APPENDIX 5
LABORATORY TEST RESULTS
ROCK QUALITY TESTS

EAA Reservoir
Project 05 05 0013 016A
Work Order No: 4

Compressive Strength of Rock Cores

Core Identification	Core Depth (feet)	Compressive Strength (psi)
CB-0158	1.0-5.5	2600
CB-0159	4.75-9.75	1250
CB-0161	4.5-8.0	1430
CB-0163	5.5-10.5	4340
CB-0165	6.5-11.5	3690
CB-0167	6.5-11.5	1530
CB-0172	2.5-7.5	1570
CB-0173	5.0-5.5	1860
CB-0175	3.5-6.5	4620
CB-0176	1.0-5.0	2650
CB-0177	4.5-9.5	3090
CB-0178	9.5-12.0	433
CB-0179	0.4-3.5	1676
CB-0187	2.5-3	1105
CB-0187	25-30	2400
CB-0188	1.0-6.0	650
CB-0211	5.0-10.0	5200
CB-0212	10.0-15.0	2710
CB-0212	3.0-3.5	5920
CB-0184	4-9	1870

Notes:

1 Core compressive strength determined in general accordance with ASTM D2938

EAA Reservoir
Project 05 05 0013 016A
Work Order No: 6

Compressive Strength of Rock Cores

CP05-EAARS-CB

Core Identification	~~Core Depth~~ (feet)	Compressive Strength (psi)
CB-0248 -0346	5.0-10.0	5010
CB-0260 -0358	8.5-13.0	2500
CB-0268 -0365	6.5-11.5	1500
CB-0276 -0372	4.0-9.0	3570
CB-0276 -0372	10.0-14.0	1570
CB-0277 -0373	4.5-9.5	1000
CB-0277 -0373	9.5-14.5	4430
CB-0281 -0377	5.5-10.5	3880
CB-0281 -0377	10.5-15.5	2250
CB-0302 -0398	7.0-12.0	2100
CB-0302 -0398	12.0-17.0	1040

Notes:

1 Core compressive strength determined in general accordance with ASTM D2938

Date:	10/18/2005
Project No:	05-05-0013-101 W.O.#5
Project Name:	EAA Resevior
Requested by:	Black & Veatch

CP05 - EAA125 - C13

Nodarse & Associates, Inc.

Sample No.	Length(inches)	Avg Diameter(inches)	Load (lbs)	Strenght(psi)	Comments
CB_0162. 7-12 ft	-0260 4.83	2.48	47180	9768	
CB-0191. 9.6-10.9ft	-0290 4.83	2.48	4220	874	
CB-0191 24-29ft	-0290 4	2.48	10700	2215	
CB-0194 41.5-45.5ft	-0293 83	2.49	5120	1053	
CB-0204 10-15ft	-0303 4.86	2.49	41020	8389	
CB-0206 9.5-14.5ft	-0304 4.86	2.49	15530	3195	
CB-0208 8.25-11.0ft	-0306 4.86	2.49	39270	8080	
CB-0216 26.1-27ft	-0314 4.86	2.46	14090	2979	
CB-0216 32.9-34.1ft	-0314 4.73	2.49	23890	4916	
CB--0220 19.9-25ft	-0318 4.86	2.49	4650	960	
CB-0220 25.0-30.0ft	-0318 4.86	2.49	15040	3095	
CB-0222 17.5-18.1ft	-0320 4.86	2.49	7200	1481	
CB-0231 2.0-7.0ft	-0329 4.52	2.47	8440	1867	
CB-0292 0-5.0ft	-0388 4.79	2.47	10150	2119	
CB-0296 0-5.0ft	-0392 4.83	2.48	8720	1805	

Nodarse & Associates, Inc.

Date: 10/4/2005
Project Name: EAA Resivior A-1
Project No: 05-05-0013-101 WO#5
Tested by: Chris B
Depth See sample #
Checked by: Chris B

ASTM D 6473-99 Test Method

Specific Gravity & Absorption
of Rock for Erosion Control

CP05-EAAR3-CB1

Sample No.	Wt.inH2O (C) gr.	SSD Wt. (B) gr.	Oven Dry Wt. (A) gr.	Bulk Sp G.	Bulk (SSD) Sp. Gr	Apparent Sp. Gr	Absorption	Comments
CB-0191 24-29ft	-0290 320.1	544.1	516.8	2.31	2.43	2.63	5.26	
CB-0194 37.8-38.5ft	-0293 663.1	1157.8	1062	2.14	2.34	2.66	9.02	
CB-0201 10-10.7ft	-0300 958.1	1631.5	1555.2	2.31	2.42	2.61	7.96	
CB-0204 10-15ft	-0303 548.2	981.7	889.1	2.05	2.26	2.61	10.43	
CB-0208 8.25-11ft	-0306 815.2	1346.1	1310.8	2.47	2.53	2.64	2.69	
CB-0220 19.9-25ft	-0318 562.5	1023.5	889.2	1.93	2.22	2.72	15.1	
CB-0220 25-30.0ft	-0318 658.2	1142.6	1059.4	2.19	2.36	2.31	7.85	

Bulk spec. gravity =A/(B-C)

Bulk spec. gravity(SSD)=B/(B-C)

Apparent spec. gravity=A(A-C)

Absorption = [(B-A)/A]X100%

EAA Reservoir
05 05 0013 106A
Work Order No: 4
Rock Core Specific Gravity and Absorption

CP05 - EARRS -

	Core Identification	Core Depth (feet)	Bulk Specific Gravity	Bulk (SSD) Specific Gravity	Apparent Specific Gravity	Absorption (%)
CB-0312	CB-0214	32.5-33.2	1.501	1.600	1.680	7.38
CB-0324	CB-0226	4.74-9.75	2.340	2.440	2.600	4.35
CB-0324	CB-0226	16.0-21.0	2.390	2.460	2.560	2.90
CB-0325	CB-0227	5.75-10.75	2.400	2.480	2.600	3.27
CB-0326	CB-0228	6.5-11.5	2.204	2.360	2.610	7.11
CB-0326	CB-0228	17.5-22.5	2.010	2.210	2.550	11.0
CB-0287	CB-0187	2.5-3.0	2.000	2.210	2.550	10.97
CB-0289	CB-0189	20.5-25.5	2.460	2.550	2.700	3.56
CB-0309	CB-0211	5.0-10.0	2.460	2.510	2.585	1.83
CB-0310	CB-0212	10.0-15.0	1.740	1.890	2.030	8.41
CB-0310	CB-0212	30.0-35.0	2.960	3.140	3.600	6.10
CB-0311	CB-0213	23.5-28.5	1.910	2.170	2.570	13.28
CB-0274	CB-0178	9.5-12.0	2.260	2.350	2.500	4.10
CB-0275	CB-0179	0.4-5.5	2.400	2.500	2.680	4.44
CB-0276	CB-0180	1.0-4.5	2.240	2.340	2.501	4.70
CB-0279	CB-0184	4.0-9.0	2.220	2.370	2.603	6.70
CB-0287	CB-0187	25.0-30.0	2.470	2.520	2.601	2.05
CB-0288	CB-0188	1.0-6.0	2.330	2.460	2.670	5.40
CB-0267	CB-0170	6.0-9.5	2.320	2.450	2.660	5.35
CB-0269	CB-0172	2.5-7.5	2.520	2.600	2.730	3.10
CB-0270	CB-0173	5.0-8.5	2.350	2.420	2.550	3.32
CB-0271	CB-0175	3.5-6.5	2.620	2.680	2.700	2.10
CB-0272	CB-0176	1.0-5.0	2.400	2.500	2.700	4.65
CB-0273	CB-0177	4.5-9.5	2.140	2.240	2.380	4.73
CB-0256	CB-0158	1.0-5.5	2.410	2.500	2.621	3.30
CB-0257	CB-0159	4.75-9.75	2.030	2.190	2.410	7.71
CB-0259	CB-0161	4.5-8.0	1.440	1.850	2.480	29.5

Notes:

1 Specific Gravity and Absorption determined in general accordance with ASTM D6473-99.

EAA Reservoir
05 05 0013 106A
Work Order No: 4
Rock Core Specific Gravity and Absorption

CP05 - ERARS -

	Core Identification	Core Depth (feet)	Bulk Specific Gravity	Bulk (SSD) Specific Gravity	Apparent Specific Gravity	Absorption (%)
CB-0261	CB-0163	5.5-10.5	2.320	2.440	2.650	5.39
CB-0262	CB-0165	6.5-11.5	2.430	2.500	2.580	2.39
CB-0264	CB-0167	6.5-11.5	2.270	2.380	2.550	4.93
CB-0327	CB-0229	4.0-9.0	2.160	2.304	2.510	6.53
CB-0327	CB-0229	18.0-23.0	1.901	2.090	2.330	9.63
CB-0327	CB-0229	23.0-28.0	1.970	2.190	2.540	11.57
CB-0331	CB-0233	2.5-7.5	2.310	2.410	2.550	4.0

Notes:
2 Specific Gravity and Absorption determined in general accordance with ASTM D6473-99.

EAA Reservoir
05 05 0013 106A
Work Order No: 6
Rock Core Specific Gravity and Absorption

CP05- EARRS - CB

Core Identification	Core Depth (feet)	~~Bulk~~ Specific Gravity	Bulk (SSD) Specific Gravity	Apparent Specific Gravity	Absorption (%)
CB-0248 -0346	5.0-10.0	2.42	2.49	2.60	2.90
CB-0260 -0358	2.0-7.0	2.40	2.50	2.50	1.51
CB-0260 -0358	8.5-13.0	2.17	2.30	2.50	6.10
CB-0268 0365	6.5-11.5	1.84	2.13	2.60	16.00
CB-0276 0372	4.0-9.0	2.17	2.34	2.60	7.87
CB-0276 0372	10.0-14.0	2.36	2.45	2.60	3.97
CB-0277 0373	4.5-9.5	2.23	2.37	2.60	6.20
CB-0277 0373	9.5-14.5	2.23	2.39	2.70	7.10
CB-0281 0377	5.5-10.5	2.19	2.33	2.60	6.78
CB-0281 0377	10.5-15.5	2.47	2.51	2.60	1.87
CB-0302 0398	7.0-12.0	2.04	2.20	2.40	7.90
CB-0302 0398	12.0-17.0	2.15	2.32	2.60	8.04

Notes: Specific Gravity and Absorption determined in general accordance with ASTM D6473-99.

Nodarse & Associates, Inc.

Date: 10/19/2005
Project Name: EAA Resivior A-1
Project No: 05-05-0013-101 WO#4
Tested by: Chris B
Depth See sample #
Checked by: Chris B

ASTM D 6473-99 Test Method

Specific Gravity & Absorption
of Rock for Erosion Control

Sample No.	Wt.inH2O (C) gr.	SSD Wt. (B) gr.	Oven Dry Wt. (A) gr.	Bulk Sp G.	Bulk (SSD) Sp. Gr	Apparent Sp. Gr	Absorption	Comments
Rip Rap sample 1	411.1	700.7	680.1	2.35	2.42	2.53	3.02	
Rip Rap sample 2	350.3	587.7	569.9	2.4	2.48	2.59	3.12	
Rip Rap sample 3	447.3	763.4	741.7	2.35	2.42	2.52	2.93	

Bulk spec. gravity =A/(B-C)

Bulk spec. gravity(SSD)=B/(B-C)

Apparent spec. gravity=A(A-C)

Absorption = [(B-A)/A]X100%

EAA Reservoir A-1
Laboratory Work Order No. 4, Rip Rap Samples
Los Angles Abrasion

Sample Number	1	2	3
Percent Wear	31.3	31.3	30.6
Grading	"A"	"A"	"A"

Note: Laboratory testing completed by Wingerter Laboratories Inc. of Miami Florida
Laboratory testing completed in accordance with ASTM C-131 & C-535.

EAA Reservoir A-1
Laboratory Work Order No. 4, Rip Rap Samples
Soundness of Rock

Sample Number	1	2	3
Percentage Loss	0%	0%	0%

Notes: Laboratory testing completed in general accordance with ASTM D5240.

APPENDIX 5
LABORATORY TEST RESULTS CARBONATE CONTENT

LABORATORY TEST RESULTS FOR
EAA RESERVOIR A-1
Nodarse & Associates, Inc. Project No. 05-05-0013

Boring Number	Sample Depth (ft)	Carbonate Content (%)
TC1-N-2	8.5	79.0
TC1-N-12	58.5	63.2
TC1-N-16	78.5	45.9
TC1-E-3	9.0	82.3
TC1-E-7	28.5	14.5
TC1-E-14	63.5	41.6
TC1-E-16	73.5	69.1
TC1-W-4	18.5	91.9
TC1-W-7	33.5	56.5
TC1-W-15	73.5	65.0
TC1-W-20	98.5	67.7
TC1-S-4	18.5	87.1
TC1-S-9	43.5	25.3
TC1-S-15	73.5	68.9
TC1-S-16	78.5	67.8
TC1-S-8	38.5	40.7

EAA Reservoir
05 05 0013 106A
Work Order No. 3
Carbonate Test Data

CB-0266

Boring Number	Depth (feet)	Carbonate Content (%)
CB 169 CP05 -EAARS	5.5-8.5	76.6
CB 171 CP05 -EAARS- CB-0268	7.0-10.0	81.6
CB 175 CP05 -EAARS -CB-0271	13.5-15.0	81.8
CB 186 CP05 - EAARS -CB 0281	33.5-35.0	34.7

227 TC-2 S 4
11.0'

Project Name: EAA
Project No:
Date: 2 21

NODARSE & ASSOCIATES, INC.

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

89.5 %

Crucible Number:		T
Wt. Of Crucible:	B	72.7778
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	72.8828
Insoluble Residue: *A-B = R*	R	0.1050

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

FZR

TC-2 W 8
33.5'

Project Name: EAA
Project No:
Date: 7-21

NODARSE & ASSOCIATES, INC.

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

23.3 %

Crucible Number:		105
Wt. of Crucible:	B	76.4745
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	77.2415
Insoluble Residue: *A-B = R*	R	0.7670

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

305

TC-2W 5
11.0'

Project Name: EAA
Project No:
Date: 2 21

NODARSE & ASSOCIATES, INC.

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

78.6 %

Crucible Number:		500
Wt. Of Crucible:	B	70.8534
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	71.0673
Insoluble Residue: *A-B = R*	R	0.2139

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

TC-2 t 5
18.5'

Project Name: EAA
Project No:
Date: 2 21

NODARSE & ASSOCIATES, INC.

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

80.6 %

Crucible Number:		C
Wt. Of Crucible:	B	75.5465
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	75.7410
Insoluble Residue: *A-B = R*	R	0.1945

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

234

TC-2 E S
18.5'

Project Name: EAA
Project No:
Date: 2 2.1

NODARSE & ASSOCIATES, INC.

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

80.6 %

Crucible Number:		C
Wt. Of Crucible:	B	75.5465
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	75.7410
Insoluble Residue: *A-B = R*	R	0.1945

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

227 TC-2 S 4
11.0'

Project Name: EAA
Project No:
Date: 2 21

NODARSE & ASSOCIATES, INC.

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

89.5 %

Crucible Number:		T
Wt. Of Crucible:	B	72.7778
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	72.8828
Insoluble Residue: *A-B = R*	R	0.1050

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

FtR

TC-2 W 8
33.5'

Project Name: EAA
Project No:
Date: 2-21

NODARSE & ASSOCIATES, INC.

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

23.3 %

Crucible Number:		105
Wt. Of Crucible:	B	76.4745
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	77.2415
Insoluble Residue: *A-B = R*	R	0.7670

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

305 TC-2W 3
11.0'

Project Name: EAA
Project No:
Date: 2 21

NODARSE & ASSOCIATES, INC.

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

78.6 %

Crucible Number:		500
Wt. Of Crucible:	B	70.8534
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	71.0673
Insoluble Residue: *A-B = R*	R	0.2139

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

EAA Reservoir
05 05 0013 106A
Work Order No: 5
Carbonate Test Data

CP05 - EAAR S - VB

	Boring Number	Depth (feet)	Carbonate Content (%)
-0283	CB-0174	100-105	71.7
"	CB-0174	110-115	75.5
"	CB-0174	115-120	75.9
"	CB-0174	125-130	77.7
"	CB-0174	140-145	53.0
"	CB-0174	150-155	68.3
"	CB-0174	160-165	67.2
"	CB-0174	165-170	41.2
"	CB-0174	180-185	37.9
"	CB-0174	185-190	53.6
"	CB-0174	195-200	36.6
"	CB-0174	200-205	23.9
-0283	CB-0174	205-210	30.5

Notes:

1 Carbonate content determined in general accordance with FDOT Standard.

EAA Reservoir
05 05 0013 106A
Work Order No. 6
Carbonate Test Data

CP05 -ETARS-VB -

	Boring Number	Depth (feet)	Carbonate Content (%)
0282	CB 164	55060	61.8
0282	CB 164	70-75	72.3
0282	CB 164	130-135	32.8
0282	CB 164	180-185	54.8
0284	CB 182	70-75	78.8
0284	CB 182	90-95	72.1
0284	CB 182	140-145	55.4
0284	CB 182	175-180	48.2
0286	CB 205	60-65	77.1
0286	CB 205	75-80	72.0
0286	CB 205	140-145	58.2
0286	CB 205	160-165	61.6

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

102

BA-01
5.5-7.0'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

87.4%

Crucible Number:		202
Wt. Of Crucible:	B	18.3244
Mass of Sample:	W	1.6001
Crucible + Insoluble Residue After Burn:	A	18.4508
Insoluble Residue: *A-B = R*	R	0.1264

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

1

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

BA-01
28.5-30.0'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

29.1 %

Crucible Number:		C
Wt. Of Crucible:	B	75.5444
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	76.2531
Insoluble Residue: *A-B = R*	R	0.7087

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

BA-01
43.5-45.0'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

10.9 %

Crucible Number:		203
Wt. Of Crucible:	B	17.2999
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	18.1907
Insoluble Residue: *A-B = R*	R	0.8908

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

BA-03
2.5-10.0'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

82.6 %

Crucible Number:		105
Wt. Of Crucible:	B	25.8748
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	26.0486
Insoluble Residue: *A-B = R*	R	0.1738

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

BA-03
29-30.5'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

40.5 %

Crucible Number:		100
Wt. Of Crucible:	B	26.1823
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	26.7771
Insoluble Residue: *A-B = R*	R	0.5948

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

BA-03
43.5' - 45.0'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

37.3%

Crucible Number:		105
Wt. Of Crucible:	B	25.8741
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	26.5013
Insoluble Residue: *A-B = R*	R	0.6272

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

101

BA-04, 6.2'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

87.7%

Crucible Number:		203
Wt. Of Crucible:	B	17.2991
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	17.4220
Insoluble Residue: *A-B = R*	R	0.1229

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

BA-04
18.5'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

82.7 %

Crucible Number:		B
Wt. Of Crucible:	B	76.4770
Mass of Sample:	W	1.0001
Crucible + Insoluble Residue After Burn:	A	76.6500
Insoluble Residue: *A-B = R*	R	0.1730

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

BA-04 33.5'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

31.4%

Crucible Number:		101
Wt. Of Crucible:	B	25.2995
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	25.9857
Insoluble Residue: $A-B = R$	R	0.6862

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

B4-05
28.5'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

36.8 %

Crucible Number:		100
Wt. of Crucible:	B	26.1721
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	26.8037
Insoluble Residue: *A-B = R*	R	0.6316

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

BA-05
8.5'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

86.2 %

Crucible Number:		101
Wt. Of Crucible:	B	25.3000
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	25.4383
Insoluble Residue: *A-B = R*	R	0.1383

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

BA-05
38.5'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

31.4 %

Crucible Number:		11
Wt. Of Crucible:	B	29.4254
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	30.1114
Insoluble Residue: *A-B = R*	R	0.6860

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

TT-6

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

BA-06
6.0-7.5'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

84.7 %

Crucible Number:		100
Wt. Of Crucible:	B	26.1653
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	26.3184
Insoluble Residue: *A-B = R*	R	0.1531

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

309

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

BA-06
28.5-30.0'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

27.6 %

Crucible Number:		C
Wt. Of Crucible:	B	75.5440
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	76.2680
Insoluble Residue: *A-B = R*	R	0.7240

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

BA-06
48.5-50.0'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

34.6 %

Crucible Number:		102
Wt. Of Crucible:	B	25.6848
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	26.3388
Insoluble Residue: *A-B = R*	R	0.6540

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

BA-07
6.0-7.5'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

83.0 %

Crucible Number:		204
Wt. Of Crucible:	B	17.8940
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	18.0643
Insoluble Residue: *A-B = R*	R	0.1703

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

B4.07
18.5-20.0'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

84.8 %

Crucible Number:		202
Wt. Of Crucible:	B	18.3399
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	18.4918
Insoluble Residue: *A-B = R*	R	0.1519

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

BA·07
38.5-40.0'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

28.5 %

Crucible Number:		102
Wt. Of Crucible:	B	25.6892
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	26.4045
Insoluble Residue: $A-B = R$	R	0.7153

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

279

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

BA-08
8.5'-10.0'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

85.9 %

Crucible Number:		105
Wt. of Crucible:	B	25.8640
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	26.0054
Insoluble Residue: $A-B = R$	R	0.1414

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

BA-08
13.5-15.0'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

83.7 %

Crucible Number:		11
Wt. Of Crucible:	B	29.4172
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	29.5807
Insoluble Residue: *A-B = R*	R	0.1635

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

225

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

BA-08
38.5-40.0

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

32.0 %

Crucible Number:		101
Wt. of Crucible:	B	25.2934
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	25.9733
Insoluble Residue: *A-B = R*	R	0.32.01

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

BA-09
23.5-25.0' 105

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

78.5 %

Crucible Number:		204
Wt. Of Crucible:	B	17.8686
Mass of Sample:	W	1.0001
Crucible + Insoluble Residue After Burn:	A	18.0836
Insoluble Residue: *A-B = R*	R	0.2150

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

BA.09
38.5-40.0'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

25.3 %

Crucible Number:		T
Wt. Of Crucible:	B	1.0001
Mass of Sample:	W	72.7716
Crucible + Insoluble Residue After Burn:	A	73.5187
Insoluble Residue: *A-B = R*	R	0.7471

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

SECA

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

BA-10
13.5-15.0'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

83.5 %

Crucible Number:		A
Wt. Of Crucible:	B	75.0438
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	75.2091
Insoluble Residue: A-B = R	R	0.1653

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

241

102

Project Name: EAA
Project No:
Date:

NODARSE & ASSOCIATES, INC.

BA-10
33.5-35.0'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

26.7 %

Crucible Number:		102
Wt. of Crucible:	B	25.6924
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	26.4250
Insoluble Residue: *A-B = R*	R	0.7326

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up ± 0.4%
50% and up ± 0.9%

APPENDIX 5
LABORATORY TEST RESULTS
OTHER TESTS

TRIAXIAL TEST RESULTS

Note: Material for triaxial tests on remolded samples was obtained from soil used in Test Cell construction.

EAA Reservoir
05 05 0013 106A
Work Order No: 5
Corrosion Test Data

CP05 - EAARS - VB - A

	Boring Number	Depth (feet)	Electrical Resisitivity (0hm-cm)	pH	Chlorides (ppm)	Sulfates (ppm)
-0283	CB-0174	5-10	8.2 x 1k	8.5	60	25
-0283	CB-0174	115-120	3.0 x 1k	8.3	60	Less than 5

Notes:

1 Corrosion Series determined in general accordance with FDOT Standards.

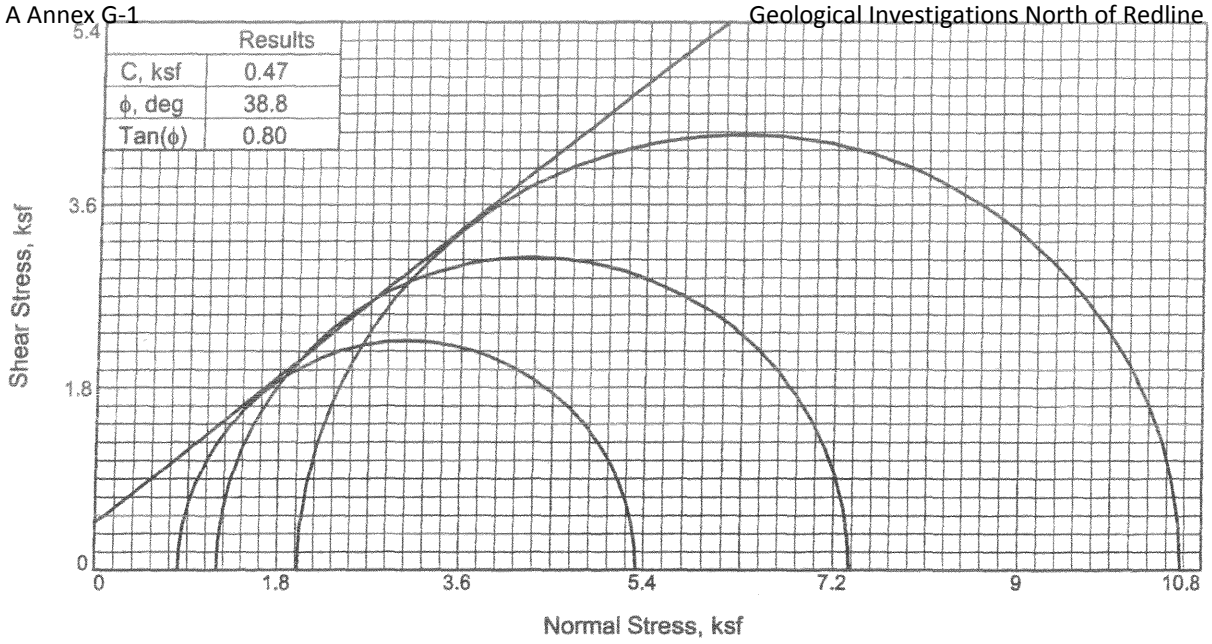
EAA Reservoir
05 05 0013 106A
Work Order No: 6
Corrosion Test Data

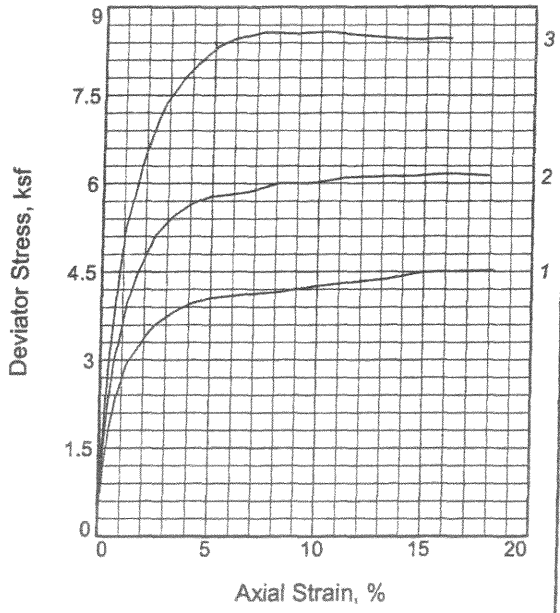
Boring Number	Depth (feet)	Electrical Resisitivity (0hm-cm)	pH	Chlorides (ppm)	Sulfates (ppm)
CB-0164	5-10	6.1 x 1k	8.9	90	60

1CP05 - EAARS - CB - 0361

Notes:

1 Corrosion Series determined in general accordance with FDOT Standards.





Sample No.		1	2	3
Initial	Water Content,	15.9	16.2	15.8
	Dry Density, pcf	104.4	107.4	107.3
	Saturation,	67.4	74.0	71.9
	Void Ratio	0.6508	0.6047	0.6066
	Diameter, in.	2.84	2.84	2.84
	Height, in.	6.05	6.15	6.83
At Test	Water Content,	22.8	21.7	21.9
	Dry Density, pcf	105.8	107.8	107.5
	Saturation,	100.0	100.0	100.0
	Void Ratio	0.6304	0.6000	0.6044
	Diameter, in.	2.83	2.84	2.84
	Height, in.	6.02	6.14	6.83
Strain rate, in./min.		0.05	0.05	0.05
Back Pressure, ksf		0.0	0.0	0.0
Cell Pressure, ksf		0.8	1.2	2.0
Fail. Stress, ksf		4.5	6.2	8.6
Ult. Stress, ksf				
σ_1 Failure, ksf		5.3	7.4	10.6
σ_3 Failure, ksf		0.8	1.2	2.0

Type of Test: Unconsolidated Undrained

Sample Type: remold

Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments

Specific Gravity= 2.762

Remarks: sample moist cured 14 days

Client: Nodarse and Associates

Project: Material Testing-Nodarse

Sample Number: UU-95% 14 day cured

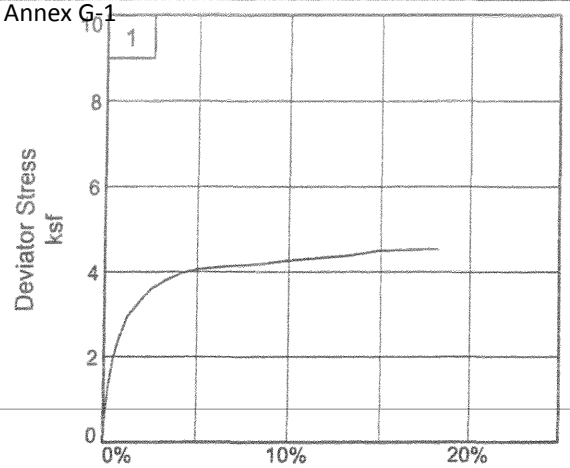
Proj. No.: 6738-05-4573 **Date:** 6-28-05

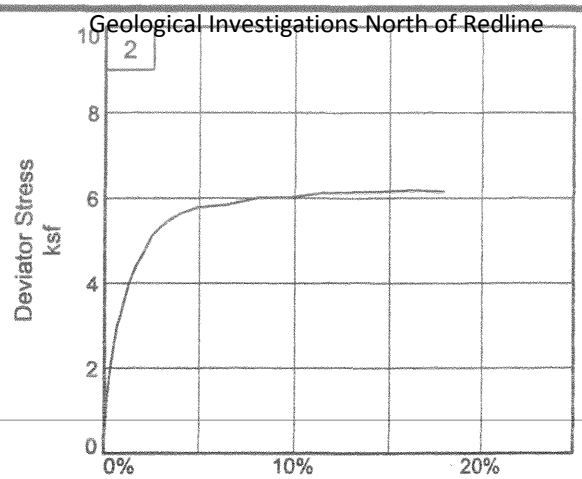
TRIAXIAL SHEAR TEST REPORT

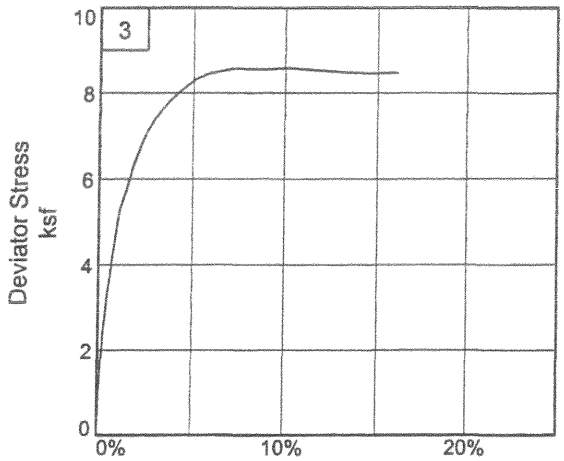
MACTEC ENGINEERING AND CONSULTING, INC.

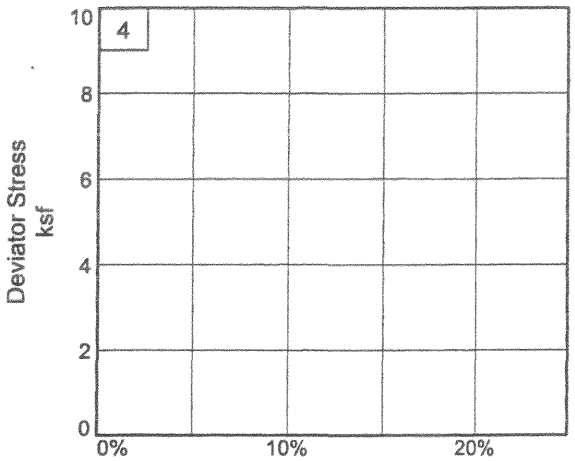
Reviewed By _____

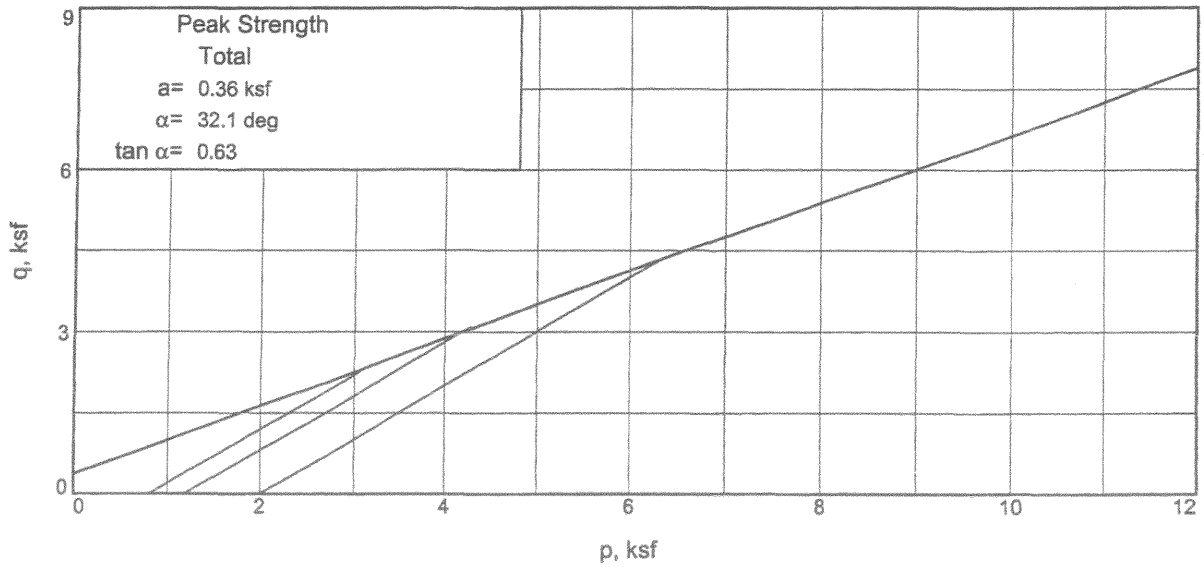
Tested By: MC **Checked By:** Rajni Sukhwani











Client: Nodarse and Associates
Project: Material Testing-Nodarse
Sample Number: UU-95% 14 day cured
Project No.: 6738-05-4573

Reviewed By _____ **MACTEC Engineering and Consulting, Inc.**

Tested By: MC _____ **Checked By:** _____

TRIAXIAL COMPRESSION TEST

Unconsolidated Undrained

7/14/2005
9:00 AM

Date: 6-28-05
Client: Nodarse and Associates
Project: Material Testing-Nodarse
Project No.: 6738-05-4573
Sample Number: UU-95% 14 day cured
Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments
Remarks: sample moist cured 14 days
Type of Sample: remold
Specific Gravity=2.762 **LL=** **PL=** **PI=**
Test Method: COE uniform strain

Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	125.860		413.600
Moisture content: Dry soil+tare, gms.	112.030		364.200
Moisture content: Tare, gms.	24.930		50.800
Moisture, %	15.9	22.8	15.8
Moist specimen weight, gms.	1217.6		
Diameter, in.	2.84	2.83	
Area, in.²	6.33	6.28	
Height, in.	6.05	6.02	
Net decrease in height, in.		0.03	
Wet Density, pcf	121.0	129.9	
Dry density, pcf	104.4	105.8	
Void ratio	0.6508	0.6304	
Saturation, %	67.4	100.0	

Test Readings for Specimen No. 1

Primary load ring constant = .463 lbs. per input unit
Membrane modulus = 0.124105 kN/cm²
Membrane thickness = 0.02 cm
Cell pressure = 5.60 psi (0.81 ksf)
Back pressure = 0.00 psi (0.00 ksf)
Strain rate, in./min. = 0.05
Fail. Stress = 4.52 ksf **at reading no.** 27

MACTEC Engineering and Consulting, Inc.

Test Readings for Speci

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.0	0.0	0.0	0.00	0.81	0.81	1.00		0.81
1	0.0010	12.0	5.6	0.0	0.13	0.81	0.93	1.16		0.87
2	0.0050	65.0	30.1	0.1	0.69	0.81	1.50	1.85		1.15
3	0.0100	95.0	44.0	0.2	1.01	0.81	1.81	2.25		1.31
4	0.0150	124.0	57.4	0.2	1.31	0.81	2.12	2.63		1.46
5	0.0200	145.0	67.1	0.3	1.53	0.81	2.34	2.90		1.57
6	0.0250	165.0	76.4	0.4	1.74	0.81	2.55	3.16		1.68
7	0.0300	183.0	84.7	0.5	1.93	0.81	2.74	3.40		1.77
8	0.0350	195.0	90.3	0.6	2.06	0.81	2.86	3.55		1.84
9	0.0400	208.0	96.3	0.7	2.19	0.81	3.00	3.72		1.90
10	0.0450	222.0	102.8	0.7	2.34	0.81	3.14	3.90		1.98
11	0.0500	233.0	107.9	0.8	2.45	0.81	3.26	4.04		2.03
12	0.0750	280.0	129.6	1.2	2.93	0.81	3.74	4.64		2.27
13	0.1000	303.0	140.3	1.7	3.16	0.81	3.97	4.92		2.39
14	0.1250	327.0	151.4	2.1	3.40	0.81	4.20	5.21		2.51
15	0.1500	347.0	160.7	2.5	3.59	0.81	4.40	5.45		2.60
16	0.1750	359.0	166.2	2.9	3.70	0.81	4.51	5.59		2.66
17	0.2000	371.0	171.8	3.3	3.81	0.81	4.61	5.72		2.71
18	0.2500	389.0	180.1	4.1	3.96	0.81	4.76	5.91		2.78
19	0.3000	401.0	185.7	5.0	4.04	0.81	4.85	6.01		2.83
20	0.4000	415.0	192.1	6.6	4.11	0.81	4.92	6.10		2.86
21	0.5000	427.0	197.7	8.3	4.16	0.81	4.96	6.15		2.88
22	0.6000	445.0	206.0	10.0	4.25	0.81	5.06	6.27		2.93
23	0.7000	460.0	213.0	11.6	4.31	0.81	5.12	6.35		2.96
24	0.8000	475.0	219.9	13.3	4.37	0.81	5.18	6.42		2.99
25	0.9000	497.0	230.1	14.9	4.49	0.81	5.29	6.56		3.05
26	1.0000	509.0	235.7	16.6	4.51	0.81	5.31	6.59		3.06
27	1.1000	521.0	241.2	18.3	4.52	0.81	5.33	6.60		3.07

MACTEC Engineering and Consulting, Inc.

Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	128.130		1393.600
Moisture content: Dry soil+tare, gms.	114.500		1212.300
Moisture content: Tare, gms.	30.350		116.100
Moisture, %	16.2	21.7	16.5
Moist specimen weight, gms.	1276.8		
Diameter, in.	2.84	2.84	
Area, in.²	6.33	6.32	
Height, in.	6.15	6.14	
Net decrease in height, in.		0.01	
Wet Density, pcf	124.9	131.2	
Dry density, pcf	107.4	107.8	
Void ratio	0.6047	0.6000	
Saturation, %	74.0	100.0	

Test Readings for Specimen No. 2

Primary load ring constant = .463 lbs. per input unit
Membrane modulus = 0.124105 kN/cm²
Membrane thickness = 0.02 cm
Cell pressure = 8.30 psi (1.20 ksf)
Back pressure = 0.00 psi (0.00 ksf)
Strain rate, in./min. = 0.05
Fail. Stress = 6.16 ksf **at reading no.** 25

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.0	0.0	0.0	0.00	1.20	1.20	1.00		1.20
1	0.0010	33.0	15.3	0.0	0.35	1.20	1.54	1.29		1.37
2	0.0050	77.0	35.7	0.1	0.81	1.20	2.01	1.68		1.60
3	0.0100	127.0	58.8	0.2	1.34	1.20	2.53	2.12		1.86
4	0.0150	164.0	75.9	0.2	1.73	1.20	2.92	2.44		2.06
5	0.0200	193.0	89.4	0.3	2.03	1.20	3.22	2.70		2.21
6	0.0250	220.0	101.9	0.4	2.31	1.20	3.51	2.93		2.35
7	0.0300	242.0	112.0	0.5	2.54	1.20	3.73	3.12		2.46
8	0.0350	262.0	121.3	0.6	2.75	1.20	3.94	3.30		2.57
9	0.0400	287.0	132.9	0.7	3.01	1.20	4.20	3.52		2.70
10	0.0450	298.0	138.0	0.7	3.12	1.20	4.31	3.61		2.75
11	0.0500	310.0	143.5	0.8	3.24	1.20	4.44	3.71		2.82
12	0.0750	380.0	175.9	1.2	3.96	1.20	5.15	4.31		3.17
13	0.1000	426.0	197.2	1.6	4.42	1.20	5.61	4.70		3.40
14	0.1250	460.0	213.0	2.0	4.75	1.20	5.95	4.98		3.57
15	0.1500	497.0	230.1	2.4	5.11	1.20	6.31	5.28		3.75
16	0.2000	534.0	247.2	3.3	5.45	1.20	6.64	5.56		3.92
17	0.2500	558.0	258.4	4.1	5.64	1.20	6.84	5.72		4.02
18	0.3000	575.0	266.2	4.9	5.77	1.20	6.96	5.83		4.08
19	0.4000	592.0	274.1	6.5	5.84	1.20	7.03	5.88		4.11
20	0.5000	619.0	286.6	8.1	6.00	1.20	7.19	6.02		4.19
21	0.6000	631.0	292.2	9.8	6.00	1.20	7.20	6.02		4.20
22	0.7000	653.0	302.3	11.4	6.10	1.20	7.30	6.11		4.25
23	0.8000	667.0	308.8	13.0	6.12	1.20	7.31	6.12		4.25
24	0.9000	681.0	315.3	14.6	6.13	1.20	7.32	6.13		4.26

MACTEC Engineering and Consulting, Inc.

Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
25	1.0000	698.0	323.2	16.3	6.16	1.20	7.36	6.16		4.28
26	1.1000	708.0	327.8	17.9	6.13	1.20	7.32	6.13		4.26

Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	122.870		333.740
Moisture content: Dry soil+tare, gms.	110.280		294.900
Moisture content: Tare, gms.	30.550		52.160
Moisture, %	15.8	21.9	16.0
Moist specimen weight, gms.	1411.4		
Diameter, in.	2.84	2.84	
Area, in.²	6.33	6.33	
Height, in.	6.83	6.83	
Net decrease in height, in.		0.00	
Wet Density, pcf	124.3	131.0	
Dry density, pcf	107.3	107.5	
Void ratio	0.6066	0.6044	
Saturation, %	71.9	100.0	

Test Readings for Specimen No. 3

Primary load ring constant = .463 lbs. per input unit
Membrane modulus = 0.124105 kN/cm²
Membrane thickness = 0.02 cm
Cell pressure = 13.90 psi (2.00 ksf)
Back pressure = 0.00 psi (0.00 ksf)
Strain rate, in./min. = 0.05
Fail. Stress = 8.58 ksf **at reading no.** 24

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.0	0.0	0.0	0.00	2.00	2.00	1.00		2.00
1	0.0010	27.0	12.5	0.0	0.28	2.00	2.29	1.14		2.14
2	0.0050	78.0	36.1	0.1	0.82	2.00	2.82	1.41		2.41
3	0.0100	146.0	67.6	0.1	1.54	2.00	3.54	1.77		2.77
4	0.0150	192.0	88.9	0.2	2.02	2.00	4.02	2.01		3.01
5	0.0200	233.0	107.9	0.3	2.45	2.00	4.45	2.22		3.23
6	0.0250	265.0	122.7	0.4	2.78	2.00	4.78	2.39		3.39
7	0.0300	295.0	136.6	0.4	3.09	2.00	5.10	2.55		3.55
8	0.0350	323.0	149.5	0.5	3.39	2.00	5.39	2.69		3.69
9	0.0400	347.0	160.7	0.6	3.63	2.00	5.64	2.82		3.82
10	0.0450	368.0	170.4	0.7	3.85	2.00	5.85	2.92		3.93
11	0.0500	393.0	182.0	0.7	4.11	2.00	6.11	3.05		4.06
12	0.0750	503.0	232.9	1.1	5.24	2.00	7.24	3.62		4.62
13	0.1000	553.0	256.0	1.5	5.74	2.00	7.74	3.87		4.87
14	0.1250	609.0	282.0	1.8	6.30	2.00	8.30	4.15		5.15
15	0.1500	655.0	303.3	2.2	6.75	2.00	8.75	4.37		5.38
16	0.1750	693.0	320.9	2.6	7.11	2.00	9.11	4.55		5.56
17	0.2000	724.0	335.2	2.9	7.40	2.00	9.40	4.70		5.70
18	0.2500	768.0	355.6	3.7	7.79	2.00	9.80	4.89		5.90

MACTEC Engineering and Consulting, Inc.

Test Readings for Specimen No. 3

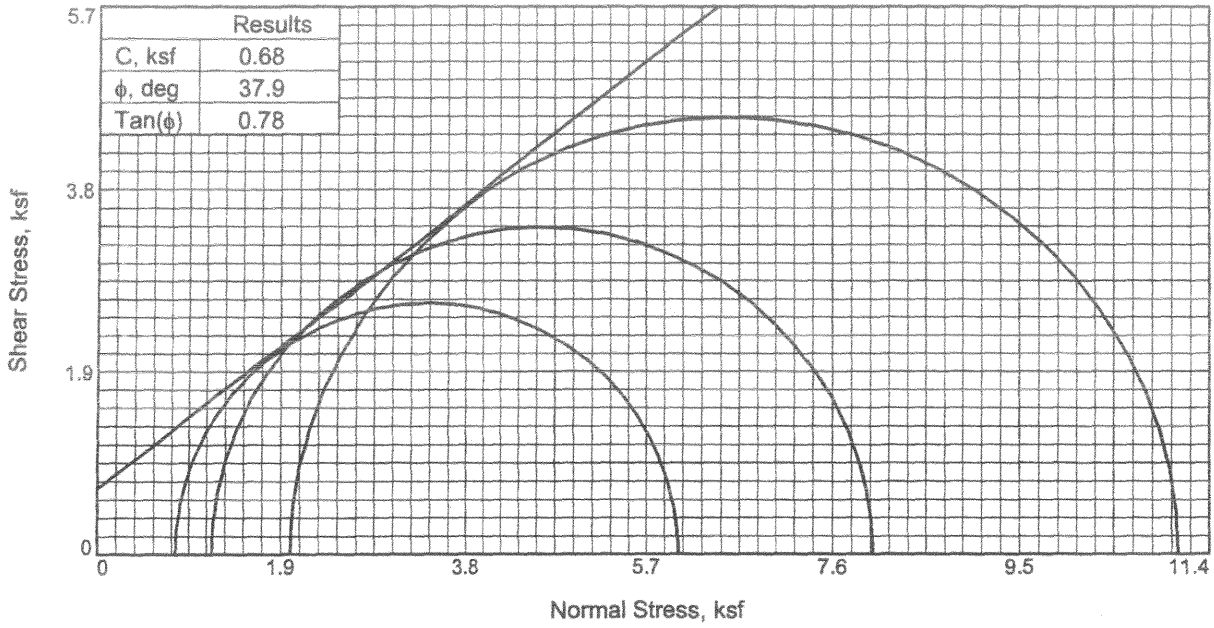
No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
19	0.3000	802.0	371.3	4.4	8.08	2.00	10.08	5.04		6.04
20	0.3500	832.0	385.2	5.1	8.32	2.00	10.32	5.15		6.16
21	0.4000	852.0	394.5	5.9	8.45	2.00	10.45	5.22		6.23
22	0.5000	878.0	406.5	7.3	8.57	2.00	10.57	5.28		6.29
23	0.6000	890.0	412.1	8.8	8.55	2.00	10.55	5.27		6.28
24	0.7000	908.0	420.4	10.3	8.58	2.00	10.59	5.29		6.29
25	0.8000	917.0	424.6	11.7	8.53	2.00	10.53	5.26		6.27
26	0.9000	927.0	429.2	13.2	8.48	2.00	10.48	5.24		6.24
27	1.0000	940.0	435.2	14.6	8.45	2.00	10.45	5.22		6.23
28	1.1000	959.0	444.0	16.1	8.47	2.00	10.48	5.23		6.24

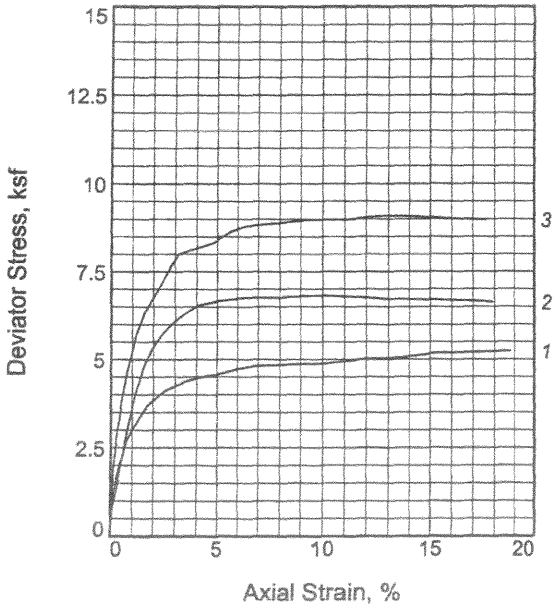
MACTEC Engineering and Consulting, Inc.

14 day cured specimens Nodarse 6738-05-4576-02 cast 6-28-05 tested 7-12-05

Tube Weight 766.2 Tube Diameter (in) 2.84 Area 6.334702 Length 25.2 cm 9.92126 in maximum density 115.5

weight w/ sample and tube	weight sample (lb)	distance to sample (cm)	sample length (in)	sample volume (cuft)	sample wet density (lb/cuft)	wet wt w/ can	dry wt. w/ can	can wt	% moisture	sample dry density (lb/cuft)	% compaction	
2104.2	2.95	9.6	6.14	0.0225	131.0	113.5	101.81	30.01	16.28	112.67026	97.6	not used
2147.1	3.04	7.8	6.85	0.0251	121.2	113.5	101.81	30.01	16.28	104.25353	90.3	1 A 13.9
2152.2	3.12	7	7.17	0.0263	118.8	112.71	100.4	24.58	16.24	102.24443	88.5	2 A 5.6
2253.5	3.28	6.7	7.28	0.0267	122.8	122.11	109.3	30.67	16.29	105.60068	91.4	not used
1978	2.67	9.8	6.06	0.0222	120.2	122.11	109.3	30.67	16.29	103.35942	89.5	3 A 8.3
2117.6	2.98	8	6.77	0.0248	120.0	139.18	124.28	32.03	16.15	103.34316	89.5	4
2173.6	3.10	7.5	6.97	0.0255	121.5	115.81	103.08	25.01	16.31	104.43123	90.4	5
2128	3.00	8.1	6.73	0.0247	121.6	93.51	84.65	30.01	16.22	104.67476	90.6	6
2135.8	3.02	8.3	6.65	0.0244	123.8	93.51	84.65	30.01	16.22	106.52016	92.2	not used
1996.8	2.71	10.5	5.79	0.0212	127.9	114.18	102.63	30.35	15.98	110.25697	95.5	1
2047.8	2.83	9.9	6.02	0.0221	128.0	125.86	112.03	24.93	15.88	110.41974	95.6	2
2057.3	2.85	9.7	6.10	0.0224	127.2	128.13	114.5	30.35	16.20	109.5015	94.8	3
2193.9	3.15	8	6.77	0.0248	126.8	122.87	110.28	30.55	15.79	109.50206	94.8	4
2060	2.90	9.3	6.26	0.0229	126.2	137.56	122.83	31.78	16.18	108.64164	94.1	5
1989	2.70	10.4	5.83	0.0214	126.2	106.78	96.22	31.52	16.32	108.49796	93.9	6





Sample No.		1	2	3
Initial	Water Content,	16.0	16.3	16.2
	Dry Density, pcf	108.3	108.0	107.6
	Saturation,	74.5	75.5	74.1
	Void Ratio	0.5925	0.5972	0.6030
	Diameter, in.	2.84	2.84	2.84
	Height, in.	5.87	6.15	6.28
At Test	Water Content,	20.9	21.3	20.9
	Dry Density, pcf	109.4	108.5	109.3
	Saturation,	100.0	100.0	100.0
	Void Ratio	0.5763	0.5886	0.5770
	Diameter, in.	2.83	2.83	2.82
	Height, in.	5.85	6.14	6.25
Strain rate, in./min.		0.05	0.05	0.05
Back Pressure, ksf		0.0	0.0	0.0
Cell Pressure, ksf		0.8	1.2	2.0
Fail. Stress, ksf		5.2	6.8	9.1
Ult. Stress, ksf				
σ_1 Failure, ksf		6.0	8.0	11.1
σ_3 Failure, ksf		0.8	1.2	2.0

Type of Test: Unconsolidated Undrained

Sample Type: remold

Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments

Specific Gravity= 2.762

Remarks: Samples moist cured 14 days

Reviewed By _____

Client: Nodarse and Associates

Project: Material Testing-Nodarse

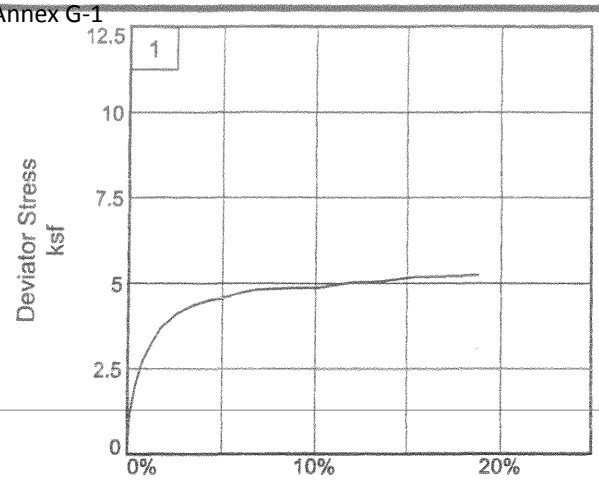
Sample Number: UU-95% 14 day cured

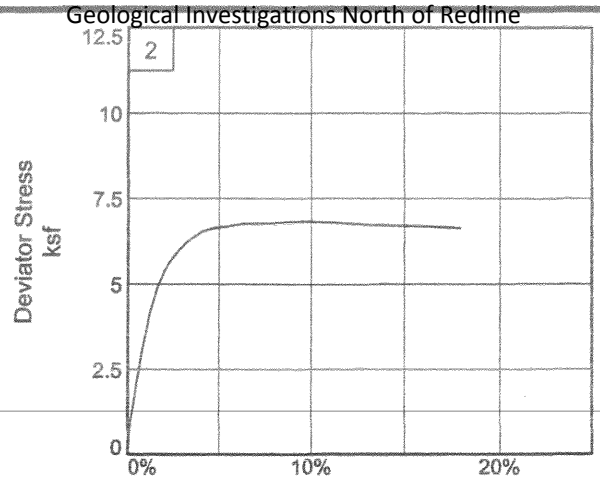
Proj. No.: 6738-05-4573 **Date:** 6-28-05

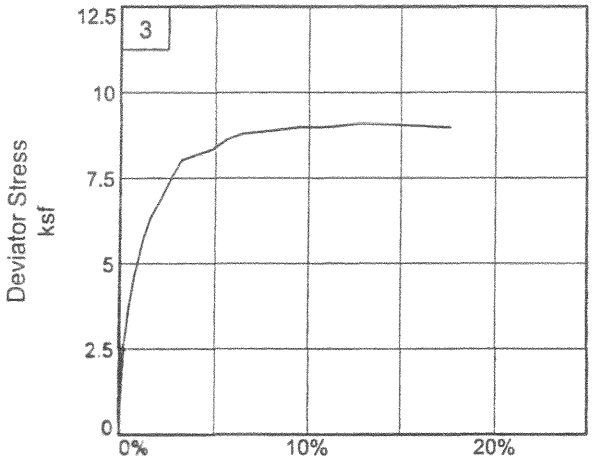
TRIAXIAL SHEAR TEST REPORT

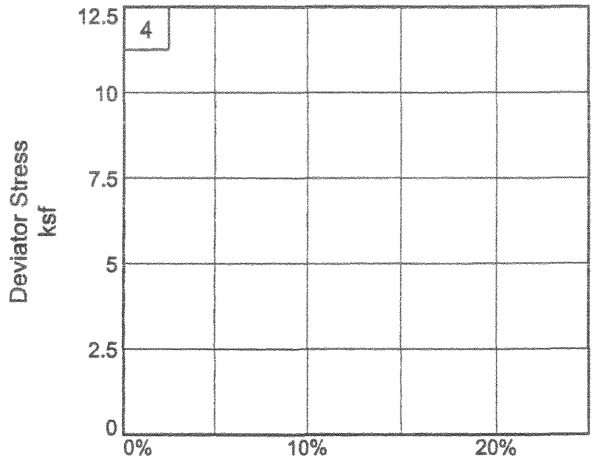
MACTEC ENGINEERING AND CONSULTING, INC.

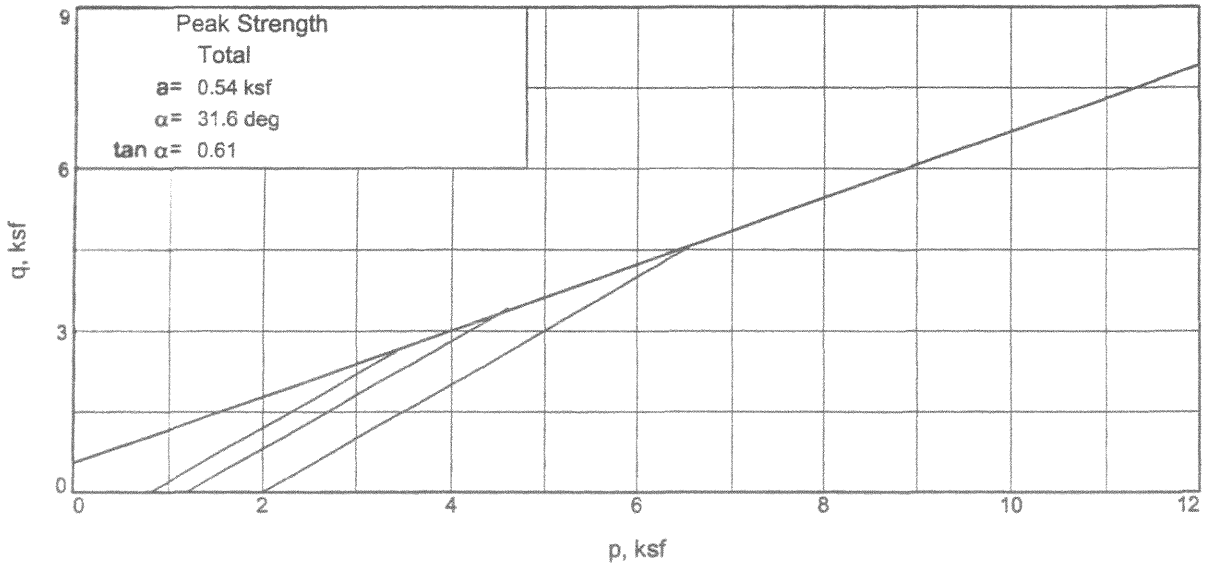
Tested By: MC **Checked By:** Rajni Sukhwani











Client: Nodarse and Associates
Project: Material Testing-Nodarse
Sample Number: UU-95% 14 day cured
Project No.: 6738-05-4573

Reviewed By _____ **MACTEC Engineering and Consulting, Inc.**

Tested By: MC _____ **Checked By:** _____

TRIAXIAL COMPRESSION TEST

Unconsolidated Undrained

7/14/2005
9:03 AM

Date: 6-28-05
Client: Nodarse and Associates
Project: Material Testing-Nodarse
Project No.: 6738-05-4573
Sample Number: UU-95% 14 day cured
Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments
Remarks: Samples moist cured 14 days
Type of Sample: remold
Specific Gravity=2.762 **LL=** **PL=** **PI=**
Test Method: COE uniform strain

Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	114.180		409.300
Moisture content: Dry soil+tare, gms.	102.630		360.550
Moisture content: Tare, gms.	30.350		52.330
Moisture, %	16.0	20.9	15.8
Moist specimen weight, gms.	1225.7		
Diameter, in.	2.84	2.83	
Area, in.²	6.33	6.29	
Height, in.	5.87	5.85	
Net decrease in height, in.		0.02	
Wet Density, pcf	125.6	132.2	
Dry density, pcf	108.3	109.4	
Void ratio	0.5925	0.5763	
Saturation, %	74.5	100.0	

Test Readings for Specimen No. 1

Primary load ring constant = .463 lbs. per input unit
Membrane modulus = 0.124105 kN/cm²
Membrane thickness = 0.02 cm
Cell pressure = 5.60 psi (0.81 ksf)
Back pressure = 0.00 psi (0.00 ksf)
Strain rate, in./min. = 0.05
Fail. Stress = 5.23 ksf **at reading no.** 28

MACTEC Engineering and Consulting, Inc.

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.0	0.0	0.0	0.00	0.81	0.81	1.00		0.81
1	0.0010	31.0	14.4	0.0	0.33	0.81	1.13	1.41		0.97
2	0.0050	78.0	36.1	0.1	0.83	0.81	1.63	2.02		1.22
3	0.0100	121.0	56.0	0.2	1.28	0.81	2.09	2.59		1.45
4	0.0150	148.0	68.5	0.3	1.56	0.81	2.37	2.94		1.59
5	0.0200	172.0	79.6	0.3	1.82	0.81	2.62	3.25		1.71
6	0.0250	193.0	89.4	0.4	2.04	0.81	2.84	3.53		1.82
7	0.0300	210.0	97.2	0.5	2.21	0.81	3.02	3.75		1.91
8	0.0350	227.0	105.1	0.6	2.39	0.81	3.20	3.97		2.00
9	0.0400	243.0	112.5	0.7	2.56	0.81	3.36	4.17		2.09
10	0.0450	256.0	118.5	0.8	2.69	0.81	3.50	4.34		2.15
11	0.0500	268.0	124.1	0.9	2.82	0.81	3.62	4.49		2.21
12	0.0750	312.0	144.5	1.3	3.26	0.81	4.07	5.05		2.44
13	0.1000	352.0	163.0	1.7	3.67	0.81	4.47	5.55		2.64
14	0.1250	374.0	173.2	2.1	3.88	0.81	4.69	5.81		2.75
15	0.1500	397.0	183.8	2.6	4.10	0.81	4.91	6.08		2.86
16	0.1750	410.0	189.8	3.0	4.21	0.81	5.02	6.23		2.91
17	0.2000	425.0	196.8	3.4	4.35	0.81	5.16	6.39		2.98
18	0.2500	443.0	205.1	4.3	4.49	0.81	5.30	6.57		3.05
19	0.3000	455.0	210.7	5.1	4.57	0.81	5.38	6.67		3.09
20	0.3500	473.0	219.0	6.0	4.71	0.81	5.52	6.84		3.16
21	0.4000	486.0	225.0	6.8	4.80	0.81	5.60	6.95		3.21
22	0.5000	500.0	231.5	8.5	4.85	0.81	5.65	7.01		3.23
23	0.6000	512.0	237.1	10.3	4.87	0.81	5.68	7.04		3.24
24	0.7000	537.0	248.6	12.0	5.01	0.81	5.82	7.21		3.31
25	0.8000	552.0	255.6	13.7	5.05	0.81	5.86	7.26		3.33
26	0.9000	577.0	267.2	15.4	5.17	0.81	5.98	7.42		3.39
27	1.0000	591.0	273.6	17.1	5.19	0.81	6.00	7.44		3.40
28	1.1000	608.0	281.5	18.8	5.23	0.81	6.04	7.49		3.42

MACTEC Engineering and Consulting, Inc.

Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	106.780		858.900
Moisture content: Dry soil+tare, gms.	96.220		771.000
Moisture content: Tare, gms.	31.520		230.300
Moisture, %	16.3	21.3	16.3
Moist specimen weight, gms.	1284.2		
Diameter, in.	2.84	2.83	
Area, in.²	6.33	6.31	
Height, in.	6.15	6.14	
Net decrease in height, in.		0.01	
Wet Density, pcf	125.6	131.7	
Dry density, pcf	108.0	108.5	
Void ratio	0.5972	0.5886	
Saturation, %	75.5	100.0	

Test Readings for Specimen No. 2

Primary load ring constant = .463 lbs. per input unit
Membrane modulus = 0.124105 kN/cm²
Membrane thickness = 0.02 cm
Cell pressure = 8.30 psi (1.20 ksf)
Back pressure = 0.00 psi (0.00 ksf)
Strain rate, in./min. = 0.05
Fail. Stress = 6.81 ksf **at reading no.** 23

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.0	0.0	0.0	0.00	1.20	1.20	1.00		1.20
1	0.0010	37.0	17.1	0.0	0.39	1.20	1.59	1.33		1.39
2	0.0050	62.0	28.7	0.1	0.65	1.20	1.85	1.55		1.52
3	0.0100	90.0	41.7	0.2	0.95	1.20	2.14	1.79		1.67
4	0.0150	115.0	53.2	0.2	1.21	1.20	2.41	2.01		1.80
5	0.0200	141.0	65.3	0.3	1.48	1.20	2.68	2.24		1.94
6	0.0250	168.0	77.8	0.4	1.77	1.20	2.96	2.48		2.08
7	0.0300	195.0	90.3	0.5	2.05	1.20	3.24	2.71		2.22
8	0.0350	220.0	101.9	0.6	2.31	1.20	3.51	2.93		2.35
9	0.0400	245.0	113.4	0.7	2.57	1.20	3.77	3.15		2.48
10	0.0450	270.0	125.0	0.7	2.83	1.20	4.03	3.37		2.61
11	0.0500	296.0	137.0	0.8	3.10	1.20	4.30	3.59		2.75
12	0.0750	395.0	182.9	1.2	4.12	1.20	5.32	4.45		3.26
13	0.1000	467.0	216.2	1.6	4.85	1.20	6.05	5.06		3.62
14	0.1250	520.0	240.8	2.0	5.38	1.20	6.58	5.50		3.89
15	0.1500	555.0	257.0	2.4	5.72	1.20	6.91	5.79		4.05
16	0.1750	584.0	270.4	2.9	5.99	1.20	7.19	6.01		4.19
17	0.2000	608.0	281.5	3.3	6.21	1.20	7.41	6.20		4.30
18	0.2500	644.0	298.2	4.1	6.53	1.20	7.72	6.46		4.46
19	0.3000	660.0	305.6	4.9	6.63	1.20	7.83	6.55		4.51
20	0.3500	672.0	311.1	5.7	6.69	1.20	7.89	6.60		4.54
21	0.4000	685.0	317.2	6.5	6.76	1.20	7.96	6.66		4.58
22	0.5000	697.0	322.7	8.1	6.76	1.20	7.96	6.66		4.58
23	0.6000	715.0	331.0	9.8	6.81	1.20	8.01	6.70		4.60
24	0.7000	724.0	335.2	11.4	6.78	1.20	7.97	6.67		4.58

MACTEC Engineering and Consulting, Inc.

Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
25	0.8000	731.0	338.5	13.0	6.72	1.20	7.91	6.62		4.55
26	0.9000	743.0	344.0	14.7	6.70	1.20	7.89	6.60		4.54
27	1.0000	755.0	349.6	16.3	6.68	1.20	7.87	6.59		4.53
28	1.1000	764.0	353.7	17.9	6.62	1.20	7.82	6.54		4.51

Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	137.560		345.130
Moisture content: Dry soil+tare, gms.	122.830		304.400
Moisture content: Tare, gms.	31.780		49.860
Moisture, %	16.2	20.9	16.0
Moist specimen weight, gms.	1305.0		
Diameter, in.	2.84	2.82	
Area, in.²	6.33	6.27	
Height, in.	6.28	6.25	
Net decrease in height, in.		0.03	
Wet Density, pcf	125.0	132.2	
Dry density, pcf	107.6	109.3	
Void ratio	0.6030	0.5770	
Saturation, %	74.1	100.0	

Test Readings for Specimen No. 3

Primary load ring constant = .463 lbs. per input unit

Membrane modulus = 0.124105 kN/cm²

Membrane thickness = 0.02 cm

Cell pressure = 13.90 psi (2.00 ksf)

Back pressure = 0.00 psi (0.00 ksf)

Strain rate, in./min. = 0.05

Fail. Stress = 9.09 ksf **at reading no.** 24

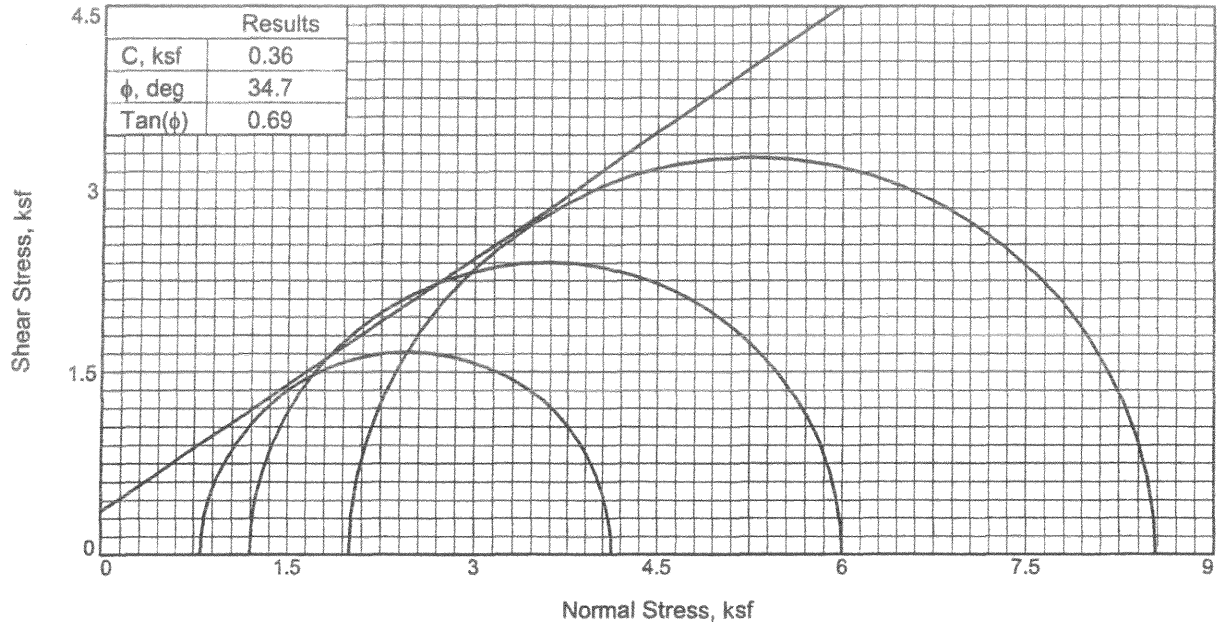
No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.0	0.0	0.0	0.00	2.00	2.00	1.00		2.00
1	0.0010	32.0	14.8	0.0	0.34	2.00	2.34	1.17		2.17
2	0.0050	118.0	54.6	0.1	1.25	2.00	3.26	1.63		2.63
3	0.0100	188.0	87.0	0.2	2.00	2.00	4.00	2.00		3.00
4	0.0150	242.0	112.0	0.2	2.57	2.00	4.57	2.28		3.29
5	0.0200	281.0	130.1	0.3	2.98	2.00	4.98	2.49		3.49
6	0.0250	313.0	144.9	0.4	3.32	2.00	5.32	2.66		3.66
7	0.0300	348.0	161.1	0.5	3.68	2.00	5.69	2.84		3.84
8	0.0350	375.0	173.6	0.6	3.97	2.00	5.97	2.98		3.99
9	0.0400	403.0	186.6	0.6	4.26	2.00	6.26	3.13		4.13
10	0.0450	427.0	197.7	0.7	4.51	2.00	6.51	3.25		4.26
11	0.0500	446.0	206.5	0.8	4.71	2.00	6.71	3.35		4.36
12	0.0750	538.0	249.1	1.2	5.66	2.00	7.66	3.83		4.83
13	0.1000	605.0	280.1	1.6	6.33	2.00	8.34	4.16		5.17
14	0.1250	645.0	298.6	2.0	6.73	2.00	8.73	4.36		5.36
15	0.1500	690.0	319.5	2.4	7.17	2.00	9.17	4.58		5.58
16	0.1750	737.0	341.2	2.8	7.62	2.00	9.62	4.81		5.81

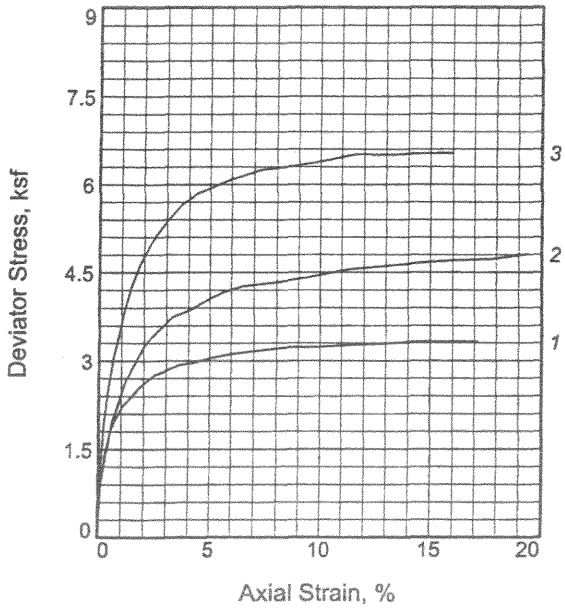
MACTEC Engineering and Consulting, Inc.

Test Readings for Specimen No. 3

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
17	0.2000	777.0	359.8	3.2	8.00	2.00	10.00	5.00		6.00
18	0.3000	821.0	380.1	4.8	8.32	2.00	10.32	5.15		6.16
19	0.3500	858.0	397.3	5.6	8.62	2.00	10.62	5.31		6.31
20	0.4000	882.0	408.4	6.4	8.78	2.00	10.79	5.39		6.39
21	0.5000	907.0	419.9	8.0	8.88	2.00	10.88	5.44		6.44
22	0.6000	934.0	432.4	9.6	8.98	2.00	10.98	5.49		6.49
23	0.7000	951.0	440.3	11.2	8.98	2.00	10.99	5.49		6.49
24	0.8000	980.0	453.7	12.8	9.09	2.00	11.09	5.54		6.55
25	0.9000	995.0	460.7	14.4	9.06	2.00	11.06	5.53		6.53
26	1.0000	1008.0	466.7	16.0	9.01	2.00	11.01	5.50		6.51
27	1.1000	1023.0	473.6	17.6	8.97	2.00	10.97	5.48		6.49

MACTEC Engineering and Consulting, Inc.





Sample No.		1	2	3
Initial	Water Content,	16.2	16.3	16.3
	Dry Density, pcf	103.5	100.7	101.2
	Saturation,	67.4	63.2	63.8
	Void Ratio	0.6653	0.7122	0.7043
	Diameter, in.	2.84	2.84	2.84
	Height, in.	7.04	6.19	6.89
At Test	Water Content,	22.7	25.2	24.9
	Dry Density, pcf	105.9	101.7	102.2
	Saturation,	100.0	100.0	100.0
	Void Ratio	0.6278	0.6957	0.6866
	Diameter, in.	2.82	2.83	2.83
	Height, in.	6.99	6.17	6.87
Strain rate, in./min.		0.05	0.05	0.05
Back Pressure, ksf		0.00	0.00	0.00
Cell Pressure, ksf		0.81	1.20	2.00
Fail. Stress, ksf		3.32	4.80	6.53
Ult. Stress, ksf				
σ_1 Failure, ksf		4.13	6.00	8.53
σ_3 Failure, ksf		0.81	1.20	2.00

Type of Test: Unconsolidated Undrained

Sample Type: Remolded

Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments

Specific Gravity= 2.762

Remarks: Specimen cured 14 days after molding.

Client: Nodarse and Associates

Project: Material Testing-Nodarse

Sample Number: UU-90% 14 day cured

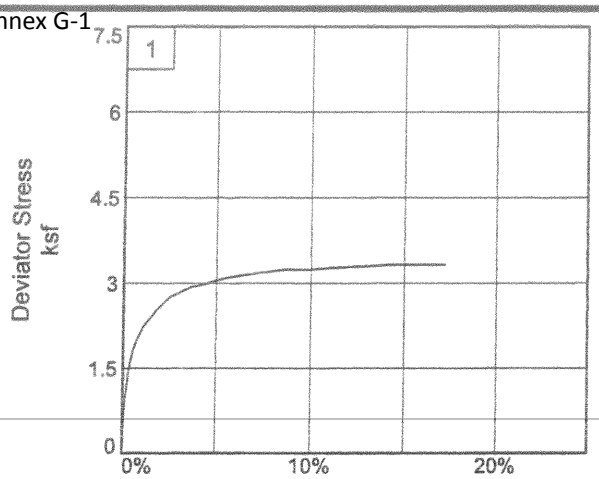
Proj. No.: 6738-05-4573 **Date:** 7/12/05

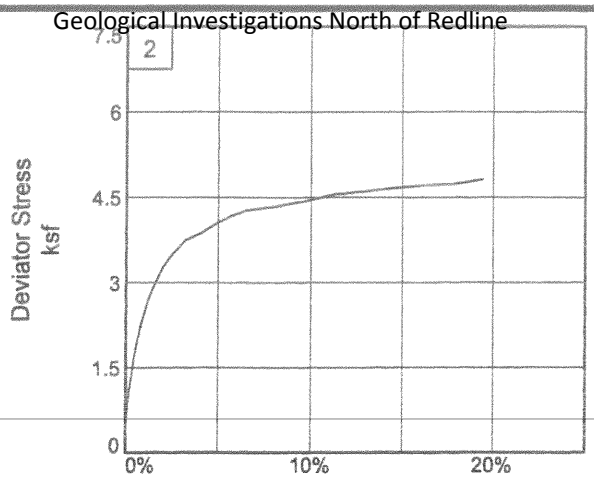
TRIAXIAL SHEAR TEST REPORT

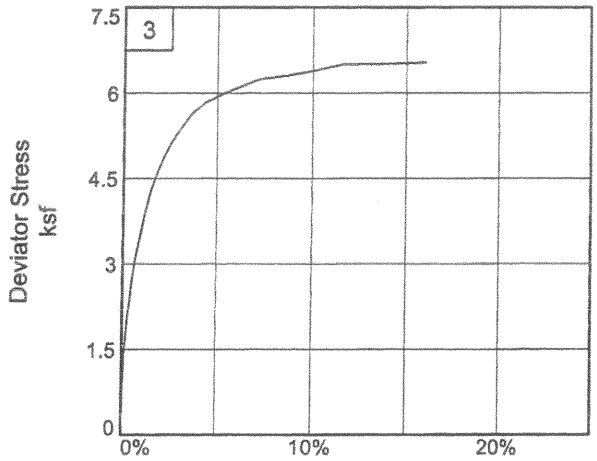
MACTEC ENGINEERING AND CONSULTING, INC.

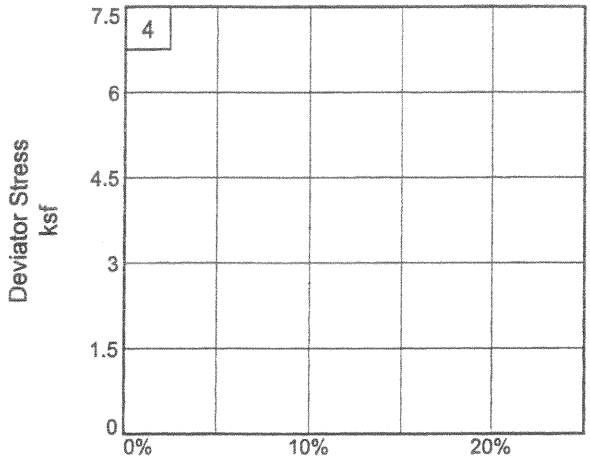
Reviewed By _____

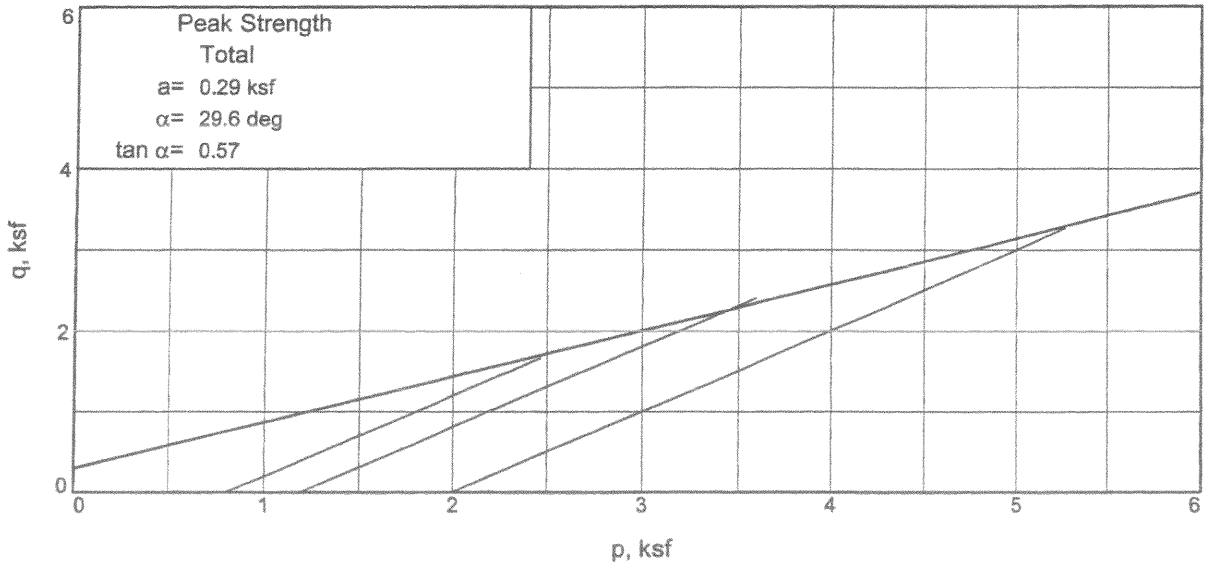
Tested By: MC **Checked By:** Rajni Sukhwani











Client: Nodarse and Associates
Project: Material Testing-Nodarse
Sample Number: UU-90% 14 day cured
Project No.: 6738-05-4573

Reviewed By _____ **MACTEC Engineering and Consulting, Inc.**

Tested By: MC _____ **Checked By:** _____

TRIAXIAL COMPRESSION TEST

Unconsolidated Undrained

7/14/2005
8:57 AM

Date: 7/12/05
Client: Nodarse and Associates
Project: Material Testing-Nodarse
Project No.: 6738-05-4573
Sample Number: UU-90% 14 day cured
Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments
Remarks: Specimen cured 14 days after molding.
Type of Sample: Remolded
Specific Gravity=2.762 **LL=** **PL=** **PI=**
Test Method: COE uniform strain

Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	112.710		1524.300
Moisture content: Dry soil+tare, gms.	100.400		1328.800
Moisture content: Tare, gms.	24.580		115.390
Moisture, %	16.2	22.7	16.1
Moist specimen weight, gms.	1408.9		
Diameter, in.	2.84	2.82	
Area, in.^{2}	6.33	6.24	
Height, in.	7.04	6.99	
Net decrease in height, in.		0.05	
Wet Density, pcf	120.4	130.0	
Dry density, pcf	103.5	105.9	
Void ratio	0.6653	0.6278	
Saturation, %	67.4	100.0	

Test Readings for Specimen No. 1

Primary load ring constant = .463 lbs. per input unit
Membrane modulus = 0.124105 kN/cm^2
Membrane thickness = 0.02 cm
Cell pressure = 5.60 psi (0.81 ksf)
Back pressure = 0.00 psi (0.00 ksf)
Strain rate, in./min. = 0.05
Fail. Stress = 3.32 ksf **at reading no.** 28

MACTEC Engineering and Consulting, Inc.

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.0	0.0	0.0	0.00	0.81	0.81	1.00		0.81
1	0.0010	20.0	9.3	0.0	0.21	0.81	1.02	1.26		0.91
2	0.0050	56.0	25.9	0.1	0.60	0.81	1.40	1.74		1.11
3	0.0100	93.0	43.1	0.1	0.99	0.81	1.80	2.23		1.30
4	0.0150	107.0	49.5	0.2	1.14	0.81	1.95	2.41		1.38
5	0.0200	130.0	60.2	0.3	1.39	0.81	2.19	2.72		1.50
6	0.0250	142.0	65.7	0.4	1.51	0.81	2.32	2.87		1.56
7	0.0300	153.0	70.8	0.4	1.63	0.81	2.43	3.02		1.62
8	0.0350	164.0	75.9	0.5	1.74	0.81	2.55	3.16		1.68
9	0.0400	173.0	80.1	0.6	1.84	0.81	2.64	3.28		1.73
10	0.0450	178.0	82.4	0.6	1.89	0.81	2.70	3.34		1.75
11	0.0500	186.0	86.1	0.7	1.97	0.81	2.78	3.45		1.79
12	0.0750	210.0	97.2	1.1	2.22	0.81	3.03	3.75		1.92
13	0.1000	226.0	104.6	1.4	2.38	0.81	3.19	3.95		2.00
14	0.1250	241.0	111.6	1.8	2.53	0.81	3.34	4.14		2.07
15	0.1500	253.0	117.1	2.1	2.65	0.81	3.45	4.28		2.13
16	0.1750	264.0	122.2	2.5	2.75	0.81	3.56	4.41		2.18
17	0.2000	270.0	125.0	2.9	2.80	0.81	3.61	4.48		2.21
18	0.2500	283.0	131.0	3.6	2.92	0.81	3.72	4.62		2.26
19	0.3000	290.0	134.3	4.3	2.97	0.81	3.77	4.68		2.29
20	0.3500	299.0	138.4	5.0	3.03	0.81	3.84	4.76		2.32
21	0.4000	307.0	142.1	5.7	3.09	0.81	3.90	4.84		2.35
22	0.5000	319.0	147.7	7.2	3.16	0.81	3.97	4.92		2.39
23	0.6000	330.0	152.8	8.6	3.22	0.81	4.03	5.00		2.42
24	0.7000	336.0	155.6	10.0	3.23	0.81	4.04	5.01		2.42
25	0.8000	345.0	159.7	11.4	3.26	0.81	4.07	5.05		2.44
26	0.9000	353.0	163.4	12.9	3.29	0.81	4.09	5.08		2.45
27	1.0000	362.0	167.6	14.3	3.31	0.81	4.12	5.11		2.46
28	1.1000	369.0	170.8	15.7	3.32	0.81	4.13	5.12		2.47
29	1.2000	375.0	173.6	17.2	3.32	0.81	4.13	5.12		2.47

MACTEC Engineering and Consulting, Inc.

Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	122.110		1314.500
Moisture content: Dry soil+tare, gms.	109.300		1148.100
Moisture content: Tare, gms.	30.670		108.500
Moisture, %	16.3	25.2	16.0
Moist specimen weight, gms.	1205.4		
Diameter, in.	2.84	2.83	
Area, in.²	6.33	6.29	
Height, in.	6.19	6.17	
Net decrease in height, in.		0.02	
Wet Density, pcf	117.1	127.3	
Dry density, pcf	100.7	101.7	
Void ratio	0.7122	0.6957	
Saturation, %	63.2	100.0	

Test Readings for Specimen No. 2

Primary load ring constant = .463 lbs. per input unit
Membrane modulus = 0.124105 kN/cm²
Membrane thickness = 0.02 cm
Cell pressure = 8.30 psi (1.20 ksf)
Back pressure = 0.00 psi (0.00 ksf)
Strain rate, in./min. = 0.05
Fail. Stress = 4.80 ksf **at reading no.** 29

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.0	0.0	0.0	0.00	1.20	1.20	1.00		1.20
1	0.0010	25.0	11.6	0.0	0.26	1.20	1.46	1.22		1.33
2	0.0050	68.0	31.5	0.1	0.72	1.20	1.91	1.60		1.56
3	0.0100	94.0	43.5	0.2	0.99	1.20	2.19	1.83		1.69
4	0.0150	113.0	52.3	0.2	1.19	1.20	2.39	2.00		1.79
5	0.0200	130.0	60.2	0.3	1.37	1.20	2.57	2.15		1.88
6	0.0250	146.0	67.6	0.4	1.54	1.20	2.74	2.29		1.97
7	0.0300	162.0	75.0	0.5	1.71	1.20	2.90	2.43		2.05
8	0.0350	175.0	81.0	0.6	1.84	1.20	3.04	2.54		2.12
9	0.0400	189.0	87.5	0.6	1.99	1.20	3.18	2.66		2.19
10	0.0450	197.0	91.2	0.7	2.07	1.20	3.27	2.73		2.23
11	0.0500	208.0	96.3	0.8	2.19	1.20	3.38	2.83		2.29
12	0.0750	255.0	118.1	1.2	2.67	1.20	3.86	3.23		2.53
13	0.1000	285.0	132.0	1.6	2.97	1.20	4.17	3.49		2.68
14	0.1250	313.0	144.9	2.0	3.25	1.20	4.44	3.72		2.82
15	0.1500	332.0	153.7	2.4	3.43	1.20	4.63	3.87		2.91
16	0.1750	348.0	161.1	2.8	3.58	1.20	4.78	4.00		2.99
17	0.2000	364.0	168.5	3.2	3.73	1.20	4.93	4.12		3.06
18	0.2500	379.0	175.5	4.1	3.85	1.20	5.05	4.22		3.12
19	0.3000	399.0	184.7	4.9	4.02	1.20	5.22	4.36		3.21
20	0.3500	416.0	192.6	5.7	4.16	1.20	5.35	4.48		3.27
21	0.4000	430.0	199.1	6.5	4.26	1.20	5.46	4.56		3.33
22	0.5000	445.0	206.0	8.1	4.33	1.20	5.53	4.62		3.36
23	0.6000	463.0	214.4	9.7	4.43	1.20	5.62	4.70		3.41
24	0.7000	484.0	224.1	11.3	4.55	1.20	5.74	4.80		3.47

MACTEC Engineering and Consulting, Inc.

Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
25	0.8000	499.0	231.0	13.0	4.60	1.20	5.80	4.85		3.50
26	0.9000	515.0	238.4	14.6	4.66	1.20	5.85	4.90		3.53
27	1.0000	530.0	245.4	16.2	4.70	1.20	5.90	4.94		3.55
28	1.1000	542.0	250.9	17.8	4.72	1.20	5.91	4.95		3.55
29	1.2000	563.0	260.7	19.4	4.80	1.20	6.00	5.02		3.60

Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	113.500		1454.600
Moisture content: Dry soil+tare, gms.	101.810		1264.500
Moisture content: Tare, gms.	30.010		106.100
Moisture, %	16.3	24.9	16.4
Moist specimen weight, gms.	1347.8		
Diameter, in.	2.84	2.83	
Area, in.²	6.33	6.29	
Height, in.	6.89	6.87	
Net decrease in height, in.		0.02	
Wet Density, pcf	117.6	127.6	
Dry density, pcf	101.2	102.2	
Void ratio	0.7043	0.6866	
Saturation, %	63.8	100.0	

Test Readings for Specimen No. 3

Primary load ring constant = .463 lbs. per input unit

Membrane modulus = 0.124105 kN/cm²

Membrane thickness = 0.02 cm

Cell pressure = 13.90 psi (2.00 ksf)

Back pressure = 0.00 psi (0.00 ksf)

Strain rate, in./min. = 0.05

Fail. Stress = 6.53 ksf **at reading no.** 28

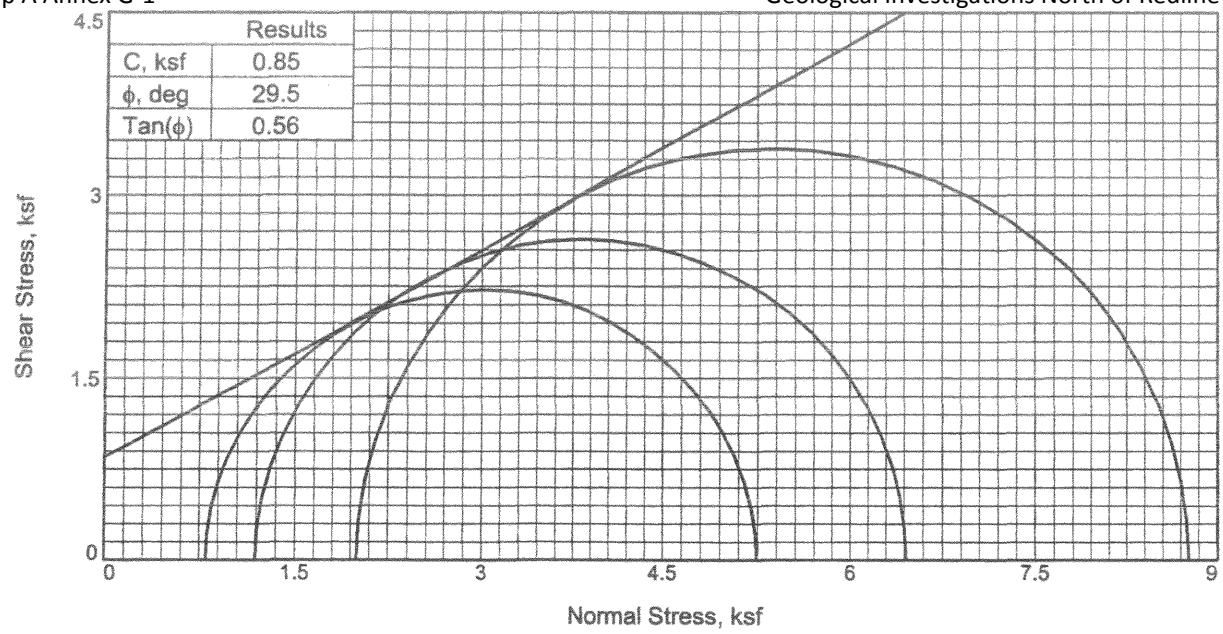
No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.0	0.0	0.0	0.00	2.00	2.00	1.00		2.00
1	0.0010	15.0	6.9	0.0	0.16	2.00	2.16	1.08		2.08
2	0.0050	87.0	40.3	0.1	0.92	2.00	2.92	1.46		2.46
3	0.0100	138.0	63.9	0.1	1.46	2.00	3.46	1.73		2.73
4	0.0150	170.0	78.7	0.2	1.80	2.00	3.80	1.90		2.90
5	0.0200	193.0	89.4	0.3	2.04	2.00	4.04	2.02		3.02
6	0.0250	217.0	100.5	0.4	2.29	2.00	4.29	2.14		3.15
7	0.0300	237.0	109.7	0.4	2.50	2.00	4.50	2.25		3.25
8	0.0350	255.0	118.1	0.5	2.69	2.00	4.69	2.34		3.35
9	0.0400	272.0	125.9	0.6	2.87	2.00	4.87	2.43		3.43
10	0.0450	290.0	134.3	0.7	3.05	2.00	5.06	2.53		3.53
11	0.0500	300.0	138.9	0.7	3.16	2.00	5.16	2.58		3.58
12	0.0750	360.0	166.7	1.1	3.77	2.00	5.78	2.89		3.89
13	0.1000	408.0	188.9	1.5	4.26	2.00	6.26	3.13		4.13
14	0.1250	445.0	206.0	1.8	4.63	2.00	6.63	3.31		4.32
15	0.1500	473.0	219.0	2.2	4.90	2.00	6.91	3.45		4.45

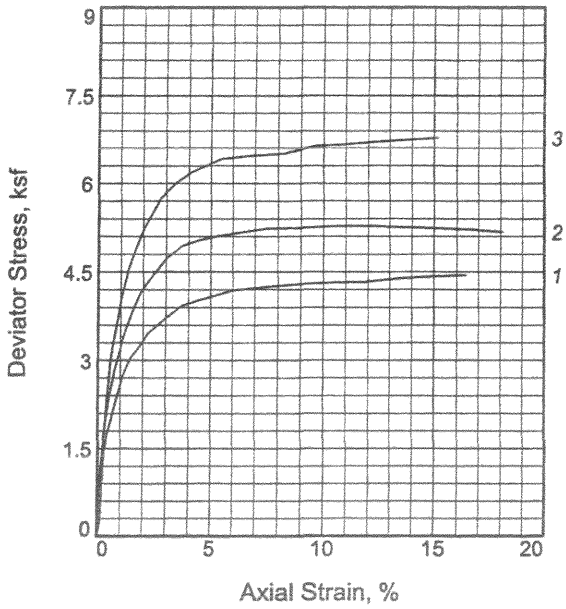
MACTEC Engineering and Consulting, Inc.

Test Readings for Specimen No. 3

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
16	0.1750	497.0	230.1	2.5	5.13	2.00	7.13	3.56		4.57
17	0.2000	517.0	239.4	2.9	5.32	2.00	7.32	3.66		4.66
18	0.2500	553.0	256.0	3.6	5.65	2.00	7.65	3.82		4.83
19	0.3000	576.0	266.7	4.4	5.84	2.00	7.84	3.92		4.92
20	0.3500	591.0	273.6	5.1	5.94	2.00	7.95	3.97		4.97
21	0.4000	607.0	281.0	5.8	6.06	2.00	8.06	4.03		5.03
22	0.5000	635.0	294.0	7.3	6.24	2.00	8.24	4.12		5.12
23	0.6000	652.0	301.9	8.7	6.31	2.00	8.31	4.15		5.15
24	0.7000	672.0	311.1	10.2	6.40	2.00	8.40	4.20		5.20
25	0.8000	695.0	321.8	11.7	6.51	2.00	8.51	4.25		5.26
26	0.9000	706.0	326.9	13.1	6.50	2.00	8.50	4.25		5.25
27	1.0000	720.0	333.4	14.6	6.52	2.00	8.52	4.26		5.26
28	1.1000	734.0	339.8	16.0	6.53	2.00	8.53	4.26		5.27

MACTEC Engineering and Consulting, Inc.





Sample No.		1	2	3
Initial	Water Content,	16.2	16.2	16.3
	Dry Density, pcf	105.1	105.8	103.8
	Saturation,	69.7	71.1	68.1
	Void Ratio	0.6400	0.6298	0.6609
	Diameter, in.	2.85	2.84	2.84
	Height, in.	6.72	6.65	7.32
At Test	Water Content,	22.6	22.2	22.4
	Dry Density, pcf	106.1	106.9	106.5
	Saturation,	100.0	100.0	100.0
	Void Ratio	0.6254	0.6136	0.6189
	Diameter, in.	2.84	2.83	2.82
	Height, in.	6.70	6.63	7.26
Strain rate, in./min.		0.05	0.05	0.05
Back Pressure, ksf		0.00	0.00	0.00
Cell Pressure, ksf		0.81	1.20	2.00
Fail. Stress, ksf		4.44	5.27	6.77
Ult. Stress, ksf				
σ_1 Failure, ksf		5.24	6.47	8.77
σ_3 Failure, ksf		0.81	1.20	2.00

Type of Test:
Unconsolidated Undrained
Sample Type: remold
Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments

Specific Gravity= 2.762
Remarks: Specimens cured 14 days

Reviewed By _____

Client: Nodarse and Associates

Project: Material Testing-Nodarse

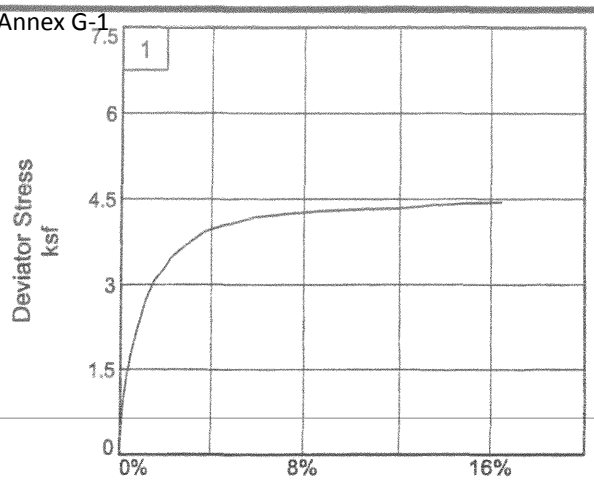
Sample Number: UU-90%-14 day cured

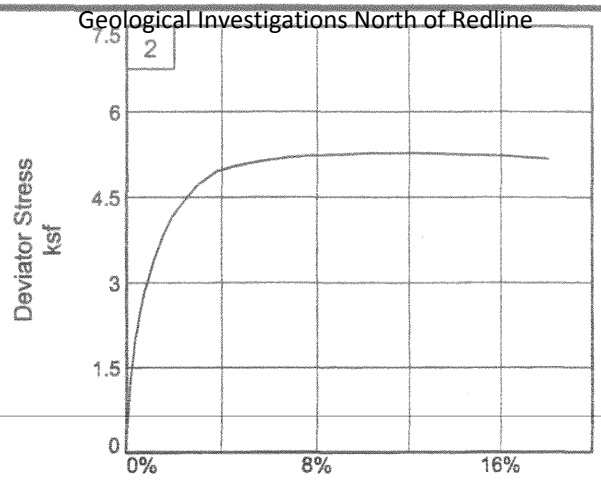
Proj. No.: 6738-05-4573 **Date:** 6-28-05

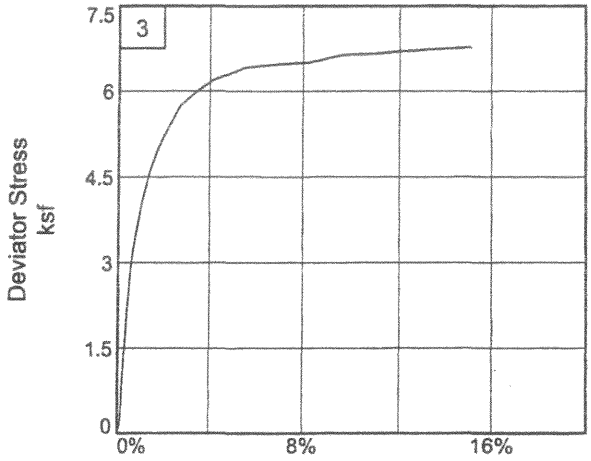
TRIAXIAL SHEAR TEST REPORT

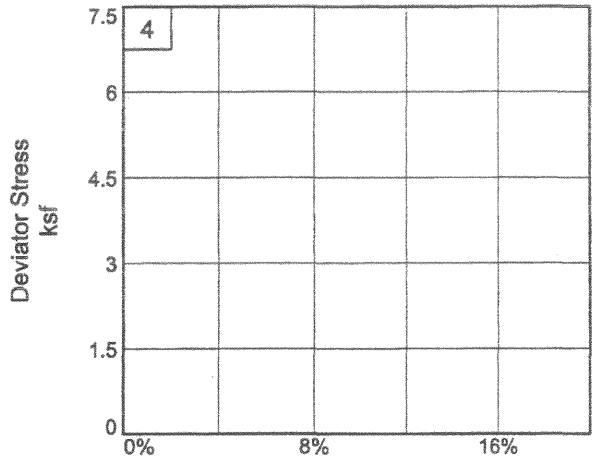
MACTEC ENGINEERING AND CONSULTING, INC.

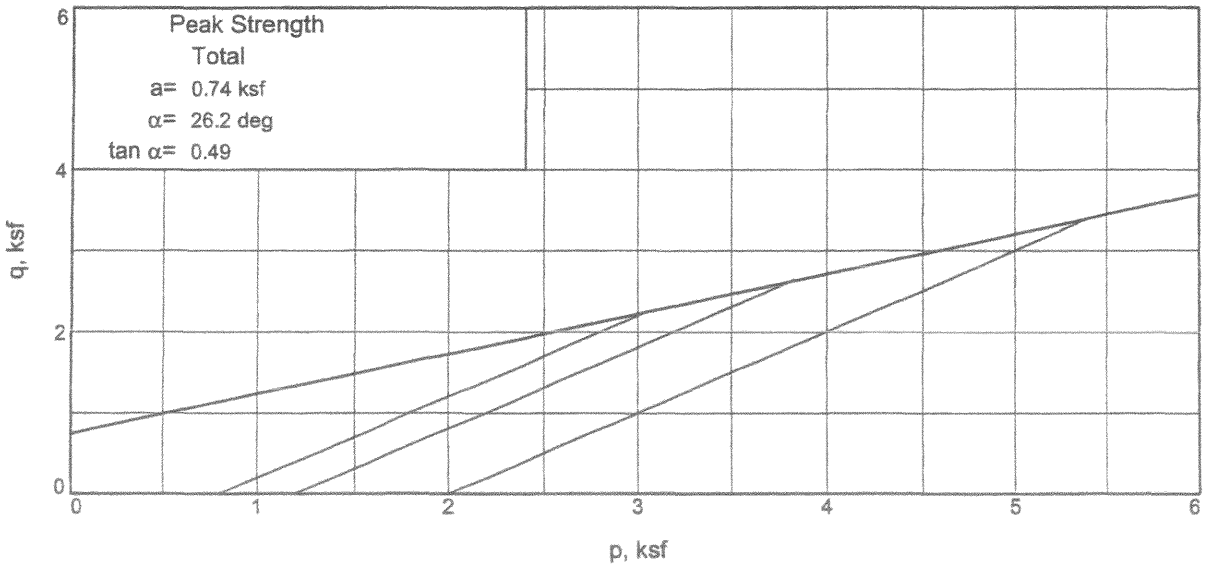
Tested By: MC **Checked By:** Rajni Sukhwani











Client: Nodarse and Associates
Project: Material Testing-Nodarse
Sample Number: UU-90%-14 day cured
Project No.: 6738-05-4573

Reviewed By _____ **MACTEC Engineering and Consulting, Inc.**

Tested By: MC _____ **Checked By:** _____

TRIAXIAL COMPRESSION TEST

Unconsolidated Undrained

7/14/2005
8:59 AM

Date: 6-28-05
Client: Nodarse and Associates
Project: Material Testing-Nodarse
Project No.: 6738-05-4573
Sample Number: UU-90%-14 day cured
Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments
Remarks: Specimens cured 14 days
Type of Sample: remold
Specific Gravity=2.762 **LL=** **PL=** **PI=**
Test Method: COE uniform strain

Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	139.180		1490.700
Moisture content: Dry soil+tare, gms.	124.280		1300.300
Moisture content: Tare, gms.	32.030		116.290
Moisture, %	16.2	22.6	16.1
Moist specimen weight, gms.	1374.2		
Diameter, in.	2.85	2.84	
Area, in.^{2}	6.38	6.34	
Height, in.	6.72	6.70	
Net decrease in height, in.		0.02	
Wet Density, pcf	122.1	130.1	
Dry density, pcf	105.1	106.1	
Void ratio	0.6400	0.6254	
Saturation, %	69.7	100.0	

Test Readings for Specimen No. 1

Primary load ring constant = .463 lbs. per input unit
Membrane modulus = 0.124105 kN/cm^2
Membrane thickness = 0.02 cm
Cell pressure = 5.60 psi (0.81 ksf)
Back pressure = 0.00 psi (0.00 ksf)
Strain rate, in./min. = 0.05
Fail. Stress = 4.44 ksf **at reading no.** 27

MACTEC Engineering and Consulting, Inc.

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.0	0.0	0.0	0.00	0.81	0.81	1.00		0.81
1	0.0010	23.0	10.6	0.0	0.24	0.81	1.05	1.30		0.93
2	0.0050	68.0	31.5	0.1	0.71	0.81	1.52	1.89		1.16
3	0.0100	98.0	45.4	0.1	1.03	0.81	1.84	2.28		1.32
4	0.0150	117.0	54.2	0.2	1.23	0.81	2.03	2.52		1.42
5	0.0200	138.0	63.9	0.3	1.45	0.81	2.25	2.79		1.53
6	0.0250	150.0	69.5	0.4	1.57	0.81	2.38	2.95		1.59
7	0.0300	167.0	77.3	0.4	1.75	0.81	2.55	3.17		1.68
8	0.0350	178.0	82.4	0.5	1.86	0.81	2.67	3.31		1.74
9	0.0400	188.0	87.0	0.6	1.96	0.81	2.77	3.44		1.79
10	0.0450	201.0	93.1	0.7	2.10	0.81	2.91	3.60		1.86
11	0.0500	211.0	97.7	0.7	2.20	0.81	3.01	3.73		1.91
12	0.0750	262.0	121.3	1.1	2.72	0.81	3.53	4.38		2.17
13	0.1000	296.0	137.0	1.5	3.07	0.81	3.87	4.80		2.34
14	0.1250	314.0	145.4	1.9	3.24	0.81	4.05	5.02		2.43
15	0.1500	337.0	156.0	2.2	3.46	0.81	4.27	5.30		2.54
16	0.2000	364.0	168.5	3.0	3.71	0.81	4.52	5.60		2.66
17	0.2500	388.0	179.6	3.7	3.93	0.81	4.73	5.87		2.77
18	0.3000	400.0	185.2	4.5	4.02	0.81	4.82	5.98		2.81
19	0.3500	411.0	190.3	5.2	4.10	0.81	4.90	6.08		2.85
20	0.4000	423.0	195.8	6.0	4.18	0.81	4.99	6.19		2.90
21	0.5000	436.0	201.9	7.5	4.24	0.81	5.05	6.26		2.93
22	0.6000	448.0	207.4	9.0	4.29	0.81	5.09	6.32		2.95
23	0.7000	458.0	212.1	10.4	4.31	0.81	5.12	6.35		2.96
24	0.8000	467.0	216.2	11.9	4.32	0.81	5.13	6.36		2.97
25	0.9000	482.0	223.2	13.4	4.39	0.81	5.19	6.44		3.00
26	1.0000	494.0	228.7	14.9	4.42	0.81	5.22	6.48		3.02
27	1.1000	505.0	233.8	16.4	4.44	0.81	5.24	6.50		3.03

MACTEC Engineering and Consulting, Inc.

Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	93.510		1475.100
Moisture content: Dry soil+tare, gms.	84.650		1284.200
Moisture content: Tare, gms.	30.010		115.500
Moisture, %	16.2	22.2	16.3
Moist specimen weight, gms.	1359.6		
Diameter, in.	2.84	2.83	
Area, in.²	6.33	6.29	
Height, in.	6.65	6.63	
Net decrease in height, in.		0.02	
Wet Density, pcf	123.0	130.6	
Dry density, pcf	105.8	106.9	
Void ratio	0.6298	0.6136	
Saturation, %	71.1	100.0	

Test Readings for Specimen No. 2

Primary load ring constant = .463 lbs. per input unit
Membrane modulus = 0.124105 kN/cm²
Membrane thickness = 0.02 cm
Cell pressure = 8.30 psi (1.20 ksf)
Back pressure = 0.00 psi (0.00 ksf)
Strain rate, in./min. = 0.05
Fail. Stress = 5.27 ksf **at reading no.** 25

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.0	0.0	0.0	0.00	1.20	1.20	1.00		1.20
1	0.0010	20.0	9.3	0.0	0.21	1.20	1.41	1.18		1.30
2	0.0050	63.0	29.2	0.1	0.67	1.20	1.86	1.56		1.53
3	0.0100	110.0	50.9	0.2	1.16	1.20	2.36	1.97		1.78
4	0.0150	141.0	65.3	0.2	1.49	1.20	2.69	2.25		1.94
5	0.0200	166.0	76.9	0.3	1.75	1.20	2.95	2.47		2.07
6	0.0250	190.0	88.0	0.4	2.01	1.20	3.20	2.68		2.20
7	0.0300	205.0	94.9	0.5	2.16	1.20	3.36	2.81		2.28
8	0.0350	223.0	103.2	0.5	2.35	1.20	3.55	2.97		2.37
9	0.0400	239.0	110.7	0.6	2.52	1.20	3.71	3.11		2.45
10	0.0450	254.0	117.6	0.7	2.67	1.20	3.87	3.24		2.53
11	0.0500	268.0	124.1	0.8	2.82	1.20	4.01	3.36		2.60
12	0.0750	322.0	149.1	1.1	3.37	1.20	4.57	3.82		2.88
13	0.1000	365.0	169.0	1.5	3.81	1.20	5.00	4.19		3.10
14	0.1250	398.0	184.3	1.9	4.14	1.20	5.33	4.46		3.26
15	0.1500	420.0	194.5	2.3	4.35	1.20	5.54	4.64		3.37
16	0.1750	440.0	203.7	2.6	4.54	1.20	5.73	4.80		3.46
17	0.2000	460.0	213.0	3.0	4.73	1.20	5.92	4.95		3.56
18	0.2500	485.0	224.6	3.8	4.94	1.20	6.14	5.14		3.67
19	0.3000	498.0	230.6	4.5	5.04	1.20	6.23	5.21		3.71
20	0.3500	508.0	235.2	5.3	5.10	1.20	6.29	5.27		3.74
21	0.4000	517.0	239.4	6.0	5.15	1.20	6.34	5.31		3.77
22	0.5000	534.0	247.2	7.5	5.23	1.20	6.43	5.38		3.81
23	0.6000	544.0	251.9	9.1	5.24	1.20	6.44	5.39		3.82
24	0.7000	556.0	257.4	10.6	5.27	1.20	6.46	5.41		3.83

MACTEC Engineering and Consulting, Inc.

Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
25	0.8000	566.0	262.1	12.1	5.27	1.20	6.47	5.41		3.83
26	0.9000	574.0	265.8	13.6	5.26	1.20	6.45	5.40		3.82
27	1.0000	582.0	269.5	15.1	5.24	1.20	6.43	5.38		3.81
28	1.1000	590.0	273.2	16.6	5.21	1.20	6.41	5.36		3.80
29	1.2000	596.0	275.9	18.1	5.17	1.20	6.37	5.33		3.78

Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	115.810		358.120
Moisture content: Dry soil+tare, gms.	103.080		315.900
Moisture content: Tare, gms.	25.010		54.860
Moisture, %	16.3	22.4	16.2
Moist specimen weight, gms.	1469.7		
Diameter, in.	2.84	2.82	
Area, in.²	6.33	6.23	
Height, in.	7.32	7.26	
Net decrease in height, in.		0.06	
Wet Density, pcf	120.7	130.4	
Dry density, pcf	103.8	106.5	
Void ratio	0.6609	0.6189	
Saturation, %	68.1	100.0	

Test Readings for Specimen No. 3

Primary load ring constant = .463 lbs. per input unit

Membrane modulus = 0.124105 kN/cm²

Membrane thickness = 0.02 cm

Cell pressure = 13.90 psi (2.00 ksf)

Back pressure = 0.00 psi (0.00 ksf)

Strain rate, in./min. = 0.05

Fail. Stress = 6.77 ksf **at reading no.** 27

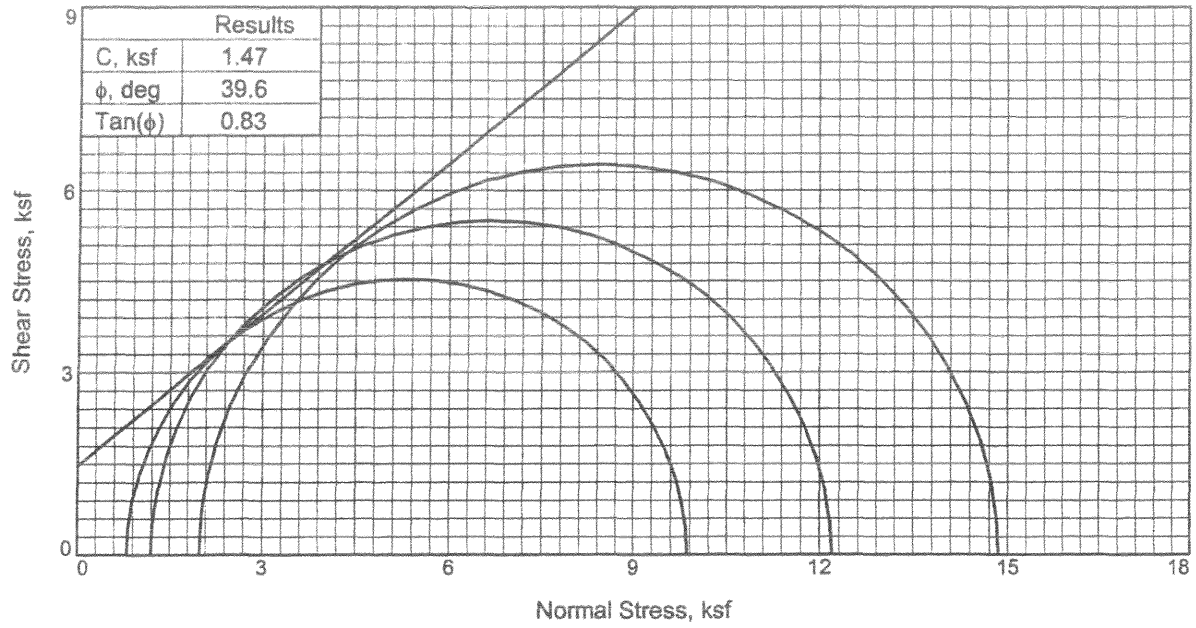
No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.0	0.0	0.0	0.00	2.00	2.00	1.00		2.00
1	0.0010	5.0	2.3	0.0	0.05	2.00	2.06	1.03		2.03
2	0.0050	7.0	3.2	0.1	0.07	2.00	2.08	1.04		2.04
3	0.0100	25.0	11.6	0.1	0.27	2.00	2.27	1.13		2.14
4	0.0150	80.0	37.0	0.2	0.85	2.00	2.86	1.43		2.43
5	0.0200	123.0	56.9	0.3	1.31	2.00	3.31	1.66		2.66
6	0.0250	175.0	81.0	0.3	1.87	2.00	3.87	1.93		2.94
7	0.0300	209.0	96.8	0.4	2.23	2.00	4.23	2.11		3.12
8	0.0350	240.0	111.1	0.5	2.56	2.00	4.56	2.28		3.28
9	0.0400	268.0	124.1	0.6	2.85	2.00	4.86	2.43		3.43
10	0.0450	290.0	134.3	0.6	3.09	2.00	5.09	2.54		3.54
11	0.0500	307.0	142.1	0.7	3.26	2.00	5.27	2.63		3.63
12	0.0750	378.0	175.0	1.0	4.01	2.00	6.01	3.00		4.00
13	0.1000	432.0	200.0	1.4	4.56	2.00	6.56	3.28		4.28
14	0.1250	470.0	217.6	1.7	4.95	2.00	6.95	3.47		4.47
15	0.1500	501.0	232.0	2.1	5.25	2.00	7.25	3.62		4.63

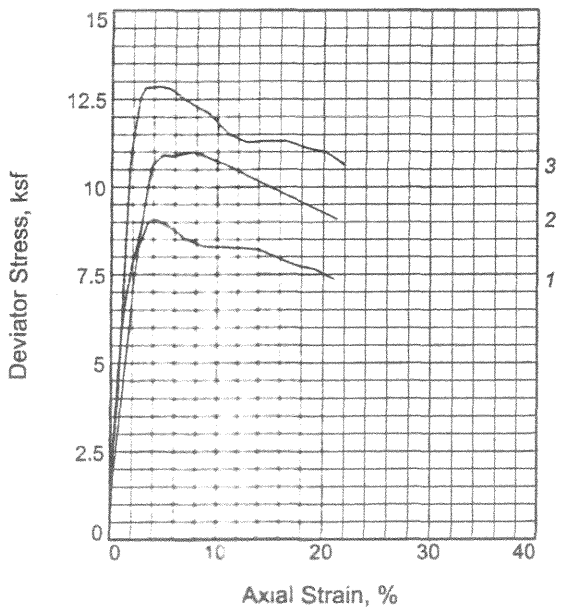
MACTEC Engineering and Consulting, Inc.

Test Readings for Specimen No. 3

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
16	0.2000	552.0	255.6	2.8	5.75	2.00	7.75	3.87		4.88
17	0.2500	580.0	268.5	3.4	6.00	2.00	8.00	4.00		5.00
18	0.3000	603.0	279.2	4.1	6.19	2.00	8.19	4.09		5.10
19	0.3500	618.0	286.1	4.8	6.30	2.00	8.30	4.15		5.15
20	0.4000	634.0	293.5	5.5	6.41	2.00	8.42	4.20		5.21
21	0.5000	649.0	300.5	6.9	6.47	2.00	8.47	4.23		5.24
22	0.6000	662.0	306.5	8.3	6.50	2.00	8.50	4.25		5.25
23	0.7000	686.0	317.6	9.6	6.64	2.00	8.64	4.32		5.32
24	0.8000	699.0	323.6	11.0	6.66	2.00	8.66	4.33		5.33
25	0.9000	715.0	331.0	12.4	6.71	2.00	8.71	4.35		5.35
26	1.0000	730.0	338.0	13.8	6.74	2.00	8.74	4.37		5.37
27	1.1000	745.0	344.9	15.2	6.77	2.00	8.77	4.38		5.39

MACTEC Engineering and Consulting, Inc.





Sample No.		1	2	3
Initial	Water Content,	15.3	15.3	15.4
	Dry Density, pcf	109.5	109.0	108.9
	Saturation,	73.5	72.7	72.9
	Void Ratio	0.5754	0.5818	0.5835
	Diameter, in.	2.84	2.84	2.84
	Height, in.	5.73	5.23	5.47
At Test	Water Content,	20.4	19.3	20.3
	Dry Density, pcf	110.4	112.5	110.5
	Saturation,	100.0	100.0	100.0
	Void Ratio	0.5622	0.5331	0.5601
	Diameter, in.	2.83	2.81	2.83
	Height, in.	5.71	5.18	5.44
Strain rate, in./min.		0.05	0.05	0.05
Back Pressure, ksf		0.0	0.0	0.0
Cell Pressure, ksf		0.8	1.2	2.0
Fail. Stress, ksf		9.1	11.0	12.8
Ult. Stress, ksf				
σ_1 Failure, ksf		9.9	12.2	14.8
σ_3 Failure, ksf		0.8	1.2	2.0

Type of Test: Unconsolidated Undrained

Sample Type: remold

Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments

Specific Gravity= 2.762

Remarks:

Reviewed By _____

Client: Nodarse and Associates

Project: Material Testing-Nodarse

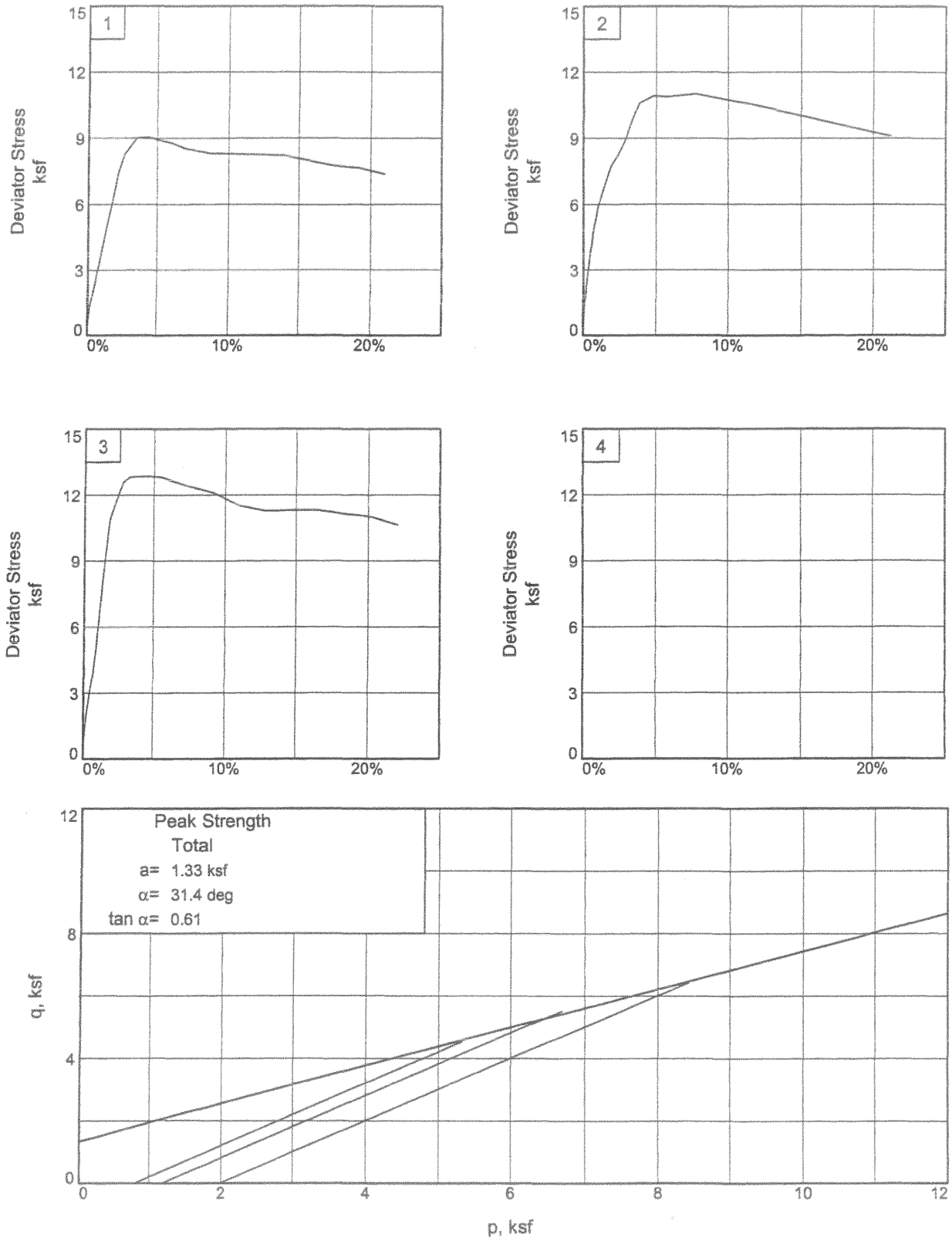
Sample Number: UU-95%-B

Proj. No.: 6738-05-4573 **Date:** 6-11-05

TRIAXIAL SHEAR TEST REPORT

MACTEC ENGINEERING AND CONSULTING, INC.

Tested By: mc **Checked By:** Rajni Sukhwani



Client: Nodarse and Associates
Project: Material Testing-Nodarse
Sample Number: UU-95%-B
Project No.: 6738-05-4573

Reviewed By _____ **MACTEC Engineering and Consulting, Inc.**

Tested By: mc _____ **Checked By:** _____

TRIAXIAL COMPRESSION TEST

Unconsolidated Undrained

6/15/2005
10:46 AM

Date: 6-11-05
Client: Nodarse and Associates
Project: Material Testing-Nodarse
Project No.: 6738-05-4573
Sample Number: UU-95%-B
Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments
Remarks:
Type of Sample: remold
Specific Gravity=2.762 **LL=** **PL=** **PI=**
Test Method: COE uniform strain

Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	188.130		1340.400
Moisture content: Dry soil+tare, gms.	170.070		1175.600
Moisture content: Tare, gms.	52.090		116.300
Moisture, %	15.3	20.4	15.6
Moist specimen weight, gms.	1202.5		
Diameter, in.	2.84	2.83	
Area, in.^{2}	6.33	6.30	
Height, in.	5.73	5.71	
Net decrease in height, in.		0.02	
Wet Density, pcf	126.2	132.8	
Dry density, pcf	109.5	110.4	
Void ratio	0.5754	0.5622	
Saturation, %	73.5	100.0	

Test Readings for Specimen No. 1

Load ring constant = 3.313 lbs. per input unit
Membrane modulus = 0.124105 kN/cm^2
Membrane thickness = 0.02 cm
Cell pressure = 5.60 psi (0.81 ksf)
Back pressure = 0.00 psi (0.00 ksf)
Strain rate, in./min. = 0.05
Fail. Stress = 9.05 ksf **at reading no.** 17

MACTEC Engineering and Consulting, Inc.

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	0.81	0.81	1.00		0.81
1	0.0010	5.00	16.6	0.0	0.38	0.81	1.19	1.47		1.00
2	0.0050	12.00	39.8	0.1	0.91	0.81	1.71	2.13		1.26
3	0.0100	18.00	59.6	0.2	1.36	0.81	2.17	2.69		1.49
4	0.0150	22.00	72.9	0.3	1.66	0.81	2.47	3.06		1.64
5	0.0200	26.00	86.1	0.4	1.96	0.81	2.77	3.43		1.79
6	0.0250	29.00	96.1	0.4	2.19	0.81	2.99	3.71		1.90
7	0.0300	32.00	106.0	0.5	2.41	0.81	3.22	3.99		2.01
8	0.0350	36.00	119.3	0.6	2.71	0.81	3.52	4.36		2.16
9	0.0400	40.00	132.5	0.7	3.01	0.81	3.81	4.73		2.31
10	0.0450	43.00	142.5	0.8	3.23	0.81	4.04	5.01		2.42
11	0.0500	47.00	155.7	0.9	3.53	0.81	4.33	5.38		2.57
12	0.0750	65.00	215.3	1.3	4.86	0.81	5.66	7.02		3.24
13	0.1000	81.00	268.4	1.8	6.03	0.81	6.83	8.47		3.82
14	0.1250	100.00	331.3	2.2	7.41	0.81	8.21	10.19		4.51
15	0.1500	112.00	371.1	2.6	8.26	0.81	9.07	11.24		4.94
16	0.2000	123.00	407.5	3.5	8.99	0.81	9.80	12.15		5.30
17	0.2500	125.00	414.1	4.4	9.05	0.81	9.86	12.23		5.33
18	0.3000	124.00	410.8	5.3	8.90	0.81	9.70	12.03		5.26
19	0.3500	123.00	407.5	6.1	8.74	0.81	9.55	11.84		5.18
20	0.4000	121.00	400.9	7.0	8.52	0.81	9.33	11.57		5.07
21	0.5000	120.00	397.6	8.8	8.29	0.81	9.10	11.28		4.95
22	0.6000	122.00	404.2	10.5	8.27	0.81	9.08	11.25		4.94
23	0.7000	124.00	410.8	12.3	8.24	0.81	9.05	11.22		4.93
24	0.8000	126.00	417.4	14.0	8.21	0.81	9.01	11.18		4.91
25	0.9000	125.00	414.1	15.8	7.98	0.81	8.78	10.89		4.79
26	1.0000	124.00	410.8	17.5	7.75	0.81	8.55	10.61		4.68
27	1.1000	125.00	414.1	19.3	7.64	0.81	8.45	10.48		4.63
28	1.2000	123.00	407.5	21.0	7.36	0.81	8.17	10.13		4.49

MACTEC Engineering and Consulting, Inc.

Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	188.130		1199.200
Moisture content: Dry soil+tare, gms.	170.070		1052.600
Moisture content: Tare, gms.	52.090		115.000
Moisture, %	15.3	19.3	15.6
Moist specimen weight, gms.	1093.1		
Diameter, in.	2.84	2.81	
Area, in.²	6.33	6.20	
Height, in.	5.23	5.18	
Net decrease in height, in.		0.05	
Wet Density, pcf	125.7	134.2	
Dry density, pcf	109.0	112.5	
Void ratio	0.5818	0.5331	
Saturation, %	72.7	100.0	

Test Readings for Specimen No. 2

Load ring constant = 3.313 lbs. per input unit
Membrane modulus = 0.124105 kN/cm²
Membrane thickness = 0.02 cm
Cell pressure = 8.30 psi (1.20 ksf)
Back pressure = 0.00 psi (0.00 ksf)
Strain rate, in./min. = 0.05
Fail. Stress = 11.00 ksf **at reading no.** 20

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	1.20	1.20	1.00		1.20
1	0.0010	5.00	16.6	0.0	0.38	1.20	1.58	1.32		1.39
2	0.0050	16.00	53.0	0.1	1.23	1.20	2.42	2.03		1.81
3	0.0100	26.00	86.1	0.2	2.00	1.20	3.19	2.67		2.19
4	0.0150	35.00	116.0	0.3	2.68	1.20	3.88	3.25		2.54
5	0.0200	41.00	135.8	0.4	3.14	1.20	4.34	3.63		2.77
6	0.0250	49.00	162.3	0.5	3.75	1.20	4.95	4.14		3.07
7	0.0300	54.00	178.9	0.6	4.13	1.20	5.32	4.45		3.26
8	0.0350	61.00	202.1	0.7	4.66	1.20	5.85	4.90		3.52
9	0.0400	66.00	218.7	0.8	5.04	1.20	6.23	5.21		3.71
10	0.0450	70.00	231.9	0.9	5.34	1.20	6.53	5.46		3.86
11	0.0500	76.00	251.8	1.0	5.79	1.20	6.98	5.84		4.09
12	0.0750	90.00	298.2	1.4	6.82	1.20	8.02	6.71		4.61
13	0.1000	103.00	341.2	1.9	7.77	1.20	8.96	7.50		5.08
14	0.1250	110.00	364.4	2.4	8.25	1.20	9.45	7.91		5.32
15	0.1500	119.00	394.2	2.9	8.89	1.20	10.08	8.43		5.64
16	0.1750	132.00	437.3	3.4	9.81	1.20	11.00	9.21		6.10
17	0.2000	143.00	473.8	3.9	10.57	1.20	11.77	9.85		6.48
18	0.2500	149.00	493.6	4.8	10.90	1.20	12.10	10.12		6.65
19	0.3000	150.00	497.0	5.8	10.87	1.20	12.06	10.09		6.63
20	0.4000	155.00	513.5	7.7	11.00	1.20	12.19	10.20		6.69
21	0.5000	155.00	513.5	9.7	10.77	1.20	11.96	10.01		6.58
22	0.6000	155.00	513.5	11.6	10.54	1.20	11.73	9.82		6.46
23	0.7000	154.00	510.2	13.5	10.24	1.20	11.44	9.57		6.32
24	0.8000	153.00	506.9	15.5	9.95	1.20	11.14	9.32		6.17

MACTEC Engineering and Consulting, Inc.

Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
25	0.9000	152.00	503.6	17.4	9.66	1.20	10.85	9.08		6.02
26	1.0000	151.00	500.3	19.3	9.37	1.20	10.56	8.84		5.88
27	1.1000	150.00	497.0	21.3	9.08	1.20	10.28	8.60		5.74

Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	189.370		1256.200
Moisture content: Dry soil+tare, gms.	171.030		1099.800
Moisture content: Tare, gms.	51.890		98.400
Moisture, %	15.4	20.3	15.6
Moist specimen weight, gms.	1142.9		
Diameter, in.	2.84	2.83	
Area, in.²	6.33	6.27	
Height, in.	5.47	5.44	
Net decrease in height, in.		0.03	
Wet Density, pcf	125.7	132.9	
Dry density, pcf	108.9	110.5	
Void ratio	0.5835	0.5601	
Saturation, %	72.9	100.0	

Test Readings for Specimen No. 3

Load ring constant = 3.313 lbs. per input unit

Membrane modulus = 0.124105 kN/cm²

Membrane thickness = 0.02 cm

Cell pressure = 13.90 psi (2.00 ksf)

Back pressure = 0.00 psi (0.00 ksf)

Strain rate, in./min. = 0.05

Fail. Stress = 12.84 ksf **at reading no.** 17

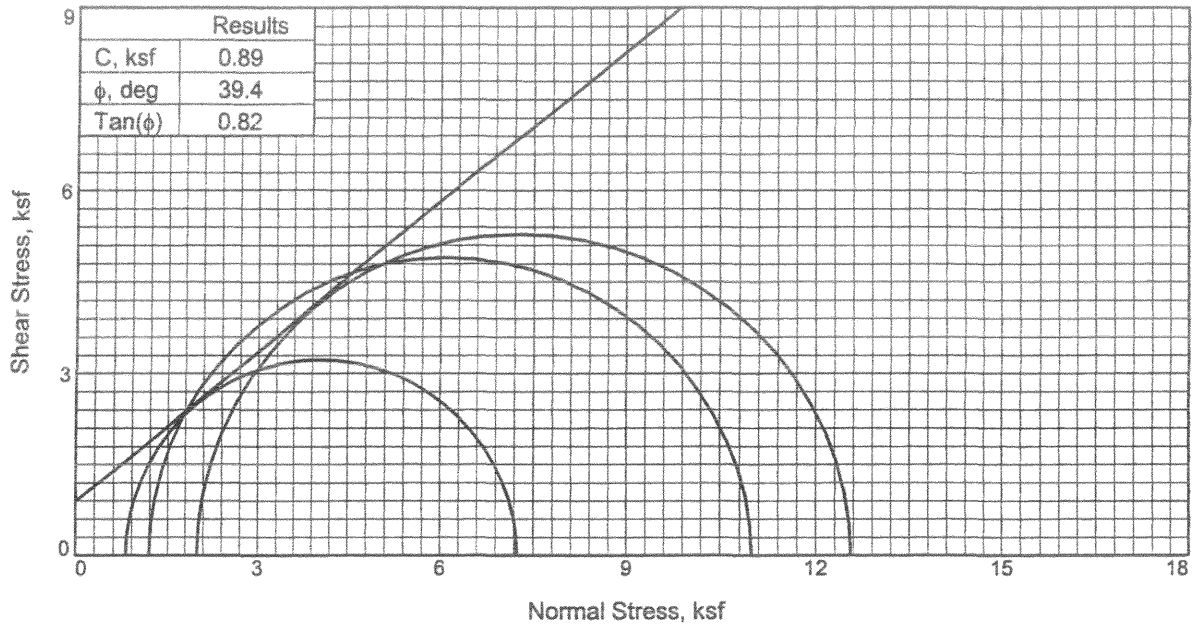
No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	2.00	2.00	1.00		2.00
1	0.0010	6.00	19.9	0.0	0.46	2.00	2.46	1.23		2.23
2	0.0050	17.00	56.3	0.1	1.29	2.00	3.29	1.65		2.65
3	0.0100	24.00	79.5	0.2	1.82	2.00	3.82	1.91		2.91
4	0.0150	30.00	99.4	0.3	2.28	2.00	4.28	2.14		3.14
5	0.0200	36.00	119.3	0.4	2.73	2.00	4.73	2.36		3.37
6	0.0250	41.00	135.8	0.5	3.10	2.00	5.11	2.55		3.55
7	0.0300	46.00	152.4	0.6	3.48	2.00	5.48	2.74		3.74
8	0.0350	51.00	169.0	0.6	3.85	2.00	5.86	2.93		3.93
9	0.0400	57.00	188.8	0.7	4.30	2.00	6.31	3.15		4.15
10	0.0450	64.00	212.0	0.8	4.83	2.00	6.83	3.41		4.42
11	0.0500	72.00	238.5	0.9	5.43	2.00	7.43	3.71		4.71
12	0.0750	112.00	371.1	1.4	8.40	2.00	10.40	5.20		6.20
13	0.1000	146.00	483.7	1.8	10.90	2.00	12.90	6.45		7.45
14	0.1500	170.00	563.2	2.8	12.57	2.00	14.58	7.28		8.29
15	0.1750	174.00	576.5	3.2	12.81	2.00	14.81	7.40		8.41
16	0.2000	175.00	579.8	3.7	12.82	2.00	14.82	7.41		8.41
17	0.2500	177.00	586.4	4.6	12.84	2.00	14.85	7.42		8.42

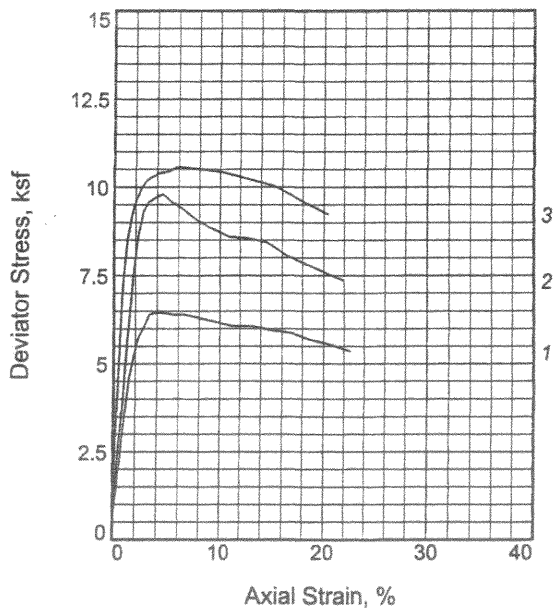
MACTEC Engineering and Consulting, Inc.

Test Readings for Specimen No. 3

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
18	0.3000	178.00	589.7	5.5	12.79	2.00	14.79	7.39		8.40
19	0.3500	177.00	586.4	6.4	12.60	2.00	14.60	7.29		8.30
20	0.4000	176.00	583.1	7.3	12.40	2.00	14.40	7.20		8.20
21	0.5000	175.00	579.8	9.2	12.09	2.00	14.09	7.04		8.05
22	0.6000	170.00	563.2	11.0	11.51	2.00	13.51	6.75		7.75
23	0.7000	170.00	563.2	12.9	11.27	2.00	13.27	6.63		7.64
24	0.8000	174.00	576.5	14.7	11.29	2.00	13.29	6.64		7.65
25	0.9000	178.00	589.7	16.5	11.30	2.00	13.30	6.65		7.65
26	1.0000	179.00	593.0	18.4	11.11	2.00	13.12	6.55		7.56
27	1.1000	181.00	599.7	20.2	10.98	2.00	12.99	6.49		7.49
28	1.2000	179.00	593.0	22.0	10.61	2.00	12.61	6.30		7.31

MACTEC Engineering and Consulting, Inc.





Sample No.		1	2	3
Initial	Water Content,	16.6	16.1	16.8
	Dry Density, pcf	104.1	103.5	104.6
	Saturation,	70.0	66.7	71.5
	Void Ratio	0.6567	0.6651	0.6486
	Diameter, in.	2.84	2.84	2.84
	Height, in.	5.32	5.50	5.90
At Test	Water Content,	22.9	23.3	22.8
	Dry Density, pcf	105.6	105.0	105.7
	Saturation,	100.0	100.0	100.0
	Void Ratio	0.6334	0.6425	0.6310
	Diameter, in.	2.83	2.83	2.83
	Height, in.	5.29	5.47	5.88
Strain rate, in./min.		0.05	0.05	0.05
Back Pressure, ksf		0.0	0.0	0.0
Cell Pressure, ksf		0.8	1.2	2.0
Fail. Stress, ksf		6.4	9.8	10.6
Ult. Stress, ksf				
σ_1 Failure, ksf		7.3	11.0	12.6
σ_3 Failure, ksf		0.8	1.2	2.0

Type of Test: Unconsolidated Undrained

Sample Type: remolded

Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments

Specific Gravity= 2.762

Remarks:

Reviewed By _____

Client: Nodarse and Associates

Project: Material Testing-Nodarse

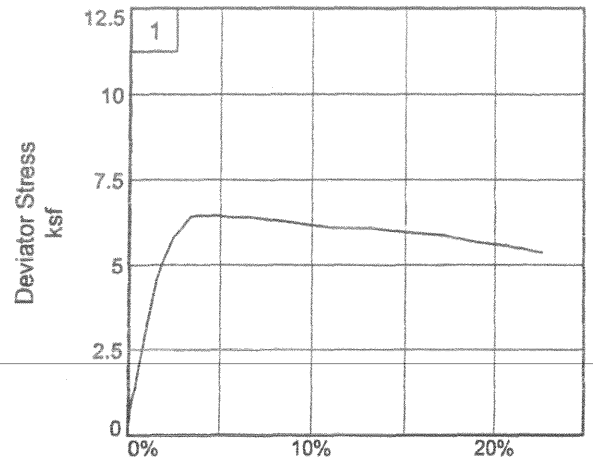
Sample Number: UU-90%-B

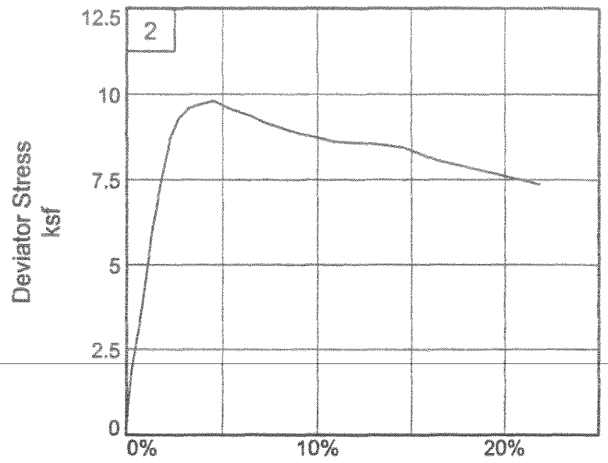
Proj. No.: 6738-05-4573 **Date:** 6-10-05

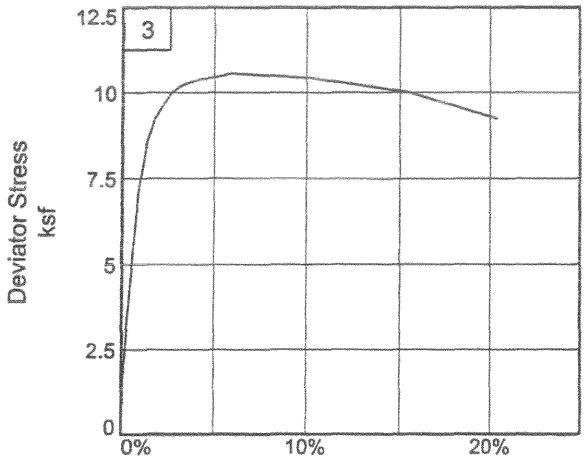
TRIAXIAL SHEAR TEST REPORT

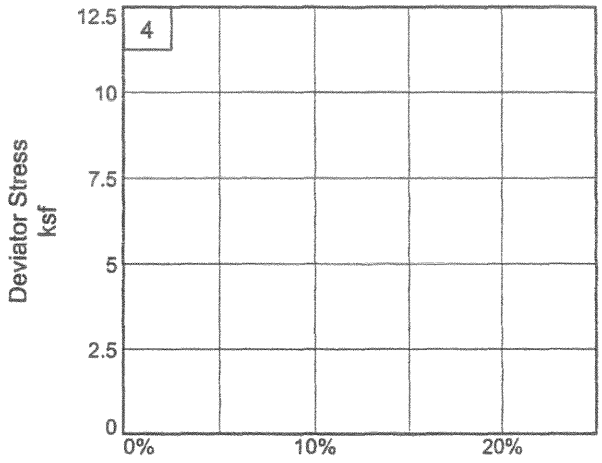
MACTEC ENGINEERING AND CONSULTING, INC.

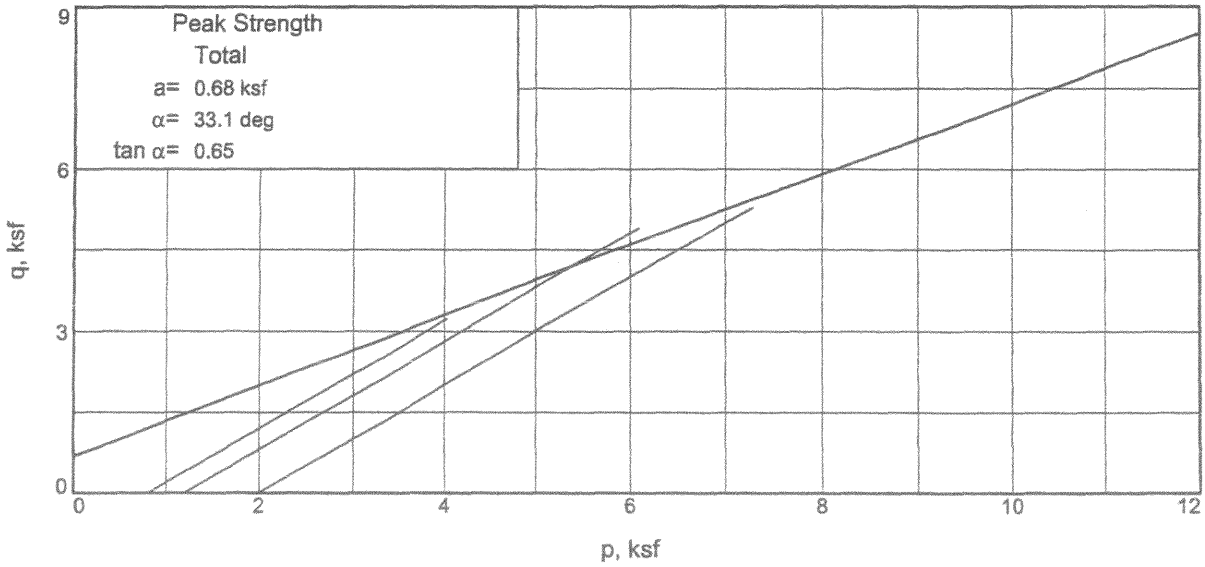
Tested By: mc **Checked By:** Rajni Sukhwani











Client: Nodarse and Associates
Project: Material Testing-Nodarse
Sample Number: UU-90%-B
Project No.: 6738-05-4573

Reviewed By _____ **MACTEC Engineering and Consulting, Inc.**

Tested By: mc _____ **Checked By:** _____

TRIAXIAL COMPRESSION TEST
Unconsolidated Undrained

6/15/2005
10:45 AM

Date: 6-10-05
Client: Nodarse and Associates
Project: Material Testing-Nodarse
Project No.: 6738-05-4573
Sample Number: UU-90%-B
Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments
Remarks:
Type of Sample: remolded
Specific Gravity=2.762 **LL=** **PL=** **PI=**
Test Method: COE uniform strain

Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	229.580		1194.700
Moisture content: Dry soil+tare, gms.	204.670		1041.000
Moisture content: Tare, gms.	55.040		115.200
Moisture, %	16.6	22.9	16.6
Moist specimen weight, gms.	1074.0		
Diameter, in.	2.84	2.83	
Area, in.^{2}	6.33	6.28	
Height, in.	5.32	5.29	
Net decrease in height, in.		0.03	
Wet Density, pcf	121.4	129.8	
Dry density, pcf	104.1	105.6	
Void ratio	0.6567	0.6334	
Saturation, %	70.0	100.0	

Test Readings for Specimen No. 1

Load ring constant = 3.313 lbs. per input unit
Membrane modulus = 0.124105 kN/cm^2
Membrane thickness = 0.02 cm
Cell pressure = 5.60 psi (0.81 ksf)
Back pressure = 0.00 psi (0.00 ksf)
Strain rate, in./min. = 0.05
Fail. Stress = 6.45 ksf **at reading no.** 18

MACTEC Engineering and Consulting, Inc.

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	0.81	0.81	1.00		0.81
1	0.0010	3.00	9.9	0.0	0.23	0.81	1.03	1.28		0.92
2	0.0050	10.00	33.1	0.1	0.76	0.81	1.57	1.94		1.19
3	0.0100	14.00	46.4	0.2	1.06	0.81	1.87	2.32		1.34
4	0.0150	17.00	56.3	0.3	1.29	0.81	2.10	2.60		1.45
5	0.0200	19.00	62.9	0.4	1.44	0.81	2.25	2.78		1.53
6	0.0250	24.00	79.5	0.5	1.82	0.81	2.62	3.25		1.71
7	0.0300	28.00	92.8	0.6	2.12	0.81	2.92	3.62		1.86
8	0.0350	31.00	102.7	0.7	2.34	0.81	3.15	3.90		1.98
9	0.0400	35.00	116.0	0.8	2.64	0.81	3.45	4.27		2.13
10	0.0450	39.00	129.2	0.8	2.94	0.81	3.75	4.65		2.28
11	0.0500	42.00	139.1	0.9	3.16	0.81	3.97	4.92		2.39
12	0.0750	60.00	198.8	1.4	4.50	0.81	5.30	6.58		3.05
13	0.1000	70.00	231.9	1.9	5.22	0.81	6.03	7.47		3.42
14	0.1250	78.00	258.4	2.4	5.79	0.81	6.60	8.18		3.70
15	0.1500	82.00	271.7	2.8	6.06	0.81	6.86	8.51		3.84
16	0.1750	87.00	288.2	3.3	6.40	0.81	7.20	8.93		4.00
17	0.2000	88.00	291.5	3.8	6.44	0.81	7.24	8.98		4.03
18	0.2500	89.00	294.9	4.7	6.45	0.81	7.25	8.99		4.03
19	0.3000	89.00	294.9	5.7	6.38	0.81	7.19	8.92		4.00
20	0.3500	90.00	298.2	6.6	6.39	0.81	7.20	8.92		4.00
21	0.4000	90.00	298.2	7.6	6.33	0.81	7.13	8.84		3.97
22	0.5000	90.00	298.2	9.4	6.20	0.81	7.00	8.68		3.90
23	0.6000	90.00	298.2	11.3	6.07	0.81	6.87	8.52		3.84
24	0.7000	92.00	304.8	13.2	6.07	0.81	6.88	8.53		3.84
25	0.8000	92.00	304.8	15.1	5.94	0.81	6.74	8.36		3.78
26	0.9000	93.00	308.1	17.0	5.87	0.81	6.67	8.28		3.74
27	1.0000	92.00	304.8	18.9	5.67	0.81	6.48	8.04		3.64
28	1.1000	92.00	304.8	20.8	5.54	0.81	6.35	7.87		3.58
29	1.2000	91.00	301.5	22.7	5.35	0.81	6.16	7.63		3.48

MACTEC Engineering and Consulting, Inc.

Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	299.270		1196.700
Moisture content: Dry soil+tare, gms.	265.040		1041.800
Moisture content: Tare, gms.	51.880		106.200
Moisture, %	16.1	23.3	16.6
Moist specimen weight, gms.	1099.1		
Diameter, in.	2.84	2.83	
Area, in.²	6.33	6.28	
Height, in.	5.50	5.47	
Net decrease in height, in.		0.03	
Wet Density, pcf	120.2	129.4	
Dry density, pcf	103.5	105.0	
Void ratio	0.6651	0.6425	
Saturation, %	66.7	100.0	

Test Readings for Specimen No. 2

Load ring constant = 3.313 lbs. per input unit
Membrane modulus = 0.124105 kN/cm²
Membrane thickness = 0.02 cm
Cell pressure = 8.30 psi (1.20 ksf)
Back pressure = 0.00 psi (0.00 ksf)
Strain rate, in./min. = 0.05
Fail. Stress = 9.79 ksf **at reading no.** 18

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	1.20	1.20	1.00		1.20
1	0.0010	3.00	9.9	0.0	0.23	1.20	1.42	1.19		1.31
2	0.0050	11.00	36.4	0.1	0.84	1.20	2.03	1.70		1.61
3	0.0100	18.00	59.6	0.2	1.37	1.20	2.56	2.14		1.88
4	0.0150	24.00	79.5	0.3	1.82	1.20	3.01	2.52		2.10
5	0.0200	28.00	92.8	0.4	2.12	1.20	3.32	2.77		2.26
6	0.0250	32.00	106.0	0.5	2.42	1.20	3.62	3.03		2.41
7	0.0300	37.00	122.6	0.5	2.80	1.20	3.99	3.34		2.59
8	0.0350	40.00	132.5	0.6	3.02	1.20	4.22	3.53		2.71
9	0.0400	45.00	149.1	0.7	3.40	1.20	4.59	3.84		2.89
10	0.0450	49.00	162.3	0.8	3.69	1.20	4.89	4.09		3.04
11	0.0500	54.00	178.9	0.9	4.07	1.20	5.26	4.40		3.23
12	0.0750	80.00	265.0	1.4	6.00	1.20	7.19	6.02		4.19
13	0.1000	100.00	331.3	1.8	7.46	1.20	8.66	7.24		4.93
14	0.1250	117.00	387.6	2.3	8.69	1.20	9.88	8.27		5.54
15	0.1500	126.00	417.4	2.7	9.31	1.20	10.51	8.79		5.85
16	0.1750	130.00	430.7	3.2	9.56	1.20	10.76	9.00		5.98
17	0.2000	132.00	437.3	3.7	9.67	1.20	10.86	9.09		6.03
18	0.2500	135.00	447.3	4.6	9.79	1.20	10.99	9.19		6.09
19	0.3000	133.00	440.6	5.5	9.55	1.20	10.75	8.99		5.97
20	0.3500	132.00	437.3	6.4	9.39	1.20	10.59	8.86		5.89
21	0.4000	130.00	430.7	7.3	9.16	1.20	10.35	8.66		5.77
22	0.5000	128.00	424.1	9.1	8.84	1.20	10.04	8.40		5.62
23	0.6000	127.00	420.8	11.0	8.59	1.20	9.79	8.19		5.49
24	0.7000	129.00	427.4	12.8	8.55	1.20	9.75	8.15		5.47

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Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
25	0.8000	130.00	430.7	14.6	8.44	1.20	9.63	8.06		5.41
26	0.9000	127.00	420.8	16.4	8.07	1.20	9.26	7.75		5.23
27	1.0000	126.00	417.4	18.3	7.83	1.20	9.02	7.55		5.11
28	1.1000	125.00	414.1	20.1	7.59	1.20	8.79	7.35		4.99
29	1.2000	124.00	410.8	21.9	7.36	1.20	8.55	7.16		4.87

Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	169.450		1346.000
Moisture content: Dry soil+tare, gms.	152.380		1169.600
Moisture content: Tare, gms.	50.720		115.300
Moisture, %	16.8	22.8	16.7
Moist specimen weight, gms.	1198.4		
Diameter, in.	2.84	2.83	
Area, in.²	6.33	6.29	
Height, in.	5.90	5.88	
Net decrease in height, in.		0.02	
Wet Density, pcf	122.2	129.9	
Dry density, pcf	104.6	105.7	
Void ratio	0.6486	0.6310	
Saturation, %	71.5	100.0	

Test Readings for Specimen No. 3

Load ring constant = 3.313 lbs. per input unit
Membrane modulus = 0.124105 kN/cm²
Membrane thickness = 0.02 cm
Cell pressure = 13.90 psi (2.00 ksf)
Back pressure = 0.00 psi (0.00 ksf)
Strain rate, in./min. = 0.05
Fail. Stress = 10.56 ksf **at reading no.** 20

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	2.00	2.00	1.00		2.00
1	0.0010	8.00	26.5	0.0	0.61	2.00	2.61	1.30		2.30
2	0.0050	22.00	72.9	0.1	1.67	2.00	3.67	1.83		2.84
3	0.0100	31.00	102.7	0.2	2.35	2.00	4.35	2.17		3.18
4	0.0150	42.00	139.1	0.3	3.18	2.00	5.18	2.59		3.59
5	0.0200	50.00	165.7	0.3	3.78	2.00	5.78	2.89		3.89
6	0.0250	58.00	192.2	0.4	4.38	2.00	6.38	3.19		4.19
7	0.0300	66.00	218.7	0.5	4.98	2.00	6.98	3.49		4.49
8	0.0350	74.00	245.2	0.6	5.58	2.00	7.58	3.79		4.79
9	0.0400	81.00	268.4	0.7	6.10	2.00	8.10	4.05		5.05
10	0.0450	88.00	291.5	0.8	6.62	2.00	8.63	4.31		5.31
11	0.0500	95.00	314.7	0.9	7.14	2.00	9.15	4.57		5.57
12	0.0750	114.00	377.7	1.3	8.54	2.00	10.54	5.26		6.27
13	0.1000	124.00	410.8	1.7	9.25	2.00	11.25	5.62		6.62
14	0.1250	130.00	430.7	2.1	9.65	2.00	11.65	5.82		6.83
15	0.1500	135.00	447.3	2.6	9.98	2.00	11.98	5.99		6.99

MACTEC Engineering and Consulting, Inc.

Test Readings for Specimen No. 3

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
16	0.1750	138.00	457.2	3.0	10.16	2.00	12.16	6.07		7.08
17	0.2000	140.00	463.8	3.4	10.26	2.00	12.26	6.12		7.13
18	0.2500	143.00	473.8	4.3	10.39	2.00	12.39	6.19		7.19
19	0.3000	145.00	480.4	5.1	10.44	2.00	12.44	6.21		7.22
20	0.3500	148.00	490.3	6.0	10.56	2.00	12.56	6.27		7.28
21	0.4000	149.00	493.6	6.8	10.53	2.00	12.53	6.26		7.27
22	0.5000	151.00	500.3	8.5	10.48	2.00	12.48	6.24		7.24
23	0.6000	153.00	506.9	10.2	10.42	2.00	12.42	6.21		7.21
24	0.7000	154.00	510.2	11.9	10.29	2.00	12.29	6.14		7.15
25	0.8000	155.00	513.5	13.6	10.16	2.00	12.16	6.07		7.08
26	0.9000	156.00	516.8	15.3	10.02	2.00	12.02	6.01		7.01
27	1.0000	155.00	513.5	17.0	9.76	2.00	11.76	5.87		6.88
28	1.1000	154.00	510.2	18.7	9.50	2.00	11.50	5.74		6.75
29	1.2000	153.00	506.9	20.4	9.24	2.00	11.24	5.61		6.62

MACTEC Engineering and Consulting, Inc.

Vaeth, Dick

From: Stathis Payiatakis [stathisp@nodarse.com]
Sent: Monday, February 06, 2006 7:53 AM
To: Vaeth, Dick
Cc: Stathis Payiatakis
Subject: FW: EAA Proctor

Dick,
As agreed on Friday
Regards
Stathis P

From: Coleman, Mark [mailto:MACOLEMAN@mactec.com]
Sent: Friday, February 03, 2006 3:15 PM
To: Stathis Payiatakis
Subject: EAA Proctor

Stathis,

I reviewed the select fill compaction test report for the EAA project, MACTEC project number 6738-05-4573-02. The test specification D-1557-91 procedure B modified shown on the report should be D-698-91 procedure B standard. If you have any questions please call.

Thanks,

Mark Coleman

MACTEC Engineering and Consulting

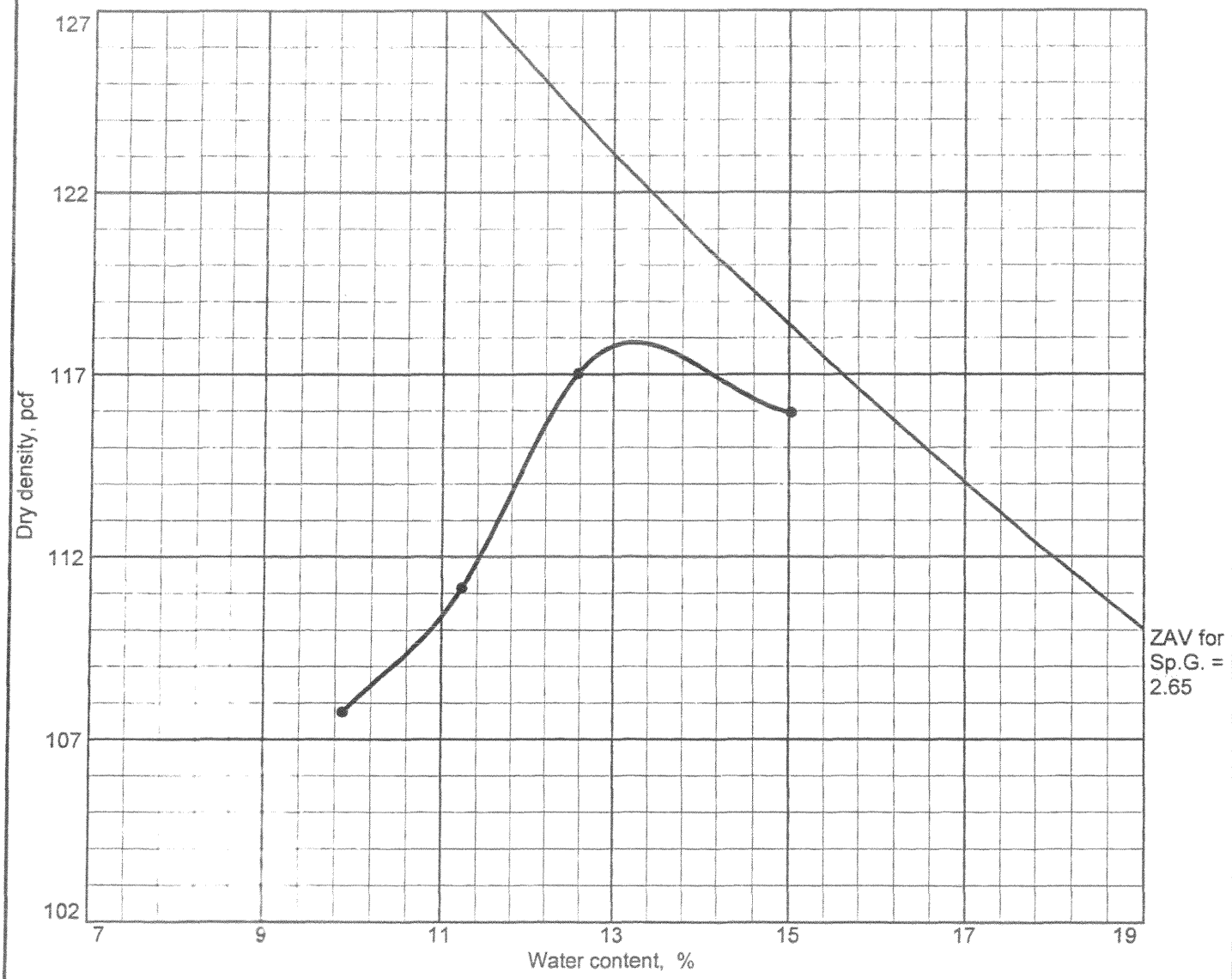
Jacksonville, Florida 32207

904-398-1084

Fax 904-398-1084

macoleman@mactec.com

COMPACTION TEST REPORT



Test specification: ASTM D 1557-91 Procedure B Modified
Oversize correction applied to each point

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/8 in.	% < No.200
	USCS	AASHTO						
	SM	A-1-b					18.3	21.1

ROCK CORRECTED TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 118.0 pcf Optimum moisture = 13.0 %	Light gray and tan clayey fine SAND with limerock and shell fragments

Project No.: 6738-05-4573-02 **Client:** Nodarse and Associates, Inc.
Project: EAA

● **Source:** Select Fill **Sample No.:** composite

Remarks:

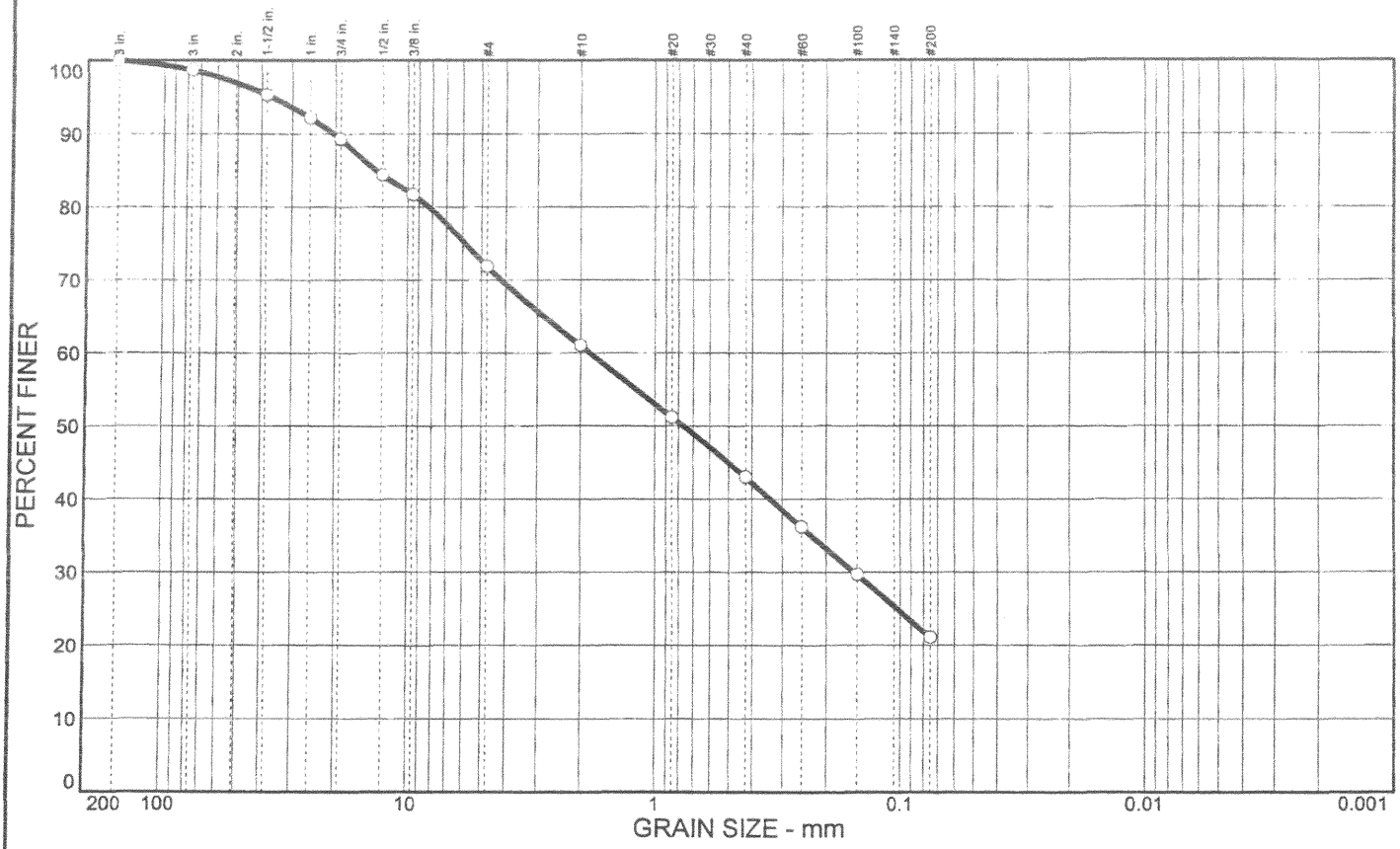
Rajni Sukhwani

COMPACTION TEST REPORT

MACTEC ENGINEERING AND CONSULTING, INC.

Reviewed By

Grain Size Distribution Report



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	1.3	26.8	50.8	21.1		SM	A-1-b		

SIEVE inches size	PERCENT FINER ○		
6	100.0		
3	98.7		
1.5	95.3		
1	92.2		
.75	89.3		
.5	84.4		
.375	81.7		
	GRAIN SIZE		
D_{60}	1.83		
D_{30}	0.154		
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○		
#4	71.9		
#10	61.0		
#20	51.2		
#40	43.0		
#60	36.2		
#100	29.7		
#200	21.1		

SOIL DESCRIPTION

○ Light gray and tan clayey fine SAND with limerock and shell fragments

REMARKS:

○

○ Source: Select Fill

Sample No.: composite

MACTEC ENGINEERING. AND CONSULTING, INC.

Client: Nodarse and Associates, Inc.

Project: EAA

Project No.: 6738-05-4573-02

R-S

Reviewed By

GRAIN SIZE DISTRIBUTION TEST DATA

Client: Nodarse and Associates, Inc.
Project: EAA
Project Number: 6738-05-4573-02

Sample Data

Source: Select Fill
Sample No.: composite
Elev. or Depth: **Sample Length (in./cm.):**
Location:
Description: Light gray and tan clayey fine SAND with limerock and shell fragments
Liquid Limit: **Plastic Limit:**
USCS Classification: SM **AASHTO Classification:** A-1-b
Testing Remarks:

Mechanical Analysis Data

	Initial
Dry sample and tare=	183928.00
Tare =	0.00
Dry sample weight =	183928.00

Sample split on .5 inch sieve
Split sample data:
Sample and tare = 478.20 Tare = .00 Sample weight = 478.20
Cumulative weight retained tare= .00
Tare for cumulative weight retained= .00

Sieve	Cumul. Wt. retained	Percent finer
6 inch	0.00	100.0
3 inch	2404.00	98.7
1.5 inch	8637.00	95.3
1 inch	14330.00	92.2
.75 inch	19677.00	89.3
.5 inch	28701.00	84.4
.375 inch	15.49	81.7
# 4	70.85	71.9
# 10	132.55	61.0
# 20	188.10	51.2
# 40	234.34	43.0
# 60	273.23	36.2
# 100	309.97	29.7
# 200	358.68	21.1

Fractional Components

Gravel/Sand based on #4
Sand/Fines based on #200
% COBBLES = 1.3 % GRAVEL = 26.8 % SAND = 50.8
% FINES = 21.1

D_{85}= 13.42 D_{60}= 1.83 D_{50}= 0.77
D_{30}= 0.15

MOISTURE DENSITY TEST DATA

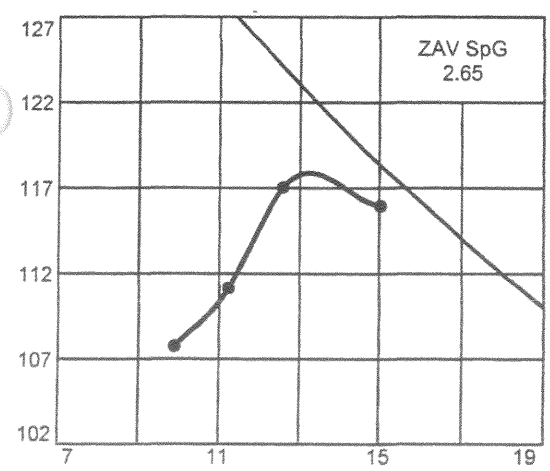
Client: Nodarse and Associates, Inc.
Project: EAA
Project Number: 6738-05-4573-02

Specimen Data

Source: Select Fill
Sample No.: composite
Elev. or Depth: **Sample Length (in./cm.):**
Location:
Description: Light gray and tan clayey fine SAND with limerock and shell fragments
USCS Classification: SM **AASHTO Classification:** A-1-b
Natural Moisture: **Liquid Limit:** **Plasticity Index:**
Testing Remarks:
Percent retained on 3/8 in. sieve: 18.3
Percent passing No. 200 sieve: 21.1 **Specific gravity:**

Test Data And Results

Type of test: ASTM D 1557-91 Procedure B Modified
Mold Dia.: 4.00 in. **Hammer Wt.:** 10 lb. **Drop:** 18 in.
Layers: five **Blows per Layer:** 25

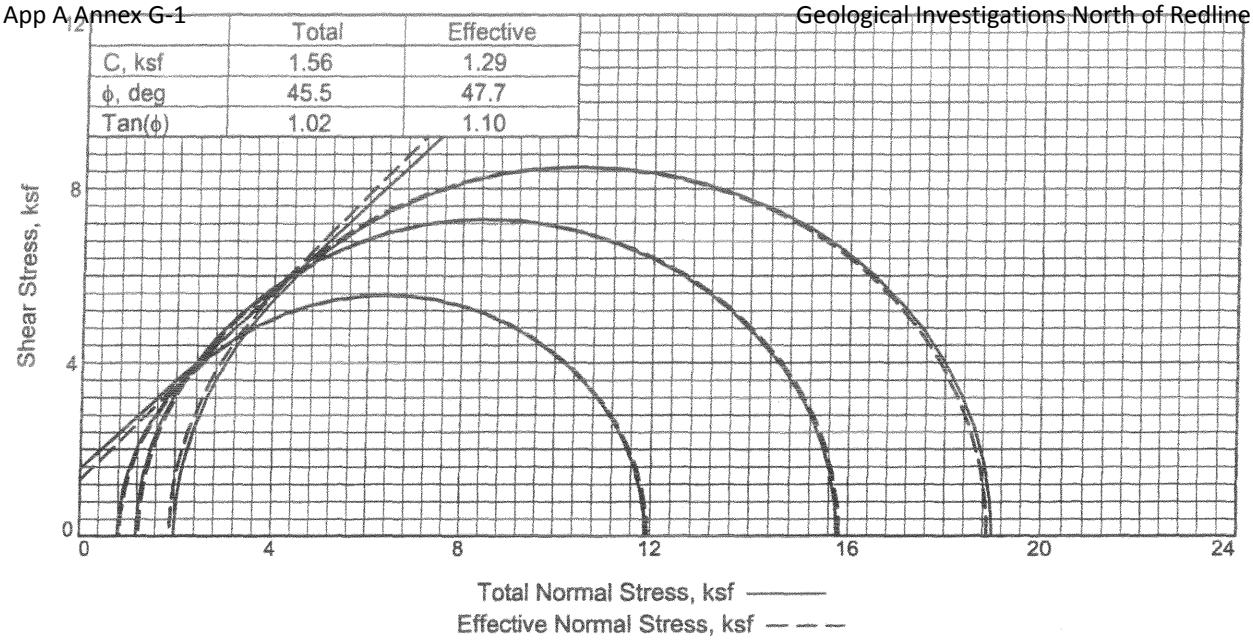


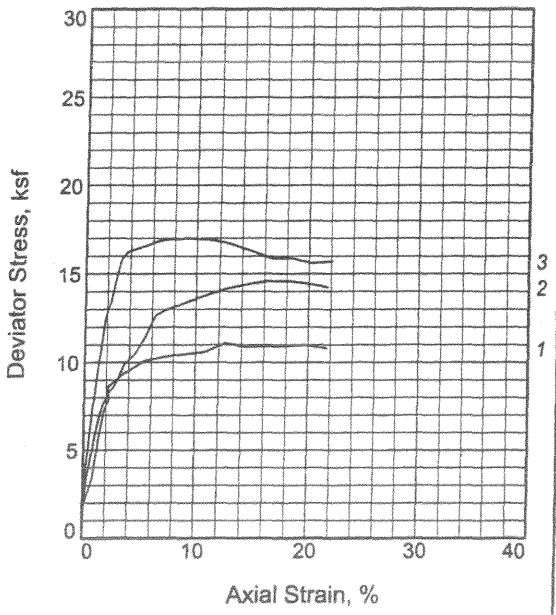
POINT NO.	1	2	3	4
WM + WS	6084.0	6114.0	5941.0	5850.0
WM	4129.0	4129.0	4129.0	4129.0
WW+T	540.90	451.40	507.80	478.20
WD+T	478.20	388.78	455.60	435.46
TARE	0.00	0.00	0.00	0.00
MOIST	13.1	16.1	11.5	9.8
MOISTURE	12.6	15.0	11.2	9.9
DRY DEN	117.0	116.0	111.2	107.8

Max dry den= 118.0 pcf Opt moisture= 13.0 %
Uncorrected Results: Max dry den= 115.5 pcf Opt moisture= 14.0 %

ASTM D 4718 Correction Data:
Bulk Specific Gravity of Oversize Material = 2.095
Moisture of Oversize Material = 10.2 %
Corrections Applied to Every Test Point

	Total	Effective
C, ksf	1.56	1.29
ϕ, deg	45.5	47.7
Tan(ϕ)	1.02	1.10





Sample No.		1	2	3
Initial	Water Content,	16.2	16.2	16.2
	Dry Density, pcf	108.3	108.0	110.0
	Saturation,	75.6	75.0	78.7
	Void Ratio	0.5917	0.5966	0.5674
	Diameter, in.	2.84	2.84	2.84
	Height, in.	5.58	5.54	5.43
At Test	Water Content,	20.1	21.1	20.0
	Dry Density, pcf	110.9	108.9	111.1
	Saturation,	100.0	100.0	100.0
	Void Ratio	0.5543	0.5836	0.5518
	Diameter, in.	2.82	2.83	2.83
	Height, in.	5.54	5.53	5.41
Strain rate, in./min.		0.05	0.05	0.05
Back Pressure, ksf		7.2	7.2	7.2
Cell Pressure, ksf		8.0	8.4	9.2
Fail. Stress, ksf		11.1	14.6	17.0
Total Pore Pr., ksf		7.2	7.1	7.3
Ult. Stress, ksf				
Total Pore Pr., ksf				
$\bar{\sigma}_1$ Failure, ksf		11.9	15.8	18.9
$\bar{\sigma}_3$ Failure, ksf		0.8	1.3	1.9

Type of Test:
CU with Pore Pressures
Sample Type: remold
Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments

Specific Gravity= 2.762
Remarks:

Reviewed By _____

Client: Nodarse and Associates

Project: Material Testing-Nodarse

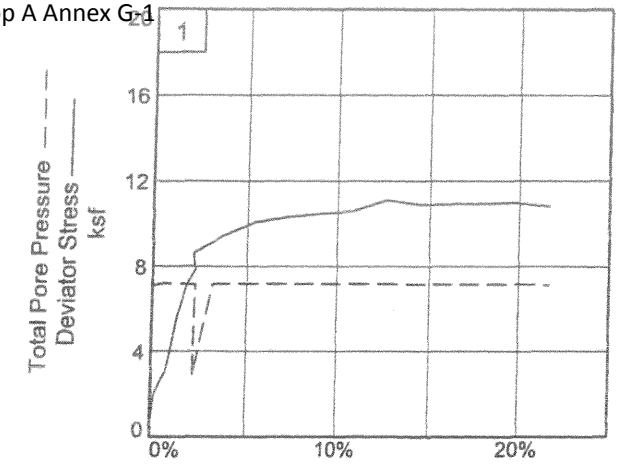
Sample Number: CU-95%-B

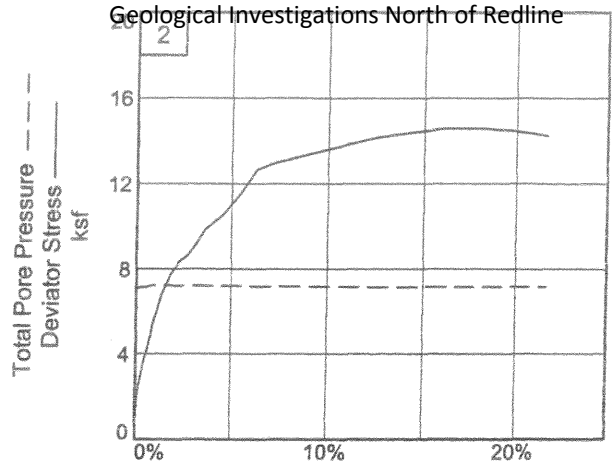
Proj. No.: 6738-05-4573 **Date:** 6-12-05

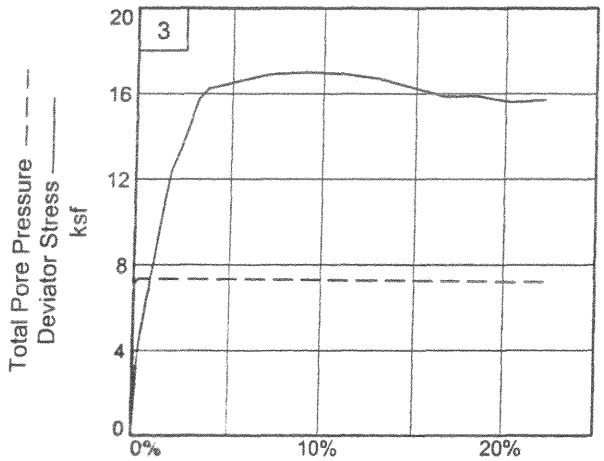
TRIAXIAL SHEAR TEST REPORT

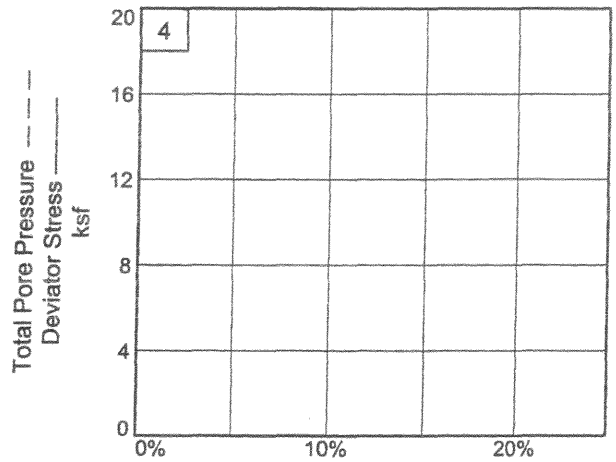
MACTEC ENGINEERING AND CONSULTING, INC.

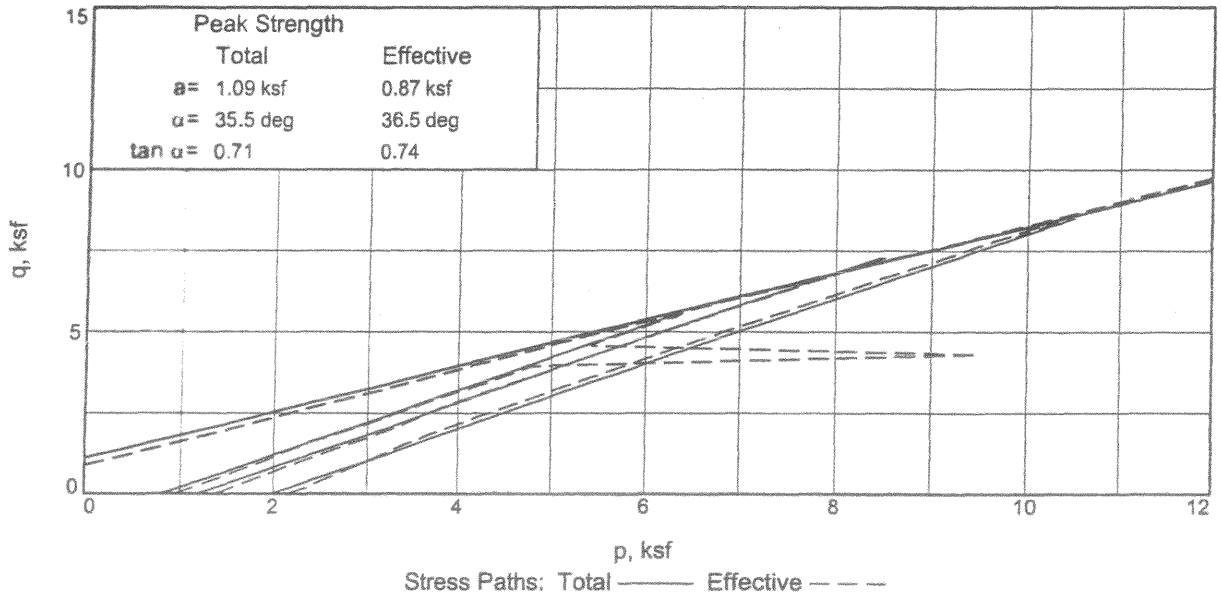
Tested By: mc **Checked By:** Rajni Sukhwani











Client: Nodarse and Associates
Project: Material Testing-Nodarse
Sample Number: CU-95%-B
Project No.: 6738-05-4573

Reviewed By _____ **MACTEC Engineering and Consulting, Inc.**

Tested By: mc _____ **Checked By:** _____

TRIAXIAL COMPRESSION TEST

CU with Pore Pressures

6/16/2005
10:57 AM

Date: 6-12-05
Client: Nodarse and Associates
Project: Material Testing-Nodarse
Project No.: 6738-05-4573
Sample Number: CU-95%-B
Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments
Remarks:
Type of Sample: remold
Specific Gravity=2.762 **LL=** **PL=** **PI=**
Test Method: COE uniform strain

Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	173.410			1326.000
Moisture content: Dry soil+tare, gms.	156.910			1142.000
Moisture content: Tare, gms.	55.030			115.790
Moisture, %	16.2	21.4	20.1	17.9
Moist specimen weight, gms.	1167.9			
Diameter, in.	2.84	2.84	2.82	
Area, in.²	6.33	6.33	6.23	
Height, in.	5.58	5.58	5.54	
Net decrease in height, in.		0.00	0.04	
Wet Density, pcf	125.9	131.5	133.2	
Dry density, pcf	108.3	108.3	110.9	
Void ratio	0.5917	0.5917	0.5543	
Saturation, %	75.6	100.0	100.0	

Test Readings for Specimen No. 1

Load ring constant = 3.313 lbs. per input unit
Membrane modulus = 0.124105 kN/cm²
Membrane thickness = 0.02 cm
Consolidation cell pressure = 55.60 psi (8.01 ksf)
Consolidation back pressure = 50.00 psi (7.20 ksf)
Consolidation effective confining stress = 0.81 ksf
Strain rate, in./min. = 0.05
Fail. Stress = 11.10 ksf **at reading no.** 24

MACTEC Engineering and Consulting, Inc.

Test Readings for Specimen No.

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	0.95	0.95	1.00	49.00	0.95	0.00
1	0.0010	8.00	26.5	0.0	0.61	0.94	1.55	1.65	49.10	1.24	0.31
2	0.0050	19.00	62.9	0.1	1.45	0.91	2.36	2.60	49.30	1.63	0.73
3	0.0100	26.00	86.1	0.2	1.99	0.89	2.88	3.22	49.40	1.89	0.99
4	0.0150	29.00	96.1	0.3	2.21	0.88	3.09	3.52	49.50	1.98	1.11
5	0.0200	31.00	102.7	0.4	2.36	0.86	3.23	3.74	49.60	2.05	1.18
6	0.0250	34.00	112.6	0.5	2.59	0.84	3.43	4.10	49.80	2.13	1.29
7	0.0300	36.00	119.3	0.5	2.74	0.84	3.57	4.28	49.80	2.21	1.37
8	0.0350	38.00	125.9	0.6	2.89	0.82	3.71	4.52	49.90	2.27	1.44
9	0.0400	40.00	132.5	0.7	3.04	0.82	3.86	4.70	49.90	2.34	1.52
10	0.0450	43.00	142.5	0.8	3.26	0.82	4.08	4.98	49.90	2.45	1.63
11	0.0500	46.00	152.4	0.9	3.49	0.84	4.32	5.18	49.80	2.58	1.74
12	0.0750	75.00	248.5	1.4	5.66	0.85	6.51	7.66	49.70	3.68	2.83
13	0.1000	95.00	314.7	1.8	7.14	0.88	8.02	9.13	49.50	4.45	3.57
14	0.1250	105.00	347.9	2.3	7.85	0.86	8.72	10.09	49.60	4.79	3.93
15	0.1200	115.00	381.0	2.2	8.61	5.20	13.81	2.66	~~19.50~~ 49.5	9.50	4.30
16	0.1750	123.00	407.5	3.2	9.11	0.88	9.99	11.38	49.50	5.44	4.56
17	0.2000	127.00	420.8	3.6	9.37	0.84	10.20	12.21	49.80	5.52	4.68
18	~~0.3000~~ 7.512	139.00 134	460.5	5.4	10.06	0.84	10.89	13.04	49.80	5.86	5.03
19	0.3000	139.00	460.5	5.4	10.06	0.84	10.89	13.04	49.80	5.86	5.03
20	0.3500	142.00	470.4	6.3	10.18	0.84	11.01	13.19	49.80	5.92	5.09
21	0.4000	145.00	480.4	7.2	10.29	0.85	11.14	13.12	49.70	6.00	5.15
22	0.5000	150.00	497.0	9.0	10.44	0.85	11.29	13.29	49.70	6.07	5.22
23	0.6000	155.00	513.5	10.8	10.57	0.85	11.42	13.45	49.70	6.14	5.29
24	0.7000	166.00	550.0	12.6	11.10	0.85	11.95	14.06	49.70	6.40	5.55
25	0.8000	166.00	550.0	14.5	10.87	0.86	11.73	13.58	49.60	6.30	5.43
26	0.9000	170.00	563.2	16.3	10.89	0.86	11.76	13.61	49.60	6.31	5.45
27	1.0000	174.00	576.5	18.1	10.91	0.86	11.77	13.63	49.60	6.32	5.45
28	1.1000	179.00	593.0	19.9	10.98	0.88	11.85	13.49	49.50	6.37	5.49
29	1.2000	180.00	596.3	21.7	10.79	0.89	11.68	13.08	49.40	6.29	5.39

Correction made
6-16-05

MACTEC Engineering and Consulting, Inc.

Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	173.410			1288.400
Moisture content: Dry soil+tare, gms.	156.910			1108.100
Moisture content: Tare, gms.	55.030			95.600
Moisture, %	16.2	21.6	21.1	17.8
Moist specimen weight, gms.	1156.0			
Diameter, in.	2.84	2.84	2.83	
Area, in.²	6.33	6.33	6.30	
Height, in.	5.54	5.54	5.53	
Net decrease in height, in.		0.00	0.01	
Wet Density, pcf	125.5	131.3	131.9	
Dry density, pcf	108.0	108.0	108.9	
Void ratio	0.5966	0.5966	0.5836	
Saturation, %	75.0	100.0	100.0	

Test Readings for Specimen No. 2

Load ring constant = 3.313 lbs. per input unit
Membrane modulus = 0.124105 kN/cm²
Membrane thickness = 0.02 cm
Consolidation cell pressure = 58.30 psi (8.40 ksf)
Consolidation back pressure = 50.00 psi (7.20 ksf)
Consolidation effective confining stress = 1.20 ksf
Strain rate, in./min. = 0.05
Fail. Stress = 14.58 ksf **at reading no.** 26

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	1.38	1.38	1.00	48.70	1.38	0.00
1	0.0010	10.00	33.1	0.0	0.76	1.35	2.11	1.56	48.90	1.73	0.38
2	0.0050	24.00	79.5	0.1	1.82	1.31	3.13	2.39	49.20	2.22	0.91
3	0.0100	33.00	109.3	0.2	2.49	1.30	3.79	2.92	49.30	2.54	1.25
4	0.0150	39.00	129.2	0.3	2.95	1.28	4.23	3.30	49.40	2.75	1.47
5	0.0200	44.00	145.8	0.4	3.32	1.28	4.60	3.59	49.40	2.94	1.66
6	0.0250	49.00	162.3	0.5	3.69	1.27	4.96	3.91	49.50	3.11	1.85
7	0.0300	53.00	175.6	0.5	3.99	1.27	5.26	4.15	49.50	3.26	2.00
8	0.0350	57.00	188.8	0.6	4.29	1.25	5.54	4.42	49.60	3.40	2.14
9	0.0400	62.00	205.4	0.7	4.66	1.22	5.88	4.81	49.80	3.55	2.33
10	0.0450	66.00	218.7	0.8	4.96	1.20	6.15	5.15	50.00	3.67	2.48
11	0.0500	72.00	238.5	0.9	5.40	1.17	6.57	5.63	50.20	3.87	2.70
12	0.0750	91.00	301.5	1.4	6.80	1.17	7.96	6.83	50.20	4.56	3.40
13	0.1000	104.00	344.6	1.8	7.73	1.20	8.93	7.47	50.00	5.06	3.87
14	0.1250	112.00	371.1	2.3	8.29	1.20	9.48	7.94	50.00	5.34	4.14
15	0.1500	117.00	387.6	2.7	8.62	1.20	9.81	8.21	50.00	5.50	4.31
16	0.1750	125.00	414.1	3.2	9.17	1.20	10.36	8.67	50.00	5.78	4.58
17	0.2000	135.00	447.3	3.6	9.85	1.21	11.06	9.15	49.90	6.14	4.93
18	0.2500	145.00	480.4	4.5	10.48	1.21	11.69	9.67	49.90	6.45	5.24
19	0.3000	160.00	530.1	5.4	11.46	1.21	12.67	10.47	49.90	6.94	5.73
20	0.3500	178.00	589.7	6.3	12.62	1.22	13.85	11.31	49.80	7.54	6.31
21	0.4000	184.00	609.6	7.2	12.92	1.22	14.15	11.56	49.80	7.69	6.46
22	0.5000	194.00	642.7	9.0	13.36	1.24	14.60	11.79	49.70	7.92	6.68
23	0.6000	204.00	675.9	10.9	13.77	1.25	15.02	11.99	49.60	8.14	6.88

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Test Readings for Specimen No. 3

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
24	0.7000	214.00	709.0	12.7	14.15	1.27	15.42	12.17	49.50	8.34	7.08
25	0.8000	222.00	735.5	14.5	14.38	1.27	15.64	12.34	49.50	8.46	7.19
26	0.9000	230.00	762.0	16.3	14.58	1.25	15.83	12.64	49.60	8.54	7.29
27	1.0000	235.00	778.6	18.1	14.57	1.25	15.83	12.63	49.60	8.54	7.29
28	1.1000	238.00	788.5	19.9	14.43	1.25	15.69	12.52	49.60	8.47	7.22
29	1.2000	240.00	795.1	21.7	14.23	1.25	15.48	12.36	49.60	8.37	7.11

Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	132.350			1281.400
Moisture content: Dry soil+tare, gms.	121.490			1110.500
Moisture content: Tare, gms.	54.280			106.100
Moisture, %	16.2	20.5	20.0	17.0
Moist specimen weight, gms.	1153.8			
Diameter, in.	2.84	2.84	2.83	
Area, in.²	6.33	6.33	6.29	
Height, in.	5.43	5.43	5.41	
Net decrease in height, in.		0.00	0.02	
Wet Density, pcf	127.8	132.6	133.3	
Dry density, pcf	110.0	110.0	111.1	
Void ratio	0.5674	0.5674	0.5518	
Saturation, %	78.7	100.0	100.0	

Test Readings for Specimen No. 3

Load ring constant = 3.313 lbs. per input unit
Membrane modulus = 0.124105 kN/cm²
Membrane thickness = 0.02 cm
Consolidation cell pressure = 63.90 psi (9.20 ksf)
Consolidation back pressure = 50.00 psi (7.20 ksf)
Consolidation effective confining stress = 2.00 ksf
Strain rate, in./min. = 0.05
Fail. Stress = 17.00 ksf **at reading no.** 22

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	2.17	2.17	1.00	48.80	2.17	0.00
1	0.0010	5.00	16.6	0.0	0.38	2.17	2.55	1.17	48.80	2.36	0.19
2	0.0050	22.00	72.9	0.1	1.67	2.03	3.70	1.82	49.80	2.86	0.83
3	0.0100	39.00	129.2	0.2	2.95	1.90	4.85	2.55	50.70	3.38	1.48
4	0.0150	52.00	172.3	0.3	3.93	1.86	5.79	3.12	51.00	3.82	1.97
5	0.0200	62.00	205.4	0.4	4.68	1.84	6.53	3.54	51.10	4.18	2.34
6	0.0250	69.00	228.6	0.5	5.21	1.84	7.05	3.82	51.10	4.45	2.60
7	0.0300	77.00	255.1	0.6	5.81	1.84	7.65	4.15	51.10	4.75	2.90
8	0.0350	85.00	281.6	0.6	6.40	1.84	8.25	4.47	51.10	5.04	3.20
9	0.0400	91.00	301.5	0.7	6.85	1.84	8.69	4.72	51.10	5.27	3.42
10	0.0450	98.00	324.7	0.8	7.37	1.84	9.21	5.00	51.10	5.53	3.68
11	0.0500	104.00	344.6	0.9	7.81	1.84	9.65	5.24	51.10	5.75	3.91
12	0.0750	138.00	457.2	1.4	10.32	1.86	12.17	6.55	51.00	7.02	5.16
13	0.1000	166.00	550.0	1.8	12.35	1.86	14.21	7.65	51.00	8.03	6.18

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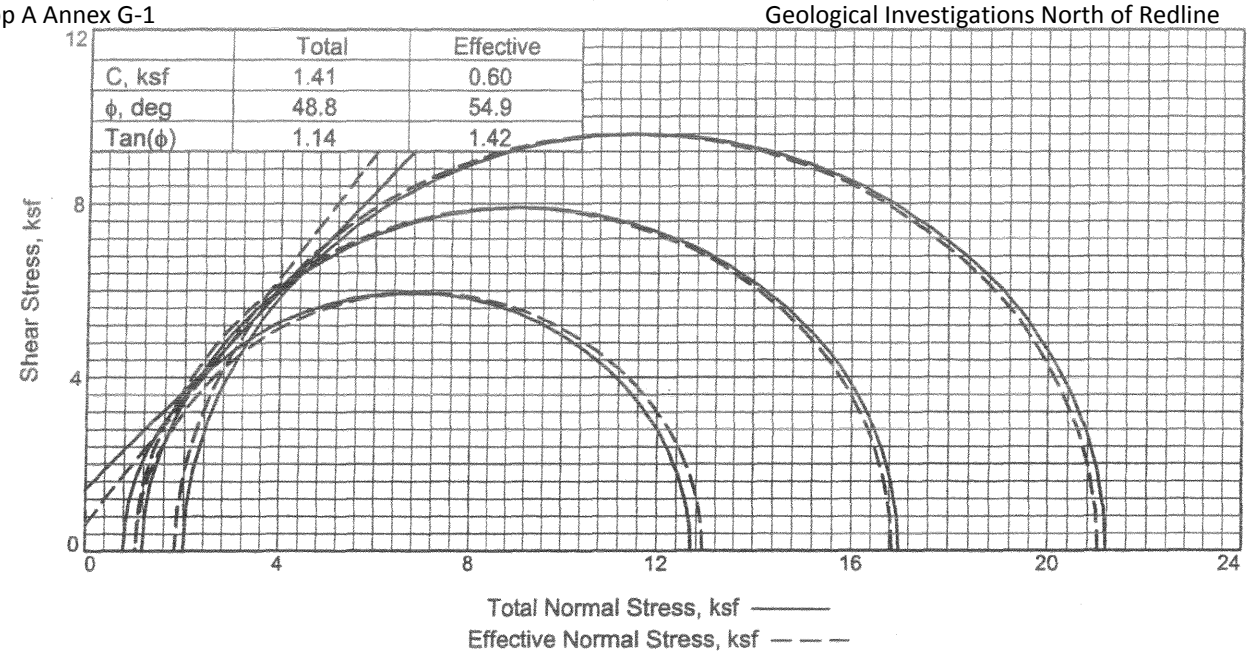
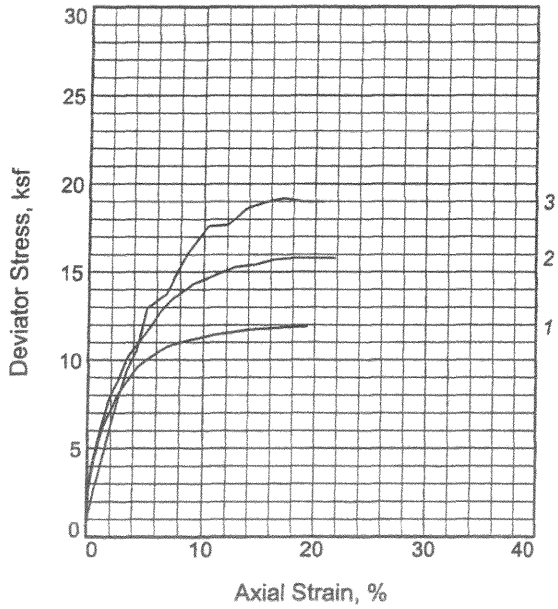
Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
14	0.1250	180.00	596.3	2.3	13.33	1.86	15.19	8.18	51.00	8.52	6.67
15	0.1500	198.00	656.0	2.8	14.60	1.87	16.47	8.80	50.90	9.17	7.30
16	0.1750	215.00	712.3	3.2	15.77	1.87	17.64	9.43	50.90	9.76	7.89
17	0.2000	222.00	735.5	3.7	16.21	1.87	18.08	9.66	50.90	9.98	8.10
18	0.2500	227.00	752.1	4.6	16.41	1.87	18.29	9.77	50.90	10.08	8.21
19	0.3000	232.00	768.6	5.5	16.61	1.87	18.49	9.87	50.90	10.18	8.31
20	0.3500	237.00	785.2	6.5	16.81	1.87	18.68	9.98	50.90	10.27	8.40
21	0.4000	241.00	798.4	7.4	16.92	1.89	18.81	9.97	50.80	10.35	8.46
22	0.5000	247.00	818.3	9.2	17.00	1.90	18.90	9.94	50.70	10.40	8.50
23	0.6000	251.00	831.6	11.1	16.92	1.92	18.83	9.83	50.60	10.37	8.46
24	0.7000	253.00	838.2	12.9	16.70	1.93	18.63	9.65	50.50	10.28	8.35
25	0.8000	252.00	834.9	14.8	16.28	1.94	18.22	9.37	50.40	10.08	8.14
26	0.9000	251.00	831.6	16.6	15.86	1.96	17.82	9.10	50.30	9.89	7.93
27	1.0000	257.00	851.4	18.5	15.88	1.97	17.86	9.05	50.20	9.91	7.94
28	1.1000	258.00	854.8	20.3	15.58	1.99	17.57	8.84	50.10	9.78	7.79
29	1.2000	266.00	881.3	22.2	15.69	2.00	17.70	8.84	50.00	9.85	7.85

MACTEC Engineering and Consulting, Inc.



	Total	Effective
C, ksf	1.41	0.60
ϕ, deg	48.8	54.9
Tan(ϕ)	1.14	1.42



Sample No.		1	2	3
Initial	Water Content,	16.6	16.6	16.6
	Dry Density, pcf	109.1	109.5	109.5
	Saturation,	79.1	79.9	79.8
	Void Ratio	0.5800	0.5745	0.5747
	Diameter, in.	2.84	2.84	2.84
	Height, in.	5.70	5.52	5.82
At Test	Water Content,	20.7	20.0	20.3
	Dry Density, pcf	109.8	111.1	110.5
	Saturation,	100.0	100.0	100.0
	Void Ratio	0.5709	0.5523	0.5609
	Diameter, in.	2.83	2.83	2.83
	Height, in.	5.69	5.49	5.80
Strain rate, in./min.		0.05	0.05	0.05
Back Pressure, ksf		7.2	7.2	7.2
Cell Pressure, ksf		8.0	8.4	9.2
Fail. Stress, ksf		11.9	15.8	19.2
Total Pore Pr., ksf		7.0	7.3	7.4
Ult. Stress, ksf				
Total Pore Pr., ksf				
$\bar{\sigma}_1$ Failure, ksf		12.9	16.9	21.0
$\bar{\sigma}_3$ Failure, ksf		1.1	1.1	1.8

Type of Test: CU with Pore Pressures

Sample Type: remolded

Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments

Specific Gravity= 2.762

Remarks:

Reviewed By _____

Client: Nodarse and Associates

Project: Material Testing-Nodarse

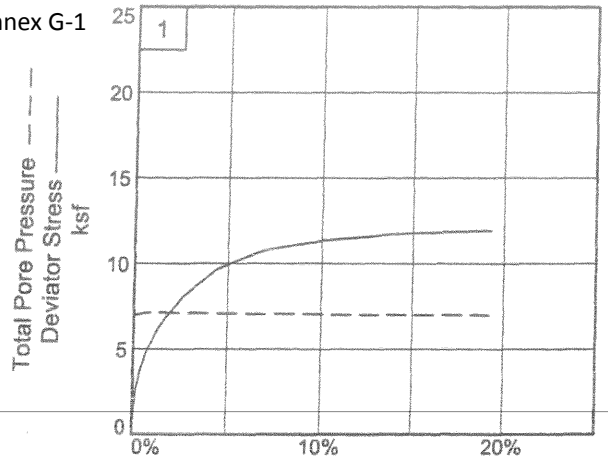
Sample Number: CU-95%-A

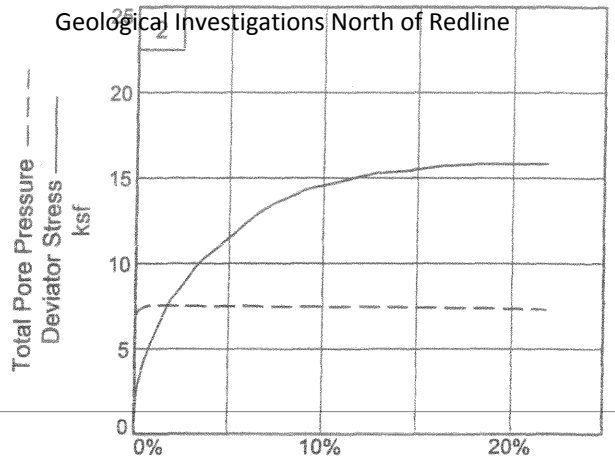
Proj. No.: 6738-05-4573 **Date:** 6-10-05

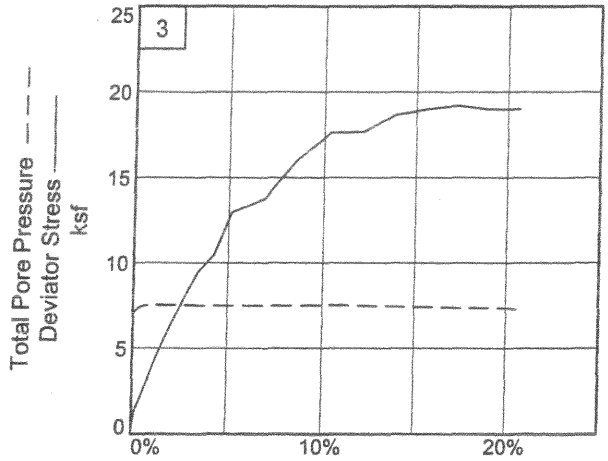
TRIAXIAL SHEAR TEST REPORT

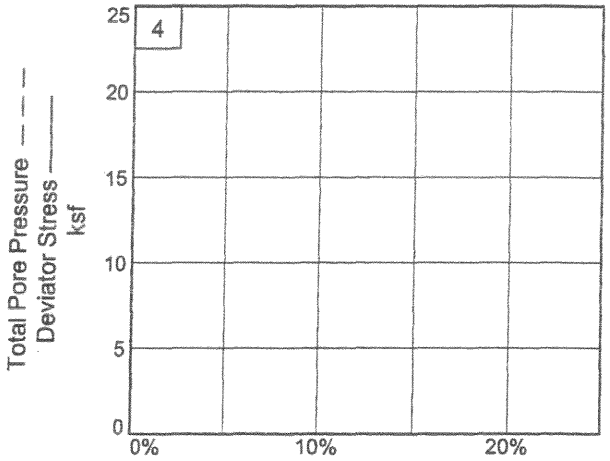
MACTEC ENGINEERING AND CONSULTING, INC.

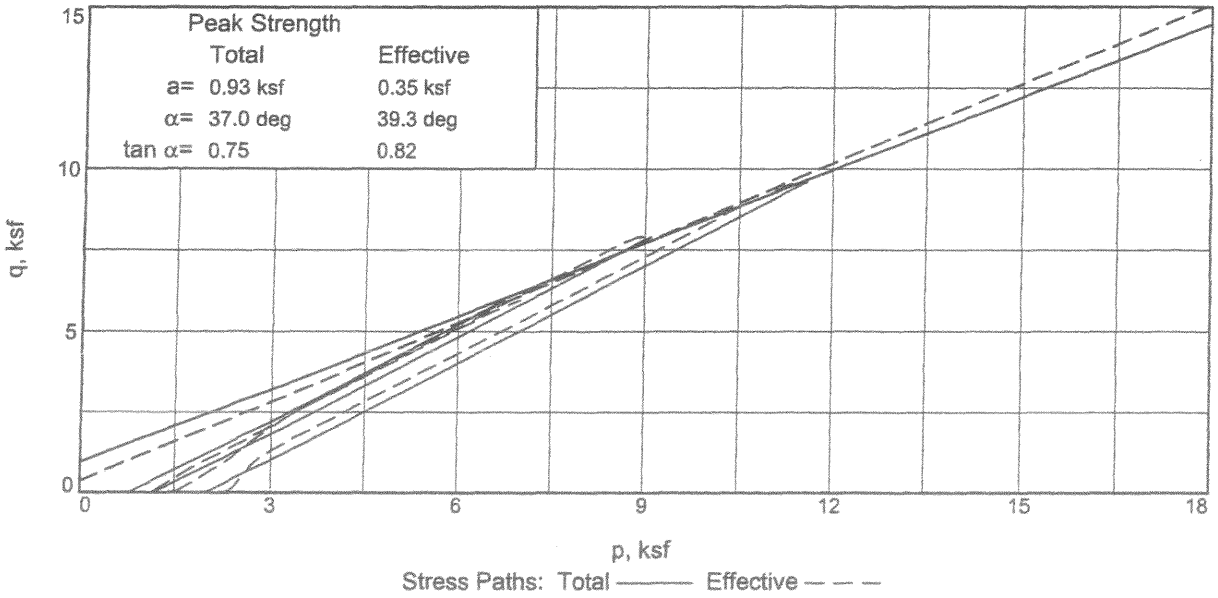
Tested By: mc **Checked By:** Rajni Sukhwani











Client: Nodarse and Associates
Project: Material Testing-Nodarse
Sample Number: CU-95%-A
Project No.: 6738-05-4573

Reviewed By _____ **MACTEC Engineering and Consulting, Inc.**

Tested By: mc _____ **Checked By:** _____

TRIAXIAL COMPRESSION TEST

CU with Pore Pressures

6/16/2005
10:39 AM

Date: 6-10-05
Client: Nodarse and Associates
Project: Material Testing-Nodarse
Project No.: 6738-05-4573
Sample Number: CU-95%-A
Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments
Remarks:
Type of Sample: remolded
Specific Gravity=2.762 **LL=** **PL=** **PI=**
Test Method: COE uniform strain

Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	188.090			1333.800
Moisture content: Dry soil+tare, gms.	168.510			1149.300
Moisture content: Tare, gms.	50.650			95.400
Moisture, %	16.6	21.0	20.7	17.5
Moist specimen weight, gms.	1206.2			
Diameter, in.	2.84	2.84	2.83	
Area, in.²	6.33	6.33	6.31	
Height, in.	5.70	5.70	5.69	
Net decrease in height, in.		0.00	0.01	
Wet Density, pcf	127.3	132.0	132.5	
Dry density, pcf	109.1	109.1	109.8	
Void ratio	0.5800	0.5800	0.5709	
Saturation, %	79.1	100.0	100.0	

Test Readings for Specimen No. 1

Load ring constant = 3.313 lbs. per input unit
Membrane modulus = 0.124105 kN/cm²
Membrane thickness = 0.02 cm
Consolidation cell pressure = 55.60 psi (8.01 ksf)
Consolidation back pressure = 50.00 psi (7.20 ksf)
Consolidation effective confining stress = 0.81 ksf
Strain rate, in./min. = 0.05
Fail. Stress = 11.89 ksf **at reading no.** 28

MACTEC Engineering and Consulting, Inc.

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	1.17	1.17	1.00	47.50	1.17	0.00
1	0.0010	5.00	16.6	0.0	0.38	1.11	1.49	1.34	47.90	1.30	0.19
2	0.0050	22.00	72.9	0.1	1.66	1.01	2.67	2.65	48.60	1.84	0.83
3	0.0100	35.00	116.0	0.2	2.64	0.99	3.64	3.66	48.70	2.31	1.32
4	0.0150	41.00	135.8	0.3	3.09	1.01	4.10	4.07	48.60	2.55	1.55
5	0.0200	47.00	155.7	0.4	3.54	0.96	4.51	4.67	48.90	2.74	1.77
6	0.0250	51.00	169.0	0.4	3.84	0.96	4.80	4.98	48.90	2.88	1.92
7	0.0300	55.00	182.2	0.5	4.14	0.94	5.07	5.42	49.10	3.00	2.07
8	0.0350	59.00	195.5	0.6	4.43	0.92	5.35	5.81	49.20	3.14	2.22
9	0.0400	63.00	208.7	0.7	4.73	0.91	5.64	6.21	49.30	3.27	2.36
10	0.0450	66.00	218.7	0.8	4.95	0.91	5.86	6.46	49.30	3.38	2.48
11	0.0500	69.00	228.6	0.9	5.17	0.89	6.06	6.79	49.40	3.48	2.59
12	0.0750	82.00	271.7	1.3	6.12	0.89	7.01	7.85	49.40	3.95	3.06
13	0.1000	92.00	304.8	1.8	6.83	0.91	7.74	8.53	49.30	4.32	3.42
14	0.1250	100.00	331.3	2.2	7.39	0.91	8.30	9.15	49.30	4.60	3.70
15	0.1500	109.00	361.1	2.6	8.02	0.92	8.95	9.71	49.20	4.93	4.01
16	0.1750	115.00	381.0	3.1	8.43	0.92	9.35	10.14	49.20	5.14	4.21
17	0.2000	121.00	400.9	3.5	8.83	0.92	9.75	10.58	49.20	5.33	4.41
18	0.2500	133.00	440.6	4.4	9.61	0.94	10.55	11.27	49.10	5.74	4.81
19	0.3000	140.00	463.8	5.3	10.03	0.94	10.96	11.71	49.10	5.95	5.01
20	0.3500	147.00	487.0	6.2	10.43	0.95	11.38	11.97	49.00	6.17	5.21
21	0.4000	153.00	506.9	7.0	10.75	0.96	11.72	12.15	48.90	6.34	5.38
22	0.5000	161.00	533.4	8.8	11.10	0.96	12.07	12.51	48.90	6.52	5.55
23	0.6000	168.00	556.6	10.5	11.36	0.99	12.36	12.43	48.70	6.67	5.68
24	0.7000	174.00	576.5	12.3	11.54	1.01	12.54	12.44	48.60	6.78	5.77
25	0.8000	180.00	596.3	14.1	11.69	1.02	12.72	12.44	48.50	6.87	5.85
26	0.9000	185.00	612.9	15.8	11.77	1.04	12.81	12.36	48.40	6.92	5.89
27	1.0000	190.00	629.5	17.6	11.84	1.04	12.88	12.42	48.40	6.96	5.92
28	1.1000	195.00	646.0	19.3	11.89	1.05	12.94	12.31	48.30	7.00	5.95

MACTEC Engineering and Consulting, Inc.

Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	188.090			1272.600
Moisture content: Dry soil+tare, gms.	168.510			1089.700
Moisture content: Tare, gms.	50.650			106.200
Moisture, %	16.6	20.8	20.0	18.6
Moist specimen weight, gms.	1172.2			
Diameter, in.	2.84	2.84	2.83	
Area, in.²	6.33	6.33	6.28	
Height, in.	5.52	5.52	5.49	
Net decrease in height, in.		0.00	0.03	
Wet Density, pcf	127.7	132.3	133.3	
Dry density, pcf	109.5	109.5	111.1	
Void ratio	0.5745	0.5745	0.5523	
Saturation, %	79.9	100.0	100.0	

Test Readings for Specimen No. 2

Load ring constant = 3.313 lbs. per input unit
Membrane modulus = 0.124105 kN/cm²
Membrane thickness = 0.02 cm
Consolidation cell pressure = 58.30 psi (8.40 ksf)
Consolidation back pressure = 50.00 psi (7.20 ksf)
Consolidation effective confining stress = 1.20 ksf
Strain rate, in./min. = 0.05
Fail. Stress = 15.81 ksf **at reading no.** 28

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	1.51	1.51	1.00	47.80	1.51	0.00
1	0.0010	10.00	33.1	0.0	0.76	1.47	2.23	1.52	48.10	1.85	0.38
2	0.0050	29.00	96.1	0.1	2.20	1.31	3.51	2.68	49.20	2.41	1.10
3	0.0100	39.00	129.2	0.2	2.96	1.17	4.13	3.54	50.20	2.65	1.48
4	0.0150	45.00	149.1	0.3	3.41	1.08	4.49	4.16	50.80	2.79	1.71
5	0.0200	50.00	165.7	0.4	3.79	1.02	4.81	4.70	51.20	2.92	1.89
6	0.0250	55.00	182.2	0.5	4.16	0.96	5.13	5.31	51.60	3.05	2.08
7	0.0300	59.00	195.5	0.5	4.46	0.94	5.40	5.77	51.80	3.17	2.23
8	0.0350	62.00	205.4	0.6	4.68	0.91	5.59	6.16	52.00	3.25	2.34
9	0.0400	66.00	218.7	0.7	4.98	0.89	5.87	6.58	52.10	3.38	2.49
10	0.0450	70.00	231.9	0.8	5.28	0.88	6.16	7.01	52.20	3.52	2.64
11	0.0500	73.00	241.8	0.9	5.50	0.88	6.38	7.26	52.20	3.63	2.75
12	0.0750	88.00	291.5	1.4	6.60	0.88	7.48	8.51	52.20	4.18	3.30
13	0.1000	103.00	341.2	1.8	7.69	0.88	8.57	9.75	52.20	4.72	3.84
14	0.1250	112.00	371.1	2.3	8.32	0.88	9.20	10.47	52.20	5.04	4.16
15	0.1500	121.00	400.9	2.7	8.95	0.88	9.83	11.19	52.20	5.35	4.47
16	0.1750	132.00	437.3	3.2	9.72	0.89	10.61	11.88	52.10	5.75	4.86
17	0.2000	140.00	463.8	3.6	10.26	0.91	11.16	12.31	52.00	6.04	5.13
18	0.2500	152.00	503.6	4.6	11.03	0.91	11.94	13.16	52.00	6.42	5.52
19	0.3000	165.00	546.6	5.5	11.86	0.89	12.75	14.28	52.10	6.82	5.93
20	0.3500	179.00	593.0	6.4	12.74	0.91	13.65	15.05	52.00	7.28	6.37
21	0.4000	190.00	629.5	7.3	13.39	0.92	14.32	15.53	51.90	7.62	6.70
22	0.5000	207.00	685.8	9.1	14.31	0.92	15.23	16.52	51.90	8.07	7.15
23	0.6000	218.00	722.2	10.9	14.76	0.94	15.70	16.77	51.80	8.32	7.38

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Test Readings for Specimen No. 3

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
24	0.7000	230.00	762.0	12.7	15.26	0.95	16.21	17.05	51.70	8.58	7.63
25	0.8000	237.00	785.2	14.6	15.39	0.96	16.36	16.96	51.60	8.66	7.70
26	0.9000	247.00	818.3	16.4	15.70	0.99	16.70	16.80	51.40	8.84	7.85
27	1.0000	254.00	841.5	18.2	15.80	1.02	16.82	16.45	51.20	8.92	7.90
28	1.1000	260.00	861.4	20.0	15.81	1.05	16.86	16.04	51.00	8.96	7.90
29	1.2000	266.00	881.3	21.8	15.81	1.12	16.93	15.07	50.50	9.03	7.90

Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	216.390			1358.600
Moisture content: Dry soil+tare, gms.	192.800			1164.300
Moisture content: Tare, gms.	50.680			108.400
Moisture, %	16.6	20.8	20.3	18.4
Moist specimen weight, gms.	1235.6			
Diameter, in.	2.84	2.84	2.83	
Area, in.²	6.33	6.33	6.30	
Height, in.	5.82	5.82	5.80	
Net decrease in height, in.		0.00	0.02	
Wet Density, pcf	127.7	132.3	132.9	
Dry density, pcf	109.5	109.5	110.5	
Void ratio	0.5747	0.5747	0.5609	
Saturation, %	79.8	100.0	100.0	

Test Readings for Specimen No. 3

Load ring constant = 3.313 lbs. per input unit
Membrane modulus = 0.124105 kN/cm²
Membrane thickness = 0.02 cm
Consolidation cell pressure = 63.90 psi (9.20 ksf)
Consolidation back pressure = 50.00 psi (7.20 ksf)
Consolidation effective confining stress = 2.00 ksf
Strain rate, in./min. = 0.05
Fail. Stress = 19.19 ksf **at reading no.** 26

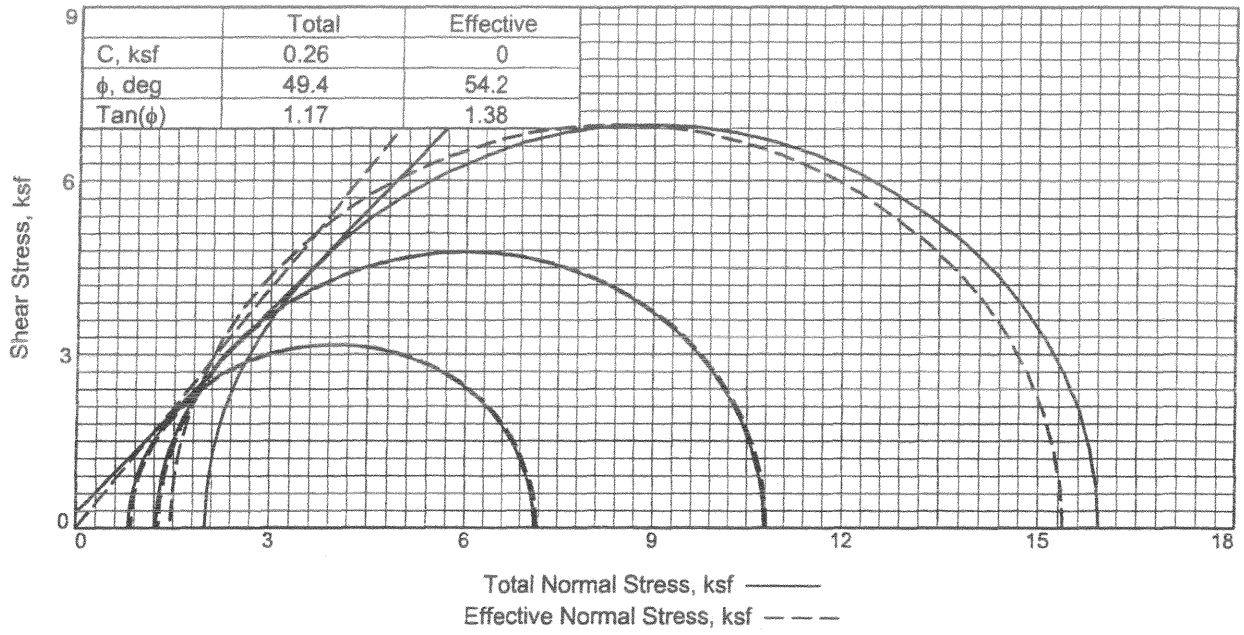
No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	2.30	2.30	1.00	47.90	2.30	0.00
1	0.0010	4.00	13.3	0.0	0.30	2.28	2.58	1.13	48.10	2.43	0.15
2	0.0050	11.00	36.4	0.1	0.83	2.12	2.95	1.39	49.20	2.53	0.42
3	0.0100	18.00	59.6	0.2	1.36	1.97	3.33	1.69	50.20	2.65	0.68
4	0.0150	21.00	69.6	0.3	1.59	1.89	3.47	1.84	50.80	2.68	0.79
5	0.0200	24.00	79.5	0.3	1.81	1.83	3.64	1.99	51.20	2.73	0.91
6	0.0250	28.00	92.8	0.4	2.11	1.77	3.88	2.19	51.60	2.83	1.06
7	0.0300	31.00	102.7	0.5	2.34	1.74	4.08	2.34	51.80	2.91	1.17
8	0.0350	35.00	116.0	0.6	2.64	1.71	4.35	2.54	52.00	3.03	1.32
9	0.0400	38.00	125.9	0.7	2.86	1.70	4.56	2.68	52.10	3.13	1.43
10	0.0450	41.00	135.8	0.8	3.08	1.68	4.77	2.83	52.20	3.23	1.54
11	0.0500	44.00	145.8	0.9	3.30	1.68	4.99	2.96	52.20	3.34	1.65
12	0.0750	60.00	198.8	1.3	4.49	1.68	6.17	3.66	52.20	3.93	2.24
13	0.1000	75.00	248.5	1.7	5.58	1.68	7.27	4.31	52.20	4.48	2.79

MACTEC Engineering and Consulting, Inc.

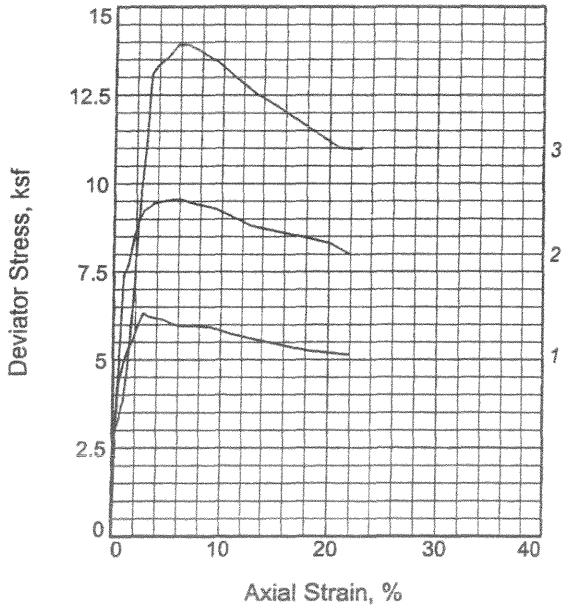
Test Readings for Specimen No. 3

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
14	0.1250	89.00	294.9	2.2	6.60	1.68	8.28	4.92	52.20	4.98	3.30
15	0.1500	102.00	337.9	2.6	7.53	1.68	9.21	5.47	52.20	5.45	3.76
16	0.1750	116.00	384.3	3.0	8.52	1.70	10.22	6.02	52.10	5.96	4.26
17	0.2000	129.00	427.4	3.4	9.44	1.71	11.15	6.51	52.00	6.43	4.72
18	0.2500	145.00	480.4	4.3	10.51	1.71	12.22	7.13	52.00	6.97	5.26
19	0.3000	180.00	596.3	5.2	12.93	1.73	14.66	8.48	51.90	8.19	6.47
20	0.4000	195.00	646.0	6.9	13.75	1.73	15.48	8.96	51.90	8.60	6.88
21	0.5000	232.00	768.6	8.6	16.06	1.71	17.77	10.37	52.00	9.74	8.03
22	0.6000	259.00	858.1	10.3	17.59	1.68	19.28	11.44	52.20	10.48	8.80
23	0.7000	265.00	877.9	12.1	17.65	1.73	19.38	11.22	51.90	10.55	8.83
24	0.8000	285.00	944.2	13.8	18.61	1.77	20.38	11.51	51.60	11.08	9.31
25	0.9000	296.00	980.6	15.5	18.95	1.80	20.75	11.53	51.40	11.27	9.47
26	1.0000	306.00	1013.8	17.2	19.19	1.83	21.01	11.49	51.20	11.42	9.59
27	1.1000	309.00	1023.7	19.0	18.97	1.86	20.83	11.21	51.00	11.34	9.49
28	1.2000	316.00	1046.9	20.7	18.99	1.93	20.92	10.84	50.50	11.42	9.49

MACTEC Engineering and Consulting, Inc.



	Total	Effective
C, ksf	0.26	0
ϕ, deg	49.4	54.2
Tan(ϕ)	1.17	1.38



Sample No.		1	2	3
Initial	Water Content,	16.2	16.2	16.2
	Dry Density, pcf	103.7	104.0	103.8
	Saturation,	67.5	67.9	67.7
	Void Ratio	0.6631	0.6587	0.6612
	Diameter, in.	2.84	2.84	2.84
	Height, in.	5.50	5.50	5.29
At Test	Water Content,	22.5	22.4	22.1
	Dry Density, pcf	106.3	106.5	107.1
	Saturation,	100.0	100.0	100.0
	Void Ratio	0.6225	0.6191	0.6107
	Diameter, in.	2.82	2.82	2.81
	Height, in.	5.46	5.46	5.24
Strain rate, in./min.		0.05	0.05	0.05
Back Pressure, ksf		7.2	7.2	7.2
Cell Pressure, ksf		8.0	8.4	9.2
Fail. Stress, ksf		6.3	9.5	13.9
Total Pore Pr., ksf		7.2	7.2	7.7
Ult. Stress, ksf				
Total Pore Pr., ksf				
$\bar{\sigma}_1$ Failure, ksf		7.2	10.8	15.4
$\bar{\sigma}_3$ Failure, ksf		0.8	1.3	1.5

Type of Test: CU with Pore Pressures

Sample Type: remold

Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments

Specific Gravity= 2.762

Remarks:

Reviewed By _____

Client: Nodarse and Associates

Project: Material Testing-Nodarse

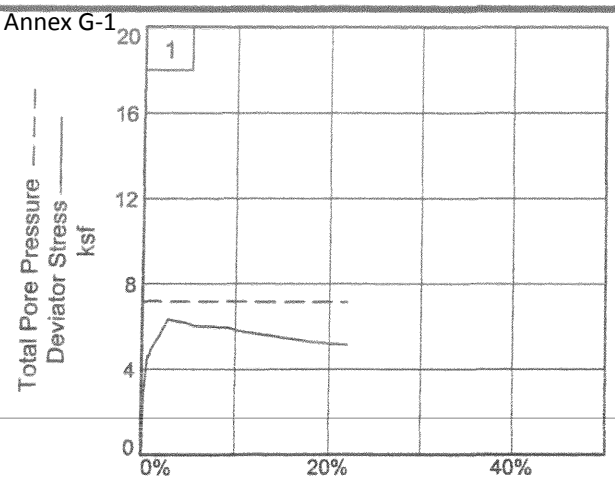
Sample Number: CU-90%-B

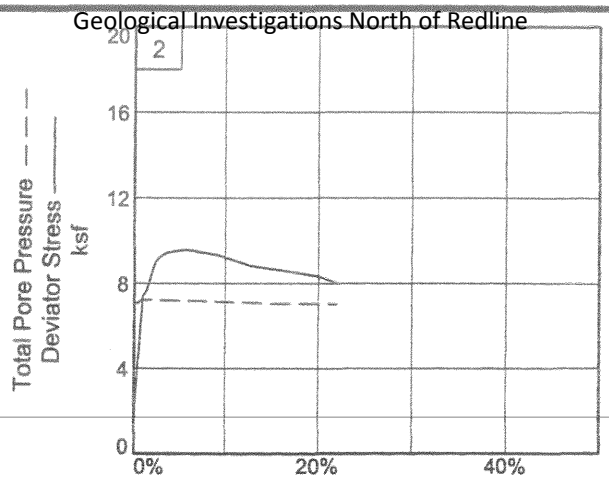
Proj. No.: 6738-05-4573 **Date:** 6-15-05

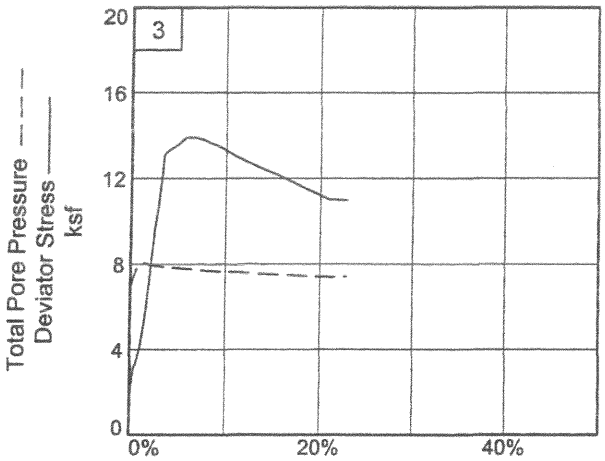
TRIAXIAL SHEAR TEST REPORT

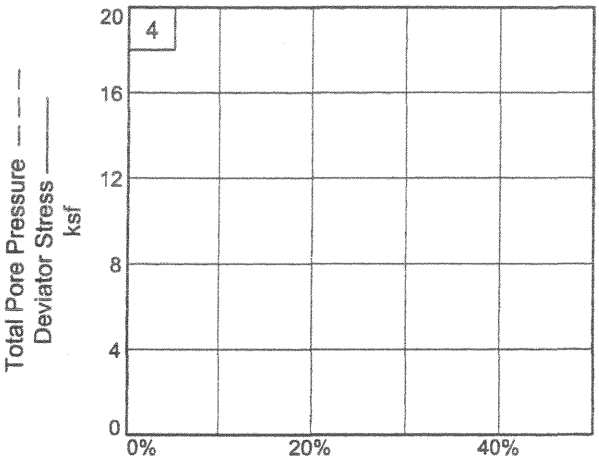
MACTEC ENGINEERING AND CONSULTING, INC.

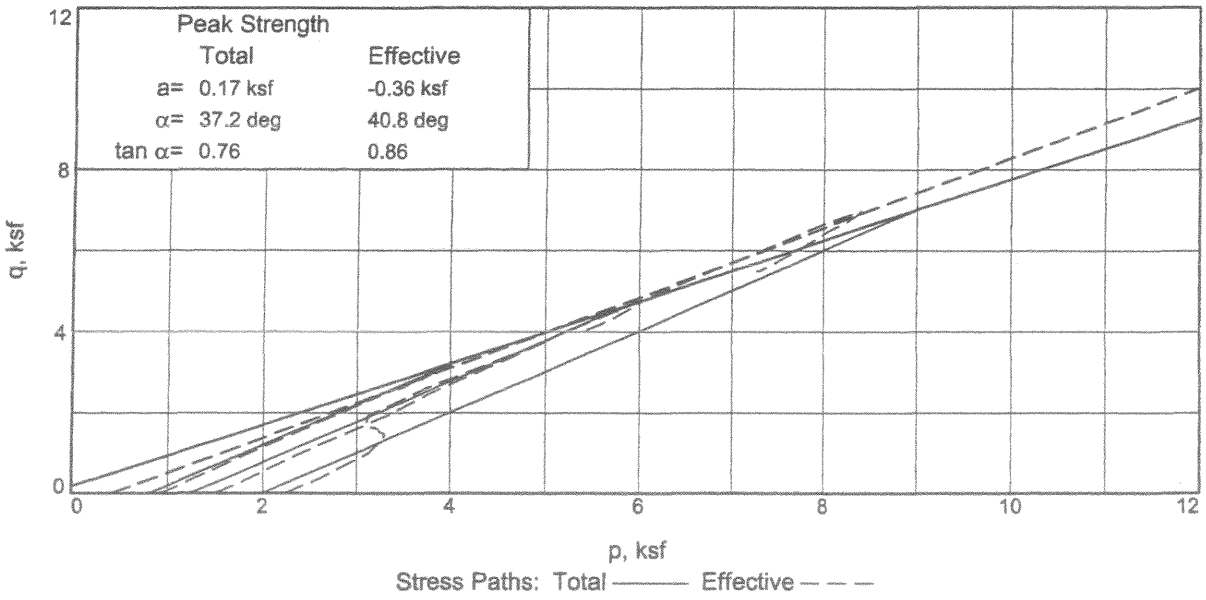
Tested By: mc **Checked By:** Rajni Sukhwani











Client: Nodarse and Associates
Project: Material Testing-Nodarse
Sample Number: CU-90%-B
Project No.: 6738-05-4573

Reviewed By _____ **MACTEC Engineering and Consulting, Inc.**

Tested By: mc _____ **Checked By:** _____

TRIAXIAL COMPRESSION TEST

CU with Pore Pressures

6/16/2005
10:29 AM

Date: 6-15-05
Client: Nodarse and Associates
Project: Material Testing-Nodarse
Project No.: 6738-05-4573
Sample Number: CU-90%-B
Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments
Remarks:
Type of Sample: remold
Specific Gravity=2.762 **LL=** **PL=** **PI=**
Test Method: COE uniform strain

Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	276.340			1296.900
Moisture content: Dry soil+tare, gms.	244.810			1117.500
Moisture content: Tare, gms.	50.150			115.570
Moisture, %	16.2	24.0	22.5	17.9
Moist specimen weight, gms.	1101.8			
Diameter, in.	2.84	2.84	2.82	
Area, in.²	6.33	6.33	6.23	
Height, in.	5.50	5.50	5.46	
Net decrease in height, in.		0.00	0.04	
Wet Density, pcf	120.5	128.6	130.2	
Dry density, pcf	103.7	103.7	106.3	
Void ratio	0.6631	0.6631	0.6225	
Saturation, %	67.5	100.0	100.0	

Test Readings for Specimen No. 1

Load ring constant = 3.313 lbs. per input unit
Membrane modulus = 0.124105 kN/cm²
Membrane thickness = 0.02 cm
Consolidation cell pressure = 55.60 psi (8.01 ksf)
Consolidation back pressure = 50.00 psi (7.20 ksf)
Consolidation effective confining stress = 0.81 ksf
Strain rate, in./min. = 0.05
Fail. Stress = 6.33 ksf **at reading no.** 15

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Test Readings for Specimen No.

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	0.92	0.92	1.00	49.20	0.92	0.00
1	0.0010	1.00	3.3	0.0	0.08	0.92	1.00	1.08	49.20	0.96	0.04
2	0.0050	5.00	16.6	0.1	0.38	0.92	1.30	1.42	49.20	1.11	0.19
3	0.0100	24.00	79.5	0.2	1.83	0.86	2.70	3.12	49.60	1.78	0.92
4	0.0150	39.00	129.2	0.3	2.98	0.86	3.84	4.45	49.60	2.35	1.49
5	0.0200	46.00	152.4	0.4	3.51	0.85	4.36	5.13	49.70	2.60	1.75
6	0.0250	52.00	172.3	0.5	3.96	0.85	4.81	5.66	49.70	2.83	1.98
7	0.0300	57.00	188.8	0.5	4.34	0.84	5.18	6.20	49.80	3.01	2.17
8	0.0350	61.00	202.1	0.6	4.64	0.84	5.48	6.56	49.80	3.16	2.32
9	0.0400	60.00	198.8	0.7	4.56	0.84	5.40	6.46	49.80	3.12	2.28
10	0.0450	62.00	205.4	0.8	4.71	0.84	5.54	6.64	49.80	3.19	2.35
11	0.0500	64.00	212.0	0.9	4.86	0.84	5.69	6.81	49.80	3.26	2.43
12	0.0750	70.00	231.9	1.4	5.29	0.84	6.12	7.33	49.80	3.48	2.64
13	0.1000	74.00	245.2	1.8	5.56	0.84	6.40	7.66	49.80	3.62	2.78
14	0.1250	80.00	265.0	2.3	5.98	0.85	6.83	8.04	49.70	3.84	2.99
15	0.1500	85.00	281.6	2.7	6.33	0.85	7.18	8.45	49.70	4.01	3.16
16	0.1750	84.00	278.3	3.2	6.23	0.85	7.07	8.33	49.70	3.96	3.11
17	0.2000	84.00	278.3	3.7	6.20	0.85	7.05	8.29	49.70	3.95	3.10
18	0.2500	84.00	278.3	4.6	6.14	0.85	6.99	8.22	49.70	3.92	3.07
19	0.3000	83.00	275.0	5.5	6.01	0.85	6.85	8.07	49.70	3.85	3.00
20	0.3500	83.00	275.0	6.4	5.95	0.85	6.80	8.00	49.70	3.82	2.97
21	0.4000	84.00	278.3	7.3	5.96	0.85	6.81	8.01	49.70	3.83	2.98
22	0.5000	85.00	281.6	9.2	5.91	0.85	6.76	7.96	49.70	3.81	2.96
23	0.6000	84.00	278.3	11.0	5.72	0.86	6.59	7.62	49.60	3.73	2.86
24	0.7000	84.00	278.3	12.8	5.61	0.86	6.47	7.49	49.60	3.67	2.80
25	0.8000	84.00	278.3	14.7	5.49	0.86	6.35	7.35	49.60	3.61	2.74
26	0.9000	84.00	278.3	16.5	5.37	0.86	6.23	7.22	49.60	3.55	2.69
27	1.0000	84.00	278.3	18.3	5.25	0.88	6.13	6.98	49.50	3.50	2.63
28	1.1000	85.00	281.6	20.2	5.20	0.86	6.06	7.01	49.60	3.46	2.60
29	1.2000	86.00	284.9	22.0	5.14	0.88	6.01	6.85	49.50	3.45	2.57

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Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	276.340			1291.100
Moisture content: Dry soil+tare, gms.	244.810			1113.500
Moisture content: Tare, gms.	50.150			115.000
Moisture, %	16.2	23.8	22.4	17.8
Moist specimen weight, gms.	1104.7			
Diameter, in.	2.84	2.84	2.82	
Area, in.²	6.33	6.33	6.23	
Height, in.	5.50	5.50	5.46	
Net decrease in height, in.		0.00	0.04	
Wet Density, pcf	120.8	128.7	130.4	
Dry density, pcf	104.0	104.0	106.5	
Void ratio	0.6587	0.6587	0.6191	
Saturation, %	67.9	100.0	100.0	

Test Readings for Specimen No. 2

Load ring constant = 3.313 lbs. per input unit
Membrane modulus = 0.124105 kN/cm²
Membrane thickness = 0.02 cm
Consolidation cell pressure = 58.60 psi (8.44 ksf)
Consolidation back pressure = 50.00 psi (7.20 ksf)
Consolidation effective confining stress = 1.24 ksf
Strain rate, in./min. = 0.05
Fail. Stress = 9.55 ksf **at reading no.** 19

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	1.50	1.50	1.00	48.20	1.50	0.00
1	0.0010	6.00	19.9	0.0	0.46	1.50	1.96	1.31	48.20	1.73	0.23
2	0.0050	23.00	76.2	0.1	1.76	1.43	3.18	2.23	48.70	2.30	0.88
3	0.0100	34.00	112.6	0.2	2.60	1.41	4.01	2.84	48.80	2.71	1.30
4	0.0150	42.00	139.1	0.3	3.21	1.41	4.62	3.27	48.80	3.01	1.60
5	0.0200	50.00	165.7	0.4	3.81	1.40	5.21	3.73	48.90	3.30	1.91
6	0.0250	58.00	192.2	0.5	4.42	1.35	5.77	4.26	49.20	3.56	2.21
7	0.0300	64.00	212.0	0.5	4.87	1.32	6.20	4.68	49.40	3.76	2.44
8	0.0350	70.00	231.9	0.6	5.32	1.31	6.63	5.06	49.50	3.97	2.66
9	0.0400	80.00	265.0	0.7	6.08	1.30	7.37	5.69	49.60	4.33	3.04
10	0.0450	88.00	291.5	0.8	6.68	1.28	7.96	6.21	49.70	4.62	3.34
11	0.0500	97.00	321.4	0.9	7.36	1.27	8.62	6.80	49.80	4.95	3.68
12	0.0750	102.00	337.9	1.4	7.70	1.25	8.95	7.15	49.90	5.10	3.85
13	0.1000	112.00	371.1	1.8	8.41	1.24	9.65	7.79	50.00	5.45	4.21
14	0.1250	120.00	397.6	2.3	8.97	1.24	10.21	8.25	50.00	5.73	4.49
15	0.1500	124.00	410.8	2.7	9.23	1.25	10.48	8.37	49.90	5.87	4.61
16	0.1750	126.00	417.4	3.2	9.33	1.27	10.60	8.37	49.80	5.93	4.67
17	0.2000	128.00	424.1	3.7	9.44	1.27	10.70	8.45	49.80	5.99	4.72
18	0.2500	130.00	430.7	4.6	9.49	1.27	10.76	8.49	49.80	6.01	4.75
19	0.3000	132.00	437.3	5.5	9.55	1.28	10.83	8.45	49.70	6.06	4.77
20	0.3500	133.00	440.6	6.4	9.53	1.28	10.81	8.43	49.70	6.04	4.76
21	0.4000	133.00	440.6	7.3	9.43	1.30	10.73	8.28	49.60	6.01	4.72
22	0.5000	134.00	443.9	9.2	9.32	1.32	10.64	8.03	49.40	5.98	4.66
23	0.6000	133.00	440.6	11.0	9.06	1.35	10.41	7.69	49.20	5.88	4.53

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Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
24	0.7000	132.00	437.3	12.8	8.81	1.38	10.19	7.37	49.00	5.79	4.40
25	0.8000	133.00	440.6	14.7	8.69	1.41	10.10	7.16	48.80	5.75	4.34
26	0.9000	134.00	443.9	16.5	8.56	1.41	9.98	7.07	48.80	5.69	4.28
27	1.0000	135.00	447.3	18.3	8.44	1.41	9.85	6.98	48.80	5.63	4.22
28	1.1000	136.00	450.6	20.2	8.31	1.43	9.74	6.83	48.70	5.58	4.16
29	1.2000	134.00	443.9	22.0	8.00	1.43	9.43	6.61	48.70	5.43	4.00

Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	276.340			1252.000
Moisture content: Dry soil+tare, gms.	244.810			1083.200
Moisture content: Tare, gms.	50.150			121.200
Moisture, %	16.2	23.9	22.1	17.5
Moist specimen weight, gms.	1060.9			
Diameter, in.	2.84	2.84	2.81	
Area, in.²	6.33	6.33	6.21	
Height, in.	5.29	5.29	5.24	
Net decrease in height, in.		0.00	0.05	
Wet Density, pcf	120.6	128.6	130.7	
Dry density, pcf	103.8	103.8	107.1	
Void ratio	0.6612	0.6612	0.6107	
Saturation, %	67.7	100.0	100.0	

Test Readings for Specimen No. 3

Load ring constant = 3.313 lbs. per input unit
Membrane modulus = 0.124105 kN/cm²
Membrane thickness = 0.02 cm
Consolidation cell pressure = 63.90 psi (9.20 ksf)
Consolidation back pressure = 50.00 psi (7.20 ksf)
Consolidation effective confining stress = 2.00 ksf
Strain rate, in./min. = 0.05
Fail. Stress = 13.92 ksf **at reading no.** 20

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	2.25	2.25	1.00	48.30	2.25	0.00
1	0.0010	9.00	29.8	0.0	0.69	2.25	2.94	1.31	48.30	2.59	0.35
2	0.0050	26.00	86.1	0.1	2.00	2.13	4.13	1.94	49.10	3.13	1.00
3	0.0100	33.00	109.3	0.2	2.53	1.99	4.52	2.27	50.10	3.25	1.27
4	0.0150	38.00	125.9	0.3	2.91	1.84	4.76	2.58	51.10	3.30	1.46
5	0.0200	40.00	132.5	0.4	3.06	1.71	4.78	2.79	52.00	3.25	1.53
6	0.0250	42.00	139.1	0.5	3.21	1.61	4.83	2.99	52.70	3.22	1.61
7	0.0300	43.00	142.5	0.6	3.29	1.47	4.76	3.24	53.70	3.11	1.64
8	0.0350	45.00	149.1	0.7	3.44	1.38	4.82	3.49	54.30	3.10	1.72
9	0.0400	47.00	155.7	0.8	3.59	1.31	4.90	3.74	54.80	3.10	1.79
10	0.0450	49.00	162.3	0.9	3.73	1.25	4.99	3.98	55.20	3.12	1.87
11	0.0500	50.00	165.7	1.0	3.81	1.21	5.02	4.15	55.50	3.11	1.90
12	0.0750	68.00	225.3	1.4	5.15	1.15	6.30	5.47	55.90	3.73	2.58
13	0.1000	94.00	311.4	1.9	7.09	1.24	8.33	6.72	55.30	4.78	3.54

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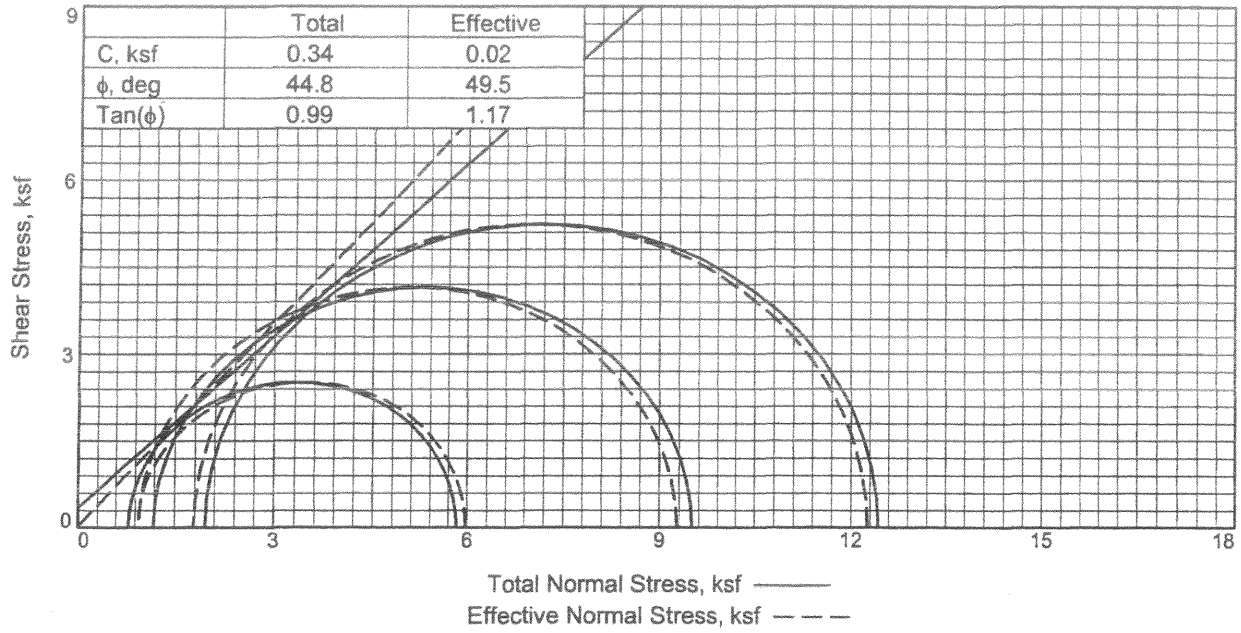
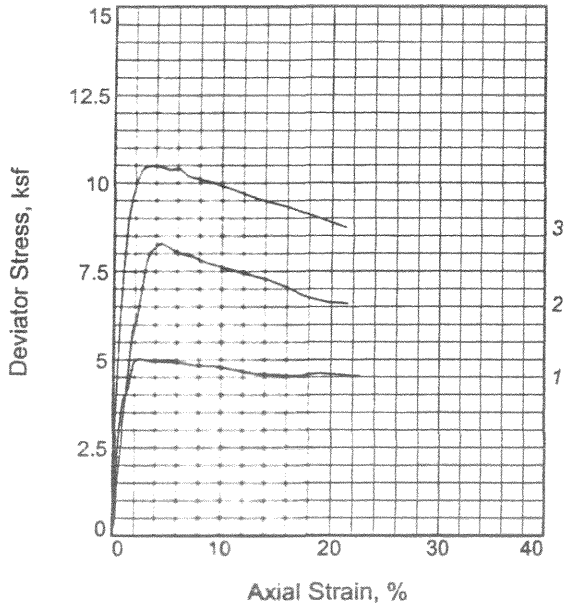
Test Readings for Specimen No. 3

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
14	0.1250	125.00	414.1	2.4	9.38	1.27	10.65	8.40	55.10	5.96	4.69
15	0.1500	146.00	483.7	2.9	10.90	1.31	12.21	9.32	54.80	6.76	5.45
16	0.1750	176.00	583.1	3.3	13.08	1.34	14.42	10.77	54.60	7.88	6.54
17	0.2000	180.00	596.3	3.8	13.31	1.37	14.68	10.73	54.40	8.02	6.65
18	0.2500	185.00	612.9	4.8	13.54	1.40	14.94	10.70	54.20	8.17	6.77
19	0.3000	192.00	636.1	5.7	13.92	1.43	15.34	10.76	54.00	8.38	6.96
20	0.3500	194.00	642.7	6.7	13.92	1.45	15.37	10.57	53.80	8.41	6.96
21	0.4000	194.00	642.7	7.6	13.78	1.50	15.27	10.20	53.50	8.39	6.89
22	0.5000	193.00	639.4	9.5	13.42	1.56	14.98	9.63	53.10	8.27	6.71
23	0.6000	190.00	629.5	11.5	12.93	1.58	14.52	9.17	52.90	8.05	6.47
24	0.7000	188.00	622.8	13.4	12.52	1.64	14.16	8.63	52.50	7.90	6.26
25	0.8000	187.00	619.5	15.3	12.18	1.68	13.86	8.23	52.20	7.77	6.09
26	0.9000	185.00	612.9	17.2	11.78	1.73	13.51	7.82	51.90	7.62	5.89
27	1.0000	183.00	606.3	19.1	11.38	1.77	13.15	7.43	51.60	7.46	5.69
28	1.1000	181.00	599.7	21.0	10.99	1.80	12.79	7.11	51.40	7.30	5.50
29	1.2000	185.00	612.9	22.9	10.96	1.79	12.75	7.14	51.50	7.27	5.48

MACTEC Engineering and Consulting, Inc.



	Total	Effective
C, ksf	0.34	0.02
ϕ, deg	44.8	49.5
Tan(ϕ)	0.99	1.17



Sample No.		1	2	3
Initial	Water Content,	16.3	16.3	16.3
	Dry Density, pcf	103.7	103.7	103.6
	Saturation,	68.0	68.1	67.8
	Void Ratio	0.6626	0.6624	0.6650
	Diameter, in.	2.84	2.84	2.84
	Height, in.	5.35	5.62	5.66
At Test	Water Content,	22.1	22.9	23.3
	Dry Density, pcf	107.0	105.6	104.9
	Saturation,	100.0	100.0	100.0
	Void Ratio	0.6116	0.6323	0.6430
	Diameter, in.	2.81	2.82	2.83
	Height, in.	5.29	5.59	5.63
Strain rate, in./min.		0.05	0.05	0.05
Back Pressure, ksf		7.2	7.2	7.2
Cell Pressure, ksf		8.0	8.4	9.2
Fail. Stress, ksf		5.0	8.3	10.5
Total Pore Pr., ksf		7.1	7.4	7.4
Ult. Stress, ksf				
Total Pore Pr., ksf				
$\bar{\sigma}_1$ Failure, ksf		6.0	9.3	12.3
$\bar{\sigma}_3$ Failure, ksf		1.0	1.0	1.8

Type of Test: CU with Pore Pressures

Sample Type: remold

Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments

Specific Gravity= 2.762

Remarks:

Reviewed By _____

Client: Nodarse and Associates

Project: Material Testing-Nodarse

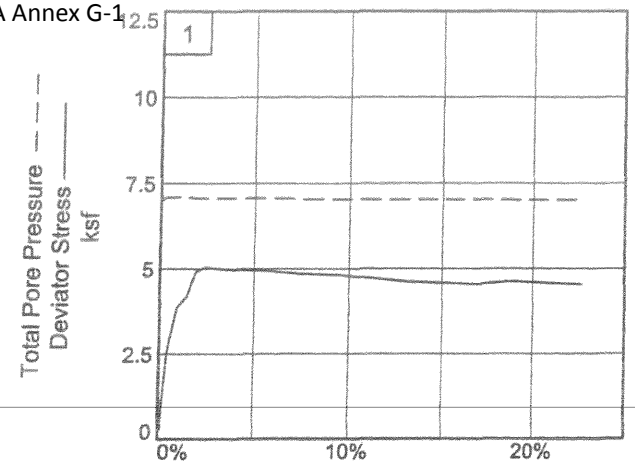
Sample Number: CU-90%-A

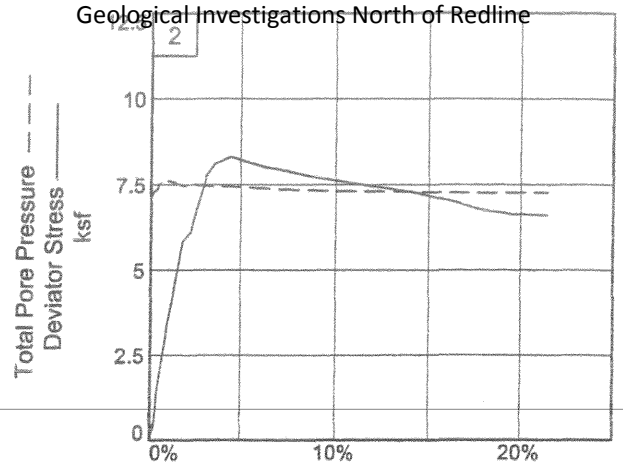
Proj. No.: 6738-05-4573 **Date:** 6-14-05

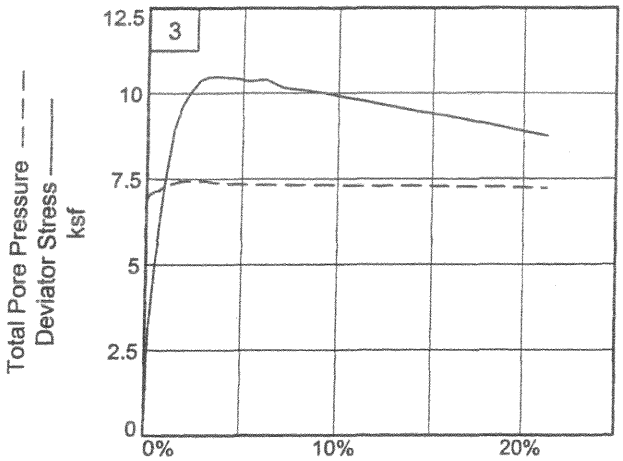
TRIAXIAL SHEAR TEST REPORT

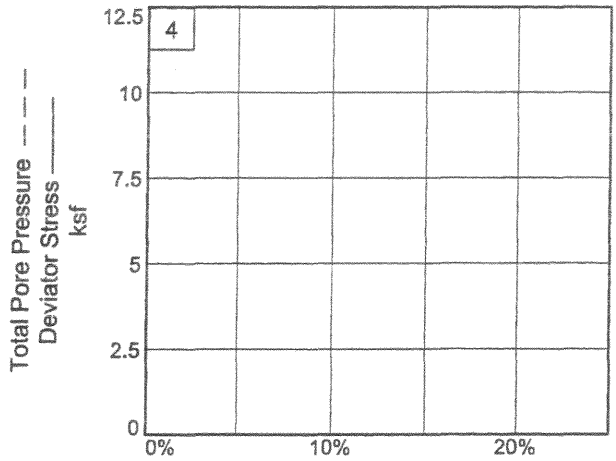
MACTEC ENGINEERING AND CONSULTING, INC.

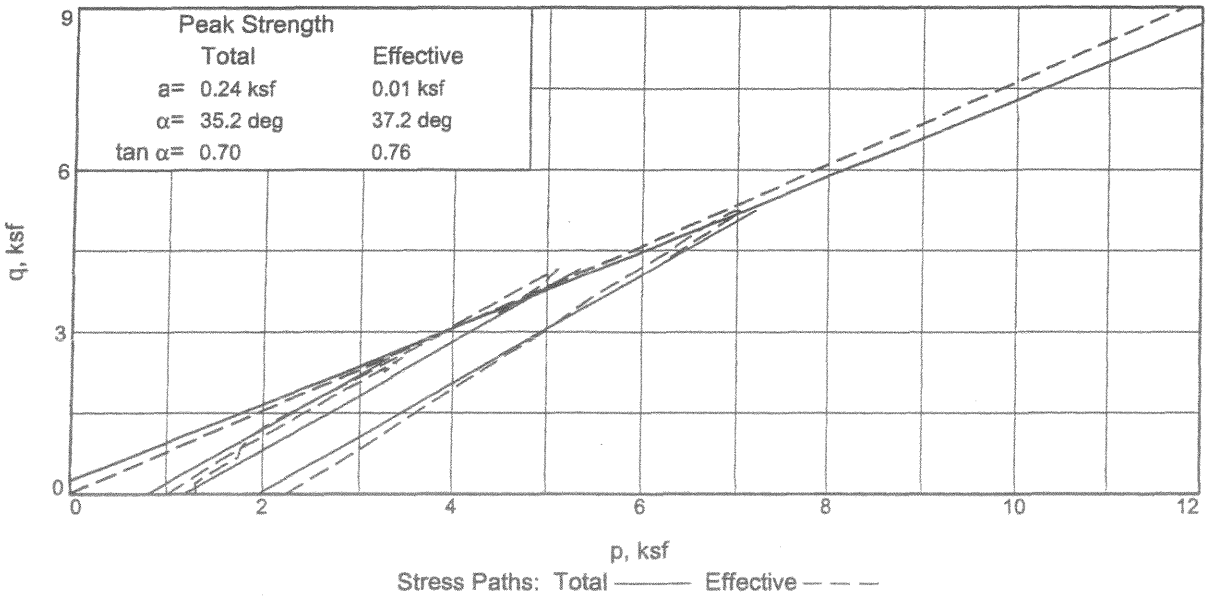
Tested By: mc **Checked By:** Rajni Sukhwani











Client: Nodarse and Associates
Project: Material Testing-Nodarse
Sample Number: CU-90%-A
Project No.: 6738-05-4573

Reviewed By _____ **MACTEC Engineering and Consulting, Inc.**

Tested By: mc _____ **Checked By:** _____

TRIAXIAL COMPRESSION TEST

CU with Pore Pressures

6/16/2005
10:07 AM

Date: 6-14-05
Client: Nodarse and Associates
Project: Material Testing-Nodarse
Project No.: 6738-05-4573
Sample Number: CU-90%-A
Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments
Remarks:
Type of Sample: remold
Specific Gravity=2.762 **LL=** **PL=** **PI=**
Test Method: COE uniform strain

Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	238.320			1187.000
Moisture content: Dry soil+tare, gms.	212.600			1009.800
Moisture content: Tare, gms.	55.000			115.150
Moisture, %	16.3	24.0	22.1	19.8
Moist specimen weight, gms.	1073.2			
Diameter, in.	2.84	2.84	2.81	
Area, in.²	6.33	6.33	6.20	
Height, in.	5.35	5.35	5.29	
Net decrease in height, in.		0.00	0.06	
Wet Density, pcf	120.6	128.6	130.7	
Dry density, pcf	103.7	103.7	107.0	
Void ratio	0.6626	0.6626	0.6116	
Saturation, %	68.0	100.0	100.0	

Test Readings for Specimen No. 1

Load ring constant = 3.313 lbs. per input unit
Membrane modulus = 0.124105 kN/cm²
Membrane thickness = 0.02 cm
Consolidation cell pressure = 55.60 psi (8.01 ksf)
Consolidation back pressure = 50.00 psi (7.20 ksf)
Consolidation effective confining stress = 0.81 ksf
Strain rate, in./min. = 0.05
Fail. Stress = 5.03 ksf **at reading no.** 14

MACTEC Engineering and Consulting, Inc.

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	1.01	1.01	1.00	48.60	1.01	0.00
1	0.0010	3.00	9.9	0.0	0.23	1.01	1.24	1.23	48.60	1.12	0.12
2	0.0050	4.00	13.3	0.1	0.31	1.01	1.32	1.30	48.60	1.16	0.15
3	0.0100	14.00	46.4	0.2	1.07	0.95	2.02	2.13	49.00	1.49	0.54
4	0.0150	23.00	76.2	0.3	1.76	0.94	2.70	2.88	49.10	1.82	0.88
5	0.0200	31.00	102.7	0.4	2.37	0.94	3.31	3.54	49.10	2.12	1.19
6	0.0250	36.00	119.3	0.5	2.76	0.94	3.69	3.94	49.10	2.31	1.38
7	0.0300	40.00	132.5	0.6	3.06	0.94	3.99	4.27	49.10	2.47	1.53
8	0.0350	43.00	142.5	0.7	3.28	0.94	4.22	4.51	49.10	2.58	1.64
9	0.0400	46.00	152.4	0.8	3.51	0.92	4.43	4.81	49.20	2.68	1.76
10	0.0450	49.00	162.3	0.8	3.74	0.92	4.66	5.05	49.20	2.79	1.87
11	0.0500	51.00	169.0	0.9	3.88	0.92	4.81	5.21	49.20	2.86	1.94
12	0.0750	55.00	182.2	1.4	4.17	0.94	5.11	5.45	49.10	3.02	2.08
13	0.1000	65.00	215.3	1.9	4.90	0.95	5.85	6.16	49.00	3.40	2.45
14	0.1250	67.00	222.0	2.4	5.03	0.95	5.98	6.29	49.00	3.47	2.52
15	0.1500	67.00	222.0	2.8	5.01	0.95	5.96	6.27	49.00	3.45	2.50
16	0.1750	67.00	222.0	3.3	4.98	0.95	5.93	6.24	49.00	3.44	2.49
17	0.2000	67.00	222.0	3.8	4.96	0.95	5.91	6.22	49.00	3.43	2.48
18	0.3000	68.00	225.3	5.7	4.93	0.95	5.88	6.19	49.00	3.42	2.47
19	0.4000	68.00	225.3	7.6	4.83	0.98	5.81	5.94	48.80	3.40	2.42
20	0.5000	69.00	228.6	9.4	4.80	0.99	5.80	5.84	48.70	3.40	2.40
21	0.6000	69.00	228.6	11.3	4.70	0.99	5.70	5.73	48.70	3.35	2.35
22	0.7000	69.00	228.6	13.2	4.60	0.99	5.60	5.63	48.70	3.30	2.30
23	0.8000	70.00	231.9	15.1	4.57	0.99	5.56	5.60	48.70	3.28	2.28
24	0.9000	71.00	235.2	17.0	4.53	0.99	5.52	5.56	48.70	3.26	2.27
25	1.0000	74.00	245.2	18.9	4.62	1.01	5.62	5.58	48.60	3.32	2.31
26	1.1000	75.00	248.5	20.8	4.57	1.01	5.58	5.53	48.60	3.29	2.28
27	1.2000	76.00	251.8	22.7	4.52	1.01	5.53	5.48	48.60	3.27	2.26

MACTEC Engineering and Consulting, Inc.

Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	238.320			1262.200
Moisture content: Dry soil+tare, gms.	212.600			1068.100
Moisture content: Tare, gms.	55.000			108.400
Moisture, %	16.3	24.0	22.9	20.2
Moist specimen weight, gms.	1127.5			
Diameter, in.	2.84	2.84	2.82	
Area, in.²	6.33	6.33	6.26	
Height, in.	5.62	5.62	5.59	
Net decrease in height, in.		0.00	0.03	
Wet Density, pcf	120.7	128.6	129.8	
Dry density, pcf	103.7	103.7	105.6	
Void ratio	0.6624	0.6624	0.6323	
Saturation, %	68.1	100.0	100.0	

Test Readings for Specimen No. 2

Load ring constant = 3.313 lbs. per input unit
Membrane modulus = 0.124105 kN/cm²
Membrane thickness = 0.02 cm
Consolidation cell pressure = 58.30 psi (8.40 ksf)
Consolidation back pressure = 50.00 psi (7.20 ksf)
Consolidation effective confining stress = 1.20 ksf
Strain rate, in./min. = 0.05
Fail. Stress = 8.30 ksf **at reading no.** 18

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	1.31	1.31	1.00	49.20	1.31	0.00
1	0.0010	1.00	3.3	0.0	0.08	1.27	1.34	1.06	49.50	1.31	0.04
2	0.0050	3.00	9.9	0.1	0.23	1.20	1.42	1.19	50.00	1.31	0.11
3	0.0100	5.00	16.6	0.2	0.38	1.11	1.49	1.34	50.60	1.30	0.19
4	0.0150	8.00	26.5	0.3	0.61	1.09	1.70	1.56	50.70	1.40	0.30
5	0.0200	18.00	59.6	0.4	1.37	1.07	2.43	2.28	50.90	1.75	0.68
6	0.0250	22.00	72.9	0.4	1.67	0.94	2.61	2.78	51.80	1.77	0.83
7	0.0300	26.00	86.1	0.5	1.97	0.86	2.84	3.28	52.30	1.85	0.99
8	0.0350	30.00	99.4	0.6	2.27	0.79	3.06	3.87	52.80	1.93	1.14
9	0.0400	34.00	112.6	0.7	2.57	0.78	3.35	4.31	52.90	2.06	1.29
10	0.0450	38.00	125.9	0.8	2.87	0.78	3.65	4.70	52.90	2.21	1.44
11	0.0500	43.00	142.5	0.9	3.25	0.79	4.04	5.10	52.80	2.42	1.62
12	0.0750	60.00	198.8	1.3	4.51	0.85	5.36	6.31	52.40	3.11	2.26
13	0.1000	78.00	258.4	1.8	5.84	0.94	6.78	7.24	51.80	3.86	2.92
14	0.1250	82.00	271.7	2.2	6.11	0.91	7.02	7.74	52.00	3.96	3.06
15	0.1500	94.00	311.4	2.7	6.97	0.92	7.90	8.57	51.90	4.41	3.49
16	0.1750	105.00	347.9	3.1	7.75	0.94	8.69	9.28	51.80	4.81	3.88
17	0.2000	110.00	364.4	3.6	8.09	0.95	9.04	9.51	51.70	4.99	4.04
18	0.2500	114.00	377.7	4.5	8.30	0.96	9.27	9.60	51.60	5.12	4.15
19	0.3000	113.00	374.4	5.4	8.15	0.99	9.15	9.20	51.40	5.07	4.08
20	0.3500	112.00	371.1	6.3	8.00	1.02	9.03	8.83	51.20	5.02	4.00
21	0.4000	112.00	371.1	7.2	7.93	1.05	8.98	8.54	51.00	5.01	3.96
22	0.5000	111.00	367.7	9.0	7.70	1.08	8.78	8.13	50.80	4.93	3.85
23	0.6000	111.00	367.7	10.7	7.55	1.09	8.65	7.90	50.70	4.87	3.78

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Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
24	0.7000	111.00	367.7	12.5	7.40	1.11	8.51	7.68	50.60	4.81	3.70
25	0.8000	111.00	367.7	14.3	7.25	1.12	8.37	7.45	50.50	4.75	3.63
26	0.9000	110.00	364.4	16.1	7.03	1.14	8.17	7.18	50.40	4.65	3.52
27	1.0000	108.00	357.8	17.9	6.76	1.15	7.91	6.87	50.30	4.53	3.38
28	1.1000	108.00	357.8	19.7	6.61	1.14	7.75	6.81	50.40	4.44	3.31
29	1.2000	110.00	364.4	21.5	6.58	1.14	7.72	6.79	50.40	4.43	3.29

Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	238.320			1285.300
Moisture content: Dry soil+tare, gms.	212.600			1102.400
Moisture content: Tare, gms.	55.000			115.700
Moisture, %	16.3	24.1	23.3	18.5
Moist specimen weight, gms.	1133.7			
Diameter, in.	2.84	2.84	2.83	
Area, in.²	6.33	6.33	6.28	
Height, in.	5.66	5.66	5.63	
Net decrease in height, in.		0.00	0.03	
Wet Density, pcf	120.5	128.5	129.4	
Dry density, pcf	103.6	103.6	104.9	
Void ratio	0.6650	0.6650	0.6430	
Saturation, %	67.8	100.0	100.0	

Test Readings for Specimen No. 3

Load ring constant = 3.313 lbs. per input unit

Membrane modulus = 0.124105 kN/cm²

Membrane thickness = 0.02 cm

Consolidation cell pressure = 63.60 psi (9.16 ksf)

Consolidation back pressure = 50.00 psi (7.20 ksf)

Consolidation effective confining stress = 1.96 ksf

Strain rate, in./min. = 0.05

Fail. Stress = 10.48 ksf **at reading no.** 16

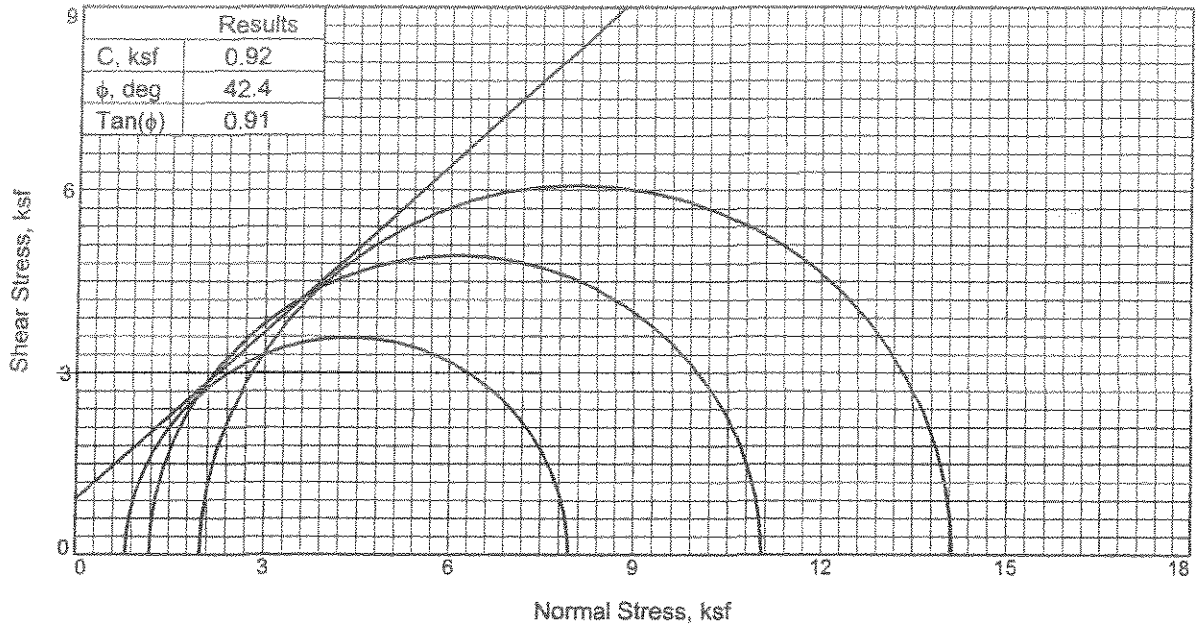
No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	2.25	2.25	1.00	48.00	2.25	0.00
1	0.0010	4.00	13.3	0.0	0.30	2.25	2.55	1.14	48.00	2.40	0.15
2	0.0050	22.00	72.9	0.1	1.67	2.19	3.86	1.76	48.40	3.02	0.84
3	0.0100	42.00	139.1	0.2	3.19	2.10	5.29	2.52	49.00	3.70	1.59
4	0.0150	50.00	165.7	0.3	3.79	2.07	5.86	2.83	49.20	3.97	1.89
5	0.0200	58.00	192.2	0.4	4.39	2.04	6.44	3.15	49.40	4.24	2.20
6	0.0250	66.00	218.7	0.4	4.99	2.02	7.01	3.48	49.60	4.51	2.50
7	0.0300	73.00	241.8	0.5	5.52	2.02	7.53	3.74	49.60	4.77	2.76
8	0.0350	80.00	265.0	0.6	6.04	1.99	8.03	4.04	49.80	5.01	3.02
9	0.0450	91.00	301.5	0.8	6.86	1.89	8.75	4.64	50.50	5.32	3.43
10	0.0500	97.00	321.4	0.9	7.30	1.84	9.15	4.96	50.80	5.50	3.65
11	0.0750	119.00	394.2	1.3	8.92	1.80	10.72	5.96	51.10	6.26	4.46
12	0.1000	129.00	427.4	1.8	9.63	1.74	11.37	6.53	51.50	6.56	4.81
13	0.1250	135.00	447.3	2.2	10.03	1.73	11.76	6.80	51.60	6.74	5.02

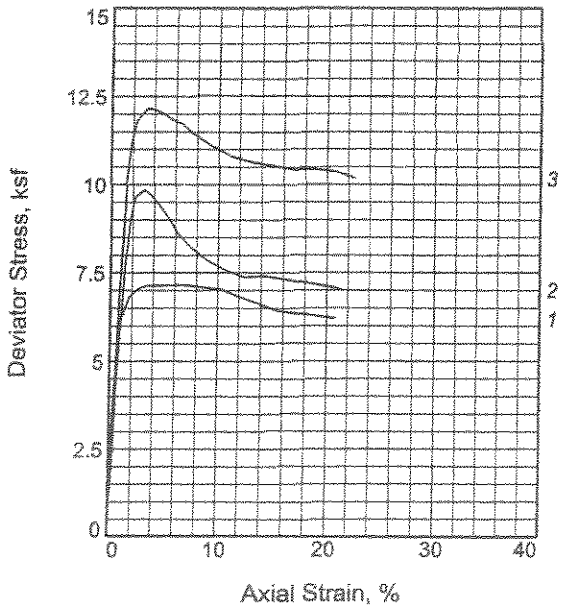
MACTEC Engineering and Consulting, Inc.

Test Readings for Specimen No. 3

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
14	0.1500	140.00	463.8	2.7	10.35	1.73	12.08	6.99	51.60	6.91	5.18
15	0.1750	142.00	470.4	3.1	10.45	1.74	12.20	7.00	51.50	6.97	5.23
16	0.2000	143.00	473.8	3.5	10.48	1.79	12.27	6.87	51.20	7.03	5.24
17	0.2500	144.00	477.1	4.4	10.46	1.80	12.26	6.81	51.10	7.03	5.23
18	0.3000	144.00	477.1	5.3	10.36	1.83	12.19	6.66	50.90	7.01	5.18
19	0.3500	146.00	483.7	6.2	10.40	1.83	12.23	6.69	50.90	7.03	5.20
20	0.4000	144.00	477.1	7.1	10.16	1.84	12.01	6.51	50.80	6.93	5.08
21	0.5000	145.00	480.4	8.9	10.04	1.84	11.88	6.45	50.80	6.86	5.02
22	0.6000	145.00	480.4	10.6	9.84	1.86	11.70	6.30	50.70	6.78	4.92
23	0.7000	145.00	480.4	12.4	9.65	1.87	11.52	6.15	50.60	6.70	4.82
24	0.8000	145.00	480.4	14.2	9.45	1.87	11.33	6.05	50.60	6.60	4.73
25	0.9000	146.00	483.7	16.0	9.32	1.89	11.21	5.94	50.50	6.55	4.66
26	1.0000	146.00	483.7	17.7	9.12	1.90	11.03	5.80	50.40	6.46	4.56
27	1.1000	146.00	483.7	19.5	8.93	1.92	10.84	5.66	50.30	6.38	4.46
28	1.2000	146.00	483.7	21.3	8.73	1.93	10.66	5.52	50.20	6.30	4.37

MACTEC Engineering and Consulting, Inc.





Sample No.		1	2	3
Initial	Water Content,	15.7	15.6	15.4
	Dry Density, pcf	110.6	109.4	109.4
	Saturation,	77.3	75.1	73.9
	Void Ratio	0.5596	0.5756	0.5765
	Diameter, in.	2.84	2.84	2.84
	Height, in.	5.77	5.64	5.32
At Test	Water Content,	20.3	19.5	20.0
	Dry Density, pcf	110.6	112.0	111.0
	Saturation,	100.0	100.0	100.0
	Void Ratio	0.5596	0.5398	0.5534
	Diameter, in.	2.84	2.82	2.83
	Height, in.	5.77	5.60	5.29
Strain rate, in./min.		0.05	0.05	0.05
Back Pressure, ksf		0.0	0.0	0.0
Cell Pressure, ksf		0.8	1.2	2.0
Fail. Stress, ksf		7.1	9.9	12.1
Ult. Stress, ksf				
σ_1 Failure, ksf		8.0	11.0	14.1
σ_3 Failure, ksf		0.8	1.2	2.0

Type of Test: Unconsolidated Undrained

Sample Type: remold

Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments

Specific Gravity= 2.762

Remarks:

Reviewed By _____

Client: Nodarse and Associates

Project: Material Testing-Nodarse

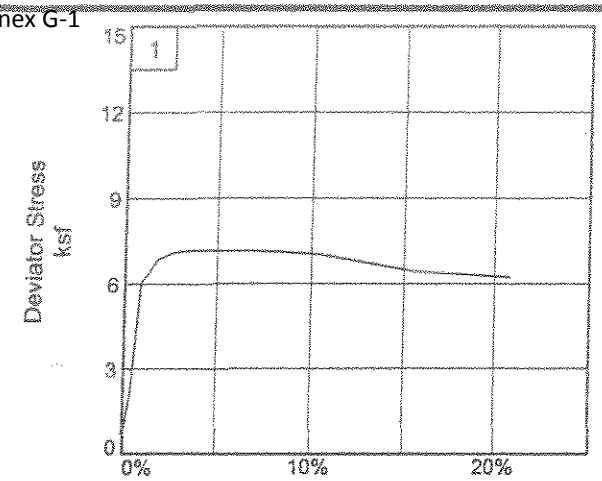
Sample Number: UU-95%-A

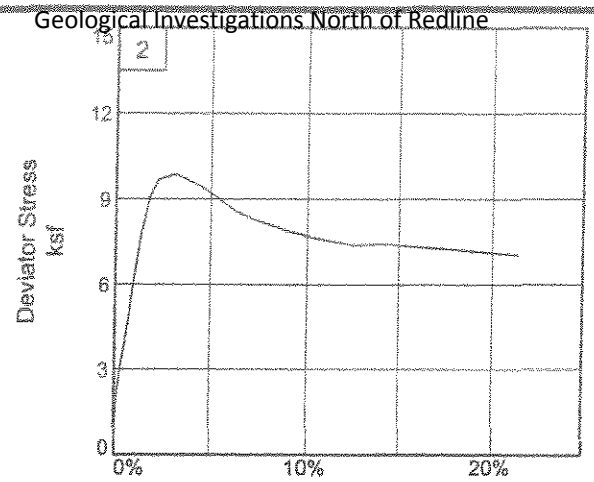
Proj. No.: 6738-05-4573 **Date:** 6-11-05

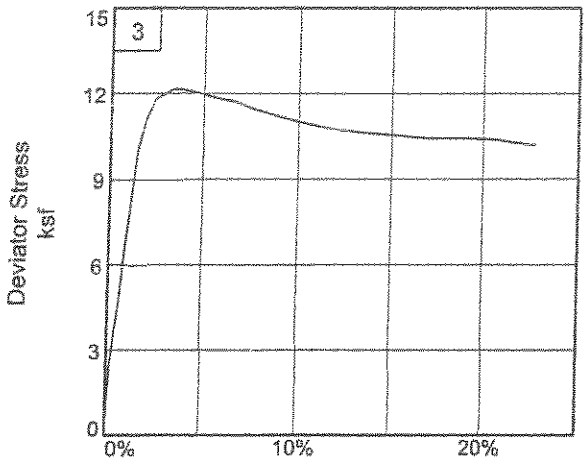
TRIAXIAL SHEAR TEST REPORT

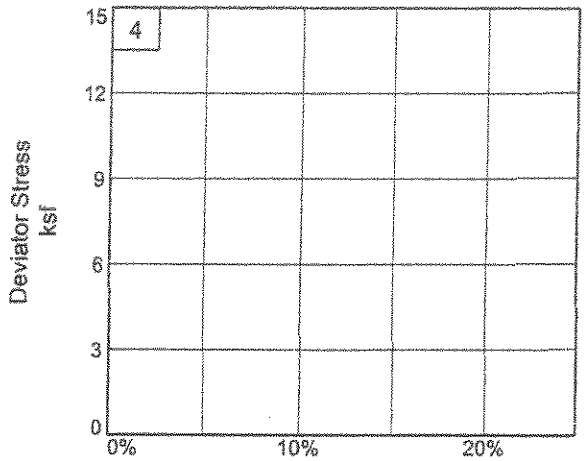
MACTEC ENGINEERING AND CONSULTING, INC.

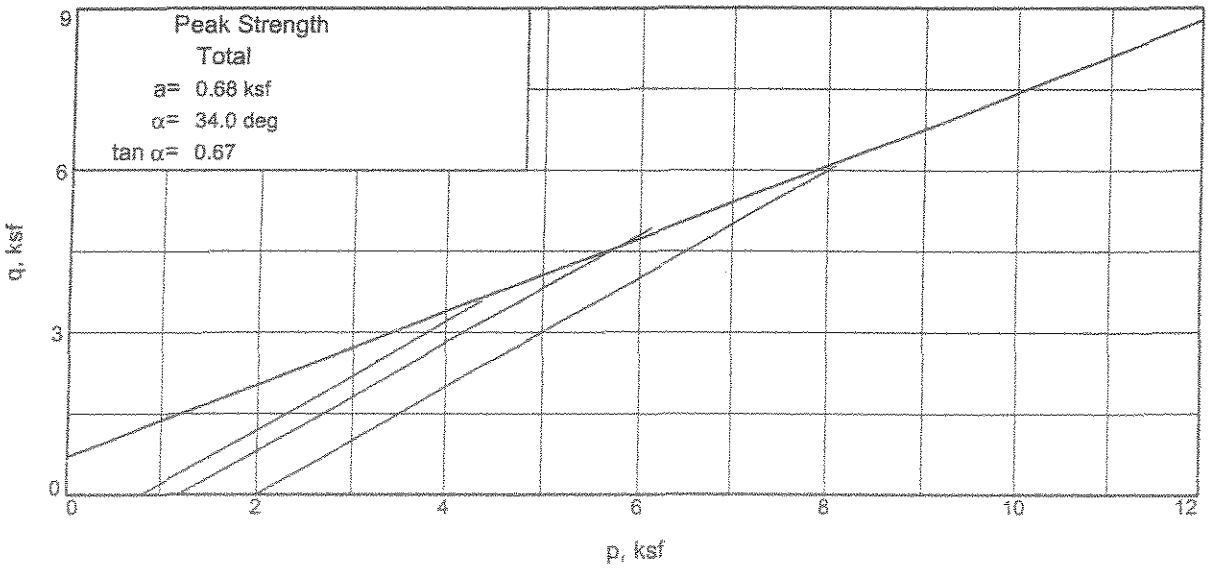
Tested By: mc **Checked By:** Rajni Sukhwani











Client: Nodarse and Associates
Project: Material Testing-Nodarse
Sample Number: UU-95%-A
Project No.: 6738-05-4573

Reviewed By _____ **MACTEC Engineering and Consulting, Inc.**

Tested By: mc **Checked By:** _____

TRIAXIAL COMPRESSION TEST

Unconsolidated Undrained

6/15/2005
10:46 AM

Date: 6-11-05
Client: Nodarse and Associates
Project: Material Testing-Nodarse
Project No.: 6738-05-4573
Sample Number: UU-95%-A
Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments
Remarks:
Type of Sample: remold
Specific Gravity=2.762 **LL=** **PL=** **PI=**
Test Method: COE uniform strain

Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	224.300		1320.500
Moisture content: Dry soil+tare, gms.	200.660		1168.100
Moisture content: Tare, gms.	49.750		230.100
Moisture, %	15.7	20.3	16.2
Moist specimen weight, gms.	1226.9		
Diameter, in.	2.84	2.84	
Area, in.^{2}	6.33	6.33	
Height, in.	5.77	5.77	
Net decrease in height, in.		0.00	
Wet Density, pcf	127.9	133.0	
Dry density, pcf	110.6	110.6	
Void ratio	0.5596	0.5596	
Saturation, %	77.3	100.0	

Test Readings for Specimen No. 1

Load ring constant = 3.313 lbs. per input unit
Membrane modulus = 0.124105 kN/cm^2
Membrane thickness = 0.02 cm
Cell pressure = 5.60 psi (0.81 ksf)
Back pressure = 0.00 psi (0.00 ksf)
Strain rate, in./min. = 0.05
Fail. Stress = 7.15 ksf **at reading no.** 21

MACTEC Engineering and Consulting, Inc.

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	0.81	0.81	1.00		0.81
1	0.0010	5.00	16.6	0.0	0.38	0.81	1.18	1.47		0.99
2	0.0050	12.00	39.8	0.1	0.90	0.81	1.71	2.12		1.26
3	0.0100	17.00	56.3	0.2	1.28	0.81	2.08	2.58		1.45
4	0.0150	22.00	72.9	0.3	1.65	0.81	2.46	3.05		1.63
5	0.0200	26.00	86.1	0.3	1.95	0.81	2.76	3.42		1.78
6	0.0250	35.00	116.0	0.4	2.62	0.81	3.43	4.25		2.12
7	0.0300	44.00	145.8	0.5	3.30	0.81	4.10	5.09		2.45
8	0.0350	53.00	175.6	0.6	3.97	0.81	4.77	5.92		2.79
9	0.0400	62.00	205.4	0.7	4.64	0.81	5.44	6.75		3.12
10	0.0450	71.00	235.2	0.8	5.31	0.81	6.11	7.58		3.46
11	0.0500	81.00	268.4	0.9	6.05	0.81	6.85	8.50		3.83
12	0.0750	86.00	284.9	1.3	6.39	0.81	7.20	8.93		4.00
13	0.1000	92.00	304.8	1.7	6.81	0.81	7.61	9.44		4.21
14	0.1250	94.00	311.4	2.2	6.93	0.81	7.73	9.59		4.27
15	0.1500	96.00	318.0	2.6	7.04	0.81	7.85	9.73		4.33
16	0.1750	97.00	321.4	3.0	7.08	0.81	7.89	9.78		4.35
17	0.2000	98.00	324.7	3.5	7.12	0.81	7.93	9.84		4.37
18	0.2500	99.00	328.0	4.3	7.13	0.81	7.94	9.85		4.37
19	0.3000	100.00	331.3	5.2	7.14	0.81	7.95	9.85		4.38
20	0.3500	101.00	334.6	6.1	7.14	0.81	7.95	9.86		4.38
21	0.4000	102.00	337.9	6.9	7.15	0.81	7.96	9.87		4.38
22	0.5000	103.00	341.2	8.7	7.08	0.81	7.89	9.79		4.35
23	0.6000	104.00	344.6	10.4	7.02	0.81	7.82	9.70		4.32
24	0.7000	103.00	341.2	12.1	6.82	0.81	7.62	9.45		4.21
25	0.8000	102.00	337.9	13.9	6.62	0.81	7.42	9.21		4.11
26	0.9000	101.00	334.6	15.6	6.42	0.81	7.23	8.96		4.02
27	1.0000	102.00	337.9	17.3	6.35	0.81	7.16	8.87		3.98
28	1.1000	103.00	341.2	19.1	6.28	0.81	7.08	8.79		3.95
29	1.2000	104.00	344.6	20.8	6.20	0.81	7.01	8.69		3.91

MACTEC Engineering and Consulting, Inc.

Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	165.540		1261.000
Moisture content: Dry soil+tare, gms.	150.080		1103.500
Moisture content: Tare, gms.	51.290		109.000
Moisture, %	15.6	19.5	15.8
Moist specimen weight, gms.	1186.9		
Diameter, in.	2.84	2.82	
Area, in.²	6.33	6.24	
Height, in.	5.64	5.60	
Net decrease in height, in.		0.04	
Wet Density, pcf	126.6	133.9	
Dry density, pcf	109.4	112.0	
Void ratio	0.5756	0.5398	
Saturation, %	75.1	100.0	

Test Readings for Specimen No. 2

Load ring constant = 3.313 lbs. per input unit
Membrane modulus = 0.124105 kN/cm²
Membrane thickness = 0.02 cm
Cell pressure = 8.30 psi (1.20 ksf)
Back pressure = 0.00 psi (0.00 ksf)
Strain rate, in./min. = 0.05
Fail. Stress = 9.85 ksf **at reading no.** 16

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	1.20	1.20	1.00		1.20
1	0.0010	8.00	26.5	0.0	0.61	1.20	1.81	1.51		1.50
2	0.0050	18.00	59.6	0.1	1.38	1.20	2.57	2.15		1.88
3	0.0100	30.00	99.4	0.2	2.29	1.20	3.49	2.92		2.34
4	0.0150	36.00	119.3	0.3	2.75	1.20	3.94	3.30		2.57
5	0.0200	42.00	139.1	0.4	3.20	1.20	4.40	3.68		2.80
6	0.0250	47.00	155.7	0.4	3.58	1.20	4.77	3.99		2.98
7	0.0300	51.00	169.0	0.5	3.88	1.20	5.07	4.25		3.13
8	0.0350	56.00	185.5	0.6	4.26	1.20	5.45	4.56		3.32
9	0.0400	62.00	205.4	0.7	4.71	1.20	5.90	4.94		3.55
10	0.0450	67.00	222.0	0.8	5.08	1.20	6.28	5.25		3.74
11	0.0500	74.00	245.2	0.9	5.61	1.20	6.80	5.69		4.00
12	0.0750	102.00	337.9	1.3	7.70	1.20	8.89	7.44		5.04
13	0.1000	120.00	397.6	1.8	9.01	1.20	10.21	8.54		5.70
14	0.1250	129.00	427.4	2.2	9.65	1.20	10.84	9.07		6.02
15	0.1500	131.00	434.0	2.7	9.75	1.20	10.95	9.16		6.07
16	0.1750	133.00	440.6	3.1	9.85	1.20	11.05	9.24		6.12
17	0.2000	132.00	437.3	3.6	9.73	1.20	10.93	9.14		6.06
18	0.2500	129.00	427.4	4.5	9.42	1.20	10.62	8.89		5.91
19	0.3000	125.00	414.1	5.4	9.05	1.20	10.24	8.57		5.72
20	0.3500	120.00	397.6	6.3	8.60	1.20	9.80	8.20		5.50
21	0.4000	117.00	387.6	7.1	8.31	1.20	9.50	7.95		5.35
22	0.5000	113.00	374.4	8.9	7.87	1.20	9.07	7.58		5.13
23	0.6000	111.00	367.7	10.7	7.58	1.20	8.77	7.34		4.98
24	0.7000	110.00	364.4	12.5	7.36	1.20	8.56	7.16		4.88

MACTEC Engineering and Consulting, Inc.

Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
25	0.8000	113.00	374.4	14.3	7.41	1.20	8.60	7.20		4.90
26	0.9000	114.00	377.7	16.1	7.32	1.20	8.51	7.12		4.85
27	1.0000	115.00	381.0	17.9	7.22	1.20	8.42	7.04		4.81
28	1.1000	116.00	384.3	19.7	7.13	1.20	8.32	6.96		4.76
29	1.2000	117.00	387.6	21.4	7.03	1.20	8.22	6.88		4.71

Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	178.450		1186.300
Moisture content: Dry soil+tare, gms.	161.940		1039.700
Moisture content: Tare, gms.	54.840		106.200
Moisture, %	15.4	20.0	15.7
Moist specimen weight, gms.	1116.7		
Diameter, in.	2.84	2.83	
Area, in.^{2}	6.33	6.27	
Height, in.	5.32	5.29	
Net decrease in height, in.		0.03	
Wet Density, pcf	126.2	133.2	
Dry density, pcf	109.4	111.0	
Void ratio	0.5765	0.5534	
Saturation, %	73.9	100.0	

Test Readings for Specimen No. 3

Load ring constant = 3.313 lbs. per input unit
Membrane modulus = 0.124105 kN/cm^2
Membrane thickness = 0.02 cm
Cell pressure = 13.90 psi (2.00 ksf)
Back pressure = 0.00 psi (0.00 ksf)
Strain rate, in./min. = 0.05
Fail. Stress = 12.15 ksf **at reading no.** 17

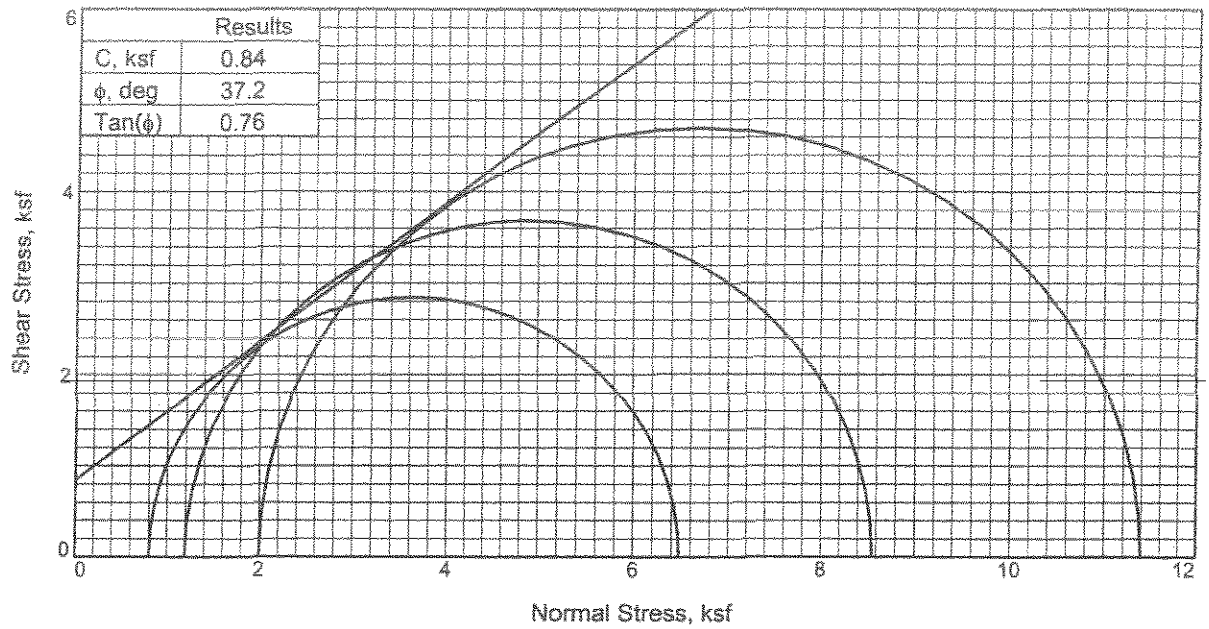
No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	2.00	2.00	1.00		2.00
1	0.0010	6.00	19.9	0.0	0.46	2.00	2.46	1.23		2.23
2	0.0050	20.00	66.3	0.1	1.52	2.00	3.52	1.76		2.76
3	0.0100	32.00	106.0	0.2	2.43	2.00	4.43	2.21		3.22
4	0.0150	40.00	132.5	0.3	3.03	2.00	5.04	2.52		3.52
5	0.0200	48.00	159.0	0.4	3.64	2.00	5.64	2.82		3.82
6	0.0250	55.00	182.2	0.5	4.16	2.00	6.16	3.08		4.08
7	0.0300	62.00	205.4	0.6	4.69	2.00	6.69	3.34		4.35
8	0.0350	71.00	235.2	0.7	5.36	2.00	7.37	3.68		4.68
9	0.0400	80.00	265.0	0.8	6.04	2.00	8.04	4.02		5.02
10	0.0450	89.00	294.9	0.9	6.71	2.00	8.71	4.35		5.36
11	0.0500	96.00	318.0	0.9	7.23	2.00	9.23	4.61		5.62
12	0.0750	133.00	440.6	1.4	9.97	2.00	11.97	5.98		6.99
13	0.1000	150.00	497.0	1.9	11.19	2.00	13.19	6.59		7.60
14	0.1250	159.00	526.8	2.4	11.81	2.00	13.81	6.90		7.91
15	0.1500	162.00	536.7	2.8	11.97	2.00	13.97	6.98		7.99

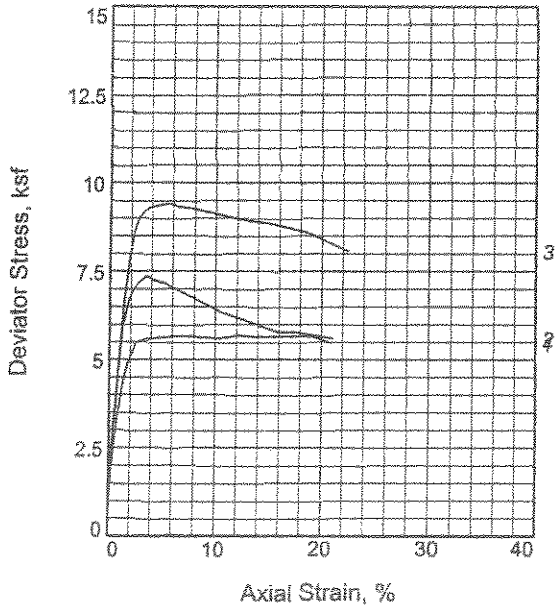
MACTEC Engineering and Consulting, Inc.

Test Readings for Specimen No. 3

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
16	0.1750	165.00	546.6	3.3	12.13	2.00	14.14	7.06		8.07
17	0.2000	166.00	550.0	3.8	12.15	2.00	14.15	7.07		8.08
18	0.2500	166.00	550.0	4.7	12.03	2.00	14.03	7.01		8.02
19	0.3000	165.00	546.6	5.7	11.84	2.00	13.84	6.91		7.92
20	0.3500	165.00	546.6	6.6	11.72	2.00	13.72	6.85		7.86
21	0.4000	163.00	540.0	7.6	11.46	2.00	13.46	6.73		7.73
22	0.5000	161.00	533.4	9.4	11.09	2.00	13.09	6.54		7.55
23	0.6000	160.00	530.1	11.3	10.79	2.00	12.79	6.39		7.40
24	0.7000	161.00	533.4	13.2	10.63	2.00	12.63	6.31		7.31
25	0.8000	163.00	540.0	15.1	10.52	2.00	12.53	6.26		7.26
26	0.9000	165.00	546.6	17.0	10.42	2.00	12.42	6.20		7.21
27	1.0000	169.00	559.9	18.9	10.43	2.00	12.43	6.21		7.21
28	1.1000	172.00	569.8	20.8	10.36	2.00	12.36	6.18		7.18
29	1.2000	173.00	573.1	22.7	10.17	2.00	12.18	6.08		7.09

MACTEC Engineering and Consulting, Inc.





Sample No.		1	2	3
Initial	Water Content,	16.6	16.6	16.6
	Dry Density, pcf	104.1	103.8	104.0
	Saturation,	69.9	69.4	69.7
	Void Ratio	0.6562	0.6605	0.6579
	Diameter, in.	2.84	2.84	2.84
	Height, in.	5.78	5.72	5.36
At Test	Water Content,	22.9	22.8	23.0
	Dry Density, pcf	105.7	105.9	105.4
	Saturation,	100.0	100.0	100.0
	Void Ratio	0.6313	0.6284	0.6357
	Diameter, in.	2.83	2.82	2.83
	Height, in.	5.75	5.68	5.34
Strain rate, in./min.		0.05	0.05	0.05
Back Pressure, ksf		0.0	0.0	0.0
Cell Pressure, ksf		0.8	1.2	2.0
Fail. Stress, ksf		5.7	7.4	9.4
Ult. Stress, ksf				
σ_1 Failure, ksf		6.5	8.6	11.4
σ_3 Failure, ksf		0.8	1.2	2.0

Type of Test:
Unconsolidated Undrained

Sample Type: remolded

Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments

Specific Gravity= 2.762

Remarks:

Reviewed By _____

Client: Nodarse and Associates

Project: Material Testing-Nodarse

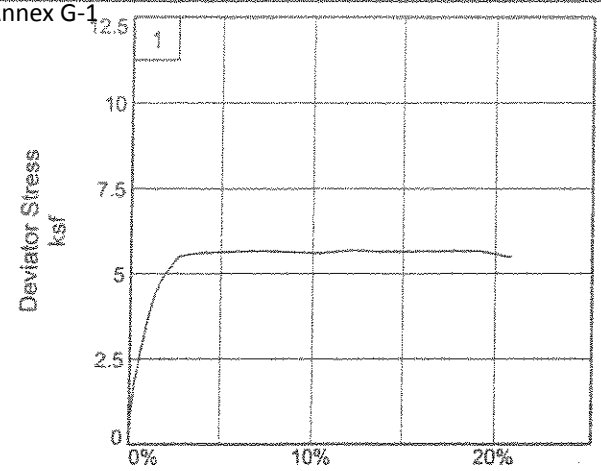
Sample Number: UU-90%-A

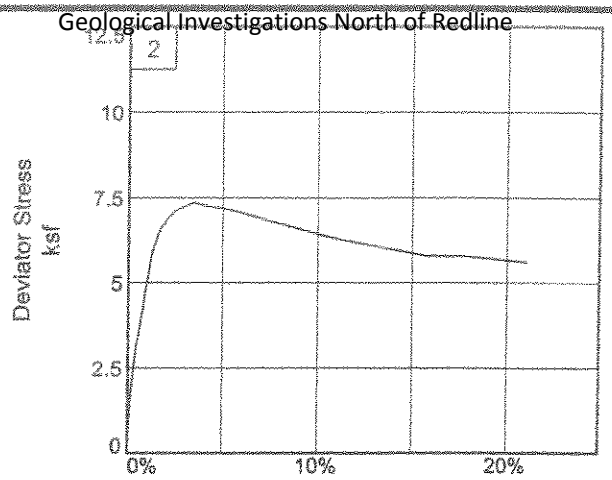
Proj. No.: 6738-05-4573 **Date:** 6-10-05

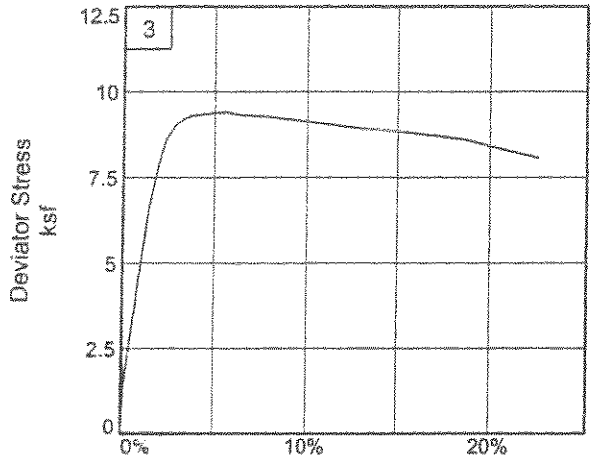
TRIAXIAL SHEAR TEST REPORT

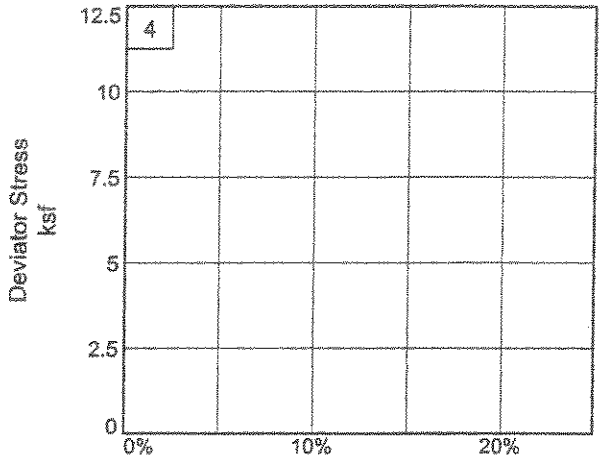
MACTEC ENGINEERING AND CONSULTING, INC.

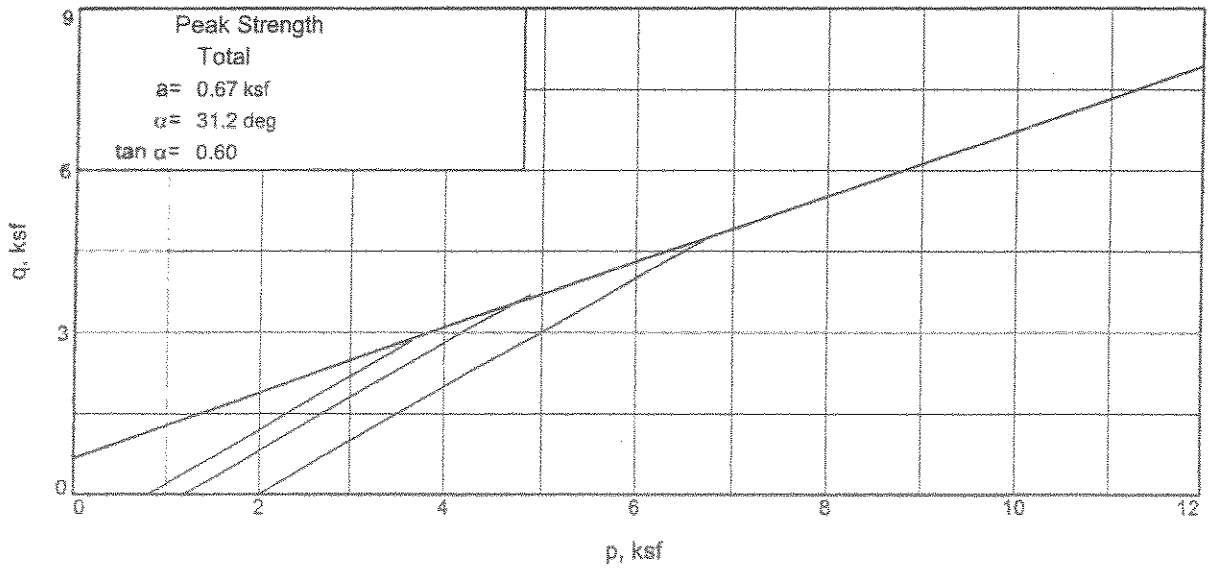
Tested By: mc **Checked By:** Kajni Sukhwani











Client: Nodarse and Associates
Project: Material Testing-Nodarse
Sample Number: UU-90%-A
Project No.: 6738-05-4573

Reviewed By _____ **MACTEC Engineering and Consulting, Inc.**

Tested By: mc _____ **Checked By:** _____

TRIAXIAL COMPRESSION TEST

Unconsolidated Undrained

6/15/2005
10:45 AM

Date: 6-10-05
Client: Nodarse and Associates
Project: Material Testing-Nodarse
Project No.: 6738-05-4573
Sample Number: UU-90%-A
Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments
Remarks:
Type of Sample: remolded
Specific Gravity=2.762 **LL=** **PL=** **PI=**
Test Method: COE uniform strain

Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	178.470		1181.000
Moisture content: Dry soil+tare, gms.	160.220		1025.700
Moisture content: Tare, gms.	50.320		115.200
Moisture, %	16.6	22.9	17.1
Moist specimen weight, gms.	1166.8		
Diameter, in.	2.84	2.83	
Area, in.²	6.33	6.27	
Height, in.	5.78	5.75	
Net decrease in height, in.		0.03	
Wet Density, pcf	121.4	129.9	
Dry density, pcf	104.1	105.7	
Void ratio	0.6562	0.6313	
Saturation, %	69.9	100.0	

Test Readings for Specimen No. 1

Load ring constant = 3.313 lbs. per input unit
Membrane modulus = 0.124105 kN/cm²
Membrane thickness = 0.02 cm
Cell pressure = 5.60 psi (0.81 ksf)
Back pressure = 0.00 psi (0.00 ksf)
Strain rate, in./min. = 0.05
Fail. Stress = 5.68 ksf **at reading no.** 23

MACTEC Engineering and Consulting, Inc.

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	0.81	0.81	1.00		0.81
1	0.0010	3.00	9.9	0.0	0.23	0.81	1.03	1.28		0.92
2	0.0050	12.00	39.8	0.1	0.91	0.81	1.72	2.13		1.26
3	0.0100	18.00	59.6	0.2	1.37	0.81	2.17	2.70		1.49
4	0.0150	24.00	79.5	0.3	1.82	0.81	2.63	3.26		1.72
5	0.0200	27.00	89.5	0.3	2.05	0.81	2.85	3.54		1.83
6	0.0250	30.00	99.4	0.4	2.27	0.81	3.08	3.82		1.94
7	0.0300	34.00	112.6	0.5	2.57	0.81	3.38	4.19		2.09
8	0.0350	37.00	122.6	0.6	2.80	0.81	3.60	4.47		2.21
9	0.0400	40.00	132.5	0.7	3.02	0.81	3.83	4.75		2.32
10	0.0450	43.00	142.5	0.8	3.25	0.81	4.05	5.02		2.43
11	0.0500	46.00	152.4	0.9	3.47	0.81	4.28	5.30		2.54
12	0.0750	58.00	192.2	1.3	4.35	0.81	5.16	6.40		2.98
13	0.1000	65.00	215.3	1.7	4.86	0.81	5.67	7.03		3.24
14	0.1500	74.00	245.2	2.6	5.48	0.81	6.29	7.80		3.55
15	0.1750	75.00	248.5	3.0	5.53	0.81	6.34	7.86		3.57
16	0.2000	76.00	251.8	3.5	5.58	0.81	6.39	7.92		3.60
17	0.2500	77.00	255.1	4.3	5.60	0.81	6.41	7.95		3.61
18	0.3000	78.00	258.4	5.2	5.62	0.81	6.43	7.97		3.62
19	0.3500	79.00	261.7	6.1	5.64	0.81	6.45	8.00		3.63
20	0.4000	80.00	265.0	7.0	5.66	0.81	6.47	8.02		3.64
21	0.5000	81.00	268.4	8.7	5.63	0.81	6.43	7.98		3.62
22	0.6000	82.00	271.7	10.4	5.59	0.81	6.39	7.93		3.60
23	0.7000	85.00	281.6	12.2	5.68	0.81	6.49	8.04		3.65
24	0.8000	86.00	284.9	13.9	5.63	0.81	6.44	7.98		3.62
25	0.9000	88.00	291.5	15.6	5.65	0.81	6.45	8.00		3.63
26	1.0000	90.00	298.2	17.4	5.66	0.81	6.46	8.01		3.63
27	1.1000	92.00	304.8	19.1	5.66	0.81	6.47	8.02		3.64
28	1.2000	91.00	301.5	20.9	5.48	0.81	6.28	7.79		3.55

MACTEC Engineering and Consulting, Inc.

Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	178.470		1253.500
Moisture content: Dry soil+tare, gms.	160.220		1090.600
Moisture content: Tare, gms.	50.320		116.400
Moisture, %	16.6	22.8	16.7
Moist specimen weight, gms.	1151.7		
Diameter, in.	2.84	2.82	
Area, in.²	6.33	6.25	
Height, in.	5.72	5.68	
Net decrease in height, in.		0.04	
Wet Density, pcf	121.1	130.0	
Dry density, pcf	103.8	105.9	
Void ratio	0.6605	0.6284	
Saturation, %	69.4	100.0	

Test Readings for Specimen No. 2

Load ring constant = 3.313 lbs. per input unit
Membrane modulus = 0.124105 kN/cm²
Membrane thickness = 0.02 cm
Cell pressure = 8.30 psi (1.20 ksf)
Back pressure = 0.00 psi (0.00 ksf)
Strain rate, in./min. = 0.05
Fail. Stress = 7.36 ksf **at reading no.** 17

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	1.20	1.20	1.00		1.20
1	0.0010	5.00	16.6	0.0	0.38	1.20	1.58	1.32		1.39
2	0.0050	14.00	46.4	0.1	1.07	1.20	2.26	1.89		1.73
3	0.0100	24.00	79.5	0.2	1.83	1.20	3.02	2.53		2.11
4	0.0150	31.00	102.7	0.3	2.36	1.20	3.55	2.97		2.37
5	0.0200	36.00	119.3	0.4	2.74	1.20	3.93	3.29		2.56
6	0.0250	42.00	139.1	0.4	3.19	1.20	4.39	3.67		2.79
7	0.0300	45.00	149.1	0.5	3.42	1.20	4.61	3.86		2.90
8	0.0350	49.00	162.3	0.6	3.72	1.20	4.91	4.11		3.05
9	0.0400	53.00	175.6	0.7	4.02	1.20	5.21	4.36		3.20
10	0.0450	56.00	185.5	0.8	4.24	1.20	5.43	4.55		3.31
11	0.0500	61.00	202.1	0.9	4.61	1.20	5.81	4.86		3.50
12	0.0750	79.00	261.7	1.3	5.95	1.20	7.14	5.98		4.17
13	0.1000	88.00	291.5	1.8	6.60	1.20	7.79	6.52		4.49
14	0.1250	93.00	308.1	2.2	6.94	1.20	8.13	6.81		4.67
15	0.1500	96.00	318.0	2.6	7.13	1.20	8.33	6.97		4.76
16	0.1750	98.00	324.7	3.1	7.25	1.20	8.44	7.06		4.82
17	0.2000	100.00	331.3	3.5	7.36	1.20	8.56	7.16		4.88
18	0.2500	99.00	328.0	4.4	7.22	1.20	8.42	7.04		4.81
19	0.3000	99.00	328.0	5.3	7.15	1.20	8.35	6.99		4.77
20	0.3500	98.00	324.7	6.2	7.02	1.20	8.21	6.87		4.70
21	0.4000	97.00	321.4	7.0	6.88	1.20	8.08	6.76		4.64
22	0.5000	95.00	314.7	8.8	6.61	1.20	7.81	6.53		4.50
23	0.6000	93.00	308.1	10.6	6.35	1.20	7.54	6.31		4.37
24	0.7000	92.00	304.8	12.3	6.15	1.20	7.35	6.15		4.27

MACTEC Engineering and Consulting, Inc.

Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
25	0.8000	91.00	301.5	14.1	5.97	1.20	7.16	5.99		4.18
26	0.9000	90.00	298.2	15.8	5.78	1.20	6.97	5.84		4.08
27	1.0000	92.00	304.8	17.6	5.78	1.20	6.98	5.84		4.09
28	1.2000	93.00	308.1	21.1	5.60	1.20	6.79	5.68		3.99

Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	178.470		1178.400
Moisture content: Dry soil+tare, gms.	160.220		1022.600
Moisture content: Tare, gms.	50.320		115.200
Moisture, %	16.6	23.0	17.2
Moist specimen weight, gms.	1080.9		
Diameter, in.	2.84	2.83	
Area, in.²	6.33	6.28	
Height, in.	5.36	5.34	
Net decrease in height, in.		0.02	
Wet Density, pcf	121.3	129.7	
Dry density, pcf	104.0	105.4	
Void ratio	0.6579	0.6357	
Saturation, %	69.7	100.0	

Test Readings for Specimen No. 3

Load ring constant = 3.313 lbs. per input unit
Membrane modulus = 0.124105 kN/cm²
Membrane thickness = 0.02 cm
Cell pressure = 13.90 psi (2.00 ksf)
Back pressure = 0.00 psi (0.00 ksf)
Strain rate, in./min. = 0.05
Fail. Stress = 9.40 ksf **at reading no.** 19

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	2.00	2.00	1.00		2.00
1	0.0010	7.00	23.2	0.0	0.53	2.00	2.53	1.27		2.27
2	0.0050	17.00	56.3	0.1	1.29	2.00	3.29	1.64		2.65
3	0.0100	23.00	76.2	0.2	1.74	2.00	3.75	1.87		2.87
4	0.0150	28.00	92.8	0.3	2.12	2.00	4.12	2.06		3.06
5	0.0200	34.00	112.6	0.4	2.57	2.00	4.58	2.29		3.29
6	0.0250	39.00	129.2	0.5	2.95	2.00	4.95	2.47		3.48
7	0.0300	44.00	145.8	0.6	3.32	2.00	5.33	2.66		3.66
8	0.0350	48.00	159.0	0.7	3.62	2.00	5.63	2.81		3.81
9	0.0400	54.00	178.9	0.7	4.07	2.00	6.07	3.03		4.04
10	0.0450	60.00	198.8	0.8	4.52	2.00	6.52	3.26		4.26
11	0.0500	64.00	212.0	0.9	4.82	2.00	6.82	3.41		4.41
12	0.0750	89.00	294.9	1.4	6.67	2.00	8.67	4.33		5.34
13	0.1000	105.00	347.9	1.9	7.83	2.00	9.83	4.91		5.92
14	0.1250	116.00	384.3	2.3	8.61	2.00	10.61	5.30		6.31
15	0.1500	122.00	404.2	2.8	9.01	2.00	11.01	5.50		6.51
16	0.1750	125.00	414.1	3.3	9.19	2.00	11.19	5.59		6.60

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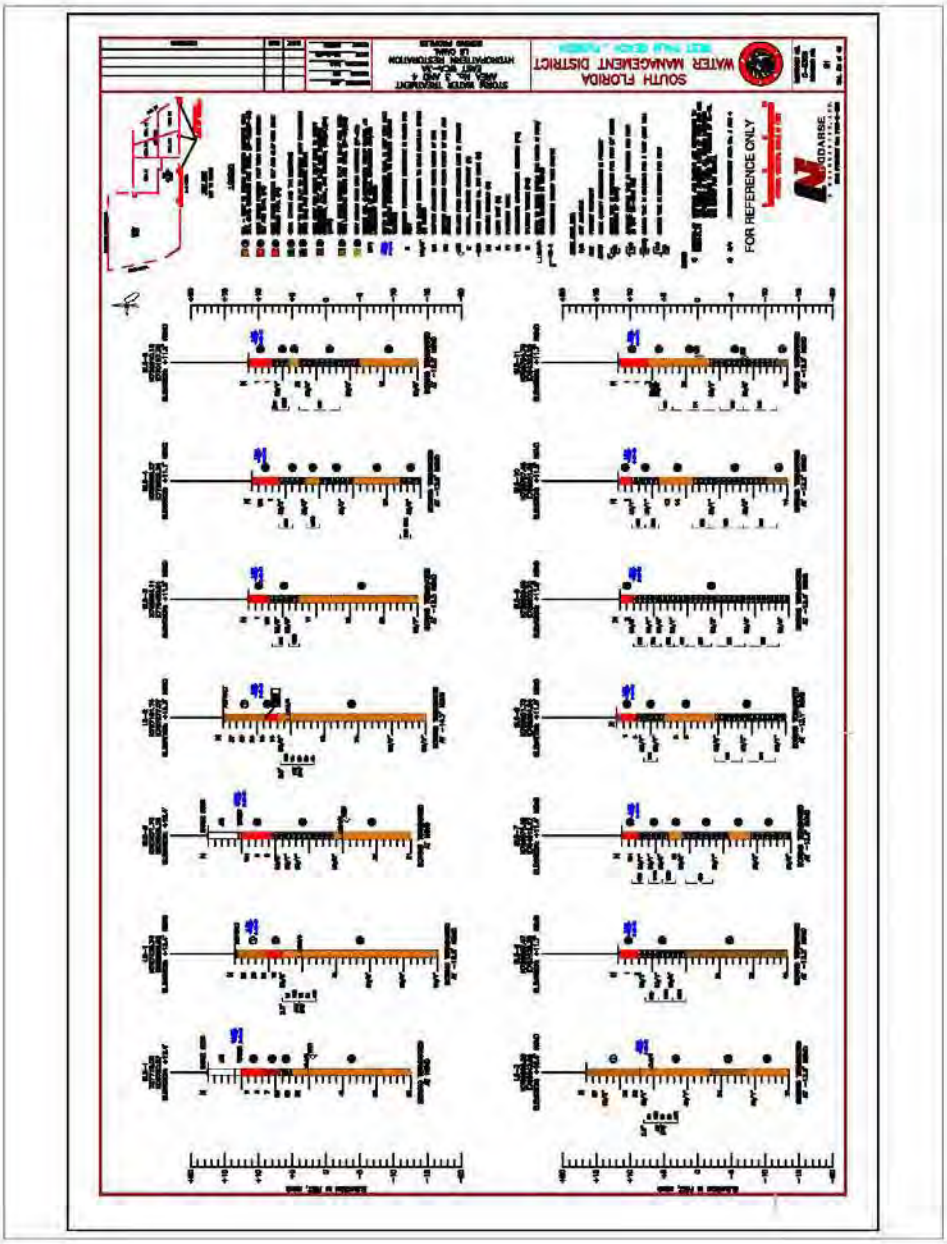
Test Readings for Specimen No. 3

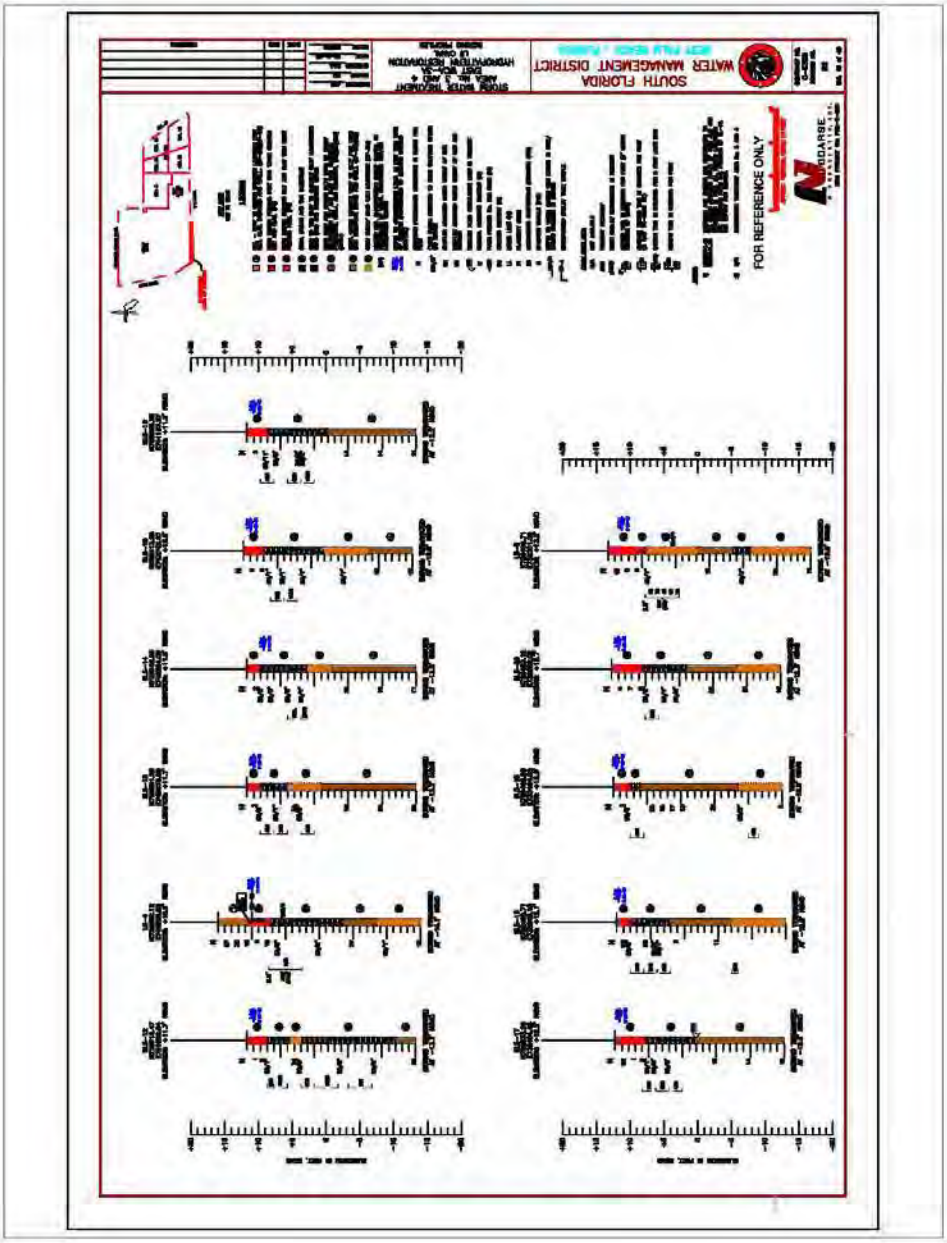
No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
17	0.2000	127.00	420.8	3.7	9.29	2.00	11.29	5.64		6.65
18	0.2500	129.00	427.4	4.7	9.34	2.00	11.35	5.67		6.67
19	0.3000	131.00	434.0	5.6	9.40	2.00	11.40	5.69		6.70
20	0.3500	131.00	434.0	6.6	9.30	2.00	11.30	5.65		6.65
21	0.4000	132.00	437.3	7.5	9.28	2.00	11.28	5.64		6.64
22	0.5000	133.00	440.6	9.4	9.16	2.00	11.16	5.58		6.58
23	0.6000	134.00	443.9	11.2	9.04	2.00	11.04	5.52		6.52
24	0.7000	135.00	447.3	13.1	8.91	2.00	10.91	5.45		6.46
25	0.8000	137.00	453.9	15.0	8.85	2.00	10.85	5.42		6.43
26	0.9000	138.00	457.2	16.9	8.72	2.00	10.72	5.36		6.36
27	1.0000	139.00	460.5	18.7	8.58	2.00	10.58	5.29		6.29
28	1.1000	138.00	457.2	20.6	8.32	2.00	10.33	5.16		6.16
29	1.2000	137.00	453.9	22.5	8.07	2.00	10.07	5.03		6.04

MACTEC Engineering and Consulting, Inc.

ANNEX G-2. GEOLOGICAL INVESTIGATIONS SOUTH OF THE REDLINE

Figure G-2-1. Nodarse and Associates, 2000 Boring Map


SOUTH FLORIDA
WATER MANAGEMENT DISTRICT
FOR REFERENCE ONLY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WATER MANAGEMENT DISTRICT
FOR REFERENCE ONLY

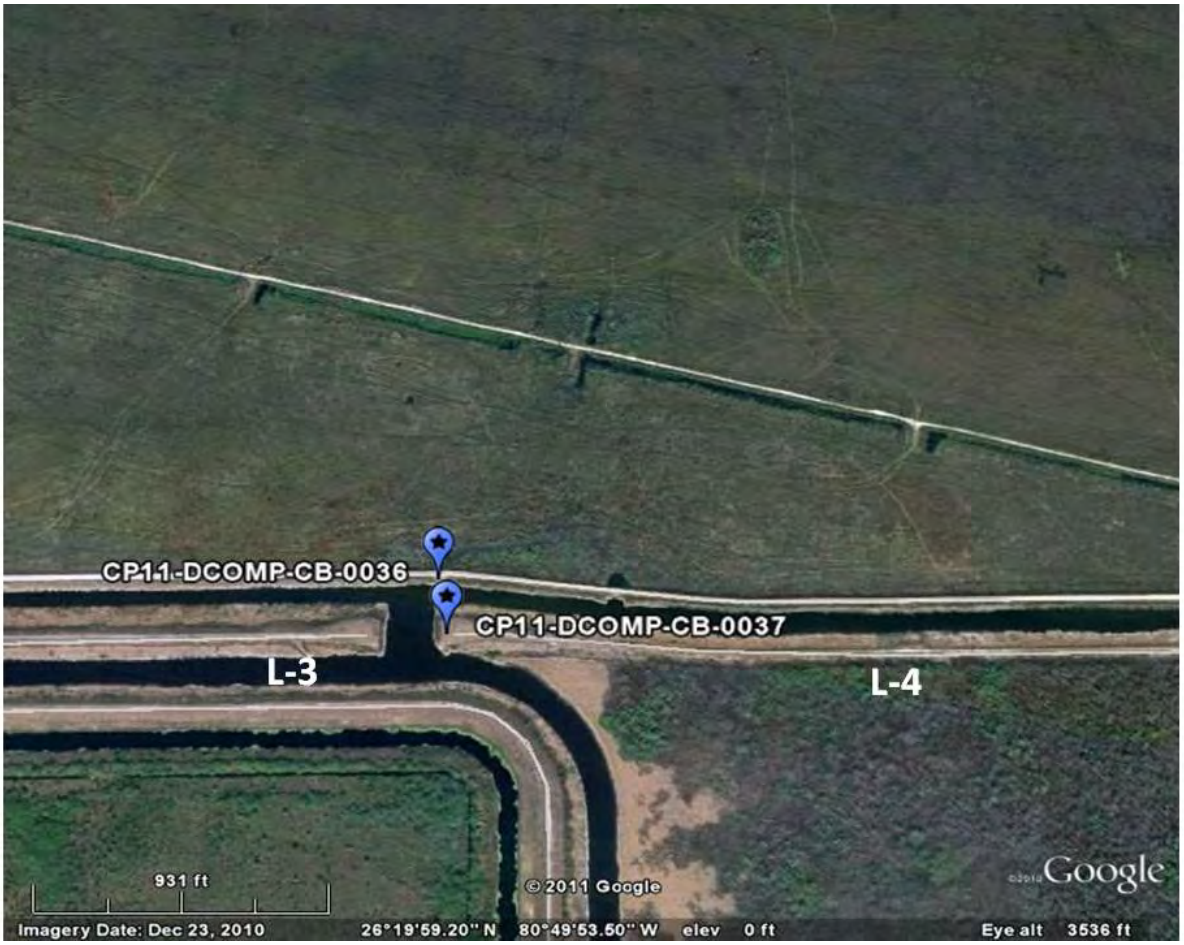

Figure G-2-2. U.S. Army Corps of Engineers 2011 Boring Map

Boring Designation CP11-DCOMP-CB-0036

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 2 SHEETS

1. PROJECT C&SF CERP WCA 3 DECOMP Part 2 L-4 North, Proposed Pump Station	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) / HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP11-DCOMP-CB-0036 / LOCATION COORDINATES X = 710,800 Y = 726,372	11. MANUFACTURER'S DESIGNATION OF DRILL Failing 1500 ☐ AUTO HAMMER ☒ MANUAL HAMMER
3. DRILLING AGENCY Corps of Engineers - CESAM / CONTRACTOR FILE NO.	12. TOTAL SAMPLES DISTURBED 1 / UNDISTURBED (UD) 0
4. NAME OF DRILLER Charlie Brown	13. TOTAL NUMBER CORE BOXES 1
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER 9.0 Ft.
	15. DATE BORING STARTED 03-15-11 / COMPLETED 03-15-11
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING 16.6 Ft.
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING 69 %
8. TOTAL DEPTH OF BORING 22.7 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Michael Fitzharris, Geologist

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
16.6	0.0						16.6		
			FILL, fine grained sand with some fine and coarse grained gravel; trace clay, 2.5YR 6/2 pale red	73			SPT Sampler 15.1	8 15 16	31
13.6	3.0			60			SPT Sampler 13.6	4 7 9	16
			SAND, clayey, some fine gravel; trace silt, 5Y 4/1 dark gray (SC)	80			SPT Sampler 12.1	5 5 3	8
10.6	6.0			73			SPT Sampler 10.6	3 3 5	8
9.1	7.5		CLAY, organic-L, moist, organic soil with calcareous sand and gravel particles, 5Y 2.5/1 black (OL)	87			SPT Sampler 9.1	2 1 1	2
7.1	9.5		SAND, clayey, moist, calcareous sand and gravel fragments, 7.5YR 2.5/1 black (SC)	63			SPT Sampler 7.6	WOH 1 1	2
6.1	10.5		CLAY, lean, moist, some calcareous gravel; little organics, 10YR 4/1 dark gray (CL)	93			SPT Sampler 6.1	2 1 4	5
4.6	12.0		SAND, clayey, trace gravel, trace silt, 2.5Y 6/1 gray (SC)	87			SPT Sampler 4.6	2 2 4	6
3.1	13.5		SAND, silty, some coarse gravel, 2.5Y 6/1 gray (SM)	40			SPT Sampler 3.1	2 4 16	20
		Weathered	LIMESTONE, fossiliferous, weathered, moderately fractured, vuggy, glaconitic staining; some clay infills, 5Y 8/1 white	65	BOX 1	RQD 32	4 x 5-1/2" DT = 9 mins HP = 200 psi DFR = 100 %		

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(Continued)

Boring Designation CP11-DCOMP-CB-0036

DRILLING LOG (Cont. Sheet)	INSTALLATION Jacksonville District	SHEET 3 OF 3 SHEETS
PROJECT C&SF CERP WCA 3 DECOMP Part 2	COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83 / VERTICAL NAVD88
LOCATION COORDINATES X = 710,800 Y = 726,372	ELEVATION TOP OF BORING 16.6 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
				65		RQD 32	4 x 5-1/2" DT = 9 mins HP = 200 psi DFR = 100 % -0.3		
				40	BOX 1 1	RQD 11	4 x 5-1/2" DT = 5 mins HP = 200 psi DFR = 70 %		
-6.1	22.7						-6.1		

NOTES:

1. USACE Jacksonville is the custodian for these original files.

2. Soils are field visually classified in accordance with the Unified Soils Classification System.

3. Grout

140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).

Abbreviations:
WOH = Weight of Hammer.
DT = Drill Time.
HP = Hydraulic Pressure.
DFR = Drill Fluid Return.

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Boring Designation CP11-DCOMP-CB-0037

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 2 SHEETS
1. PROJECT C&SF CERP WCA 3 DECOMP Part 2 L-4 South, Proposed Pump Station Alternate		9. SIZE AND TYPE OF BIT See Remarks	
		10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP11-DCOMP-CB-0037	LOCATION COORDINATES X = 710,839 Y = 726,167	11. MANUFACTURER'S DESIGNATION OF DRILL Failing 1500	☐ AUTO HAMMER ☒ MANUAL HAMMER
3. DRILLING AGENCY Corps of Engineers - CESAM	CONTRACTOR FILE NO.	12. TOTAL SAMPLES	DISTURBED 1 / UNDISTURBED (UD) 0
4. NAME OF DRILLER Charlie Brown		13. TOTAL NUMBER CORE BOXES 1	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED	DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER 8.3 Ft.	
		15. DATE BORING	STARTED 03-22-11 / COMPLETED 03-22-11
6. THICKNESS OF OVERBURDEN N/A		16. ELEVATION TOP OF BORING 20.0 Ft.	
7. DEPTH DRILLED INTO ROCK N/A		17. TOTAL RECOVERY FOR BORING 61 %	
8. TOTAL DEPTH OF BORING 20.7 Ft.		18. SIGNATURE AND TITLE OF INSPECTOR Michael Fitzharris, Geologist	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
20.0	0.0						20.0		
			FILL, gravelly, trace organics; trace clay; trace roots; some shell fragments, 5YR 7/1 light gray	67			SPT Sampler	10, 24, 16	40
			From El. 18.5 to 14.0 Ft., sandy, trace organics; trace shell fragments, 7.5YR 4/1 dark gray	53			18.5 SPT Sampler	4, 6, 8	14
				67			17.0 SPT Sampler	9, 10, 13	23
				87			15.5 SPT Sampler	11, 15, 21	36
			From El. 14.0 to 12.5 Ft., gravelly, some silt, 7.5YR 5/2 brown	67			14.0 SPT Sampler	13, 10, 12	22
			From El. 12.5 to 11.0 Ft. sandy, 10YR 5/1 gray	0			12.5 SPT Sampler	5, 6, 6	12
11.0	9.0						11.0		
10.9	9.1		SAND, clayey, trace gravel; some shell fragments, 10YR 7/1 light gray (SC)						
10.7	9.3								
10.5	9.5		CLAY, organic-L, low plasticity, some sand, 10YR 2/1 black (OL)	80			SPT Sampler	9, 2, 2	4
			SAND, silty, some shell fragments, 10YR 7/2 light gray (SM)				9.5		
			CLAY, organic-H, some fibrous material, 5YR 2.5/2 dark reddish brown (OH)	100			SPT Sampler	1, 2, 2	4
8.0	12.0						8.0		
			SAND, silty, 10YR 2/2 very dark brown (SM)	100			SPT Sampler	woh, woh, woh	0
							6.5		
5.9	14.1								
			SAND, clayey, some gravel and silt; some shell fragments; trace organics, 10YR 5/2 grayish brown (SC)	80			SPT Sampler	2, 7, 7	14
							5.0		

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(Continued)

Boring Designation: CP11-DCOMP-CB-0037

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District	SHEET 2 OF 2 SHEETS
PROJECT: C&SF CERP WCA 3 DECOMP Part 2	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.)	HORIZONTAL: NAD83 / VERTICAL: NAVD88
LOCATION COORDINATES: X = 710,839 Y = 726,167	ELEVATION TOP OF BORING: 20.0 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
				69			SPT Sampler 3.7	1 4 50/0.3'	54+
				0			Advanced Boring		
1.9	18.1						1.9		
			LIMESTONE, moderately hard, moderately fractured, vuggy, 10YR 7/1 light gray	100	BOX 1	RQD 42	4 x 5-1/2" DT = 11 mins HP = 200 psi DFR = 90 %		
-0.7	20.7						-0.7		

NOTES:

1. USACE Jacksonville is the custodian for these original files.

2. Soils are field visually classified in accordance with the Unified Soils Classification System.

3. Grout.

140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.)

Abbreviations:
WOH = Weight of Hammer.
DT = Drill Time.
HP = Hydraulic Pressure.
DFR = Drill Fluid Return.

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Figure G-2-3. U.S. Army Corps of Engineers 2011 Boring Map

Boring Designation CP11-DCOMP-CB-0011

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 2 SHEETS

1. PROJECT C&SF CERP WCA 3 DECOMP Part 2 L-5 Canal Plug, Proposed Pump Station	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) / HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP11-DCOMP-CB-0011 / LOCATION COORDINATES X = 775,757 Y = 727,006	11. MANUFACTURER'S DESIGNATION OF DRILL Failing 1500 ☐ AUTO HAMMER ☒ MANUAL HAMMER
3. DRILLING AGENCY Corps of Engineers - CESAM / CONTRACTOR FILE NO.	12. TOTAL SAMPLES DISTURBED 0 / UNDISTURBED (UD) 0
4. NAME OF DRILLER Charlie Brown	13. TOTAL NUMBER CORE BOXES 1
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER 7.0 Ft.
	15. DATE BORING STARTED 03-22-11 / COMPLETED 03-22-11
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING 13.4 Ft.
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING 55 %
8. TOTAL DEPTH OF BORING 27.9 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Michael Fitzharris, Geologist

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
13.4	0.0						13.4		
			FILL, sandy, some gravel; trace roots, 7.5YR 5/1 gray	100			SPT Sampler	3, 50	
11.9	1.5						11.9		
			SAND, clayey, some gravel; some shell fragments, 10YR 6/1 gray (SC)	80			SPT Sampler	15, 23, 17	40
							10.4		
				100			SPT Sampler	14, 16, 16	32
							8.9		
				53			SPT Sampler	36, 16, 17	33
							7.4		
				67			SPT Sampler	7, 7, 7	14
							5.9		
				100			SPT Sampler	8, 8, 11	19
							4.4		
				53			SPT Sampler	28, 24, 6	30
2.9	10.5						2.9		
			GRAVEL, silty, some shell fragments, 10YR 6/2 light brownish gray (GM)	47			SPT Sampler	8, 7, 10	17
1.4	12.0						1.4		
			SAND, silty, some shell fragments, 2.5Y 7/1 light gray (SM)	67			SPT Sampler	11, 5, 3	8
-0.1	13.5						-0.1		
			GRAVEL, silty, trace clay; some organics; some shell fragments, 7.5YR 5/1 gray (GM)	27			SPT Sampler	2, 2, 2	4
							-1.6		

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(Continued)

Boring Designation CP11-DCOMP-CB-0011

DRILLING LOG (Cont. Sheet)	INSTALLATION Jacksonville District	SHEET 3 OF 3 SHEETS
PROJECT C&SF CERP WCA 3 DECOMP Part 2	COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83 / VERTICAL NAVD88
LOCATION COORDINATES X = 775,757 Y = 727,006	ELEVATION TOP OF BORING 13.4 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
-3.1	16.5			7			SPT Sampler -2.6	1 / 1	2+
-4.6	18.0		CLAY, organic-H, trace gravel; trace sand; some shell fragments, 2.5Y 3/1 very dark gray (OH)	40			SPT Sampler -4.6	1/0.0' woh / woh / woh	0
-5.6	19.0		GRAVEL, silty, some organics; some shell fragments, 2.5Y 3/3 dark olive brown (GM)	33			SPT Sampler -6.1	1 / 2 / 1	3
-7.6	21.0		SAND, clayey, some gravel; some shell fragments, 2.5Y 7/3 pale yellow (SC)	33			SPT Sampler -7.6	5 / 9 / 12	21
-10.0	23.4		SAND, silty, some shell fragments; trace clay, 5Y 8/1 white (SM)	20			SPT Sampler -9.1	4 / 6 / 3	9
				56			SPT Sampler -10.0	4 / 50/0.4'	
-14.5	27.9		LIMESTONE, fossiliferous, moderately hard, vuggy, 7.5YR 7/1 light gray	57	BOX 1	RQD 8	4 x 5-1/2" DT = 8 mins HP = 200 psi DFR = 75 % -14.5		

NOTES:

1. USACE Jacksonville is the custodian for these original files.

2. Soils are field visually classified in accordance with the Unified Soils Classification System.

3. Grout

140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).

Abbreviations:
WOH = Weight of Hammer.
DT = Drill Time.
HP = Hydraulic Pressure.
DFR = Drill Fluid Return.

SAJ FORM 1836-A
JUN 02

Boring Designation CP11-DCOMP-CB-0012

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 2 SHEETS

1. PROJECT C&SF CERP WCA 3 DECOMP Part 2 L-5 South	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) / HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP11-DCOMP-CB-0012 / LOCATION COORDINATES X = 774,031 Y = 726,857	11. MANUFACTURER'S DESIGNATION OF DRILL Failing 1500 ☐ AUTO HAMMER ☒ MANUAL HAMMER
3. DRILLING AGENCY Corps of Engineers - CESAM / CONTRACTOR FILE NO.	12. TOTAL SAMPLES DISTURBED 1 / UNDISTURBED (UD) 0
4. NAME OF DRILLER Charlie Brown	13. TOTAL NUMBER CORE BOXES 1
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER 7.3 Ft.
	15. DATE BORING STARTED 03-19-11 / COMPLETED 03-19-11
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING 13.7 Ft.
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING 59 %
8. TOTAL DEPTH OF BORING 22.9 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Michael Fitzharris, Geologist

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
13.7	0.0						13.7		
			FILL, sandy, some gravel; trace clay and shells, 2.5Y 6/2 light brownish gray	73			SPT Sampler	15, 23, 20	43
							12.2		
				60			SPT Sampler	9, 9, 9	18
							10.7		
				58			SPT Sampler	5, 34, 50	84
9.2	4.5						9.2		
8.8	4.9		SAND, silty, some shell fragments, 2.5Y 6/2 light brownish gray (SM)						
			CLAY, organic-H, some shell fragments, 2.5Y 2.5/1 black (OH)	57			SPT Sampler	3, 4, 5	9
7.7	6.0						7.7		
7.2	6.5		CLAY, fat, trace sand, 2.5Y 2.5/1 black (CH)						
			CLAY, organic-H, trace sand and gravel; trace shells, 2.5Y 2.5/1 black (OH)	100			SPT Sampler	2, 2, 2	4
							6.2		
				63			SPT Sampler	5, 5, 50/0.2'	55+
5.0	8.7						5.0		
4.9	8.8		CLAY, lean, trace gravel, 2.5Y 5/1 gray (CL)						
			LIMESTONE, fossiliferous, vuggy, 10YR 7/1 light gray	96		RQD 38	4 x 5-1/2" DT = 11 mins HP = 200 psi DFR = 40 %		
							3.7		
			At El. 3.7 Ft., highly weathered, 10YR 6/3 pale brown	32	BOX 1	RQD 0	4 x 5-1/2" DT = 9 mins HP = 200 psi DFR = 40 %		
							0.3		
				22		RQD 0	4 x 5-1/2" DT = 5 mins HP = 200 psi DFR = 5 %		

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(Continued)

Boring Designation CP11-DCOMP-CB-0012

DRILLING LOG (Cont. Sheet)	INSTALLATION Jacksonville District	SHEET 3 OF 3 SHEETS
PROJECT C&SF CERP WCA 3 DECOMP Part 2	COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83 / VERTICAL NAVD88
LOCATION COORDINATES X = 774,031 Y = 726,857	ELEVATION TOP OF BORING 13.7 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
		Highly Weathered		22		RQD 0	4 x 5-1/2" DT = 5 mins HP = 200 psi DFR = 5 %		
							-4.2		
				31	BOX 1 / 1	RQD 27	4 x 5-1/2" DT = 5 mins HP = 200 psi DFR = 5 %		
-9.2	22.9						-9.2		
			NOTES: 1. USACE Jacksonville is the custodian for these original files. 2. Soils are field visually classified in accordance with the Unified Soils Classification System. 3. Grout				140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.). Abbreviations: DT = Drill Time. HP = Hydraulic Pressure. DFR = Drill Fluid Return.		

15 20 25 30 35

SAJ FORM 1836-A
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Boring Designation CP11-DCOMP-CB-0014

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 2 SHEETS
1. PROJECT C&SF CERP WCA 3 DECOMP Part 2 L-5 South		9. SIZE AND TYPE OF BIT See Remarks	
		10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP11-DCOMP-CB-0014	LOCATION COORDINATES X = 770,021 Y = 726,834	11. MANUFACTURER'S DESIGNATION OF DRILL Failing 1500	☐ AUTO HAMMER ☒ MANUAL HAMMER
3. DRILLING AGENCY Corps of Engineers - CESAM	CONTRACTOR FILE NO.	12. TOTAL SAMPLES	DISTURBED 0 / UNDISTURBED (UD) 0
4. NAME OF DRILLER Charlie Brown		13. TOTAL NUMBER CORE BOXES 2	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED	DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER Not Encountered	
		15. DATE BORING	STARTED 03-18-11 / COMPLETED 03-18-11
6. THICKNESS OF OVERBURDEN N/A		16. ELEVATION TOP OF BORING 14.7 Ft.	
7. DEPTH DRILLED INTO ROCK N/A		17. TOTAL RECOVERY FOR BORING 70 %	
8. TOTAL DEPTH OF BORING 21.5 Ft.		18. SIGNATURE AND TITLE OF INSPECTOR Michael Fitzharris, Geologist	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
14.7	0.0						14.7		
			FILL, sandy, mainly silty sand with some gravel, trace clay, 2.5Y 7/1 light gray	87			SPT Sampler	45 / 48 / 28	76
							13.2		
				53			SPT Sampler	7 / 13 / 13	26
11.7	3.0						11.7		
			SAND, clayey, low plasticity, some silt and gravel, 2.5YR 5/1 reddish gray (SC)	100			SPT Sampler	19 / 50	
10.2	4.5						10.2		
9.9	4.8		SAND, silty, some clay and gravel, 10YR 6/2 light brownish gray (SM)	100			9.9 SPT Sampler	50/0.3'	
			LIMESTONE, fossiliferous, moderately hard, weathered, slightly fractured, vuggy, 7.5YR 7/1 light gray	57		RQD 0	4 x 5-1/2" DT = 14 mins HP = 300 psi DFR = 100 %		
							6.9		
			At El. 5.9 Ft., highly fractured. 7.5YR 8/1 white	74	BOX 1	RQD 22	4 x 5-1/2" DT = 11 mins HP = 200 psi DFR = 80 %		
							1.9		
				62		RQD 0	4 x 5-1/2" DT = 8 mins HP = 200 psi DFR = 80 %		

Weathering

SAJ FORM 1836
JUN 02

(Continued)

Boring Designation CP11-DCOMP-CB-0014

DRILLING LOG (Cont. Sheet)	INSTALLATION Jacksonville District		SHEET OF SHEETS
PROJECT C&SF CERP WCA 3 DECOMP Part 2	COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83	VERTICAL NAVD88
LOCATION COORDINATES X = 770,021 Y = 726,834	ELEVATION TOP OF BORING 14.7 Ft.		

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR CD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
				62	BOX 1	RQD 0	4 x 5-1/2" DT = 8 mins HP = 200 psi DFR = 80 % -1.8		
				28	BOX 2	RQD 0	4 x 5-1/2" DT = 6 mins HP = 200 psi DFR = 0 %		
-6.8	21.5						-6.8		
			NOTES: 1. USACE Jacksonville is the custodian for these original files. 2. Soils are field visually classified in accordance with the Unified Soils Classification System. 3. Grout				140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.). Abbreviations: DT = Drill Time. HP = Hydraulic Pressure DFR = Drill Fluid Return.		

15 20 25 30 35

SAJ FORM 1836-A
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Boring Designation CP11-DCOMP-CB-0016

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 2 SHEETS
1. PROJECT C&SF CERP WCA 3 DECOMP Part 2 L-5 South		9. SIZE AND TYPE OF BIT See Remarks	
		10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP11-DCOMP-CB-0016	LOCATION COORDINATES X = 766,059 Y = 726,798	11. MANUFACTURER'S DESIGNATION OF DRILL Failing 1500	☐ AUTO HAMMER ☒ MANUAL HAMMER
3. DRILLING AGENCY Corps of Engineers - CESAM	CONTRACTOR FILE NO.	12. TOTAL SAMPLES	DISTURBED 1 / UNDISTURBED (UD) 0
4. NAME OF DRILLER Charlie Brown		13. TOTAL NUMBER CORE BOXES 1	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED	DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER 6.6 Ft.	
		15. DATE BORING	STARTED 03-18-11 / COMPLETED 03-18-11
6. THICKNESS OF OVERBURDEN N/A		16. ELEVATION TOP OF BORING 15.3 Ft.	
7. DEPTH DRILLED INTO ROCK N/A		17. TOTAL RECOVERY FOR BORING 76 %	
8. TOTAL DEPTH OF BORING 16.0 Ft.		18. SIGNATURE AND TITLE OF INSPECTOR Michael Fitzharris, Geologist	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
15.3	0.0						15.3		
			FILL, sandy, low plasticity, some clay; some gravel, 5Y 4/1 dark gray	80			SPT Sampler	18, 23, 15	38
13.8									
				67			SPT Sampler	9, 13, 17	30
12.3	3.0						12.3		
			SAND, clayey, medium plasticity, some gravel; little silt; little shells; some organics, 10YR 5/1 gray (SC)	100			SPT Sampler	13, 10, 12	22
10.8			At El. 10.8 Ft., trace organics, 10YR 5/2 grayish brown						
				87			SPT Sampler	13, 13, 8	21
9.3	6.0						9.3		
8.7	6.6		CLAY, fat, gravelly; some coarse sand; shell fragments; some fibrous material, 10YR 2/1 black (CH)	67			SPT Sampler	4, 4, 2	6
			CLAY, organic-H, 10YR 2/1 black (OH)						
7.8			From El. 7.8 to 4.8 Ft., moist, trace calcareous gravel, 10YR 2/2 very dark brown						
				100			SPT Sampler	1, 1, 1	2
6.3									
				53			SPT Sampler	1, 3, 2	5
4.8	10.5						4.8		
4.0	11.3		CLAY, fat, moist, some coarse-grained sand; some organics, 7.5YR 6/1 gray (CH)	63			SPT Sampler	10, 50/0.3'	
			LIMESTONE, fossiliferous, moderately hard; vuggy, 10YR 7/1 light gray						
			At El. 2.1 Ft., open aperture	70	BOX 1	RQD 45	4 x 5-1/2" HP = 200 psi DFR = 100 %		

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(Continued)

Boring Designation CP11-DCOMP-CB-0016

DRILLING LOG (Cont. Sheet)	INSTALLATION Jacksonville District	SHEET 3 OF 3 SHEETS
PROJECT C&SF CERP WCA 3 DECOMP Part 2	COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83 / VERTICAL NAVD88
LOCATION COORDINATES X = 766,059 Y = 726,798	ELEVATION TOP OF BORING 15.3 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
-0.7	16.0			70	BOX 1	RQD 45	4 x 5-1/2" HP = 200 psi DFR = 100 % -0.7		

NOTES:

1. USACE Jacksonville is the custodian for these original files.

2. Soils are field visually classified in accordance with the Unified Soils Classification System.

3. Grout

140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).

Abbreviations:
HP = Hydraulic Pressure
DFR = Drill Fluid Return.

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SAJ FORM 1836-A
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Boring Designation CP11-DCOMP-CB-0018

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 2 SHEETS
1. PROJECT C&SF CERP WCA 3 DECOMP Part 2 L-5 South		9. SIZE AND TYPE OF BIT See Remarks	
		10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP11-DCOMP-CB-0018	LOCATION COORDINATES X = 761,968 Y = 726,749	11. MANUFACTURER'S DESIGNATION OF DRILL Failing 1500	☐ AUTO HAMMER ☒ MANUAL HAMMER
3. DRILLING AGENCY Corps of Engineers - CESAM	CONTRACTOR FILE NO.	12. TOTAL SAMPLES	DISTURBED 0 / UNDISTURBED (UD) 0
4. NAME OF DRILLER Charlie Brown		13. TOTAL NUMBER CORE BOXES 1	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED	DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER 7.4 Ft.	
		15. DATE BORING	STARTED 03-18-11 / COMPLETED 03-18-11
6. THICKNESS OF OVERBURDEN N/A		16. ELEVATION TOP OF BORING 14.8 Ft.	
7. DEPTH DRILLED INTO ROCK N/A		17. TOTAL RECOVERY FOR BORING 61 %	
8. TOTAL DEPTH OF BORING 13.7 Ft.		18. SIGNATURE AND TITLE OF INSPECTOR Michael Fitzharris, Geologist	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
14.8	0.0						14.8		
			FILL, sandy, some gravel; trace roots; trace clay and shell fragments, 7.5YR 6/1 gray	86			SPT Sampler	27, 48, 50	98
							13.3		
				53			SPT Sampler	18, 35, 49	84
11.8	3.0						11.8		
			SAND, clayey, moist, some organic soil; some silt and gravel, 7.5YR 5/1 gray (SC)	100			SPT Sampler	23, 18, 50/0.1'	68+
10.4	4.4						10.7		
			LIMESTONE, vuggy, 10YR 7/2 light gray At El. 10.3 Ft., moderately fractured	27	BOX 1	ROD 0	DT = 4 mins HP = 200 psi DFR = 75 %		
8.3	6.5						8.3		
			CLAY, organic-H, moist, some fibrous plant material, 10YR 2/1 black (OH)	43			SPT Sampler	2, 4, 7	11
6.8	8.0						6.8		
			LIMESTONE, intensely weathered, 10YR 5/6 yellowish brown From El. 6.4 to 5.0 Ft., fossiliferous, pitted; shell fragments, 10YR 7/2 light gray	50			6.4 SPT Sampler	50/0.4'	
			At El. 5.0 Ft., moderately fractured	68	BOX 1	ROD 33	DT = 9 mins HP = 200 psi DFR = 60 %		
1.1	13.7						1.1		
			NOTES: 1. USACE Jacksonville is the custodian for				140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).		

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(Continued)

Boring Designation: CP11-DCOMP-CB-0018

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District		SHEET 2 OF 2 SHEETS
PROJECT: C&SF CERP WCA 3 DECOMP Part 2	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.)	HORIZONTAL: NAD83	VERTICAL: NAVD88
LOCATION COORDINATES: X = 761,968 Y = 726,749	ELEVATION TOP OF BORING: 14.8 Ft.		

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
			these original files. 2. Soils are field visually classified in accordance with the Unified Soils Classification System. 3. Grout				Abbreviations: DT = Drill Time. HP = Hydraulic Pressure. DFR = Drill Fluid Return.		

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Boring Designation CP11-DCOMP-CB-0020

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 2 SHEETS
1. PROJECT C&SF CERP WCA 3 DECOMP Part 2 L-5 South		9. SIZE AND TYPE OF BIT See Remarks	
		10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP11-DCOMP-CB-0020	LOCATION COORDINATES X = 757,988 Y = 726,710	11. MANUFACTURER'S DESIGNATION OF DRILL Failing 1500	☐ AUTO HAMMER ☒ MANUAL HAMMER
3. DRILLING AGENCY Corps of Engineers - CESAJ	CONTRACTOR FILE NO.	12. TOTAL SAMPLES	DISTURBED 0 / UNDISTURBED (UD) 0
4. NAME OF DRILLER Charlie Brown		13. TOTAL NUMBER CORE BOXES 1	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED	DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER Not Encountered	
		15. DATE BORING	STARTED 03-17-11 / COMPLETED 03-17-11
6. THICKNESS OF OVERBURDEN N/A		16. ELEVATION TOP OF BORING 14.4 Ft.	
7. DEPTH DRILLED INTO ROCK N/A		17. TOTAL RECOVERY FOR BORING 57 %	
8. TOTAL DEPTH OF BORING 17.2 Ft.		18. SIGNATURE AND TITLE OF INSPECTOR Michael Fitzharris, Geologist	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
14.4	0.0						14.4		
13.8	0.6		FILL, sandy, some gravel; trace clay; shell fragments, 5Y 7/1 light gray	83			13.8 SPT Sampler	27 / 50/0.1	
12.0	2.4	Weathered	LIMESTONE, moderately hard, weathered, vuggy, 10YR 6/1 gray	44	BOX 1	RQD 19	12.0 DT = 5 mins HP = 200 psi DFR = 100 %		
			SAND, silty, some gravel; little clay, 5Y 7/1 light gray (SM)	73			10.5 SPT Sampler	24 / 24 / 23	47
				63			9.0 SPT Sampler	17 / 30 / 19	49
8.7	5.7		CLAY, organic-H, moist, trace clay, 5Y 2.5/1 black (OH)	33			7.5 SPT Sampler	6 / 2 / 2	4
7.1	7.3		SAND, silty, 5Y 5/2 olive gray (SM)	60			6.0 SPT Sampler	2 / 12 / 20	32
				53			4.5 SPT Sampler	14 / 4 / 3	7
				67			3.0 SPT Sampler	8 / 6 / 18	24
				47			1.5 SPT Sampler	43 / 32 / 7	39
				73			0.0 SPT Sampler	2 / 5 / 38	43
0.0	14.4		LIMESTONE, fossiliferous, moderately hard, vuggy, some gravel; trace clay; low	32	BOX 1	RQD 19			

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(Continued)

Boring Designation: CP11-DCOMP-CB-0020

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District	SHEET OF SHEETS
PROJECT: C&SF CERP WCA 3 DECOMP Part 2	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.)	HORIZONTAL: NAD83 / VERTICAL: NAVD88
LOCATION COORDINATES: X = 757,988 Y = 726,710	ELEVATION TOP OF BORING: 14.4 Ft	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR CD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
-2.8	17.2		cohesion; shell fragments. 10YR 5/1 gray	32	BOX 1	RQD 19	DT = 15 mins HP = 200 psi DFR = 100 % -2.8		
			NOTES: 1. USACE Jacksonville is the custodian for these original files. 2. Soils are field visually classified in accordance with the Unified Soils Classification System. 3. Grout.				140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.). Abbreviations: DT = Drill Time. HP = Hydraulic Pressure. DFR = Drill Fluid Return.		

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Boring Designation CP11-DCOMP-CB-0022

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 2 SHEETS

1. PROJECT C&SF CERP WCA 3 DECOMP Part 2 L-5 South	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) | HORIZONTAL NAD83 | VERTICAL NAVD88
2. BORING DESIGNATION CP11-DCOMP-CB-0022 | LOCATION COORDINATES X = 754,072 Y = 726,667	11. MANUFACTURER'S DESIGNATION OF DRILL Failing 1500 ☐ AUTO HAMMER ☒ MANUAL HAMMER
3. DRILLING AGENCY Corps of Engineers - CESAM | CONTRACTOR FILE NO.	12. TOTAL SAMPLES | DISTURBED 0 | UNDISTURBED (UD) 0
4. NAME OF DRILLER Charlie Brown	13. TOTAL NUMBER CORE BOXES 1
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL | BEARING	14. ELEVATION GROUND WATER Not Encountered
	15. DATE BORING | STARTED 03-17-11 | COMPLETED 03-17-11
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING 14.3 Ft.
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING 71 %
8. TOTAL DEPTH OF BORING 15.3 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Michael Fitzharris, Geologist

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
14.3	0.0						14.3		
			FILL, sandy, trace clay; some gravel; trace shells, 10YR 6/1 gray	80			SPT Sampler	17, 40, 24	64
							12.8		
				60			SPT Sampler	16, 20, 18	38
							11.3		
			At El. 11.3 Ft., low plasticity	50			SPT Sampler	17, 50/0.1"	
10.7	3.6						10.7		
		Weathered	LIMESTONE, fossiliferous, weathered, vuggy, some clay infills; some oxidation staining, 2.5Y 6/1 gray	29	BOX 1	RQD 0	4 x 5-1/2" DT = 19 mins HP = 200 psi DFR = 100 %		
6.5	7.8						6.5		
			CLAY, organic-H, some fibrous plant material, 5Y 2.5/1 black (OH)	100			SPT Sampler	1, 1, 1	2
							5.0		
				93			SPT Sampler	1, 1, 1	2
3.5	10.8						3.5		
		Highly Weathered	LIMESTONE, fossiliferous, highly weathered, moderately fractured, fractured between 11.4 to 12.0 ft depth, 10YR 7/2 light gray	82	BOX 1	RQD 51	DT = 18 mins HP = 200 psi DFR = 60 %		

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(Continued)

Boring Designation CP11-DCOMP-CB-0022

DRILLING LOG (Cont. Sheet)	INSTALLATION Jacksonville District	SHEET 3 OF 3 SHEETS
PROJECT C&SF CERP WCA 3 DECOMP Part 2	COORDINATE SYSTEM/DATUM State Plane. FLE (U.S. Ft.)	HORIZONTAL NAD83 / VERTICAL NAVD88
LOCATION COORDINATES X = 754,072 Y = 726,667	ELEVATION TOP OF BORING 14.3 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
-1.0	15.3		At El. -0.7 Ft., weak cementation	82			-1.0		

NOTES:

1. USACE Jacksonville is the custodian for these original files.

2. Soils are field visually classified in accordance with the Unified Soils Classification System.

3. Grout

140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.)

Abbreviations:
DT = Drill Time.
HP = Hydraulic Pressure.
DFR = Drill Fluid Return.

15 20 25 30 35

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Boring Designation CP11-DCOMP-CB-0024

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 1 SHEETS

1. PROJECT C&SF CERP WCA 3 DECOMP Part 2 L-5 South	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) / HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP11-DCOMP-CB-0024 / LOCATION COORDINATES X = 750,077 Y = 726,617	11. MANUFACTURER'S DESIGNATION OF DRILL Failing 1500 ☐ AUTO HAMMER ☒ MANUAL HAMMER
3. DRILLING AGENCY Corps of Engineers - CESAM / CONTRACTOR FILE NO.	12. TOTAL SAMPLES DISTURBED 1 / UNDISTURBED (UD) 0
4. NAME OF DRILLER Charlie Brown	13. TOTAL NUMBER CORE BOXES 1
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER 12.4 Ft.
	15. DATE BORING STARTED 03-16-11 / COMPLETED 03-17-11
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING 14.3 Ft.
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING 67 %
8. TOTAL DEPTH OF BORING 9.7 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Michael Fitzharris, Geologist

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
14.3	0.0						14.3		
			FILL, gravelly, some sand, strong HCL reaction, 5Y 7/1 light gray	67			SPT Sampler	26 50	
							12.8 Advanced Boring		
11.3	3.0						11.3		
10.8	3.5		SAND, silty, strong reaction with HCl, 2.5Y 7/1 light gray (SM)	75			10.8 SPT Sampler	50	
			LIMESTONE, moderately hard, vuggy, 2.5Y 8/4 pale yellow						
8.8	5.5								
			CLAY, organic-H, some calcareous sand and gravel, 2.5Y 2.5/1 black (OH)	48	1 BOX 1	RQD 20	4 x 5-1/2" DT = 11 mins HP = 200 psi DFR = 70 %		
5.9	8.4						5.8		
			LIMESTONE, 2.5Y 7/2 light gray	80		RQD 28	4 x 5-1/2" DT = 8 mins HP = 200 psi DFR = 100 %		
4.6	9.7						4.6		

NOTES:

1. USACE Jacksonville is the custodian for these original files.

2. Soils are field visually classified in accordance with the Unified Soils Classification System.

3. Grout

140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).

Abbreviations:
DT = Drill Time.
HP = Hydraulic Pressure.
DFR = Drill Fluid Return.

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Boring Designation CP11-DCOMP-CB-0026

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 2 SHEETS

1. PROJECT C&SF CERP WCA 3 DECOMP Part 2 L-5 South	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) / HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP11-DCOMP-CB-0026 / LOCATION COORDINATES X = 746,190 Y = 726,559	11. MANUFACTURER'S DESIGNATION OF DRILL Failing 1500 ☐ AUTO HAMMER ☒ MANUAL HAMMER
3. DRILLING AGENCY Corps of Engineers - CESAM / CONTRACTOR FILE NO.	12. TOTAL SAMPLES DISTURBED 1 / UNDISTURBED (UD) 0
4. NAME OF DRILLER Charlie Brown	13. TOTAL NUMBER CORE BOXES 1
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER 7.6 Ft.
	15. DATE BORING STARTED 03-19-11 / COMPLETED 03-19-11
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING 14.7 Ft.
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING 74 %
8. TOTAL DEPTH OF BORING 12.2 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Michael Fitzharris, Geologist

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
14.7	0.0						14.7		
			FILL, sandy, trace gravel; trace shell fragments; some gravel, 5Y 4/1 dark gray	80			SPT Sampler 13.2	8 16 19	35
				67			SPT Sampler 11.7	11 24 24	48
				75			SPT Sampler 10.2	21 50	
8.7	6.0			80			SPT Sampler 8.7	11 5 3	8
7.2	7.5		CLAY, organic-H, some fibrous material; trace calcareous gravel, 2.5Y 2.5/1 black (OH) ▼	53			SPT Sampler 7.2	1 1 7	8
5.7	9.0		SAND, silty, some clay; some organics; little gravel; little shell fragments, 2.5Y 3/1 very dark gray (SM)	63			SPT Sampler 5.7	3 50	
2.5	12.2		LIMESTONE, fossiliferous, moderately hard, vuggy, 7.5YR 6/1 gray At El. 5.4 Ft., moderately fractured At El. 4.4 Ft., highly fractured	100	BOX 1	RQD 53	4 x 5-1/2" DT = 10 mins HP = 200 psi DFR = 90 % 2.5		

NOTES:

1. USACE Jacksonville is the custodian for these original files.

2. Soils are field visually classified in accordance with the Unified Soils Classification System.

140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).

Abbreviations:
DT = Drill Time.
HP = Hydraulic Pressure
DFR = Drill Fluid Return

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(Continued)

Boring Designation CP11-DCOMP-CB-0026

DRILLING LOG (Cont. Sheet)	INSTALLATION Jacksonville District		SHEET 2 OF 2 SHEETS
PROJECT C&SF CERP WCA 3 DECOMP Part 2	COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83	VERTICAL NAVD88
LOCATION COORDINATES X = 746,190 Y = 726,559	ELEVATION TOP OF BORING 14.7 Ft		

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
			3. Grout						

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Boring Designation CP11-DCOMP-CB-0028

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 2 SHEETS

1. PROJECT C&SF CERP WCA 3 DECOMP Part 2 L-5 South	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) / HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP11-DCOMP-CB-0028 / LOCATION COORDINATES X = 742,303 Y = 726,513	11. MANUFACTURER'S DESIGNATION OF DRILL Failing 1500 ☐ AUTO HAMMER ☒ MANUAL HAMMER
3. DRILLING AGENCY Corps of Engineers - CESAM / CONTRACTOR FILE NO.	12. TOTAL SAMPLES DISTURBED 1 / UNDISTURBED (UD) 0
4. NAME OF DRILLER Charlie Brown	13. TOTAL NUMBER CORE BOXES 1
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER Not Encountered
	15. DATE BORING STARTED 03-21-11 / COMPLETED 03-21-11
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING 14.5 Ft.
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING 54 %
8. TOTAL DEPTH OF BORING 12.6 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Michael Fitzharris, Geologist

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
14.5	0.0						14.5		
			FILL, gravelly, 10YR 7/2 light gray	40			SPT Sampler	18, 20, 14	34
							13.0		
				60			SPT Sampler	12, 13, 14	27
							11.5		
11.3	3.2		At El. 11.6 Ft., trace organics; trace clay	100			11.3 SPT Sampler	50/0.2'	
			LIMESTONE, moderately hard, very wide aperture, vuggy, 7.5YR 5/1 gray	80	BOX 1	RQD 0	4 x 5-1/2" DT = 5 mins HP = 200 psi DFR = 80 %		
							9.3		
8.8	5.7						8.8 Advanced Boring		
			CLAY, organic-H, some calcareous gravel; trace clay, 10YR 2/2 very dark brown (OH)	47			SPT Sampler	4, 2, 2	4
7.3	7.2						7.3		
			LIMESTONE, intensely weathered, some organics and fibrous material, 2.5YR 5/2 weak red	43			SPT Sampler	6, 23, 50/0.4'	73+
							5.9		
			At El. 5.9 Ft., fossiliferous, firm, vuggy, some clay infilling, 7.5YR 5/1 gray	63	BOX 1	RQD 44	4 x 5-1/2" DT = 15 mins HP = 200 psi DFR = 100 %		
1.9	12.6						1.9		

NOTES:

1. USACE Jacksonville is the custodian for these original files.

2. Soils are field visually classified in accordance with the Unified Soils

140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).

Abbreviations:
DT = Drill Time.
HP = Hydraulic Pressure.
DFR = Drill Fluid Return.

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(Continued)

Boring Designation CP11-DCOMP-CB-0028

DRILLING LOG (Cont. Sheet)	INSTALLATION Jacksonville District		SHEET 3 OF 4 SHEETS
PROJECT C&SF CERP WCA 3 DECOMP Part 2	COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83	VERTICAL NAVD88
LOCATION COORDINATES X = 742,303 Y = 726,513	ELEVATION TOP OF BORING 14.5 Ft		

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
			Classification System.						
			3) Grout						

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Boring Designation CP11-DCOMP-CB-0030

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 2 SHEETS
1. PROJECT C&SF CERP WCA 3 DECOMP Part 2 L-5 South		9. SIZE AND TYPE OF BIT See Remarks	
		10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP11-DCOMP-CB-0030	LOCATION COORDINATES X = 738,282 Y = 726,446	11. MANUFACTURER'S DESIGNATION OF DRILL Failing 1500	☐ AUTO HAMMER ☒ MANUAL HAMMER
3. DRILLING AGENCY Corps of Engineers - CESAM	CONTRACTOR FILE NO.	12. TOTAL SAMPLES	DISTURBED 1 / UNDISTURBED (UD) 0
4. NAME OF DRILLER Charlie Brown		13. TOTAL NUMBER CORE BOXES 1	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED	DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER 5.9 Ft.	
		15. DATE BORING	STARTED 03-21-11 / COMPLETED 03-21-11
6. THICKNESS OF OVERBURDEN N/A		16. ELEVATION TOP OF BORING 14.1 Ft.	
7. DEPTH DRILLED INTO ROCK N/A		17. TOTAL RECOVERY FOR BORING 79 %	
8. TOTAL DEPTH OF BORING 14.0 Ft.		18. SIGNATURE AND TITLE OF INSPECTOR Michael Fitzharris, Geologist	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
14.1	0.0						14.1		
			FILL, sandy, some silt; trace clay; trace organics; trace shells	80			SPT Sampler 12.6	7 / 28 / 44	72
				60			SPT Sampler 11.1	7 / 16 / 34	50
				100			SPT Sampler 9.6	50	
9.2	4.9								
			CLAY, organic-H, moist, some fibrous material (OH)	57			SPT Sampler 8.1	5 / 3 / 2	5
6.9	7.2			100			SPT Sampler 6.6	1 / 2 / 4	6
6.6	7.5		CLAY, fat, trace organics (CH)						
5.3	8.8		CLAY, organic-H, low plasticity, some clay; some gravel; little sand (OH) ▼	69			SPT Sampler 5.3	5 / 20 / 50/0.3'	70+
0.1	14.0		LIMESTONE, moderately hard, vuggy, some sandy clay infills	90	BOX 1	RQD 65	4 x 5-1/2" DT = 15 mins HP = 200 psi DFR = 50 % 0.1		
			NOTES:				140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).		

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(Continued)

Boring Designation: CP11-DCOMP-CB-0030

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District		SHEET OF SHEETS
PROJECT: C&SF CERP WCA 3 DECOMP Part 2	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.)	HORIZONTAL: NAD83	VERTICAL: NAVD88
LOCATION COORDINATES: X = 738,282 Y = 726,446	ELEVATION TOP OF BORING: 14.1 Ft.		

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
			1. USACE Jacksonville is the custodian for these original files 2. Soils are field visually classified in accordance with the Unified Soils Classification System. 3. Grout				Abbreviations: DT = Drill Time. HP = Hydraulic Pressure. DFR = Drill Fluid Return.		

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Boring Designation CP11-DCOMP-CB-0032

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 2 SHEETS

1. PROJECT C&SF CERP WCA 3 DECOMP Part 2 L-5 South	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) / HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP11-DCOMP-CB-0032 / LOCATION COORDINATES X = 734,280 Y = 726,400	11. MANUFACTURER'S DESIGNATION OF DRILL Failing 1500 ☐ AUTO HAMMER ☒ MANUAL HAMMER
3. DRILLING AGENCY Corps of Engineers - CESAJ / CONTRACTOR FILE NO.	12. TOTAL SAMPLES DISTURBED 0 / UNDISTURBED (UD) 0
4. NAME OF DRILLER Charlie Brown	13. TOTAL NUMBER CORE BOXES 1
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER 7.7 Ft.
	15. DATE BORING STARTED 03-21-11 / COMPLETED 03-21-11
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING 14.9 Ft.
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING 73 %
8. TOTAL DEPTH OF BORING 25.5 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Michael Fitzharris, Geologist

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
14.9	0.0						14.9		
			FILL, gravelly, trace organics, 7.5YR 7/1 light gray	73			SPT Sampler	12, 42, 25	67
			From El. 13.4 to 8.3 Ft., sandy, little gravel; trace organics, 10YR 6/2 light brownish gray	80			SPT Sampler	5, 7, 8	15
				90			SPT Sampler	9, 7, 6	13
				33			SPT Sampler	4, 2, 3	5
8.6	6.3						8.9		
			CLAY, organic-H, medium plasticity, some fibrous material, 5Y 2.5/1 black (OH)	93			SPT Sampler	1, 1, 4	5
7.4	7.5						7.4		
			SAND, clayey, wet, 10YR 6/1 gray (SC)	53			SPT Sampler	4, 2, 8	10
5.9	9.0						5.9		
			SAND, silty, wet, trace gravel, organic odor, 10YR 3/2 very dark grayish brown (SM)	60			SPT Sampler	4, 5, 9	14
							4.4		
				67			SPT Sampler	8, 8, 7	15
							2.9		
				73			SPT Sampler	5, 5, 8	13
							1.4		
				60			SPT Sampler	6, 6, 7	13
							-0.1		

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(Continued)

Boring Designation CP11-DCOMP-CB-0032

DRILLING LOG (Cont. Sheet)	INSTALLATION Jacksonville District	SHEET 2 OF 2 SHEETS
PROJECT C&SF CERP WCA 3 DECOMP Part 2	COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83 / VERTICAL NAVD88
LOCATION COORDINATES X = 734,280 Y = 726,400	ELEVATION TOP OF BORING 14.9 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
				63			SPT Sampler -1.1	3 5	12+
				53			SPT Sampler	7/0.0' 4 4 4	8
-3.1	18.0						-3.1		
			SAND, poorly-graded with silt, some shell fragments, organic odor, 2.5Y 6/2 light brownish gray (SP-SM)	67			SPT Sampler	5 8 9	17
-4.6	19.5						-4.6		
			SAND, silty, some shell fragments, organic odor, 10YR 7/1 light gray (SM)	67			SPT Sampler -6.1	8 10 7	17
				63			SPT Sampler -7.6	6 4 3	7
				27			SPT Sampler -9.1	3 3 7	10
				20			SPT Sampler	2 3 4	7
-10.6	25.5						-10.6		

NOTES:

1. USACE Jacksonville is the custodian for these original files.

2. Soils are field visually classified in accordance with the Unified Soils Classification System

3. Grout

140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).

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Boring Designation CP11-DCOMP-CB-0034

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 2 SHEETS
1. PROJECT C&SF CERP WCA 3 DECOMP Part 2 S-8 Area, Proposed Pump Station		9. SIZE AND TYPE OF BIT See Remarks	
		10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP11-DCOMP-CB-0034	LOCATION COORDINATES X = 730,243 Y = 726,191	11. MANUFACTURER'S DESIGNATION OF DRILL Failing 1500	☐ AUTO HAMMER ☒ MANUAL HAMMER
3. DRILLING AGENCY Corps of Engineers - CESAM	CONTRACTOR FILE NO.	12. TOTAL SAMPLES	DISTURBED 1 / UNDISTURBED (UD) 0
4. NAME OF DRILLER Charlie Brown		13. TOTAL NUMBER CORE BOXES 1	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED	DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER 8.5 Ft.	
		15. DATE BORING	STARTED 03-16-11 / COMPLETED 03-16-11
6. THICKNESS OF OVERBURDEN N/A		16. ELEVATION TOP OF BORING 15.8 Ft.	
7. DEPTH DRILLED INTO ROCK N/A		17. TOTAL RECOVERY FOR BORING 76 %	
8. TOTAL DEPTH OF BORING 13.8 Ft.		18. SIGNATURE AND TITLE OF INSPECTOR Michael Fitzharris, Geologist	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
15.8	0.0						15.8		
			SAND, silty, trace coarse grain sand and fine gravel; trace organics and roots in top 6 inches, 2.5Y 4/1 dark gray (SM)	73			SPT Sampler	4 / 16 / 26	42
							14.3		
				60			SPT Sampler	2 / 10 / 17	27
							12.8		
				93			SPT Sampler	14 / 14 / 47	61
11.3	4.5						11.3		
			CLAY, organic-H, strong reaction with HCl, 2.5Y 2.5/1 black (OH)	73			SPT Sampler	3 / 3 / 1	4
			From El. 9.9 to 8.3 Ft., trace calcareous gravel				9.8		
				80			SPT Sampler	2 / 2 / 3	5
8.3	7.5						8.3		
			SAND, silty, some gravel, 5Y 5/1 gray (SM)	53			SPT Sampler	3 / 9 / 50	59
6.8	9.0						6.8		
		Moderately Weathered	LIMESTONE, fossiliferous, moderately weathered, soft sandy pockets; vuggy, 10YR 7/1 light gray	90	BOX 1	ROD 77	DT = 11 mins HP = 200 psi DFR = 100 %		
2.0	13.8						2.0		
			NOTES: 1. USACE Jacksonville is the custodian for				140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).		

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(Continued)

Boring Designation CP11-DCOMP-CB-0034

DRILLING LOG (Cont. Sheet)	INSTALLATION Jacksonville District		SHEET 2 OF 2 SHEETS
PROJECT C&SF CERP WCA 3 DECOMP Part 2	COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83	VERTICAL NAVD88
LOCATION COORDINATES X = 730,243 Y = 726,191	ELEVATION TOP OF BORING 15.8 Ft		

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
			these original files. 2. Soils are field visually classified in accordance with the Unified Soils Classification System. 3. Grout				Abbreviations: DT = Drill Time. HP = Hydraulic Pressure. DFR = Drill Fluid Return.		

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Boring Designation CP11-DCOMP-CB-0035

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 2 SHEETS
1. PROJECT C&SF CERP WCA 3 DECOMP Part 2 Proposed Pump Station		9. SIZE AND TYPE OF BIT See Remarks	
		10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP11-DCOMP-CB-0035	LOCATION COORDINATES X = 729,500 Y = 726,555	11. MANUFACTURER'S DESIGNATION OF DRILL Failing 1500	☐ AUTO HAMMER ☒ MANUAL HAMMER
3. DRILLING AGENCY Corps of Engineers - CESAM	CONTRACTOR FILE NO.	12. TOTAL SAMPLES	DISTURBED 1 / UNDISTURBED (UD) 0
4. NAME OF DRILLER Charlie Brown		13. TOTAL NUMBER CORE BOXES 1	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED	DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER 9.5 Ft.	
		15. DATE BORING	STARTED 03-16-11 / COMPLETED 03-16-11
6. THICKNESS OF OVERBURDEN N/A		16. ELEVATION TOP OF BORING 13.5 Ft.	
7. DEPTH DRILLED INTO ROCK N/A		17. TOTAL RECOVERY FOR BORING 71 %	
8. TOTAL DEPTH OF BORING 13.8 Ft.		18. SIGNATURE AND TITLE OF INSPECTOR Michael Fitzharris, Geologist	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
13.5	0.0						13.5		
			FILL, sandy, nonplastic, trace organics and roots; some coarse grain sand and fine gravel, 10YR 4/1 dark gray	80			SPT Sampler 12.0	20 41 16	57
				53			SPT Sampler 10.5	20 15 16	31
				73			SPT Sampler 9.0	15 10 7	17
8.5	5.0								
			SAND, silty, wet, some gravel; trace clay, 5Y 7/1 light gray (SM)	93			SPT Sampler 7.5	5 7 50	57
				58			SPT Sampler 6.0	34 15 50	65
6.0	7.5								
		Slightly Weathered	LIMESTONE, fossiliferous, slightly weathered, some vugs At El. 5.2 Ft., slightly fractured	92		RQD 50	4 x 5-1/2" DT = 9 mins HP = 200 psi DFR = 60 % 4.7		
				50	BOX 1 1	RQD 37	4 x 5-1/2" DT = 6 mins HP = 200 psi DFR = 60 %		
-0.3	13.8						-0.3		
			NOTES: 1. USACE Jacksonville is the custodian for				140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).		

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Boring Designation CP11-DCOMP-CB-0035

DRILLING LOG (Cont. Sheet)	INSTALLATION Jacksonville District		SHEET 2 OF 2 SHEETS
PROJECT C&SF CERP WCA 3 DECOMP Part 2	COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83	VERTICAL NAVD88
LOCATION COORDINATES X = 729,500 Y = 726,555	ELEVATION TOP OF BORING 13.5 Ft		

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
			these original files. 2. Soils are field visually classified in accordance with the Unified Soils Classification System. 3. Grout				Abbreviations: DT = Drill Time. HP = Hydraulic Pressure. DFR = Drill Fluid Return.		

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Boring Designation CP11-DCOMP-CB-0036

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 2 SHEETS

1. PROJECT C&SF CERP WCA 3 DECOMP Part 2 L-4 North, Proposed Pump Station	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) / HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP11-DCOMP-CB-0036 / LOCATION COORDINATES X = 710,800 Y = 726,372	11. MANUFACTURER'S DESIGNATION OF DRILL Failing 1500 ☐ AUTO HAMMER ☒ MANUAL HAMMER
3. DRILLING AGENCY Corps of Engineers - CESAM / CONTRACTOR FILE NO.	12. TOTAL SAMPLES DISTURBED 1 / UNDISTURBED (UD) 0
4. NAME OF DRILLER Charlie Brown	13. TOTAL NUMBER CORE BOXES 1
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER 9.0 Ft.
	15. DATE BORING STARTED 03-15-11 / COMPLETED 03-15-11
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING 16.6 Ft.
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING 69 %
8. TOTAL DEPTH OF BORING 22.7 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Michael Fitzharris, Geologist

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
16.6	0.0						16.6		
			FILL, fine grained sand with some fine and coarse grained gravel; trace clay, 2.5YR 6/2 pale red	73			SPT Sampler	8 / 15 / 16	31
							15.1		
				60			SPT Sampler	4 / 7 / 9	16
13.6	3.0						13.6		
			SAND, clayey, some fine gravel; trace silt, 5Y 4/1 dark gray (SC)	80			SPT Sampler	5 / 5 / 3	8
							12.1		
				73			SPT Sampler	3 / 3 / 5	8
10.6	6.0						10.6		
			CLAY, organic-L, moist, organic soil with calcareous sand and gravel particles, 5Y 2.5/1 black (OL)	87			SPT Sampler	2 / 1 / 1	2
9.1	7.5						9.1		
			SAND, clayey, moist, calcareous sand and gravel fragments, 7.5YR 2.5/1 black (SC)	63			SPT Sampler	WOH / 1 / 1	2
							7.6		
7.1	9.5								
			CLAY, lean, moist, some calcareous gravel; little organics, 10YR 4/1 dark gray (CL)	93			SPT Sampler	2 / 1 / 4	5
6.1	10.5						6.1		
			SAND, clayey, trace gravel, trace silt, 2.5Y 6/1 gray (SC)	87			SPT Sampler	2 / 2 / 4	6
4.6	12.0						4.6		
			SAND, silty, some coarse gravel, 2.5Y 6/1 gray (SM)	40			SPT Sampler	2 / 4 / 16	20
3.1	13.5						3.1		
		Weathered	LIMESTONE, fossiliferous, weathered, moderately fractured, vuggy, glaconitic staining; some clay infills, 5Y 8/1 white	65	BOX 1	RQD 32	4 x 5-1/2" DT = 9 mins HP = 200 psi DFR = 100 %		

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(Continued)

Boring Designation CP11-DCOMP-CB-0036

DRILLING LOG (Cont. Sheet)	INSTALLATION Jacksonville District	SHEET 3 OF 3 SHEETS
PROJECT C&SF CERP WCA 3 DECOMP Part 2	COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83 / VERTICAL NAVD88
LOCATION COORDINATES X = 710,800 Y = 726,372	ELEVATION TOP OF BORING 16.6 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
				65		RQD 32	4 x 5-1/2" DT = 9 mins HP = 200 psi DFR = 100 % -0.3		
				40	BOX 1 1	RQD 11	4 x 5-1/2" DT = 5 mins HP = 200 psi DFR = 70 %		
-6.1	22.7						-6.1		

NOTES:

1. USACE Jacksonville is the custodian for these original files.

2. Soils are field visually classified in accordance with the Unified Soils Classification System.

3. Grout

140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).

Abbreviations:
WOH = Weight of Hammer.
DT = Drill Time.
HP = Hydraulic Pressure.
DFR = Drill Fluid Return.

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Boring Designation CP11-DCOMP-CB-0037

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 2 SHEETS
1. PROJECT C&SF CERP WCA 3 DECOMP Part 2 L-4 South, Proposed Pump Station Alternate		9. SIZE AND TYPE OF BIT See Remarks	
		10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP11-DCOMP-CB-0037	LOCATION COORDINATES X = 710,839 Y = 726,167	11. MANUFACTURER'S DESIGNATION OF DRILL Failing 1500	☐ AUTO HAMMER ☒ MANUAL HAMMER
3. DRILLING AGENCY Corps of Engineers - CESAM	CONTRACTOR FILE NO.	12. TOTAL SAMPLES	DISTURBED 1 / UNDISTURBED (UD) 0
4. NAME OF DRILLER Charlie Brown		13. TOTAL NUMBER CORE BOXES 1	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED	DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER 8.3 Ft.	
		15. DATE BORING	STARTED 03-22-11 / COMPLETED 03-22-11
6. THICKNESS OF OVERBURDEN N/A		16. ELEVATION TOP OF BORING 20.0 Ft.	
7. DEPTH DRILLED INTO ROCK N/A		17. TOTAL RECOVERY FOR BORING 61 %	
8. TOTAL DEPTH OF BORING 20.7 Ft.		18. SIGNATURE AND TITLE OF INSPECTOR Michael Fitzharris, Geologist	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
20.0	0.0						20.0		
			FILL, gravelly, trace organics; trace clay; trace roots; some shell fragments, 5YR 7/1 light gray	67			SPT Sampler	10, 24, 16	40
			From El. 18.5 to 14.0 Ft., sandy, trace organics; trace shell fragments, 7.5YR 4/1 dark gray	53			18.5 SPT Sampler	4, 6, 8	14
				67			17.0 SPT Sampler	9, 10, 13	23
				87			15.5 SPT Sampler	11, 15, 21	36
			From El. 14.0 to 12.5 Ft., gravelly, some silt, 7.5YR 5/2 brown	67			14.0 SPT Sampler	13, 10, 12	22
			From El. 12.5 to 11.0 Ft. sandy, 10YR 5/1 gray	0			12.5 SPT Sampler	5, 6, 6	12
11.0	9.0						11.0		
10.9	9.1		SAND, clayey, trace gravel; some shell fragments, 10YR 7/1 light gray (SC)						
10.7	9.3								
10.5	9.5		CLAY, organic-L, low plasticity, some sand, 10YR 2/1 black (OL)	80			SPT Sampler	9, 2, 2	4
			SAND, silty, some shell fragments, 10YR 7/2 light gray (SM)				9.5		
			CLAY, organic-H, some fibrous material, 5YR 2.5/2 dark reddish brown (OH)	100			SPT Sampler	1, 2, 2	4
8.0	12.0						8.0		
			SAND, silty, 10YR 2/2 very dark brown (SM)	100			SPT Sampler	woh, woh, woh	0
							6.5		
5.9	14.1								
			SAND, clayey, some gravel and silt; some shell fragments; trace organics, 10YR 5/2 grayish brown (SC)	80			SPT Sampler	2, 7, 7	14
							5.0		

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JUN 02

(Continued)

Boring Designation CP11-DCOMP-CB-0037

DRILLING LOG (Cont. Sheet)	INSTALLATION Jacksonville District	SHEET 3 OF 3 SHEETS
PROJECT C&SF CERP WCA 3 DECOMP Part 2	COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83 / VERTICAL NAVD88
LOCATION COORDINATES X = 710,839 Y = 726,167	ELEVATION TOP OF BORING 20.0 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
				69			SPT Sampler	1 / 4 / 50/0.3'	54+
							3.7		
				0			Advanced Boring		
1.9	18.1						1.9		
			LIMESTONE, moderately hard, moderately fractured, vuggy, 10YR 7/1 light gray	100	BOX 1	RQD 42	4 x 5-1/2" DT = 11 mins HP = 200 psi DFR = 90 %		
-0.7	20.7						-0.7		

NOTES:

1. USACE Jacksonville is the custodian for these original files.

2. Soils are field visually classified in accordance with the Unified Soils Classification System

3. Grout

140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).

Abbreviations:
WOH = Weight of Hammer.
DT = Drill Time.
HP = Hydraulic Pressure
DFR = Drill Fluid Return.

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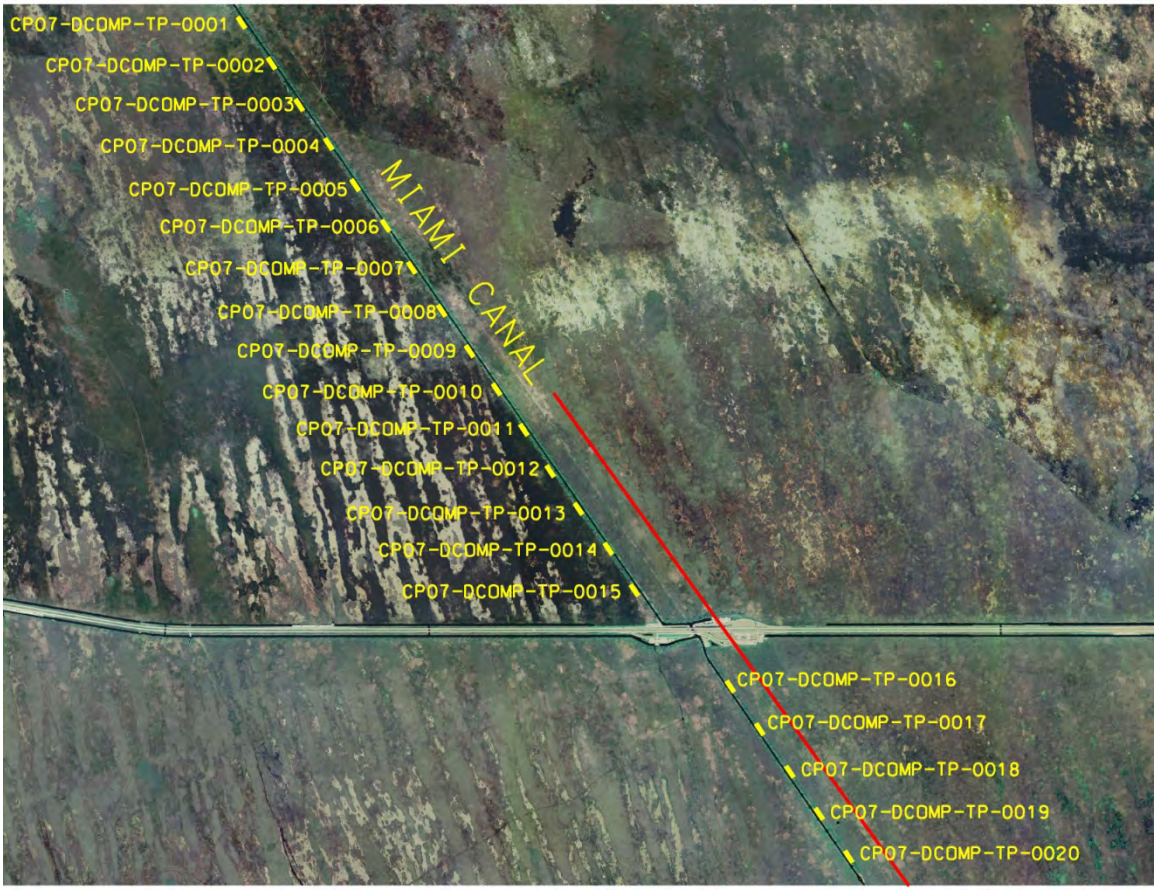

Figure G-2-3. Trench Locations along Miami Canal (Wolf WPC, 2009)

Boring Designation CP08-DCOMP-TP-0001

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 1 SHEETS

1. PROJECT C&SF CERP WCA 3 DECOMP	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) / HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP08-DCOMP-TP-0001 / LOCATION COORDINATES X = 758,064 Y = 683,851	11. MANUFACTURER'S DESIGNATION OF DRILL CAT 320 ☐ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY WPC, Inc. / CONTRACTOR FILE NO.	12. TOTAL SAMPLES DISTURBED 1 / UNDISTURBED (UD) 0
4. NAME OF DRILLER Danny's Backhoe	13. TOTAL NUMBER CORE BOXES 0
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER Depth 4.0 Ft.
	15. DATE BORING STARTED 10-18-08 / COMPLETED 10-18-08
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING Not Determined
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING N/A
8. TOTAL DEPTH OF BORING 9.0 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Tom Casey, P.E., Geotechnical Engineer

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 1 FT.	N-VALUE
	0.0		GRAVEL, poorly-graded with silt, mostly angular to subangular fine to coarse gravel-sized limestone, few subangular to rounded fine to medium-grained sand-sized quartz, few silt, few angular to subangular fine to medium-grained sand-sized shell, moist, 2.5Y 6/3 light yellowish brown (GP-GM)		Bulk		Test Pit		
	6.5		CLAY, organic-fl, high plasticity, mostly clay, some organic matter, little silt, wet, (compressed peat), 10YR 3/3 dark brown (OH)						
	9.0		LIMESTONE						

NOTES:

1. Soils are field visually classified in accordance with the Unified Soils Classification System.

DRAFT

☐ Geology/Hydrogeo/Struc Checked ☐ Database/Template Checked ☐ Initial/Data Entry Checked

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JUN 02

Boring Designation CP08-DCOMP-TP-0002

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 1 SHEETS

1. PROJECT C&SF CERP WCA 3 DECOMP	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) / HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP08-DCOMP-TP-0002 / LOCATION COORDINATES X = 759,269 Y = 682,191	11. MANUFACTURER'S DESIGNATION OF DRILL CAT 320 ☐ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY WPC, Inc. / CONTRACTOR FILE NO.	12. TOTAL SAMPLES DISTURBED 2 / UNDISTURBED (UD) 0
4. NAME OF DRILLER Danny's Backhoe	13. TOTAL NUMBER CORE BOXES 0
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER Depth 4.0 Ft.
	15. DATE BORING STARTED 10-17-08 / COMPLETED 10-17-08
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING Not Determined
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING N/A
8. TOTAL DEPTH OF BORING 8.5 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Tom Casey, P.E., Geotechnical Engineer

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 6 IN.	N-VALUE
0	0.0								
5.5			GRAVEL, poorly-graded, mostly angular to subangular fine to coarse gravel-sized limestone, little subangular to rounded fine to medium-grained sand-sized quartz, trace silt, moist, 2.5Y 6/2 light brownish gray (GP)						
					S-1		Test Pit		
4.5			At 4.5 Ft., some organic matter						
5.5	5.5				S-2				
3			CLAY, organic-H, high plasticity, mostly clay, some organic matter, little silt, wet, (compressed peat), 10YR 3/3 dark brown (OH)				Test Pit		
8.5	8.5		LIMESTONE						

NOTES:

1. Soils are field visually classified in accordance with the Unified Soils Classification System.

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Database/Template Checked
Signature Checked
Data Entry Checked

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Boring Designation CP08-DCOMP-TP-0003

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 1 SHEETS

1. PROJECT C&SF CERP WCA 3 DECOMP	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) / HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP08-DCOMP-TP-0003 / LOCATION COORDINATES X = 760,269 Y = 680,577	11. MANUFACTURER'S DESIGNATION OF DRILL CAT 320 ☐ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY WPC, Inc. / CONTRACTOR FILE NO.	12. TOTAL SAMPLES DISTURBED 1 / UNDISTURBED (UD) 0
4. NAME OF DRILLER Danny's Backhoe	13. TOTAL NUMBER CORE BOXES 0
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER Depth 3.5 Ft.
	15. DATE BORING STARTED 10-17-08 / COMPLETED 10-17-08
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING Not Determined
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING N/A
8. TOTAL DEPTH OF BORING 8.5 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Tom Casey, P.E., Geotechnical Engineer

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 1 FT.	N-VALUE
	0.0								
			GRAVEL, poorly-graded with silt, mostly angular to subangular fine to coarse gravel-sized limestone, little subangular to rounded fine-grained sand-sized quartz, few angular to subangular boulder-sized limestone, few silt, moist, 2.5Y 5/2 grayish brown (GP-GM)		Bulk		Test Pit		
	6.0		CLAY, organic-H, high plasticity, mostly clay, some organic matter, little silt, wet, (compressed peat), 10YR 3/3 dark brown (OH)						
	8.5		LIMESTONE						

NOTES:

1. Soils are field visually classified in accordance with the Unified Soils Classification System.

DRAFT

Geology/Geotechnical Data Checked

Database/Template Checked

Initial/Date Entry Checked

SAJ FORM 1836
JUN 02

Boring Designation CP08-DCOMP-TP-0004

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 1 SHEETS

1. PROJECT C&SF CERP WCA 3 DECOMP	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) / HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP08-DCOMP-TP-0004 / LOCATION COORDINATES X = 761,292 Y = 679,123	11. MANUFACTURER'S DESIGNATION OF DRILL CAT 320 ☐ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY WPC, Inc. / CONTRACTOR FILE NO.	12. TOTAL SAMPLES DISTURBED 2 / UNDISTURBED (UD) 0
4. NAME OF DRILLER Danny's Backhoe	13. TOTAL NUMBER CORE BOXES 0
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER Depth 2.5 Ft.
	15. DATE BORING STARTED 10-17-08 / COMPLETED 10-17-08
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING Not Determined
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING N/A
8. TOTAL DEPTH OF BORING 7.0 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Tom Casey, P.E., Geotechnical Engineer

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 1 FT.	N-VALUE
	0.0								
			GRAVEL, poorly-graded with silt, mostly angular to subangular fine to coarse gravel-sized limestone, few subangular to rounded fine-grained sand-sized quartz, few boulder-sized limestone, few silt, moist, 2.5Y 6/2 light brownish gray (GP-GM)		S-1		Test Pit		
	4.0								
			GRAVEL, poorly-graded, mostly angular to subangular fine to coarse gravel-sized limestone, few subangular to rounded fine-grained sand-sized quartz, trace silt, 2.5Y 5/2 grayish brown (GP)		S-2		Test Pit		
	6.0								
	7.0		CLAY, organic-H, high plasticity, mostly clay, some organic matter, little silt, wet, (compressed peat), 10YR 3/3 dark brown (OH)						
			LIMESTONE						

NOTES:

1. Soils are field visually classified in accordance with the Unified Soils Classification System.

DRAFT
Database/Template Checked
Geology/Geotechnical Checked
Initial/Data Entry Checked

SAJ FORM 1836
JUN 02

Boring Designation CP08-DCOMP-TP-0005

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 1 SHEETS

1. PROJECT C&SF CERP WCA 3 DECOMP	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) / HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP08-DCOMP-TP-0005 / LOCATION COORDINATES X = 762,724 Y = 677,123	11. MANUFACTURER'S DESIGNATION OF DRILL CAT 320 ☐ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY WPC, Inc. / CONTRACTOR FILE NO.	12. TOTAL SAMPLES DISTURBED 1 / UNDISTURBED (UD) 0
4. NAME OF DRILLER Danny's Backhoe	13. TOTAL NUMBER CORE BOXES 0
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER Depth 3.0 Ft.
	15. DATE BORING STARTED 10-16-08 / COMPLETED 10-16-08
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING Not Determined
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING N/A
8. TOTAL DEPTH OF BORING 8.0 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Tom Casey, P.E., Geotechnical Engineer

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 1 FT.	N-VALUE
	0.0								
			GRAVEL, poorly-graded with silt, mostly angular to subangular fine to coarse gravel-sized limestone, little subangular to rounded fine-grained sand-sized quartz, few silt, moist, 2.5Y 5/2 grayish brown (GP-GM)		Bulk		Test Pit		
	6.0		CLAY, organic-H, high plasticity, mostly clay, some organic matter, little silt, wet, (compressed peat), 10YR 3/3 dark brown (OH)						
	8.0		LIMESTONE						

NOTES:

1. Soils are field visually classified in accordance with the Unified Soils Classification System.

DRAFT
Initial/Data Entry Checked
Geology/Nomenclature Checked
Database/Template Checked

SAJ FORM 1836
JUN 02

Boring Designation CP08-DCOMP-TP-0006

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 1 SHEETS

1. PROJECT C&SF CERP WCA 3 DECOMP	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) / HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP08-DCOMP-TP-0006 / LOCATION COORDINATES X = 763,951 Y = 675,576	11. MANUFACTURER'S DESIGNATION OF DRILL CAT 320 ☐ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY WPC, Inc. / CONTRACTOR FILE NO.	12. TOTAL SAMPLES DISTURBED 2 / UNDISTURBED (UD) 0
4. NAME OF DRILLER Danny's Backhoe	13. TOTAL NUMBER CORE BOXES 0
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER Depth 3.0 Ft.
	15. DATE BORING STARTED 10-16-08 / COMPLETED 10-16-08
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING Not Determined
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING N/A
8. TOTAL DEPTH OF BORING 8.0 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Tom Casey, P.E., Geotechnical Engineer

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/1 FT.	N-VALUE
	0.0								
	3.5		GRAVEL, poorly-graded with silt, mostly angular to subangular fine to coarse gravel-sized limestone, little subangular to rounded fine-grained sand-sized quartz, few silt, trace shell, moist, 2.5Y 4/2 dark grayish brown (GP-GM)		S-1				
	5.5		GRAVEL, silty, mostly angular to subangular fine to coarse gravel-sized limestone, little subangular to rounded fine-grained sand-sized quartz, little silt, trace shell, 2.5Y 3/2 very dark grayish brown (GM)		S-2		Test Pit		
	8.0		CLAY, organic-H, high plasticity, mostly clay, some organic matter, little silt, wet, (compressed peat), 10YR 3/3 dark brown (OH)				Test Pit		
			LIMESTONE						

NOTES:

1. Soils are field visually classified in accordance with the Unified Soils Classification System.

DRAFT
☐ Database/Template Checked
☐ Geology/Analysis Review Checked
☐ Tattler/Data Entry Checked

SAJ FORM 1836
JUN 02

Boring Designation CP08-DCOMP-TP-0007

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 1 SHEETS

1. PROJECT C&SF CERP WCA 3 DECOMP	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) / HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP08-DCOMP-TP-0007 / LOCATION COORDINATES X = 764,997 Y = 673,826	11. MANUFACTURER'S DESIGNATION OF DRILL CAT 320 ☐ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY WPC, Inc. / CONTRACTOR FILE NO.	12. TOTAL SAMPLES DISTURBED 1 / UNDISTURBED (UD) 0
4. NAME OF DRILLER Danny's Backhoe	13. TOTAL NUMBER CORE BOXES 0
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER Depth 3.0 Ft.
	15. DATE BORING STARTED 10-16-08 / COMPLETED 10-16-08
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING Not Determined
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING N/A
8. TOTAL DEPTH OF BORING 7.5 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Tom Casey, P.E., Geotechnical Engineer

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 1 FT.	N-VALUE
	0.0								
			GRAVEL, poorly-graded, mostly silt, some organic matter, some fine to coarse gravel-sized limestone, few subangular to rounded fine-grained sand-sized quartz, moist, 10YR 3/2 very dark grayish brown (GP)		Bulk				
	5.0		CLAY, organic-H, high plasticity, mostly clay, some organic matter, little silt, wet, (compressed peat), 10YR 3/3 dark brown (OH)				Test Pit		
	7.5		LIMESTONE						

NOTES:

1. Soils are field visually classified in accordance with the Unified Soils Classification System.

DRAFT
Initials/date Entry Checked
Geology/Geomorphic Checked
Database/Template Checked

SAJ FORM 1836
JUN 02

Boring Designation CP08-DCOMP-TP-0008

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 1 SHEETS

1. PROJECT C&SF CERP WCA 3 DECOMP	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) / HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP08-DCOMP-TP-0008 / LOCATION COORDINATES X = 766,247 Y = 672,076	11. MANUFACTURER'S DESIGNATION OF DRILL CAT 320 ☐ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY WPC, Inc. / CONTRACTOR FILE NO.	12. TOTAL SAMPLES DISTURBED 3 / UNDISTURBED (UD) 0
4. NAME OF DRILLER Danny's Backhoe	13. TOTAL NUMBER CORE BOXES 0
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER Depth 4.0 Ft.
	15. DATE BORING STARTED 10-16-08 / COMPLETED 10-16-08
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING Not Determined
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING N/A
8. TOTAL DEPTH OF BORING 8.0 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Tom Casey, P.E., Geotechnical Engineer

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 1 FT.	N-VALUE
	0.0								
			GRAVEL, poorly-graded with silt, mostly angular to subangular fine to coarse gravel-sized limestone, little subangular to rounded fine-grained sand-sized quartz, few boulder-sized limestone, few silt, trace shell, moist, 2.5Y 6/3 light yellowish brown (GP-GM)		S-1		Test Pit		
	5.0				S-2		Test Pit		
			SAND, silty, mostly subangular to rounded fine-grained sand-sized quartz, some angular to subangular fine to coarse gravel-sized limestone, little silt, trace shell, 2.5Y 5/2 grayish brown (SM)		S-3		Test Pit		
	7.0								
	8.0		CLAY, organic-H, high plasticity, mostly clay, some organic matter, little silt, wet (compressed peat), 10YR 3/3 dark brown (OH)						
			LIMESTONE						

NOTES:

1. Soils are field visually classified in accordance with the Unified Soils Classification System.

DRAFT

SAJ FORM 1836
JUN 02

Boring Designation CP08-DCOMP-TP-0009

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 1 SHEETS

1. PROJECT C&SF CERP WCA 3 DECOMP	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) / HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP08-DCOMP-TP-0009 / LOCATION COORDINATES X = 767,384 Y = 670,439	11. MANUFACTURER'S DESIGNATION OF DRILL CAT 320 ☐ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY WPC, Inc. / CONTRACTOR FILE NO.	12. TOTAL SAMPLES DISTURBED 3 / UNDISTURBED (UD) 0
4. NAME OF DRILLER Danny's Backhoe	13. TOTAL NUMBER CORE BOXES 0
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER Depth 3.0 Ft.
	15. DATE BORING STARTED 10-15-08 / COMPLETED 10-15-08
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING Not Determined
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING N/A
8. TOTAL DEPTH OF BORING 8.0 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Tom Casey, P.E., Geotechnical Engineer

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 1 FT.	N-VALUE
	0.0								
	2.0		GRAVEL, poorly-graded with silt, mostly angular to subangular fine to coarse gravel-sized limestone, few subangular to rounded fine-grained sand-sized quartz, few silt, few angular to subangular fine to medium-grained sand-sized shell, trace organic matter, moist, 2.5Y 5/3 light olive brown (GP-GM)		S-1		Test Pit		
	8.0		SAND, silty, mostly subangular to rounded fine-grained sand-sized quartz, little angular to subangular fine to coarse gravel-sized limestone, little silt, few fine to medium-grained sand-sized shell, trace organic matter, 10YR 2/2 very dark brown (SM)		Bulk S-2		Test Pit Test Pit		
			LIMESTONE						

NOTES:

1. Soils are field visually classified in accordance with the Unified Soils Classification System.

DRAFT

☐ Database/Template Checked
☐ Geology/Agency Review Checked
☐ Initial/Data Entry Checked

SAJ FORM 1836
JUN 02

Boring Designation CP08-DCOMP-TP-0010

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 1 SHEETS

1. PROJECT C&SF CERP WCA 3 DECOMP	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) / HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP08-DCOMP-TP-0010 / LOCATION COORDINATES X = 768,475 Y = 668,870	11. MANUFACTURER'S DESIGNATION OF DRILL CAT 320 ☐ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY WPC, Inc / CONTRACTOR FILE NO.	12. TOTAL SAMPLES DISTURBED 3 / UNDISTURBED (UD) 0
4. NAME OF DRILLER Danny's Backhoe	13. TOTAL NUMBER CORE BOXES 0
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER Depth 4.0 Ft.
	15. DATE BORING STARTED 10-15-08 / COMPLETED 10-15-08
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING Not Determined
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING N/A
8. TOTAL DEPTH OF BORING 11.0 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Tom Casey, P.E., Geotechnical Engineer

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/1 FT.	N-VALUE
	0.0								
			GRAVEL, silty, mostly angular to subangular fine to coarse gravel-sized limestone, some boulder-sized limestone, little subangular to rounded fine-grained sand-sized quartz, little silt, trace organic matter, moist, 2.5Y 5/2 grayish brown (GM)						
					S-1		Test Pit		
	4.0								
			GRAVEL, poorly-graded with silt, mostly angular to subangular fine to coarse gravel-sized limestone, few subrounded to rounded fine-grained sand-sized quartz, few silt, 2.5Y 5/2 grayish brown (GP-GM)		S-2				
	5.5								
			CLAY, organic H, high plasticity, mostly organic matter, some clay, little silt, wet, (compressed peat), 10YR 3/3 dark brown (OH)				Test Pit		
					S-3		Test Pit		
	11.0								
			LIMESTONE						

NOTES:

1. Soils are field visually classified in accordance with the Unified Soils Classification System.

DRAFT
Database/Template Checked
Geology/Analysis Checked
Initial/Data Entry Checked

SAJ FORM 1836
JUN 02

Boring Designation CP08-DCOMP-TP-0011

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 1 SHEETS

1. PROJECT C&SF CERP WCA 3 DECOMP	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) / HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP08-DCOMP-TP-0011 / LOCATION COORDINATES X = 769,589 Y = 667,234	11. MANUFACTURER'S DESIGNATION OF DRILL CAT 320 ☐ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY WPC, Inc. / CONTRACTOR FILE NO.	12. TOTAL SAMPLES DISTURBED 2 / UNDISTURBED (UD) 0
4. NAME OF DRILLER Danny's Backhoe	13. TOTAL NUMBER CORE BOXES 0
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER Depth 3.5 Ft.
	15. DATE BORING STARTED 10-15-08 / COMPLETED 10-15-08
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING Not Determined
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING N/A
8. TOTAL DEPTH OF BORING 7.0 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Tom Casey, P.E., Geotechnical Engineer

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/6 IN.	N-VALUE
	0.0								
			GRAVEL, poorly-graded with silt, mostly angular to subangular fine to coarse gravel-sized limestone, little subangular to rounded fine-grained sand-sized quartz, few silt, moist, 2.5Y 7/3 pale yellow (GP-GM)						
					S-1		Test Pit		
	5.0		CLAY, organic-H, high plasticity, mostly clay, some organic matter, little silt, wet, (compressed peat), 10YR 3/3 dark brown (OH)		S-2		Test Pit		
	7.0		LIMESTONE						

NOTES:

1. Soils are field visually classified in accordance with the Unified Soils Classification System.

DRAFT
Database/Template Checked
Geology/Geotechnical Data Checked
Data Entry Checked

SAJ FORM 1836
JUN 02

Boring Designation CP08-DCOMP-TP-0012

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 1 SHEETS

1. PROJECT C&SF CERP WCA 3 DECOMP	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) / HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP08-DCOMP-TP-0012 / LOCATION COORDINATES X = 770,657 Y = 665,551	11. MANUFACTURER'S DESIGNATION OF DRILL CAT 320 ☐ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY WPC, Inc. / CONTRACTOR FILE NO.	12. TOTAL SAMPLES DISTURBED 4 / UNDISTURBED (UD) 0
4. NAME OF DRILLER Danny's Backhoe	13. TOTAL NUMBER CORE BOXES 0
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER Depth 5.0 Ft.
	15. DATE BORING STARTED 10-14-08 / COMPLETED 10-14-08
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING Not Determined
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING N/A
8. TOTAL DEPTH OF BORING 7.5 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Tom Casey, P.E., Geotechnical Engineer

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/1 FT.	N-VALUE
	0.0								
			GRAVEL, poorly-graded with silt, mostly angular to subangular fine to coarse gravel-sized limestone, few subangular to rounded fine-grained sand-sized quartz, few silt, few fine to medium-grained sand-sized shell, moist, 2.5Y 6/3 light yellowish brown (GP-GM)		S-1		Test Pit		
					S-2		Test Pit		
					S-3		Test Pit		
	6.0								
			CLAY, organic-H, high plasticity, mostly organic matter, some clay, little silt, wet, (compressed peat), 10YR 3/3 dark brown (OH)		S-4		Test Pit		
	7.5								
			LIMESTONE						

NOTES:

1. Soils are field visually classified in accordance with the Unified Soils Classification System.

DRAFT
Database/Template Checked
Geology/Mapping/Figures Checked
Tables/Data Entry Checked

SAJ FORM 1836
JUN 02

Boring Designation CP08-DCOMP-TP-0013

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 1 SHEETS

1. PROJECT C&SF CERP WCA 3 DECOMP	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) HORIZONTAL NAD83 VERTICAL NAVD88
2. BORING DESIGNATION CP08-DCOMP-TP-0013 LOCATION COORDINATES X = 771,817 Y = 663,983	11. MANUFACTURER'S DESIGNATION OF DRILL CAT 320 ☐ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY WPC, Inc. CONTRACTOR FILE NO.	12. TOTAL SAMPLES DISTURBED 5 UNDISTURBED (UD) 0
4. NAME OF DRILLER Danny's Backhoe	13. TOTAL NUMBER CORE BOXES 0
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED DEG. FROM VERTICAL BEARING	14. ELEVATION GROUND WATER Depth 2.0 Ft.
	15. DATE BORING STARTED 10-14-08 COMPLETED 10-14-08
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING Not Determined
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING N/A
8. TOTAL DEPTH OF BORING 8.0 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Tom Casey, P.E., Geotechnical Engineer

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 1 FT.	N-VALUE
	0.0								
			GRAVEL, poorly-graded, mostly angular to subangular fine to coarse gravel-sized limestone, few subangular to rounded fine to medium-grained sand-sized quartz, few angular to subangular fine to medium-grained sand-sized shell, trace silt, moist, 2.5Y 8/2 pale yellow (GP)						
					S-1		Test Pit		
					S-2		Test Pit		
			At 5.0 Ft., some organic matter		S-3		Test Pit		
	6.5				S-4				
			CLAY, organic-FI, high plasticity, mostly clay, some organic matter, little silt, wet, (compressed peat), 10YR 3/3 dark brown (OH)				Test Pit		
	8.0				S-5		Test Pit		
			LIMESTONE						

NOTES:

1. Soils are field visually classified in accordance with the Unified Soils Classification System.

DRAFT
Geology/Hydrogeology Checked
Database/Template Checked
Initial/Date Entry Checked

SAJ FORM 1836
JUN 02

Boring Designation CP08-DCOMP-TP-0014

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 1 SHEETS

1. PROJECT C&SF CERP WCA 3 DECOMP	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) / HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP08-DCOMP-TP-0014 / LOCATION COORDINATES X = 773,044 Y = 662,414	11. MANUFACTURER'S DESIGNATION OF DRILL CAT 320 ☐ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY WPC, Inc. / CONTRACTOR FILE NO.	12. TOTAL SAMPLES DISTURBED 4 / UNDISTURBED (UD) 0
4. NAME OF DRILLER Danny's Backhoe	13. TOTAL NUMBER CORE BOXES 0
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER Depth 2.0 Ft.
	15. DATE BORING STARTED 10-14-08 / COMPLETED 10-14-08
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING Not Determined
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING N/A
8. TOTAL DEPTH OF BORING 7.0 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Tom Casey, P.E., Geotechnical Engineer

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/1 FT.	N-VALUE
	0.0								
			GRAVEL, poorly-graded with silt, mostly angular to subangular fine to coarse gravel-sized limestone, few subangular to rounded fine-grained sand-sized quartz, few silt, few fine to medium-grained sand-sized shell, moist, 2.5Y 6/2 light brownish gray (GP-GM)						
					S-1		Test Pit		
					S-2				
			At 3.5 Ft., some organic matter						
	4.0								
			SAND, silty, mostly subrounded to rounded fine-grained sand-sized quartz, little silt, few fine to coarse-grained sand-sized shell, 2.5Y 3/2 very dark grayish brown (SM)				Test Pit		
	6.0				S-3		Test Pit		
	7.0		CLAY, organic-H, high plasticity, mostly organic matter, some clay, little silt, wet, (compressed peat), 10YR 3/3 dark brown (OH)		S-4		Test Pit		
			LIMESTONE						

NOTES:

1. Soils are field visually classified in accordance with the Unified Soils Classification System.

DRAFT
Database/Template Checked
Geology/Hydrology Checked
Data/Data Entry Checked

SAJ FORM 1836
JUN 02

Boring Designation CP08-DCOMP-TP-0015

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 1 SHEETS

1. PROJECT C&SF CERP WCA 3 DECOMP	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) / HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP08-DCOMP-TP-0015 / LOCATION COORDINATES X = 774,113 Y = 660,687	11. MANUFACTURER'S DESIGNATION OF DRILL CAT 320 ☐ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY WPC, Inc. / CONTRACTOR FILE NO.	12. TOTAL SAMPLES DISTURBED 6 / UNDISTURBED (UD) 0
4. NAME OF DRILLER Danny's Backhoe	13. TOTAL NUMBER CORE BOXES 0
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER Depth 3.5 Ft.
	15. DATE BORING STARTED 10-14-08 / COMPLETED 10-14-08
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING Not Determined
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING N/A
8. TOTAL DEPTH OF BORING 9.5 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Tom Casey, P.E., Geotechnical Engineer

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 1 FT.	N-VALUE
	0.0								
			GRAVEL, poorly-graded with silt, mostly angular to subangular fine to coarse gravel-sized limestone, few subangular to rounded fine-grained sand-sized quartz, few silt, few angular to subangular fine to medium-grained sand-sized shell, moist, 2.5Y 8/2 pale yellow (GP-GM)		S-1		Test Pit		
					S-2		Test Pit		
	5.0								
			GRAVEL, poorly-graded, mostly angular to subangular fine to coarse gravel-sized limestone, few angular to subangular fine to coarse-grained sand-sized shell, trace subrounded to rounded fine-grained sand-sized quartz, trace silt, 2.5Y 7/2 light gray (GP)		S-3		Test Pit		
	8.5				S-4		Test Pit		
			SAND, silty, mostly subangular to rounded fine-grained sand-sized quartz, some silt, trace organic matter, wet, 10YR 3/3 dark brown (SM)						
	9.5				S-5		Test Pit		
			LIMESTONE		S-6		Test Pit		

NOTES:

1. Soils are field visually classified in accordance with the Unified Soils Classification System

DRAFT
Database/Template Checked
Geology/Subsurface Checked
Data/Data Entry Checked

SAJ FORM 1836
JUN 02

Boring Designation CP08-DCOMP-TP-0016

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 1 SHEETS

1. PROJECT C&SF CERP WCA 3 DECOMP	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) / HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP08-DCOMP-TP-0016 / LOCATION COORDINATES X = 778,045 Y = 656,663	11. MANUFACTURER'S DESIGNATION OF DRILL CAT 320 ☐ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY WPC, Inc. / CONTRACTOR FILE NO.	12. TOTAL SAMPLES DISTURBED 1 / UNDISTURBED (UD) 0
4. NAME OF DRILLER Danny's Backhoe	13. TOTAL NUMBER CORE BOXES 0
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER Depth 3.5 Ft.
	15. DATE BORING STARTED 10-20-08 / COMPLETED 10-20-08
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING Not Determined
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING N/A
8. TOTAL DEPTH OF BORING 10.5 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Tom Casey, P.E., Geotechnical Engineer

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/1 FT.	N-VALUE
	0.0								
			GRAVEL, silty, mostly angular to subangular fine to coarse gravel-sized limestone, little silt, few subangular to rounded fine-grained sand-sized quartz, few boulder-sized limestone, moist, 2.5Y 6/2 light brownish gray (GM)						
					2.5				
	6.0								
			CLAY, organic-H, high plasticity, mostly clay, some organic matter, little silt, wet, (compressed peat), 10YR 3/3 dark brown (OH)				Test Pit		
	10.5								
			LIMESTONE						

NOTES:

1. Soils are field visually classified in accordance with the Unified Soils Classification System.

DRAFT
Database/Template Checked
Geology/Hydrology Checked
Initial/Data Entry Checked

SAJ FORM 1836
JUN 02

Boring Designation CP08-DCOMP-TP-0017

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 1 SHEETS

1. PROJECT C&SF CERP WCA 3 DECOMP	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) / HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP08-DCOMP-TP-0017 / LOCATION COORDINATES X = 779,250 Y = 656,026	11. MANUFACTURER'S DESIGNATION OF DRILL CAT 320 ☐ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY WPC, Inc. / CONTRACTOR FILE NO.	12. TOTAL SAMPLES DISTURBED 2 / UNDISTURBED (UD) 0
4. NAME OF DRILLER Danny's Backhoe	13. TOTAL NUMBER CORE BOXES 0
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER Depth 3.0 Ft.
	15. DATE BORING STARTED 10-20-08 / COMPLETED 10-20-08
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING Not Determined
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING N/A
8. TOTAL DEPTH OF BORING 8.0 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Tom Casey, P.E., Geotechnical Engineer

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 1 FT.	N-VALUE
	0.0								
			GRAVEL, poorly-graded with silt, mostly angular to subangular fine to coarse gravel-sized limestone, few subangular to rounded fine-grained sand-sized quartz, few silt, few angular to subangular fine to medium-grained sand-sized shell, moist, 2.5Y 8/2 pale yellow (GP-GM)						
					S-1		Test Pit		
					S-2				
	6.0						Test Pit		
			CLAY, organic-H, high plasticity, mostly clay, some organic matter, little silt, wet, (compressed peat), 10YR 3/3 dark brown (OH)						
	8.0		LIMESTONE						

NOTES:

1. Soils are field visually classified in accordance with the Unified Soils Classification System.

DRAFT
Database/Template Checked
Geology/Research/Lab Checked
Initial/Date Entry Checked

SAJ FORM 1836
JUN 02

Boring Designation CP08-DCOMP-TP-0018

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 1 SHEETS

1. PROJECT: C&SF CERP WCA 3 DECOMP	9. SIZE AND TYPE OF BIT: See Remarks
	10. COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.) / HORIZONTAL: NAD83 / VERTICAL: NAVD88
2. BORING DESIGNATION: CP08-DCOMP-TP-0018 / LOCATION COORDINATES: X = 780,478 Y = 653,231	11. MANUFACTURER'S DESIGNATION OF DRILL: CAT 320 / ☐ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY: WPC, Inc. / CONTRACTOR FILE NO.	12. TOTAL SAMPLES: DISTURBED 2 / UNDISTURBED (UD) 0
4. NAME OF DRILLER: Danny's Backhoe	13. TOTAL NUMBER CORE BOXES: 0
5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER: Depth 2.0 Ft.
	15. DATE BORING: STARTED 10-20-08 / COMPLETED 10-20-08
6. THICKNESS OF OVERBURDEN: N/A	16. ELEVATION TOP OF BORING: Not Determined
7. DEPTH DRILLED INTO ROCK: N/A	17. TOTAL RECOVERY FOR BORING: N/A
8. TOTAL DEPTH OF BORING: 7.5 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR: Tom Casey, P.E., Geotechnical Engineer

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 1 FT.	N-VALUE
	0.0		GRAVEL, poorly-graded with silt, mostly angular to subangular fine to coarse gravel-sized limestone, few subangular to rounded fine-grained sand-sized quartz, few boulder-sized limestone, few silt, few angular to subangular fine to coarse-grained sand-sized shell, moist, 2.5Y 4/2 dark grayish brown (GP-GM)						
					S-1		Test Pit		
					S-2				
	5.5		CLAY, organic-H, high plasticity, mostly clay, some organic matter, little silt, wet (compressed peat), 10YR 3/3 dark brown (OH)				Test Pit		
	7.5		LIMESTONE						

NOTES:

1. Soils are field visually classified in accordance with the Unified Soils Classification System

DRAFT
Database/Template Checked
Geology/Seismic/Core Checked
Initial/Data Entry Checked

SAJ FORM 1836
JUN 02

Boring Designation CP08-DCOMP-TP-0019

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 1 SHEETS

1. PROJECT C&SF CERP WCA 3 DECOMP	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) / HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP08-DCOMP-TP-0019 / LOCATION COORDINATES X = 781,683 Y = 651,526	11. MANUFACTURER'S DESIGNATION OF DRILL CAT 320 ☐ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY WPC, Inc. / CONTRACTOR FILE NO.	12. TOTAL SAMPLES DISTURBED 1 / UNDISTURBED (UD) 0
4. NAME OF DRILLER Danny's Backhoe	13. TOTAL NUMBER CORE BOXES 0
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER Depth 3.0 Ft.
	15. DATE BORING STARTED 10-21-08 / COMPLETED 10-21-08
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING Not Determined
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING N/A
8. TOTAL DEPTH OF BORING 8.5 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Tom Casey, P.E., Geotechnical Engineer

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 1 FT.	N-VALUE
	0.0								
			GRAVEL, poorly-graded with silt, mostly angular to subangular fine to coarse gravel-sized limestone, few subangular to rounded fine-grained sand-sized quartz, few silt, moist, 2.5Y 6/3 light yellowish brown (GP-GM)		S-1				
	3.0								
			CLAY, organic-H, high plasticity, mostly clay, some organic matter, little silt, wet, (compressed peat), 10YR 3/3 dark brown (OH)				Test Pit		
	8.5								
			LIMESTONE						

NOTES:

1. Soils are field visually classified in accordance with the Unified Soils Classification System.

DRAFT
Database/Template Checked
Geology/Nomenclature Checked
Tables/Data Entry Checked

SAJ FORM 1836
JUN 02

Boring Designation CP08-DCOMP-TP-0020

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 1 SHEETS

1. PROJECT C&SF CERP WCA 3 DECOMP	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) / HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP08-DCOMP-TP-0020 / LOCATION COORDINATES X = 782,887 Y = 649,798	11. MANUFACTURER'S DESIGNATION OF DRILL CAT 320 ☐ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY WPC, Inc. / CONTRACTOR FILE NO.	12. TOTAL SAMPLES DISTURBED 2 / UNDISTURBED (UD) 0
4. NAME OF DRILLER Danny's Backhoe	13. TOTAL NUMBER CORE BOXES 0
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER Depth 3.5 Ft.
	15. DATE BORING STARTED 10-22-08 / COMPLETED 10-22-08
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING Not Determined
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING N/A
8. TOTAL DEPTH OF BORING 8.0 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Tom Casey, P.E., Geotechnical Engineer

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/1 FT.	N-VALUE
	0.0								
			GRAVEL, poorly-graded with silt, mostly angular to subangular fine to coarse gravel-sized limestone, few subangular to rounded fine-grained sand-sized quartz, few boulder-sized limestone, few silt, few angular to subangular fine to medium-grained sand-sized shell, moist, 2.5Y 7/2 light gray (GP-GM)		S-1		Test Pit		
					S-2		Test Pit		
	6.5								
			CLAY, organic-H, high plasticity, mostly clay, some organic matter, little silt, wet, (compressed peat), 10YR 3/3 dark brown (OH)						
	8.0								
			LIMESTONE						

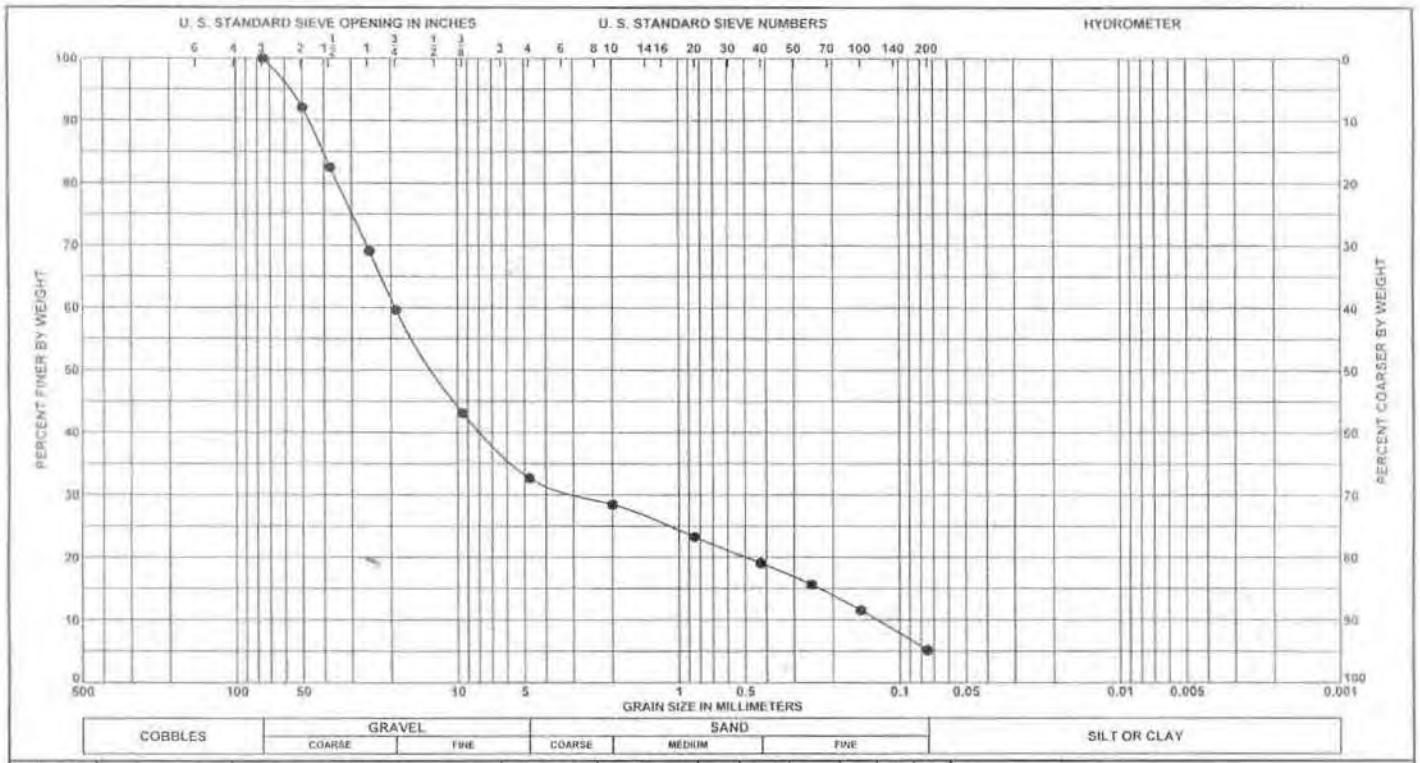
NOTES:

1. Soils are field visually classified in accordance with the Unified Soils Classification System.

DRAFT

☐ Database/Template Checked
☐ Geology/Nomenclature Checked
☐ Initial/Date Entry Checked

SAJ FORM 1836
JUN 02

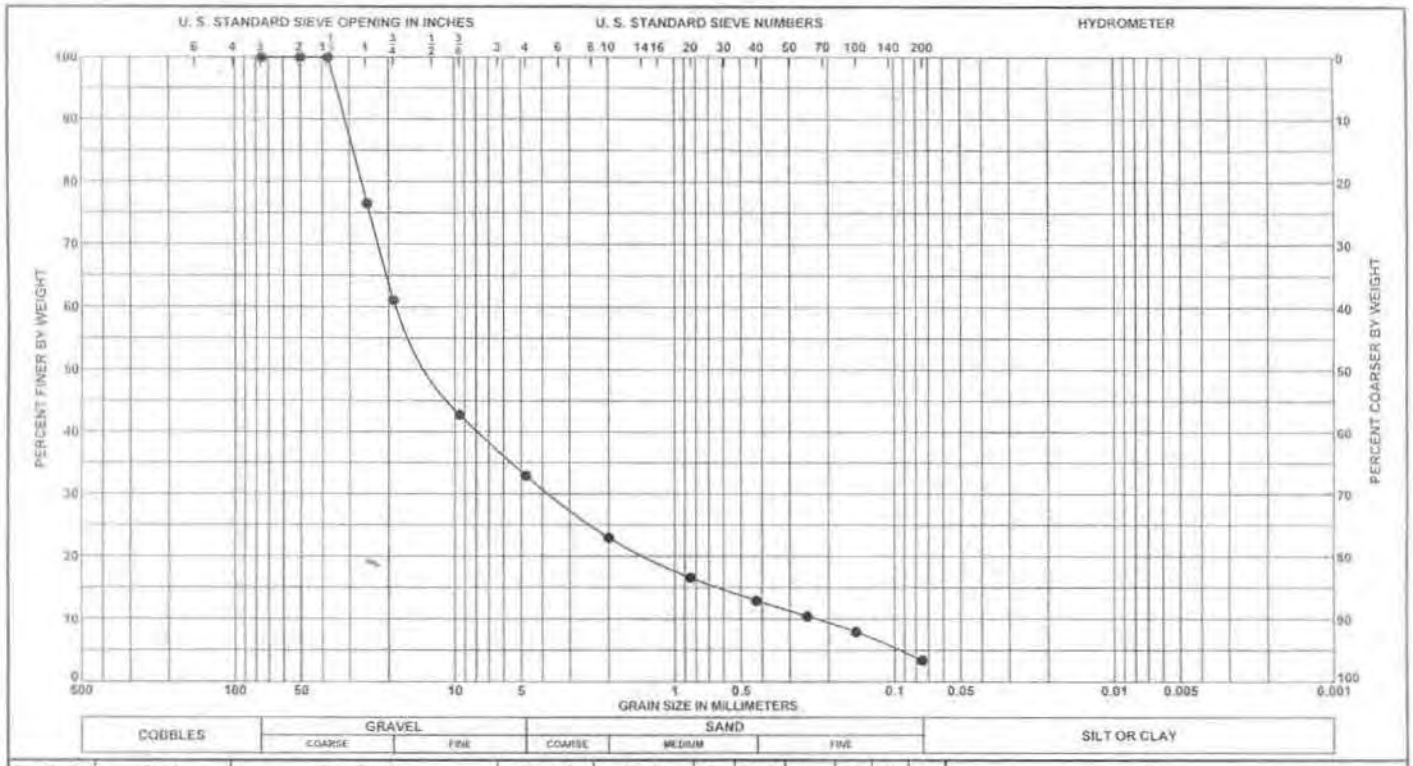


Sample No.	Depth	Classification	Munsell	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● BULK	2.0 to 3.0 Ft.	LIMESTONE, poorly-graded with silt, mostly coarse-gravel to medium sand-size limerock fragments, few medium to fine sand-size shell fragments, few fine-grained quartz, few silt, light (GP-GM)	2.5Y 6/3							

PROJECT	Miami Canal
BORING NO.	TP-1
BORING ELEV.	Not Determined
DATE	2/6/2009

GRADATION CURVES

SAJ FORM 2087
JUN 02



Sample No.	Depth	Classification	Munsell	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● 1	2.5 to 3.5 Ft	LIMESTONE, poorly-graded, mostly coarse-gravel to medium sand-size limerock fragments, few fine-grained quartz, trace silt, light brownish gray (GP)	2.5Y 6/2							

PROJECT Miami Canal

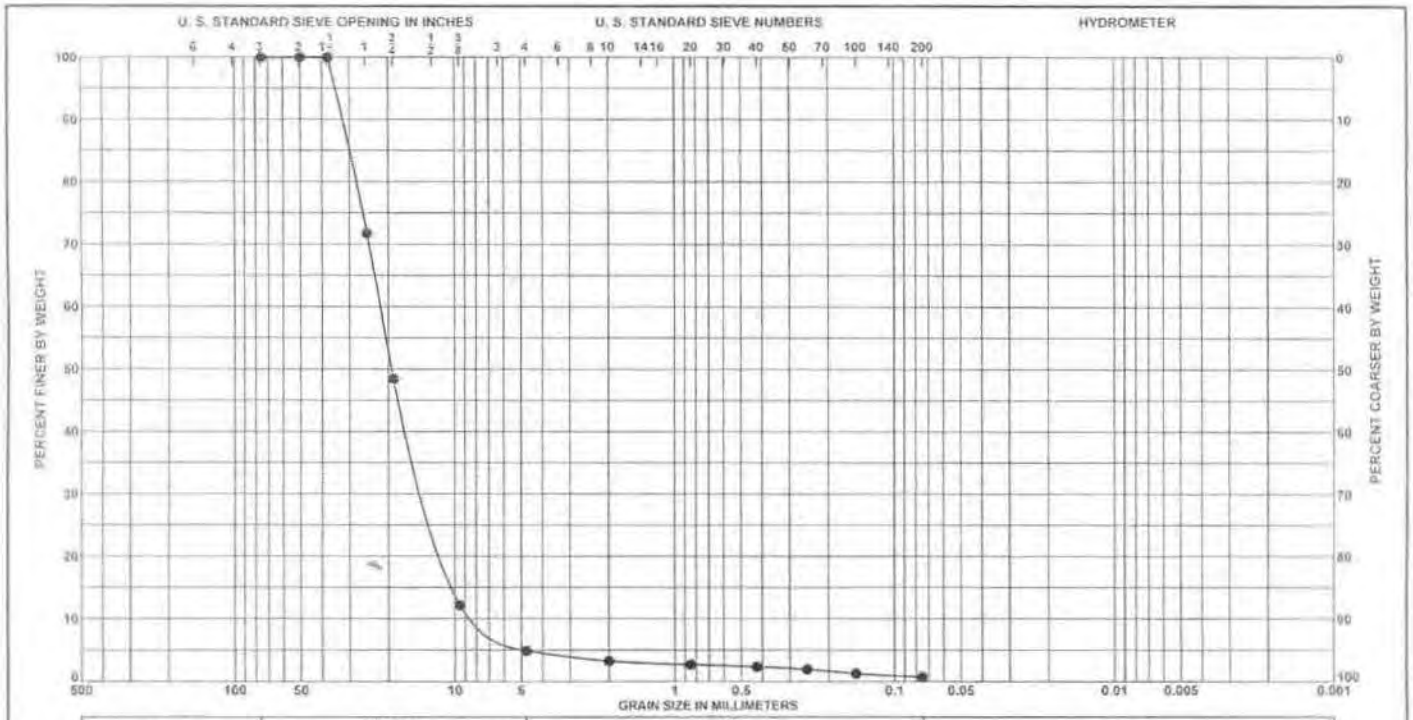
BORING NO. TP-2

BORING ELEV. Not Determined

DATE 2/6/2009

GRADATION CURVES

SAJ FORM 2087
JUN 03

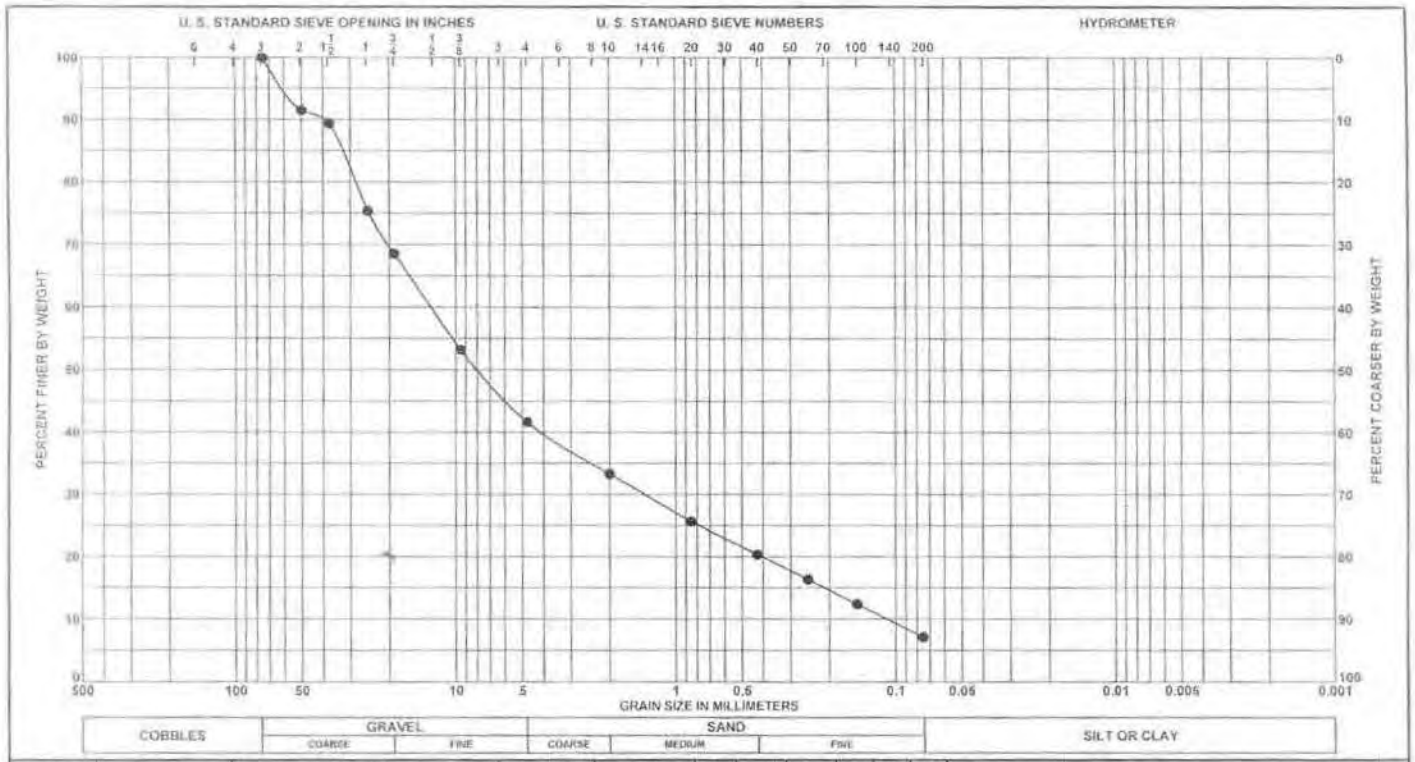


Sample No.	Depth	Classification	Munsell	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● 2	4.5 to 5.5 Ft	LIMESTONE, poorly-graded, mostly coarse-gravel to medium sand-size limerock fragments, trace fine-grained quartz, trace silt, dark grayish brown (GP)	2.5Y 4/2							

GRADATION CURVES

PROJECT	Miami Canal
BORING NO.	TP-2
BORING ELEV.	Not Determined
DATE	2/6/2009

SAJ FORM 2087
JUN 02



Sample No.	Depth	Classification	Munsell	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● BULK	2.0 to 3.0 Ft	LIMESTONE, poorly-graded with silt, mostly coarse-gravel to medium sand-size limerock fragments, little fine-grained quartz, few silt, grayish brown (GP-GM)	2.5Y 5/2							

GRADATION CURVES

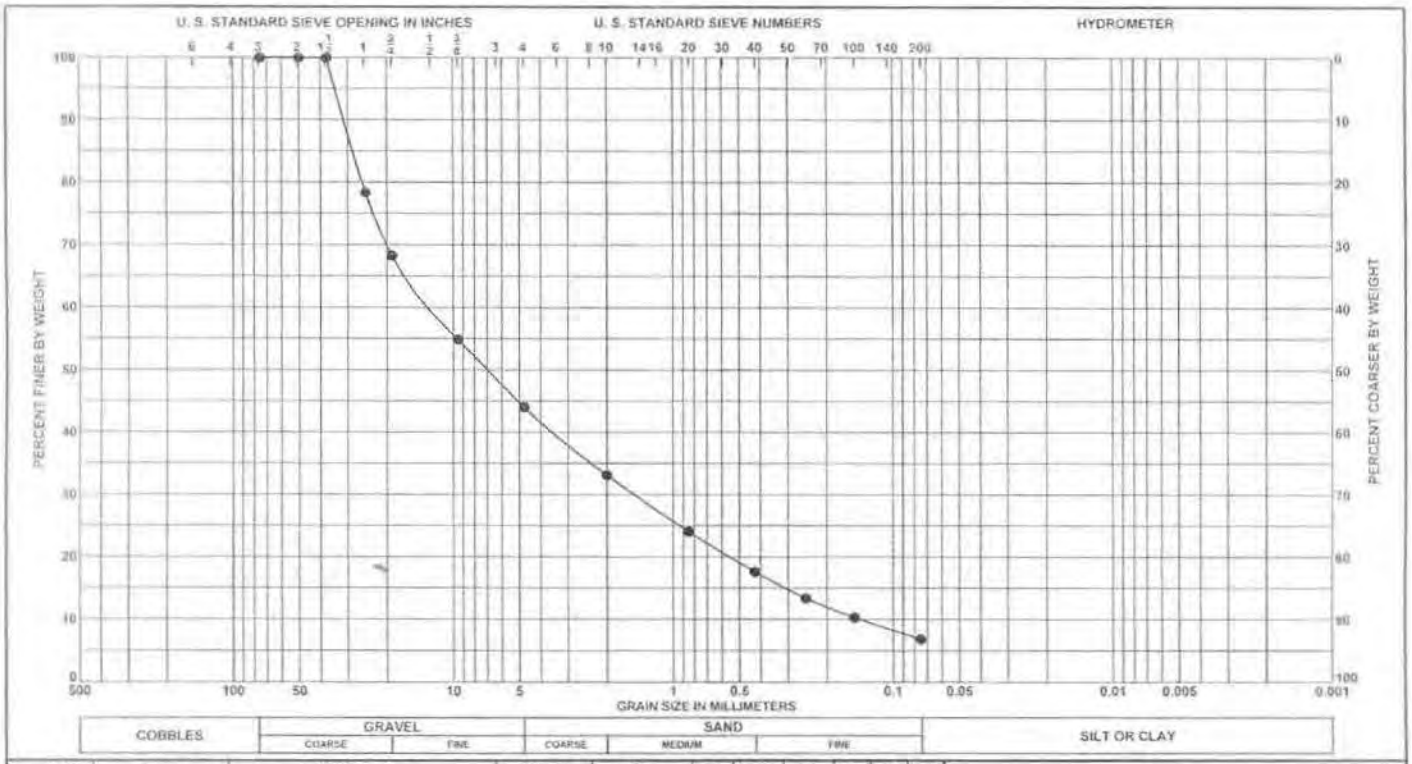
PROJECT Miami Canal

BORING NO. TP-3

BORING ELEV. Not Determined

DATE 2/6/2009

SAJ FORM 2087
JUN 02

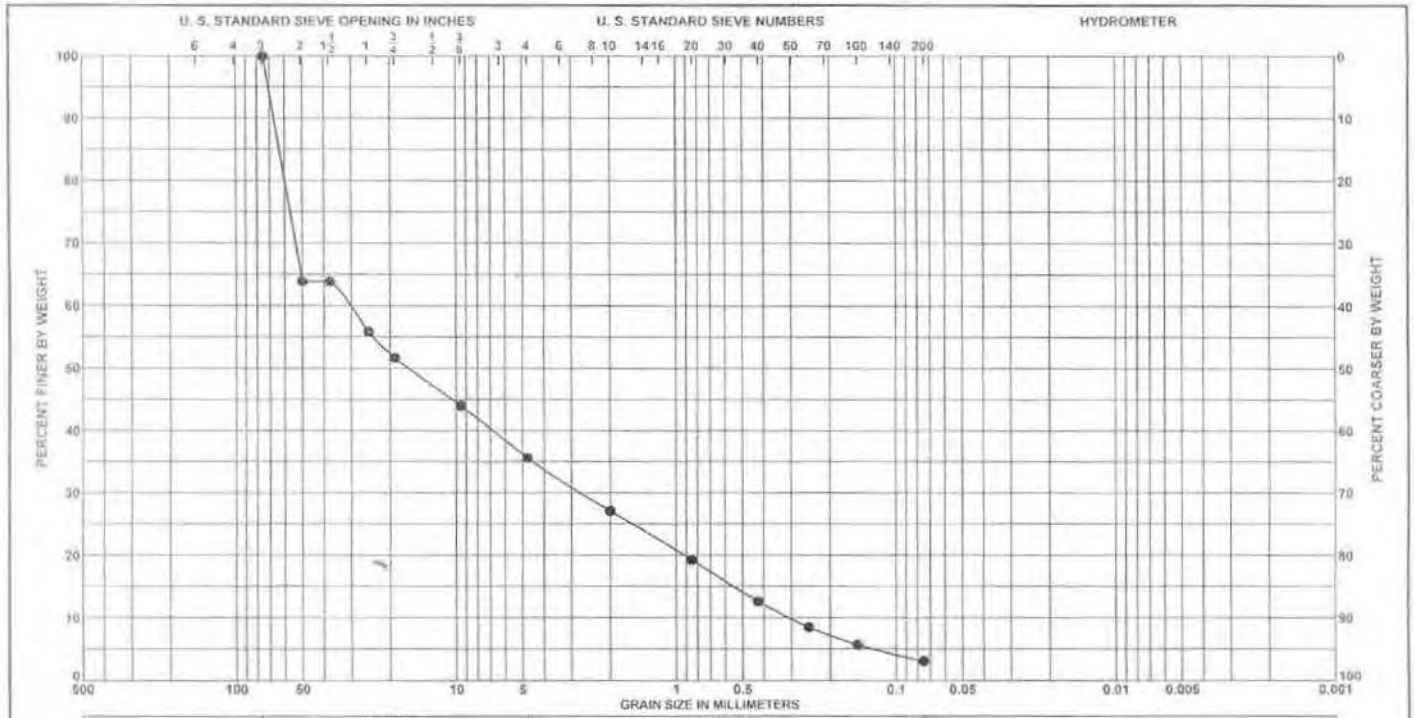


Sample No.	Depth	Classification	Munsell	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● 1	2.0 to 3.0 Ft	LIMESTONE, poorly-graded with silt, mostly coarse-gravel to medium sand-size limerock fragments, few fine-grained quartz, few silt, light brownish gray (GP-GM)	2.5Y 6/2							

GRADATION CURVES

PROJECT	Miami Canal
BORING NO.	TP-4
BORING ELEV.	Not Determined
DATE	2/6/2009

SAJ FORM 2087
JUN 02



Sample No.	Depth	Classification	Munsell	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● 2	5.0 to 6.0 Ft	LIMESTONE, poorly-graded, mostly coarse-gravel to medium sand-size limerock fragments, few fine-grained quartz, trace silt, grayish brown (GP)	2.5Y 5/2							

PROJECT Miami Canal

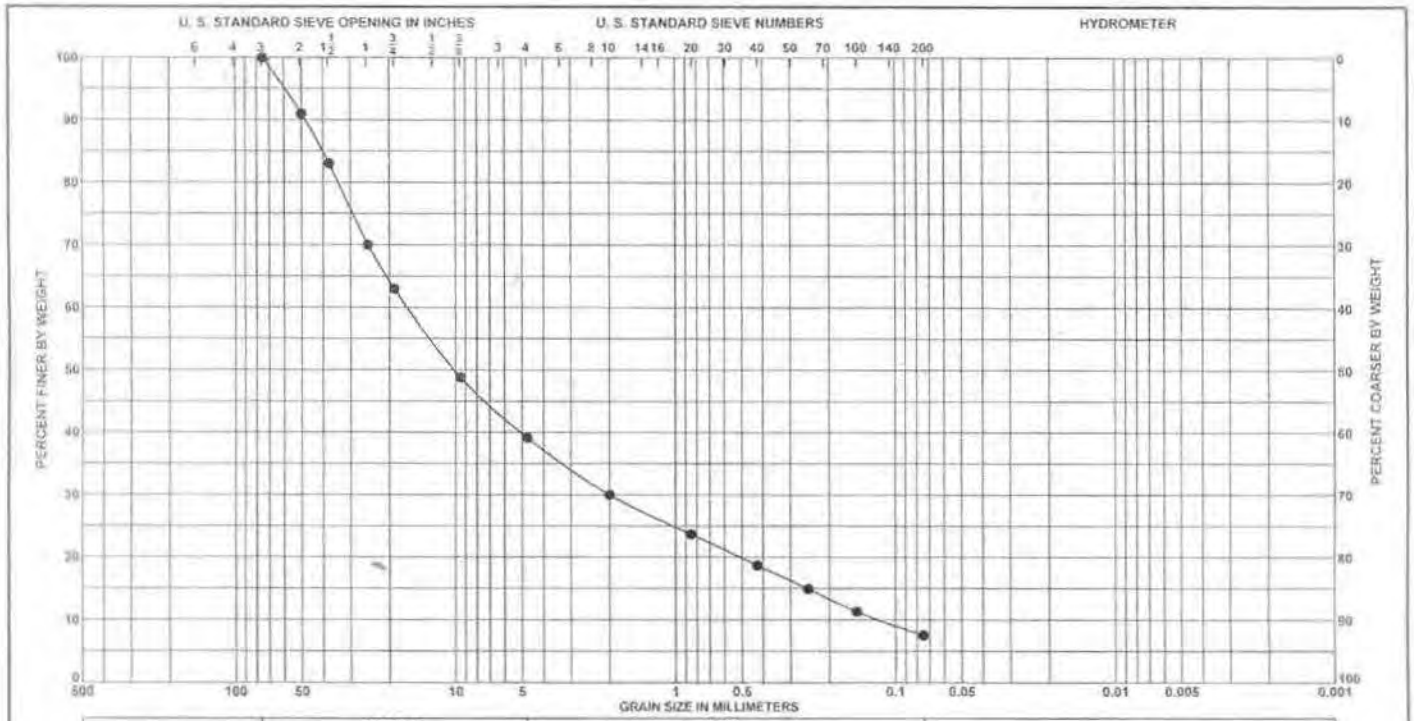
BORING NO. TP-4

BORING ELEV. Not Determined

DATE 2/6/2009

GRADATION CURVES

SAJ FORM 2087
JUN 02

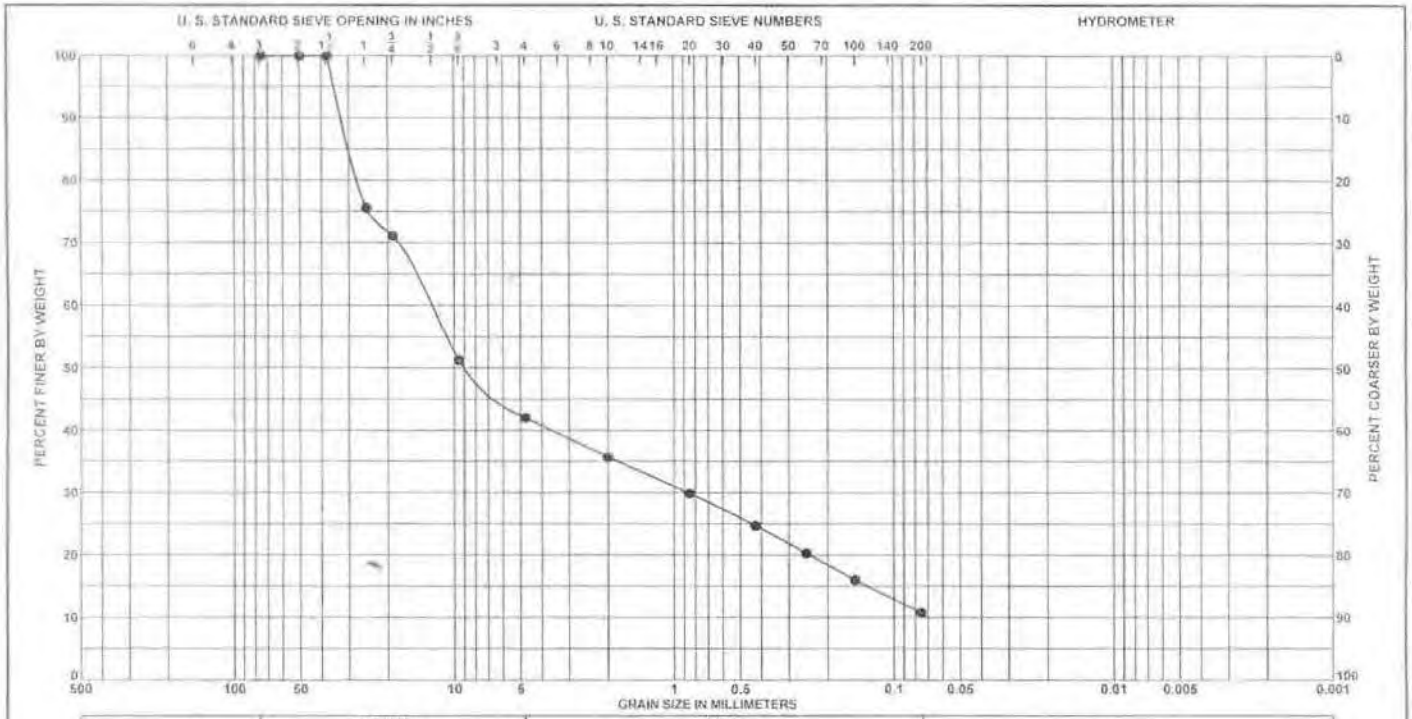


Sample No.	Depth	Classification	Munsell	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● BULK	2.0 to 2.5 Ft	LIMESTONE, poorly-graded with silt, mostly coarse-gravel to medium sand-size limerock fragments, little fine-grained quartz, few silt, grayish brown (GP-GM)	2.5Y 5/2							

GRADATION CURVES

PROJECT	Miami Canal
BORING NO.	TP-5
BORING ELEV.	Not Determined
DATE	2/6/2009

SAJ FORM 2087
JUN 02

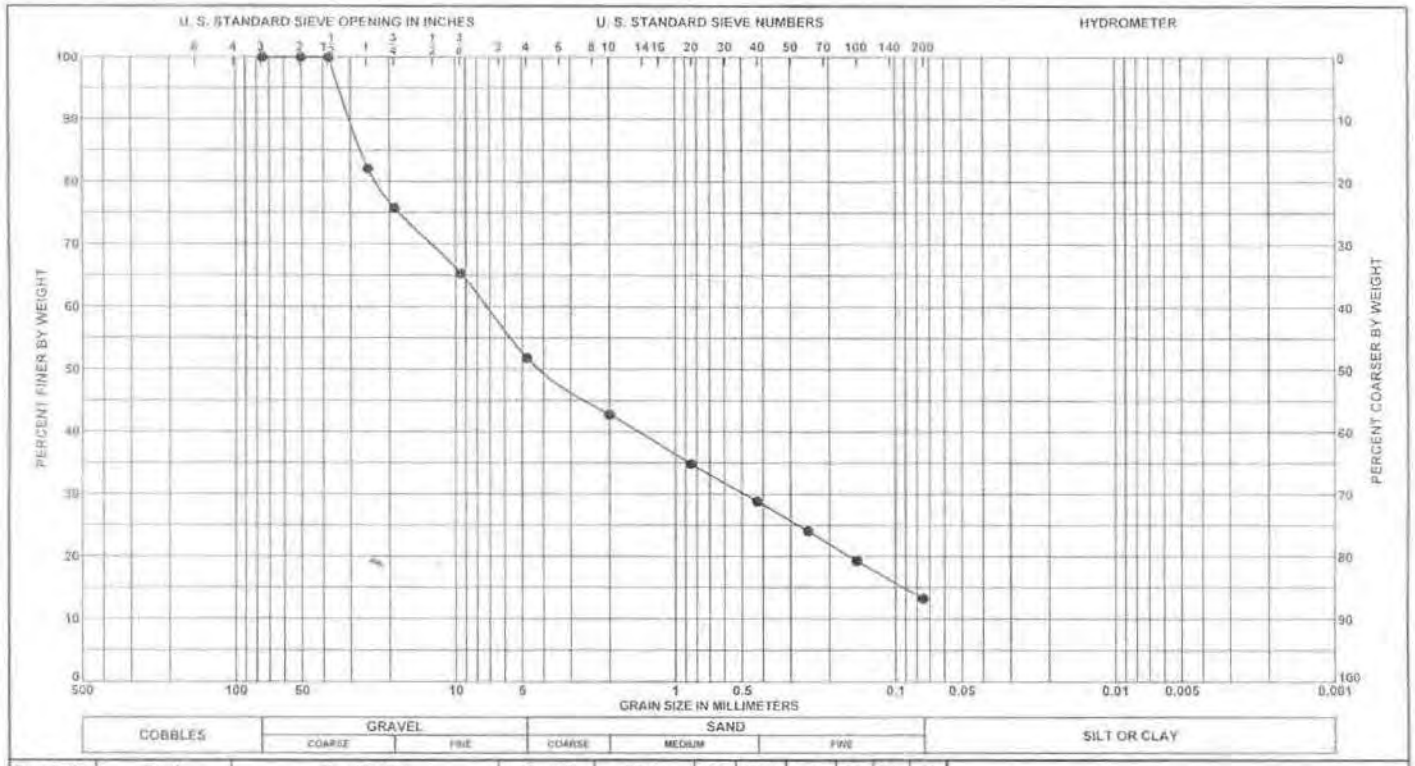


Sample No.	Depth	Classification	Munsell	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● 1	3.0 to 4.0 Ft.	LIMESTONE: poorly-graded with silt, mostly coarse-gravel to medium sand-size limerock fragments, little fine-grained quartz, few silt, trace shell fragments, dark grayish brown	2.5Y 4/2							

PROJECT	Miami Canal
BORING NO.	TP-6
BORING ELEV.	Not Determined
DATE	2/6/2009

(Gi **GRADATION CURVES**

SAJ FORM 2087
JUN 02

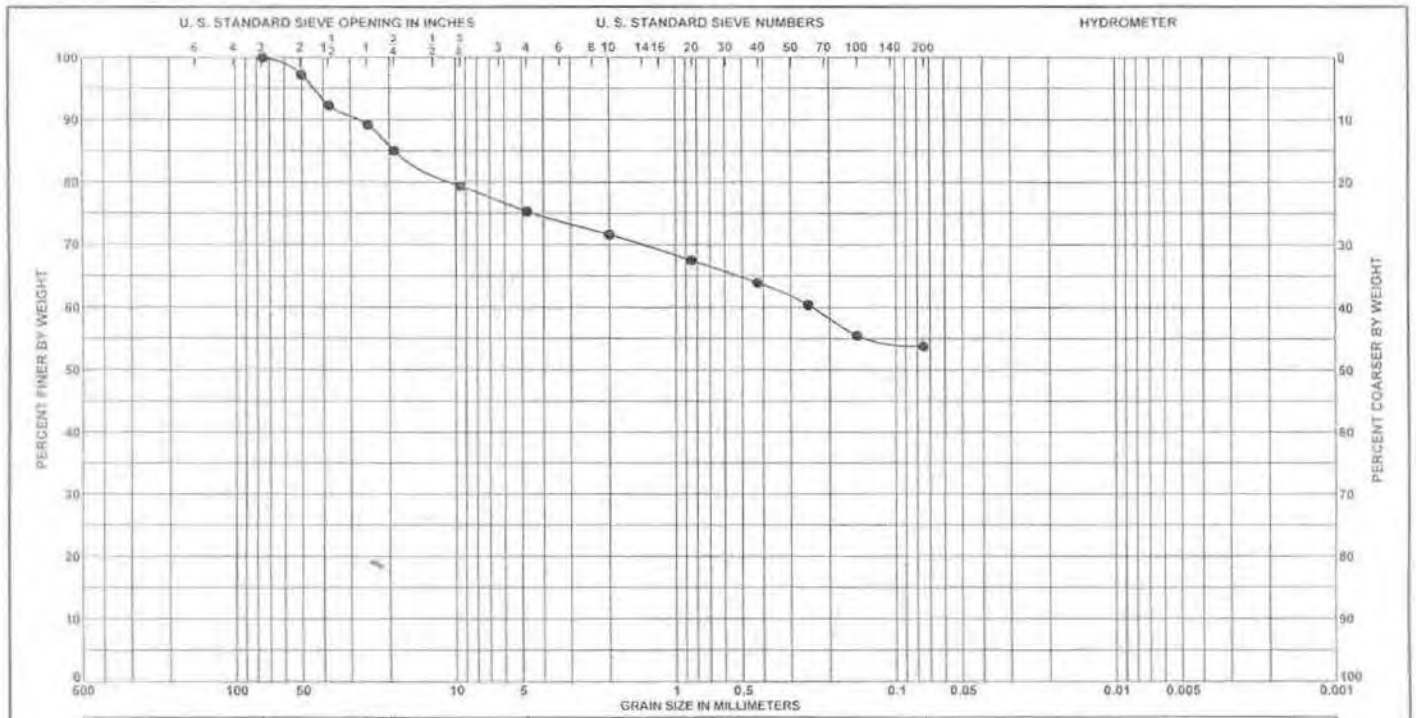


Sample No.	Depth	Classification	Munsell	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● 2	4.5 to 5.5 Ft	LIMESTONE, silty, mostly	2.5Y 3/2							
		coarse-gravel to medium sand-size								
		limerock fragments, little								
		fine-grained quartz, little silt, trace								
		shell fragments, very dark grayish								
		brow								

GRADATION CURVES

PROJECT	Miami Canal
BORING NO.	TP-6
BORING ELEV.	Not Determined
DATE	2/6/2009

SAJ FORM 2087
JUN 02

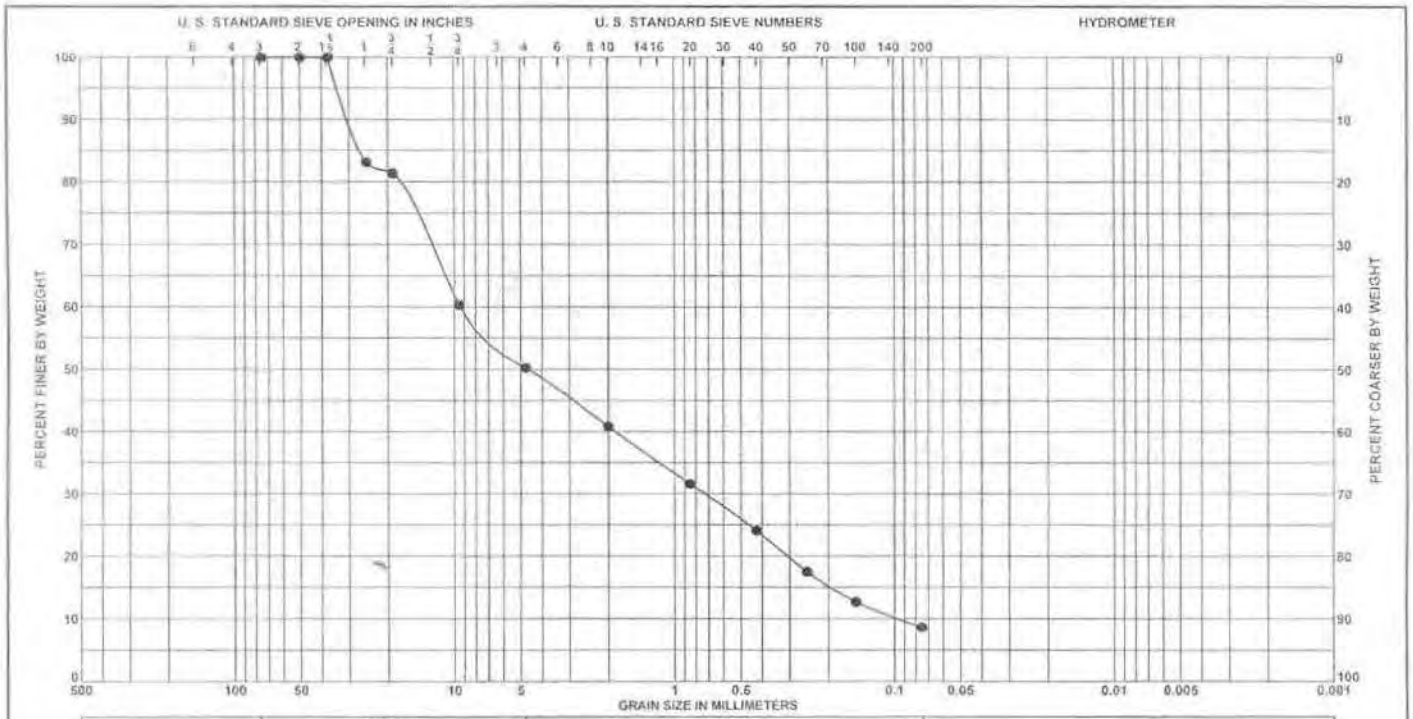


Sample No.	Depth	Classification	Munsell	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● BULK	2.0 to 3.0 Ft	SILT, organic-L, some	10YR 3/2							
		coarse-gravel to medium sand-size								
		limerock fragments, few,								
		fine-grained quartz sand, very dark								
		grayish brown (OL)								

GRADATION CURVES

PROJECT	Miami Canal
BORING NO.	TP-7
BORING ELEV.	Not Determined
DATE	2/6/2009

SAJ FORM 2087
JUN 02



Sample No.	Depth	Classification	Munsell	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● 1	2.0 to 3.0 Ft	LIMESTONE, poorly-graded with silt, mostly coarse-gravel to medium sand-size limerock fragments, little fine-grained quartz, few silt, trace shell fragments, light yellowish brown	2.5Y 6/3							

GRADATION CURVES

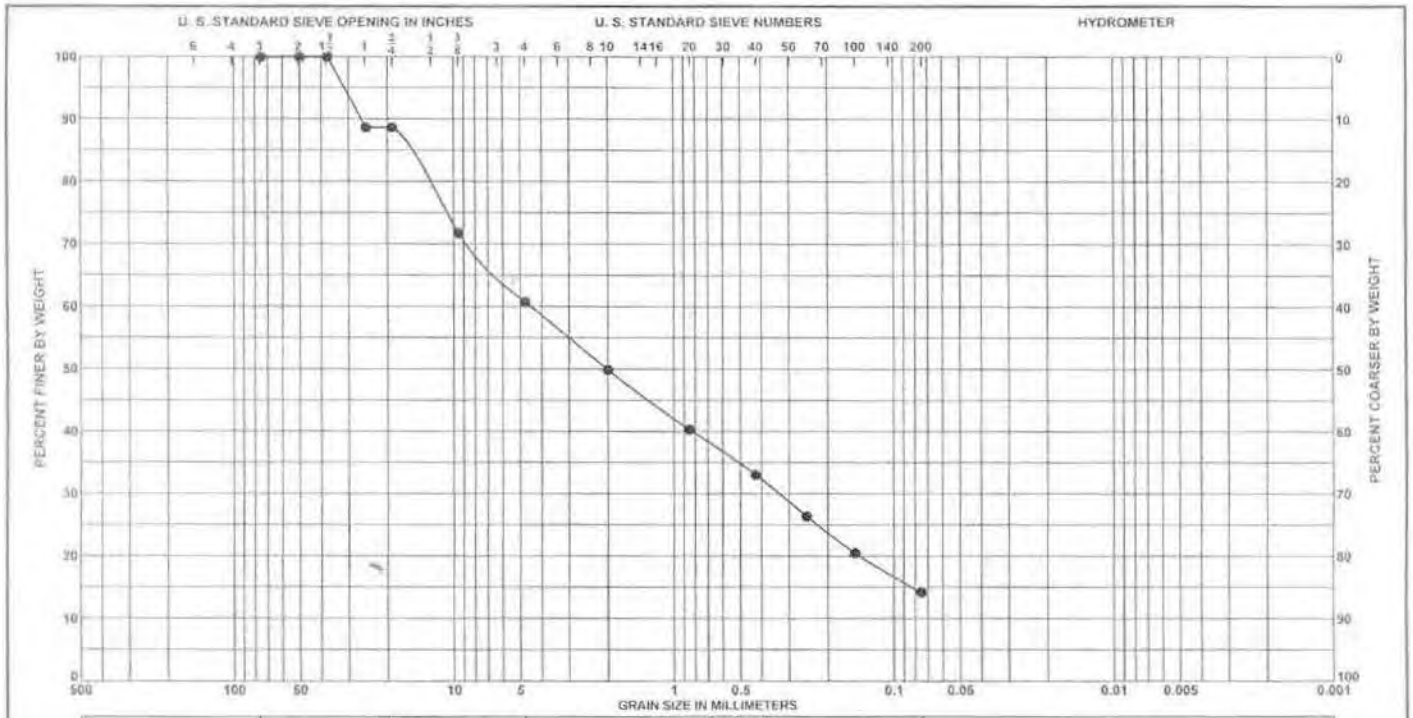
PROJECT: Miami Canal

BORING NO.: TP-8

BORING ELEV.: Not Determined

DATE: 2/6/2009

SAJ FORM 2087
JUN 02

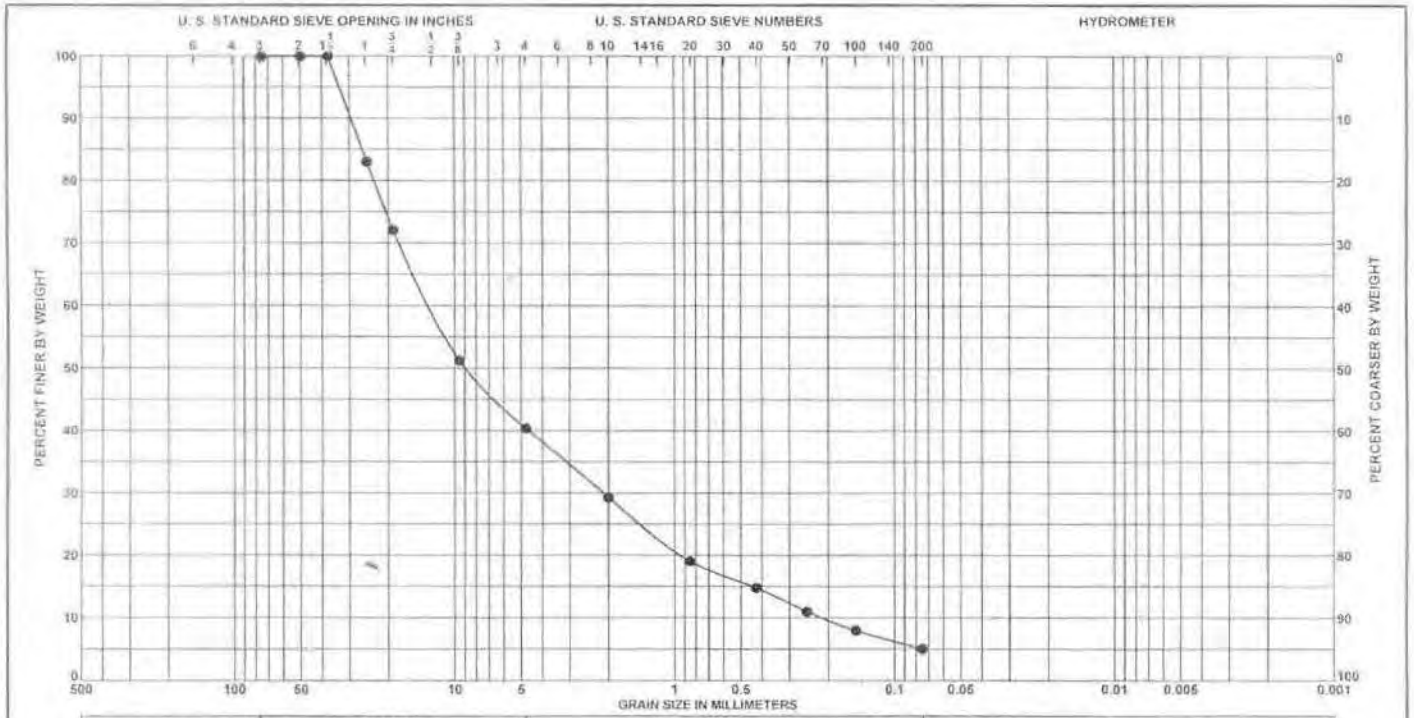


Sample No.	Depth	Classification	Munsell	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● 3	6.0 to 7.0 Ft	SAND, silty, mostly coarse-gravel to medium sand-size limerock fragments, little fine-grained quartz, little silt, trace shell fragments, grayish brown (SM)	2.5Y 5/2							

GRADATION CURVES

PROJECT	Miami Canal
BORING NO.	TP-8
BORING ELEV.	Not Determined
DATE	2/6/2009

SAJ FORM 2087
JUN 02



Sample No.	Depth	Classification	Munsell	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● 1	1.5 to 2.5 Ft	LIMESTONE, poorly-graded with silt, mostly coarse-gravel to medium sand-size limerock fragments, few fine-grained quartz, few silt, few medium to fine sand-size shell fragments, l (GP-GM)	2.5Y 5/3							

PROJECT Miami Canal

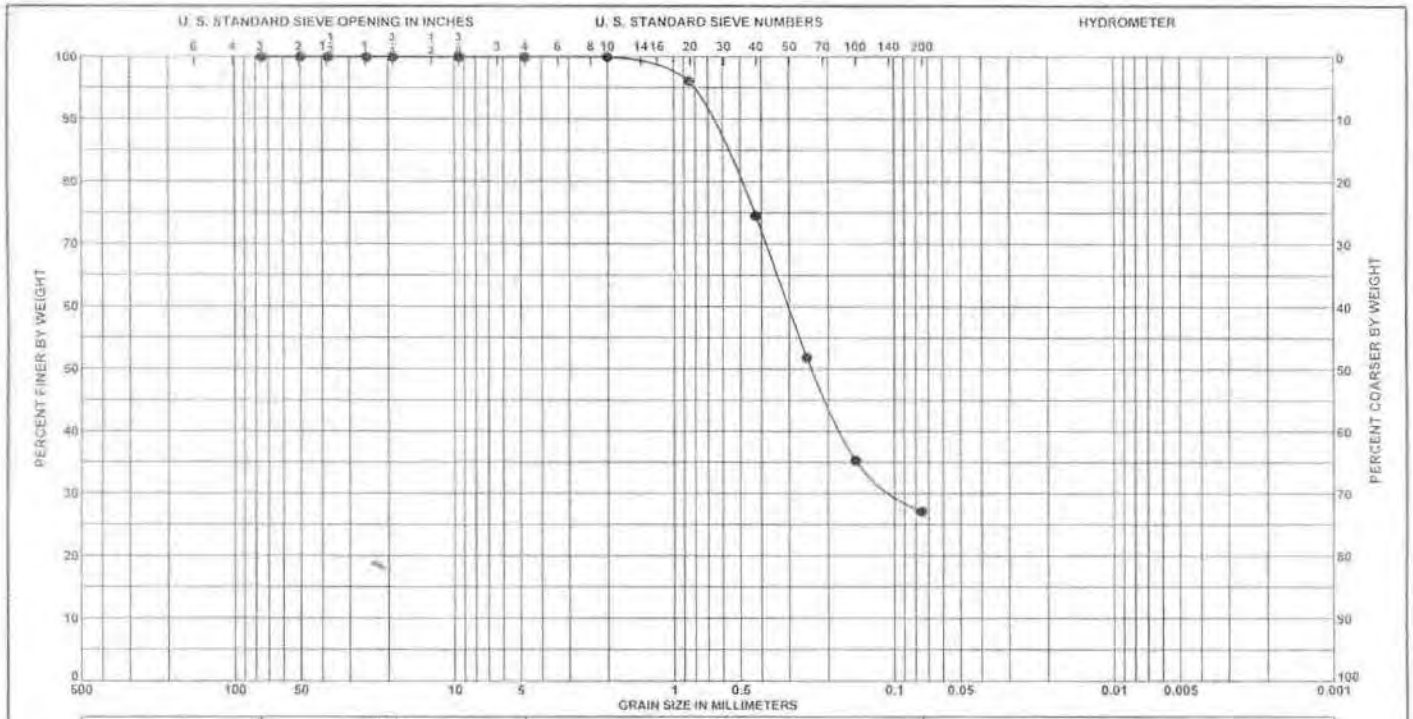
BORING NO. TP-9

BORING ELEV. Not Determined

DATE 2/6/2009

GRADATION CURVES

SAJ FORM 2087
JUN 02

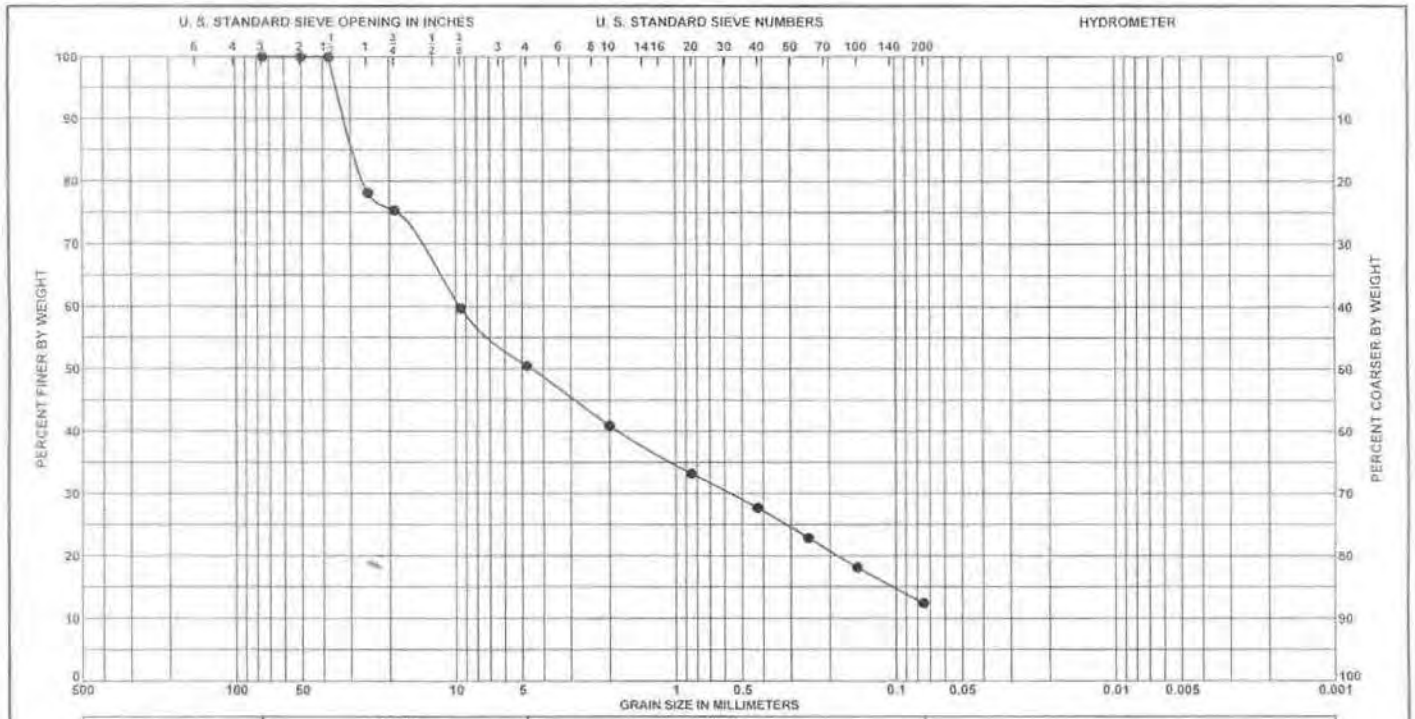


Sample No.	Depth	Classification	Munsell	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● 2	2.5 to 3.5 Ft.	SAND, silty, some fine-grained quartz, little silt, little medium to fine sand-size limerock fragments, few medium to fine sand-size shell fragments, few organic matter, very dark br	10YR 2/2							

GRADATION CURVES

PROJECT	Miami Canal
BORING NO.	TP-9
BORING ELEV.	Not Determined
DATE	2/6/2009

SAJ FORM 2087
JUN 02

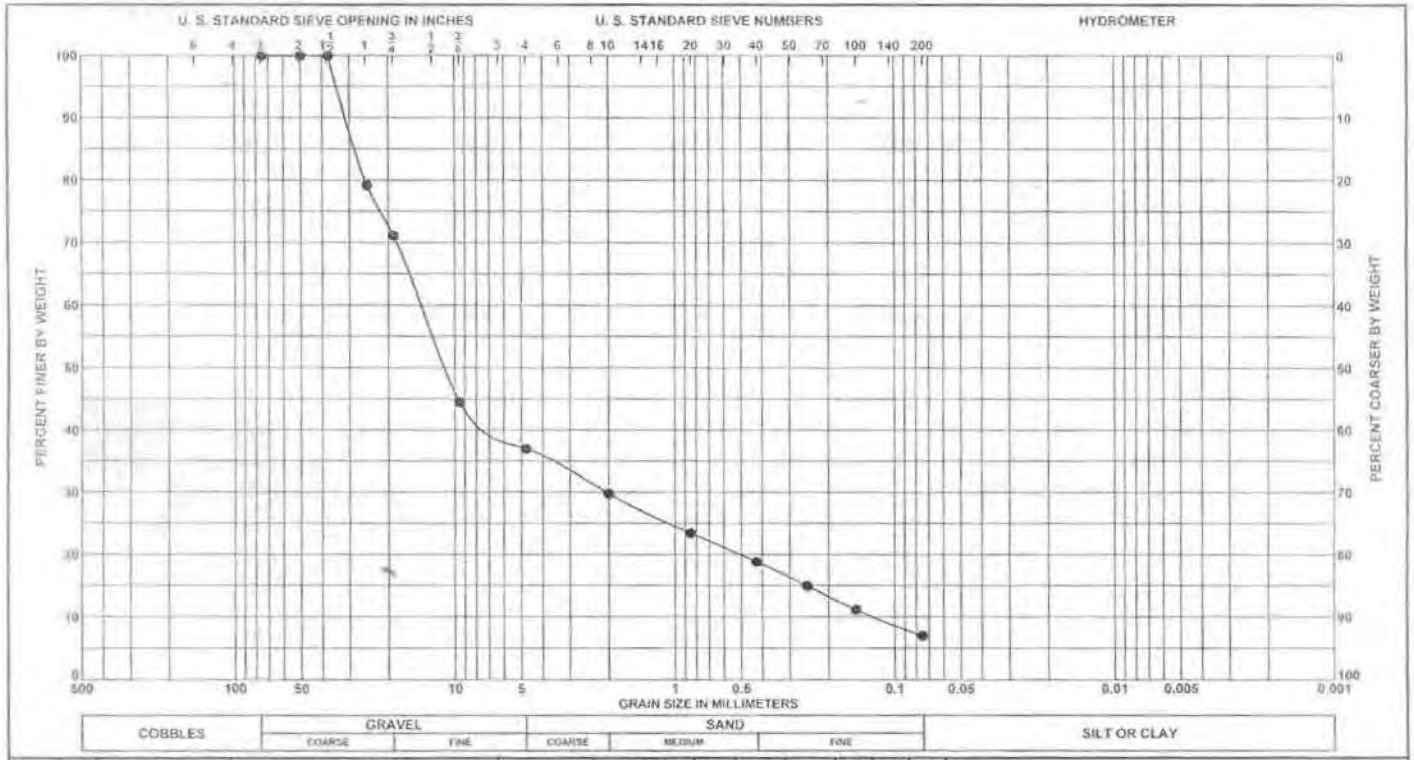


Sample No.	Depth	Classification	Munsell	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● 1	3.0 to 3.5 Ft.	LIMESTONE, silty, mostly	2.5Y 5/2							
		coarse-gravel to medium sand-size								
		limerock fragments, little								
		fine-grained quartz, little silt, few								
		medium to fine sand-size shell								
		fragments, gra								

GRADATION CURVES

PROJECT	Miami Canal
BORING NO.	TP-10
BORING ELEV.	Not Determined
DATE	2/6/2009

SAJ FORM 2087
JUN 02



Sample No.	Depth	Classification	Munsell	CO_3 %	G_s	Org %	w_n	LL	PL	PI
● 2	4.5 to 5.5 Ft	LIMESTONE, poorly-graded with silt, mostly coarse-gravel to medium sand-size limerock fragments, few fine-grained quartz, few silt, grayish brown (GP-GM)	2.5Y 5/2							

PROJECT Miami Canal

BORING NO. TP-10

BORING ELEV. Not Determined

DATE 2/6/2009

GRADATION CURVES

SAJ FORM 2087
JUN 02

ANNEX G-3. GEOLOGICAL INVESTIGATIONS – BLUE, GREEN, AND YELLOW LINES

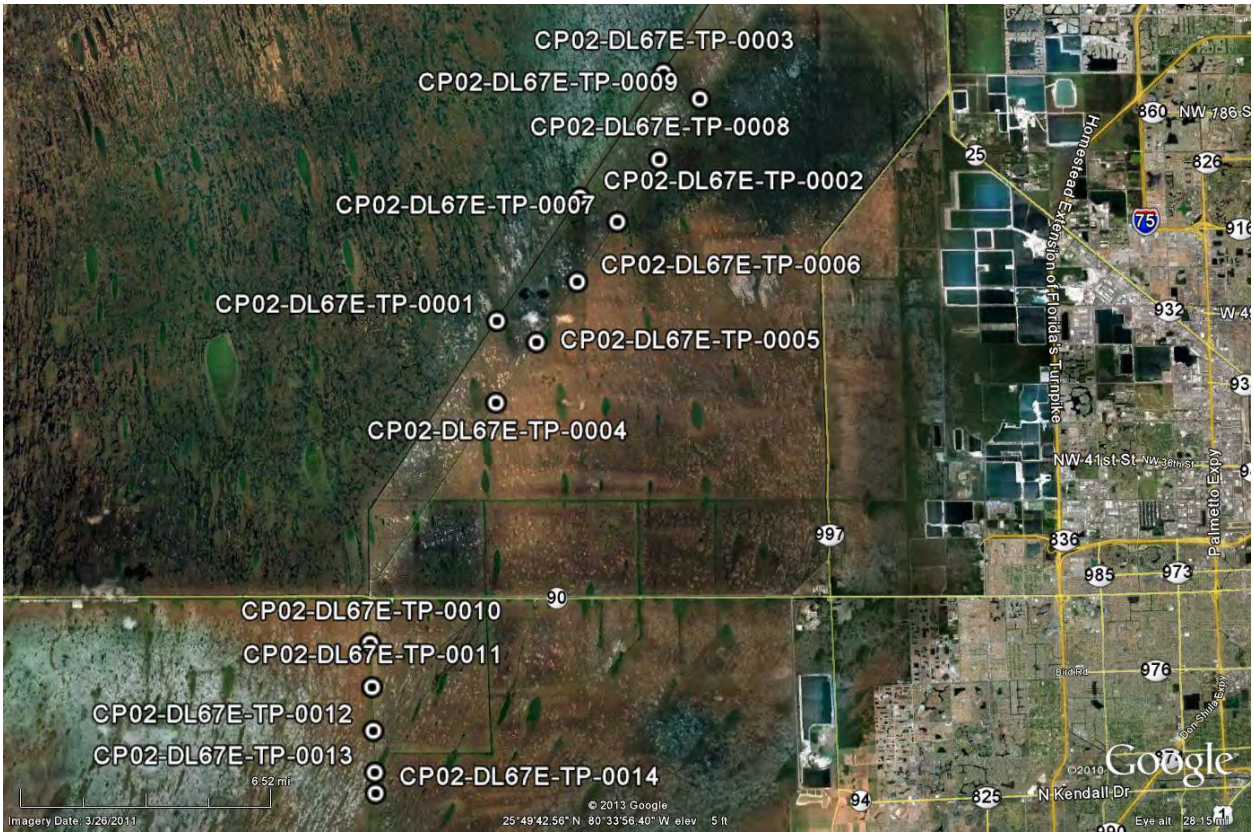


Figure G-3-1. L-67 test pit excavations (U.S. Army Corps of Engineers, 2002)

Boring Designation CP02-DL67E-TP-0001

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 2 SHEETS

1. PROJECT US DOI Modified Waters to ENP L-67 Extension	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) / HORIZONTAL NAD83 / VERTICAL NGVD29
2. BORING DESIGNATION CP02-DL67E-TP-0001 / LOCATION COORDINATES X = 781,188 Y = 557,009	11. MANUFACTURER'S DESIGNATION OF DRILL Backhoe ☐ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY Corps of Engineers - CESAJ / CONTRACTOR FILE NO.	12. TOTAL SAMPLES DISTURBED 1 / UNDISTURBED (UD) 0
4. NAME OF DRILLER H & H Land	13. TOTAL NUMBER CORE BOXES 0
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER Not Encountered
	15. DATE BORING STARTED 06-12-02 / COMPLETED 06-12-02
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING 15.0 Ft.
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING N/A
8. TOTAL DEPTH OF BORING 10.0 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Steve Myers, Geologist

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 1 FT.	N-VALUE
15.0	0.0						15.0		
			FILL, gravelly, mostly subangular to rounded fine to coarse gravel-sized limestone, some subangular to rounded fine to coarse-grained sand-sized carbonate, little silt, few cobble-sized limestone, strong reaction with HCl, moist, gray		1		Test Pit		
5.0	10.0						5.0		
			NOTES: 1. USACE Jacksonville is the custodian for these original files. 2. Soils are field visually classified in accordance with the Unified Soils Classification System. 3. Laboratory Testing Results SAMPLE ID / SAMPLE DEPTH / LABORATORY CLASSIFICATION 1 / 0.0/10.0 / GW-GM*						

SAJ FORM 1836
JUN 02

(Continued)

3

Boring Designation CP02-DL67E-TP-0001

DRILLING LOG (Cont. Sheet)	INSTALLATION Jacksonville District		SHEET 3 OF 3 SHEETS
PROJECT US DOI Modified Waters to ENP	COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83	VERTICAL NGVD29
LOCATION COORDINATES X = 781,188 Y = 557,009	ELEVATION TOP OF BORING 15.0 Ft.		

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 1 FT.	N-VALUE
			*Lab visual classification based on gradation curve. No Atterberg limits.						

SAJ FORM 1836-A
JUN 02

Boring Designation CP02-DL67E-TP-0002

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 2 SHEETS

1. PROJECT US DOI Modified Waters to ENP L-67 Extension	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) / HORIZONTAL NAD83 / VERTICAL NGVD29
2. BORING DESIGNATION CP02-DL67E-TP-0002 / LOCATION COORDINATES X = 792,572 Y = 573,843	11. MANUFACTURER'S DESIGNATION OF DRILL Backhoe ☐ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY Corps of Engineers - CESAJ / CONTRACTOR FILE NO.	12. TOTAL SAMPLES DISTURBED 1 / UNDISTURBED (UD) 0
4. NAME OF DRILLER H & H Land	13. TOTAL NUMBER CORE BOXES 0
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER Not Encountered
	15. DATE BORING STARTED 06-12-02 / COMPLETED 06-12-02
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING 15.5 Ft.
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING N/A
8. TOTAL DEPTH OF BORING 10.0 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Steve Myers, Geologist

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 1 FT.	N-VALUE
15.5	0.0						15.5		
			FILL, gravelly, mostly fine to coarse gravel-sized limestone, some angular to subangular fine to coarse-grained sand-sized carbonate, little silt, strong reaction with HCl, dry, gray						
			At El. 11.5 Ft., few cobble-sized limestone		1		Test Pit		
5.5	10.0						5.5		
			NOTES: 1. USACE Jacksonville is the custodian for these original files. 2. Soils are field visually classified in accordance with the Unified Soils Classification System. 3. Laboratory Testing Results SAMPLE ID / SAMPLE DEPTH / LABORATORY CLASSIFICATION 1 / 0.0/10.0 / GP*						

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JUN 02

(Continued)

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Boring Designation CP02-DL67E-TP-0002

DRILLING LOG (Cont. Sheet)	INSTALLATION Jacksonville District		SHEET 3 OF 2 SHEETS
PROJECT US DOI Modified Waters to ENP	COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83	VERTICAL NGVD29
LOCATION COORDINATES X = 792,572 Y = 573,843	ELEVATION TOP OF BORING 15.5 Ft.		

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 1 FT.	N-VALUE
			*Lab visual classification based on gradation curve. No Atterberg limits.						

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Boring Designation CP02-DL67E-TP-0003

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 2 SHEETS

1. PROJECT US DOI Modified Waters to ENP L-67 Extension		9. SIZE AND TYPE OF BIT See Remarks	
		10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83 / VERTICAL NGVD29
2. BORING DESIGNATION CP02-DL67E-TP-0003	LOCATION COORDINATES X = 804,064 Y = 590,838	11. MANUFACTURER'S DESIGNATION OF DRILL Backhoe	☐ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY Corps of Engineers - CESAJ	CONTRACTOR FILE NO.	12. TOTAL SAMPLES	DISTURBED 1 / UNDISTURBED (UD) 0
4. NAME OF DRILLER H & H Land		13. TOTAL NUMBER CORE BOXES 0	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED	DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER Not Encountered	
		15. DATE BORING	STARTED 06-12-02 / COMPLETED 06-12-02
6. THICKNESS OF OVERBURDEN N/A		16. ELEVATION TOP OF BORING 15.6 Ft.	
7. DEPTH DRILLED INTO ROCK N/A		17. TOTAL RECOVERY FOR BORING N/A	
8. TOTAL DEPTH OF BORING 10.0 Ft.		18. SIGNATURE AND TITLE OF INSPECTOR Steve Myers, Geologist	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 1 FT.	N-VALUE
15.6	0.0						15.6		
			FILL, gravelly, mostly subrounded to rounded fine to coarse gravel-sized limestone, little subangular to rounded fine to coarse-grained sand-sized carbonate, little silt, few cobble-sized limestone, moist, gray		1		Test Pit		
5.6	10.0						5.6		
			NOTES: 1. USACE Jacksonville is the custodian for these original files. 2. Soils are field visually classified in accordance with the Unified Soils Classification System. 3. Laboratory Testing Results SAMPLE ID / SAMPLE DEPTH / LABORATORY CLASSIFICATION 1 / 0.0/10.0 / GP-GM*						

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JUN 02

(Continued)

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Boring Designation CP02-DL67E-TP-0003

DRILLING LOG (Cont. Sheet)	INSTALLATION Jacksonville District		SHEET 3 OF 3 SHEETS
PROJECT US DOI Modified Waters to ENP	COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83	VERTICAL NGVD29
LOCATION COORDINATES X = 804,064 Y = 590,838	ELEVATION TOP OF BORING 15.6 Ft.		

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 1 FT.	N-VALUE
			*Lab visual classification based on gradation curve. No Atterberg limits.						

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JUN 02

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Boring Designation CP02-DL67E-TP-0004

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 2 SHEETS
1. PROJECT US DOI Modified Waters to ENP L-67 Extension		9. SIZE AND TYPE OF BIT See Remarks	
		10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83 / VERTICAL NGVD29
2. BORING DESIGNATION CP02-DL67E-TP-0004	LOCATION COORDINATES X = 781,054 Y = 545,860	11. MANUFACTURER'S DESIGNATION OF DRILL Backhoe	☐ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY Corps of Engineers - CESAJ	CONTRACTOR FILE NO.	12. TOTAL SAMPLES	DISTURBED 2 / UNDISTURBED (UD) 0
4. NAME OF DRILLER H & H Land		13. TOTAL NUMBER CORE BOXES 0	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED	DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER 6.1 Ft.	
		15. DATE BORING	STARTED 06-19-02 / COMPLETED 06-19-02
6. THICKNESS OF OVERBURDEN N/A		16. ELEVATION TOP OF BORING 10.1 Ft.	
7. DEPTH DRILLED INTO ROCK N/A		17. TOTAL RECOVERY FOR BORING N/A	
8. TOTAL DEPTH OF BORING 10.0 Ft.		18. SIGNATURE AND TITLE OF INSPECTOR Steve Myers, Geologist	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/1 FT.	N-VALUE
10.1	0.0						10.1		
			FILL, gravelly, mostly angular to subrounded fine to coarse gravel-sized limestone, some silt, little cobble-sized limestone, few angular to subrounded fine to coarse-grained sand-sized carbonate, strong reaction with HCl, brown		1		Test Pit		
			At El. 6.1 Ft., wet						
4.1	6.0								
			PEAT, fibrous, black (PT)				3.6		
					2		Test Pit		
0.1	10.0						0.1		

NOTES:

1. USACE Jacksonville is the custodian for these original files.

2. Soils are field visually classified in accordance with the Unified Soils Classification System.

3. Laboratory Testing Results

SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION
1	0.0/6.5	GW*

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JUN 02

(Continued)

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Boring Designation CP02-DL67E-TP-0004

DRILLING LOG (Cont. Sheet)	INSTALLATION Jacksonville District		SHEET 3 OF 2 SHEETS
PROJECT US DOI Modified Waters to ENP	COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83	VERTICAL NGVD29
LOCATION COORDINATES X = 781,054 Y = 545,860	ELEVATION TOP OF BORING 10.1 Ft.		

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 1 FT.	N-VALUE
			*Lab visual classification based on gradation curve. No Atterberg limits.						

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JUN 02

Boring Designation CP02-DL67E-TP-0005

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 2 SHEETS

1. PROJECT US DOI Modified Waters to ENP L-67 Extension	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) / HORIZONTAL NAD83 / VERTICAL NGVD29
2. BORING DESIGNATION CP02-DL67E-TP-0005 / LOCATION COORDINATES X = 786,627 Y = 554,101	11. MANUFACTURER'S DESIGNATION OF DRILL Backhoe ☐ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY Corps of Engineers - CESAJ / CONTRACTOR FILE NO.	12. TOTAL SAMPLES DISTURBED 2 / UNDISTURBED (UD) 0
4. NAME OF DRILLER H & H Land	13. TOTAL NUMBER CORE BOXES 0
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER 3.6 Ft.
	15. DATE BORING STARTED 06-19-02 / COMPLETED 06-19-02
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING 9.1 Ft.
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING N/A
8. TOTAL DEPTH OF BORING 10.0 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Steve Myers, Geologist

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 1 FT.	N-VALUE
9.1	0.0						9.1		
			FILL, gravelly, mostly angular to subrounded fine to coarse gravel-sized limestone, little silt, few cobble-sized limestone, few subangular to subrounded fine to coarse-grained sand-sized carbonate, brown		1		Test Pit		
			At El. 3.6 Ft., wet						
2.1	7.0						2.1		
			PEAT, wet, fibrous, black (PT)		2		Test Pit		
-0.9	10.0						-0.9		

NOTES:

1. USACE Jacksonville is the custodian for these original files.

2. Soils are field visually classified in accordance with the Unified Soils Classification System.

3. Laboratory Testing Results

SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION
1	0.0/7.0	GP*

SAJ FORM 1836
JUN 02

(Continued)

Boring Designation CP02-DL67E-TP-0005

DRILLING LOG (Cont. Sheet)	INSTALLATION Jacksonville District		SHEET 2 OF 2 SHEETS
PROJECT US DOI Modified Waters to ENP	COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83	VERTICAL NGVD29
LOCATION COORDINATES X = 786,627 Y = 554,101	ELEVATION TOP OF BORING 9.1 Ft.		

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 1 FT.	N-VALUE
			*Lab visual classification based on gradation curve. No Atterberg limits.						

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12

Boring Designation CP02-DL67E-TP-0006

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 2 SHEETS

1. PROJECT US DOI Modified Waters to ENP L-67 Extension	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) / HORIZONTAL NAD83 / VERTICAL NGVD29
2. BORING DESIGNATION CP02-DL67E-TP-0006 / LOCATION COORDINATES X = 792,210 Y = 562,354	11. MANUFACTURER'S DESIGNATION OF DRILL Backhoe ☐ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY Corps of Engineers - CESAJ / CONTRACTOR FILE NO.	12. TOTAL SAMPLES DISTURBED 2 / UNDISTURBED (UD) 0
4. NAME OF DRILLER H & H Land	13. TOTAL NUMBER CORE BOXES 0
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER 5.5 Ft.
	15. DATE BORING STARTED 06-19-02 / COMPLETED 06-19-02
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING 10.7 Ft.
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING N/A
8. TOTAL DEPTH OF BORING 9.5 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Steve Myers, Geologist

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/1 FT.	N-VALUE
10.7	0.0						10.7		
			FILL, gravelly, mostly angular to subrounded fine to coarse gravel-sized limestone, little silt, little cobble-sized limestone, few subangular to rounded fine to coarse-grained sand-sized carbonate, strong reaction with HCl, moist, brown		1		Test Pit		
			At El. 5.3 Ft. wet						
3.5	7.2						3.5		
			PEAT, wet, fibrous, black/brown (PT)		2		Test Pit		
1.2	9.5						1.2		

NOTES:

1. USACE Jacksonville is the custodian for these original files

2. Soils are field visually classified in accordance with the Unified Soils Classification System.

3. Laboratory Testing Results

SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION
1	0.0/7.2	GP*

*Lab visual classification based on gradation

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JUN 02

(Continued)

Boring Designation CP02-DL67E-TP-0006

DRILLING LOG (Cont. Sheet)	INSTALLATION Jacksonville District		SHEET 2 OF 2 SHEETS
PROJECT US DOI Modified Waters to ENP	COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83	VERTICAL NGVD29
LOCATION COORDINATES X = 792,210 Y = 562,354	ELEVATION TOP OF BORING 10.7 Ft.		

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 1 FT.	N-VALUE
			curve. No Atterberg limits.						

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JUN 02

Boring Designation CP02-DL67E-TP-0007

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 2 SHEETS

1. PROJECT US DOI Modified Waters to ENP L-67 Extension	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) / HORIZONTAL NAD83 / VERTICAL NGVD29
2. BORING DESIGNATION CP02-DL67E-TP-0007 / LOCATION COORDINATES X = 797,726 Y = 570,520	11. MANUFACTURER'S DESIGNATION OF DRILL Backhoe ☐ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY Corps of Engineers - CESAJ / CONTRACTOR FILE NO.	12. TOTAL SAMPLES / DISTURBED 2 / UNDISTURBED (UD) 0
4. NAME OF DRILLER H & H Land	13. TOTAL NUMBER CORE BOXES 0
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER 3.6 Ft.
	15. DATE BORING / STARTED 06-19-02 / COMPLETED 06-19-02
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING 9.6 Ft.
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING N/A
8. TOTAL DEPTH OF BORING 10.0 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Steve Myers, Geologist

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/1 FT.	N-VALUE
9.6	0.0						9.6		
			FILL, gravelly, mostly angular to subrounded fine to coarse gravel-sized limestone, little cobble-sized limestone, little silt, few fine to coarse-grained sand-sized carbonate, strong reaction with HCl, dry, brown						
			At El. 5.6 Ft., gray		1		Test Pit		
			At El. 3.6 Ft., wet						
1.4	8.2						1.4		
			PEAT, wet, fibrous, black/brown (PT)		2		Test Pit		
-0.4	10.0						-0.4		

NOTES:

1. USACE Jacksonville is the custodian for these original files.

2. Soils are field visually classified in accordance with the Unified Soils Classification System.

3. Laboratory Testing Results

SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION
1	0.0/8.2	GP-GM*

SAJ FORM 1836
JUN 02

(Continued)

Boring Designation CP02-DL67E-TP-0007

DRILLING LOG (Cont. Sheet)	INSTALLATION Jacksonville District		SHEET 3 OF 2 SHEETS
PROJECT US DOI Modified Waters to ENP	COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83	VERTICAL NGVD29
LOCATION COORDINATES X = 797,726 Y = 570,520	ELEVATION TOP OF BORING 9.6 Ft.		

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 1 FT.	N-VALUE
			*Lab visual classification based on gradation curve. No Atterberg limits.						

SAJ FORM 1836-A
JUN 02

Boring Designation CP02-DL67E-TP-0008

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 1 SHEETS

1. PROJECT US DOI Modified Waters to ENP L-67 Extension	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) / HORIZONTAL NAD83 / VERTICAL NGVD29
2. BORING DESIGNATION CP02-DL67E-TP-0008 / LOCATION COORDINATES X = 803,486 Y = 579,032	11. MANUFACTURER'S DESIGNATION OF DRILL Backhoe / ☐ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY Corps of Engineers - CESAJ / CONTRACTOR FILE NO.	12. TOTAL SAMPLES / DISTURBED 2 / UNDISTURBED (UD) 0
4. NAME OF DRILLER H & H Land	13. TOTAL NUMBER CORE BOXES 0
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER 4.7 Ft.
	15. DATE BORING / STARTED 06-20-02 / COMPLETED 06-20-02
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING 10.2 Ft.
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING N/A
8. TOTAL DEPTH OF BORING 9.0 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Steve Myers, Geologist

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 1 FT.	N-VALUE
10.2	0.0						10.2		
			FILL, cobbles, mostly angular cobble-sized limestone, little silt, few sand, strong reaction with HCl, dry, gray		1		Test Pit		
			At El. 5.2 Ft., gravelly, some coarse gravel-sized limestone, little cobble-sized limestone At El. 4.7 Ft., wet						
2.7	7.5						2.7		
			PEAT, high plasticity, soft, fibrous, interbedded with lean clay, black (PT)		2		Test Pit		
1.2	9.0						1.2		
			BORING TERMINATED IN REFUSAL						

NOTES:

1. USACE Jacksonville is the custodian for these original files.

2. Soils are field visually classified in accordance with the Unified Soils Classification System.

3. Laboratory Testing Results

SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION
1	0.0/7.5	GW*

*Lab visual classification based on gradation curve. No Atterberg limits.

SAJ FORM 1836
JUN 02

Boring Designation CP02-DL67E-TP-0009

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 1 SHEETS

1. PROJECT US DOI Modified Waters to ENP L-67 Extension	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) / HORIZONTAL NAD83 / VERTICAL NGVD29
2. BORING DESIGNATION CP02-DL67E-TP-0009 / LOCATION COORDINATES X = 809,063 Y = 587,280	11. MANUFACTURER'S DESIGNATION OF DRILL Backhoe ☐ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY Corps of Engineers - CESAJ / CONTRACTOR FILE NO.	12. TOTAL SAMPLES DISTURBED 2 / UNDISTURBED (UD) 0
4. NAME OF DRILLER H & H Land	13. TOTAL NUMBER CORE BOXES 0
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER 4.6 Ft.
	15. DATE BORING STARTED 06-20-02 / COMPLETED 06-20-02
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING 10.0 Ft.
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING N/A
8. TOTAL DEPTH OF BORING 9.0 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Steve Myers, Geologist

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 1 FT.	N-VALUE
10.0	0.0						10.0		
			FILL, gravelly, mostly angular to subrounded fine to coarse gravel-sized limestone, little silt, few fine to coarse gravel-sized limestone, moist, brown		1		Test Pit		
			At El. 4.6 Ft. wet						
2.2	7.8						2.2		
			PEAT, fibrous, black/brown (PT)		2		Test Pit		
1.0	9.0						1.0		
			BORING TERMINATED IN REFUSAL						

NOTES:

1. USACE Jacksonville is the custodian for these original files.

2. Soils are field visually classified in accordance with the Unified Soils Classification System.

3. Laboratory Testing Results

SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION
1	0.0/7.8	GW*

*Lab visual classification based on gradation curve. No Atterberg limits.

SAJ FORM 1836
JUN 02

Boring Designation CP02-DL67E-TP-0010

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 2 SHEETS

1. PROJECT US DOI Modified Waters to ENP L-67 Extension		9. SIZE AND TYPE OF BIT See Remarks	
		10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83 / VERTICAL NGVD29
2. BORING DESIGNATION CP02-DL67E-TP-0010	LOCATION COORDINATES X = 763,742 Y = 513,043	11. MANUFACTURER'S DESIGNATION OF DRILL Backhoe	☐ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY Corps of Engineers - CESAJ	CONTRACTOR FILE NO.	12. TOTAL SAMPLES	DISTURBED 1 / UNDISTURBED (UD) 0
4. NAME OF DRILLER H & H Land		13. TOTAL NUMBER CORE BOXES 0	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED	DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER 3.5 Ft.	
		15. DATE BORING	STARTED 06-11-02 / COMPLETED 06-11-02
6. THICKNESS OF OVERBURDEN N/A		16. ELEVATION TOP OF BORING 13.0 Ft.	
7. DEPTH DRILLED INTO ROCK N/A		17. TOTAL RECOVERY FOR BORING N/A	
8. TOTAL DEPTH OF BORING 10.0 Ft.		18. SIGNATURE AND TITLE OF INSPECTOR Steve Myers, Geologist	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/1 FT.	N-VALUE
13.0	0.0						13.0		
			FILL, sandy, some angular to subrounded fine to coarse-grained sand-sized carbonate, some gravel to boulder-sized limestone up to 3', little rounded fine-grained sand-sized quartz, little silt, dry, tan		1		Test Pit		
3.7	9.3						3.7		
3.5	9.5		PEAT, moist, fibrous, black (PT)						
3.0	10.0		LIMESTONE, hard, moderately weathered, aphanitic, vuggy, brown/tan				3.0		

NOTES:

1. USACE Jacksonville is the custodian for these original files.

2. Soils are field visually classified in accordance with the Unified Soils Classification System.

3. Laboratory Testing Results

SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION
1	0.0/9.3	SP*

Abbreviations:
NR = Not Recorded.

SAJ FORM 1836
JUN 02

(Continued)

Boring Designation CP02-DL67E-TP-0010

DRILLING LOG (Cont. Sheet)	INSTALLATION Jacksonville District		SHEET 3 OF 3 SHEETS
PROJECT US DOI Modified Waters to ENP	COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83	VERTICAL NGVD29
LOCATION COORDINATES X = 763,742 Y = 513,043	ELEVATION TOP OF BORING 13.0 Ft.		

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 1 FT.	N-VALUE
			*Lab visual classification based on gradation curve. No Atterberg limits.						

SAJ FORM 1836-A
JUN 02

Boring Designation CP02-DL67E-TP-0011

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 2 SHEETS

1. PROJECT: US DOI Modified Waters to ENP L-67 Extension	9. SIZE AND TYPE OF BIT: See Remarks
	10. COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.) / HORIZONTAL: NAD83 / VERTICAL: NGVD29
2. BORING DESIGNATION: CP02-DL67E-TP-0011 / LOCATION COORDINATES: X = 763,955 Y = 507,074	11. MANUFACTURER'S DESIGNATION OF DRILL: Backhoe / ☐ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY: Corps of Engineers - CESAJ / CONTRACTOR FILE NO.	12. TOTAL SAMPLES: DISTURBED 2 / UNDISTURBED (UD) 0
4. NAME OF DRILLER: H & H Land	13. TOTAL NUMBER CORE BOXES: 0
5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER: 3.1 Ft.
	15. DATE BORING: STARTED 06-11-02 / COMPLETED 06-11-02
6. THICKNESS OF OVERBURDEN: N/A	16. ELEVATION TOP OF BORING: 12.3 Ft.
7. DEPTH DRILLED INTO ROCK: N/A	17. TOTAL RECOVERY FOR BORING: N/A
8. TOTAL DEPTH OF BORING: 10.0 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR: Steve Myers, Geologist

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/1 FT.	N-VALUE
12.3	0.0						12.3		
			FILL, sandy, mostly rounded fine-grained sand-sized quartz, little subangular to rounded carbonate, little silt, few fine to coarse gravel-sized limestone, few cobble-sized limestone, strong reaction with HCl, moist, tan		1		Test Pit		
4.6	7.8						4.6		
4.3	8.0		PEAT, few clay, black (PT)				4.3 Test Pit		
			SAND, clayey, medium plasticity, soft, some rounded fine-grained sand-sized quartz, some clay, little silt, wet, gray (SC)		2		Test Pit		
2.5	9.8						2.5		
2.3	10.0		LIMESTONE, hard, slightly weathered, aphanitic, vuggy, brown				2.3 Test Pit		

NOTES:

1. USACE Jacksonville is the custodian for these original files.

2. Soils are field visually classified in accordance with the Unified Soils Classification System.

3. Laboratory Testing Results

SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION

SAJ FORM 1836
JUN 02

(Continued)

Boring Designation CP02-DL67E-TP-0011

DRILLING LOG (Cont. Sheet)	INSTALLATION Jacksonville District		SHEET 2 OF 2 SHEETS
PROJECT US DOI Modified Waters to ENP	COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83	VERTICAL NGVD29
LOCATION COORDINATES X = 763,955 Y = 507,074	ELEVATION TOP OF BORING 12.3 Ft.		

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 1 FT.	N-VALUE
			1 0.0/7.8 SP*						
			*Lab visual classification based on gradation curve. No Atterberg limits.						

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SAJ FORM 1836-A
JUN 02

Boring Designation CP02-DL67E-TP-0012

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 2 SHEETS

1. PROJECT US DOI Modified Waters to ENP L-67 Extension	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) / HORIZONTAL NAD83 / VERTICAL NGVD29
2. BORING DESIGNATION CP02-DL67E-TP-0012 / LOCATION COORDINATES X = 764,168 Y = 501,106	11. MANUFACTURER'S DESIGNATION OF DRILL Backhoe ☐ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY Corps of Engineers - CESAJ / CONTRACTOR FILE NO.	12. TOTAL SAMPLES DISTURBED 1 / UNDISTURBED (UD) 0
4. NAME OF DRILLER H & H Land	13. TOTAL NUMBER CORE BOXES 0
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER 3.6 Ft.
	15. DATE BORING STARTED 06-11-02 / COMPLETED 06-11-02
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING 12.3 Ft.
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING N/A
8. TOTAL DEPTH OF BORING 10.0 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Steve Myers, Geologist

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 1 FT.	N-VALUE
12.3	0.0						12.3		
			FILL, sandy, mostly rounded fine-grained sand-sized quartz, little subangular to rounded fine to coarse-grained sand-sized carbonate, few gravel to cobble-sized limestone, strong reaction with HCl, moist, tan		1		Test Pit		
			At El. 3.8 Ft., few silt, wet, gray						
2.8	9.5						2.8		
2.3	10.0		LIMESTONE, hard, slightly weathered, aphanitic, solid, yellowish				2.3 Test Pit		

NOTES:

1. USACE Jacksonville is the custodian for these original files.

2. Soils are field visually classified in accordance with the Unified Soils Classification System

3. Laboratory Testing Results

SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION
1	0.0/9.5	SP*

SAJ FORM 1836
JUN 02

(Continued)

Boring Designation CP02-DL67E-TP-0012

DRILLING LOG (Cont. Sheet)	INSTALLATION Jacksonville District		SHEET 3 OF 2 SHEETS
PROJECT US DOI Modified Waters to ENP	COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83	VERTICAL NGVD29
LOCATION COORDINATES X = 764,168 Y = 501,106	ELEVATION TOP OF BORING 12.3 Ft.		

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 1 FT.	N-VALUE
			*Lab visual classification based on gradation curve. No Atterberg limits.						

SAJ FORM 1836-A
JUN 02

Boring Designation CP02-DL67E-TP-0013

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 2 SHEETS

1. PROJECT US DOI Modified Waters to ENP L-67 Extension	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) / HORIZONTAL NAD83 / VERTICAL NGVD29
2. BORING DESIGNATION CP02-DL67E-TP-0013 / LOCATION COORDINATES X = 764,371 Y = 495,427	11. MANUFACTURER'S DESIGNATION OF DRILL Backhoe ☐ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY Corps of Engineers - CESAJ / CONTRACTOR FILE NO.	12. TOTAL SAMPLES DISTURBED 2 / UNDISTURBED (UD) 0
4. NAME OF DRILLER H & H Land	13. TOTAL NUMBER CORE BOXES 0
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER 1.7 Ft.
	15. DATE BORING STARTED 06-11-02 / COMPLETED 06-11-02
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING 11.4 Ft.
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING N/A
8. TOTAL DEPTH OF BORING 10.0 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Steve Myers, Geologist

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/1 FT.	N-VALUE
11.4	0.0						11.4		
			FILL, sandy, mostly rounded fine-grained sand-sized quartz, some subrounded to rounded fine-grained sand-sized carbonate, little coarse gravel-sized limestone, few cobble-sized limestone, moist, light gray		1		Test Pit		
5.4	6.0						5.4		
			PEAT, moist, fibrous, black (PT)		2		Test Pit		
1.4	10.0		At El. 1.7 Ft., wet				1.4		
			BORING TERMINATED IN REFUSAL						

NOTES:

1. USACE Jacksonville is the custodian for these original files.

2. Soils are field visually classified in accordance with the Unified Soils Classification System.

3. Laboratory Testing Results

SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION

SAJ FORM 1836
JUN 02

(Continued)

Boring Designation CP02-DL67E-TP-0013

DRILLING LOG (Cont. Sheet)	INSTALLATION Jacksonville District	SHEET 3 OF 3 SHEETS
PROJECT US DOI Modified Waters to ENP	COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83 / VERTICAL NGVD29
LOCATION COORDINATES X = 764,371 Y = 495,427	ELEVATION TOP OF BORING 11.4 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 1 FT.	N-VALUE
			1 0.0/6.0 GP*						
			*Lab visual classification based on gradation curve. No Atterberg limits.						

SAJ FORM 1836-A
JUN 02

Boring Designation CP02-DL67E-TP-0014

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 2 SHEETS

1. PROJECT US DOI Modified Waters to ENP L-67 Extension		9. SIZE AND TYPE OF BIT See Remarks	
		10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83 / VERTICAL NGVD29
2. BORING DESIGNATION CP02-DL67E-TP-0014	LOCATION COORDINATES X = 764,470 Y = 492,583	11. MANUFACTURER'S DESIGNATION OF DRILL Backhoe	☐ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY Corps of Engineers - CESAJ	CONTRACTOR FILE NO.	12. TOTAL SAMPLES	DISTURBED 1 / UNDISTURBED (UD) 0
4. NAME OF DRILLER H & H Land		13. TOTAL NUMBER CORE BOXES 0	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED	DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER 2.6 Ft.	
		15. DATE BORING	STARTED 06-11-02 / COMPLETED 06-11-02
6. THICKNESS OF OVERBURDEN N/A		16. ELEVATION TOP OF BORING 11.4 Ft.	
7. DEPTH DRILLED INTO ROCK N/A		17. TOTAL RECOVERY FOR BORING N/A	
8. TOTAL DEPTH OF BORING 9.3 Ft.		18. SIGNATURE AND TITLE OF INSPECTOR Steve Myers, Geologist	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/1 FT.	N-VALUE
11.4	0.0						11.4		
			FILL, sandy, mostly rounded fine-grained sand-sized quartz, few angular to subrounded fine-grained sand-sized carbonate, few fine gravel-sized limestone, strong reaction with HCl, moist, tan		1		Test Pit		
			At El. 5.4 Ft., little cobble-sized limestone						
4.2	7.3						4.2		
			PEAT, wet, brown/black (PT)				Test Pit		
2.2	9.3						2.2		
			BORING TERMINATED IN REFUSAL						

NOTES:

1. USACE Jacksonville is the custodian for these original files.

2. Soils are field visually classified in accordance with the Unified Soils Classification System.

3. Laboratory Testing Results

SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION
1	0.0/7.3	SP*

*Lab visual classification based on gradation

SAJ FORM 1836
JUN 02

(Continued)

Boring Designation CP02-DL67E-TP-0014

DRILLING LOG (Cont. Sheet)	INSTALLATION Jacksonville District		SHEET 2 OF 2 SHEETS
PROJECT US DOI Modified Waters to ENP	COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83	VERTICAL NGVD29
LOCATION COORDINATES X = 764,470 Y = 492,583	ELEVATION TOP OF BORING 11.4 Ft.		

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 1 FT.	N-VALUE
			curve. No Atterberg limits.						

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SAJ FORM 1836-A
JUN 02

Figure G-3-2. L-67C Boring Map (U.S. Army Corps of Engineers, 2009)

Boring Designation CP09-DCOMP-CB-0001

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 2 SHEETS

1. PROJECT C&SF:CERP:WCA 3 Decomp Part 1 L-67A Vicinity	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) / HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP09-DCOMP-CB-0001 / LOCATION COORDINATES X = Y =	11. MANUFACTURER'S DESIGNATION OF DRILL Failing 1500 / ☐ AUTO HAMMER ☒ MANUAL HAMMER
3. DRILLING AGENCY Corps of Engineers - CESAM / CONTRACTOR FILE NO.	12. TOTAL SAMPLES / DISTURBED 12 / UNDISTURBED (UD) 0
4. NAME OF DRILLER C. Brown	13. TOTAL NUMBER CORE BOXES 1
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER 9.1 Ft.
	15. DATE BORING / STARTED 07-01-09 / COMPLETED 07-01-09
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING 16.3 Ft.
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING 56 %
8. TOTAL DEPTH OF BORING 17.6 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Jerrell Hand, Geologist

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
16.3	0.0						16.3		
			FILL, gravelly, few fine to coarse-grained sand-sized carbonate, few silt, trace organic matter, moist, 10YR 6/2 light brownish gray	67	1		SPT Sampler	6 12 8	20
							14.8		
				53	2		SPT Sampler	5 5 8	13
							13.3		
				40	3		SPT Sampler	6 3 6	9
							11.8		
				47	4		SPT Sampler	1 2 5	7
							10.3		
				47	5		SPT Sampler	1 1 2	3
							8.8		
				47	6		SPT Sampler	3 5 8	13
7.3	9.0						7.3		
			SILT, organic-L, few peat, slightly fibrous, 10YR 2/1 black (OL)	60	7		SPT Sampler	2 2 5	7
							5.8		
				67	8		SPT Sampler	2 10 8	18
							4.3		
				40	9		3.8 SPT Sampler	1	
							Advanced Boring		
							2.8		
				80	10		SPT Sampler	2 3 3	6
							1.3		

SAJ FORM 1836
JUN 02

(Continued)

Boring Designation CP09-DCOMP-CB-0001

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District	SHEET 3 OF 3 SHEETS
PROJECT: C&SF:CERP:WCA 3 Decomp Part 1	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.)	HORIZONTAL: NAD83 / VERTICAL: NAVD88
LOCATION COORDINATES: X = Y =	ELEVATION TOP OF BORING: 16.3 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
1.0	15.3								
		Slightly Weathered	LIMESTONE, hard, slightly weathered, fine grained, 2.5YR 6/2 pale red	67	11		SPT Sampler	6, 10, 20	30
-0.2									
				45	12		SPT Sampler	9, 0	
-1.3	17.6								

NOTES:

1. USACE Jacksonville is the custodian for these original files.

2. Soils are field visually classified in accordance with the Unified Soils Classification System.

3. Laboratory Testing Results

SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION
1	0.0/1.5	GP-GM*
4	4.5/6.0	GM*

*Lab visual classification based on gradation curve. No Atterberg limits.

4. Additional Laboratory Testing

2 Moisture Content
5D Moisture Content
6 Moisture Content
13 Moisture Content

140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).

SAJ FORM 1836-A
JUN 02

Boring Designation CP09-DCOMP-CB-0002

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 2 SHEETS

1. PROJECT C&SF:CERP:WCA 3 Decomp Part 1 L-67A Vicinity	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) / HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP09-DCOMP-CB-0002 / LOCATION COORDINATES X = Y =	11. MANUFACTURER'S DESIGNATION OF DRILL Failing 1500 / ☐ AUTO HAMMER ☒ MANUAL HAMMER
3. DRILLING AGENCY Corps of Engineers - CESAM / CONTRACTOR FILE NO.	12. TOTAL SAMPLES DISTURBED 11 / UNDISTURBED (UD) 0
4. NAME OF DRILLER C. Brown	13. TOTAL NUMBER CORE BOXES 1
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER 9.7 Ft.
	15. DATE BORING STARTED 07-01-09 / COMPLETED 07-01-09
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING 16.2 Ft.
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING 51 %
8. TOTAL DEPTH OF BORING 16.4 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Jerrell Hand, Geologist

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
16.2	0.0						16.2		
			FILL, gravelly, mostly carbonate, few fine to coarse-grained sand-sized carbonate, few silt, trace organic matter, moist, many hard carbonate cobles and boulders too large to sample at surface, 10YR 7/1 light gray	67	1		SPT Sampler	3 8 8	16
							14.7		
				47	2		SPT Sampler	7 7 0	7
							13.2		
				67	3		SPT Sampler	8 4 5	9
							11.7		
				33	4		SPT Sampler	2 10 6	16
							10.2		
				47	5		SPT Sampler	25 6 14	20
8.7	7.5						8.7		
			SILT, organic-L, few peat, wet, slightly fibrous, 10YR 2/1 black (OL)	60	6		SPT Sampler	2 3 4	7
							7.2		
				20	7		SPT Sampler	3 1 1	2
							5.7		
				33	8		SPT Sampler	3 4 6	10
							4.2		
				27	9		SPT Sampler	1 1 1	2
							2.7		
				80	10		SPT Sampler	1 1 3	4
							1.2		

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JUN 02

(Continued)

Boring Designation CP09-DCOMP-CB-0002

DRILLING LOG (Cont. Sheet)	INSTALLATION Jacksonville District	SHEET 2 OF 2 SHEETS
PROJECT C&SF:CERP:WCA 3 Decomp Part 1	COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83 / VERTICAL NAVD88
LOCATION COORDINATES X = Y =	ELEVATION TOP OF BORING 16.2 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
0.3	15.9		SILT, organic-L, medium plasticity, mostly silt, trace peat (OL)	86	11		SPT Sampler	1 / 1 / 50/0.4"	51+
0.0	16.2								
-0.2	16.4		LIMESTONE, hard, slightly weathered, fine grained, 2.5YR 6/2 pale red				-0.2 140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).		

NOTES:

1. USACE Jacksonville is the custodian for these original files.

2. Soils are field visually classified in accordance with the Unified Soils Classification System.

3. Laboratory Testing Results

SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION
1	0.0/1.5	SM*
3	3.0/4.5	GM*

*Lab visual classification based on gradation curve. No Atterberg limits.

4. Additional Laboratory Testing

4 Moisture Content
6 Percent Organic
9 Moisture Content

SAJ FORM 1836-A
JUN 02

Boring Designation CP09-DCOMP-CB-0003

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 1 SHEETS

1. PROJECT C&SF:CERP:WCA 3 Decomp Part 1 L-67A Vicinity	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) / HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP09-DCOMP-CB-0003 / LOCATION COORDINATES X = Y =	11. MANUFACTURER'S DESIGNATION OF DRILL Failing 1500 / ☐ AUTO HAMMER ☒ MANUAL HAMMER
3. DRILLING AGENCY Corps of Engineers - CESAM / CONTRACTOR FILE NO.	12. TOTAL SAMPLES / DISTURBED 4 / UNDISTURBED (UD) 0
4. NAME OF DRILLER C. Brown	13. TOTAL NUMBER CORE BOXES 1
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER 6.9 Ft.
	15. DATE BORING / STARTED 07-02-09 / COMPLETED 07-02-09
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING 6.9 Ft.
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING 58 %
8. TOTAL DEPTH OF BORING 15.3 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Jerrell Hand, Geologist

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
6.9	0.0						6.9		
			SILT, organic-L, trace organic matter, wet, 10YR 2/1 black (OL)	0			SPT Sampler 5.4	3 3 2	5
				7	1		SPT Sampler 3.9	1 1 1	2
				NR			SPT Sampler 2.4	1 0 1	1
				27	2		SPT Sampler 0.9	1 1 1	2
0.9	6.0								
			LIMESTONE, hard, weathered, fine grained, pockets of organic and carbonate silt, 10YR 7/2 light gray	60	3		SPT Sampler -0.6	23 23 13	36
			At El. -1.1 Ft., hard, fine grained, porous, few solution channels, 2.5YR 8/1 white	50	4		SPT Sampler -1.2	9 50/0.1	
		Weathered		103	BOX 1	ROD 67	4 x 5-1/2" Diamond Set Bit DT = 39 mins HP = 300 psi DFR = 100 % -5.1		
				94		ROD 52	4 x 5-1/2" Diamond Set Bit DT = 23 mins HP = 300 psi DFR = 100 %		

SAJ FORM 1836
JUN 02

(Continued)

Boring Designation CP09-DCOMP-CB-0003

DRILLING LOG (Cont. Sheet)	INSTALLATION Jacksonville District		SHEET 3 OF 3 SHEETS
PROJECT C&SF:CERP:WCA 3 Decomp Part 1	COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83	VERTICAL NAVD88
LOCATION COORDINATES X = Y =	ELEVATION TOP OF BORING 6.9 Ft.		

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
-8.4	15.3			94			-8.4		

NOTES:

1. USACE Jacksonville is the custodian for these original files.

2. Soils are field visually classified in accordance with the Unified Soils Classification System.

3. At .5 Ft. above water level, water was flowing from NW side of levee through gravel

140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).

Abbreviations:
NR = Not Recorded.
DT = Drill Time.
HP = Hydraulic Pressure.
DFR = Drill Fluid Return.

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SAJ FORM 1836-A
JUN 02

Boring Designation CP09-DCOMP-CB-0004

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 2 SHEETS
1. PROJECT C&SF:CERP:WCA 3 Decomp Part 1 L-67A Vicinity		9. SIZE AND TYPE OF BIT See Remarks	
		10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP09-DCOMP-CB-0004	LOCATION COORDINATES X = Y =	11. MANUFACTURER'S DESIGNATION OF DRILL Failing 1500	☐ AUTO HAMMER ☒ MANUAL HAMMER
3. DRILLING AGENCY Corps of Engineers - CESAM	CONTRACTOR FILE NO.	12. TOTAL SAMPLES	DISTURBED 5 / UNDISTURBED (UD) 0
4. NAME OF DRILLER C. Brown		13. TOTAL NUMBER CORE BOXES 1	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED	DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER	
		15. DATE BORING	STARTED 06-30-09 / COMPLETED 06-30-09
6. THICKNESS OF OVERBURDEN N/A		16. ELEVATION TOP OF BORING 6.9 Ft.	
7. DEPTH DRILLED INTO ROCK N/A		17. TOTAL RECOVERY FOR BORING 49 %	
8. TOTAL DEPTH OF BORING 15.0 Ft.		18. SIGNATURE AND TITLE OF INSPECTOR Jerrell Hand, Geologist	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
6.9	0.0						6.9		
			SILT, organic-L, few peat, wet, 2.5YR 2.5/1 reddish black (OL)	33	1		SPT Sampler 5.4	3 6 2	8
				0			SPT Sampler 3.9	4 3 1	4
2.9	4.0			67	2		SPT Sampler 2.4	1 0 4	4
		Slightly Weathered	LIMESTONE, hard, slightly weathered, very fine grained, 7.5YR 7/1 light gray		3				
				40	4		SPT Sampler 0.9	3 6 10	16
-0.6	7.5			53	5		SPT Sampler -0.6	5 10 50	60
-2.3	9.2		SILTSTONE, silicious, hard, cavity, CAPROCK, slightly porous, carbonate trace calcite XLS, trace limonite, solution channels to 1.5", 2.5YR 8/1 white	80		RQD 32	6" Diamond Set Bit DT = 18 mins HP = 300 psi DFR = 0 % -3.1		
		Weathered	LIMESTONE, moderately hard, weathered, fine grained, porous, solution channels, 5YR 7/1 light gray		BOX 1				
			From El. -5.6 to -8.1 Ft., fine grained, cavity, partially filled vertical 1.5 in solution channel, 10YR 8/1 white	50		RQD 0	6" Diamond Set Bit DT = 25 mins HP = 300 psi DFR = 90 % -8.1		
-8.1	15.0								

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(Continued)

Boring Designation CP09-DCOMP-CB-0004

DRILLING LOG (Cont. Sheet)	INSTALLATION Jacksonville District		SHEET 2 OF 2 SHEETS
PROJECT C&SF:CERP:WCA 3 Decomp Part 1	COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83	VERTICAL NAVD88
LOCATION COORDINATES X = Y =	ELEVATION TOP OF BORING 6.9 Ft.		

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
			NOTES: 1. USACE Jacksonville is the custodian for these original files. 2. Soils are field visually classified in accordance with the Unified Soils Classification System.				140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.). Abbreviations: DT = Drill Time. HP = Hydraulic Pressure. DFR = Drill Fluid Return.		

15 20 25 30 35

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JUN 02

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REPORT OF GEOTECHNICAL EXPLORATION

L30SMPP Additional Drilling
TO#70
Miami, Florida
Contract W912EP-05-D-0009
WOLF/WPC Project No. WPC6208.00036

- Prepared For -

U.S. Army Corp of Engineers
Mr. Webster Shipley
701 San Marco Blvd, 3 East
Jacksonville, FL 32207

- Prepared By -

WOLF/WPC
3047-4 St. Johns Bluff Road South
Jacksonville, Florida 32246

ENGINEERING, ENVIRONMENTAL & CONSTRUCTION SERVICES

LISTEN • RESPOND • PERFORM

December 11, 2008

Mr. Webster Shipley
U.S. Army Corps of Engineers
701 San Marco Boulevard, 3 East
Jacksonville, Florida 32207

Final Conceptual Geotechnical Data Report
L30SMPP Additional Drilling
Contract W912EP-05-D-0009
Miami-Dade County, Florida
WOLF/WPC Project No. WPC6208.00036

Dear Mr. Shipley:

WOLF/WPC has performed the additional field and laboratory geotechnical services for the L30 Seepage Management Pilot Project (SMPP). This conceptual report presents our understanding of the project, outlines our exploratory procedures, and presents the field and laboratory data obtained for the project.

We have enjoyed assisting you on this project and look forward to serving as your geotechnical consultant on the remainder of this project and on future projects. If you have any questions concerning this report, please contact us.

Respectfully Submitted,
WOLF/WPC

Jason R. Mckinnon, P.E.
Project Engineer
Registered, Florida No. 58696

Thomas J Casey, P.E.
Senior Geotechnical Engineer
Registered, Florida No. 62245

Distribution: U.S. Army Corps of Engineers (3)
File (1)

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APPENDICES

APPENDIX A

Site Location Map

Field Exploration Plan

APPENDIX B

Drilling Logs for SPT Borings

Photographs

APPENDIX C

Summary of Laboratory Testing Results

SECTION 1.0 – INVESTIGATION SCOPE

The scope of services for this investigation was provided in the statement of work (SOW) dated February 6, 2008, and was performed under the existing contract W912EP-05-D-0009. The requested field scope of services for this investigation included performing three (3) Standard Penetration Test (SPT) borings with rock coring. The laboratory testing scope of services included performing miscellaneous classification and index property tests, including unconfined compressive strength, visual shell content, and specific gravity determinations.

The project site is shown on the Site Location Map and Field Exploration Plan in Appendix A of this report. The depth of the SPT borings was 90 feet below the existing ground surface, or approximate elevation EL. -76.0. Laboratory classification and index property testing was assigned by Mr. Shipley following review of preliminary field drilling logs.

SECTION 2.0 – INVESTIGATION PURPOSE

The purpose of the exploratory drilling is to identify subsurface conditions in the right-of-way of the access road adjacent to the Canal L-30 Levee. The project is located west of Miami in Miami-Dade County near the intersection of Krome Avenue and Highway 41.

SECTION 3.0 – GEOLOGICAL SETTING

The Biscayne Aquifer is composed of Miami Limestone and the Fort Thompson Formation. The Miami Limestone is typically characterized as soft to moderately hard, moderately to highly weathered, thick bedded, highly burrowed in the project area, white to yellow, and contains abundant solution cavities. In the uppermost part of the Miami Limestone, the solution cavities are commonly filled with loose quartz sand and peat. The Fort Thompson Formation lies unconformably beneath the Miami Limestone and is comprised of thick units of soft to hard, moderately weathered, light gray, limestone and sandy limestone that contains marine fossils and calcareous sandstone with a few thin beds of fresh water limestone. In the Project area, the Fort Thompson Formation commonly has zones that contain many vugs and much less commonly can contain cavities up to several feet in diameter.

The Pinecrest Sand Member of the Tamiami Formation creates a semi-confining unit within the Surficial Aquifer System. It lies unconformably beneath the Fort Thompson

Formation and is commonly comprised of quartz sand, limestone, and sandstone that is moderately hard and creamy white to greenish gray with uncommon soft layers of silty, clayey, and shelly sands. A grey limestone, also known as the Ochopee Limestone Member of the Tamiami Formation, lies unconformably below the Pinecrest Sand Member.

SECTION 4.0 – FIELD EXPLORATION

4.1 General

The field exploration conducted for this investigation included performing three (3) SPT borings with rock coring at locations specified by the U.S. Army Corps of Engineers (USACE).

Exploration point coordinates (Latitude and Longitude) were provided by USACE. The exploration points were initially laid out using a Trimble GeoXH handheld GPS device. We also converted the Latitude and Longitudes to State Plane Coordinates using the conversion program CORPSCON. The following table summarizes the exploration locations and depths:

Table 4.1-Summary of Exploration Point Locations and Depths

POINT NAME	LOCATION COORDINATES				EXPLORATION DEPTH, FEET	DATE PERFORMED
	NORTHING (Y)	EASTING (X)	LATITUDE	LONGITUDE		
CP07-L30PP-CB-0007	523,542	825,597	25° 46 23.04	80° 29 09.68	90	5/22/08
CP07-L30PP-CB-0008	523,820	825,595	25° 46 25.79	80° 29 06.51	90	5/21/08
CP07-L30PP-CB-0009	524,095	825,886	25° 46 28.5	80° 29 03.32	89	5/15/08

4.2 SPT Borings

The borings utilized Standard Penetration Test (SPT) split spoon sampling (ASTM D 1586) conducted continuously with 1.5-foot sample intervals in the upper 20 feet. The borings were advanced using mud rotary drilling process using recirculated drilling slurry to stabilize the borehole walls and flush the cuttings. Once the borings reached about 20 feet, the holes were reamed and widened and casing was set in the boreholes to maintain stability within the dike soils. The borings were then advanced thru intact limestone layers using a 5-foot long core barrel. Rock coring continued to depths ranging from 73.5 feet to 75 feet below the existing ground surface, then the split-spoon sampler was re-attached and continuous SPT sampling resumed to the termination depth of the borings. Once the borings were completed, they were airlifted with a compressed air

hose to remove excess sand from the borehole.

At the completion of each boring, geophysical logging was performed by personnel from the United States Geological Survey (USGS) on each borehole. The SPT boring Drilling Logs are presented in Appendix B of this report.

SECTION 5.0 – LABORATORY TESTING

Following review of the preliminary field logs, Mr. Shipley assigned several laboratory tests on samples obtained from the drilling operation. The laboratory testing conducted for this exploration included the following:

- 3 Visual Percent Shell Content
- 3 Specific Gravity Determinations for Rock (ASTM D 854)
- 3 Unconfined Compressive Strength Tests for Rock (ASTM D 2938-95)

The results of the laboratory testing and index property testing are presented in Appendix C of this report.

SECTION 6.0 – SUBSURFACE PROFILE

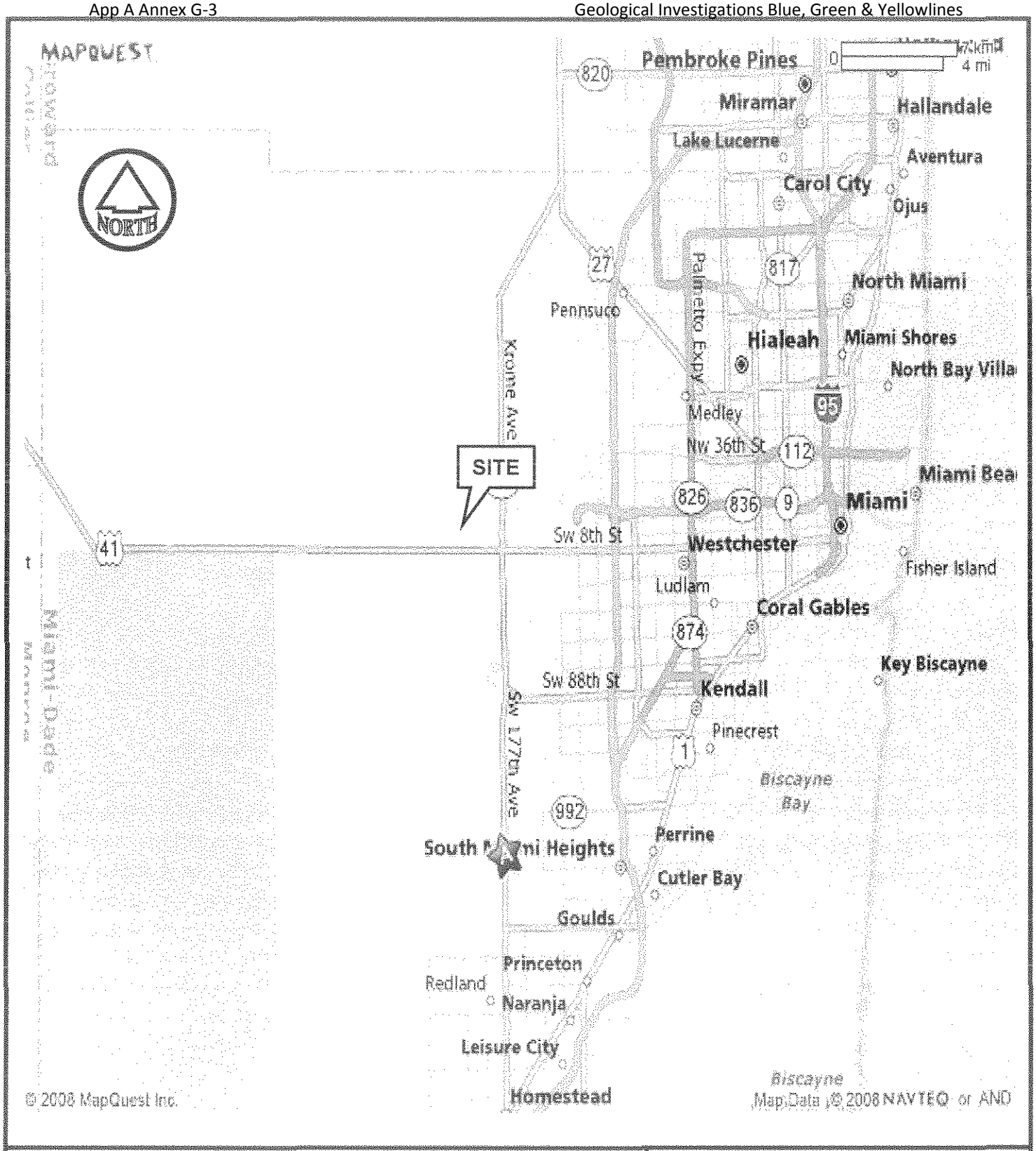
The encountered soils were classified using the Unified Soil Classification System (USCS) in general accordance with ASTM D 2488. The subsurface conditions encountered at the site generally consisted of mixed levee fill materials consisting of sands (SP/SM), clay (CH), silt (ML), and/or limestone gravel (GP) to depths ranging from about 16 feet to 17 feet, at which point a thin layer (1 foot to 1.5 feet thick) of organic peat (PT) was encountered. The borings then generally encountered limestone to depths ranging from about 73.5 feet to 75 feet below ground surface. Below the intact limestone layers, the borings generally encountered sands (SP), silty sands (SM), silts (ML), clay (CH), sand-gravel mixtures (GP), and clay-limestone gravel mixtures (GC) to the termination depth of 89 feet to 90 feet below ground surface. SPT N-values generally ranged from very loose to very dense throughout the subsurface profiles.

The groundwater level was encountered by the SPT borings at depths of approximately 18 feet below the existing ground surface. It should be noted that groundwater levels will fluctuate due to seasonal rainfall fluctuations, distance to relief points or water features, soil drainage characteristics, and construction operations.

APPENDICES

APPENDIX A

- **Site Location Map**
- **Field Exploration Plan**



REFERENCE:

www.mapquest.com

WOLF WPC ENGINEERING, ENVIRONMENTAL & CONSTRUCTION SERVICES

SITE LOCATION MAP

L30 SMPP
Miami, Florida

WOLF/WPC Project No.: WPC6208.00036

Date: 8/12/2008

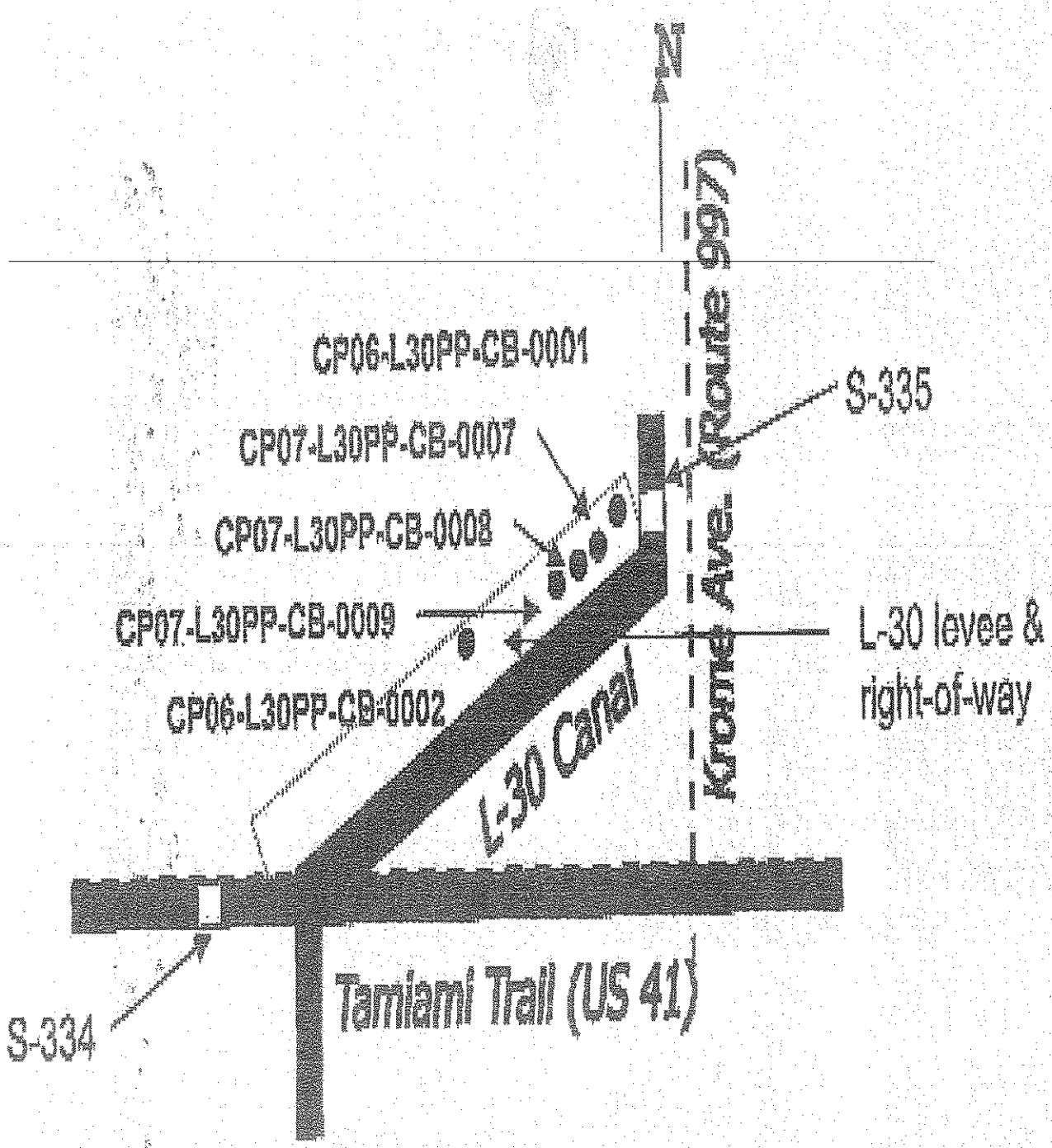


Figure 1: Boring and Well Locations

REFERENCE: ACOE SOW

WOLF WPC ENGINEERING, ENVIRONMENTAL & CONSTRUCTION SERVICES

FIELD EXPLORATION PLAN

L30 SMPP
Miami, Florida

WOLF/WPC Project No.: WPC6208.00036

Date: 8/12/2008

APPENDIX B

- **Drilling Logs for SPT Borings**
- **Photographs**

Boring Designation CP07-L30PP-CB-0007

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 5 SHEETS

1. PROJECT L-30 Seepage Management Pilot Project	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) / HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP07-L30PP-CB-0007 / LOCATION COORDINATES X = 825,597 Y = 523,542	11. MANUFACTURER'S DESIGNATION OF DRILL ☐ AUTO HAMMER ☒ MANUAL HAMMER
3. DRILLING AGENCY Amdrill / CONTRACTOR FILE NO.	12. TOTAL SAMPLES DISTURBED 24 / UNDISTURBED (UD) 0
4. NAME OF DRILLER Adam Benson	13. TOTAL NUMBER CORE BOXES 11
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER -4.0 Ft.
	15. DATE BORING STARTED 05-13-08 / COMPLETED 05-14-08
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING 14.0 Ft.
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING 52 %
8. TOTAL DEPTH OF BORING 90.0 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Mark Holmes,

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
14.0	0.0						14.0		
			SAND, poorly-graded, dense to medium dense, mostly fine-grained sand-sized quartz, some sand to gravel-sized limestone, Levee Fill Material, 10YR 7/2 light gray (SP)	50	1		SPT Sampler	21 30 15 12	45
							12.0		
				30	2		SPT Sampler	8 8 18 9	26
							10.0		
9.0	5.0			0	3		SPT Sampler	4 4	
							9.0		
			GRAVEL, poorly-graded, medium dense, mostly sand to cobble-sized limestone, few fine-grained sand-sized quartz, few clay, 10YR 8/2 very pale brown (GP)	33	4		SPT Sampler	4 8 12	20
							7.5		
				33	5		SPT Sampler	5 7 5	12
							6.0		
				33	6		SPT Sampler	5 5 6	11
							4.5		
			At El. 4.5 Ft., loose, mostly sand to cobble-sized limestone, some clay, few fine-grained sand-sized quartz, 10YR 8/2 very pale brown	33	7		SPT Sampler	3 5 5	10
							3.0		
2.5	11.5								
			GRAVEL, poorly-graded, medium dense, mostly sand to cobble-sized limestone, some clay, few fine-grained sand-sized quartz, 10YR 8/2 very pale brown (GP)	33	8		SPT Sampler	6 9 8	17
							1.5		
1.0	13.0								
			CLAY, fat, stiff to soft, mostly clay, few shell, 10YR 3/3 dark brown (CH)	33	9		SPT Sampler	7 6 3	9
							0.0		
				7	10		SPT Sampler	2 2	

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(Continued)

Boring Designation CP07-L30PP-CB-0007

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District	SHEET 2 OF 5 SHEETS
PROJECT: L-30 Seepage Management Pilot Project	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.)	HORIZONTAL: NAD83 / VERTICAL: NAVD88
LOCATION COORDINATES: X = 825,597 Y = 523,542	ELEVATION TOP OF BORING: 14.0 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
				7	10		-1.5 SPT Sampler	2	4
-2.5	16.5			13	11		SPT Sampler	2 / 3 / 2	5
-3.0	17.0		PEAT, soft, some clay, 10YR 3/3 dark brown (PT)				-3.0		
			LIMESTONE, 10YR 8/2 very pale brown	50	12		SPT Sampler	15 / 21 / 11	32
							-4.5		
				50	13		SPT Sampler	18 / 22 / 30	52
-6.0	20.0		LIMESTONE, fossiliferous, moderately hard, 10YR 8/2 very pale brown				-6.0		
				50	BOX 14	RQD 12			
							-11.0		
				85	BOX 15	RQD 47			
		Weathered	At El. -14.0 Ft., sparsely fossiliferous, moderately hard, weathered, 10YR 8/2 very pale brown						
-16.0	30.0		LIMESTONE				-16.0		
				75	BOX 16	RQD 26			
-19.5	33.5	Highly Weathered	At El. -19.0 Ft., very soft, highly weathered, 10YR 8/2 very pale brown						
			LIMESTONE, soft, 10YR 8/2 very pale brown				-21.0		

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Boring Designation CP07-L30PP-CB-0007

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District	SHEET 3 OF 5 SHEETS

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
L-30 Seepage Management Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 825,597 Y = 523,542	14.0 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
		Highly Weathered	At El. -21.0 Ft., fossiliferous, soft, 10YR 8/2 very pale brown	90	BOX 17	RQD 71	-26.0		
			At El. -26.0 Ft., fossiliferous, moderately hard, Unconfined Compression Test on sample from 42 - 45 feet, 10YR 7/1 light gray	65	BOX 18	RQD 40	-31.0		
				85	BOX 19	RQD 70	-36.0		
			At El. -36.0 Ft., sparsely fossiliferous, moderately hard, 5YR 8/2 pinkish white	40	BOX 20	RQD 39	-41.0		
-41.0	55.0								

35 40 45 50 55

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Boring Designation CP07-L30PP-CB-0007

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District	SHEET 4 OF 6 SHEETS
PROJECT: L-30 Seepage Management Pilot Project	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.)	HORIZONTAL: NAD83 / VERTICAL: NAVD88
LOCATION COORDINATES: X = 825,597 Y = 523,542	ELEVATION TOP OF BORING: 14.0 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
			LIMESTONE, fossiliferous, very hard, 5YR 8/2 pinkish white	30	BOX 21	RQD 17	-46.0		
			At El. -46.0 Ft., very hard, 10Y 7/1 light greenish gray	85	BOX 22	RQD 42	-51.0		
		Highly Weathered	At El. -51.0 Ft., fossiliferous, 10Y 7/1 light greenish gray	85	BOX 23	RQD 79	-56.0		
			At El. -55.0 Ft., 10YR 7/1 light gray	25	BOX 24	RQD 8	-59.5		
-61.0	75.0			33	25		SPT Sampler -61.0	6 5 5	10

55 60 65 70 75

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Boring Designation CP07-L30PP-CB-0007

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District	SHEET 5 OF 5 SHEETS
PROJECT: L-30 Seepage Management Pilot Project	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.)	HORIZONTAL: NAD83 / VERTICAL: NAVD88
LOCATION COORDINATES: X = 825,597 Y = 523,542	ELEVATION TOP OF BORING: 14.0 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
			SAND, poorly-graded, medium dense, mostly subangular medium to coarse-grained sand-sized quartz, little shell, 5Y 6/3 pale olive (SP)	93	26		SPT Sampler -62.5	11 10 10	20
				60	27		SPT Sampler -64.0	3 4 11	15
-64.5	78.5								
-65.0	79.0		GRAVEL, poorly-graded, medium dense, little medium-grained sand-sized quartz, 5Y 6/3 pale olive (GP)	133	28		SPT Sampler -65.5	4 8 7	15
-66.0	80.0		CLAY, fat, stiff, few fine to coarse gravel-sized limestone, few quartz, few shell, 5Y 6/3 pale olive (CH)						
			SILT, inorganic-L, stiff to firm, little clay, few fine-grained sand-sized quartz, few shell, 5Y 6/3 pale olive (ML)	20	29		SPT Sampler -67.0	5 7 20	27
				93	30		SPT Sampler -68.5	5 5 6	11
				33	31		SPT Sampler -70.0	4 5 5	10
-71.5	85.5			33	32		SPT Sampler -71.5	2 2 3	5
			SAND, silty, dense, mostly fine to coarse-grained sand-sized quartz, little silt, few shell, trace clay, 5Y 6/3 pale olive (SM)	67	33		SPT Sampler -73.0	19 21 26	47
-73.0	87.0								
			SAND, poorly-graded, dense, mostly coarse-grained sand-sized quartz, few shell, 5Y 6/3 pale olive (SP)	33	34		SPT Sampler -74.5	21 20 23	43
				8	35		SPT Sampler -76.0	15 16 27	43
-76.0	90.0								
			NOTES: 1. Soils are field visually classified in accordance with the Unified Soils Classification System. 2. Additional Laboratory Testing Specific Gravity				140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).		

75 80 85 90 95

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Boring Designation CP07-L30PP-CB-0008

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 5 SHEETS

1. PROJECT L-30 Seepage Management Pilot Project	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) / HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP07-L30PP-CB-0008 / LOCATION COORDINATES X = 825,595 Y = 523,820	11. MANUFACTURER'S DESIGNATION OF DRILL ☐ AUTO HAMMER ☒ MANUAL HAMMER
3. DRILLING AGENCY Amdrill / CONTRACTOR FILE NO.	12. TOTAL SAMPLES DISTURBED 22 / UNDISTURBED (UD) 0
4. NAME OF DRILLER Adam Benson	13. TOTAL NUMBER CORE BOXES 12
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER -4.0 Ft.
	15. DATE BORING STARTED 05-15-08 / COMPLETED 05-16-08
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING 14.0 Ft.
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING 67 %
8. TOTAL DEPTH OF BORING 90.0 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Mark Holmes.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
14.0	0.0						14.0		
			SILT, inorganic-L, very stiff to stiff, Levee Fill material, 10YR 7/3 very pale brown (ML)	30	1		SPT Sampler	22 17 12	29
				30	2		SPT Sampler 12.5	9 10 7	17
				0	3		SPT Sampler 11.0	4 6 6	12
9.5	4.5						SPT Sampler 9.5		
			SAND, poorly-graded, medium dense, mostly subangular to subrounded fine to coarse-grained sand-sized quartz, 10YR 6/3 pale brown (SP)	65	4		SPT Sampler	5 5 8	13
8.0	6.0						SPT Sampler 8.0		
			GRAVEL, poorly-graded, loose to medium dense, few subangular to subrounded coarse-grained sand-sized quartz, 10YR 6/3 pale brown (GP)	50	5		SPT Sampler	4 4 4	8
				30	6		SPT Sampler 6.5	3 6 7	13
			At El. 5.0 Ft., loose to medium dense, little quartz, 10YR 6/3 pale brown	50	7		SPT Sampler 5.0	5 5 5	10
				50	8		SPT Sampler 3.5	4 5 7	12
2.0	12.0						SPT Sampler 2.0		
			LIMESTONE, hard, 10YR 8/2 very pale brown	10	9		SPT Sampler	1 1 2	3
			At El. 0.5 Ft., 10YR 8/2 very pale brown	30	10		SPT Sampler 0.5	5 6 4	10
							-1.0		

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JUN 02

(Continued)

Boring Designation CP07-L30PP-CB-0008

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District		SHEET 2 OF 5 SHEETS
PROJECT: L-30 Seepage Management Pilot Project	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.)	HORIZONTAL: NAD83	VERTICAL: NAVD88
LOCATION COORDINATES: X = 825,595 Y = 523,820	ELEVATION TOP OF BORING: 14.0 Ft.		

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
				25	11		SPT Sampler	3 / 2 / 4	6
-2.5									
-3.0	17.0		PEAT, stiff (PT)	80	12		SPT Sampler	6 / 18 / 30	48
-3.5	17.5		LIMESTONE, 10YR 7/1 light gray						
-4.0									
				60	BOX 13				
-6.0			At El. -6.0 Ft., sparsely fossiliferous, 10YR 7/1 light gray						
				95	BOX 14	RQD 12			
-11.0	25.0		LIMESTONE, fossiliferous, hard, 10YR 7/1 light gray						
-11.0									
				50	BOX 15	RQD 53			
-16.0									
-17.0	31.0								
-17.5	31.5	Highly Weathered	LIMESTONE, very soft, highly weathered, 10YR 7/1 light gray						
			LIMESTONE, fossiliferous, hard, 10YR 7/1 light gray	75	BOX 16	RQD 58			
-20.0	34.0								
-20.5	34.5		LIMESTONE, very soft, highly weathered, 10YR 7/1 light gray						
			LIMESTONE, fossiliferous, hard, Unconfined						
-21.0									

15 20 25 30 35

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Boring Designation CP07-L30PP-CB-0008

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District		SHEET 3 OF 5 SHEETS
PROJECT: L-30 Seepage Management Pilot Project	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.)	HORIZONTAL: NAD83	VERTICAL: NAVD88
LOCATION COORDINATES: X = 825,595 Y = 523,820	ELEVATION TOP OF BORING: 14.0 Ft.		

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
			Compression test on sample from 35 - 40 feet, 10YR 7/1 light gray						
-22.5	36.5		LIMESTONE, soft, highly weathered	95	BOX 17	RQD 81			
-26.0	40.0		LIMESTONE, fossiliferous, hard, 2.5YR 8/2 pinkish white	80	BOX 18	RQD 43	-26.0		
				85	BOX 19	RQD 57	-31.0		
-34.0	48.0		At El. -32.5 Ft., large marine fossils grading to smaller with depth						
			LIMESTONE, noticable burrowing increasing with depth, 2.5YR 8/2 pinkish white				-36.0		
-38.0	52.0		LIMESTONE, soft, decreasing fossils and burrows, 2.5YR 8/3 pink	60	BOX 20	RQD 26	-41.0		

Highly Weathered

35 40 45 50 55

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Boring Designation CP07-L30PP-CB-0008

DRILLING LOG (Cont. Sheet)	INSTALLATION Jacksonville District	SHEET 4 OF 5 SHEETS

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
L-30 Seepage Management Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 825,595 Y = 523,820	14.0 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
-43.0	57.0		LIMESTONE, hard, numerous marine fossils	85	BOX 21	RQD 32	-46.0		
			At El. -46.0 Ft., fossiliferous						
			At El. -48.0 Ft., grading to mudstone, with sand increasing with depth	60	BOX 22	RQD 18	-51.0		
				60	BOX 23	RQD 28	-56.0		
-56.0	70.0		SAND, poorly-graded, 10Y 8/1 light greenish gray (SP)						
			At El. -59.0 Ft., few fine to coarse-grained sand-sized shell, 10Y 8/1 light greenish gray	40	BOX 24	RQD 30	-61.0		

55 60 65 70 75

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Boring Designation CP07-L30PP-CB-0008

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District		SHEET 5 OF 5 SHEETS
PROJECT: L-30 Seepage Management Pilot Project	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.)	HORIZONTAL: NAD83	VERTICAL: NAVD88
LOCATION COORDINATES: X = 825,595 Y = 523,820	ELEVATION TOP OF BORING: 14.0 Ft.		

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
			At El. -61.0 Ft., loose to medium dense, 5G 8/2 pale green	50	25		SPT Sampler -62.5	9 / 5 / 5	10
-63.0	77.0								
-63.5	77.5		SAND, clayey, loose (SC)	85	26		SPT Sampler -64.0	7 / 8 / 11	19
			SAND, poorly-graded, medium dense, few shell (SP)	50	27		SPT Sampler -65.5	7 / 10 / 14	24
-66.0	80.0								
-66.5	80.5		GRAVEL, poorly-graded, medium dense (GP)	90	28		SPT Sampler -67.0	4 / 9 / 14	23
			SAND, poorly-graded, medium dense, 10Y 3/1 dark greenish gray (SP)	90	29		SPT Sampler -68.5	10 / 11 / 11	22
				90	30		SPT Sampler -70.0	3 / 6 / 10	16
-70.5	84.5								
			SAND, silty, medium dense, 10Y 3/1 dark greenish gray (SM)	95	31		SPT Sampler -71.5	5 / 10 / 12	22
			At El. -72.0 Ft., loose to medium dense, 10Y 3/1 dark greenish gray	95	32		SPT Sampler -73.0	2 / 3 / 7	10
				100	33		SPT Sampler -74.5	6 / 5 / 5	10
				100	34		SPT Sampler -76.0	4 / 6 / 8	14
-76.0	90.0								

NOTES:

1. Soils are field visually classified in accordance with the Unified Soils Classification System.

2. Additional Laboratory Testing

Specific Gravity

140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).

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Boring Designation CP07-L30PP-CB-0009

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 5 SHEETS

1. PROJECT L-30 Seepage Management Pilot Project		9. SIZE AND TYPE OF BIT See Remarks	
		10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP07-L30PP-CB-0009	LOCATION COORDINATES X = 825,886 Y = 524,095	11. MANUFACTURER'S DESIGNATION OF DRILL	☐ AUTO HAMMER ☒ MANUAL HAMMER
3. DRILLING AGENCY Amdrill	CONTRACTOR FILE NO.	12. TOTAL SAMPLES	DISTURBED 22 / UNDISTURBED (UD) 0
4. NAME OF DRILLER Adam Benson		13. TOTAL NUMBER CORE BOXES 12	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED	DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER -4.0 Ft.	
		15. DATE BORING	STARTED 05-19-08 / COMPLETED 05-20-08
6. THICKNESS OF OVERBURDEN N/A		16. ELEVATION TOP OF BORING 14.0 Ft.	
7. DEPTH DRILLED INTO ROCK N/A		17. TOTAL RECOVERY FOR BORING 53 %	
8. TOTAL DEPTH OF BORING 89.0 Ft.		18. SIGNATURE AND TITLE OF INSPECTOR Larry Mattila,	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
14.0	0.0						14.0		
			GRAVEL, poorly-graded, dense, Levee Fill Material (GP)	40	1		SPT Sampler 12.5	18 / 26 / 17	43
			From El. 12.5 to -3.5 Ft., dense to loose, trace clayey sand	40	2		SPT Sampler 11.0	16 / 27 / 11	38
				30	3		SPT Sampler 9.5	6 / 6 / 7	13
				30	4		SPT Sampler 8.0	6 / 8 / 14	22
				20	5		SPT Sampler 6.5	3 / 4 / 5	9
				30	6		SPT Sampler 5.0	6 / 5 / 5	10
				40	7		SPT Sampler 3.5	5 / 6 / 6	12
				20	8		SPT Sampler 2.0	6 / 8 / 7	15
				30	9		SPT Sampler 0.5	6 / 10 / 9	19
				20	10		SPT Sampler -1.0	4 / 4 / 4	8

0 5 10 15

SAJ FORM 1836
JUN 02

(Continued)

Boring Designation CP07-L30PP-CB-0009

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District	SHEET 2 OF 5 SHEETS
PROJECT: L-30 Seepage Management Pilot Project	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.)	HORIZONTAL: NAD83 / VERTICAL: NAVD88
LOCATION COORDINATES: X = 825,886 Y = 524,095	ELEVATION TOP OF BORING: 14.0 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
-2.0	16.0		PEAT, stiff, some clay (PT)	20	11		SPT Sampler -2.5	3 3 7	10
-3.5	17.5		LIMESTONE, weathered, vuggy, white	40	12		SPT Sampler -4.0	4 15 21	36
-6.0	20.0		LIMESTONE, hard, weathered, vuggy. some micrite, white	60	BOX 13	RQD 31	-6.0		
			From El. -11.0 to -16.0 Ft., weathered, vuggy,, white	80	BOX 14	RQD 66	-11.0		
			From El. -16.0 to -21.0 Ft., weathered, vuggy, vugs filled with calcite sands, white	30	BOX 15	RQD 10	-16.0		
				50	BOX 16	RQD 30	-21.0		

Weathered

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JUN 02

Boring Designation CP07-L30PP-CB-0009

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District		SHEET 3 OF 5 SHEETS
PROJECT: L-30 Seepage Management Pilot Project	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.)	HORIZONTAL: NAD83	VERTICAL: NAVD88
LOCATION COORDINATES: X = 825,886 Y = 524,095	ELEVATION TOP OF BORING: 14.0 Ft.		

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
			From El. -21.0 to -26.0 Ft., hard, weathered, trace vugs, shell molds, white	85	BOX 17	RQD 68	-26.0		
			From El. -26.0 to -31.0 Ft., weathered, vuggy, sparite in vugs, shell molds and some shells, Unconfined Compression test on sample from 38 - 40 feet, 10YR 7/1 light gray	90	BOX 18	RQD 73	-31.0		
-31.0	45.0		LIMESTONE, moderately hard, weathered, some vugs and shell molds, hard, white	90	BOX 19	RQD 81	-36.0		
			From El. -36.0 to -41.0 Ft., weathered, vuggy, sparite in vugs, white	65	BOX 20	RQD 20	-41.0		

35 40 45 50 55

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JUN 02

Boring Designation CP07-L30PP-CB-0009

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District	SHEET 4 OF 5 SHEETS
PROJECT: L-30 Seepage Management Pilot Project	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.)	HORIZONTAL: NAD83 / VERTICAL: NAVD88
LOCATION COORDINATES: X = 825,886 Y = 524,095	ELEVATION TOP OF BORING: 14.0 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
			From El. -41.0 to -46.0 Ft., very vuggy, shell molds and marine fossils, white	20	BOX 21	RQD 0	-46.0		
			From El. -46.0 to -51.0 Ft., vuggy, some shell and sparite, white	55	BOX 22	RQD 8	-51.0		
			From El. -51.0 to -56.0 Ft., very vuggy, some shells and sparite, pinkish-tan	50	BOX 23	RQD 8	-56.0		
			From El. -56.0 to -60.0 Ft., somewhat vuggy, shell molds and sparite, light tan	80	BOX 24	RQD 78	-60.0		
-60.0	74.0		GRAVEL, poorly-graded, dense, mostly fine-grained sand-sized quartz, some fine to coarse gravel-sized limestone, light gray	60	24		SPT Sampler	14 / 16	

55 60 65 70 75

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Boring Designation CP07-L30PP-CB-0009

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District	SHEET 5 OF 5 SHEETS
PROJECT: L-30 Seepage Management Pilot Project	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.)	HORIZONTAL: NAD83 / VERTICAL: NAVD88
LOCATION COORDINATES: X = 825,886 Y = 524,095	ELEVATION TOP OF BORING: 14.0 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
			(GP)	60	24		-61.5 SPT Sampler	24	40
			From El. -61.5 to -63.0 Ft., dense, some fine to coarse gravel-sized limestone, light gray	60	26		SPT Sampler -63.0	8 / 15 / 24	39
			From El. -63.0 to -64.5 Ft., dense, some subangular to subrounded fine to coarse gravel-sized limestone, light gray	50	27		SPT Sampler -64.5	10 / 19 / 12	31
			From El. -64.5 to -66.0 Ft., medium dense, light gray	90	28		SPT Sampler -66.0	11 / 14 / 11	25
-66.0	80.0		GRAVEL, clayey, medium dense to dense, some subrounded fine-grained sand-sized quartz, gray (GC)	90	29		SPT Sampler -67.5	5 / 7 / 11	18
				50	30		SPT Sampler -69.0	6 / 8 / 10	18
				80	31		SPT Sampler -70.5	7 / 14 / 18	32
				80	32		SPT Sampler -72.0	6 / 12 / 13	25
			From El. -72.0 to -75.0 Ft., dense to medium dense, some subrounded fine-grained sand-sized quartz, some shell, gray	60	33		SPT Sampler -73.5	8 / 15 / 18	33
-75.0	89.0				34		SPT Sampler -75.0	5 / 7 / 9	16

NOTES:

1. Soils are field visually classified in accordance with the Unified Soils Classification System.

2. Additional Laboratory Testing

Specific Gravity

140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).

Abbreviations:
NR = Not Recorded.

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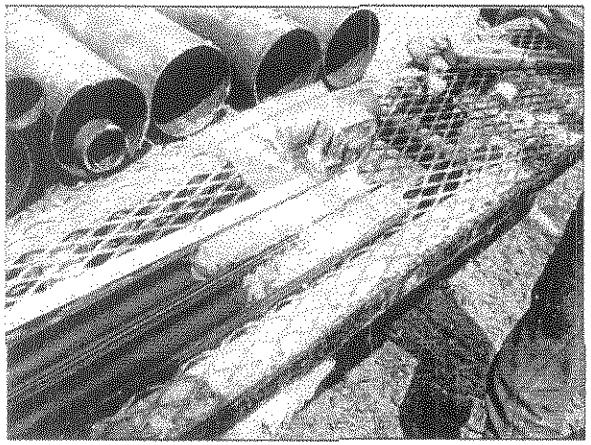
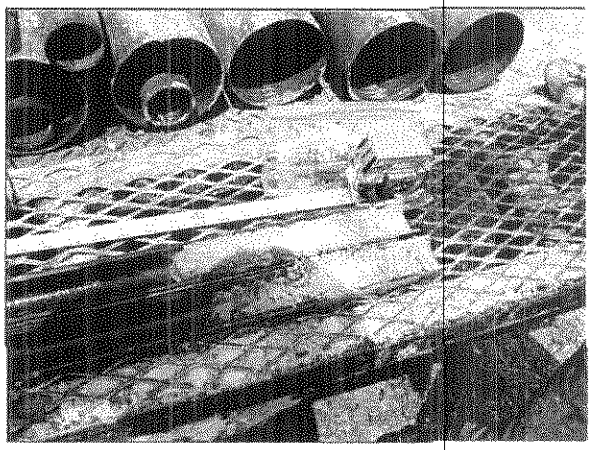
JUN 02



CP07-L30PP-CB-0007 Sample 1



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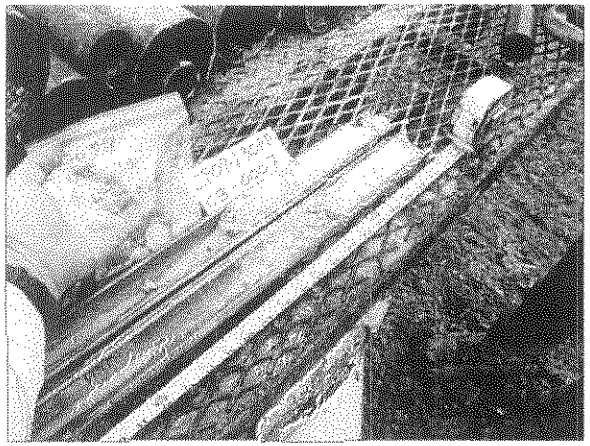
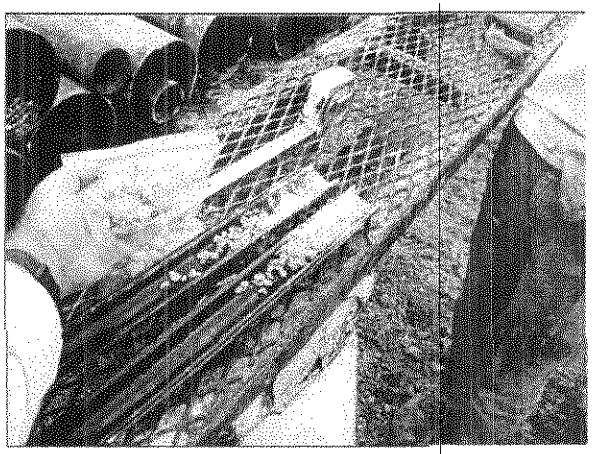


CP07-L30PP-CB-0007 Sample 3



CP07-L30PP-CB-0007 Sample 4

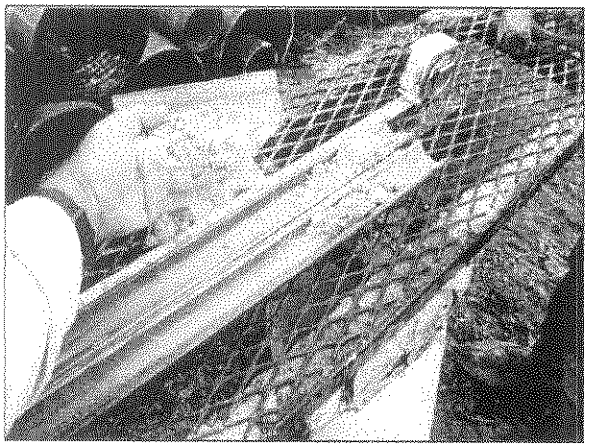
WOLF WPC ENGINEERING, ENVIRONMENTAL & CONSTRUCTION SERVICES

COREBORING PHOTOGRAPHS

L30 Seepage Management Pilot Project

Miami-Dade County, Florida

WOLF/WPC Project No.:	Date:
WPC6208.00036	12/03/08



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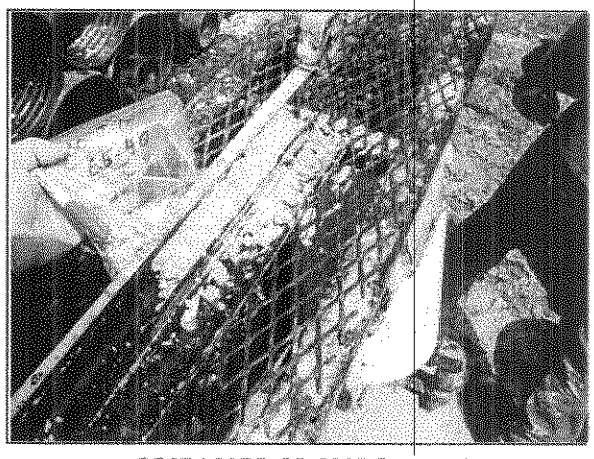

CP07-L30PP-CB-0007 Sample 6

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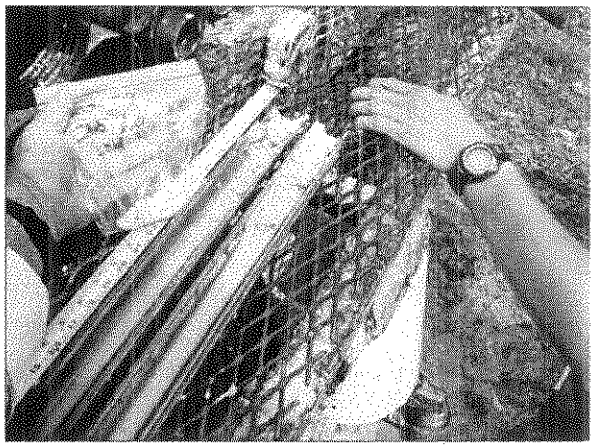
CP07-L30PP-CB-0007 Sample 7



CP07-L30PP-CB-0007 Sample 8

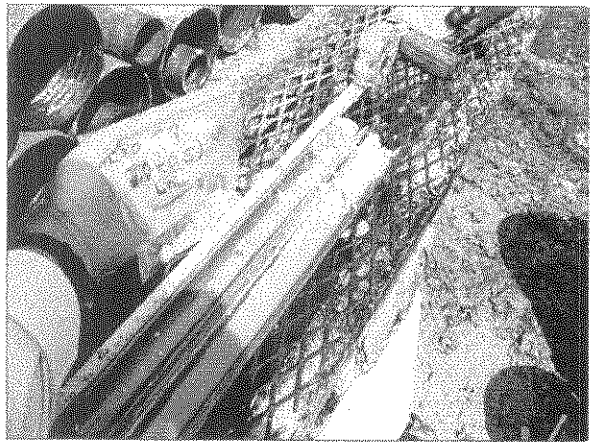
WOLF WPC ENGINEERING, ENVIRONMENTAL & CONSTRUCTION SERVICES

COREBORING PHOTOGRAPHS

L30 Seepage Management Pilot Project

Miami-Dade County, Florida

WOLF/WPC Project No.:	Date:
WPC6208.00036	12/03/08



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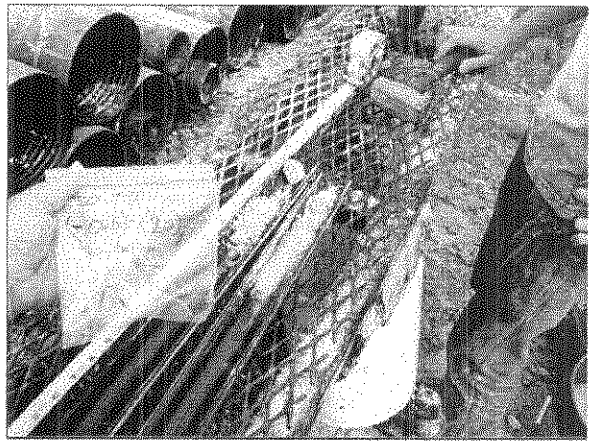

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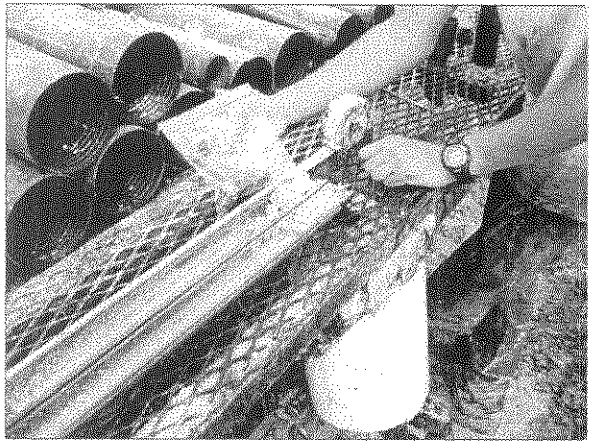

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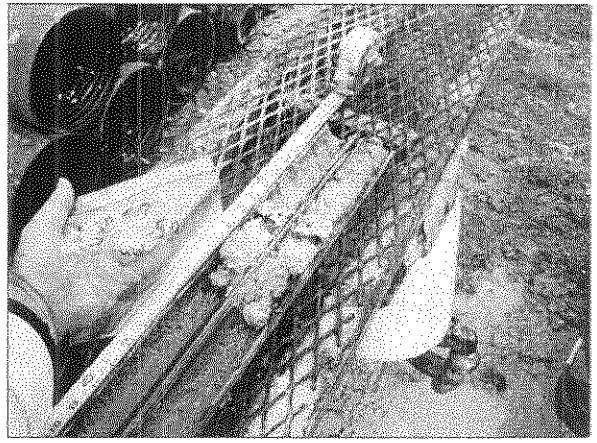

CP07-L30PP-CB-0007 Sample 12

WOLF WPC ENGINEERING, ENVIRONMENTAL & CONSTRUCTION SERVICES

COREBORING PHOTOGRAPHS

L30 Seepage Management Pilot Project

Miami-Dade County, Florida

WOLF/WPC Project No.:	Date:
WPC6208.00036	12/03/08

WOLF WPC ENGINEERING, ENVIRONMENTAL & CONSTRUCTION SERVICES

COREBORING PHOTOGRAPHS

L30 Seepage Management Pilot Project

Miami-Dade County, Florida

WOLF/WPC Project No.: WPC6208.00036

Date: 12/03/08

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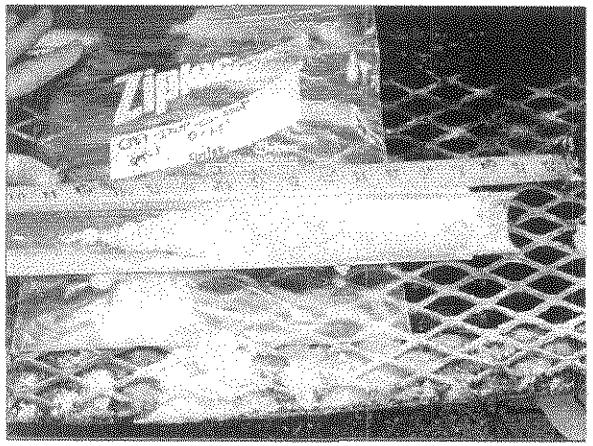
CP07-L30PP-CB-0007 Sample 13 THRU 35



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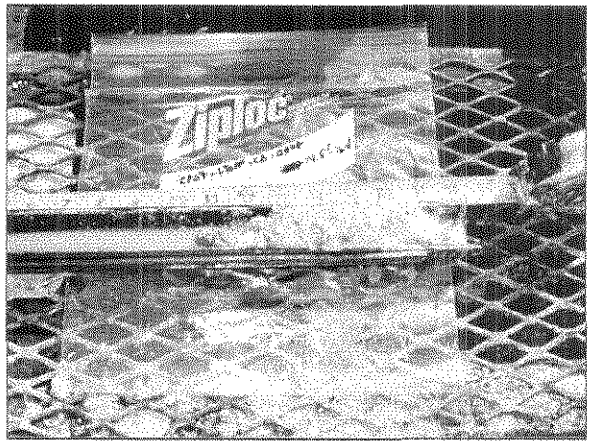
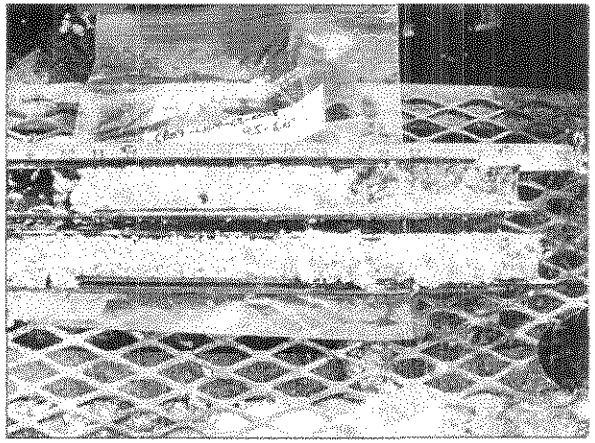


CP07-L30PP-CB-0008 Sample 2

FILE CORRUPTED

CP07-L30PP-CB-0008 Sample 3



CP07-L30PP-CB-0008 Sample 4

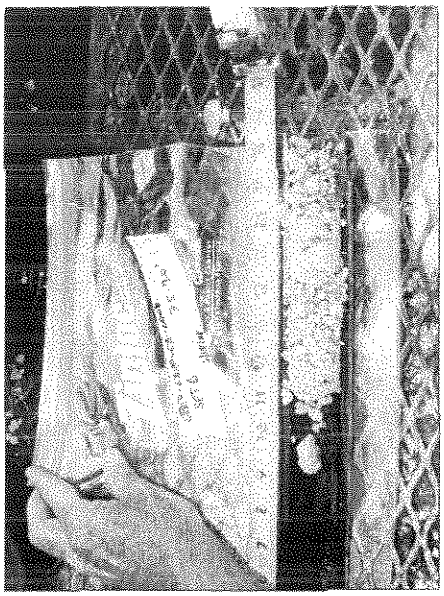
WOLF WPC ENGINEERING, ENVIRONMENTAL, & CONSTRUCTION SERVICES

COREBORING PHOTOGRAPHS

L30 Seepage Management Pilot Project

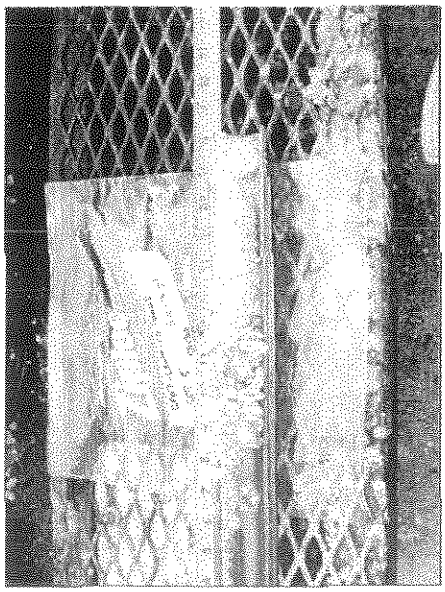
Miami-Dade County, Florida

WOLF/WPC Project No.:	Date:
WPC6208.00036	12/03/08



CP07-L30PP-CB-0008 Sample 6

CP07-L30PP-CB-0008 Sample 8



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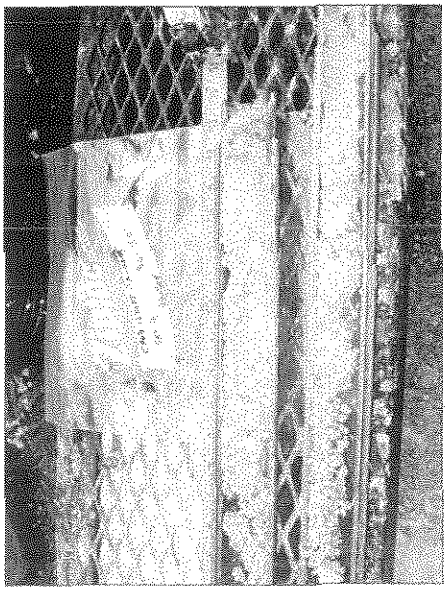


CP07-L30PP-CB-0008 Sample 7

WOLF WPC ENGINEERING, ENVIRONMENTAL & CONSTRUCTION SERVICES

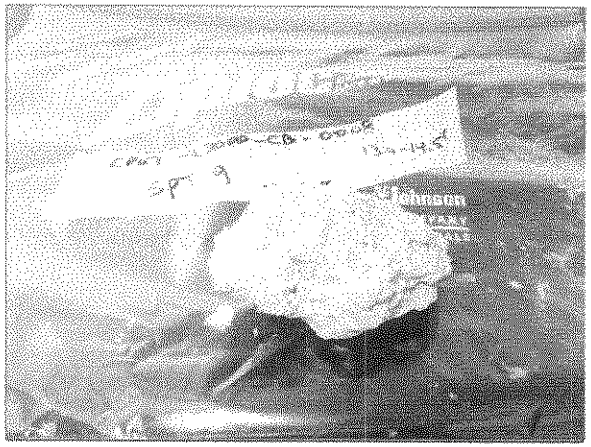
COREBORING PHOTOGRAPHS

L30 Seepage Management Pilot Project

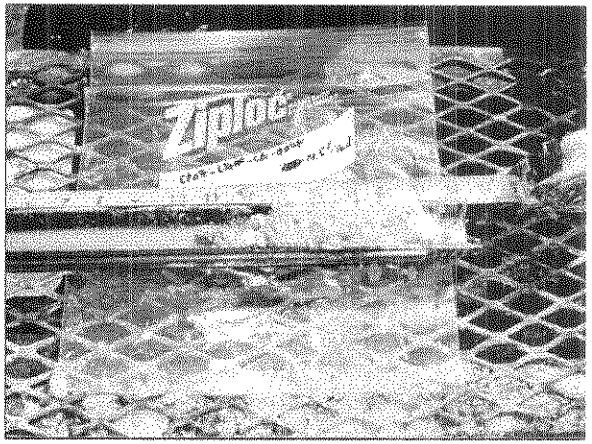
Miami-Dade County, Florida

WOLF/WPC Project No.: WPC6208.00036

Date: 12/03/08



CP07-L30PP-CB-0008 Sample 9



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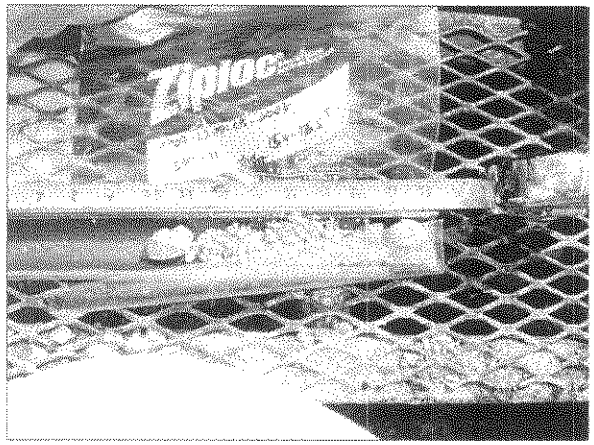

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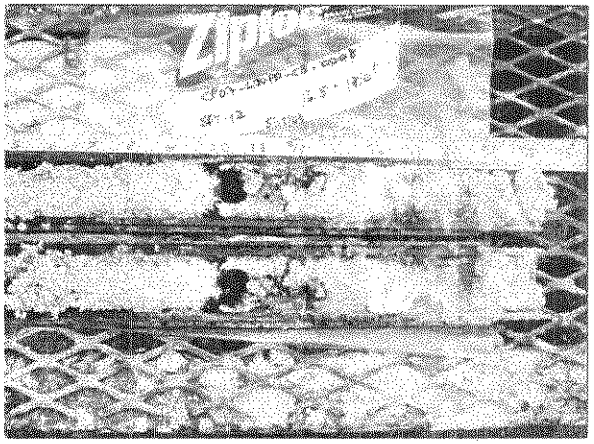

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WOLF WPC ENGINEERING, ENVIRONMENTAL & CONSTRUCTION SERVICES

COREBORING PHOTOGRAPHS

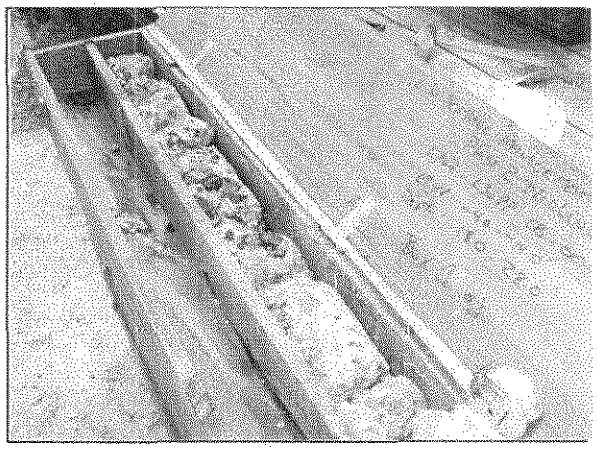
L30 Seepage Management Pilot Project

Miami-Dade County, Florida

WOLF/WPC Project No.:	Date:
WPC6208.00036	12/03/08

FILE CORRUPTED

CP07-L30PP-CB-0008 Sample 13



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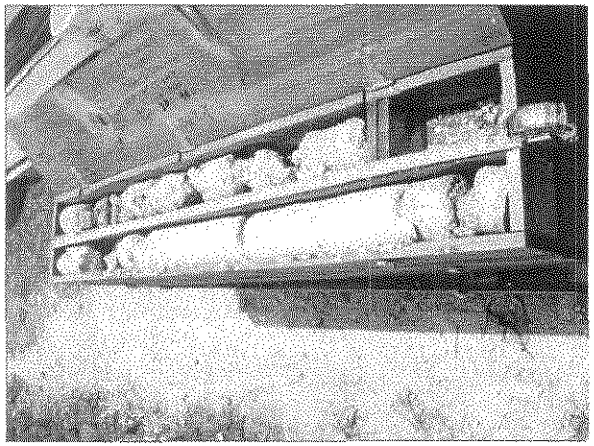

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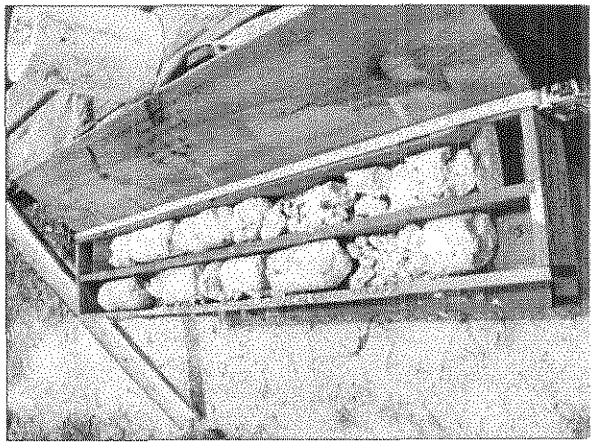


CP07-L30PP-CB-0008 Sample 18 & 19

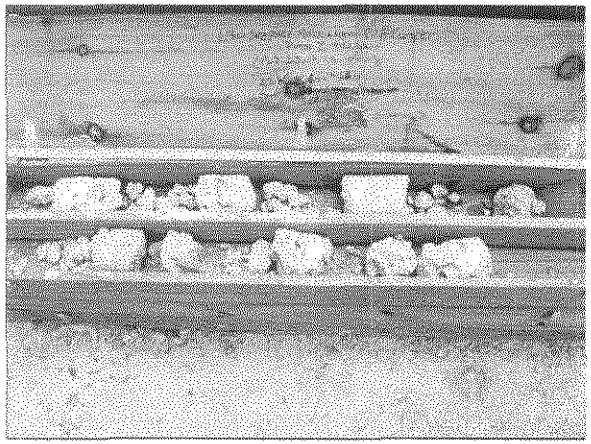
WOLF WPC ENGINEERING, ENVIRONMENTAL & CONSTRUCTION SERVICES

COREBORING PHOTOGRAPHS

L30 Seepage Management Pilot Project

Miami-Dade County, Florida

WOLF/WPC Project No.:	Date:
WPC6208.00036	12/03/08



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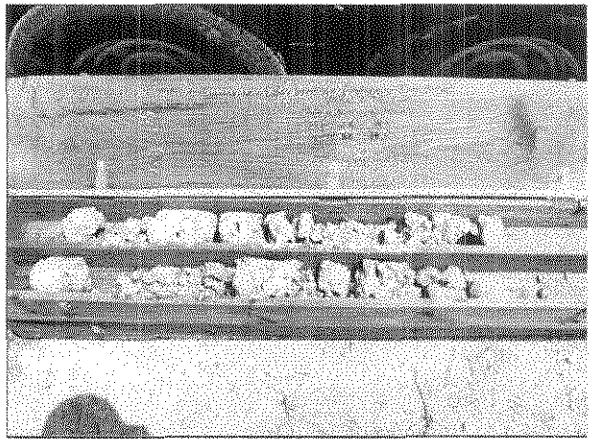

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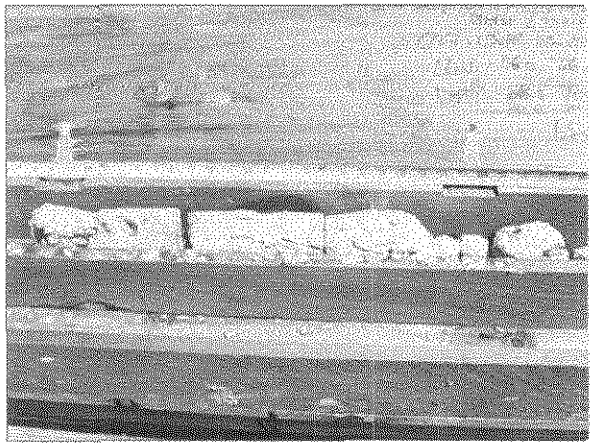

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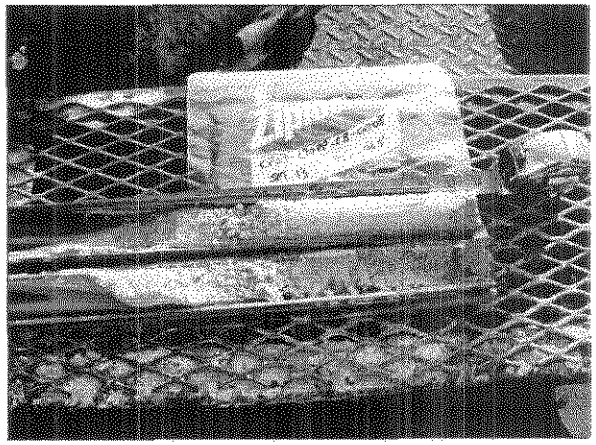


CP07-L30PP-CB-0008 Sample 25

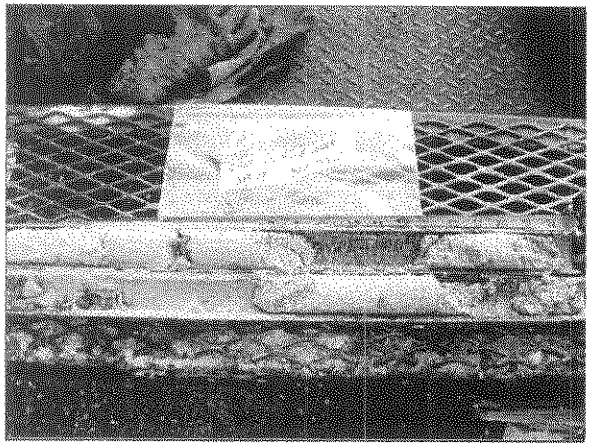
WOLF WPC ENGINEERING, ENVIRONMENTAL & CONSTRUCTION SERVICES

COREBORING PHOTOGRAPHS

L30 Seepage Management Pilot Project

Miami-Dade County, Florida

WOLF/WPC Project No.:	Date:
WPC6208.00036	12/03/08



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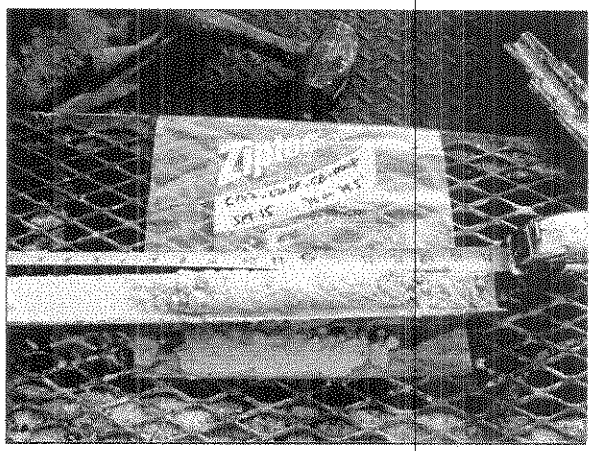

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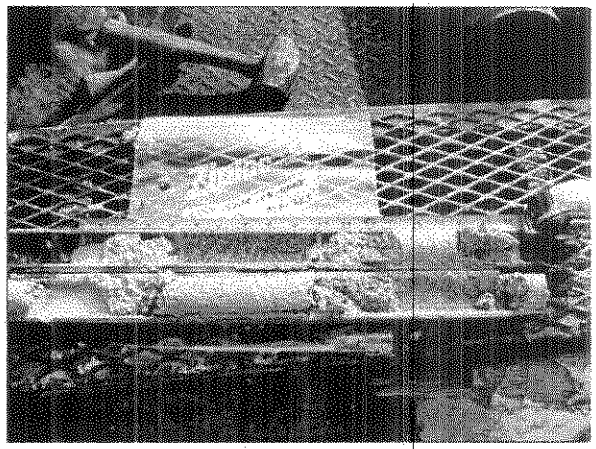


CP07-L30PP-CB-0007 Sample 29

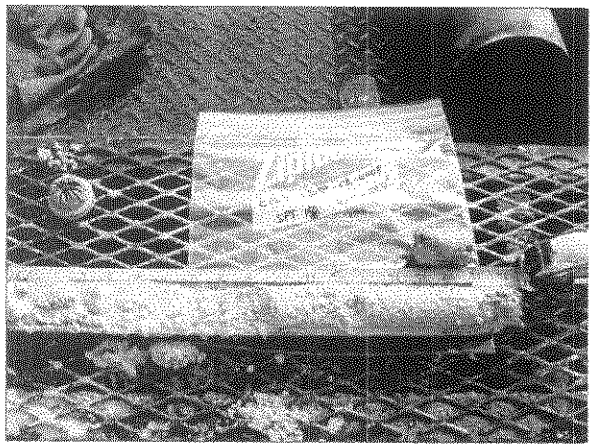
WOLF WPC ENGINEERING, ENVIRONMENTAL & CONSTRUCTION SERVICES

COREBORING PHOTOGRAPHS

L30 Seepage Management Pilot Project

Miami-Dade County, Florida

WOLF/WPC Project No.:	Date:
WPC6208.00036	12/03/08



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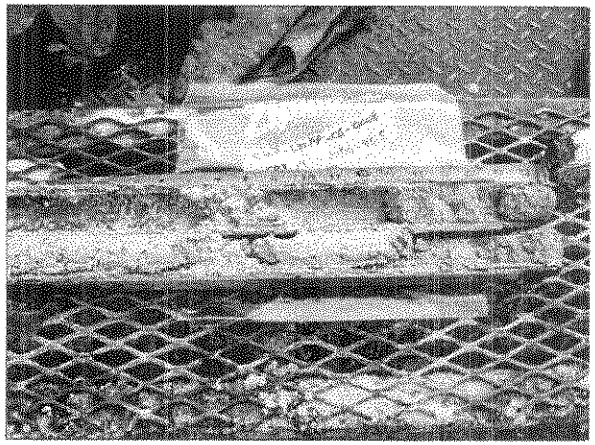

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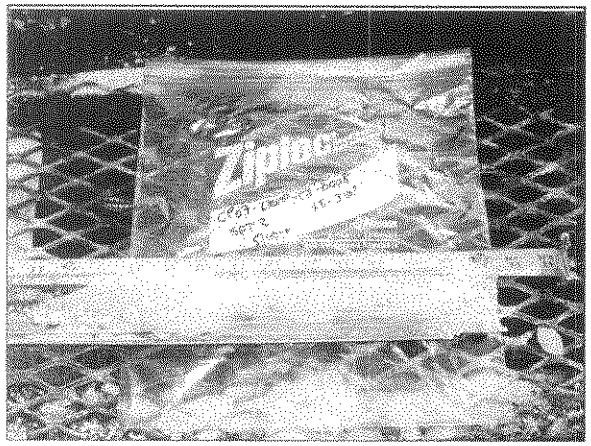

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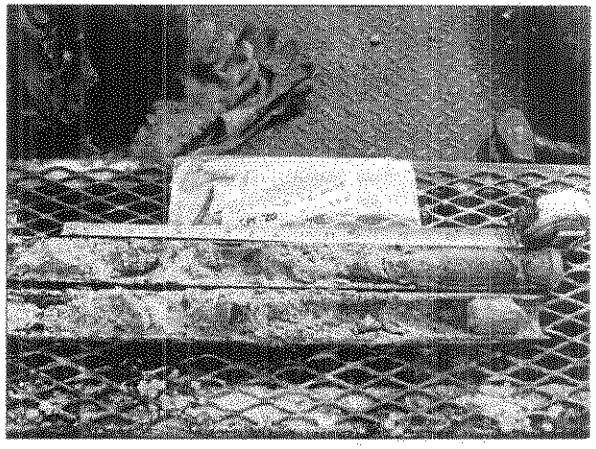


CP07-L30PP-CB-0008 Sample 33

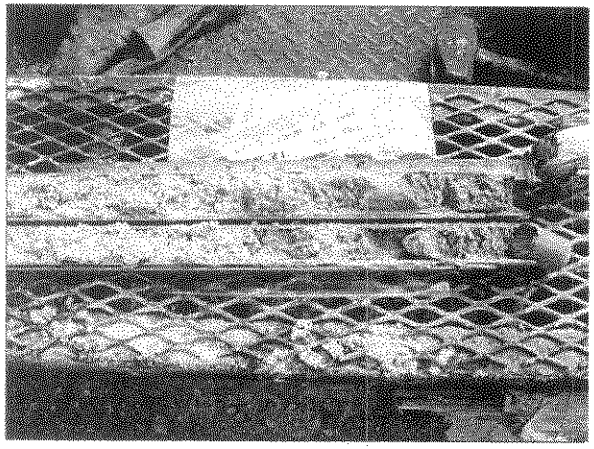
WOLF WPC ENGINEERING, ENVIRONMENTAL & CONSTRUCTION SERVICES

COREBORING PHOTOGRAPHS

L30 Seepage Management Pilot Project

Miami-Dade County, Florida

WOLF/WPC Project No.:	Date:
WPC6208.00036	12/03/08



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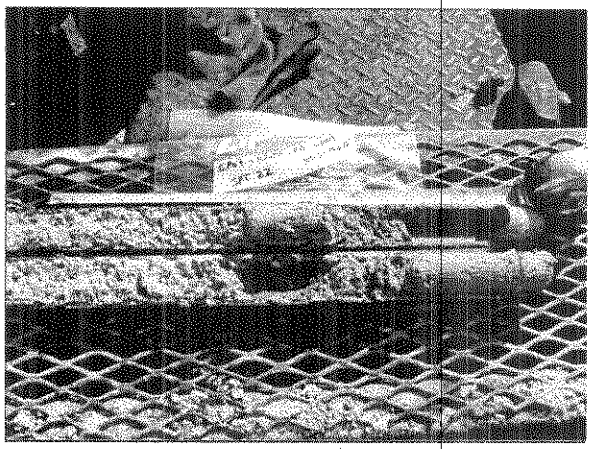

CP07-L30PP-CB-0008 Sample 35

WOLF WPC ENGINEERING, ENVIRONMENTAL & CONSTRUCTION SERVICES

COREBORING PHOTOGRAPHS

L30 Seepage Management Pilot Project

Miami-Dade County, Florida

WOLF/WPC Project No.:	Date:
WPC6208.00036	12/03/08

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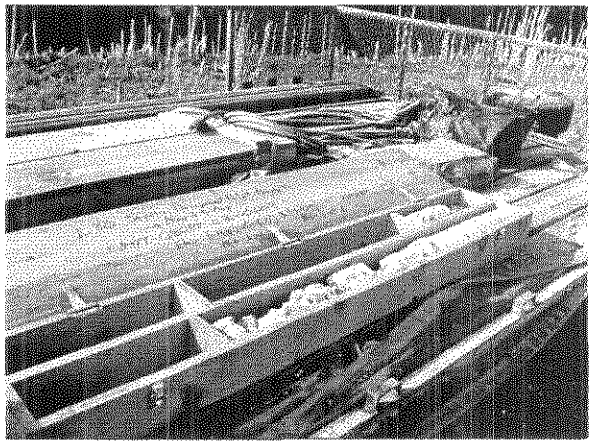

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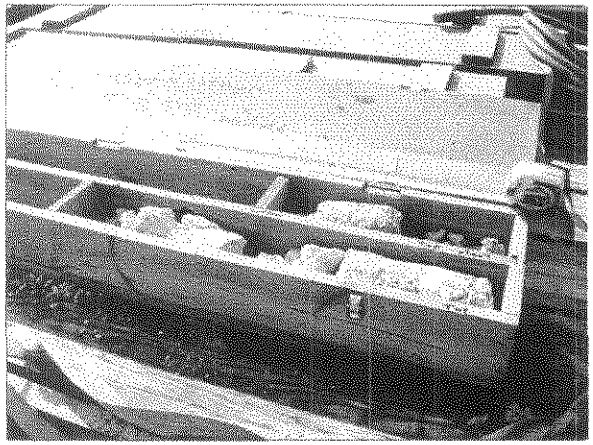

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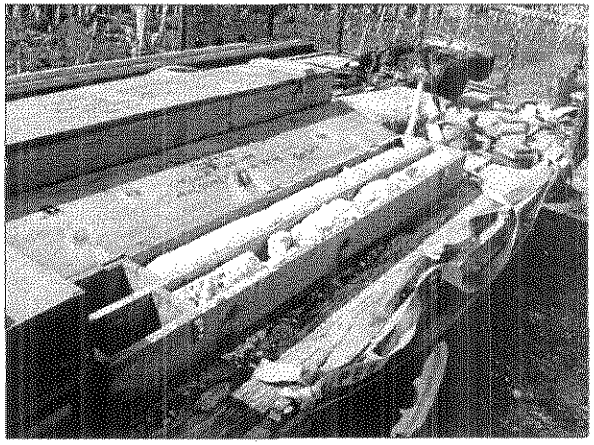

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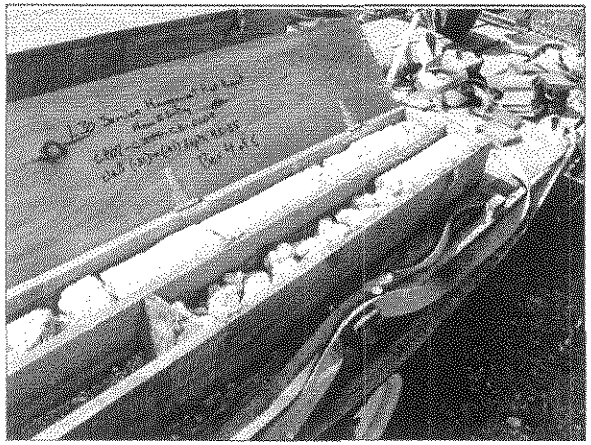
WOLF WPC ENGINEERING, ENVIRONMENTAL & CONSTRUCTION SERVICES

COREBORING PHOTOGRAPHS

L30 Seepage Management Pilot Project

Miami-Dade County, Florida

WOLF/WPC Project No.:	Date:
WPC6208.00036	12/03/08



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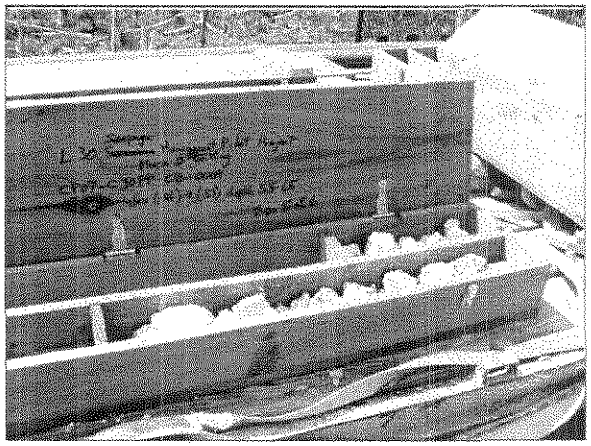

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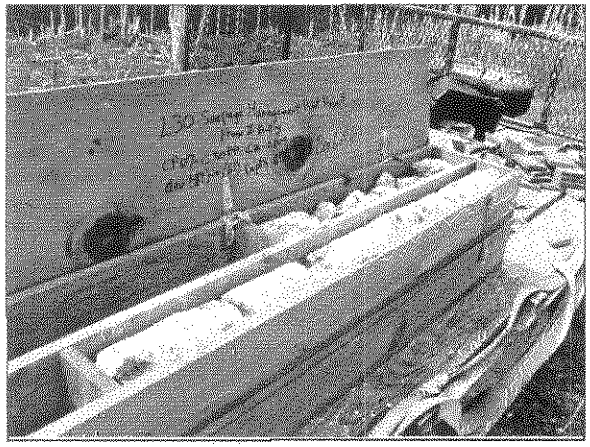

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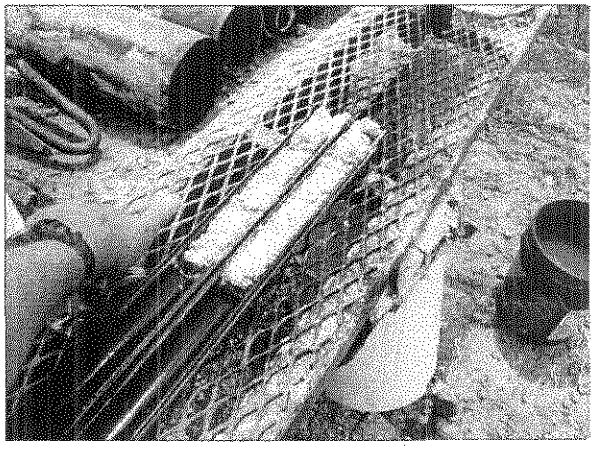


CP07-L30PP-CB-0009 Sample 25

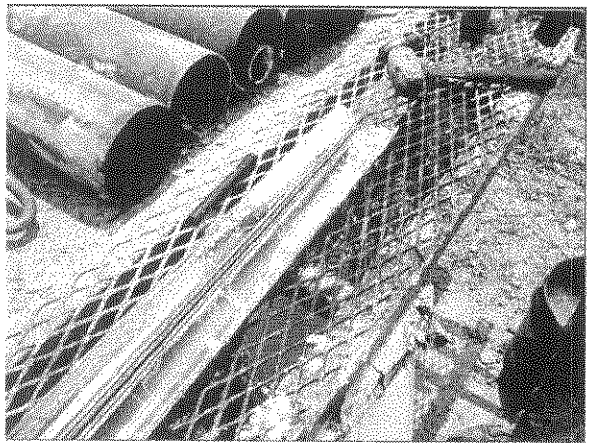
WOLF WPC ENGINEERING, ENVIRONMENTAL, & CONSTRUCTION SERVICES

COREBORING PHOTOGRAPHS

L30 Seepage Management Pilot Project

Miami-Dade County, Florida

WOLF/WPC Project No.:	Date:
WPC6208.00036	12/03/08



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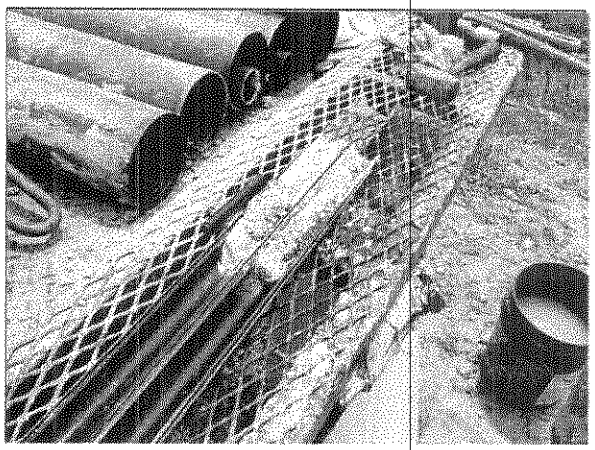

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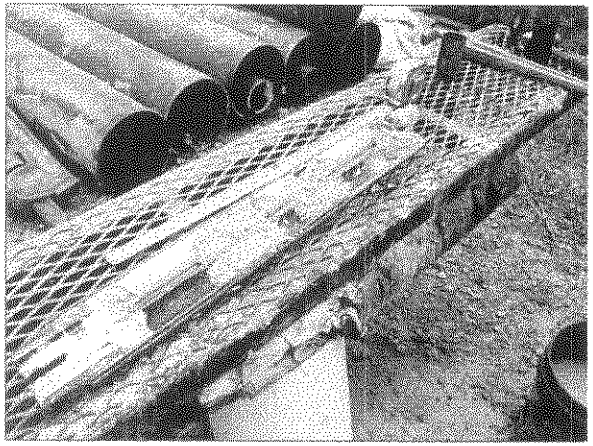

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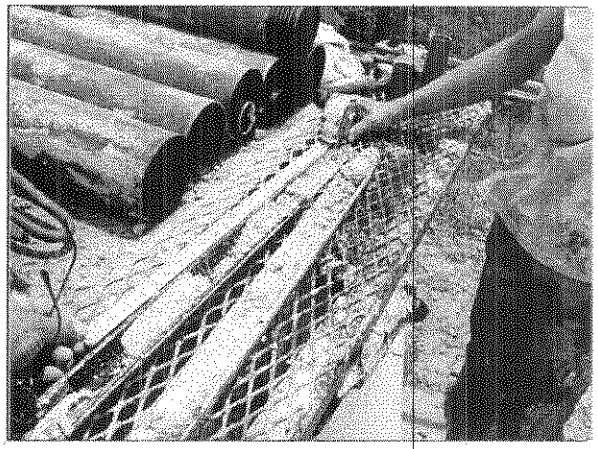


CP07-L30PP-CB-0009 Sample 29

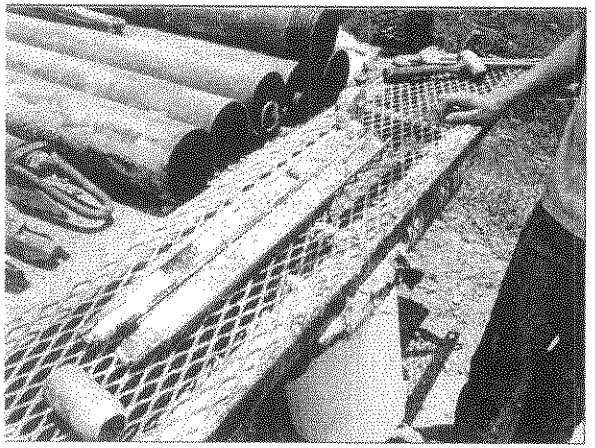
WOLF WPC ENGINEERING, ENVIRONMENTAL & CONSTRUCTION SERVICES

COREBORING PHOTOGRAPHS

L30 Seepage Management Pilot Project

Miami-Dade County, Florida

WOLF/WPC Project No.:	Date:
WPC6208.00036	12/03/08



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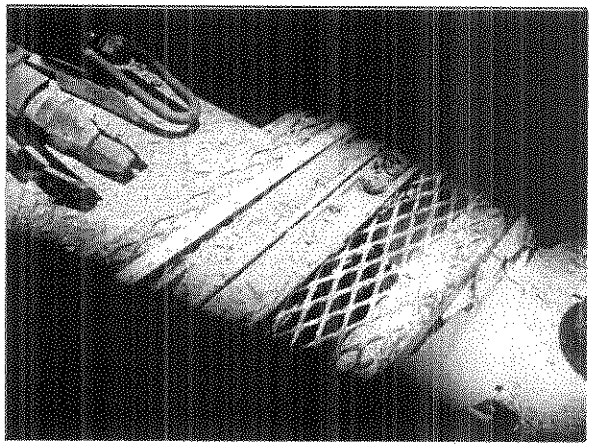

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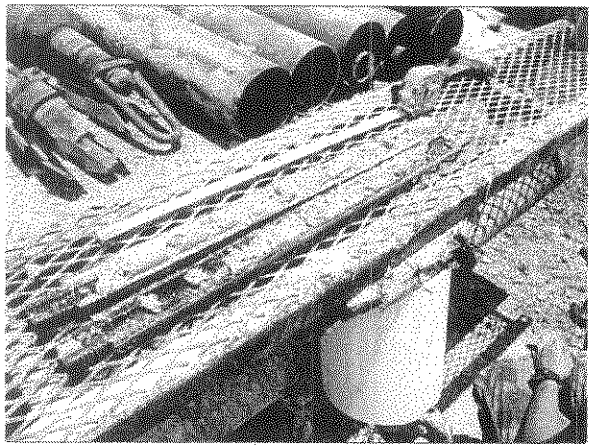

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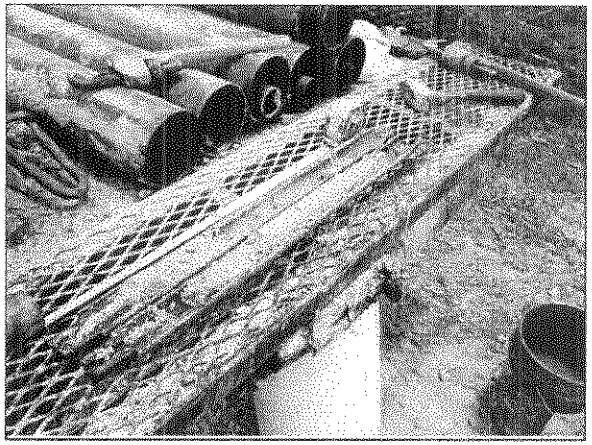


CP07-L30PP-CB-0009 Sample 33

WOLF WPC ENGINEERING, ENVIRONMENTAL & CONSTRUCTION SERVICES

COREBORING PHOTOGRAPHS

L30 Seepage Management Pilot Project

Miami-Dade County, Florida

WOLF/WPC Project No.:	Date:
WPC6208.00036	12/03/08

CP07-L30PP-CB-0009 Sample 34

WOLF WPC ENGINEERING, ENVIRONMENTAL & CONSTRUCTION SERVICES

COREBORING PHOTOGRAPHS

L30 Seepage Management Pilot Project

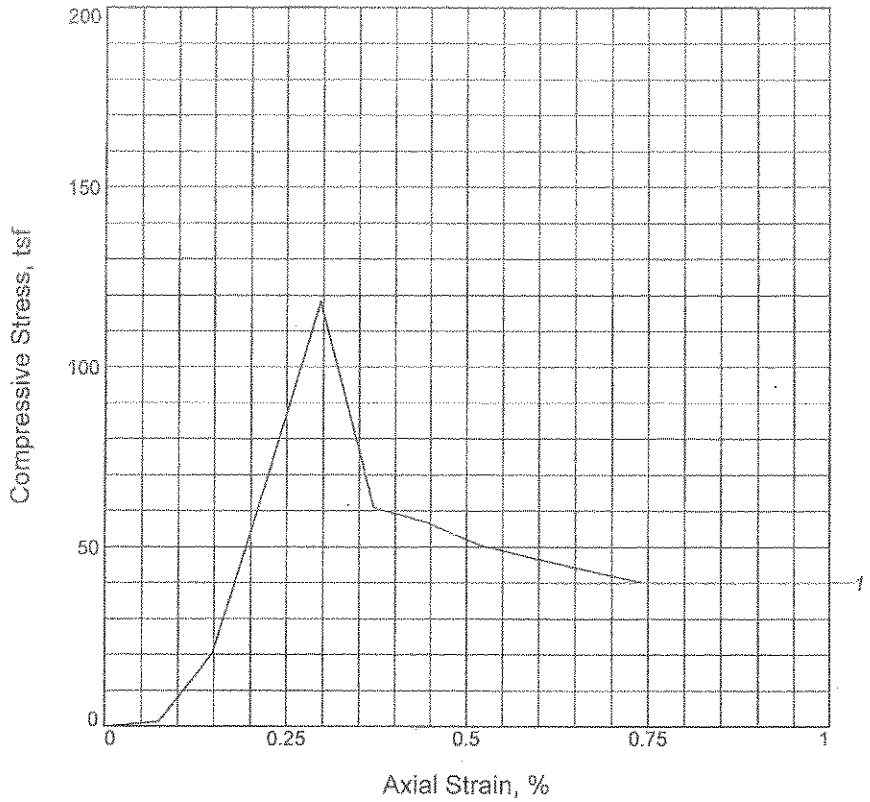
Miami-Dade County, Florida

WOLF/WPC Project No.: WPC6208.00036 **Date:** 12/03/08

APPENDIX C

- **Summary of Laboratory Test Results**

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	118.198			
Undrained shear strength, tsf	59.099			
Failure strain, %	0.3			
Strain rate, in./min.	0.06			
Water content, %	5.2			
Wet density, pcf	142.8			
Dry density, pcf	135.8			
Saturation, %	62.8			
Void ratio	0.2179			
Specimen diameter, in.	3.91			
Specimen height, in.	6.75			
Height/diameter ratio	1.73			

Description: Limerock Core, 10YR 7/1

LL =	PL =	PI =	GS= 2.65	Type: CORE

Project No.: WPC6308.00036

Date Sampled:

Remarks:

Figure _____

Client: USACE

Project: L-30 Seepage Management Pilot program

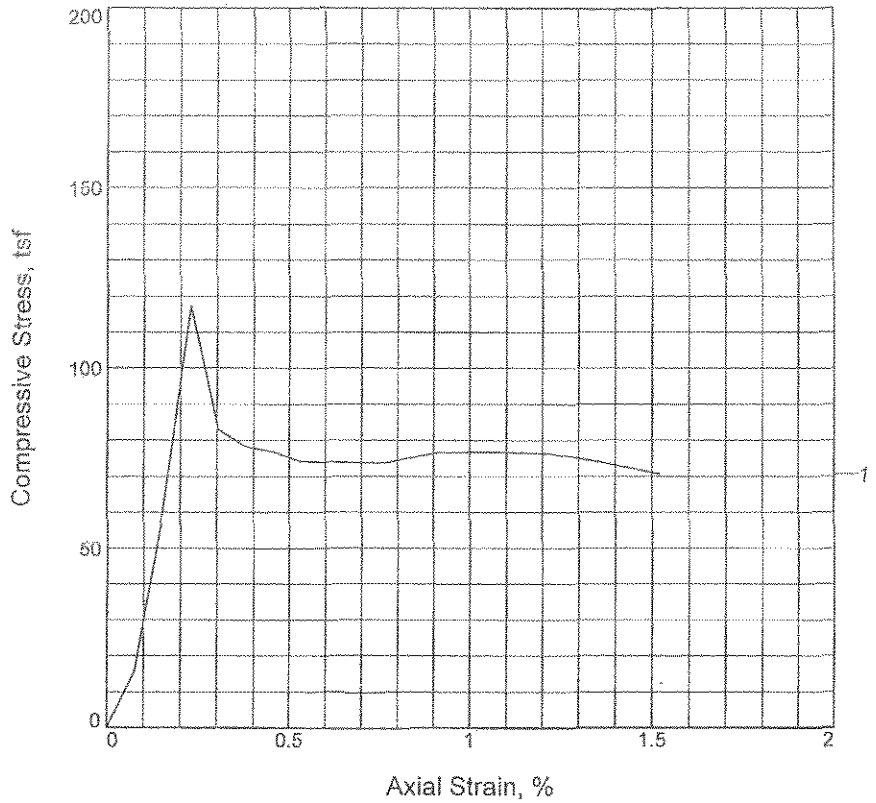
Location: CP07-L30PP-CB-007
Depth: 42.0'- 45.0'

UNCONFINED COMPRESSION TEST

WPC

Tested By: C. Martin

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	117.248			
Undrained shear strength, tsf	58.624			
Failure strain, %	0.2			
Strain rate, in./min.	0.03			
Water content, %	2.7			
Wet density, pcf	153.4			
Dry density, pcf	149.3			
Saturation, %	66.7			
Void ratio	0.1079			
Specimen diameter, in.	3.94			
Specimen height, in.	6.58			
Height/diameter ratio	1.67			

Description: Limerock Core, 10YR 7/1

LL =	PL =	PI =	GS= 2.65	Type: CORE

Project No.: WPC6308.00036

Date Sampled:

Remarks:

Client: USACE

Project: L-30 Seepage Management Pilot program

Location: CP07-L30PP-CB-008

Depth: 35.0'- 40.0'

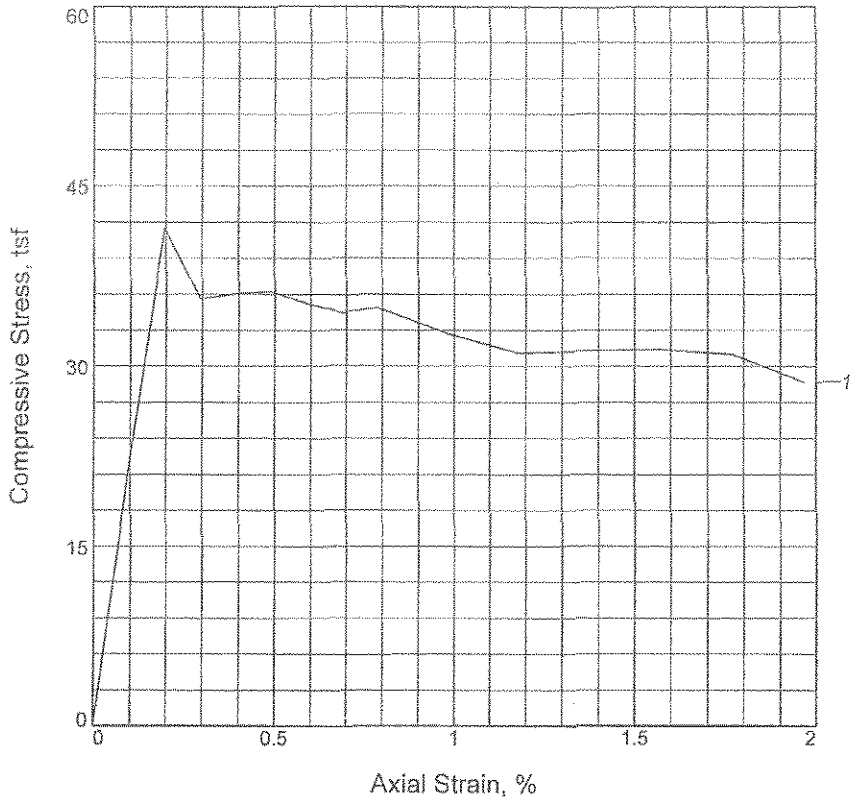
UNCONFINED COMPRESSION TEST

WPC

Figure _____

Tested By: C. Martin

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	41.458			
Undrained shear strength, tsf	20.729			
Failure strain, %	0.2			
Strain rate, in./min.	0.04			
Water content, %	7.2			
Wet density, pcf	148.0			
Dry density, pcf	138.1			
Saturation, %	96.3			
Void ratio	0.1983			
Specimen diameter, in.	3.95			
Specimen height, in.	5.08			
Height/diameter ratio	1.29			

Description: Limerock Core, 10YR 7/1

LL =	PL =	PI =	GS= 2.65	Type: CORE

Project No.: WPC6308.00036

Date Sampled:

Remarks:

Client: USACE

Project: L-30 Seepage Management Pilot program

Location: CP07-L30PP-CB-009

Depth: 38..0'- 40.0'

UNCONFINED COMPRESSION TEST

WPC

Figure _____

Tested By: C. Martin

SPECIALIZING IN SOILS
EXPLORATION, PHYSICAL
TESTING, ENGINEERING AND
NDT EXAMINATION SERVICES

CHALLENGE
ENGINEERING & TESTING, INC.

P. O. BOX 91537
4234 HALLS MILL ROAD
MOBILE, ALABAMA 36691
PHONE: (251) 666-1435
FAX: (251) 666-1438
EMAIL: CHALLENGETESTING@AOL.COM

FINAL REPORT
L-30 SEEPAGE MANAGEMENT PILOT PROJECT
WATER CONSERVATION AREA 3B
MIAMI-DADE COUNTY, FLORIDA

Contract # W912EP-05-D-0010
Delivery Order # 0003
Challenge Engineering & Testing, Inc.

Prepared For:
U.S. Army Corps of Engineers – Jacksonville District
Geotechnical Branch
701 San Marco Boulevard
Jacksonville, Florida 32207

Submitted By:
Challenge Engineering & Testing, Inc.
4234 Halls Mill Road
Mobile, Alabama 36691

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WATER CONSERVATION AREA 3B
MIAMI-DADE COUNTY, FLORIDA

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Procedures & Project Specifications
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gInt Core Boring Logs
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VI. CORE BOX INVENTORY & REPORTS

VII. U.S.G.S. BOREHOLE LOGGING

(1)

PURPOSE OF PROJECT

The U.S. Army Corps of Engineers is interested in determining the type, nature, and characteristics of lithological units that include the Biscayne Aquifer and the extent and conditions of the various materials as they exist to the depths at each of the locations specified.

The purpose of the L-30 Seepage Management Pilot Project (SMPP) is to address seepage management issues along the L-30 Canal related to the onset of other Comprehensive Everglades Restoration Plan (CERP) projects within the next five years.

The Pilot project is being conducted to provide information to determine the appropriate amount of wet season groundwater flow to return to the Everglades National Park (ENP) while minimizing potential impacts to the Miami-Dade West Well field and freshwater flows to Biscayne Bay.

This project is located west of Miami, Florida, northwest of the Tamiami Trail (US41) and Krome Avenue (Route 997). Work was performed along the top to the L-30 Canal Levee which runs mainly north-south and makes a 45 degree southwesterly departure from Krome Avenue toward the Tamiami Trail, commonly known as the "L-30 Triangle."

Challenge Engineering & Testing, Inc. of Mobile, Alabama was requested to assist the Jacksonville District of The U.S. Army Corps of Engineers on this contract.

SCOPE OF WORK

The scope of work consisted of performing in the upland (landside along top of L-30 levee) and in the freshwater wetland environment of the Water Conservation Area 3B the following:

- Core Drilling
- Wireline Core & Splitspoon Sampling
- Installation of Groundwater Monitoring Wells

Authorization to proceed with the requested tasks was issued on September 18th, 2006, Contract #W912EP-05-D-0010 – Delivery Order #0003 by the U.S. Army Corps of Engineers – Jacksonville District.

Field work was requested to be completed by November 19, 2006 for this assignment order.

PROCEDURES AND PROJECT SPECIFICATIONS

This report presents the procedures as followed for the borehole location, soil sampling and the classification of each respective soil sample in conjunction with special notes as recorded regarding conditions encountered in the field.

U.S. Army Corps of Engineer Standard Boring Log Forms 1836 are completed for each core boring performed in the designated location as generated with the Geotechnical Integrator "gINT" Software Program and script/library files as furnished by the Jacksonville District.

Drilling techniques and equipment were in general accordance with the prescribed technical provisions as stated in the Department of the Army Engineering Manual EM-1110-2-1907, "Soil Sampling" Publication.

FIELD WORK PERFORMED

PHASE I: TOP OF L-30 LEVEE LANDSIDE CORE BORINGS / WELL INSTALLATION

The landside well drilling phase of work on this project consisted of performing numerous tasks along the top of the L-30 Levee in designated test locations.

Boreholes were located utilizing the x-y coordinates as furnished by the Jacksonville District of the U.S. Army Corps of Engineers and converted by Corpscon to latitude/longitude for GPS location.

Three (3) borings were designated to be located along the top of the levee in the center of the roadway.

In each of the locations the following tasks were performed:

- Large diameter (10") roller bit was used to drill through the levee to top of rock
- PVC (8") surface casing set to top of rock
- Wireline rock coring was commenced with a five foot 4" x 5 ½" core barrel to the base of the rock formation with fresh water
- Boreholes were reamed with a seven and one-half inch (7.5") bit
- Boreholes developed for a period of three (3) hours with compressed air
- U.S. Geological Survey was notified of field progress
- Boreholes were allowed to remain for a minimum of 72 hours
- Borehole logging was performed by U.S.G.S.
- After approximately 7 days, drillcrew returned to perform continuous splitspoon sampling for an additional 30 feet
- Boreholes were backfilled with gravel and crushed limestone

The rig used on this project was a CME-55 four (4) wheel drive truck mounted hydraulic drill unit equipped with a standard manual 140 lb. splitspoon drive hammer and a Moyno reciprocating cavity unit pump.

Groundwater monitoring wells were installed approximately 10 ft. from each of the large diameter boreholes along the backside (south-canal)) top of levee. The construction consisted of two (2) inch diameter schedule 40 Johnson threaded joint "Tri-Lock" PVC installed with two (2) feet of 0.060" slotted screen.

Pea gravel backfill was used to fill the annulus around the screen.

A seal of 3/8" bentonite pellets was placed above the pea gravel. The remaining borehole annulus was backfilled with crushed limestone and gravel to the surface.

Flush mount security covers were completed encased in a three (3) foot by three (3) foot concrete pad. Locking top caps were placed on the well pipe.

The base of the Fort Thompson Formation was noted for each of the borings and reported in the below table. Splitspoon sampling was conducted for thirty (30) feet in the Pinecrest Sands below the Ft. Thompson Formation.

The computed horizontal coordinates for each of the borings to Florida East – NAD 83 State Plane Coordinates and vertical elevations to NAVD 1988 are reported as follows:

BORING/WELL DRILLING TEST LOCATIONS

Boring/Well Number	NAD 1983 Florida East Northing	Easting	Elevation (Ft.)	Base of Ft. Thompson
CP06-L30PP-CB-0001	524279	826073	17.27	- 57.7
CP06-L30PP-CB-0002	522044	823753	17.49	- 62.5
CP06-L30PP-CB-0003	519743	821358	17.19	- 57.1
			Top of Casing	
CP06-L30PP-MW-0001	524270	826074	17.12	
CP06-L30PP-MW-0002	522036	823753	17.10	
CP06-L30PP-MW-0003	519734	821356	16.87	

PHASE II:
WATER CONSERVATION AREA 3B FRESHWATER WETLAND WELLS

Two (2) locations in the WCA3B were designated for monitoring wells and platforms to be constructed

(4)

Each site was drilled to termination depth with an amphibious track mounted drill setup. The wells were constructed and developed in the same manner as described above for the upland L-30 levee.

Surface casing consisted of installing six (6) inch schedule 80 PVC casing around the well and strapped to a four legged 2" galvanized steel pipe platform with a 48" treated wooden work deck.

WELL DRILLING TEST LOCATIONS

Boring/Well Number	NAD 1983 Florida East Northing	Easting	Top Of Casing
CP06-L30PP-MW-0004	526589	821601	12.00
CP06-L30PP-MW-0005	528482	824038	13.55

WELL DEVELOPMENT

The large diameter seven and one-half (7.5) inch boreholes were developed by insertion of tremmie pipe to the base of the reamed boreholes and using compressed air as supplied by a portable 185 CFM compressor to lift and blow out water and debris from boreholes. Each was developed for a period of a minimum of three (3) hours as the well was noted to produce "clear water".

Air bubbles were noted to be present rising to the surface waters on both sides of the levee for a distance of up to 105 feet from the well for a period of time of at least 20 minutes following development.

Each of the two (2) inch permanent groundwater monitoring wells was developed by pumping and surging until "clear" water was produced.

As per project specifications, an inventory of core boxes as prepared in the gINT format was submitted to Mrs. Karen Pitchford. The samples were placed in labeled wooden core boxes and delivered to the Corps of Engineer Warehouse on Talleyrand Avenue in Jacksonville, Florida on November 8, 2006. The core boxes were verified received by Mr. Mark Whitson and Dr. June Mirecki of the U.S. Army Corps of Engineers.

REPORT SUBMITTALS

The field boring logs, visual classifications and test results were all entered into the Geotechnical Integrator (gINT) software format as designed by the Jacksonville District which is presented as part of this report.

Digital project photographs were taken throughout the duration of the field work to document progress. Some the photographs are found attached as part of this report to include completed well installations.

Monitoring well construction diagrams are completed for each well.

FIELD EXPLORATION SUMMARY CONCLUSION

Coordination of field activities was conducted with Mr. Keith Price, Miami Field Office of the South Florida Water Management District during the term of this project.

During the field work on this project, coordination and updates were provided to Mr. Kevin Cunningham of the U.S. Geological Survey and U.S. Army Corps of Engineers Project Geologist Dr. June Mirecki of the Jacksonville District.

A special work permit was secured by Challenge Engineering Testing, Inc, through the Florida Fish and Wildlife Conservation Commission to work in the area due to excessive high water and public usage restrictions.

Challenge Engineering & Testing, Inc. has made every attempt to conduct this field project according to the project specifications and at the direction & satisfaction of all parties involved.

REPORT INVESTIGATION LIMITATIONS

The core borings, installation of the groundwater monitoring wells, analyses and recommendations submitted in this preliminary report are based on the data obtained from the field explorations performed at the locations depicted on the site plan. These locations were chosen by the U.S. Army Corps of Engineers, Jacksonville District. The area explored is limited to the depth and diameter of the core borings. This report does not reflect any variations which may occur adjacent to or between the core borings. The nature and extent of the variations between the borings may not become evident until during future excavations or construction in the area.

This report is based on relatively shallow explorations and a scope of work determined solely by the Corps of Engineers. This report does not include an evaluation of the environmental (ecological or hazardous/toxic material related) condition of the site and subsurface.

This report has been prepared for the exclusive use of the U.S. Army Corps of Engineers in accordance with generally accepted soil and foundation engineering practices.

It has been our pleasure for Challenge Engineering & Testing, Inc. to provide the U.S. Army Corps of Engineers – Jacksonville District our geotechnical engineering testing services on this project along the L-30 Levee & in the Water Conservation Area 3B.

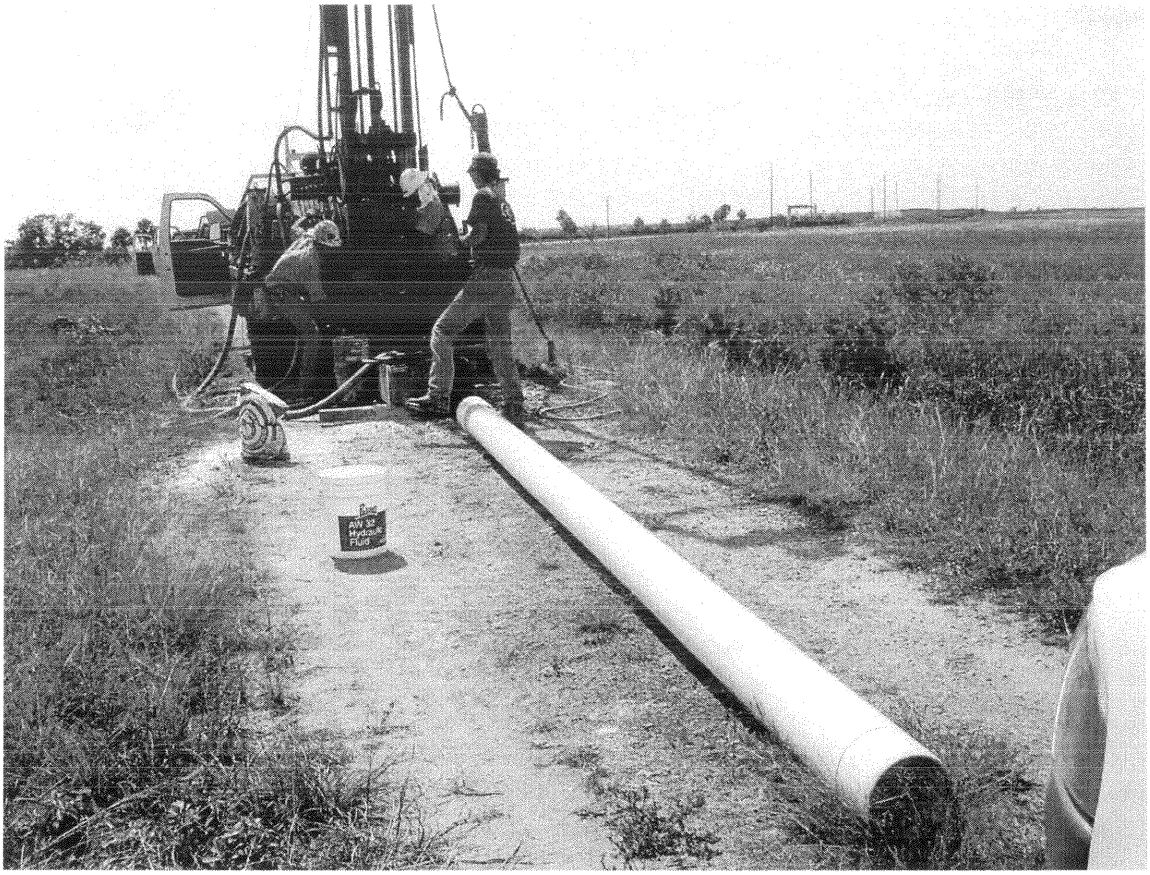
I trust that you will find this submittal to be in general conformance with the project guidelines and specifications.

Respectfully Submitted,
Challenge Engineering & Testing, Inc.

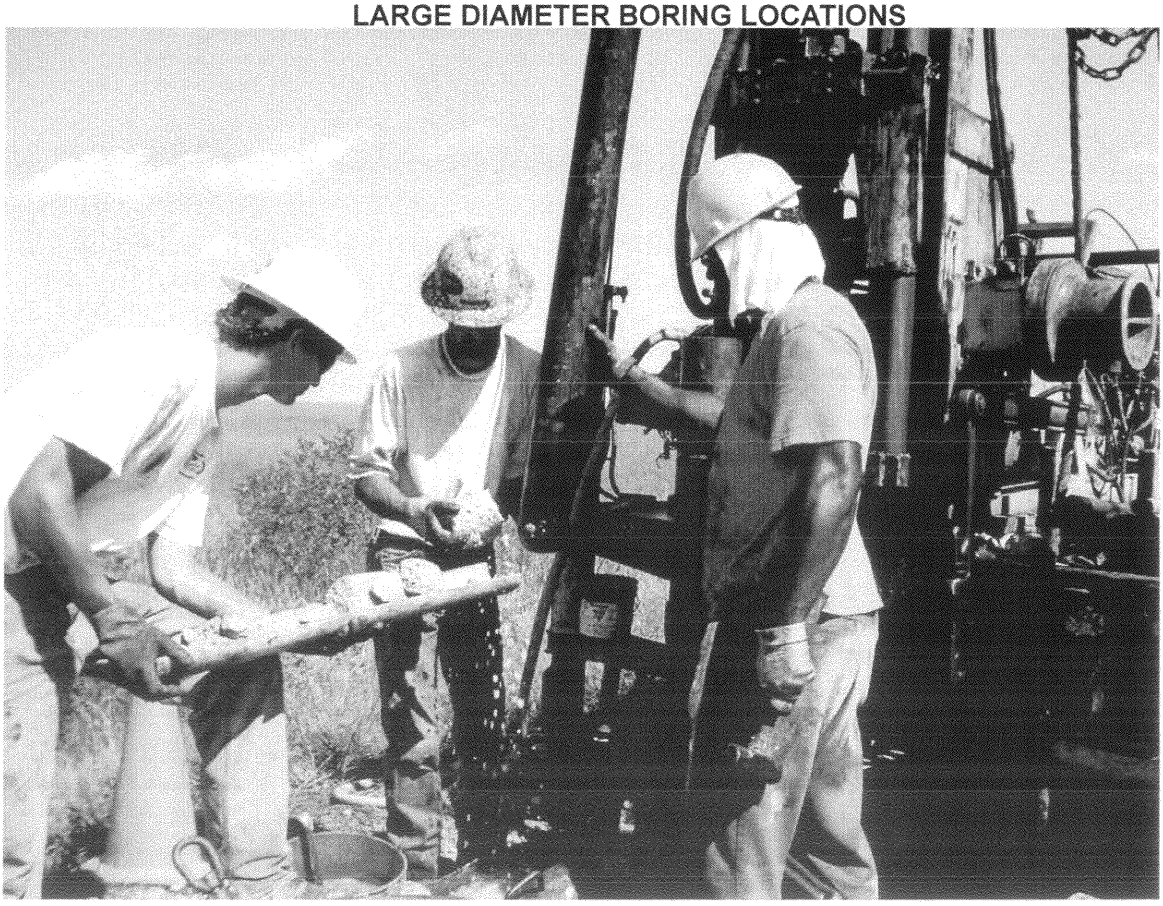
V. J. Thompson III, P.E.
Florida Registration # 37610

(7)

REFERENCE PROJECT PHOTOGRAPHS



8" SURFACE PVC CASING WAS SET AT EACH OF THE LARGE DIAMETER BORING LOCATIONS



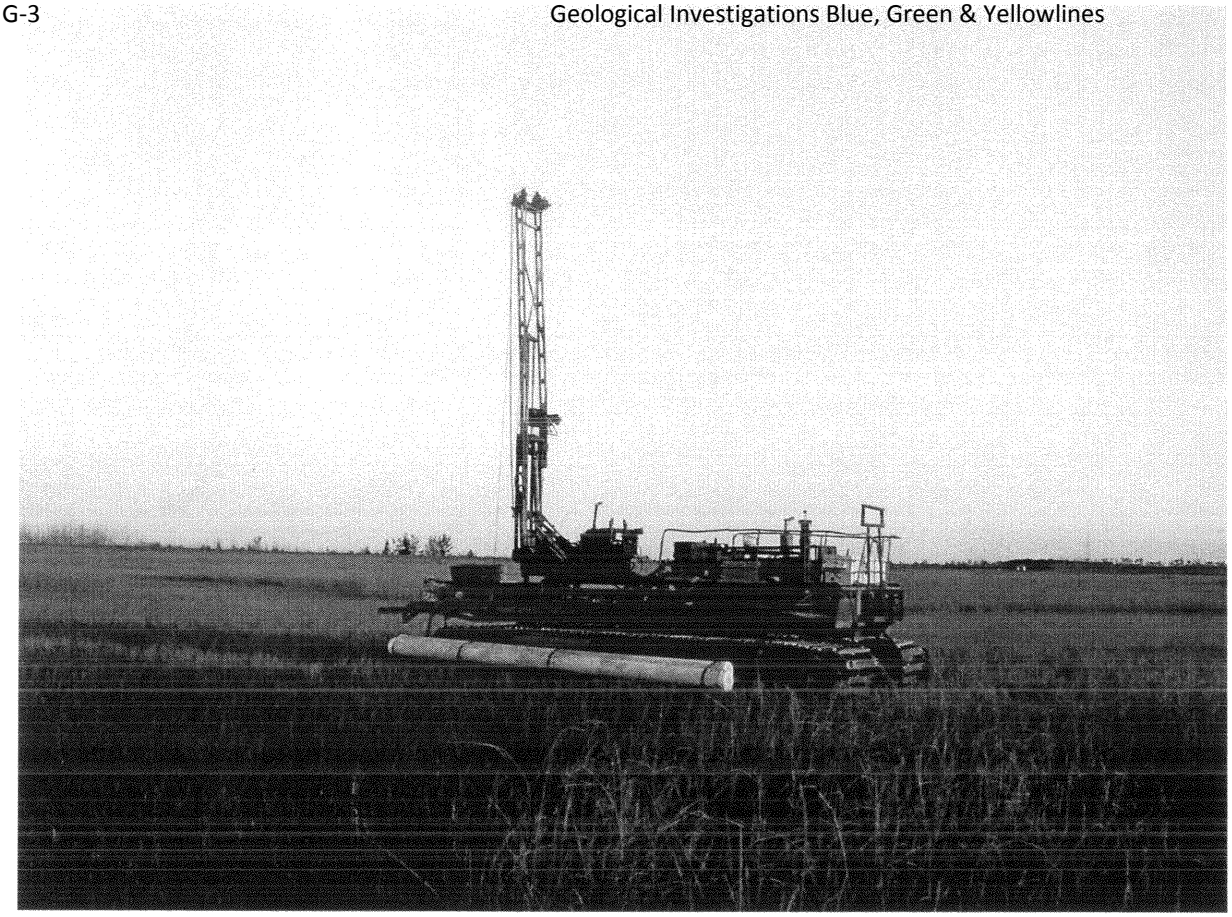
4" WIRELINE CORING SYSTEM USED TO SAMPLE TO ROCK

7.5" OPEN BOREHOLES BEING AIR LIFTED WITH COMPRESSOR FOR 3 HOURS EACH PRIOR TO BEING LOGGED BY THE U.S.G.S.

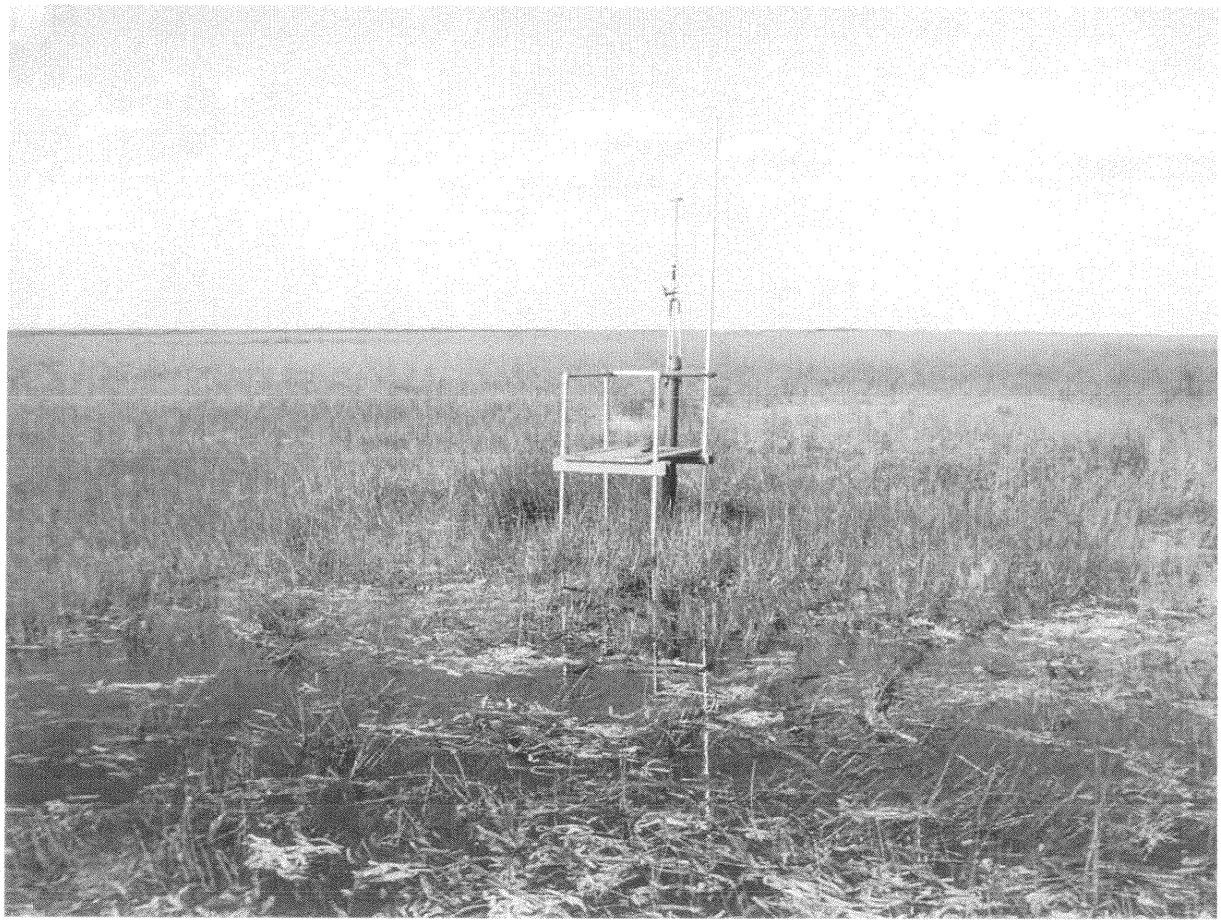
AIR BUBBLES WERE NOTED TO BE PRESENT ON BOTH SIDES OF THE LEVEE UP TO 105 FT. FROM BOREHOLES 10 MINUTES AFTER COMPRESSOR SHUTDOWN

FLUSH MOUNT MONITORING WELL PADS CONSTRUCTED ON TOP OF L-30.
GPS POSITIONING CONDUCTED ON WELL CASING

COMPLETED FLUSH MOUNT WELL PAD ON SOUTHSIDE OF L-30
WITH BOLTDOWN MANHOLE COVER

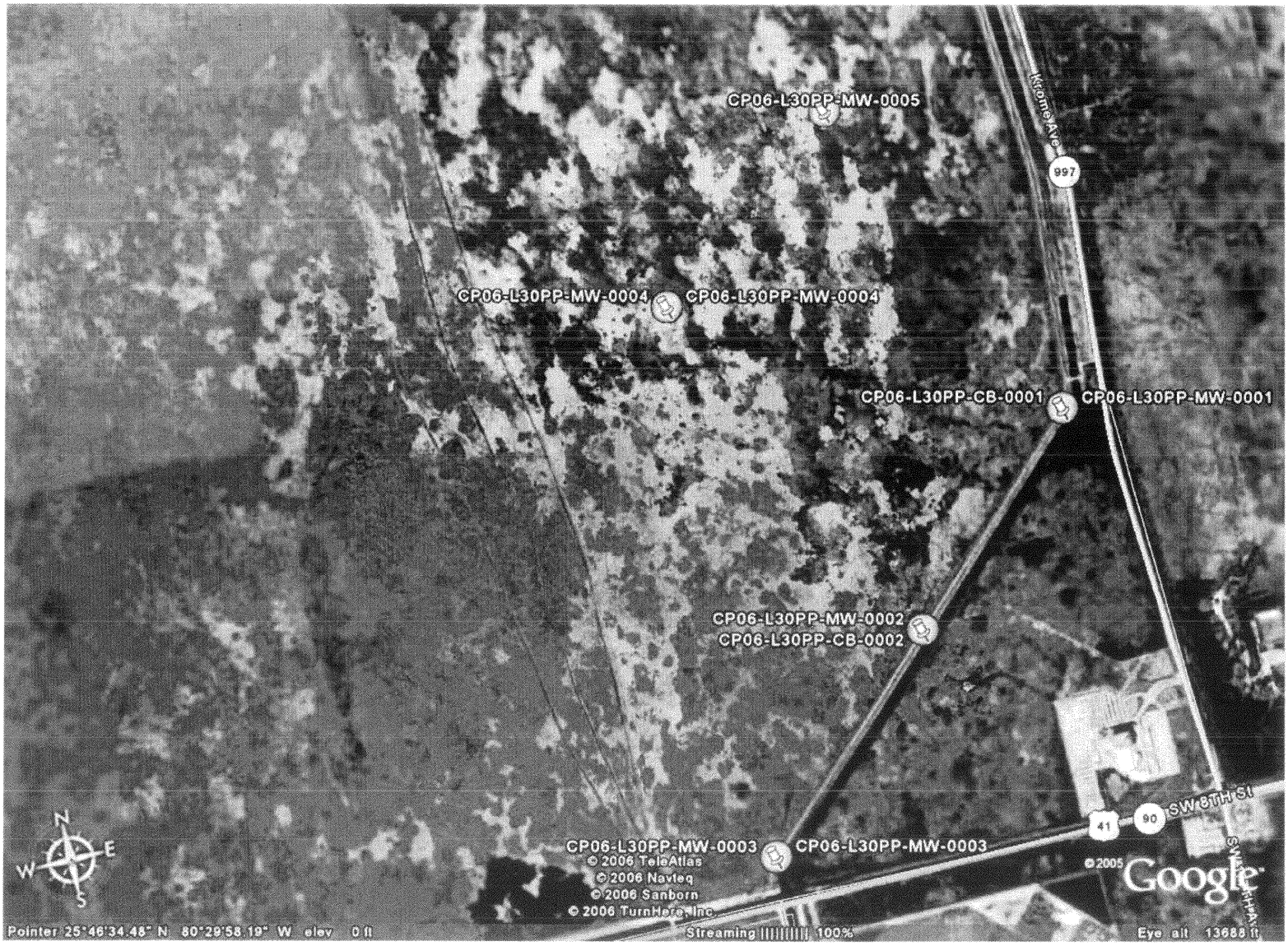


ATV SWAMP MOUNTED DRILL BUGGY ON-SITE



MONITORING WELL PLATFORM

BORING LOCATION MAP



LOCATION OF CORE BORINGS AND MONITORING WELLS
L-30 SEEPAGE MANAGEMENT PILOT PROJECT
DADE COUNTY, FLORIDA

SOILS TEST CORE BORING NUMBER "CP06-L30PP-CB-0001"

Miami-Dade County, Florida

Boring Designation CP06-L30PP-CB-0001

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 6 SHEETS

1. PROJECT L-30 Seepage Management Pilot Project Top Of Levee L-30 (Center of Roadway)	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) / HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP06-L30PP-CB-0001 / LOCATION COORDINATES X = 826,073 Y = 524,279	11. MANUFACTURER'S DESIGNATION OF DRILL CME 55 Truckrig ☐ AUTO HAMMER ☒ MANUAL HAMMER
3. DRILLING AGENCY Challenge Engineering & Testing, Inc. / CONTRACTOR FILE NO. 2006D30	12. TOTAL SAMPLES DISTURBED 33 / UNDISTURBED (UD) 0
4. NAME OF DRILLER Adam Benson	13. TOTAL NUMBER CORE BOXES 5
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER 5.0 Ft.
	15. DATE BORING STARTED 10-04-06 / COMPLETED 10-17-06
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING 17.3 Ft.
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING 79 %
8. TOTAL DEPTH OF BORING 105.0 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Bob Momberger, Geologist

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
17.3	0.0						17.3		
			L-30 Levee Fill Material				Advanced Boring w/ tricone roller bit		

0
5
10
15

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(Continued)

Boring Designation CP06-L30PP-CB-0001

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District	SHEET 2 OF 6 SHEETS
PROJECT: L-30 Seepage Management Pilot Project	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.)	HORIZONTAL: NAD83 / VERTICAL: NAVD88
LOCATION COORDINATES: X = 826,073 Y = 524,279	ELEVATION TOP OF BORING: 17.3 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
-0.2	17.5						Advanced Boring w/ tricone roller bit -0.2		
		Moderately Weathered	LIMESTONE, oolitic, fossiliferous, moderately hard, moderately weathered, aphanitic, pitted, Ft. Thompson Formation, 5Y 8/2 pale yellow	80	1	RQD 0	4 x 5-1/2" Diamond Impregnated Bit DT = 1 mins HP = 250 psi DFR = 25 % -2.7		
		Weathered	From El. -2.7 to -11.2 Ft., weathered, thick bedding, vuggy	80	2 BOX 1	RQD 25	4 x 5-1/2" Diamond Impregnated Bit DT = 7 mins HP = 250 psi DFR = 25 % -7.7		
		Weathered	From El. -11.2 to -12.7 Ft., soft, 5Y 8/1 white	80	3	RQD 30	4 x 5-1/2" Diamond Impregnated Bit DT = 7 mins HP = 250 psi DFR = 0 % -12.7		
		Slightly Weathered	From El. -12.7 to -17.7 Ft., moderately hard, slightly weathered, thick bedding, vuggy, 5Y 8/2 pale yellow	100	4 BOX 2	RQD 80	4 x 5-1/2" Diamond Impregnated Bit DT = 4 mins HP = 250 psi DFR = 0 % -17.7		

15 20 25 30 35

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JUN 02

Boring Designation CP06-L30PP-CB-0001

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District		SHEET 3 OF 6 SHEETS
PROJECT: L-30 Seepage Management Pilot Project	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.)	HORIZONTAL: NAD83	VERTICAL: NAVD88
LOCATION COORDINATES: X = 826,073 Y = 524,279	ELEVATION TOP OF BORING: 17.3 Ft.		

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
		Unweathered	From El. -17.7 to -31.7 Ft., unweathered, aphanitic, massive bedding, vuggy, sand filled vugs, 5Y 8/1 white	90	5 BOX 2	RQD 70	4 x 5-1/2" Diamond Impregnated Bit DT = 3 mins HP = 250 psi DFR = 0 %		
			-22.7						
			At El. -22.7 Ft., 2.5Y 8/1 white	100	6	RQD 100	4 x 5-1/2" Diamond Impregnated Bit DT = 3 mins HP = 250 psi DFR = 0 %		
			-27.7						
			From El. -31.7 to -32.7 Ft., fossiliferous, soft, porous, 5Y 8/1 white	65	7 BOX 3	RQD 43	4 x 5-1/2" Diamond Impregnated Bit DT = 3 mins HP = 250 psi DFR = 0 %		
			-32.7						
			From El. -32.7 to -37.7 Ft., moderately hard, thin bedding, vuggy	50	8	RQD 20	4 x 5-1/2" Diamond Impregnated Bit DT = 5 mins HP = 250 psi DFR = 0 %		
			-37.7						

35 40 45 50 55

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JUN 02

Boring Designation CP06-L30PP-CB-0001

DRILLING LOG (Cont. Sheet)	INSTALLATION Jacksonville District	SHEET 4 OF 6 SHEETS
PROJECT L-30 Seepage Management Pilot Project	COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83 / VERTICAL NAVD88
LOCATION COORDINATES X = 826,073 Y = 524,279	ELEVATION TOP OF BORING 17.3 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
		Unweathered	From El. -37.7 to -47.7 Ft., medium bedding, vuggy, 2.5Y 8/1 white	50	BOX 3 / 9	RQD 20	4 x 5-1/2" Diamond Impregnated Bit DT = 4 mins HP = 250 psi DFR = 0 %		
				100	BOX 4	RQD 55	4 x 5-1/2" Diamond Impregnated Bit DT = 4 mins HP = 250 psi DFR = 0 %		
			From El. -47.7 to -52.7 Ft., thick bedding, vuggy, clay filled vugs, 2.5Y 7/1 light gray	100	11	RQD 90	4 x 5-1/2" Diamond Impregnated Bit DT = 4 mins HP = 250 psi DFR = 0 %		
			From El. -52.7 to -57.7 Ft., thin bedding, sand filled vugs	25	BOX 5 / 12	RQD 25	4 x 5-1/2" Diamond Impregnated Bit DT = 4 mins HP = 250 psi DFR = 0 %		
-57.7	75.0						-57.7		

Depth scale: 55, 60, 65, 70, 75

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JUN 02

Boring Designation CP06-L30PP-CB-0001

DRILLING LOG (Cont. Sheet)	INSTALLATION Jacksonville District	SHEET 5 OF 6 SHEETS

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
L-30 Seepage Management Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 826,073 Y = 524,279	17.3 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
-57.8	75.1		SAND, silty, mostly carbonate, Pinecrest Sand Formation (SM)	0	13	RQD 0	4 x 5-1/2" Diamond Impregnated Bit	WOH	
			SHELL, mostly angular coarse gravel-sized flat and elongated shell up to 1", some coarse gravel-sized limestone up to 1-1/2", strong reaction with HCl, wet, 10Y 8/1 light greenish gray	27	14		SPT Sampler -59.2	0 0	0
				27	15		SPT Sampler -60.7	3 1 1	2
				50	16		SPT Sampler -62.2	1 1 1	2
-62.2	79.5		SAND, silty, mostly fine-grained sand-sized quartz, some angular sand to gravel-sized shell up to 1/2", few silt, strong reaction with HCl, wet, 10G 4/1 dark greenish gray (SM)	80	17		SPT Sampler -63.7	2 1 2	3
			At El. -63.7 Ft., low plasticity, trace clay	97	18		SPT Sampler -65.2	3 2 3	5
			At El. -65.2 Ft., nonplastic, mostly fine-grained sand-sized quartz, some angular sand to gravel-sized shell up to 1/2", few silt, strong reaction with HCl, wet, 5Y 6/1 gray	93	19		SPT Sampler -66.7	8 5 8	13
				97	20		SPT Sampler -68.2	2 3 14	17
-69.7	87.0			97	21		SPT Sampler -69.7	17 19 16	35
			SHELL, mostly angular fine to coarse gravel-sized flat and elongated shell up to 1/2", few silt, strong reaction with HCl, wet, 5Y 8/1 white	97	22		SPT Sampler -71.2	14 12 12	24
				90	23		SPT Sampler -72.7	12 10 10	20
-74.2	91.5			97	24		SPT Sampler -74.2	18 23 33	56
			SHELL, mostly fine-grained sand-sized quartz, some angular fine to coarse gravel-sized shell up to 1/2", few silt, strong reaction with HCl, wet, 5Y 8/1 white	97	25		SPT Sampler -75.7	16 18 29	47
			At El. -75.7 Ft., weak cementation	90	26		SPT Sampler -77.2	12 14 15	29
-77.7	95.0			97	27		SPT Sampler	22	

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JUN 02

Boring Designation CP06-L30PP-CB-0001

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District	SHEET 6 OF 6 SHEETS
PROJECT: L-30 Seepage Management Pilot Project	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.)	HORIZONTAL: NAD83 / VERTICAL: NAVD88
LOCATION COORDINATES: X = 826,073 Y = 524,279	ELEVATION TOP OF BORING: 17.3 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
			SHELL, mostly angular coarse gravel-sized flat and elongated shell up to 1-1/2", little fine-grained sand-sized quartz, strong reaction with HCl, wet, weak cementation, 5Y 6/1 gray	97	27		SPT Sampler -78.7	25 45	70
-80.2	97.5			97	28		SPT Sampler -80.2	29 9 9	18
			SAND, silty, mostly fine to coarse-grained sand-sized sandstone up to 1/2", little fine to medium-grained sand-sized shell up to 1/8", strong reaction with HCl, wet, weak cementation, 5Y 7/1 light gray (SM)	90	29		SPT Sampler -81.7	10 7 8	15
				90	30		SPT Sampler -83.2	7 11 10	21
			At El. -83.7 Ft., some fine to medium-grained sand-sized shell up to 1/2"	90	31		SPT Sampler -84.7	14 24 23	47
				90	32		SPT Sampler -86.2	15 6 5	11
-87.7	105.0			90	33		SPT Sampler -87.7	12 12 14	26

NOTES:

1. Soils are field visually classified in accordance with the Unified Soils Classification System.

2. Set 17.5 Ft. of 8" Schedule 40 PVC Pipe Through Center of L-30 Levee To Top of Rock.

3. Boring Drilled/Sampled In Three Phases:
A. Set Surface Casing.
B. 4" Wireline Rock Coring To Base Of Rock.
C. Splitspoon Sampling 30 Ft. Below Base of Rock.

4. Borehole Reamed To 7.5" To Base of Rock. USGS Performed Borehole Logging.

5. 2" Monitoring Well Set @
X = 826074 Y= 524270

Screen From -42.1 to -44.1 Ft.

6. Cored to 80 Ft. To Confirm Out of Rock.

7. Boring sealed with available sediment.

140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).

Abbreviations:
WOH = Weight of Hammer.
DT = Drill Time.
HP = Hydraulic Pressure.
DFR = Drill Fluid Return.

95 100 105 110 115

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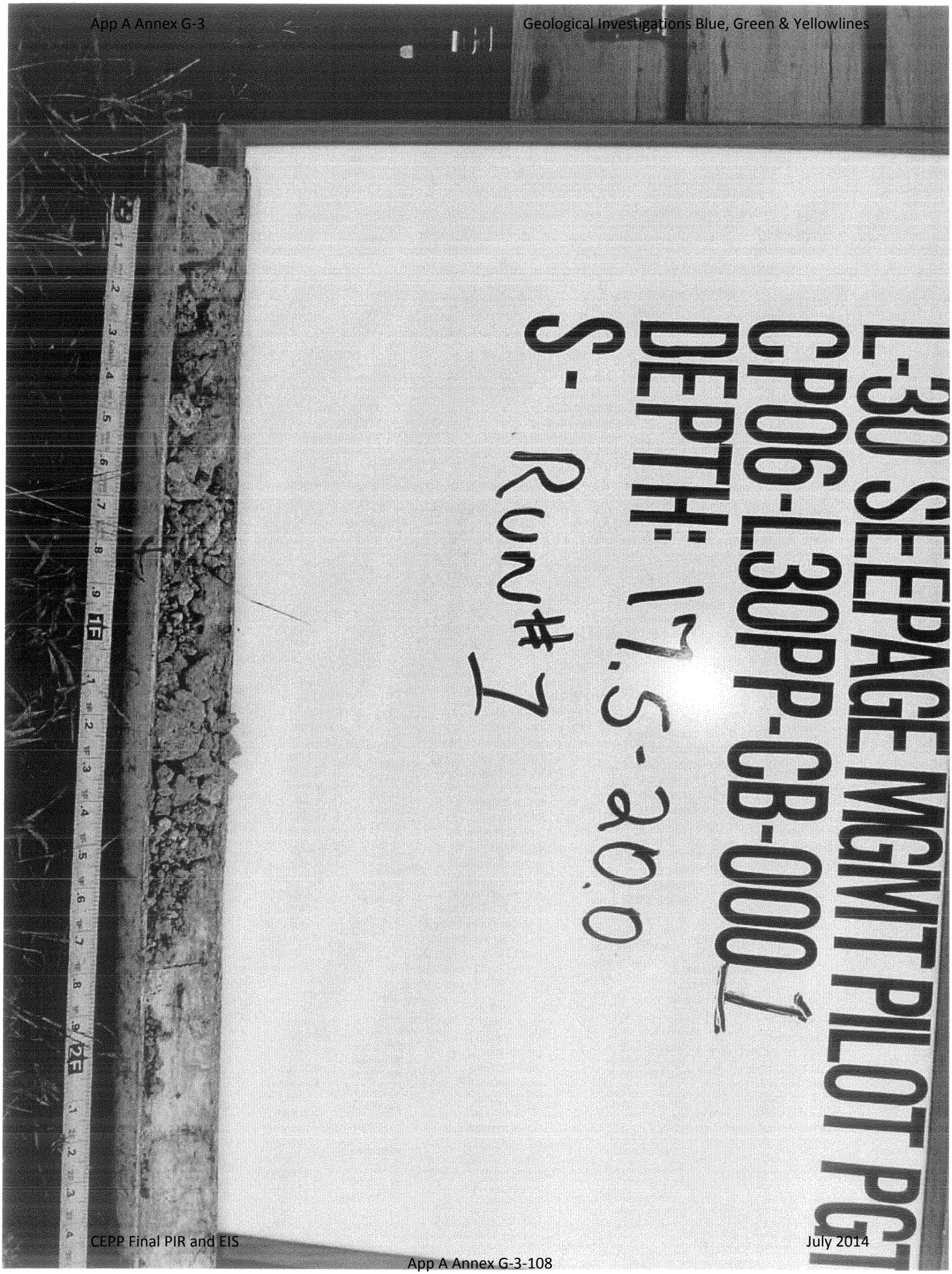
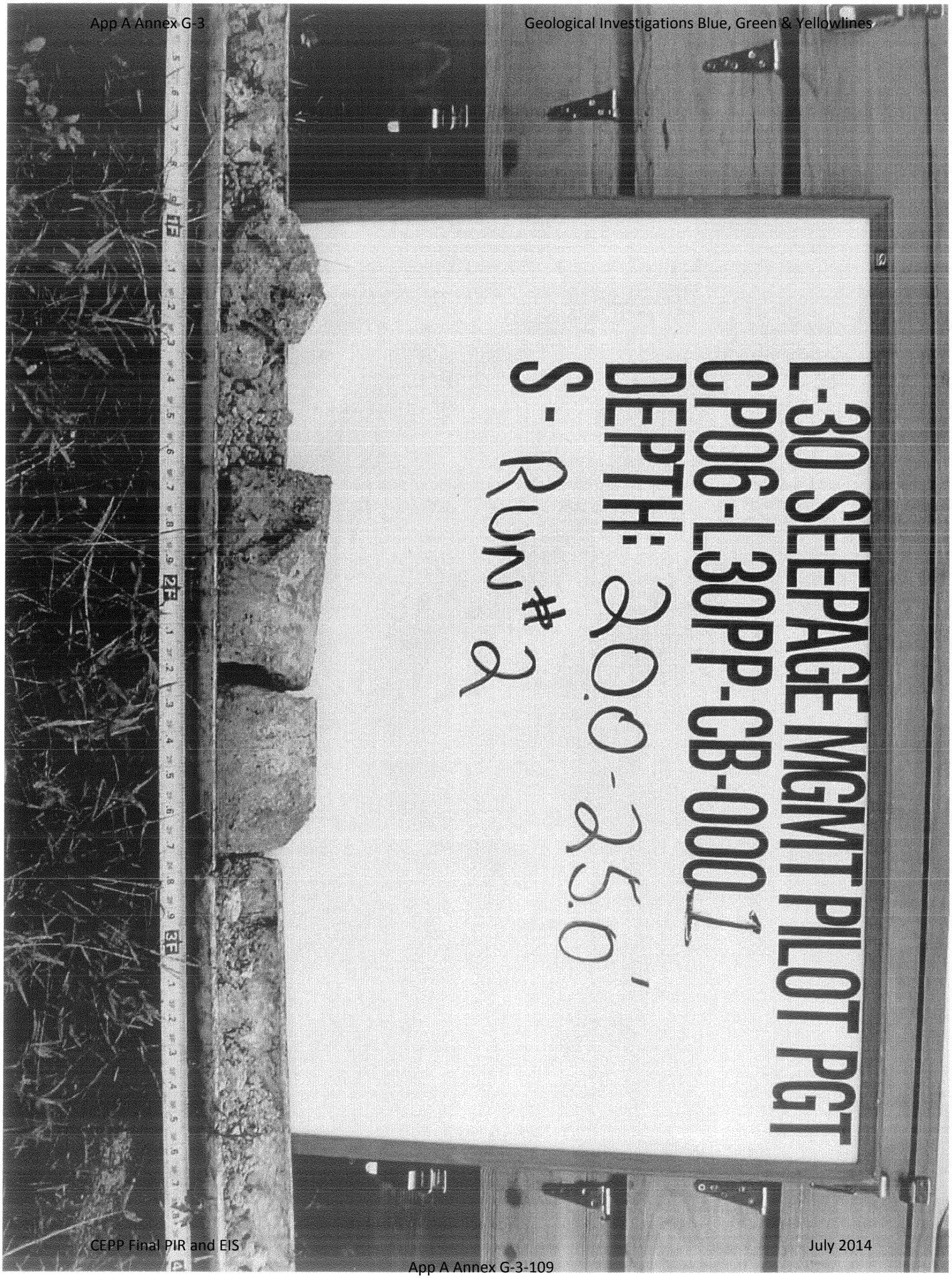
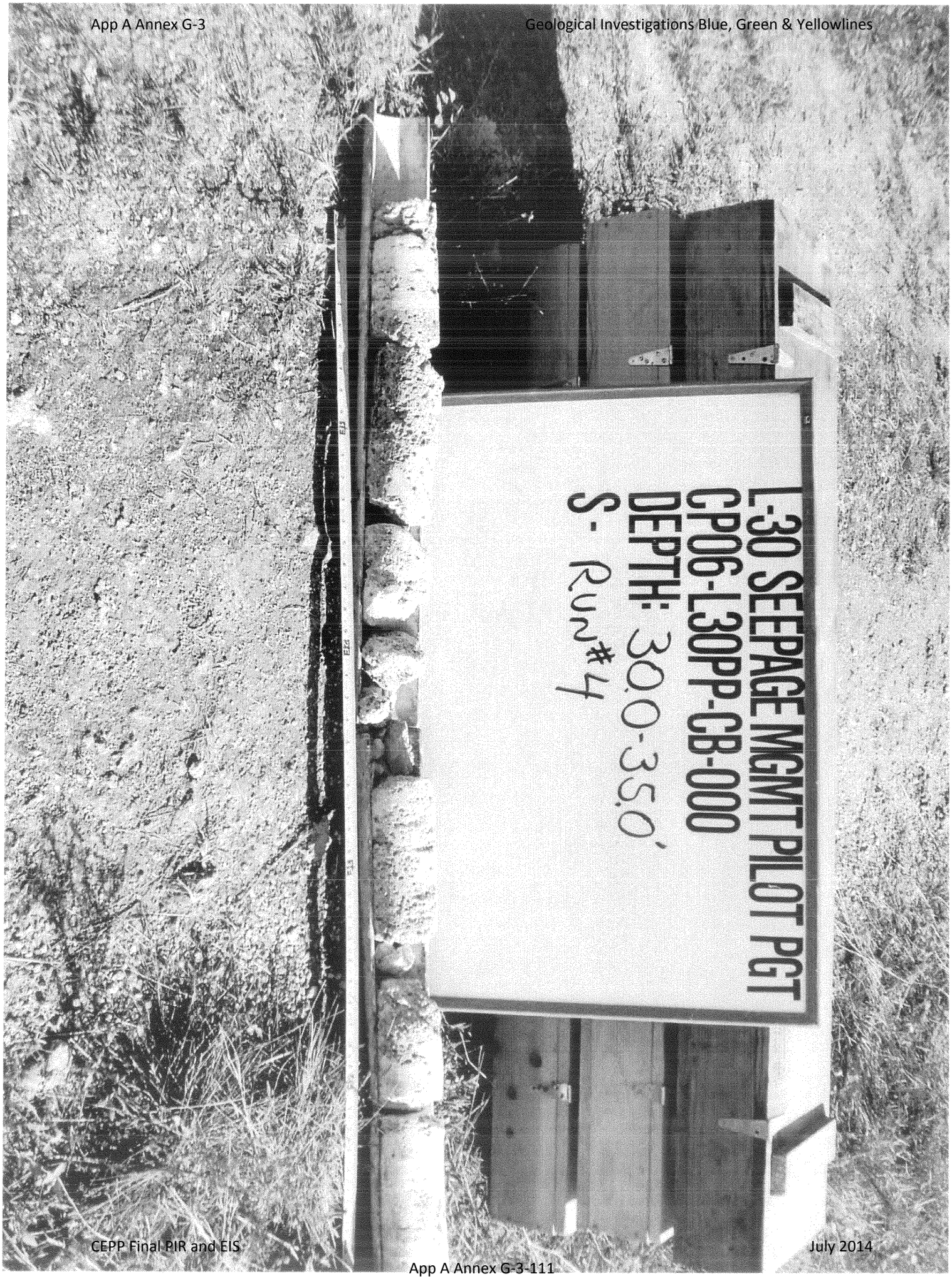
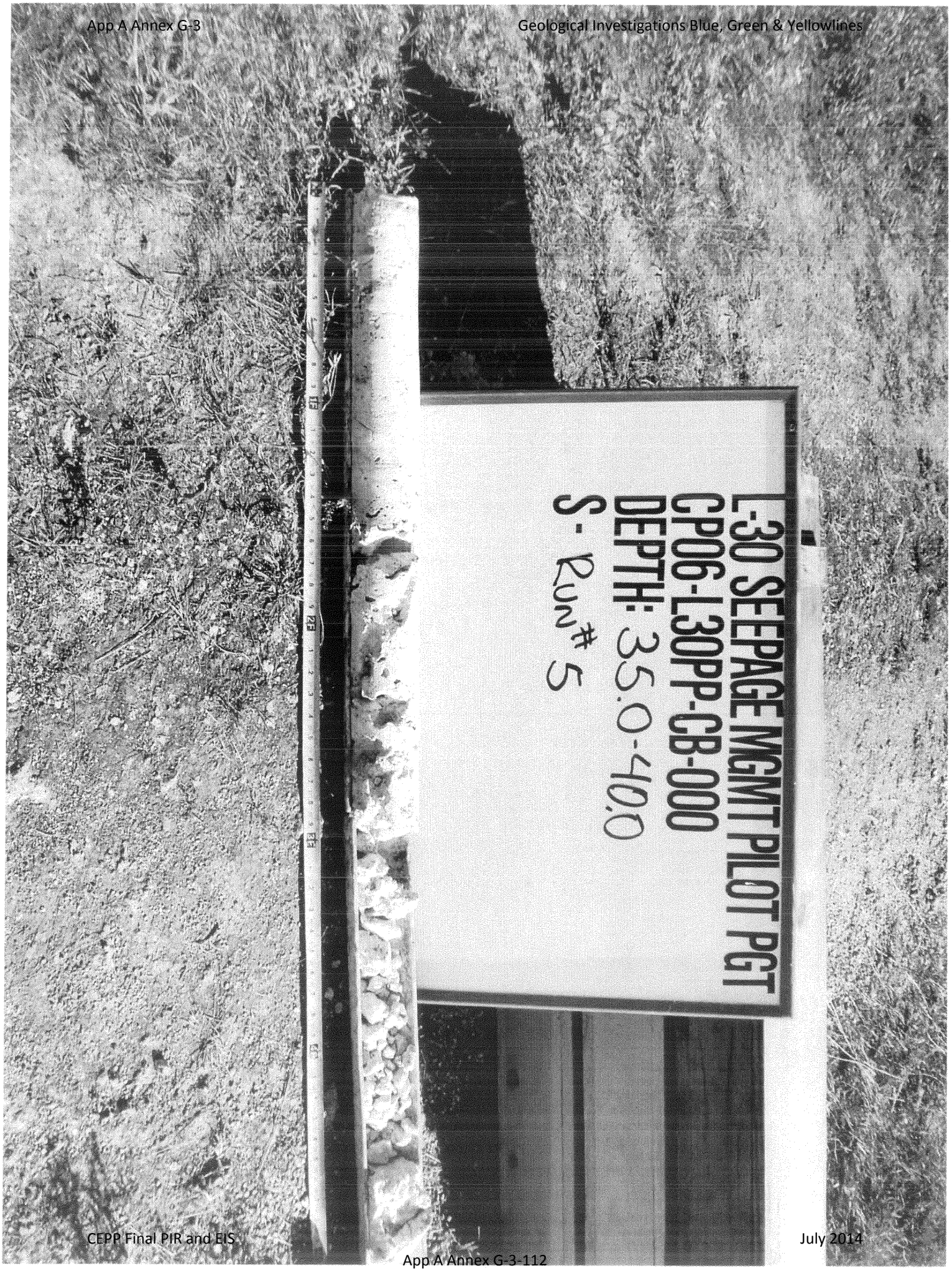

L-30 SEEPAGE MGMT PILOT PGI
GP06-L30PP-GB-0007
DEPTH: 17.5-20.0
S- Run#7


L-30 SEEPAGE MGMT PILOT PGT
CP06-L30PP-GB-0001
DEPTH: 200'-250'
S- RUN# 2

L-30 SEEPAGE MGMT PILOT PGT
CP06-L30PP-CB-000
DEPTH: 250-300'
S. RUN #3


L-30 SEEPAGE MGMT PILOT PGT
CP06-L30PP-CB-000
DEPTH: 300-350'
S- Run#4

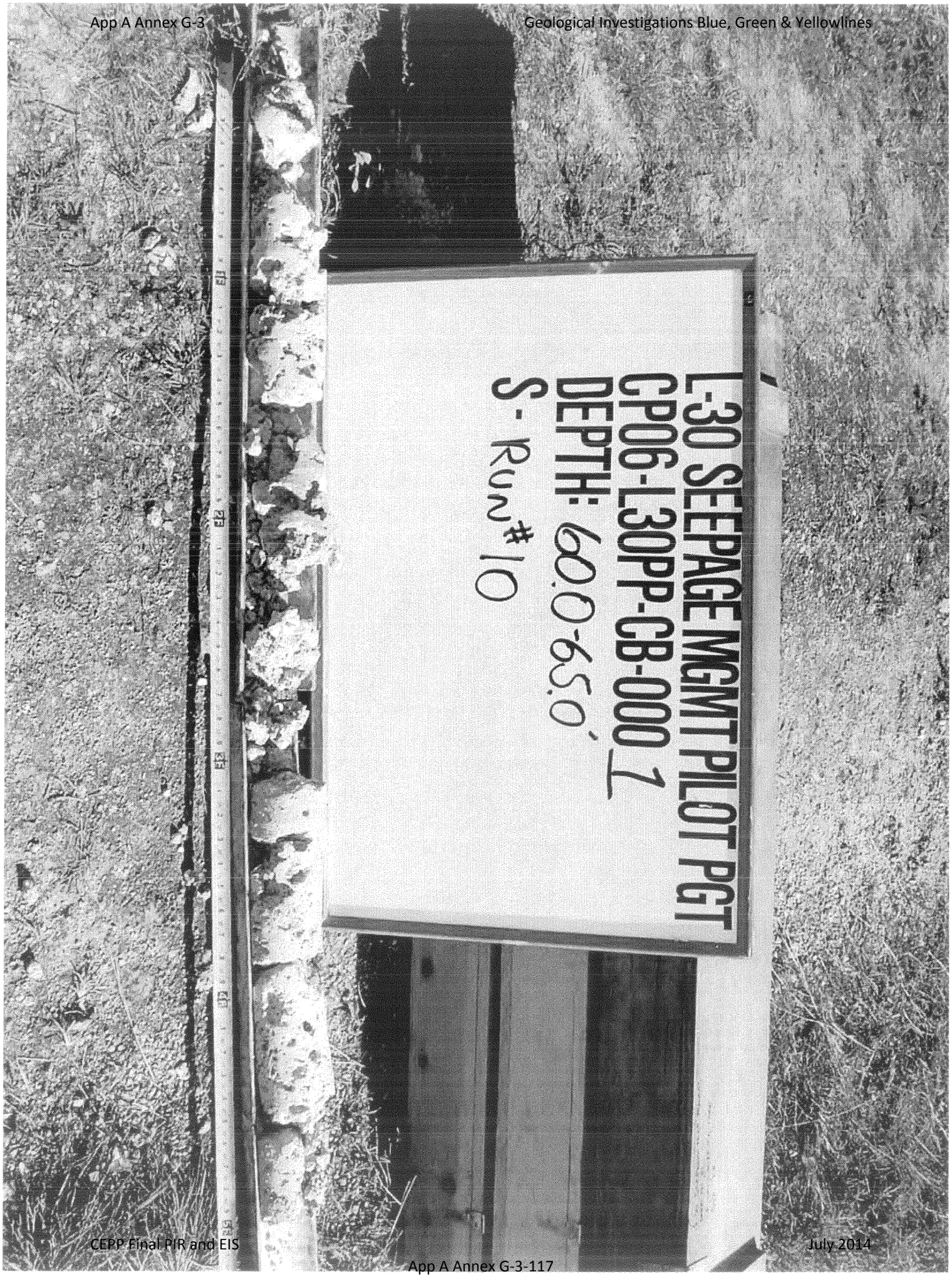

L-30 SEEPAGE MGMT PILOT PGT
CP06-L30PP-CB-000
DEPTH: 35.0-40.0
S- Run# 5

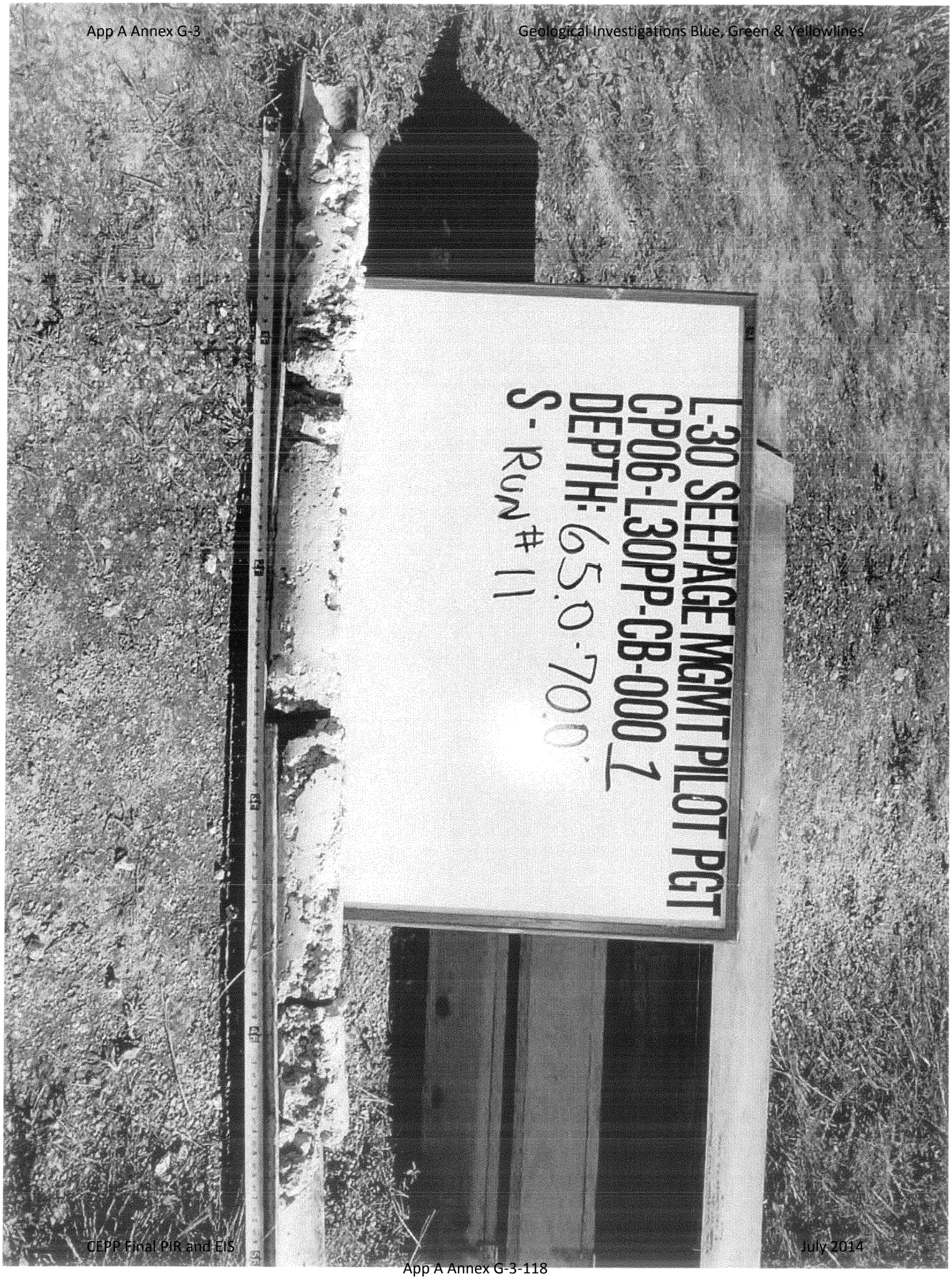
L-30 SEEPAGE MGMT PILOT PGT
CP06-L30PP-CB-000
DEPTH: 40.0-45.0'
S-Run#6

L-30 SEEPAGE MGMT PILOT PGT
CP06-L30PP-CB-000 1
DEPTH: 45.0-50.0'
S- Run# 7

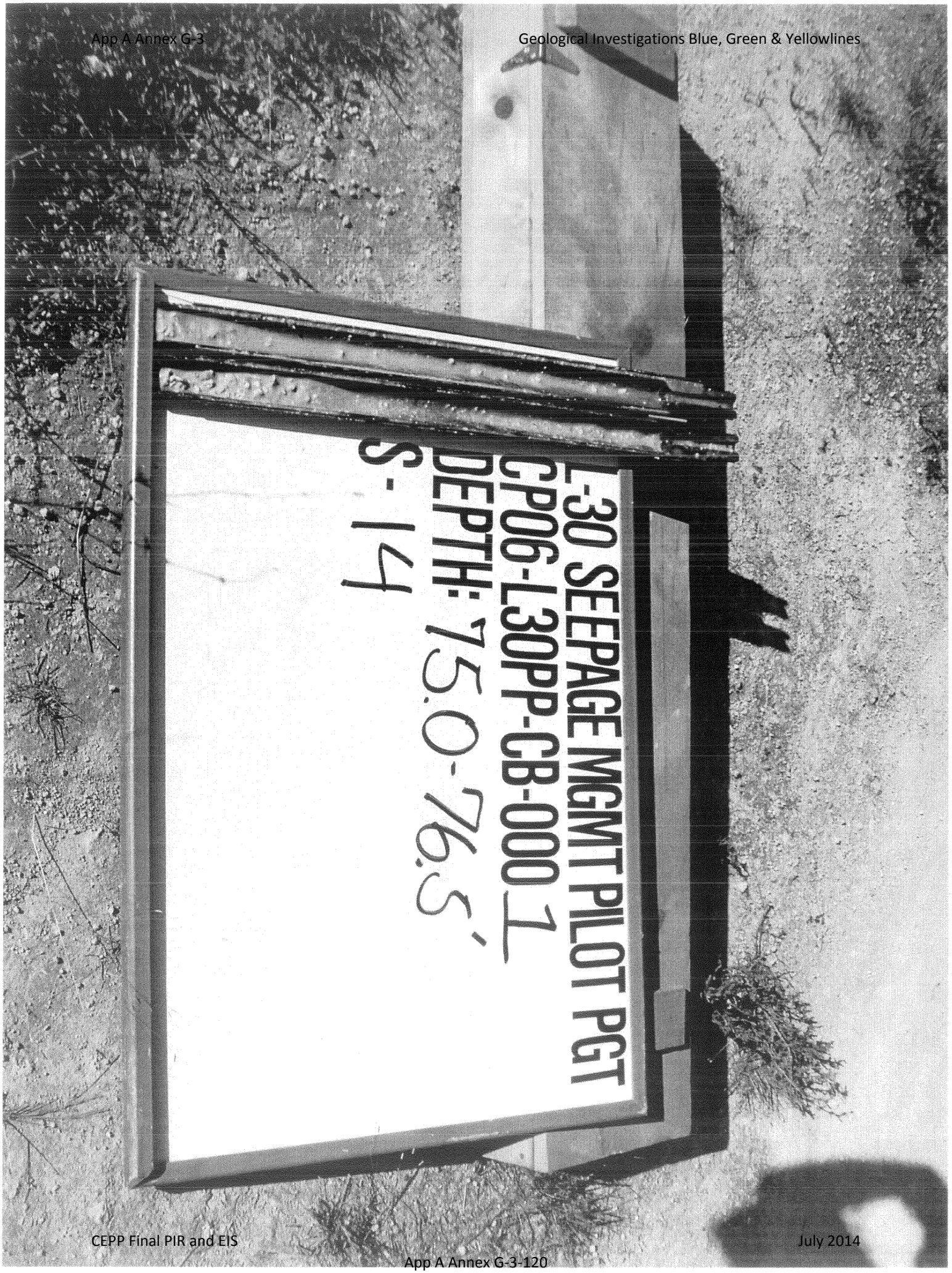
L-30 SEEPAGE MGMT PILOT PGT
CP06-L30PP-CB-000 1
DEPTH: 50.0-55.0'
S- RUN# 8

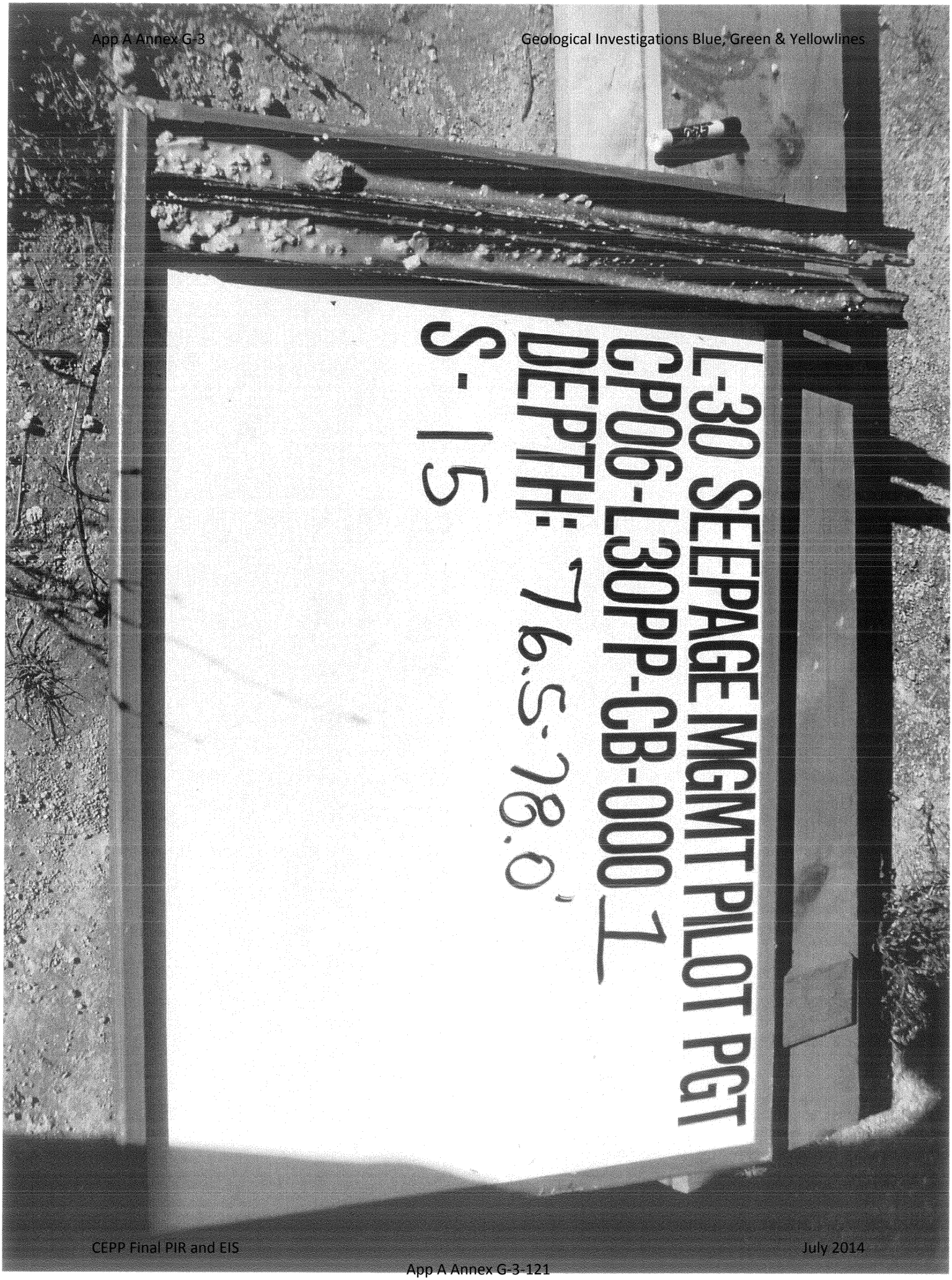
L-30 SEEPAGE MGMT PILOT PGT
CP06-L30PP-CB-000
DEPTH: 55.0-60.0'
S- Run# 9

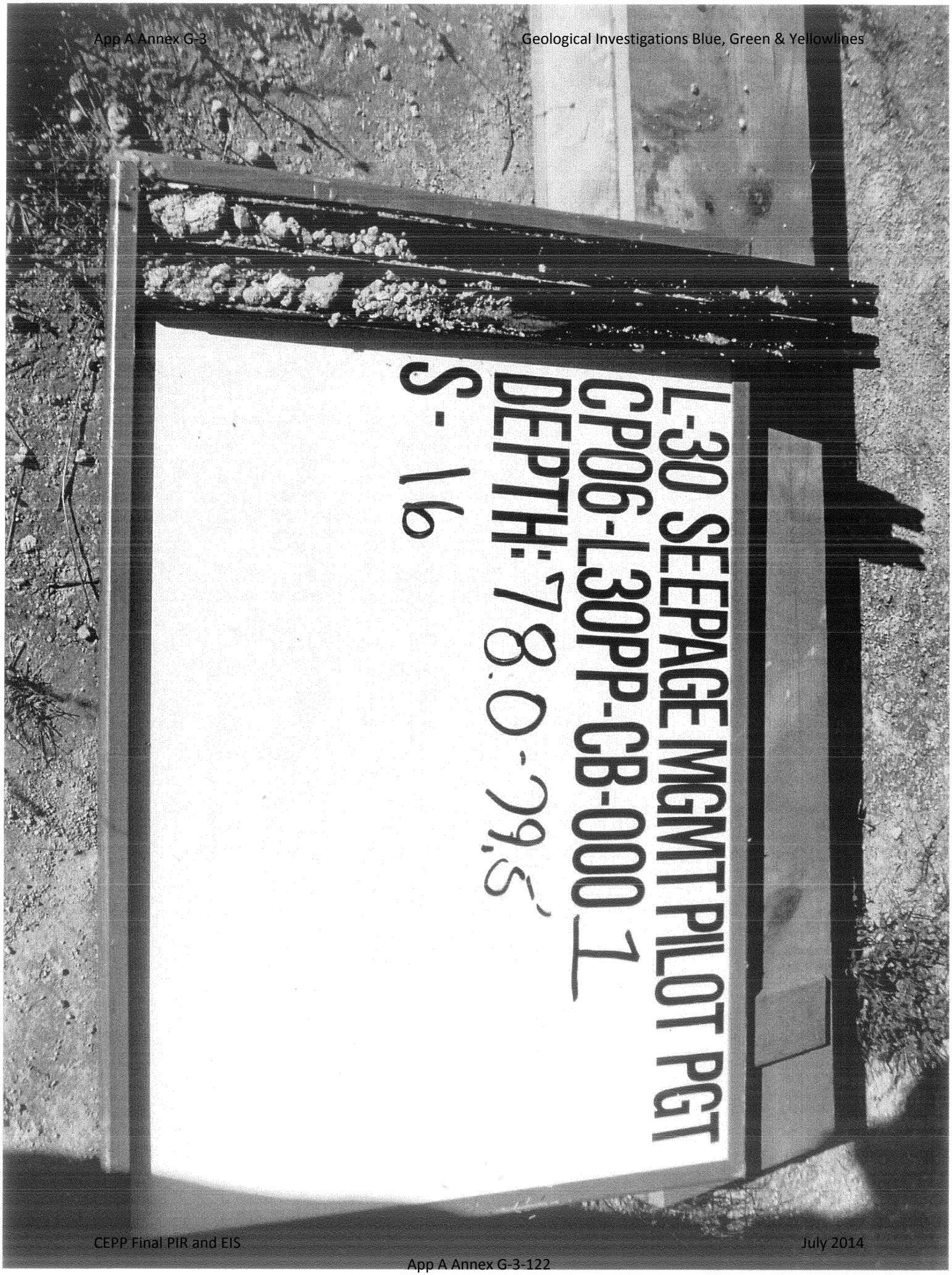

L-30 SEEPAGE MGMT PILOT PGT
CP06-L30PP-CB-000 1
DEPTH: 60.0-65.0'
S- RUN# 10


L-30 SEEPAGE MGMT PILOT PGT
CP06-L30PP-CB-000 1
DEPTH: 65.0-70.0'
S-RUN # 11

L-30 SEEPAGE MGMT PILOT PGT
CP06-L30PP-CB-0007
DEPTH: 70.0-75.0'
S- Run #12


L-30 SEEPAGE MGMT PILOT PGT
GP06-L30PP-CB-0001
DEPTH: 75.0-76.5'
S-14


L-30 SEEPAGE MGMT PILOT PGT
CP06-L30PP-CB-000 1
DEPTH: 76.5-78.0'
S-15


L-30 SEEPAGE MGMT PILOT PGT
CP06-L30PP-CB-000 1
DEPTH: 78.0-79.5'
S-16

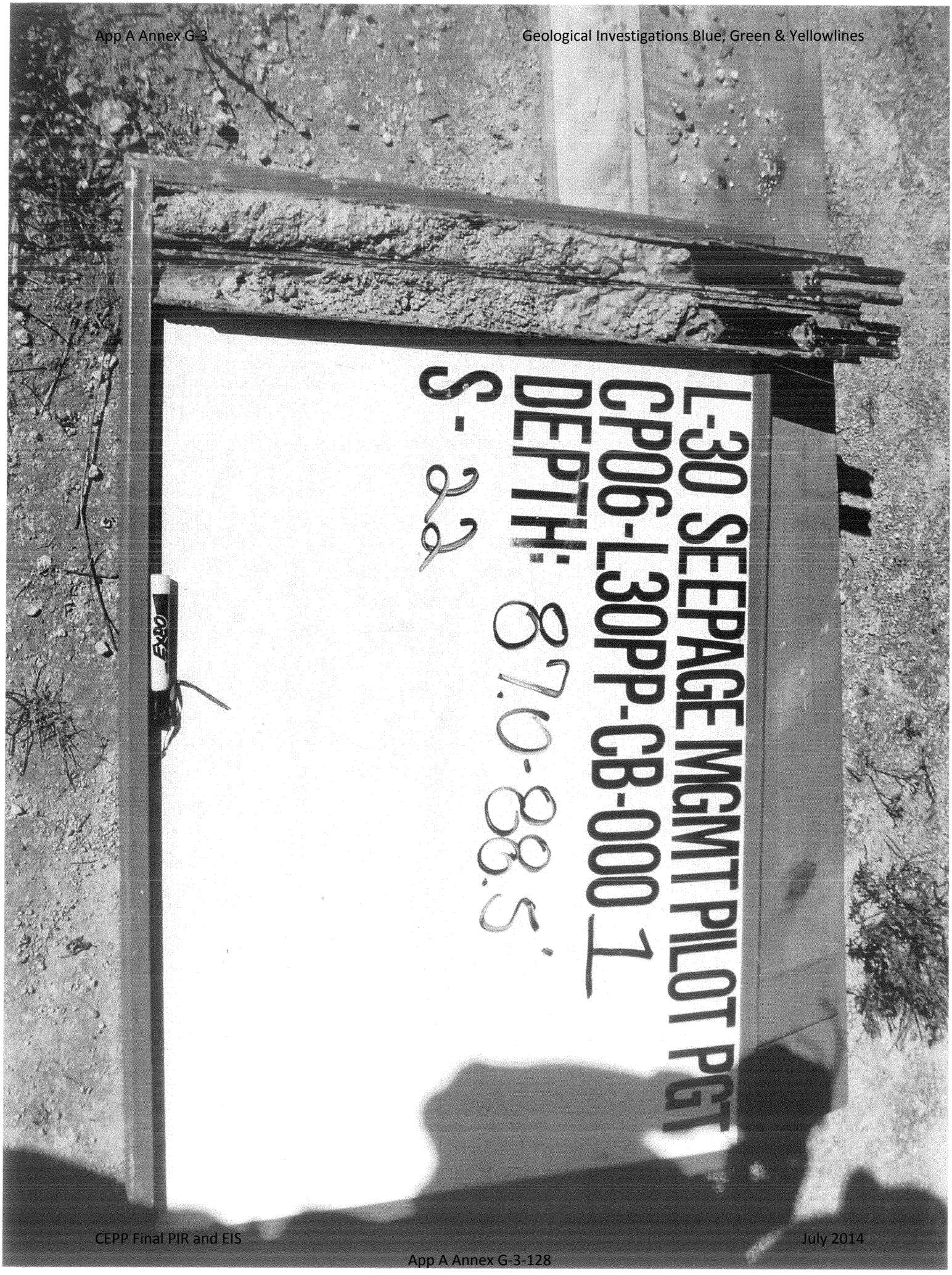
L-30 SEEPAGE MGMT PILOT PGT
GP06-L30PP-CB-000 1
DEPTH: 79.5-81.0'
S-17

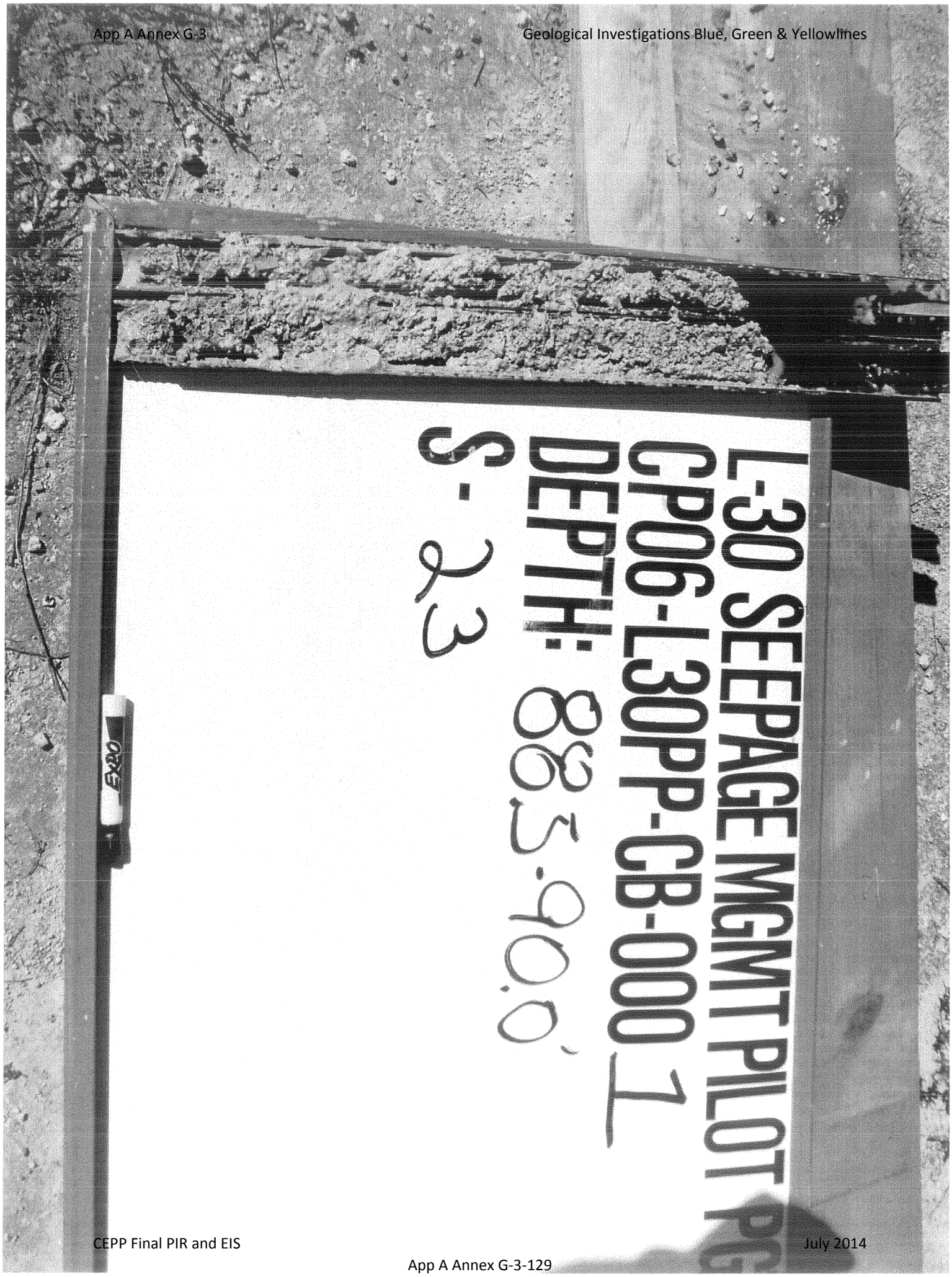
L-30 SEEPAGE MGMT PILOT PGT
CP06-L30PP-CB-000 1
DEPTH: 81.0-82.5'
S- 18

L-30 SEEPAGE MGMT PILOT PGM
GP06-L30PP-CB-000 1
DEPTH: 82.5'-84.0'
S-19

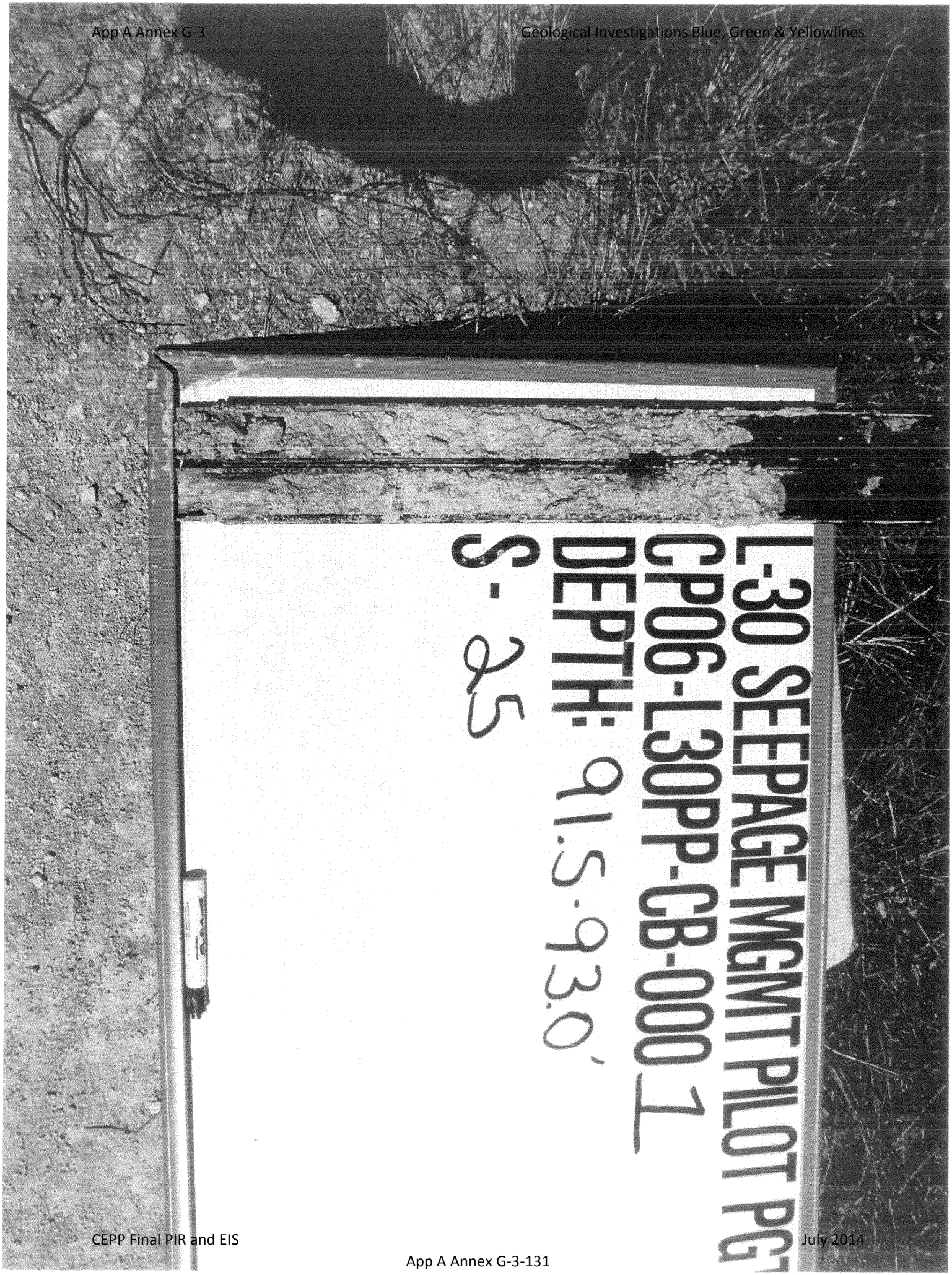
L-30 SEEPAGE MGMT PILOT PGE
CP06-L30PP-CB-000 1
DEPTH: 84.0-88.5
S-20

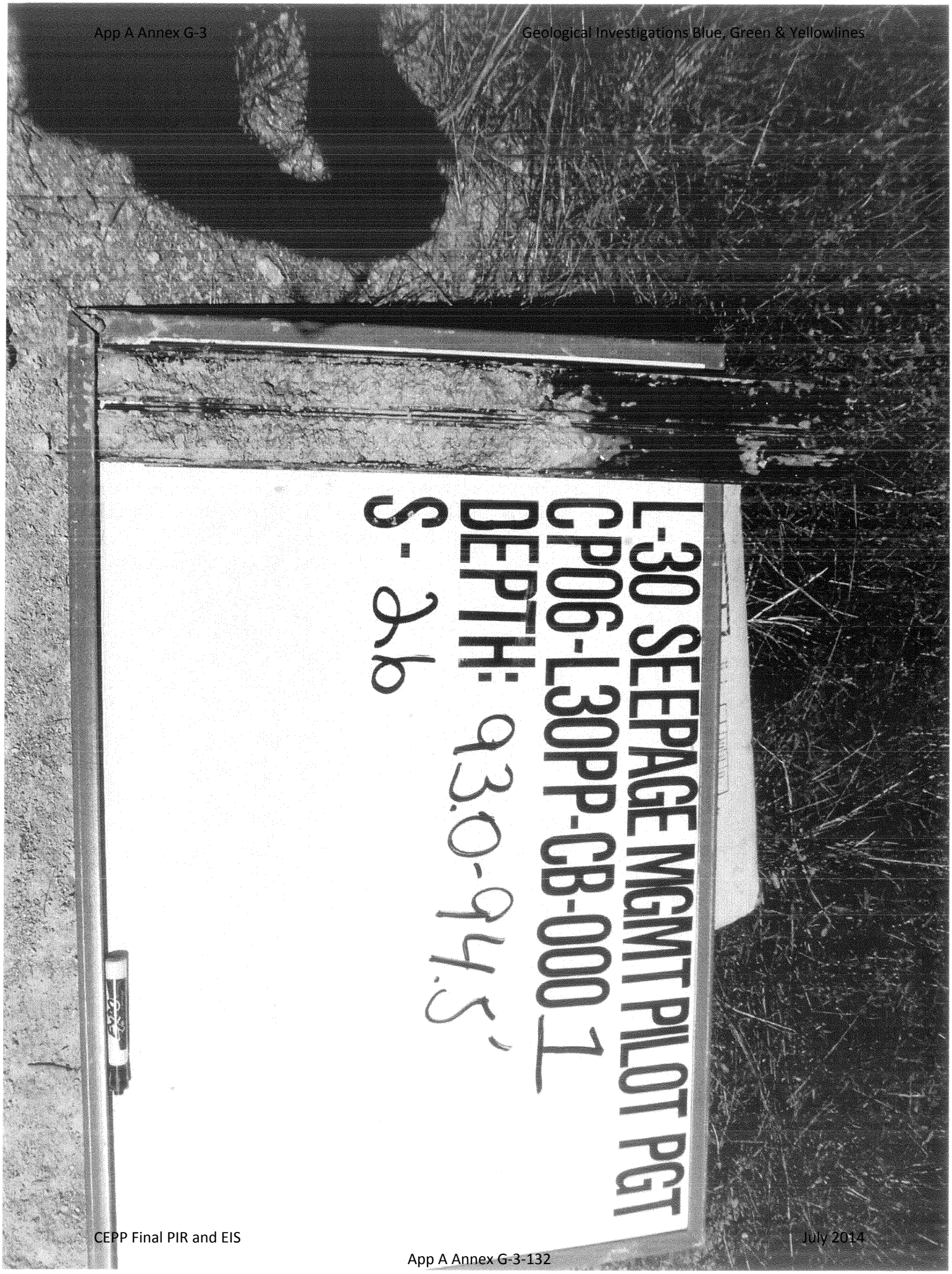
L-30 SEEPAGE MGMT PILOT PGT
CP06-L30PP-CB-000 1
DEPTH: 87.0-88.5
S-21


L-30 SEEPAGE MGMT PILOT PGT
CP06-L30PP-CB-0001
DEPTH: 870-883.5'
S-22

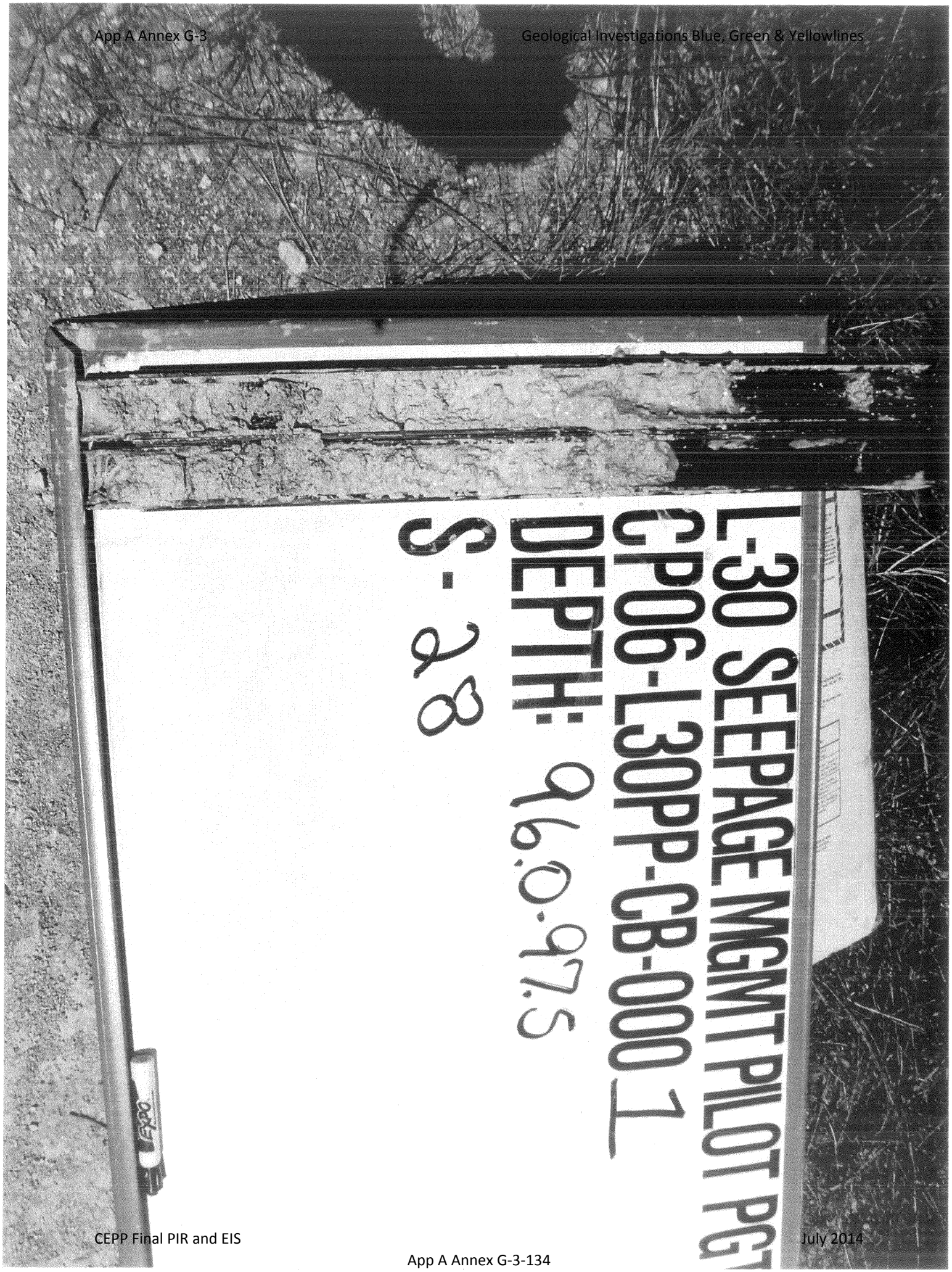

L-30 SEEPAGE MGMT PILOT PG
CP06-L30PP-CB-000 1
DEPTH: 885.90'
S-23

L-30 SEEPAGE MGMT PILOT PGT
GP06-L30PP-CB-0001
DEPTH: 90.0-91.5'
S-24


L-30 SEEPAGE MGMT PILOT PG
CP06-L30PP-CB-0001
DEPTH: 91.5-93.0'
S-25


L-30 SEEPAGE MGMT PILOT PGT
CP06-L30PP-CB-0001
DEPTH: 930-945'
S. 26

L-30 SEEPAGE MGMT PILOT PGT
GP06-L30PP-CB-000 1
DEPTH: 945.960'
S-37


L-30 SEEPAGE MGMT PILOT PG
GP06-L30PP-CB-000 1
DEPTH: 96.0-97.5
S. 28

L-30 SEEPAGE MGMT PILOT PGT
GP06-L30PP-CB-0001
DEPTH: 97.5-99.0'
S: 99

L-30 SEEPAGE MGMT PILOT PGT
GP06-L30PP-CB-0001
DEPTH: 99.0-100.5'
S-30

L30 SEEPAGE MGMT PILOT PGT
GP06-L30PP-GB-0001
DEPTH: 100.5-102.0
S-31

L-30 SEEPAGE MGMT PILOT PGT
CP06-L30PP-CB-0001
DEPTH: 1020.0-1035'
S-32

L-30 SEEPAGE MGMT PILOT PGT
GP06-L30PP-GB-0001
DEPTH: 103.5'-105.0'
S-333

SOILS TEST CORE BORING NUMBER "CP06-L30PP-CB-0002"

Miami-Dade County, Florida

Boring Designation CP06-L30PP-CB-0002

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 7 SHEETS

1. PROJECT L-30 Seepage Management Pilot Project Top Of Levee L-30 (Center of Roadway)	9. SIZE AND TYPE OF BIT See Remarks
	10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.) / HORIZONTAL NAD83 / VERTICAL NAVD88
2. BORING DESIGNATION CP06-L30PP-CB-0002 / LOCATION COORDINATES X = 823,753 Y = 522,044	11. MANUFACTURER'S DESIGNATION OF DRILL CME 55 Truckrig ☐ AUTO HAMMER ☒ MANUAL HAMMER
3. DRILLING AGENCY Challenge Engineering & Testing, Inc. / CONTRACTOR FILE NO. 2006D30	12. TOTAL SAMPLES DISTURBED 33 / UNDISTURBED (UD) 0
4. NAME OF DRILLER Adam Benson	13. TOTAL NUMBER CORE BOXES 4
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED / DEG. FROM VERTICAL / BEARING	14. ELEVATION GROUND WATER 5.0 Ft.
	15. DATE BORING STARTED 10-06-06 / COMPLETED 10-17-06
6. THICKNESS OF OVERBURDEN N/A	16. ELEVATION TOP OF BORING 17.5 Ft.
7. DEPTH DRILLED INTO ROCK N/A	17. TOTAL RECOVERY FOR BORING 65 %
8. TOTAL DEPTH OF BORING 109.0 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR Bob Momberger, Geologist

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
17.5	0.0						17.5		
			L-30 Levee Fill Material						
							Advanced Boring w/ tricone roller bit		

0 5 10 15

SAJ FORM 1836
JUN 02

(Continued)

Boring Designation CP06-L30PP-CB-0002

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District	SHEET 2 OF 7 SHEETS
PROJECT: L-30 Seepage Management Pilot Project	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.)	HORIZONTAL: NAD83 / VERTICAL: NAVD88
LOCATION COORDINATES: X = 823,753 Y = 522,044	ELEVATION TOP OF BORING: 17.5 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
0.2	17.3						Advanced Boring w/ tricone roller bit 0.2		
-2.5	20.0	Moderately Weathered	LIMESTONE, oolitic, sparsely fossiliferous, soft, moderately weathered, fine-grained, thin bedding, vuggy, Ft. Thompson Formation, 2.5Y 8/2 pale yellow	81	1	RQD 20	4 x 5-1/2" Diamond Impregnated Bit DT = 1 mins HP = 250 psi DFR = 50 % -2.5		
-5.5	23.0	Moderately Weathered	LIMESTONE, hard, moderately weathered, fine-grained, thick bedding, pitted, 5Y 8/1 white At El. -4.0 Ft., 5Y 7/3 pale yellow	100	2	RQD 85	4 x 5-1/2" Diamond Impregnated Bit DT = 4 mins HP = 250 psi DFR = 25 % -7.5		
-12.5	30.0	Slightly Weathered	LIMESTONE, fossiliferous, moderately hard, slightly weathered, aphanitic, thick bedding, vuggy, 5Y 8/2 pale yellow At El. -9.5 Ft., thin bedding, 5Y 8/1 white	60	BOX 1 3	RQD 10	4 x 5-1/2" Diamond Impregnated Bit DT = 3 mins HP = 250 psi DFR = 0 % -12.5		
-14.5	32.0		SAND, silty, soft, mostly subangular fine-grained sand-sized carbonate, strong reaction with HCl, wet, 2.5Y 8/2 pale yellow (SM)						
		Moderately Weathered	LIMESTONE, fossiliferous, moderately hard, moderately weathered, fine-grained, thin bedding, vuggy, 5Y 8/1 white At El. -17.0 Ft., 5Y 6/4 pale olive	60	BOX 2	RQD 0	4 x 5-1/2" Diamond Impregnated Bit DT = 4 mins HP = 250 psi DFR = 0 % -17.5		

15 20 25 30 35

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Boring Designation CP06-L30PP-CB-0002

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District	SHEET 3 OF 7 SHEETS
PROJECT: L-30 Seepage Management Pilot Project	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.)	HORIZONTAL: NAD83 / VERTICAL: NAVD88
LOCATION COORDINATES: X = 823,753 Y = 522,044	ELEVATION TOP OF BORING: 17.5 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
		Moderately Weathered	From El. -20.5 to -31.5 Ft., unweathered, aphanitic, thin bedding, pitted, 5Y 8/1 white	60	5	RQD 25	4 x 5-1/2" Diamond Impregnated Bit DT = 3 mins HP = 250 psi DFR = 0 %		
				60	BOX 2	RQD 0	4 x 5-1/2" Diamond Impregnated Bit DT = 5 mins HP = 250 psi DFR = 0 %		
		Unweathered	From El. -31.5 to -37.5 Ft., soft, unweathered, aphanitic, thin bedding, pitted, clay filled pits	66	7	RQD 0	4 x 5-1/2" Diamond Impregnated Bit DT = 5 mins HP = 250 psi DFR = 0 %		
		Unweathered		60	BOX 3	RQD 25	4 x 5-1/2" Diamond Impregnated Bit DT = 6 mins HP = 250 psi DFR = 0 %		

35 -22.5 40 -27.5 45 -32.5 50 -37.5 55

SAJ FORM 1836-A
JUN 02

Boring Designation CP06-L30PP-CB-0002

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District	SHEET 4 OF 7 SHEETS
PROJECT: L-30 Seepage Management Pilot Project	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.)	HORIZONTAL: NAD83 / VERTICAL: NAVD88
LOCATION COORDINATES: X = 823,753 Y = 522,044	ELEVATION TOP OF BORING: 17.5 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
		Mod. Weathered	From El. -37.5 to -39.5 Ft., moderately hard, moderately weathered, aphanitic, thin bedding, vuggy, 5Y 7/2 light gray						
		Unweathered	From El. -39.5 to -43.5 Ft., soft, unweathered, aphanitic, thin bedding, pitted, clay filled pits, 5Y 8/1 white	25	9	RQD 0	4 x 5-1/2" Diamond Impregnated Bit DT = 4 mins HP = 250 psi DFR = 0 %		
							-42.5		
		Moderately Weathered	From El. -43.5 to -46.0 Ft., moderately hard, moderately weathered, aphanitic, thin bedding, vuggy, sand filled vugs, 5Y 7/3 pale yellow	20	BOX 10 3	RQD 0	4 x 5-1/2" Diamond Impregnated Bit DT = 6 mins HP = 250 psi DFR = 0 %		
			From El. -46.0 to -51.5 Ft., moderately weathered, aphanitic, thin bedding, pitted, clay filled pits, 10YR 7/2 light gray						
							-47.5		
		Moderately Weathered	From El. -51.5 to -55.5 Ft., unweathered, aphanitic, medium bedding, vuggy, sand filled vugs, 10YR 8/2 very pale brown	80	11	RQD 8	4 x 5-1/2" Diamond Impregnated Bit DT = 6 mins HP = 250 psi DFR = 0 %		
							-52.5		
		Unweathered	From El. -55.5 to -57.5 Ft., moderately weathered, fine-grained, thick bedding, pitted, sand filled pits, 2.5Y 6/1 gray	90	BOX 12 4	RQD 60	4 x 5-1/2" Diamond Impregnated Bit DT = 3 mins HP = 250 psi DFR = 0 %		
-57.5	75.0	Mod. Weathered					-57.5		

55 60 65 70 75

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Boring Designation CP06-L30PP-CB-0002

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District	SHEET 5 OF 7 SHEETS
PROJECT: L-30 Seepage Management Pilot Project	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.)	HORIZONTAL: NAD83 / VERTICAL: NAVD88
LOCATION COORDINATES: X = 823,753 Y = 522,044	ELEVATION TOP OF BORING: 17.5 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
-61.5	79.0	Slightly Weathered	LIMESTONE, soft, slightly weathered, aphanitic, 5Y 7/3 pale yellow	0	BOX 13 4	RQD 0	4 x 5-1/2" Diamond Impregnated Bit DT = 2 mins HP = 250 psi DFR = 0 %		
-62.5	80.0	Wea.	LIMESTONE, fossiliferous, soft, slightly weathered, aphanitic, pitted, sand filled pits, 5Y 7/3 pale yellow	20	14		SPT Sampler	WOR 0 0	0
-63.0			SHELL, mostly angular coarse-grained sand-sized shell up to 1/2", little clay, strong reaction with HCl, wet, Pinecrest Sand Formation, 2.5Y 7/1 light gray	40	15		SPT Sampler	7 12 11	23
-64.5			At El. -64.5 Ft., some coarse gravel-sized limestone up to 1"	97	16		SPT Sampler	7 14 14	28
-66.0				73	17		SPT Sampler	8 17 16	33
-67.5				100	18		SPT Sampler	7 8 8	16
-68.5	86.0		SAND, clayey, nonplastic, soft, mostly fine-grained sand-sized carbonate, little clay, strong reaction with HCl, wet, 2.5Y 7/1 light gray (SC)	50	19		SPT Sampler	12 14 15	29
-69.0			SHELL, mostly angular coarse-grained sand-sized shell up to 1/4", some coarse-grained sand-sized limestone up to 1/2", little clay, strong reaction with HCl, wet, 2.5Y 6/1 gray	77	20		SPT Sampler	12 12 14	26
-70.5				90	21		SPT Sampler	14 8 10	18
-72.0				90	22		SPT Sampler	10 8 7	15
-73.5			At El. -73.5 Ft., nonplastic, mostly angular medium-grained sand-sized shell up to 1/4", little fine to medium-grained sand-sized carbonate, strong reaction with HCl, wet, 2.5Y 6/1 gray	90	23		SPT Sampler	5 7 7	14
-74.5	92.0		CLAY, lean, medium plasticity, soft, mostly clay, some shell up to 1/4", little fine-grained sand-sized carbonate, strong reaction with HCl, wet, 2.5Y 5/1 gray (CL)	90	24		SPT Sampler	6 5	
-75.0			At El. -76.5 Ft., some fine-grained sand-sized quartz, little coarse-grained sand-sized shell, strong reaction with HCl,						
-76.5									

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Boring Designation CP06-L30PP-CB-0002

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District	SHEET 6 OF 7 SHEETS
PROJECT: L-30 Seepage Management Pilot Project	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.)	HORIZONTAL: NAD83 / VERTICAL: NAVD88
LOCATION COORDINATES: X = 823,753 Y = 522,044	ELEVATION TOP OF BORING: 17.5 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
			wet, 10Y 6/1 greenish gray	90	24		-78.0 SPT Sampler	5	10
-78.5	96.0							15	
			SAND, silty, very soft, mostly fine-grained sand-sized quartz, little silt, little coarse-grained sand-sized shell up to 1/4", strong reaction with HCl, wet, 10Y 7/1 light greenish gray (SM)	67	25		SPT Sampler -79.5	15	23
								8	
				47	26		SPT Sampler -81.0	7	28
-81.0	98.5							14	
			SHELL, mostly angular fine to coarse gravel-sized shell up to 3/4", little fine-grained sand-sized quartz, little sand to gravel-sized limestone up to 1/2", few silt, strong reaction with HCl, wet, 10Y 7/1 light greenish gray	90	27		SPT Sampler -82.5	7	35
			At El. -82.5 Ft., few fine-grained sand-sized quartz					14	
								21	
				90	28		SPT Sampler -84.0	22	44
								23	
								21	
			At El. -85.0 Ft., some fine to medium-grained sand-sized quartz, trace sand to gravel-sized shell up to 3/4"	90	29		SPT Sampler -85.5	12	20
								11	
								9	
				90	30		SPT Sampler -87.0	5	20
								10	
-87.5	105.0							10	
			SAND, silty, some fine-grained sand-sized quartz, little fine-grained sand-sized carbonate, little sand to gravel-sized shell up to 1/2", strong reaction with HCl, wet, 10Y 6/1 greenish gray (SM)	90	31		SPT Sampler -88.5	17	65
			At El. -88.5 Ft., few coarse-grained sand-sized limestone up to 1/4"					23	
								42	
				90	32		SPT Sampler -90.0	27	74
								37	
								37	
				97	33		SPT Sampler -91.5	14	71
								34	
-91.4	108.9							37	
			LIMESTONE, fossiliferous, moderately hard, coarse-grained, pitted, clay filled pits, 10Y 6/1 greenish gray				140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).		

NOTES:

1. Soils are field visually classified in accordance with the Unified Soils Classification System.

2. Set 17.5 Ft. of 8" Schedule 40 PVC Pipe Through Center of L-30 Levee To Top of Rock.

3. Boring Drilled/Sampled In Three Phases:
A. Set Surface Casing.
B. 4" Wireline Rock Coring To Base Of Rock.
C. Splitspoon Sampling 30 Ft. Below Base of Rock.

Abbreviations:
WOR = Weight of Rods.
DT = Drill Time.
HP = Hydraulic Pressure.
DFR = Drill Fluid Return.

95 100 105 110 115

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Boring Designation CP06-L30PP-CB-0002

DRILLING LOG (Cont. Sheet)	INSTALLATION Jacksonville District		SHEET 7 OF 7 SHEETS
PROJECT L-30 Seepage Management Pilot Project	COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83	VERTICAL NAVD88
LOCATION COORDINATES X = 823,753 Y = 522,044	ELEVATION TOP OF BORING 17.5 Ft.		

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
			4. Borehole Reamed To 7.5" To Base of Rock. USGS Performed Borehole Logging.						
			5. 2" Monitoring Well Set @ X = 823754 Y= 522036						
			Screen From -40.7 to -42.7 Ft.						
			6. Cored to 80 Ft. To Confirm Out of Rock						
			7. Boring sealed with available sediment.						

115
120
125
130
135

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30 SEEPAGE MGMT PILOT PGT
GP06-130PP-GB-0002
DEPTH: 173'-200
S. RUN #1

L-30 SEEPAGE MGMT PILOT PGT
CP06-L30PP-CB-0002
DEPTH: 200-250'
S- RUN #2

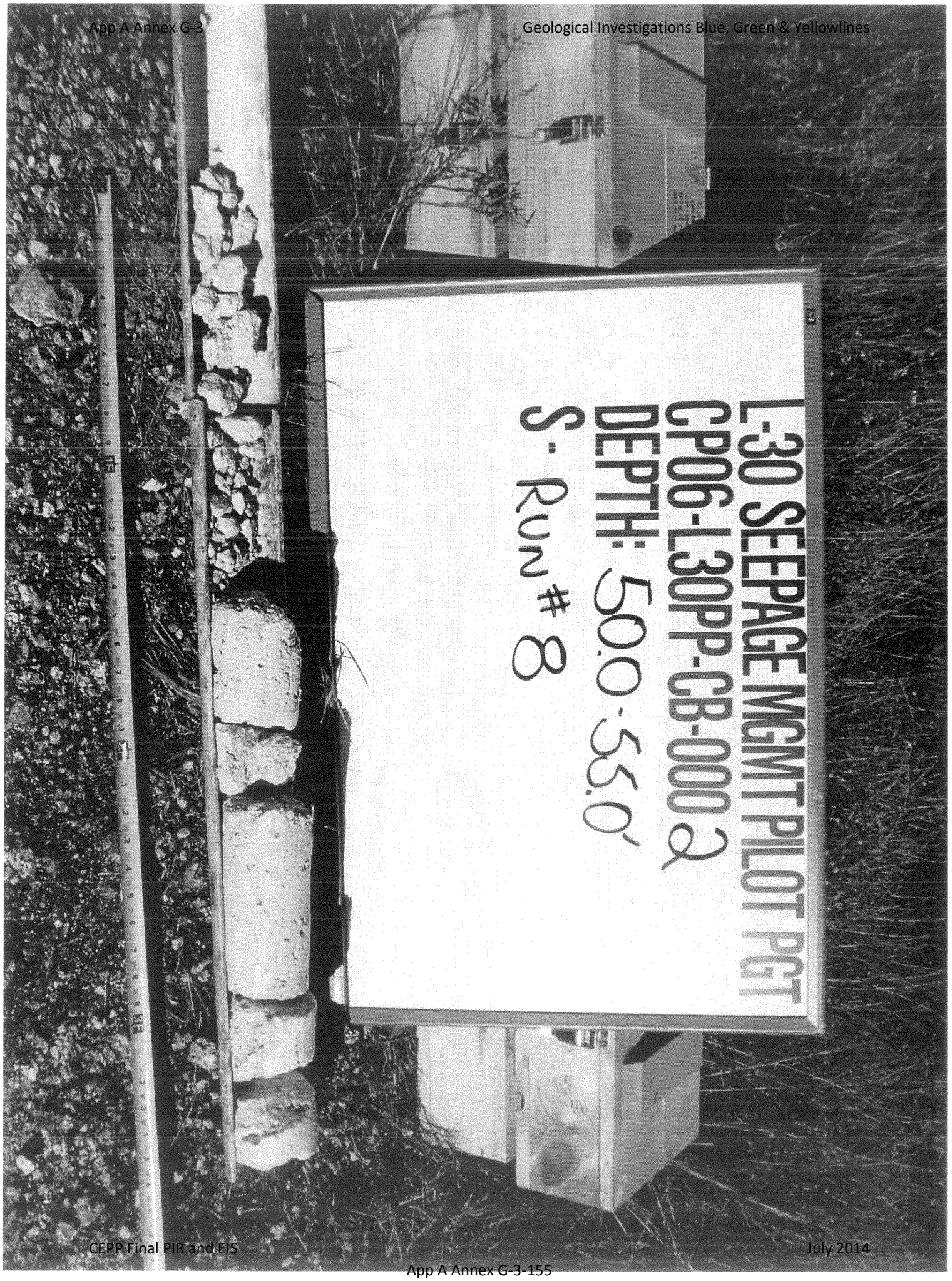
L-30 SEEPAGE MGMT PILOT PGT
CP06-L30PP-CB-0002
DEPTH: 25.0-30.0'
S. RUN #3

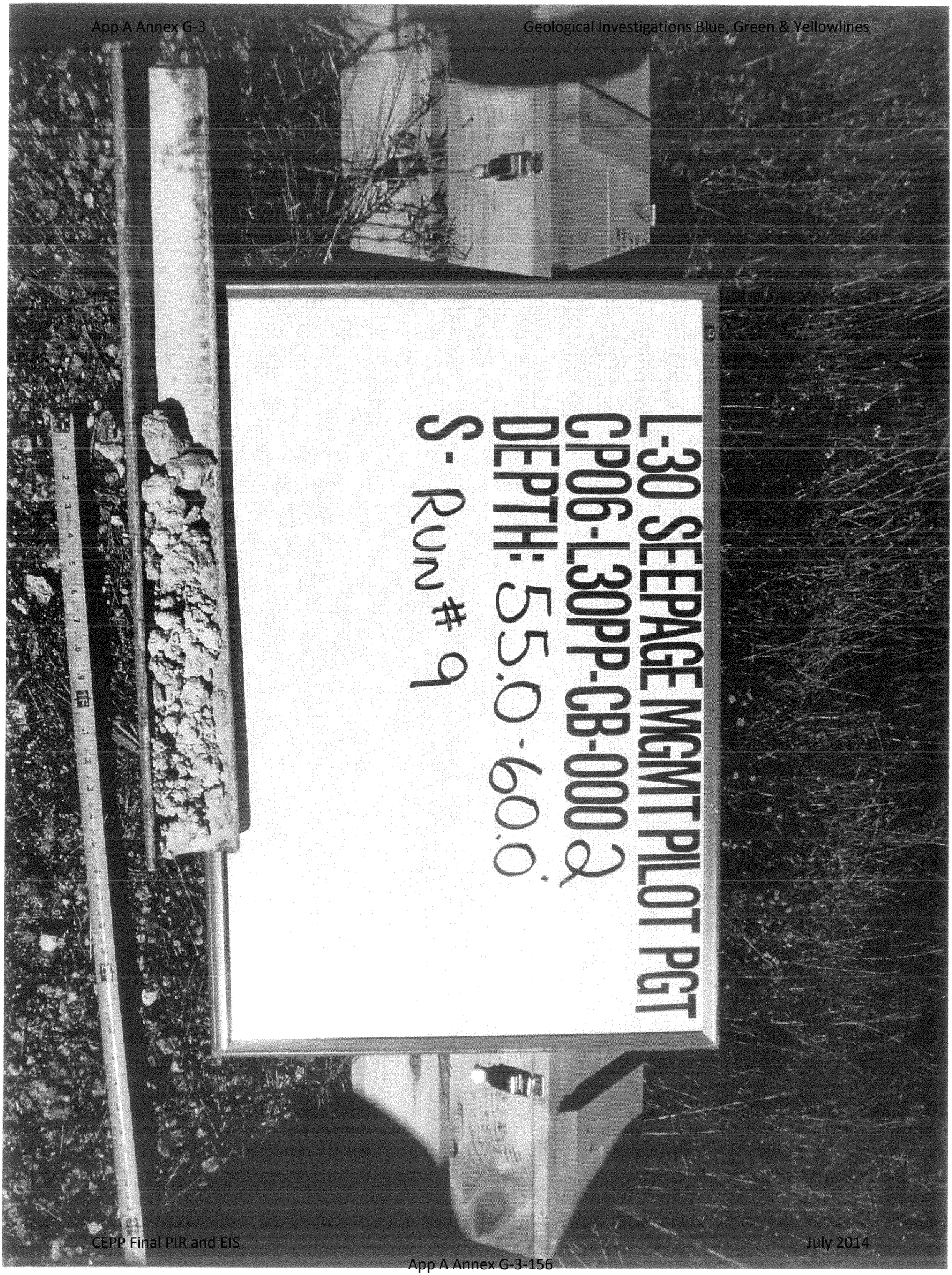
L-30 SEEPAGE MGMT PILOT PGT
CP06-L30PP-CB-0002
DEPTH: 30.0'-35.0'
S- RUN # 4

L-30 SEEPAGE MGMT PILOT PGT
CP06-L30PP-CB-0002
DEPTH: 350-400
S-RUN #5

L-30 SEEPAGE MGMT PILOT PGT
CP06-L30PP-CB-0002
DEPTH: 40.0-45.0'
S- Run#6

L-30 SEEPAGE MGMT PILOT PGT
CP06-L30PP-CB-0002
DEPTH: 450-500'
S- RUN #7

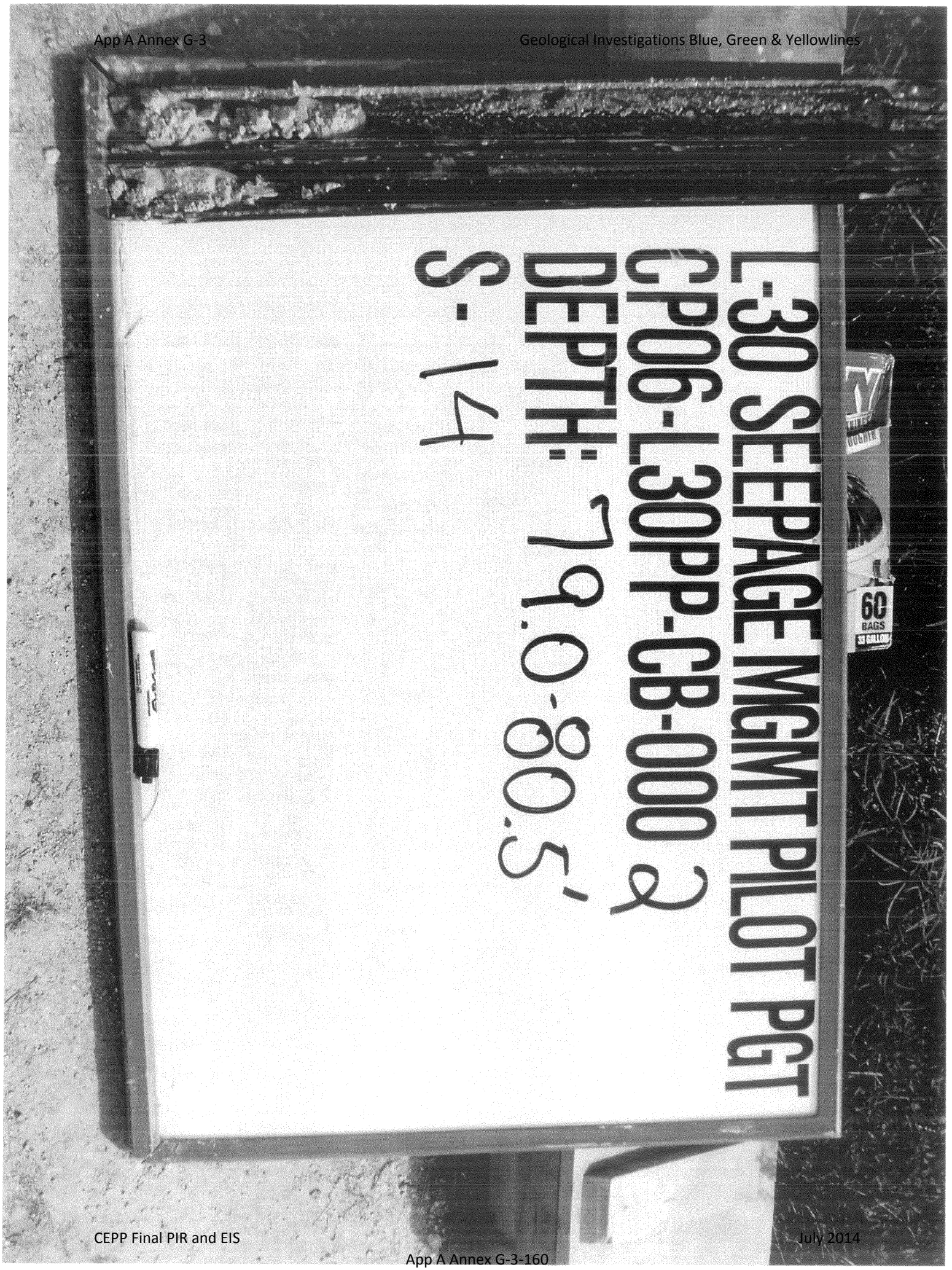

L-30 SEEPAGE MGMT PILOT PGT
GP06-L30PP-CB-0002
DEPTH: 50.0-55.0'
S. Run # 8

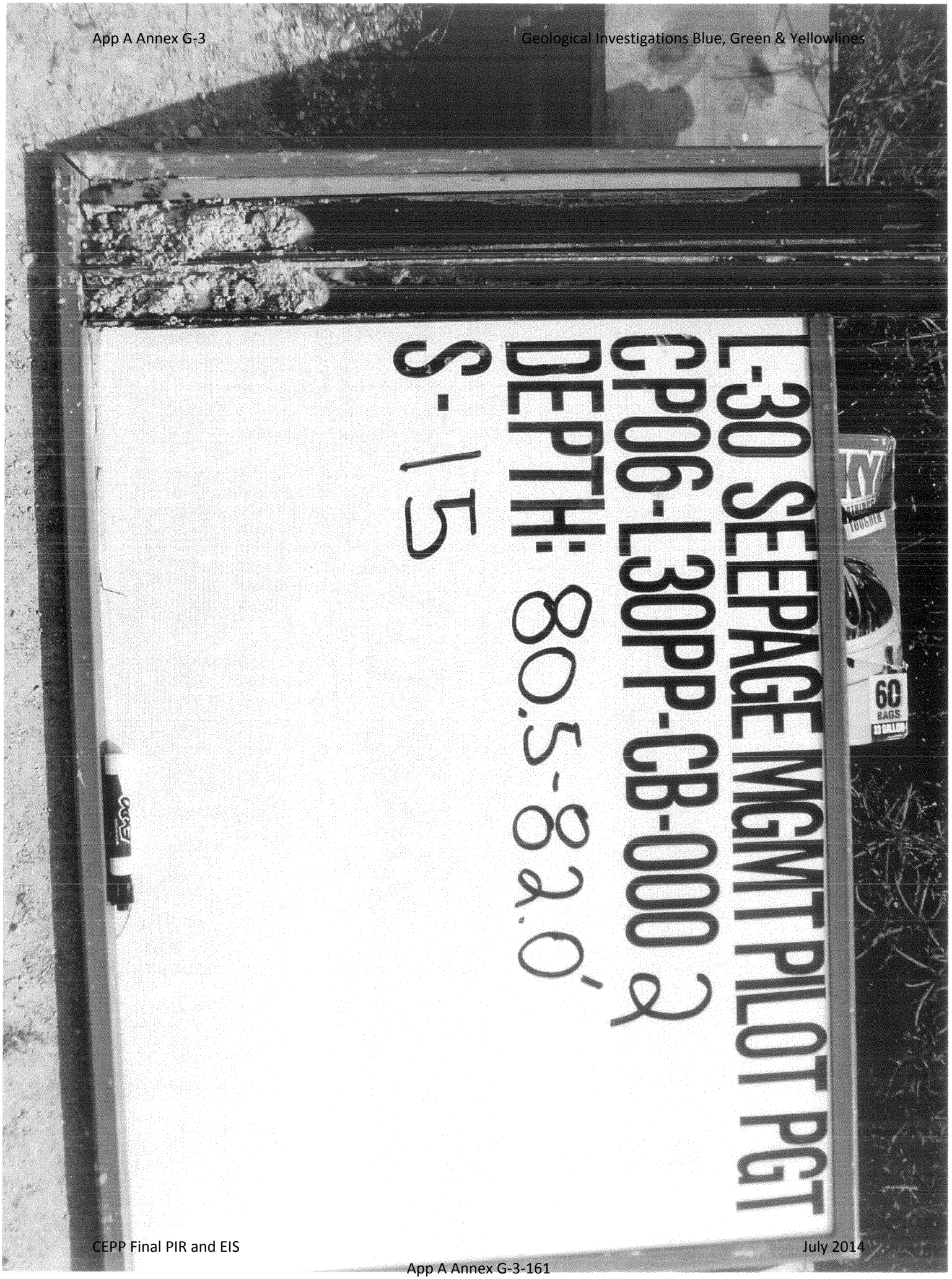

L-30 SEEPAGE MGMT PILOT PGT
CP06-L30PP-CB-0002
DEPTH: 55.0-60.0'
S- Run #9

L-30 SEEPAGE MGMT PILOT PGT
CP06-L30PP-CB-0002
DEPTH: 60.0-65.0
S- RUN #10

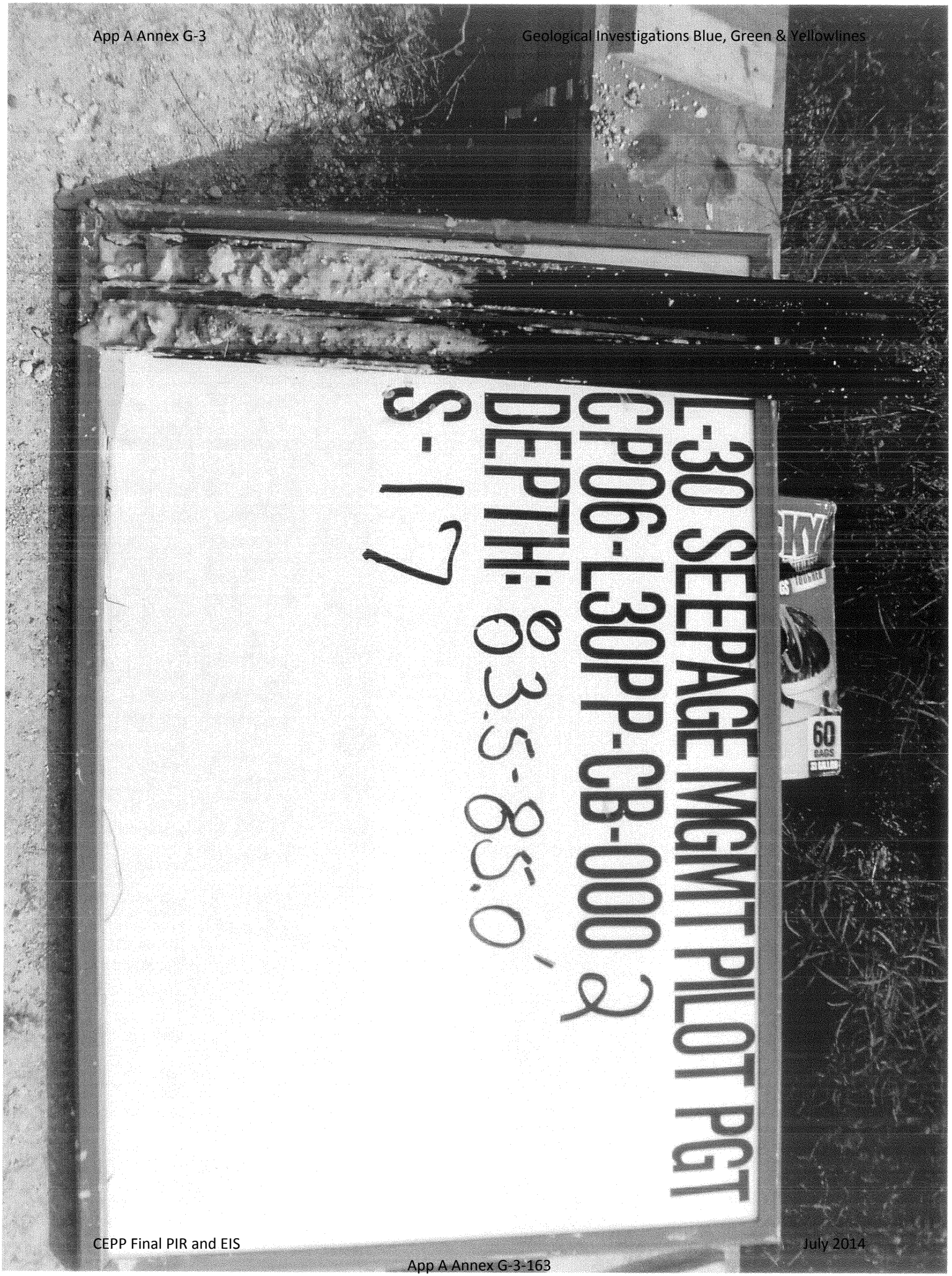
L-30 SEEPAGE MGMT PILOT PGT
GP06-L30PP-CB-0002
DEPTH: 65-70.0'
S-RUN # 11

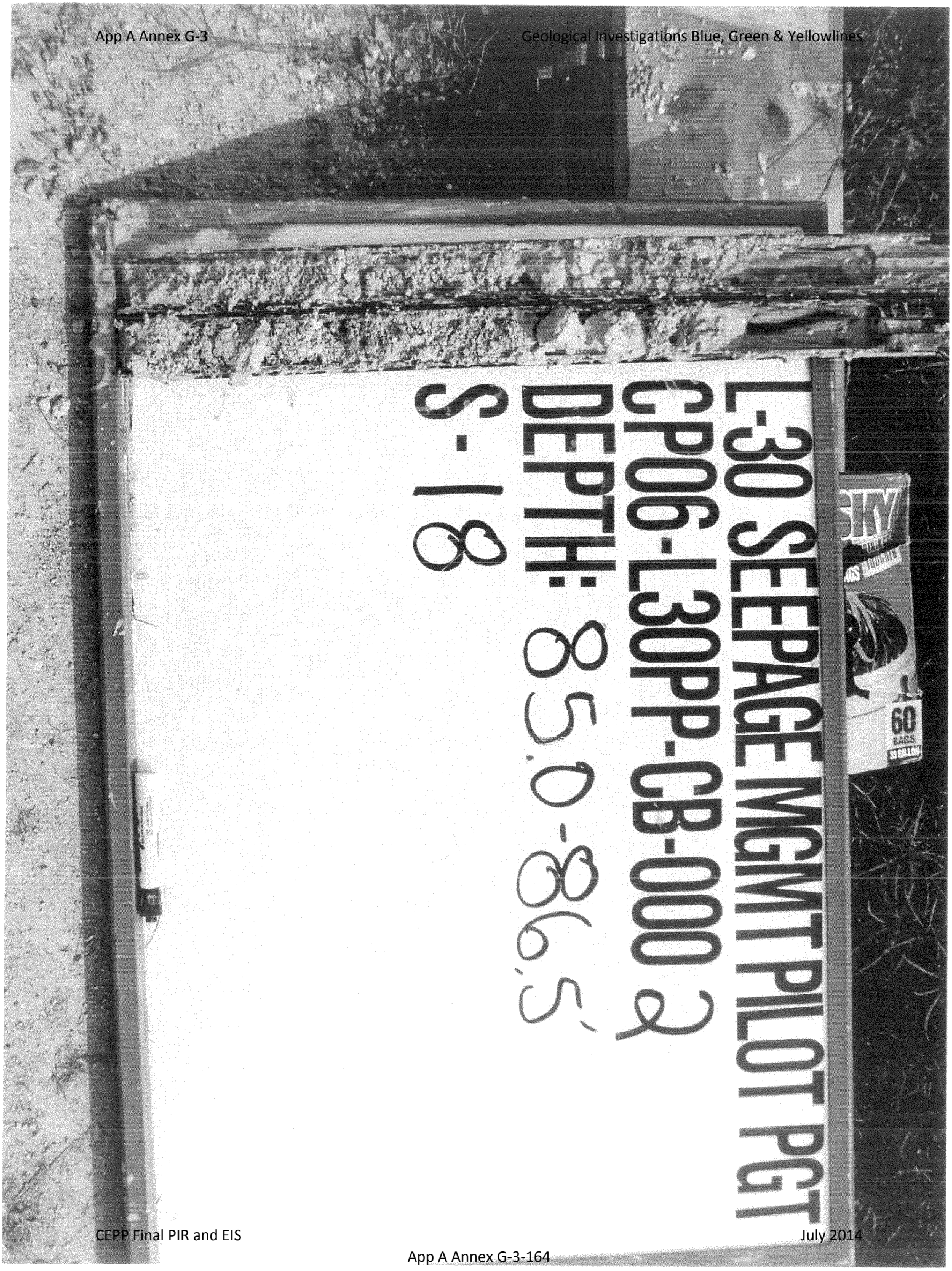
L-30 SEEPAGE MGMT PILOT PGT
CP06-L30PP-CB-0002
DEPTH: 70.0-75.0'
S-RUN#12

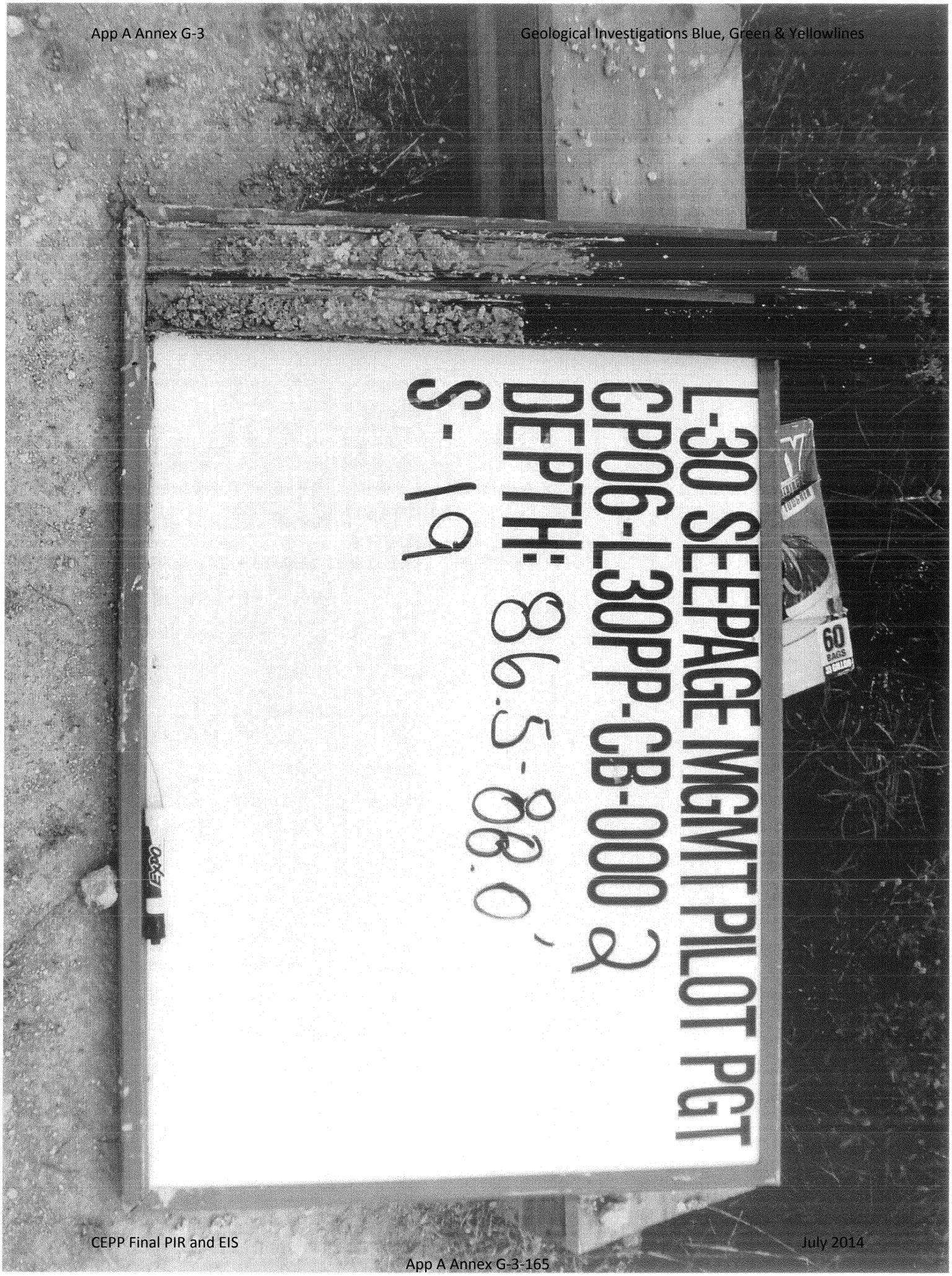

60
BAGS
33 GALLON
I-30 SEEPAGE MGMT PILOT PGT
GP06-I30PP-GB-000 2
DEPTH: 79.0-80.5'
S: 14


I-30 SEEPAGE MGMT PILOT PGT
GP06-I30PP-GB-0002
DEPTH: 80.5-82.0'
S: 15
60
BAGS

L-30 SEEPAGE MGMT PILOT PGT
GP06-L30PP-CB-0002
DEPTH: 82.0-83.5'
S-16

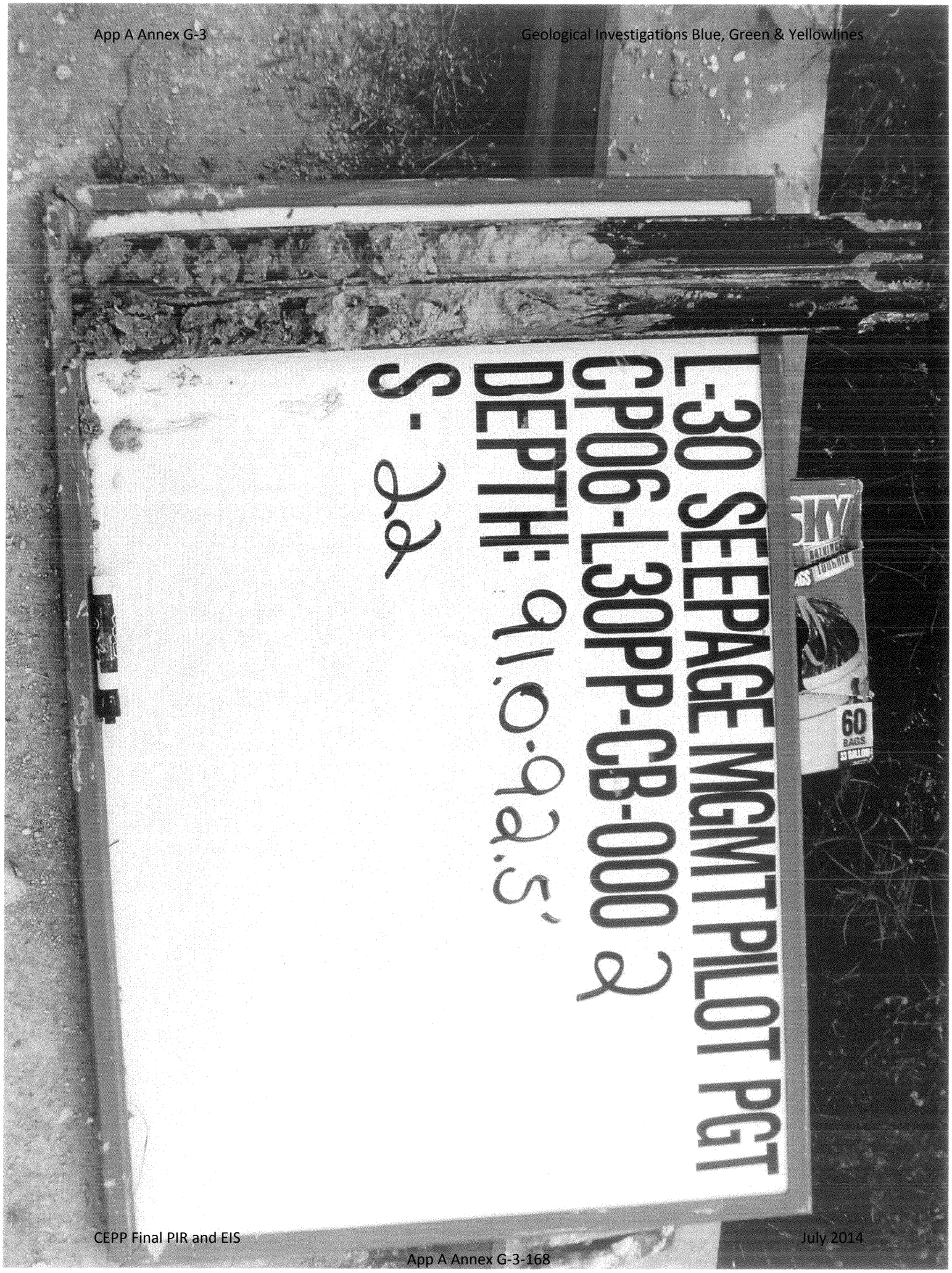

L-30 SEEPAGE MGMT PILOT PGT
GP06-L30PP-GB-0002
DEPTH: 83.5-85.0'
S-17
60
BAGS


L-30 SEEPAGE MGMT PILOT PGT
GP06-L30PP-GB-0002
DEPTH: 85.0-86.5
S-18
60
BAGS


L-30 SEEPAGE MGMT PILOT PGT
GP06-L30PP-CB-0002
DEPTH: 86.5-88.0'
S-19
60
BAGS
50 GALLON

L30 SEEPAGE MGMT PILOT PGT
GP06-L30PP-GB-0002
DEPTH: 88.0-89.5
S-20
60
BAGS
35 GALLON

L-30 SEEPAGE MGMT PILOT PGT
CP06-L30PP-CB-0002
DEPTH: 895-910'
S-21

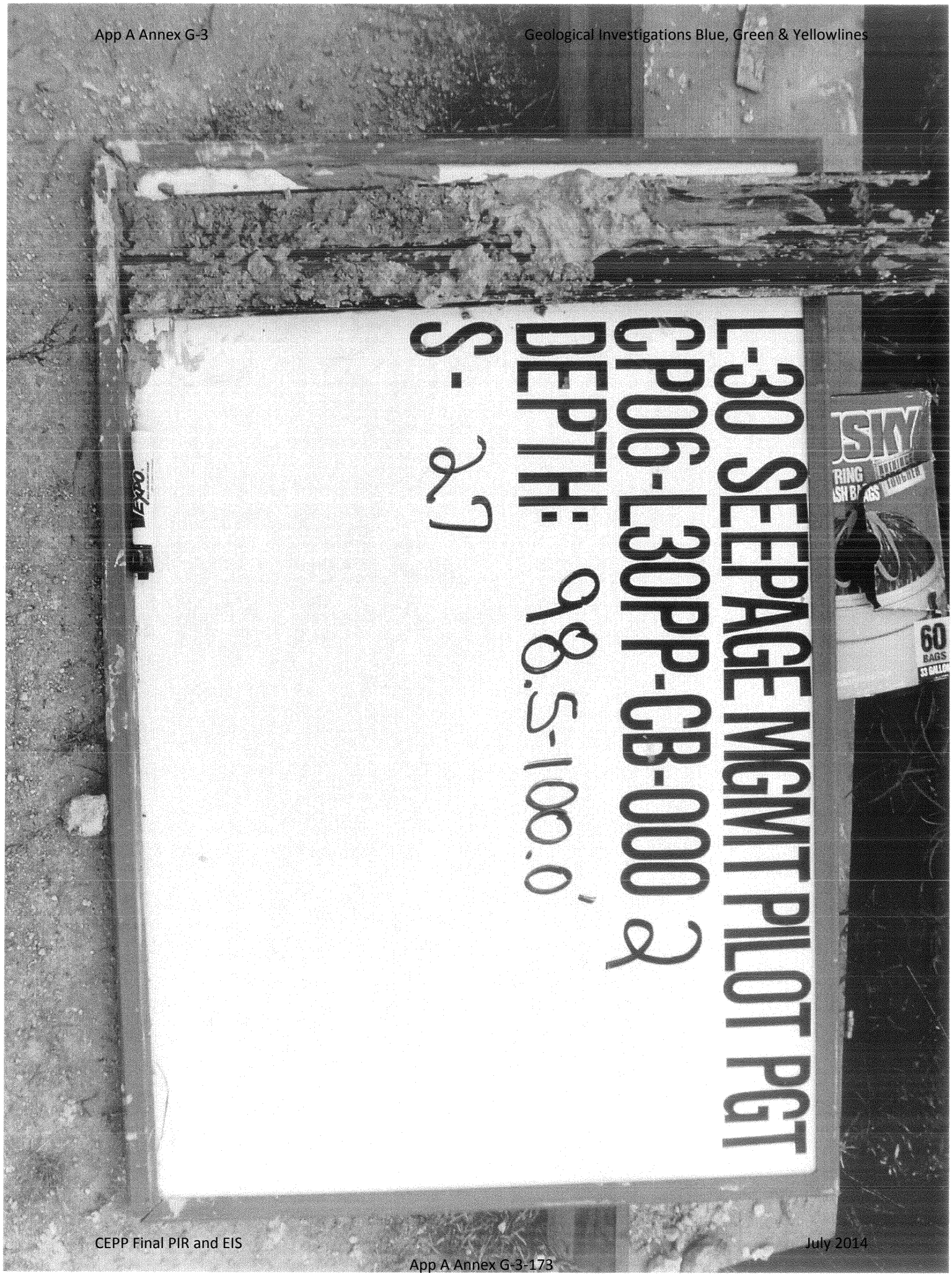

L-30 SEEPAGE MGMT PILOT PGT
GP06-L30PP-GB-0002
DEPTH: 91.0-92.5'
S-28
60
BAGS

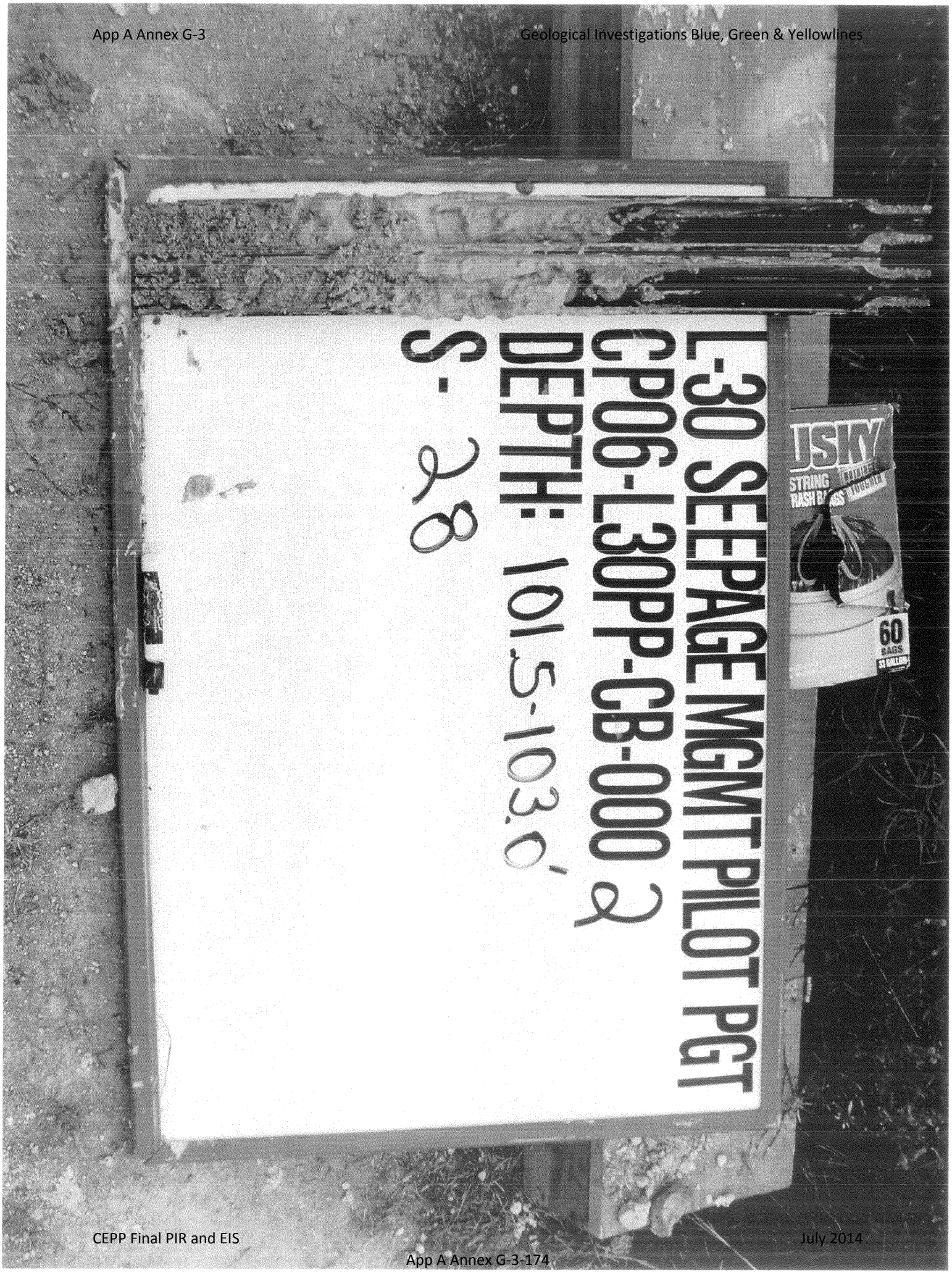
L-30 SEEPAGE MGMT PILOT PGT
GP06-L30PP-CB-000 2
DEPTH: 925-940'
S-23
SKY
60
BAGS

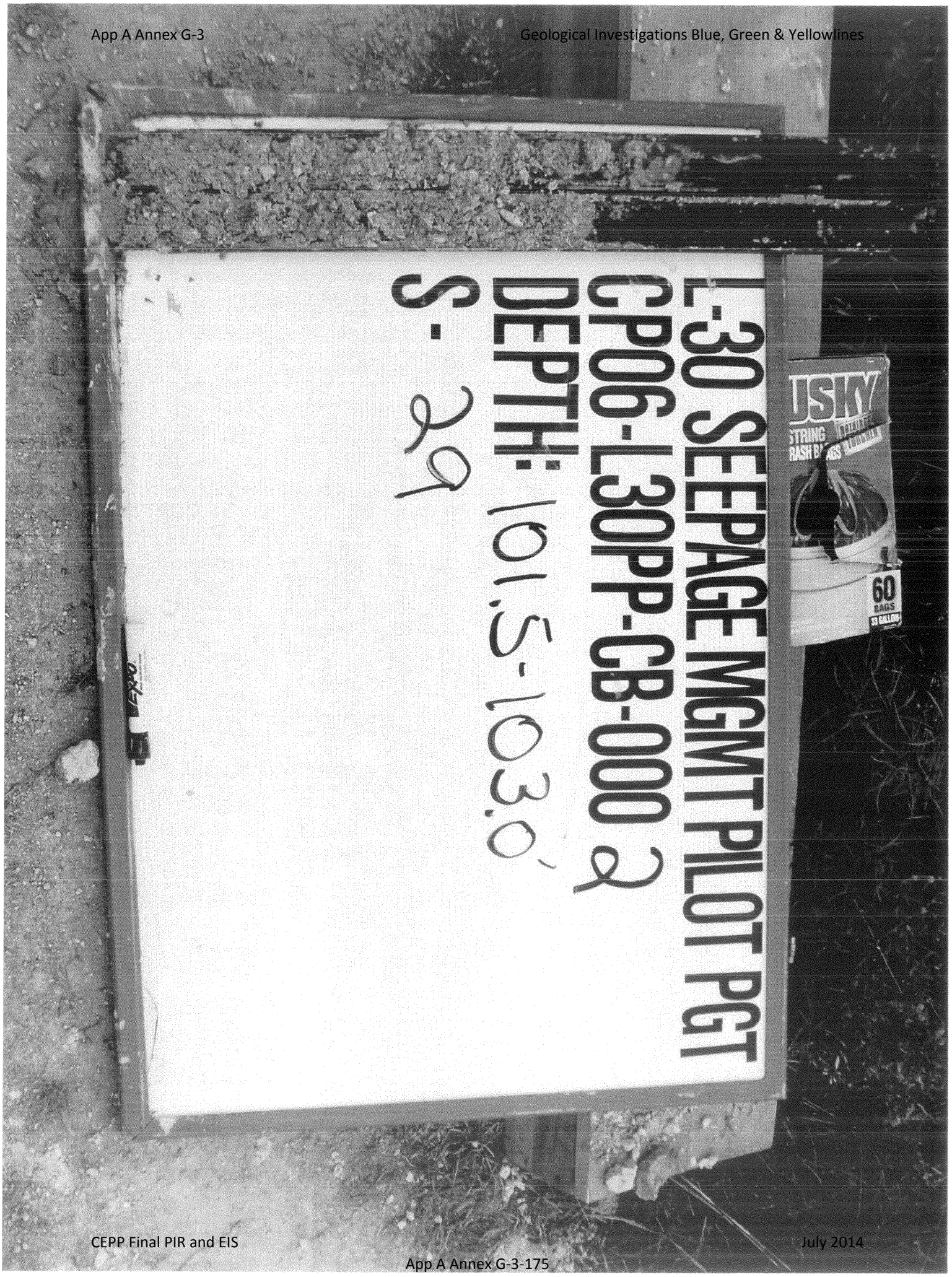
L-30 SEEPAGE MGMT PILOT PGT
GP06-L30PP-CB-000 2
DEPTH: 94.0-95.5'
S- 24
SKY
60
BAGS

L-30 SEEPAGE MGMT PILOT PGT
GP06-L30PP-CB-000 2
DEPTH: 95.5-97.0
S: 25
60
BAGS

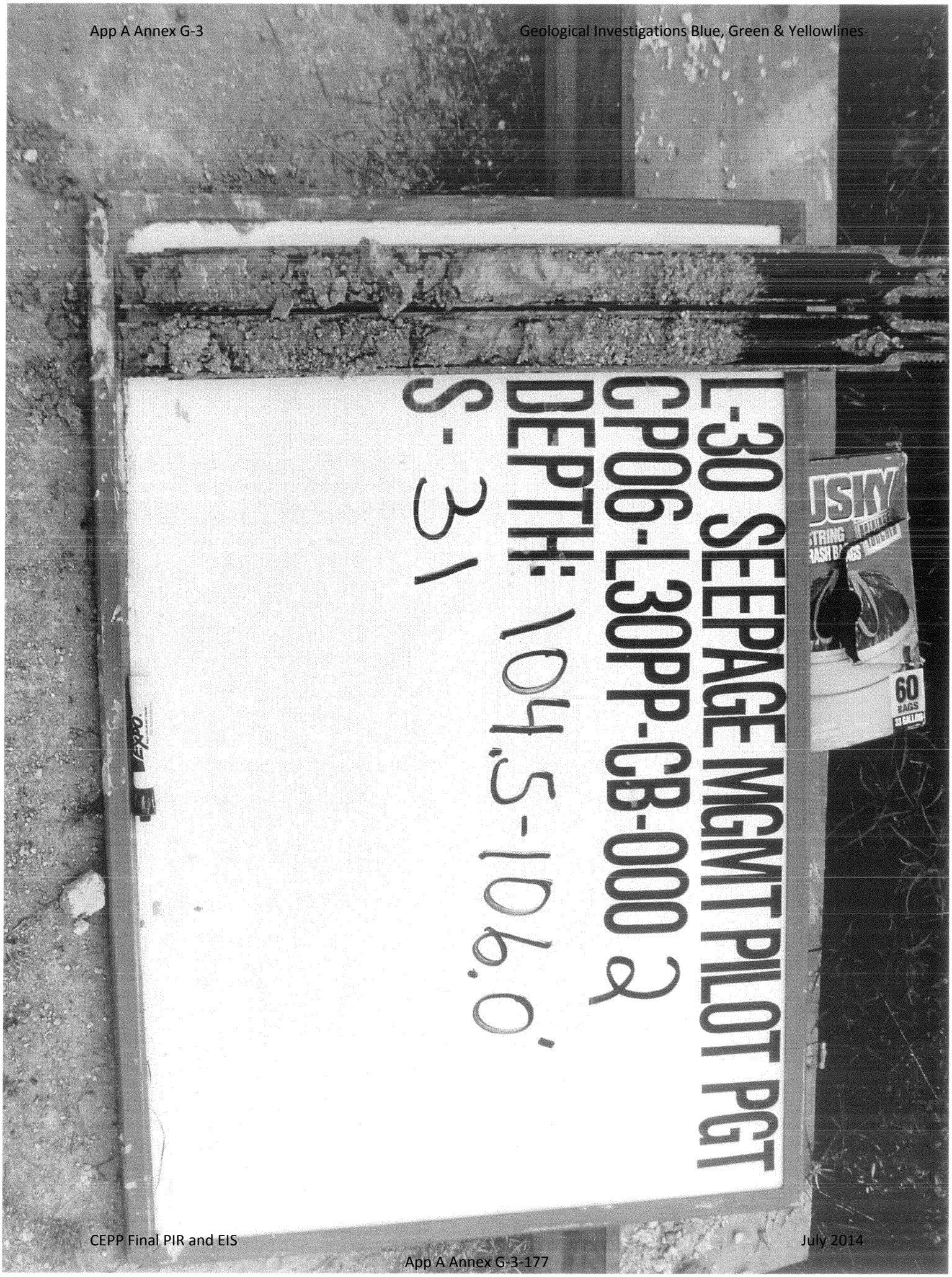
L-30 SEEPAGE MGMT PILOT PGT
CP06-L30PP-CB-0002
DEPTH: 970-985'
S: 96
SKY
60
BAGS


L-30 SEEPAGE MGMT PILOT PGT
GP06-L30PP-CB-0002
DEPTH: 98.5-100.0'
S: 27
60
BAGS


L-30 SEEPAGE MGMT PILOT PGT
GP06-L30PP-CB-0002
DEPTH: 101.5-103.0'
S-28
USKY
STRING
60
BAGS


L-30 SEEPAGE MGMT PILOT PGT
CP06-L30PP-CB-0002
DEPTH: 101.5-103.0'
S-29
USIX
60
BAGS

L-30 SEEPAGE MGMT PILOT PGT
GP06-L30PP-CB-0002
DEPTH: 1030-1045
S- 30
USKY
STRING
TRASH BAGS
60
BAGS
33 GALLON


L-30 SEEPAGE MGMT PILOT PGT
GP06-L30PP-CB-0002
DEPTH: 104.5-106.0'
S-31
USKY
60
BAGS

L-30 SEEPAGE MGMT PILOT PGT
CP06-L30PP-CB-000 2
DEPTH: 106.0-107.5
S-32
USKY
STRING
60
BAGS

L-30 SEEPAGE MGMT PILOT PGT
GP06-L30PP-CB-0002
DEPTH: 1075.5-1090'
S: 333
USKY
60
BAGS

SOILS TEST CORE BORING NUMBER "CP06-L30PP-CB-0003"

Miami-Dade County, Florida

Boring Designation CP06-L30PP-CB-0003

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 6 SHEETS

1. PROJECT L-30 Seepage Management Pilot Project Top Of Levee L-30 (Center of Roadway)	9. SIZE AND TYPE OF BIT: See Remarks 10. COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.) — HORIZONTAL: NAD83 — VERTICAL: NAVD88
2. BORING DESIGNATION: CP06-L30PP-CB-0003 — LOCATION COORDINATES: X = 821,358 Y = 519,743	11. MANUFACTURER'S DESIGNATION OF DRILL: CME 55 Truckrig — ☐ AUTO HAMMER ☒ MANUAL HAMMER
3. DRILLING AGENCY: Challenge Engineering & Testing, Inc. — CONTRACTOR FILE NO.: 2006D30	12. TOTAL SAMPLES — DISTURBED: 33 — UNDISTURBED (UD): 0
4. NAME OF DRILLER: Adam Benson	13. TOTAL NUMBER CORE BOXES: 5
5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED — DEG. FROM VERTICAL: — BEARING:	14. ELEVATION GROUND WATER: 5.0 Ft.
	15. DATE BORING — STARTED: 10-07-06 — COMPLETED: 10-18-06
6. THICKNESS OF OVERBURDEN: N/A	16. ELEVATION TOP OF BORING: 17.2 Ft.
7. DEPTH DRILLED INTO ROCK: N/A	17. TOTAL RECOVERY FOR BORING: 73 %
8. TOTAL DEPTH OF BORING: 105.0 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR: Bob Momberger, Geologist

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
17.2	0.0						17.2		
			L-30 Levee Fill Material						
							Advanced Boring w/ tricone roller bit		

0 5 10 15

SAJ FORM 1836
JUN 02

(Continued)

Boring Designation CP06-L30PP-CB-0003

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District	SHEET 2 OF 6 SHEETS
PROJECT: L-30 Seepage Management Pilot Project	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.)	HORIZONTAL: NAD83 / VERTICAL: NAVD88
LOCATION COORDINATES: X = 821,358 Y = 519,743	ELEVATION TOP OF BORING: 17.2 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
-0.3	17.5						Advanced Boring w/ tricone roller bit		
		Slightly Weathered	LIMESTONE, oolitic, sparsely fossiliferous, moderately hard, slightly weathered, fine-grained, thick bedding, vuggy, peat filled vugs, Ft. Thompson Formation, 2.5Y 8/2 pale yellow	100	1	RQD 50	4 x 5-1/2" Diamond Impregnated Bit DT = 3 mins HP = 250 psi DFR = 50 %		
			At El. -2.8 Ft., vuggy, quartz filled vugs				-2.8		
			From El. -4.3 to -12.8 Ft., aphanitic, thick bedding, pitted, sand filled pits, 2.5Y 7/2 light gray	100	2 BOX 1	RQD 30	4 x 5-1/2" Diamond Impregnated Bit DT = 6 mins HP = 250 psi DFR = 25 %		
			At El. -6.8 Ft., pitted, clay filled pits				-7.8		
				70	3	RQD 45	4 x 5-1/2" Diamond Impregnated Bit DT = 5 mins HP = 250 psi DFR = 0 %		
-12.8	30.0						-12.8		
			LIMESTONE, fossiliferous, very soft, slightly weathered, aphanitic, thin bedding, vuggy, clay filled vugs, 2.5Y 8/1 white	6	BOX 2 4	RQD 0	4 x 5-1/2" Diamond Impregnated Bit DT = 3 mins HP = 250 psi DFR = 0 %		
							-17.8		

15 20 25 30 35

SAJ FORM 1836-A
JUN 02

Boring Designation CP06-L30PP-CB-0003

DRILLING LOG (Cont. Sheet)	INSTALLATION Jacksonville District		SHEET 3 OF 6 SHEETS
PROJECT L-30 Seepage Management Pilot Project	COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)	HORIZONTAL NAD83	VERTICAL NAVD88
LOCATION COORDINATES X = 821,358 Y = 519,743	ELEVATION TOP OF BORING 17.2 Ft.		

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
		Slightly Weathered	At El. -17.8 Ft., sparsely fossiliferous, moderately hard, slightly weathered, aphanitic, thick bedding, pitted	90	5	RQD 50	4 x 5-1/2" Diamond Impregnated Bit DT = 4 mins HP = 250 psi DFR = 0 %		
			At El. -21.8 Ft., fossiliferous				-22.8		
			At El. -25.8 Ft., soft, vuggy, clay filled vugs	96	BOX 2 6	RQD 20	4 x 5-1/2" Diamond Impregnated Bit DT = 2 mins HP = 250 psi DFR = 0 %		
		Unweathered	At El. -27.3 Ft., moderately hard, unweathered, aphanitic, medium bedding, vuggy, sand filled vugs, 5Y 8/1 white				-27.8		
				70	7	RQD 20	4 x 5-1/2" Diamond Impregnated Bit DT = 3 mins HP = 250 psi DFR = 0 %		
							-32.8		
				90	BOX 3 8	RQD 25	4 x 5-1/2" Diamond Impregnated Bit DT = 4 mins HP = 250 psi DFR = 0 %		
							-37.8		

35 40 45 50 55

SAJ FORM 1836-A
JUN 02

Boring Designation CP06-L30PP-CB-0003

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District	SHEET 4 OF 6 SHEETS
PROJECT: L-30 Seepage Management Pilot Project	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.)	HORIZONTAL: NAD83 / VERTICAL: NAVD88
LOCATION COORDINATES: X = 821,358 Y = 519,743	ELEVATION TOP OF BORING: 17.2 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
		Slightly Weathered	At El. -37.8 Ft., slightly weathered, pitted, 2.5Y 8/1 white	70	9 BOX 3	RQD 20	4 x 5-1/2" Diamond Impregnated Bit DT = 2 mins HP = 250 psi DFR = 0 %		
-44.8	62.0	Unweathered	LIMESTONE, hard, unweathered, pitted, 2.5Y 6/1 gray	80	10	RQD 20	4 x 5-1/2" Diamond Impregnated Bit DT = 7 mins HP = 250 psi DFR = 0 %		
		Moderately Weathered	At El. -47.8 Ft., moderately weathered, thin bedding, vuggy, clay filled vugs	40	11 BOX 4	RQD 0	4 x 5-1/2" Diamond Impregnated Bit DT = 2 mins HP = 250 psi DFR = 0 %		
-49.8	67.0		LIMESTONE, soft, clay filled vugs						
-54.8	72.0		SHELL, mostly angular sand to gravel-sized shell up to 1/2", few fine-grained sand-sized carbonate, trace limestone up to 1/8", strong reaction with HCl, wet, 5Y 7/1 light gray	20	12	RQD 0	4 x 5-1/2" Diamond Impregnated Bit DT = 1 mins HP = 250 psi DFR = 0 %		
			At El. -57.1 Ft., little fine-grained sand-sized carbonate, Pinecrest Sand Formation						

Depth scale: 55, 60, 65, 70, 75

SAJ FORM 1836-A
JUN 02

Boring Designation CP06-L30PP-CB-0003

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District	SHEET 5 OF 6 SHEETS
PROJECT: L-30 Seepage Management Pilot Project	COORDINATE SYSTEM/DATUM: State Plane, FLE (U.S. Ft.)	HORIZONTAL: NAD83 / VERTICAL: NAVD88
LOCATION COORDINATES: X = 821,358 Y = 519,743	ELEVATION TOP OF BORING: 17.2 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
				0	13	RQD 0	4 x 5-1/2" Diamond Impregnated Bit		
				67	14		SPT Sampler -59.3	4 2 2	4
				73	15		SPT Sampler -60.8	3 2 4	6
				73	16		SPT Sampler -62.3	3 2 3	5
			At El. -62.3 Ft., mostly angular fine to coarse gravel-sized shell up to 1/2", few silt, few clay, strong reaction with HCl, wet, 10Y 6/1 greenish gray	47	17		SPT Sampler -63.8	7 6 6	12
-65.3	82.5			97	18		SPT Sampler -65.3	5 4 7	11
-66.8	84.0		SAND, silty, mostly fine-grained sand-sized carbonate, little angular sand to gravel-sized shell up to 1/2", few sandstone, strong reaction with HCl, wet, moderate cementation, N 6/ gray (SM)	100	19		-65.6 SPT Sampler -66.8 Advanced Boring	50/0.3'	
			SHELL, low plasticity, mostly angular sand to gravel-sized shell up to 1/2", little clay, few silt, strong reaction with HCl, wet, 10Y 6/1 greenish gray	90	20		SPT Sampler -68.3	14 14 17	31
				53	21		SPT Sampler -69.8	9 19 21	40
			At El. -69.8 Ft., mostly angular fine gravel-sized shell up to 3/4", few silt, strong reaction with HCl, wet, 10Y 6/1 greenish gray	80	22		SPT Sampler -71.3	19 22 26	48
			At El. -71.3 Ft., little silt	90	23		SPT Sampler -72.8	22 21 17	38
-72.8	90.0								
			SAND, silty, mostly medium-grained sand-sized quartz, some angular medium-grained sand-sized shell up to 1/4", strong reaction with HCl, wet, N 6/ gray (SM)	97	24		SPT Sampler -74.3	11 12 15	27
				97	25		SPT Sampler -75.8	14 14 14	28
				97	26		SPT Sampler -77.3	9 6 7	13
				67	27		SPT Sampler	8	

SAJ FORM 1836-A
JUN 02

Boring Designation CP06-L30PP-CB-0003

DRILLING LOG (Cont. Sheet)	INSTALLATION Jacksonville District	SHEET 6 OF 6 SHEETS

PROJECT	COORDINATE SYSTEM/DATUM	HORIZONTAL	VERTICAL
L-30 Seepage Management Pilot Project	State Plane, FLE (U.S. Ft.)	NAD83	NAVD88

LOCATION COORDINATES	ELEVATION TOP OF BORING
X = 821,358 Y = 519,743	17.2 Ft.

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
			At El. -77.8 Ft., some angular sand to gravel-sized shell up to 1/2", trace silt, strong reaction with HCl, wet, N 6/ gray	67	27		SPT Sampler -78.8	5 6	11
			At El. -78.8 Ft., some angular sand to gravel-sized shell up to 1"	97	28		SPT Sampler -80.3	2 3 7	10
				97	29		SPT Sampler -81.8	29 25 23	48
			At El. -81.8 Ft., little angular medium-grained sand-sized shell up to 1/4", strong reaction with HCl, wet, N 6/ gray	97	30		SPT Sampler -83.3	12 20 27	47
			At El. -83.3 Ft., some angular sand to gravel-sized shell up to 1"	93	31		SPT Sampler -84.8	10 26 28	54
			At El. -84.8 Ft., some angular sand to gravel-sized shell up to 1-1/2"	70	32		SPT Sampler -86.3	15 26 13	39
-87.8	105.0		At El. -86.3 Ft., little angular sand to gravel-sized shell up to 1/2", weak cementation, 10Y 7/1 light greenish gray	73	33		SPT Sampler -87.8	6 7 8	15

NOTES:

1. Soils are field visually classified in accordance with the Unified Soils Classification System.

2. Set 17.5 Ft. of 8" Schedule 40 PVC Pipe Through Center of L-30 Levee To Top of Rock.

3. Boring Drilled/Sampled In Three Phases:
A. Set Surface Casing.
B. 4" Wireline Rock Coring To Base Of Rock.
C. Splitspoon Sampling 30 Ft. Below Base of Rock.

4. Borehole Reamed To 7.5" To Base of Rock. USGS Performed Borehole Logging.

5. 2" Monitoring Well Set @
X = 821356 Y= 519734

Screen From -41.8 to -43.8 Ft.

6. Cored to 80 Ft. To Confirm Out of Rock

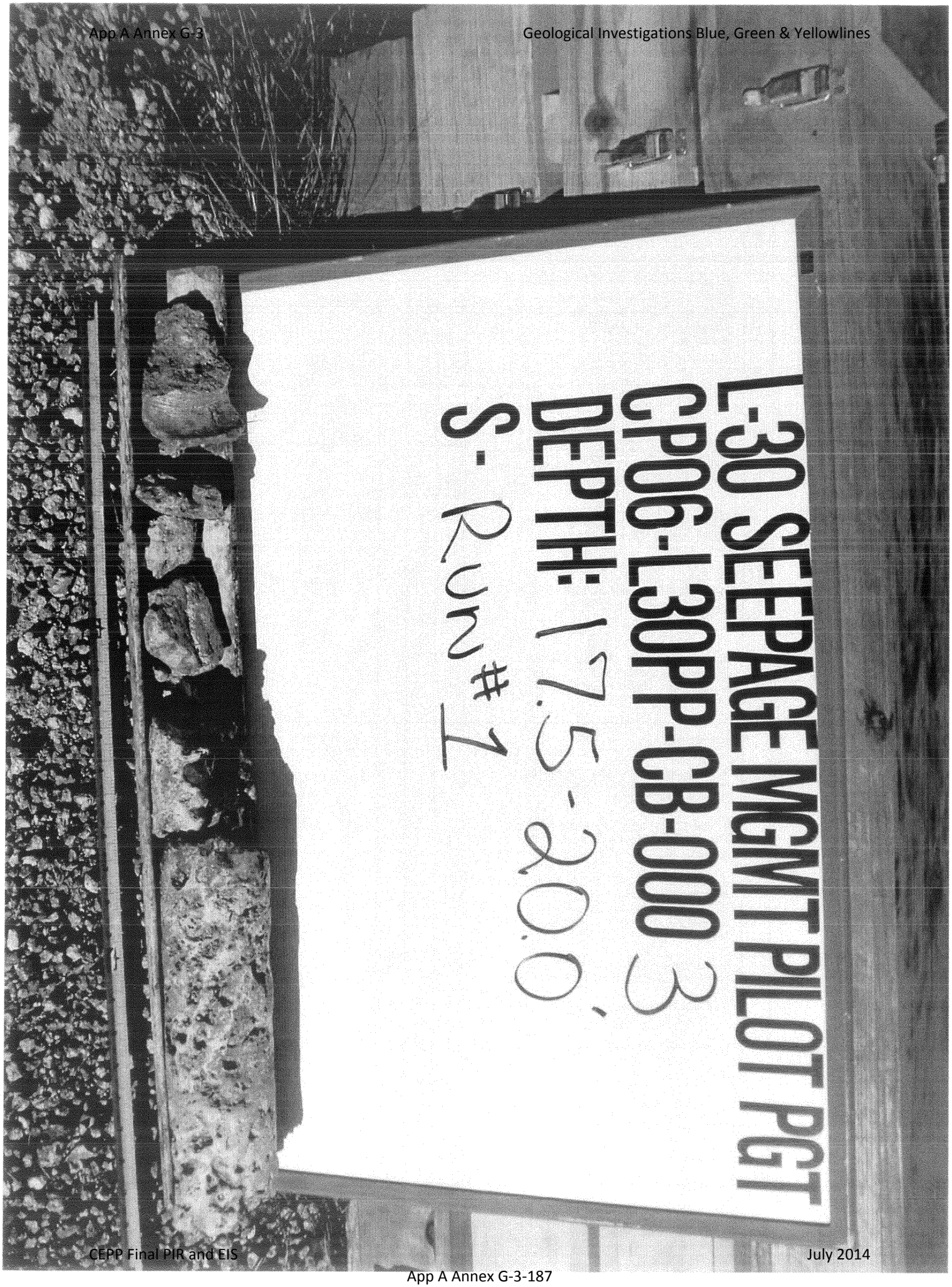
7. Boring sealed with available sediment.

140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).

Abbreviations:
DT = Drill Time.
HP = Hydraulic Pressure.
DFR = Drill Fluid Return.

95 100 105 110 115

SAJ FORM 1836-A
JUN 02


L-30 SEEPAGE MGMT PILOT PGT
CP06-L30PP-CB-000 3
DEPTH: 175-200'
S-Run#1

L-30 SEEPAGE MGMT PILOT PGT
CP06-L30PP-CB-0003
DEPTH: 200-250'
S-RUN#2

L-30 SEEPAGE MGMT PILOT PGT
GP06-L30PP-CB-0003
DEPTH: 25.0-30.0
S. RUN#3

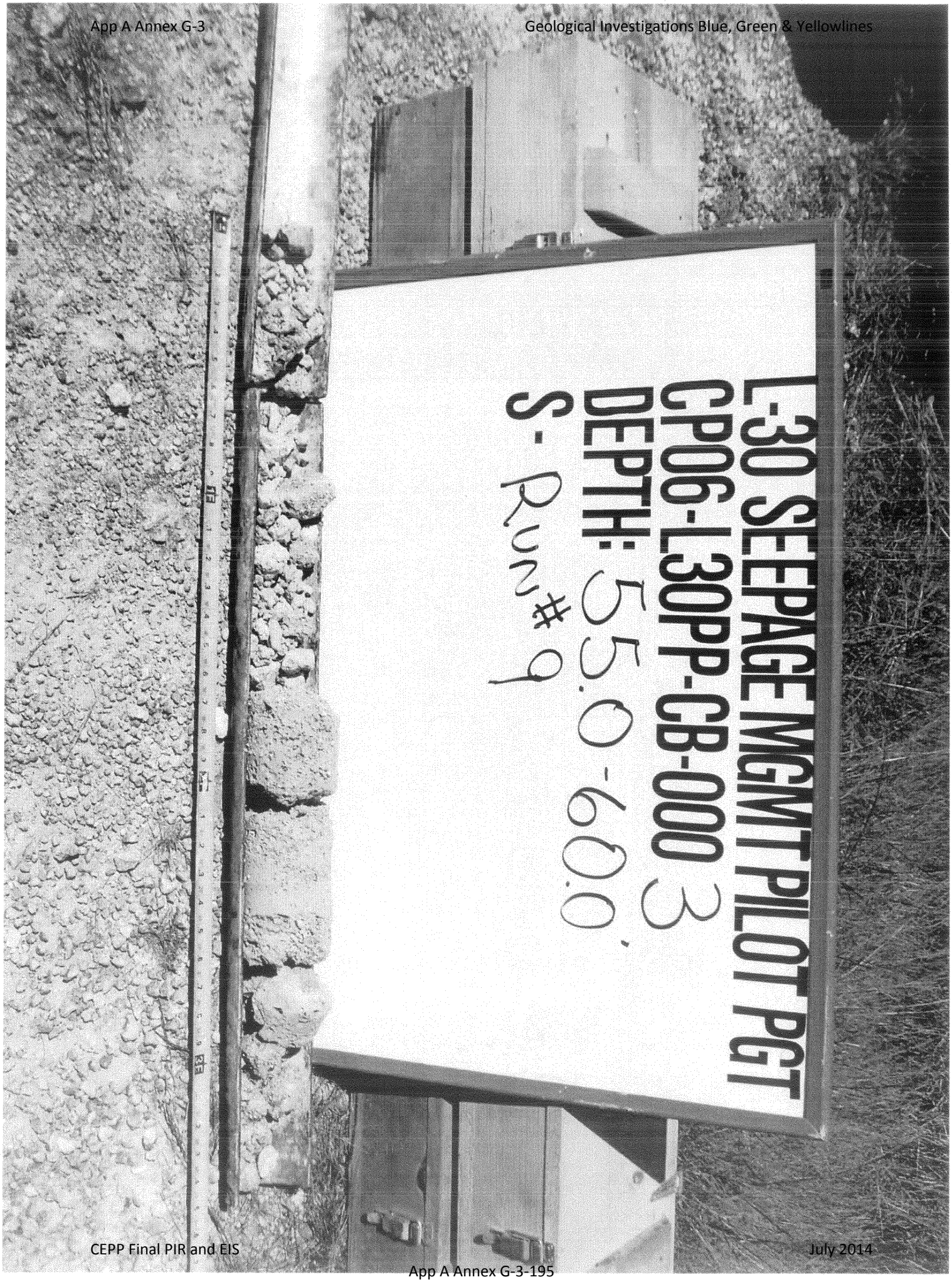
L-30 SEEPAGE MGMT PILOT PGT
CP06-L30PP-CB-0003
DEPTH: 30.0-35.0
S- RUN#4

L-30 SEEPAGE MGMT PILOT PGT
CP06-L30PP-CB-0003
DEPTH: 35.0-40.0'
S- RUN#5

L-30 SEEPAGE MGMT PILOT PIT
CP06-L30PP-CB-0003
DEPTH: 40.0-45.0'
S. Run #6

L-30 SEEPAGE MGMT PILOT PGT
CP06-L30PP-CB-000 3
DEPTH: 45.0-50.0'
S- Run# 7

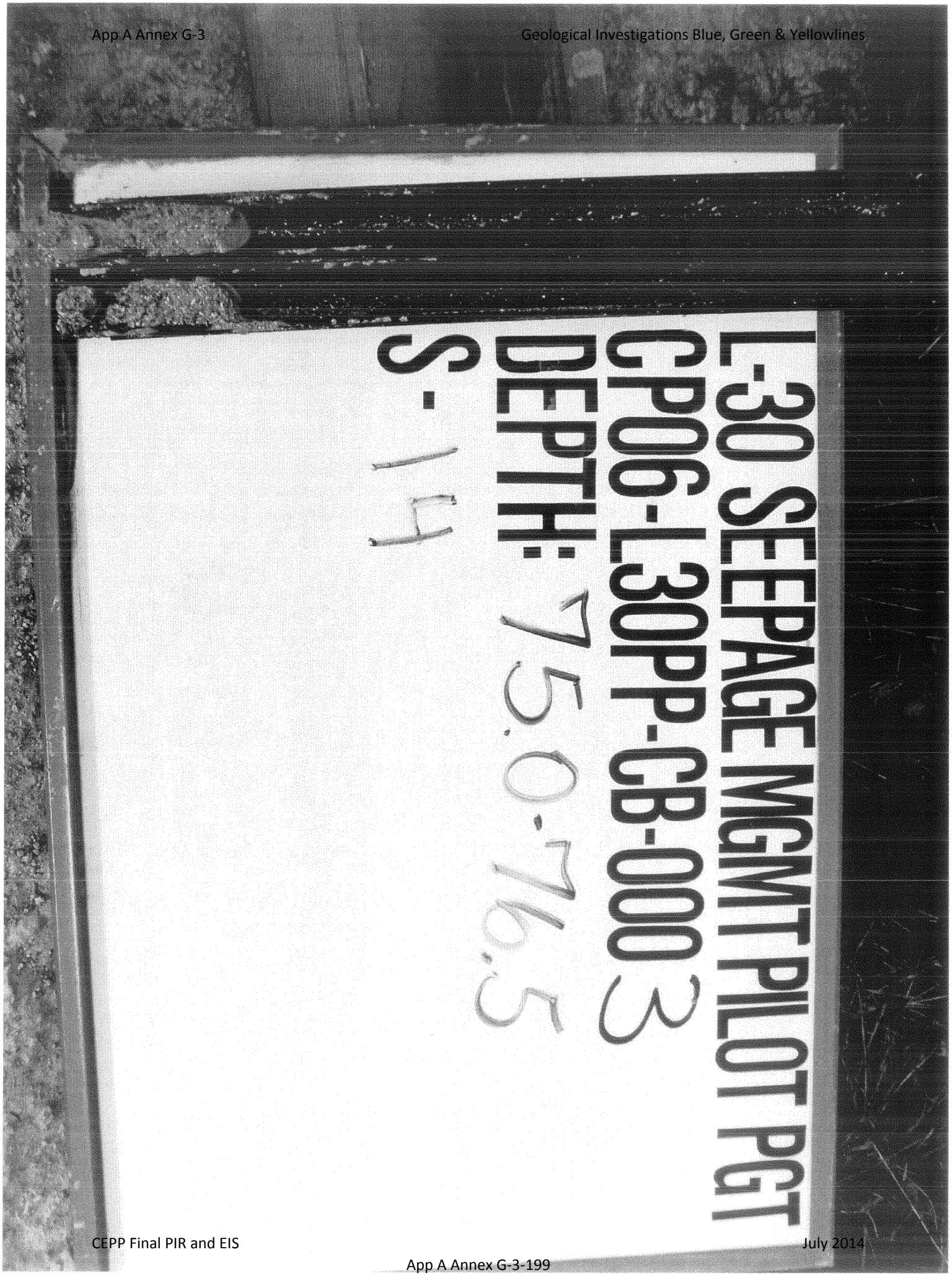
L-30 SEEPAGE MGMT PILOT PGT
CP06-L30PP-CB-000 3
DEPTH: 50.0-55.0'
S- Run #8

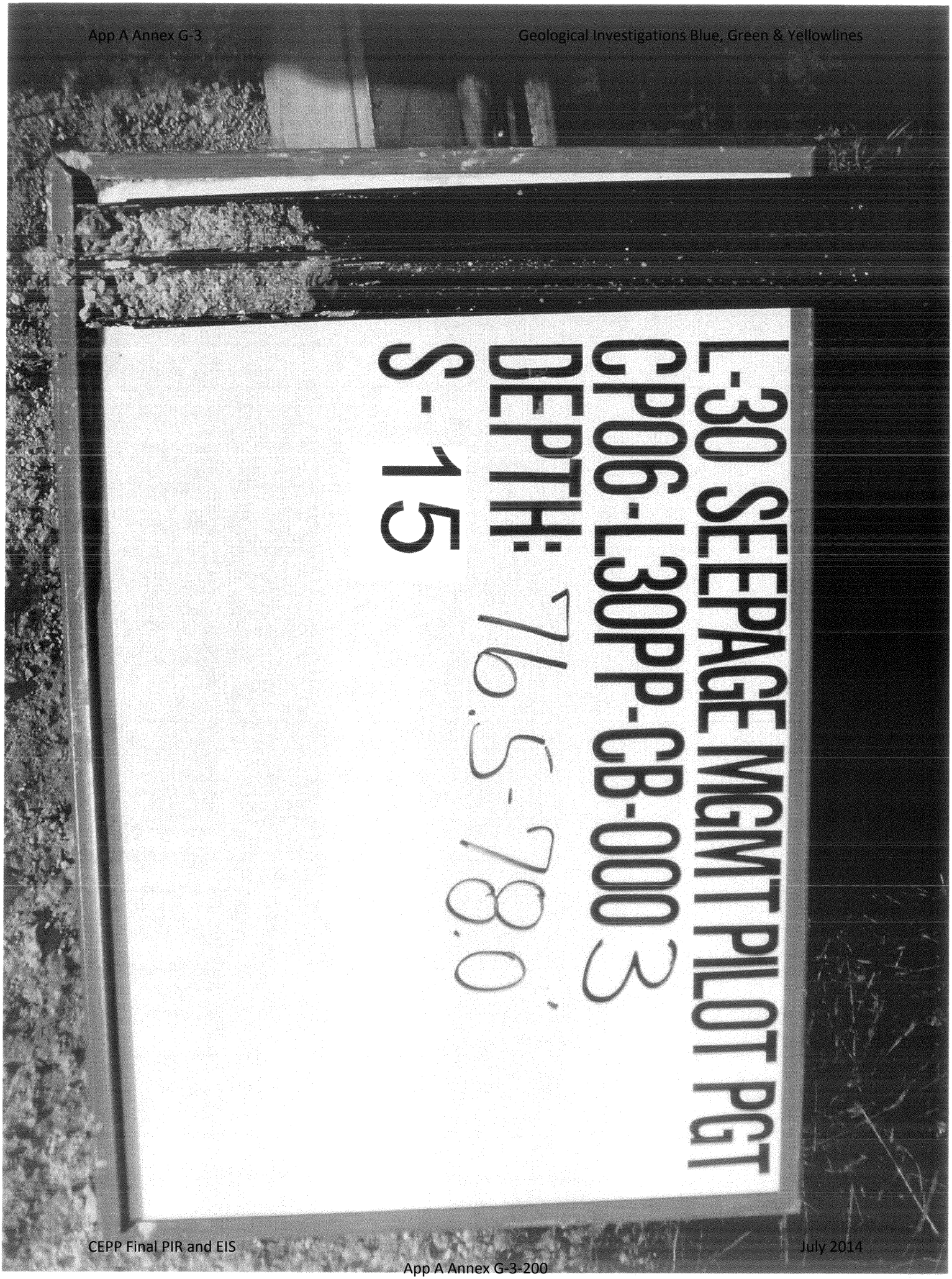

L-30 SEEPAGE MGMT PILOT PGT
CP06-L30PP-CB-000 3
DEPTH: 55.0 - 60.0'
S. Run #9

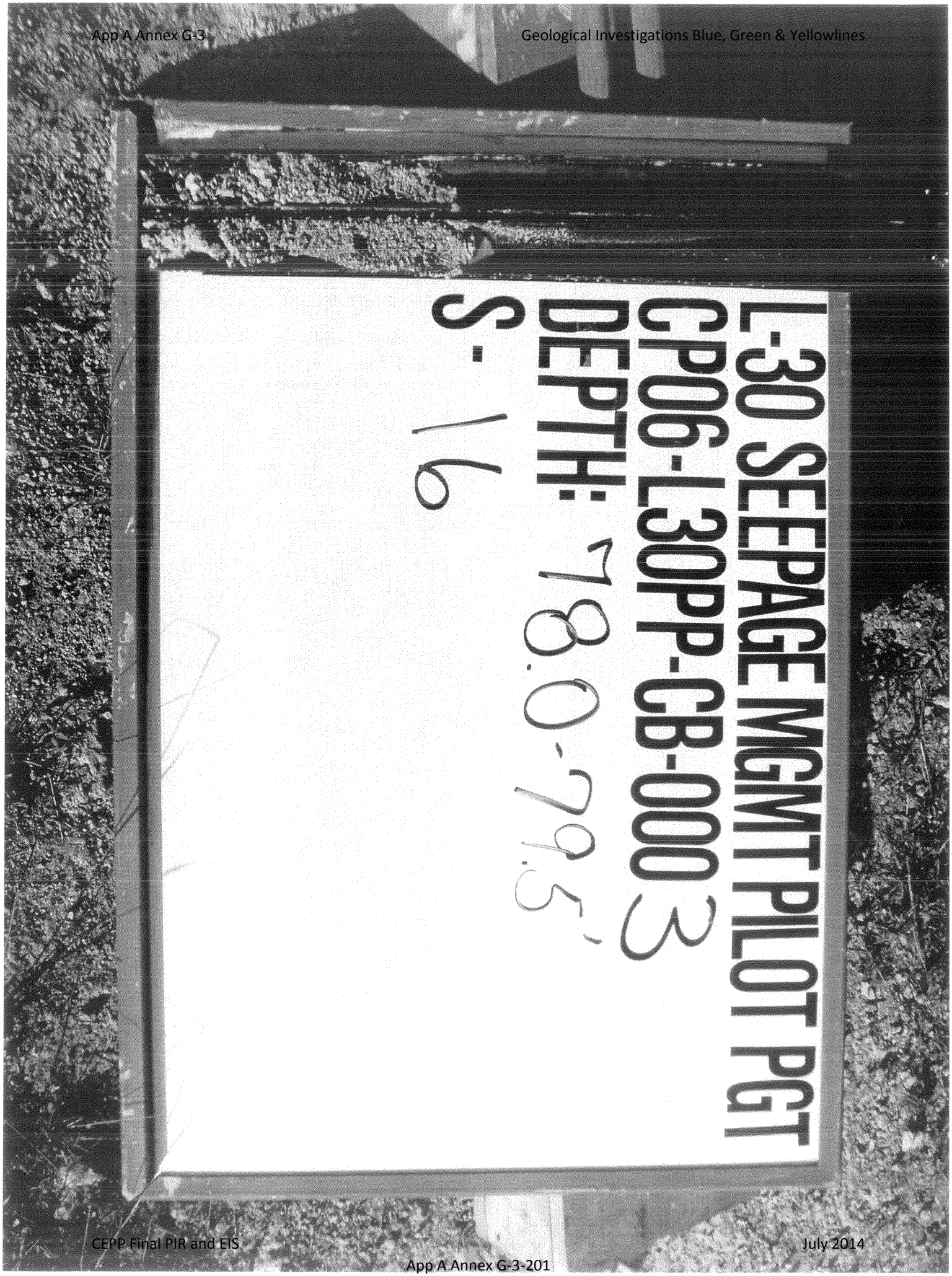
L-30 SEEPAGE MGMT PILOT PGT
CP06-L30PP-CB-000 3
DEPTH: 600-650'
S- Run #10

L-30 SEEPAGE MGMT PILOT PGT
CP06-L30PP-CB-0003
DEPTH: 650-700'
S- Run #11

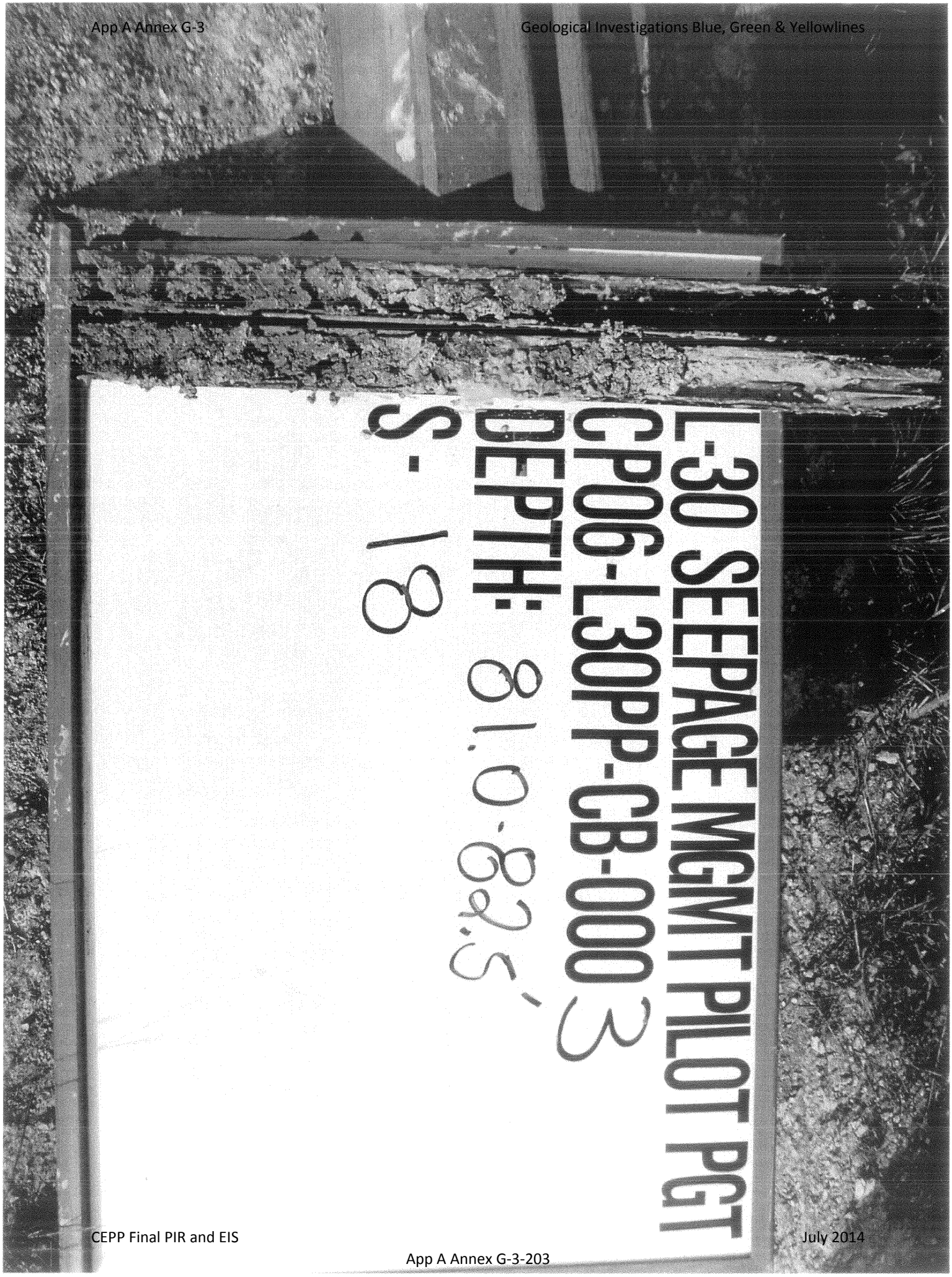
L-30 SEEPAGE MGMT PILOT PGT
GP06-L30PP-CB-000 3
DEPTH: 70.0-75.0'
S- Run#12


L-30 SEEPAGE MGMT PILOT PGT
GP06-L30PP-GB-0003
DEPTH: 75.0-76.5
S: 1H

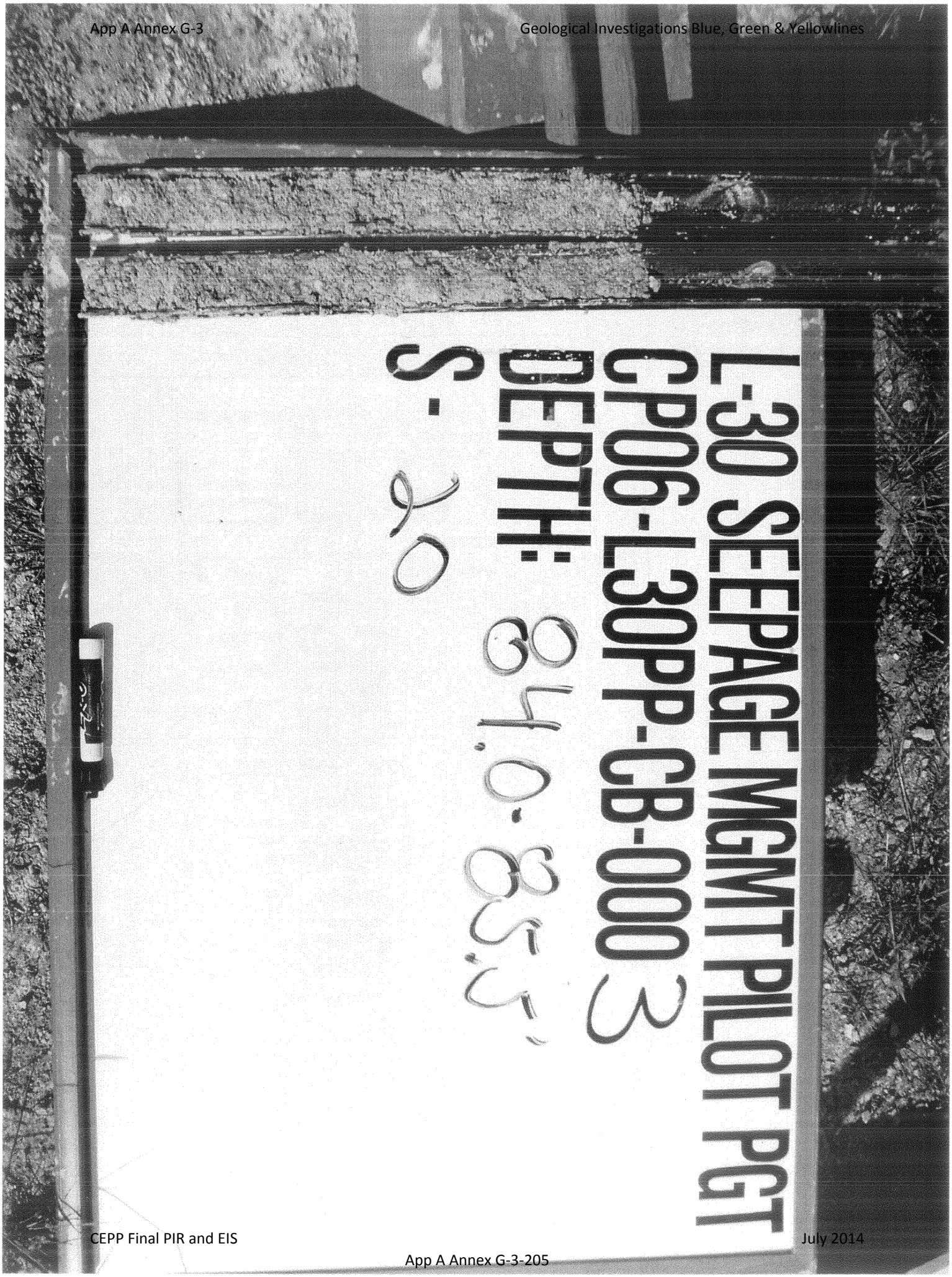

L-30 SEEPAGE MGMT PILOT PGT
GP06-L30PP-GB-000 3
DEPTH: 76.5-78.0
S-15


L-30 SEEPAGE MGMT PILOT PGT
GP06-L30PP-CB-003
DEPTH: 178.0-179.5
S- 16

L-30 SEEPAGE MGMT PILOT PG
GP06-L30PP-CB-0003
DEPTH: 19.5-81.0
S: 17


L-30 SEEPAGE MGMT PILOT PGT
CP06-L30PP-CB-0003
DEPTH: 8.0-8.25'
S-18

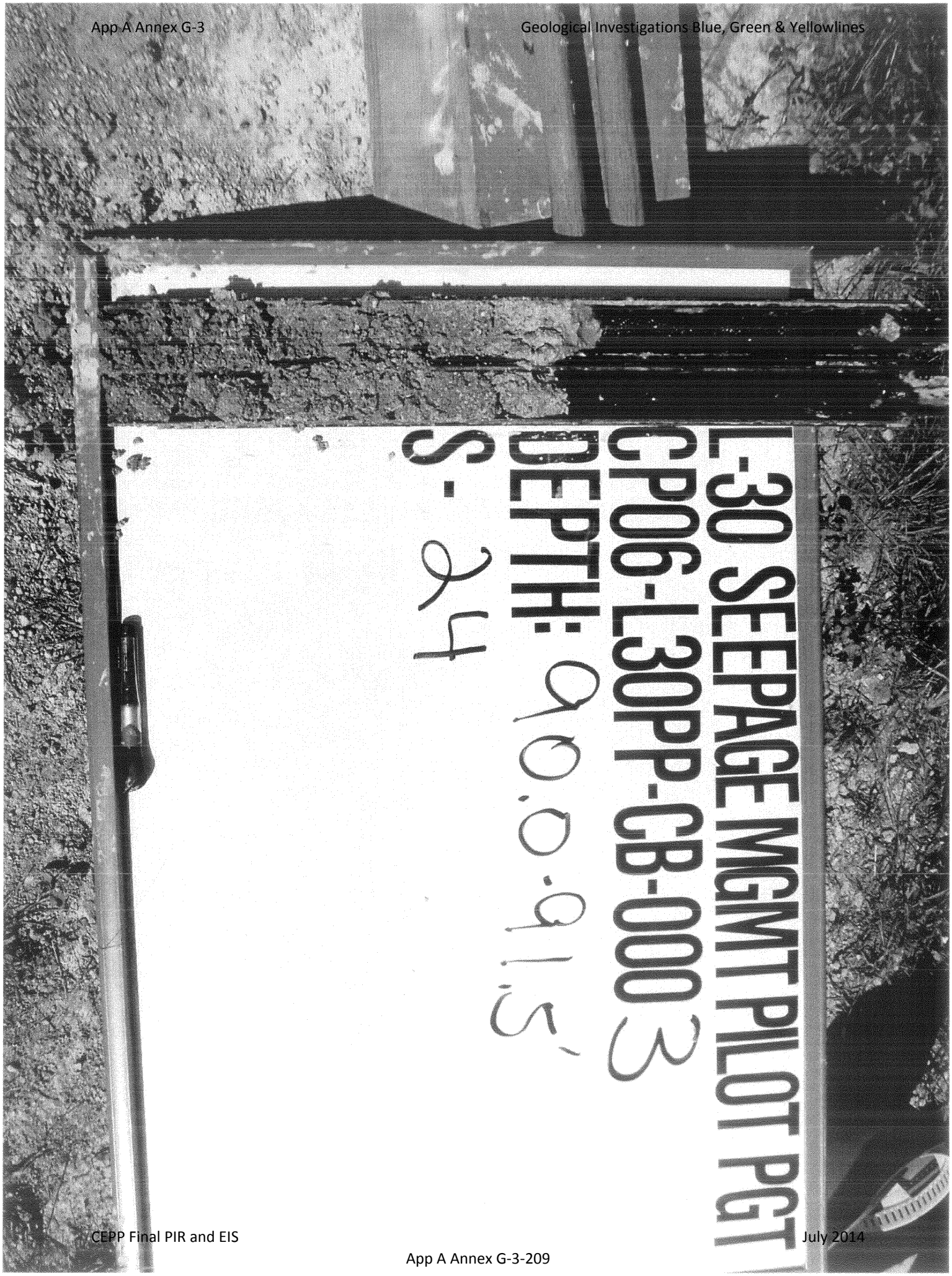
L-30 SEEPAGE MGMT PILOT PGT
GP06-L30PP-CB-0003
DEPTH: 02.5-8.0 ft
S-19


L-30 SEEPAGE MGMT PILOT PGT
GP06-L30PP-GB-0003
DEPTH: 8.4'-8.5'
S: 90

L-30 SEEPAGE MGMT PILOT PGT
GP06-L30PP-GB-0003
DEPTH: 85.5-87.0'
S-9-1

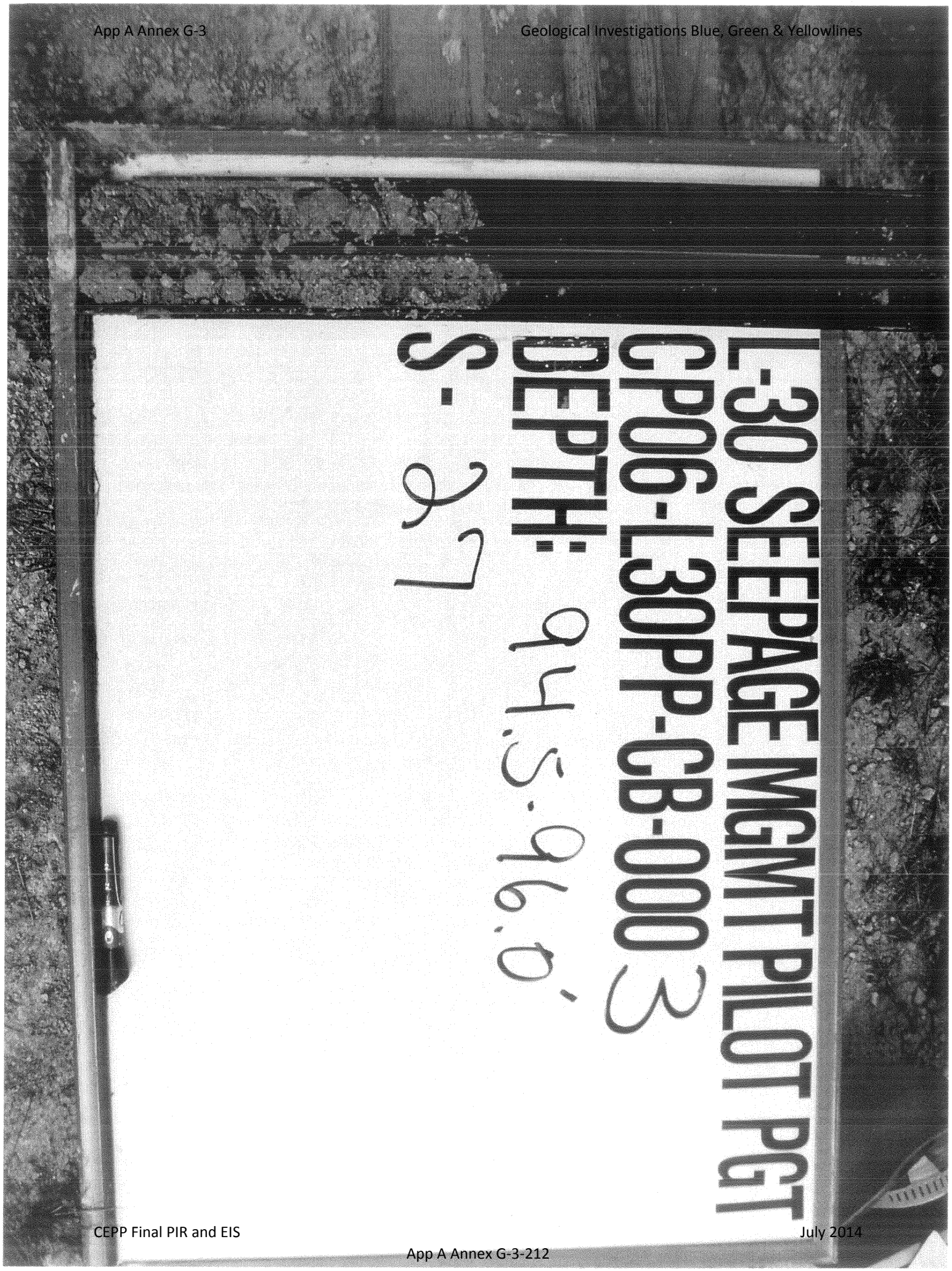
L-30 SEEPAGE MGMT PILOT PGT
GP06-L30PP-GB-0003
DEPTH: 8.7 0-8.8 S.
S-99

L-30 SEEPAGE MGMT PILOT PGT
GP06-L30PP-CB-0003
DEPTH: 88.5-100.0
S-2


L-30 SEEPAGE MGMT PILOT PGT
GP06-L30PP-CB-0003
DEPTH: 90.0-91.5
S-94

L30 SEEPAGE MGMT PILOT P
GP06-L30PP-CB-0003
DEPTH: 91.5-93.0
S: 9 of 5

L-30 SEEPAGE MGMT PILOT PGT
GP06-L30PP-CB-0003
DEPTH: 9.3.0-9.4.5'
S-96


L30 SEEPAGE MGMT PILOT PGT
GP06-L30PP-GB-0003
DEPTH: 94.5-96.0'
S: L8

L-30 SEEPAGE MGMT PILOT PGT
GP06-L30PP-GB-0003
DEPTH: 96.0-97.5'
S: 8

L-30 SEEPAGE MGMT PILOT
CP06-L30PP-CB-0003
DEPTH: 97.5-98.0'
S: 99

L-30 SEEPAGE MGMT PILOT PO
GP06-L30PP-GB-0003
DEPTH: 99.0-100.5'
S.W.O

L-30 SEEPAGE MGMT PILOT PGT
CP06-L30PP-CB-0003
DEPTH: 100.5-102.0'
S: 3-1

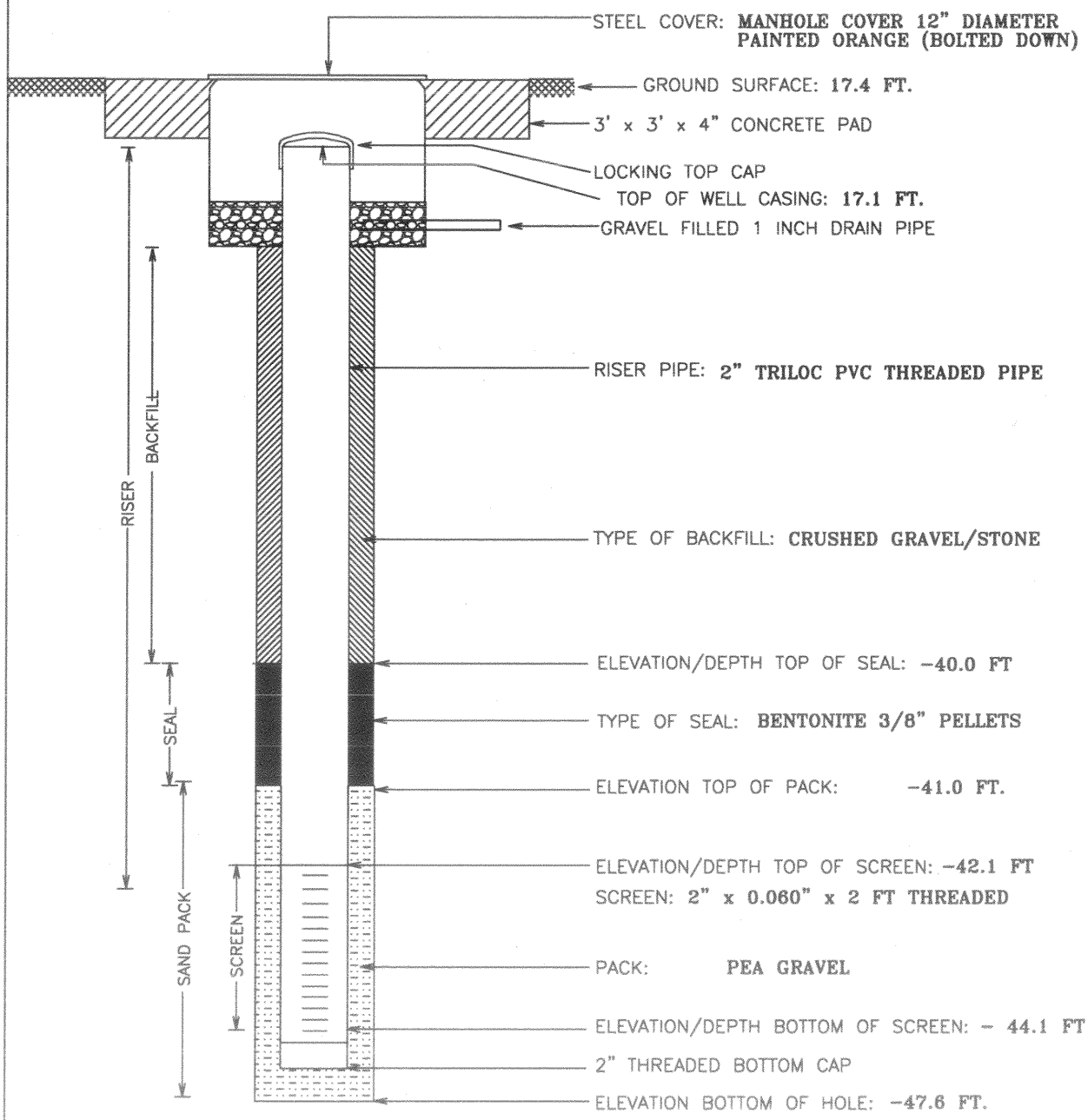
L-30 SEEPAGE MGMT PILOT
GP06-L30PP-GB-0003
DEPTH: 10.0-10.3'
S.W.

L-30 SEEPAGE MGMT PILOT PGT
GP06-L30PP-GB-0003
DEPTH: 103.5-105.0
S: 3 3

MONITORING WELL CONSTRUCTION DIAGRAMS

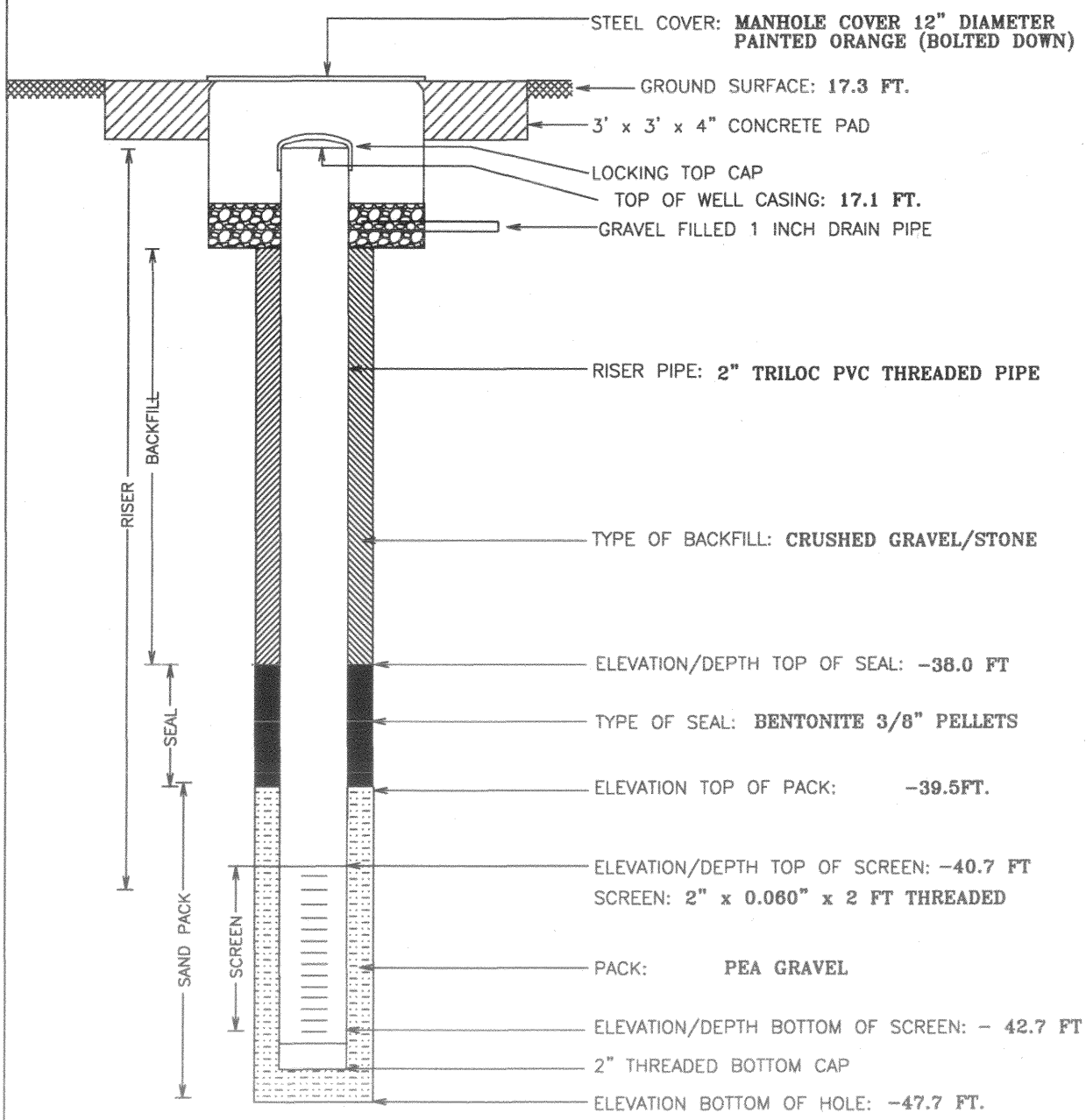
CHALLENGE ENGINEERING & TESTING, INC. 4234 HALLS MILL ROAD, MOBILE, ALABAMA 36693 (251) 666-1435	MONITORING WELL CONSTRUCTION LOG
PROJECT: **L-30 SEEPAGE MANAGEMENT PILOT PROJECT DADE COUNTY, FLORIDA** LOCATION: **L-30 LEVEE (TAMIAMI TRAIL & KROME AVE.)** BORING: **CP06-L30PP-MW-0001** CHALLENGE JOB NO.: **2006D30** DATE: **OCTOBER 20, 2006**	DRILLER: **ADAM BENSON** DRILLING METHOD: **MUD ROTARY DRILLING** DEVELOPMENT METHOD: **PUMPING/SURGING** GROUND ELEVATION: **17.4**

LOCATION: TOP OF LEVEE L-30 (SOUTH SIDE OF ROADWAY)
N = 524,270 E = 826,074



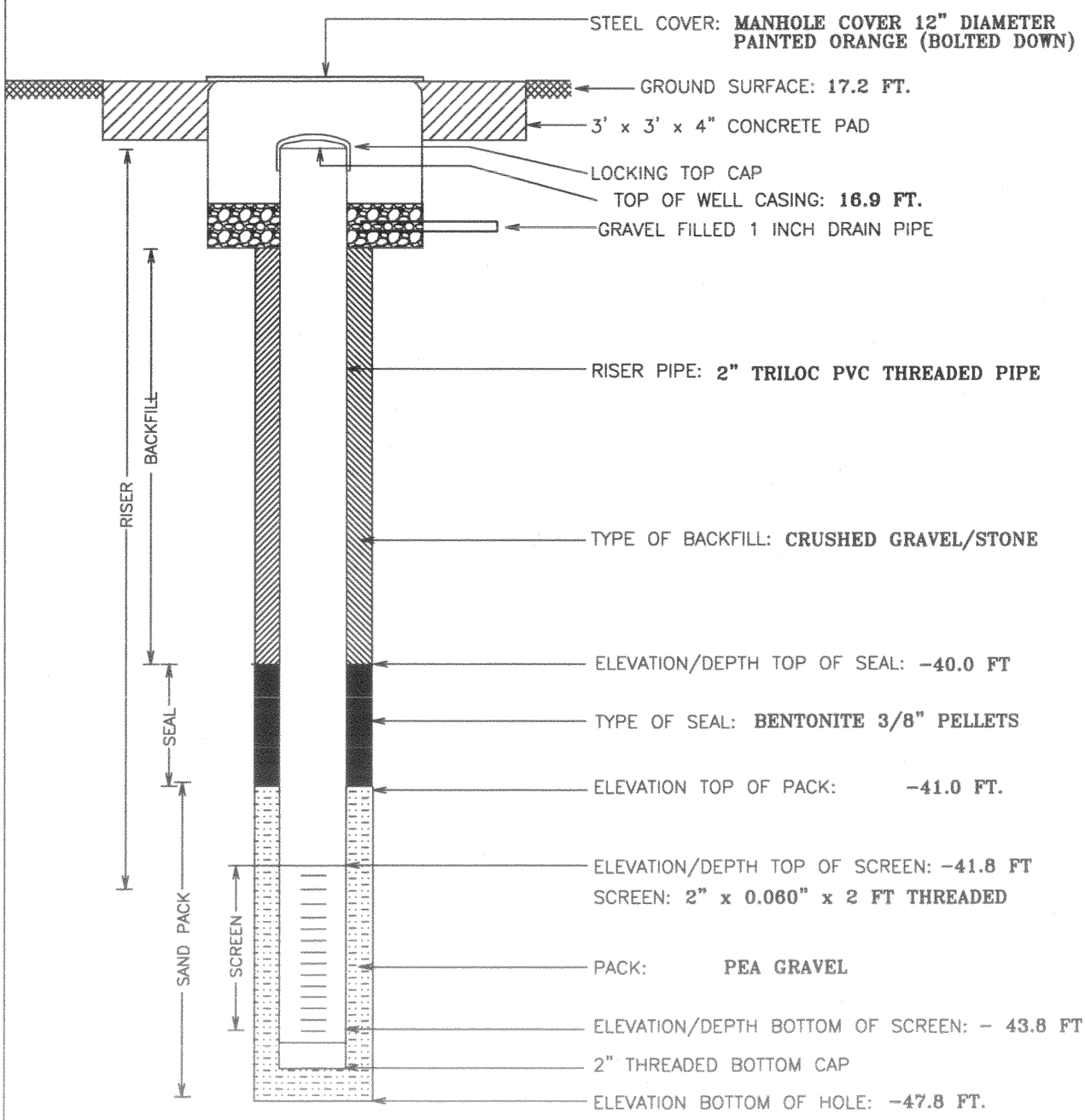
CHALLENGE ENGINEERING & TESTING, INC. 4234 HALLS MILL ROAD, MOBILE, ALABAMA 36693 (251) 666-1435	MONITORING WELL CONSTRUCTION LOG
PROJECT: **L-30 SEEPAGE MANAGEMENT PILOT PROJECT DADE COUNTY, FLORIDA** LOCATION: **L-30 LEVEE (TAMIAMI TRAIL & KROME AVE.)** BORING: **CP06-L30PP-MW-0002** CHALLENGE JOB NO.: **2006D30** DATE: **OCTOBER 20, 2006**	DRILLER: **ADAM BENSON** DRILLING METHOD: **MUD ROTARY DRILLING** DEVELOPMENT METHOD: **PUMPING/SURGING** GROUND ELEVATION: **17.3 FT. NAVD88**

LOCATION: TOP OF LEVEE L-30 (SOUTH SIDE OF ROADWAY)
N = 522,036 E = 823,754



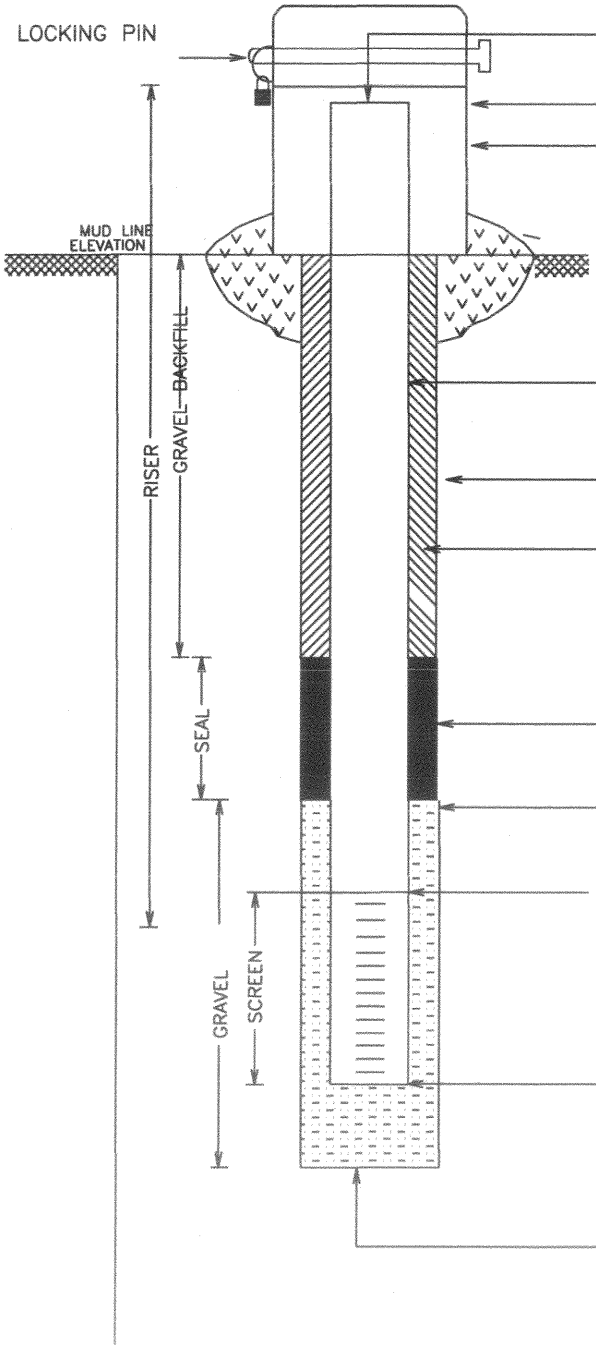
CHALLENGE ENGINEERING & TESTING, INC. 4234 HALLS MILL ROAD, MOBILE, ALABAMA 36693 (251) 666-1435	MONITORING WELL CONSTRUCTION LOG
PROJECT: **L-30 SEEPAGE MANAGEMENT PILOT PROJECT DADE COUNTY, FLORIDA** LOCATION: **L-30 LEVEE (TAMIAMI TRAIL & KROME AVE.)** BORING: **CP06-L30PP-MW-0003** CHALLENGE JOB NO.: **2006D30** DATE: **OCTOBER 20, 2006**	DRILLER: **ADAM BENSON** DRILLING METHOD: **MUD ROTARY DRILLING** DEVELOPMENT METHOD: **PUMPING/SURGING** GROUND ELEVATION: **17.2 FT. NAVD88**

LOCATION: TOP OF LEVEE L-30 (SOUTH SIDE OF ROADWAY)
N = 519,734 E = 821,356



CHALLENGE ENGINEERING & TESTING, INC. 4234 HALLS MILL ROAD, MOBILE, ALABAMA 36693 (251) 666-1435	MONITORING WELL CONSTRUCTION LOG
PROJECT: **L-30 SEEPAGE MANAGEMENT PILOT PROJECT**	DRILLER: **ADAM BENSON**
LOCATION: **DADE COUNTY, FL (TAMIAMI TRAIL & KROME AVE.)**	DRILLING METHOD: **ROLLER BIT - WET ROTARY**
BORING: **CP06-L30PP-MW-0004**	DEVELOPMENT METHOD: **PUMPING/SURGING**
CHALLENGE JOB NO.: **2006D30**	TOP OF CASING: **12.00 FT.**
DATE: **NOVEMBER 2006**	FIELD GEOLOGIST: **BOB MOMBERGER, P.G.**

- MARINE WELL -



TOP CAP WITH VENT HOLE

ELEVATION OF TOP OF RISER PIPE: **12.00 FT.**

STICK-UP TOP OF SECURITY CASING: **6" SCHEDULE 80 PVC**

RISER PIPE: **2" TRILOC PVC THREADED PIPE**

BOREHOLE DIAMETER: **4.5"**

TYPE OF BACKFILL: **CRUSHED GRAVEL BACKFILL**

TYPE OF SEAL: **BENTONITE 3/8" PELLETS**

PEA GRAVEL BACKFILL

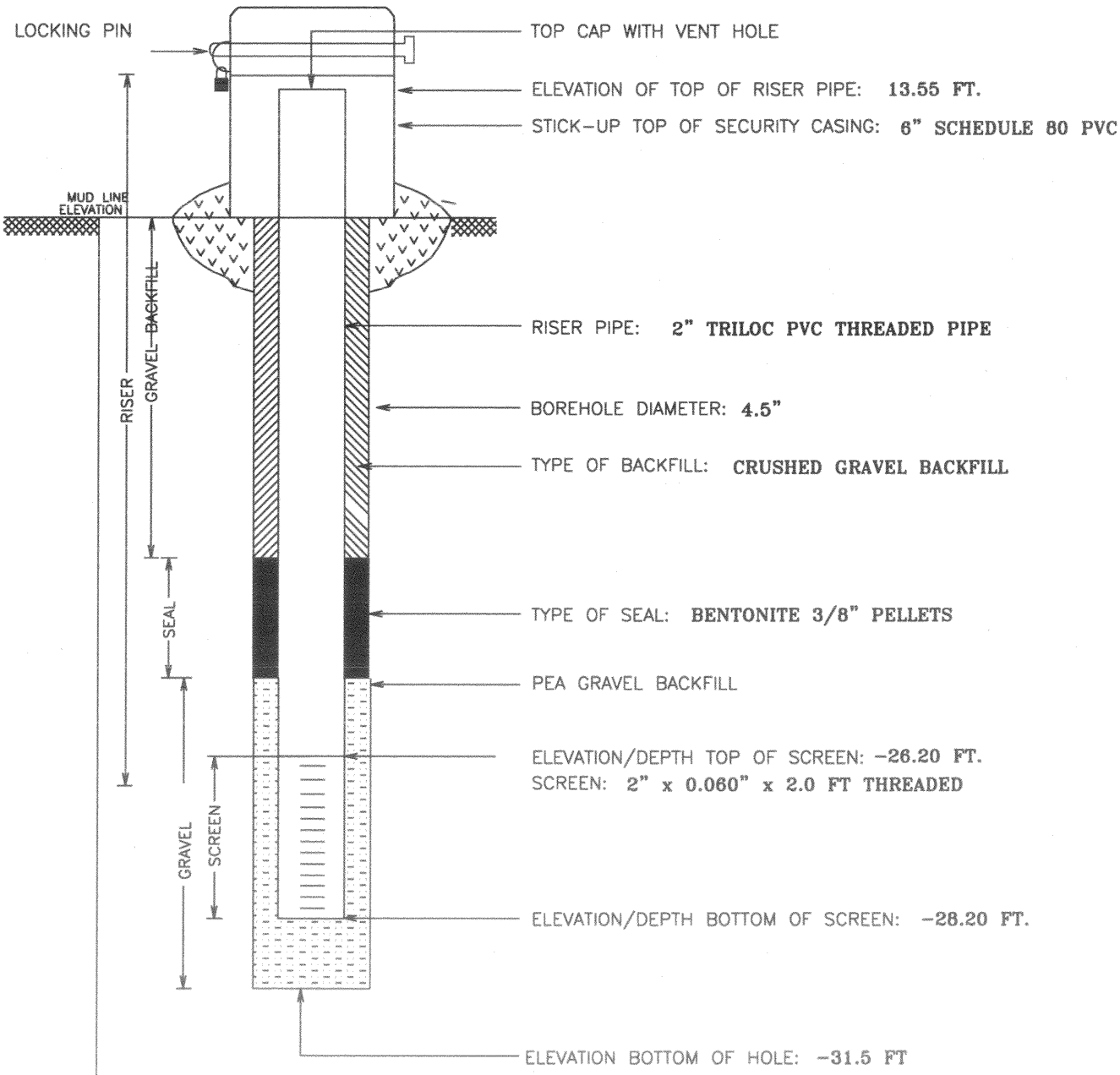
ELEVATION/DEPTH TOP OF SCREEN: **-23.8 FT.**
SCREEN: **2" x 0.060" x 2.0 FT THREADED**

ELEVATION/DEPTH BOTTOM OF SCREEN: **-25.8 FT.**

ELEVATION BOTTOM OF HOLE: **-30.0 FT**

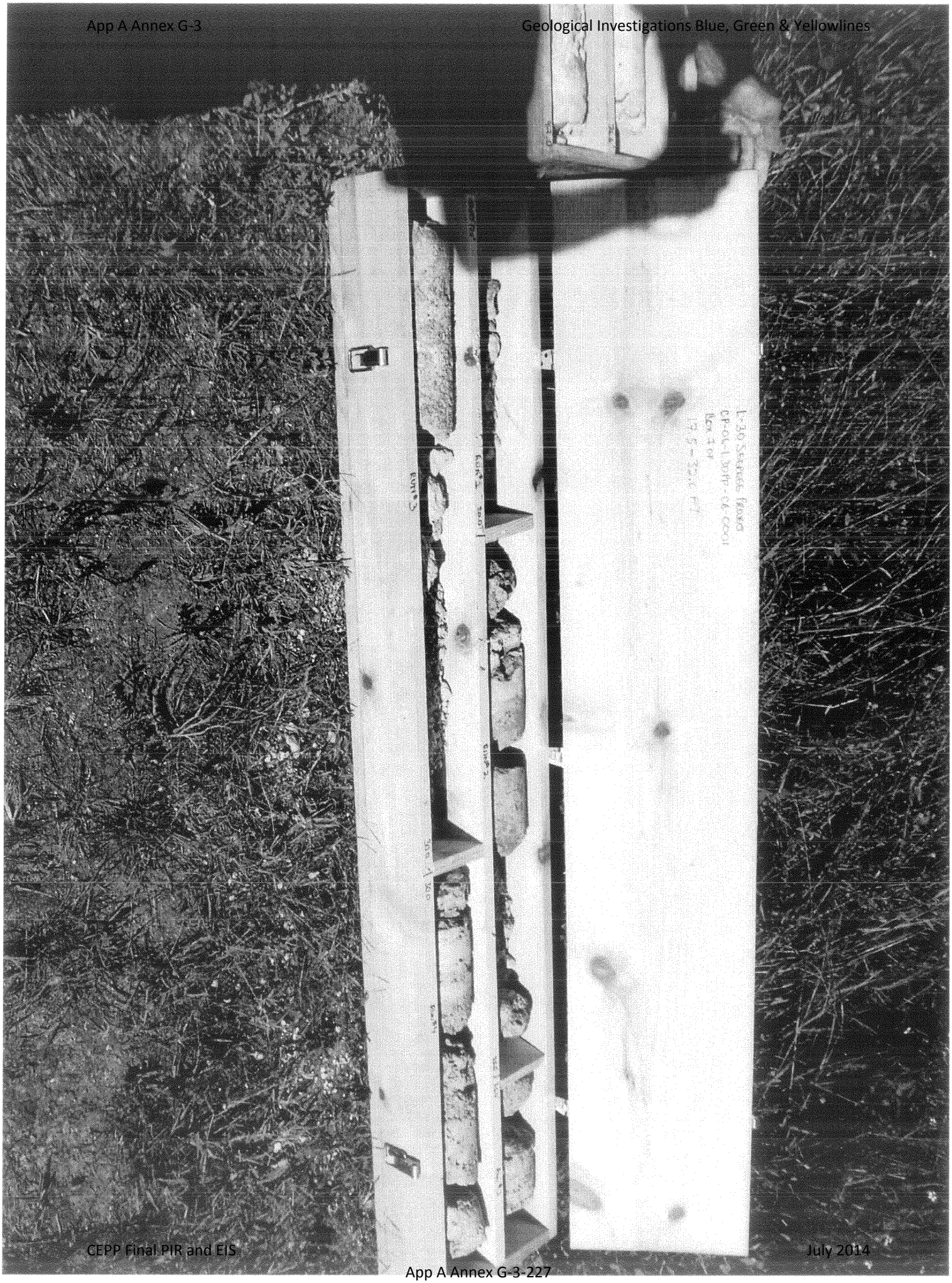
CHALLENGE ENGINEERING & TESTING, INC. 4234 HALLS MILL ROAD, MOBILE, ALABAMA 36693 (251) 666-1435	MONITORING WELL CONSTRUCTION LOG
PROJECT: **L-30 SEEPAGE MANAGEMENT PILOT PROJECT**	DRILLER: **ADAM BENSON**
LOCATION: **DADE COUNTY, FL (TAMIAMI TRAIL & KROME AVE.)**	DRILLING METHOD: **ROLLER BIT - WET ROTARY**
BORING: **CP06-L30PP-MW-0005**	DEVELOPMENT METHOD: **PUMPING/SURGING**
CHALLENGE JOB NO.: **2006D30**	TOP OF CASING: **13.55 FT.**
DATE: **NOVEMBER 2006**	FIELD GEOLOGIST: **BOB MOMBERGER, P.G.**

- MARINE WELL -

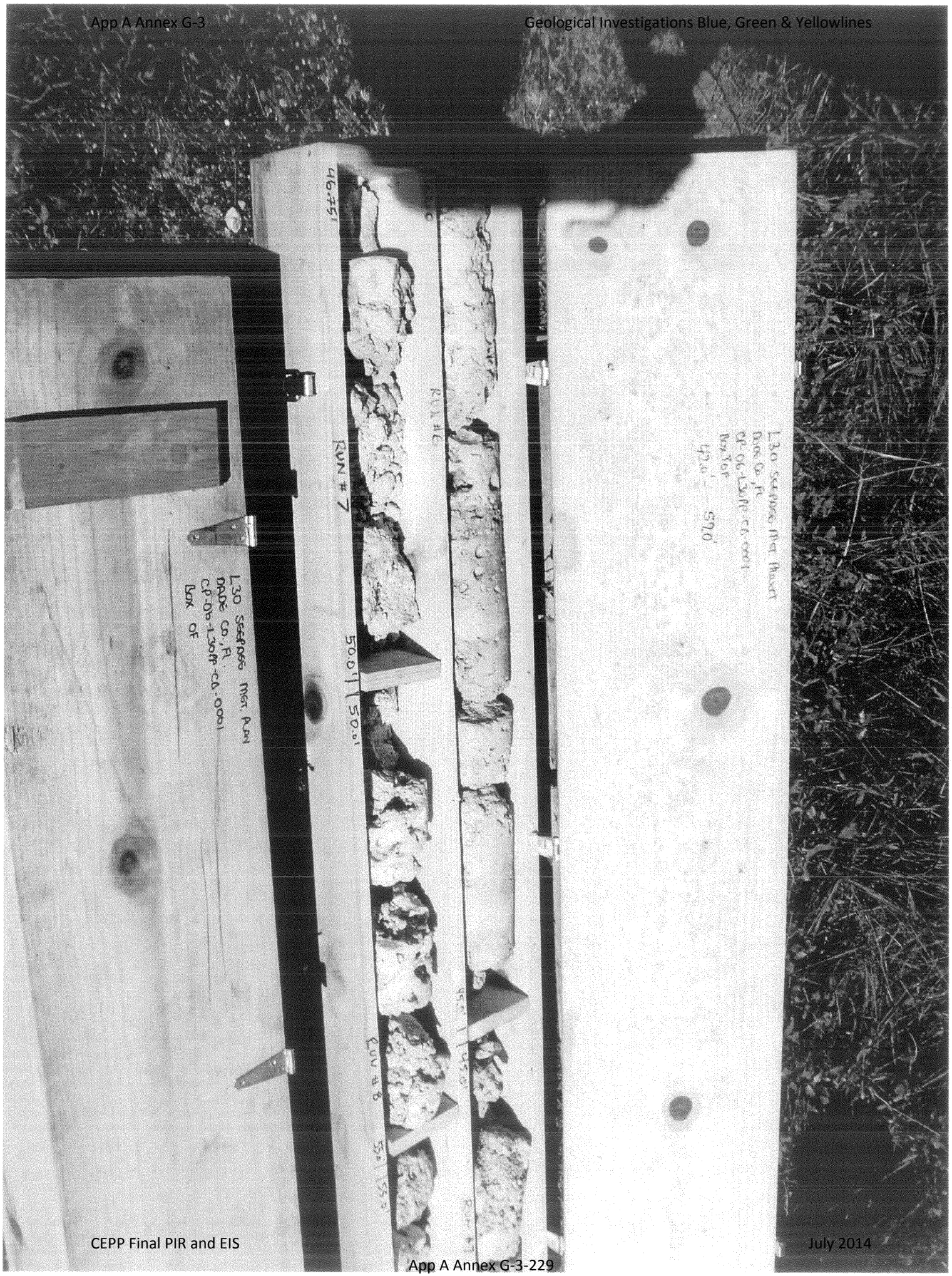


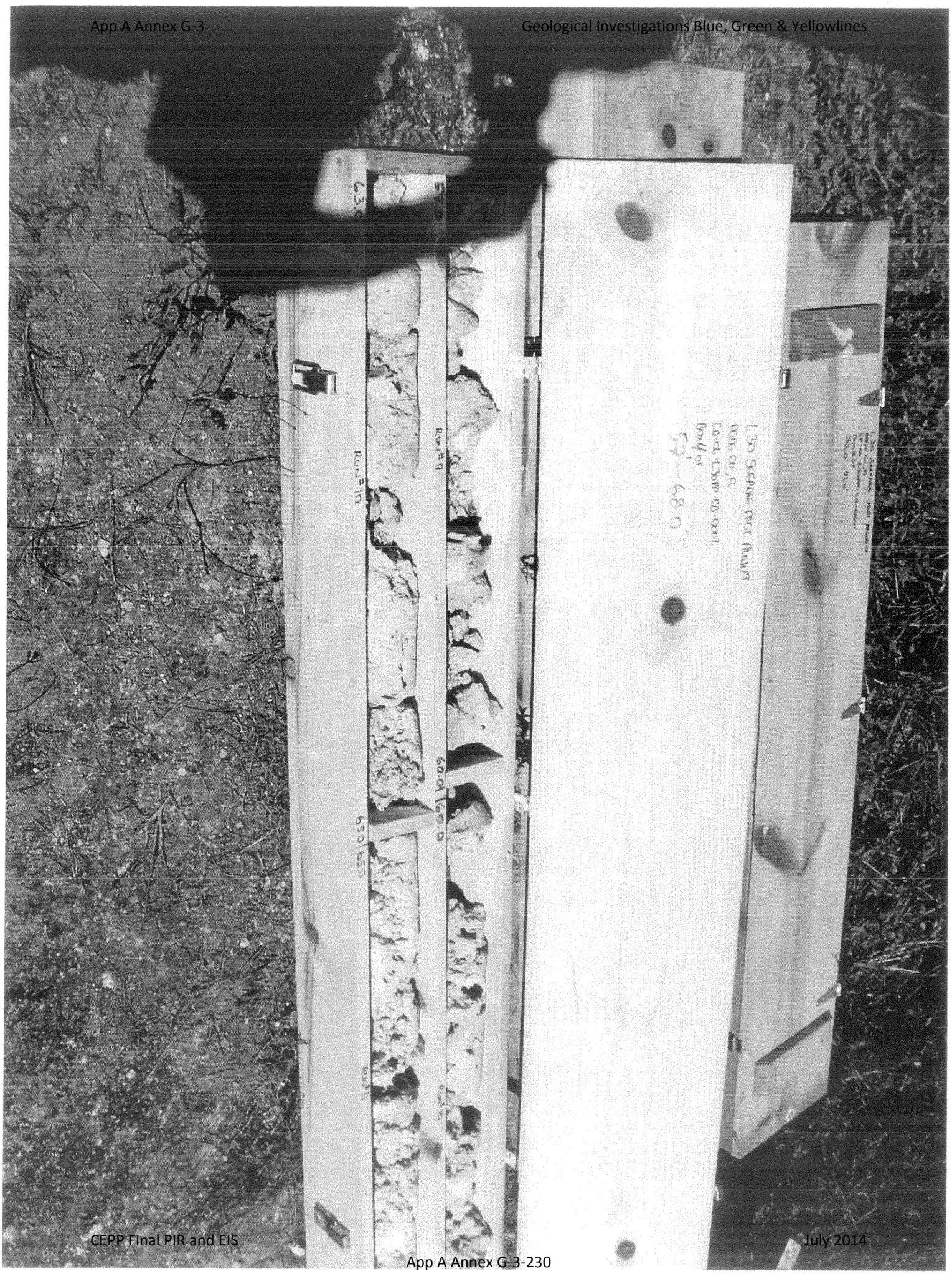
CORE BOX INVENTORY REPORT & PHOTOGRAPHS

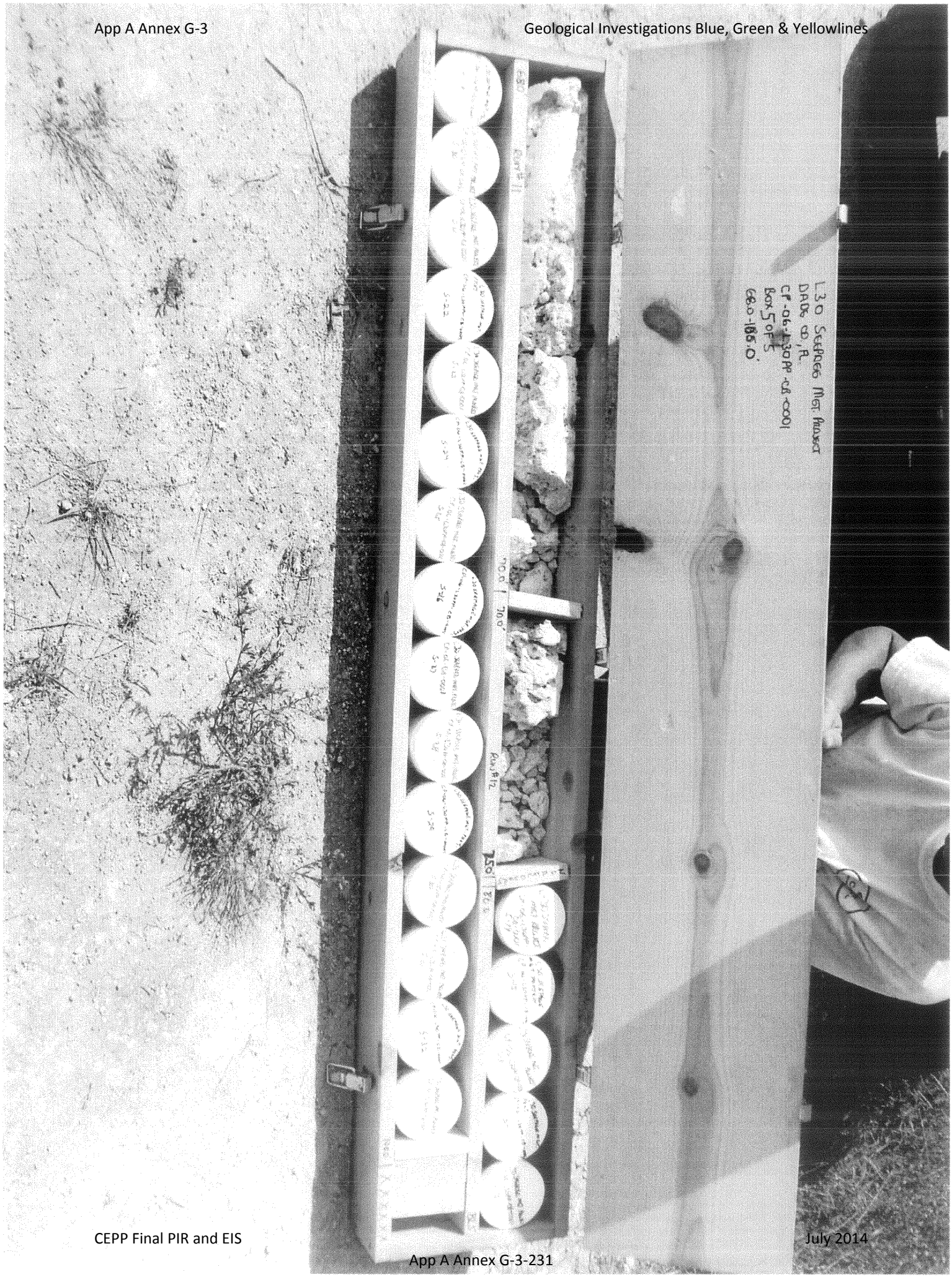
```
ENCP06-L30PP-CB-0001  L-30 Seepage M~BOX 1 OF 5 BOXES; BORING 1 OF 1 BORING; EL. -0.2 TO -14.7; BOX ID: 1A Loca~ 1BX  PITCHFORDKARENEN-GG3295
ENCP06-L30PP-CB-0001  L-30 Seepage M~BOX 2 OF 5 BOXES; BORING 1 OF 1 BORING; EL. -14.7 TO -24.7; BOX ID: 2ALoca~ 1BX  PITCHFORDKARENEN-GG3295
ENCP06-L30PP-CB-0001  L-30 Seepage M~BOX 3 OF 5 BOXES; BORING 1 OF 1 BORING; EL. -24.7 TO -39.7; BOX ID: 3ALoca~ 1BX  PITCHFORDKARENEN-GG3295
ENCP06-L30PP-CB-0001  L-30 Seepage M~BOX 4 OF 5 BOXES; BORING 1 OF 1 BORING; EL. -39.7 TO -50.7; BOX ID: 4ALoca~ 1BX  PITCHFORDKARENEN-GG3295
ENCP06-L30PP-CB-0001  L-30 Seepage M~BOX 5 OF 5 BOXES; BORING 1 OF 2 BORINGS; EL. -50.7 TO -87.7; BOX ID: ~Loca~ 1BX  PITCHFORDKARENEN-GG3295
ENCP06-L30PP-CB-0002  L-30 Seepage M~BOX 1 OF 4 BOXES; BORING 1 OF 1 BORING; EL. 0.2 TO -12.5; BOX ID: 6A  Loca~ 1BX  PITCHFORDKARENEN-GG3295
ENCP06-L30PP-CB-0002  L-30 Seepage M~BOX 2 OF 4 BOXES; BORING 1 OF 1 BORING; EL. -12.5 TO -32.5; BOX ID: 7ALoca~ 1BX  PITCHFORDKARENEN-GG3295
ENCP06-L30PP-CB-0002  L-30 Seepage M~BOX 3 OF 4 BOXES; BORING 1 OF 1 BORING; EL. -32.5 TO -52.5; BOX ID: 8ALoca~ 1BX  PITCHFORDKARENEN-GG3295
ENCP06-L30PP-CB-0002  L-30 Seepage M~BOX 4 OF 4 BOXES; BORING 1 OF 1 BORING; EL. -52.5 TO -91.5; BOX ID: 9ALoca~ 1BX  PITCHFORDKARENEN-GG3295
ENCP06-L30PP-CB-0003  L-30 Seepage M~BOX 1 OF 5 BOXES; BORING 1 OF 1 BORING; EL. -0.3 TO -11.8; BOX ID: 10ALoca~ 1BX  PITCHFORDKARENEN-GG3295
ENCP06-L30PP-CB-0003  L-30 Seepage M~BOX 2 OF 5 BOXES; BORING 1 OF 1 BORING; EL. -11.8 TO -29.3; BOX ID: 1~Loca~ 1BX  PITCHFORDKARENEN-GG3295
ENCP06-L30PP-CB-0003  L-30 Seepage M~BOX 3 OF 5 BOXES; BORING 1 OF 1 BORING; EL. -29.3 TO -44.8; BOX ID: 1~Loca~ 1BX  PITCHFORDKARENEN-GG3295
ENCP06-L30PP-CB-0003  L-30 Seepage M~BOX 4 OF 5 BOXES; BORING 1 OF 1 BORING; EL. -44.8 TO -86.3; BOX ID: 1~Loca~ 1BX  PITCHFORDKARENEN-GG3295
ENCP06-L30PP-CB-0003  L-30 Seepage M~BOX 5 OF 5 BOXES; BORING 2 OF 2 BORINGS; EL. -86.3 TO -87.8; BOX ID: ~Loca~ 1BX  PITCHFORDKARENEN-GG3295
```

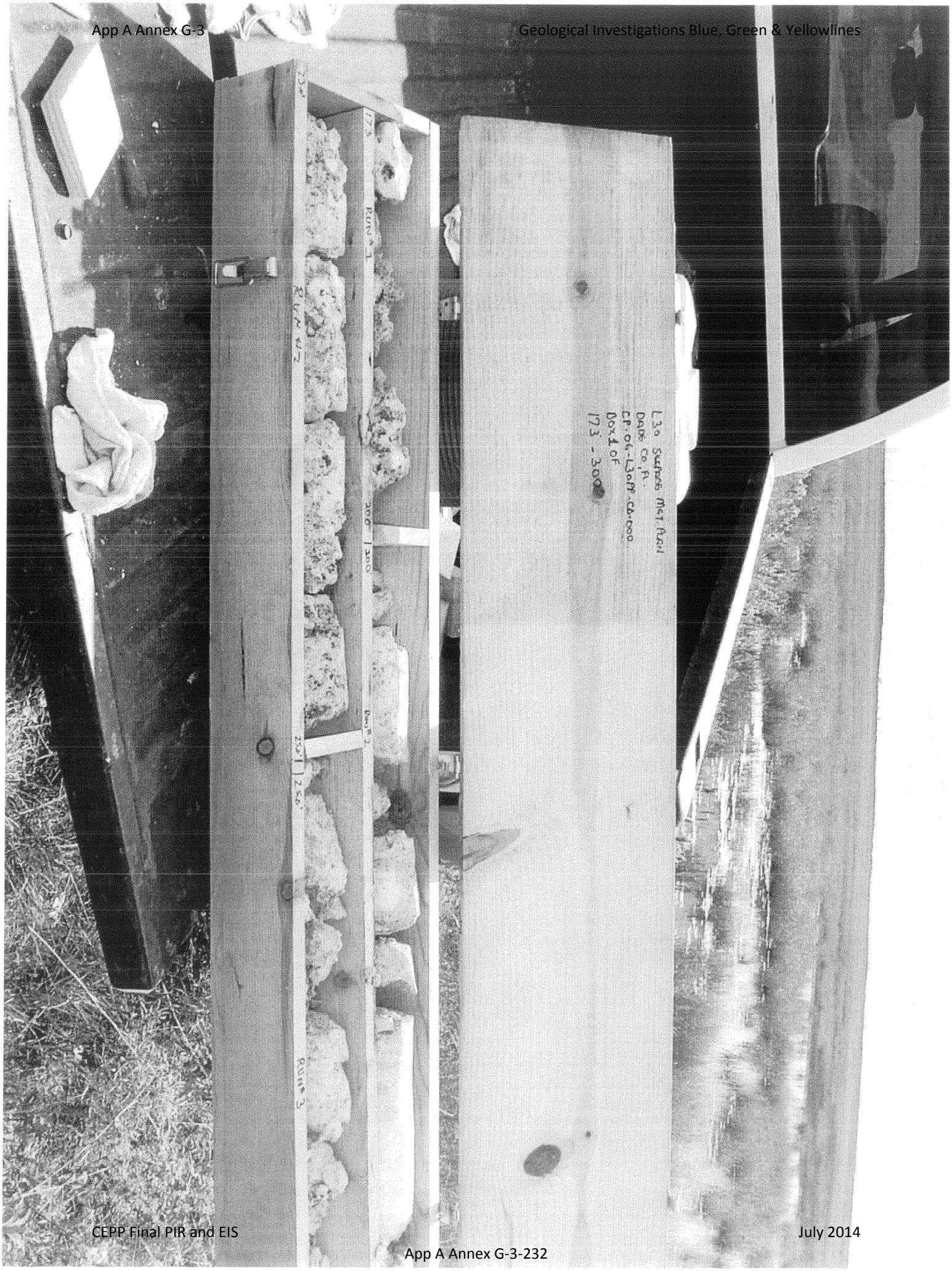

L-30 Seepage Boring
CP-04-1 Drill-04-0001
Box 4 of
12.5 - 22.0 ft

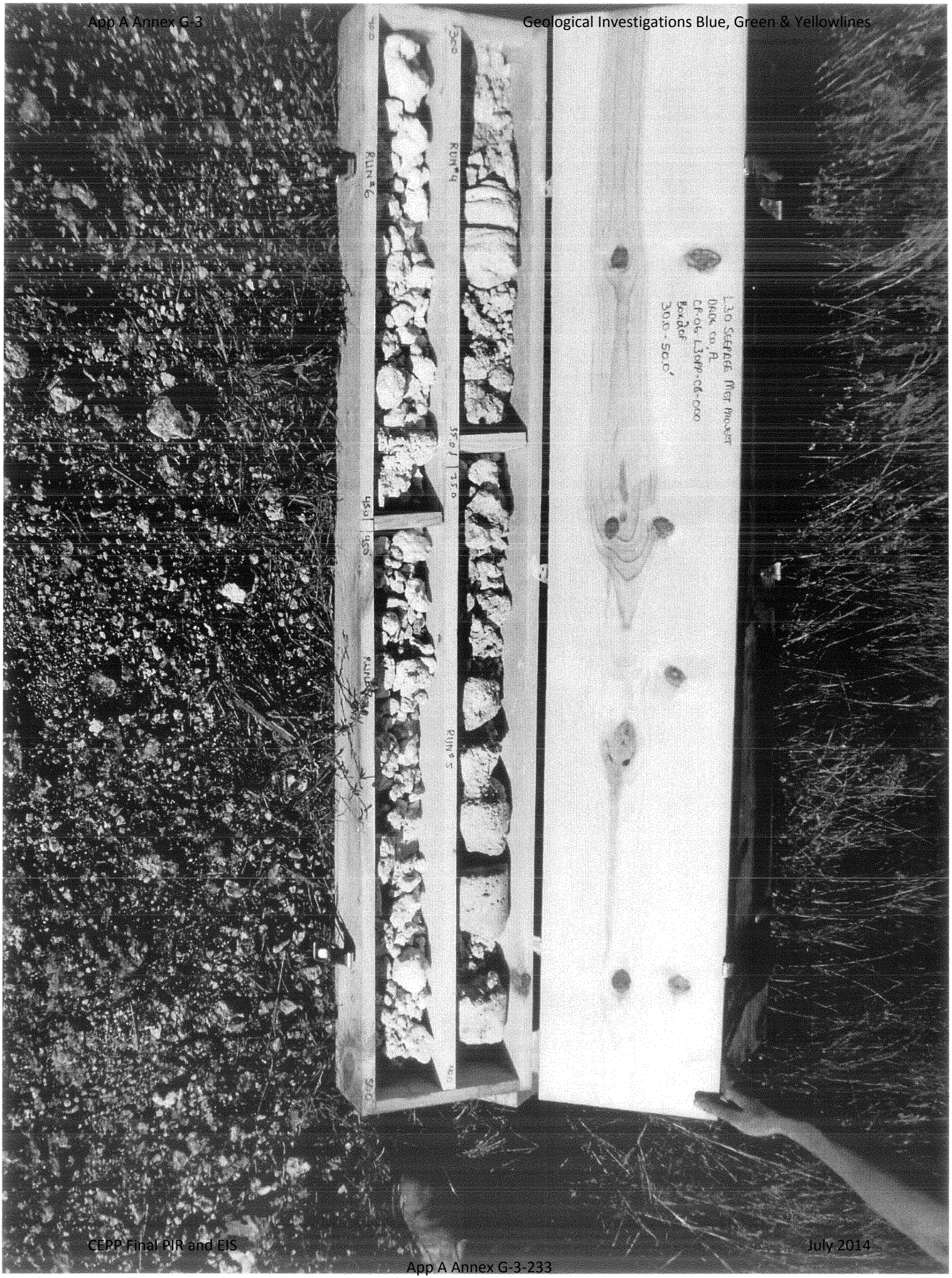
L30 Seepage Met Pipe
Dade County, FL
CP-06-L30PP-CB-0001
Box 3 of
36.0
Run #5
Run #5
Run #6

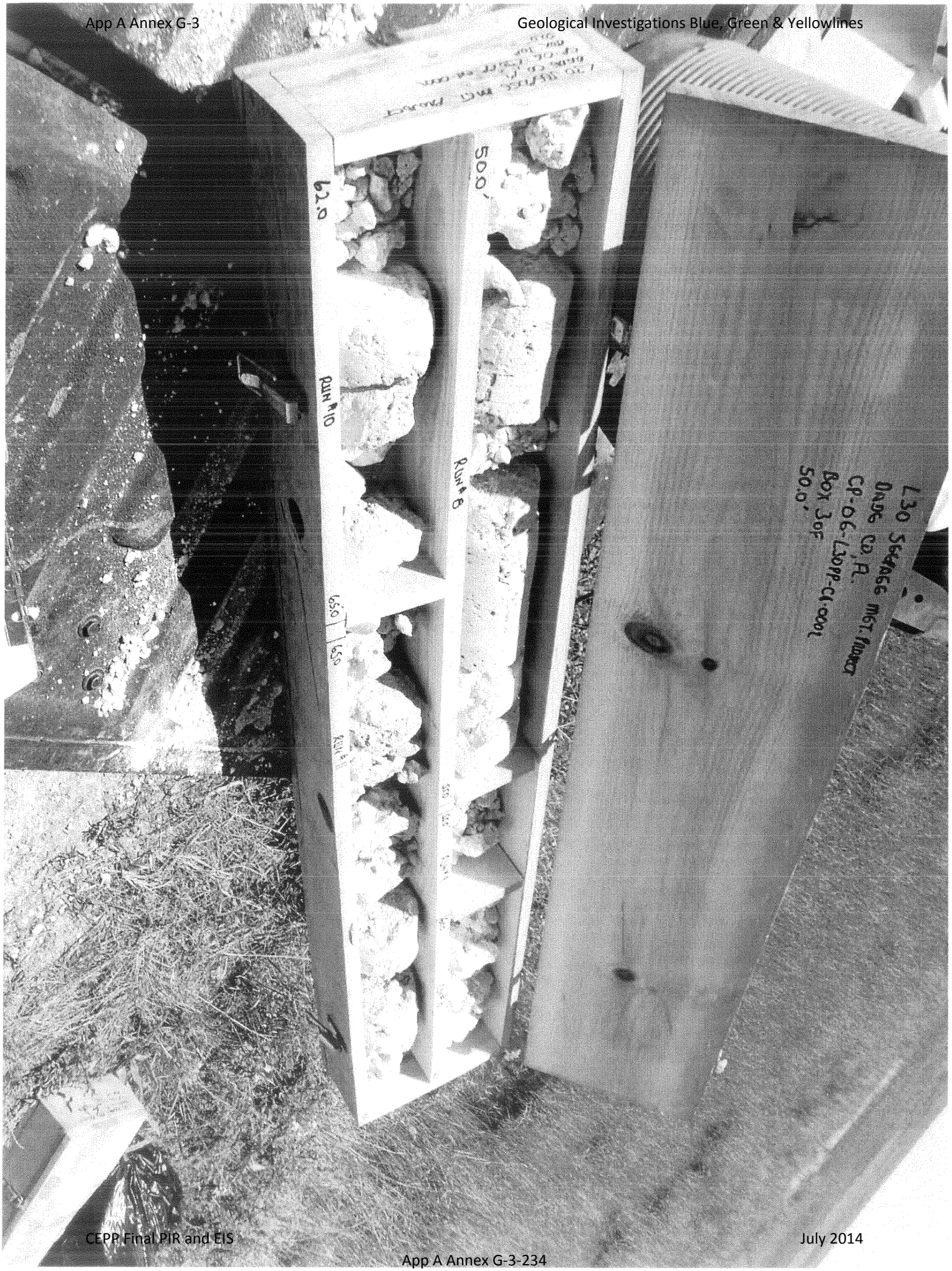

L30 SEEPAGE MGT. PLAN
DADE CO., FL
CP-06-L30PP-CA-0001
BOX 3 OF
42.0' - 59.0'
RUN #6
RUN #7
RUN #8
46.75'
50.0'
50.0'
55.0'
55.0'
L30 SEEPAGE MGT. PLAN
DADE CO., FL
CP-06-L30PP-CA-0001
BOX OF


63.0
Run 8
Run 10
60.0
65.0


L30 Seepage Mgt. Project
DADE CO., FL
CP-06-L30PP-CB-0001
Box 5 of 5
68.0-106.0'
Row #12
70.0'
75.0'

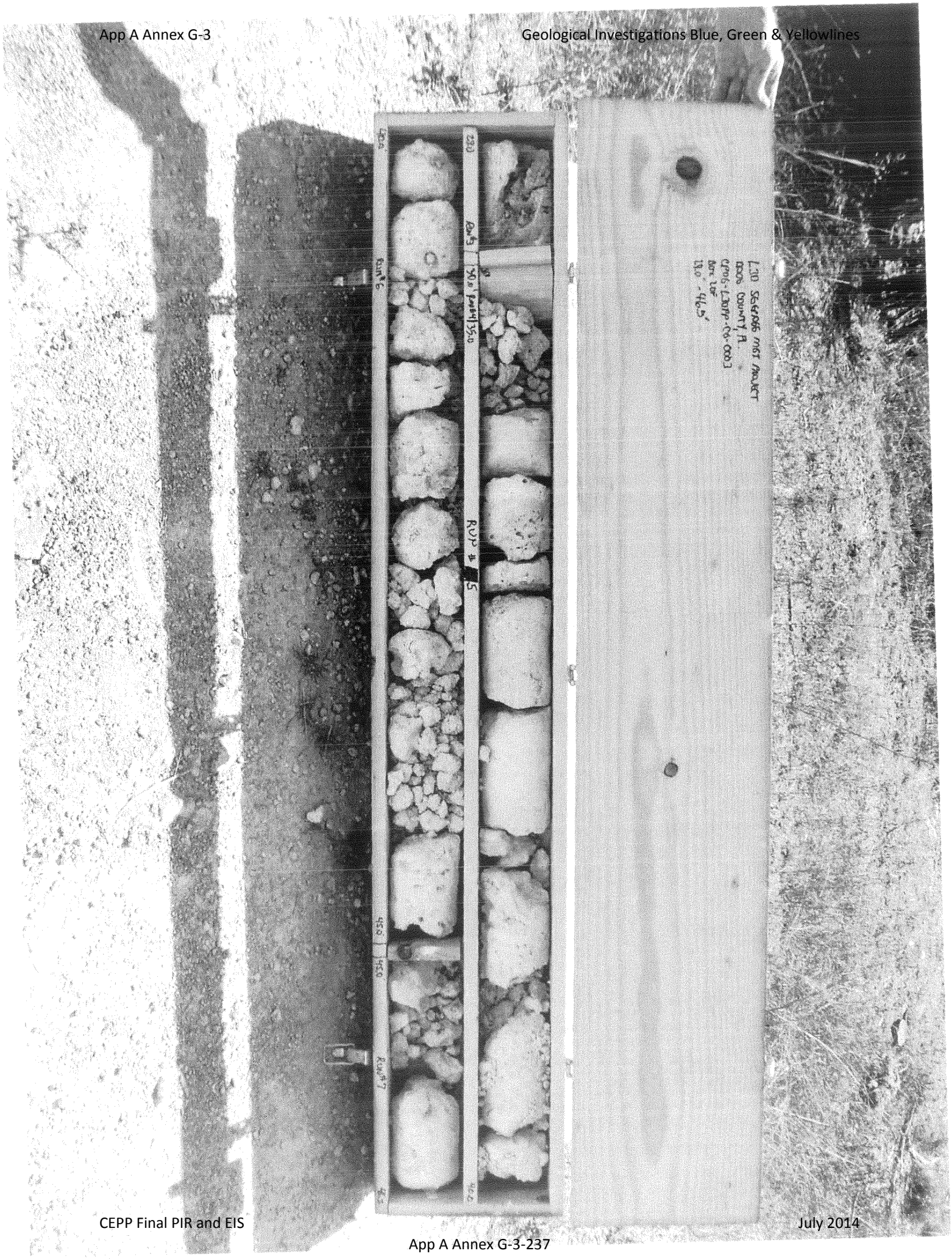

L30 Surface Met Run
Date Co, Ft.
CP-04-L30ff-CB-000
Box 1 of
173 - 300
173
Run 1
Run 2
200
300
232
Run 3

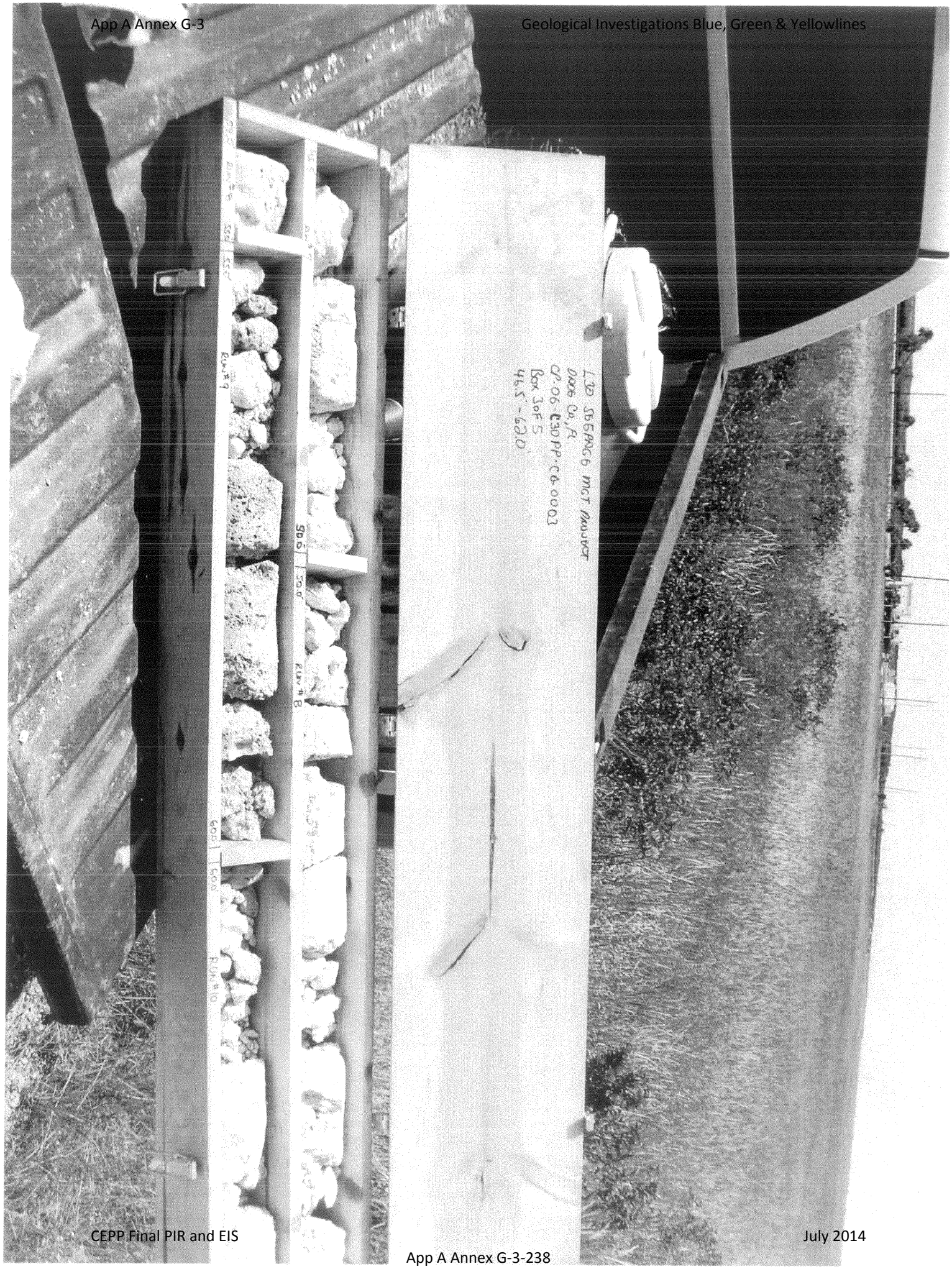

L30 Seepage Test Project
Dade Co., FL
CF-06 L30PP-CB-000
Roadcut
300.0 - 500'
Run #4
Run #5
Run #6
Run #7
Run #8
Run #9
300
350
400
450
500
550
600

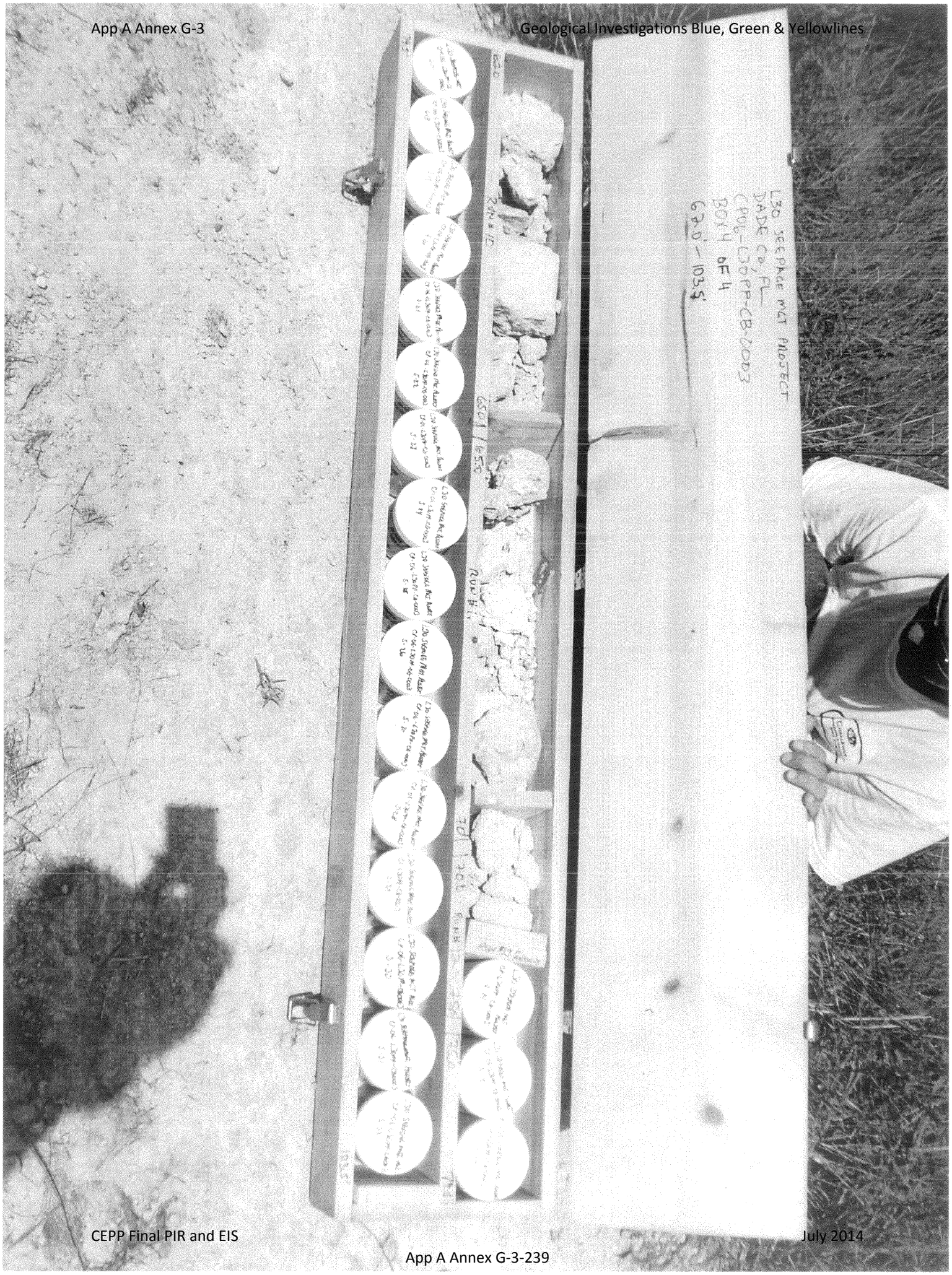

L30 SEEPAGE
OAOG CO. AL.
CP-06-L30PP-C1.0001
BOX 3 OF
50.0'
MGT. FAULT
50.0'
RUN #8
62.0
RUN #10
65.0
65.0

L-30 SEEPAGE TEST PROJECT
DADE CO., FL
CP-06-L30PP-CA-0001
BOX 4 OF 7
70.0' - 110.0'

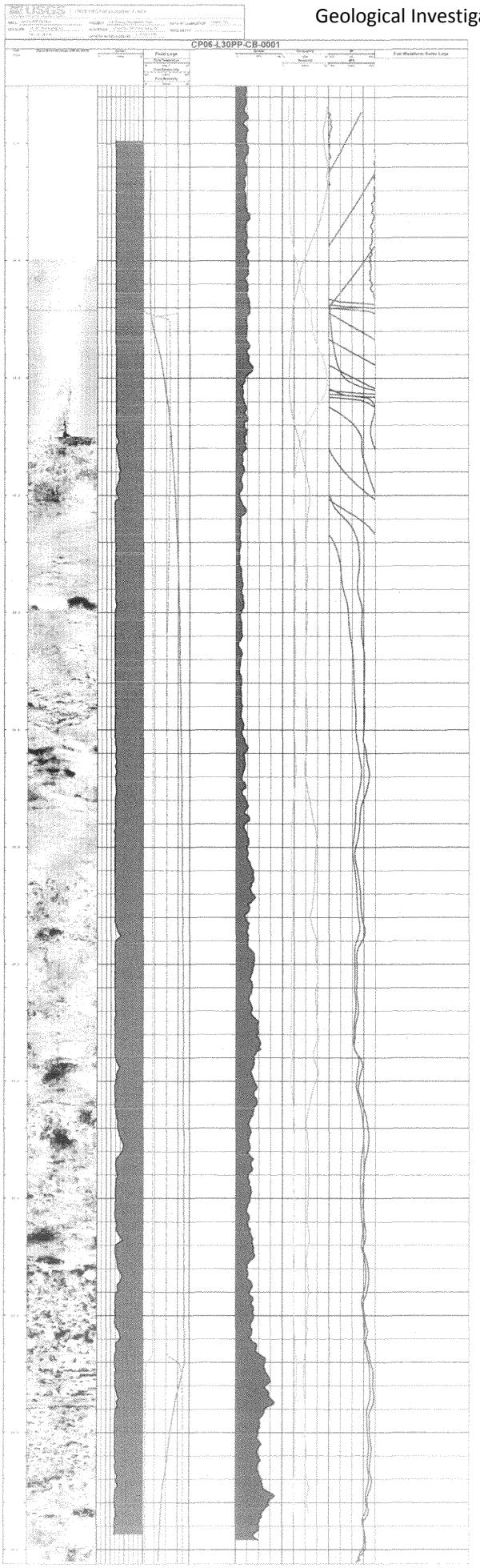
L 30 SEEPAGE MCT Fm.XCS
DADE CO. FL
CP 06-L30PP-CA 0003
Box 1 of
@175.29.6
175
Run #1
Run #2
200
Run #2
250
150
Run #3


RVP # 15


LBD SB5PA56 MGT Project
DOOE Ch, A
CP-06-C3DPP-C6-0003
Box 3 of 5
46.5'-60.0'
Run #9
Run #8
Run #10
30.0
60.0


L30 SEEPAGE MAT PROTECT
DADE CO. FL
CP06-L30PP-CB-0003
BOX 4 OF 4
640' - 1035'

U.S.G.S. BOREHOLE LOGS


CP06-L30PP-CB-0001

Well	Phase	Duration	Volume Recharged/Recovered (in million gallons)	Percent Recovery	Aquifer or Water Source	Sample Collection Date	Sample Collection Time	Gross Alpha, in pCi/L	Gross Alpha, Reporting Level	WQ FLAG for WQ 304
								WQ304	WQ306	
OKF-100 upper	Recharge	Week 1	7.773946		UFA	12-Jul-11	10:35			
OKF-100 lower	Recharge		7.773946		APPZ	12-Jul-11	12:00			
EXKR-1	Recharge		2.938902		Surface Water	11-Jul-11	15:21	0.597	3	U
MW-19	Recharge				UFA - 4200-FT					
MW-18	Recharge				UFA - 2350-FT					
MW-10	Recharge		7.773946		UFA - 350 ft SZMW	12-Jul-11	9:30			
MW-17	Recharge				SAS					
OKF-100 upper	Recharge	Week 3	81.716135		UFA	27-Jul-11	11:43	4.61	3	V
OKF-100 lower	Recharge		81.716135		APPZ	27-Jul-11	12:54	2.26	3	U
EXKR-1	Recharge		81.716135		Surface Water	26-Jul-11	13:10	0.245	3	U
MW-19	Recharge		86.726274		UFA - 4200-FT	28-Jul-11	11:17			
MW-18	Recharge		86.726274		UFA - 2350-FT	28-Jul-11	13:35			
MW-10	Recharge		86.726274		UFA - 350 ft SZMW	28-Jul-11	12:05	1.43	3	J
MW-17	Recharge				SAS	26-Jul-11	15:03			
OKF-100 upper	Recharge	Week 5	144.501563		UFA	9-Aug-11	9:51	3.19	3	V
OKF-100 lower	Recharge		144.501563		APPZ	9-Aug-11	11:07			
EXKR-1	Recharge		149.427474		Surface Water	10-Aug-11	11:50	1.31	3	U
MW-19	Recharge				UFA - 4200-FT					
MW-18	Recharge				UFA - 2350-FT					
MW-10	Recharge		149.427474		UFA - 350 ft SZMW	10-Aug-11	12:50	-0.283	3	U
MW-17	Recharge				SAS					
OKF-100 upper	Recharge	Week 7	214.208367		UFA	23-Aug-11	11:50	2.93	3	J
OKF-100 lower	Recharge		214.208367		APPZ	23-Aug-11	13:00	3.58	3	U
EXKR-1	Recharge		219.296561		Surface Water	24-Aug-11	11:30	0.843	3	U
MW-19	Recharge		224.014730		UFA - 4200-FT	25-Aug-11	12:02			
MW-18	Recharge		224.014730		UFA - 2350-FT	25-Aug-11	13:32			
MW-10	Recharge		224.014730		UFA - 350 ft SZMW	25-Aug-11	10:45	1.23	3	U
MW-17	Recharge				SAS	24-Aug-11	12:29	2.62	3	U
OKF-100 upper	Recharge	Week 9	289.282410		UFA	7-Sep-11	11:30	4.66	3	V
OKF-100 lower	Recharge		289.282410		APPZ	7-Sep-11	12:40	5.19	3	V
EXKR-1	Recharge		284.191399		Surface Water	6-Sep-11	11:10	0.421	3	U
MW-19	Recharge		294.198994		UFA - 4200-FT	8-Sep-11	13:55			
MW-18	Recharge		294.198994		UFA - 2350-FT	8-Sep-11	12:02			
MW-10	Recharge		294.198994		UFA - 350 ft SZMW	8-Sep-11	10:45			
MW-17	Recharge				SAS	6-Sep-11	12:20	6.78	3	V
OKF-100 upper	Recharge	Week 13	433.591124		UFA	5-Oct-11	12:00	2.82	3	U
OKF-100 lower	Recharge		433.591124		APPZ	5-Oct-11	13:30	-2.56	3	U
EXKR-1	Recharge		428.548053		Surface Water	4-Oct-11	11:30	0.281	3	U
MW-19	Recharge		438.582593		UFA - 4200-FT	6-Oct-11	12:09			
MW-18	Recharge		438.582593		UFA - 2350-FT	6-Oct-11	14:07			
MW-10	Recharge		438.582593		UFA - 350 ft SZMW	6-Oct-11	11:00	2.76	3	U
MW-17	Recharge				SAS	4-Oct-11	12:45	9.07	3	U
OKF-100 upper	Recharge	Week 17	536.941012		UFA	2-Nov-11	12:25	1.44	3	J
OKF-100 lower	Recharge		541.854719		APPZ	3-Nov-11	11:17			
EXKR-1	Recharge		536.941012		Surface Water	2-Nov-11	10:05	0.0372	3	U
MW-19	Recharge		541.854719		UFA - 4200-FT	3-Nov-11	12:55			
MW-18	Recharge		541.854719		UFA - 2350-FT	3-Nov-11	13:42			
MW-10	Recharge		541.854719		UFA - 350 ft SZMW	3-Nov-11	10:05			
MW-17	Recharge				SAS	2-Nov-11	11:12	3.45	3	U
OKF-100 upper	Recharge	Week 21	713.623007		UFA	7-Dec-11	13:35	1.3	3	U
OKF-100 lower	Recharge		718.616152		APPZ	8-Dec-11	13:05			
EXKR-1	Recharge		713.623007		Surface Water	7-Dec-11	11:50	0.553	3	U
MW-19	Recharge		718.616152		UFA - 4200-FT	8-Dec-11	14:05	1.15	3	U
MW-18	Recharge		718.616152		UFA - 2350-FT	8-Dec-11	15:11			
MW-10	Recharge		718.616152		UFA - 350 ft SZMW	8-Dec-11	11:30	0.888	3	U
MW-17	Recharge				SAS	7-Dec-11	12:20	5.8	3	J
OKF-100 upper	Recharge	Week 25	847.990793		UFA	3-Jan-12	12:10	1.36	3	U
OKF-100 lower	Recharge		847.990793		APPZ	3-Jan-12	13:15	4.14	3	U
EXKR-1	Recharge		852.955765		Surface Water	4-Jan-12	11:15	0.359	3	U
MW-19	Recharge		857.881459		UFA - 4200-FT	5-Jan-12	11:11			
MW-18	Recharge		857.881459		UFA - 2350-FT	5-Jan-12	12:25			
MW-10	Recharge		857.881459		UFA - 350 ft SZMW	5-Jan-12	13:25	0.937	3	U
MW-17	Recharge				SAS	5-Jan-12	13:55	3.82	3	U
OKF-100 upper	Storage	Week 29-31	998.358723		UFA	8-Feb-12	11:20	1.18	3	U
OKF-100 upper	Storage		998.358723		UFA	23-Feb-12	12:07			
OKF-100 lower	Recharge		998.358723		APPZ	8-Feb-12	12:34	0.204	3	U
EXKR-1	Recharge		995.849288		Surface Water	2-Feb-12	11:55	0.409	3	U
EXKR-1D	Recharge		998.358723		Surface Water	3-Feb-12	11:55			
MW-19	Recharge		998.358723		UFA - 4200-FT	9-Feb-12	12:02			
MW-18	Recharge		998.358723		UFA - 2350-FT	9-Feb-12	14:10			
MW-10	Recharge		998.358723		UFA - 350 ft SZMW	9-Feb-12	10:49	0.0476	3	U
MW-10	Recharge		998.358723		UFA - 350 ft SZMW	23-Feb-12	11:05			
MW-17	Recharge				SAS	9-Feb-12	12:56	3.67	3	U
OKF-100 upper	Storage	Weeks 32-34	998.358723		UFA	5-Mar-12	12:35	0.36	3	U
OKF-100 lower	Storage		998.358723		APPZ	5-Mar-12	13:45	5.22	3	U
EXKR-1	Storage		998.358723		Stored Water					
MW-19	Storage		998.358723		UFA - 4200-FT	6-Mar-12	10:17			
MW-18	Storage		998.358723		UFA - 2350-FT	6-Mar-12	13:45			
MW-10	Storage		998.358723		UFA - 350 ft SZMW	6-Mar-12	11:16	0.0745	3	U
MW-17	Storage				SAS	6-Mar-12	12:05	2.75	3	U
OKF-100 upper	Storage	Week 35-36	998.358723		UFA	22-Mar-12	11:50			
OKF-100 upper	Storage		998.358723		UFA	4-Apr-12	10:00	1.53	3	J
OKF-100 lower	Storage		998.358723		APPZ	4-Apr-12	11:30	0.941	3	U
EXKR-1	Storage		998.358723		Stored Water					
MW-19	Storage		998.358723		UFA - 4200-FT	5-Apr-12	11:35			
MW-18	Storage		998.358723		UFA - 2350-FT	5-Apr-12	13:45			
MW-10	Storage		998.358723		UFA - 350 ft SZMW	5-Apr-12	10:23	1.62	3	U
MW-17	Storage				SAS	5-Apr-12	12:20	2.02	3	U
OKF-100 upper	Storage	Week 39-40	998.358723		UFA	22-Mar-12	11:50			
OKF-100 upper	Storage		998.358723		UFA	4-Apr-12	10:00	1.53	3	J
OKF-100 lower	Storage		998.358723		APPZ	4-Apr-12	11:30	0.941	3	U
EXKR-1	Storage		998.358723		Stored Water					
MW-19	Storage		998.358723		UFA - 4200-FT	5-Apr-12	11:35			
MW-18	Storage		998.358723		UFA - 2350-FT	5-Apr-12	13:45			
MW-10	Storage		998.358723		UFA - 350 ft SZMW	5-Apr-12	10:23	1.62	3	U
MW-17	Storage				SAS	5-Apr-12	12:20	2.02	3	U
OKF-100 upper	Storage	Week 44	998.358723		UFA	2-May-12	11:06	1.95	3	J
OKF-100 lower	Storage		998.358723		APPZ	2-May-12	12:27	4.44	3	U
EXKR-1	Storage		998.358723		Stored Water					
MW-19	Storage		998.358723		UFA - 4200-FT	3-May-12	13:14			
MW-18	Storage		998.358723		UFA - 2350-FT	3-May-12	14:23			
MW-10	Storage		998.358723		UFA - 350 ft SZMW	3-May-12	11:30	0.566	3	U
MW-17	Storage				SAS	3-May-12	11:50	2.84	3	U

Table 8. Radionuclide concentrations and activities obtained during Cycle 4.

Well	Phase	Duration	Volume Recharged/Recovered (in million gallons)	Percent Recovery	Aquifer or Water Source	Sample Collection Date	Sample Collection Time	Gross Alpha, in pCi/L	Gross Alpha, Reporting Level	WQ FLAG for WQ 304
								WQ304	WQ306	
OKF-100 upper	Storage	Week 48	998.358723		UFA	13-Jun-12	10:51	1.65	3	U
OKF-100 lower	Storage		998.358723		APPZ	13-Jun-12	11:57	1.83	3	U
EXKR-1	Storage		998.358723		Stored Water					
MW-19	Storage		998.358723		UFA - 4200-FT	13-Jun-12	13:31			
MW-18	Storage		998.358723		UFA - 2350-FT	14-Jun-12	14:18			
MW-10	Storage		998.358723		UFA - 350 ft SZMW	14-Jun-12	10:46	0.858	3	U
MW-17	Storage				SAS	14-Jun-12	12:42	< 2.71	3	U
OKF-100 upper	Storage	Week 52	998.358723		UFA	11-Jul-12	10:50	1.86	3	J
OKF-100 lower	Storage		998.358723		APPZ	11-Jul-12	11:57	<0.22	3	U
EXKR-1	Storage		998.358723		Stored Water					
MW-19	Storage		998.358723		UFA - 4200-FT	12-Jul-12	12:35			
MW-18	Storage		998.358723		UFA - 2350-FT	12-Jul-12	14:45			
MW-10	Storage		998.358723		UFA - 350 ft SZMW	12-Jul-12	11:00	0.866	3	U
MW-17	Storage				SAS	12-Jul-12	13:05	< 1.58	3	U
OKF-100 upper	Storage	Week 56	998.358723		UFA	8-Aug-12	11:55	1.64	3	U
~~OKF-100 lower~~	~~Storage~~		~~998.358723~~		~~APPZ~~	~~8-Aug-12~~	~~13:06~~	~~9.17~~	~~3~~	~~Y~~
EXKR-1	Storage		998.358723		Stored Water					
MW-19	Storage		998.358723		UFA - 4200-FT	9-Aug-12	12:10			
MW-18	Storage		998.358723		UFA - 2350-FT	9-Aug-12	13:36			
MW-10	Storage		998.358723		UFA - 350 ft SZMW	9-Aug-12	10:55	0.896	3	U
MW-17	Storage				SAS	8-Aug-12	13:41	10.2	3	U
OKF-100 upper	Storage	Week 60	998.358723		UFA	11-Sep-12	11:20	1.86	3	U
OKF-100 lower	Storage		998.358723		APPZ	11-Sep-12	12:25	13.7	3	U
EXKR-1	Storage		998.358723		Stored Water					
MW-19	Storage		998.358723		UFA - 4200-FT	12-Sep-12	12:11			
MW-18	Storage		998.358723		UFA - 2350-FT	12-Sep-12	13:35			
MW-10	Storage		998.358723		UFA - 350 ft SZMW	12-Sep-12	10:50	1.54	3	J
MW-17	Storage				SAS	11-Sep-12	13:59	5.36	3	U
OKF-100 upper	Storage	Week 64	998.358723		UFA	10-Oct-12	12:05	2.28	3	J
OKF-100 lower	Storage		998.358723		APPZ	10-Oct-12	13:10	3.79	3	U
EXKR-1	Storage		998.358723		Stored Water					
MW-19	Storage		998.358723		UFA - 4200-FT	10-Oct-12	14:57			
MW-18	Storage		998.358723		UFA - 2350-FT	11-Oct-12	11:42			
MW-10	Storage		998.358723		UFA - 350 ft SZMW	11-Oct-12	10:05	1.73	3	U
MW-17	Storage				SAS	11-Oct-12	12:55	< 4.18	3	U
OKF-100 upper	Storage	Week 68	998.358723		UFA	6-Nov-12	12:45	1.3	3	U
OKF-100 lower	Storage		998.358723		APPZ	6-Nov-12	14:01	1.5	3	U
EXKR-1	Storage		998.358723		Stored Water					
MW-19	Storage		998.358723		UFA - 4200-FT	8-Nov-12	12:12			
MW-18	Storage		998.358723		UFA - 2350-FT	8-Nov-12	13:42			
MW-10	Storage		998.358723		UFA - 350 ft SZMW	8-Nov-12	12:50	2.44	3	J
MW-17	Storage				SAS	7-Nov-12	14:23	0	3	U
OKF-100 upper	Storage	Week 74	998.358723		UFA	18-Dec-12	11:20	1.35	3	U
OKF-100 lower	Storage		998.358723		APPZ	18-Dec-12	12:30	5.07	3	U
EXKR-1	Storage		998.358723		Stored Water					
MW-19	Storage		998.358723		UFA - 4200-FT	20-Dec-12	10:57			
MW-18	Storage		998.358723		UFA - 2350-FT	20-Dec-12	12:27			
MW-10	Storage		998.358723		UFA - 350 ft SZMW	19-Dec-12	10:15	1.48	3	U
MW-17	Storage				SAS	19-Dec-12	13:08	1.69	3	U

Table 8. Radionuclide concentrations and activities obtained during Cycle 4.

GEOLOGICAL INVESTIGATION PERTAINING TO L31N SLURRY WALL CONSTRUCTION

(U.S. ARMY CORPS OF ENGINEERS, 2011)

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www.amec.com CA-0007867

MIAMI-DADE LIMESTONE PRODUCTS ASSOCIATION
L-31N SEEPAGE BARRIER: PHASE 1
L-31N LEVEE

SITE PLAN

MIAMI-DADE COUNTY, FLORIDA

DATE: October 11, 2011
DRAWN BY: MAJ
CHECKED BY: LGB
PROJECT NO.: 16059

LELSIE G. BROMWELL, P.E.
FLA. REG. NO. 18234

DATE:

REFER TO INDEX FOR TOTAL SHEETS INCLUDED.
SHEET – 5

P:\PROJECTS\CEDO\16059 MacVicar L31 Surry Wallbeg\16059 SITE_LOC.dwg, SITE PLAN, 10/11/2011 2:06:01 PM, mark.a.jones, BCI Engineers & Scientists, Inc.

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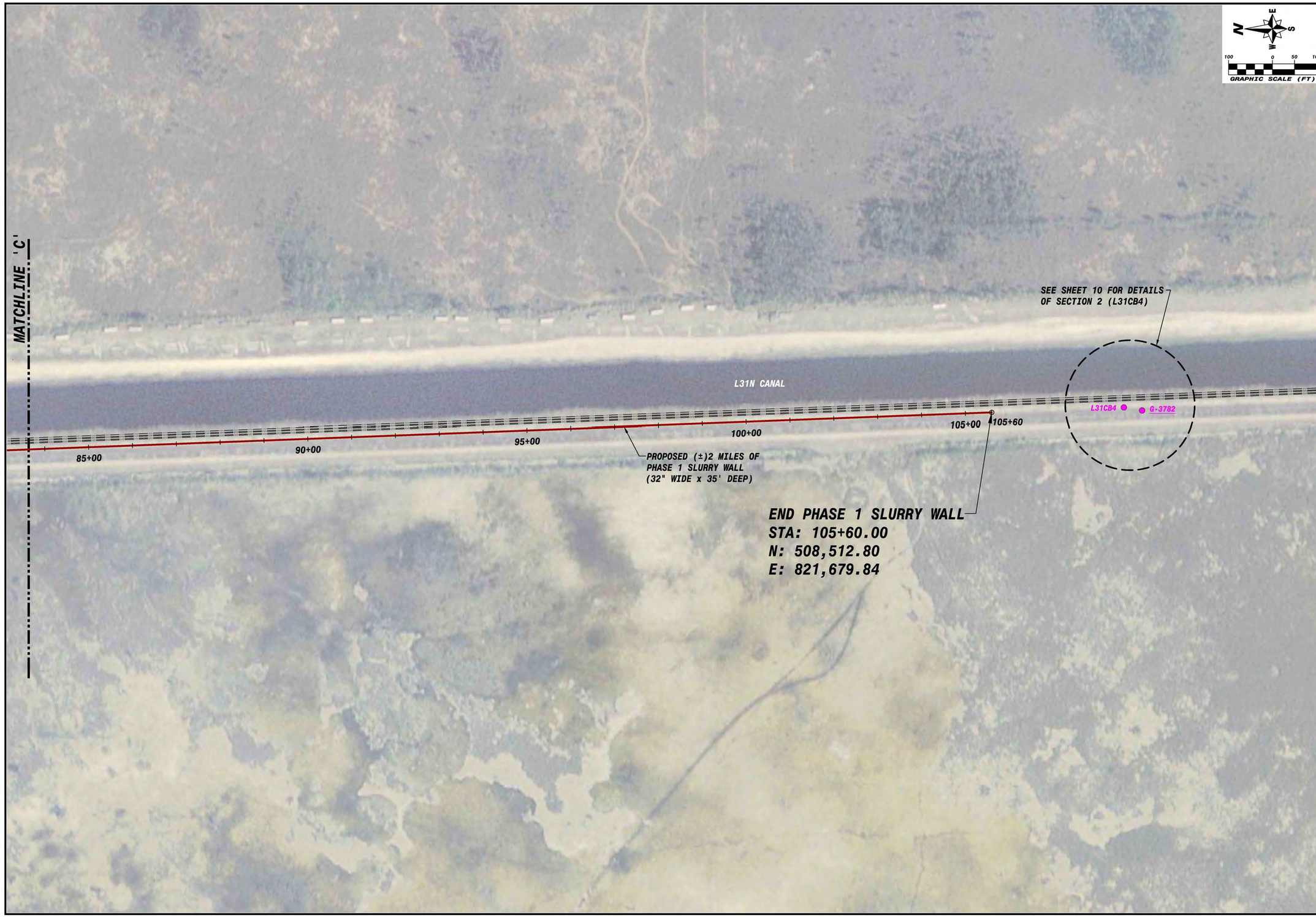
MIAMI-DADE LIMESTONE PRODUCTS ASSOCIATION
L-31N SEEPAGE BARRIER: PHASE 1
L-31N LEVEE
SITE PLAN
MIAMI-DADE COUNTY, FLORIDA

DATE: October 11, 2011
DRAWN BY: MAJ
CHECKED BY: LGB
PROJECT NO.: 16059

LELSIE G. BROMWELL, P.E.
FLA. REG. NO. 18234

DATE:

REFER TO INDEX FOR TOTAL SHEETS INCLUDED.
SHEET – 6



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L-31N SEEPAGE BARRIER: PHASE 1
L-31N LEVEE
SITE PLAN
MIAMI-DADE COUNTY, FLORIDA

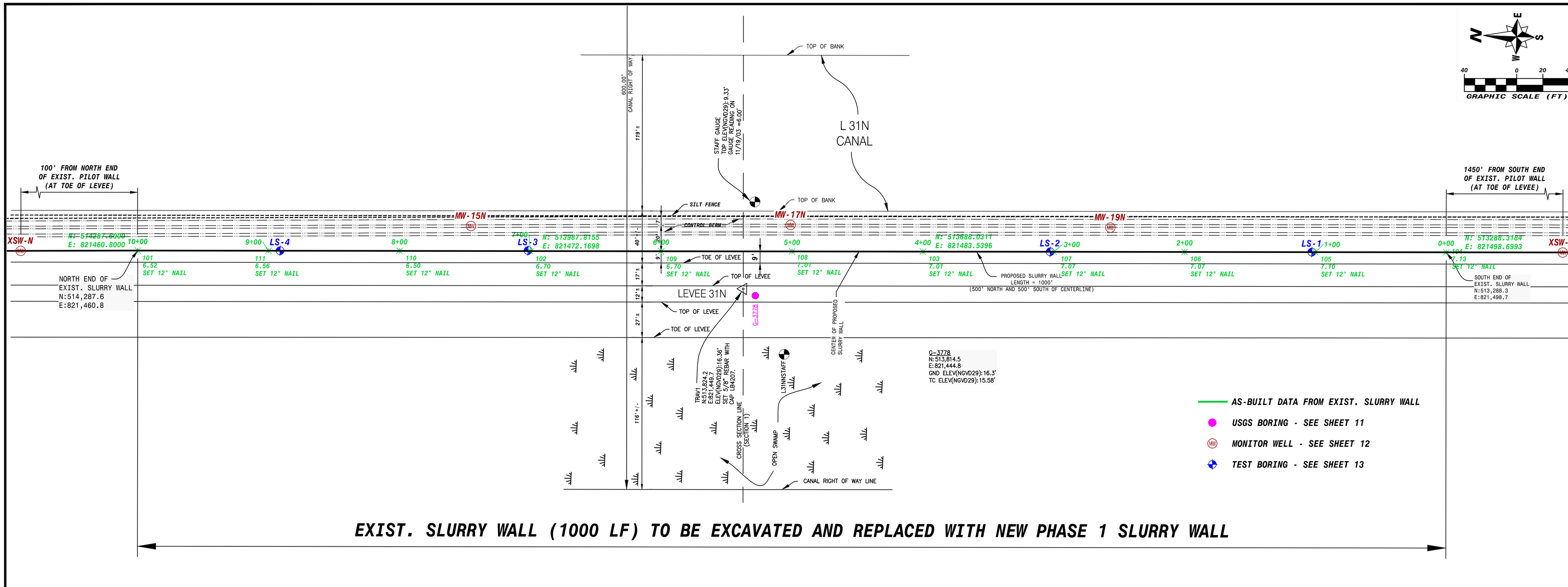
DATE: October 11, 2011
DRAWN BY: MAJ
CHECKED BY: LGB
PROJECT NO.: 16059

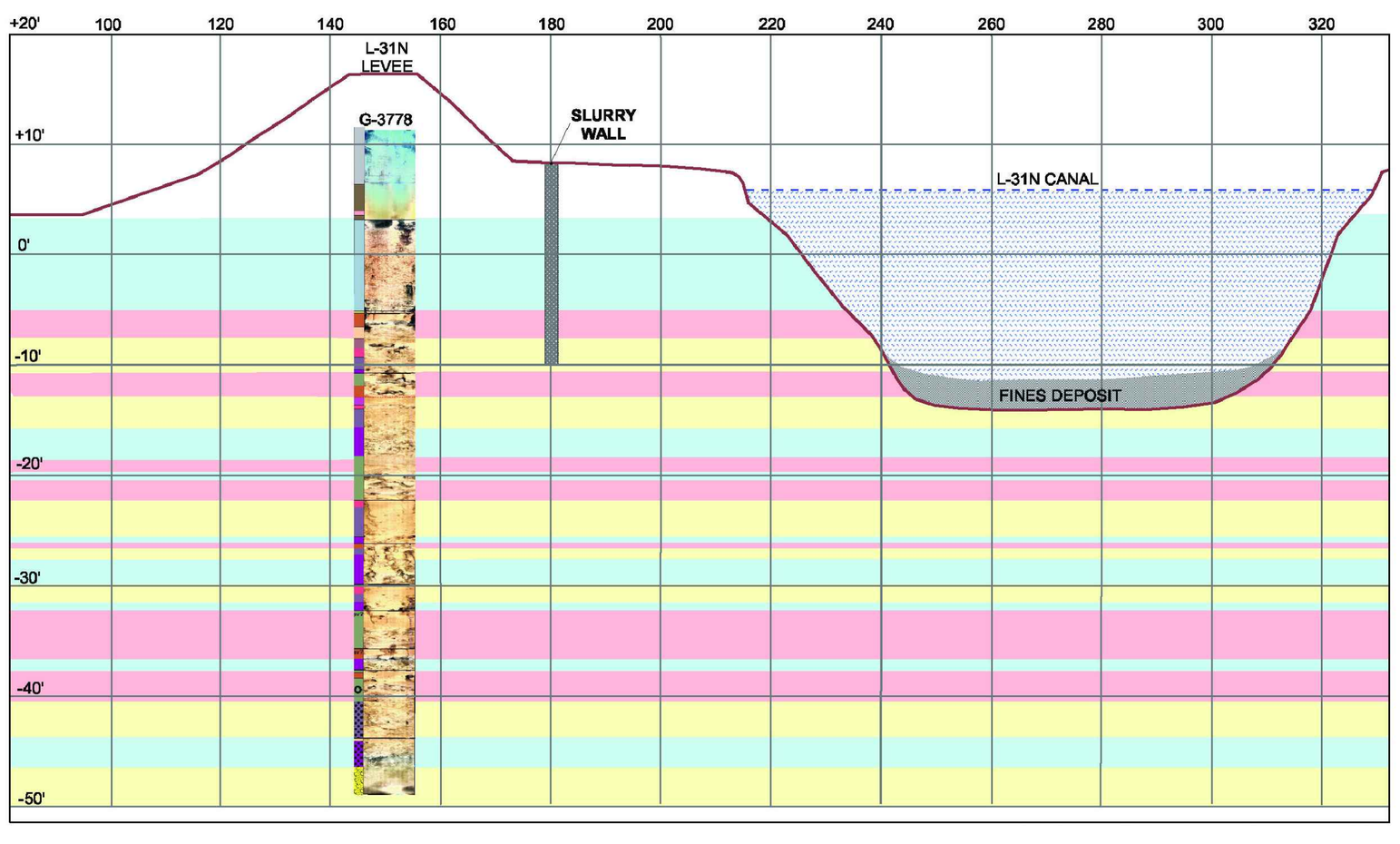
LELSIE G. BROMWELL, P.E.
FLA. REG. NO. 18234

DATE:

REFER TO INDEX FOR TOTAL SHEETS INCLUDED.
SHEET – 7

P:\PROJECTS\CEDS\16059 Manchurie L31 Slurry Wall\dwg\16059 SITE_LOC.dwg, 7 SITE PLAN, 10/11/2011 3:06:25 PM, mark.a.jones, BCI Engineers & Scientists, Inc.

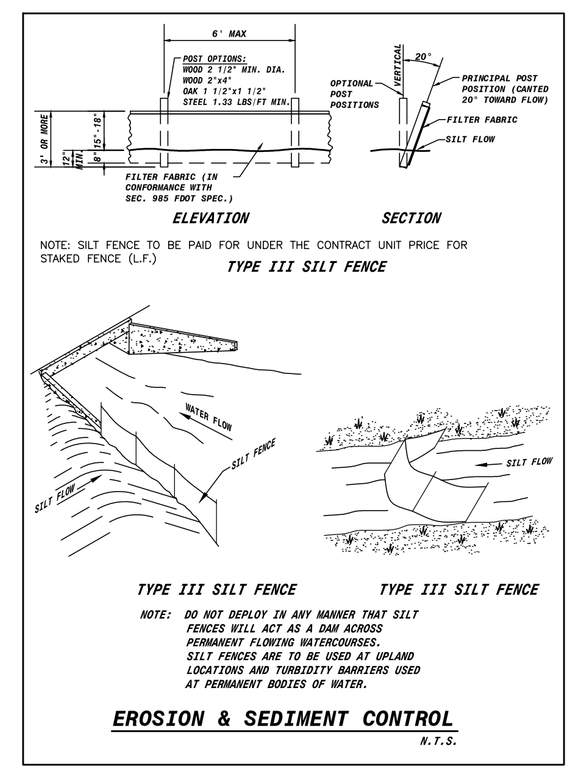




SCHEMATIC SECTION VIEW

DESIGNATION	NORTHING	EASTING	GROUND ELEVATION	TOP OF CASING	TOTAL DEPTH (ELEVATION)	SCREEN INTERVAL (ELEVATION)	
G-3778	513,814.5	821,444.8	16.3'	15.58'	-88	-86 to -88	NGVD29

DESIGNATION	NORTHING	EASTING	NGVD29 ELEV
TRAV1	513,824.2	821,449.7	16.36'



CONTRACTOR CERTIFICATION

I have read the notes and reviewed the plans and I propose to properly implement erosion and sediment control during construction.

SIGNATURE: _____

PRINTED NAME: _____

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MIAMI-DADE LIMESTONE PRODUCTS ASSOCIATION
L-31N SEEPAGE BARRIER: PHASE 1
L-31N LEVEE
EXISTING TEST SECTION
MIAMI-DADE COUNTY, FLORIDA

DATE: October 11, 2011
DRAWN BY: MAJ
CHECKED BY: LGB
PROJECT NO.: 16059

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FLA. REG. NO. 18234

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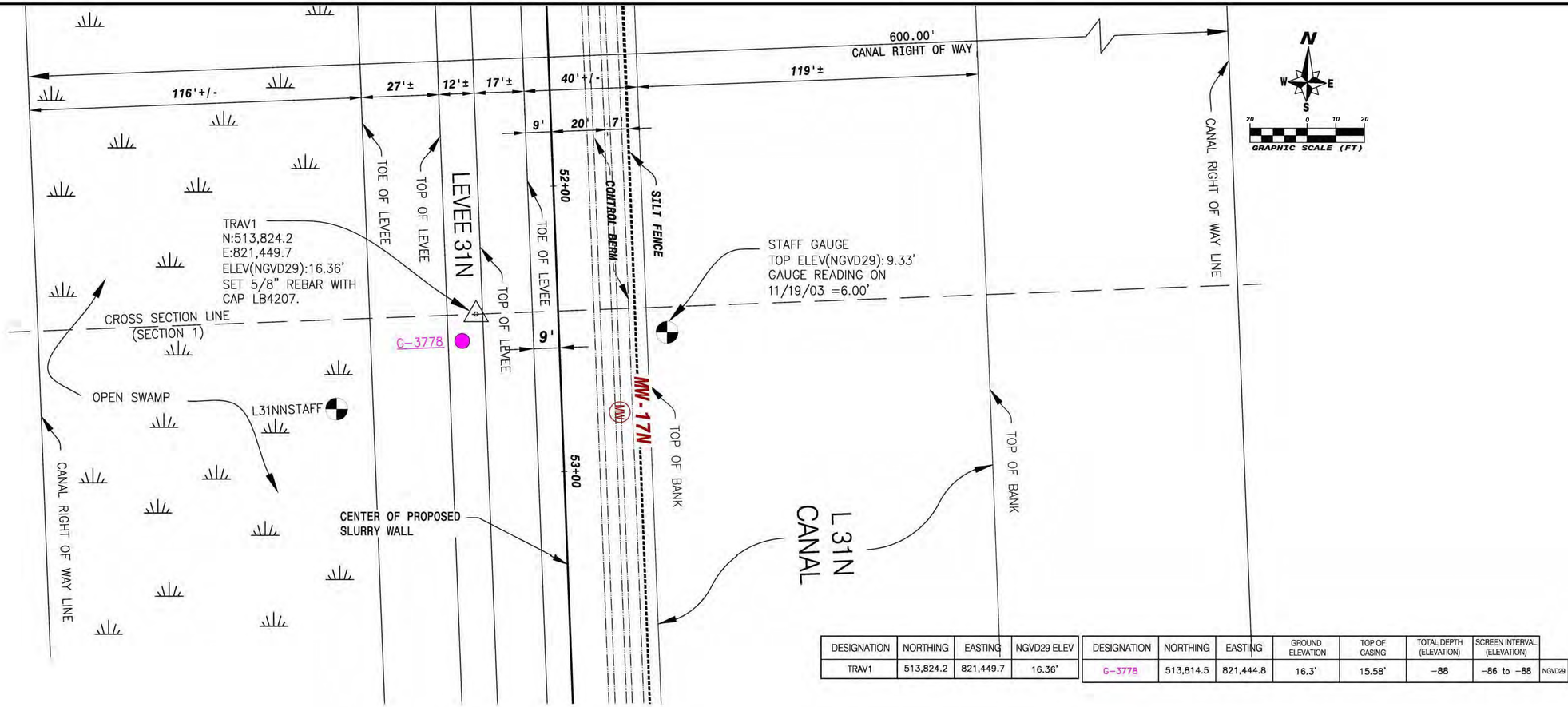
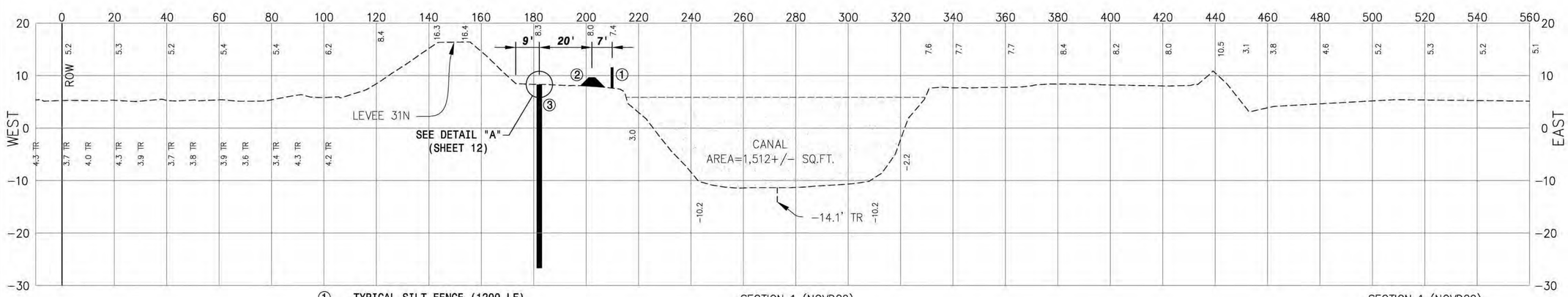
REFER TO INDEX FOR TOTAL SHEETS INCLUDED.
SHEET - 8



DESIGNATION	NORTHING	EASTING	NGVD29 ELEV
TRAV1	513,824.2	821,449.7	16.36'

DESIGNATION	NORTHING	EASTING	GROUND ELEVATION	TOP OF CASING	TOTAL DEPTH (ELEVATION)	SCREEN INTERVAL (ELEVATION)	
G-3778	513,814.5	821,444.8	16.3'	15.58'	-88	-86 to -88	NGVD29



SURVEYORS NOTES:

1- FOR ADDITIONAL NOTES AND REFERENCES SEE SHEET No. 3.

2- ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NGVD29 DATUM.

① TYPICAL SILT FENCE (1200 LF) (FDOT INDEX 102)

② TYPICAL 2-FOOT HIGH RUNOFF CONTROL BERM CONSTRUCTED WITH NATIVE SOIL (1200 LF)

③ SLURRY WALL 32" WIDE X 35' DEEP (2 MILES) SEE DETAIL "A", SHEET 12

SECTION 1 (NGVD29)

WATER ELEVATION = 5.8'(NGVD29)
DATE = 10/27/2003

SECTION 1 (NGVD29)

GRAPHIC SCALE (FT)

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L-31N SEEPAGE BARRIER: PHASE 1
L-31N LEVEE

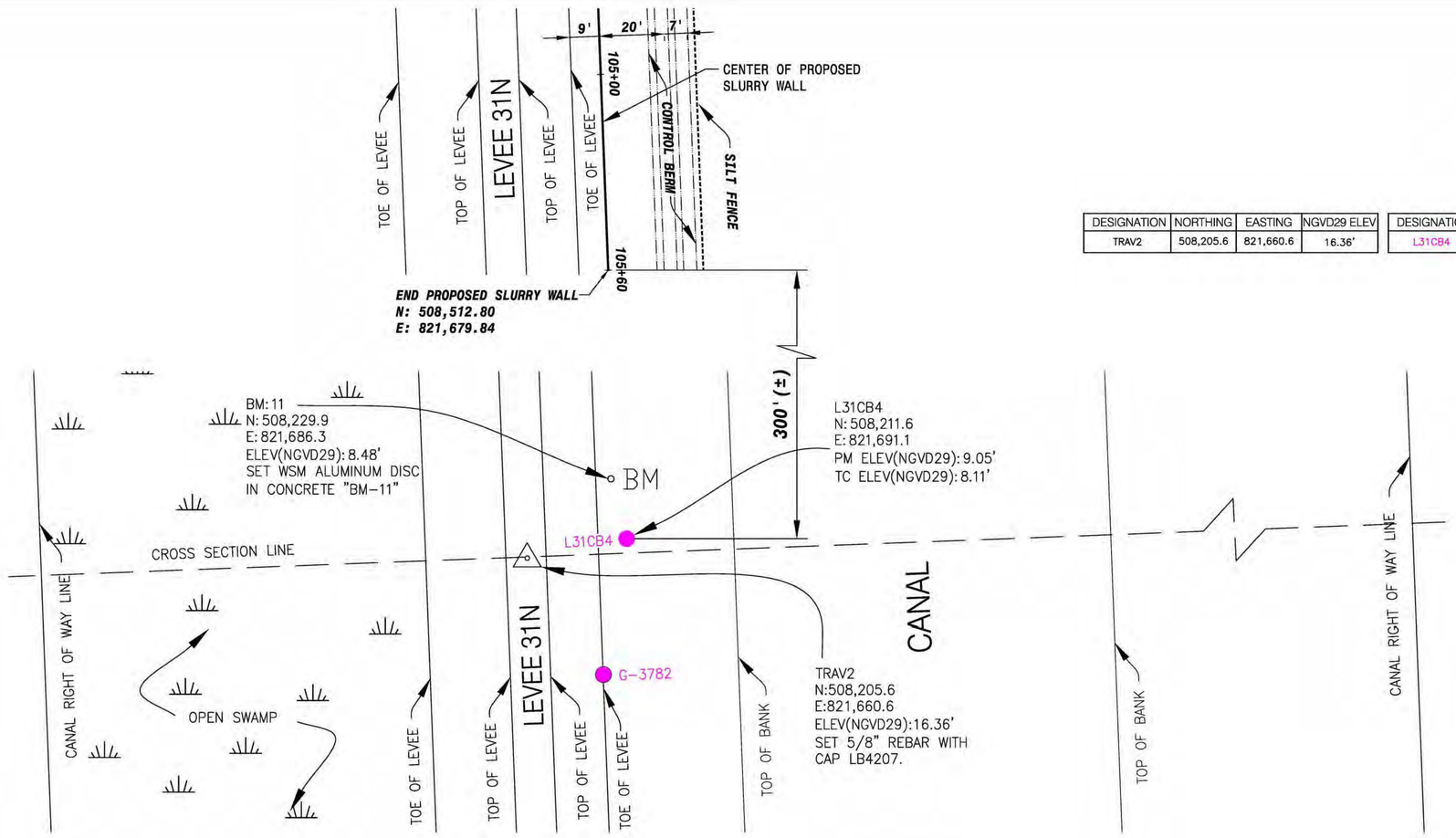
PLAN AND PROFILE
SECTION 1 - (G3778)
MIAMI-DADE COUNTY, FLORIDA

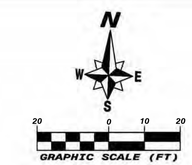
DATE: October 11, 2011
DRAWN BY: MAJ
CHECKED BY: LGB
PROJECT NO.: 16059

LELSIE G. BROMWELL, P.E.
FLA. REG. NO. 18234

DATE:

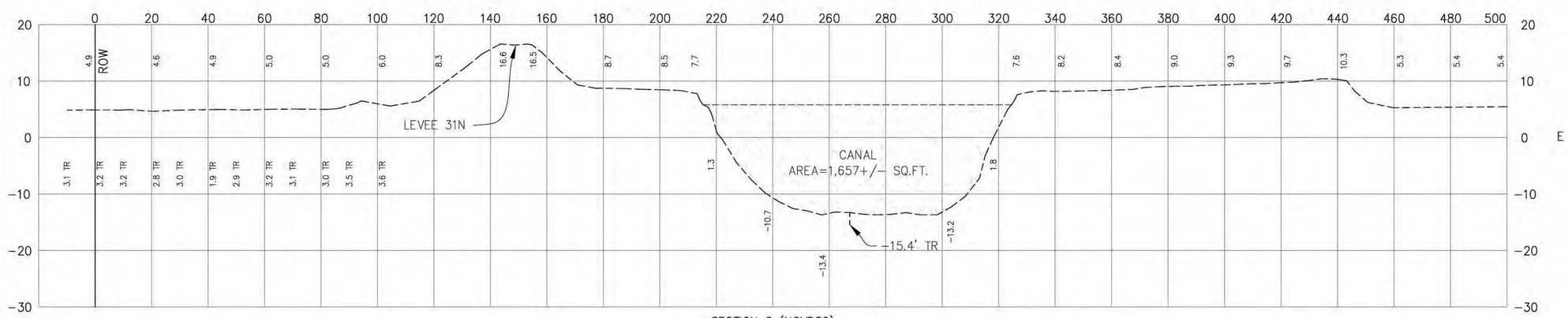
REFER TO INDEX FOR TOTAL SHEETS INCLUDED.
SHEET - 9





DESIGNATION	NORTHING	EASTING	NGVD29 ELEV
TRAV2	508,205.6	821,660.6	16.36'

DESIGNATION	NORTHING	EASTING	PLATFORM MARK	TOP OF CASING	
L31CB4	508,211.6	821,691.1	9.05'	8.11'	NGVD29



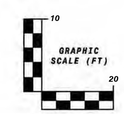
SECTION 2 (NGVD29)

WATER ELEVATION = 5.8'(NGVD29)
DATE = 10/27/2003

SURVEYORS NOTES:

1– FOR ADDITIONAL NOTES AND REFERENCES SEE SHEET No. 1 OF 9.

2– ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NGVD29 DATUM.



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L-31N SEEPAGE BARRIER: PHASE 1
L-31N LEVEE

PLAN AND PROFILE
SECTION 2 (L31CB4)
MIAMI-DADE COUNTY, FLORIDA

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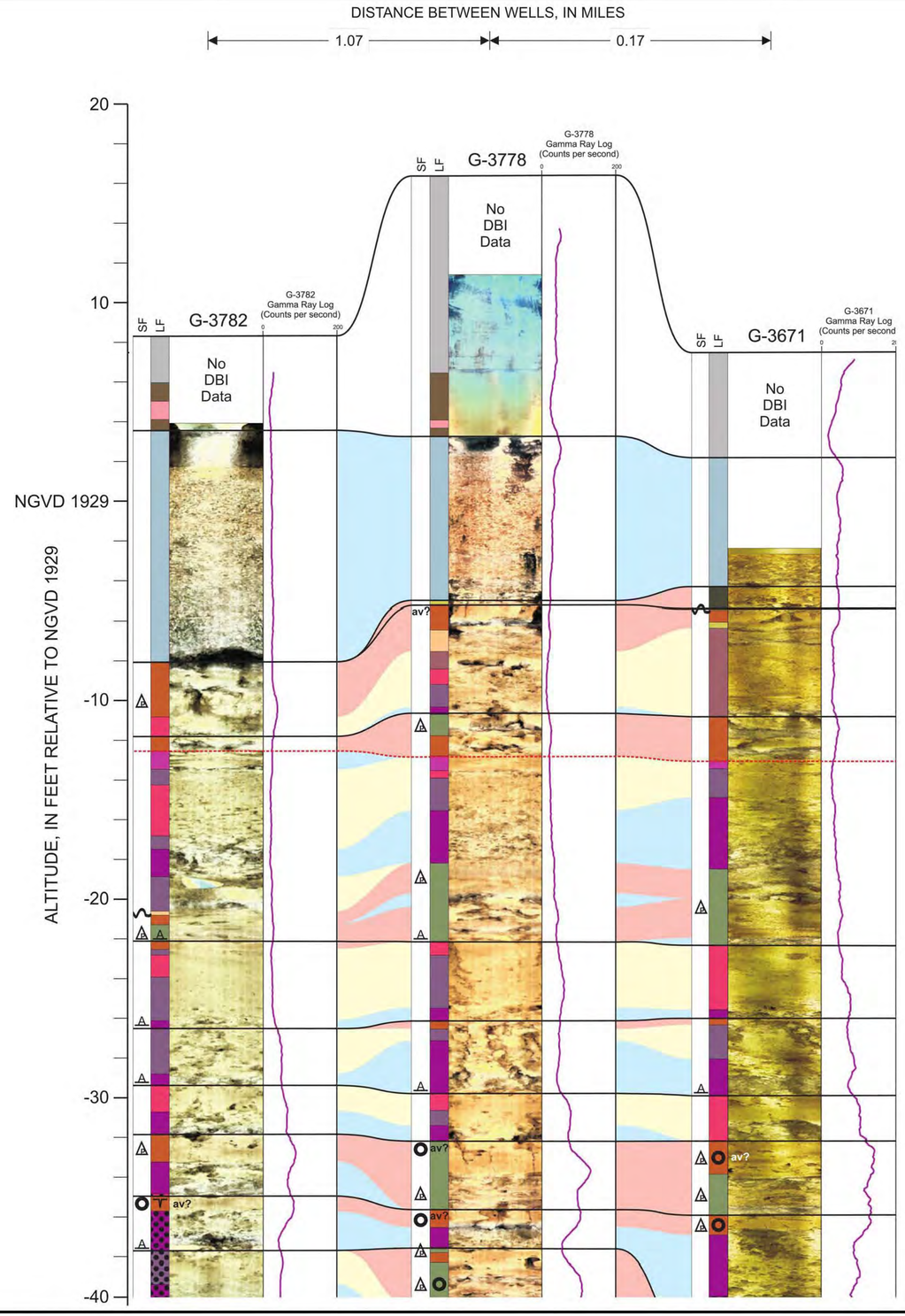
SHEET – 10



Reference: Cunningham, K. J., et al., USGS SIR 2005-5235

EXPLANATION

Lithofacies

- Peloid packstone/ grainstone
- Peloid wackestone/ packstone
- *Planorbella* floatstone/ rudstone & sandy *Planorbella* floatstone/ rudstone
- Gastropod floatstone/ rudstone & sandy gastropod floatstone/ rudstone
- Conglomerate & sandy conglomerate
- Autobreccia
- Pedogenic limestone
- Root-mold limestone
- Mudstone/wackestone & sandy mudstone/ wackestone
- Laminated peloid packstone/grainstone
- Skeletal packstone/ grainstone & sandy skeletal pack-stone/grainstone
- Coral framestone
- Pelecypod floatstone/ rudstone & sandy pelecypod floatstone/ rudstone
- Touching-vug pelecypod floatstone/rudstone & sandy touching-vug pelecypod floatstone/ rudstone
- Vuggy wackestone/ packstone
- Quartz sandstone & skeletal sandstone
- Quartz sand
- Calcareous sandstone
- Shelly quartz sand
- Limestone & sandy limestone
- Mollusk shells & sandy mollusk shells

Miscellaneous

- Fill
- Peat
- Marl
- Latence
- No recovery

- HFC3A STROMATOLITE LAYER
- STRATIGRAPHIC BOUNDARY--Dashed where uncertain
- BASE OF BISCAYNE AQUIFER

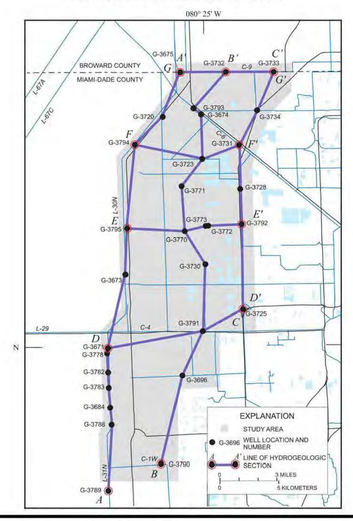
- ABRUPT CONTACT
- av? ALVEOLAR TEXTURE ?
- CHAROPHYTES
- CLAY RICH
- DBI DIGITAL BOREHOLE IMAGE
- LAMINATED CALCRETE
- CLAST OF LAMINATED CALCRETE
- FM FORMATION
- GAMMA RAY
- HFC HIGH-FREQUENCY CYCLE
- HFCS HIGH-FREQUENCY CYCLE SET
- HU HYDROGEOLOGIC UNIT
- LF LITHOFACIES
- MICRITIC RICH
- *PLANORBELLA*
- QU Q-UNIT (Perkins, 1977)
- SEMIVERTICAL CRACKS
- SF SIGNIFICANT FEATURES

Pore Class

CARBONATE PORE CLASSES OF THE FORT THOMPSON FORMATION AND MIAMI LIMESTONE

- PORE CLASS III
- PORE CLASS II
- PORE CLASS I
- PORE CLASS II MIXED SILICICLASTICS AND CARBONATES

Vertical Scale Greatly Exagerated
Horizontal Scale Not to Scale



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L-31N SEEPAGE BARRIER: PHASE 1
L-31N LEVEE

USGS LOG

MIAMI-DADE COUNTY, FLORIDA

DATE: October 11, 2011
DRAWN BY: MAJ
CHECKED BY: LGB
PROJECT NO.: 16059

LELSIE G. BROWNLEE
FLA. REG. NO. 18234
DATE:

DRAFT

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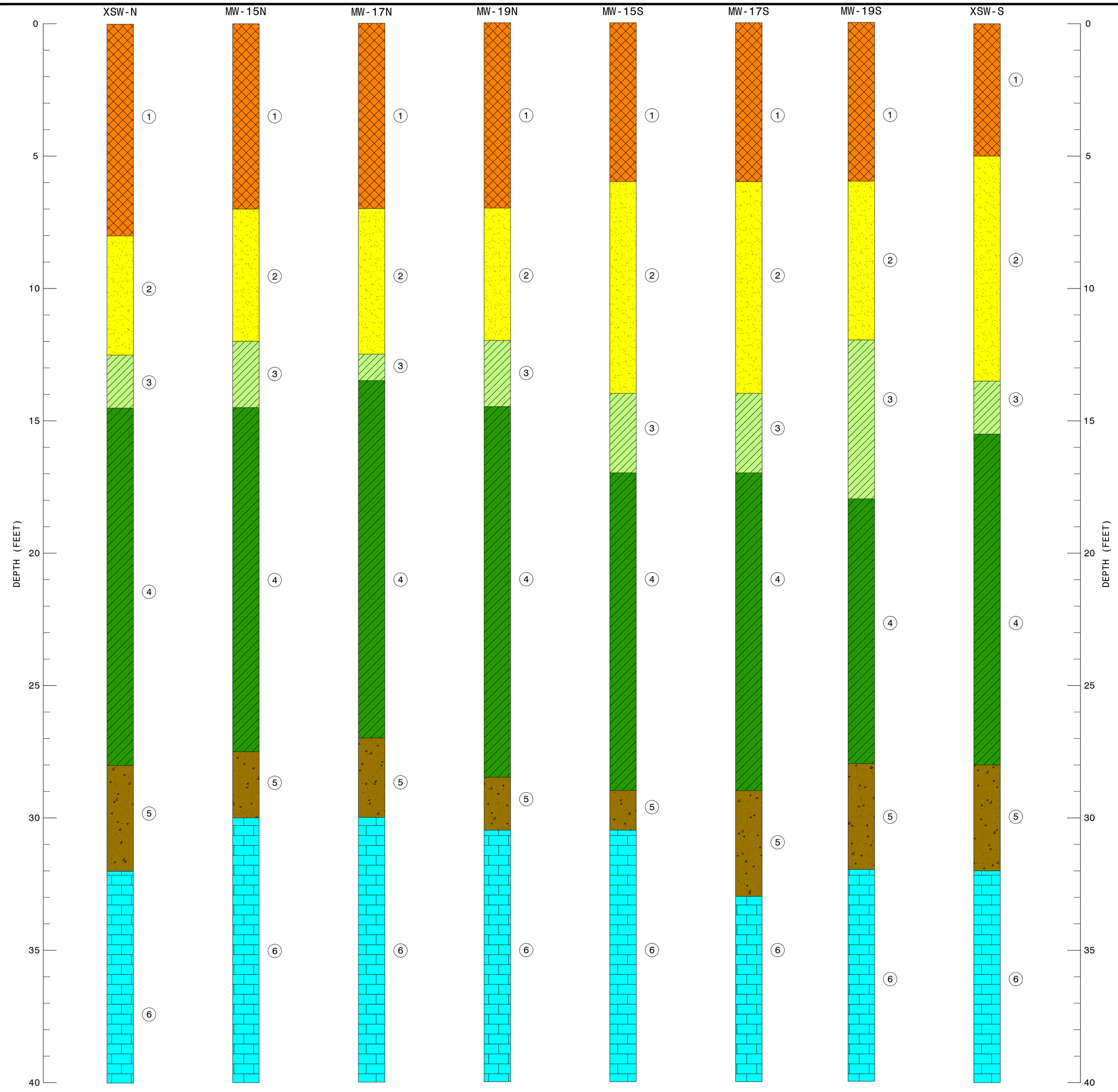
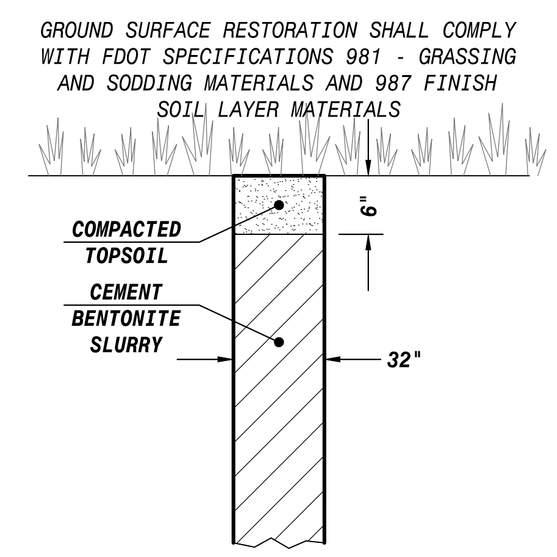
SHEET – 11



EXPLANATION

1. FILL/PEAT/VOID
2. OOLITE LIMESTONE
3. HARD, DENSE LIMESTONE (Q4 MARKER)
4. MARINE LIMESTONE (GRAY AND WHITE)
5. FRESHWATER/BRACKISH WATER LIMESTONE (Q3 MARKER)
6. WHITE, MARINE LIMESTONE (VERY PERMEABLE)



DETAIL "A"
WALL COMPLETION
not to scale

Know what's below. Call before you dig.

NO.	DATE	REVISION

AMEC-BCI Engineers & Scientists, Inc.
2000 E. Edgewood Dr. Ste #215, Lakeland, FL 33803
Phone: 863.667.2345 Fax: 863.667.2662
www.amec.com CA-0007867

MIAMI-DADE LIMESTONE PRODUCTS ASSOCIATION
L-31N SEEPAGE BARRIER: PHASE 1
L-31N LEVEE

MONITOR WELL LOGS AND WALL DETAIL

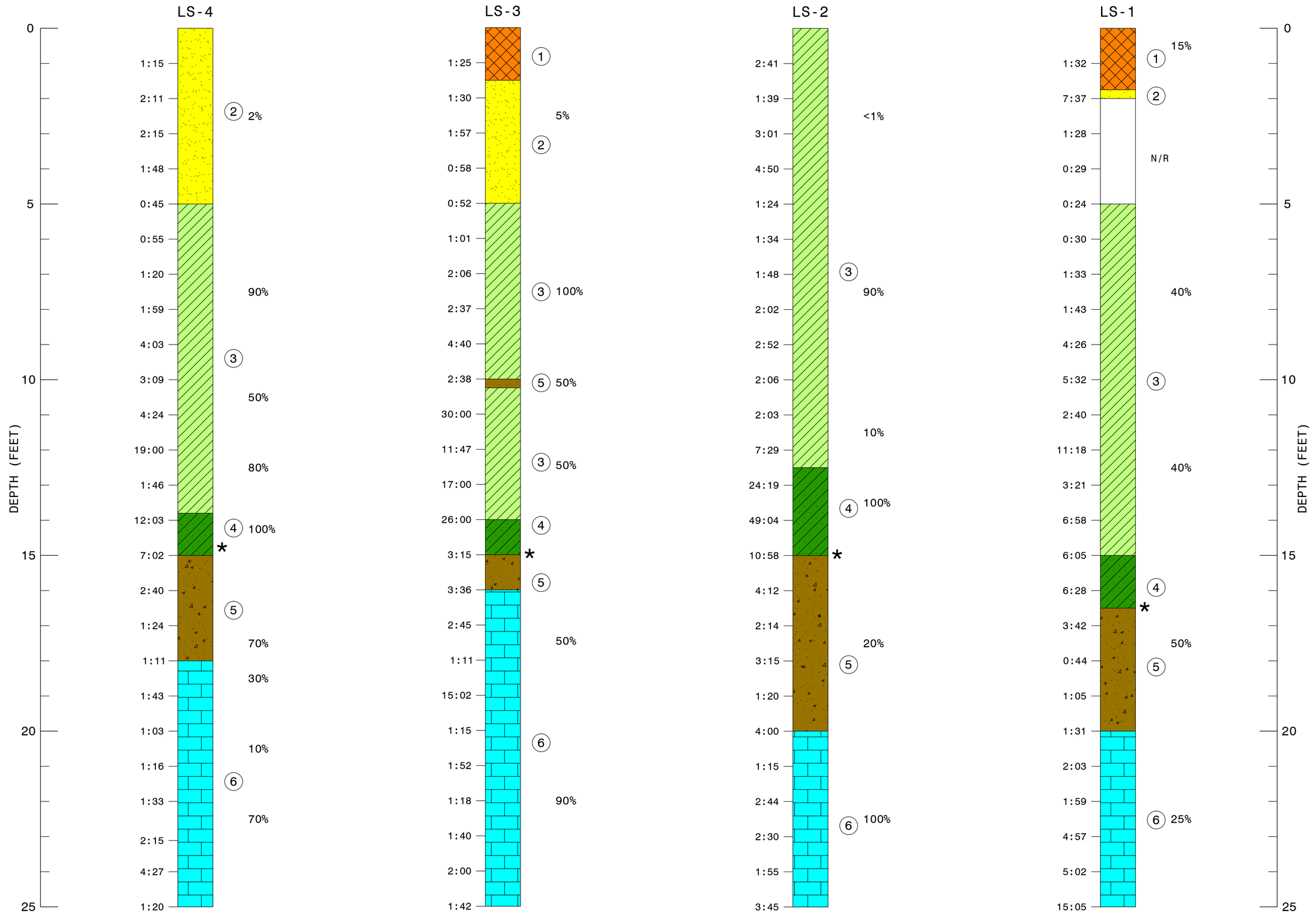
MIAMI-DADE COUNTY, FLORIDA

DATE: October 11, 2011
DRAWN BY: MAJ
CHECKED BY: LGB
PROJECT NO.: 16059

LELSIE G. BROMWELL, P.E.
FLA. REG. NO. 18234

DATE:

REFER TO INDEX FOR TOTAL SHEETS INCLUDED.
SHEET – 12



EXPLANATION

1. FILL
2. LAKE FLIRT MARL; WITH LIMESTONE / MUDSTONE
3. MIAMI ODLITE; WHITE TO CREAM OOLITIC LIMESTONE, CAVITY RIDDLED
4. Q_4 LAYER; FRESH WATER LIMESTONE
5. TAN TO GRAY, FOSSILFEROUS, VARIABLE SANDSTONE FRAGMENTS
6. MARINE LIMESTONE; WHITE TO LIGHT GRAY FOSSILIFEROUS

%	PERCENT RECOVERY
N/R	NO RECOVERY
2:41	DRILLING RATE (MINUTES PER FOOT ADVANCED)
*	TOP OF FORT THOMPSON FORMATION

Know what's below. Call before you dig.

NO.	DATE	REVISION

amec
AMEC-BCI Engineers & Scientists, Inc.
2000 E. Edgewood Dr. Ste #215, Lakeland, FL 33803
Phone: 863.667.2345 Fax: 863.667.2662
www.amec.com CA-0007867

MIAMI-DADE LIMESTONE PRODUCTS ASSOCIATION
L-31N SEEPAGE BARRIER: PHASE 1
L-31N LEVEE
BORING LOGS AND WALL DETAIL
MIAMI-DADE COUNTY, FLORIDA

DATE: October 11, 2011
DRAWN BY: MAJ
CHECKED BY: LGB
PROJECT NO.: 16059

LELSIE G. BROMWELL, P.E.
FLA. REG. NO. 18234

DATE:

REFER TO INDEX FOR TOTAL SHEETS INCLUDED.
SHEET – 13

ANNEX G4. CEPP PIR FLOW EASEMENT BASIN (FEB) PRELIMINARY SEEPAGE ANALYSIS

Geotechnical Seepage Analysis CEPP Flow Easement Basin (FEB)

1. General. This section is a description of the geotechnical seepage analysis performed for the Flow Equalization Basin (FEB) feature associated with the Central Everglades Protection Project (CEPP). The FEB is situated in South Florida and lies south of the Bolles Canal, north of Levee L-5, east of the Miami Canal (L-23) and west of the EAA project. It is to be bordered to the east by the STA3/4 Inflow Canal and to the South by the STA3/4 Supply Canal. The proposed FEB footprint is indicated in Figure G-1.

2. Regional Geology. The regional geologic conditions of the proposed FEB are varied in this area (see Figure G-1). Along the southern boundary near L-5, and the Miami Canal to the west, recent fill materials consisting of poorly graded gravel, sand, silt, and minor amounts of shells vary in thickness from 0.5 foot to 6 feet thick. This fill material extends to other canal areas of Broward County. Below this fill material and throughout most of the surficial cover of northern Broward County, Quaternary shelly-sediments of the Plio-Pleistocene age prevail. The shelly sediments consist of mollusk bearing sediments (sands and carbonates) (P. Schweitzer, 2010). These conditions may also be marginally applicable to the FEB site in Palm Beach County as well.

Below these sediments is the Miami Limestone (Pleistocene) which represents the upper portion of the well-known Biscayne Aquifer. Thickness of the Biscayne Aquifer varies considerably from 10 feet in the northwest end of the county to 240 feet by Ft. Lauderdale which is situated in eastern Broward County (U.S. Geological Survey, 1970); however, the Miami Limestone's maximum thickness is 40 feet toward the coast (U.S. Army of Corps of Engineers, 2011). The Miami Limestone consists of two facies (P. Schweitzer, 2010): an oolitic facies of white to orangish gray, poorly to moderately indurated, sandy, oolitic limestone with scattered concentrations of fossils and a bryozoan facies of white to orangish gray, poorly to well-indurated, sandy, fossiliferous limestone.

The Ft. Thompson Formation represents the base of the Biscayne Aquifer. It is over 200 feet thick in eastern Palm Beach County. This unit consists of alternating beds of marine, brackish and freshwater limestones. The hydraulic conductivity of this formation averages 40,000 feet per day (U.S. Army Corps of Engineers, 2011).

Groundwater within the Biscayne Aquifer is at or near the ground surface and is generally undulating conforming to the topography. The water table commonly slopes eastward toward the coast, except in the Everglades, where it slopes southward. The groundwater table normally lies within the Miami Limestone or organic soils of recent age. Water table fluctuations are heavily influenced by seasonal rainfall, natural discharge, and pumping.

3. Local Geology. The local geology of the FEB feature begins at the surface with peaty material (peaty clay and/or organic sand), generally with an average thickness of 5-8 feet. Below that are undifferentiated layers of sandy, clayey materials of marginal thickness. Below these are consolidated and unconsolidated sediments of the Ft. Thompson formation. The Ft. Thompson limestone is pitted to vuggy with quartz sand-filled voids. The thickness of the Ft. Thompson limestone in this area is indeterminable at this time due to sparse subsurface exploration data.

Underlying the Ft. Thompson formation is the Caloosahatchee Marl which consists of shelly sands and shell marls. Below this formation is the Tamiami Formation which has a maximum depth of 65 feet to the top of the formation. This is the base of the unconfined water-table aquifer (Schroeder et al, 1954). Within the FEB, the majority of the surficial soils are Histosols which includes Everglades peats and Loxahatchee peats (Gleason et al., 1974; Bruland, 2006). According to Gleason et al, 1974, Everglades peats develop on topographic high areas and are comprised of *Cladium* tissue. Everglades peats are typically brown to black with minimal mineral content. Loxahatchee peats are found in topographic low areas and are composed of the remains of the roots and rhizomes of *Nymphea*, a white water lily. Loxahatchee peats have been classified as the Terra Ceia series (Euic, hyperthermic Typic Haplosaprists) (Soil Conservation Service, 1978). The western margin of WCA-3A is mixed marl peats that are derived from the underlying limestone (Brown et al., 1991).

4. Seismicity. South Florida is considered to be one of the most seismically stable locations in the United States (Petersen, Mark D. et. al, 2008). Historically, only minor shocks have occurred, with only one that resulted in damage. Additional shocks of suspect origin have been recorded that were felt in the Everglades area. The three Florida shocks of doubtful seismic origin rumbled through the Everglades, La Belle/Fort Myers area in July 1930, Tampa in December 1940, and the Miami/Everglades/Fort Myers area in January 1942. Most authorities attributed these incidents to blasting, but a few contend that they were seismic.

ER 1110-2-1806, (1995) indicates that South Florida is in Seismic Zone 0 (areas with least potential for seismic activity). Since no capable faults or recent earthquake epicenters are known to exist near the project site, the possibility of accelerations at the site approaching that required to induce liquefaction of the subsurface is remote. However, since this is a planned permanent impoundment and the underlying soils contain loose sand and silt granular material, a liquefaction screening evaluation will be conducted in accordance with CERP Design Criteria Memorandum No. 6. This screening will be conducted once the geotechnical investigations are completed.

5. Existing Project Data. There is only a sparse amount of subsurface geotechnical data available for the FEB. Existing subsurface used to develop the eastern dike seepage analysis cross section was taken from the EAA Reservoir A-1 Geotechnical Data Report of March 2006. A core boring and recharge test was also taken within the reservoir area with the core boring log CP02-EAARS-CB-0002 presented in Appendix G-1. This information was obtained from Report No. 02-042, Ardaman and Associates, 2003. To evaluate the seepage on the west side of the FEB, C & SF Part I Agricultural and Conservation Areas, Supplement 1 – Geology and Soils, December, 1951 provided geologic cross sections that provide subsurface information for the north and west sides of the proposed FEB impoundment. The western boundary subsurface profile can be approximately defined by Figure G-2 along L-23 from sta. 0+00 to sta. 600+00. The northern subsurface boundary of the FEB can be approximated by the cross sections taken along L -22 shown on Figures G-3 and G-4 from sta. 532+18 to sta. 0+00.

6. Seepage Model. The seepage analysis was performed on two sections of the proposed perimeter levee and canal system. The models consist of one typical section for the east dike and one of the west dike. A copy of the idealized geometry and water surface elevations used in the seepage analysis are shown on Figures G-5 and G-6. The computational tool used to model the seepage for the east and west cross sections was the two dimensional finite element program SEEP/W. The east and west SEEP/W representations of the input model are shown on Figures G-7 and G-8. Layers and hydraulic input parameters used in the SEEP/W cross sections are provided in Tables G-1 and G-2. The impoundment water level was kept at el. 10.0 ft with tailwater at the dike toe at elevation 6.0 ft.

The subsurface characterization for the model was conducted using an idealized geologic profile utilized for the EAA project immediately east of the project feature site. Due to the extremely limited geotechnical exploration data in the area of the FEB footprint, the modeled results presented provide only a tentative estimate of seepage quantities. The western cross section model was based on a recharge test at location RT-2 near core boring CP02-EAARS-CB-0002. This boring, which is located in the middle of the proposed reservoir, was performed in the 2003 geotechnical exploration program for the EAA and as described by Report No. 02-042, Ardaman and Associates, 2003. Other subsurface information used for development of the west section model was the C & SF Part I Agricultural and Conservation Areas, Supplement 1 – Geology and Soils, December, 1951 and C & SF Part I Agricultural and Conservation Areas, Supplement 7 – Permeability Investigations by Well Pumping Tests, February, 1953, and Report of Investigations No. 13 (RI-13), Water Resources of Palm Beach County, Florida, 1954.

Table G-1. Eastern Seepage Model Cross Section Material Properties

Layer	Elevation Extent (feet)	Kx, Horizontal Hydraulic Conductivity (fpd)	Anisotropy Ratio, Ky/Kx
Dike Sand	EL. 15.0->EL. 6.0	3.0	1.0
Caprock Limestone	EL. 6.0->EL.3.0	100	0.1
Upper Okeechobee-Upper Limestone	EL. 3.0-> -13.0	60	0.42
Upper Okeechobee-Lower Limestone	EL. -13.0 ->-24.0	200	0.375
Lower Okeechobee-Upper Sands	EL. -24.0 ->-56.2	250	0.5
Tamiami Formation	EL. -56.20 ->-89.9	36	0.5

Table G-2. Western Seepage Model Cross Section Material Properties

Layer	Elevation Extent (feet)	Kx, Horizontal Hydraulic Conductivity (fpd)	Anisotropy Ratio, Ky/Kx
Dike Sand	EL. 15.0->EL. 6.0	3.0	1.0
Caprock Limestone	EL. 6.0->EL.3.0	283	0.1
Upper Okeechobee-Upper Limestone	EL. 3.0-> -13.0	72	0.42
Upper Okeechobee-Lower Limestone	EL. -13.0 ->-24.0	200	0.375
Lower Okeechobee-Upper Sands	EL. -24.0 ->-56.2	250	0.5
Tamiami Formation	EL. -56.20 ->-89.9	36	0.5

The regional hydrogeologic features of the project feature area show the surficial aquifer of sand, shell and limestone tends to thicken from the western boundary at Hendry County to the eastern edge of Palm Beach County. However, from north to south, the surficial aquifer top limestone beds thicken somewhat from Lake Okeechobee to about five miles south where they become more uniform in thickness. Supplement 1 (1951) indicates the presence of cavities in the top layers of the limestone in selected borings from 1-3 feet in thickness. These, however, do not seem to be continuous, at least along the line of borings. These features may have a profound effect on the hydraulic conductivity of the subsurface strata on the west side of the reservoir. To compensate for this, the hydraulic conductivities for the east section model were increased by 20% to account for a roughly 5.2% increase in porosity over the strata matrix hydraulic conductivity values. The caprock permeability in the west section model was increased from 100 ft/day to 283 ft/day based on results of the recharge test of Report No. 02-042 (2003).

The resulting seepage quantity for the east section was 320 cubic feet/day/ft of levee, and for the west section the seepage quantity was 387 cubic feet/day/ft of levee.

7. Future Geotechnical Investigations. The seepage quantities presented for the FEB are tentative estimates. As they are a basis for the project estimate, the subsurface materials need to be characterized by a geotechnical exploration and laboratory testing program. There is a very real possibility that previous core borings did not pick up key flow channels within the underlying limerock layers and these could be so conducive to flow that they will control the seepage losses for the reservoir. In addition, laminar flow assumptions used in the Darcy's Law based models may not be applicable in some areas. Scaled test sections at the adjacent EAA project show that maintaining an operating reservoir head level over an extended period of time may be difficult without seepage control systems such as cutoff walls or reservoir bottom treatment. Furthermore, there is a potential for piping of embankment material if there are cavities and natural pipes in the levee foundation. A comprehensive geotechnical exploration program featuring components such as reservoir foundation clearing and mapping along with geophysical testing, full-scale pump testing

along with design stage core boring exploration and geotechnical laboratory testing will be required. It is recommended to begin planning for such investigations as expeditiously as possible.

8. Borrow Materials. Sands from the proposed existing borrow from the exterior canal can be used as dike fill material. Whether they can be used without processing of limestone rock fragments is to be determined. With removal of organic surficial soils, dike foundation bearing and tolerable settlement levels are anticipated.

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Nodarse and Associates, 2000, Stormwater Treatment Area No. 3 and 4 East WCA-3A Hydropattern Restoration L-5 Canal, Boring Profiles.

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U.S. Geological Survey, 1970, Groundwater Atlas of the United States, Alabama, Florida, Georgia, and South Carolina HA730-G.

Figure G-1. Aerial Photograph of Project Site

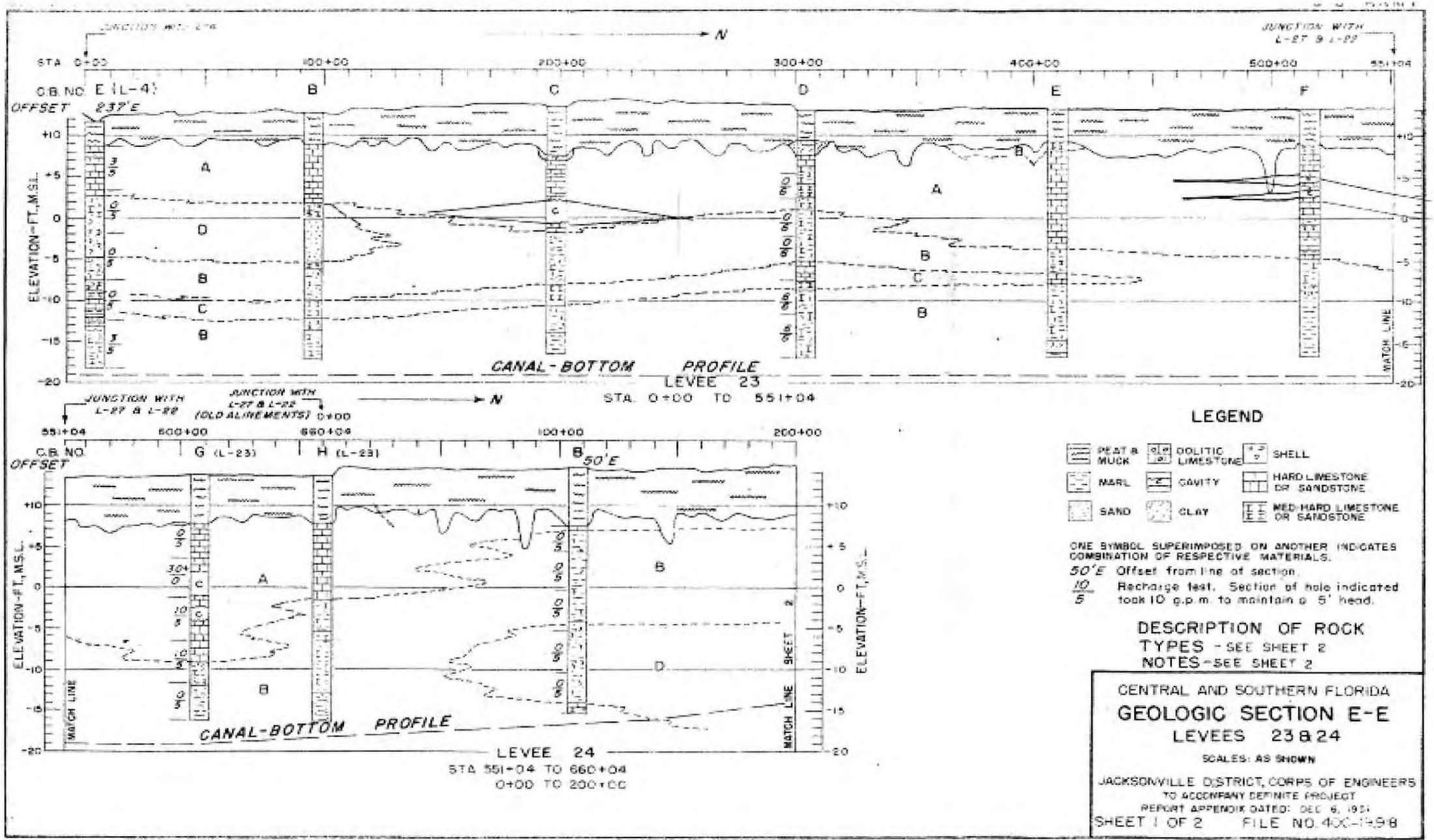

Figure G-2. Geologic Section L-23 & L-24

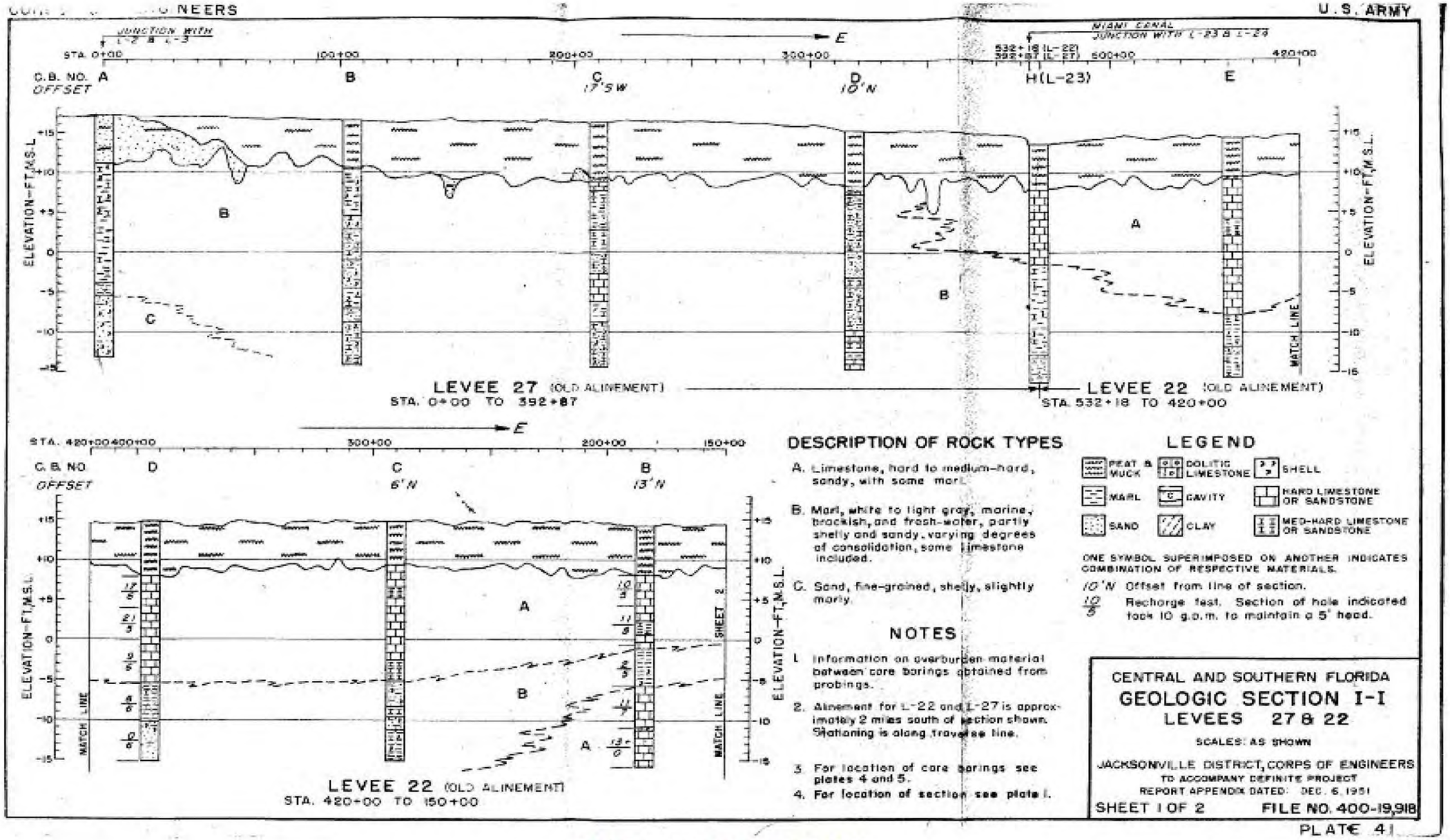

Figure G-3. Geologic Section L-27 & L-22

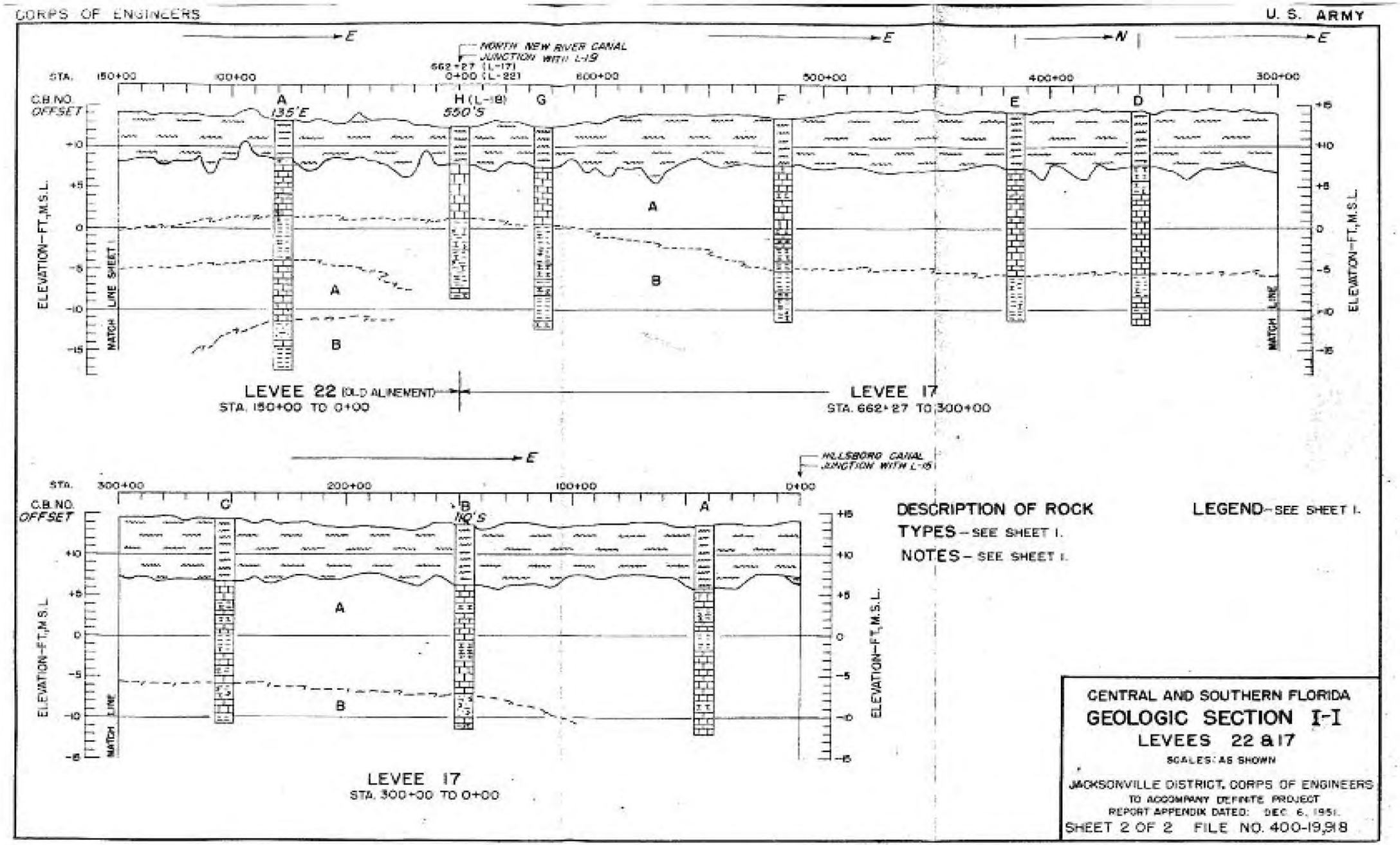

Figure G-4. Geologic Section L-22 & L-17

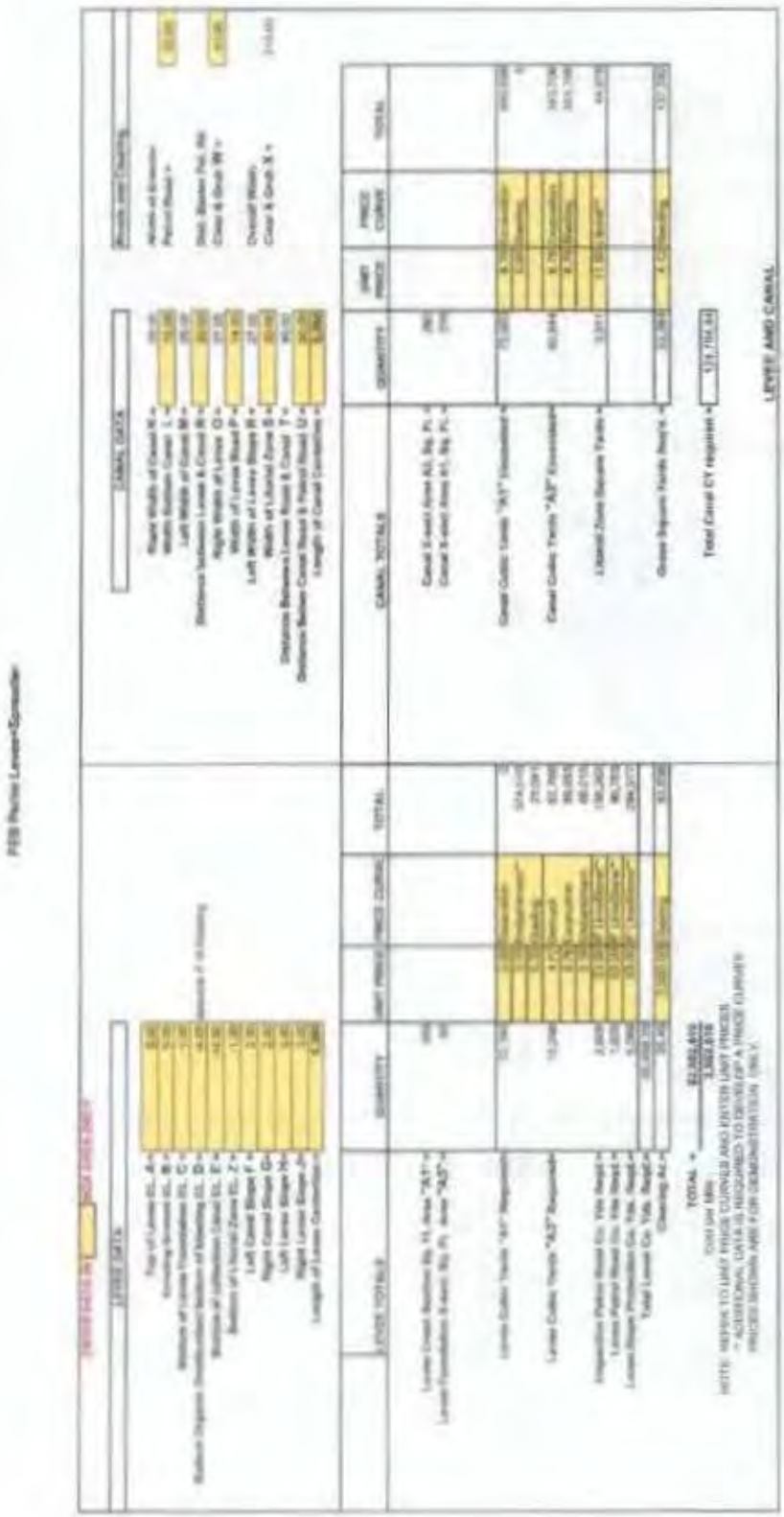

Figure G-5. FEB Seepage Model Input Data

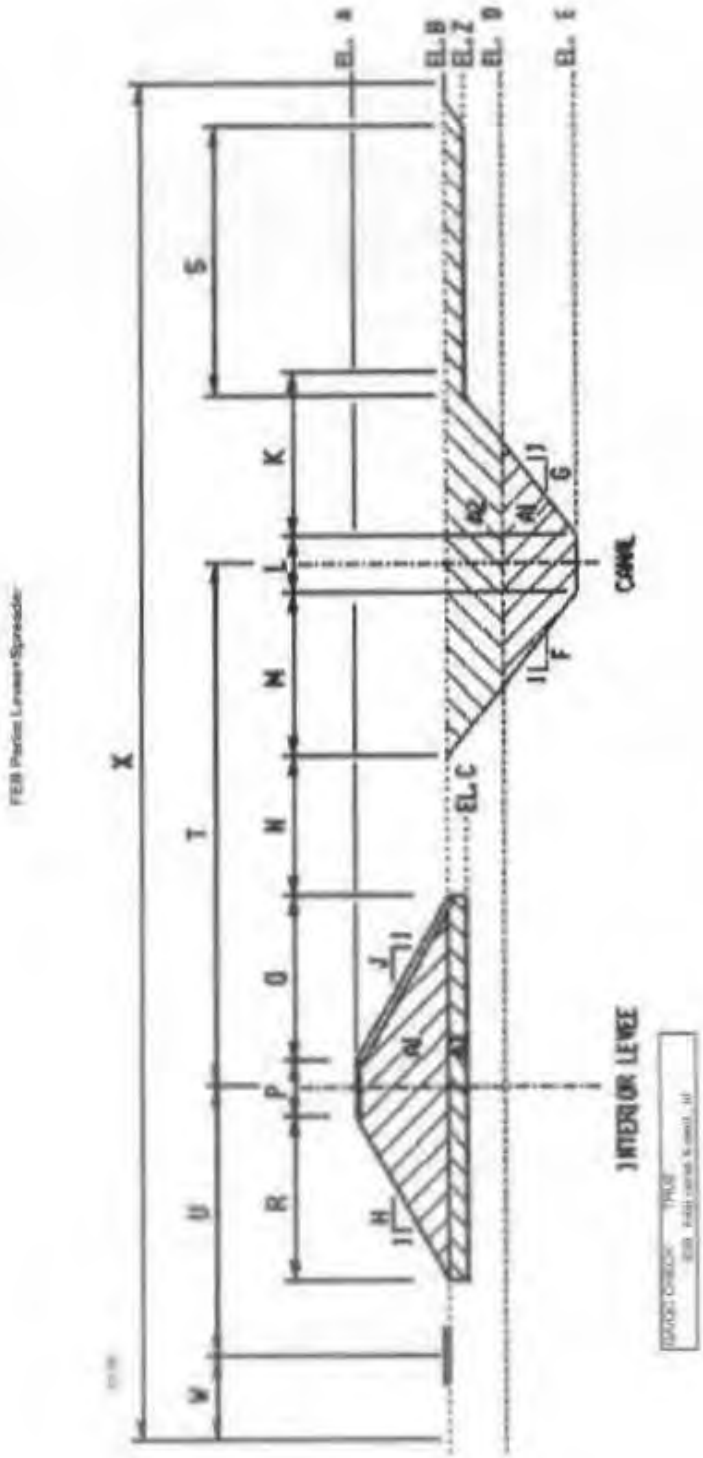

Figure G-6. FEB Seepage Model Idealized Cross Section Geometry

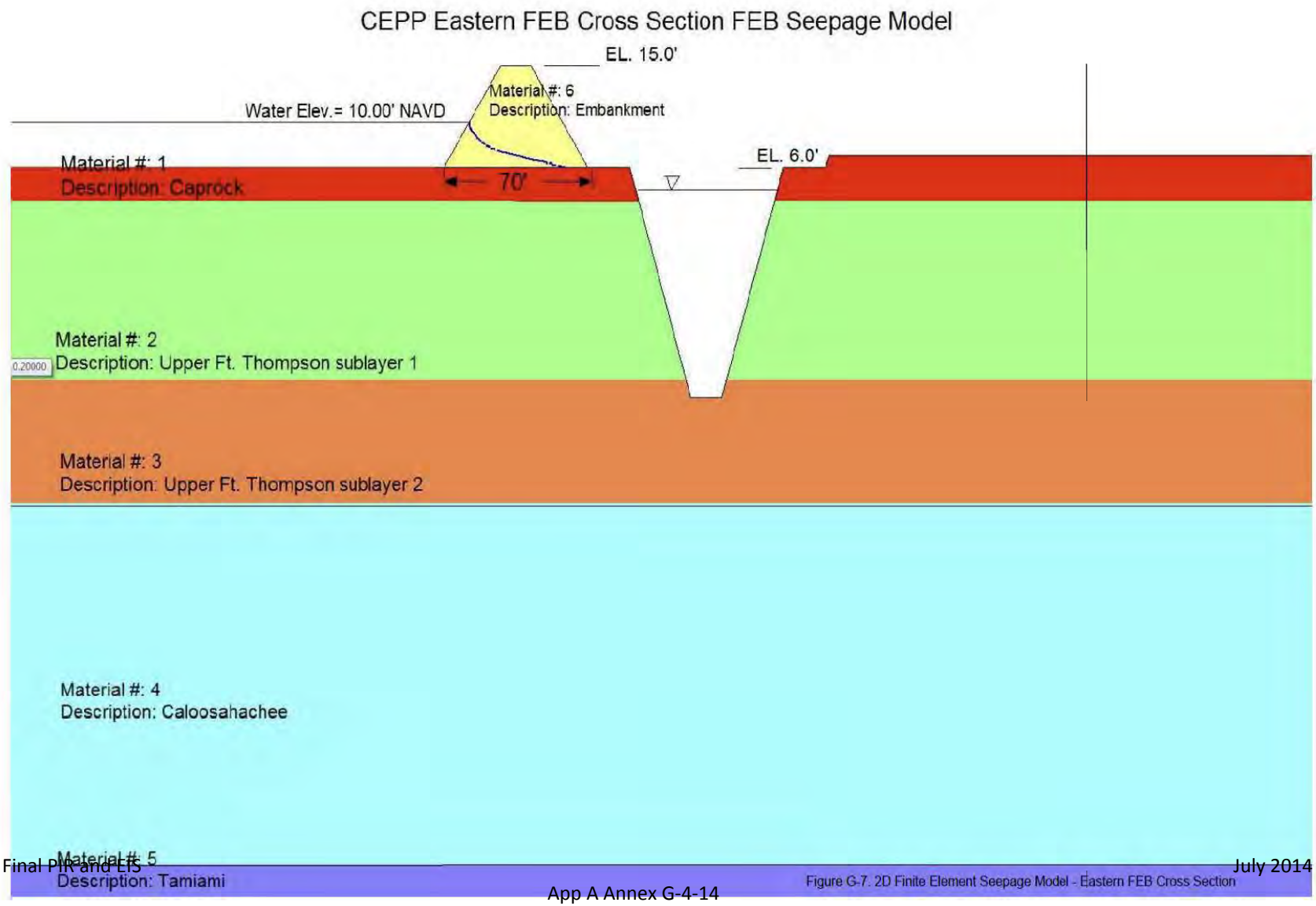

Figure G-7. 2D Finite Element Seepage Model - Eastern FEB Cross Section

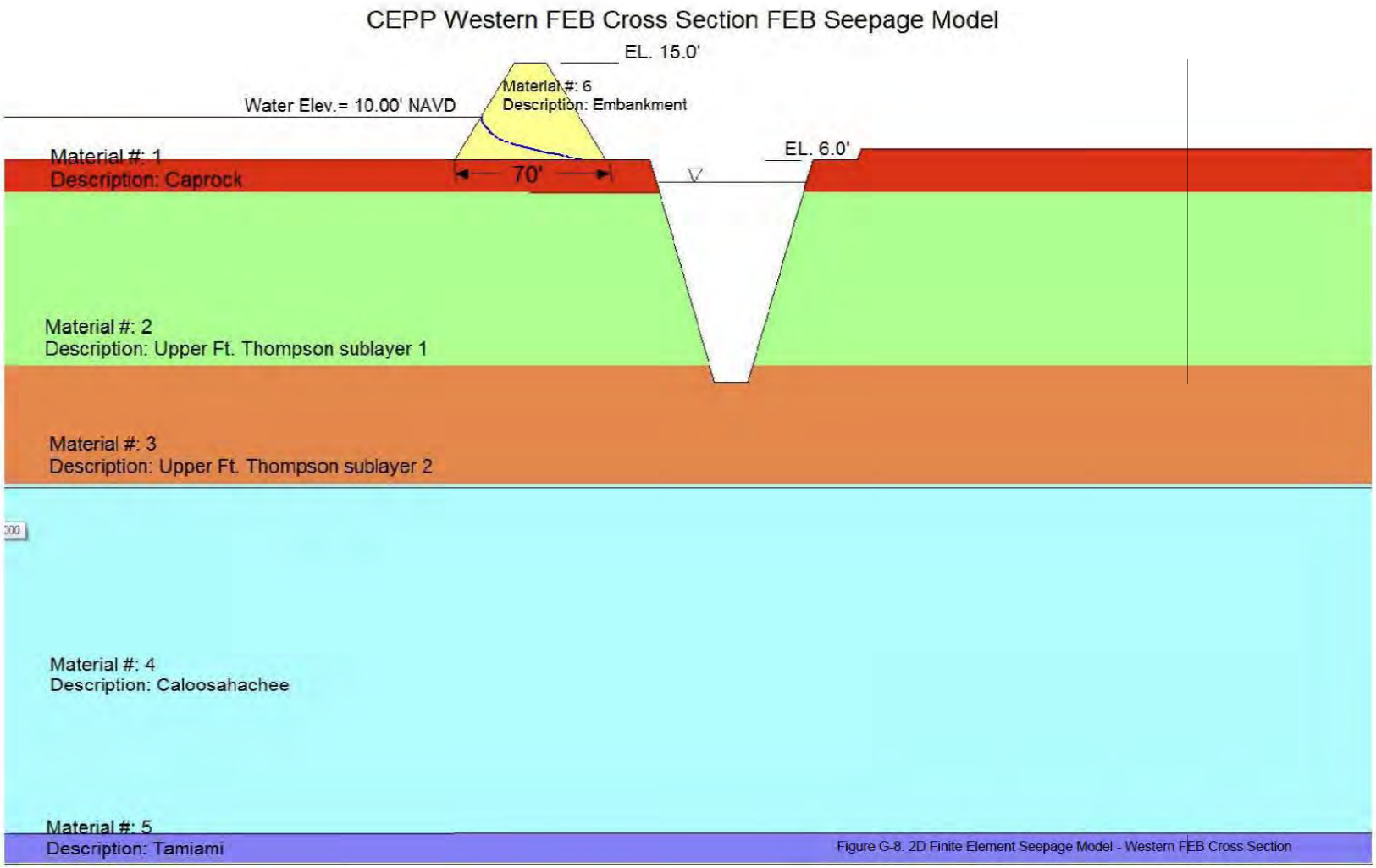

Figure G-8. 2D Finite Element Seepage Model - Western FEB Cross Section

APPENDIX G

CORE BORING

CP02-EAARS-CB-0002

Boring Designation CP02-EAARS-CB-0002

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 10 SHEETS

1. PROJECT: CERP Everglades Agricultural Area Reservoirs, Phase 1, Effort 1, Compartment A	9. SIZE AND TYPE OF BIT: See Remarks
	10. COORDINATE SYSTEM/DATUM: State Plane, FLE; HORIZONTAL: NAD83; VERTICAL: NAVD88
2. BORING DESIGNATION: CP02-EAARS-CB-0002; LOCATION COORDINATES: X = 736,775 Y = 775,528	11. MANUFACTURER'S DESIGNATION OF DRILL: CME-55; ☐ AUTO HAMMER ☒ MANUAL HAMMER
3. DRILLING AGENCY: Ardaman & Associates, Inc.; CONTRACTOR FILE NO.: 02-042	12. TOTAL SAMPLES: DISTURBED 118; UNDISTURBED (UD) 0
4. NAME OF DRILLER: M. Gulick	13. TOTAL NUMBER CORE BOXES: 5
5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED; DEG. FROM VERTICAL; BEARING	14. ELEVATION GROUND WATER: Not Determined
	15. DATE BORING: STARTED 08-13-02; COMPLETED 09-03-02
6. THICKNESS OF OVERBURDEN: 5.4 Ft.	16. ELEVATION TOP OF BORING: 12.0 Ft.
7. DEPTH DRILLED INTO ROCK: 13.5 Ft.	17. TOTAL RECOVERY FOR BORING: 80 %
8. TOTAL DEPTH OF BORING: 180.0 Ft.	18. SIGNATURE AND TITLE OF INSPECTOR: H. Snyder, Civil Engineer

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR CORE	REMARKS	BLOWS/0.5 FT.	N-VALUE
12.0	0.0						12.0		
			FILL, gravelly, mixture of fine gravel size limestone, fine to coarse grained limestone sand, and silt, dry, light gray	13	1		SPT Sampler	32 / 32 / 8	40
							10.4		
				40	2		SPT Sampler	4 / 6 / 6	12
9.0	3.0						9.0		
8.8	3.2		SAND, silty, mostly fine-grained, some silt, dry, dark brown (SM)						
			Limestone, hard, slightly weathered, medium-grained, porous to pitted, light gray-green	47	3		SPT Sampler	1 / 2 / 4	6
							7.4		
				100	4		SPT Sampler	16 / 50/0.4'	
							6.6		
5.0	7.0		Limestone, moderately hard	50	6 BOX 1	RQD 28	4 x 5-1/2" Diamond Impregnated Bit DT = 80 mins HP = 100 psi		
		Slightly Weathered					2.0		
				100	7	RQD 0	4 x 5-1/2" Diamond Impregnated Bit 9 mins, 100 psi		
							0.9		
				80	8		SPT Sampler	4 / 4 / 29	33
							-0.6		
				50	9		-1.0 SPT Sampler	50/0.4'	
				45	BOX 10	RQD 39	4 x 5-1/2" Diamond Impregnated Bit DT = 23 mins HP = 100 psi		

SAJ FORM 1836
JUN 02

(Continued)

G-1

Boring Designation CP02-EAARS-CB-0002

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District	SHEET 2 OF 10 SHEETS
PROJECT: CERP Everglades Agricultural Area Reservoirs	COORDINATE SYSTEM/DATUM: State Plane, FLE	HORIZONTAL: NAD83 / VERTICAL: NAVD88
LOCATION COORDINATES: X = 736,775 Y = 775,528	ELEVATION TOP OF BORING: 12.0 Ft	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR SPT	REMARKS	BLOWS/0.5 FT.	N-VALUE
-4.0	16.0		At El. -3.0 Ft., vuggy	45	BOX 1	RQD 39	4 x 5-1/2" Diamond Impregnated Bit DT = 23 mins HP = 100 psi (-4.0)		
			Limestone, hard, unweathered, fine-grained, vuggy, trace of shell, gray	NR	11		(-4.2) SPT Sampler	50/0.2'	
				84	BOX 1	RQD 50	4 x 5-1/2" Diamond Impregnated Bit DT = 15 mins HP = 100 psi (-8.0)		
				70	BOX 2	RQD 40	4 x 5-1/2" Diamond Impregnated Bit 8 mins. 100 psi (-9.6)		
			At El. -9.0 Ft., little shell	33	14		SPT Sampler (-10.6)	5, 7, 8	15
			At El. -10.6 Ft., trace silt	47	15		SPT Sampler (-12.0)	7, 9, 10	19
-12.0	24.0								
			SAND, poorly-graded with silt, some angular fine-grained quartz, some fine-grained limestone, little angular shell, trace phosphate, light brown (SP-SM)	47	16		SPT Sampler (-13.6)	7, 10, 11	21
				47	17		SPT Sampler (-15.0)	11, 10, 11	21
-15.0	27.0								
			SAND, silty, mostly fine-grained quartz, trace angular fine-grained shell, trace clay, trace phosphate, light gray (SM)	73	18		SPT Sampler (-16.6)	8, 9, 9	18
			At El. -17.0 Ft., little clay	87	19		SPT Sampler (-18.0)	7, 6, 6	12
				87	20		SPT Sampler (-19.6)	6, 5, 5	10
-19.6	31.5								
			SAND, poorly-graded with silt, mostly fine-grained quartz, little shell, few silt, light brown (SP-SM)	73	21		SPT Sampler (-21.0)	8, 8, 12	20
				73	22		SPT Sampler (-22.6)	10, 11, 13	24
-22.6	34.5								
			SAND, poorly-graded, mostly fine to	75	23		SPT Sampler	11	

SAJ FORM 1836-A
JUN 02

(Continued)

G-2

Boring Designation CP02-EAARS-CB-0002

DRILLING LOG (Cont. Sheet)	INSTALLATION Jacksonville District	SHEET 3 OF 10 SHEETS
PROJECT CERP Everglades Agricultural Area Reservoirs	COORDINATE SYSTEM/DATUM State Plane, FLE	HORIZONTAL NAD83 / VERTICAL NAVD88
LOCATION COORDINATES X = 736,775 Y = 775,528	ELEVATION TOP OF BORING 12.0 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
			medium-grained quartz, some angular fine to medium-grained shell, few phosphate, trace silt, light brown to light gray (SP)	75	23		SPT Sampler	11 / 11	22
			At El. -24.0 Ft., trace shell, trace of shell	93	24		SPT Sampler	6 / 7 / 8	15
				67	25		SPT Sampler	3 / 5 / 5	10
				67	26		SPT Sampler	4 / 6 / 7	13
				73	27		SPT Sampler	5 / 5 / 7	12
			At El. -30.0 Ft., trace fine gravel-sized shell	60	28		SPT Sampler	5 / 6 / 7	13
				93	29		SPT Sampler	7 / 4 / 7	11
				80	30		SPT Sampler	10 / 6 / 6	16
			At El. -34.6 Ft., trace fine gravel-sized limestone	93	31		SPT Sampler	10 / 8 / 11	19
-36.6	48.5								
			Limestone, hard, fine-grained, trace of silt, few fine grained sand, trace of clay, gray	93	32		SPT Sampler	9 / 29 / 34	63
				53	33		SPT Sampler	14 / 6 / 9	15
-39.0	51.0								
			SAND, poorly-graded, mostly fine-grained shell, trace coarse gravel-sized phosphate, trace clay, gray (SP)	80	34		SPT Sampler	4 / 5 / 6	11
			From El. -40.6 to -45.0 Ft., mostly medium to coarse-grained shell, trace fine gravel-sized shell, trace clay, light brown	73	35		SPT Sampler	11 / 19 / 26	45
				87	36		SPT Sampler	17 / 20	

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(Continued)

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Boring Designation CP02-EAARS-CB-0002

DRILLING LOG (Cont. Sheet)	INSTALLATION Jacksonville District	SHEET 4 OF 10 SHEETS
PROJECT CERP Everglades Agricultural Area Reservoirs	COORDINATE SYSTEM/DATUM State Plane, FLE	HORIZONTAL NAD83 / VERTICAL NAVD88
LOCATION COORDINATES X = 736,775 Y = 775,528	ELEVATION TOP OF BORING 12.0 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR CORE	REMARKS	BLOWS/ 6" S.P.T.	N-VALUE
				87	36		-43.6 SPT Sampler	19	39
				87	37		SPT Sampler	15 / 19 / 22	41
-45.0	57.0						-45.0		
			SAND, poorly-graded with clay, mostly medium-grained sand, little clay, little angular shell, trace fine gravel-sized shell, gray (SP-SC)	100	38		SPT Sampler	12 / 16 / 13	29
							-46.6		
			At El. -47.0 Ft., few shell, trace clay	60	39		SPT Sampler	14 / 17 / 19	36
							-48.0		
				93	40		SPT Sampler	10 / 14 / 14	28
-49.6	61.5						-49.6		
			SAND, clayey, mostly fine to medium-grained sand, some clay, little fine gravel-sized shell, gray (SC)	87	41		SPT Sampler	10 / 19 / 31	50
							-51.0		
				93	42		SPT Sampler	10 / 13 / 12	25
							-52.6		
			At El. -52.6 Ft., some shell, trace clay, lens of clay	73	43		SPT Sampler	13 / 13 / 20	33
							-54.0		
				100	44		SPT Sampler	10 / 11 / 11	22
-55.6	67.5						-55.6		
			SAND, poorly-graded with clay, mostly shell (SP-SC)	67	45		SPT Sampler	10 / 12 / 16	28
							-57.0		
				93	46		SPT Sampler	16 / 14 / 12	26
							-58.6		
				53	47		SPT Sampler	11 / 12 / 16	28
							-60.0		
				67	48		SPT Sampler	18 / 14 / 19	33
			At El. -61.6 Ft., mostly shell				-61.6		
				87	49		SPT Sampler	6 / 12 / 15	27
							-63.0		

55 60 65 70 75

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(Continued)

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Boring Designation CP02-EAARS-CB-0002

DRILLING LOG (Cont. Sheet)	INSTALLATION Jacksonville District	SHEET 6 OF 10 SHEETS
PROJECT CERP Everglades Agricultural Area Reservoirs	COORDINATE SYSTEM/DATUM State Plane, FLE	HORIZONTAL NAD83 / VERTICAL NAVD88
LOCATION COORDINATES X = 736,775 Y = 775,528	ELEVATION TOP OF BORING 12.0 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR CORE	REMARKS	BLOWS/0.5 FT.	N-VALUE
-63.8	75.7								
			Limestone, fine-grained, trace of clay, trace of phosphate, gray	93	50		SPT Sampler	20 / 18 / 18	36
							-64.6		
				53	51		SPT Sampler	14 / 16 / 17	33
-66.0	78.0						-66.0		
			SAND, poorly-graded, mostly fine to medium-grained quartz, trace sandstone, trace shell, light gray (SP)	67	52		SPT Sampler	10 / 40 / 45	85
							-67.6		
				67	53		SPT Sampler	26 / 32 / 49	81
							-69.0		
				100	54		SPT Sampler	36 / 65 / 57	122
							-70.6		
				87	55		SPT Sampler	10 / 14 / 20	34
							-72.0		
				93	56		SPT Sampler	14 / 28 / 29	57
							-73.6		
				53	57		SPT Sampler	14 / 17	
							-75.0		
				87	59		SPT Sampler	8 / 18 / 29	47
							-76.6		
				87	60		SPT Sampler	24 / 34 / 42	76
							-78.0		
				73	61		SPT Sampler	9 / 18 / 20	38
							-79.6		
			From El. -79.6 to -80.6 Ft., mostly coarse-grained quartz, trace phosphate, trace shell, trace sandstone, light gray	93	62		SPT Sampler	4 / 10 / 6	16
-80.6	92.5						-81.0		
			SAND, clayey, mostly medium to coarse-grained sand, some clay, trace phosphate, trace shell, gray (SC)	100	63		SPT Sampler	5 / 7 / 12	19
			At El. -82.0 Ft., trace sand						
							-82.6		
			At El. -82.6 Ft., little shell, little limestone	100	64		SPT Sampler	3	

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(Continued)

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Boring Designation CP02-EAARS-CB-0002

DRILLING LOG (Cont. Sheet)	INSTALLATION Jacksonville District	SHEET 6 OF 10 SHEETS
PROJECT CERP Everglades Agricultural Area Reservoirs	COORDINATE SYSTEM/DATUM State Plane, FLE	HORIZONTAL NAD83 / VERTICAL NAVD88
LOCATION COORDINATES X = 736,775 Y = 775,528	ELEVATION TOP OF BORING 12.0 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	REC. %	BOX OR SAMPLE	RQD OR CD	REMARKS	BLOWS/0.5 FT.	N-VALUE
				100	64		SPT Sampler -84.0	9 / 7	16
			At El. -84.0 Ft., trace sand	100	65		SPT Sampler -85.6	10 / 8 / 9	17
			At El. -86.0 Ft., trace limestone	87	66		SPT Sampler -87.0	18 / 21 / 26	47
			At El. -87.0 Ft., some shell	67	67		SPT Sampler -88.6	12 / 22 / 29	51
-88.6	100.5		SAND, clayey, mostly fine to coarse-grained sand, some clay, few shell, trace phosphate, gray (SC)	100	68		SPT Sampler -90.0	14 / 9 / 14	23
-90.0	102.0		Sandstone, fine-grained, few shell, trace of clay, trace of phosphate, gray	67	69		SPT Sampler -91.6	5 / 16 / 20	36
				100	70		SPT Sampler -93.0	17 / 16 / 17	33
				87	71		SPT Sampler -94.6	9 / 17 / 19	36
				67	72		SPT Sampler -96.0	3 / 19 / 30	49
				73	73		SPT Sampler -97.6	19 / 19 / 23	42
			At El. -98.0 Ft., few clay	93	74		SPT Sampler -99.0	24 / 21 / 22	43
				93	75		SPT Sampler -100.6	22 / 24 / 19	43
				93	76		SPT Sampler -102.0	18 / 15 / 20	35
				87	77		SPT Sampler	14 / 16	

95 100 105 110 115

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JUN 02

(Continued)

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Boring Designation: CP02-EAARS-CB-0002

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District	SHEET 7 OF 10 SHEETS
PROJECT: CERP Everglades Agricultural Area Reservoirs	COORDINATE SYSTEM/DATUM: State Plane, FLE	HORIZONTAL: NAD83 / VERTICAL: NAVD88
LOCATION COORDINATES: X = 736,775 Y = 776,528	ELEVATION TOP OF BORING: 12.0 Ft	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	REC.	RQD OR SAMPLE	BLOWS	REMARKS	BLOWS 6"	N-VALUE
				87	77	-103.6	SPT Sampler	17	20
				87	78	-105.0	SPT Sampler	15 / 17 / 14	31
				93	79	-106.6	SPT Sampler	12 / 10 / 11	21
				100	80	-108.0	SPT Sampler	13 / 17 / 16	33
				93	81	-109.6	SPT Sampler	12 / 14 / 18	32
				87	82	-111.0	SPT Sampler	17 / 22 / 17	39
				93	83	-112.6	SPT Sampler	12 / 16 / 16	32
				73	84	-114.0	SPT Sampler	14 / 22 / 19	41
				87	85	-115.6	SPT Sampler	15 / 14 / 13	27
				93	86	-117.0	SPT Sampler	14 / 13 / 13	26
				73	87	-118.6	SPT Sampler	13 / 14 / 10	24
				87	88	-120.0	SPT Sampler	9 / 10 / 15	25
				80	89	-121.6	SPT Sampler	26 / 15 / 16	31
				87	90	-123.0	SPT Sampler	23 / 24 / 18	42

115 120 125 130 135

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Boring Designation CP02-EAARS-CB-0002

DRILLING LOG (Cont. Sheet)	INSTALLATION Jacksonville District	SHEET 8 OF 10 SHEETS
PROJECT CERP Everglades Agricultural Area Reservoirs	COORDINATE SYSTEM/DATUM State Plane, FLE	HORIZONTAL NAD83 / VERTICAL NAVD88
LOCATION COORDINATES X = 736,775 Y = 775,528	ELEVATION TOP OF BORING 12.0 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD CORE	REMARKS	BLOWS/ 6.5 FT.	N-VALUE
				60	91		SPT Sampler	9, 10, 11	21
							-124.6		
				93	92		SPT Sampler	17, 24, 19	43
							-126.0		
				80	93		SPT Sampler	25, 28, 20	48
							-127.6		
				73	94		SPT Sampler	14, 18, 19	37
							-129.0		
				87	95		SPT Sampler	12, 16, 39	55
							-130.6		
-131.0	143.0								
			SAND, poorly-graded, mostly fine to medium-grained quartz, trace phosphate, light gray (SP)	100	96		SPT Sampler	31, 37, 24	61
							-132.0		
				100	97		SPT Sampler	17, 21, 17	38
							-133.6		
				100	98		SPT Sampler	14, 16, 20	36
							-135.0		
				100	99		SPT Sampler	12, 25, 27	52
							-136.6		
				100	100		SPT Sampler	12, 18, 18	36
							-138.0		
				93	101		SPT Sampler	11, 16, 18	34
							-139.6		
				100	102		SPT Sampler	10, 16, 22	38
							-141.0		
				67	103		SPT Sampler	15, 26, 25	51
-142.6	154.5						-142.6		
			Sandstone, fine-grained, some quartz sand.	80	104		SPT Sampler	18	

135 140 145 150 155

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Boring Designation CP02-EAARS-CB-0002

DRILLING LOG (Cont. Sheet)	INSTALLATION Jacksonville District	SHEET 9 OF 10 SHEETS
PROJECT CERP Everglades Agricultural Area Reservoirs	COORDINATE SYSTEM/DATUM State Plane, FLE; HORIZONTAL NAD83	VERTICAL NAVD88
LOCATION COORDINATES X = 736,775 Y = 775,528	ELEVATION TOP OF BORING 12.0 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD GRD	REMARKS	BLOWS/ 0.5 FT.	N VALUE
			few clay, trace shell, trace phosphate, gray At El. -143.0 Ft., few shell	80	104		SPT Sampler -144.0	20 19	39
				93	105		SPT Sampler -145.6	25 22 24	46
			At El. -145.6 Ft., trace clay	100	106		SPT Sampler -147.0	9 17 41	58
				73	107		SPT Sampler -148.6	16 20 20	40
				80	108		SPT Sampler -150.0	15 17 19	36
				80	109		SPT Sampler -151.6	30 20 18	38
				73	110		SPT Sampler -153.0	18 16 21	37
				80	111		SPT Sampler -154.6	14 16 18	34
				80	112		SPT Sampler -156.0	10 18 19	37
				73	113		SPT Sampler -157.6	6 17 14	31
-159.0	171.0			100	114		SPT Sampler -159.0	14 14 16	30
			SAND, poorly-graded, mostly fine to medium-grained quartz, trace fine gravel-sized sandstone, trace phosphate, light gray (SP)	100	115		SPT Sampler -160.6	15 24 19	43
-161.0	173.0								
			Sandstone, medium-grained, some quartz sand, few clay, few shell, trace of phosphate, gray	100	116		SPT Sampler -162.0	14 17 11	28
				87	117		SPT Sampler	24 24	

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Boring Designation: CP02-EAARS-CB-0002

DRILLING LOG (Cont. Sheet)	INSTALLATION: Jacksonville District	SHEET 10 OF 10 SHEETS
PROJECT: CERP Everglades Agricultural Area Reservoirs	COORDINATE SYSTEM/DATUM: State Plane, FLE; HORIZONTAL: NAD83; VERTICAL: NAVD88	
LOCATION COORDINATES: X = 736,775 Y = 775,528	ELEVATION TOP OF BORING: 12.0 Ft.	

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	REC. %	BOX OR SAMPLE NO.	RQD OR GRAD.	REMARKS	BLOWS/0.5 FT.	N-VALUE
				87	117		-163.6 SPT Sampler	18	42
				67	118		SPT Sampler -165.0	16 / 16 / 18	34
				100	119		SPT Sampler -166.6	17 / 18 / 19	37
				100	120		SPT Sampler -168.0	25 / 26 / 29	55
-168.0	180.0								

NOTES:

1. Soils are field visually classified in accordance with the Unified Soils Classification System.

2. Laboratory Testing Results

SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION
119	177.0/178.5	*

*Lab visual classification based on gradation curve. No Atterberg limits.

3. Additional Laboratory Testing

119 Moisture Content

140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.)

Abbreviations:
NR = Not Recorded
DT = Drill Time
HP = Hydraulic Pressure

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