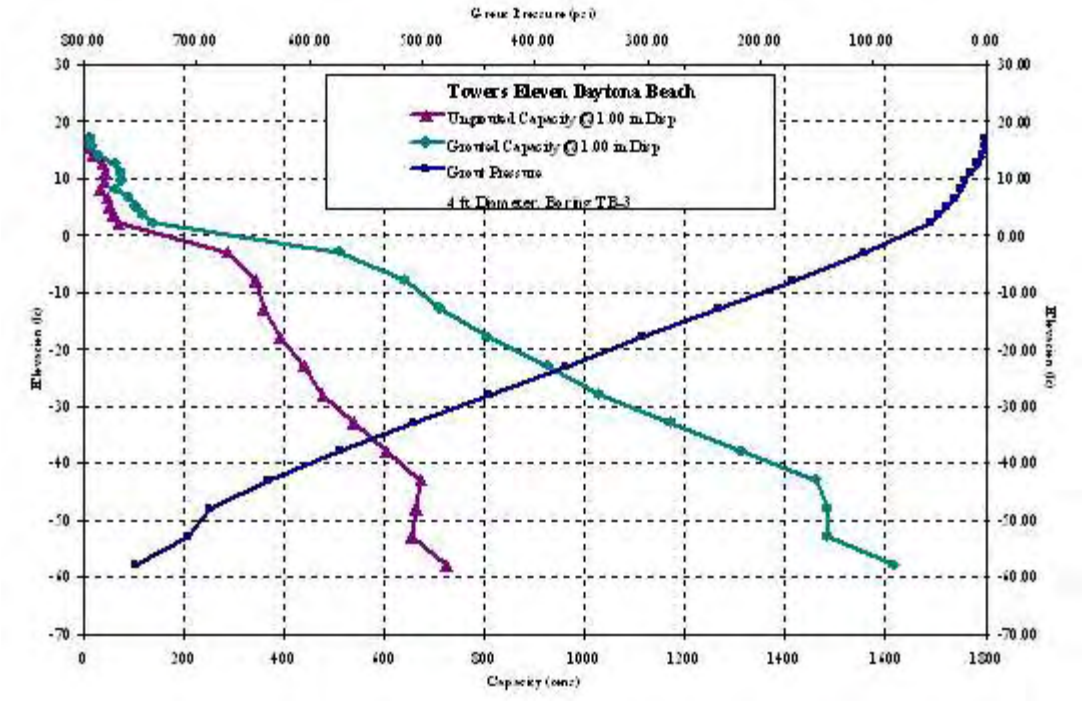


Figure C-180 Towers Eleven Condos: TB-03, 4ft Diameter

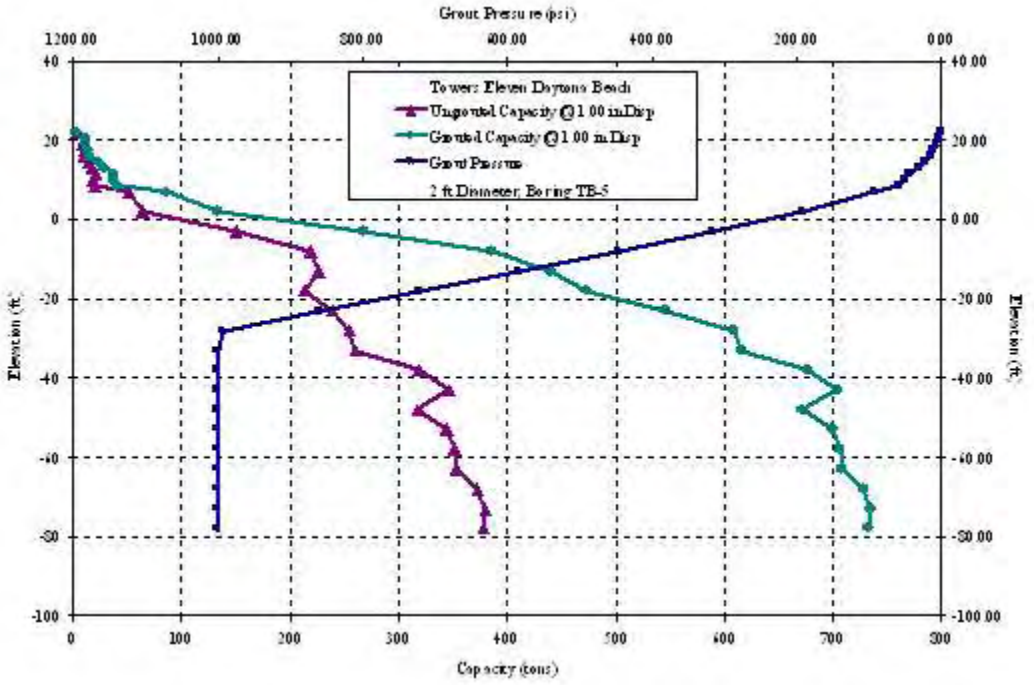


Figure C-181 Towers Eleven Condos: TB-05, 2ft Diameter

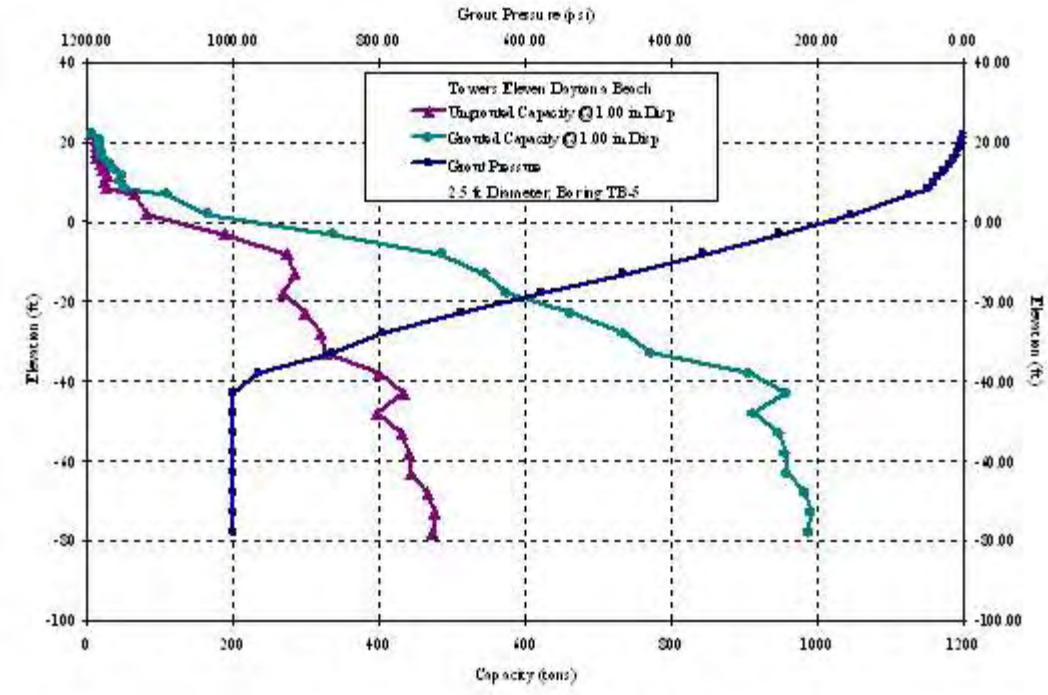


Figure C-182 Towers Eleven Condos: TB-05, 2.5ft Diameter

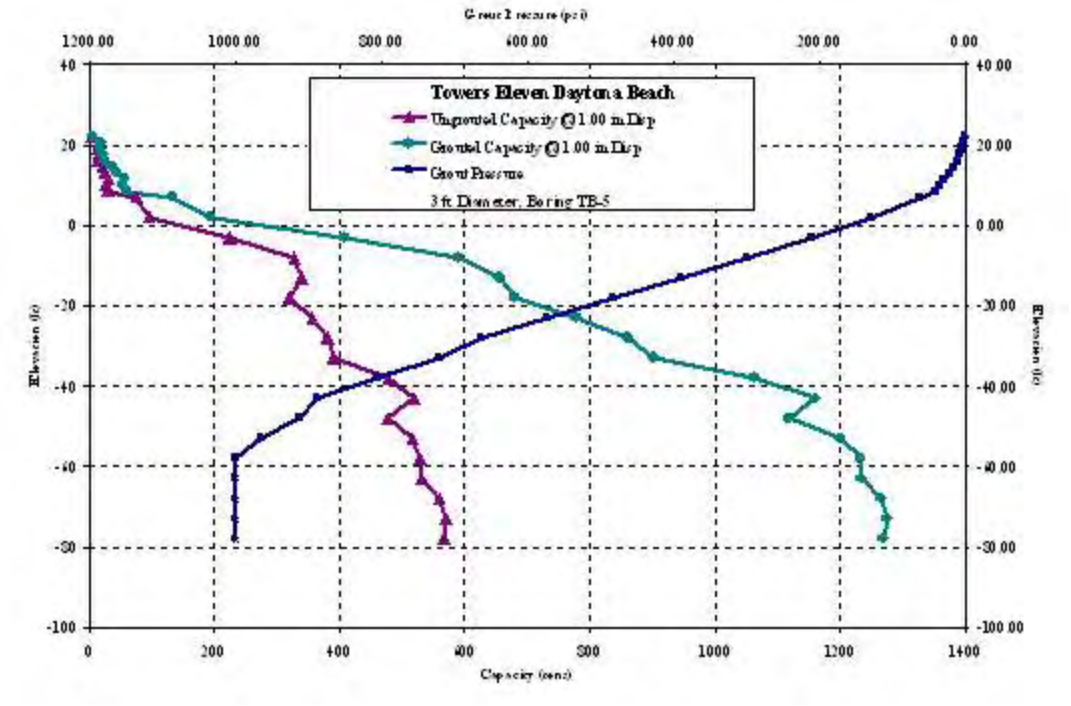


Figure C-183 Towers Eleven Condos: TB-05, 3ft Diameter

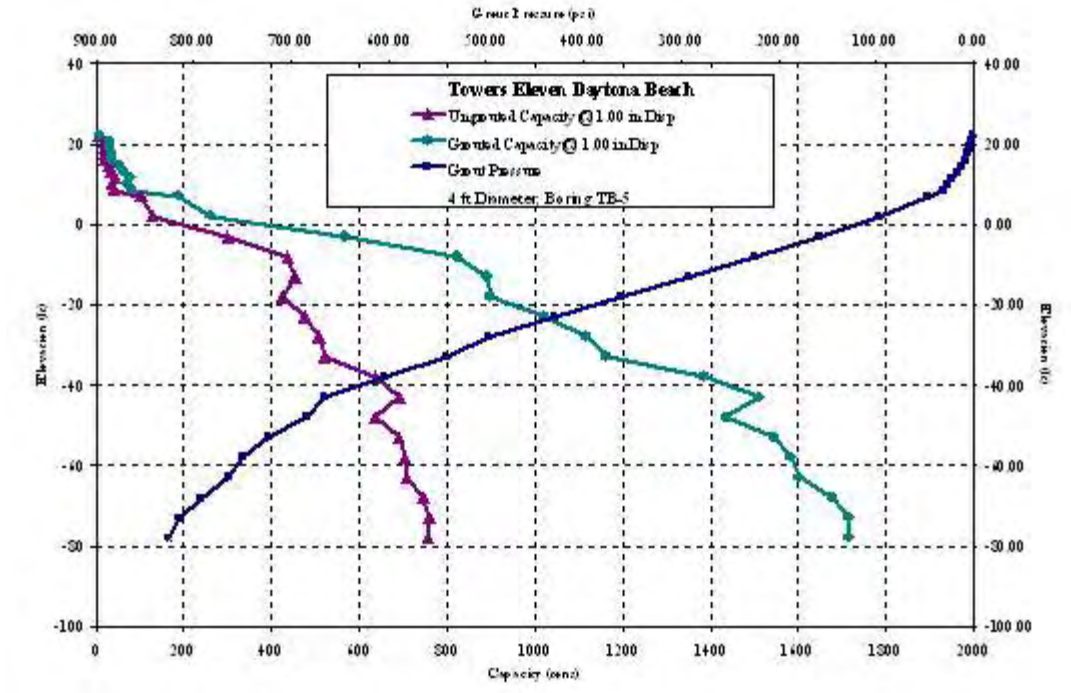


Figure C-184 Towers Eleven Condos: TB-05, 4ft Diameter

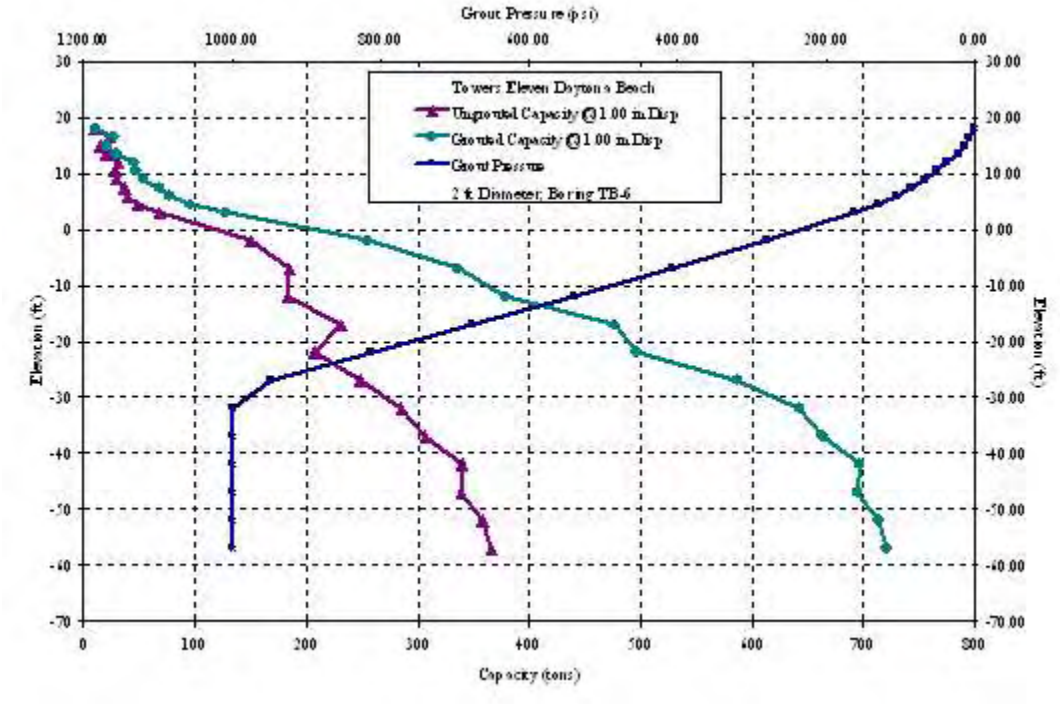


Figure C-185 Towers Eleven Condos: TB-6, 2ft Diameter

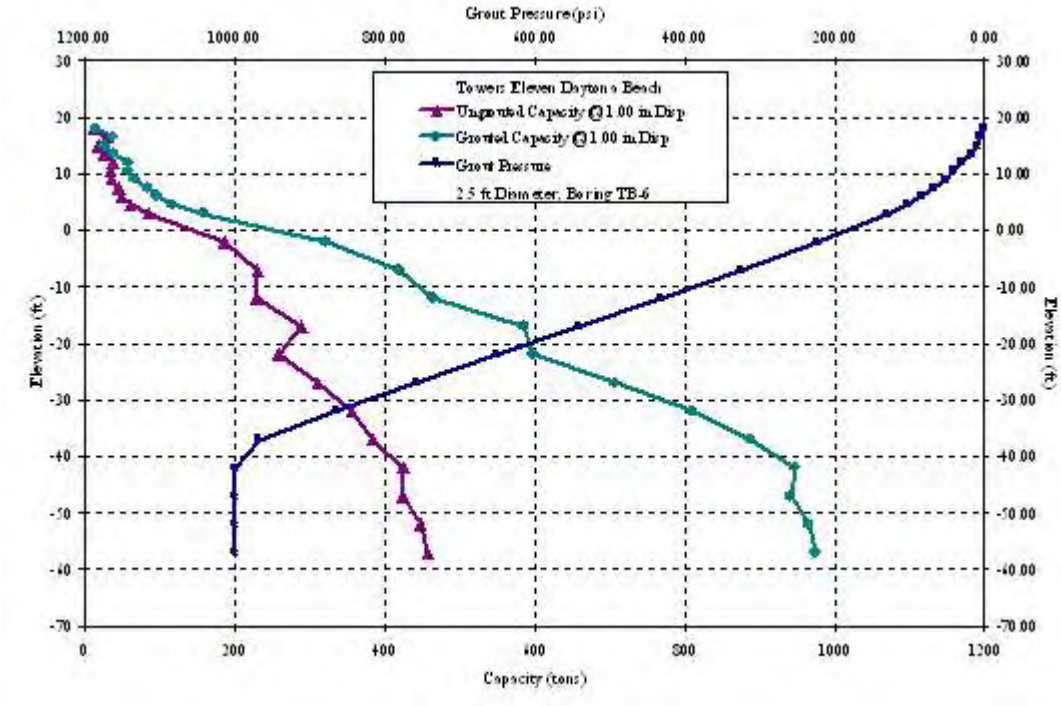


Figure C-186 Towers Eleven Condos: TB-6, 2.5ft Diameter

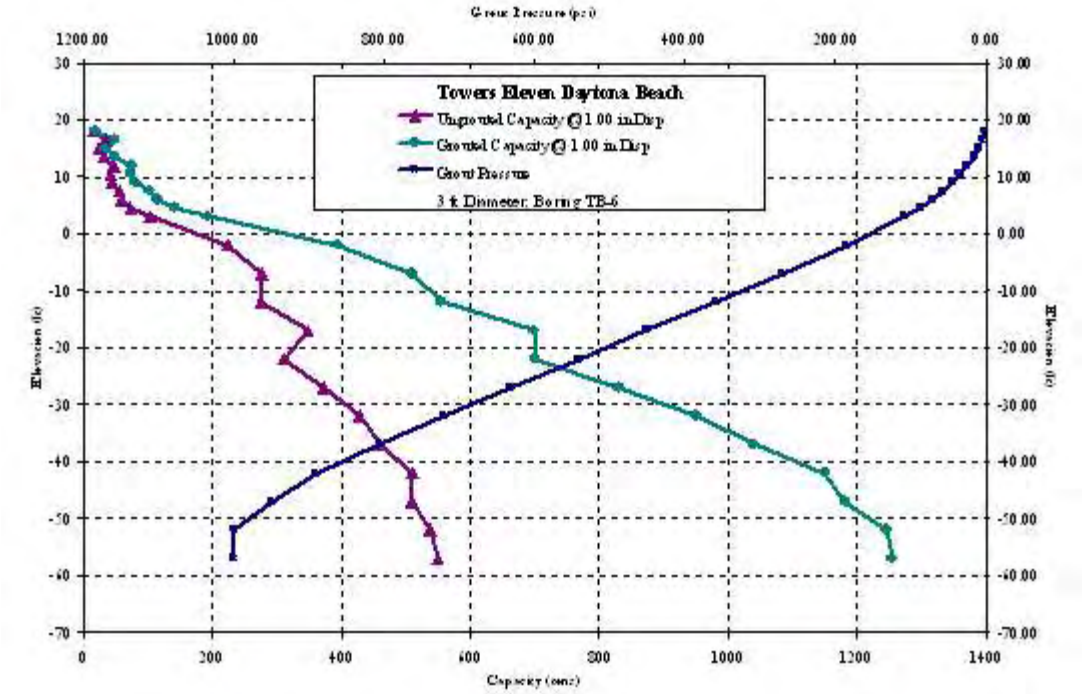


Figure C-187 Towers Eleven Condos: TB-6, 3ft Diameter

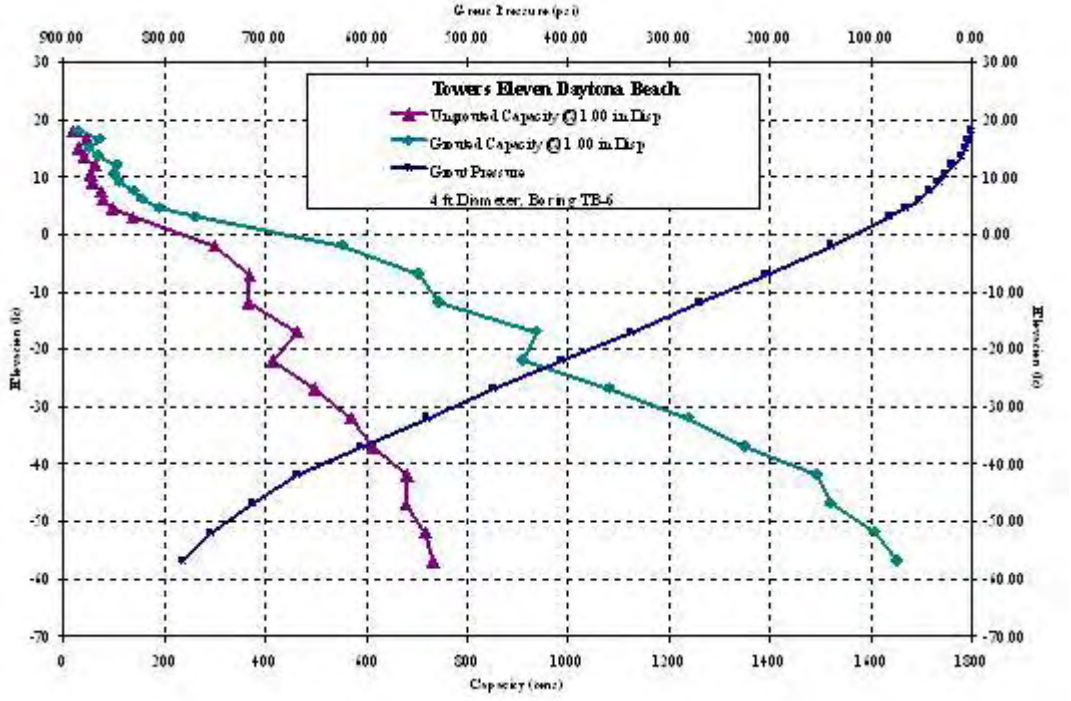


Figure C-188 Towers Eleven Condos: TB-6, 4ft Diameter

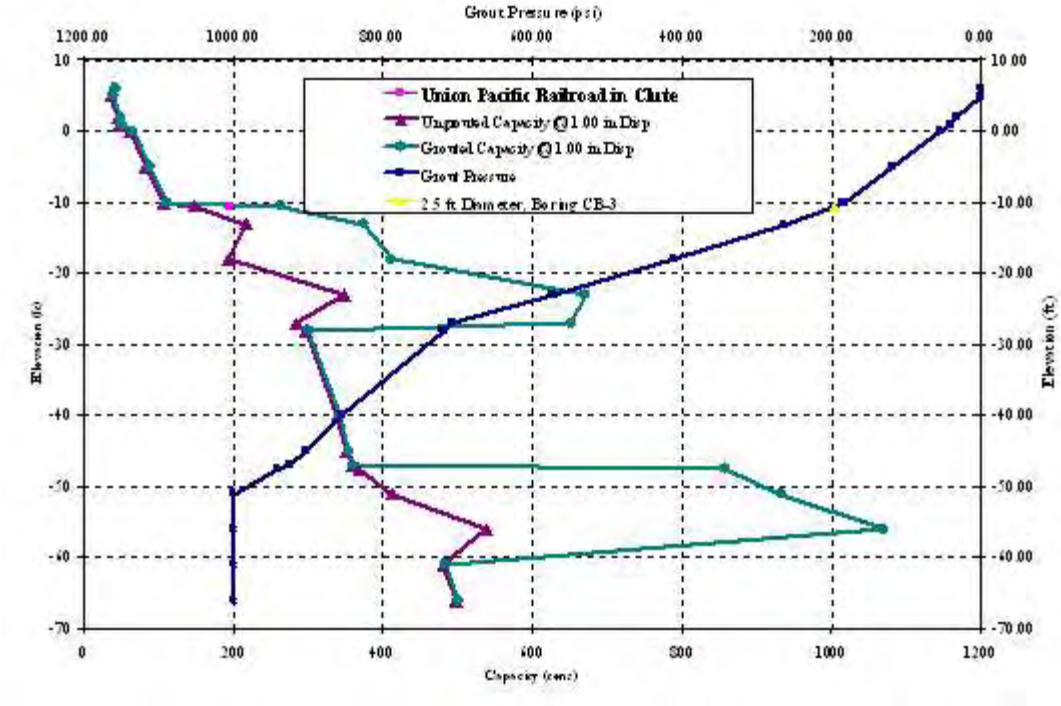


Figure C-189 Union Pacific Railroad: CB-3, 2.5ft Diameter

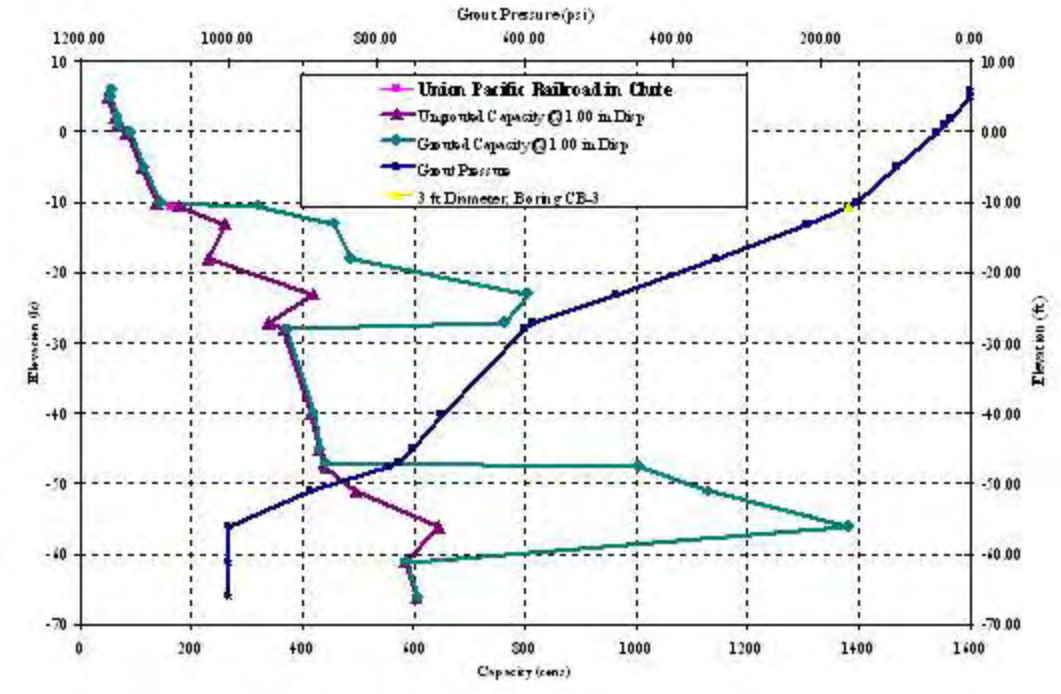


Figure C-190 Union Pacific Railroad: CB-3, 3ft Diameter

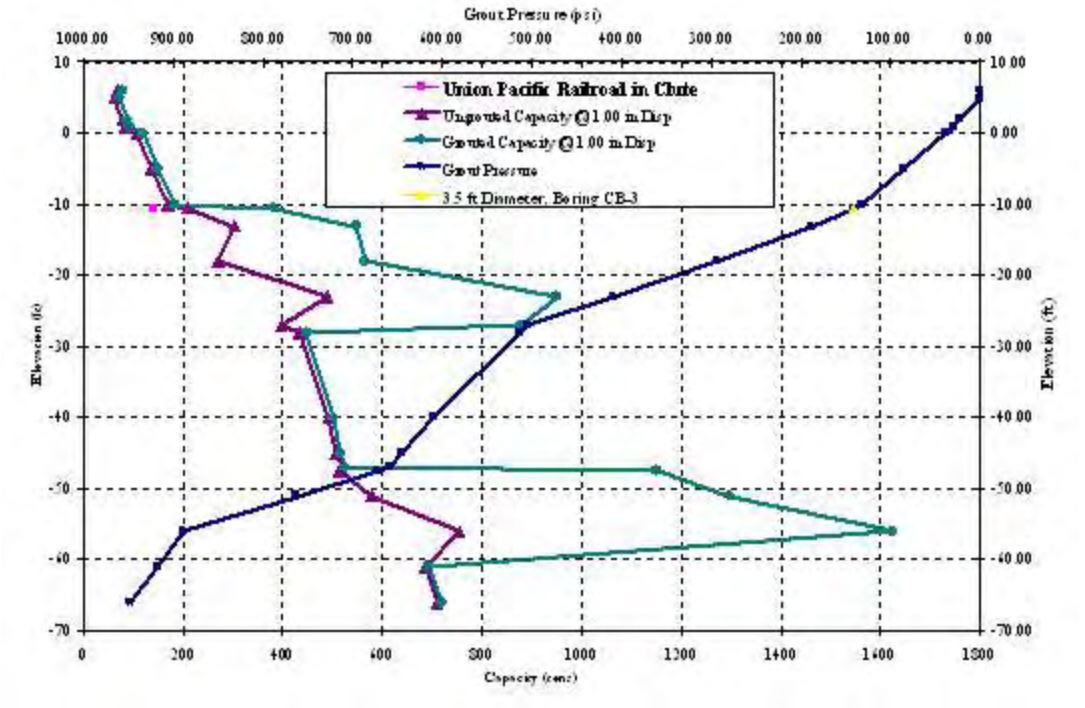


Figure C-191 Union Pacific Railroad: CB-3, 3.5ft Diameter

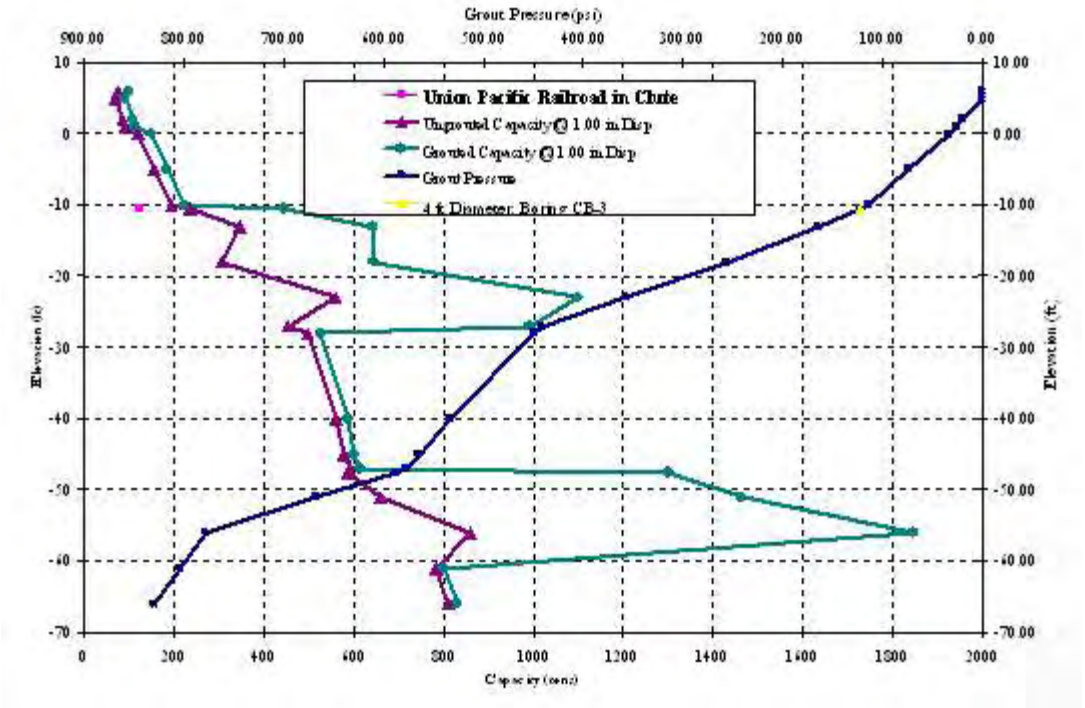


Figure C-192 Union Pacific Railroad: CB-3, 4ft Diameter

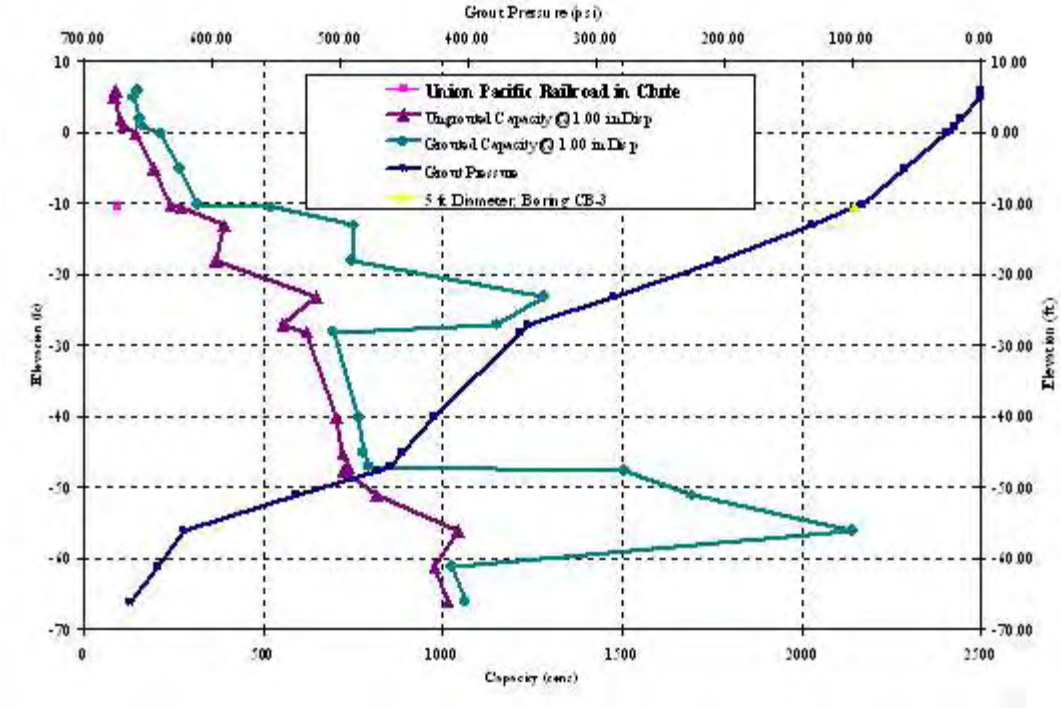


Figure C-193 Union Pacific Railroad: CB-3, 5ft Diameter

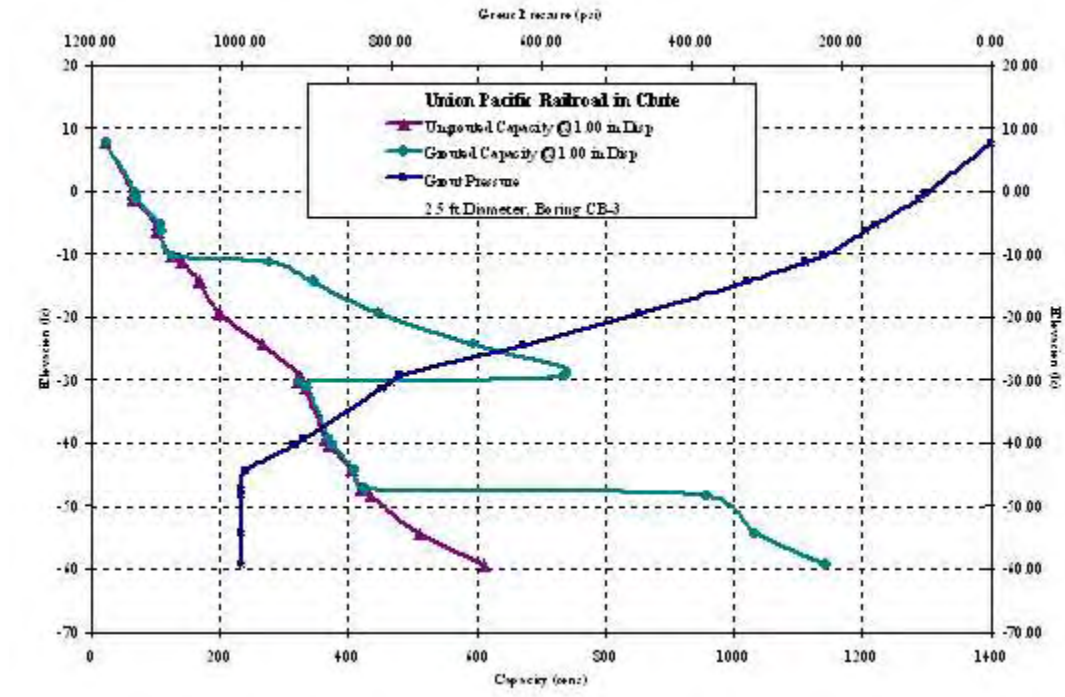


Figure C-194 Union Pacific Railroad: CB-4, 2.5ft Diameter

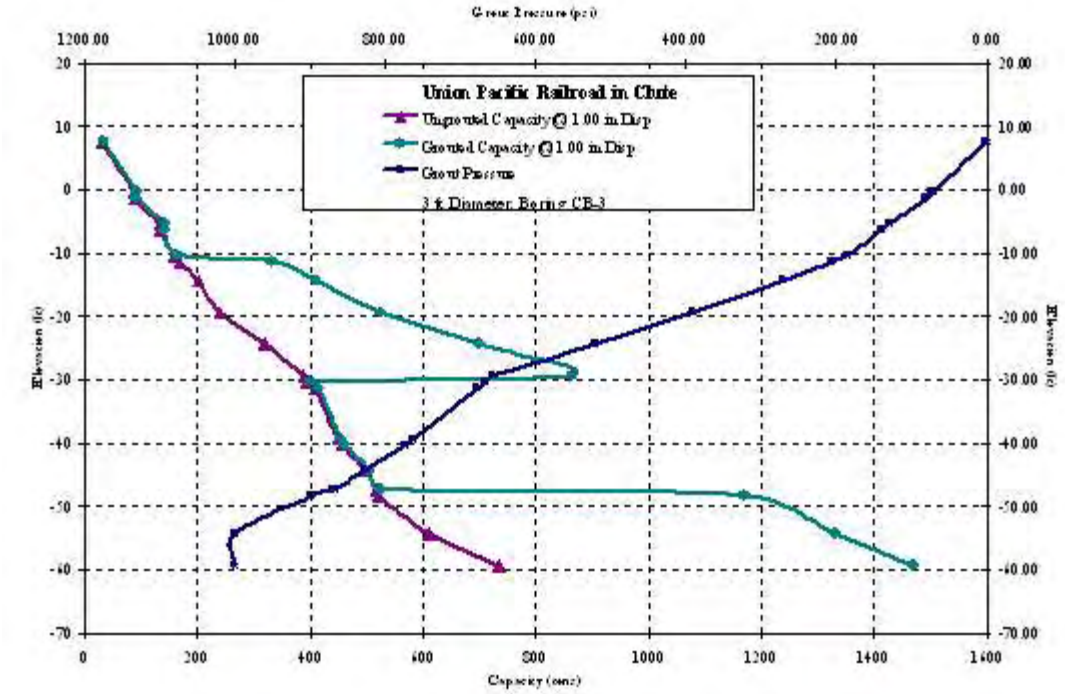


Figure C-195 Union Pacific Rail Road: CB-4, 3ft Diameter

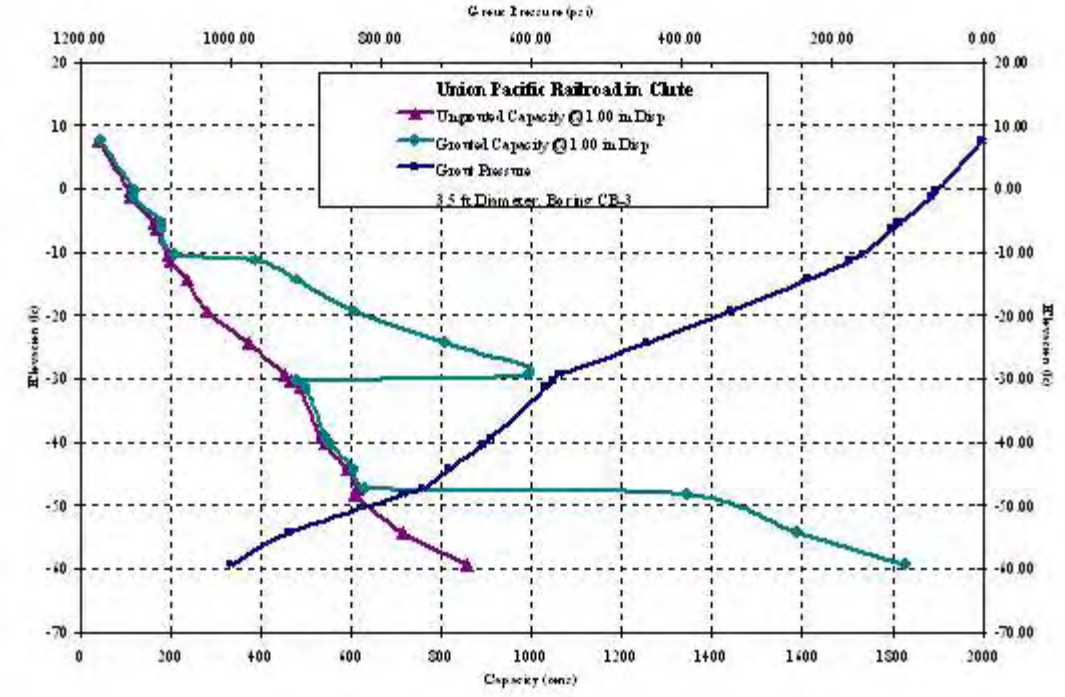


Figure C-196 Union Pacific Railroad: CB-4, 3.5ft Diameter

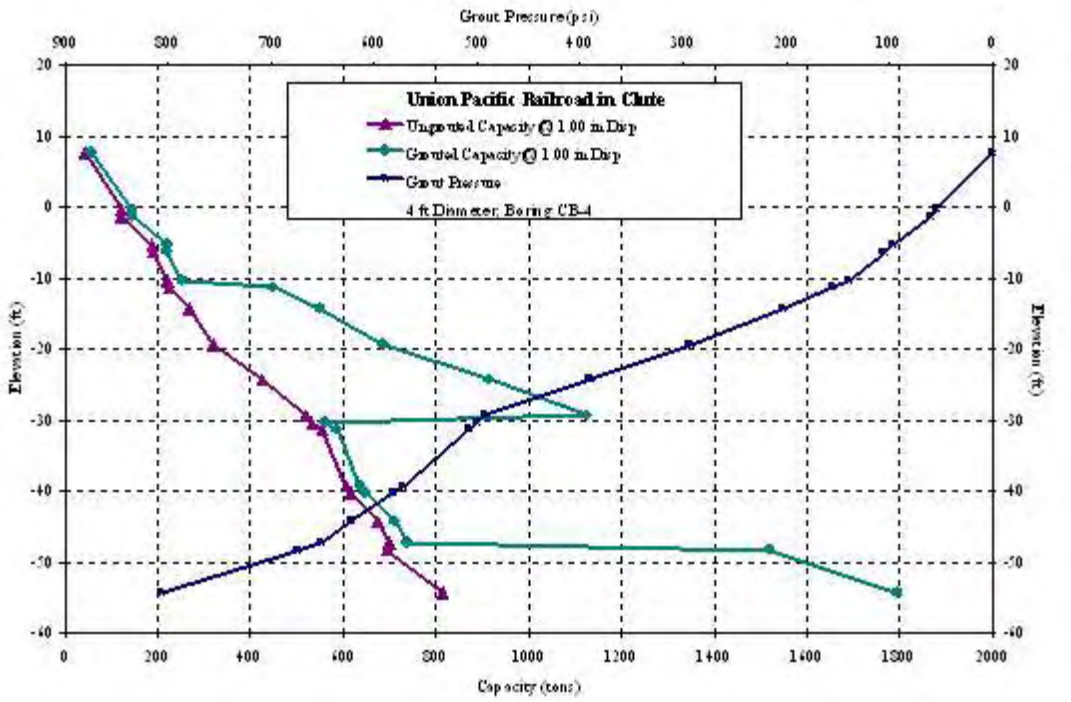


Figure C-197 Union Pacific Railroad: CB-4, 4ft Diameter

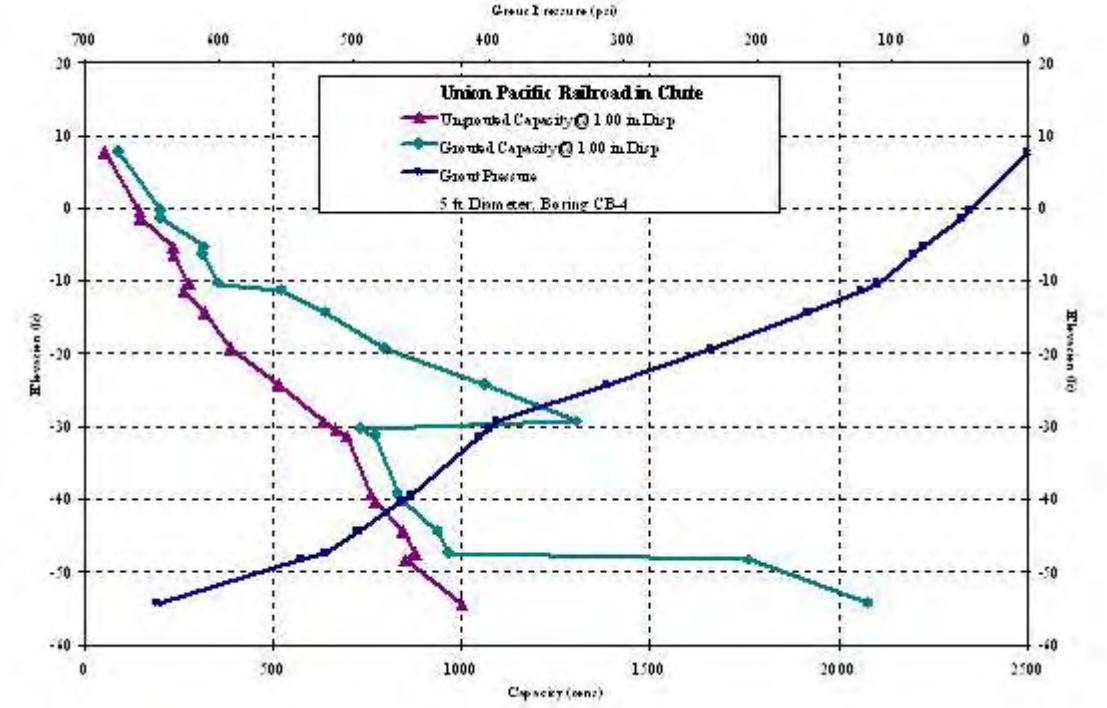


Figure C-198 Union Pacific Railroad: CB-4, 5ft Diameter

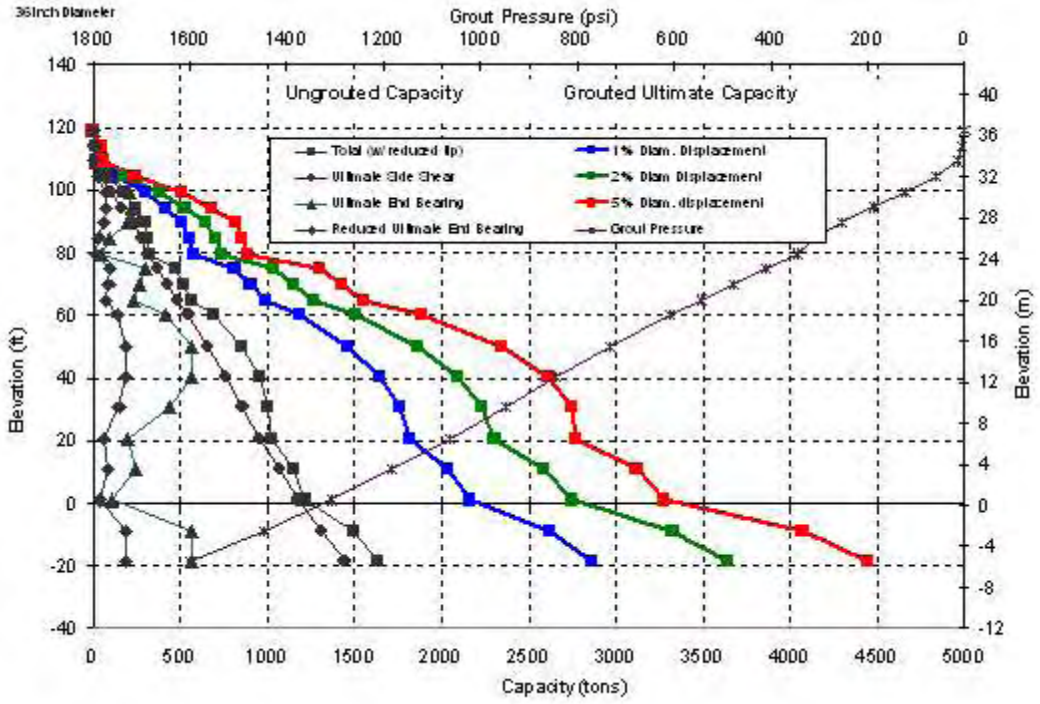


Figure C-199 US 82 / Mississippi River Bridge: B-7, 3ft Diameter

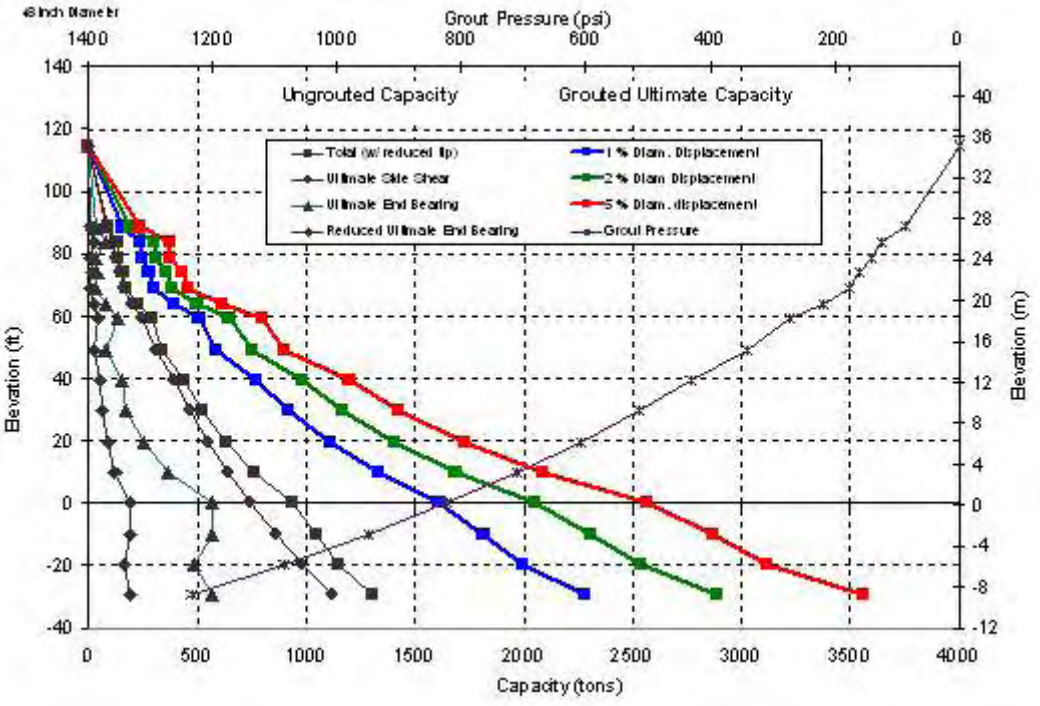


Figure C-200 US 82 / Mississippi River Bridge: B-7, 4ft Diameter

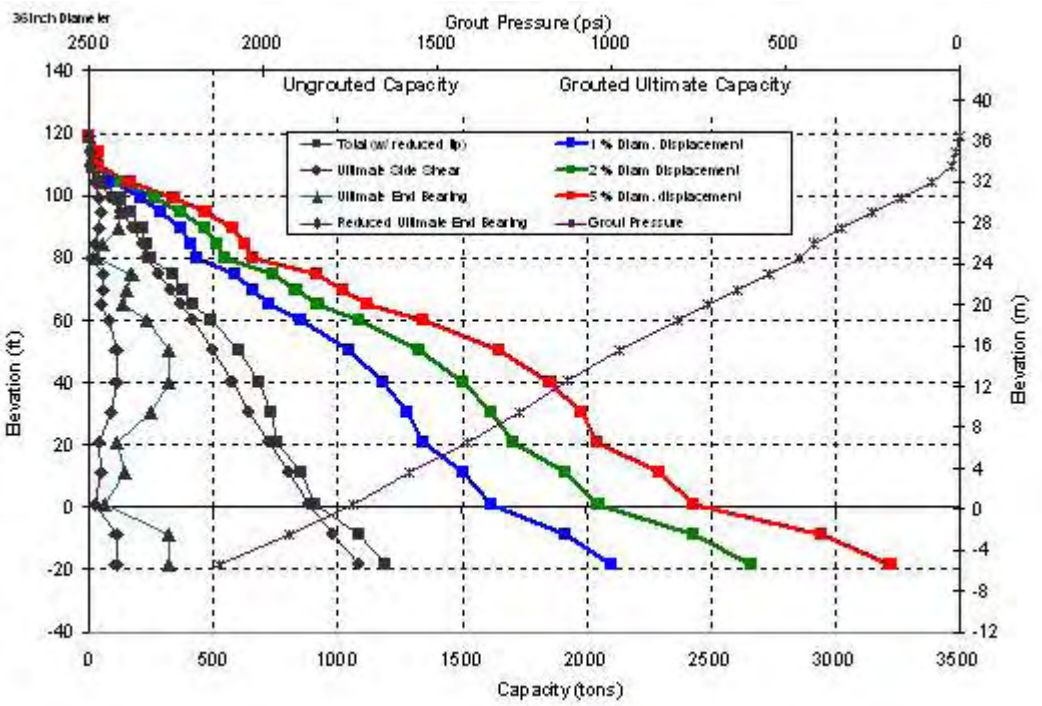


Figure C-201 US 82 / Mississippi River Bridge: B-22, 3ft Diameter

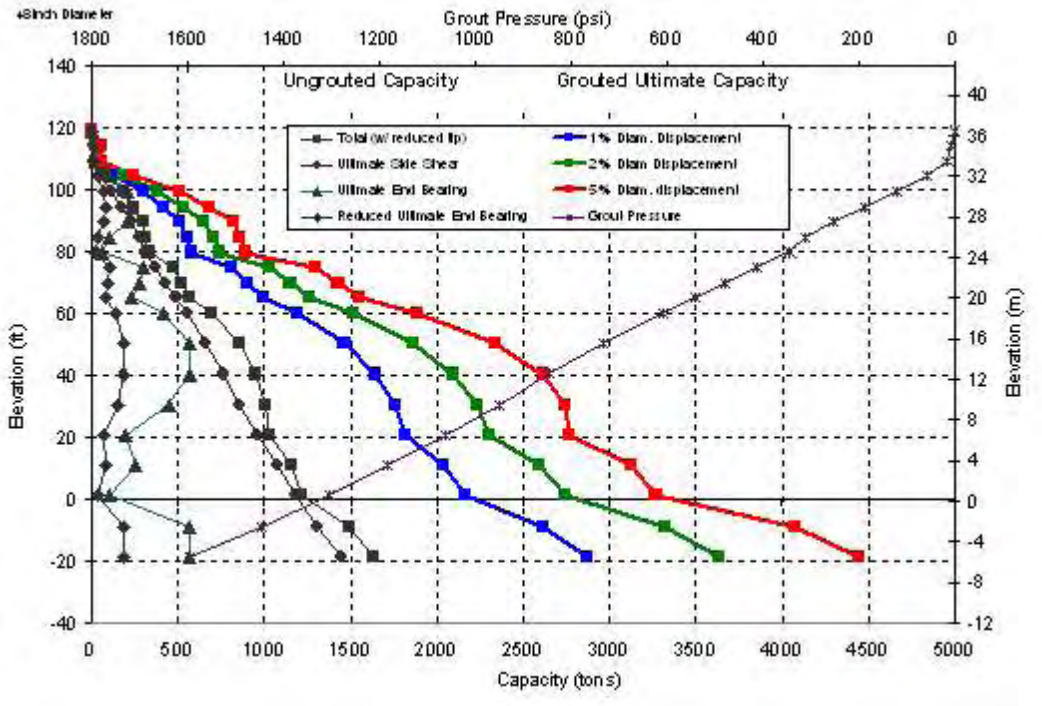


Figure C-202 US 82 / Mississippi River Bridge: B-22, 4ft Diameter

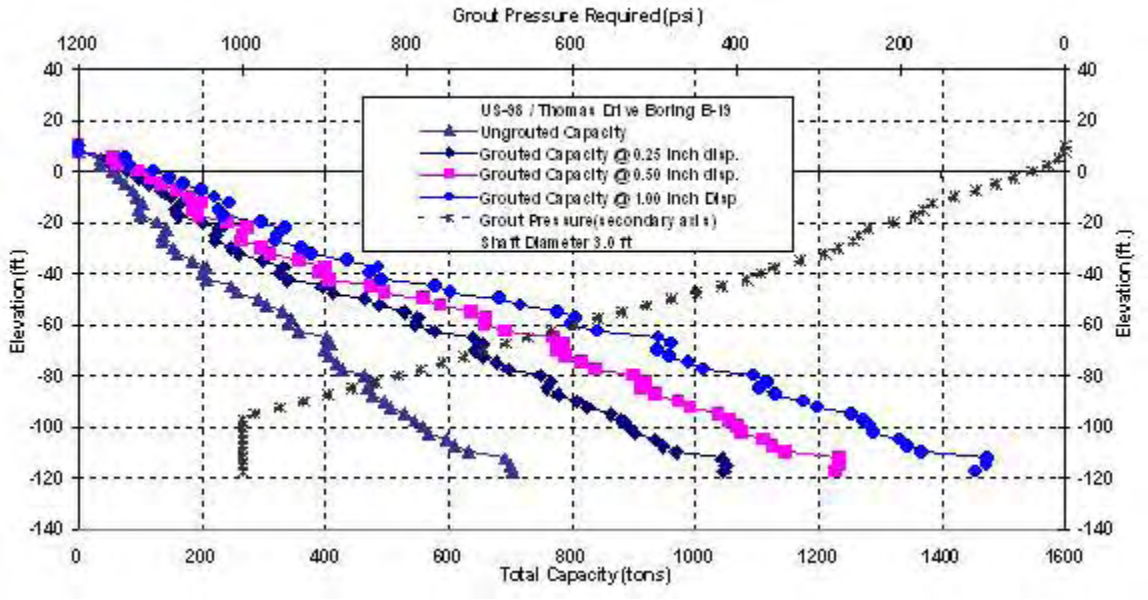


Figure C-203 US 98: B-19, ft Diameter

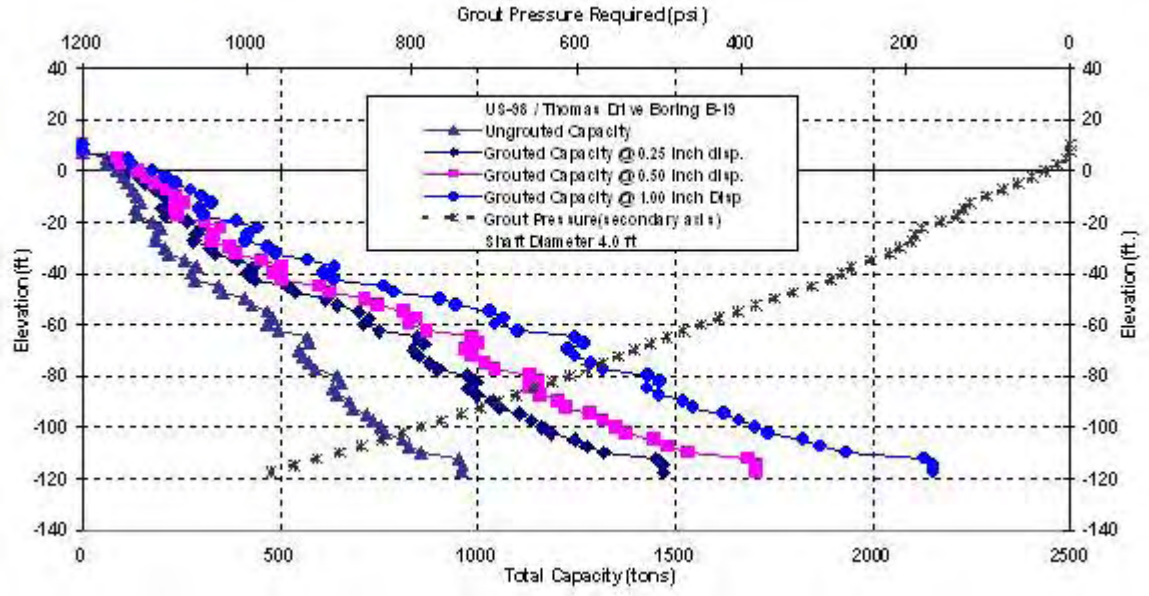


Figure C-204 US 98: B-19, 4ft Diameter

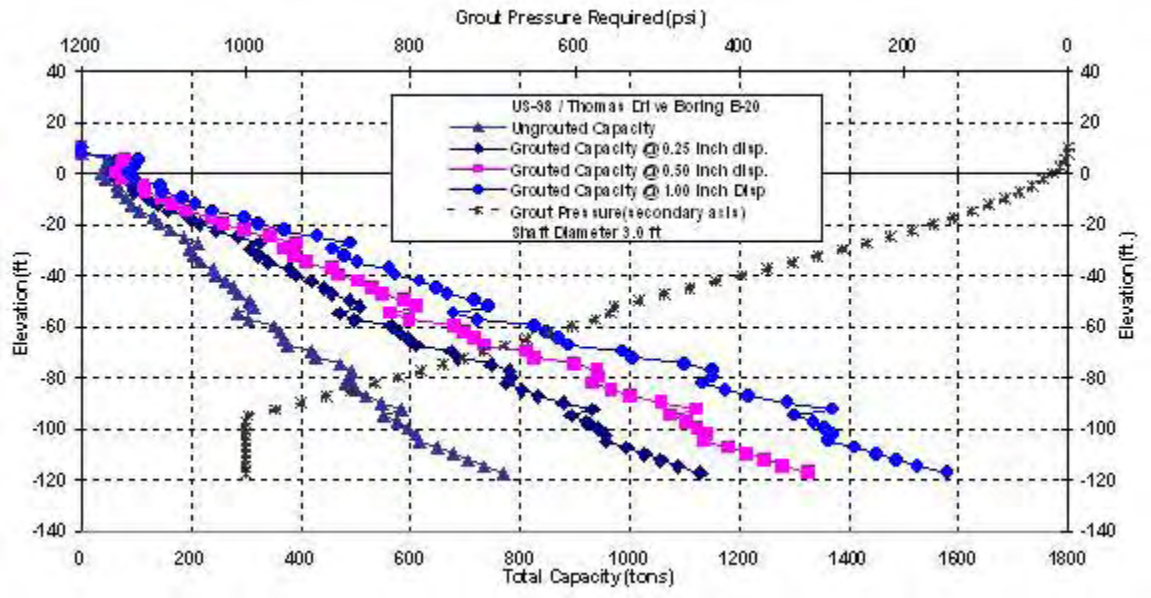


Figure C-205 US 98: B-20, 3ft Diameter

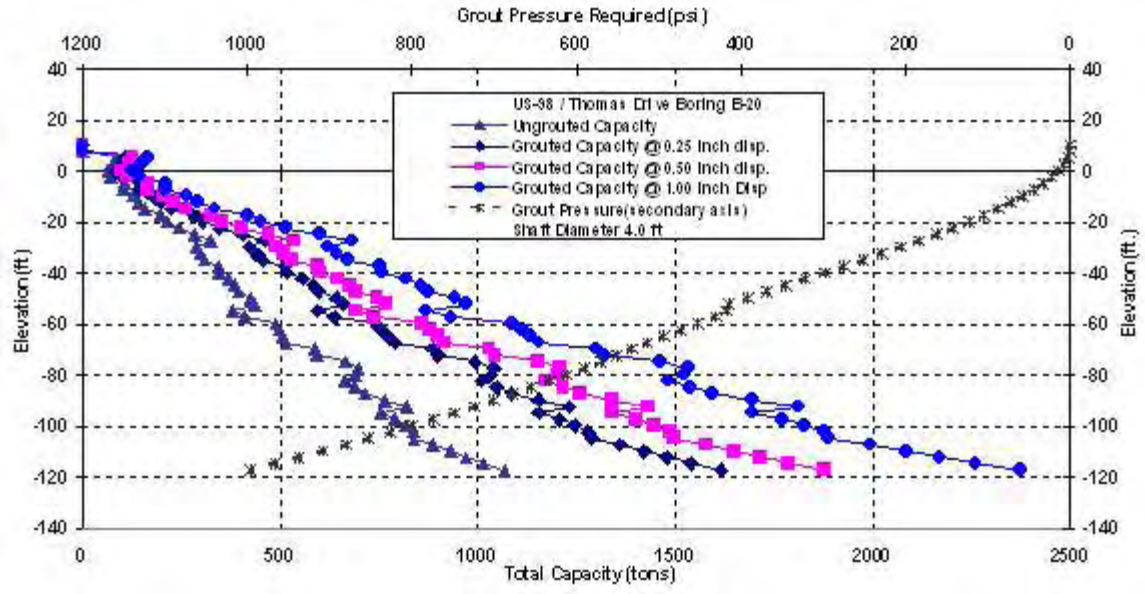


Figure C-206 US 98: B-20, 4ft Diameter

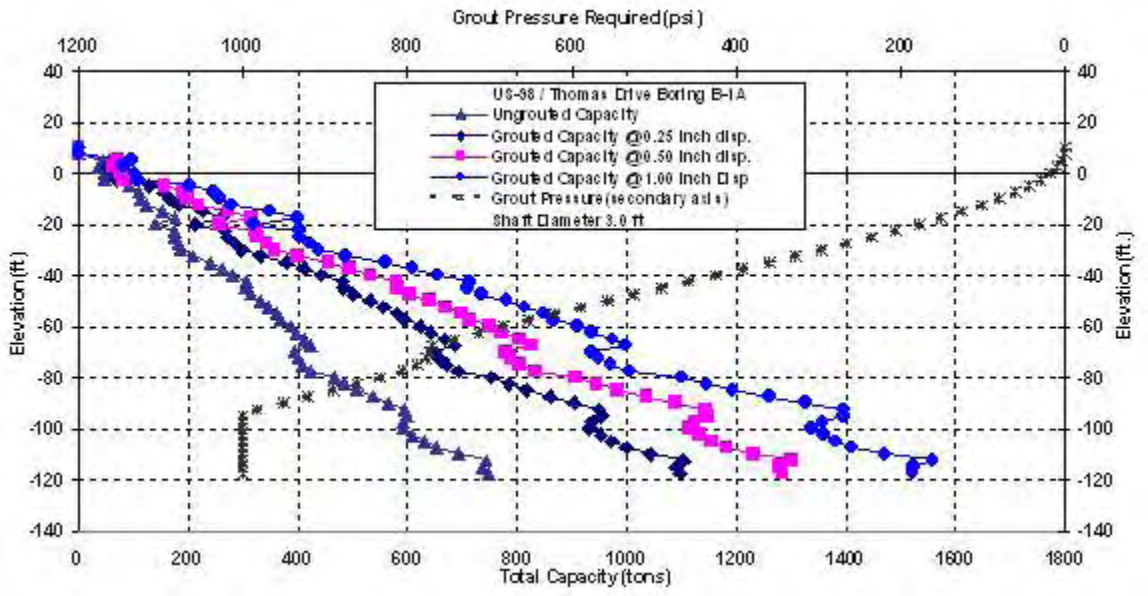


Figure C-207 US 98: B-1A, 3ft Diameter

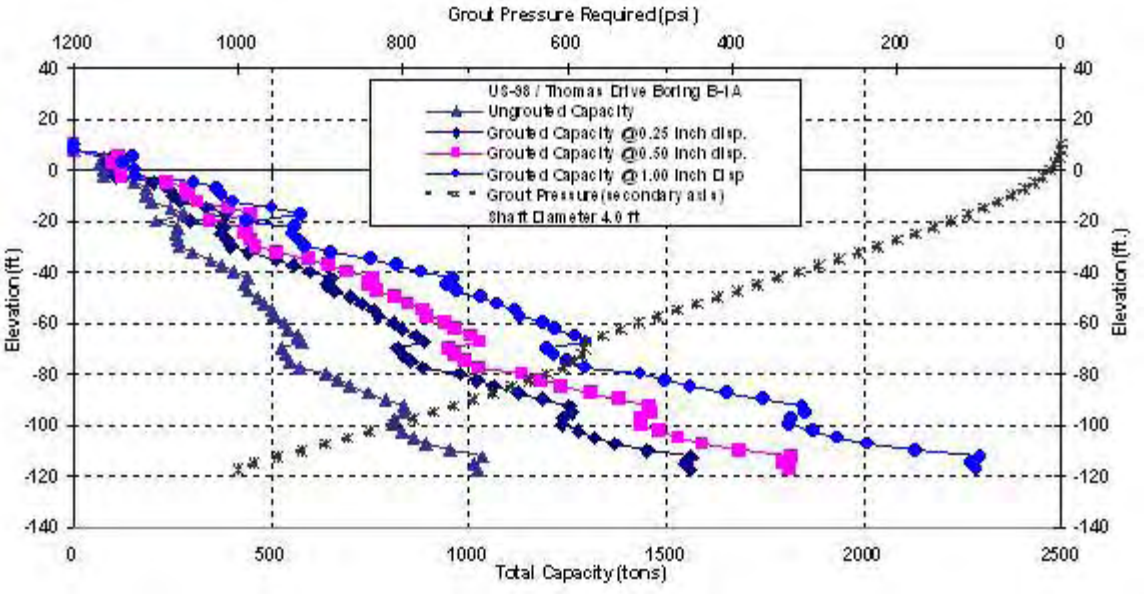


Figure C-208 US 98: B-1A, 4ft Diameter

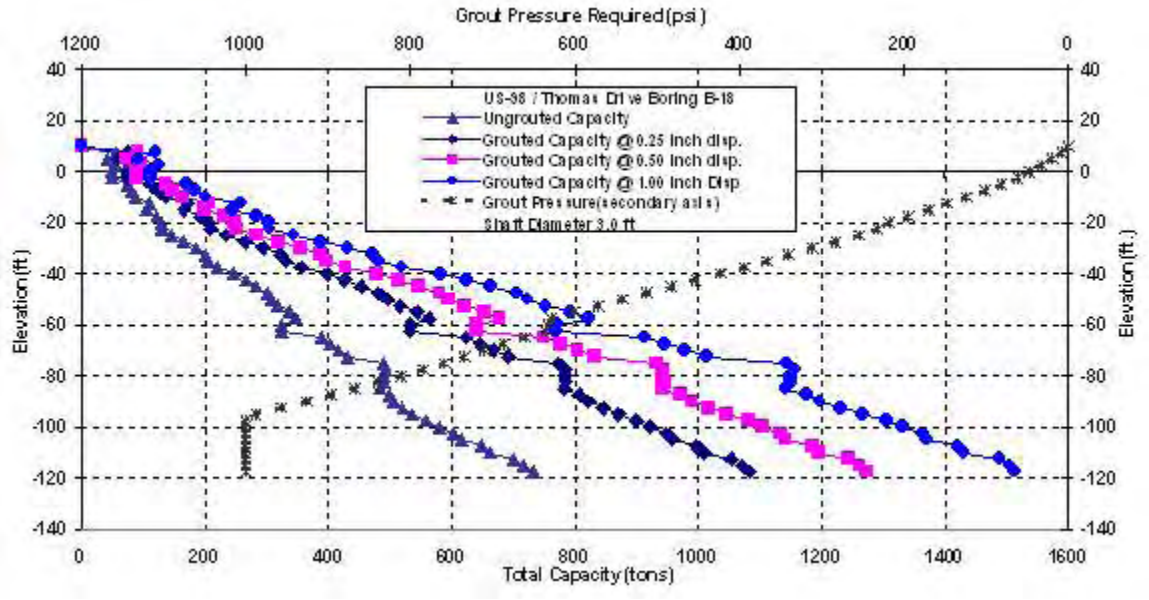


Figure C-209 US 98: B-18, 3ft Diameter

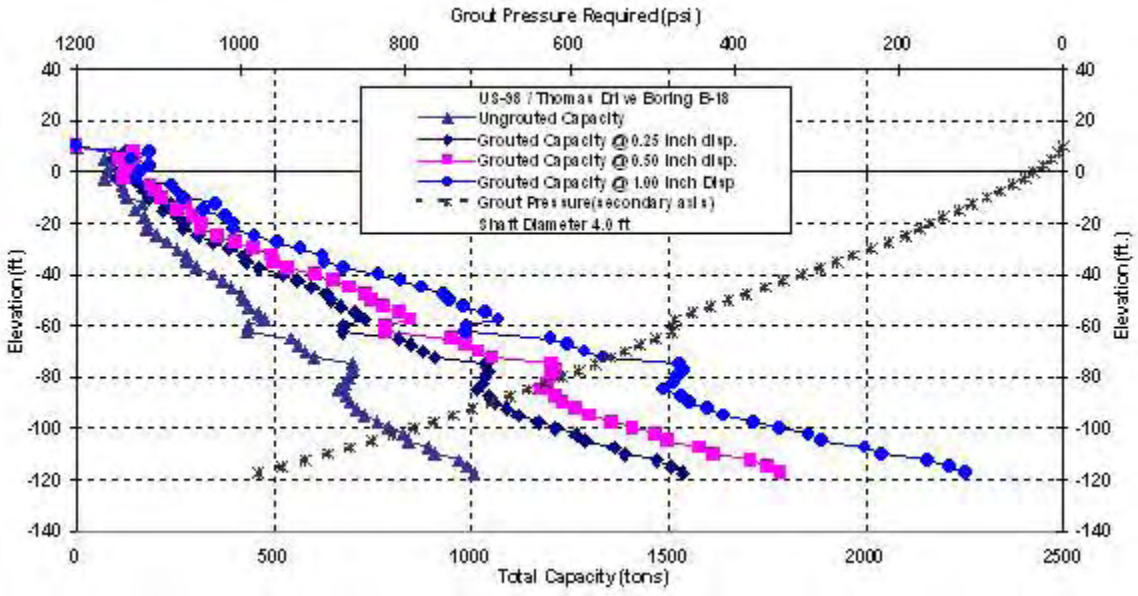


Figure C-210 US 98: B-18, 4ft Diameter

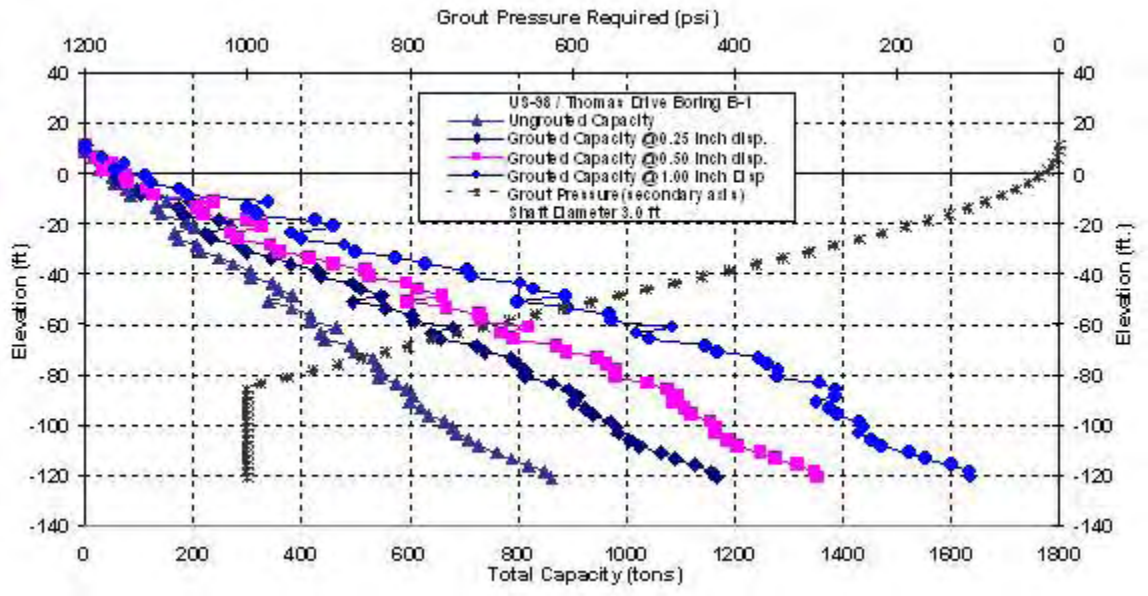


Figure C-211 US 98: B-1, 3ft Diameter

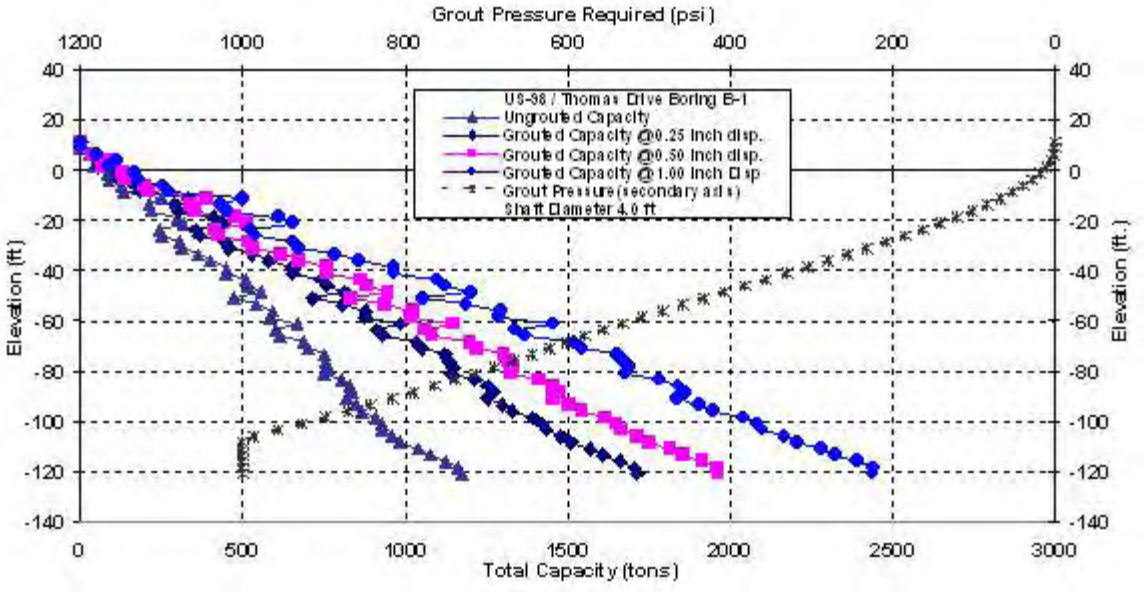


Figure C-212 US 98: B-1, 4ft Diameter

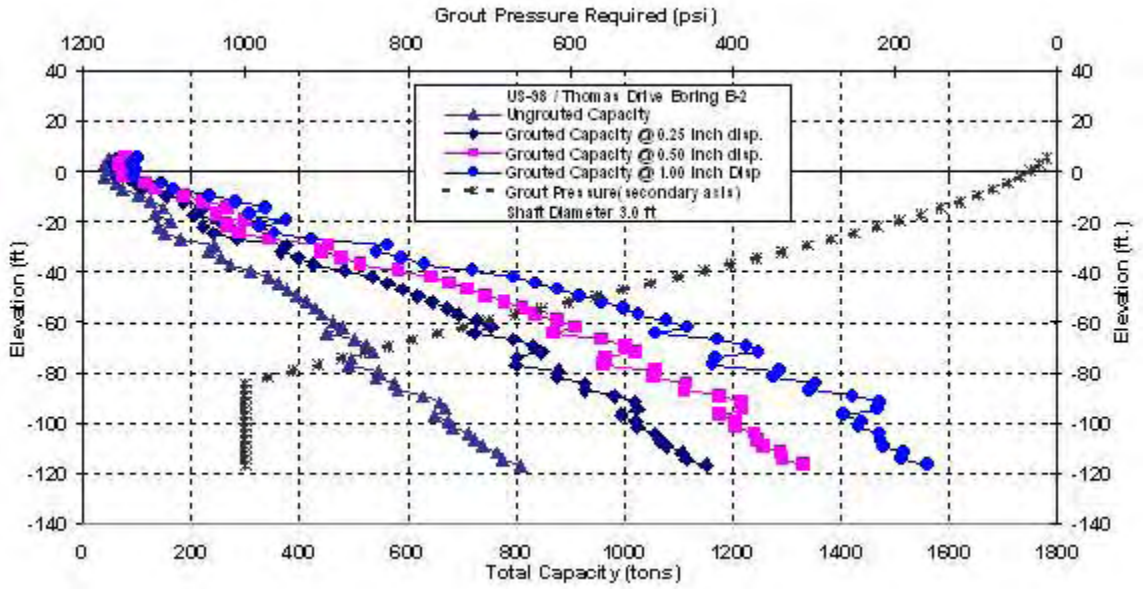


Figure C-213 US 98: B-2, 3ft Diameter

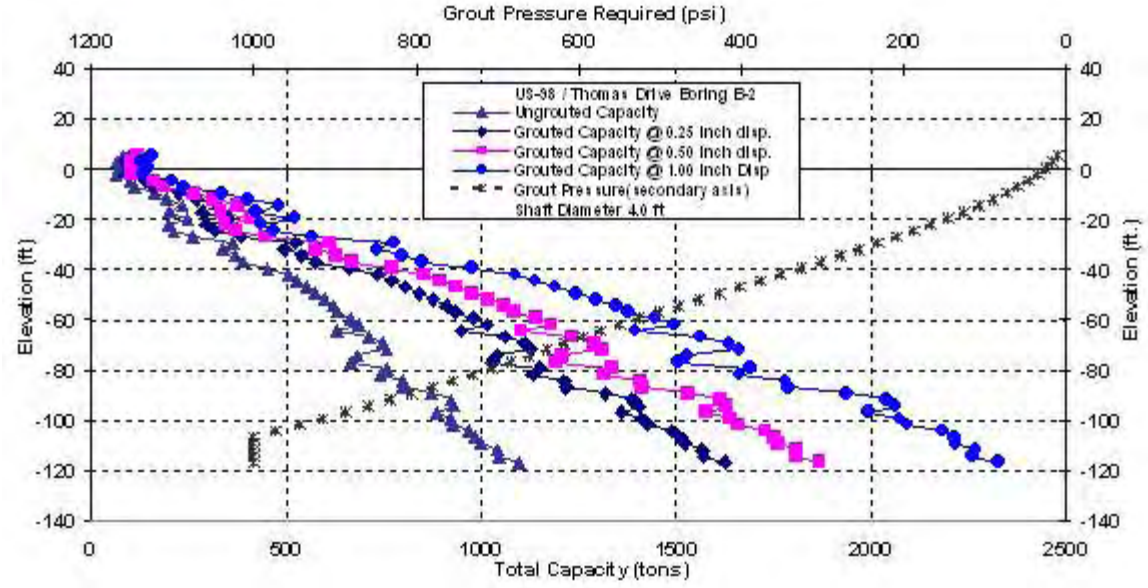


Figure C-214 US 98: B-2, 4ft Diameter

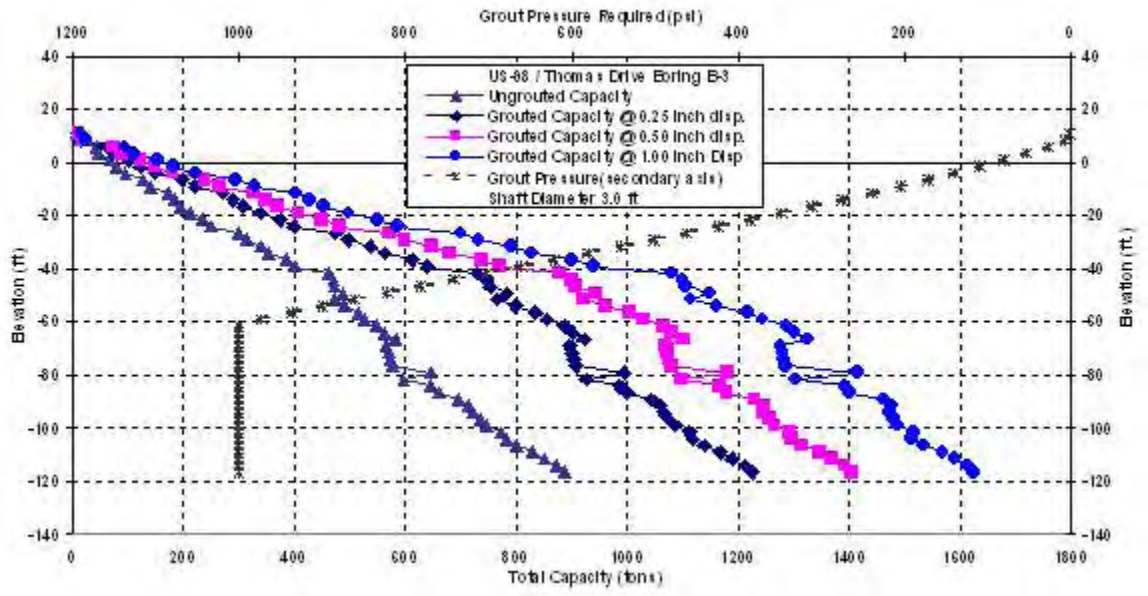


Figure C-215 US 98: B-3, 3ft Diameter

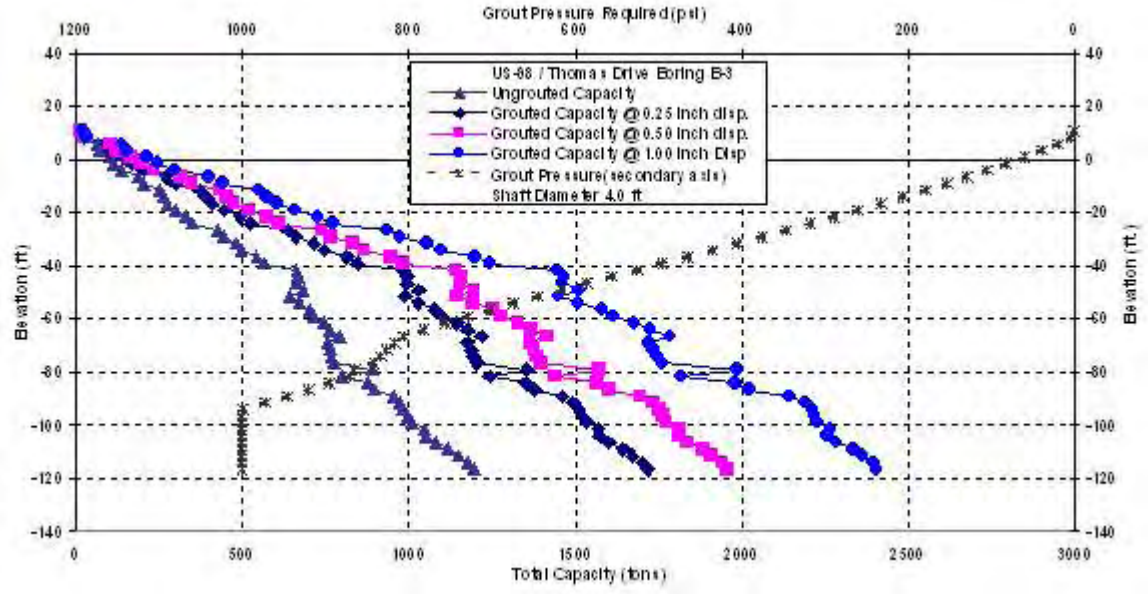


Figure C-216 US 98: B-3, 4ft Diameter

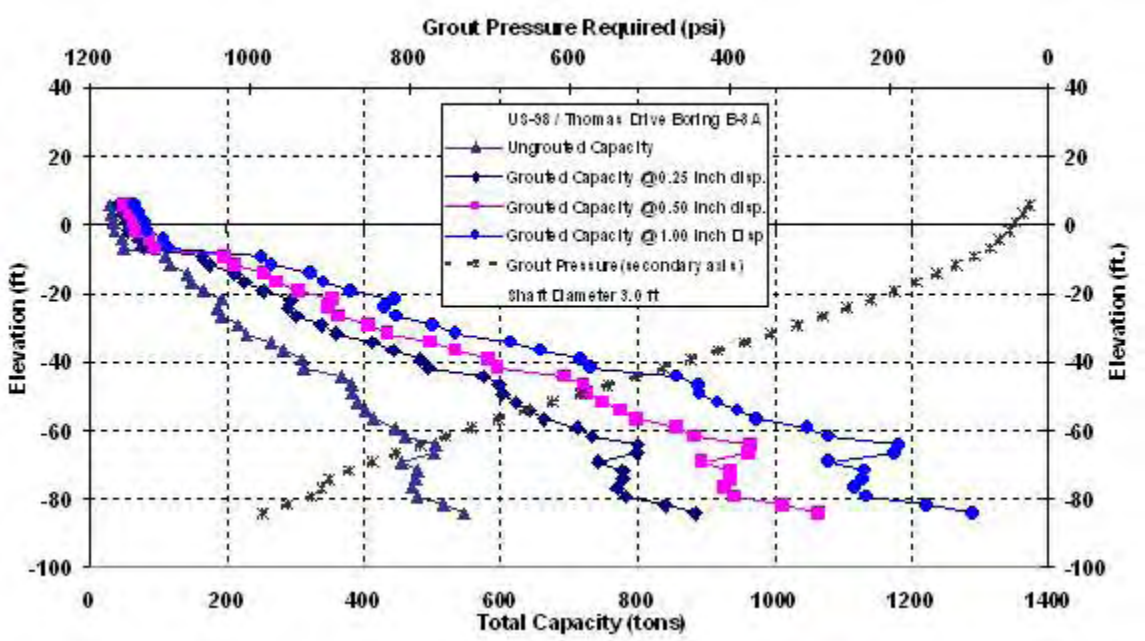


Figure C-217 US 98: B-3A, 3ft Diameter

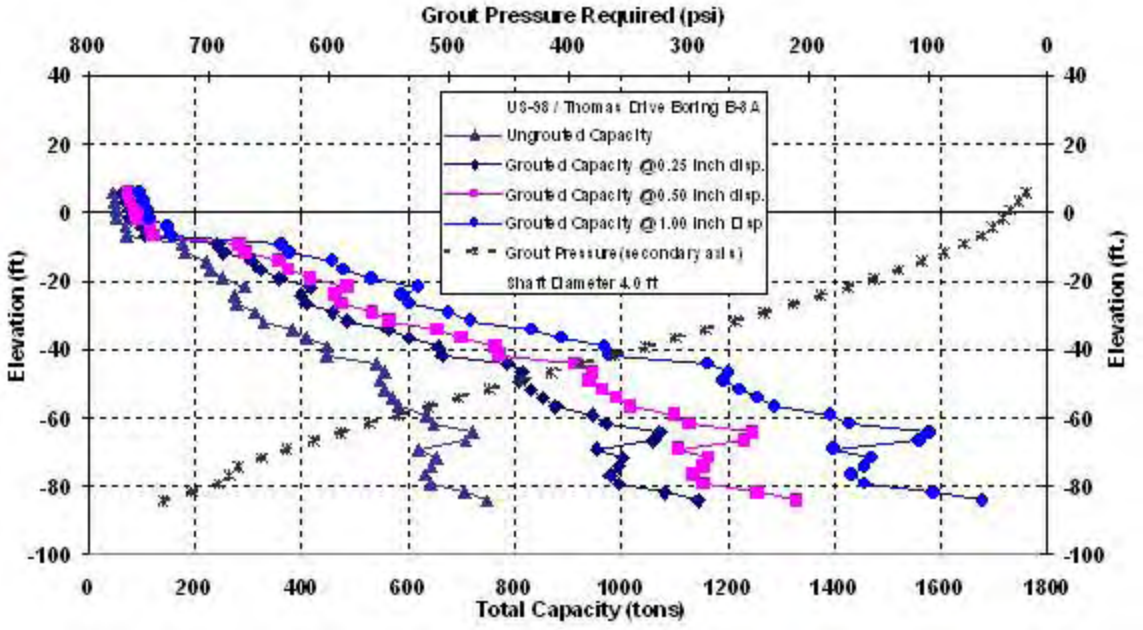


Figure C-218 US 98: B-3A, 4ft Diameter

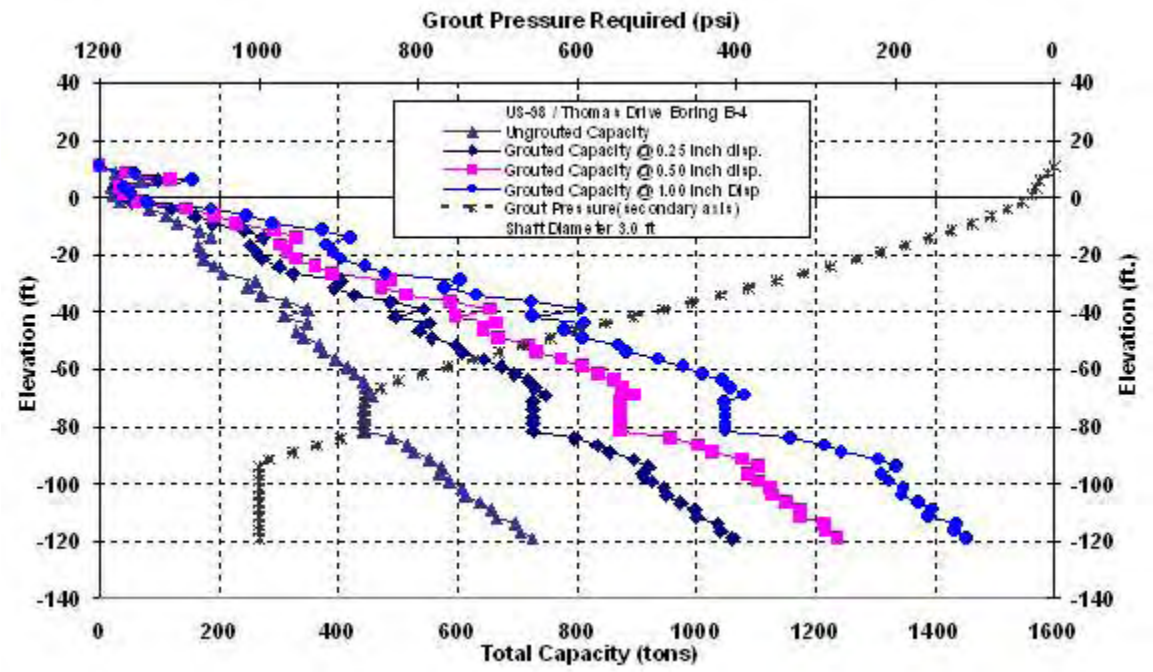


Figure C-219 US 98: B-4, 3ft Diameter

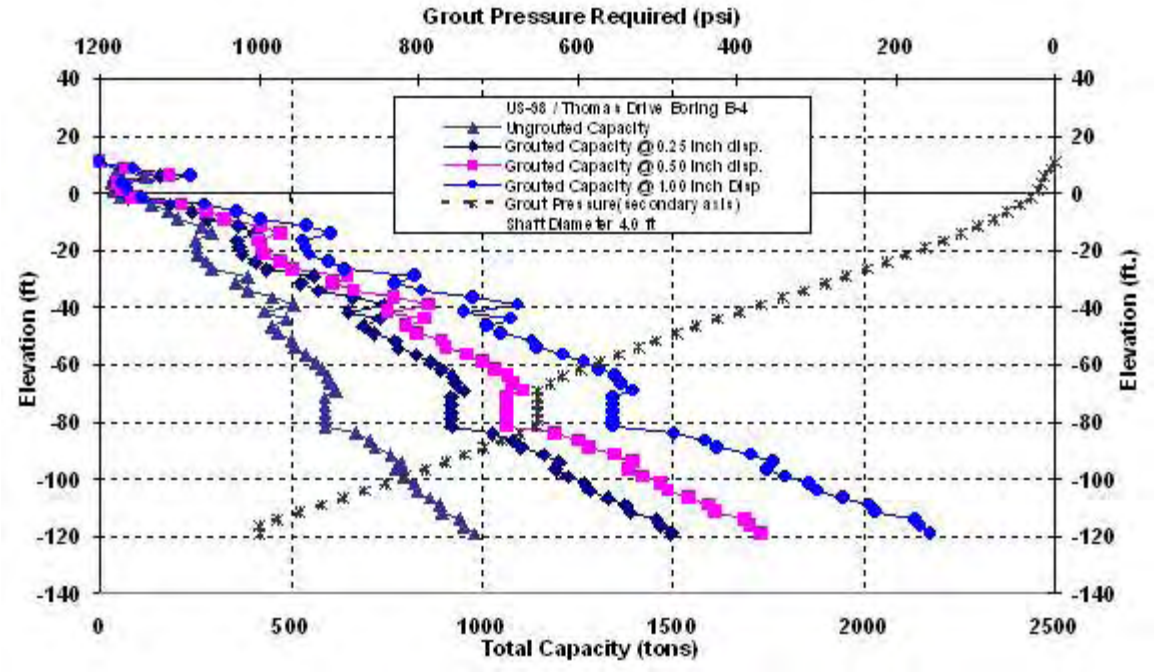


Figure C-220 US 98: B-4, 4ft Diameter

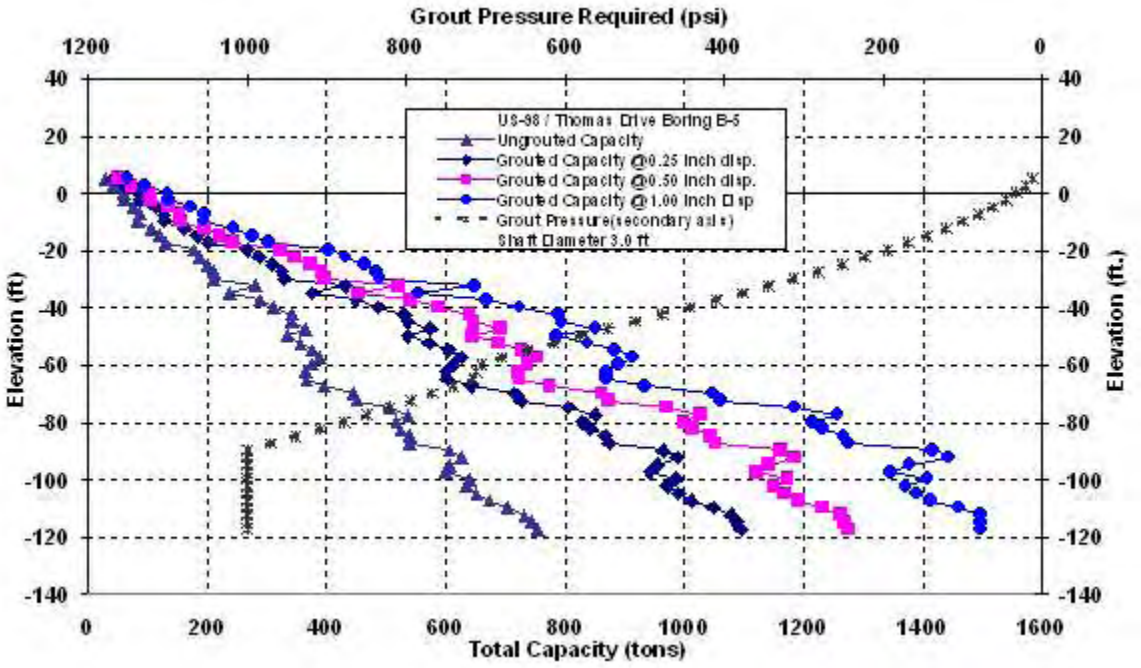


Figure C-221 US 98: B-5, 3ft Diameter

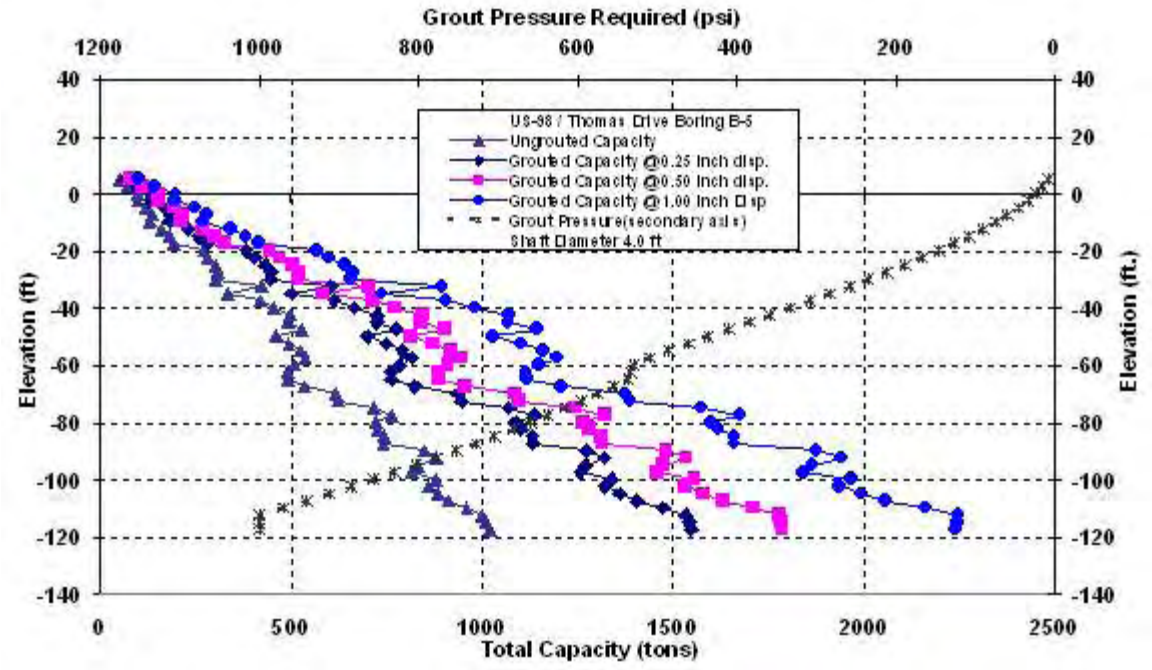


Figure C-222 US 98: B-5, 4ft Diameter

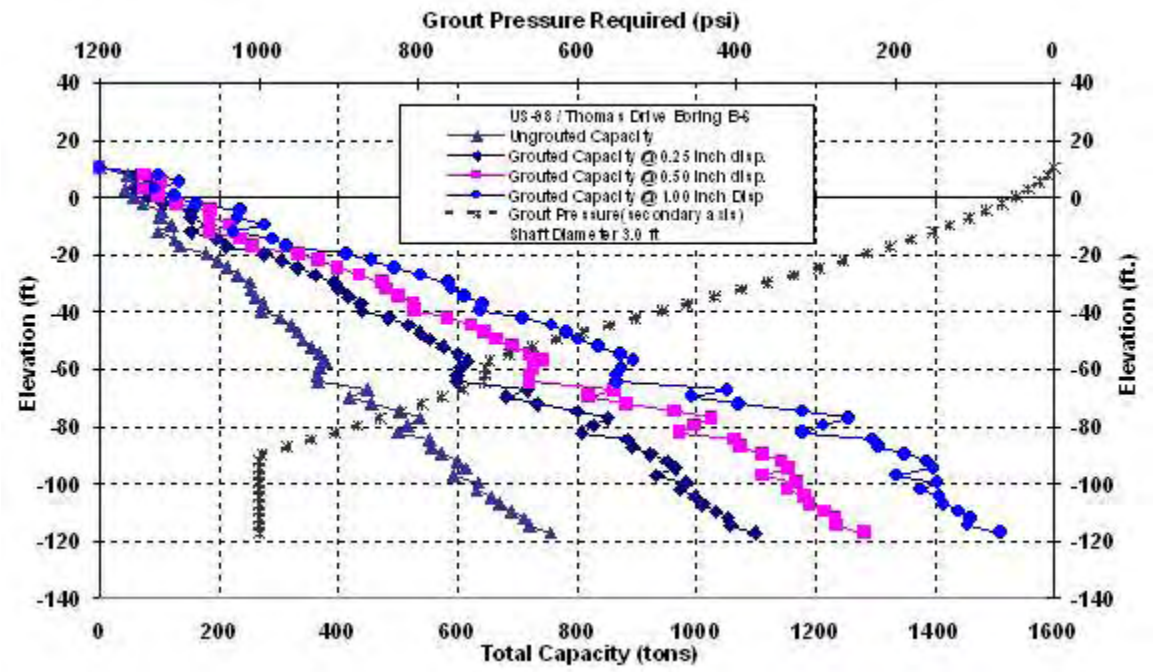


Figure C-223 US 98: B-6, 3ft Diameter

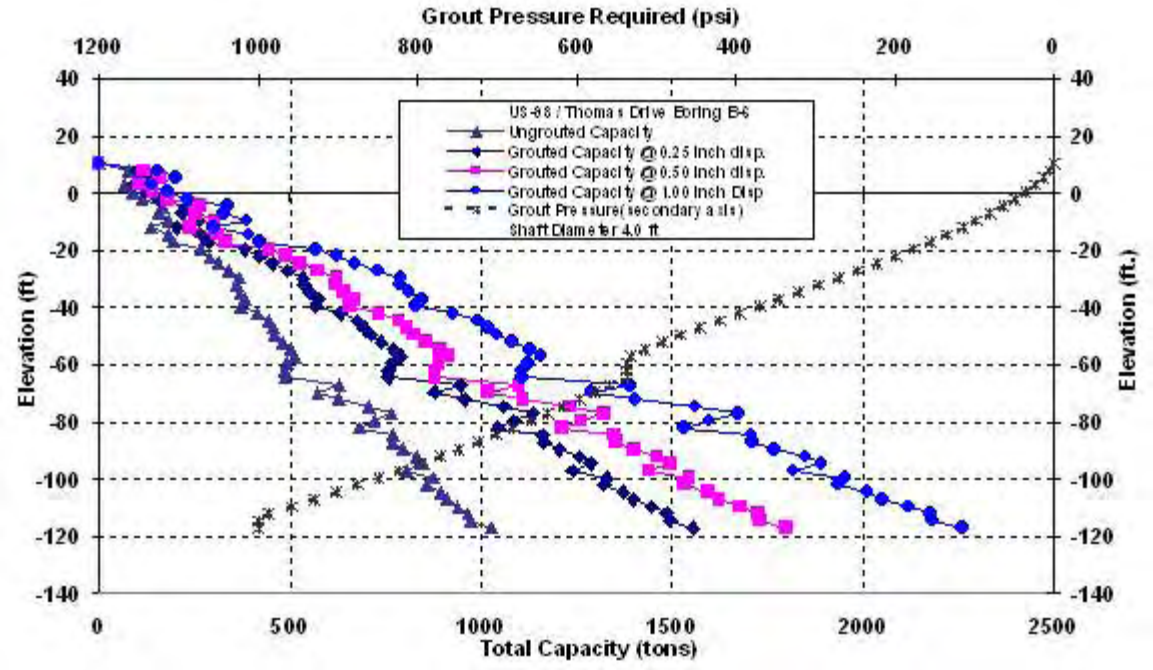


Figure C-224 US 98: B-6, 4ft Diameter

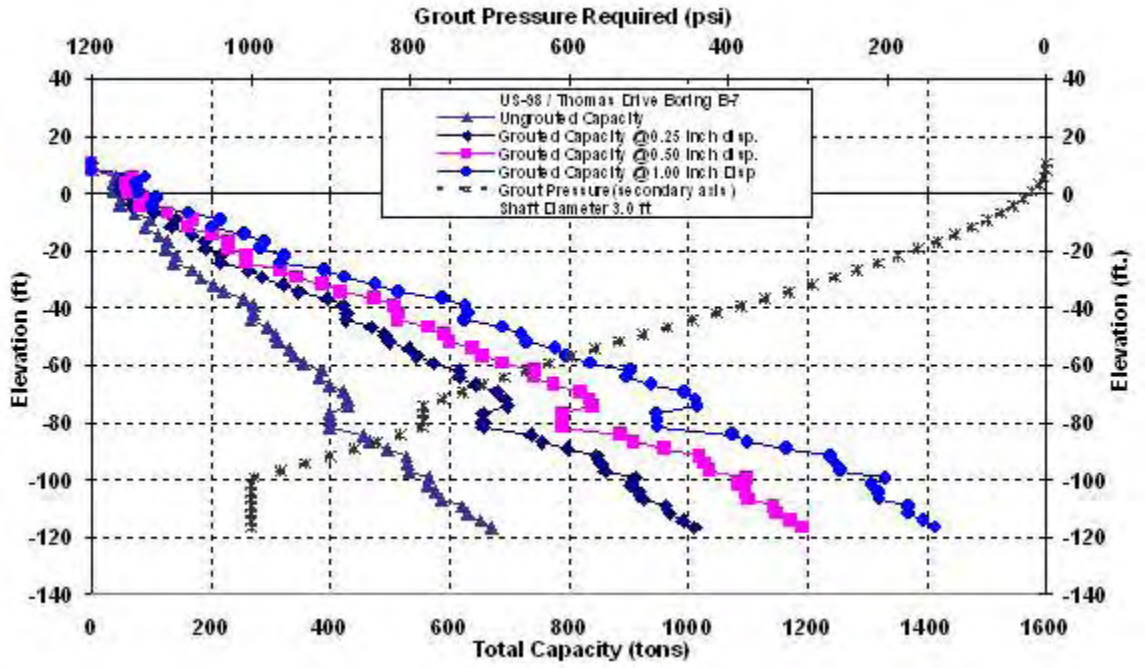


Figure C-225 US 98: B-7, 3ft Diameter

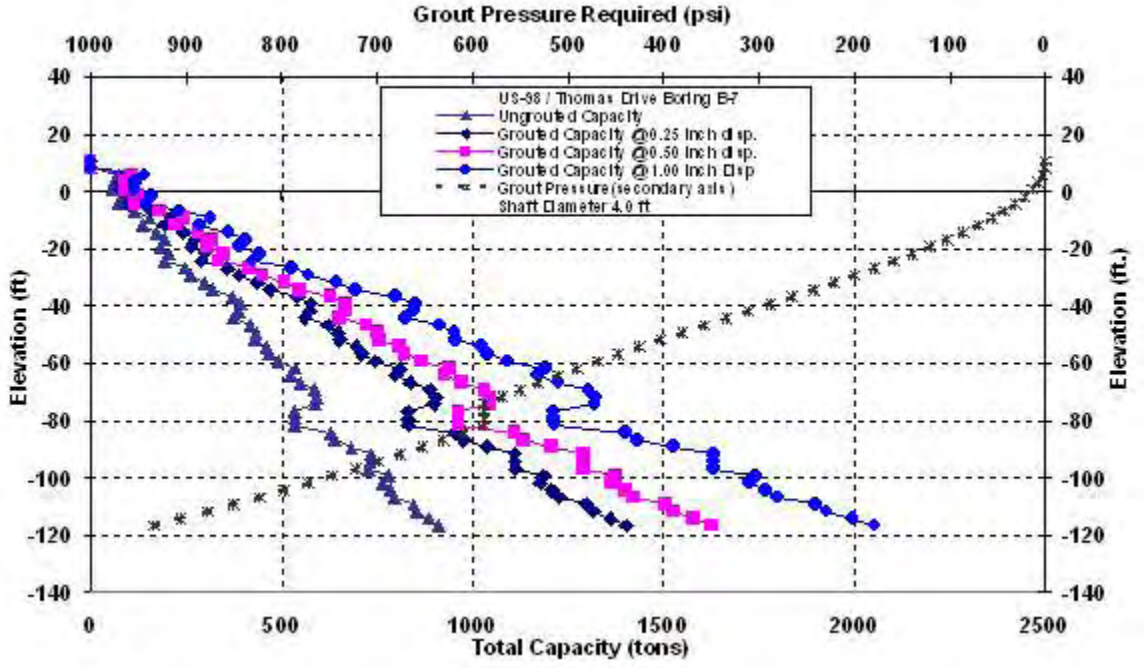


Figure C-226 US 98: B-7, 4ft Diameter

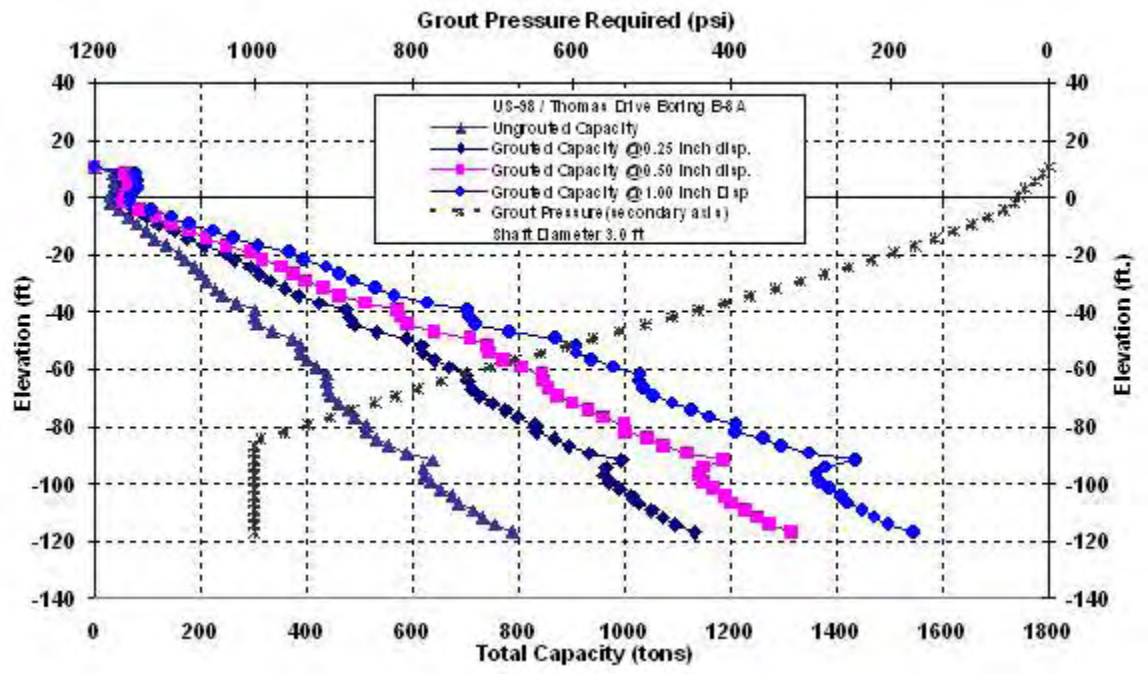


Figure C-227 US 98: B-8A, 3ft Diameter

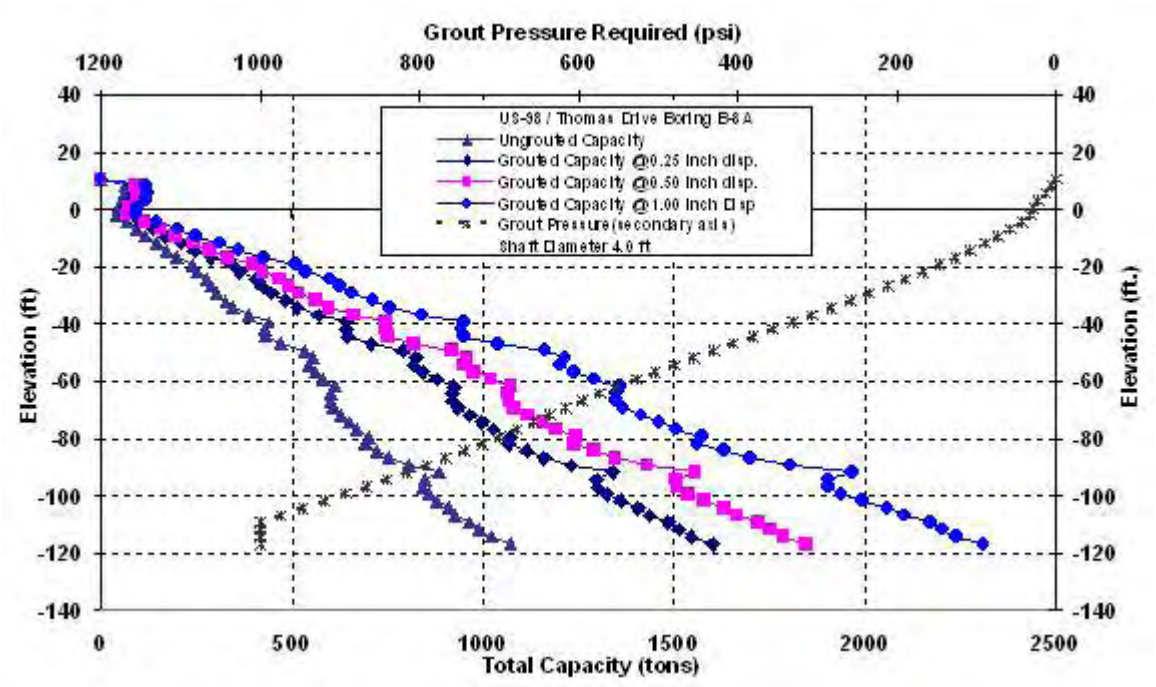


Figure C-228 US 98: B-8A, 4ft Diameter

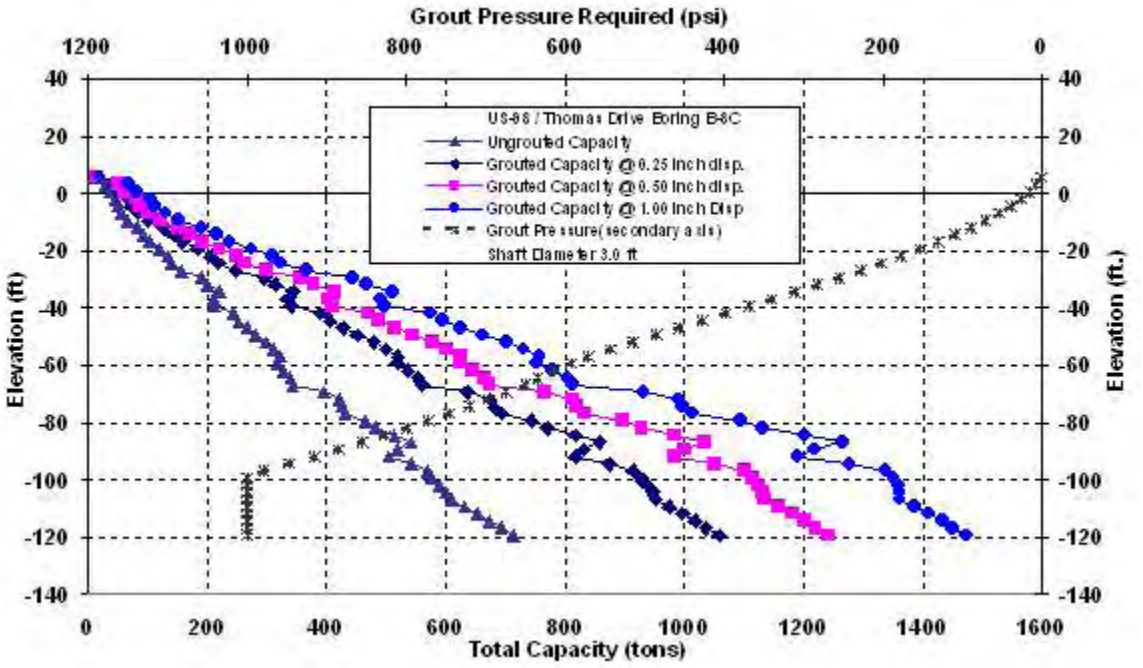


Figure C-229 US 98: B-8C, 3ft Diameter

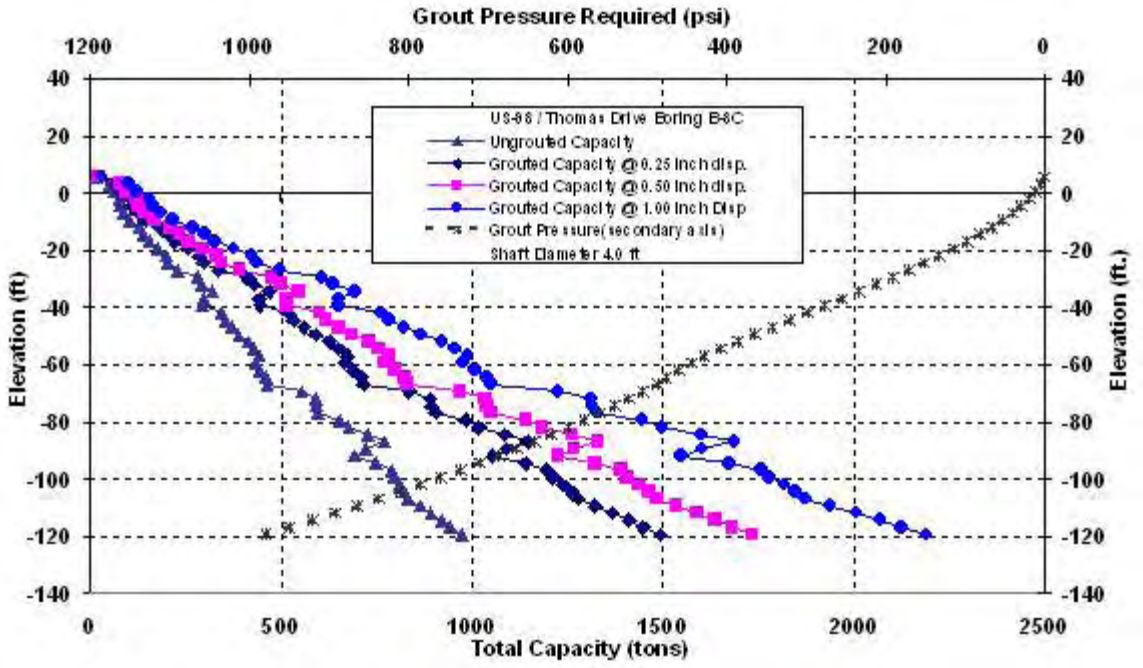


Figure C-230 US 98: B-8C, 4ft Diameter

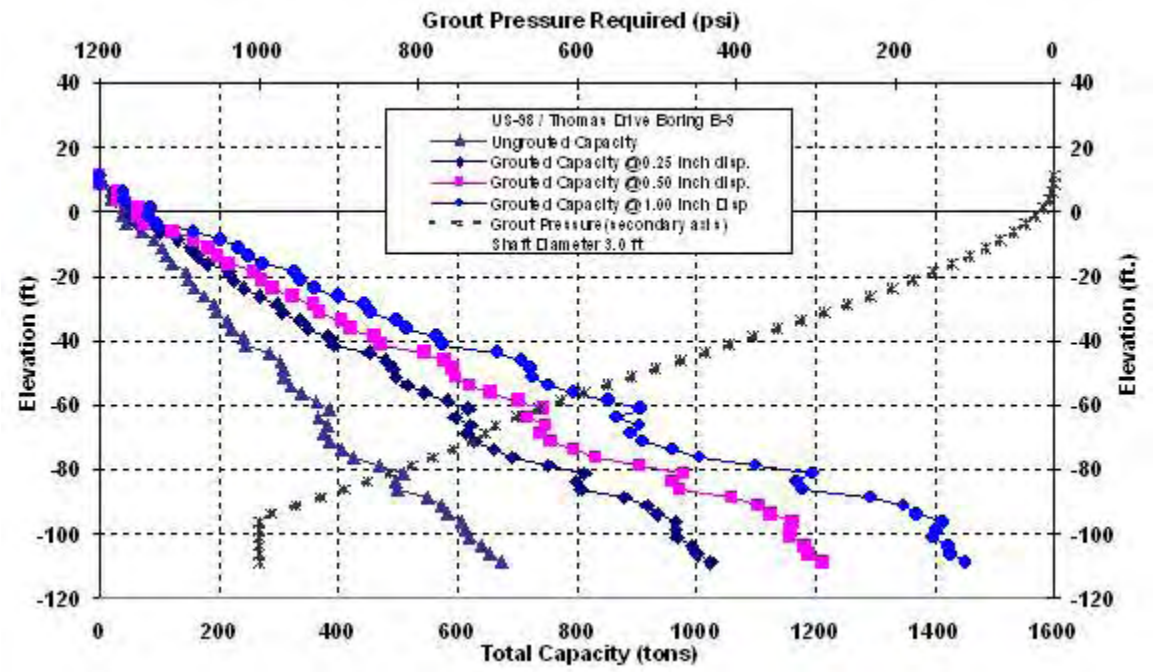


Figure C-231 US 98: B-9, 3ft Diameter

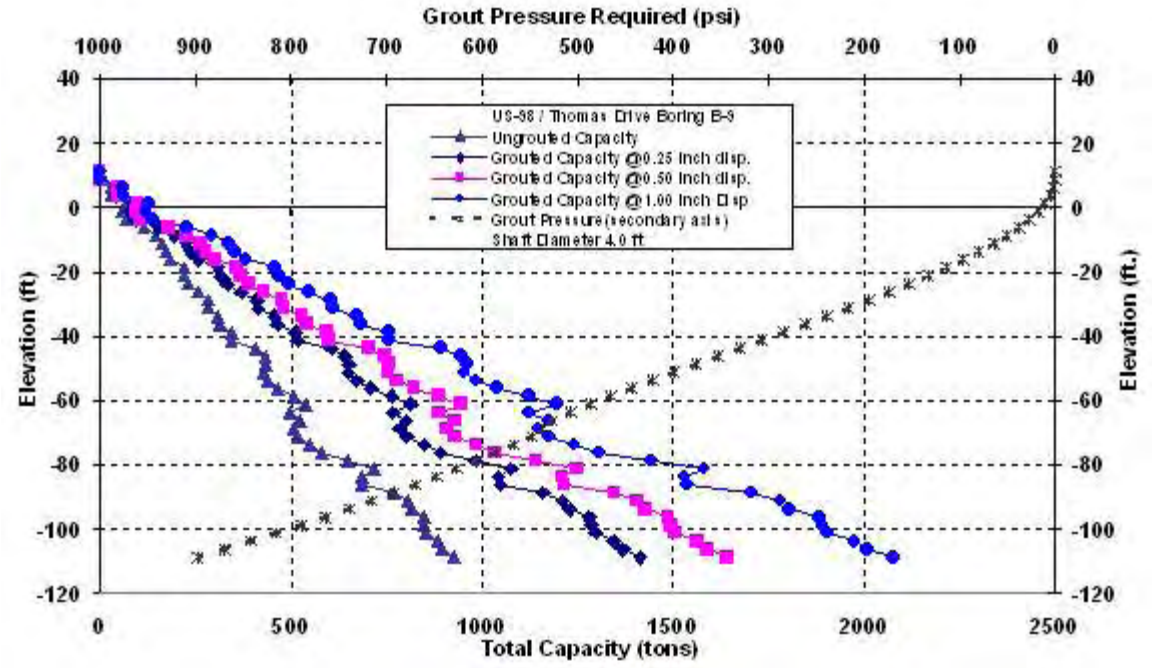


Figure C-232 US 98: B-9, 4ft Diameter

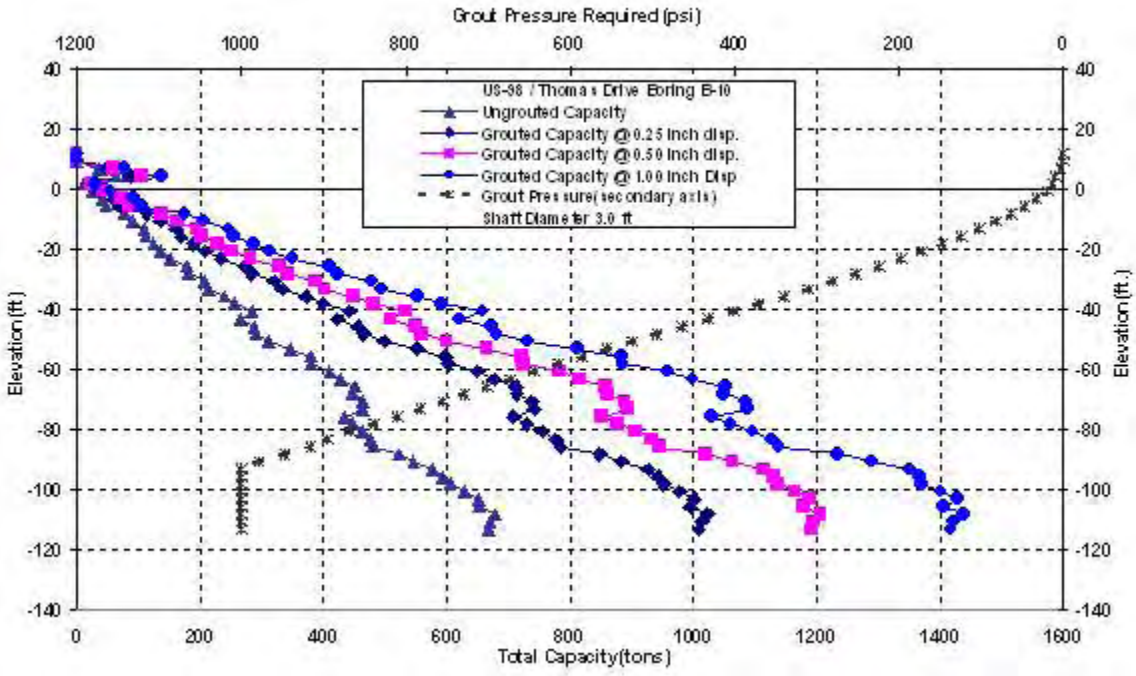


Figure C-233 US 98: B-10, 3ft Diameter

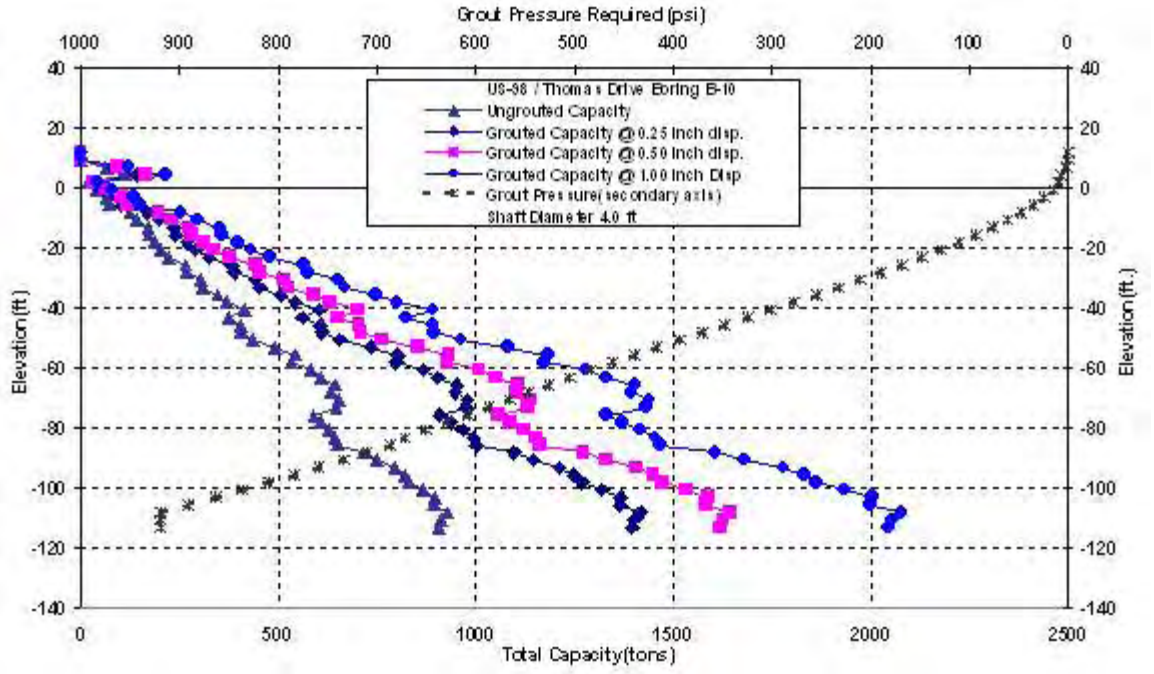


Figure C-234 US 98: B-10, 4ft Diameter

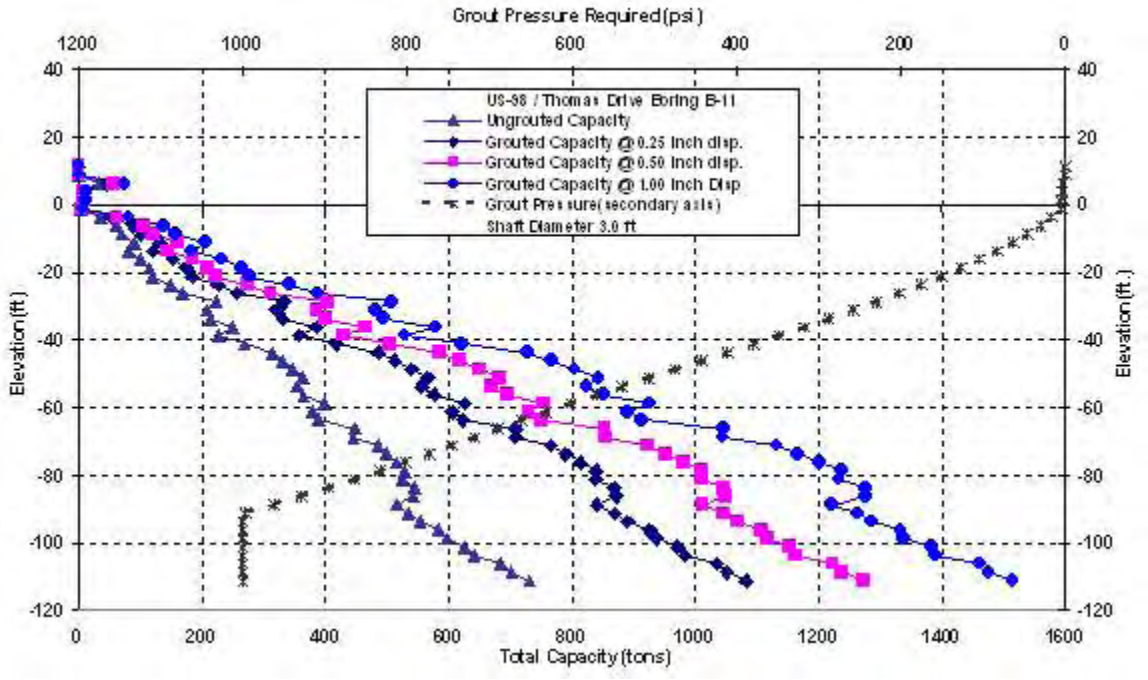


Figure C-235 US 98: B-11, 3ft Diameter

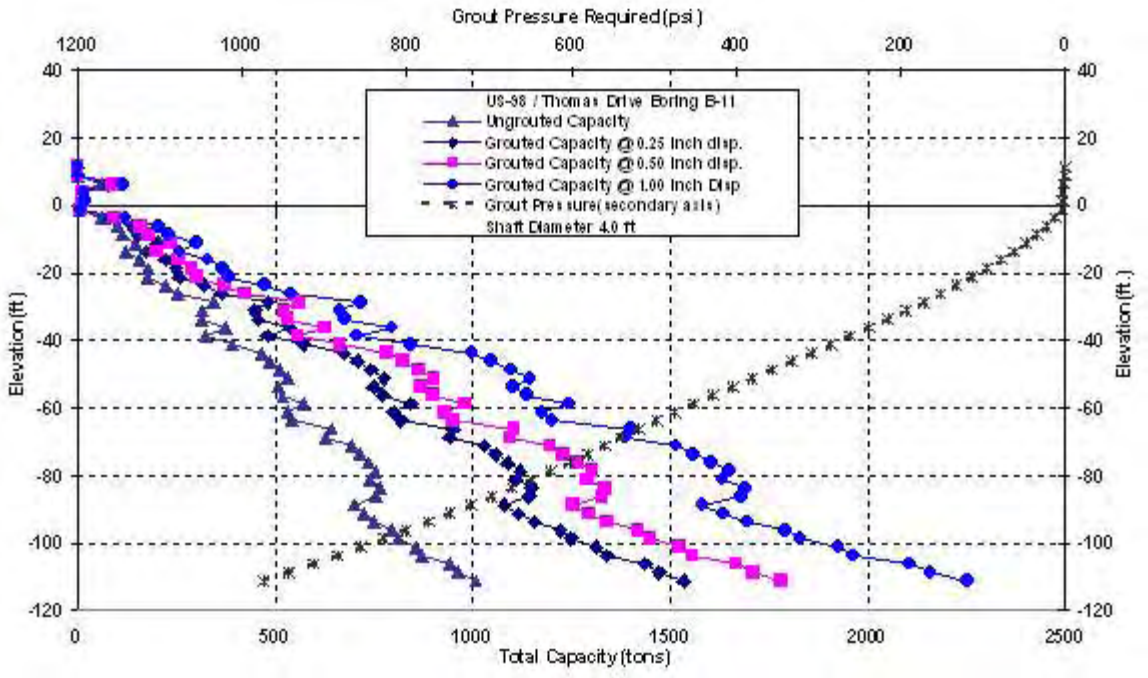


Figure C-236 US 98: B-11, 4ft Diameter

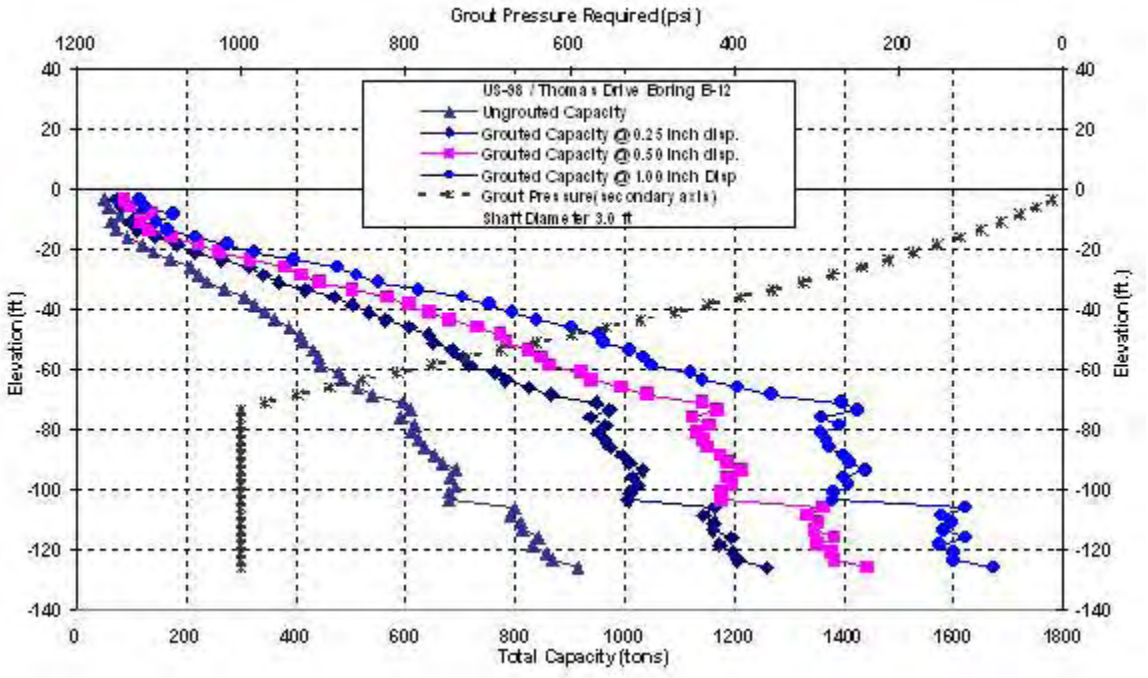


Figure C-237 US 98: B-12, 3ft Diameter

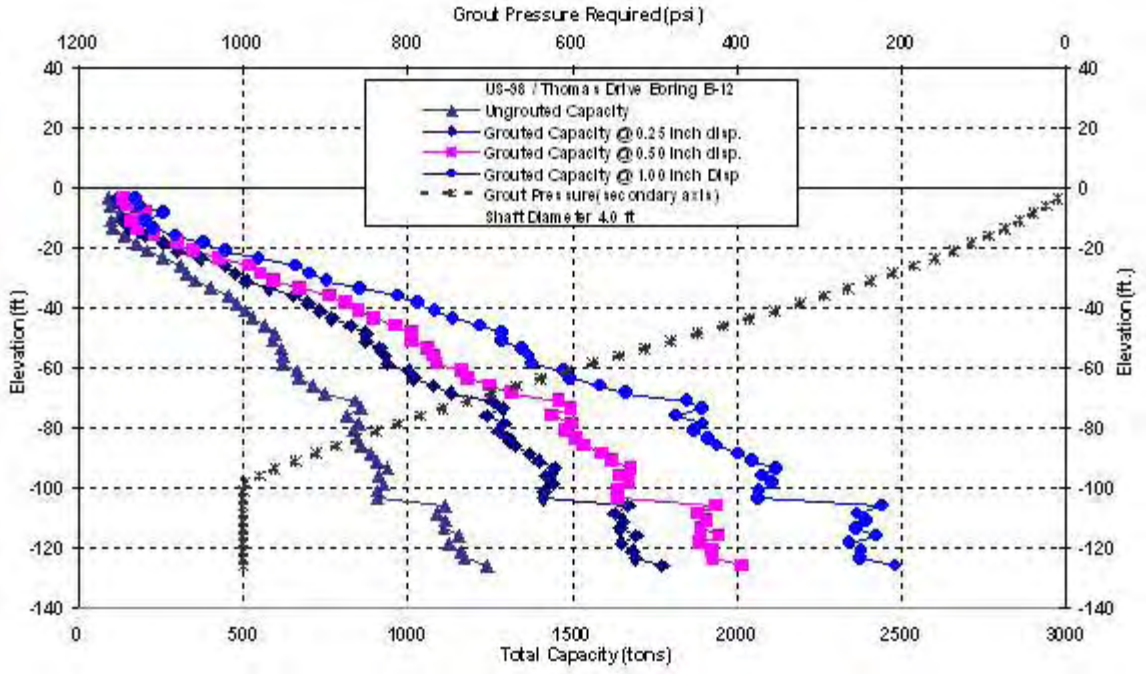


Figure C-238 US 98: B-12, 4ft Diameter

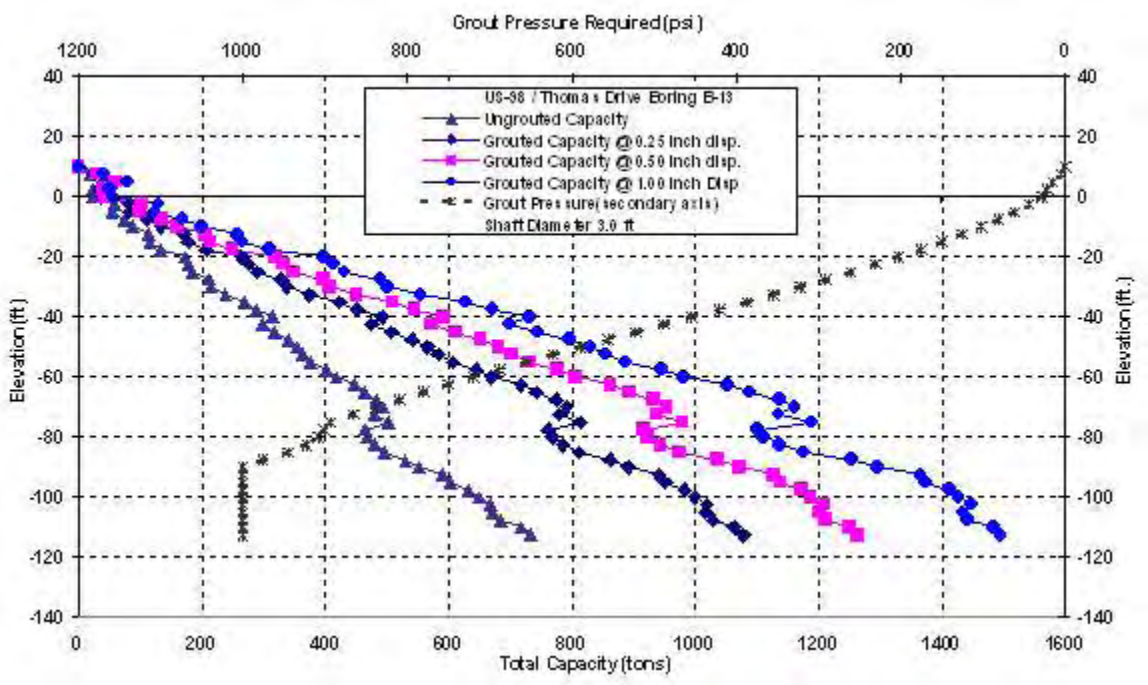


Figure C-239 US 98: B-13, 3ft Diameter

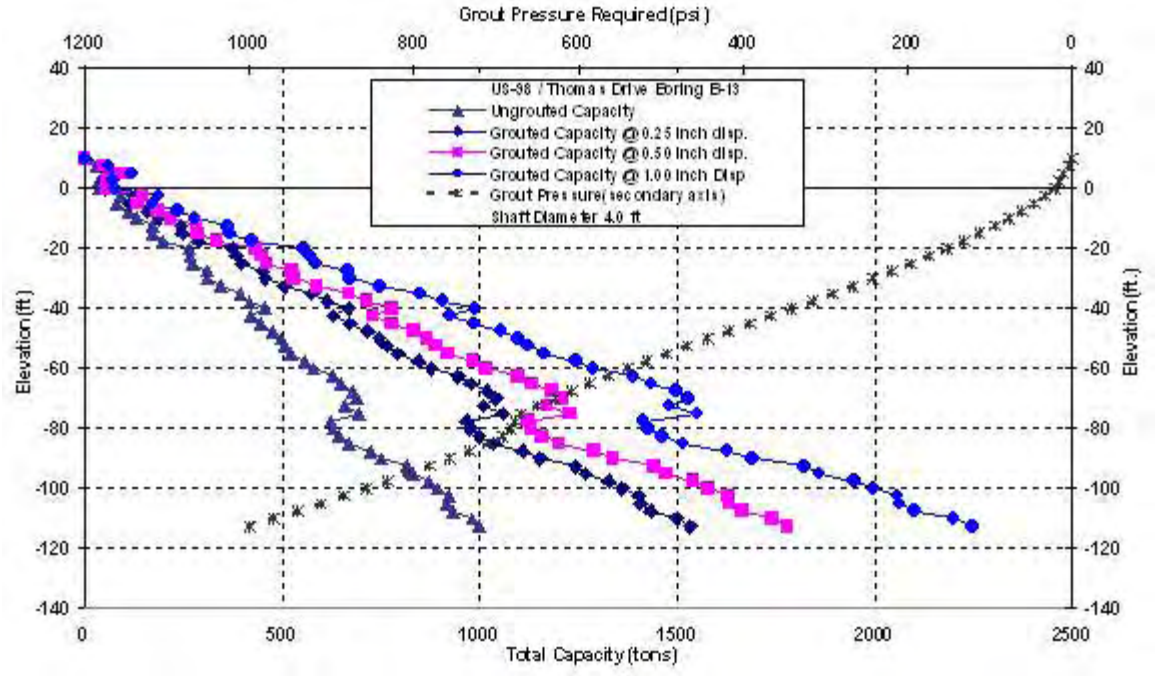


Figure C-240 US 98: B-13, 4ft Diameter

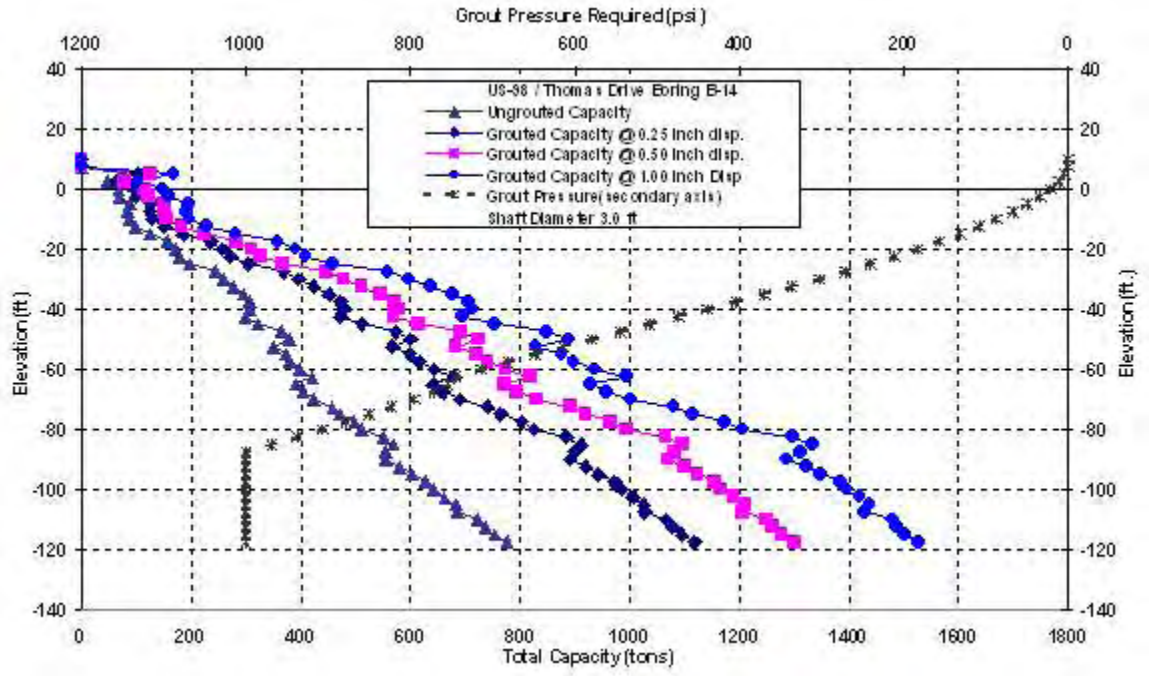


Figure C-241 US 98: B-14, 3ft Diameter

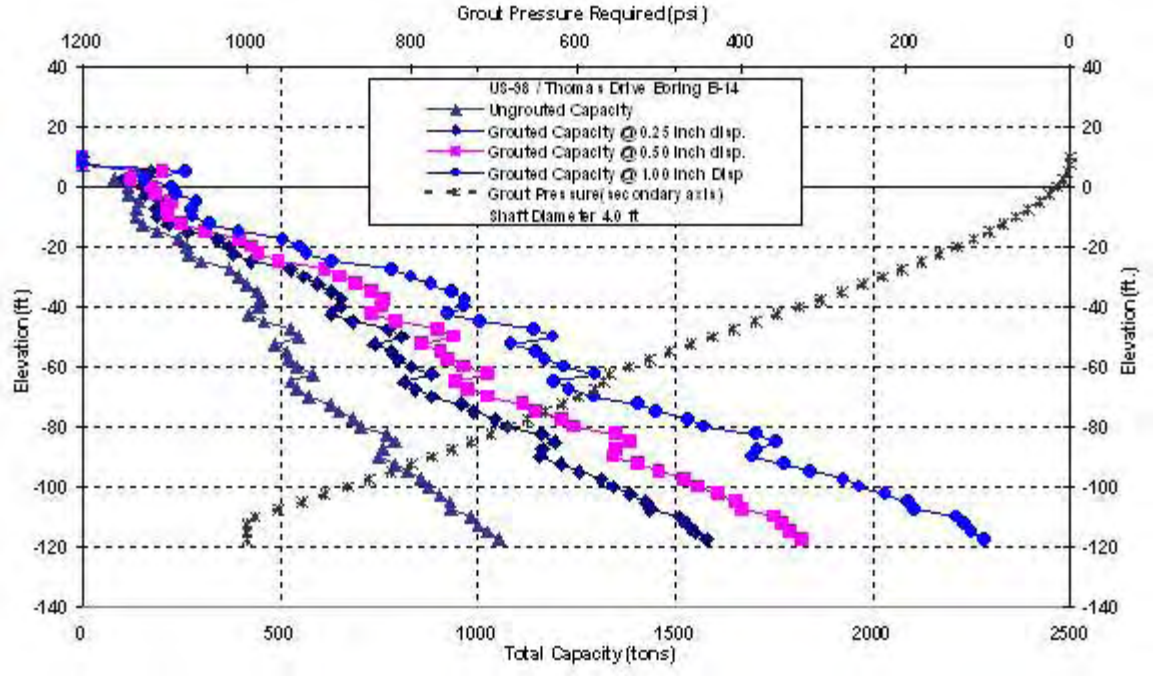


Figure C-242 US 98: B-14, 4ft Diameter

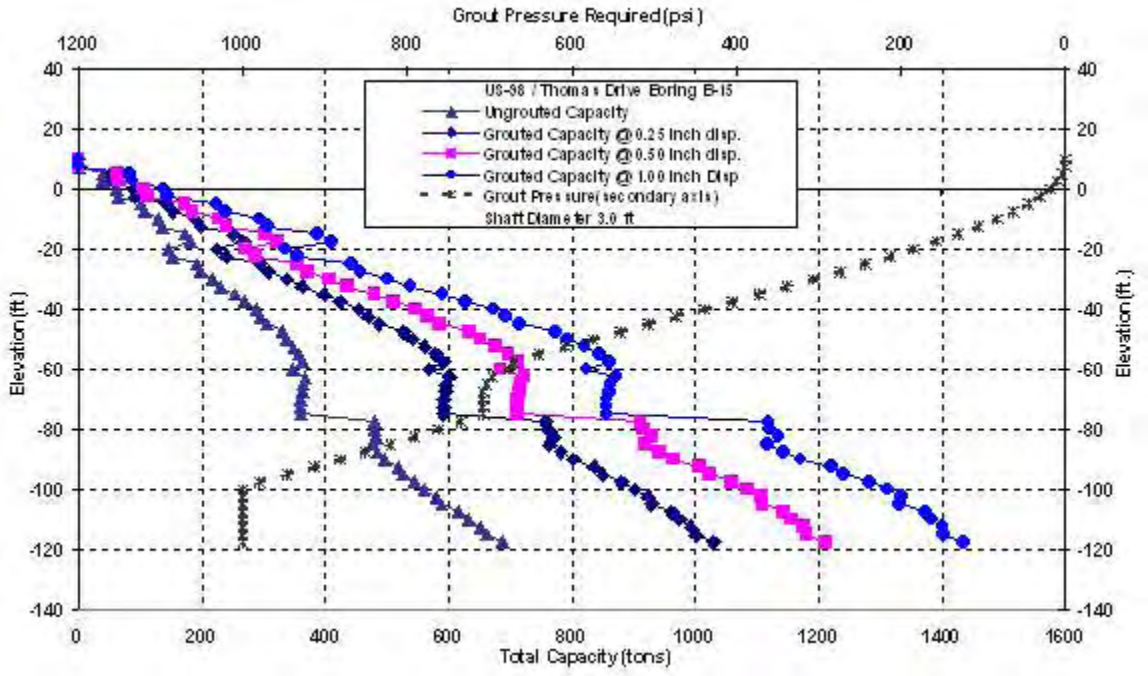


Figure C-243 US 98: B-15, 3ft Diameter

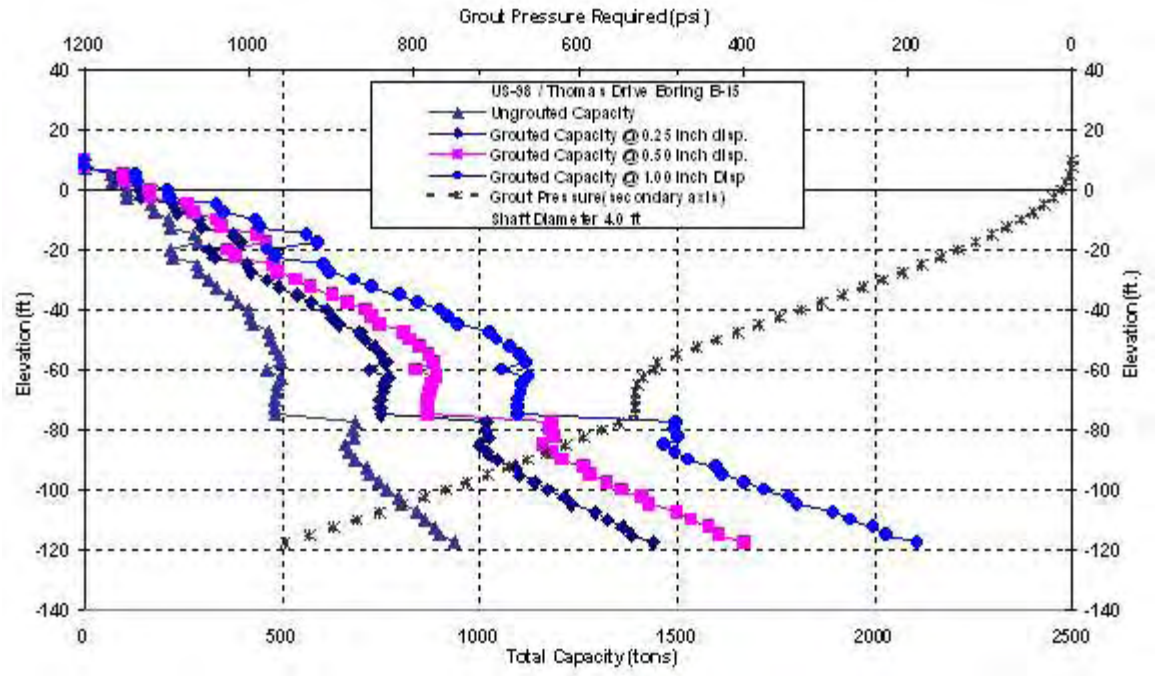


Figure C-244 US 98: B-15, 4ft Diameter

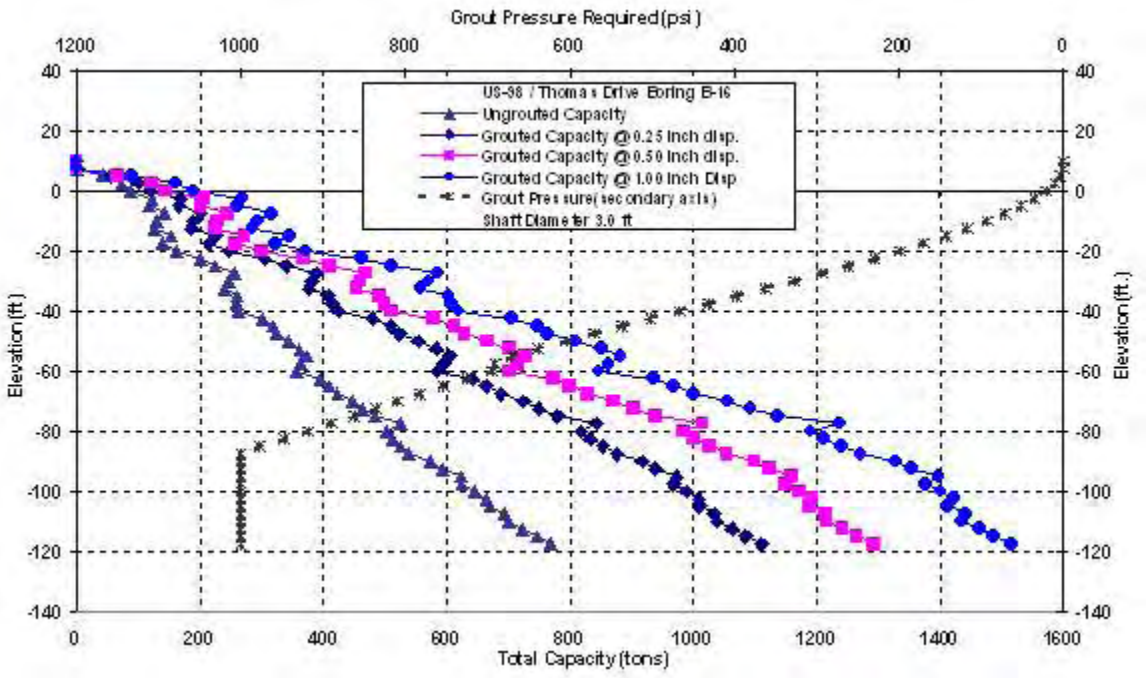


Figure C-245 US 98: B-16, 3ft Diameter

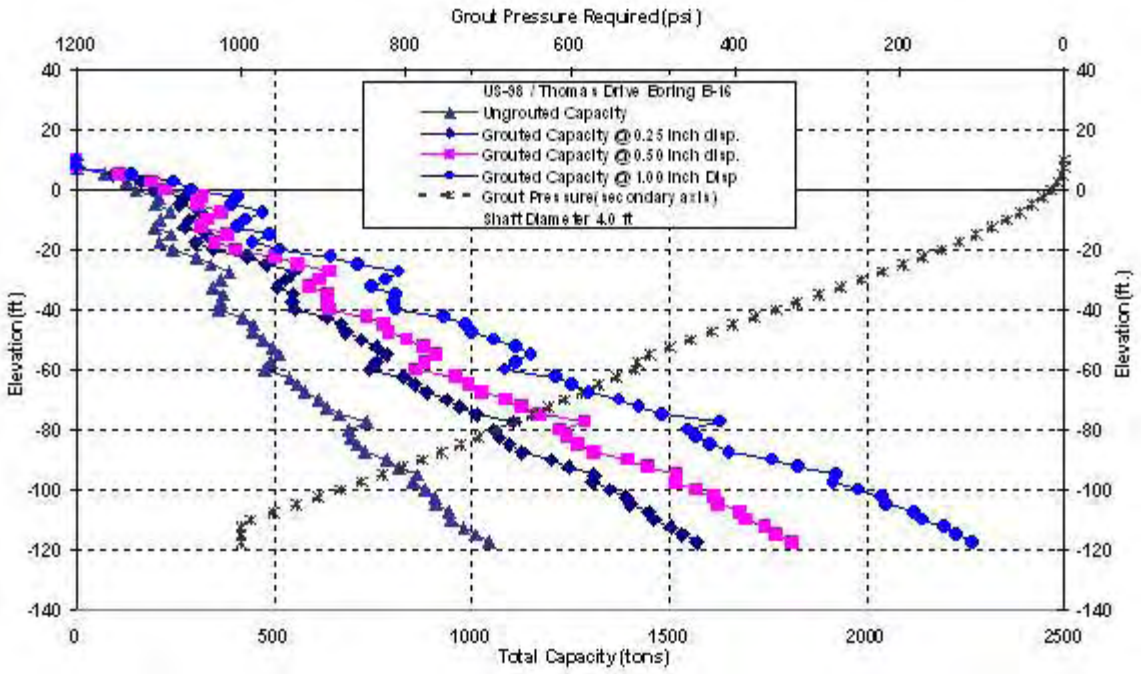


Figure C-246 US 98: B-16, 4ft Diameter

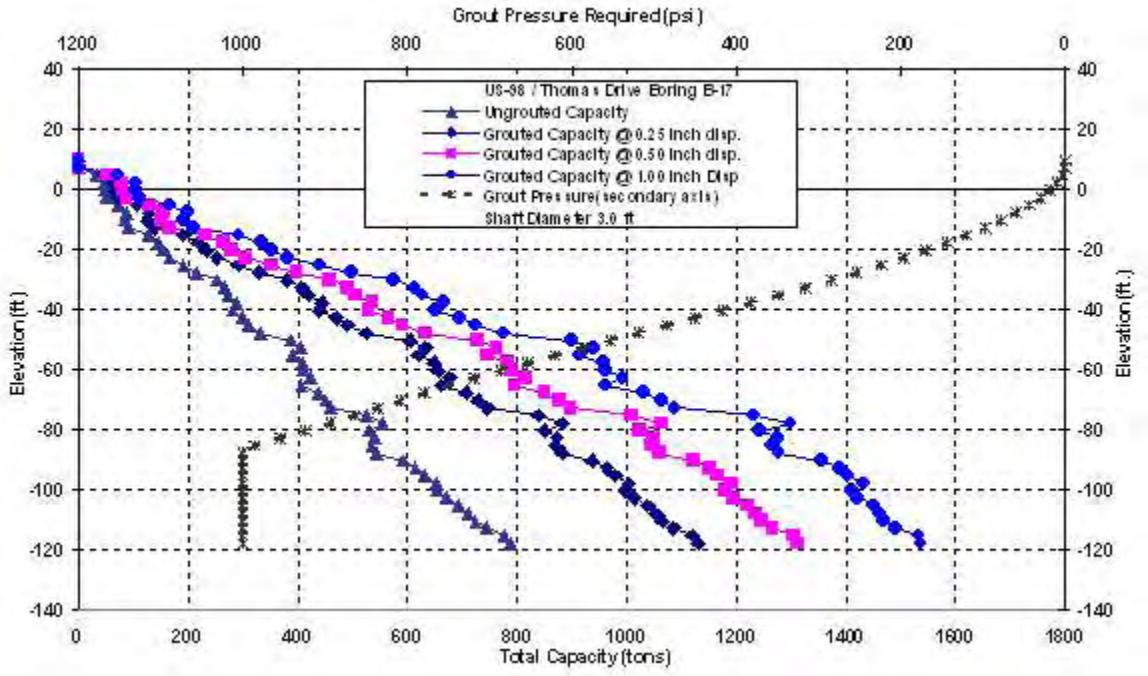


Figure C-247 US 98: B-17, 3ft Diameter

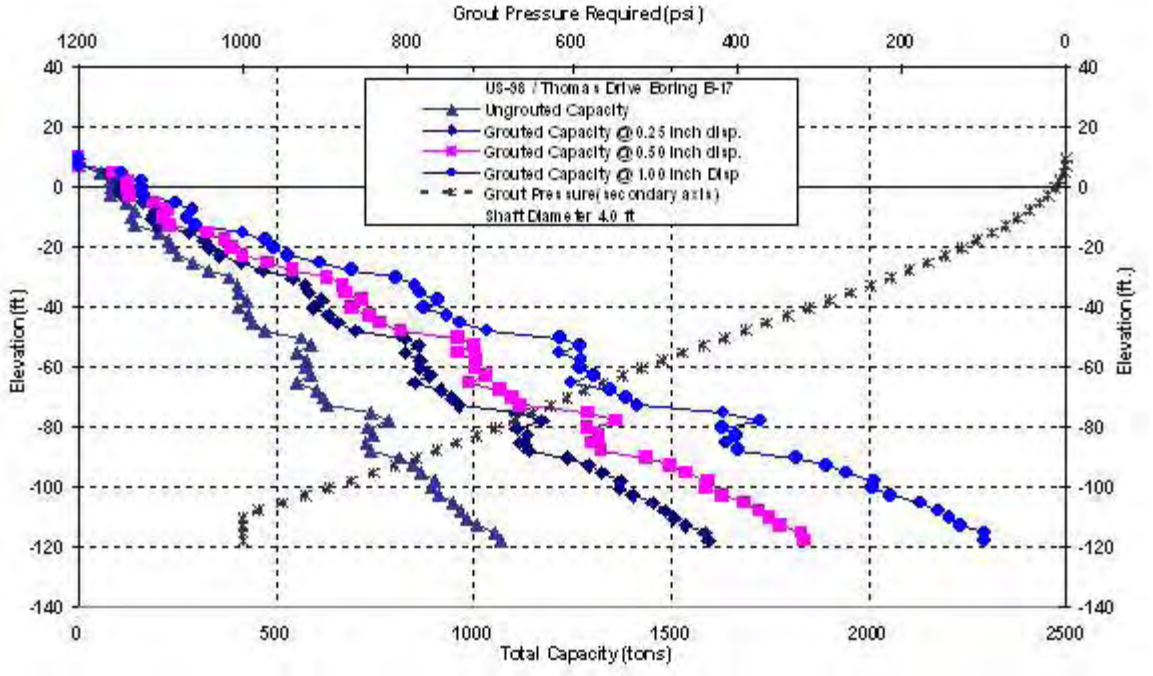


Figure C-248 US 98: B-17, 4ft Diameter

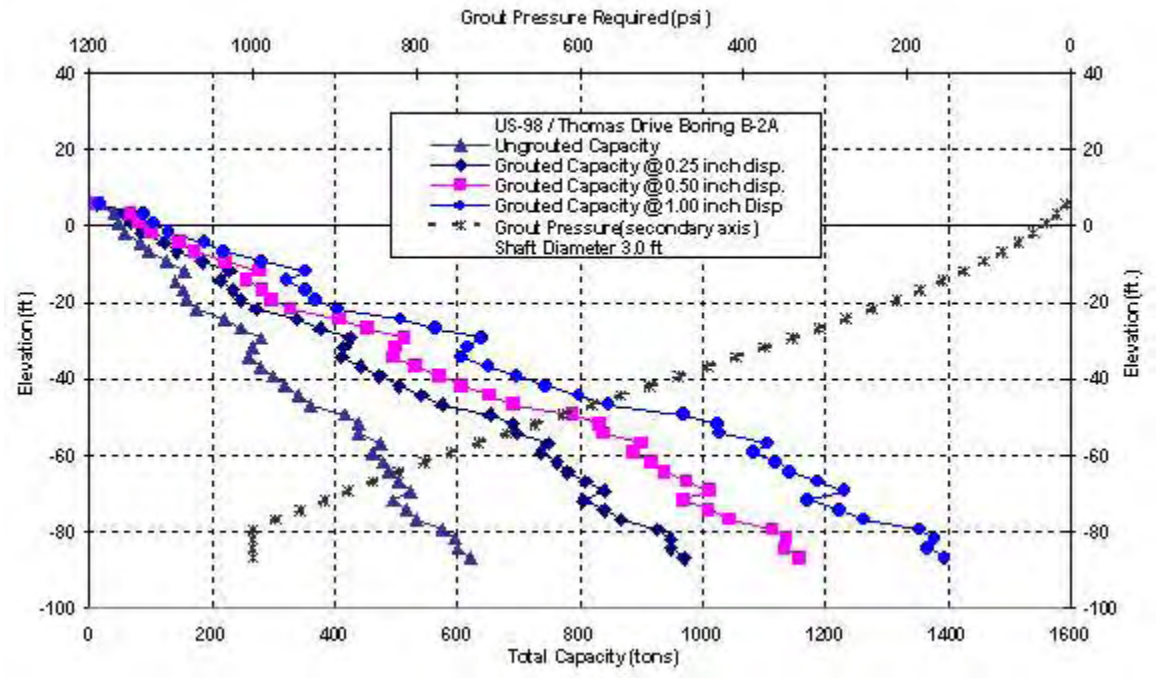


Figure C-249 US 98: B-2A, 3ft Diameter

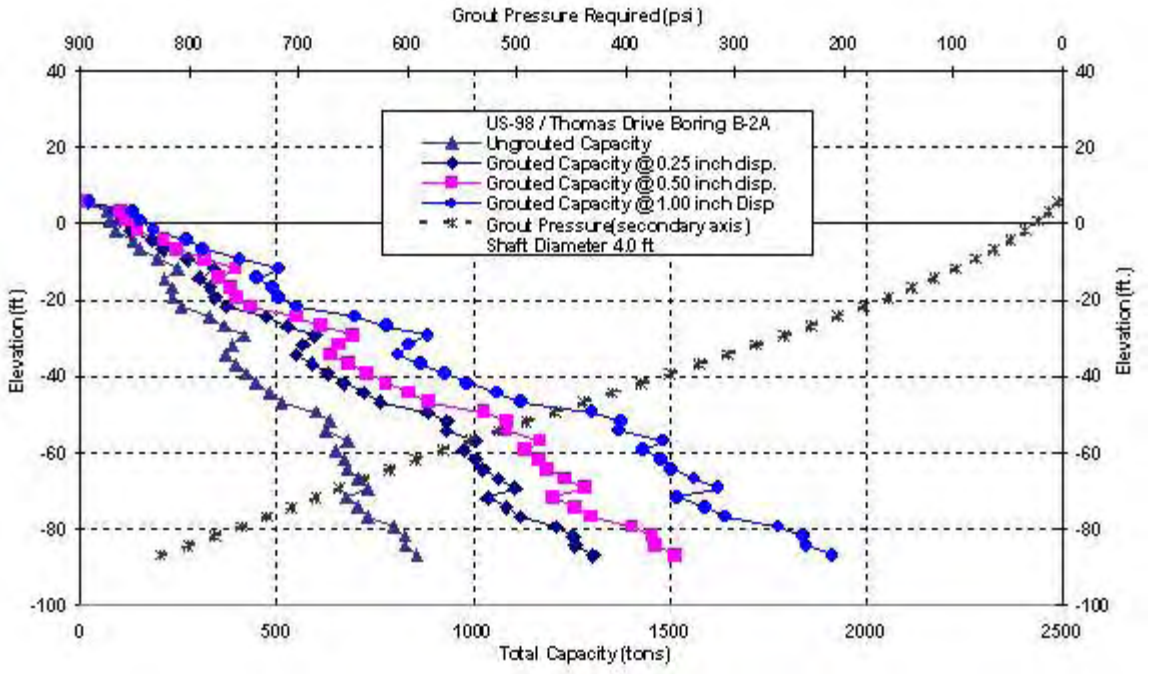


Figure C-250 US 98: B-2A, 4ft Diameter

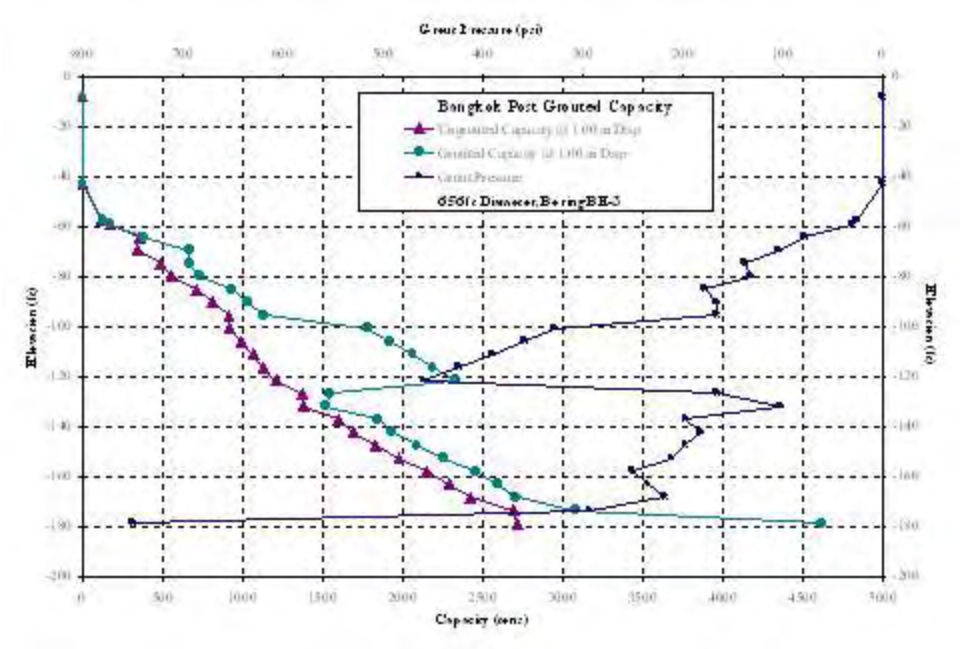


Figure C-251 Bangkok: BH 3, 2m Diameter

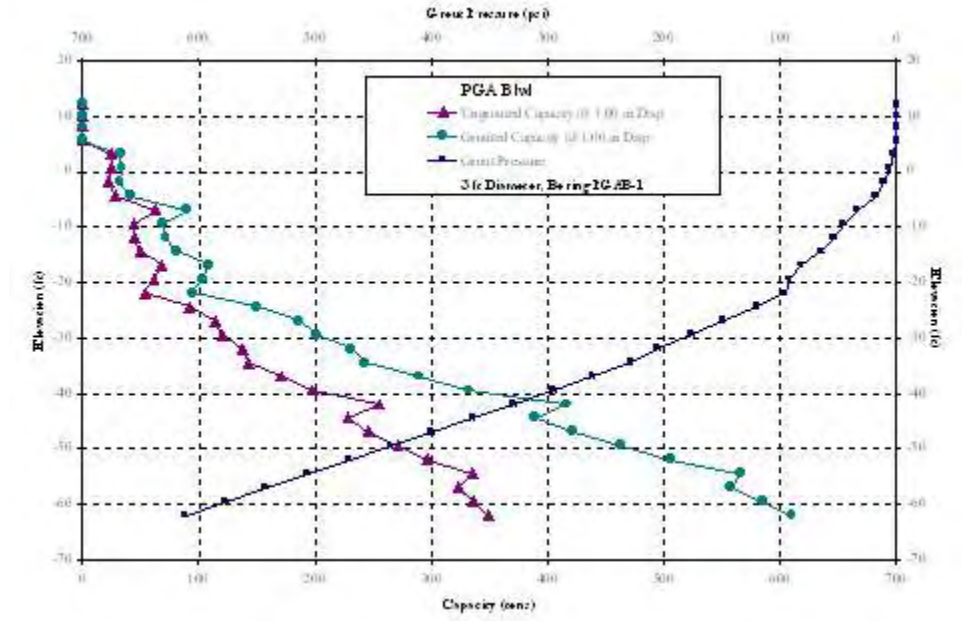


Figure C-252 PGA Blvd: PGAB-1, 3ft Diameter

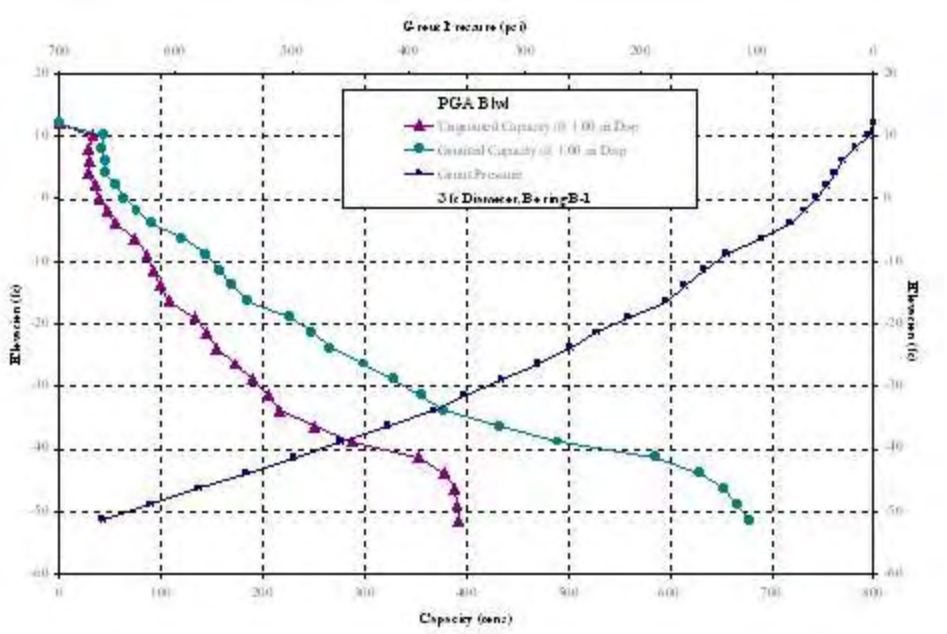


Figure C-253 PGA Blvd: B-1, 3ft Diameter

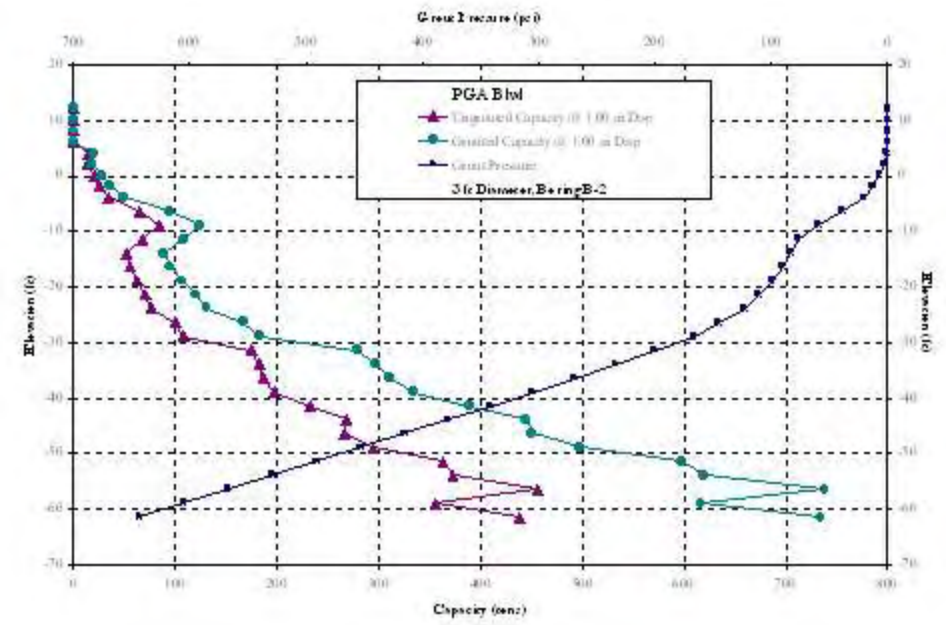


Figure C-254 PGA Blvd: B-2, 3ft Diameter

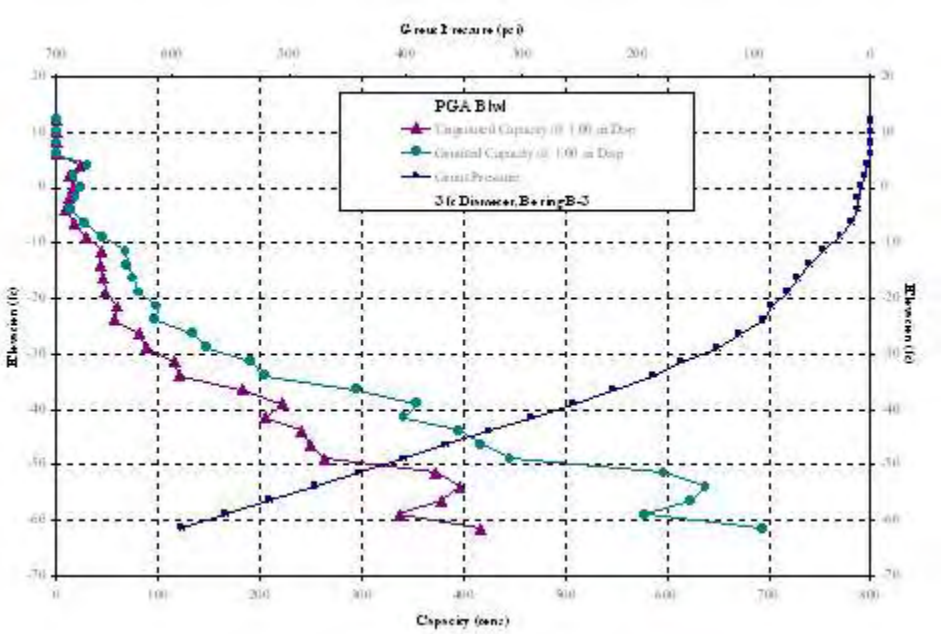


Figure C-255 PGA Blvd: B-3, 3ft Diameter

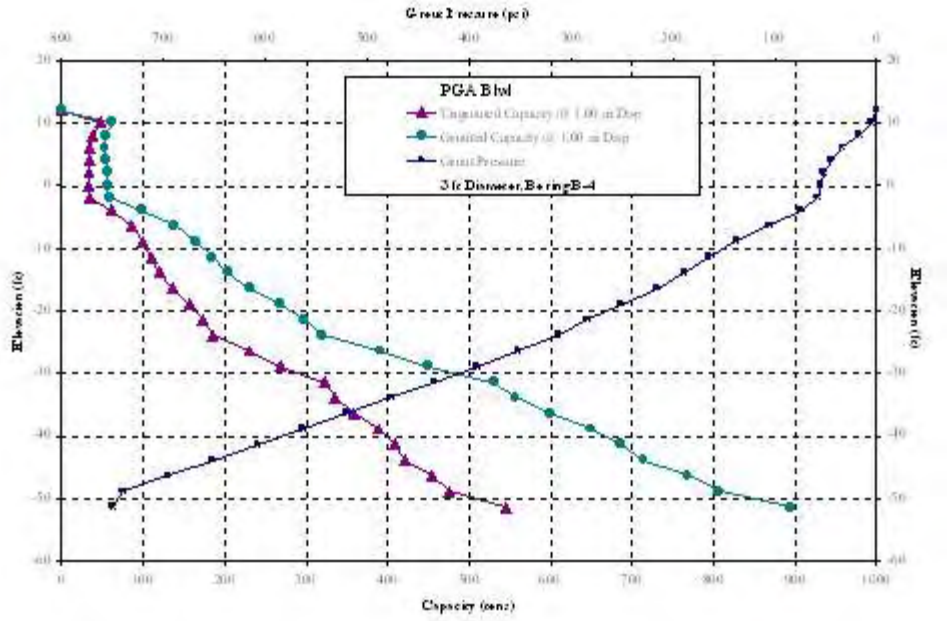


Figure C-256 PGA Blvd: B-4, 3ft Diameter

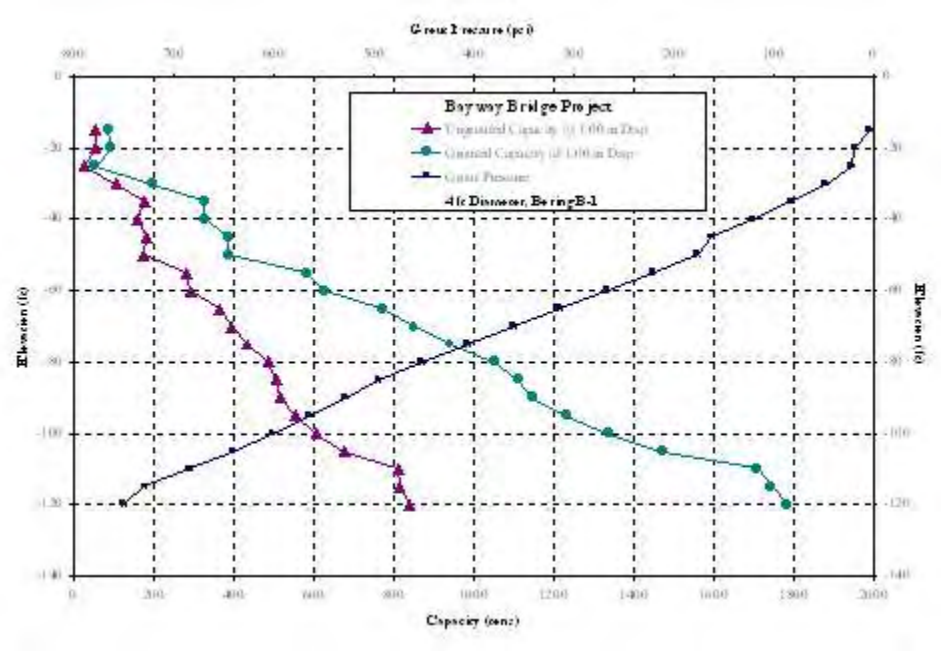


Figure C-257 Bayway Bridge: B-1, 4ft Diameter

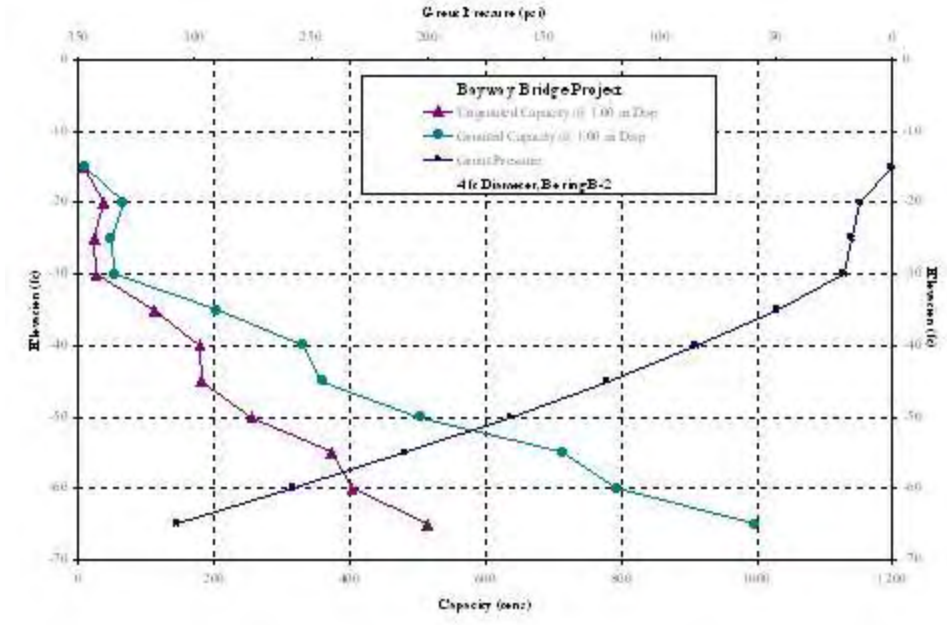


Figure C-258 Bayway Bridge: B-2, 4ft Diameter

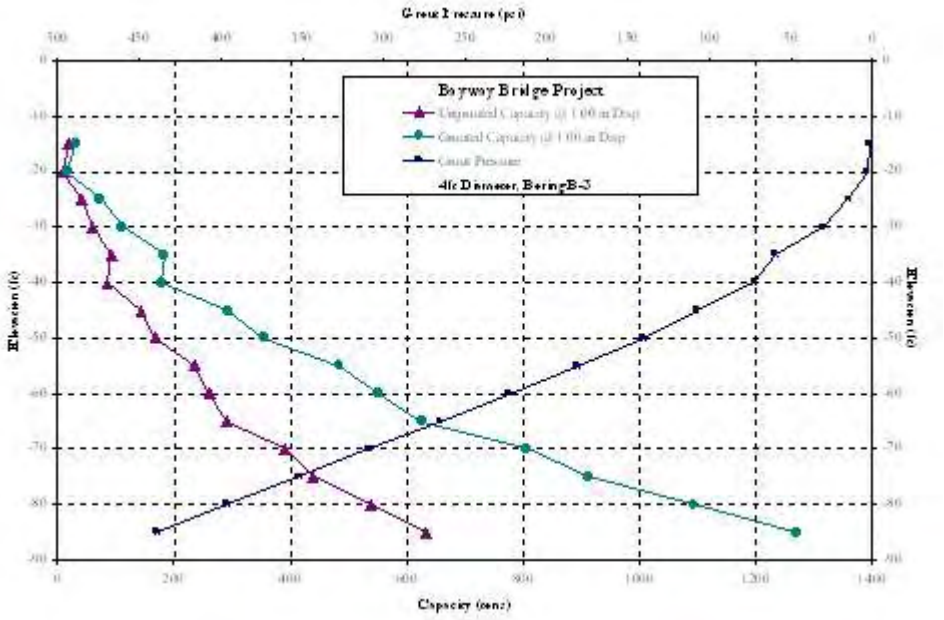


Figure C-259 Bayway Bridge: B-3, 4ft Diameter

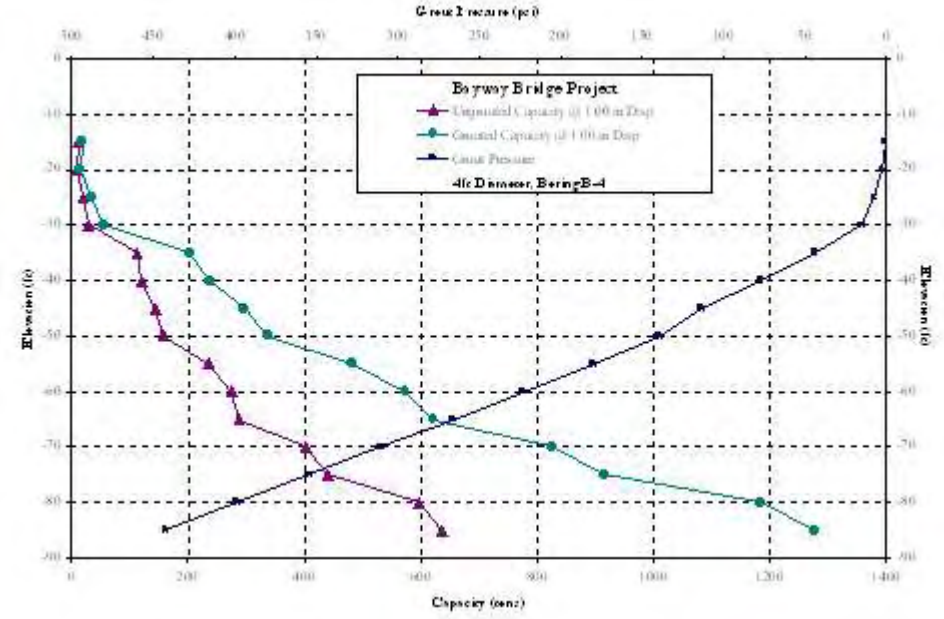


Figure C-260 Bayway Bridge: B-4, 4ft Diameter

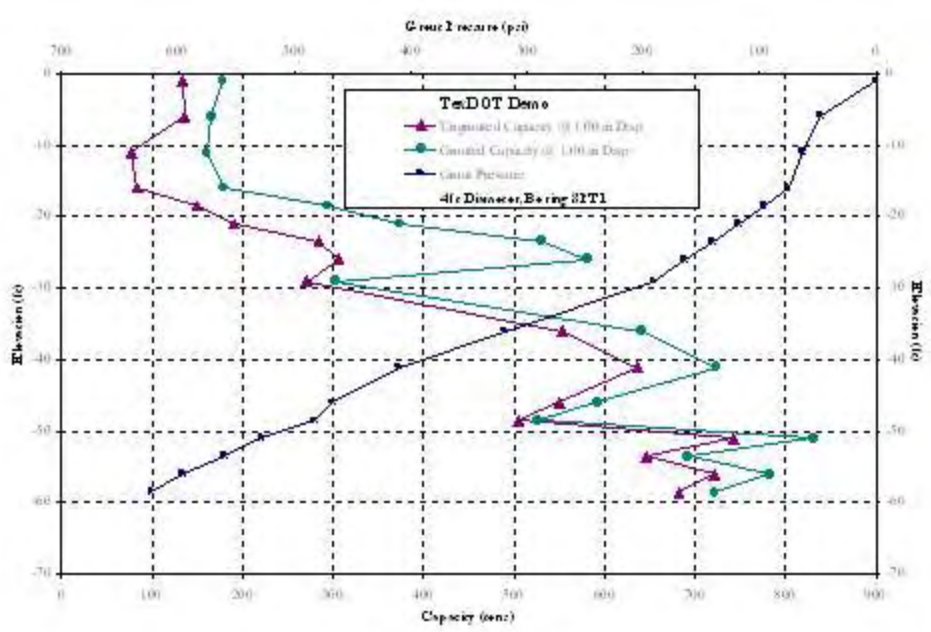


Figure C-261 TexDOT Demo: SPT 1, 4ft Diameter

APPENDIX D SAMPLE SPECIFICATIONS FOR POST GROUTING

DRILLED SHAFTS

SECTION 455 of the Florida Department of Transportation Specifications is revised as follows:

ARTICLE 455-22 Page 444 of the Florida Department of Transportation Specifications is deleted and replaced with the following:455-22.3

455-22.1 General: Three tests shall be conducted with the intent of optimizing the design of the drilled shaft foundation elements. The tests shall be conducted on two test shafts (LT-1 and LT-2). Test 1: Test Shaft LT-1 shall be tested in statnamic axial compression to failure with instrumentation capable of detecting the ultimate side shear and end bearing capacity. Test Shaft LT-2 shall be constructed with an apparatus capable of delivering high-pressure cementitious grout to the shaft tip as a method of improving the shaft capacity. Test 2 and Test 3 of this program shall be conducted on Test Shaft LT-2. Test 2: Test Shaft LT-2 shall be grouted at the tip to improve the end bearing capacity while also determining the ultimate side shear capacity. Test 3: Test Shaft LT-2 shall be loaded in statnamic axial compression to failure also with instrumentation capable of detecting the ultimate side shear and end bearing capacity. Test 3 shall be conducted only after the grout has achieved sufficient strength as directed by the Engineer. All load tests shall be completed prior to construction to corroborate the design capacity and at non-production drilled shaft locations. Under the supervision of the Engineer, the Contractor shall perform pilot holes at each test shaft location before constructing the test shafts and at the proposed production shaft locations as shown in the plans. A pilot hole with Standard Penetration Test shall be performed per ASTM 1586, the "Soils and Foundations Handbook" and as directed by the Engineer. If rock is encountered at pilot hole, rock coring with a minimum size of 102 mm diameter shall be performed. Standard Penetration Test also shall be performed between each rock coring. The pilot holes shall be paid for as Core (Shaft Excavation) as described in 455-24.9. The statnamic axial compression loading apparatus shall be capable of producing 10MN or the maximum load that the shaft will support, whichever occurs first or as directed by the Engineer.

Load testing of drilled shafts LT-1 and LT-2 (Test 1 and Test 2) shall not begin until the concrete has attained a minimum compressive strength of 28 MPa. High early strength concrete may be used to obtain this strength at an earlier time to prevent testing delays, upon the approval of the Engineer. Drilled shafts shall be load tested in the order described above or as directed by the Engineer. Loadings shall be completed as described hereafter. The Contractor shall supply any specialty sub-contractors for statnamic Tests. Unless shown otherwise in the plans or these Technical Special Provisions, the Contractor shall supply all equipment, materials, labor and technical personnel required to conduct the load tests. The

Contractor's loading apparatus shall be designed to accommodate the maximum load plus an adequate safety factor.

The drilled shaft(s) used for the load test program will be instrumented as provided herein or as approved by the Engineer.

455-22.1.1 Notification to the Public: Two weeks prior to the performance of the load test the contractor shall notify the State of the time and place of such tests for public awareness.

455-22.2 Post-Pressure grouting of Drilled Shaft Bottom

455-22.2.1 Description: This work shall consist of furnishing all materials and labor necessary to perform pressure grouting of the drilled shaft tip as shown in the Plans or as directed by the Engineer. Test Shaft No. LT-2 shall be post-grouted at the base of the shaft tip after the shaft concrete has attained a minimum compressive strength of 28 MPa. Test Shaft No. LT-1 shall not be grouted prior to testing. After grout has achieved sufficient strength, as directed by the Department, a Statnamic axial load test shall be conducted on Test Shaft LT-2 to failure as directed by the Engineer.

455-22.2.2 General: The intent of this Axial Testing/Grouting Program is to optimize the design of the drilled shaft foundations by assessing the strength improvement gained from post-grouting a drilled shaft tip. By applying grout pressures up to 7000 kPa at the shaft tip, the shaft stiffness and tip resistance can be increased. The improvement is to be determined on the basis of the load-displacement response of two drilled shafts each loaded in axial downward compression. One of the shafts will be grouted to improve the end bearing (LT-2) and the other will not be grouted (LT-1) thus providing a control basis.

Within this program the Contractor shall provide the post-grout apparatus that shall be affixed to the bottom of the reinforcing cage by the Contractor as directed by the State. The post-grout program shall use the same sister-bar strain gage instrumentation as the Statnamic Supplier, and as such the Contractor shall provide a minimum of 30 days notice to the State to coordinate the concurrent installation of the post-grout apparatus.

Additional tell-tale instrumentation shall be provided and installed by the contractor as directed by the Department. Such instrumentation consists of three (3) 53 mm diameter schedule 40 PVC pipes per grouted shaft that run the full length of the reinforcing cage, positioned at equidistant locations around the reinforcing cage. Within each of these pipes shall be a single 1.59 mm diameter stainless-steel stranded wire which is secured at the shaft tip and extended within the shaft top with a minimum excess length of 5 m. Subsequent, production shafts will not be required to be constructed with tell-tale instrumentation but rather shall be grouted while monitoring grout pressure, grout volume, and uplift using a survey level as described in 455-22.4.3.

455-22.2.3 Materials: The post-grout process will require a reference frame as described in 445-22.4.2. On this frame three (3) pulley assemblies shall be mounted so as to align with corresponding tell-tale wires for accurate measurement of the shaft tip movement during post-grouting. The Contractor shall provide adequate shade for the reference frame to minimize thermal effects due to direct sunlight.

Computerized data acquisition equipment for the monitoring of the post-grouting process will be provided by the Department; however, the Contractor shall provide adequate AC power for its operation.

455-22.2.4 Equipment: The contractor shall supply any additional equipment and man power required to effectively post-grout the bottom of Test Shaft No. LT-2. This equipment includes, but is not limited to:

1. A grouting pump capable of supplying 7000 kPa of grout pressure to the tip of the post-grout shafts.
2. Grout pump should be equipped with pressure and volume transducers capable of being monitored by the Department-provided data acquisition system.
3. Air compressor
4. Fresh water supply with pump
5. Grout mixer with a minimum capacity of 175 liters (1/4 cubic yard)
6. High density polyethylene (HDPE) grout tubing, 19 mm O.D. (3/4") or 25 mm schedule 80 PVC piping, sufficient in length to provide three full lengths of the shaft reinforcement cage with an additional 5 m for each grouted shaft.
7. Survey Level as described in 455-22.4.3.

455-22.2.5 Preparation for Grouting: The contractor shall notify the Department of the shaft installation, Statnamic testing and post-grouting schedule 30 days prior to commencing. Preparation will include proper instrumentation prior to shaft construction as specified in 455-22.3 Statnamic Load Testing, and in 455-22.2.2. After successful installation of the test shafts, access must be made available to the top of shaft for surveying, post grouting tubes, tell-tale casing and wires, and imbedded strain gage instrumentation wiring.

455-22.2.6 Procedure for Post-grouting Shaft bottom: The contractor shall assist the State as necessary during all aspects of the post-grouting test program. Test Shaft LT-2 will be post-grouted to a state of upward shear failure which should have top of shaft movements at a constant grouting pressure and shall not exceed 2 inches. The following steps shall be taken in the performance of the post-grouting process.

1. Preparation for testing as described in 455-22.2.5.
2. Survey and record the shaft top elevation to a bench mark.
3. Install reference frame and tell-tale pulley assemblies.
4. Connect grout tubes to grout pump and pump cementitious grout continuously until a maximum grout volume, grout pressure or shaft uplift is exceeded, as directed by the Engineer.
5. All embedded strain gages, grout pressure transducer, grout volume transducer, and tell-tale displacement transducers shall be monitored continuously throughout the grout process. Test Shaft LT-2 shall be accessible at all times for residual stress measurements starting from the time directly after casting and ending after the Statnamic load test.
6. Upon completion and throughout the grouting process the shaft top elevation shall be surveyed and recorded as directed by the Engineer.

Grouting Procedure and Specifications

Step 1. Using the intended grout pump, fill pump reservoir with water and flush pump lines and shaft access lines simultaneously until residual drilling fluid is expelled from all shaft access lines and clear water is returned. Each access line shall be fitted with a sacrificial in-line valve capable of sustaining the design grout pressure.

Step 2. Survey the elevation of the top of shaft.

Step 3. Mix a sufficient volume of neat cement grout to adequately fill all lines plus an additional 4 to 5 cubic feet.

> NOTE: Grout shall consist of Type I-II Portland cement and water with a water cement ratio of 0.5. NO SAND MIXES CAN BE USED. The grout shall be mixed thoroughly with a high efficiency mixer capable of producing a semi-colloidal suspension. A mixer assembly capable of mixing, holding, and pumping is recommended.
>
> *Grout Strength*, The grout cube strength shall be at least 2500 psi at the time of superstructure construction using *"ASTM-C109/C109M-98 Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (using 2 in or 50 mm cube specimens)."*

Step 4. Open return side access lines (one at a time) and pump grout until competent grout is returned from each line. Close all return lines and steadily pump grout into the toe of the shaft until the specified design grout pressure is sustained. Fluctuating peak pressures observed at the pump shall not be interpreted as sufficient, but rather the sustained gage pressure.

NOTE: The grouting process shall be continuous from the time of commencing. A minimum net volume of 2 cubic feet must be pumped to the toe by the time the design pressure is achieved. This will assure that an artificial pressure is not induced by access line blockage

Step 5. Discontinue grouting when one of the following criteria are met:

Pressure, Design pressure is achieved while pumping a minimum net volume of 2 cubic feet to the toe of the shaft, or

Displacement, Upward surveyed displacement exceeds 0.75 inches.

Volume, If Grout Volume exceeds 5 cubic feet:

Should the grout pressure not be achieved by an upper limit of 5 cubic feet while the shaft has not exceeded the upward displacement criterion, the water cement ratio shall be reduced systematically by an interval of 0.25 and pumping resumed until the design pressure can be achieved. A practical lower limit for w/c ratios of grout is 0.4. Grout Volume Criterion will restart with each reduced w/c ratio.

Step 6. Re-survey the elevation of the top of shaft, record upward displacement, net grout volume, maximum sustained grout pressure.

APPENDIX E FIELD GROUT RECORD LOG SUMMARIES

Figure E-1 PGA Blvd Phase I field survey record data for FEC bridge.

Shaft ID Name	Shaft Length (m)	Grout Press (bars)	Displacement (mm)	Total Volume (L)	Return Volume (L)	Grouting Date
b1s1	12.839	24	1.0	97.5	20.0	10/16/2002
b1s2	12.839	24	1.0	87.5	22.5	10/16/2002
b1s3	12.839	24	0.0	97.5	22.5	10/16/2002
b4s1	10.596	26	5.5	150.0	20.0	11/13/2002
b4s2	10.596	38	9.5	260.0	20.0	11/13/2002
b4s3	10.596	22	1.0	55.0	20.0	11/13/2002
p2s1	15.186	43	7.0	87.5	25.0	10/22/2002
p2s2	15.186	43	1.0	92.5	25.0	10/21/2002
p2s3	15.186	44	7.0	107.5	25.0	10/21/2002
p2s4	15.186	45	4.0	75.0	25.0	10/22/2002
p2s5	15.186	44	1.0	100.0	25.0	10/22/2002
p2s6	15.186	45	3.0	92.5	25.0	10/22/2002
p2s7	15.186	43	4.0	92.5	25.0	10/21/2002
p2s8	15.186	45	3.0	90.0	25.0	10/21/2002
p2s9	15.186	44	2.0	110.0	25.0	10/22/2002
p3s1	15.667	53	9.0	70.0	25.0	11/14/2002
p3s2	15.667	52	3.0	100.0	30.0	11/14/2002
p3s3	15.667	53	4.0	200.0	30.0	11/14/2002
p3s4	15.667	51	5.0	120.0	30.0	11/14/2002
p3s5	15.667	51	2.0	155.0	25.0	11/13/2002
p3s6	15.667	51	1.5	70.0	25.0	11/13/2002
p3s7	15.667	52	2.0	115.0	30.0	11/14/2002
p3s8	15.667	51	7.0	115.0	30.0	11/14/2002
p3s9	15.667	51	2.5	127.5	25.0	11/13/2002

Figure E-2 PGA Blvd Phase I field survey record data for Ramp 71.

Shaft ID Name	Shaft Length (m)	Grout Press (bars)	Displacement (mm)	Total Volume (L)	Return Volume (L)	Grouting Date
b1s1	9.986	25	3.0	210.0	20.0	11/13/2002
b1s2	9.986	25	3.0	110.0	25.0	11/13/2002
b1s3	9.986	25	2.0	165.0	20.0	11/13/2002
b3s1	12.12	22	1.0	85.0	40.0	11/12/2002
b3s2	12.12	22	1.5	50.0	20.0	11/12/2002
b3s3	12.12	24	2.0	50.0	20.0	11/12/2002
p2s1	14.505	40	1.5	77.5	32.5	11/12/2002
p2s2	14.505	42	3.0	115.0	30.0	11/12/2002
p2s3	14.505	40	2.0	100.0	30.0	11/12/2002
p2s4	14.505	40	4.0	95.0	25.0	11/12/2002

Appendix E (continued)

Figure E-3 PGA Blvd Phase I field survey record data for SR 811 bridge.

Shaft ID Name	Shaft Length (m)	Grout Press (bars)	Displacement (mm)	Total Volume (L)	Return Volume (L)	Grouting Date
b1r5	14.415	30	1.0	59.5	32.5	7/18/2002
b1r6	14.809	28	5.0	260.0	32.5	7/18/2002
b1r7	14.387	30	2.5	106.0	36.0	7/1/2002
b1r8	14.2	30	6.5	147.5	12.5	7/30/2002
b1r9	13.29	30	12.0	240.0	27.5	7/30/2002
b4s5	14.77	31	1.0	147.5	25.0	8/21/2002
b4s6	14.72	31	0.0	60.0	25.0	8/21/2002
b4s7	14.68	31	1.0	107.5	30.0	8/21/2002
b4s8	14.74	32	2.0	90.0	47.5	8/21/2002
b4s9	15.11	31	1.0	110.0	30.0	8/21/2002
p2r3s1	14.39	31	19.0	82.5	32.5	8/6/2002
p2r3s2	14.53	35	1.5	60.0	30.0	8/7/2002
p2r3s3	14.87	35	4.0	72.5	30.0	8/7/2002
p2r3s4	14.626	39	6.5	127.5	35.0	8/6/2002
p2r4s1	17.77	42	3.0	82.5	32.5	8/22/2002
p2r4s2	17.61	42	2.0	97.5	22.5	9/12/2002
p2r4s3	17.85	42	0.0	137.5	45.0	8/22/2002
p2r4s4	17.336	39	1.0	107.5	30.0	8/6/2002
p2r5s1	14.42	32	3.0	387.5	30.0	8/7/2002
p2r5s2	14.694	33	3.0	150.0	32.5	8/7/2002
p2r5s3	14.624	31	7.0	230.0	30.0	8/7/2002
p2r5s4	14.708	32	3.0	160.0	25.0	9/3/2002
p3r3s1	12.408	35	1.0	165.0	22.5	9/19/2002
p3r3s2	12.258	35	1.5	120.0	25.0	9/18/2002
p3r3s3	12.428	35	1.5	105.0	30.0	9/18/2002
p3r3s4	12.528	35	2.0	82.5	22.5	9/18/2002
p3r4s1	14.998	43	0.0	160.0	25.0	9/18/2002
p3r4s2	15.148	45	2.0	82.5	25.0	9/18/2002
p3r4s3	14.988	45	0.0	85.0	25.0	9/19/2002
p3r4s4	14.568	45	2.0	240.0	25.0	9/19/2002
p3r5s1	12.248	35	2.0	105.0	27.5	9/19/2002
p3r5s2	12.528	35	2.0	187.5	22.5	9/19/2002
p3r5s3	12.368	35	1.0	157.5	22.5	9/19/2002
p3r5s4	12.19	35	1.0	115.0	22.5	9/19/2002
t1s1	9.986	14	1.0	75.0	22.5	10/14/2002
t1s2	9.986	14.5	1.0	75.0	15.0	10/14/2002
t1s3	9.986	16	1.0	67.5	25.0	10/14/2002
t1s4	9.986	17	0.0	67.5	20.0	10/14/2002
t3s1	9.986	16	0.0	60.0	15.0	10/15/2002
t3s2	9.986	15	0.0	107.5	22.5	10/15/2002
t3s3	9.986	16	2.5	80.0	25.0	10/15/2002
t3s4	11.986	18.5	0.5	75.0	17.5	10/15/2002

Appendix E (continued)

Figure E-4 PGA Blvd Phase II field survey record data for SR 811 bridge.

Shaft ID Name	Shaft Length (m)	Grout Press (bars)	Displacement (mm)	Total Volume (L)	Return Volume (L)	Grouting Date
b1L1	14.2	29	1.0	152.5	37.5	11/11/2003
b1L2	14.12	30	1.0	55.0	25.0	11/11/2003
b1L3	14.54	30	2.0	140.0	20.0	11/13/2003
b1L4	14.18	30	0.0	192.5	25.0	11/11/2003
b4s1	14.1	35	1.0	117.5	27.5	12/12/2003
b4s2	14.03	34	0.5	77.5	25.0	12/12/2003
b4s3	14.09	35	1.0	170.0	35.0	12/15/2003
b4s4	14.18	35	1.5	75.0	27.5	12/12/2003
p2l1s1	17.768	35	0.5	85.0	35.0	11/22/2003
p2l1s2	18.035	35	0.5	105.0	17.5	11/22/2003
p2l1s3	17.648	35	1.0	50.0	25.0	11/22/2003
p2l1s4	16.552	50	1.0	75.0	42.5	11/25/2003
p2l2s1	17.778	35	1.0	90.0	25.0	11/22/2003
p2l2s2	17.938	35	1.5	100.0	37.5	11/22/2003
p2l2s3	17.434	36	1.0	90.0	35.0	11/22/2003
p2l2s4	17.83	34	1.0	250.0	60.0	11/22/2003
p3l1s1	17.918	36	1.0	85.0	45.0	12/9/2003
p3l1s2	18.898	36	0.0	102.5	25.0	12/9/2003
p3l1s3	17.954	36	0.0	90.0	47.5	12/8/2003
p3l1s4	17.778	36	0.0	102.5	57.5	12/8/2003
p3l2s1	17.828	35	0.0	67.5	22.5	11/24/2003
p3l2s2	18.688	33	0.0	100.0	40.0	11/24/2003
p3l2s3	17.954	36	1.0	80.0	32.5	11/24/2003
p3l2s4	18.428	36	0.5	50.0	22.5	11/24/2003
t2s1	13.096	15	1.5	170.0	20.0	12/12/2003
t2s2	13.076	14	1.0	85.0	15.0	12/18/2003
t2s3	13.046	15	0.5	75.0	25.0	12/12/2003
t2s4	13.162	16	1.0	170.0	27.5	12/15/2003
t4s1	10.061	16	0.0	207.5	25.0	12/8/2003
t4s2	10.061	16	0.0	280.0	35.0	12/8/2003
t4s3	10.091	17	0.0	70.0	25.0	12/8/2003
t4s4	10.161	17	0.0	75.0	25.0	12/8/2003

Appendix E (continued)

Figure E-5 Natchez field survey record data.

Shaft ID Name	Shaft Length (m)	Tip Elevation (m)	Grout Press (bars)	Displacement (mm)	Total Volume (L)	Return Volume (L)	Grouting Date
Bent 1 Shaft 1	23.17	7.62	22.0	2.00	360.0	127.5	7/12/03
Bent 1 Shaft 2	23.17	7.62	23.0	2.00	345.0	132.5	7/12/2003
Bent 2 Shaft 1	21.34	7.62	26.0	3.00	152.5	82.5	7/12/2003
Bent 2 Shaft 2	21.34	7.62	25.0	4.00	355.0	125.0	7/12/2003
Bent 3 Shaft 1	21.95	7.62	25.0	5.00	657.5	135.0	7/11/2003
Bent 3 Shaft 2	21.95	7.62	24.0	3.00	495.0	65.0	7/11/2003
Bent 4 Shaft 1	21.95	7.62	25.0	2.00	162.5	50.0	7/10/2003
Bent 4 Shaft 2	21.95	7.62	25.0	4.00	382.5	50.0	7/10/2003
Bent 5 Shaft 1	21.95	7.62	24.0	3.00	397.5	155.0	7/10/2003
Bent 5 Shaft 2	21.95	7.62	32.0	4.50	302.0	70.0	7/10/03,7/11/03
Bent 6 Shaft 1	29.88	7.62	25.0	0.50	215.0	35.0	8/4/2003
Bent 6 Shaft 2	29.88	7.62	25.0	1.50	235.0	25.0	8/4/2003
Bent 7 Shaft 1	29.88	7.62	25.0	1.50	215.0	185.0	8/5/2003
Bent 7 Shaft 2	29.88	7.62	24.0	5.00	175.0	100.0	8/5/2003
Bent 8 Shaft 1	29.88	7.62	26.0	2.50	277.5	235.0	8/5/2003
Bent 8 Shaft 2	29.88	7.62	27.0	2.50	182.5	105.0	8/5/2003
Bent 9 Shaft 1	29.88	7.62	24.0	3.50	270.0	90.0	8/6/2003
Bent 9 Shaft 2	29.88	7.62	22.0	8.50	335.0	115.0	8/6/2003
Bent 10 Shaft 1	24.70	7.62	23.5	4.00	232.5	50.0	8/6/2003
Bent 10 Shaft 2	24.70	7.62	22.0	6.00	282.5	35.0	8/6/2003
Bent 11 Shaft 1	21.65	7.62	15.0	12.50	175.0	80.0	8/19/2003
Bent 11 Shaft 2	21.65	7.62	14.0	7.00	142.5	65.0	8/19/2003
Bent 12 Shaft 1	28.66	7.62	15.0	15.00	370.0	40.0	8/19/2003
Bent 12 Shaft 2	28.66	7.62	25.0	3.00	355.0	85.0	8/19/2003
Bent 13 Shaft 1	28.35	7.62	24.0	2.00	315.0	30.0	8/20/2003
Bent 13 Shaft 2	28.35	7.62	25.0	2.00	162.5	30.0	8/20/2003

Drilled Shaft Post Grout Field Record

Project Name: FM 507 North Floodway Pilot Channel Bridge - Willacy County, Texas	
	Shaft Designation: West Shaft
Contractor: A.H. Beck Foundation Conmpany, Inc.	Post Grout Date: 7/8/03
Post Grouting By: Applied Foundation Testing, Inc.	AFT Grout Technician: Jason Frederick
	AFT Project Engineer: Mike Muchard, P.E.

Drilled Shaft Information

Drilled Shaft Tip Diameter: 30 in.	Drilled Shaft Top Elevation: 15.00 ft
Drilled Shaft Length: 46.00 ft	Drilled Shaft Tip Elevation: -31.00 ft
Shaft Construction Date: 7/01/03	Concrete Strength at Time of Grouting (psi) 3600

Post Grouting Information

Flat Jack Diameter: 24 inches	Grout Plant Type: HANY IC 310
Grout Tube Diameter: 0.79 in I.D.	Pump Type: Single Stage Piston
Grout Tube Length: 48 ft	Mixer Type: Colloidal Mixing w/Agitator Holding
No. of Grout Tubes: 3	Grout Type: Type I Portland Cement
Volume of Grout Tubes: 0.49 ft^3	Water / Cement Ratio: 0.4 to 0.5 (+/- 0.05)
Total Volume in Pump and Lines (ft^3): 0.52	Yield: 36 Liters per bag (1.256 ft^3) @ 0.5 w/c ratio

Post Grouting Criteria

Maximum Permissible Displacement: Test	Maximum Required Grout Pressure: Test
Minimum Grout Volume: 1.0 cubic feet	

Post Grouting Data / Comments

Uplift of adjacent column occurred.
Hydrostatic pressure of 21 psi needs to be added to below.

	Grout Pressure		Upward Shaft Displacement		Grout Volume		
Time	bar	psi	mm	inches	L	ft^3	Notes
2:40							Batch Grout @ w/c = 0.50
2:57	0	0	0.00	0.000	22.5	0.79	Grout return all tubes
3:00	7	103	1.00	0.039	12.5	0.44	
3:01	11	162	2.00	0.079	12.5	0.44	
3:13	15	221	3.50	0.138	90.0	3.18	
3:17	7	103	3.50	0.138	42.5	1.50	
3:25	13	191	6.00	0.2	105.0	3.71	reduce w/c =0.4
3:43	15	221	7.50	0.295	47.5	1.68	Lock Valve.
Maximums	**15**	**221**	**7.50**	**0.295**	**332.5**	**11.74**	

Figure E-1 FM 507 West shaft field survey record.

Drilled Shaft Post Grout Field Record

Project Name: FM 507 North Floodway Pilot Channel Bridge - Willacy County, Texas	
	Shaft Designation: East Shaft
Contractor: A.H. Beck Foundation Conmpany, Inc.	Post Grout Date: 7/8/03
Post Grouting By: Applied Foundation Testing, Inc.	AFT Grout Technician: Jason Frederick
	AFT Project Engineer: Mike Muchard, P.E.

Drilled Shaft Information

Drilled Shaft Tip Diameter: 30 in.	Drilled Shaft Top Elevation: 15.00 ft
Drilled Shaft Length: 46.00 ft	Drilled Shaft Tip Elevation: -31.00 ft
Shaft Construction Date: 7/01/03	Concrete Strength at Time of Grouting (psi) 3600

Post Grouting Information

Flat Jack Diameter: 24 inches	Grout Plant Type: HANY IC 310
Grout Tube Diameter: 0.79 in I.D.	Pump Type: Single Stage Piston
Grout Tube Length: 48 ft	Mixer Type: Colloidal Mixing w/Agitator Holding
No. of Grout Tubes: 3	Grout Type: Type I Portland Cement
Volume of Grout Tubes: 0.49 ft^3	Water / Cement Ratio: 0.5 (+/- 0.05)
Total Volume in Pump and Lines (ft^3): 0.52	Yield: 36 Liters per bag (1.256 ft^3) @ 0.5 w/c ratio

Post Grouting Criteria

Maximum Permissible Displacement: Test	Maximum Required Grout Pressure: Test
Minimum Grout Volume: 1.0 cubic feet	

Post Grouting Data / Comments

Hydrostatic pressure of 21 psi needs to be added to pressure measurements below.

	Grout Pressure		Upward Shaft Displacement		Grout Volume		
Time	bar	psi	mm	inches	L	ft^3	Notes
4:39							Batch Grout @ w/c = 0.45
4:42	0	0	0.00	0.000	42.5	1.50	Grout return all tubes
4:44	6	88	0.50	0.020	10.0	0.35	
4:49	10	147	3.50	0.138	47.5	1.68	
4:53	13	191	7.50	0.295	37.5	1.32	Lock Valve.
Maximums	**13**	**191**	**7.50**	**0.295**	**137.5**	**4.86**	

Conversions : Grout plant holding tank volume calibration = 1 inch in tank = 5 liters grout

(1 cubic meter = 1.307 cubic yards = 35.3 cubic feet) (1 Bar = 100 kPa = 14.7 psi)

(28.32 Liters = 1 cubic foot) (3.785 Liters = 1 Gallon) (25.4 mm = 1 inch) (1 kg = 2.21 lbs)

Figure E-2 FM 507 East shaft field survey record.